DESIGN OF PORTABLE ROTARY DRILL SET UP AND DEVELOPMENT OF MATHEMATICAL MODEL FOR ESTIMATING PHYSICO-MECHANICAL PROPERTIES OF IGNEOUS ROCKS THROUGH NOISE MEASUREMENT

Thesis

Submitted in partial fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

by

MASOOD

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D E C L A R A T I O N

by the

Ph. D. RESEARCH SCHOLAR

I hereby declare that the Research Thesis entitled "**Development of Mathematical Models for Determining Physical Properties of Igneous Rocks Through Noise Measurement using Fabricated Portable Drill"** which is being submitted to the **National Institute of Technology Karnataka, Surathkal** in partial fulfillment of the requirements for the award of the Degree of **Doctor of Philosophy** in Mining Engineering is a bonafide report of the research work carried out by me. The material contained in this Research Thesis has not been submitted to any University or Institution for the award of any degree.

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CERTIFICATE

This is certify that theResearchThesisentitled**“Design of Portable Rotary Drill Setup and Development of Mathematical Model for Estimating Physico-Mechanical Properties of Igneous Rocks Through Noise Measurement”** submitted by Masood (Registration No. MN09F01) as the record of the research work carriedoutbyhim, is accepted as the Research Thesissubmission in partial fulfillment of the requirementsfortheaward of degree of Doctorof Philosophy.

Research Guides

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ABSTRACT

The process of drilling is invariably associated with noise as a by-product. Scientists and engineers worldwide have widely used acoustic signatures from mechanical equipment’s to detect fault in a system. However, the application of sound in determining rock properties is limited. In the past few years, research in the area of predicting rock properties using sound level produced during drilling has been reported by various investigators. However, the equipment used by the earlier investigators was a jack hammer drill which itself was a high noise generating unit and it was believed that the noise from the drilling unit itself might be affecting the results of sound level during measurement. Further, the CNC machine used by the earlier investigators was rarely used in mines. Added to that, the cost of the machine was also high.

In view of the above, it is felt necessary to fabricate a low cost and low noise generating drilling unit for the purpose of estimating rock properties. Hence the primary focus of this research work is development and fabrication of a portable, cost effective, rotary drilling set-up for drilling in rocks of varying physico-mechanical properties. Further, development of general prediction mathematical models for different physico-mechanical properties of igneous rock using statistical methods is also one of the component of the research work.The purpose of this research work is to design and fabricate a low cost and low noise producing drilling setup which will be very useful in the estimation of rock properties using sound level produced during drilling. The developed models based on the results of laboratory studies, clearly indicate the prediction of the physico-mechanical properties of igneous rocks with acceptable degree of accuracy using this designed drill setup.

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NOTATIONS

L_{eq}	Equivalent sound level
ρ	Density
V_p	P-wave velocity
n	Porosity
R^2	correlation coefficient or regression coefficient
β	Unknown Parameter
X	independent variables
Y	dependent variable
f	Response Variable
A	Drill bit diameter
B	Drill bit speed
C	Thrust
D	A-weighted Equivalent sound level
k	The number of model parameter
n	The Number of scenarios
x_i	Independent process variable
b_i	Linear effect of x_i
b_{ij}	Quadratic Effect of x_i
ε	Fitting error in multiple regression model
R_2	Coefficient of determination

NOMENCLATURE

ISRM	International Society for Rock Mechanics
UCS	Uni-axial Compressive Strength
AE	Acoustic Emission
IJMME	International Journal of Mining & Mineral Engineering
RMRE	Rocks Mechanics & Rock Engineering
MLP	Multi Layer Perceptron
RBF	Radial Basis Function
SRN	Schmidt Rebound Number
TS	Tensile Strength
E	Elasticity
ANN	Artificial Neural Network
SV	Sound Velocity
SRN	Schmidt Rebound Number
RPM	Revolution Per Minute
ANOVA	Analysis of Variance
MSE	Mean Square Error
MS	Mean Square
DF	Degrees of Freedom
SS	Sum of Squares
VAF	Values Account For
RMSE	Root Mean Square Error
MAPE	Mean Absolute Percentage Error

CHAPTER 1

1.0 INTRODUCTION

Drilling in rock/strata of any type invariably produces noise as a by-product. Particularly in hard rocks, jackhammer drill is extensively used for the purpose of drilling which has the major noise source as the driving unit emitting high intensity low frequency noise due to compressed air (Powel, 1956). It has been estimated that, of the total noise energy of pneumatic drill, 87.5% is contributed by the exhaust and the next largest component is the impact between the piston and the drill steel (Walker, 1963; Holdo, 1958 & Miller, 1963).

Acoustic signatures from mechanical equipments had been widely used to detect fault in a system. However, the application of sound in determining rock properties was very limited. In the past few years, research in the area of predicting rock properties using sound level produced during drilling had been reported by various investigators.

Earlier, few studies in oil and gas industries seemed to have proposed a technique called ‘‘Seismic While Drilling’’ for estimating rock formations. For instance, few studies had proposed the use of noise produced by the bit during drilling as a seismic source for surveying the area around a well and also for formation characterization while drilling (Onyia, 1988; Martinez, 1991; Rector & Hardage, 1992; Miranda, 1996; Asanuma & Niitsuma, 1996; Hsu, 1997; Aleotti et al, 1999; Tsuru & Kozawa, 1998; Hand et al, 1999; Fernandez & Pixton, 2005). A recent study (Stuart et al, 2007)has also reported a method of estimating formation properties by analyzing acoustic waves that are emitted from and received by a bottom hole assembly. It needs to be emphasized that ‘‘Seismic

While Drilling’’ technique is different from the technique of estimating rock properties using sound levels produced during drilling.

An attempt was made by Vardhan & Murthy (2007) to investigate the influence on sound level due to drilling in rocks of varying physico-mechanicalproperties using jackhammer drill. The results indicated higher sound level at various measurement locations with increase in compressive strength and with lower values of abrasivity of rocks.Based on the results of Vardhan & Murthy (2007), in the year 2009, Vardhan, Adhikari & Govindaraj indicated that sound level can be a promising tool in estimating rock properties during drilling. A number of investigation were carried out by Vardhan & Yadav (2011); Rajesh Kumar, Vardhan & Govindaraj (2011)[abc]; Rajesh Kumar, Vardhan, Govindaraj & Vijay (2013); Rajesh Kumar, Vardhan, Govindaraj &Sowmya Saraswathi (2013) to determine the rock properties using sound level produced during drilling with different degrees of success. A number of models both using statistical techniques as well as using Artificial Neural Networks were developed by the above mentioned investigators. However it is important to mention here that the entire investigation by the above mentioned researchers concentrated in using a computer numerical controlled (CNC) vertical milling machine for drilling holes with drill bit diameters ranging from 6 to 20mm with a shank length of 40 mm. This equipment hardly found application in mining industry. Added to that, it was capital intensive.

Kivade et al (2011& 2014[ab]) studied in detail the effect of applied thrust on the penetration rate and sound level of jackhammer drill. It was said that the compressive strength and abrasivity exhibit strong correlations with the sound level and penetration rate. All the investigation of Kivade et al (2011 & 2014[ab]) was based on experimental work in the laboratory using jackhammer drill, which itself was a high noise generating equipment.

Based on the above, it is clear that, there is no doubt regarding estimation of rock properties using sound level produced during drilling. However, the equipment used by the earlier investigators was a jack hammer drill which itself was a high noise generating unit and it was believed that the noise from the drilling unit itself might be affecting the results of sound level during measurement. Further, the CNC machine used by the earlier investigators was rarely used in mines. Added to that, the cost of the machine was also high.

In view of the above, it is necessary to fabricate a low cost and low noise generating drilling unit. It is believed that, such a setup will be more efficient in estimation of rock properties using sound level produced during drilling. Added to that, due to its lower cost, it can be easily used by even small quarry operators who are reluctant in spending more money on purchasing high end equipments.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1DETERMINATION OF ROCK PROPERTIES THROUGH EXPERIMENTAL WORK

Determining and estimating the physico–mechanical properties of rock is one of the important aspects for the mining and civil engineers in the area of rock mechanics. The International Society for Rock Mechanics (ISRM) has suggested a number of methods for measuring rock properties both in the laboratory as well as in the field which were compiled and edited by Ulusay and Hudson (2007).

Schmidt (1951) had designed a portable hammer to conduct non-destructive tests on concrete which was popularly known as Schmidt hammer and was widely used for indirectly estimating the rock strength. The Schmidt hammerbasicallymeasured the surface rebound hardness of the tested material. In the year 2009, Aydin proposed a revised suggested method, which superceded the portion of earlier ISRM document, to determine the rebound hardness of rock surfaces both in laboratory conditions and in-situ with an emphasis on the use of this hardness value as an index of the uniaxial compressive strength and Young's modulus of rock materials.

Szlavin (1974) carried out an analysis to find out if statistically significant correlations existbetween the physico-mechanical properties of rock. According to him, this would make it possible for the estimates to be made of one property from any other single property. Various tests such as Compressive Strength, Tensile Strength, Shore Hardness, Indentation, Specific Energy and Abrasivity were conducted on a number of samples and the arithmetic mean value was calculated which was used in the analysis.

A program was devised so that the test results could be fed into a computer. The relationships between the variables were obtained in terms of regression coefficients, standard deviations and correlation coefficients. A comparison of the results showed that the majority of the 'direct' physico-mechanical propertiescould be estimated with reasonable accuracy from each other. However, more errors were involved in the determination of, and calculation from, the energy based units, i.e. specific energy index and abrasivity. Szlavin (1974) also pointed out that, the ratio of uniaxial compressive strength and specific energy was approximately constant.

In the year 1998, Szwedzicki proposed a standard indentation test, as a measure of hardness and its use to predict the uniaxial compressive strength (UCS). According to him, standardized indentation testing allowed for the characterization of physico-mechanical properties of rock. Further, there was a relationship between the value of the indentation hardness index and the UCS.

Gill et al. (2005), by rigorous statistical procedure, proposed an algorithm to determine the minimum number of specimens required in the laboratory testing for the determination of physico-mechanical properties of rocks.

Lama &Vutukuri (1978) and Carmichael (1982) through the results of field investigation, tabulated extensive lists of various mechanical properties of sedimentary rocks from different locations around the world. Kwasniewski (1989) determined the UCS and porosity data of various sandstones. Jizba (1991) presented the physico-mechanical properties of sandstones and shales with a wide range of porosity recovered from various depths in Texas, USA. Wong et al. (1997) also presented a table of strength and other physico-mechanical properties of several representative porous sandstones.

Bradford et al. (1998) and Horsrud (2001) also reported the laboratory test results on the North Sea sandstone and shale, respectively.

2.2 DETERMINATION OF ROCK PROPERTIES USING SOUND LEVEL

Sound has been widely used for fault diagnosis in mechanical industry. It is a very important tool which is even used in predictive maintenance of equipments. However, its application in rock mechanics is very limited. The application of sound in rock mechanics particularly for determination and estimation of rock properties has started very recently in the last few years.

Acoustic emission studies related to rocks were initiated by Obert (1941) and Obert& Duvall (1942) to predict rock bursts in mines. Several investigators (Knill et al. 1968, Hardy 1972, Hardy 1977, Mogi 1973, Shamina 1975, Byerlee 1978) diverted their attention on the change in spectral amplitudes of acoustic waves over a wide band of monitoring frequencies with increasing applied stress.

McNally (1990) proposed an exponential relationship between UCS and the sonic log after study of the UCS test results on thousands of core samples with geophysical logs from Bowen Basin. As reported by Ward (1998), the German Creek Mine derived its own local formula.

Hatherly (2002) proposed an alternative approach to estimate the UCS of elastic rocks from geophysical borehole logs. He first determined the composition of the rocks and then correlated this to the UCS.

Schon (1996) also found that there was either a linear, polynomial or logarithmic relationship between seismic velocity and UCS.

Zborovjan (2001) showed that rock acoustic signature could be found between the frequency ranges 5000 – 8000 Hz. It was also pointed out that the lower half of signal spectrum was mainly due to the noise produced from the drilling engine and cooling water.

In the year 2003, Zborovjan et al. discussed about acoustic identification of rocks during the process of drilling. An attempt was made by him to identify specific acoustic signature of each drilled rock type and the rock class type. A software was developed for acoustic rock identification based on Hidden Markov Models (Rasmussen 2000). The developed software included the real experimental results to identify the specific acoustic signature of each drilled rock type. According to him, the proposed software gave satisfying results in rock class acoustic identification.

Miklusova et al. (2006) developed an experimental setup to simulate rock disintegration by rotary drilling in the laboratory. She discussed about the analysis of noise signals as acoustic behavior of rock drilling process. According to her, acoustic signal had the potential to be used for control of rock disintegration process.

Futo et al. (2003) discussed the possibility of rock drilling optimization through acoustic signals. According to the investigators, the equivalent level for representative frequency depended on the rock types. Hence, equivalent sound levels could be used for identification of the rock type.

According to Gradl et al. (2008), bit characteristics could be determined using acoustical data alone, i.e. noise of a bit. Investigators could detect major differences in the frequency characteristics during the analysis of the roller cone bit and the natural diamond bit.

Williams & Hagan (2006) investigated the changes in rock cutting conditions with the nature of acoustic signals generated in rock. According to them, acoustic emission vary with time during the rock cutting process and there exists a correlation between the rise in cutting force and the levels of acoustic emission.

In 1994, Jung et al. conducted indentation experiments on rock core specimens. They recorded and analyzed Load – displacement, Acoustic Emission (AE), Root Mean Square – time, AE number – time and AE signal – time curves. They concluded that, during indentation, acoustic emission activities increase with increasing stress level. It rises sharply as the critical load was reached and chipping occurred. According to him, the acoustic emission to a large extent is dependent on rock hardness which was closely associated with its mineral composition, structure and texture and physical properties.

An attempt was made by Vardhan& Murthy (2007) to investigate the influence on sound level due to drilling in rocks of varying physical properties i.e. compressive strength and abrasivity using jackhammer drill. For this purpose, a jackhammer drill setup was fabricated wherein the thrust applied can be varied while drilling vertical holes. The results of this study indicated that, increase in thrust increases the sound level at higher midband frequencies in the noise spectrum. Both the thrust and air pressure were found to have a significant effect on the sound level produced by jackhammer drill at all the measurement locations. It was said that to maintain a constant penetration rate in the rocks, both the thrust and air pressure need to be increased with an increase in compressive strength and decrease in rock abrasivity. Therefore, increased compressive strength and lower abrasivity of rocks will require higher air pressure and thrusts to be applied to achieve an optimum penetration rate and therefore will result in higher sound level at the operator's position and at other measurement locations.

Based on results of Vardhan& Murthy (2007), in the year 2009, Vardhan, Adhikari&Govindaraj indicated that sound level could be a promising tool in estimating rock properties during drilling.

Rajesh Kumar, Vardhan&Govindaraj (2011[a]) developed empirical models using multiple regression technique for prediction of physico-mechanical properties of metamorphic rocks. The model considered the parameters as drill bit diameter, bit speed, penetration rate and equivalent sound level produced during drilling. The F-test was used to check the validity of the developed models. The experimentally measured rock property values and the values calculated from the developed regression model were fairly close which indicated that the developed models could be efficiently used in prediction of intact metamorphic rock properties.

Rajesh Kumar, Vardhan&Govindaraj (2011[b]) also developed a general prediction model to investigate the relationships between sound level produced during drilling and physico-mechanical properties such as uniaxial compressive strength, tensile strength and percentage porosity of sedimentary rocks. The results were evaluated using the multiple regression analysis taking into account the interaction effects of various predictor variables. Predictor variables selected for the multiple regression model were the drill bit diameter, drill bit speed, penetration rate and equivalent sound level produced during rotary drilling (L_{eq}). The constructed models were checked using various prediction performance indices. It was said that the constructed models can be used for practical purposes.

Rajesh Kumar, Vardhan&Govindaraj (2011[c]) also made an attempt to estimate rock properties such as uniaxial compressive strength, Schmidt rebound number and Young's modulus using sound level produced during rotary drilling. For this purpose, a computer numerical controlled vertical milling centre was used for drilling holes with drill bit diameters ranging from 6 to 20 mm with a shank length of 40 mm. Fourteen different rock types were tested. The study was carried out to develop the empirical relations using multiple regression analysis between sound level produced during drilling and rock properties considering the effects of drill bit diameter, drill bit speed and drill bit penetration rate. The F-test was used to check the validity of the developed models. The measured rock property values and the values calculated from the developed regression model were fairly close, indicating that the developed models could be efficiently used with acceptable accuracy in prediction of rock properties.

Kivade et al (2011) studied in detail the effect of applied thrust on the penetration rate and sound level of jackhammer drill.

Rajesh Kumar, Vardhan, Govindaraj& Vijay (2013) made an attempt to predict rock properties using soft computing techniques such as multiple regression, artificial neural network (MLP and RBF) models, taking drill bit speed, penetration rate, drill bit diameter and equivalent sound level produced during drilling as the input parameters. A database of 448 cases were tested for determination of uniaxial compressive strength (UCS), Schmidt rebound number (SRN), dry density (r), P-wave velocity (V_p), tensile strength (TS), modulus of elasticity (E) and percentage porosity (n) and the prediction capabilities of the models were then analyzed. Results from the analysis demonstrated that, neural network approach was efficient when compared to statistical analysis in predicting rock properties from the sound level produced during drilling.

Rajesh Kumar, Vardhan, Govindaraj&SowmyaSaraswathi (2013) reported that in many rock engineering applications such as foundations, slopes and tunnels, the intact rock properties are not actually determined by laboratory tests, due to the requirement of high quality core samples and sophisticated test equipments. An artificial neural network models were reported to be developed to predict the rock properties of the intact rock, by using sound level produced during rock drilling. A database of 832 datasets, including drill bit diameter, drill bit speed, penetration rate of the drill bit and equivalent sound level (L_{eq}) produced during drilling for input parameters, and uniaxial compressive strength (UCS), Schmidt rebound number (SRN), dry density (ρ), P-wave velocity (Vp), tensile strength (TS), modulus of elasticity (E) and percentage porosity (n) of intact rock for output, was established. The constructed models were checked using various prediction performance indices. Goodness of the fit measures revealed that recommended ANN model fitted the data as accurately as experimental results, indicating the usefulness of artificial neural networks in predicting rock properties.

Investigation was carried out by Kivade et al (2014) on ten rock samples using pneumatic drill with drill bits of different diameters. The sound level and penetration rates were correlated with the rock properties. It was said that the compressive strength and abrasivity exhibit strong correlations with the sound level and penetration rate. It was concluded that, among the rock properties included in the study, the compressive strength and abrasivity values were the dominant ones affecting the penetration rate and sound level of percussive drills.

Kivade et al (2014) also reported about a detailed study carried out to determine the influence of rock properties on the sound level produced during pneumatic drilling. Further, investigation was also carried out on the effect of thrust, air pressure and compressive strength on penetration rate and the sound level produced. It was observed that, very low thrust resulted in low penetration rate. Even very high thrust did not produce high penetration rate at higher operating air pressures. With increase in thrust beyond the optimum level, the penetration rate started decreasing and caused the drill bit to ‘stall’. Results of the study showed that penetration rate and sound level increased with the increase in the thrust level. After reaching the maximum, they started decreasing despite the increase of thrust. A general prediction model was developed to investigate the relationships between sound level produced during drilling and physical properties such as uniaxial compressive strength and abrasivity of sedimentary rocks. The results were evaluated using the multiple regression analysis taking into account the interaction effects of predictor variables.

SrisharanShreedharan, ChiranthHegde, Sunil Sharma and Vardhan (2014) also reported on method to monitor and evaluate the sounds produced as undesirable by-products, at the drill-bit and rock interface, to predict the type of rock being drilled. It was said that the method might be extrapolated further in the estimation of rock properties.

2.3 APPLICATION OF REGRESSION TECHNIQUES IN GEO-MECHANICS

There had been a steady increase in the successful and potential application of regression in many areas of geo-mechanics in the recent past.

Sachapazis (1990) carried out tests to determine Schmidt hammer rebound hardness number, Tangent Young’s modulus, and uniaxial compressive strength for 29 different types of carbonate rocks. The correlations between these parameters were carried out and regression equations were established among the above said properties with high coefficients of determination (R^2).

A statistical approach was proposed by Kim &Gao (1995), for the computation of the mechanical properties of rock mass. It was said that the approach accounts for the uncertainty due to the variability of the rock material properties and the pattern of the discontinuities in the rock mass. All parameters describing the rock mass properties were considered random variables instead of a constant. Probability distributions of the deformation modulus and the compressive strength of a rock mass were obtained by applying Monte Carlo simulation. Using extreme value statistics, the input data used for the simulation and the simulation results were analyzed. It was said that the third type asymptotic distribution of the smallest values was general statistical representation of mechanical properties of rocks.

Using Schmidt Hammer rebound readings of seven rock types, Katz et al. (2000) developed new empirical correlations with laboratory measured values of Young's modulus, Uniaxial Compressive Strength and density. According to the investigators, these developed equations could be used to estimate the relevant mechanical properties in the field as well as laboratory.

An evaluation of the correlations using least squares regression, between the uniaxial compressive strength (UCS) values of 48 different rocks and the corresponding resulted of point load, Schmidt hammer, sound velocity and impact strength tests were carried out by Kahraman in the year 2001. By calculating the coefficient of variation, the variability of test resulted for each test and each rock type was evaluated. According to him, strong linear relations existed between the point load strength index values and UCS values for the coal measure rocks and other rocks. The Schmidt hammer and sound velocity tested exhibit significant nonlinear correlations with the compressive strength of rock. In the sound velocity test, the data points were scattered at higher strength values. There was no clear relation between the impact strength values and compressive strength values for coal measure rocks. A weak nonlinear correlation was found between the impact strength values and the compressive strength values for the other rocks. Based on his investigation, he concluded that, except for the impact strength, all other test methods evaluated in the study provide reliable estimation of compressive strength of rock.

An investigation using regression analysis was carried out by Altindag (2002), to find out the relationship between brittleness and different rock properties i.e., drillability index, Point load and Elastic modulus based on the data of Bilgin et al. (1993) and Kahraman et al. (2000). According to him, there existed a significant correlation between brittleness and the drillability index.

In the year 2002, Kahraman investigated the relationship between the direct and the indirect P-wave velocity values obtained through laboratory experiments.

Significant amount of investigation had been carried out on the usefulness of Schmidt hammer test on different rock types (Deere & Miller, 1966;Aufmuth, 1973; Beverly et al. 1979;Kidybinski, 1980; Singh et al. 1983; Sheorey et al. 1984;Haramy& DeMarco, 1985; Ghose&Chakraborti, 1986; O'Rourke, 1989; Cargill &Shakoor, 1990;Sachpazis, 1990; Kahraman et al. 1996;Tugrul&Zarif, 1999; Katz et al. 2000; Yilmaz &Sendir, 2002). Various empirical equations had been proposed for estimating UCS and Young's modulus of rock from Schmidt hammer rebound number.

An attempt was made by Yasar& Erdogan (2004a) to find out the statistical relationships between Schmidt hammer rebound number and Shore scleroscope hardness values with various physico-mechanical properties of different rocks. According to them, physico-mechanical properties could be estimated using hardness methods. They also pointed out based on their study that porosity increases with decreasing hardness values and strength of the rocks.

Yasar& Erdogan (2004b) also developed the statistical relations using the least square regression method to predict physico-mechanical properties namely UCS, Young's Modulus and Density of Carbonate rocks using Sound Velocity (SV) index value. Based on their study, they concluded that the above said physico-mechanical properties can be estimated from Sound Velocity values using their mathematical equations.

Singh & Rao (2005) pointed out that there was a strong correlation between ultimate strength and the tangent modulus values of the block mass tested in the laboratory for a specific failure mode, when plotted on the Dure-Miller classification chart and it followed an empirical straight line.

Karakus et al. (2005) used the technique of multiple regression modeling to predict elastic properties of intact rocks from index tests.

Chang et al. (2006) reported that, some of the equations developed work reasonably well (for example, strength – porosity relationships for sandstone and shale) to predict rock properties. However, the authors were of the opinion that rock strength variations with individual physical property measurements scatter considerably, indicating that most of the empirical equations were not sufficiently generic to fit all the data published on rock strength and physical properties.

Kahraman&Alber (2006), correlated the electrical resistivity values with experimentally measured physico-mechanical properties such as uniaxial compressive strength, elastic modulus, point load strength, Schmidt hammer value, P-wave velocity, density and porosity values, using least squares regression method. According to the authors:

- UCS and elastic modulus, increases with increasing electrical resistivity.
- There exists a strong logarithmic relationships between UCS and resistivity and between resistivity and elastic modulus.
- Density linearly increases with increasing resistivity.
- Porosity and electrical resistivity are inversely related.

Based on their investigation, the authors concluded that, electrical resistivity could be used as a representative measure of rock properties, particularly for characterizing rocks for which regularly shaped specimen were difficult to obtain.

Karakurt et al. (2013) carried out an experimental and statistical study on noise level generated during rock sawing by circular diamond saw blades. Influence of the operating variables and rock properties on the noise level were investigated and analyzed. Statistical analysis were then employed and models were built for the prediction of noise levels depending on the operating variables and the rock properties. The derived models were validated through statistical tests. It is found that increasing of peripheral speed, traverse speed and cutting depth result in an increase in noise levels. On the other hand, a decreasing trend in noise level was initially observed with increasing the flow rate of cooling fluid. It was said that there is moderate correlations between uniaxial compressive strength, density and noise levels.

Kahraman et al. (2013) made an attempt to determine the Los Angeles abrasion resistance using indirect method for preliminary investigation as the direct method is time consuming, expensive, and requires a large amount of samples. In this investigation, Los Angeles abrasion, noise level measurement, density and porosity tests were carried out on 27 different rock types including igneous, metamorphic and sedimentary rocks. The test results were evaluated using the simple and multiple regression analysis. A good corelation was found by the investigators between the Los Angeles abrasion loss and the noise level. In order to check the possibility of obtaining more significant relations, multiple regression analysis was performed by including density and porosity values. However, the regression analysis showed that the correlation coefficients of multiple regression equations were slightly higher than that of the simple regression equation. Since the simple regression equation is practical and statistically significant, it was suggested for estimation purpose. The investigators concluded that Los Angeles abrasion loss of aggregates can be reliably estimated from noise level measurement.

Delibalta et al. (2015) carried out an investigation on the usability of noise level from rock cutting for the prediction of physico-mechanical properties of rocks. According to the investigators, as the indirect tests are easier and cheaper than the direct tests, the prediction of rock properties from the indirect testing methods is important especially for the preliminary investigations. In this study, the predictability of the physico-mechanical rock properties from the noise level measured during cutting rock with diamond saw was investigated. Noise measurement test, uniaxial compressive strength (UCS) test, Brazilian tensile strength (BTS) test, point load strength (Is) test, density test, and porosity test were carried out on 54 different rock types in the laboratory. The results were statistically analyzed to derive estimation equations. Strong correlations between the noise level and the mechanical rock properties were found. The relations follow power functions. Increasing rock strength increases the noise level. Density and porosity also correlated strongly with the noise level. The relations follow linear functions. Increasing density increases the noise level while increasing porosity decreases the noise level. It was said that, the developed equations are valid for the rocks with a compressive strength below 150 MPa. Finally, it was concluded that the physico-mechanical rock properties can reliably be estimated from the noise level measured during cutting the rock with diamond saw.

Faisal et al. (2007), carried out linear statistical analysis to establish the relationships between engineering properties of the intact rock namely dolomite, dolomitic limestone and shale rocks with different types of hardness i.e., Schmidt, shore scleroscope, abrasion, and total hardness. According to the authors, there existed a good relationship between the engineering properties of the intact rock and its hardness.

Yavuz et al. (2008), investigated the dependence of abrasion rate on physico-mechanical properties of rocks namely bulk density, effective porosity, P-Wave velocity, Schmidt rebound hardness, Compressive strength, Tensile strength through least square regression analysis. Based on their investigation, the authors concluded that:

- Hardness, tensile strength, compressive strength and density of rock could adequately estimate the abrasion rate of rocks.
- There is a possibility of rough estimateofabrasion rate of rocks using porosity and P-wave velocity of rocks.
- More abrasion resistant rocks are likely to have high bulk density, compressive strength, tensile strength, hardness and lower value of porosity.

Kilic&Teymen (2008) showed satisfactory correlationsforestimating the physico-mechanical properties of rocks using non-destructive and indirect test methods.

CHAPTER 3

3.0 OBJECTIVES & SCOPE OF THE WORK

3.1 OBJECTIVES

Based on the literature review, the OBJECTIVES of the present investigation are as follows:

1. Development and fabrication of a portable, cost effective, rotary drilling set-up for drilling in rocks of varying physico-mechanical properties.

2. Development of general prediction mathematical models for different physico-mechanical properties of igneous rock using statistical methods.

3.2 SCOPE OF THE WORK

Based on the suggestions received from the members of the Research Progress Assessment Committee, the SCOPE of the WORK is limited to:

a. Design and fabrication of the drilling setup.

b. Development of general prediction mathematical models for different physico-mechanical properties of igneous rock through multiple regression analysis in order to establish the relationship between:

i. Sound levels produced during drilling and uni-axial compressive strength of igneous rocks.

ii. Sound levels produced during drilling and the tensile strength of igneous rocks.

iii. Sound levels produced during drilling and the Schmidt Rebound Number.

iv. Sound levels produced during drilling and the rock density.

v. Sound level produced during drilling and the porosity of igneous rocks.

CHAPTER 4

4.0 EQUIPMENTS AND INSTRUMENTATIONS

The equipments and instruments described below in this chapter were used to measure various physico-mechanical properties in the laboratory.

4.1 EQUIPMENTS

4.1.1 AIM-317E-Mu Compression Testing Machine

Compressive strength was one of the most important physico-mechanical properties of rock material, used in excavation projects. AIM–317E–Mu micro controller compression testing machine was used for measurement of Uniaxial Compressive Strength (UCS) of rock materials (Fig.4.1).

Fig.4.1 AIM-317E-Mu, Compression Testing Machine

It had an intelligent pace rate controller, motorized pumping unit and loading unit with maximum loading capacity of 2000 kN.

4.1.2 Brazilian Tensile Testing Machine

Rock material generally has a low tensile strength. The low tensile strength is due to the existence of micro cracks in the rock. The existence of micro cracks may also be the cause of rock failing suddenly in tension with a small strain. Tensile strength of rock was measured from Brazilian test loading frame with 100 kN capacity, having a base and a cross head joined together with two solid pillars with nuts (Fig. 4.2).

At the top, the pillars have long threads for height adjustment and on the base, a 100 kN hydraulic jack is centrally fixed between the pillars. This jack has an integral pumping unit and an oil reservoir. A 100 kN capacity pressure gauge is fixed to the jack for indicating the load on the specimen and also an operating handle is provided with the jack.

Fig 4.2 Brazilian Tensile Testing Machine

4.2 INSTRUMENTATIONS

4.2.1 DIGI – Schmidt 2000

Schmidt hammer rebound hardness is often measured during the early part of field investigation. It is a measure of the hardness of the rock material by counting the rebound degree. Tests were performed with DIGI – SCHMIDT 2000 (Fig.4.3). The graphic LCD 128 x 128 pixel display unit of the instrument immediately displays the rebound value.

Fig.4.3 DIGI-SCHMIDT 2000, SRN measuring instrument

4.2.2 SPARK 706 Sound Level Measuring Instrument

The instrument used for sound measurement was a Spark 706 from Larson Davis, Inc., USA (Fig.4.4). The instrument was equipped with a detachable 10.6 mm microphone and 7.6 cm cylindrical mast type preamplifier. The microphone and preamplifier assembly were connected by an integrated 1.0 m cable. A Larson Davis CAL 200 Precision Acoustic Calibrator was used for calibrating the sound level meter. Before taking any measurement, the acoustical sensitivity of the sound level meter was checked using the calibrator. Table 4.1 gives the technical specifications of the sound level meter used in the investigation.

Fig. 4.4 Spark 706, Sound Measuring Instrument

Table 4.1: Specifications of sound level meter

Specification	705 / 705+	All Other
Measurements Range	40 to 143 dB(RMS) : 801 to 46dB (Pea) Typical	
Max. Pack Level	146 dB SPL	
Detectors	Slow Fast Peak	
Frequency Weighting	A/C un weighted Peak	
Microphone	3/8" Electrets	
Memory	4MB Non volatile	
Clock / Calendar	Month, Day, Year , Hr: Min : Sec	
Power Supply	Internal One AA battery 35 Hour Operation	Internal Two AA battery 100 Hour Operation
Dimension	3.9 L x 2.9 W x 0.78 D	5.5 L x 2.5W x 1.25 D
Weight	7.0 oz (198g)	8.4 oz (238g)
Standard Met	ANSI S1.4 -1983, ANSI S1.25 -1991, IEC 60651 1993, IEC 60804 1993, IEC 61252 1993, Compliant	
Intrinsic Safety Standard Met	ANSI/UL 913, ANSI/UL 2279, part 11 CSA 157 – CSA E70 11 (Canada) IEC 60079-11 EN50020 (Europe)	

4.2.3 Porosity

Porosity describes how densely the material is packed. To determine the porosity of the rock samples, the specimens were prepared and tested in accordance with ISRM suggestions (Ulusay and Hudson 2007). Porosity was measured by crushing the rock to fine powder and measuring the volume of powder by displacement of the fluid in a pycnometer. The total volume of pores is calculated as the difference between the volume of the specimen and that of the crushed particle. At least five samples of each rock type were used for measuring porosity.

4.2.4 Dry Density

Density is a measure of mass per unit volume. Density of rock material varies, and is often related to the porosity of the rock. It is sometimes defined by unit weight and specific gravity. The density of each core sample was measured after the removal of moisture from it.

CHAPTER 5

DESIGN AND FABRICATION OF THE EXPERIMENTAL SET-UP

5.0 INTRODUCTION

A number of studies have been reported recently on the application of sound level, which has been discussed elaborately in the literature. All these studies have concentrated on using either CNC or jack hammer machine for the purpose of drilling. CNC machine is widely used in the mechanical industry whereas jack hammer drill is widely used in hard rock mining. Though CNC machine produces less noise, it is a costly equipment and not every small mine/quarry operator will like to procure it. Jack hammer drill is a highly noise producing machine and it is felt that the noise of the jack hammer drill will interfere with noise produced during the process of rock drilling.

In view of the above, it is felt to fabricate a low cost and silent drill machine for drilling in rock blocks to indirectly estimate the physico-mechanical properties of the rocks.

5.1 FABRICATION OF PORTABLE DRILL MACHINE

The entire set-up is fabricated for the purpose of experimental investigation. Basically, the set-up which is portable and noiseless unit in itself consists of three important parts as mentioned below.

i. Drilling unit
ii. Water supply and storage unit
iii. Hydraulic pump unit

5.1.1 The Drilling Unit

The drilling unit with different components of the drill set-up is shown in {Fig.5.1(a) and Fig. 5.1(b)} which consists of the following parts:

1. Metal base	11. Balancing rope
2. Metal structure support	12. Wooden base
3. Column with movable piston	13. Sample holder
4. Box girder	14. Motor regulator
5. 1 HP motor	15. RPM display
6. Belt	16. Two pipes
7. Drive pulleys	17. Cylinder
8. Drill chuck	18. Power cord and
9. Drill rod	19. Two pulley wheels
10. Dead weight	

The drill unit is supported on a strong and rigid metal base, which is most commonly used in drilling machines. The loading structure is designed and fabricated such that not only it withstand the weight of the machine, but also strong enough for cyclic loading during drilling. Further, the metal base is connected to a solid rigid structure for accurate and fast drilling of the collected rock samples. The drill machine is equipped with 1 HP noiseless motor which transmits the power through a belt pulley arrangement; the arrangement is such that the transmission loss is negligible.The speed of the motor can be easily monitored using a motor regulator knob provided just beside the motor assembly. The speed of the drill machine in RPM is displayed by a digital tachometer provided near the speed regulator knob.

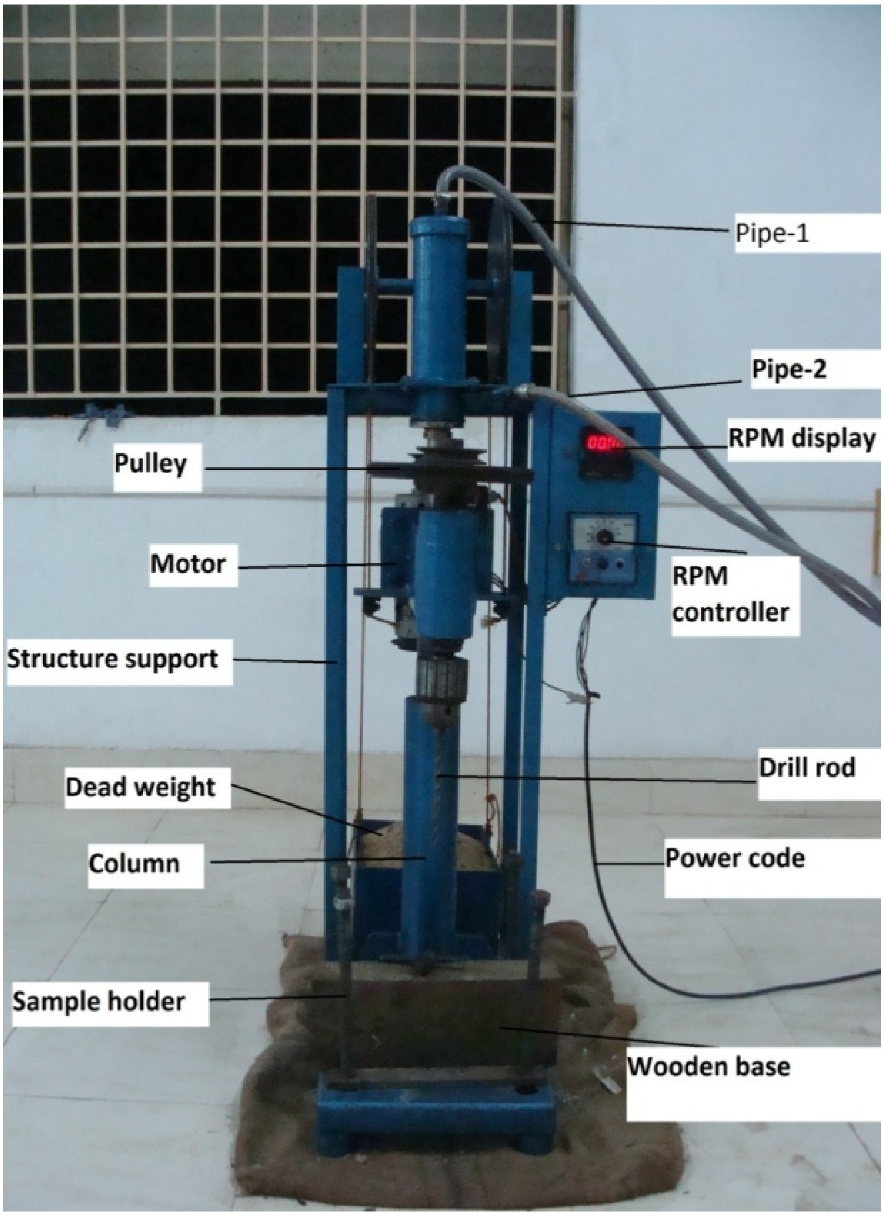


Fig.5.1(a) Drill unit with different components

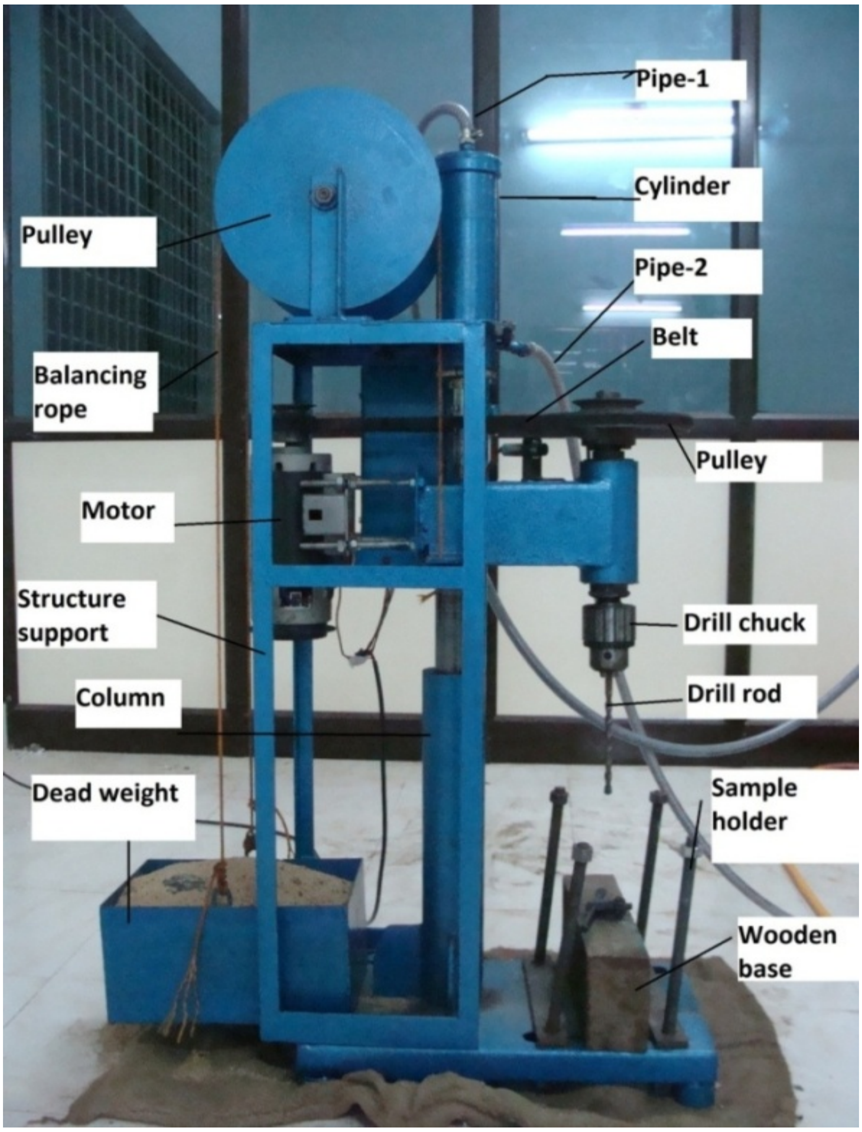


Fig.5.1(b) Drill unit with different components

To hold the drill bit used in the present investigation a chuck with a specialised clamp is used to hold the object firmly during the process of drilling. A two pulley wheel has been equipped to transmit the power. The drive element of a pulley system is belt that runs over the pulley inside the groove. For accurate holding of the work piece, a sample holder with a bolt nut arrangement is provided, such that the rock samples with different sizes can be placed and changed depending upon the length of the bolt to ensure that drilling takes place within few rotations of the drill bit as soon as it comes in contact with the surface of the rock sample. To facilitate the upward and downward moment of the drill bit, a reciprocating piston is provided which reciprocates inside the cylinder which is the central working part of the drill unit. It ascends and descends accordingly with respect to the applied thrust.

5.1.2 Water Storage and Supply Unit

Fig.5.2 shows the different parts of the water storage and supply unit. It consists of Air Vessel, Pressure Vessel, Water Tub, Water Pressure Gauge, 3 Release Pipes,Main Valve, 2 Supply Valves, 2 Release Valves, Feed Pipe, Release Pipe (From Pump)andsuction pipe.

To reduce acceleration heads, air vessels are used on both suction and delivery pipes as for the satisfactory working of a reciprocating pump.The pressure inside the cylinder at any instant must not be less than the vapour pressure of the liquid. In this unit, a pressure vessel holds the liquid at a pressure substantially different from the ambient pressure. If the pressure inside the cylinder is less than or equal to vapour pressure of the fluid, then separation will occur. There are two situations of the piston where this (separation) can happen. One is at the beginning of the suction stroke and the other is at the end of the delivery stroke. Maximum speed in the case of reciprocating pump is determined based on above mentioned condition, i.e., pressure inside the cylinder during suction and delivery stroke should not fall below vapour pressure of the flowing fluid in the suction and delivery pipe.

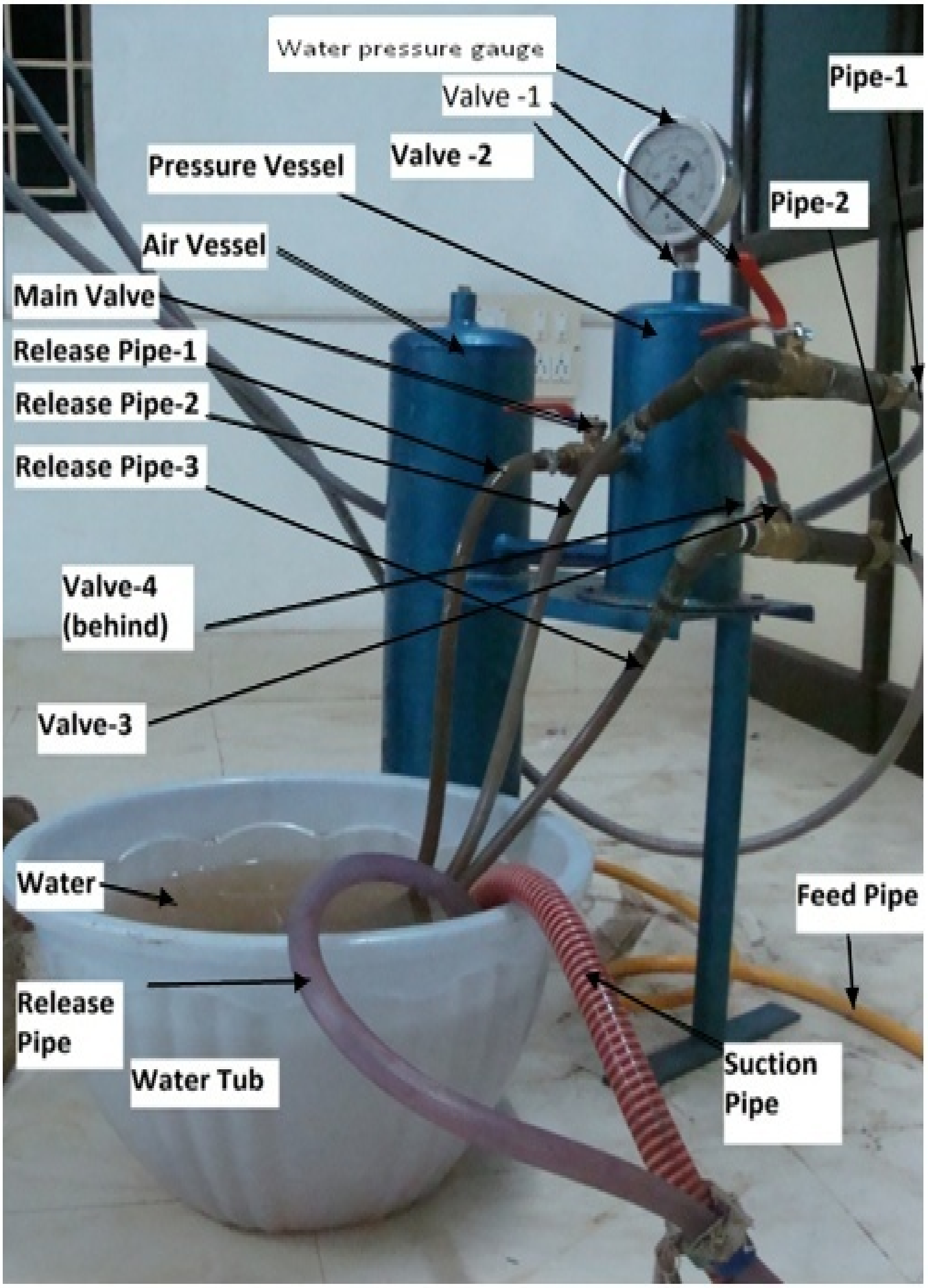


Fig.5.2 Water storage and supply unit for the experimental drill set-up

The pressure at which separation takes place is known as separation pressure and the head corresponding to separation pressure is called separation pressure head.Since an air vessel is a closed chamber (cast iron closed chamber) having an opening at its base, through which water flows into the vessel, or from the vessel, and fitted on the suction as well as on the delivery side, near the pump cylinder to reduce the accelerating head.

Development of acceleration head in the reciprocating pump is undesirable, since it becomes an extra head against which the pump has to work. It is also known that higher the speed and longer the pipe, higher is the acceleration head. However, there is a limit to the speed with which the pump may work from the cavitation close to the cylinder as possible. The vessel is fitted with compressed air, which can contract or expand to absorb most of the pressure fluctuations. An air vessel in a reciprocating pump acts like a flywheel of an engine. Whenever, the pressure rises, water in excess of the average discharge is forced into the air vessel. As the level of the liquid in the air vessel rises, the air held in air chamber gets compressed. When the water pressure in the pipe falls, the compressed air ejects the excess water out.These vessels are capable of absorbing fluctuations in pressure or velocity.It is assumedthat the velocity in suction and delivery pipes between air vessels and the cylinder isfluctuating and there is a uniform velocity in pipes beyond the air vessels. When the mean velocity of water in the suction pipes is less than the instantaneous velocity of water in the suction pipe between the air vessel and the cylinder, the required excess water goes out of the air vessel to the cylinder, and when the mean velocity is more than the instantaneous velocity, the excess water goes into the air vessel. Similarly, for the delivery side, when the mean velocity of water is less than the instantaneous velocity the excess water goes into the air vessel and vice versa.

5.1.3 Hydraulic Sub Unit

Fig.5.3 shows the different parts of the hydraulic pump assembly, which pumps water from the water storage and feeds to the supply unit, which is used by the drilling unit for applying thrust which can be controlled manually. Further, this sub unit is one of the most important part of the drill set-up which consists of different components which are given below:

i. Motor
ii. Belt
iii. Drive Wheel
iv. Single Piston Pump
v. Suction Pipe
vi. Pump Head
vii. Feed Pipe
viii. Regulator Knob
ix. Power cord
x. Release pipe

5.2 COMPLETE SET-UP WITH DIFFERENT COMPONENTS

The whole set-up as a single assembled one with different sub components is as shown in Fig. 5.4.

5.3 WORKING PRINCIPLE OF DRILL SET-UP

The pump and the motor operations are parallel and not dependent on each other. The working procedure for the experimental drilling set-up is as follows:

i. Open all the valves of the pressure vessel once and close the supply and release valves.
ii. Fit the drill rod to the drill chuck.
iii. Place the sample on the wooden base and clamp the sample using the sample holder.
iv. Switch on the motor and pump.
v. Set the pressure using the main valve and the RPM using the regulator provided.
vi. Now open the Valve-3 (Release valve) and then Valve -1 (Supply valve).
vii. Now the piston in the cylinder moves down thus moving the Girder down.
viii. Thus the drill rod comes in contact with the sample and drills the rock block.

5.4 PRECAUTIONS TO BE OBSERVED

i. The drill bit should not get red hot during drilling.
ii. Keep the hands away from the drill bit and belt during operation.
iii. Use ear protective equipment during drilling the rock sample.
iv. The pressure should not exceed the maximum value of the pressure gauge.
v. There should not be any leakage of water through pipes and inter connecting systems.
vi. Oil level of the water pump should be maintained to its level.
vii. There should not be any leakage of oil in the water pump.
viii. The water used should be clean and without solid dirt.
ix. Sample should be fixed tightly on the wooden base by sample holder.

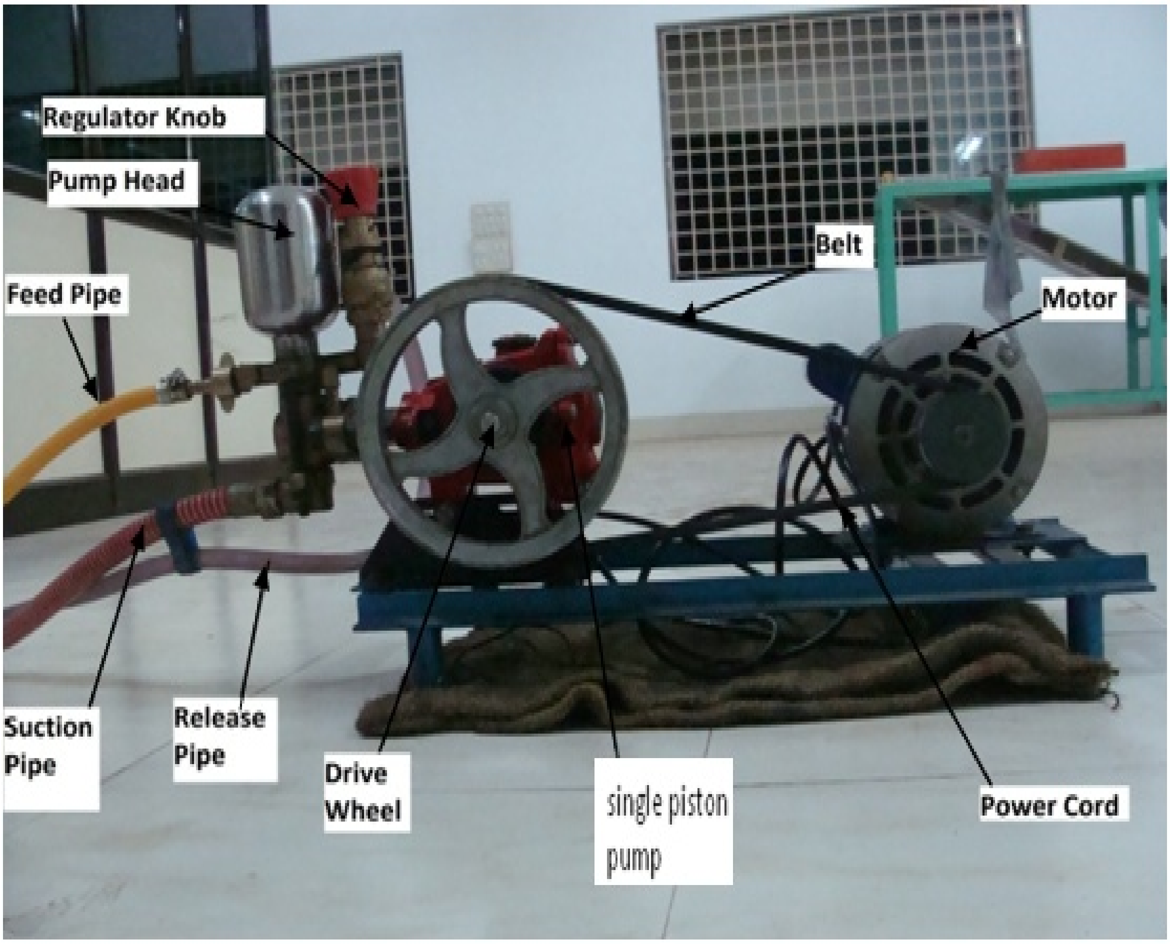


Fig.5.3 Hydraulic pump of the experimental drilling set-up

Fig.5.4 Complete unit with different components

5.5 COST CONSIDERATIONS AND EFFECTIVENESS OF DRILL SETUP

The drilling setup which has been fabricated is an inexpensive and portable device. The cost of this drilling set up is not at all significant compared to other equipment like CNC or Jack hammer drill which has been used by other investigators in the recent past. The overall cost of the complete set-up is only Rs. 55,000=00 which is comparatively less than both CNC machine and that of a jack hammer drill set up. Further, the noise emission from this drilling setup is very low (only of the order of 76dB (A)), thereby making it more suitable for this research work. Both the thrust and RPM on this drill set up can be easily controlled making it very suitable for field applications. Hence it can be anticipated that this set up will be a possible alternative for estimation of physico-mechanical properties of igneous rock samples using sound level produced during drilling in the field.

5.6 CLOSURE

The fabricated drill set-up which produces significantly lesser noise and which is also portable, has been discussed elaborately in this chapter with adequate emphasis made on each and every component as far as the description and the working procedure is concerned. Hence the set-up will be useful in the determination of sound level produced during drilling considering the effects of drill bit diameter, and the amount of thrust applied. The results of laboratory study could be used to predict the physico-mechanical properties of rocks. Since the proposed method is considerably simple and requires lesser time, it may be an economically feasible and a better alternative method in saving the duration of time to conduct experimental investigation and could find application in various engineering applications particularly in geo-technical field.

CHAPTER 6

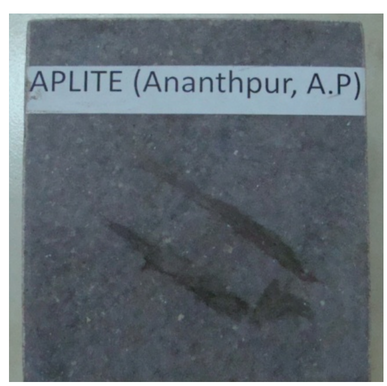
LABORATORY INVESTIGATION

As discussed earlier, the aim of this work is to develop prediction models for the determination of various properties of igneous rocks from sound levels produced during rotary drilling. Hence, for the purpose of this investigation, twelve different types of igneous rocks were collected from different parts of South India. During sample collection, each block was inspected for macroscopic defects so that it would provide test specimens which are free from any irregularities and defects.

6.1PREPARATION OF TEST SPECIMENS

Twelve different types of igneous rock samples were collected from different locations spread across south India. The collected rock samples were prepared to a volumetric size of 15 cm3. Further, these samples were macro examined to ensure that they are free from any macroscopic defects. Figure 6.1 shows typical sized specimens of igneous rocks used in the present study.

6.1(a)

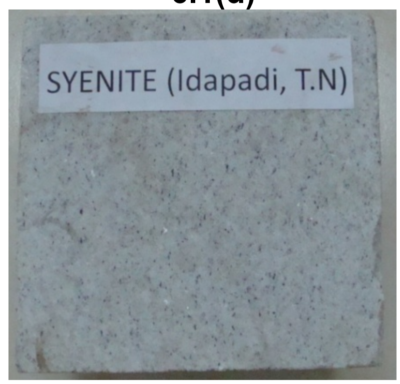


6.1(b)

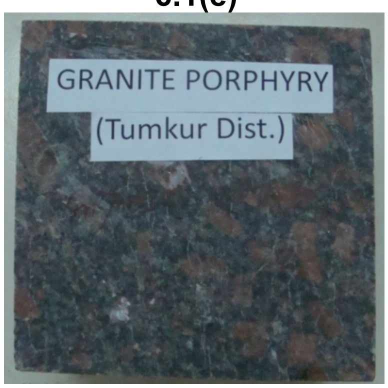
6.1(c)

6.1(d)

6.1(e)



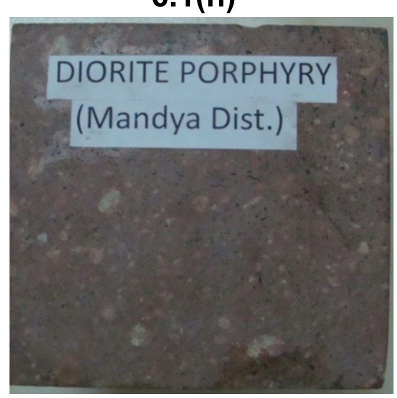
6.1(f)



6.1(g)

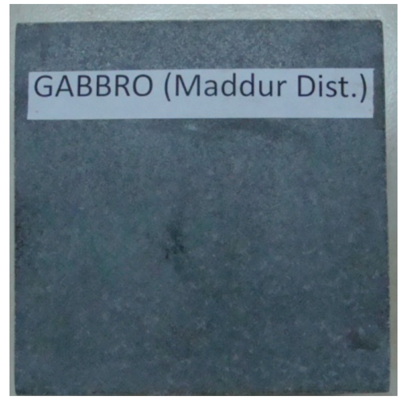
6.1(h)

6.1(i)



6.1(j)

6.1(k)



6.1(l)

Fig. 6.1 (a) – 6.1 (l) Rock samples used for the investigation

Below is the brief explanation for twelve types of rocks used in the study:

i. Granite grey is grayish granite formed as intrusive igneous rock with medium to coarse grained texture. The word is derived from Granum (Latin) means grains. The composition consists of quartz and feldspars. The other accessory minerals are mica, apatite and magnetite.

The texture will be medium grained, polycrystalline and equi-granular and the origin is plutonic.

ii. Aptite (Anantapur) is the name given to intrusive rock in which quartz and feldspar are the dominant minerals. Aptites are usually very fine-grained, white, grey or pinkish in colour and their constituents are visible only with the help of a magnifying lens. This type of rock blocks are found at Anantapur in Andhra Pradesh state.

These are igneous rocks with plutonic origin. Fine grained texture is only the distinguishing character because the mineral composition is as same as granite. These rocks are basically formed from magma composition.

iii. Felsite Mysore (also called Felstone) is a very fine grained volcanic rock that may or may not contain larger crystals. Felsite is a field term for a light coloured rock that typically requires petrographic examination or chemical analysis for more precise definition. This rock is typically of volcanic origin, and may be found in association with obsidian and rhyolite (Hosrud 2001). In some cases, it is sufficiently fine-grained for use in making stone tools.

These types of rocks are intermediate ones, where porphyritic texture can be observed clearly.

iv. Gabbro Greenish refers to a large group of dark, coarse-grained, intrusive mafic igneous rocks chemically equivalent to basalt. The rocks are plutonic, formed when molten magma is trapped beneath the earth's surface and cools into a crystalline mass. The vast majority of the earth's surface is underlain by gabbro within the oceanic crust, produced by basalt magmatism at mid-ocean ridges.

It is a plutonic in nature, where the essential mineral is plagioclase and accessory minerals are mica and hypersthenes. Texture is coarse grained, where some varieties shows porphyrytic texture. The compositions of these types of rocks are hornblende, diorite olivine and pyroxenes.

v. Granite Pink (Ilakal) is a common, coarse-grained, light-colored, hard igneous rock consisting chiefly of quartz, orthoclase or microcline and mica.

According to color index pink granite may be leucocratic (light colored) minerals.

vi. Syenite is a coarse-grained intrusive igneous rock of the same general composition as granite but with the quartz either absent or present in relatively small amounts (<5

%). The feldspar component of syenite is predominantly alkaline in character (usually orthoclase). Plagioclase feldspars may be present in small quantities, less than 10%. This type of rock exclusively available in Idapadi of Tamilnadu State.

Further compositions such as alkali feldspars, orthoclase albrite is found in dark coloured minerals such as brotite, hornblende and augite. The accessory minerals are ziricon, sphene.

vii. Granite Porphyry is a common andwidely occurring type of intrusive, felsic, igneous rock which is granular and crystalline in texture. This rock consists mainly of quartz, mica and feldspar. A granitic rock with a porphyritic texture is sometimes known as porphyry.

These types of rocks are plutonic in origin and show porphyrytic texture where it is characterized by the presence of conspicuously large sized crystals known as phenocrysts which are embedded in a fine grained ground mass. These phenocrysts occur at moderate temperature level or intermediate level with in the earth's crusts. It is neither because of rapid cooling nor slow cooling of magma.

viii. Basalt (Nagpur) is a common extrusive volcanic rock. It is usually grey to black in colour and fine-grained due to the fast cooling of lava at the surface of a moon or planet. It may be porphyritic containing larger crystals in a fine matrix, or vesicular, or frothy scoria. Unweathered basalt is black or grey in colour. By definition, basalt is defined as an aphanitic igneous rock that contains, by volume, less than 20 % quartz and less than 10 % feldspathoid and where at least 65 % of the feldspar is in the form of plagioclase (Kahramann, 2001). This type of rocks is found in Nagpur situated in

Maharashtra State. Also, in some of the Deccan traps basaltic rocks are extensively found in states such as Gujrat and Madhya Pradesh.

In these types of rocks we cannot observe the clear crystallization of minerals.

ix. Syenite Porphyry is a very fine grained volcanic rock containing large crystals of phenocrysts which makes it porphyry.

These types of rocks are plutonic in origin and show porphyrytic texture where it is characterized by the presence of conspicuously large sized crystals known as phenocrysts which are embedded in a fine grained ground mass. These phenocrysts occur at moderate temperature level or intermediate level with in the earth's crusts. It is neither because of rapid cooling nor slow cooling of magma.

x. Diorite Porphyry is a grey to dark grey intermediate intrusive igneous rock composed principally of plagioclase feldspar (typically andesine), biotite, hornblende, and/or pyroxene. It may contain small amounts of quartz, microcline and olivine. Zircon, apatite, sphene, magnetite, ilmenite and sulfides occur as accessory minerals (Katz et al., 2001). It can also be black or bluish-grey and frequently has a greenish colour.

xi. Granite (Karnataka) is intrusive, felsic, igneous rock which is granular and crystalline in texture, found in the state of Karnataka. This rock consists mainly of quartz, mica and feldspar. This type of rock blocks are found at Maddur in Karnataka State.

xii. Gabbro (Maddur) is a dark, coarse grained, intrusive igneous rock type. The rocks are plutonic, formed when molten magma is trapped beneath the earth's surface and cools into a crystalline mass.

6.2 DRILL BITS USED FOR DRILLING ROCK SAMPLES

Fig. 6.2 Tungsten carbide drill bits

The term drill may refer to either a drilling machine or a drill bit for use in a drilling machine. In this thesis, for clarity, the term drill bit or bit is used to refer to a bit which is used in a drilling machine and drill refers always to a drilling machine. The drill bit used is made up of tungsten carbide. In the present study drill bits of three different diameters were used i.e. 16 mm, 18 mm and 20 mm. One drill bit was used for drilling six holes and each block facilitates six holes. Drill bits are cutting tools used to create cylindrical holes, almost always of circular cross-section. Drill bits are available in many standard sizes and have many uses (Miklusova et al, 2006). Bits are held in a tool called a drill, which rotates them and provides torque and axial force to create the hole. Specialized bits are also available for non-cylindrical-shaped holes. The shank is the part of the drill bit grasped by the chuck of a drill. The cutting edges of the drill bit are at one end, and the shank is at the other. In the present investigation drill bits made up of tungsten carbide were used. Tungsten carbide bits posses' typically high resistance to wear and more importantly can be used at high temperatures, thereby preventing the tip of the drill bit getting extremely hot during the course of drilling.

6.3 DETERMINATION OF ROCK PROPERTIES

6.3.1 Compressive strength

For the measurement of uni-axial compressive strength micro controller compression testing machine was used, the details of which was explained in the Chapter V. The igneous rock blocks were prepared with NX-size core specifications, having a length-to-diameter ratio of 2.5:1 as per ISRM standards (Ulusay and Hudson, 2007). Each type of rock was represented by five core specimens. The oven-dried and NX-size core specimens were tested for its compression strength and the average compressive strength for different igneous rock blocks was determined, measured, which are shown in the Table 6.1.

6.3.2 Tensile strength

The rock samples of 54 mm diameter NX-size core specimens, having a length less than 27 mm were prepared as per ISRM standards (Ulusay and Hudson, 2007). The cylindrical surfaces were made free from any irregularities across the thickness using polishing machine. End faces were made flat to within 0.25 mm. The specimen was wrapped around its periphery with one layer of the masking tape and loaded into the Brazilian Tensile Test apparatus across its diameter. Load is applied continuously at a constant rate such that failure occurs within 15-30 seconds. Five sample specimens were tested and the average value was determined and tabulated as shown in the Table 6.1.

6.3.3 Schmidt rebound number

The SRN (Schmidt Rebound Number) was determined using Schmidt Hammer. All tests were performed with the hammer held vertically downwards and at right angles to the horizontal rock face (Aydin, 2009). To get schmidt hammer rebound number, ten readings were taken on a particular rock sample and then the mean of nearer values were used for the analysis. The basic statistical evaluations of SRN of different igneous rocks are given in the respective Table 6.1.

6.3.4 Porosity

To determine the porosity of the rock samples, the specimens were prepared and tested in accordance with ISRM guidelines (Ulusay and Hudson, 2007). Porosity of rocks under study is given in Table 6.1.

6.3.5 Dry density

Density is a measure of mass per unit of volume. Density of rock material varies and is often related to the porosity of the rock. It is sometimes defined by unit weight and specific gravity. The density of each core sample was measured after the removal of moisture from it. The moisture was removed by placing the samples in an electric oven at approximately 80^0 C for one hour and then drying at room temperature(Ulusay and Hudson, 2007). The density of dry sample was calculated using equation (6.1).

Dry density, $$\rho = \frac{\text{Mass of the sample}}{\text{Volume}} = \text{g/cc} \qquad (6.1)$$

Each test was repeated five times and the average dry density of each rock samples were calculated, which is given in Table 6.1.

Table-6.1: The average values of physico-mechanical properties of igneous rocks

Sl. No.	Igneous rock sample	Sound Level (dB)	Tensile strength(Mpa)	UCS (MPa)	SRN	Density (gm/cc)	Porosity (%)
1	Granite Grey	97.55	5.23	46.23	39	2.39	1.73
2	AptiteAnathpur	98.71	5.32	46.50	42	2.40	1.62
3	Felsite Mysore	101.45	5.52	47.60	43	2.41	1.56
4	Gabbro Greenish	102.83	5.70	47.80	47	2.43	1.37
5	Granite Pink Mysore	102.71	5.93	48.0	48	2.50	1.33
6	Syenite	102.75	5.95	48.1	51	2.51	1.33
7	Granite Porphyry	106.55	6.34	51.7	57	2.53	1.20
8	Basalt Nagpur	109.83	6.73	53.2	60	2.56	1.15
9	Syenite Porphyry	111.7	6.81	53.9	62	2.57	0.92
10	Diorite Porphyry	113.88	6.95	57.9	65	2.61	0.83
11	Granite Karnataka	117.31	9.30	77.9	72	2.91	0.56
12	Gabbro Madduru	119.63	12.3	102.6	78	3.30	0.25

6.3.6 Inference

From Table 6.1 it can be observed that the physico- mechanical properties of igneous rock blocks, increases non linearly with Granite Grey measuring the lowest value of Uni – axial compressive strength (UCS) i.e., 46.23 MPa, whereas, it was found that Gabbro Madduru having the maximum value of 102.6 MPa. Also, the Tensile Strength of different igneous rock blocks considered in the present investigation measures the lowest value of 5.23 MPa for Granite Grey and 12.3 MPa for GrabbroMadduru. Further, the values of SRN and Density measurements are 39 and 2.39 gm/cc for Granite Grey, where as 78 and 3.30 gm/cc for Gabbro Madduru respectively. The values of Porosity decreases from 1.73% to 0.25% for different igneous rock blocks.

It is also significant to mention that the sound level of 97.55 dB(A) was measured with respect to Granite Grey, Where as for Gabbro Madduru was measured with the value of 119.63 dB(A). Hence, it is significant to mention that there is a total difference of 22.08 dB (A) between the rock blocks with lowest UCS of 46.23 MPa and 102.6 MPa of highest UCS. Hence, it can be concluded that rock blocks having highest Tensile Strength, Uni-axial Compressive Strength and Schimdt Rebound Number values generate more degree of sound compared with rock blocks having low physic-mechanical property, irrespective of the drill bit parameters used such as dill bit diameter, thrust etc., in the present investigation. Further, it can also be noticed there is very slight variation of sound level of the order of 0.05 dB (A) between Granite Pink Mysore and Syenite rock blocks. Whereas for Granite Karnataka and Diorite Porphyry there is the maximum difference of sound level measurement of the order of 3.43 dB(A). Also, Gabbro Madduru with highest UCS of 102.6 MPa is having sound level of 2.32 dB (A) greater than Granite Karnataka, where both these type of rock blocks are available in Karnataka state. Hence it can be suggested that these two rock blocks may be useful in different engineering applications, where high amount of hardness and strength is necessary.

6.4 OPERATING PROCEDURE FOR THE DRILLING SET-UP

The construction and working principle of drill set has been explained in Chapter IV. The drill consists of one hydraulic pump and a motor which operates in parallel and not dependent on each other. The drill machine was operated in the following sequence:

- Initially all the valves of the pressure vessel were opened, and supply and release valves were closed.

- The drill rod was attached to the drill chuck.
- The rock sample was placed on the wooden base and it is clamped using the sample holder.
- The motor and the pump were switched on.
- The thrust was controlled using the main valve and the RPM was regulated using a regulator.
- Once the required thrust and RPM have been attained, release valve (i.e. valve-3) and supply valve (i.e. valve-1) are opened.
- By doing this piston in the cylinder descends down thus moving the Girder down.
- Now drill rod will come in contact with the surface of the rock sample and drills the rock.

6.4.1 Precautions adopted while drilling

- Turning of the drill bit getting red hot was avoided.
- Ear plugs were used while drilling.
- It was ensured that pressure was not exceeded beyond the maximum value of the pressure gauge.
- Leakage of water through pipes and inter connecting systems was avoided.
- Oil level of the water pump was maintained to appropriate level.
- Leakage of oil in the water pump was avoided.
- It was ensured the water used is clean and free from solid dirt.
- The rock block was fixed firmly on the wooden base using sample holder to avoid slipping of rock block during drilling operation.

6.5 MEASUREMENT OF SOUND LEVELS

For measurement of sound levels 'Spark 706' (from Larson Davis, Inc., USA) dosimeter was used. The microphone of the dosimeter was held at a distance of 1.5 cm from the drill rod, near the rock surface. Cushioning was provided for the drill machine to prevent any noise generation from the floor due to the vibration of drill machine.

Before starting the experiment, sound level was measured six times to ensure whether there is any significant variation in the noise generated from the drill machine. The noise level measurements thus taken indicated that the equipment produced sound of consistent value for all the six measurements taken 1.5 cm from the drilling machine. Equivalent sound level of the room environment measured was 55 dB and that of Portable Rotary Drill Machine was 76 dB.

It may be argued that sound produced from the Portable Rotary Drill Machine itself may affect the sound level measurement during rock drilling. It is important to mention here that if the sound level difference between two sources is more than 10 dB, then the total sound level will remain the same as that of the higher source (Hosrud 2001). Further, taking the measurement very close to the source will reduce the effect of sound produced from other sources.

6.6 SELECTION OF DRILL PARAMETERS

The drilling parameters were fixed after a number of trial runs of the drill machine. Drilling was carried out at 280, 290 and 300 rpm for four different thrusts i.e. 15, 18, 20 and 25 kg/cm^2. Four different diameter of drill bits were selected i.e. 6 mm, 8 mm, 10 mm and 16 mm for trial run, for shank lengths of 150 mm and 200 mm.

During drilling it was found that the drill bits of diameters lesser than 16 mm was turning to red hot and was unable to withstand the heat. Hence, the minimum diameter of drill rod selected for the present study was 16 mm. In addition to this two more drill bits of diameters 18 mm and 20 mm are also considered. This minimum diameter of drill rod was determined to ensure more number of drill holes on each rock sample/block. Among two shanks i.e. 150 mm and 200 mm lengths, it was concluded to select 200 mm shank in the present study, as it reduce the time required for one complete cycle of drilling. Further, this length was more suitable for the drilling machine as well as for the size of rock blocks selected.

Among three drill speeds i.e. 280, 290 and 300 rpm there was not much variation in the sound levels and the measured values were found to be almost consistent. Hence, in the present study 300 rpm was kept constant for all the trials i.e. different combination of drill parameters for different types of rocks.

6.7 EXPERIMENTAL PROCEDURE

A well prepared rock sample was placed over the wooden base of the Portable Rotary Drill Machine and firmly tightened with a pair of sample holders. For each rock block six vertical holes were drilled by keeping drill bit speed constant at 300 rpm. This was repeated for all three drill rods of diameters 16 mm, 18 mm and 20 mm by varying thrust at four stages i.e. 15, 18, 20 and 25 kg/cm^2. The sound levels were recorded precisely using dosimeter during drilling. For each rock sample six readings were recorded for one combination of drill diameter and thrust. Once the drill bits were found to be worn out, it was replaced with a new one, so as to ensure consistent in drilling. This procedure was repeated for all the rock samples/rock blocks which are under investigation.

The sound level data captured by the dosimeter for each rock sample was transferred to the computer system and was analysed using Blaze Software. The equivalent sound level of each hole measured/recorded by the dosimeter for different rock types is given in Tables 6.2 to 6.13.

The arithmetic average of each set of six measurements was computed to yield the average A-weighted equivalent sound level for a particular rock block and tabulated with respect to different physico mechanical properties. It was found that the recorded equivalent sound levels were almost consistent.

6.8 RESULTS AND DISCUSSION

6.8.1 Experimental Values With 16 mm Drill Bit and 15 Kg/cm^2 Thrust

Table-6.2: Equivalent sound levels (Leq) with 16 mm diameter drill rod at 15 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	96.0	95.2	95.8	95.6	95.7	95.2	95.58
2	AptiteAnantapur	98.5	97.9	98.6	98.3	98.7	98.6	98.43
3	Felsite Mysore	100.1	100.1	100.2	100.1	100.0	100.1	100.1
4	Gabbro Greenish.	101.6	101.5	101.3	101.1	101.1	101.3	101.3
5	Granite Pink Mysore	101.9	101.8	101.7	101.6	101.6	101.7	101.7
6	Syenite	102.0	102.2	102.0	102.3	102.3	102.0	102.1
7	Granite Porphyry	105.6	105.5	105.6	105.6	105.6	105.5	105.5
8	Basalt Nagpur	109.1	109.2	109.2	109.2	109.1	109.0	109.1
9	Syenite Porphyry	110.8	110.9	110.9	110.6	110.6	110.9	110.7
10	Diorite Porphyry	113.3	113.2	113.1	113.3	113.0	113.1	113.1
11	Granite Karnataka	116.5	116.5	116.2	116.2	116.1	116.2	116.2
12	Gabbro Madduru	118.8	118.9	118.7	118.7	118.6	118.9	118.7

From the above table 6.2 for the drill bit parameters of 16 mm dia meter and thrust of 15 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 95.58 dB(A), where as the maximum average A weighted sound level measurement of 118.7 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 23.12 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

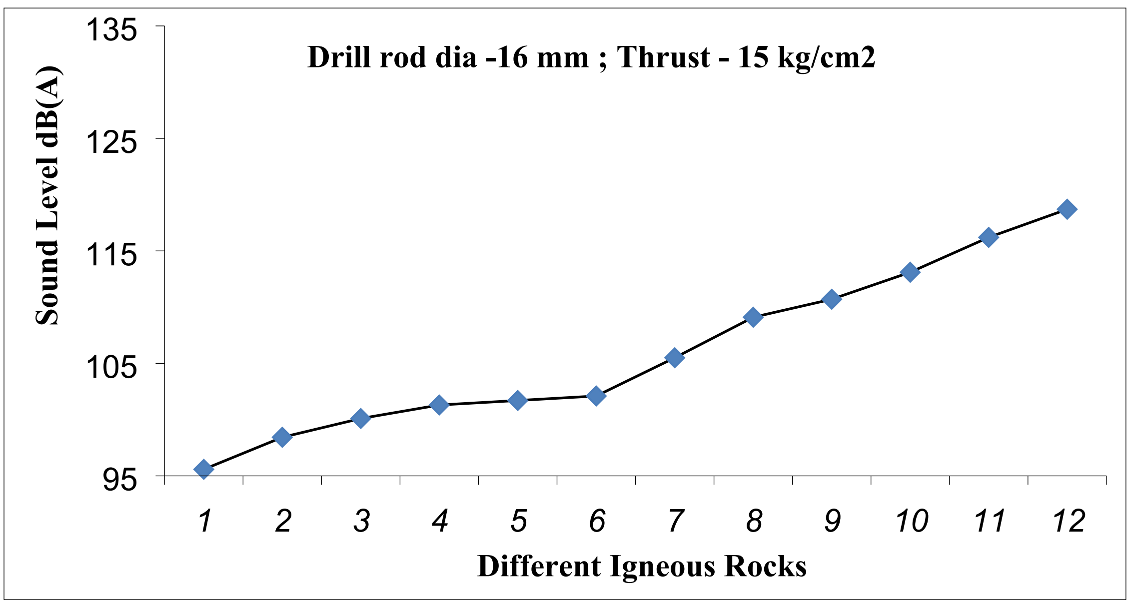


Fig. 6.3 Sound Level Vs rock type for 16 mm diameter drill rod at 15 kg/cm^2 thrust

6.8.2 Experimental Values With 16 mm Drill Bit and 18 Kg/cm^2 Thrust

Table-6.3: Equivalent sound levels (Leq) with 16 mm diameter drill rod at 18 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	96.1	95.3	95.9	95.9	95.8	95.6	95.76667
2	AptiteAnantapur	98.7	98.2	98.7	98.4	98.8	98.7	98.58333
3	Felsite Mysore	100.3	100.3	100.3	100.3	100.1	100.3	100.2667
4	Gabbro Greenish.	101.7	101.6	101.5	101.3	101.3	101.5	101.4833
5	Granite Pink Mysore	102.1	101.9	101.8	101.7	101.7	101.8	101.8333
6	Syenite	102.2	102.3	102.1	102.4	102.3	102.2	102.25
7	Granite Porphyry	105.7	105.6	105.8	105.7	105.7	105.6	105.6833
8	Basalt Nagpur	109.3	109.3	109.3	109.3	109.3	109.2	109.2833
9	Syenite Porphyry	110.9	111.1	111.1	110.7	110.7	111.1	110.9333
10	Diorite Porphyry	113.5	113.3	113.2	113.4	113.3	113.2	113.3167
11	Granite Karnataka	116.7	116.7	116.3	116.3	116.3	116.3	116.4333
12	Gabbro Madduru	118.9	118.7	118.8	118.9	119.1	119.1	118.9167

From the above table 6.3 for the drill bit parameters of 16 mm dia meter and thrust of 18 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 95.76 dB(A), where as the maximum average A weighted sound level measurement of 118.91 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 23.15 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

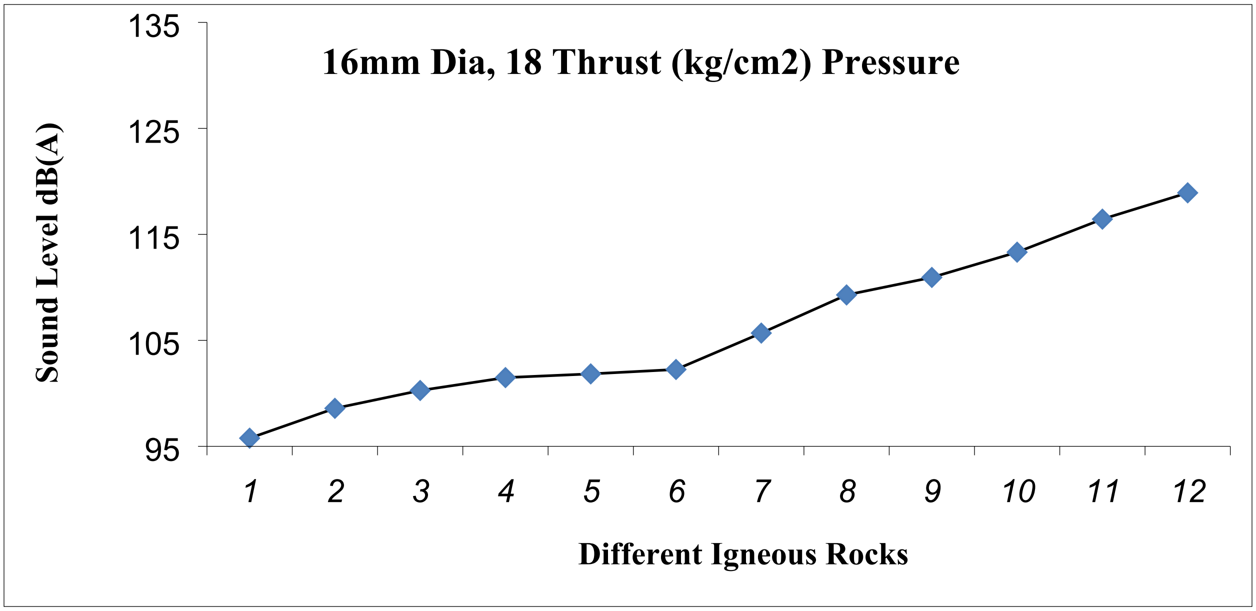


Fig. 6.4 Sound Level Vs rock type for 16 mm diameter drill rod at 18 kg/cm^2 thrust

6.8.3 Experimental Values With 16 mm Drill Bit and 20 Kg/cm^2 Thrust

Table-6.4: Equivalent sound levels (Leq) with 16 mm diameter drill rod at 20 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.3	97.3	97.3	97.2	97.4	97.2	97.28
2	AptiteAnantapur	99.1	98.7	98.3	98.8	98.7	98.9	98.75
3	Felsite Mysore	100.5	101.6	100.8	100.8	100.7	100.8	100.86
4	Gabbro Greenish.	102.1	101.9	101.9	101.6	101.7	101.6	101.8
5	Granite Pink Mysore	102.5	102.4	102.5	102.6	102.7	102.4	102.51
6	Syenite	102.6	102.6	102.7	102.7	102.8	102.7	102.68
7	Granite Porphyry	105.9	105.9	105.9	105.9	106.2	106.3	106.01
8	Basalt Nagpur	109.7	109.9	109.9	110.0	110.3	109.8	109.93
9	Syenite Porphyry	111.3	111.4	111.5	111.4	111.6	111.6	111.46
10	Diorite Porphyry	113.6	113.7	113.7	113.8	113.7	113.9	113.73
11	Granite Karnataka	117.0	117.1	116.9	117.1	116.9	116.9	116.98
12	Gabbro Madduru	119.3	119.4	119.4	119.3	119.2	119.3	119.31

From the above table 6.4 for the drill bit parameters of 16 mm dia meter and thrust of 20 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 97.28

dB(A), where as the maximum average A weighted sound level measurement of 119.31 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.03 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

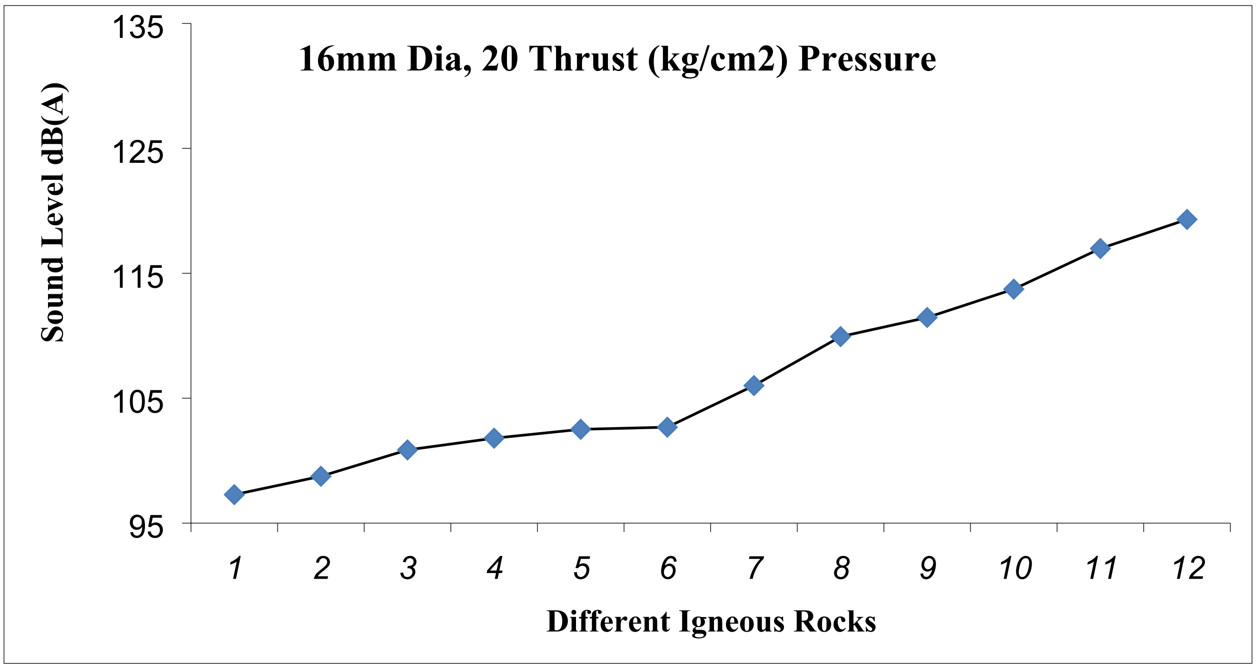


Fig. 6.5 Sound Level Vs rock type for 16 mm diameter drill rod at 20 kg/cm^2 thrust

6.8.4 Experimental Values With 16 mm Drill Bit and 25 Kg/cm² Thrust

Table-6.5: Equivalent sound levels (Leq) with 16 mm diameter drill rod at 25 kg/cm² thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.0	97.1	96.9	97.2	97.3	97.9	97.23
2	AptiteAnantapur	98.9	98.5	98.0	98.7	98.6	98.69	98.56
3	Felsite Mysore	100.2	101.5	100.6	100.6	100.5	100.6	100.6
4	Gabbro Greenish.	101.9	101.8	101.7	101.5	101.6	101.5	101.6
5	Granite Pink Mysore	102.3	102.3	102.3	102.5	102.5	102.2	102.3
6	Syenite	102.5	102.5	102.6	102.6	102.6	102.5	102.5
7	Granite Porphyry	105.8	105.7	105.7	105.8	105.9	106.0	105.8
8	Basalt Nagpur	109.6	109.8	109.8	109.9	109.9	109.7	109.7
9	Syenite Porphyry	111.0	111.2	111.3	111.3	111.5	111.5	111.3
10	Diorite Porphyry	113.5	113.6	113.6	113.6	113.5	113.7	113.5
11	Granite Karnataka	116.9	116.9	116.8	116.9	116.8	116.7	116.8
12	Gabbro Madduru	119.1	119.2	119.2	119.0	119.1	119.1	119.1

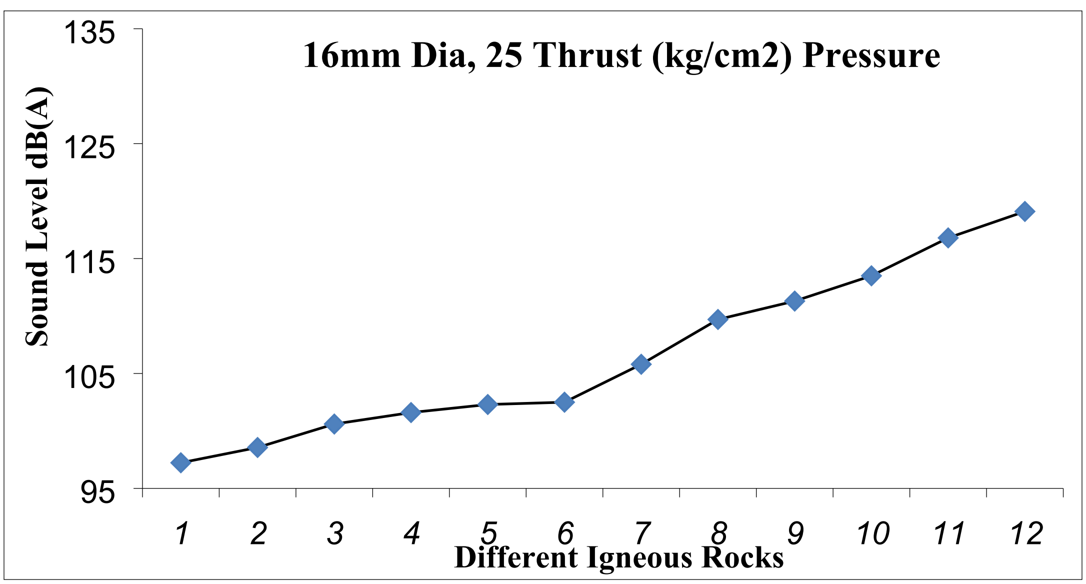


Fig. 6.6 Sound Level Vs rock type for 16 mm diameter drill rod at 25 kg/cm² thrust

From the above table 6.5 for the drill bit parameters of 16 mm dia meter and thrust of 25 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 97.23 dB(A), where as the maximum average A weighted sound level measurement of 119.1 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 21.87 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

6.8.5 Experimental Values With 18 mm Drill Bit and 15 Kg/cm^2 Thrust

Table-6.6: Equivalent sound levels (Leq) with 18 mm diameter drill rod at 15 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	96.9	96.3	96.1	96.2	96.3	96.0	96.3
2	AptiteAnantapur	98.8	98.9	98.7	98.3	98.7	99.3	98.78
3	Felsite Mysore	100.5	100.6	100.7	100.6	100.5	100.7	100.6
4	Gabbro Greenish.	101.8	101.7	101.7	101.7	101.7	101.9	101.6
5	Granite Pink Mysore	102.3	102.2	102.0	102.0	102.2	102.2	102.1
6	Syenite	102.5	102.6	102.6	102.6	102.7	102.5	102.5
7	Granite Porphyry	105.9	106.0	106.0	105.9	105.8	105.7	105.8
8	Basalt Nagpur	109.3	109.5	109.3	109.6	109.6	109.3	109.4
9	Syenite Porphyry	111.0	111.3	111.3	111.0	111.2	111.2	111.1
10	Diorite Porphyry	113.5	113.6	113.5	113.6	113.6	113.6	113.5
11	Granite Karnataka	116.8	116.9	116.9	116.8	116.9	116.8	116.8
12	Gabbro Madduru	119.0	119.1	119.1	119.1	119.2	119.0	119.0

From the above table 6.6 for the drill bit parameters of 18 mm dia meter and thrust of 15 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 96.3

dB(A), where as the maximum average A weighted sound level measurement of 119.0 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.7 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

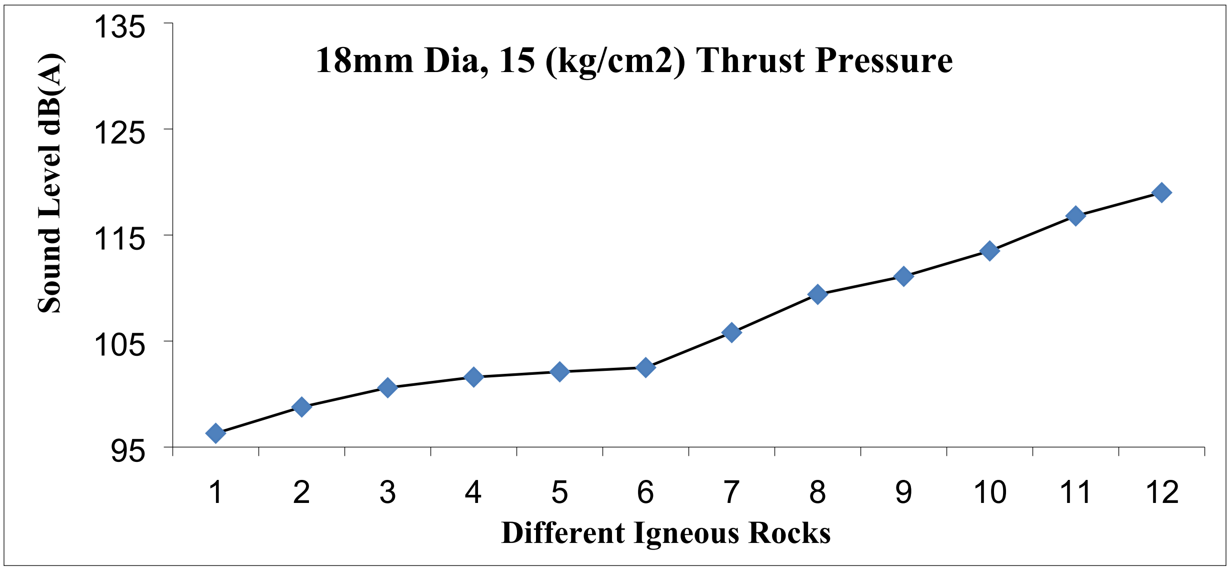


Fig. 6.7 Sound Level Vs rock type for 16 mm diameter drill rod at 15 kg/cm^2 thrust

6.8.6 Experimental Values With 18 mm Drill Bit and 18 Kg/cm^2 Thrust

Table-6.7: Equivalent sound levels (Leq) with 18 mm diameter drill rod at 18 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.1	96.4	96.4	96.3	96.4	96.2	96.46
2	AptiteAnantapur	98.8	99.2	98.8	98.5	98.8	99.5	98.93
3	Felsite Mysore	100.7	100.8	100.9	100.7	100.7	100.9	100.78
4	Gabbro Greenish.	101.9	101.8	101.8	101.8	101.8	101.9	101.83
5	Granite Pink Mysore	102.5	102.3	102.3	102.1	102.3	102.4	102.3
6	Syenite	102.7	102.7	102.7	102.7	102.8	102.7	102.7
7	Granite Porphyry	106.2	106.3	106.3	106.2	105.9	105.8	105.45

8	Basalt Nagpur	109.5	109.6	109.4	109.8	109.8	109.4	109.58
9	Syenite Porphyry	111.2	111.5	111.4	111.3	111.3	111.3	111.33
10	Diorite Porphyry	113.6	113.7	113.6	113.7	113.7	113.8	113.68
11	Granite Karnataka	116.9	117.1	117.1	116.9	117.1	116.9	116.5
12	Gabbro Madduru	119.3	119.3	119.2	119.3	119.2	119.2	119.25

From the above table 6.7 for the drill bit parameters of 18 mm dia meter and thrust of 18 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 96.46 dB(A), where as the maximum average A weighted sound level measurement of 119.25 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.79 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

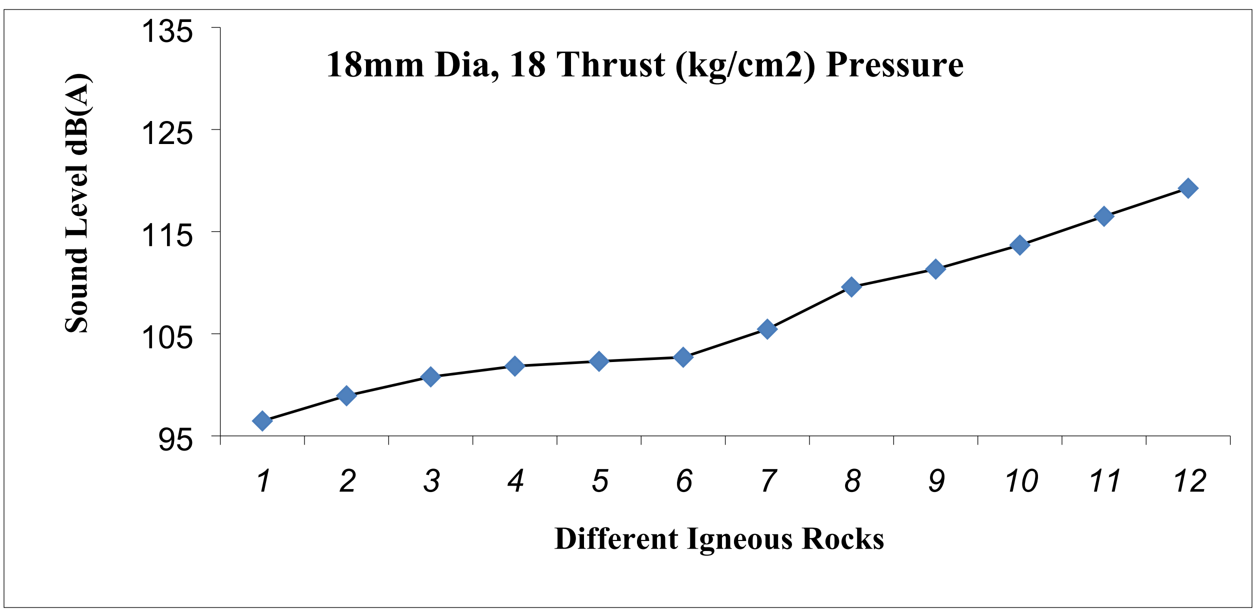


Fig. 6.8 Sound Level Vs rock type for 18 mm diameter drill rod at 18 kg/cm^2 thrust

6.8.7 Experimental Values With 18 mm Drill Bit and 20 Kg/cm^2 Thrust

Table-6.8: Equivalent sound levels (Leq) with 18 mm diameter drill rod at 20 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.3	97.8	97.8	97.6	97.7	97.1	97.55
2	AptiteAnantapur	99.0	99.1	98.5	98.4	98.8	98.5	98.71
3	Felsite Mysore	101.3	101.5	101.3	101.3	101.6	101.7	101.45
4	Gabbro Greenish.	102.1	102.4	102.6	102.5	102.5	102.2	102.83
5	Granite Pink Mysore	102.7	102.8	102.6	102.7	102.7	102.8	102.71
6	Syenite	102.9	102.9	102.9	102.8	102.1	102.9	102.75
7	Granite Porphyry	106.3	106.5	106.4	106.5	106.7	106.9	106.55
8	Basalt Nagpur	110.1	109.9	109.8	110.0	109.7	109.8	109.83
9	Syenite Porphyry	111.8	111.7	111.6	111.6	111.7	111.8	111.7
10	Diorite Porphyry	113.9	113.8	113.9	113.9	113.9	113.9	113.88
11	Granite Karnataka	117.1	117.3	117.3	117.4	117.5	117.3	117.31
12	Gabbro Madduru	119.7	119.7	119.7	119.5	119.7	119.5	119.63

From the above table 6.8 for the drill bit parameters of 18 mm dia meter and thrust of 20 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 97.55 dB(A), where as the maximum average A weighted sound level measurement of 119.63 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.08 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

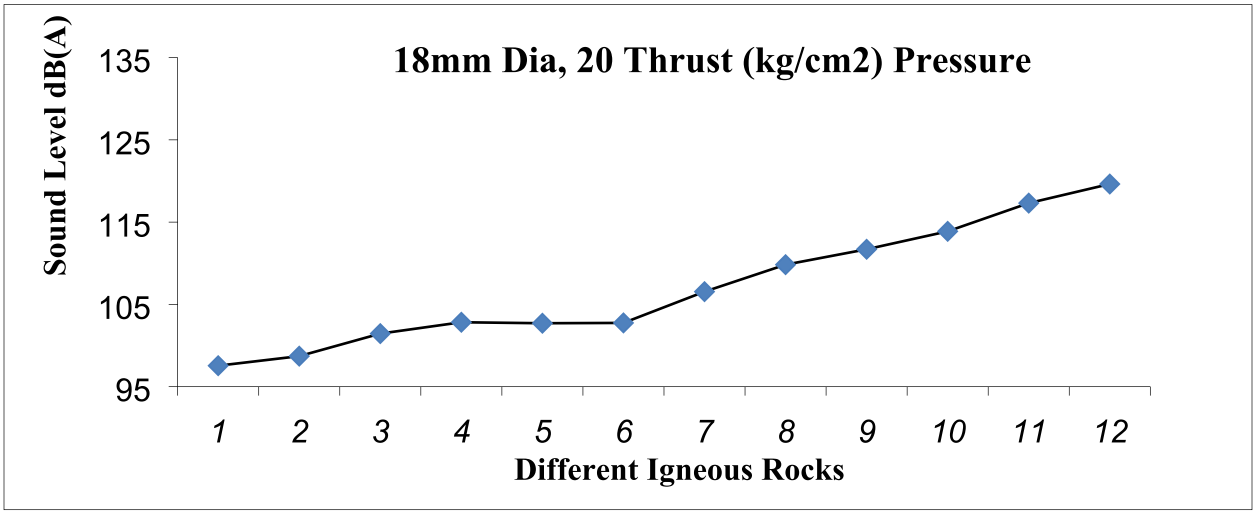


Fig. 6.9 Sound Level Vs rock type for 18 mm diameter drill rod at 20 kg/cm² thrust

6.8.8 Experimental Values With 18 mm Drill Bit and 25 Kg/cm² Thrust

Table-6.9: Equivalent sound levels (Leq) with 18 mm diameter drill rod at 25 kg/cm² thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.2	97.6	97.5	97.3	97.5	97.0	97.35
2	AptiteAnantapur	98.9	98.9	98.2	98.1	98.7	98.3	98.5
3	Felsite Mysore	101.0	101.3	101.1	101.1	101.5	101.5	101.25
4	Gabbro Greenish.	102.0	102.2	102.3	102.3	102.3	102.0	102.1
5	Granite Pink Mysore	102.6	102.7	102.5	102.5	102.5	102.6	102.5
6	Syenite	102.8	102.7	102.7	102.7	102.8	102.8	102.7
7	Granite Porphyry	106.2	106.3	106.3	106.3	106.5	106.7	106.3
8	Basalt Nagpur	109.9	109.8	109.7	109.9	109.6	109.6	109.7
9	Syenite Porphyry	111.6	111.5	111.5	111.5	111.6	111.7	111.5
10	Diorite Porphyry	113.8	113.7	113.7	113.7	113.8	113.8	113.7
11	Granite Karnataka	117.0	117.2	117.1	117.2	117.3	117.2	117.1
12	Gabbro Madduru	119.5	119.6	119.5	119.3	119.6	119.3	119.4

From the above table 6.9 for the drill bit parameters of 18 mm dia meter and thrust of 25 kg/cm²it was observed that Granite Grey has a least A weighted sound level of 97.35 dB(A), where as the maximum average A weighted sound level measurement of 119.40 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.05 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

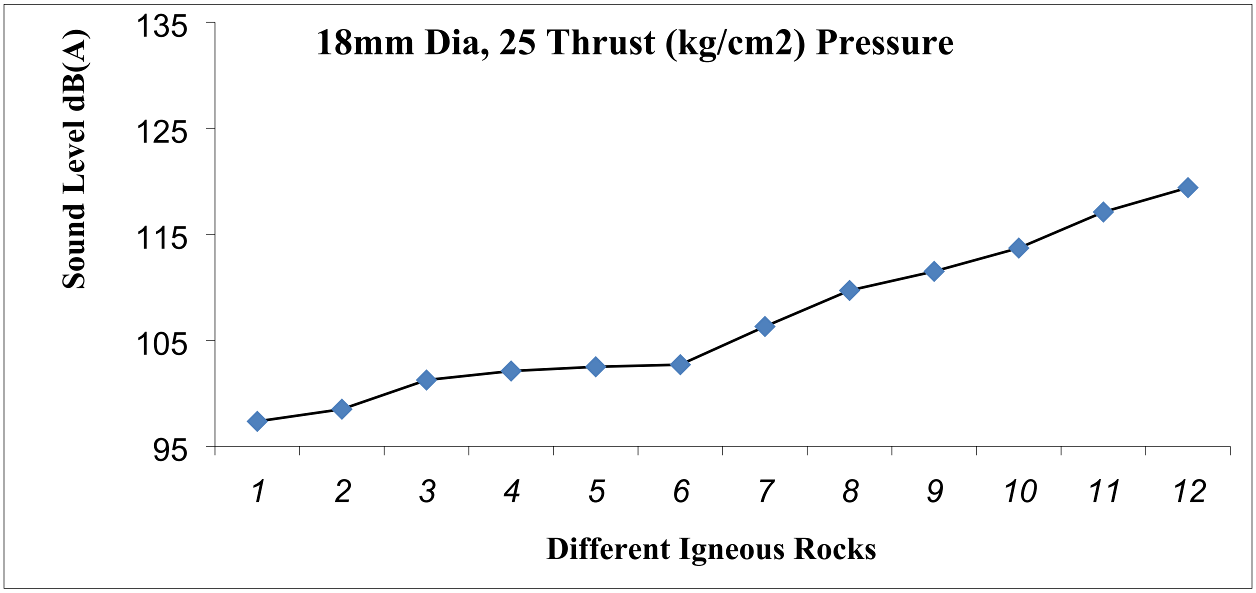


Fig. 6.10 Sound Level Vs rock type for 18 mm diameter drill rod at 25 kg/cm^2 thrust

6.8.9 Experimental Values With 20 mm Drill Bit and 15 Kg/cm^2 Thrust

Table-6.10: Equivalent sound levels (Leq) with 20 mm diameter drill rod at 15 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	96.8	96.1	97.0	97.2	97.3	96.9	96.88
2	AptiteAnantapur	98.9	98.3	99.5	99.6	99.1	99.2	99.1
3	Felsite Mysore	101.0	100.9	101.0	100.9	101.1	101.3	101
4	Gabbro Greenish.	102.0	102.0	102.3	102.3	102.3	102.0	102.1
5	Granite Pink Mysore	102.3	102.5	102.5	102.6	102.6	102.5	102.5
6	Syenite	102.7	102.8	102.8	102.7	102.8	102.7	102.7
7	Granite Porphyry	106.2	106.1	106.6	106.6	106.5	106.5	106.4
8	Basalt Nagpur	109.8	109.7	109.7	109.8	109.8	109.7	109.7
9	Syenite Porphyry	111.5	111.5	111.6	111.5	111.5	111.6	111.5

10	Diorite Porphyry	113.7	113.7	113.8	113.8	113.8	113.7	113.7
11	Granite Karnataka	117.0	117.1	117.2	117.1	117.2	117.0	117.1
12	Gabbro Madduru	119.5	119.3	119.5	119.5	119.3	119.5	119.4

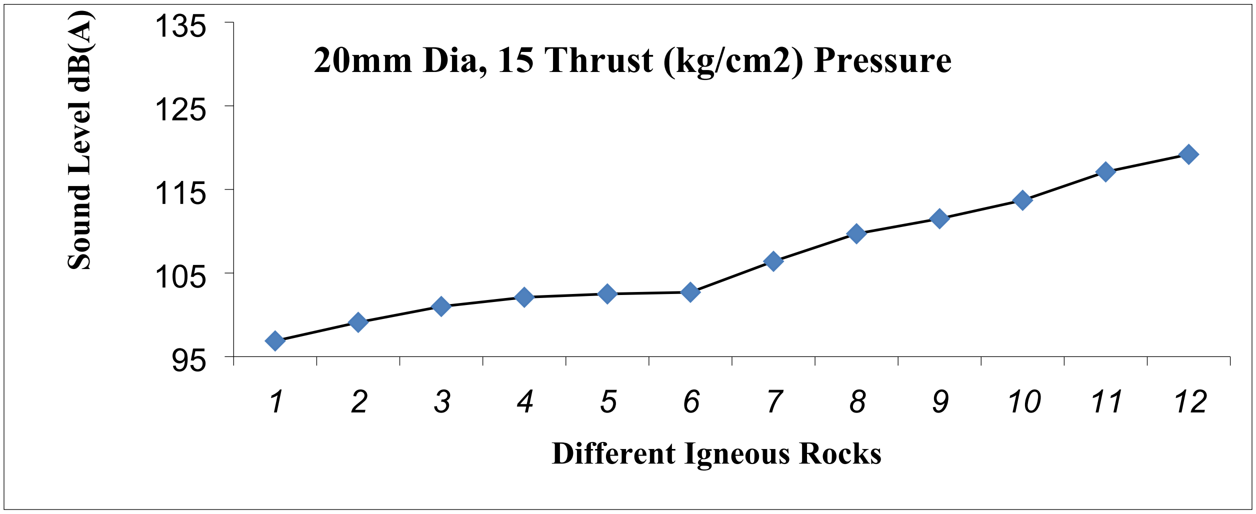


Fig. 6.11 Sound Level Vs rock type for 20 mm diameter drill rod at 15 kg/cm^2 thrust

From the above table 6.10 for the drill bit parameters of 20 mm dia meter and thrust of 15 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 96.88 dB(A), where as the maximum average A weighted sound level measurement of 119.40 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.52 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

6.8.10 Experimental Values With 20 mm Drill Bit and 18 Kg/cm^2 Thrust

Table-6.11: Equivalent sound levels (Leq) with 20 mm diameter drill rod at 18 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	96.9	96.4	96.3	97.1	97.5	97.1	96.88
2	AptiteAnantapur	99.2	98.5	99.6	99.7	99.3	99.3	99.3
3	Felsite Mysore	101.3	101.1	101.3	101.1	101.3	101.5	101.26
4	Gabbro Greenish.	102.2	102.2	102.5	102.5	102.4	102.3	102.35
5	Granite Pink Mysore	102.5	102.6	102.6	102.7	102.8	102.6	102.63
6	Syenite	102.9	102.9	102.9	102.8	102.9	102.9	102.88
7	Granite Porphyry	106.3	106.3	106.7	106.8	106.6	106.7	106.56
8	Basalt Nagpur	109.9	109.8	109.9	109.9	109.9	109.8	109.86
9	Syenite Porphyry	111.7	111.6	111.7	111.6	111.7	111.7	111.66
10	Diorite Porphyry	113.8	113.8	113.9	113.9	113.9	113.9	113.86
11	Granite Karnataka	117.1	117.3	117.3	117.3	117.3	117.2	117.25
12	Gabbro Madduru	119.7	119.5	119.7	119.7	119.6	119.7	119.65

From the above table 6.11 for the drill bit parameters of 20 mm dia meter and thrust of 18 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 96.88 dB(A), where as the maximum average A weighted sound level measurement of 119.65 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.77 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

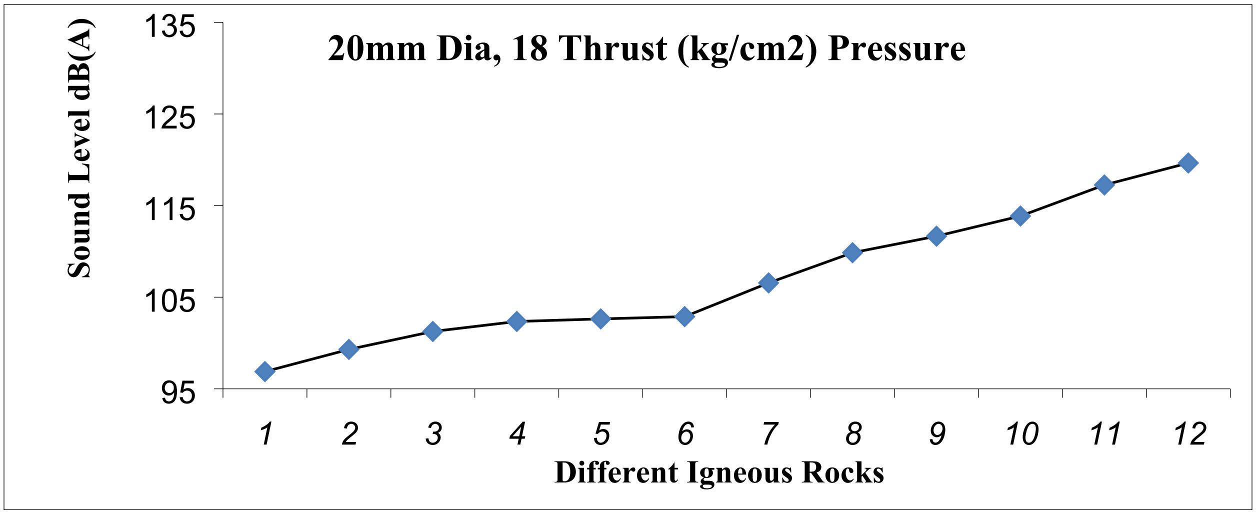


Fig. 6.12 Sound Level Vs rock type for 20 mm diameter drill rod at 18 kg/cm^2 thrust

6.8.11 Experimental Values With 20 mm Drill Bit and 20 Kg/cm^2 Thrust

Table-6.12: Equivalent sound levels (Leq) with 20 mm diameter drill rod at 20 kg/cm^2 thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.9	96.3	96.3	97.8	98.1	97.2	97.26
2	AptiteAnantapur	99.7	99.8	99.8	99.5	99.7	99.7	99.7
3	Felsite Mysore	101.9	101.8	101.9	102.1	101.9	101.8	101.9
4	Gabbro Greenish.	102.6	103.1	102.9	102.3	102.5	102.7	102.68
5	Granite Pink Mysore	103.1	103.1	102.9	103.1	102.9	103.0	103.01
6	Syenite	103.1	103.0	102.9	103.1	103.1	102.9	103.01
7	Granite Porphyry	106.9	107.1	107.0	107.2	106.8	106.9	106.98
8	Basalt Nagpur	110.1	110.2	110.1	110.3	110.3	110.5	110.25
9	Syenite Porphyry	111.9	112.1	112.1	112.1	111.6	111.9	111.95
10	Diorite Porphyry	114.0	114.1	113.9	113.9	114.0	114.1	114
11	Granite Karnataka	117.6	117.7	117.7	117.8	117.7	117.6	117.68
12	Gabbro Madduru	119.9	119.8	119.9	120.0	119.9	119.9	119.9

From the above table 6.12 for the drill bit parameters of 20 mm dia meter and thrust of 20 kg/cm^{2}it was observed that Granite Grey has a least A weighted sound level of 97.26 dB(A), whereas the maximum average A weighted sound level measurement of 119.9

dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.64 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

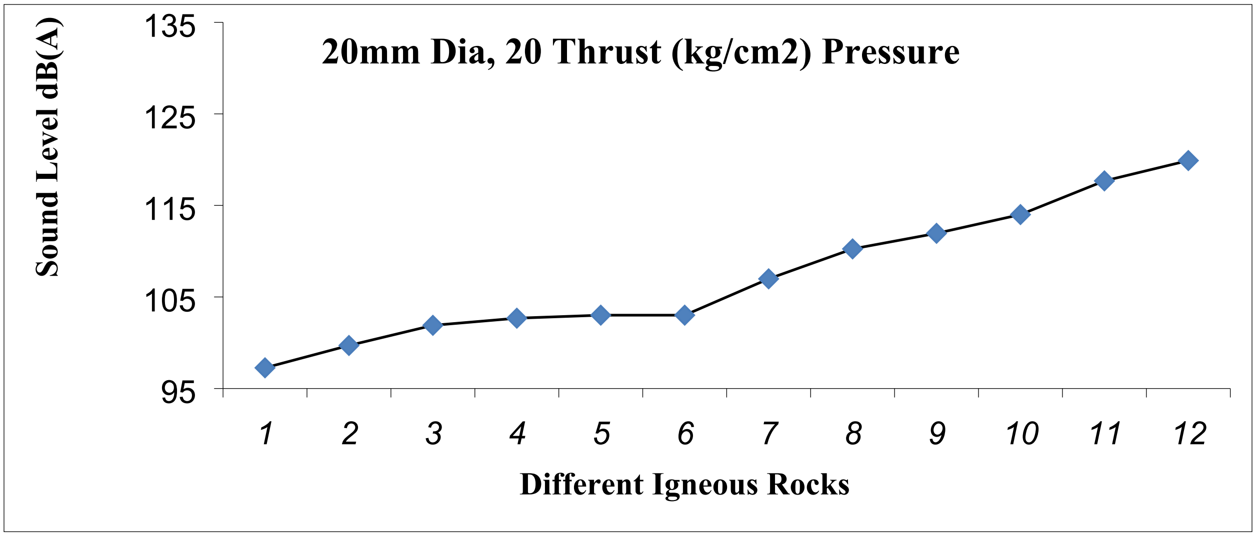


Fig. 6.13 Sound Level Vs rock type for 20 mm diameter drill rod at 20 kg/cm² thrust

6.8.12 Experimental Values With 20 mm Drill Bit and 25 Kg/cm² Thrust

Table-6.13: Equivalent sound levels (Leq) with 20 mm diameter drill rod at 25 kg/cm² thrust

Sl. No.	Material	S1(dB)	S2(dB)	S3(dB)	S4(dB)	S5(db)	S6(dB)	S_{AVG}(dB)
1	Granite Grey	97.8	96.2	97.6	97.8	97.9	97.0	97.38
2	AptiteAnantapur	99.5	99.7	99.7	99.3	99.6	99.5	99.55
3	Felsite Mysore	101.8	101.7	101.7	101.9	101.8	101.6	101.75
4	Gabbro Greenish.	102.5	102.9	102.8	102.2	102.3	102.5	102.53
5	Granite Pink Mysore	102.9	102.9	102.8	102.9	102.7	102.9	102.8
6	Syenite	102.9	102.9	102.8	102.9	102.9	102.8	102.8
7	Granite Porphyry	106.8	106.9	106.9	106.9	106.7	106.7	106.8
8	Basalt Nagpur	110.0	110.1	110.0	110.1	110.1	110.3	110.1
9	Syenite Porphyry	111.8	111.9	111.9	111.9	111.8	111.7	111.8

10	Diorite Porphyry	113.9	113.9	113.8	113.8	113.9	113.9	113.8
11	Granite Karnataka	117.5	117.5	117.6	117.6	117.6	117.5	117.5
12	Gabbro Madduru	119.8	119.7	119.8	119.9	119.8	119.8	119.8

From the above table 6.13 for the drill bit parameters of 20 mm dia meter and thrust of 25 kg/cm^2it was observed that Granite Grey has a least A weighted sound level of 97.38 dB(A), where as the maximum average A weighted sound level measurement of 119.8 dB(A) was recorded for igneous rock block namely Gabbro Madduru, thereby measuring a difference of 22.42 dB(A) between the rock block of maximum Uni – axial compressive strength (UCS) of 102.6 MPa and the minimum UCS of 46.23 MPa. Whereas the Tensile Strength was found to be 5.23 MPa and 12.3 MPa for respective igneous rock blocks.

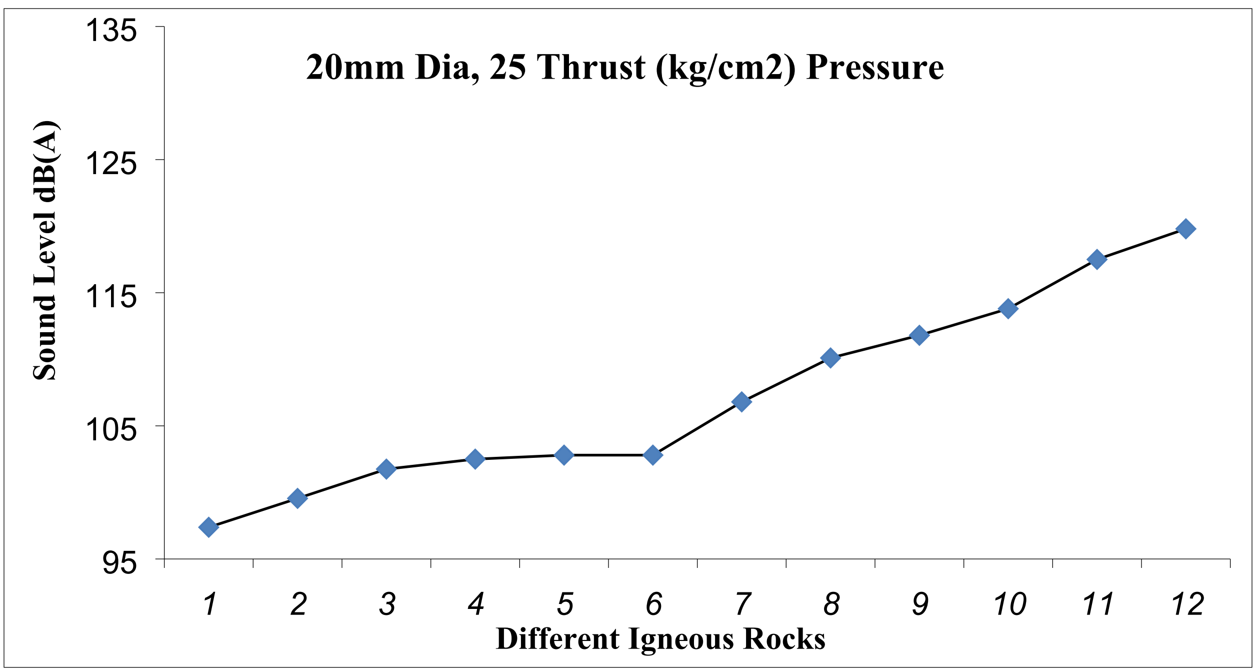


Fig. 6.14 Sound Level Vs rock type for 20 mm diameter drill rod at 25 kg/cm^2 thrust

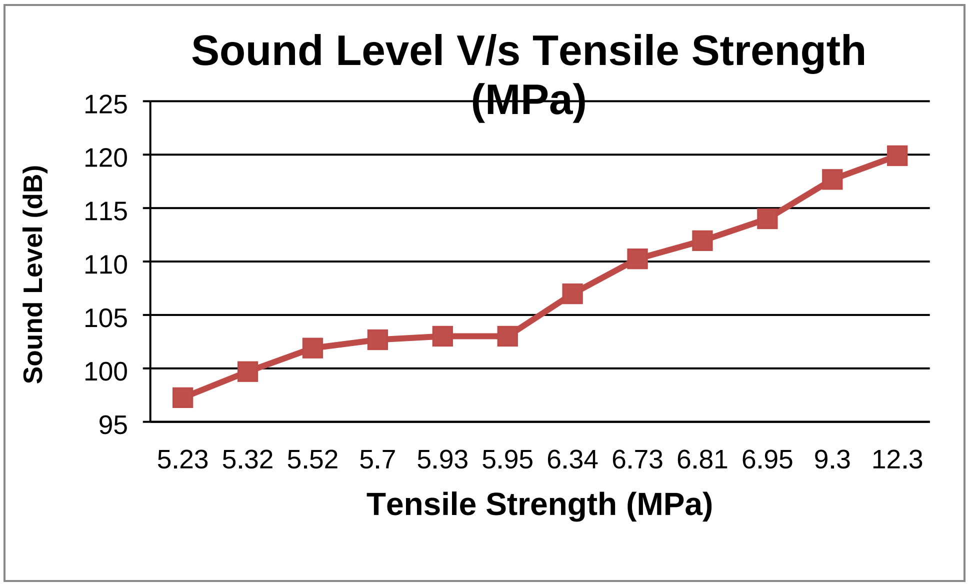


Fig 6.15 : Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm^2) V/s Tensile Strength.

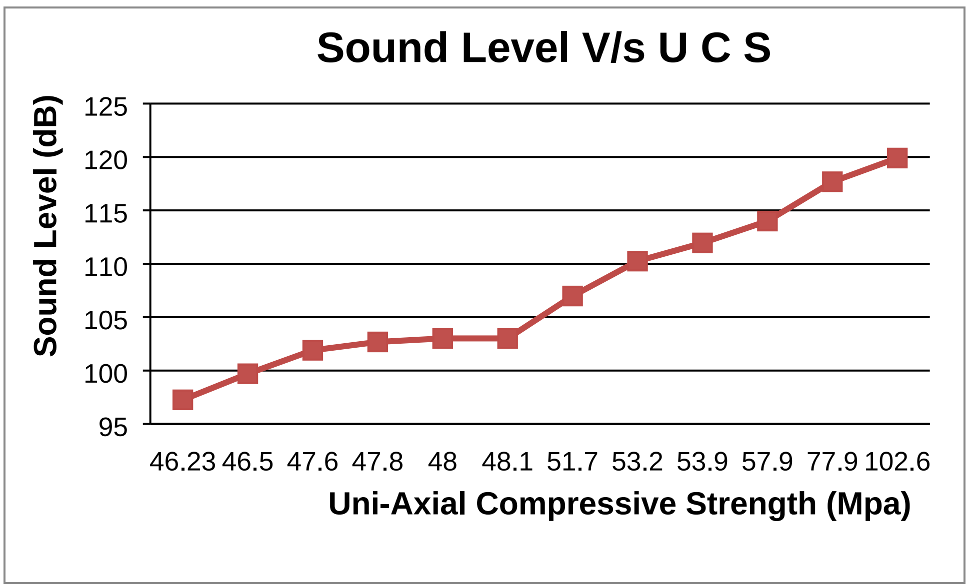


Fig 6.16: Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm^2) V/s UCS.

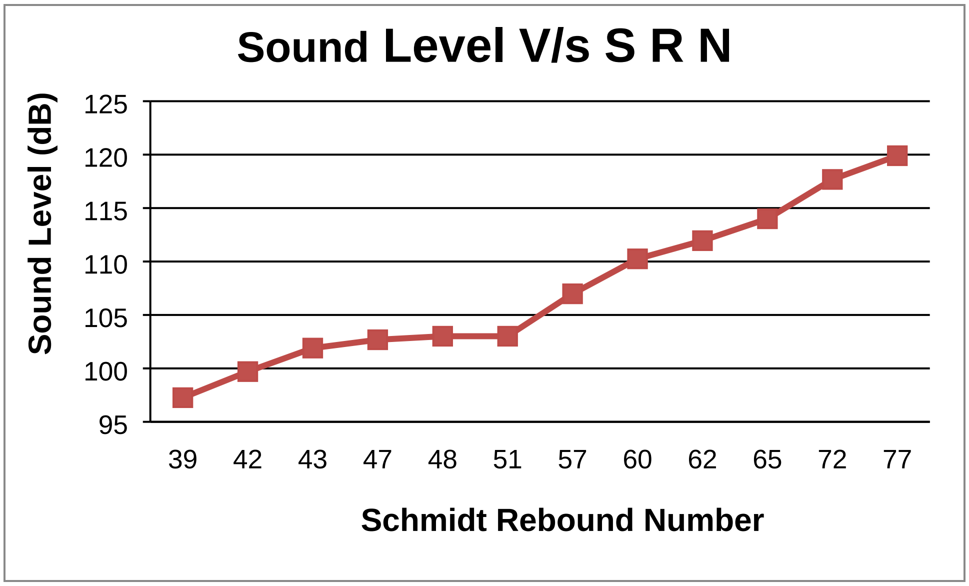


Fig 6.17: Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm^2) V/s SRN.

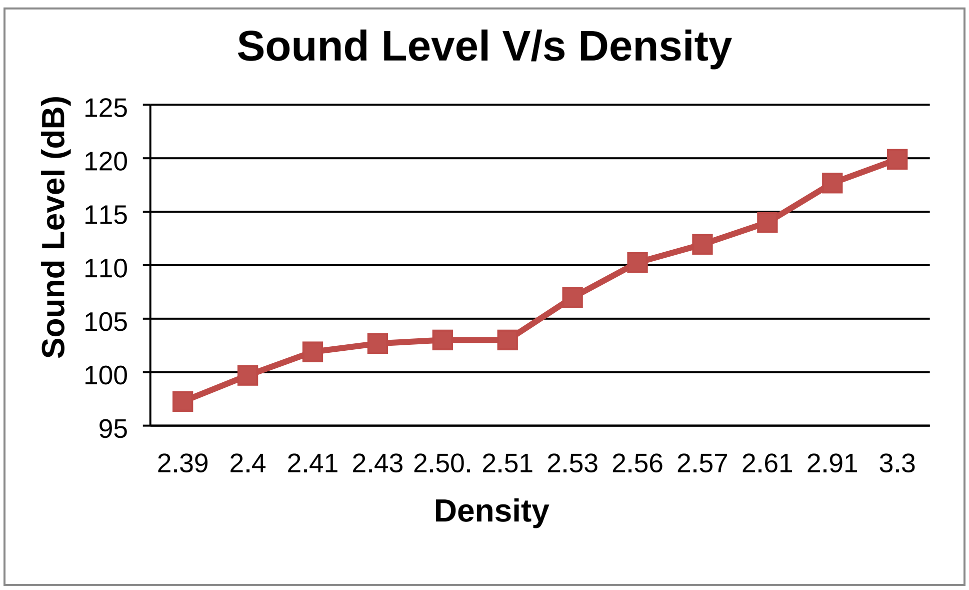


Fig 6.18: Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm^2) V/s Density.

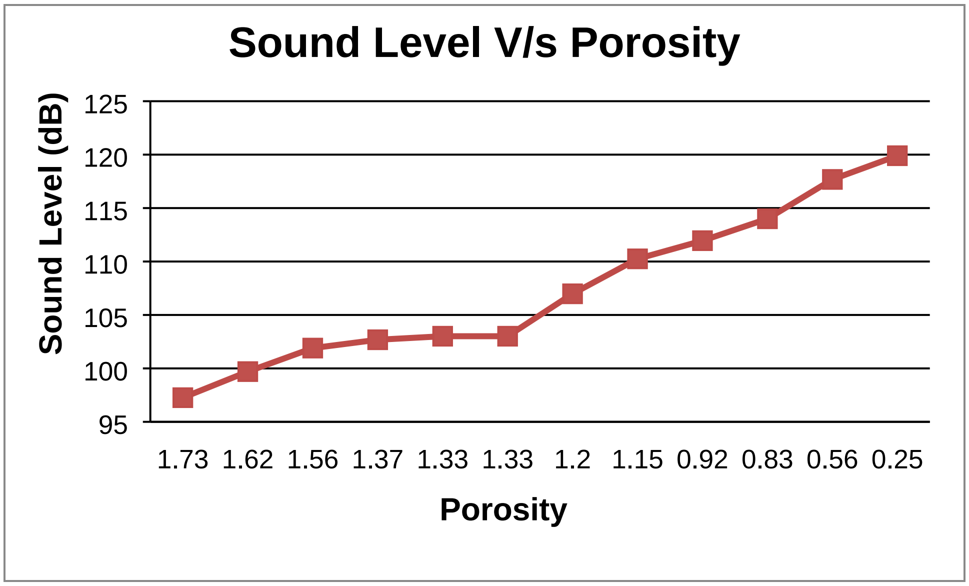


Fig 6.19: Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm²) V/s Porosity.

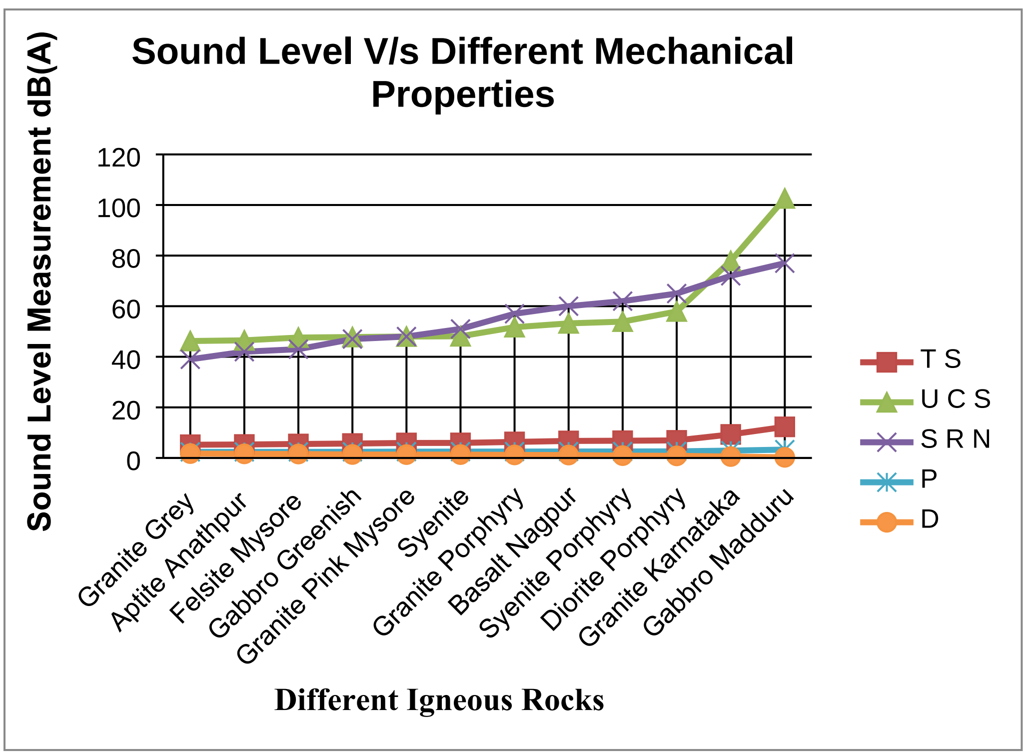


Fig 6.20: Sound Level measurement using Portable Drill Setup by considering drill bit diameter 18 (mm) and Thrust Pressure 20(kg/cm²) V/s Different Mechanical Properties.

6.9 INFERENCE

From the figures shown above, it can be observed that A-weighted equivalent sound level produced during drilling process increases non linearly as the mechanical properties like UCS, SRN, Density, porosity and Tensile strength of the igneous rock increases. This may be due to increase in resistance offered against drilling. Further It may be argued that sound produced from the fabricated drill set up itself may affect the sound level measurement during rock drilling. It is important to mention here that the motor used in the set-up is noiseless with negligible sound level and hence do not have any impact on the equivalent sound level measurements.

CHAPTER 7

MATHEMATICAL MODELLING

7.1 INTRODUCTION

In statistics, regression analysis is a statistical process for the estimation and the determination of relationship among variables (Finol et al). It consists many techniques for modeling and analyzing several variables, when the main aim is on the relationship between a dependent variable and one or more independent variables. The regression analysis helps to understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variable is varied, while the other independent variables are kept constant. Most commonly, regression analysis determines the conditional expectation of the dependent variable when the independent variables are known. In all instances, the estimation target is a function of the independent variables called the regression function. In regression analysis, it is also possible to characterize the variation of the dependent variable around the regression function which can be described by a probability distribution.

Most common application of regression analysis is for prediction and forecasting. It is also used to know which among the independent variables are related to the dependent variable, and determination of different forms of these relationships. There are many techniques for carrying out regression analysis, among them linear regression and ordinary least squares regression are significant, where regression function is defined in terms of a finite number of unknown parameters, that are estimated from the available data. In practice, the performance of regression analysis methods depends on the form of the data generating process, and how it depends on the regression approach being followed. Since the actual form of the data-generating process is generally not known, regression analysis often depends to some extent on making assumptions about this process. These assumptions are sometimes testable if a sufficient quantity of data is known. Regression models for prediction are often applicable even when the assumptions are moderately violated, although they may not perform optimally. However, in certain applications with small effects or questions of causality based on observational data, regression methods can give misleading results.

7.2 UNKNOWN PARAMETERS

In various fields of engineering application, different terminologies are used in place of dependent and independent variables.

- The unknown parameters, denoted as β, which may represent a scalar or a vector.
- The independent variables X.
- The dependent variable Y.

A regression model relates ‘Y’ to a function of ‘X’ and ‘β’ can be represented as shown in equation 7.1

$$Y » f(X, \beta) \qquad \text{…. 7.1}$$

To carry out regression analysis, the form of the function ‘f’ must be specified. Sometimes the form of this function is based on knowledge about the relationship between Y and X that does not rely on the data. If no such knowledge is available, a flexible or convenient form for f is chosen.

In order to perform a regression analysis it is necessary to provide information about the dependent variable Y.

- If N is the number of measurements and K being the number of unknown parameters, if Ndatais of the form (Y, X), where $N < K$, most classical approaches to regression analysis cannot be performed, since the system of equations defining the regression model is underdetermined, as sufficient data is unavailable to recover β.

- If exactly $N = K$ data points are observed, and the function f is linear, the equations $Y = f(X, \beta)$ can be solved exactly rather than approximately. This reduces to solving a set of N equations with N unknowns (the elements of β), which has a unique solution as long as the X are linearly independent. If f is nonlinear, a solution may not exist, or many solutions may exist.

- The most common situation is where $N > K$ data points are observed. In this case, there is enough information in the data to estimate a unique value for β that best fits the data in some sense, and the regression model when applied to the data can be viewed as an over determined system in β.

In the last case, the regression analysis provides the tools for:

1. Finding a solution for unknown parameters β that will, for example, minimize difference between the measured and predicted values of the dependent variable Y (also known as method of least squares).

2. Under certain statistical assumptions, the regression analysis may use the surplus information to provide statistical information about the unknown parameters β and predicted values of the dependent variable Y.

7.3 NECESSARY NUMBER OF INDEPENDENT MEASUREMENTS

If three unknown parameters are considered in a regression model (such as β_0, β_1, and β_2)and, if any investigator performs ten measurements all at exactly the same value of independent variable vector X (which contains the independent variables X_1, X_2, and X_3), the regression analysis will not be applicable to give a unique set of estimated values for the three unknown parameters. In that case, it is most appropriate to estimate the average value and the standard deviation of the dependent variable Y. Similarly, measuring at two different values of X can provide enough data for a regression with two unknowns, but not for three or more unknowns.

If the investigator had performed measurements at three different values of the independent variable vector X, then regression analysis would provide a unique set of estimates for the three unknown parameters in β.

7.3.1 Statistical Assumptions

When the number of measurements '*N*' is larger than the number of unknown parameters '*K*' and the measurement errors are normally distributed then the excess of information contained in ($N - K$) measurements is applicable to make statistical predictions about the unknown parameters. This excess of information is referred to as the degrees of freedom of the regression.

7.4 UNDERLYING ASSUMPTIONS

Classical assumptions for regression analysis include:

- The sample is representative of the population for the inference prediction.

- The error is a random variable with a mean of zero conditional on the explanatory variables.
- The independent variables are measured with no error. Instead, modeling may be done using errors-in-variables model techniques if any errors do exist.
- The predictors are linearly independent, i.e. it is not possible to express any predictor as a linear combination of the others.
- The errors are uncorrelated, that is, the variance–covariance matrix of the errors is diagonal and each non-zero element is the variance of the error.

These above mentioned conditions are sufficient for the least-squares estimator to possess desirable properties; in particular, these assumptions imply that the parameter estimates will be unbiased, consistent, and efficient in the class of linear unbiased estimators. It is important to note that actual data less commonly satisfies the assumptions. That is, the method is useful even though the assumptions are not correct. Variation from the assumptions can sometimes be used as a measure of how far the model is from being applicable. Most of the assumptions may be relaxed in more advanced methods. Reports of statistical analyses usually include analyses of tests on the sample data and methodology for the fit and usefulness of the model.

Independent and dependent variables often refer to values measured at point locations. There may be spatial trends and spatial autocorrelation in the variables that violate statistical assumptions of regression. Geographic weighted regression is one technique to deal with such data. Also, variables may include values aggregated by areas. With aggregated data the modifiable areal unit problem can cause extreme variation in regression parameters. In linear regression, the model specification is that the dependent variable, $y_i$is a linear combination of the parameters (but need not be linear in the independent variables). For a particular instance in simple linear regression for modeling n data points there is one independent variable: x_i and two parameters, β_0 and β_1, which is given by the equation for a straight line as shown in equation 7.2

Straight line: $y_i= \beta_0+ \beta_1 x_i + \varepsilon_i$, i=1… n. …. 7.2

7.5 MATHEMATICAL MODELS USING MULTIPLE REGRESSION ANALYSIS

As discussed earlier, multiple regression analysis is a powerful technique used for predicting the unknown value of a variable from the known value of two or more variables- also called the predictors. The variable whose value is to be predicted is known as the dependent variable and the ones whose known values are used for prediction are known independent (exploratory) variables.

In general, the multiple regression equation of Y on X_1, X_2… X_k can be of the form as shown in equation 7.3

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + b_k X_k \qquad \ldots. 7.3$$

Here b_0 is the intercept and b_1, b_2, b_3… b_k are analogous to the slope in linear regression equation and are also called regression coefficients. They can be interpreted the same way as slope. Thus if b_i = 2.5, it would indicates that Y will increase by 2.5 units if X_i increased by 1 unit. The appropriateness of the multiple regression model as a whole can be tested by the F-test in the ANOVA table. A significant F indicates a linear relationship between Y and at least one of the X's. Once a multiple regression equation has been constructed, one can check how good it is (in terms of predictive ability) by examining the coefficient of determination (R2).

$R2$ always lies between 0 and 1.All software provides it whenever regression procedure is run. The closer R_2 is to 1, the better is the model and its prediction.

A related question is whether the independent variables individually influence the dependent variable significantly. Statistically, it is equivalent to testing the null hypothesis that the relevant regression coefficient is zero. This can be done using t-test. If the t-test of a regression coefficient is significant, it indicates that the variable is in question influences Y significantly, while controlling for other independent explanatory variables. Multiple regression technique does not test whether data are linear. On the contrary, it proceeds by assuming that the relationship between the Y and each of X_i's is linear. Hence as a rule, it is prudent to always look at the scatter plots of (Y, X_i), i= 1, 2… k. If any plot suggests non linearity, one may use a suitable transformation to attain linearity.

Another important assumption is nonexistence of multi co linearity, the independent variables are not related among themselves. At a very basic level, this can be tested by computing the correlation coefficient between each pair of independent variables. Therefore, multiple regression analysis is used when one is interested in predicting a continuous dependent variable from a number of independent variables. If dependent variable is dichotomous, then logistic regression should be used.

Further it can be expected score on one variable R, R Square and Adjusted R Square, where R is a measure of the correlation between the observed value and the predicted value of the criterion variable. R Square (R^2) is the square of this measure of correlation and indicates the proportion of the variance in the criterion variable, so an Adjusted R Square value is calculated which takes into account the number of variables in the model and the number of observations the model is based on. This Adjusted R Square value gives the most useful measure of the success of the model. If, for example we have an Adjusted R Square value of 0.75 we can say that the model is accounted for 75% of the variance in the criterion.

7.6 INPUT TO A REGRESSION PROBLEM

Simple regression: (x1, Y1), (x1, Y2)… (x n, Y n)

Multiple regression: ((x1)1, (x2)1, (x3)1 … (x K) 1, Y1),

((x1)2, (x2)2, (x3) 2 … (x K)2, Y2),

((x1)3, (x2)3, (x3)3, … (x K)3, Y3), … ,

((x1) n, (x2) n, (x3)n, … (x K)n, Y n),

The variable Y is designated as the "dependent variable." The only distinction between the two situations above is whether there is just one x predictor or many. The predictors are called "independent variables." There is certain awkwardness about giving generic names for the independent variables in the multiple regression case. In this notation, x1 is the name of the first independent variable, and its values are (x1)1, (x1)2, (x1)3… (x1) n.

The listing for the multiple regression case suggests that the data are found in a spreadsheet. In application programs like Minitab, the variables can appear in any of the spreadsheet columns. The dependent variable and the independent variables may appear in any columns in any order.

When choosing a predictor variable selection is based, such that one might be able to correlate with the criterion variable, but that is not strongly correlated with the other predictor variables. However, correlations amongst the predictor variables are not unusual. The term multi co linearity is used to describe the situation when a high correlation is detected between two or more predictor variables. Such high correlations cause problems when trying to draw inferences about the relative contribution of each predictor variable to the success of the model.

There are different ways that the relative contribution of each predictor variable can be assessed. The success of the model in predicting the criterion variable is then assessed. In contrast, “hierarchical” methods enter the variables into the model in a specified order. The order specified should reflect some theoretical consideration or previous findings. If one have no reason to believe that one variable is likely to be more important than other this method is not applicable. As each variable is entered into the model its contribution is assessed. If adding the variable does not significantly increase the predictive power of the model then the variable is dropped.

Further, in this research work pertaining to rock properties, to obtain applicable and practical predictive qualitative relationships, it is necessary to model the rock properties and the drill process variables. Multiple regression analysis is widely used for modeling and analyzing the experimental results. Therefore in this present investigation, Regression is the determination of statistical relationship between two or more variables. It is the method to deal with the formulation of mathematical model depicting the relationship among the variables which can be used for the purpose of prediction of values of dependent or response variables, given the values of predictor or independent variable(s), the analysis concerning the relationship is known as multiple correlation and equations describing such relationships are called as multiple regression equations. Physical properties of rocks can be predicted by multiple regression modeling, the statistical methodology used to relate variables (Bowerman and O'connell, 1990).

In order to establish the predictive models among the parameters obtained in this research work, multiple regression and Analysis of Variance (ANOVA) techniques are used. For modeling and analysis Minitab 15 software for windows was used. Further, higher p-value means the independent variables are not statistically significant and it can also be stated if the p-value is set at 0.05 then to reject the null hypothesis, the significance level of 5.001 % or higher has to be used. Hence the p-value represents the lowest significance level that can be used to reject the null hypothesis.

The p-values for individual predictor variables will be obtain from t –statistics and the same value for individual variables assess the significance of including that predictor in the regression analysis. On the other part p-value obtain from the F – statistics assess, whether the whole regression is significant or not. If one predictor is significant, so will be the regression and for the overall regression the value obtained at R-Squared and R-adjusted has to be considered.

7.7 MULTIPLE REGRESSION ANALYSIS AND ANOVA TECHNIQUE

The laboratory experimental results are used to model the various responses using multiple regression method by using a non-linear fit among the responses and the corresponding significant parameters. The performance of the model depends on a large number of factors that act and interact in a complex manner. When the predictor variables in a multiple regression model are interrelated or are dependent on each other, a multi-co linearity problem exists and hinders the ability to assess the importance of a predictor variable. The solutions to the problem are to remove one or more of the highly correlated predictor variables or to add more scenarios used in building the model.

The mathematical modeling of sound level produced during drilling is influenced by many factors. Therefore a detailed process representation anticipates a second order model. ANOVA is carried out to find which input parameter significantly affects the desired response. To facilitate the experiments and measurement, four important predictor variables are considered in the present study. They are drill bit diameter (A), drill bit speed (B), Thrust applied (C) and the average value of A – weighted equivalent sound level produced during drilling in dB(A) i.e., (D). The responses considered are Uni-axial compressive strength (UCS), Schmidt rebound number (SRN), Dry density (r), Tensile strength (TS), and Percentage porosity (p). The mathematical models for the physico-mechanical properties with parameters under consideration can be of the form as shown in equation 7.4

$$Y=\square\ (x_1, x_2, x_3 \ldots) + \square \qquad \ldots.\ 7.4$$

where, Y is the response and x_1, x_2, x_3 are the independent process variables and ϵ is fitting error. A quadratic model of fcan be written as shown in equation 7.5

$$\square = b_0 + \sum_{i=1}^{n} b_i x_i + \sum_{i=1}^{n} b_{ij} x_i^2 + \sum_{i<j}^{n} b_{ij} x_j + \epsilon \qquad \ldots.\ 7.5$$

where, $b_i$represents the linear effect of x_i, b_{ij} represents the quadratic effect of x_i and b_{ij} in fourth term represents linear interaction between x_i and x_j. Then the regression models contain linear terms, squared terms and cross product terms.

Individual responses are modeled by using multiple regression analysis. The coefficient table lists the estimated coefficients for all the predictors. p-value determines the observed relationship between response and the predictors and indicates, whether it is statistically significant or not. If the p-value is less than the selected a level (to test the significance, one needs to set a risk level called the alpha level. In most cases, the ‘rule of thumb’ is to set the alpha level at 0.05, i.e., 95% confidence interval), the association is statistically significant and the model is selected. On the other hand, if it is more than the selected *a* level, it is not statistically significant and the independent variable under consideration is removed from the model and the regression analysis is performed by using all the remaining independent variables. The procedure is continued by removing one independent variable at a time from the model. The screening is stopped when the independent variable remaining in the model can not be removed from the system.

The criterion for the explanation capability of the dependent variable from information obtained via the independent variables is the strength of the relation (R^2). When the explained variation is divided by the total variation of y values, i.e. when R^2 is calculated, then the proportion of variation of the dependent variable changes is obtained and that is explained by the independent variable. As the number of independent variables increases, R^2will be greater. Therefore, R^2 should be adjusted (corrected) as follows, which is shown in equation 7.6

$$\overline{R}^2 = \left[R^2 - \frac{k-1}{n-1}\right]\left[\frac{n-1}{n-k}\right] \qquad \text{.... 7.6}$$

where, k the number of model parameters, and n the number of scenarios. Higher the value of R^2 means that there is a good correlation between the experimentally measured values and the predicted values using the developed models.

7.7.1Selection of Rock Samples for Modeling

For experimental works, different categories of rocks are collected. Out of the total collected rocks, there are 12 igneous rock types. Out of these, 10 rock types are used for developing the model and 2 types are used to test the accuracy of the developed model. Therefore as can be seen by considering the drilling parameters for set of three different conditions as stated below:

a) Drill diameters of 16, 18 and 20 mm.

b) Drill speed of the machine 280,290 and 300 rpm.

c) Thrust pressure of 15 ,18, 20, and 25kg/cm^2

Hence, the total conditions used for developing the mathematical model are 3 (drill bits) x 3 (machine speed) x 4 (applied thrust pressure) i.e. in total 36x10 (360 Leq values) and similarly 36x2 (72 Leg values) for testing the developed models.

7.8 MATHEMATICAL REGRESSION MODEL FOR DIFFERENT IGNEOUS ROCK PROPERTIES:

Multiple regression model to predict uni-axial compressive strength for igneous rock types is given by equation 7.7:

$$UCS\ (Igneous) = 525.9816+2.135 \times A+0.065 \times B+2.5 \times C -10.162 \times D + 0.061 \times D^2 - 0.026 \times A \times D -0.001 \times B \times D- 0.02811 \times C \times D \quad \ldots 7.7$$

Significance of regression coefficients for estimation of uni-axial compressive strength is listed in Table 7.1, which also shows *t* value and p-value. The final ANOVA table of the reduced quadratic model for UCS is shown in Table 7.2. This table also represents degrees of freedom (DF), mean square (MS), sum of squares (SS), *F*-value and p-value associated with factors. As seen from Table 7.3, for igneous rocks, the selected model explains 95.1% of the total variation in the observed UCS tests.

TABLE 7.1: Significance of regression coefficients for estimation of uniaxial compressive strength (igneous rocks)

Model terms for UCS	Parameter estimate (coefficients)	t-value	p-value
Constant	525.9816	21.693	0.000
A	2.135	7.9	0.000
B	0.065	2.3	0.006
C	2.5	1.9	0.042
D	-10.162	-26.365	0.000
D^2	0.061	32.117	0.000
AD	-0.026	-9.2	0.000
BD	-0.001	-3.12	0.002
CD	-0.02811	-2.293	0.021

TABLE 7.2: Analysis of variance (ANOVA) for the selected quadratic model for estimation of UCS (igneous rocks)

Source of variations	Degree of freedom	Sum of squares	Mean squares	F-value	p-value
Model	8	216597.60	26623.07	2956.60	0.000
Linear	4	6625.92	1639.73	175.39	0.000
Square	1	9726.65	9712.64	1023.75	0.000
Interaction	3	932.55	321.18	32.65	0.000
Residual Error	631	5216.60	9.03	-	-
Total	639	22501.72	-	-	-

TABLE 7.3: Model summary for dependent variable (UCS - igneous rocks)

R^2	Predicted R^2	Adjusted R^2	Standard error
0.963	0.96	0.9512	2.98

Multiple regression models to predict Schmidt rebound number of the igneous rock types is given by equation 7.8:

$$SRN\ (Igneous) = 11.7894 + 0.582 \times A + 0.021 \times B - 2.357 \times D + 0.018 \times D^2 - 0.008 \times A \times D \quad ..7.8$$

Significance of regression coefficients for estimation of Schmidt rebound number is listed in Table 7.4, which also shows *t* value and p-value. The final ANOVA table of the reduced quadratic model for SRN is shown in Table 7.5. This table also represents degrees of freedom (DF), mean square (MS), sum of squares (SS), F-value and p-value associated with factors. As seen from Table 7.6, for igneous rocks, the selected model explains 96.8% of the total variation in the observed SRN tests.

TABLE 7.4: Significance of regression coefficients for estimation of Schmidt rebound number (igneous rocks)

Model terms for SRN	Parameter estimate (coefficients)	t-value	p-value
Constant	11.7894	14.013	0.000
A	0.582	5.136	0.000
B	0.021	1.675	0.046
D	-2.357	-15.357	0.000
D^2	0.018	21.562	0.000
AD	-0.008	-6.612	0.000

TABLE 7.5: Analysis of variance (ANOVA) for the selected quadratic model for estimation of Schmidt rebound number (igneous rocks)

Source of variations	Degree of freedom	Sum of squares	Mean squares	F-value	p-value
Model	5	55238.82	9210.15	5474.98	0.000
Linear	3	415.46	142.12	84.32	0.000
Square	1	823.28	848.300	503.18	0.000
Interaction	1	82.65	41.615	24.68	0.000
Residual Error	628	1065.16	1.686	-	-
Total	633	2386.55	-	-	-

TABLE 7.6: Model summary for dependent variable (SRN - igneous rocks)

R^2	Predicted R^2	Adjusted R^2	Standard error
0.9612	0.9702	0.9682	1.28

Multiple regression model to predict dry density of the igneous rock types is given by equation 7.9:

$$\rho \text{ Density (Igneous)} = 1.5 + 0.387 \times A - 0.1813 \times D + 0.0010 \times D^2 – 0.00039 \times A \times D \quad …..7.9$$

Significance of regression coefficients for estimation of dry density is listed in Table 7.7, which also shows t-value and p-value. The final ANOVA table of the reduced quadratic model for dry density is shown in Table 7.8. This table also represents degrees of freedom (DF), mean square (MS), sum of squares (SS), F-value and p-value associated with factors. As seen from Table 7.9, for igneous rocks, the selected model explains 75.6% of the total variation in the observed dry density tests.

TABLE 7.7: Significance of regression coefficients for estimation of Dry density (igneous rock)

Model terms for Dry density	Parameter estimate (coefficients)	t-value	p-value
Constant	1.5	19.120	0.000
A	0.387	4.814	0.000
D	-0.1813	-16.284	0.000
D^2	0.0010	17.966	0.000
AD	-0.00039	-5.205	0.000

TABLE 7.8: Analysis of variance (ANOVA) for the selected quadratic model for estimation of Dry density (igneous rock)

Source of variations	Degree of freedom	Sum of squares	Mean squares	F-value	p-value
Model	4	16.52150	4.23376	552.05	0.000
Linear	2	2.36246	1.03123	134.47	0.000
Square	1	2.57550	2.47550	322.79	0.000
Interaction	1	0.20780	0.20780	27.10	0.000
Residual Error	635	4.56991	0.00767	-	-
Total	639	9.71567	-	-	-

TABLE 7.9: Model summary for dependent variable (Dry Density – igneous rock)

R^2	Predicted R^2	Adjusted R^2	Standard error
0.756	0.752	0.7563	0.0865

Multiple regression models to predict Tensile strength of the igneous rock types is given by equation 7.10:

$$TS\ (Igneous) = 56.518714 + 0.2730 \times A\ .0086 \times B + 0.3106 \times C - 1.2657 \times D + .0076 \times D^2 - .0032 \times A \times D - 0.0001 \times B \times D - 0.0035 \times C \times D \qquad \ldots\ldots7.10$$

Significance of regression coefficients for estimation of Tensile strength is listed in Table 7.10, which also shows t-value and p-value. The final ANOVA table of the reduced quadratic model for Tensile strength is shown in Table 7.11. This table also represents degrees of freedom (DF), mean square (MS), sum of squares (SS), F-value and p-value associated with factors. As seen from Table 7.12, for igneous rocks, the selected model explains 95.6% of the total variation in the observed Tensile strength tests.

TABLE 7.10: Significance of regression coefficients for estimation of Tensile strength (igneous rock)

Model terms for Tensile strength	Parameter estimate (coefficients)	t-value	p-value
Constant	56.418714	22.778	0.000
A	0.2730	8.219	0.000
B	0.0086	2.768	0.006
C	0.3106	2.012	0.045
D	-1.2657	-27.448	0.000
D^2	0.0076	34.392	0.000
AD	-0.0031	-9.783	0.000
BD	-0.0001	-3.295	0.001
CD	-0.0035	-2.394	0.017

TABLE 7.11: Analysis of variance (ANOVA) for the selected quadratic model for estimation of Tensile strength (igneous rock)

Source of variations	Degree of freedom	Sum of squares	Mean squares	F-value	p-value
Model	8	3855.630	481.954	3691.64	0.000
Linear	4	104.024	26.006	199.20	0.000
Square	1	154.417	154.417	1182.80	0.000
Interaction	3	14.491	4.830	37.00	0.000
Residual Error	628	82.379	0.131	-	-
Total	636	3938.01	-	-	-

TABLE 7.12: Model summary for dependent variable (Tensile strength - igneous rock).

R^2	Predicted R^2	Adjusted R^2	Standard error
0.961	0.9823	0.9562	0.362

Multiple regression model to predict percentage porosity of the igneous rock types is given by equation 7.11:

$$P\ (\text{Igneous}) = 32.151974+0.0943 \times A - 0.5338 \times D + .00023 \times D^2 - 0.0007 \times A \times D. \qquad \ldots\ldots 7.11$$

Significance of regression coefficients for estimation of percentage porosity is listed in Table 7.13, which also shows t-value and p-value. The final ANOVA table of the reduced quadratic model for dry percentage porosity is shown in Table 7.14. This table also represents degrees of freedom (DF), mean square (MS), sum of squares (SS), F-value and p-value associated with factors. As seen from Table 7.15, for igneous rocks, the selected model explains 93.59% of the total variation in the observed percentage porosity tests.

TABLE 7.13: Significance of regression coefficients for estimation of % Porosity (igneous rock)

Model terms for % Porosity	Parameter estimate (coefficients)	t-value	p-value
Constant	32.151974	26.815	0.000
A	0.0943	5.493	0.000
D	-0.5338	-22.467	0.000
D^2	0.00023	18.923	0.000
AD	-0.0007	-4.513	0.000

TABLE 7.14: Analysis of variance (ANOVA) for the selected quadratic model for estimation of % Porosity (igneous rock)

Source of variations	Degree of freedom	Sum of squares	Mean squares	F-value	p-value
Model	4	361.8989	90.4747	2591.90	0.000
Linear	2	17.6990	8.8495	253.52	0.000
Square	1	12.4997	12.4997	358.09	0.000
Interaction	1	0.7109	0.7109	20.37	0.000
Residual Error	635	22.1657	0.0349	-	-
Total	639	384.065	-	-	-

TABLE 7.15: Model summary for dependent variable (% Porosity - igneous rock)

R^2	Predicted R^2	Adjusted R^2	Standard error
0.9313	0.9215	0.9359	0.186

7.9 PERFORMANCE PREDICTION OF THE DERIVED MODELS:

In fact, the coefficient of correlation between the measured and predicted values is a good indicator to check the prediction performance of the model. However, in this study, Values Account For (VAF) (Equation) and Root Mean Square Error (RMSE) (Equation) indices were calculated to compare the performance of the prediction capacity of predictive models developed (Alvarez and Babuska 1999, Finol et al. 2001, Gokceoglu 2002, Yilmaz and Yuksek 2008, Yilmaz and Yuksek 2009, Yilmaz and Kaynar 2011) .Further, the VAF value would be of the form as shown equation 7.12 and RMSE would be of the form as shown in equation 7.13

$$VAF = \left[1 - \frac{var(y - y')}{var(y)}\right] \times 100 \qquad \text{.... 7.12}$$

$$RMSE = \sqrt{\frac{1}{N}\Sigma_{i-1}^{N}(y - y')^2} \qquad \text{... 7.13}$$

Where y and y' are the measured and predicted values respectively. If the VAF is 100 and RMSE is 0, then the model will be excellent. Mean absolute percentage error (MAPE) which is a measure of accuracy in a fitted series value was also used to check the prediction performances of the models. MAPE usually expresses accuracy as a percentage as shown in below equation 7.14

$$MAPE = \frac{1}{N}\sum_{i - 1}^{N}\left|\frac{A_i - P_i}{A_i}\right| \times 100 \qquad \text{…. 7.14}$$

Where A_i is the actual value and P_i is the predicted value. Lower values of MAPE, indicate that there will be a better correlation between predicted values and experimental results.

Using the developed regression models for igneous rocks, performance prediction indices for training as well as test data were calculated and are given in Table 7.16. From the table it is evident that the developed model for predicting dry density is less efficient when compared to all other models as it has low VAF value. MAPE values for test data are 12.3, 16.1, 21.2, 8.3, and 7.21 for UCS, SRN, dry density, TS, and percentage porosity respectively, which indirectly explains the reliability of the predicted models of igneous rocks.

TABLE 7.16 Performance prediction indices of the regression models (Igneous Rock)

		UCS	SRN	Density	Tensile strength	% Porosity
Training data	VAF	95.3	96.1	75.6	95.8	93.192
	RMSE	5.5	6.1	0.39	0.38	0.506
	MAPE	10.2	12.5	15.2	5.21	6.601
Test da	VAF	93.6	95.3	62.3	95.7	92.23
	RMSE	8.2	7.96	0.62	0.625	0.523

	MAPE	12.3	16.1	21.2	8.3	7.21

7.10 INFERENCE:

In this chapter, the experimental values obtained in the present investigation are used to develop mathematical models for different phsico-mechanical properties, such as Uni-axial compressive strength, Tensile strength, SRN, Density and porosity. By using the Minitab software and Analysis of variance, models are established. It is observed that physico-mechanical properties has very low p-values with acceptable tolerance and hence the performance of prediction indices were determined which further can be used to compare with the developed models for other indirect investigation methods.

CHAPTER - 8

CONCLUSION AND SCOPE FOR FURTHER RESEARCH

8.1 CONCLUSIONS

The following conclusions are drawn based on the research work carried out:

- The drilling set-up designed and fabricated in this research investigation will be useful in the estimation of rock properties using sound level produced during drilling.
- The results of laboratory studies carried out in this research work clearly indicate the prediction of the physico-mechanical properties of igneous rocks with acceptable degree of accuracy.
- Since the proposed method is considerably simple and requires lesser time in arriving at the physico-mechanical properties, hence it will be an economically feasible (in traditional method, the rock blocks are sent from the mine to some established laboratory which is time consuming as well as a costly affair) and a better alternative and could find wide application in various geo-technical field.
- In order to establish the predictive models among different parameters considered in the investigation, it is found that multiple regression analysis can be an effective technique in minimizing the uncertainties involved in the investigation.

- The set of empirical equations developed in this research work for prediction of physico-mechanical properties of igneous rocks can be readily utilized in mining and various geotechnical fields.
- Though, an attempt has been made in this research work to estimate rock properties using sound level produced during drilling using the various empirical equations developed, however, it is not aimed at replacing the suggested ISRM methods. The developed equations can be certainly used for a quick and easy estimate of different rock properties using the light weighted, portable, low cost drill set-up with acceptable degree of accuracy.
- Further, the proposed equations can serve a valuable information for the purpose of comparing the performance of the developed models with other indirect investigations.

8.2 SCOPE FOR FURTHER RESEARCH

- In the present work only igneous rock samples collected across the southern part of India has been used. However this investigation can be extended for sedimentary as well as metamorphic rock samples.
- In the present work, drill bit diameters of 16 mm, 18 mm and 20 mm have been used for the purpose of drilling. This work can be extended for other drill diameters too.
- Also, in the present work only intact rocks are considered for recording the sound level produced during the process of drilling. Similar work can be extended/carried out for the rock mass drilling.

- The fabricated portable drill set-up can be directly tried in the field and prediction models could be developed and the results of the same could be compared with that of IRSM suggested methods.

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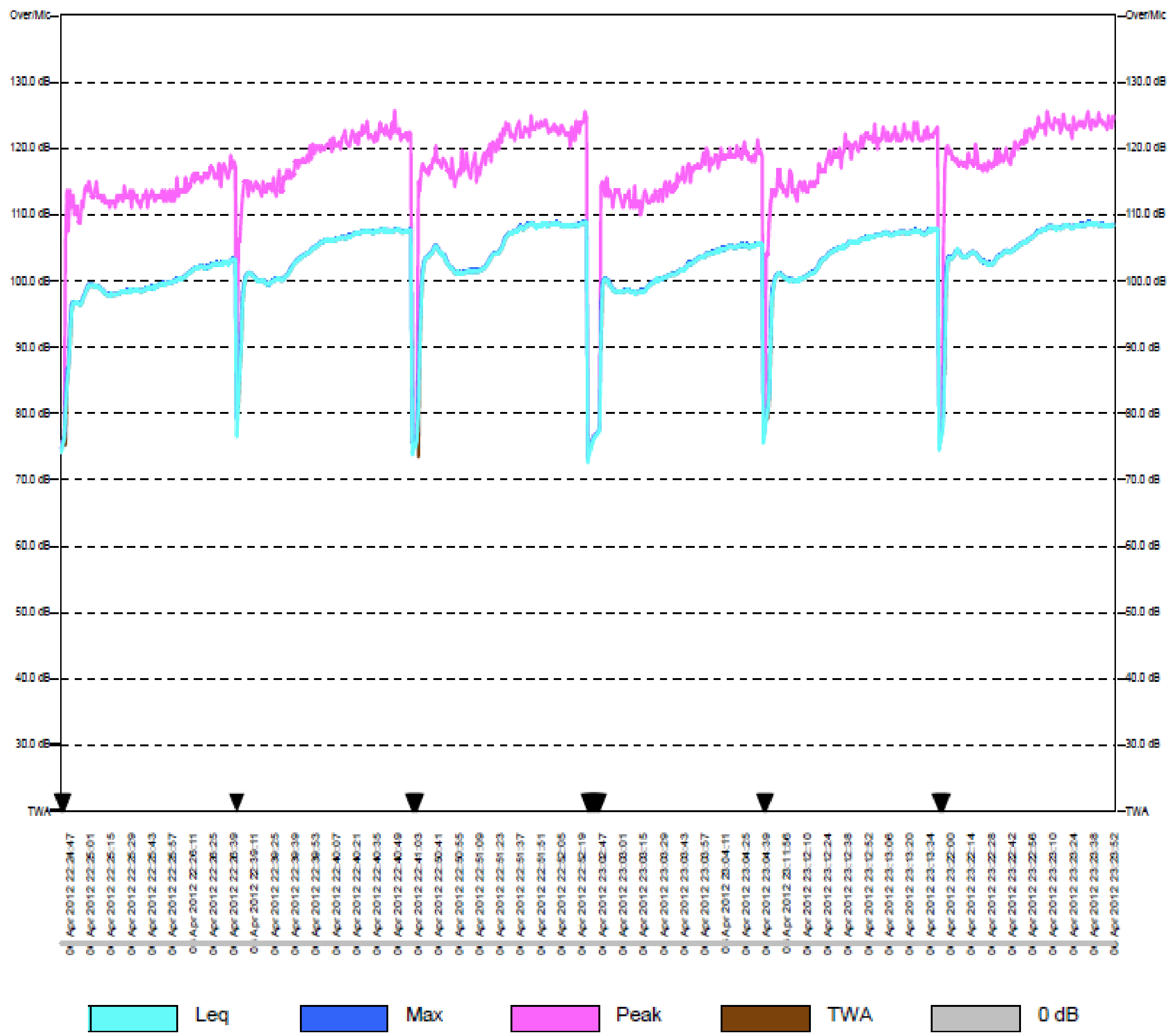
APPENDIX - I

SOUND LEVELS FOR DRILLING IN THE IGNEOUS ROCK SAMPLES

Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5		Dose:	17.4	%
Threshold:	80.0	dBA	Projected Dose:	696.8	%
Criterion Level:	90.0	dBA	Leq:	104.6	dBA
Criterion Duration:	8.0	hours	TWA:	104.0	dBA
			TWA (8)	77.4	dBA
L10:	108.0	dBA	Lmax:	108.8	dBA
L30:	106.0	dBA	Lpeak (max):	125.5	dB
L50:	103.5	dBA	Lep (8)	88.6	dBA
L70:	100.5	dBA	SE:	2.3	Pa^2hr
L90:	98.0	dBA			



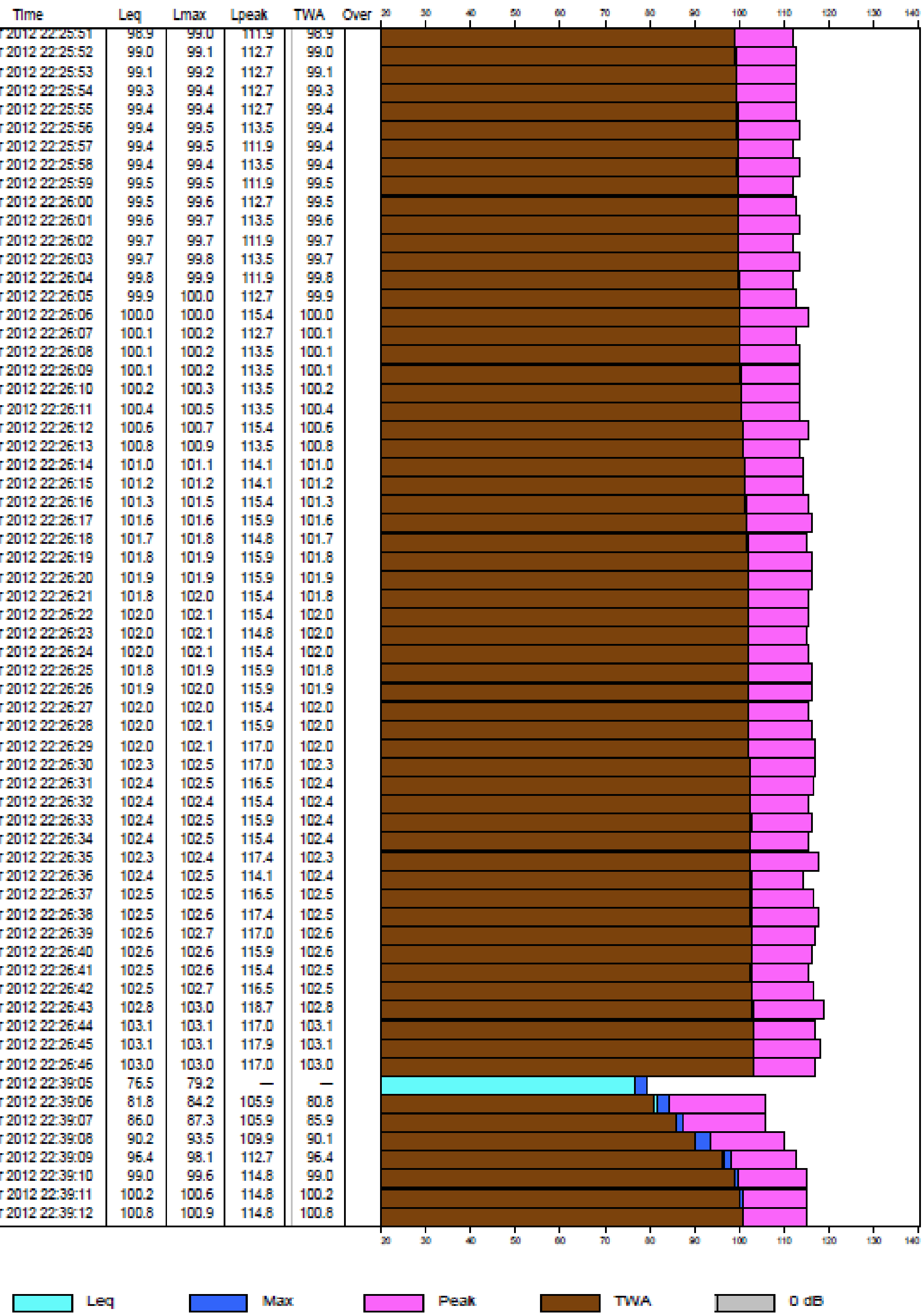
Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
1	06 Apr 2012 22:24:47	74.1	74.6	—	—	
2	06 Apr 2012 22:24:48	75.2	75.7	—	—	
3	06 Apr 2012 22:24:49	76.1	76.5	—	—	
4	06 Apr 2012 22:24:50	79.8	81.7	105.9	75.2	
5	06 Apr 2012 22:24:51	84.3	86.7	113.5	84.2	
6	06 Apr 2012 22:24:52	86.2	86.7	107.4	86.2	
7	06 Apr 2012 22:24:53	90.5	93.1	113.5	90.3	
8	06 Apr 2012 22:24:54	95.2	96.2	111.0	95.2	
9	06 Apr 2012 22:24:55	96.6	96.7	112.7	96.6	
10	06 Apr 2012 22:24:56	96.4	96.5	109.9	96.4	
11	06 Apr 2012 22:24:57	96.6	96.7	111.0	96.6	
12	06 Apr 2012 22:24:58	96.6	96.7	111.0	96.6	
13	06 Apr 2012 22:24:59	96.5	96.6	108.8	96.5	
14	06 Apr 2012 22:25:00	96.3	96.4	108.8	96.3	
15	06 Apr 2012 22:25:01	96.5	96.8	111.9	96.5	
16	06 Apr 2012 22:25:02	97.2	97.4	111.0	97.2	
17	06 Apr 2012 22:25:03	97.7	98.0	113.5	97.7	
18	06 Apr 2012 22:25:04	98.3	98.6	114.1	98.3	
19	06 Apr 2012 22:25:05	98.9	99.1	113.5	98.9	
20	06 Apr 2012 22:25:06	99.2	99.3	114.8	99.2	
21	06 Apr 2012 22:25:07	99.3	99.4	113.5	99.3	
22	06 Apr 2012 22:25:08	99.2	99.3	112.7	99.2	
23	06 Apr 2012 22:25:09	99.2	99.2	112.7	99.2	
24	06 Apr 2012 22:25:10	99.1	99.2	113.5	99.1	
25	06 Apr 2012 22:25:11	99.1	99.1	114.8	99.1	
26	06 Apr 2012 22:25:12	99.0	99.1	112.7	99.0	
27	06 Apr 2012 22:25:13	98.9	99.0	112.7	98.9	
28	06 Apr 2012 22:25:14	98.7	98.8	112.7	98.7	
29	06 Apr 2012 22:25:15	98.5	98.6	111.9	98.5	
30	06 Apr 2012 22:25:16	98.2	98.4	112.7	98.2	
31	06 Apr 2012 22:25:17	98.0	98.1	111.9	98.0	
32	06 Apr 2012 22:25:18	97.8	97.8	111.9	97.8	
33	06 Apr 2012 22:25:19	97.7	97.8	111.9	97.7	
34	06 Apr 2012 22:25:20	97.8	97.8	111.0	97.8	
35	06 Apr 2012 22:25:21	97.8	97.9	111.9	97.8	
36	06 Apr 2012 22:25:22	97.7	97.8	111.9	97.7	
37	06 Apr 2012 22:25:23	97.9	97.9	111.9	97.9	
38	06 Apr 2012 22:25:24	97.8	97.9	111.0	97.8	
39	06 Apr 2012 22:25:25	97.8	97.9	112.7	97.8	
40	06 Apr 2012 22:25:26	97.9	98.0	111.9	97.9	
41	06 Apr 2012 22:25:27	98.0	98.1	112.7	98.0	
42	06 Apr 2012 22:25:28	98.2	98.2	112.7	98.2	
43	06 Apr 2012 22:25:29	98.2	98.3	111.9	98.2	
44	06 Apr 2012 22:25:30	98.3	98.3	114.1	98.3	
45	06 Apr 2012 22:25:31	98.3	98.3	112.7	98.3	
46	06 Apr 2012 22:25:32	98.3	98.4	112.7	98.3	
47	06 Apr 2012 22:25:33	98.4	98.4	112.7	98.4	
48	06 Apr 2012 22:25:34	98.4	98.4	113.5	98.4	
49	06 Apr 2012 22:25:35	98.4	98.4	111.0	98.4	
50	06 Apr 2012 22:25:36	98.4	98.5	113.5	98.4	
51	06 Apr 2012 22:25:37	98.5	98.5	112.7	98.5	
52	06 Apr 2012 22:25:38	98.5	98.5	112.7	98.5	
53	06 Apr 2012 22:25:39	98.5	98.5	111.9	98.5	
54	06 Apr 2012 22:25:40	98.4	98.5	111.9	98.4	
55	06 Apr 2012 22:25:41	98.4	98.4	111.0	98.4	
56	06 Apr 2012 22:25:42	98.3	98.4	111.9	98.3	
57	06 Apr 2012 22:25:43	98.4	98.5	112.7	98.4	
58	06 Apr 2012 22:25:44	98.6	98.7	112.7	98.6	
59	06 Apr 2012 22:25:45	98.7	98.8	113.5	98.7	
60	06 Apr 2012 22:25:46	98.7	98.8	111.0	98.7	
61	06 Apr 2012 22:25:47	98.7	98.8	112.7	98.7	
62	06 Apr 2012 22:25:48	98.9	98.9	112.7	98.9	
63	06 Apr 2012 22:25:49	98.9	98.9	113.5	98.9	
64	06 Apr 2012 22:25:50	98.9	98.9	112.7	98.9	

Page 1 of 12 Leq Max Peak TWA 0 dB

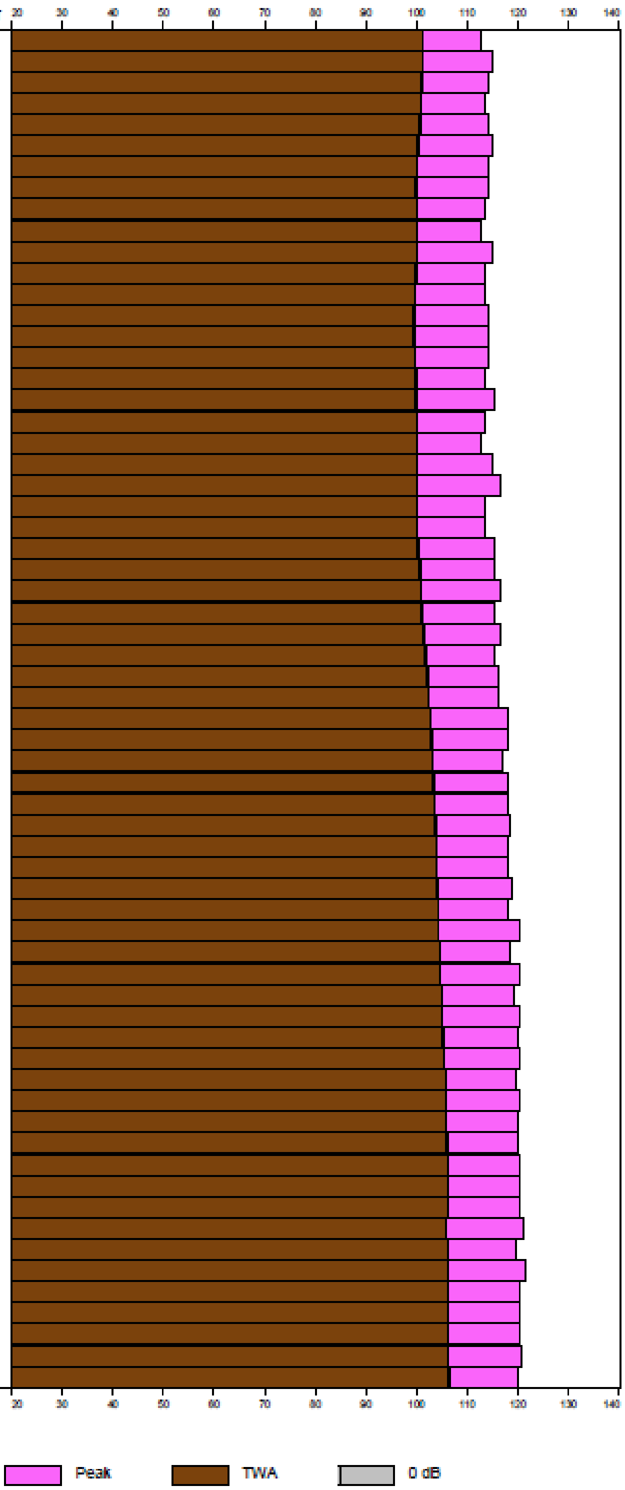
Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
65	06 Apr 2012 22:25:51	98.9	99.0	111.9	98.9	
66	06 Apr 2012 22:25:52	99.0	99.1	112.7	99.0	
67	06 Apr 2012 22:25:53	99.1	99.2	112.7	99.1	
68	06 Apr 2012 22:25:54	99.3	99.4	112.7	99.3	
69	06 Apr 2012 22:25:55	99.4	99.4	112.7	99.4	
70	06 Apr 2012 22:25:56	99.4	99.5	113.5	99.4	
71	06 Apr 2012 22:25:57	99.4	99.5	111.9	99.4	
72	06 Apr 2012 22:25:58	99.4	99.4	113.5	99.4	
73	06 Apr 2012 22:25:59	99.5	99.5	111.9	99.5	
74	06 Apr 2012 22:26:00	99.5	99.6	112.7	99.5	
75	06 Apr 2012 22:26:01	99.6	99.7	113.5	99.6	
76	06 Apr 2012 22:26:02	99.7	99.7	111.9	99.7	
77	06 Apr 2012 22:26:03	99.7	99.8	113.5	99.7	
78	06 Apr 2012 22:26:04	99.8	99.9	111.9	99.8	
79	06 Apr 2012 22:26:05	99.9	100.0	112.7	99.9	
80	06 Apr 2012 22:26:06	100.0	100.0	115.4	100.0	
81	06 Apr 2012 22:26:07	100.1	100.2	112.7	100.1	
82	06 Apr 2012 22:26:08	100.1	100.2	113.5	100.1	
83	06 Apr 2012 22:26:09	100.1	100.2	113.5	100.1	
84	06 Apr 2012 22:26:10	100.2	100.3	113.5	100.2	
85	06 Apr 2012 22:26:11	100.4	100.5	113.5	100.4	
86	06 Apr 2012 22:26:12	100.6	100.7	115.4	100.6	
87	06 Apr 2012 22:26:13	100.8	100.9	113.5	100.8	
88	06 Apr 2012 22:26:14	101.0	101.1	114.1	101.0	
89	06 Apr 2012 22:26:15	101.2	101.2	114.1	101.2	
90	06 Apr 2012 22:26:16	101.3	101.5	115.4	101.3	
91	06 Apr 2012 22:26:17	101.6	101.6	115.9	101.6	
92	06 Apr 2012 22:26:18	101.7	101.8	114.8	101.7	
93	06 Apr 2012 22:26:19	101.8	101.9	115.9	101.8	
94	06 Apr 2012 22:26:20	101.9	101.9	115.9	101.9	
95	06 Apr 2012 22:26:21	101.8	102.0	115.4	101.8	
96	06 Apr 2012 22:26:22	102.0	102.1	115.4	102.0	
97	06 Apr 2012 22:26:23	102.0	102.1	114.8	102.0	
98	06 Apr 2012 22:26:24	102.0	102.1	115.4	102.0	
99	06 Apr 2012 22:26:25	101.8	101.9	115.9	101.8	
100	06 Apr 2012 22:26:26	101.9	102.0	115.9	101.9	
101	06 Apr 2012 22:26:27	102.0	102.0	115.4	102.0	
102	06 Apr 2012 22:26:28	102.0	102.1	115.9	102.0	
103	06 Apr 2012 22:26:29	102.0	102.1	117.0	102.0	
104	06 Apr 2012 22:26:30	102.3	102.5	117.0	102.3	
105	06 Apr 2012 22:26:31	102.4	102.5	116.5	102.4	
106	06 Apr 2012 22:26:32	102.4	102.4	115.4	102.4	
107	06 Apr 2012 22:26:33	102.4	102.5	115.9	102.4	
108	06 Apr 2012 22:26:34	102.4	102.5	115.4	102.4	
109	06 Apr 2012 22:26:35	102.3	102.4	117.4	102.3	
110	06 Apr 2012 22:26:36	102.4	102.5	114.1	102.4	
111	06 Apr 2012 22:26:37	102.5	102.5	116.5	102.5	
112	06 Apr 2012 22:26:38	102.5	102.6	117.4	102.5	
113	06 Apr 2012 22:26:39	102.6	102.7	117.0	102.6	
114	06 Apr 2012 22:26:40	102.6	102.6	115.9	102.6	
115	06 Apr 2012 22:26:41	102.5	102.6	115.4	102.5	
116	06 Apr 2012 22:26:42	102.5	102.7	116.5	102.5	
117	06 Apr 2012 22:26:43	102.8	103.0	118.7	102.8	
118	06 Apr 2012 22:26:44	103.1	103.1	117.0	103.1	
119	06 Apr 2012 22:26:45	103.1	103.1	117.9	103.1	
120	06 Apr 2012 22:26:46	103.0	103.0	117.0	103.0	
121	06 Apr 2012 22:39:05	76.5	79.2	—	—	
122	06 Apr 2012 22:39:06	81.8	84.2	105.9	80.8	
123	06 Apr 2012 22:39:07	86.0	87.3	105.9	85.9	
124	06 Apr 2012 22:39:08	90.2	93.5	109.9	90.1	
125	06 Apr 2012 22:39:09	96.4	98.1	112.7	96.4	
126	06 Apr 2012 22:39:10	99.0	99.6	114.8	99.0	
127	06 Apr 2012 22:39:11	100.2	100.6	114.8	100.2	
128	06 Apr 2012 22:39:12	100.8	100.9	114.8	100.8	



Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
129	06 Apr 2012 22:39:13	101.0	101.1	112.7	101.0	
130	06 Apr 2012 22:39:14	101.1	101.1	114.8	101.1	
131	06 Apr 2012 22:39:15	100.8	101.0	114.1	100.8	
132	06 Apr 2012 22:39:16	100.6	100.7	113.5	100.6	
133	06 Apr 2012 22:39:17	100.4	100.6	114.1	100.4	
134	06 Apr 2012 22:39:18	100.1	100.3	114.8	100.1	
135	06 Apr 2012 22:39:19	99.9	100.0	114.1	99.9	
136	06 Apr 2012 22:39:20	99.8	99.9	114.1	99.8	
137	06 Apr 2012 22:39:21	99.9	99.9	113.5	99.9	
138	06 Apr 2012 22:39:22	100.0	100.0	112.7	100.0	
139	06 Apr 2012 22:39:23	100.0	100.0	114.8	100.0	
140	06 Apr 2012 22:39:24	99.7	99.9	113.5	99.7	
141	06 Apr 2012 22:39:25	99.5	99.6	113.5	99.5	
142	06 Apr 2012 22:39:26	99.4	99.4	114.1	99.4	
143	06 Apr 2012 22:39:27	99.4	99.4	114.1	99.4	
144	06 Apr 2012 22:39:28	99.6	99.7	114.1	99.6	
145	06 Apr 2012 22:39:29	99.8	99.9	113.5	99.8	
146	06 Apr 2012 22:39:30	99.8	99.9	115.4	99.8	
147	06 Apr 2012 22:39:31	100.0	100.1	113.5	100.0	
148	06 Apr 2012 22:39:32	100.1	100.1	112.7	100.1	
149	06 Apr 2012 22:39:33	100.1	100.2	114.8	100.1	
150	06 Apr 2012 22:39:34	100.1	100.2	116.5	100.1	
151	06 Apr 2012 22:39:35	100.0	100.1	113.5	100.0	
152	06 Apr 2012 22:39:36	100.0	100.0	113.5	100.0	
153	06 Apr 2012 22:39:37	100.1	100.3	115.4	100.1	
154	06 Apr 2012 22:39:38	100.5	100.6	115.4	100.5	
155	06 Apr 2012 22:39:39	100.7	100.8	116.5	100.7	
156	06 Apr 2012 22:39:40	100.9	101.1	115.4	100.9	
157	06 Apr 2012 22:39:41	101.3	101.5	116.5	101.3	
158	06 Apr 2012 22:39:42	101.7	102.0	115.4	101.7	
159	06 Apr 2012 22:39:43	102.0	102.2	115.9	102.0	
160	06 Apr 2012 22:39:44	102.4	102.5	115.9	102.4	
161	06 Apr 2012 22:39:45	102.6	102.8	117.9	102.6	
162	06 Apr 2012 22:39:46	102.9	103.0	117.9	102.9	
163	06 Apr 2012 22:39:47	103.0	103.1	117.0	103.0	
164	06 Apr 2012 22:39:48	103.2	103.3	117.9	103.2	
165	06 Apr 2012 22:39:49	103.4	103.6	117.9	103.4	
166	06 Apr 2012 22:39:50	103.6	103.7	118.3	103.6	
167	06 Apr 2012 22:39:51	103.7	103.8	117.9	103.7	
168	06 Apr 2012 22:39:52	103.9	103.9	117.9	103.9	
169	06 Apr 2012 22:39:53	104.0	104.1	118.7	104.0	
170	06 Apr 2012 22:39:54	104.1	104.2	117.9	104.1	
171	06 Apr 2012 22:39:55	104.3	104.3	120.2	104.3	
172	06 Apr 2012 22:39:56	104.6	104.7	118.3	104.6	
173	06 Apr 2012 22:39:57	104.7	104.8	120.5	104.7	
174	06 Apr 2012 22:39:58	104.8	104.9	119.1	104.8	
175	06 Apr 2012 22:39:59	105.0	105.1	120.2	105.0	
176	06 Apr 2012 22:40:00	105.1	105.2	119.8	105.1	
177	06 Apr 2012 22:40:01	105.4	105.5	120.2	105.4	
178	06 Apr 2012 22:40:02	105.6	105.6	119.5	105.6	
179	06 Apr 2012 22:40:03	105.7	105.8	120.2	105.7	
180	06 Apr 2012 22:40:04	105.8	105.8	119.8	105.8	
181	06 Apr 2012 22:40:05	105.9	106.0	119.8	105.9	
182	06 Apr 2012 22:40:06	106.0	106.1	120.2	106.0	
183	06 Apr 2012 22:40:07	106.1	106.1	120.5	106.1	
184	06 Apr 2012 22:40:08	106.0	106.0	120.5	106.0	
185	06 Apr 2012 22:40:09	105.9	105.9	121.1	105.9	
186	06 Apr 2012 22:40:10	106.0	106.0	119.5	106.0	
187	06 Apr 2012 22:40:11	106.0	106.1	121.4	106.0	
188	06 Apr 2012 22:40:12	106.0	106.1	120.5	106.0	
189	06 Apr 2012 22:40:13	106.1	106.3	120.5	106.1	
190	06 Apr 2012 22:40:14	106.3	106.3	120.5	106.3	
191	06 Apr 2012 22:40:15	106.3	106.3	120.8	106.3	
192	06 Apr 2012 22:40:16	106.3	106.3	119.8	106.3	



Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

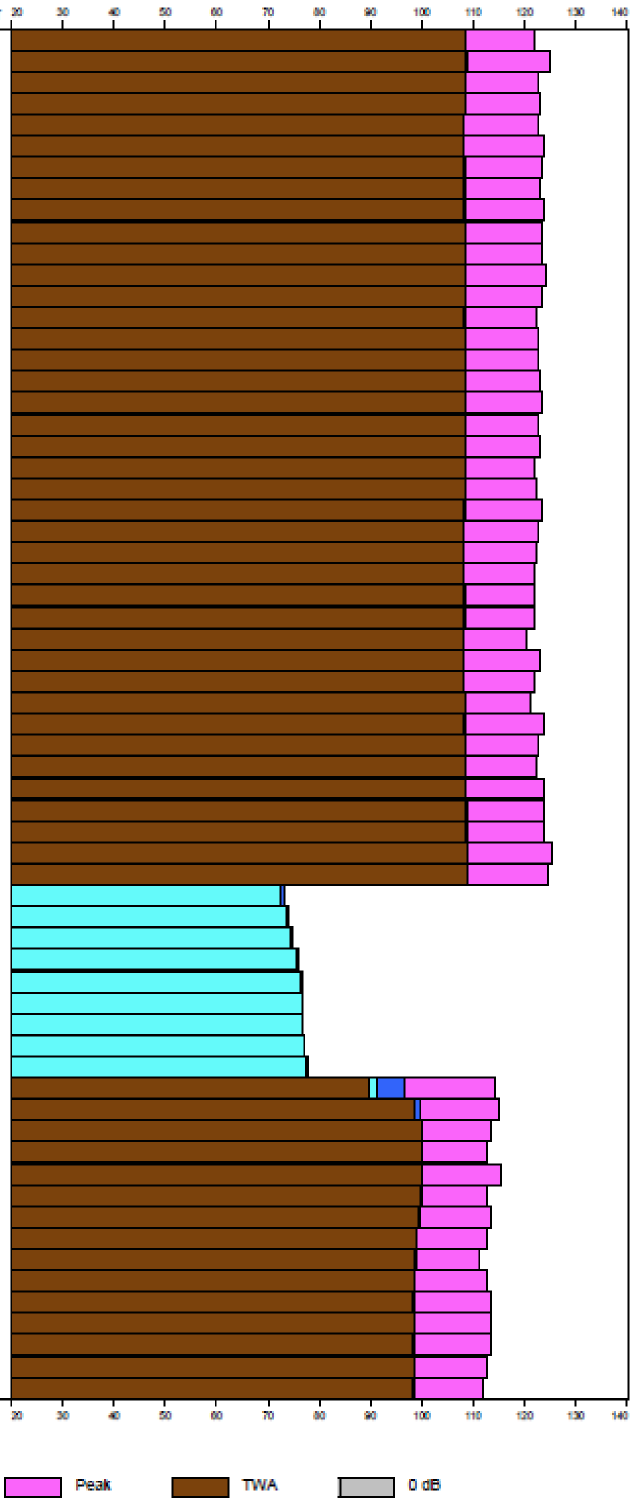
No.	Time	Leq	Lmax	Lpeak	TWA	Over
193	06 Apr 2012 22:40:17	106.5	106.6	121.4	106.5	
194	06 Apr 2012 22:40:18	106.4	106.6	121.7	106.4	
195	06 Apr 2012 22:40:19	106.2	106.3	122.5	106.2	
196	06 Apr 2012 22:40:20	106.3	106.4	120.8	106.3	
197	06 Apr 2012 22:40:21	106.6	106.7	120.5	106.5	
198	06 Apr 2012 22:40:22	106.6	106.7	120.2	106.6	
199	06 Apr 2012 22:40:23	106.6	106.6	121.7	106.6	
200	06 Apr 2012 22:40:24	106.7	106.9	122.5	106.7	
201	06 Apr 2012 22:40:25	107.0	107.0	121.7	107.0	
202	06 Apr 2012 22:40:26	107.1	107.1	120.8	107.1	
203	06 Apr 2012 22:40:27	107.1	107.1	122.0	107.1	
204	06 Apr 2012 22:40:28	107.1	107.2	120.5	107.1	
205	06 Apr 2012 22:40:29	107.1	107.2	122.0	107.1	
206	06 Apr 2012 22:40:30	107.2	107.2	122.0	107.2	
207	06 Apr 2012 22:40:31	107.4	107.4	123.2	107.4	
208	06 Apr 2012 22:40:32	107.3	107.4	122.2	107.3	
209	06 Apr 2012 22:40:33	107.3	107.3	122.5	107.3	
210	06 Apr 2012 22:40:34	107.3	107.3	123.9	107.3	
211	06 Apr 2012 22:40:35	107.3	107.3	121.4	107.3	
212	06 Apr 2012 22:40:36	107.4	107.4	121.7	107.4	
213	06 Apr 2012 22:40:37	107.3	107.4	121.7	107.3	
214	06 Apr 2012 22:40:38	107.1	107.2	121.4	107.1	
215	06 Apr 2012 22:40:39	107.2	107.3	120.8	107.2	
216	06 Apr 2012 22:40:40	107.4	107.4	122.2	107.4	
217	06 Apr 2012 22:40:41	107.4	107.4	121.1	107.4	
218	06 Apr 2012 22:40:42	107.4	107.4	122.0	107.4	
219	06 Apr 2012 22:40:43	107.5	107.5	123.7	107.5	
220	06 Apr 2012 22:40:44	107.6	107.6	122.5	107.6	
221	06 Apr 2012 22:40:45	107.5	107.6	122.5	107.5	
222	06 Apr 2012 22:40:46	107.5	107.5	122.0	107.5	
223	06 Apr 2012 22:40:47	107.5	107.5	123.2	107.5	
224	06 Apr 2012 22:40:48	107.4	107.5	122.0	107.4	
225	06 Apr 2012 22:40:49	107.5	107.5	122.5	107.5	
226	06 Apr 2012 22:40:50	107.4	107.4	121.4	107.4	
227	06 Apr 2012 22:40:51	107.3	107.4	123.7	107.3	
228	06 Apr 2012 22:40:52	107.4	107.5	122.2	107.4	
229	06 Apr 2012 22:40:53	107.5	107.6	125.5	107.5	
230	06 Apr 2012 22:40:54	107.6	107.6	122.5	107.6	
231	06 Apr 2012 22:40:55	107.5	107.6	122.2	107.5	
232	06 Apr 2012 22:40:56	107.5	107.5	122.7	107.5	
233	06 Apr 2012 22:40:57	107.4	107.5	121.1	107.4	
234	06 Apr 2012 22:40:58	107.2	107.3	121.7	107.2	
235	06 Apr 2012 22:40:59	107.3	107.4	121.7	107.3	
236	06 Apr 2012 22:41:00	107.3	107.4	122.0	107.3	
237	06 Apr 2012 22:41:01	107.3	107.4	122.0	107.3	
238	06 Apr 2012 22:41:02	107.4	107.4	121.1	107.4	
239	06 Apr 2012 22:41:03	107.5	107.5	122.2	107.5	
240	06 Apr 2012 22:41:04	107.5	107.5	122.0	107.5	
241	06 Apr 2012 22:50:29	73.8	75.6	—	—	
242	06 Apr 2012 22:50:30	75.2	75.5	—	—	
243	06 Apr 2012 22:50:31	74.9	75.2	—	—	
244	06 Apr 2012 22:50:32	76.0	76.7	—	—	
245	06 Apr 2012 22:50:33	80.2	84.8	114.8	73.4	
246	06 Apr 2012 22:50:34	89.2	92.9	113.5	88.9	
247	06 Apr 2012 22:50:35	96.6	99.0	116.5	96.5	
248	06 Apr 2012 22:50:36	100.6	101.6	117.4	100.6	
249	06 Apr 2012 22:50:37	102.4	102.9	117.0	102.4	
250	06 Apr 2012 22:50:38	103.2	103.3	116.5	103.2	
251	06 Apr 2012 22:50:39	103.3	103.5	116.5	103.3	
252	06 Apr 2012 22:50:40	103.5	103.7	115.9	103.5	
253	06 Apr 2012 22:50:41	103.9	104.0	117.0	103.9	
254	06 Apr 2012 22:50:42	103.9	104.0	117.0	103.9	
255	06 Apr 2012 22:50:43	104.4	104.7	118.3	104.4	
256	06 Apr 2012 22:50:44	104.9	105.1	117.9	104.9	

Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
257	06 Apr 2012 22:50:45	105.1	105.2	120.2	105.1	
258	06 Apr 2012 22:50:46	104.9	105.0	117.9	104.9	
259	06 Apr 2012 22:50:47	104.4	104.7	117.9	104.4	
260	06 Apr 2012 22:50:48	104.0	104.1	117.4	104.0	
261	06 Apr 2012 22:50:49	103.9	104.0	117.0	103.9	
262	06 Apr 2012 22:50:50	103.9	103.9	118.3	103.9	
263	06 Apr 2012 22:50:51	103.4	103.8	117.9	103.4	
264	06 Apr 2012 22:50:52	102.9	103.1	117.4	102.9	
265	06 Apr 2012 22:50:53	102.4	102.6	116.5	102.4	
266	06 Apr 2012 22:50:54	102.1	102.2	116.5	102.1	
267	06 Apr 2012 22:50:55	101.9	102.0	115.4	101.9	
268	06 Apr 2012 22:50:56	101.8	101.8	118.3	101.8	
269	06 Apr 2012 22:50:57	101.5	101.7	115.9	101.5	
270	06 Apr 2012 22:50:58	101.1	101.3	114.1	101.1	
271	06 Apr 2012 22:50:59	101.0	101.1	115.4	101.0	
272	06 Apr 2012 22:51:00	101.1	101.2	115.9	101.1	
273	06 Apr 2012 22:51:01	101.2	101.2	116.5	101.2	
274	06 Apr 2012 22:51:02	101.1	101.1	115.9	101.1	
275	06 Apr 2012 22:51:03	101.0	101.1	119.5	101.0	
276	06 Apr 2012 22:51:04	101.1	101.2	116.5	101.1	
277	06 Apr 2012 22:51:05	101.2	101.2	117.0	101.2	
278	06 Apr 2012 22:51:06	101.2	101.2	119.1	101.2	
279	06 Apr 2012 22:51:07	101.3	101.5	117.0	101.3	
280	06 Apr 2012 22:51:08	101.5	101.5	115.9	101.5	
281	06 Apr 2012 22:51:09	101.3	101.4	115.4	101.3	
282	06 Apr 2012 22:51:10	101.3	101.4	117.4	101.3	
283	06 Apr 2012 22:51:11	101.4	101.4	117.9	101.4	
284	06 Apr 2012 22:51:12	101.4	101.4	119.1	101.4	
285	06 Apr 2012 22:51:13	101.3	101.3	114.8	101.3	
286	06 Apr 2012 22:51:14	101.3	101.4	117.0	101.3	
287	06 Apr 2012 22:51:15	101.4	101.5	115.9	101.4	
288	06 Apr 2012 22:51:16	101.6	101.7	117.4	101.6	
289	06 Apr 2012 22:51:17	101.7	101.8	118.3	101.7	
290	06 Apr 2012 22:51:18	101.8	101.9	119.1	101.8	
291	06 Apr 2012 22:51:19	102.0	102.1	117.4	102.0	
292	06 Apr 2012 22:51:20	102.3	102.5	119.1	102.3	
293	06 Apr 2012 22:51:21	102.6	102.8	119.1	102.6	
294	06 Apr 2012 22:51:22	103.0	103.2	120.5	103.0	
295	06 Apr 2012 22:51:23	103.4	103.6	117.9	103.4	
296	06 Apr 2012 22:51:24	103.8	103.9	120.8	103.8	
297	06 Apr 2012 22:51:25	103.9	104.0	120.5	103.9	
298	06 Apr 2012 22:51:26	104.0	104.0	119.5	104.0	
299	06 Apr 2012 22:51:27	103.9	104.0	121.1	103.9	
300	06 Apr 2012 22:51:28	104.1	104.3	119.8	104.1	
301	06 Apr 2012 22:51:29	104.5	104.7	122.0	104.5	
302	06 Apr 2012 22:51:30	104.7	104.9	120.8	104.7	
303	06 Apr 2012 22:51:31	105.2	105.5	122.7	105.2	
304	06 Apr 2012 22:51:32	105.9	106.3	122.0	105.9	
305	06 Apr 2012 22:51:33	106.4	106.6	123.7	106.4	
306	06 Apr 2012 22:51:34	106.7	106.8	122.7	106.7	
307	06 Apr 2012 22:51:35	106.9	107.1	123.5	106.9	
308	06 Apr 2012 22:51:36	107.1	107.2	121.7	107.1	
309	06 Apr 2012 22:51:37	107.1	107.2	122.0	107.1	
310	06 Apr 2012 22:51:38	107.2	107.3	121.7	107.2	
311	06 Apr 2012 22:51:39	107.4	107.4	121.1	107.4	
312	06 Apr 2012 22:51:40	107.5	107.5	122.7	107.5	
313	06 Apr 2012 22:51:41	107.5	107.5	123.2	107.5	
314	06 Apr 2012 22:51:42	107.8	108.0	123.9	107.8	
315	06 Apr 2012 22:51:43	108.0	108.1	121.7	108.0	
316	06 Apr 2012 22:51:44	107.9	108.0	121.7	107.9	
317	06 Apr 2012 22:51:45	107.6	107.8	122.0	107.6	
318	06 Apr 2012 22:51:46	107.9	108.0	123.0	107.9	
319	06 Apr 2012 22:51:47	108.2	108.3	122.5	108.2	
320	06 Apr 2012 22:51:48	108.3	108.4	122.7	108.3	

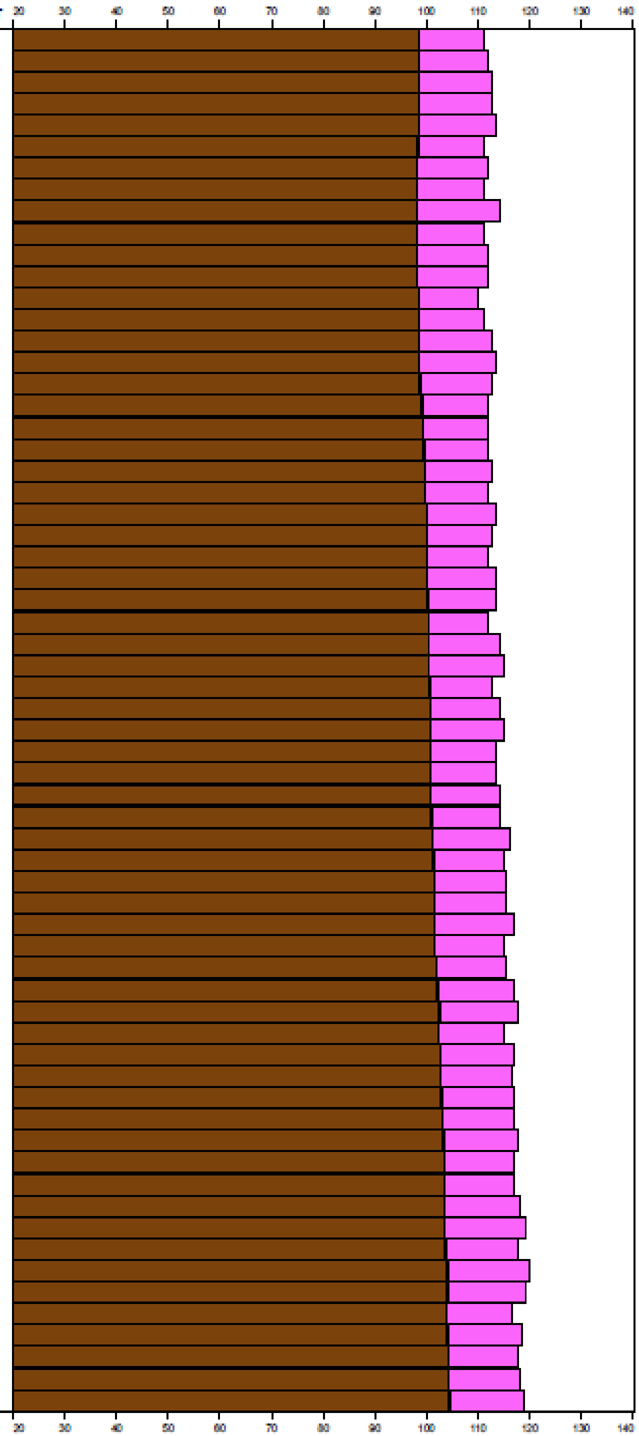
Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
321	06 Apr 2012 22:51:49	108.3	108.4	121.7	108.3	
322	06 Apr 2012 22:51:50	108.5	108.6	124.7	108.5	
323	06 Apr 2012 22:51:51	108.5	108.6	122.7	108.5	
324	06 Apr 2012 22:51:52	108.3	108.4	123.0	108.3	
325	06 Apr 2012 22:51:53	108.1	108.1	122.7	108.1	
326	06 Apr 2012 22:51:54	108.1	108.1	123.7	108.1	
327	06 Apr 2012 22:51:55	108.2	108.3	123.2	108.2	
328	06 Apr 2012 22:51:56	108.2	108.3	123.0	108.2	
329	06 Apr 2012 22:51:57	108.1	108.3	123.9	108.1	
330	06 Apr 2012 22:51:58	108.4	108.5	123.2	108.4	
331	06 Apr 2012 22:51:59	108.4	108.5	123.5	108.4	
332	06 Apr 2012 22:52:00	108.3	108.4	124.1	108.3	
333	06 Apr 2012 22:52:01	108.3	108.4	123.2	108.3	
334	06 Apr 2012 22:52:02	108.3	108.3	122.2	108.3	
335	06 Apr 2012 22:52:03	108.3	108.4	122.7	108.3	
336	06 Apr 2012 22:52:04	108.4	108.5	122.5	108.4	
337	06 Apr 2012 22:52:05	108.4	108.5	123.0	108.4	
338	06 Apr 2012 22:52:06	108.5	108.5	123.5	108.5	
339	06 Apr 2012 22:52:07	108.6	108.6	122.5	108.5	
340	06 Apr 2012 22:52:08	108.5	108.6	123.0	108.5	
341	06 Apr 2012 22:52:09	108.4	108.5	122.0	108.4	
342	06 Apr 2012 22:52:10	108.3	108.4	122.2	108.3	
343	06 Apr 2012 22:52:11	108.3	108.3	123.2	108.3	
344	06 Apr 2012 22:52:12	108.1	108.2	122.7	108.1	
345	06 Apr 2012 22:52:13	108.1	108.2	122.2	108.1	
346	06 Apr 2012 22:52:14	108.2	108.2	122.0	108.2	
347	06 Apr 2012 22:52:15	108.2	108.3	122.0	108.2	
348	06 Apr 2012 22:52:16	108.2	108.3	122.0	108.2	
349	06 Apr 2012 22:52:17	108.1	108.1	120.2	108.1	
350	06 Apr 2012 22:52:18	108.1	108.2	123.0	108.1	
351	06 Apr 2012 22:52:19	108.2	108.2	121.7	108.2	
352	06 Apr 2012 22:52:20	108.3	108.3	121.1	108.3	
353	06 Apr 2012 22:52:21	108.2	108.3	123.9	108.2	
354	06 Apr 2012 22:52:22	108.3	108.4	122.7	108.3	
355	06 Apr 2012 22:52:23	108.3	108.4	122.2	108.3	
356	06 Apr 2012 22:52:24	108.4	108.5	123.7	108.4	
357	06 Apr 2012 22:52:25	108.6	108.7	123.7	108.6	
358	06 Apr 2012 22:52:26	108.6	108.7	123.9	108.6	
359	06 Apr 2012 22:52:27	108.7	108.7	125.3	108.7	
360	06 Apr 2012 22:52:28	108.7	108.8	124.5	108.7	
361	06 Apr 2012 23:02:43	72.6	73.2	—	—	
362	06 Apr 2012 23:02:44	73.8	74.2	—	—	
363	06 Apr 2012 23:02:45	74.6	74.9	—	—	
364	06 Apr 2012 23:02:46	75.4	75.8	—	—	
365	06 Apr 2012 23:02:47	76.2	76.5	—	—	
366	06 Apr 2012 23:02:48	76.5	76.6	—	—	
367	06 Apr 2012 23:02:49	76.6	76.9	—	—	
368	06 Apr 2012 23:02:50	77.0	77.1	—	—	
369	06 Apr 2012 23:02:51	77.3	77.6	—	—	
370	06 Apr 2012 23:02:52	91.4	96.6	114.1	89.5	
371	06 Apr 2012 23:02:53	98.7	99.7	114.8	98.7	
372	06 Apr 2012 23:02:54	100.0	100.1	113.5	100.0	
373	06 Apr 2012 23:02:55	100.1	100.1	112.7	100.1	
374	06 Apr 2012 23:02:56	100.0	100.1	115.4	100.0	
375	06 Apr 2012 23:02:57	99.7	99.9	112.7	99.7	
376	06 Apr 2012 23:02:58	99.2	99.5	113.5	99.2	
377	06 Apr 2012 23:02:59	98.9	99.0	112.7	98.9	
378	06 Apr 2012 23:03:00	98.6	98.7	111.0	98.6	
379	06 Apr 2012 23:03:01	98.4	98.5	112.7	98.4	
380	06 Apr 2012 23:03:02	98.3	98.3	113.5	98.3	
381	06 Apr 2012 23:03:03	98.3	98.4	113.5	98.3	
382	06 Apr 2012 23:03:04	98.3	98.3	113.5	98.3	
383	06 Apr 2012 23:03:05	98.3	98.3	112.7	98.3	
384	06 Apr 2012 23:03:06	98.2	98.3	111.9	98.2	



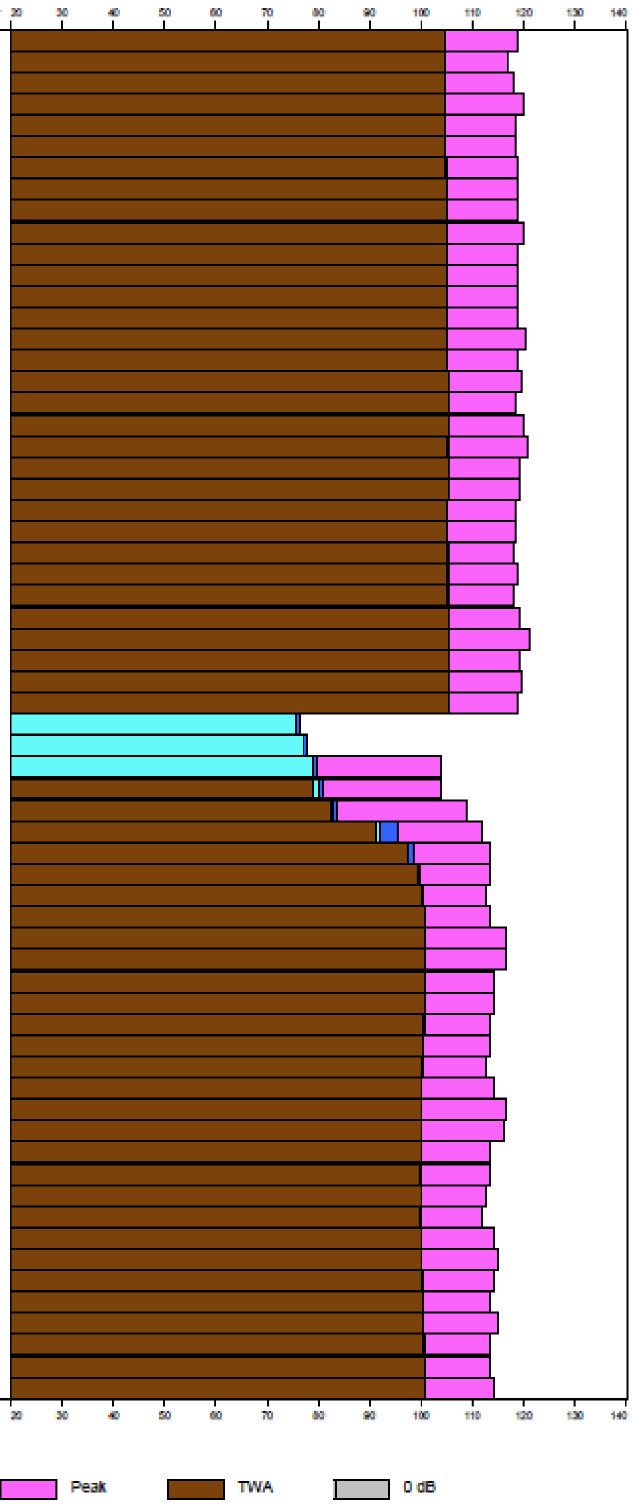
Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
385	06 Apr 2012 23:03:07	98.4	98.4	111.0	98.4	
386	06 Apr 2012 23:03:08	98.3	98.4	111.9	98.3	
387	06 Apr 2012 23:03:09	98.4	98.5	112.7	98.4	
388	06 Apr 2012 23:03:10	98.5	98.6	112.7	98.5	
389	06 Apr 2012 23:03:11	98.5	98.5	113.5	98.5	
390	06 Apr 2012 23:03:12	98.3	98.3	111.0	98.3	
391	06 Apr 2012 23:03:13	98.2	98.3	111.9	98.2	
392	06 Apr 2012 23:03:14	98.2	98.3	111.0	98.2	
393	06 Apr 2012 23:03:15	98.1	98.1	114.1	98.1	
394	06 Apr 2012 23:03:16	98.1	98.2	111.0	98.1	
395	06 Apr 2012 23:03:17	98.1	98.1	111.9	98.1	
396	06 Apr 2012 23:03:18	98.2	98.3	111.9	98.2	
397	06 Apr 2012 23:03:19	98.3	98.4	109.9	98.3	
398	06 Apr 2012 23:03:20	98.3	98.4	111.0	98.3	
399	06 Apr 2012 23:03:21	98.3	98.4	112.7	98.3	
400	06 Apr 2012 23:03:22	98.4	98.5	113.5	98.4	
401	06 Apr 2012 23:03:23	98.7	98.8	112.7	98.7	
402	06 Apr 2012 23:03:24	99.0	99.1	111.9	99.0	
403	06 Apr 2012 23:03:25	99.2	99.3	111.9	99.2	
404	06 Apr 2012 23:03:26	99.4	99.5	111.9	99.4	
405	06 Apr 2012 23:03:27	99.5	99.5	112.7	99.5	
406	06 Apr 2012 23:03:28	99.6	99.7	111.9	99.6	
407	06 Apr 2012 23:03:29	99.9	100.0	113.5	99.9	
408	06 Apr 2012 23:03:30	100.0	100.1	112.7	100.0	
409	06 Apr 2012 23:03:31	100.0	100.1	111.9	100.0	
410	06 Apr 2012 23:03:32	100.1	100.1	113.5	100.1	
411	06 Apr 2012 23:03:33	100.2	100.3	113.5	100.2	
412	06 Apr 2012 23:03:34	100.2	100.3	111.9	100.2	
413	06 Apr 2012 23:03:35	100.4	100.4	114.1	100.4	
414	06 Apr 2012 23:03:36	100.4	100.5	114.8	100.4	
415	06 Apr 2012 23:03:37	100.5	100.6	112.7	100.5	
416	06 Apr 2012 23:03:38	100.7	100.8	114.1	100.7	
417	06 Apr 2012 23:03:39	100.8	100.8	114.8	100.8	
418	06 Apr 2012 23:03:40	100.8	100.9	113.5	100.8	
419	06 Apr 2012 23:03:41	100.9	101.0	113.5	100.9	
420	06 Apr 2012 23:03:42	100.9	100.9	114.1	100.9	
421	06 Apr 2012 23:03:43	100.9	101.0	114.1	100.9	
422	06 Apr 2012 23:03:44	101.1	101.2	115.9	101.1	
423	06 Apr 2012 23:03:45	101.3	101.4	114.8	101.3	
424	06 Apr 2012 23:03:46	101.5	101.5	115.4	101.5	
425	06 Apr 2012 23:03:47	101.6	101.6	115.4	101.6	
426	06 Apr 2012 23:03:48	101.6	101.7	117.0	101.6	
427	06 Apr 2012 23:03:49	101.6	101.7	114.8	101.6	
428	06 Apr 2012 23:03:50	101.8	102.0	115.4	101.8	
429	06 Apr 2012 23:03:51	102.1	102.2	117.0	102.1	
430	06 Apr 2012 23:03:52	102.4	102.5	117.4	102.4	
431	06 Apr 2012 23:03:53	102.4	102.5	114.8	102.4	
432	06 Apr 2012 23:03:54	102.5	102.6	117.0	102.5	
433	06 Apr 2012 23:03:55	102.7	102.8	116.5	102.7	
434	06 Apr 2012 23:03:56	102.8	102.9	117.0	102.8	
435	06 Apr 2012 23:03:57	103.0	103.1	117.0	103.0	
436	06 Apr 2012 23:03:58	103.2	103.3	117.4	103.2	
437	06 Apr 2012 23:03:59	103.3	103.4	117.0	103.3	
438	06 Apr 2012 23:04:00	103.4	103.5	117.0	103.4	
439	06 Apr 2012 23:04:01	103.5	103.6	117.9	103.5	
440	06 Apr 2012 23:04:02	103.5	103.5	119.1	103.5	
441	06 Apr 2012 23:04:03	103.5	103.7	117.4	103.5	
442	06 Apr 2012 23:04:04	103.9	104.0	119.8	103.9	
443	06 Apr 2012 23:04:05	104.0	104.1	119.1	104.0	
444	06 Apr 2012 23:04:06	103.9	103.9	116.5	103.9	
445	06 Apr 2012 23:04:07	104.0	104.2	118.3	104.0	
446	06 Apr 2012 23:04:08	104.1	104.2	117.4	104.1	
447	06 Apr 2012 23:04:09	104.1	104.2	117.9	104.1	
448	06 Apr 2012 23:04:10	104.2	104.4	118.7	104.2	



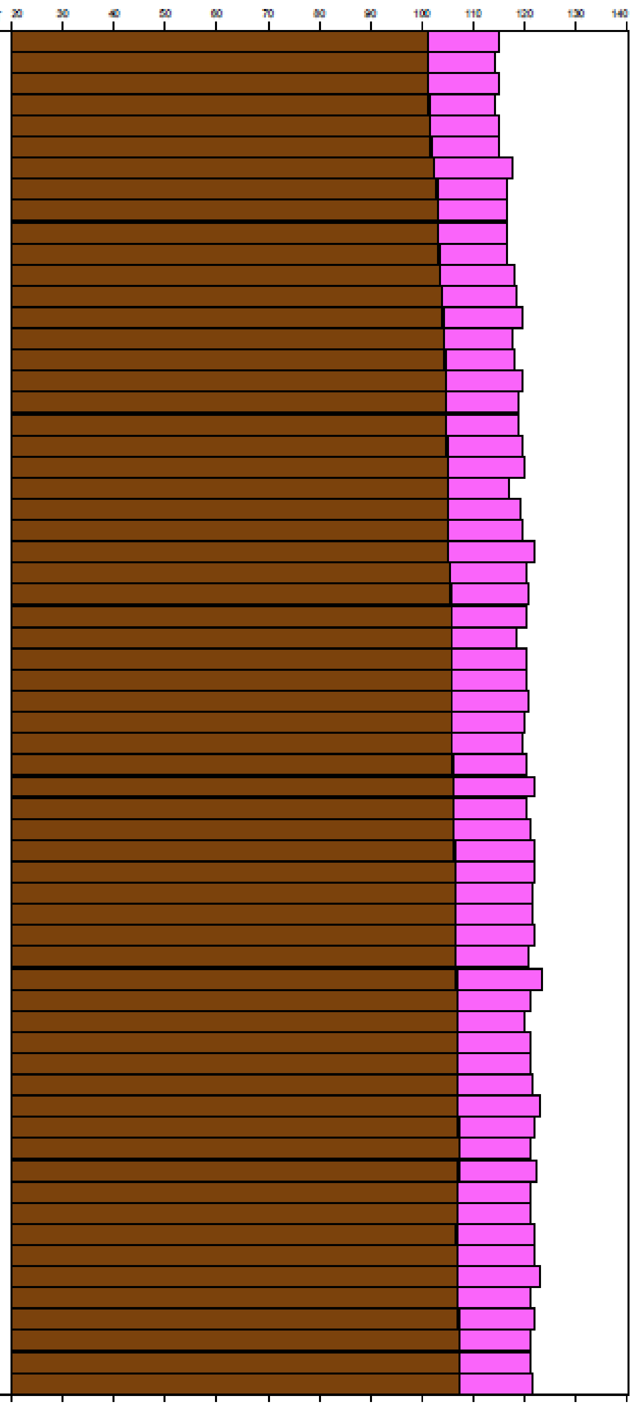
Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
449	06 Apr 2012 23:04:11	104.5	104.6	118.7	104.5	
450	06 Apr 2012 23:04:12	104.4	104.5	117.0	104.4	
451	06 Apr 2012 23:04:13	104.4	104.6	117.9	104.4	
452	06 Apr 2012 23:04:14	104.6	104.7	119.8	104.6	
453	06 Apr 2012 23:04:15	104.7	104.7	118.3	104.7	
454	06 Apr 2012 23:04:16	104.7	104.7	118.3	104.7	
455	06 Apr 2012 23:04:17	104.7	104.9	118.7	104.7	
456	06 Apr 2012 23:04:18	104.9	104.9	118.7	104.9	
457	06 Apr 2012 23:04:19	105.0	105.1	118.7	105.0	
458	06 Apr 2012 23:04:20	105.0	105.1	119.8	105.0	
459	06 Apr 2012 23:04:21	105.1	105.1	118.7	105.1	
460	06 Apr 2012 23:04:22	105.0	105.1	118.7	105.0	
461	06 Apr 2012 23:04:23	105.0	105.0	118.7	105.0	
462	06 Apr 2012 23:04:24	104.9	104.9	118.7	104.9	
463	06 Apr 2012 23:04:25	105.0	105.1	120.2	105.0	
464	06 Apr 2012 23:04:26	105.1	105.1	118.7	105.1	
465	06 Apr 2012 23:04:27	105.2	105.3	119.5	105.2	
466	06 Apr 2012 23:04:28	105.3	105.3	118.3	105.3	
467	06 Apr 2012 23:04:29	105.2	105.3	119.8	105.2	
468	06 Apr 2012 23:04:30	105.1	105.2	120.8	105.1	
469	06 Apr 2012 23:04:31	105.3	105.3	119.1	105.3	
470	06 Apr 2012 23:04:32	105.2	105.3	119.1	105.2	
471	06 Apr 2012 23:04:33	104.9	105.1	118.3	104.9	
472	06 Apr 2012 23:04:34	105.0	105.1	118.3	105.0	
473	06 Apr 2012 23:04:35	105.1	105.2	117.9	105.1	
474	06 Apr 2012 23:04:36	105.2	105.2	118.7	105.2	
475	06 Apr 2012 23:04:37	105.2	105.2	117.9	105.2	
476	06 Apr 2012 23:04:38	105.3	105.4	119.1	105.3	
477	06 Apr 2012 23:04:39	105.4	105.4	121.1	105.4	
478	06 Apr 2012 23:04:40	105.4	105.4	119.1	105.4	
479	06 Apr 2012 23:04:41	105.4	105.4	119.5	105.4	
480	06 Apr 2012 23:04:42	105.4	105.5	118.7	105.4	
481	06 Apr 2012 23:11:46	75.5	76.2	—	—	
482	06 Apr 2012 23:11:47	77.0	77.7	—	—	
483	06 Apr 2012 23:11:48	79.0	79.7	103.9	—	
484	06 Apr 2012 23:11:49	80.3	80.8	103.9	79.2	
485	06 Apr 2012 23:11:50	82.6	83.4	108.8	82.5	
486	06 Apr 2012 23:11:51	91.9	95.5	111.9	91.3	
487	06 Apr 2012 23:11:52	97.5	98.7	113.5	97.5	
488	06 Apr 2012 23:11:53	99.3	99.8	113.5	99.3	
489	06 Apr 2012 23:11:54	100.2	100.5	112.7	100.2	
490	06 Apr 2012 23:11:55	100.7	100.9	113.5	100.7	
491	06 Apr 2012 23:11:56	100.9	101.0	116.5	100.9	
492	06 Apr 2012 23:11:57	100.9	101.0	116.5	100.9	
493	06 Apr 2012 23:11:58	100.8	101.0	114.1	100.8	
494	06 Apr 2012 23:11:59	100.6	100.7	114.1	100.6	
495	06 Apr 2012 23:12:00	100.4	100.6	113.5	100.4	
496	06 Apr 2012 23:12:01	100.3	100.4	113.5	100.3	
497	06 Apr 2012 23:12:02	100.1	100.3	112.7	100.1	
498	06 Apr 2012 23:12:03	100.0	100.0	114.1	100.0	
499	06 Apr 2012 23:12:04	100.0	100.0	116.5	100.0	
500	06 Apr 2012 23:12:05	100.1	100.1	115.9	100.1	
501	06 Apr 2012 23:12:06	100.0	100.1	113.5	100.0	
502	06 Apr 2012 23:12:07	99.8	99.9	113.5	99.8	
503	06 Apr 2012 23:12:08	99.9	99.9	112.7	99.9	
504	06 Apr 2012 23:12:09	99.8	99.9	111.9	99.8	
505	06 Apr 2012 23:12:10	100.0	100.0	114.1	100.0	
506	06 Apr 2012 23:12:11	100.0	100.1	114.8	100.0	
507	06 Apr 2012 23:12:12	100.2	100.2	114.1	100.2	
508	06 Apr 2012 23:12:13	100.3	100.4	113.5	100.3	
509	06 Apr 2012 23:12:14	100.4	100.4	114.8	100.4	
510	06 Apr 2012 23:12:15	100.5	100.6	113.5	100.5	
511	06 Apr 2012 23:12:16	100.7	100.8	113.5	100.7	
512	06 Apr 2012 23:12:17	100.8	100.9	114.1	100.8	



Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
513	06 Apr 2012 23:12:18	101.0	101.2	114.8	101.0	
514	06 Apr 2012 23:12:19	101.1	101.2	114.1	101.1	
515	06 Apr 2012 23:12:20	101.1	101.2	114.8	101.1	
516	06 Apr 2012 23:12:21	101.2	101.4	114.1	101.2	
517	06 Apr 2012 23:12:22	101.5	101.6	114.8	101.5	
518	06 Apr 2012 23:12:23	101.7	101.9	114.8	101.7	
519	06 Apr 2012 23:12:24	102.2	102.4	117.4	102.2	
520	06 Apr 2012 23:12:25	102.7	102.9	116.5	102.7	
521	06 Apr 2012 23:12:26	103.0	103.1	116.5	103.0	
522	06 Apr 2012 23:12:27	103.2	103.3	116.5	103.2	
523	06 Apr 2012 23:12:28	103.3	103.3	116.5	103.3	
524	06 Apr 2012 23:12:29	103.4	103.5	117.9	103.4	
525	06 Apr 2012 23:12:30	103.7	103.9	118.3	103.7	
526	06 Apr 2012 23:12:31	104.0	104.2	119.5	104.0	
527	06 Apr 2012 23:12:32	104.2	104.3	117.4	104.2	
528	06 Apr 2012 23:12:33	104.3	104.4	117.9	104.3	
529	06 Apr 2012 23:12:34	104.4	104.5	119.5	104.4	
530	06 Apr 2012 23:12:35	104.6	104.7	118.7	104.6	
531	06 Apr 2012 23:12:36	104.6	104.7	118.7	104.6	
532	06 Apr 2012 23:12:37	104.8	104.9	119.5	104.8	
533	06 Apr 2012 23:12:38	104.9	105.0	119.8	104.9	
534	06 Apr 2012 23:12:39	104.8	104.9	117.0	104.8	
535	06 Apr 2012 23:12:40	105.0	105.1	119.1	105.0	
536	06 Apr 2012 23:12:41	105.0	105.0	119.5	105.0	
537	06 Apr 2012 23:12:42	105.1	105.1	122.0	105.1	
538	06 Apr 2012 23:12:43	105.2	105.3	120.2	105.2	
539	06 Apr 2012 23:12:44	105.4	105.6	120.8	105.4	
540	06 Apr 2012 23:12:45	105.8	105.9	120.5	105.8	
541	06 Apr 2012 23:12:46	105.7	105.8	118.3	105.7	
542	06 Apr 2012 23:12:47	105.7	105.7	120.2	105.7	
543	06 Apr 2012 23:12:48	105.7	105.8	120.5	105.7	
544	06 Apr 2012 23:12:49	105.8	105.8	120.8	105.8	
545	06 Apr 2012 23:12:50	105.7	105.8	119.8	105.7	
546	06 Apr 2012 23:12:51	105.8	105.8	119.5	105.8	
547	06 Apr 2012 23:12:52	105.9	106.1	120.5	105.9	
548	06 Apr 2012 23:12:53	106.1	106.2	121.7	106.1	
549	06 Apr 2012 23:12:54	106.2	106.3	120.2	106.2	
550	06 Apr 2012 23:12:55	106.2	106.2	121.1	106.2	
551	06 Apr 2012 23:12:56	106.3	106.4	122.0	106.3	
552	06 Apr 2012 23:12:57	106.4	106.4	122.0	106.4	
553	06 Apr 2012 23:12:58	106.3	106.4	121.4	106.3	
554	06 Apr 2012 23:12:59	106.5	106.6	121.4	106.5	
555	06 Apr 2012 23:13:00	106.5	106.5	121.7	106.5	
556	06 Apr 2012 23:13:01	106.5	106.6	120.8	106.5	
557	06 Apr 2012 23:13:02	106.6	106.7	123.5	106.6	
558	06 Apr 2012 23:13:03	106.7	106.8	121.1	106.7	
559	06 Apr 2012 23:13:04	106.8	106.9	119.8	106.8	
560	06 Apr 2012 23:13:05	106.7	106.8	121.1	106.7	
561	06 Apr 2012 23:13:06	106.8	106.8	121.1	106.8	
562	06 Apr 2012 23:13:07	106.9	106.9	121.4	106.9	
563	06 Apr 2012 23:13:08	107.0	107.1	123.0	107.0	
564	06 Apr 2012 23:13:09	107.1	107.2	122.0	107.1	
565	06 Apr 2012 23:13:10	107.1	107.2	121.1	107.1	
566	06 Apr 2012 23:13:11	107.1	107.1	122.2	107.1	
567	06 Apr 2012 23:13:12	106.8	107.0	121.1	106.8	
568	06 Apr 2012 23:13:13	106.7	106.8	121.1	106.7	
569	06 Apr 2012 23:13:14	106.7	106.8	122.0	106.7	
570	06 Apr 2012 23:13:15	106.9	107.0	121.7	106.9	
571	06 Apr 2012 23:13:16	107.0	107.1	123.0	107.0	
572	06 Apr 2012 23:13:17	107.1	107.1	121.1	107.1	
573	06 Apr 2012 23:13:18	107.1	107.2	122.0	107.1	
574	06 Apr 2012 23:13:19	107.1	107.2	121.1	107.1	
575	06 Apr 2012 23:13:20	107.3	107.3	121.1	107.3	
576	06 Apr 2012 23:13:21	107.2	107.2	121.4	107.2	



Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

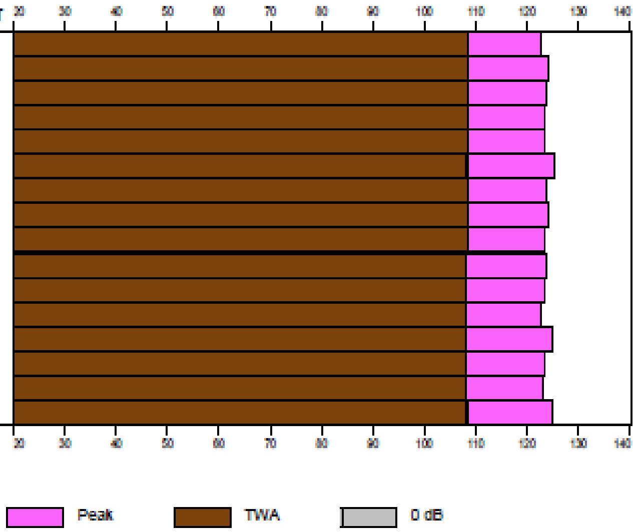
No.	Time	Leq	Lmax	Lpeak	TWA	Over
577	06 Apr 2012 23:13:22	107.2	107.3	123.5	107.2	
578	06 Apr 2012 23:13:23	107.2	107.2	122.0	107.2	
579	06 Apr 2012 23:13:24	107.0	107.1	121.4	107.0	
580	06 Apr 2012 23:13:25	107.1	107.1	122.2	107.1	
581	06 Apr 2012 23:13:26	107.2	107.3	122.0	107.2	
582	06 Apr 2012 23:13:27	107.3	107.3	121.4	107.3	
583	06 Apr 2012 23:13:28	107.2	107.3	121.1	107.2	
584	06 Apr 2012 23:13:29	107.4	107.5	123.7	107.4	
585	06 Apr 2012 23:13:30	107.4	107.5	122.2	107.4	
586	06 Apr 2012 23:13:31	107.4	107.5	123.7	107.4	
587	06 Apr 2012 23:13:32	107.4	107.4	121.4	107.4	
588	06 Apr 2012 23:13:33	107.3	107.4	121.1	107.3	
589	06 Apr 2012 23:13:34	107.0	107.1	121.4	107.0	
590	06 Apr 2012 23:13:35	107.0	107.0	121.1	107.0	
591	06 Apr 2012 23:13:36	106.9	107.0	122.5	106.9	
592	06 Apr 2012 23:13:37	106.9	107.1	121.4	106.9	
593	06 Apr 2012 23:13:38	107.3	107.4	123.0	107.3	
594	06 Apr 2012 23:13:39	107.5	107.5	121.4	107.5	
595	06 Apr 2012 23:13:40	107.5	107.5	121.7	107.5	
596	06 Apr 2012 23:13:41	107.5	107.5	121.7	107.5	
597	06 Apr 2012 23:13:42	107.5	107.6	122.0	107.5	
598	06 Apr 2012 23:13:43	107.5	107.6	122.2	107.5	
599	06 Apr 2012 23:13:44	107.6	107.7	122.7	107.6	
600	06 Apr 2012 23:13:45	107.6	107.7	123.0	107.6	
601	06 Apr 2012 23:21:58	74.4	74.8	—	—	
602	06 Apr 2012 23:21:59	75.6	76.1	—	—	
603	06 Apr 2012 23:22:00	76.8	77.3	—	—	
604	06 Apr 2012 23:22:01	78.2	79.6	103.9	—	
605	06 Apr 2012 23:22:02	87.6	93.9	117.0	85.7	
606	06 Apr 2012 23:22:03	99.3	101.9	119.8	99.1	
607	06 Apr 2012 23:22:04	102.9	103.4	120.2	102.9	
608	06 Apr 2012 23:22:05	103.4	103.4	119.1	103.4	
609	06 Apr 2012 23:22:06	103.2	103.4	119.5	103.2	
610	06 Apr 2012 23:22:07	103.3	103.6	118.3	103.3	
611	06 Apr 2012 23:22:08	103.6	103.7	118.3	103.6	
612	06 Apr 2012 23:22:09	104.0	104.3	117.9	104.0	
613	06 Apr 2012 23:22:10	104.4	104.5	118.3	104.4	
614	06 Apr 2012 23:22:11	104.4	104.5	117.4	104.4	
615	06 Apr 2012 23:22:12	104.1	104.4	117.4	104.1	
616	06 Apr 2012 23:22:13	103.7	103.8	117.9	103.7	
617	06 Apr 2012 23:22:14	103.5	103.6	117.4	103.5	
618	06 Apr 2012 23:22:15	103.5	103.6	117.4	103.5	
619	06 Apr 2012 23:22:16	103.4	103.5	117.4	103.4	
620	06 Apr 2012 23:22:17	103.5	103.6	117.0	103.5	
621	06 Apr 2012 23:22:18	103.7	103.8	119.1	103.7	
622	06 Apr 2012 23:22:19	103.9	104.1	117.9	103.9	
623	06 Apr 2012 23:22:20	104.1	104.2	117.9	104.1	
624	06 Apr 2012 23:22:21	104.2	104.2	117.4	104.2	
625	06 Apr 2012 23:22:22	104.2	104.2	117.4	104.2	
626	06 Apr 2012 23:22:23	104.0	104.1	120.5	104.0	
627	06 Apr 2012 23:22:24	103.7	103.9	119.1	103.7	
628	06 Apr 2012 23:22:25	103.4	103.5	117.0	103.4	
629	06 Apr 2012 23:22:26	103.1	103.2	117.0	103.1	
630	06 Apr 2012 23:22:27	102.9	103.0	117.0	102.9	
631	06 Apr 2012 23:22:28	102.8	102.8	116.5	102.8	
632	06 Apr 2012 23:22:29	102.8	102.8	117.4	102.8	
633	06 Apr 2012 23:22:30	102.5	102.6	117.0	102.5	
634	06 Apr 2012 23:22:31	102.4	102.5	116.5	102.4	
635	06 Apr 2012 23:22:32	102.4	102.5	117.9	102.4	
636	06 Apr 2012 23:22:33	102.4	102.5	117.4	102.4	
637	06 Apr 2012 23:22:34	102.4	102.4	117.0	102.4	
638	06 Apr 2012 23:22:35	102.4	102.6	117.4	102.4	
639	06 Apr 2012 23:22:36	102.7	102.8	117.4	102.7	
640	06 Apr 2012 23:22:37	103.0	103.2	119.5	103.0	

Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
641	06 Apr 2012 23:22:38	103.4	103.6	117.4	103.4	
642	06 Apr 2012 23:22:39	103.6	103.7	119.5	103.6	
643	06 Apr 2012 23:22:40	103.7	103.7	117.9	103.7	
644	06 Apr 2012 23:22:41	103.8	104.0	118.7	103.8	
645	06 Apr 2012 23:22:42	104.1	104.2	117.9	104.1	
646	06 Apr 2012 23:22:43	104.3	104.4	118.7	104.3	
647	06 Apr 2012 23:22:44	104.3	104.4	119.8	104.3	
648	06 Apr 2012 23:22:45	104.4	104.5	118.3	104.4	
649	06 Apr 2012 23:22:46	104.3	104.3	117.9	104.3	
650	06 Apr 2012 23:22:47	104.2	104.2	117.4	104.2	
651	06 Apr 2012 23:22:48	104.4	104.5	119.5	104.4	
652	06 Apr 2012 23:22:49	104.5	104.6	118.7	104.5	
653	06 Apr 2012 23:22:50	104.7	104.8	120.8	104.7	
654	06 Apr 2012 23:22:51	104.8	104.9	120.2	104.8	
655	06 Apr 2012 23:22:52	105.1	105.2	119.8	105.1	
656	06 Apr 2012 23:22:53	105.3	105.3	120.5	105.3	
657	06 Apr 2012 23:22:54	105.4	105.5	120.8	105.4	
658	06 Apr 2012 23:22:55	105.5	105.6	120.8	105.5	
659	06 Apr 2012 23:22:56	105.6	105.6	120.5	105.6	
660	06 Apr 2012 23:22:57	105.6	105.7	122.5	105.6	
661	06 Apr 2012 23:22:58	105.8	105.9	120.8	105.8	
662	06 Apr 2012 23:22:59	106.0	106.0	122.2	106.0	
663	06 Apr 2012 23:23:00	106.2	106.3	122.7	106.2	
664	06 Apr 2012 23:23:01	106.3	106.4	122.2	106.3	
665	06 Apr 2012 23:23:02	106.5	106.5	121.4	106.5	
666	06 Apr 2012 23:23:03	106.7	106.8	121.7	106.7	
667	06 Apr 2012 23:23:04	106.9	107.0	123.0	106.9	
668	06 Apr 2012 23:23:05	107.2	107.4	122.5	107.2	
669	06 Apr 2012 23:23:06	107.3	107.4	124.5	107.3	
670	06 Apr 2012 23:23:07	107.4	107.5	123.2	107.4	
671	06 Apr 2012 23:23:08	107.5	107.5	123.0	107.5	
672	06 Apr 2012 23:23:09	107.5	107.6	123.2	107.5	
673	06 Apr 2012 23:23:10	107.5	107.6	123.5	107.5	
674	06 Apr 2012 23:23:11	107.6	107.6	122.0	107.6	
675	06 Apr 2012 23:23:12	107.8	108.0	125.3	107.8	
676	06 Apr 2012 23:23:13	108.0	108.1	124.1	108.0	
677	06 Apr 2012 23:23:14	108.1	108.2	123.2	108.1	
678	06 Apr 2012 23:23:15	108.0	108.1	123.0	108.0	
679	06 Apr 2012 23:23:16	107.9	108.0	122.7	107.9	
680	06 Apr 2012 23:23:17	107.9	108.0	124.3	107.9	
681	06 Apr 2012 23:23:18	107.8	107.9	123.9	107.8	
682	06 Apr 2012 23:23:19	107.8	107.9	123.7	107.8	
683	06 Apr 2012 23:23:20	107.9	107.9	124.1	107.9	
684	06 Apr 2012 23:23:21	107.8	107.9	122.2	107.8	
685	06 Apr 2012 23:23:22	107.8	107.9	122.7	107.8	
686	06 Apr 2012 23:23:23	108.1	108.1	124.9	108.1	
687	06 Apr 2012 23:23:24	108.2	108.2	123.5	108.2	
688	06 Apr 2012 23:23:25	108.2	108.3	123.0	108.2	
689	06 Apr 2012 23:23:26	108.3	108.3	122.7	108.3	
690	06 Apr 2012 23:23:27	108.1	108.3	123.2	108.1	
691	06 Apr 2012 23:23:28	107.9	108.0	122.5	107.9	
692	06 Apr 2012 23:23:29	107.7	107.8	121.4	107.7	
693	06 Apr 2012 23:23:30	107.9	108.2	124.5	107.9	
694	06 Apr 2012 23:23:31	108.2	108.3	123.0	108.2	
695	06 Apr 2012 23:23:32	108.2	108.3	122.7	108.2	
696	06 Apr 2012 23:23:33	108.2	108.3	123.5	108.2	
697	06 Apr 2012 23:23:34	108.3	108.3	123.9	108.3	
698	06 Apr 2012 23:23:35	108.3	108.3	123.2	108.3	
699	06 Apr 2012 23:23:36	108.3	108.3	123.9	108.3	
700	06 Apr 2012 23:23:37	108.2	108.3	123.0	108.2	
701	06 Apr 2012 23:23:38	108.3	108.3	123.5	108.3	
702	06 Apr 2012 23:23:39	108.4	108.5	124.7	108.4	
703	06 Apr 2012 23:23:40	108.5	108.6	125.3	108.5	
704	06 Apr 2012 23:23:41	108.5	108.6	123.2	108.5	

Serial Number:	02433	Start:	06 Apr 2012 22:24:47
Model Number:	706	Stop:	06 Apr 2012 23:23:58
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
705	06 Apr 2012 23:23:42	108.4	108.5	122.7	108.4	
706	06 Apr 2012 23:23:43	108.4	108.4	124.1	108.4	
707	06 Apr 2012 23:23:44	108.3	108.4	123.9	108.3	
708	06 Apr 2012 23:23:45	108.4	108.5	123.2	108.4	
709	06 Apr 2012 23:23:46	108.4	108.5	123.5	108.4	
710	06 Apr 2012 23:23:47	108.3	108.3	125.1	108.3	
711	06 Apr 2012 23:23:48	108.3	108.3	123.9	108.3	
712	06 Apr 2012 23:23:49	108.3	108.4	124.1	108.3	
713	06 Apr 2012 23:23:50	108.3	108.4	123.5	108.3	
714	06 Apr 2012 23:23:51	108.2	108.2	123.7	108.2	
715	06 Apr 2012 23:23:52	108.2	108.2	123.2	108.2	
716	06 Apr 2012 23:23:53	108.1	108.2	122.7	108.1	
717	06 Apr 2012 23:23:54	108.1	108.2	124.7	108.1	
718	06 Apr 2012 23:23:55	108.1	108.2	123.5	108.1	
719	06 Apr 2012 23:23:56	108.2	108.2	123.0	108.2	
720	06 Apr 2012 23:23:57	108.3	108.4	124.7	108.3	



Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
1	06 Apr 2012 17:14:45	80.6	85.0	111.9	76.6	
2	06 Apr 2012 17:14:46	89.5	90.9	112.7	89.4	
3	06 Apr 2012 17:14:47	91.5	92.3	113.5	91.4	
4	06 Apr 2012 17:14:48	94.0	96.1	115.4	94.0	
5	06 Apr 2012 17:14:49	97.5	98.5	116.5	97.5	
6	06 Apr 2012 17:14:50	99.4	100.0	116.5	99.4	
7	06 Apr 2012 17:14:51	100.6	101.1	119.1	100.6	
8	06 Apr 2012 17:14:52	101.5	101.8	120.2	101.5	
9	06 Apr 2012 17:14:53	101.9	102.1	118.3	101.9	
10	06 Apr 2012 17:14:54	102.3	102.4	118.7	102.3	
11	06 Apr 2012 17:14:55	102.3	102.5	116.5	102.3	
12	06 Apr 2012 17:14:56	102.6	102.7	119.1	102.6	
13	06 Apr 2012 17:14:57	102.5	102.6	117.9	102.5	
14	06 Apr 2012 17:14:58	102.3	102.4	118.3	102.3	
15	06 Apr 2012 17:14:59	102.1	102.2	117.9	102.1	
16	06 Apr 2012 17:15:00	101.9	102.0	118.7	101.9	
17	06 Apr 2012 17:15:01	101.7	101.8	117.4	101.7	
18	06 Apr 2012 17:15:02	101.4	101.5	118.7	101.4	
19	06 Apr 2012 17:15:03	101.3	101.4	117.0	101.3	
20	06 Apr 2012 17:15:04	101.1	101.2	117.9	101.1	
21	06 Apr 2012 17:15:05	100.9	101.0	117.4	100.9	
22	06 Apr 2012 17:15:06	100.9	101.0	117.4	100.9	
23	06 Apr 2012 17:15:07	101.0	101.1	117.9	101.0	
24	06 Apr 2012 17:15:08	100.8	101.0	118.7	100.8	
25	06 Apr 2012 17:15:09	100.6	100.8	116.5	100.6	
26	06 Apr 2012 17:15:10	100.4	100.5	115.9	100.4	
27	06 Apr 2012 17:15:11	100.4	100.5	115.9	100.4	
28	06 Apr 2012 17:15:12	100.3	100.3	115.9	100.3	
29	06 Apr 2012 17:15:13	100.2	100.3	117.9	100.2	
30	06 Apr 2012 17:15:14	100.3	100.4	115.9	100.3	
31	06 Apr 2012 17:15:15	100.1	100.2	115.4	100.1	
32	06 Apr 2012 17:15:16	99.9	99.9	117.0	99.9	
33	06 Apr 2012 17:15:17	99.9	100.0	115.4	99.9	
34	06 Apr 2012 17:15:18	100.0	100.0	116.5	100.0	
35	06 Apr 2012 17:15:19	100.0	100.1	115.9	100.0	
36	06 Apr 2012 17:15:20	100.0	100.1	115.9	100.0	
37	06 Apr 2012 17:15:21	99.9	100.0	115.9	99.9	
38	06 Apr 2012 17:15:22	99.9	100.0	115.9	99.9	
39	06 Apr 2012 17:15:23	100.2	100.4	116.5	100.2	
40	06 Apr 2012 17:15:24	100.4	100.4	117.0	100.4	
41	06 Apr 2012 17:15:25	100.4	100.5	117.9	100.4	
42	06 Apr 2012 17:15:26	100.4	100.4	116.5	100.4	
43	06 Apr 2012 17:15:27	100.3	100.3	114.8	100.3	
44	06 Apr 2012 17:15:28	100.1	100.2	115.4	100.1	
45	06 Apr 2012 17:15:29	100.1	100.2	115.9	100.1	
46	06 Apr 2012 17:15:30	100.1	100.2	116.5	100.1	
47	06 Apr 2012 17:15:31	99.9	100.0	115.4	99.9	
48	06 Apr 2012 17:15:32	99.7	99.8	117.4	99.7	
49	06 Apr 2012 17:15:33	99.5	99.7	115.4	99.5	
50	06 Apr 2012 17:15:34	99.4	99.5	115.4	99.4	
51	06 Apr 2012 17:15:35	99.5	99.6	116.5	99.5	
52	06 Apr 2012 17:15:36	99.6	99.8	114.8	99.6	
53	06 Apr 2012 17:15:37	99.8	99.8	117.0	99.8	
54	06 Apr 2012 17:15:38	99.8	99.9	115.9	99.8	
55	06 Apr 2012 17:15:39	99.8	99.8	115.4	99.8	
56	06 Apr 2012 17:15:40	99.7	99.7	116.5	99.7	
57	06 Apr 2012 17:15:41	99.7	99.8	117.4	99.7	
58	06 Apr 2012 17:15:42	99.7	99.7	115.4	99.7	
59	06 Apr 2012 17:15:43	99.6	99.7	116.5	99.6	
60	06 Apr 2012 17:15:44	99.6	99.7	117.0	99.6	
61	06 Apr 2012 17:15:45	99.6	99.6	115.9	99.6	
62	06 Apr 2012 17:15:46	99.5	99.6	114.8	99.5	
63	06 Apr 2012 17:15:47	99.6	99.6	115.9	99.6	
64	06 Apr 2012 17:15:48	99.5	99.5	115.9	99.5	

Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
65	06 Apr 2012 17:15:49	99.5	99.6	115.4	99.5	
66	06 Apr 2012 17:15:50	99.6	99.7	117.0	99.6	
67	06 Apr 2012 17:15:51	99.7	99.7	116.5	99.7	
68	06 Apr 2012 17:15:52	99.8	99.9	115.9	99.8	
69	06 Apr 2012 17:15:53	99.8	99.9	114.8	99.8	
70	06 Apr 2012 17:15:54	99.6	99.6	116.5	99.6	
71	06 Apr 2012 17:15:55	99.6	99.6	116.5	99.6	
72	06 Apr 2012 17:15:56	99.5	99.6	114.8	99.5	
73	06 Apr 2012 17:15:57	99.4	99.4	116.5	99.4	
74	06 Apr 2012 17:15:58	99.4	99.5	115.9	99.4	
75	06 Apr 2012 17:15:59	99.5	99.6	115.4	99.5	
76	06 Apr 2012 17:16:00	99.5	99.6	117.4	99.5	
77	06 Apr 2012 17:16:01	99.5	99.6	115.9	99.5	
78	06 Apr 2012 17:16:02	99.3	99.4	114.8	99.3	
79	06 Apr 2012 17:16:03	99.2	99.2	114.8	99.2	
80	06 Apr 2012 17:16:04	99.4	99.4	115.4	99.4	
81	06 Apr 2012 17:16:05	99.4	99.4	114.8	99.4	
82	06 Apr 2012 17:16:06	99.3	99.4	115.4	99.3	
83	06 Apr 2012 17:16:07	99.2	99.3	115.4	99.2	
84	06 Apr 2012 17:16:08	99.2	99.2	113.5	99.2	
85	06 Apr 2012 17:16:09	99.1	99.2	115.9	99.1	
86	06 Apr 2012 17:16:10	99.1	99.2	115.4	99.1	
87	06 Apr 2012 17:16:11	99.1	99.1	117.9	99.1	
88	06 Apr 2012 17:16:12	99.1	99.1	114.8	99.1	
89	06 Apr 2012 17:16:13	99.1	99.1	116.5	99.1	
90	06 Apr 2012 17:16:14	99.0	99.1	114.1	99.0	
91	06 Apr 2012 17:16:15	98.9	99.0	115.4	98.9	
92	06 Apr 2012 17:16:16	98.9	99.0	115.9	98.9	
93	06 Apr 2012 17:16:17	98.9	99.0	114.8	98.9	
94	06 Apr 2012 17:16:18	98.9	99.1	117.0	98.9	
95	06 Apr 2012 17:16:19	99.1	99.1	114.1	99.1	
96	06 Apr 2012 17:16:20	99.1	99.1	115.9	99.1	
97	06 Apr 2012 17:16:21	98.9	99.0	115.9	98.9	
98	06 Apr 2012 17:16:22	99.0	99.2	117.0	99.0	
99	06 Apr 2012 17:16:23	99.1	99.1	115.9	99.1	
100	06 Apr 2012 17:16:24	99.1	99.2	115.4	99.1	
101	06 Apr 2012 17:16:25	99.1	99.3	118.7	99.1	
102	06 Apr 2012 17:16:26	99.3	99.4	115.9	99.3	
103	06 Apr 2012 17:16:27	99.2	99.3	116.5	99.2	
104	06 Apr 2012 17:16:28	99.3	99.4	117.4	99.3	
105	06 Apr 2012 17:16:29	99.5	99.6	117.0	99.5	
106	06 Apr 2012 17:16:30	99.7	99.8	118.3	99.7	
107	06 Apr 2012 17:16:31	99.8	99.9	118.3	99.8	
108	06 Apr 2012 17:16:32	99.9	100.0	117.0	99.9	
109	06 Apr 2012 17:16:33	99.8	99.9	116.5	99.8	
110	06 Apr 2012 17:16:34	100.0	100.1	117.0	100.0	
111	06 Apr 2012 17:16:35	100.2	100.2	115.9	100.2	
112	06 Apr 2012 17:16:36	100.2	100.3	117.9	100.2	
113	06 Apr 2012 17:16:37	100.4	100.4	117.4	100.4	
114	06 Apr 2012 17:16:38	100.2	100.4	116.5	100.2	
115	06 Apr 2012 17:16:39	99.9	100.0	117.9	99.9	
116	06 Apr 2012 17:16:40	100.1	100.5	116.5	100.1	
117	06 Apr 2012 17:16:41	100.8	101.0	117.9	100.8	
118	06 Apr 2012 17:16:42	101.1	101.1	117.0	101.1	
119	06 Apr 2012 17:16:43	100.8	101.1	116.5	100.8	
120	06 Apr 2012 17:16:44	100.5	100.7	118.7	100.5	
121	06 Apr 2012 17:16:45	100.8	101.0	118.7	100.8	
122	06 Apr 2012 21:24:36	85.8	86.1	105.9	85.8	
123	06 Apr 2012 21:24:37	88.4	90.8	112.7	88.2	
124	06 Apr 2012 21:24:38	92.6	93.8	113.5	92.6	
125	06 Apr 2012 21:24:39	94.9	95.8	114.1	94.9	
126	06 Apr 2012 21:24:40	96.8	97.6	115.4	96.8	
127	06 Apr 2012 21:24:41	98.7	99.4	115.4	98.7	
128	06 Apr 2012 21:24:42	99.7	100.2	114.1	99.7	

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
129	06 Apr 2012 21:24:43	100.8	101.2	115.9	100.8	
130	06 Apr 2012 21:24:44	101.3	101.4	113.5	101.3	
131	06 Apr 2012 21:24:45	101.6	101.9	114.8	101.6	
132	06 Apr 2012 21:24:46	102.1	102.3	115.9	102.1	
133	06 Apr 2012 21:24:47	102.2	102.3	115.4	102.2	
134	06 Apr 2012 21:24:48	102.3	102.3	116.5	102.3	
135	06 Apr 2012 21:24:49	102.1	102.2	114.8	102.1	
136	06 Apr 2012 21:24:50	102.0	102.0	114.8	102.0	
137	06 Apr 2012 21:24:51	102.1	102.2	115.4	102.1	
138	06 Apr 2012 21:24:52	102.1	102.2	115.4	102.1	
139	06 Apr 2012 21:24:53	102.1	102.2	115.4	102.1	
140	06 Apr 2012 21:24:54	102.0	102.1	115.4	102.0	
141	06 Apr 2012 21:24:55	102.0	102.1	116.5	102.0	
142	06 Apr 2012 21:24:56	101.8	102.0	114.8	101.8	
143	06 Apr 2012 21:24:57	101.7	101.8	118.3	101.7	
144	06 Apr 2012 21:24:58	101.8	101.9	115.4	101.8	
145	06 Apr 2012 21:24:59	101.8	101.8	115.9	101.8	
146	06 Apr 2012 21:25:00	101.8	101.9	115.4	101.8	
147	06 Apr 2012 21:25:01	101.8	101.8	115.4	101.8	
148	06 Apr 2012 21:25:02	101.8	101.8	115.9	101.8	
149	06 Apr 2012 21:25:03	101.9	101.9	114.8	101.9	
150	06 Apr 2012 21:25:04	102.0	102.0	114.8	102.0	
151	06 Apr 2012 21:25:05	102.0	102.0	114.1	102.0	
152	06 Apr 2012 21:25:06	101.9	102.0	115.9	101.9	
153	06 Apr 2012 21:25:07	101.9	102.0	115.4	101.9	
154	06 Apr 2012 21:25:08	101.9	102.0	116.5	101.9	
155	06 Apr 2012 21:25:09	101.9	102.0	114.8	101.9	
156	06 Apr 2012 21:25:10	102.0	102.0	114.8	102.0	
157	06 Apr 2012 21:25:11	101.9	102.0	115.9	101.9	
158	06 Apr 2012 21:25:12	101.8	101.8	115.9	101.8	
159	06 Apr 2012 21:25:13	101.6	101.7	114.8	101.6	
160	06 Apr 2012 21:25:14	101.5	101.6	115.4	101.5	
161	06 Apr 2012 21:25:15	101.5	101.5	117.0	101.5	
162	06 Apr 2012 21:25:16	101.5	101.6	116.5	101.5	
163	06 Apr 2012 21:25:17	101.5	101.6	115.9	101.5	
164	06 Apr 2012 21:25:18	101.5	101.6	114.1	101.5	
165	06 Apr 2012 21:25:19	101.5	101.6	115.9	101.5	
166	06 Apr 2012 21:25:20	101.6	101.7	114.8	101.6	
167	06 Apr 2012 21:25:21	101.7	101.8	115.4	101.7	
168	06 Apr 2012 21:25:22	101.7	101.7	114.8	101.7	
169	06 Apr 2012 21:25:23	101.7	101.7	115.4	101.7	
170	06 Apr 2012 21:25:24	101.9	102.0	116.5	101.9	
171	06 Apr 2012 21:25:25	101.9	101.9	117.0	101.9	
172	06 Apr 2012 21:25:26	101.8	101.8	115.9	101.8	
173	06 Apr 2012 21:25:27	101.7	101.7	115.4	101.7	
174	06 Apr 2012 21:25:28	101.7	101.8	115.4	101.6	
175	06 Apr 2012 21:25:29	101.7	101.8	114.8	101.7	
176	06 Apr 2012 21:25:30	101.5	101.6	115.9	101.5	
177	06 Apr 2012 21:25:31	101.4	101.4	114.8	101.4	
178	06 Apr 2012 21:25:32	101.4	101.4	115.9	101.4	
179	06 Apr 2012 21:25:33	101.3	101.4	115.4	101.3	
180	06 Apr 2012 21:25:34	101.3	101.3	115.4	101.3	
181	06 Apr 2012 21:25:35	101.3	101.4	114.1	101.3	
182	06 Apr 2012 21:25:36	101.7	101.8	116.5	101.7	
183	06 Apr 2012 21:25:37	101.8	101.8	116.5	101.8	
184	06 Apr 2012 21:25:38	101.8	101.9	116.5	101.8	
185	06 Apr 2012 21:25:39	101.8	101.9	114.8	101.8	
186	06 Apr 2012 21:25:40	102.0	102.0	115.9	102.0	
187	06 Apr 2012 21:25:41	101.9	101.9	115.4	101.9	
188	06 Apr 2012 21:25:42	102.1	102.2	116.5	102.1	
189	06 Apr 2012 21:25:43	102.2	102.2	115.9	102.2	
190	06 Apr 2012 21:25:44	102.1	102.1	115.9	102.1	
191	06 Apr 2012 21:25:45	102.1	102.1	118.3	102.1	
192	06 Apr 2012 21:25:46	102.2	102.2	114.1	102.2	

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
193	06 Apr 2012 21:25:47	102.2	102.3	115.9	102.2	
194	06 Apr 2012 21:25:48	102.0	102.1	115.9	102.0	
195	06 Apr 2012 21:25:49	101.9	101.9	115.9	101.9	
196	06 Apr 2012 21:25:50	102.0	102.1	115.9	102.0	
197	06 Apr 2012 21:25:51	102.1	102.1	115.9	102.1	
198	06 Apr 2012 21:25:52	102.1	102.1	115.9	102.1	
199	06 Apr 2012 21:25:53	102.0	102.0	115.9	102.0	
200	06 Apr 2012 21:25:54	101.8	101.9	115.9	101.8	
201	06 Apr 2012 21:25:55	101.9	101.9	117.9	101.9	
202	06 Apr 2012 21:25:56	102.0	102.0	116.5	102.0	
203	06 Apr 2012 21:25:57	101.9	102.0	115.9	101.9	
204	06 Apr 2012 21:25:58	101.9	102.0	115.4	101.9	
205	06 Apr 2012 21:25:59	101.9	101.9	115.4	101.9	
206	06 Apr 2012 21:26:00	101.8	101.9	116.5	101.8	
207	06 Apr 2012 21:26:01	101.9	102.0	115.9	101.9	
208	06 Apr 2012 21:26:02	102.0	102.1	115.9	102.0	
209	06 Apr 2012 21:26:03	102.2	102.4	116.5	102.2	
210	06 Apr 2012 21:26:04	102.3	102.4	117.9	102.3	
211	06 Apr 2012 21:26:05	102.2	102.3	115.4	102.2	
212	06 Apr 2012 21:26:06	101.8	102.0	117.0	101.8	
213	06 Apr 2012 21:26:07	101.7	101.7	115.9	101.7	
214	06 Apr 2012 21:26:08	101.9	102.0	117.0	101.9	
215	06 Apr 2012 21:26:09	101.9	102.0	118.3	101.9	
216	06 Apr 2012 21:26:10	101.6	101.8	115.4	101.6	
217	06 Apr 2012 21:26:11	101.6	101.7	115.9	101.6	
218	06 Apr 2012 21:26:12	101.7	101.7	115.9	101.7	
219	06 Apr 2012 21:26:13	101.7	101.8	117.0	101.7	
220	06 Apr 2012 21:26:14	101.6	101.7	114.8	101.6	
221	06 Apr 2012 21:26:15	101.6	101.7	117.0	101.6	
222	06 Apr 2012 21:26:16	101.5	101.6	115.4	101.5	
223	06 Apr 2012 21:26:17	101.2	101.4	115.4	101.2	
224	06 Apr 2012 21:26:18	101.3	101.3	115.9	101.3	
225	06 Apr 2012 21:26:19	101.4	101.5	118.3	101.4	
226	06 Apr 2012 21:26:20	101.5	101.6	115.9	101.5	
227	06 Apr 2012 21:26:21	101.6	101.6	114.8	101.6	
228	06 Apr 2012 21:26:22	101.5	101.6	117.0	101.5	
229	06 Apr 2012 21:26:23	101.6	101.8	117.0	101.6	
230	06 Apr 2012 21:26:24	101.9	102.0	117.0	101.9	
231	06 Apr 2012 21:26:25	102.0	102.1	118.3	102.0	
232	06 Apr 2012 21:26:26	102.1	102.2	116.5	102.1	
233	06 Apr 2012 21:26:27	102.3	102.3	118.3	102.3	
234	06 Apr 2012 21:26:28	102.3	102.3	117.0	102.3	
235	06 Apr 2012 21:26:29	102.2	102.3	115.9	102.2	
236	06 Apr 2012 21:26:30	102.1	102.2	115.9	102.1	
237	06 Apr 2012 21:26:31	102.0	102.2	117.9	102.0	
238	06 Apr 2012 21:26:32	102.4	102.5	116.5	102.4	
239	06 Apr 2012 21:26:33	102.5	102.5	116.5	102.5	
240	06 Apr 2012 21:26:34	102.4	102.5	115.9	102.4	
241	06 Apr 2012 21:26:35	102.5	102.6	116.5	102.5	
242	06 Apr 2012 21:34:46	93.1	93.4	117.4	93.1	
243	06 Apr 2012 21:34:47	94.8	96.6	115.4	94.8	
244	06 Apr 2012 21:34:48	98.7	100.2	117.4	98.7	
245	06 Apr 2012 21:34:49	101.6	102.5	118.3	101.6	
246	06 Apr 2012 21:34:50	103.0	103.3	118.7	103.0	
247	06 Apr 2012 21:34:51	103.6	103.9	119.1	103.6	
248	06 Apr 2012 21:34:52	104.0	104.1	119.5	104.0	
249	06 Apr 2012 21:34:53	104.1	104.2	119.5	104.1	
250	06 Apr 2012 21:34:54	104.0	104.1	117.4	104.0	
251	06 Apr 2012 21:34:55	104.1	104.1	118.3	104.1	
252	06 Apr 2012 21:34:56	104.4	104.7	119.1	104.4	
253	06 Apr 2012 21:34:57	104.7	104.7	118.7	104.7	
254	06 Apr 2012 21:34:58	104.8	105.0	118.3	104.8	
255	06 Apr 2012 21:34:59	105.0	105.1	120.2	105.0	
256	06 Apr 2012 21:35:00	104.9	105.0	119.1	104.9	

Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
257	06 Apr 2012 21:35:01	105.0	105.0	118.3	105.0	
258	06 Apr 2012 21:35:02	105.1	105.2	120.2	105.1	
259	06 Apr 2012 21:35:03	105.2	105.3	118.7	105.2	
260	06 Apr 2012 21:35:04	105.3	105.5	120.2	105.3	
261	06 Apr 2012 21:35:05	105.8	106.1	121.1	105.8	
262	06 Apr 2012 21:35:06	106.3	106.4	120.5	106.3	
263	06 Apr 2012 21:35:07	106.5	106.6	121.7	106.5	
264	06 Apr 2012 21:35:08	106.6	106.7	120.5	106.6	
265	06 Apr 2012 21:35:09	106.7	106.7	120.8	106.7	
266	06 Apr 2012 21:35:10	106.7	106.7	120.2	106.7	
267	06 Apr 2012 21:35:11	106.6	106.7	120.2	106.6	
268	06 Apr 2012 21:35:12	106.4	106.5	121.1	106.4	
269	06 Apr 2012 21:35:13	106.6	106.7	121.7	106.6	
270	06 Apr 2012 21:35:14	106.5	106.5	120.5	106.5	
271	06 Apr 2012 21:35:15	106.2	106.3	119.5	106.2	
272	06 Apr 2012 21:35:16	106.0	106.1	120.8	106.0	
273	06 Apr 2012 21:35:17	105.8	105.9	120.2	105.8	
274	06 Apr 2012 21:35:18	105.8	105.9	120.2	105.8	
275	06 Apr 2012 21:35:19	105.7	105.8	119.5	105.7	
276	06 Apr 2012 21:35:20	105.7	105.7	120.2	105.7	
277	06 Apr 2012 21:35:21	105.7	105.7	119.1	105.7	
278	06 Apr 2012 21:35:22	105.6	105.6	119.8	105.6	
279	06 Apr 2012 21:35:23	105.5	105.6	119.1	105.5	
280	06 Apr 2012 21:35:24	105.5	105.5	119.8	105.5	
281	06 Apr 2012 21:35:25	105.2	105.4	118.3	105.2	
282	06 Apr 2012 21:35:26	105.0	105.0	120.2	105.0	
283	06 Apr 2012 21:35:27	104.9	105.0	118.3	104.9	
284	06 Apr 2012 21:35:28	104.6	104.7	118.7	104.6	
285	06 Apr 2012 21:35:29	104.5	104.5	117.4	104.5	
286	06 Apr 2012 21:35:30	104.3	104.4	119.1	104.3	
287	06 Apr 2012 21:35:31	104.4	104.5	118.7	104.4	
288	06 Apr 2012 21:35:32	104.5	104.5	117.4	104.5	
289	06 Apr 2012 21:35:33	104.5	104.5	118.7	104.5	
290	06 Apr 2012 21:35:34	104.6	104.6	118.3	104.6	
291	06 Apr 2012 21:35:35	104.5	104.5	119.5	104.5	
292	06 Apr 2012 21:35:36	104.5	104.5	117.9	104.5	
293	06 Apr 2012 21:35:37	104.5	104.6	119.8	104.5	
294	06 Apr 2012 21:35:38	104.5	104.6	118.7	104.5	
295	06 Apr 2012 21:35:39	104.7	104.7	118.7	104.7	
296	06 Apr 2012 21:35:40	104.6	104.7	117.9	104.6	
297	06 Apr 2012 21:35:41	104.6	104.7	117.9	104.6	
298	06 Apr 2012 21:35:42	104.6	104.7	118.7	104.6	
299	06 Apr 2012 21:35:43	104.5	104.6	117.9	104.5	
300	06 Apr 2012 21:35:44	104.6	104.6	118.7	104.6	
301	06 Apr 2012 21:35:45	104.4	104.5	117.9	104.4	
302	06 Apr 2012 21:35:46	104.3	104.4	118.7	104.3	
303	06 Apr 2012 21:35:47	104.4	104.4	117.4	104.4	
304	06 Apr 2012 21:35:48	104.4	104.5	118.7	104.4	
305	06 Apr 2012 21:35:49	104.5	104.6	118.7	104.5	
306	06 Apr 2012 21:35:50	104.6	104.6	117.4	104.6	
307	06 Apr 2012 21:35:51	104.7	104.7	118.3	104.7	
308	06 Apr 2012 21:35:52	104.6	104.7	119.1	104.6	
309	06 Apr 2012 21:35:53	104.6	104.7	122.0	104.6	
310	06 Apr 2012 21:35:54	104.7	104.7	120.8	104.7	
311	06 Apr 2012 21:35:55	104.7	104.7	118.3	104.7	
312	06 Apr 2012 21:35:56	104.7	104.9	119.8	104.7	
313	06 Apr 2012 21:35:57	105.0	105.0	121.4	105.0	
314	06 Apr 2012 21:35:58	104.9	105.1	120.2	104.9	
315	06 Apr 2012 21:35:59	105.0	105.1	120.5	105.0	
316	06 Apr 2012 21:36:00	105.1	105.1	120.2	105.1	
317	06 Apr 2012 21:36:01	105.1	105.1	118.7	105.1	
318	06 Apr 2012 21:36:02	105.0	105.1	122.2	105.0	
319	06 Apr 2012 21:36:03	104.9	104.9	120.8	104.9	
320	06 Apr 2012 21:36:04	104.9	105.0	123.2	104.9	

Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
321	06 Apr 2012 21:36:05	105.0	105.1	122.7	105.0	
322	06 Apr 2012 21:36:06	104.9	104.9	119.8	104.9	
323	06 Apr 2012 21:36:07	104.9	104.9	122.5	104.9	
324	06 Apr 2012 21:36:08	105.0	105.1	121.1	105.0	
325	06 Apr 2012 21:36:09	105.0	105.1	122.0	105.0	
326	06 Apr 2012 21:36:10	104.9	105.0	119.5	104.9	
327	06 Apr 2012 21:36:11	105.0	105.0	120.2	105.0	
328	06 Apr 2012 21:36:12	105.0	105.1	120.2	105.0	
329	06 Apr 2012 21:36:13	105.1	105.1	119.8	105.1	
330	06 Apr 2012 21:36:14	105.3	105.5	123.2	105.3	
331	06 Apr 2012 21:36:15	105.4	105.5	119.8	105.4	
332	06 Apr 2012 21:36:16	105.4	105.5	125.3	105.4	
333	06 Apr 2012 21:36:17	105.5	105.5	124.5	105.5	
334	06 Apr 2012 21:36:18	105.4	105.4	123.0	105.4	
335	06 Apr 2012 21:36:19	105.1	105.3	119.5	105.1	
336	06 Apr 2012 21:36:20	104.8	105.0	119.5	104.8	
337	06 Apr 2012 21:36:21	104.7	104.8	117.9	104.7	
338	06 Apr 2012 21:36:22	104.9	105.0	122.0	104.9	
339	06 Apr 2012 21:36:23	104.9	105.0	122.2	104.9	
340	06 Apr 2012 21:36:24	104.9	105.0	121.4	104.9	
341	06 Apr 2012 21:36:25	104.8	104.9	122.7	104.8	
342	06 Apr 2012 21:36:26	104.9	104.9	120.5	104.9	
343	06 Apr 2012 21:36:27	104.9	104.9	119.1	104.9	
344	06 Apr 2012 21:36:28	104.8	105.0	119.8	104.8	
345	06 Apr 2012 21:36:29	105.0	105.1	117.9	105.0	
346	06 Apr 2012 21:36:30	105.0	105.1	121.4	105.0	
347	06 Apr 2012 21:36:31	105.1	105.1	125.7	105.1	
348	06 Apr 2012 21:36:32	105.3	105.4	119.8	105.3	
349	06 Apr 2012 21:36:33	105.3	105.4	120.5	105.3	
350	06 Apr 2012 21:36:34	105.2	105.2	119.1	105.2	
351	06 Apr 2012 21:36:35	105.1	105.2	120.2	105.1	
352	06 Apr 2012 21:36:36	105.1	105.1	120.2	105.1	
353	06 Apr 2012 21:36:37	105.1	105.1	122.0	105.1	
354	06 Apr 2012 21:36:38	105.1	105.2	119.1	105.1	
355	06 Apr 2012 21:36:39	105.2	105.2	122.2	105.2	
356	06 Apr 2012 21:36:40	105.2	105.2	122.5	105.2	
357	06 Apr 2012 21:36:41	105.3	105.4	119.8	105.3	
358	06 Apr 2012 21:36:42	105.1	105.1	121.7	105.1	
359	06 Apr 2012 21:36:43	105.1	105.2	119.8	105.1	
360	06 Apr 2012 21:36:44	105.2	105.3	123.0	105.2	
361	06 Apr 2012 21:36:45	105.1	105.2	122.2	105.1	
362	06 Apr 2012 21:45:30	79.4	80.1	—	65.9	
363	06 Apr 2012 21:45:31	81.0	82.5	105.9	81.0	
364	06 Apr 2012 21:45:32	84.0	86.2	103.9	83.9	
365	06 Apr 2012 21:45:33	88.4	90.8	109.9	88.3	
366	06 Apr 2012 21:45:34	94.4	96.2	114.1	94.3	
367	06 Apr 2012 21:45:35	96.9	98.1	114.1	96.9	
368	06 Apr 2012 21:45:36	99.1	100.0	115.4	99.1	
369	06 Apr 2012 21:45:37	100.5	101.1	117.0	100.5	
370	06 Apr 2012 21:45:38	101.6	102.0	116.5	101.6	
371	06 Apr 2012 21:45:39	102.4	102.7	115.9	102.4	
372	06 Apr 2012 21:45:40	103.0	103.1	115.9	103.0	
373	06 Apr 2012 21:45:41	103.3	103.4	117.4	103.3	
374	06 Apr 2012 21:45:42	103.5	103.6	117.4	103.5	
375	06 Apr 2012 21:45:43	103.7	103.8	117.0	103.7	
376	06 Apr 2012 21:45:44	103.8	103.8	117.4	103.8	
377	06 Apr 2012 21:45:45	103.7	103.8	116.5	103.7	
378	06 Apr 2012 21:45:46	103.5	103.6	117.0	103.5	
379	06 Apr 2012 21:45:47	103.5	103.6	118.3	103.5	
380	06 Apr 2012 21:45:48	103.4	103.5	116.5	103.4	
381	06 Apr 2012 21:45:49	103.4	103.4	117.0	103.4	
382	06 Apr 2012 21:45:50	103.3	103.4	115.9	103.3	
383	06 Apr 2012 21:45:51	103.2	103.3	116.5	103.2	
384	06 Apr 2012 21:45:52	103.1	103.2	117.9	103.1	

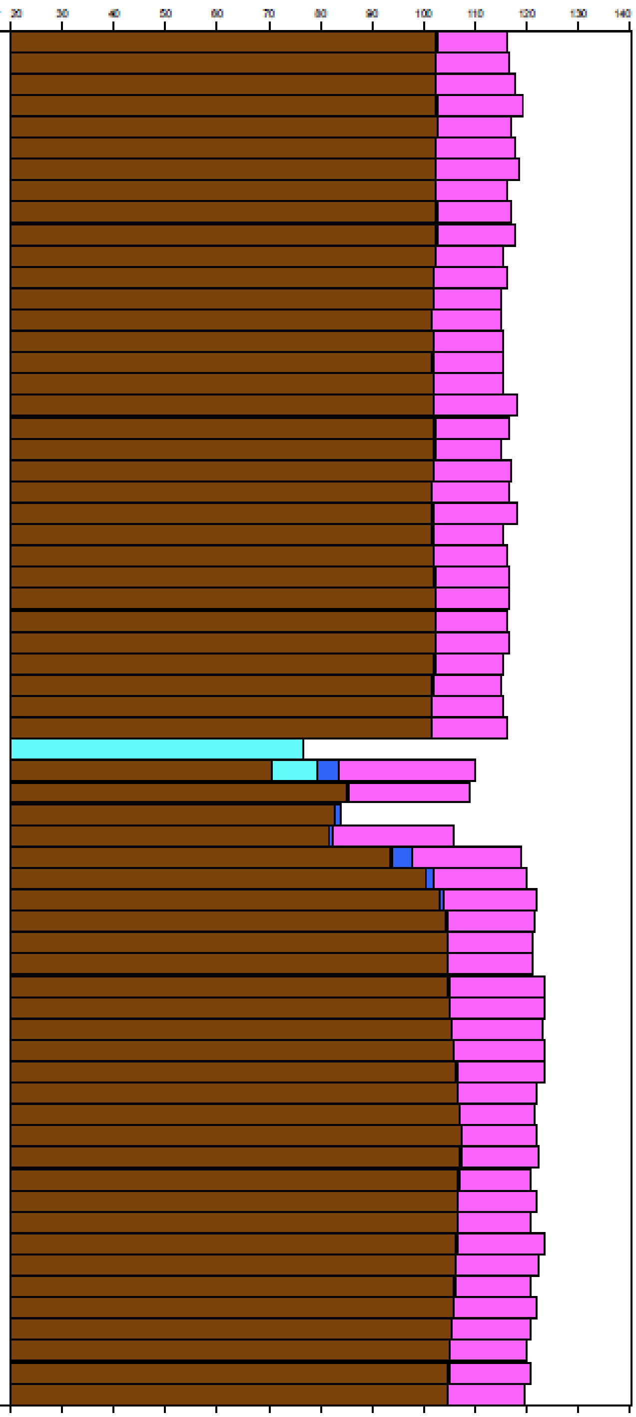
Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
385	06 Apr 2012 21:45:53	102.9	103.0	117.0	102.9	
386	06 Apr 2012 21:45:54	102.6	102.8	115.9	102.6	
387	06 Apr 2012 21:45:55	102.3	102.4	115.9	102.3	
388	06 Apr 2012 21:45:56	102.1	102.2	116.5	102.1	
389	06 Apr 2012 21:45:57	102.0	102.1	115.4	102.0	
390	06 Apr 2012 21:45:58	102.0	102.0	117.0	102.0	
391	06 Apr 2012 21:45:59	102.1	102.1	116.5	102.1	
392	06 Apr 2012 21:46:00	102.1	102.2	114.8	102.1	
393	06 Apr 2012 21:46:01	102.2	102.3	117.4	102.2	
394	06 Apr 2012 21:46:02	102.2	102.3	115.9	102.2	
395	06 Apr 2012 21:46:03	102.1	102.2	115.9	102.1	
396	06 Apr 2012 21:46:04	102.0	102.1	117.4	102.0	
397	06 Apr 2012 21:46:05	101.8	101.9	115.9	101.8	
398	06 Apr 2012 21:46:06	101.8	101.9	115.9	101.8	
399	06 Apr 2012 21:46:07	101.8	101.9	115.9	101.8	
400	06 Apr 2012 21:46:08	101.6	101.7	115.4	101.6	
401	06 Apr 2012 21:46:09	101.5	101.5	115.9	101.5	
402	06 Apr 2012 21:46:10	101.5	101.6	117.4	101.5	
403	06 Apr 2012 21:46:11	101.6	101.8	116.5	101.6	
404	06 Apr 2012 21:46:12	101.9	101.9	115.9	101.9	
405	06 Apr 2012 21:46:13	102.0	102.0	117.0	102.0	
406	06 Apr 2012 21:46:14	102.1	102.2	116.5	102.1	
407	06 Apr 2012 21:46:15	102.2	102.3	116.5	102.2	
408	06 Apr 2012 21:46:16	102.3	102.3	117.4	102.3	
409	06 Apr 2012 21:46:17	102.3	102.3	119.5	102.3	
410	06 Apr 2012 21:46:18	102.3	102.4	118.3	102.3	
411	06 Apr 2012 21:46:19	102.2	102.3	118.3	102.2	
412	06 Apr 2012 21:46:20	102.1	102.2	117.4	102.1	
413	06 Apr 2012 21:46:21	101.9	102.0	120.2	101.9	
414	06 Apr 2012 21:46:22	101.9	102.0	115.9	101.9	
415	06 Apr 2012 21:46:23	102.1	102.3	119.1	102.1	
416	06 Apr 2012 21:46:24	102.4	102.4	118.7	102.4	
417	06 Apr 2012 21:46:25	102.4	102.4	117.9	102.4	
418	06 Apr 2012 21:46:26	102.3	102.3	117.0	102.3	
419	06 Apr 2012 21:46:27	102.3	102.4	118.3	102.3	
420	06 Apr 2012 21:46:28	102.5	102.5	117.4	102.5	
421	06 Apr 2012 21:46:29	102.5	102.6	120.2	102.5	
422	06 Apr 2012 21:46:30	102.5	102.6	119.5	102.5	
423	06 Apr 2012 21:46:31	102.4	102.4	118.3	102.4	
424	06 Apr 2012 21:46:32	102.3	102.4	117.0	102.3	
425	06 Apr 2012 21:46:33	102.2	102.3	116.5	102.2	
426	06 Apr 2012 21:46:34	102.4	102.5	115.9	102.4	
427	06 Apr 2012 21:46:35	102.5	102.5	119.1	102.5	
428	06 Apr 2012 21:46:36	102.5	102.6	116.5	102.5	
429	06 Apr 2012 21:46:37	102.7	102.8	116.5	102.7	
430	06 Apr 2012 21:46:38	102.8	102.8	117.0	102.8	
431	06 Apr 2012 21:46:39	102.7	102.8	117.0	102.7	
432	06 Apr 2012 21:46:40	102.6	102.7	115.9	102.6	
433	06 Apr 2012 21:46:41	102.6	102.7	117.4	102.6	
434	06 Apr 2012 21:46:42	102.7	102.8	118.3	102.7	
435	06 Apr 2012 21:46:43	102.8	102.8	118.3	102.8	
436	06 Apr 2012 21:46:44	102.9	102.9	118.3	102.9	
437	06 Apr 2012 21:46:45	102.9	103.0	118.3	102.9	
438	06 Apr 2012 21:46:46	102.8	103.0	116.5	102.8	
439	06 Apr 2012 21:46:47	102.8	102.8	118.7	102.8	
440	06 Apr 2012 21:46:48	102.9	102.9	117.9	102.9	
441	06 Apr 2012 21:46:49	102.9	102.9	117.0	102.9	
442	06 Apr 2012 21:46:50	102.9	102.9	117.4	102.9	
443	06 Apr 2012 21:46:51	102.8	102.9	117.9	102.8	
444	06 Apr 2012 21:46:52	102.8	102.8	117.0	102.8	
445	06 Apr 2012 21:46:53	102.7	102.8	115.9	102.7	
446	06 Apr 2012 21:46:54	102.6	102.6	117.9	102.6	
447	06 Apr 2012 21:46:55	102.6	102.7	116.5	102.6	
448	06 Apr 2012 21:46:56	102.6	102.6	117.0	102.6	

Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
449	06 Apr 2012 21:46:57	102.5	102.6	115.9	102.5	
450	06 Apr 2012 21:46:58	102.4	102.4	116.5	102.4	
451	06 Apr 2012 21:46:59	102.4	102.5	117.4	102.4	
452	06 Apr 2012 21:47:00	102.5	102.6	119.1	102.5	
453	06 Apr 2012 21:47:01	102.5	102.6	117.0	102.5	
454	06 Apr 2012 21:47:02	102.5	102.5	117.4	102.5	
455	06 Apr 2012 21:47:03	102.4	102.4	118.3	102.4	
456	06 Apr 2012 21:47:04	102.4	102.5	115.9	102.4	
457	06 Apr 2012 21:47:05	102.5	102.5	117.0	102.5	
458	06 Apr 2012 21:47:06	102.5	102.5	117.4	102.5	
459	06 Apr 2012 21:47:07	102.2	102.4	115.4	102.2	
460	06 Apr 2012 21:47:08	101.9	102.0	115.9	101.9	
461	06 Apr 2012 21:47:09	101.8	101.9	114.8	101.8	
462	06 Apr 2012 21:47:10	101.7	101.7	114.8	101.7	
463	06 Apr 2012 21:47:11	101.8	101.8	115.4	101.8	
464	06 Apr 2012 21:47:12	101.7	101.8	115.4	101.7	
465	06 Apr 2012 21:47:13	101.8	102.0	115.4	101.8	
466	06 Apr 2012 21:47:14	102.1	102.1	117.9	102.1	
467	06 Apr 2012 21:47:15	102.1	102.2	116.5	102.1	
468	06 Apr 2012 21:47:16	102.0	102.2	114.8	102.0	
469	06 Apr 2012 21:47:17	101.7	101.9	117.0	101.7	
470	06 Apr 2012 21:47:18	101.6	101.6	116.5	101.6	
471	06 Apr 2012 21:47:19	101.6	101.7	117.9	101.6	
472	06 Apr 2012 21:47:20	101.6	101.7	115.4	101.6	
473	06 Apr 2012 21:47:21	101.8	102.1	115.9	101.8	
474	06 Apr 2012 21:47:22	102.1	102.2	116.5	102.1	
475	06 Apr 2012 21:47:23	102.2	102.3	116.5	102.2	
476	06 Apr 2012 21:47:24	102.2	102.4	115.9	102.2	
477	06 Apr 2012 21:47:25	102.3	102.4	116.5	102.3	
478	06 Apr 2012 21:47:26	102.1	102.3	115.4	102.1	
479	06 Apr 2012 21:47:27	101.6	101.8	114.8	101.6	
480	06 Apr 2012 21:47:28	101.4	101.4	115.4	101.4	
481	06 Apr 2012 21:47:29	101.4	101.6	115.9	101.4	
482	06 Apr 2012 21:57:22	76.7	76.8	—	—	
483	06 Apr 2012 21:57:23	79.2	83.6	109.9	70.4	
484	06 Apr 2012 21:57:24	84.9	85.6	108.8	84.9	
485	06 Apr 2012 21:57:25	82.9	83.8	—	82.9	
486	06 Apr 2012 21:57:26	81.6	82.3	105.9	81.6	
487	06 Apr 2012 21:57:27	94.0	97.7	118.7	93.4	
488	06 Apr 2012 21:57:28	100.4	102.1	119.8	100.3	
489	06 Apr 2012 21:57:29	103.1	103.9	121.7	103.1	
490	06 Apr 2012 21:57:30	104.2	104.4	121.4	104.2	
491	06 Apr 2012 21:57:31	104.5	104.5	121.1	104.5	
492	06 Apr 2012 21:57:32	104.5	104.6	121.1	104.5	
493	06 Apr 2012 21:57:33	104.7	104.9	123.5	104.7	
494	06 Apr 2012 21:57:34	105.0	105.2	123.2	105.0	
495	06 Apr 2012 21:57:35	105.3	105.5	123.0	105.3	
496	06 Apr 2012 21:57:36	105.7	105.9	123.5	105.7	
497	06 Apr 2012 21:57:37	106.3	106.5	123.2	106.3	
498	06 Apr 2012 21:57:38	106.5	106.6	122.0	106.5	
499	06 Apr 2012 21:57:39	106.8	107.0	121.4	106.8	
500	06 Apr 2012 21:57:40	107.2	107.2	121.7	107.2	
501	06 Apr 2012 21:57:41	106.9	107.2	122.2	106.9	
502	06 Apr 2012 21:57:42	106.6	106.7	120.8	106.6	
503	06 Apr 2012 21:57:43	106.4	106.4	121.7	106.4	
504	06 Apr 2012 21:57:44	106.3	106.4	120.8	106.3	
505	06 Apr 2012 21:57:45	106.3	106.4	123.5	106.3	
506	06 Apr 2012 21:57:46	106.2	106.3	122.2	106.2	
507	06 Apr 2012 21:57:47	105.8	106.0	120.8	105.8	
508	06 Apr 2012 21:57:48	105.6	105.7	121.7	105.6	
509	06 Apr 2012 21:57:49	105.3	105.4	120.8	105.3	
510	06 Apr 2012 21:57:50	105.0	105.1	119.8	105.0	
511	06 Apr 2012 21:57:51	104.8	104.9	120.8	104.8	
512	06 Apr 2012 21:57:52	104.6	104.6	119.5	104.6	



Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
513	06 Apr 2012 21:57:53	104.3	104.5	120.2	104.3	
514	06 Apr 2012 21:57:54	104.1	104.2	119.8	104.1	
515	06 Apr 2012 21:57:55	103.9	104.0	120.8	103.9	
516	06 Apr 2012 21:57:56	103.6	103.8	119.8	103.6	
517	06 Apr 2012 21:57:57	103.5	103.5	119.8	103.5	
518	06 Apr 2012 21:57:58	103.3	103.4	119.1	103.3	
519	06 Apr 2012 21:57:59	103.2	103.2	120.8	103.2	
520	06 Apr 2012 21:58:00	103.0	103.1	117.9	103.0	
521	06 Apr 2012 21:58:01	102.9	103.0	119.8	102.9	
522	06 Apr 2012 21:58:02	102.9	102.9	119.5	102.9	
523	06 Apr 2012 21:58:03	102.8	102.9	118.7	102.8	
524	06 Apr 2012 21:58:04	102.7	102.8	117.4	102.7	
525	06 Apr 2012 21:58:05	102.7	102.8	118.3	102.7	
526	06 Apr 2012 21:58:06	102.8	102.8	118.7	102.8	
527	06 Apr 2012 21:58:07	102.8	102.8	117.4	102.8	
528	06 Apr 2012 21:58:08	102.7	102.7	118.3	102.7	
529	06 Apr 2012 21:58:09	102.7	102.8	118.3	102.7	
530	06 Apr 2012 21:58:10	102.8	102.8	119.5	102.8	
531	06 Apr 2012 21:58:11	102.9	102.9	117.4	102.9	
532	06 Apr 2012 21:58:12	103.0	103.1	118.7	103.0	
533	06 Apr 2012 21:58:13	103.1	103.2	119.1	103.1	
534	06 Apr 2012 21:58:14	103.2	103.2	118.3	103.2	
535	06 Apr 2012 21:58:15	103.3	103.3	118.3	103.3	
536	06 Apr 2012 21:58:16	103.4	103.4	119.1	103.4	
537	06 Apr 2012 21:58:17	103.4	103.4	119.1	103.4	
538	06 Apr 2012 21:58:18	103.3	103.4	118.3	103.3	
539	06 Apr 2012 21:58:19	103.3	103.3	118.3	103.3	
540	06 Apr 2012 21:58:20	103.3	103.4	118.3	103.3	
541	06 Apr 2012 21:58:21	103.4	103.4	119.1	103.4	
542	06 Apr 2012 21:58:22	103.4	103.4	120.2	103.4	
543	06 Apr 2012 21:58:23	103.4	103.4	119.1	103.4	
544	06 Apr 2012 21:58:24	103.3	103.4	119.5	103.3	
545	06 Apr 2012 21:58:25	103.3	103.3	118.7	103.3	
546	06 Apr 2012 21:58:26	103.4	103.5	118.3	103.4	
547	06 Apr 2012 21:58:27	103.5	103.5	118.7	103.5	
548	06 Apr 2012 21:58:28	103.4	103.5	120.2	103.4	
549	06 Apr 2012 21:58:29	103.4	103.4	118.7	103.4	
550	06 Apr 2012 21:58:30	103.2	103.3	117.9	103.2	
551	06 Apr 2012 21:58:31	103.1	103.2	119.1	103.1	
552	06 Apr 2012 21:58:32	103.1	103.1	117.9	103.1	
553	06 Apr 2012 21:58:33	103.0	103.0	119.1	103.0	
554	06 Apr 2012 21:58:34	103.1	103.1	118.7	103.1	
555	06 Apr 2012 21:58:35	103.1	103.1	117.9	103.1	
556	06 Apr 2012 21:58:36	103.1	103.2	117.9	103.1	
557	06 Apr 2012 21:58:37	103.1	103.1	118.3	103.1	
558	06 Apr 2012 21:58:38	103.1	103.2	117.9	103.1	
559	06 Apr 2012 21:58:39	103.1	103.1	117.9	103.1	
560	06 Apr 2012 21:58:40	103.1	103.2	117.0	103.1	
561	06 Apr 2012 21:58:41	103.3	103.3	118.3	103.3	
562	06 Apr 2012 21:58:42	103.3	103.4	117.4	103.3	
563	06 Apr 2012 21:58:43	103.5	103.5	119.1	103.5	
564	06 Apr 2012 21:58:44	103.5	103.5	119.1	103.5	
565	06 Apr 2012 21:58:45	103.5	103.5	117.9	103.5	
566	06 Apr 2012 21:58:46	103.5	103.5	118.7	103.5	
567	06 Apr 2012 21:58:47	103.4	103.5	119.5	103.4	
568	06 Apr 2012 21:58:48	103.4	103.4	117.9	103.4	
569	06 Apr 2012 21:58:49	103.3	103.4	117.4	103.3	
570	06 Apr 2012 21:58:50	103.2	103.3	118.3	103.2	
571	06 Apr 2012 21:58:51	103.2	103.2	118.3	103.2	
572	06 Apr 2012 21:58:52	103.2	103.2	117.4	103.2	
573	06 Apr 2012 21:58:53	103.2	103.2	118.7	103.2	
574	06 Apr 2012 21:58:54	103.2	103.3	117.4	103.2	
575	06 Apr 2012 21:58:55	103.4	103.4	117.4	103.4	
576	06 Apr 2012 21:58:56	103.5	103.5	119.1	103.5	

Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
577	06 Apr 2012 21:58:57	103.4	103.5	117.4	103.4	
578	06 Apr 2012 21:58:58	103.2	103.3	116.5	103.2	
579	06 Apr 2012 21:58:59	103.1	103.1	119.1	103.1	
580	06 Apr 2012 21:59:00	103.1	103.1	118.3	103.1	
581	06 Apr 2012 21:59:01	103.1	103.3	117.4	103.1	
582	06 Apr 2012 21:59:02	103.3	103.4	119.5	103.3	
583	06 Apr 2012 21:59:03	103.2	103.3	118.3	103.2	
584	06 Apr 2012 21:59:04	103.1	103.2	118.3	103.1	
585	06 Apr 2012 21:59:05	103.1	103.2	118.3	103.1	
586	06 Apr 2012 21:59:06	103.2	103.3	117.9	103.2	
587	06 Apr 2012 21:59:07	103.3	103.3	118.3	103.3	
588	06 Apr 2012 21:59:08	103.2	103.3	117.0	103.2	
589	06 Apr 2012 21:59:09	103.2	103.3	118.3	103.2	
590	06 Apr 2012 21:59:10	103.2	103.3	117.0	103.2	
591	06 Apr 2012 21:59:11	103.3	103.3	119.1	103.3	
592	06 Apr 2012 21:59:12	103.1	103.3	119.8	103.1	
593	06 Apr 2012 21:59:13	103.0	103.1	117.4	103.0	
594	06 Apr 2012 21:59:14	103.0	103.2	118.3	103.0	
595	06 Apr 2012 21:59:15	103.4	103.5	117.9	103.4	
596	06 Apr 2012 21:59:16	103.5	103.6	118.7	103.5	
597	06 Apr 2012 21:59:17	103.6	103.6	119.5	103.6	
598	06 Apr 2012 21:59:18	103.7	103.7	117.9	103.7	
599	06 Apr 2012 21:59:19	103.7	103.8	119.1	103.7	
600	06 Apr 2012 21:59:20	103.6	103.7	117.0	103.6	
601	06 Apr 2012 21:59:21	103.7	103.8	118.7	103.7	
602	06 Apr 2012 22:09:41	82.9	84.3	108.8	82.8	
603	06 Apr 2012 22:09:42	82.4	83.8	—	82.3	
604	06 Apr 2012 22:09:43	80.3	80.9	—	78.1	
605	06 Apr 2012 22:09:44	81.7	87.0	116.5	80.3	
606	06 Apr 2012 22:09:45	96.9	100.7	120.2	96.4	
607	06 Apr 2012 22:09:46	104.4	106.1	124.5	104.3	
608	06 Apr 2012 22:09:47	106.9	107.4	124.1	106.9	
609	06 Apr 2012 22:09:48	107.6	107.8	123.9	107.6	
610	06 Apr 2012 22:09:49	107.9	108.0	122.0	107.9	
611	06 Apr 2012 22:09:50	107.8	107.9	122.5	107.8	
612	06 Apr 2012 22:09:51	107.8	107.9	123.9	107.8	
613	06 Apr 2012 22:09:52	107.8	107.9	123.0	107.8	
614	06 Apr 2012 22:09:53	107.5	107.6	123.2	107.5	
615	06 Apr 2012 22:09:54	107.4	107.4	123.5	107.4	
616	06 Apr 2012 22:09:55	107.4	107.5	123.7	107.4	
617	06 Apr 2012 22:09:56	107.5	107.5	123.0	107.5	
618	06 Apr 2012 22:09:57	107.5	107.6	123.2	107.5	
619	06 Apr 2012 22:09:58	107.4	107.4	122.2	107.4	
620	06 Apr 2012 22:09:59	107.3	107.3	123.2	107.3	
621	06 Apr 2012 22:10:00	107.1	107.2	122.7	107.1	
622	06 Apr 2012 22:10:01	106.9	107.1	122.2	106.9	
623	06 Apr 2012 22:10:02	106.7	106.7	122.5	106.7	
624	06 Apr 2012 22:10:03	106.5	106.6	122.0	106.5	
625	06 Apr 2012 22:10:04	106.3	106.4	122.2	106.3	
626	06 Apr 2012 22:10:05	106.1	106.2	121.1	106.1	
627	06 Apr 2012 22:10:06	105.8	106.0	121.1	105.8	
628	06 Apr 2012 22:10:07	105.7	105.7	120.8	105.7	
629	06 Apr 2012 22:10:08	105.6	105.6	121.7	105.6	
630	06 Apr 2012 22:10:09	105.5	105.6	121.4	105.5	
631	06 Apr 2012 22:10:10	105.5	105.5	122.2	105.5	
632	06 Apr 2012 22:10:11	105.4	105.5	121.1	105.4	
633	06 Apr 2012 22:10:12	105.4	105.5	120.8	105.4	
634	06 Apr 2012 22:10:13	105.2	105.3	121.1	105.2	
635	06 Apr 2012 22:10:14	105.3	105.4	121.1	105.3	
636	06 Apr 2012 22:10:15	105.5	105.5	121.1	105.5	
637	06 Apr 2012 22:10:16	105.5	105.6	122.0	105.5	
638	06 Apr 2012 22:10:17	105.6	105.6	121.4	105.6	
639	06 Apr 2012 22:10:18	105.6	105.7	122.2	105.6	
640	06 Apr 2012 22:10:19	105.6	105.6	120.2	105.6	

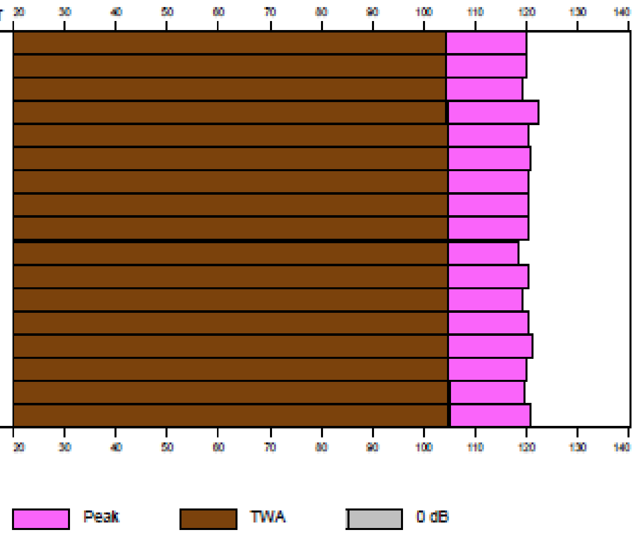
Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
641	06 Apr 2012 22:10:20	105.5	105.5	121.1	105.5	
642	06 Apr 2012 22:10:21	105.5	105.5	120.8	105.5	
643	06 Apr 2012 22:10:22	105.3	105.4	120.5	105.3	
644	06 Apr 2012 22:10:23	105.3	105.4	121.1	105.3	
645	06 Apr 2012 22:10:24	105.3	105.4	123.5	105.3	
646	06 Apr 2012 22:10:25	105.1	105.2	120.2	105.1	
647	06 Apr 2012 22:10:26	104.9	105.0	119.5	104.9	
648	06 Apr 2012 22:10:27	104.7	104.8	120.5	104.7	
649	06 Apr 2012 22:10:28	104.7	104.8	121.1	104.7	
650	06 Apr 2012 22:10:29	104.8	104.8	120.5	104.8	
651	06 Apr 2012 22:10:30	104.7	104.8	120.2	104.7	
652	06 Apr 2012 22:10:31	104.7	104.8	119.8	104.7	
653	06 Apr 2012 22:10:32	104.6	104.7	120.8	104.6	
654	06 Apr 2012 22:10:33	104.6	104.6	121.4	104.6	
655	06 Apr 2012 22:10:34	104.5	104.6	120.5	104.5	
656	06 Apr 2012 22:10:35	104.5	104.5	120.8	104.5	
657	06 Apr 2012 22:10:36	104.5	104.5	120.5	104.5	
658	06 Apr 2012 22:10:37	104.4	104.5	119.5	104.4	
659	06 Apr 2012 22:10:38	104.4	104.4	120.2	104.4	
660	06 Apr 2012 22:10:39	104.2	104.3	120.5	104.2	
661	06 Apr 2012 22:10:40	104.1	104.2	118.7	104.1	
662	06 Apr 2012 22:10:41	104.2	104.2	122.0	104.2	
663	06 Apr 2012 22:10:42	104.3	104.4	119.8	104.3	
664	06 Apr 2012 22:10:43	104.5	104.6	121.7	104.5	
665	06 Apr 2012 22:10:44	104.6	104.7	119.8	104.6	
666	06 Apr 2012 22:10:45	104.6	104.7	121.1	104.6	
667	06 Apr 2012 22:10:46	104.7	104.7	119.1	104.7	
668	06 Apr 2012 22:10:47	104.7	104.8	119.8	104.7	
669	06 Apr 2012 22:10:48	104.7	104.7	121.4	104.7	
670	06 Apr 2012 22:10:49	104.7	104.7	120.5	104.7	
671	06 Apr 2012 22:10:50	104.7	104.8	121.1	104.7	
672	06 Apr 2012 22:10:51	104.6	104.8	121.7	104.6	
673	06 Apr 2012 22:10:52	104.5	104.6	120.5	104.5	
674	06 Apr 2012 22:10:53	104.6	104.6	120.8	104.6	
675	06 Apr 2012 22:10:54	104.6	104.7	119.1	104.6	
676	06 Apr 2012 22:10:55	104.7	104.8	121.1	104.7	
677	06 Apr 2012 22:10:56	104.7	104.8	119.5	104.7	
678	06 Apr 2012 22:10:57	104.7	104.8	119.1	104.7	
679	06 Apr 2012 22:10:58	104.7	104.8	120.8	104.7	
680	06 Apr 2012 22:10:59	104.7	104.8	119.5	104.7	
681	06 Apr 2012 22:11:00	104.8	104.9	120.2	104.8	
682	06 Apr 2012 22:11:01	104.7	104.8	118.7	104.7	
683	06 Apr 2012 22:11:02	104.7	104.8	119.8	104.7	
684	06 Apr 2012 22:11:03	104.6	104.7	119.8	104.6	
685	06 Apr 2012 22:11:04	104.6	104.7	119.5	104.6	
686	06 Apr 2012 22:11:05	104.7	104.7	119.5	104.7	
687	06 Apr 2012 22:11:06	104.6	104.7	120.2	104.6	
688	06 Apr 2012 22:11:07	104.5	104.6	119.8	104.5	
689	06 Apr 2012 22:11:08	104.6	104.7	122.2	104.6	
690	06 Apr 2012 22:11:09	104.6	104.7	121.1	104.6	
691	06 Apr 2012 22:11:10	104.7	104.8	118.7	104.7	
692	06 Apr 2012 22:11:11	104.7	104.8	119.1	104.7	
693	06 Apr 2012 22:11:12	104.6	104.7	119.5	104.6	
694	06 Apr 2012 22:11:13	104.6	104.6	120.5	104.6	
695	06 Apr 2012 22:11:14	104.6	104.7	121.1	104.6	
696	06 Apr 2012 22:11:15	104.6	104.7	120.5	104.6	
697	06 Apr 2012 22:11:16	104.5	104.6	119.8	104.5	
698	06 Apr 2012 22:11:17	104.5	104.5	118.3	104.5	
699	06 Apr 2012 22:11:18	104.4	104.5	119.8	104.4	
700	06 Apr 2012 22:11:19	104.5	104.6	120.5	104.5	
701	06 Apr 2012 22:11:20	104.4	104.5	120.2	104.4	
702	06 Apr 2012 22:11:21	104.3	104.4	119.1	104.3	
703	06 Apr 2012 22:11:22	104.2	104.2	118.3	104.2	
704	06 Apr 2012 22:11:23	104.1	104.2	118.7	104.1	

Leq Max Peak TWA 0 dB

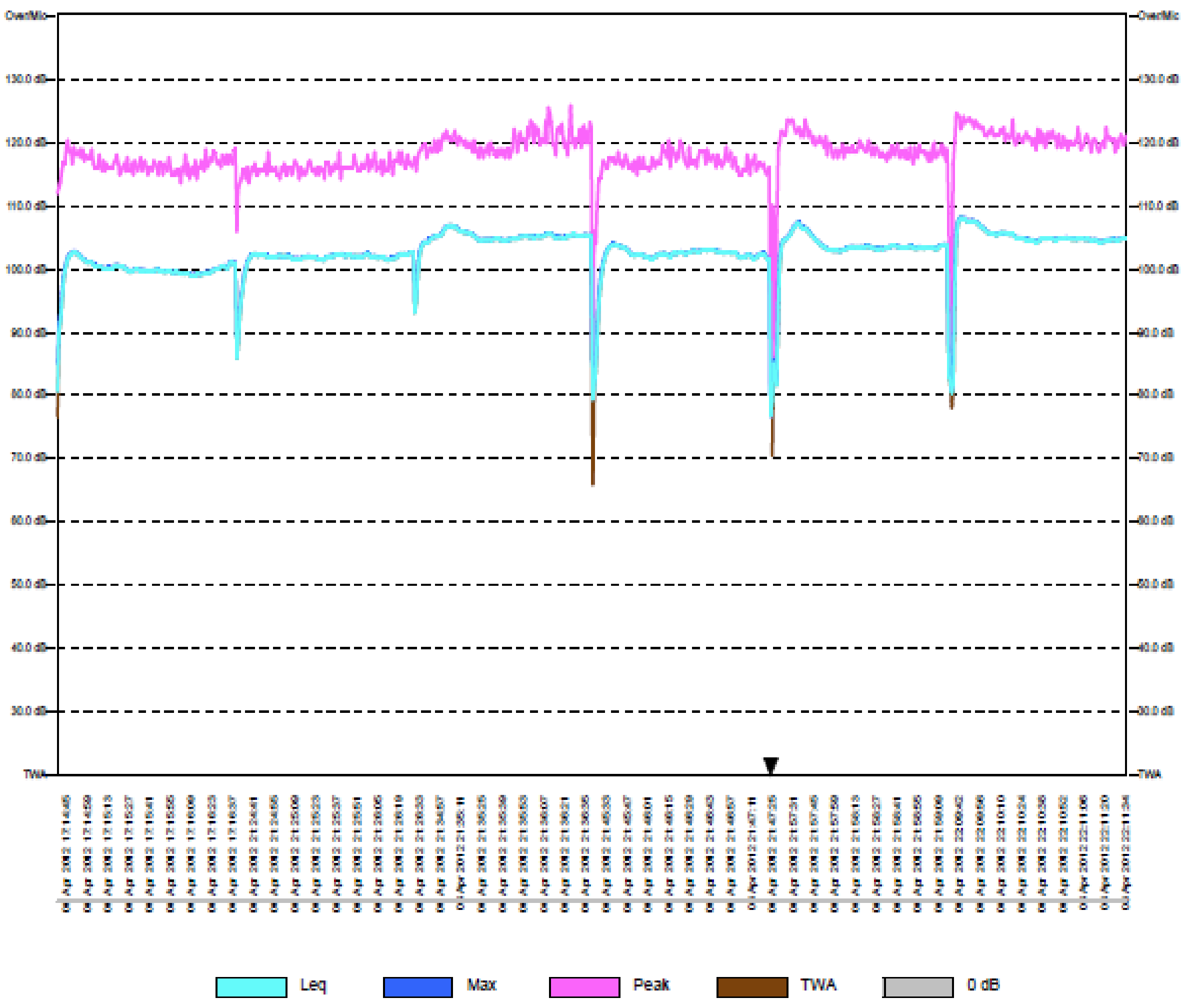
Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

No.	Time	Leq	Lmax	Lpeak	TWA	Over
705	06 Apr 2012 22:11:24	104.1	104.2	119.8	104.1	
706	06 Apr 2012 22:11:25	104.2	104.2	119.8	104.2	
707	06 Apr 2012 22:11:26	104.3	104.3	119.1	104.3	
708	06 Apr 2012 22:11:27	104.4	104.4	122.2	104.4	
709	06 Apr 2012 22:11:28	104.5	104.5	120.5	104.5	
710	06 Apr 2012 22:11:29	104.4	104.4	120.8	104.4	
711	06 Apr 2012 22:11:30	104.5	104.5	120.2	104.5	
712	06 Apr 2012 22:11:31	104.6	104.6	120.2	104.6	
713	06 Apr 2012 22:11:32	104.6	104.7	120.5	104.6	
714	06 Apr 2012 22:11:33	104.5	104.5	118.3	104.5	
715	06 Apr 2012 22:11:34	104.4	104.5	120.2	104.4	
716	06 Apr 2012 22:11:35	104.5	104.5	119.1	104.5	
717	06 Apr 2012 22:11:36	104.5	104.6	120.5	104.5	
718	06 Apr 2012 22:11:37	104.6	104.8	121.1	104.6	
719	06 Apr 2012 22:11:38	104.8	104.8	119.8	104.8	
720	06 Apr 2012 22:11:39	104.7	104.8	119.5	104.7	
721	06 Apr 2012 22:11:40	104.7	104.8	120.8	104.7	



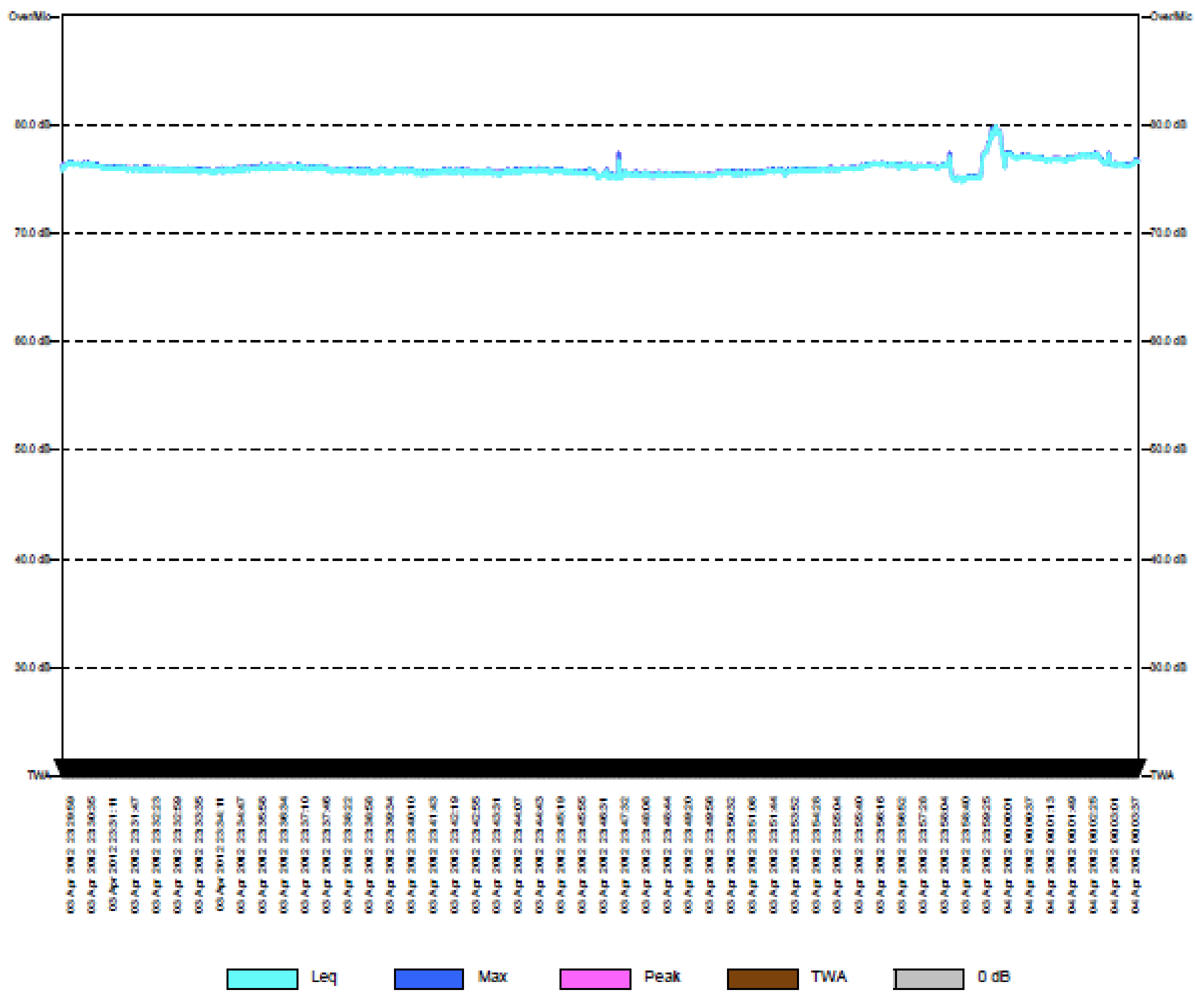
Serial Number:	02433	Start:	06 Apr 2012 17:14:45
Model Number:	706	Stop:	06 Apr 2012 22:11:41
RMS Weighting:	A Weighting	Run Time:	00:12:01
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	721

Exchange Rate:	5	Dose:	15.2 %
Threshold:	80.0 dBA	Projected Dose:	608.3 %
Criterion Level:	90.0 dBA	Leq:	103.3 dBA
Criterion Duration:	8.0 hours	TWA:	103.0 dBA
		TWA (8)	76.4 dBA
L10:	105.0 dBA	Lmax:	108.0 dBA
L30:	104.0 dBA	Lpeak (max):	125.7 dB
L50:	102.5 dBA	Lep (8)	87.3 dBA
L70:	101.5 dBA	SE:	1.7 Pa²hr
L90:	99.5 dBA		



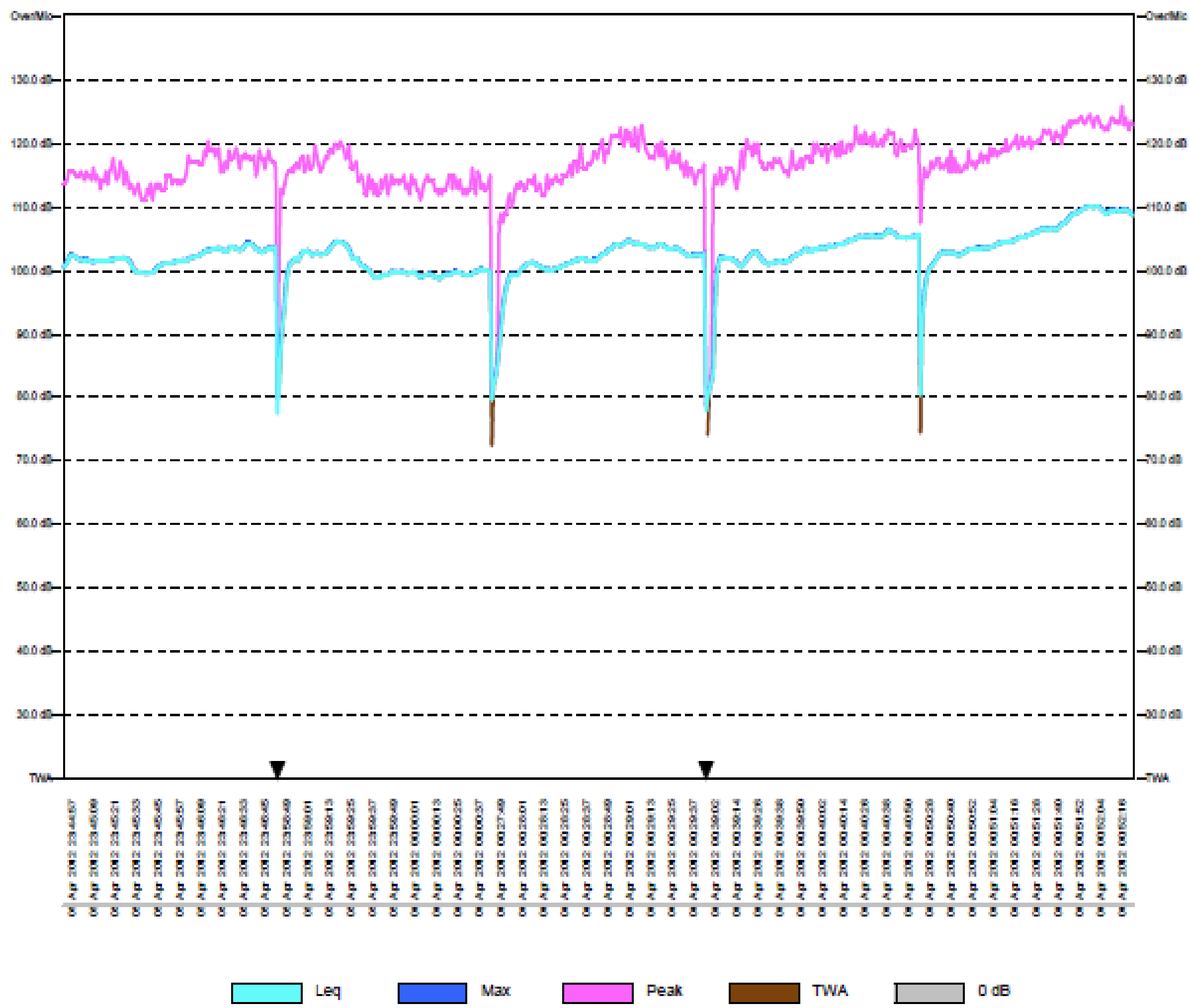
Serial Number:	02433	Start:	03 Apr 2012 23:29:59
Model Number:	706	Stop:	04 Apr 2012 00:03:58
RMS Weighting:	A Weighting	Run Time:	00:30:21
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	1821

Exchange Rate:	5	Dose:	—
Threshold:	80.0 dBA	Projected Dose:	—
Criterion Level:	90.0 dBA	Leq:	76.0 dBA
Criterion Duration:	8.0 hours	TWA:	—
		TWA (8)	—
L10:	76.5 dBA	Lmax:	79.8 dBA
L30:	76.0 dBA	Lpeak (max):	—
L50:	75.5 dBA	Lep (8)	64.0 dBA
L70:	75.5 dBA	SE:	0.0 Pa²hr
L90:	75.0 dBA		



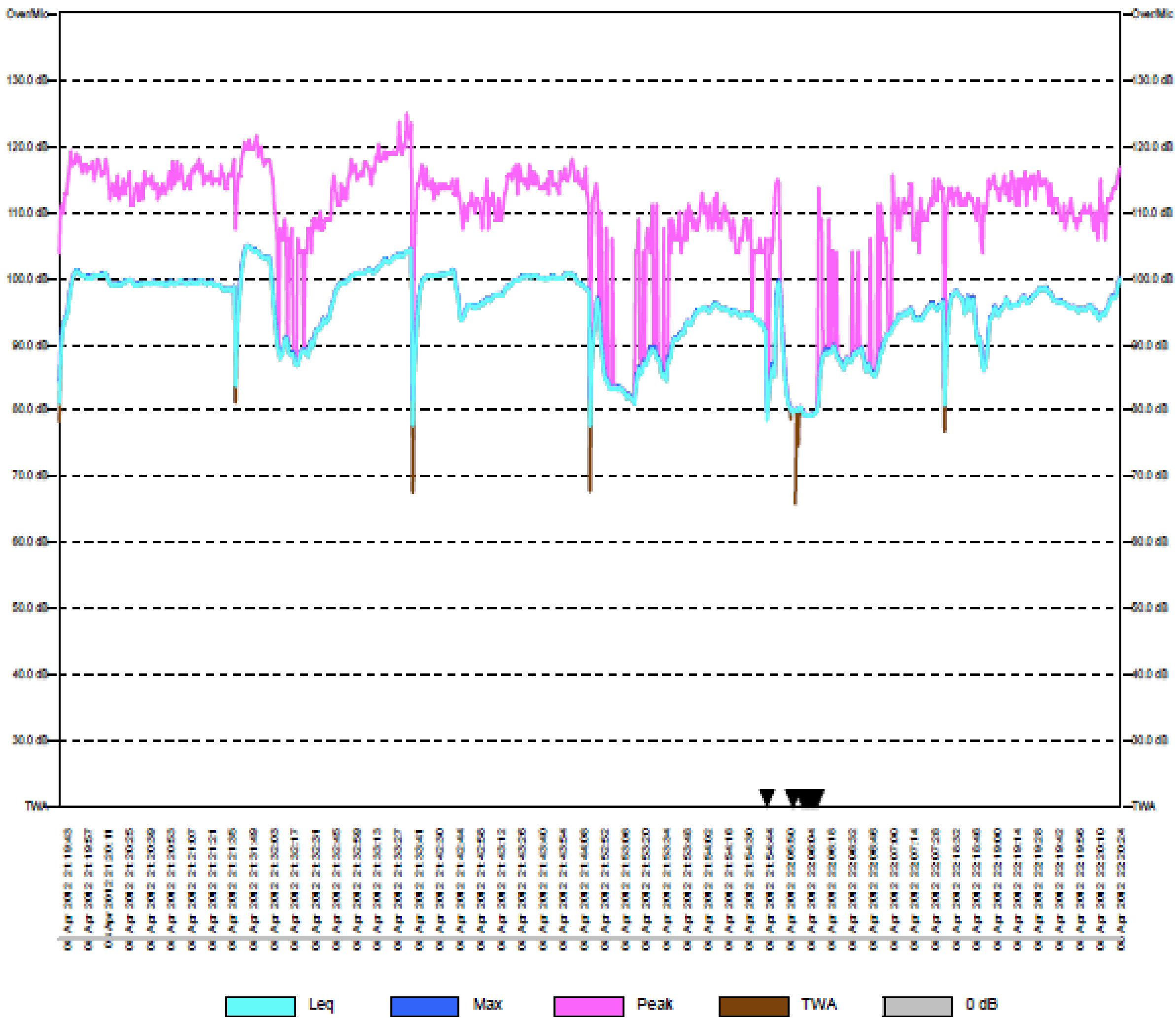
Serial Number:	02433	Start:	05 Apr 2012 23:44:57
Model Number:	706	Stop:	06 Apr 2012 00:52:28
RMS Weighting:	A Weighting	Run Time:	00:10:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	600

Exchange Rate:	5	Dose:	12.6 %
Threshold:	80.0 dBA	Projected Dose:	603.9 %
Criterion Level:	90.0 dBA	Leq:	103.4 dBA
Criterion Duration:	8.0 hours	TWA:	103.0 dBA
		TWA (8)	75.0 dBA
L10:	105.5 dBA	Lmax:	110.0 dBA
L30:	103.5 dBA	Lpeak (max):	125.7 dB
L50:	102.0 dBA	Lep (8)	86.6 dBA
L70:	101.0 dBA	SE:	1.5 Pa²hr
L90:	99.0 dBA		



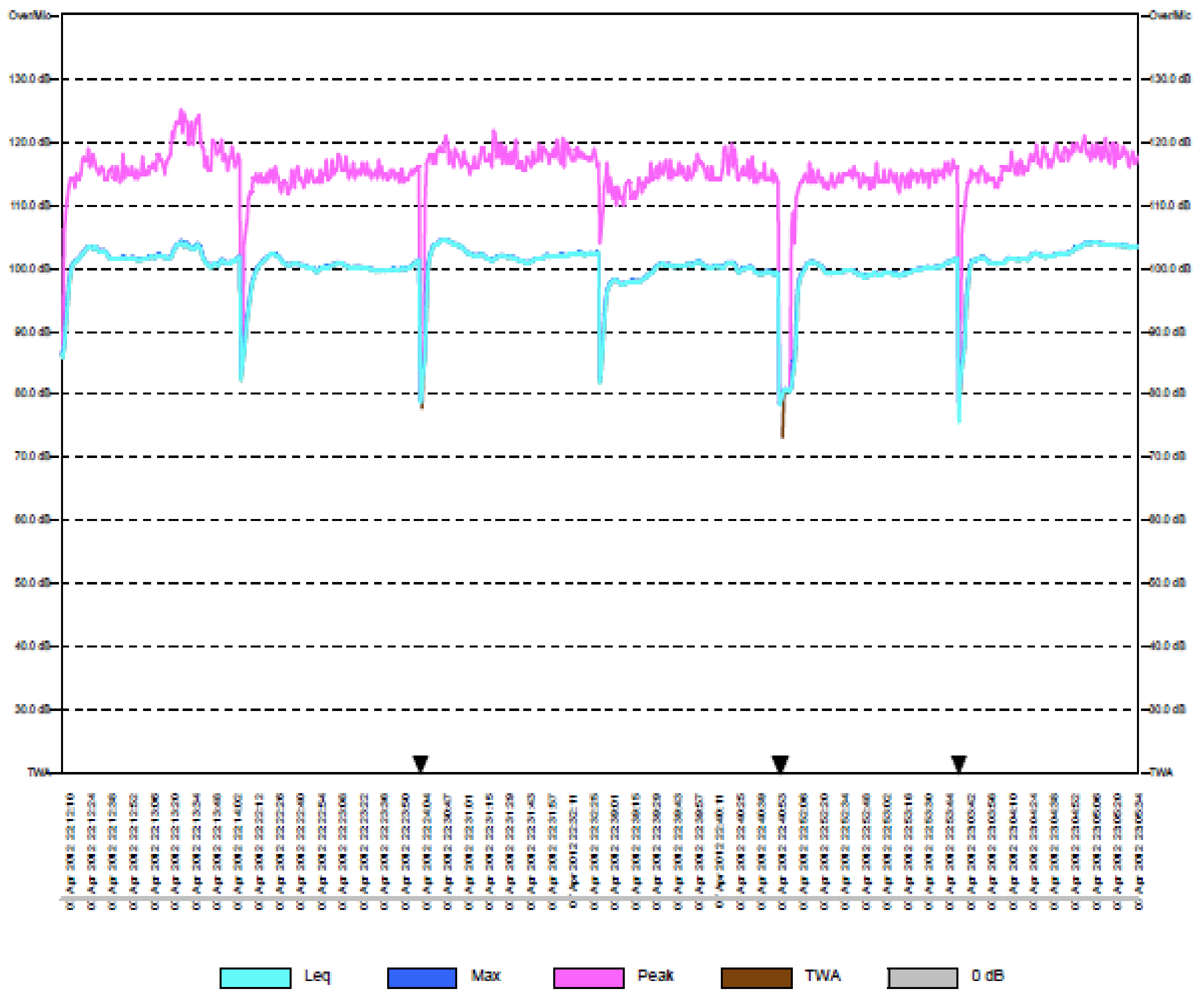
Serial Number:	02433	Start:	08 Apr 2012 21:19:43
Model Number:	706	Stop:	08 Apr 2012 22:20:30
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5	Dose:	6.3 %
Threshold:	80.0 dBA	Projected Dose:	252.7 %
Criterion Level:	90.0 dBA	Leq:	97.5 dBA
Criterion Duration:	8.0 hours	TWA:	96.7 dBA
		TWA (8)	70.1 dBA
L10:	100.5 dBA	Lmax:	104.9 dBA
L30:	99.0 dBA	Lpeak (max):	124.7 dB
L50:	95.5 dBA	Lep (8)	81.5 dBA
L70:	93.5 dBA	SE:	0.5 Pa²hr
L90:	85.5 dBA		



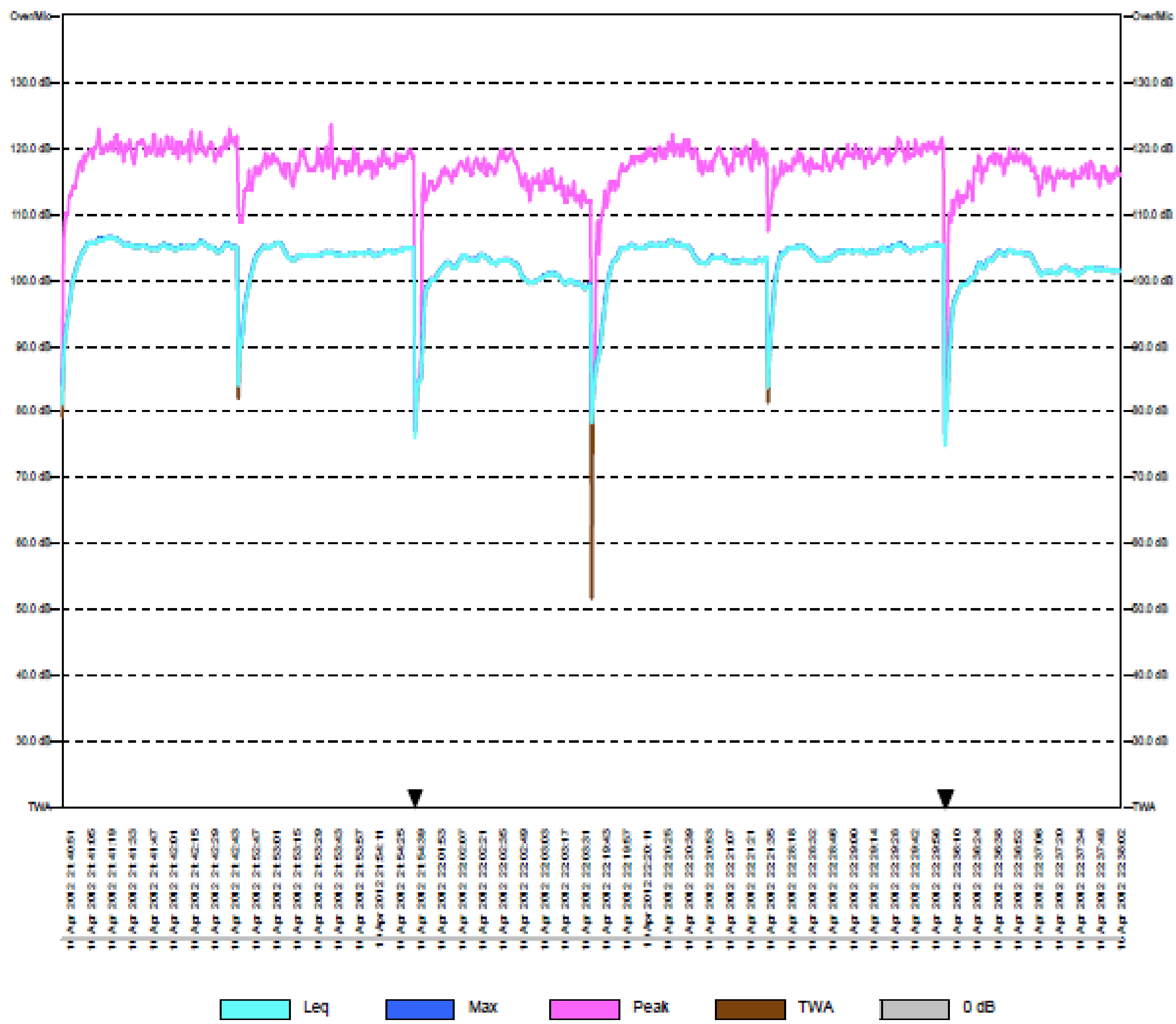
Serial Number:	02433	Start:	07 Apr 2012 22:12:10
Model Number:	706	Stop:	07 Apr 2012 23:05:40
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5	Dose:	11.0 %
Threshold:	80.0 dBA	Projected Dose:	439.7 %
Criterion Level:	90.0 dBA	Leq:	100.9 dBA
Criterion Duration:	8.0 hours	TWA:	100.7 dBA
		TWA (8)	74.1 dBA
L10:	103.0 dBA	Lmax:	104.4 dBA
L30:	101.5 dBA	Lpeak (max):	124.9 dB
L50:	100.5 dBA	Lep (8)	84.9 dBA
L70:	99.5 dBA	SE:	1.0 Pa²hr
L90:	98.0 dBA		



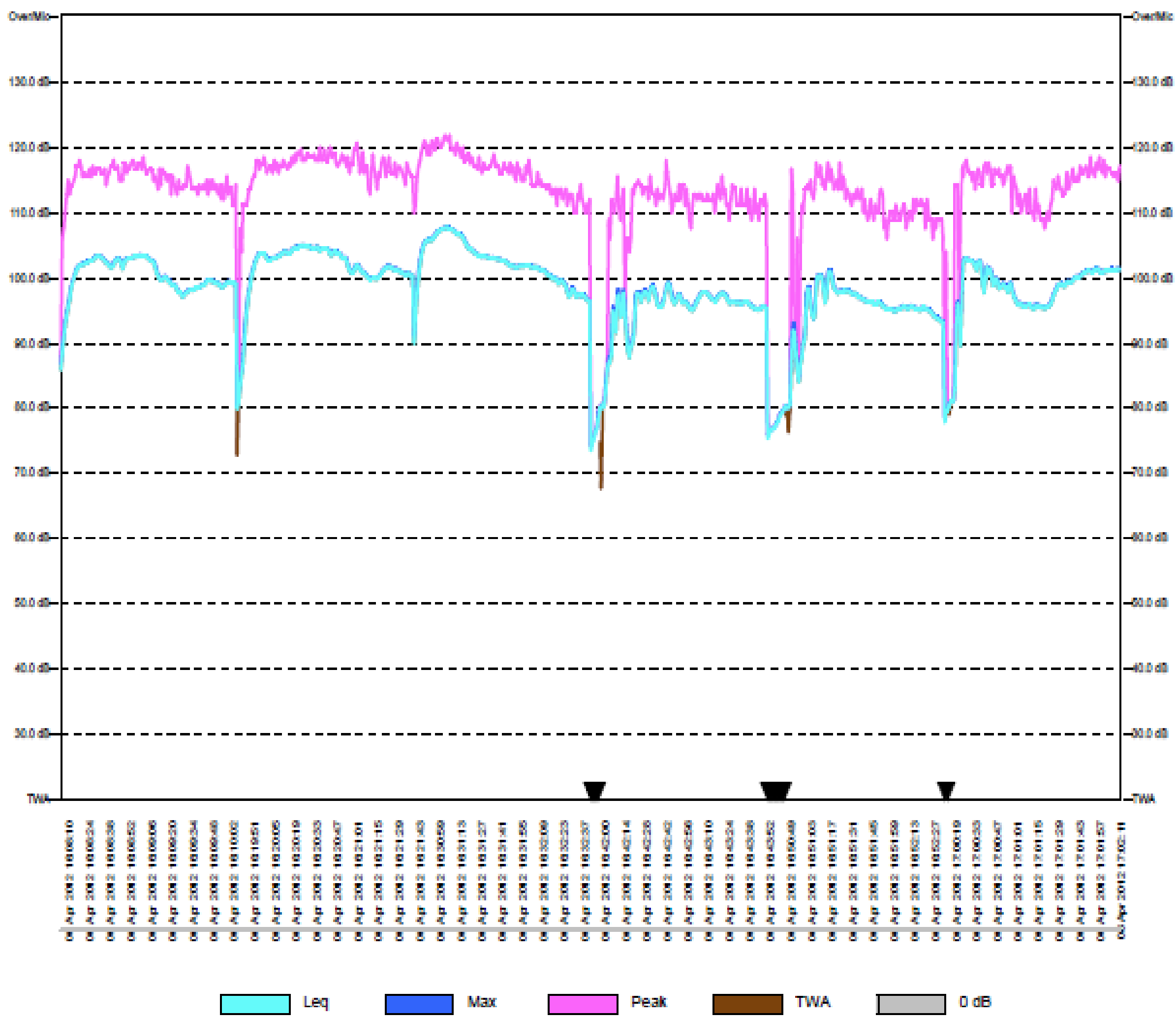
Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5		Dose:	15.5	%
Threshold:	80.0	dBA	Projected Dose:	619.7	%
Criterion Level:	90.0	dBA	Leq:	103.4	dBA
Criterion Duration:	8.0	hours	TWA:	103.2	dBA
			TWA (8)	76.5	dBA
L10:	105.0	dBA	Lmax:	106.4	dBA
L30:	104.5	dBA	Lpeak (max):	123.5	dB
L50:	103.5	dBA	Lep (8)	87.4	dBA
L70:	102.0	dBA	SE:	1.7	Pa²hr
L90:	99.0	dBA			



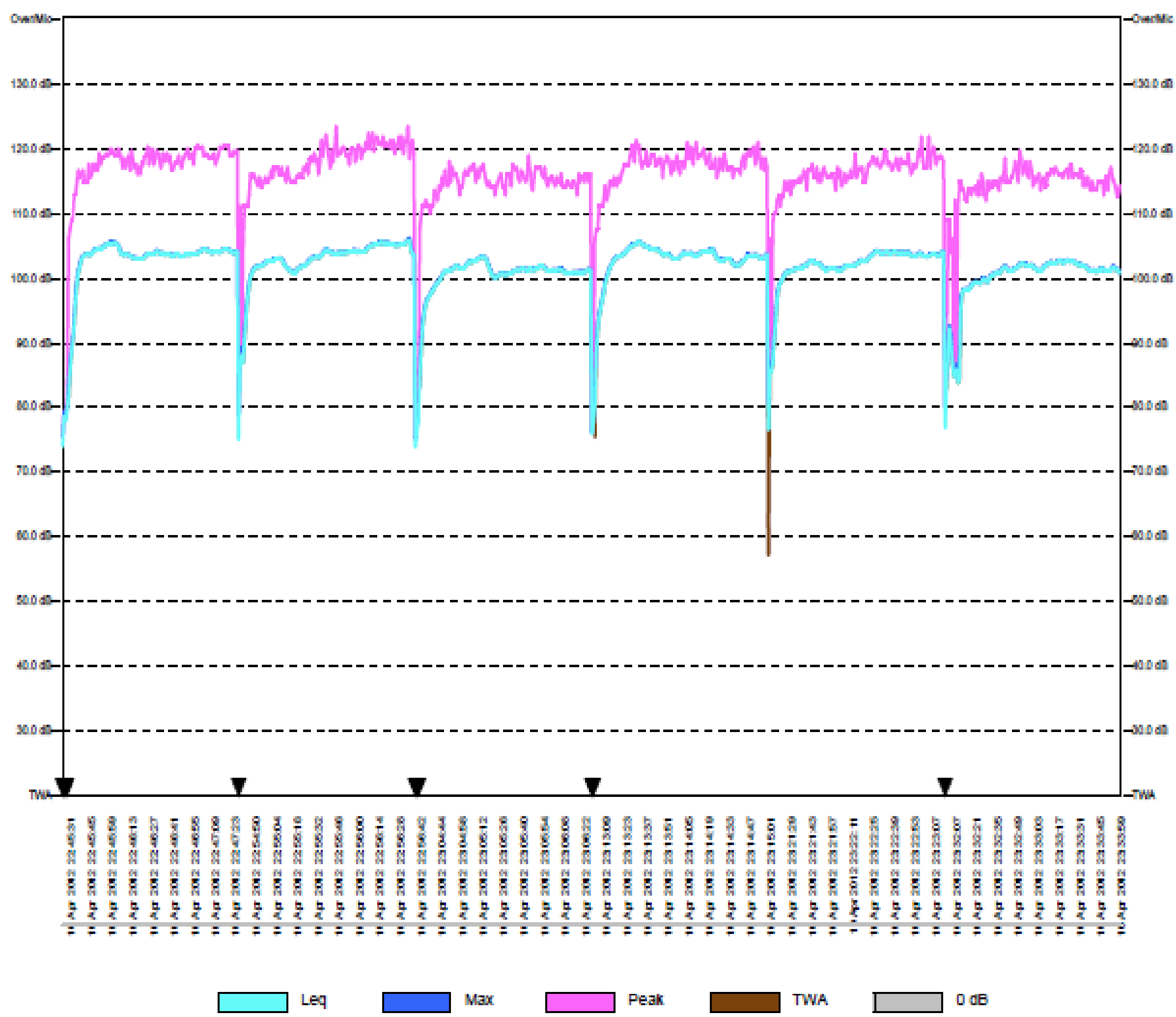
Serial Number:	02433	Start:	06 Apr 2012 16:08:10
Model Number:	706	Stop:	06 Apr 2012 17:02:17
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5	Dose:	9.6 %
Threshold:	80.0 dBA	Projected Dose:	385.2 %
Criterion Level:	90.0 dBA	Leq:	100.5 dBA
Criterion Duration:	8.0 hours	TWA:	99.7 dBA
		TWA (8)	73.1 dBA
L10:	103.5 dBA	Lmax:	107.7 dBA
L30:	101.0 dBA	Lpeak (max):	121.7 dB
L50:	98.5 dBA	Lep (8)	84.4 dBA
L70:	96.0 dBA	SE:	0.9 Pa²hr
L90:	93.0 dBA		



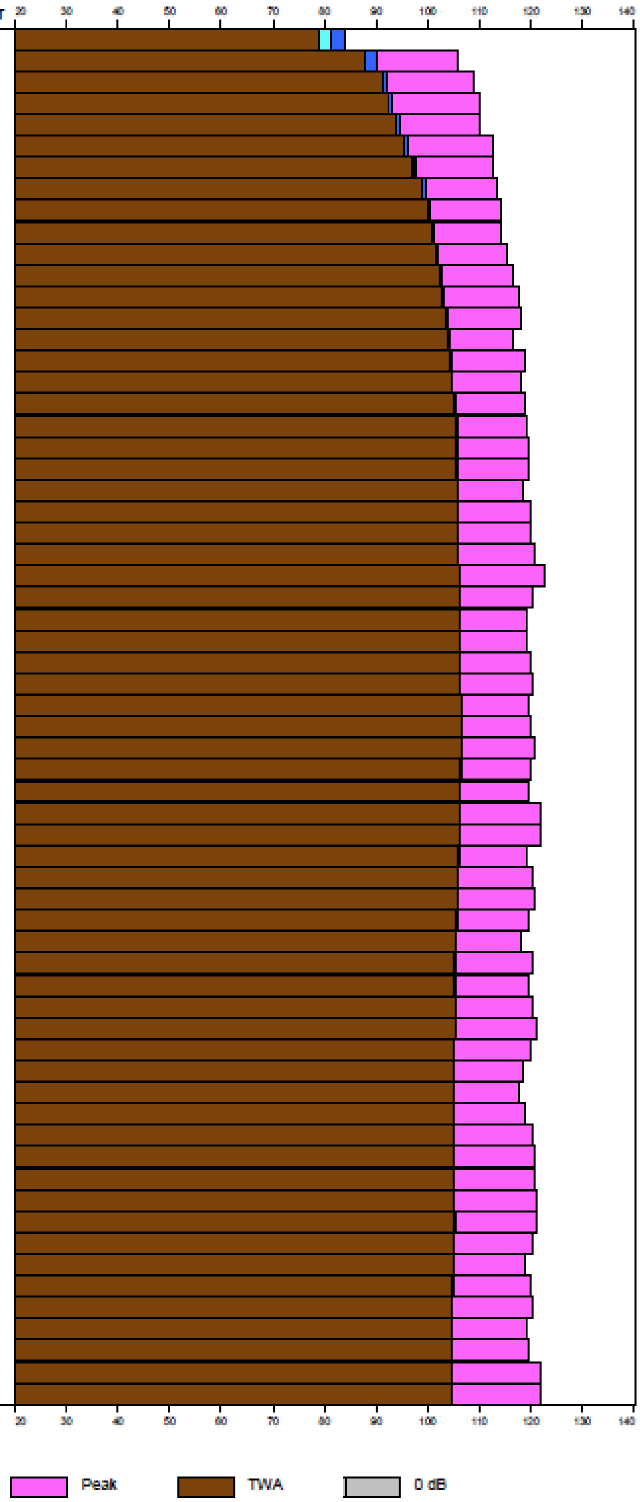
Serial Number:	02433	Start:	10 Apr 2012 22:45:31
Model Number:	706	Stop:	10 Apr 2012 23:34:05
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

Exchange Rate:	5	Dose:	13.6 %
Threshold:	80.0 dBA	Projected Dose:	542.3 %
Criterion Level:	90.0 dBA	Leq:	102.5 dBA
Criterion Duration:	8.0 hours	TWA:	102.2 dBA
		TWA (8)	75.6 dBA
L10:	104.0 dBA	Lmax:	106.0 dBA
L30:	103.5 dBA	Lpeak (max):	123.2 dB
L50:	102.0 dBA	Lep (8)	86.4 dBA
L70:	101.0 dBA	SE:	1.4 Pa^2hr
L90:	99.0 dBA		



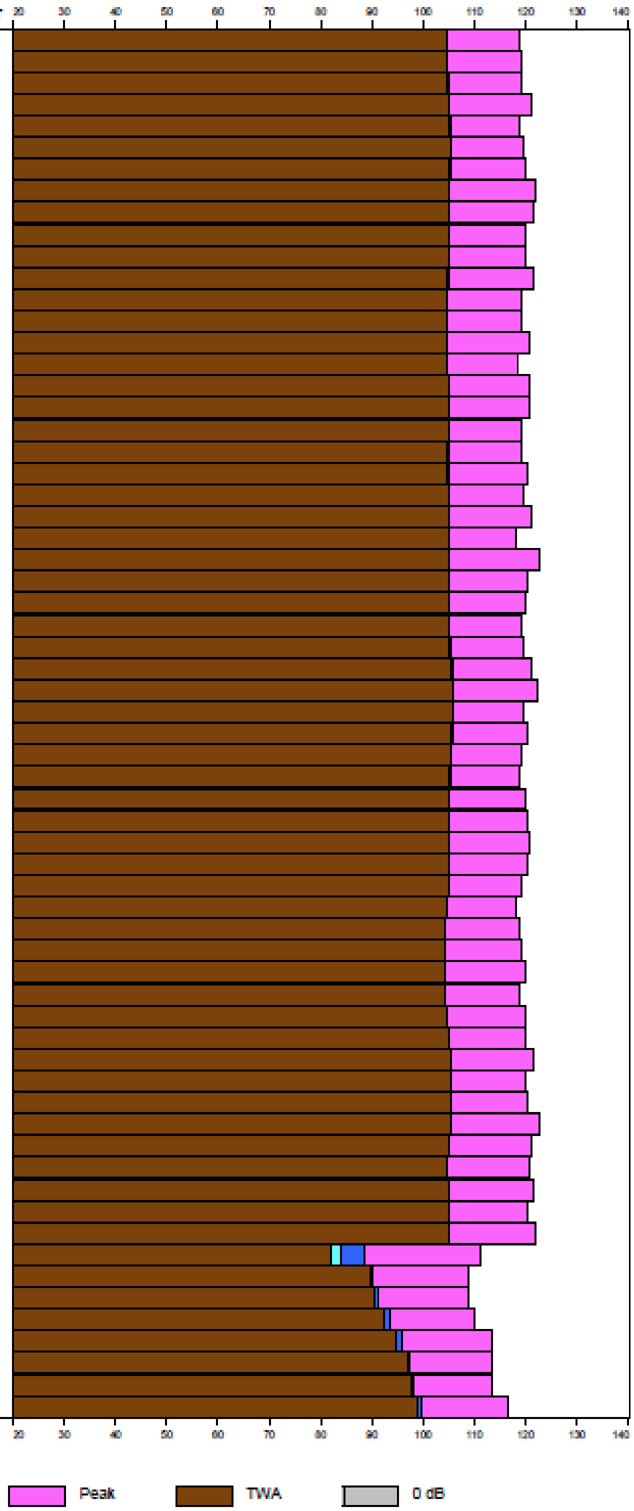
Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
1	10 Apr 2012 21:40:51	81.2	83.9	—	79.2	
2	10 Apr 2012 21:40:52	87.8	89.9	105.9	87.7	
3	10 Apr 2012 21:40:53	91.1	91.8	108.8	91.0	
4	10 Apr 2012 21:40:54	92.5	93.1	109.9	92.5	
5	10 Apr 2012 21:40:55	93.9	94.5	109.9	93.9	
6	10 Apr 2012 21:40:56	95.5	96.4	112.7	95.5	
7	10 Apr 2012 21:40:57	97.1	97.9	112.7	97.1	
8	10 Apr 2012 21:40:58	98.7	99.6	113.5	98.7	
9	10 Apr 2012 21:40:59	100.1	100.5	114.1	100.1	
10	10 Apr 2012 21:41:00	100.8	101.2	114.1	100.8	
11	10 Apr 2012 21:41:01	101.6	102.0	115.4	101.6	
12	10 Apr 2012 21:41:02	102.3	102.6	116.5	102.3	
13	10 Apr 2012 21:41:03	102.8	103.1	117.4	102.8	
14	10 Apr 2012 21:41:04	103.5	103.8	117.9	103.5	
15	10 Apr 2012 21:41:05	104.0	104.2	116.5	104.0	
16	10 Apr 2012 21:41:06	104.3	104.4	118.7	104.3	
17	10 Apr 2012 21:41:07	104.6	104.8	117.9	104.6	
18	10 Apr 2012 21:41:08	105.1	105.4	118.7	105.1	
19	10 Apr 2012 21:41:09	105.5	105.6	119.1	105.5	
20	10 Apr 2012 21:41:10	105.5	105.6	119.5	105.5	
21	10 Apr 2012 21:41:11	105.5	105.6	119.5	105.5	
22	10 Apr 2012 21:41:12	105.6	105.7	118.3	105.6	
23	10 Apr 2012 21:41:13	105.6	105.7	119.8	105.6	
24	10 Apr 2012 21:41:14	105.6	105.6	119.8	105.6	
25	10 Apr 2012 21:41:15	105.7	105.8	120.8	105.7	
26	10 Apr 2012 21:41:16	106.0	106.1	122.7	106.0	
27	10 Apr 2012 21:41:17	106.0	106.1	120.2	106.0	
28	10 Apr 2012 21:41:18	106.0	106.0	119.1	106.0	
29	10 Apr 2012 21:41:19	106.0	106.1	119.1	106.0	
30	10 Apr 2012 21:41:20	106.1	106.2	119.8	106.1	
31	10 Apr 2012 21:41:21	106.3	106.3	120.5	106.3	
32	10 Apr 2012 21:41:22	106.3	106.4	119.5	106.3	
33	10 Apr 2012 21:41:23	106.3	106.4	119.8	106.3	
34	10 Apr 2012 21:41:24	106.3	106.4	120.8	106.3	
35	10 Apr 2012 21:41:25	106.3	106.4	119.8	106.3	
36	10 Apr 2012 21:41:26	106.2	106.3	119.5	106.2	
37	10 Apr 2012 21:41:27	106.3	106.3	121.7	106.3	
38	10 Apr 2012 21:41:28	106.0	106.1	121.7	106.0	
39	10 Apr 2012 21:41:29	105.9	106.0	119.1	105.9	
40	10 Apr 2012 21:41:30	105.8	105.9	120.2	105.8	
41	10 Apr 2012 21:41:31	105.7	105.7	120.8	105.7	
42	10 Apr 2012 21:41:32	105.5	105.6	119.5	105.5	
43	10 Apr 2012 21:41:33	105.2	105.3	117.9	105.2	
44	10 Apr 2012 21:41:34	105.1	105.2	120.5	105.1	
45	10 Apr 2012 21:41:35	105.2	105.2	119.5	105.2	
46	10 Apr 2012 21:41:36	105.3	105.3	120.2	105.3	
47	10 Apr 2012 21:41:37	105.2	105.3	121.1	105.2	
48	10 Apr 2012 21:41:38	105.1	105.1	119.8	105.1	
49	10 Apr 2012 21:41:39	105.0	105.1	118.3	105.0	
50	10 Apr 2012 21:41:40	104.9	105.0	117.4	104.9	
51	10 Apr 2012 21:41:41	104.9	105.0	118.7	104.9	
52	10 Apr 2012 21:41:42	105.0	105.1	120.5	105.0	
53	10 Apr 2012 21:41:43	104.8	105.0	120.8	104.8	
54	10 Apr 2012 21:41:44	105.0	105.0	120.8	105.0	
55	10 Apr 2012 21:41:45	105.0	105.1	121.1	105.0	
56	10 Apr 2012 21:41:46	105.1	105.2	121.1	105.1	
57	10 Apr 2012 21:41:47	105.1	105.1	120.5	105.1	
58	10 Apr 2012 21:41:48	104.9	105.1	118.7	104.9	
59	10 Apr 2012 21:41:49	104.7	104.8	119.8	104.7	
60	10 Apr 2012 21:41:50	104.6	104.7	120.2	104.6	
61	10 Apr 2012 21:41:51	104.6	104.6	119.1	104.6	
62	10 Apr 2012 21:41:52	104.5	104.6	119.5	104.5	
63	10 Apr 2012 21:41:53	104.6	104.8	122.0	104.6	
64	10 Apr 2012 21:41:54	104.7	104.8	122.0	104.7	



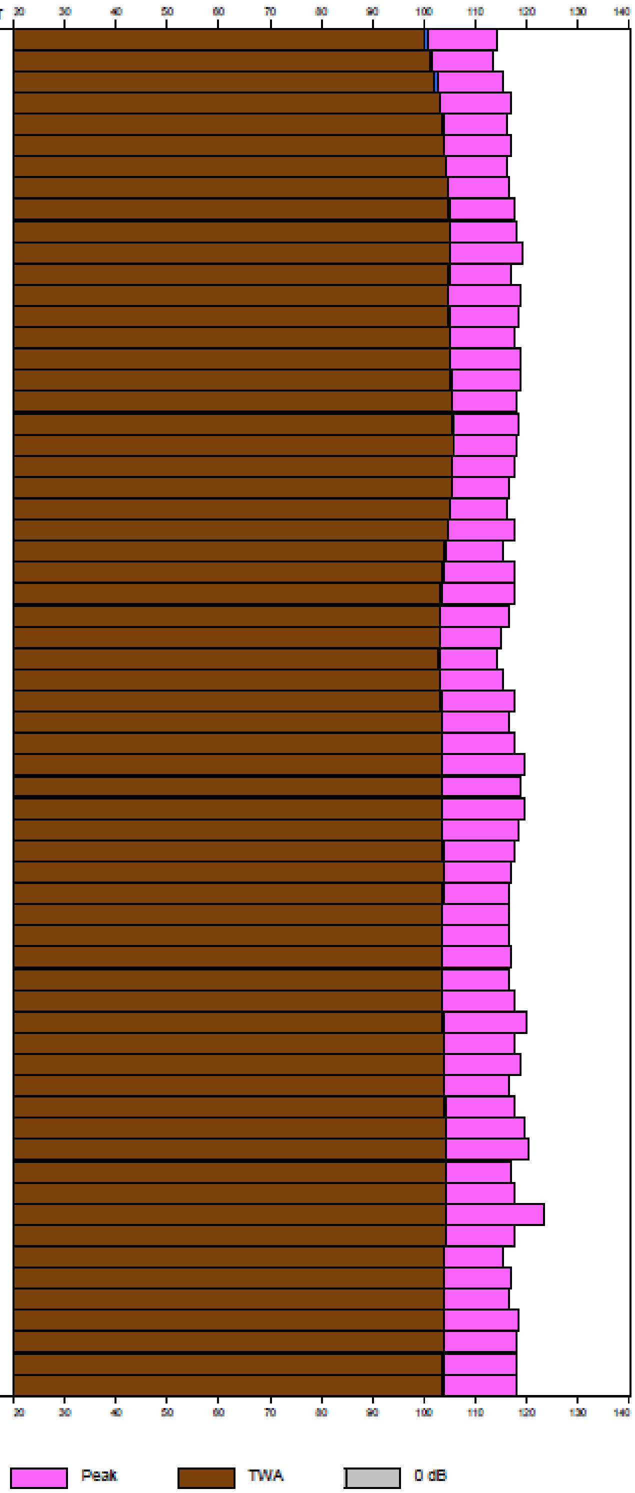
Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
65	10 Apr 2012 21:41:55	104.5	104.6	118.7	104.5	
66	10 Apr 2012 21:41:56	104.6	104.7	119.1	104.6	
67	10 Apr 2012 21:41:57	104.7	104.9	119.1	104.7	
68	10 Apr 2012 21:41:58	105.0	105.1	121.1	105.0	
69	10 Apr 2012 21:41:59	105.2	105.2	118.7	105.2	
70	10 Apr 2012 21:42:00	105.3	105.3	119.5	105.3	
71	10 Apr 2012 21:42:01	105.1	105.3	119.8	105.1	
72	10 Apr 2012 21:42:02	104.9	104.9	121.7	104.9	
73	10 Apr 2012 21:42:03	104.9	104.9	121.4	104.9	
74	10 Apr 2012 21:42:04	104.9	105.0	119.8	104.9	
75	10 Apr 2012 21:42:05	104.9	105.0	119.8	104.9	
76	10 Apr 2012 21:42:06	104.7	104.8	121.4	104.7	
77	10 Apr 2012 21:42:07	104.6	104.7	119.1	104.6	
78	10 Apr 2012 21:42:08	104.5	104.6	119.1	104.5	
79	10 Apr 2012 21:42:09	104.6	104.7	120.8	104.6	
80	10 Apr 2012 21:42:10	104.7	104.7	118.3	104.7	
81	10 Apr 2012 21:42:11	104.9	105.0	120.8	104.9	
82	10 Apr 2012 21:42:12	104.9	105.0	120.8	104.9	
83	10 Apr 2012 21:42:13	104.8	104.9	119.1	104.8	
84	10 Apr 2012 21:42:14	104.8	104.9	119.1	104.8	
85	10 Apr 2012 21:42:15	104.8	104.9	120.2	104.8	
86	10 Apr 2012 21:42:16	104.9	104.9	119.5	104.9	
87	10 Apr 2012 21:42:17	105.0	105.1	121.1	105.0	
88	10 Apr 2012 21:42:18	105.0	105.1	117.9	105.0	
89	10 Apr 2012 21:42:19	104.9	104.9	122.5	104.9	
90	10 Apr 2012 21:42:20	104.8	104.9	120.5	104.8	
91	10 Apr 2012 21:42:21	105.0	105.1	119.8	105.0	
92	10 Apr 2012 21:42:22	105.0	105.1	119.1	105.0	
93	10 Apr 2012 21:42:23	105.1	105.2	119.5	105.1	
94	10 Apr 2012 21:42:24	105.4	105.6	121.1	105.4	
95	10 Apr 2012 21:42:25	105.7	105.8	122.2	105.7	
96	10 Apr 2012 21:42:26	105.7	105.8	119.5	105.7	
97	10 Apr 2012 21:42:27	105.5	105.6	120.2	105.5	
98	10 Apr 2012 21:42:28	105.3	105.4	119.1	105.3	
99	10 Apr 2012 21:42:29	105.2	105.3	118.7	105.2	
100	10 Apr 2012 21:42:30	104.9	105.0	119.8	104.9	
101	10 Apr 2012 21:42:31	104.9	104.9	120.2	104.9	
102	10 Apr 2012 21:42:32	104.9	104.9	120.8	104.9	
103	10 Apr 2012 21:42:33	104.9	104.9	120.5	104.9	
104	10 Apr 2012 21:42:34	104.8	104.9	119.1	104.8	
105	10 Apr 2012 21:42:35	104.5	104.7	117.9	104.5	
106	10 Apr 2012 21:42:36	104.2	104.3	118.7	104.2	
107	10 Apr 2012 21:42:37	104.1	104.2	119.1	104.1	
108	10 Apr 2012 21:42:38	104.2	104.3	119.8	104.2	
109	10 Apr 2012 21:42:39	104.2	104.3	118.7	104.2	
110	10 Apr 2012 21:42:40	104.5	104.7	119.8	104.5	
111	10 Apr 2012 21:42:41	104.9	105.1	119.8	104.9	
112	10 Apr 2012 21:42:42	105.2	105.4	121.4	105.2	
113	10 Apr 2012 21:42:43	105.3	105.4	119.8	105.3	
114	10 Apr 2012 21:42:44	105.3	105.4	120.5	105.3	
115	10 Apr 2012 21:42:45	105.2	105.3	122.7	105.2	
116	10 Apr 2012 21:42:46	105.0	105.1	121.1	105.0	
117	10 Apr 2012 21:42:47	104.7	104.8	120.8	104.7	
118	10 Apr 2012 21:42:48	104.9	105.0	121.4	104.9	
119	10 Apr 2012 21:42:49	104.8	105.0	120.2	104.8	
120	10 Apr 2012 21:42:50	104.8	104.9	121.7	104.8	
121	10 Apr 2012 21:52:41	84.1	88.5	111.0	82.0	
122	10 Apr 2012 21:52:42	89.5	89.9	108.8	89.5	
123	10 Apr 2012 21:52:43	90.4	91.0	108.8	90.4	
124	10 Apr 2012 21:52:44	92.2	93.5	109.9	92.2	
125	10 Apr 2012 21:52:45	94.8	95.9	113.5	94.8	
126	10 Apr 2012 21:52:46	96.8	97.3	113.5	96.8	
127	10 Apr 2012 21:52:47	97.8	98.2	113.5	97.8	
128	10 Apr 2012 21:52:48	98.9	99.6	116.5	98.9	



Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
129	10 Apr 2012 21:52:49	100.1	100.6	114.1	100.1	
130	10 Apr 2012 21:52:50	101.0	101.5	113.5	101.0	
131	10 Apr 2012 21:52:51	102.0	102.5	115.4	102.0	
132	10 Apr 2012 21:52:52	102.9	103.2	117.0	102.9	
133	10 Apr 2012 21:52:53	103.5	103.7	115.9	103.5	
134	10 Apr 2012 21:52:54	103.8	104.0	117.0	103.8	
135	10 Apr 2012 21:52:55	104.1	104.3	115.9	104.1	
136	10 Apr 2012 21:52:56	104.5	104.6	116.5	104.5	
137	10 Apr 2012 21:52:57	104.7	104.8	117.4	104.7	
138	10 Apr 2012 21:52:58	105.0	105.1	117.9	105.0	
139	10 Apr 2012 21:52:59	104.9	105.1	119.1	104.9	
140	10 Apr 2012 21:53:00	104.7	104.8	117.0	104.7	
141	10 Apr 2012 21:53:01	104.7	104.7	118.7	104.7	
142	10 Apr 2012 21:53:02	104.7	104.9	118.3	104.7	
143	10 Apr 2012 21:53:03	105.0	105.0	117.4	105.0	
144	10 Apr 2012 21:53:04	105.0	105.1	118.7	105.0	
145	10 Apr 2012 21:53:05	105.1	105.2	118.7	105.1	
146	10 Apr 2012 21:53:06	105.3	105.4	117.9	105.3	
147	10 Apr 2012 21:53:07	105.5	105.6	118.3	105.5	
148	10 Apr 2012 21:53:08	105.6	105.6	117.9	105.6	
149	10 Apr 2012 21:53:09	105.4	105.5	117.4	105.4	
150	10 Apr 2012 21:53:10	105.3	105.4	116.5	105.3	
151	10 Apr 2012 21:53:11	104.8	105.1	115.9	104.8	
152	10 Apr 2012 21:53:12	104.4	104.6	117.4	104.4	
153	10 Apr 2012 21:53:13	104.0	104.2	115.4	104.0	
154	10 Apr 2012 21:53:14	103.6	103.8	117.4	103.6	
155	10 Apr 2012 21:53:15	103.2	103.3	117.4	103.2	
156	10 Apr 2012 21:53:16	103.2	103.2	116.5	103.2	
157	10 Apr 2012 21:53:17	103.1	103.1	114.8	103.1	
158	10 Apr 2012 21:53:18	102.9	102.9	114.1	102.9	
159	10 Apr 2012 21:53:19	103.0	103.0	115.4	103.0	
160	10 Apr 2012 21:53:20	103.2	103.4	117.4	103.2	
161	10 Apr 2012 21:53:21	103.5	103.5	116.5	103.5	
162	10 Apr 2012 21:53:22	103.5	103.5	117.4	103.5	
163	10 Apr 2012 21:53:23	103.5	103.5	119.5	103.5	
164	10 Apr 2012 21:53:24	103.5	103.6	118.7	103.5	
165	10 Apr 2012 21:53:25	103.6	103.6	119.5	103.6	
166	10 Apr 2012 21:53:26	103.6	103.6	118.3	103.6	
167	10 Apr 2012 21:53:27	103.6	103.7	117.4	103.6	
168	10 Apr 2012 21:53:28	103.7	103.7	117.0	103.7	
169	10 Apr 2012 21:53:29	103.6	103.7	116.5	103.6	
170	10 Apr 2012 21:53:30	103.6	103.6	116.5	103.6	
171	10 Apr 2012 21:53:31	103.5	103.6	116.5	103.5	
172	10 Apr 2012 21:53:32	103.6	103.6	117.0	103.6	
173	10 Apr 2012 21:53:33	103.6	103.6	116.5	103.6	
174	10 Apr 2012 21:53:34	103.5	103.6	117.4	103.5	
175	10 Apr 2012 21:53:35	103.6	103.7	119.8	103.6	
176	10 Apr 2012 21:53:36	103.7	103.8	117.4	103.7	
177	10 Apr 2012 21:53:37	103.8	103.8	118.7	103.8	
178	10 Apr 2012 21:53:38	103.9	103.9	116.5	103.9	
179	10 Apr 2012 21:53:39	103.9	104.0	117.4	103.9	
180	10 Apr 2012 21:53:40	104.1	104.1	119.5	104.1	
181	10 Apr 2012 21:53:41	104.1	104.2	120.2	104.1	
182	10 Apr 2012 21:53:42	104.1	104.1	117.0	104.1	
183	10 Apr 2012 21:53:43	104.1	104.1	117.4	104.1	
184	10 Apr 2012 21:53:44	104.1	104.1	123.5	104.1	
185	10 Apr 2012 21:53:45	104.1	104.1	117.4	104.1	
186	10 Apr 2012 21:53:46	103.9	104.0	115.4	103.9	
187	10 Apr 2012 21:53:47	103.8	103.9	117.0	103.8	
188	10 Apr 2012 21:53:48	103.8	103.9	116.5	103.8	
189	10 Apr 2012 21:53:49	103.9	104.0	118.3	103.9	
190	10 Apr 2012 21:53:50	103.8	103.9	117.9	103.8	
191	10 Apr 2012 21:53:51	103.6	103.7	117.9	103.6	
192	10 Apr 2012 21:53:52	103.6	103.7	117.9	103.6	

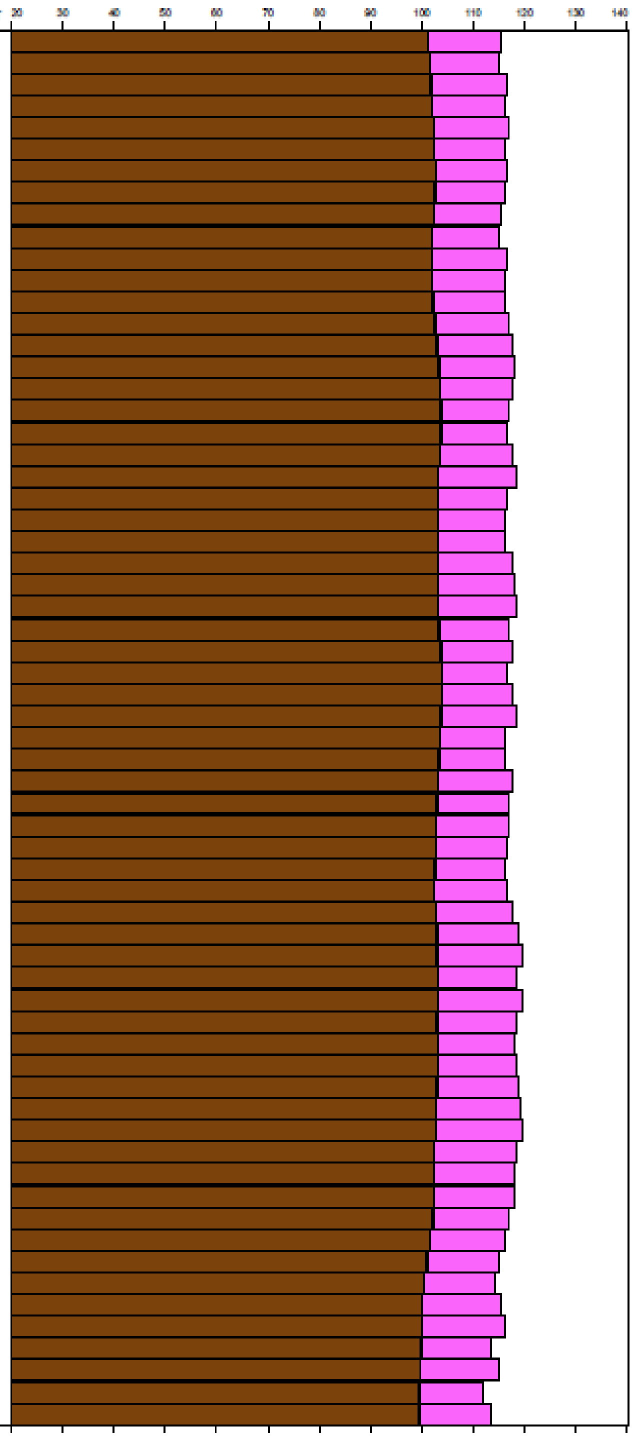


Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
193	10 Apr 2012 21:53:53	103.6	103.7	117.9	103.6	
194	10 Apr 2012 21:53:54	103.6	103.7	115.9	103.6	
195	10 Apr 2012 21:53:55	103.5	103.6	117.4	103.5	
196	10 Apr 2012 21:53:56	103.8	103.9	117.9	103.8	
197	10 Apr 2012 21:53:57	103.9	103.9	116.5	103.9	
198	10 Apr 2012 21:53:58	103.9	103.9	116.5	103.9	
199	10 Apr 2012 21:53:59	103.8	103.9	119.8	103.8	
200	10 Apr 2012 21:54:00	103.8	103.9	117.4	103.8	
201	10 Apr 2012 21:54:01	103.9	103.9	118.7	103.9	
202	10 Apr 2012 21:54:02	103.9	103.9	119.1	103.9	
203	10 Apr 2012 21:54:03	103.9	104.0	115.9	103.9	
204	10 Apr 2012 21:54:04	104.0	104.0	117.0	104.0	
205	10 Apr 2012 21:54:05	104.0	104.0	116.5	104.0	
206	10 Apr 2012 21:54:06	103.8	103.9	117.0	103.8	
207	10 Apr 2012 21:54:07	103.9	103.9	117.9	103.9	
208	10 Apr 2012 21:54:08	104.0	104.0	117.0	104.0	
209	10 Apr 2012 21:54:09	104.0	104.2	117.9	104.0	
210	10 Apr 2012 21:54:10	104.2	104.3	117.0	104.2	
211	10 Apr 2012 21:54:11	104.1	104.2	117.9	104.1	
212	10 Apr 2012 21:54:12	103.8	104.0	115.4	103.8	
213	10 Apr 2012 21:54:13	103.5	103.6	117.4	103.5	
214	10 Apr 2012 21:54:14	103.5	103.7	117.0	103.5	
215	10 Apr 2012 21:54:15	103.8	103.8	115.9	103.8	
216	10 Apr 2012 21:54:16	103.7	103.8	118.3	103.7	
217	10 Apr 2012 21:54:17	103.9	104.0	117.4	103.9	
218	10 Apr 2012 21:54:18	103.9	103.9	117.4	103.9	
219	10 Apr 2012 21:54:19	103.9	104.0	119.5	103.9	
220	10 Apr 2012 21:54:20	104.1	104.3	119.1	104.1	
221	10 Apr 2012 21:54:21	104.3	104.4	117.9	104.3	
222	10 Apr 2012 21:54:22	104.4	104.4	117.9	104.4	
223	10 Apr 2012 21:54:23	104.3	104.4	118.3	104.3	
224	10 Apr 2012 21:54:24	104.4	104.5	117.0	104.4	
225	10 Apr 2012 21:54:25	104.2	104.3	117.4	104.2	
226	10 Apr 2012 21:54:26	104.0	104.1	117.4	104.0	
227	10 Apr 2012 21:54:27	104.0	104.1	117.0	104.0	
228	10 Apr 2012 21:54:28	104.2	104.3	119.1	104.2	
229	10 Apr 2012 21:54:29	104.3	104.3	117.9	104.3	
230	10 Apr 2012 21:54:30	104.3	104.5	118.7	104.3	
231	10 Apr 2012 21:54:31	104.5	104.5	117.9	104.5	
232	10 Apr 2012 21:54:32	104.5	104.6	118.7	104.5	
233	10 Apr 2012 21:54:33	104.5	104.6	117.9	104.5	
234	10 Apr 2012 21:54:34	104.7	104.8	118.3	104.7	
235	10 Apr 2012 21:54:35	104.7	104.7	118.3	104.7	
236	10 Apr 2012 21:54:36	104.7	104.7	119.5	104.7	
237	10 Apr 2012 21:54:37	104.6	104.7	119.1	104.6	
238	10 Apr 2012 21:54:38	104.7	104.7	119.5	104.7	
239	10 Apr 2012 21:54:39	104.7	104.7	118.3	104.7	
240	10 Apr 2012 21:54:40	104.7	104.8	118.7	104.7	
241	10 Apr 2012 22:01:41	76.1	77.1	—	—	
242	10 Apr 2012 22:01:42	81.3	83.3	—	79.3	
243	10 Apr 2012 22:01:43	84.2	84.4	—	84.2	
244	10 Apr 2012 22:01:44	84.5	84.7	—	84.5	
245	10 Apr 2012 22:01:45	84.9	85.3	—	84.9	
246	10 Apr 2012 22:01:46	88.0	91.1	112.7	87.8	
247	10 Apr 2012 22:01:47	94.6	96.6	115.9	94.5	
248	10 Apr 2012 22:01:48	97.8	98.5	111.9	97.7	
249	10 Apr 2012 22:01:49	98.8	99.0	112.7	98.8	
250	10 Apr 2012 22:01:50	98.9	99.0	113.5	98.9	
251	10 Apr 2012 22:01:51	99.3	99.9	114.8	99.3	
252	10 Apr 2012 22:01:52	100.0	100.1	114.8	100.0	
253	10 Apr 2012 22:01:53	100.0	100.0	114.1	100.0	
254	10 Apr 2012 22:01:54	99.9	100.0	113.5	99.9	
255	10 Apr 2012 22:01:55	100.1	100.3	114.1	100.1	
256	10 Apr 2012 22:01:56	100.6	101.0	114.1	100.6	

Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
257	10 Apr 2012 22:01:57	101.2	101.2	115.4	101.2	
258	10 Apr 2012 22:01:58	101.4	101.6	114.8	101.4	
259	10 Apr 2012 22:01:59	101.6	101.8	116.5	101.6	
260	10 Apr 2012 22:02:00	101.9	102.0	115.9	101.9	
261	10 Apr 2012 22:02:01	102.2	102.3	117.0	102.2	
262	10 Apr 2012 22:02:02	102.4	102.5	115.9	102.4	
263	10 Apr 2012 22:02:03	102.6	102.7	116.5	102.6	
264	10 Apr 2012 22:02:04	102.4	102.6	115.9	102.4	
265	10 Apr 2012 22:02:05	102.3	102.4	115.4	102.3	
266	10 Apr 2012 22:02:06	101.9	102.0	114.8	101.9	
267	10 Apr 2012 22:02:07	101.7	101.9	116.5	101.7	
268	10 Apr 2012 22:02:08	101.8	101.8	115.9	101.8	
269	10 Apr 2012 22:02:09	101.9	102.2	115.9	101.9	
270	10 Apr 2012 22:02:10	102.4	102.5	117.0	102.4	
271	10 Apr 2012 22:02:11	102.8	103.0	117.4	102.8	
272	10 Apr 2012 22:02:12	103.1	103.3	117.9	103.1	
273	10 Apr 2012 22:02:13	103.5	103.5	117.4	103.5	
274	10 Apr 2012 22:02:14	103.6	103.7	117.0	103.6	
275	10 Apr 2012 22:02:15	103.6	103.7	116.5	103.6	
276	10 Apr 2012 22:02:16	103.3	103.5	117.4	103.3	
277	10 Apr 2012 22:02:17	103.2	103.3	118.3	103.2	
278	10 Apr 2012 22:02:18	103.1	103.1	116.5	103.1	
279	10 Apr 2012 22:02:19	103.0	103.1	115.9	103.0	
280	10 Apr 2012 22:02:20	103.0	103.0	115.9	103.0	
281	10 Apr 2012 22:02:21	103.0	103.1	117.4	103.0	
282	10 Apr 2012 22:02:22	103.1	103.1	117.9	103.1	
283	10 Apr 2012 22:02:23	102.9	103.1	118.3	102.9	
284	10 Apr 2012 22:02:24	103.0	103.3	117.0	103.0	
285	10 Apr 2012 22:02:25	103.5	103.7	117.4	103.5	
286	10 Apr 2012 22:02:26	103.8	103.8	116.5	103.8	
287	10 Apr 2012 22:02:27	103.7	103.8	117.4	103.7	
288	10 Apr 2012 22:02:28	103.5	103.7	118.3	103.5	
289	10 Apr 2012 22:02:29	103.4	103.4	115.9	103.4	
290	10 Apr 2012 22:02:30	103.3	103.3	115.9	103.3	
291	10 Apr 2012 22:02:31	103.0	103.2	117.4	103.0	
292	10 Apr 2012 22:02:32	102.8	103.0	117.0	102.8	
293	10 Apr 2012 22:02:33	102.5	102.7	117.0	102.5	
294	10 Apr 2012 22:02:34	102.5	102.6	116.5	102.5	
295	10 Apr 2012 22:02:35	102.4	102.5	115.9	102.4	
296	10 Apr 2012 22:02:36	102.3	102.4	116.5	102.3	
297	10 Apr 2012 22:02:37	102.5	102.6	117.4	102.5	
298	10 Apr 2012 22:02:38	102.8	102.9	118.7	102.8	
299	10 Apr 2012 22:02:39	102.8	102.9	119.5	102.8	
300	10 Apr 2012 22:02:40	102.9	103.0	118.3	102.9	
301	10 Apr 2012 22:02:41	102.9	103.0	119.5	102.9	
302	10 Apr 2012 22:02:42	102.9	103.0	118.3	102.9	
303	10 Apr 2012 22:02:43	103.0	103.0	117.9	103.0	
304	10 Apr 2012 22:02:44	103.0	103.1	118.3	103.0	
305	10 Apr 2012 22:02:45	102.9	103.0	118.7	102.9	
306	10 Apr 2012 22:02:46	102.7	102.8	119.1	102.7	
307	10 Apr 2012 22:02:47	102.7	102.8	119.5	102.7	
308	10 Apr 2012 22:02:48	102.3	102.4	118.3	102.3	
309	10 Apr 2012 22:02:49	102.3	102.3	117.9	102.3	
310	10 Apr 2012 22:02:50	102.4	102.4	117.9	102.4	
311	10 Apr 2012 22:02:51	102.0	102.3	117.0	102.0	
312	10 Apr 2012 22:02:52	101.4	101.7	115.9	101.4	
313	10 Apr 2012 22:02:53	100.8	101.0	114.8	100.8	
314	10 Apr 2012 22:02:54	100.3	100.5	114.1	100.3	
315	10 Apr 2012 22:02:55	100.1	100.1	115.4	100.1	
316	10 Apr 2012 22:02:56	100.0	100.1	115.9	100.0	
317	10 Apr 2012 22:02:57	99.8	99.9	113.5	99.8	
318	10 Apr 2012 22:02:58	99.6	99.6	114.8	99.6	
319	10 Apr 2012 22:02:59	99.4	99.5	111.9	99.4	
320	10 Apr 2012 22:03:00	99.4	99.5	113.5	99.4	



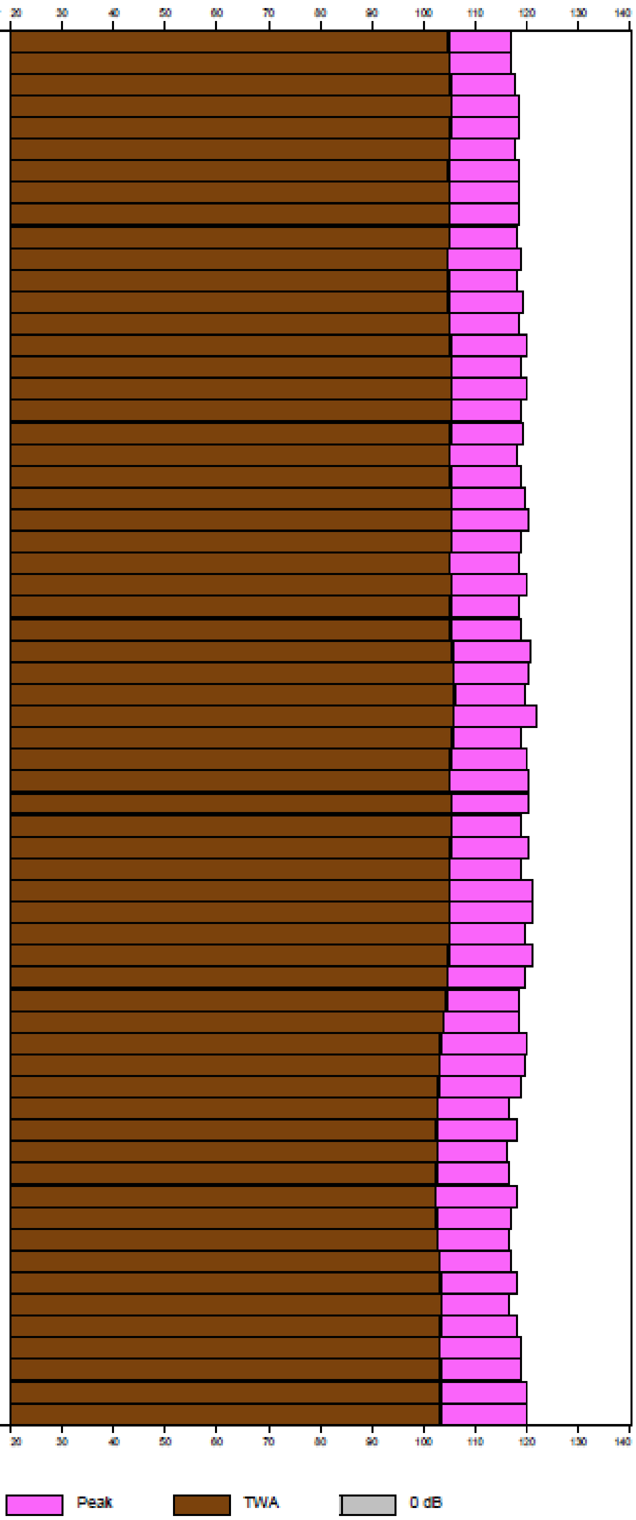
Leq Max Peak TWA 0 dB

Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
321	10 Apr 2012 22:03:01	99.4	99.5	115.4	99.4	
322	10 Apr 2012 22:03:02	99.6	99.7	114.8	99.6	
323	10 Apr 2012 22:03:03	99.7	99.8	114.8	99.7	
324	10 Apr 2012 22:03:04	99.8	99.9	114.8	99.8	
325	10 Apr 2012 22:03:05	100.0	100.0	115.9	100.0	
326	10 Apr 2012 22:03:06	100.1	100.1	113.5	100.1	
327	10 Apr 2012 22:03:07	100.2	100.3	114.8	100.2	
328	10 Apr 2012 22:03:08	100.4	100.6	113.5	100.4	
329	10 Apr 2012 22:03:09	100.5	100.5	116.5	100.5	
330	10 Apr 2012 22:03:10	100.6	100.7	115.9	100.6	
331	10 Apr 2012 22:03:11	100.8	100.9	114.8	100.8	
332	10 Apr 2012 22:03:12	100.8	100.9	114.8	100.8	
333	10 Apr 2012 22:03:13	100.9	101.0	116.5	100.9	
334	10 Apr 2012 22:03:14	101.1	101.1	116.5	101.1	
335	10 Apr 2012 22:03:15	100.9	101.1	114.8	100.9	
336	10 Apr 2012 22:03:16	100.8	100.8	113.5	100.8	
337	10 Apr 2012 22:03:17	100.8	100.8	114.1	100.8	
338	10 Apr 2012 22:03:18	100.6	100.8	114.1	100.6	
339	10 Apr 2012 22:03:19	100.1	100.4	114.1	100.1	
340	10 Apr 2012 22:03:20	100.0	100.1	115.4	100.0	
341	10 Apr 2012 22:03:21	99.7	99.9	112.7	99.7	
342	10 Apr 2012 22:03:22	99.5	99.6	114.1	99.5	
343	10 Apr 2012 22:03:23	99.3	99.4	111.9	99.3	
344	10 Apr 2012 22:03:24	99.4	99.5	111.9	99.4	
345	10 Apr 2012 22:03:25	99.5	99.7	114.1	99.5	
346	10 Apr 2012 22:03:26	99.9	99.9	112.7	99.9	
347	10 Apr 2012 22:03:27	99.9	100.0	113.5	99.9	
348	10 Apr 2012 22:03:28	99.6	99.8	112.7	99.6	
349	10 Apr 2012 22:03:29	99.3	99.4	114.8	99.3	
350	10 Apr 2012 22:03:30	99.4	99.5	111.9	99.4	
351	10 Apr 2012 22:03:31	99.4	99.4	112.7	99.4	
352	10 Apr 2012 22:03:32	99.4	99.5	111.9	99.4	
353	10 Apr 2012 22:03:33	99.2	99.3	112.7	99.2	
354	10 Apr 2012 22:03:34	99.1	99.2	111.0	99.1	
355	10 Apr 2012 22:03:35	98.8	99.0	113.5	98.8	
356	10 Apr 2012 22:03:36	98.6	98.7	112.7	98.6	
357	10 Apr 2012 22:03:37	98.7	98.8	111.9	98.7	
358	10 Apr 2012 22:03:38	98.9	98.9	111.9	98.9	
359	10 Apr 2012 22:03:39	98.9	99.1	111.9	98.9	
360	10 Apr 2012 22:03:40	99.0	99.1	111.9	99.0	
361	10 Apr 2012 22:19:39	78.3	80.0	—	51.8	
362	10 Apr 2012 22:19:40	81.6	83.1	—	81.6	
363	10 Apr 2012 22:19:41	84.3	85.3	—	84.3	
364	10 Apr 2012 22:19:42	86.5	87.6	103.9	86.5	
365	10 Apr 2012 22:19:43	87.7	87.8	108.8	87.7	
366	10 Apr 2012 22:19:44	88.4	89.1	103.9	88.4	
367	10 Apr 2012 22:19:45	90.0	90.8	108.8	90.0	
368	10 Apr 2012 22:19:46	92.0	93.1	109.9	92.0	
369	10 Apr 2012 22:19:47	94.2	95.0	111.0	94.2	
370	10 Apr 2012 22:19:48	96.0	97.1	113.5	95.9	
371	10 Apr 2012 22:19:49	98.0	98.7	111.0	98.0	
372	10 Apr 2012 22:19:50	99.6	100.2	111.9	99.5	
373	10 Apr 2012 22:19:51	100.7	101.1	114.8	100.7	
374	10 Apr 2012 22:19:52	101.4	101.8	113.5	101.4	
375	10 Apr 2012 22:19:53	102.3	102.6	114.8	102.3	
376	10 Apr 2012 22:19:54	102.8	103.0	114.8	102.8	
377	10 Apr 2012 22:19:55	103.0	103.1	113.5	103.0	
378	10 Apr 2012 22:19:56	103.0	103.0	114.8	103.0	
379	10 Apr 2012 22:19:57	103.4	103.7	114.1	103.4	
380	10 Apr 2012 22:19:58	104.1	104.5	115.9	104.1	
381	10 Apr 2012 22:19:59	104.7	104.7	117.0	104.7	
382	10 Apr 2012 22:20:00	104.7	104.7	117.4	104.7	
383	10 Apr 2012 22:20:01	104.6	104.7	116.5	104.6	
384	10 Apr 2012 22:20:02	104.7	104.9	116.5	104.7	

Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
385	10 Apr 2012 22:20:03	104.8	104.8	117.0	104.8	
386	10 Apr 2012 22:20:04	104.8	105.0	117.0	104.8	
387	10 Apr 2012 22:20:05	105.1	105.2	117.4	105.1	
388	10 Apr 2012 22:20:06	105.3	105.3	118.3	105.3	
389	10 Apr 2012 22:20:07	105.1	105.2	118.3	105.1	
390	10 Apr 2012 22:20:08	105.0	105.1	117.4	105.0	
391	10 Apr 2012 22:20:09	104.8	104.8	118.3	104.8	
392	10 Apr 2012 22:20:10	104.8	104.9	118.3	104.8	
393	10 Apr 2012 22:20:11	104.9	104.9	118.3	104.9	
394	10 Apr 2012 22:20:12	104.8	104.9	117.9	104.8	
395	10 Apr 2012 22:20:13	104.6	104.7	118.7	104.6	
396	10 Apr 2012 22:20:14	104.7	104.9	117.9	104.7	
397	10 Apr 2012 22:20:15	104.8	104.9	119.1	104.8	
398	10 Apr 2012 22:20:16	104.9	105.0	118.3	104.9	
399	10 Apr 2012 22:20:17	105.2	105.3	119.8	105.2	
400	10 Apr 2012 22:20:18	105.3	105.4	118.7	105.3	
401	10 Apr 2012 22:20:19	105.3	105.4	119.8	105.3	
402	10 Apr 2012 22:20:20	105.2	105.3	118.7	105.2	
403	10 Apr 2012 22:20:21	105.1	105.2	119.1	105.1	
404	10 Apr 2012 22:20:22	105.1	105.1	117.9	105.1	
405	10 Apr 2012 22:20:23	105.1	105.2	118.7	105.1	
406	10 Apr 2012 22:20:24	105.2	105.3	119.5	105.2	
407	10 Apr 2012 22:20:25	105.3	105.4	120.2	105.3	
408	10 Apr 2012 22:20:26	105.3	105.4	118.7	105.3	
409	10 Apr 2012 22:20:27	105.1	105.2	118.3	105.1	
410	10 Apr 2012 22:20:28	105.2	105.3	119.8	105.2	
411	10 Apr 2012 22:20:29	105.1	105.2	118.3	105.1	
412	10 Apr 2012 22:20:30	105.1	105.3	118.7	105.1	
413	10 Apr 2012 22:20:31	105.5	105.7	120.8	105.5	
414	10 Apr 2012 22:20:32	105.8	105.9	120.5	105.8	
415	10 Apr 2012 22:20:33	105.9	106.0	119.5	105.9	
416	10 Apr 2012 22:20:34	105.8	105.9	122.0	105.8	
417	10 Apr 2012 22:20:35	105.5	105.6	118.7	105.5	
418	10 Apr 2012 22:20:36	105.2	105.3	119.8	105.2	
419	10 Apr 2012 22:20:37	105.1	105.2	120.5	105.1	
420	10 Apr 2012 22:20:38	105.2	105.4	120.2	105.2	
421	10 Apr 2012 22:20:39	105.3	105.4	118.7	105.3	
422	10 Apr 2012 22:20:40	105.1	105.2	120.5	105.1	
423	10 Apr 2012 22:20:41	105.0	105.0	118.7	105.0	
424	10 Apr 2012 22:20:42	104.9	105.0	121.1	104.9	
425	10 Apr 2012 22:20:43	105.0	105.1	121.1	105.0	
426	10 Apr 2012 22:20:44	105.0	105.1	119.5	105.0	
427	10 Apr 2012 22:20:45	104.8	104.9	121.1	104.8	
428	10 Apr 2012 22:20:46	104.6	104.6	119.5	104.6	
429	10 Apr 2012 22:20:47	104.2	104.5	118.3	104.2	
430	10 Apr 2012 22:20:48	103.7	104.0	118.3	103.7	
431	10 Apr 2012 22:20:49	103.2	103.5	119.8	103.2	
432	10 Apr 2012 22:20:50	103.1	103.2	119.5	103.1	
433	10 Apr 2012 22:20:51	102.8	102.9	118.7	102.8	
434	10 Apr 2012 22:20:52	102.6	102.7	116.5	102.6	
435	10 Apr 2012 22:20:53	102.5	102.6	117.9	102.5	
436	10 Apr 2012 22:20:54	102.6	102.6	115.9	102.6	
437	10 Apr 2012 22:20:55	102.5	102.6	116.5	102.5	
438	10 Apr 2012 22:20:56	102.4	102.4	117.9	102.4	
439	10 Apr 2012 22:20:57	102.5	102.5	117.0	102.5	
440	10 Apr 2012 22:20:58	102.6	102.8	116.5	102.6	
441	10 Apr 2012 22:20:59	103.0	103.1	117.0	103.0	
442	10 Apr 2012 22:21:00	103.2	103.5	117.9	103.2	
443	10 Apr 2012 22:21:01	103.5	103.5	116.5	103.5	
444	10 Apr 2012 22:21:02	103.3	103.4	117.9	103.3	
445	10 Apr 2012 22:21:03	103.2	103.3	118.7	103.2	
446	10 Apr 2012 22:21:04	103.3	103.3	118.7	103.3	
447	10 Apr 2012 22:21:05	103.3	103.3	119.8	103.3	
448	10 Apr 2012 22:21:06	103.2	103.3	119.8	103.2	

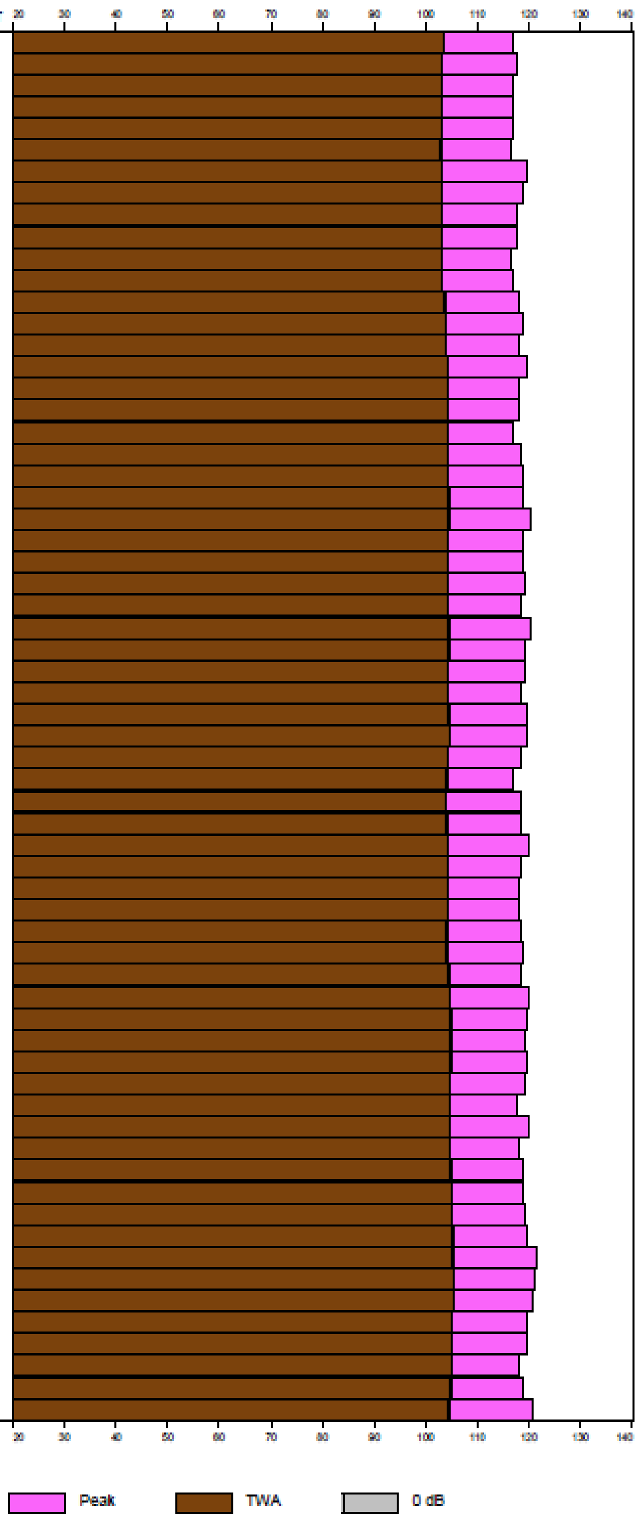


Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
449	10 Apr 2012 22:21:07	103.3	103.4	119.1	103.3	
450	10 Apr 2012 22:21:08	103.3	103.4	118.3	103.3	
451	10 Apr 2012 22:21:09	103.4	103.6	117.4	103.4	
452	10 Apr 2012 22:21:10	103.0	103.2	118.3	103.0	
453	10 Apr 2012 22:21:11	102.8	102.8	116.5	102.8	
454	10 Apr 2012 22:21:12	102.8	102.9	115.9	102.8	
455	10 Apr 2012 22:21:13	102.8	102.9	117.0	102.8	
456	10 Apr 2012 22:21:14	102.7	102.8	117.4	102.7	
457	10 Apr 2012 22:21:15	102.6	102.7	116.5	102.6	
458	10 Apr 2012 22:21:16	102.6	102.7	119.8	102.6	
459	10 Apr 2012 22:21:17	102.6	102.8	118.7	102.6	
460	10 Apr 2012 22:21:18	102.8	102.9	118.7	102.8	
461	10 Apr 2012 22:21:19	102.7	102.7	118.7	102.7	
462	10 Apr 2012 22:21:20	102.7	102.8	119.5	102.7	
463	10 Apr 2012 22:21:21	102.9	103.0	117.4	102.9	
464	10 Apr 2012 22:21:22	103.0	103.1	119.5	103.0	
465	10 Apr 2012 22:21:23	102.8	102.9	118.7	102.8	
466	10 Apr 2012 22:21:24	102.8	102.9	120.2	102.8	
467	10 Apr 2012 22:21:25	102.8	102.8	119.5	102.8	
468	10 Apr 2012 22:21:26	102.8	102.9	118.3	102.8	
469	10 Apr 2012 22:21:27	102.5	102.6	117.0	102.5	
470	10 Apr 2012 22:21:28	102.5	102.6	116.5	102.5	
471	10 Apr 2012 22:21:29	102.7	102.7	121.1	102.7	
472	10 Apr 2012 22:21:30	102.6	102.7	118.3	102.6	
473	10 Apr 2012 22:21:31	102.7	102.8	120.8	102.7	
474	10 Apr 2012 22:21:32	102.9	103.0	119.1	102.9	
475	10 Apr 2012 22:21:33	103.0	103.1	117.4	103.0	
476	10 Apr 2012 22:21:34	102.9	102.9	119.8	102.9	
477	10 Apr 2012 22:21:35	102.7	102.8	118.7	102.7	
478	10 Apr 2012 22:21:36	102.9	103.1	119.8	102.9	
479	10 Apr 2012 22:21:37	103.1	103.2	117.9	103.1	
480	10 Apr 2012 22:21:38	103.1	103.2	119.1	103.1	
481	10 Apr 2012 22:28:08	83.8	87.7	107.4	81.5	
482	10 Apr 2012 22:28:09	88.7	89.7	109.9	88.7	
483	10 Apr 2012 22:28:10	91.5	92.9	111.0	91.5	
484	10 Apr 2012 22:28:11	94.5	95.8	112.7	94.4	
485	10 Apr 2012 22:28:12	97.3	98.6	117.0	97.3	
486	10 Apr 2012 22:28:13	99.7	100.6	114.1	99.7	
487	10 Apr 2012 22:28:14	101.2	101.9	114.8	101.2	
488	10 Apr 2012 22:28:15	102.4	102.8	115.4	102.4	
489	10 Apr 2012 22:28:16	103.2	103.6	115.9	103.2	
490	10 Apr 2012 22:28:17	103.8	104.0	117.9	103.8	
491	10 Apr 2012 22:28:18	103.9	104.0	115.9	103.9	
492	10 Apr 2012 22:28:19	103.8	103.9	116.5	103.8	
493	10 Apr 2012 22:28:20	104.2	104.5	117.4	104.2	
494	10 Apr 2012 22:28:21	104.6	104.6	116.5	104.6	
495	10 Apr 2012 22:28:22	104.7	104.7	117.0	104.7	
496	10 Apr 2012 22:28:23	104.7	104.8	117.0	104.7	
497	10 Apr 2012 22:28:24	104.7	104.8	116.5	104.7	
498	10 Apr 2012 22:28:25	104.6	104.7	118.3	104.6	
499	10 Apr 2012 22:28:26	104.8	104.8	117.4	104.8	
500	10 Apr 2012 22:28:27	104.9	104.9	117.9	104.9	
501	10 Apr 2012 22:28:28	104.9	104.9	119.5	104.9	
502	10 Apr 2012 22:28:29	105.0	105.1	117.9	105.0	
503	10 Apr 2012 22:28:30	105.1	105.2	119.1	105.1	
504	10 Apr 2012 22:28:31	105.0	105.1	118.7	105.0	
505	10 Apr 2012 22:28:32	104.9	105.0	117.0	104.9	
506	10 Apr 2012 22:28:33	104.7	104.8	116.5	104.7	
507	10 Apr 2012 22:28:34	104.7	104.7	117.4	104.7	
508	10 Apr 2012 22:28:35	104.4	104.6	117.9	104.4	
509	10 Apr 2012 22:28:36	104.2	104.2	115.9	104.2	
510	10 Apr 2012 22:28:37	104.1	104.2	118.3	104.1	
511	10 Apr 2012 22:28:38	103.8	103.8	117.9	103.8	
512	10 Apr 2012 22:28:39	103.5	103.6	117.0	103.5	

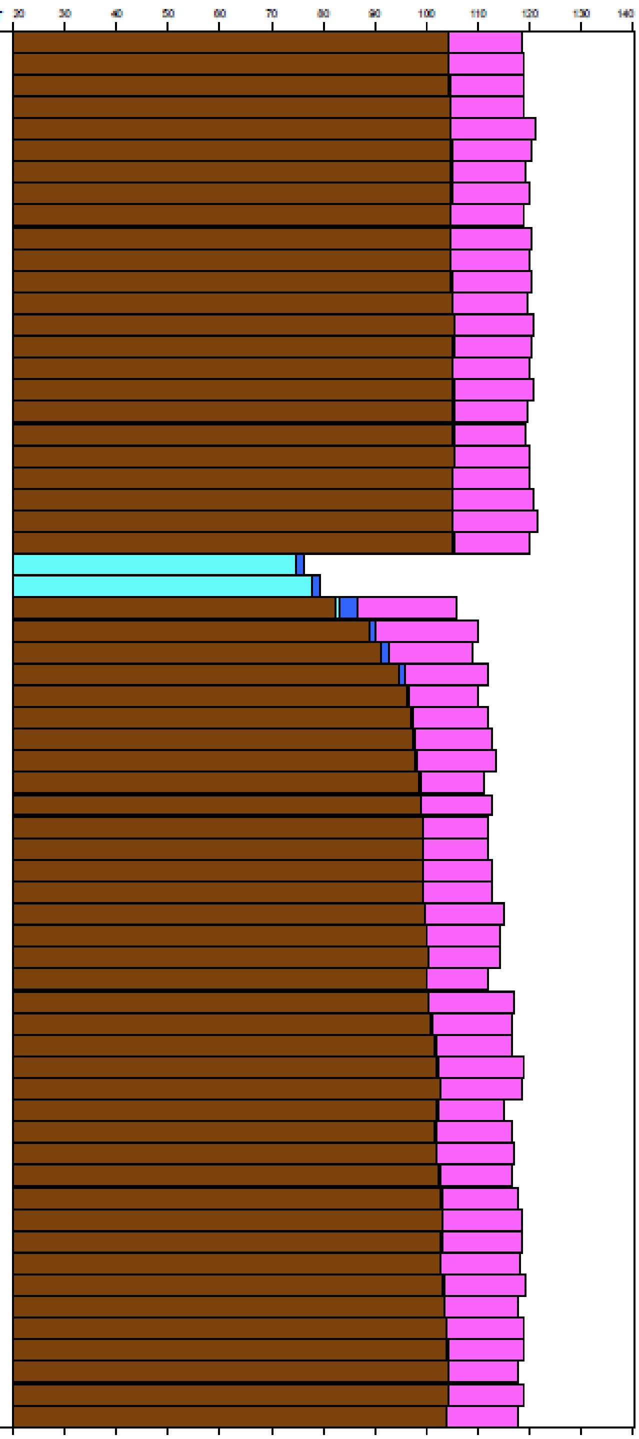
Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
513	10 Apr 2012 22:28:40	103.3	103.5	117.0	103.3	
514	10 Apr 2012 22:28:41	103.1	103.3	117.4	103.1	
515	10 Apr 2012 22:28:42	102.9	102.9	117.0	102.9	
516	10 Apr 2012 22:28:43	103.0	103.0	117.0	103.0	
517	10 Apr 2012 22:28:44	102.9	103.0	117.0	102.9	
518	10 Apr 2012 22:28:45	102.8	102.9	116.5	102.8	
519	10 Apr 2012 22:28:46	103.1	103.3	119.5	103.1	
520	10 Apr 2012 22:28:47	103.1	103.2	118.7	103.1	
521	10 Apr 2012 22:28:48	103.0	103.1	117.4	103.0	
522	10 Apr 2012 22:28:49	103.1	103.1	117.4	103.1	
523	10 Apr 2012 22:28:50	103.1	103.1	116.5	103.1	
524	10 Apr 2012 22:28:51	103.2	103.3	117.0	103.2	
525	10 Apr 2012 22:28:52	103.6	103.7	117.9	103.6	
526	10 Apr 2012 22:28:53	103.7	103.7	118.7	103.7	
527	10 Apr 2012 22:28:54	103.8	104.0	117.9	103.8	
528	10 Apr 2012 22:28:55	104.1	104.2	119.5	104.1	
529	10 Apr 2012 22:28:56	104.2	104.3	117.9	104.2	
530	10 Apr 2012 22:28:57	104.1	104.2	117.9	104.1	
531	10 Apr 2012 22:28:58	104.2	104.3	117.0	104.2	
532	10 Apr 2012 22:28:59	104.1	104.2	118.3	104.1	
533	10 Apr 2012 22:29:00	104.2	104.2	118.7	104.2	
534	10 Apr 2012 22:29:01	104.3	104.4	118.7	104.3	
535	10 Apr 2012 22:29:02	104.4	104.4	120.5	104.4	
536	10 Apr 2012 22:29:03	104.2	104.3	118.7	104.2	
537	10 Apr 2012 22:29:04	104.2	104.3	118.7	104.2	
538	10 Apr 2012 22:29:05	104.1	104.2	119.1	104.1	
539	10 Apr 2012 22:29:06	104.2	104.3	118.3	104.2	
540	10 Apr 2012 22:29:07	104.4	104.4	120.5	104.4	
541	10 Apr 2012 22:29:08	104.4	104.4	119.1	104.4	
542	10 Apr 2012 22:29:09	104.3	104.4	119.1	104.3	
543	10 Apr 2012 22:29:10	104.3	104.3	118.3	104.3	
544	10 Apr 2012 22:29:11	104.3	104.4	119.5	104.3	
545	10 Apr 2012 22:29:12	104.4	104.5	119.5	104.4	
546	10 Apr 2012 22:29:13	104.1	104.3	118.3	104.1	
547	10 Apr 2012 22:29:14	103.9	104.0	117.0	103.9	
548	10 Apr 2012 22:29:15	103.8	104.0	118.3	103.8	
549	10 Apr 2012 22:29:16	104.0	104.1	118.3	104.0	
550	10 Apr 2012 22:29:17	104.0	104.2	119.8	104.0	
551	10 Apr 2012 22:29:18	104.3	104.3	118.3	104.3	
552	10 Apr 2012 22:29:19	104.2	104.3	117.9	104.2	
553	10 Apr 2012 22:29:20	104.1	104.2	117.9	104.1	
554	10 Apr 2012 22:29:21	104.0	104.1	118.3	104.0	
555	10 Apr 2012 22:29:22	104.0	104.1	118.7	104.0	
556	10 Apr 2012 22:29:23	104.2	104.4	118.3	104.2	
557	10 Apr 2012 22:29:24	104.5	104.6	119.8	104.5	
558	10 Apr 2012 22:29:25	104.7	104.8	119.5	104.7	
559	10 Apr 2012 22:29:26	104.7	104.9	119.1	104.7	
560	10 Apr 2012 22:29:27	104.7	104.8	119.5	104.7	
561	10 Apr 2012 22:29:28	104.6	104.7	119.1	104.6	
562	10 Apr 2012 22:29:29	104.5	104.6	117.4	104.5	
563	10 Apr 2012 22:29:30	104.5	104.6	119.8	104.5	
564	10 Apr 2012 22:29:31	104.4	104.5	117.9	104.4	
565	10 Apr 2012 22:29:32	104.8	105.0	118.7	104.8	
566	10 Apr 2012 22:29:33	105.0	105.0	118.7	105.0	
567	10 Apr 2012 22:29:34	105.0	105.1	119.1	105.0	
568	10 Apr 2012 22:29:35	105.1	105.2	119.5	105.1	
569	10 Apr 2012 22:29:36	105.1	105.3	121.4	105.1	
570	10 Apr 2012 22:29:37	105.3	105.4	121.1	105.3	
571	10 Apr 2012 22:29:38	105.2	105.4	120.8	105.2	
572	10 Apr 2012 22:29:39	105.0	105.1	119.5	105.0	
573	10 Apr 2012 22:29:40	104.9	105.0	119.5	104.9	
574	10 Apr 2012 22:29:41	104.8	104.9	117.9	104.8	
575	10 Apr 2012 22:29:42	104.5	104.8	118.7	104.5	
576	10 Apr 2012 22:29:43	104.3	104.4	120.8	104.3	



Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

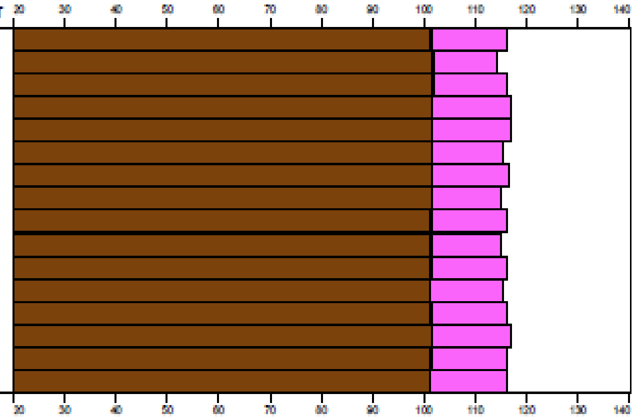
No.	Time	Leq	Lmax	Lpeak	TWA	Over
577	10 Apr 2012 22:29:44	104.2	104.3	118.3	104.2	
578	10 Apr 2012 22:29:45	104.2	104.3	118.7	104.2	
579	10 Apr 2012 22:29:46	104.3	104.4	118.7	104.3	
580	10 Apr 2012 22:29:47	104.4	104.6	118.7	104.4	
581	10 Apr 2012 22:29:48	104.6	104.7	121.1	104.6	
582	10 Apr 2012 22:29:49	104.7	104.8	120.2	104.7	
583	10 Apr 2012 22:29:50	104.7	104.8	119.1	104.7	
584	10 Apr 2012 22:29:51	104.7	104.8	119.8	104.7	
585	10 Apr 2012 22:29:52	104.6	104.6	118.7	104.6	
586	10 Apr 2012 22:29:53	104.6	104.7	120.5	104.6	
587	10 Apr 2012 22:29:54	104.7	104.7	119.8	104.7	
588	10 Apr 2012 22:29:55	104.7	104.8	120.5	104.7	
589	10 Apr 2012 22:29:56	105.0	105.1	119.5	105.0	
590	10 Apr 2012 22:29:57	105.2	105.2	120.8	105.2	
591	10 Apr 2012 22:29:58	105.1	105.2	120.5	105.1	
592	10 Apr 2012 22:29:59	105.1	105.1	119.8	105.1	
593	10 Apr 2012 22:30:00	105.1	105.3	120.8	105.1	
594	10 Apr 2012 22:30:01	105.1	105.2	119.5	105.1	
595	10 Apr 2012 22:30:02	105.2	105.4	119.1	105.2	
596	10 Apr 2012 22:30:03	105.3	105.4	119.8	105.3	
597	10 Apr 2012 22:30:04	105.1	105.2	119.8	105.1	
598	10 Apr 2012 22:30:05	105.1	105.1	120.8	105.1	
599	10 Apr 2012 22:30:06	105.1	105.1	121.4	105.1	
600	10 Apr 2012 22:30:07	105.1	105.2	119.8	105.1	
601	10 Apr 2012 22:36:08	75.0	76.1	—	—	
602	10 Apr 2012 22:36:09	78.0	79.2	—	—	
603	10 Apr 2012 22:36:10	83.3	86.6	105.9	82.4	
604	10 Apr 2012 22:36:11	88.7	90.2	109.9	88.7	
605	10 Apr 2012 22:36:12	91.4	92.8	108.8	91.4	
606	10 Apr 2012 22:36:13	94.5	95.6	111.9	94.5	
607	10 Apr 2012 22:36:14	96.3	96.7	109.9	96.3	
608	10 Apr 2012 22:36:15	97.0	97.2	111.9	97.0	
609	10 Apr 2012 22:36:16	97.4	97.6	112.7	97.4	
610	10 Apr 2012 22:36:17	97.9	98.3	113.5	97.9	
611	10 Apr 2012 22:36:18	98.6	98.8	111.0	98.6	
612	10 Apr 2012 22:36:19	98.8	98.9	112.7	98.8	
613	10 Apr 2012 22:36:20	99.2	99.3	111.9	99.2	
614	10 Apr 2012 22:36:21	99.2	99.3	111.9	99.2	
615	10 Apr 2012 22:36:22	99.2	99.2	112.7	99.2	
616	10 Apr 2012 22:36:23	99.2	99.3	112.7	99.2	
617	10 Apr 2012 22:36:24	99.5	99.7	114.8	99.5	
618	10 Apr 2012 22:36:25	99.9	100.1	114.1	99.9	
619	10 Apr 2012 22:36:26	100.2	100.3	114.1	100.2	
620	10 Apr 2012 22:36:27	100.1	100.1	111.9	100.1	
621	10 Apr 2012 22:36:28	100.4	100.5	117.0	100.4	
622	10 Apr 2012 22:36:29	100.8	101.3	116.5	100.8	
623	10 Apr 2012 22:36:30	101.6	102.0	116.5	101.6	
624	10 Apr 2012 22:36:31	102.1	102.5	118.7	102.1	
625	10 Apr 2012 22:36:32	102.5	102.6	118.3	102.5	
626	10 Apr 2012 22:36:33	102.0	102.3	114.8	102.0	
627	10 Apr 2012 22:36:34	101.7	101.8	116.5	101.7	
628	10 Apr 2012 22:36:35	101.9	101.9	117.0	101.9	
629	10 Apr 2012 22:36:36	102.3	102.5	116.5	102.3	
630	10 Apr 2012 22:36:37	102.8	103.0	117.4	102.8	
631	10 Apr 2012 22:36:38	103.0	103.1	118.3	103.0	
632	10 Apr 2012 22:36:39	102.8	103.0	118.3	102.8	
633	10 Apr 2012 22:36:40	102.8	102.9	117.9	102.8	
634	10 Apr 2012 22:36:41	103.0	103.4	119.1	103.0	
635	10 Apr 2012 22:36:42	103.5	103.5	117.4	103.5	
636	10 Apr 2012 22:36:43	103.7	103.9	118.7	103.7	
637	10 Apr 2012 22:36:44	104.0	104.2	118.7	104.0	
638	10 Apr 2012 22:36:45	104.2	104.3	117.4	104.2	
639	10 Apr 2012 22:36:46	104.1	104.1	118.7	104.1	
640	10 Apr 2012 22:36:47	103.8	104.0	117.4	103.8	



Leq Max Peak TWA 0 dB

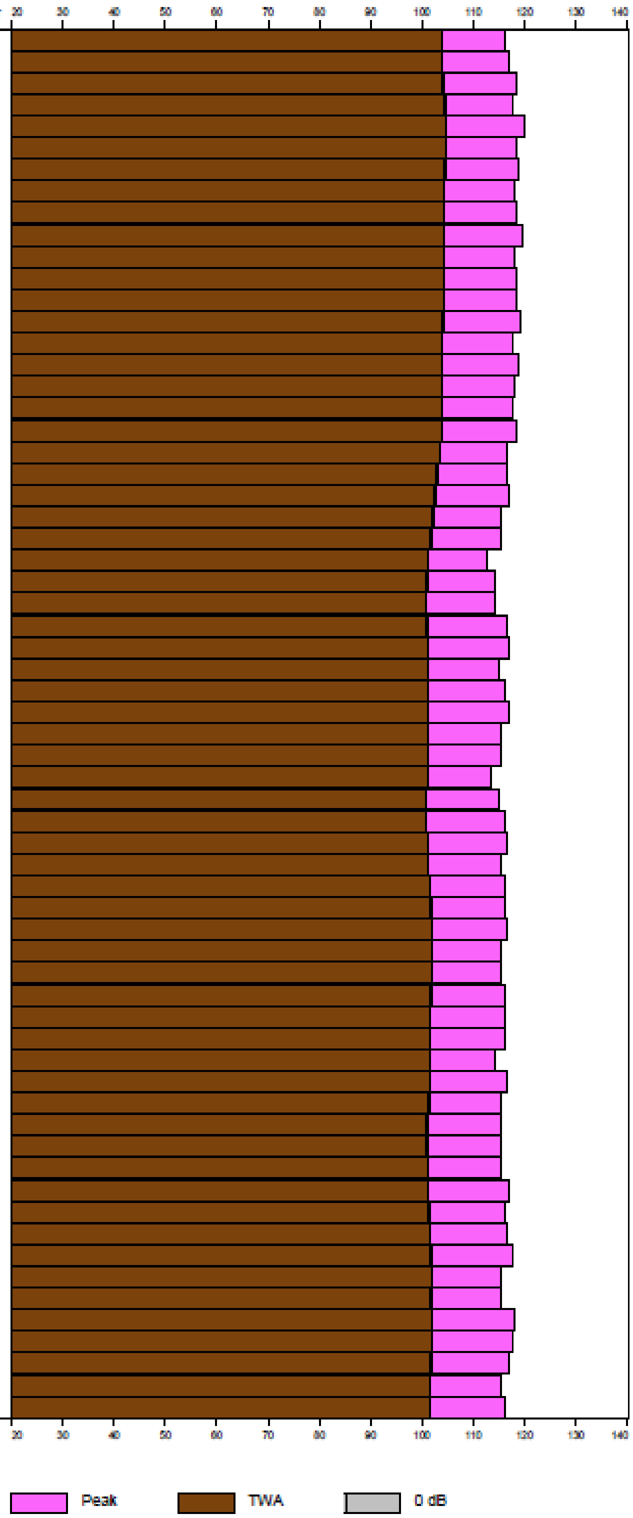
Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
705	10 Apr 2012 22:37:52	101.3	101.4	115.9	101.3	
706	10 Apr 2012 22:37:53	101.6	101.8	114.1	101.6	
707	10 Apr 2012 22:37:54	101.7	101.8	115.9	101.7	
708	10 Apr 2012 22:37:55	101.6	101.7	117.0	101.6	
709	10 Apr 2012 22:37:56	101.4	101.4	117.0	101.4	
710	10 Apr 2012 22:37:57	101.4	101.4	115.4	101.4	
711	10 Apr 2012 22:37:58	101.5	101.6	116.5	101.5	
712	10 Apr 2012 22:37:59	101.4	101.5	114.8	101.4	
713	10 Apr 2012 22:38:00	101.3	101.4	115.9	101.3	
714	10 Apr 2012 22:38:01	101.3	101.4	114.8	101.3	
715	10 Apr 2012 22:38:02	101.3	101.4	115.9	101.3	
716	10 Apr 2012 22:38:03	101.2	101.2	115.4	101.2	
717	10 Apr 2012 22:38:04	101.3	101.4	115.9	101.3	
718	10 Apr 2012 22:38:05	101.5	101.5	117.0	101.4	
719	10 Apr 2012 22:38:06	101.3	101.5	115.9	101.3	
720	10 Apr 2012 22:38:07	101.2	101.3	115.9	101.2	



Serial Number:	02433	Start:	10 Apr 2012 21:40:51
Model Number:	706	Stop:	10 Apr 2012 22:38:08
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
641	10 Apr 2012 22:36:48	103.8	103.8	115.9	103.8	
642	10 Apr 2012 22:36:49	103.7	103.8	117.0	103.7	
643	10 Apr 2012 22:36:50	103.9	104.0	118.3	103.9	
644	10 Apr 2012 22:36:51	104.3	104.4	117.4	104.3	
645	10 Apr 2012 22:36:52	104.5	104.5	119.8	104.5	
646	10 Apr 2012 22:36:53	104.4	104.5	118.3	104.4	
647	10 Apr 2012 22:36:54	104.3	104.4	118.7	104.3	
648	10 Apr 2012 22:36:55	104.0	104.2	117.9	104.0	
649	10 Apr 2012 22:36:56	104.1	104.1	118.3	104.1	
650	10 Apr 2012 22:36:57	104.0	104.1	119.5	104.0	
651	10 Apr 2012 22:36:58	104.1	104.1	117.9	104.1	
652	10 Apr 2012 22:36:59	104.1	104.1	118.3	104.1	
653	10 Apr 2012 22:37:00	104.1	104.2	118.3	104.1	
654	10 Apr 2012 22:37:01	103.9	104.1	119.1	103.9	
655	10 Apr 2012 22:37:02	103.8	103.9	117.4	103.8	
656	10 Apr 2012 22:37:03	103.8	103.8	118.7	103.8	
657	10 Apr 2012 22:37:04	103.9	103.9	117.9	103.9	
658	10 Apr 2012 22:37:05	103.9	103.9	117.4	103.9	
659	10 Apr 2012 22:37:06	103.7	103.8	118.3	103.7	
660	10 Apr 2012 22:37:07	103.5	103.6	116.5	103.5	
661	10 Apr 2012 22:37:08	102.8	103.2	116.5	102.8	
662	10 Apr 2012 22:37:09	102.4	102.6	117.0	102.4	
663	10 Apr 2012 22:37:10	102.0	102.2	115.4	102.0	
664	10 Apr 2012 22:37:11	101.6	101.8	115.4	101.6	
665	10 Apr 2012 22:37:12	101.1	101.3	112.7	101.1	
666	10 Apr 2012 22:37:13	100.8	101.0	114.1	100.8	
667	10 Apr 2012 22:37:14	100.8	100.9	114.1	100.8	
668	10 Apr 2012 22:37:15	101.0	101.2	116.5	101.0	
669	10 Apr 2012 22:37:16	101.1	101.2	117.0	101.1	
670	10 Apr 2012 22:37:17	101.1	101.2	114.8	101.1	
671	10 Apr 2012 22:37:18	101.2	101.3	115.9	101.2	
672	10 Apr 2012 22:37:19	101.2	101.3	117.0	101.2	
673	10 Apr 2012 22:37:20	101.2	101.3	115.4	101.2	
674	10 Apr 2012 22:37:21	101.1	101.1	115.4	101.1	
675	10 Apr 2012 22:37:22	101.0	101.1	113.5	101.0	
676	10 Apr 2012 22:37:23	101.0	101.0	114.8	101.0	
677	10 Apr 2012 22:37:24	100.9	100.9	115.9	100.9	
678	10 Apr 2012 22:37:25	101.0	101.1	116.5	101.0	
679	10 Apr 2012 22:37:26	101.1	101.2	115.4	101.1	
680	10 Apr 2012 22:37:27	101.4	101.6	115.9	101.4	
681	10 Apr 2012 22:37:28	101.7	101.8	115.9	101.7	
682	10 Apr 2012 22:37:29	101.8	101.9	116.5	101.8	
683	10 Apr 2012 22:37:30	101.9	101.9	115.4	101.9	
684	10 Apr 2012 22:37:31	101.8	102.0	115.4	101.8	
685	10 Apr 2012 22:37:32	101.6	101.8	115.9	101.6	
686	10 Apr 2012 22:37:33	101.5	101.6	115.9	101.5	
687	10 Apr 2012 22:37:34	101.5	101.6	115.9	101.5	
688	10 Apr 2012 22:37:35	101.4	101.4	114.1	101.4	
689	10 Apr 2012 22:37:36	101.4	101.5	116.5	101.4	
690	10 Apr 2012 22:37:37	101.2	101.4	115.4	101.2	
691	10 Apr 2012 22:37:38	100.9	101.0	115.4	100.9	
692	10 Apr 2012 22:37:39	100.9	101.0	115.4	100.9	
693	10 Apr 2012 22:37:40	101.0	101.1	115.4	101.0	
694	10 Apr 2012 22:37:41	101.2	101.2	117.0	101.2	
695	10 Apr 2012 22:37:42	101.3	101.4	115.9	101.3	
696	10 Apr 2012 22:37:43	101.5	101.6	116.5	101.5	
697	10 Apr 2012 22:37:44	101.7	101.9	117.4	101.7	
698	10 Apr 2012 22:37:45	101.8	101.9	115.4	101.8	
699	10 Apr 2012 22:37:46	101.7	101.8	115.4	101.7	
700	10 Apr 2012 22:37:47	101.8	101.9	117.9	101.8	
701	10 Apr 2012 22:37:48	101.8	101.8	117.4	101.8	
702	10 Apr 2012 22:37:49	101.7	101.8	117.0	101.7	
703	10 Apr 2012 22:37:50	101.6	101.6	115.4	101.6	
704	10 Apr 2012 22:37:51	101.5	101.6	115.9	101.5	



Serial Number:	02433	Start:	06 Apr 2012 16:08:10
Model Number:	706	Stop:	06 Apr 2012 17:02:17
RMS Weighting:	A Weighting	Run Time:	00:12:00
Peak Weighting::	Unweighted	Pre Calibration:	27 Mar 2012 22:29:00
Detector:	Slow	Post Calibration:	11 Apr 2012 12:43:00
Gain:	0 dB	Deviation:	0.0 dB
Sample Period:	1 second	Periods:	720

No.	Time	Leq	Lmax	Lpeak	TWA	Over
1	06 Apr 2012 16:08:10	85.8	86.7	—	85.8	
2	06 Apr 2012 16:08:11	88.2	89.5	105.9	88.2	
3	06 Apr 2012 16:08:12	90.6	91.5	107.4	90.6	
4	06 Apr 2012 16:08:13	92.5	93.3	109.9	92.5	
5	06 Apr 2012 16:08:14	94.1	94.7	112.7	94.1	
6	06 Apr 2012 16:08:15	95.3	95.8	114.8	95.3	
7	06 Apr 2012 16:08:16	96.5	97.3	112.7	96.5	
8	06 Apr 2012 16:08:17	98.0	98.5	114.1	98.0	
9	06 Apr 2012 16:08:18	99.0	99.4	114.1	99.0	
10	06 Apr 2012 16:08:19	99.8	100.1	114.8	99.8	
11	06 Apr 2012 16:08:20	100.4	100.8	115.4	100.4	
12	06 Apr 2012 16:08:21	101.1	101.3	117.0	101.1	
13	06 Apr 2012 16:08:22	101.4	101.6	117.0	101.4	
14	06 Apr 2012 16:08:23	101.8	101.9	117.9	101.8	
15	06 Apr 2012 16:08:24	101.9	101.9	117.0	101.9	
16	06 Apr 2012 16:08:25	101.9	102.0	115.4	101.9	
17	06 Apr 2012 16:08:26	102.0	102.0	115.9	102.0	
18	06 Apr 2012 16:08:27	102.0	102.2	115.4	102.0	
19	06 Apr 2012 16:08:28	102.2	102.2	115.4	102.2	
20	06 Apr 2012 16:08:29	102.3	102.5	115.9	102.3	
21	06 Apr 2012 16:08:30	102.5	102.5	116.5	102.5	
22	06 Apr 2012 16:08:31	102.4	102.5	115.4	102.4	
23	06 Apr 2012 16:08:32	102.5	102.7	117.0	102.5	
24	06 Apr 2012 16:08:33	102.9	103.1	115.9	102.9	
25	06 Apr 2012 16:08:34	103.1	103.2	115.9	103.1	
26	06 Apr 2012 16:08:35	103.2	103.2	116.5	103.2	
27	06 Apr 2012 16:08:36	103.2	103.3	116.5	103.2	
28	06 Apr 2012 16:08:37	103.1	103.2	116.5	103.1	
29	06 Apr 2012 16:08:38	102.9	103.1	115.9	102.9	
30	06 Apr 2012 16:08:39	102.8	102.9	115.9	102.8	
31	06 Apr 2012 16:08:40	102.4	102.5	116.5	102.4	
32	06 Apr 2012 16:08:41	102.2	102.3	114.1	102.2	
33	06 Apr 2012 16:08:42	102.0	102.1	115.4	102.0	
34	06 Apr 2012 16:08:43	101.7	102.0	115.9	101.7	
35	06 Apr 2012 16:08:44	101.5	101.6	117.0	101.5	
36	06 Apr 2012 16:08:45	101.5	101.7	117.0	101.5	
37	06 Apr 2012 16:08:46	101.7	102.1	117.9	101.7	
38	06 Apr 2012 16:08:47	102.4	102.7	116.5	102.4	
39	06 Apr 2012 16:08:48	102.6	102.7	116.5	102.6	
40	06 Apr 2012 16:08:49	102.9	102.9	117.0	102.9	
41	06 Apr 2012 16:08:50	102.7	102.9	114.8	102.7	
42	06 Apr 2012 16:08:51	102.1	102.5	115.4	102.1	
43	06 Apr 2012 16:08:52	101.2	101.5	114.8	101.2	
44	06 Apr 2012 16:08:53	101.8	102.4	117.4	101.8	
45	06 Apr 2012 16:08:54	102.6	102.7	117.4	102.6	
46	06 Apr 2012 16:08:55	102.7	102.8	115.9	102.7	
47	06 Apr 2012 16:08:56	102.9	102.9	117.0	102.9	
48	06 Apr 2012 16:08:57	102.9	102.9	116.5	102.9	
49	06 Apr 2012 16:08:58	102.9	102.9	117.4	102.9	
50	06 Apr 2012 16:08:59	103.0	103.1	117.9	103.0	
51	06 Apr 2012 16:09:00	103.1	103.1	117.4	103.1	
52	06 Apr 2012 16:09:01	103.1	103.2	116.5	103.1	
53	06 Apr 2012 16:09:02	103.2	103.3	116.5	103.2	
54	06 Apr 2012 16:09:03	103.3	103.3	117.4	103.3	
55	06 Apr 2012 16:09:04	103.3	103.4	117.4	103.3	
56	06 Apr 2012 16:09:05	103.2	103.3	116.5	103.2	
57	06 Apr 2012 16:09:06	103.2	103.3	118.3	103.2	
58	06 Apr 2012 16:09:07	103.2	103.3	117.0	103.2	
59	06 Apr 2012 16:09:08	103.3	103.3	115.9	103.3	
60	06 Apr 2012 16:09:09	103.0	103.2	115.9	103.0	
61	06 Apr 2012 16:09:10	102.7	102.8	116.5	102.7	
62	06 Apr 2012 16:09:11	102.5	102.7	116.5	102.5	
63	06 Apr 2012 16:09:12	102.4	102.5	116.5	102.4	
64	06 Apr 2012 16:09:13	102.3	102.5	114.8	102.3