



FCC PART 15.249

TEST REPORT

For

Serene Innovations Inc.

14731 Carmenita Road, Norwalk, CA 90650, USA

FCC ID: Z33-CA1

Report Type: Original Report	Product Type: Central Alert
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Report Number: RSZ110922002-00	
Report Date: 2011-12-12	
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* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Serene Innovations Inc.*'s product, model number: CA-360 (FCC ID: Z33-CA1), or the "EUT" in this report was a *Central Alert*, which was measured approximately: 16.5 cm (L) x 6 cm (W) x 11 cm (H), rated input voltage: 4*1.5 V AA battery or DC 9V from adapter.

Adapter information: Switch Power Supply
Model: KSAD0900100W1US
Input: AC 100-240V, 50/60Hz, 0.6A Max
Output: DC 9.0V, 1.0A Max

** All measurement and test data in this report was gathered from production sample serial number: 1109065 (Assigned by BACL, Shenzhen). The EUT was received on 2011-09-22.*

Objective

This report is prepared on behalf of *Serene Innovations Inc.* in accordance with Part 2, Subpart J, and Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

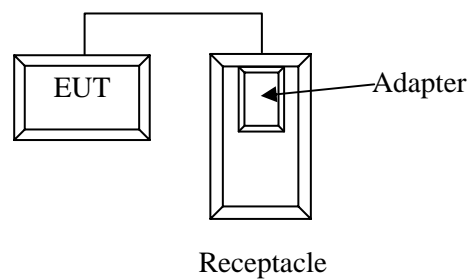
Description of Test Configuration

The system was configured for testing in a testing mode.

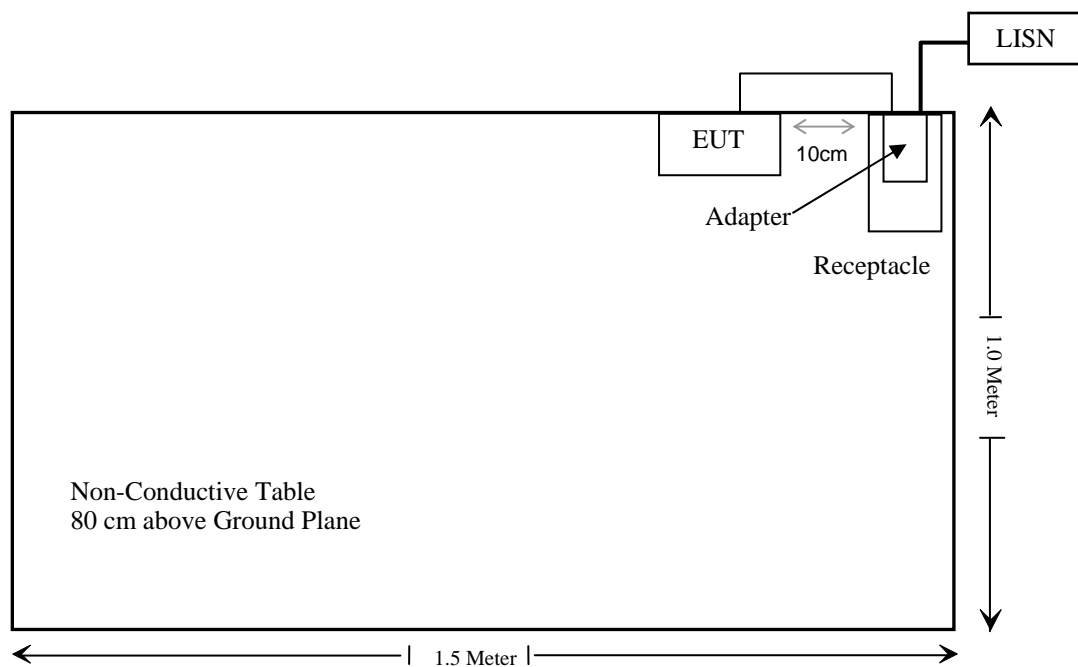
Equipment Modifications

No modification was made to the EUT tested.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conduction Emissions	Compliance
§15.209(a) §15.249(a) §15.249(c) §15.249(d)§15.35	Radiated Emissions	Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has a PCB antenna which complies with FCC §15.203.

Result: Compliance, please refer to the EUT internal photos.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

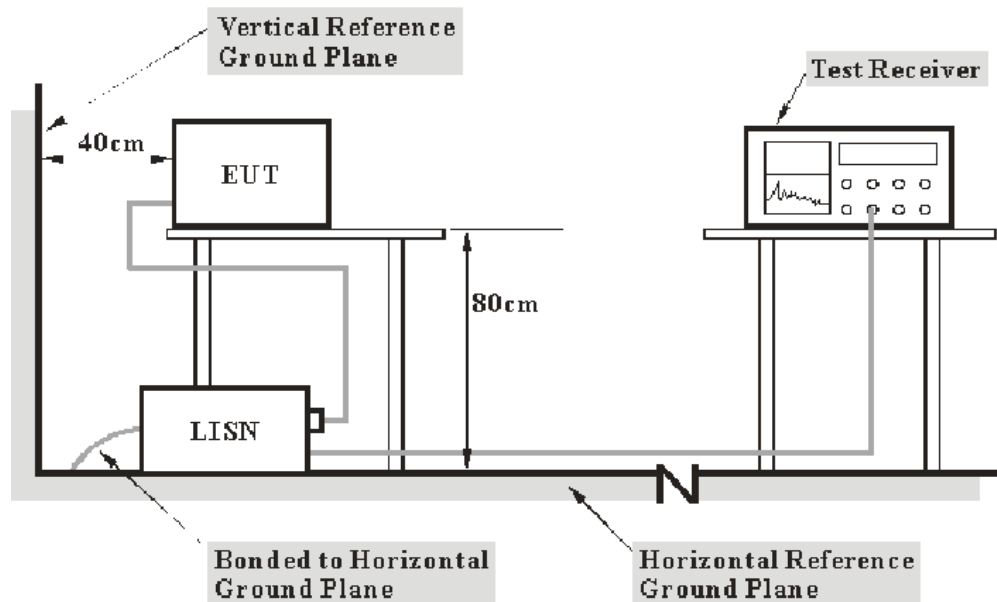
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence).

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

11.58 dB at 17.390 MHz in the **Line** conducted mode

Test Data

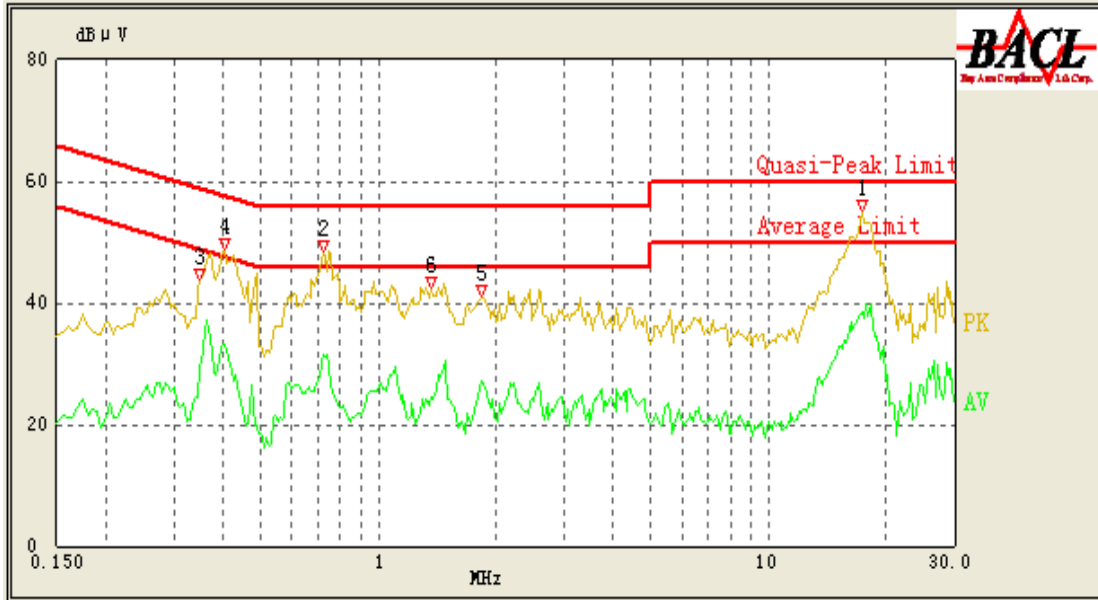
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Allan An on 2011-10-27.

Test Mode: Transmitting

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
17.390	38.42	10.06	50.00	11.58	Ave.
17.390	46.19	10.06	60.00	13.81	QP
0.720	31.35	9.97	46.00	14.65	Ave.
0.405	43.30	9.96	58.71	15.41	QP
0.405	33.19	9.96	48.71	15.52	Ave.
0.725	38.82	9.97	56.00	17.18	QP
1.840	27.26	9.97	46.00	18.74	Ave.
1.840	35.36	9.97	56.00	20.64	QP
0.350	29.27	9.96	50.29	21.02	Ave.
1.360	24.46	9.97	46.00	21.54	Ave.
1.365	34.21	9.97	56.00	21.79	QP
0.350	36.45	9.96	60.29	23.84	QP

AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
17.695	37.04	10.06	50.00	12.96	Ave.
26.610	34.91	10.13	50.00	15.09	Ave.
0.740	28.28	9.97	46.00	17.72	Ave.
17.755	41.88	10.06	60.00	18.12	QP
26.610	41.86	10.13	60.00	18.14	QP
0.740	36.40	9.97	56.00	19.60	QP
1.485	25.52	9.97	46.00	20.48	Ave.
0.405	28.22	9.96	48.71	20.49	Ave.
0.405	37.71	9.96	58.71	21.00	QP
2.540	22.03	9.97	46.00	23.97	Ave.
1.495	30.39	9.97	56.00	25.61	QP
2.520	29.58	9.97	56.00	26.42	QP

FCC §15.205, §15.209 & §15.249 - RADIATED EMISSIONS

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

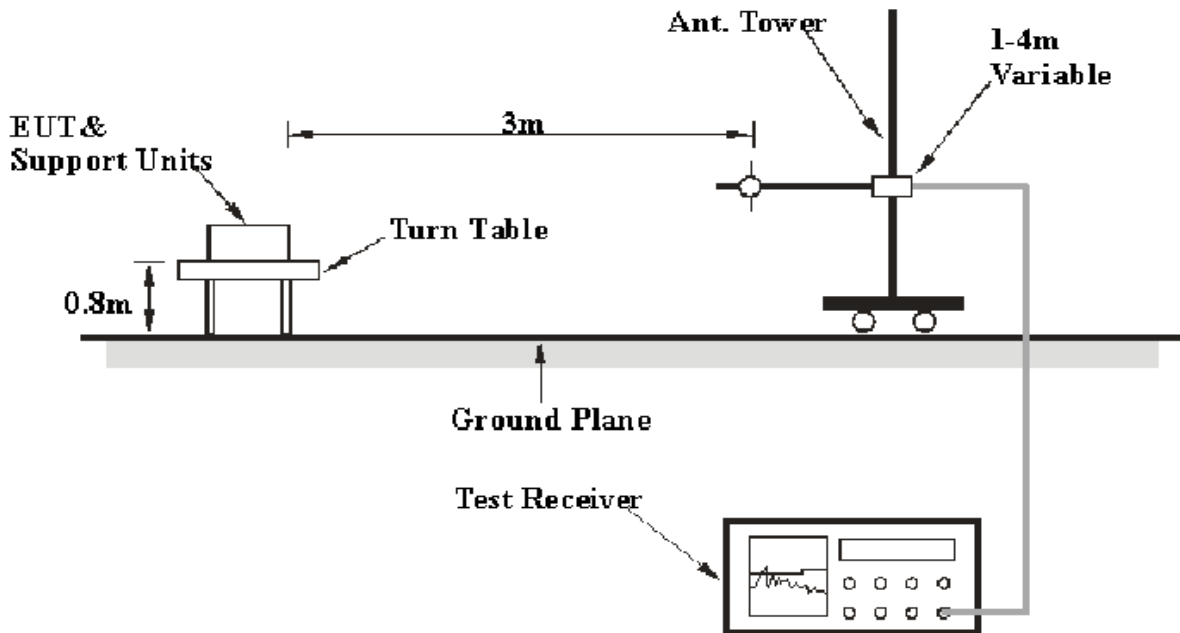
$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

$$\text{Peak: RBW} = 1\text{MHz} / \text{VBW} = 1\text{MHz} / \text{Sweep} = \text{Auto}$$

$$\text{Average: RBW} = 1\text{MHz} / \text{VBW} = 10\text{Hz} / \text{Sweep} = \text{Auto}$$

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209 and FCC 15.249 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Agilent	Spectrum Analyzer	8564E	3943A01781	2011-04-12	2012-04-11
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-05-05	2012-05-04

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

The testing was performed by Allan An on 2011-10-27.

Test Mode: Transmitting

(The EUT has been pre-scanned with the battery and AC/DC power adapter separately; the worse case was presented with the AC/DC adapter)

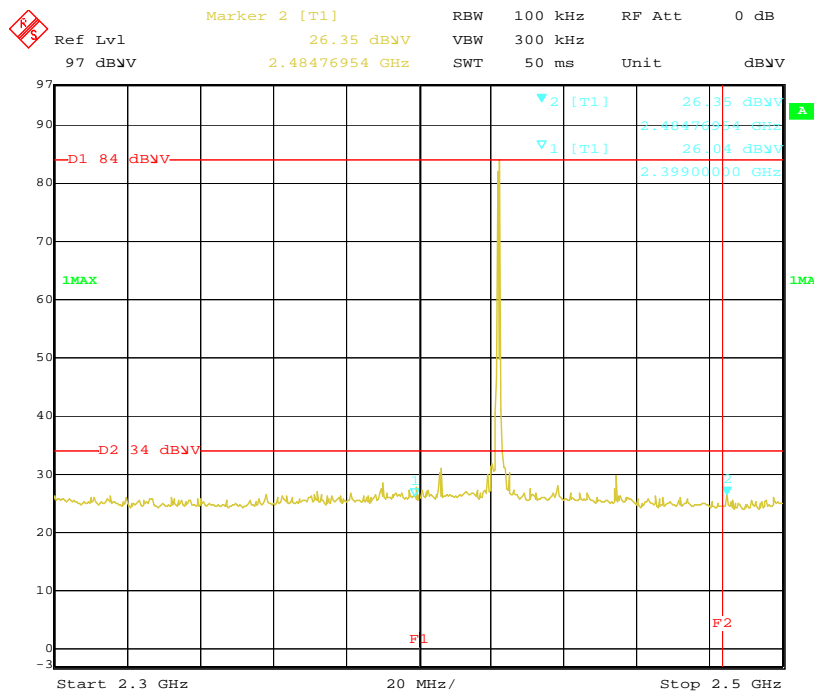
30 MHz – 25 GHz:

Indicated		Detector (PK/QP/A ve.)	Table Angle Degree	Test Antenna		Correction Factor			FCC 15.249/15.205/15.209			
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
2422	86.18	PK	110	1.5	V	30.3	3.03	27.54	91.97	114	22.03	Fund.
2422	84.34	PK	25	1.5	H	30.9	3.03	27.54	90.73	114	23.27	Fund.
2422	79.24	Ave.	110	1.5	V	30.3	3.03	27.54	85.03	94	8.97	Fund.
2422	78.53	Ave.	125	1.5	H	30.9	3.03	27.54	84.92	94	9.08	Fund.
4844	37.12	Ave.	155	1.5	H	36.3	4.30	27.51	50.21	54	3.79*	harmonic
4844	38.34	Ave.	100	1.8	V	35	4.30	27.51	50.13	54	3.87*	harmonic
4844	47.68	PK	155	1.5	H	36.3	4.30	27.51	60.77	74	13.23	harmonic
4844	47.79	PK	100	1.8	V	35	4.30	27.51	59.58	74	14.42	harmonic
42.481	49.18	QP	103	1.3	V	12.9	0.32	25.90	36.50	40	3.5*	Spurious
42.567	48.98	QP	103	1.2	V	12.9	0.32	25.90	36.30	40	3.7*	Spurious
58.668	46.22	QP	103	2.0	V	6.1	0.38	25.80	26.90	40	13.1	Spurious
61.043	45.02	QP	103	1.8	V	6.1	0.38	25.80	25.70	40	14.3	Spurious
36.066	31.00	QP	103	1.8	V	16.9	0.30	25.90	22.30	40	17.7	Spurious
910.00	28.78	QP	165	2.0	H	20.4	3.92	25.60	27.50	46	18.5	Spurious

*Within measurement uncertainty!

Note: The other data which below the limit 20 dB was not recorded.

Band Edge:



***** END OF REPORT *****