NVLAP LAB CODE 200707-0

FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT

For

Acoustic Arc International Ltd.

Unit 207, 2/F, Photonics Centre, No.2 Science Park East Avenue,
Hong Kong Science Park, N.T., Hong Kong

FCC ID: VHC-AAI-AS0850-00

This Report Concerns:	Equipment Type:
☒ Original Report	900MHz Floating Wireless Speaker

Test Engineer:	Kidd Yang
Report No.:	RSZ08042204
Test Date:	2008-04-28 to 2008-05-01
Report Date:	2008-05-05
Reviewed By:	EMC Manager: Green Xu
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Acoustic Arc International Ltd.*'s product, model number: AS0850 *t*he "EUT" as referred to in this report is a *900MHz Floating wireless speaker,* which measures approximately 12.5 cmL x 8.5 cmW x 9.0cmH, rated input voltage: DC 6V adapter and DC 6V Battery.

AC/DC Adapter:
Manufacturer: Acoustic Arc International Ltd.
Model: D6300
Input: 120V AC/60Hz 9W
Output: 6V DC 300mA

** All measurement and test data in this report was gathered from production sample serial number: 0804048 (Assigned by BACL, Shenzhen). The EUT was received on 2008-04-22.*

Objective

This Type approval report is prepared on behalf of *Acoustic Arc International Ltd.* 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 Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in 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 November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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 a National Institute of Standards and Technology (NIST) accredited laboratory, under the 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

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modifications were made to the unit tested.

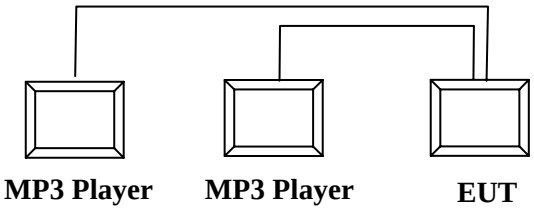
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
BLUEUSB	MP3 Player	N/A	N/A	DoC
IPOD	MP3 Player	N/A	N/A	DoC

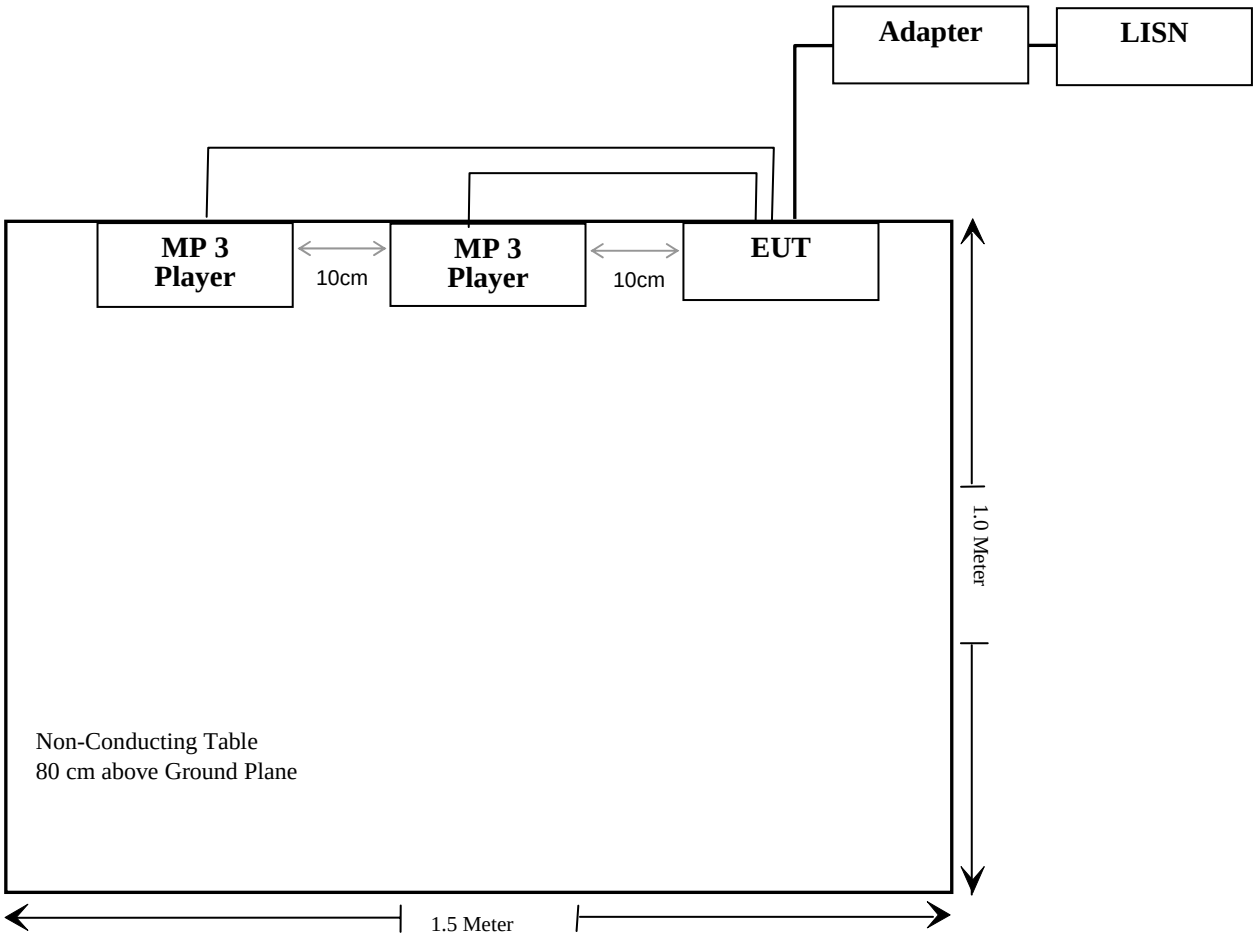
External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Audio Cable	1.54	MP 3 Player	EUT
Unshielded Detachable DC Power Cable	1.87	Adapter	EUT

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
§15.205(a), §15.209(a), 15.249(a), §15.249(c)	Radiated Emissions	Compliant
§15.249(d)	Out of Band Emissions	Compliant

§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §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 antenna is a permanently attached antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

Result: Compliant.

Please refer to the EUT internal photos.

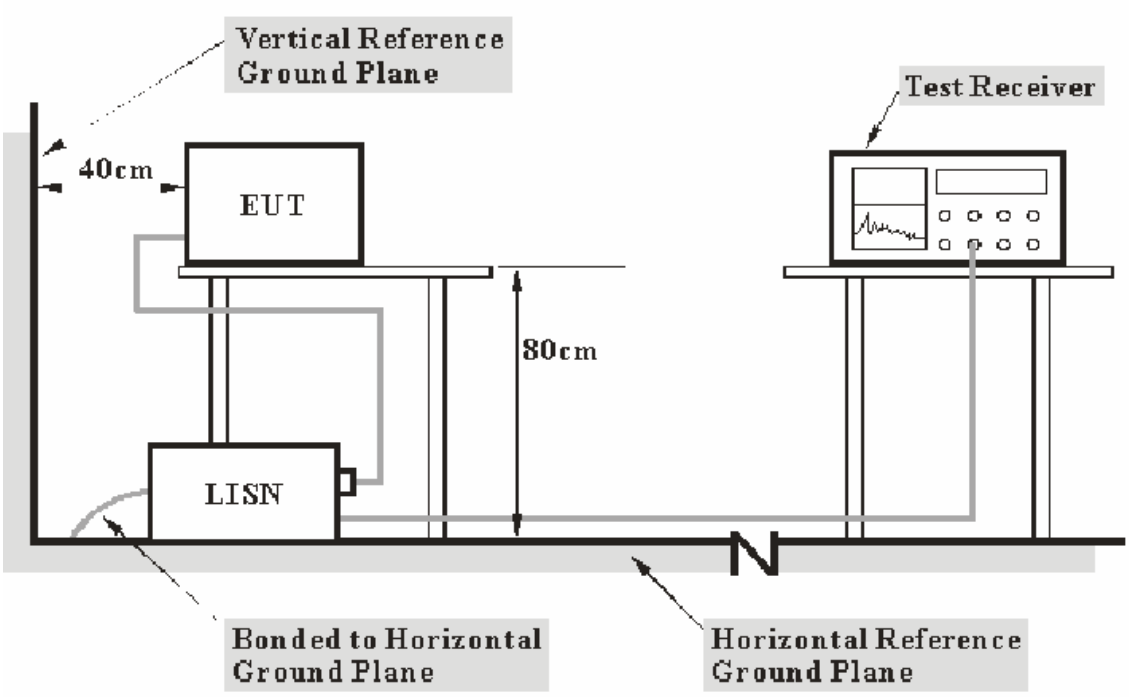
§15.207 - CONDUCTED EMISSIONS

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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ±2.4 dB.

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 C63.4-2003 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 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:

Frequency Range	***IFBW***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

***** Com-Power's LISN were used as the supporting equipment.
*** 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 Procedure

During the conducted emission test, the adapter was connected to the outlet of 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:

16.30 dB at **1.285 MHz** in the **Neutral** conductor mode

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

The testing was performed by Kidd Yang on 2008-04-28.

Test Mode: Transmitting

Line Conducted Emissions				FCC Part15 .207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Hot/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
1.285	29.70	AV	Neutral	46.00	16.30
1.285	37.20	QP	Neutral	56.00	18.80
1.285	23.60	AV	Hot	46.00	22.40
1.285	28.80	QP	Hot	56.00	27.20
0.700	25.50	QP	Neutral	56.00	30.50
0.240	21.50	AV	Neutral	52.10	30.60
0.700	14.60	AV	Neutral	46.00	31.40
0.215	21.30	AV	Neutral	53.01	31.71
0.240	20.20	AV	Hot	52.10	31.90
0.240	30.00	QP	Hot	62.10	32.10
0.240	29.00	QP	Neutral	62.10	33.10
0.845	22.70	QP	Hot	56.00	33.30
0.210	19.20	AV	Hot	53.21	34.01
0.210	28.90	QP	Hot	63.21	34.31
0.215	28.40	QP	Neutral	63.01	34.61
0.845	10.80	AV	Hot	46.00	35.20
29.995	9.30	AV	Neutral	50.00	40.70
29.995	8.50	AV	Hot	50.00	41.50
7.185	8.10	AV	Neutral	50.00	41.90
29.800	17.90	QP	Hot	60.00	42.10
7.445	7.10	AV	Hot	50.00	42.90
29.800	16.20	QP	Neutral	60.00	43.80
7.185	14.80	QP	Neutral	60.00	45.20
7.445	13.60	QP	Hot	60.00	46.40

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

Conducted Emission Test

28. Apr 08 22:30

FCC Part 15

EUT: 900MHz Floating wireless speaker
Manuf: Acoustic Arc

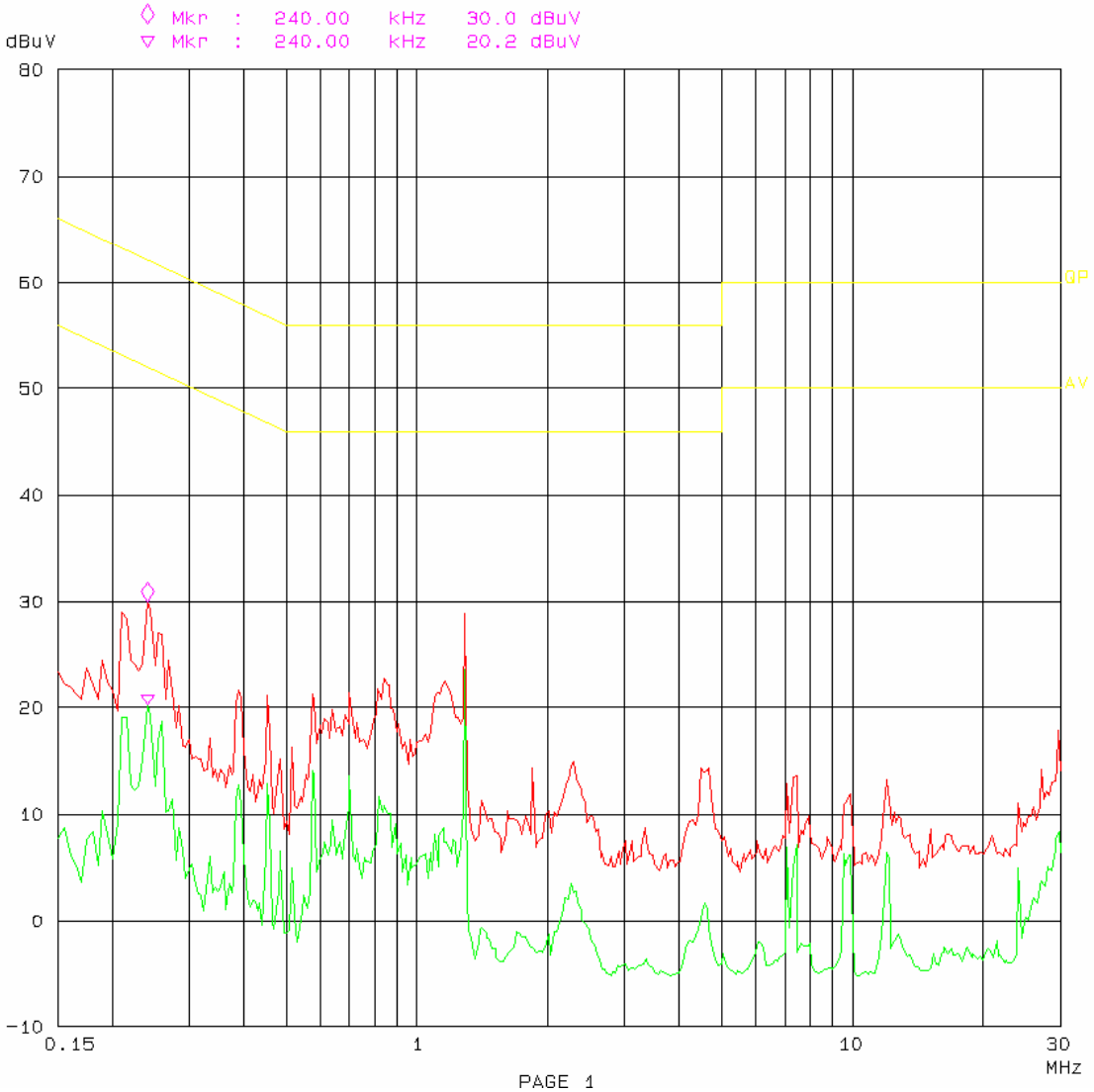
Operator: Kidd
Test Spec: AC 120V/60Hz Hot
Comment: Temp: 26 Humi: 56%

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	PK+AV	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 8
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
5	150k	30M	ESH2_Z5



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Conducted Emission Test

28. Apr 08 22:07

FCC Part 15

EUT: 900MHz Floating wireless speaker
Manuf: Acoustic Arc

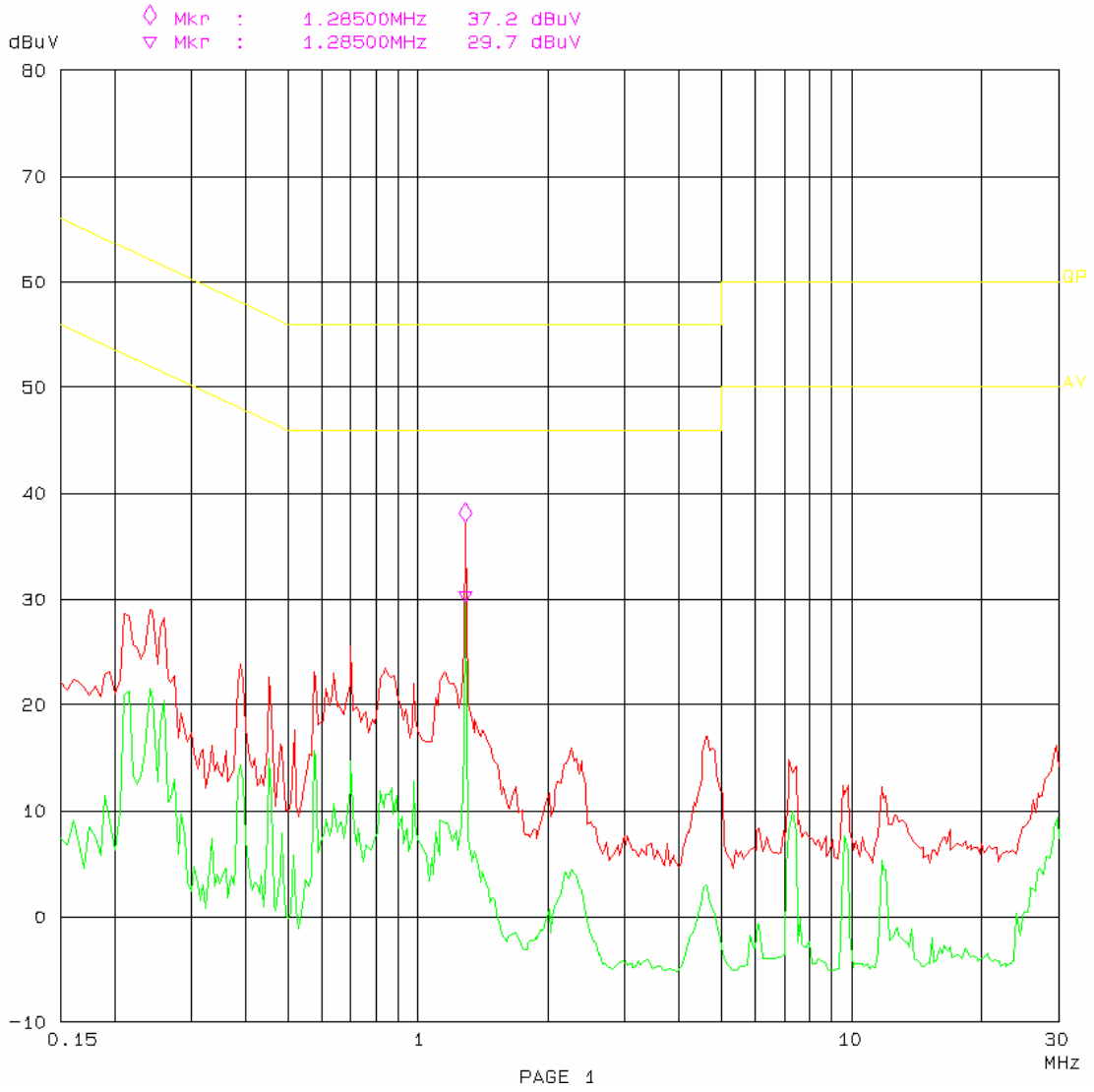
Operator: Kidd
Test Spec: AC 120V/60Hz N
Comment: Temp: 26 Humi: 56%

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	PK+AV	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 8
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
5	150k	30M	ESH2_Z5



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§15.205(a) §15.209(a) §15.249(a) §15.249(d) - RADIATED EMISSIONS

Applicable Standard

As per §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 §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 NIS 81, 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:

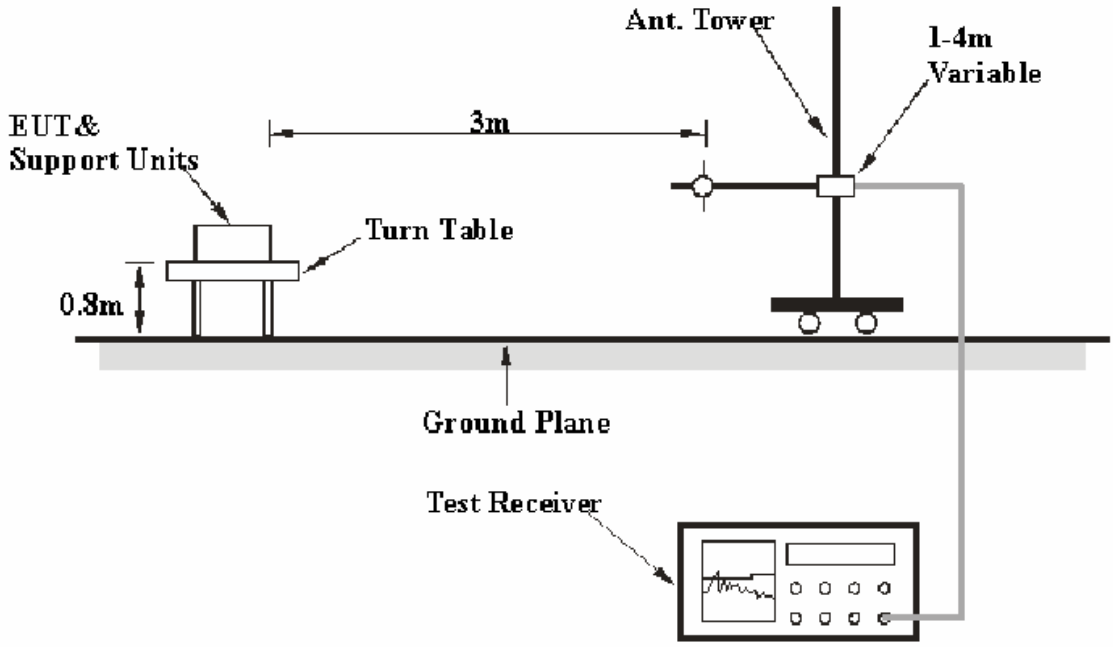
Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2007-10-16	2008-10-16
HP	Amplifier	8447E	1937A01046	2007-11-15	2008-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
R&S	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09

*** 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 Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

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 meter, 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss- Amplifier Gain

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

Margin = Limit - Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.249, with the worst margin reading of:

30-1000MHz:

0.2 dB at **897.261725 MHz** in the **Vertical** polarization, **Channel 1**
0.7 dB at **928.679800 MHz** in the **Vertical** polarization, **Channel 3**

Above 1GHz:

3.87 dB at **912.50 MHz** in the **Horizontal** polarization, **Channel 1**
3.53 dB at **913.50 MHz** in the **Horizontal** polarization, **Channel 3**

Test Data

Environmental Conditions

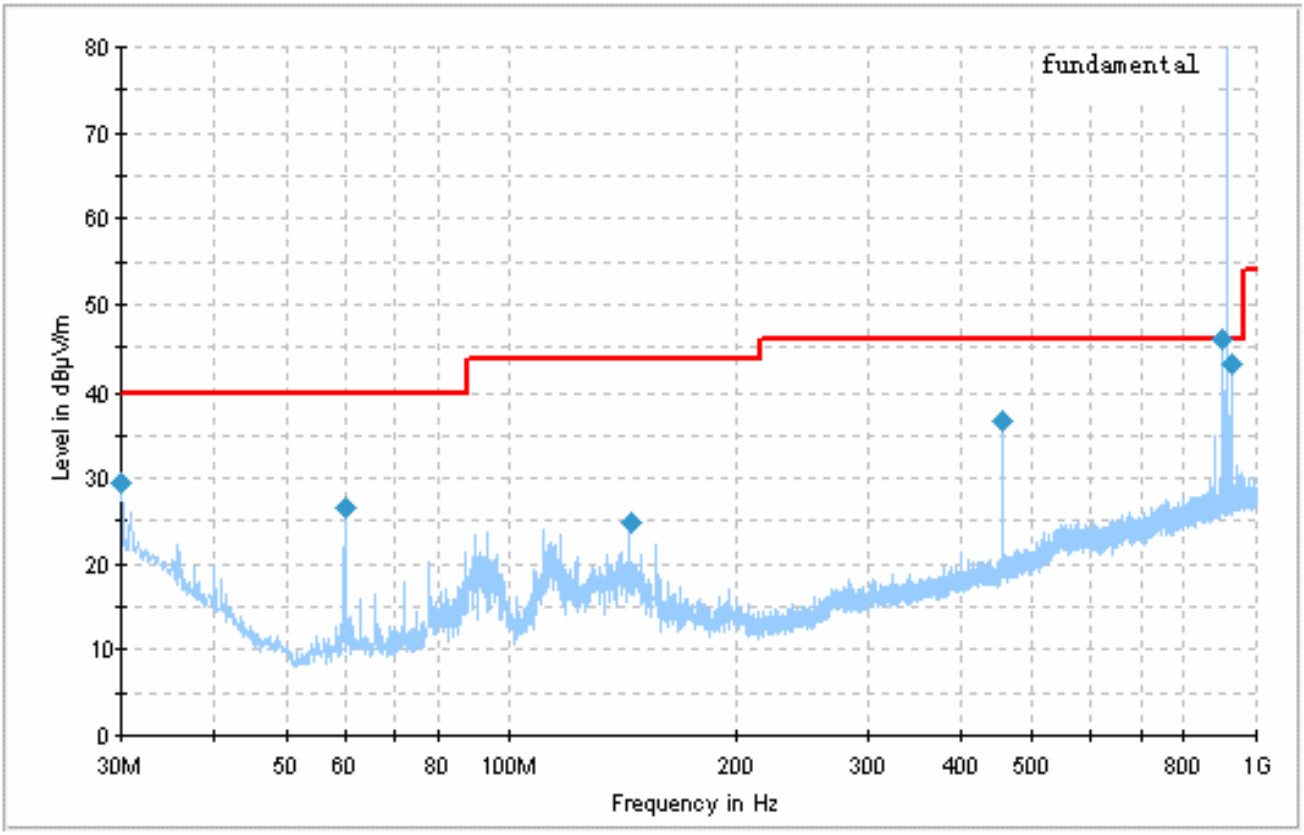
Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	100.9kPa

The testing was performed by Kidd Yang on 2008-04-28.

30-1000 MHz:

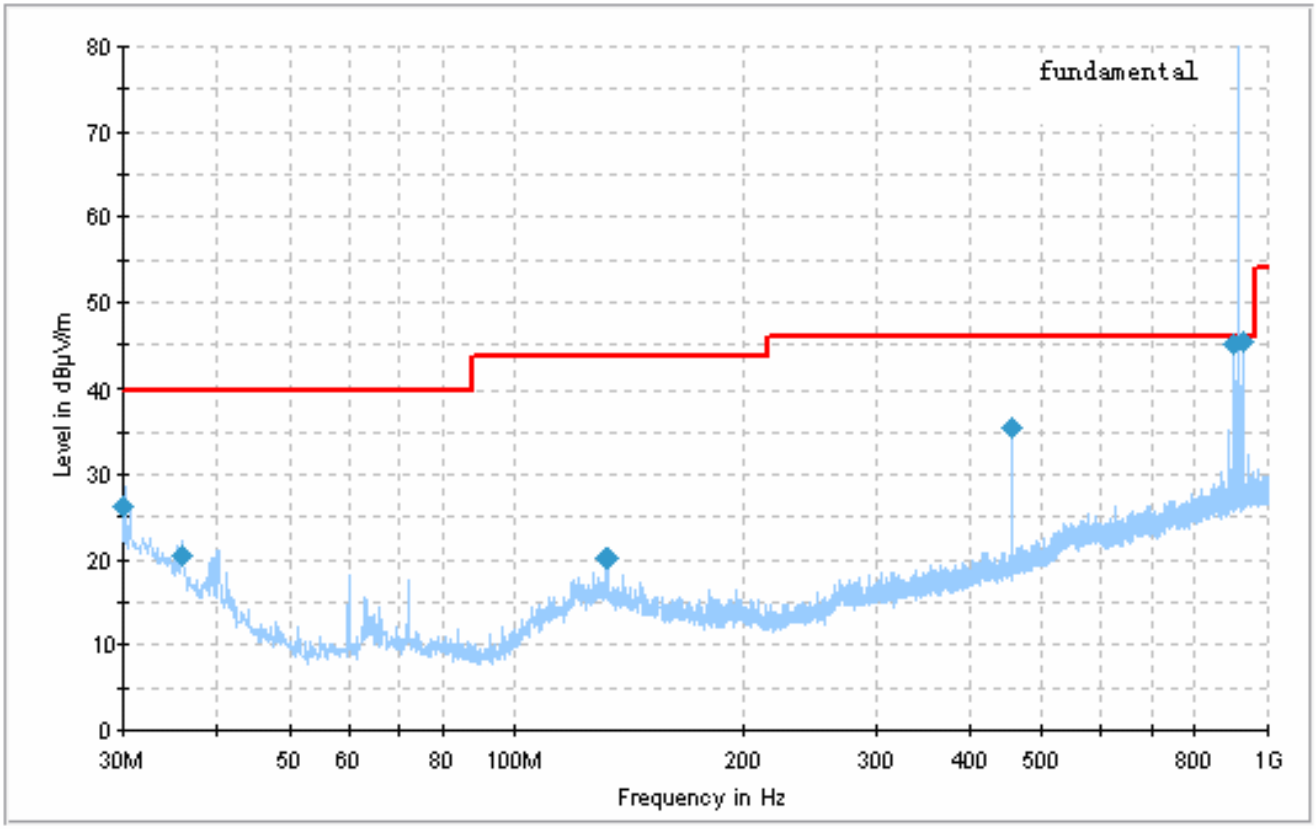
Test Mode: Transmitting

Channel 1



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
897.261725	45.8	306.0	V	45.0	1.2	46.0	0.2*
927.659550	42.9	235.0	V	320.0	1.5	46.0	3.1*
456.329575	36.7	210.0	V	282.0	-7.1	46.0	9.3
30.021638	29.6	333.0	V	0.0	-4.0	40.0	10.4
60.084950	26.6	129.0	V	272.0	-17.3	40.0	13.4
143.975000	24.9	274.0	V	15.0	1.2	43.5	18.6

Channel 3



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
928.679800	45.3	358.0	V	3.0	1.5	46.0	0.7*
898.264575	45.1	206.0	V	298.0	1.3	46.0	0.9*
456.735450	35.4	211.0	V	0.0	-7.1	46.0	10.6
30.085672	26.2	170.0	V	0.0	-4.0	40.0	13.8
36.000425	20.6	177.0	V	227.0	-8.2	40.0	19.4
131.971250	20.2	325.0	H	0.0	1.2	43.5	23.3

Above 1GHz:

Freq. (MHz)	Meter Reading (dBµV)	Detector PK/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.209 & 15.249		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
Channel 1												
912.50	94.90	QP	230	1.2	H	20.4	0.38	25.55	90.13	94	3.87	Fund.
912.50	93.86	QP	358	1.3	V	20.4	0.38	25.55	89.09	94	4.91	Fund.
1825.0	41.51	AV	180	1.6	V	27.5	2.82	34.8	37.03	54	16.97	Harmonic
2737.5	36.85	AV	45	1	V	29.2	4.22	34.0	36.27	54	17.73	Harmonic
2737.5	36.36	AV	268	1.5	H	29.2	4.22	34.0	35.78	54	18.22	Harmonic
1825.0	40.21	AV	270	1.6	H	27.5	2.82	34.8	35.73	54	18.27	Harmonic
3650.0	34.25	AV	20	1.2	V	30.5	4.04	33.8	34.99	54	19.01	Harmonic
3650.0	33.82	AV	18	1.6	H	30.5	4.04	33.8	34.56	54	19.44	Harmonic
2737.5	47.15	PK	49	1.2	V	29.2	4.22	34.0	46.57	74	27.43	Harmonic
1825.0	50.25	PK	360	1.6	V	27.5	2.82	34.8	45.77	74	28.23	Harmonic
2737.5	46.20	PK	263	1.5	H	29.2	4.22	34.0	45.62	74	28.38	Harmonic
3650.0	44.62	PK	263	1.4	V	30.5	4.04	33.8	45.36	74	28.64	Harmonic
3650.0	43.68	PK	250	1	H	30.5	4.04	33.8	44.42	74	29.58	Harmonic
1825.0	48.36	PK	268	1.6	H	27.5	2.82	34.8	43.88	74	30.12	Harmonic
Channel 3												
913.50	95.24	QP	360	1.6	H	20.4	0.38	25.55	90.47	94	3.53	Fund.
913.50	94.83	QP	260	1.2	V	20.4	0.38	25.55	90.06	94	3.94	Fund.
1827.0	42.86	AV	250	1.0	V	27.5	2.82	34.8	38.38	54	15.62	Harmonic
2740.5	38.78	AV	268	1.6	V	29.2	4.22	34.0	38.2	54	15.8	Harmonic
2740.5	38.21	AV	49	1.2	H	29.2	4.22	34.0	37.63	54	16.37	Harmonic
3654.0	35.62	AV	18	1.6	H	30.5	4.04	33.8	36.36	54	17.64	Harmonic
1827.0	39.62	AV	270	1.6	H	27.5	2.82	34.8	35.14	54	18.86	Harmonic
3654.0	32.95	AV	20	1.2	V	30.5	4.04	33.8	33.69	54	20.31	Harmonic
2740.5	48.69	PK	230	1.8	V	29.2	4.22	34.0	48.11	74	25.89	Harmonic
1827.0	51.24	PK	45	1.0	V	27.5	2.82	34.8	46.76	74	27.24	Harmonic
2740.5	47.25	PK	358	1.3	H	29.2	4.22	34.0	46.67	74	27.33	Harmonic
3654.0	44.52	PK	168	1.6	H	30.5	4.04	33.8	45.26	74	28.74	Harmonic
1827.0	47.69	PK	180	1.6	H	27.5	2.82	34.8	43.21	74	30.79	Harmonic
3654.0	42.24	PK	263	1.4	V	30.5	4.04	33.8	42.98	74	31.02	Harmonic

§15.249(d) – OUT OF BAND EMISSIONS

Applicable Standard

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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

3. Set the RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including the specified frequencies of band edges.

4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2007-10-16	2008-10-16
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) Corp. 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:	53%
ATM Pressure:	100.9kPa

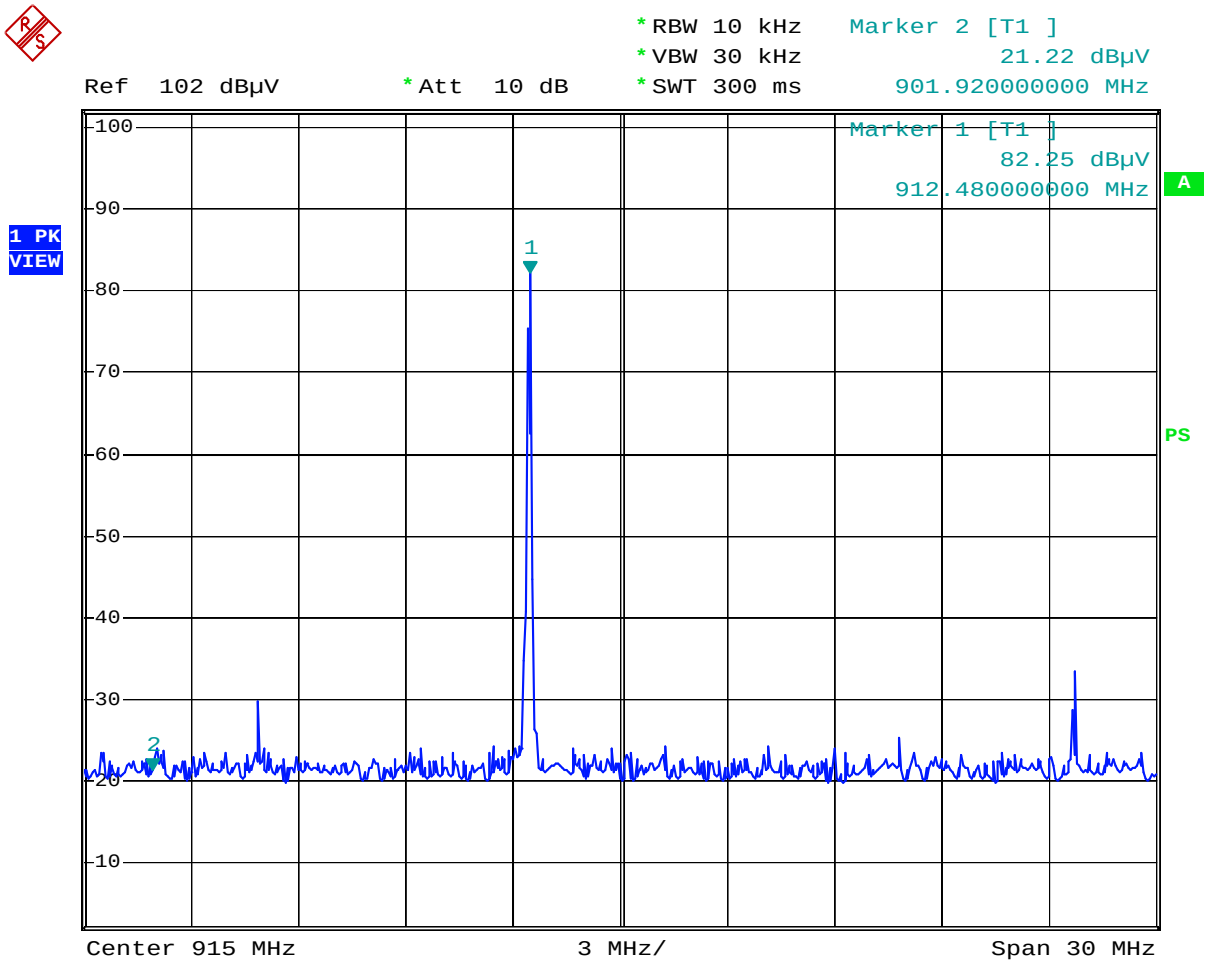
The testing was performed by Kidd Yang on 2008-05-01.

Test mode: Transmitting

Test Result: Compliant.

Please refer to following plots.

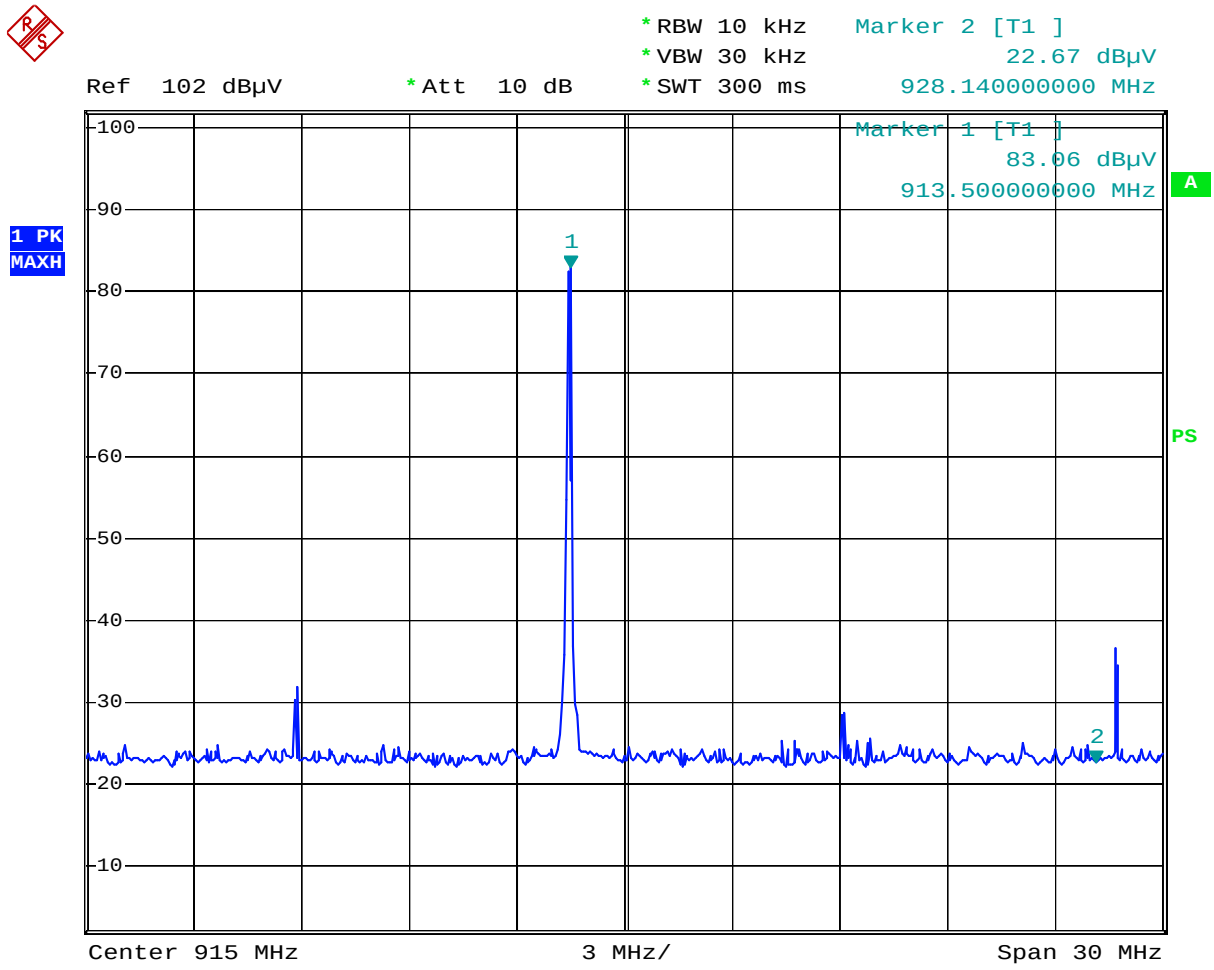
Lowest Channel



Frequency Range Left Side

Date: 1.MAY.2008 04:02:34

Highest Channel



Frequency Range Right Side

Date: 1.MAY.2008 04:06:20

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