



FCC PART 15D

TEST REPORT

For

SAMSUNG TECHWIN CO., LTD.

42 Seongju-Dong Kyungsangnam-do, Changwon-si, South Korea

FCC ID: NLMSEW2001WP

<b>Report Type:</b> Original Report	<b>Product Type:</b> Baby Audio Monitor
<b>Test Engineer:</b> Eric Lee	<i>Eric Lee</i>
<b>Report Number:</b> RSZ111108005-00B	
<b>Report Date:</b> 2011-11-25	
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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

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### Product Description for Equipment Under Test (EUT)

The *SAMSUNG TECHWIN CO., LTD*'s product, model number: *SEW-2001W(PU1)* (FCC ID: *NLMSEW2001WP*) (the "EUT") in this report is a parent unit of Baby Audio Monitor, which was measured approximately: 12.5 cm (L) x 7.5 cm (W) x 4.0 cm (H), input voltage: DC 2.4V rechargeable AAA 500mAh NimH battery pack or DC 5V adapter.

Adapter 1 information: AC ADAPTOR  
Model: AK075G-0500060U  
Input: 100-240VAC 50/60Hz 0.35A  
Output: 5VDC 0.6A

Adapter 2 information: AC ADAPTER  
Model: 5E-AD050060-U  
Input: 100-240VAC 50/60Hz 0.15A  
Output: 5VDC 0.6A

*Note: The series product, model SEW-2002W (PU2) is electrically identical with the model SEW-2001W (PU1) that was certificated by BACL, and the difference between them was explained for details in the attached declaration letter.*

*\* All measurement and test data in this report was gathered from production sample serial number: C85069MBB00001W or C87T69MBB00001W (Assigned by applicant). The EUT was received on 2011-11-08.*

### Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.17 - 2006, and ANSI C64.3 2009.

The tests were performed in order to determine compliance with FCC Part 15, Subpart D, and section 15.203, 15.315, 15.317, 15.319 and 15.323 rules.

### Related Submittal(s)/Grant(s)

FCC Part 15D submission of baby unit submissions with FCC ID: NLMSEW2001WB.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2006, 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 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 test mode which is provided by the manufacturer.

### Equipment Modifications

No modification was made to the unit tested.

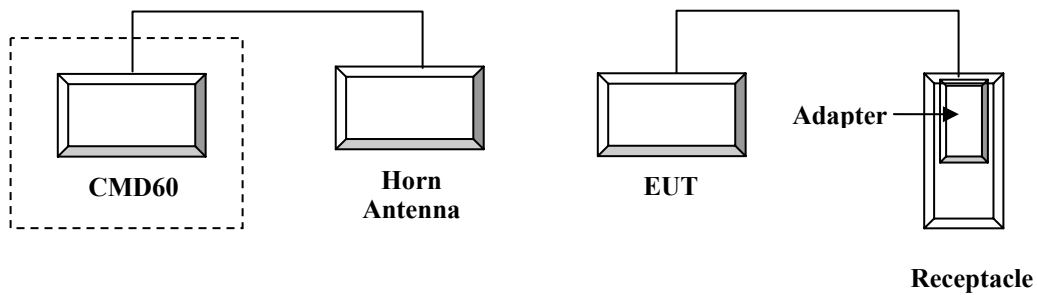
### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R & S	Digital Radio-Communication Tester	CMD60	829902/026

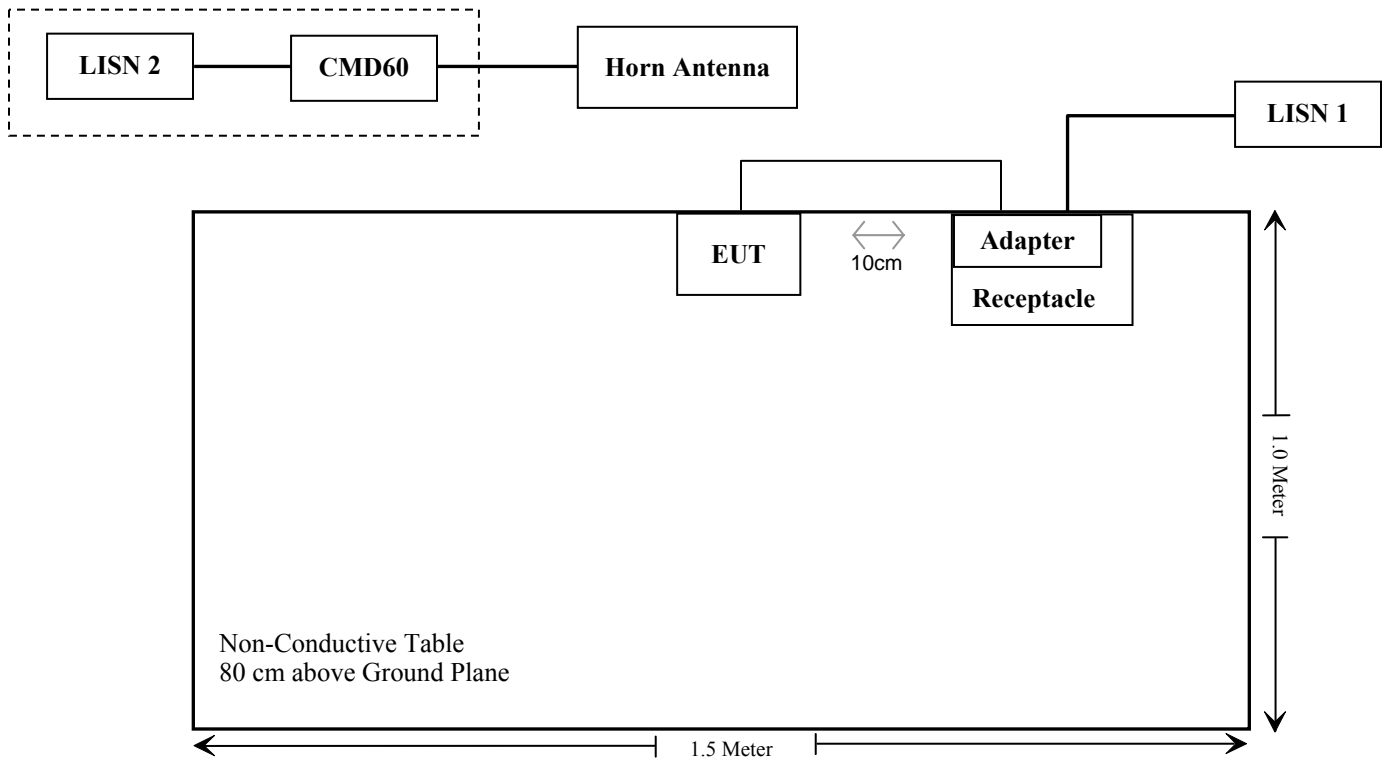
### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detectable DC Power Cable	1.5	EUT	Adapter

### Configuration of Test Setup



### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§ 15.319 (i), 2.1093	RF Radiation Exposure	Compliance
§ 15.317, § 15.203	Antenna Requirement	Compliance
§ 15.315, § 15.207	Conducted Emission	Compliance
§ 15.323 (a)	Emission Bandwidth	Compliance
§ 15.319 (c)	Peak Transmit Power	Compliance
§ 15.319 (d)	Power Spectral Density	Compliance
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliance
§ 15.319 (g)	Radiated Emission	Compliance
§ 15.323 (f)	Frequency Stability Handset	Compliance
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliance



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## **FCC §15.319 (i) & §2.1093 - RF EXPOSURE**

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### **Applicable Standard**

According to FCC §15.319 (i) Unlicensed PCS devices are subject to the radiofrequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a general population/uncontrolled environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to FCC KDB 447498 D01 Mobile Portable RF Exposure v04 1) c): Unless excluded by specific FCC test procedures, portable devices with output power  $> 60/f$  (GHz) mW shall include SAR data for equipment approval.

### **RF Exposure Evaluation**

Max Peak output power: 1924.992 MHz: 16.02 dBm = 39.994 mW

Duty Cycle =  $T_{on}/T_p = 4.09\%$

The source-based average power =  $39.994 \text{ mW} \times 4.09\% = 1.64 \text{ mW}$

$60/f(\text{GHz}) = 60/1.924992 = 31.17 \text{ mW}$

The source-based average power is less than  $60/f(\text{GHz})$

So the SAR evaluation can be exempted.

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## **FCC §15.317 & §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

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 with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **Antenna Connector Construction**

This product has a monopole antenna which permanently affixed on RF module, the maximum gain is 0 dBi, fulfill the requirement of this section. The details please refer to the internal photos of EUT.

**Result:** Compliance.

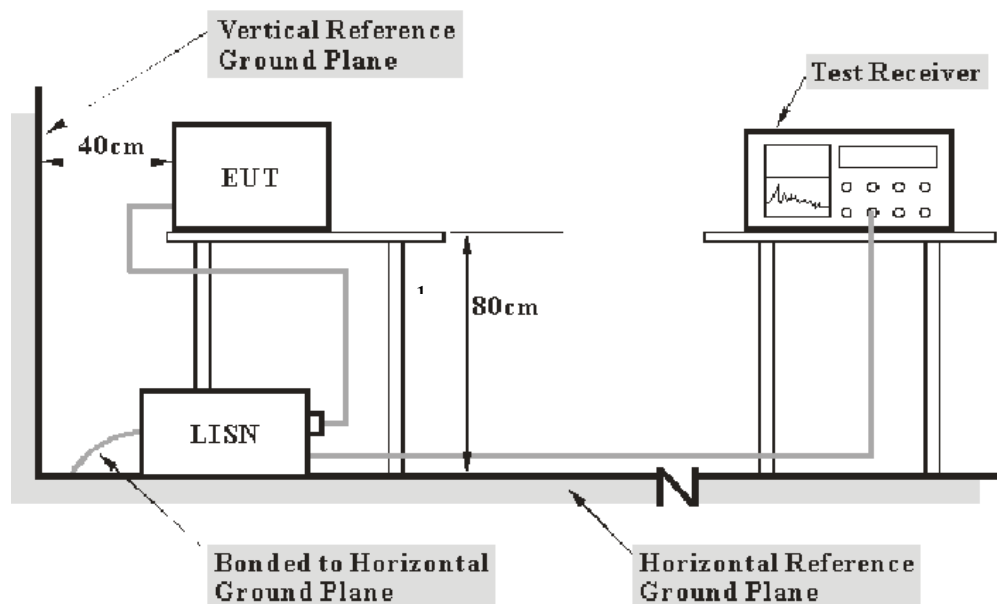
## FCC §15.315 & §15.207 - CONDUCTED EMISSIONS

### 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  $\pm 2.4$  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 15.315 and FCC 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

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 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:

**16.49 dB at 0.640 MHz** in the **Neutral** conducted mode for adapter 1

## Test Data

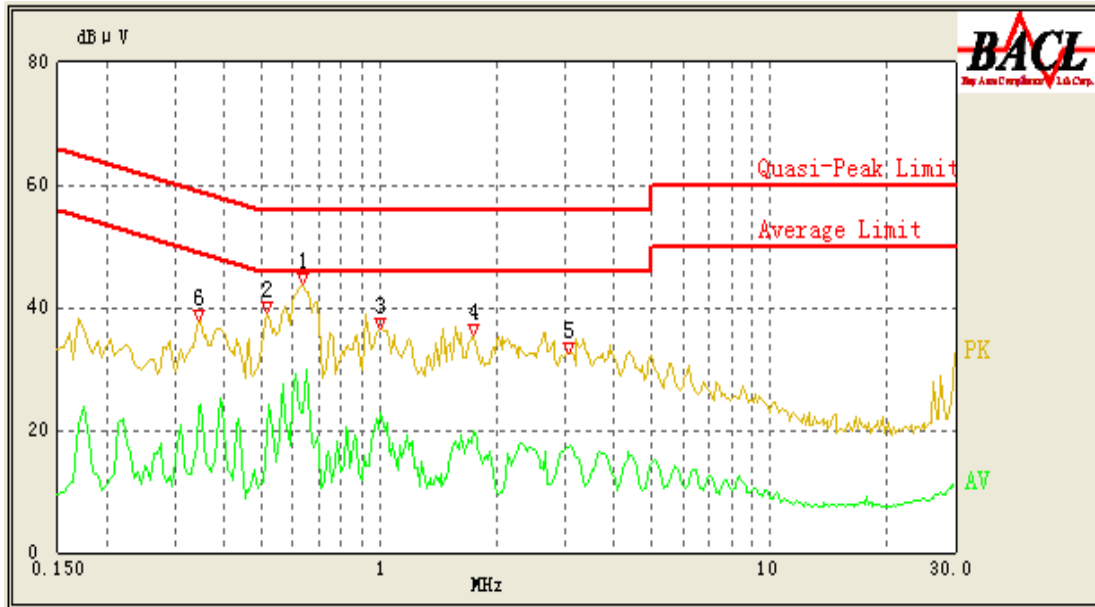
### Environmental Conditions

<b>Temperature:</b>	20 ° C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

*The testing was performed by Eric Lee on 2011-11-12.*

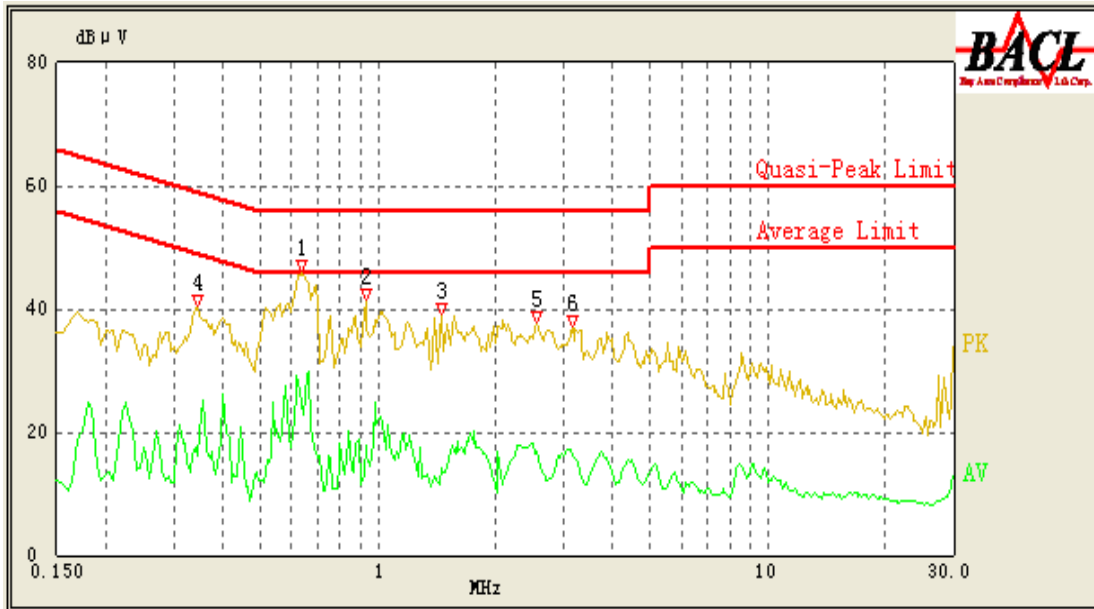
Test Mode: Transmitting (Adapter 1)

120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.635	36.19	10.23	56.00	19.81	QP
0.520	24.10	10.23	46.00	21.90	Ave.
3.055	27.08	10.42	56.00	28.92	QP
3.060	17.16	10.43	46.00	28.84	Ave.
0.345	33.70	10.23	60.43	26.73	QP
0.345	23.68	10.23	50.43	26.75	Ave.
1.730	17.93	10.31	46.00	28.07	Ave.
1.010	31.92	10.24	56.00	24.08	QP
0.630	22.76	10.23	46.00	23.24	Ave.
1.000	22.69	10.24	46.00	23.31	Ave.
0.515	32.63	10.23	56.00	23.37	QP
1.735	29.89	10.31	56.00	26.11	QP

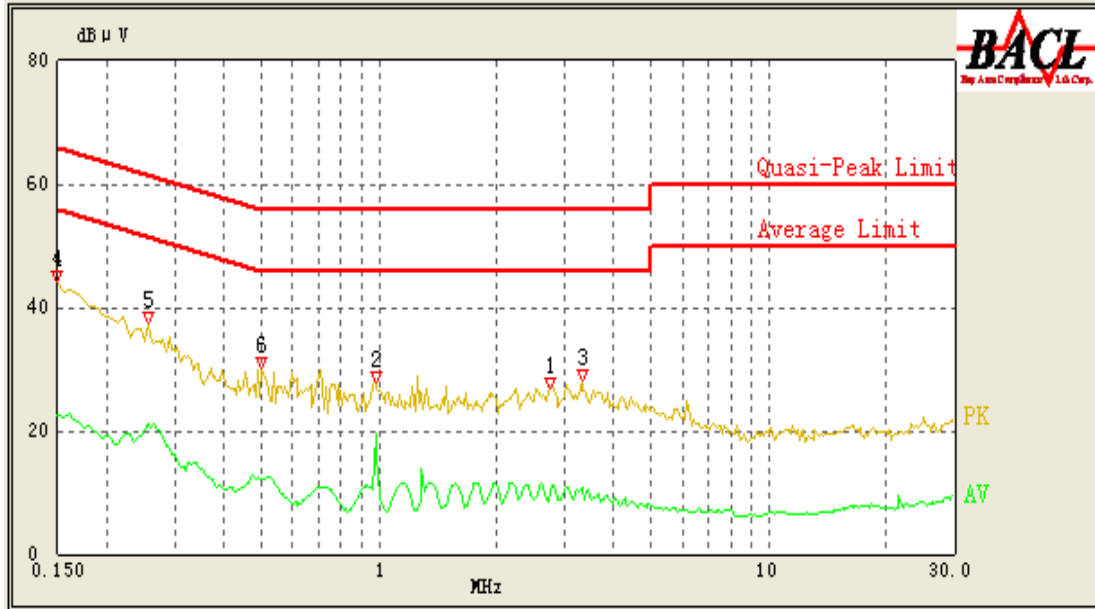
**120V/ 60 Hz, Neutral:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.640	39.51	10.23	56.00	16.49	QP
0.640	24.65	10.23	46.00	21.35	Ave.
0.930	30.98	10.24	56.00	25.02	QP
1.455	30.19	10.28	56.00	25.81	QP
0.345	33.82	10.23	60.43	26.61	QP
3.145	28.83	10.43	56.00	27.17	QP
2.555	27.77	10.38	56.00	28.23	QP
0.930	17.71	10.24	46.00	28.29	Ave.
3.115	17.32	10.43	46.00	28.68	Ave.
2.555	16.78	10.38	46.00	29.22	Ave.
1.460	14.15	10.28	46.00	31.85	Ave.
0.345	16.21	10.23	50.43	34.22	Ave.

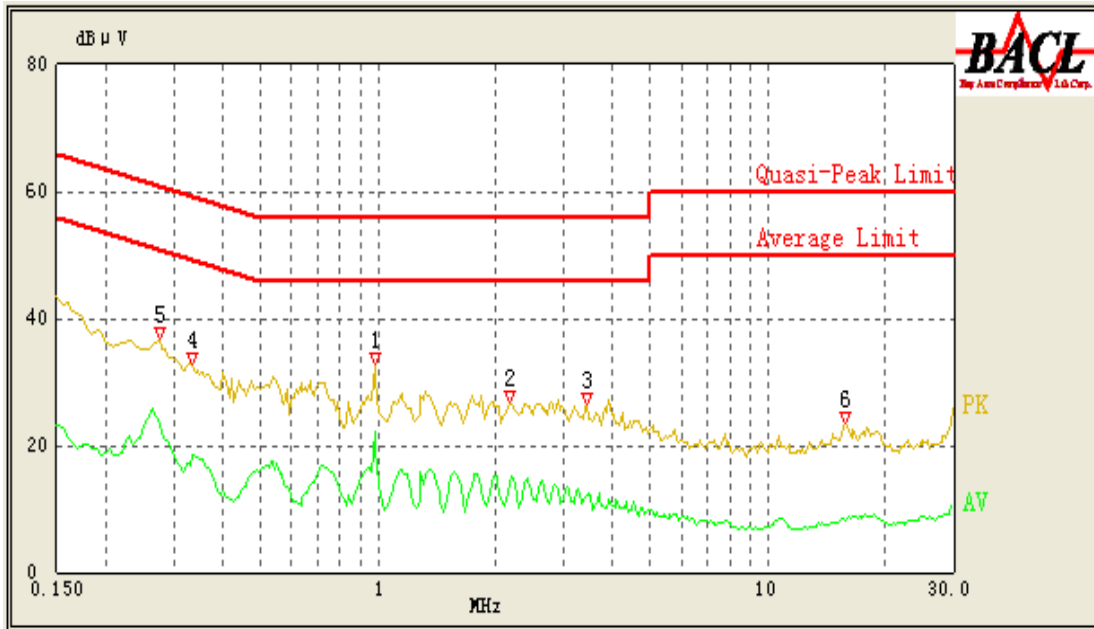
Test Mode: Transmitting (Adapter 2)

120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.980	19.39	10.24	46.00	26.61	Ave.
0.150	37.48	10.23	66.00	28.52	QP
0.255	31.17	10.23	63.00	31.83	QP
0.255	21.03	10.23	53.00	31.97	Ave.
0.980	23.76	10.24	56.00	32.24	QP
0.150	22.61	10.23	56.00	33.39	Ave.
0.500	12.01	10.23	46.00	33.99	Ave.
3.320	10.68	10.45	46.00	35.32	Ave.
2.760	9.73	10.40	46.00	36.27	Ave.
0.500	19.58	10.23	56.00	36.42	QP
3.320	19.24	10.45	56.00	36.76	QP
2.755	19.02	10.40	56.00	36.98	QP

**120V/ 60 Hz, Neutral:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.980	22.17	10.24	46.00	23.83	Ave.
0.980	27.95	10.24	56.00	28.05	QP
0.275	23.64	10.23	52.43	28.79	Ave.
0.275	31.90	10.23	62.43	30.53	QP
2.170	14.15	10.35	46.00	31.85	Ave.
0.335	18.40	10.23	50.71	32.31	Ave.
0.335	27.59	10.23	60.71	33.12	QP
3.460	12.46	10.46	46.00	33.54	Ave.
2.175	21.85	10.35	56.00	34.15	QP
3.425	19.85	10.46	56.00	36.15	QP
15.820	8.21	11.45	50.00	41.79	Ave.
15.835	12.40	11.46	60.00	47.60	QP

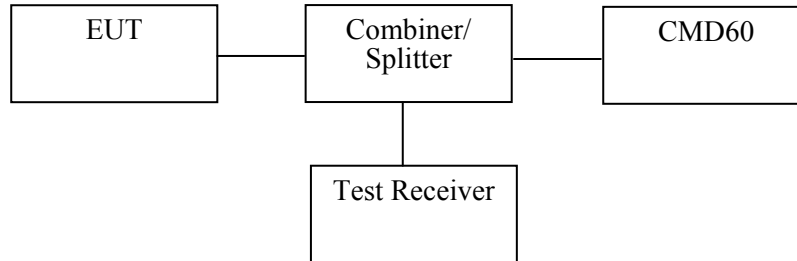


## FCC §15.323 (a) - EMISSION BANDWIDTH

### Applicable Standard

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below

Test Setup 1:



The width, in Hz, of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that is 26 dB down relative to the maximum level of the modulated carrier. It is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1% of the emission band-width of the device under measurement. [Extraction from 47 CFR 15, subpart D, 15.303 (C)].

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

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

### Test Procedure

Using the manufacturer’s information on occupied bandwidth set the spectrum analyzer as follows:

Resolution bandwidth	1.0% of the emission bandwidth (as close as possible)
Video bandwidth	>3 times the resolution bandwidth
Number of sweeps	sufficient to stability the trace
Detection mode	peak detection with maximum hold

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	20 ° C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

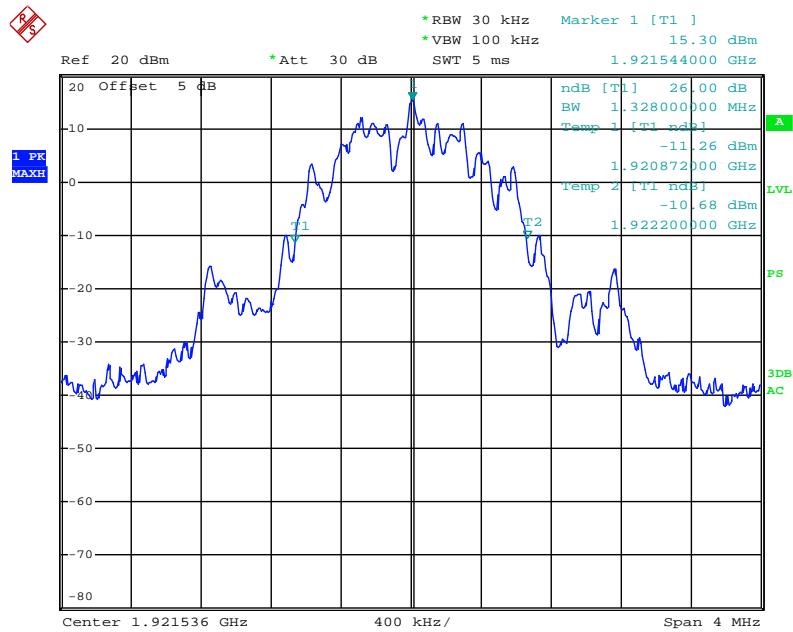
The testing was performed by Eric Lee on 2011-11-17.

Test Mode: Transmitting

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	Limit
Low	1921.536	1.328	50 kHz < OBW <2.5 MHz
Middle	1924.992	1.328	50 kHz < OBW <2.5 MHz
High	1928.448	1.328	50 kHz < OBW <2.5 MHz

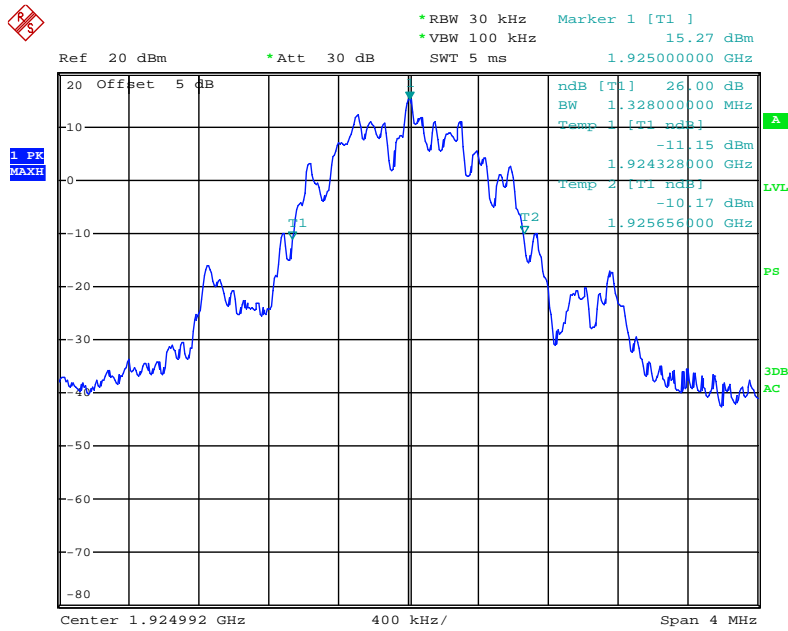
Test Result: Pass, please refer to the attached plots.

Low Channel



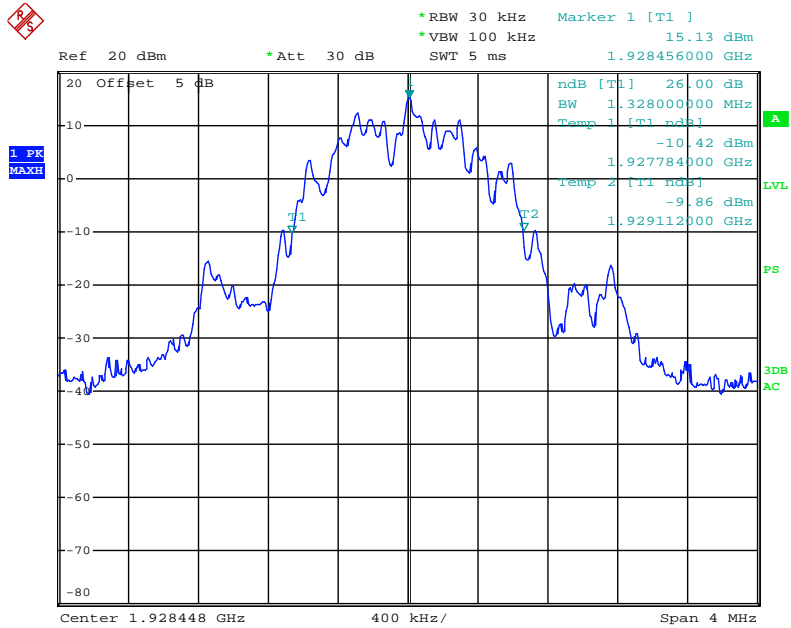
Date: 17.NOV.2011 11:11:33

### Middle Channel



Date: 17.NOV.2011 11:10:11

### High Channel



Date: 17.NOV.2011 11:08:45

## FCC §15.319 (c) - PEAK TRANSMIT POWER

### Applicable Standard

The peak power output as measured over an interval of time equal to the transmission-burst duration of the device under all conditions of modulation. [47 CFR 15, subpart D, 15.303 (f)].

### Part 15.323(a) & Part 15.319(c) Peak Transmit Power:

The limit for Peak Transmit Power (PTP) is calculated using the following formula:

$$PTP = 100 \mu W \times (EBW)^{1/2}$$

EBW is the transmit emission bandwidth in Hz determined in the other test item:

The peak transmitter power is measured in accordance with ANSI C63.17-2006 Clause 6.1.2.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

### Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	≥ Emission bandwidth
Video bandwidth	≥ RBW
Span	Zero
Center frequency	Nominal center frequency of channels
Amplitude scale	Log (linear may be used if analyzer has sufficient linear dynamic range and accuracy)
Detection	Peak detection
Trigger	Video
Sweep rate	Sufficiently rapid to permit the transmit pulse to be resolved accurately

### Test Data

#### Environmental Conditions

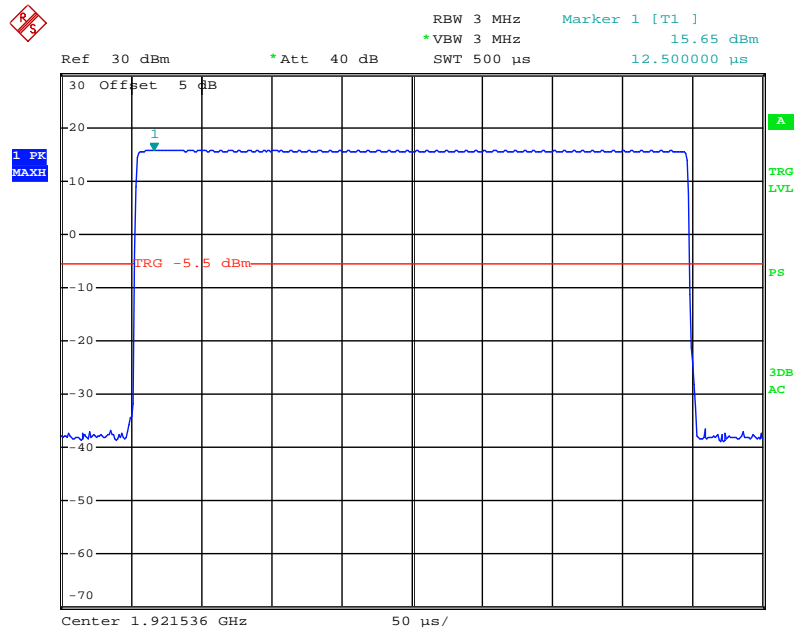
Temperature:	20 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

*The testing was performed by Eric Lee on 2011-11-09.*

**Test Result:** Pass; please refer to the following table and plots.

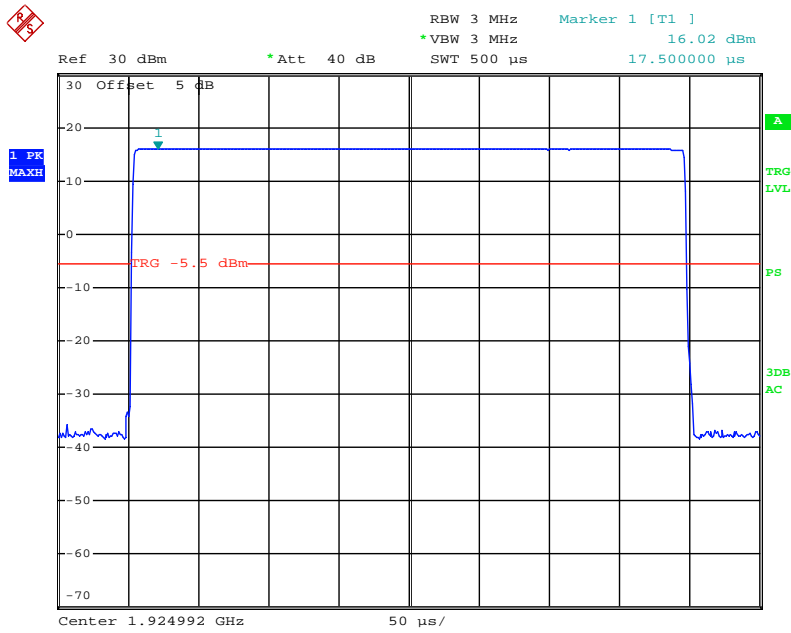
Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	15.65	20.62
1924.992	16.02	20.62
1928.448	15.59	20.62

**Low Channel**



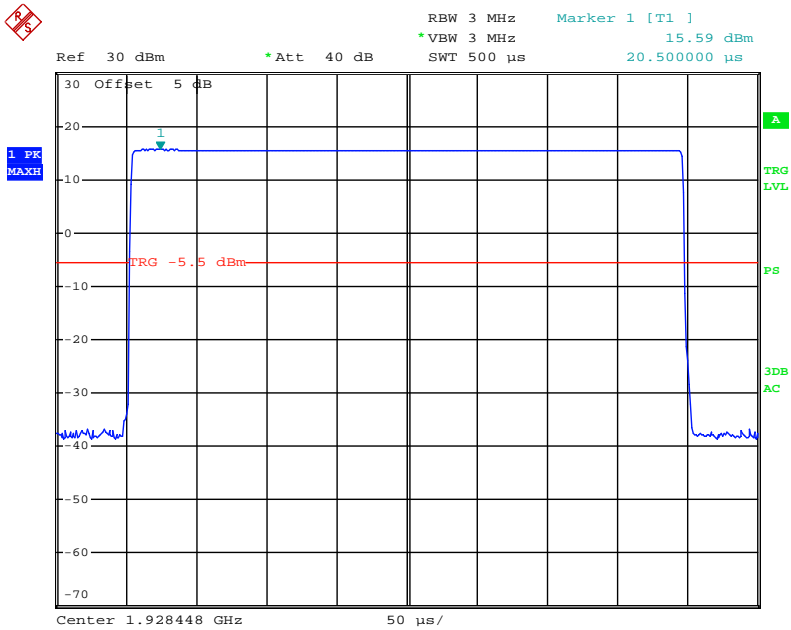
Date: 9.NOV.2011 10:16:55

### Middle Channel



Date: 9.NOV.2011 10:13:45

### High Channel



Date: 9.NOV.2011 10:15:50

## FCC §15.319 (d) - POWER SPECTRAL DENSITY

### Applicable Standard

The average pulse energy in a 3 kHz bandwidth is divided by the pulse duration.

The power spectral density shall not exceed 3mW in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

The power spectral density is measured in accordance with ANSI C63.17.2006 Clause 6.1.5.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

### Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	3kHz
Video bandwidth	$\geq 3 \times \text{RBW}$
Span	Zero span at frequency with the maximum level (frequency determined in 6.1.3 if the same type of signal (continuous versus burst) was used in 6.1.3)
Center frequency	Spectral peak as determined in 6.1.3
Sweep time	For burst signals, sufficient to include essentially all of the maximum length burst at the output of a 3 kHz filter (e.g., maximum input burst duration plus 600 $\mu$ s). For continuous signals, 20 ms.
Amplitude scale	Log power
Detection	Sample detection and averaged for a minimum of 100 sweeps
Trigger	External or internal

### Test Data

#### Environmental Conditions

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

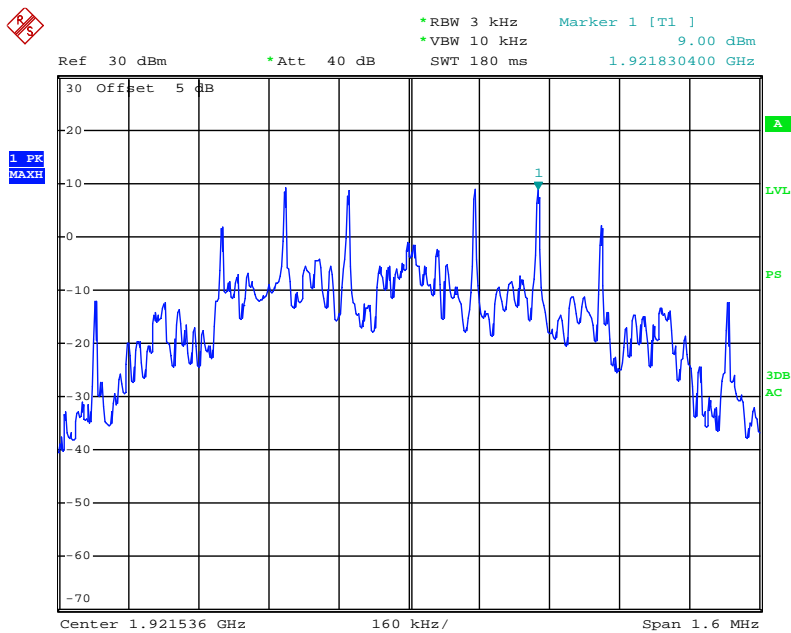
*The testing was performed by Eric Lee on 2011-11-10.*

*Test Mode: Transmitting*

**Test Result:** Compliance, please refer to following tables and plots

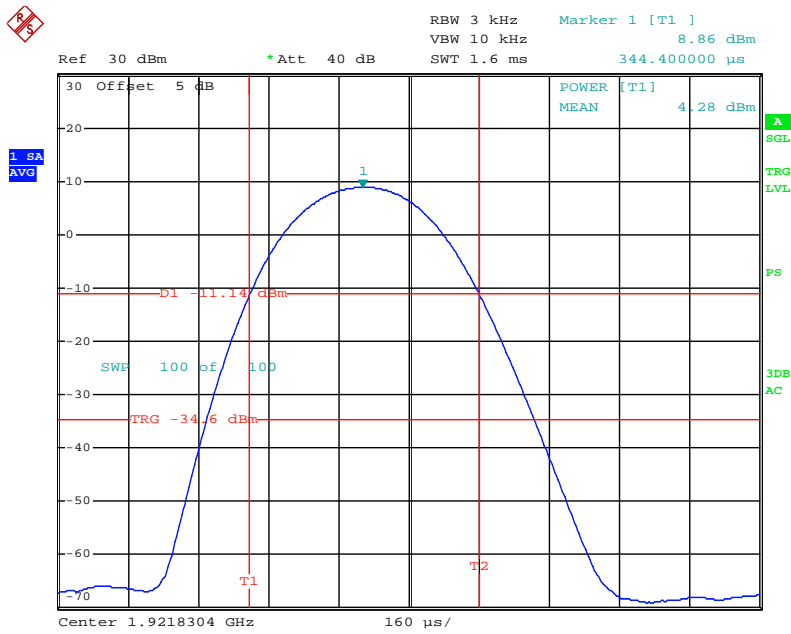
Frequency (MHz)	Power Spectral Density		Limit (mW/3kHz)	Result
	(dBm/3kHz)	(mW/3kHz)		
1921.536	4.28	2.68	3	Pass
1924.992	4.35	2.72	3	Pass
1928.448	4.22	2.64	3	Pass

**Low Channel**



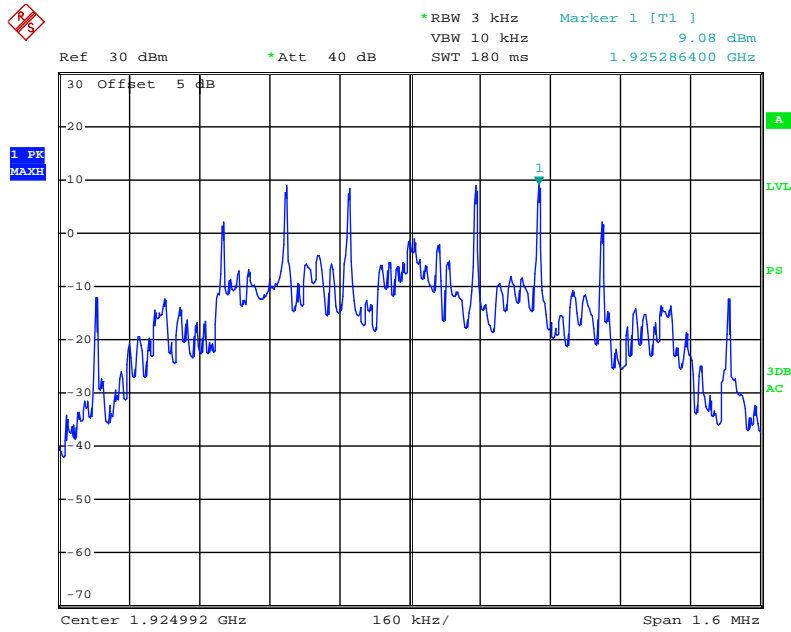
Date: 10.NOV.2011 09:52:00



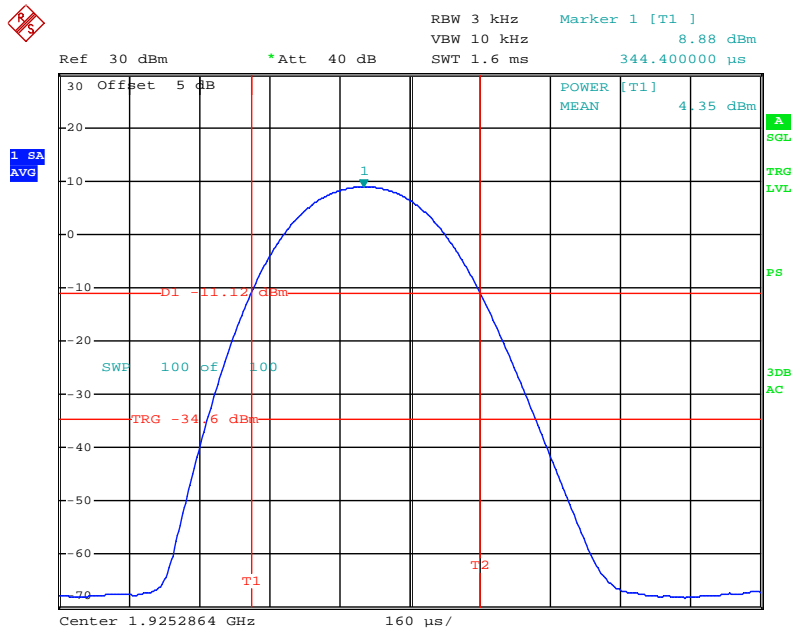


Date: 10.NOV.2011 10:10:57

**Middle Channel**

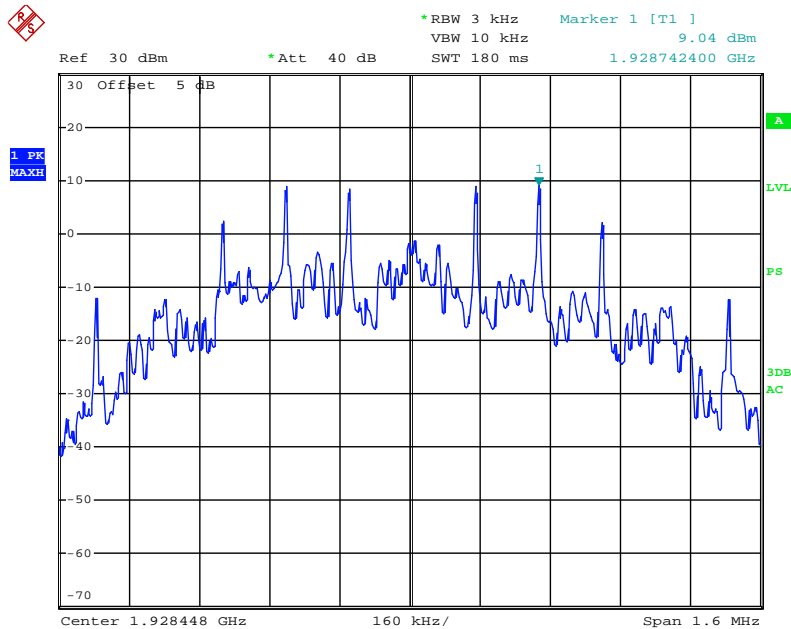


Date: 10.NOV.2011 10:13:32

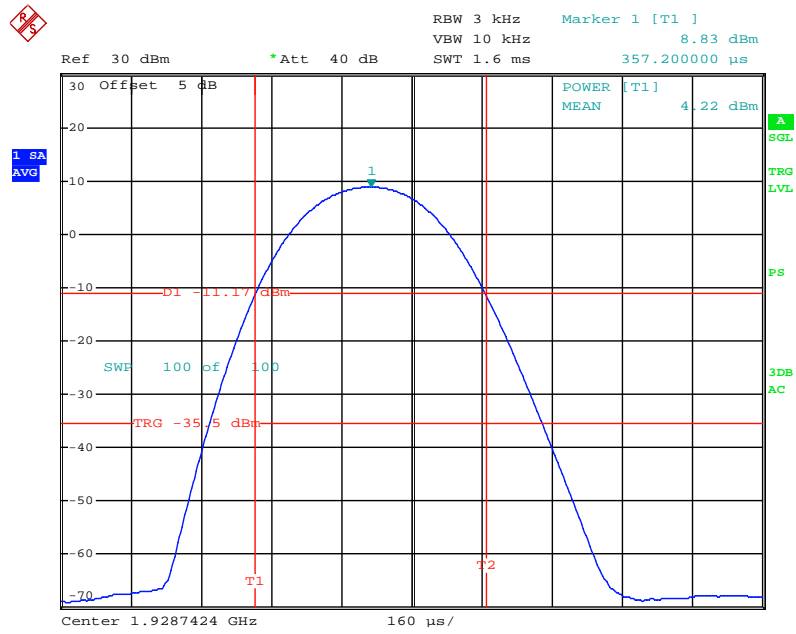


Date: 10.NOV.2011 10:18:19

### High Channel



Date: 10.NOV.2011 10:23:09



Date: 10.NOV.2011 10:26:08

## FCC §15.323 (d) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND

### Applicable Standard

Emissions inside the sub-band must comply with the following emission mask:

1. In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device;
2. in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator;
3. in the bands between 3B and the sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator.

Where B = emission bandwidth

Emission Outside the sub-band shall be attenuated below a reference power of 112 mw (20.5 dBm) as follows:

1. 30 dB between the sub-band and 1.25 MHz above or below the sub-band;
2. 50 dB between 1.25 and 2.5 MHz above or below the sub-band;
3. 60 dB at 2.5 MHz or greater above or below the sub-band.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
HP	Spectrum Analyzer	8593A	2919A00242	2011-03-09	2012-03-08

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

### Test Data

#### Environmental Conditions

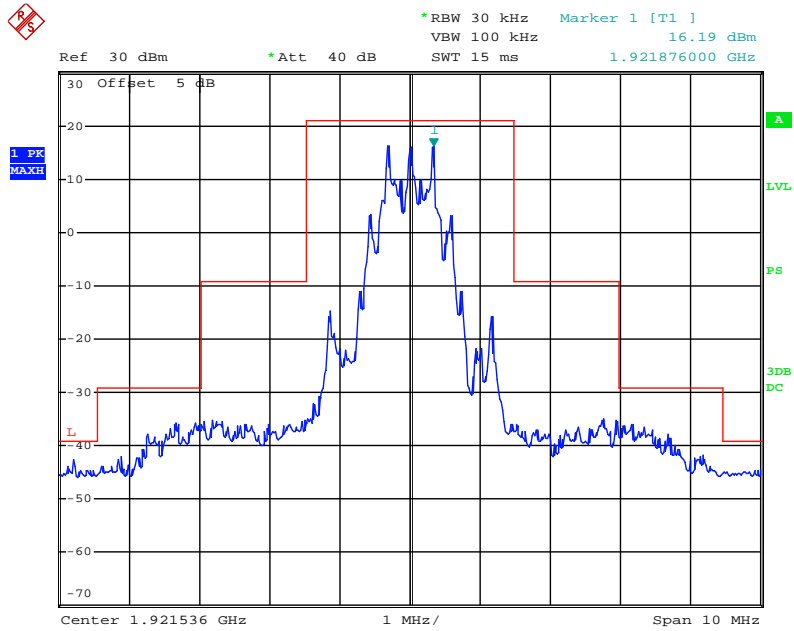
Temperature:	20 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

*The testing was performed by Eric Lee on 2011-09-16 to 2011-11-10.*

*Test Mode: Transmitting*

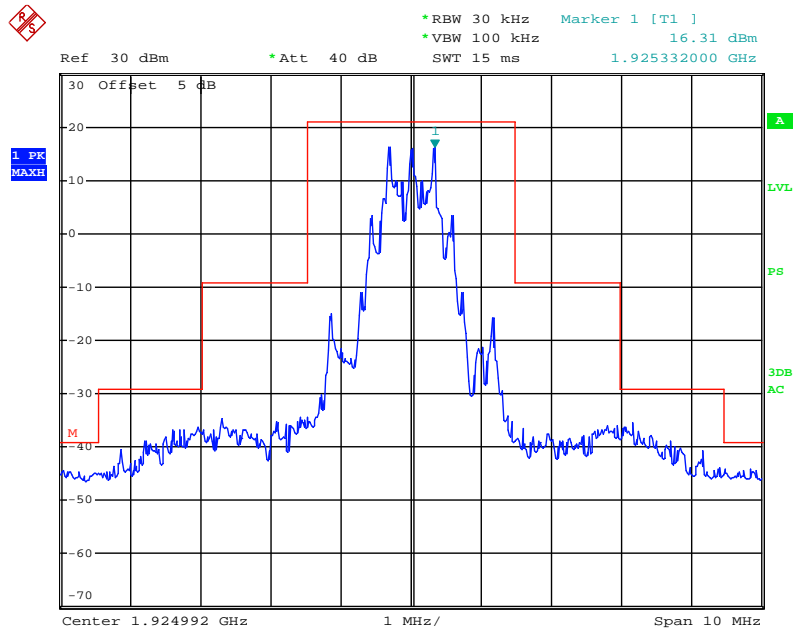
**Test Result:** Compliance, please refer to following tables and plots

### Low Channel (Unwanted Emission inside the Sub-band)



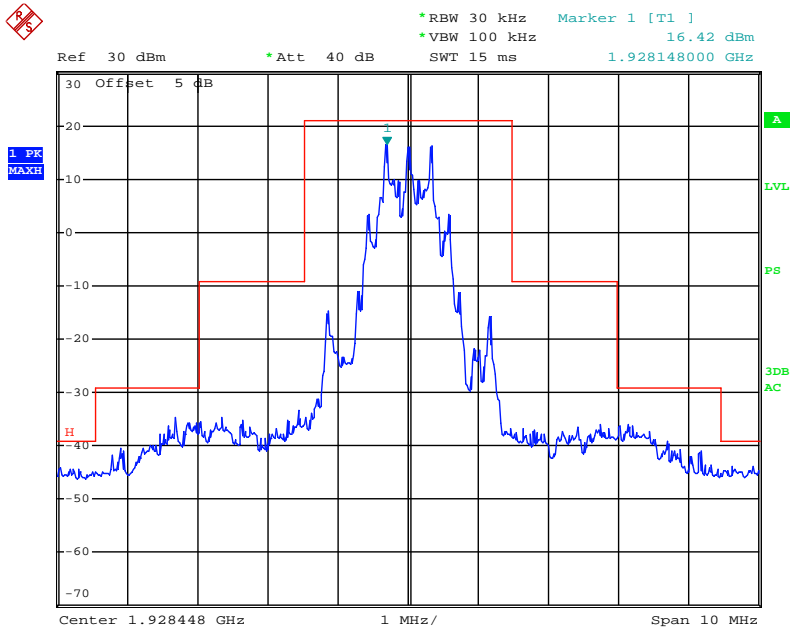
Date: 10.NOV.2011 13:45:21

### Middle Channel (Unwanted Emission inside the Sub-band)



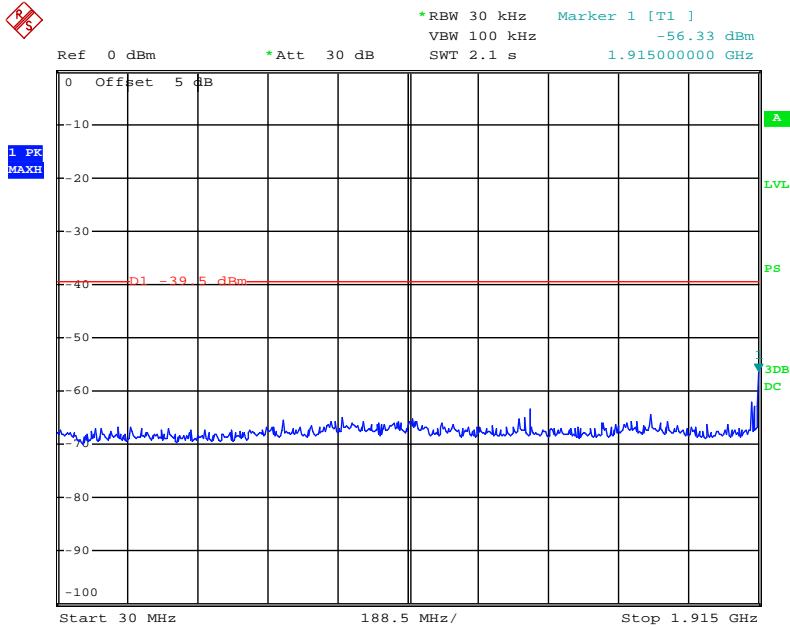
Date: 10.NOV.2011 12:48:49

### High Channel (Unwanted Emission inside the Sub-band)

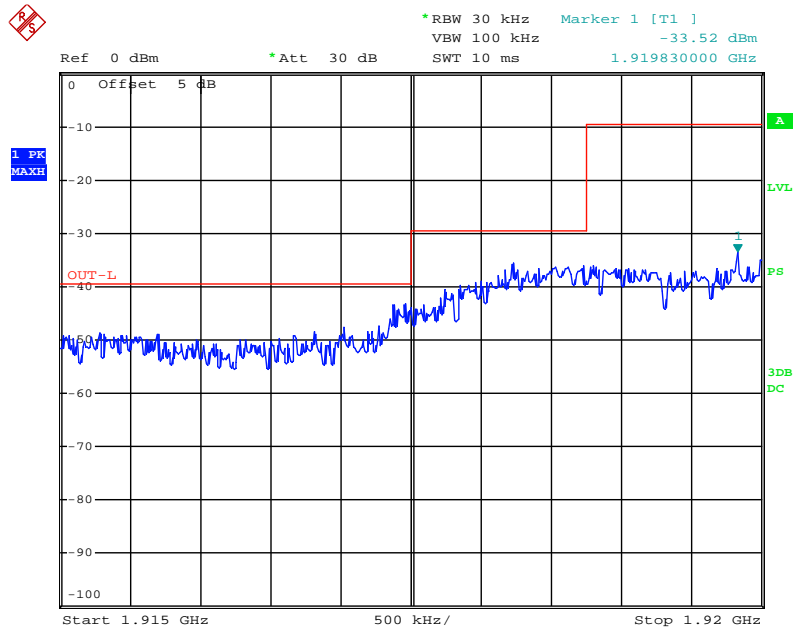


Date: 10.NOV.2011 12:46:56

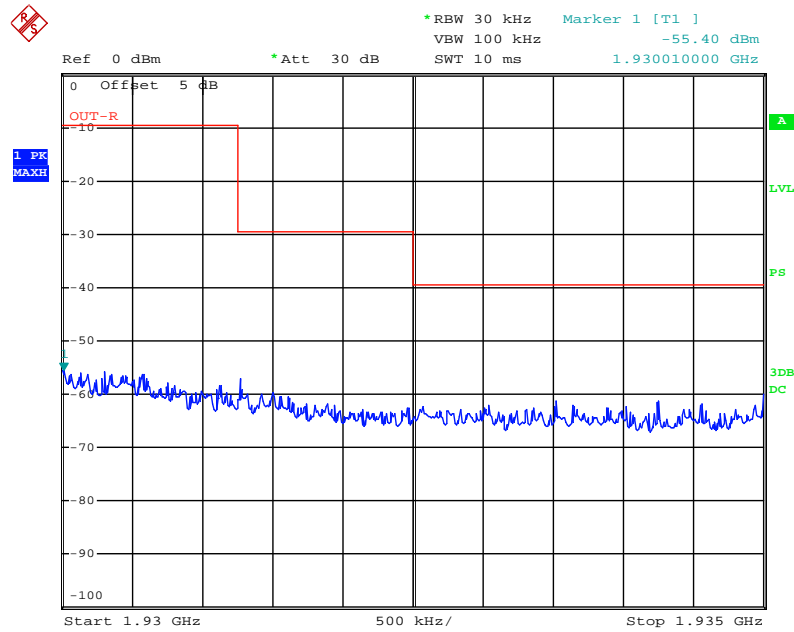
### Low Channel (Unwanted Emission outside the Sub-band)



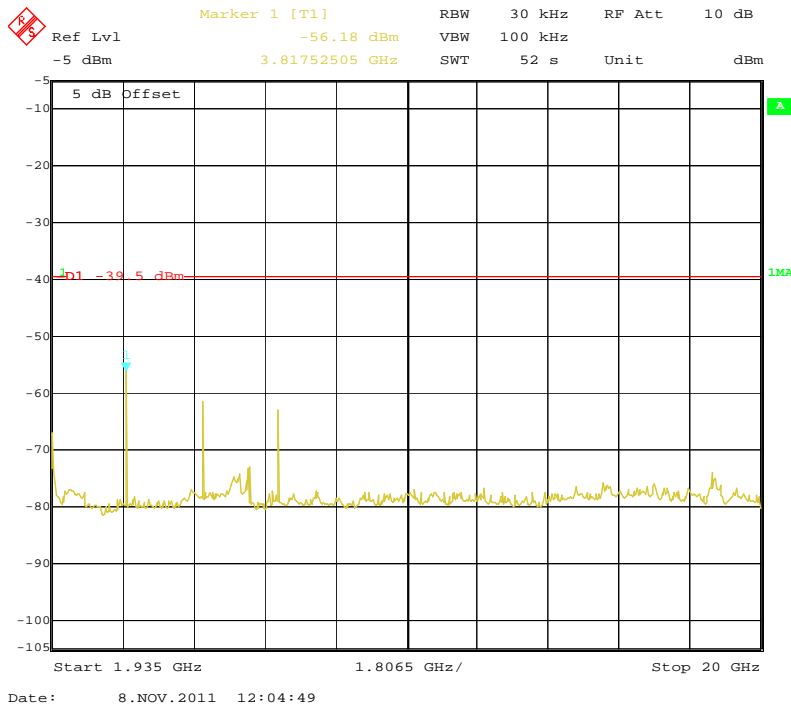
Date: 10.NOV.2011 13:49:25



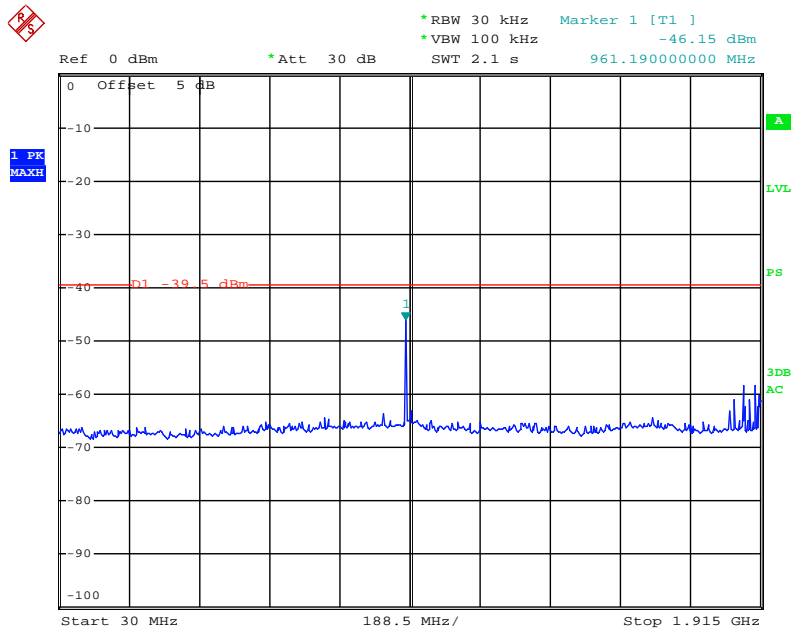
Date: 10.NOV.2011 13:50:38



Date: 10.NOV.2011 13:43:04

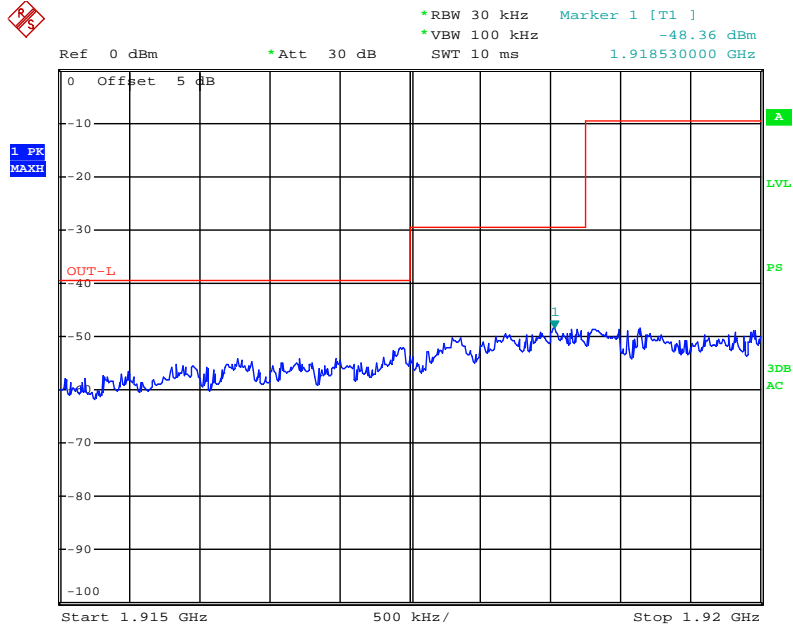


**Middle Channel (Unwanted Emission outside the Sub-band)**

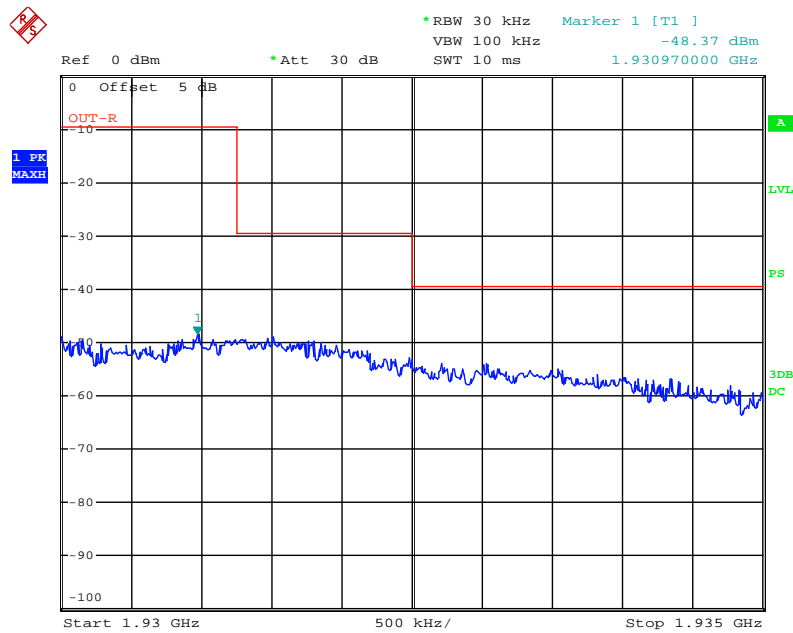


Date: 10.NOV.2011 12:55:13

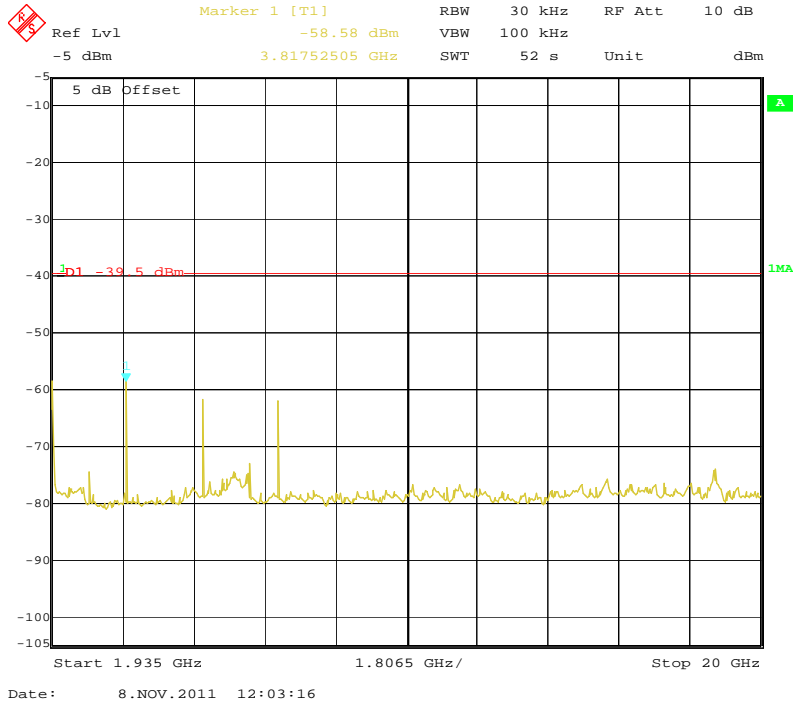




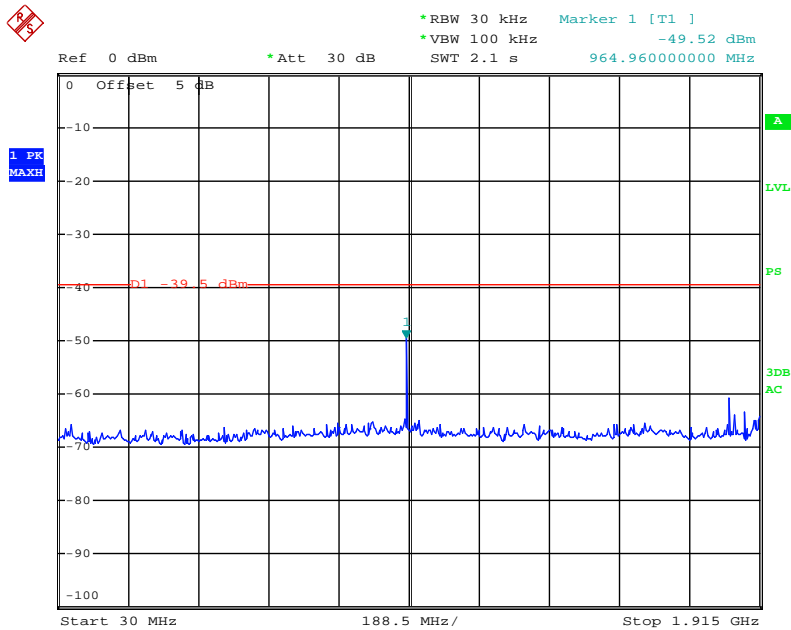
Date: 10.NOV.2011 12:56:38

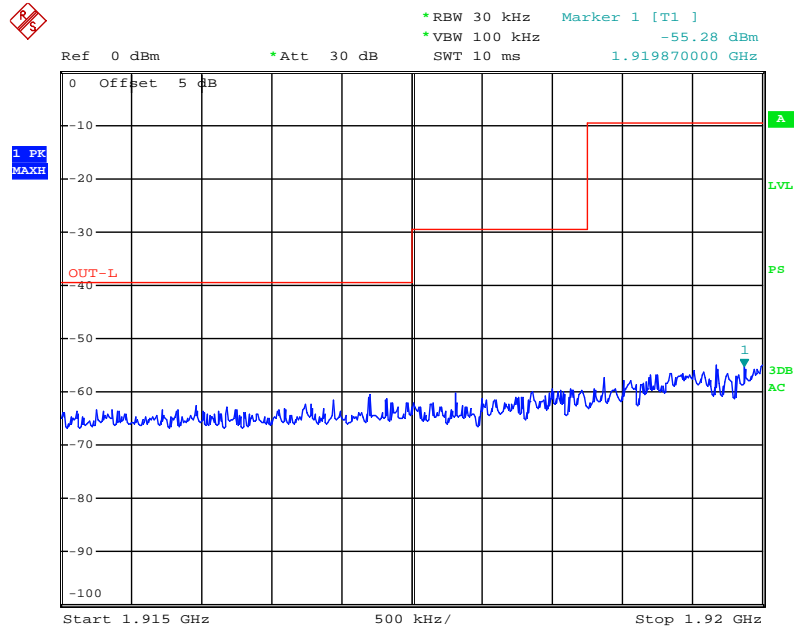


Date: 10.NOV.2011 13:42:16

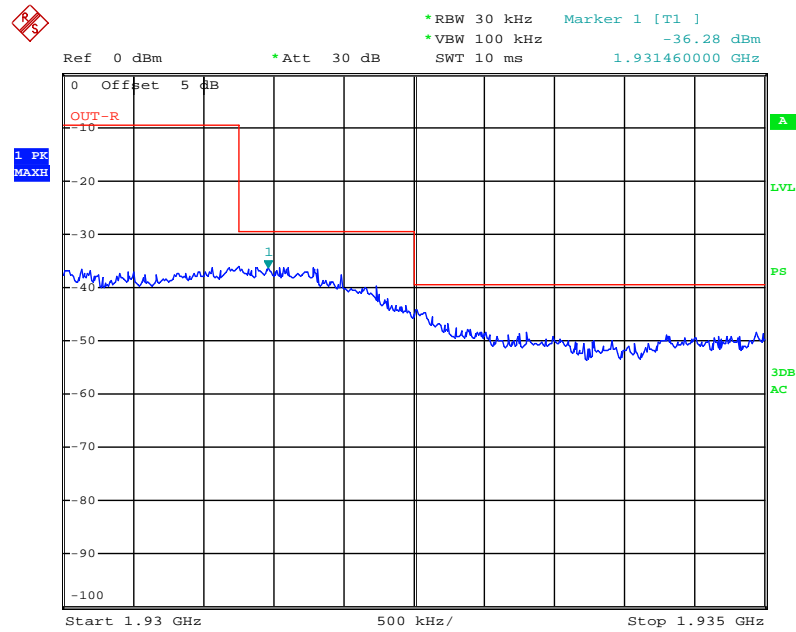


**High Channel (Unwanted Emission outside the Sub-band)**

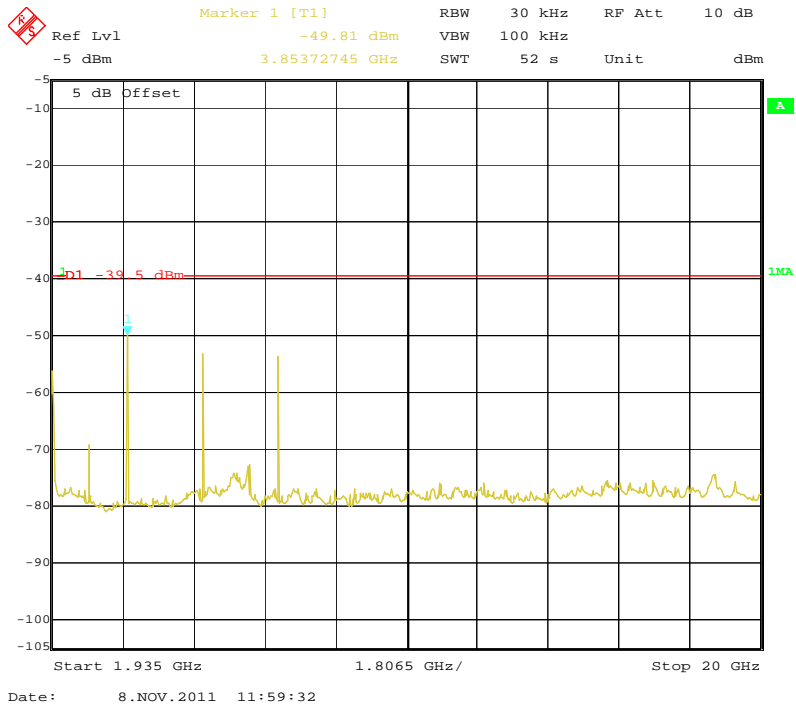




Date: 10.NOV.2011 12:40:19



Date: 10.NOV.2011 12:43:36



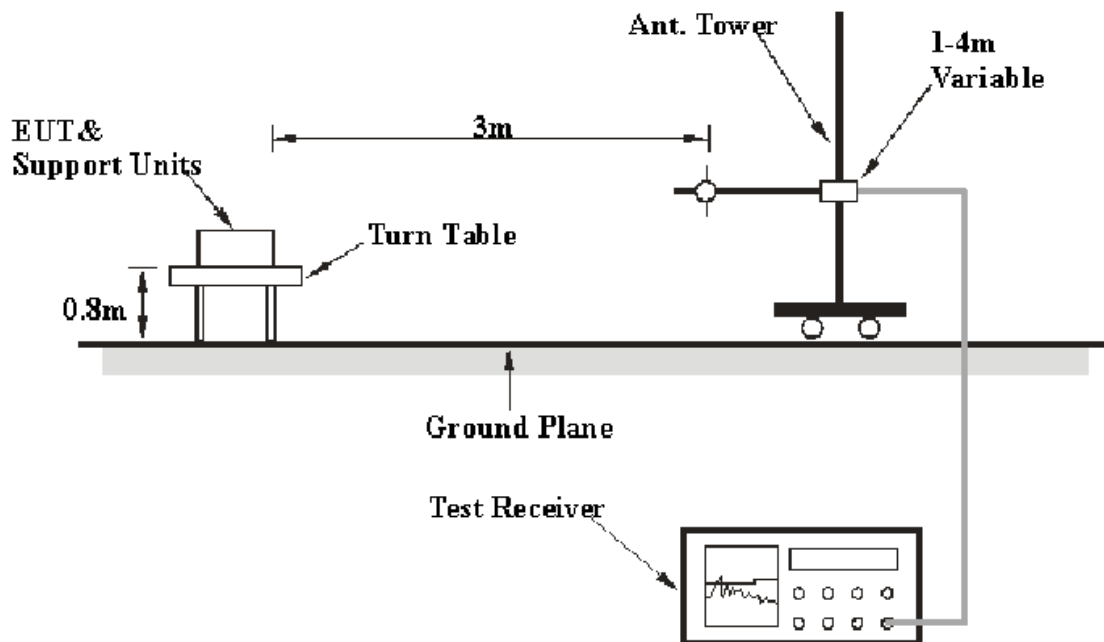
## FCC §15.319 (g) - RADIATED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, 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  $\pm 4.0$  dB(k=2, 95% level of confidence).

### EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.17 - 2006. The specification used was the FCC 15.209 and FCC 15.319(g) limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

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

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30MHz – 1000 MHz	100 kHz	300 kHz
Above 1 GHz	1 MHz	3 MHz

## 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	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Mini-Circuits	Pre-amplifier	ZVA-213+	N/A	2011-09-12	2012-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	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 Procedure

For the radiated emissions test, the adapter 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.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies above 1 GHz.

## 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 maximum limit. The equation for margin calculation is as follows:

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

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC 15.209 and 15.319 (g), with the worst margin reading of:

**8.47 dB at 7686.144 MHz in the Horizontal polarization**

## Test Data

### Environmental Conditions

<b>Temperature:</b>	20 ° C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

*The testing was performed by Eric Lee on 2011-11-11.*

**1) Below 1 GHz**

*Test mode: Transmitting (Adapter 1 & Adapter 2)*

Note: No emissions were detected below 1 GHz.

**2) Above 1GHz**

Freq. (MHz)	S.A. Reading (dBµV)	Detector PK/QP/Ave	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.319(g)/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
<b>Low Channel</b>												
7686.144	47.90	PK	191	1.4	H	39	5.27	26.64	65.53	74	8.47	Harmonic
3843.072	52.41	PK	339	1.7	H	33.9	3.73	26.87	63.17	74	10.83	Harmonic
7686.144	43.49	PK	184	1.4	V	37.7	5.27	26.64	59.82	74	14.18	Harmonic
3843.072	49.78	PK	0	1.2	V	33	3.73	26.87	59.64	74	14.36	Harmonic
11529.216	37.87	PK	0	1.4	H	41	6.69	26.28	59.28	74	14.72	Harmonic
9607.68	38.77	PK	352	1.4	V	39.9	5.98	26.42	58.23	74	15.77	Harmonic
9607.68	37.38	PK	189	1.3	H	41.1	5.98	26.42	58.04	74	15.96	Harmonic
11529.216	33.12	PK	353	1.4	V	40.4	6.69	26.28	53.93	74	20.07	Harmonic
5764.608	38.20	PK	185	1.5	H	37.4	4.57	26.68	53.49	74	20.51	Harmonic
5764.608	38.91	PK	197	1.5	V	36.2	4.57	26.68	53.00	74	21.00	Harmonic
<b>Middle Channel</b>												
3849.984	54.66	PK	335	1.4	H	33.9	3.73	26.87	65.42	74	8.58	Harmonic
11549.942	41.42	PK	342	1.5	H	41	6.69	26.28	62.83	74	11.17	Harmonic
3849.984	51.52	PK	5	1.5	V	33	3.73	26.87	61.38	74	12.62	Harmonic
9624.96	41.23	PK	12	1.4	V	39.9	5.98	26.42	60.69	74	13.31	Harmonic
11549.942	38.79	PK	358	1.4	V	40.4	6.69	26.28	59.60	74	14.40	Harmonic
9624.96	38.22	PK	0	1.3	H	41.1	5.98	26.42	58.88	74	15.12	Harmonic
5774.976	39.78	PK	177	1.4	H	37.4	4.57	26.68	55.07	74	18.93	Harmonic
7699.968	37.92	PK	24	1.3	V	37.7	5.27	26.64	54.25	74	19.75	Harmonic
5774.976	39.15	PK	56	1.3	V	36.2	4.57	26.68	53.24	74	20.76	Harmonic
7699.968	35.48	PK	0	1.4	H	39	5.27	26.64	53.11	74	20.89	Harmonic
<b>High Channel</b>												
7713.792	46.87	PK	199	1.4	H	39.0	5.27	26.64	64.50	74	9.50	Harmonic
3856.896	52.49	PK	0	1.2	H	33.9	3.73	26.87	63.25	74	10.75	Harmonic
11570.688	41.64	PK	344	1.4	H	41.0	6.69	26.28	63.05	74	10.95	Harmonic
9642.24	41.31	PK	355	1.3	H	41.1	5.98	26.42	61.97	74	12.03	Harmonic
3856.896	51.67	PK	0	1.3	V	33.0	3.73	26.87	61.53	74	12.47	Harmonic
9642.24	41.45	PK	0	1.4	V	39.9	5.98	26.42	60.91	74	13.09	Harmonic
7713.792	44.19	PK	180	1.3	V	37.7	5.27	26.64	60.52	74	13.48	Harmonic
11570.688	37.85	PK	341	1.4	V	40.4	6.69	26.28	58.66	74	15.34	Harmonic
5785.344	36.42	PK	192	1.2	H	37.4	4.57	26.68	51.71	74	22.29	Harmonic
5785.344	35.90	PK	184	1.4	V	36.2	4.57	26.68	49.99	74	24.01	Harmonic

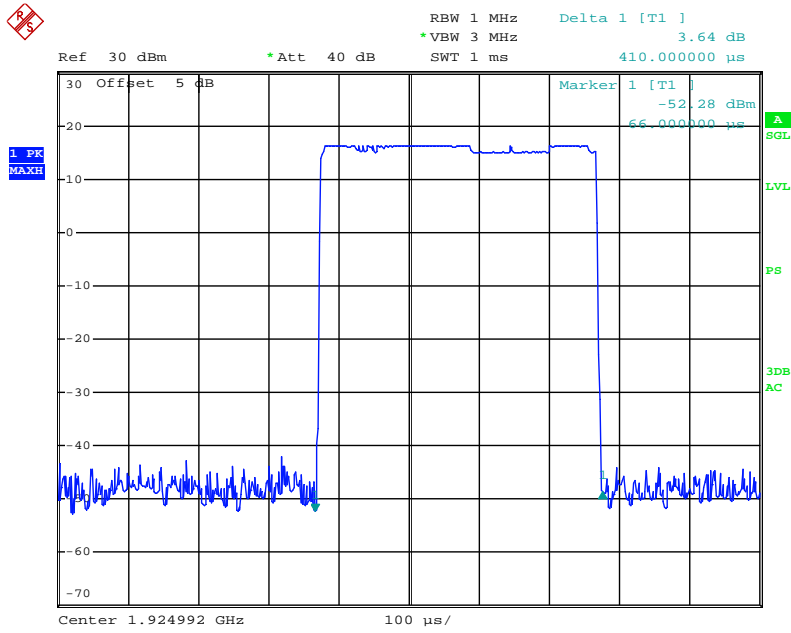


Field Strength of Radiated Emission (Average)							
Freq. (MHz)	Peak Cord. Amp. @ 3m (dBµV/m)	Antenna Polar (H/V)	Duty Cycle Factor (dB)	Cord. Amp. (dBµV/m)	FCC 15.319(g)		Comment
					Limit (dBµV/m)	Margin (dB)	
<b>Low Channel</b>							
7686.144	65.53	H	-27.76	37.77	54	16.23	Harmonic
3843.072	63.17	H	-27.76	35.41	54	18.59	Harmonic
7686.144	59.82	V	-27.76	32.06	54	21.94	Harmonic
3843.072	59.64	V	-27.76	31.88	54	22.12	Harmonic
11529.216	59.28	H	-27.76	31.52	54	22.48	Harmonic
9607.68	58.23	V	-27.76	30.47	54	23.53	Harmonic
9607.68	58.04	H	-27.76	30.28	54	23.72	Harmonic
11529.216	53.93	V	-27.76	26.17	54	27.83	Harmonic
5764.608	53.49	H	-27.76	25.73	54	28.27	Harmonic
5764.608	53.00	V	-27.76	25.24	54	28.76	Harmonic
<b>Middle Channel</b>							
3849.984	65.42	H	-27.76	37.66	54	16.34	Harmonic
11549.942	62.83	H	-27.76	35.07	54	18.93	Harmonic
3849.984	61.38	V	-27.76	33.62	54	20.38	Harmonic
9624.96	60.69	V	-27.76	32.93	54	21.07	Harmonic
11549.942	59.60	V	-27.76	31.84	54	22.16	Harmonic
9624.96	58.88	H	-27.76	31.12	54	22.88	Harmonic
5774.976	55.07	H	-27.76	27.31	54	26.69	Harmonic
7699.968	54.25	V	-27.76	26.49	54	27.51	Harmonic
5774.976	53.24	V	-27.76	25.48	54	28.52	Harmonic
7699.968	53.11	H	-27.76	25.35	54	28.65	Harmonic
<b>High Channel</b>							
7713.792	64.50	H	-27.76	36.74	54	17.26	Harmonic
3856.896	63.25	H	-27.76	35.49	54	18.51	Harmonic
11570.688	63.05	H	-27.76	35.29	54	18.71	Harmonic
9642.24	61.97	H	-27.76	34.21	54	19.79	Harmonic
3856.896	61.53	V	-27.76	33.77	54	20.23	Harmonic
9642.24	60.91	V	-27.76	33.15	54	20.85	Harmonic
7713.792	60.52	V	-27.76	32.76	54	21.24	Harmonic
11570.688	58.66	V	-27.76	30.90	54	23.10	Harmonic
5785.344	51.71	H	-27.76	23.95	54	30.05	Harmonic
5785.344	49.99	V	-27.76	22.23	54	31.77	Harmonic

Note: Duty Cycle=Ton/Tp\*100%  
 Ton = 410 µs = 0.410 ms, Tp = 10.02 ms  
 Duty Cycle = Ton/Tp = 4.09 %  
 Duty cycle factor = 20lg (Duty Cycle) = - 27.76 dB  
 Average = Peak + Duty Cycle Factor

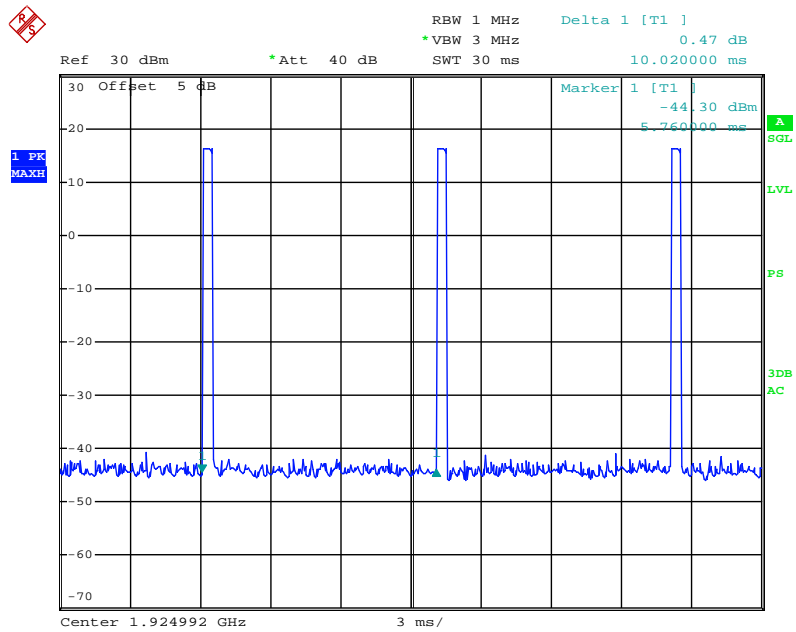
Please refer to the following plots for Duty cycle measurement:

T<sub>on</sub>:



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T<sub>p</sub>:



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## FCC §15.323 (f) - FREQUENCY STABILITY

### Applicable Standard

Per FCC §15.323(f), the frequency stability of the carrier frequency of the intentional radiator shall be maintained within  $\pm 10$  ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of  $-20^{\circ}$  to  $+50^{\circ}$  °C at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of  $20^{\circ}$  °C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage

### Test Procedure

This procedure should be carried out for each of the following test cases:

Temperature	Supply Voltage
20°C	85-115% or new batteries
-20°C	Normal
+50°C	Normal

<sup>a</sup>Use the lowest temperature at which the EUT is specified to operate if it is above  $-20^{\circ}$  °C.

Using the mean carrier frequency at  $20^{\circ}$  °C and at nominal supply voltage as the reference, the mean carrier frequency shall be maintained within  $\pm 10$  ppm at the two extreme temperatures (or as declared by the manufacturer) and at normal temperature (typically  $20^{\circ}$  °C) at the two extreme supply voltages. This test does not apply to an EUT that is capable only of operating from a battery.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2011-06-04	2012-06-03
R&S	Digital Radio-Communication Tester	CMD60	829902/026	2011-09-26	2012-09-25

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

The testing was performed by Eric Lee on 2011-11-10.

Test Mode: Transmitting

**Test Result:** Compliance.

Powered by adapter:

Temperature (°C)	Voltage (V <sub>AC</sub> )	Channel Frequency (MHz)	Measured Frequency Offset		Limit (ppm)
			(kHz)	(ppm)	
20	102	1924.992	-15	-7.79	± 10
	120	1924.992	-14	-7.27	± 10
	138	1924.992	-12	-6.23	± 10
-20	120	1924.992	-15	-7.79	± 10
50	120	1924.992	-14	-7.27	± 10

Powered by battery:

Temperature (°C)	Voltage (V <sub>DC</sub> )	Channel Frequency (MHz)	Measured Frequency Offset		Limit (ppm)
			(kHz)	(ppm)	
20	2.0	1924.992	-14	-7.27	± 10
	2.4	1924.992	-12	-6.23	± 10
	2.4	1924.992	-14	-7.27	± 10
-20	2.4	1924.992	-15	-7.29	± 10
50	2.0	1924.992	-14	-7.27	± 10

## **FCC §15.323 (c) (e) & §15.319(f) – SPECIFIC REQUIREMENTS FOR UPCS DEVICE**

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### **Automatic Discontinuation of Transmission, FCC Part 15.319(f)**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. The provisions in this section are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

**Test Procedure:** Please according to the declaration provided by manufacturer.

**Test result:** Meet the requirement

### **Monitoring Time FCC Part 15.323 (c) (1)**

Immediately prior to initiating transmission, devices must monitor the combined time and spectrum window in which they intend to transmit. For a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 7.3.4

**Test result:**

EUT monitors the combined time and spectrum window prior to initiation of transmission. Test result please according to FCC 15.323(c) (4).

### **Lower Monitoring Threshold Part15.323 (c)(2)**

The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 7.3.1

**Test result:** Not Apply

### **Maximum Transmit Period FCC Part 15.323 (c) (3)**

If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 8.2.2

**Test result:**

Repetition of Access Criteria	Measured Maximum Transmission Time (Second)	Limit (Second)	Results
First	16200	28,800	Pass
Second	16200	28,800	Pass

**System Acknowledgement, FCC Part 15.323 (c) (4)**

Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgment, at which time the access criteria must be repeated.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 8.1.1, 8.2.1

**Test result:**

Test	Time taken (second)	Limit (second)	Result
Connection acknowledgement	0.1	1	Pass
Change of access criteria for control information	N/A	30	Pass
Transmission cease time	1.2	30	Pass
Pulse length	0.0004	0.01	Pass

Note: N/A=Not Applicable

**Least Interfered Channel (LIC) Selection, FCC Part 15.323 (c) (5)**

If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed.

Calculation of monitoring threshold limits for isochroous devices:

Lower threshold:  $T_L = -174 + 10\log_{10}B + M_u + P_{MAX} - P_{EUT}$  (dBm)

Upper threshold:  $T_U = -174 + 10\log_{10}B + M_u + P_{MAX} - P_{EUT}$  (dBm)

Where: B=Emission bandwidth (Hz)

$M_u$  =dB the threshold may exceed thermal noise (30 for  $T_L$  & 50 for  $T_U$ )

$P_{MAX} = 5\log_{10}B - 10$  (dBm)

$P_{EUT}$  =Transmitted power (dBm)

**Limit:**

Monitor Threshold	B (MHz)	M <sub>U</sub> (dB)	P <sub>MAX</sub> (dBm)	P <sub>EUT</sub> (dBm)	Threshold (dBm)
T <sub>L</sub>	1.328	30	20.62	16.02	-78.17
T <sub>U</sub>	1.328	50	20.62	16.02	-58.17

The EUT must not transmit until the interference level is less than or equal to:

Measured Threshold Level  $\leq$  T<sub>U</sub>

Where: T<sub>U</sub> = Upper threshold level

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 7.3.2, 7.3.3, 7.3.4

**Test result:**

Monitor threshold	Measured Threshold Level	Limit (dBm)
Lower Threshold(dBm)	N/A	-78.17
Upper Threshold(dBm)	N/A	-58.17

Note: The upper threshold is applicable as the EUT utilizes more than 40 duplex system channels

**Random waiting FCC Part 15.323(c) (6)**

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same window after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 8.1.3

**Test result:** The manufacturer declares that this provision is not utilized by the EUT.

**Monitoring Bandwidth, FCC Part 15.323 (c) (7)**

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than  $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$  microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 7.5

**Test result:**

Test Equation (μs)	B(bandwidth) (MHz)	Pulse width (μs)	Limit (μs)	Result
$50 (1.25/B)^{1/2}$	1.328	48.51	50	Pass
$35 (1.25/B)^{1/2}$	1.328	33.96	35	Pass

**Monitoring Antenna, FCC Part 15.323 (c) (8)**

The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

**Test procedure:** Measurement method according to ANSI C63.17-2006 paragraph 4

**Test result:** The antenna of the EUT used for transmission is the same interior antenna that used for monitoring.

**Monitoring threshold relation FCC Part 15.323(c) (9)**

Devices that have a power output lower than the maximum permitted under the rules can increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

**Test procedure:** Measurement method according to ANSI C63.17-2006 paragraph 4

**Test result:** Not apply based on Part 15.323 (c)(5)

**Duplex Connections, FCC Part 15.323 (c) (10)**

An initiating device may attempt to establish a duplex connection by monitors both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 8.3

**Test result:** The manufacturer declares that this provision is not utilized by the EUT.

**Alternative monitoring interval for co-located devices, FCC Part 15.323 (c) (11)**

An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

**Test procedure:** Measurement method according to ANSI C63.17-2006 clause 8.4

**Test result:** The manufacturer declares that this provision is not utilized by the EUT.

**Fair Access, FCC Part 15.323 (c) (12)**

The provisions of FCC Part 15.323(c)(10) or (c)(11) shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.



**Test result:**

The manufacturer declares that this device does not use any mechanisms as provided by Part 15.323 (c) (10) or (c) (11) to extend the range of spectrum occupied over space or time for the purpose of denying fail access to spectrum to other device.

**Frame Repetition Stability, Part 15 .323 (e)**

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these sub-bands shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number.

**Test procedure:**

Measurement method according to ANSI C63.17-2006 clause 6.2.2, 6.2.3

**Test result:**

Frame Repetition Stability:

Frame Repetition Stability (ppm)	Limit (ppm)	Result (Pass/Fail)
0.01	10	Pass

Frame Period and Jitter:

Max.pos.Jitter (us)	Max.neg.Jitter (us)	Frame period (ms)	Limit	
			Frame Period (ms)	Jitter (us)
0.07	-0.07	10.00000	20 or 10/X	25us

Note: X is a positive whole number.

## PRODUCT SIMILARITY DECALARATION LETTER



### SAMSUNG TECHWIN CO., LTD

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Tel: +82-70-7147-8361 Fax: +82-318018-3717

### Product Similarity Declaration

To Whom It May Concern,

We, SAMSUNG TECHWIN CO., LTD, hereby declare that our (Product Name: Baby Audio Monitor), Parent Model Number: SEW-2002W(PU2) is electrically identical with the Parent Model Number: SEW-2001W(PU1) that was certified by BACL. As SEW-2003W(BU) is their baby unit, so SEW-2002W(PU2) and SEW-2001W(PU1) are named differently due to marketing purposes.

The only difference between SEW-2001W(PU1) and SEW-2002W(PU2) are that:

1. SEW-2002W(PU2) contains two multiple parents and one SEW-2003W(BU) baby unit in the same box.
2. SEW-2001W(PU1) contains only one parent and one SEW-2003W(BU) baby unit in the same box.

This is just package configuration difference and there are no electrically different components or uncertified products contained.

Please contact me if you have any question.

A handwritten signature in black ink, appearing to read "Jeisoon Kang".

Signature:  
Jeisoon Kang  
Principal Research Engineer  
Date:2011-11-16

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