Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Avantronics Limited

The 4th Floor, Yuepeng Building, No.1019 Jiabin Rd, Luohu District, Shenzhen, China

FCC ID: WJ5-BTRC-300

Report Type:	Product Type:
Original Report	Avantree Roxa

Test Engineer:	Mick Yin
Report Number:	RSZ121203008-00B
Report Date:	2013-01-05
Reviewed By:	Sula Huang RF Engineer
Test Laboratory:	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 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Avantronics Limited*'s product, model number: *BTRC-300 (FCC ID: WJ5-BTRC-300)* or the "EUT" in this report was a *Avantree Roxa,* which was measured approximately: 45.5 mm (L) x 55.5 mm (W) x 33.5 mm (H), rated input voltage: AC100-240V 50/60 Hz. Test voltage: AC120V/60 Hz.

** All measurement and test data in this report was gathered from production sample serial number: 1212009 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2012-12-03.*

Objective

This report is prepared on behalf of *Avantronics Limited* in accordance with Part 2-Subpart J, 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 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submission with FCC ID: WJ5-BTRC-300.

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 emissions measurement was performed and 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 software (CSR BlueSuite 2.5) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

EUT Exercise Software

CSR BlueSuite 2.5

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

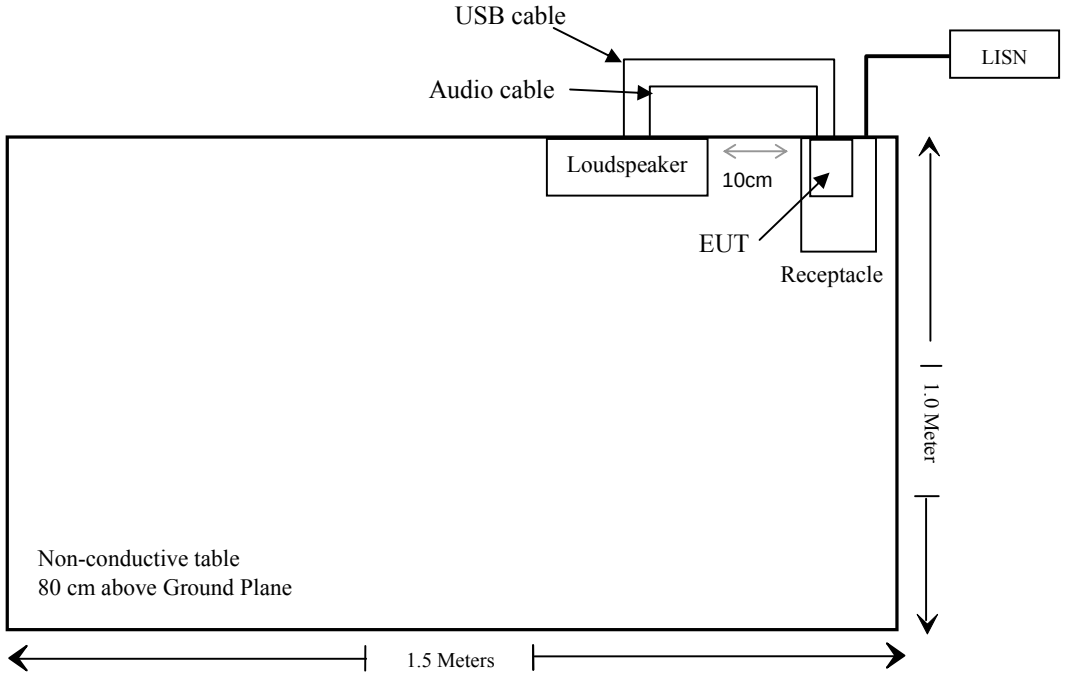
Manufacturer	Description	Model	Serial Number
Gajah	Loudspeaker	GD71BT	N/A
Meizu	Mobile Phone	MX	N/A

External I/O Cable

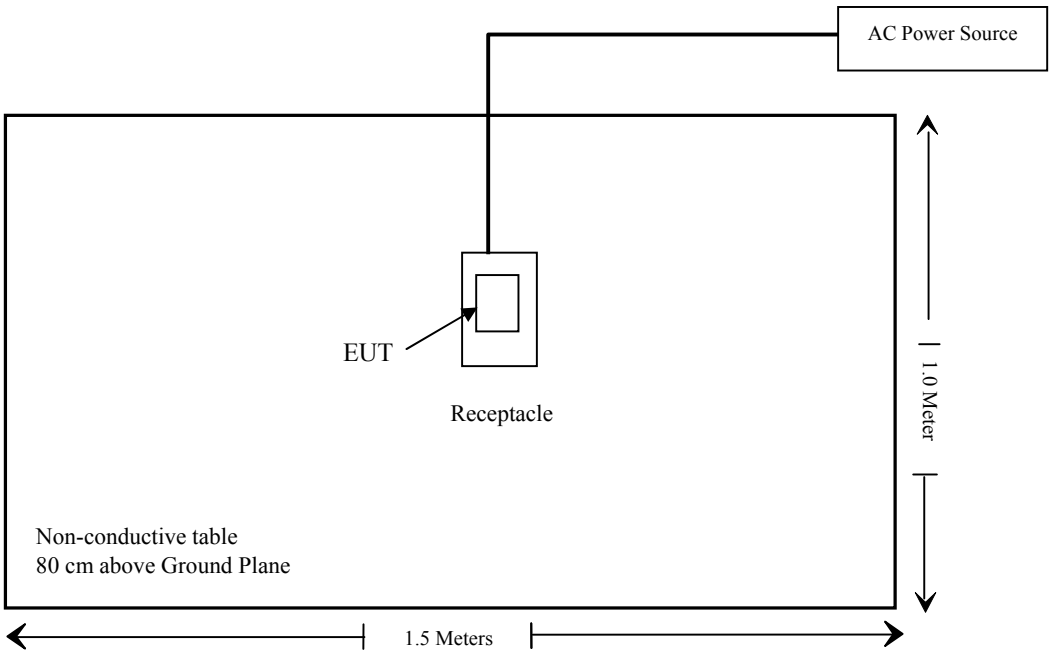
Cable Description	Length (m)	From/Port	To
Unshielded Detachable USB Cable	0.6	EUT	Loudspeaker
Unshielded Detachable Audio cable	0.2	EUT	Loudspeaker
Unshielded Detachable AC Cable	1.0	Receptacle	LISN

Block Diagram of Test Setup

For AC Line Conducted Emissions Test



For Radiated Emission Test



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a),	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mw/cm^2)**	**Averaging Time (Minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally ***numeric*** gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
BT4.0	2402	0	1.0	-0.04	0.991	20	0.000197	1.0
	2440	0	1.0	-1.48	0.711	20	0.000141	1.0
	2480	0	1.0	-3.74	0.423	20	0.000084	1.0

Note: To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

Result: Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an integrated antenna arrangement, which was permanently attached and the gain was 0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliant.

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 Laboratories Corp. (Shenzhen) is 2.4 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.
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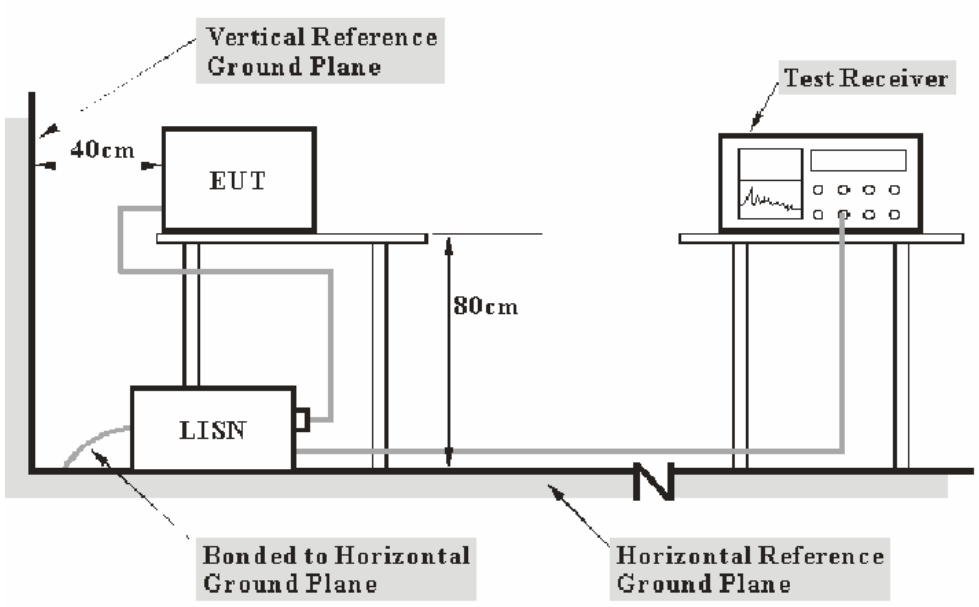
EUT Setup



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 measurement procedure of EUT setup is according with per ANSI C63.4-2009. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

The EUT 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:

Frequency Range	IF B/W
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	100176	2012-11-24	2013-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-21
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the EUT was connected to the first 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.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Pulse Limiter Attenuation

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:

Margin = Limit – Corrected Amplitude

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:

13.30 dB at **0.395 MHz** in the **Neutral** conducted mode

Test Data

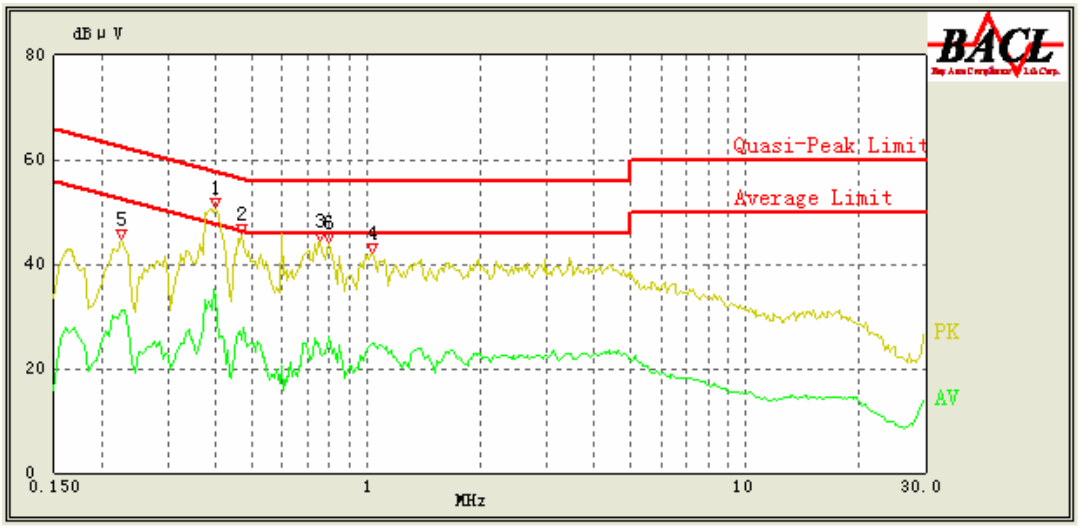
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Mick Yin on 2012-12-05.

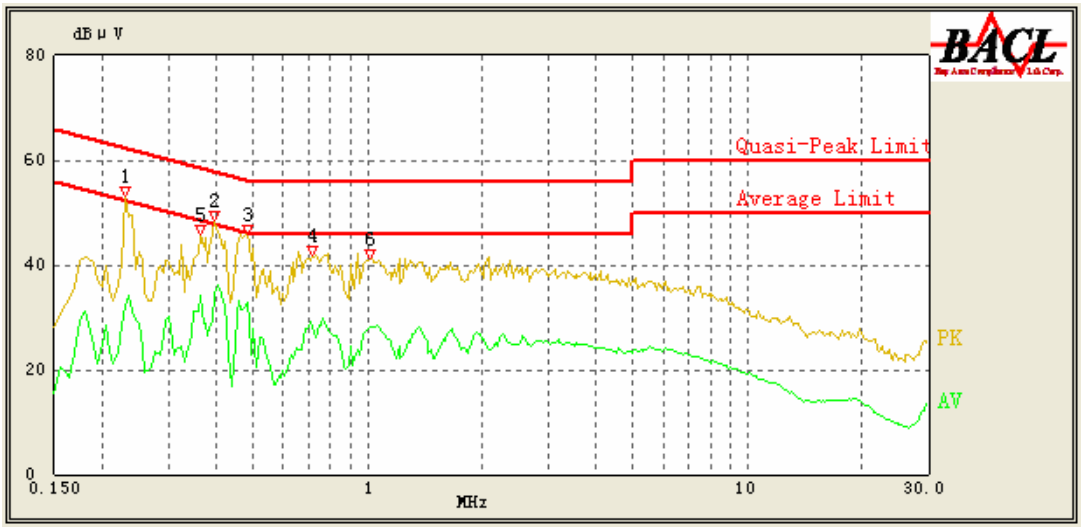
Test Mode: Charging & Transmitting

AC 120V / 60Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK /QP/Ave.)
0.400	44.05	10.26	58.86	14.81	QP
0.400	33.85	10.26	48.86	15.01	Ave.
0.795	39.34	10.20	56.00	16.66	QP
0.470	39.56	10.26	56.86	17.30	QP
0.755	38.20	10.21	56.00	17.80	QP
0.795	25.49	10.20	46.00	20.51	Ave.
1.035	35.17	10.17	56.00	20.83	QP
1.035	24.76	10.17	46.00	21.24	Ave.
0.470	25.49	10.26	46.86	21.37	Ave.
0.225	31.22	10.27	53.86	22.64	Ave.
0.755	23.12	10.21	46.00	22.88	Ave.
0.225	38.81	10.27	63.86	25.05	QP

AC 120V / 60Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK /QP/Ave.)
0.395	45.70	10.25	59.00	13.30	QP
0.485	32.84	10.24	46.43	13.59	Ave.
0.395	34.35	10.25	49.00	14.65	Ave.
0.485	41.76	10.24	56.43	14.67	QP
0.365	34.23	10.25	49.86	15.63	Ave.
0.230	47.53	10.25	63.71	16.18	QP
0.710	29.03	10.21	46.00	16.97	Ave.
1.020	28.32	10.17	46.00	17.68	Ave.
0.715	37.24	10.21	56.00	18.76	QP
0.365	39.70	10.25	59.86	20.16	QP
0.230	32.23	10.25	53.71	21.48	Ave.
1.015	34.28	10.17	56.00	21.72	QP

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor =LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

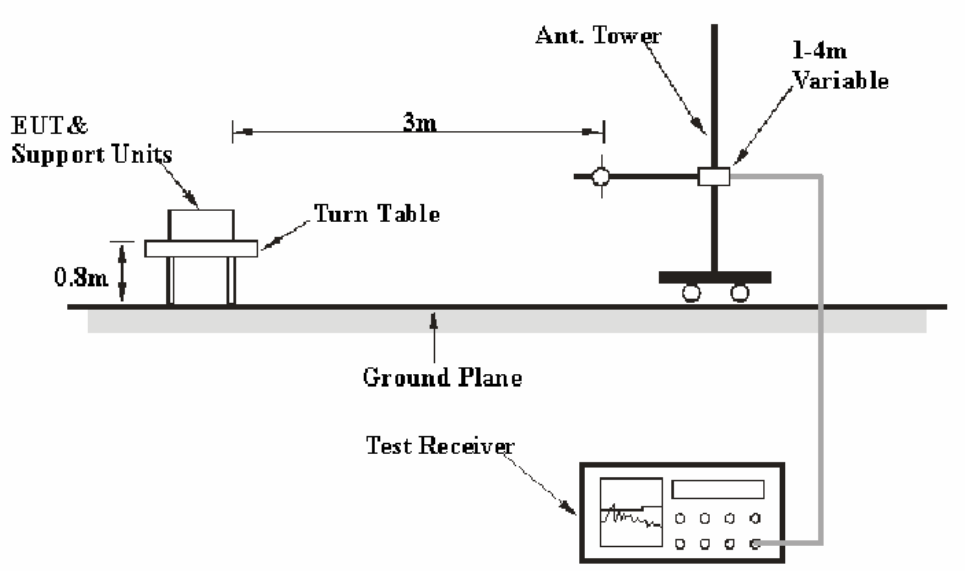
FCC §15.247 (d); §15.209; §15.205;

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 estimation of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

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:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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-1GHz 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:

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 limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13
R&S	Auto test Software	EMC32	V6.30	-	-

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, with the worst margin reading of:

4.09dB at **4880.0 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Mick Yin on 2012-12-28.

EUT operation mode: Transmitting

30 MHz-25 GHz

Frequency	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC PART 15.247	
(MHz)	Reading (dBμV/m)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2402 MHz)									
2402.0	92.30	PK	34	1.2	H	6.13	98.43	/	/
2402.0	87.72	Ave.	34	1.2	H	6.13	93.85	/	/
2402.0	90.45	PK	135	1.1	V	6.13	96.58	/	/
2402.0	85.48	Ave.	135	1.1	V	6.13	91.61	/	/
4804.0	33.10	Ave.	241	1.1	V	12.40	45.50	54	8.50
7206.0	23.63	Ave.	93	1.3	V	17.06	40.69	54	13.31
4804.0	44.98	PK	241	1.1	V	12.40	57.38	74	16.62
9608.0	17.34	Ave.	157	1.2	V	19.28	36.62	54	17.38
260.32	42.36	QP	115	1.7	H	-15.4	26.96	46	19.04
7206.0	35.99	PK	93	1.3	V	17.06	53.05	74	20.95
2732.8	23.85	Ave.	11	43	H	7.93	31.78	54	22.22
9608.0	31.73	PK	157	1.2	V	19.28	51.01	74	22.99
2372.3	20.89	Ave.	45	1.1	V	6.13	27.02	54	26.98
2352.5	20.85	Ave.	83	1.3	H	5.48	26.33	54	27.67
2732.8	35.54	PK	68	35	H	7.93	43.47	74	30.53
2372.3	35.48	PK	45	1.1	V	6.13	41.61	74	32.39
2352.5	34.81	PK	83	1.3	H	5.48	40.29	74	33.71
Middle Channel(2440 MHz)									
2440.0	87.60	PK	86	1.1	H	7.21	94.81	/	/
2440.0	82.91	Ave.	86	1.1	H	7.21	90.12	/	/
2440.0	87.88	PK	114	1.2	V	7.21	95.09	/	/
2440.0	83.22	Ave.	114	1.2	V	7.21	90.43	/	/
4880.0	37.45	Ave.	13	1.1	H	12.46	49.91	54	4.09
4880.0	50.69	PK	13	1.1	H	12.46	63.15	74	10.85
7320.0	26.18	Ave.	69	1.3	V	16.49	42.67	54	11.33
9760.0	18.17	Ave.	177	1.1	V	19.29	37.46	54	16.54
7320.0	39.46	PK	69	1.3	V	16.49	55.95	74	18.05
260.32	42.65	QP	132	1.6	H	-15.4	27.25	46	18.75
9760.0	32.07	PK	177	1.1	V	19.29	51.36	74	22.64
2744.8	22.04	Ave.	166	1.2	V	7.93	29.97	54	24.03
2387.6	20.88	Ave.	32	1.0	V	6.13	27.01	54	26.99
2361.9	20.85	Ave.	93	1.1	H	5.48	26.33	54	27.67
2744.8	34.88	PK	166	1.2	V	7.93	42.81	74	31.19
2387.6	36.2	PK	32	1.0	V	6.13	42.33	74	31.67
2361.9	35.06	PK	93	1.1	H	5.48	40.54	74	33.46

Frequency	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m) (MHz)	FCC PART 15.247	
(MHz)	Reading (dBμV/m)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Reading (dBμV/m)	Detector (PK/QP/Ave.)
High Channel(2480 MHz)									
2480.0	87.08	PK	68	1.2	H	7.21	94.29	/	/
2480.0	81.91	Ave.	68	1.2	H	7.21	89.12	/	/
2480.0	86.07	PK	115	1.1	V	7.21	93.28	/	/
2480.0	81.32	Ave.	115	1.1	V	7.21	88.53	/	/
4960.0	36.70	Ave.	139	1.3	H	12.50	49.20	54	4.80
7440.0	27.20	Ave.	52	1.1	V	15.90	43.10	54	10.90
4960.0	49.96	PK	139	1.3	H	12.50	62.46	74	11.54
9920.0	18.27	Ave.	253	1.2	V	19.38	37.65	54	16.35
260.32	42.58	QP	96	1.5	H	-15.4	27.18	46	18.82
7440.0	38.80	PK	52	1.1	V	15.90	54.70	74	19.30
2376.4	26.80	Ave.	93	1.1	V	6.13	32.93	54	21.07
2848.3	23.12	Ave.	115	1.1	H	8.56	31.68	54	22.32
9920.0	32.22	PK	253	1.2	V	19.38	51.60	74	22.40
2786.8	21.36	Ave.	32	1.2	H	8.62	29.98	54	24.02
2376.4	38.05	PK	93	1.1	V	6.13	44.18	74	29.82
2848.3	35.44	PK	115	1.1	H	8.56	44.00	74	30.00
2786.8	33.44	PK	32	1.2	H	8.62	42.06	74	31.94

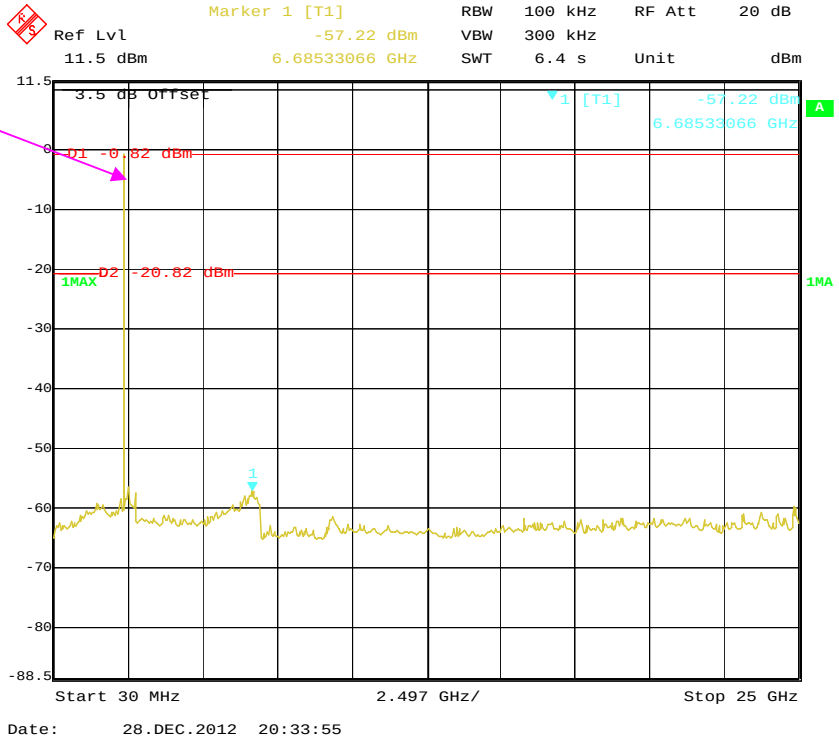
Note:

Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor
Corrected Amplitude = Receiver Reading + Corrected Factor
Margin = Limit- Corrected Amplitude

Conducted Spurious Emissions at Antenna Port:

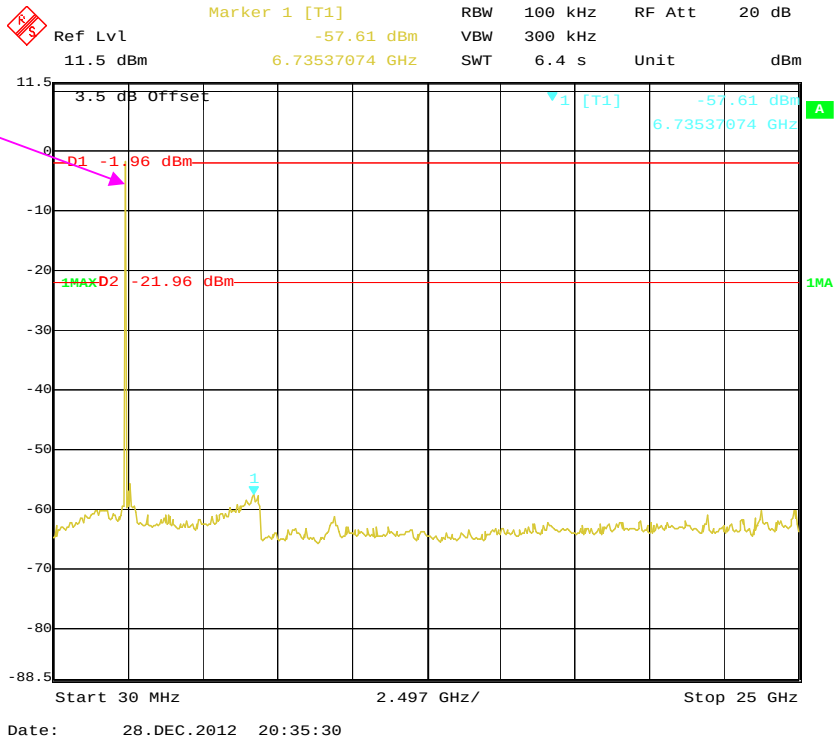
Low Channel

Fundamental

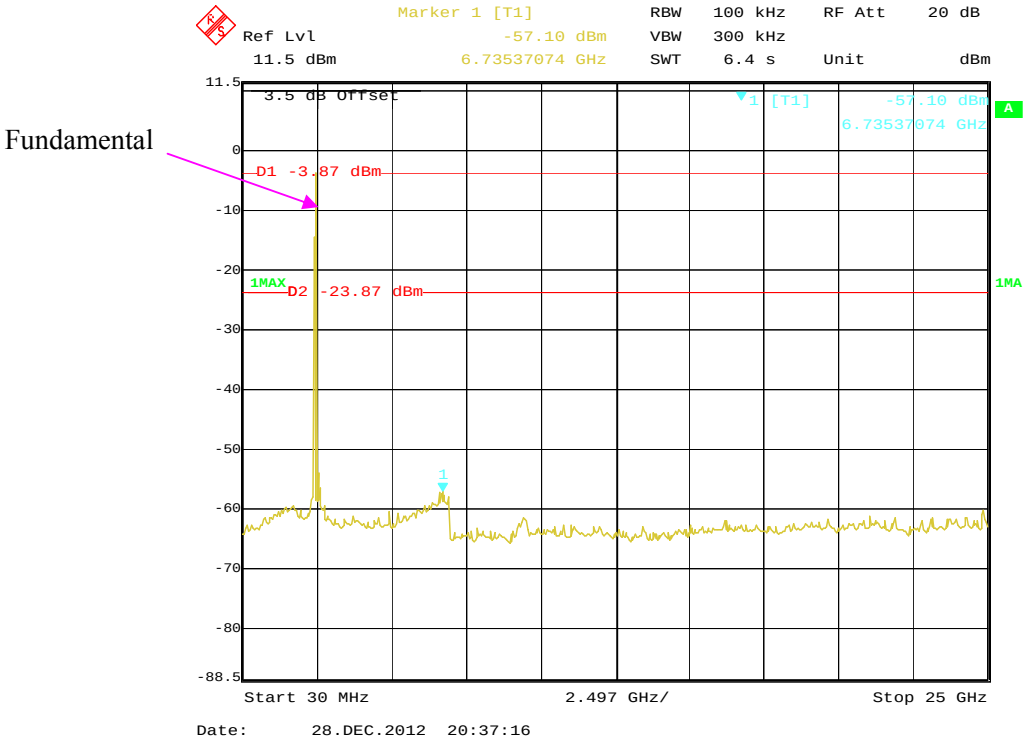


Middle Channel

Fundamental



High Channel



FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING

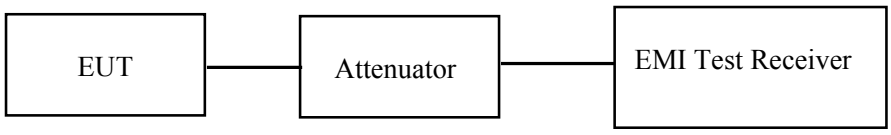
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

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 it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Mick Yin on 2012-12-28.

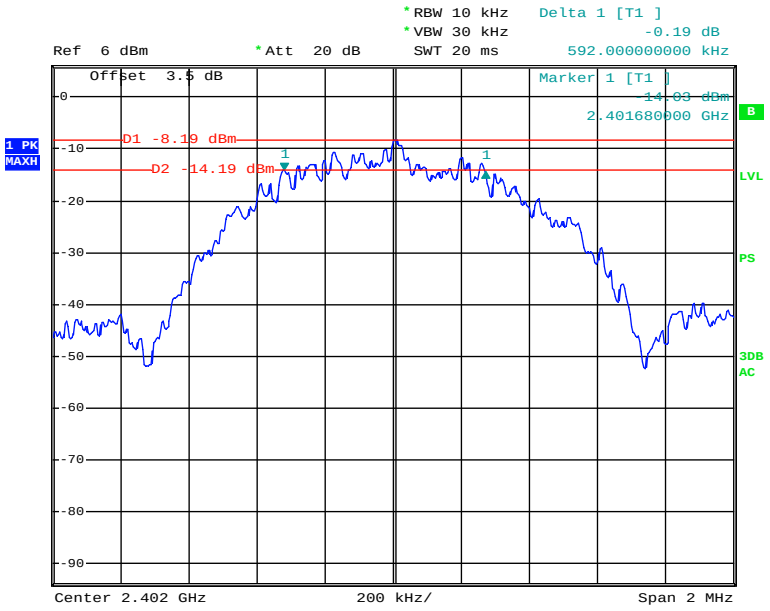
EUT operation mode: Transmitting

Test Result: Compliance

Please refer to the following tables and plots.

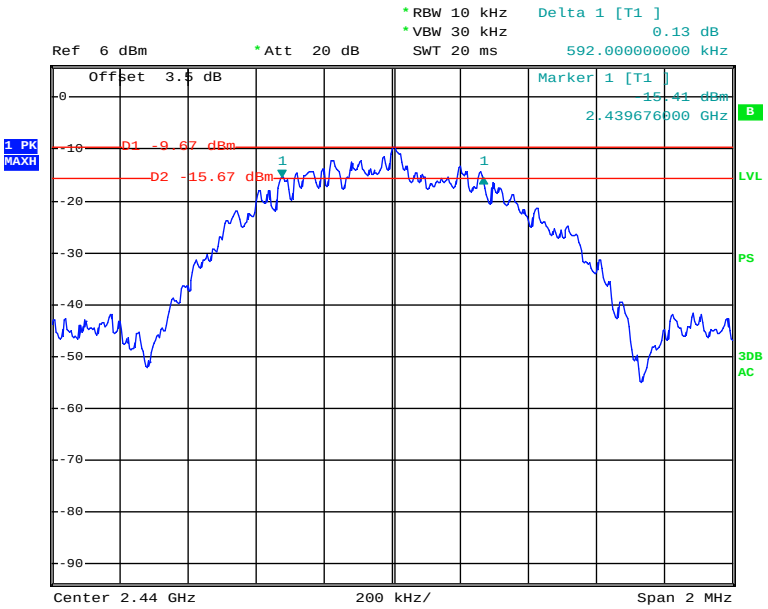
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)
Low	2402	592	≥500
Middle	2440	592	≥500
High	2480	592	≥500

Low Channel



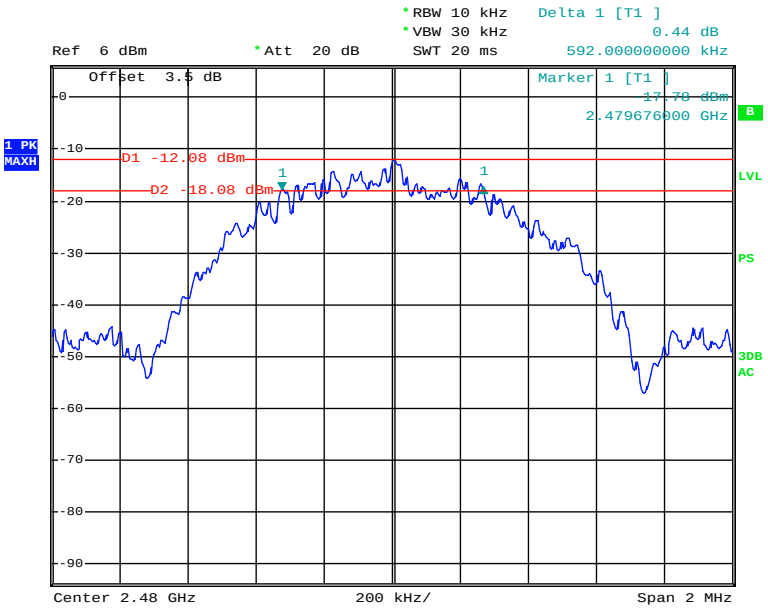
Date: 28.DEC.2012 18:06:32

Middle Channel



Date: 28.DEC.2012 18:07:53

High Channel



Date: 28.DEC.2012 18:09:29

FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Equipment List and Details

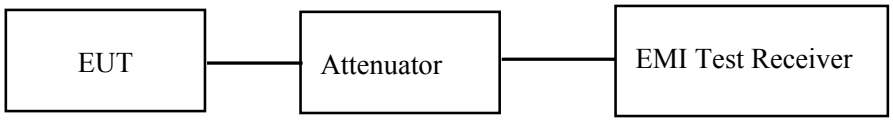
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

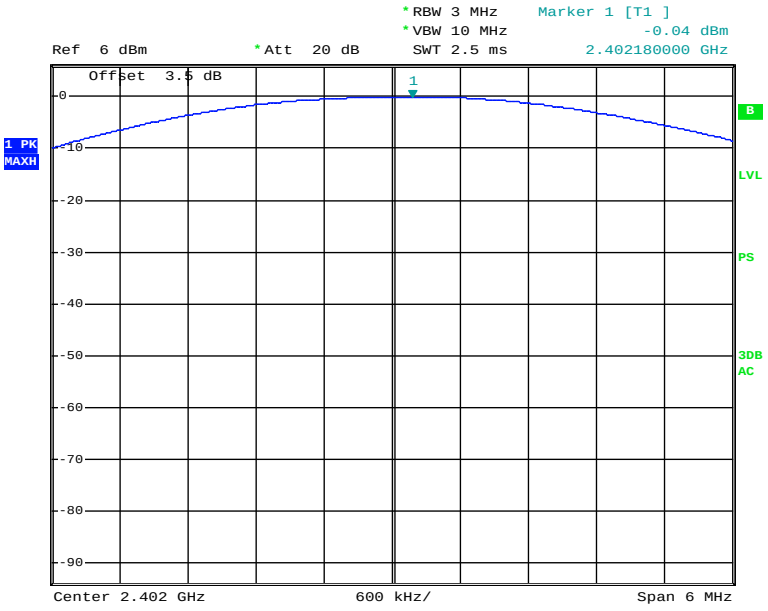
Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Mick Yin on 2012-12-28.

EUT operation mode: Transmitting

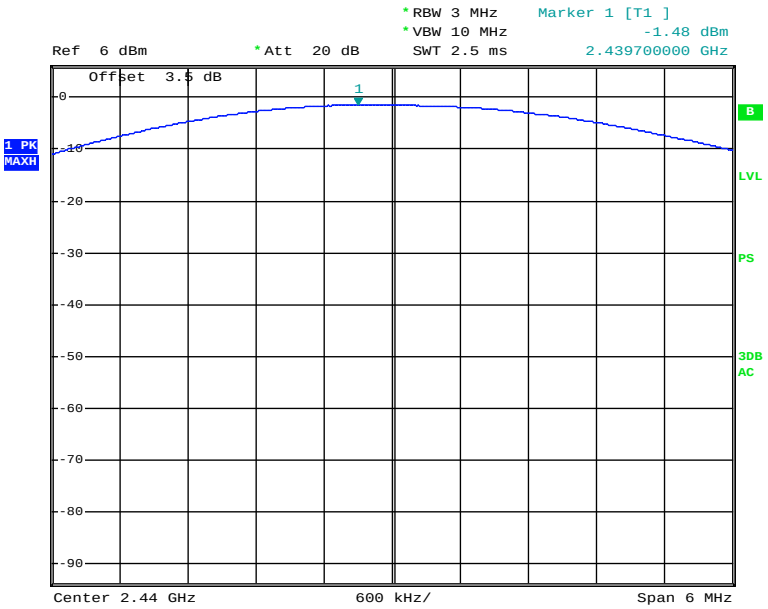
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Low	2402	-0.04	30	Pass
Middle	2440	-1.48	30	Pass
High	2480	-3.74	30	Pass

RF Output Power, Low Channel



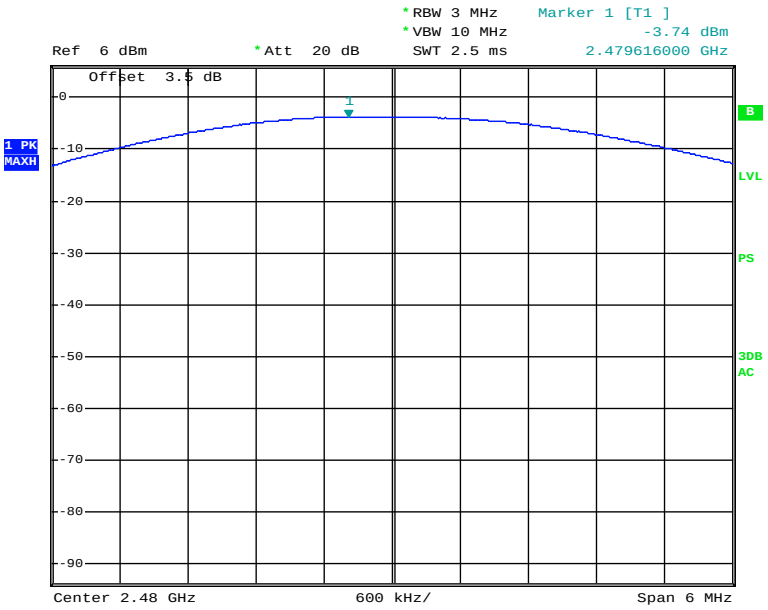
Date: 28.DEC.2012 18:16:03

RF Output Power, Middle Channel



Date: 28.DEC.2012 18:16:55

RF Output Power, High Channel



Date: 28.DEC.2012 18:17:37

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

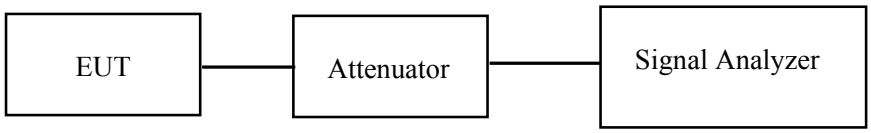
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

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 RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

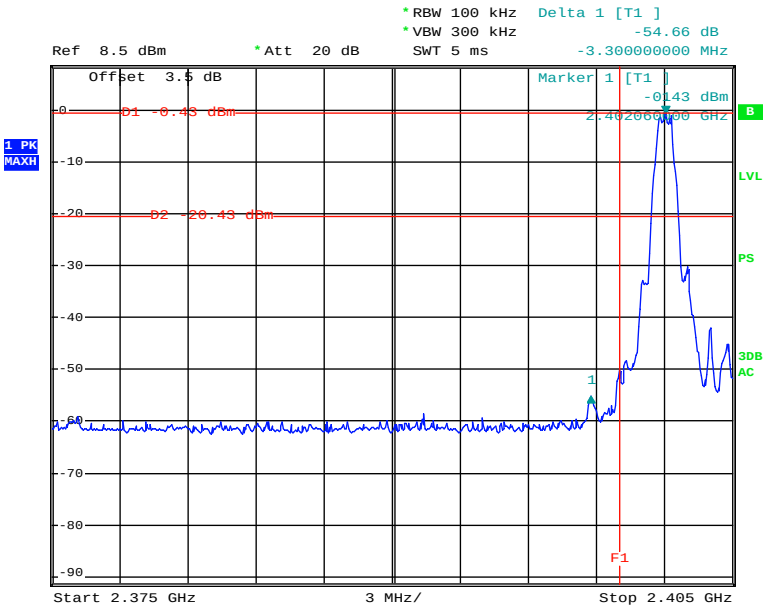
The testing was performed by Mick Yin on 2012-12-28.

Test mode: Transmitting

Test Result: Compliance.

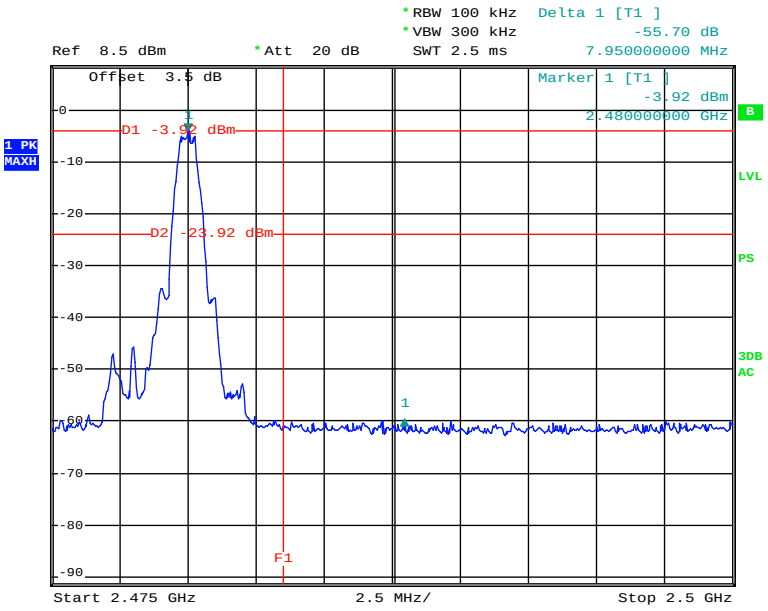
Please refer to following plots.

Band Edge, Left Side



Date: 28.DEC.2012 18:48:57

Band Edge, Right Side



Date: 28.DEC.2012 18:44:48

FCC §15.247(e) - POWER SPECTRAL DENSITY

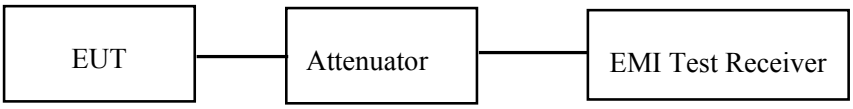
Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02 Clause 9.1 Option 1

1. Set analy center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measurement value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

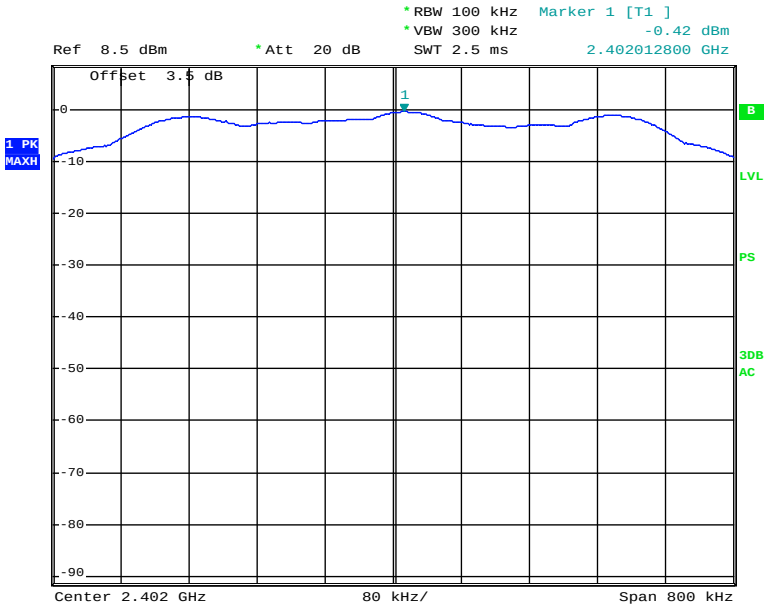
The testing was performed by Mick Yin on 2012-12-28.

EUT operation mode: Transmitting

Test Result: Pass

Channel	Frequency (MHz)	Power spectral density (dBm/100kHz)	Power spectral density (dBm/3kHz)	Limit (dBm/3kHz)
Low	2402	-0.42	-16.14	8
Middle	2440	-1.90	-17.43	8
High	2480	-4.15	-19.61	8

Low Channel (100 kHz)



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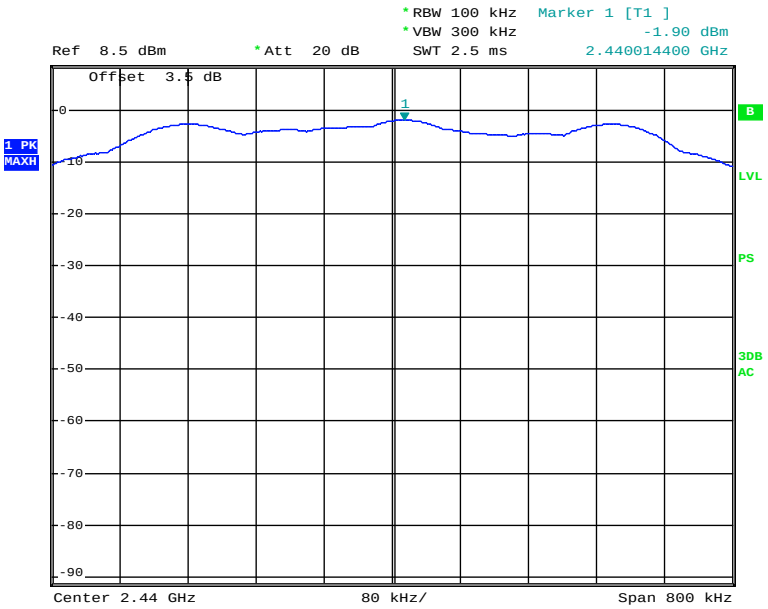
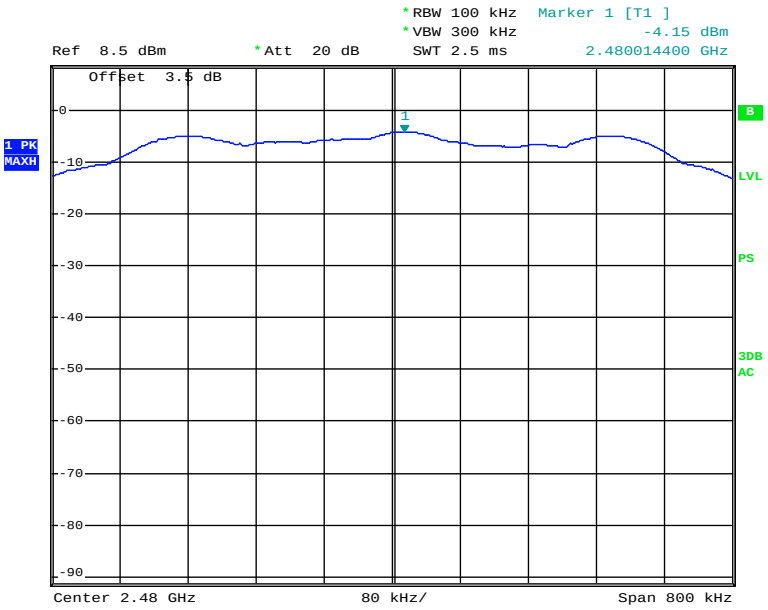
Middle Channel (100 kHz)



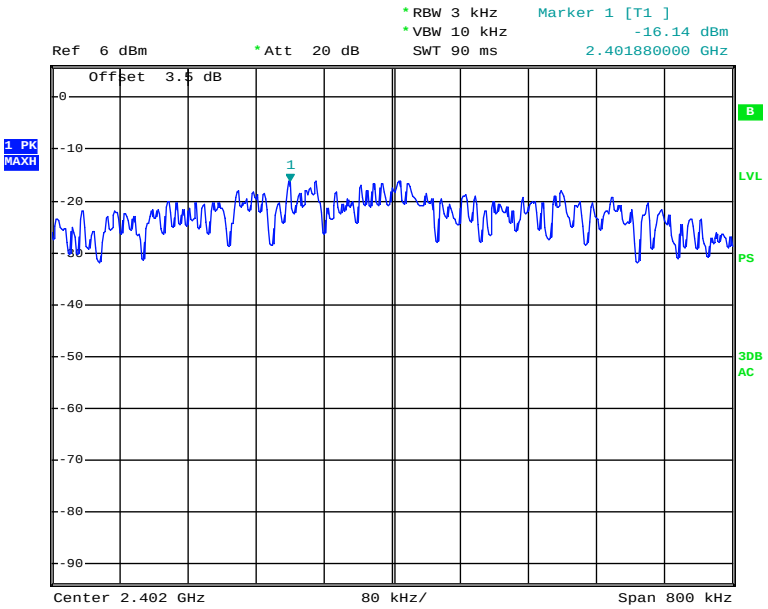
Date: 28.DEC.2012 18:33:09

High Channel (100 kHz)



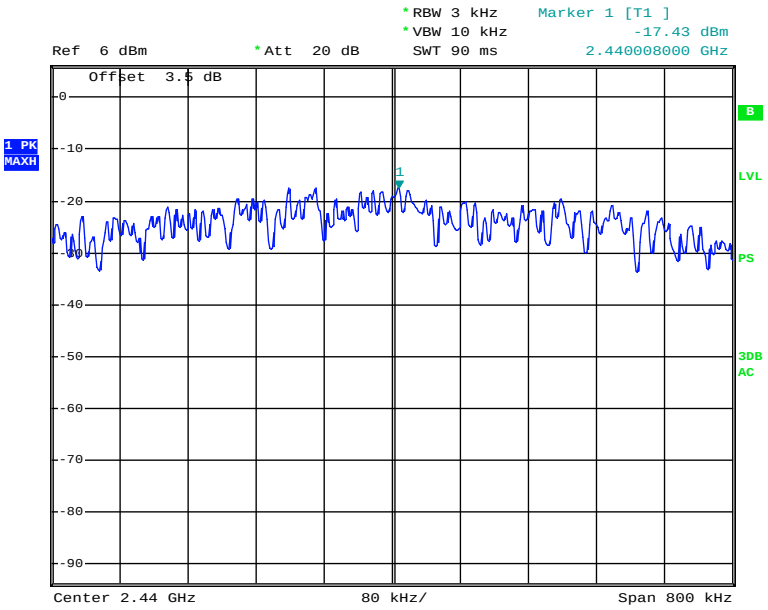
Date: 28.DEC.2012 18:33:49

Low Channel (3 kHz)



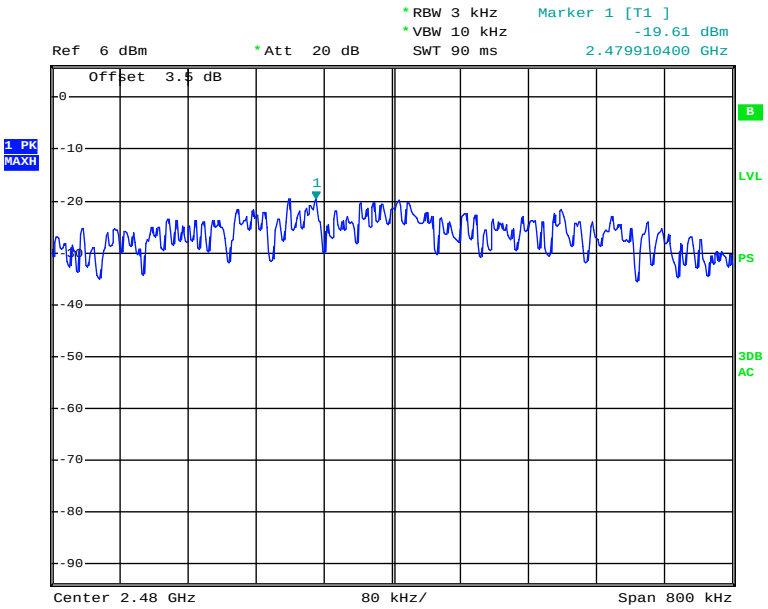
Date: 28.DEC.2012 18:31:54

Middle Channel (3 kHz)



Date: 28.DEC.2012 18:31:20

High Channel (3 kHz)



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