Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Zhuhai Unitech Power Technology Co., Ltd.

No.102, Yinhua Road, Xiangzhou, Zhuhai, Guangdong, China

FCC ID: Z5FIKEYMU-1

Report Type:	**Product Type:**
Original Report	Smart Key(Zigbee)

Test Engineer:	Eric Lee
Report Number:	RSZ111013010-00A
Report Date:	2012-02-07
Reviewed By:	Alvin Huang EMC 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 *Zhuhai Unitech Power Technology Co., Ltd.*'s product, model number: *iKeyMU-1_F (FCC ID: Z5FIKEYMU-1)* (the "EUT") in this report is a *Smart Key*, which was measured approximately: 13.2 cm (L) x 7.2 cm (W) x 3.1 cm (H), rated input voltage: DC 4.2V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1110042 (Assigned by BACL, Shenzhen). The EUT was received on 2011-10-13.*

Objective

This report is prepared on behalf of *Zhuhai Unitech Power Technology Co., Ltd.* 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 DTS submissions with FCC ID: Z5FIADAPTERL
FCC Part 15C DXX submissions with FCC ID: Z5FIKEYMU-1

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.

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

Test Facility

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

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

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode which was selected by manufacturer.

EUT Exercise Software

Software was provided by client.

Equipment Modifications

No modifications were made to the unit tested.

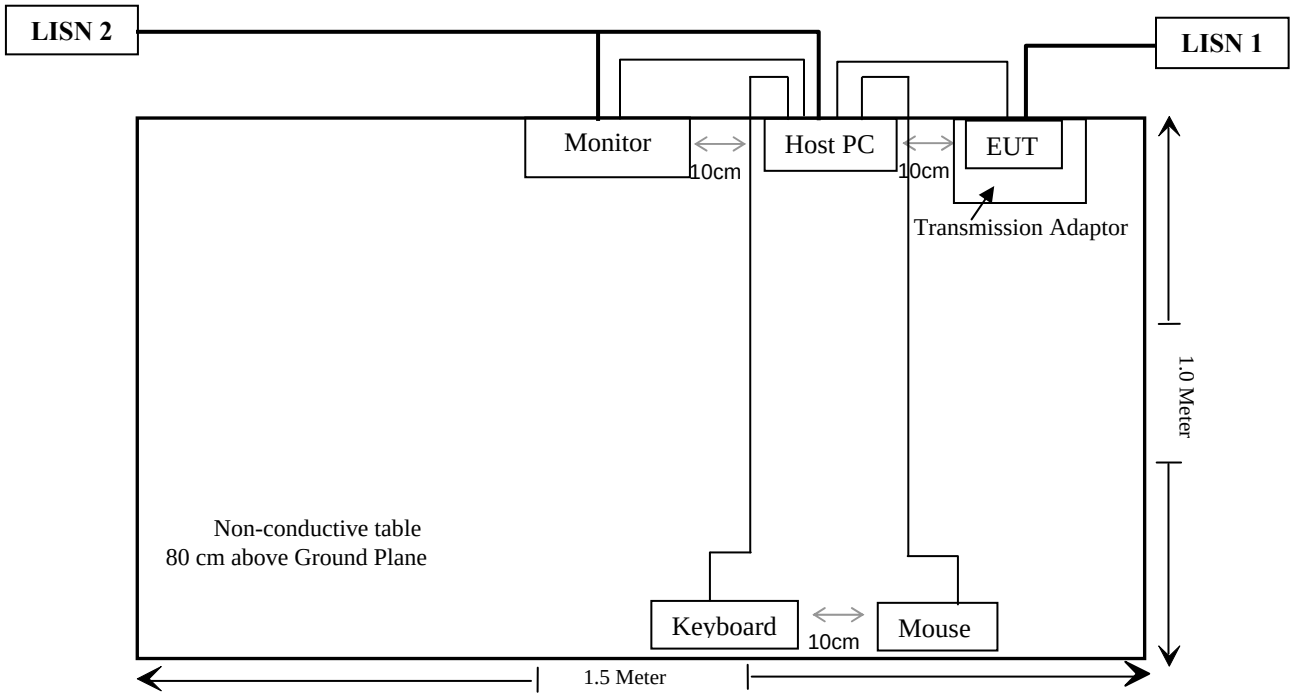
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Host PC	1#	N/A
DELL	Keyboard 1#	L100	CNORH656658907BL04TY
DELL	Mouse 1#	MOC5UO	G1B0096D
SAMSUNG	Monitor	225MS	CR22HV2P401073M
Zhuhai Unitech Power Technology Co., Ltd	Transmission Adaptor	iAdapterL-2_FU	N/A

External I/O Cabling List and Details

Cable Description	Length (m)	From	To
Shielded Detachable Keyboard Cable	1.5	Keyboard Port/Host	Host PC
Shielded Detachable Mouse Cable	1.2	Mouse Port/Host	Host PC
Unshielded Detachable VGA Cable	1.5	VGA Port/Host	Monitor
Unshielded Detachable RS-232 Cable	1.0	EUT	Host PC

Block Diagram of Test Setup



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 Emission 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)

Standard Applicable

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
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2440	3	1.995	21.82	152.05	20	0.060	1.0

Result: The device meets FCC MPE limit at 20 cm distance.

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 owns one monopole antennas, which in accordance to section 15.203, the maximum gain is 3 dBi; please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

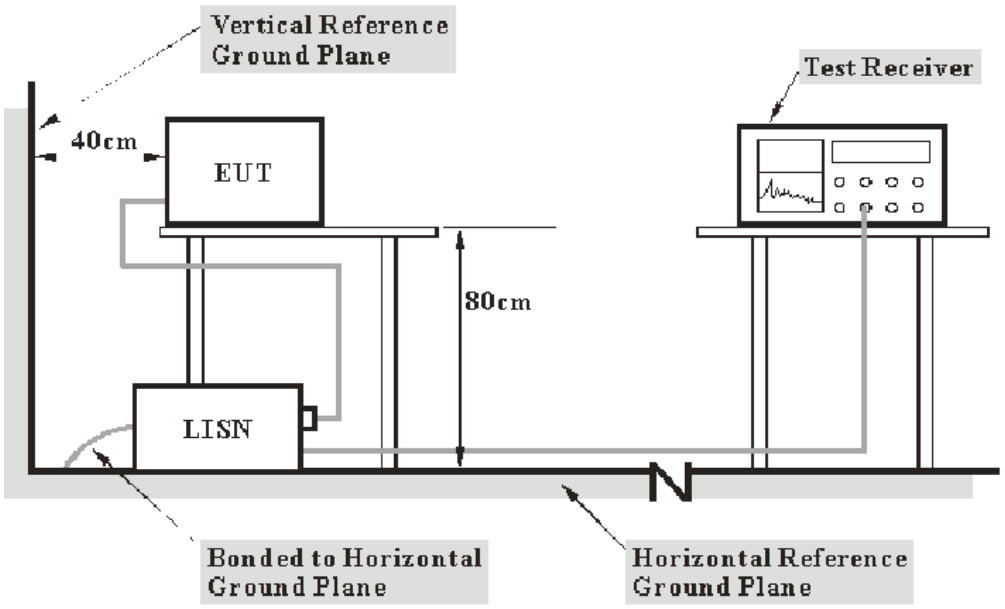
FCC §15.207

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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence).

EUT Setup



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

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

The 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 Procedure

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

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

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

Test Equipment List and Details

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

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

Test 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:

10.89 dB at **27.120 MHz** in the **Line** conducted mode

Test Data

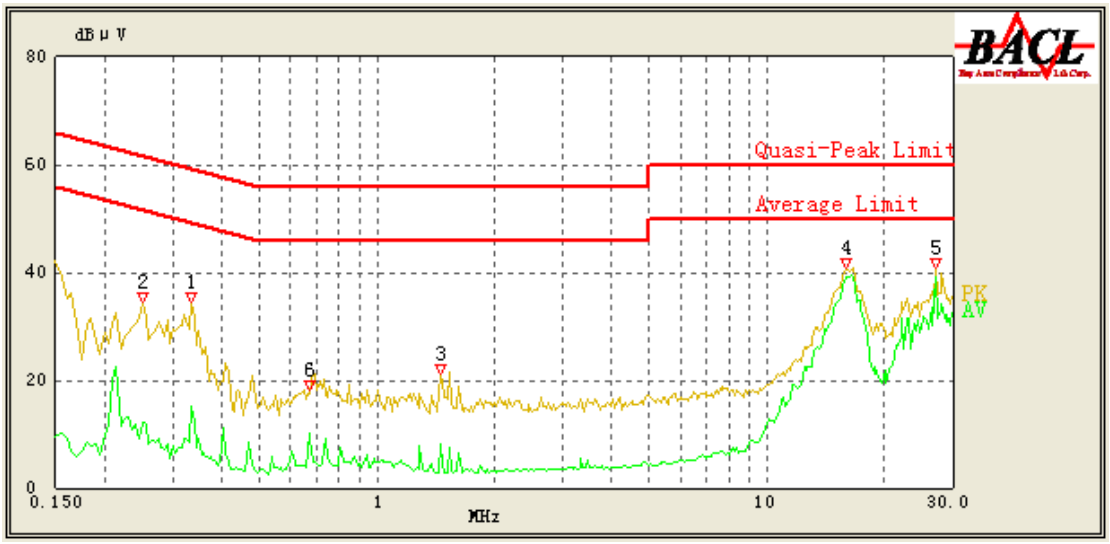
Environmental Conditions

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

The testing was performed by Eric Lee on 2011-11-16.

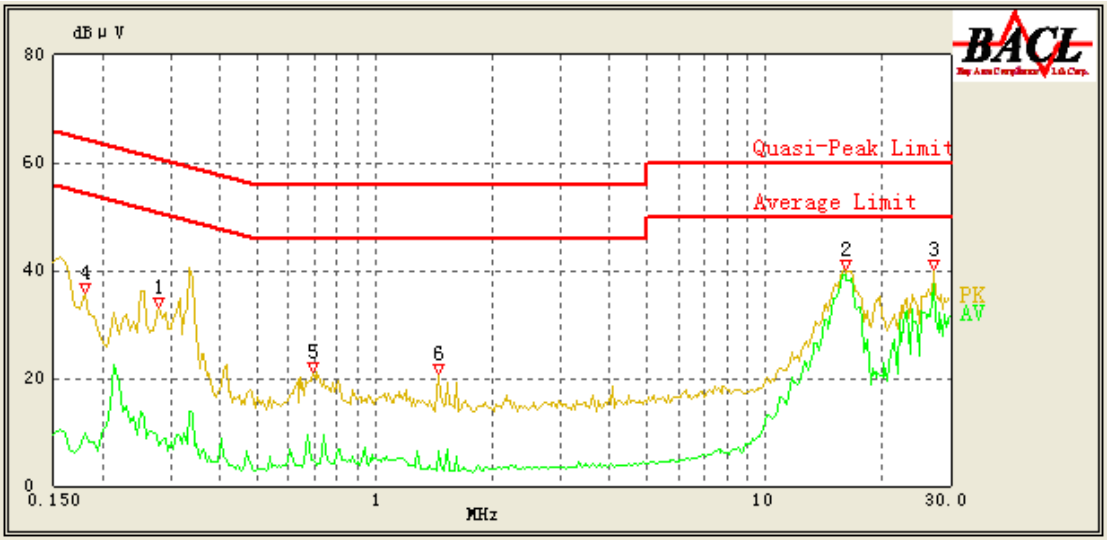
Test Mode: Charging

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
27.120	39.11	12.66	50.00	10.89	Ave.
16.045	39.02	11.46	50.00	10.98	Ave.
27.120	38.98	12.66	60.00	21.02	QP
0.250	29.14	10.23	63.14	34.00	QP
0.335	15.13	10.23	50.71	35.58	Ave.
0.335	25.01	10.23	60.71	35.70	QP
0.670	10.21	10.24	46.00	35.79	Ave.
1.460	8.05	10.28	46.00	37.95	Ave.
1.460	17.02	10.28	56.00	38.98	QP
0.250	12.30	10.23	53.14	40.84	Ave.
16.045	18.51	11.46	60.00	41.49	QP
0.670	14.23	10.24	56.00	41.77	QP

AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
16.090	39.08	11.46	50.00	10.92	Ave.
27.120	37.59	12.66	50.00	12.41	Ave.
27.120	39.02	12.66	60.00	20.98	QP
16.090	31.39	11.46	60.00	28.61	QP
1.460	6.57	10.28	46.00	39.43	Ave.
1.460	16.46	10.28	56.00	39.54	QP
0.690	14.94	10.24	56.00	41.06	QP
0.690	4.87	10.24	46.00	41.13	Ave.
0.280	20.15	10.23	62.29	42.14	QP
0.280	7.63	10.23	52.29	44.66	Ave.
0.180	9.83	10.23	55.14	45.31	Ave.
0.180	19.15	10.23	65.14	45.99	QP

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

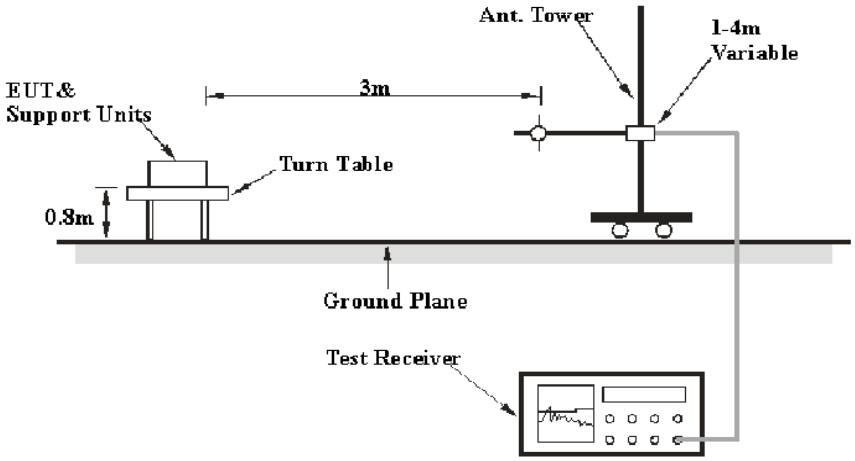
Measurement Uncertainty

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.

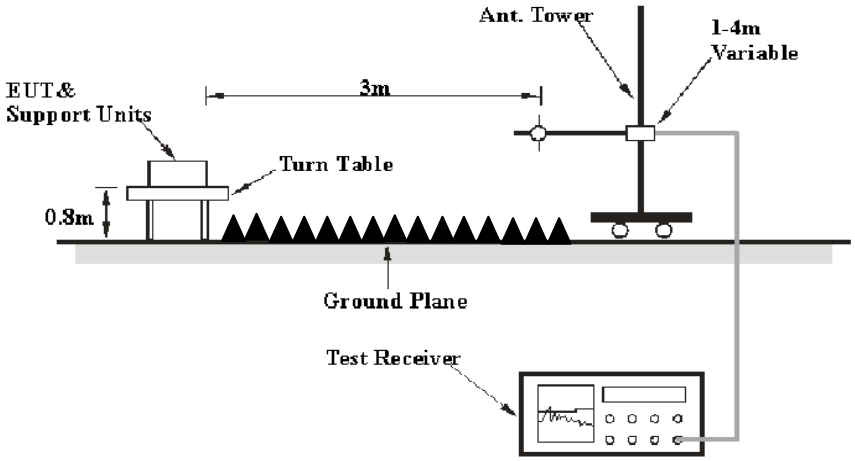
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ±4.0 dB(k=2, 95% level of confidence) .

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2003. 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***	***Detector***
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	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-1 GHz, 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	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	2011-03-11	2012-03-10
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-05-05	2012-05-04

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

Test 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:

6.42 dB at **2390 MHz** in the **Horizontal** polarization

Test Data

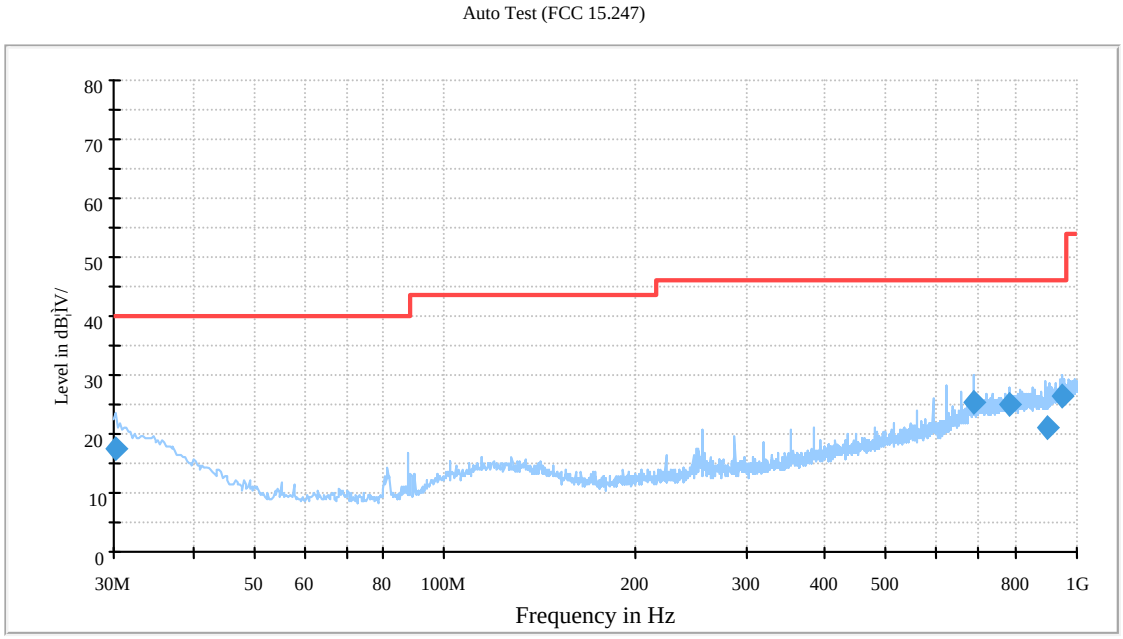
Environmental Conditions

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

The testing was performed by Eric Lee on 2011-11-21.

1) Below 1 GHz:

Test Mode: simultaneous transmission for Zigbee & RFID 125 kHz (worst case at Low channel)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
950.662250	26.4	172.0	H	300.0	0.6	46.0	19.6
687.967250	25.3	189.0	V	276.0	-3.5	46.0	20.7
784.033000	25.1	123.0	V	135.0	-2.0	46.0	20.9
30.237229	17.5	172.0	V	7.0	-5.5	40.0	22.5
898.031250	21.0	401.0	H	214.0	-0.9	46.0	25.0

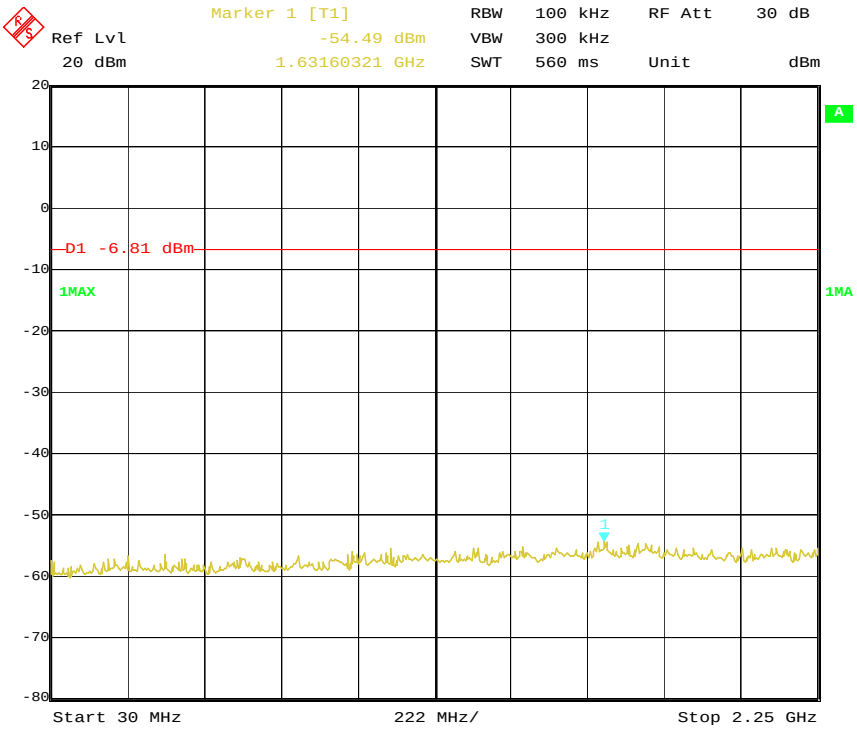
Note: the data which below the limit 20dB was not recorded.

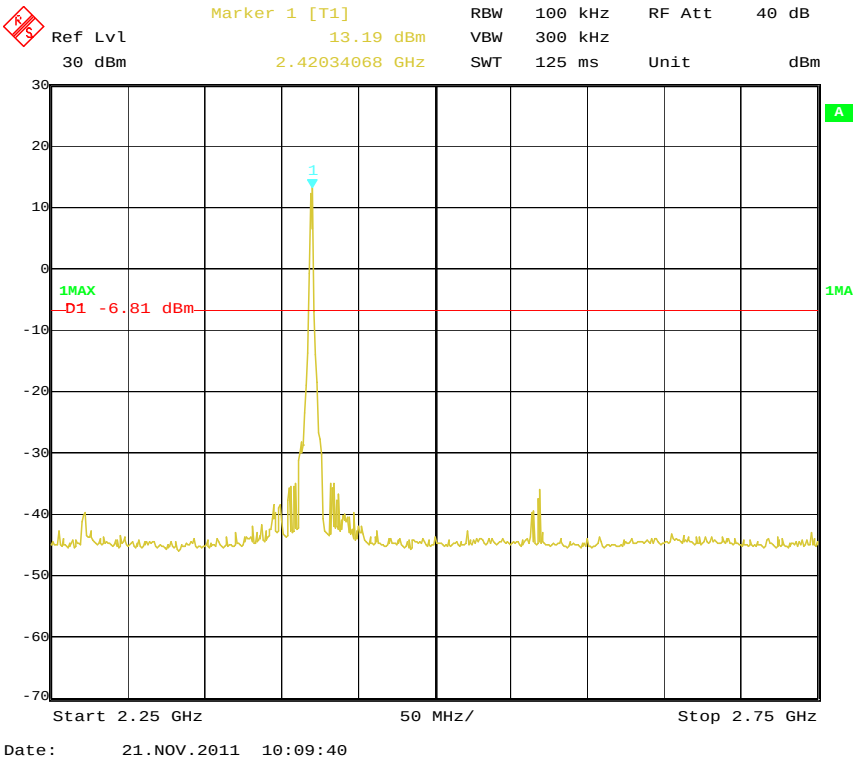
2) Above 1 GHz

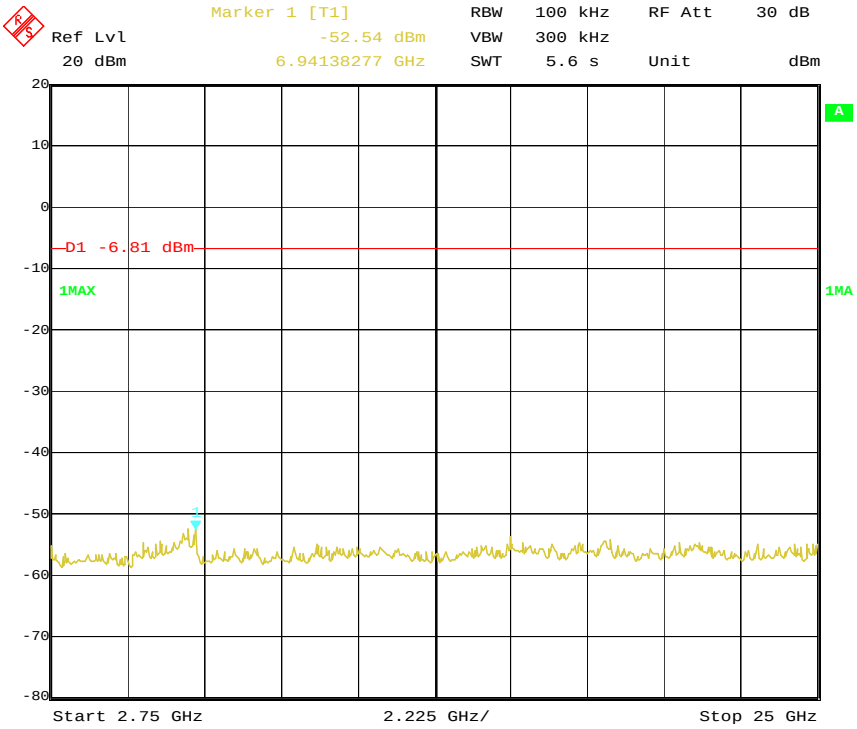
Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2420 MHz)												
2390	60.83	PK	350	2.0	H	30.6	2.98	26.83	67.58	74	6.42	spurious
2390	59.34	PK	270	1.6	V	30.6	2.98	26.83	66.09	74	7.91	spurious
4840	44.56	PK	140	1.5	H	36.0	4.30	26.75	58.11	74	15.89	harmonic
4840	23.55	Ave.	140	1.5	H	36.0	4.30	26.75	37.10	54	16.90	harmonic
4840	21.02	Ave.	180	1.4	V	34.8	4.30	26.75	33.37	54	20.63	harmonic
2390	24.87	Ave.	350	2.0	H	30.6	2.98	26.83	31.62	54	22.38	spurious
2390	24.30	Ave.	270	1.6	V	30.6	2.98	26.83	31.05	54	22.95	spurious
4840	37.89	PK	180	1.4	V	34.8	4.30	26.75	50.24	74	23.76	harmonic
Middle Channel (2440 MHz)												
4880	42.57	PK	125	1.4	H	36.10	4.35	26.75	56.27	74	17.73	harmonic
4880	22.54	Ave.	125	1.4	H	36.10	4.35	26.75	36.24	54	17.76	harmonic
4880	21.13	Ave.	50	1.8	V	34.90	4.35	26.75	33.63	54	20.37	harmonic
4880	38.49	PK	50	1.8	V	34.90	4.35	26.75	50.99	74	23.01	harmonic
High Channel (2460 MHz)												
2483.6	60.55	PK	165	1.5	V	30.6	3.11	26.88	67.38	74	6.62	spurious
2483.6	59.80	PK	168	1.5	H	30.6	3.11	26.88	66.63	74	7.37	spurious
4920	22.84	Ave.	350	1.6	H	36.4	4.40	26.75	36.89	54	17.11	harmonic
4920	23.15	Ave.	222	1.8	V	35.2	4.40	26.75	36.00	54	18.00	harmonic
4920	41.20	PK	350	1.6	H	36.4	4.40	26.75	55.25	74	18.75	harmonic
4920	41.69	PK	222	1.8	V	35.2	4.40	26.75	54.54	74	19.46	harmonic
2483.6	24.81	Ave.	165	1.5	V	30.6	3.11	26.88	31.64	54	22.36	spurious
2483.6	24.34	Ave.	168	1.5	H	30.6	3.11	26.88	31.17	54	22.83	spurious

Antenna Port Conducted Spurious Emissions:

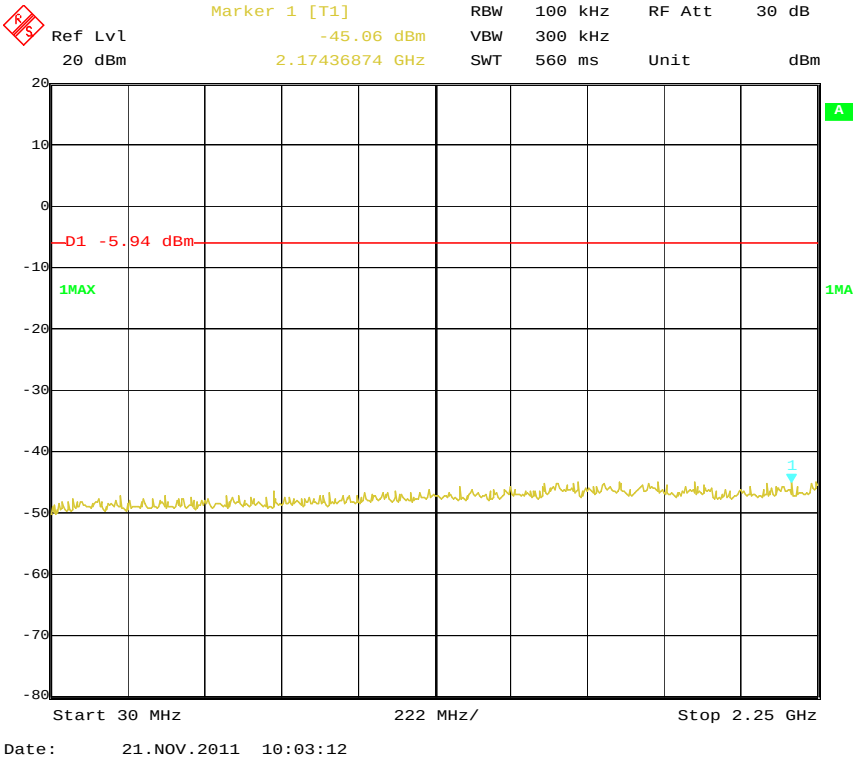
Low Channel

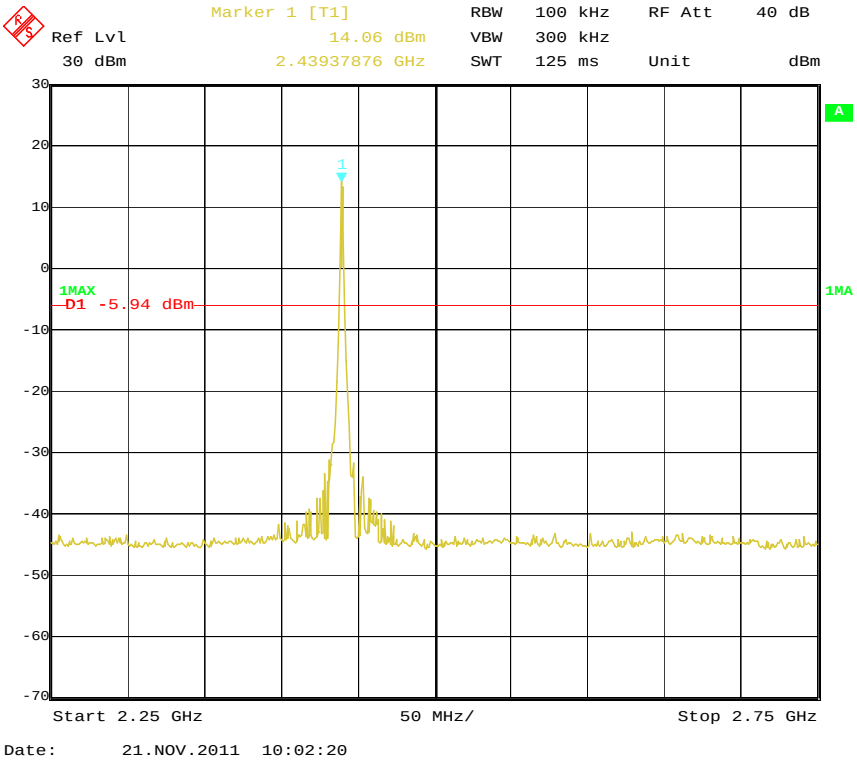






Middle Channel

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RF Att 40 dB
Ref Lvl
14.06 dBm
VBW 300 kHz
30 dBm
2.43937876 GHz
SWT 125 ms
Unit dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
A
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D1 -5.94 dBm
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50 MHz/
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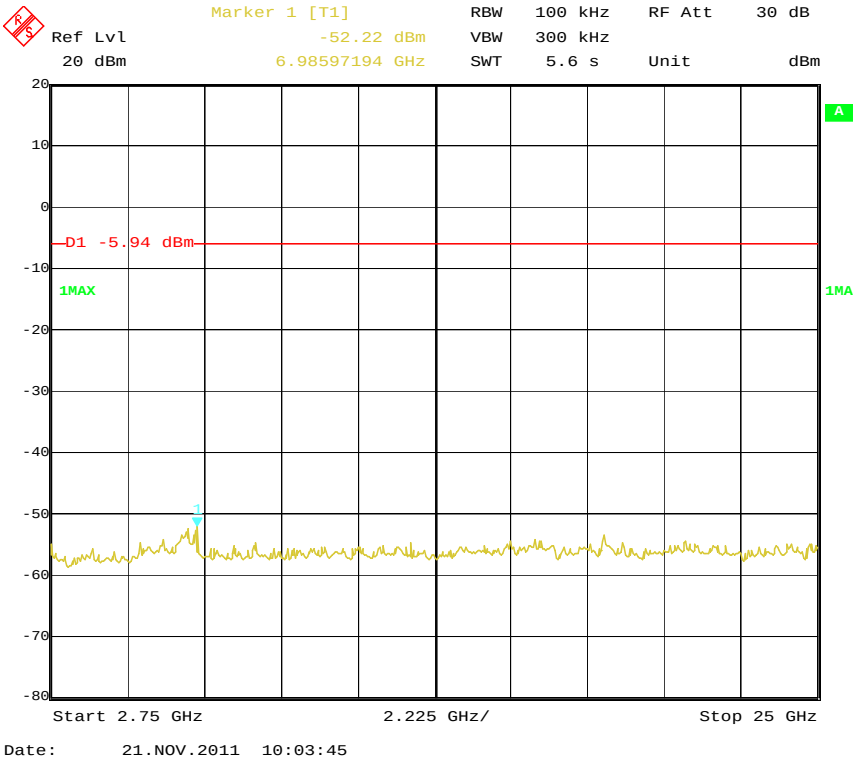
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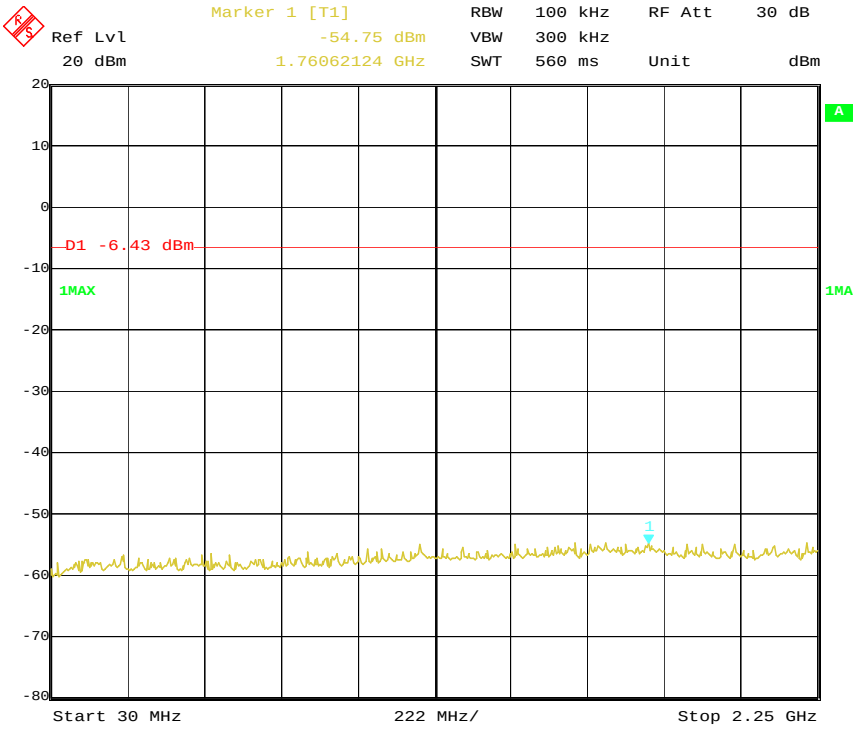
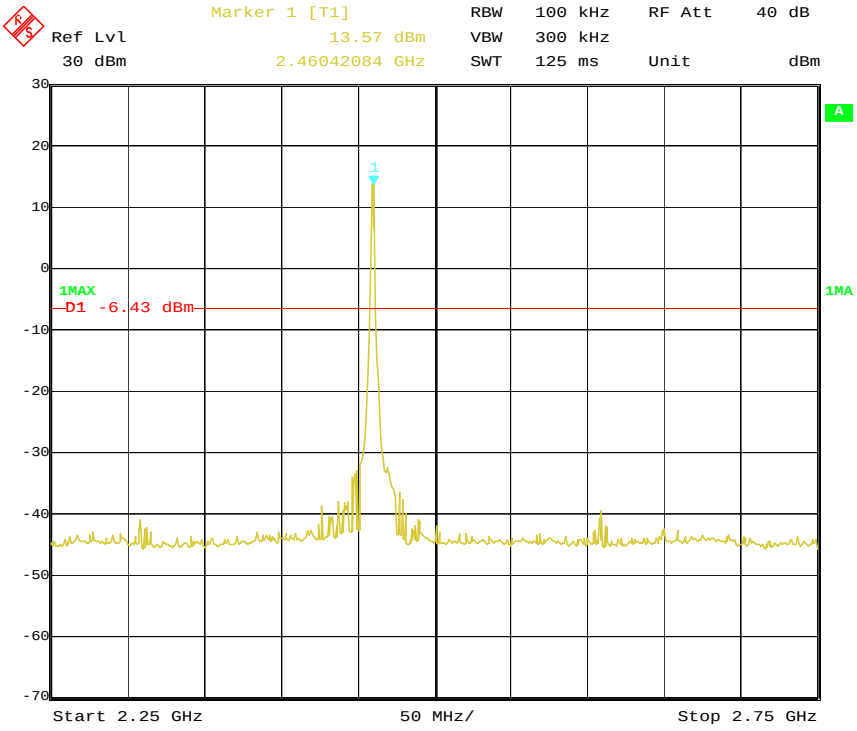
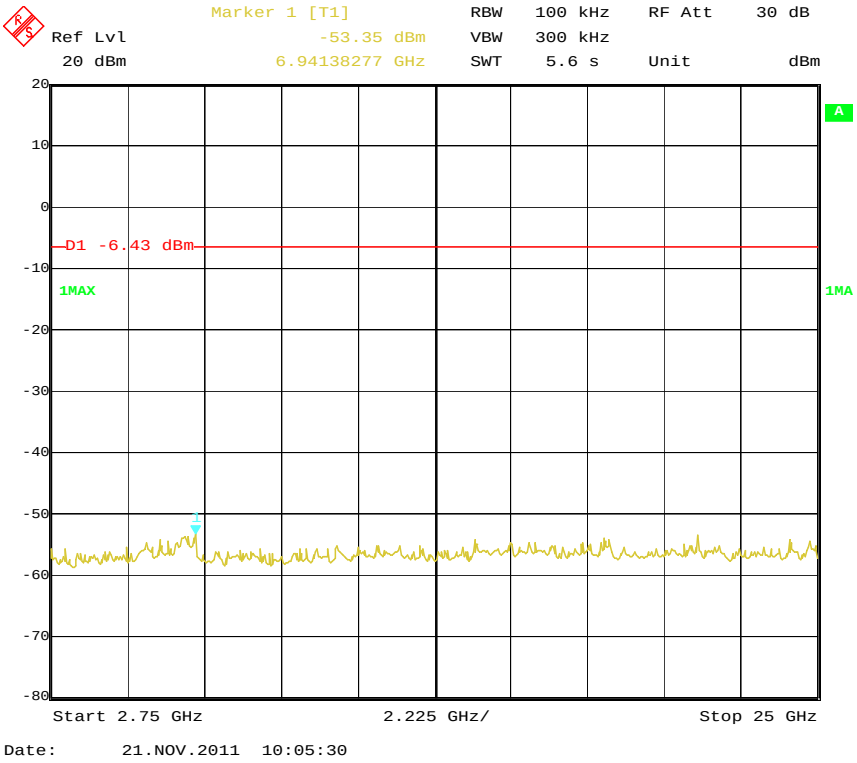
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-52.22 dBm
VBW 300 kHz
20 dBm
6.98597194 GHz
SWT 5.6 s
Unit dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
A
1
D1 -5.94 dBm
1MAX
1MA
Start 2.75 GHz
2.225 GHz/
Stop 25 GHz
Date: 21.NOV.2011 10:03:45

High Channel






Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-53.35 dBm
VBW 300 kHz
20 dBm
6.94138277 GHz
SWT 5.6 s
Unit dBm
D1 -6.43 dBm
1MAX
1MA
A
Start 2.75 GHz
2.225 GHz/
Stop 25 GHz
Date: 21.NOV.2011 10:05:30

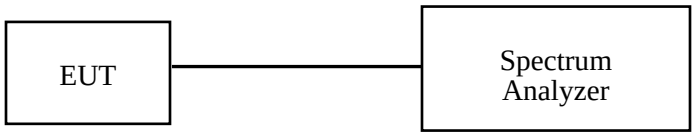
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

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	100035	2011-11-11	2012-11-10

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

Test Data

Environmental Conditions

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

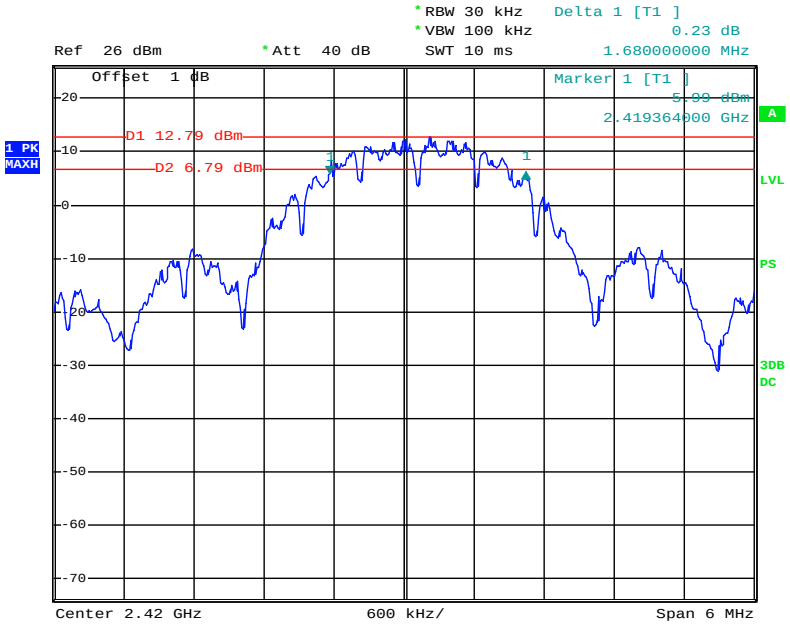
The testing was performed by Eric Lee on 2011-12-03.

Test Result: Pass.

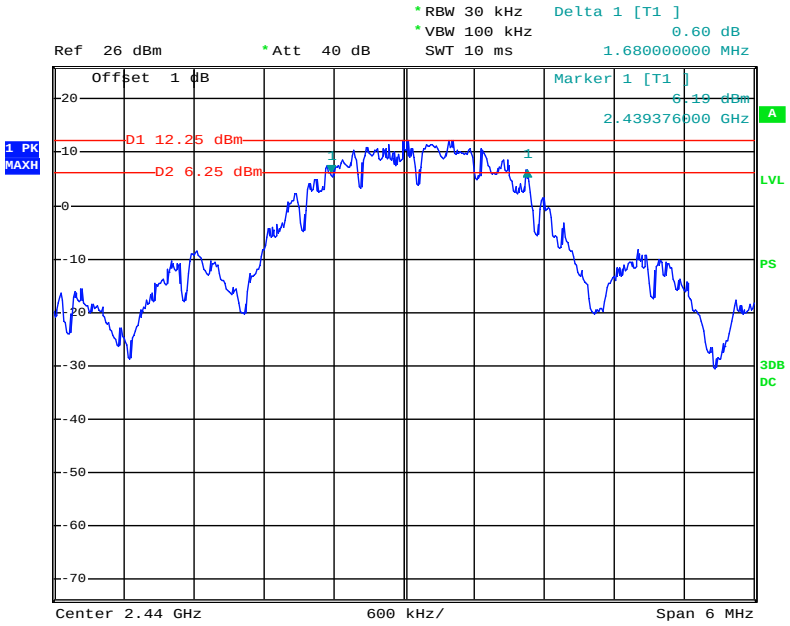
Please refer to the following tables and plots.

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	FCC Part 15.247 Limit (kHz)
Low	2420	1.680	>500
Middle	2440	1.680	>500
High	2460	1.668	>500

Low Channel

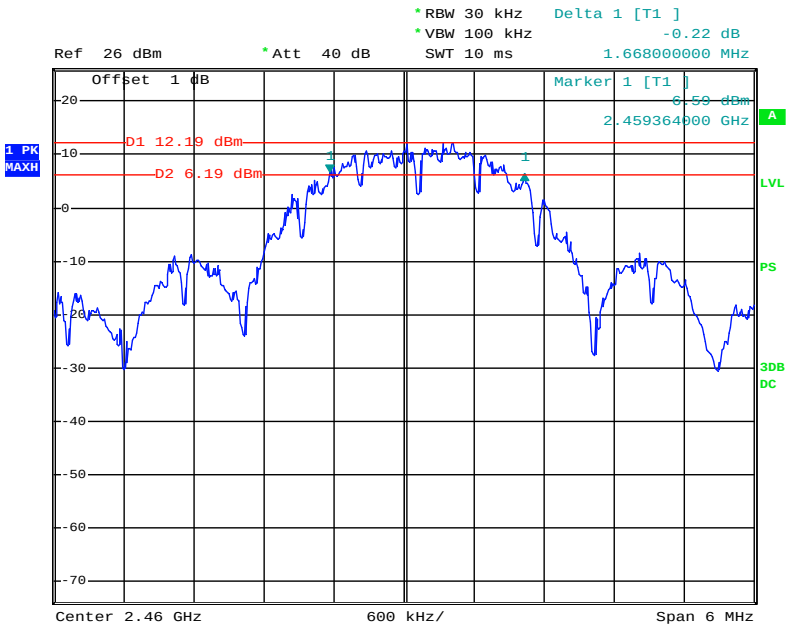


Middle Channel



Date: 24.NOV.2011 05:04:49

High Channel



Date: 24.NOV.2011 06:14:05

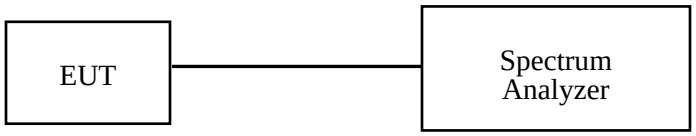
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §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 Procedure

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 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 in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

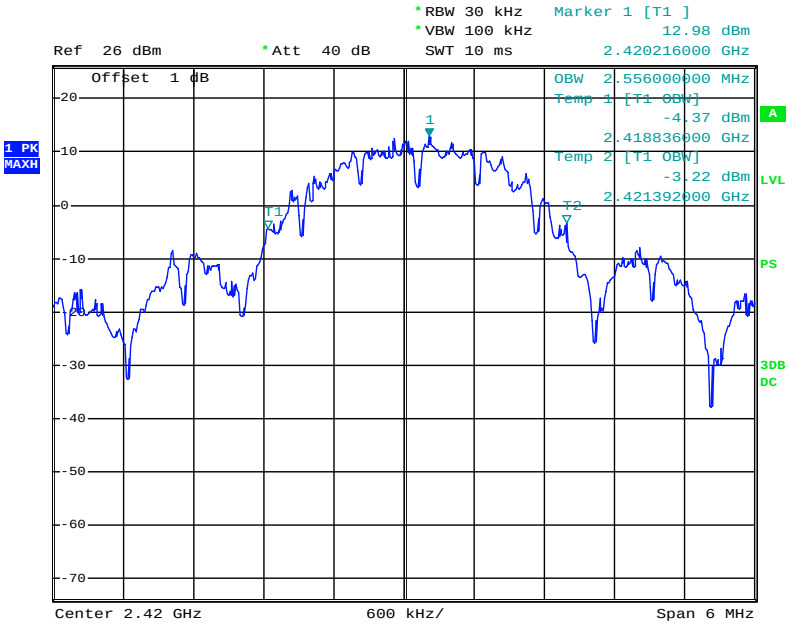
Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2011-11-24.

Test Mode: Transmitting

Channel	Frequency (MHz)	Reading Power (dBm)	Limit (dBm)	Result
Low	2420	21.66	30	Pass
Middle	2440	21.82	30	Pass
High	2460	21.61	30	Pass

99% Occupied Bandwidth, Low Channel



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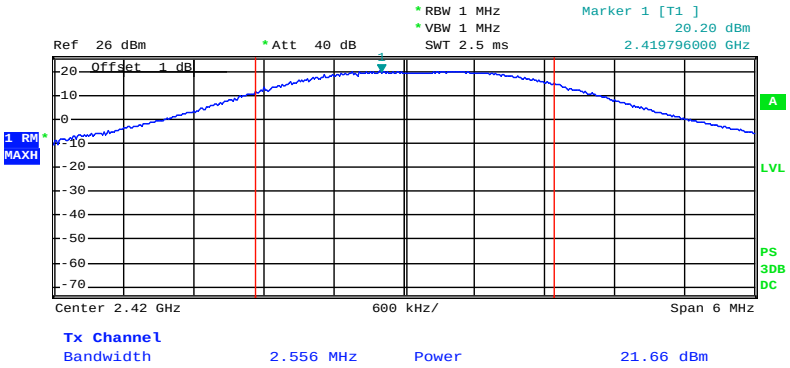
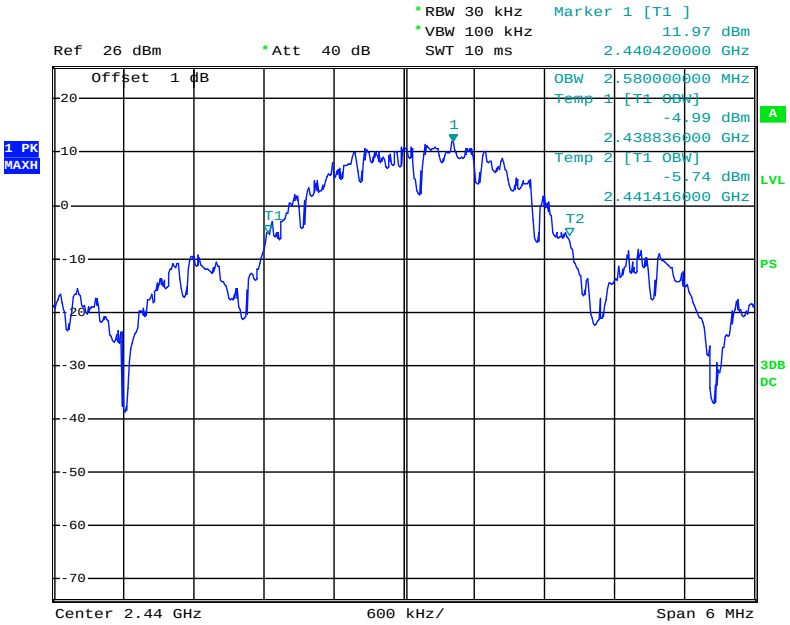
RF Output Power, Low Channel



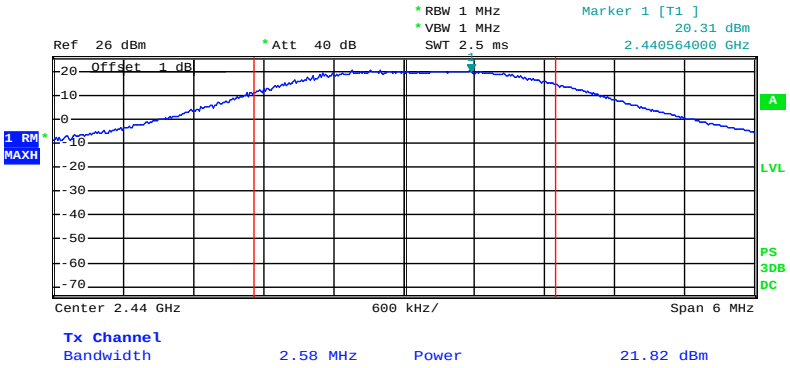
Date: 24.NOV.2011 05:45:25

99% Occupied Bandwidth, Middle Channel



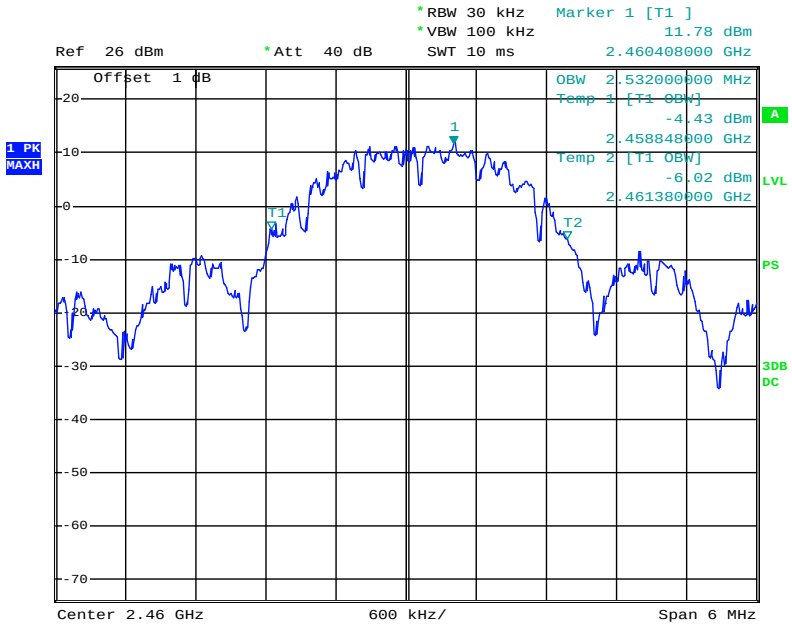
Date: 24.NOV.2011 05:06:29

RF Output Power, Middle Channel



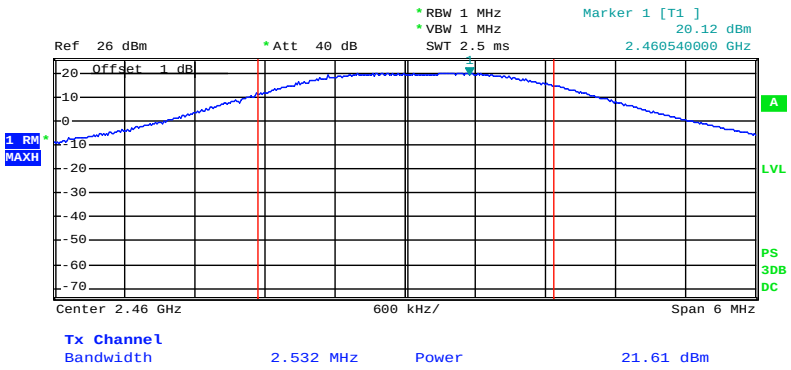
Date: 24.NOV.2011 05:07:46

99% Occupied Bandwidth, High Channel



Date: 24.NOV.2011 06:16:07

RF Output Power, High Channel



Date: 24.NOV.2011 06:17:09

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

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 1 MHz and VBW of spectrum analyzer to 1 MHz 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	100035	2011-11-11	2012-11-10

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

Test Data

Environmental Conditions

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

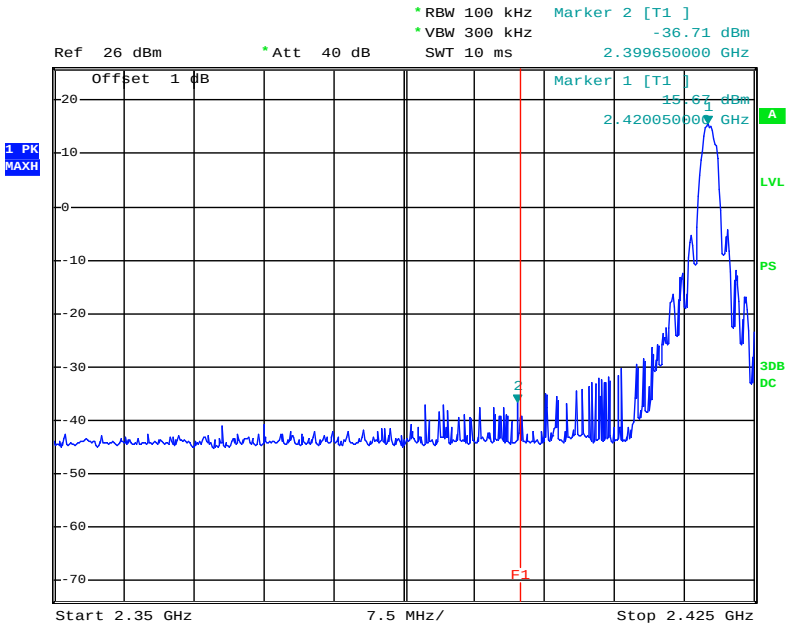
The testing was performed by Eric Lee on 2011-11-24.

Test Result: *Compliance*

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	⩾Limit (dBc)	Result
Low	2399.650	52.38	20	Pass
High	2491.658	54.00	20	Pass

Please refer to following plots.

Band Edge, Left Side



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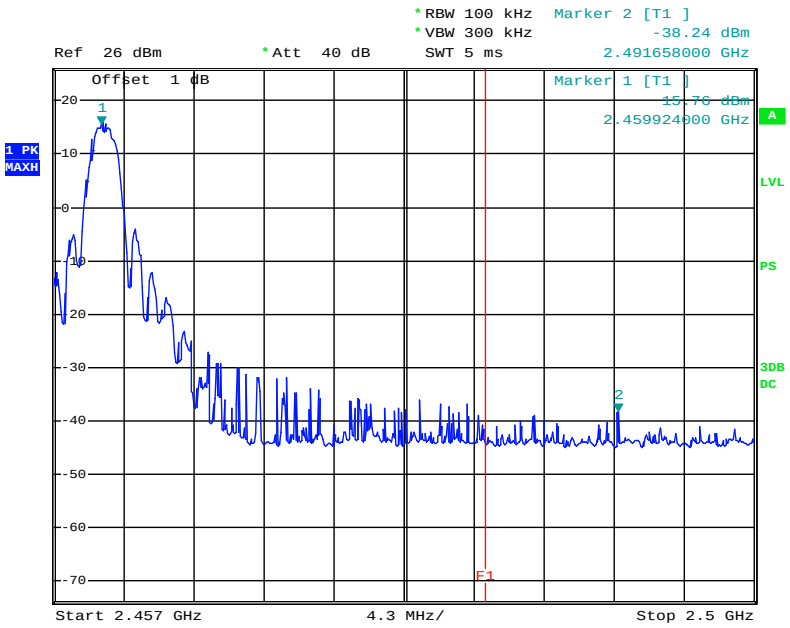
Band Edge, Right Side



Date: 24.NOV.2011 06:24:01

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

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 was set 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. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
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	100035	2011-11-11	2012-11-10

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

Test Data

Environmental Conditions

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

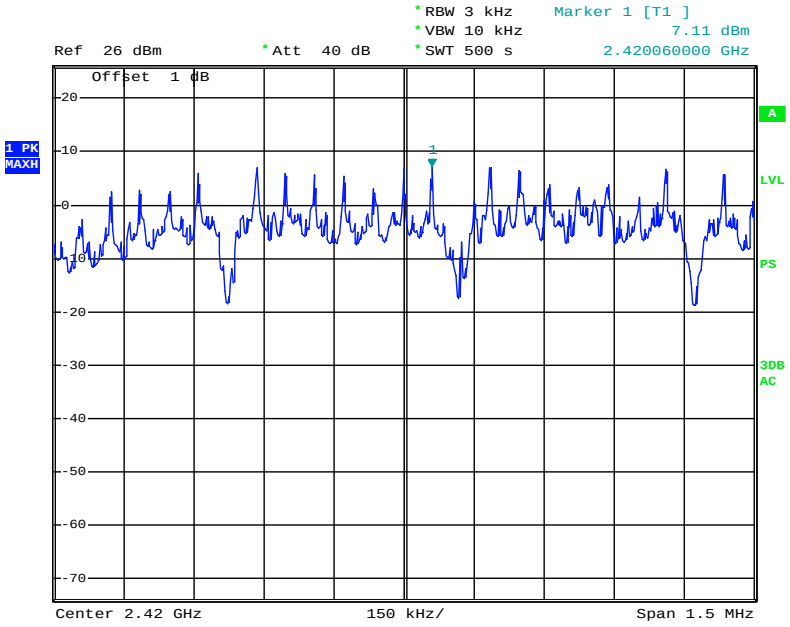
The testing was performed by Eric Lee on 2011-11-24.

Test Mode: Transmitting

Test Result: Pass

Channel	Frequency (MHz)	Reading Power Spectral Density (dBm)	Limit (dBm)	Result
Low	2420	7.11	8	Pass
Middle	2440	7.55	8	Pass
High	2460	7.16	8	Pass

Power Spectral Density, Low Channel



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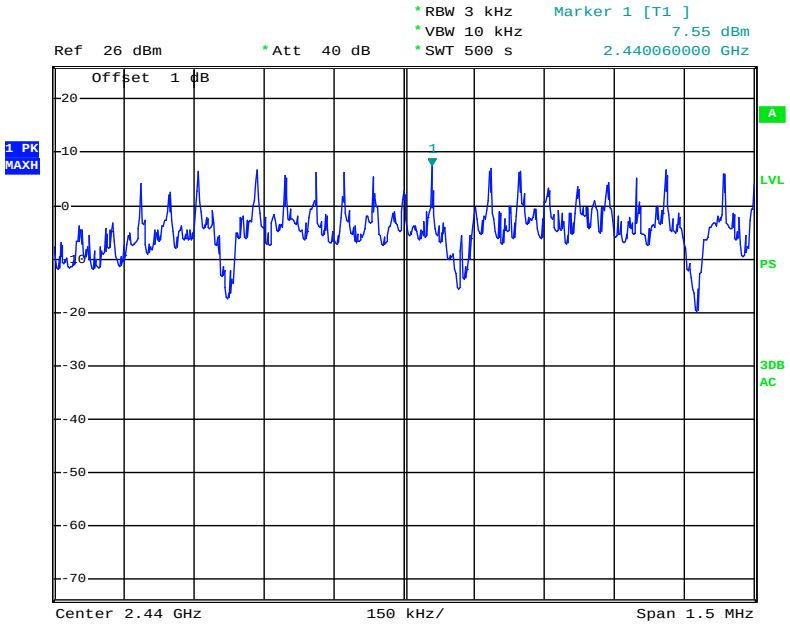
Power Spectral Density, Middle Channel



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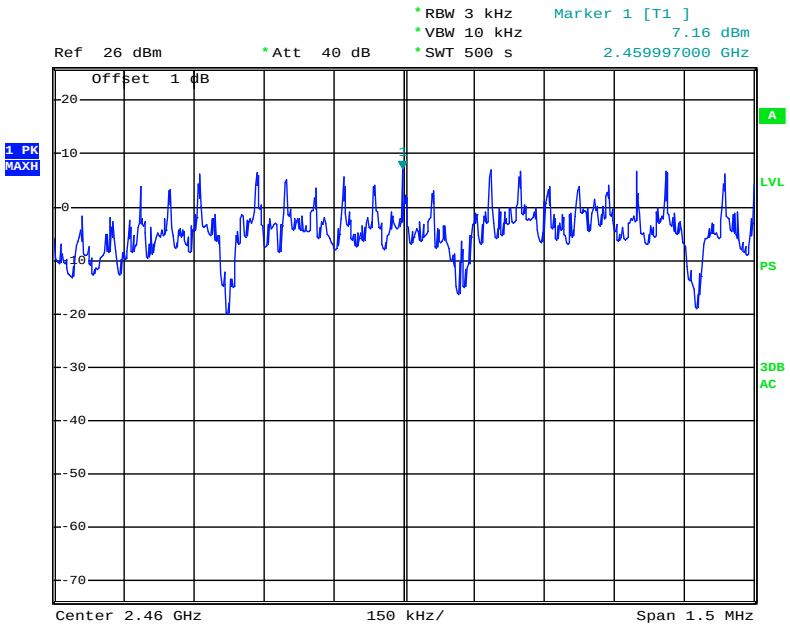
Power Spectral Density, High Channel



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