



FCC PART 15.247 MEASUREMENT AND TEST REPORT

For

EYO ASIA ELECTRONIC CO.,LTD

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Report Type: Original Report	Product Type: GSM Mobile Phone
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *EYO ASIA ELECTRONIC CO.,LTD*'s product, model number: *A060* or the "EUT" as referred to in this report is a *GSM Mobile Phone*, which measures approximately:

111.0 mm (L) x 61.0 mm (W) x 15.0 mm (H), rated input voltage: DC 3.7V Rechargeable Li-ion battery or DC 5.0 V adapter for charging.

Frequency Range:

Cellular Band: 824-849 MHz (TX), 869-894 MHz (RX)
PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)
Bluetooth: 2402-2480MHz (TX/ RX)
WI-FI IEEE 802.11b/g: 2412-2462MHz (TX/RX)

Modulation Mode: GSM/PCS: GMSK; Bluetooth: GFSK; WI-FI: DSSS/OFDM

Transmitter Output Power:

Cellular Band: 32±2dBm
PCS Band: 30±2dBm
Bluetooth: -6~4dBm
WI-FI IEEE 802.11b: 16±2dBm; IEEE 802.11g: 13±2dBm

Adapter information:

Input: 100-240VAC 50/60Hz 150mA;

Output: 5.0V 600mA

Objective

This Type approval report is prepared on behalf of *EYO ASIA ELECTRONIC 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.

Test Methodology

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

All radiated and conducted emissions measurements were performed at ShenZhen Emtex Co.,Ltd . The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by ShenZhen Emtex Co.,Ltd to collect test data is located in Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China.

Test site at ShenZhen Emtex Co.,Ltd 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 March 18, 2008 and October 28, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 709623 and 406365. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacturer.

EUT Exercise Software

N/A

Equipment Modifications

No modification was made to the unit tested.

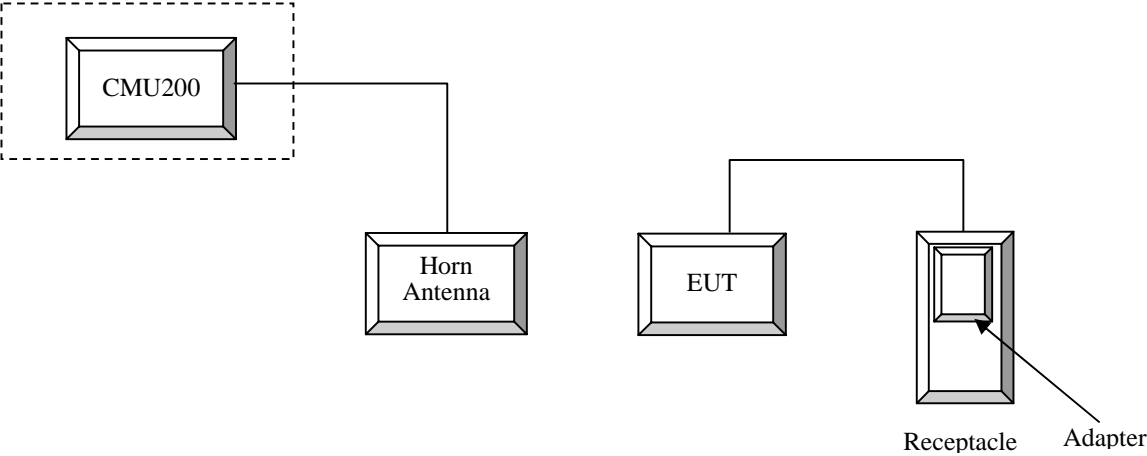
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
R & S	Universal Radio CommutationTester	CMU200	102910	DoC

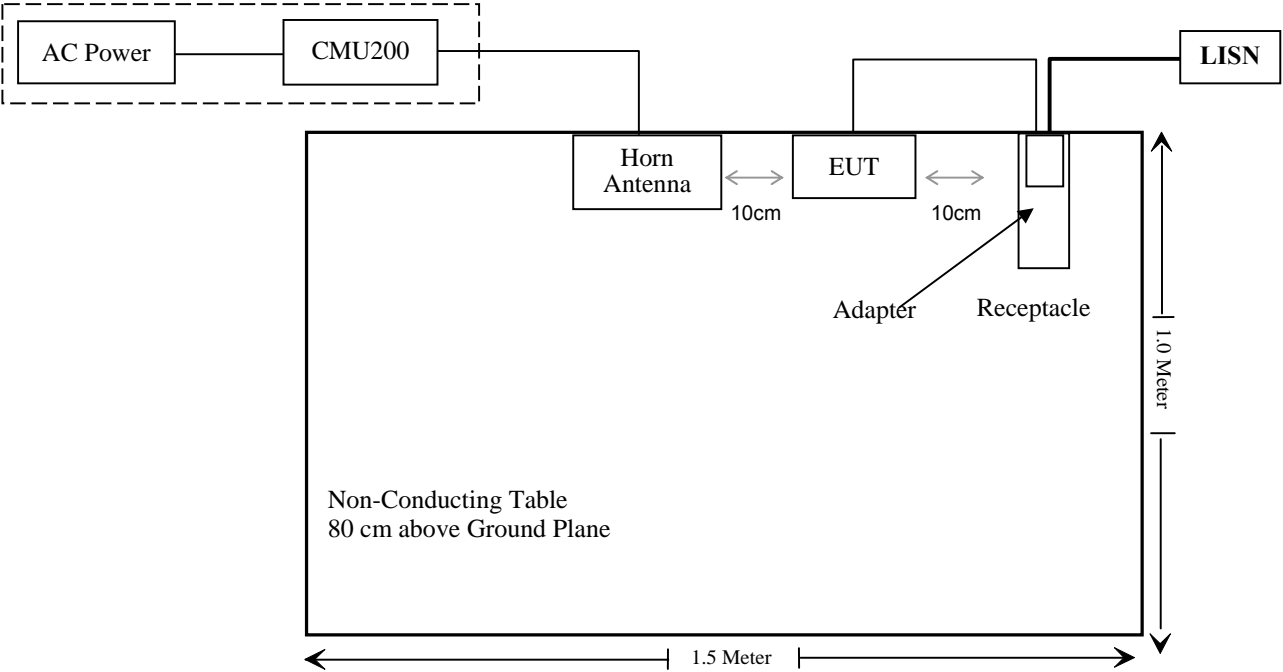
External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable Power Cable	0.8	EUT	Adapter

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

Note: The uncertainty of any RF test which use conducted method measurement is ± 1.0 dB.

The uncertainty of any radiation emissions measurement is ± 4.0 dB.

FCC §15.247 (i) and §2.1093 – RF Exposure

Applicable Standard

According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	<u>SAR not required:</u> <u>Unlicensed only</u>
Unlicensed Transmitters	<p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> output ≤ 60/f: SAR not required output > 60/f: stand-alone SAR required <p><u>When there is simultaneous transmission –</u> <u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> output $\leq 2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas output $\leq P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas output $\leq P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR < 1.2 W/kg <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> test SAR on highest output channel for each wireless mode and exposure condition if SAR for highest output channel is $> 50\%$ of SAR limit, evaluate all channels according to normal procedures 	<ul style="list-style-type: none"> when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <p><u>Licensed & Unlicensed</u></p> <ul style="list-style-type: none"> when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 <p><u>SAR required:</u> <u>Licensed & Unlicensed</u></p> <p>antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition</p> <p>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</p>
Jaw, Mouth and Nose	<p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations 	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Result:

Please refer to SAR report released by *Compliance Certification Service Inc.*, Report No: KS110623B03.

The SAR measurement is exempt.

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 a PIFA antenna of Bluetooth, the maximum gain is 0 dBi, which in accordance to section 15.203, Please see EUT photo for details.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

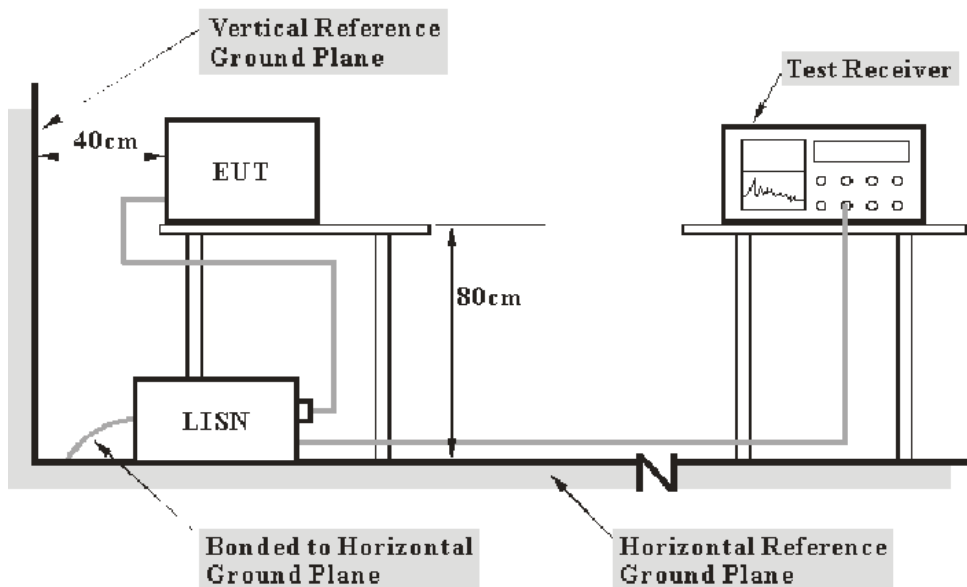
FCC §15.207

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 ShenZhen Emtex Co.,Ltd is ± 2.4 dB.

EUT Setup



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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	834549/006	2010-09-07	2011-09-06
Rohde & Schwarz	L.I.S.N.	ENV216	834548/112	2010-09-07	2011-09-06
Rohde & Schwarz	EMI Test Receiver	ESCS30	828985/018	2010-09-07	2011-09-06

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

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:

10.74 dB at 12.865 MHz in the Neutral conducted mode

Test Data

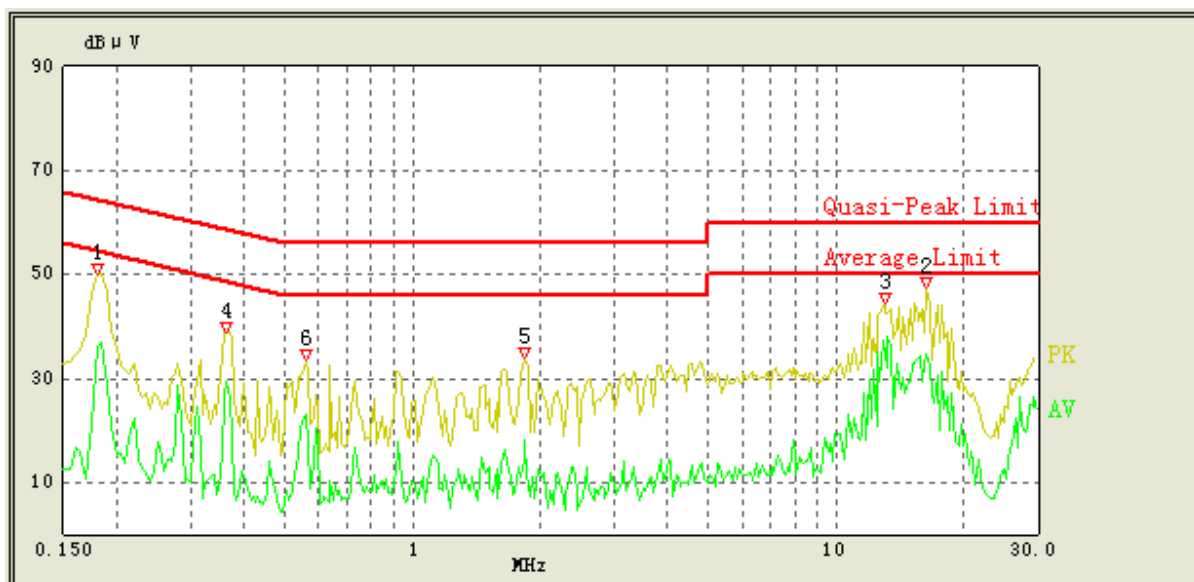
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	50 %
ATM Pressure:	100.0kPa

** The testing was performed by Simon Mo on 2011-06-23.*

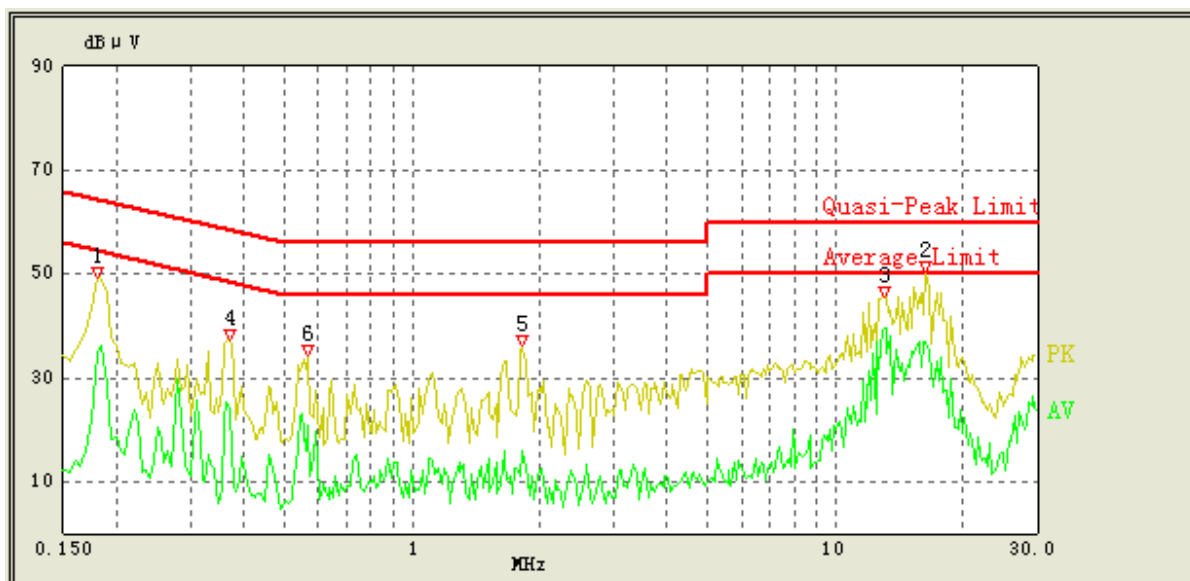
Test Mode: Charging & communicating

AC 120V/60 Hz, Line



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.180	10.08	40.24	65.14	24.90	QP
0.180	10.08	36.25	55.14	18.89	Ave
16.360	10.16	35.06	60.00	24.94	QP
16.345	10.16	34.80	50.00	15.20	Ave
13.020	10.13	38.90	60.00	21.10	QP
12.870	10.13	37.35	50.00	12.65	Ave
0.365	10.06	34.63	59.86	25.23	QP
0.365	10.06	29.29	49.86	20.57	Ave
1.845	10.18	22.62	56.00	33.38	QP
1.845	10.18	18.08	46.00	27.92	Ave
0.560	10.19	28.26	56.00	27.74	QP
0.560	10.19	22.88	46.00	23.12	Ave

AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.180	10.08	35.95	65.14	29.19	QP
0.180	10.08	34.86	55.14	20.28	Ave
16.355	10.16	41.46	60.00	18.54	QP
16.340	10.16	37.10	50.00	12.90	Ave
13.020	10.13	40.96	60.00	19.04	QP
12.865	10.13	39.26	50.00	10.74	Ave
0.370	10.07	27.48	59.71	32.23	QP
0.370	10.07	24.35	49.71	25.36	Ave
1.815	10.18	22.20	56.00	33.80	QP
1.815	10.18	15.93	46.00	30.07	Ave
0.565	10.19	29.62	56.00	26.38	QP
0.565	10.19	20.67	46.00	25.33	Ave

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

Applicable Standard

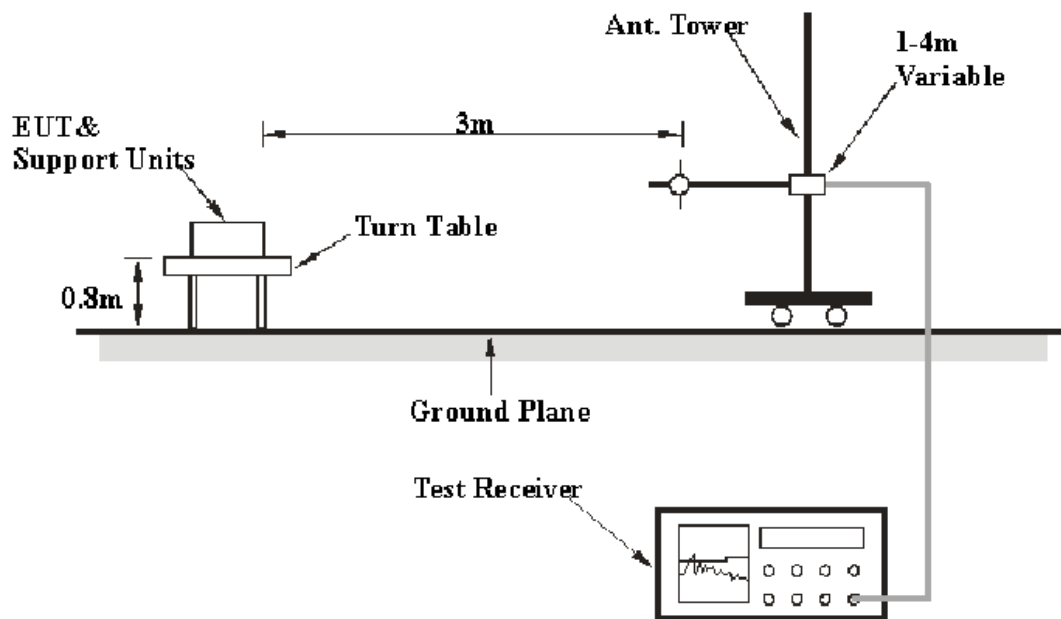
FCC §15.247 (d); §15.209; §15.205;

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 ShenZhen Emtek Co.,Ltd is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B 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.

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>	<i>Detector</i>
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP30	839511/010	2010-09-26	2011-09-25
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07
HP	Amplifier	8447D	2944A07999	2010-10-02	2011-10-02
HP	Amplifier	8449B	2624A00116	2011-03-03	2012-03-02
Schwarzbeck	Horn Antenna	BBHA 9120	D143	2010-09-04	2011-09-03
Schwarzbeck	Bilog Antenna	VULB9163	142	2011-04-12	2012-04-12
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

For the radiated emissions test, the adapter was connected to the outlet of the LISN

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:

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the 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 Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

Below 1GHz:

9.20 dB at **37.696250 MHz** in the **Vertical** polarization

Above 1GHz:

14.72 dB at **4960 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

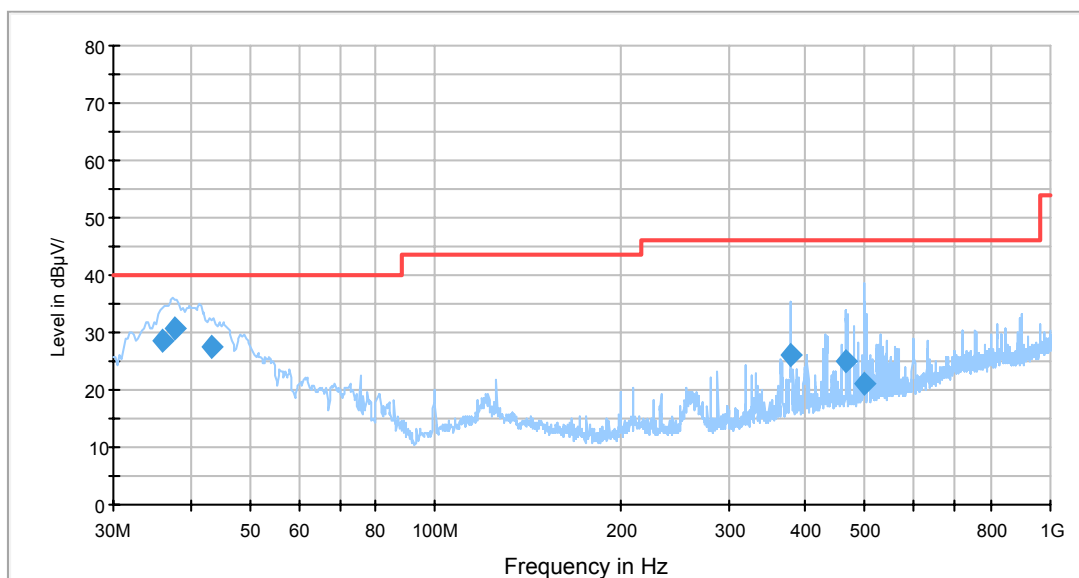
Temperature:	26 °C
Relative Humidity:	50 %
ATM Pressure:	100.0kPa

The testing was performed by Simon Mo on 2011-06-23.

Test Mode: Charging & Transmitting

Below 1 GHz

Auto Test(FCC 15.209)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
37.696250	30.8	100.0	V	119.0	-9.6	40.0	9.2
35.994500	28.7	100.0	V	205.0	-9.5	40.0	11.3
43.281750	27.6	101.0	V	162.0	-10.1	40.0	12.4
377.893750	26.1	184.0	V	170.0	-10.4	46.0	19.9
464.230500	24.9	120.0	H	193.0	-8.9	46.0	21.1
498.424000	20.9	101.0	V	240.0	-8.4	46.0	25.1

Above 1 GHz

Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
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)
Low Channel (2402 MHz)											
4804	42.66	PK	180	1.4	H	36.6	4.30	26.75	56.81	74	17.19
4804	21.58	Ave	160	1.4	H	36.6	4.30	26.75	35.73	54	18.27
4804	43.79	PK	180	1.1	V	35.4	4.30	26.75	56.74	74	17.26
4804	22.36	Ave	150	1.1	V	35.4	4.30	26.75	35.31	54	18.69
Middle Channel (2441 MHz)											
4882	43.05	PK	180	1.8	H	36.6	4.36	26.75	57.26	74	16.74
4882	22.06	Ave	175	1.8	H	36.6	4.36	26.75	36.27	54	17.73
4882	43.87	PK	180	1.1	V	35.4	4.36	26.75	56.88	74	17.12
4882	22.45	Ave	185	1.1	V	35.4	4.36	26.75	35.46	54	18.54
High Channel (2480 MHz)											
4960	45.03	PK	20	1.2	H	36.6	4.40	26.75	59.28	74	14.72
4960	24.15	Ave	0	1.0	H	36.6	4.40	26.75	38.4	54	15.6
4960	45.82	PK	0	1.2	V	35.4	4.40	26.75	58.87	74	15.13
4960	24.76	Ave	20	1.0	V	35.4	4.40	26.75	37.81	54	16.19

Spurious emission in restricted band:

Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205		
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)
2389.26	46.11	PK	20	1.2	H	30.6	2.98	26.83	52.86	74	21.14
2389.26	25.52	Ave	0	1.0	H	30.6	2.98	26.83	32.27	54	21.73
2389.26	49.36	PK	30	1.2	V	30.6	2.98	26.83	56.11	74	17.89
2389.26	30.26	Ave	0	1.0	V	30.6	2.98	26.83	37.01	54	16.99
2483.63	48.57	PK	10	1.0	H	30.6	3.11	26.88	55.4	74	18.60
2483.63	29.73	Ave	0	1.0	H	30.6	3.11	26.88	36.56	54	17.44
2483.63	50.97	PK	0	1.2	V	30.6	3.11	26.88	57.8	74	16.20
2483.63	31.54	Ave	0	1.0	V	30.6	3.11	26.88	38.37	54	15.63

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.9kPa

* The testing was performed by Simon Mo on 2011-06-23.

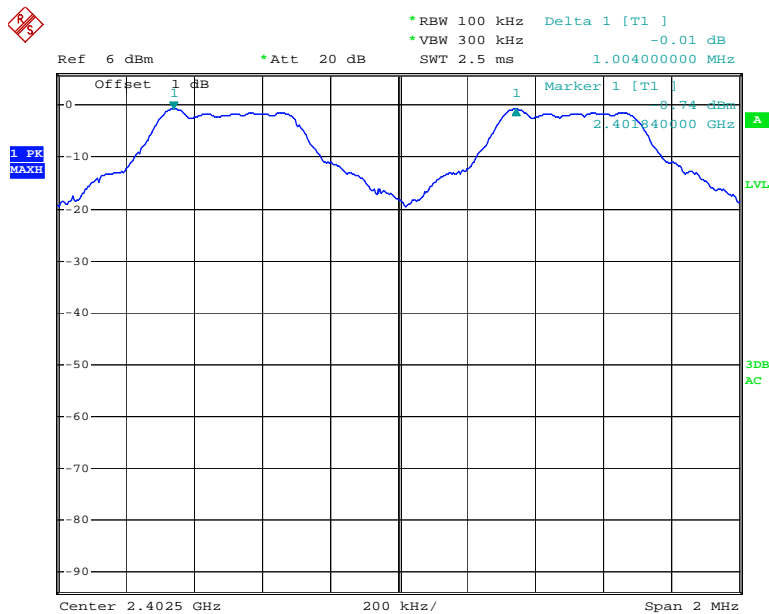
Test Mode: Transmitting

Test Result: Compliance.

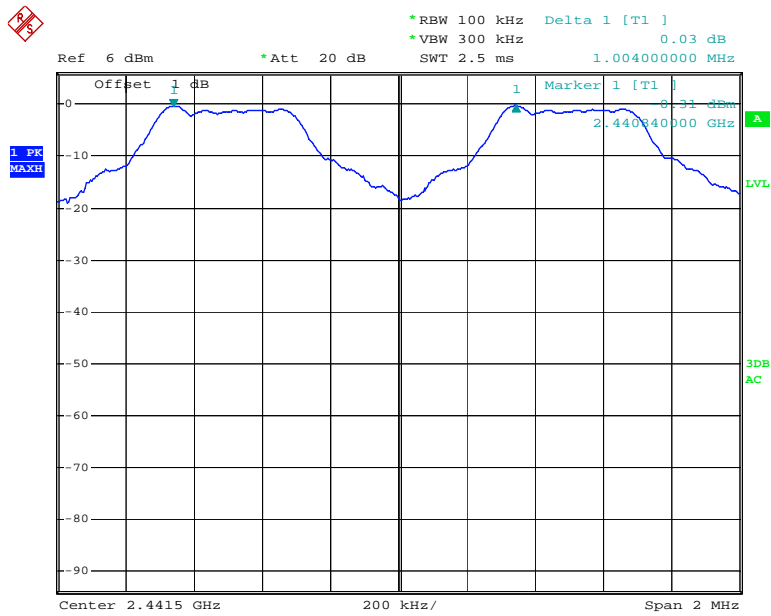
Please refer to following tables and plots

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2402	1.004	0.581	Pass
Adjacent	2403			
Middle	2441	1.004	0.579	Pass
Adjacent	2442			
High	2480	1.004	0.581	Pass
Adjacent	2479			

Low Channel

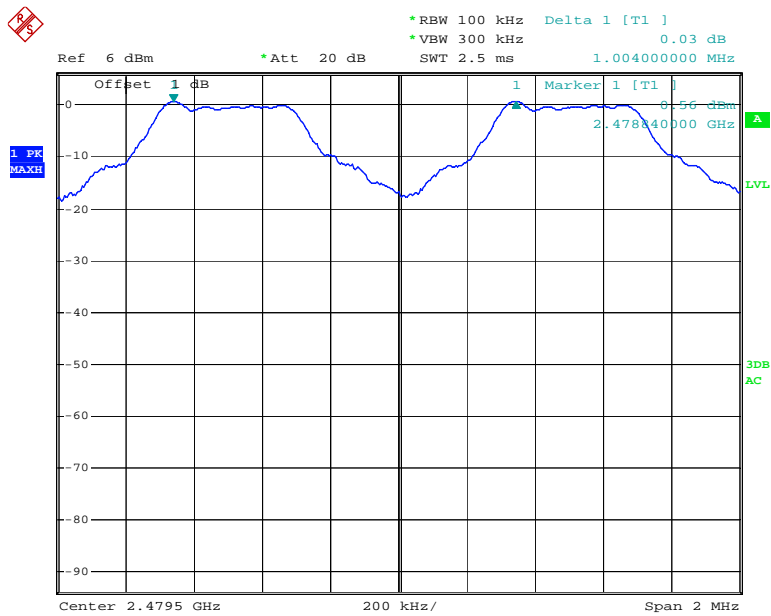


Middle Channel



2011-03-23 10:00:00

High Channel



2011-03-23 10:00:00

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

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 on the test table without connection to measurement instrument. Turn on the EUT. 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 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.9kPa

* The testing was performed by Simon Mo on 2011-06-23.

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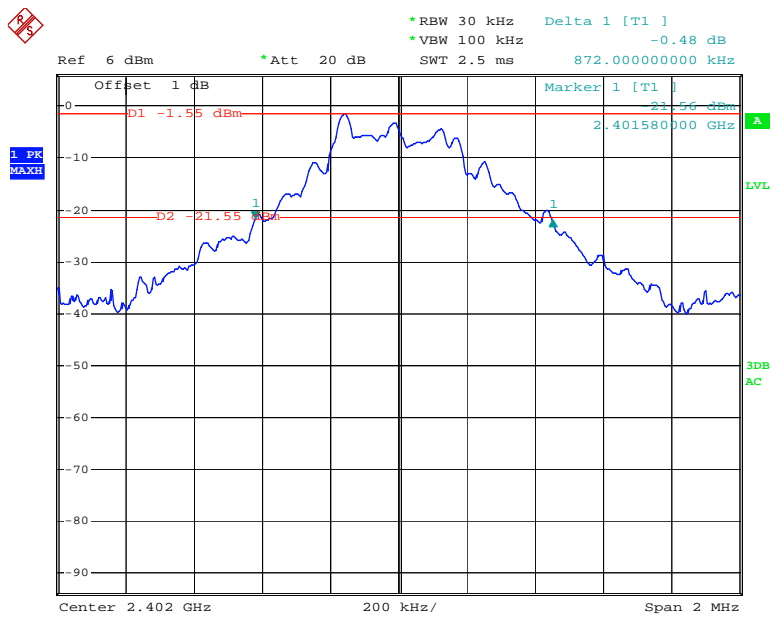
Test Mode: Transmitting

Test Result: Compliance.

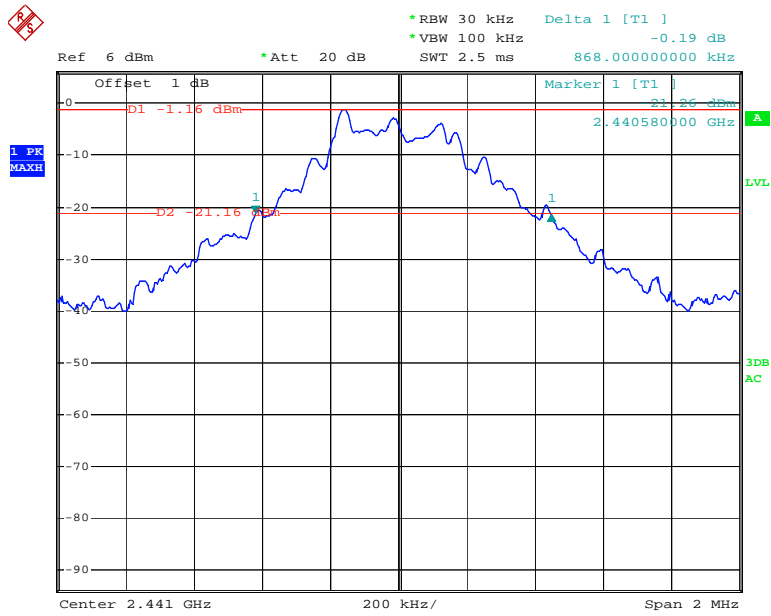
Please refer to following tables and plots

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.872
Middle	2441	0.868
High	2480	0.872

Low Channel

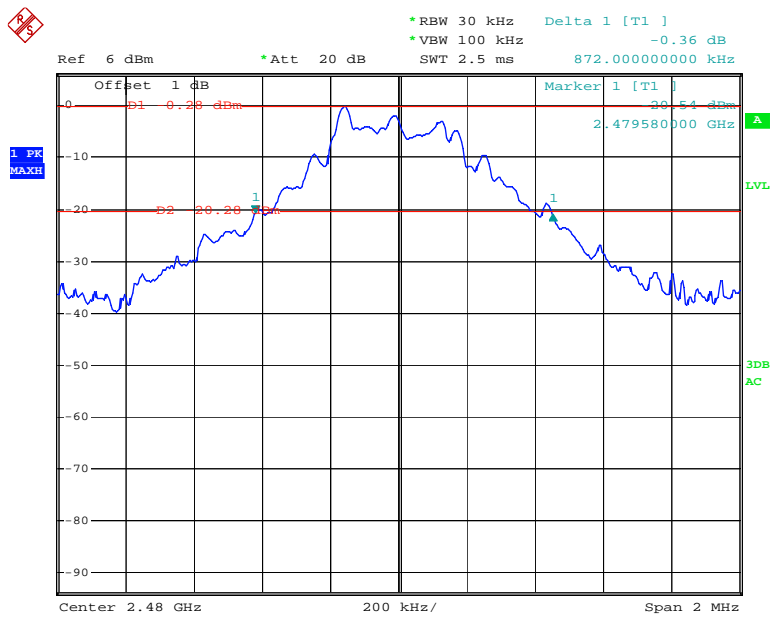


Middle Channel



2013-03-22 13:22:22

High Channel



2013-03-22 13:22:22

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.9kPa

* The testing was performed by Simon Mo on 2011-06-23.

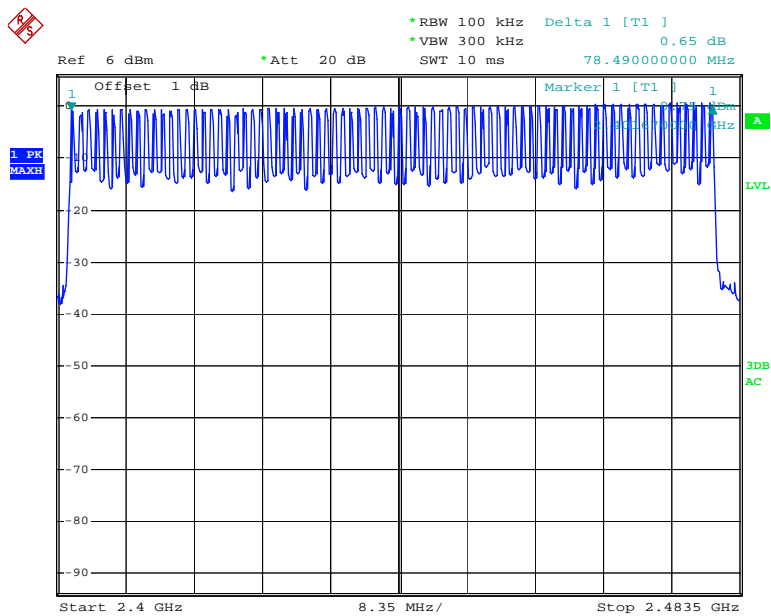
Test Mode: Transmitting

Test Result: Compliance.

Please refer to following tables and plots

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥ 15

Number of Hopping Channels



2011-07-01 10:10:10

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels * 31.6s

Hop rate=1600/s

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.0kPa

* The testing was performed by Simon Mo on 2011-06-23.

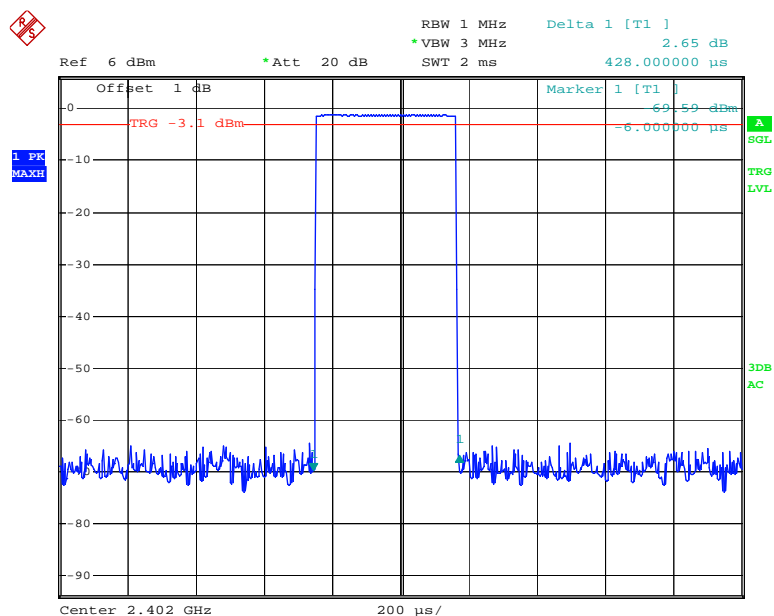
Test Mode: Transmitting

Test Result: Compliance.

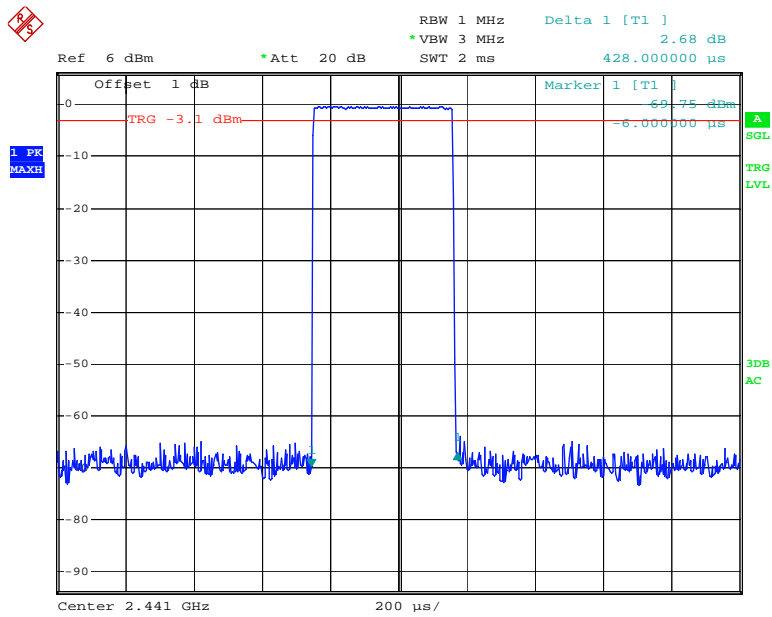
Please refer to following tables and plots

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.428	0.137	0.4	Pass
	Middle	0.428	0.137	0.4	Pass
	High	0.428	0.137	0.4	Pass
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s				
DH 3	Low	1.690	0.270	0.4	Pass
	Middle	1.690	0.270	0.4	Pass
	High	1.690	0.270	0.4	Pass
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s				
DH 5	Low	2.954	0.315	0.4	Pass
	Middle	2.966	0.316	0.4	Pass
	High	2.954	0.315	0.4	Pass
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s				

Low Channel for DH1

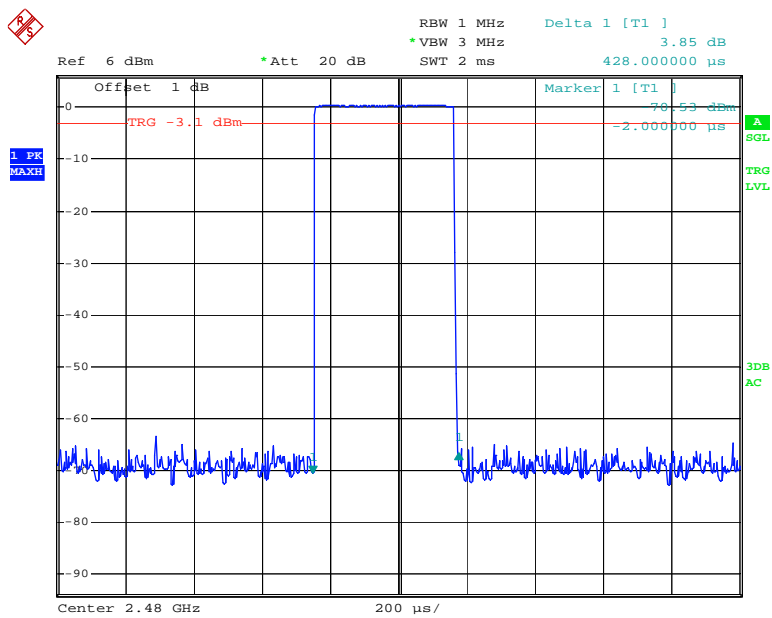


Middle Channel for DH1



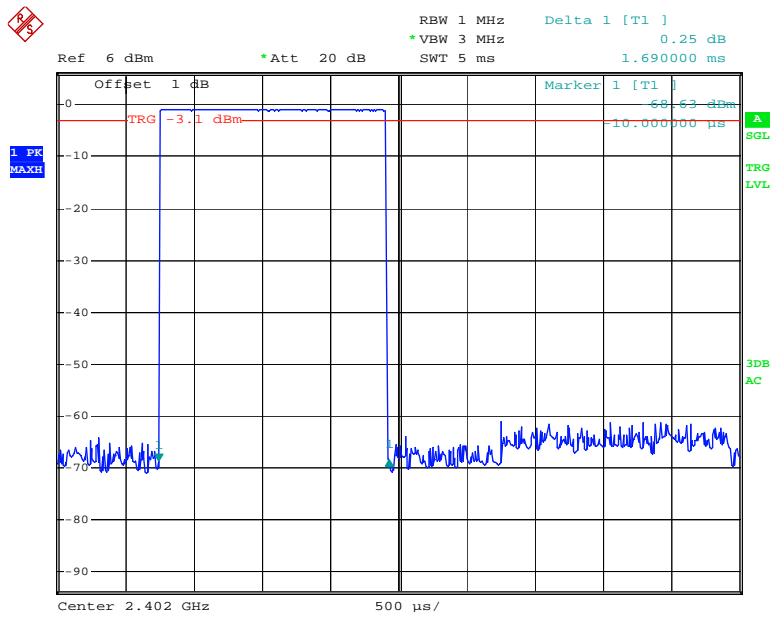
2011-03-23 11:00:00

High Channel for DH1



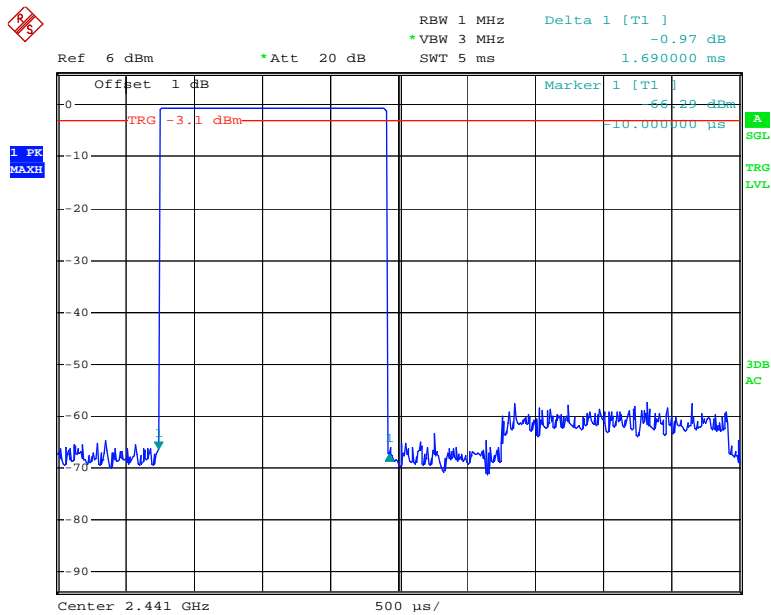
2011-03-23 11:00:00

Low Channel for DH3



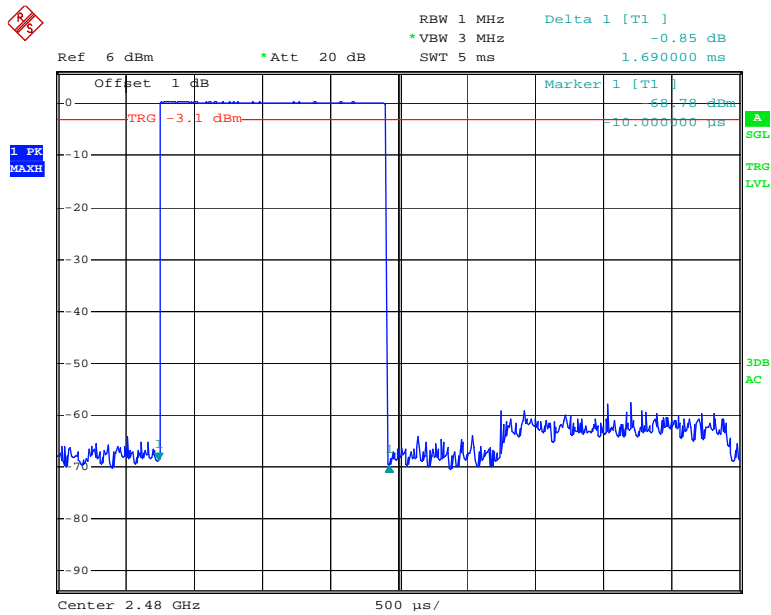
File Name: 201105102R-2-15.247-BT

Middle Channel for DH3

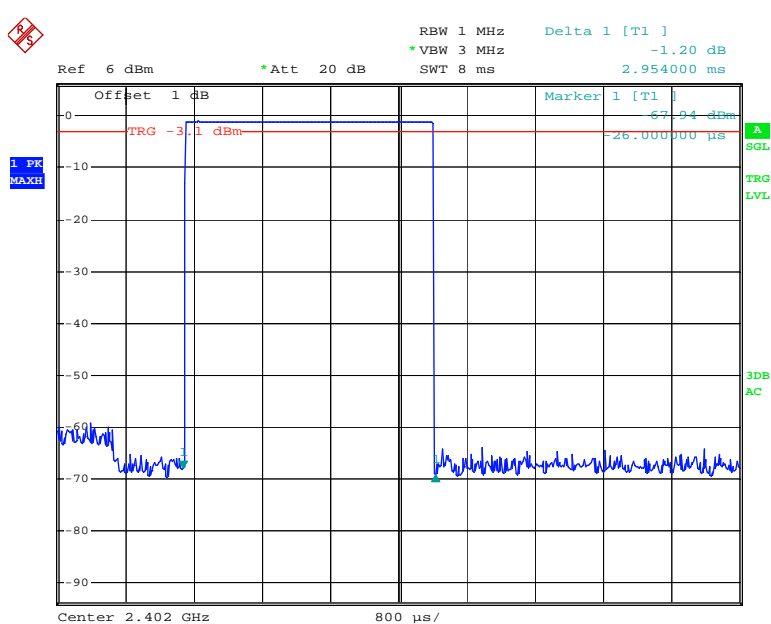


File Name: 201105102R-2-15.247-BT

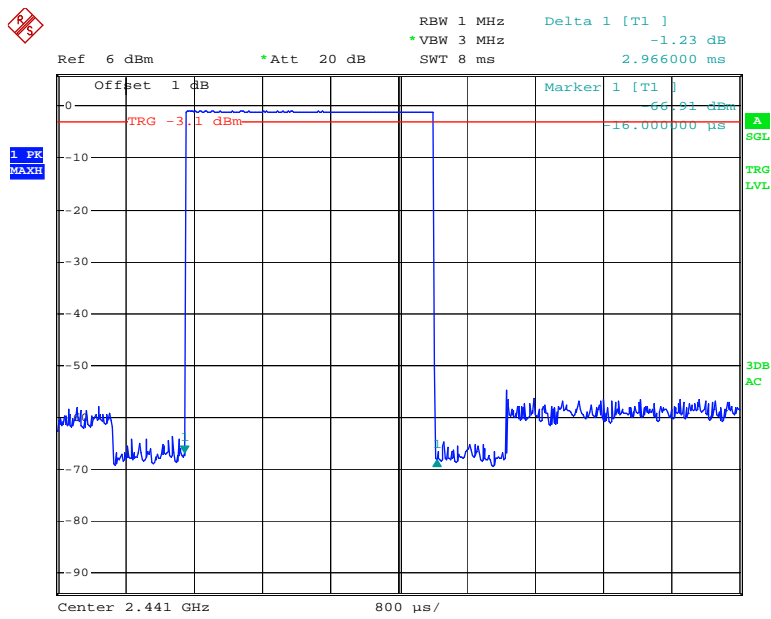
High Channel for DH3



Low Channel for DH5

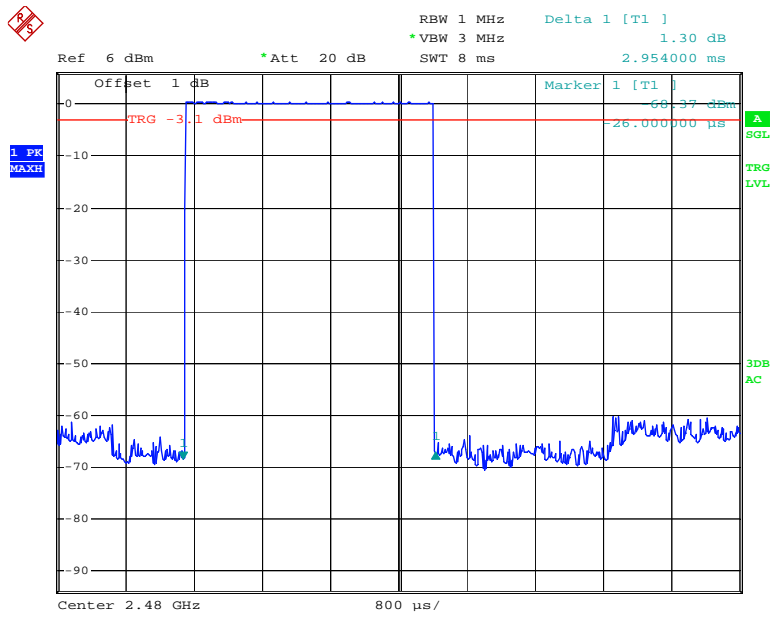


Middle Channel for DH5



2011-03-01 14:04

High Channel for DH5



2011-03-01 14:04

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

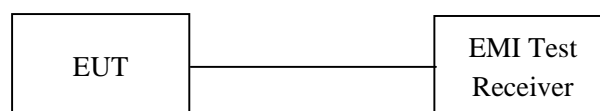
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

1. Place the EUT on a bench and set 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:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.9kPa

* The testing was performed by Simon Mo on 2011-06-23.

Test Mode: Transmitting

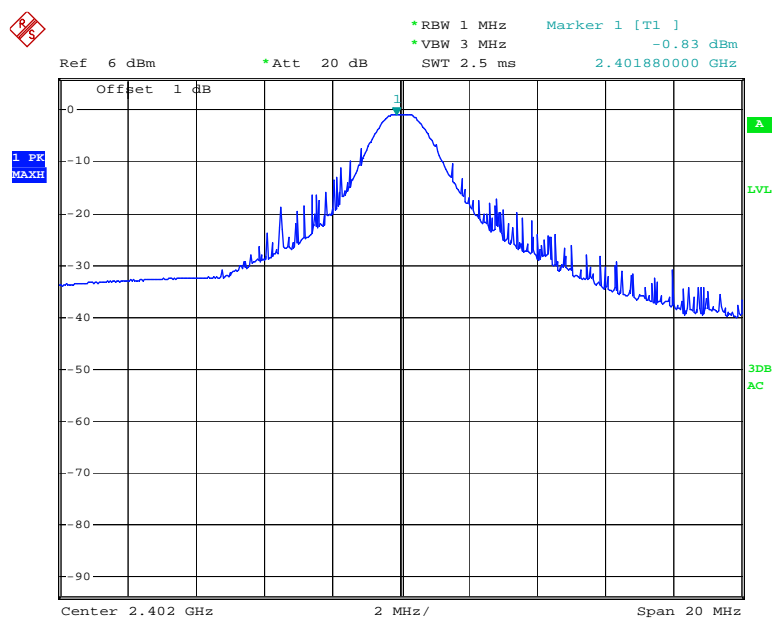
Test Result: Compliance.

Please refer to following tables and plots

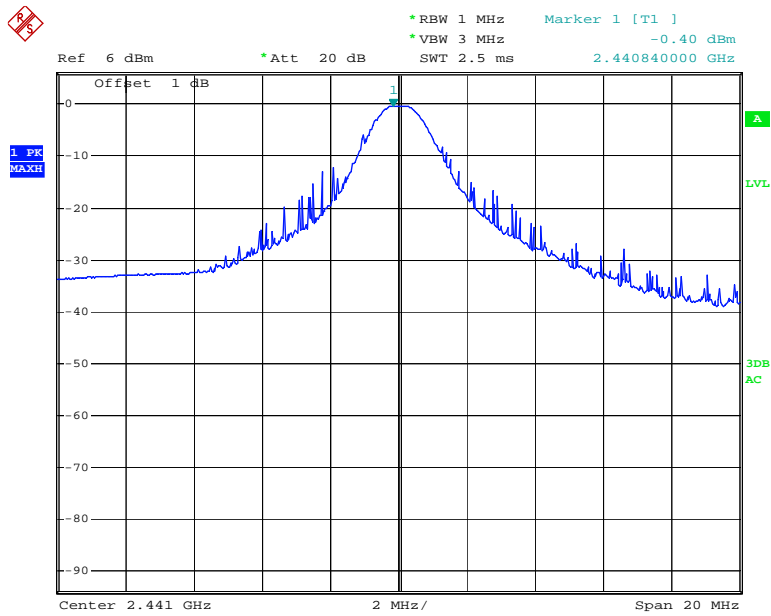
channel	Channel Frequency (MHz)	Reading Output Power (dBm)	Output Power (mW)	Limit (mW)
Low channel	2402	-0.83	0.15	125
Middle channel	2441	-0.40	0.91	125
High channel	2480	0.53	1.13	125

Note: The data above was tested in conducted mode.

Low Channel

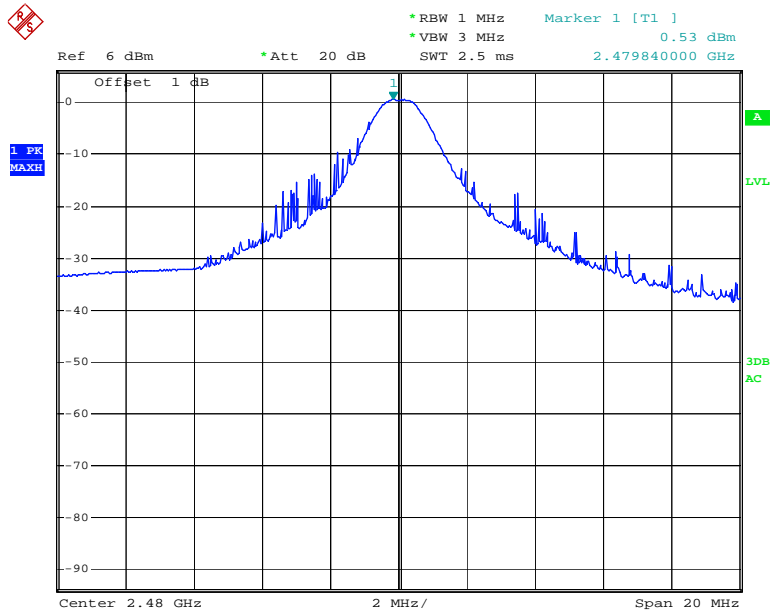


Middle Channel



2011-02-12 02:12:02

High Channel



2011-02-12 02:12:55

FCC §15.247(d) - BAND EDGES TESTING**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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 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 Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.9 kPa

* The testing was performed by Simon Mo on 2011-06-23.

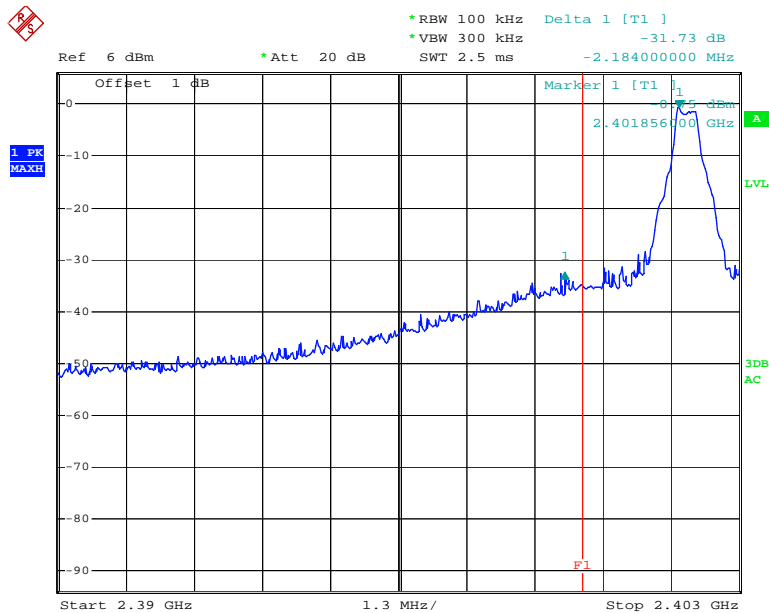
Test Mode: Transmitting

Test Result: Compliance.

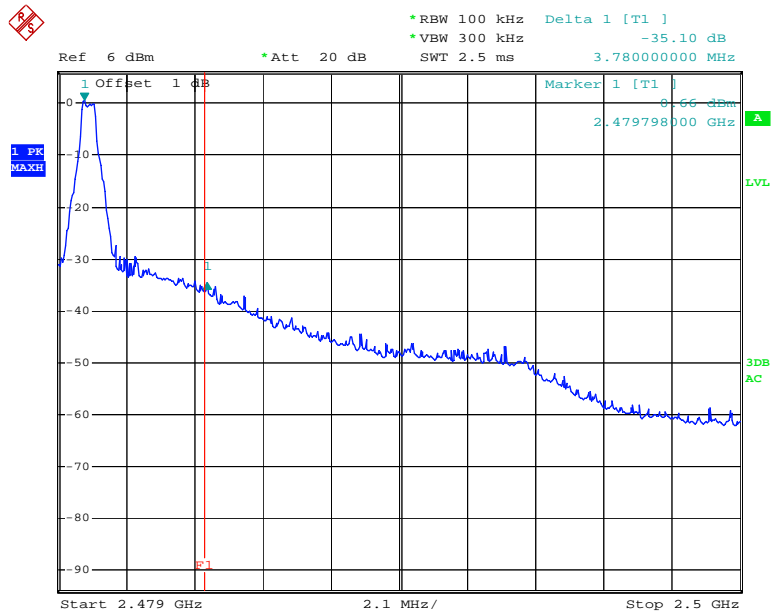
Please refer to following tables and plots

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.672	31.73	20
2483.578	35.10	20

Band Edge: Left Side



Band Edge: Right Side



2.479798000 GHz

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