NVLAP LAB CODE 200707-0

Bay Area Compliance Labs. Corp.

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Beyond E-Tech Inc

3005 West Loop South, STE.100,

Houston, TX 77027, USA

FCC ID: WTID620

Report Type:	**Product Type:**
Original Report	GSM&GPRS Dual Standby Mobile Phone

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Report Number: RSZ08101602-247

Report Date: 2008-11-19

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Beyond E-Tech Inc's* product, model number: *D620* or the "EUT" as referred to in this report is a *GSM&GPRS Dual Standby Mobile Phone,* which measures approximately: 11.4 cm L x 5.2 cm W x 2.1 cm H, input voltage: 3.7V battery.

Frequency Band: GSM850: 824-849 MHZ (Tx); 869-894 MHz (Rx)
PCS1900: 1850-1910 MHz (Tx); 1930-1990 MHz (Rx)
Bluetooth: 2402-2480 MHz (Tx/Rx)

** All measurement and test data in this report was gathered from production sample serial number: 0810043. The EUT was received on 2008-10-16.*

Objective

This Type approval report is prepared on behalf of *Beyond E-Tech Inc 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.

This measurement and test report only pertains to the Bluetooth portion of the EUT; for measurement and test results to the GSM 850/1900 function please refer to report RSZ08101602-2224 issued by Shenzhen BACL.

Related Submittal(s)/Grant(s)

FCC Part22H and 24E submission with FCC ID: WTID620.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All 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 in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

NVLAP LAB CODE 200707-0

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

SYSTEM TEST CONFIGURATION

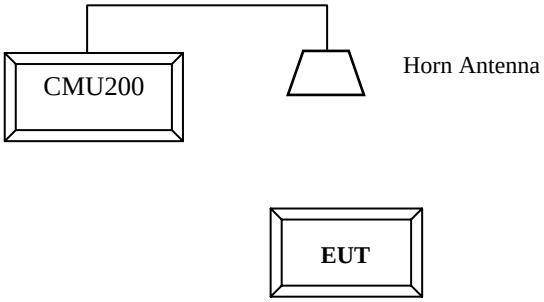
Description of Test Configuration

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

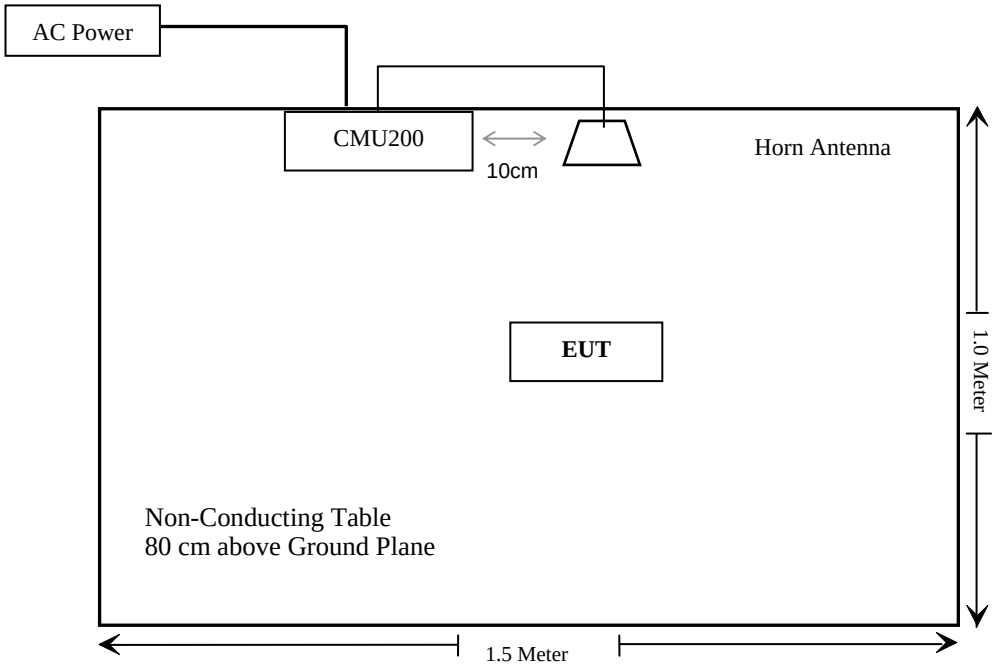
Equipment Modifications

No modification was made to the unit tested.

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	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emissions	Compliant
§15.205, §15.209, §15.109, §15.247(d)	Radiated Emissions	Compliant
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

CFR47 §15.247 (i) and §2.1093 - RF EXPOSURE

Standard Applicable

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.

Limits for General Population/Uncontrolled Exposure

According to FCC Exclusion list, In the following table, f_{GHz} is mid-band frequency in GHz, and d is the distance to a person'sbody, excluding hands, wrists, feet, and ankles.

Exposure category	low threshold	high threshold
general population	$(60/f_{GHz})$ mW, $d < 2.5$ cm $(120/f_{GHz})$ mW, $d \geq 2.5$ cm	$(900/f_{GHz})$ mW, $d < 20$ cm
occupational	$(375/f_{GHz})$ mW, $d < 2.5$ cm $(900/f_{GHz})$ mW, $d \geq 2.5$ cm	$(2250/f_{GHz})$ mW, $d < 20$ cm

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:

Two antennas are available for the EUT, one is GSM/PCS antenna and the other is Bluetooth antenna, the distance between them is less 2.5 cm, according to FCC KDB 648474 D01 SAR Handsets Multi Xmiter and ant. V01r05 released on September 2008, the Max peak output power is 1.208 mW< P_{Ref} (12 mw) stand-alone SAR is not required for Bluetooth antenna.

The SAR measurement is exempt.

CFR47 §15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to CFr47 § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has an integral antenna built on PCB, end-user can not access, please refer to the EUT internal photos.

Result: Compliant.

CFR47 §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

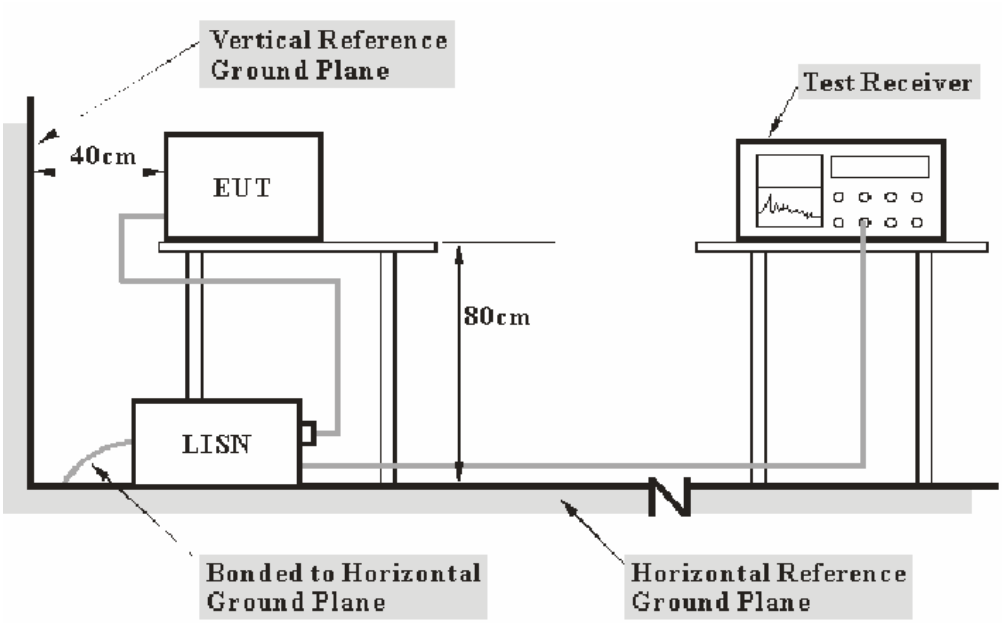
CFR47 §15.207

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.

EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	1100.0008.02	2008-06-21	2009-06-21
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25

*** 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 Procedure

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:

6.10 dB at **27.3200 MHz** in the **Line** conductor mode

Test Data

Environmental Conditions

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

** The testing was performed by Vicent Kang on 2008-11-10.*

Test Mode: Charging & Transmitting

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
27.3200	53.90	QP	Line	60.00	6.10
0.4100	37.90	AV	Neutral	47.65	9.75
0.3400	36.80	AV	Neutral	49.20	12.40
0.4150	34.90	AV	Line	47.55	12.65
0.3450	36.00	AV	Line	49.08	13.08
0.4800	32.10	AV	Neutral	46.34	14.24
0.3450	44.40	QP	Line	59.08	14.68
0.4100	42.80	QP	Neutral	57.65	14.85
0.4150	42.70	QP	Line	57.55	14.85
0.2050	48.40	QP	Neutral	63.41	15.01
0.3400	44.00	QP	Neutral	59.20	15.20
0.1850	47.60	QP	Line	64.26	16.66
0.5450	28.80	AV	Neutral	46.00	17.20
0.2050	36.20	AV	Neutral	53.41	17.21
0.2750	43.40	QP	Line	60.97	17.57
0.1850	36.60	AV	Line	54.26	17.66
0.2050	45.60	QP	Line	63.41	17.81
0.4800	38.30	QP	Neutral	56.34	18.04
0.2750	42.50	QP	Neutral	60.97	18.47
0.5450	37.50	QP	Neutral	56.00	18.50
0.2750	30.90	AV	Line	50.97	20.07
0.2050	33.20	AV	Line	53.41	20.21
0.2750	29.90	AV	Neutral	50.97	21.07
27.1200	25.80	AV	Line	50.00	24.20

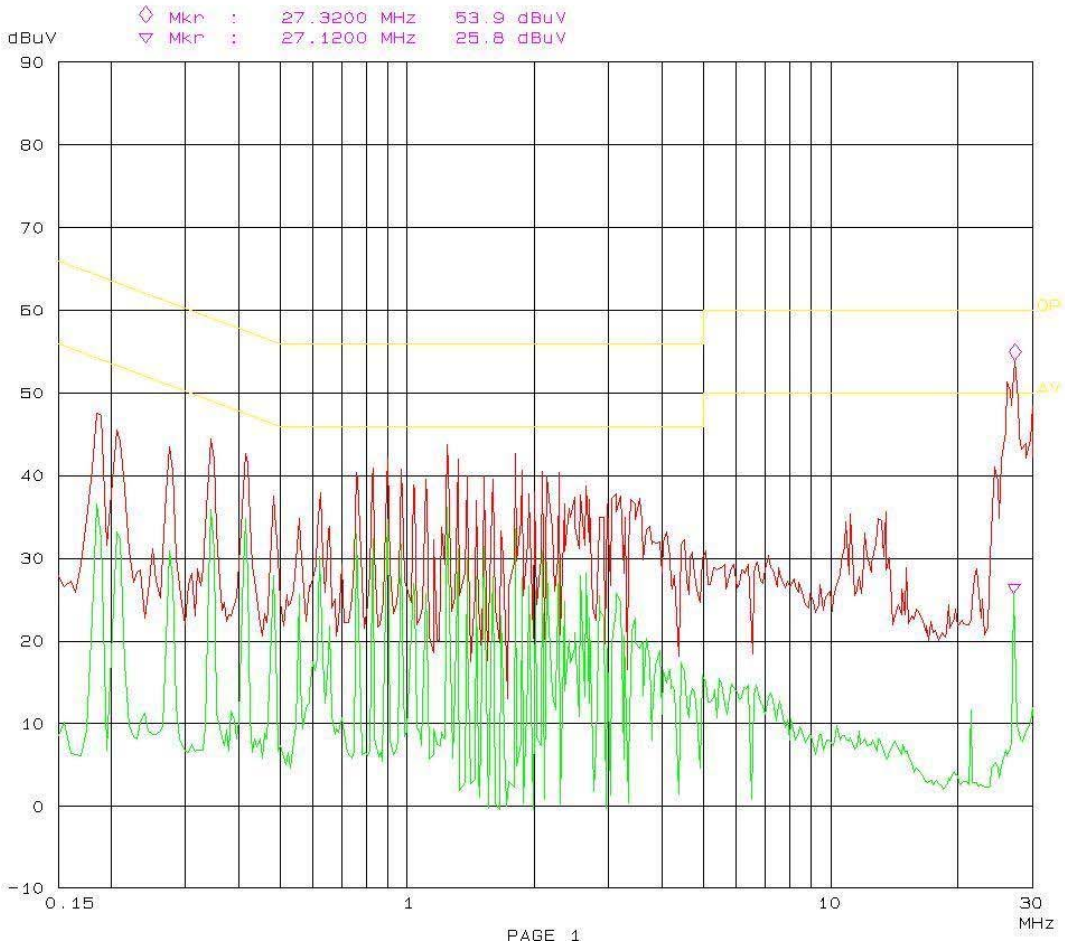
Plot(s) of Test Data

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

Conducted emission 10. Nov 08 13:07

FCC part15

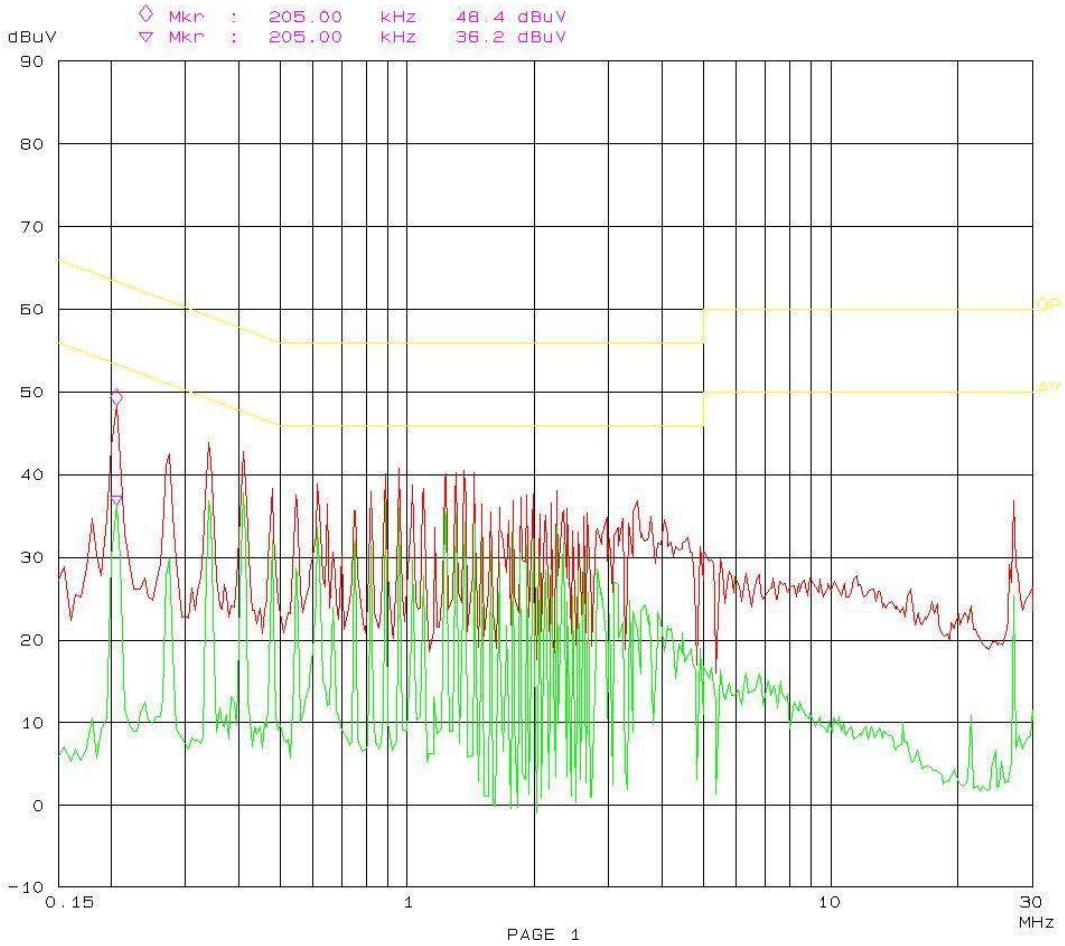
EUT:	GSM&GPRS dual standby mobile phone
Manuf:	BET
Op Cond:	CHARGING&TRANSMITTING
Operator:	Vicent
Test Spec:	AC 120V/60Hz L
Comment:	Temp: 25 Hum: 56%
	BACL



Conducted emission 10. Nov 08 12:54

FCC part15

EUT:	GSM&GPRS dual standby mobile phone
Manuf:	BET
Op Cond:	CHARGING&TRANSMITTING
Operator:	Vicent
Test Spec:	AC 120V/60Hz N
Comment:	Temp: 25 Hum: 56%
	BACL



CFR47 §15.205, §15.209, §15.247 - RADIATED EMISSIONS

Applicable Standard

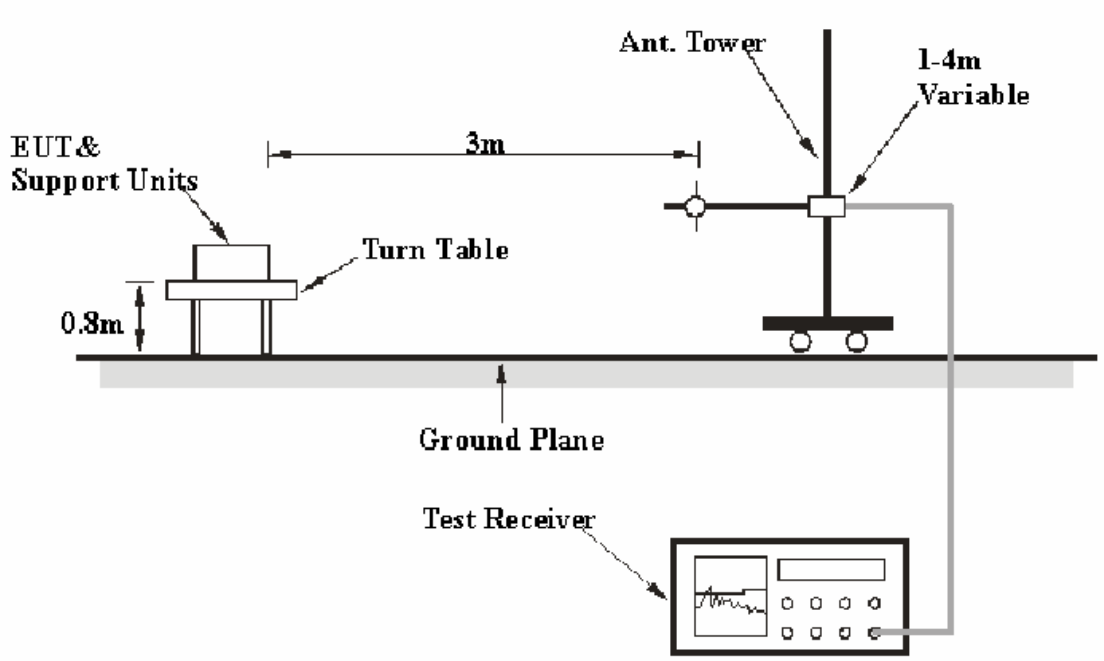
CFR47 §15.205; §15.109; §15.247 (d).

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.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 limits.

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***
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

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

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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

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

Margin = Limit - Corrected Amplitude

Test Results Summary

According to the 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:

Transmitting mode (Below 1GHz):

13.7 dB at 31.94617 MHz in the Vertical polarization

Transmitting mode (Above 1 GHz):

17.22 dB at 4804 MHz in the Horizontal polarization (Low Channel)
16.73 dB at 4882 MHz in the Vertical polarization (Middle Channel)
17.32 dB at 4960 MHz in the Horizontal polarization (High Channel)

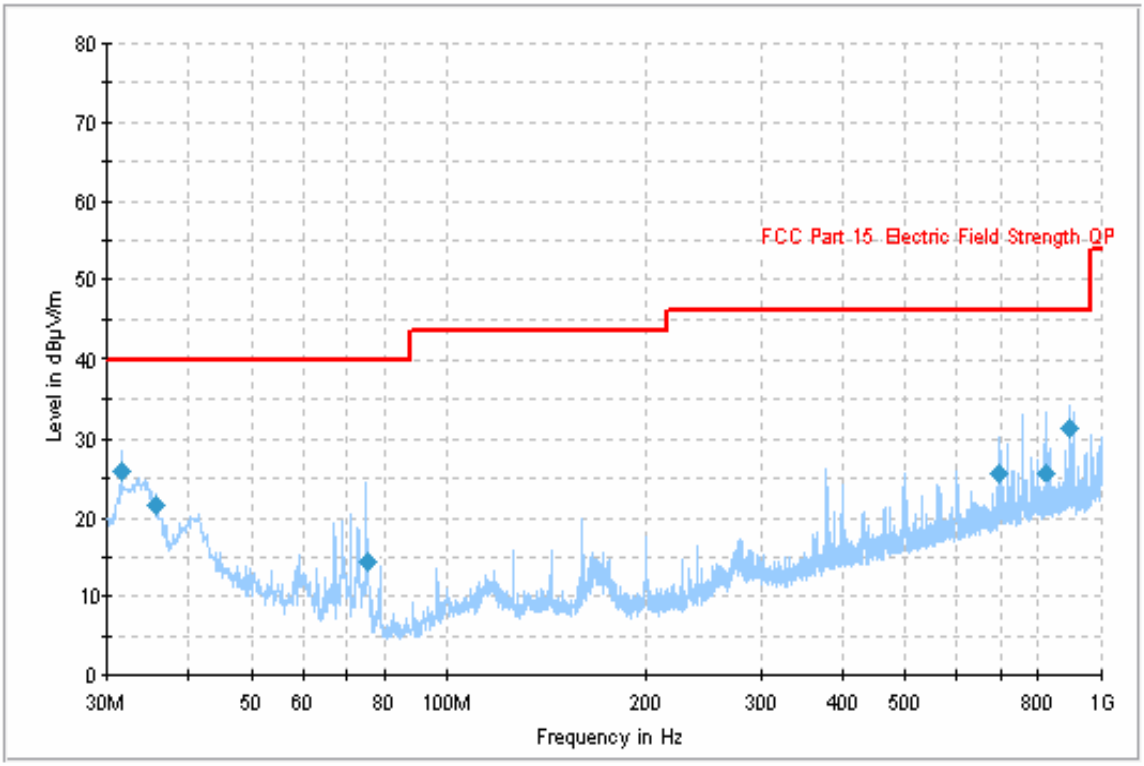
Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2008-10-29*

Test Mode: Transmitting (worse-case below 1GHz)



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
31.94617	26.3	105.0	V	353.0	-16.4	40.0	13.7
909.2221	31.3	310.0	V	123.0	-4.0	46.0	14.7
36.23807	22.4	104.0	V	67.0	-19.4	40.0	17.6
825.2427	24.8	120.0	V	125.0	-17.8	46.0	21.2
697.1834	24.6	128.0	V	119.0	-22.1	46.0	21.4
77.1665	14.8	393.0	H	121.0	-21.7	40.0	25.2

Test Mode: Transmitting (Above 1GHz)

Freq. (MHz)	Reading (dBµV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
2402	88.32	PK	25	1.80	H	30.6	3.61	34	88.53			Fund.
2402	78.1	AV	35	1.80	H	30.6	3.61	34	78.31			Fund.
4804	40.25	PK	240	1.02	H	36.6	4.64	33.4	48.09	74	25.91	Harmonic
4804	28.94	AV	240	1.02	H	36.6	4.64	33.4	36.78	54	17.22	Harmonic
1385.8	48.79	PK	225	1.40	H	25.8	5.37	34.6	45.36	74	28.64	Spurious
1385.8	35.96	AV	225	1.40	H	25.8	5.37	34.6	32.53	54	21.47	Spurious
2402	95.89	PK	355	1.75	V	30.6	3.61	34	96.1			Fund.
2402	85.47	AV	354	1.75	V	30.6	3.61	34	85.68			Fund.
4804	41.85	PK	180	1.05	V	35.4	4.64	33.4	48.49	74	25.51	Harmonic
4804	29.00	AV	180	1.05	V	35.4	4.64	33.4	35.64	54	18.36	Harmonic
1385.8	45.96	PK	155	1.55	V	25.8	5.37	34.6	42.53	74	31.47	Spurious
1385.8	34.12	AV	154	1.55	V	25.8	5.37	34.6	30.69	54	23.31	Spurious
Middle Channel (2441 MHz)												
2441	88.68	PK	25	1.67	H	30.6	3.61	34	88.89			Fund.
2441	78.15	AV	25	1.67	H	30.6	3.61	34	78.36			Fund.
4882	43.08	PK	250	1.00	H	35.4	4.64	33.4	49.72	74	24.28	Harmonic
4882	29.35	AV	250	1.00	H	35.4	4.64	33.4	35.99	54	18.01	Harmonic
1133.84	55.84	PK	175	1.37	H	24.3	4.88	34.9	50.12	74	23.88	Spurious
1133.84	42.93	AV	175	1.37	H	24.3	4.88	34.9	37.21	54	16.79	Spurious
2441	93.35	PK	0	1.67	V	30.6	3.61	34	93.56			Fund.
2441	82.86	AV	0	1.67	V	30.6	3.61	34	83.07			Fund.
4882	42.56	PK	178	1.03	V	36.6	4.64	33.4	50.4	74	23.6	Harmonic
4882	29.43	AV	178	1.03	V	36.6	4.64	33.4	37.27	54	16.73	Harmonic
1385.8	48.92	PK	130	1.07	V	25.8	5.37	34.6	45.49	74	28.51	Spurious
1385.8	36.29	AV	130	1.07	V	25.8	5.37	34.6	32.86	54	21.14	Spurious
High Channel (2480 MHz)												
2480	88.48	PK	35	1.67	H	30.6	3.61	34	88.69			Fund.
2480	77.98	AV	35	1.67	H	30.6	3.61	34	78.19			Fund.
4960	42.62	PK	35	1.10	H	36.6	4.55	33.4	50.37	74	23.63	Harmonic
4960	28.93	AV	35	1.10	H	36.6	4.55	33.4	36.68	54	17.32	Harmonic
1449.62	47.39	PK	150	1.15	H	26.0	5.47	34.5	44.36	74	29.64	Spurious
1449.62	34.76	AV	150	115	H	26.0	5.47	34.5	31.73	54	22.27	Spurious
2480	93.05	PK	355	1.67	V	30.6	3.61	34	93.26			Fund.
2480	82.94	AV	355	1.67	V	30.6	3.61	34	83.15			Fund.
4960	43.11	PK	355	1.10	V	35.4	4.55	33.4	49.66	74	24.34	Harmonic
4960	28.97	AV	355	1.10	V	35.4	4.55	33.4	35.52	54	18.48	Harmonic
1133.84	55.61	PK	280	1.20	PK	24.3	4.88	34.9	49.89	74	24.11	Spurious
1133.84	40.54	AV	280	1.20	AV	24.3	4.88	34.9	34.82	54	19.18	Spurious

Spurious emission in restricted band

Freq. (MHz)	Reading (dBµV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)
Out of left side band (2310 – 2390 MHz)											
2379.0	46.38	PK	352	1.50	V	30.6	3.61	34	46.59	74	27.41
2368.0	46.11	PK	355	1.30	H	30.6	3.61	34	46.32	74	27.68
2389.0	47.00	PK	353	1.00	V	30.6	3.61	34	47.21	74	26.79
Out of left side band (2483.5 – 2500 MHz)											
2483.6	51.05	PK	225	1.50	V	30.6	3.61	34	51.26	74	22.74
2483.6	49.36	PK	275	1.30	H	30.6	3.61	34	49.57	74	24.43

CFR47 §15.247(a) (1)-CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping 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	100035	2008-10-16	2009-10-16

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

Test Procedure

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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2008-11-03.*

Test Result: Compliant.

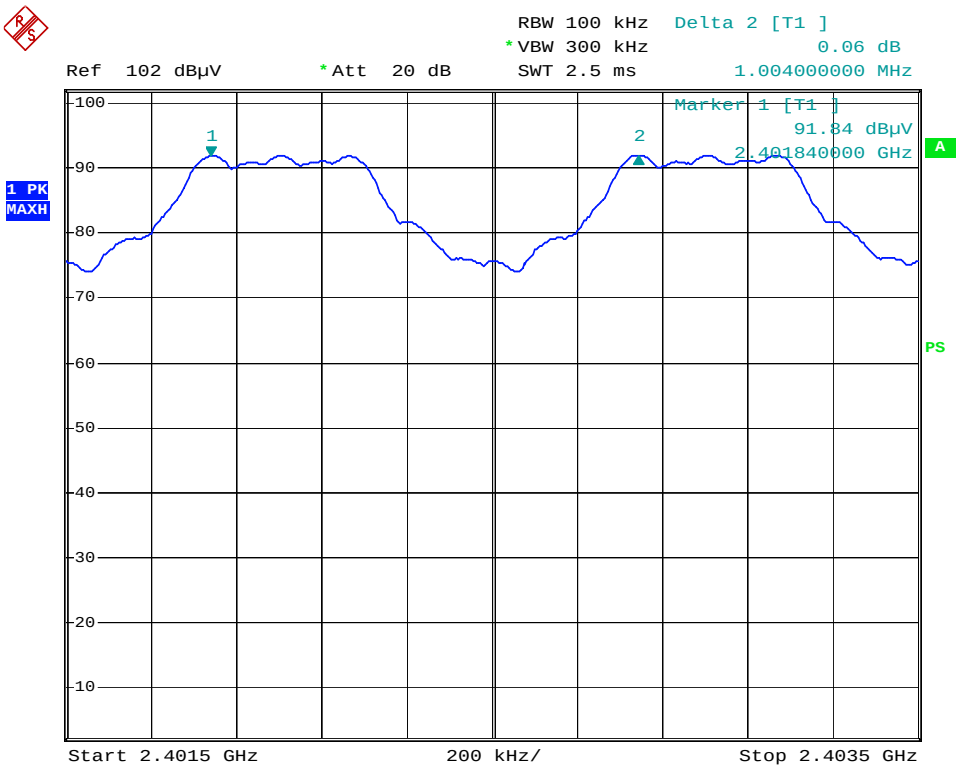
Please refer to following tables and plots

Test Mode: Transmitting

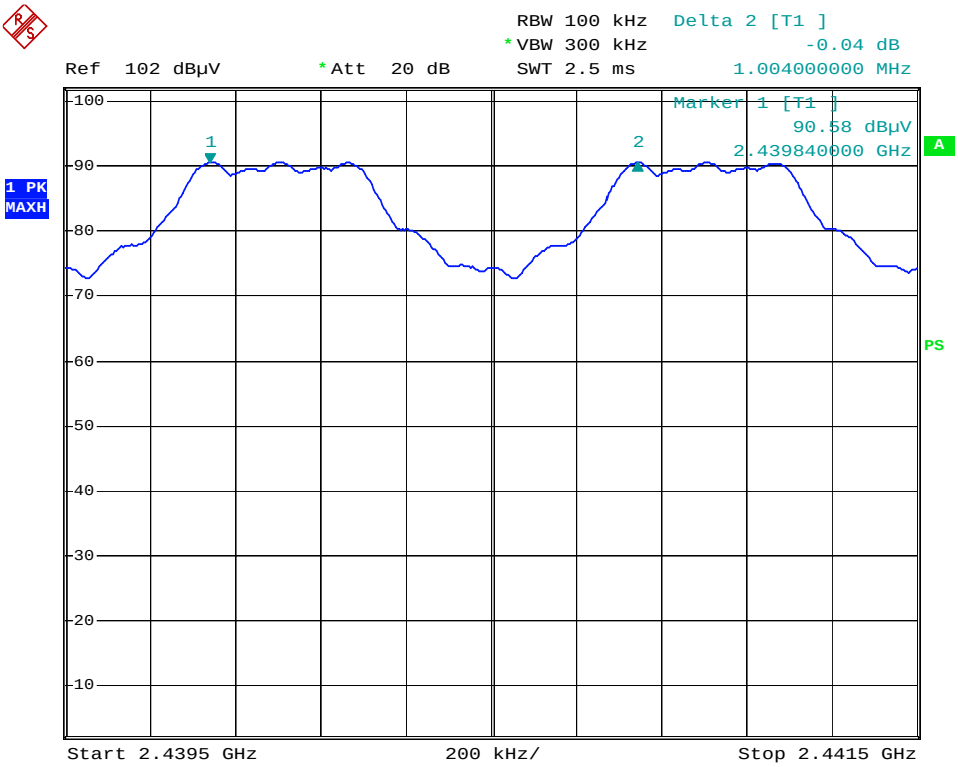
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.004	0.512	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.004	0.512	Pass
Adjacent Channel	2442			
High Channel	2480	1.004	0.488	Pass
Adjacent Channel	2479			

Please refer to the following plots.

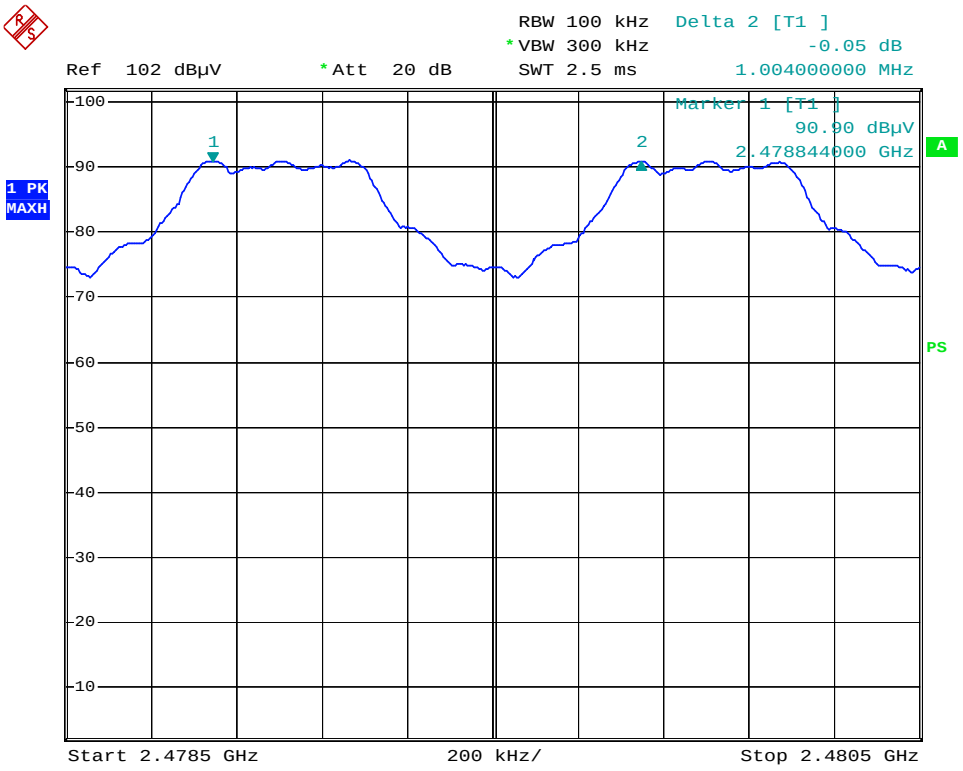
Low Channel



Middle Channel



High Channel



CFR47 §15.247(a) (1) – 20dB 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 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

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

Test Procedure

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 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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2008-10-30.*

Test Result: Compliant.

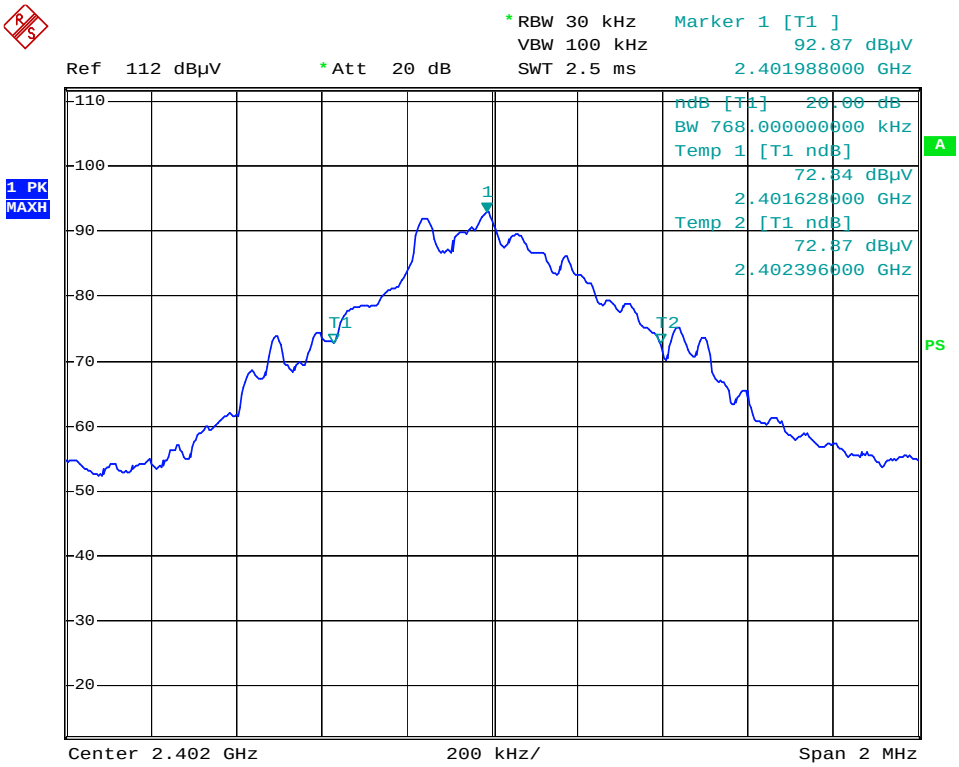
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	0.768
Middle	2441	0.768
High	2480	0.732

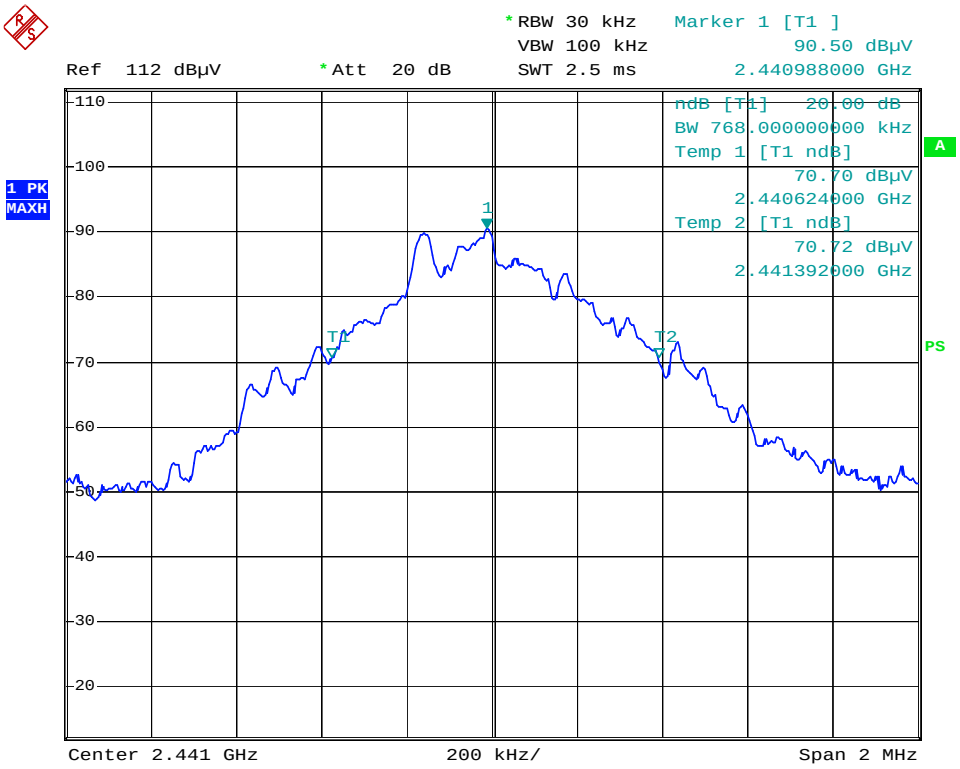
Please refer to the following plots.

Low Channel



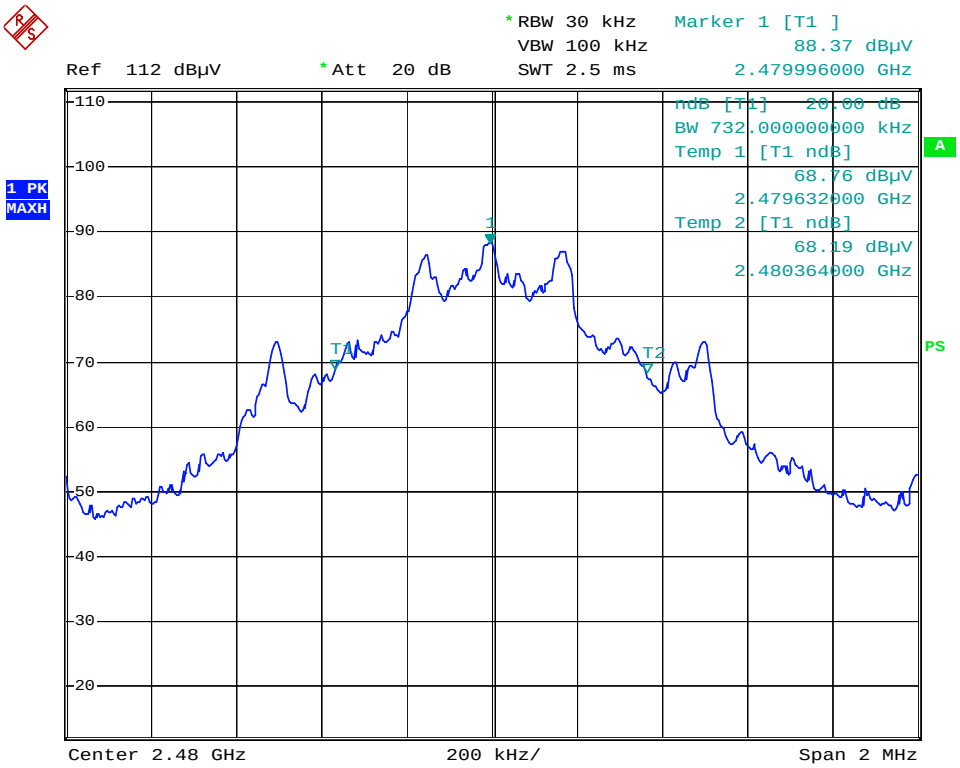
Date: 30.OCT.2008 11:17:17

Middle Channel



Date: 30.OCT.2008 11:12:07

High Channel



Date: 30.OCT.2008 11:15:29

CFR47 §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	100035	2008-10-16	2009-10-16

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

Test Procedure

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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

The testing was performed by Vicent Kang on 2008-10-30.

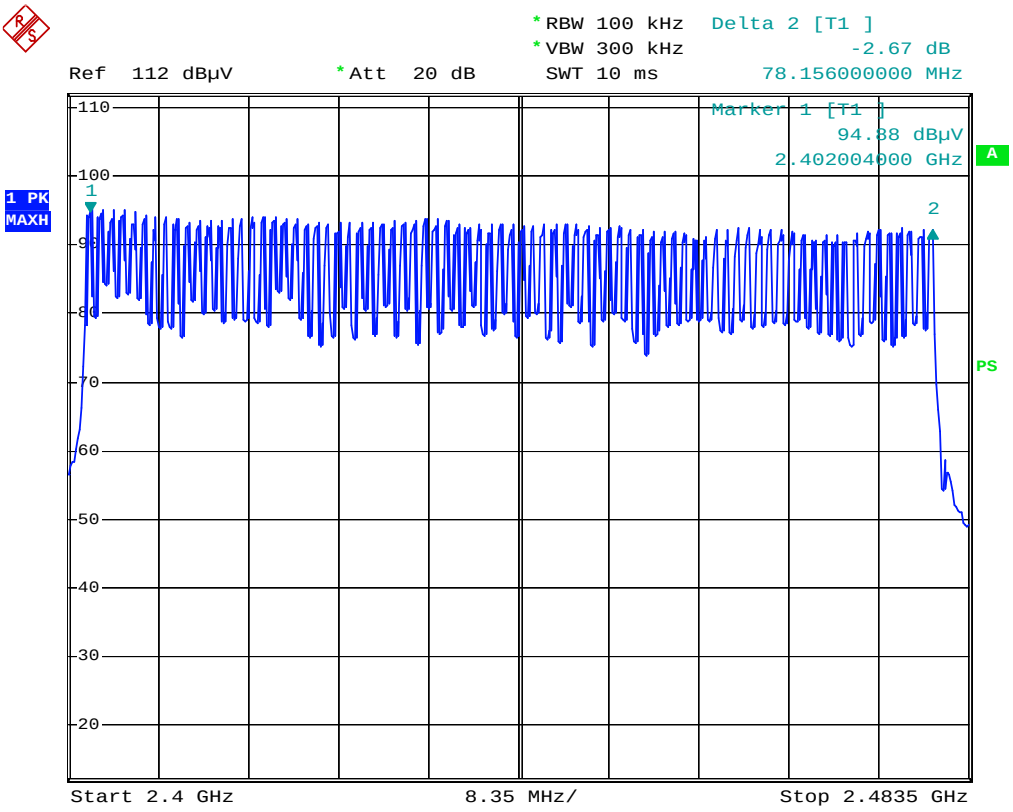
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2402-2480	79	>15

Number of Hopping Channels



Date: 30.OCT.2008 12:00:16

CFR47 §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	100035	2008-10-16	2009-10-16

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

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X 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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2008-10-30.*

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

DH 1 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	0.400	0.1280	0.4	Pass
Middle	0.390	0.1248	0.4	Pass
High	0.400	0.1280	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second

DH 3 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	1.68	0.2688	0.4	Pass
Middle	1.67	0.2672	0.4	Pass
High	1.67	0.2672	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second

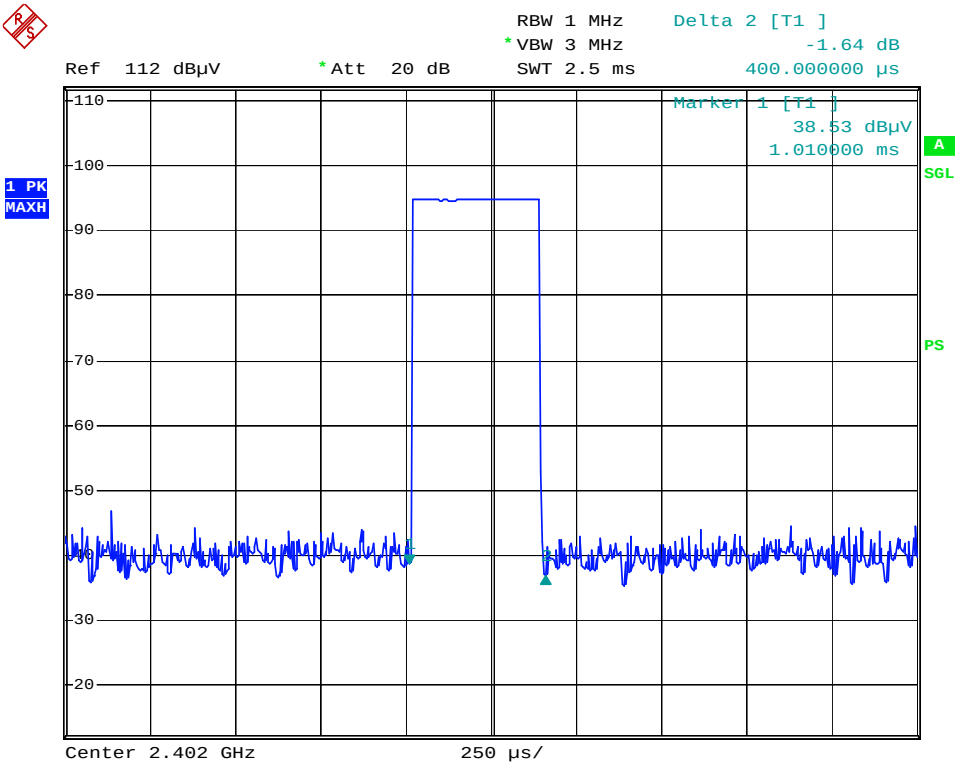
DH 5 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	2.96	0.3157	0.4	Pass
Middle	2.94	0.3136	0.4	Pass
High	2.96	0.3157	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second

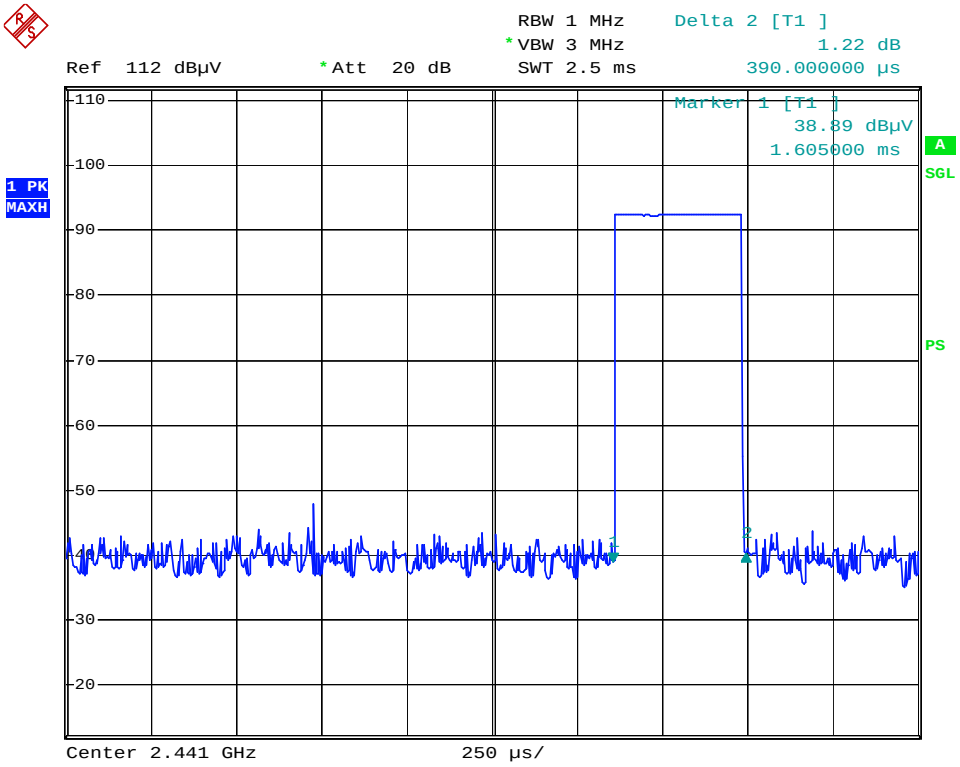
Please refer to the following plots.

Low Channel for DH1



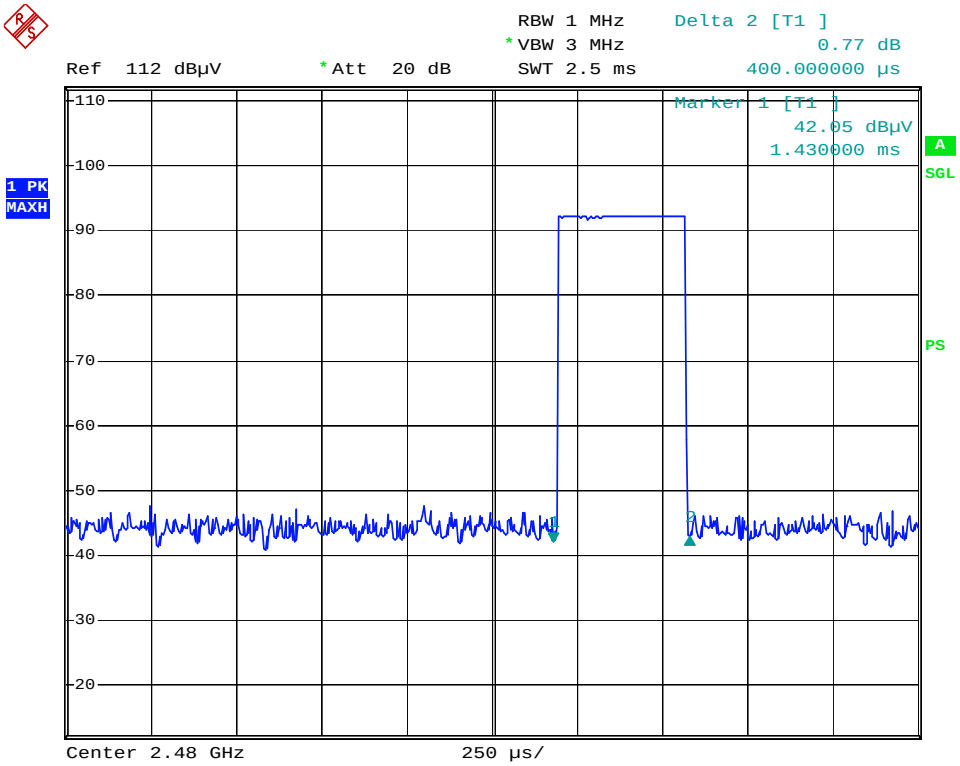
Date: 30.OCT.2008 12:04:07

Middle Channel for DH1



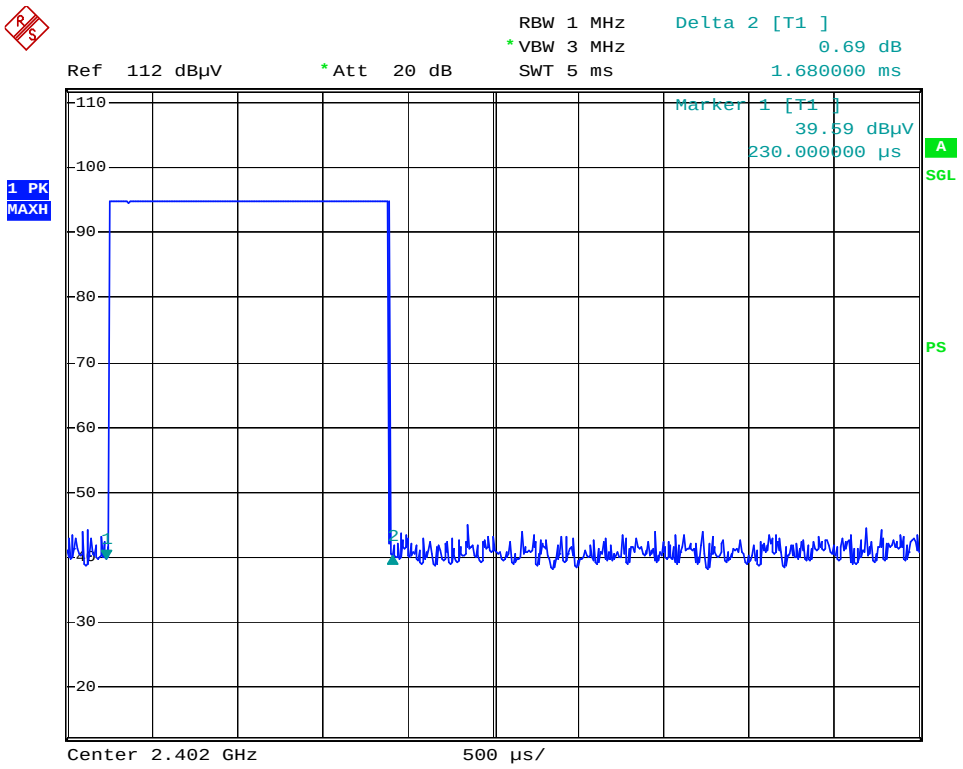
Date: 30.OCT.2008 12:07:38

High Channel for DH1



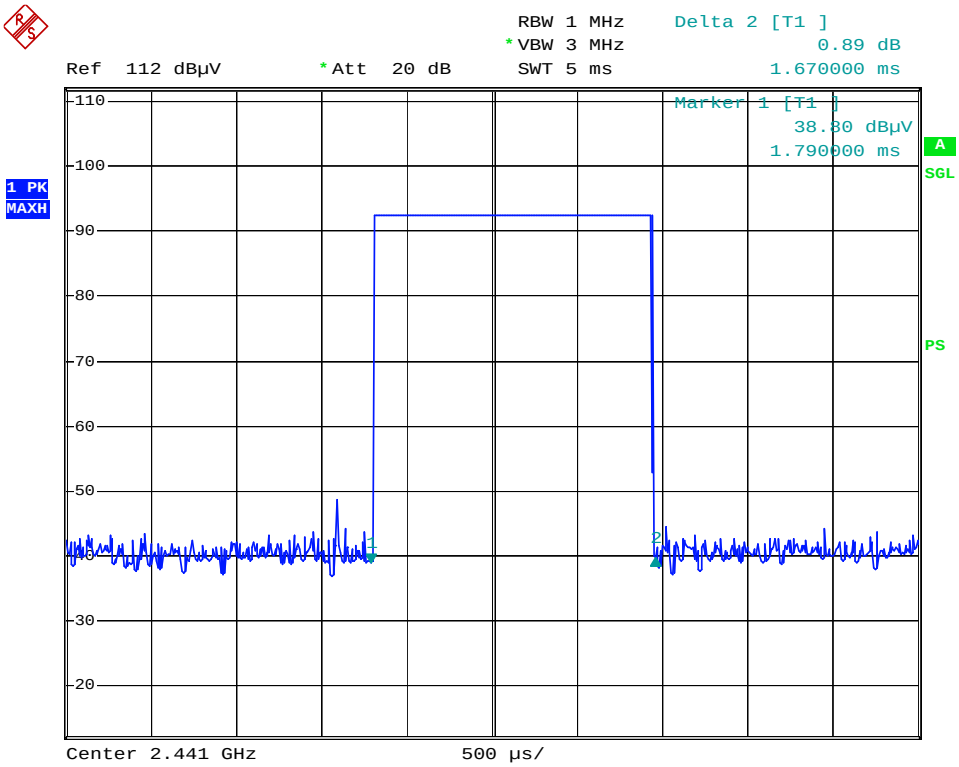
Date: 30.OCT.2008 12:10:04

Low Channel for DH3



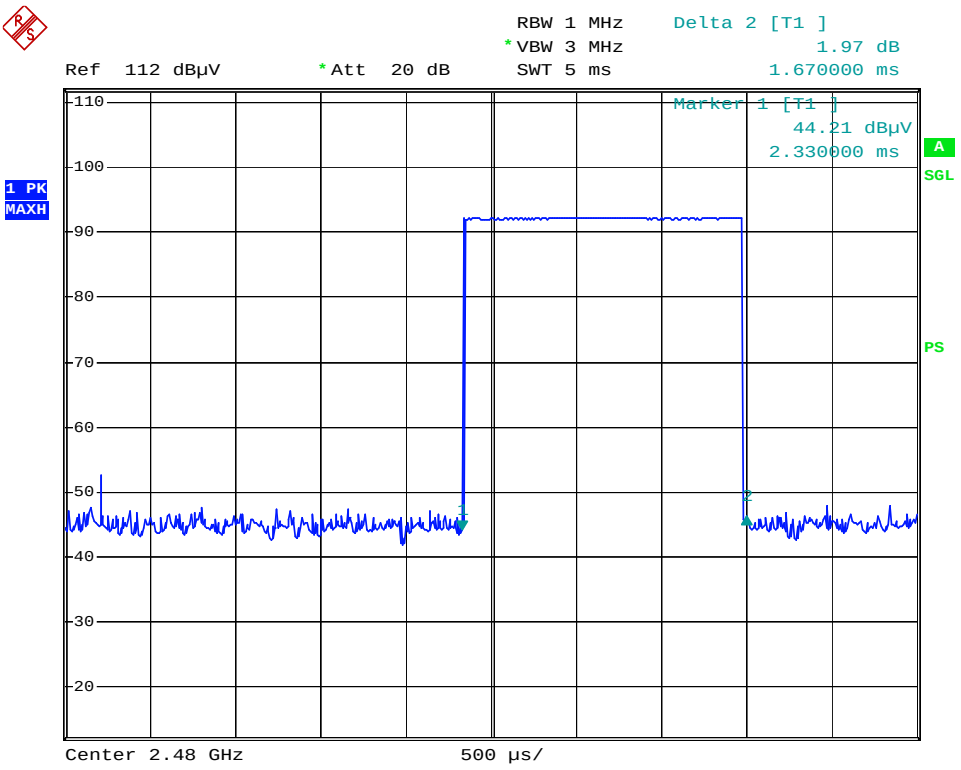
Date: 30.OCT.2008 13:25:15

Middle Channel for DH3



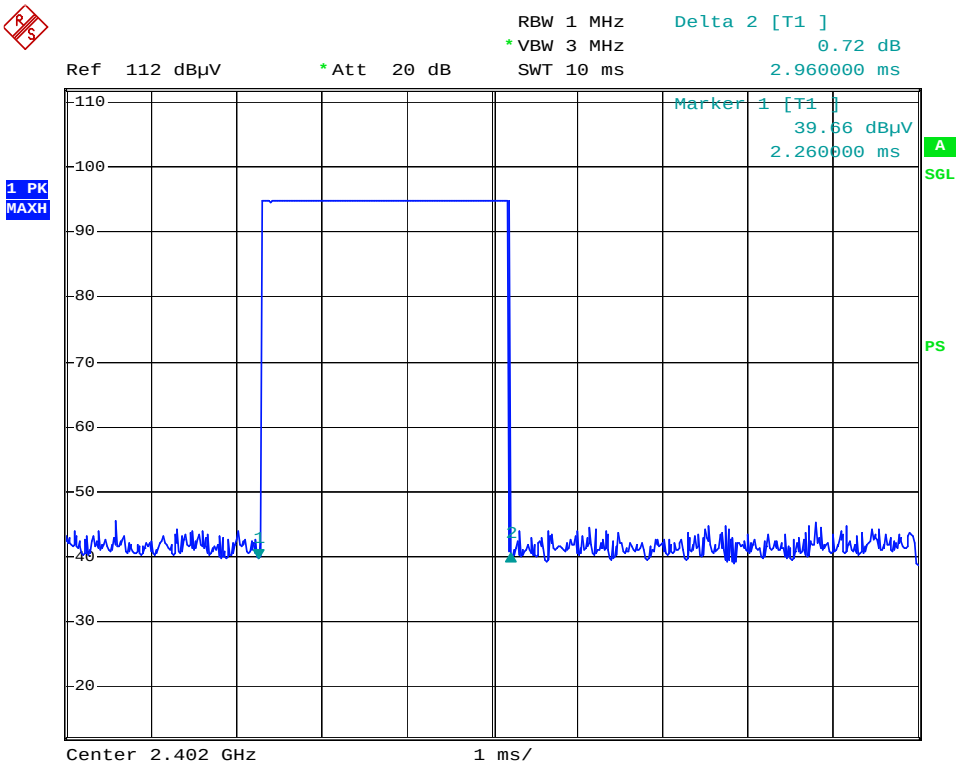
Date: 30.OCT.2008 13:29:36

High Channel for DH3



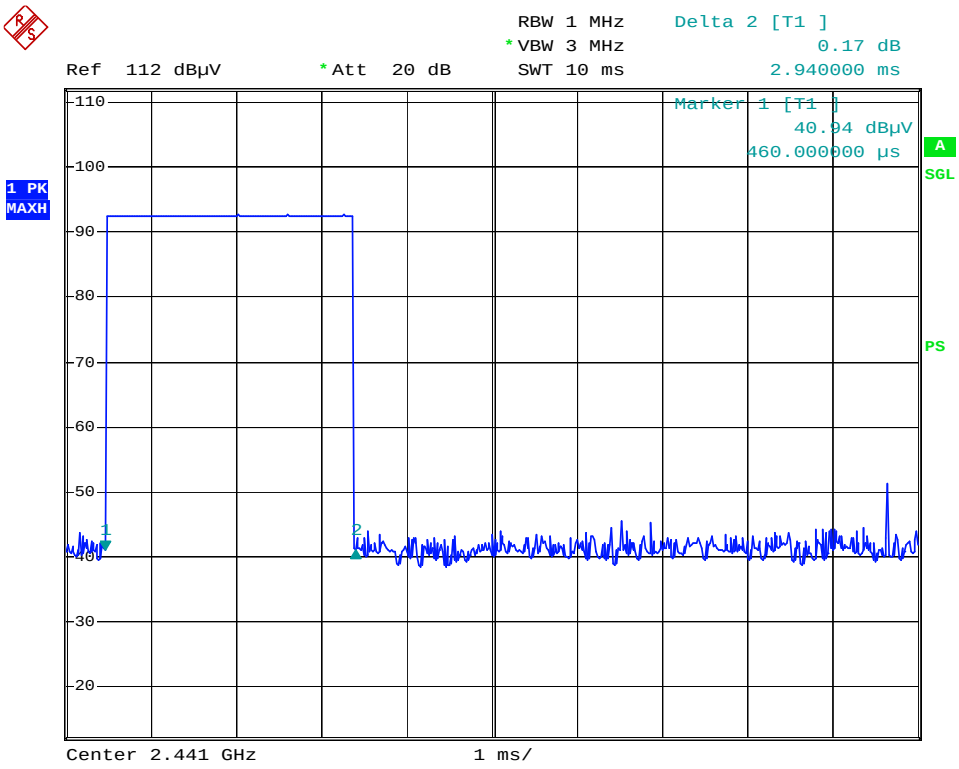
Date: 30.OCT.2008 13:30:27

Low Channel for DH5



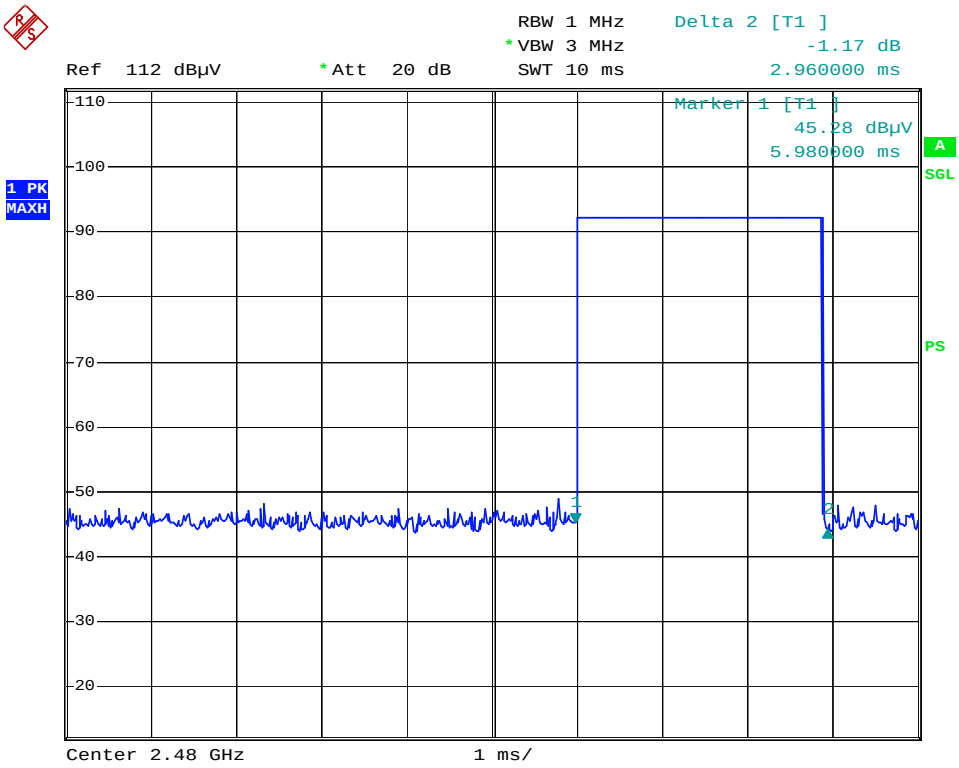
Date: 30.OCT.2008 13:32:37

Middle Channel for DH5



Date: 30.OCT.2008 13:33:21

High Channel for DH5



Date: 30.OCT.2008 13:34:39

CFR47 §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	100035	2008-10-16	2009-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

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

Test Procedure

The antenna was integrated; radiated test method will be applied.

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

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2008-10-30.*

Test Result: Compliant.

Test Mode: Transmitting

Freq. (MHz)	Receiver Reading (dBµV/m)	Detector	Table Direction Degree	Antenna		Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBµV/m)	EIRP		Part15.247 Limit (mW)
				Height (m)	Factor (dB/m)				(dBm)	(mW)	
2402	95.89	PK	254	1.7	30.6	3.60	34	96.09	0.82	1.208	125
2441	93.35	PK	0	1.7	30.6	3.61	34	93.56	-1.71	0.675	125
2480	93.05	PK	355	1.6	30.6	3.62	34	93.27	-2.00	0.631	125

Note: P (dBm) = E (dBµV/m) – 95.27

CFR47 §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	100035	2008-10-16	2009-10-16
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	1100.0008.02	2008-06-21	2009-06-21

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

Test Procedure

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. Put it on the Rotated table and 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 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

**The testing was performed by Vicent Kang on 2008-10-30.*

Test Result: Compliant

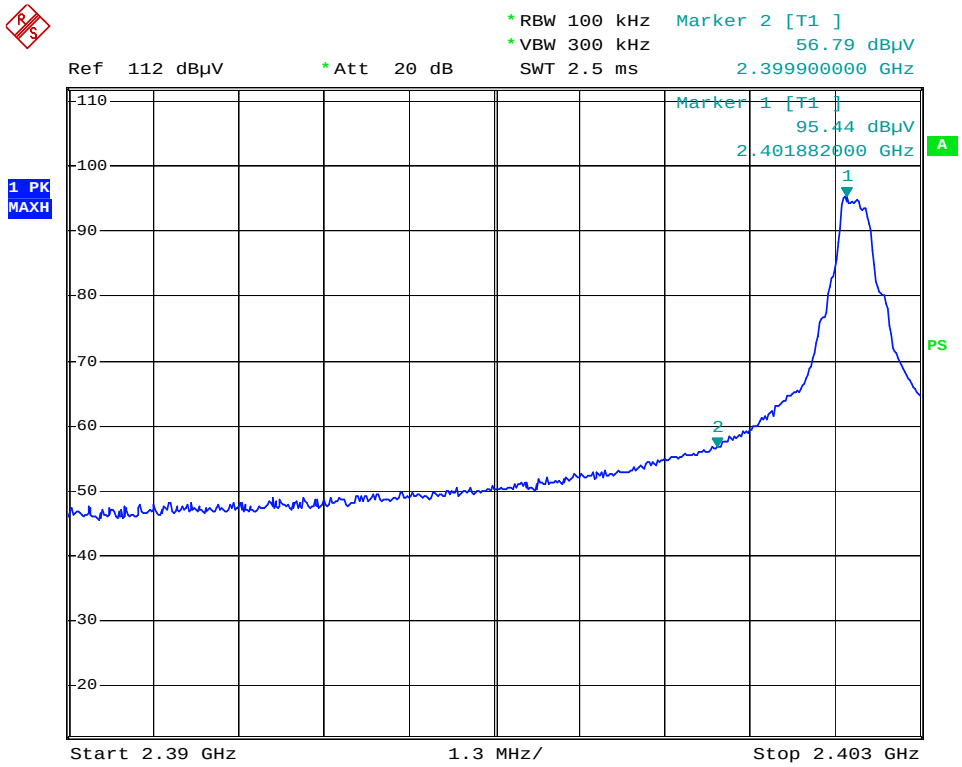
Please refer to the following table and plots.

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.900	38.65	20
2483.600	44.04	20

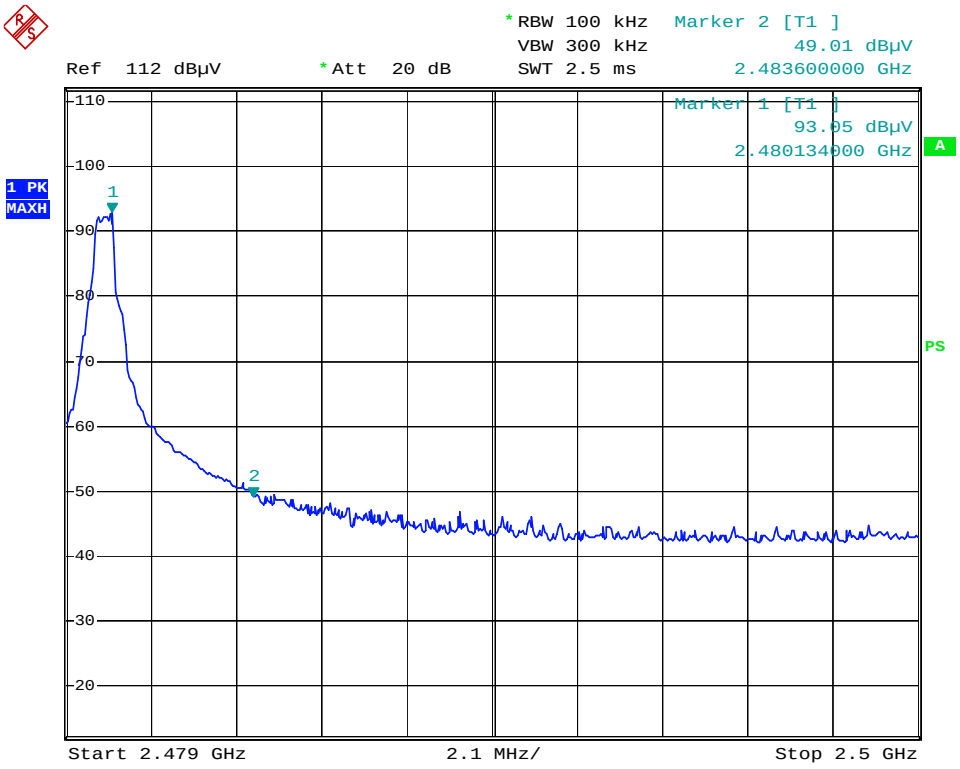
Note: The point fall into the stricted band was in FCC 15.209, please refer to the restrict band testing.

Band Edge: Left Side



Date: 30.OCT.2008 11:00:09

Band Edge: Right Side



Date: 30.OCT.2008 11:05:56

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