NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Dyal Trading Limited

Coxmoor Road, Sutton in Ashfield,

Nottinghamshire, NG17 5LA, UK

FCC ID: XWN5017271000016C

Report Type:	**Product Type:**
Original Report	Watch Phone

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Report Number:	RSZ09110901-247
Report Date:	2009-12-08
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TABLE OF CONTENTS

GENERAL INFORMATION **4**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
OBJECTIVE 4
RELATED SUBMITTAL(S)/GRANT(S) 4
TEST METHODOLOGY 4
TEST FACILITY 5
SYSTEM TEST CONFIGURATION **6**
DESCRIPTION OF TEST CONFIGURATION 6
EUT EXERCISE SOFTWARE 6
EQUIPMENT MODIFICATIONS 6
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS 6
EXTERNAL I/O CABLE 6
CONFIGURATION OF TEST SETUP 7
BLOCK DIAGRAM OF TEST SETUP 7
SUMMARY OF TEST RESULTS **9**
FCC §15.247 (i) & §2.1093 – RF EXPOSURE **10**
STANDARD APPLICABLE 10
RESULT: 11
FCC §15.203 - ANTENNA REQUIREMENT **12**
STANDARD APPLICABLE 12
ANTENNA CONNECTOR CONSTRUCTION 12
FCC §15.207 (a) - CONDUCTED EMISSIONS **13**
APPLICABLE STANDARD 13
MEASUREMENT UNCERTAINTY 13
EUT SETUP 13
EMI TEST RECEIVER SETUP 14
TEST EQUIPMENT LIST AND DETAILS 14
TEST PROCEDURE 14
TEST RESULTS SUMMARY 14
TEST DATA 14
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS **17**
APPLICABLE STANDARD 17
MEASUREMENT UNCERTAINTY 17
EUT SETUP 17
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP 18
TEST EQUIPMENT LIST AND DETAILS 18
TEST PROCEDURE 18
CORRECTED AMPLITUDE & MARGIN CALCULATION 18
TEST RESULTS SUMMARY 19
TEST DATA 19
FCC §15.247(a)(1)-CHANNEL SEPARATION TEST **23**
APPLICABLE STANDARD 23
TEST EQUIPMENT LIST AND DETAILS 23
TEST PROCEDURE 23

TEST DATA 23

FCC §15.247(a)(1) – 20 dB BANDWIDTH TESTING 26

APPLICABLE STANDARD 26
TEST EQUIPMENT LIST AND DETAILS 26
TEST PROCEDURE 26
TEST DATA 26

FCC §15.247(a)(1)(iii)-QUANTITY OF HOPPING CHANNEL TEST 29

APPLICABLE STANDARD 29
TEST EQUIPMENT LIST AND DETAILS 29
TEST PROCEDURE 29
TEST DATA 29

FCC §15.247(a)(1)(iii) -TIME OF OCCUPANCY (DWELL TIME) 31

APPLICABLE STANDARD 31
TEST EQUIPMENT LIST AND DETAILS 31
TEST PROCEDURE 31
TEST DATA 31

FCC §15.247(b)(1) - PEAK OUTPUT POWER MEASUREMENT 36

APPLICABLE STANDARD 36
TEST EQUIPMENT LIST AND DETAILS 36
TEST PROCEDURE 36
TEST DATA 36

FCC §15.247(d) - BAND EDGES TESTING 38

APPLICABLE STANDARD 38
TEST EQUIPMENT LIST AND DETAILS 38
TEST PROCEDURE 38
TEST DATA 39

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Dyal Trading Limited*'s product, model number: *sWaP Classic BX1-S (FCC ID: XWN5017271000016C)* or the "EUT" as referred to in this report is a *Watch Phone,* which measures approximately: 5.0 cm L x 6.2 cm W x 8.5 cm H, rated input voltage: DC 3.7V battery.

Frequency Range:
PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)
Bluetooth: 2400-2483.5 MHz (TX/Rx)

Modulation Mode: GMSK (PCS); GFSK (Bluetooth)

Transmitter Output Power:
PCS Band: 30±2 dBm
Bluetooth: -6~4 dBm

Adapter Information: POWER SUPPLY
MODEL: CGSW-0500500
INPUT: 100-240V AC 50/60Hz
OUTPUT: 5V 500mA

** All measurement and test data in this report was gathered from production sample serial number: 0911013 (Assigned by BACL, Shenzhen). The EUT was received on 2009-11-09.*

Objective

This Type approval report is prepared on behalf of *Dyal Trading Limited in* accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 24E submission with FCC ID: XWN5017271000016C.

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 21, 2007. 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).

EUT Exercise Software

N/A.

Equipment Modifications

No modification was made to the unit tested.

Local Support Equipment List and Details

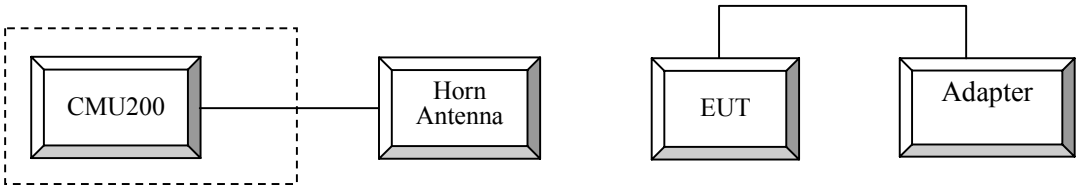
Manufacturer	Description	Model	Serial Number	FCC ID
R & S	Universal Radio CommutationTester	CMU200	1100 0008.02	DOC

External I/O Cable

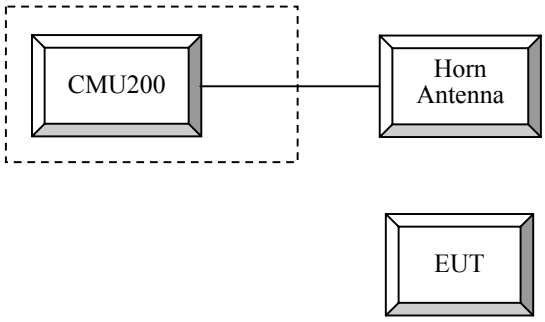
Cable Description	Length (m)	From Port	To
Unshielded Detachable DC Cabel	0.9	Adapter	EUT

Configuration of Test Setup

For Conducted emissions

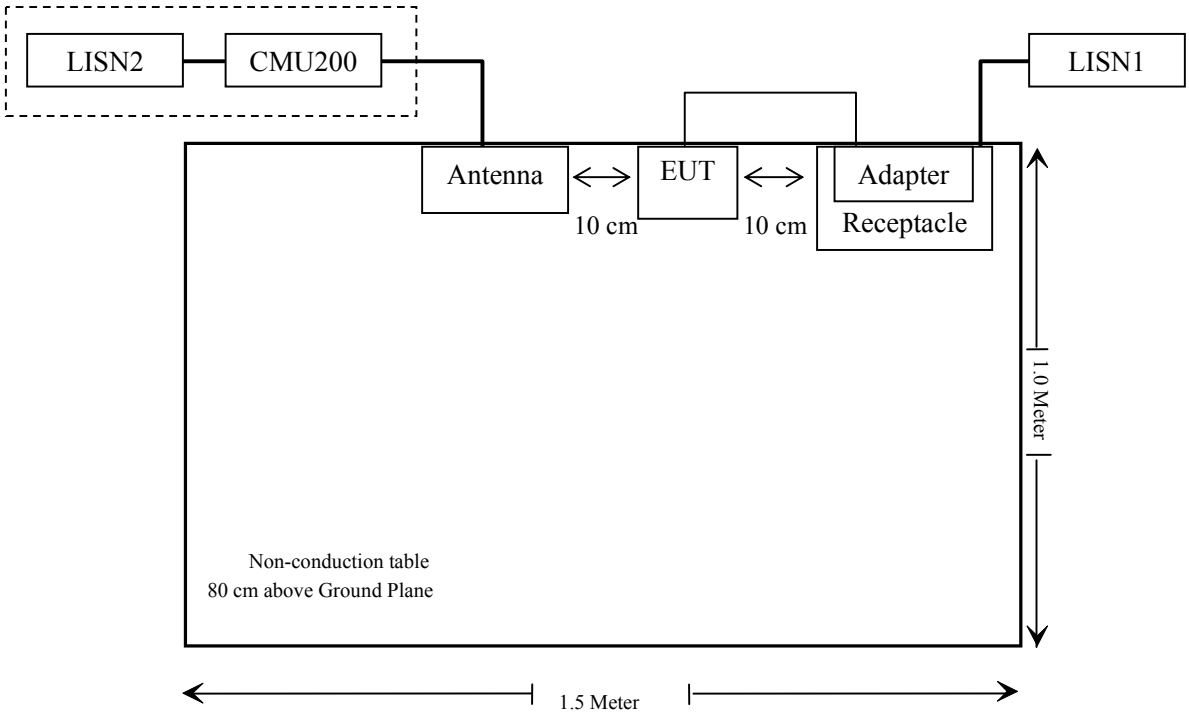


For Radiated emissions

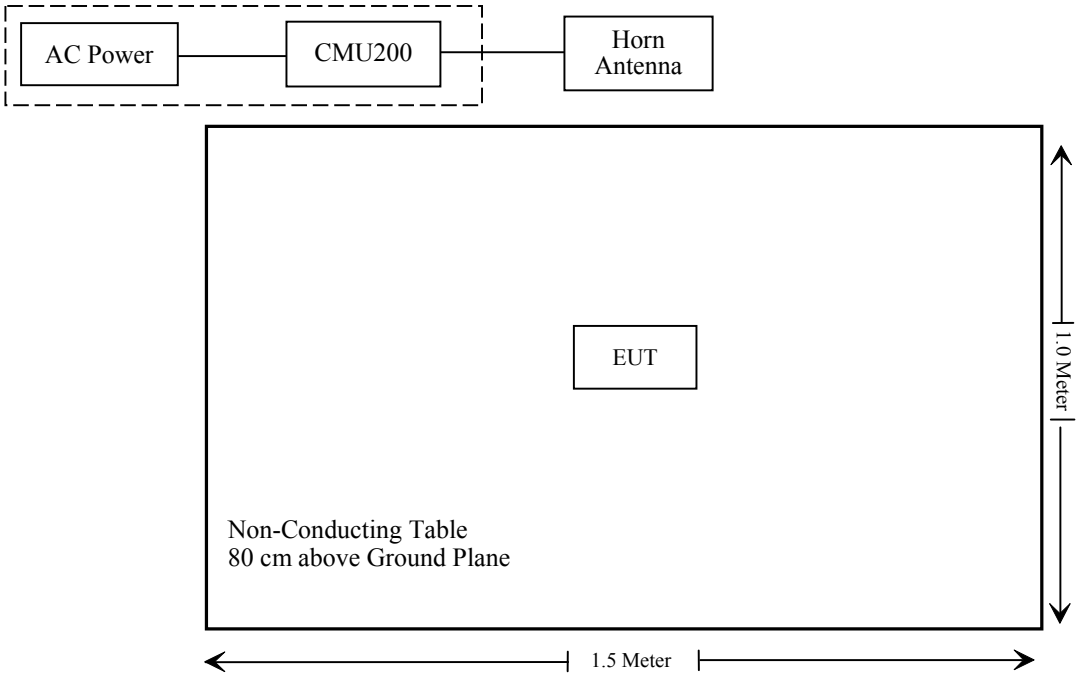


Block Diagram of Test Setup

For Conducted emissions



For Radiated emissions



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, §15.247(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

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Standard Applicable

According to FCC §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	Routine evaluation required	SAR not required: Unlicensed only o when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed o when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas o when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed 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 Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – o output ≤ 60/f: SAR not required o output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when o output ≤ 2·P_{Ref} and antenna is ≥ 5.0 cm from other antennas o output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas o output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required o test SAR on highest output channel for each wireless mode and exposure condition o if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	
Jaw, Mouth and Nose	Flat phantom SAR required o 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 o 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.

Three antennas are available for the EUT, one is PCS antenna, the other is Wifi antenna and the third is Bluetooth antenna, the distance between GSM/PCS and Bluetooth is less than 2.5cm, the distance between WiFi and Bluetooth is more than 5cm. according to FCC KDB 648474 D01 SAR Handsets Multi Xmiter and ant, V01r05 released on September 2008, the Max peak output power is 0.592 mW< P_{Ref} (12 mw) stand-alone SAR is not required for Bluetooth antenna.

Result:

The SAR measurement is exempt.

FCC §15.203 - ANTENNA REQUIREMENT

Standard Applicable

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 2 integral antennas, one is for Bluetooth, the gain is 2.35 dBi; other is for PCS, the gain is 3.71 dBi, which in accordance to section 15.203 please refer to the internal photos.

Result: Compliant.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

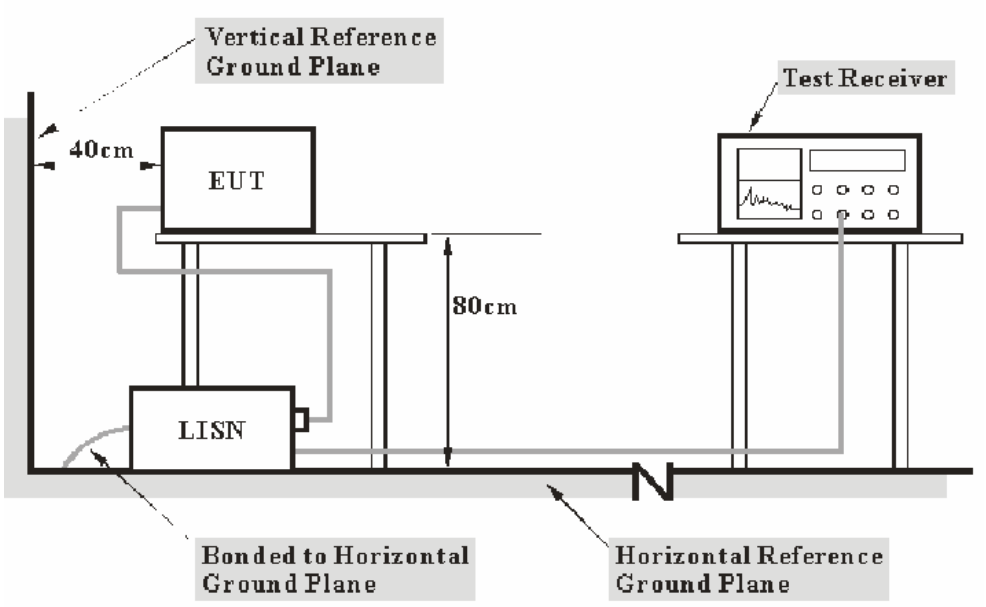
FCC §15.207

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.

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.

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

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	830245/006	2009-04-28	2010-04-27
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-04-28	2010-04-27

*** 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

During the conducted emission test, the adapter was connected to the LISN 1, the other support equipment was connected to the LISN 2.

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:

19.02 dB at **0.9250 MHz** in the **Line** conductor mode
14.58 dB at **0.8600 MHz** in the **Neutral** conductor mode

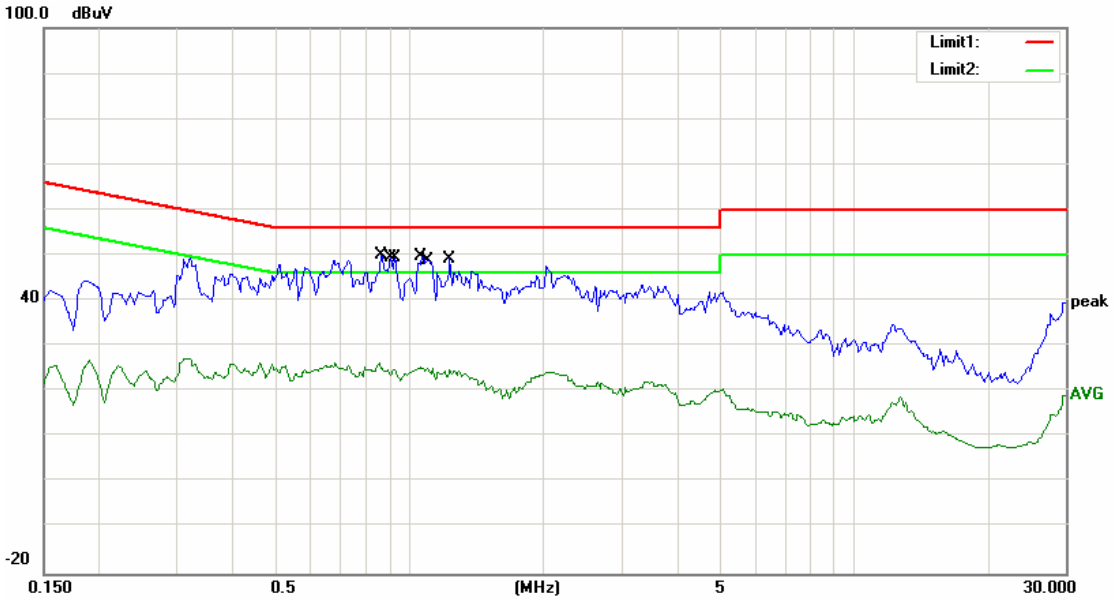
Test Data

Environmental Conditions

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

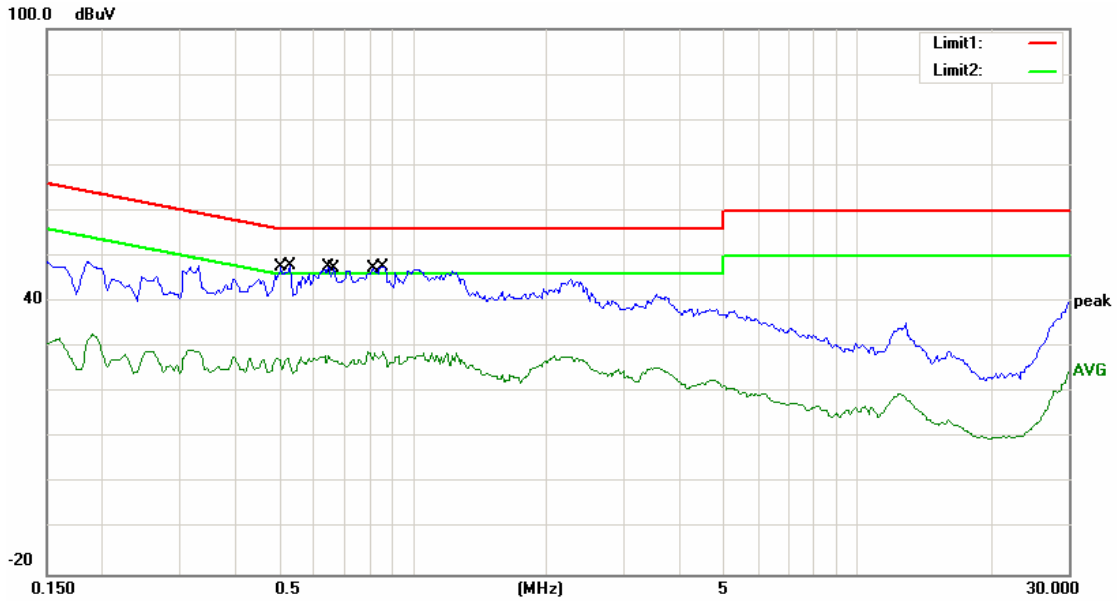
The testing was performed by Vicent Kang on 2009-11-27.

120V/60 Hz, Line:



Conducted Emission				FCC Part 15.207		
Frequency (MHz)	Receiver Reading (dBμV)	Correction Factor (dB)	Cord. Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark
0.9250	26.88	10.10	36.98	56.00	19.02	QP
0.9050	25.88	10.10	35.98	56.00	20.02	QP
1.0950	25.84	10.10	35.94	56.00	20.06	QP
0.8650	25.82	10.10	35.92	56.00	20.08	QP
1.0700	25.51	10.10	35.61	56.00	20.39	QP
0.9250	15.19	10.10	25.29	46.00	20.71	AV
1.2300	25.10	10.10	35.20	56.00	20.80	QP
1.0700	14.82	10.10	24.92	46.00	21.08	AV
0.9050	14.74	10.10	24.84	46.00	21.16	AV
1.0950	14.72	10.10	24.82	46.00	21.18	AV
0.8650	14.51	10.10	24.61	46.00	21.39	AV
1.2300	14.24	10.10	24.34	46.00	21.66	AV

120V/60 Hz, Neutral:



Conducted Emission				FCC Part 15.207		
Frequency (MHz)	Receiver Reading (dBμV)	Correction Factor (dB)	Cord. Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark
0.8600	31.32	10.10	41.42	56.00	14.58	QP
0.6650	31.09	10.10	41.19	56.00	14.81	QP
0.6450	31.05	10.10	41.15	56.00	14.85	QP
0.8150	31.05	10.10	41.15	56.00	14.85	QP
0.5300	31.03	10.10	41.13	56.00	14.87	QP
0.5050	30.30	10.10	40.40	56.00	15.60	QP
0.8600	19.11	10.10	29.21	46.00	16.79	AV
0.6450	17.77	10.10	27.87	46.00	18.13	AV
0.8150	17.65	10.10	27.75	46.00	18.25	AV
0.6650	17.02	10.10	27.12	46.00	18.88	AV
0.5300	16.91	10.10	27.01	46.00	18.99	AV
0.5050	15.65	10.10	25.75	46.00	20.25	AV

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

Applicable Standard

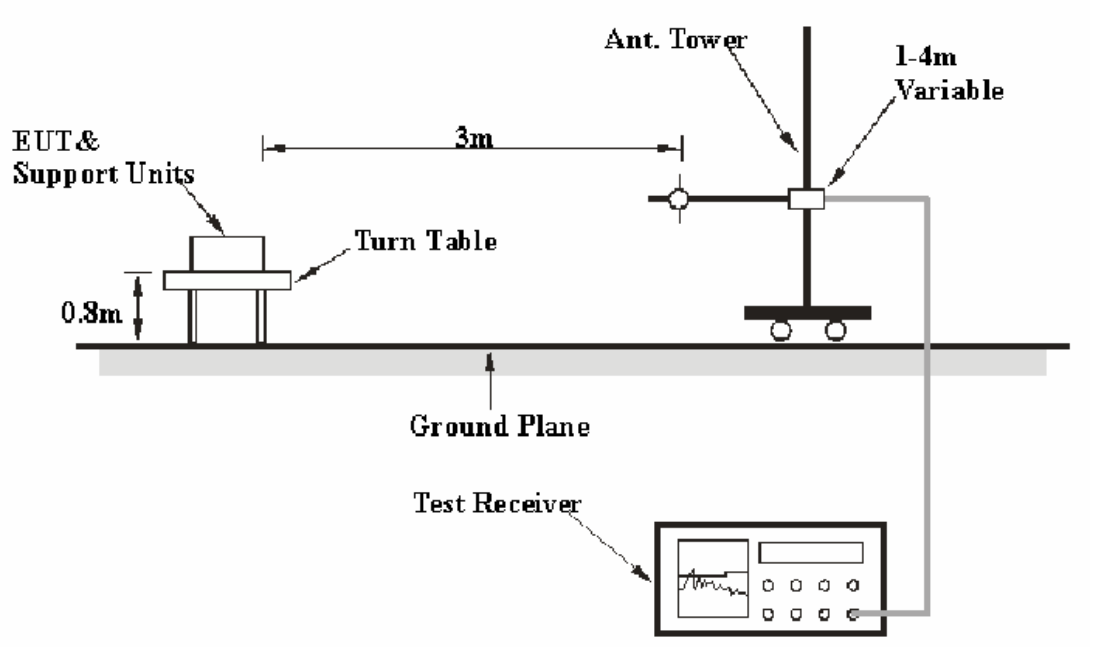
FCC §15.247 (d); §15.209; §15.205;

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.

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.

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:

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	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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 limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15, Subpart C, section 15.205, 15.109, 15.209 and 15.247, with the worst margin reading of:

30 -1000 MHz:

7.1 dB at **756.044250 MHz** in the **Vertical** polarization

Above 1 GHz:

Low Channel**: 8.41 dB** at **4804 MHz** in the **Horizontal** polarization
Middle Channel**: 9.15 dB** at **4882 MHz** in the **Horizontal** polarization
High Channel**: 11.20 dB** at **4960 MHz** in the **Horizontal** polarization

Test Data

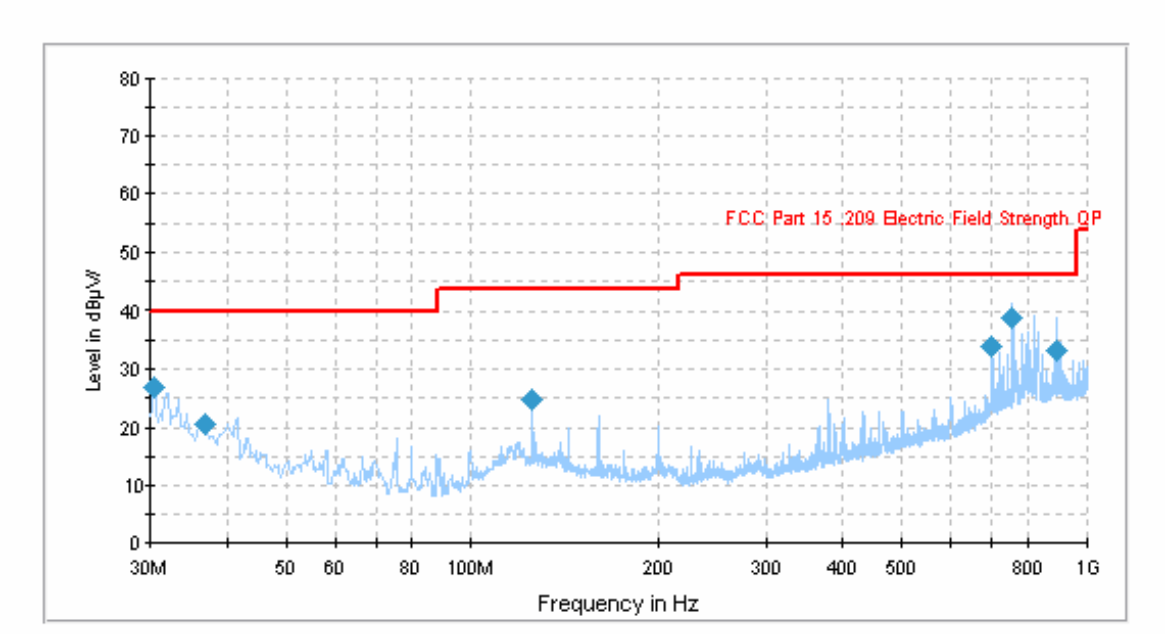
Environmental Conditions

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

The testing was performed by Vicent Kang on 2009-11-23.

30-1000 MHz:

Test Mode: Transmitting & Charging



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
756.044250	38.9	116.0	V	336.0	-2.7	46.0	7.1
698.209250	34.1	116.0	V	325.0	-4.7	46.0	11.9
890.921750	33.2	101.0	V	0.0	-0.2	46.0	12.8
30.498164	26.8	129.0	V	288.0	-6.3	40.0	13.2
125.984750	24.6	171.0	H	347.0	-13.7	43.5	18.9
36.770250	20.7	116.0	V	6.0	-11.1	40.0	19.3

Above 1 GHz:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Freq. (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2402 MHz)												
2402	82.42	PK	25	1.50	H	30.90	7.90	33.90	87.32			Fund.
2402	78.02	AV	25	1.50	H	30.90	7.90	33.90	82.92			Fund.
2402	88.69	PK	355	1.30	V	30.30	7.90	33.90	92.99			Fund.
2402	84.24	AV	355	1.30	V	30.30	7.90	33.90	88.54			Fund.
4804	35.43	AV	240	1.20	H	36.30	7.56	33.70	45.59	54.00	8.41	harmonic
4804	32.59	AV	180	1.50	V	35.00	7.56	33.70	41.45	54.00	12.55	harmonic
2487.07	34.83	AV	235	1.80	H	30.90	7.99	33.90	39.82	54.00	14.18	spurious
2331.96	35.34	AV	152	1.30	H	30.90	7.32	33.90	39.66	54.00	14.34	spurious
2487.07	34.83	AV	136	1.50	V	30.30	7.99	33.90	39.22	54.00	14.78	spurious
2379.41	34.56	AV	315	1.20	V	30.30	7.32	33.90	38.28	54.00	15.72	spurious
1784.63	36.64	AV	154	1.60	V	28.80	5.99	34.20	37.23	54.00	16.77	spurious
1786.77	36.82	AV	225	1.40	H	28.30	5.99	34.20	36.91	54.00	17.09	spurious
4804	46.34	PK	240	1.20	H	36.30	7.56	33.70	56.50	74.00	17.50	harmonic
4804	46.76	PK	180	1.50	V	35.00	7.56	33.70	55.62	74.00	18.38	harmonic
2487.07	47.51	PK	235	1.80	H	30.90	7.99	33.90	52.50	74.00	21.50	spurious
2331.96	47.98	PK	152	1.30	H	30.90	7.32	33.90	52.30	74.00	21.70	spurious
2487.07	47.53	PK	136	1.50	V	30.30	7.99	33.90	51.92	74.00	22.08	spurious
2379.41	47.70	PK	315	1.30	V	30.30	7.32	33.90	51.42	74.00	22.58	spurious
1784.63	49.65	PK	155	1.50	V	28.80	5.99	34.20	50.24	74.00	23.76	spurious
1786.77	49.55	PK	225	1.40	H	28.30	5.99	34.20	49.64	74.00	24.36	spurious
Middle Channel (2441 MHz)												
2441	82.53	PK	25	1.30	H	30.30	7.92	33.90	86.85			Fund.
2441	78.37	AV	25	1.30	H	30.30	7.92	33.90	82.69			Fund.
2441	87.48	PK	0	1.60	V	30.30	7.92	33.90	91.80			Fund.
2441	83.99	AV	0	1.60	V	30.30	7.92	33.90	88.31			Fund.
4882	34.69	AV	250	1.00	H	36.30	7.56	33.70	44.85	54.00	9.15	harmonic
4882	32.41	AV	178	1.30	V	35.00	7.56	33.70	41.27	54.00	12.73	harmonic
2322.50	35.36	AV	186	1.60	H	30.90	7.32	33.90	39.68	54.00	14.32	spurious
2487.85	34.66	AV	235	1.30	H	30.90	7.99	33.90	39.65	54.00	14.35	spurious
2490.37	34.69	AV	145	1.30	V	30.30	7.99	33.90	39.08	54.00	14.92	spurious
2322.50	34.96	AV	130	1.10	V	30.30	7.30	33.90	38.66	54.00	15.34	spurious
2029.58	34.73	AV	254	1.20	V	29.80	6.32	34.00	36.85	54.00	17.15	spurious
4882	45.78	PK	250	1.00	H	36.30	7.56	33.70	55.94	74.00	18.06	harmonic
4882	45.51	PK	178	1.30	V	35.00	7.56	33.70	54.37	74.00	19.63	harmonic
2487.85	47.65	PK	235	1.20	H	30.90	7.99	33.90	52.64	74.00	21.36	spurious
2490.37	48.02	PK	145	1.20	V	30.30	7.99	33.90	52.41	74.00	21.59	spurious
2322.50	47.88	PK	186	1.60	H	30.90	7.32	33.90	52.20	74.00	21.80	spurious
2322.50	47.59	PK	130	1.40	V	30.30	7.30	33.90	51.29	74.00	22.71	spurious
2029.58	48.77	PK	254	1.50	V	29.80	6.32	34.00	50.89	74.00	23.11	spurious
1133.84	34.25	AV	175	1.40	H	24.10	4.78	35.00	28.13	54.00	25.87	spurious
1133.84	48.96	PK	175	1.40	H	25.10	4.78	35.00	43.84	74.00	30.16	spurious

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Freq. (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
High Channel (2480 MHz)												
2480	80.24	PK	35	1.50	H	30.30	7.94	33.90	84.58			Fund.
2480	77.01	AV	35	1.50	H	30.30	7.94	33.90	81.35			Fund.
2480	84.38	PK	355	1.60	V	30.30	7.94	33.90	88.72			Fund.
2480	81.15	AV	355	1.60	V	30.30	7.94	33.90	85.49			Fund.
4960	32.64	AV	35	1.70	H	36.30	7.56	33.70	42.80	54.00	11.20	harmonic
4960	31.88	AV	355	1.10	V	35.00	7.56	33.70	40.74	54.00	13.26	harmonic
2484.16	34.69	AV	154	1.50	V	30.30	7.99	33.90	39.08	54.00	14.92	spurious
2490.31	33.80	AV	250	1.30	H	30.90	7.99	33.90	38.79	54.00	15.21	spurious
2329.69	35.08	AV	86	1.40	V	30.30	7.30	33.90	38.78	54.00	15.22	spurious
2329.39	33.38	AV	136	1.60	H	30.90	7.32	33.90	37.70	54.00	16.30	spurious
1721.64	34.75	AV	280	1.20	V	28.80	5.99	34.20	35.34	54.00	18.66	spurious
4960	45.00	PK	35	1.70	H	36.30	7.56	33.70	55.16	74.00	18.84	harmonic
2484.16	50.39	PK	154	1.98	V	30.30	7.99	33.90	54.78	74.00	19.22	spurious
4960	45.29	PK	355	1.10	V	35.00	7.56	33.70	54.15	74.00	19.85	harmonic
2490.31	48.32	PK	250	1.20	H	30.90	7.99	33.90	53.31	74.00	20.69	spurious
2329.39	47.70	PK	136	1.80	H	30.90	7.32	33.90	52.02	74.00	21.98	spurious
2329.69	48.03	PK	86	1.50	V	30.30	7.30	33.90	51.73	74.00	22.27	spurious
1721.64	49.79	PK	280	1.20	V	28.80	5.99	34.20	50.38	74.00	23.62	spurious
1252.70	33.84	AV	150	1.30	H	24.10	4.78	35.00	27.72	54.00	26.28	spurious
1252.70	48.34	PK	150	1.30	H	25.10	4.78	35.00	43.22	74.00	30.78	spurious

FCC §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	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

** The testing was performed by Vicent Kang on 2009-11-23.*

Test Result: Compliant.

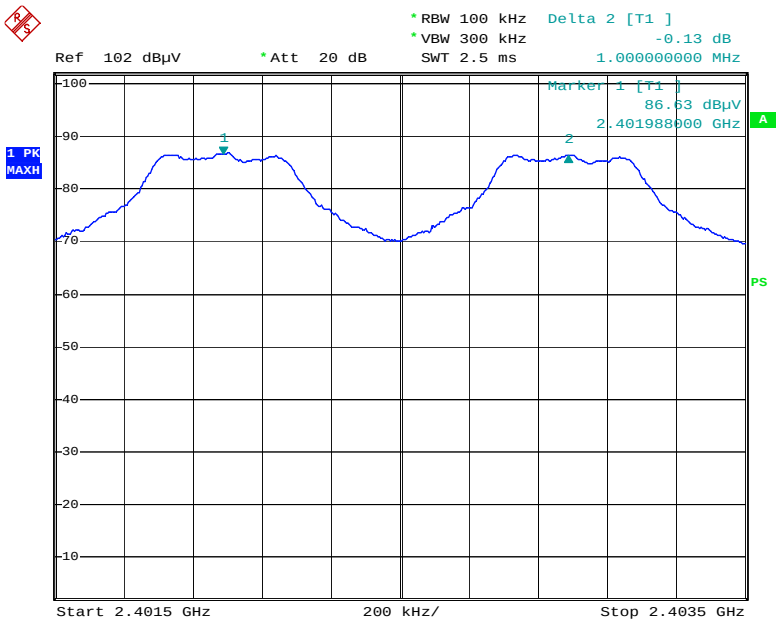
Please refer to following tables and plots

Test Mode: Transmitting

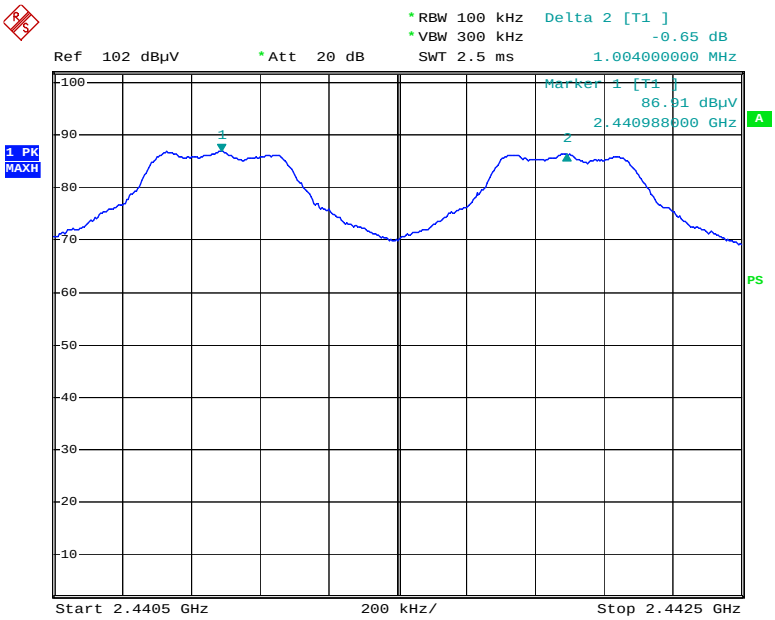
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.000	0.60267	Pass
Adjacent Channel	2403			
Mid Channel	2440	1.004	0.59200	Pass
Adjacent Channel	2441			
High Channel	2480	1.008	0.59733	Pass
Adjacent Channel	2479			

Please refer to the following plots.

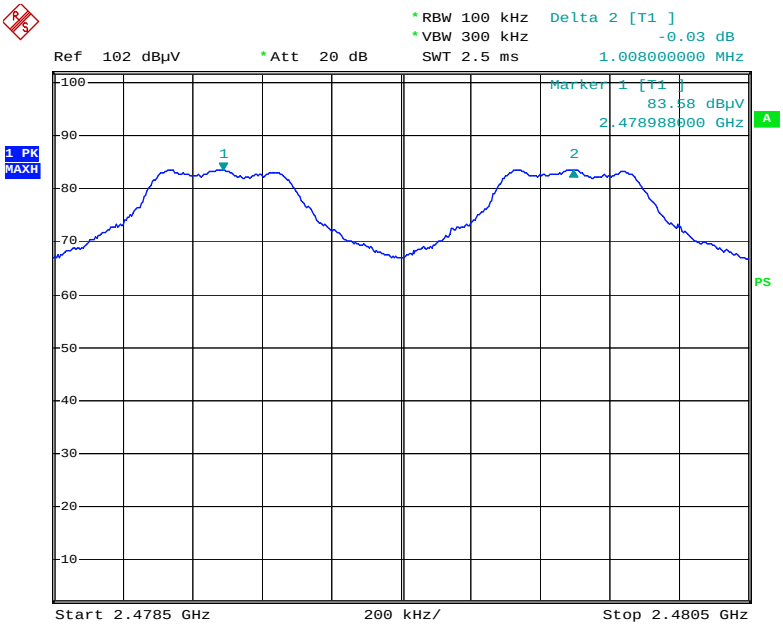
Low Channel



Middle Channel



High Channel



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 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

** The testing was performed by Vicent Kang on 2009-11-23.*

Test Result: Compliant.

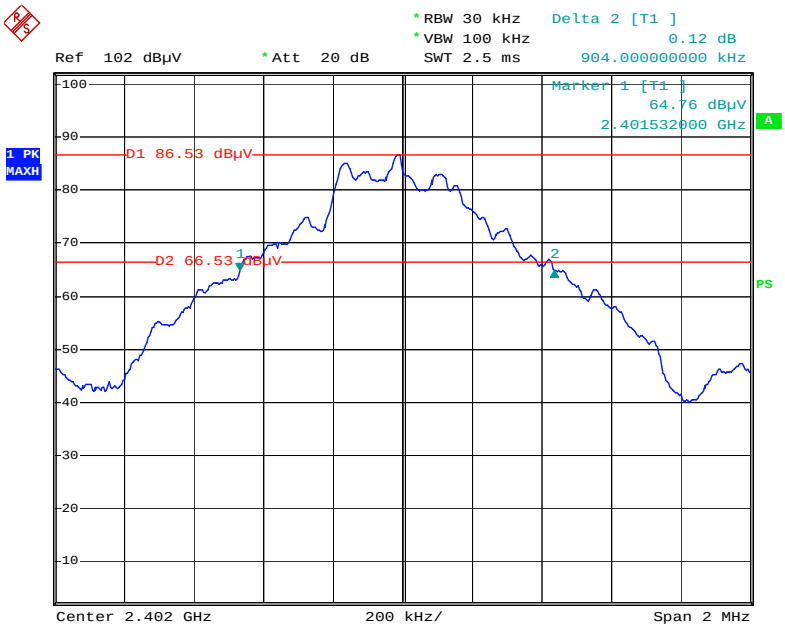
Please refer to following tables and plots

Test Mode: Transmitting

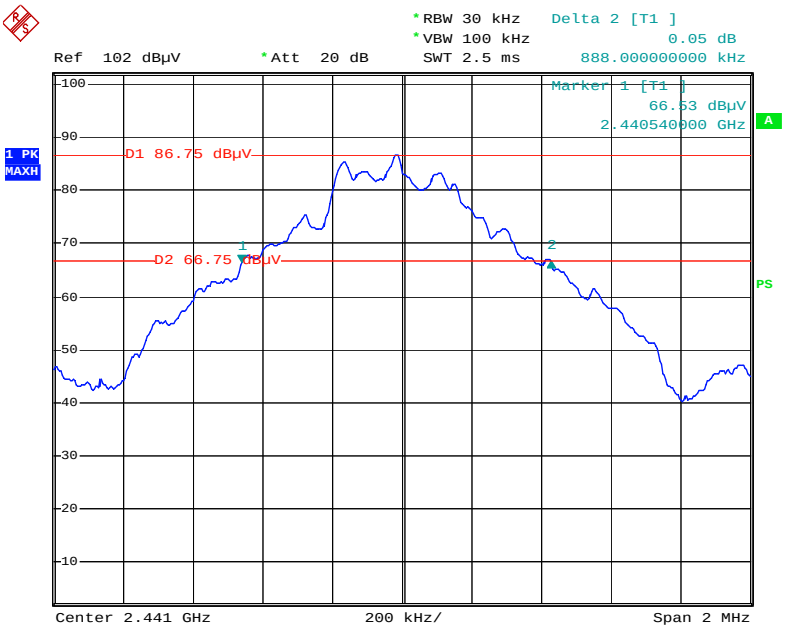
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.904
Middle	2441	0.888
High	2480	0.896

Please refer to the following plots.

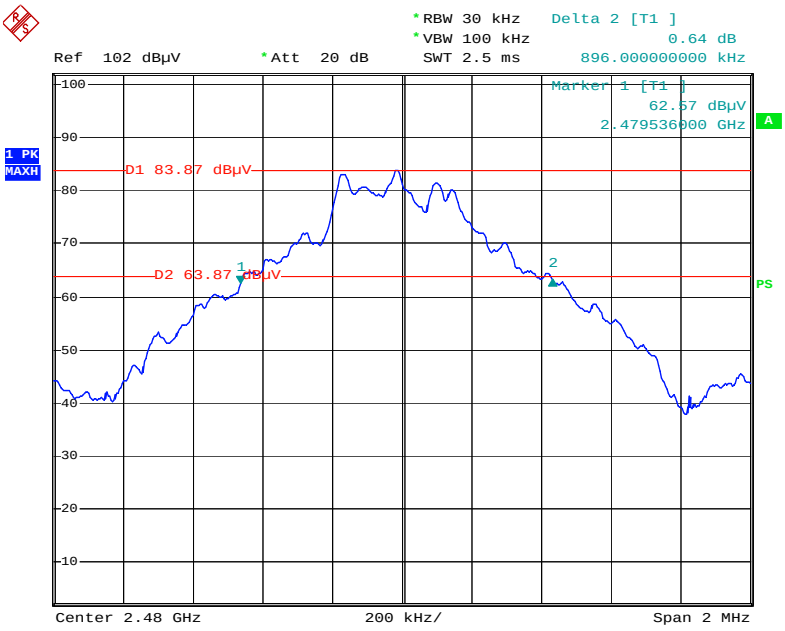
Low Channel



Middle Channel



High Channel



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	100035	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

The testing was performed by Vicent Kang on 2009-11-23.

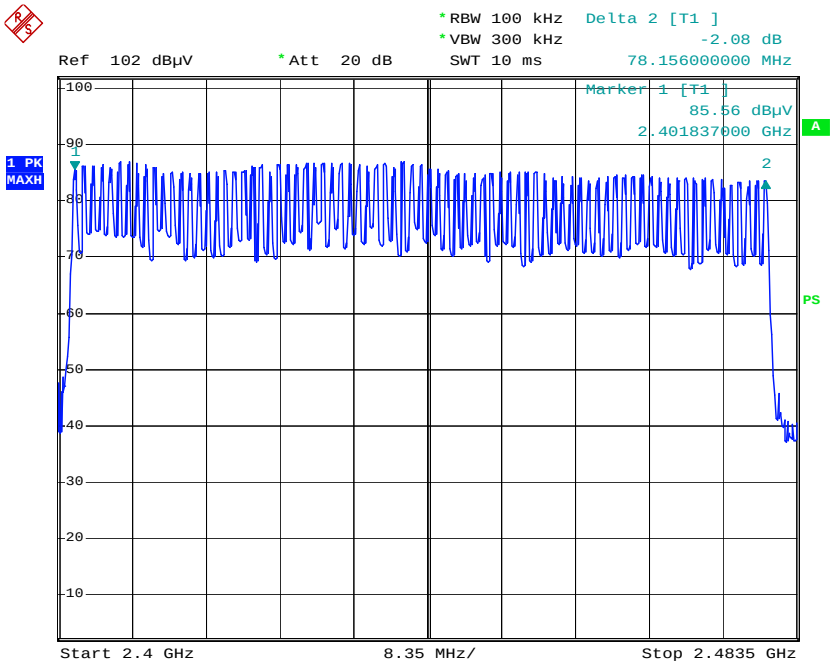
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

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

Number of Hopping Channels



Date: 23.NOV.2009 14:19:57

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	100035	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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= Pulse width (ms) × (1600 / 2 / 79) ×31.6 Second

Hop rate=1600/s

Test Data

Environmental Conditions

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

** The testing was performed by Vicent Kang on 2009-11-23.*

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	0.480	0.154	0.4	Pass
Middle	0.484	0.155	0.4	Pass
High	0.492	0.157	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	1.800	0.288	0.4	Pass
Middle	1.776	0.284	0.4	Pass
High	1.808	0.289	0.4	Pass

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

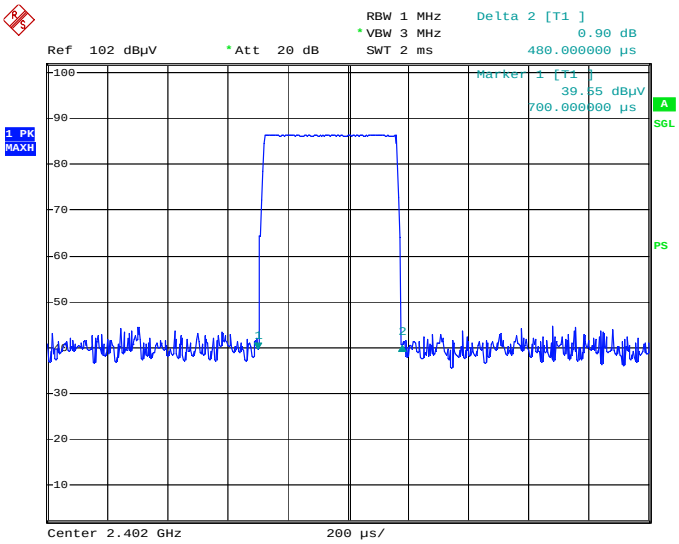
DH 5 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	3.040	0.324	0.4	Pass
Middle	3.056	0.326	0.4	Pass
High	3.040	0.324	0.4	Pass

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

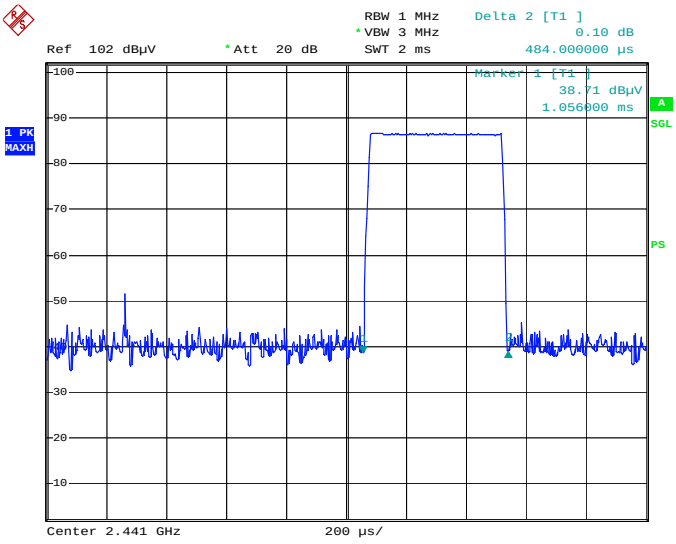
Please refer to the following plots.

Low Channel for DH1



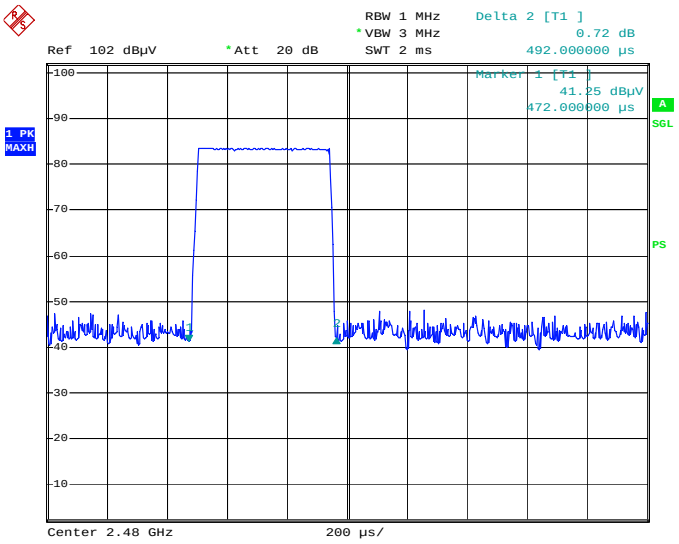
Date: 23.NOV.2009 14:21:09

Middle Channel for DH1



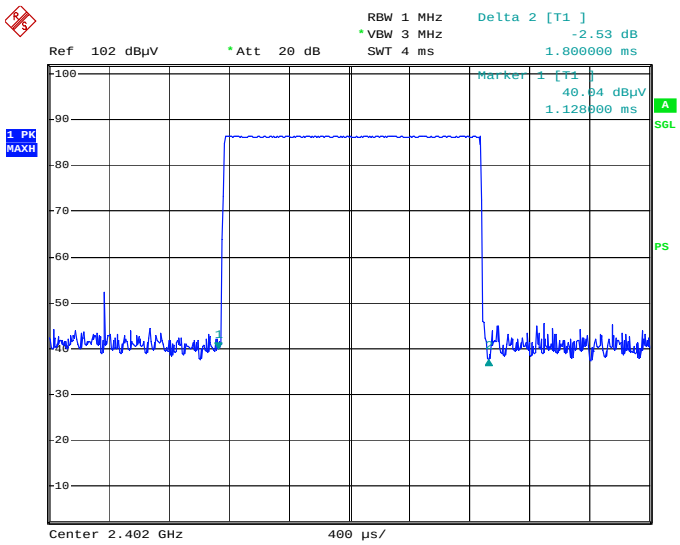
Date: 23.NOV.2009 14:22:05

High Channel for DH1



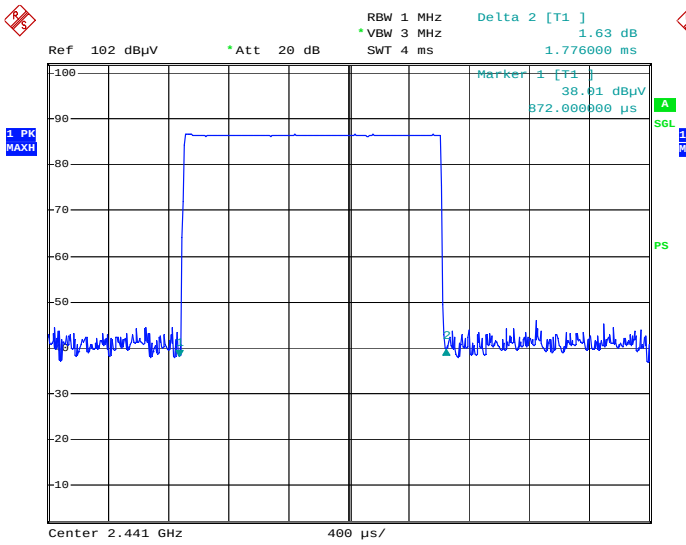
Date: 23.NOV.2009 14:23:01

Low Channel for DH3



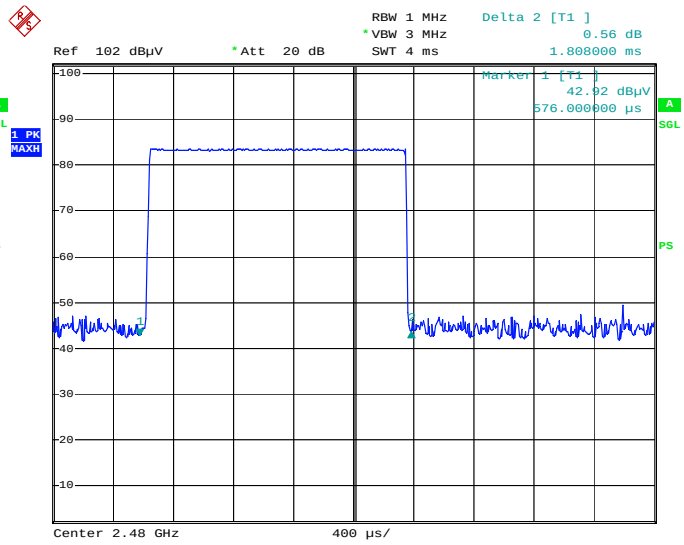
Date: 23.NOV.2009 14:26:20

Middle Channel for DH3



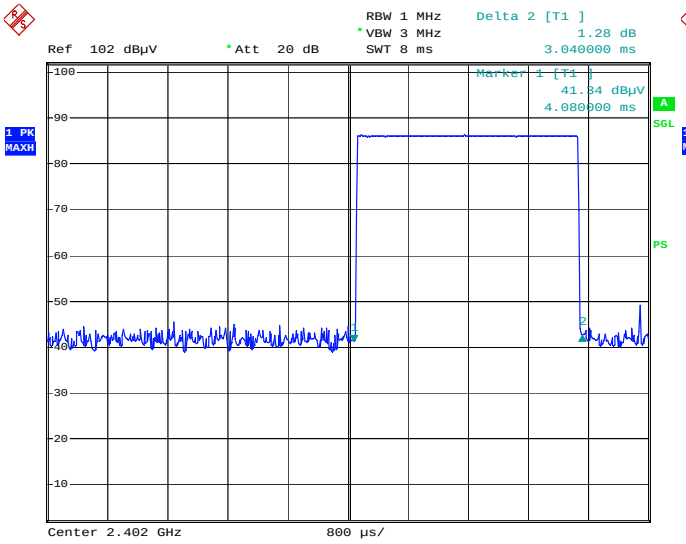
Date: 23.NOV.2009 14:25:26

High Channel for DH3



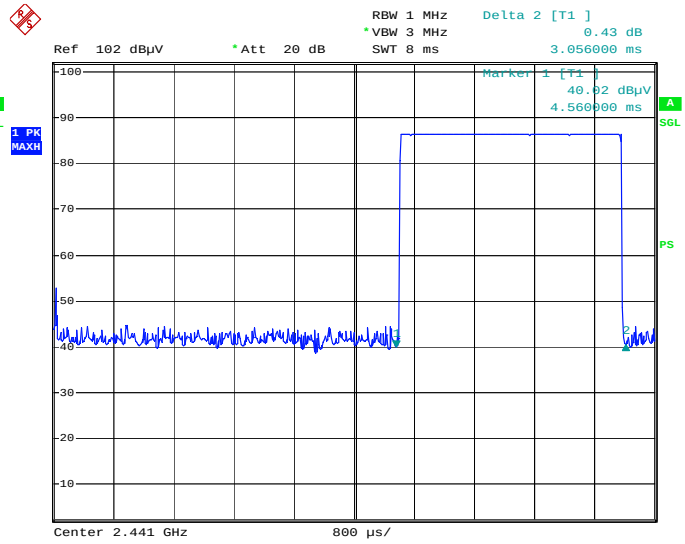
Date: 23.NOV.2009 14:23:57

Low Channel for DH5



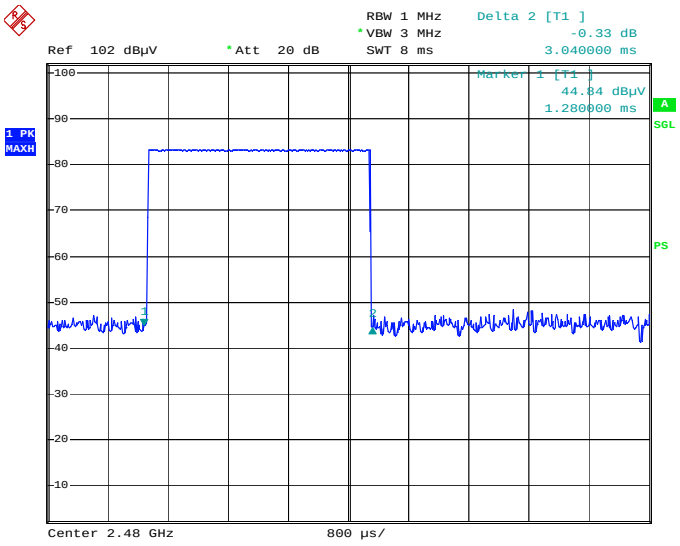
Date: 23.NOV.2009 14:33:55

Middle Channel for DH5



Date: 23.NOV.2009 14:32:39

High Channel for DH5



Date: 23.NOV.2009 14:36:57

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	100035	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

FCC DA 00-705, the antenna of EUT is integrated; radiated test method will be applied.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

** The testing was performed by Vicent Kang on 2009-11-23.*

Test Result: Compliant.

Test Mode: Transmitting

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247			
Freq. (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	EIRP (dBm)	EIRP (mw)	Limit (mw)
Low Channel (2402 MHz)												
2402	88.69	PK	355	1.30	V	30.30	7.90	33.90	92.99	-2.28	0.592	1000
2441	87.48	PK	0	1.60	30.30	7.92	33.90	91.80	2441	-3.47	0.450	1000
2480	84.38	PK	355	1.60	30.30	7.94	33.90	88.72	2480	-6.55	0.221	1000

Note: P(dBm) = E (dBμV/m) – 95.27 dB

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	100035	2009-11-07	2010-11-06
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

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

Test Procedure

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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

**The testing was performed by Vicent Kang on 2009-11-23.*

Test Result: Compliant

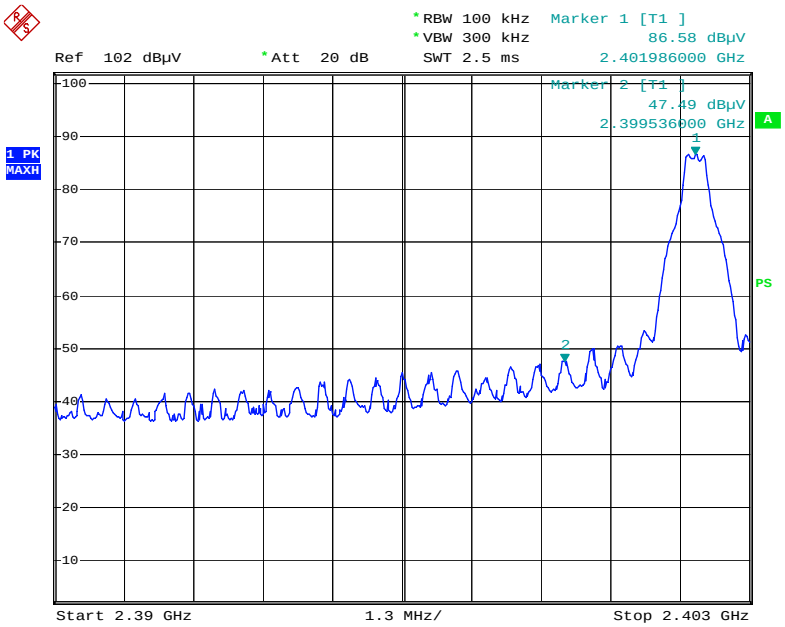
Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.536	39.08	20
2483.896	40.94	20

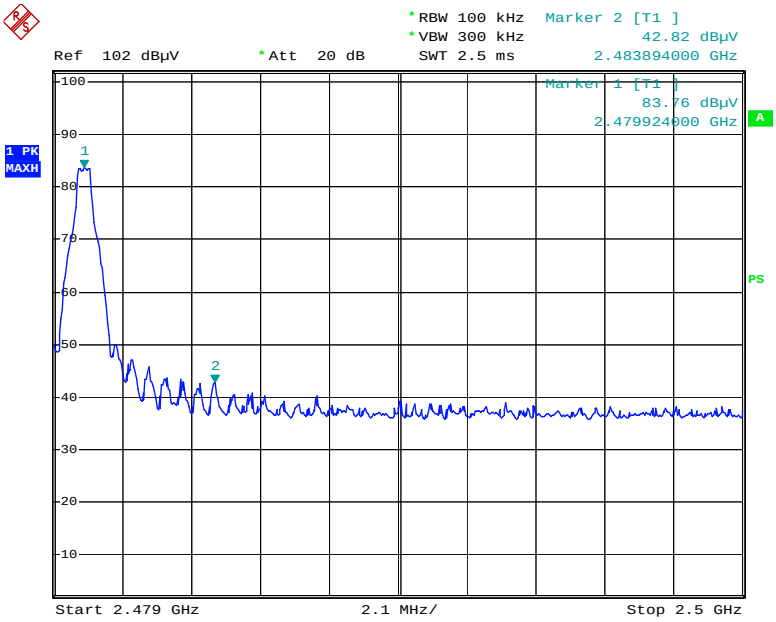
Note: The point fall into the stricted band was in FCC 15.209, please refer to the restrict band testing.

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



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