



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Zhongshan K-mate General Electronics Co., Ltd.

3/F B1 Building Fuwan Industrial Zone Sunwen East Road,
Zhongshan, China

FCC ID: WAD-BTH001B

Report Type: Original Report	Product Type: Bluetooth Stereo Headset
Test Engineer: Cookies Bu	<i>Cookies Bu</i>
Report Number: RSZ08090105	
Report Date: 2007-09-27	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*”

TABLE OF CONTENTS

GENERAL INFORMATION.....4

 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)4

 OBJECTIVE4

 RELATED SUBMITTAL(S)/GRANT(S).....4

 TEST METHODOLOGY4

 TEST FACILITY5

SYSTEM TEST CONFIGURATION.....6

 DESCRIPTION OF TEST CONFIGURATION6

 EQUIPMENT MODIFICATIONS6

 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS6

 EXTERNAL I/O CABLE.....6

 CONFIGURATION OF TEST SETUP7

 BLOCK DIAGRAM OF TEST SETUP7

SUMMARY OF TEST RESULTS8

CFR47 §15.247 (i) & §2.1093 - RF EXPOSURE.....9

CFR47 §15.203 - ANTENNA REQUIREMENT.....10

 STANDARD APPLICABLE10

 ANTENNA CONNECTOR CONSTRUCTION10

CFR47 §15.207 (a) - CONDUCTED EMISSIONS11

 MEASUREMENT UNCERTAINTY11

 EUT SETUP11

 EMI TEST RECEIVER SETUP.....12

 TEST EQUIPMENT LIST AND DETAILS.....12

 TEST PROCEDURE12

 TEST RESULTS SUMMARY12

 TEST DATA13

 PLOT(S) OF TEST DATA13

CFR47 §15.205, §15.109, §15.209, §15.247 - RADIATED EMISSIONS.....16

 APPLICABLE STANDARD16

 MEASUREMENT UNCERTAINTY16

 EUT SETUP16

 EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP17

 TEST EQUIPMENT LIST AND DETAILS.....17

 TEST PROCEDURE17

 CORRECTED AMPLITUDE & MARGIN CALCULATION17

 TEST RESULTS SUMMARY18

 TEST DATA18

CFR47 §15.247(a) (1)-CHANNEL SEPARATION TEST23

 APPLICABLE STANDARD23

 TEST EQUIPMENT LIST AND DETAILS.....23

 TEST PROCEDURE23

TEST DATA23

CFR47 §15.247(a) (1) – 20dB BANDWIDTH TESTING.....27

 APPLICABLE STANDARD27

 TEST EQUIPMENT LIST AND DETAILS.....27

 TEST PROCEDURE27

 TEST DATA27

CFR47 §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST31

 APPLICABLE STANDARD31

 TEST EQUIPMENT LIST AND DETAILS.....31

 TEST PROCEDURE31

 TEST DATA31

CFR47 §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....33

 APPLICABLE STANDARD33

 TEST EQUIPMENT LIST AND DETAILS.....33

 TEST PROCEDURE33

 TEST DATA33

CFR47 §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT44

 APPLICABLE STANDARD44

 TEST EQUIPMENT LIST AND DETAILS.....44

 TEST PROCEDURE44

 TEST DATA44

CFR47 §15.247(d) - BAND EDGES TESTING48

 APPLICABLE STANDARD48

 TEST EQUIPMENT LIST AND DETAILS.....48

 TEST PROCEDURE48

 TEST DATA49

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Zhongshan K-mate General Electronics Co., Ltd's* product, model number: *BTH001* or the "EUT" as referred to in this report is a *Bluetooth stereo headset*, which measures approximately: 13.1 cm L x 12.5 cm W x 2.5 cm H, input voltage: 3.7V battery.

** All measurement and test data in this report was gathered from production sample serial number: 0809005 (Assigned by BACL, Shenzhen). The EUT was received on 2008-09-01.*

Objective

This Type approval report is prepared on behalf of *Zhongshan K-mate General Electronics 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, 15.107, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

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).



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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.

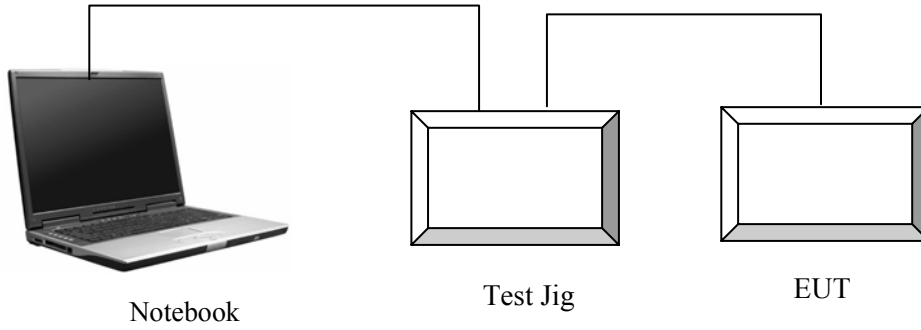
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Great Quality	Notebook	RX-7336	N/A	DoC

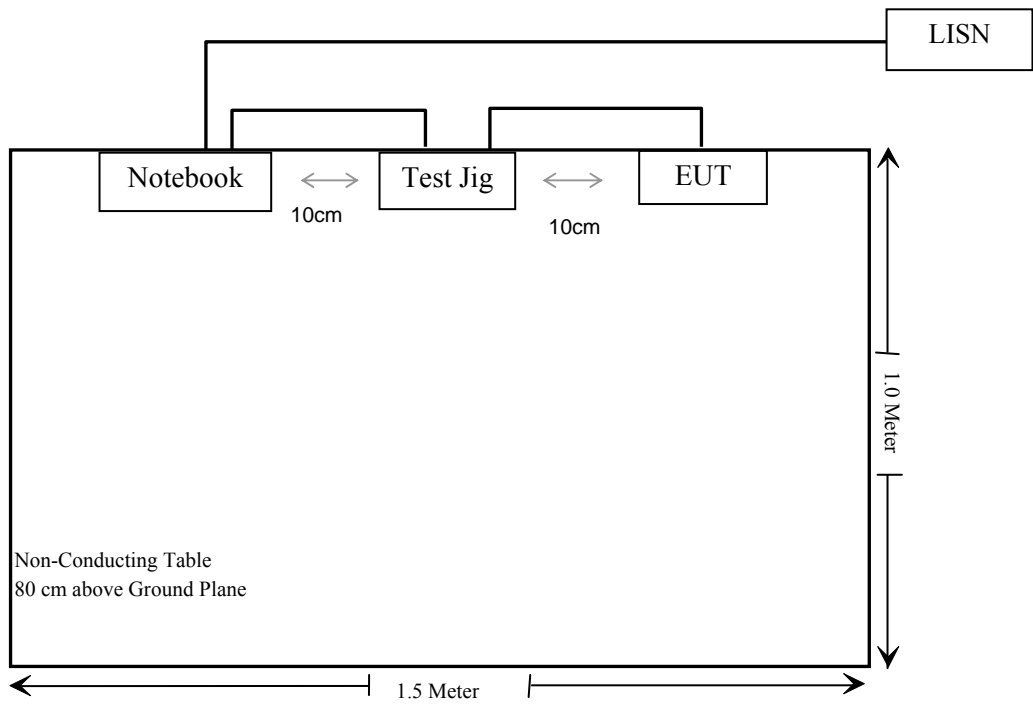
External I/O Cable

Cable Description	Length (m)	From Port	To
USB Cable	1.27	EUT	PC

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, §15.109, §15.209, §15.247(d)	Radiated Emission	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

Note: * Within measurement uncertainty.

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

Standard Applicable

According to § 1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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's body, excluding hands, wrists, feet, and ankles.

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

This is a portable device and the Max peak output power is $1.648\text{mW} < 24.58\text{mW} = (60/2.441\text{GHz}) \text{ mW}$

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 a component antenna on PCB. The maximum gain is 0 dBi; please refer to the internal photos.

Result: Compliant.

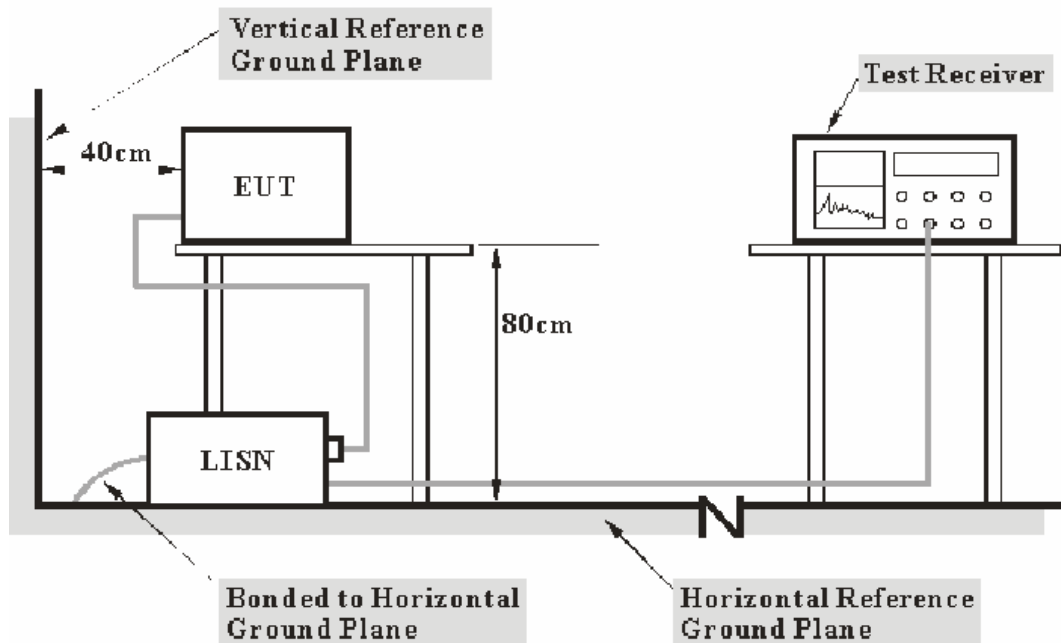
CFR47 §15.207 (a) - CONDUCTED EMISSIONS

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 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 notebook 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:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
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

* Com-Power's LISN were used as the supporting equipment.

* **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 notebook 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:

5.5 dB at 22.26 MHz in the **Neutral** conductor mode

Test Data**Environmental Conditions**

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

**The testing was performed by Cookies Bu on 2008-09-12.*

Test Mode: Charging

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	Amplitude (dBμV)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)
22.260	54.50	QP	Neutral	60.00	5.50
14.105	46.60	QP	Neutral	60.00	13.40
19.890	44.80	QP	Line	60.00	15.20
18.510	42.20	QP	Neutral	60.00	17.80
19.905	29.70	AV	Line	50.00	20.30
0.240	30.60	AV	Line	52.10	21.50
0.240	29.30	AV	Neutral	52.10	22.80
18.490	26.60	AV	Neutral	50.00	23.40
4.710	31.80	QP	Line	56.00	24.20
6.075	35.20	QP	Neutral	60.00	24.80
0.480	29.10	QP	Line	56.34	27.24
0.480	18.90	AV	Line	46.34	27.44
4.710	17.90	AV	Line	46.00	28.10
1.690	17.70	AV	Line	46.00	28.30
0.395	29.50	QP	Neutral	57.96	28.46
0.240	33.60	QP	Line	62.10	28.50
0.240	32.70	QP	Neutral	62.10	29.40
10.750	30.50	QP	Line	60.00	29.50
6.045	20.00	AV	Neutral	50.00	30.00
1.690	24.60	QP	Line	56.00	31.40
10.750	17.50	AV	Line	50.00	32.50
6.075	16.20	AV	Neutral	50.00	33.80
0.395	13.40	AV	Neutral	47.96	34.56
22.260	15.10	AV	Neutral	50.00	34.90

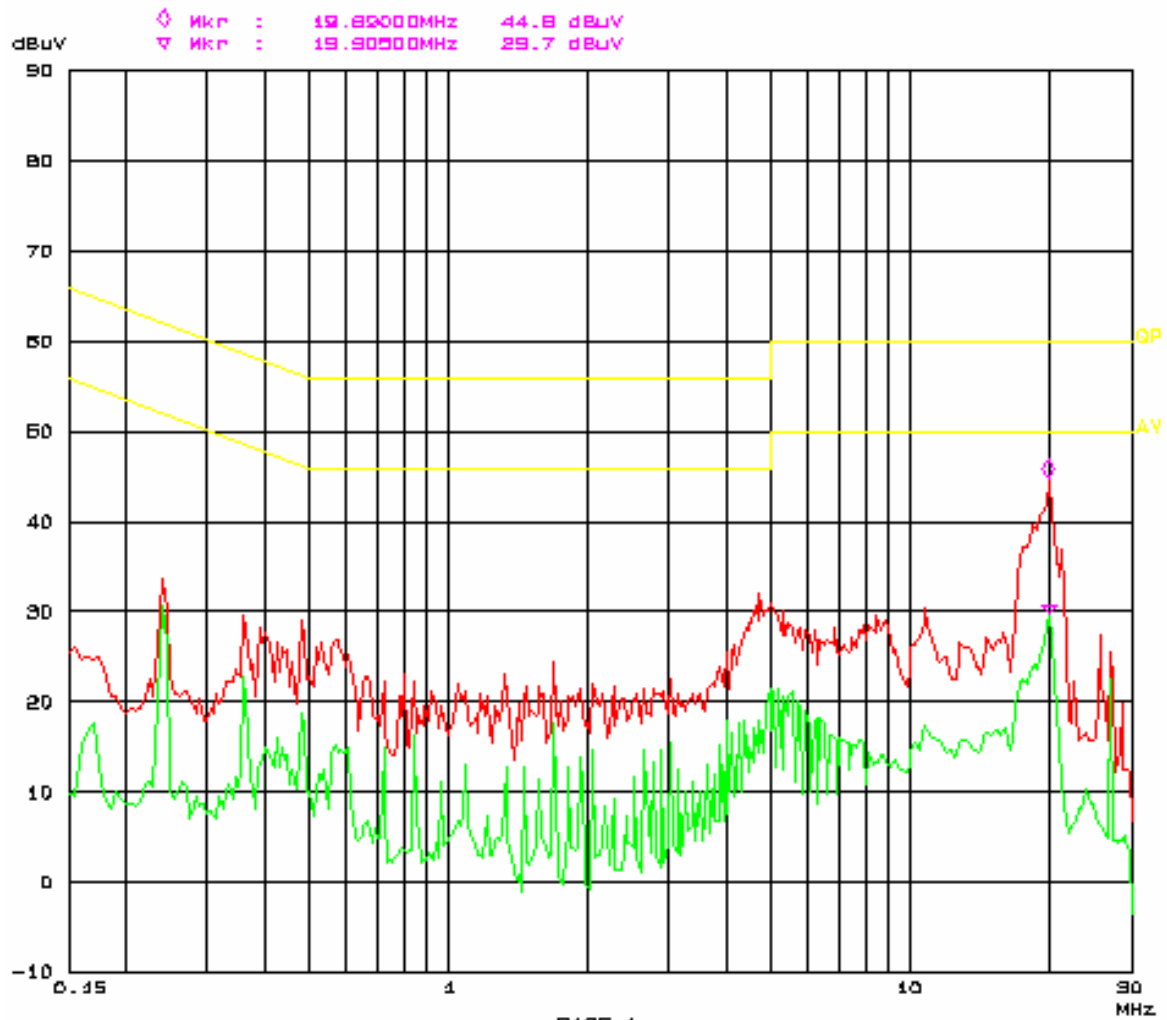
Plot(s) of Test Data

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

conducted emission
FCC PART15

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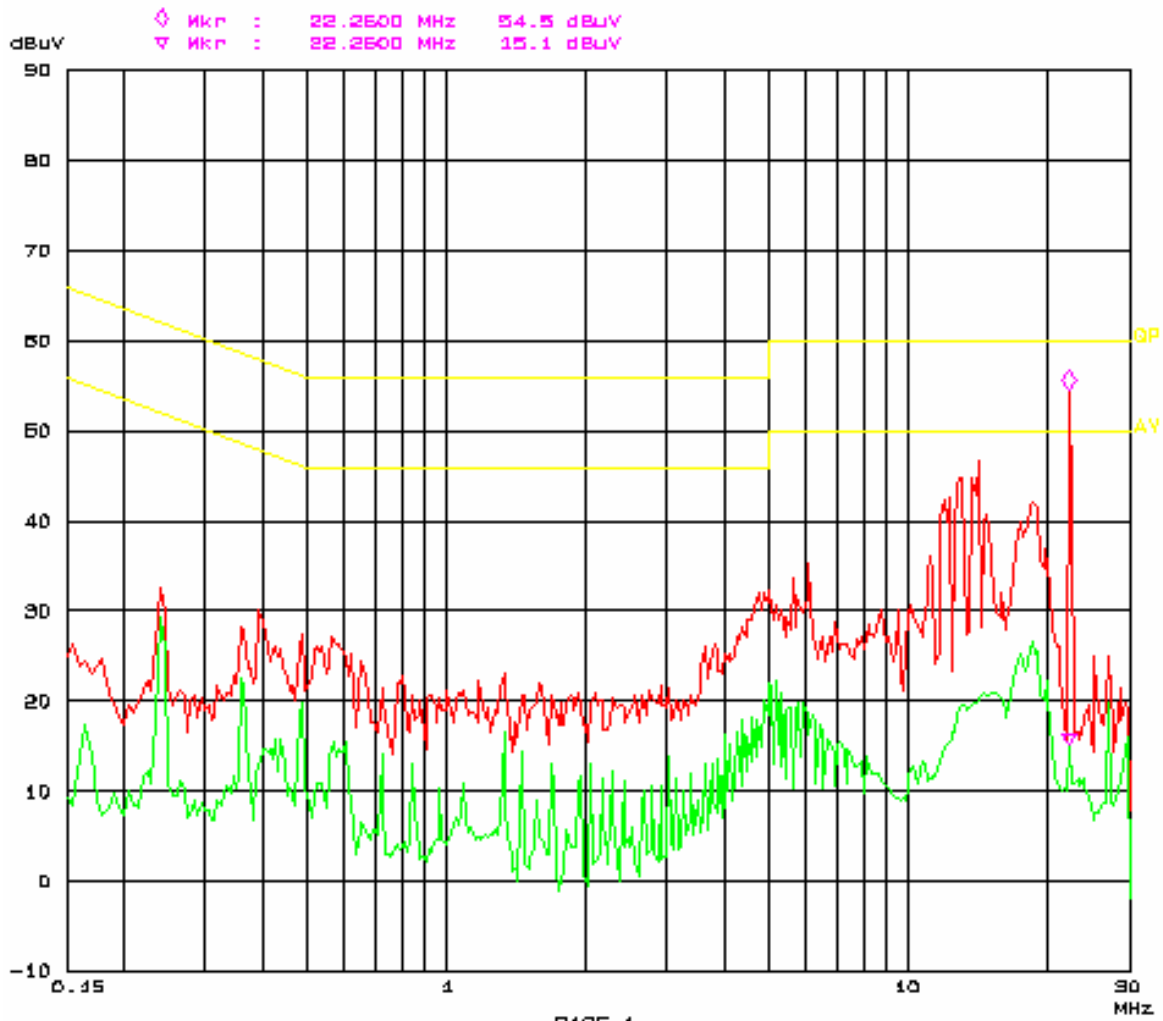
EUT: BLUETOOTH STEREO HEADSET BTH001
Manuf: K-MATE
Op Cond: Charging
Operator: CDKIEB
Test Spec: AC 120V/60Hz LINE
Comment: Temp: 25 Hum: 58%



conducted emission
FCC PART15

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EUT: BLUETOOTH STEREO HEADSET BTH001
Manuf: K-MATE
Op Cond: Charging
Operator: CDDKIEB
Test Spec: AC 120V60Hz Neutral
Comment: Temp: 25 Hum: 58%



CFR47 §15.205, §15.109, §15.209, §15.247 - RADIATED EMISSIONS

Applicable Standard

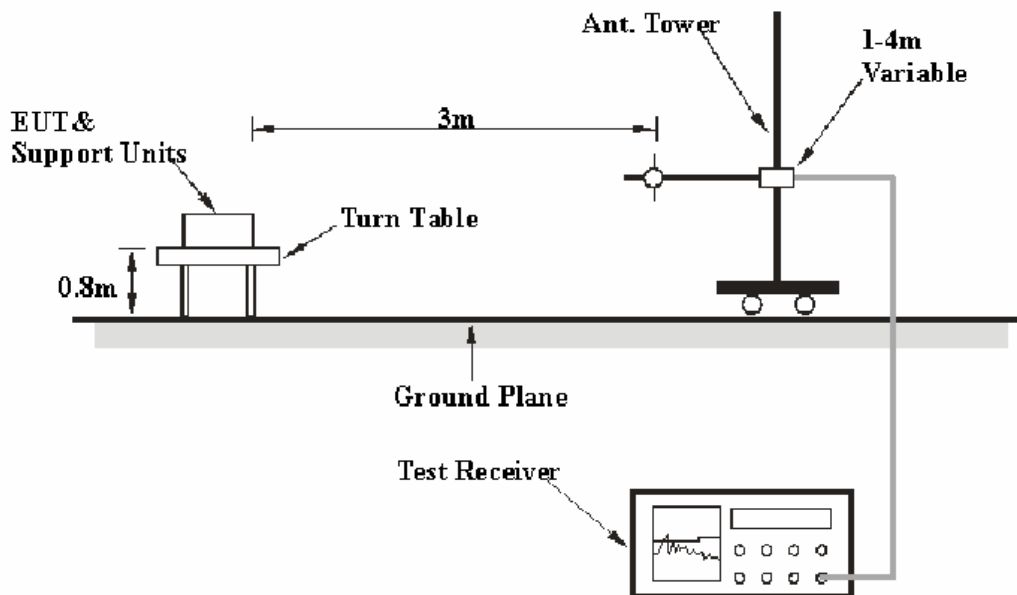
CFR47 §15.205; §15.109; §15.209; §15.247 (d).

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 15.109, 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 notebook 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>
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	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
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 notebook 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:

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

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 maximum 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, section 15.205, 15.209, and 15.247, with the worst margin reading of:

Charging mode (30 – 1000 MHz):

2.7 dB at 49.442350 MHz in the Vertical polarization

Transmitting mode (30 – 1000 MHz):

4.3 dB at 58.993900 MHz in the Vertical polarization

Transmitting mode (Above 1 GHz):

16.35 dB at 2273 MHz in the Horizontal polarization (Low Channel)

16.31 dB at 2270 MHz in the Vertical polarization (Middle Channel)

15.39 dB at 4960 MHz in the Horizontal polarization (High Channel)

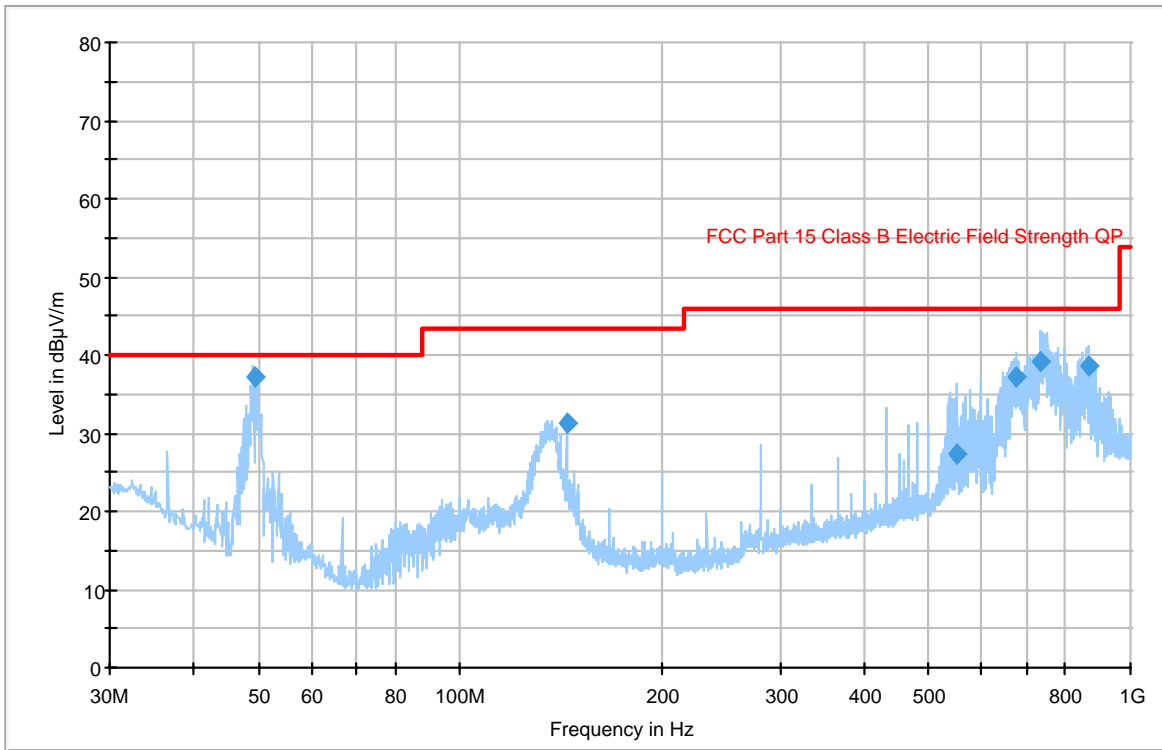
Test Data

Environmental Conditions

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

**The testing was performed by Cookies Bu on 2008-09-16*

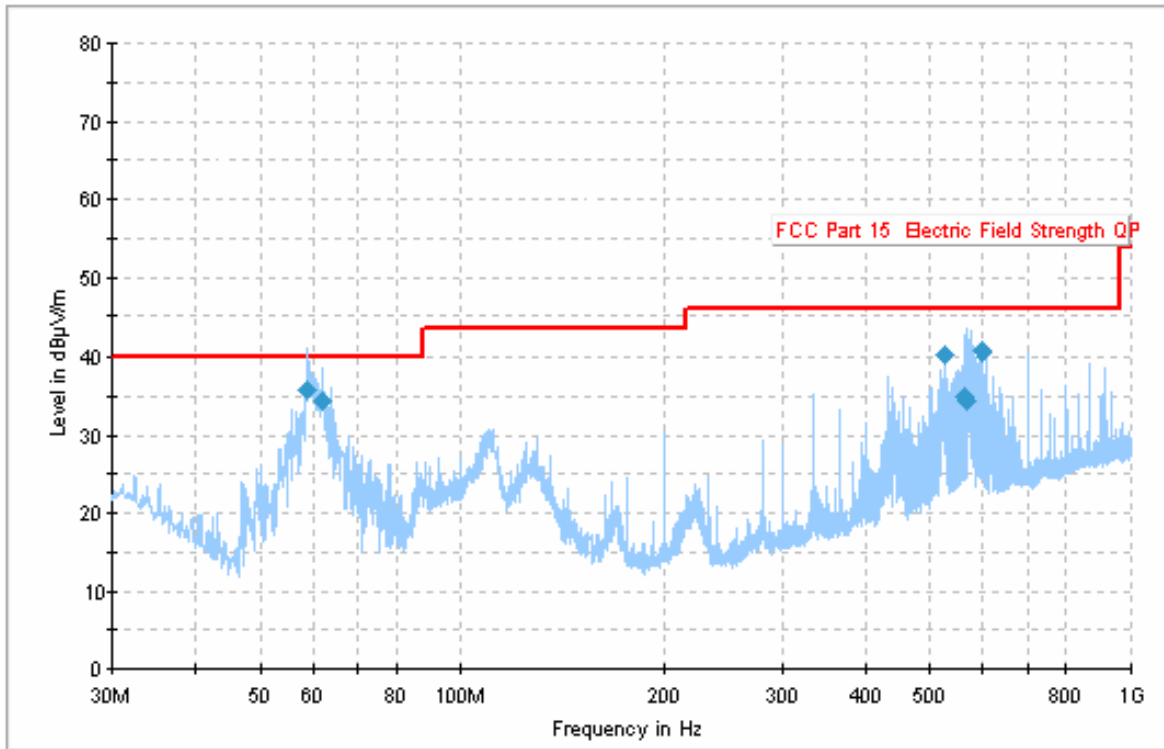
Test Mode: Charging (30 – 1000 MHz)



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
49.442350	37.3	122.0	V	0.0	-16.8	40.0	2.7*
733.307200	39.2	109.0	H	176.0	-1.2	46.0	6.8
866.695025	38.7	117.0	H	250.0	0.5	46.0	7.3
676.299225	37.1	115.0	H	162.0	-2.2	46.0	8.9
143.992850	31.2	110.0	H	235.0	-11.3	43.5	12.3
550.096175	27.4	184.0	V	216.0	-3.8	46.0	18.6

- *Within measurement uncertainty.*

Test Mode: Transmitting (30 – 1000 MHz)



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
58.993900	35.7	104.0	V	67.0	-17.3	40.0	4.3
600.050550	40.6	206.0	V	299.0	-3.7	46.0	5.4
62.129225	34.4	400.0	H	156.0	-17.1	40.0	5.6
528.308175	38.3	104.0	V	282.0	-1.2	46.0	7.7
563.307725	35.0	217.0	V	277.0	-3.9	46.0	11.0
568.543425	34.3	188.0	V	282.0	-3.8	46.0	11.7

Test Mode: Transmitting (Above 1GHz)

Freq. (MHz)	S.A. 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	92.50	PK	25	1.80	H	27.5	7.72	34	93.72			Fund.
2402	82.23	AV	35	1.80	H	27.5	7.72	34	83.45			Fund.
2402	91.54	PK	355	1.75	V	27.5	7.72	34	92.76			Fund.
2402	81.29	AV	354	1.75	V	27.5	7.72	34	82.51			Fund.
2273	57.82	PK	225	1.40	H	27.4	7.03	34.6	57.65	74	16.35	Spurious
2273	37.80	AV	225	1.40	H	27.4	7.03	34.6	37.63	54	16.37	Spurious
4804	32.32	AV	240	1.02	H	31.2	7.01	33.4	37.13	54	16.87	Harmonic
4804	32.29	AV	180	1.05	V	31.2	7.01	33.4	37.1	54	16.90	Harmonic
2273	35.74	AV	154	1.55	V	27.4	7.03	34.6	35.57	54	18.43	Spurious
2273	53.81	PK	155	1.55	V	27.4	7.03	34.6	53.64	74	20.36	Spurious
4804	46.40	PK	180	1.05	V	31.2	7.01	33.4	51.21	74	22.79	Harmonic
4804	46.34	PK	240	1.02	H	31.2	7.01	33.4	51.15	74	22.85	Harmonic
Middle Channel												
2441	91.28	PK	25	1.67	H	27.5	7.72	34	92.5			Fund.
2441	78.19	AV	25	1.67	H	27.5	7.72	34	79.41			Fund.
2441	91.09	PK	0	1.67	V	27.5	3.61	34	88.2			Fund.
2441	79.01	AV	0	1.67	V	27.5	3.61	34	76.12			Fund.
2270	37.94	AV	130	1.07	V	27.4	6.95	34.6	37.69	54	16.31	Spurious
4882	31.96	AV	250	1.00	H	31.5	7.25	33.4	37.31	54	16.69	Harmonic
2270	37.32	AV	175	1.37	H	27.4	6.95	34.6	37.07	54	16.93	Spurious
2270	54.85	PK	175	1.37	H	27.4	6.95	34.6	54.6	74	19.4	Spurious
4882	31.85	AV	178	1.03	V	31.5	4.64	33.4	34.59	54	19.41	Harmonic
4882	45.67	PK	250	1.00	H	31.5	7.25	33.4	51.02	74	22.98	Harmonic
2270	50.95	PK	130	1.07	V	27.4	6.95	34.6	50.7	74	23.3	Spurious
4882	45.72	PK	178	1.03	V	31.5	4.64	33.4	48.46	74	25.54	Harmonic
High Channel												
2480	88.17	PK	35	1.67	H	28.0	7.82	34	89.99			Fund.
2480	75.52	AV	35	1.67	H	28.0	7.82	34	77.34			Fund.
2480	87.53	PK	355	1.67	V	28.0	7.82	34	89.35			Fund.
2480	77.82	AV	355	1.67	V	28.0	7.82	34	79.64			Fund.
4960	32.74	AV	35	1.10	H	32.0	7.27	33.4	38.61	54	15.39	Harmonic
4960	31.81	AV	355	1.10	V	32.0	7.27	33.4	37.68	54	16.32	Harmonic
2266	36.19	AV	150	1.15	H	27.4	7.88	34.6	36.87	54	17.13	Spurious
2266	55.58	PK	150	1.15	H	27.4	7.88	34.6	56.26	74	17.74	Spurious
2266	54.11	PK	280	1.20	V	27.4	7.88	34.6	54.79	74	19.21	Spurious
2266	33.87	AV	280	1.20	V	27.4	7.88	34.6	34.55	54	19.45	Spurious
4960	45.46	PK	35	1.10	H	32.0	7.27	33.4	51.33	74	22.67	Harmonic
4960	45.23	PK	355	1.10	V	32.0	7.27	33.4	51.1	74	22.9	Harmonic

Spurious emission in restricted band:

Test Mode: Transmitting

Freq. (MHz)	Meter Reading (dB μ V)	Detector PK/AV	Direction Degree	Antenna Loss			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC 15.209	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)
Out of left side band (2310 MHz-2390 MHz)											
2381	50.38	PK	352	1.50	V	30.6	3.61	34	50.59	74	23.41
2381	41.28	AV	246	1.40	V	30.6	3.61	34	41.49	54	12.51
2378	50.11	PK	355	1.30	V	30.6	3.61	34	50.32	74	23.68
2378	48.55	AV	183	1.10	V	30.6	3.61	34	48.76	54	5.24
2389	53.00	PK	353	1.00	H	30.6	3.61	34	53.21	74	20.79
2389	42.45	AV	114	1.00	H	30.6	3.61	34	42.66	54	11.34
Out of left side band (2483.5 MHz-2500 MHz)											
2498	46.36	PK	260	1.20	H	30.6	3.61	34	46.57	74	27.43
2489	37.90	AV	261	1.50	H	30.6	3.61	34	38.11	54	15.89
2492	46.36	PK	275	1.30	V	30.6	3.61	34	46.57	74	27.43
2492	36.10	AV	236	1.40	V	30.6	3.61	34	36.31	54	17.69
2485	54.29	PK	270	1.50	V	30.6	3.61	34	54.5	74	19.5
2485	44.56	AV	172	1.30	V	30.6	3.61	34	44.77	54	9.23

CFR47 §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	100035	2007-10-16	2008-10-16

* **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 Cookies Bu on 2008-09-22.*

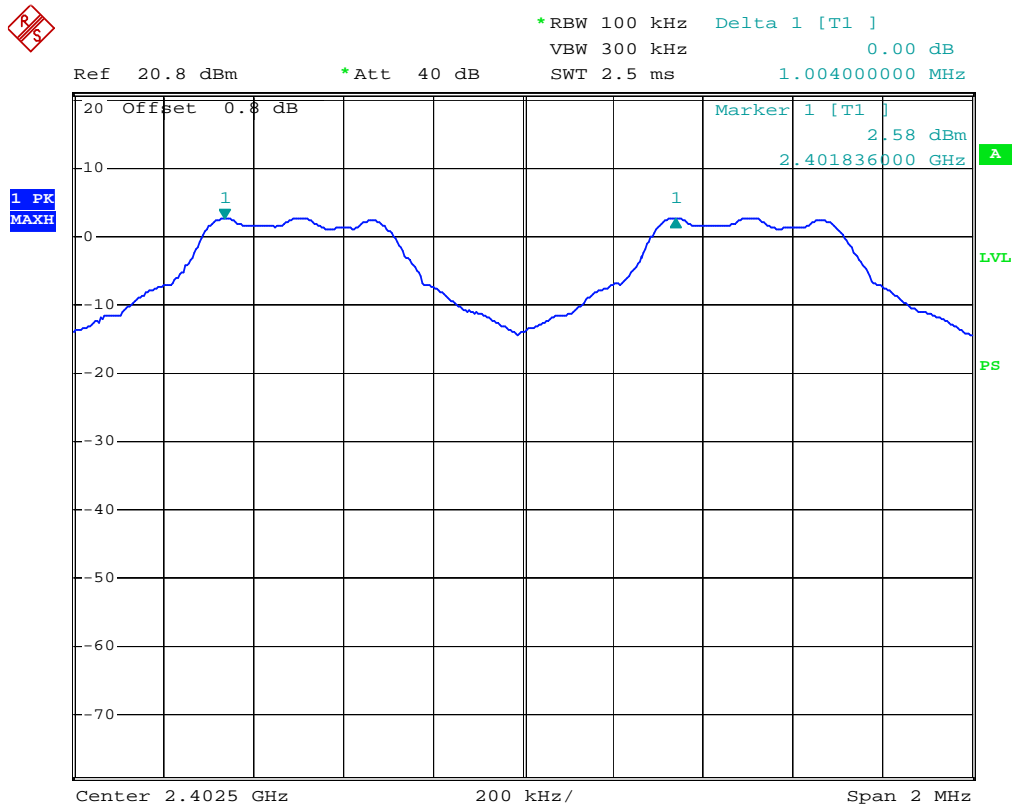
Test Result: Compliant.

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	0.564	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.004	0.564	Pass
Adjacent Channel	2442			
High Channel	2480	1.004	0.564	Pass
Adjacent Channel	2479			

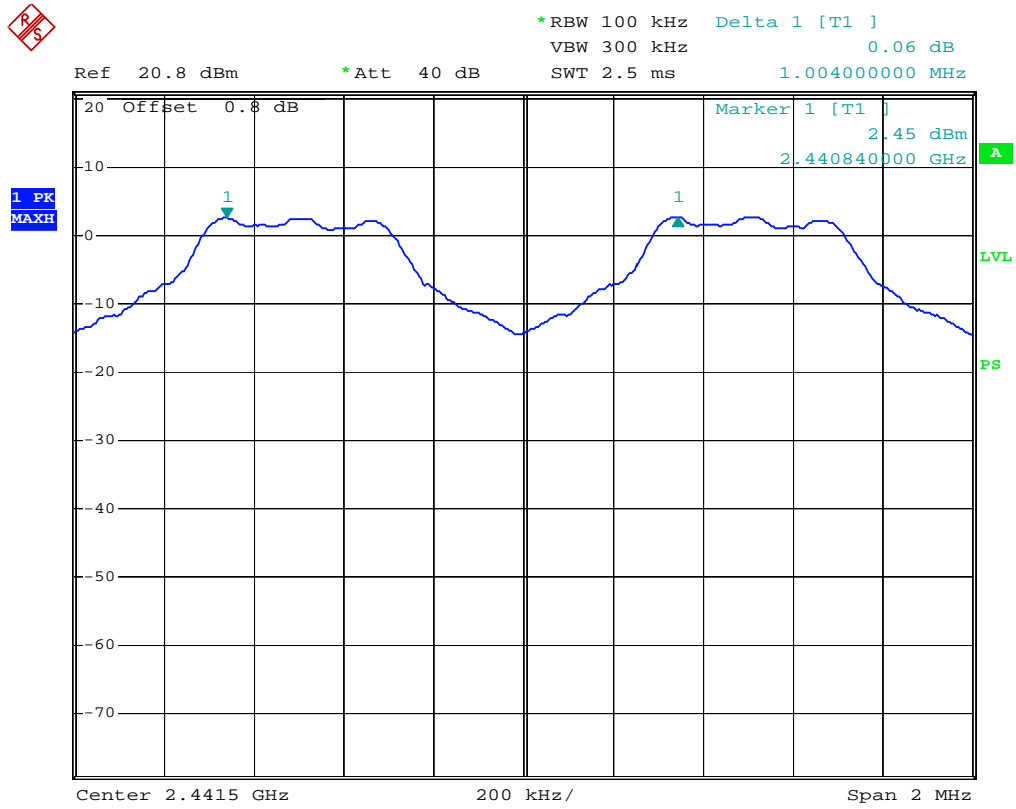
Low Channel



peak output power, low

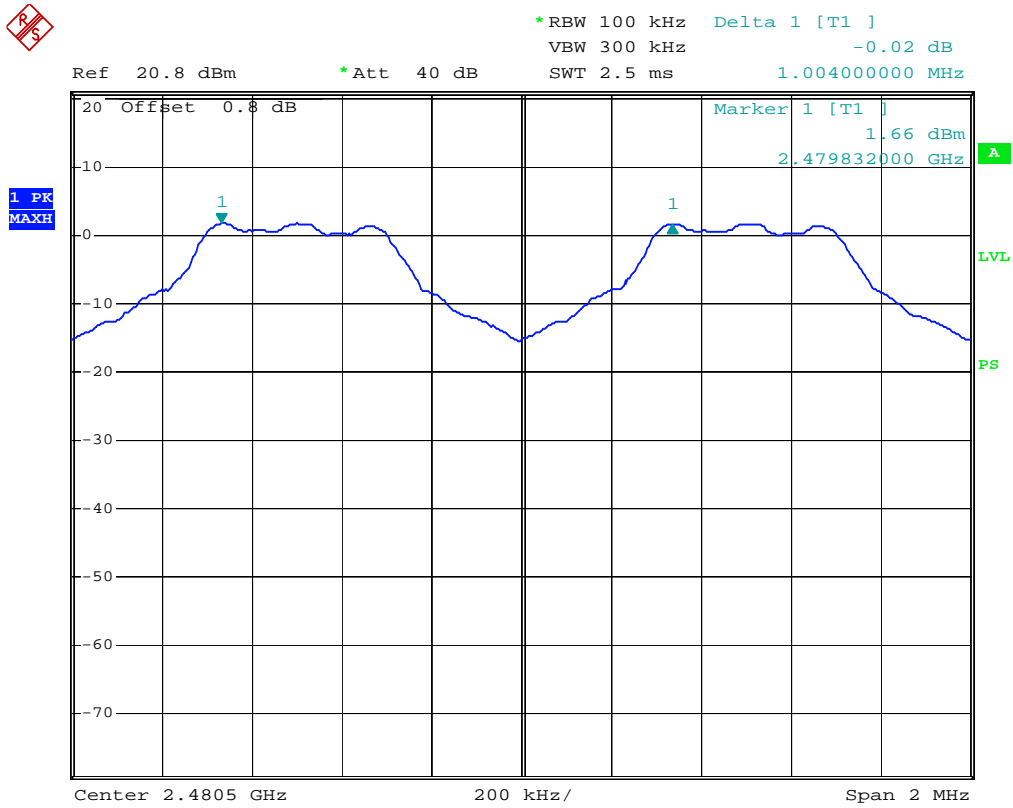
Date: 22.SEP.2008 16:20:40

Middle Channel



peak output power,middle
Date: 22.SEP.2008 16:23:25

High Channel



peak output power,high

Date: 22.SEP.2008 16:21:52

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	2007-10-16	2008-10-16

* **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 Cookies Bu on 2008-09-19.*

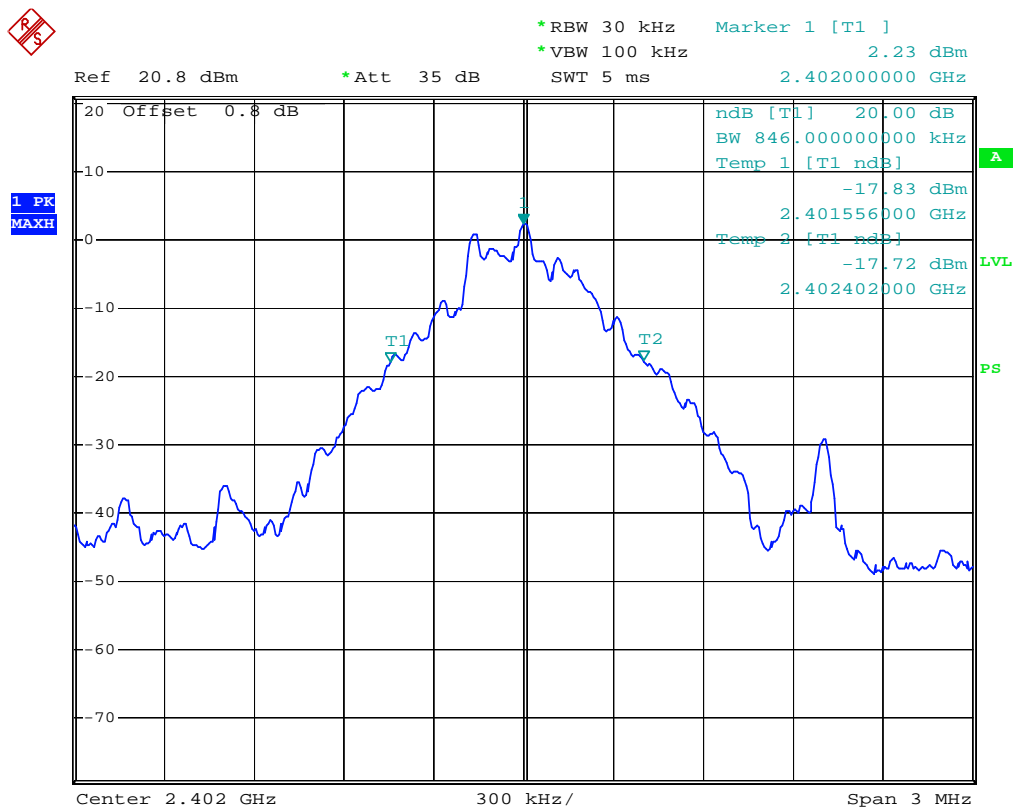
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	0.846
Middle	2441	0.846
High	2480	0.846

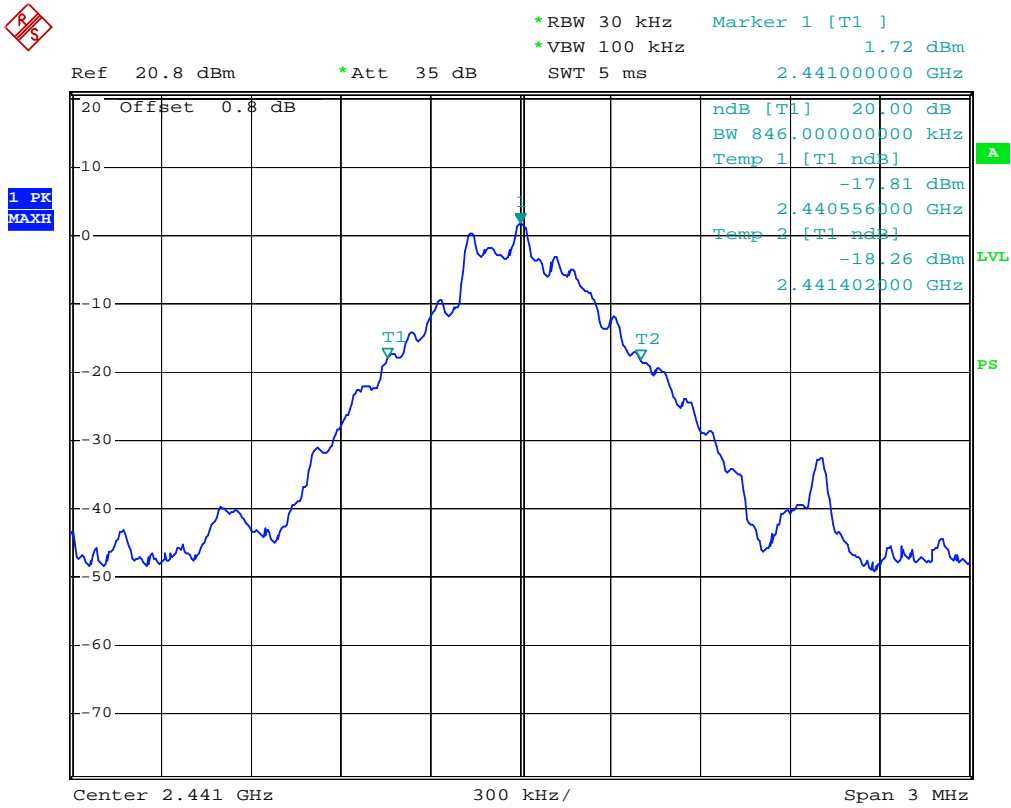
Low Channel



20 dB bandwidth, low

Date: 19.SEP.2008 17:57:42

Middle Channel



20 dB bandwidth,middle

Date: 19.SEP.2008 17:59:39

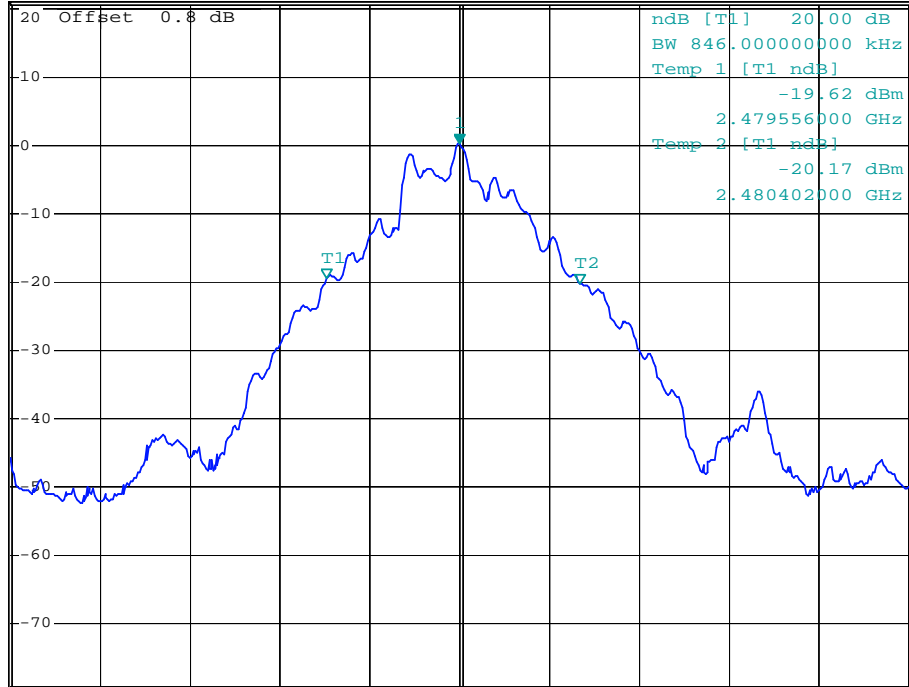
High Channel



*RBW 30 kHz Marker 1 [T1]
*VBW 100 kHz 0.14 dBm

Ref 20.8 dBm *Att 35 dB SWT 5 ms 2.480000000 GHz

1 PK
MAXH



Center 2.48 GHz 300 kHz/ Span 3 MHz

20 dB bandwidth,high

Date: 19.SEP.2008 18:00:54

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	2007-10-16	2008-10-16

* **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 transmitting 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 Cookies Bu on 2008-09-19.

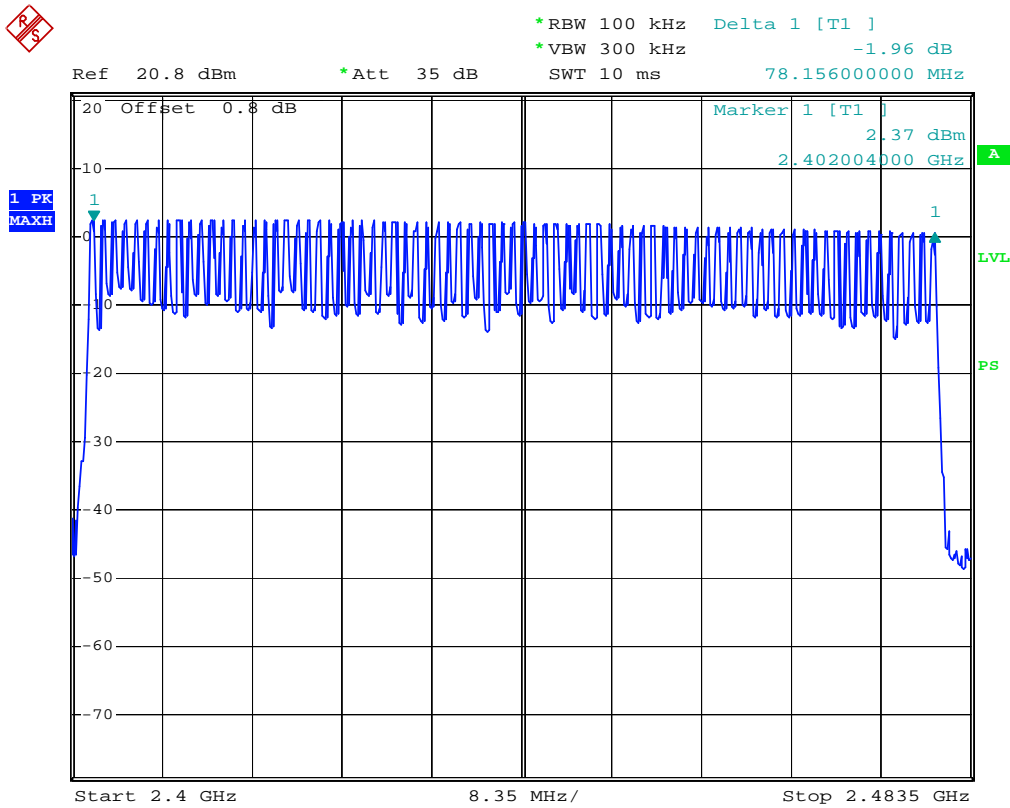
Test Result: Compliant.

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



Quantity of channel

Date: 19.SEP.2008 17:36:33

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	2007-10-16	2008-10-16

* **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 Cookies Bu on 2008-09-22.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

DH 1

Channel	Pulse width (ms)	Dwell time (Second)	Limit (Second)	Result
Low	0.560	0.1792	0.4	Pass
Middle	0.560	0.1792	0.4	Pass
High	0.560	0.1792	0.4	Pass

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

DH 3

Channel	Pulse width (ms)	Dwell time (Second)	Limit (Second)	Result
Low	1.83	0.2928	0.4	Pass
Middle	1.83	0.2928	0.4	Pass
High	1.82	0.2928	0.4	Pass

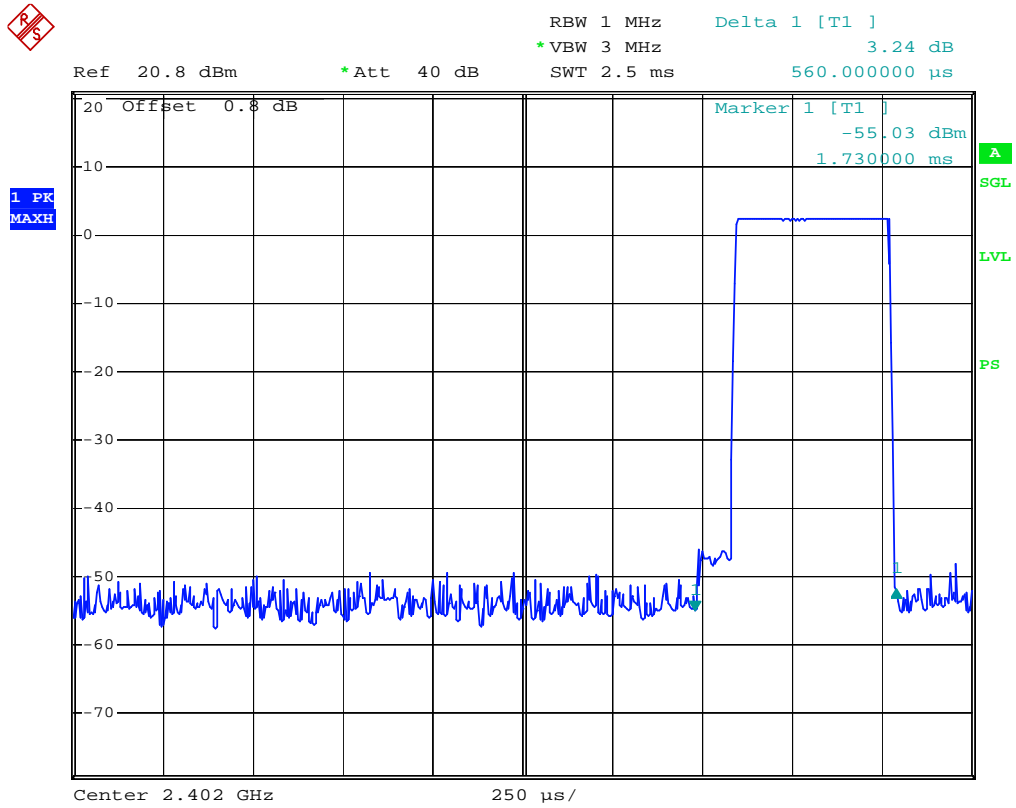
NOTE: Dwell time=Pulse width (ms) × (1600 ÷ 4 ÷ 79) × 31.6 Second

DH 5

Channel	Pulse width (ms)	Dwell time (Second)	Limit (Second)	Result
Low	3.088	0.3294	0.4	Pass
Middle	3.120	0.3328	0.4	Pass
High	3.104	0.3311	0.4	Pass

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

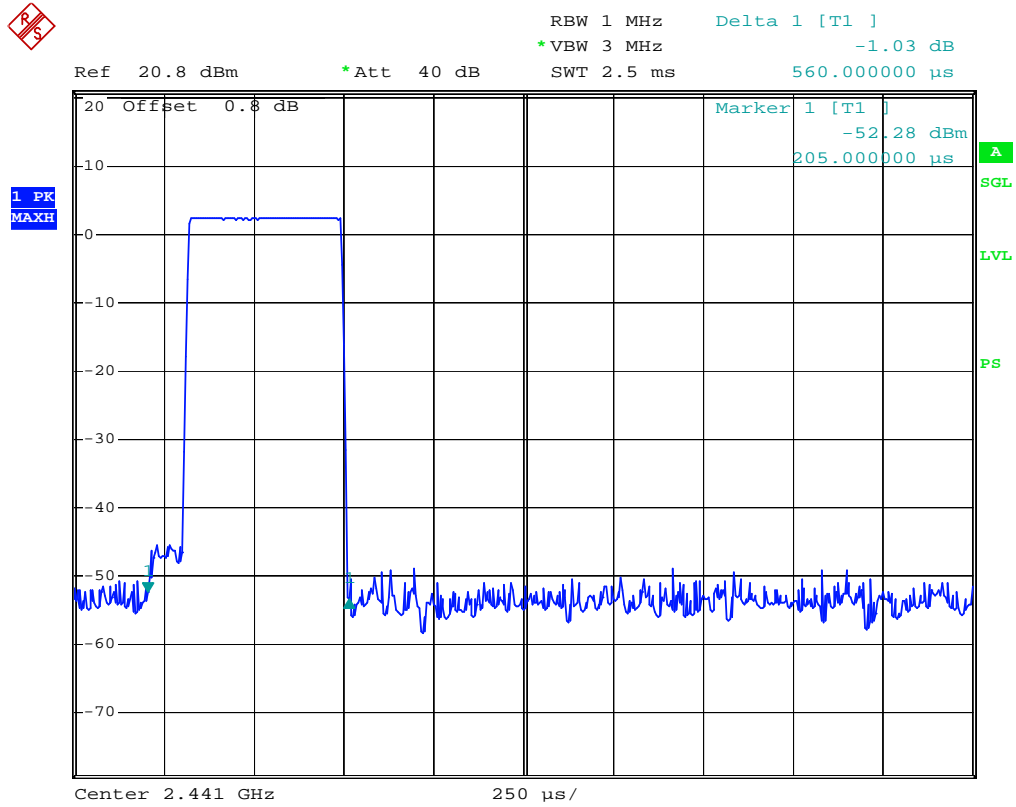
Low Channel for DH1



DH1 Dwell time,low

Date: 22.SEP.2008 16:39:23

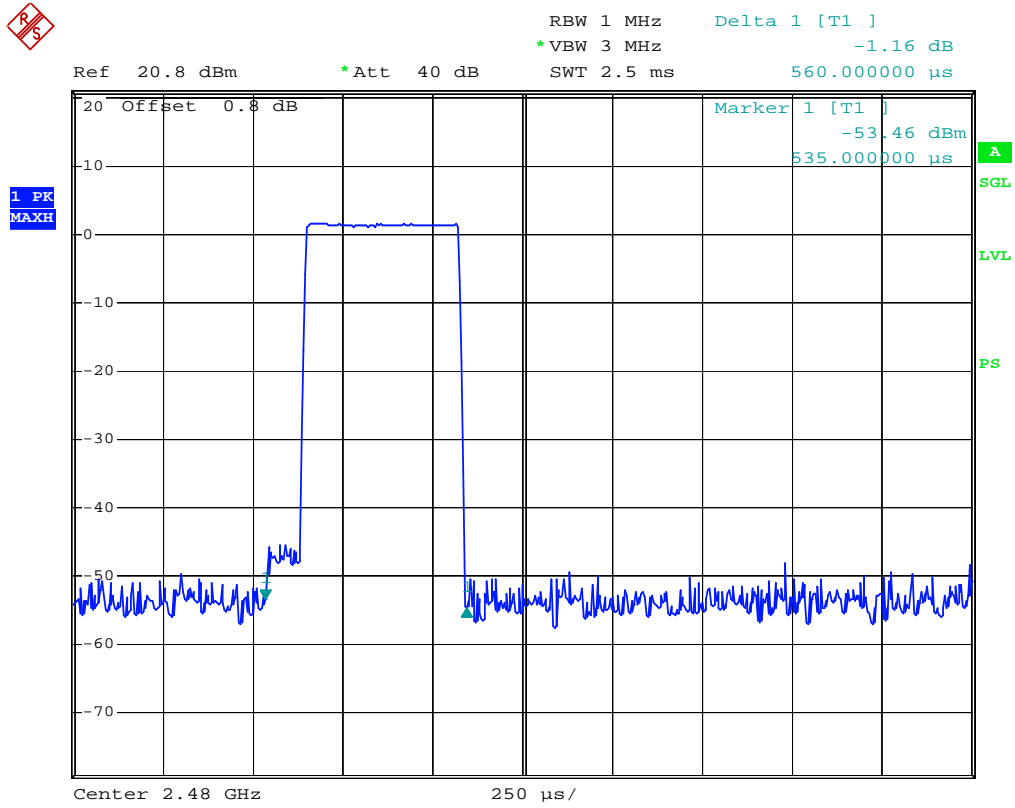
Middle Channel for DH1



DH1 Dwell time,middle

Date: 22.SEP.2008 16:41:25

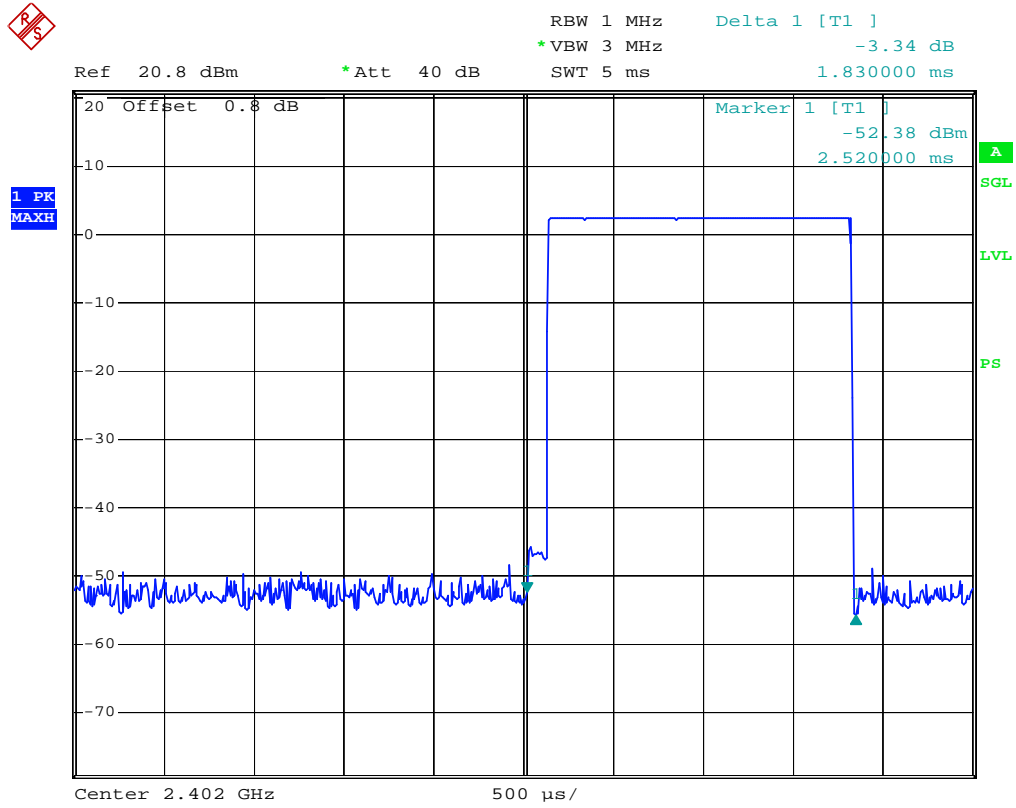
High Channel for DH1



DH1 Dwell time,HIGH

Date: 22.SEP.2008 16:38:19

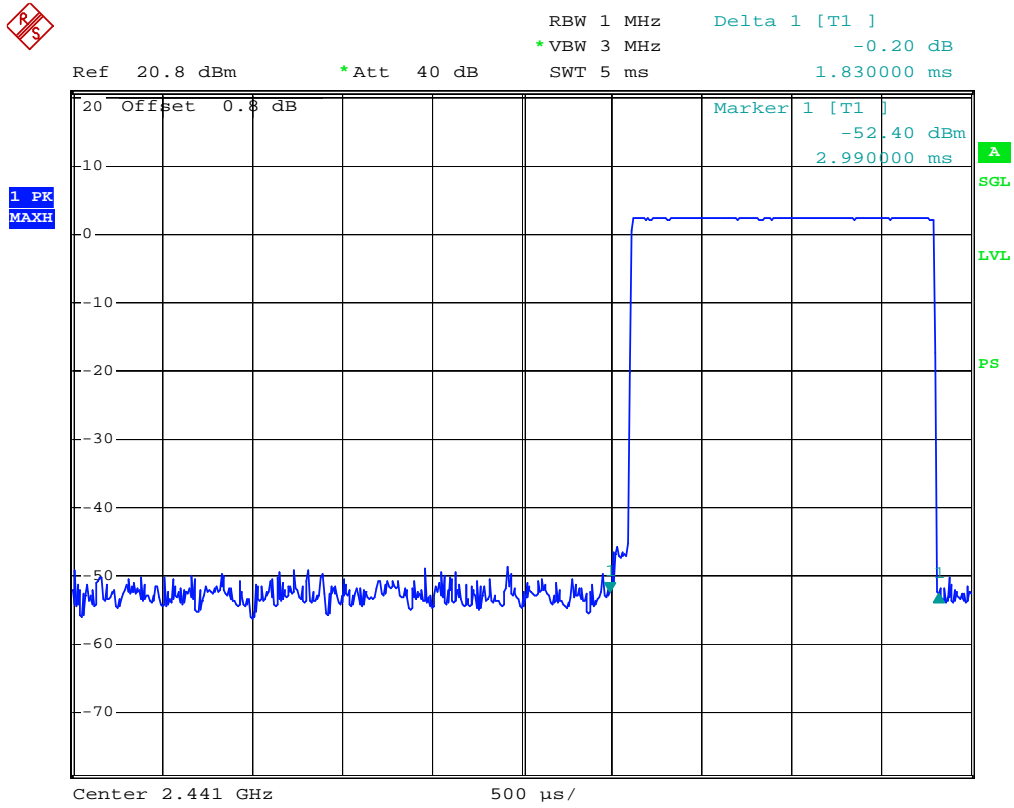
Low Channel for DH3



DH3 Dwell time,low

Date: 22.SEP.2008 16:47:18

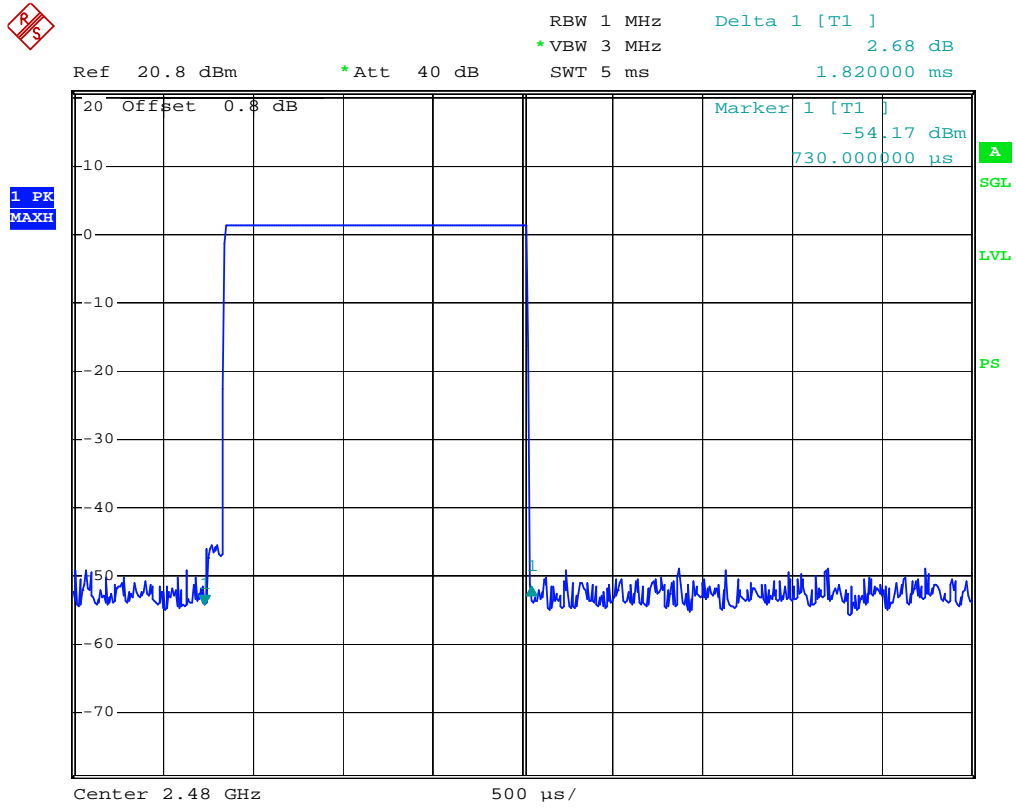
Middle Channel for DH3



DH3 Dwell time,middle

Date: 22.SEP.2008 16:48:23

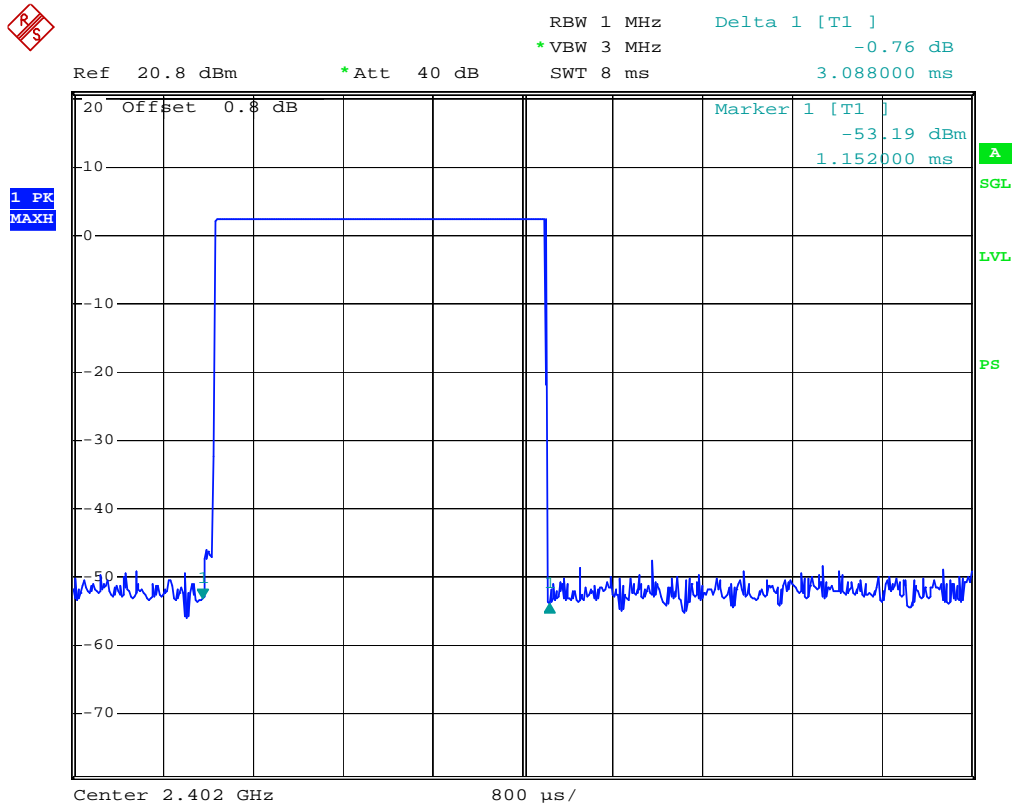
High Channel for DH3



DH3 Dwell time,high

Date: 22.SEP.2008 16:49:29

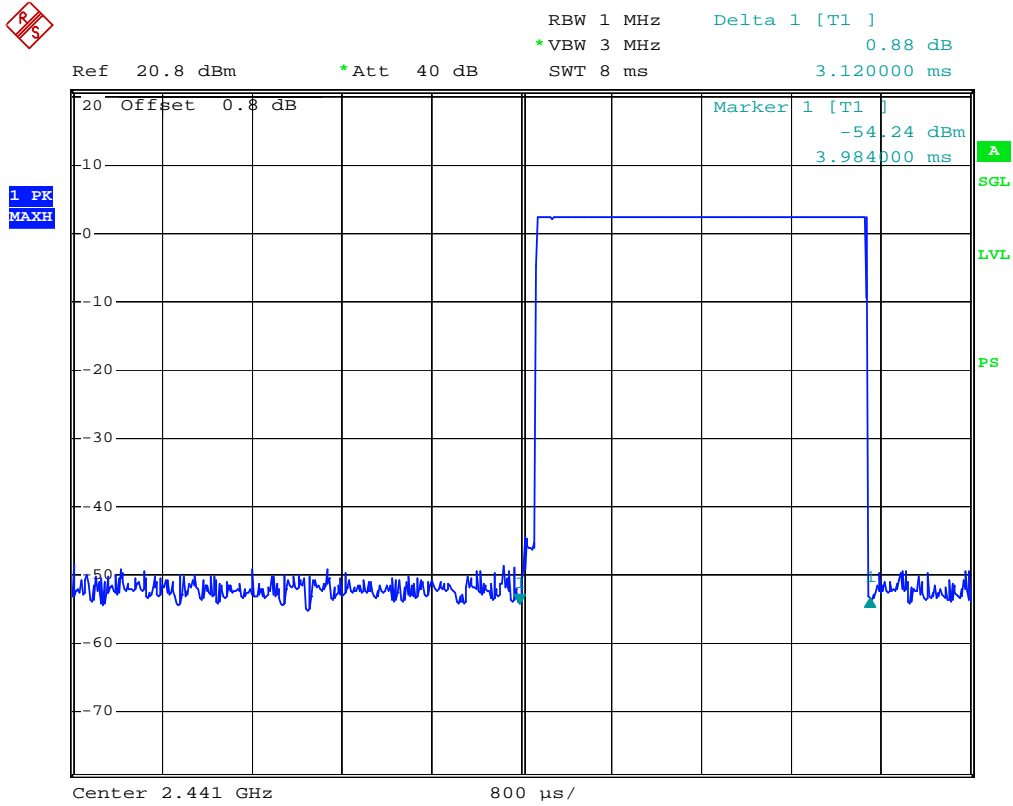
Low Channel for DH5



DH5 Dwell time,low

Date: 22.SEP.2008 16:51:50

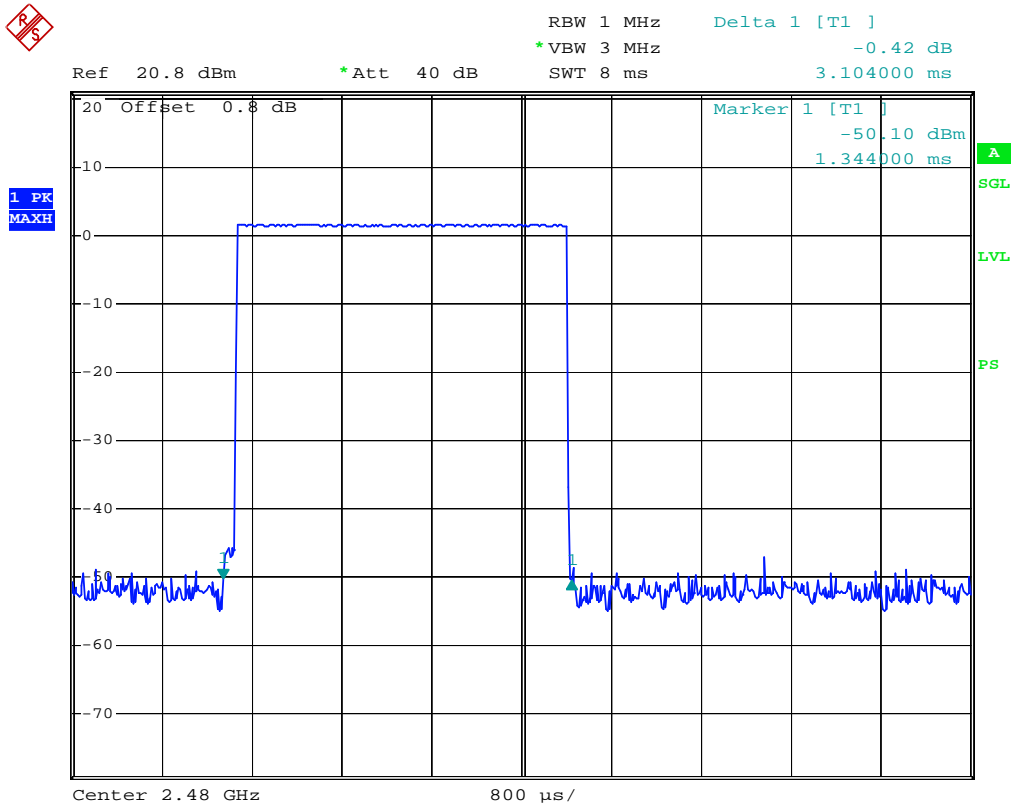
Middle Channel for DH5



DH5 Dwell time,middle

Date: 22.SEP.2008 16:53:58

High Channel for DH5



DH5 Dwell time,high

Date: 22.SEP.2008 16:58:03

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.

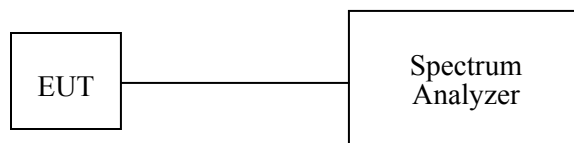
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

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



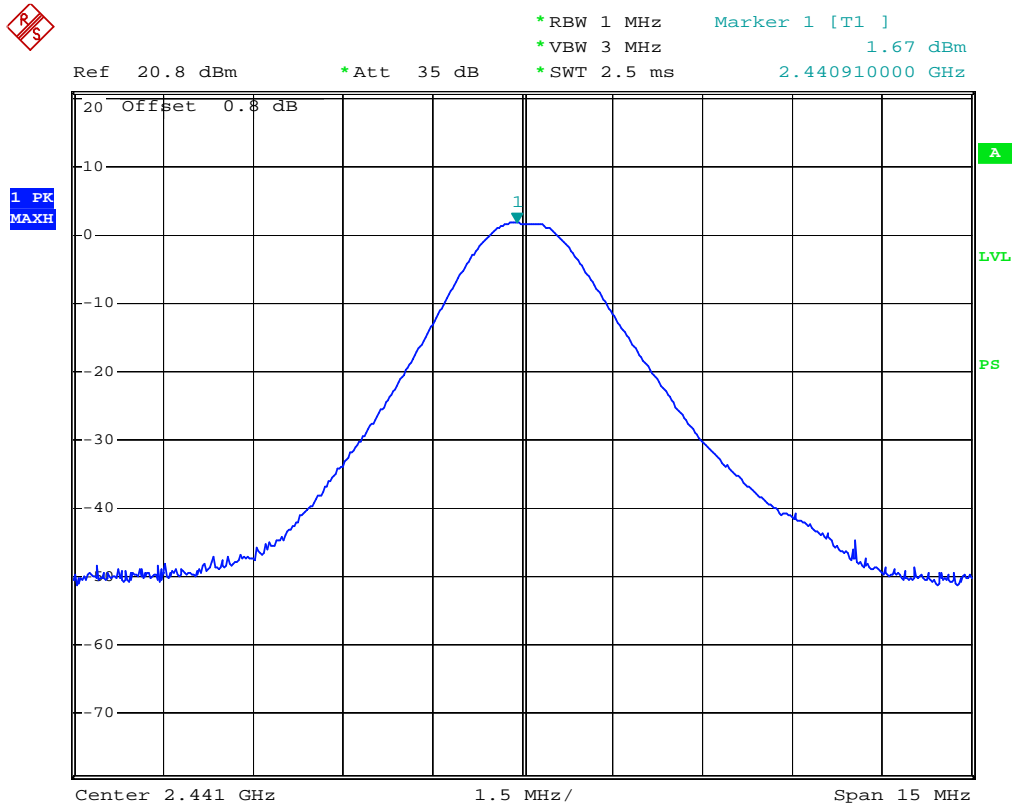
Test Data

Environmental Conditions

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

*The testing was performed by Cookies Bu on 2008-09-15.

Middle Channel



peak output power,middle channel

Date: 19.SEP.2008 17:29:41

High Channel

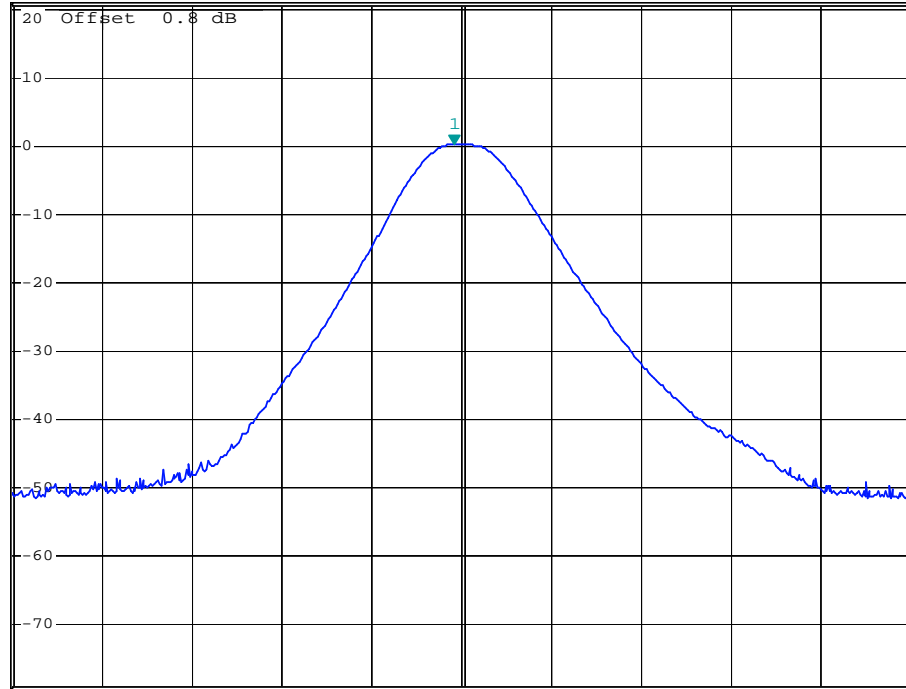


*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz 0.18 dBm
*SWT 2.5 ms 2.479880000 GHz

Ref 20.8 dBm

*Att 35 dB

1 PK
MAXH



Center 2.48 GHz

1.5 MHz/

Span 15 MHz

peak output power,high channel

Date: 19.SEP.2008 17:30:32

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	2007-10-16	2008-10-16

* **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. 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 Cookies Bu on 2008-09-19.*

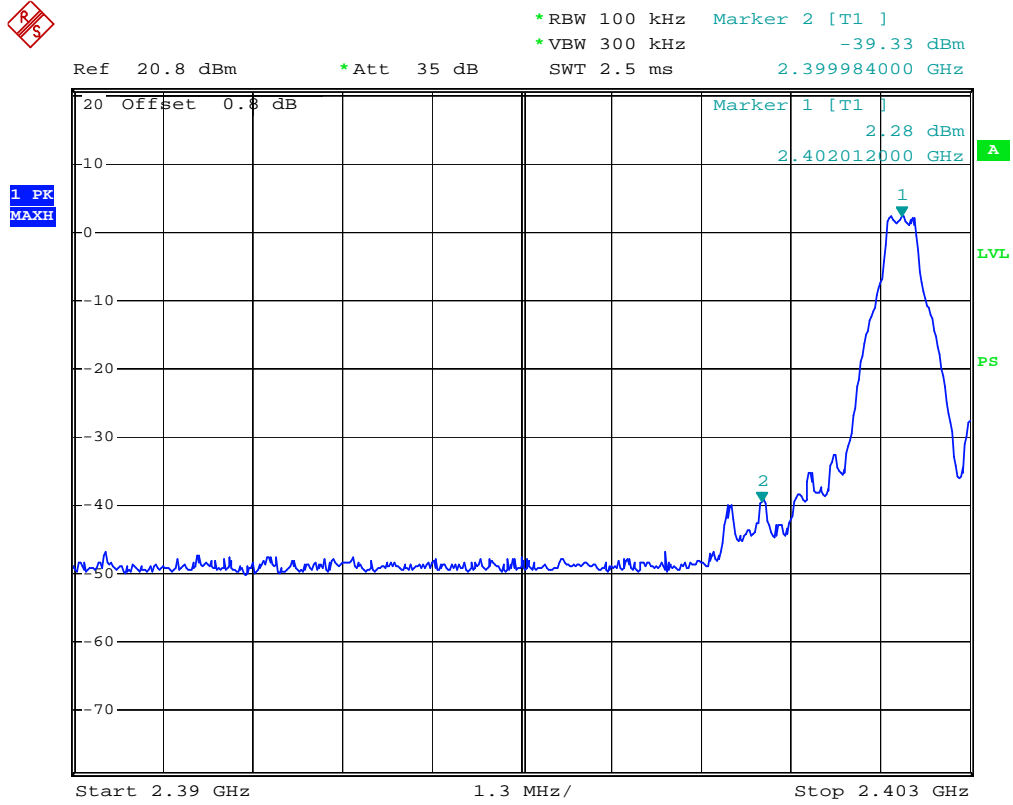
Test Result: Compliant

Please refer to the following table and plots.

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.984	41.61	20
2485.510	45.75	20

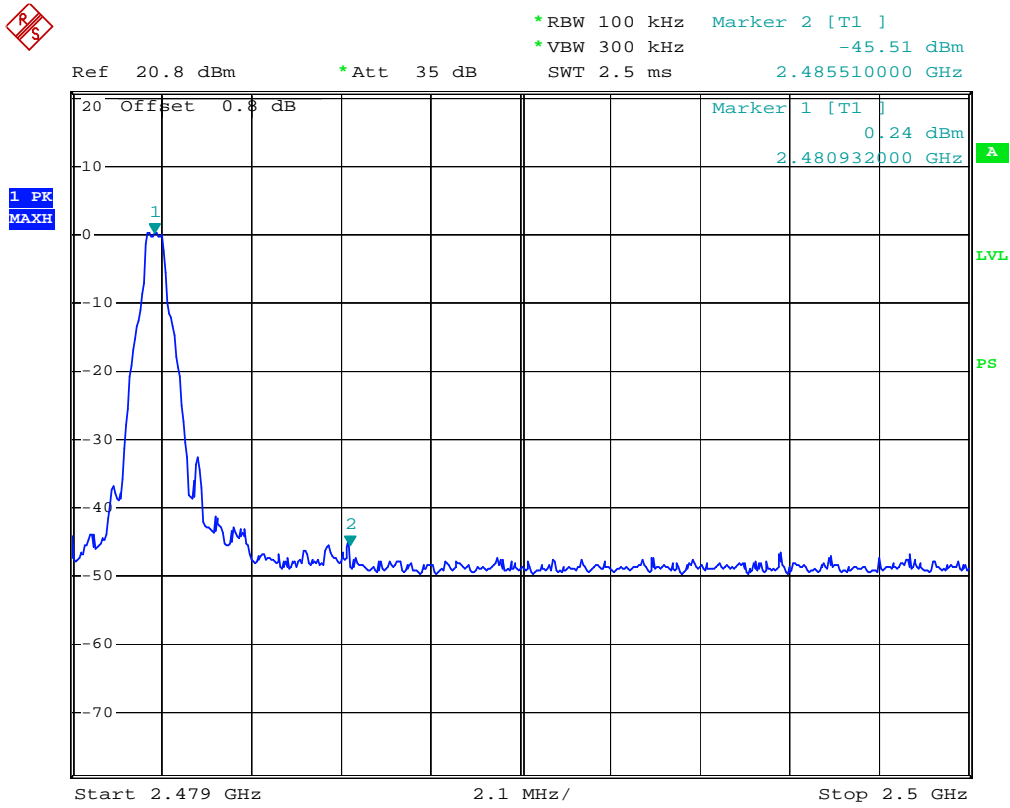
Band Edge Left Side



out of bandedge, left

Date: 19.SEP.2008 17:54:19

Band Edge Right Side



out of bandedge, right

Date: 19.SEP.2008 17:52:26

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