NVLAP LAB CODE 200707-0

Bay Area Compliance Lab Corp.

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Plantronics Inc.

345 Encinal Street, Santa Cruz, CA 95060, USA

FCC ID: AL8-V835

Report Type:	Product Type:
Original Report	Mono Bluetooth Headset

Test Engineer:	Phoenix Liu
Report No.:	RSZ08062005
Test Date:	2008-06-27
Report Date:	2008-07-10
Reviewed By:	EMC Engineer: Merry Zhao
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *Plantronics Inc.'s* product, FCC ID: *AL8-V835*, model number: *Voyager 835* or the "EUT" as referred to in this report is a *mono Bluetooth Headset*, rated input voltage: 3.7 V battery and 5V adapter.
Adapter:
Model: SSA-3W-05 050018F
Input: 100~240 V -50/60Hz 0.2A (0.2A)
Output: 5.0V (5.0V) =180mA

1.2 Mechanical Description of EUT

The *Plantronics Inc.'s* product, model number: *Voyager 835*, measures approximately: 5.4 cm (L) x 1.7 cm (W) x 2.0 cm (H).

** All measurement and test data in this report was gathered from production sample serial number: 0806058 (Assigned by BACL, Shenzhen). The EUT was received on 2008-06-20.*

1.3 EUT Photograph

1.4 Objective

This Type approval report is prepared on behalf of *Plantronics 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, 15.209 and 15.247 rules.

1.5 Related Submittal(s)/Grant(s)

This is a Change ID application. The original application was granted on 2005-12-02.

1.6 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.

1.7 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/ts/htdocs/210/214/scopes/2007070.htm.

2 SYSTEM TEST CONFIGURATION

2.1 Description of Test Configuration

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

2.2 EUT Exercise Software

N/A.

2.3 Special Accessories

The special accessories were provided by Bay Area Compliance Laboratories Corp. (Shenzhen).

2.4 Equipment Modifications

No modification was made to the unit tested.

2.5 Local Support Equipment List and Details

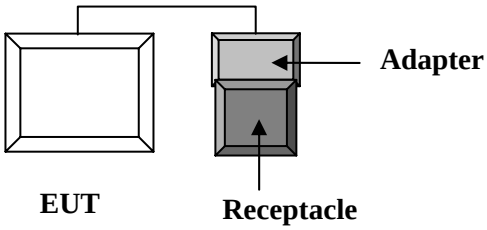
Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Laptop	D610	N/A	DoC

2.6 External I/O Cable

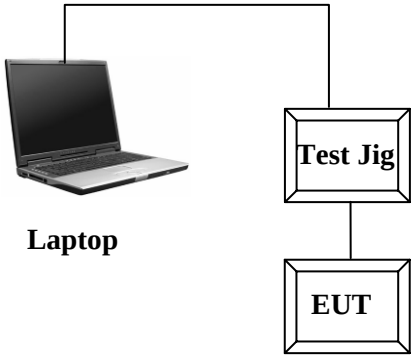
Cable Description	Length (m)	From Port	To
Unshielded Detachable DC Power Cable	2.0	EUT	Adapter

2.7 Configuration of Test Setup

Charging mode:

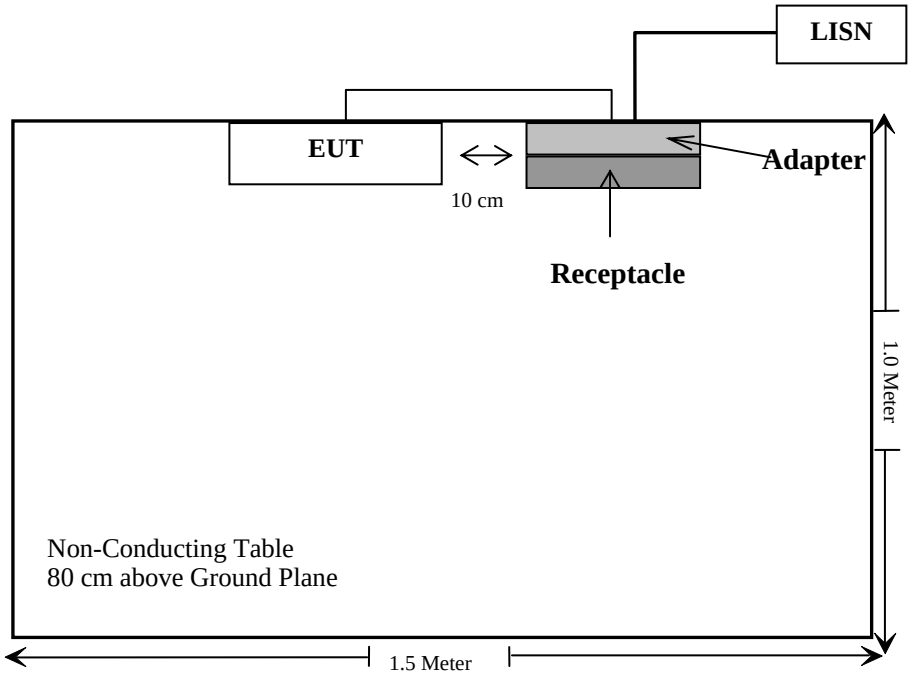


Transmitting mode:

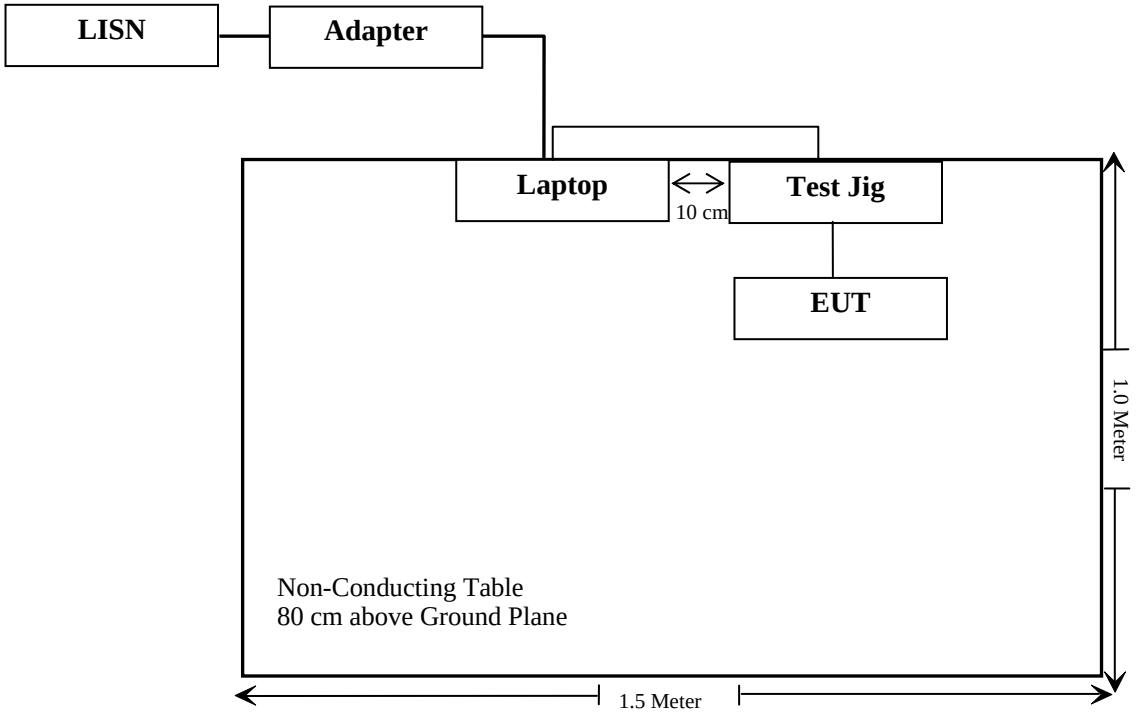


2.8 Block Diagram of Test Setup

Charging mode:



Transmitting mode:



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §2.1093	RF exposure	Compliant
CFR47 §15.203	Antenna Requirement	Compliant
CFR47§15.107, §15.207 (a)	Conducted Emissions	Compliant
CFR47 §15.205	Restricted Band	Compliant
CFR47 §15.205, §15.109, §15.209, §15.247(d)	Radiated Emission	Compliant
CFR47 §15.247 (a)(1)	20 dB Bandwidth	Compliant
CFR47 §15.247(a)(1)	Channel Separation Test	Compliant
CFR47 §15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
CFR47 §15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
CFR47 §15.247(b)(1)	Peak Output Power Measurement	Compliant
CFR47 §15.247(d)	Band edges	Compliant

4 §15.247 (i) & §2.1093 - RF EXPOSURE

4.1 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.
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.

4.2 Measurement Result:

This is a portable device and the Max peak output power is 1.71 mW<24.58mW= (60/2.441GHz) mW

The SAR measurement is not necessary.

5 CFR47 §15.203 - ANTENNA REQUIREMENT

5.1 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.

5.2 Antenna Connector Construction

The EUT has a Integral antenna, which, in accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.

Result: *Compliance*.

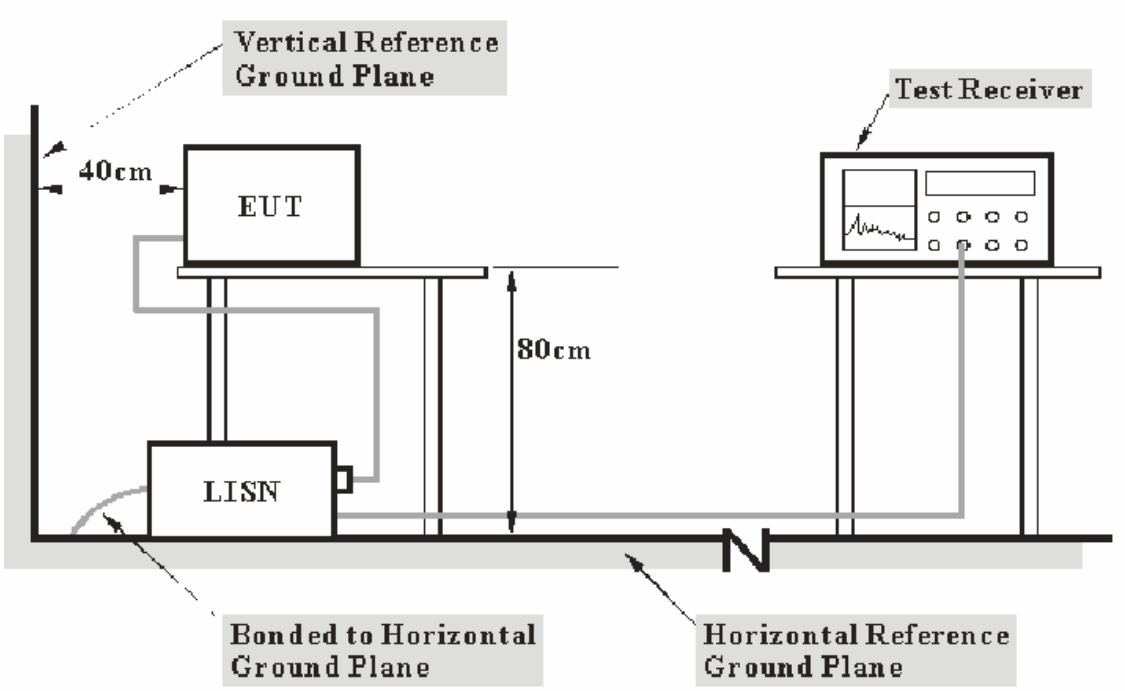
6 §15.207 (a) - CONDUCTED EMISSIONS

6.1 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 Laboratories Corp.(Shenzhen) is ±2.4 dB.

6.2 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 Class B 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 Laptop was connected to a 120 VAC/60 Hz power source.

6.3 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

6.4 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	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
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 Laboratories Corp.(Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

6.5 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

6.6 Test Procedure

During the conducted emission test, the adapter 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.

6.7 Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107 and FCC Part 15.207, with the worst margin reading of:

23.29 dB at **0.460 MHz** in the **Neutral** conductor mode

6.8 Test Data

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Phase (Hot/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.460	33.40	QP	Neutral	56.69	23.29
0.395	24.50	AV	Hot	47.96	23.46
27.120	26.50	AV	Neutral	50.00	23.50
0.395	34.40	QP	Neutral	57.96	23.56
0.525	31.50	QP	Hot	56.00	24.50
0.460	22.10	AV	Neutral	46.69	24.59
0.395	33.30	QP	Hot	57.96	24.66
0.525	21.20	AV	Hot	46.00	24.80
0.395	22.10	AV	Neutral	47.96	25.86
0.260	24.20	AV	Hot	51.43	27.23
1.380	28.70	QP	Neutral	56.00	27.30
29.830	32.00	QP	Hot	60.00	28.00
1.315	27.90	QP	Hot	56.00	28.10
1.315	17.70	AV	Hot	46.00	28.30
0.265	31.80	QP	Neutral	61.27	29.47
0.260	31.00	QP	Hot	61.43	30.43
0.265	20.60	AV	Neutral	51.27	30.67
27.120	29.20	QP	Neutral	60.00	30.80
1.380	14.50	AV	Neutral	46.00	31.50
0.205	31.50	QP	Neutral	63.41	31.91
29.990	17.70	AV	Hot	50.00	32.30
8.620	27.20	QP	Hot	60.00	32.80
8.550	15.30	AV	Hot	50.00	34.70
0.205	7.80	AV	Neutral	53.41	45.61

6.9 Plot(s) of Test Data

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

Conduction Emission

27. Jun 08 13:04

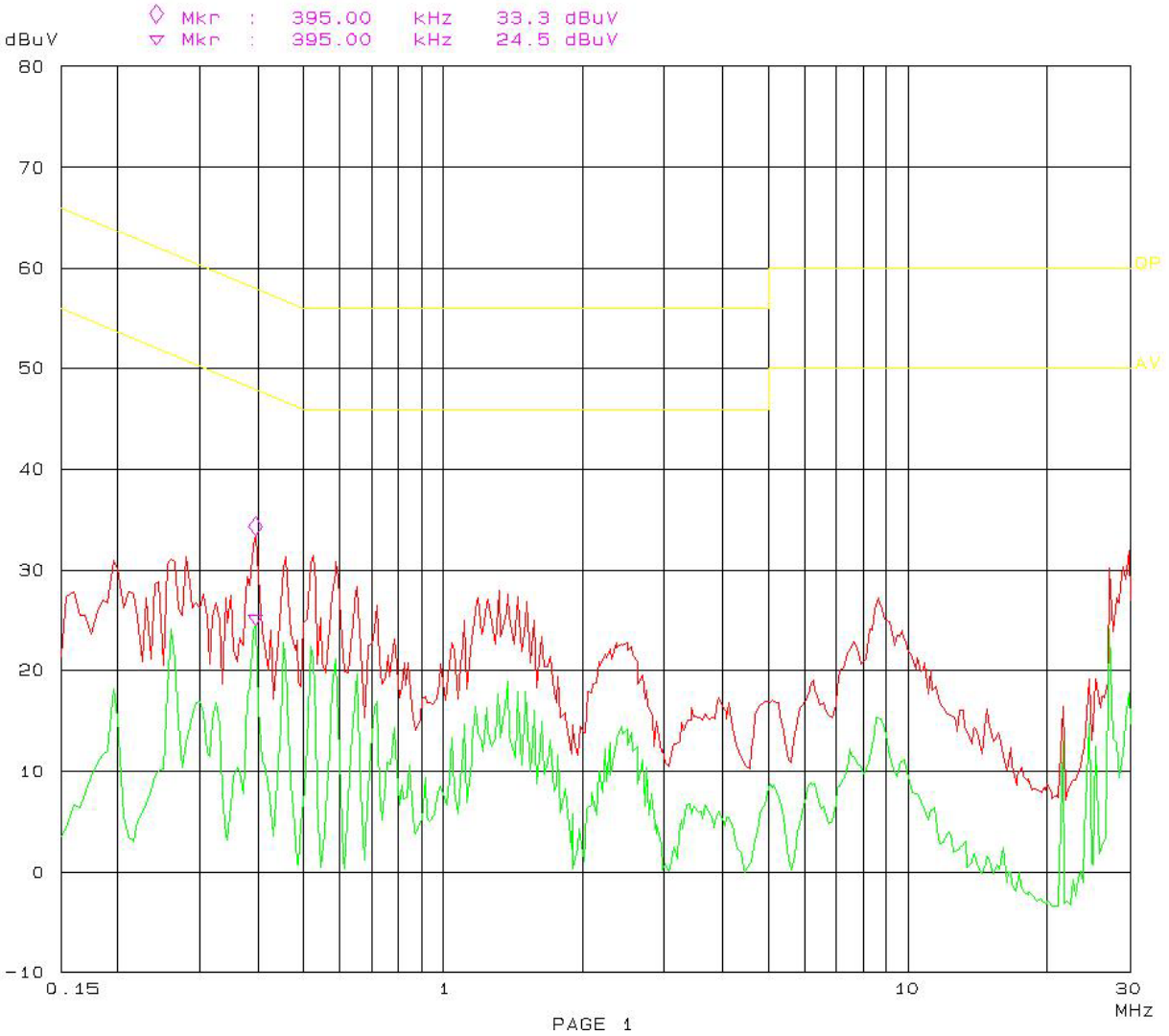
FCC 15

EUT: Mono Bluetooth Headset M/N: Voyager835
Manuf: Plantronics
Op Cond: Charging (adapter)
Operator: Phoenix
Test Spec: AC 120V/60Hz H
Comment: Temp: 25 Hum: 56%

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	PK+AV	10ms	AUTO	LN OFF

Transducer	No.	Start	Stop	Name
	5	9k	30M	ESH2_Z5



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Conduction Emission

27. Jun 08 11:47

FCC 15

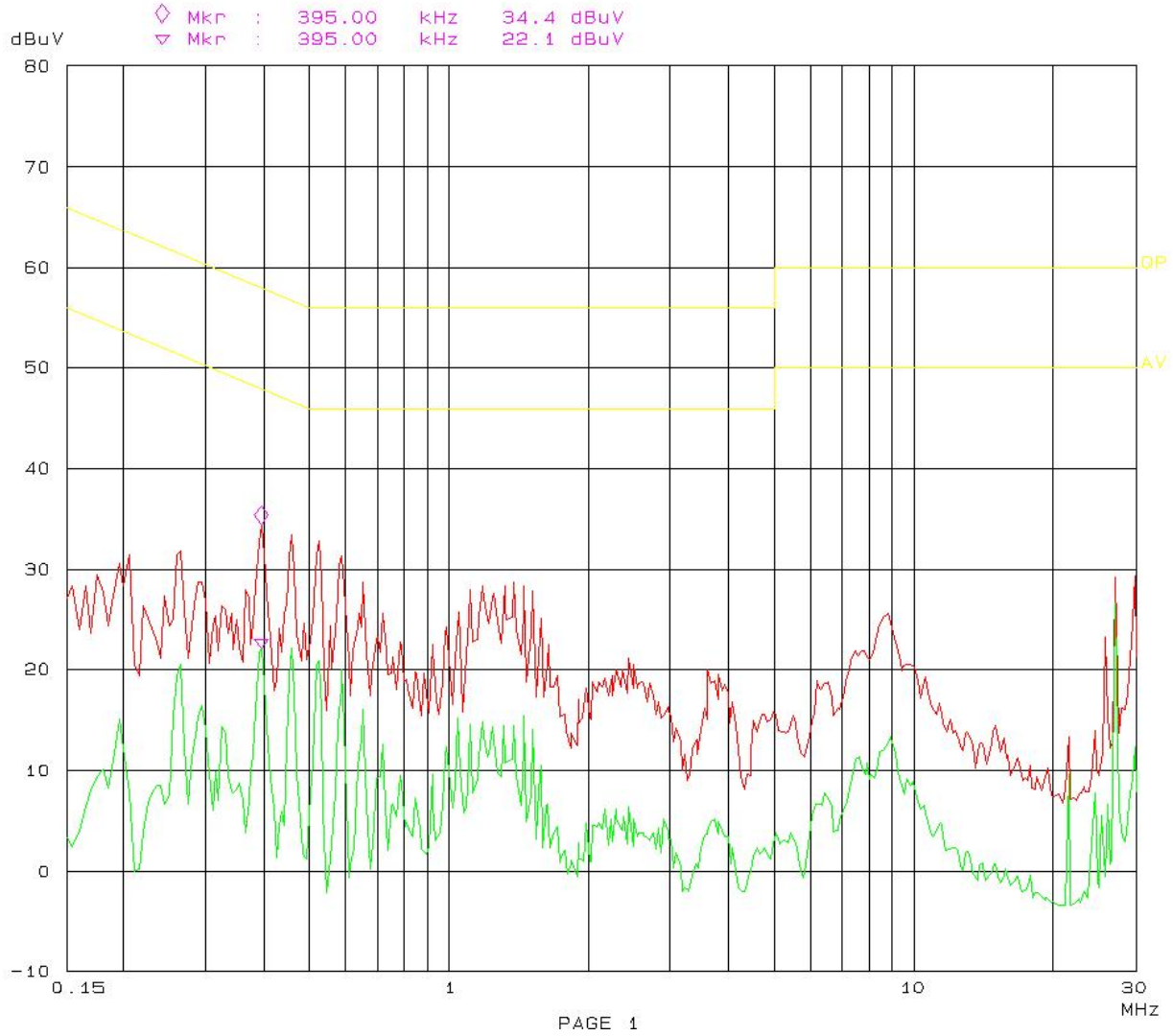
EUT: Mono Bluetooth Headset M/N: Voyager835
Manuf: Plantronics
Op Cond: Charging (adapter)
Operator: Phoenix
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%

Scan Settings (1 Range)

| Frequencies | | | Receiver Settings | | | | |

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	PK+AV	10ms	AUTO	LN OFF

Transducer	No.	Start	Stop	Name
	5	9k	30M	ESH2_Z5



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

7.1 Applicable Standard

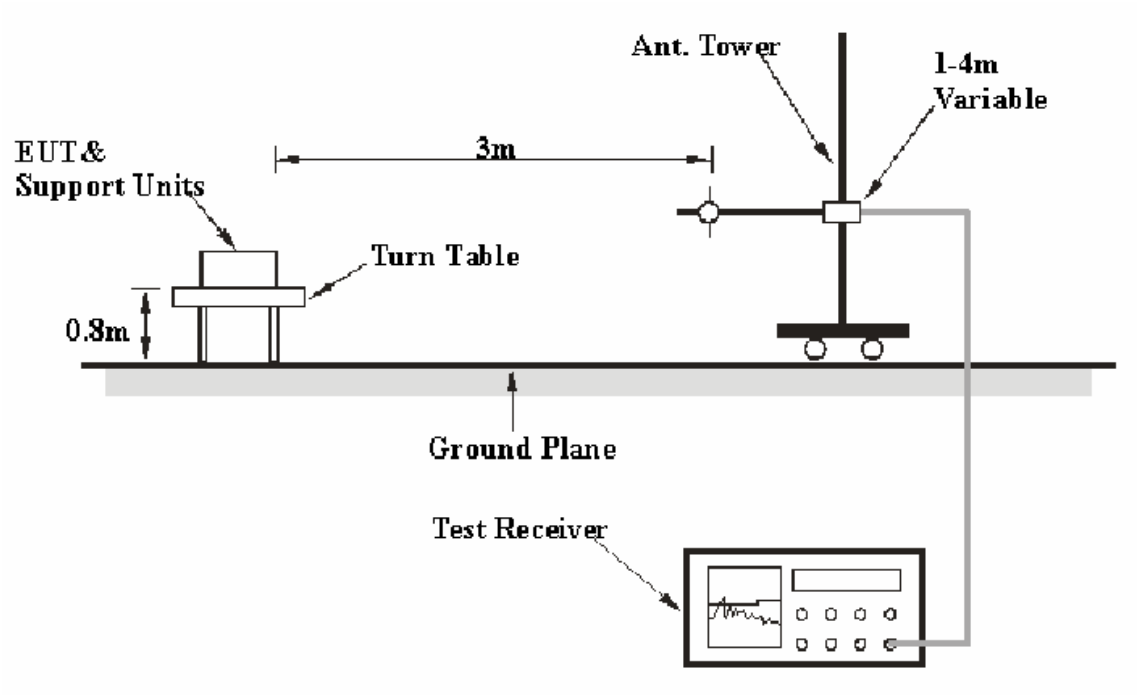
CFR47 §15.205; §15.209; §15.247 (d).

7.2 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.

7.3 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 Laptop was connected to a 120 VAC/60 Hz power source.

7.4 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

7.5 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.

7.6 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27

7.7 Test Procedure

For the radiated emissions test, the host PC 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.

7.8 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

7.9 Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart B, section 15.109, Subpart C, 15.205, 15.209, and 15.247, with the worst margin reading of:

Charging mode (Below 1GHz):

15.7 dB at **284.017300 MHz** in the **Horizontal** polarization

Transmitting mode (Below 1GHz):

1.60 dB at **215.872225 MHz** in the **Horizontal** polarization

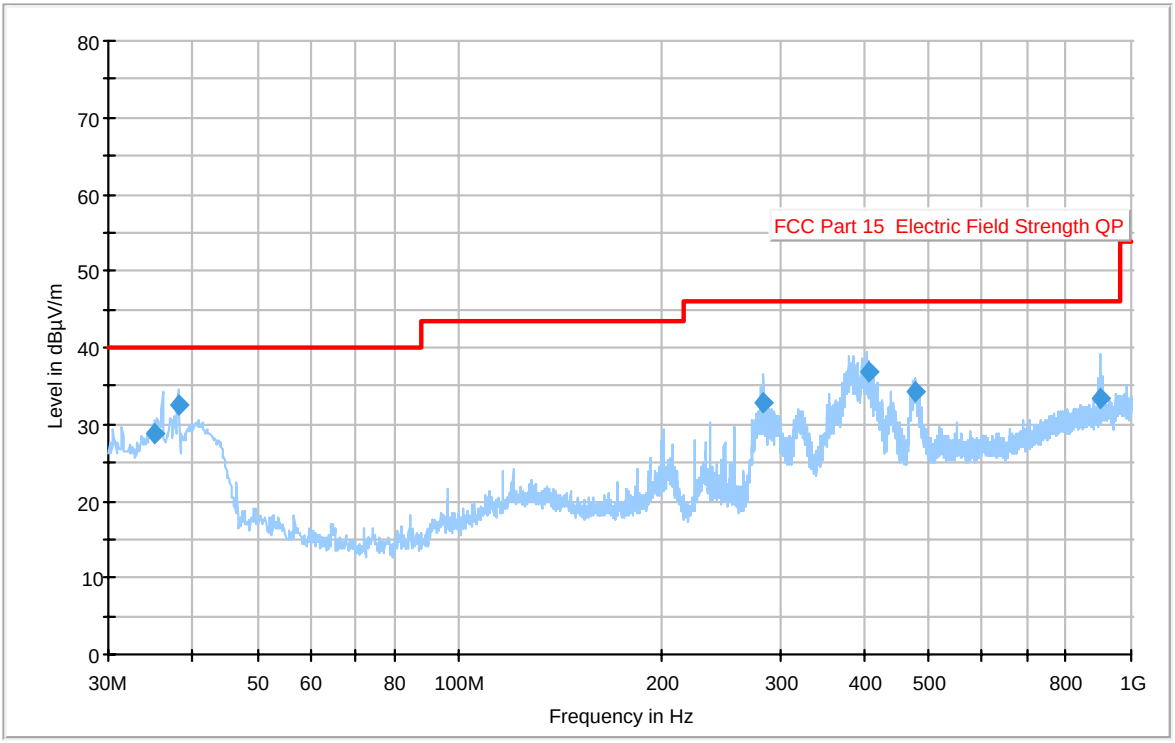
Transmitting mode (Above 1GHz):

7.18 dB at **4804.00 MHz** in the **Vertical** polarization, **for above 1GHz (Low Channel)**
4.83 dB at **4882.00 MHz** in the **Vertical** polarization, **for above 1GHz (Middle Channel)**
5.18 dB at **4960.00 MHz** in the **Horizontal** polarization, **for above 1GHz (High Channel)**

7.10 Test Data

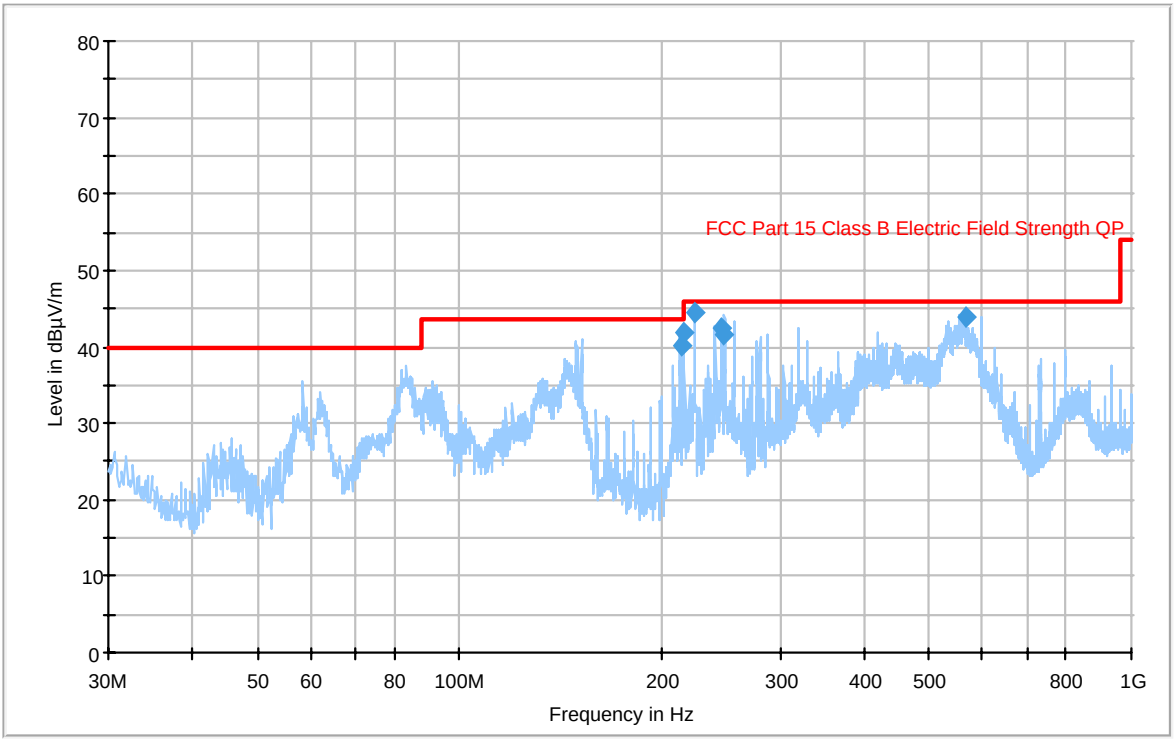
Below 1 GHz

Test Mode: Charging



Frequency (MHz)	Corrected Amp. (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
284.017300	32.8	115.0	H	45.0	-16.0	46.0	15.7
475.496625	34.3	99.0	H	257.0	-12.2	46.0	16.5
38.125325	32.4	400.0	H	233.0	-14.6	40.0	17.0
897.105275	33.3	301.0	H	231.0	-0.2	46.0	17.8
405.417875	36.8	257.0	V	55.0	-13.8	46.0	20.6
35.265750	28.9	247.0	H	0.0	-12.3	40.0	21.0

Test Mode: Transmitting



Frequency (MHz)	Corrected Amp. (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
215.872225	41.9	172.0	H	206.0	-12.8	43.5	1.6
223.971200	44.3	117.0	H	120.0	-12.6	46.0	1.7
566.306575	43.9	172.0	H	191.0	-3.8	46.0	2.1
213.292025	40.2	185.0	H	207.0	-12.8	43.5	3.3
245.334200	42.5	167.0	H	126.0	-11.8	46.0	3.5
247.848300	41.6	151.0	H	125.0	-11.8	46.0	4.4

Above 1 GHz

Test Mode: Transmitting

Freq. (MHz)	Meter Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBμV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	Remarks
Low Channel = 2402MHz												
4804	40.88	AV	90	1.0	V	34.7	4.64	33.4	46.82	54	7.18	Harmonic
4804	40.79	AV	90	1.0	H	34.6	4.64	33.4	46.63	54	7.37	Harmonic
1190	45.21	AV	180	1.2	V	26.0	2.77	35.0	38.98	54	15.02	Spurious
1190	42.56	AV	180	1.2	H	26.5	2.77	35.0	36.83	54	17.17	Spurious
4804	46.93	PK	180	1.2	V	34.7	4.64	33.4	52.87	74	21.13	Harmonic
4804	46.54	PK	180	1.2	H	34.6	4.64	33.4	52.38	74	21.62	Harmonic
1190	48.57	PK	45	1.2	H	26.5	2.77	35.0	42.84	74	31.16	Spurious
1190	48.49	PK	45	1.2	V	26.0	2.77	35.0	42.26	74	31.74	Spurious
Middle Channel = 2441MHz												
4882	43.33	AV	243	1.4	V	34.6	4.64	33.4	49.17	54	4.83	Harmonic
4882	40.98	AV	142	1.6	H	34.7	4.64	33.4	46.92	54	7.08	Harmonic
1660	48.01	AV	135	1.3	H	26.0	2.77	35.0	41.78	54	12.22	Spurious
1660	47.21	AV	85	1.5	V	26.5	2.77	35.0	41.48	54	12.52	Spurious
4882	47.03	PK	153	1.5	V	34.6	4.64	33.4	52.87	74	21.13	Harmonic
4882	46.01	PK	234	1.8	H	34.7	4.64	33.4	51.95	74	22.05	Harmonic
1660	49.84	PK	265	1.4	V	26.5	2.77	35.0	44.11	74	29.89	Spurious
1660	50.00	PK	156	1.4	H	26.0	2.77	35.0	43.77	74	30.23	Spurious
High Channel = 2480MHz												
4960	43.07	AV	256	1.8	H	34.6	4.55	33.4	48.82	54	5.18	Harmonic
4960	42.35	AV	142	1.5	V	34.7	4.55	33.4	48.20	54	5.80	Harmonic
1690	49.50	AV	210	1.2	V	26.0	2.77	35.0	87.68	54	10.73	Spurious
1690	45.78	AV	156	1.2	H	26.5	2.77	35.0	40.05	54	13.95	Spurious
4960	46.23	PK	142	1.4	V	34.7	4.55	33.4	52.08	74	21.92	Harmonic
4960	46.11	PK	145	1.4	H	34.6	4.55	33.4	51.86	74	22.14	Harmonic
1690	50.85	PK	240	1.4	V	26.0	2.77	35.0	44.62	74	29.38	Spurious
1690	48.75	PK	128	1.5	H	26.5	2.77	35.0	43.02	74	30.98	Spurious

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

8.1 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.

8.2 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.

8.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27

8.4 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.

8.5 Test Data

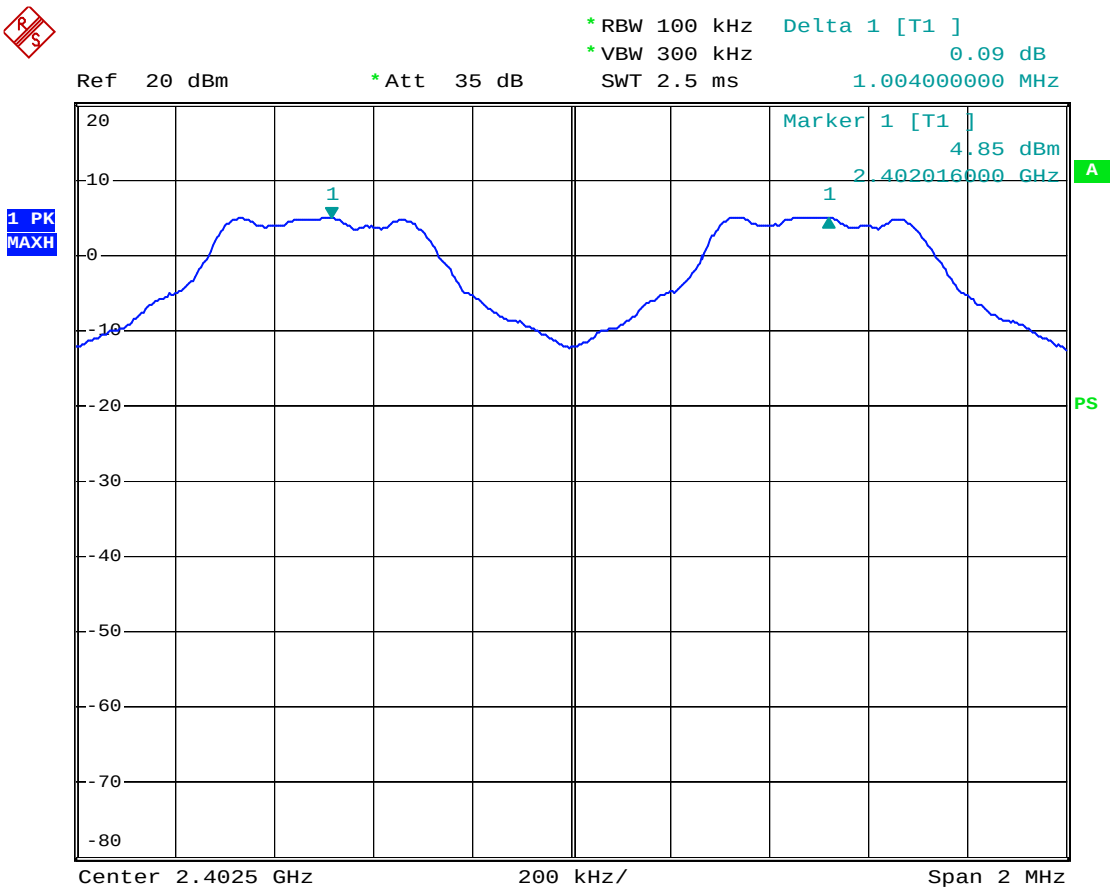
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low Channel	2402	1004	549	Pass
Adjacency Channel	2403			
Middle Channel	2441	1004	565	Pass
Adjacency Channel	2442			
High Channel	2480	1004	570	Pass
Adjacency Channel	2479			

Test Result: Compliance.

Please refer to following plots

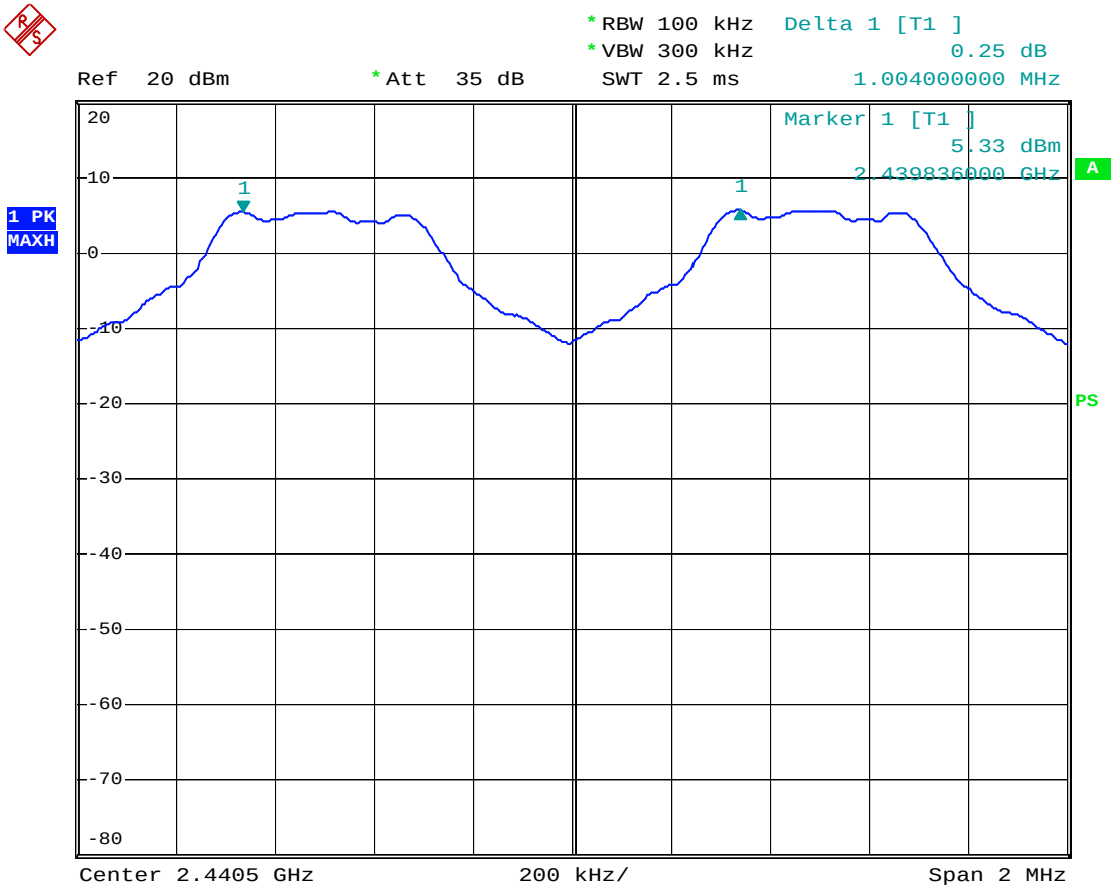
Low Channel



channel sepration low channel

Date: 27.JAN.2008 23:03:44

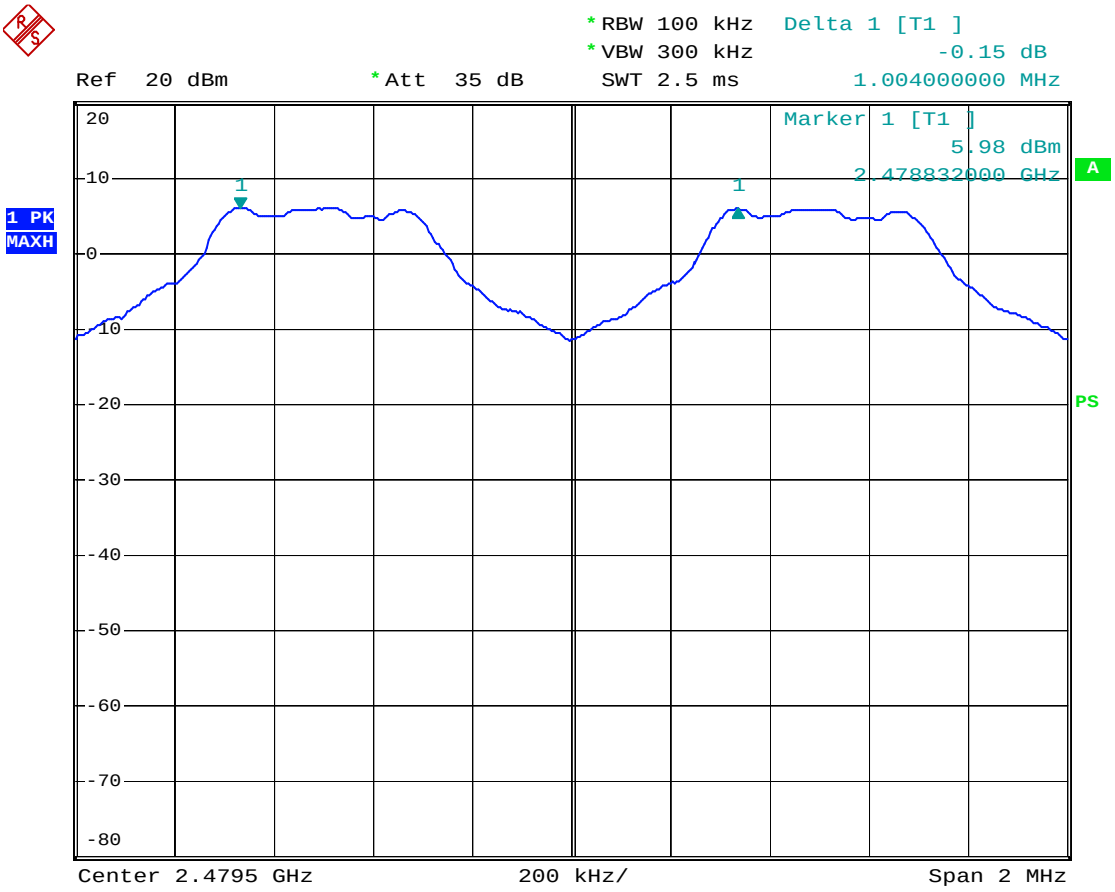
Middle Channel



channel sepration middle channel

Date: 27.JAN.2008 23:05:53

High Channel



channel sepration high channel

Date: 27.JAN.2008 23:07:03

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

9.1 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.

9.2 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.

9.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

9.4 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.

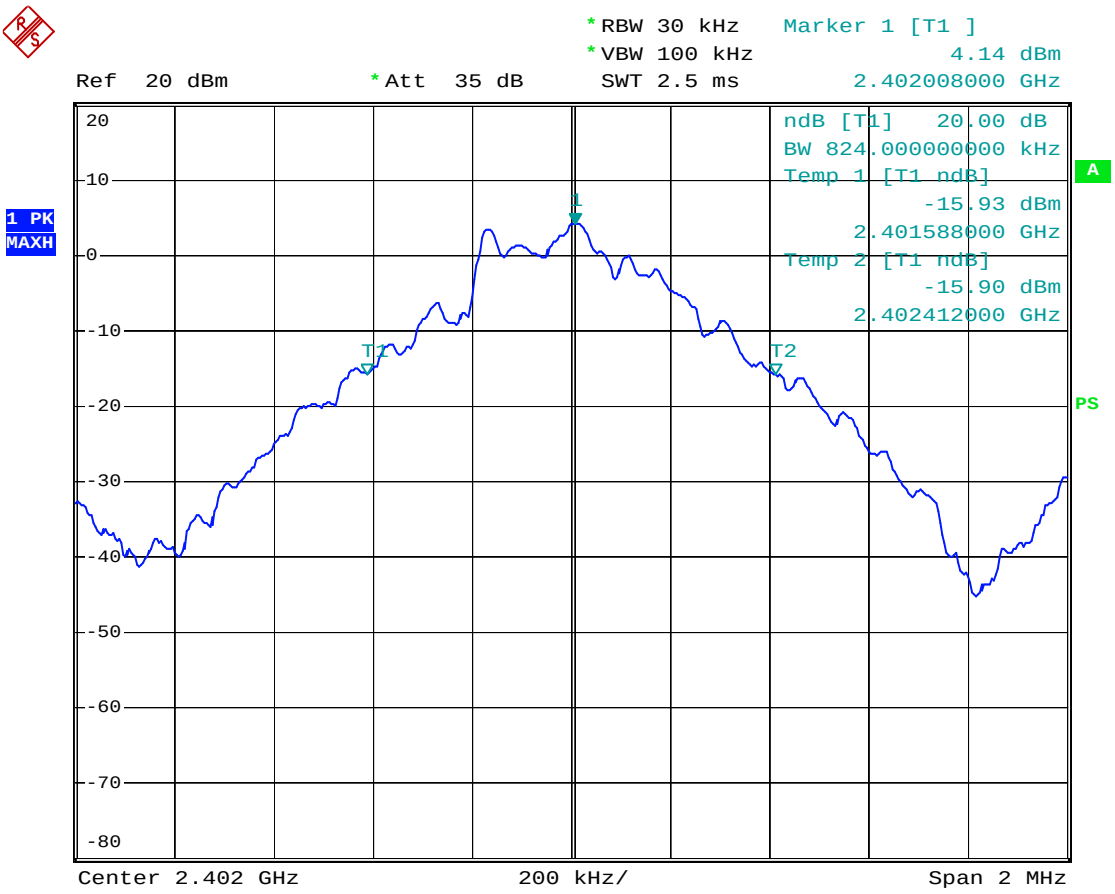
9.5 Test Data

Test Result: Please refer to the following table and plots.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low	2402	824
Middle	2441	848
High	2480	856

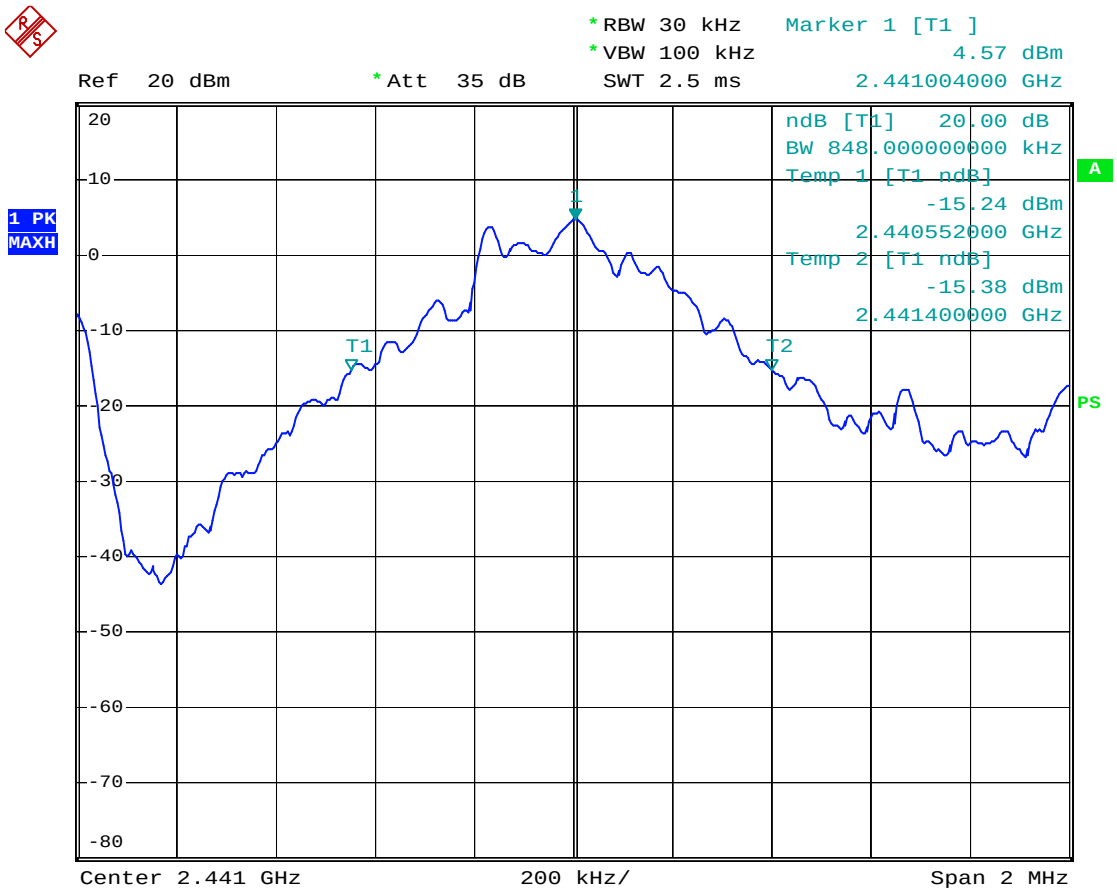
Low Channel



20dB band width low channel

Date: 27.JAN.2008 23:20:37

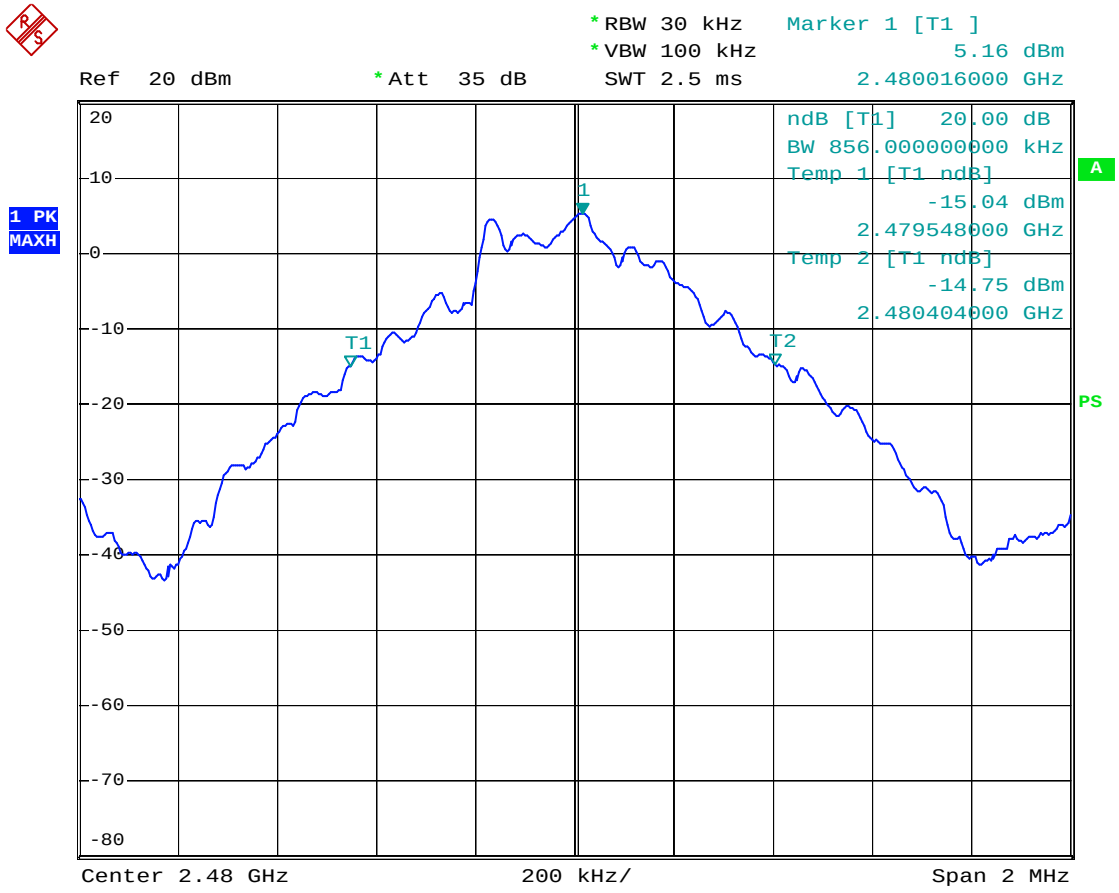
Middle Channel



20dB band width middle channel

Date: 27.JAN.2008 23:19:44

High Channel



20dB band width high channel

Date: 27.JAN.2008 23:18:33

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

10.1 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.

10.2 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.

10.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

10.4 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.

10.5 Test Data

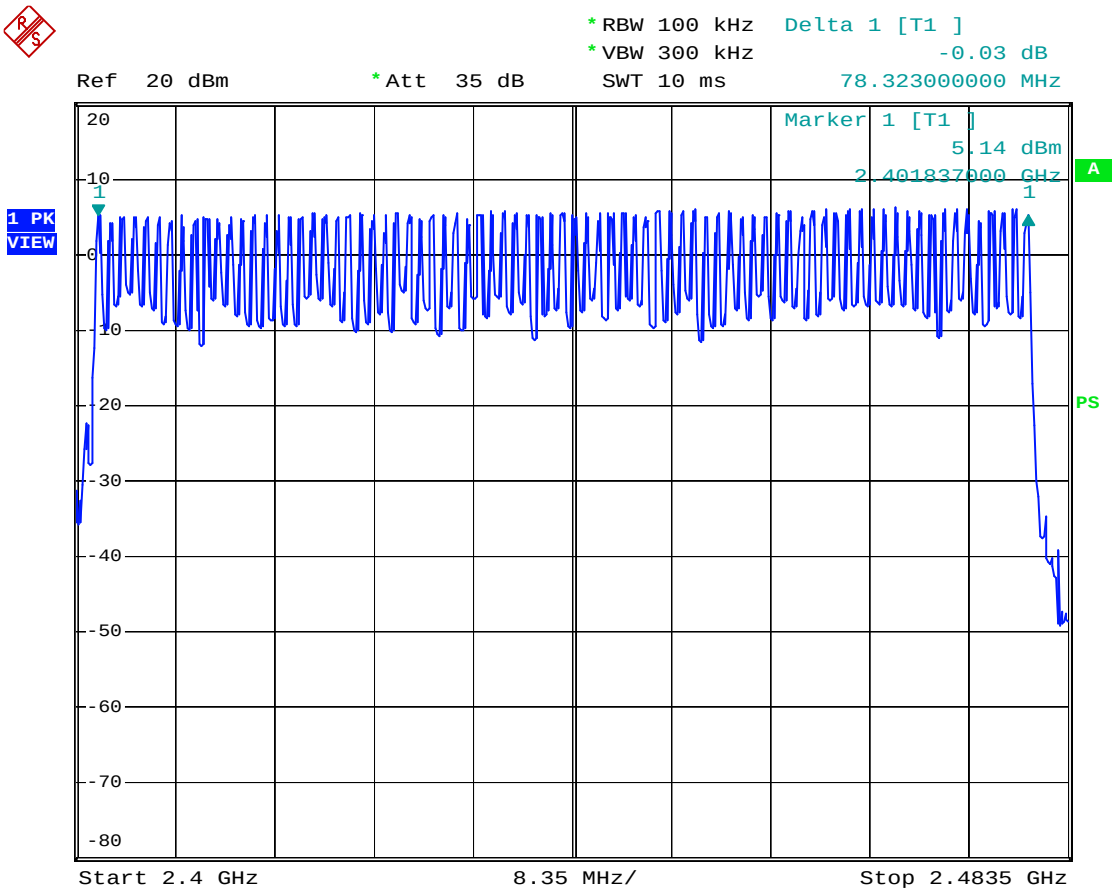
Test Mode: Transmitting

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

Test Result: Compliance.

Please refer to following plot.

Number of Hopping Channels



hopping channels

Date: 27.JAN.2008 22:25:38

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

11.1 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.

11.2 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.

11.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

11.4 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

11.5 Test Data

Please refer to following tables and plots

Test Mode: Transmitting

DH1 mode

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	0.550	0.176	0.4	Pass
Middle	0.540	0.173	0.4	Pass
High	0.550	0.176	0.4	Pass

NOTE: Dwell time = Pulse time*(1600/2/79)*31.6S

DH3 mode

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	1.820	0.291	0.4	Pass
Middle	1.820	0.291	0.4	Pass
High	1.840	0.294	0.4	Pass

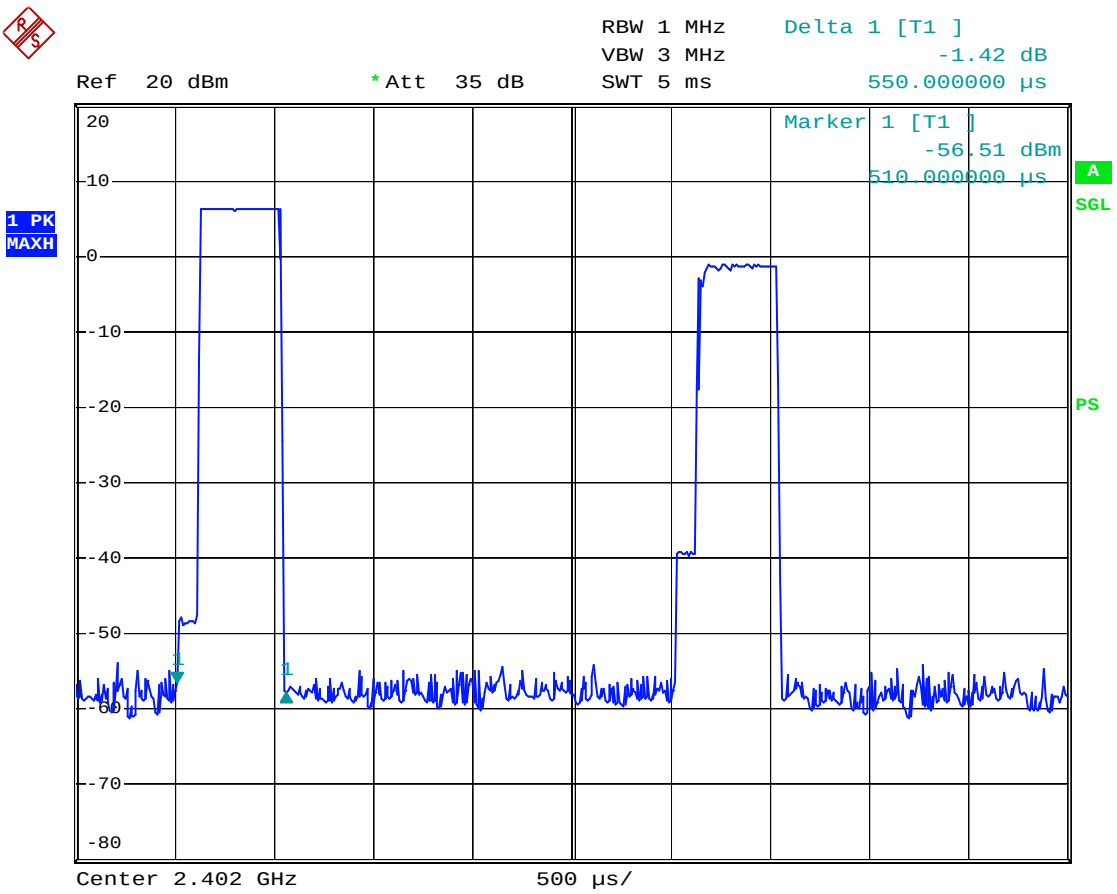
NOTE: Dwell time = Pulse time*(1600/4/79)*31.6S

DH5 mode

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	3.090	0.330	0.4	Pass
Middle	3.090	0.333	0.4	Pass
High	3.120	0.333	0.4	Pass

NOTE: Dwell time = Pulse time*(1600/6/79)*31.6S

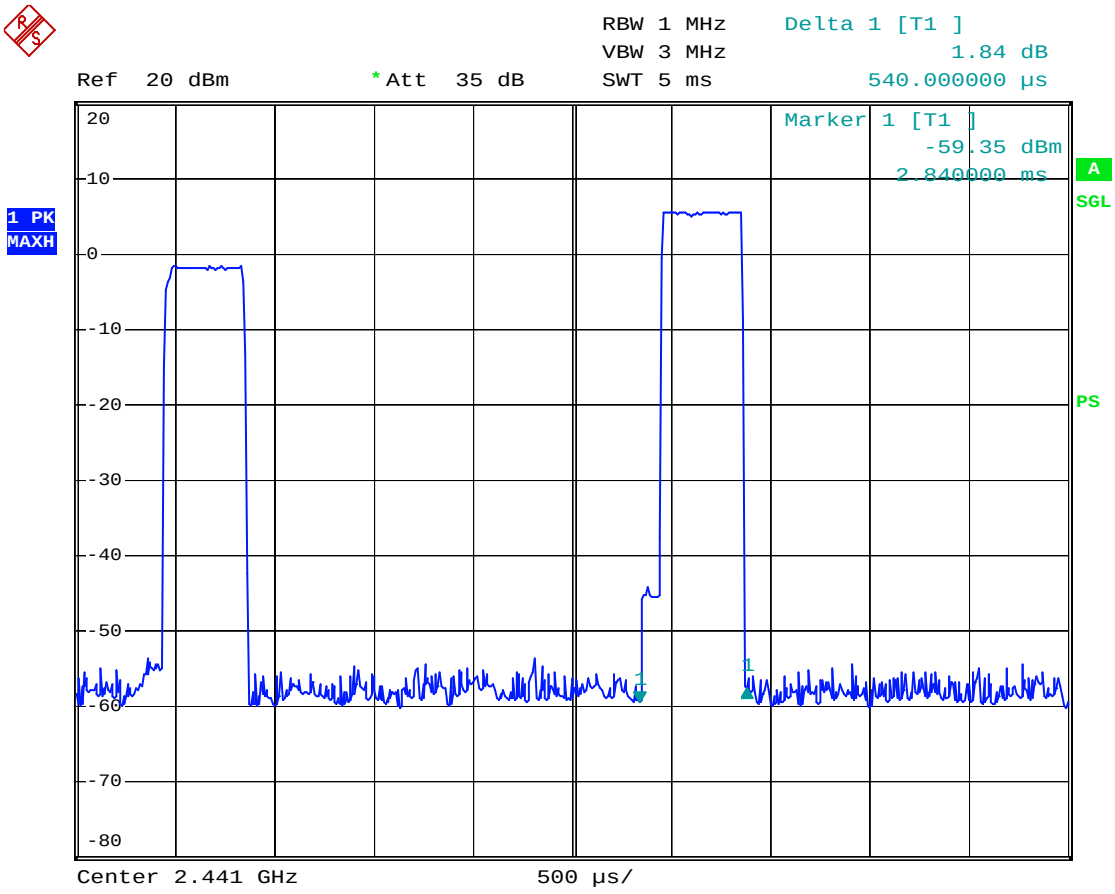
Low Channel for DH1



dwell time low channel (DH1) on time

Date: 2.JUL.2008 10:55:53

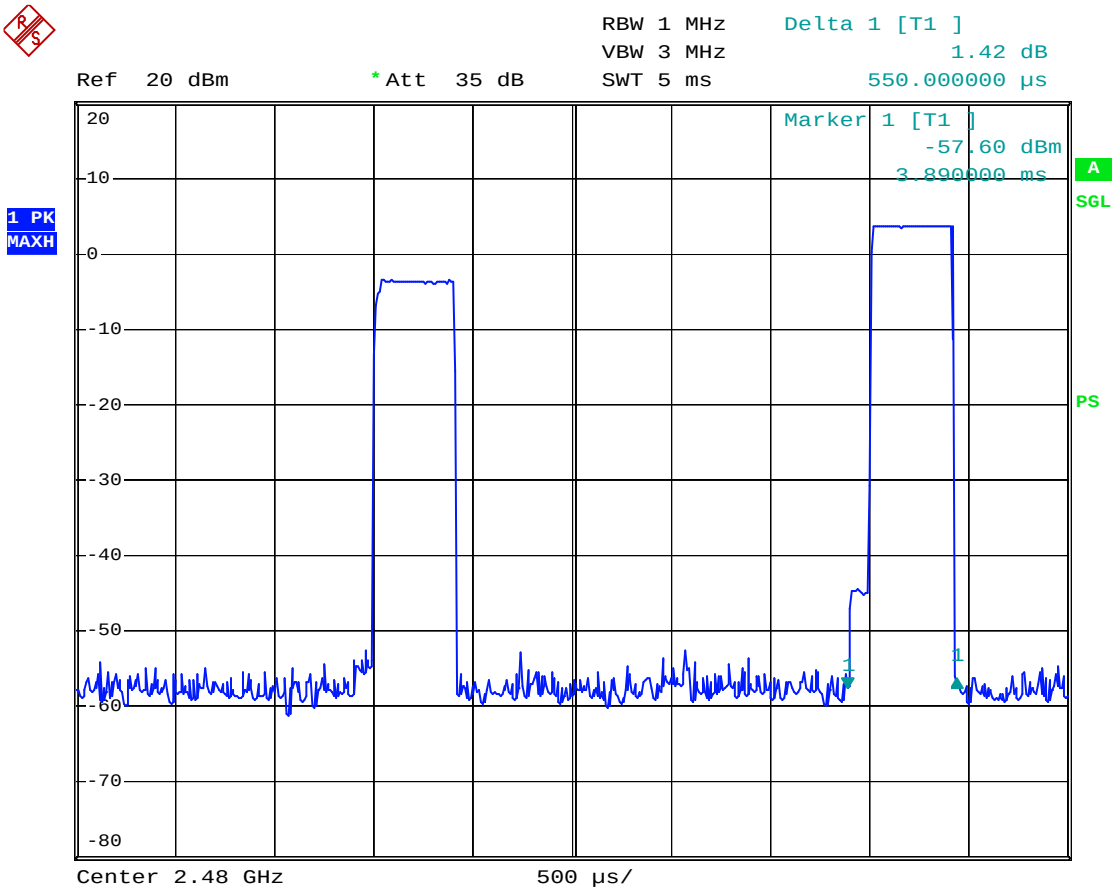
Middle Channel for DH1



dwell time middle channel (DH1) on time

Date: 2.JUL.2008 10:57:44

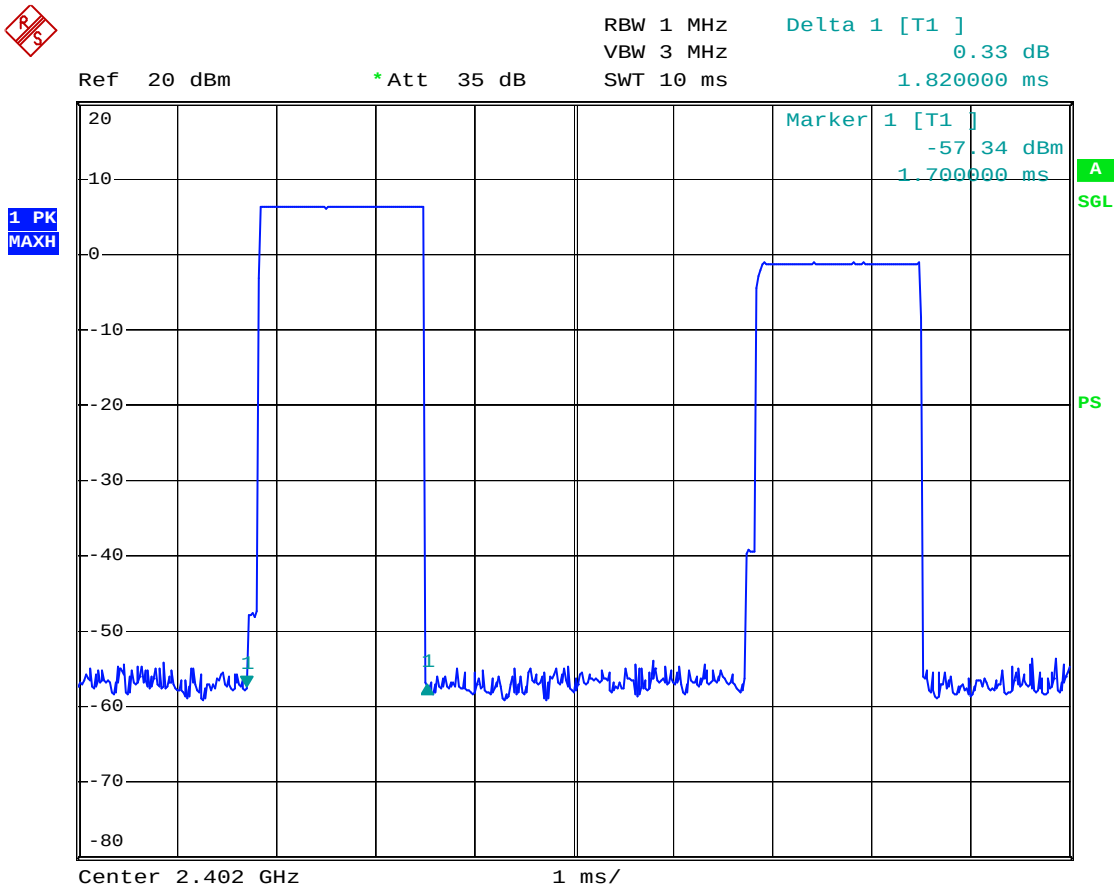
High Channel for DH1



dwell time high channel (DH1) on time

Date: 2.JUL.2008 11:00:08

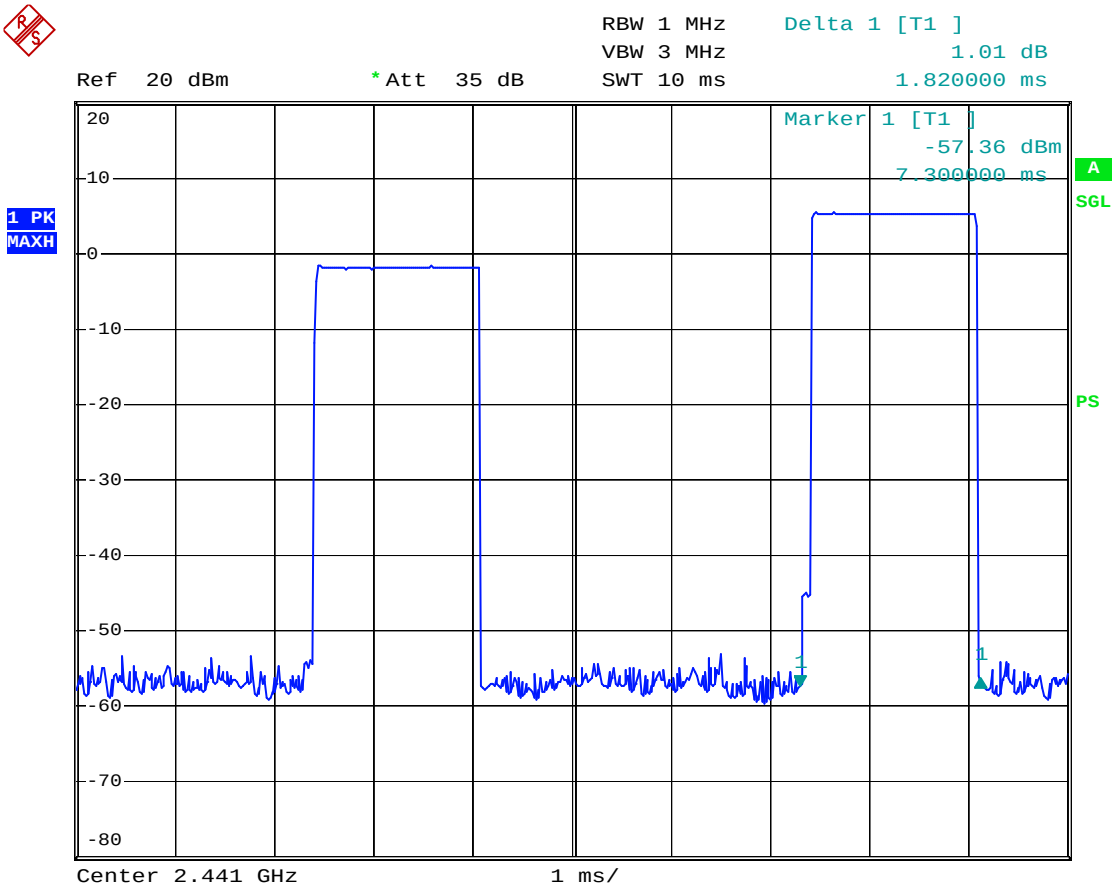
Low Channel for DH3



dwell time low channel (DH3) on time

Date: 2.JUL.2008 11:04:10

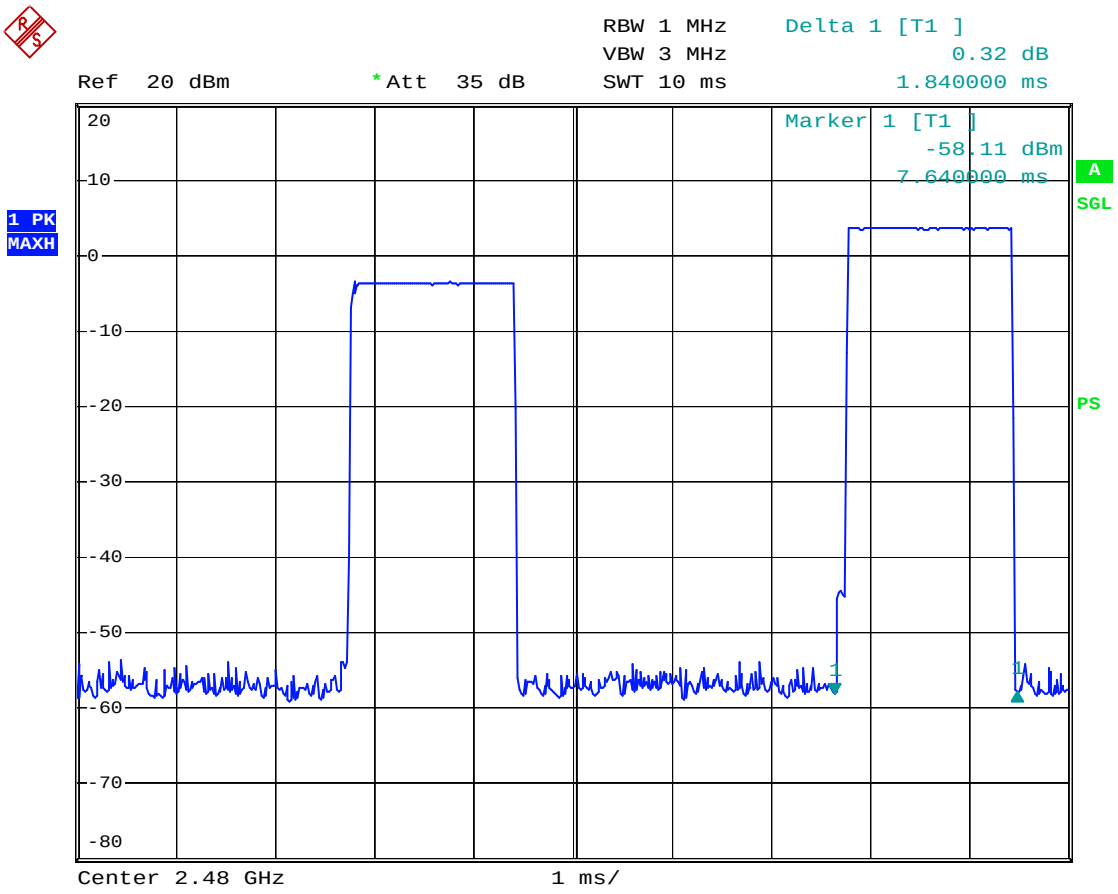
Middle Channel for DH3



dwell time middle channel (DH3) on time

Date: 2.JUL.2008 11:03:33

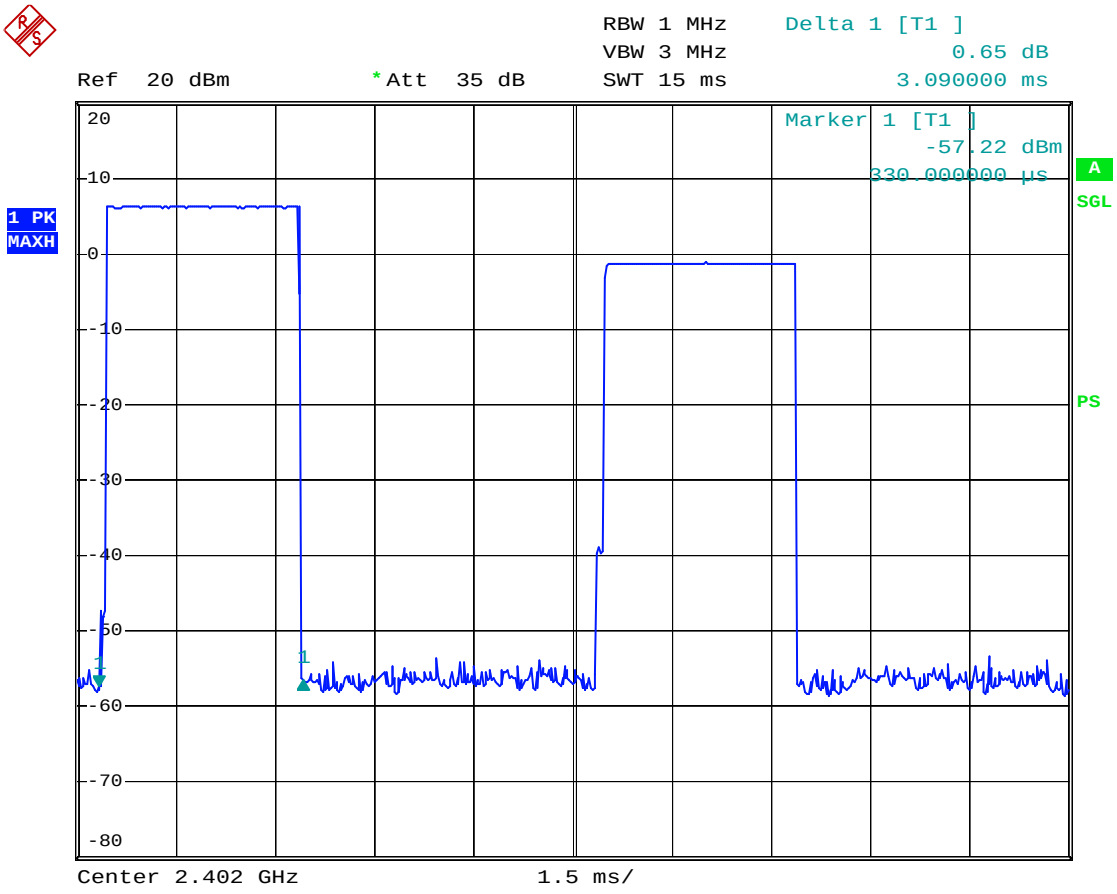
High Channel for DH3



dwell time high channel (DH3) on time

Date: 2.JUL.2008 11:01:35

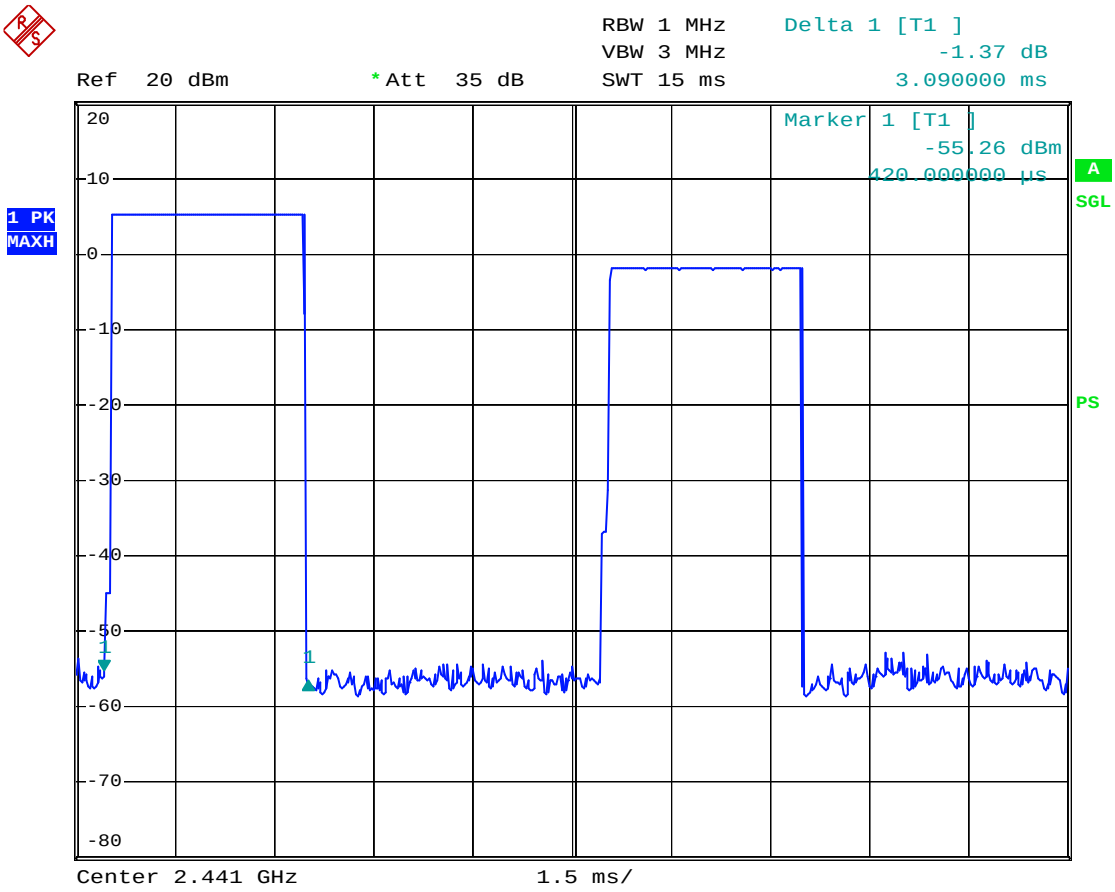
Low Channel for DH5



dwell time low channel (DH5) on time

Date: 2.JUL.2008 11:07:42

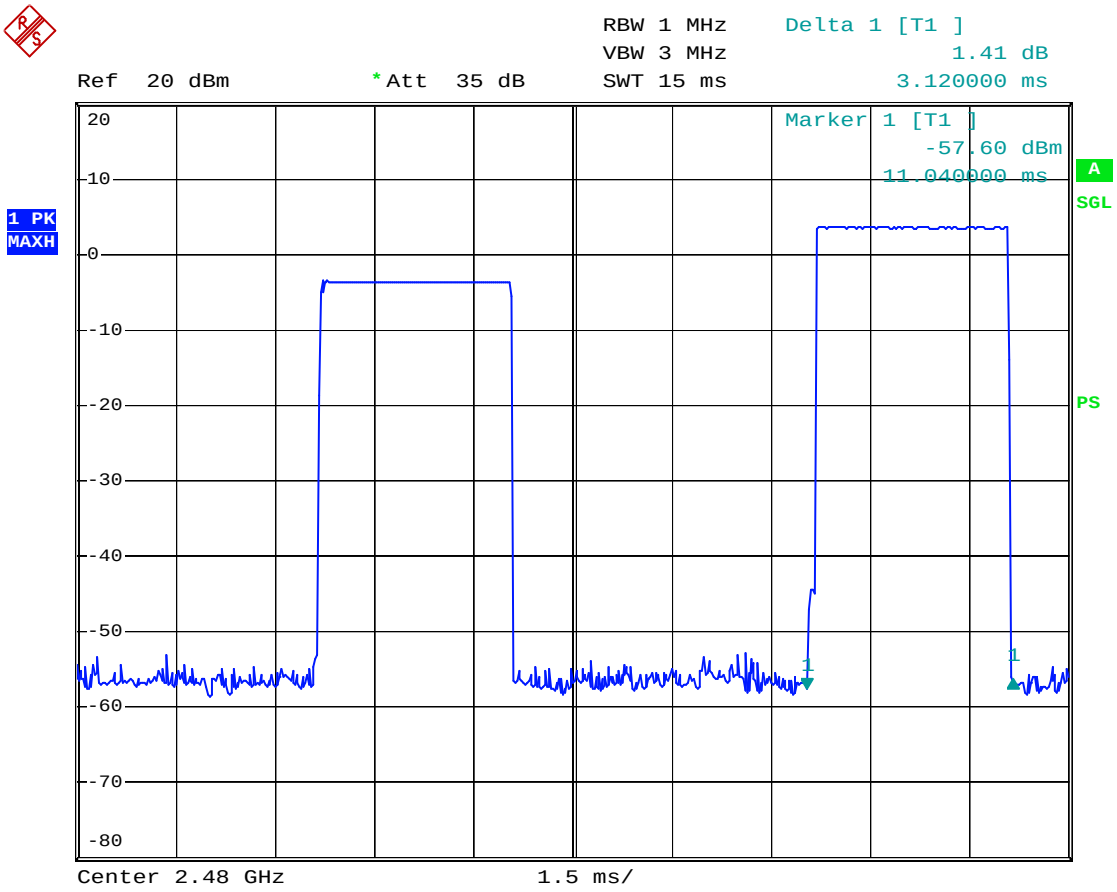
Middle Channel for DH5



dwell time middle channel (DH5) on time

Date: 2.JUL.2008 11:08:57

High Channel for DH5



dwell time high channel (DH5) on time

Date: 2.JUL.2008 11:11:34

12 CFR47 §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

12.1 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.

12.2 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
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.

12.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

12.4 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 peak detection modes.

12.5 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

12.6 Test Data

Test Mode: Transmitting

Freq. (MHz)	Receiver Reading (dBµV)	Detector PK/AV	Table Direction Degree	Antenna		Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBµV/m)	Trans. Factor (dB)	EIRP		Part15.247 Limit (W)
				Height (m)	Factor (dB/m)					(dBm)	(mW)	
Low Channel												
2402	98.40	PK	90	1	30.6	3.61	35	97.61	95.27	2.34	1.71	1
Middle Channel												
2441	97.06	PK	128	1.5	30.6	3.61	35	96.27	95.27	1	1.26	1
High Channel												
2480	95.45	PK	65	1.4	30.6	3.61	35	94.66	95.27	-0.61	0.87	1

Note: P (dBm) = E (dBµV/m) – 95.27

13 CFR47 §15.247(d) - BAND EDGES TESTING

13.1 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)).

13.2 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.

13.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-06-27.

13.4 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.

13.5 Test Data

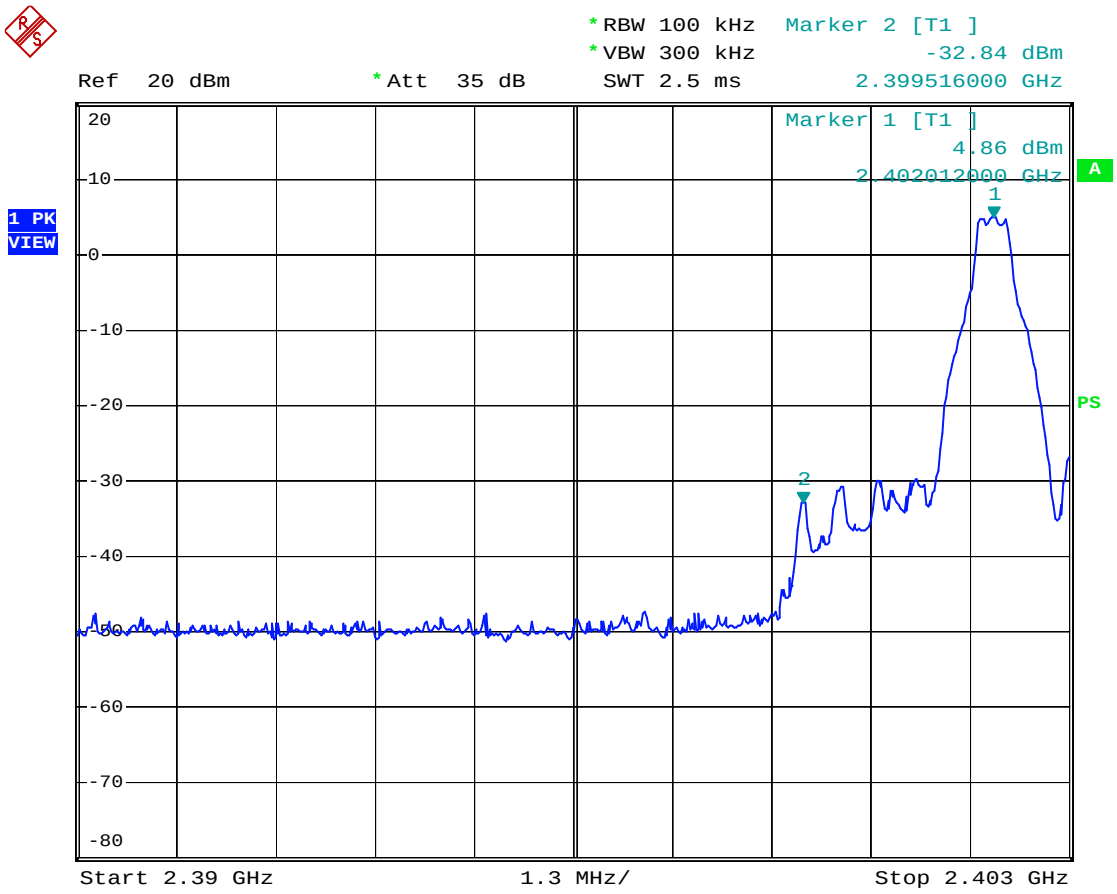
Test Mode: Transmitting

Frequency (MHz)	Delta Peak to in-band emission (dBc)	Limit (dBc)
2399.516	37.70	20
2483.662	57.66	20

Test Result: Pass

Please refer to the following plots.

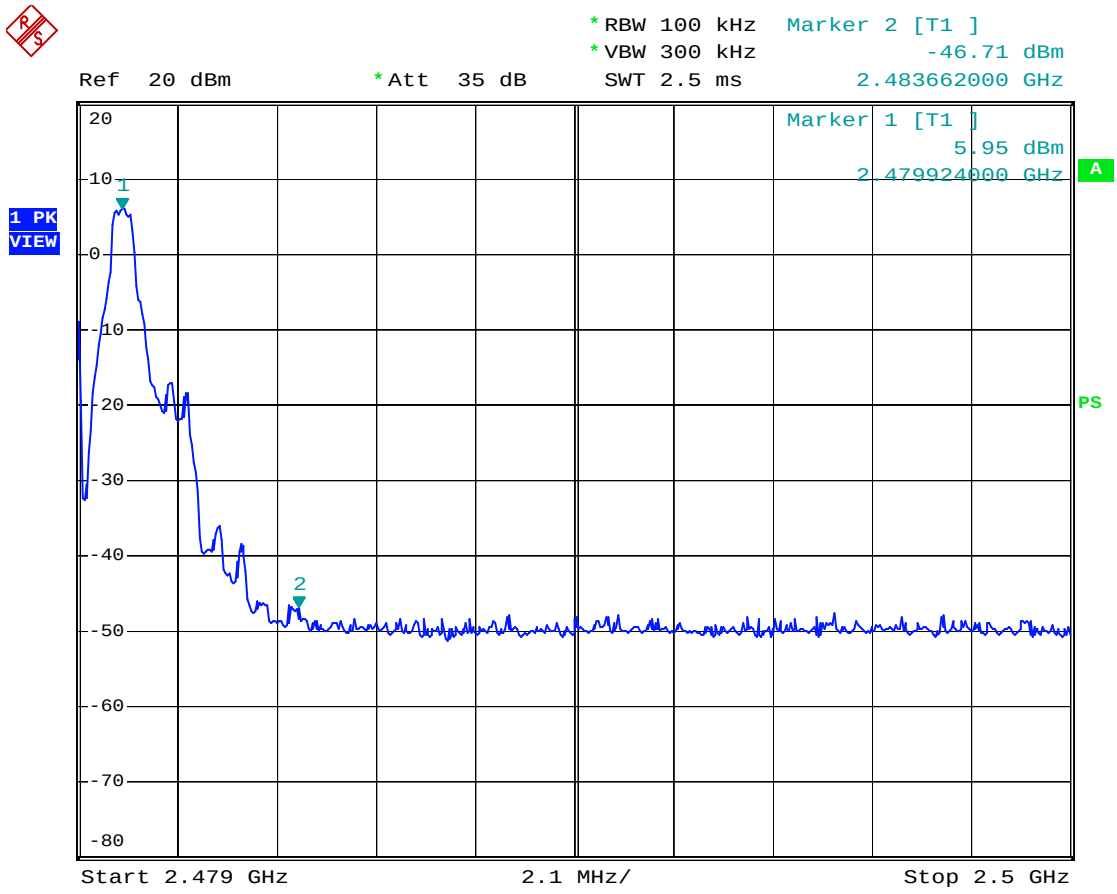
Band Edge Left Side



out of band edge left

Date: 27.JAN.2008 23:39:34

Band Edge Right Side



out of band edge right

Date: 27.JAN.2008 23:42:02

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