



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Voyetra Turtle Beach, Inc.

150 Clearbrook Road, Ste 162,
Elmsford, NY 10523, USA

FCC ID: XGB-TB2125
Model: Ear Force® PBT

Report Type: Original Report	Product Type: Bluetooth Headset
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Report Number: <u>RSZ10051906</u>	
Report Date: <u>2010-06-28</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Voyetra Turtle Beach, Inc.*'s product, model number: *Ear Force® PBT (FCC ID: XGB-TB2125)* or the "EUT" as referred to in this report is a *Bluetooth Headset*, which measures approximately: 5.2 cm L x 1.7 cm W x 2.4 cm H, rated input voltage: DC 3.7 V Lithium battery.

All measurement and test data in this report was gathered from production sample serial number: 1005051 (Assigned by BACL, Shenzhen). The EUT was received on 2010-05-19.

Objective

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

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

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 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 with Bluetest III software.

Equipment Modifications

No modification was made to the unit tested.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Intel	Motherboard	D865GKD	11S19R1949ZJ1WCB46J1K8	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E-80BM	DoC
Maxtor	Hard Disk	6Y080L0	Y23QNXTE	DoC
ALPS	3.5' Floppy	06P5226	11S06P5226ZJ1W25373957	DoC
Lite-ON	CD-Rom	LTN-489S	11S71P7366ZJ1SYC130015	DoC
ProMOS	Memory	V826616J24SATG-C0	D61A2605H	N/A
Intel	CPU	Pentium4 2800MHz	N/A	N/A
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

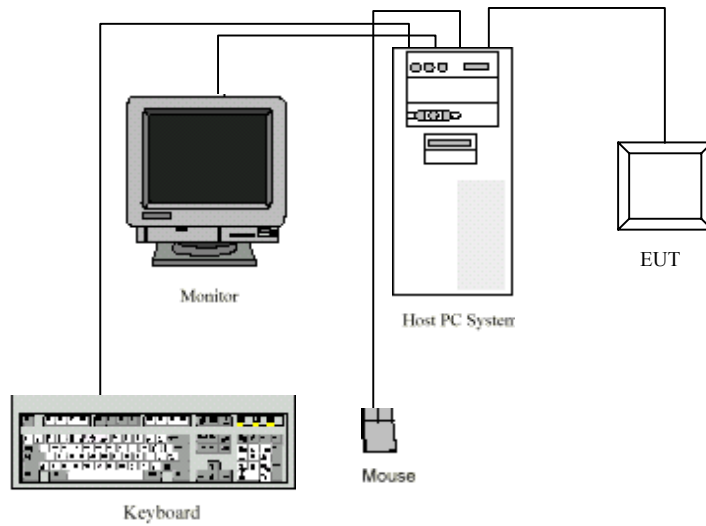
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4WQ	DoC
DELL	Keyboard	L100	CNORH656658907BL05DC	DoC
DELL	Mouse	MOC5UO	G1900NKD	DoC
DELL	LCD Monitor	1505FP	CN-OY4287-71618-574-GBSH	DoC

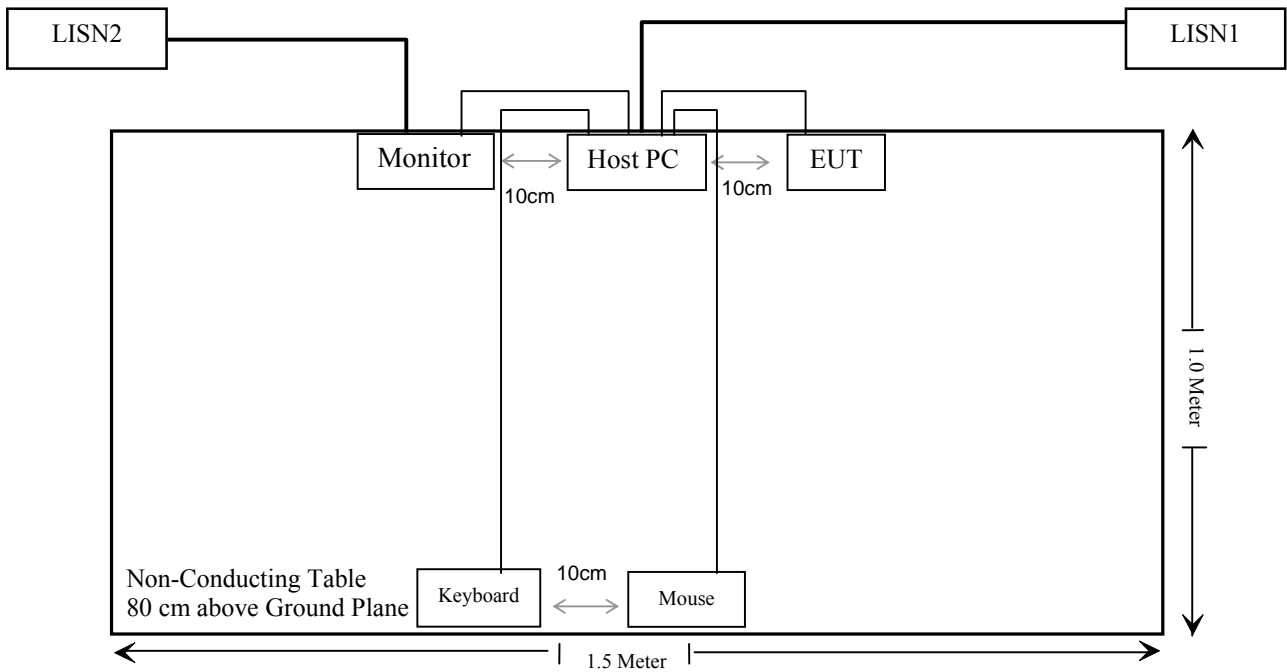
External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.50	K/B Port / Host	K/B
Shielded Detachable Mouse Cable	1.50	PS/2 Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port / Host	Monitor
Shielded Detachable Serial Cable	1.20	Serial Port / Host	Modem
Unshielded Detachable USB Power Line	0.8	PC	EUT

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) §1.1307 (b)(1), §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

CFR47 §15.247 (i), §1.1307 (b)(1) & §2.1093 - RF EXPOSURE**Applicable Standard**

According to §15.247(e)(i) and §1.1307(b)(1), 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 KDB 447498 D01 Mobile Portable RF Exposure v03r03, no SAR required if power is lower than the flowing threshold:

When routine evaluation is required for SAR and the output power is $\leq 60/f(\text{GHz})$ mW, the test reduction and test exclusion procedures given herein, or in KDB 616217 or KDB 648474, are applicable.

A device may be used in portable exposure conditions with no restrictions on host platforms when either the source-based time-averaged output power is $\leq 60/f(\text{GHz})$ mW or all measured 1-g SAR are < 0.4 W/kg. When SAR evaluation is required, the most conservative exposure conditions for all expected operating configurations must be tested.

Measurement Result:

Max peak output power:

$$P_{\text{BDR}} = 0.68 \text{ dBm} = 1.169 \text{ mW}$$

$$P_{\text{EDR}} = 0.37 \text{ dBm} = 1.089 \text{ mW}$$

$$60/f_{\text{GHz}} = 60/2441 = 24.58 \text{ mW}$$

$$P_{\text{BDR}} < 60/f_{\text{GHz}}$$

$$P_{\text{EDR}} < 60/f_{\text{GHz}}$$

This is a portable device and the Max peak output power of EUT is less than 24.58 mW, the SAR is not required.

CFR47 §15.203 – ANTENNA REQUIREMENT

Applicable Standard

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 printed antenna on the PCB, which in accordance to section 15.203, the maximum gain is -1.0 dBi; please refer to the internal photos.

Result: Compliant.

CFR47 §15.207(a) - CONDUCTED EMISSIONS

Applicable Standard

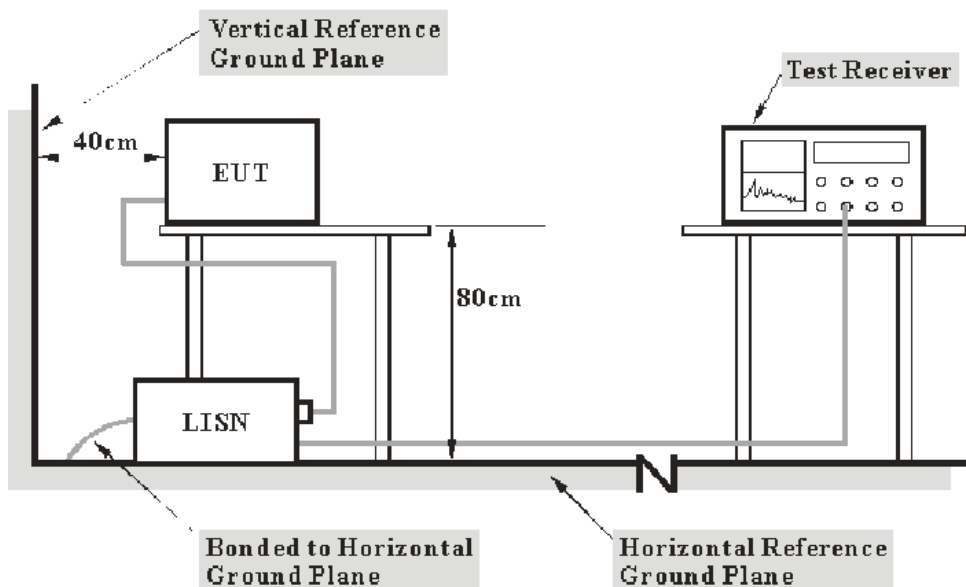
CFR47 §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ± 2.4 dB.

EUT Setup



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

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

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 PC was connected to a 120V 60Hz 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
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2010-03-03	2011-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2010-03-09	2011-03-08

* **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 PC 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:

12.23 dB at 0.600 MHz in the **Line** conductor mode
13.67 dB at 0.600 MHz in the **Neutral** conductor mode

Test Data

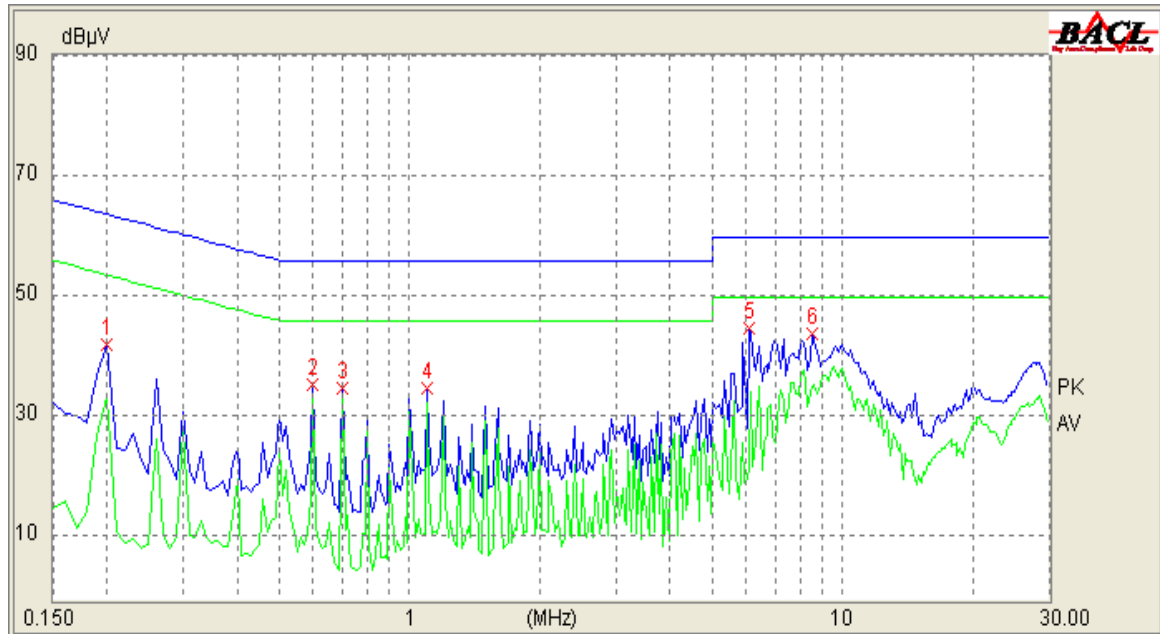
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

* *The testing was performed by Wayne Cheng on 2010-06-23.*

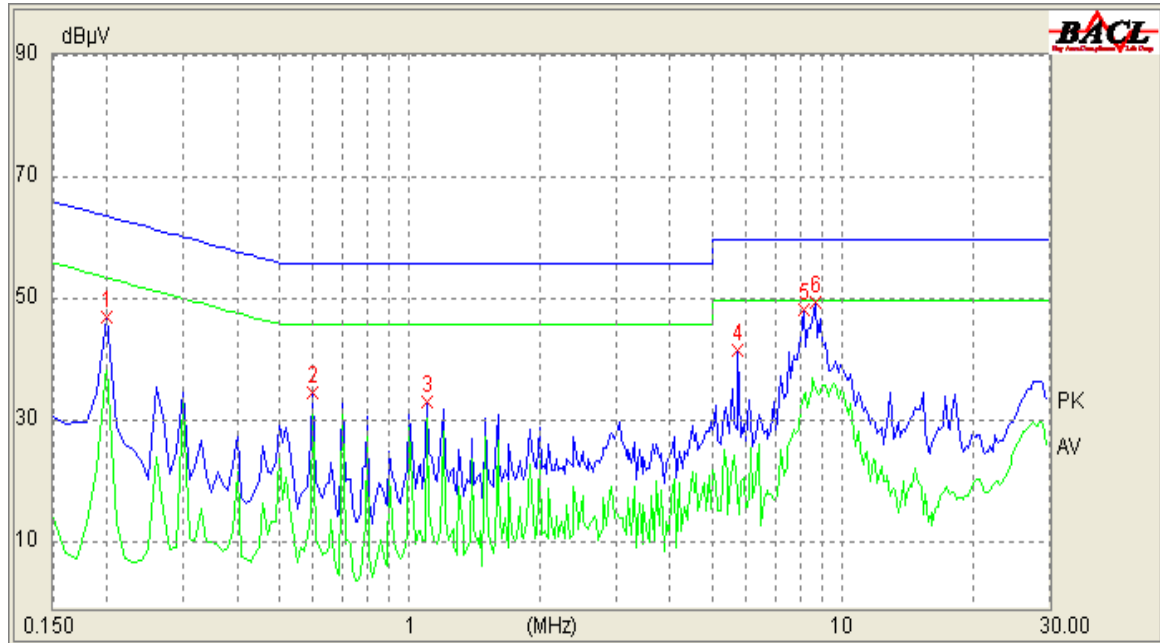
Test Mode: Transmitting & Charging

120 V/60 Hz, Line:



Conducted Emission			FCC Part 15.207		
Frequency (MHz)	Corrected Factor (dB)	Corrected Result (dBµV)	Limit (dBµV)	Margin (dB)	Remark (PK/Ave/QP)
0.600	10.10	33.77	46.00	12.23	Ave
0.700	10.10	33.68	46.00	12.32	Ave
1.100	10.10	32.44	46.00	13.56	Ave
8.620	10.20	35.53	50.00	14.47	Ave
8.550	10.20	39.77	60.00	20.23	QP
0.200	10.10	33.45	53.69	20.24	Ave
0.600	10.10	34.57	56.00	21.43	QP
0.700	10.10	34.27	56.00	21.73	QP
1.100	10.10	33.75	56.00	22.25	QP
0.200	10.10	40.32	63.69	23.37	QP
6.110	10.20	21.68	50.00	28.32	Ave
6.070	10.20	18.27	60.00	41.73	QP

120 V/60 Hz, Neutral:



Conducted Emission			FCC Part 15.207		
Frequency (MHz)	Corrected Factor (dB)	Corrected Result (dBµV)	Limit (dBµV)	Margin (dB)	Remark (PK/Ave/QP)
0.600	10.10	32.33	46.00	13.67	Ave
0.200	10.10	39.39	53.69	14.30	Ave
8.720	10.20	35.07	50.00	14.93	Ave
1.100	10.10	30.81	46.00	15.19	Ave
8.120	10.20	34.50	50.00	15.50	Ave
0.200	10.10	42.98	63.69	20.71	QP
8.120	10.20	38.08	60.00	21.92	QP
0.600	10.10	33.02	56.00	22.98	QP
1.100	10.10	31.65	56.00	24.35	QP
8.710	10.20	29.28	60.00	30.72	QP
5.780	10.20	15.23	50.00	34.77	Ave
5.730	10.20	18.61	60.00	41.39	QP

CFR47 §15.205, §15.209 & §15.247 – RADIATED EMISSIONS

Applicable Standard

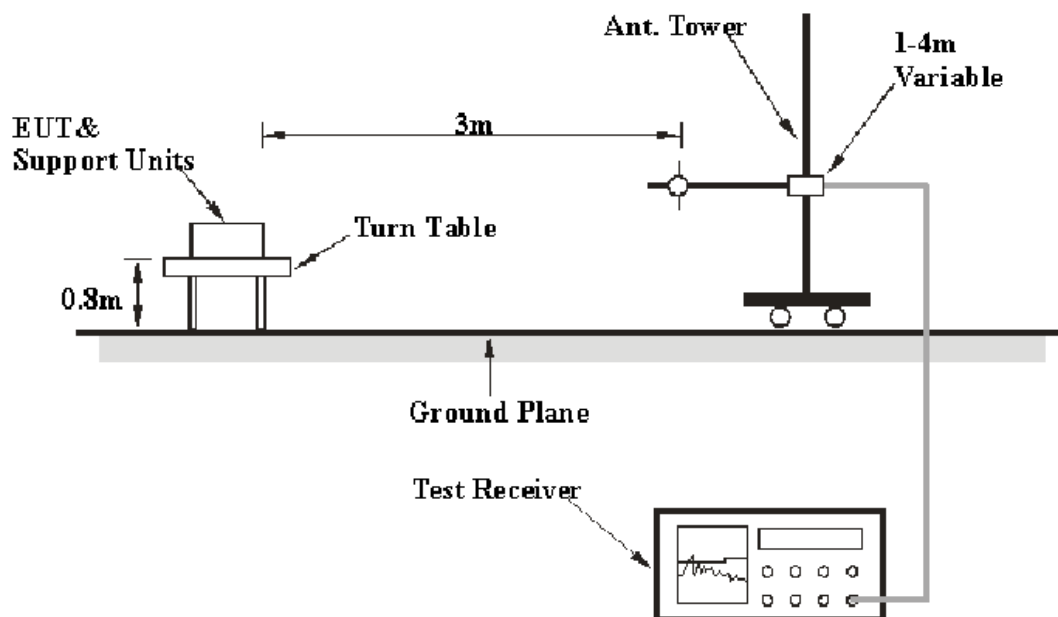
CFR47 §15.205; §15.209; §15.247 (d)

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 15.209, FCC 15.109 and FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency</i>	<i>RB/W</i>	<i>VB/W</i>	<i>Detector</i>
30 MHz-1 GHz	100 kHz	300 kHz	Quasi-peak
1GHz- 25GHz	1MHz	3 MHz	Peak
1GHz- 25GHz	1MHz	10 Hz	Average

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	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07

* **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.

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 7 dB means the emission is 7 dB 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:

Below 1 GHz:

19.2 dB at **31.060000 MHz** in the **Horizontal** polarization, BDR

18.3 dB at **901.949750 MHz** in the **Horizontal** polarization, EDR

Above 1 GHz:

For BDR:

3.39 dB at **4804 MHz** in the **Horizontal** polarization (Low Channel)

2.38 dB at **4882 MHz** in the **Horizontal** polarization (Middle Channel)

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

For EDR:

8.53 dB at **4804 MHz** in the **Horizontal** polarization (Low Channel)

8.06 dB at **4882 MHz** in the **Horizontal** polarization (Middle Channel)

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

Test Data

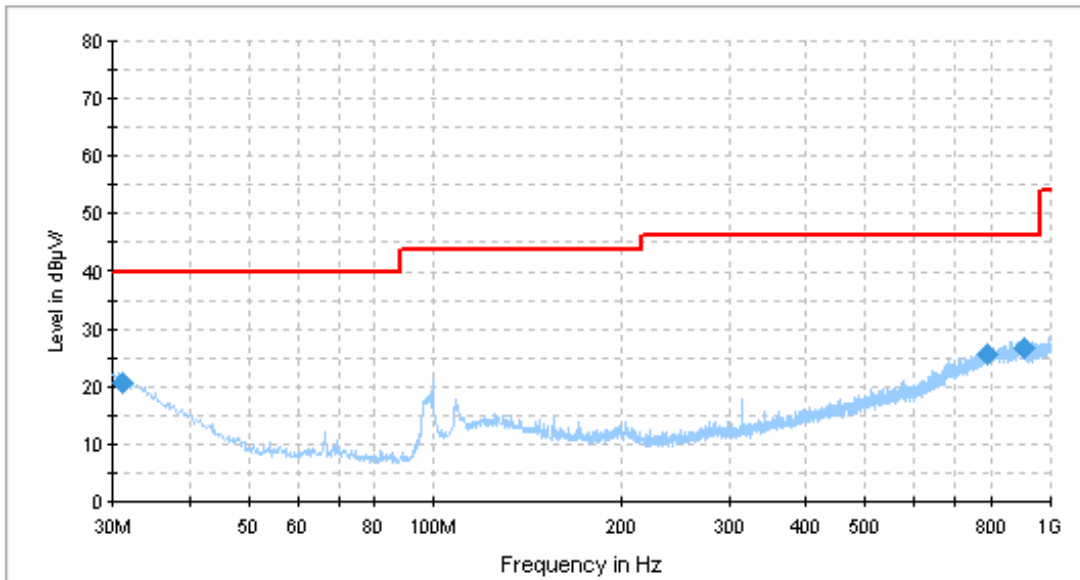
Environmental Conditions

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

* The testing was performed by Wayne Cheng on 2010-06-04 to 2010-06-05.

Below 1 GHz:

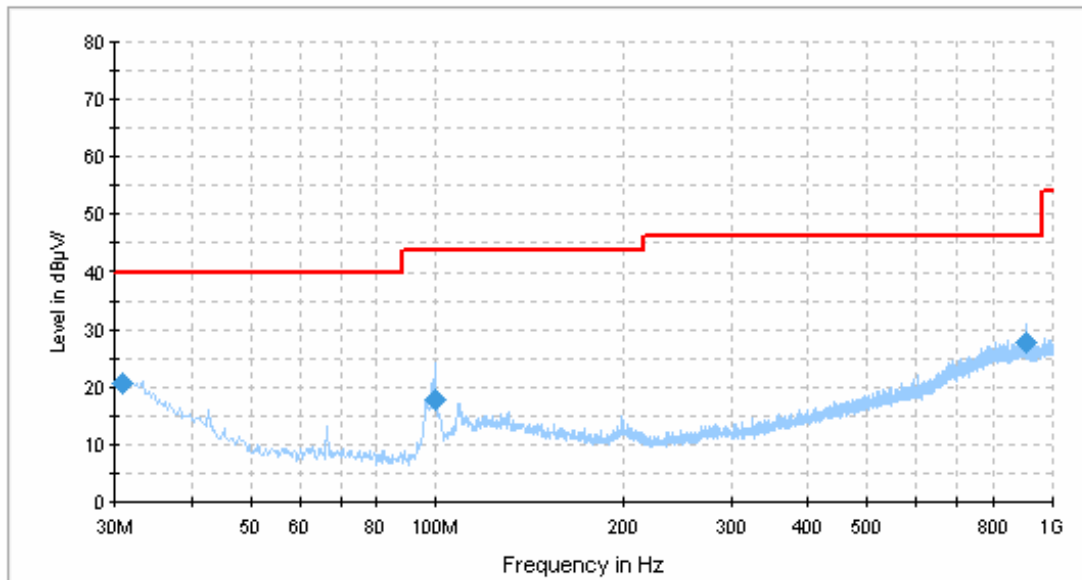
Test Mode: Transmitting (BDR)-worst case



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
31.060000	20.8	304.0	H	145.0	-6.8	40.0	19.2
788.100750	25.8	104.0	H	113.0	-1.7	46.0	20.2
904.030000	26.8	203.0	H	8.0	-0.5	46.0	19.2

Note: The data which below the limit 20 dB was not recorded.

Test Mode: Transmitting (EDR)-worst case



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
901.949750	27.7	400.0	H	176.0	-0.4	46.0	18.3
31.018500	20.8	323.0	H	40.0	-6.7	40.0	19.2
99.602750	17.9	400.0	H	94.0	-17.3	43.5	25.6

Above 1 GHz:

Test Mode: Transmitting (BDR)

Frequency (MHz)	Receiver Reading (dBµV)	Detector PK/QP/Ave.	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
4804	36.82	Ave	45	2.18	H	36.3	4.30	26.81	50.61	54	3.39*	harmonic
4804	35.13	Ave	327	2.50	V	35.0	4.30	26.81	47.62	54	6.38	harmonic
4804	49.14	PK	45	2.18	H	36.3	4.30	26.81	62.93	74	11.07	harmonic
4804	47.16	PK	327	2.50	V	35.0	4.30	26.81	59.65	74	14.35	harmonic
Middle Channel (2441 MHz)												
4882	37.73	Ave	174	2.24	H	36.3	4.37	26.78	51.62	54	2.38*	harmonic
4882	34.54	Ave	163	2.27	V	35.0	4.37	26.78	47.13	54	6.87	harmonic
4882	49.96	PK	174	2.24	H	36.3	4.37	26.78	63.85	74	10.15	harmonic
4882	45.46	PK	163	2.27	V	35.0	4.37	26.78	58.05	74	15.95	harmonic
High Channel (2480 MHz)												
4960	36.90	Ave	175	2.19	H	36.3	4.41	26.75	50.83	54	3.17*	harmonic
4960	31.73	Ave	252	2.50	V	35.0	4.41	26.75	44.36	54	9.64	harmonic
4960	48.09	PK	175	2.19	H	36.3	4.41	26.75	62.02	74	11.98	harmonic
4960	43.59	PK	252	2.50	V	35.0	4.41	26.75	56.22	74	17.78	harmonic

* Within measurement uncertainty.

Test Mode: Transmitting (EDR)

Frequency (MHz)	Receiver Reading (dBµV)	Detector PK/QP/Ave.	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
4804	31.68	Ave	152	1.92	H	36.3	4.3	26.81	45.47	54	8.53	harmonic
4804	30.32	Ave	280	1.72	V	35.0	4.3	26.81	42.81	54	11.19	harmonic
4804	45.06	PK	152	1.92	H	36.3	4.3	26.81	58.85	74	15.15	harmonic
4804	43.04	PK	280	1.72	V	35.0	4.3	26.81	55.53	74	18.47	harmonic
Middle Channel (2441 MHz)												
4882	32.05	Ave	129	2.17	H	36.3	4.37	26.78	45.94	54	8.06	harmonic
4882	29.83	Ave	33	251	V	35.0	4.37	26.78	42.42	54	11.58	harmonic
4882	46.13	PK	129	2.17	H	36.3	4.37	26.78	60.02	74	13.98	harmonic
4882	43.25	PK	33	251	V	35.0	4.37	26.78	55.84	74	18.16	harmonic
High Channel (2480 MHz)												
4960	30.05	Ave	351	215	H	36.3	4.41	26.75	43.98	54	10.02	harmonic
4960	27.32	Ave	296	250	V	35.0	4.41	26.75	39.95	54	14.05	harmonic
4960	43.22	PK	351	215	H	36.3	4.41	26.75	57.15	74	16.85	harmonic
4960	40.18	PK	296	250	V	35.0	4.41	26.75	52.81	74	21.19	harmonic

Restric Band Emission:

Frequency (MHz)	Receiver Reading (dBμV)	Detector PK/QP/Ave.	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.247/209/205		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	Remarks
BDR mode												
2483.5	29.11	Ave	280	1.71	V	33.9	3.18	26.85	39.34	54	14.66	spurious
2483.5	45.71	PK	280	1.71	V	33.9	3.18	26.85	55.94	74	18.06	spurious
2483.5	24.14	Ave	0	2.51	H	33.9	3.18	26.85	34.37	54	19.63	spurious
2390	22.48	Ave	50	1.79	V	33.9	3.03	26.83	32.58	54	21.42	spurious
2390	22.02	Ave	149	1.70	H	33.9	3.03	26.83	32.12	54	21.88	spurious
2483.5	38.79	PK	0	2.51	H	33.9	3.18	26.85	49.02	74	24.98	spurious
2390	35.39	PK	50	1.79	V	33.9	3.03	26.83	45.49	74	28.51	spurious
2390	35.04	PK	149	1.70	H	33.9	3.03	26.83	45.14	74	28.86	spurious
EDR mode												
2483.5	29.72	Ave	96	1.58	V	33.9	3.18	26.85	39.95	54	14.05	spurious
2483.5	47.55	PK	96	1.58	V	33.9	3.18	26.85	57.78	74	16.22	spurious
2483.5	24.14	Ave	0	2.51	H	33.9	3.18	26.85	34.37	54	19.63	spurious
2390	22.04	Ave	58	1.44	H	33.9	3.03	26.83	32.14	54	21.86	spurious
2390	21.94	Ave	185	2.17	V	33.9	3.03	26.83	32.04	54	21.96	spurious
2483.5	38.79	PK	0	2.51	H	33.9	3.18	26.85	49.02	74	24.98	spurious
2390	35.75	PK	58	1.44	H	33.9	3.03	26.83	45.85	74	28.15	spurious
2390	35.43	PK	185	2.17	V	33.9	3.03	26.83	45.53	74	28.47	spurious

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	2009-11-24	2010-11-23

* **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:	100.0 kPa

* *The testing was performed by Wayne Cheng on 2010-06-01.*

Test Result: Compliant.

Please refer to following tables and plots

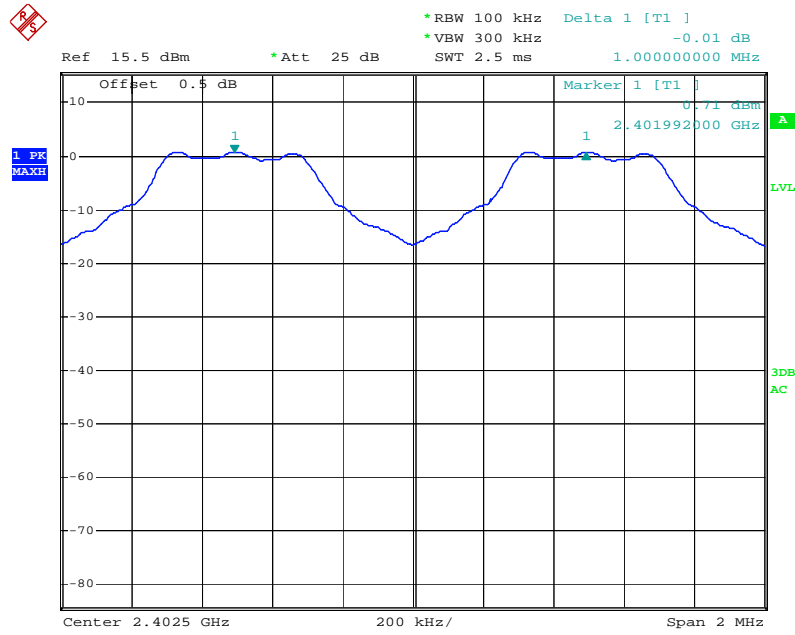
Test Mode: Transmitting

Mode	Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR	Low Channel	2402	1.00	0.57	Pass
	Adjacent Channel	2403			
	Mid Channel	2441	1.00	0.57	Pass
	Adjacent Channel	2442			
	High Channel	2480	1.00	0.56	Pass
	Adjacent Channel	2479			
EDR	Low Channel	2402	1.00	0.82	Pass
	Adjacent Channel	2403			
	Mid Channel	2441	1.00	0.83	Pass
	Adjacent Channel	2442			
	High Channel	2480	1.00	0.83	Pass
	Adjacent Channel	2479			

Please refer to the following plots.

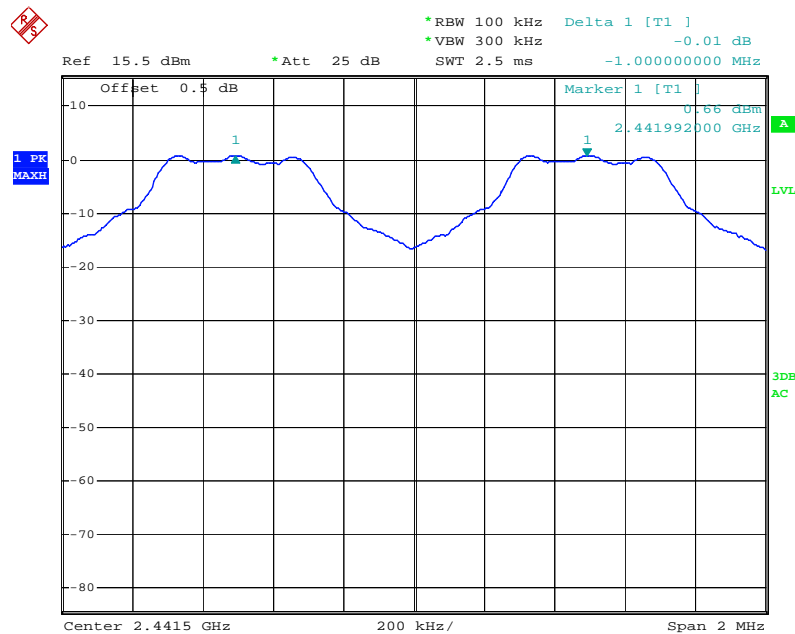
BDR:

Low Channel



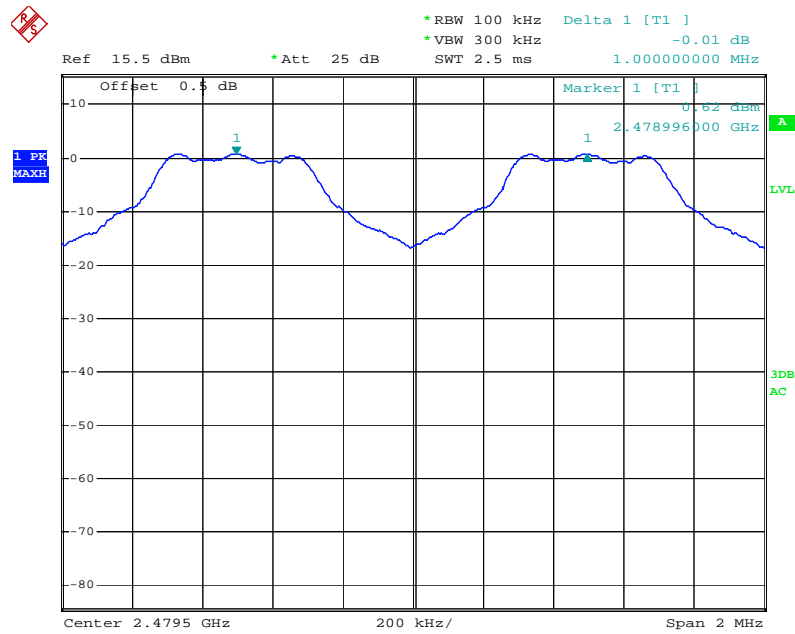
Date: 1.JUN.2010 22:04:56

Middle Channel



Date: 1.JUN.2010 22:06:13

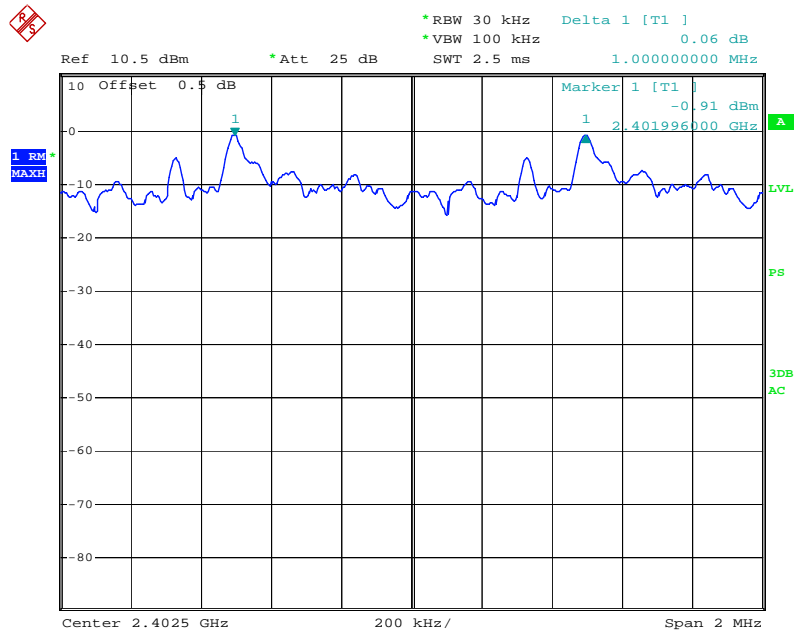
High Channel



Date: 1.JUN.2010 22:07:22

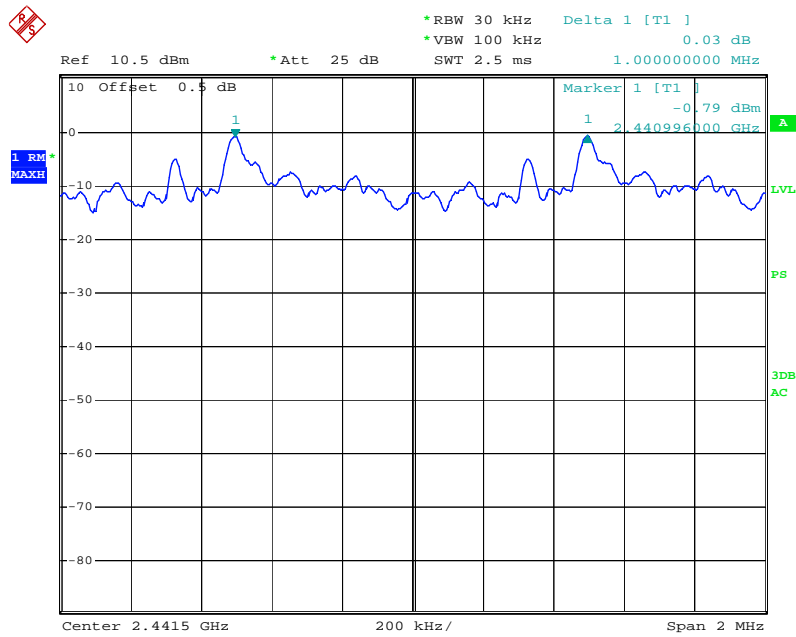
EDR:

Low Channel



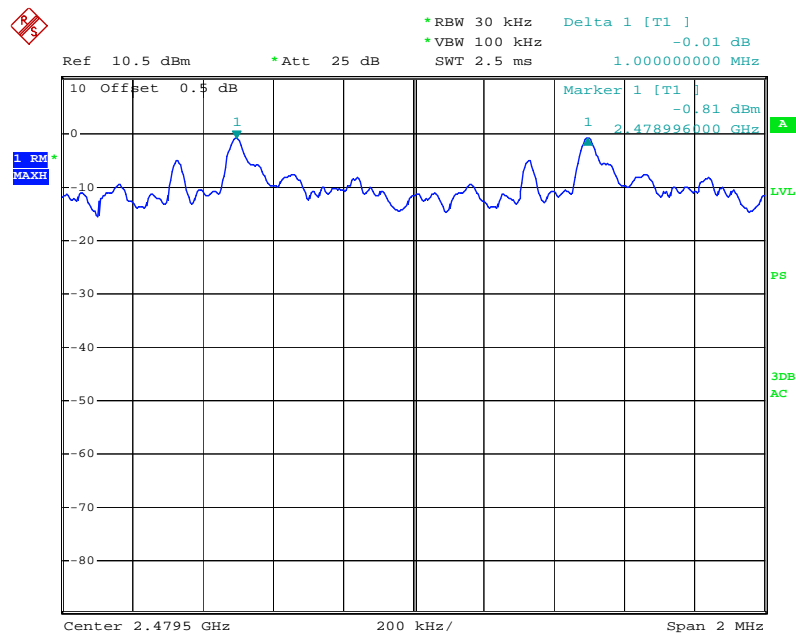
Date: 1.JUN.2010 23:24:56

Middle Channel



Date: 1.JUN.2010 23:26:01

High Channel



Date: 1.JUN.2010 23:27:05

CFR47 §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	2009-11-24	2010-11-23

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

* The testing was performed by Wayne Cheng on 2010-06-01.

Test Result: Compliant.

Please refer to following tables and plots

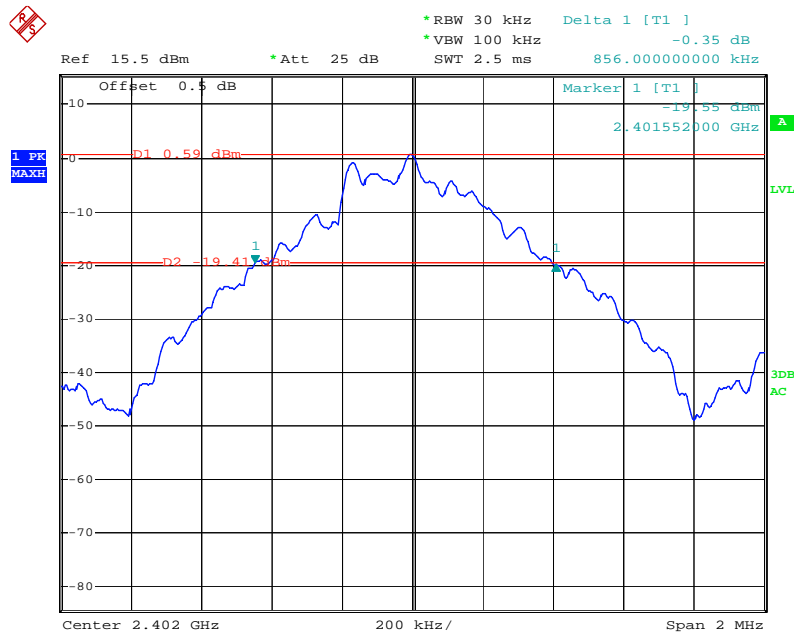
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR	Low	2402	0.856
	Middle	2441	0.852
	High	2480	0.844
EDR	Low	2402	1.236
	Middle	2441	1.242
	High	2480	1.242

Please refer to the following plots.

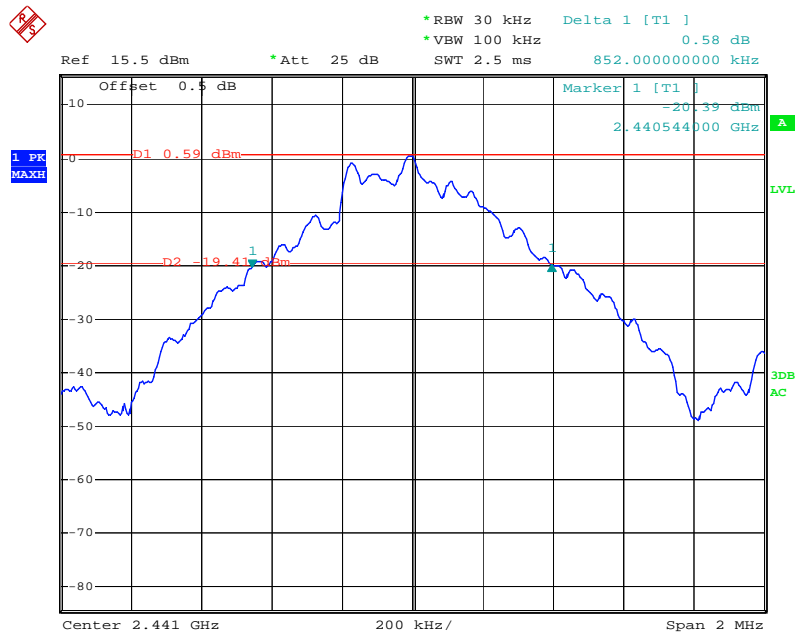
BDR:

Low Channel



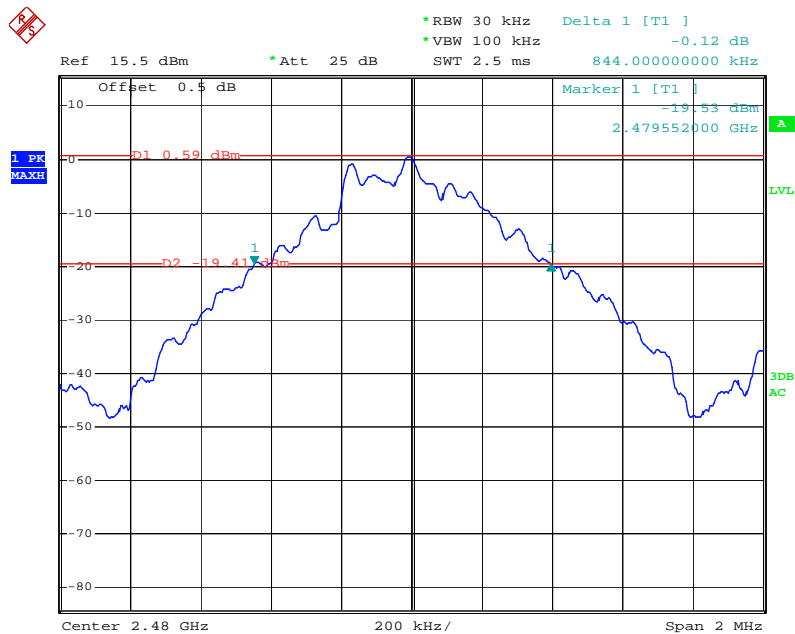
Date: 1.JUN.2010 21:56:39

Middle Channel



Date: 1.JUN.2010 21:57:35

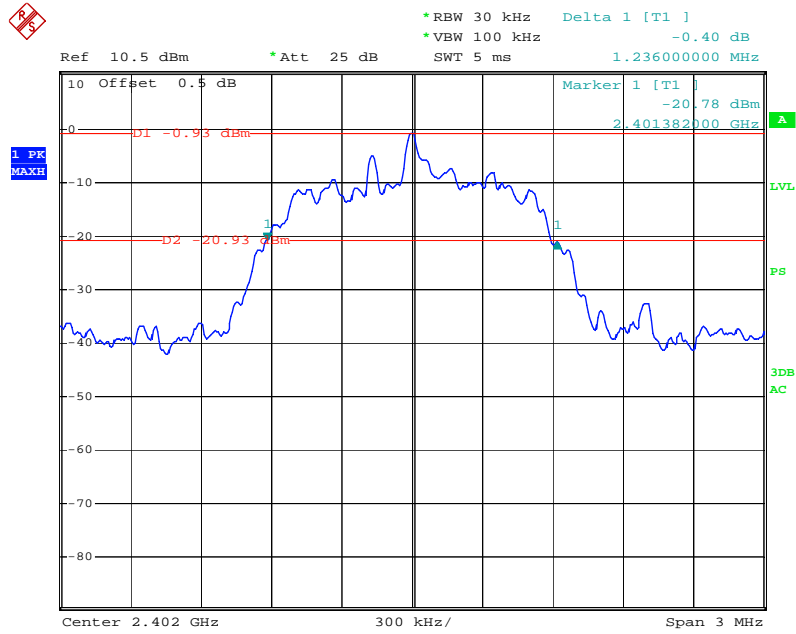
High Channel



Date: 1.JUN.2010 21:58:19

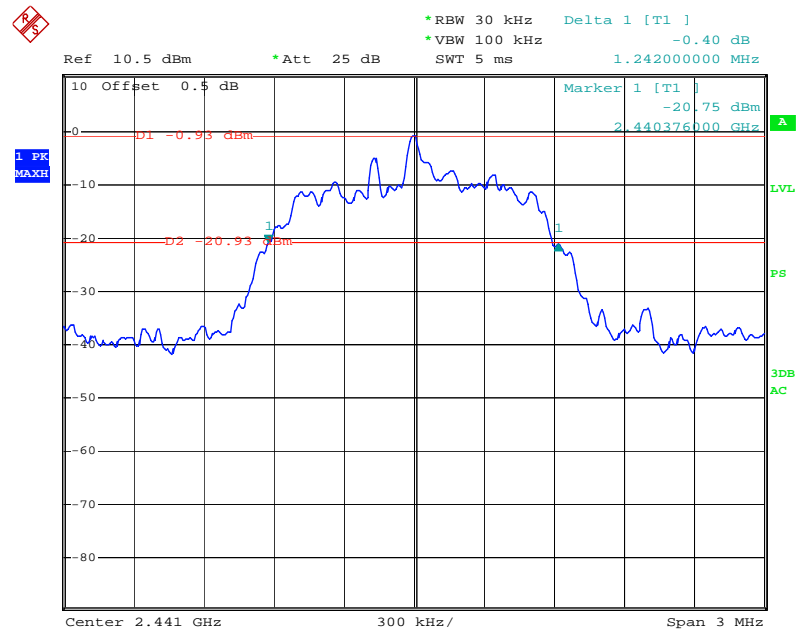
EDR:

Low Channel



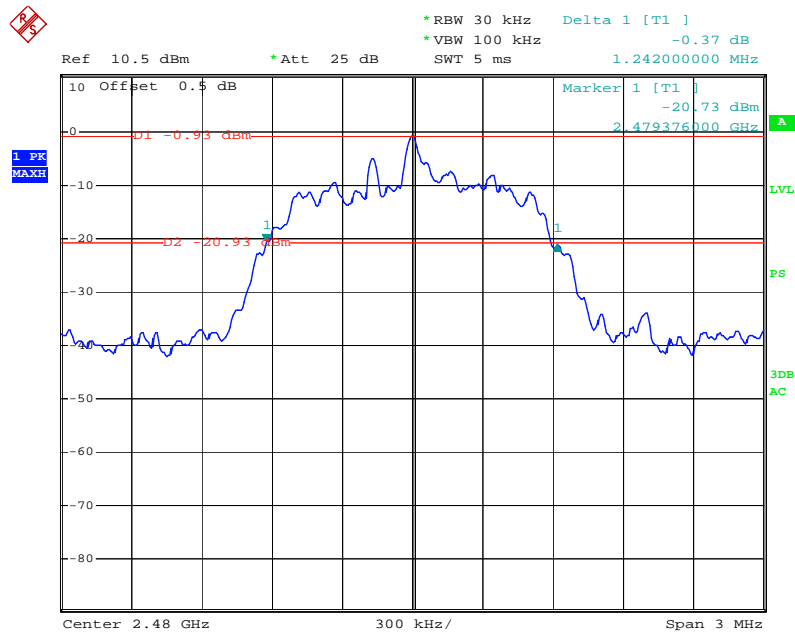
Date: 1.JUN.2010 23:18:01

Middle Channel



Date: 1.JUN.2010 23:19:06

High Channel



Date: 1.JUN.2010 23:19:57

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	2009-11-24	2010-11-23

* **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:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Wayne Cheng on 2010-06-01.

Test Result: Compliant.

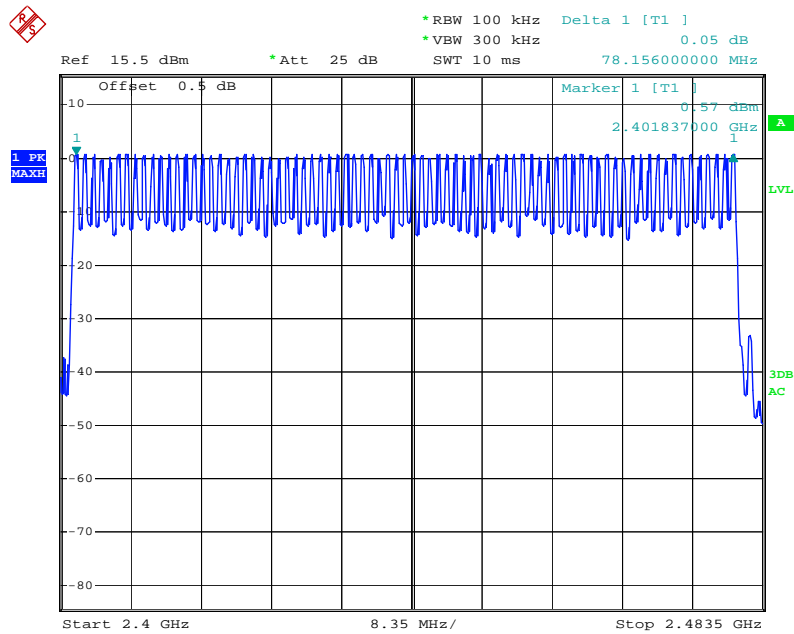
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Frequency Range (MHz)	Number of Hopping Channel	Limit
BDR	2402-2480	79	≥ 15
EDR	2402-2480	79	≥ 15

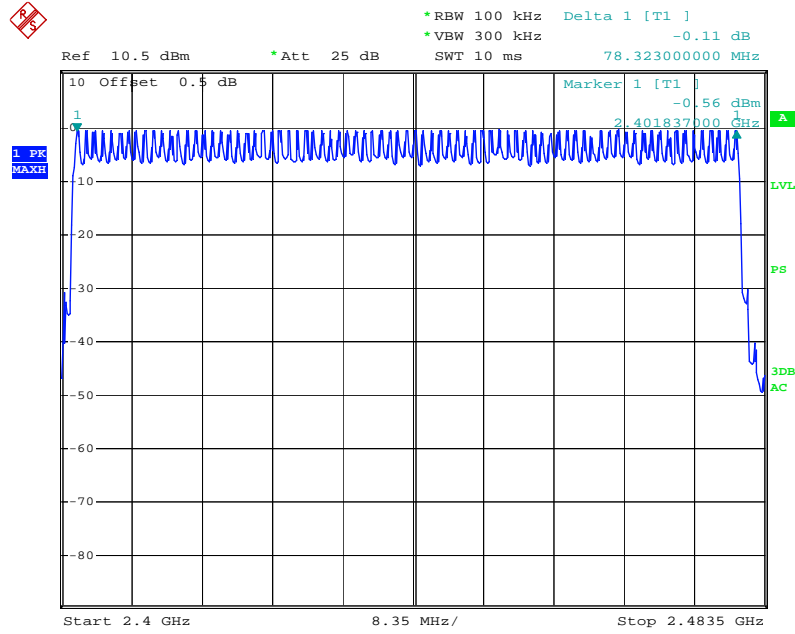
Number of Hopping Channels

BDR:



Date: 1.JUN.2010 22:10:35

EDR:



Date: 1.JUN.2010 23:35:18

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	2009-11-24	2010-11-23

* **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:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

* The testing was performed by Wayne Cheng on 2010-06-01 to 2010-06-02.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.535	0.171	0.4	Pass
	Middle	0.535	0.171	0.4	Pass
	High	0.535	0.171	0.4	Pass
	<i>Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second</i>				
DH 3	Low	1.805	0.289	0.4	Pass
	Middle	1.795	0.288	0.4	Pass
	High	1.795	0.288	0.4	Pass
	<i>Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second</i>				
DH 5	Low	3.085	0.330	0.4	Pass
	Middle	3.065	0.327	0.4	Pass
	High	3.065	0.327	0.4	Pass
	<i>Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second</i>				

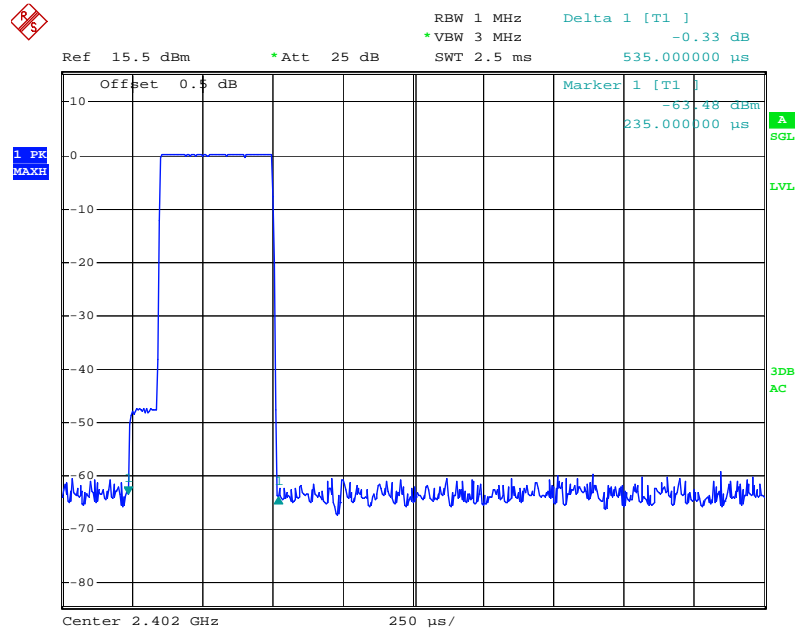
Test Mode: Transmitting (EDR)

Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.545	0.175	0.4	Pass
	Middle	0.545	0.175	0.4	Pass
	High	0.545	0.175	0.4	Pass
	<i>Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second</i>				
DH 3	Low	1.798	0.288	0.4	Pass
	Middle	1.798	0.288	0.4	Pass
	High	1.798	0.288	0.4	Pass
	<i>Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second</i>				
DH 5	Low	3.078	0.329	0.4	Pass
	Middle	3.078	0.329	0.4	Pass
	High	3.078	0.329	0.4	Pass
	<i>Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second</i>				

Please refer to the following plots.

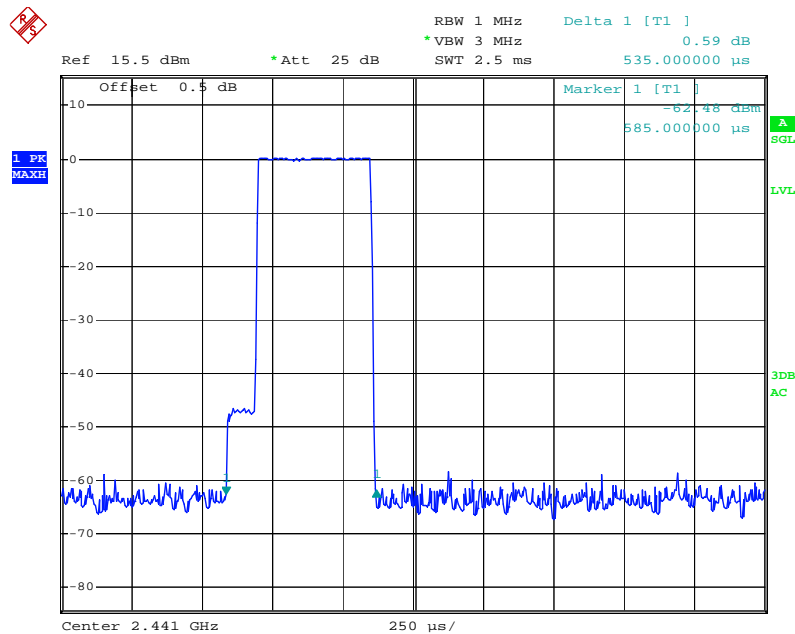
BDR:

Low Channel for DH1



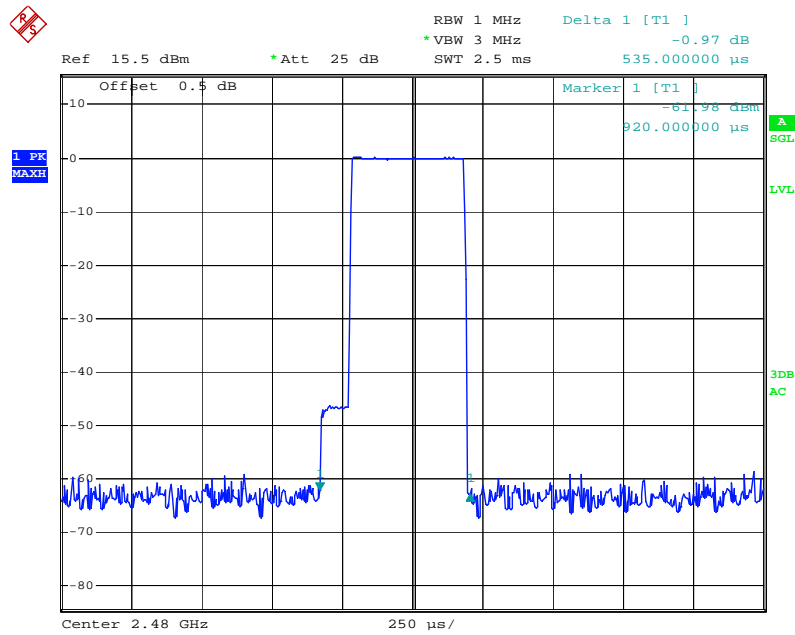
Date: 1.JUN.2010 22:30:28

Middle Channel for DH1



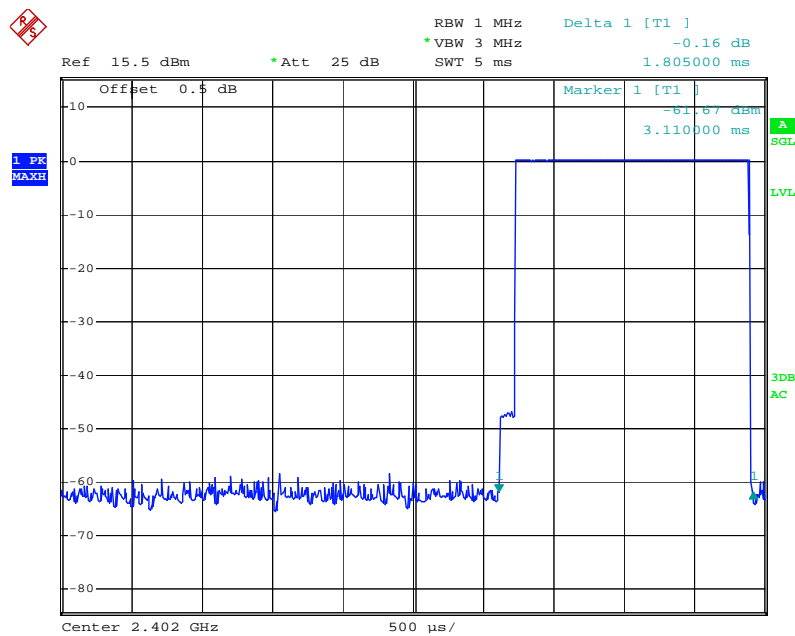
Date: 1.JUN.2010 22:30:55

High Channel for DH1



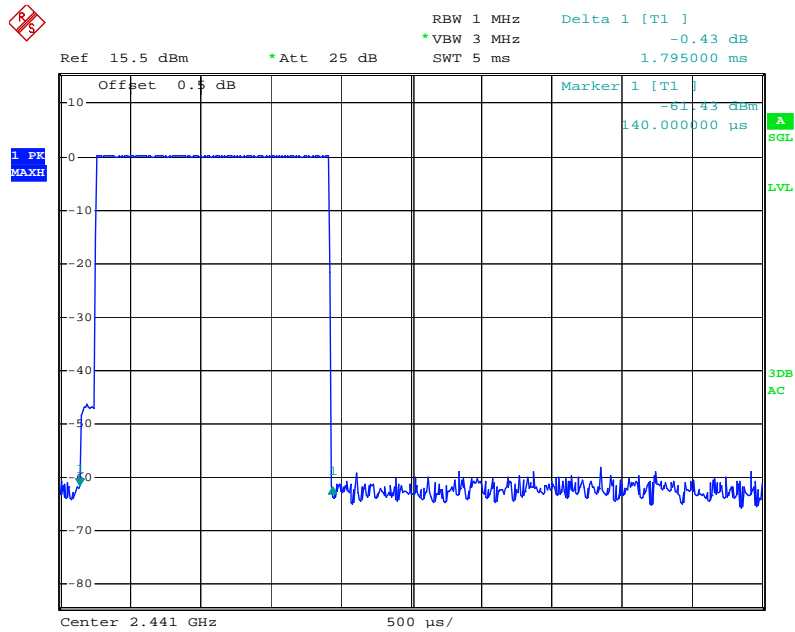
Date: 1.JUN.2010 22:31:28

Low Channel for DH3



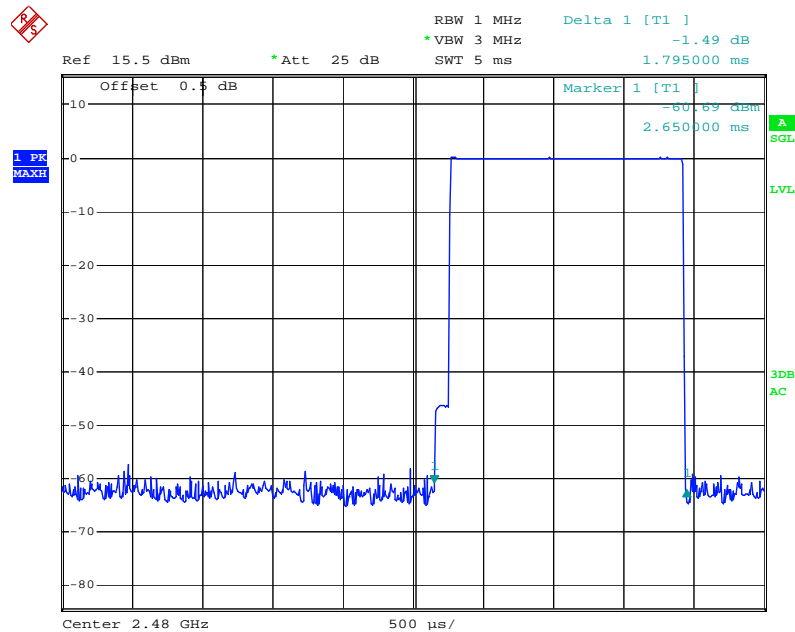
Date: 1.JUN.2010 22:37:47

Middle Channel for DH3



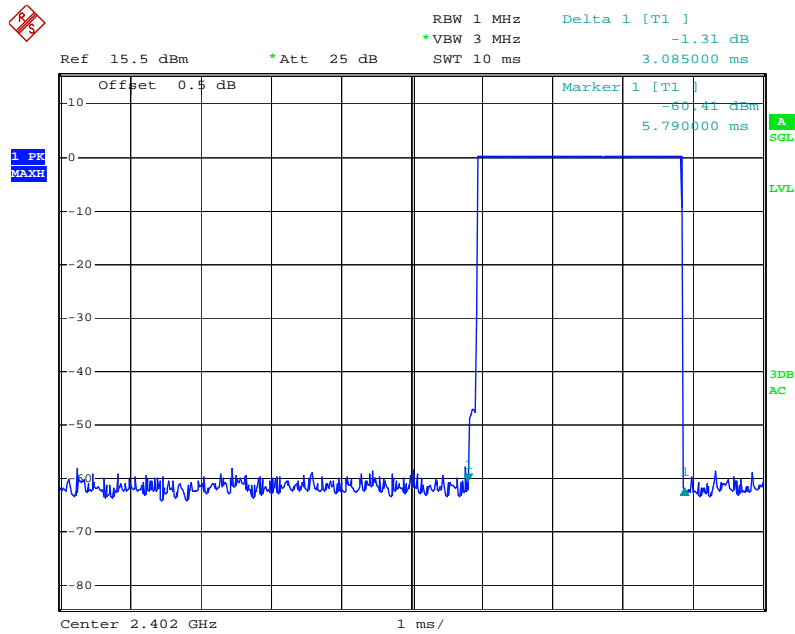
Date: 1.JUN.2010 22:34:01

High Channel for DH3



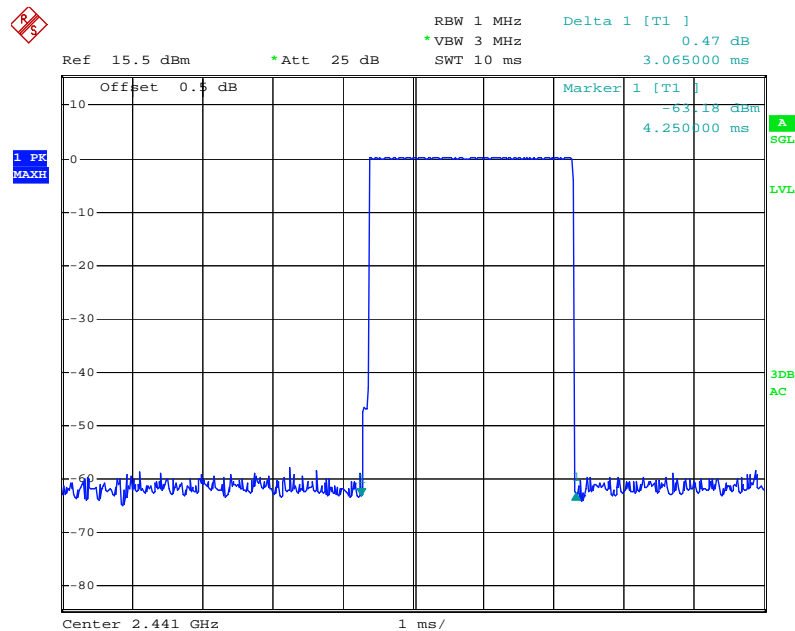
Date: 1.JUN.2010 22:33:23

Low Channel for DH5



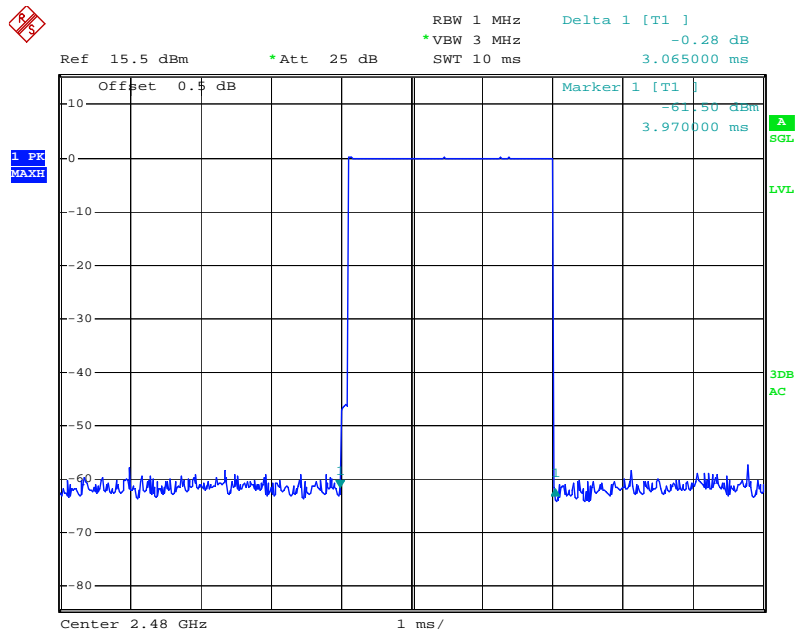
Date: 1.JUN.2010 22:38:48

Middle Channel for DH5



Date: 1.JUN.2010 22:39:15

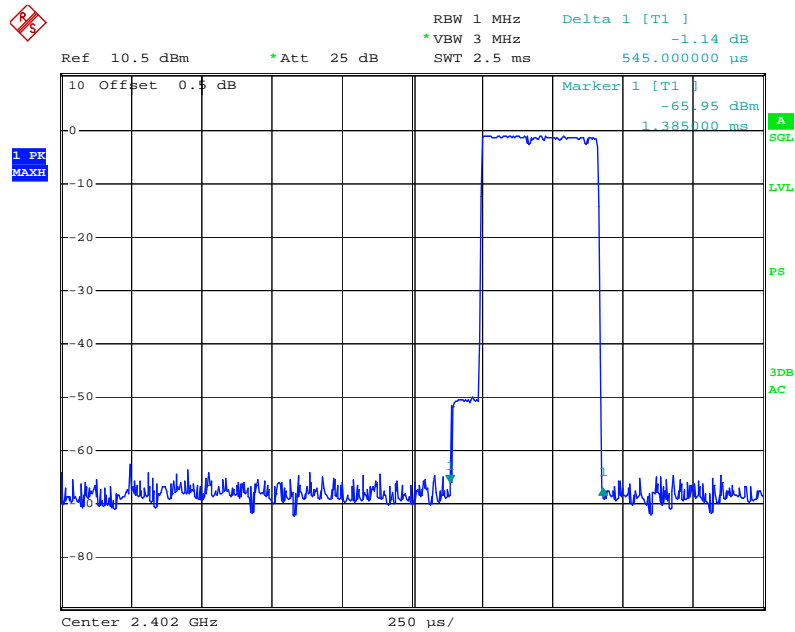
High Channel for DH5



Date: 1.JUN.2010 22:39:41

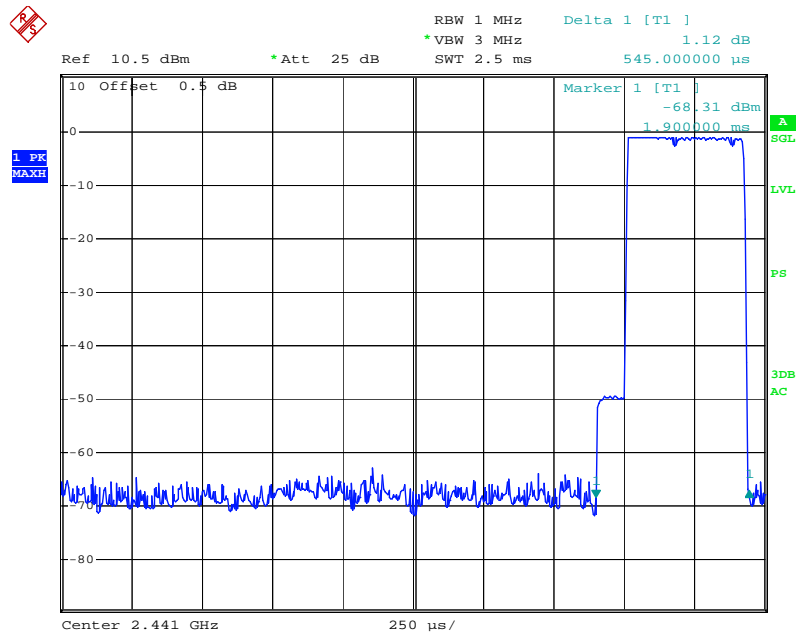
EDR:

Low Channel for DH1



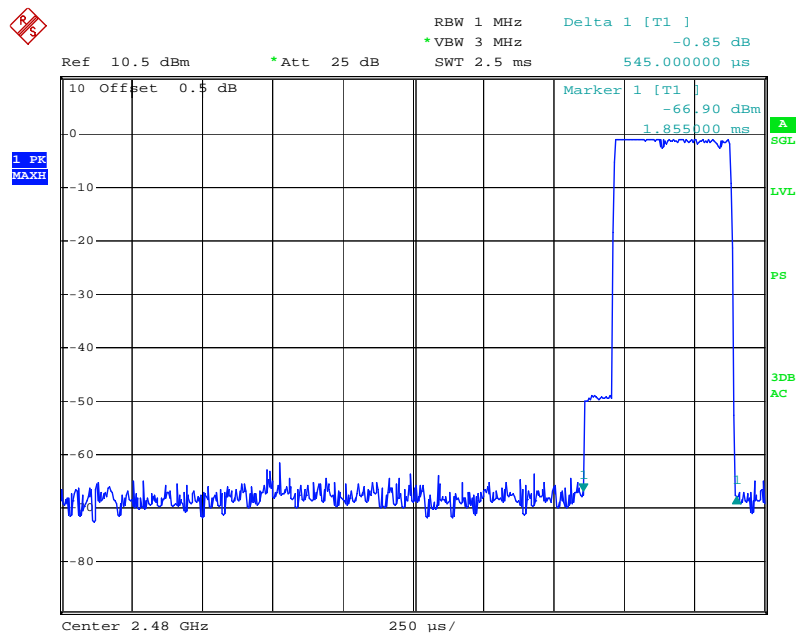
Date: 1.JUN.2010 23:47:43

Middle Channel for DH1



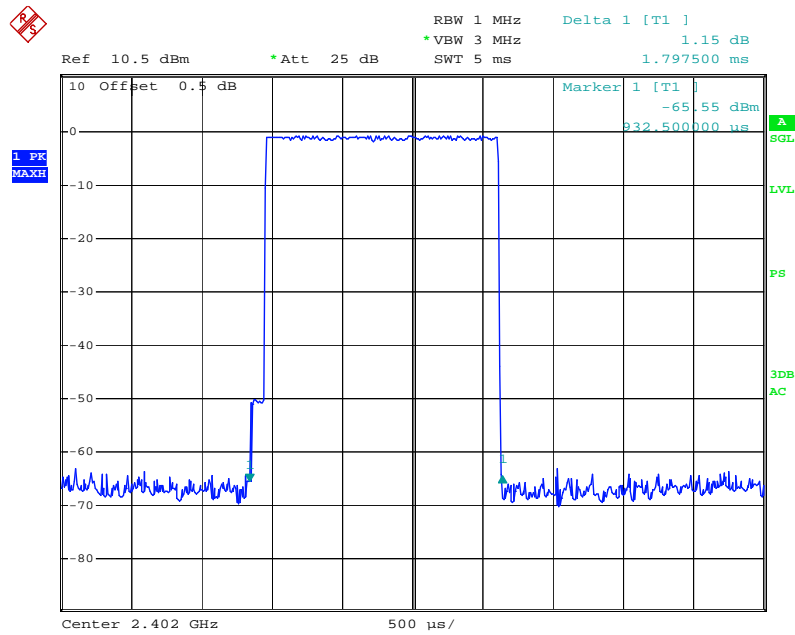
Date: 1.JUN.2010 23:45:47

High Channel for DH1



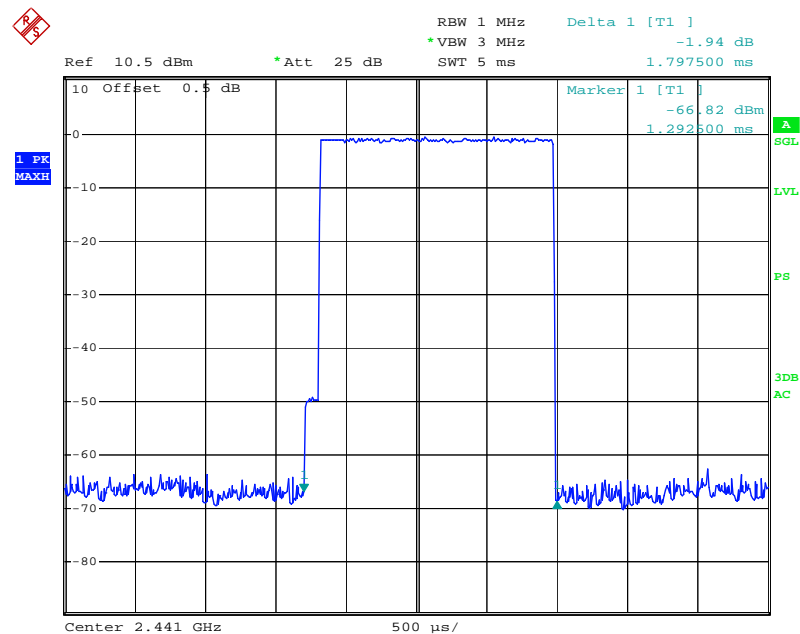
Date: 1.JUN.2010 23:43:45

Low Channel for DH3



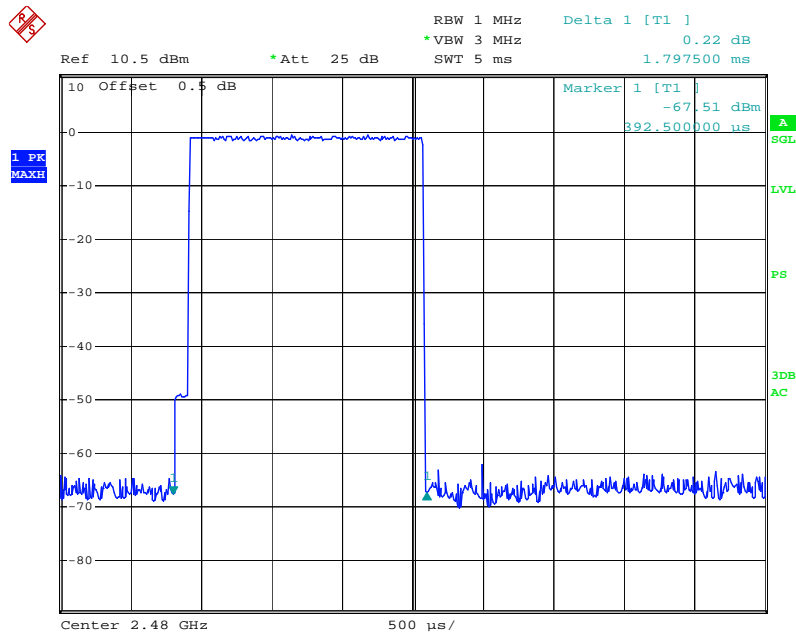
Date: 1.JUN.2010 23:54:19

Middle Channel for DH3



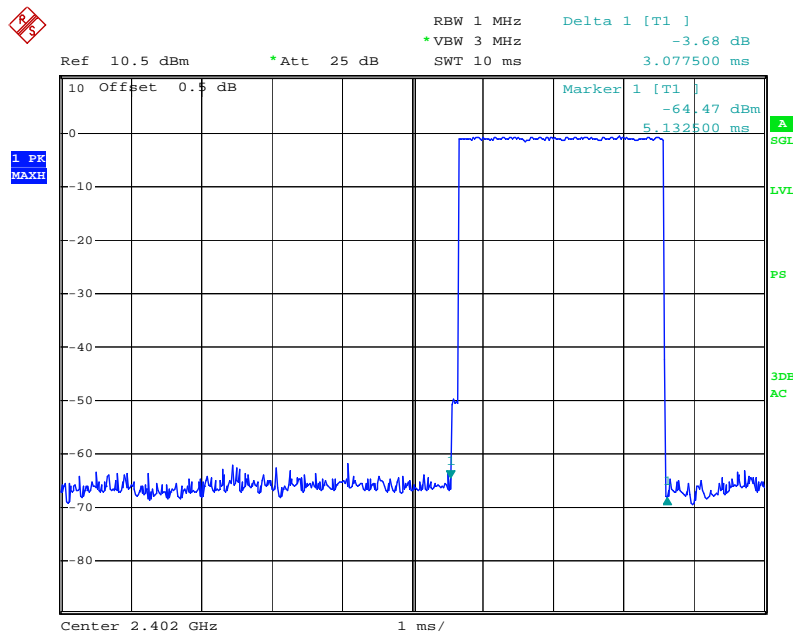
Date: 1.JUN.2010 23:57:10

High Channel for DH3



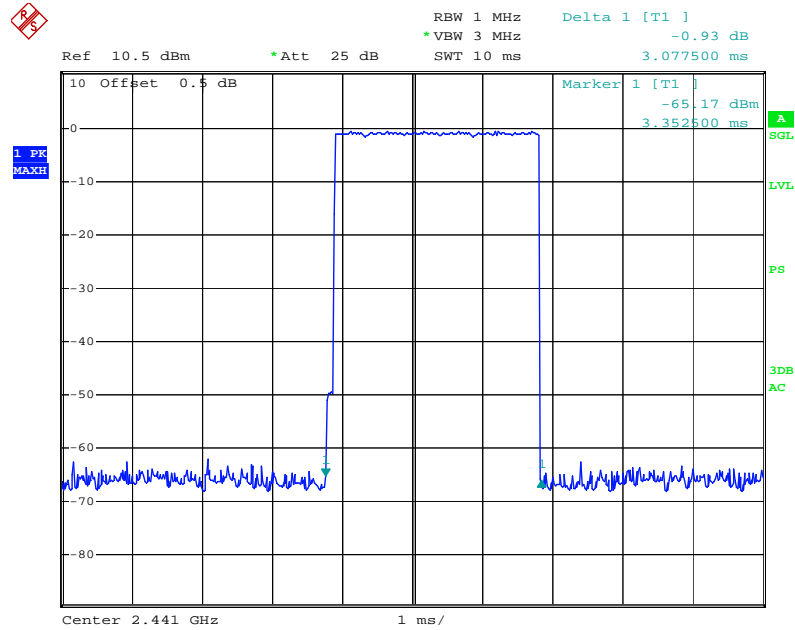
Date: 1.JUN.2010 23:57:59

Low Channel for DH5



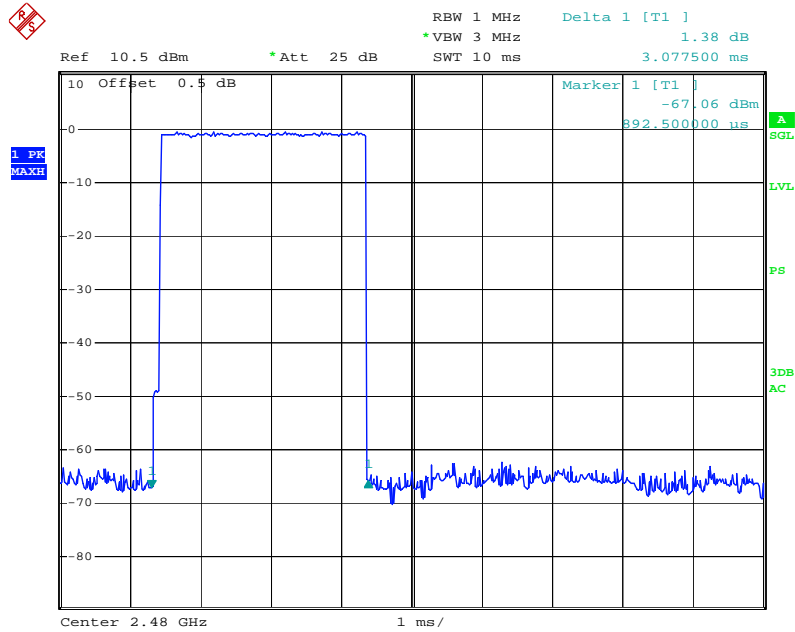
Date: 2.JUN.2010 00:01:42

Middle Channel for DH5



Date: 2.JUN.2010 00:00:30

High Channel for DH5



Date: 1.JUN.2010 23:59:46

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.

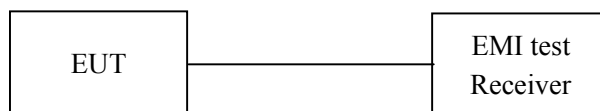
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23

* **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 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:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

* The testing was performed by Wayne Cheng on 2010-06-06.

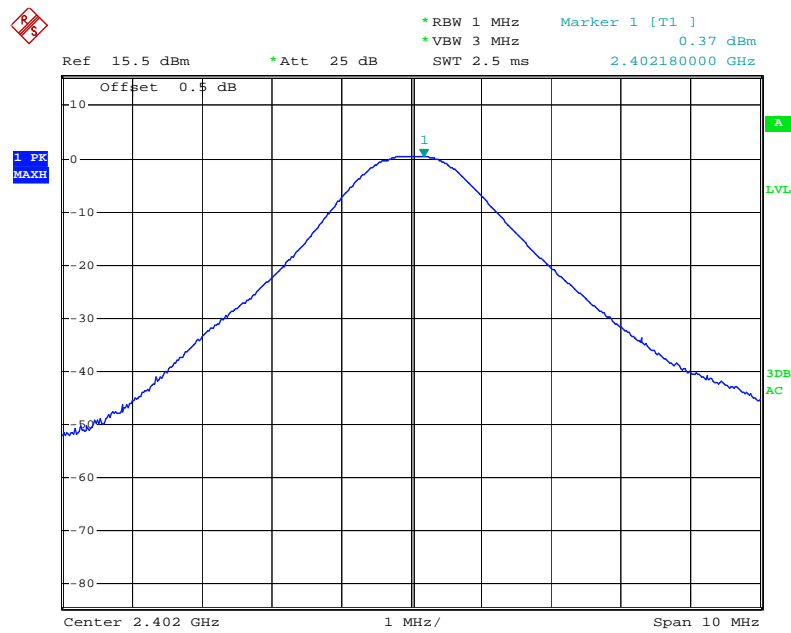
Test Result: Compliant.

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Output power (mW)	Limit (mW)
BDR	Low	2402	0.37	1.089	1000
	Middle	2441	0.68	1.169	1000
	High	2480	0.63	1.156	1000
EDR	Low	2402	-0.87	0.818	1000
	Middle	2441	-0.22	0.951	1000
	High	2480	0.37	1.089	1000

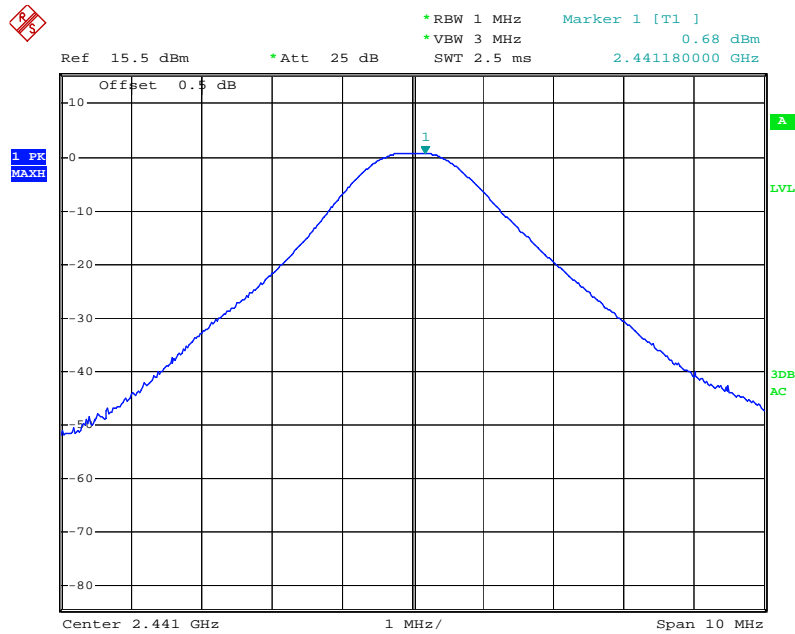
BDR:

Low Channel



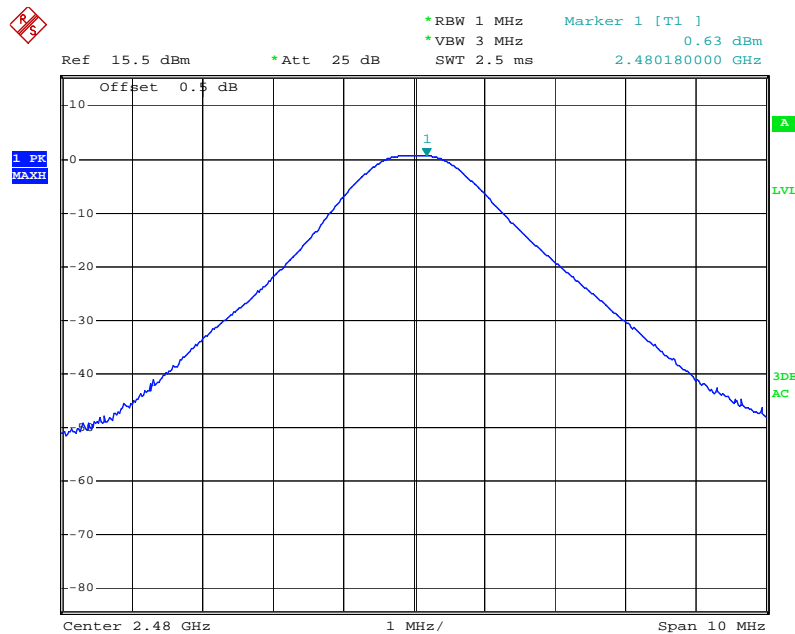
Date: 6.JUN.2010 10:43:38

Middle Channel



Date: 6.JUN.2010 10:46:07

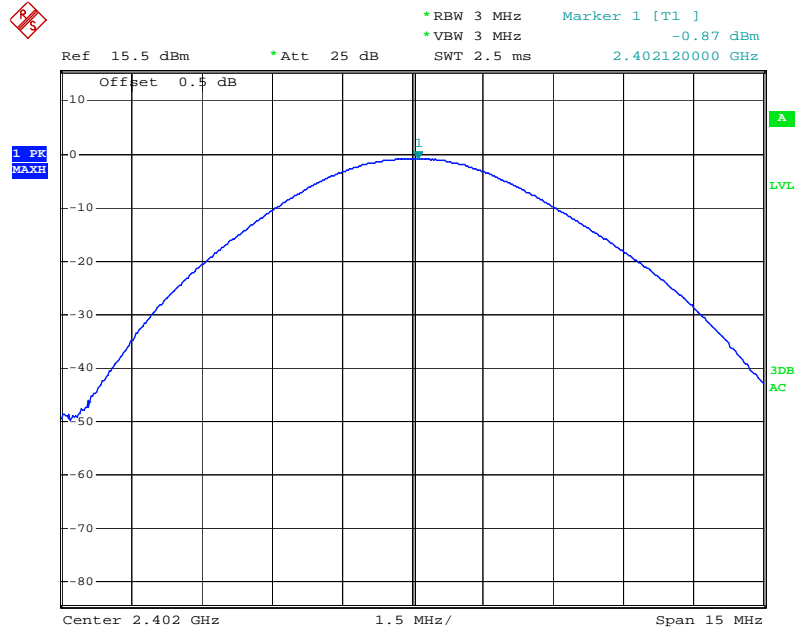
High Channel



Date: 6.JUN.2010 10:47:13

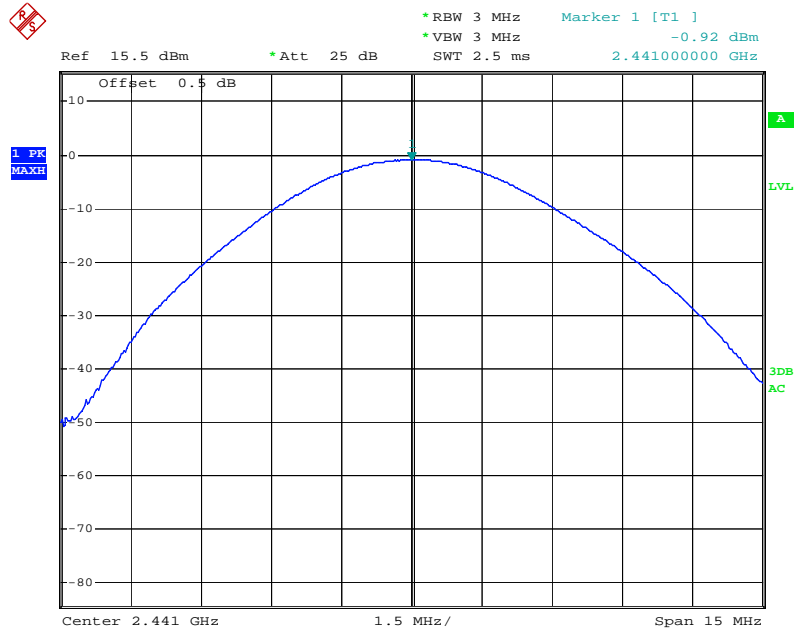
EDR:

Low Channel



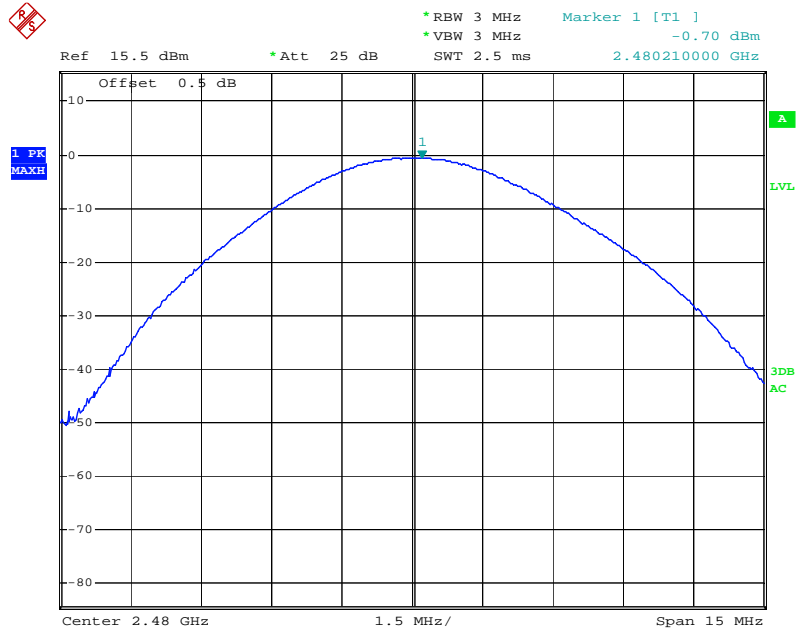
Date: 6.JUN.2010 10:56:03

Middle Channel



Date: 6.JUN.2010 10:56:39

High Chanel



Date: 6.JUN.2010 10:55:20

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	2009-11-24	2010-11-23

* **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. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 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:	48 %
ATM Pressure:	100.0 kPa

**The testing was performed by Wayne Cheng on 2010-06-06.*

Test Result: Compliant

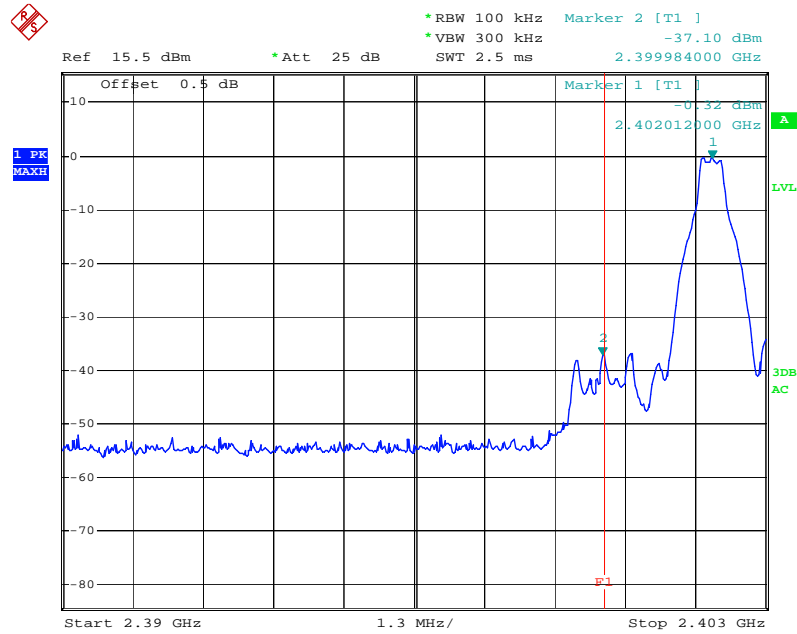
Test Mode: Transmitting

Mode	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR	2.399984	37.08	20
	2.483956	36.78	20
EDR	2.399984	36.78	20
	2.483914	46.03	20

Please refer to follow plots:

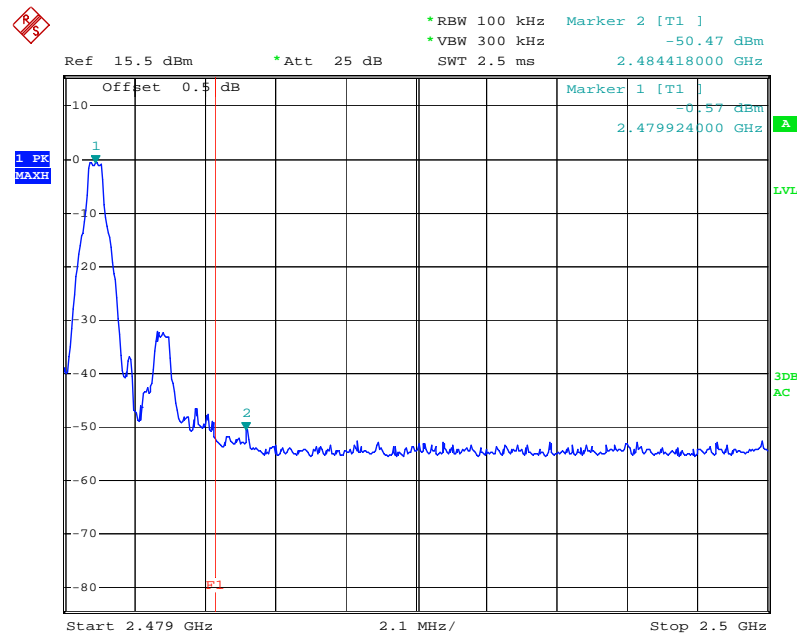
BDR:

Band Edge: Left Side



Date: 6.JUN.2010 10:50:20

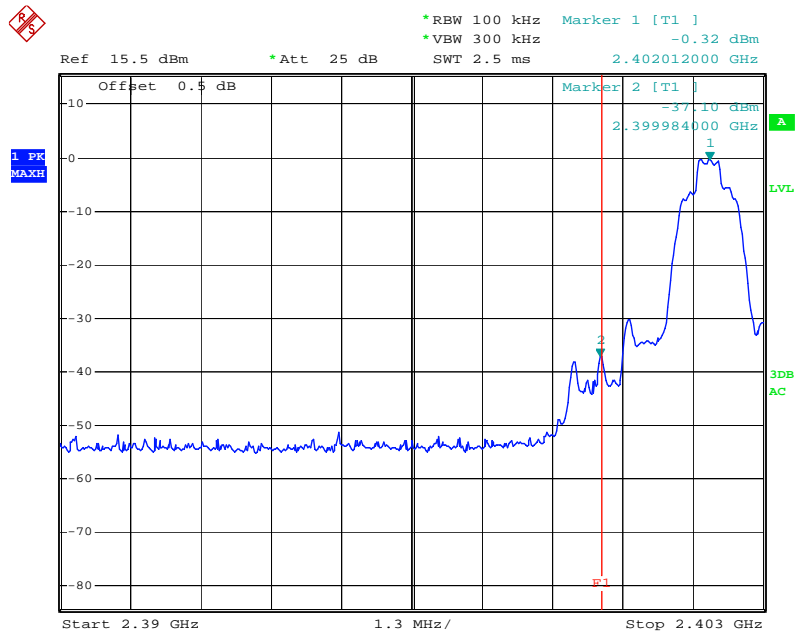
Band Edge: Right Side



Date: 6.JUN.2010 10:49:04

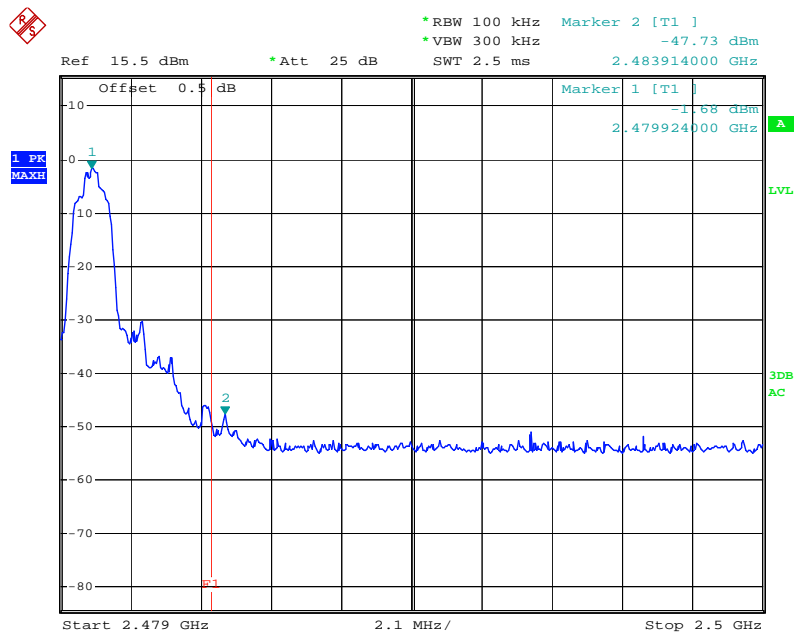
EDR:

Band Edge: Left Side



Date: 6.JUN.2010 10:51:27

Band Edge: Right Side



Date: 6.JUN.2010 10:54:16

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