

FCC PART 15.247  
TEST REPORT

For

**Zhongshan K-mate General Electronics Co., Ltd.**

Fuwan Industrial Zone, Fuwan South Road, Sunwen East Road,  
East District, Zhongshan, Guangdong, China

**FCC ID: WAD-BTT009**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Bluetooth Transmitter and Receiver with Docking Station
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<b>Report Number:</b> RDG110801001-00	
<b>Report Date:</b> 2011-08-30	
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\* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Zhongshan K-mate General Electronics Co., Ltd*'s product, model number: *BTT009 (FCC ID: WAD-BTT009)* (the "EUT") in this report is a *Bluetooth Transmitter and Receiver with docking station*, which was measured approximately: 51.4mm (L) x 34.7mm (W) x 8.6mm (H), rated input voltage: DC 3.7 V built-in rechargeable battery.

*\* All measurement and test data in this report was gathered from production sample serial number: 1108001 (Assigned by BACL, Shenzhen). The EUT was received on 2011-08-01.*

### Objective

This 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 the compliance of the EUT with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247.

### Related Submittal(s)/Grant(s)

No related submittal(s)

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 on 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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 an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacture.

### EUT Exercise Software

N/A

### Equipment Modifications

No modification was made to the unit tested.

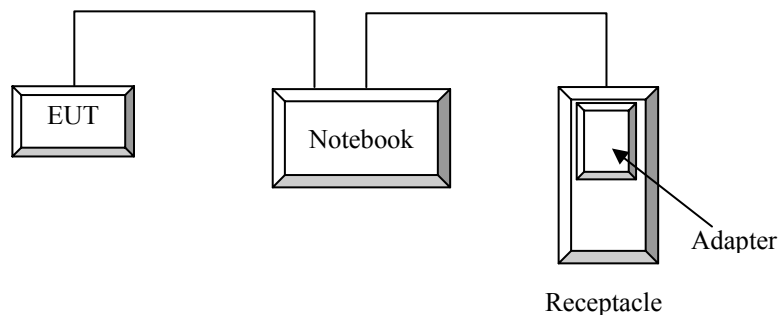
### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Notebook	2373	N/A

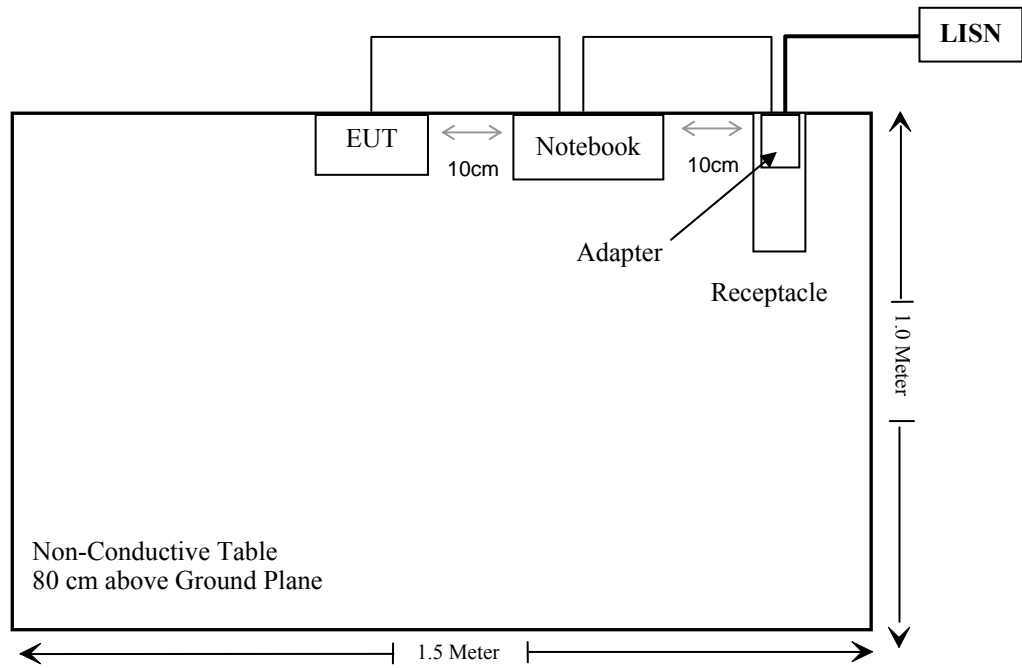
### External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable USB Charging Cable	0.8	EUT	Notebook

### Configuration of Test Setup



### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance



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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC §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 use a multilayer ceramic antenna, the maximum gain is 2.0 dBi, which in accordance to section 15.203; please refer to the internal photos.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

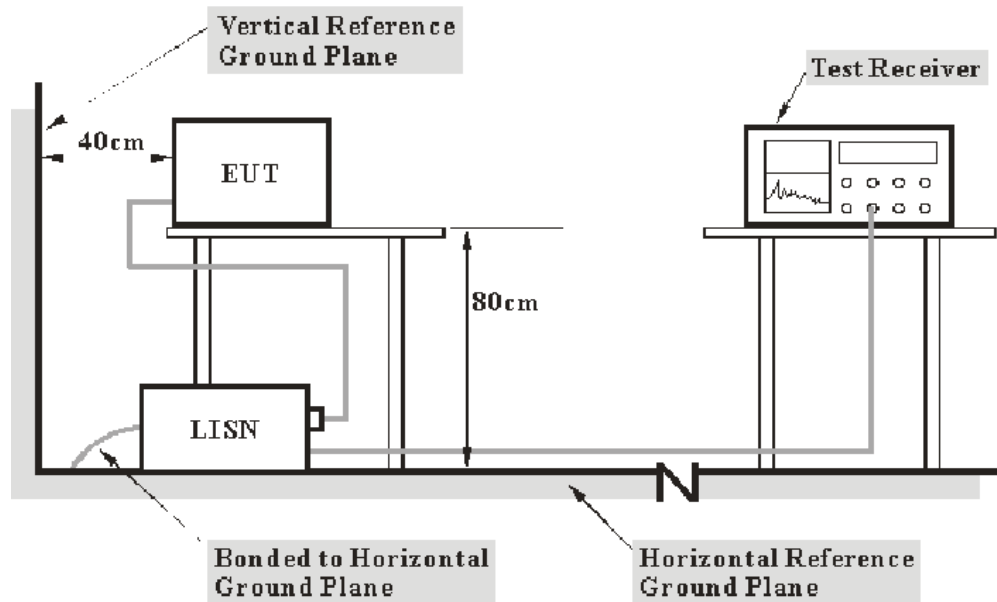
FCC §15.207

### Measurement Uncertainty

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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is  $\pm 2.4$  dB ( $k=2$ , 95% level of confidence)..

### 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 C63.4-2009 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 adapter of 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 Procedure

During the conducted emission test, the adapter 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08
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

\* **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 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:

**4.64 dB at 3.830 MHz in the Neutral conducted mode**

## Test Data

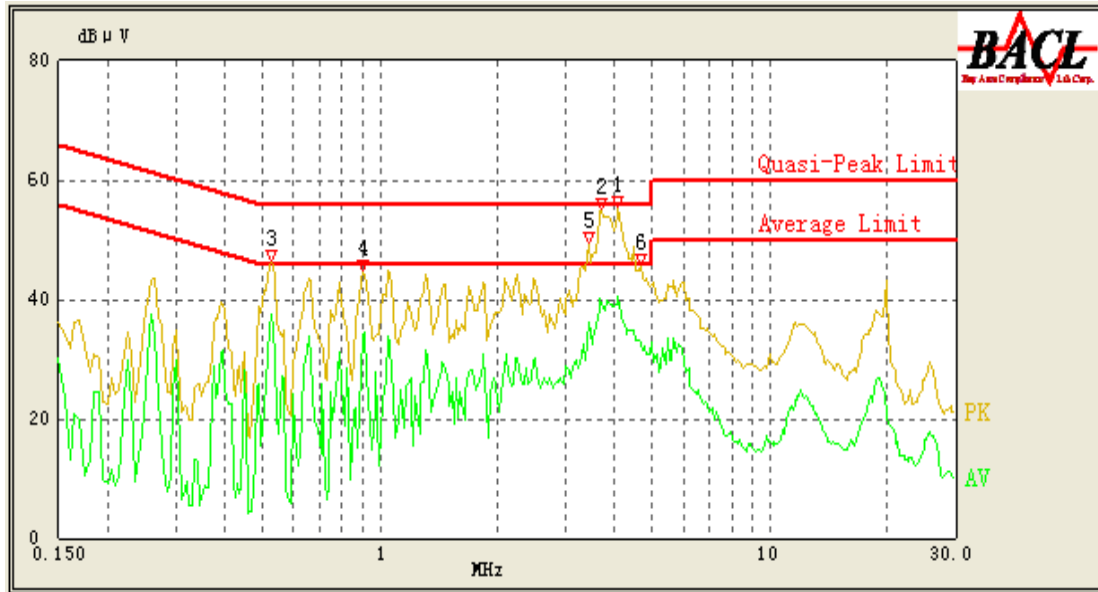
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	48 %
<b>ATM Pressure:</b>	100.0kPa

\* The testing was performed by Walt Kang on 2011-08-18.

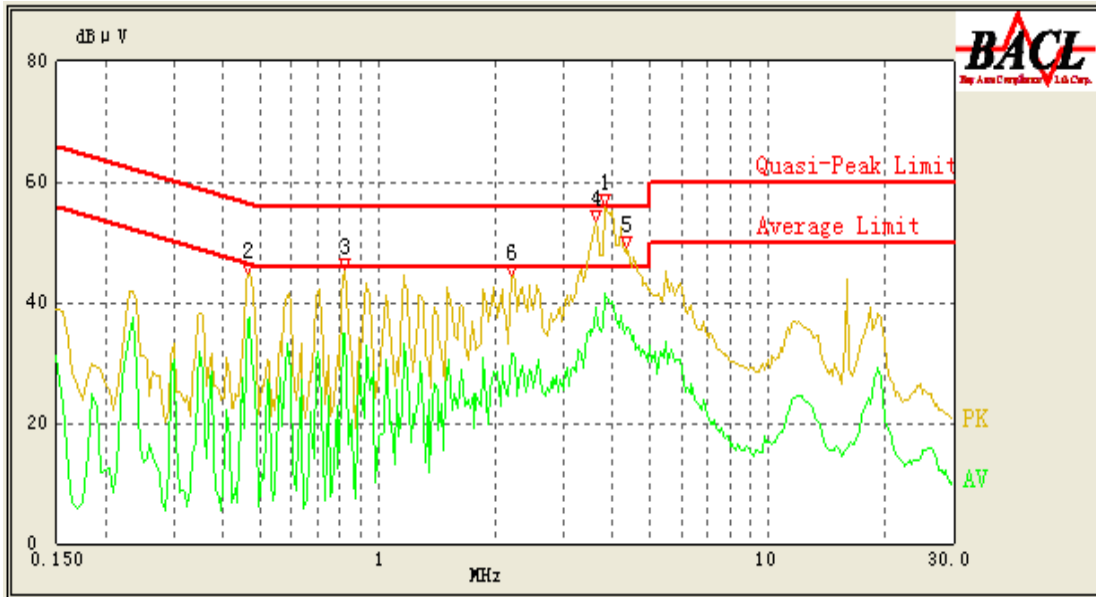
Test Mode: Charging & Transmitting

AC 120V/60 Hz, Line



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
4.075	40.35	10.10	46.00	5.65	Ave.
3.705	39.12	10.10	46.00	6.88	Ave.
3.710	48.47	10.10	56.00	7.53	QP
4.085	48.32	10.10	56.00	7.68	QP
0.525	37.63	10.10	46.00	8.37	Ave.
3.450	36.19	10.10	46.00	9.81	Ave.
0.905	33.98	10.10	46.00	12.02	Ave.
4.650	32.89	10.10	46.00	13.11	Ave.
3.450	41.15	10.10	56.00	14.85	QP
0.905	40.02	10.10	56.00	15.98	QP
0.525	38.41	10.10	56.00	17.59	QP
4.695	35.01	10.10	56.00	20.99	QP

AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
3.830	41.36	10.10	46.00	4.64	Ave.
3.630	39.16	10.10	46.00	6.84	Ave.
3.830	48.18	10.10	56.00	7.82	QP
0.465	37.11	10.10	47.00	9.89	Ave.
4.345	35.71	10.10	46.00	10.29	Ave.
0.820	34.93	10.10	46.00	11.07	Ave.
3.630	44.89	10.10	56.00	11.11	QP
4.345	42.11	10.10	56.00	13.89	QP
2.205	31.44	10.10	46.00	14.56	Ave.
2.205	39.72	10.10	56.00	16.28	QP
0.820	37.66	10.10	56.00	18.34	QP
0.465	38.44	10.10	57.00	18.56	QP

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

### Applicable Standard

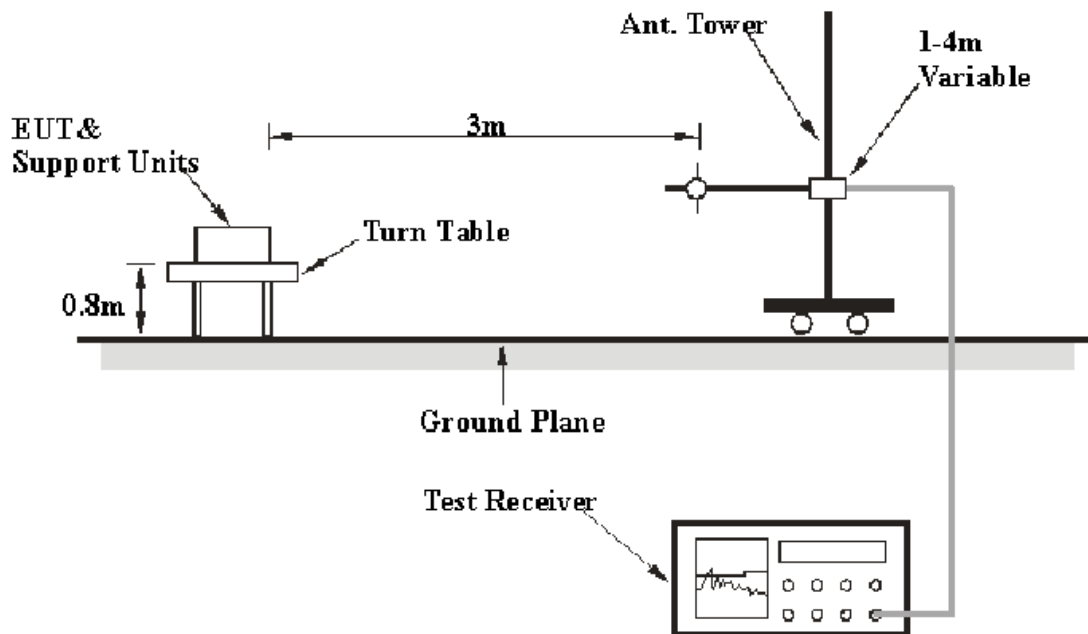
FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 4.0$  dB. ( $k=2$ , 95% level of confidence).

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

## 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>	<i>Detector</i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	PK

## Test Procedure

For the radiated emissions test, the adapter of notebook was connected to the outlet of the LISN

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-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

## 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 limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2011-07-08	2012-07-07

\* **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 Results Summary

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

### Below 1 GHz:

**8.8 dB** at **66.599750 MHz** in the **Vertical** polarization for charging mode

### Above 1 GHz:

**7.93 dB** at **4959.98 MHz** in the **Horizontal** polarization for transmitting mode (High Channel)

## Test Data

### Environmental Conditions

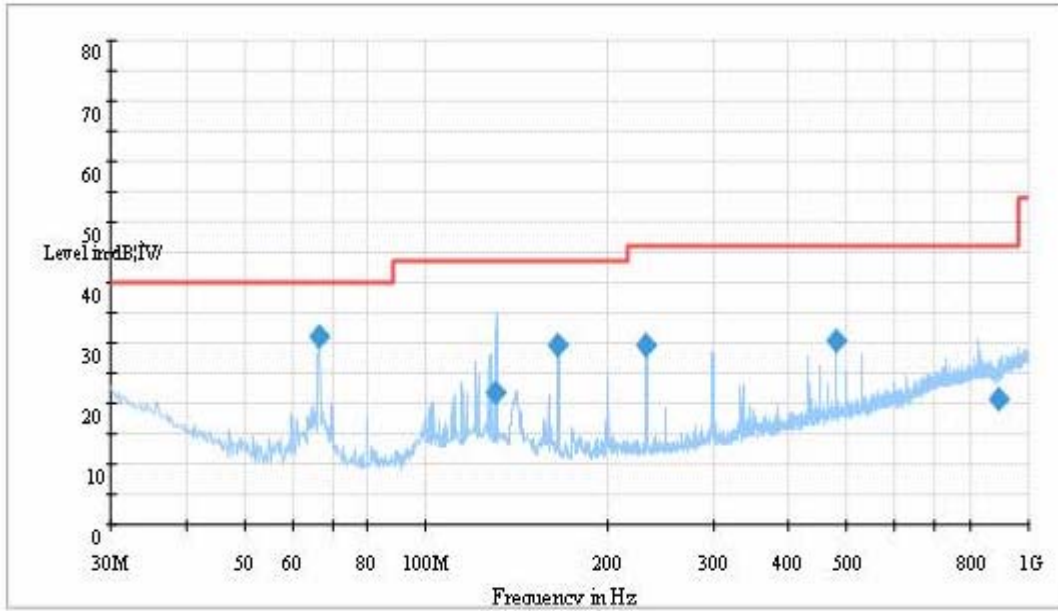
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

*The testing was performed by Walt Kang on 2011-08-17.*



**1) 30-1000 MHz**

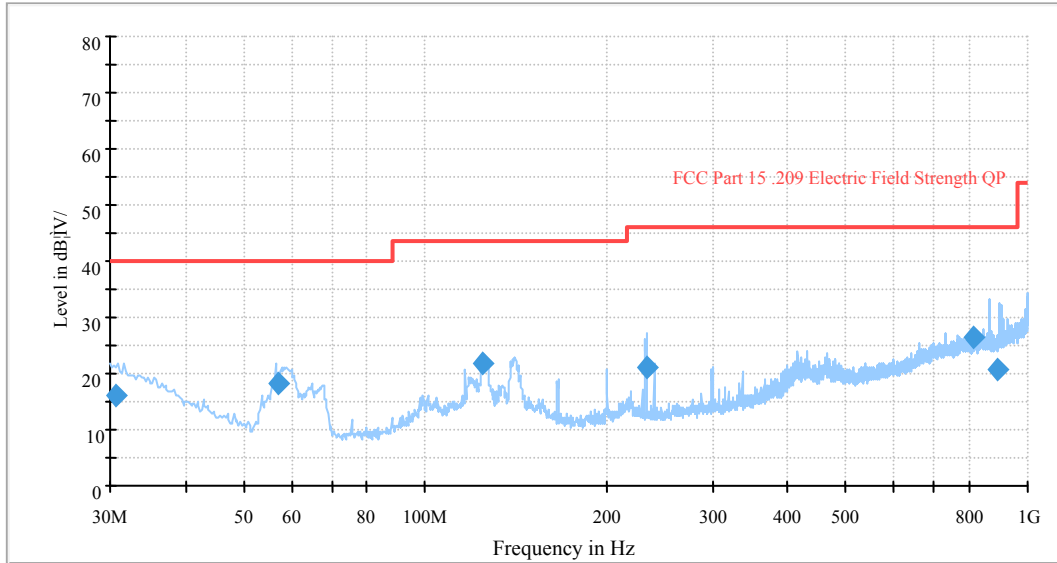
*Test Mode: Charging*



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
66.599750	31.2	100.0	V	95.0	-18.4	40.0	8.8
165.941000	29.7	187.0	H	342.0	-14.7	43.5	13.8
480.061000	30.3	118.0	V	263.0	-8.7	46.0	15.7
232.318000	29.7	135.0	H	138.0	-13.8	46.0	16.3
130.919000	21.8	400.0	H	94.0	-12.6	43.5	21.7
891.205250	20.6	400.0	V	78.0	-1.2	46.0	25.4

Test Mode: Transmitting (worst case)

Auto Test (FCC 15.209)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
816.116500	26.5	190.0	H	1.0	-1.6	46.0	19.5
56.929500	18.4	102.0	V	154.0	-18.3	40.0	21.6
125.032250	21.9	203.0	V	275.0	-12.3	43.5	21.6
30.710000	16.0	306.0	V	257.0	-5.9	40.0	24.0
233.159000	21.0	172.0	H	79.0	-13.8	46.0	25.0
891.336250	20.6	105.0	V	26.0	-1.2	46.0	25.4

2) Above 1 GHz

Test Mode: Transmitting (BDR)

Indicated		Detector (PK/Ave.)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	S.A. Reading (dBµV)			Height (cm)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low Channel (2402 MHz)											
4804	29.14	Ave.	149	107	H	31.2	4.3	27.51	37.13	54	16.87
3583.08	30.68	Ave.	27	186	V	30.2	3.68	27.71	36.85	54	17.15
3583.08	29.51	Ave.	146	120	H	30.2	3.68	27.71	35.68	54	18.32
4804	27.68	Ave.	58	105	V	31.2	4.3	27.51	35.67	54	18.33
4804	44.22	PK	149	107	H	31.2	4.3	27.51	52.21	74	21.79
4804	42.16	PK	58	105	V	31.2	4.3	27.51	50.15	74	23.85
3583.08	37.26	PK	27	186	V	30.2	3.68	27.71	43.43	74	30.57
3583.08	36.51	PK	146	120	H	30.2	3.68	27.71	42.68	74	31.32
Middle Channel (2441 MHz)											
4882	34.32	Ave.	159	135	H	31.2	4.3	27.51	42.31	54	11.69
4882	29.79	Ave.	173	107	V	31.2	4.3	27.51	37.78	54	16.22
3586.43	30.23	Ave.	134	113	H	30.2	3.68	27.71	36.4	54	17.60
3586.59	29.54	Ave.	211	101	V	30.2	3.68	27.71	35.71	54	18.29
4882	43.58	PK	173	107	V	31.2	4.3	27.51	51.57	74	22.43
4882	42.46	PK	159	135	H	31.2	4.3	27.51	50.45	74	23.55
3586.43	36.12	PK	134	112	H	30.2	3.68	27.71	42.29	74	31.71
3586.59	35.28	PK	211	101	V	30.2	3.68	27.71	41.45	74	32.55
High Channel (2480 MHz)											
4960	38.08	Ave.	158	112	H	31.2	4.3	27.51	46.07	54	7.93
4960	36.25	Ave.	318	106	V	31.2	4.3	27.51	44.24	54	9.76
3552.67	33.47	Ave.	127	101	H	30.2	3.68	27.71	39.64	54	14.36
3552.73	29.64	Ave.	247	103	V	30.2	3.68	27.71	35.81	54	18.19
4960	42.13	PK	158	112	H	31.2	4.3	27.51	50.12	74	23.88
4960	40.32	PK	318	106	V	31.2	4.3	27.51	48.31	74	25.69
3552.67	37.45	PK	127	101	H	30.2	3.68	27.71	43.62	74	30.38
3552.73	32.81	PK	247	103	V	30.2	3.68	27.71	38.98	74	35.02

Test Mode: Transmitting (EDR)

Indicated		Detector (PK/Ave.)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	S.A. Reading (dB $\mu$ V)			Height (cm)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
Low Channel (2402 MHz)											
4804	34.93	Ave.	249	100	H	31.2	4.3	27.51	42.92	54	11.08
4804	27.43	Ave.	158	115	V	31.2	4.3	27.51	35.42	54	18.58
3602.11	26.32	Ave.	207	188	V	30.2	3.68	27.71	32.49	54	21.51
4804	43.81	PK	249	100	H	31.2	4.3	27.51	51.8	74	22.2
4804	41.87	PK	158	115	V	31.2	4.3	27.51	49.86	74	24.14
3602.06	22.21	Ave.	110	183	H	30.2	3.68	27.71	28.38	54	25.62
3602.06	33.97	PK	110	183	H	30.2	3.68	27.71	40.14	74	33.86
3602.11	31.11	PK	207	188	V	30.2	3.68	27.71	37.28	74	36.72
Middle Channel (2441 MHz)											
4882	36.17	Ave.	159	115	H	31.2	4.3	27.51	44.16	54	9.84
4882	29.68	Ave.	173	127	V	31.2	4.3	27.51	37.67	54	16.33
4882	30.16	Ave.	304	143	H	30.2	3.68	27.71	36.33	54	17.67
3626.53	28.11	Ave.	221	141	V	30.2	3.68	27.71	34.28	54	19.72
4882	44.78	PK	159	115	H	31.2	4.3	27.51	52.77	74	21.23
4882	42.29	PK	173	127	V	31.2	4.3	27.51	50.28	74	23.72
3626.39	34.16	PK	304	143	H	30.2	3.68	27.71	40.33	74	33.67
3626.53	32.92	PK	221	141	V	30.2	3.68	27.71	39.09	74	34.91
High Channel (2480 MHz)											
4960	38.01	Ave.	158	112	H	31.2	4.3	27.51	46.00	54	8.00
4960	36.33	Ave.	318	136	V	31.2	4.3	27.51	44.32	54	9.68
3652.60	33.44	Ave.	187	161	H	30.2	3.68	27.71	39.61	54	14.39
3652.77	27.72	Ave.	47	143	V	30.2	3.68	27.71	33.89	54	20.11
4960	44.27	PK	318	136	V	31.2	4.3	27.51	52.26	74	21.74
4960	43.97	PK	158	112	H	31.2	4.3	27.51	51.96	74	22.04
3652.60	36.41	PK	187	161	H	30.2	3.68	27.71	42.58	74	31.42
3652.77	32.84	PK	47	143	V	30.2	3.68	27.71	39.01	74	34.99

**3) Spurious Emission in Restricted Bands**

Indicated		Detector (PK/Ave.)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209/15.205		
Frequency (MHz)	S.A. Reading (dBµV)			Height (cm)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Test Mode: Transmitting (BDR)											
2487	33.65	Ave	77	183	V	29.1	3.11	26.83	39.03	54	14.97
2338	32.22	Ave	58	166	V	28.6	2.98	26.83	36.97	54	17.03
2485	29.78	Ave	187	151	H	28.8	3.11	26.83	34.86	54	19.14
2336	30.06	Ave	78	142	H	28.3	2.98	26.83	34.51	54	19.49
2338	37.62	PK	58	166	V	28.6	2.98	26.83	42.37	74	31.63
2487	36.81	PK	77	183	V	29.1	3.11	26.83	42.19	74	31.81
2336	36.13	PK	78	142	H	28.3	2.98	26.83	40.58	74	33.42
2485	35.42	PK	187	151	H	28.8	3.11	26.83	40.50	74	33.50
Test Mode: Transmitting (EDR)											
2496	33.43	Ave.	177	123	V	29.1	3.11	26.83	38.81	54	15.19
2389	32.12	Ave	258	146	V	28.6	2.98	26.83	36.87	54	17.13
2389	32.17	Ave	108	150	H	28.3	2.98	26.83	36.62	54	17.38
2494	29.54	Ave	137	151	H	28.8	3.11	26.83	34.62	54	19.38
2389	37.76	PK	108	150	H	28.3	2.98	26.83	42.21	74	31.79
22389	37.43	PK	258	146	V	28.6	2.98	26.83	42.18	74	31.82
2496	36.63	PK	177	123	V	29.1	3.11	26.83	42.01	74	31.99
2494	35.33	PK	137	151	H	28.8	3.11	26.83	40.41	74	33.59

## FCC §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	2010-11-11	2011-11-10

\* **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 trace
3. Measure the channel separation.

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

\* The testing was performed by Walt Kang on 2011-08-17.

**Test Result:** Compliance, please refer to following tables and plots

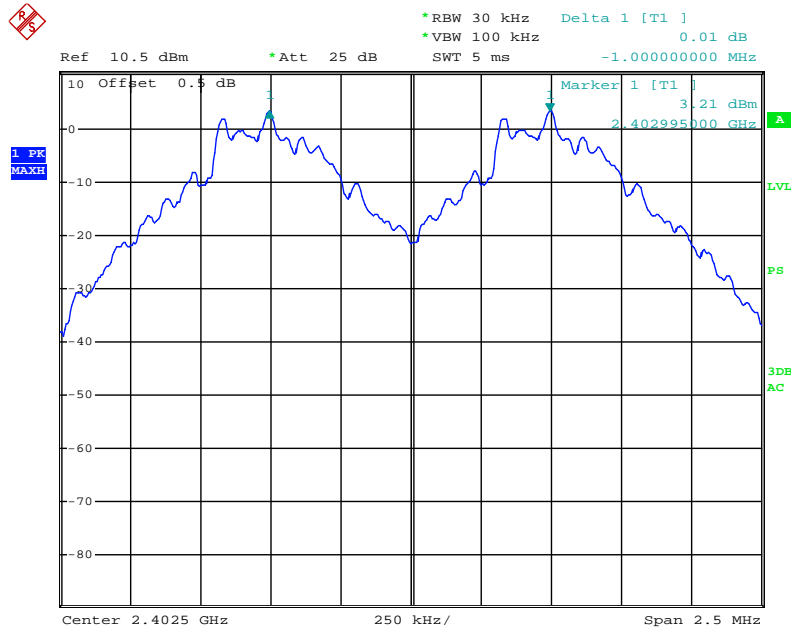
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR	Low	2402	1.00	0.560	Pass
	Adjacent	2403			
	Middle	2441	1.00	0.555	Pass
	Adjacent	2442			
	High	2480	1.00	0.563	Pass
	Adjacent	2479			
EDR	Low	2402	1.00	0.811	Pass
	Adjacent	2403			
	Middle	2441	1.00	0.813	Pass
	Adjacent	2442			
	High	2480	1.00	0.813	Pass
	Adjacent	2479			

Please refer to the following plots.

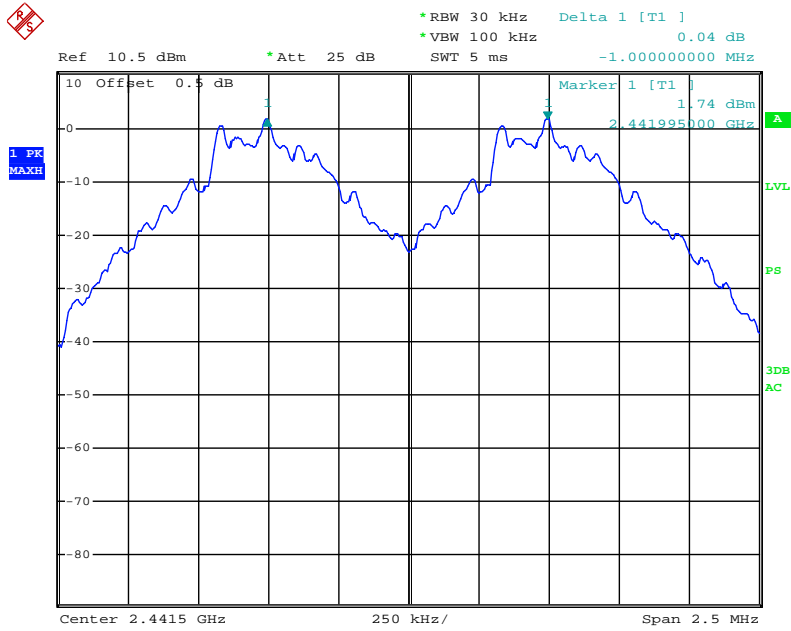
**BDR:**

**Low Channel**



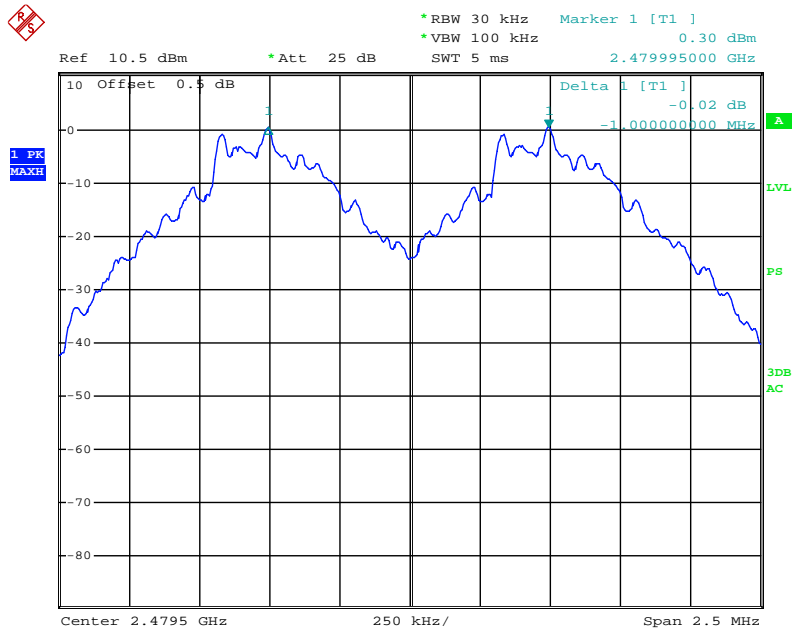
Date: 17.AUG.2011 11:31:57

### Middle Channel



Date: 17.AUG.2011 11:33:13

### High Channel

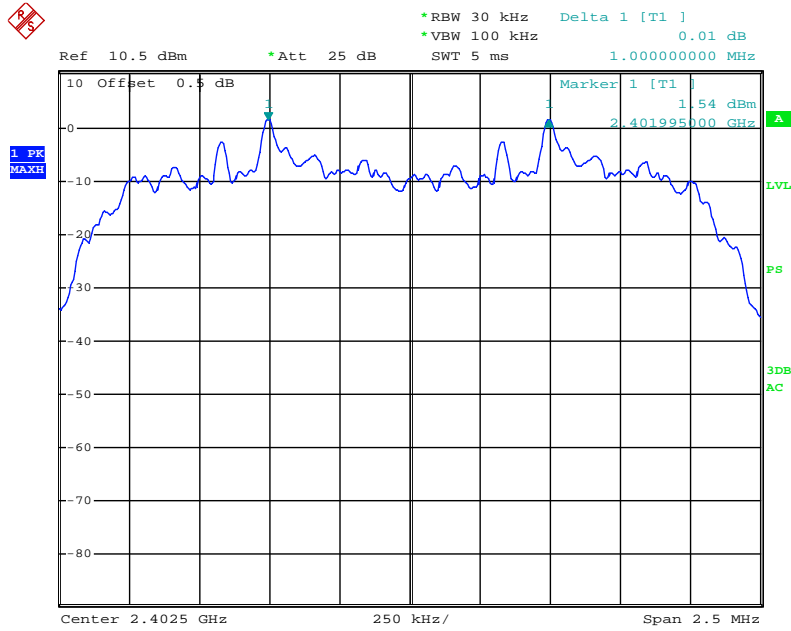


Date: 17.AUG.2011 11:34:11



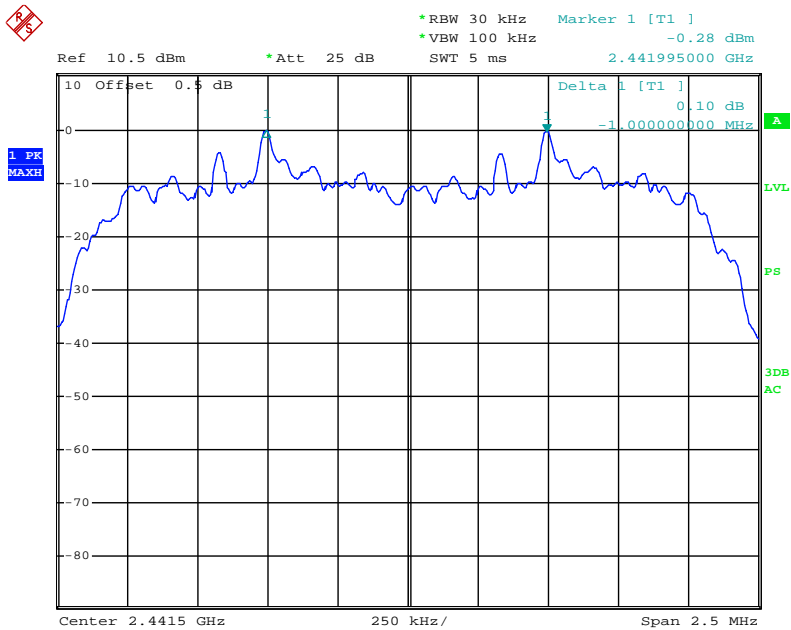
EDR:

Low Channel



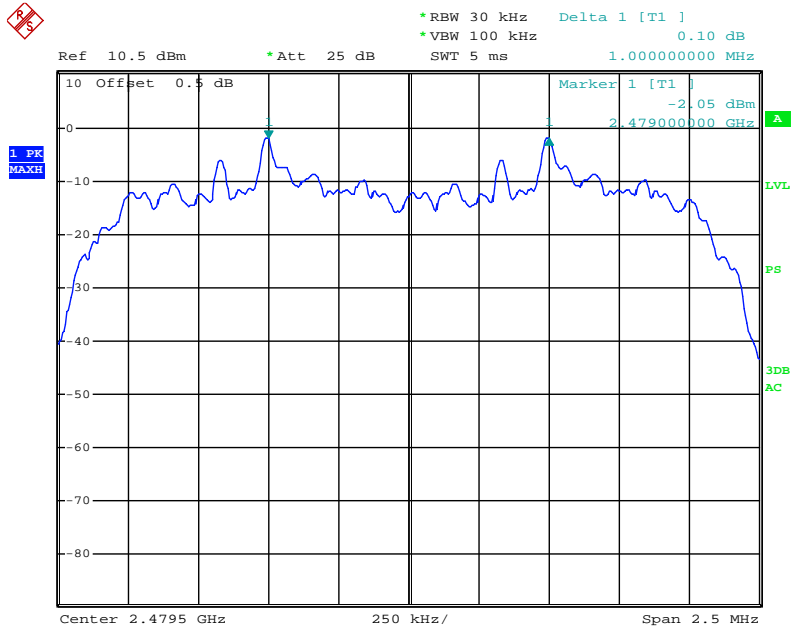
Date: 17.AUG.2011 11:30:10

Middle Channel



Date: 17.AUG.2011 11:29:01

### High Channel



Date: 17.AUG.2011 11:27:40

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

### Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Data

#### Environmental Conditions

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

\* The testing was performed by Walt Kang on 2011-08-17.

**Test Result:** Compliance, please refer to following tables and plots

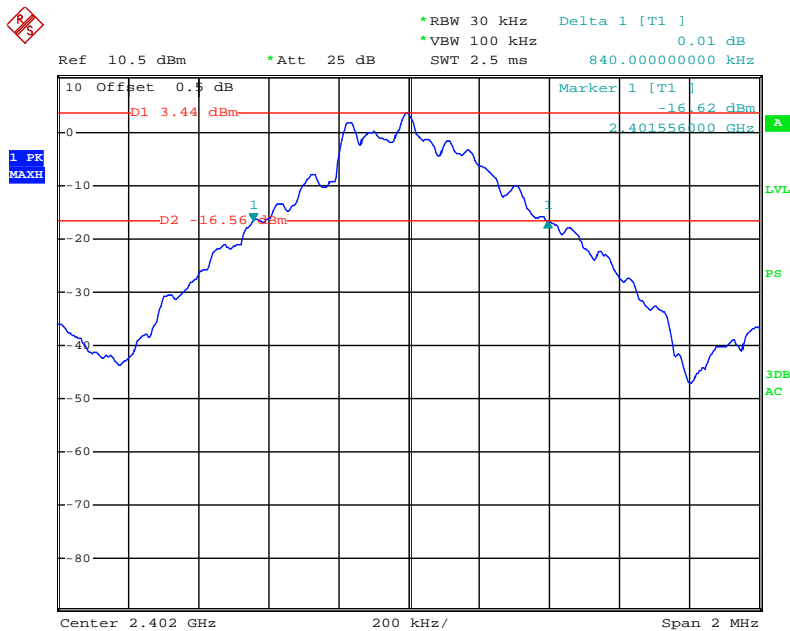
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR	Low	2402	0.840
	Middle	2441	0.832
	High	2480	0.844
EDR	Low	2402	1.216
	Middle	2441	1.220
	High	2480	1.220

Please refer to the following plots.

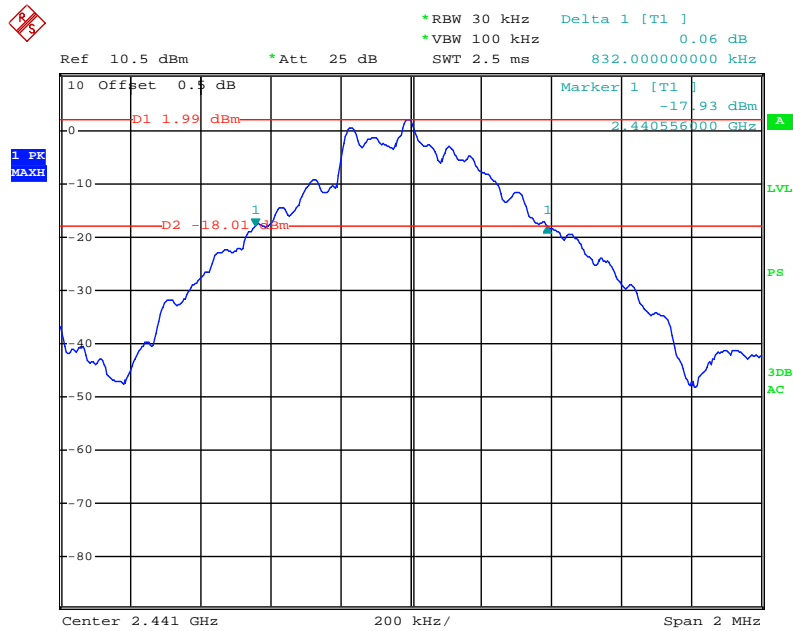
**BDR:**

**Low Channel**



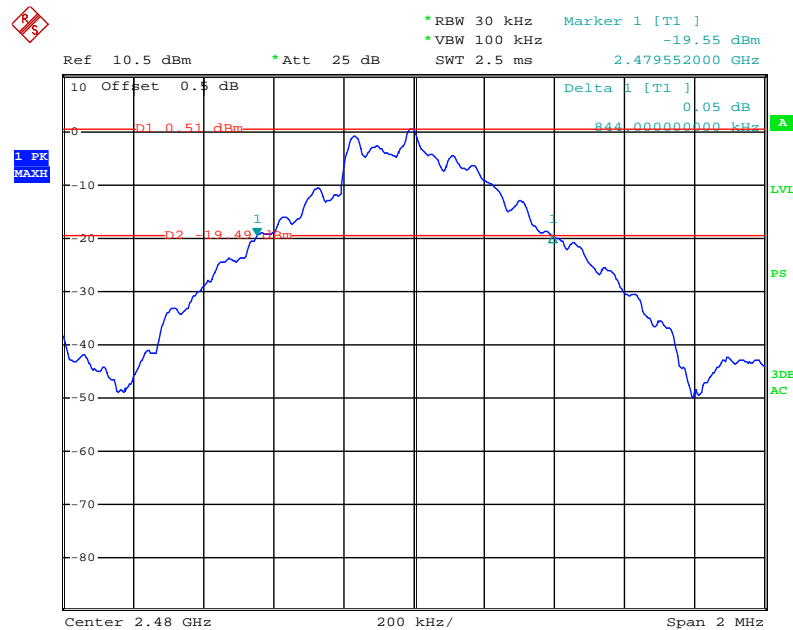
Date: 3.AUG.2011 04:58:08

### Middle Channel



Date: 3.AUG.2011 04:52:05

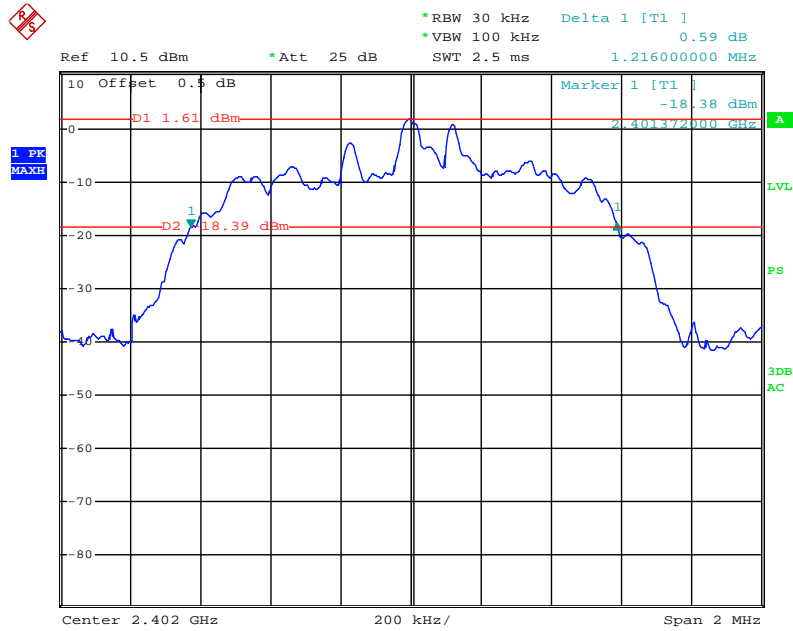
### High Channel



Date: 3.AUG.2011 04:48:32

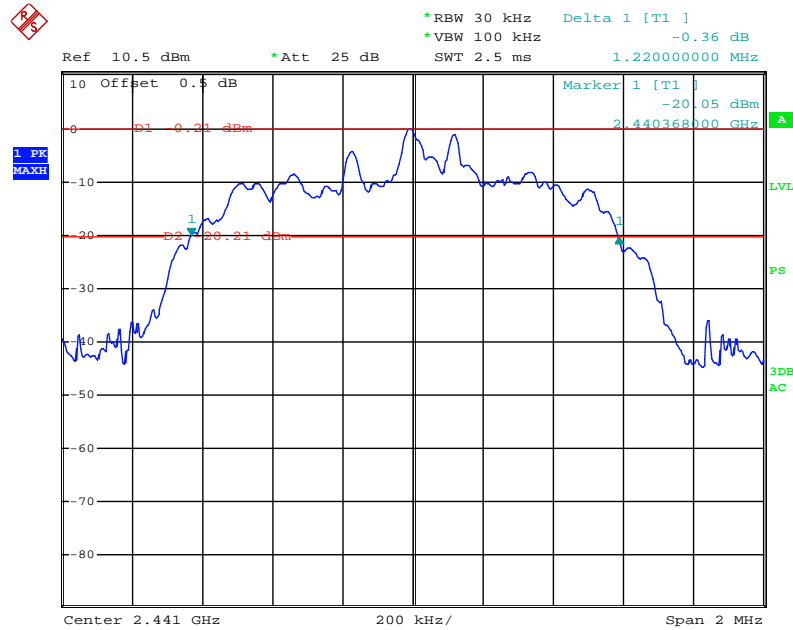
EDR:

### Low Channel



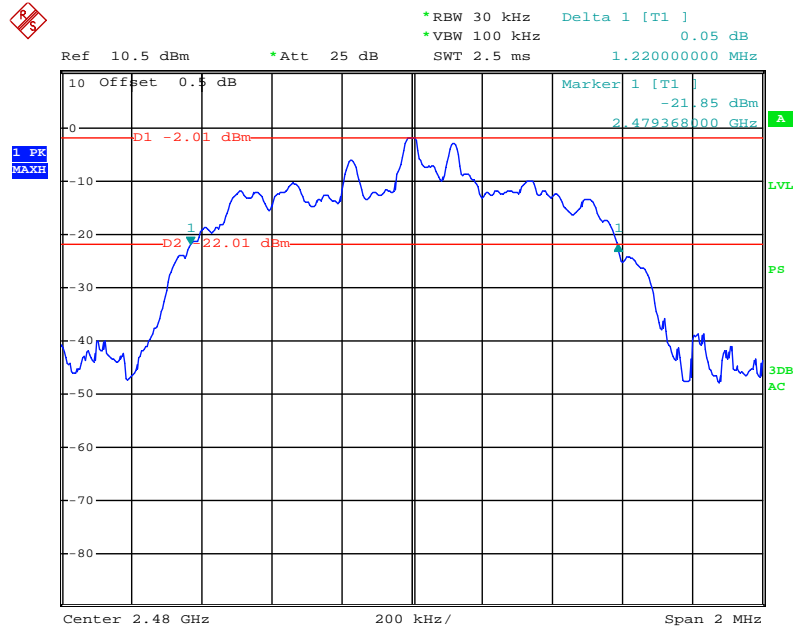
Date: 3.AUG.2011 05:29:59

### Middle Channel



Date: 3.AUG.2011 05:32:27

### High Channel



Date: 3.AUG.2011 05:34:50

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

### Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

### Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

### Test Data

#### Environmental Conditions

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

*The testing was performed by Walt Kang on 2011-08-17.*

**Test Result:** Compliance, please refer to following tables and plots

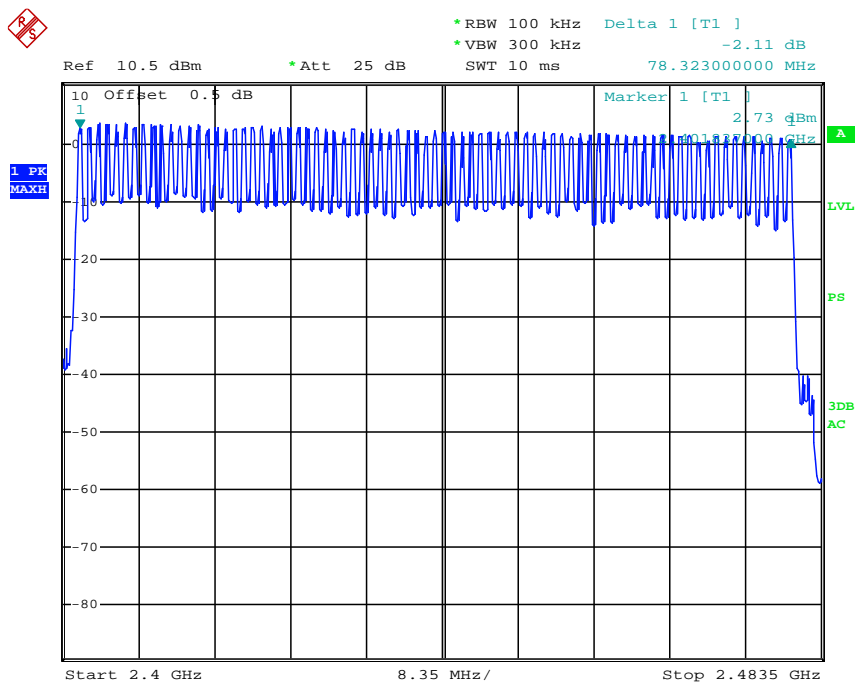


Test Mode: Transmitting

Mode	Frequency Range (MHz)	Number of Hopping Channel	Requirement
BDR	2400-2483.5	79	≥ 15
EDR	2400-2483.5	79	≥ 15

**BDR:**

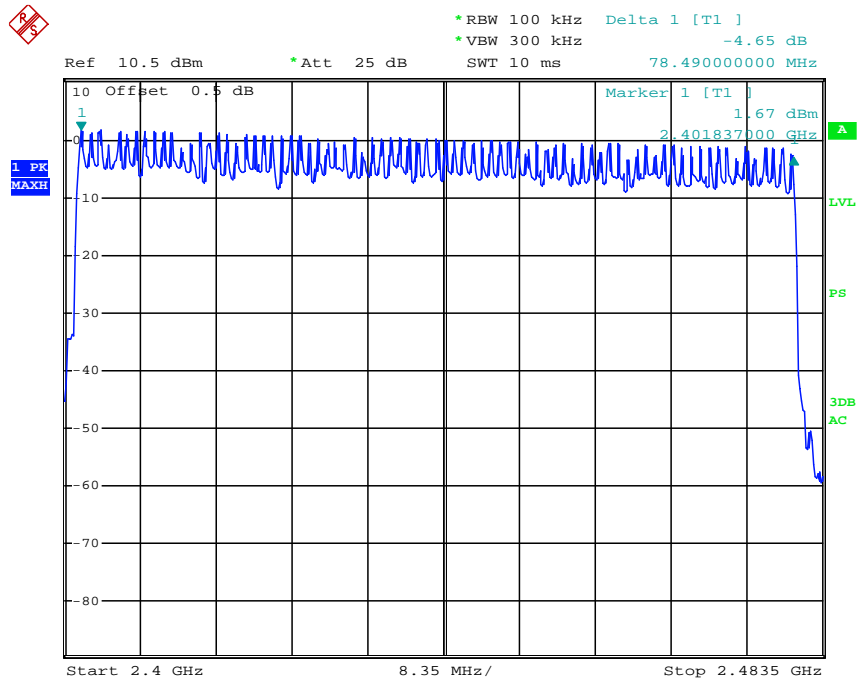
**Number of Hopping Channels**



Date: 17.AUG.2011 20:24:31

EDR:

### Number of Hopping Channels



Date: 17.AUG.2011 20:26:47

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

### **Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 \* channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell time = Pulse time\*hop rate/number of hopping channels\*31.6S

Hop rate=1600/S

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

\* *The testing was performed by Walt Kang on 2011-08-17.*

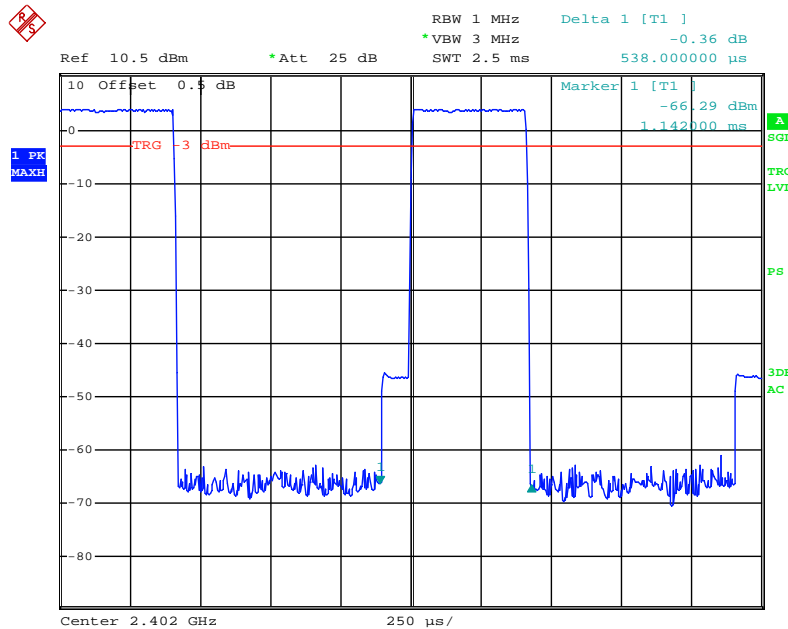
**Test Result:** Compliance, please refer to following tables and plots

Test Mode: Transmitting (BDR)

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.538	0.172	0.4	Pass
	Middle	0.541	0.173	0.4	Pass
	High	0.541	0.173	0.4	Pass
Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s					
DH 3	Low	1.813	0.290	0.4	Pass
	Middle	1.811	0.289	0.4	Pass
	High	1.811	0.289	0.4	Pass
Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s					
DH 5	Low	3.075	0.328	0.4	Pass
	Middle	3.075	0.328	0.4	Pass
	High	3.070	0.327	0.4	Pass
Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s					

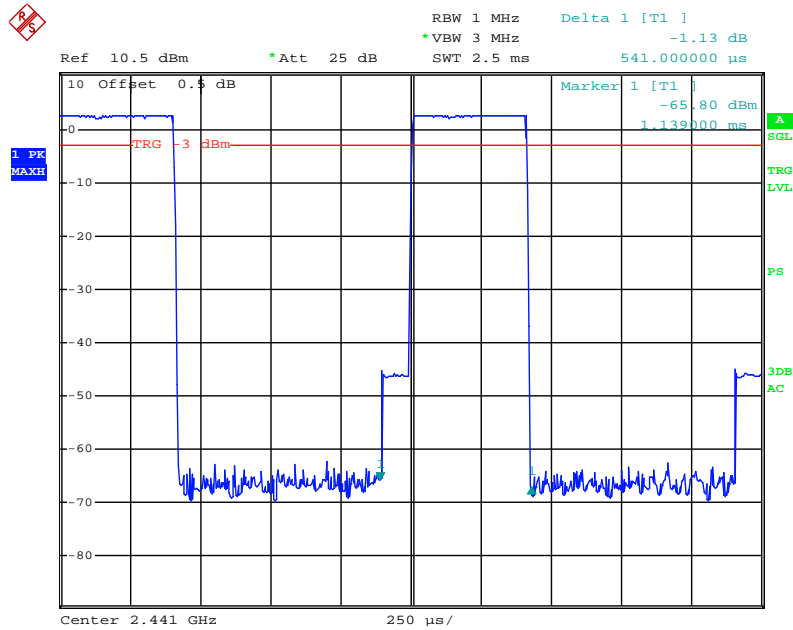
Please refer to the following plots.

Low Channel for DH1



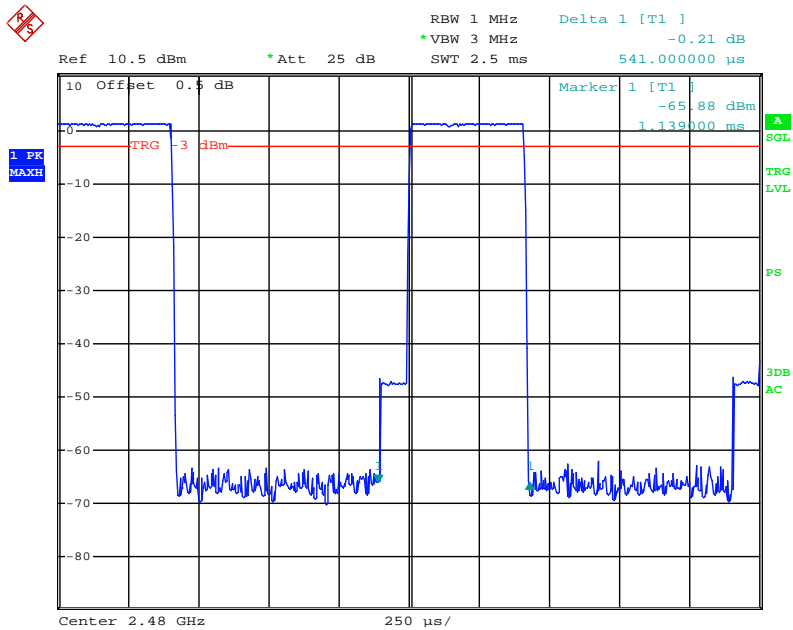
Date: 17.AUG.2011 21:09:57

### Middle Channel for DH1



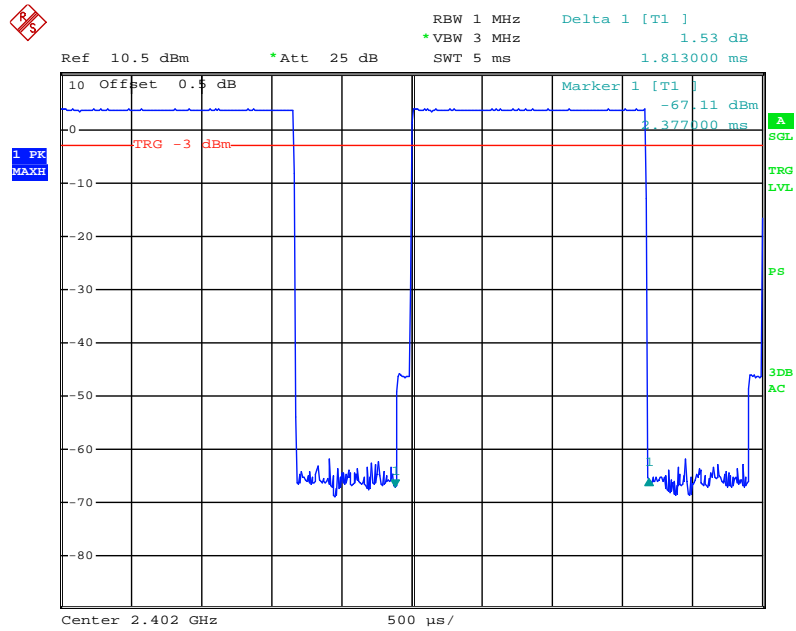
Date: 17.AUG.2011 21:02:32

### High Channel for DH1



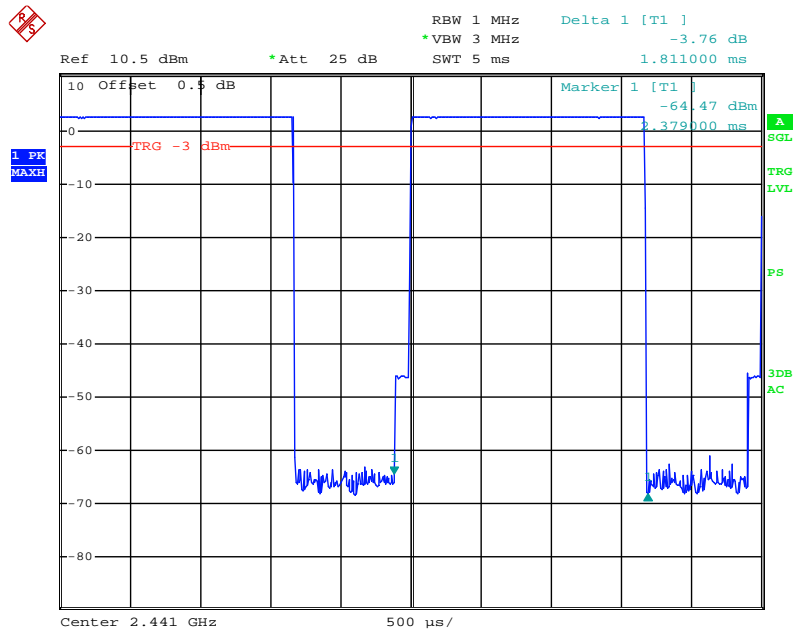
Date: 17.AUG.2011 21:01:06

### Low Channel for DH3



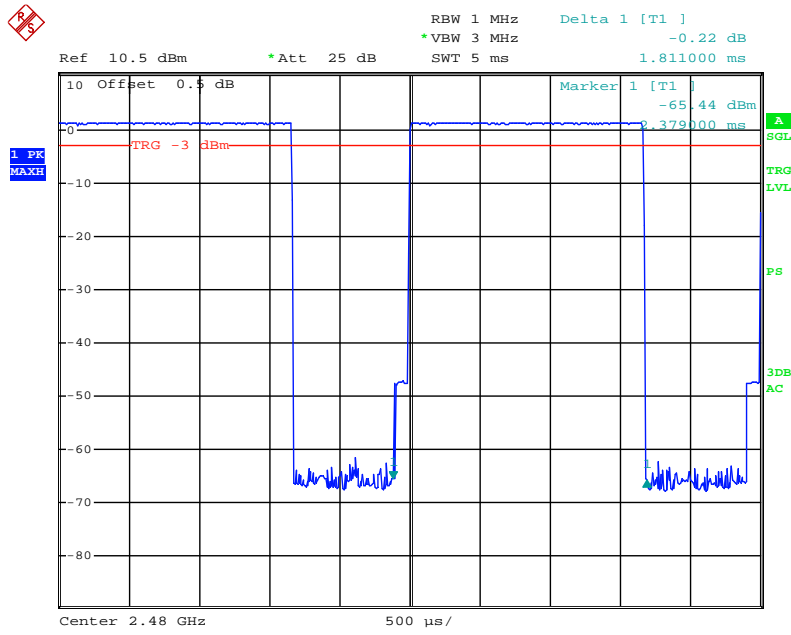
Date: 17.AUG.2011 21:08:54

### Middle Channel for DH3



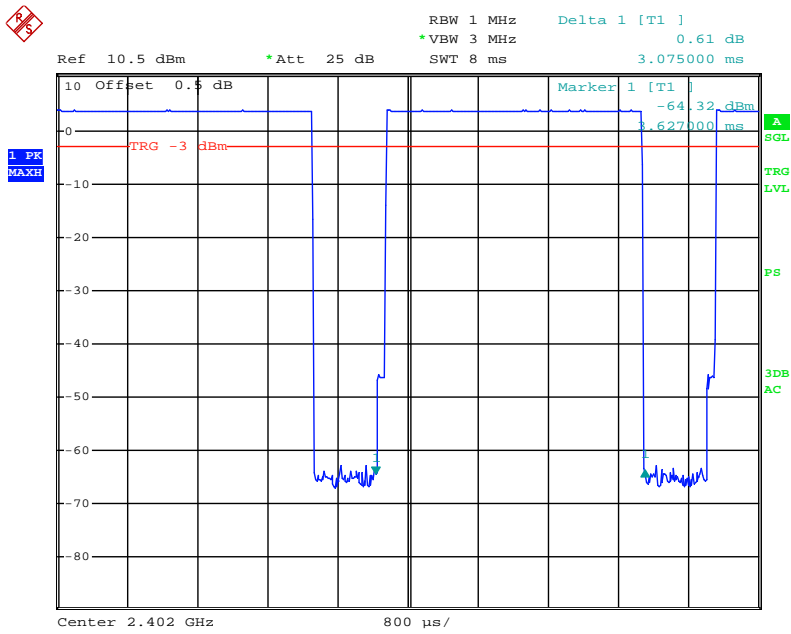
Date: 17.AUG.2011 21:03:48

### High Channel for DH3



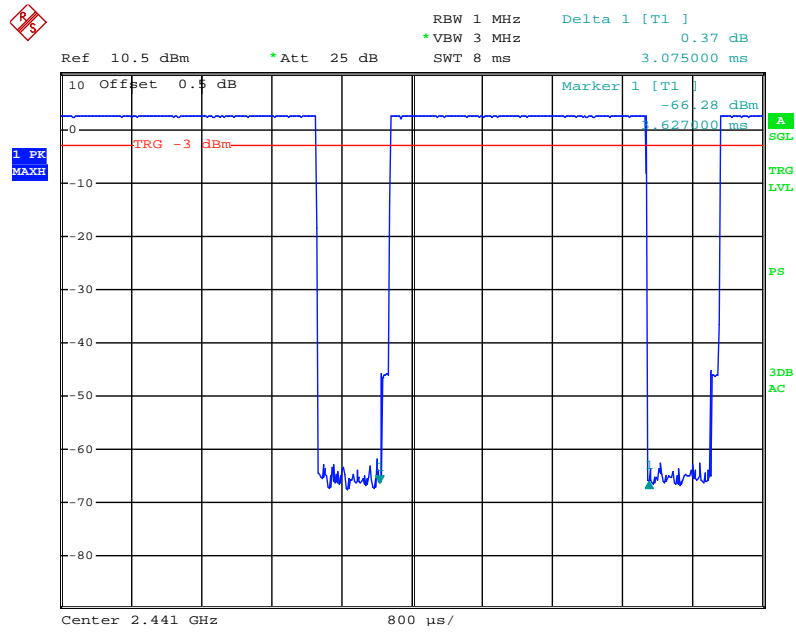
Date: 17.AUG.2011 20:59:41

### Low Channel for DH5



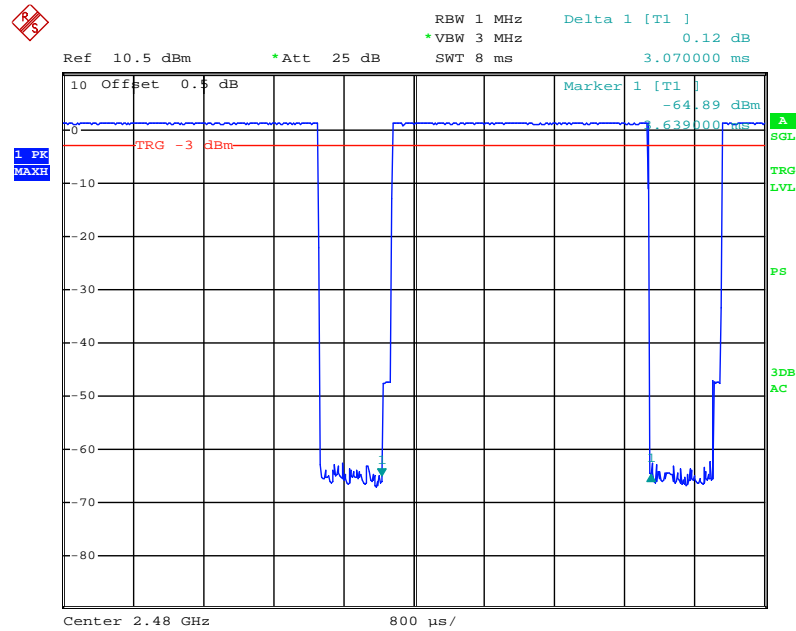
Date: 17.AUG.2011 21:07:53

### Middle Channel for DH5



Date: 17.AUG.2011 21:05:12

### High Channel for DH5



Date: 17.AUG.2011 20:58:29

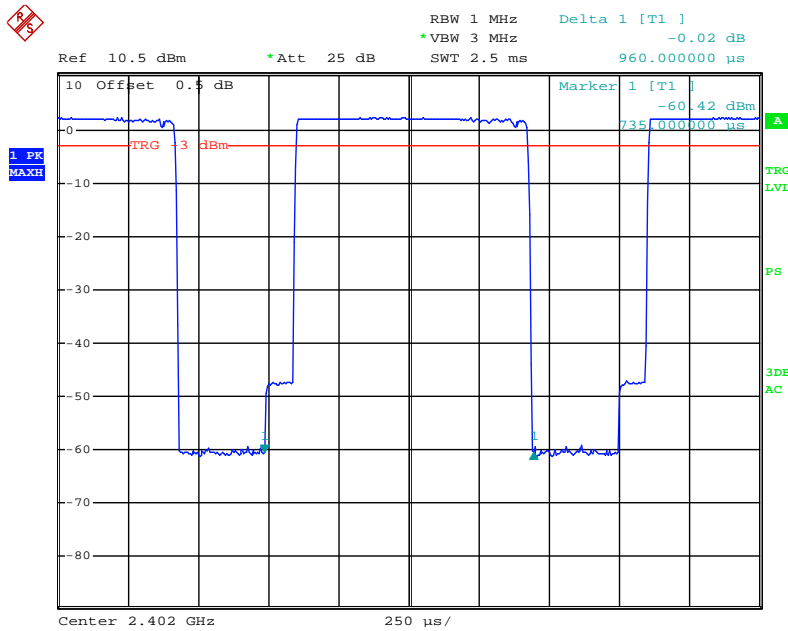


Test Mode: Transmitting (EDR)

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.960	0.307	0.4	Pass
	Middle	0.557	0.178	0.4	Pass
	High	0.562	0.179	0.4	Pass
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s				
DH 3	Low	1.810	0.289	0.4	Pass
	Middle	1.817	0.290	0.4	Pass
	High	1.822	0.291	0.4	Pass
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s				
DH 5	Low	3.090	0.330	0.4	Pass
	Middle	3.090	0.330	0.4	Pass
	High	3.086	0.329	0.4	Pass
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s				

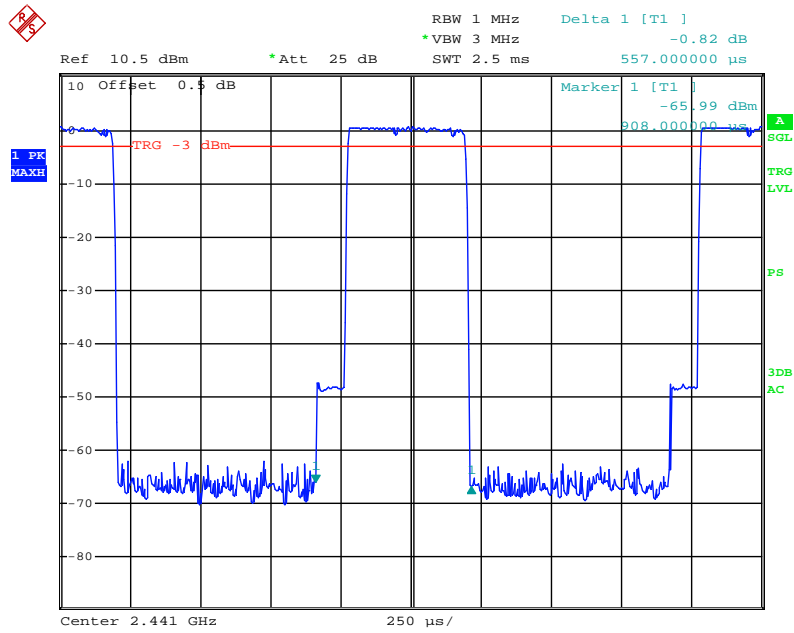
Please refer to the following plots.

Low Channel for DH1



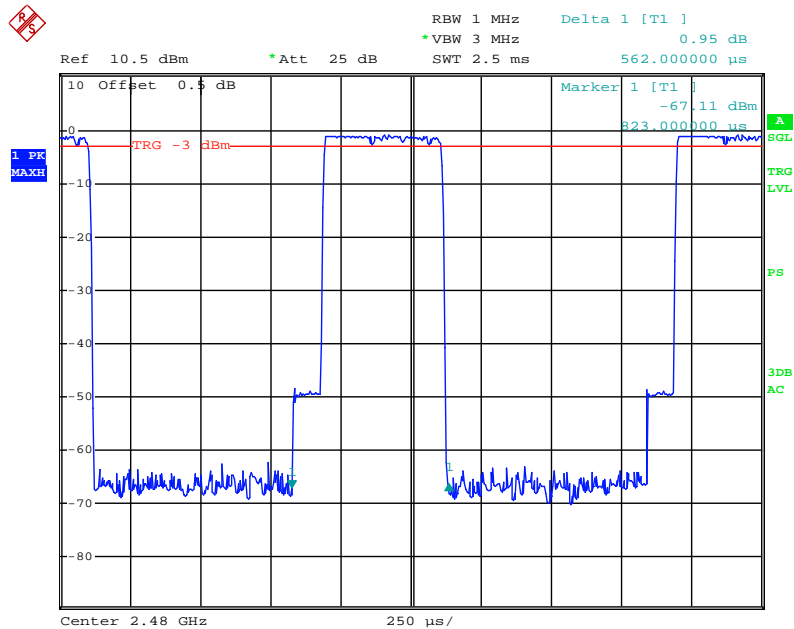
Date: 17.AUG.2011 20:33:50

### Middle Channel for DH1



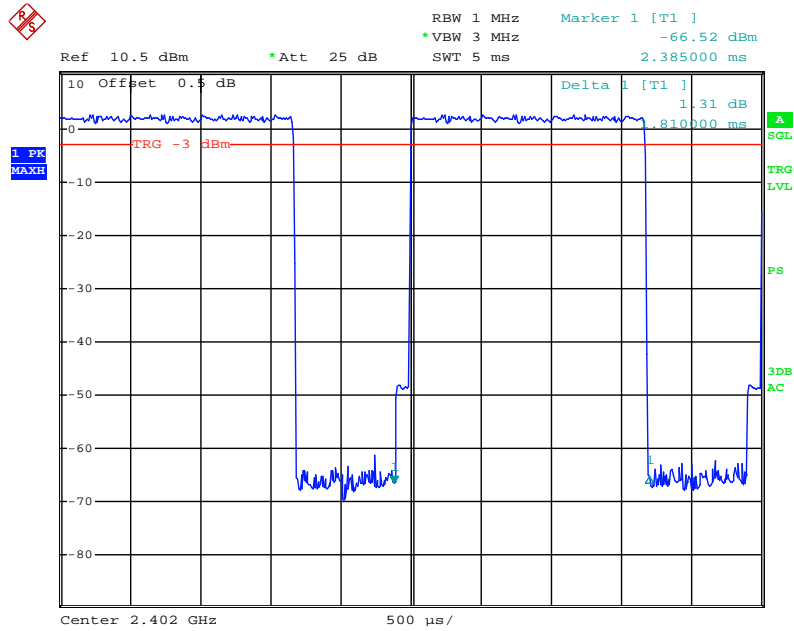
Date: 17.AUG.2011 20:53:06

### High Channel for DH1



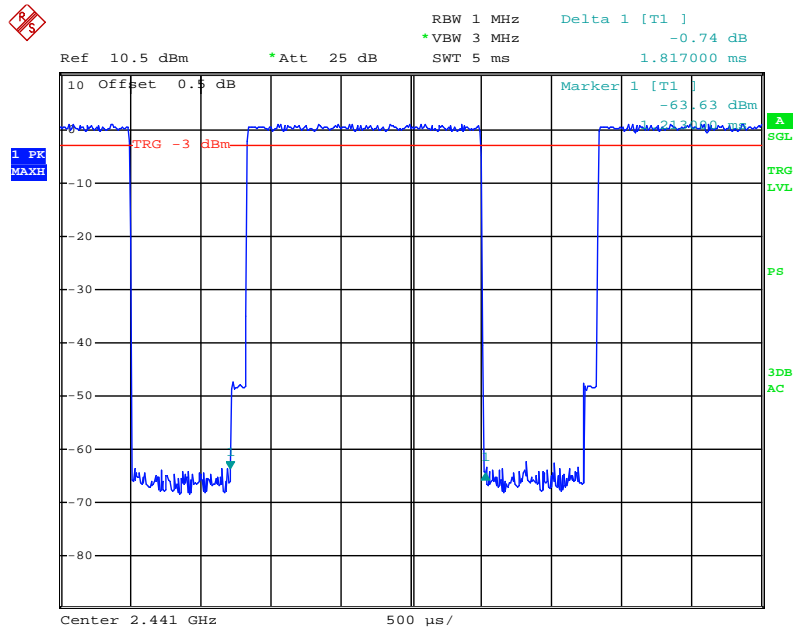
Date: 17.AUG.2011 20:54:50

### Low Channel for DH3



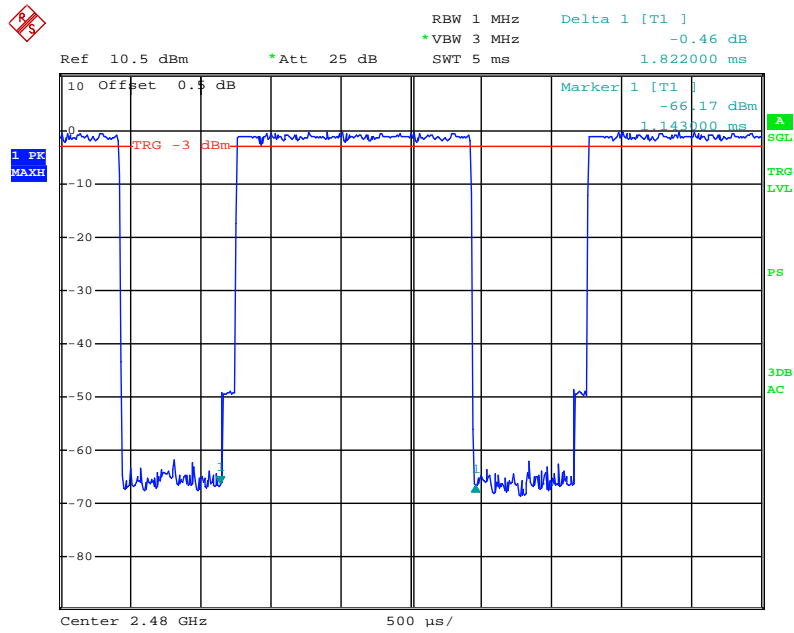
Date: 17.AUG.2011 20:37:52

### Middle Channel for DH3



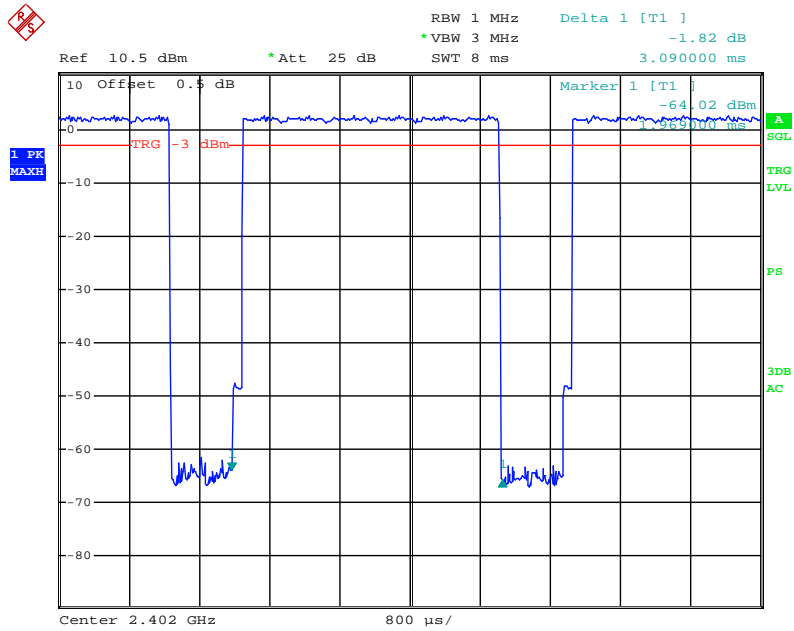
Date: 17.AUG.2011 20:50:46

### High Channel for DH3



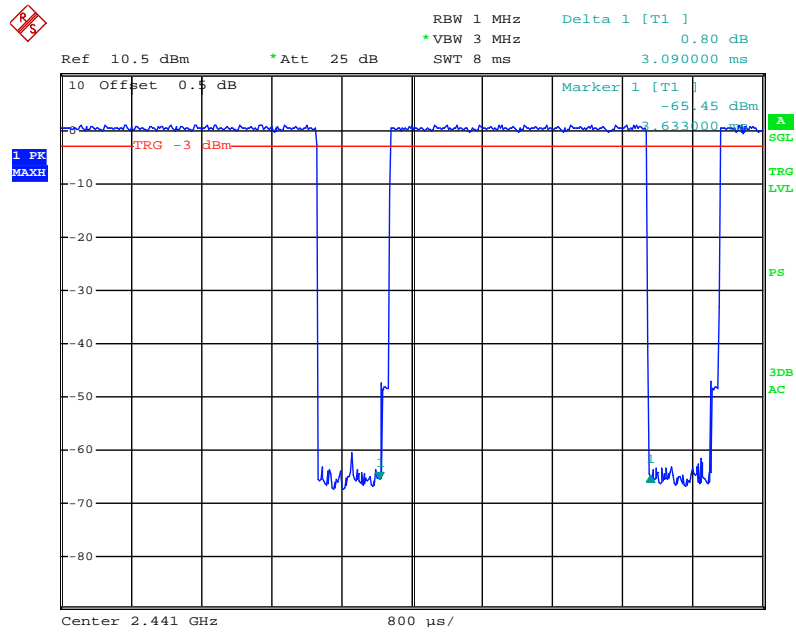
Date: 17.AUG.2011 20:55:55

### Low Channel for DH5



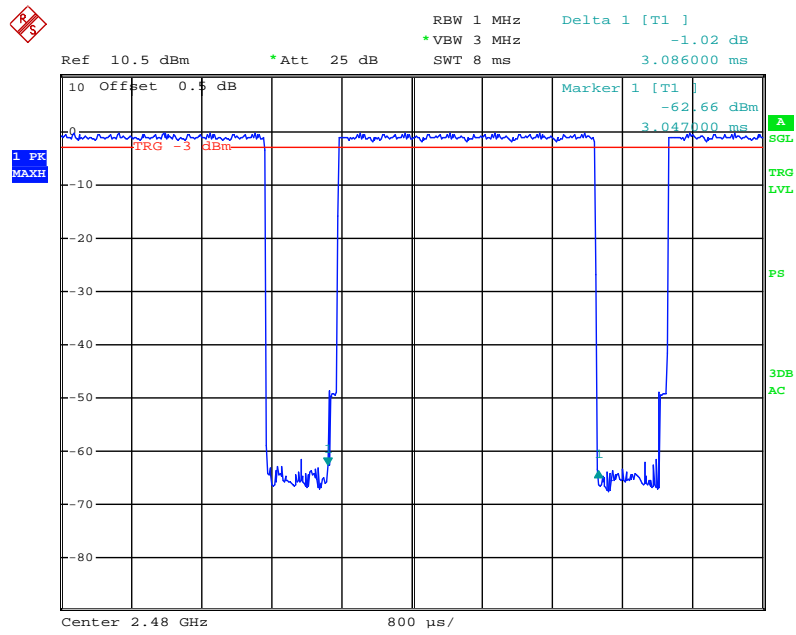
Date: 17.AUG.2011 20:39:03

### Middle Channel for DH5



Date: 17.AUG.2011 20:42:14

### High Channel for DH5



Date: 17.AUG.2011 20:56:53

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

### Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

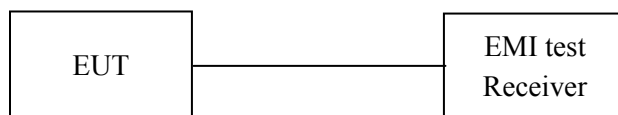
### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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:	56 %
ATM Pressure:	100.0kPa

\* The testing was performed by Walt Kang on 2011-08-17.

**Test Result:** Compliance.

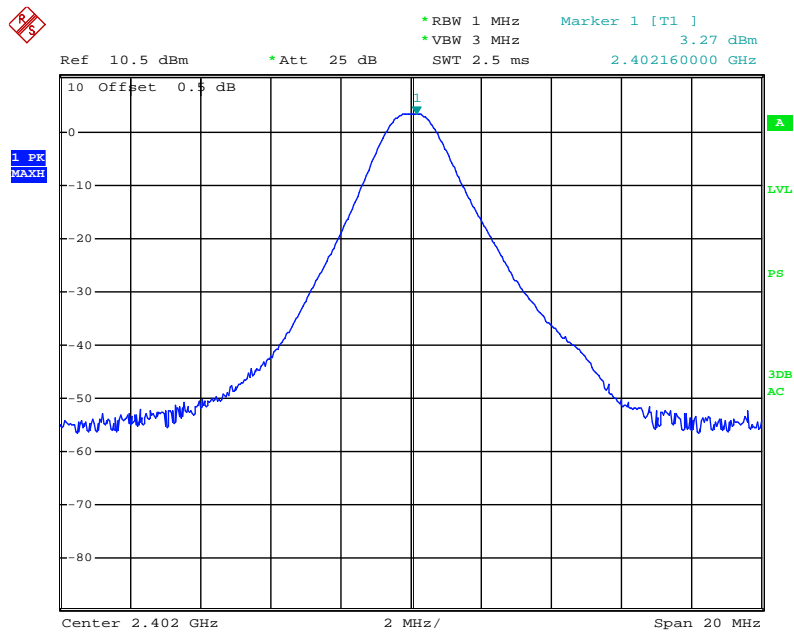
*Test Mode: Transmitting*

Mode	Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
BDR	Low	2402	3.27	21
	Middle	2441	1.81	21
	High	2480	0.39	21
EDR	Low	2402	2.12	21
	Middle	2441	0.54	21
	High	2480	-1.15	21

Please refer to the following plots

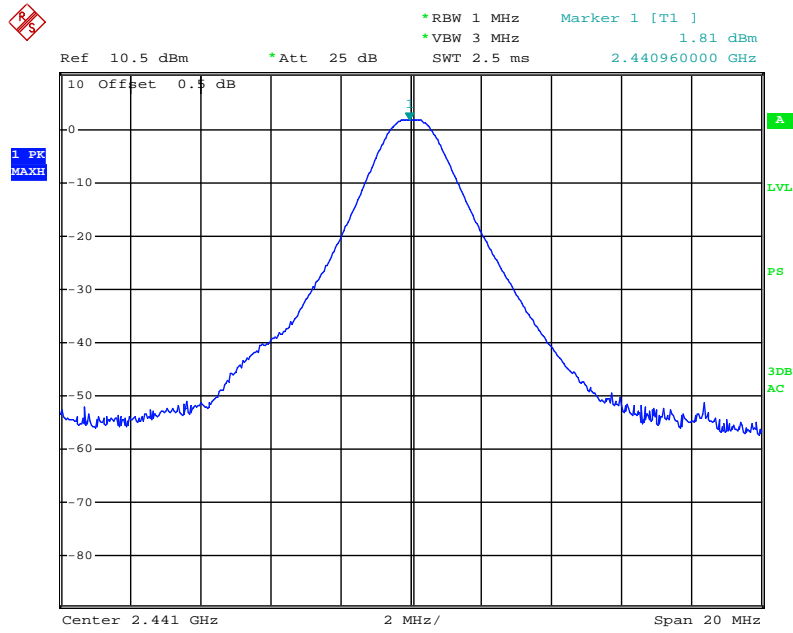
**BDR:**

**Low Channel**



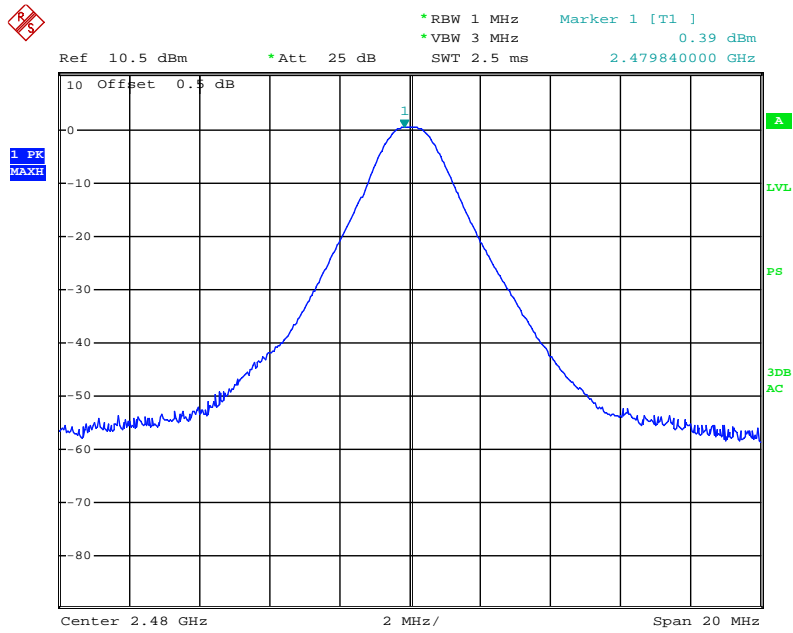
Date: 3.AUG.2011 06:12:26

### Middle Channel



Date: 3.AUG.2011 06:13:00

### High Chanel

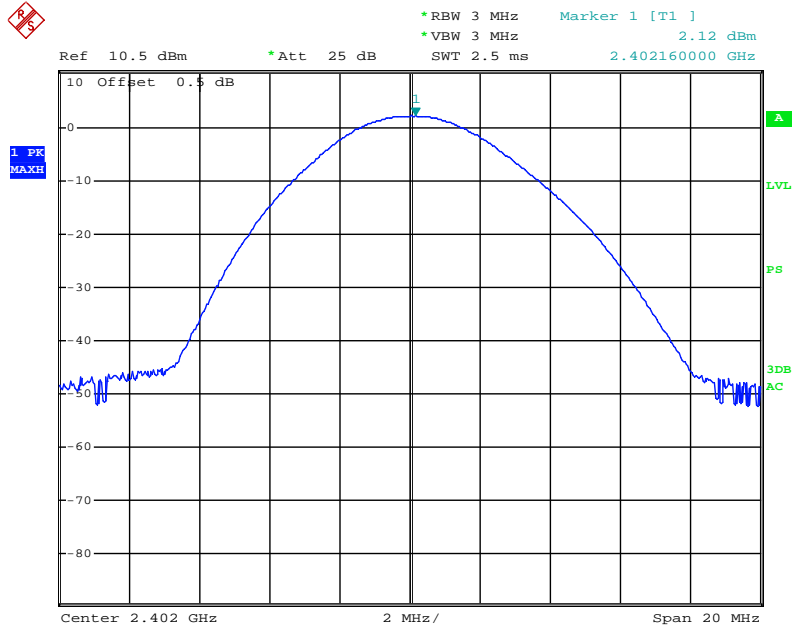


Date: 3.AUG.2011 06:14:32



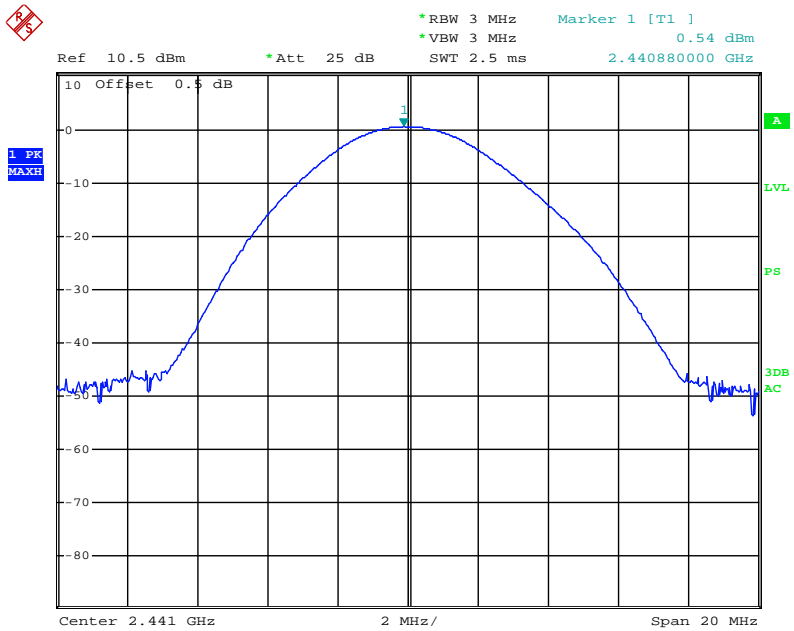
**EDR:**

**Low Channel**



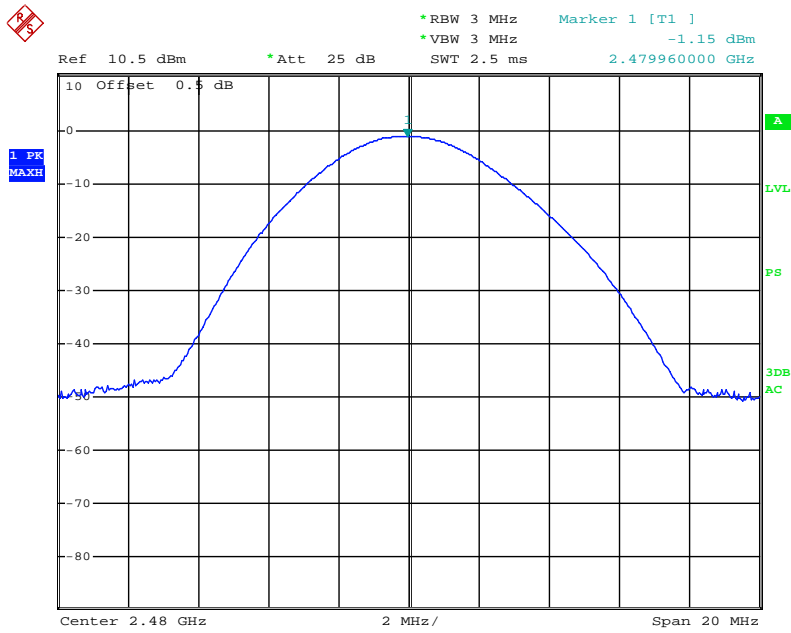
Date: 3.AUG.2011 06:09:01

**Middle Channel**



Date: 3.AUG.2011 06:08:27

### High Chanel



Date: 3.AUG.2011 06:06:51

## FCC §15.247(d) - BAND EDGES TESTING

### Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
SUNOL SCIENCES	Horn antenna	DRH-118	A052604	2011-05-05	2012-05-05

\* **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**

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

*\*The testing was performed by Walt Kang on 2011-08-17.*

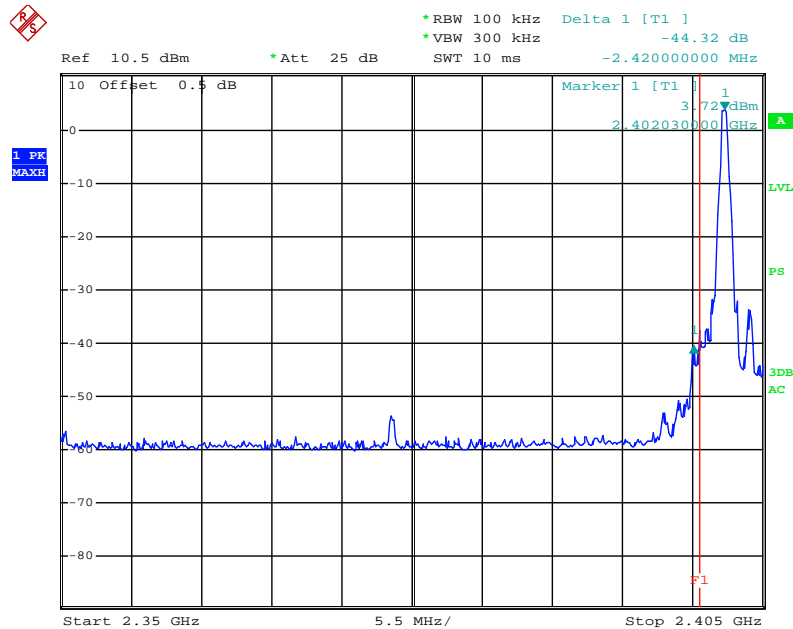
**Test Result:** Compliant, please refer to the following table and plots.

*Test Mode: Transmitting*

Mode	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR	2399.61	44.32	20
	2484.00	56.16	20
EDR	2399.714	46.30	20
	2506.000	55.29	20

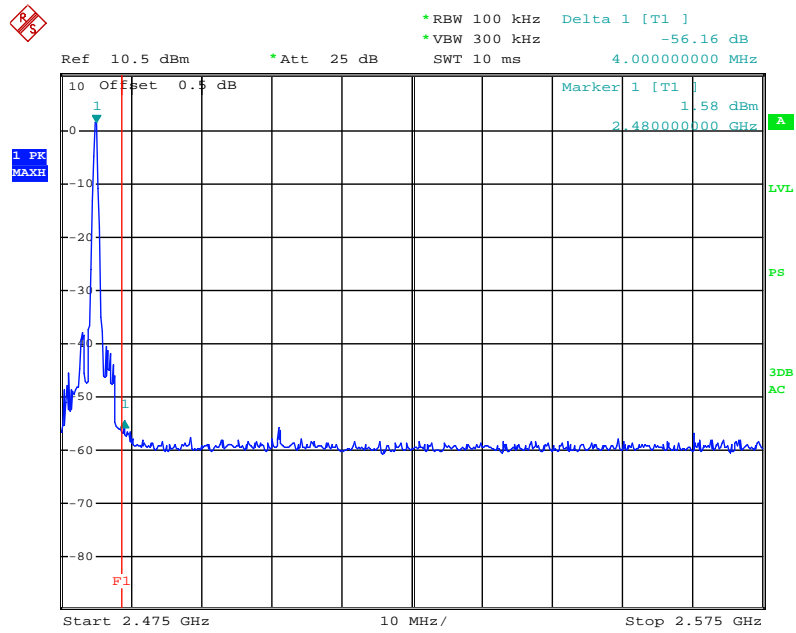
**BDR:**

**Band Edge: Left Side**



Date: 17.AUG.2011 21:18:46

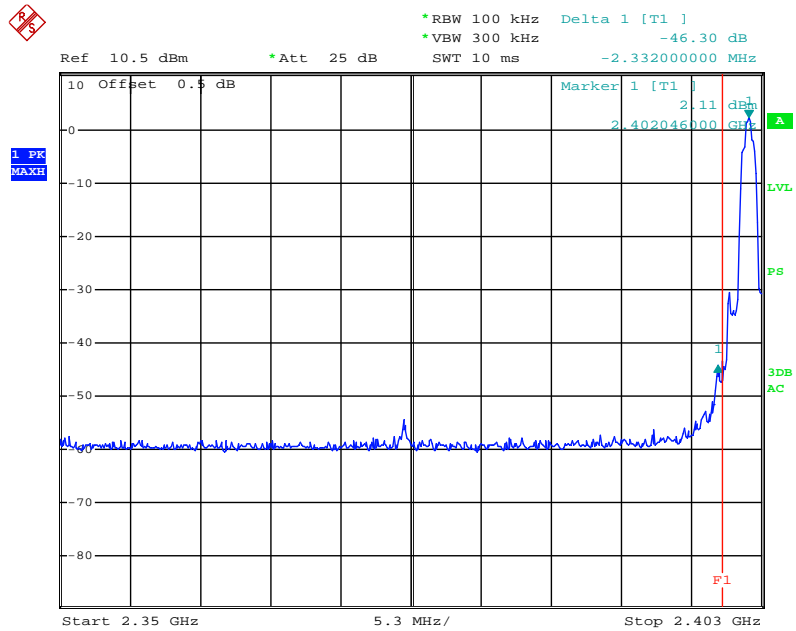
### Band Edge: Right Side



Date: 17.AUG.2011 21:29:08

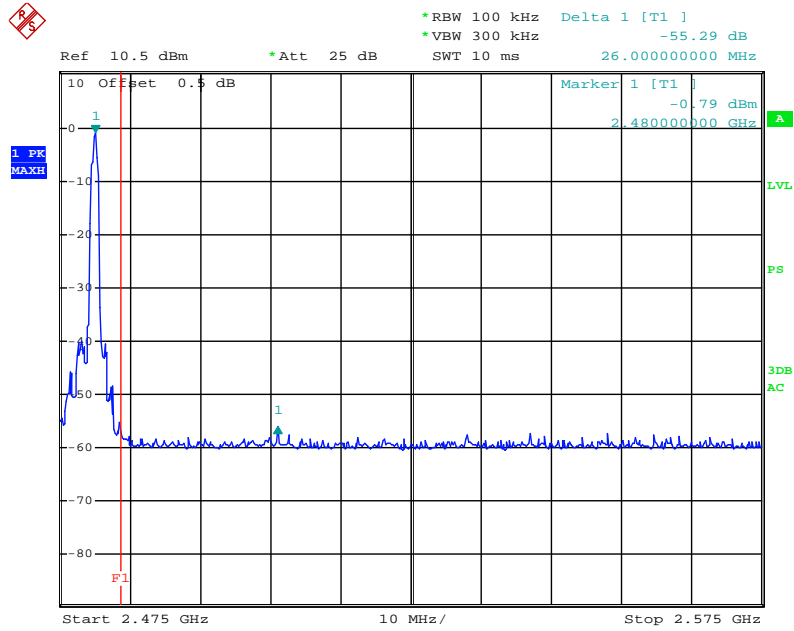
EDR:

### Band Edge: Left Side



Date: 17.AUG.2011 21:36:41

### Band Edge: Right Side



Date: 17.AUG.2011 21:31:38

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