



## FCC PART 15.247

### TEST REPORT

For

### Nexpro International Limitada

San Jose-Goicoechea, Guadalupe, Barrio Tournon, Frente Al Hotel Villas Tournon, Oficinas Del Bufete  
Facio Y Canas, Costa Rica

**FCC ID: ZYPF5010A**

<b>Report Type:</b> Original Report	<b>Product Type:</b> GSM Mobile Phone
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<b>Report Number:</b> <u>R1DG120426004-00B</u>	
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\* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk “★” (Rev.2)

## TABLE OF CONTENTS

<b>GENERAL INFORMATION.....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE .....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY .....	4
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EQUIPMENT MODIFICATIONS .....	6
SUPPORT EQUIPMENT LIST AND DETAILS .....	6
BLOCK DIAGRAM OF TEST SETUP .....	6
<b>SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
<b>FCC §15.247 (I) AND §2.1093 – RF EXPOSURE .....</b>	<b>8</b>
APPLICABLE STANDARD .....	8
RESULT: COMPLIANCE .....	9
<b>FCC §15.203 - ANTENNA REQUIREMENT.....</b>	<b>10</b>
APPLICABLE STANDARD .....	10
ANTENNA CONNECTOR CONSTRUCTION .....	10
<b>FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS .....</b>	<b>11</b>
APPLICABLE STANDARD .....	11
MEASUREMENT UNCERTAINTY .....	11
EUT SETUP .....	11
EMI TEST RECEIVER SETUP.....	12
TEST EQUIPMENT LIST AND DETAILS.....	12
TEST PROCEDURE .....	12
TEST RESULTS SUMMARY .....	12
TEST DATA .....	12
<b>FCC §15.209, §15.205 &amp; §15.247(d) - SPURIOUS EMISSIONS.....</b>	<b>15</b>
APPLICABLE STANDARD .....	15
MEASUREMENT UNCERTAINTY .....	15
EUT SETUP .....	15
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP .....	16
TEST PROCEDURE .....	16
TEST EQUIPMENT LIST AND DETAILS.....	16
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	16
TEST RESULTS SUMMARY .....	17
TEST DATA .....	17
<b>FCC §15.247(a) (1) - CHANNEL SEPARATION TEST .....</b>	<b>21</b>
APPLICABLE STANDARD .....	21
TEST EQUIPMENT LIST AND DETAILS.....	21
TEST PROCEDURE .....	21
TEST DATA .....	21
<b>FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING .....</b>	<b>28</b>

APPLICABLE STANDARD .....	28
TEST PROCEDURE .....	28
TEST EQUIPMENT LIST AND DETAILS.....	28
TEST DATA .....	28
<b>FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST.....</b>	<b>35</b>
APPLICABLE STANDARD .....	35
TEST PROCEDURE .....	35
TEST EQUIPMENT LIST AND DETAILS.....	35
TEST DATA .....	35
<b>FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME).....</b>	<b>38</b>
APPLICABLE STANDARD .....	38
TEST PROCEDURE .....	38
TEST EQUIPMENT LIST AND DETAILS.....	38
TEST DATA .....	38
<b>FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT.....</b>	<b>54</b>
APPLICABLE STANDARD .....	54
TEST PROCEDURE .....	54
TEST EQUIPMENT LIST AND DETAILS.....	54
TEST DATA .....	54
<b>FCC §15.247(d) - BAND EDGES TESTING .....</b>	<b>56</b>
APPLICABLE STANDARD .....	56
TEST PROCEDURE .....	56
TEST EQUIPMENT LIST AND DETAILS.....	56
TEST DATA .....	57

## GENERAL INFORMATION

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

The *Nexpro International Limitada*'s product, model number: *Dolphin F5010a* (FCC ID: ZYPF5010A) (the "EUT") in this report was a *GSM Mobile Phone*, which was measured approximately: 11.3 cm (L) x 6.3cm (W) x 1.4cm (H), rated input voltage: DC 3.7V Lithium battery or DC 5.0V from adapter for charging.

Adapter Information:

MODEL NO:C325A50070

ADAPTADOR ca/cc

ENTRADA: AC100-240Vca, 50/60 Hz, 120mA

SALIDA: DC5Vcc, 700mA

*\* All measurement and test data in this report was gathered from production sample serial number: 1204260004 (Assigned by BACL, Shenzhen). The EUT was received on 2012-05-08.*

### Objective

This report is prepared on behalf of *Nexpro International Limitada* 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 EUT with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

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

FCC Part 22H&24E PCE submissions with FCC ID: ZYPF5010A.

FCC Part 15B JBP submissions with FCC ID: ZYPF5010A.

FCC Part 15C DTS submissions with FCC ID: ZYPF5010A.

### 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.

The uncertainty of any RF tests which use conducted method measurement is  $\pm 0.96$  dB, the uncertainty of any radiation on emissions measurement is  $\pm 4.0$  dB

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. 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.: 273710. 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 manufacturer.

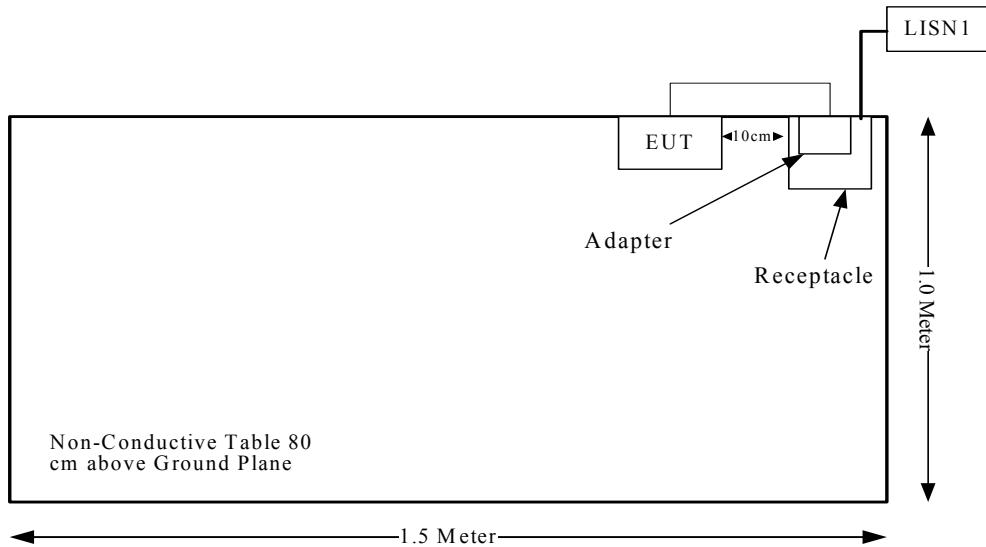
### Equipment Modifications

No modification was made to the EUT tested.

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
TESCOM	Bluetooth Tester	TC-3000B	3000B650083

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	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

## FCC §15.247 (I) AND §2.1093 – RF EXPOSURE

### Applicable Standard

According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

**Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters**

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	<u>SAR not required:</u> <u>Unlicensed only</u> <ul style="list-style-type: none"> <li>○ when stand-alone 1-g SAR is not required and antenna is <math>\geq 5</math> cm from other antennas</li> </ul> <u>Licensed &amp; Unlicensed</u> <ul style="list-style-type: none"> <li>○ when the sum of the 1-g SAR is <math>&lt; 1.6</math> W/kg for all simultaneous transmitting antennas</li> <li>○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is <math>&lt; 0.3</math></li> </ul> <u>SAR required:</u> <u>Licensed &amp; Unlicensed</u> <p>antenna pairs with SAR to peak location separation ratio <math>\geq 0.3</math>; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition</p> <p><b>Note:</b> simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</p>
Jaw, Mouth and Nose	<u>Flat phantom SAR required</u> <ul style="list-style-type: none"> <li>○ when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues</li> <li>○ position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations</li> </ul>	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

- 1) Bluetooth can transmit simultaneously with Wi-Fi and GSM.
- 2) The distance between BT and GSM antenna is cm 7.5cm> 5cm. The max output power of Bluetooth antenna is (6.94dBm) 4.94mW < 2P<sub>Ref</sub>(24mW) .According to KDB648474, stand-alone SAR is not required for BT antenna and simultaneous SAR evaluation is not required for Bluetooth and GSM antennas.
- 3) P<sub>Ref</sub> is defined as the maximum conducted power available at the antenna according to source-based time-averaging requirements of Section 2.1093(d) (5).

**Result:** Compliance

## **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 has a PIFA antenna, which complied with 15.203, the maximum gain is 1.33dBi, please refer to the internal photos.

**Result:** Compliance.

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

### Applicable Standard

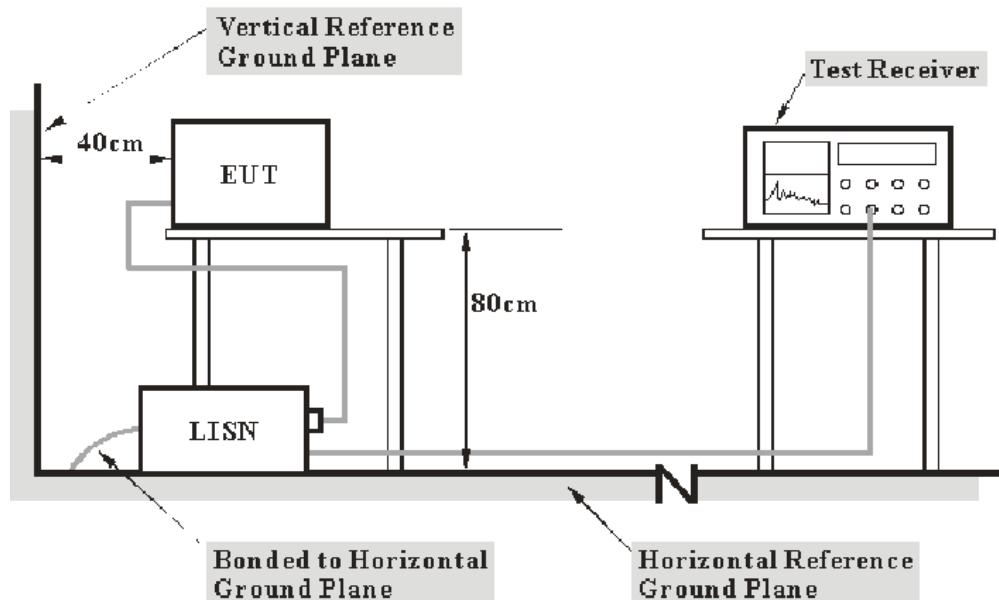
FCC §15.207

### 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 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 PC 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:

<b><u>Frequency Range</u></b>	<b><u>IF BW</u></b>
150 kHz – 30 MHz	9 kHz

## 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	ESCS30	101122	2011-11-17	2012-11-16
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16

\* **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:

**29.96 dB at 1.290 MHz in the Neutral conducted mode**

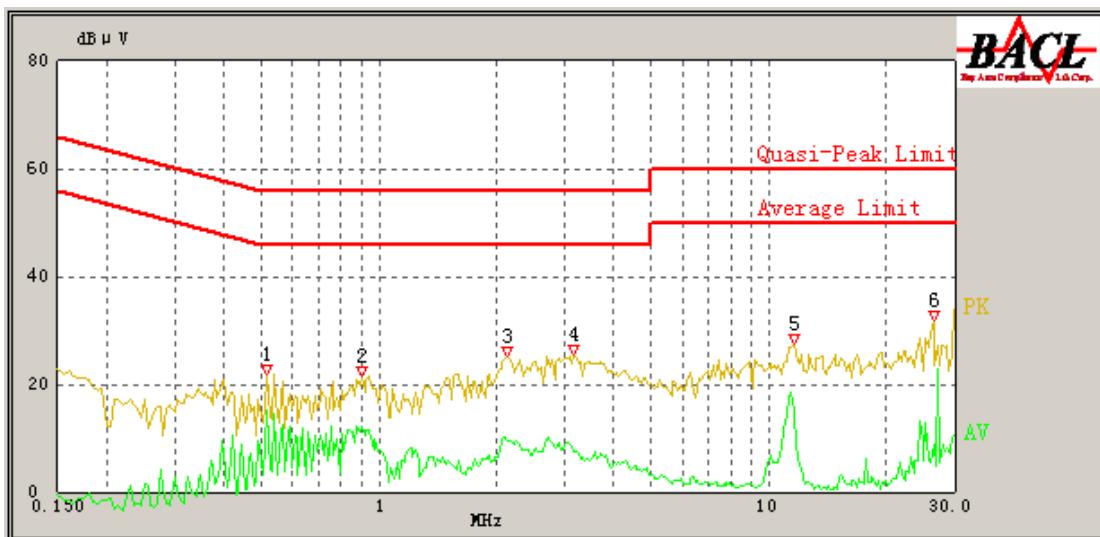
## Test Data

### Environmental Conditions

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

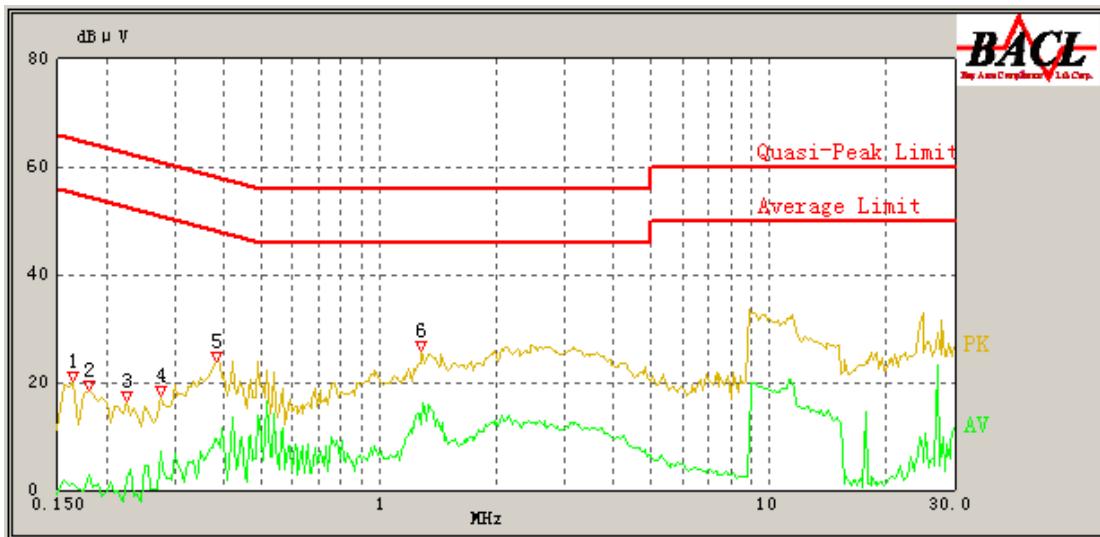
\* The testing was performed by Dean Liu on 2012-05-10.

*Test Mode: Transmitting*



Frequency (MHz)	Corrected Result (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (QP / Ave.)
0.515	18.55	0.42	56.00	37.45	QP
0.515	15.32	0.42	46.00	30.68	Ave
0.900	17.78	0.45	56.00	38.22	QP
0.900	12.14	0.45	46.00	33.86	Ave
2.140	15.95	0.48	56.00	40.05	QP
2.130	9.39	0.48	46.00	36.61	Ave
3.170	16.51	0.49	56.00	39.49	QP
3.170	7.65	0.49	46.00	38.35	Ave
11.615	18.74	0.86	60.00	41.26	QP
11.560	15.18	0.85	50.00	34.82	Ave
26.440	13.33	2.29	60.00	46.67	QP
26.610	8.67	2.27	50.00	41.33	Ave

## 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Result (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (PK /QP/Ave.)
0.165	14.55	0.41	65.57	51.02	QP
0.165	1.30	0.41	55.57	54.27	Ave
0.180	13.32	0.41	65.14	51.82	QP
0.180	2.98	0.41	55.14	52.16	Ave
0.225	10.56	0.42	63.86	53.30	QP
0.225	2.23	0.42	53.86	51.63	Ave
0.275	13.75	0.42	62.43	48.68	QP
0.275	7.14	0.42	52.43	45.29	Ave
0.385	19.95	0.42	59.29	39.34	QP
0.385	9.60	0.42	49.29	39.69	Ave
1.285	19.59	0.46	56.00	36.41	QP
1.290	16.04	0.46	46.00	29.96	Ave

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

### Applicable Standard

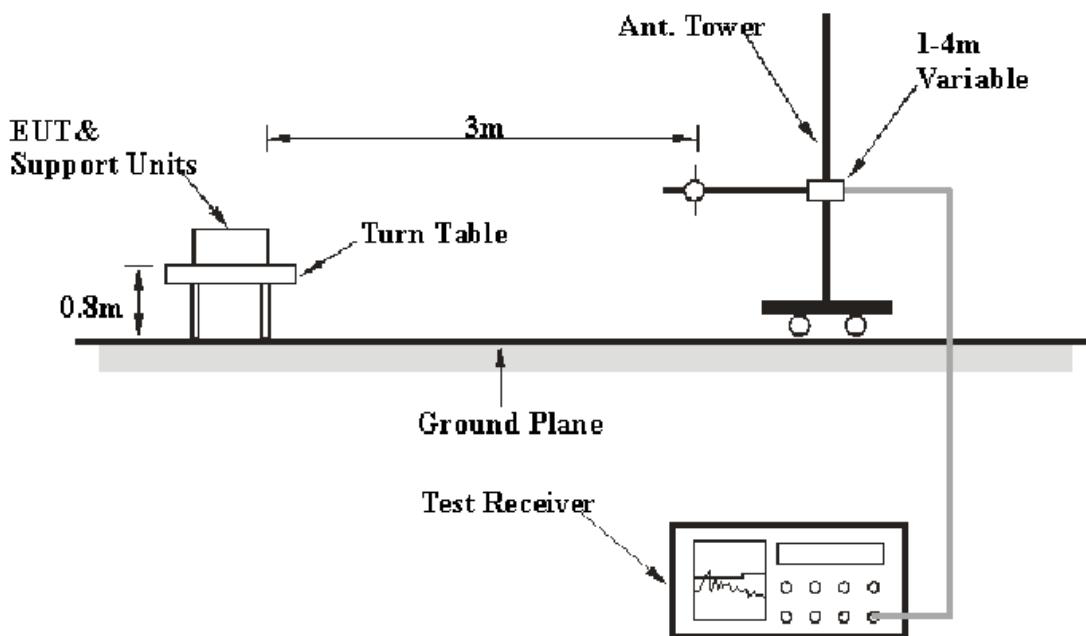
FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

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

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

### EUT Setup



The radiated emission tests were performed in the 3 meters 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 PC was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

<b>Frequency Range</b>	<b>RBW</b>	<b>Video BW</b>	<b>Detector</b>
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	Ave.

## Test Procedure

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.

## 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>
HP	Amplifier	HP8447D	2944A09795	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
DUCOMMUN Technologies	Pre-amp	ALN-09173030-01	991396-01	2011-11-24	2012-12-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2012-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ 26	8386001028	2011-11-24	2012-11-23

\* **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.

## 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 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:

**Transmitting (BDR-8DPSK) Mode: 19.5 dB at 421 MHz in the Horizontal polarization at low 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 Dean Liu on 2012-05-10.*

*Test Mode: Transmitting (BDR- GFSK)*

Frequency (MHz)	Reading (dBmV)	Detector (PK/QP /Ave.)	Polar (H/V)	Corrected Amplitude (dB/m)	Correction Data (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Comment
Low Channel (2402MHz)								
4804	17.76	Ave.	H	10.54	28.3	54	25.7	Harmonic
4804	17.22	Ave.	V	10.54	27.76	54	26.24	Harmonic
2352	14.42	Ave.	H	6.95	21.37	54	32.63	spurious
2352	14.21	Ave.	V	6.95	21.16	54	32.84	spurious
4804	33.01	PK	H	10.79	43.8	74	30.2	Harmonic
4804	32.01	PK	V	10.79	42.8	74	31.2	Harmonic
2386	28.21	PK	H	6.95	35.16	74	38.84	spurious
2386	28.09	PK	V	6.95	35.04	74	38.96	spurious
313	29.35	QP	V	-4.83	24.52	46	21.48	spurious
313	28.44	QP	H	-4.83	23.61	46	22.39	spurious
2402	60.67	PK	H	34.91	95.58	N/A	N/A	Fundamental
2402	28.34	Ave.	H	34.91	63.25	N/A	N/A	Fundamental
2402	60.93	PK	V	34.91	95.84	N/A	N/A	Fundamental
2402	28.94	Ave.	V	34.91	63.85	N/A	N/A	Fundamental
Middle Channel (2441MHz)								
4882	17.42	Ave.	H	11.07	28.49	54	25.51	Harmonic
4882	17.56	Ave.	V	11.07	28.63	54	25.37	Harmonic
4882	32.21	PK	H	11.07	43.28	74	30.72	Harmonic
4882	33.56	PK	V	11.07	44.63	74	29.37	Harmonic
259	29.84	QP	V	-6.72	23.12	46	22.88	spurious
259	28.61	QP	H	-6.72	21.89	46	24.11	spurious
2441	62.13	PK	H	35.24	97.37	N/A	N/A	Fundamental
2441	29.89	Ave.	H	35.24	65.13	N/A	N/A	Fundamental
2441	62.87	PK	V	35.24	98.11	N/A	N/A	Fundamental
2441	29.95	Ave.	V	35.24	65.19	N/A	N/A	Fundamental
High Channel (2480MHz)								
4960	17.36	Ave.	H	10.96	28.32	54	25.68	Harmonic
4960	17.25	Ave.	V	10.96	28.21	54	25.79	Harmonic
4960	33.64	PK	V	10.96	44.6	74	29.4	Harmonic
2483.5	14.56	Ave.	V	7.53	22.09	54	31.91	spurious
2483.5	14.77	Ave.	H	7.53	22.3	54	31.7	spurious
4960	32.11	PK	H	10.96	43.07	74	30.93	Harmonic
421	28.79	QP	V	-2.52	26.27	46	19.73	spurious
421	29.01	QP	H	-2.52	26.49	46	19.51	spurious
2483.5	29.05	PK	V	7.53	36.58	74	37.42	spurious
2483.5	28.64	PK	H	7.53	36.17	74	37.83	spurious
2480	60.35	PK	H	35.3	95.65	N/A	N/A	Fundamental
2480	28.09	Ave.	H	35.3	63.39	N/A	N/A	Fundamental
2480	60.67	PK	V	35.3	95.97	N/A	N/A	Fundamental
2480	28.75	Ave.	V	35.3	64.05	N/A	N/A	Fundamental

Test Mode: Transmitting (BDR- $\pi/4$ -DQPSK))

Frequency (MHz)	Reading (dBmV)	Detector (PK/QP /Ave.)	Polar (H/V)	Corrected Amplitude (dB/m)	Correction Data (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Comment
Low Channel (2402MHz)								
4804	17.43	Ave.	H	10.54	27.97	54	26.03	Harmonic
4804	16.89	Ave.	V	10.54	27.43	54	26.57	Harmonic
2352	14.09	Ave.	H	6.95	21.04	54	32.96	spurious
2352	13.88	Ave.	V	6.95	20.83	54	33.17	spurious
4804	32.35	PK	H	10.79	43.14	74	30.86	Harmonic
4804	31.35	PK	V	10.79	42.14	74	31.86	Harmonic
2386	27.55	PK	H	6.95	34.5	74	39.5	spurious
2386	27.43	PK	V	6.95	34.38	74	39.62	spurious
313	28.69	QP	V	-4.83	23.86	46	22.14	spurious
313	27.78	QP	H	-4.83	22.95	46	23.05	spurious
2402	59.99	PK	H	34.91	94.9	N/A	N/A	Fundamental
2402	27.66	Ave.	H	34.91	62.57	N/A	N/A	Fundamental
2402	60.25	PK	V	34.91	95.16	N/A	N/A	Fundamental
2402	28.26	Ave.	V	34.91	63.17	N/A	N/A	Fundamental
Middle Channel (2441MHz)								
4882	17.09	Ave.	H	11.07	28.16	54	25.84	Harmonic
4882	17.23	Ave.	V	11.07	28.3	54	25.7	Harmonic
4882	31.88	PK	H	11.07	42.95	74	31.05	Harmonic
4882	33.23	PK	V	11.07	44.3	74	29.7	Harmonic
259	29.18	QP	V	-6.72	22.46	46	23.54	spurious
259	27.95	QP	H	-6.72	21.23	46	24.77	spurious
2441	61.47	PK	H	35.24	96.71	N/A	N/A	Fundamental
2441	29.21	Ave.	H	35.24	64.45	N/A	N/A	Fundamental
2441	62.19	PK	V	35.24	97.43	N/A	N/A	Fundamental
2441	29.27	Ave.	V	35.24	64.51	N/A	N/A	Fundamental
High Channel (2480MHz)								
4960	17.03	Ave.	H	10.96	27.99	54	26.01	Harmonic
4960	16.92	Ave.	V	10.96	27.88	54	26.12	Harmonic
4960	33.31	PK	V	10.96	44.27	74	29.73	Harmonic
2483.5	14.23	Ave.	V	7.53	21.76	54	32.24	spurious
2483.5	14.11	Ave.	H	7.53	21.64	54	32.36	spurious
4960	31.45	PK	H	10.96	42.41	74	31.59	Harmonic
421	28.13	QP	V	-2.52	25.61	46	20.39	spurious
421	28.35	QP	H	-2.52	25.83	46	20.17	spurious
2483.5	28.39	PK	V	7.53	35.92	74	38.08	spurious
2483.5	27.98	PK	H	7.53	35.51	74	38.49	spurious
2480	59.67	PK	H	35.3	94.97	N/A	N/A	Fundamental
2480	27.41	Ave.	H	35.3	62.71	N/A	N/A	Fundamental
2480	59.99	PK	V	35.3	95.29	N/A	N/A	Fundamental
2480	28.07	Ave.	V	35.3	63.37	N/A	N/A	Fundamental

Test Mode: Transmitting (BDR-8DPSK)

Frequency (MHz)	Reading (dBmV)	Detector (PK/QP /Ave.)	Polar (H/V)	Corrected Amplitude (dB/m)	Correction Data (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Comment
Low Channel (2402MHz)								
4804	17.89	Ave.	H	10.54	28.43	54	25.57	Harmonic
4804	17.56	Ave.	V	10.54	28.1	54	25.9	Harmonic
2352	14.35	Ave.	H	6.95	21.3	54	32.7	spurious
2352	13.95	Ave.	V	6.95	20.9	54	33.1	spurious
4804	32.95	PK	H	10.79	43.74	74	30.26	Harmonic
4804	32.01	PK	V	10.79	42.8	74	31.2	Harmonic
2386	29.01	PK	H	6.95	35.96	74	38.04	spurious
2386	28.65	PK	V	6.95	35.6	74	38.4	spurious
313	28.76	QP	V	-4.83	23.93	46	22.07	spurious
313	28.93	QP	H	-4.83	24.1	46	21.9	spurious
2402	61.01	PK	H	34.91	95.92	N/A	N/A	Fundamental
2402	28.62	Ave.	H	34.91	63.53	N/A	N/A	Fundamental
2402	61.21	PK	V	34.91	96.12	N/A	N/A	Fundamental
2402	29.56	Ave.	V	34.91	64.47	N/A	N/A	Fundamental
Middle Channel (2441MHz)								
4882	17.54	Ave.	H	11.07	28.61	54	25.39	Harmonic
4882	17.52	Ave.	V	11.07	28.59	54	25.41	Harmonic
4882	30.25	PK	H	11.07	41.32	74	32.68	Harmonic
4882	31.56	PK	V	11.07	42.63	74	31.37	Harmonic
259	28.59	QP	V	-6.72	21.87	46	24.13	spurious
259	26.55	QP	H	-6.72	19.83	46	26.17	spurious
2441	62.73	PK	H	35.24	97.97	N/A	N/A	Fundamental
2441	30.11	Ave.	H	35.24	65.35	N/A	N/A	Fundamental
2441	63.14	PK	V	35.24	98.38	N/A	N/A	Fundamental
2441	30.27	Ave.	V	35.24	65.51	N/A	N/A	Fundamental
High Channel (2480MHz)								
4960	18.02	Ave.	H	10.96	28.98	54	25.02	Harmonic
4960	17.65	Ave.	V	10.96	28.61	54	25.39	Harmonic
4960	35.62	PK	V	10.96	46.58	74	27.42	Harmonic
2483.5	14.56	Ave.	V	7.53	22.09	54	31.91	spurious
2483.5	14.83	Ave.	H	7.53	22.36	54	31.64	spurious
4960	33.76	PK	H	10.96	44.72	74	29.28	Harmonic
421	29.02	QP	V	-2.52	26.5	46	19.5	spurious
421	27.36	QP	H	-2.52	24.84	46	21.16	spurious
2483.5	30.11	PK	V	7.53	37.64	74	36.36	spurious
2483.5	31.53	PK	H	7.53	39.06	74	34.94	spurious
2480	61.2	PK	H	35.3	96.5	N/A	N/A	Fundamental
2480	29.02	Ave.	H	35.3	64.32	N/A	N/A	Fundamental
2480	61.9	PK	V	35.3	97.2	N/A	N/A	Fundamental
2480	29.13	Ave.	V	35.3	64.43	N/A	N/A	Fundamental

## 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 2400-2483.50 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	101122	2011-11-17	2012-11-16

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

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

### Test Data

#### Environmental Conditions

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

\* The testing was performed by Dean Liu on 2012-05-11.

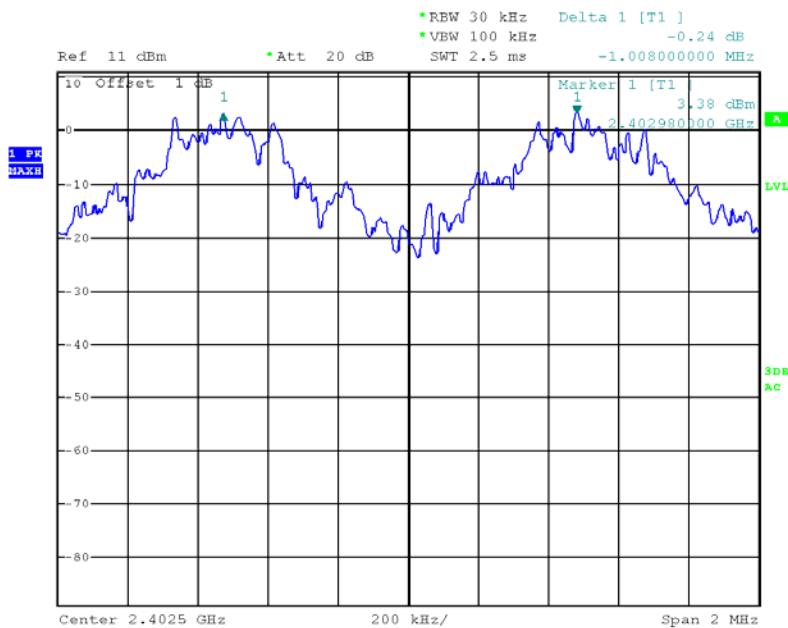
**Test Result:** Compliance.

Please refer to following tables and plots

*Test Mode: Transmitting*

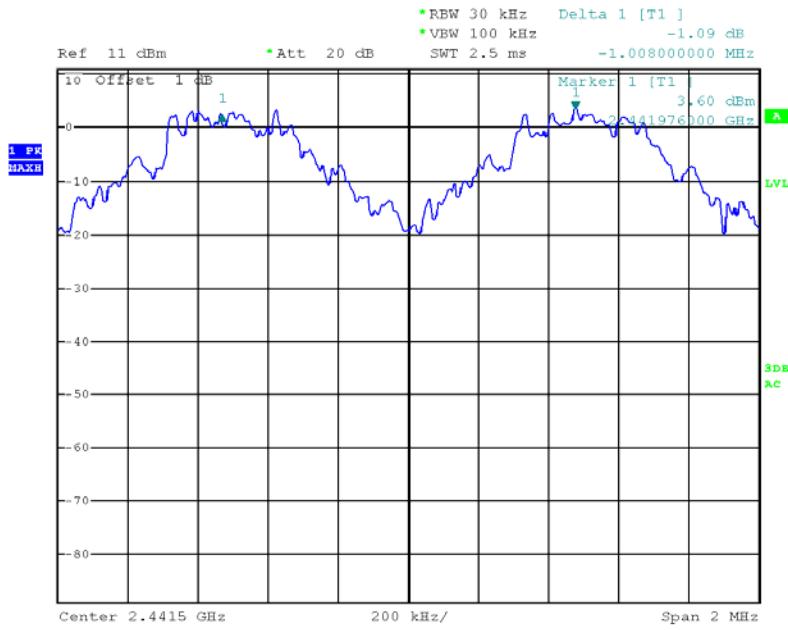
Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
<i>BDR Mode (GFSK)</i>	Low	2402	1.008	0.616	Pass
	Adjacent	2403			
	Middle	2441	1.008	0.624	Pass
	Adjacent	2442			
	High	2480	1.000	0.624	Pass
	Adjacent	2479			
<i>EDR Mode (<math>\pi/4</math>-DQPSK)</i>	Low	2402	1.000	0.832	Pass
	Adjacent	2403			
	Middle	2441	1.008	0.875	Pass
	Adjacent	2442			
	High	2480	1.008	0.872	Pass
	Adjacent	2479			
<i>EDR Mode (8DPSK)</i>	Low	2402	1.004	0.848	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.851	Pass
	Adjacent	2442			
	High	2480	1.000	0.851	Pass
	Adjacent	2479			

## **BDR - Low Channel**

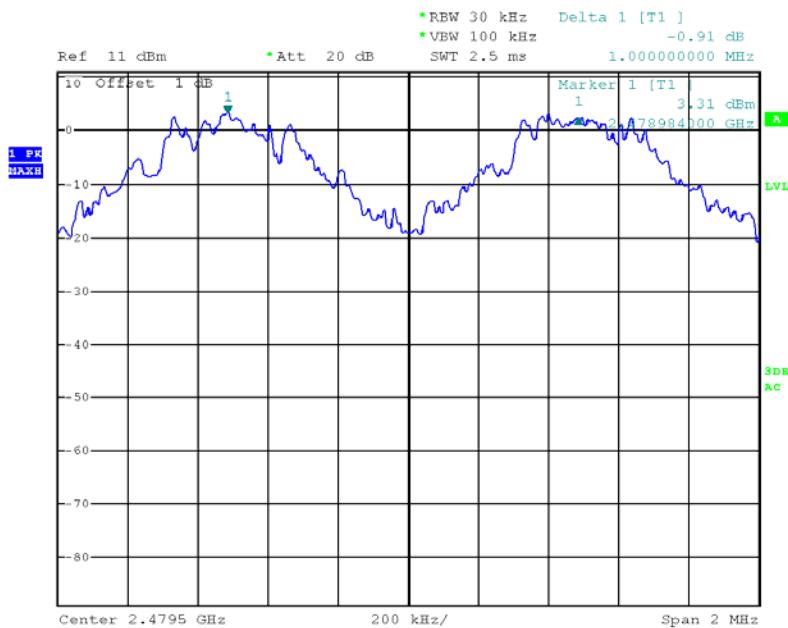


Date: 11.MAY.2012 15:32:06

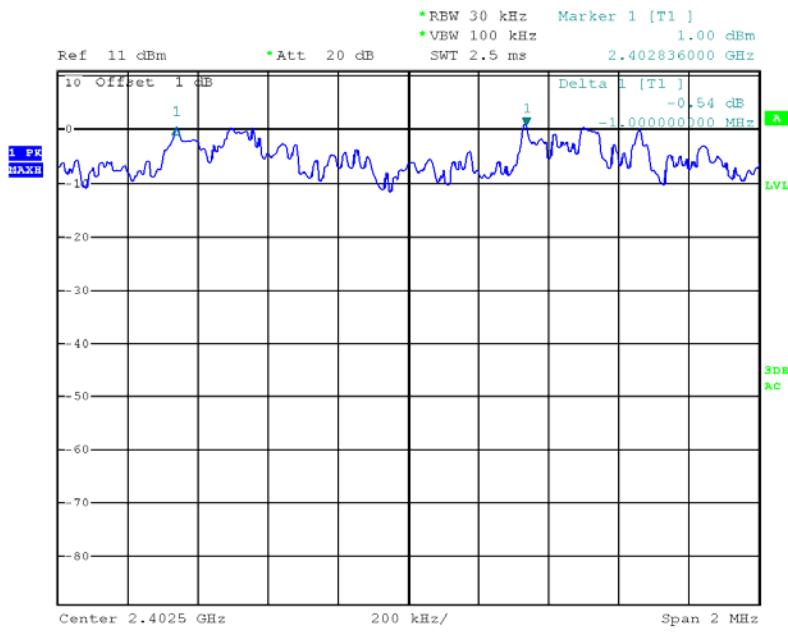
## BDR - Middle Channel



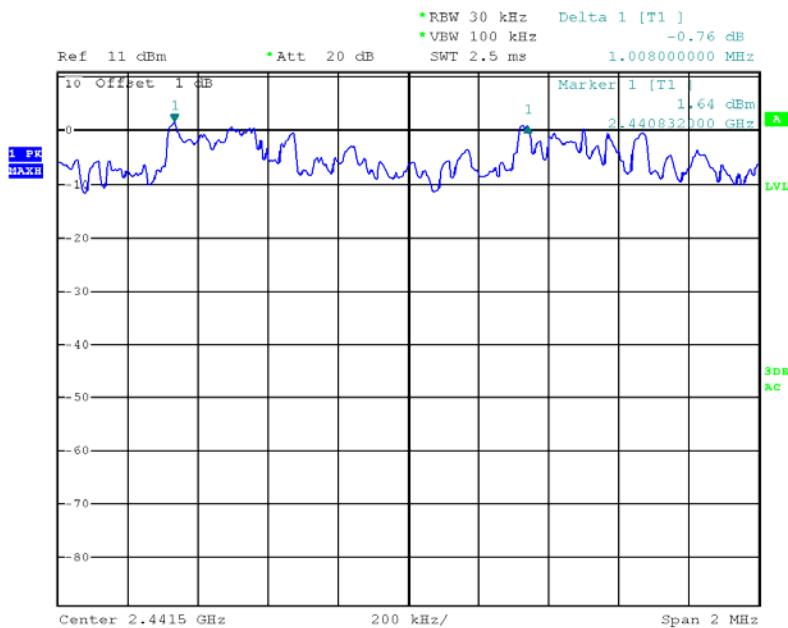
Date: 11.MAY.2012 15:34:24

**BDR - High Channel**

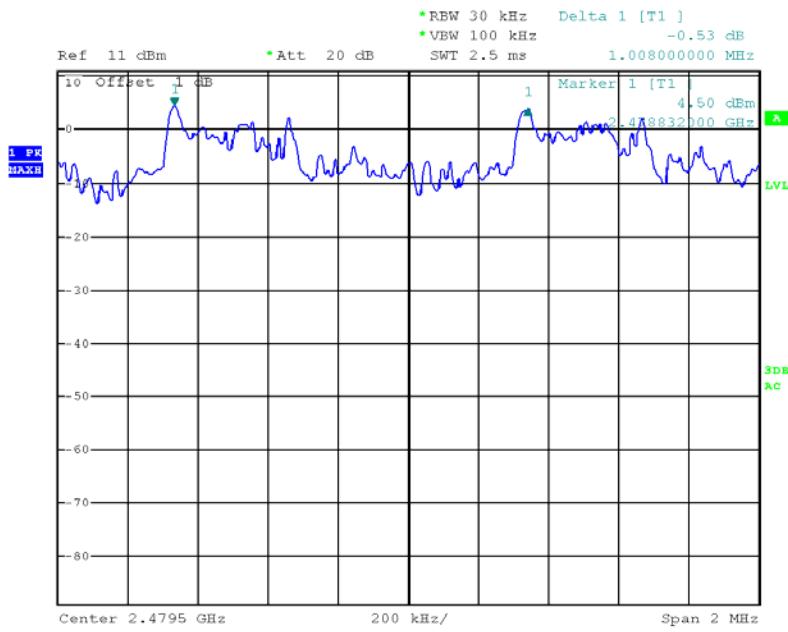
Date: 11.MAY.2012 15:35:54

**EDR ( $\pi/4$ -DQPSK) - Low Channel**

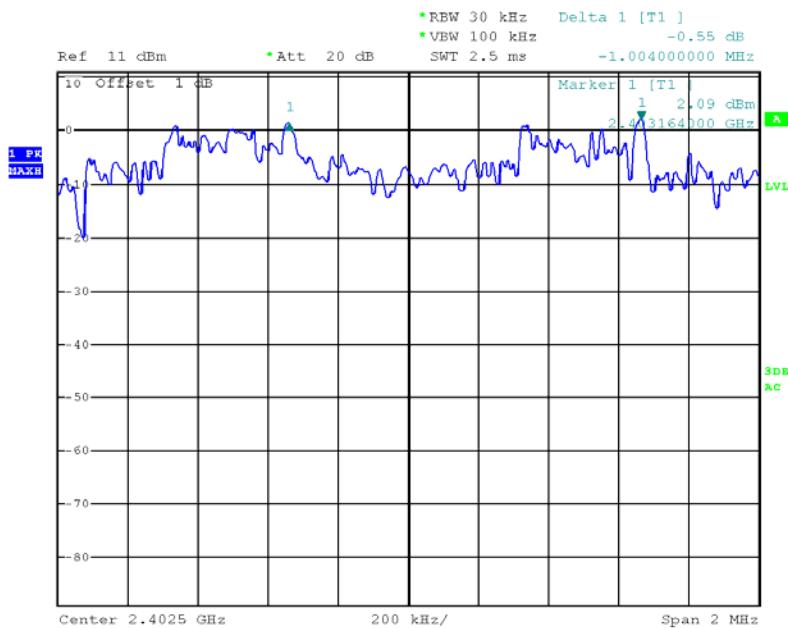
Date: 11.MAY.2012 15:51:49

**EDR ( $\pi/4$ -DQPSK) - Middle Channel**

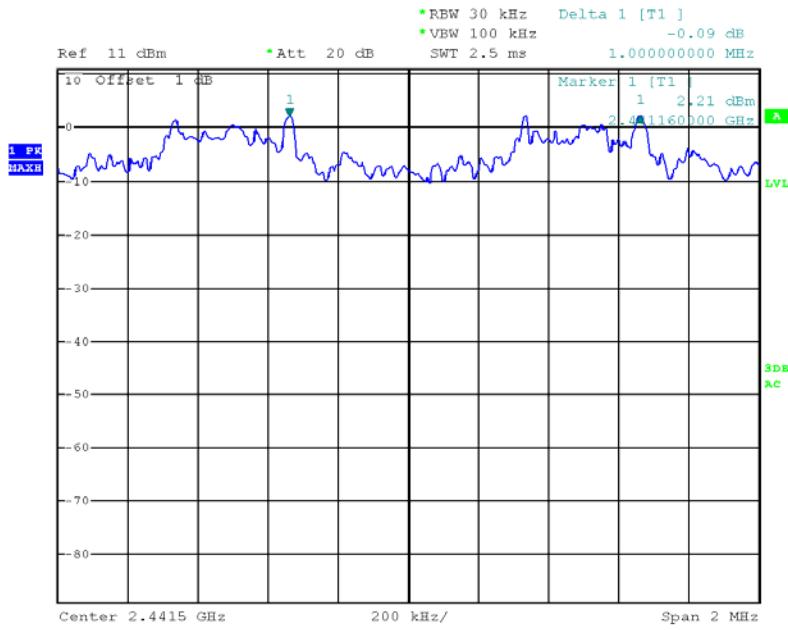
Date: 11.MAY.2012 15:53:47

**EDR ( $\pi/4$ -DQPSK) - High Channel**

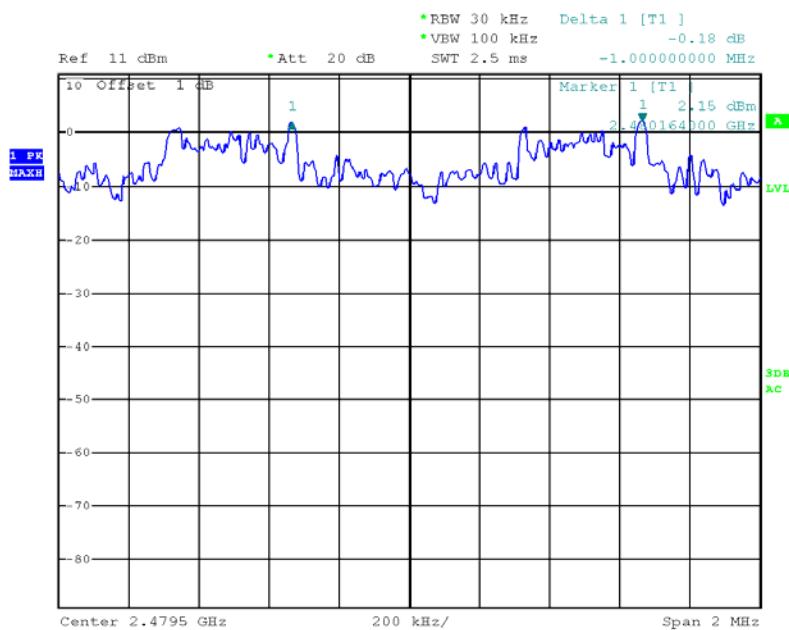
Date: 11.MAY.2012 15:58:18

**EDR (8DPSK) - Low Channel**

Date: 11.MAY.2012 15:48:16

**EDR (8DPSK) - Middle Channel**

Date: 11.MAY.2012 15:40:51

**EDR (8DPSK) - High Channel**

Date: 11.MAY.2012 15:38:06

## 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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

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

### Test Data

#### Environmental Conditions

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

\* The testing was performed by Dean Liu on 2012-05-11.

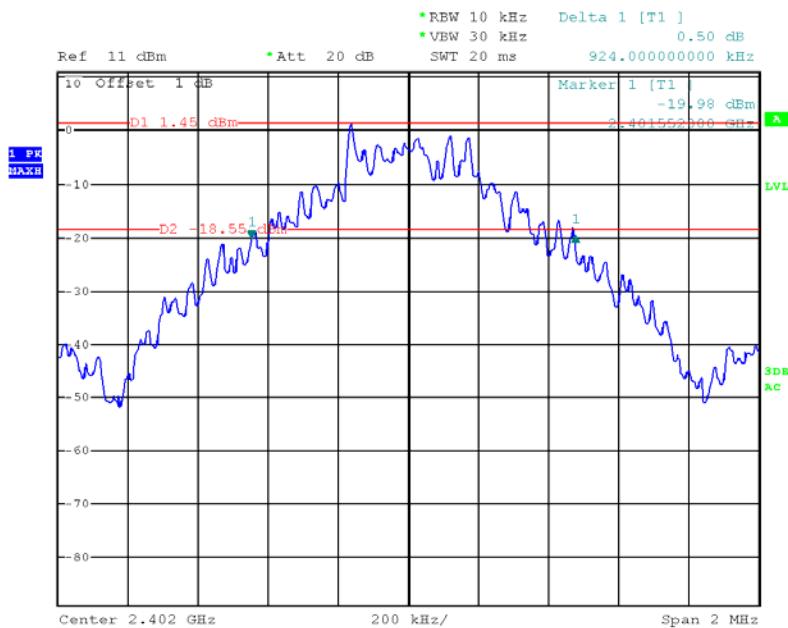
**Test Result:** Compliance.

Please refer to following tables and plots

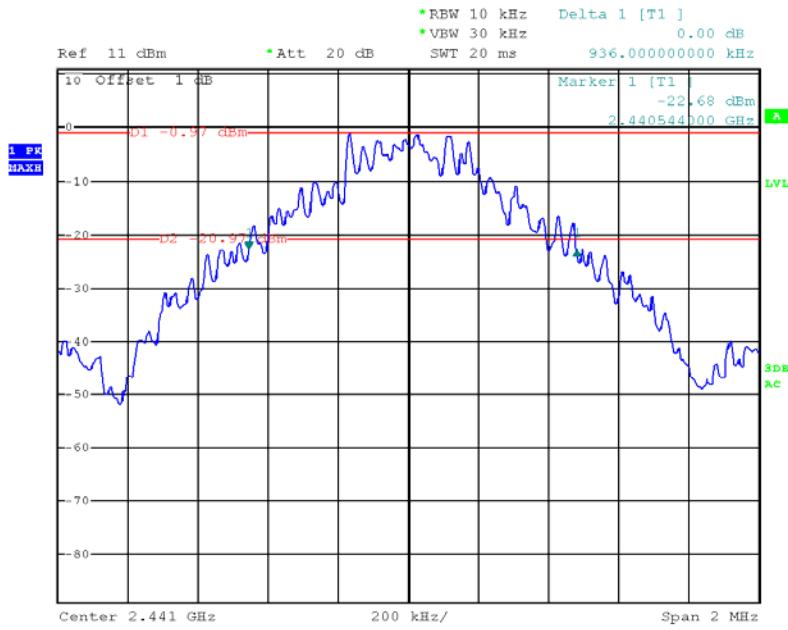
*Test Mode: Transmitting*

	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>20 dB Bandwidth (MHz)</b>
<i>BDR Mode (GFSK)</i>	Low	2402	924.000
	Middle	2441	936.000
	High	2480	936.000
<i>EDR Mode (<math>\pi/4</math>-DQPSK)</i>	Low	2402	1.248
	Middle	2441	1.312
	High	2480	1.308
<i>EDR Mode (8DPSK)</i>	Low	2402	1.272
	Middle	2441	1.276
	High	2480	1.276

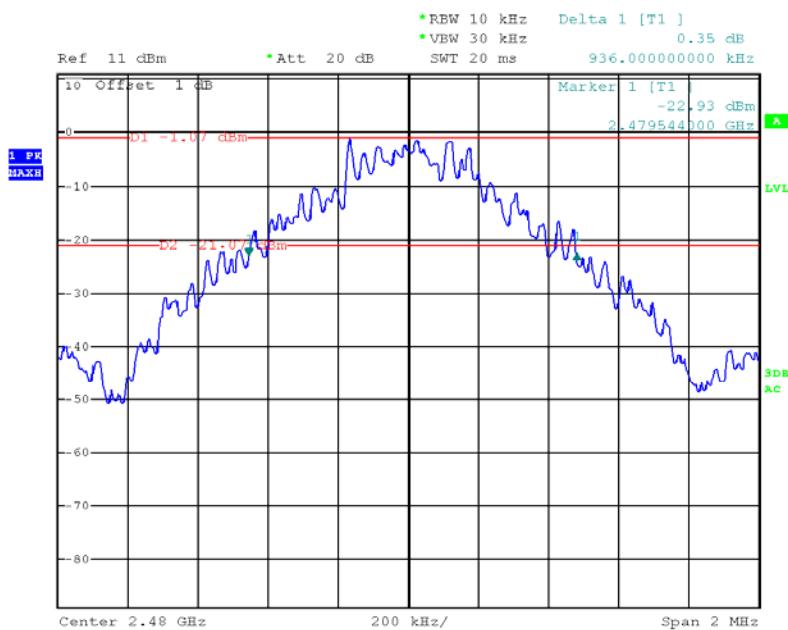
Please refer to the following plots.

**BDR - Low Channel**

Date: 11.MAY.2012 15:19:47

**BDR - Middle Channel**

Date: 11.MAY.2012 15:21:32

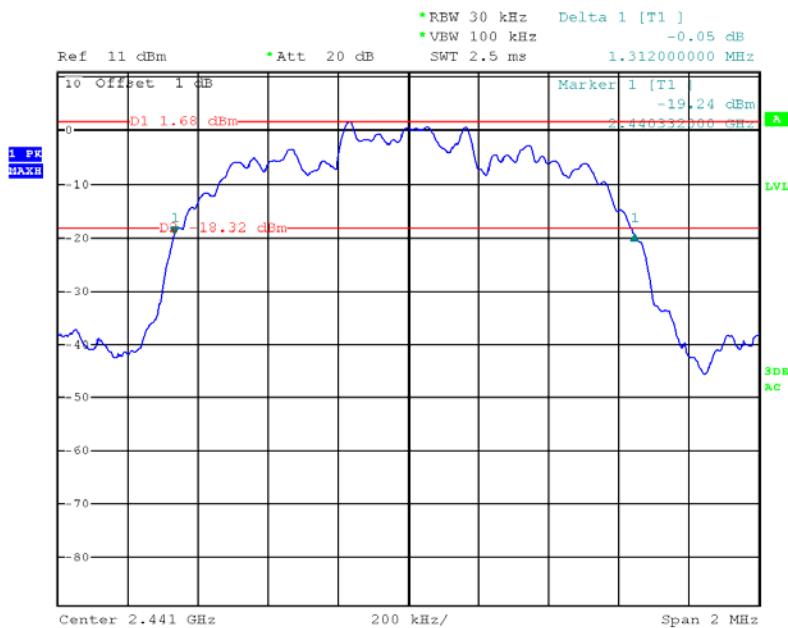
**BDR - High Channel**

Date: 11.MAY.2012 15:29:44

**EDR ( $\pi/4$ -DQPSK) - Low Channel**

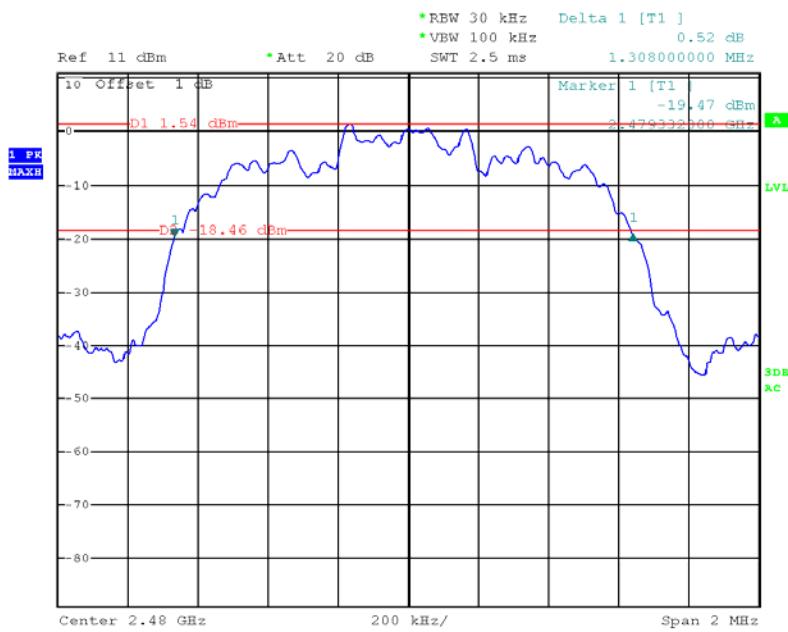
Date: 11.MAY.2012 15:04:07

## EDR ( $\pi/4$ -DQPSK) - Middle Channel

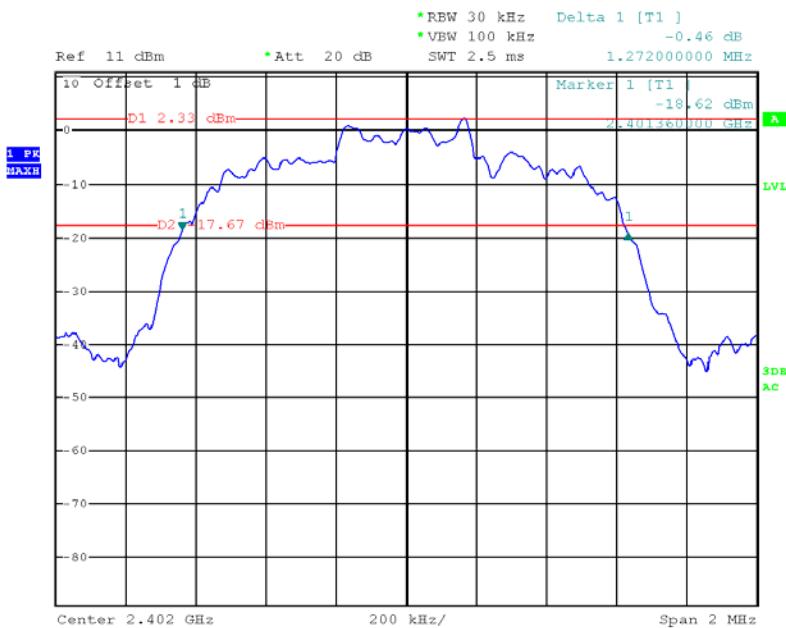


Date: 11.MAY.2012 15:05:28

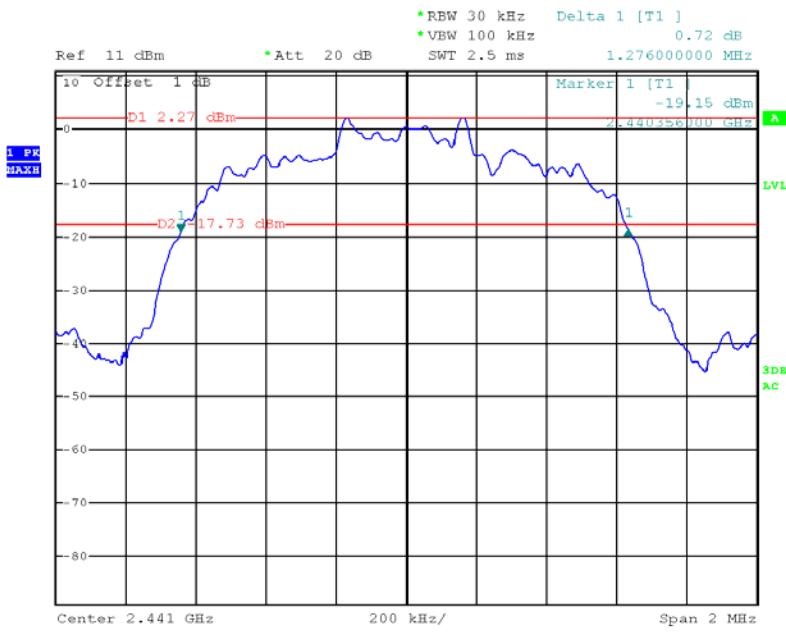
## EDR ( $\pi/4$ -DQPSK) - High Channel



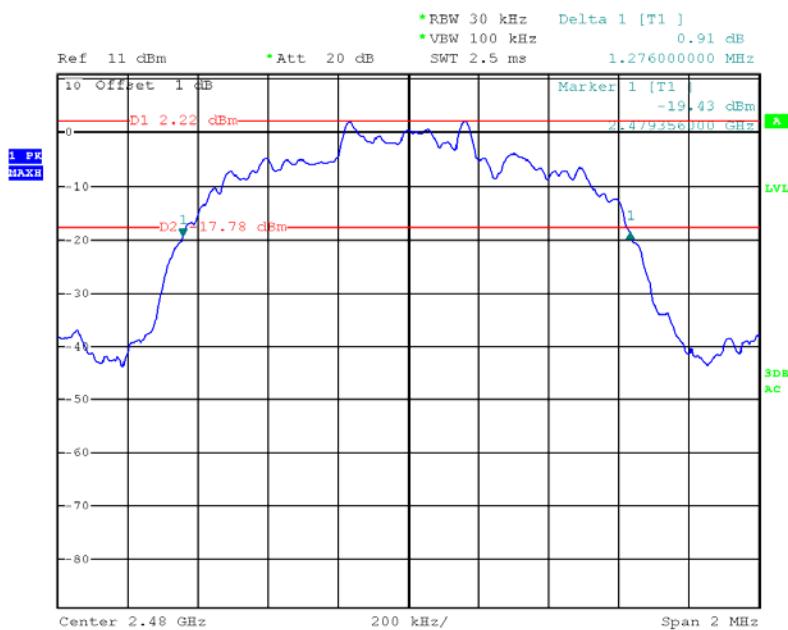
Date: 11.MAY.2012 15:07:10

**EDR (8DPSK) - Low Channel**

Date: 11.MAY.2012 15:16:03

**EDR (8DPSK) - Middle Channel**

Date: 11.MAY.2012 15:14:22

**EDR (8DPSK) - High Channel**

Date: 11.MAY.2012 15:10:06

## 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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

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

### Test Data

#### Environmental Conditions

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

The testing was performed by Dean Liu on 2012-05-11.

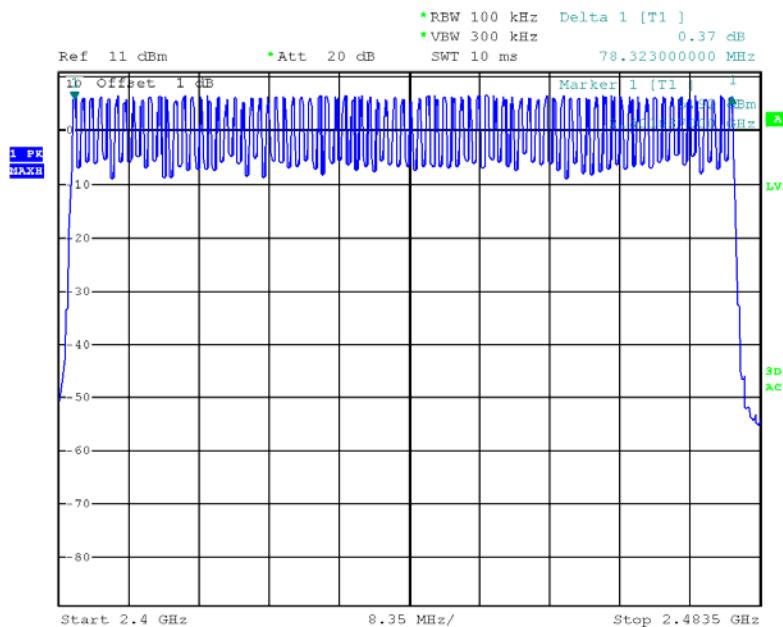
**Test Result:** Compliance.

Please refer to following tables and plots

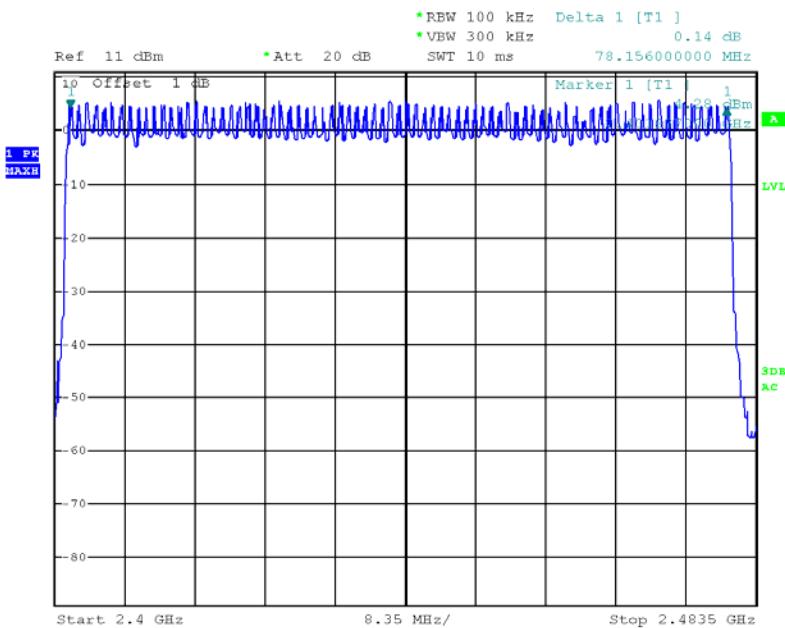
*Test Mode: Transmitting (BDR & EDR)*

	Frequency Range (MHz)	Number of Hopping Channel	Limit
BDR	2400-2483.50	79	≥15
EDR ( $\pi/4$ -DQPSK)	2400-2483.50	79	≥15
EDR (8DPSK)	2400-2483.50	79	≥15

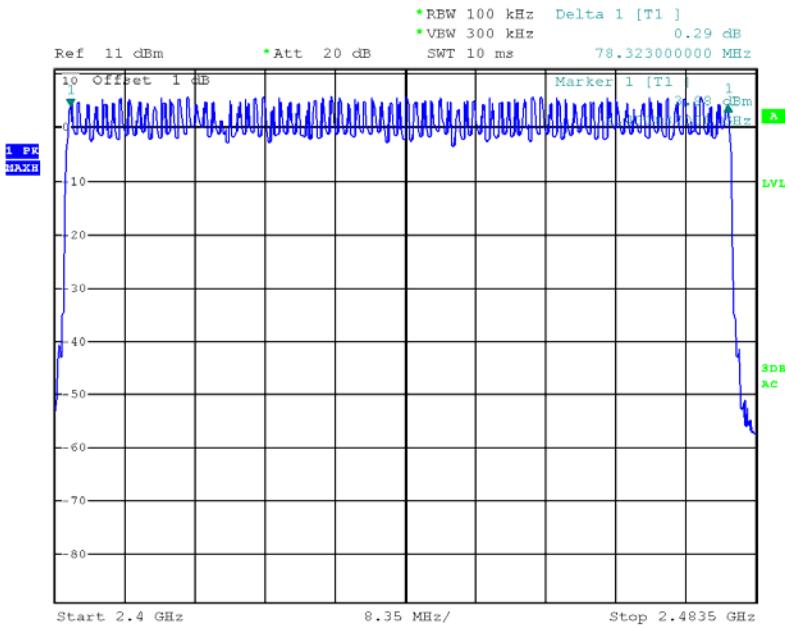
### BDR - Number of Hopping Channels



Date: 11.MAY.2012 14:24:07

**EDR ( $\pi/4$ -DQPSK) - Number of Hopping Channels**

Date: 11.MAY.2012 14:18:10

**EDR (8DPSK) - Number of Hopping Channels**

Date: 11.MAY.2012 14:20:59

**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 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= time slot length \* hop rate/ number of hopping channels \* 31.6s

Hop rate=1600/s

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	8386001028	2011-11-24	2012-12-23

\* **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 Data****Environmental Conditions**

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

\* The testing was performed by Dean Liu on 2012-05-11.

**Test Result:** Compliance.

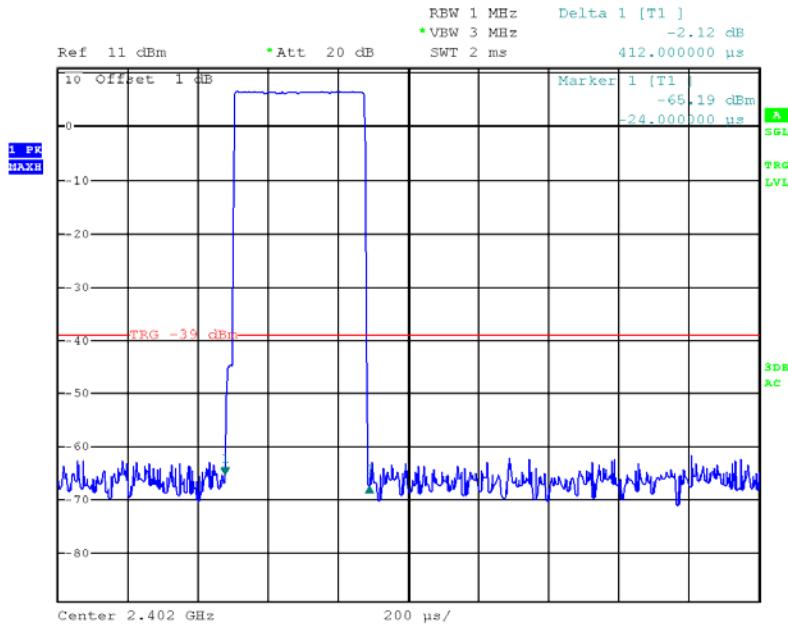
Please refer to following tables and plots

*DH1:*

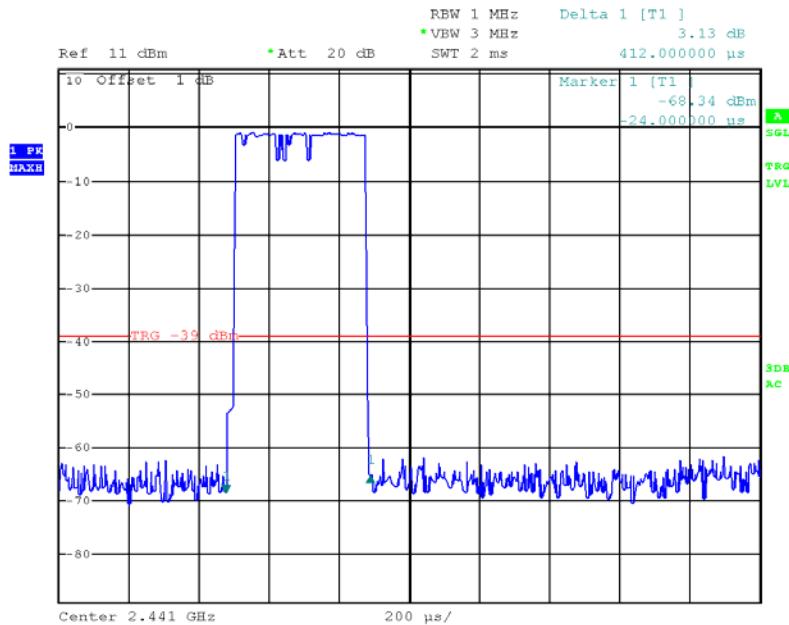
### *Test Mode: Transmitting*

	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	0.412	0.132	0.4	Pass
	Middle	0.412	0.132	0.4	Pass
	High	0.412	0.132	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				
EDR Mode ( $\pi/4$ -DQPSK)	Low	0.420	0.134	0.4	Pass
	Middle	0.420	0.134	0.4	Pass
	High	0.420	0.134	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				
EDR Mode (8DPSK)	Low	0.420	0.134	0.4	Pass
	Middle	0.420	0.134	0.4	Pass
	High	0.416	0.133	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				

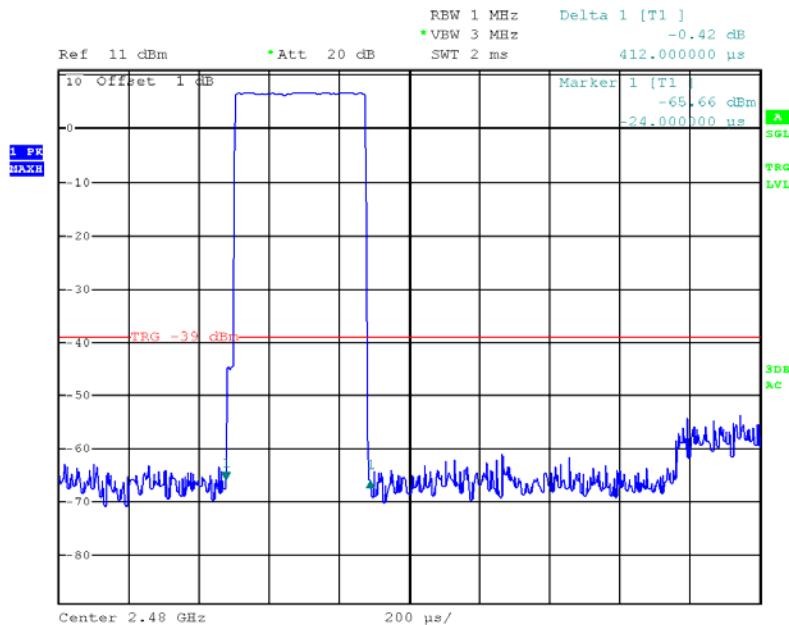
## BDR - Low Channel



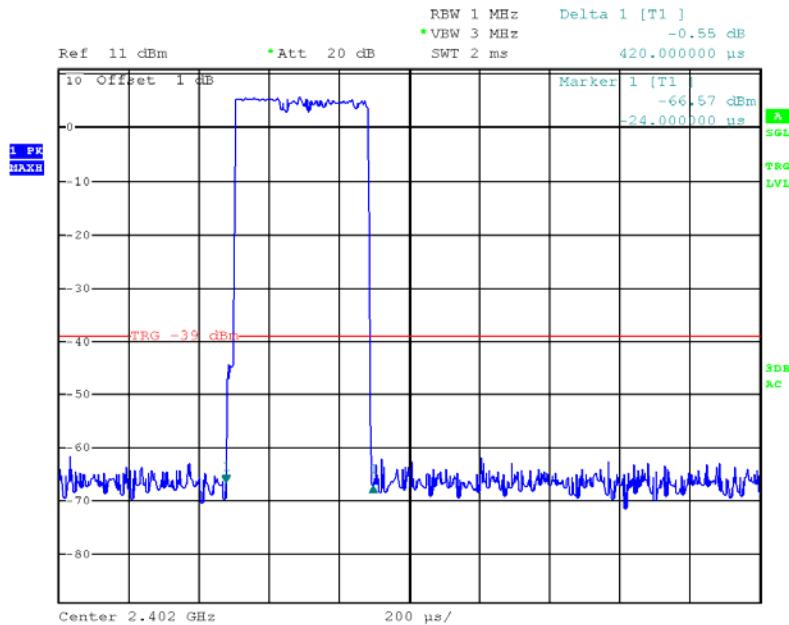
Date: 11.MAY.2012 14:26:41

**BDR - Middle Channel**

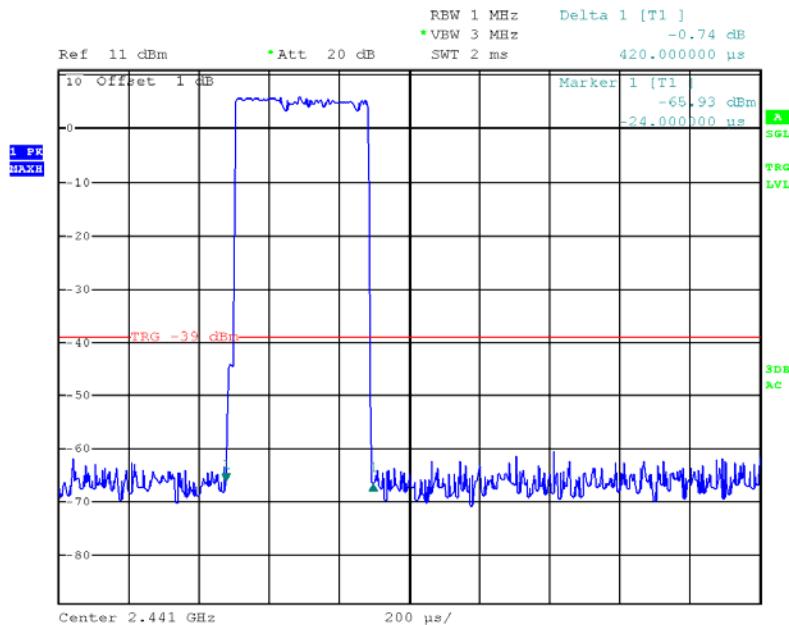
Date: 11.MAY.2012 14:27:12

**BDR - High Channel**

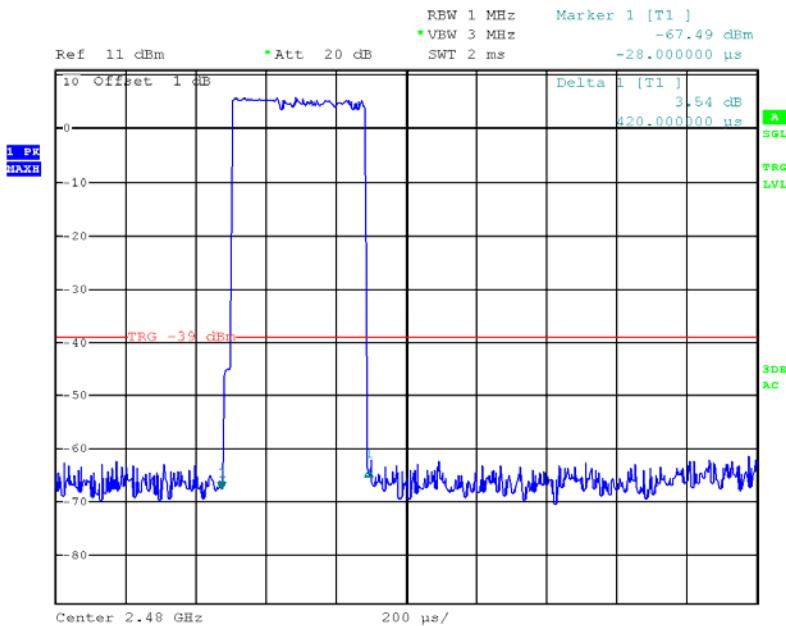
Date: 11.MAY.2012 14:27:47

**EDR ( $\pi/4$ -DQPSK) - Low Channel**

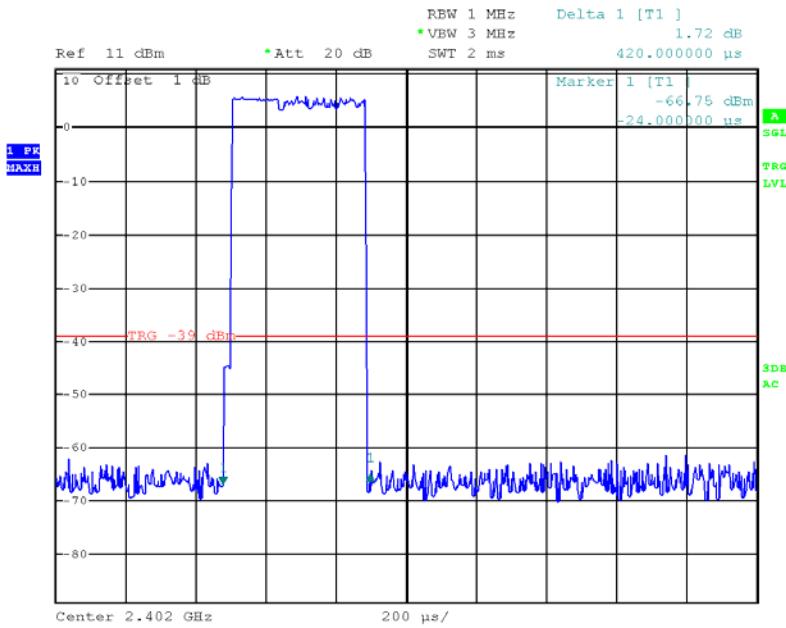
Date: 11.MAY.2012 14:30:10

**EDR ( $\pi/4$ -DQPSK) - Middle Channel**

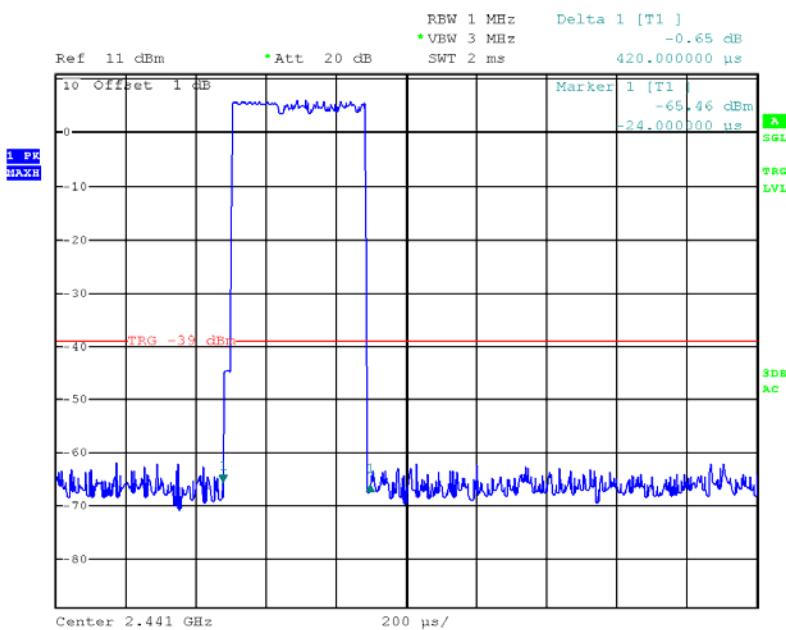
Date: 11.MAY.2012 14:29:30

**EDR ( $\pi/4$ -DQPSK) - High Channel**

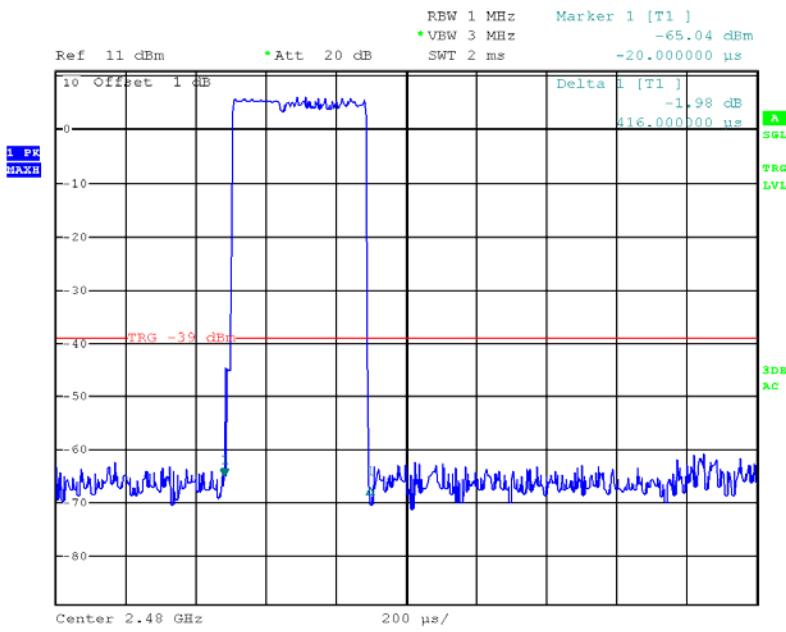
Date: 11.MAY.2012 14:29:03

**EDR (8DPSK) - Low Channel**

Date: 11.MAY.2012 14:30:44

**EDR (8DPSK) - Middle Channel**

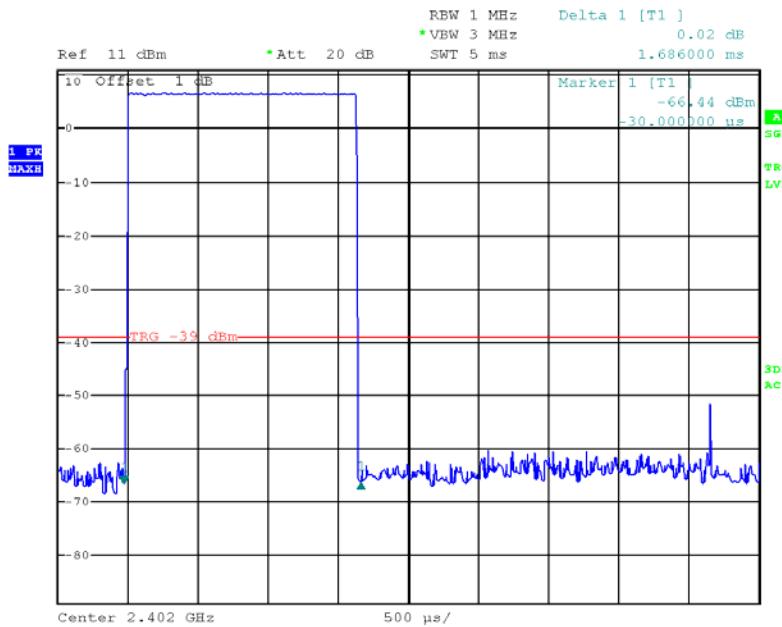
Date: 11.MAY.2012 14:31:03

**EDR (8DPSK) - High Channel**

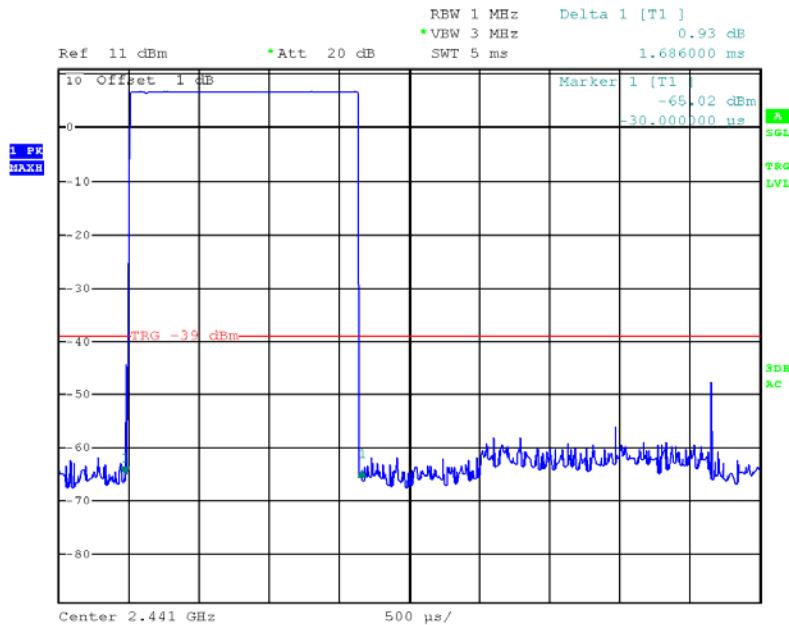
Date: 11.MAY.2012 14:31:32

**DH3:***Test Mode: Transmitting*

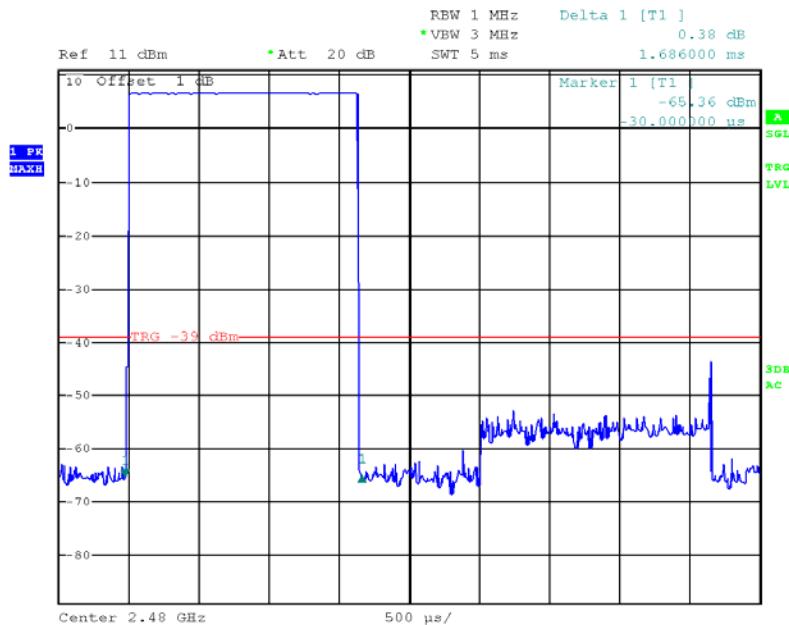
	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	1.686	0.270	0.4	Pass
	Middle	1.686	0.270	0.4	Pass
	High	1.686	0.270	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/4/79)*31.6S</i>					
EDR Mode ( $\pi/4$ -DQPSK)	Low	1.686	0.270	0.4	Pass
	Middle	1.676	0.268	0.4	Pass
	High	1.686	0.270	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/4/79)*31.6S</i>					
EDR Mode (8DPSK)	Low	1.686	0.270	0.4	Pass
	Middle	1.686	0.270	0.4	Pass
	High	1.686	0.270	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/4/79)*31.6S</i>					

**BDR - Low Channel**

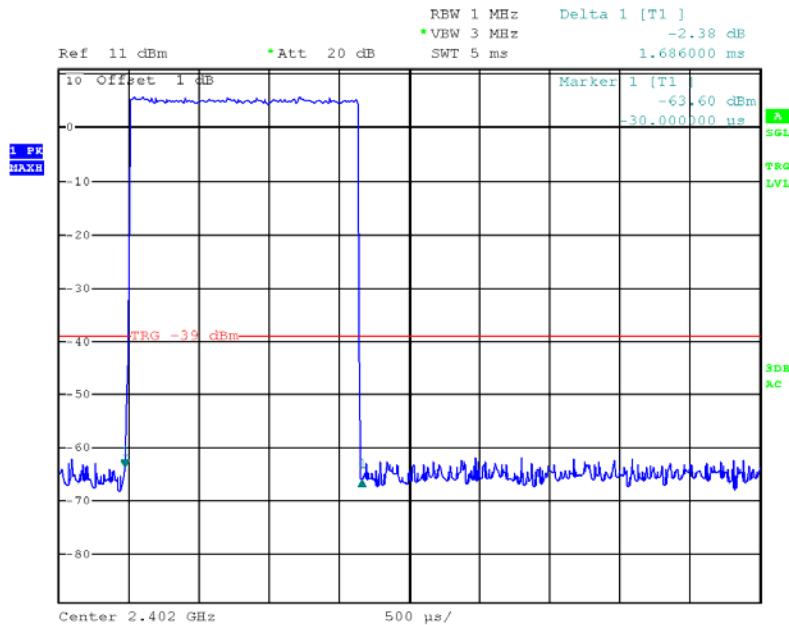
Date: 11.MAY.2012 14:38:48

**BDR - Middle Channel**

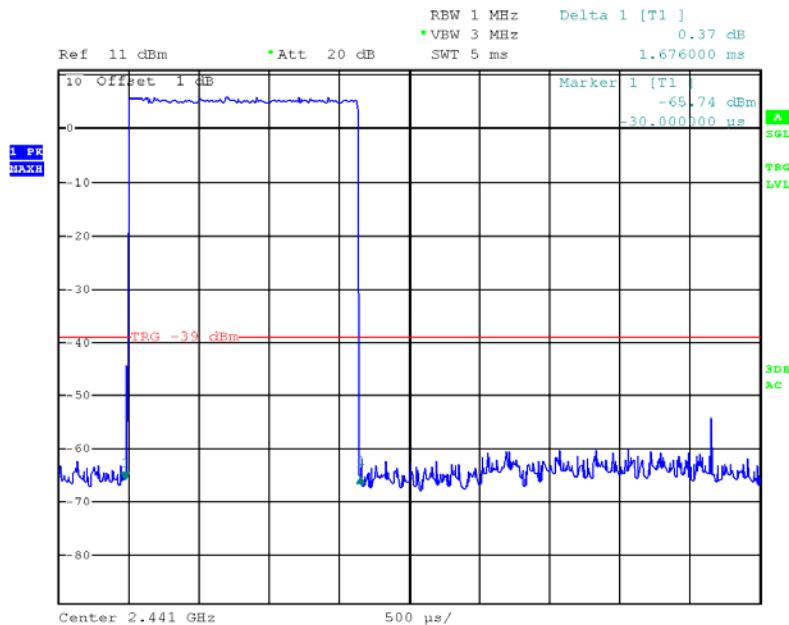
Date: 11.MAY.2012 14:39:19

**BDR - High Channel**

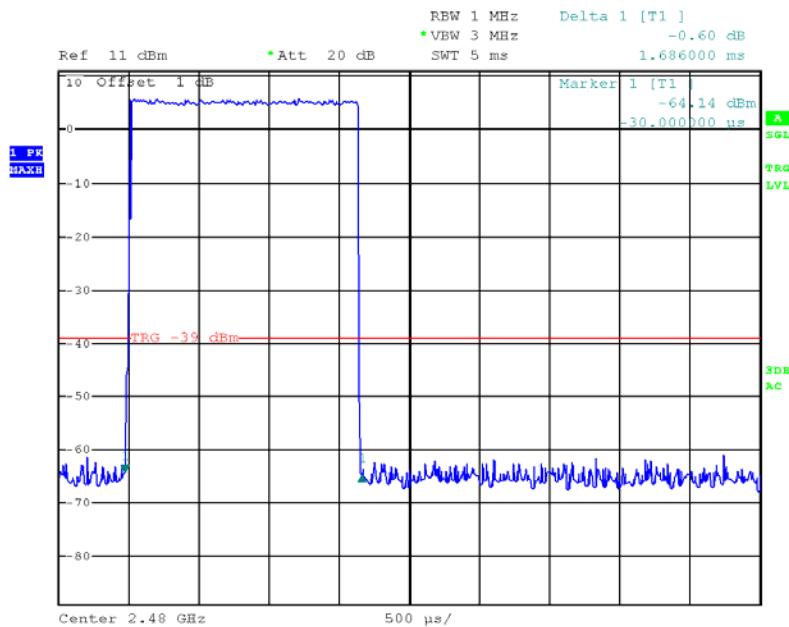
Date: 11.MAY.2012 14:39:36

**EDR ( $\pi/4$ -DQPSK) - Low Channel**

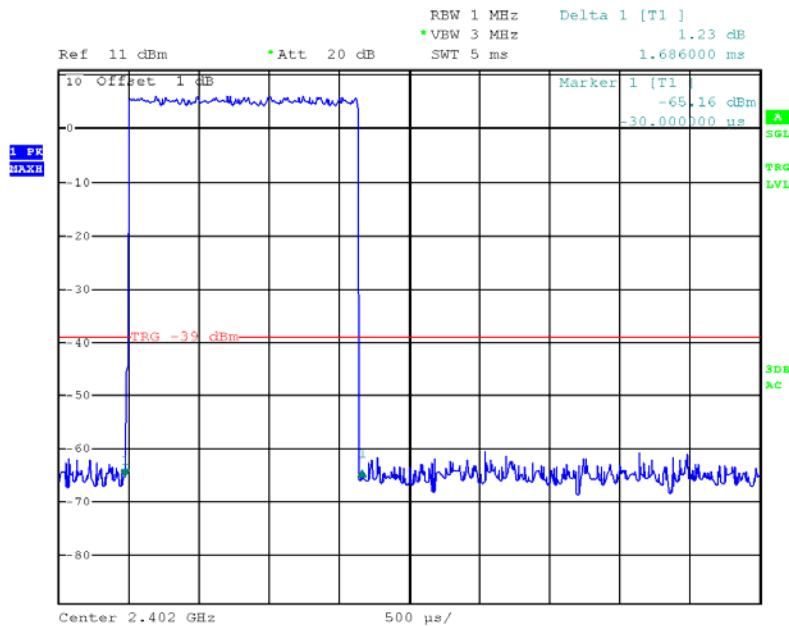
Date: 11.MAY.2012 14:33:00

**EDR ( $\pi/4$ -DQPSK) - Middle Channel**

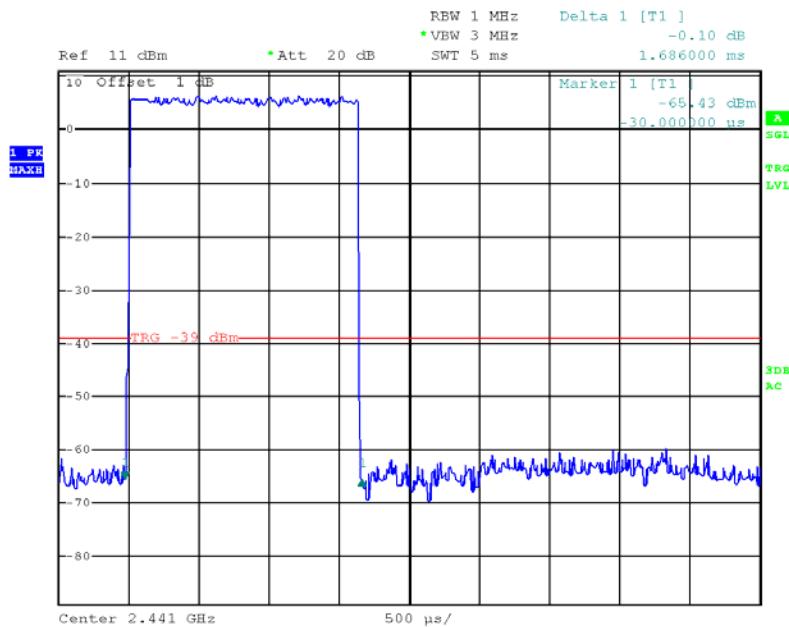
Date: 11.MAY.2012 14:33:26

**EDR ( $\pi/4$ -DQPSK) - High Channel**

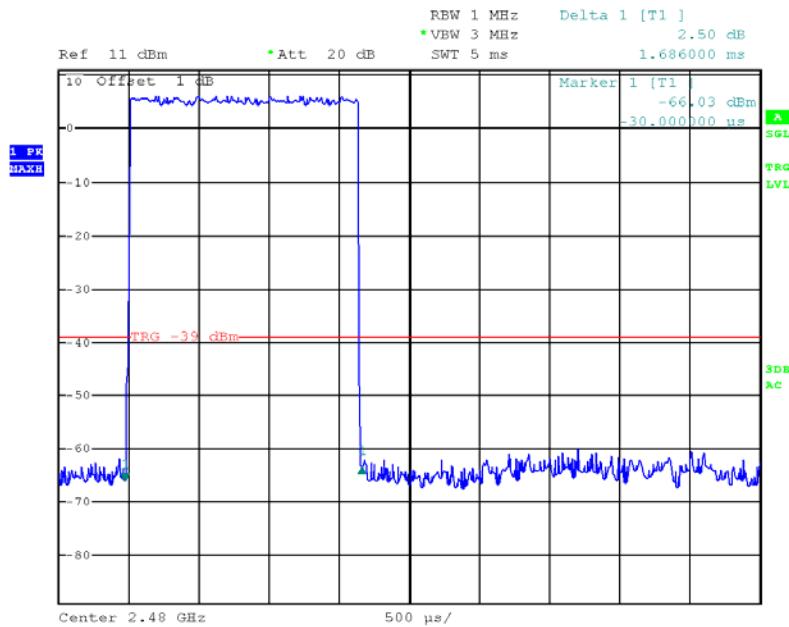
Date: 11.MAY.2012 14:34:19

**EDR (8DPSK) - Low Channel**

Date: 11.MAY.2012 14:37:55

**EDR (8DPSK) - Middle Channel**

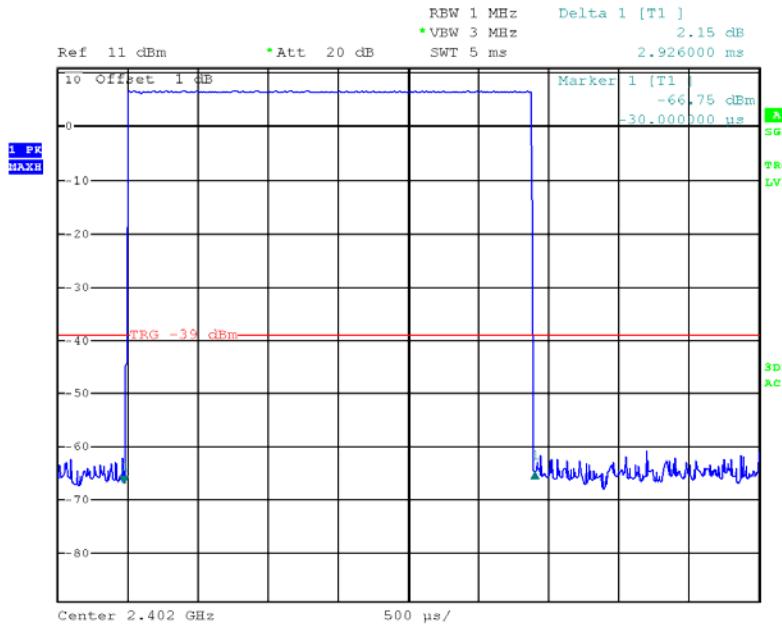
Date: 11.MAY.2012 14:37:33

**EDR (8DPSK) - High Channel**

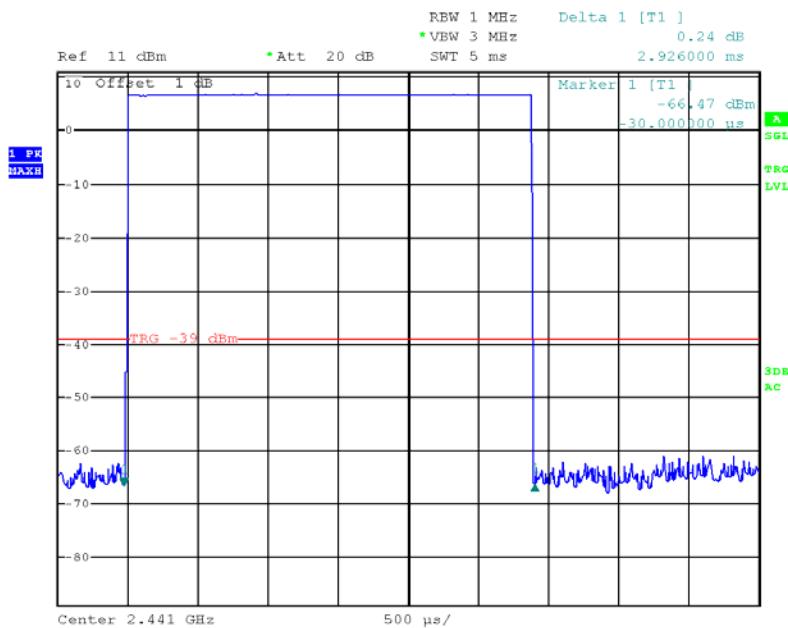
Date: 11.MAY.2012 14:37:03

**DH5:***Test Mode: Transmitting*

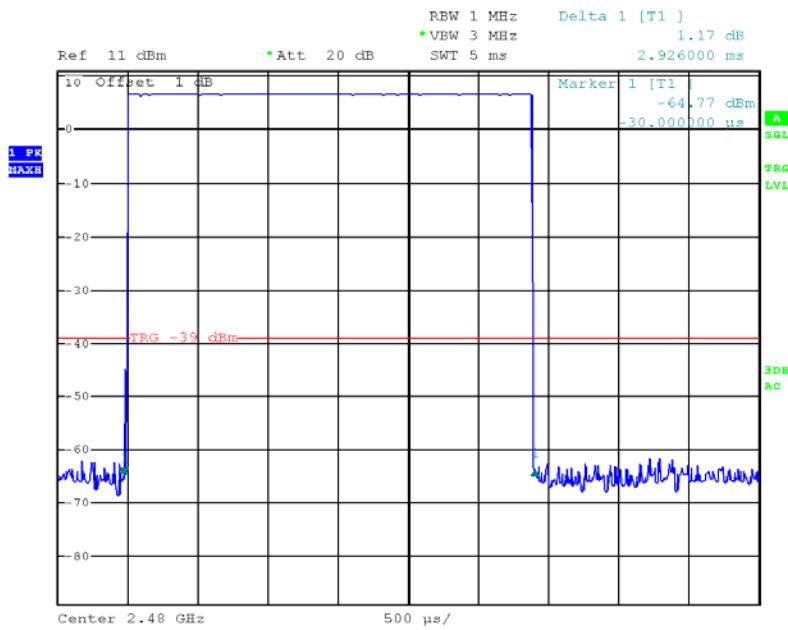
	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	2.926	0.312	0.4	Pass
	Middle	2.926	0.312	0.4	Pass
	High	2.926	0.312	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/6/79)*31.6S</i>					
EDR Mode ( $\pi/4$ -DQPSK)	Low	2.926	0.312	0.4	Pass
	Middle	2.936	0.313	0.4	Pass
	High	2.936	0.313	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/6/79)*31.6S</i>					
EDR Mode (8DPSK)	Low	2.936	0.313	0.4	Pass
	Middle	2.936	0.313	0.4	Pass
	High	2.936	0.313	0.4	Pass
<i>Note: Dwell time = Pulse time*(1600/6/79)*31.6S</i>					

**BDR - Low Channel**

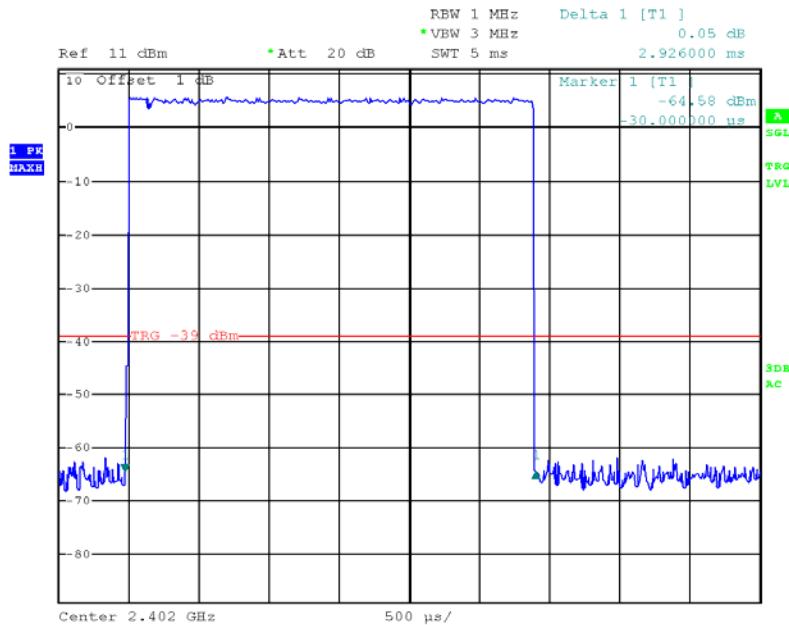
Date: 11.MAY.2012 14:40:54

**BDR - Middle Channel**

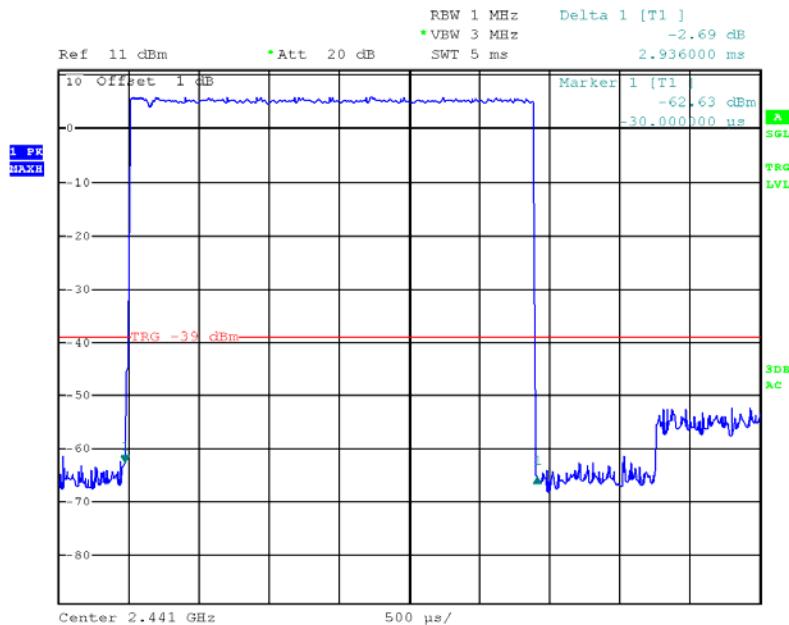
Date: 11.MAY.2012 14:41:12

**BDR - High Channel**

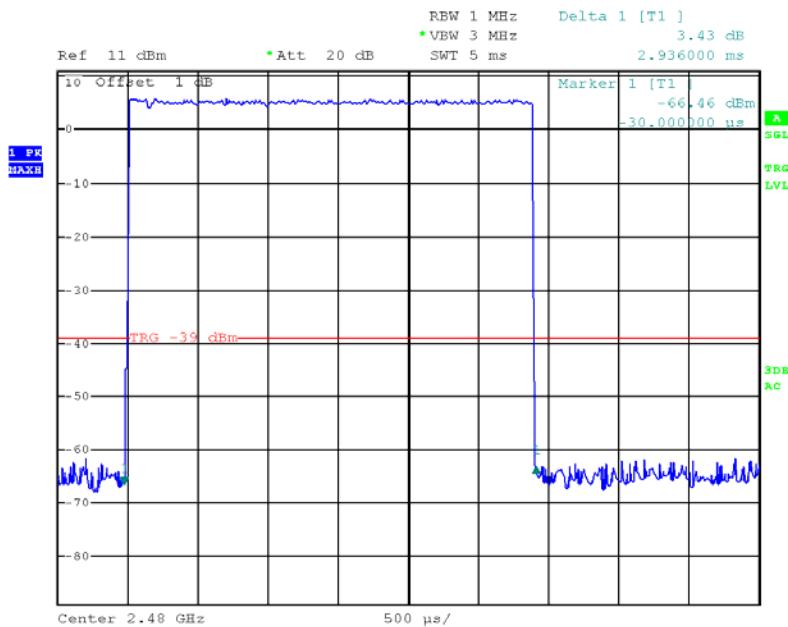
Date: 11.MAY.2012 14:40:25

**EDR ( $\pi/4$ -DQPSK) - Low Channel**

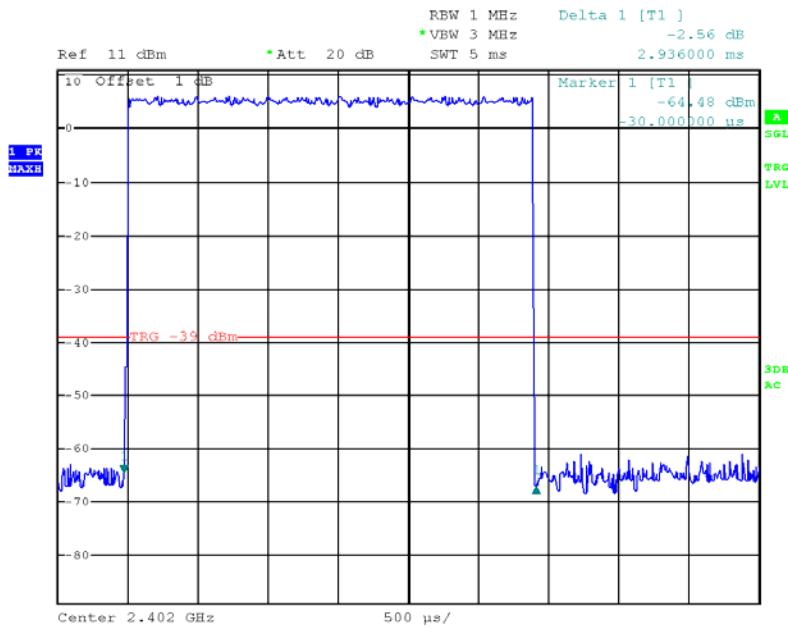
Date: 11.MAY.2012 14:43:04

**EDR ( $\pi/4$ -DQPSK) - Middle Channel**

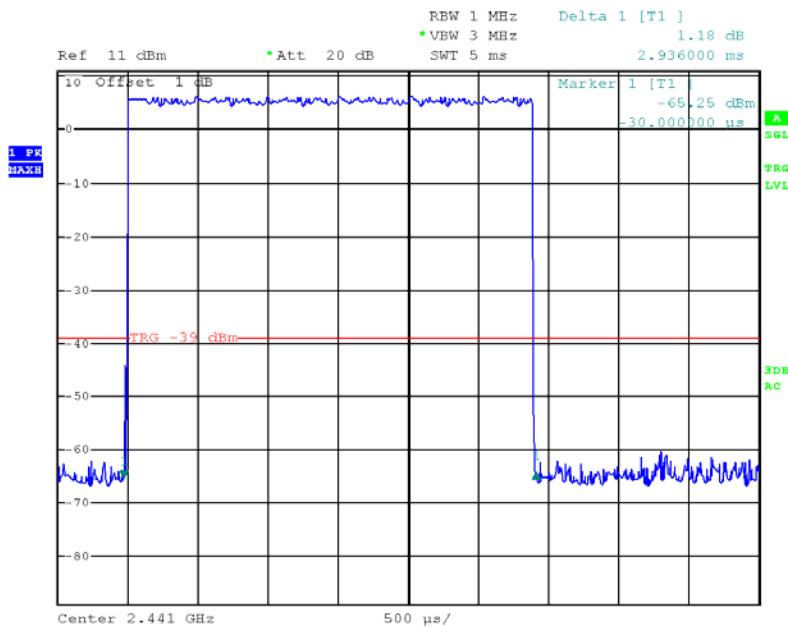
Date: 11.MAY.2012 14:42:24

**EDR ( $\pi/4$ -DQPSK) - High Channel**

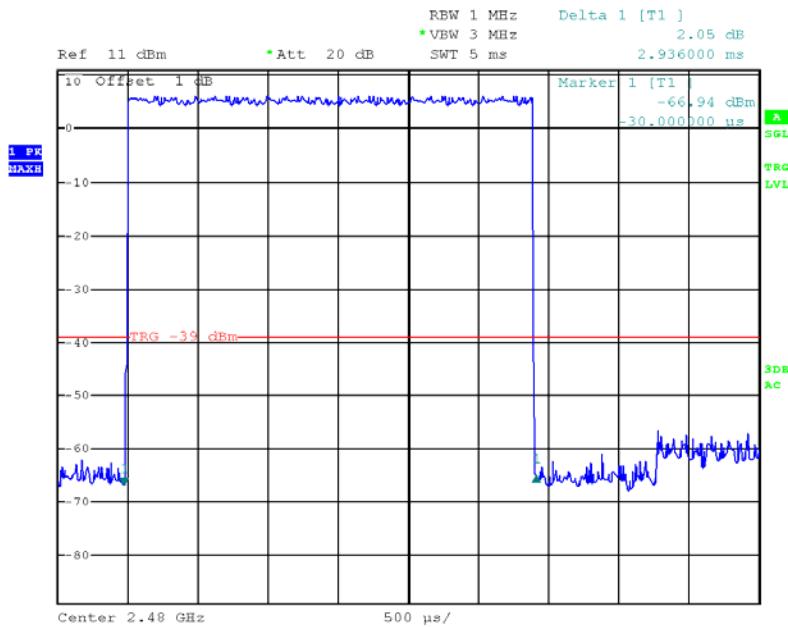
Date: 11.MAY.2012 14:43:45

**EDR (8DPSK) - Low Channel**

Date: 11.MAY.2012 14:46:20

**EDR (8DPSK) - Middle Channel**

Date: 11.MAY.2012 14:45:29

**EDR (8DPSK) - High Channel**

Date: 11.MAY.2012 14:44:28

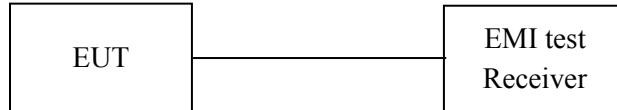
## FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

### 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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

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

### Test Data

#### Environmental Conditions

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

\* The testing was performed by Dean Liu on 2012-05-21.

**Test Result:** Compliance.

*Test Mode: Transmitting*

	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Output power (dBm)</b>	<b>Limit (dBm)</b>
BDR Mode (GFSK)	Low	2402	6.64	30
	Middle	2441	6.82	30
	High	2480	6.73	30
EDR Mode ( $\pi/4$ -DQPSK)	Low	2402	6.45	30
	Middle	2441	6.67	30
	High	2480	6.54	30
EDR Mode (8DPSK)	Low	2402	6.73	30
	Middle	2441	6.94	30
	High	2480	6.82	30

Note: The data above was tested in conducted mode.

## 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 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 100 kHz bandwidth from band edge.
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

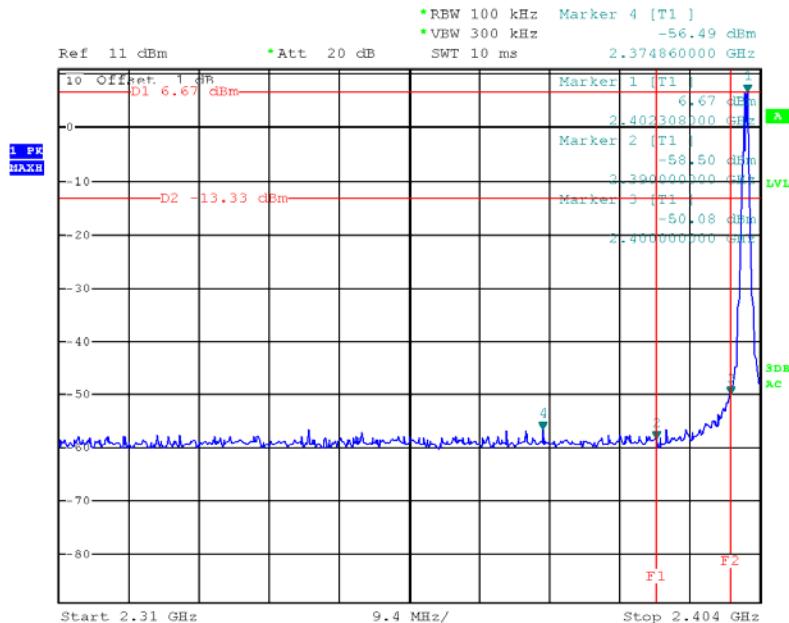
\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

**Test Data****Environmental Conditions**

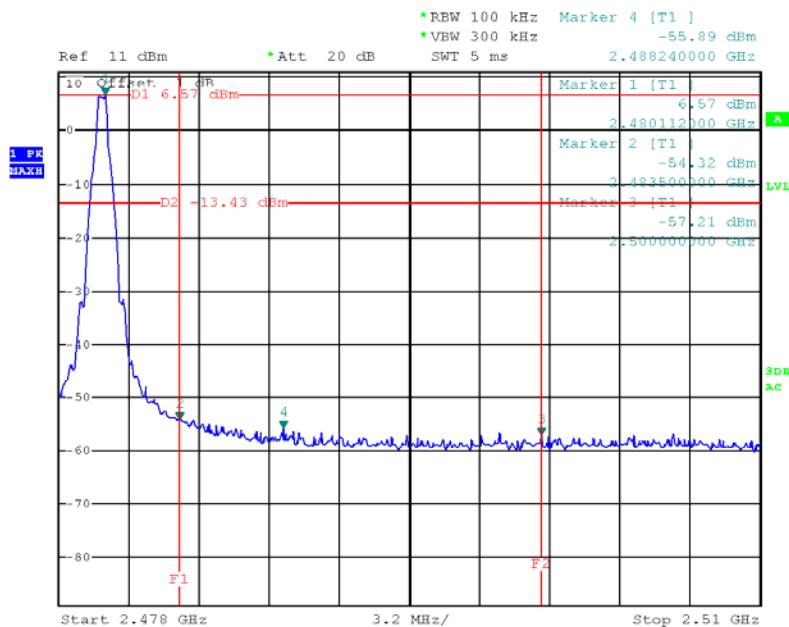
<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

*\*The testing was performed by Dean Liu on 2012-05-11.*

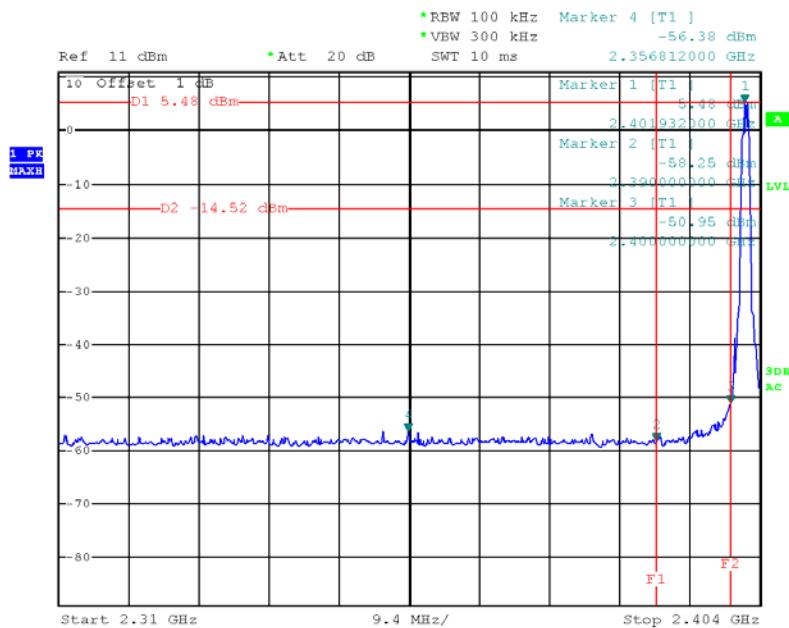
**Test Result:** Compliance

**BDR: Band Edge, Left Side**

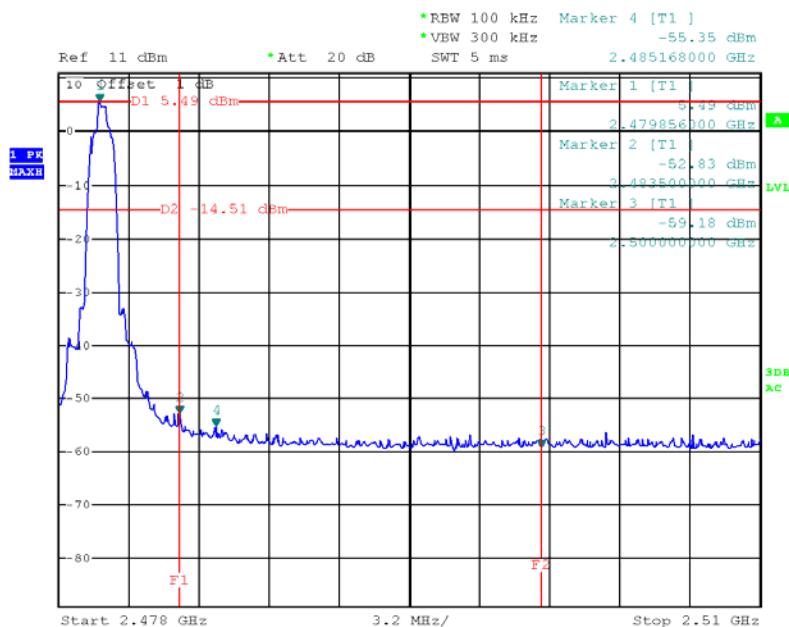
Date: 11.MAY.2012 15:27:43

**BDR: Band Edge, Right Side**

Date: 11.MAY.2012 15:25:28

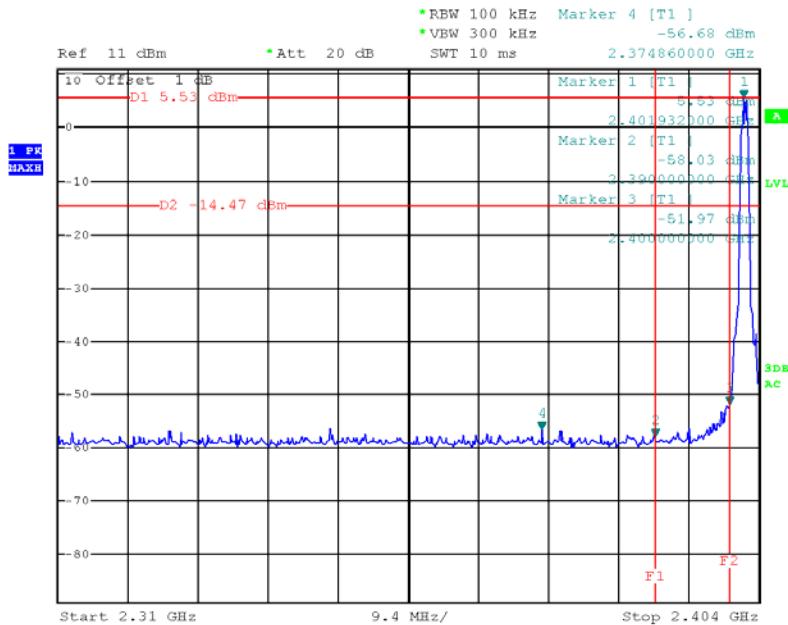
EDR ( $\pi/4$ -DQPSK) : Band Edge, Left Side

Date: 11.MAY.2012 14:12:06

EDR ( $\pi/4$ -DQPSK) : Band Edge, Right Side

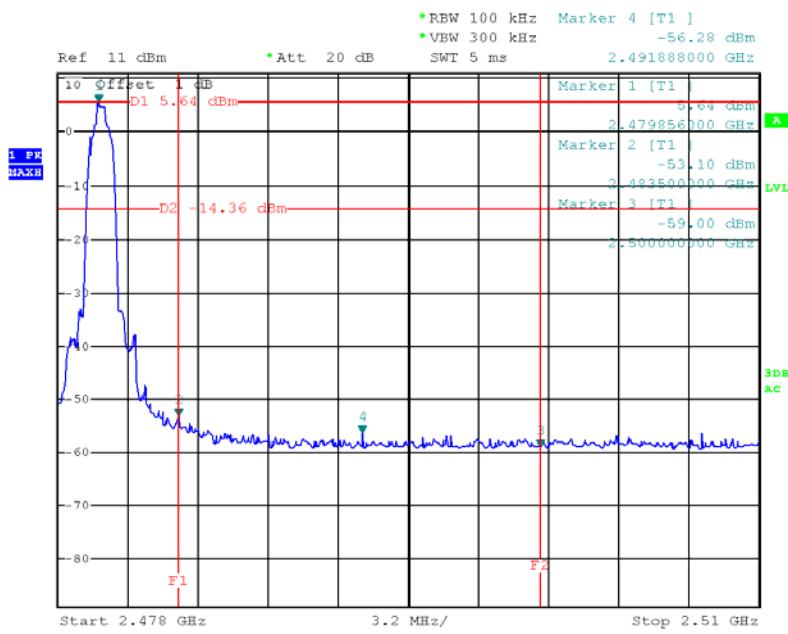
Date: 11.MAY.2012 13:56:28

## EDR (8DPSK): Band Edge, Left Side



Date: 11.MAY.2012 14:07:28

## EDR (8DPSK): Band Edge, Right Side



Date: 11.MAY.2012 14:00:33

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