Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Voyetra Turtle Beach, Inc.

150 Clearbrook Rd., Suite 162, Elmsford, New York 10523, USA

FCC ID: XGB-TB2276

Report Type:	**Product Type:**
Original Report	Portable Wi-Fi & Bluetooth Radio Transceiver

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Report Number:	R1DG120114002-00A
Report Date:	2012-03-07
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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

Product Description for Equipment under Test (EUT)

The *Voyetra Turtle Beach, Inc.*'s product, model number: *TB300-2276-01(FCC ID: XGB-TB2276)* ("EUT") in this report was a *Portable Wi-Fi & Bluetooth Radio Transceiver, named as EAR FORCE XP400 RX*, which was measured approximately: 18.0 cm (L) x 21.0 cm (W) x 10.0 cm (H), rated input voltage: DC 3.7 V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1201142 (Assigned by Shenzhen BACL). The EUT was received on 2012-01-14.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS and Part 15.407 NII submissions with ID: XGB-TB2276

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 ±0.96 dB, the uncertainty of any radiation on emissions measurement is ±4.0 dB

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).

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 EUT was configured for testing in an engineering mode which was provided by the manufacturer.

EUT Exercise Software

Test software: ActivePerl 5.4.810 & bluetooth software

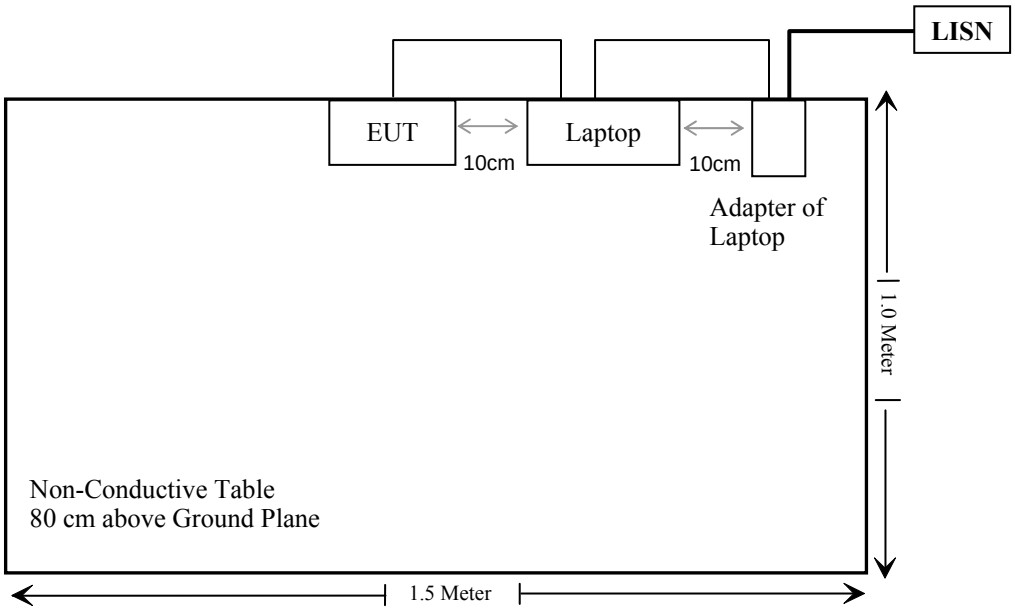
Equipment Modifications

No modification was made to the EUT tested.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Laptop	T40	N/A

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 §1.1307 (b) (1) & §2.1093 - RF EXPOSURE

Applicable Standard

According to subpart 15.247(i)and subpart §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.

According to KDB 447498 D01 Mobile Portable RF Exposure v03r03, no SAR required if power is lower than the flowing threshold:

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

A device may be used in portable exposure conditions with no restrictions on host platforms when either the source-based time-averaged output power is ≤ 60/f(GHz) mW or all measured 1-g SAR are < 0.4 W/kg.10 When SAR evaluation is required, the most conservative exposure conditions for all expected operating configurations must be tested.

Measurement Result:

Max Peak output power: 0.51 dBm (1.125 mW)

Antenna Gain: 2.27 dBi

EIRP = 0.51 + 2.27 = 2.78 dBm = 1.897 mW

SAR exclusion threshold: $60/f_{GHz}$ = 60/2402 = 24.98 mW

The SAR measurement is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (i), Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi

Antenna Connector Construction

The EUT has a PCB antenna on the PCB, which in accordance to section 15.203, the maximum gain is 2.27 dBi; please refer to the internal photos.

Result: Compliance.

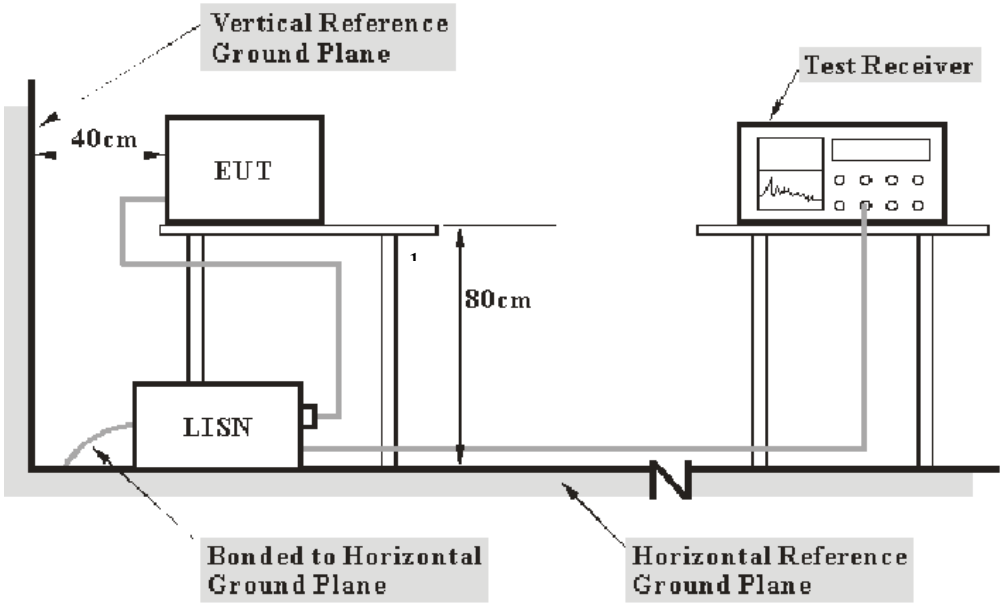
FCC§15.207 - CONDUCTED EMISSIONS

Measurement Uncertainty

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

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 2.4 dB (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 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 laptop was connected to an AC 120V/50 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:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter of laptop 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
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	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 Part 15 .207, with the worst margin reading of:

8.75 dB at **8.845 MHz** in the **Line** conducted mode.

Test Data

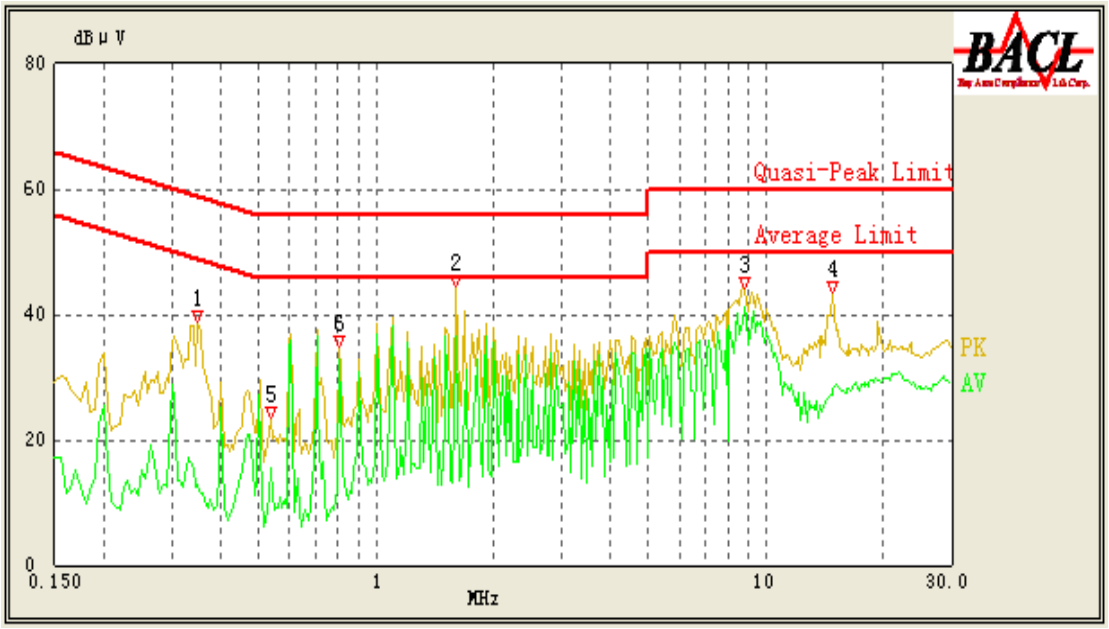
Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Felix li on 2012-02-01.

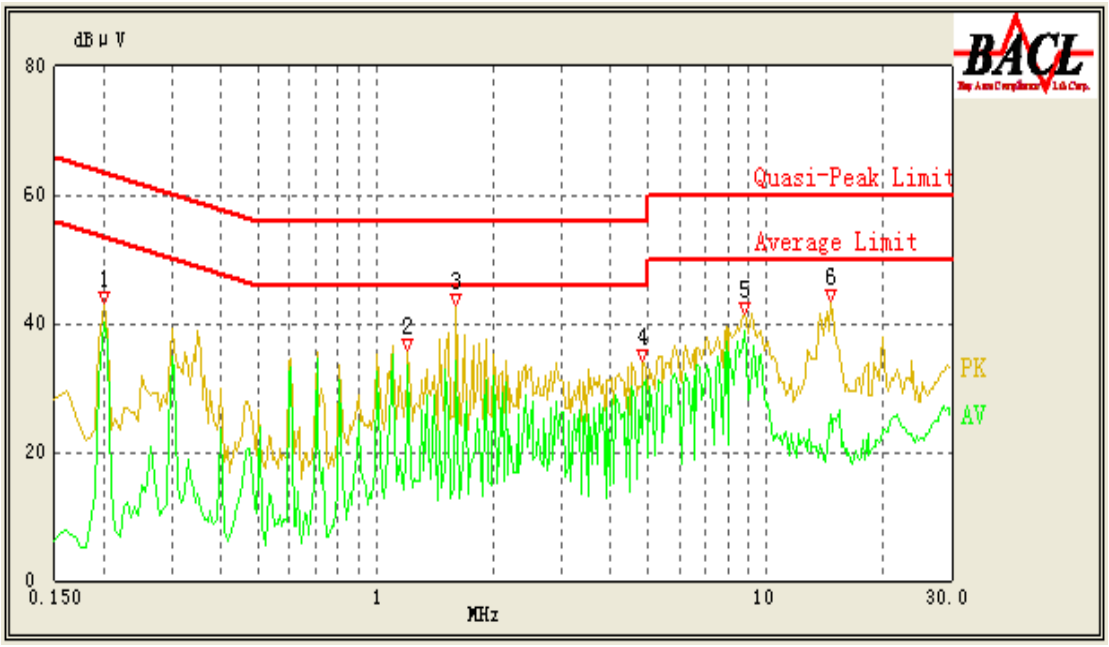
EUT Operation Mode: Charging &Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
8.845	41.25	10.10	50.00	8.75	Ave.
1.610	36.61	10.10	46.00	9.39	Ave.
0.805	32.96	10.10	46.00	13.04	Ave.
1.610	42.79	10.10	56.00	13.21	QP
8.845	41.32	10.10	60.00	18.68	QP
0.805	33.60	10.10	56.00	22.40	QP
14.770	27.25	10.10	50.00	22.75	Ave.
14.815	29.89	10.10	60.00	30.11	QP
0.540	15.38	10.10	46.00	30.62	Ave.
0.350	25.09	10.10	60.29	35.20	QP
0.350	12.76	10.10	50.29	37.53	Ave.
0.540	17.75	10.10	56.00	38.25	QP

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
8.845	38.79	10.10	50.00	11.21	Ave.
1.610	34.26	10.10	46.00	11.74	Ave.
1.205	33.41	10.10	46.00	12.59	Ave.
0.200	40.33	10.10	54.57	14.24	Ave.
1.610	39.86	10.10	56.00	16.14	QP
4.825	29.72	10.10	46.00	16.28	Ave.
8.845	38.58	10.10	60.00	21.42	QP
1.205	33.33	10.10	56.00	22.67	QP
0.200	40.91	10.10	64.57	23.66	QP
4.825	30.73	10.10	56.00	25.27	QP
14.865	23.32	10.10	50.00	26.68	Ave.
14.745	28.91	10.10	60.00	31.09	QP

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

Applicable Standard

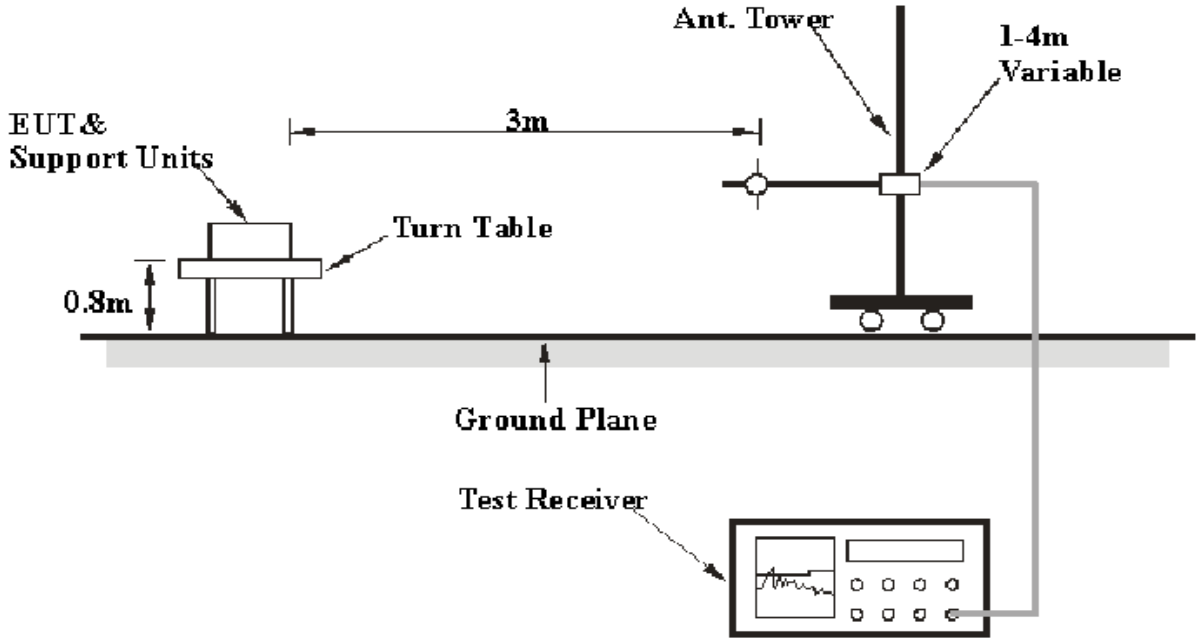
FCC §15.247 (d); §15.209; §15.205;

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 CISPR 16-4-4, 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 chamber 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.

The adapter of laptop was connected to an AC 120V/50 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:

Frequency Range	***RBW***	***Video B/W***	***Detector***
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

During the radiated emission test, the adapter of laptop was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Pre-amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-circuits	Pre-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
Electro-Mechanics	Horn antenna	3116	9510-2270	2011-10-11	2012-11-10

*** 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 Results Summary

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

15.3 dB at **4960 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

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

The testing was performed by Felix Li on 2012-02-01.

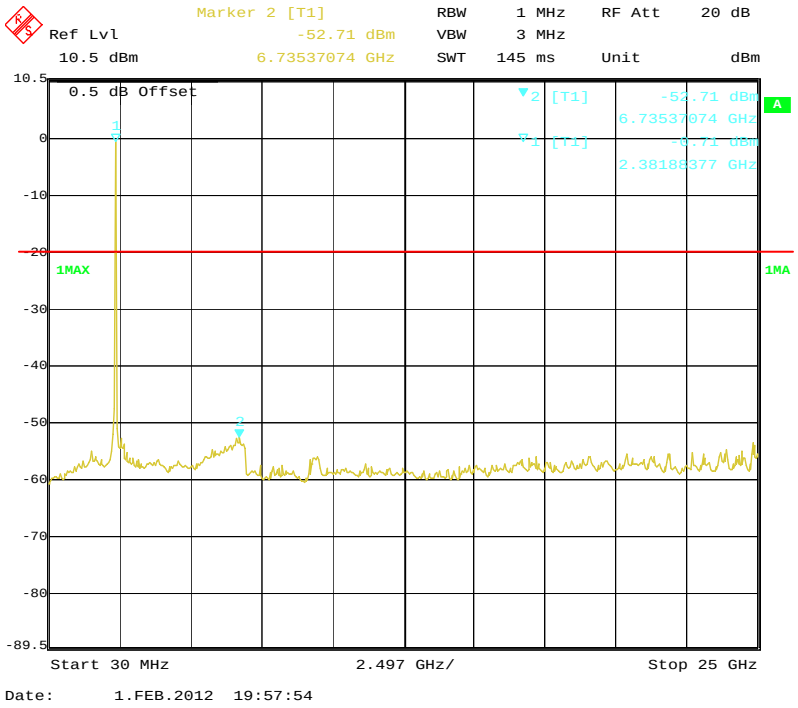
Test Mode: Transmitting (EDR mode was the worst case)

30 MHz - 25 GHz (EDR mode was the worst case and the worst data as below)

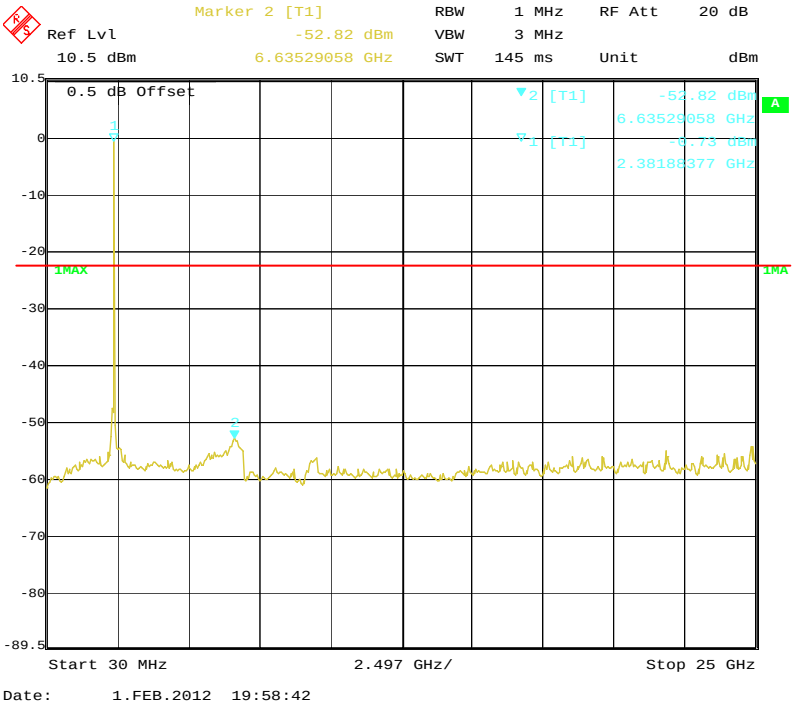
Indicated		Detector (PK/QP/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBµV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment
Frequency at Low Channel (2402 MHz)												
4804	44.23	PK	225	1.5	H	35.9	3.92	26.80	57.25	74	16.75	harmonic
4804	19.35	Ave.	225	1.5	H	35.9	3.92	26.80	32.37	54	21.63	harmonic
4804	44.80	PK	96	1.8	V	34.2	3.92	26.80	56.12	74	17.88	harmonic
4804	19.61	Ave.	96	1.8	V	34.2	3.92	26.80	30.93	54	23.07	harmonic
Frequency at Middle Channel (2441 MHz)												
4882	44.50	PK	330	1.3	H	36.3	3.97	26.78	57.99	74	16.01	harmonic
4882	21.66	Ave.	330	1.3	H	36.3	3.97	26.78	35.15	54	18.85	harmonic
4882	45.80	PK	179	1.8	V	35.4	3.97	26.78	58.39	74	15.61	harmonic
4882	21.73	Ave.	179	1.8	V	35.4	3.97	26.78	34.32	54	19.68	harmonic
Frequency at High Channel (2480 MHz)												
4960	45.12	PK	225	1.7	H	36.3	3.99	26.71	58.70	74	15.30	harmonic
4960	19.17	Ave.	225	1.7	H	36.3	3.99	26.71	32.75	54	21.25	harmonic
4960	45.05	PK	142	1.4	V	35.4	3.99	26.71	57.73	74	16.27	harmonic
4960	19.48	Ave.	142	1.4	V	35.4	3.99	26.71	32.16	54	21.84	harmonic

3) Spurious Emission at Antenna Terminals

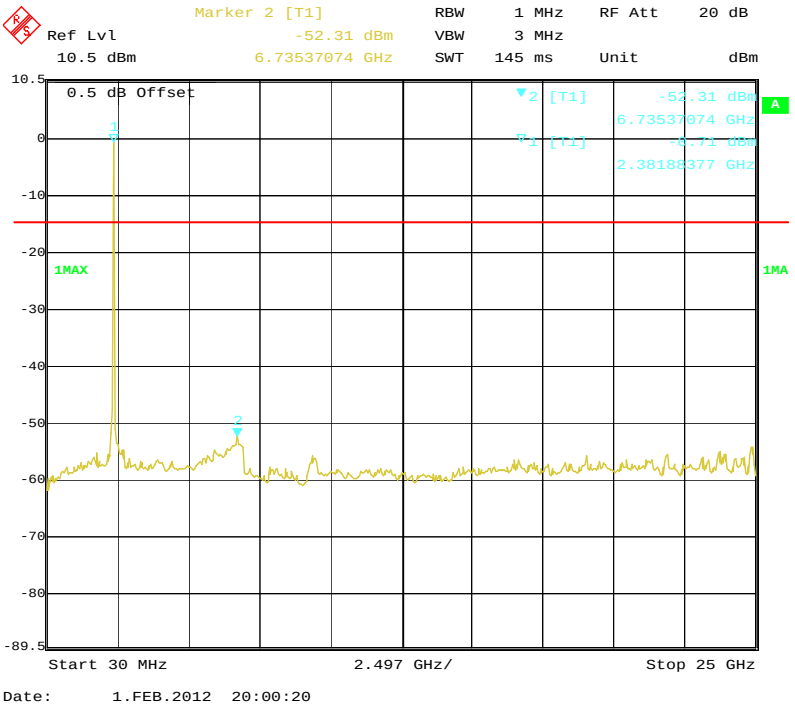
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 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	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

*** 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, RBW was set at 100 kHz; VBW was set at 300 kHz max hold the channel.
2. Set the adjacent channel of the EUT max hold another trace
3. Measure the channel separation.

Test Data

Environmental Conditions

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

** The testing was performed by Felix Li from 2012-02-01 to 2012-02-04.*

Test Result: Compliance.

Please refer to following tables and plots

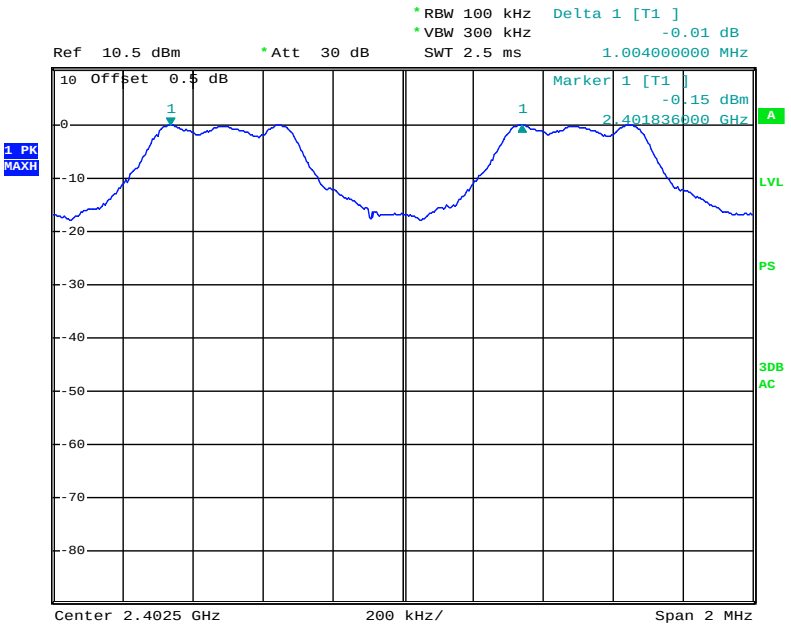
Test Mode: Transmitting

BDR Mode (GFSK):

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2402	1.004	≥0.620	Pass
Adjacent	2403			
Middle	2441	1.004	≥0.620	Pass
Adjacent	2442			
High	2480	1.004	≥0.620	Pass
Adjacent	2479			

Please refer to the following plots.

Low Channel



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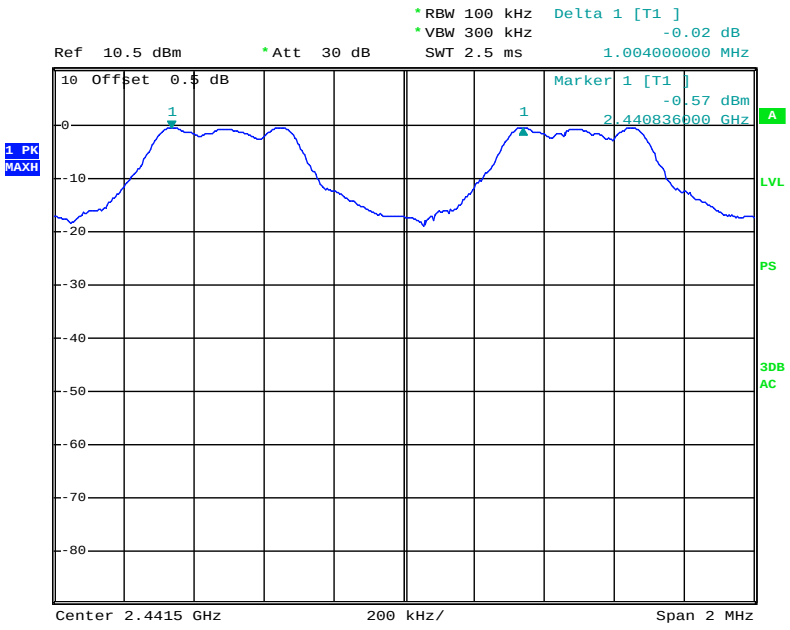
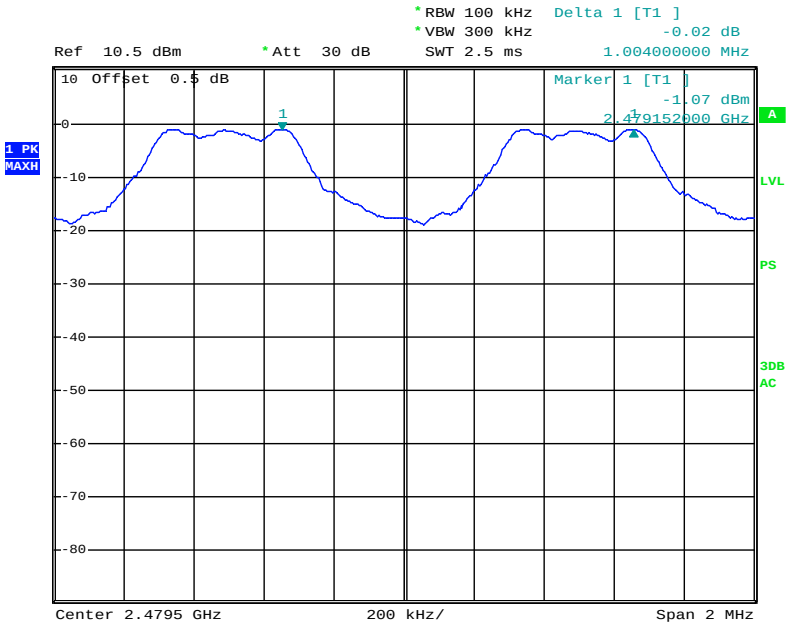
Middle Channel



Date: 1.FEB.2012 17:00:09

High Channel



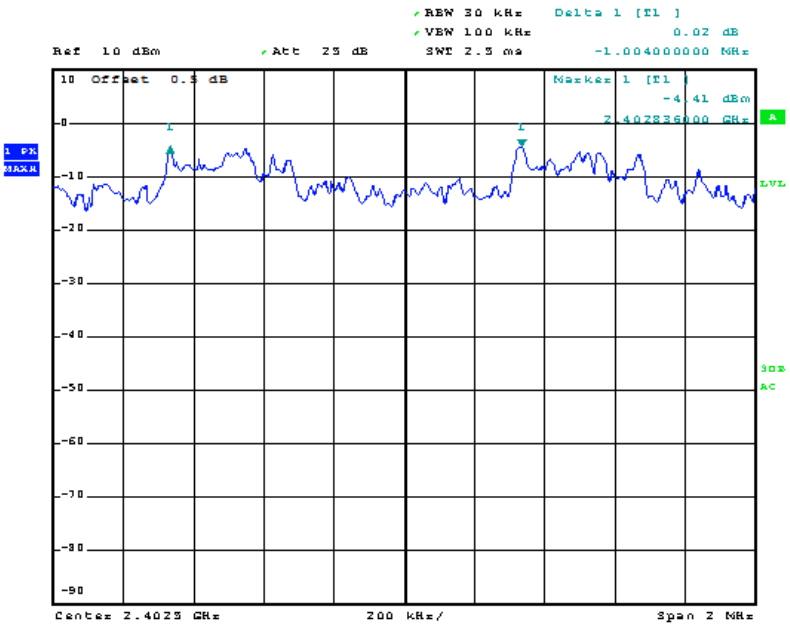
Date: 1.FEB.2012 16:56:31

EDR Mode (π /4-DQPSK):

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2402	1.004	≥0.823	Pass
Adjacent	2403			
Middle	2441	1.000	≥0.852	Pass
Adjacent	2442			
High	2480	1.000	≥0.844	Pass
Adjacent	2479			

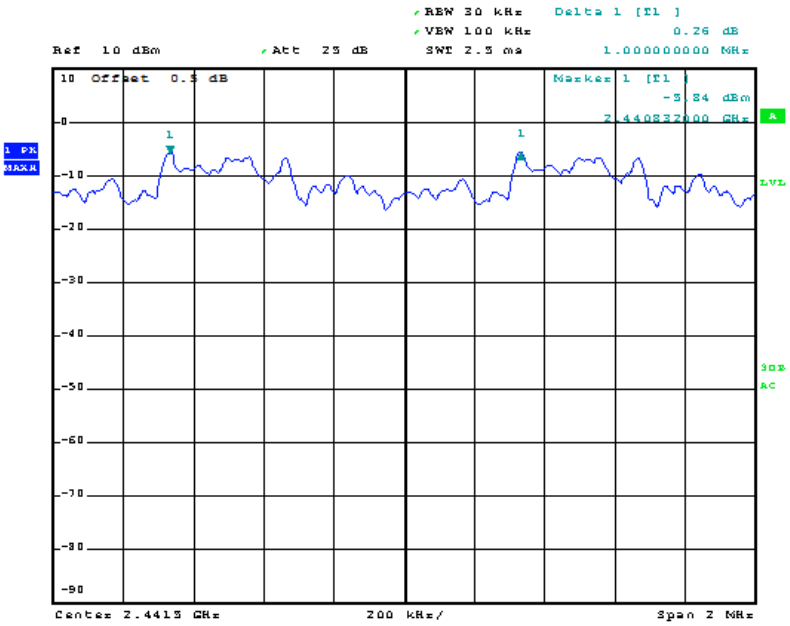
Please refer to the following plots.

Low Channel



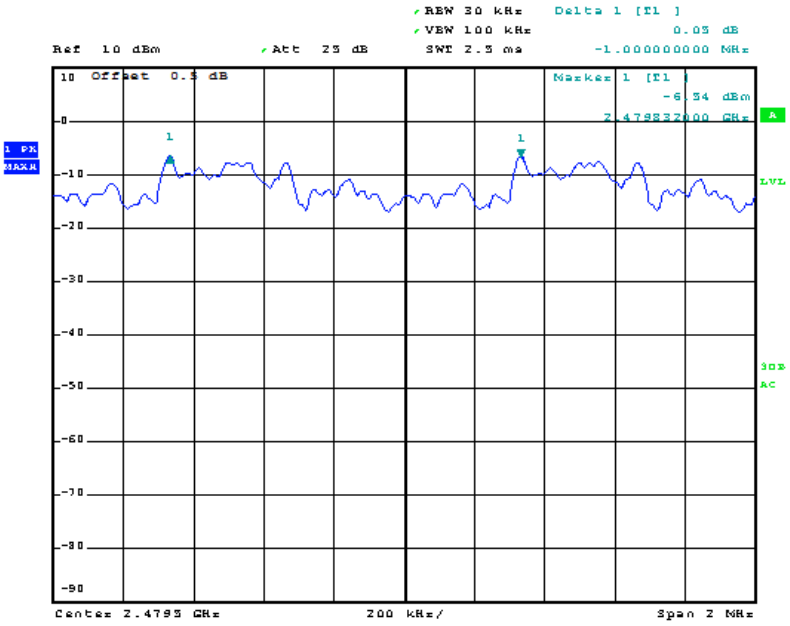
Date: 4.FEB.2012 14:50:02

Middle Channel



Date: 4.FEB.2012 14:45:08

High Channel



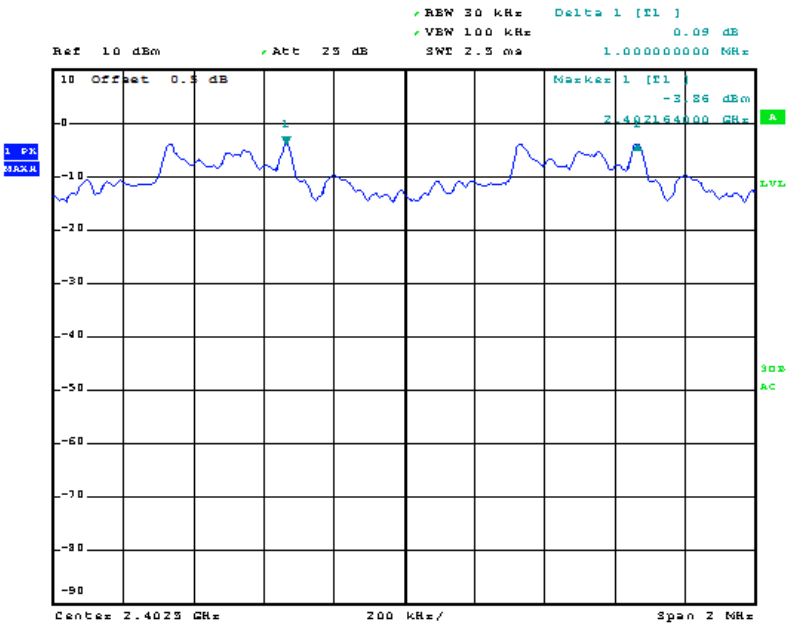
Date: 4.FEB.2012 14:43:46

EDR Mode (8DPSK):

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2402	1.000	≥0.808	Pass
Adjacent	2403			
Middle	2441	1.004	≥0.808	Pass
Adjacent	2442			
High	2480	1.000	≥0.812	Pass
Adjacent	2479			

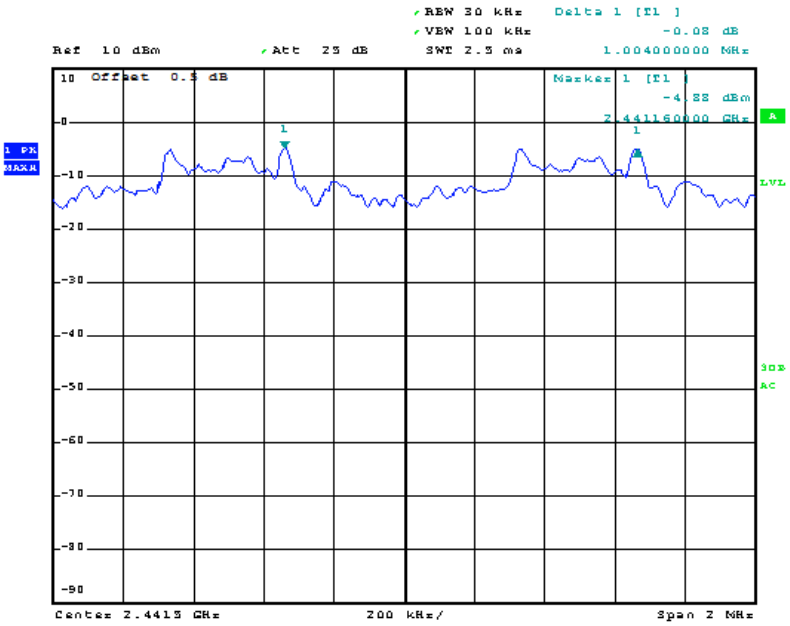
Please refer to the following plots.

Low Channel



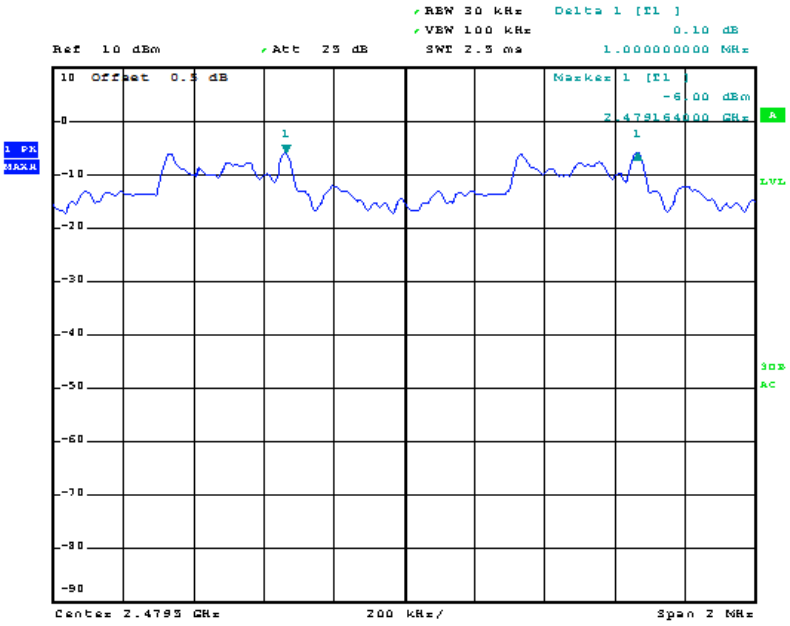
Date: 4.FEB.2012 14:40:00

Middle Channel



Date: 4.FEB.2012 14:41:34

High Channel



Date: 4.FEB.2012 14:42:49

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	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

*** 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 Felix Li from 2012-02-01 to 2012-02-04.*

Test Result: Compliance.

Please refer to following tables and plots

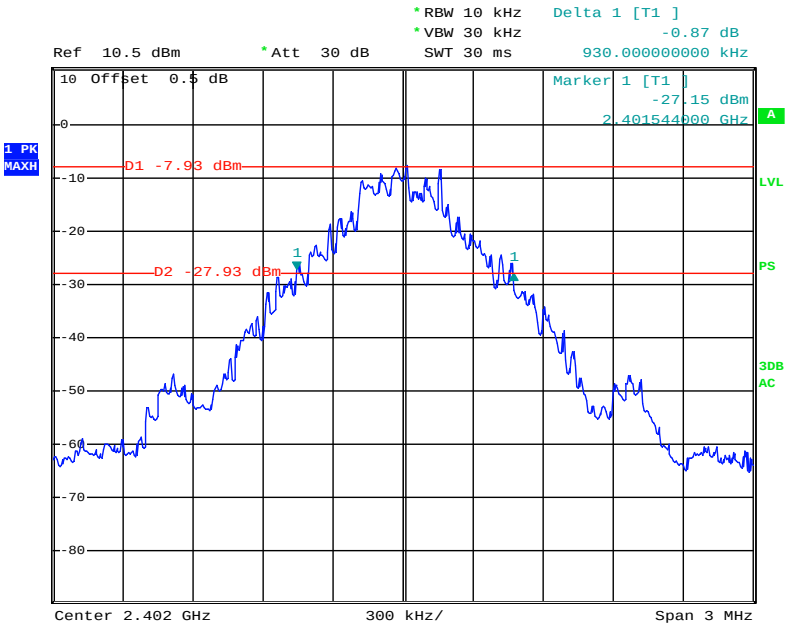
Test Mode: Transmitting

BDR Mode (GFSK):

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.930
Middle	2441	0.930
High	2480	0.924

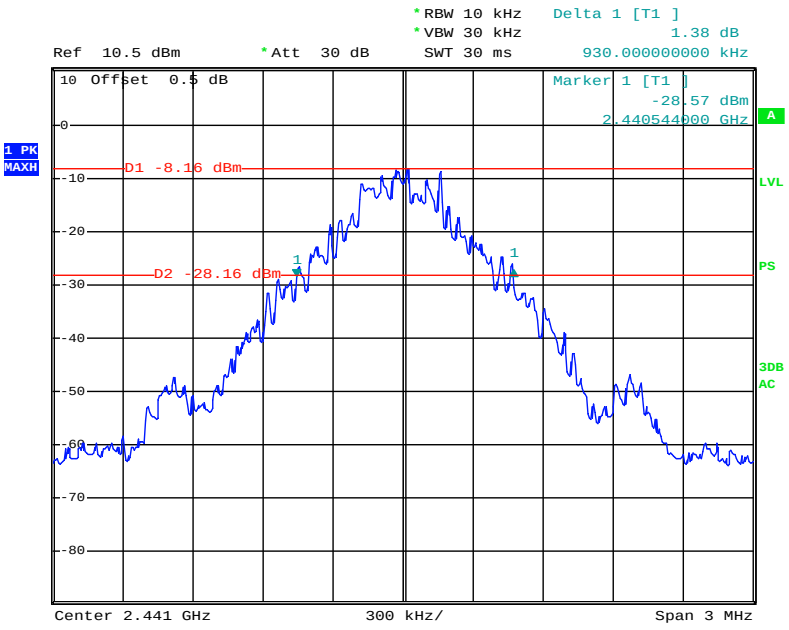
Please refer to the following plots.

Low Channel



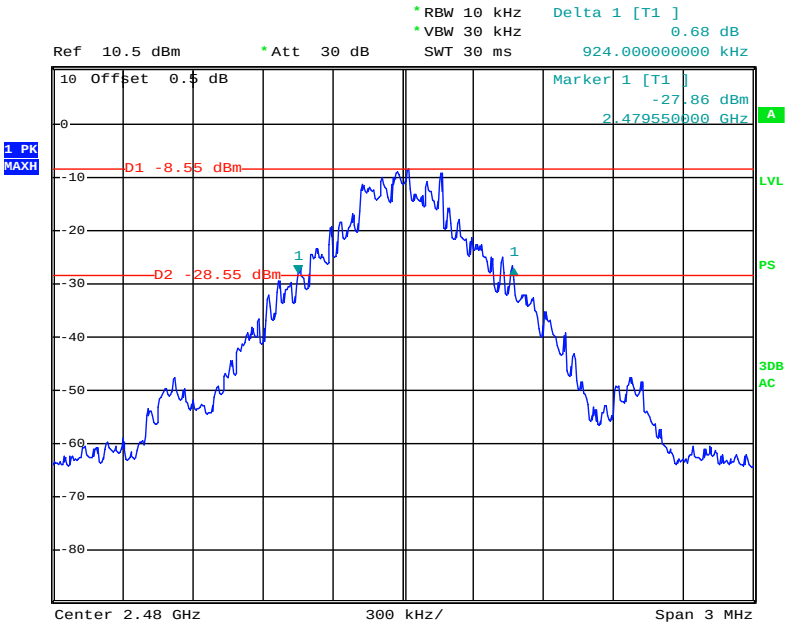
Date: 2.FEB.2012 11:29:22

Middle Channel



Date: 2.FEB.2012 11:24:48

High Channel



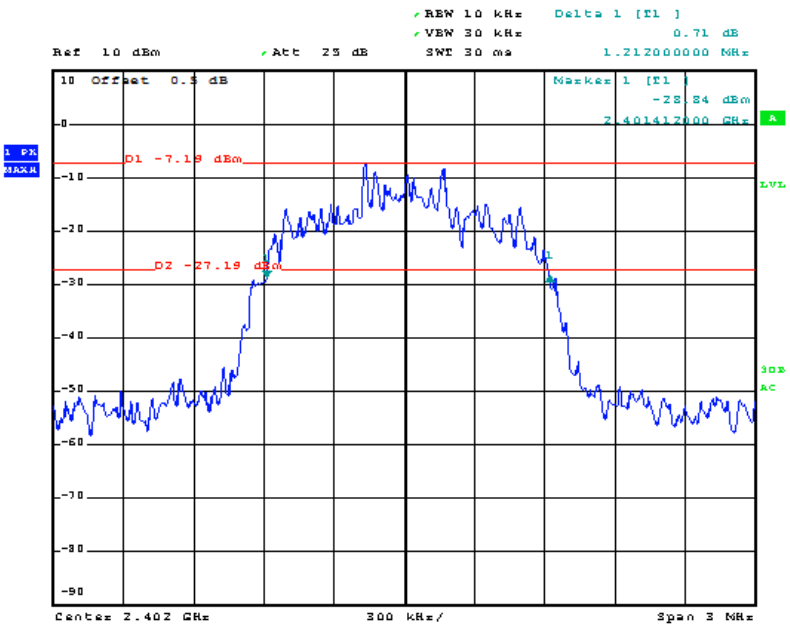
Date: 2.FEB.2012 11:28:15

EDR Mode(π/4-DQPSK):

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.212
Middle	2441	1.212
High	2480	1.218

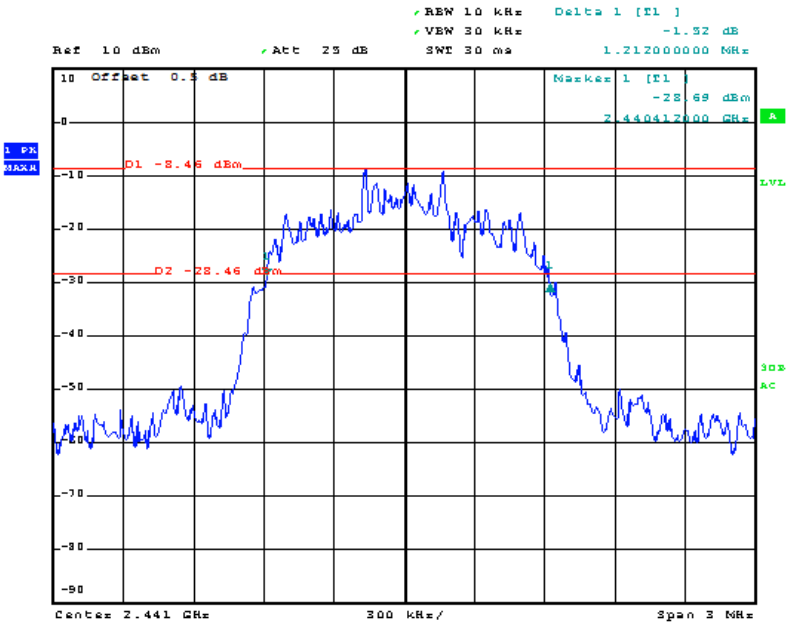
Please refer to the following plots.

Low Channel



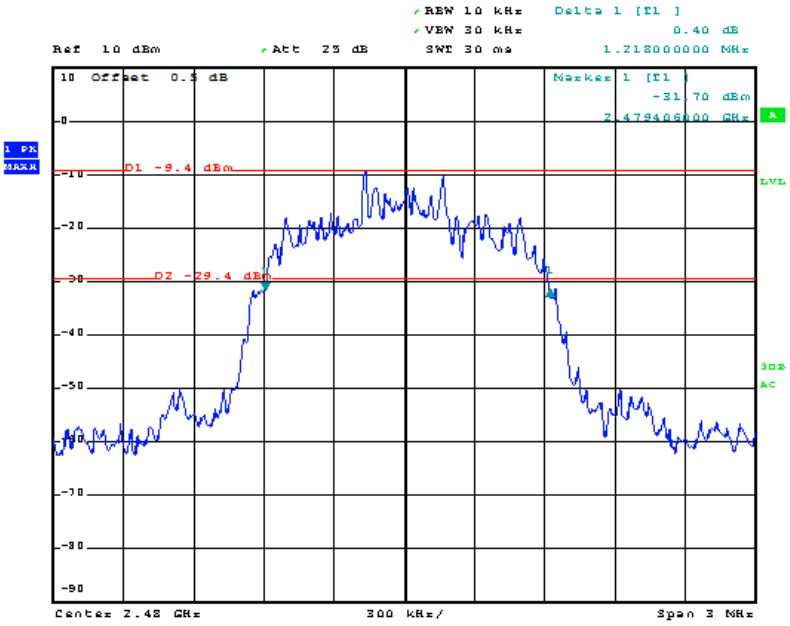
Date: 4.FEB.2012 14:35:44

Middle Channel



Date: 4.FEB.2012 14:33:43

High Channel



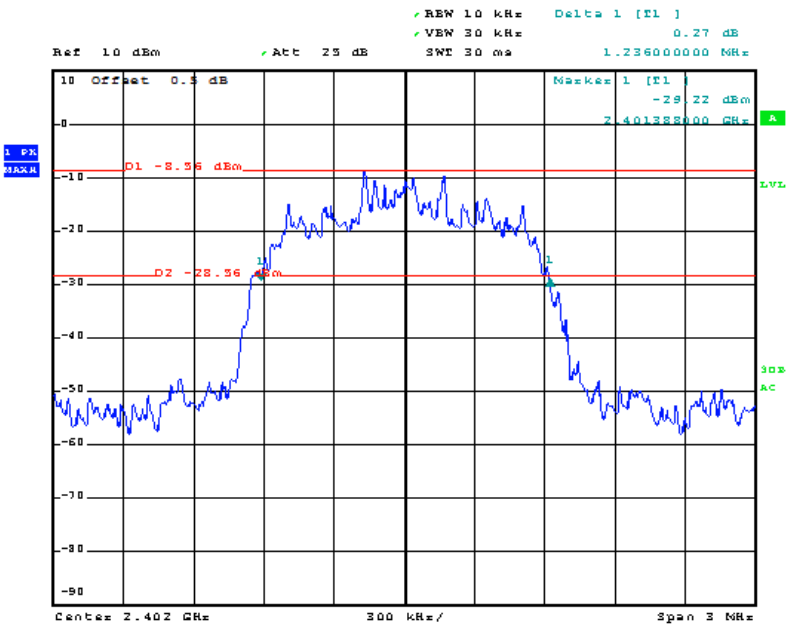
Date: 4.FEB.2012 14:30:15

EDR Mode(8DPSK):

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.234
Middle	2441	1.278
High	2480	1.266

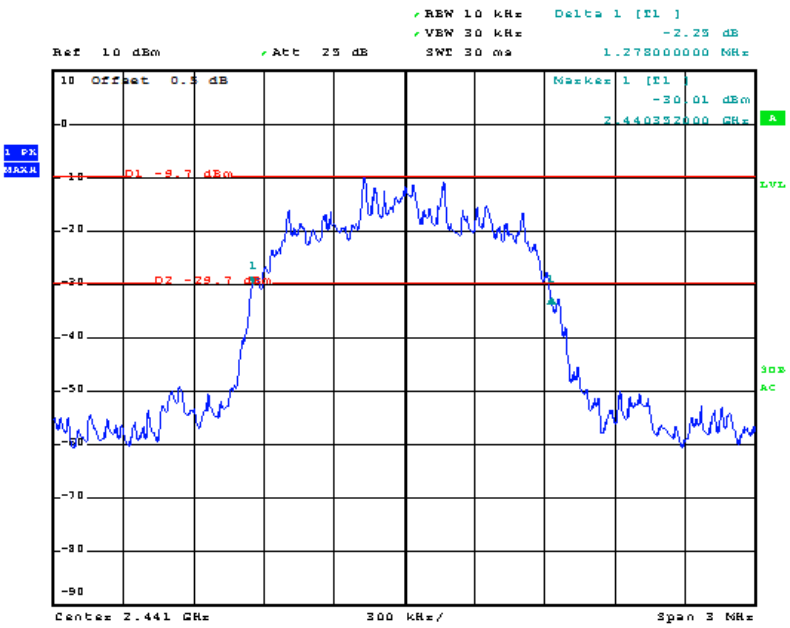
Please refer to the following plots.

Low Channel



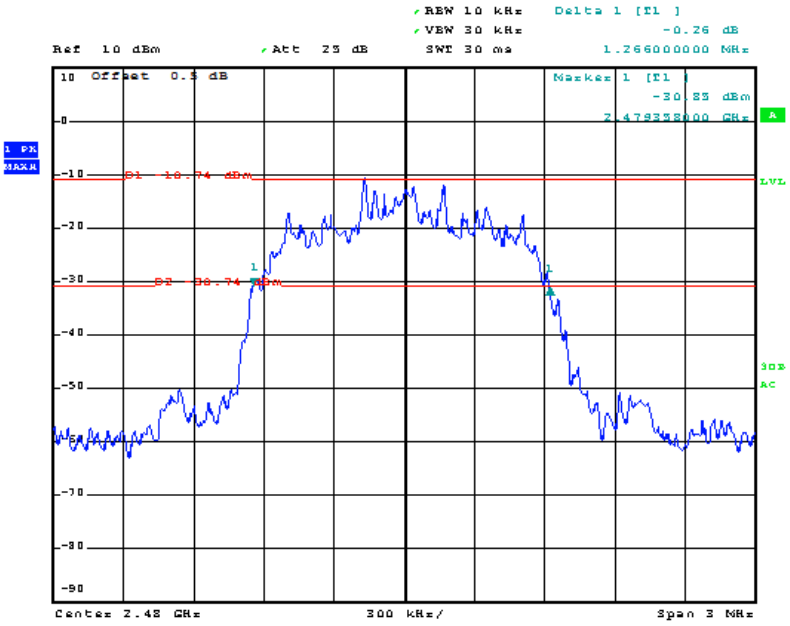
Date: 4.FEB.2012 14:23:04

Middle Channel



Date: 4.FEB.2012 14:24:33

High Channel



Date: 4.FEB.2012 14:28:35

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	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

* **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 Felix Li from 2012-02-01 to 2012-02-04.*

Test Result: Compliance.

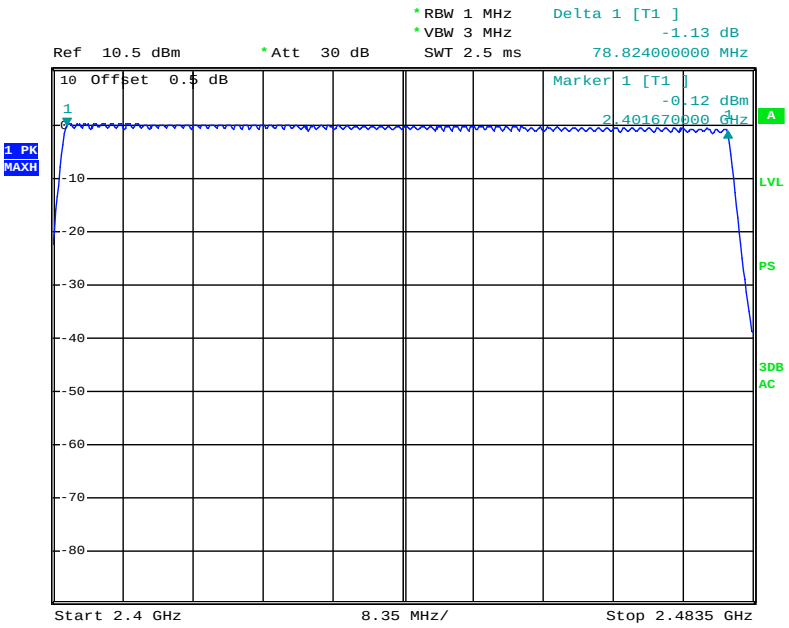
Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	79	≥ 15

Number of Hopping Channels

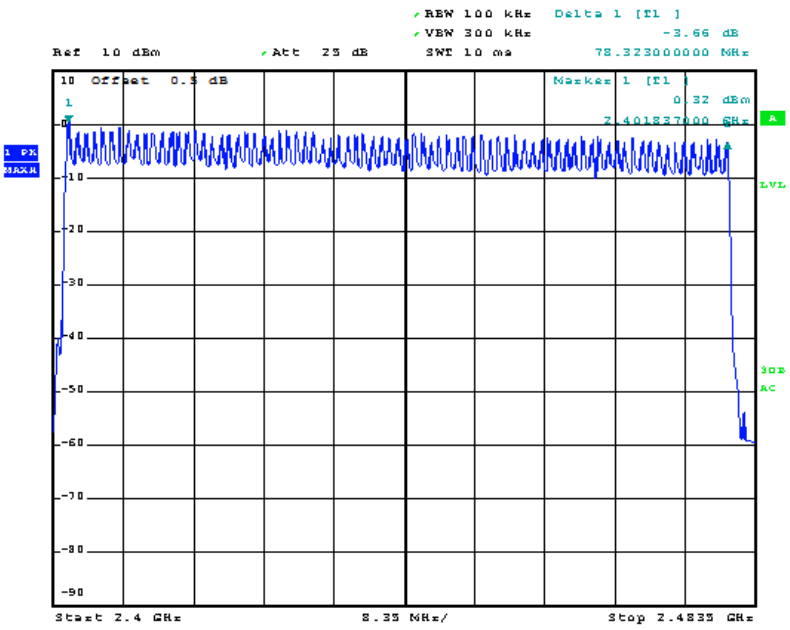


Date: 1.FEB.2012 16:49:22

EDR Mode(π/4-DQPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	79	≥ 15

Number of Hopping Channels

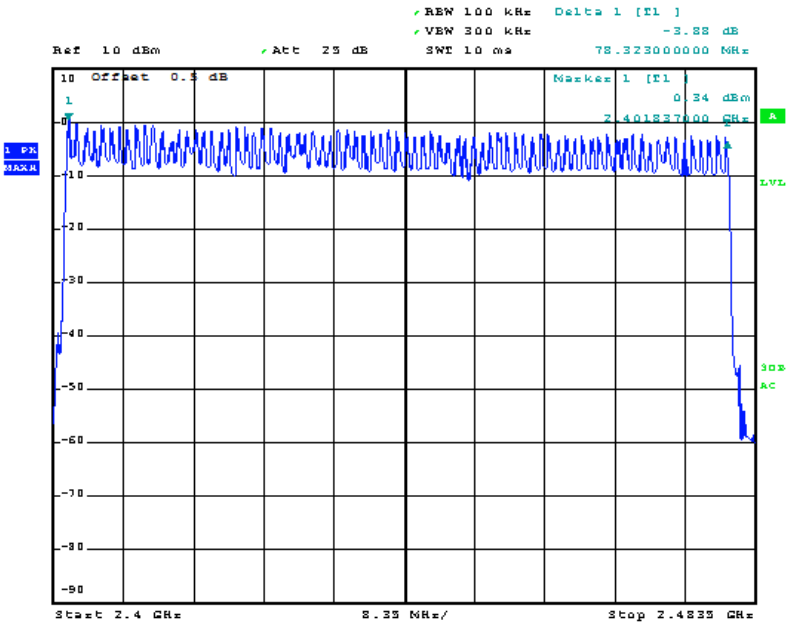


Date: 4.FEB.2012 15:50:13

EDR Mode(8DPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	79	≥15

Number of Hopping Channels



Date: 4.FEB.2012 15:46:28

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 ∗ hope 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	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

*** 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 Felix Li from 2012-02-01 to 2012-02-04.*

Test Result: Compliance.

Please refer to following tables and plots

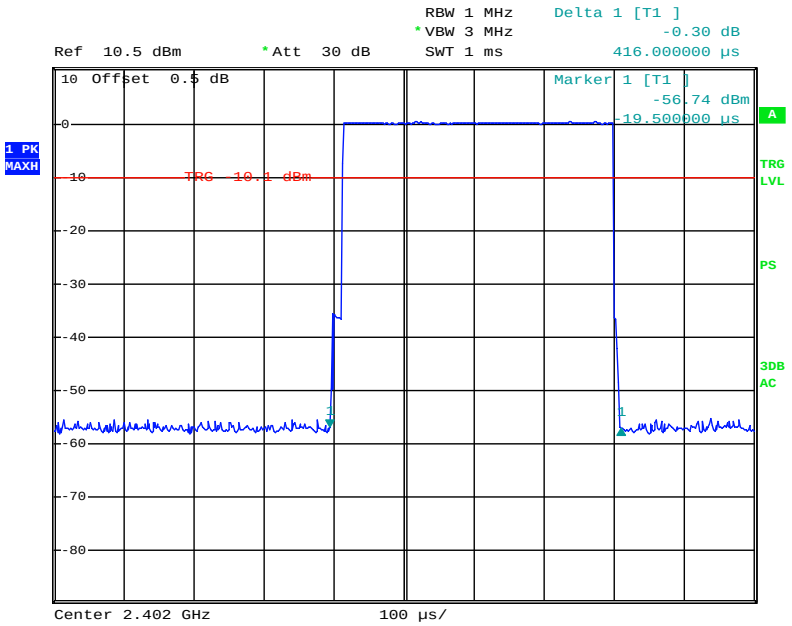
Test Mode: Transmitting

BDR Mode (GFSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.416	0.133	0.4	Pass
	Middle	0.416	0.133	0.4	Pass
	High	0.416	0.133	0.4	Pass
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s				
DH 3	Low	1.686	0.270	0.4	Pass
	Middle	1.686	0.270	0.4	Pass
	High	1.686	0.270	0.4	Pass
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s				
DH 5	Low	2.950	0.315	0.4	Pass
	Middle	2.950	0.315	0.4	Pass
	High	2.950	0.315	0.4	Pass
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s				

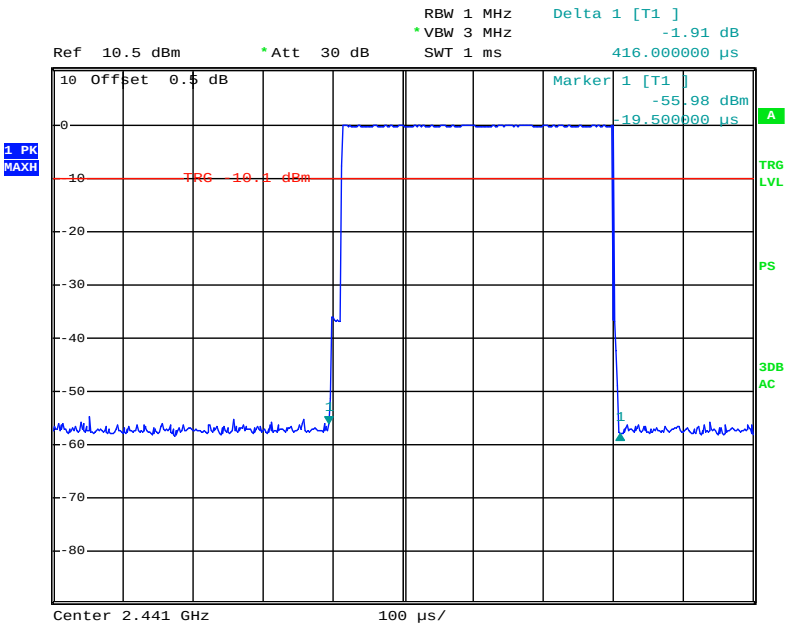
Please refer to the following plots.

Low Channel for DH1



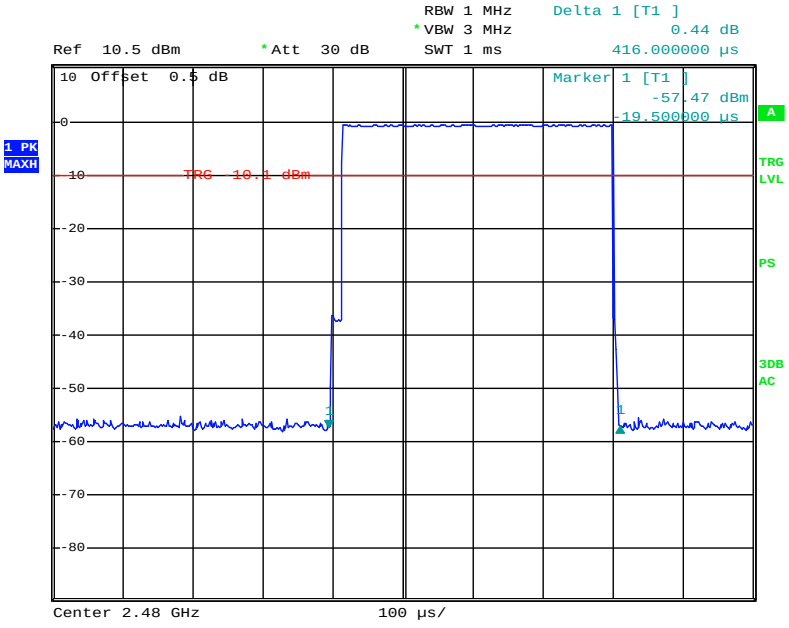
Date: 1.FEB.2012 17:33:25

Middle Channel for DH1



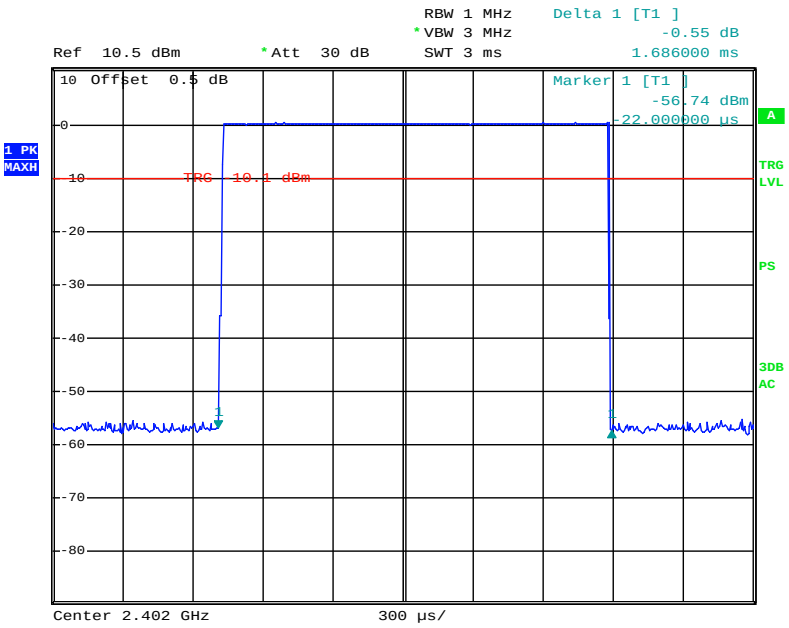
Date: 1.FEB.2012 17:33:50

High Channel for DH1



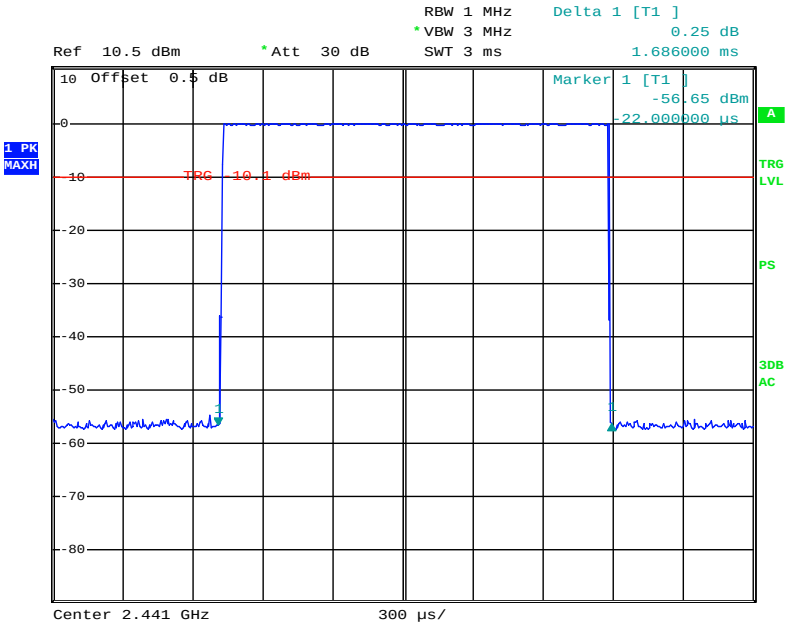
Date: 1.FEB.2012 17:32:46

Low Channel for DH3



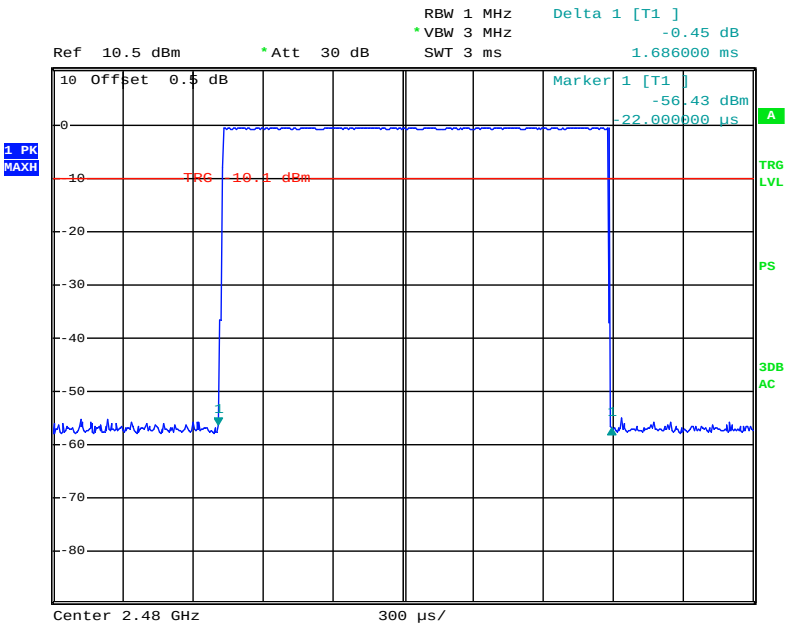
Date: 1.FEB.2012 17:35:14

Middle Channel for DH3



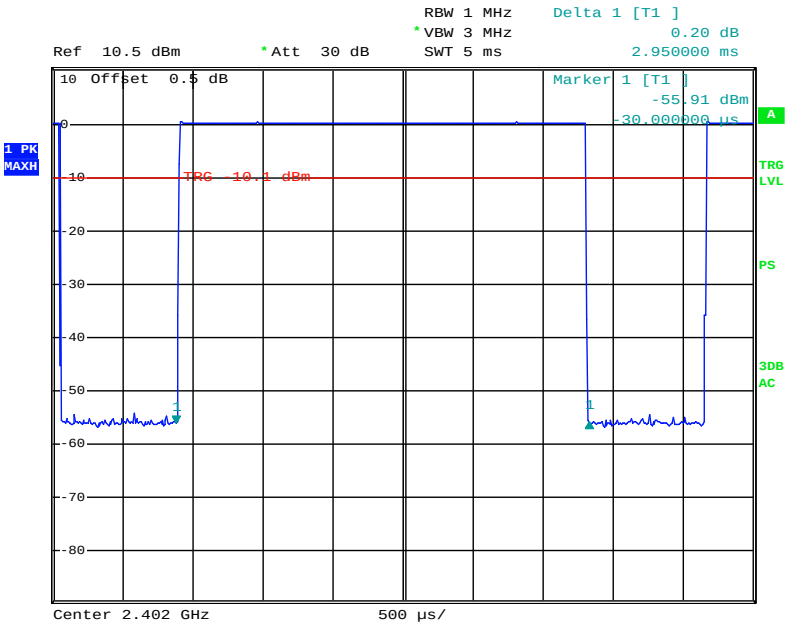
Date: 1.FEB.2012 17:34:49

High Channel for DH3



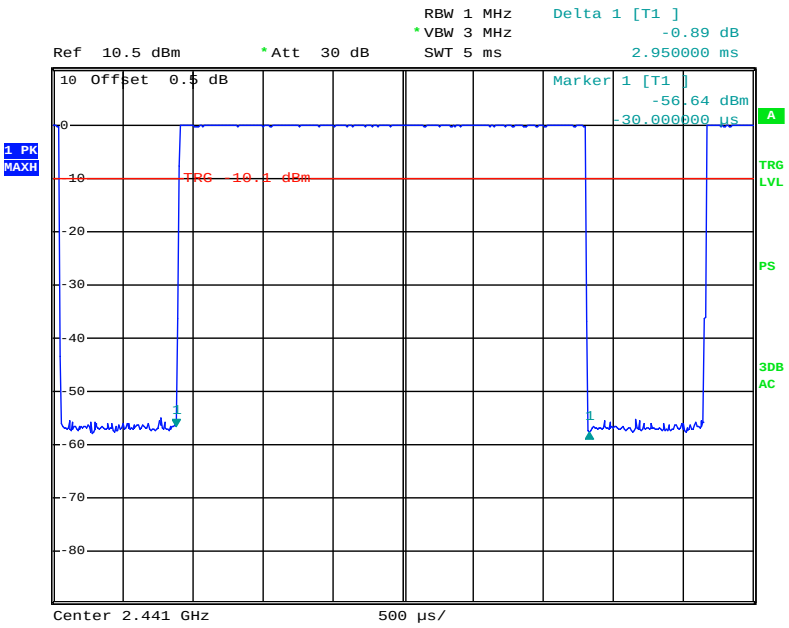
Date: 1.FEB.2012 17:35:33

Low Channel for DH5



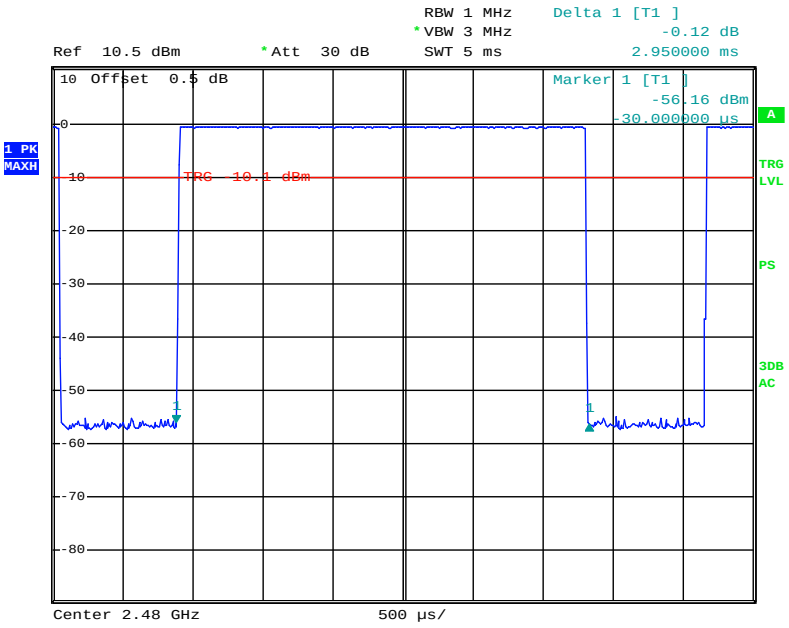
Date: 1.FEB.2012 17:40:58

Middle Channel for DH5



Date: 1.FEB.2012 17:37:25

High Channel for DH5



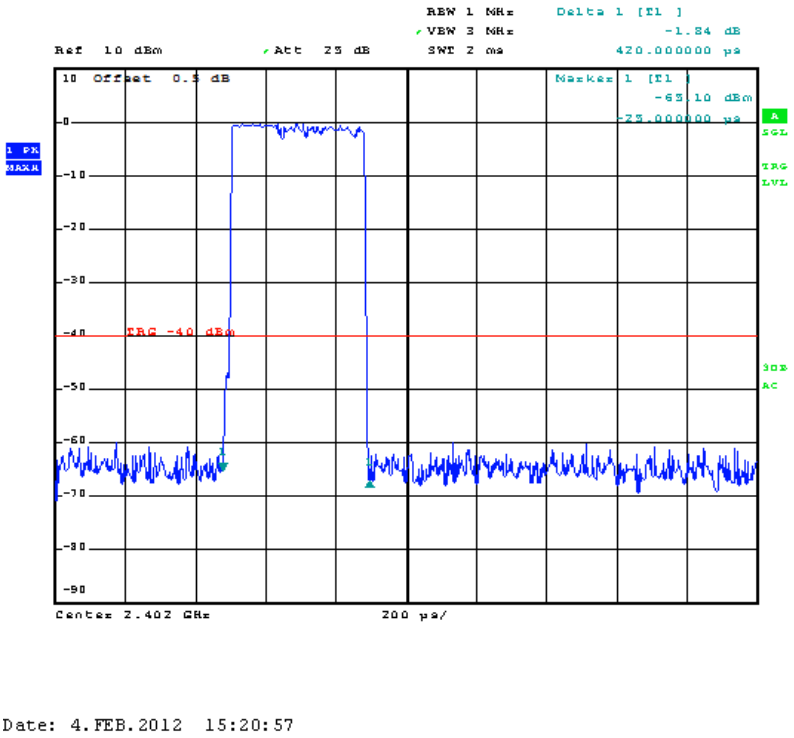
Date: 1.FEB.2012 17:37:03

EDR Mode (π/4-DQPSK):

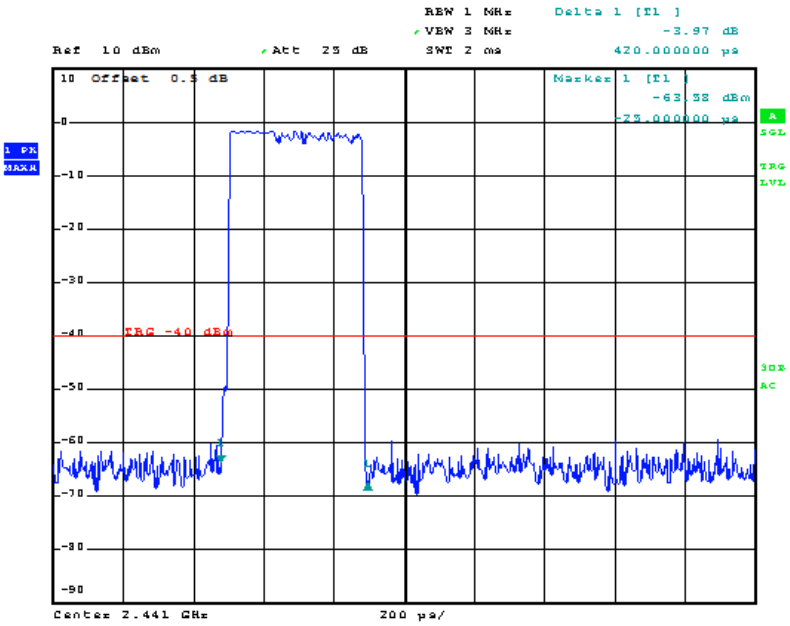
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.420	0.1344	0.4	Pass
	Middle	0.420	0.1344	0.4	Pass
	High	0.420	0.1344	0.4	Pass
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s				
DH 3	Low	1.690	0.2704	0.4	Pass
	Middle	1.680	0.5376	0.4	Pass
	High	1.680	0.5376	0.4	Pass
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s				
DH 5	Low	2.954	0.3151	0.4	Pass
	Middle	2.954	0.3151	0.4	Pass
	High	2.954	0.3151	0.4	Pass
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s				

Please refer to the following plots.

Low Channel for DH1

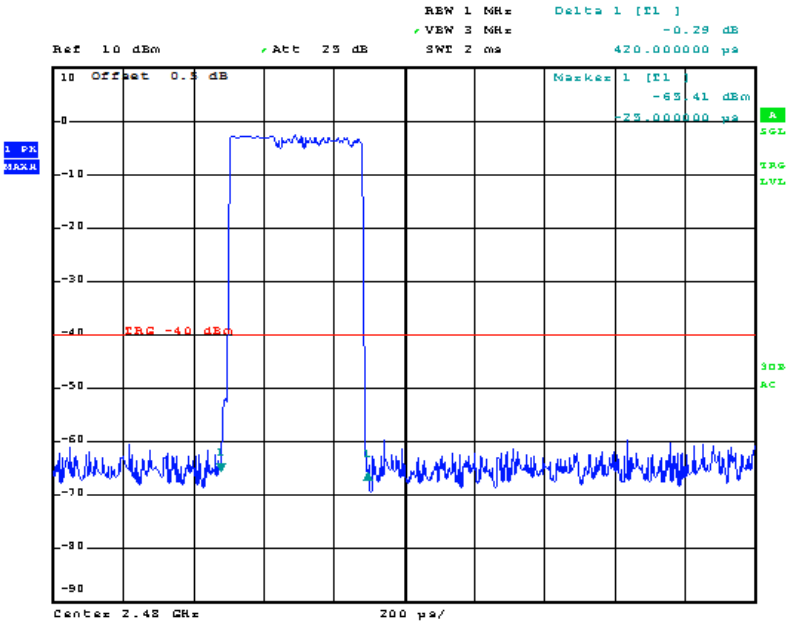


Middle Channel for DH1



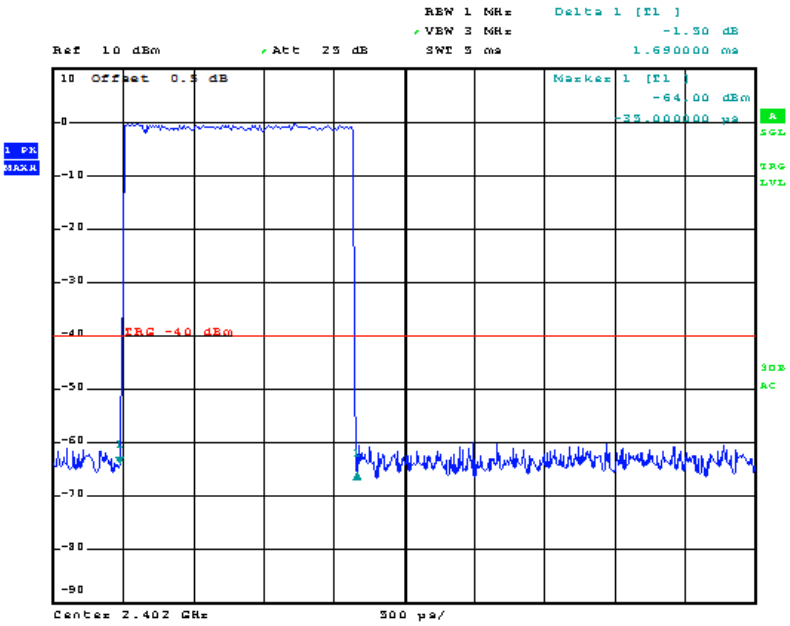
Date: 4.FEB.2012 15:21:18

High Channel for DH1



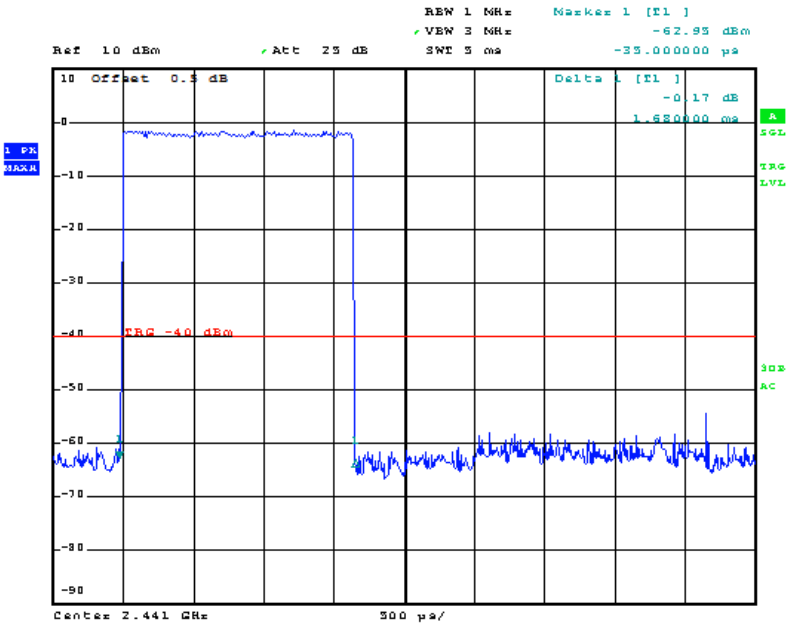
Date: 4.FEB.2012 15:21:41

Low Channel for DH3



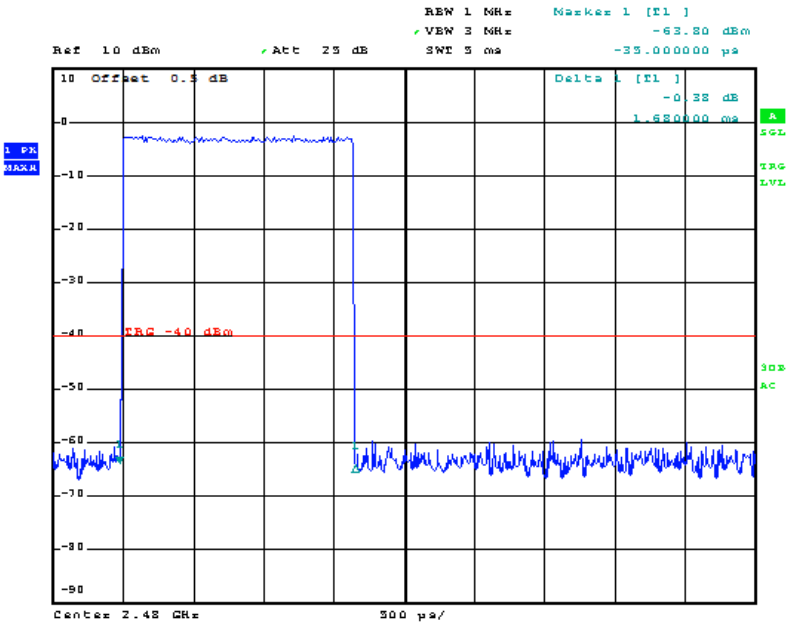
Date: 4.FEB.2012 15:23:32

Middle Channel for DH3



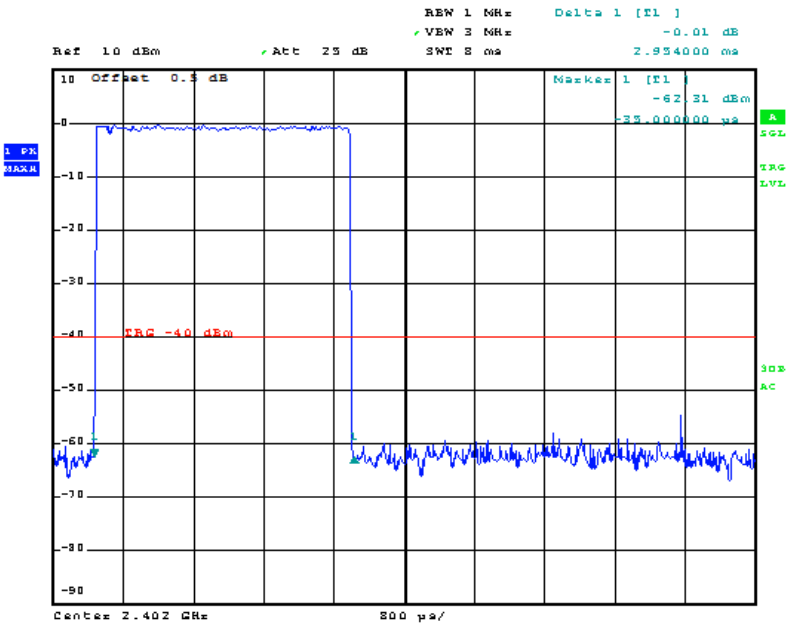
Date: 4.FEB.2012 15:23:05

High Channel for DH3



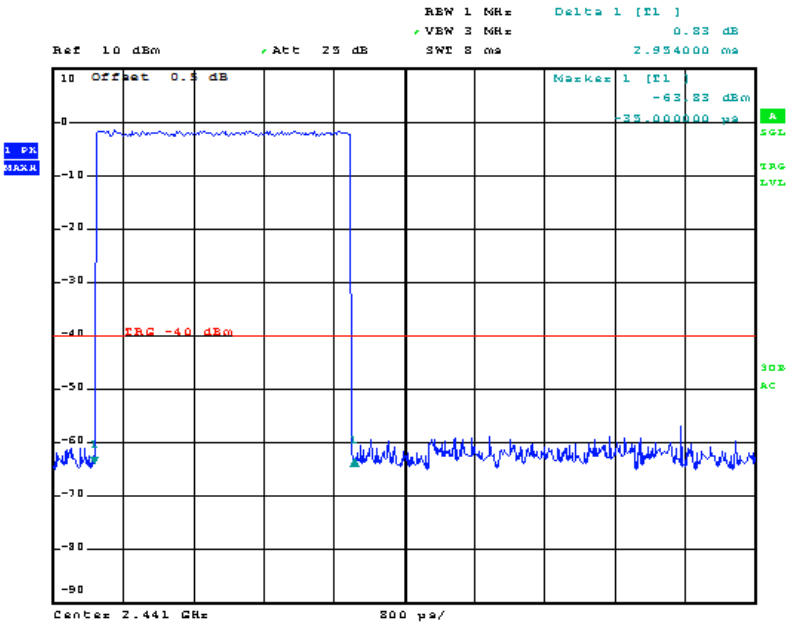
Date: 4.FEB.2012 15:22:35

Low Channel for DH5



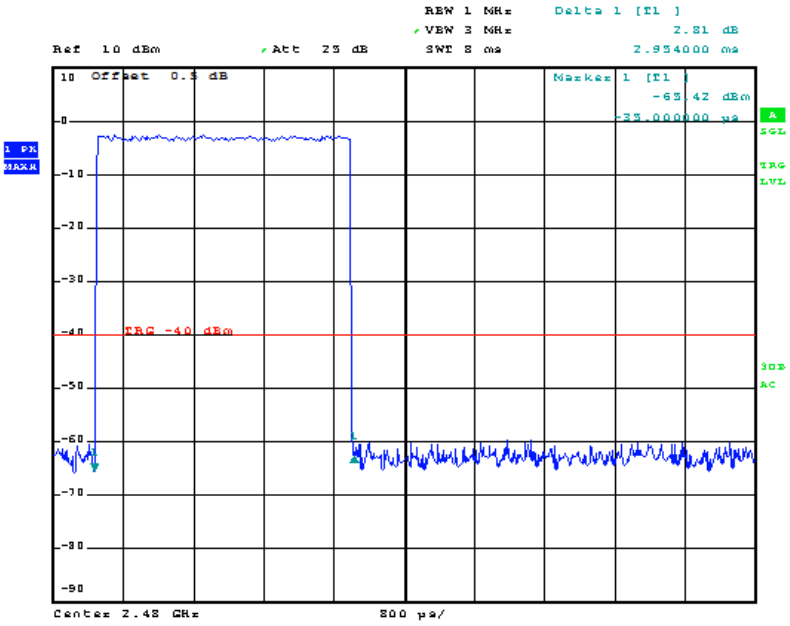
Date: 4.FEB.2012 15:28:47

Middle Channel for DH5



Date: 4.FEB.2012 15:28:16

High Channel for DH5



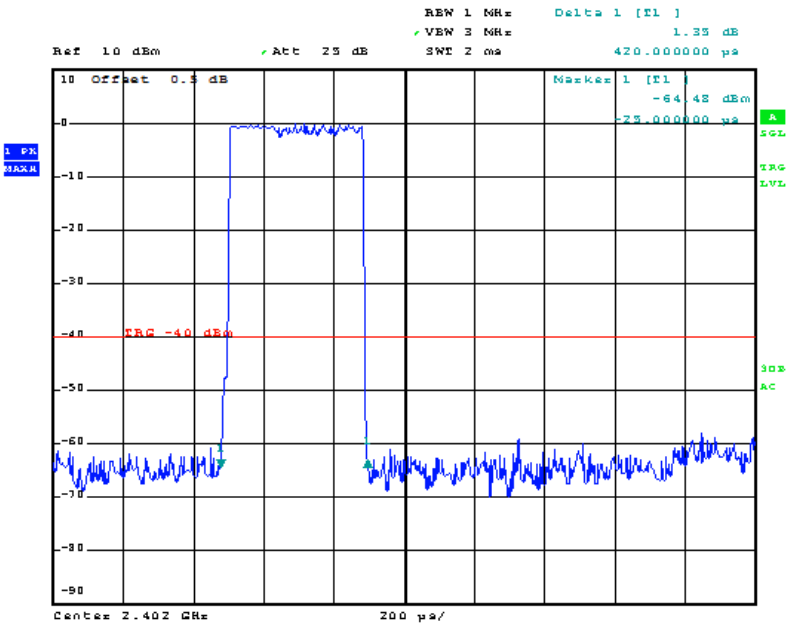
Date: 4.FEB.2012 15:27:56

EDR Mode (8DPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH 1	Low	0.420	0.1344	0.4	Pass
	Middle	0.416	0.1331	0.4	Pass
	High	0.420	0.1344	0.4	Pass
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6s				
DH 3	Low	1.690	0.2704	0.4	Pass
	Middle	1.690	0.5408	0.4	Pass
	High	1.690	0.5408	0.4	Pass
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6s				
DH 5	Low	2.960	0.3157	0.4	Pass
	Middle	2.944	0.3140	0.4	Pass
	High	2.960	0.3157	0.4	Pass
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6s				

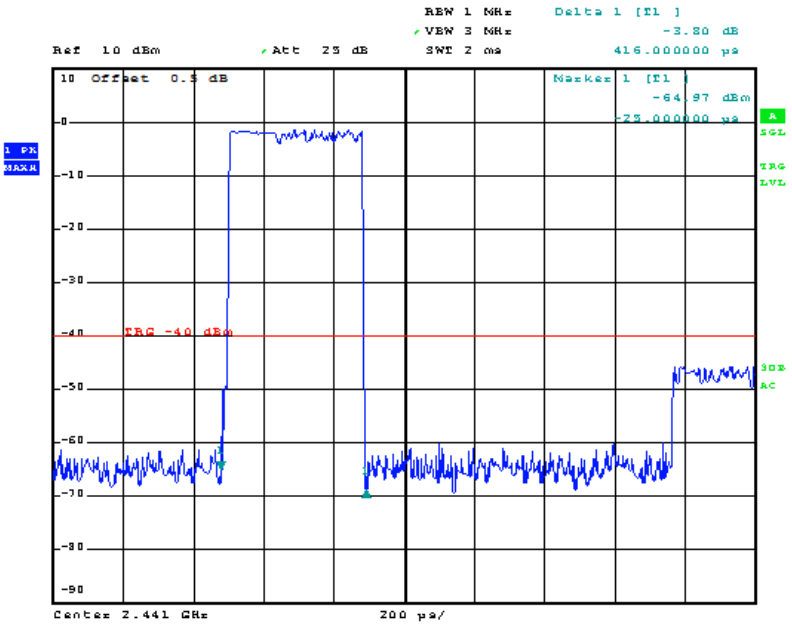
Please refer to the following plots.

Low Channel for DH1



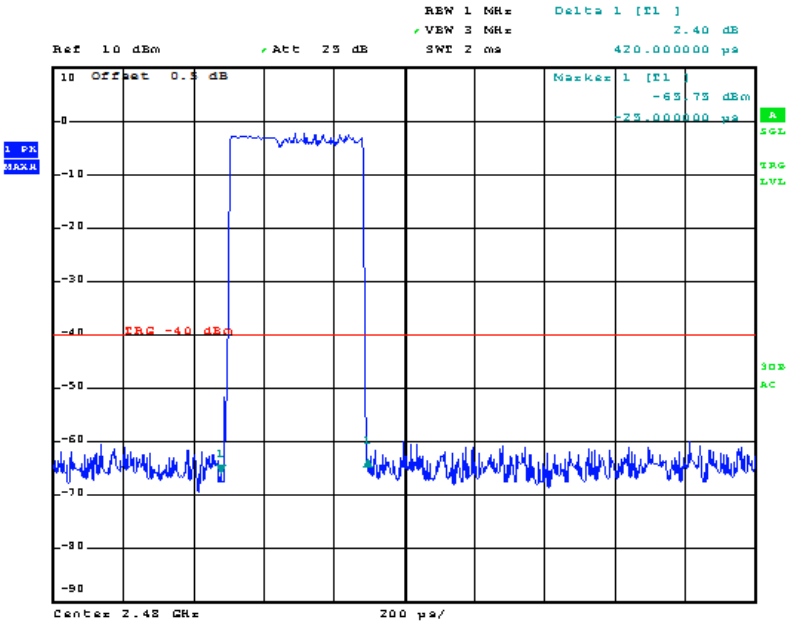
Date: 4.FEB.2012 15:19:40

Middle Channel for DH1



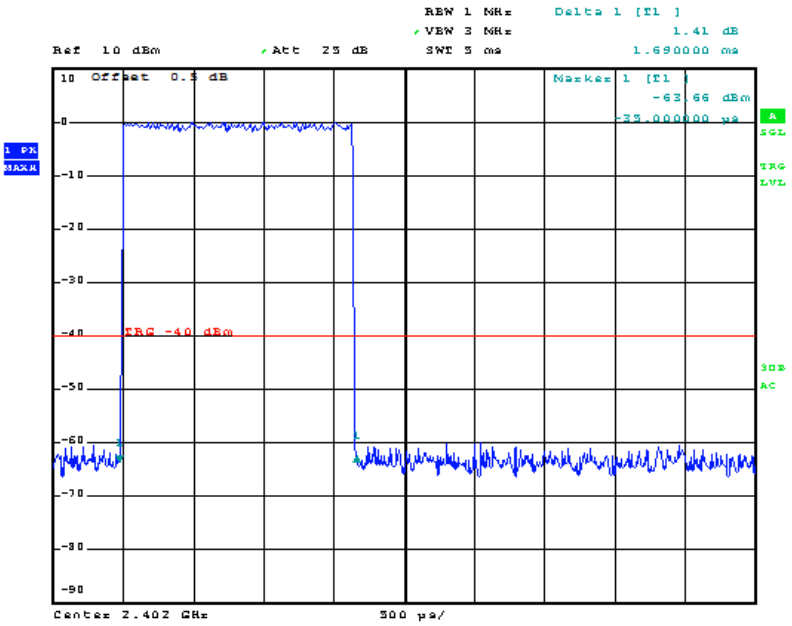
Date: 4.FEB.2012 15:19:12

High Channel for DH1



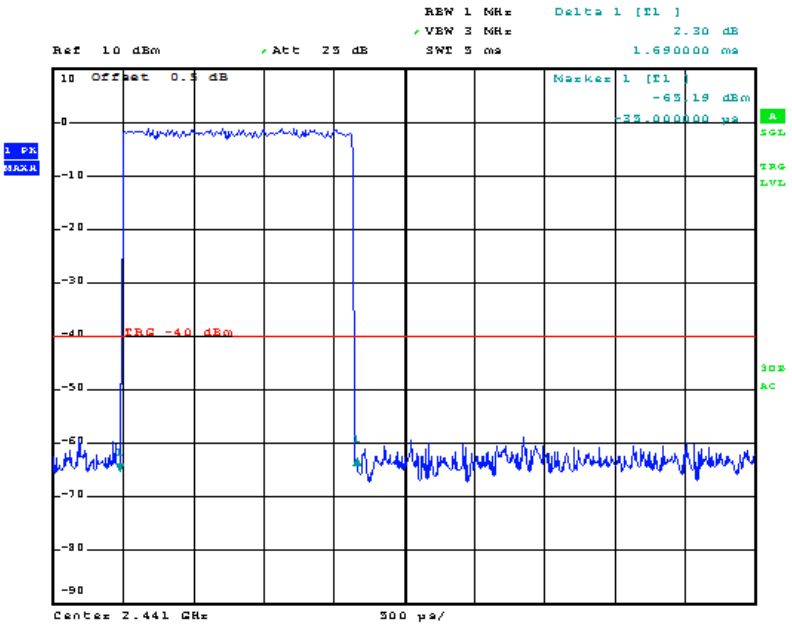
Date: 4.FEB.2012 15:18:38

Low Channel for DH3



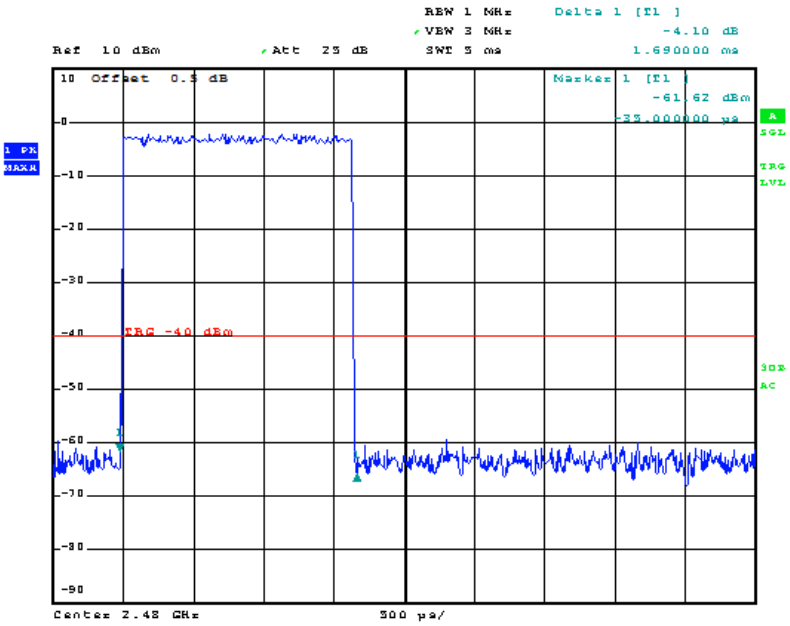
Date: 4.FEB.2012 15:24:07

Middle Channel for DH3



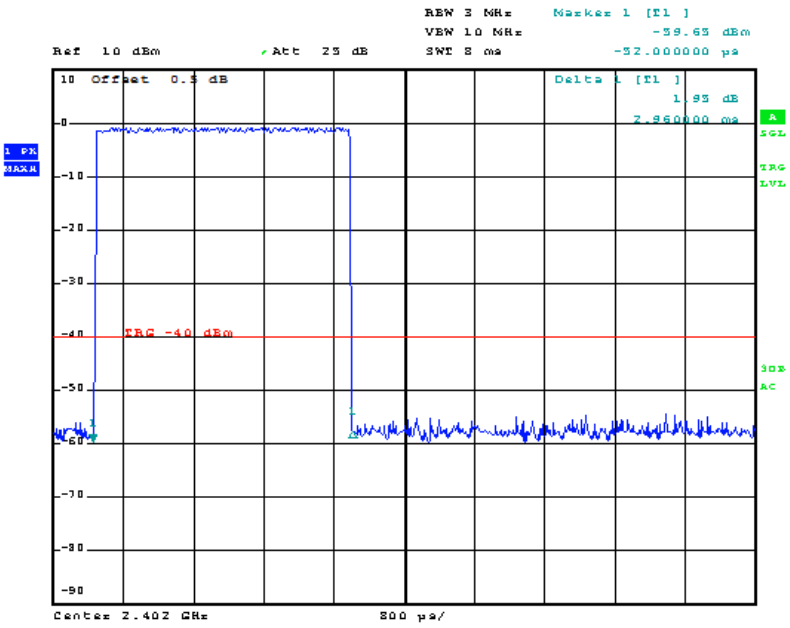
Date: 4.FEB.2012 15:24:33

High Channel for DH3



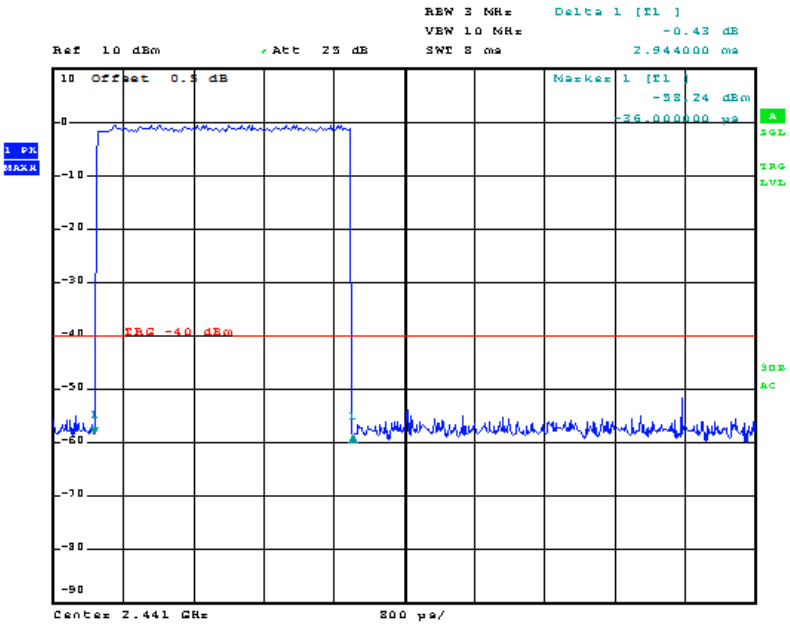
Date: 4.FEB.2012 15:24:56

Low Channel for DH5



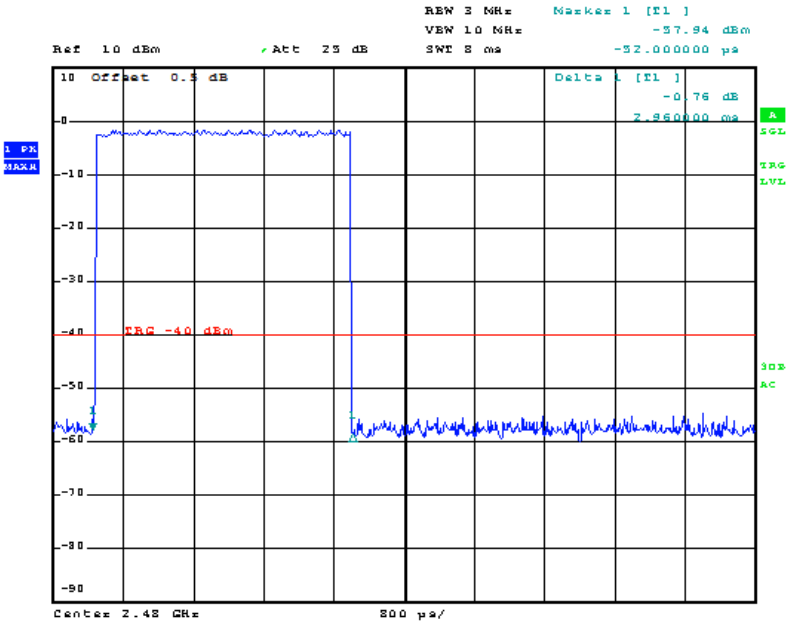
Date: 4.FEB.2012 15:38:06

Middle Channel for DH5



Date: 4.FEB.2012 15:37:13

High Channel for DH5



Date: 4.FEB.2012 15:38:37

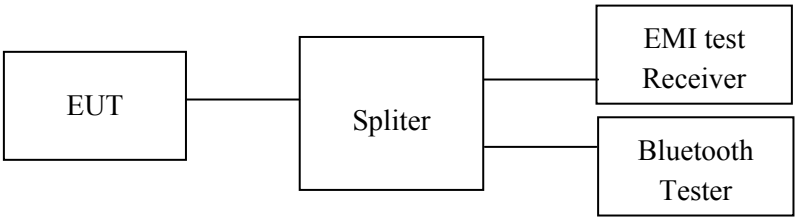
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to FCC §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	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

*** 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 Felix Li on 2012-02-02.*

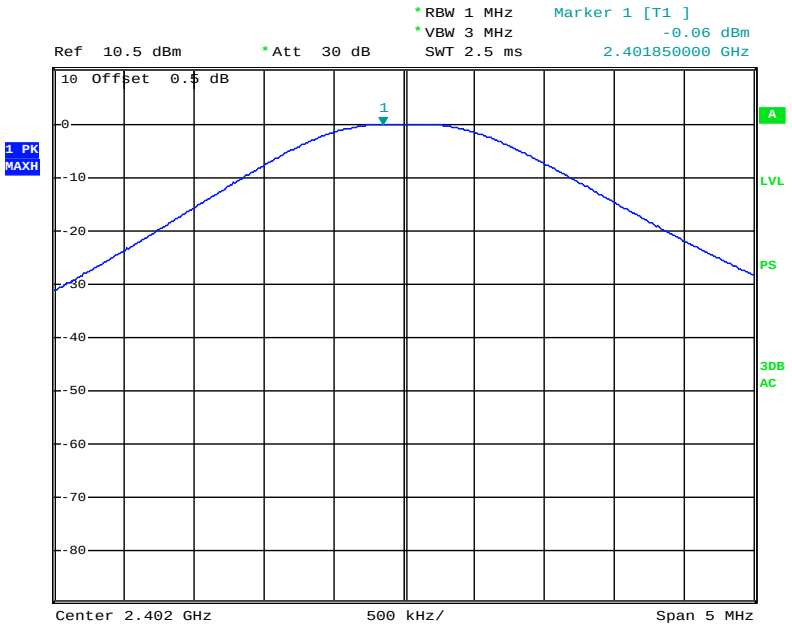
Test Result: Compliance.

Test Mode: Transmitting

BDR Mode (GFSK):

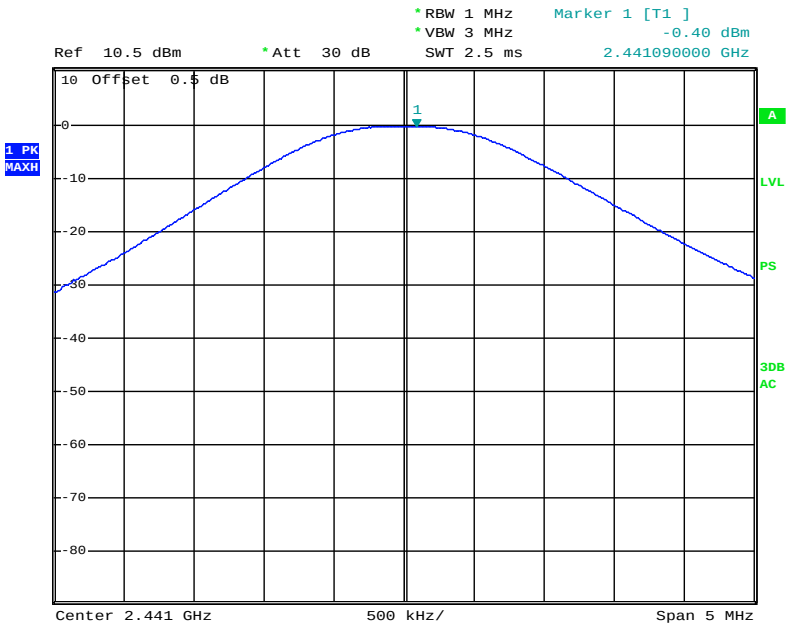
Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
Low	2402	-0.06	0.986	1000
Middle	2441	-0.40	0.912	1000
High	2480	-0.88	0.817	1000

Low Channel



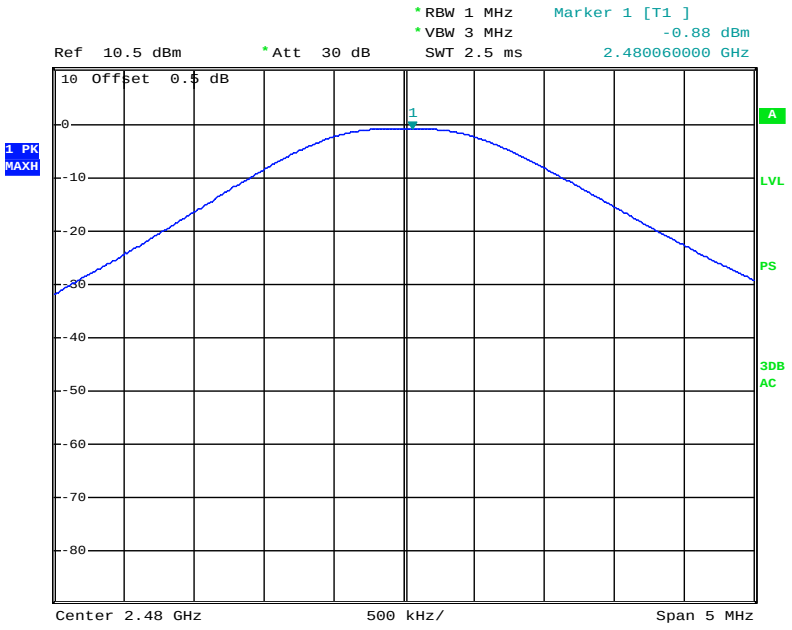
Date: 2.FEB.2012 11:10:24

Middle Channel



Date: 2.FEB.2012 11:25:13

High Channel

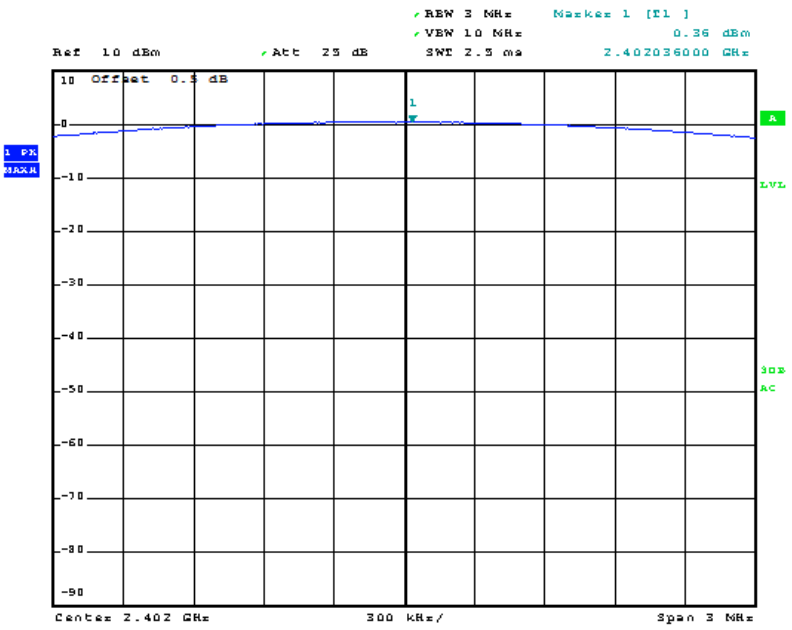


Date: 2.FEB.2012 11:26:19

EDR Mode (π/4-DQPSK):

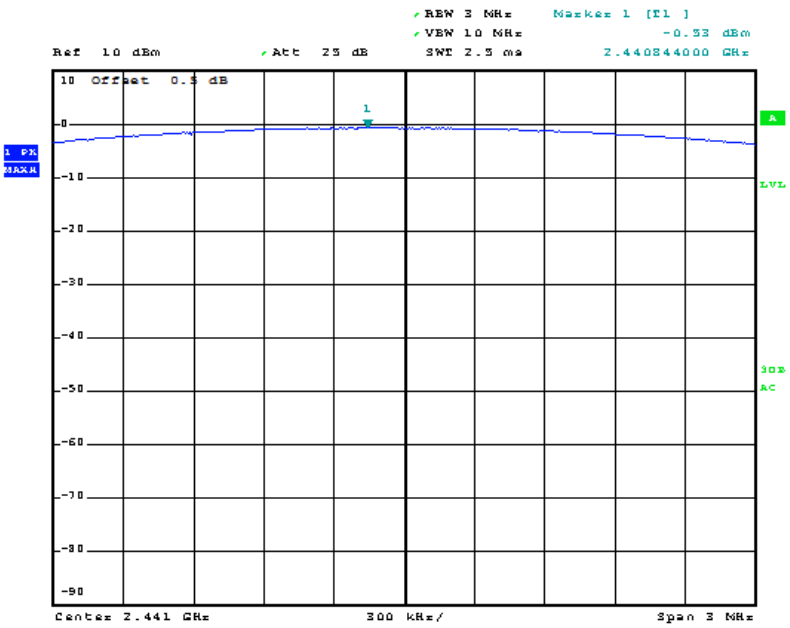
Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
Low	2402	0.36	1.086	1000
Middle	2441	-0.53	0.885	1000
High	2480	-1.69	0.678	1000

Low Channel



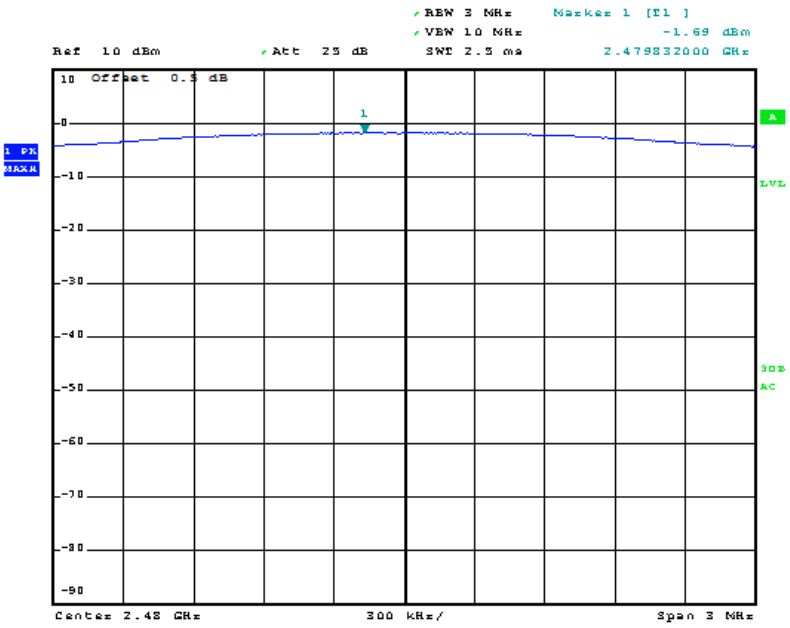
Date: 4.FEB.2012 14:51:31

Middle Channel



Date: 4.FEB.2012 14:52:32

High Channel

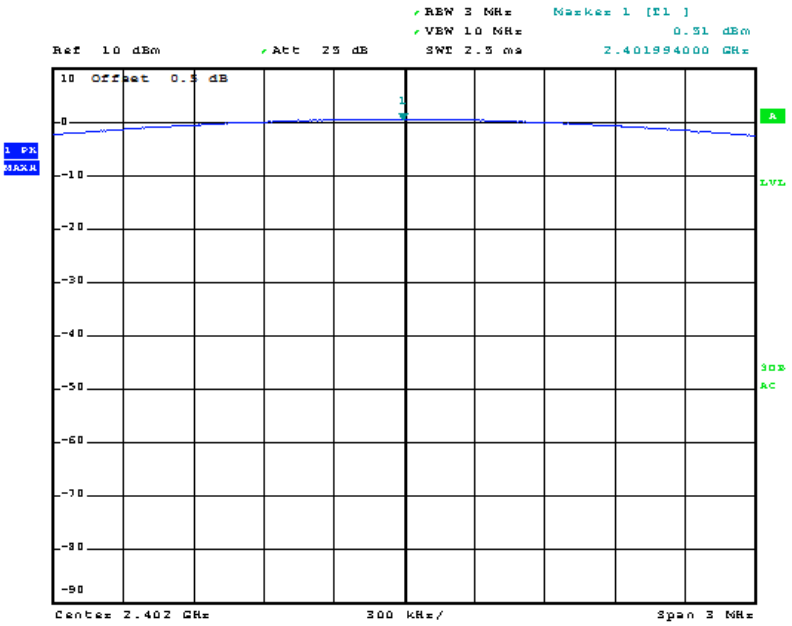


Date: 4.FEB.2012 14:53:19

EDR Mode (8DPSK):

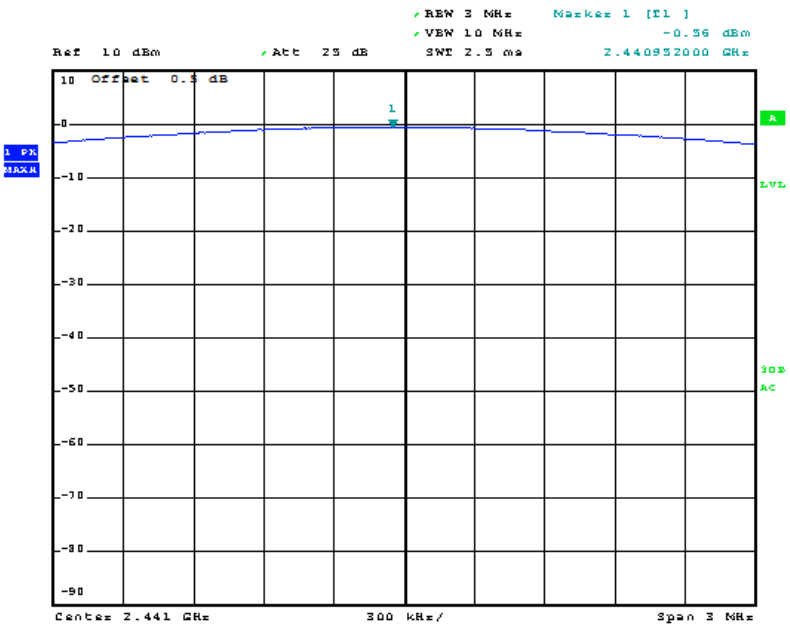
Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
Low	2402	0.51	1.125	1000
Middle	2441	-0.56	0.879	1000
High	2480	-1.51	0.706	1000

Low Channel



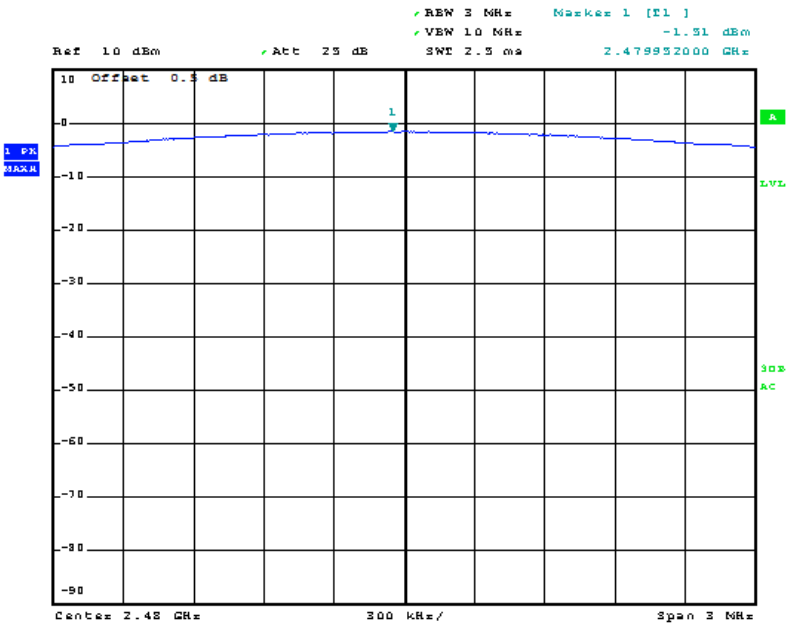
Date: 4.FEB.2012 15:14:06

Middle Channel



Date: 4.FEB.2012 15:14:46

High Channel



Date: 4.FEB.2012 15:15:26

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 an 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 RBW 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	100035	2011-11-11	2012-11-10
TESCOM	Bluetooth Tester	TC-3000B	3000B650083	2011-12-07	2012-12-06

*** 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

**The testing was performed by Felix Li from 2012-02-02 to 2012-02-04.*

Test Result: Compliant

Please refer to the following table and plots.

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2400	57.89	20
2483.5	58.00	20

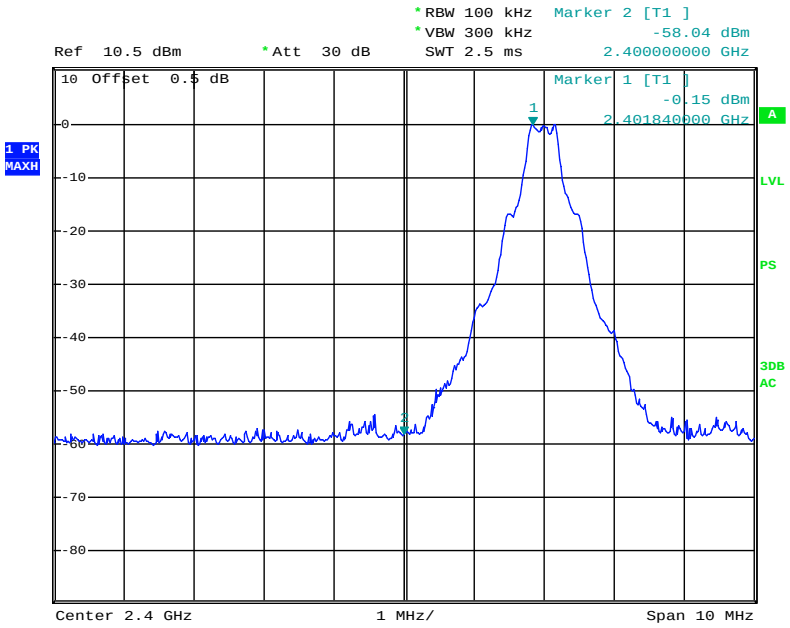
EDR Mode (π/4-DQPSK):

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2400	55.96	20
2483.5	55.88	20

EDR Mode (8DPSK):

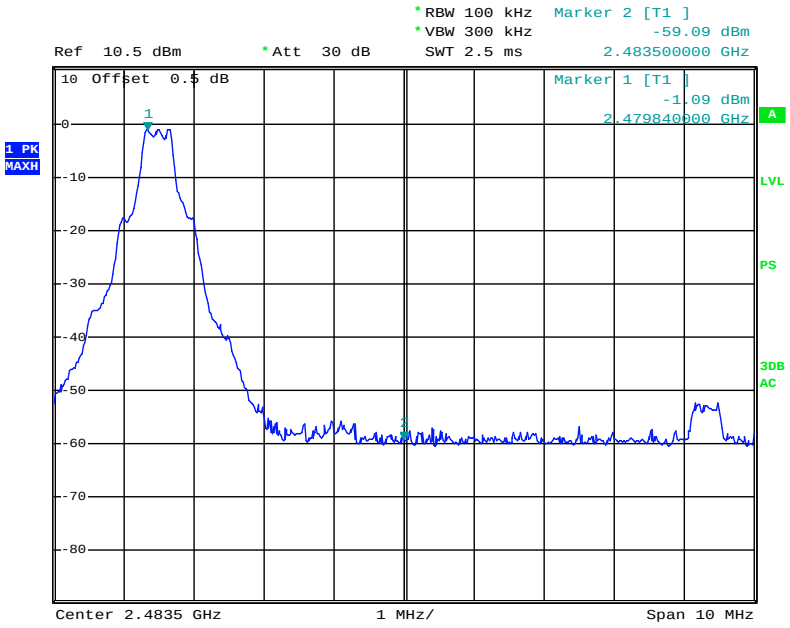
Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2400	51.11	20
2483.5	56.13	20

GFSK - Band Edge: Left Side



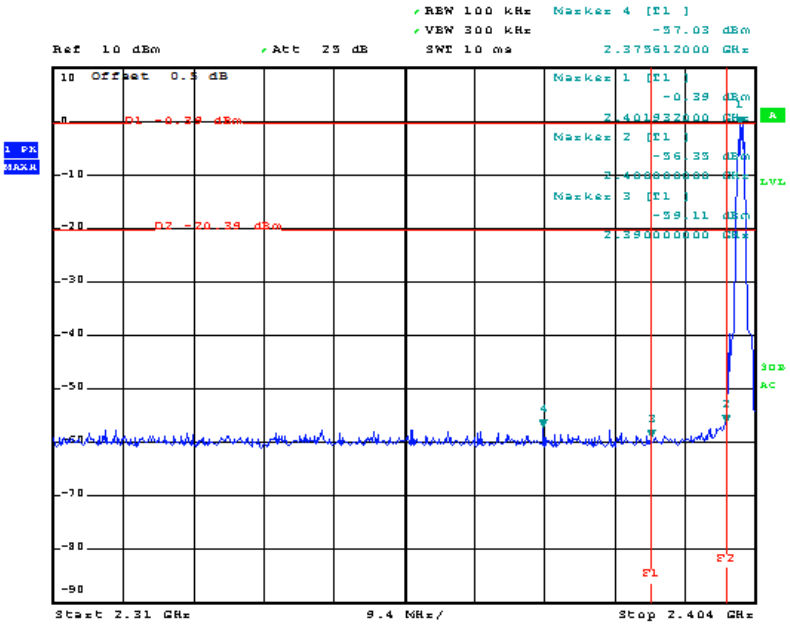
Date: 1.FEB.2012 16:53:28

GFSK - Band Edge: Right Side



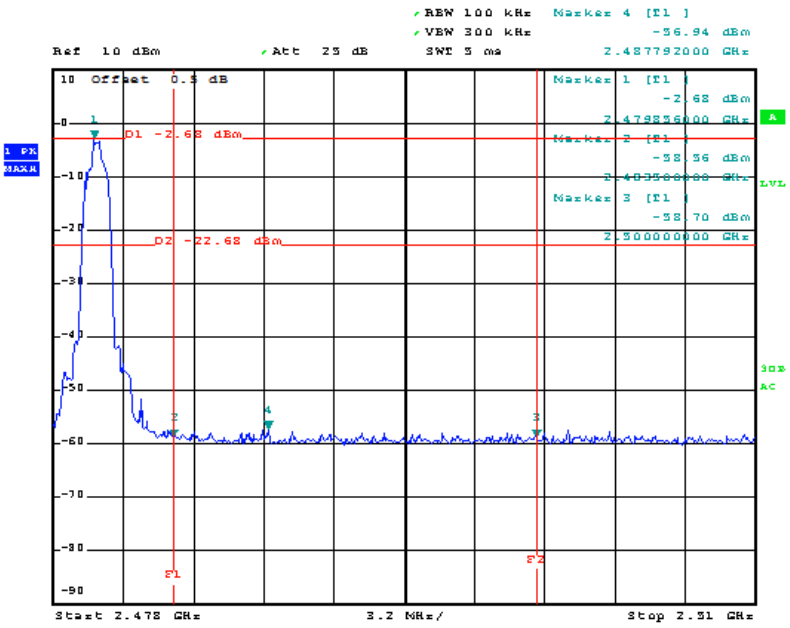
Date: 1.FEB.2012 16:54:35

π/4-DQPSK - Band Edge: Left Side



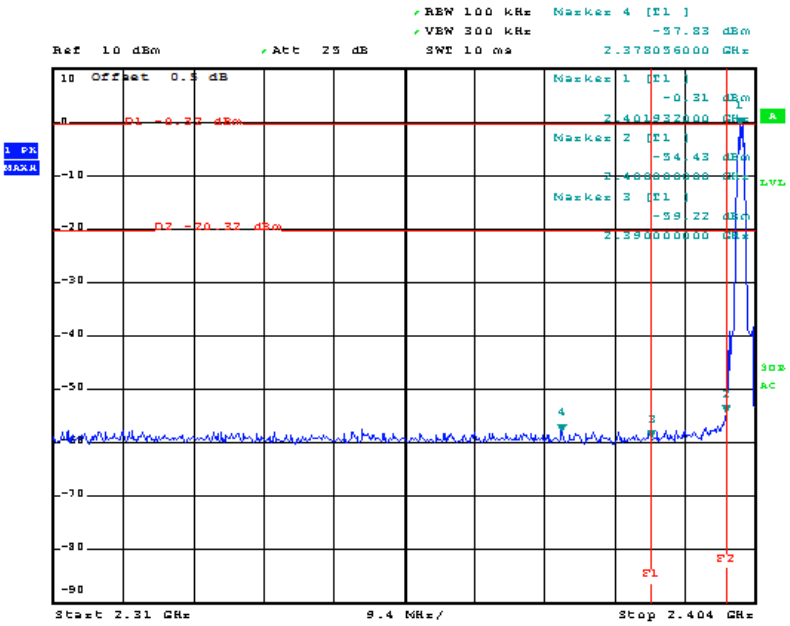
Date: 4.FEB.2012 15:13:07

π/4-DQPSK - Band Edge: Right Side



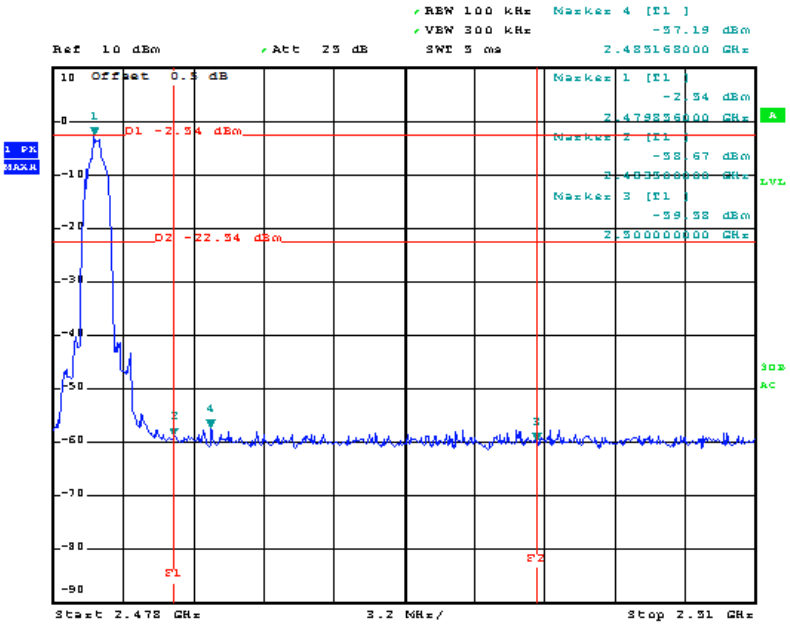
Date: 4.FEB.2012 15:07:08

8DPSK - Band Edge: Left Side



Date: 4.FEB.2012 15:11:59

8DPSK - Band Edge: Right Side



Date: 4.FEB.2012 15:08:21

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