

**FCC PART 15.247
TEST REPORT**

For

Victorwood Holdings Limited

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Kwai Chung, N.T., Hong Kong

FCC ID: T5HBM101KIJAKA

Report Type: Original Report	Product Type: Bluetooth Stereo Headset
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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 *Victorwood Holdings Limited's* product, model number: *BM-101 (FCC ID: T5HBM101KIJAKA)* or the "EUT" in this report was a *Bluetooth Stereo Headset*, which was measured approximately: 21.5 cm (L) x 16.0 cm (W) x 9.0 cm (H), rated input voltage: DC 3.7 V battery or DC 5 V charging from USB Port.

** All measurement and test data in this report was gathered from production sample serial number: 1208023 (Assigned by Shenzhen BACL). The EUT was received on 2012-08-07.*

Objective

This test report is prepared on behalf of *Victorwood Holdings Limited* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

No Related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a testing mode.

Equipment Modifications

No modification was made to the EUT tested.

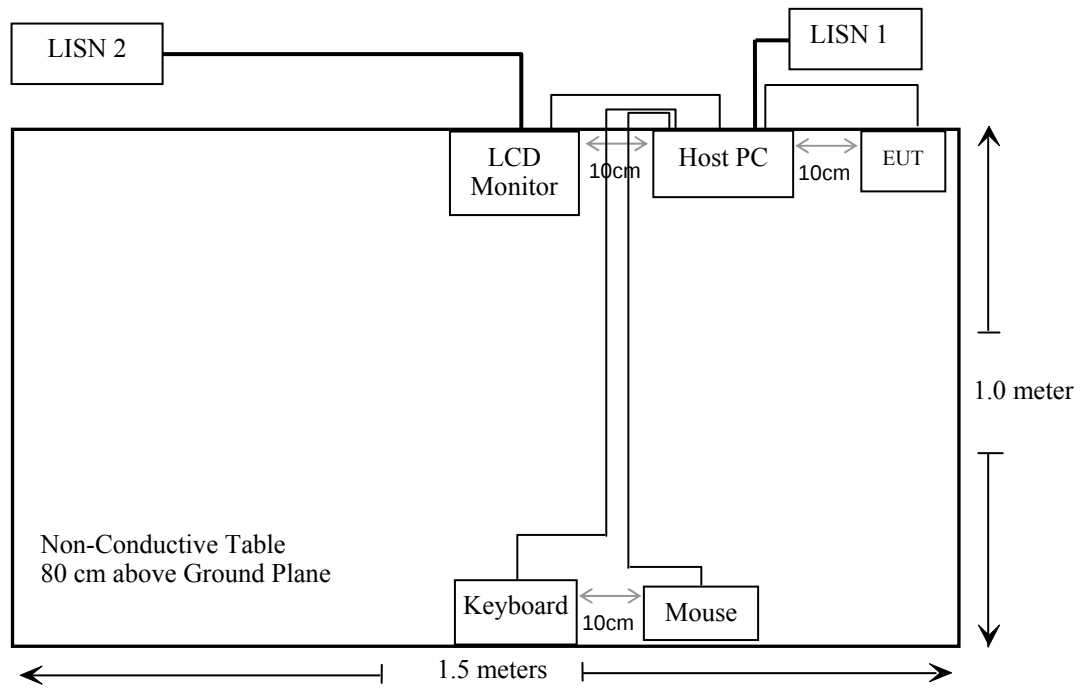
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable USB Cable	1.5	Host PC	Mouse
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.8	Host PC	LCD Monitor
Unshielded Detachable DC Cable	1.0	EUT	Host PC

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure Info	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission 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) & §2.1093 – RF EXPOSURE EVALUATION

Standard Applicable

FCC §15.247 (i) and §2.1093.

According to KDB 447498 1) c), portable device with output power $>60/f_{\text{GHz}}$ mW shall include SAR data for equipment approval.

Evaluation Result

Peak Conducted Outptu Power: 0.33 dBm (1.079 mw);

Antenna Gain: 2.0 dBi;

E.I.R.P: 2.33 dBm (1.71 mw)

SAR threshold: $60/f_{\text{GHz}} = 60/2.441 = 24.58 \text{ mW}$

The EUT is a portable device, the maimum output power is less than FCC SAR threshold. SAR evaluation is not required.

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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT used one fixed antenna, which in accordance to section 15.203, the maximum gain is 2 dBi; please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

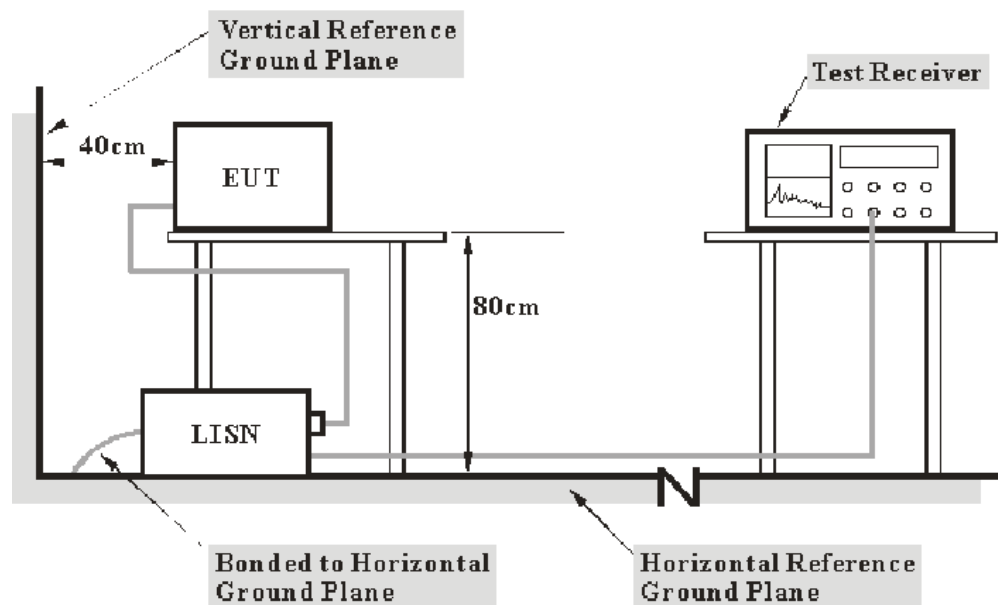
FCC §15.207

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 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 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 spacing between the peripherals was 10 cm.

The host 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:

<u>Frequency Range</u>	<u>IF B/W</u>
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the host PC was connected to the outlet of the first LISN, and LCD monitor was connected to the second 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	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	N/A	N/A

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

Test Results Summary

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

10.91 dB at 10.065 MHz in the Neutral conducted mode

Test Data

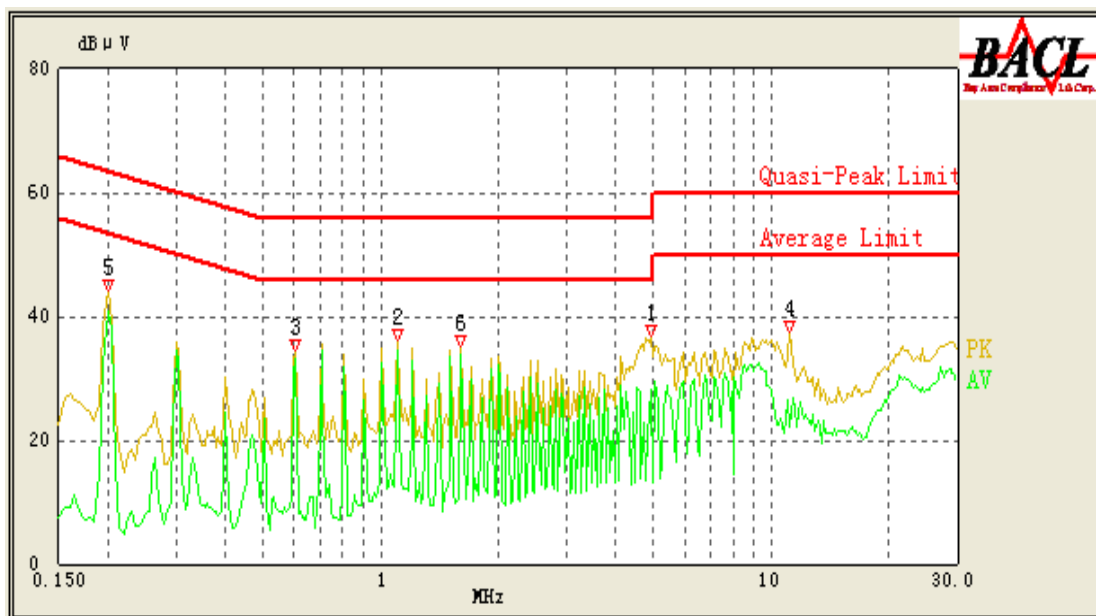
Environmental Conditions

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

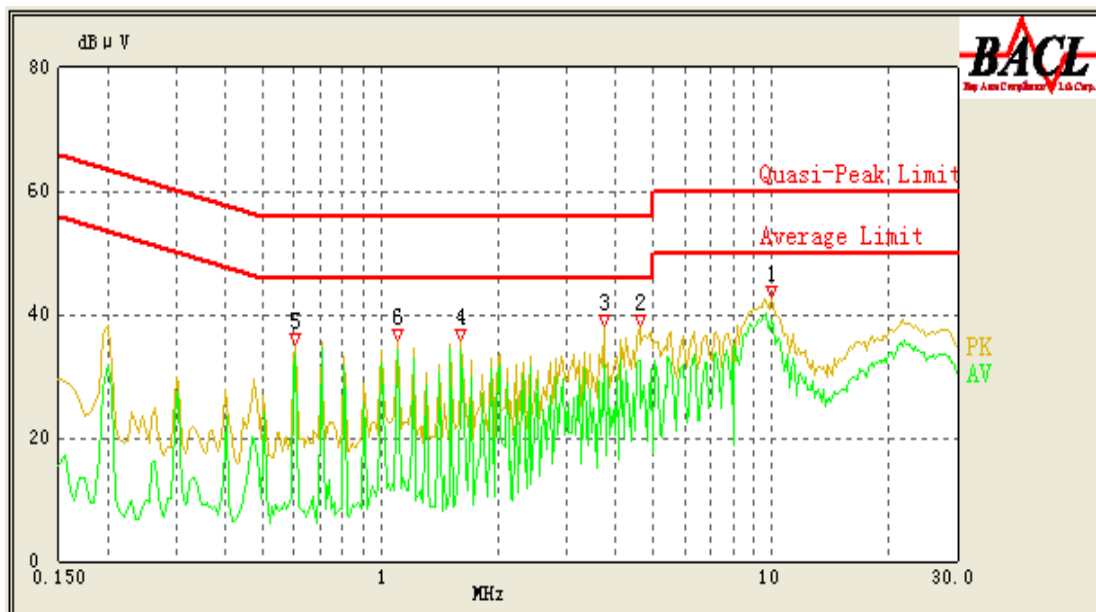
The testing was performed by Eric Lee on 2012-08-20.

Test Mode: Charging & Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
1.105	34.66	9.80	46.00	11.34	Ave.
1.610	33.68	9.80	46.00	12.32	Ave.
0.605	33.26	9.69	46.00	12.74	Ave.
0.200	40.99	9.60	54.57	13.58	Ave.
4.930	28.11	9.80	46.00	17.89	Ave.
1.105	35.59	9.80	56.00	20.41	QP
0.605	34.53	9.69	56.00	21.47	QP
1.610	34.09	9.80	56.00	21.91	QP
0.200	41.48	9.60	64.57	23.09	QP
4.930	32.12	9.80	56.00	23.88	QP
11.165	22.01	10.23	50.00	27.99	Ave.
11.165	23.62	10.23	60.00	36.38	QP

AC 120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
10.065	39.09	10.01	50.00	10.91	Ave.
1.105	34.33	9.80	46.00	11.67	Ave.
1.610	34.29	9.80	46.00	11.71	Ave.
0.605	33.59	9.69	46.00	12.41	Ave.
4.630	32.51	9.80	46.00	13.49	Ave.
3.725	31.92	9.80	46.00	14.08	Ave.
10.065	40.42	10.01	60.00	19.58	QP
4.630	35.94	9.80	56.00	20.06	QP
1.610	35.19	9.80	56.00	20.81	QP
1.105	35.15	9.80	56.00	20.85	QP
0.605	34.11	9.69	56.00	21.89	QP
3.725	32.92	9.80	56.00	23.08	QP

FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

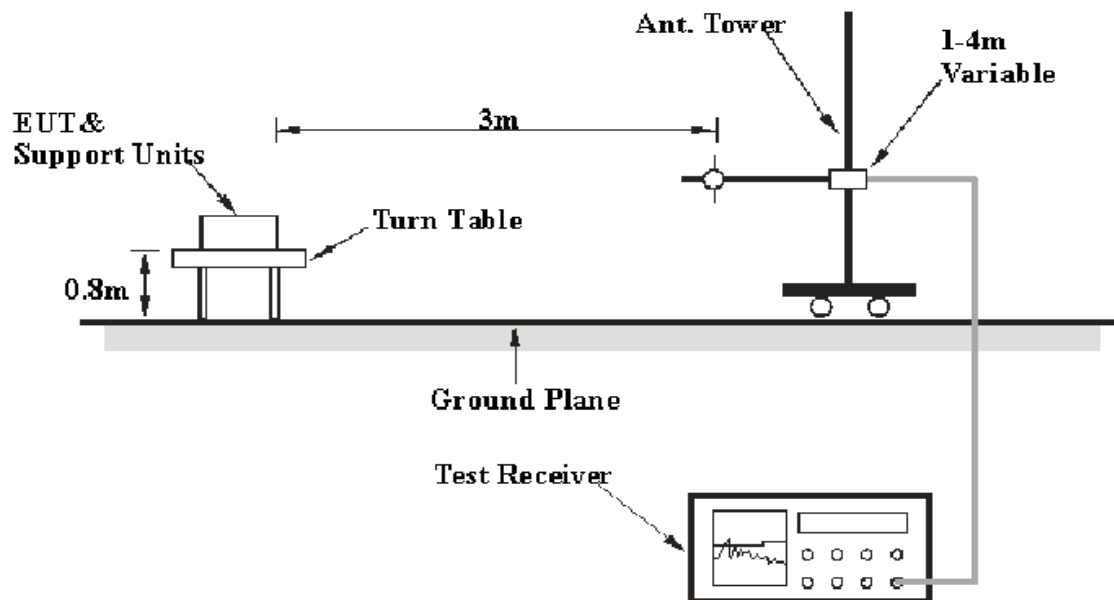
FCC §15.205; §15.209; §15.247(d)

Measurement Uncertainty

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

Based on 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, 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 host 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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>	<i>Detector</i>
30 MHz – 1000 MHz	120 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

For radiated emissions, 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 and peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01057	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
Mini-Circuits	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-05-17	2013-05-16
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-10-14	2012-10-13
Rohde & Schwarz	Auto test Software	EMC32	V6.30	N/A	N/A

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

Test Results Summary

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

16.34 dB at 9764 MHz in the Vertical polarization

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

The testing was performed by Eric Lee on 2012-08-18.

Test mode: Transmitting (Scan with GFSK, $\pi/4$ -DQPSK, 8-DPSK, the worst case is BDR Mode (GFSK))

30 MHz ~25 GHz:

Frequency (MHz)	Receiver/S.A.		Turn table Degree	Test Antenna			Cable Loss (dB)	Amplifier Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)	Factor (dB)				Limit (dBuV/m)	Margin (dB)
Low Channel(2402 MHz)											
2402	92.18	PK	125	1.3	V	29.60	3.03	26.50	98.31	/	/
2402	78.78	Ave.	125	1.3	V	29.60	3.03	26.50	84.91	/	/
2402	90.20	PK	26	1.2	H	29.60	3.03	26.50	96.33	/	/
2402	78.15	Ave.	26	1.2	H	29.60	3.03	26.50	84.28	/	/
9608	18.20	Ave.	37	1.2	V	39.80	5.98	26.50	37.48	54	16.52
9608	36.15	PK	37	1.2	V	39.80	5.98	26.50	55.43	74	18.57
7206	18.25	Ave.	355	1.1	H	37.90	5.22	26.50	34.87	54	19.13
43.5	32.17	QP	26	1.2	V	12.90	0.32	25.89	19.50	40	20.5
4804	18.59	Ave.	43	1.2	V	34.60	4.30	26.50	30.99	54	23.01
4804	38.45	PK	43	1.2	V	34.60	4.30	26.50	50.85	74	23.15
7206	32.47	PK	355	1.1	H	37.90	5.22	26.50	49.09	74	24.91
2485.1	18.98	Ave.	24	1.3	V	29.60	3.03	26.50	25.11	54	28.89
2364.3	19.25	Ave.	3	1.3	H	29.00	2.98	26.50	24.73	54	29.27
2331.2	17.89	Ave.	133	1.2	V	29.00	2.98	26.50	23.37	54	30.63
2485.1	35.44	PK	24	1.3	V	29.60	3.03	26.50	41.57	74	32.43
2364.3	35.47	PK	3	1.3	H	29.00	2.98	26.50	40.95	74	33.05
2331.2	35.42	PK	133	1.2	V	29.00	2.98	26.50	40.90	74	33.10
Middle Channel (2441 MHz)											
2441	92.14	PK	76	1.1	V	30.2	3.11	26.5	98.95	/	/
2441	76.38	Ave.	76	1.1	V	30.2	3.11	26.5	83.19	/	/
2441	89.25	PK	37	1.2	H	30.2	3.11	26.5	96.06	/	/
2441	75.14	Ave.	37	1.2	H	30.2	3.11	26.5	81.95	/	/
9764	18.26	Ave.	133	1.3	V	39.8	6.10	26.5	37.66	54	16.34
9764	35.47	PK	133	1.3	V	39.8	6.10	26.5	54.87	74	19.13
7323	17.68	Ave.	55	1.3	H	37.9	5.09	26.5	34.17	54	19.83
382	36.52	QP	146	1.5	V	13.6	1.40	25.57	25.95	46	20.05
7323	34.58	PK	55	1.3	H	37.9	5.09	26.5	51.07	74	22.93
4882	18.25	Ave.	43	1.2	V	34.6	4.36	26.5	30.71	54	23.29
4882	36.25	PK	43	1.2	V	34.6	4.36	26.5	48.71	74	25.29
2485.4	19.82	Ave.	25	1.1	V	29.6	3.03	26.5	25.95	54	28.05
2334.2	19.17	Ave.	34	1.2	V	29.0	2.98	26.5	24.65	54	29.35
2361.1	18.99	Ave.	78	1.1	H	29.0	2.98	26.5	24.47	54	29.53
2485.4	36.71	PK	25	1.1	V	29.6	3.03	26.5	42.84	74	31.16
2334.2	35.24	PK	34	1.2	V	29.0	2.98	26.5	40.72	74	33.28
2361.1	35.24	PK	78	1.1	H	29.0	2.98	26.5	40.72	74	33.28

Frequency (MHz)	Receiver/S.A.		Turn table Degree	Test Antenna			Cable Loss (dB)	Amplifier Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)	Factor (dB)				Limit (dBuV/m)	Margin (dB)
High Channel (2480 MHz)											
2480	92.47	PK	78	1.1	V	30.2	3.11	26.5	99.28	/	/
2480	78.56	Ave.	78	1.1	V	30.2	3.11	26.5	85.37	/	/
2480	88.57	PK	138	1.3	H	30.2	3.11	26.5	95.38	/	/
2480	78.94	Ave.	138	1.3	H	30.2	3.11	26.5	85.75	/	/
9920	17.89	Ave.	5	1.2	V	39.8	6.08	26.5	37.27	54	16.73
7440	18.25	Ave.	4	1.2	H	37.2	5.20	26.5	34.15	54	19.85
9920	34.28	PK	5	1.2	V	39.8	6.08	26.5	53.66	74	20.34
4960	20.14	Ave.	15	1.1	V	34.6	4.40	26.5	32.64	54	21.36
482.6	31.28	QP	225	1.0	V	15.6	3.12	26.25	23.75	46	22.25
4960	38.12	PK	15	1.1	V	34.6	4.40	26.5	50.62	74	23.38
7440	34.15	PK	4	1.2	H	37.2	5.20	26.5	50.05	74	23.95
2334.6	19.31	Ave.	57	1.1	V	29.0	2.98	26.5	24.79	54	29.21
2483.5	18.47	Ave.	138	1.3	V	29.6	3.03	26.5	24.60	54	29.40
2365.5	18.94	Ave.	54	1.2	H	29.0	2.98	26.5	24.42	54	29.58
2334.6	35.66	PK	57	1.1	V	29.0	2.98	26.5	41.14	74	32.86
2365.5	35.47	PK	54	1.2	H	29.0	2.98	26.5	40.95	74	33.05
2483.5	34.35	PK	138	1.3	V	29.6	3.03	26.5	40.48	74	33.52

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 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 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. Set the EUT in transmitting mode, RBW of spectrum was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

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.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

* The testing was performed by Eric Lee on 2012-08-18.

Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	≥Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.004	0.528	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.528	Pass
	Adjacent	2442			
	High	2480	1.004	0.528	Pass
	Adjacent	2479			
EDR ($\pi/4$ -DQPSK)	Low	2402	1.004	0.812	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.812	Pass
	Adjacent	2442			
	High	2480	1.004	0.812	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.004	0.808	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.808	Pass
	Adjacent	2442			
	High	2480	1.004	0.808	Pass
	Adjacent	2479			

Note: Limit = 20 dB bandwidth *2/3

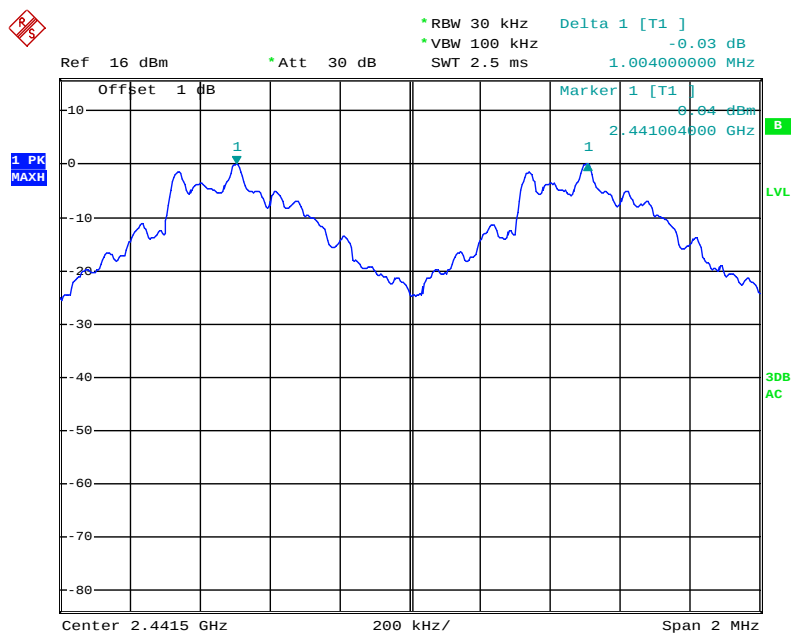
Ref 16 dBm * Att 30 dB * RBW 30 kHz Delta 1 [T1] -0.00 dB
 * VBW 100 kHz SWT 2.5 ms 1.004000000 MHz

Offset 1 dB Marker 1 [T1] 0.00 dBm
 2.402000000 GHz

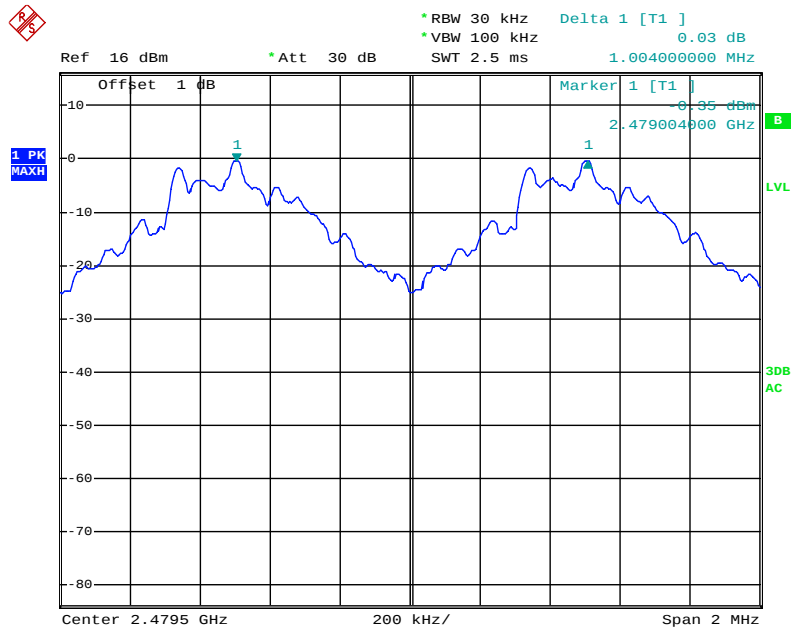
1 PK MAX

Center 2.4025 GHz 200 kHz/ Span 2 MHz

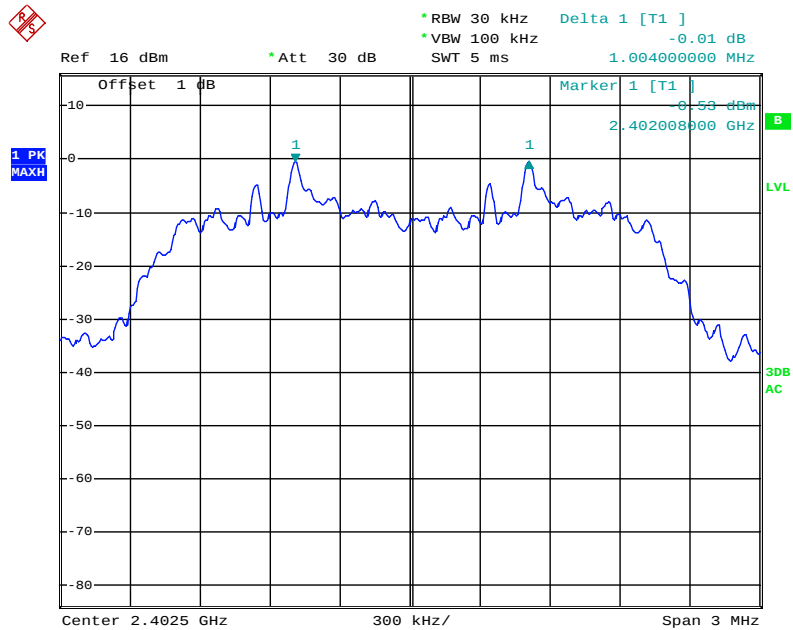
BDR (GFSK): Middle Channel



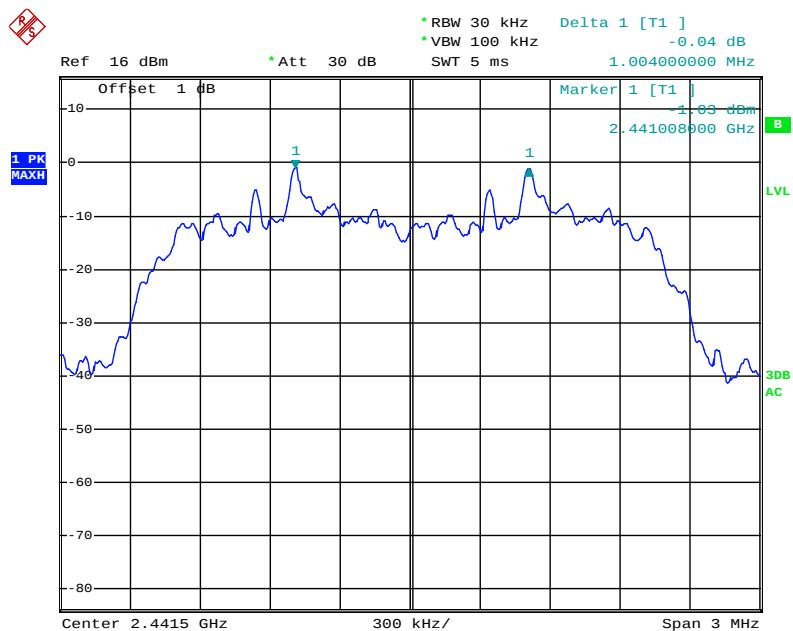
Date: 18.AUG.2012 11:35:55

BDR (GFSK): High Channel

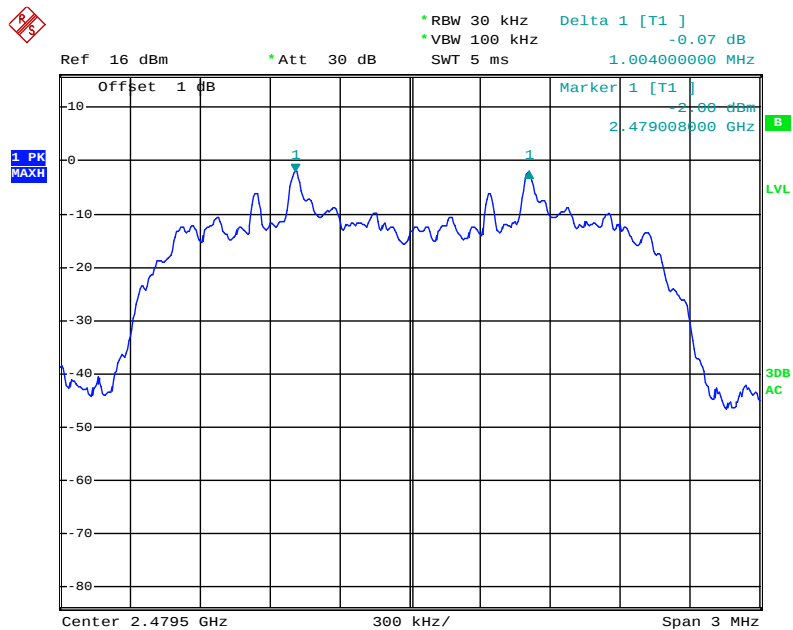
Date: 18.AUG.2012 11:37:11

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

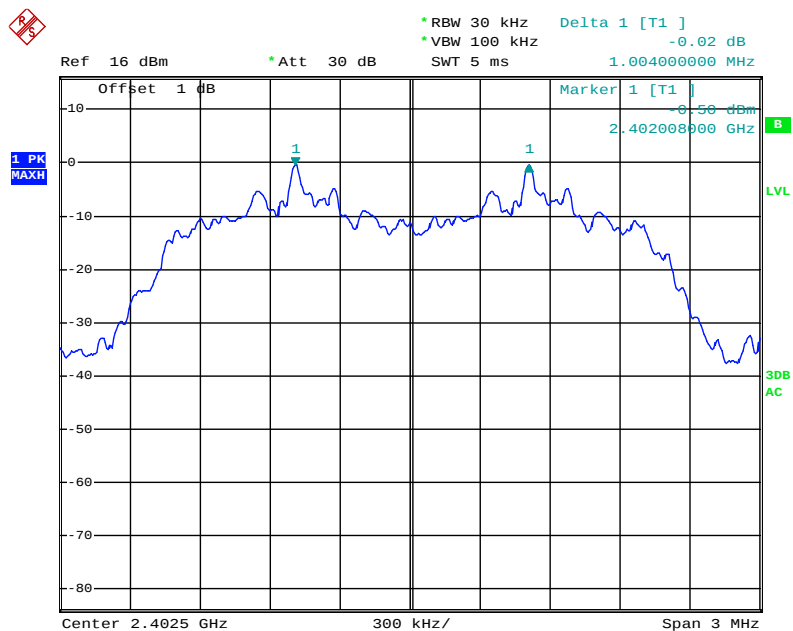
Date: 18.AUG.2012 11:40:52

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

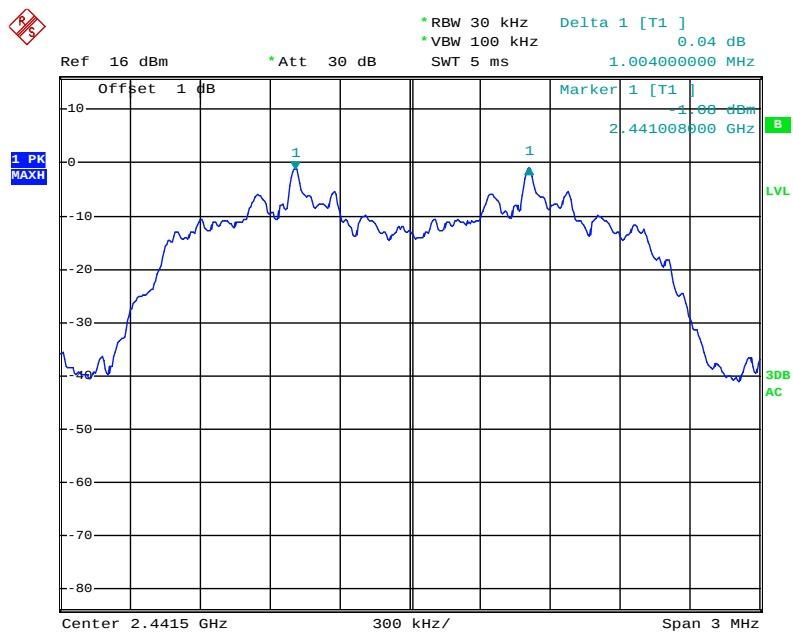
Date: 18.AUG.2012 11:39:56

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

Date: 18.AUG.2012 11:38:33

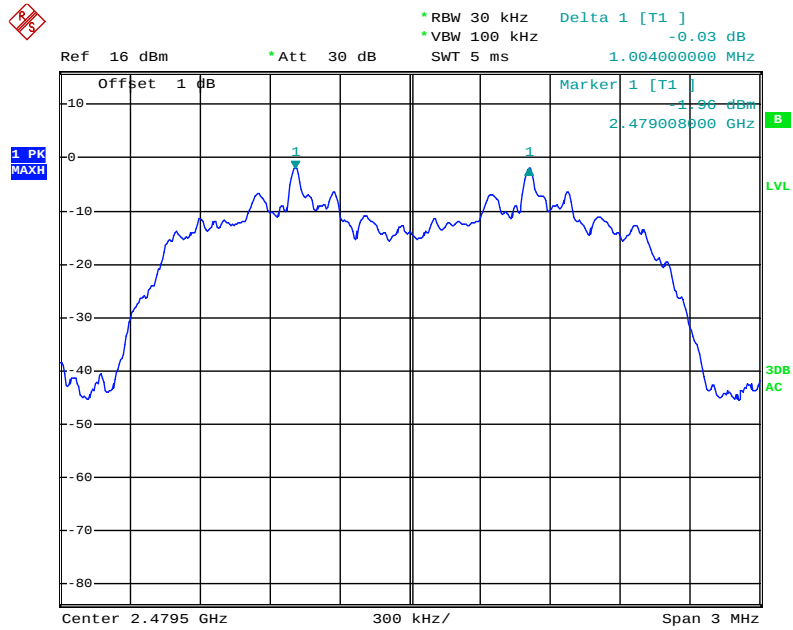
EDR (8DPSK): Low Channel

Date: 18.AUG.2012 11:42:21

EDR (8DPSK): Middle Channel

Date: 18.AUG.2012 11:43:31

EDR (8DPSK): High Channel



Date: 18.AUG.2012 11:44:23

FCC §15.247(a) (1) – 20 dB EMISSION 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 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test 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 kPa

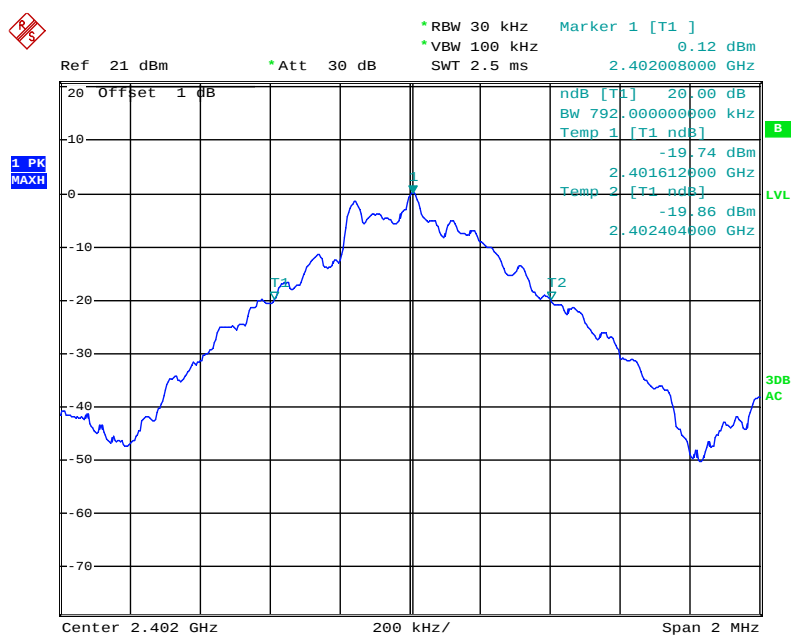
* The testing was performed by Eric Lee on 2012-08-18.

Test Mode: Transmitting

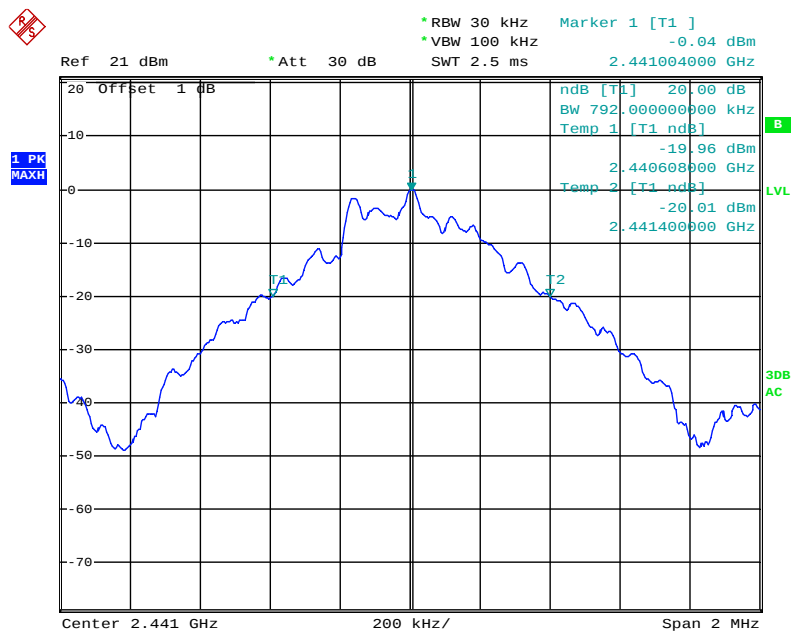
Test Result: Compliance. Please refer to following tables and plots

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR (GFSK)	Low	2402	0.792
	Middle	2441	0.792
	High	2480	0.792
EDR ($\pi/4$ -DQPSK)	Low	2402	1.218
	Middle	2441	1.218
	High	2480	1.218
EDR (8DPSK)	Low	2402	1.212
	Middle	2441	1.212
	High	2480	1.212

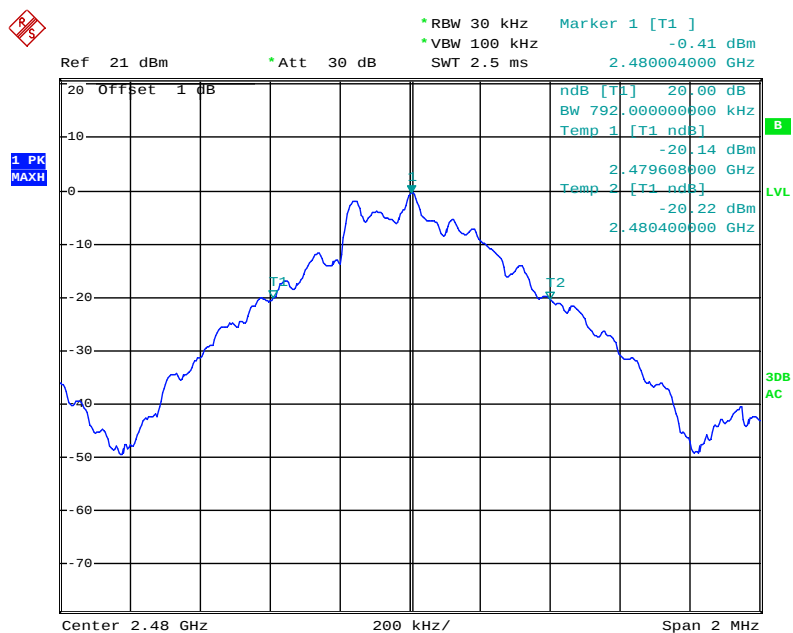
BDR (GFSK): Low Channel



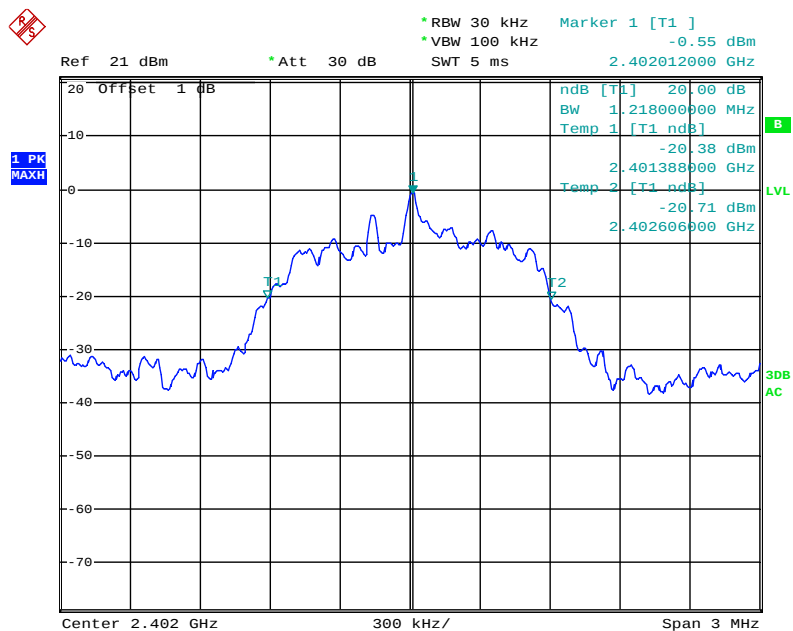
Date: 18.AUG.2012 11:05:27

BDR (GFSK): Middle Channel

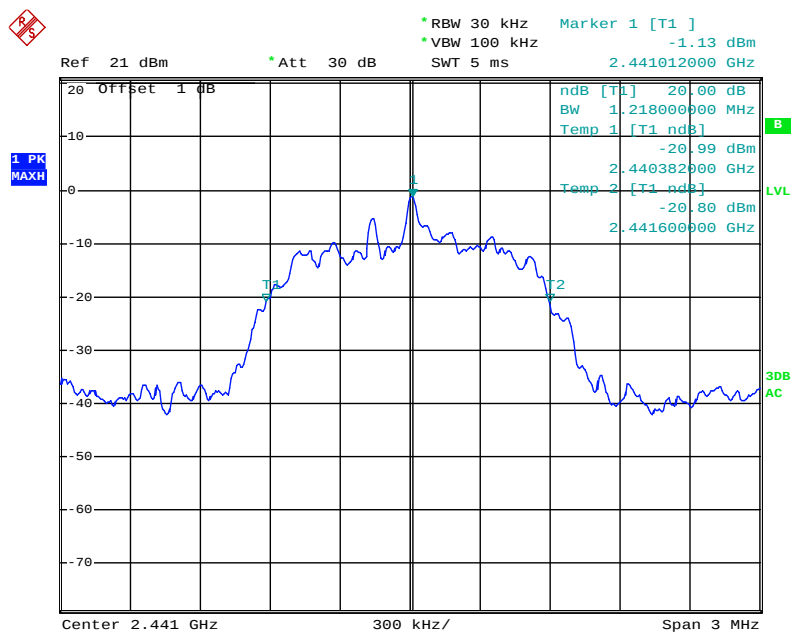
Date: 18.AUG.2012 11:04:12

BDR (GFSK): High Channel

Date: 18.AUG.2012 11:04:58

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

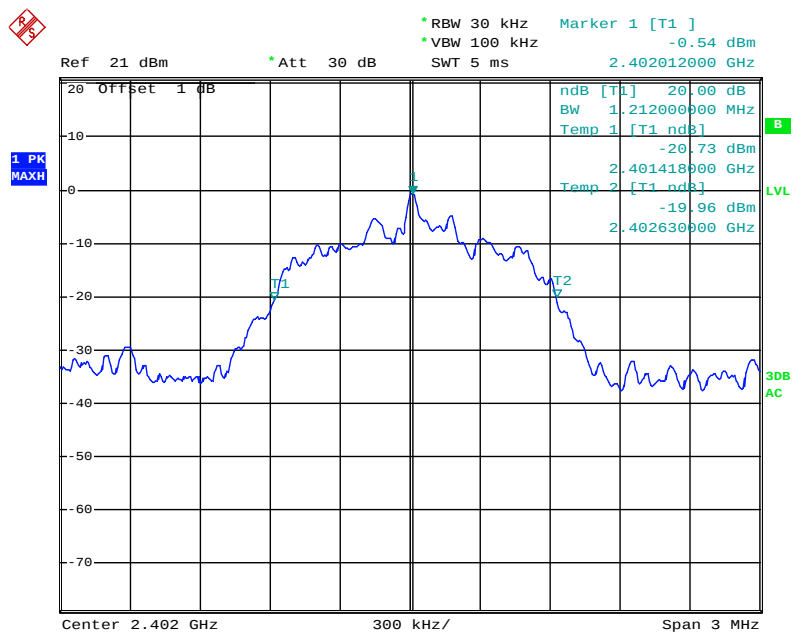
Date: 18.AUG.2012 11:09:20

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

Date: 18.AUG.2012 11:08:04

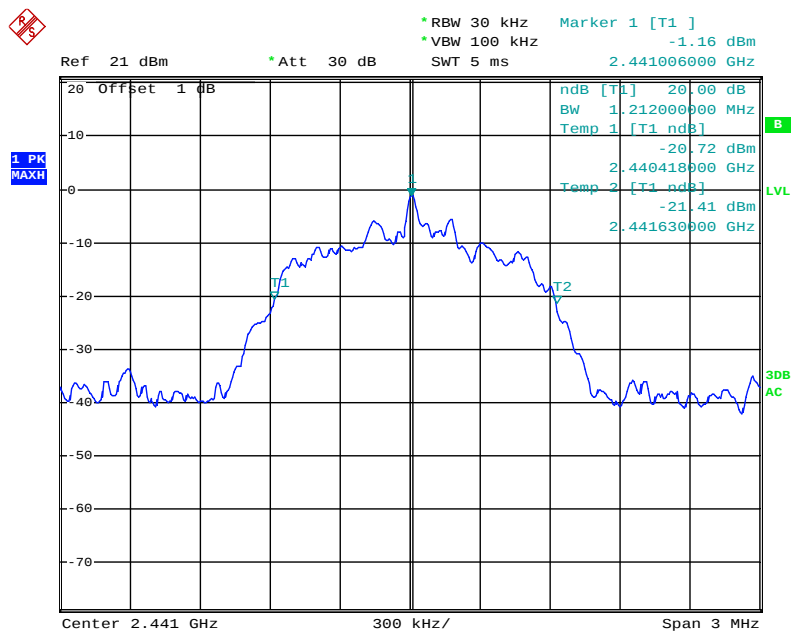
[illegible]

EDR (8DPSK): Low Channel



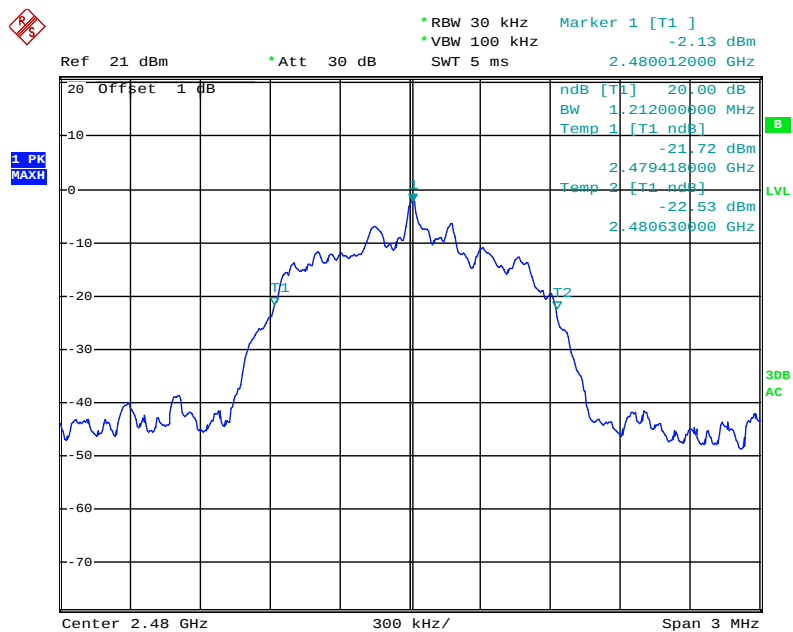
Page 31 of 62

EDR (8DPSK): Middle Channel



Date: 18.AUG.2012 11:11:30

EDR (8DPSK): High Channel



Date: 18.AUG.2012 11:12:35

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	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 kPa

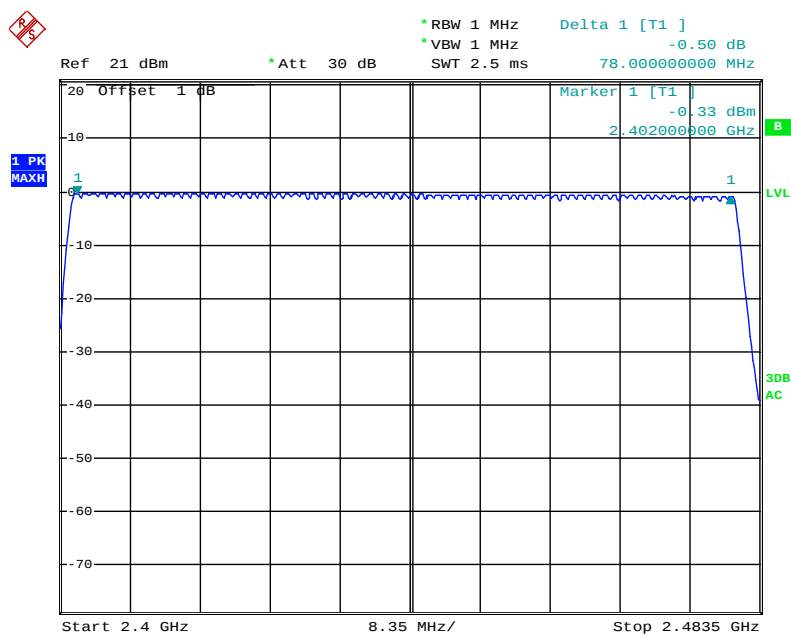
The testing was performed by Eric Lee on 2012-08-18.

Test Mode: Charging & Transmitting

Test Result: Compliance. Please refer to following tables and plots

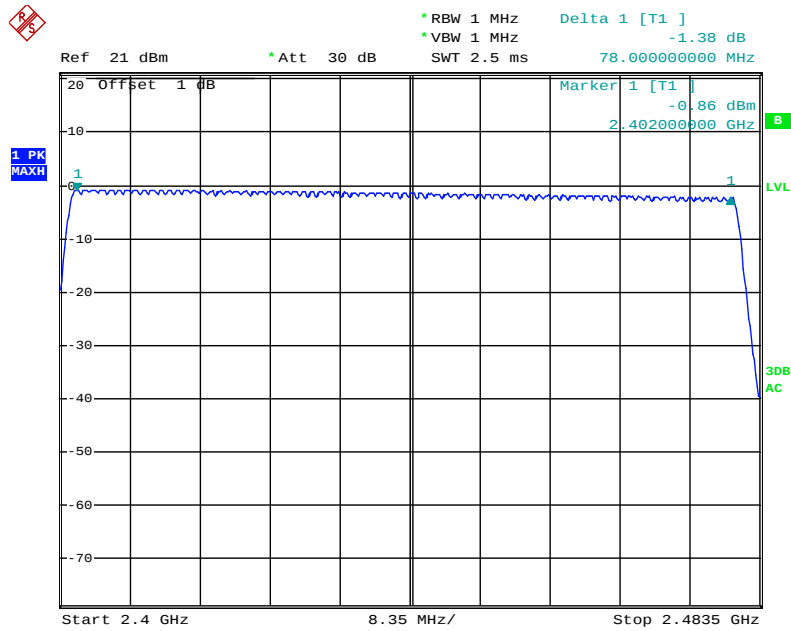
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥ 15
EDR ($\pi/4$ -DQPSK)	2400-2483.5	79	≥ 15
EDR (8DPSK)	2400-2483.5	79	≥ 15

BDR (GFSK): Number of Hopping Channels



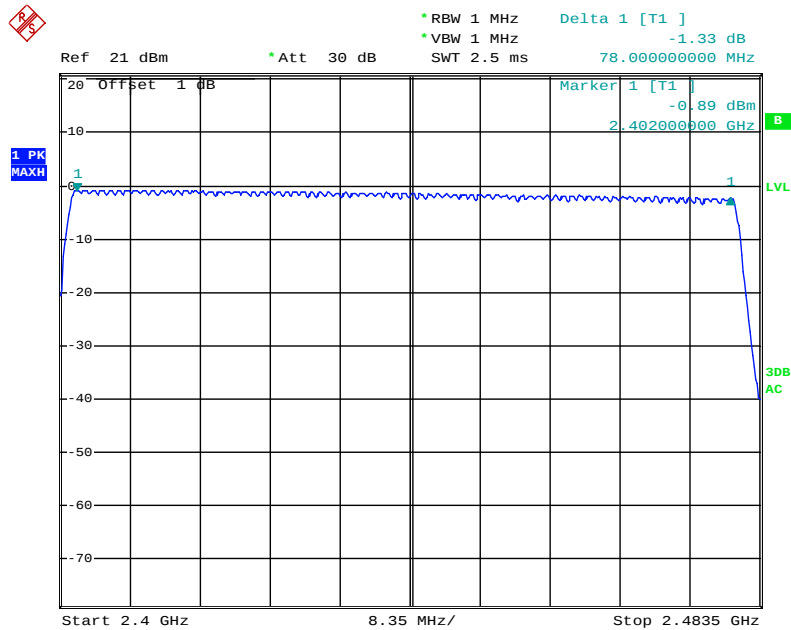
Date: 18.AUG.2012 10:45:37

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



Date: 18.AUG.2012 10:49:47

(8DPSK): Number of Hopping Channels



Date: 18.AUG.2012 10:51:08

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

Dwell time = Pulse time*hop rate/number of hopping channels*31.6S
Hop rate=1600/S

Test 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.

Test Data**Environmental Conditions**

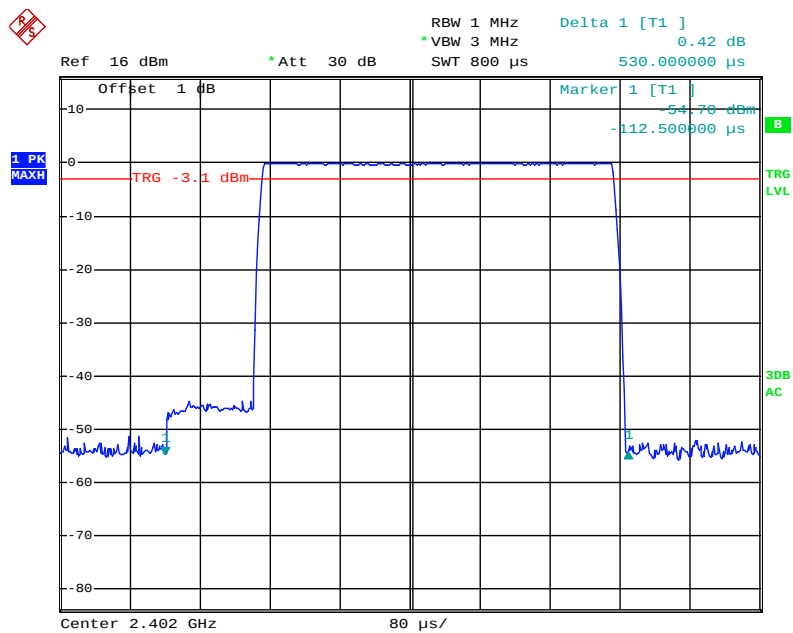
Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

The testing was performed by Eric Lee on 2012-08-18.

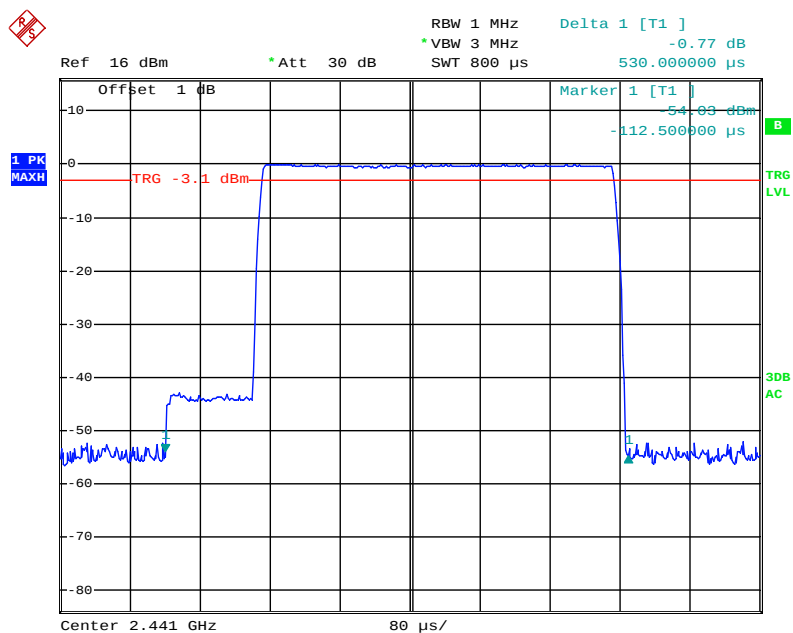
Test Mode: Charging & Transmitting

Test Result: Compliance. Please refer to following tables and plots

Mode		Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
BDR (GFSK)	DH 1	Low	0.530	0.1696	0.4	Pass
		Middle	0.530	0.1696	0.4	Pass
		High	0.530	0.1696	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.805	0.2888	0.4	Pass
		Middle	1.805	0.2888	0.4	Pass
		High	1.805	0.2888	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	3.067	0.3271	0.4	Pass
		Middle	3.067	0.3271	0.4	Pass
		High	3.067	0.3271	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR ($\pi/4$ -DQPSK)	DH 1	Low	0.540	0.1728	0.4	Pass
		Middle	0.540	0.1728	0.4	Pass
		High	0.540	0.1728	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.810	0.2896	0.4	Pass
		Middle	1.810	0.2896	0.4	Pass
		High	1.810	0.2896	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	3.076	0.3281	0.4	Pass
		Middle	3.076	0.3281	0.4	Pass
		High	3.076	0.3281	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	DH 1	Low	0.542	0.1734	0.4	Pass
		Middle	0.542	0.1734	0.4	Pass
		High	0.542	0.1734	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.816	0.2906	0.4	Pass
		Middle	1.816	0.2906	0.4	Pass
		High	1.816	0.2906	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	3.076	0.3281	0.4	Pass
		Middle	3.076	0.3281	0.4	Pass
		High	3.076	0.3281	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

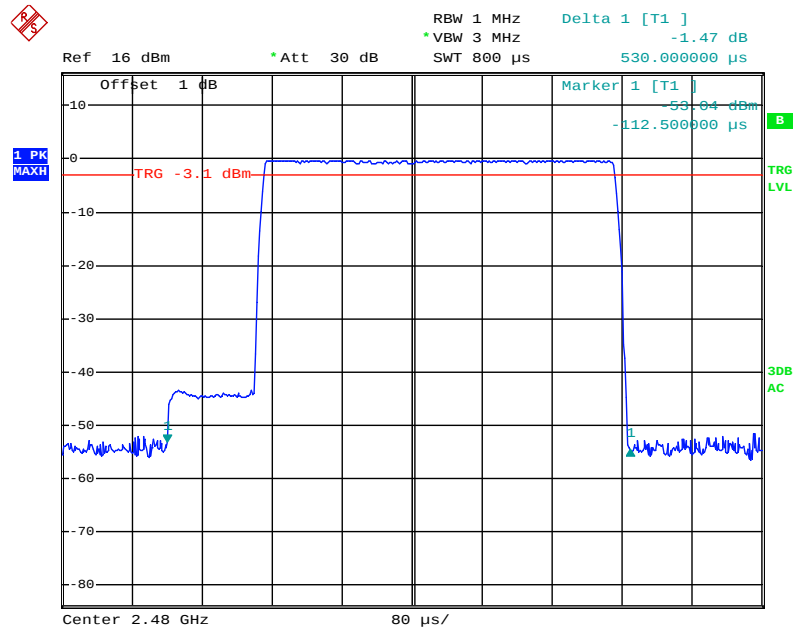
BDR (GFSK):**Pulse time, Low Channel, DH1**

Date: 18.AUG.2012 13:12:31

Pulse time, Middle Channel, DH1

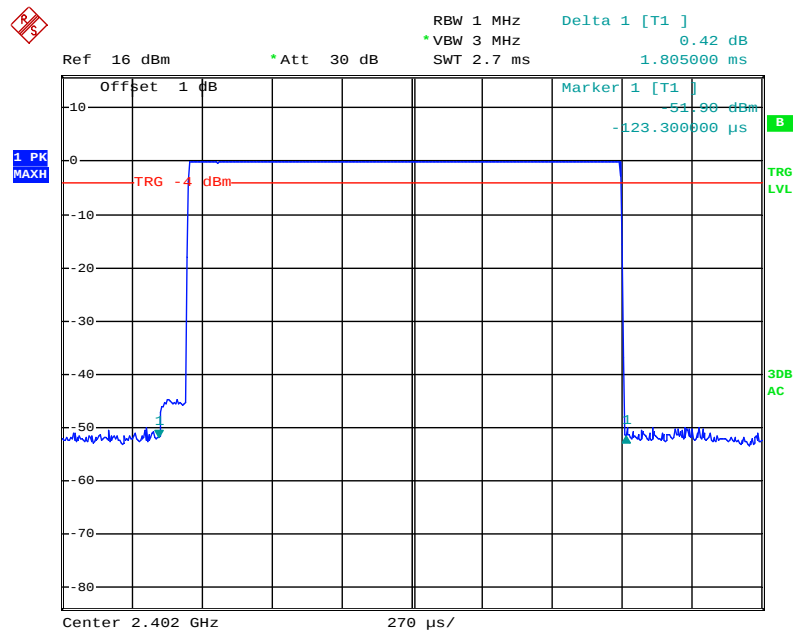
Date: 18.AUG.2012 13:12:41

Pulse time, High Channel, DH1



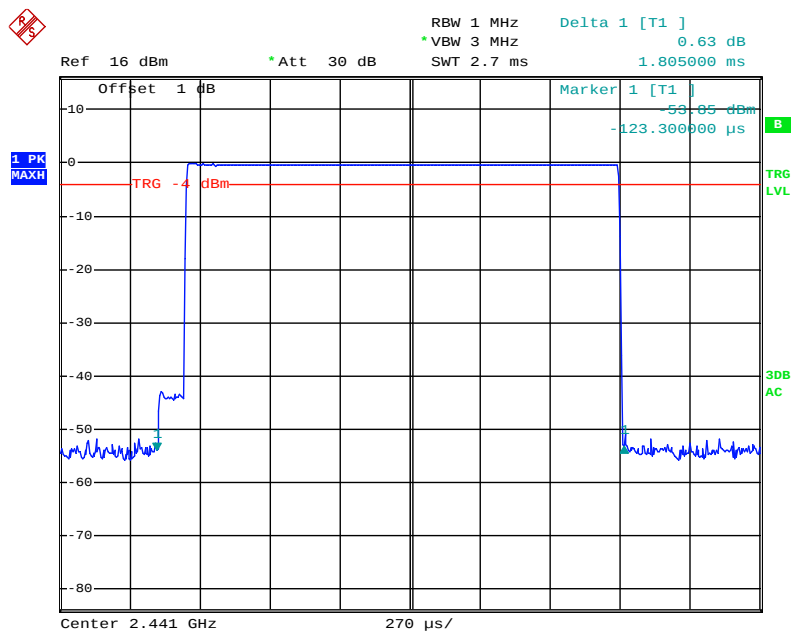
Date: 18.AUG.2012 13:12:55

Pulse time, Low Channel, DH3



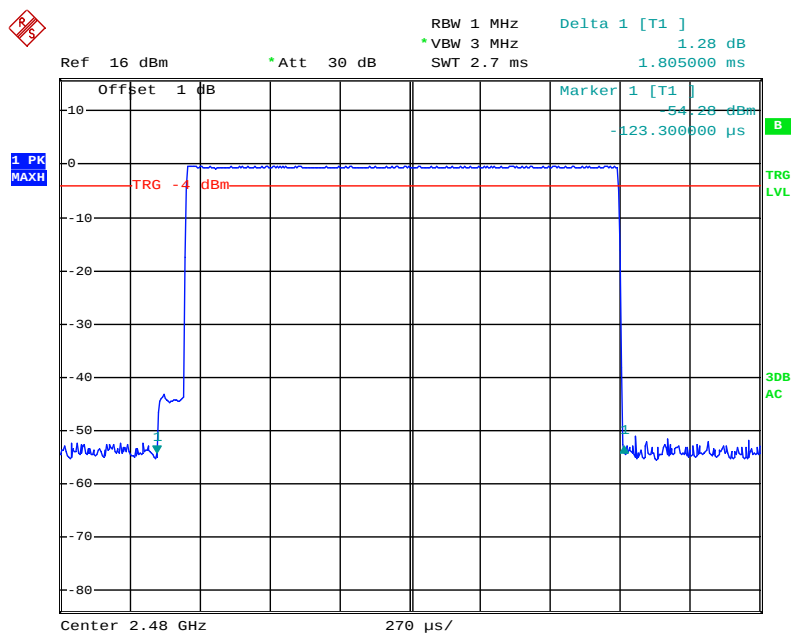
Date: 18.AUG.2012 13:23:54

Pulse time, Middle Channel, DH3



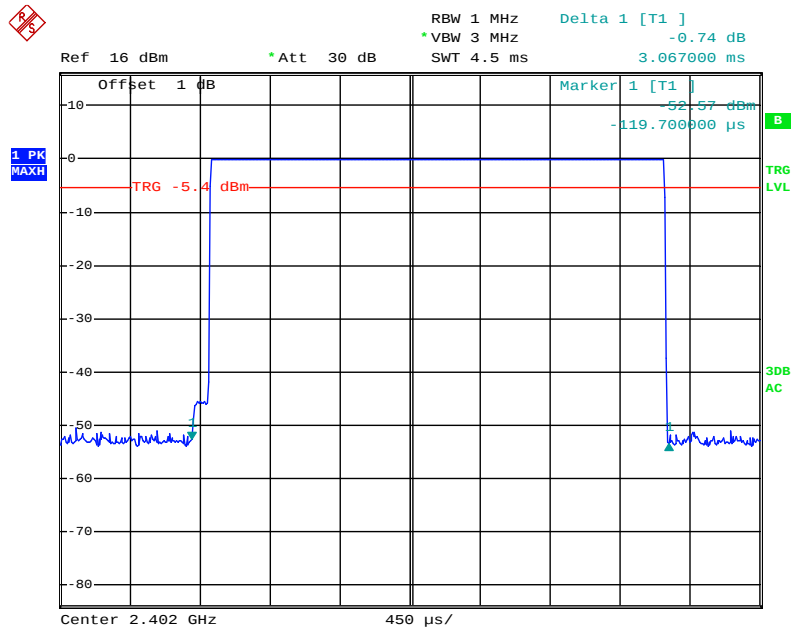
Date: 18.AUG.2012 13:24:51

Pulse time, High Channel, DH3



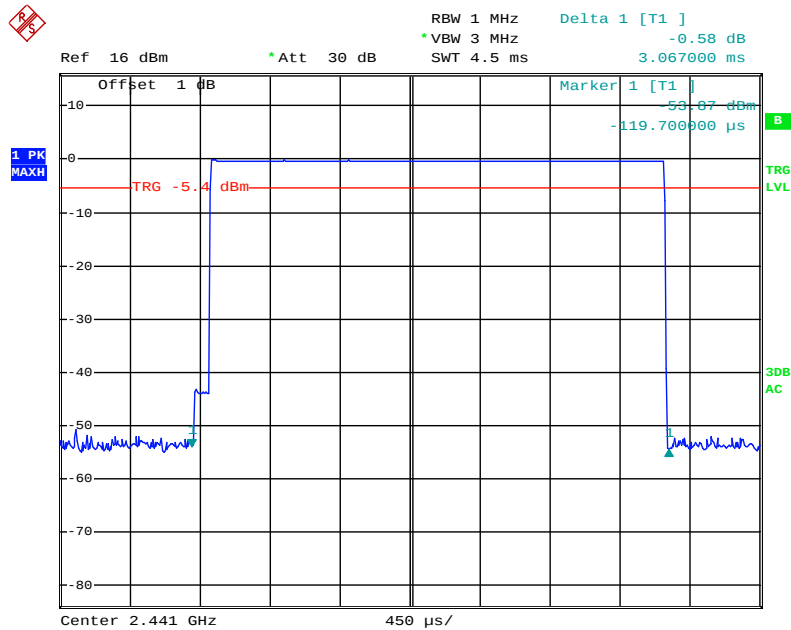
Date: 18.AUG.2012 13:25:01

Pulse time, Low Channel, DH5

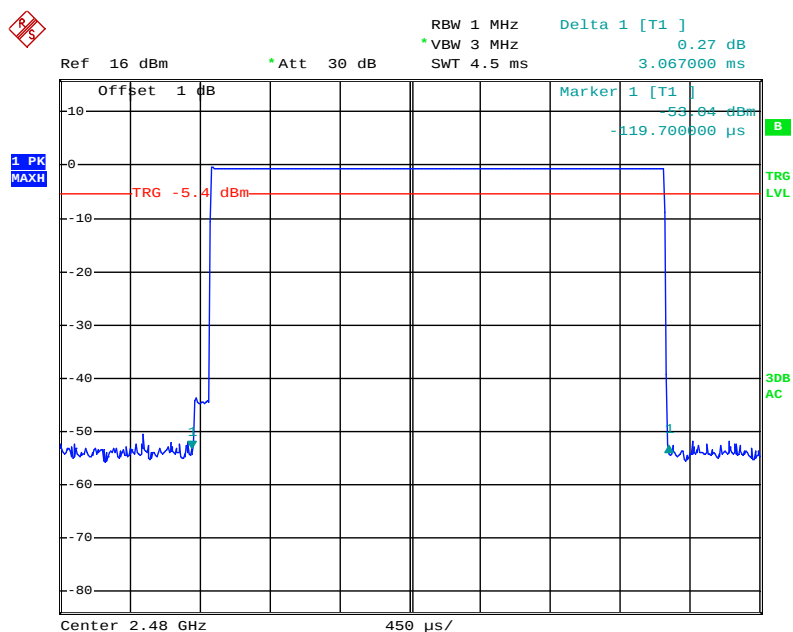


Date: 18.AUG.2012 13:34:18

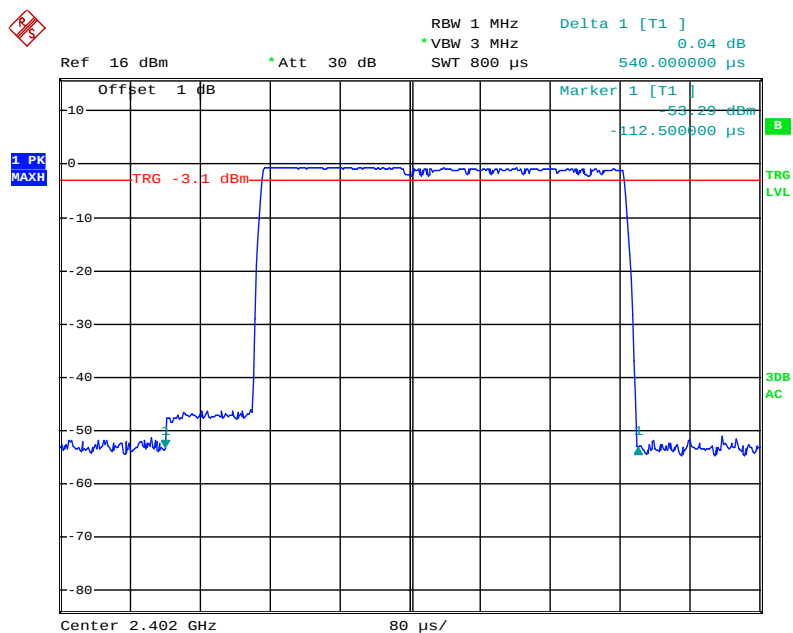
Pulse time, Middle Channel, DH5



Date: 18.AUG.2012 13:34:39

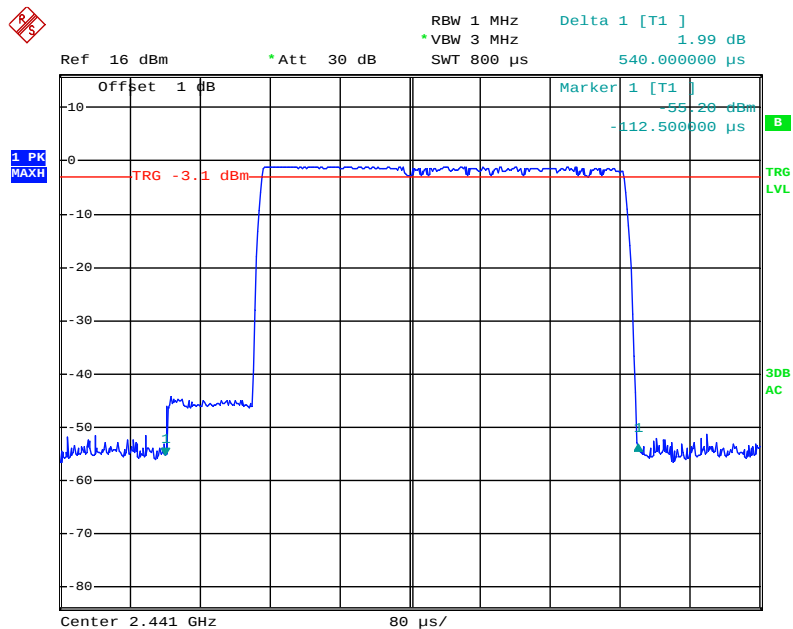
Pulse time, High Channel, DH5

Date: 18.AUG.2012 13:34:52

EDR ($\pi/4$ -DQPSK):**Pulse time, Low Channel, DH1**

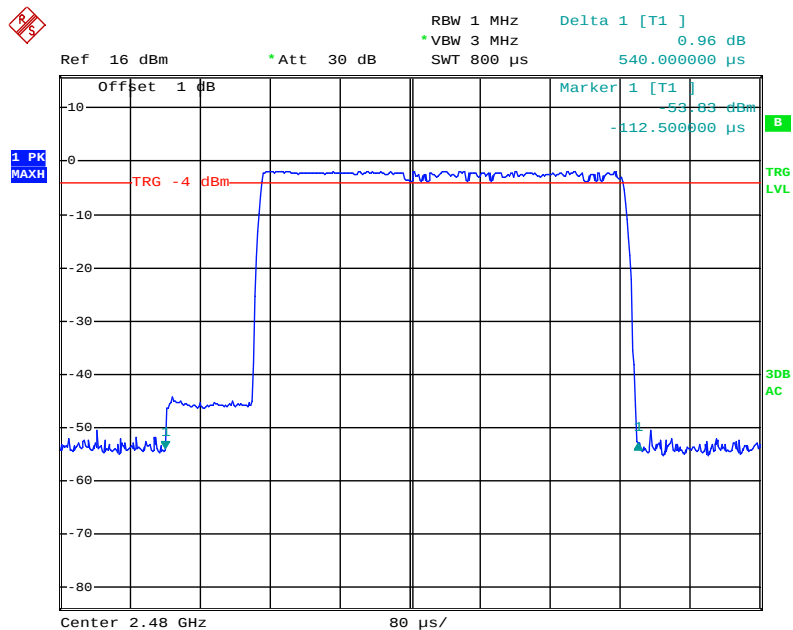
Date: 18.AUG.2012 13:13:58

Pulse time, Middle Channel, DH1



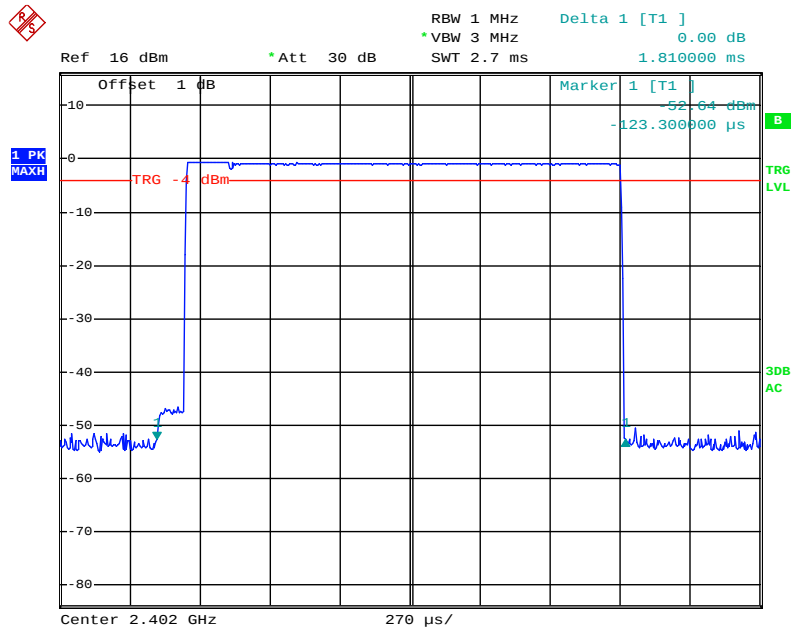
Date: 18.AUG.2012 13:14:14

Pulse time, High Channel, DH1



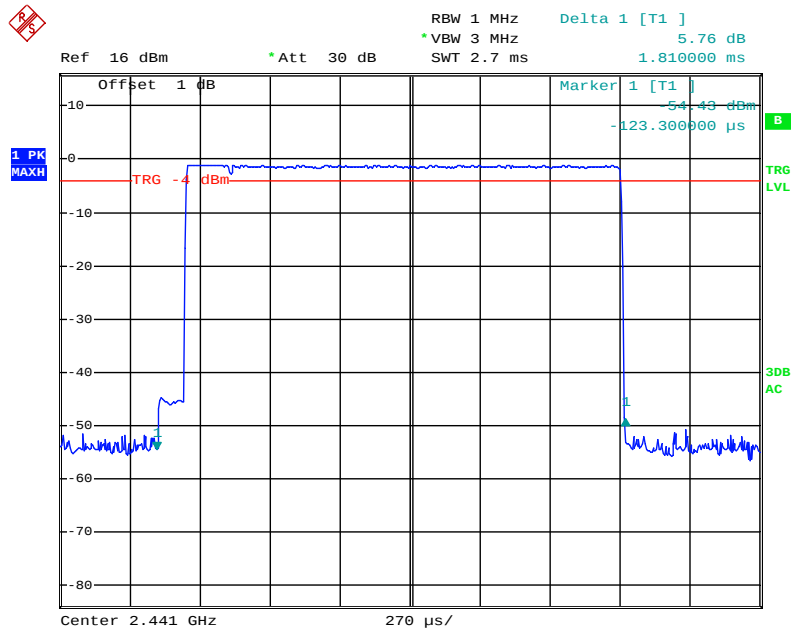
Date: 18.AUG.2012 13:14:43

Pulse time, Low Channel, DH3



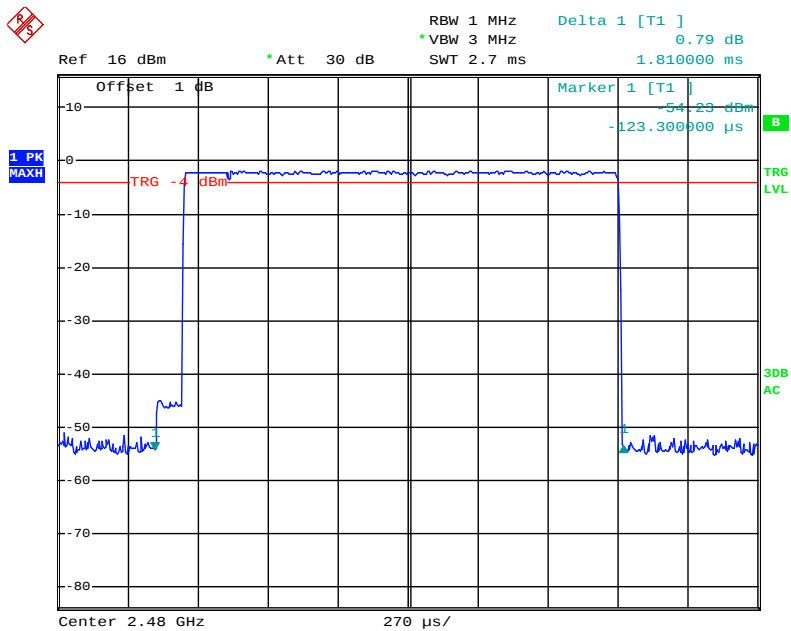
Date: 18.AUG.2012 13:26:31

Pulse time, Middle Channel, DH3



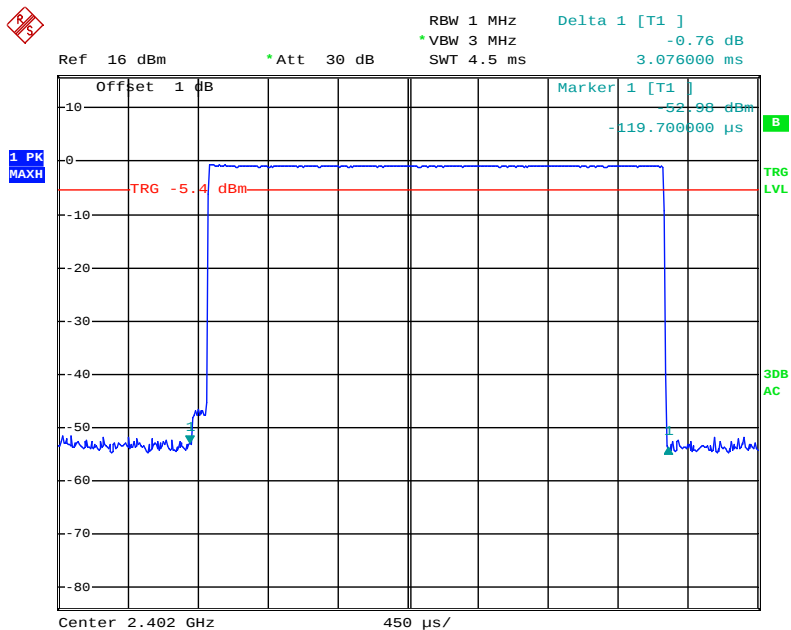
Date: 18.AUG.2012 13:26:03

Pulse time, High Channel, DH3



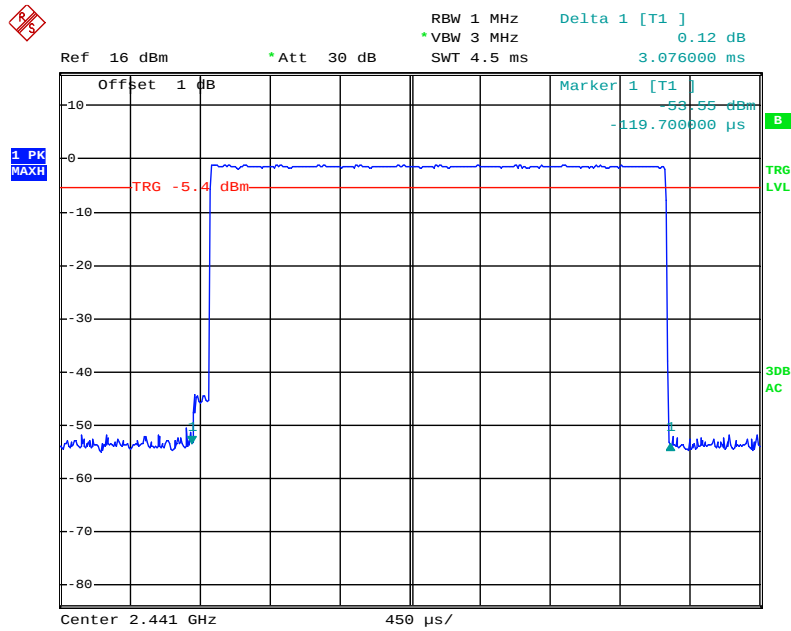
Date: 18.AUG.2012 13:25:48

Pulse time, Low Channel, DH5



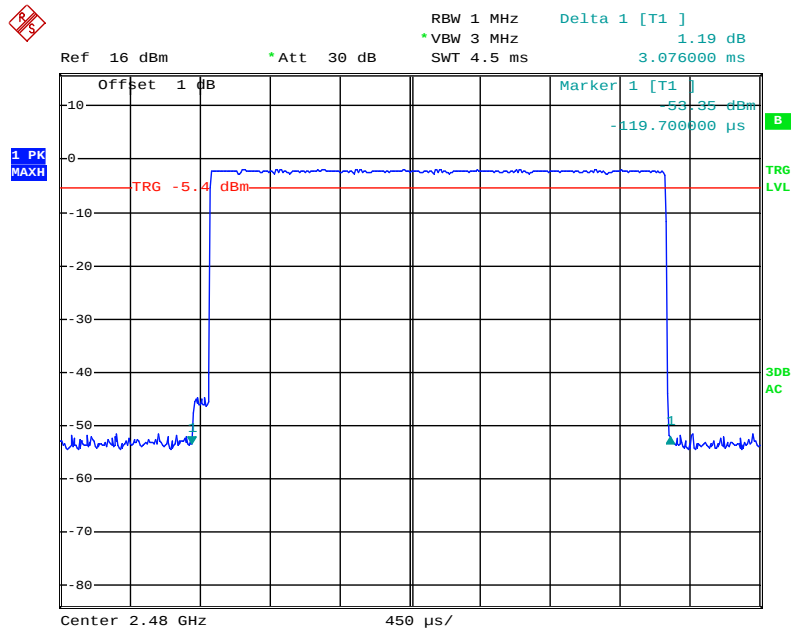
Date: 18.AUG.2012 13:36:34

Pulse time, Middle Channel, DH5



Date: 18.AUG.2012 13:36:19

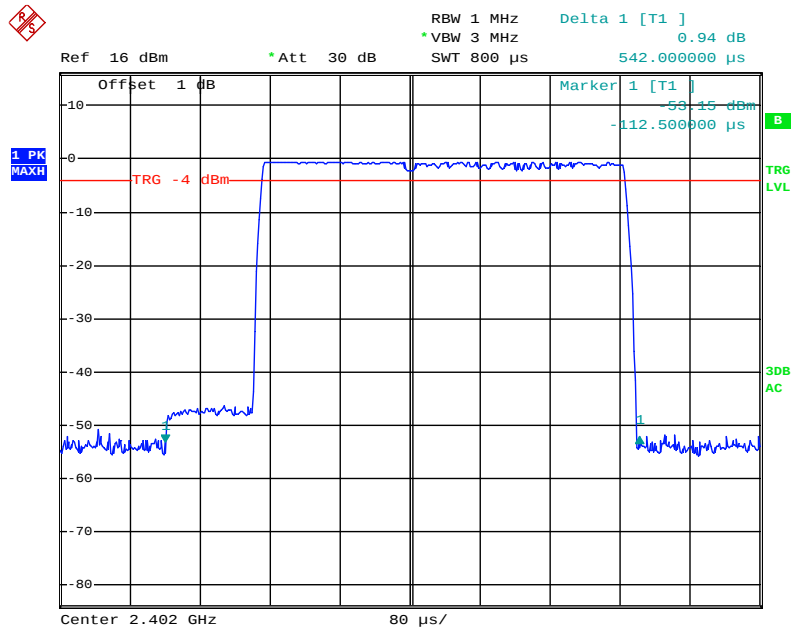
Pulse time, High Channel, DH5



Date: 18.AUG.2012 13:36:03

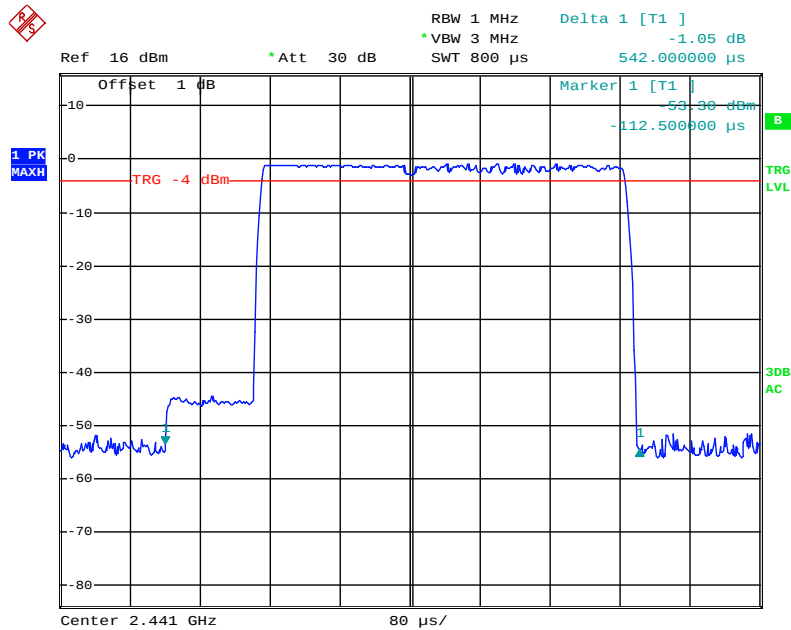
EDR (8DPSK):

Pulse time, Low Channel, DH1



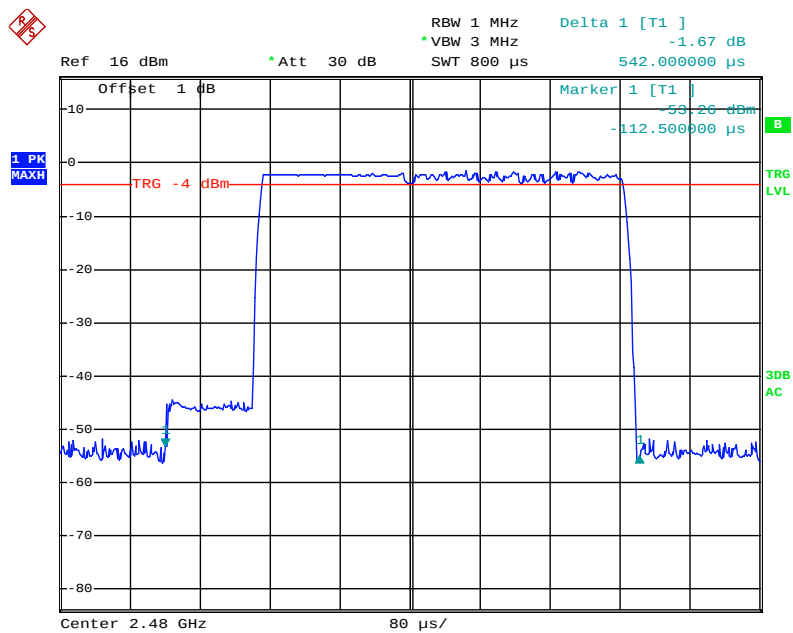
Date: 18.AUG.2012 13:20:58

Pulse time, Middle Channel, DH1



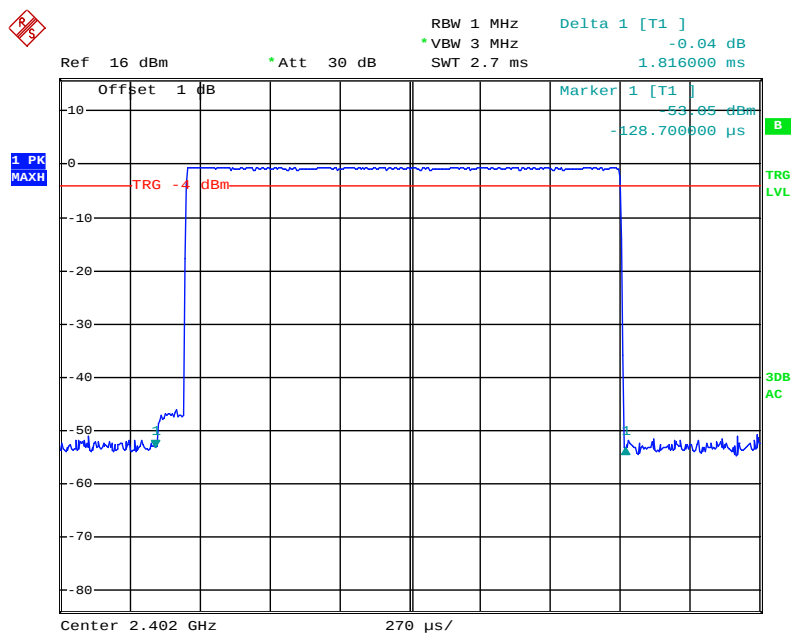
Date: 18.AUG.2012 13:21:11

Pulse time, High Channel, DH1



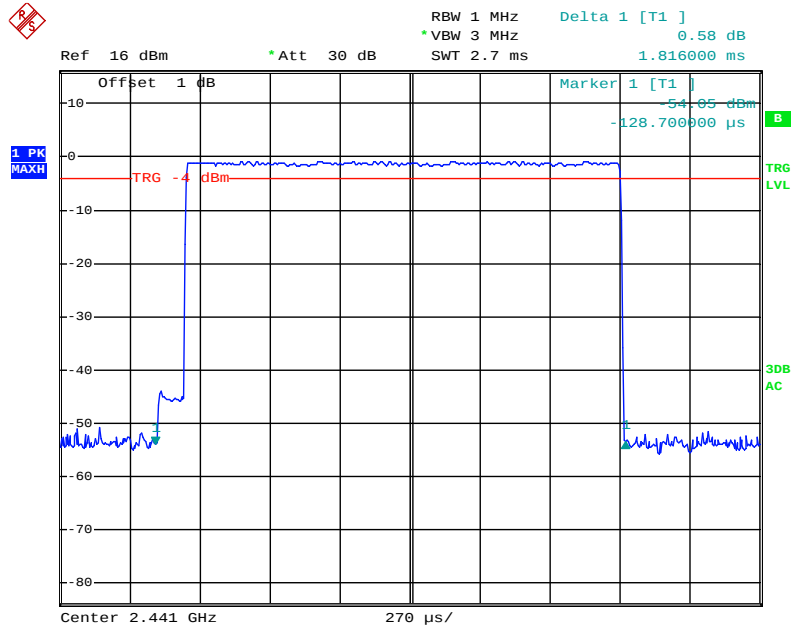
Date: 18.AUG.2012 13:21:29

Pulse time, Low Channel, DH3



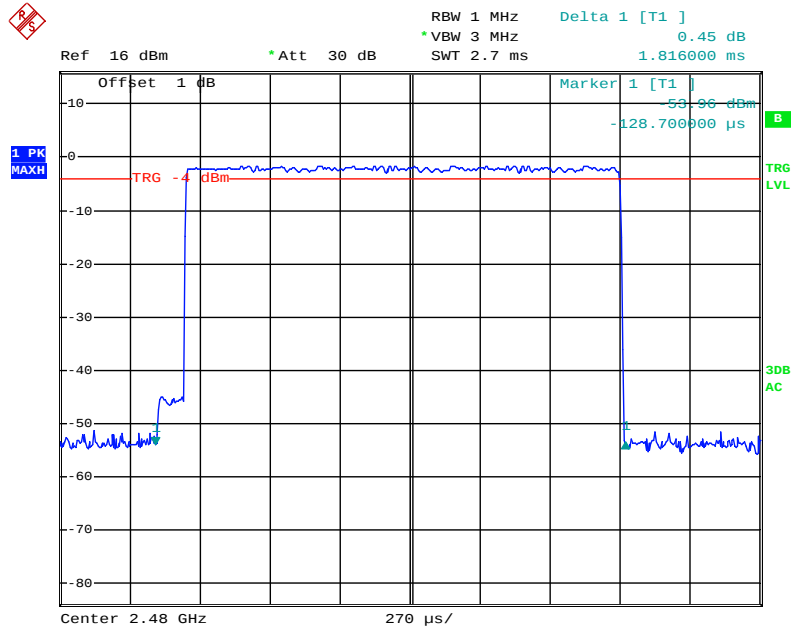
Date: 18.AUG.2012 13:27:43

Pulse time, Middle Channel, DH3



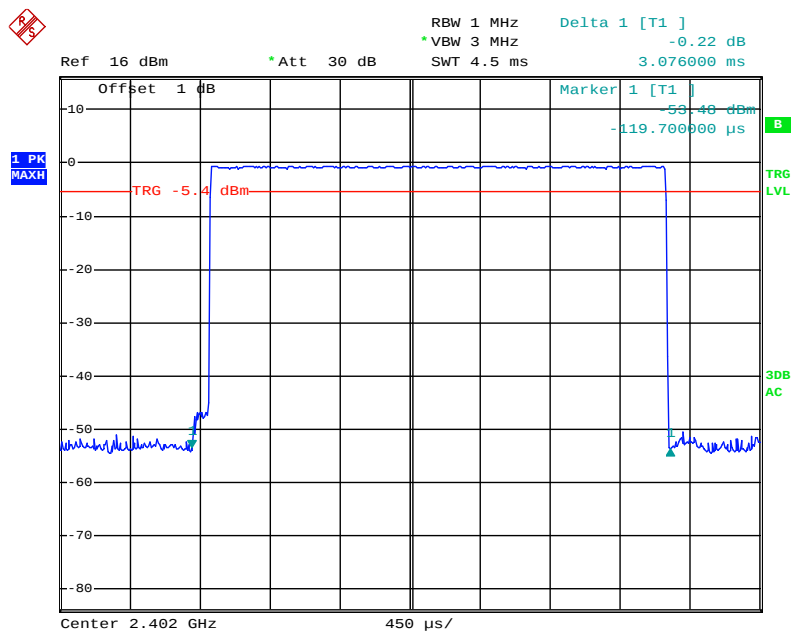
Date: 18.AUG.2012 13:29:12

Pulse time, High Channel, DH3



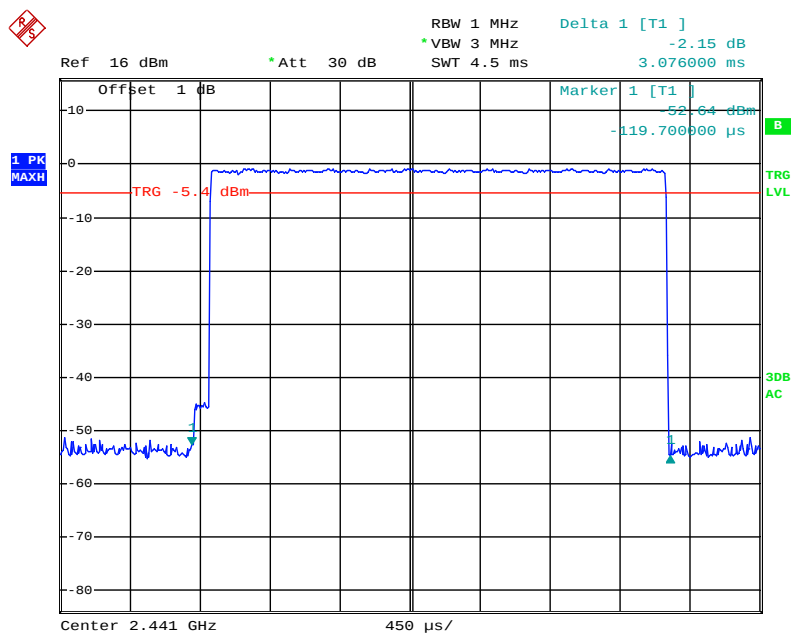
Date: 18.AUG.2012 13:29:28

Pulse time, Low Channel, DH5



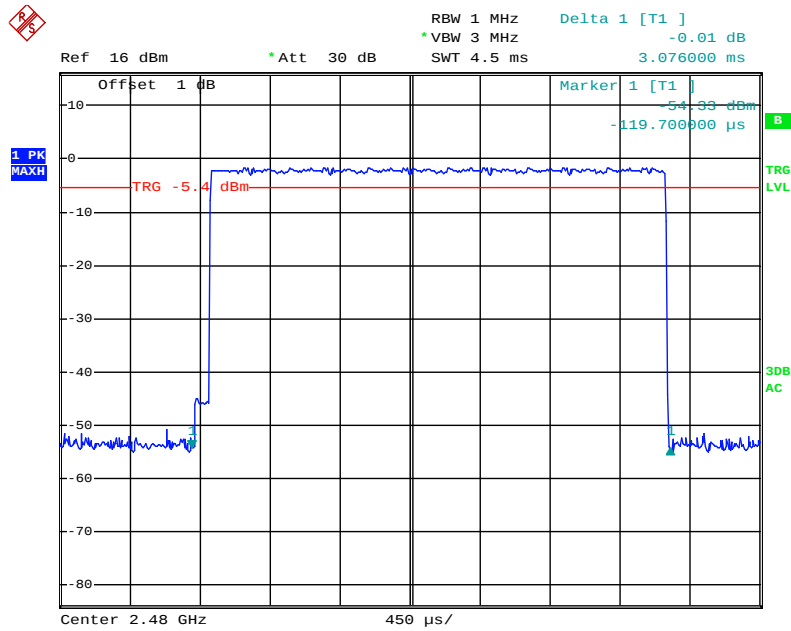
Date: 18.AUG.2012 13:37:23

Pulse time, Middle Channel, DH5



Date: 18.AUG.2012 13:37:38

Pulse time, High Channel, DH5



Date: 18.AUG.2012 13:38:58

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

Applicable Standard

According to §15.247(b) (2), for frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Test Procedure

1. Place the EUT on a bench and set it 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 kPa

The testing was performed by Eric Lee on 2012-08-18.

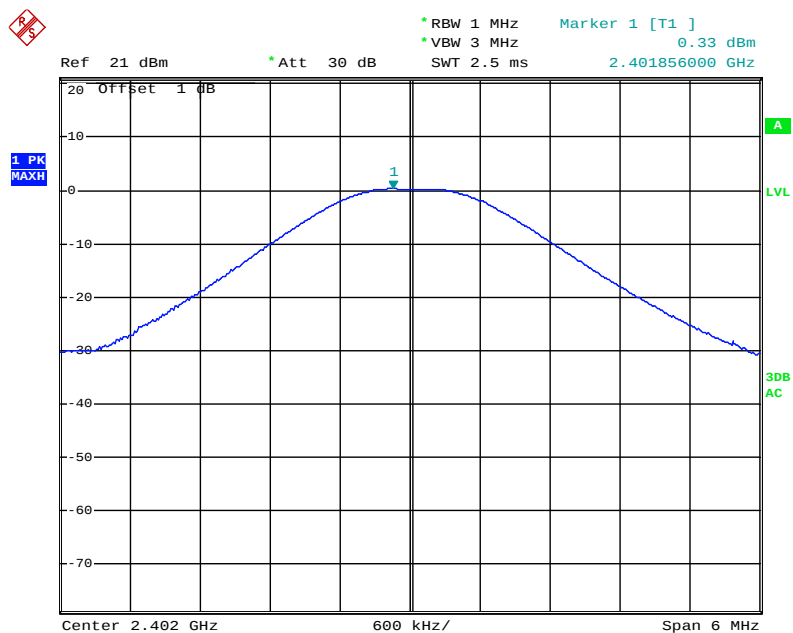
Test Mode: Charging & Transmitting

Test Result: Compliance. Please refer to following tables and plots

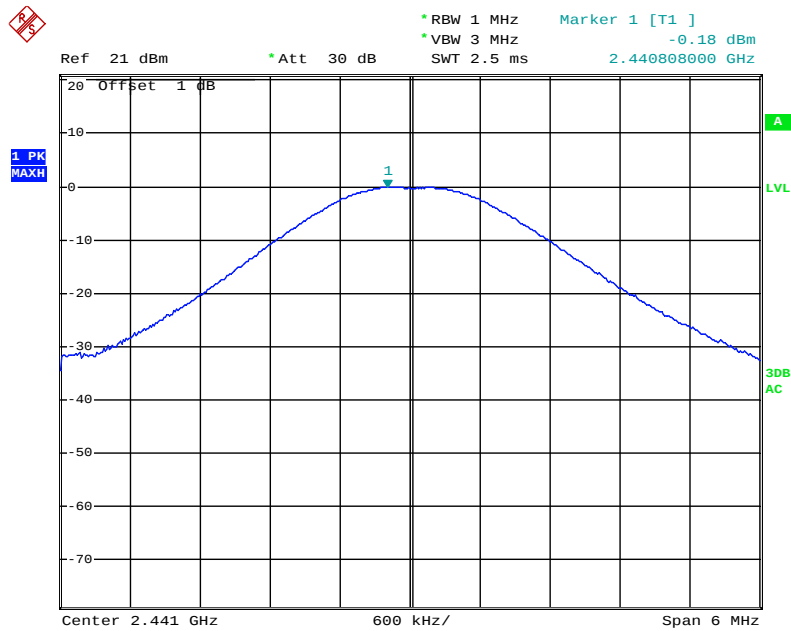
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	0.33	1.079	1000
	Middle	2441	-0.18	0.959	1000
	High	2480	-0.58	0.875	1000
EDR ($\pi/4$ -DQPSK)	Low	2402	0.00	1.000	1000
	Middle	2441	-0.35	0.923	1000
	High	2480	-0.64	0.823	1000
EDR (8DPSK)	Low	2402	-0.15	0.966	1000
	Middle	2441	-0.51	0.889	1000
	High	2480	-0.96	0.802	1000

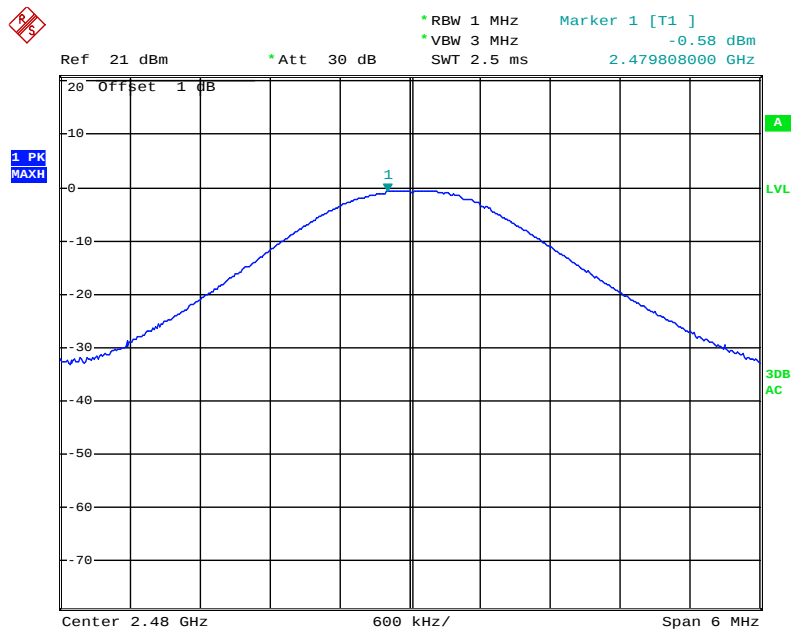
BDR (GFSK): Low Channel



Date: 18.AUG.2012 11:20:40

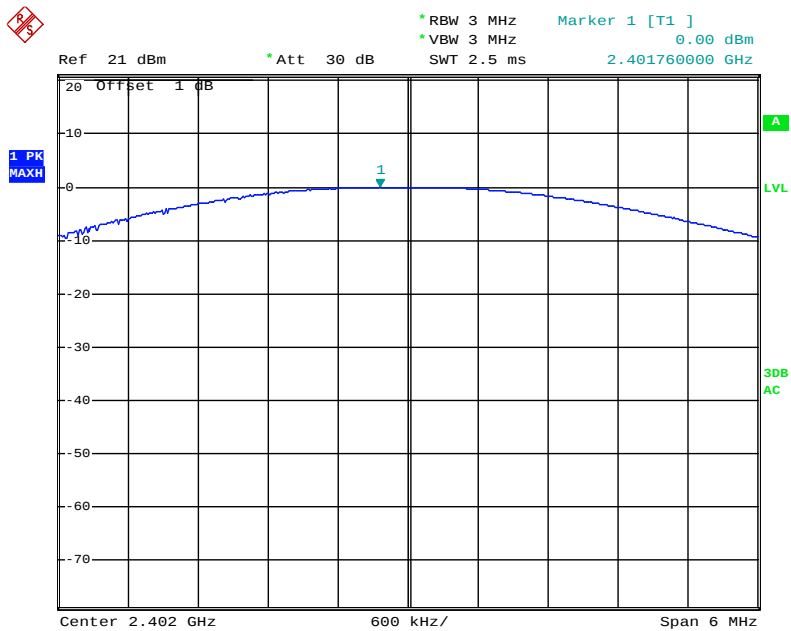
BDR (GFSK): Middle Channel

Date: 18.AUG.2012 11:21:30

BDR (GFSK): High Channel

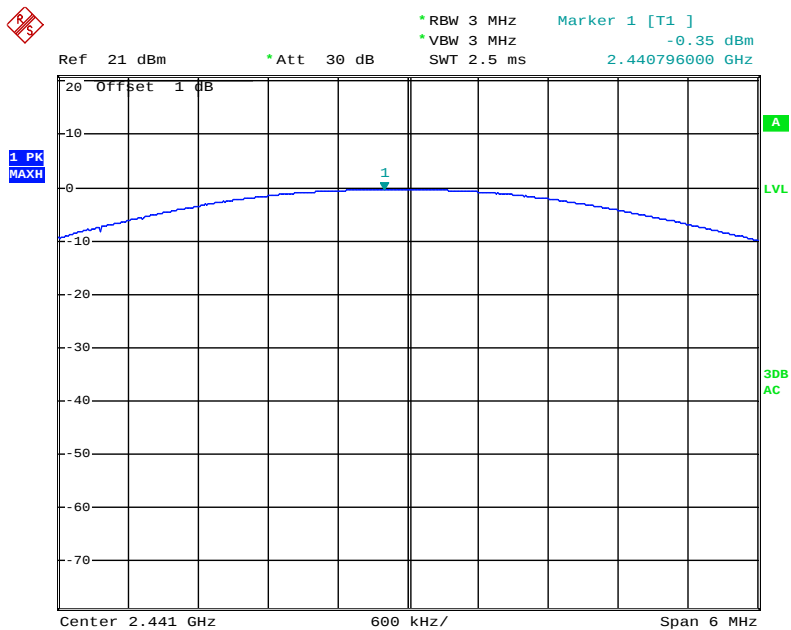
Date: 18.AUG.2012 11:22:10

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



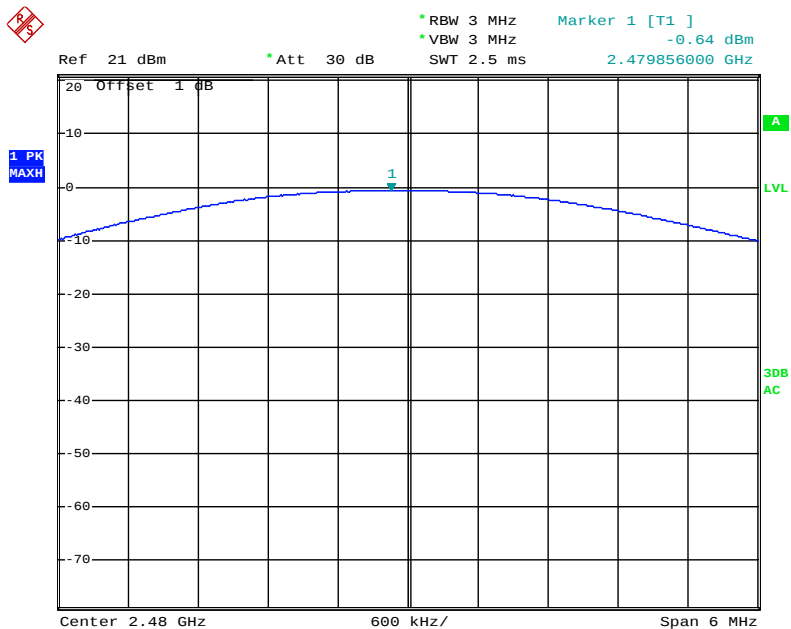
Date: 18.AUG.2012 11:23:53

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



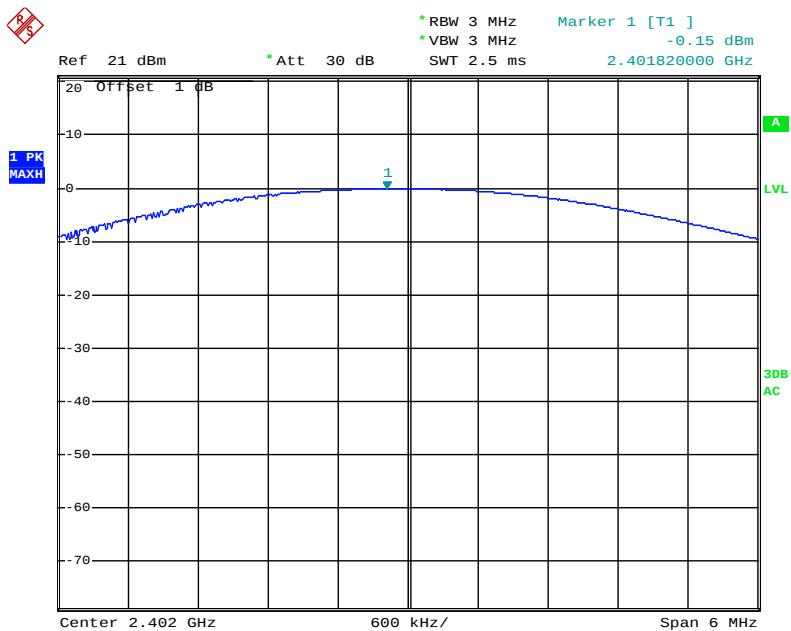
Date: 18.AUG.2012 11:24:50

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



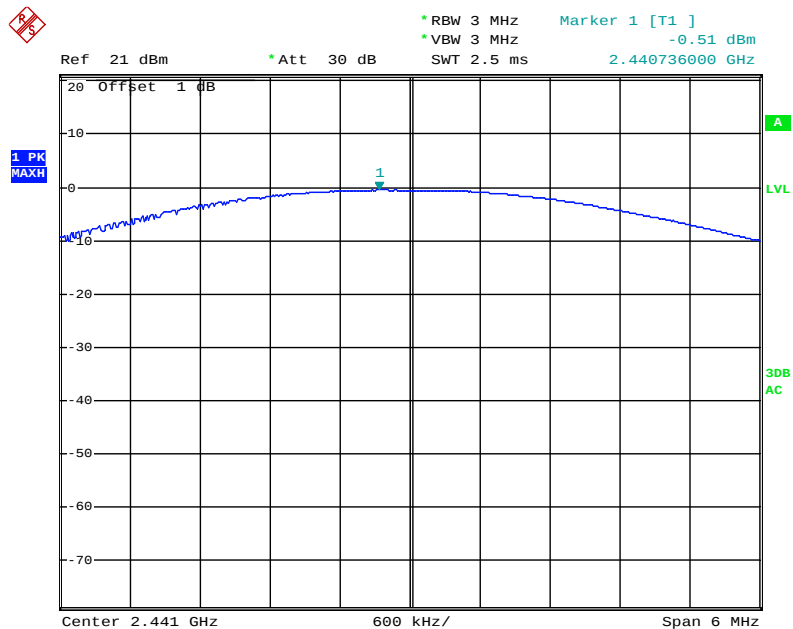
Date: 18.AUG.2012 11:26:20

EDR (8DPSK): Low Channel



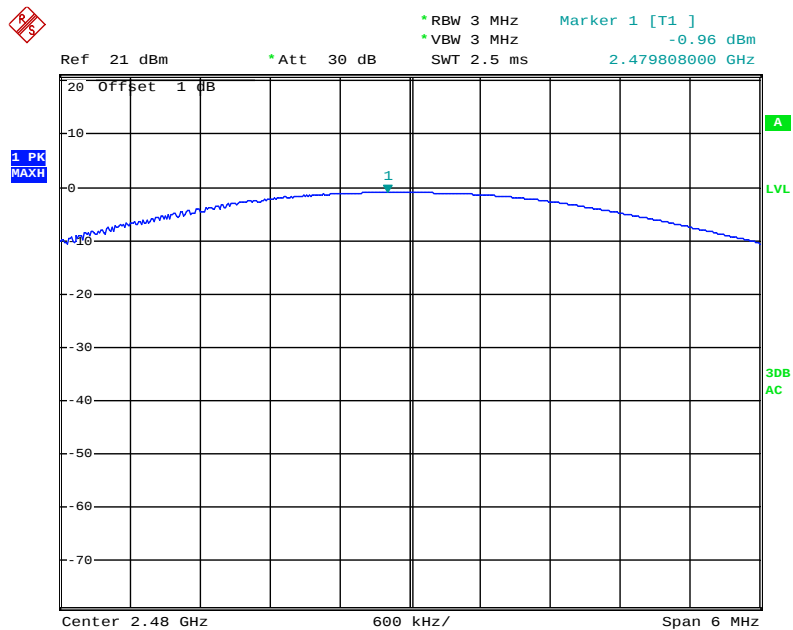
Date: 18.AUG.2012 11:28:15

EDR (8DPSK): Middle Channel



Date: 18.AUG.2012 11:29:14

EDR (8DPSK): High Channel



Date: 18.AUG.2012 11:32:33

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 of spectrum analyzer to RBW=300 kHz, VBW=1 MHz.
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**

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

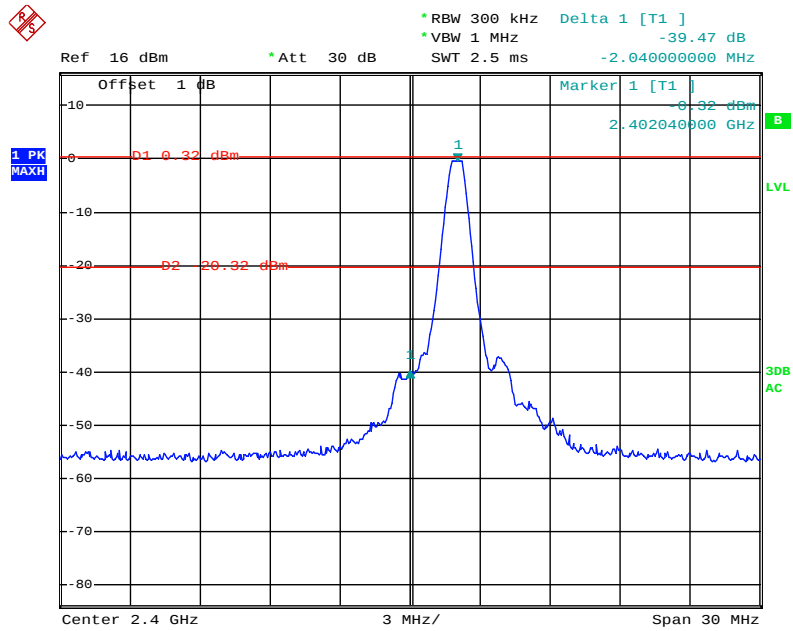
The testing was performed by Eric Lee on 2012-08-18.

Test Mode: Charging & Transmitting

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

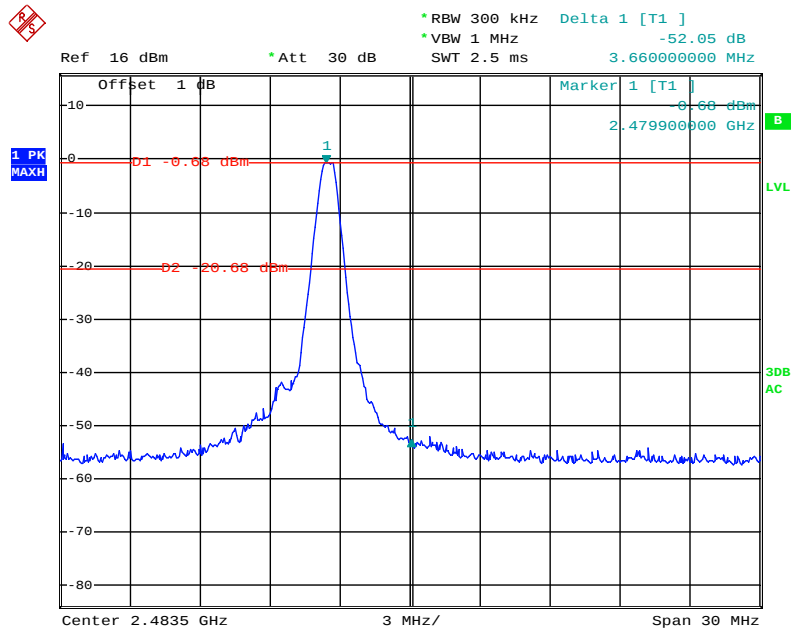
Mode	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR (GFSK)	2400	39.47	> 20
	2483.5	52.05	> 20
EDR ($\pi/4$ -DQPSK)	2400	33.91	> 20
	2483.5	49.91	> 20
EDR (8DPSK)	2400	33.60	> 20
	2483.5	48.76	> 20

BDR (GFSK): Band Edge-Left Side

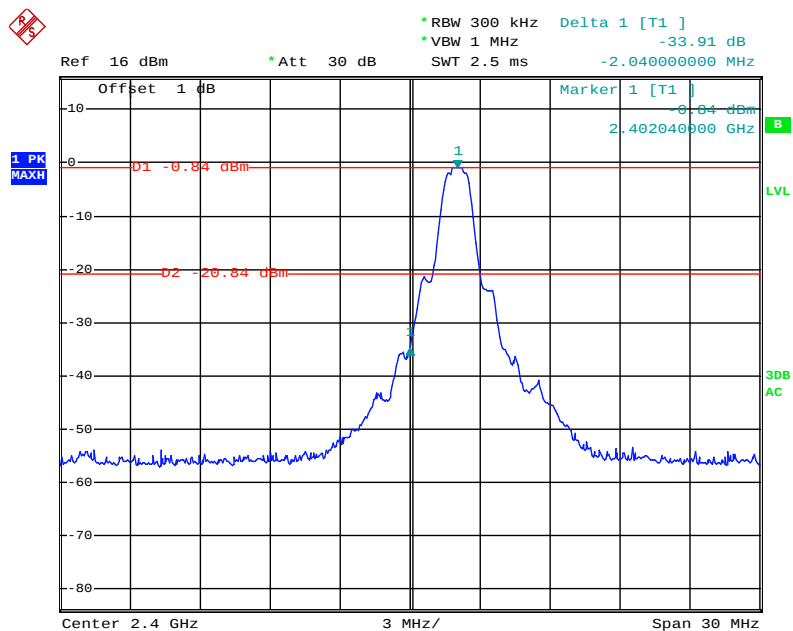


Date: 18.AUG.2012 13:43:58

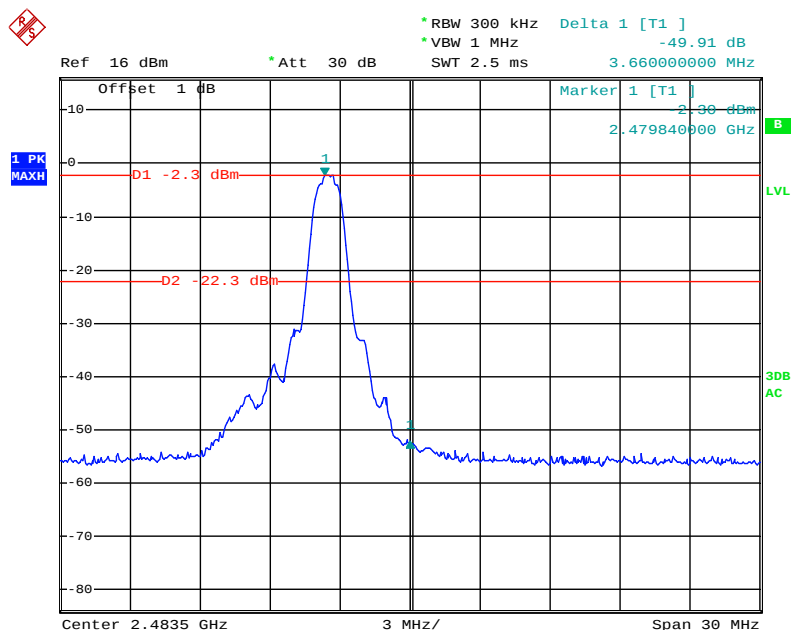
BDR (GFSK): Band Edge-Right Side



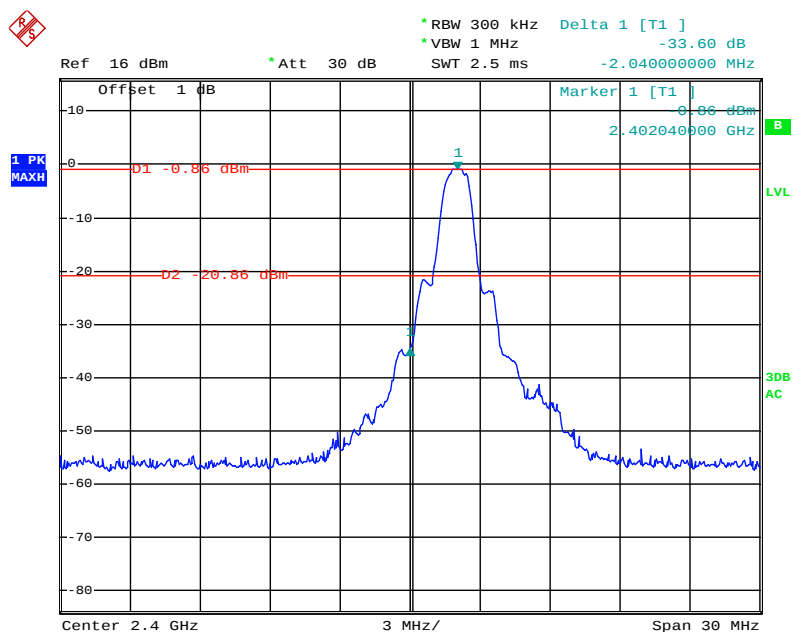
Date: 18.AUG.2012 13:52:51

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

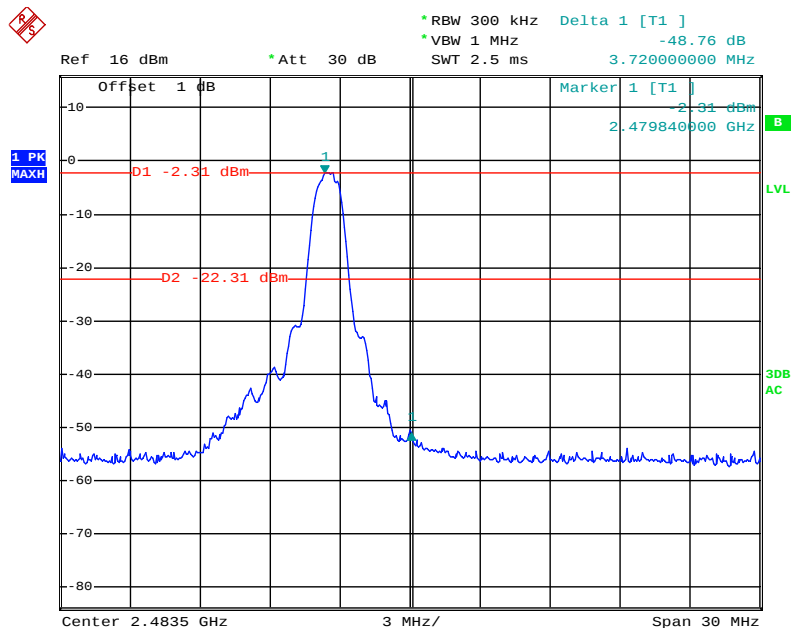
Date: 18.AUG.2012 13:45:40

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

Date: 18.AUG.2012 13:51:44

EDR (8DPSK): Band Edge-Left Side

Date: 18.AUG.2012 13:46:54

BDR (8DPSK): Band Edge-Right Side

Date: 18.AUG.2012 13:48:43

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