Lab Code: 200707-0

FCC PART 15.247
TEST REPORT

For

Gajah International (HK) Co., Ltd.

18/F Bel Trade Commercial Building, 1-3, Burrows Street, Wan Chai, Hong Kong

FCC ID: UFKMDX001B

Report Type:	**Product Type:**
Original Report	MID

Test Engineer:	Tiger Ye
Report Number:	RSZ130121002-00B
Report Date:	2013-01-30
Reviewed By:	Alvin Huang RF Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Gajah International (HK) Co., Ltd.*'s product, model number: *MDX001B (FCC ID: UFKMDX001B)* or the "EUT" in this report was a MID, *named as MDX001B by applicant,* which was measured approximately: 27.0 cm (L) x 17.0 cm (W) x 1.5 cm (H), rated input voltage: 7.4V rechargeable Li-ion battery or DC 9V charging from adapter.

Adapter Information: AC-DC ADAPTER
Model: SK02G-0900200U;
Input: AC 100-240V~50/60Hz, 0.6A Max.
Output: DC 9V, 2A

** All measurement and test data in this report was gathered from production sample serial number: 1301088 (Assigned by BACL, Shenzhen). The EUT was received on 2012-12-25.*

Objective

This test report is prepared on behalf of *Gajah International (HK) Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine 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)

FCC Part 15B JBP and FCC Part 15.247 DTS submissions with FCC ID: UFKMDX001B.

Test Methodology

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

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

Test Facility

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

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

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode which was selected by manufacturer.

EUT Exercise Software

Ampak RFTestTool ,VER: 3.6
Tx Power level:0

Equipment Modifications

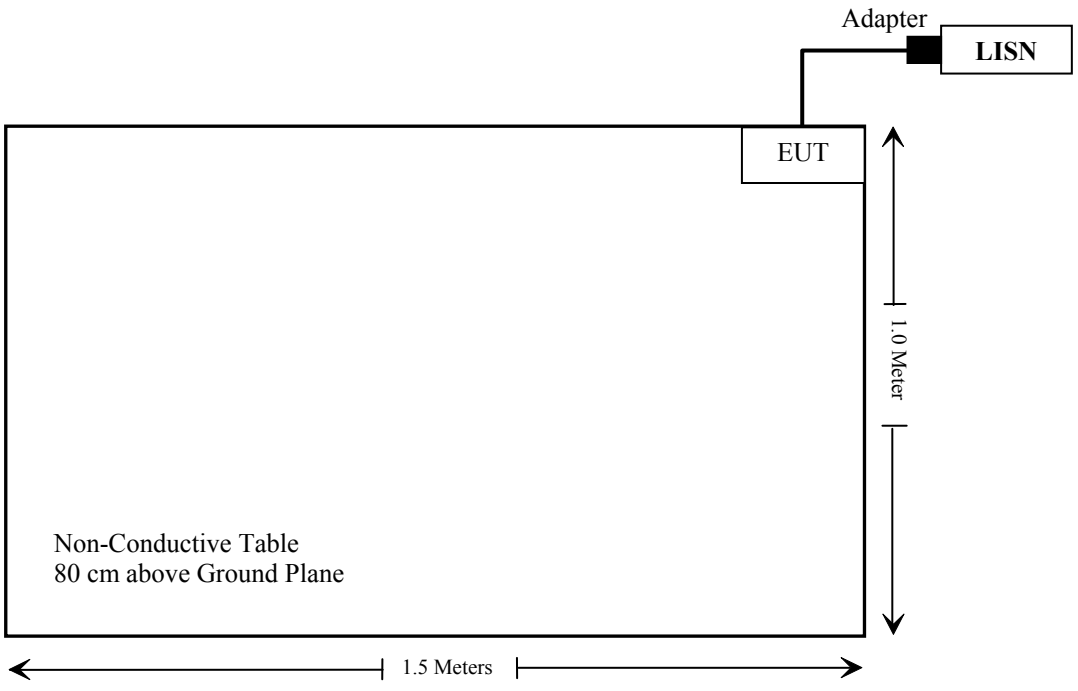
No modification was made to the EUT

External I/O Cabling List and Details

Cable Description	Length (m)	From	To
Un-shielding Detachable DC Power Cable	1.2	EUT	Adapter

Block Diagram of Test Setup

For Conducted Emission:



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)	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	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band edges	Compliance

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 Mobile Portable RF Exposure v05 Appendix A, SAR can be exempted if the output power is less than the SAR exclusion threshold:

For f = 2450 MHz the output power is less than 10 mW at distance of 5 mm

RF Exposure Evaluation

Maximum peak output power at antenna input terminal:
2480 MHz: 0.76 dBm = 1.19 mW
SAR exclusion threshold: 10 mW＞ 1.19 mW
So the SAR evaluation 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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has an integrated antenna arrangement, which was permanently attached and the gain was 1 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

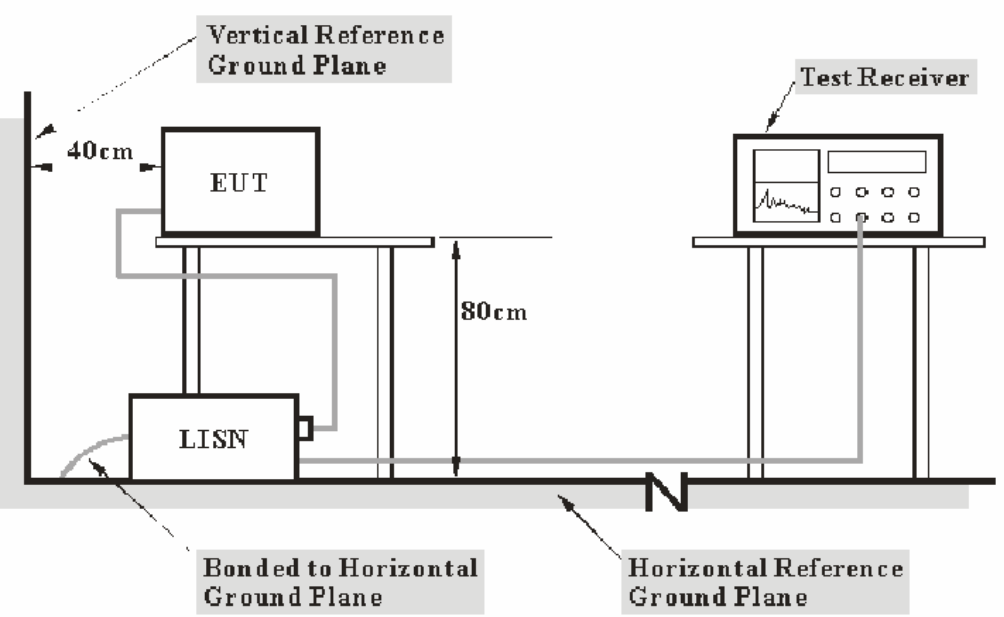
FCC §15.207

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 16-4-2, 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), and the uncertainty will not be taken into consideration for the test data recorded in the report.

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 adapter 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:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2012-11-24	2013-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-21
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 Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the first 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.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Pulse Limiter Attenuation

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 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:

9.73 dB at **2.240 MHz** in the **Line** conducted mode

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

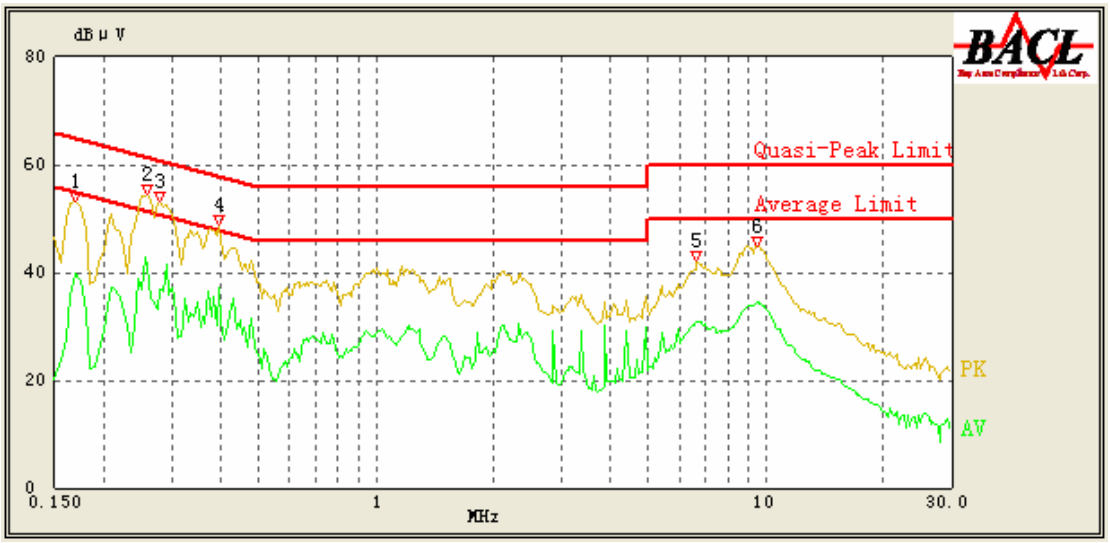
The testing was performed by Tiger Ye on 2013-01-30.

EUT operation 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)
2.240	36.27	10.20	46.00	9.73	Ave.
0.340	40.64	10.10	50.57	9.93	Ave.
0.955	34.36	10.20	46.00	11.64	Ave.
0.340	46.25	10.10	60.57	14.32	QP
0.480	32.09	10.18	46.57	14.48	Ave.
0.275	37.81	10.10	52.43	14.62	Ave.
0.275	46.73	10.10	62.43	15.70	QP
0.480	40.41	10.18	56.57	16.16	QP
2.265	38.13	10.20	56.00	17.87	QP
0.955	37.29	10.20	56.00	18.71	QP
0.165	43.87	10.10	65.57	21.70	QP
0.165	32.52	10.10	55.57	23.05	Ave.

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.260	41.11	10.10	52.86	11.75	Ave.
0.395	37.21	10.10	49.00	11.79	Ave.
0.260	50.32	10.10	62.86	12.54	QP
0.280	49.19	10.10	62.29	13.10	QP
0.280	36.94	10.10	52.29	15.35	Ave.
9.560	34.59	10.30	50.00	15.41	Ave.
0.170	39.92	10.10	55.43	15.51	Ave.
0.395	39.86	10.10	59.00	19.14	QP
6.650	30.69	10.28	50.00	19.31	Ave.
9.495	39.09	10.30	60.00	20.91	QP
6.660	35.00	10.28	60.00	25.00	QP
0.170	37.86	10.10	65.43	27.57	QP

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor = LISN VDF + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude

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

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

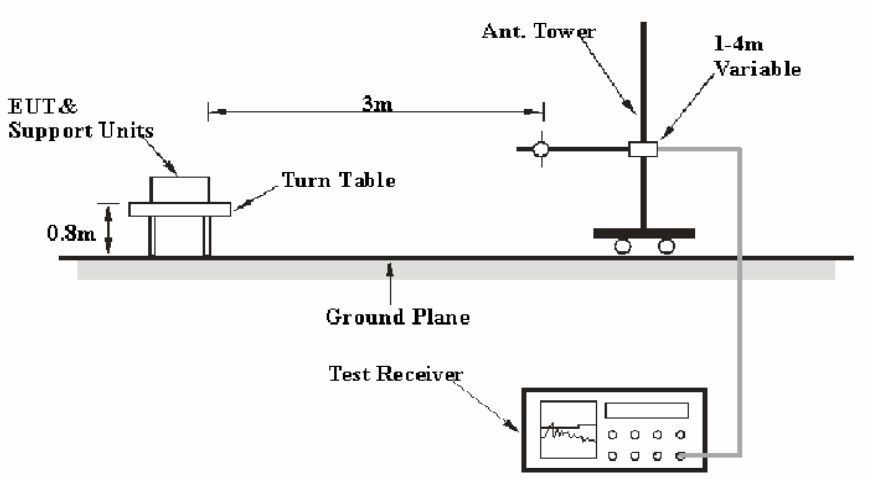
Measurement Uncertainty

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.

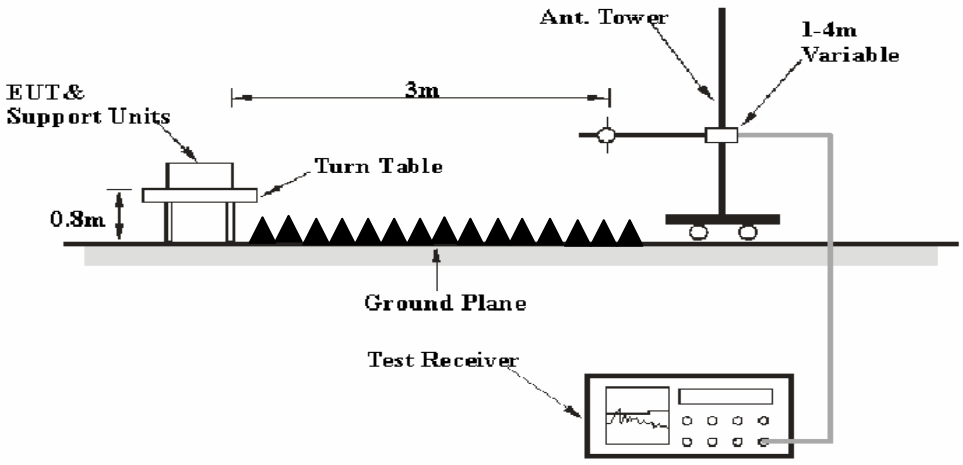
Based on CISPR 16-4-2, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB. (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup

Below 1 GHz:



Above 1 GHz:



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.

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	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
1 GHz – 25 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz 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:

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 maximum 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	Amplifier	8447E	1937A01057	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13
R&S	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, traceable to National Primary Standards and International System of Units (SI).

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:

9.79 dB at **4882.0 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Tiger Ye on 2013-01-26.

Test Mode: Transmitting

EUT operation mode: Transmitting (Scan with GFSK, π/4-DQPSK, 8DPSK, the worst case is BDR Mode (GFSK))

30 MHz ~25 GHz:

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC PART 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2402 MHz)									
2402.0	90.2	PK	118	1.9	H	6.13	96.36	/	/
2402.0	79.0	Ave.	118	1.9	H	6.13	85.08	/	/
2402.0	85.1	PK	104	1.5	V	6.13	91.24	/	/
2402.0	75.1	Ave.	104	1.5	V	6.13	81.25	/	/
4804.0	47.3	PK	316	1.9	H	12.4	59.67	74	14.33
4804.0	26.8	Ave.	316	1.9	H	12.4	39.21	54	14.79
253.3	43.8	QP	32	1.1	H	-15.4	28.42	46	17.58
9608.0	16.6	Ave.	111	1.8	V	19.28	35.88	54	18.12
7206.0	18.1	Ave.	285	1.7	V	17.06	35.14	54	18.86
9608.0	33.1	PK	111	1.8	V	19.28	52.39	74	21.61
7206.0	32.8	PK	285	1.7	V	17.06	49.83	74	24.17
2493.8	20.5	Ave.	143	1.2	V	7.21	27.66	54	26.34
2390.0	20.5	Ave.	58	1.6	V	6.13	26.67	54	27.33
2326.6	20.9	Ave.	232	1.5	H	5.48	26.42	54	27.58
2390.0	37.3	PK	58	1.6	V	6.13	43.39	74	30.61
2493.8	34.7	PK	143	1.2	V	7.21	41.86	74	32.14
2323.6	35.8	PK	232	1.5	H	5.48	41.28	74	32.72
Middle Channel(2441 MHz)									
2441.0	87.6	PK	29	1.2	H	7.21	94.84	/	/
2441.0	78.0	Ave.	29	1.2	H	7.21	85.24	/	/
2441.0	85.9	PK	300	1.1	V	7.21	93.11	/	/
2441.0	74.9	Ave.	300	1.1	V	7.21	82.08	/	/
4882.0	51.8	PK	241	1.2	H	12.46	64.21	74	9.79
4882.0	28.2	Ave.	241	1.2	H	12.46	40.70	54	13.30
9764.0	18.2	Ave.	343	1.1	H	19.4	37.62	54	16.38
7323.0	19.7	Ave.	71	1.1	V	16.49	36.23	54	17.77
253.3	43.2	QP	119	1.2	H	-15.4	27.75	46	18.25
7323.0	35.6	PK	71	1.1	V	16.49	52.12	74	21.88
9764.0	31.4	PK	343	1.1	H	19.4	50.83	74	23.17
2496.2	19.7	Ave.	216	1.3	H	7.21	26.92	54	27.08
2324.6	21.3	Ave.	151	1.2	V	5.48	26.80	54	27.20
2371.2	20.2	Ave.	218	1.1	V	6.13	26.31	54	27.69
2496.2	35.8	PK	216	1.3	H	7.21	42.99	74	31.01
2324.6	35.3	PK	151	1.2	V	5.48	40.75	74	33.25
2371.2	34.5	PK	218	1.1	V	6.13	40.66	74	33.34

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC PART 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel(2480 MHz)									
2480.0	85.4	PK	21	1.2	H	7.21	92.64	/	/
2480.0	75.7	Ave.	21	1.2	H	7.21	82.94	/	/
2480.0	83.2	PK	253	1.1	V	7.21	90.37	/	/
2480.0	72.1	Ave.	253	1.1	V	7.21	79.34	/	/
4960.0	49.1	PK	64	1.3	H	12.5	61.61	74	12.39
4960.0	28.0	Ave.	64	1.3	H	12.5	40.53	54	13.47
9920.0	19.7	Ave.	205	1.2	H	19.38	39.11	54	14.89
7440.0	20.3	Ave.	178	1.1	H	15.9	36.22	54	17.78
253.3	42.9	QP	21	1.1	H	-15.4	27.47	46	18.53
2483.5	25.1	Ave.	350	1.1	V	7.21	32.32	54	21.68
7440.0	34.6	PK	178	1.1	H	15.9	50.45	74	23.55
9920.0	30.5	PK	205	1.2	H	19.38	49.84	74	24.16
2376.1	23.7	Ave.	263	1.2	V	6.13	29.80	54	24.20
2483.5	42.1	PK	350	1.1	V	7.21	49.34	74	24.66
2344.5	20.9	Ave.	351	1.2	V	5.48	26.42	54	27.58
2376.1	37.3	PK	263	1.2	V	6.13	43.38	74	30.62
2344.5	36.5	PK	351	1.2	V	5.48	41.99	74	32.01

Note:
1) Corrected Amplitude = Corrected Factor + Reading
2) Corrected Factor=Antenna factor (RX) + Cable loss – Amplifier factor
3) Margin = Limit - Corrected Amplitude

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 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	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

** The testing was performed by Tiger Ye on 2013-01-23.*

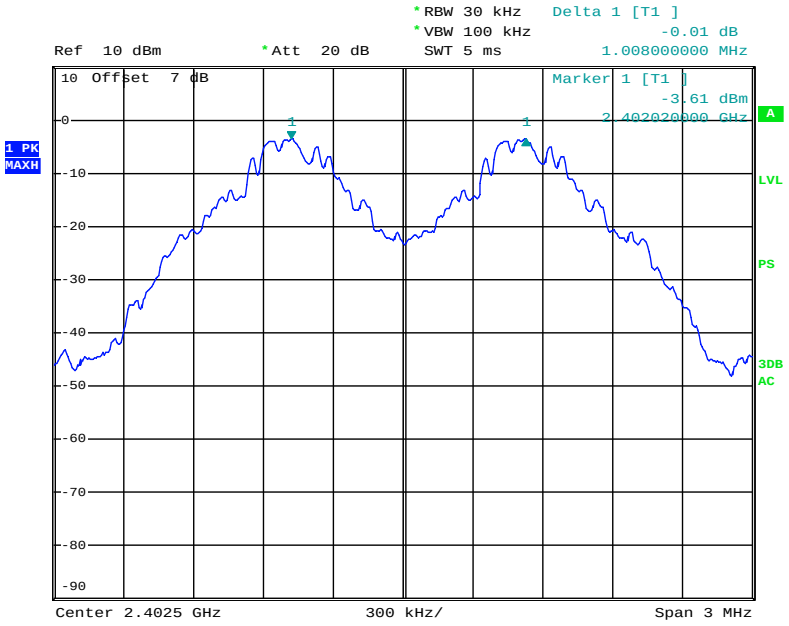
EUT operation mode: Transmitting

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

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	≥Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.008	0.688	Pass
	Adjacent	2403			
	Middle	2441	1.008	0.688	Pass
	Adjacent	2442			
	High	2480	1.008	0.688	Pass
	Adjacent	2479			
EDR (π/4-DQPSK)	Low	2402	1.002	0.901	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.901	Pass
	Adjacent	2442			
	High	2480	1.002	0.901	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.002	0.880	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.880	Pass
	Adjacent	2442			
	High	2480	1.002	0.880	Pass
	Adjacent	2479			

Note: Limit = 20 dB bandwidth *2/3

BDR (GFSK): Low Channel



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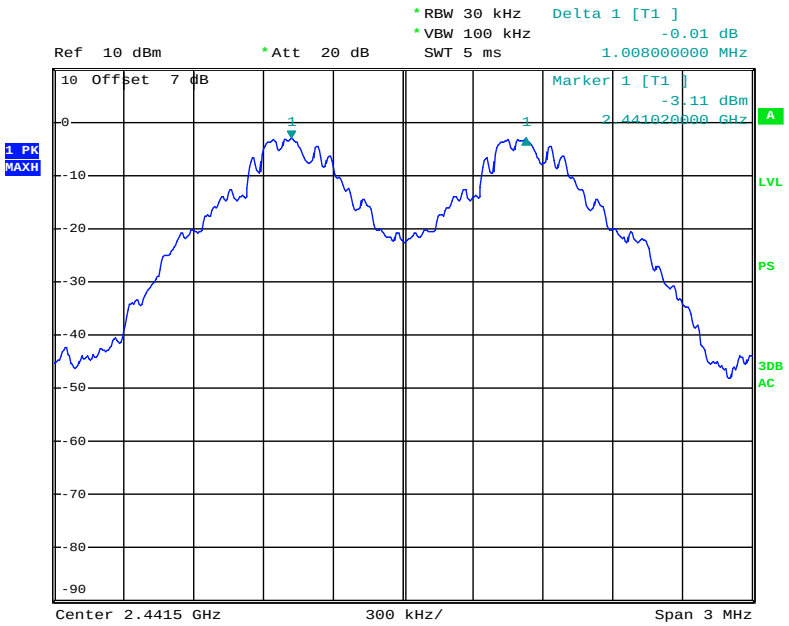
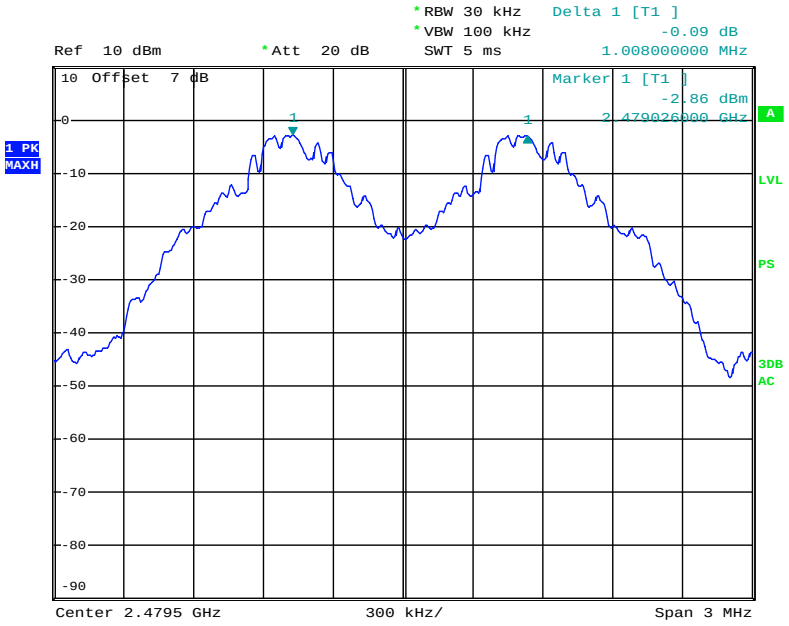
BDR (GFSK): Middle Channel



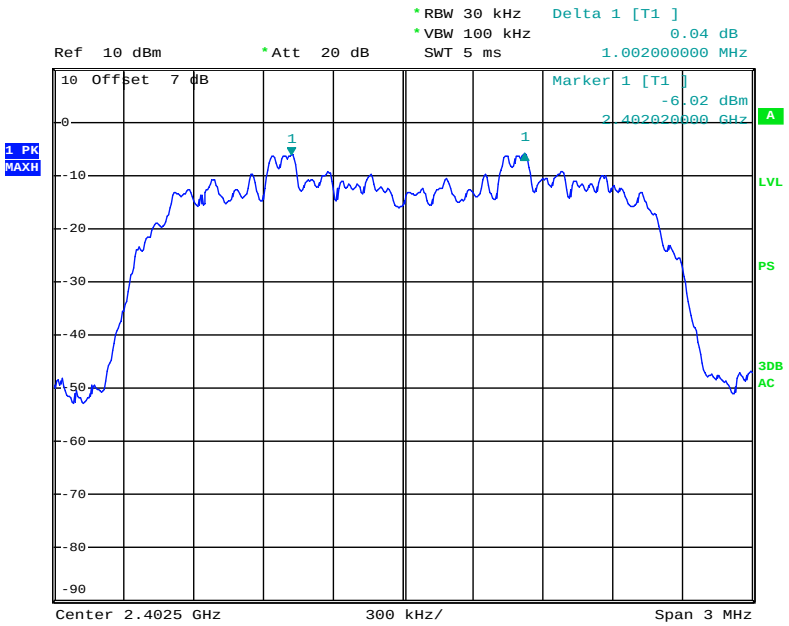
Date: 23.JAN.2013 08:32:27

BDR (GFSK): High Channel



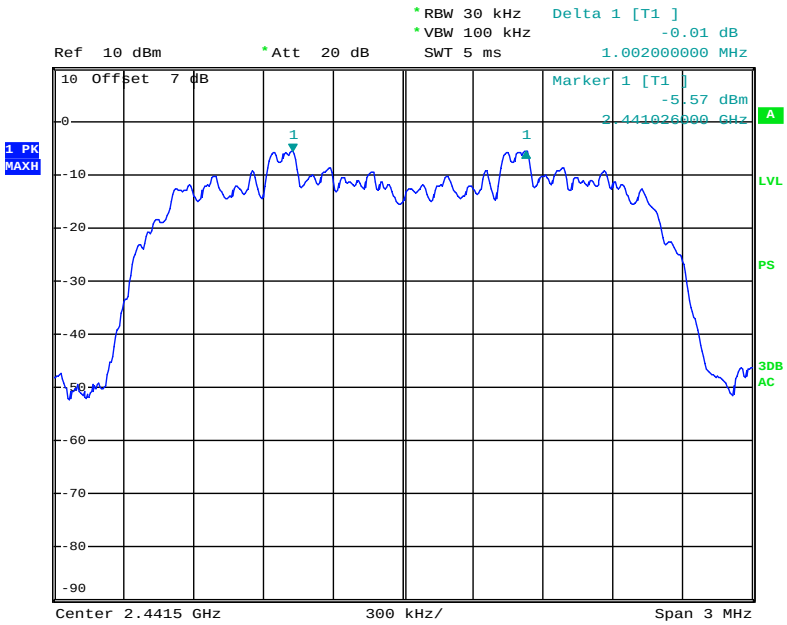
Date: 23.JAN.2013 08:33:46

EDR (π/4-DQPSK): Low Channel



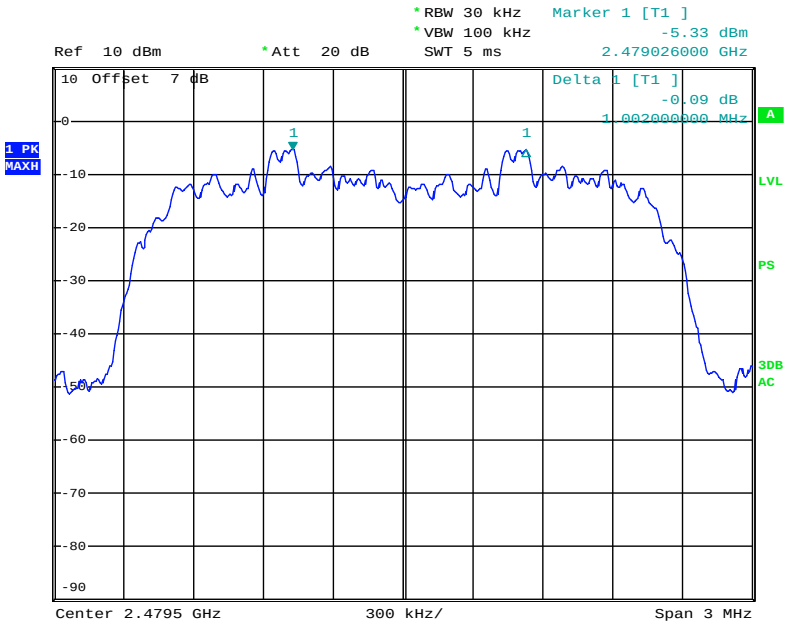
Date: 23.JAN.2013 09:55:01

EDR (π/4-DQPSK): Middle Channel



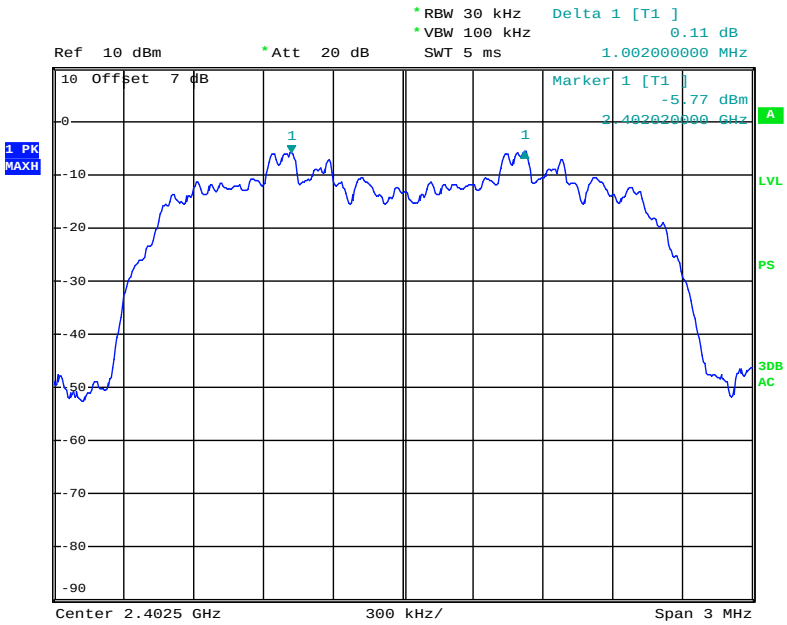
Date: 23.JAN.2013 08:36:14

EDR (π/4-DQPSK): High Channel



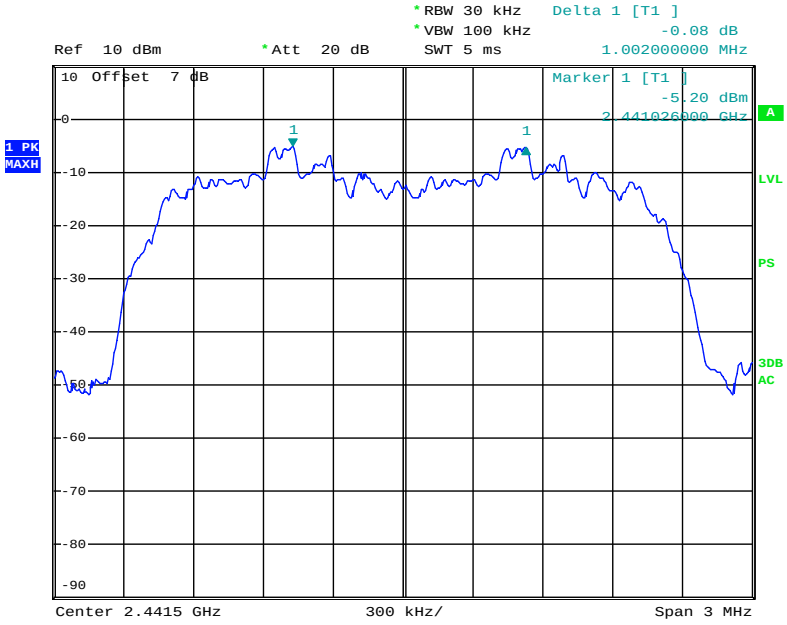
Date: 23.JAN.2013 09:53:01

EDR (8DPSK): Low Channel



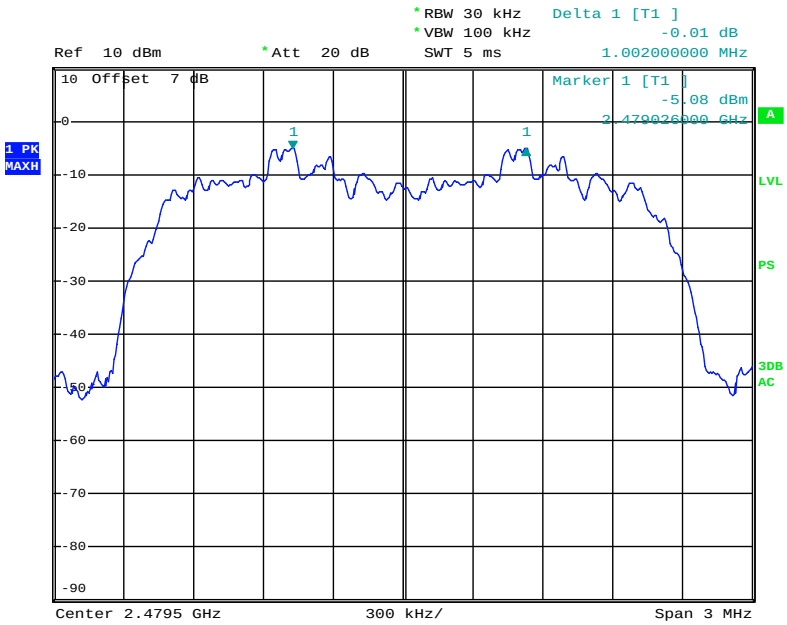
Date: 23.JAN.2013 08:38:32

EDR (8DPSK): Middle Channel



Date: 23.JAN.2013 08:39:29

EDR (8DPSK): High Channel



Date: 23.JAN.2013 08:40:21

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	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100 kPa

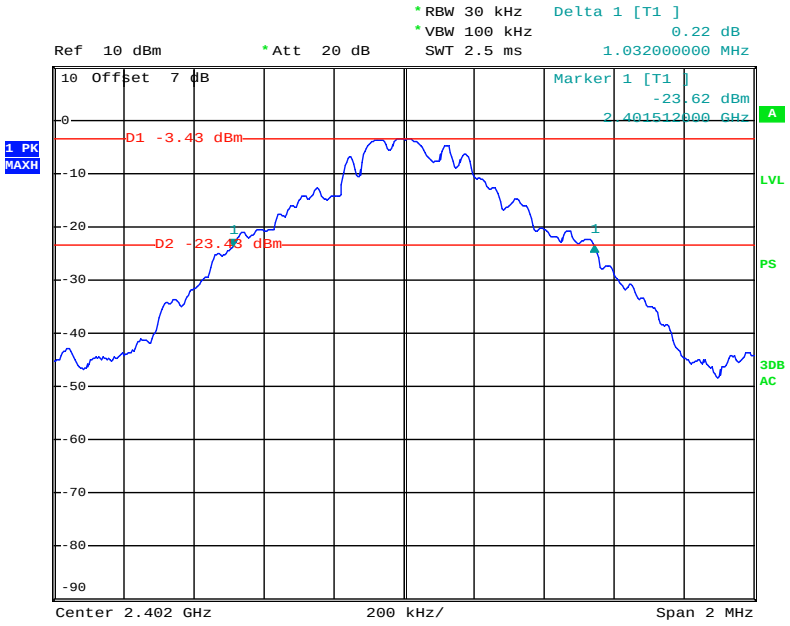
** The testing was performed by Tiger Ye on 2013-01-22.*

EUT operation mode: Transmitting

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

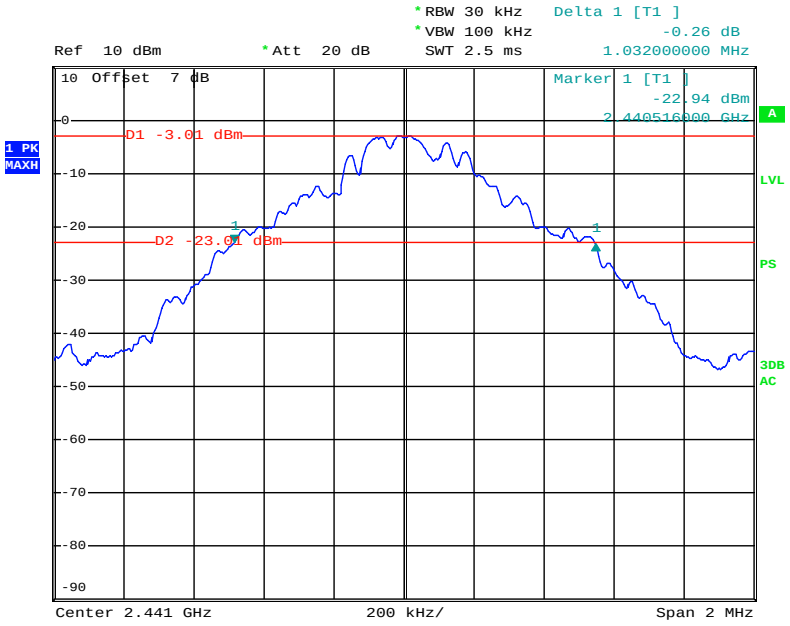
Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR (GFSK)	Low	2402	1.032
	Middle	2441	1.032
	High	2480	1.032
EDR (π/4-DQPSK)	Low	2402	1.352
	Middle	2441	1.352
	High	2480	1.352
EDR (8DPSK)	Low	2402	1.320
	Middle	2441	1.320
	High	2480	1.320

BDR (GFSK): Low Channel



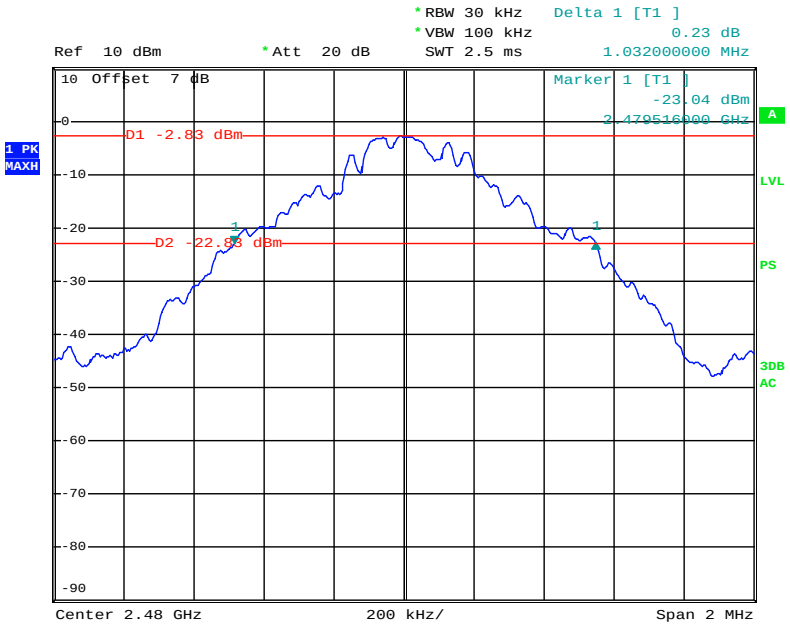
Date: 22.JAN.2013 16:40:16

BDR (GFSK): Middle Channel



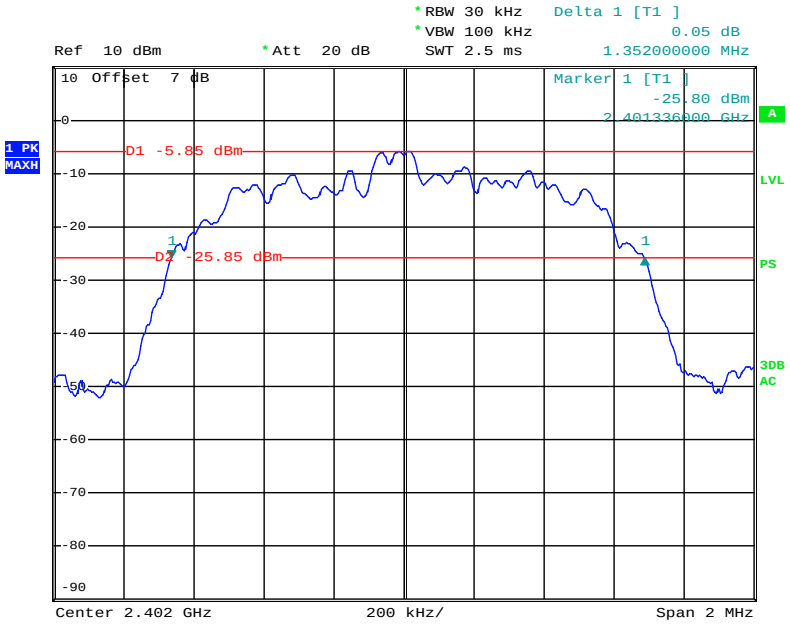
Date: 22.JAN.2013 16:41:39

BDR (GFSK): High Channel



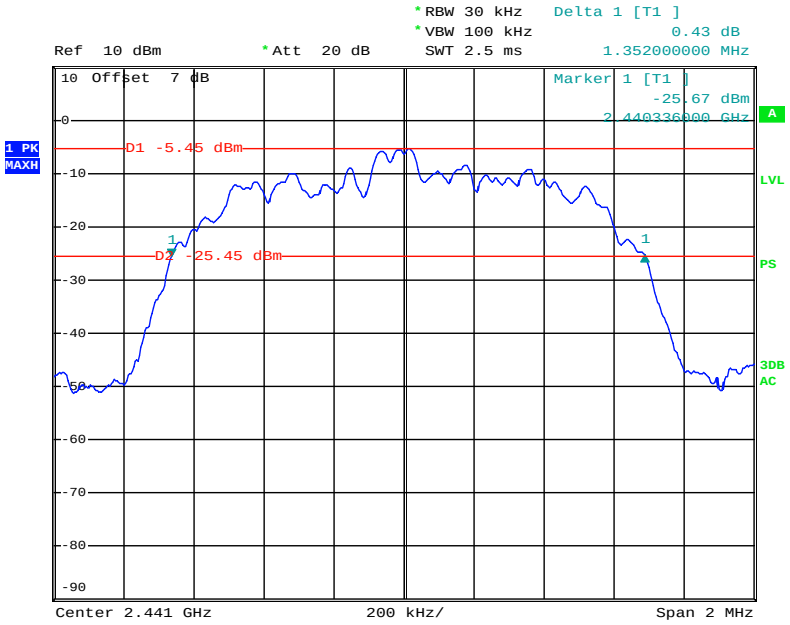
Date: 22.JAN.2013 16:42:42

EDR (π/4-DQPSK): Low Channel



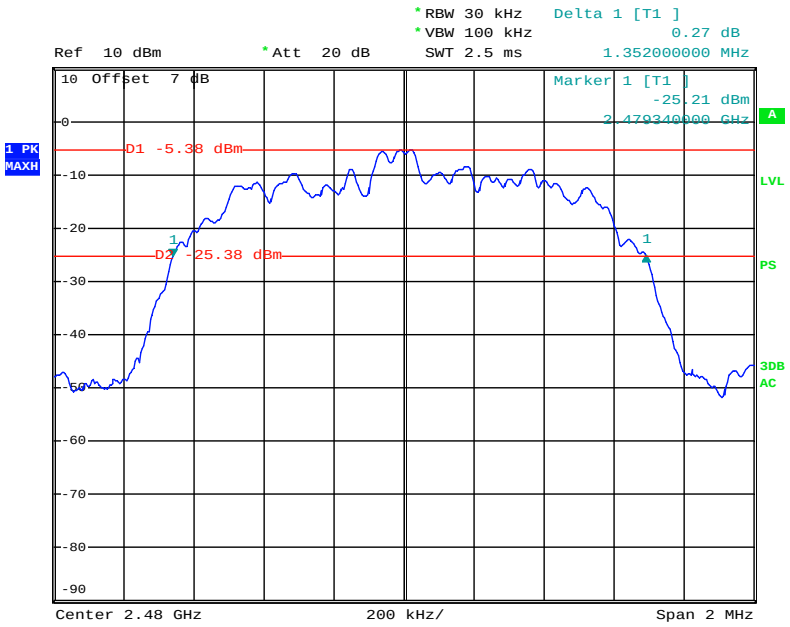
Date: 22.JAN.2013 16:47:52

EDR (π/4-DQPSK): Middle Channel



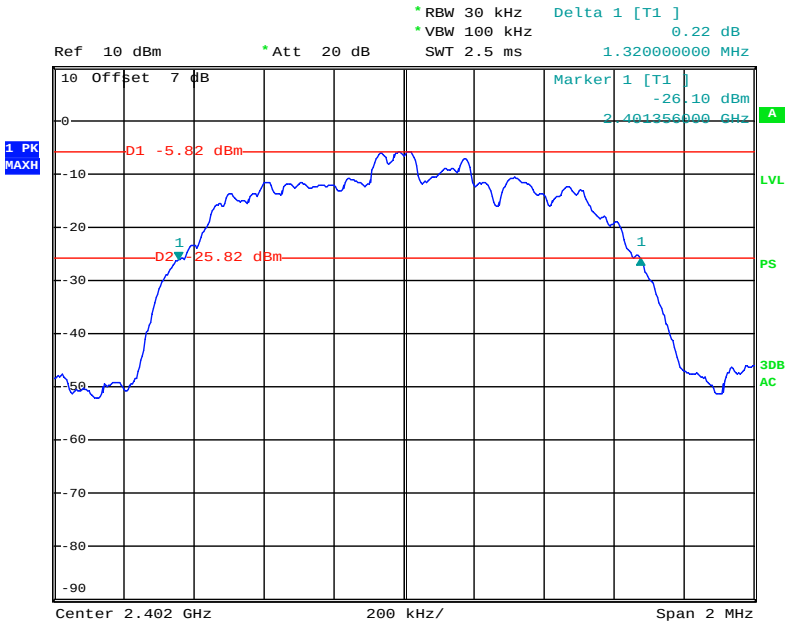
Date: 22.JAN.2013 16:48:53

EDR (π/4-DQPSK): High Channel



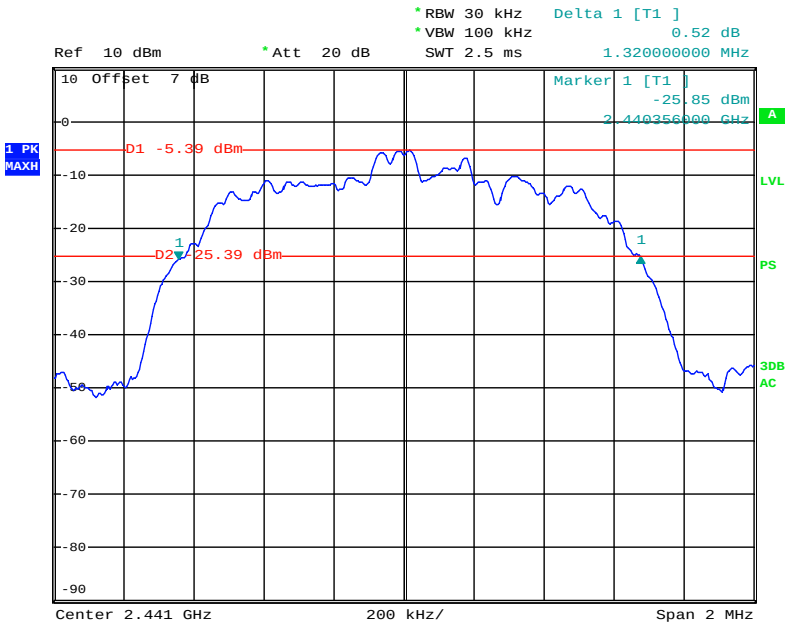
Date: 22.JAN.2013 16:49:44

EDR (8DPSK): Low Channel



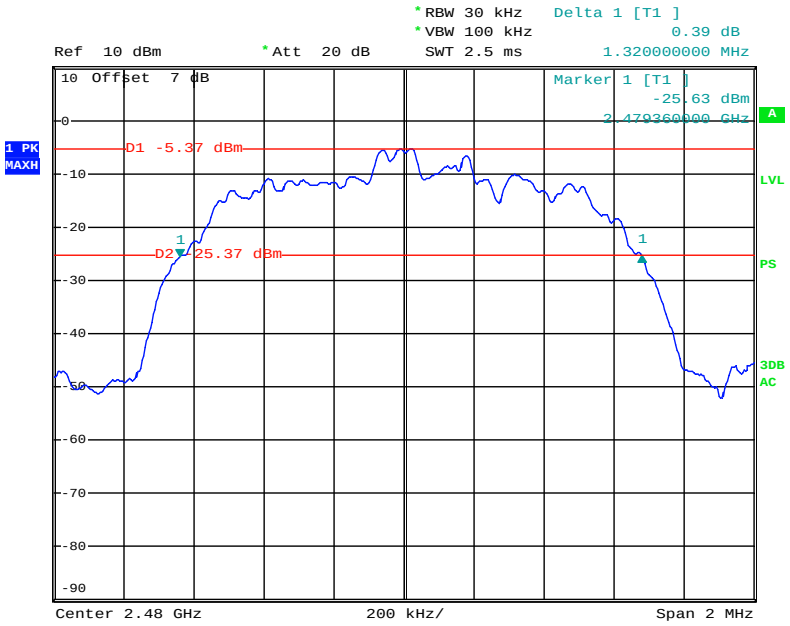
Date: 22.JAN.2013 16:52:59

EDR (8DPSK): Middle Channel



Date: 22.JAN.2013 16:55:09

EDR (8DPSK): High Channel



Date: 22.JAN.2013 16:56:47

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	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

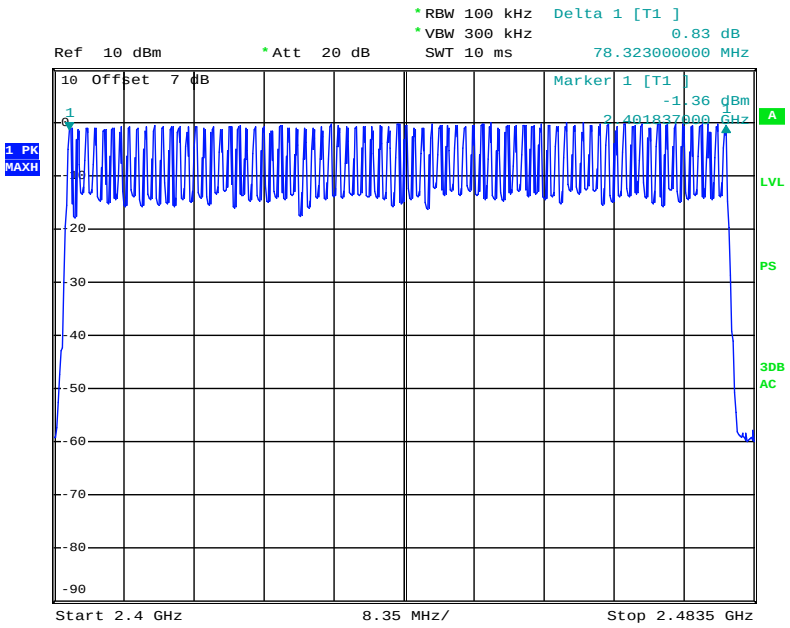
The testing was performed by Tiger Ye on 2013-01-22.

EUT operation mode: Transmitting

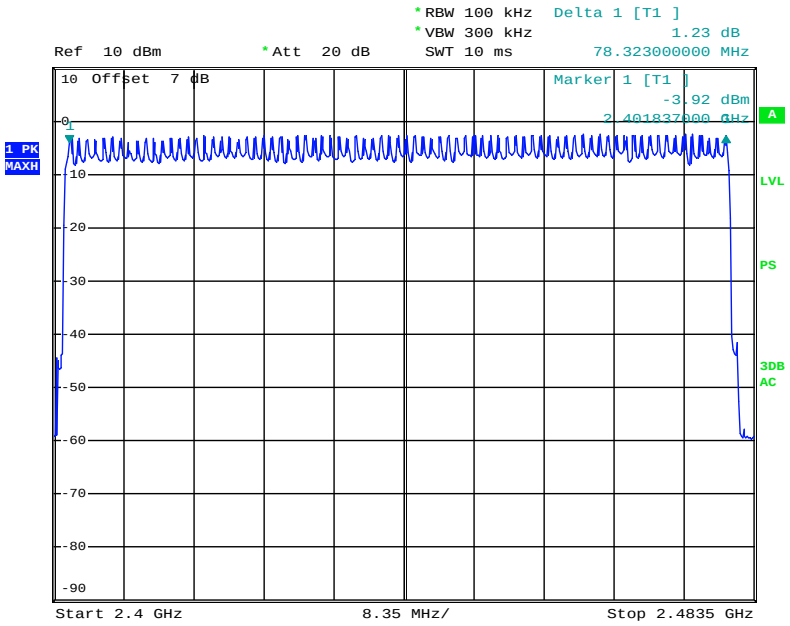
Test Result: Compliance. Please refer to following tables and plots

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

BDR (GFSK): Number of Hopping Channels

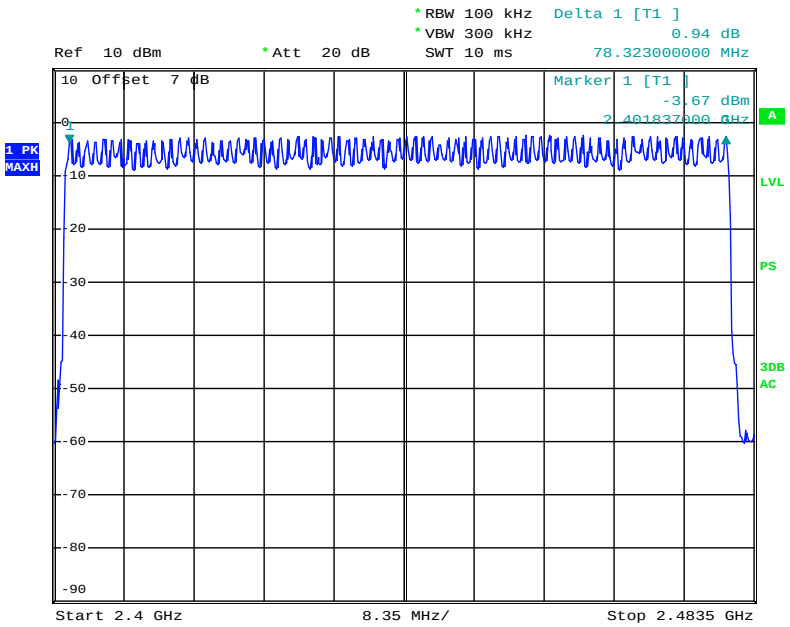


EDR (π/4-DQPSK): Number of Hopping Channels



Date: 22.JAN.2013 16:32:50

(8DPSK): Number of Hopping Channels



Date: 22.JAN.2013 16:36:30

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*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	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Tiger Ye on 2013-01-23.

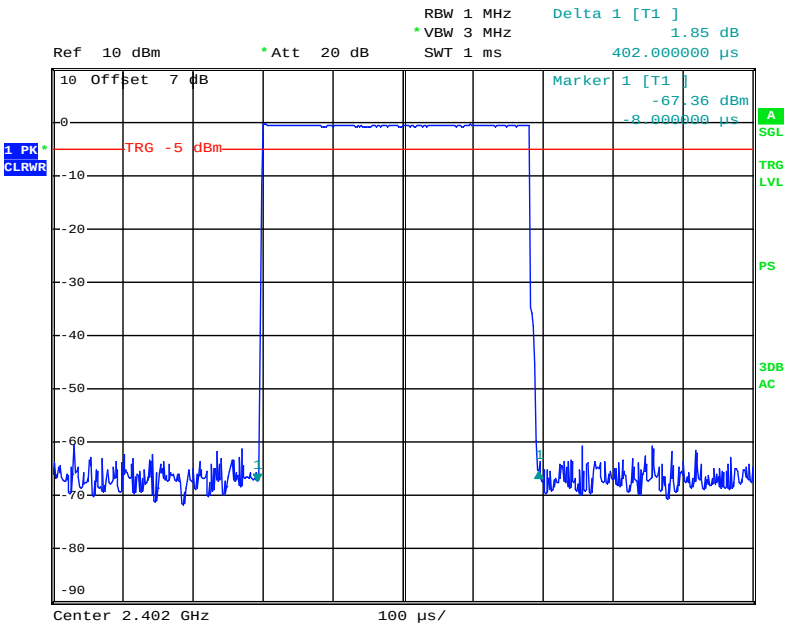
EUT operation mode: Transmitting

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	0.402	0.129	0.4	Pass
		Middle	0.402	0.129	0.4	Pass
		High	0.402	0.129	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.674	0.268	0.4	Pass
		Middle	1.674	0.268	0.4	Pass
		High	1.674	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.934	0.313	0.4	Pass
		Middle	2.934	0.313	0.4	Pass
		High	2.934	0.313	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (π/4-DQPSK)	DH 1	Low	0.408	0.131	0.4	Pass
		Middle	0.408	0.131	0.4	Pass
		High	0.408	0.131	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.674	0.268	0.4	Pass
		Middle	1.674	0.268	0.4	Pass
		High	1.674	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.934	0.313	0.4	Pass
		Middle	2.934	0.313	0.4	Pass
		High	2.934	0.313	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	DH 1	Low	0.408	0.131	0.440	Pass
		Middle	0.408	0.131	0.440	Pass
		High	0.408	0.131	0.440	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.674	0.268	0.4	Pass
		Middle	1.674	0.268	0.4	Pass
		High	1.674	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.934	0.313	0.4	Pass
		Middle	2.934	0.313	0.4	Pass
		High	2.934	0.313	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

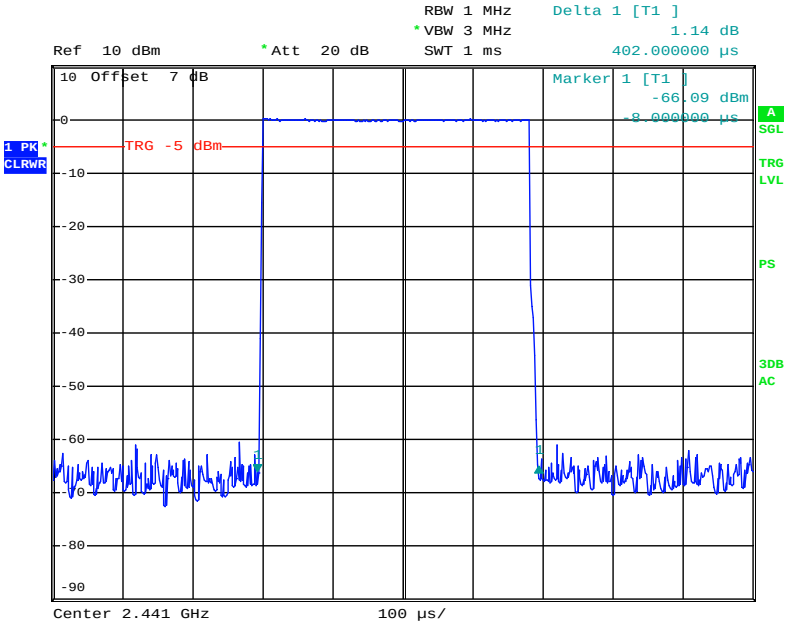
BDR (GFSK):

Pulse time, Low Channel, DH1



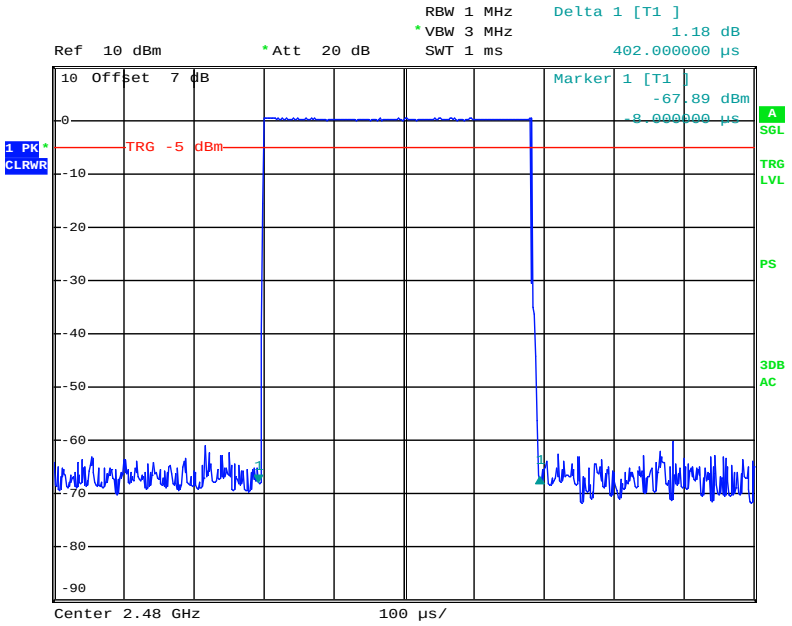
Date: 23.JAN.2013 09:11:50

Pulse time, Middle Channel, DH1



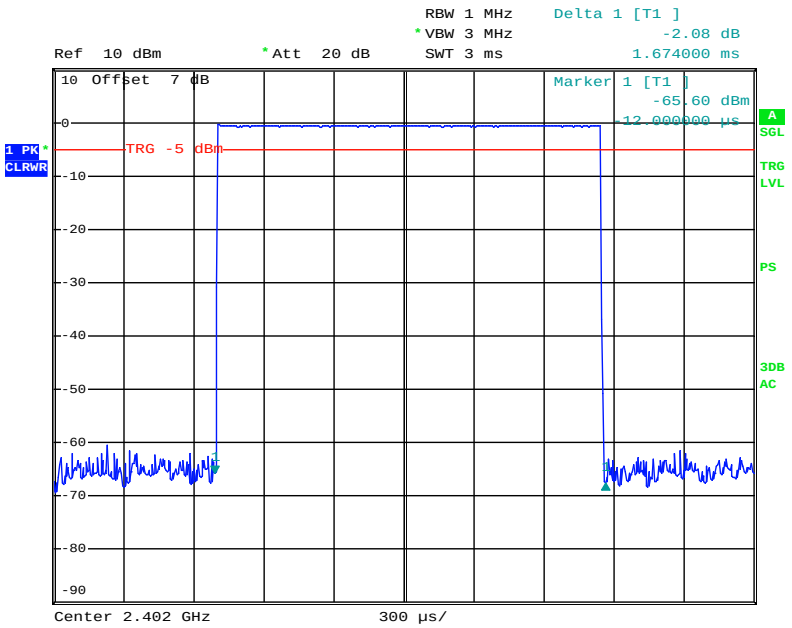
Date: 23.JAN.2013 09:12:32

Pulse time, High Channel, DH1



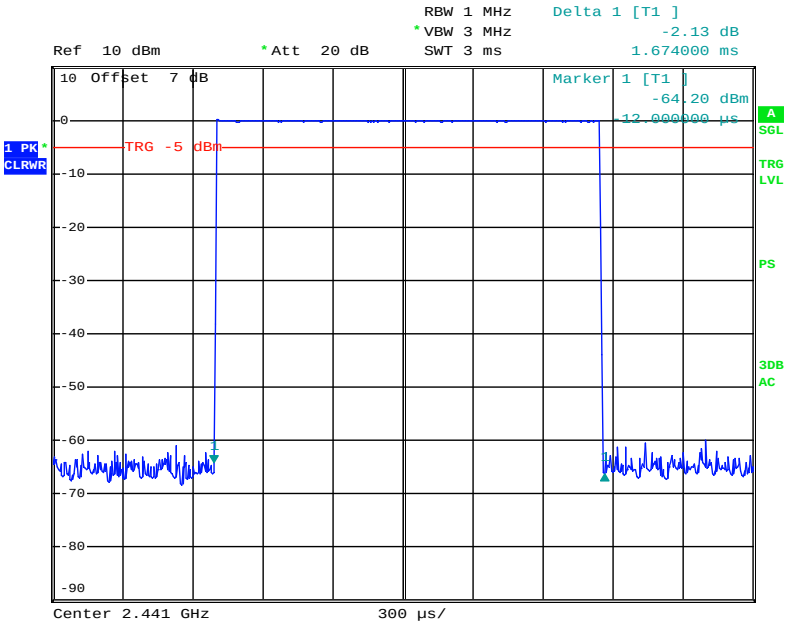
Date: 23.JAN.2013 09:12:56

Pulse time, Low Channel, DH3



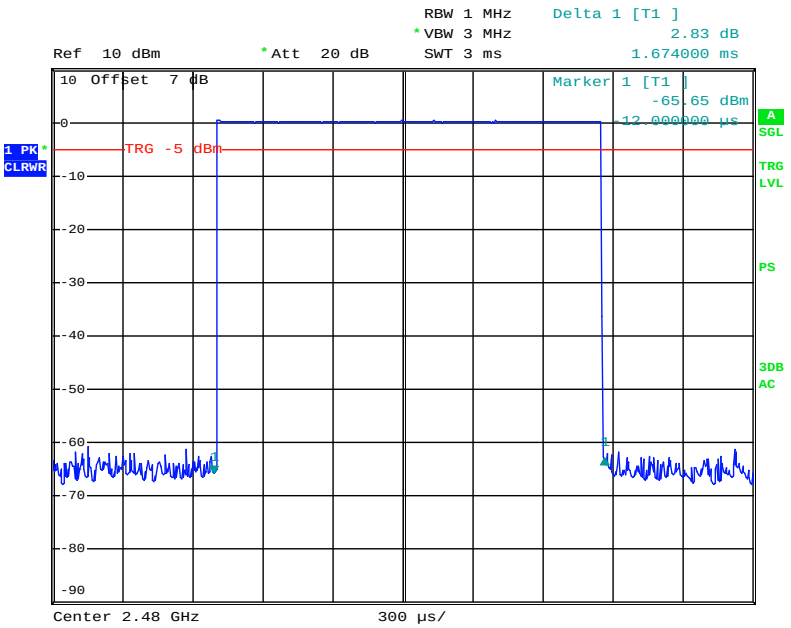
Date: 23.JAN.2013 09:19:04

Pulse time, Middle Channel, DH3



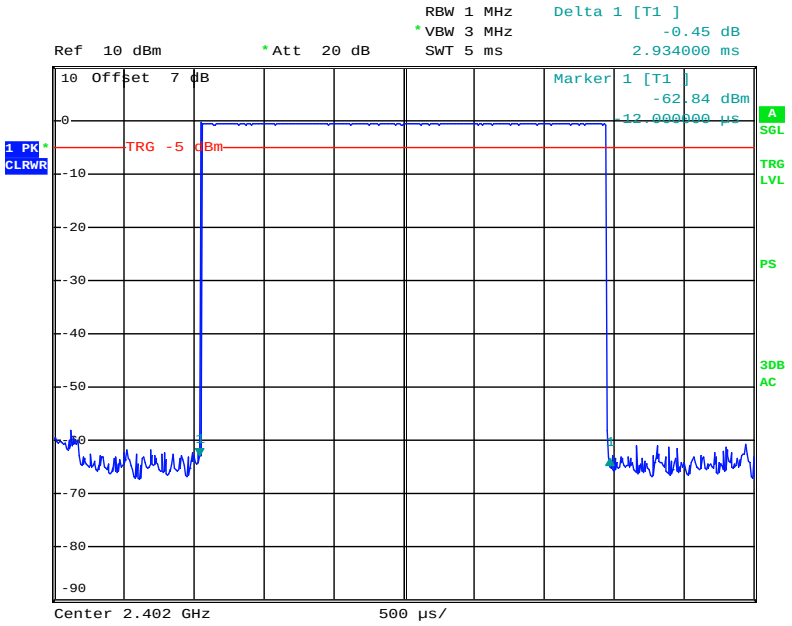
Date: 23.JAN.2013 09:18:41

Pulse time, High Channel, DH3



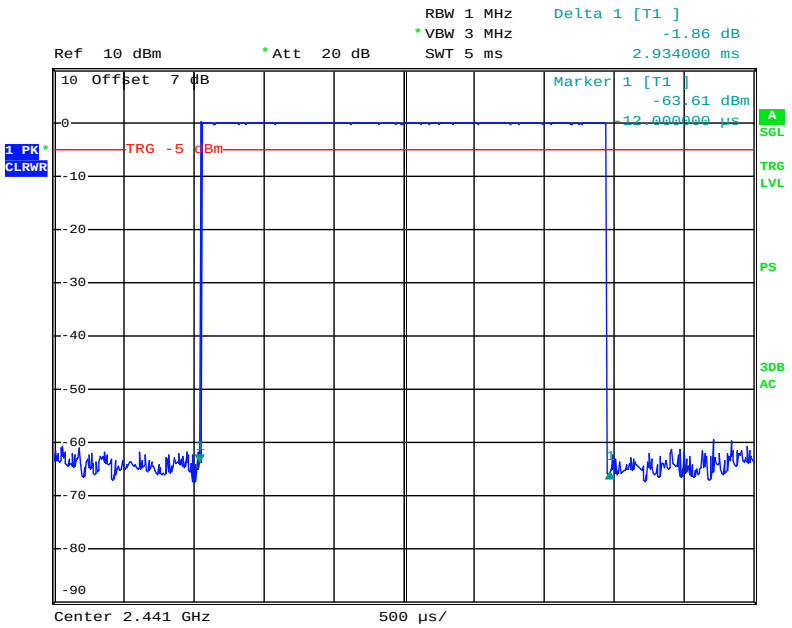
Date: 23.JAN.2013 09:19:20

Pulse time, Low Channel, DH5



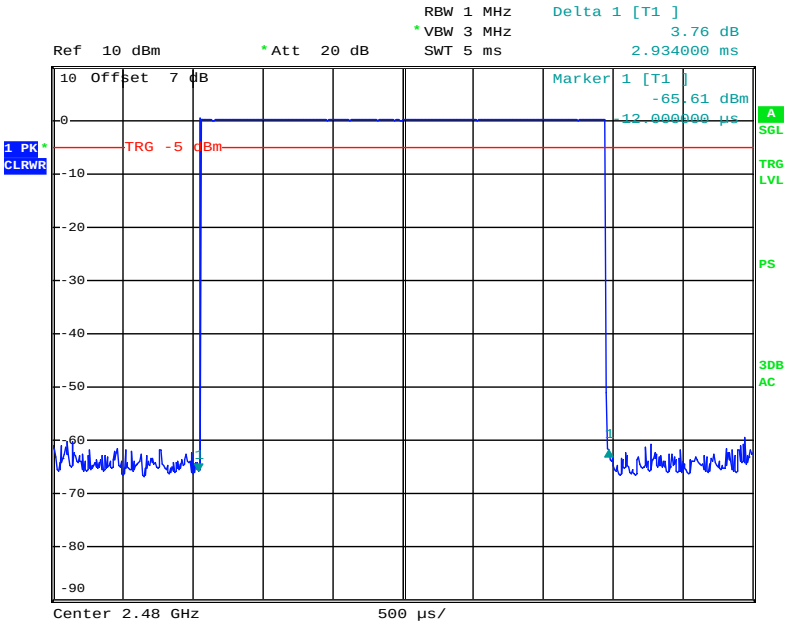
Date: 23.JAN.2013 09:24:58

Pulse time, Middle Channel, DH5



Date: 23.JAN.2013 09:29:58

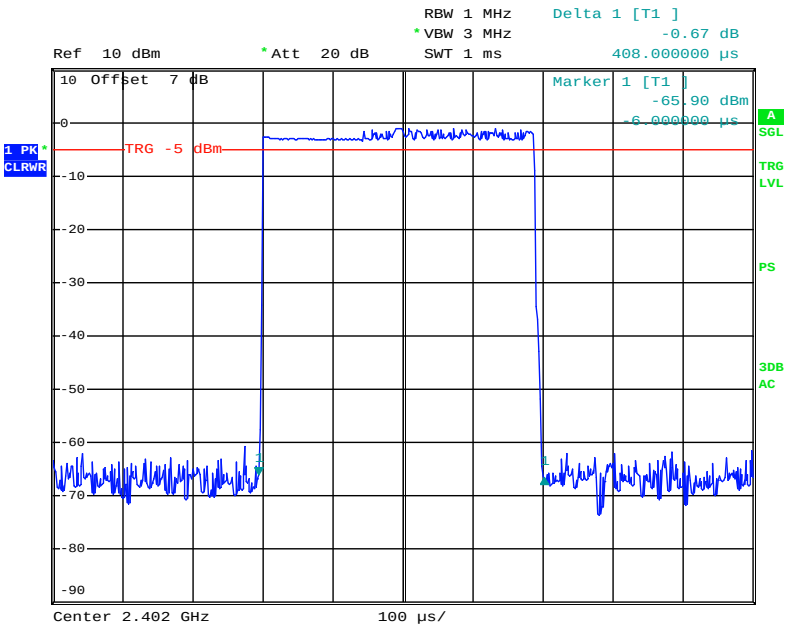
Pulse time, High Channel, DH5



Date: 23.JAN.2013 09:30:15

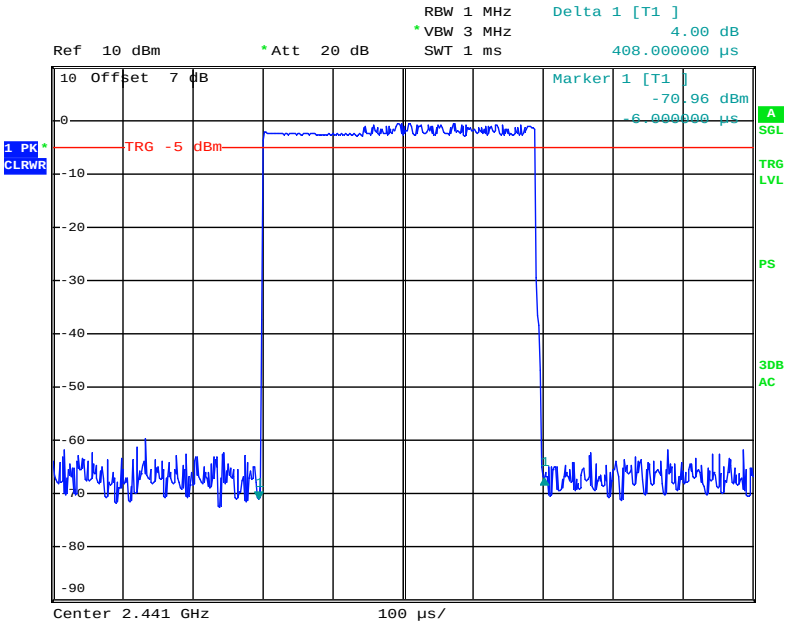
EDR (π/4-DQPSK):

Pulse time, Low Channel, DH1



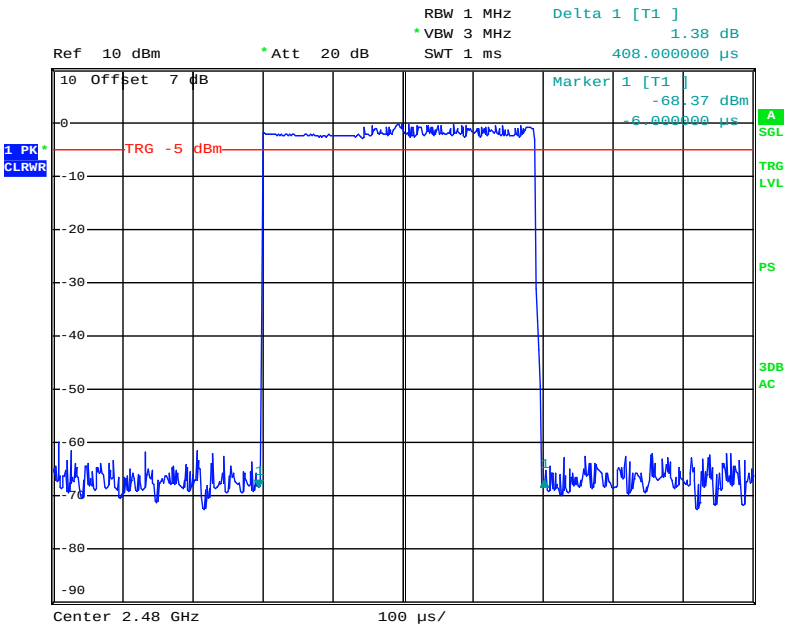
Date: 23.JAN.2013 09:14:01

Pulse time, Middle Channel, DH1



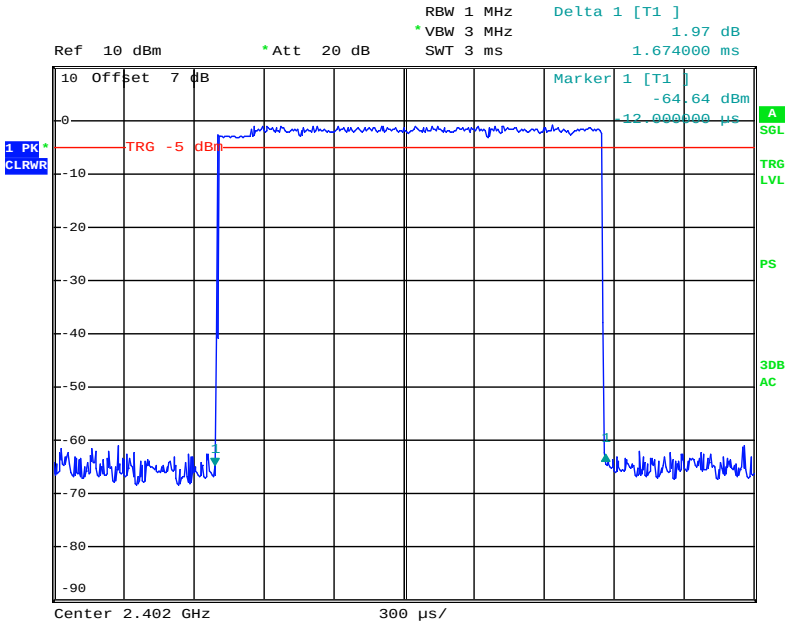
Date: 23.JAN.2013 09:14:26

Pulse time, High Channel, DH1



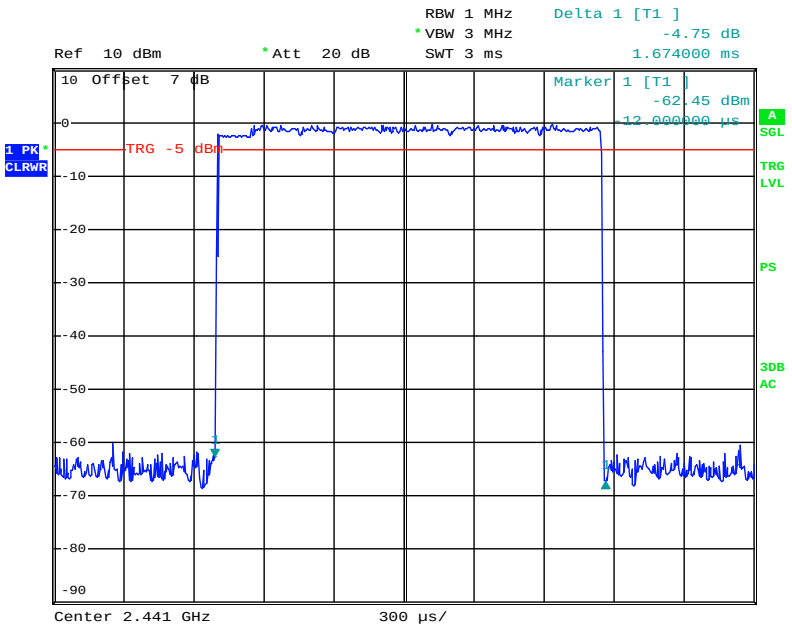
Date: 23.JAN.2013 09:14:48

Pulse time, Low Channel, DH3



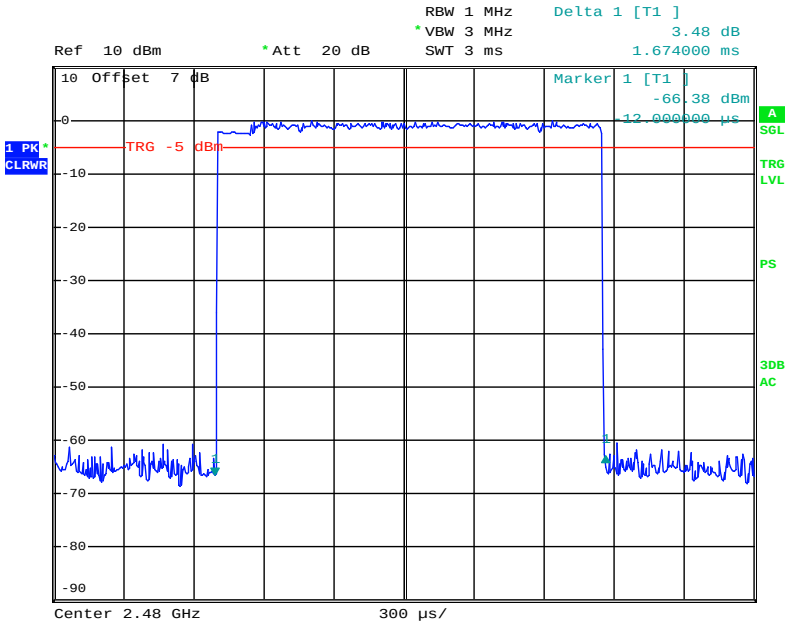
Date: 23.JAN.2013 09:20:33

Pulse time, Middle Channel, DH3



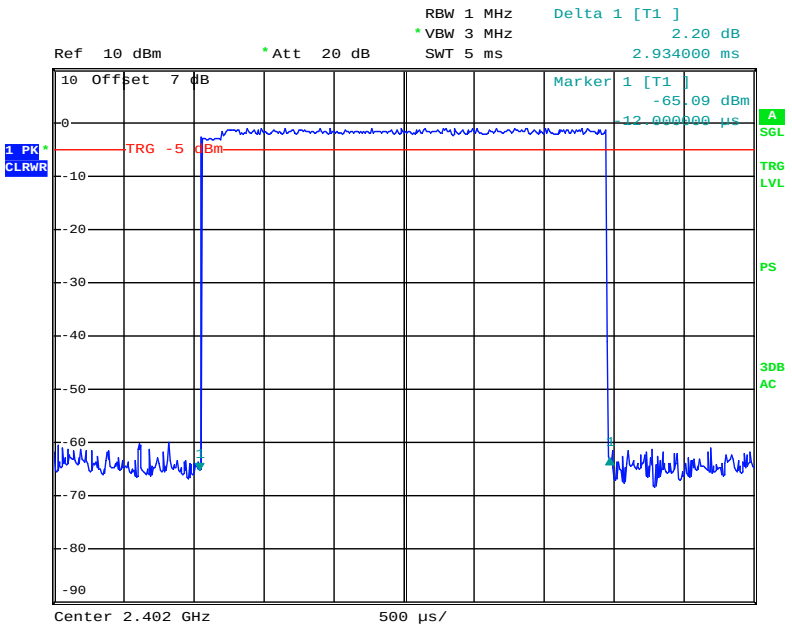
Date: 23.JAN.2013 09:20:47

Pulse time, High Channel, DH3



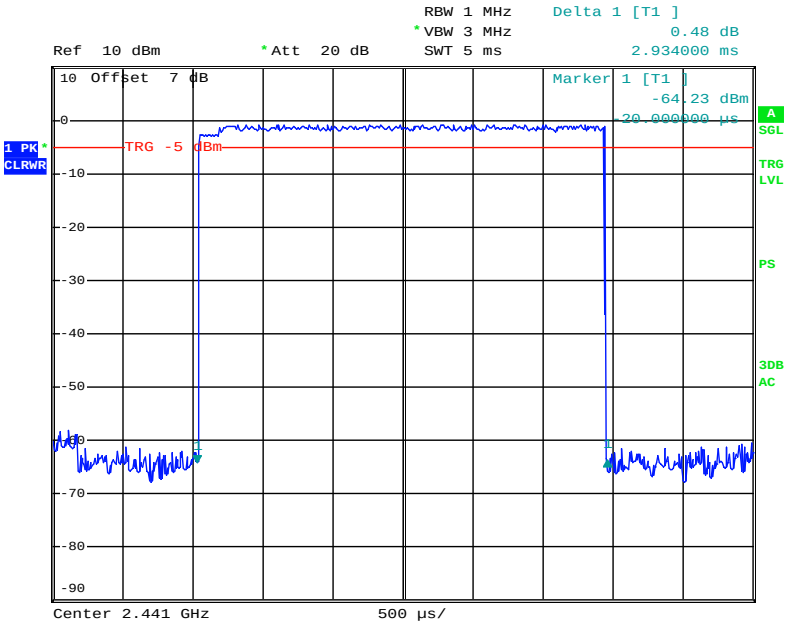
Date: 23.JAN.2013 09:21:07

Pulse time, Low Channel, DH5



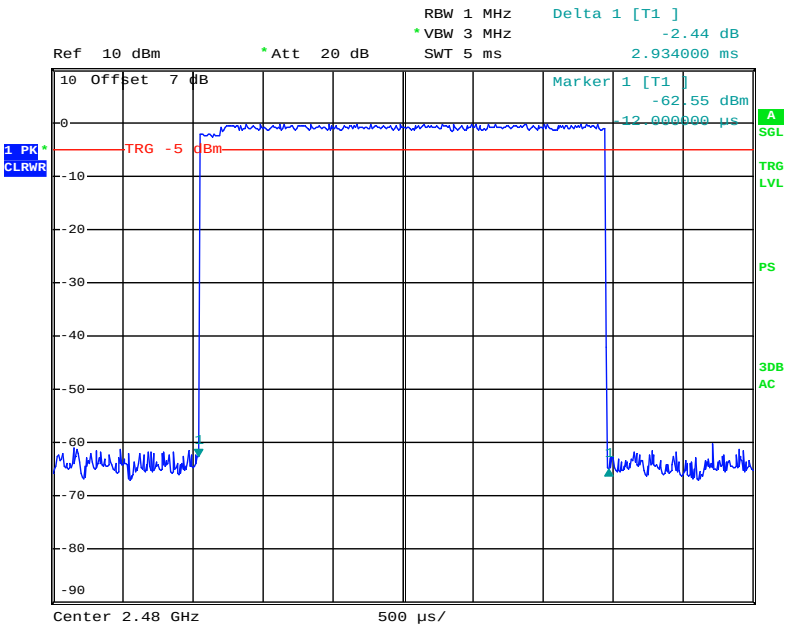
Date: 23.JAN.2013 09:31:31

Pulse time, Middle Channel, DH5



Date: 23.JAN.2013 09:49:05

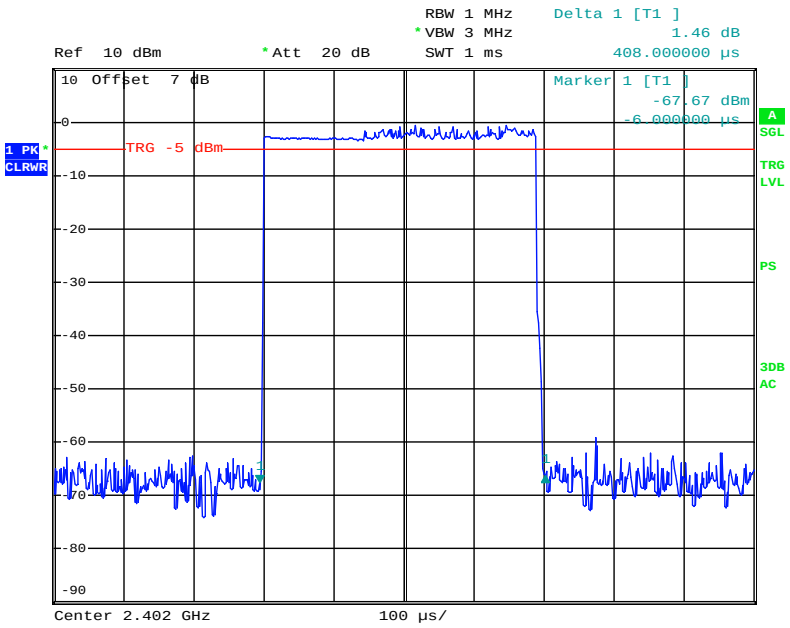
Pulse time, High Channel, DH5



Date: 23.JAN.2013 09:32:46

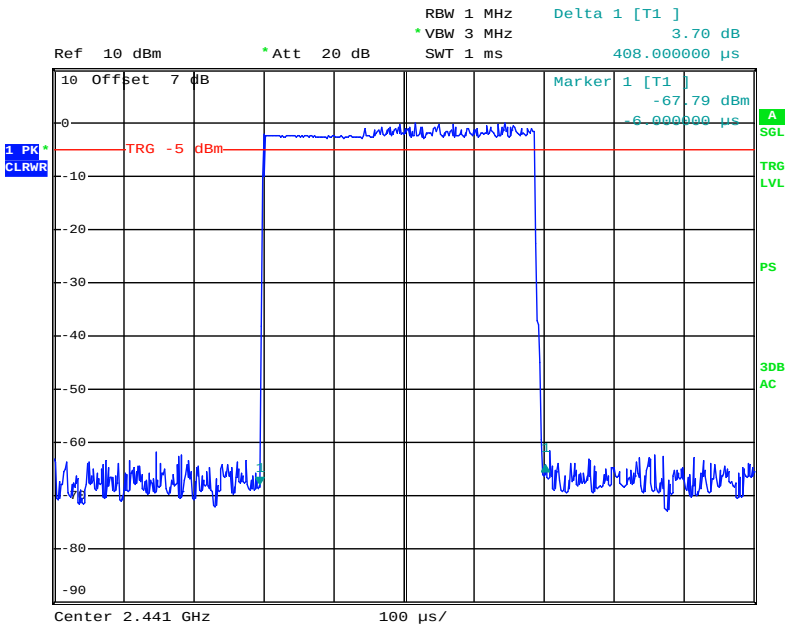
EDR (8DPSK):

Pulse time, Low Channel, DH1



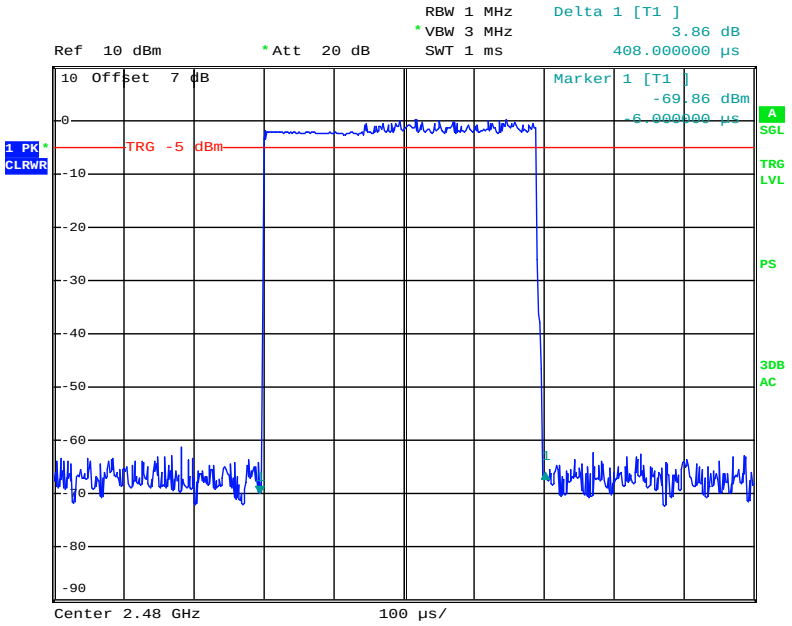
Date: 23.JAN.2013 09:15:33

Pulse time, Middle Channel, DH1



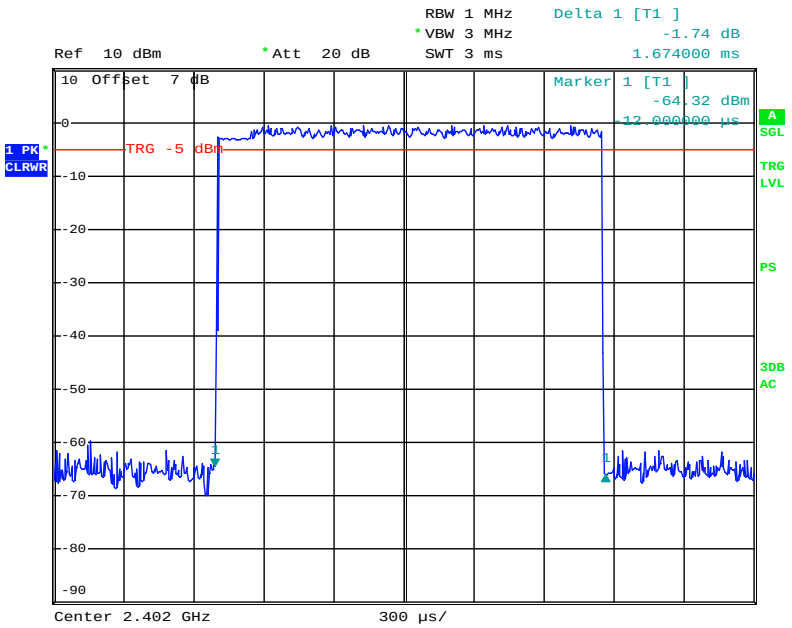
Date: 23.JAN.2013 09:15:59

Pulse time, High Channel, DH1



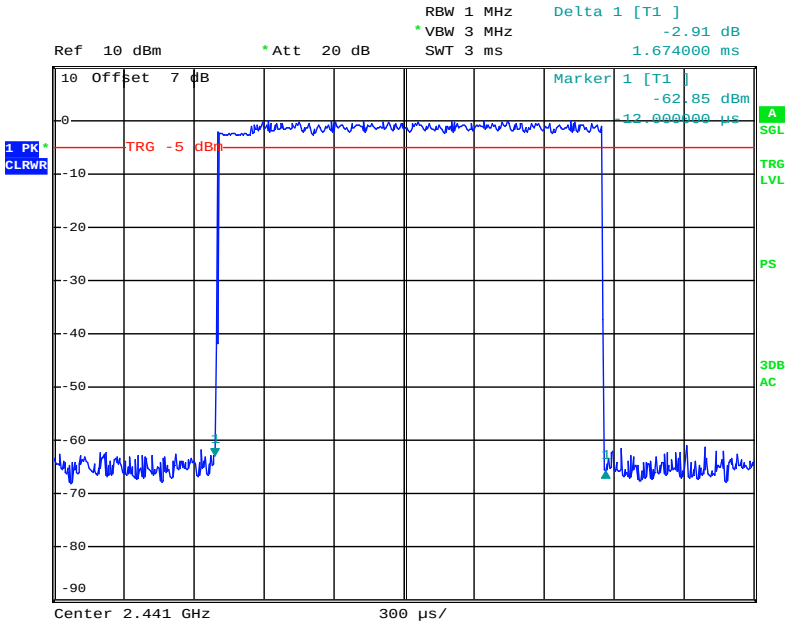
Date: 23.JAN.2013 09:16:17

Pulse time, Low Channel, DH3



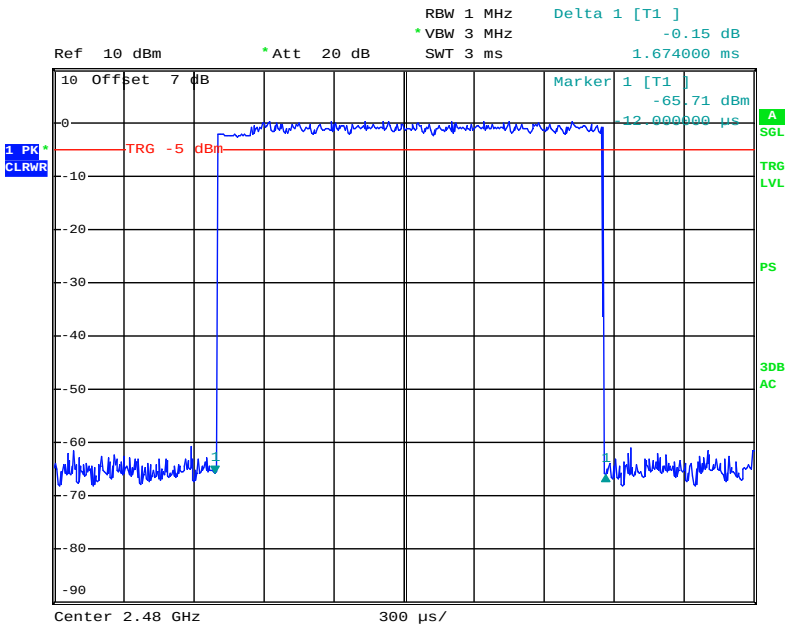
Date: 23.JAN.2013 09:21:51

Pulse time, Middle Channel, DH3



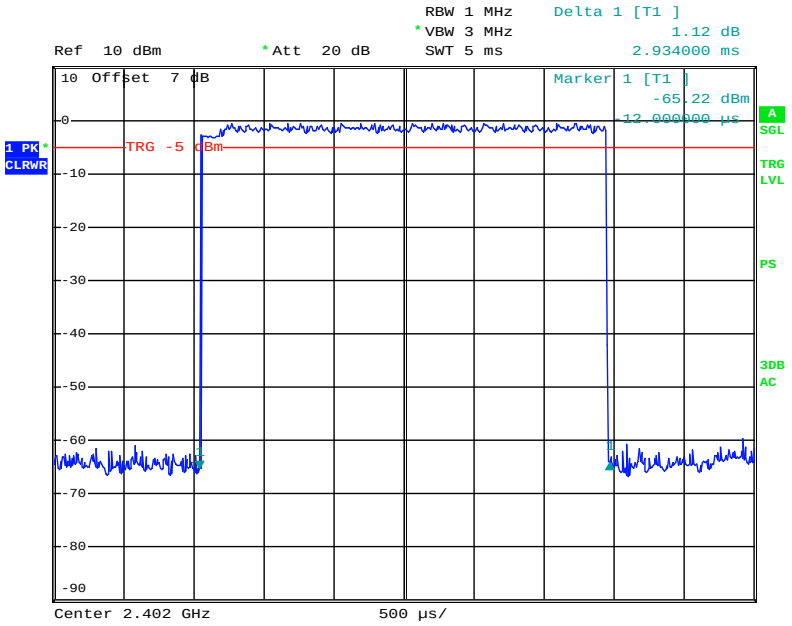
Date: 23.JAN.2013 09:22:13

Pulse time, High Channel, DH3



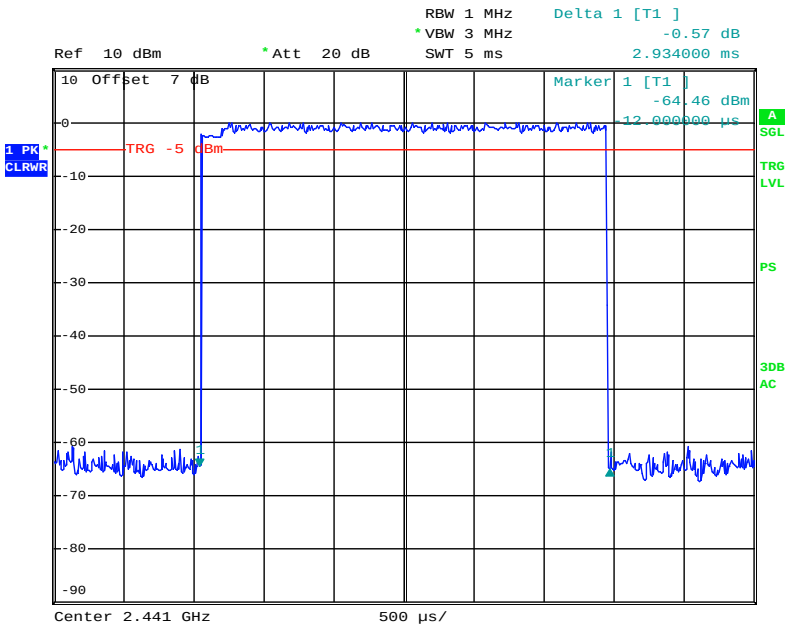
Date: 23.JAN.2013 09:23:10

Pulse time, Low Channel, DH5



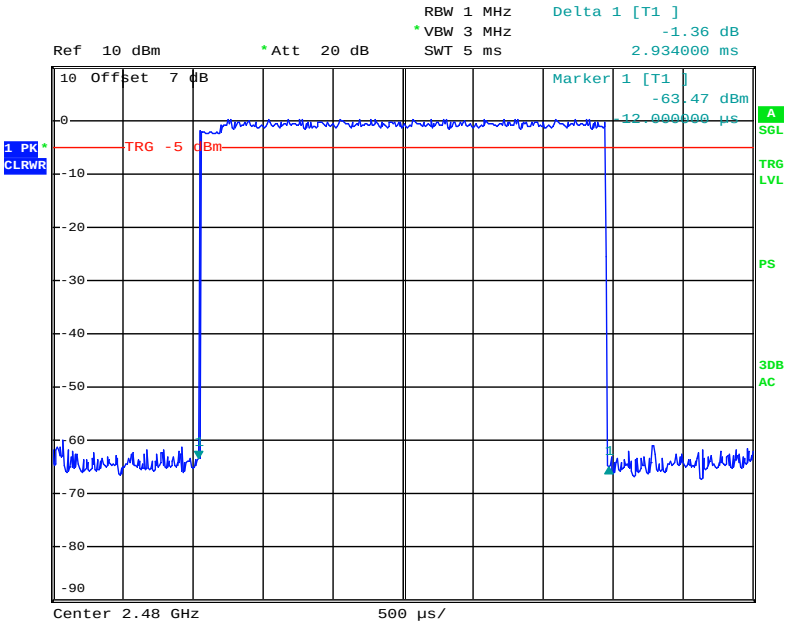
Date: 23.JAN.2013 09:40:50

Pulse time, Middle Channel, DH5



Date: 23.JAN.2013 09:41:28

Pulse time, High Channel, DH5



Date: 23.JAN.2013 09:41:48

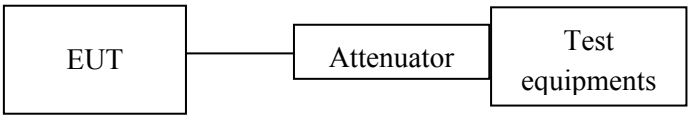
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

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

Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Tiger Ye on 2013-01-23.

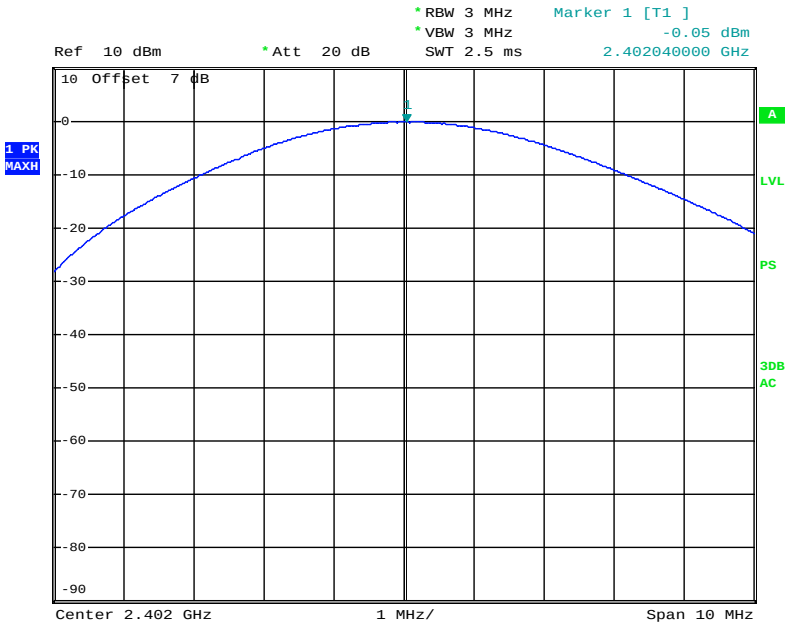
EUT operation mode: Transmitting

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

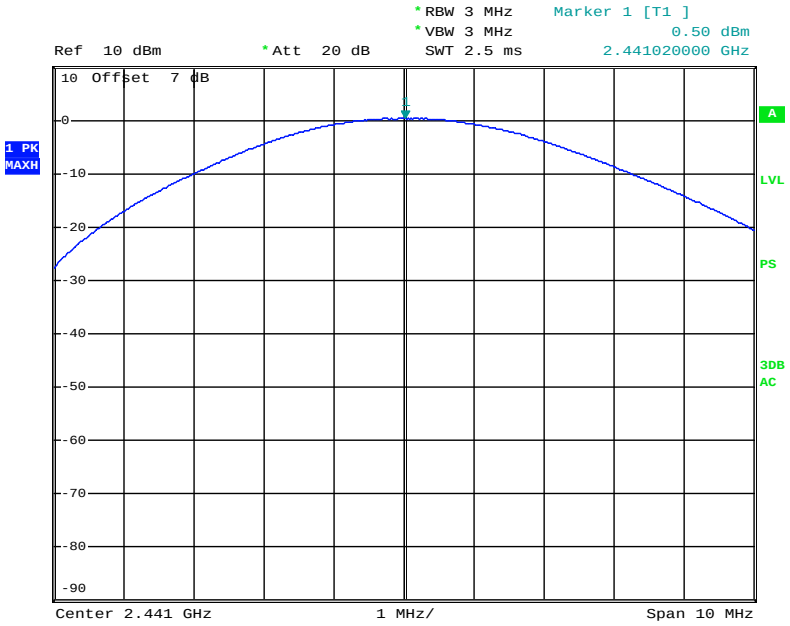
Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	-0.05	0.99	1000
	Middle	2441	0.50	1.12	1000
	High	2480	0.76	1.19	1000
EDR (π/4-DQPSK)	Low	2402	-0.38	0.92	1000
	Middle	2441	0.15	1.04	1000
	High	2480	0.50	1.12	1000
EDR (8DPSK)	Low	2402	0.05	1.01	1000
	Middle	2441	0.34	1.08	1000
	High	2480	0.57	1.14	1000

Note: The data above was tested in conducted mode.

BDR (GFSK): Low Channel

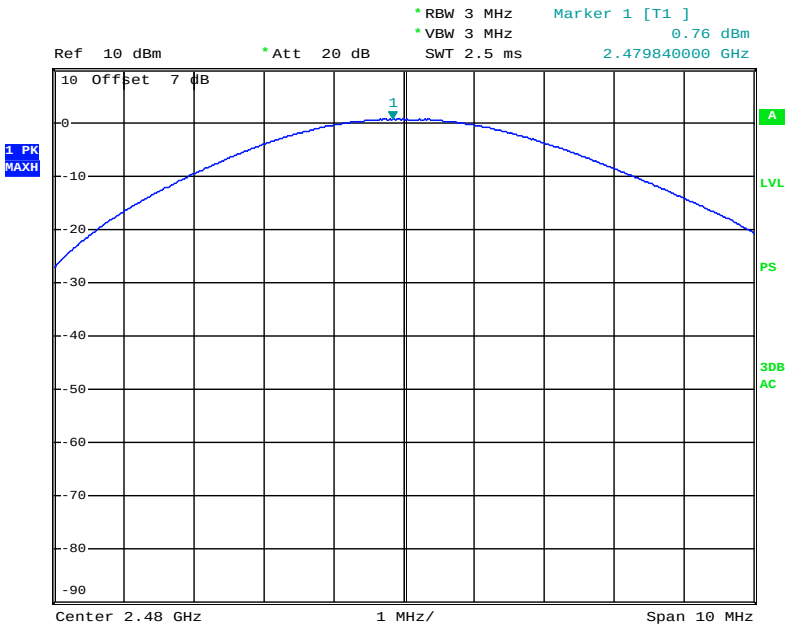


BDR (GFSK): Middle Channel



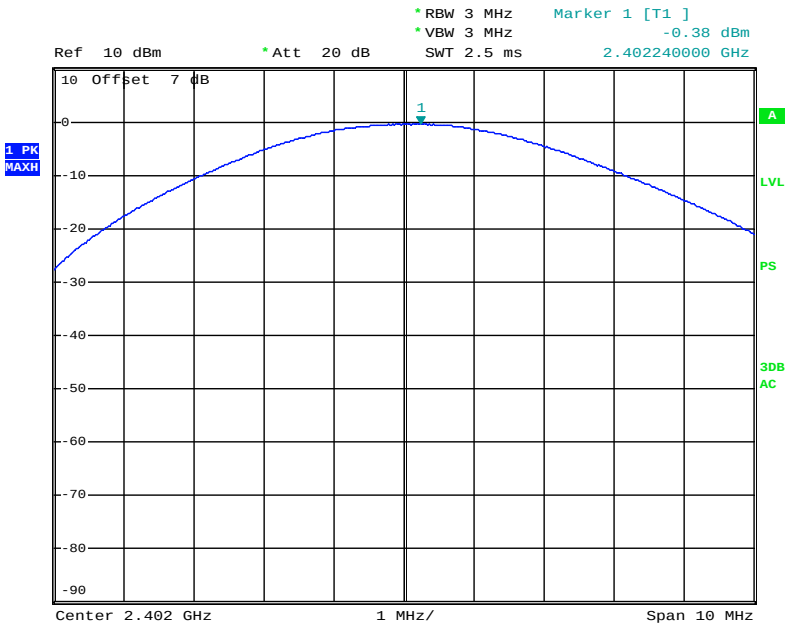
Date: 23.JAN.2013 08:43:25

BDR (GFSK): High Chanel



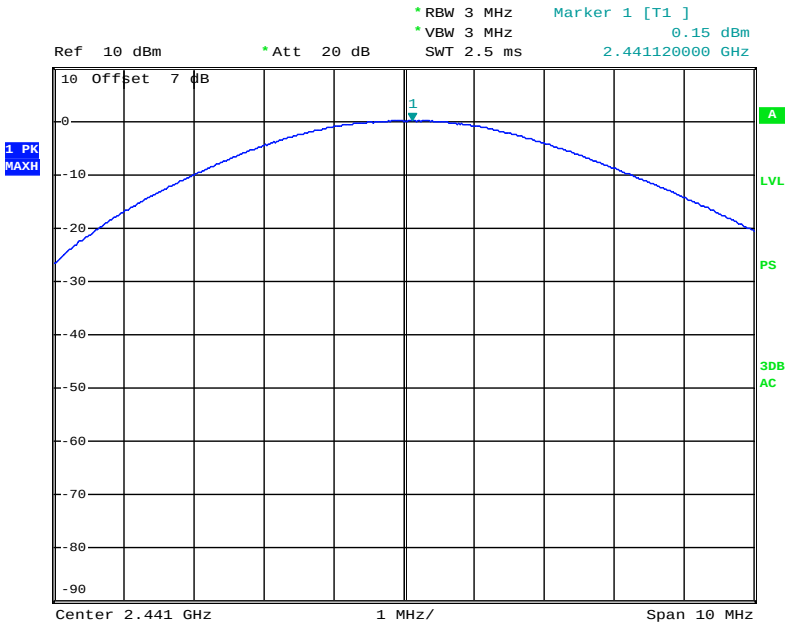
Date: 23.JAN.2013 08:43:54

EDR(π/4-DQPSK): Low Channel



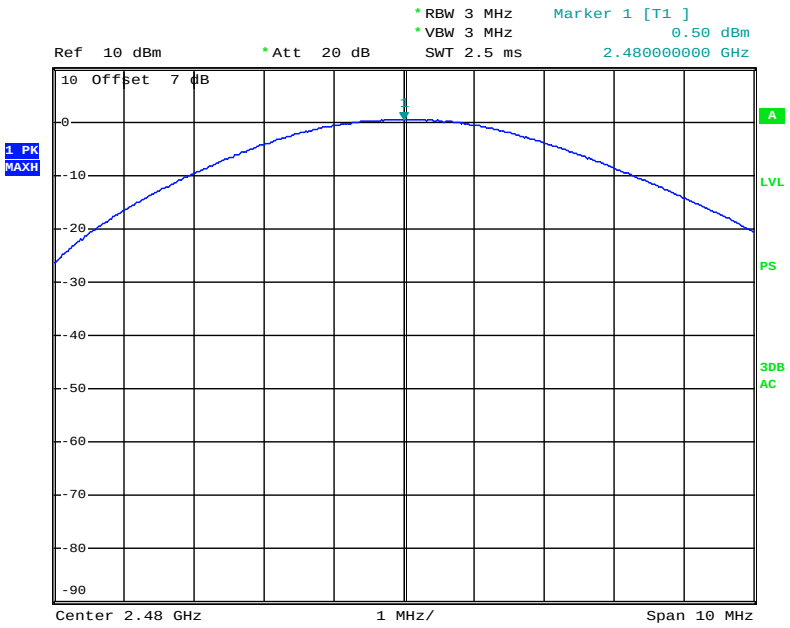
Date: 23.JAN.2013 08:45:05

EDR(π/4-DQPSK): Middle Channel



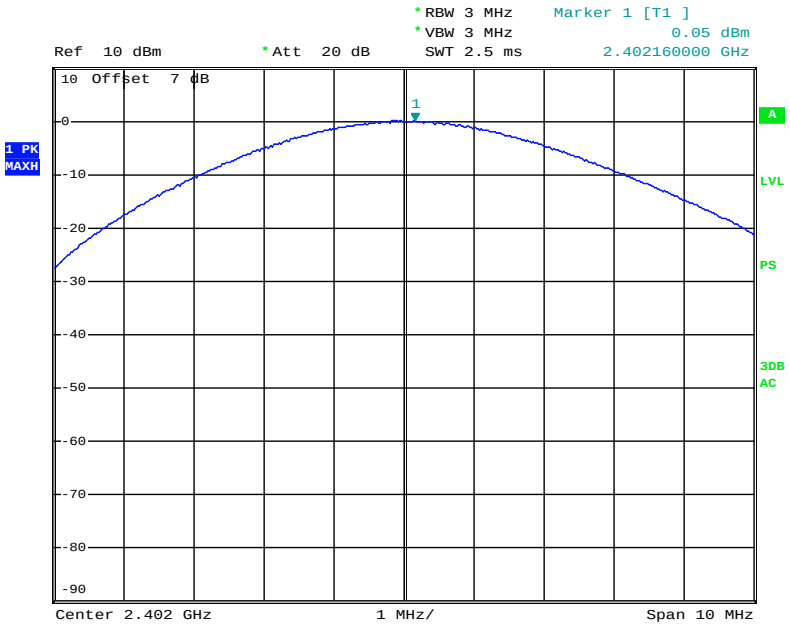
Date: 23.JAN.2013 08:45:39

EDR(π/4-DQPSK): High Chanel



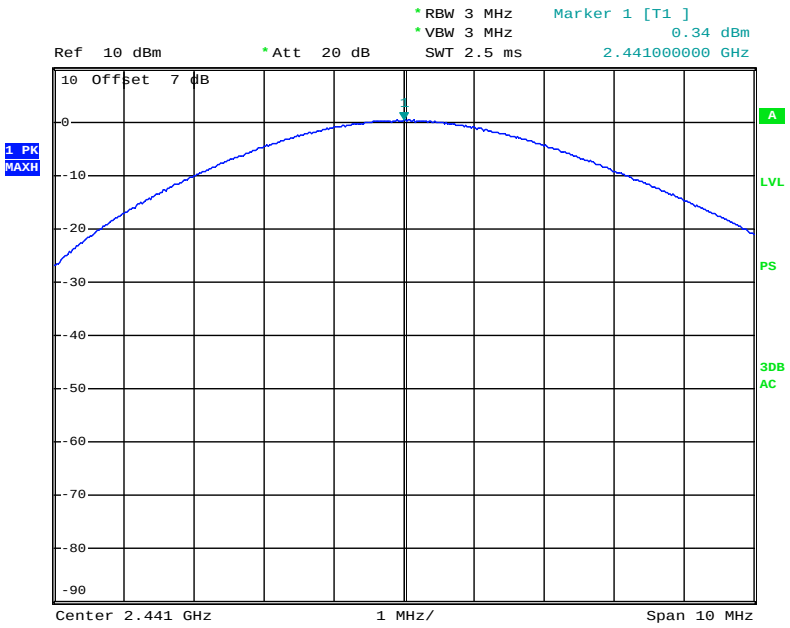
Date: 23.JAN.2013 08:46:25

EDR(8DPSK): Low Channel



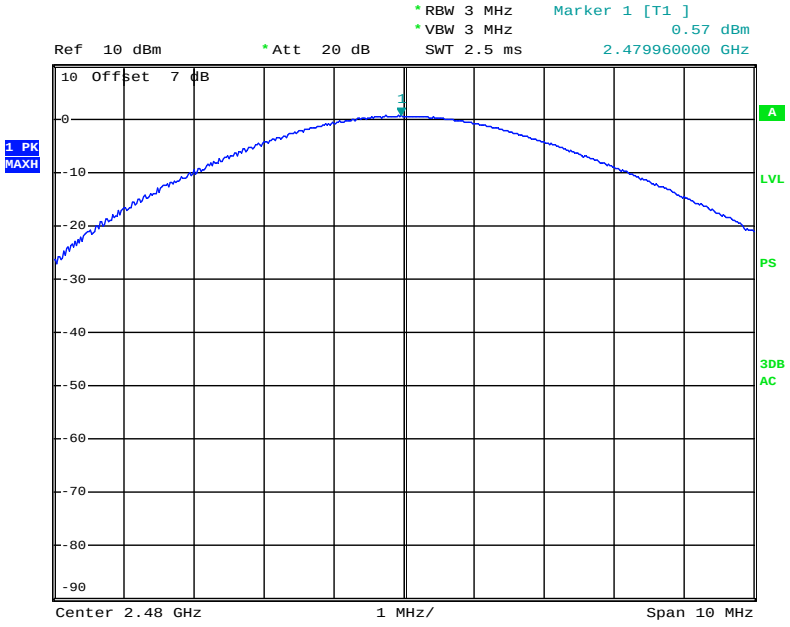
Date: 23.JAN.2013 08:47:02

EDR(8DPSK): Middle Channel



Date: 23.JAN.2013 09:45:44

EDR(8DPSK): High Chanel



Date: 23.JAN.2013 08:52:15

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 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	101122	2012-08-08	2013-08-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

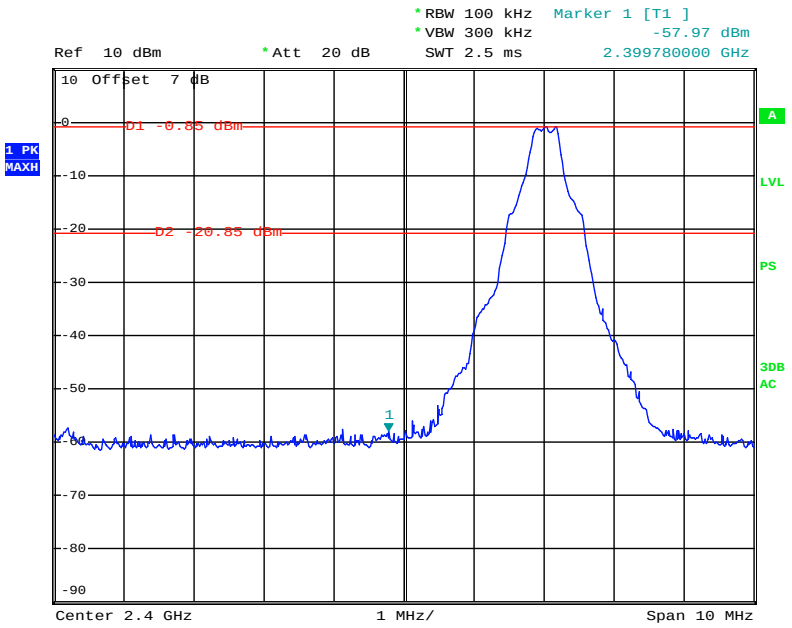
The testing was performed by Tiger Ye on 2013-01-23.

EUT operation mode: Transmitting

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

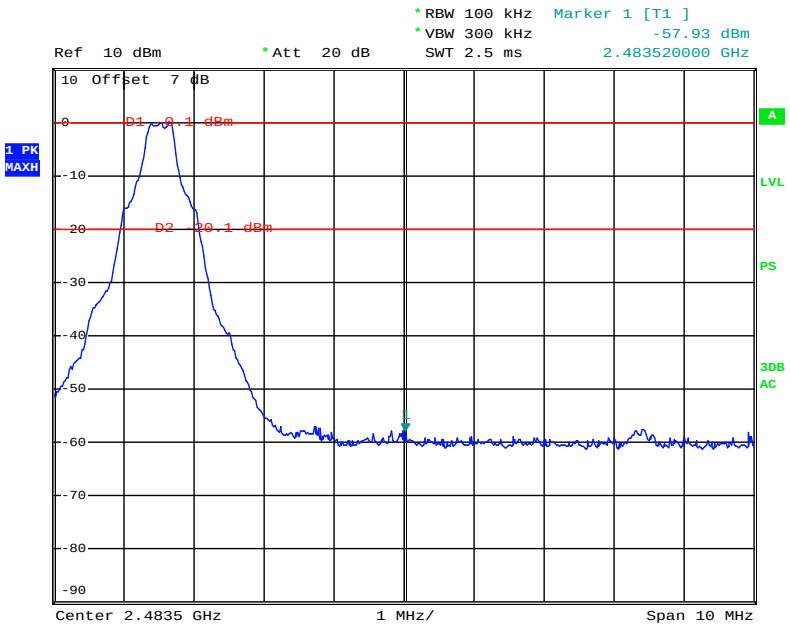
Mode	Frequency Band	Delta Peak to band emission (dBc)	＞Delta Limit (dBc)	Result
BDR (GFSK)	Left-band	57.12	20	Pass
	Right-band	57.83	20	Pass
EDR (π/4-DQPSK)	Left-band	52.95	20	Pass
	Right-band	57.40	20	Pass
EDR (8-DPSK)	Left-band	54.65	20	Pass
	Right-band	57.28	20	Pass

BDR (GFSK): Band Edge-Left Side



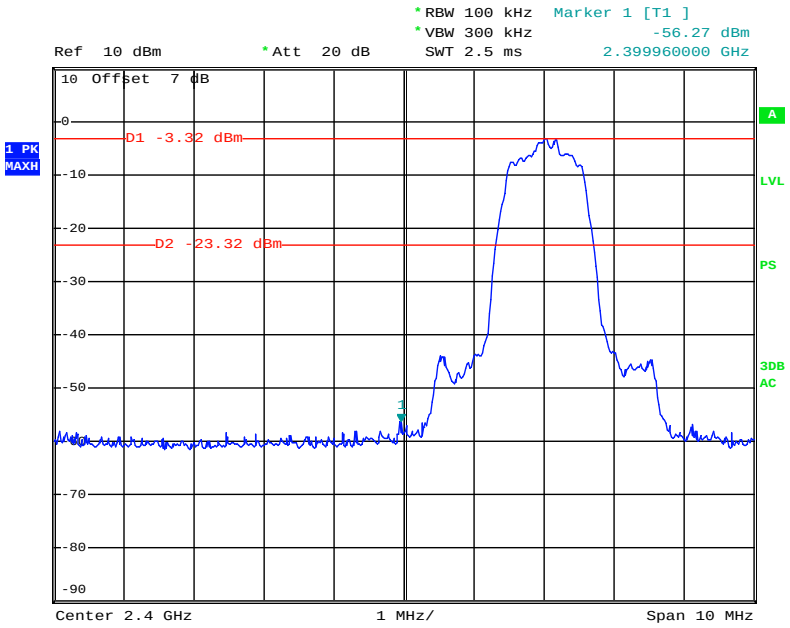
Date: 23.JAN.2013 08:55:05

BDR (GFSK): Band Edge-Right Side



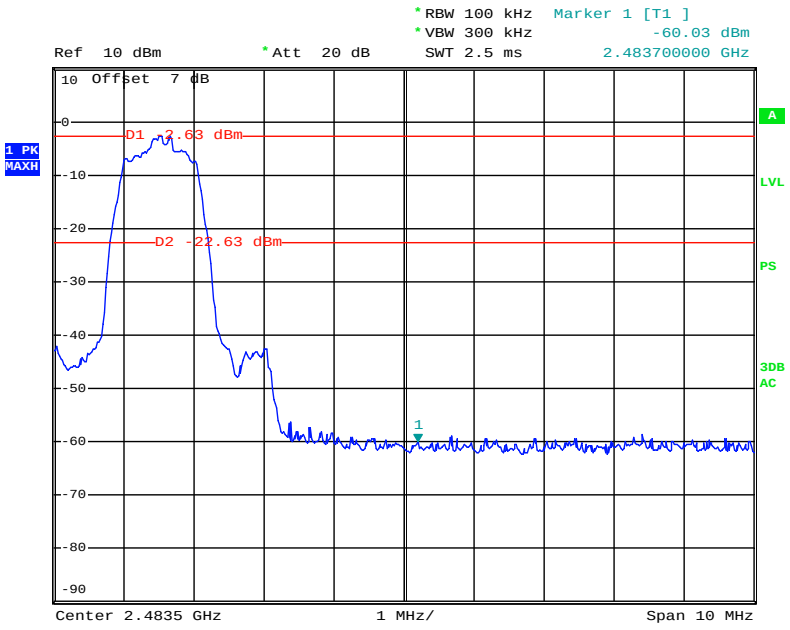
Date: 23.JAN.2013 08:56:41

EDR (π/4-DQPSK): Band Edge-Left Side



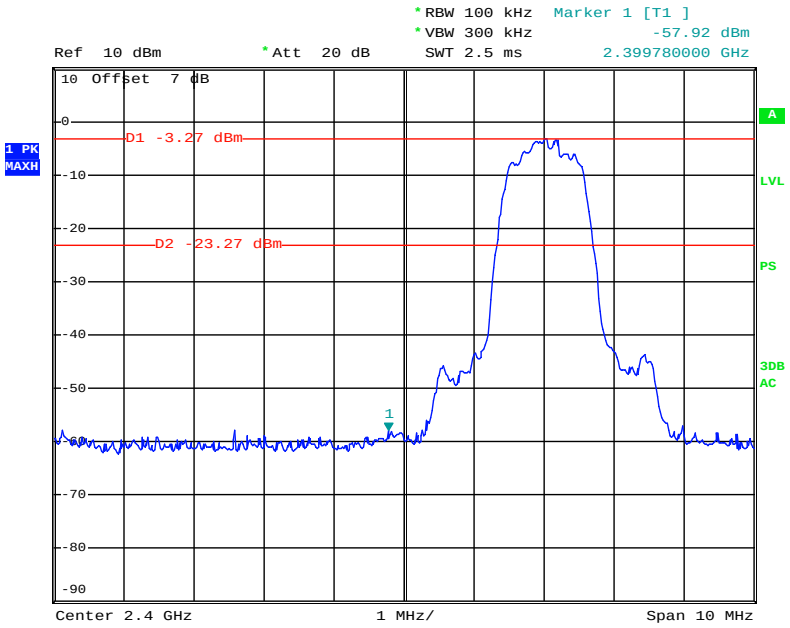
Date: 23.JAN.2013 08:59:32

EDR (π/4-DQPSK): Band Edge-Right Side



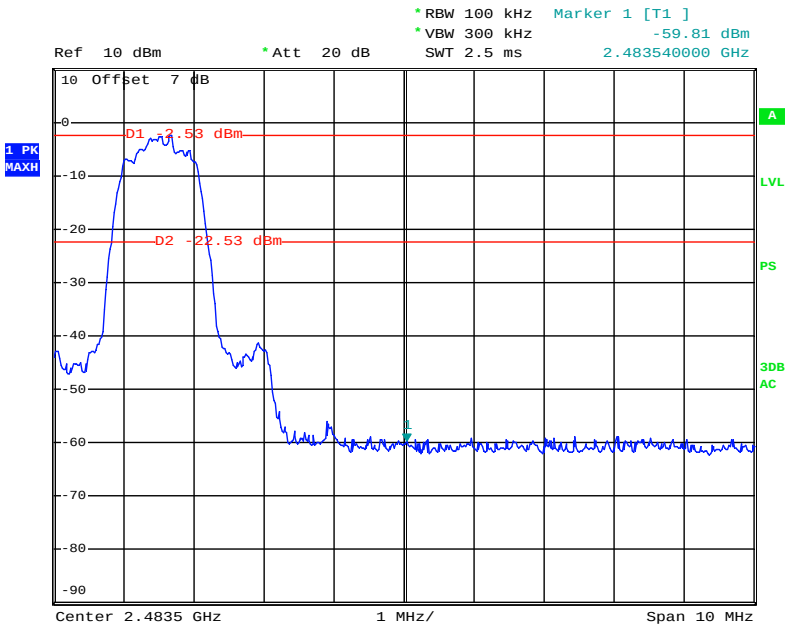
Date: 23.JAN.2013 09:06:19

EDR (8DPSK): Band Edge-Left Side



Date: 23.JAN.2013 09:07:25

EDR (8DPSK): Band Edge-Right Side



Date: 23.JAN.2013 09:08:58

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