

FCC PART 15.247

TEST REPORT

For

Coby Communications Ltd.

Unit C-E, 8/F, PO Shau Centre, 115 How Ming Street, Kwun Tong Kowloon, Hong Kong

FCC ID: S7IMID9762

Report Type: Original Report	Product Type: Mobile Internet Device
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Report Number:	R1DG121130002-00A
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Coby Communications Ltd.*'s product, model number: MID9762 (*FCC ID: S7IMID9762*) or ("EUT") in this report is a Mobile Internet Device, which was measured approximately: 24.0 cm (L) x19.0cm (W) x1.0cm (H), rated input voltage: DC 3.7V from lithium battery or DC 5V form adapter.

Adapter Information: FLYPOWER
MODEL: PS12K0502000UE
INPUT: AC 100-240V, 50/60Hz, 0.35A
OUTPUT: DC 5.0V, 2000mA

** All measurement and test data in this report was gathered from production sample serial number: 121130002 (Assigned by BACL, Dongguan). The EUT was received on 2012-11-30.*

Objective

This report is prepared on behalf of *Coby Communications Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: *S7IMID9762* for Wifi

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. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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

Test Facility

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

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

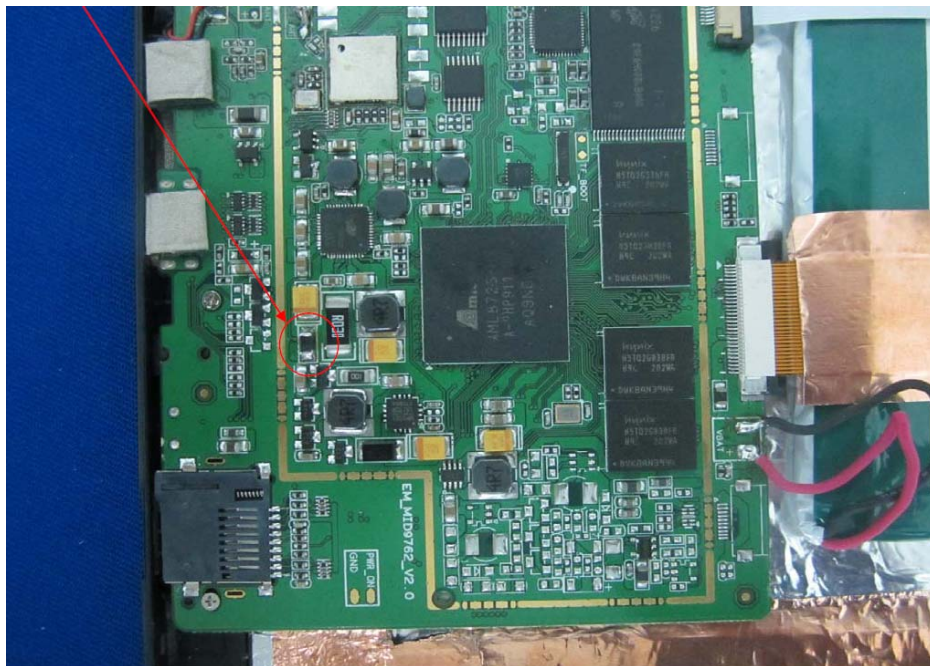
The system was configured for testing in an engineering mode, which was provided by manufacturer.

EUT Exercise Software

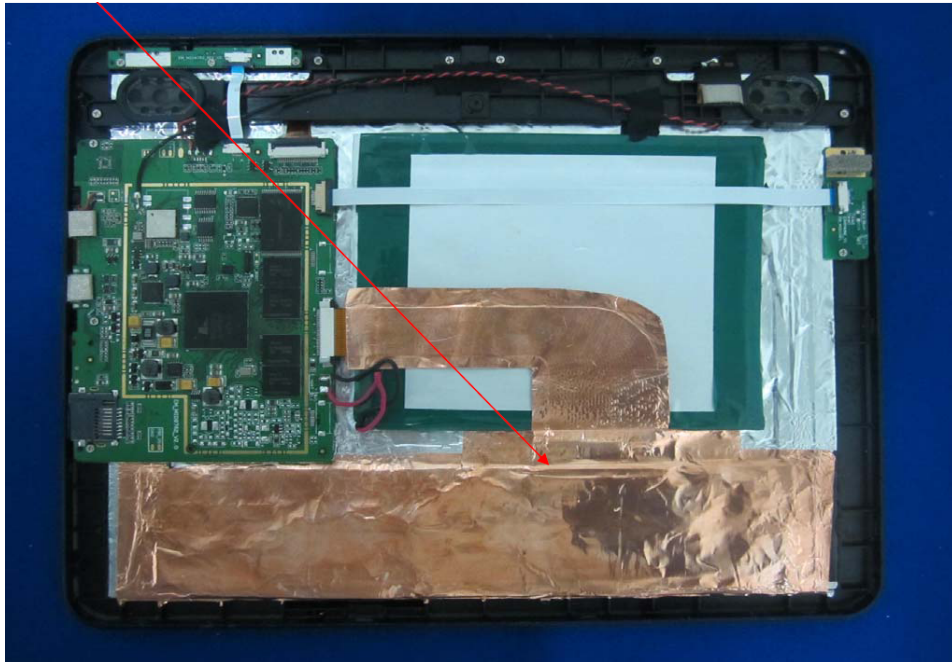
The test was performed under “RF test”, which was provided by the manufacturer.

Equipment Modifications

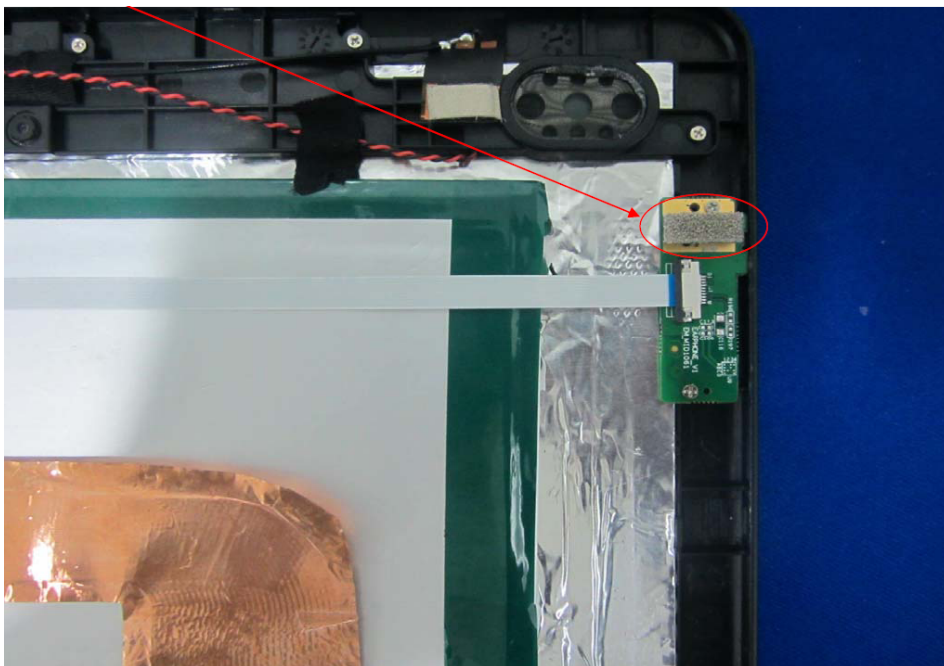
1 Change the element FB24 into 600Ω magnetic bead in the main board. (As shown in the picture below)



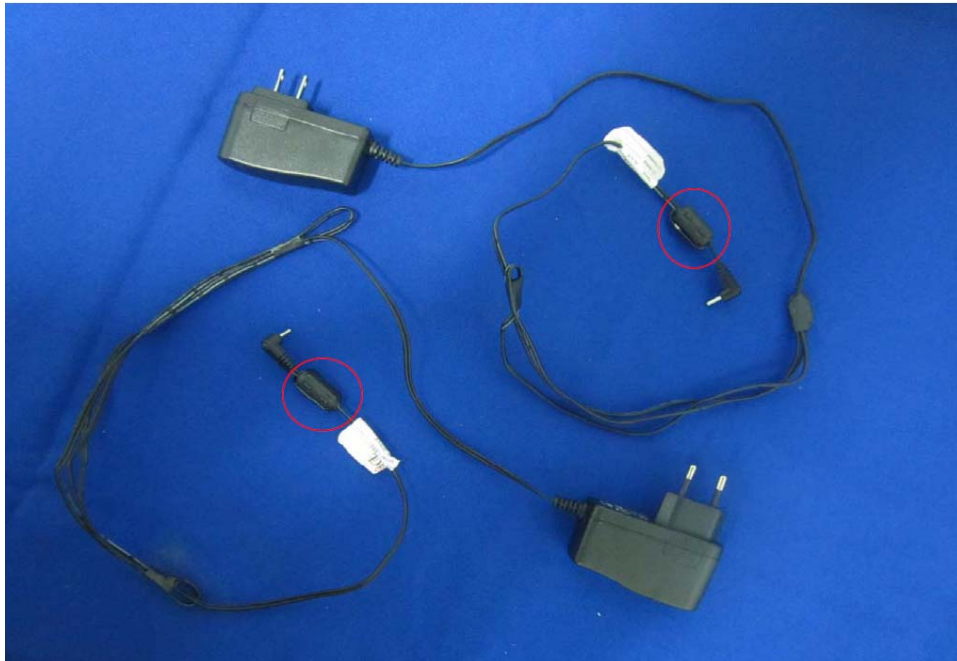
2 Shield the display line and display templates with copper foil. (As shown in the picture below)



3 Attach the conductive foam on the audio output plate. (As shown in the picture below)



4 Add the core on the power output line, and wound one circle. (As shown in the picture below)



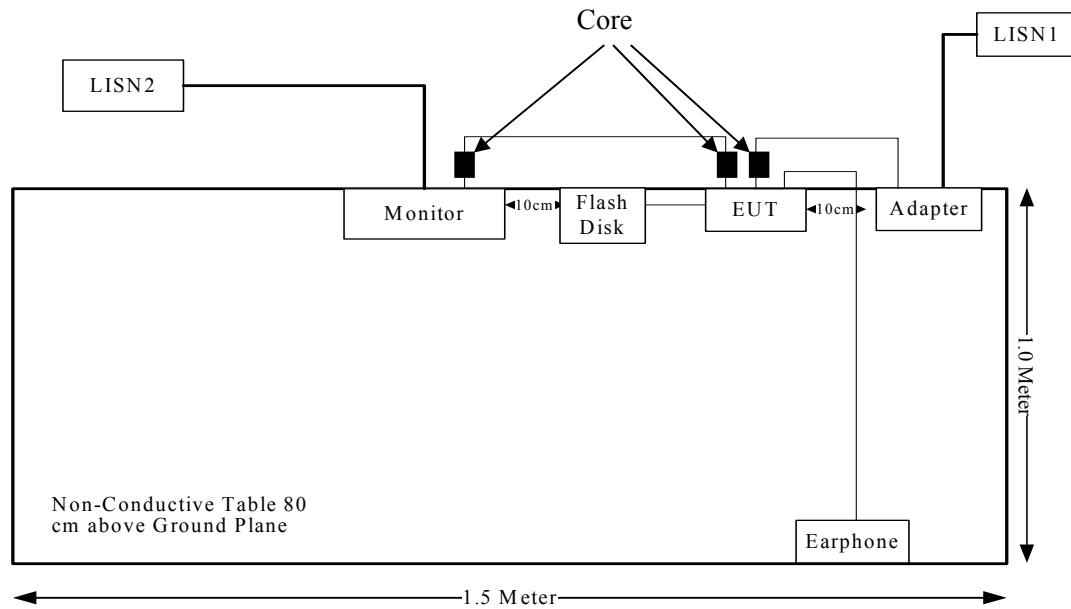
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Monitor	U3011t	CN-OPH5NY-74445-16T-290L
kingston	Flash Disk	DT101	N/A

External Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable HDMI Cable	1.8	HDMI Port of Monitor	EUT
Shielded Detachable USB OTG Cable	0.1	Flash Disk	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307(b) (1), §2.1093	RF EXPOSURE	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1093- RF EXPOSURE

Applicable Standard

According to §15.247(e)(i) 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 $f=2450\text{MHz}$, the output power is less 10mW at distance of 5mm.

Measurement Result

Peak conducted output power= 8.79 dBm

Antenna gain = 1.0 dBi

SAR exclusion threshold 10 mW (10 dBm) > 8.79 dBm

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 Internal Antenna soldered on the print circuit board, which complied with 15.203, the maximum gain is 1.0 dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

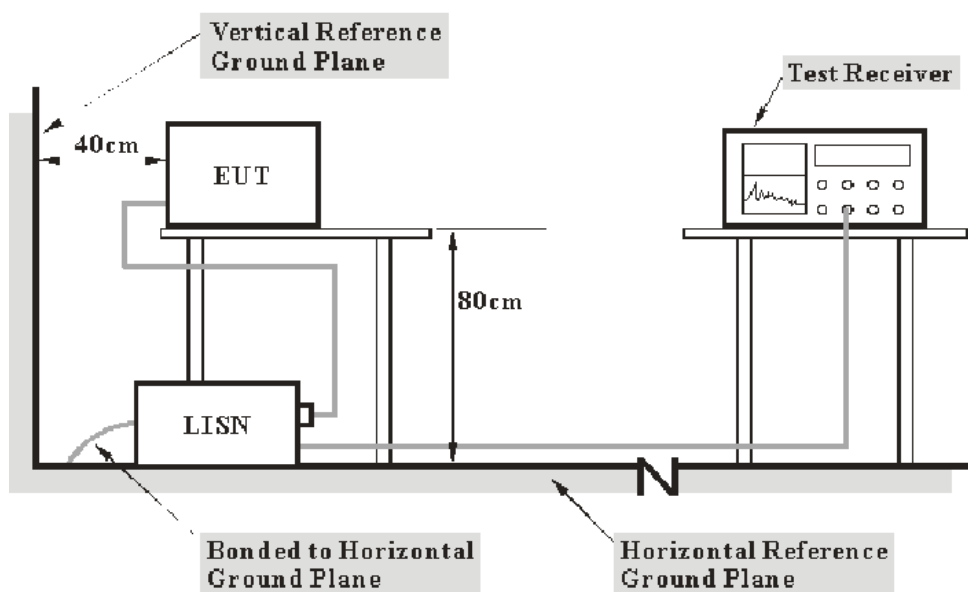
FCC§15.207

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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Dongguan) is ± 2.4 dB ($k=2$, 95% level of confidence), and the uncertainty will not be taken into consideration for all 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:

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

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-11-29	2013-11-28

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:

14.39 dB at 0.450 MHz in the **Neutral** conducted mode.

Test Data

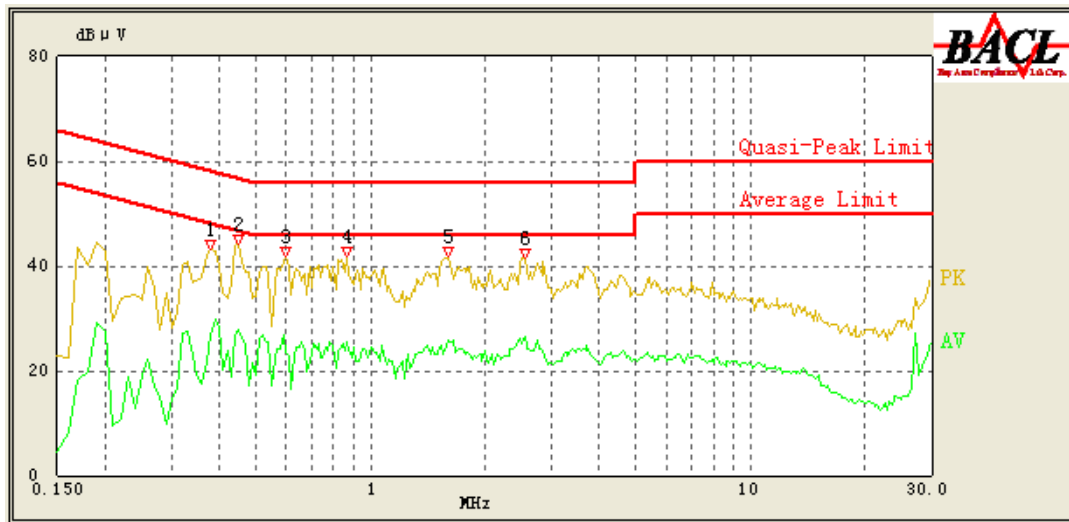
Environmental Conditions

Temperature:	23.2° C
Relative Humidity:	58 %
ATM Pressure:	101.2 kPa

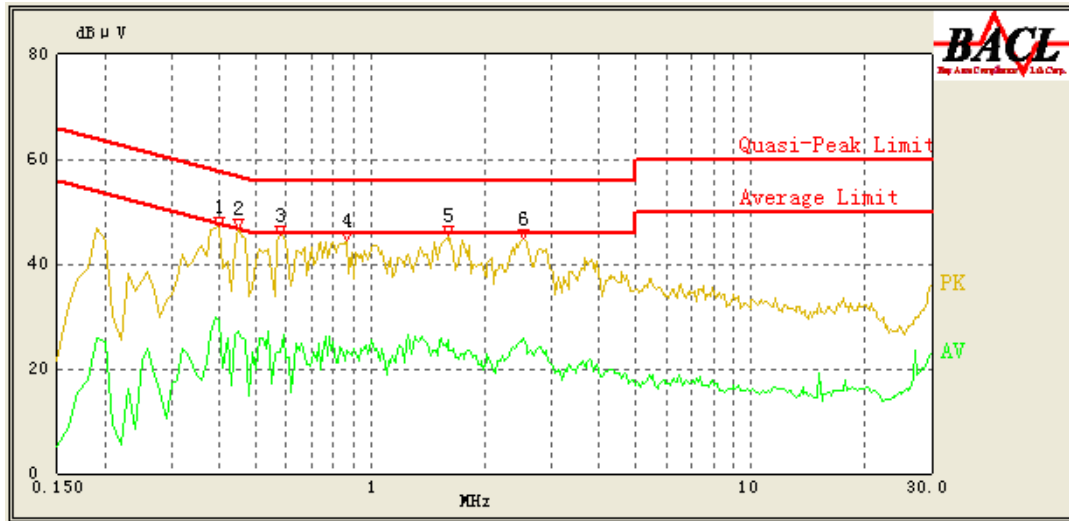
The testing was performed by Leon Chen on 2012-12-05.

Test Mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.600	38.56	0.32	56.00	17.44	QP
0.450	39.28	0.31	57.43	18.15	QP
0.870	37.45	0.32	56.00	18.55	QP
2.550	26.58	0.33	46.00	19.42	AV
0.450	27.83	0.31	47.43	19.60	AV
1.610	36.37	0.35	56.00	19.63	QP
2.550	36.00	0.33	56.00	20.00	QP
0.380	39.37	0.33	59.43	20.06	QP
1.610	25.66	0.35	46.00	20.34	AV
0.870	25.37	0.32	46.00	20.63	AV
0.380	26.90	0.33	49.43	22.53	AV
0.600	23.47	0.32	46.00	22.53	AV

AC 120V/60 Hz, Neutral

Frequency (MHz)	Cord. Reading (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/AV/QP)
0.450	43.04	0.22	57.43	14.39	QP
0.400	43.68	0.22	58.86	15.18	QP
0.870	40.28	0.23	56.00	15.72	QP
0.580	40.02	0.22	56.00	15.98	QP
1.610	39.35	0.25	56.00	16.65	QP
2.530	38.03	0.27	56.00	17.97	QP
0.400	29.05	0.22	48.86	19.81	AV
2.530	25.76	0.27	46.00	20.24	AV
0.450	27.13	0.22	47.43	20.30	AV
1.610	23.64	0.25	46.00	22.36	AV
0.870	23.51	0.23	46.00	22.49	AV
0.580	23.07	0.22	46.00	22.93	AV

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

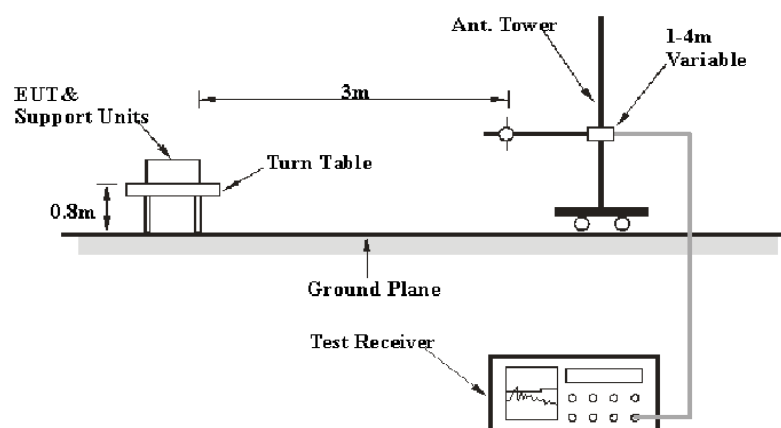
Measurement Uncertainty

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

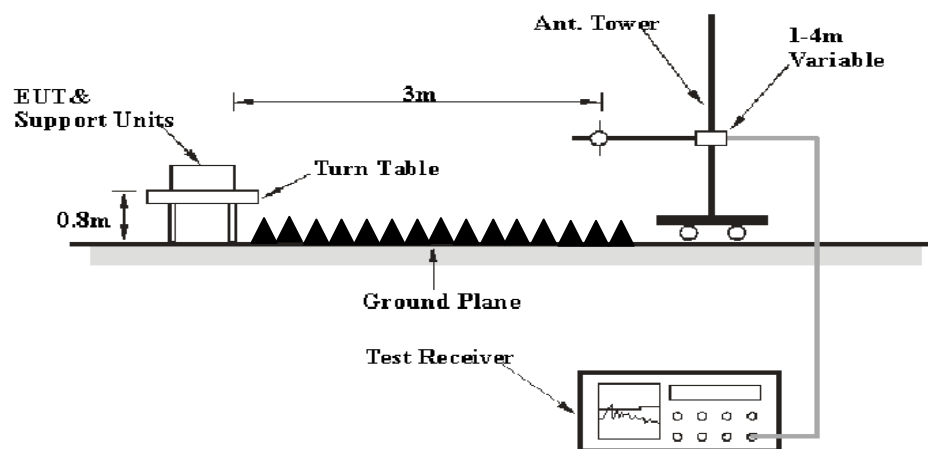
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Dongguan) is 4.0 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup

Below 1GHz:



Above 1GHz:



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

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

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

Test Procedure

For the radiated emissions test, the adapter was connected to the first AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-09-06	2013-09-05
HP	Pre-amplifier	8447E	2434A02181	2012-10-08	2013-10-07
R&S	Spectrum Analyzer	FSEM 30	DE31388	2012-03-15	2013-03-14
ETS-LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2014-09-05
PICOSECOND	Amplifier	5828	2708	N/A	N/A

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Results Summary

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

3.47 dB at 9920 MHz in the Horizontal polarization

Test Data

Environmental Conditions

Temperature:	25.9°C
Relative Humidity:	54%
ATM Pressure:	100.7kPa

The testing was performed by Leon Chen on 2012-12-01.

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
9608	15.47	AV	H	32.96	8.75	6.90	50.28	54.00	3.72*
7206	14.62	AV	H	34.09	6.50	7.08	48.13	54.00	5.87
269.32	44.14	QP	H	13.65	2.00	21.50	38.29	46.00	7.71
4804	16.85	AV	V	30.59	4.67	7.36	44.75	54.00	9.25
9608	29.13	PK	H	32.96	8.75	6.90	63.94	74.00	10.06
1404.7	24.55	AV	V	23.35	2.82	8.87	41.85	54.00	12.15
7206	27.19	PK	H	34.09	6.50	7.08	60.70	74.00	13.30
1404.7	42.37	PK	V	23.35	2.82	8.87	59.67	74.00	14.33
2390	17.13	AV	V	25.61	3.84	8.50	38.08	54.00	15.92
4804	29.1	PK	V	30.59	4.67	7.36	57.00	74.00	17.00
2390	30.68	PK	V	25.61	3.84	8.50	51.63	74.00	22.37
2402	52.21	AV	H	25.65	3.90	8.50	73.26	N/A	N/A
2402	81.06	PK	H	25.65	3.90	8.50	102.11	N/A	N/A
2402	52.44	AV	V	25.65	3.90	8.50	73.49	N/A	N/A
2402	84.31	PK	V	25.65	3.90	8.50	105.36	N/A	N/A
Middle Channel: 2441 (MHz)									
9764	15.49	AV	H	33.33	8.58	6.94	50.46	54.00	3.54 *
7323	14.27	AV	H	34.38	6.72	7.19	48.18	54.00	5.82
269.59	43.75	QP	H	13.67	1.99	21.50	37.91	46.00	8.09
4882	16.94	AV	V	30.79	4.75	7.32	45.16	54.00	8.84
9764	29.08	PK	H	33.33	8.58	6.94	64.05	74.00	9.95
1404.3	23.99	AV	V	23.35	2.82	8.87	41.29	54.00	12.71
7323	27.23	PK	H	34.38	6.72	7.19	61.14	74.00	12.86
1404.3	41.89	PK	V	23.35	2.82	8.87	59.19	74.00	14.81
2233.7	18.75	AV	H	25.21	3.63	9.11	38.48	54.00	15.52
4882	29.31	PK	V	30.79	4.75	7.32	57.53	74.00	16.47
2233.7	32.87	PK	H	25.21	3.63	9.11	52.60	74.00	21.40
2441	52.2	AV	H	25.75	3.99	8.50	73.44	N/A	N/A
2441	80.42	PK	H	25.75	3.99	8.50	101.66	N/A	N/A
2441	52.63	AV	V	25.75	3.99	8.50	73.87	N/A	N/A
2441	83.38	PK	V	25.75	3.99	8.50	104.62	N/A	N/A

High Channel: 2480(MHz)									
9920	15.28	AV	H	33.71	8.41	6.97	50.43	54.00	3.57*
7440	14.64	AV	H	34.66	6.95	7.30	48.95	54.00	5.05
270.13	44.06	QP	H	13.69	1.98	21.50	38.23	46.00	7.77
4960	16.94	AV	V	31.00	4.70	7.27	45.37	54.00	8.63
9920	29.34	PK	H	33.71	8.41	6.97	64.49	74.00	9.51
7440	27.42	PK	H	34.66	6.95	7.30	61.73	74.00	12.27
1403.8	23.87	AV	V	23.35	2.81	8.87	41.16	54.00	12.84
1403.8	42.22	PK	V	23.35	2.81	8.87	59.51	74.00	14.49
2483.5	37.43	PK	V	25.86	3.80	8.50	58.59	74.00	15.41
4960	29.31	PK	V	31.00	4.70	7.27	57.74	74.00	16.26
2483.5	15.96	AV	V	25.86	3.80	8.50	37.12	54.00	16.88
2480	52.18	AV	H	25.85	3.82	8.50	73.35	N/A	N/A
2480	80.21	PK	H	25.85	3.82	8.50	101.38	N/A	N/A
2480	52.34	AV	V	25.85	3.82	8.50	73.51	N/A	N/A
2480	83.38	PK	V	25.85	3.82	8.50	104.55	N/A	N/A

*Within measurement uncertainty!

EDR Mode ($\pi/4$ -DQPSK):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
9608	15.42	AV	H	32.96	8.75	6.90	50.23	54.00	3.77*
7206	14.38	AV	H	34.09	6.50	7.08	47.89	54.00	6.11
269.32	44.17	QP	H	13.65	2.00	21.50	38.32	46.00	7.68
9608	28.79	PK	H	32.96	8.75	6.90	63.60	74.00	10.40
1404.05	46.29	PK	V	23.35	2.81	8.87	63.58	74.00	10.42
4804	15.13	AV	V	30.59	4.67	7.36	43.03	54.00	10.97
1404.05	23.74	AV	V	23.35	2.81	8.87	41.03	54.00	12.97
7206	27.03	PK	H	34.09	6.50	7.08	60.54	74.00	13.46
4804	29.26	PK	V	30.59	4.67	7.36	57.16	74.00	16.84
2390	15.57	AV	V	25.61	3.84	8.50	36.52	54.00	17.48
2390	30.19	PK	V	25.61	3.84	8.50	51.14	74.00	22.86
2402	55.11	AV	H	25.65	3.90	8.50	76.16	N/A	N/A
2402	80.31	PK	H	25.65	3.90	8.50	101.36	N/A	N/A
2402	56.5	AV	V	25.65	3.90	8.50	77.55	N/A	N/A
2402	84.7	PK	V	25.65	3.90	8.50	105.75	N/A	N/A
Middle Channel: 2441 (MHz)									
9764	15.97	AV	H	33.33	8.58	6.94	50.94	54.00	3.06*
7323	14.27	AV	H	34.38	6.72	7.19	48.18	54.00	5.82
269.59	43.94	QP	H	13.67	1.99	21.50	38.10	46.00	7.90
4882	15.74	AV	V	30.79	4.75	7.32	43.96	54.00	10.04
9764	28.98	PK	H	33.33	8.58	6.94	63.95	74.00	10.05
7323	26.86	PK	H	34.38	6.72	7.19	60.77	74.00	13.23
2263.5	19.43	AV	H	25.29	3.83	9.11	39.44	54.00	14.56
2263.5	38.72	PK	H	25.29	3.83	9.11	58.73	74.00	15.27
4882	29.33	PK	V	30.79	4.75	7.32	57.55	74.00	16.45
1404.2	18.16	AV	V	23.35	2.82	8.87	35.46	54.00	18.54
1404.2	35.61	PK	V	23.35	2.82	8.87	52.91	74.00	21.09
2441	55.33	AV	H	25.75	3.99	8.50	76.57	N/A	N/A
2441	81.5	PK	H	25.75	3.99	8.50	102.74	N/A	N/A
2441	55.97	AV	V	25.75	3.99	8.50	77.21	N/A	N/A
2441	84.07	PK	V	25.75	3.99	8.50	105.31	N/A	N/A

High Channel: 2480(MHz)									
9920	15.18	AV	H	33.71	8.41	6.97	50.33	54.00	3.67*
7440	13.98	AV	H	34.66	6.95	7.30	48.29	54.00	5.71
270.13	43.82	QP	H	13.69	1.98	21.50	37.99	46.00	8.01
9920	29.03	PK	H	33.71	8.41	6.97	64.18	74.00	9.82
4960	15.56	AV	V	31.00	4.70	7.27	43.99	54.00	10.01
1402.8	45.75	PK	V	23.35	2.81	8.87	63.04	74.00	10.96
7440	27.49	PK	H	34.66	6.95	7.30	61.80	74.00	12.20
1402.8	23.77	AV	V	23.35	2.81	8.87	41.06	54.00	12.94
2483.5	19.8	AV	V	25.86	3.80	8.50	40.96	54.00	13.04
2483.5	37.06	PK	V	25.86	3.80	8.50	58.22	74.00	15.78
4960	29.12	PK	V	31.00	4.70	7.27	57.55	74.00	16.45
2480	55.3	AV	H	25.85	3.82	8.50	76.47	N/A	N/A
2480	81.74	PK	H	25.85	3.82	8.50	102.91	N/A	N/A
2480	56.02	AV	V	25.85	3.82	8.50	77.19	N/A	N/A
2480	84.1	PK	V	25.85	3.82	8.50	105.27	N/A	N/A

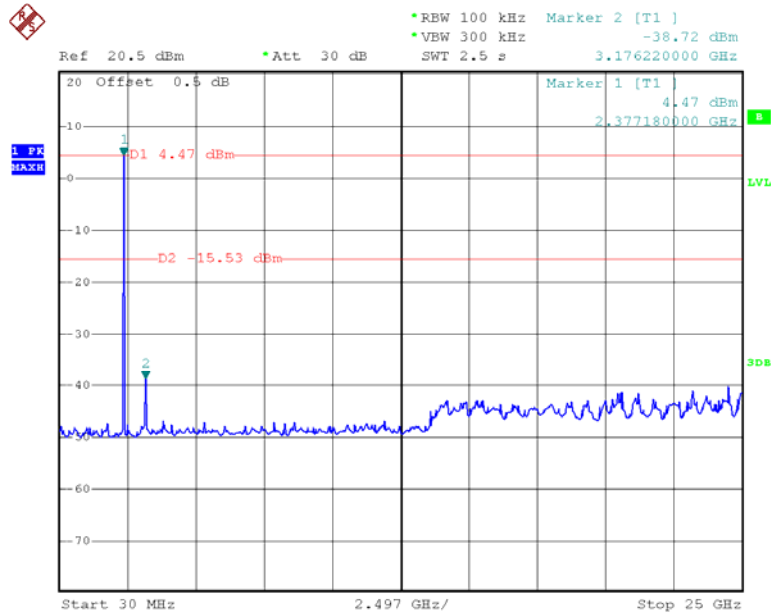
*Within measurement uncertainty!

EDR Mode (8DPSK):

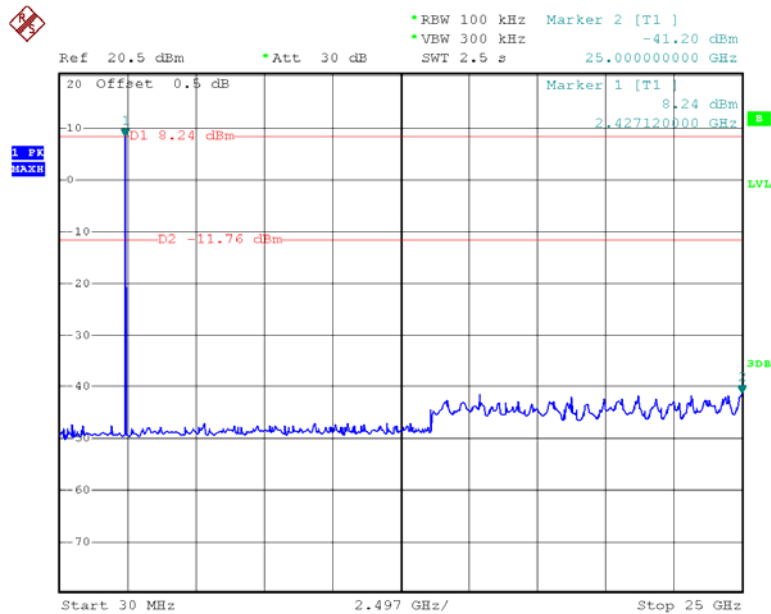
Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
9608	15.43	AV	H	32.96	8.75	6.90	50.24	54.00	3.76*
7206	14.35	AV	H	34.09	6.50	7.08	47.86	54.00	6.14
269.32	44.09	QP	H	13.65	2.00	21.50	38.24	46.00	7.76
4804	17.88	AV	V	30.59	4.67	7.36	45.78	54.00	8.22
9608	28.99	PK	H	32.96	8.75	6.90	63.80	74.00	10.20
1404.4	24.56	AV	V	23.35	2.82	8.87	41.86	54.00	12.14
1404.4	43.88	PK	V	23.35	2.82	8.87	61.18	74.00	12.82
7206	27.15	PK	H	34.09	6.50	7.08	60.66	74.00	13.34
2390	17.08	AV	V	25.61	3.84	8.50	38.03	54.00	15.97
4804	29.84	PK	V	30.59	4.67	7.36	57.74	74.00	16.26
2390	30.46	PK	V	25.61	3.84	8.50	51.41	74.00	22.59
2402	66.57	AV	H	25.65	3.90	8.50	87.62	N/A	N/A
2402	81.23	PK	H	25.65	3.90	8.50	102.28	N/A	N/A
2402	68.65	AV	V	25.65	3.90	8.50	89.70	N/A	N/A
2402	84.21	PK	V	25.65	3.90	8.50	105.26	N/A	N/A
Middle Channel: 2441 (MHz)									
9764	15.37	AV	H	33.33	8.58	6.94	50.34	54.00	3.66 *
7323	13.96	AV	H	34.38	6.72	7.19	47.87	54.00	6.13
4882	17.96	AV	V	30.79	4.75	7.32	46.18	54.00	7.82
269.59	43.87	QP	H	13.67	1.99	21.50	38.03	46.00	7.97
9764	28.86	PK	H	33.33	8.58	6.94	63.83	74.00	10.17
1404.03	24.65	AV	V	23.35	2.81	8.87	41.94	54.00	12.06
7323	26.92	PK	H	34.38	6.72	7.19	60.83	74.00	13.17
2276.5	18.12	AV	H	25.32	3.93	9.11	38.26	54.00	15.74
4882	29.89	PK	V	30.79	4.75	7.32	58.11	74.00	15.89
1404.03	40.74	PK	V	23.35	2.81	8.87	58.03	74.00	15.97
2276.5	33.51	PK	H	25.32	3.93	9.11	53.65	74.00	20.35
2441	66.38	AV	H	25.75	3.99	8.50	87.62	N/A	N/A
2441	81.29	PK	H	25.75	3.99	8.50	102.53	N/A	N/A
2441	68.41	AV	V	25.75	3.99	8.50	89.65	N/A	N/A
2441	83.86	PK	V	25.75	3.99	8.50	105.10	N/A	N/A

High Channel: 2480(MHz)									
9920	15.35	AV	H	33.71	8.41	6.94	50.53	54.00	3.47*
7440	14.38	AV	H	34.66	6.95	7.30	48.69	54.00	5.31
2483.5	27.39	AV	V	25.86	3.80	8.50	48.55	54.00	5.45
4960	17.92	AV	V	31.00	4.70	7.27	46.35	54.00	7.65
270.13	44.14	QP	H	13.69	1.98	21.50	38.31	46.00	7.69
9920	29.12	PK	H	33.71	8.41	6.94	64.30	74.00	9.70
1404.01	44.95	PK	V	23.35	2.81	8.87	62.24	74.00	11.76
1404.01	24.76	AV	V	23.35	2.81	8.87	42.05	54.00	11.95
7440	27.18	PK	H	34.66	6.95	7.30	61.49	74.00	12.51
4960	29.77	PK	V	31.00	4.70	7.27	58.20	74.00	15.80
2483.5	36.57	PK	V	25.86	3.80	8.50	57.73	74.00	16.27
2480	66.22	AV	H	25.85	3.82	8.50	87.39	N/A	N/A
2480	81.17	PK	H	25.85	3.82	8.50	102.34	N/A	N/A
2480	68.25	AV	V	25.85	3.82	8.50	89.42	N/A	N/A
2480	83.84	PK	V	25.85	3.82	8.50	105.01	N/A	N/A

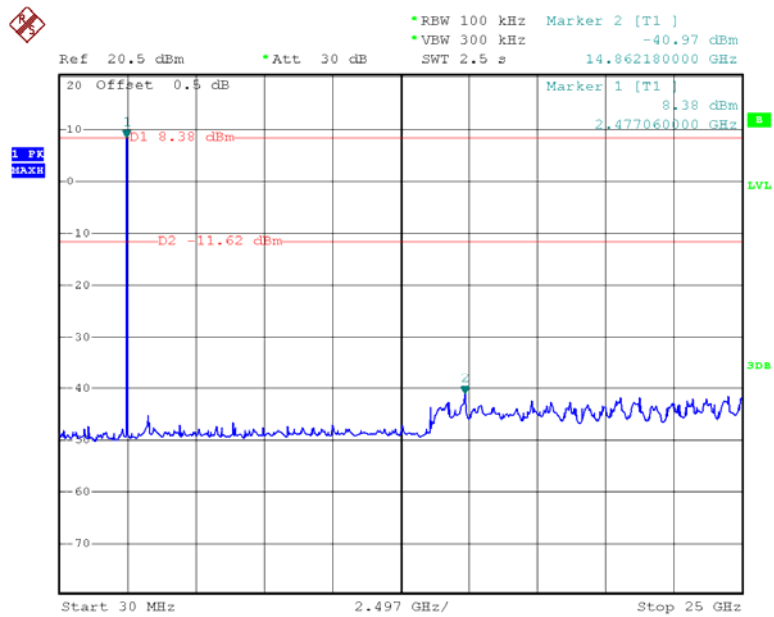
*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port**BDR Mode (GFSK):****Low Channel**

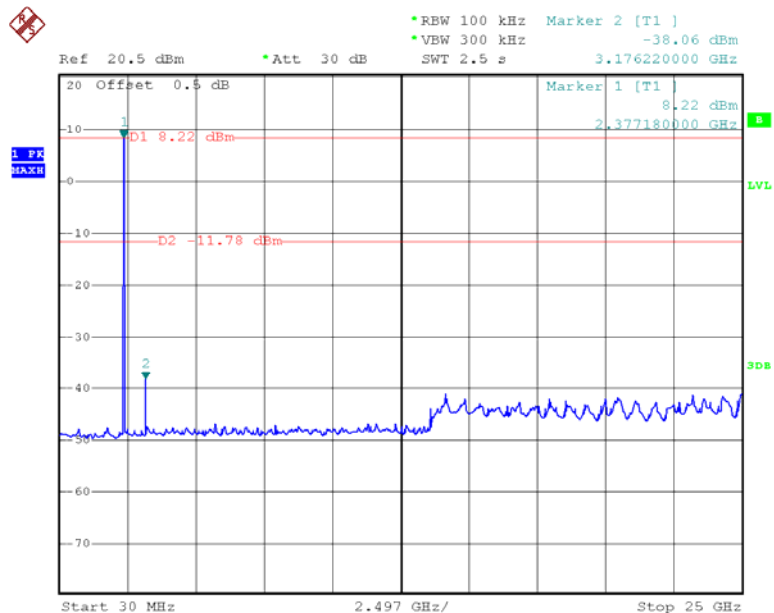
Date: 1.DEC.2012 16:40:44

Middle Channel

Date: 1.DEC.2012 16:39:23

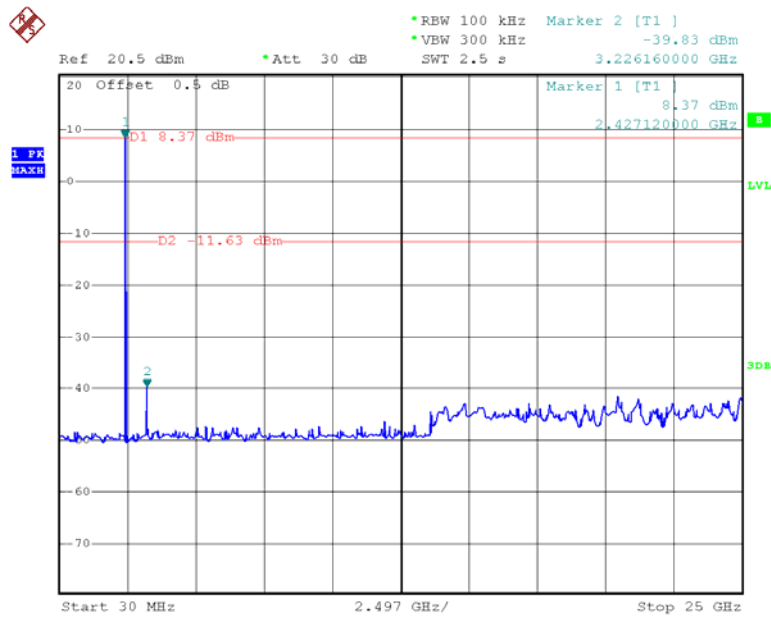
High Channel

Date: 1.DEC.2012 16:37:37

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

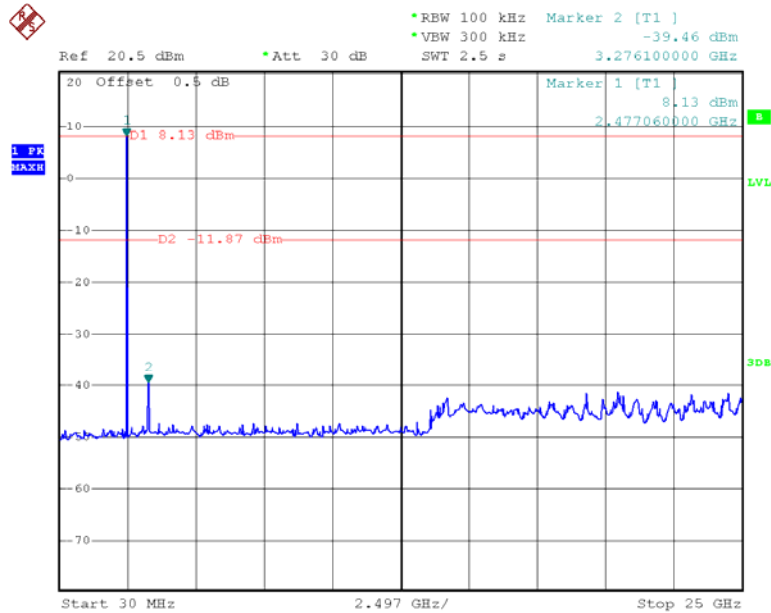
Date: 1.DEC.2012 17:56:00

Middle Channel

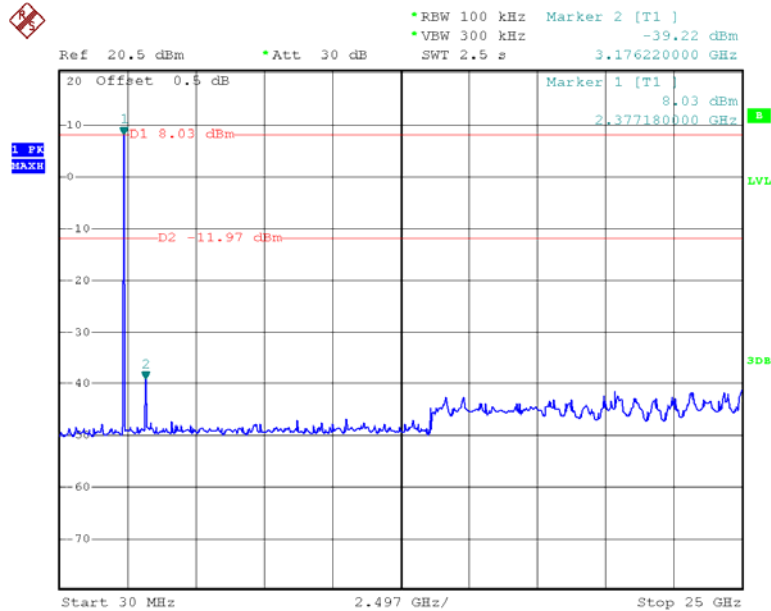


Date: 1.DEC.2012 17:56:34

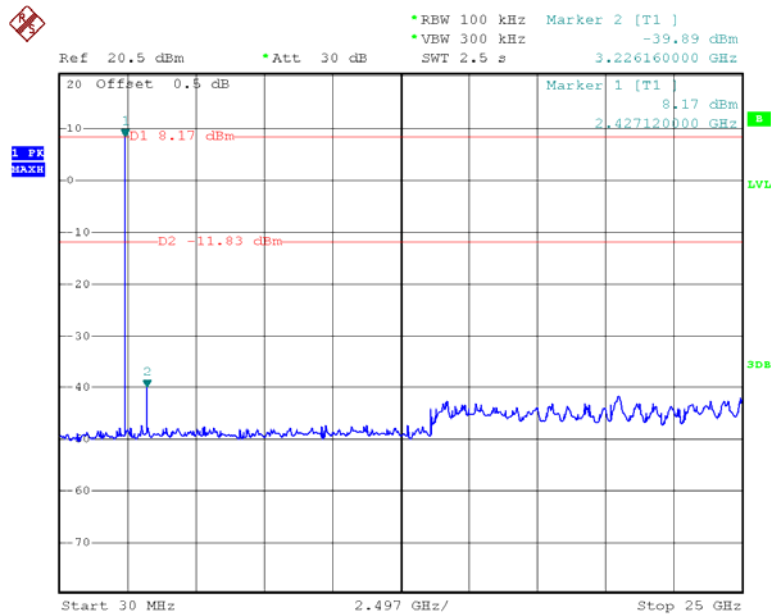
High Channel



Date: 1.DEC.2012 17:57:17

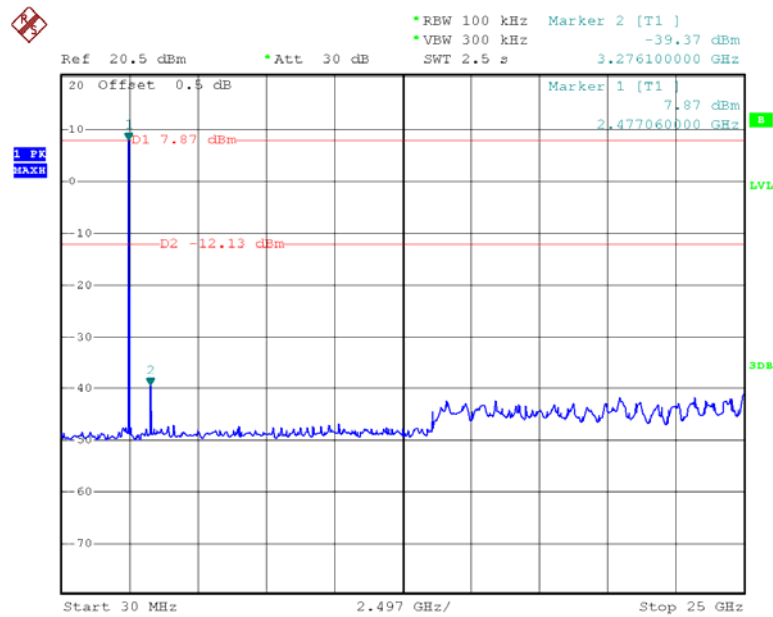
EDR Mode (8DPSK):**Low Channel**

Date: 1.DEC.2012 18:30:30

Middle Channel

Date: 1.DEC.2012 18:31:20

High Channel



Date: 1.DEC.2012 18:32:32

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

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	22.9 °C
Relative Humidity:	57 %
ATM Pressure:	101.2 kPa

* The testing was performed by Leon Chen on 2012-12-01.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR Mode (GFSK)	Low	2402	1.004	0.59	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.57	Pass
	Adjacent	2440			
	High	2480	1.004	0.59	Pass
	Adjacent	2479			
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	1.000	0.95	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.95	Pass
	Adjacent	2440			
	High	2480	1.000	0.95	Pass
	Adjacent	2479			
EDR Mode (8DPSK)	Low	2402	1.000	0.94	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.94	Pass
	Adjacent	2440			
	High	2480	1.000	0.94	Pass
	Adjacent	2479			

BDR Mode (GFSK):**Low Channel**

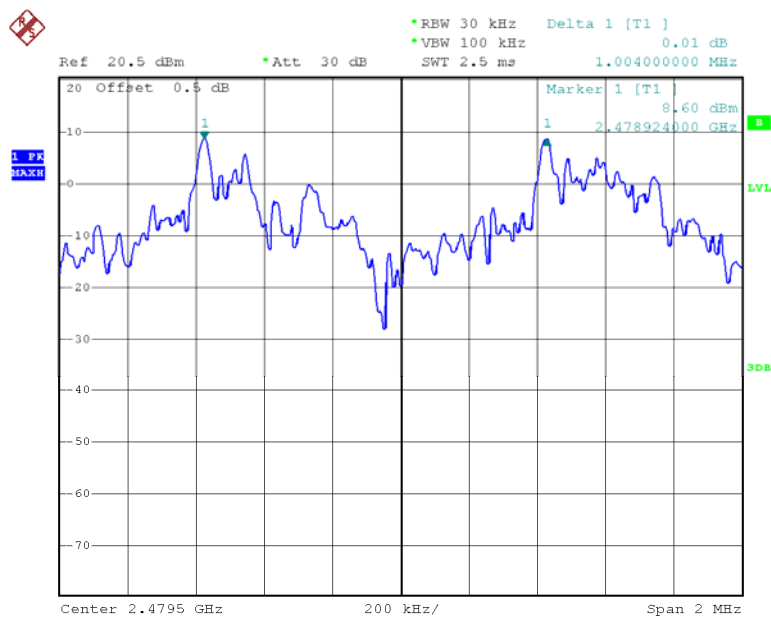
Date: 1.DEC.2012 16:45:45

Middle Channel

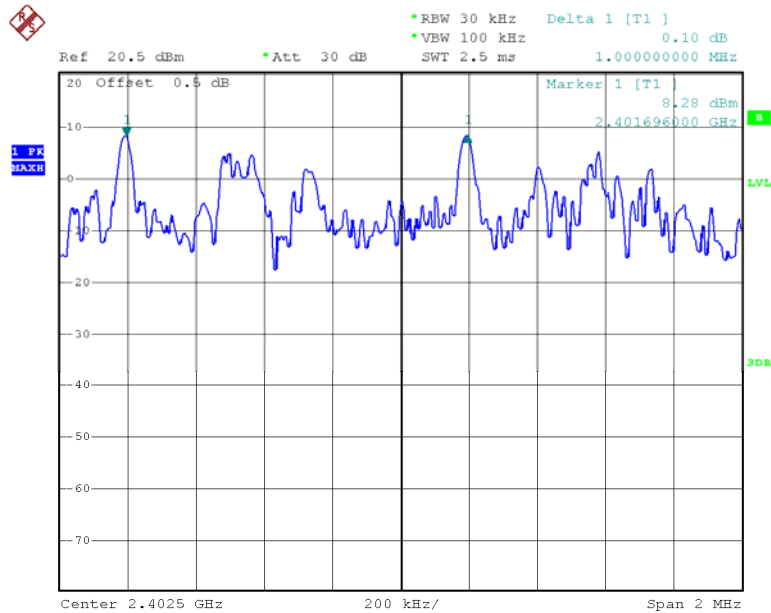


Date: 1.DEC.2012 16:48:10

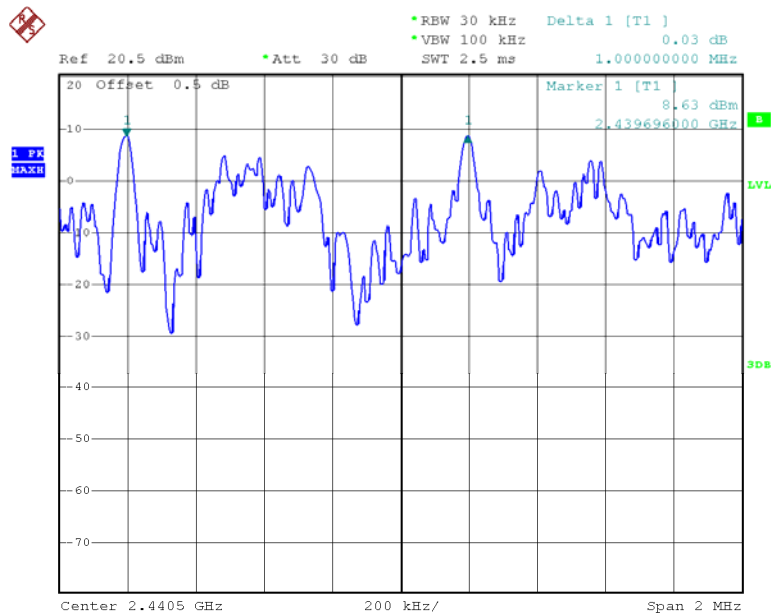
High Channel



Date: 1.DEC.2012 16:52:46

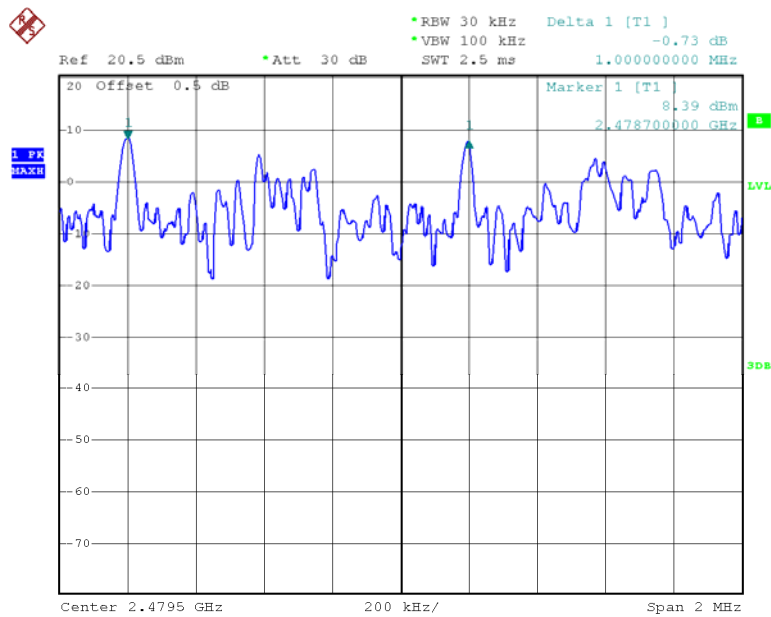
EDR Mode ($\pi/4$ -DQPSK):**Low Channel**

Date: 1.DEC.2012 18:00:24

Middle Channel

Date: 1.DEC.2012 18:01:34

High Channel



Date: 1.DEC.2012 18:02:51

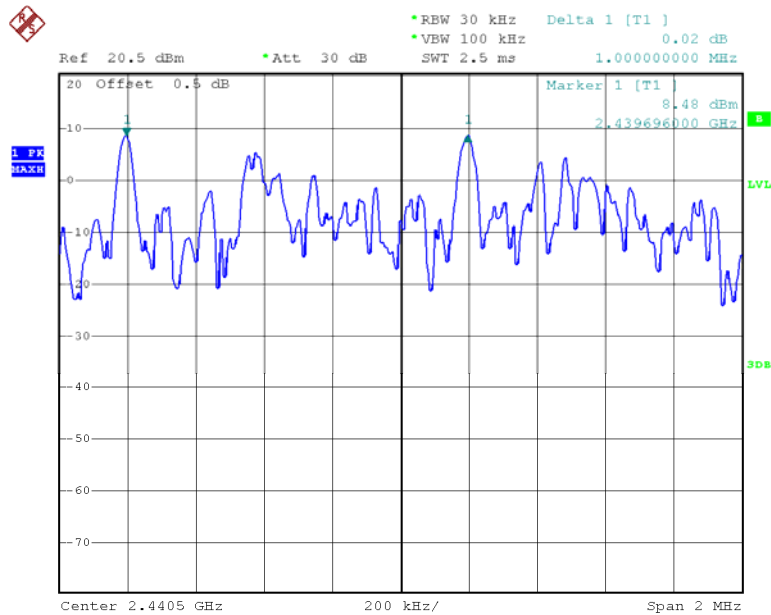
EDR Mode (8DPSK):

Low Channel



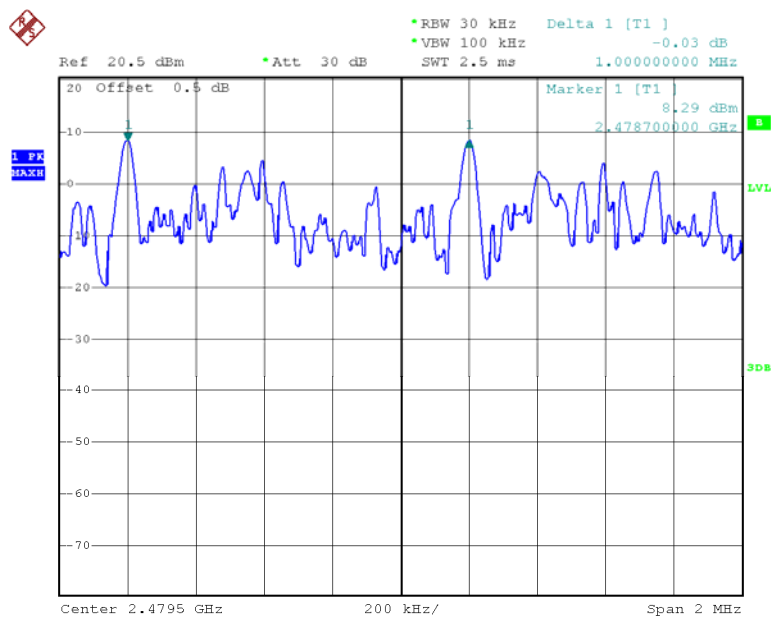
Date: 1.DEC.2012 18:35:22

Middle Channel



Date: 1.DEC.2012 18:37:19

High Channel



Date: 1.DEC.2012 18:39:34

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING**Applicable Standard**

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

Temperature:	22.9 °C
Relative Humidity:	57 %
ATM Pressure:	101.2 kPa

* The testing was performed by Leon Chen on 2012-12-01.

Test Result: Compliance.

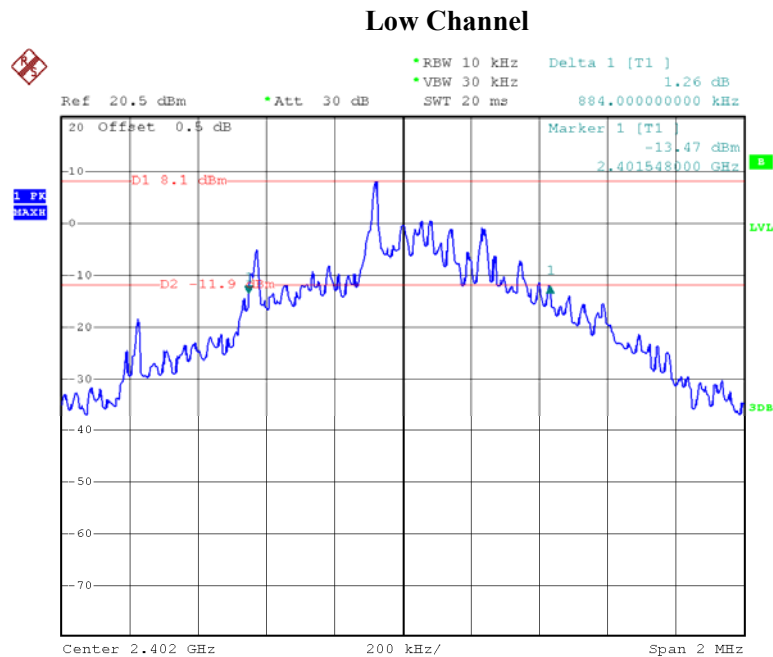
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.884
	Middle	2441	0.856
	High	2480	0.888
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	1.420
	Middle	2441	1.420
	High	2480	1.420
EDR Mode (8DPSK)	Low	2402	1.416
	Middle	2441	1.412
	High	2480	1.416

Please refer to the following plots.

BDR Mode (GFSK):



Date: 1.DEC.2012 16:23:41

Middle Channel



Date: 1.DEC.2012 16:16:46

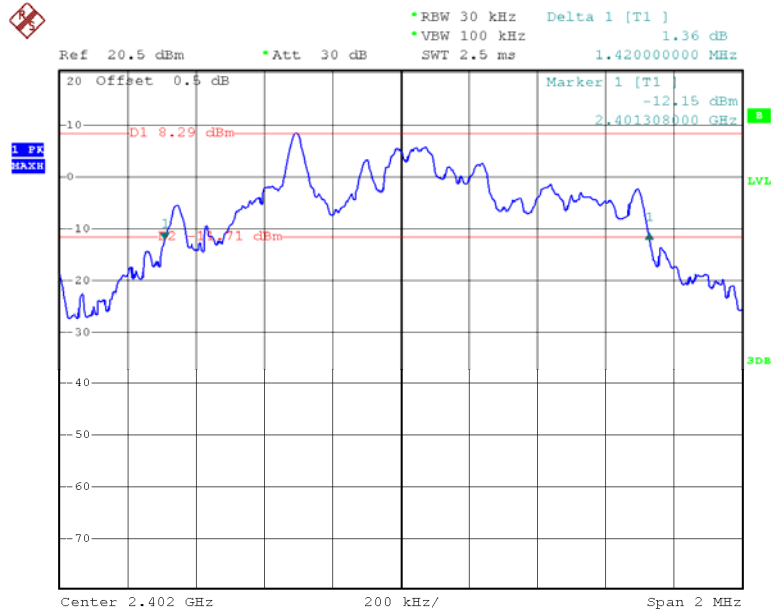
High Channel



Date: 1.DEC.2012 16:15:14

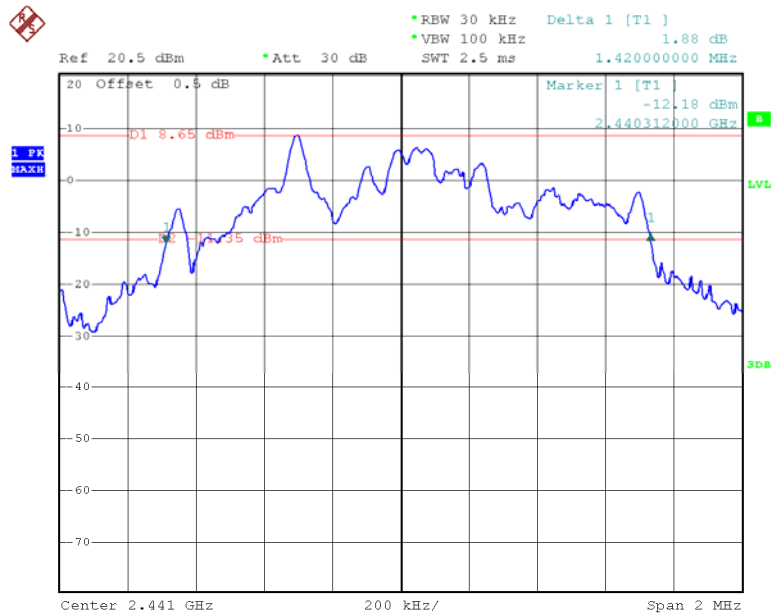
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



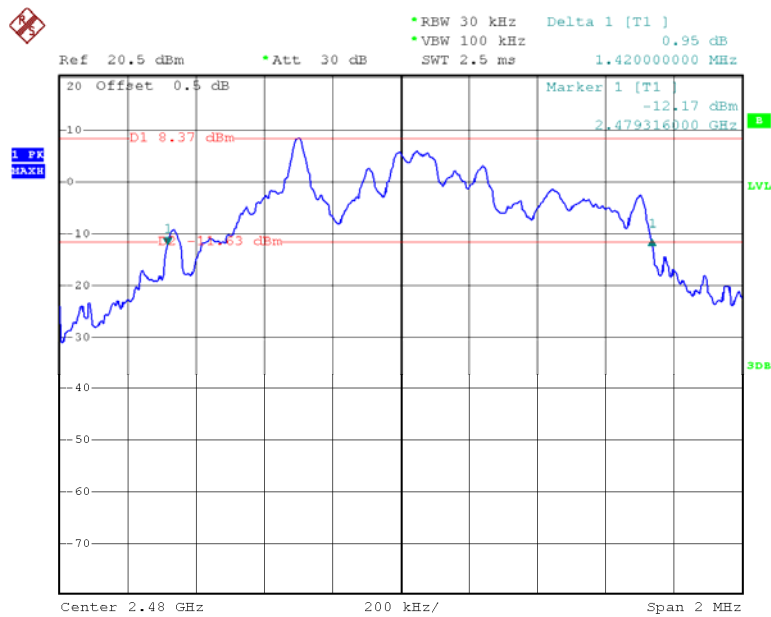
Date: 1.DEC.2012 17:37:56

Middle Channel



Date: 1.DEC.2012 17:40:26

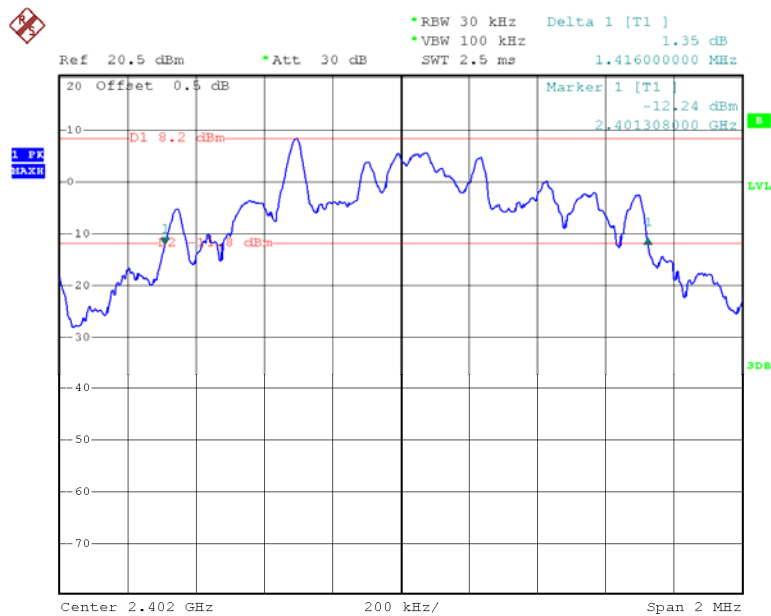
High Channel



Date: 1.DEC.2012 17:41:38

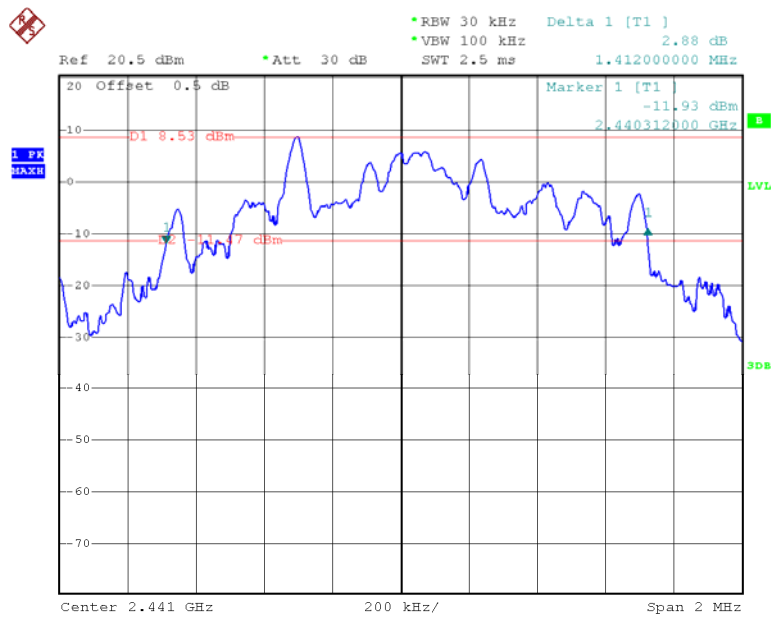
EDR Mode (8DPSK):

Low Channel



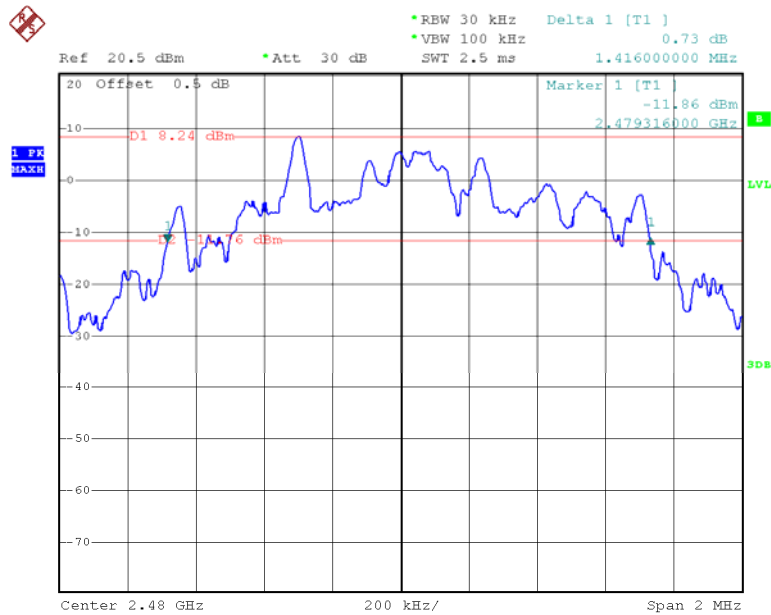
Date: 1.DEC.2012 18:20:51

Middle Channel



Date: 1.DEC.2012 18:21:39

High Channel



Date: 1.DEC.2012 18:22:20

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	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

Temperature:	25.9°C
Relative Humidity:	54 %
ATM Pressure:	100.7kPa

The testing was performed by Leon Chen on 2012-11-24.

Test Result: Compliance.

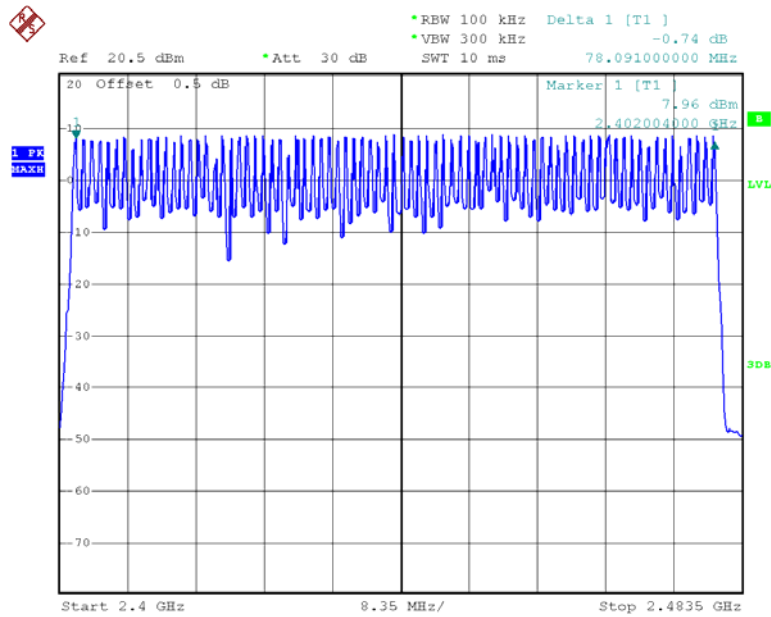
Please refer to following tables and plots

Test Mode: Transmitting

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

BDR Mode (GFSK):

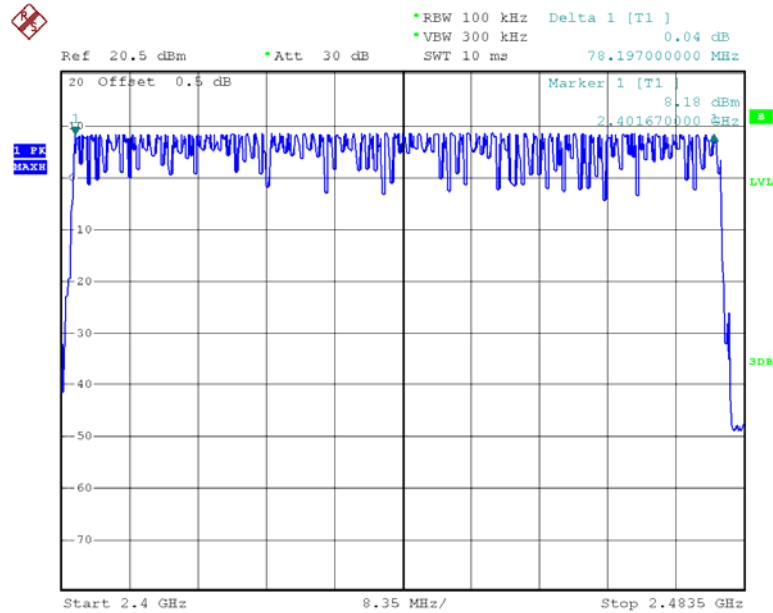
:

Number of Hopping Channels

Date: 1.DEC.2012 16:57:37

EDR Mode ($\pi/4$ -DQPSK):

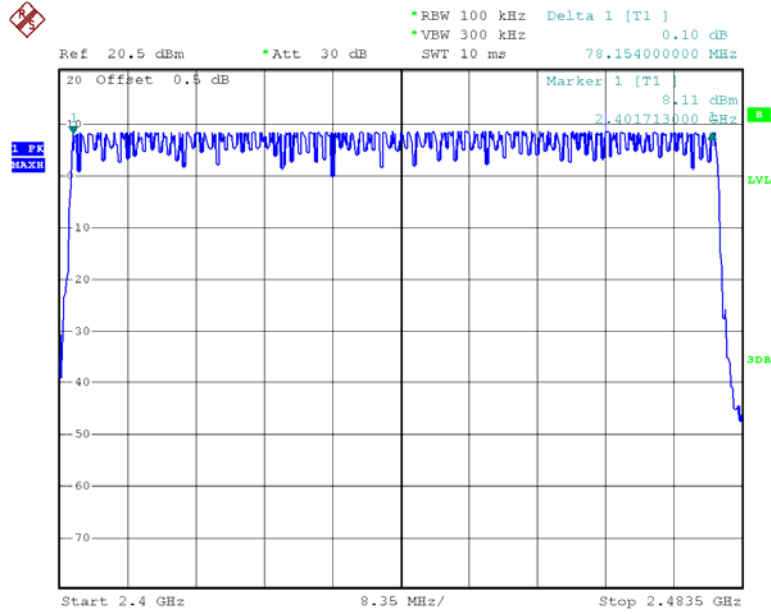
Number of Hopping Channels



Date: 1.DEC.2012 18:10:32

EDR Mode (8DPSK):

Number of Hopping Channels



Date: 1.DEC.2012 19:08:24

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 $0.4 \times \text{channel no. (s)}$, the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels *hopping NO. * 0.4s

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

Temperature:	25.9 °C
Relative Humidity:	54 %
ATM Pressure:	100.7kPa

* The testing was performed by Leon Chen on 2012-12-01.

Test Result: Compliance.

Please refer to following tables and plots

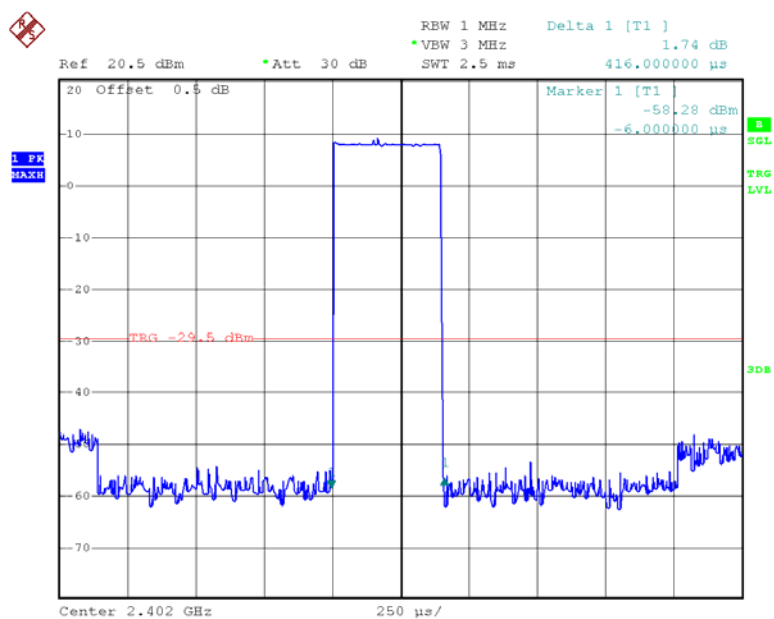
Test Mode: Transmitting

BDR Mode (GFSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.416	0.133	0.4	Pass
	Middle	0.426	0.136	0.4	Pass
	High	0.411	0.132	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
DH3	Low	1.670	0.267	0.4	Pass
	Middle	1.670	0.267	0.4	Pass
	High	1.670	0.267	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
DH5	Low	2.934	0.313	0.4	Pass
	Middle	2.934	0.313	0.4	Pass
	High	2.950	0.315	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

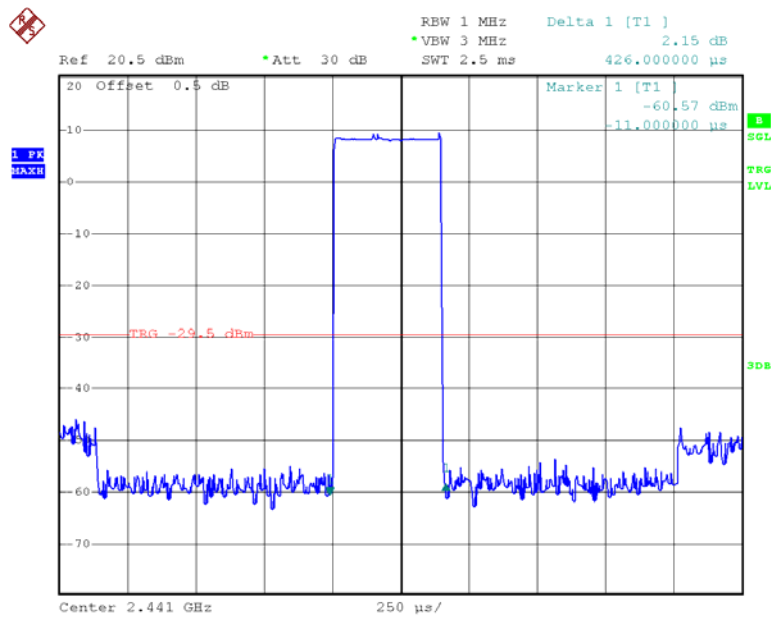
DH1:

Low Channel



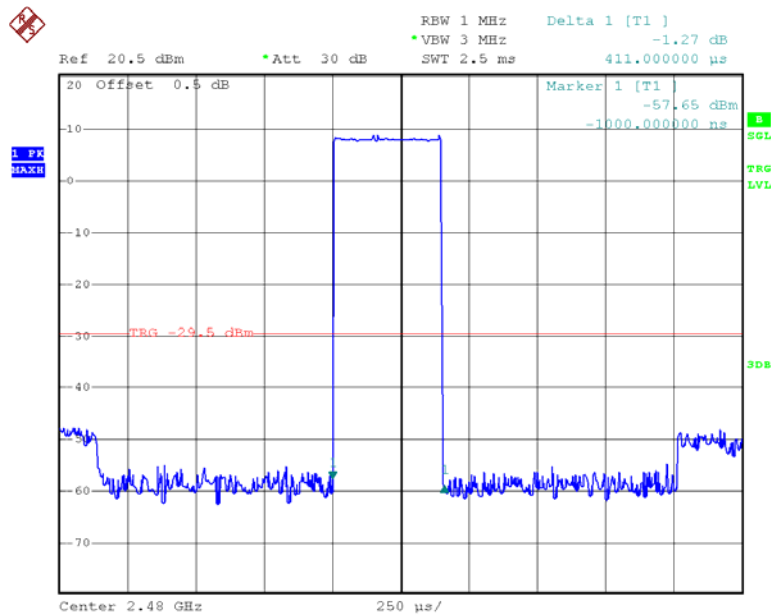
Date: 1.DEC.2012 17:10:52

Middle Channel



Date: 1.DEC.2012 17:10:26

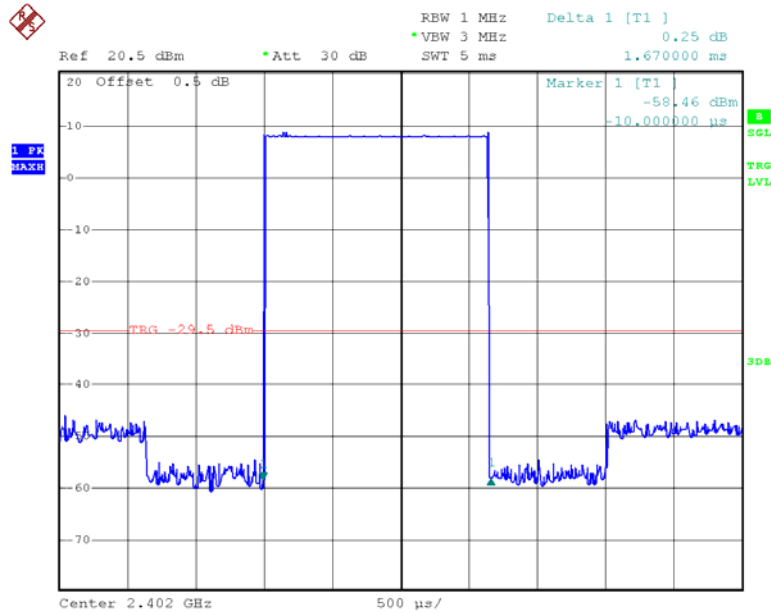
High Channel



Date: 1.DEC.2012 17:09:56

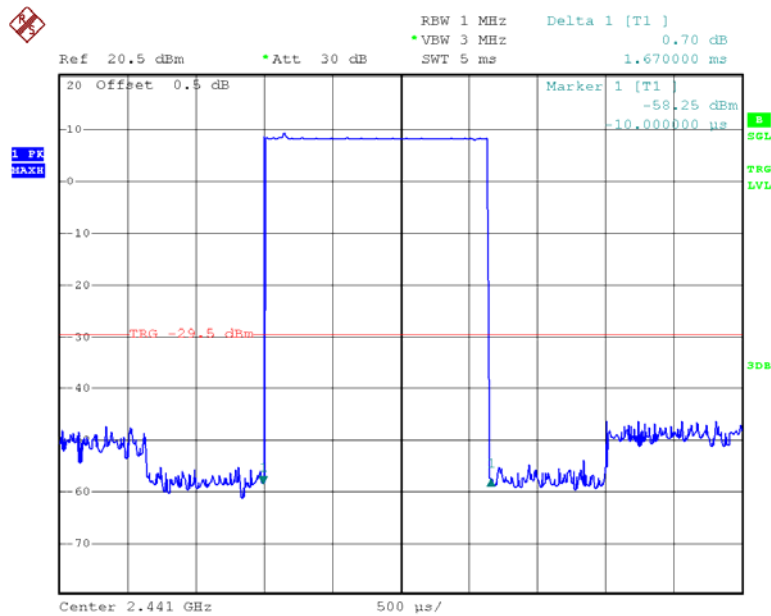
DH3:

Low Channel



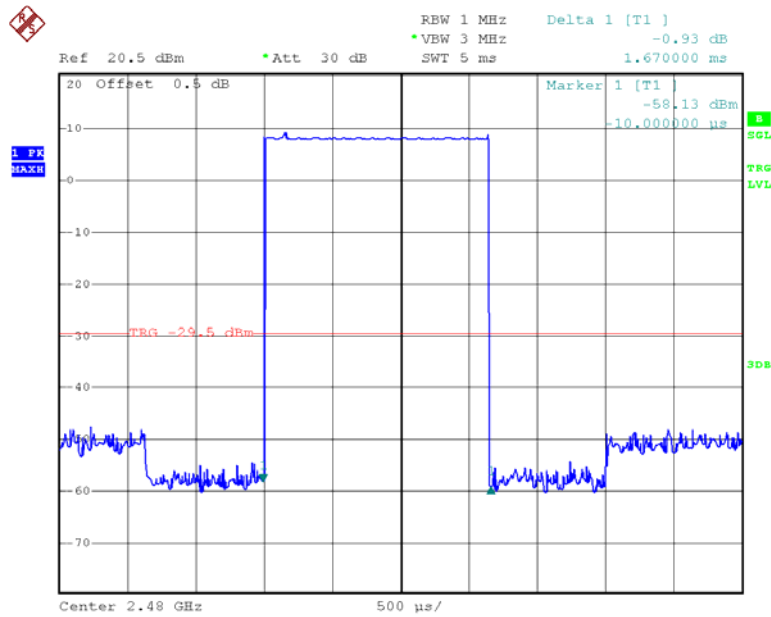
Date: 1.DEC.2012 17:05:34

Middle Channel



Date: 1.DEC.2012 17:05:22

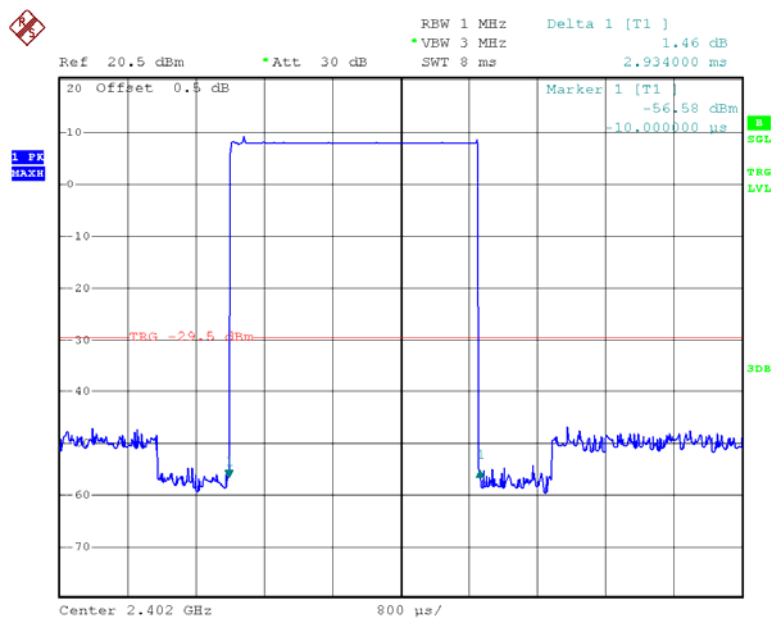
High Channel



Date: 1.DEC.2012 17:05:06

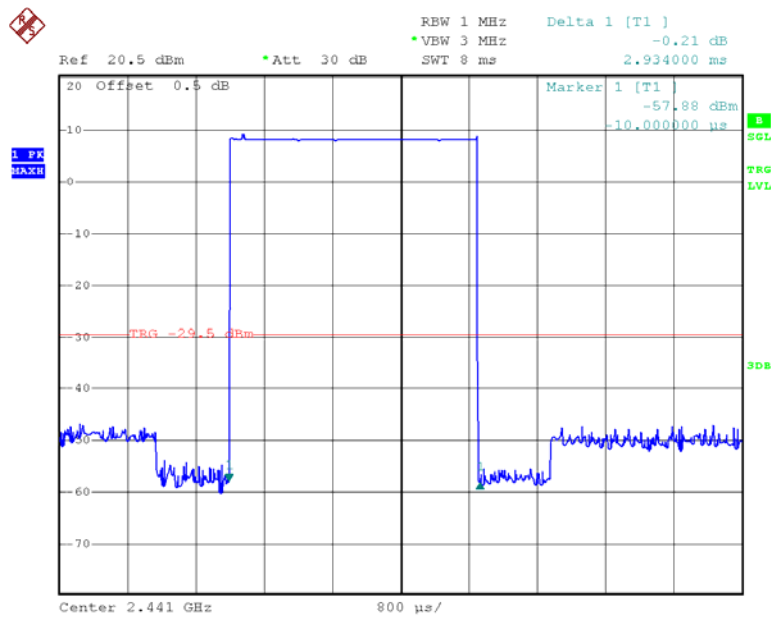
DH5:

Low Channel



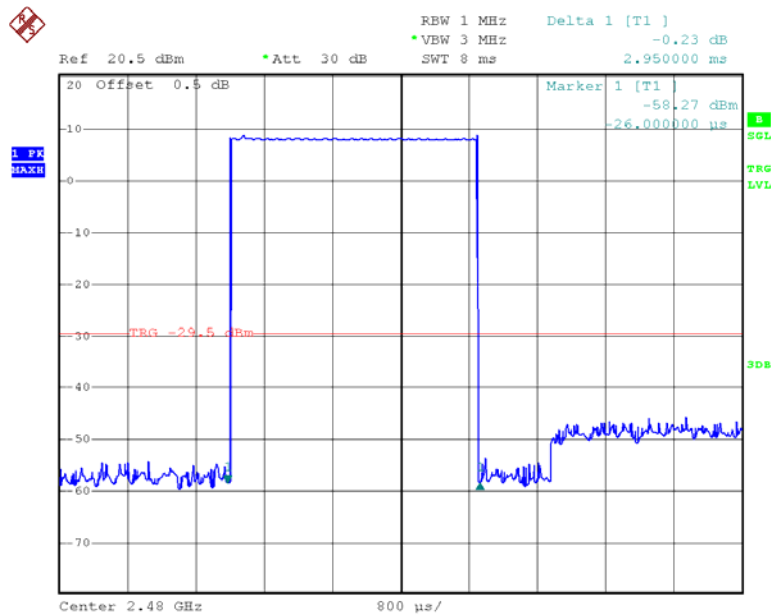
Date: 1.DEC.2012 17:06:33

Middle Channel



Date: 1.DEC.2012 17:06:50

High Channel



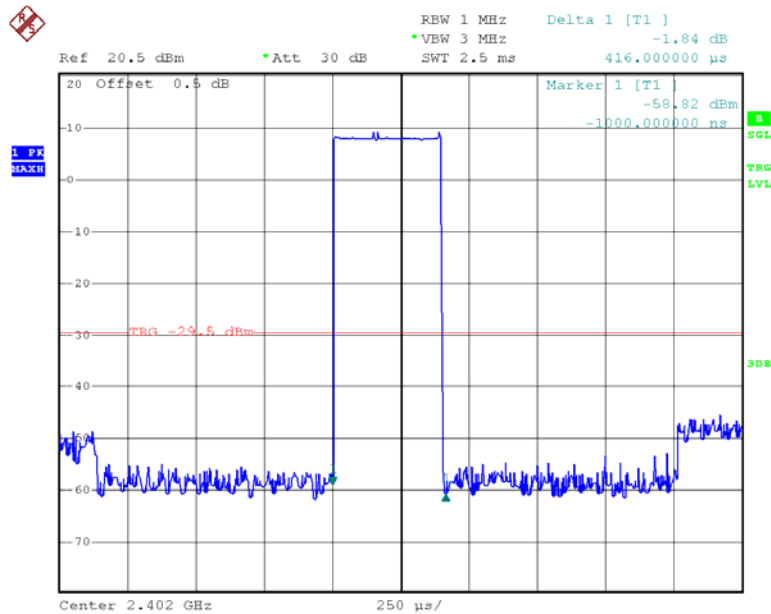
Date: 1.DEC.2012 17:07:04

EDR Mode ($\pi/4$ -DQPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.416	0.133	0.4	Pass
	Middle	0.426	0.136	0.4	Pass
	High	0.416	0.133	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
DH3	Low	1.676	0.268	0.4	Pass
	Middle	1.676	0.268	0.4	Pass
	High	1.666	0.267	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
DH5	Low	2.940	0.314	0.4	Pass
	Middle	2.956	0.315	0.4	Pass
	High	2.940	0.314	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

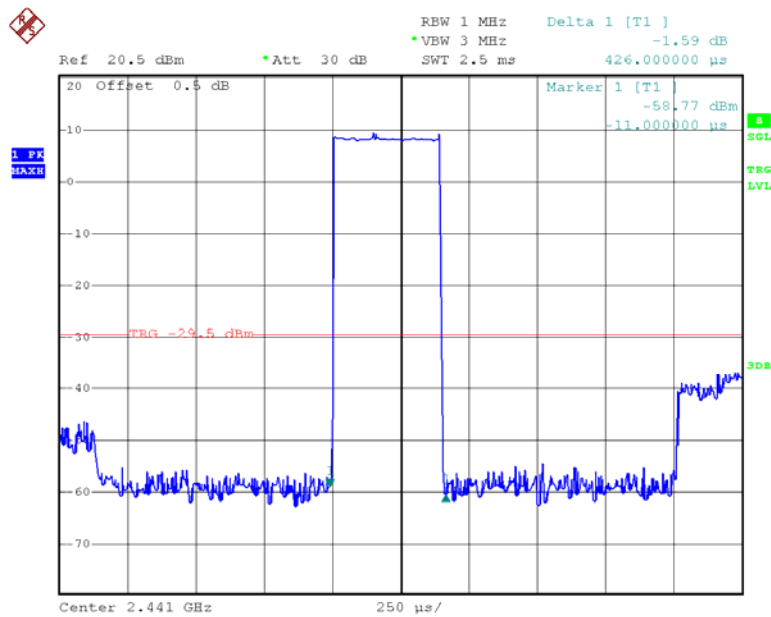
DH1:

Low Channel



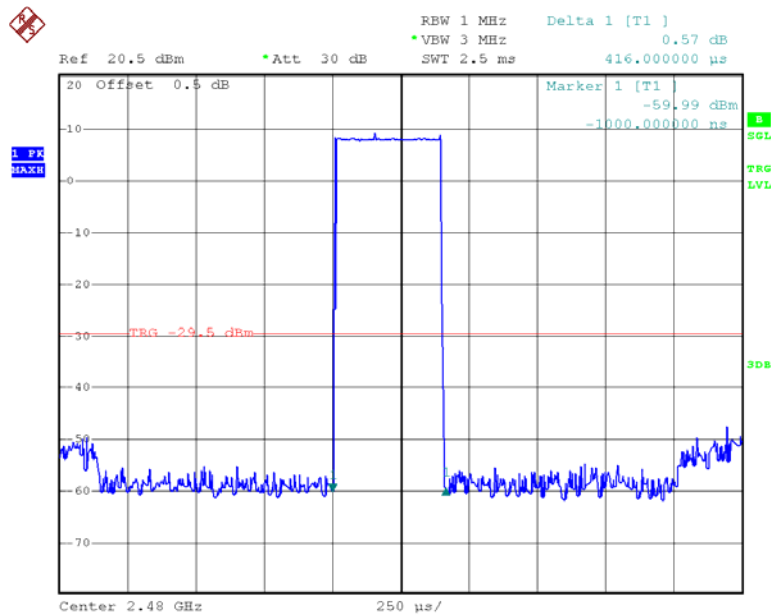
Date: 1.DEC.2012 17:11:56

Middle Channel



Date: 1.DEC.2012 17:12:13

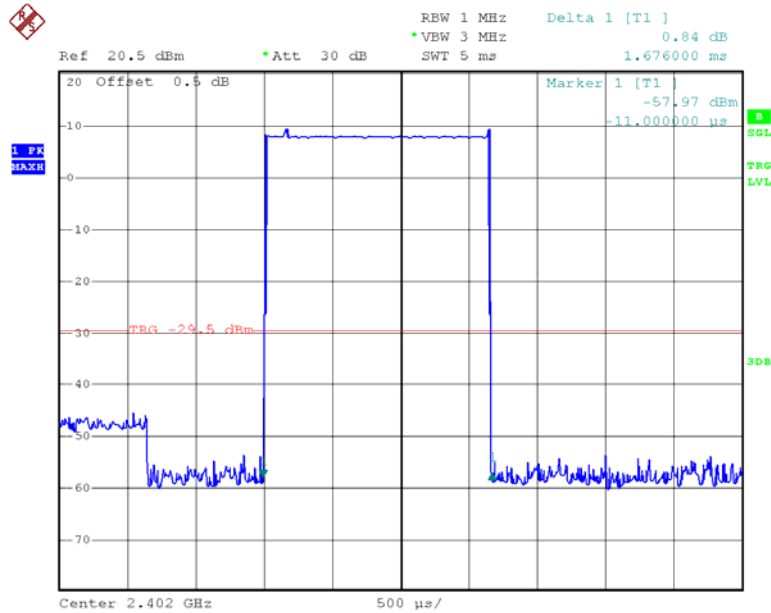
High Channel



Date: 1.DEC.2012 17:12:27

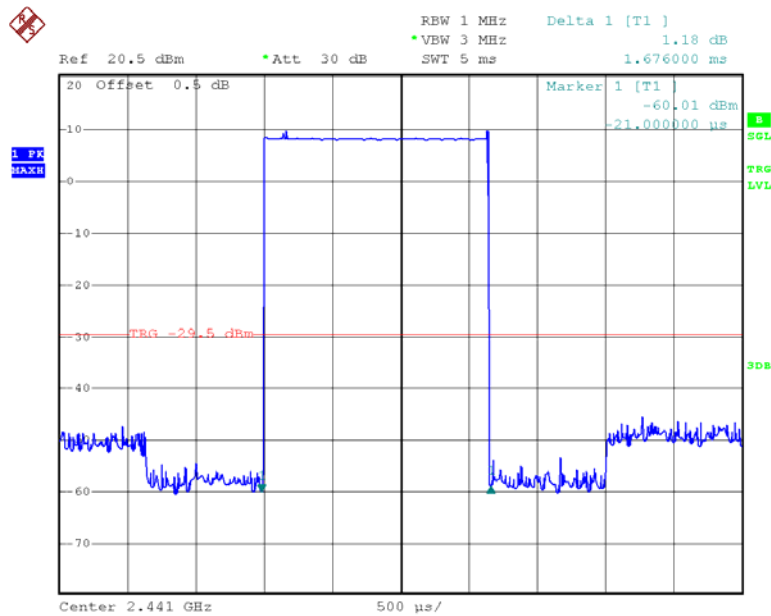
DH3:

Low Channel



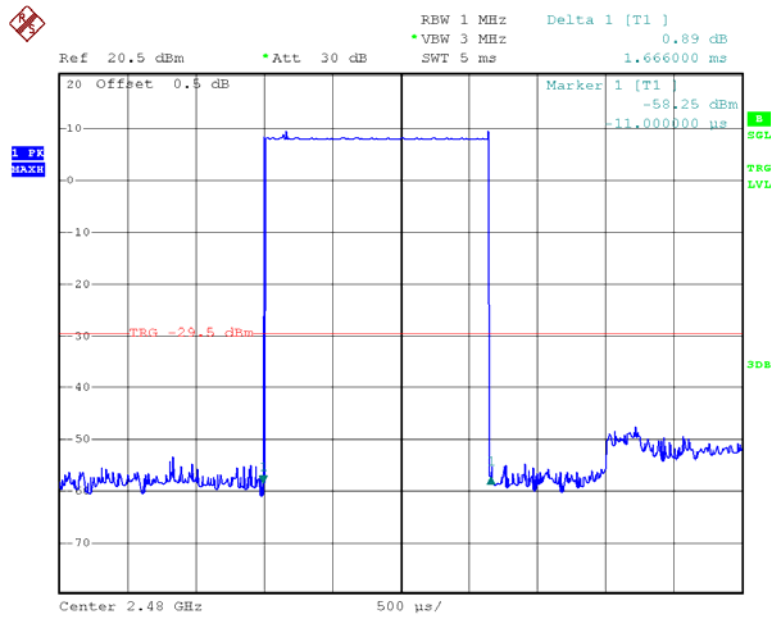
Date: 1.DEC.2012 17:14:21

Middle Channel



Date: 1.DEC.2012 17:14:06

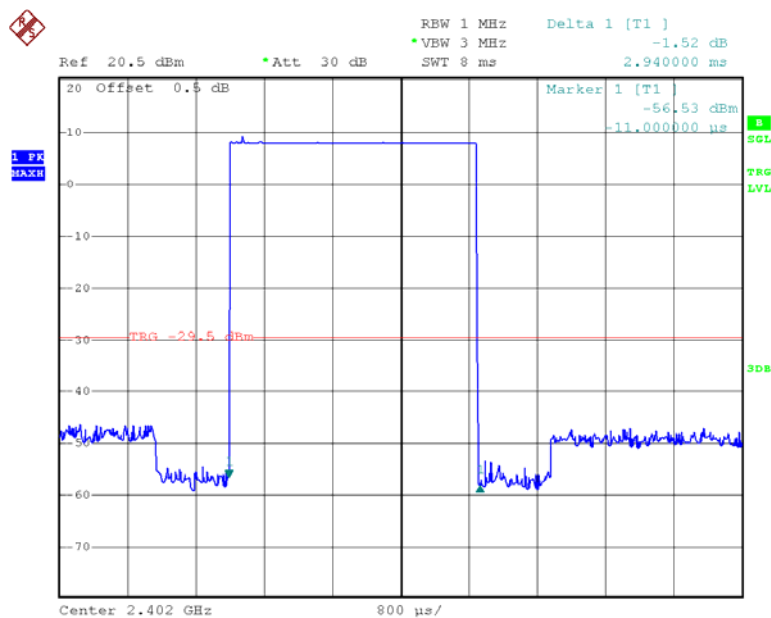
High Channel



Date: 1.DEC.2012 17:13:29

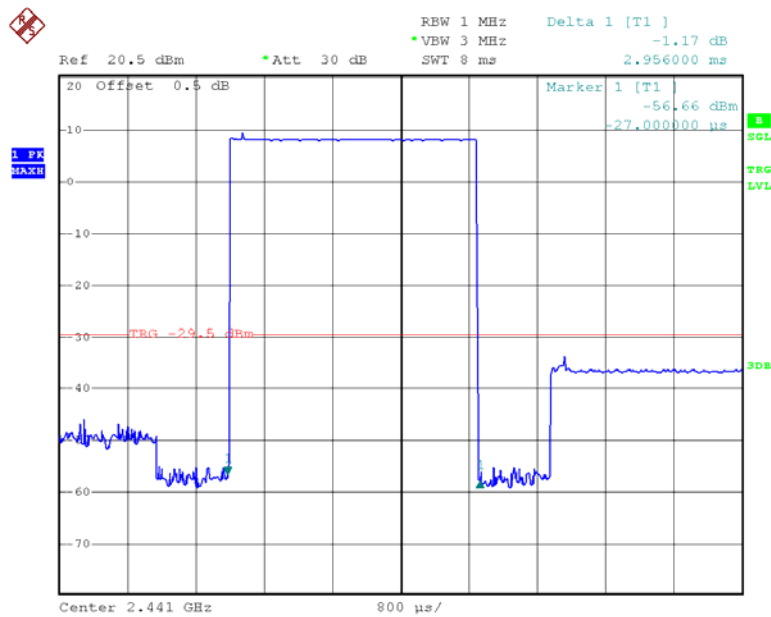
DH5:

Low Channel



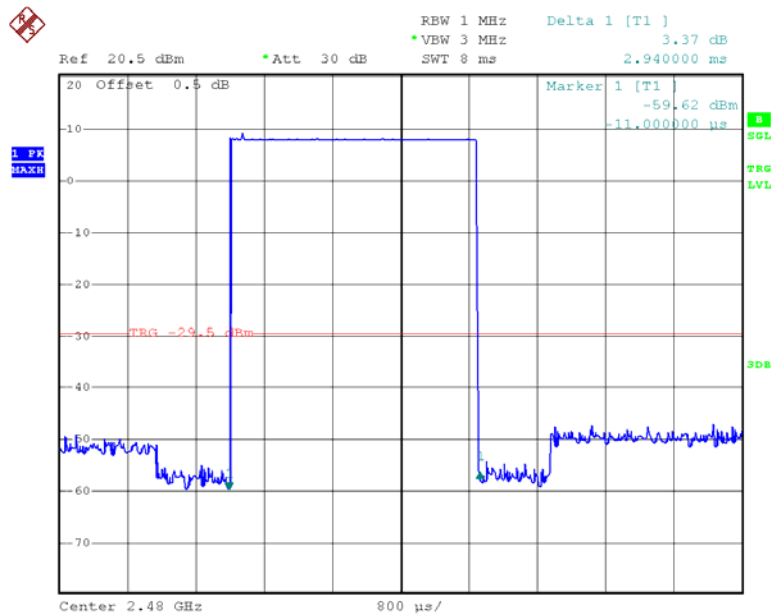
Date: 1.DEC.2012 17:15:07

Middle Channel



Date: 1.DEC.2012 17:15:20

High Channel



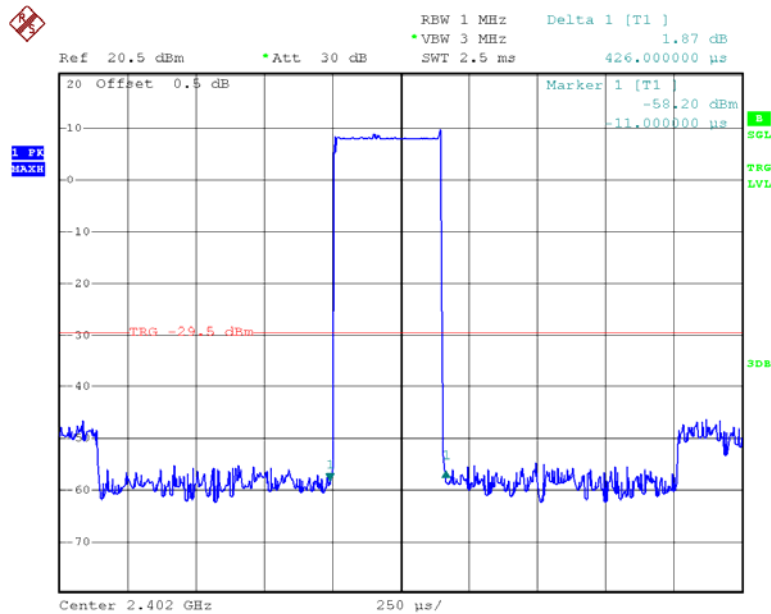
Date: 1.DEC.2012 17:15:31

EDR Mode (8DPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.426	0.136	0.4	Pass
	Middle	0.416	0.133	0.4	Pass
	High	0.421	0.135	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
DH3	Low	1.666	0.267	0.4	Pass
	Middle	1.666	0.267	0.4	Pass
	High	1.676	0.268	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
DH5	Low	2.972	0.317	0.4	Pass
	Middle	2.972	0.317	0.4	Pass
	High	2.940	0.314	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

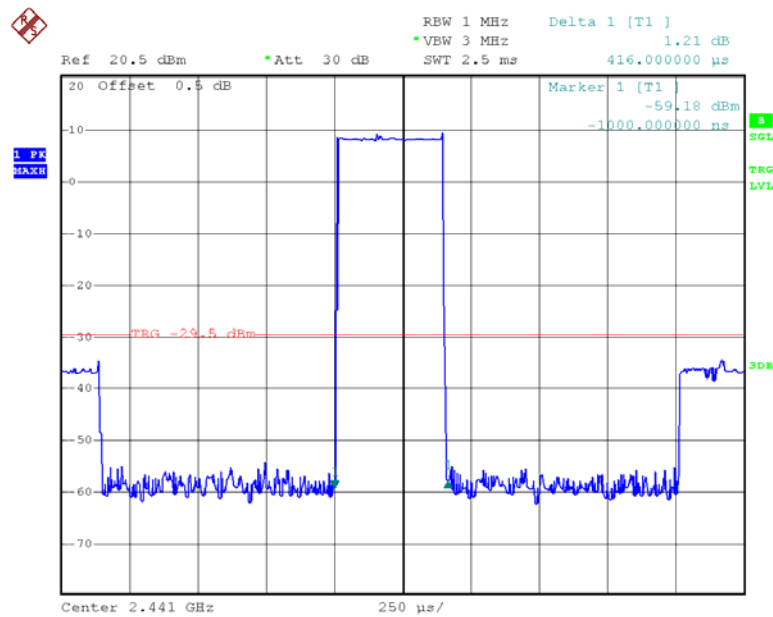
DH1:

Low Channel



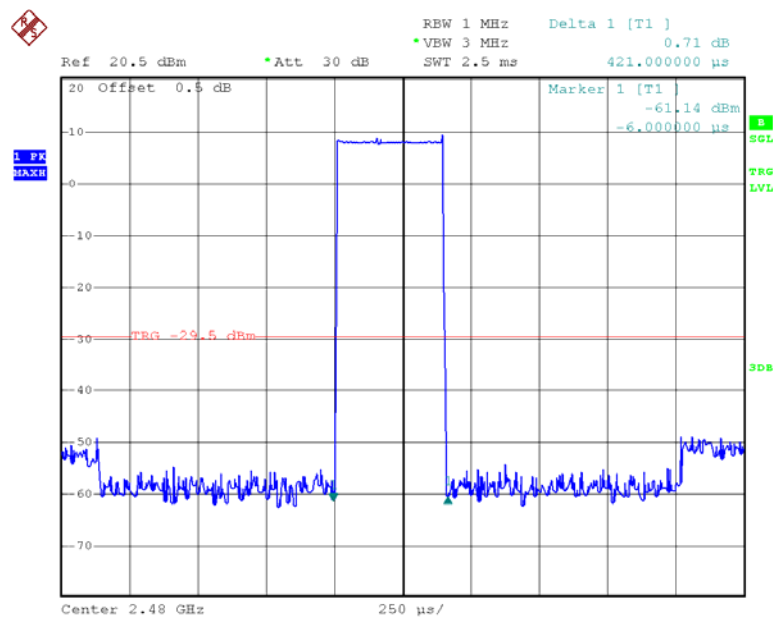
Date: 1.DEC.2012 17:20:42

Middle Channel



Date: 1.DEC.2012 17:20:26

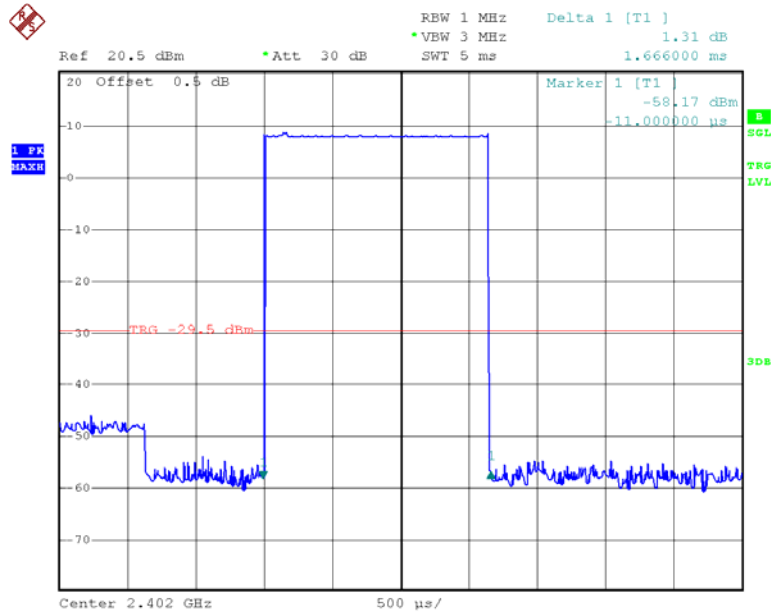
High Channel



Date: 1.DEC.2012 17:20:11

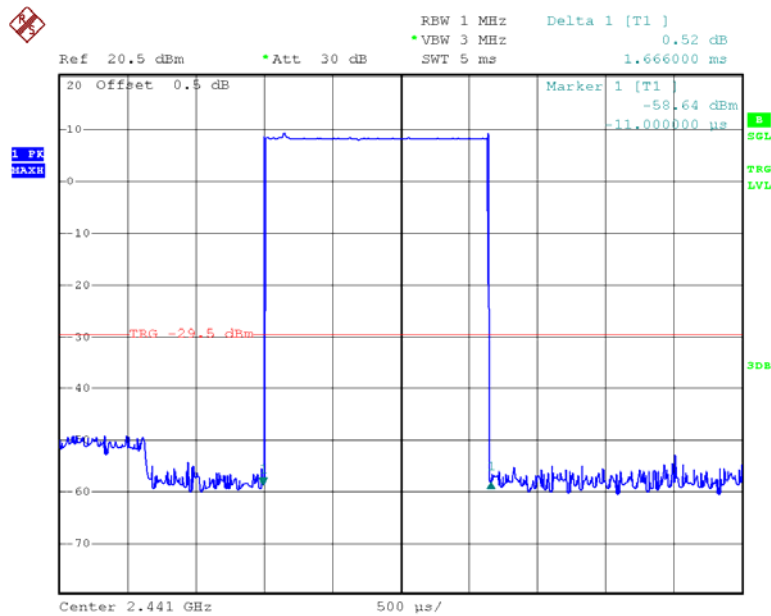
DH3:

Low Channel



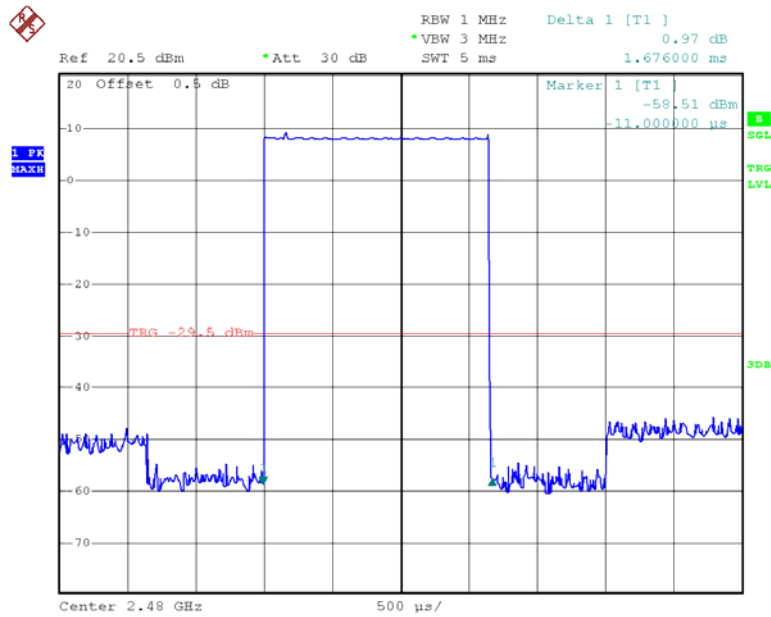
Date: 1.DEC.2012 17:21:32

Middle Channel



Date: 1.DEC.2012 17:21:47

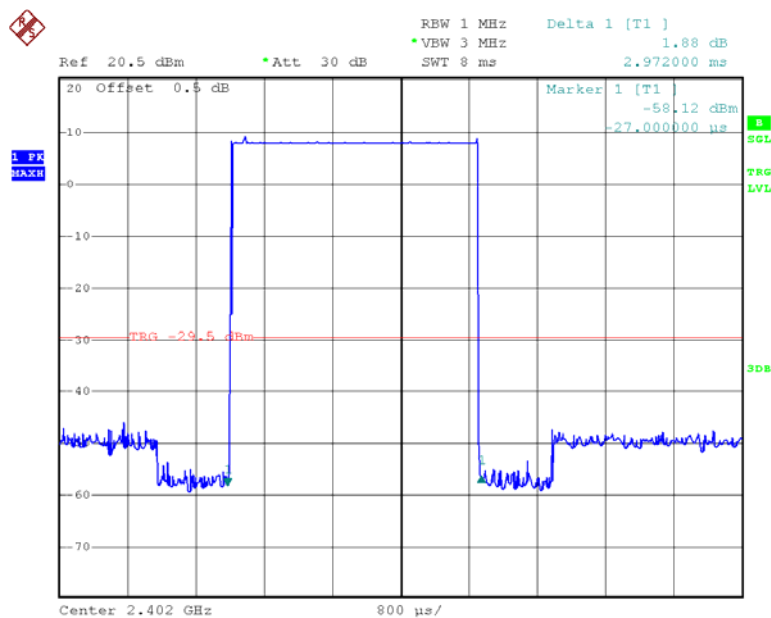
High Channel



Date: 1.DEC.2012 17:22:02

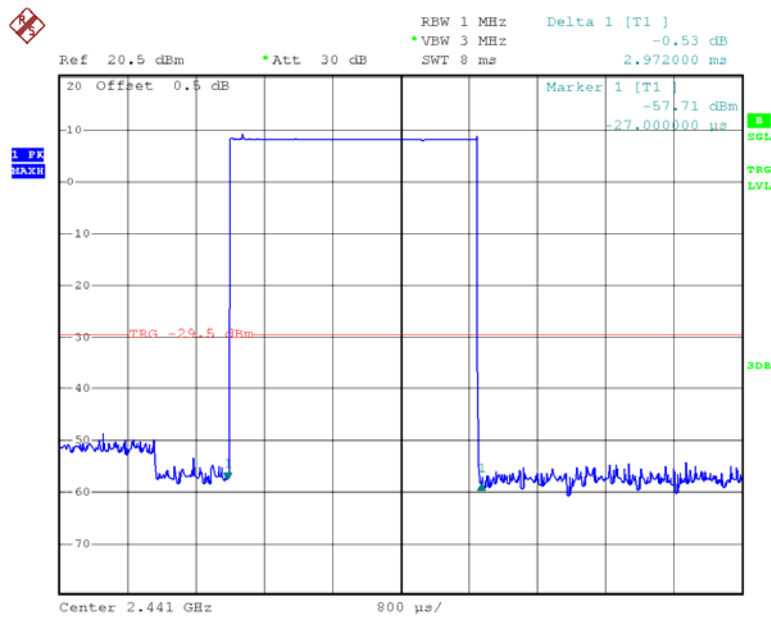
DH5:

Low Channel



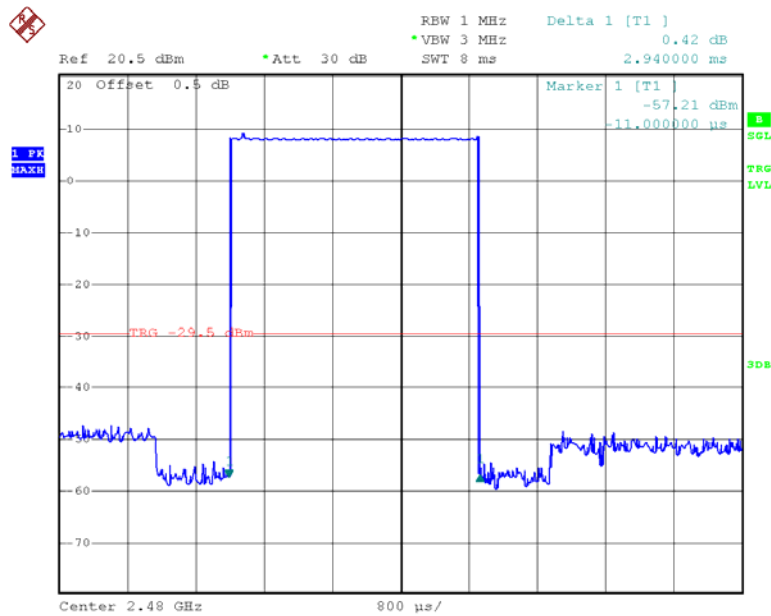
Date: 1.DEC.2012 17:23:25

Middle Channel



Date: 1.DEC.2012 17:23:13

High Channel



Date: 1.DEC.2012 17:22:57

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

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

Temperature:	22.9°C
Relative Humidity:	57 %
ATM Pressure:	101.2 kPa

* The testing was performed by Leon Chen on 2012-12-01.

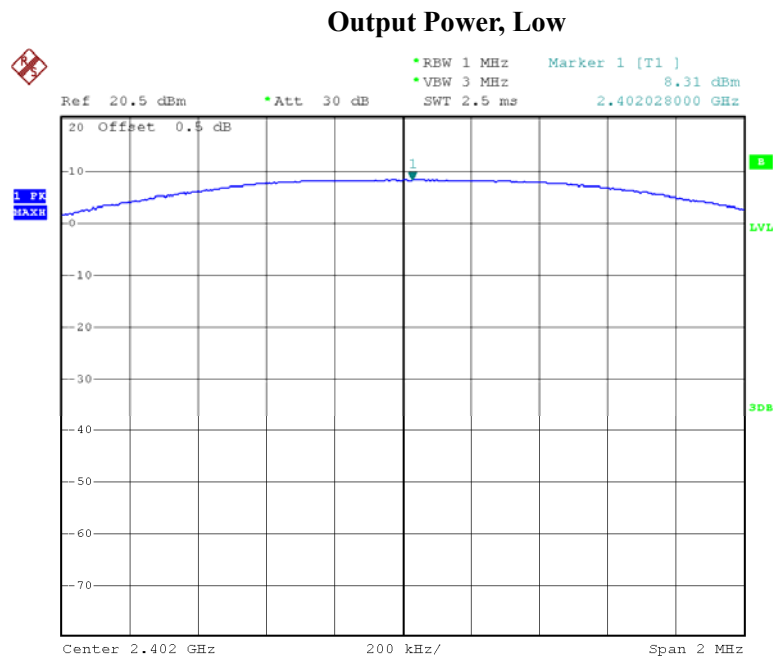
Test Result: Compliance.

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	Low	2402	8.31	30
	Middle	2441	8.59	30
	High	2480	8.36	30
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	8.75	30
	Middle	2441	8.79	30
	High	2480	8.67	30
EDR Mode (8DPSK)	Low	2402	8.78	30
	Middle	2441	8.74	30
	High	2480	8.71	30

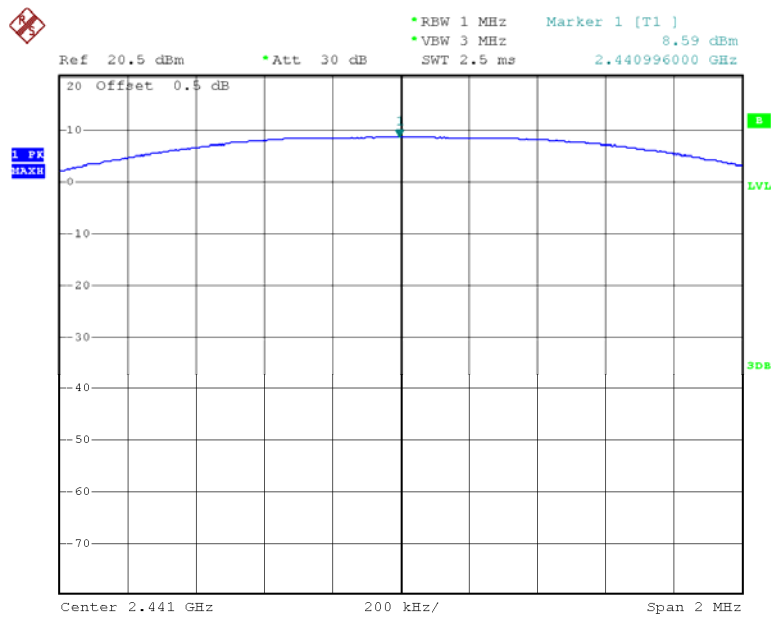
Note: The data above was tested in conducted mode.

BDR Mode (GFSK):



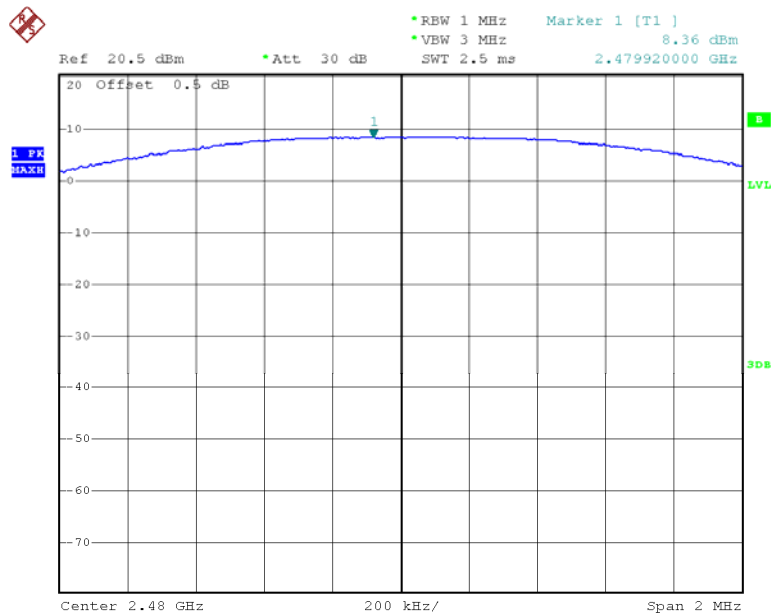
Date: 1.DEC.2012 16:27:14

Output Power, Middle



Date: 1.DEC.2012 16:26:52

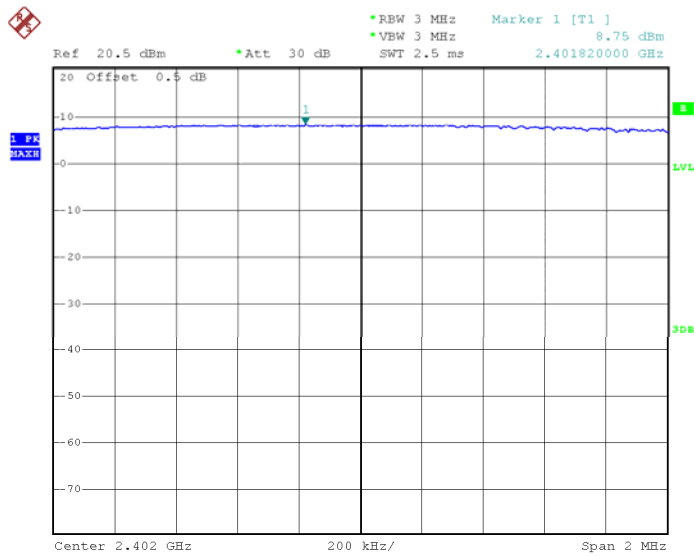
Output Power, High



Date: 1.DEC.2012 16:27:38

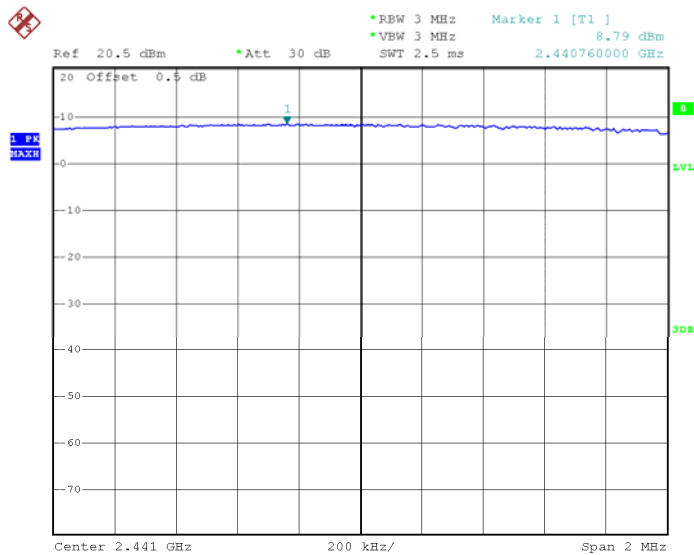
EDR Mode ($\pi/4$ -DQPSK):

Output Power, Low



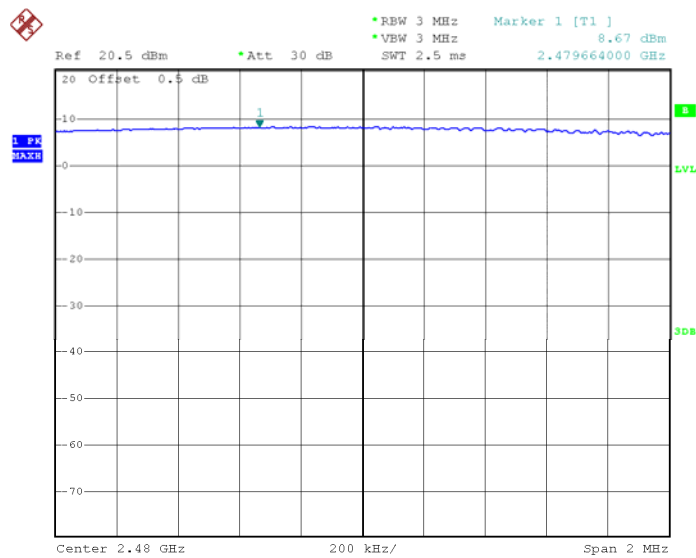
Date: 1.DEC.2012 19:13:14

Output Power, Middle



Date: 1.DEC.2012 19:13:47

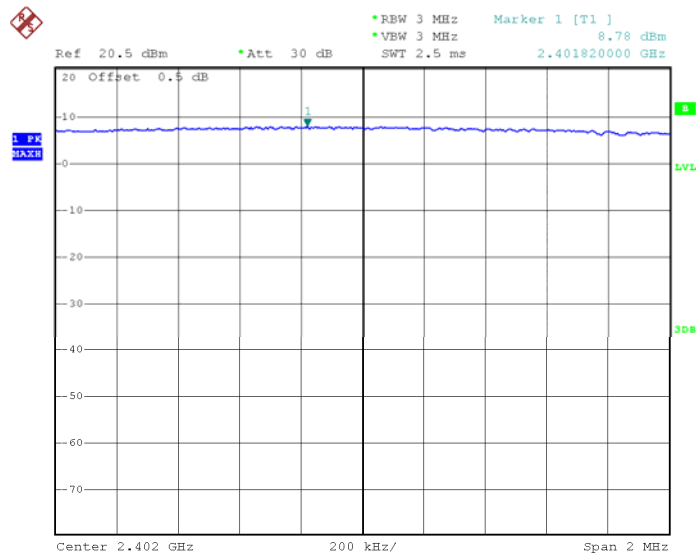
Output Power, High



Date: 1.DEC.2012 19:14:10

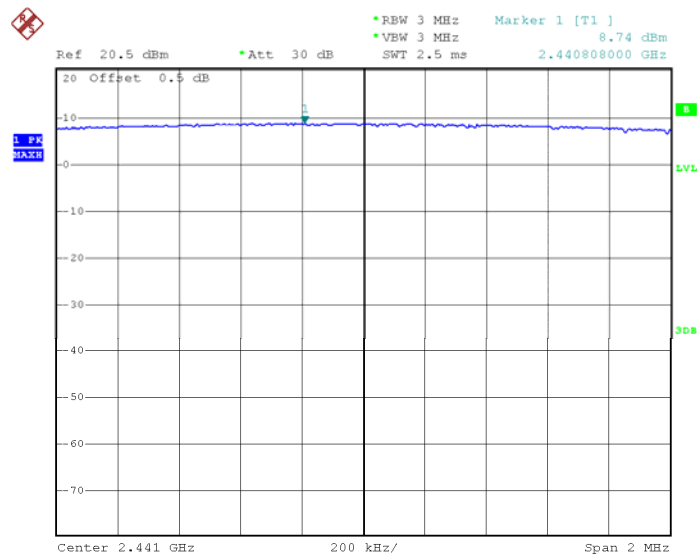
EDR Mode (8DPSK):

Output Power, Low



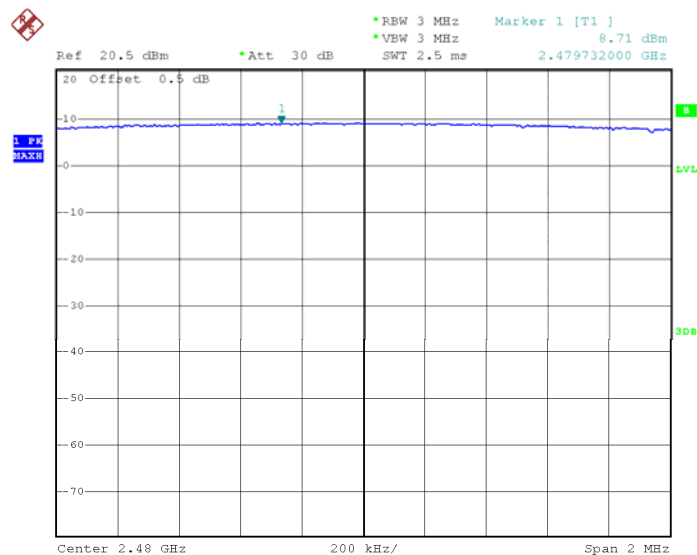
Date: 1.DEC.2012 18:23:44

Output Power, Middle



Date: 1.DEC.2012 18:23:20

Output Power, High



Date: 1.DEC.2012 18:22:57

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

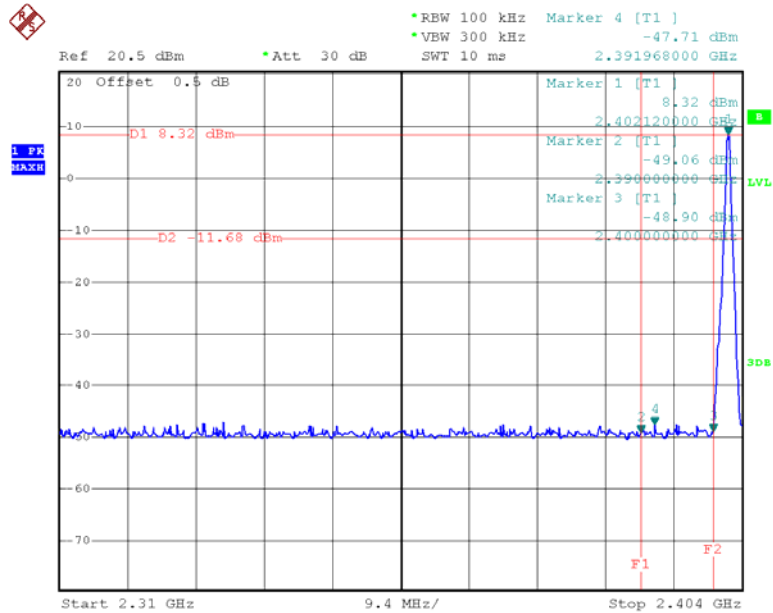
Environmental Conditions

Temperature:	22.9 °C
Relative Humidity:	57 %
ATM Pressure:	101.2 kPa

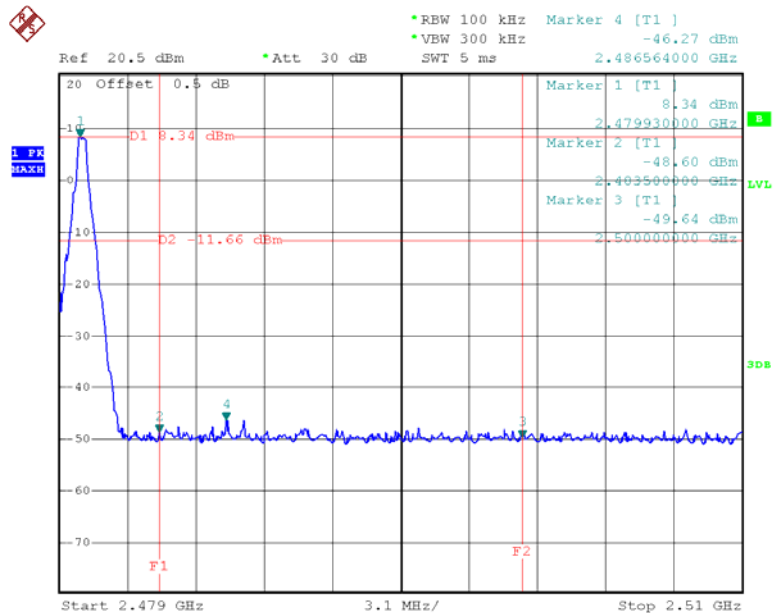
**The testing was performed by Leon Chen on 2012-12-01.*

Test Result: Compliance

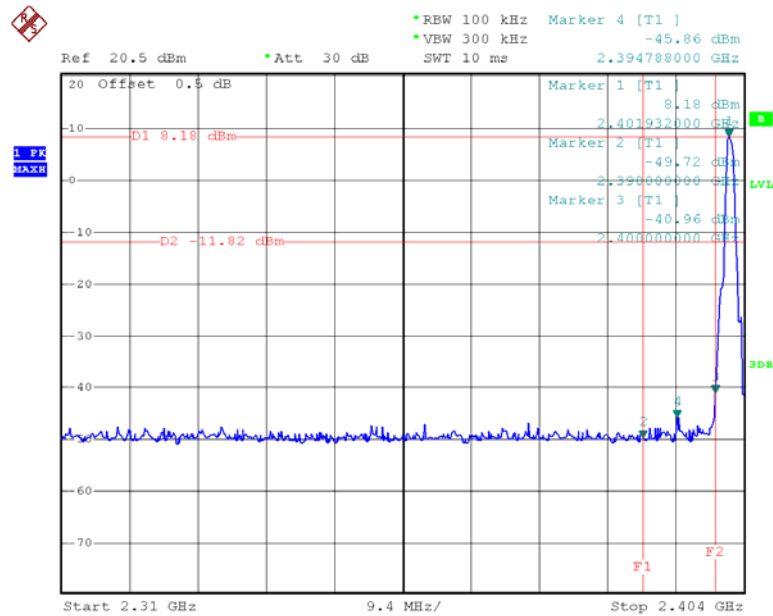
BDR Mode (GFSK):

Band Edge, Left Side

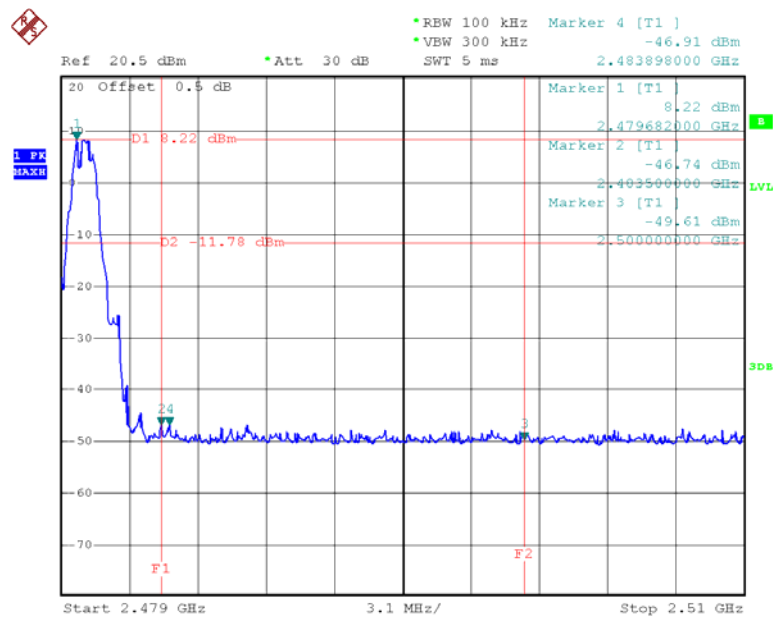
Date: 1.DEC.2012 16:35:05

Band Edge, Right Side

Date: 1.DEC.2012 16:36:18

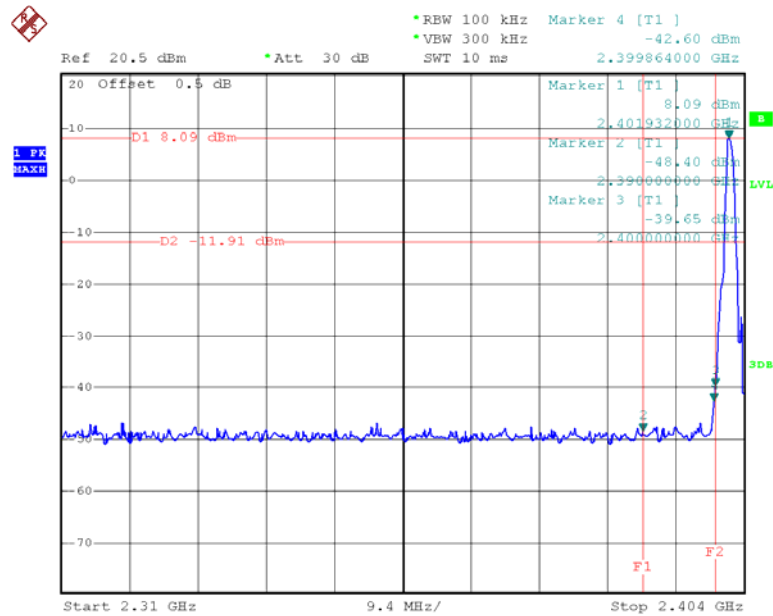
EDR Mode ($\pi/4$ -DQPSK):**Band Edge, Left Side**

Date: 1.DEC.2012 17:53:18

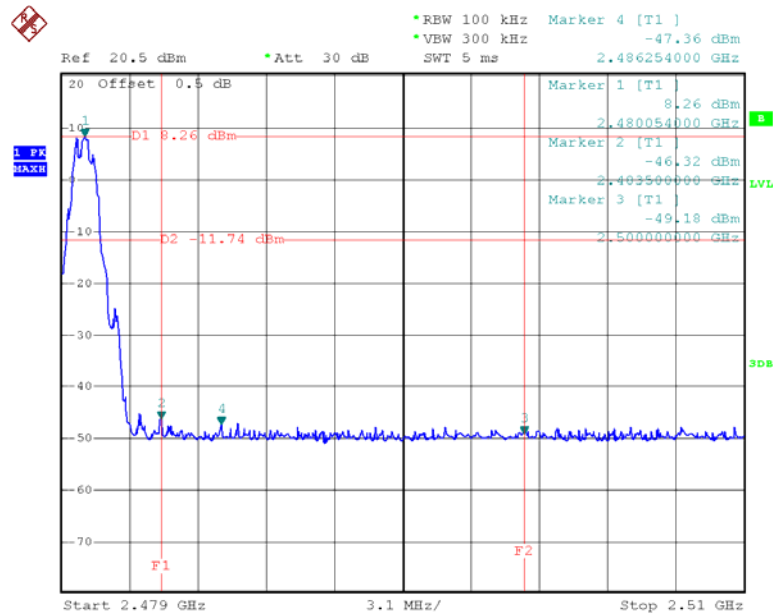
Band Edge, Right Side

Date: 1.DEC.2012 17:52:13

EDR Mode (8DPSK):

Band Edge, Left Side

Date: 1.DEC.2012 18:29:12

Band Edge, Right Side

Date: 1.DEC.2012 18:28:08

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