

FCC PART 15.247
TEST REPORT

For

VOXLAND SARL

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FCC ID: ZKIBBZ302

Report Type: Original Report	Product Type: Bluetooth Helicopter
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Report Number: <u>RSZ120920801-00</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The VOXLAND SARL's product, model number: BBZ302 (FCC ID: ZKIBBZ302) or the "EUT" in this report was a *Bluetooth Helicopter*, which was measured approximately: 23.0 cm (L) x 18.0 cm (W) x 13.2 cm (H), rated input voltage: DC 3.7V from battery or DC 5V from PC for charging.

Note: The series product, model BBZ302 and BBZ352 are electrically identical, they have the same PCB layout and schematic, the differences between them are the appearance color and model number, we select BBZ302 for fully testing, which was explained in the attached declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 1209006 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2012-09-28.*

Objective

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

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

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

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

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

Test Facility

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

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

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

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



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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a testing mode which was controlled by software tester.

EUT Exercise Software

BlueSuite2.1

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

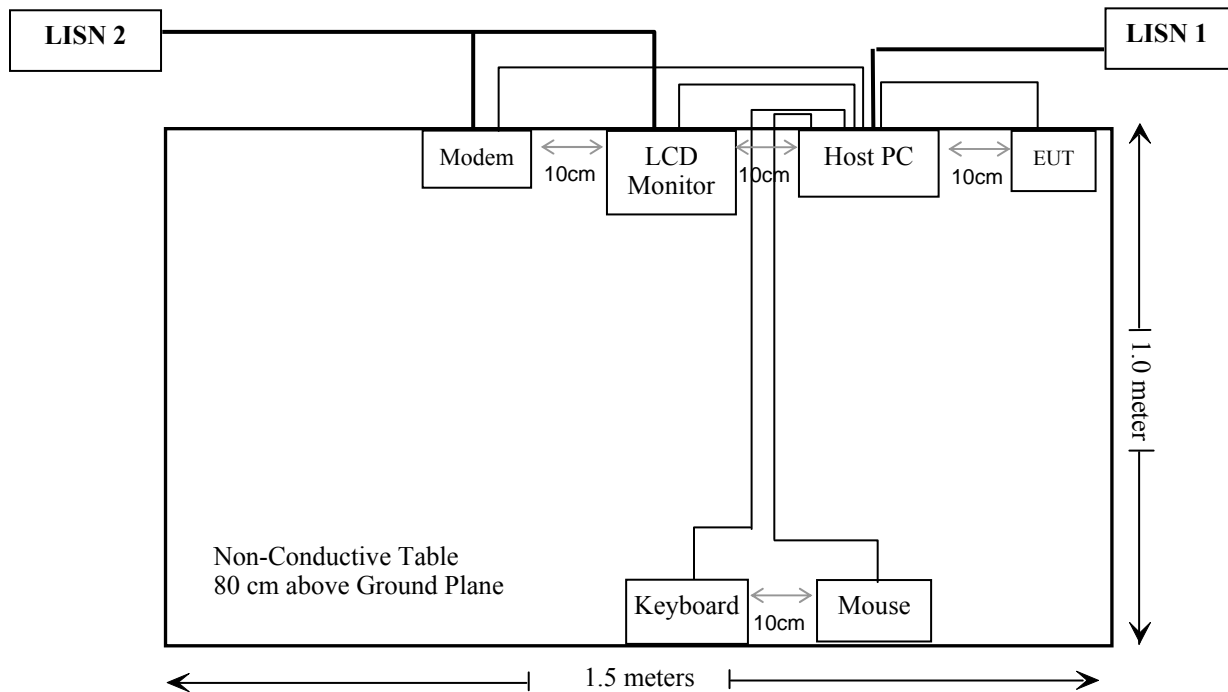
Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
SAST	Modem	AEM-2100	0293

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable USB Cable	1.5	Host PC	Mouse
Shielded Detachable Serial Cable	1.2	Host PC	Modem
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.5	Host PC	LCD Monitor
Unshielded Detachable USB Cable	1.0	EUT	Host PC

Block Diagram of Test Setup

For conducted emissions



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

FCC §15.247 (i) & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mw/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = Antenna Gain

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BDR (GFSK)	2402	0	1.0	2.91	1.954	20	0.00039	1.0
EDR (π/4-DQPSK)	2402	0	1.0	3.06	2.023	20	0.00040	1.0
EDR (8DPSK)	2402	0	1.0	3.19	2.084	20	0.00041	1.0

Result: The device meets FCC MPE limit at 20 cm distance.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT used one fixed PCB antenna, which was in accordance to section 15.203, the maximum gain is 0 dBi; please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

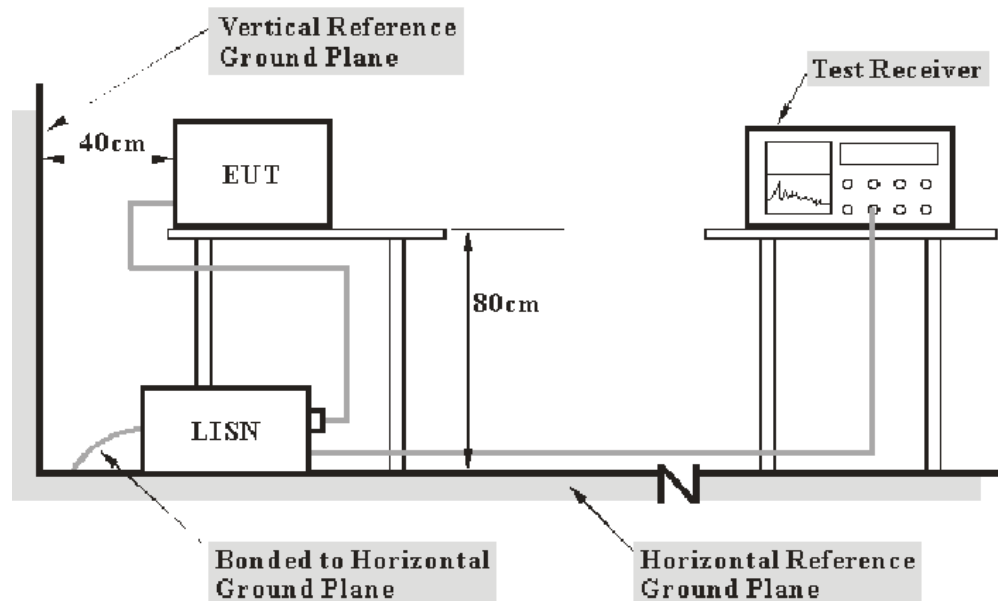
FCC §15.207

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 CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence), 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 measurement procedure of EUT setup is according with ANSI C63.4-2009. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

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

Test Procedure

During the conducted emission test, the host PC was connected to the first LISN, the modem and LCD monitor were connected to the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

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

Corrected 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:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Pulse Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB 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 Part 15.207, with the worst margin reading of:

9.54 dB at 9.255 MHz in the Neutral conducted mode

Test Data

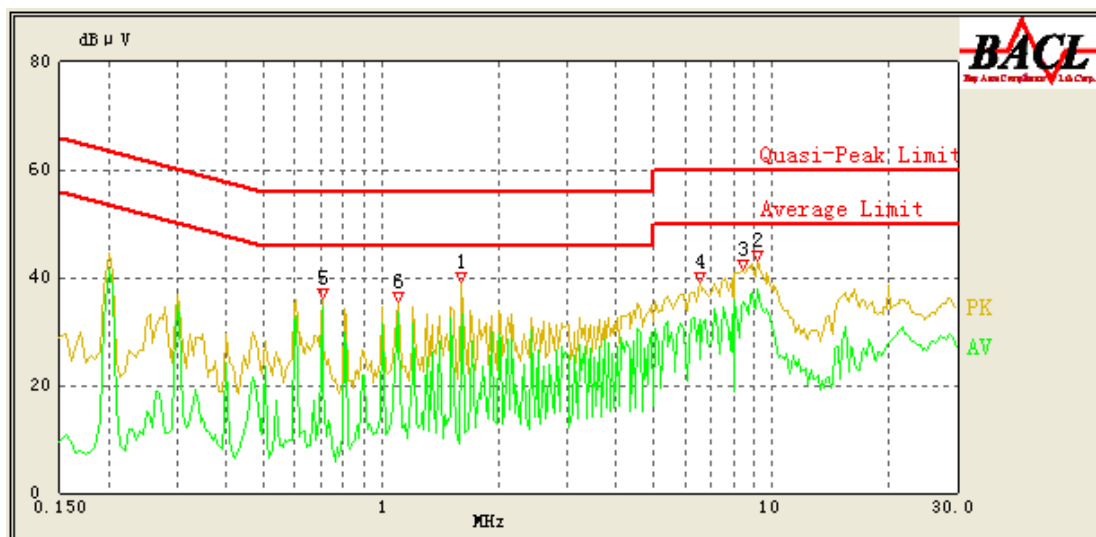
Environmental Conditions

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

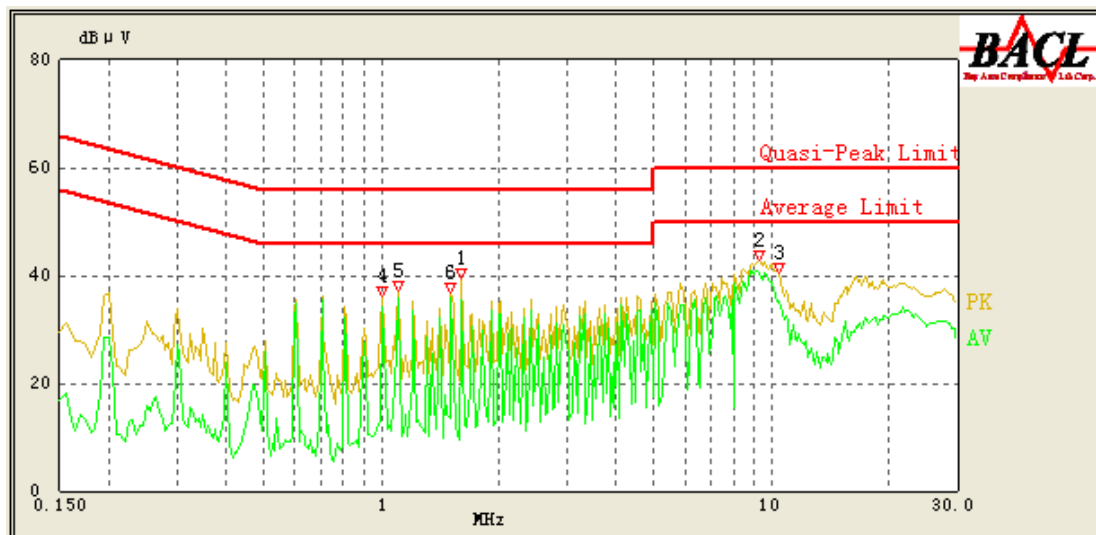
The testing was performed by Gardon Zhang on 2012-09-26.

EUT operation mode: Charging

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.705	34.49	10.22	46.00	11.51	Ave.
9.250	37.84	10.46	50.00	12.16	Ave.
1.105	33.62	10.17	46.00	12.38	Ave.
1.620	33.18	10.19	46.00	12.82	Ave.
8.445	35.65	10.43	50.00	14.35	Ave.
6.535	32.07	10.36	50.00	17.93	Ave.
0.705	35.33	10.22	56.00	20.67	QP
1.610	34.69	10.19	56.00	21.31	QP
9.250	38.56	10.46	60.00	21.44	QP
1.105	34.39	10.17	56.00	21.61	QP
8.445	37.83	10.43	60.00	22.17	QP
6.535	32.77	10.36	60.00	27.23	QP

AC 120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
9.255	40.46	10.46	50.00	9.54	Ave.
1.510	35.81	10.19	46.00	10.19	Ave.
1.105	35.77	10.17	46.00	10.23	Ave.
1.610	35.43	10.19	46.00	10.57	Ave.
1.005	34.12	10.17	46.00	11.88	Ave.
10.465	35.33	10.56	50.00	14.67	Ave.
9.255	40.52	10.46	60.00	19.48	QP
1.105	36.38	10.17	56.00	19.62	QP
1.510	36.23	10.19	56.00	19.77	QP
1.610	35.80	10.19	56.00	20.20	QP
1.005	35.09	10.17	56.00	20.91	QP
10.465	36.11	10.56	60.00	23.89	QP

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

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

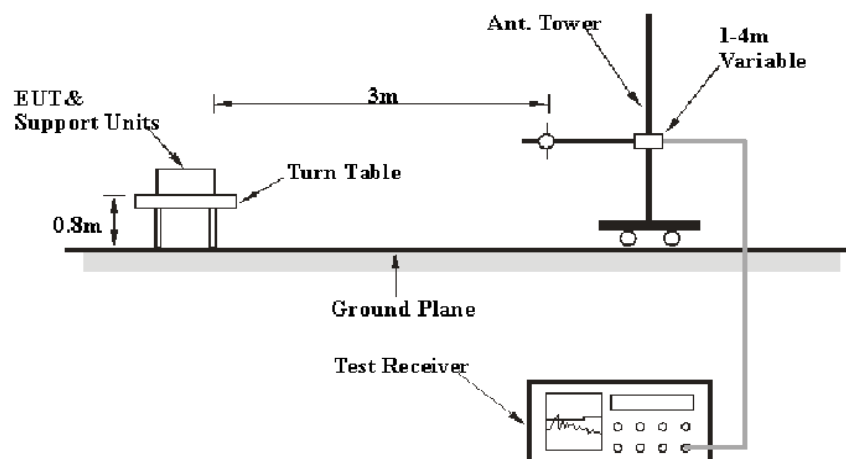
Measurement Uncertainty

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

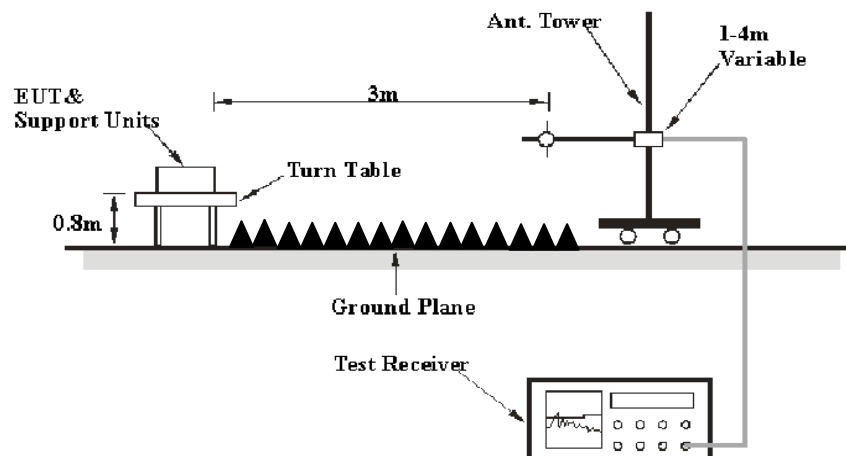
Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for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

The spacing between the peripherals was 10 cm

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

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

Test Procedure

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

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

Corrected Amplitude & Margin Calculation

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

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Corrected Factor}$$

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-04-12	2013-04-11
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-10-14	2012-10-13
Rohde & Schwarz	Auto test Software	EMC32	V6.30	-	-

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

Test Results Summary

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

16.59 dB at 9920.0 MHz in the Horizontal polarization

Test Data

Environmental Conditions

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

The testing was performed by Gardon Zhang on 2012-09-25.

EUT operation mode: Transmitting

Below 1 GHz:

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Detector (PK/QP/Ave.)	Antenna Height (cm)	Antenna Polarity	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
358.466250	25.3	QP	107.0	V	84.0	-13.3	46.0	20.7
439.975000	25.3	QP	106.0	H	131.0	-11.5	46.0	20.7
367.075000	24.9	QP	103.0	H	147.0	-13.1	46.0	21.1
454.860000	23.2	QP	108.0	H	230.0	-11.0	46.0	22.8
400.055000	22.5	QP	107.0	H	178.0	-11.8	46.0	23.5
352.525000	22.4	QP	112.0	V	66.0	-13.5	46.0	23.6

1 ~25 GHz: (Scan with GFSK, $\pi/4$ -DQPSK, 8-DPSK, the worst case is BDR Mode (GFSK))

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Cord. Amp. (dBuV/m)	Part 15.247205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBuV/m)	Margin (dB)
Low Channel (2402 MHz)									
2402.0	84.95	PK	16	1.2	H	6.13	91.08	/	/
2402.0	73.06	Ave.	16	1.2	H	6.13	79.19	/	/
2402.0	82.96	PK	35	1.3	V	6.13	89.09	/	/
2402.0	70.54	Ave.	35	1.3	V	6.13	76.67	/	/
9608.0	17.89	Ave.	69	1.2	H	19.28	37.17	54	16.83
7206.0	17.85	Ave.	143	1.3	V	17.06	34.91	54	19.09
4804.0	21.66	Ave.	122	1.2	V	12.40	34.06	54	19.94
9608.0	33.62	PK	69	1.2	H	19.28	52.90	74	21.10
2366.3	24.91	Ave.	85	1.2	V	5.48	30.39	54	23.61
7206.0	33.26	PK	143	1.3	V	17.06	50.32	74	23.68
2485.2	23.05	Ave.	78	1.2	V	6.81	29.86	54	24.14
4804.0	36.69	PK	122	1.2	V	12.40	49.09	74	24.91
2331.5	22.68	Ave.	99	1.3	H	5.48	28.16	54	25.84
2485.2	36.97	PK	78	1.2	V	6.81	43.78	74	30.22
2366.3	38.17	PK	85	1.2	V	5.48	43.65	74	30.35
2331.5	36.65	PK	99	1.3	H	5.48	42.13	74	31.87
Middle Channel (2441 MHz)									
2441.0	84.02	PK	39	1.3	H	7.21	91.23	/	/
2441.0	73.06	Ave.	39	1.3	H	7.21	80.27	/	/
2441.0	82.64	PK	62	1.3	V	6.81	89.45	/	/
2441.0	70.15	Ave.	62	1.3	V	6.81	76.96	/	/
9764.0	17.44	Ave.	81	1.3	H	19.40	36.84	54	17.16
4882.0	22.19	Ave.	45	1.2	V	12.46	34.65	54	19.35
7323.0	18.06	Ave.	8	1.3	V	16.49	34.55	54	19.45
9764.0	32.46	PK	81	1.3	H	19.40	51.86	74	22.14
7323.0	33.25	PK	8	1.3	V	16.49	49.74	74	24.26
2484.3	22.91	Ave.	48	1.2	V	6.81	29.72	54	24.28
2365.5	24.16	Ave.	33	1.1	V	5.48	29.64	54	24.36
4882.0	37.09	PK	45	1.2	V	12.46	49.55	74	24.45
2332.7	22.91	Ave.	9	1.3	H	5.48	28.39	54	25.61
2484.3	37.01	PK	48	1.2	V	6.81	43.82	74	30.18
2365.5	37.89	PK	33	1.1	V	5.48	43.37	74	30.63
2332.7	36.67	PK	9	1.3	H	5.48	42.15	74	31.85

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Cord. Amp. (dBuV/m)	Part 15.247205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBuV/m)	Margin (dB)
High Channel(2480 MHz)									
2480.0	81.25	PK	36	1.1	H	7.21	88.46	/	/
2480.0	70.69	Ave.	36	1.1	H	7.21	77.90	/	/
2480.0	80.06	PK	91	1.3	V	6.81	86.87	/	/
2480.0	68.97	Ave.	91	1.3	V	6.81	75.78	/	/
9920.0	18.03	Ave.	36	1.2	H	19.38	37.41	54	16.59
4960.0	22.58	Ave.	55	1.1	V	12.50	35.08	54	18.92
7440.0	18.53	Ave.	7	1.3	V	15.90	34.43	54	19.57
9920.0	32.98	PK	36	1.2	H	19.38	52.36	74	21.64
2366.7	24.17	Ave.	62	1.1	V	5.48	29.65	54	24.35
2487.3	22.68	Ave.	8	1.2	V	6.81	29.49	54	24.51
7440.0	33.02	PK	7	1.3	V	15.90	48.92	74	25.08
2332.8	23.34	Ave.	26	1.3	H	5.48	28.82	54	25.18
4960.0	36.07	PK	55	1.1	V	12.50	48.57	74	25.43
2487.3	37.11	PK	8	1.2	V	6.81	43.92	74	30.08
2366.7	37.81	PK	62	1.1	V	5.48	43.29	74	30.71
2332.8	36.91	PK	26	1.3	H	5.48	42.39	74	31.61

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

Applicable Standard

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

Test Procedure

1. Set the EUT in transmitting mode, maxhold the channel.
2. Set the adjacent channel of the EUT and 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 the NIST.

Test Data

Environmental Conditions

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

* The testing was performed by Gardon Zhang on 2012-09-22.

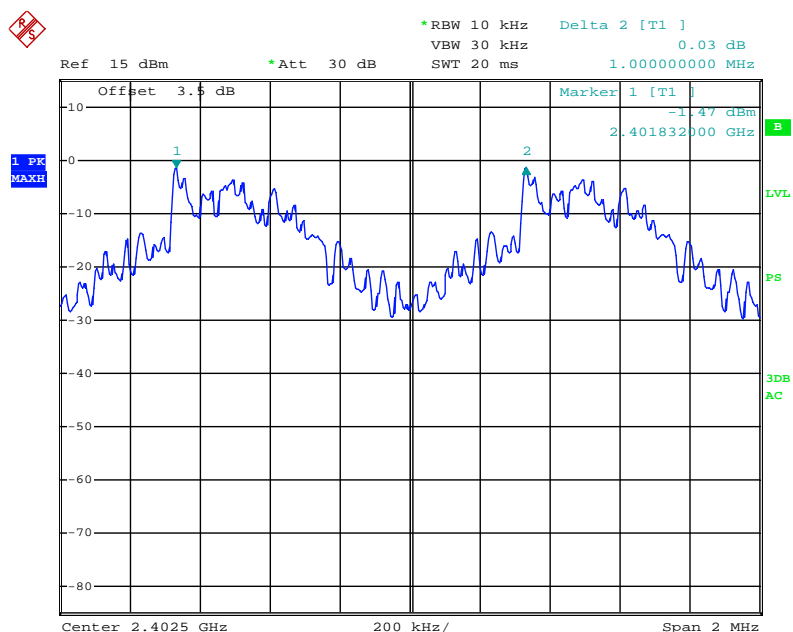
EUT operation mode: Transmitting

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

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.000	0.555	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.555	Pass
	Adjacent	2442			
	High	2480	1.000	0.555	Pass
	Adjacent	2479			
EDR ($\pi/4$ -DQPSK)	Low	2402	1.002	0.832	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.832	Pass
	Adjacent	2442			
	High	2480	1.002	0.832	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.002	0.814	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.814	Pass
	Adjacent	2442			
	High	2480	1.002	0.814	Pass
	Adjacent	2479			

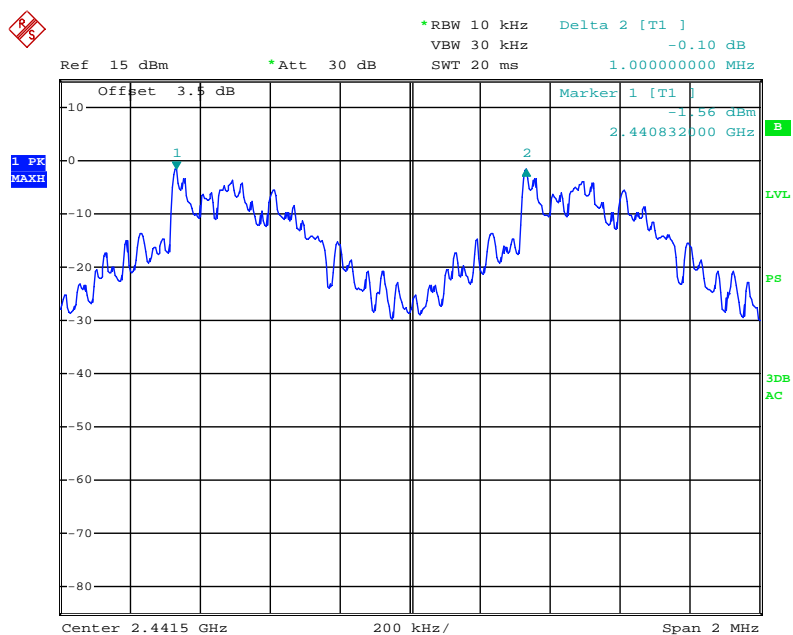
Note: Limit = 20 dB bandwidth *2/3

BDR (GFSK): Low Channel



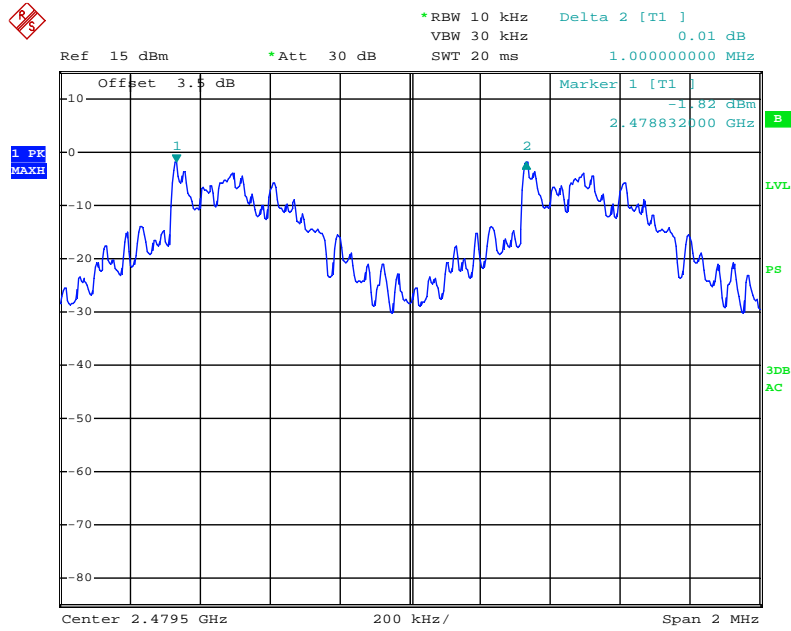
Date: 22.SEP.2012 14:13:19

BDR (GFSK): Middle Channel



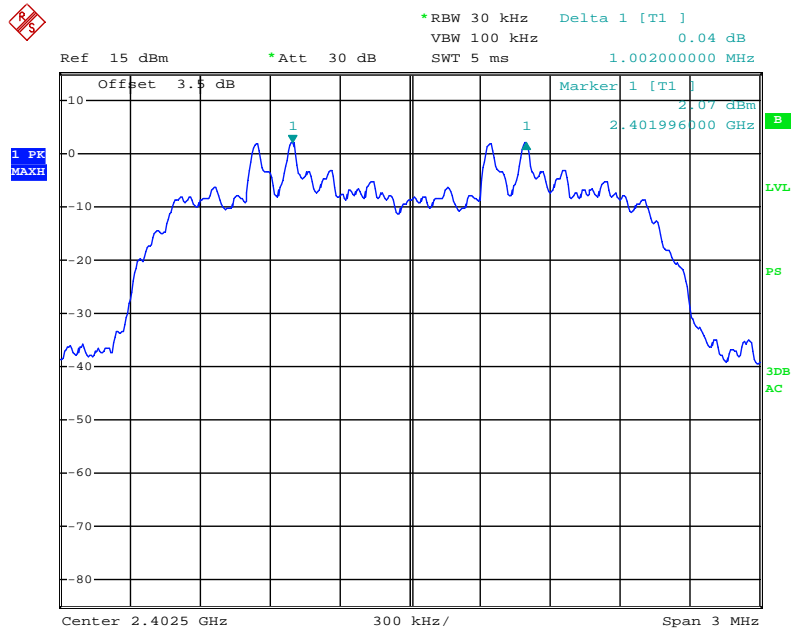
Date: 22.SEP.2012 14:15:29

BDR (GFSK): High Channel

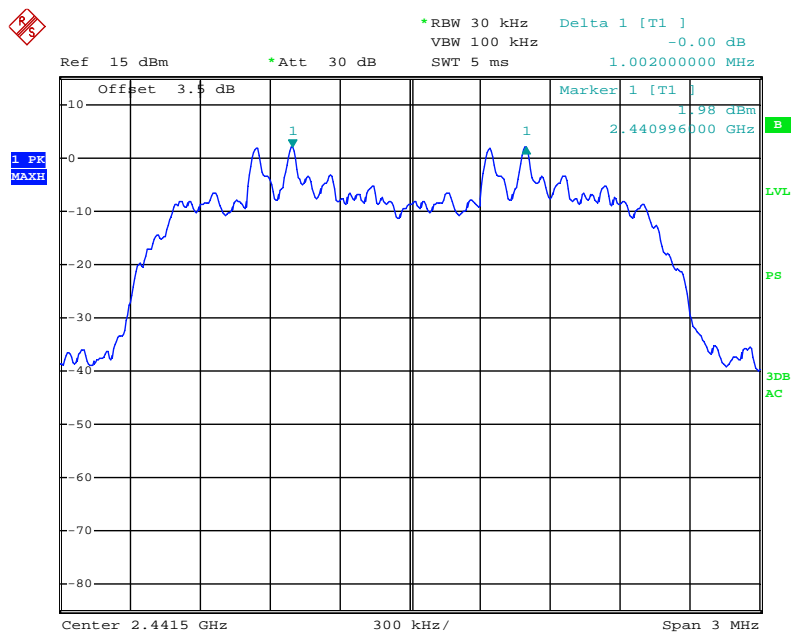


Date: 22.SEP.2012 14:17:22

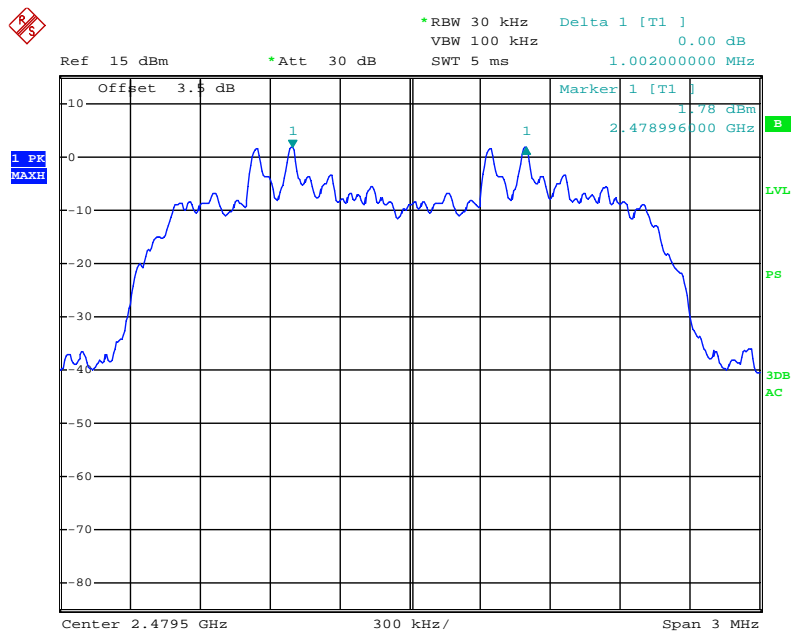
EDR ($\pi/4$ -DQPSK): Low Channel



Date: 22.SEP.2012 15:35:17

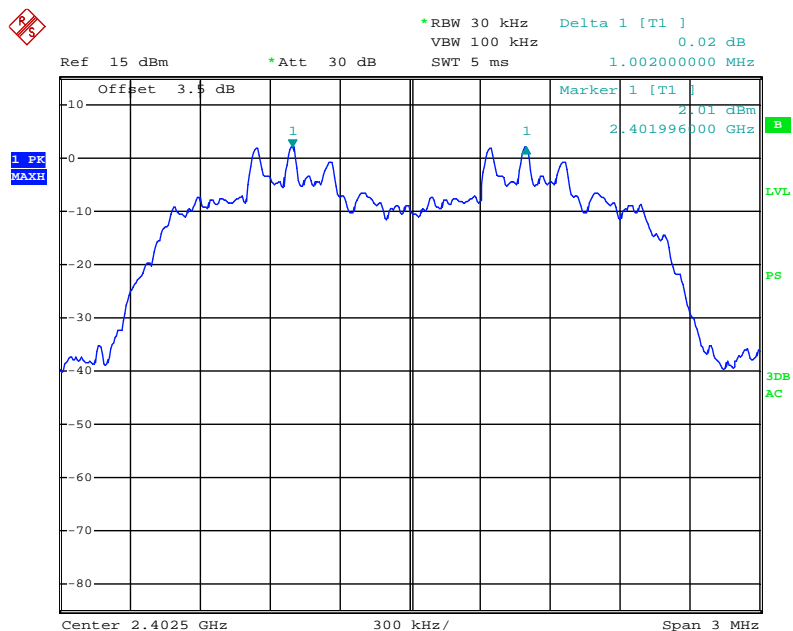
EDR ($\pi/4$ -DQPSK): Middle Channel

Date: 22.SEP.2012 15:36:57

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

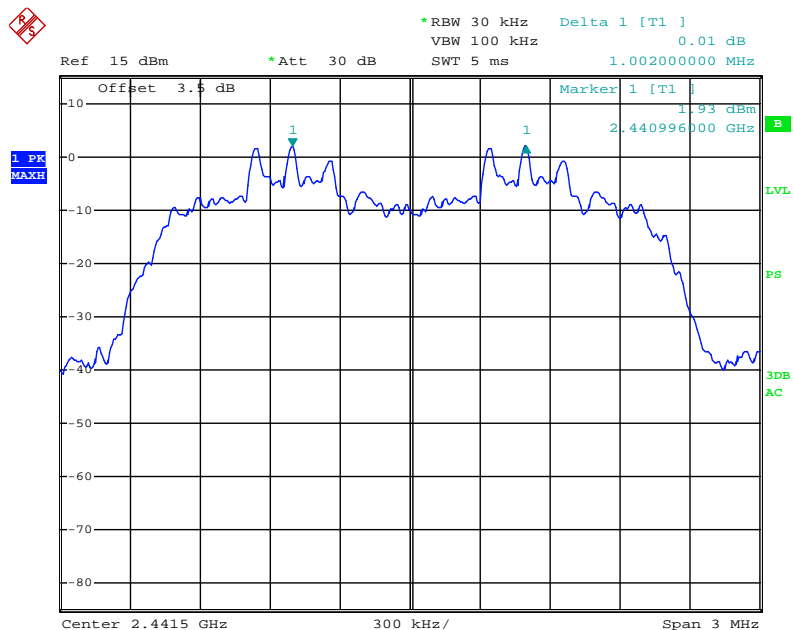
Date: 22.SEP.2012 15:39:06

EDR (8DPSK): Low Channel



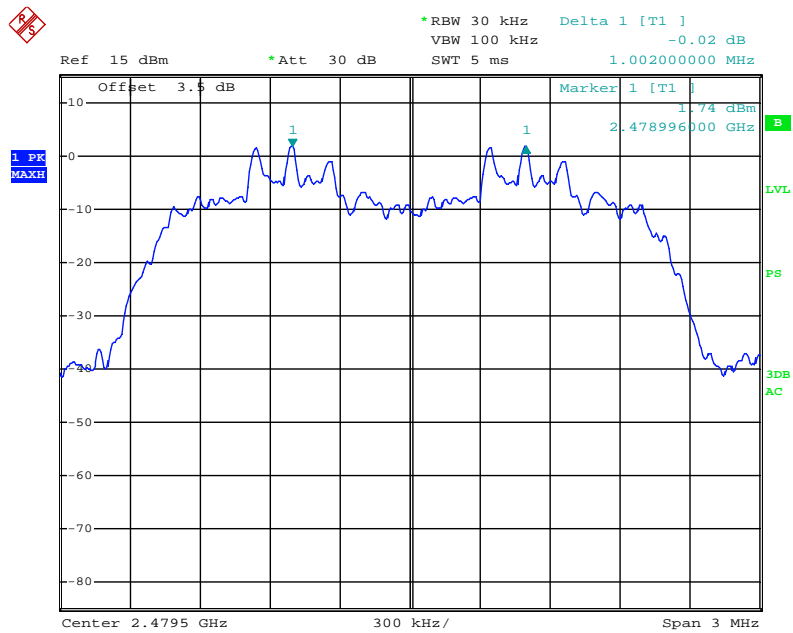
Date: 22.SEP.2012 16:27:07

EDR (8DPSK): Middle Channel



Date: 22.SEP.2012 16:28:30

EDR (8DPSK): High Channel



Date: 22.SEP.2012 16:29:53

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 the NIST.

Test Data

Environmental Conditions

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

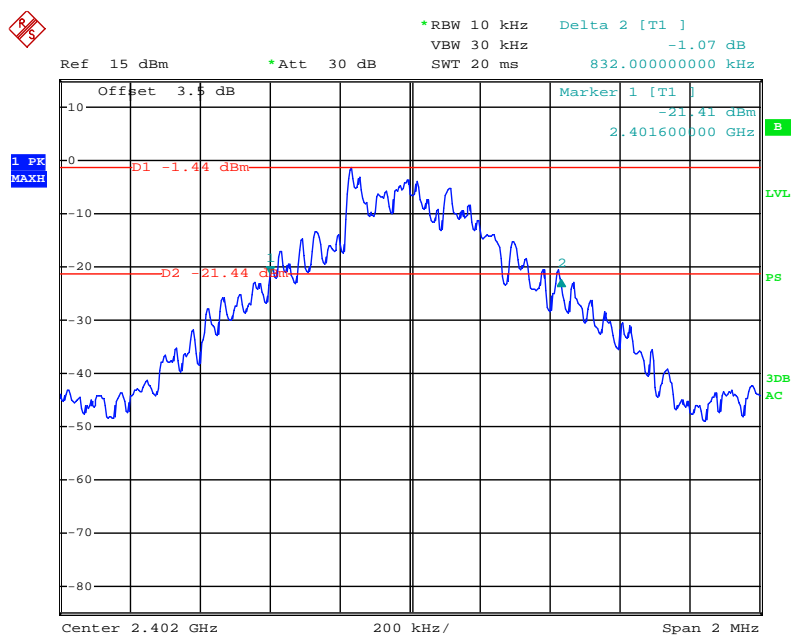
* The testing was performed by Gardon Zhang on 2012-09-22.

EUT operation mode: Transmitting

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

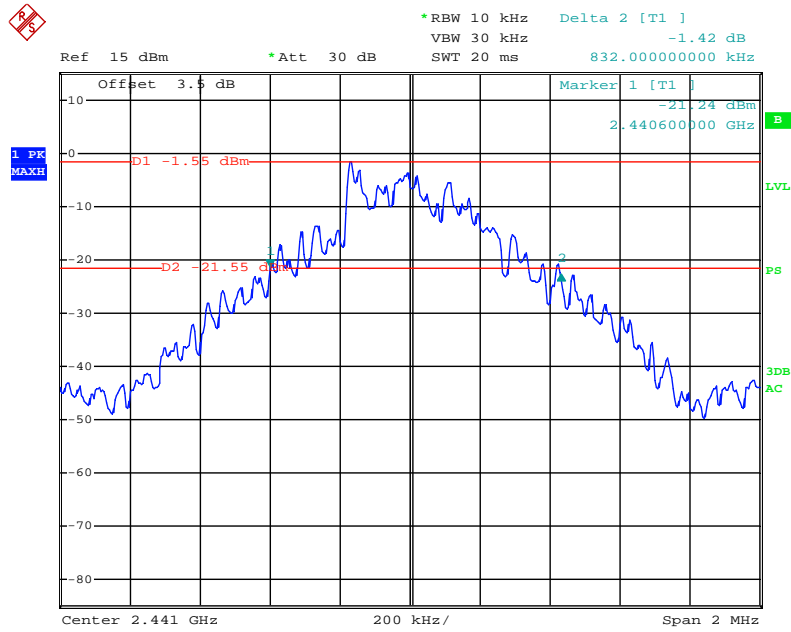
Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR (GFSK)	Low	2402	0.832
	Middle	2441	0.832
	High	2480	0.832
EDR ($\pi/4$ -DQPSK)	Low	2402	1.248
	Middle	2441	1.248
	High	2480	1.248
EDR (8DPSK)	Low	2402	1.220
	Middle	2441	1.220
	High	2480	1.220

BDR (GFSK): Low Channel



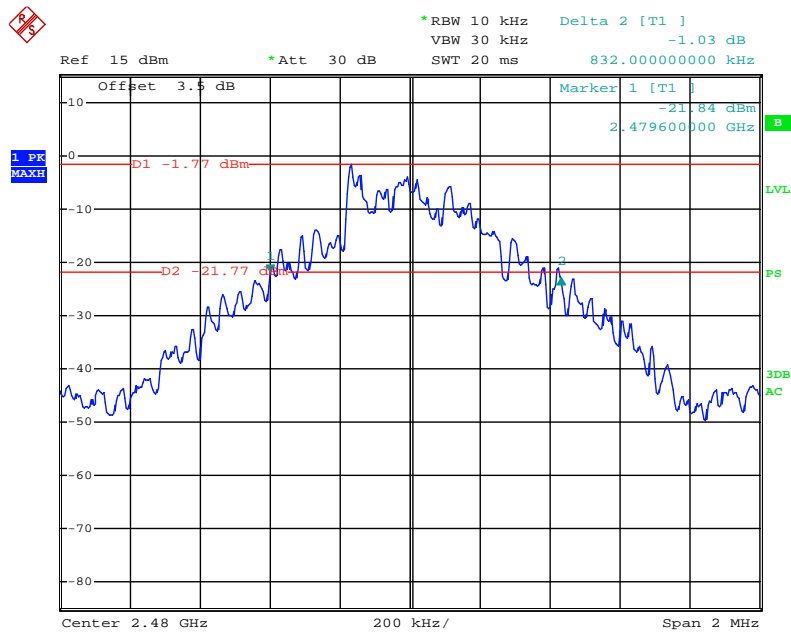
Date: 22.SEP.2012 13:48:26

BDR (GFSK): Middle Channel



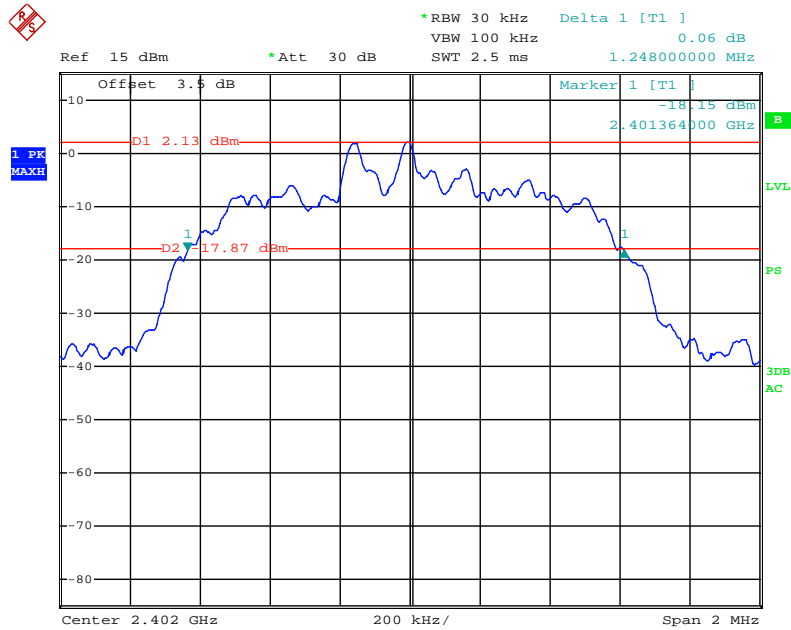
Date: 22.SEP.2012 13:57:28

BDR (GFSK): High Channel



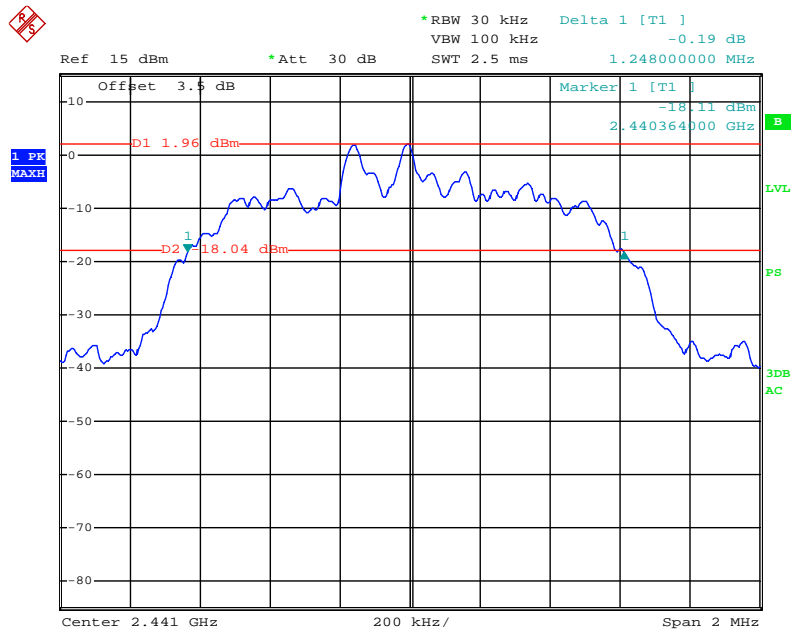
Date: 22.SEP.2012 13:58:48

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

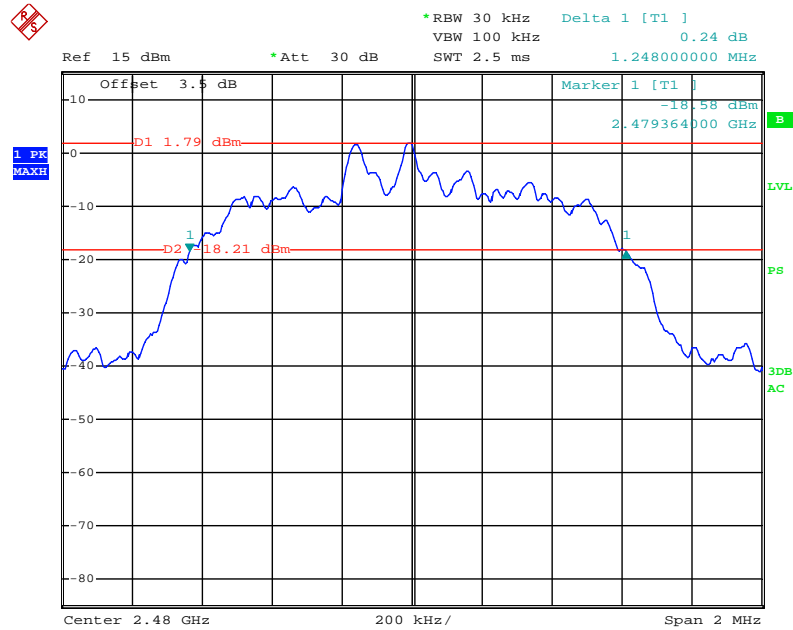


Date: 22.SEP.2012 15:33:13

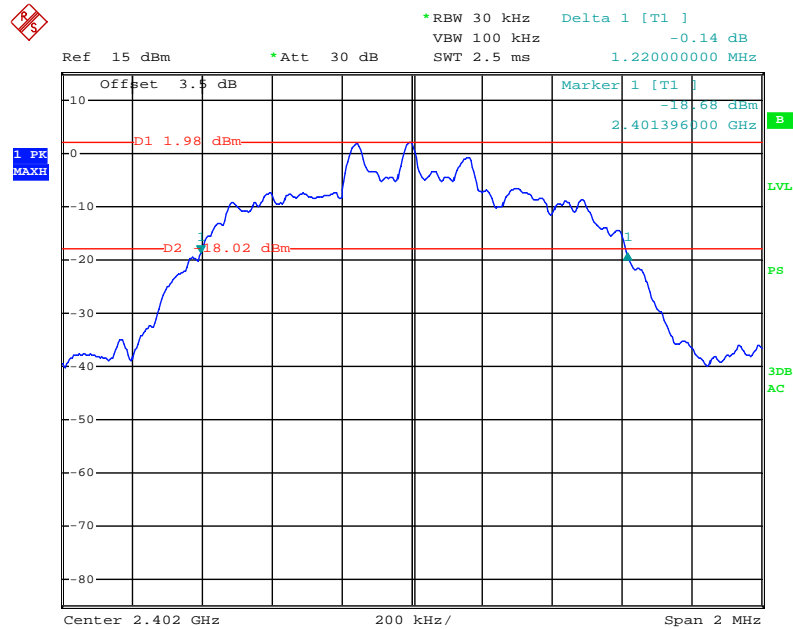
EDR ($\pi/4$ -DQPSK): Middle Channel



Date: 22.SEP.2012 15:27:44

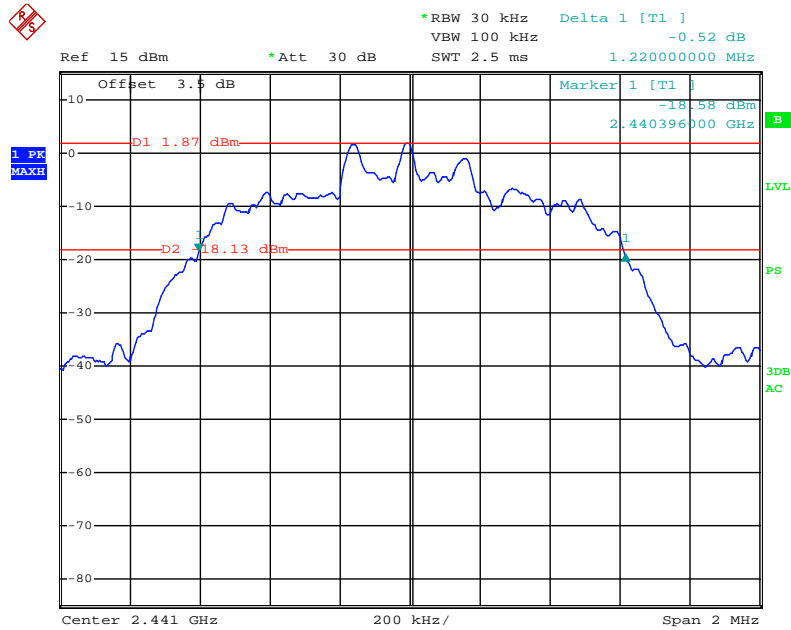
EDR ($\pi/4$ -DQPSK): High Channel

Date: 22.SEP.2012 15:29:52

EDR (8DPSK): Low Channel

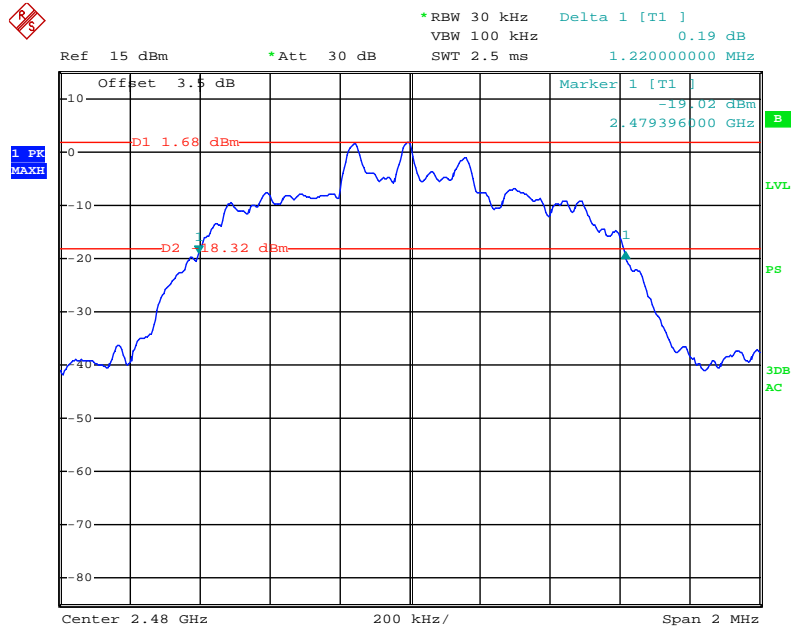
Date: 22.SEP.2012 16:12:34

EDR (8DPSK): Middle Channel



Date: 22.SEP.2012 16:13:52

EDR (8DPSK): High Channel



Date: 22.SEP.2012 16:15:28

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 the NIST.

Test Data**Environmental Conditions**

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

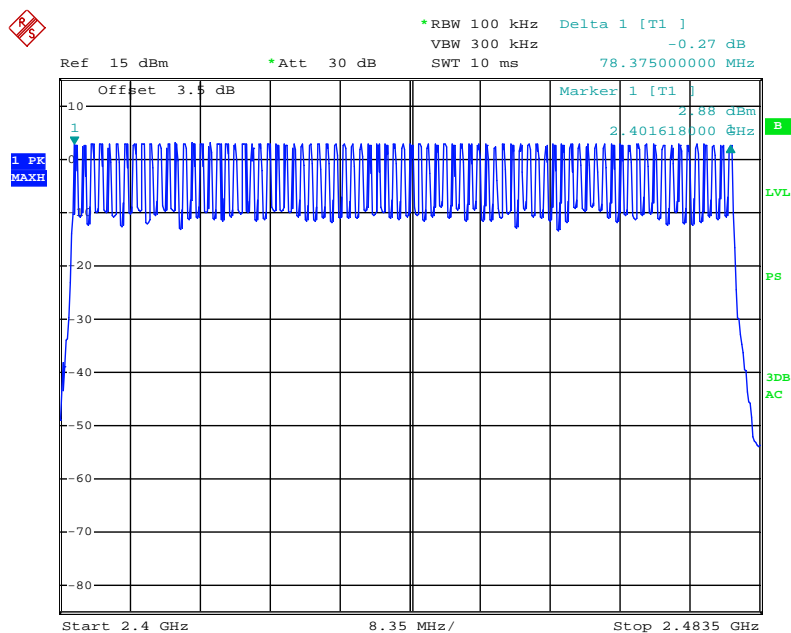
The testing was performed by Gardon Zhang on 2012-09-22.

EUT operation mode: Transmitting

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

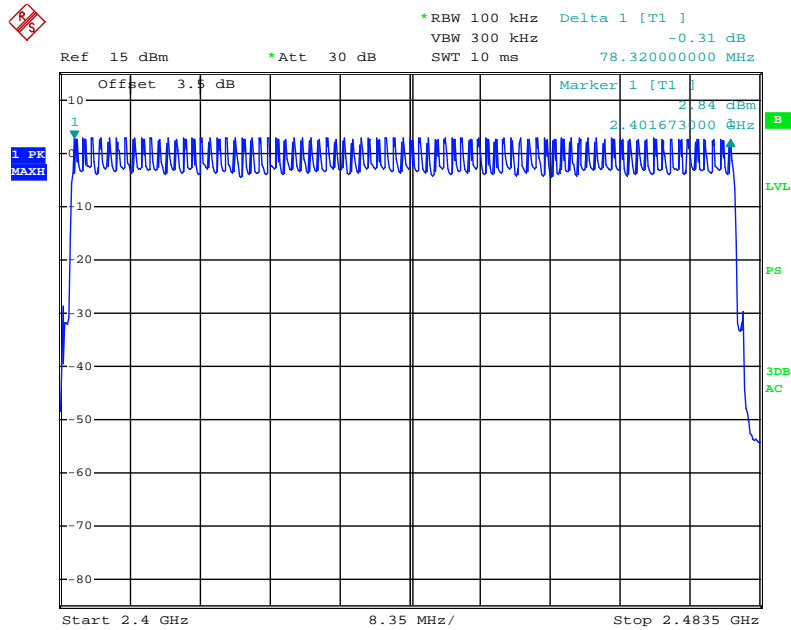
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥ 15
EDR ($\pi/4$ -DQPSK)	2400-2483.5	79	≥ 15
EDR (8DPSK)	2400-2483.5	79	≥ 15

BDR (GFSK): Number of Hopping Channels



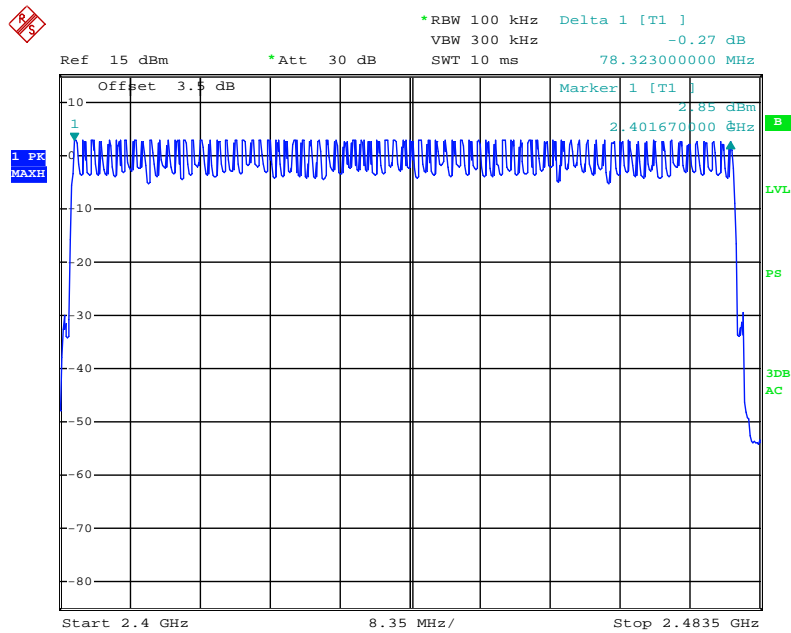
Date: 22.SEP.2012 14:33:48

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



Date: 22.SEP.2012 16:07:27

(8DPSK): Number of Hopping Channels



Date: 22.SEP.2012 16:45:04

FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME)**Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	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 the NIST.

Test Data**Environmental Conditions**

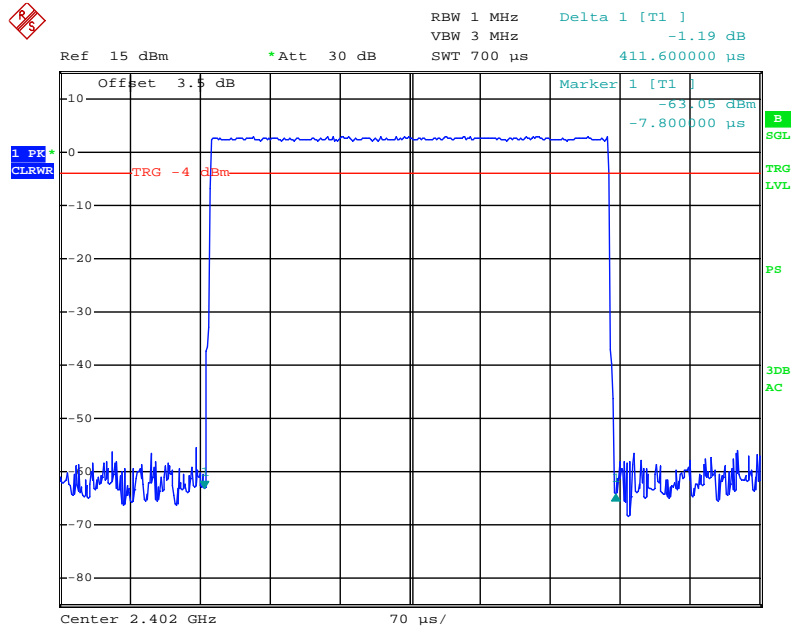
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

The testing was performed by Gardon Zhang on 2012-09-22

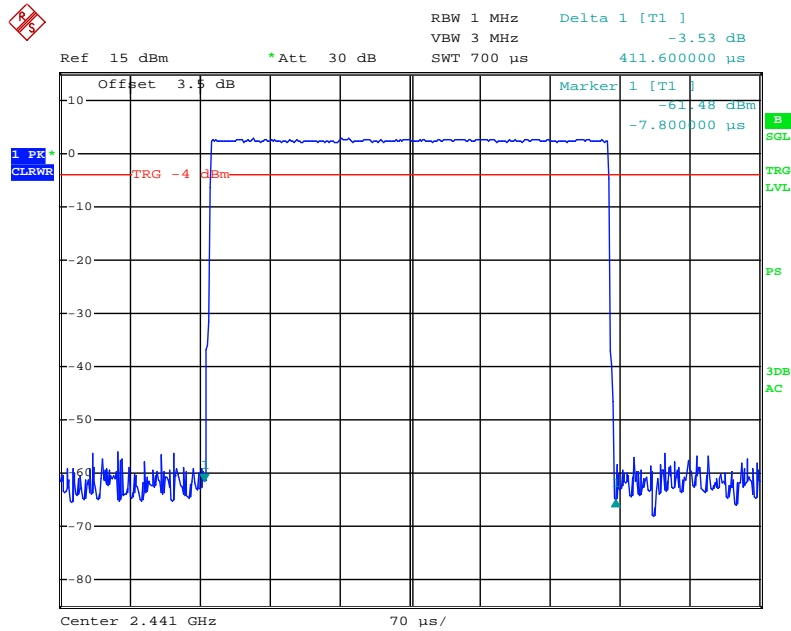
EUT operation mode: Transmitting

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	0.412	0.132	0.4	Pass
		Middle	0.412	0.132	0.4	Pass
		High	0.412	0.132	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.688	0.270	0.4	Pass
		Middle	1.688	0.270	0.4	Pass
		High	1.688	0.270	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.930	0.313	0.4	Pass
		Middle	2.930	0.313	0.4	Pass
		High	2.930	0.313	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR ($\pi/4$ -DQPSK)	DH 1	Low	0.422	0.135	0.4	Pass
		Middle	0.422	0.135	0.4	Pass
		High	0.422	0.135	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.691	0.271	0.4	Pass
		Middle	1.691	0.271	0.4	Pass
		High	1.691	0.271	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.939	0.314	0.4	Pass
		Middle	2.939	0.314	0.4	Pass
		High	2.939	0.314	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	DH 1	Low	0.423	0.136	0.4	Pass
		Middle	0.423	0.136	0.4	Pass
		High	0.423	0.136	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.694	0.271	0.4	Pass
		Middle	1.694	0.271	0.4	Pass
		High	1.694	0.271	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.954	0.315	0.4	Pass
		Middle	2.954	0.315	0.4	Pass
		High	2.954	0.315	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

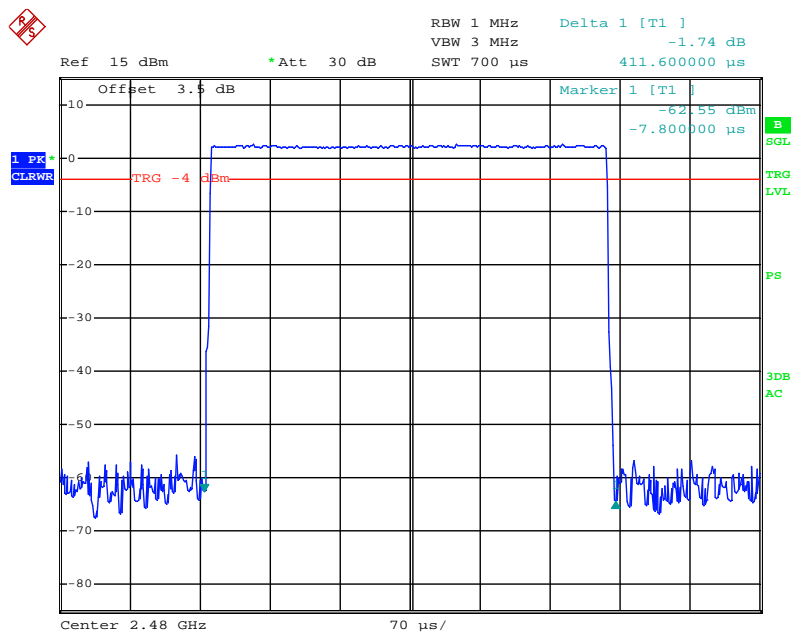
BDR (GFSK):**Pulse time, Low Channel, DH1**

Date: 22.SEP.2012 14:46:35

Pulse time, Middle Channel, DH1

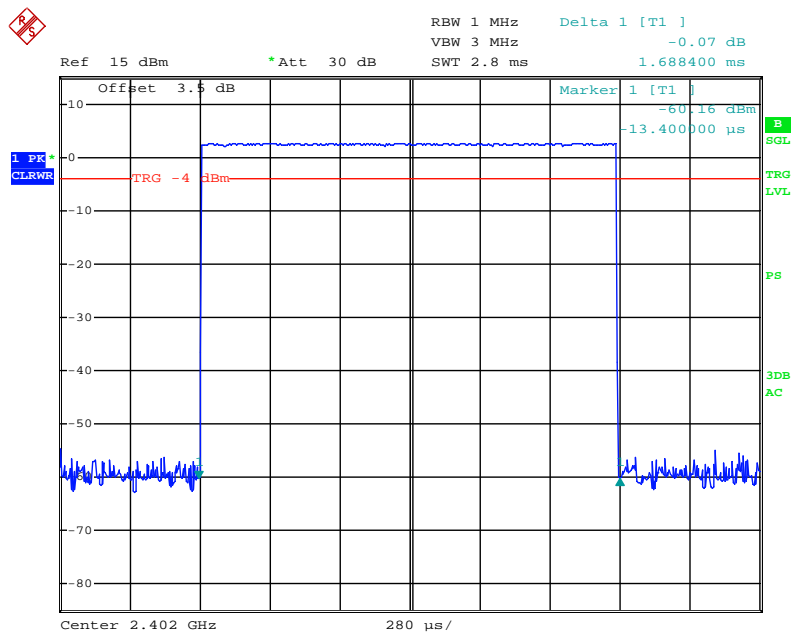
Date: 22.SEP.2012 14:48:05

Pulse time, High Channel, DH1



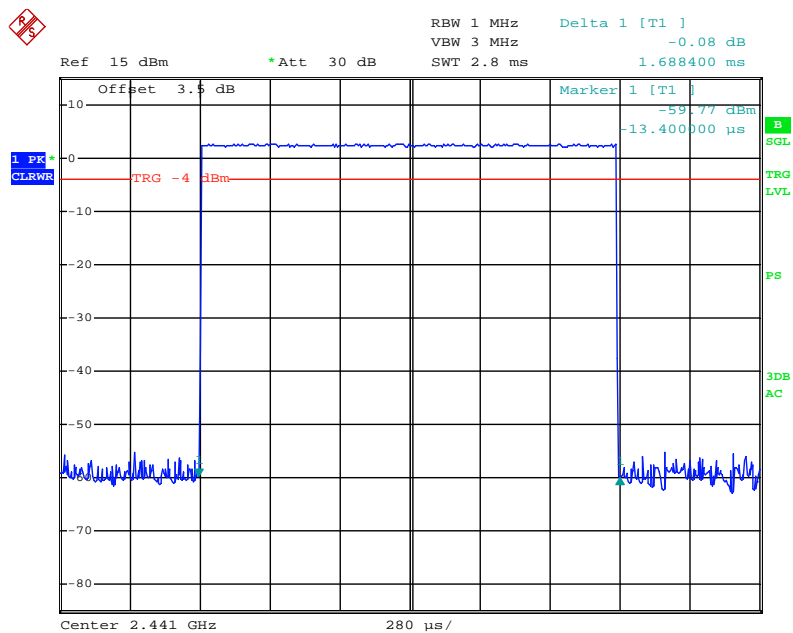
Date: 22.SEP.2012 14:48:42

Pulse time, Low Channel, DH3



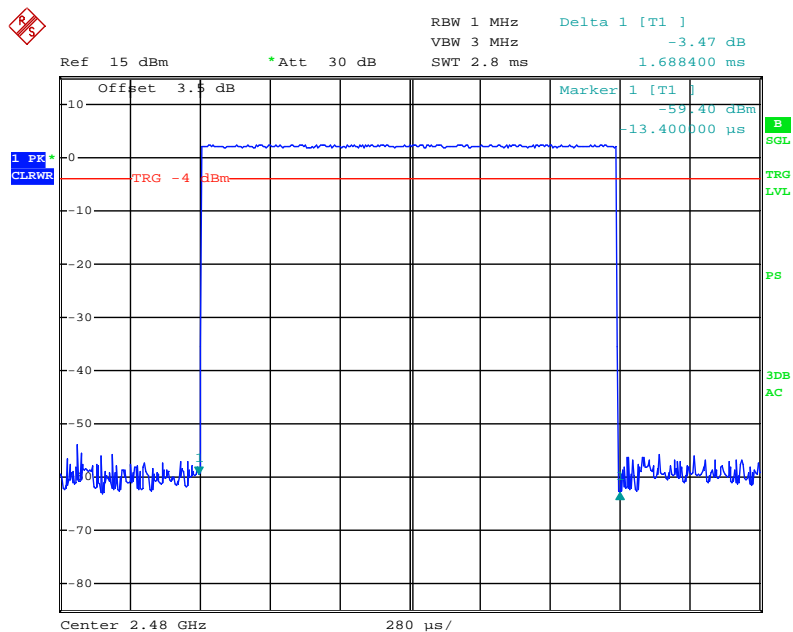
Date: 22.SEP.2012 14:51:16

Pulse time, Middle Channel, DH3



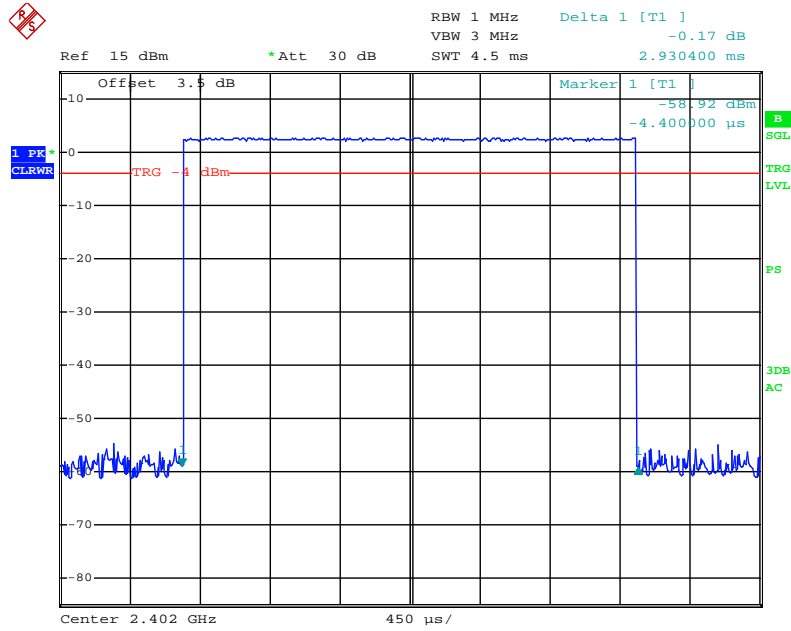
Date: 22.SEP.2012 14:50:52

Pulse time, High Channel, DH3



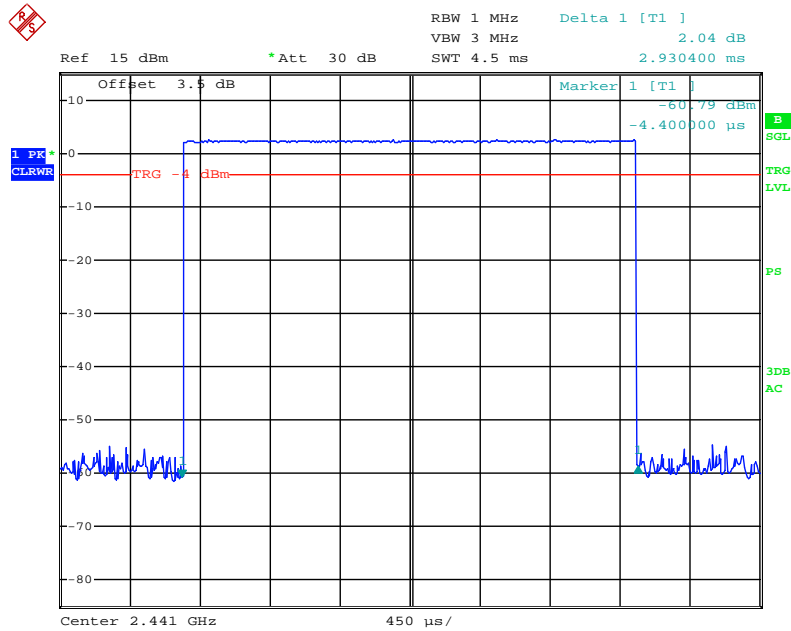
Date: 22.SEP.2012 14:50:26

Pulse time, Low Channel, DH5

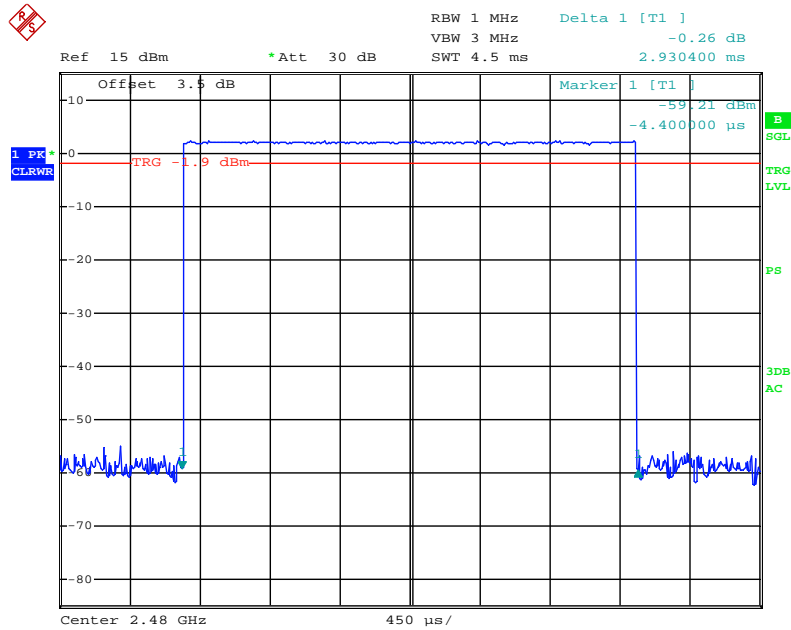


Date: 22.SEP.2012 14:53:37

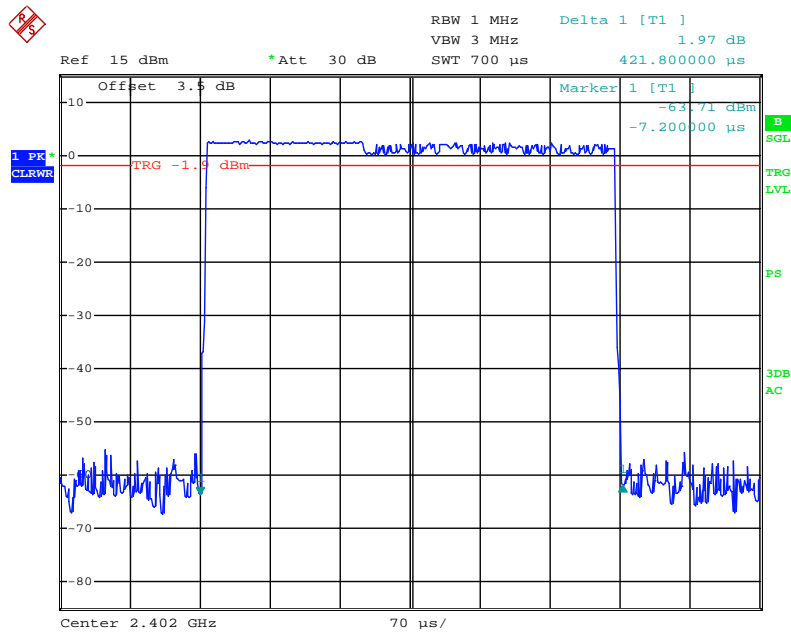
Pulse time, Middle Channel, DH5



Date: 22.SEP.2012 14:54:29

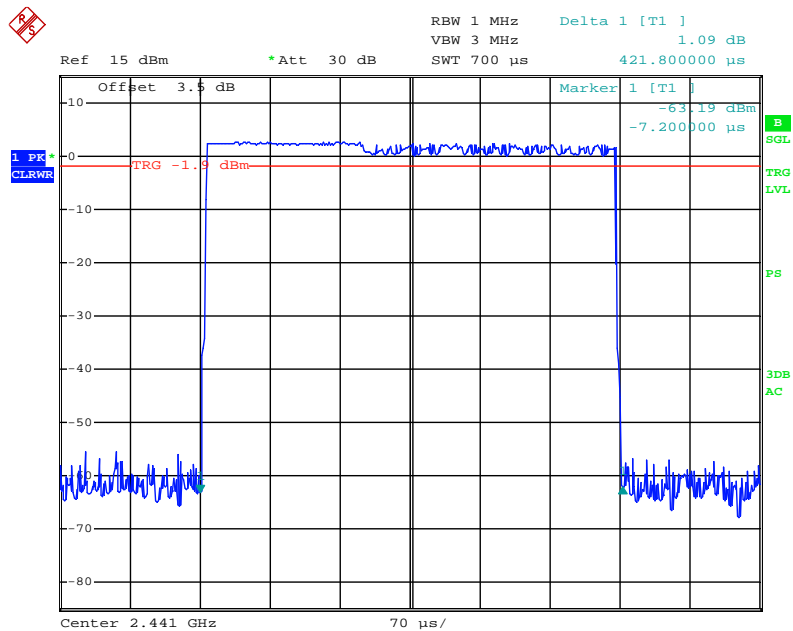
Pulse time, High Channel, DH5

Date: 22.SEP.2012 15:05:33

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

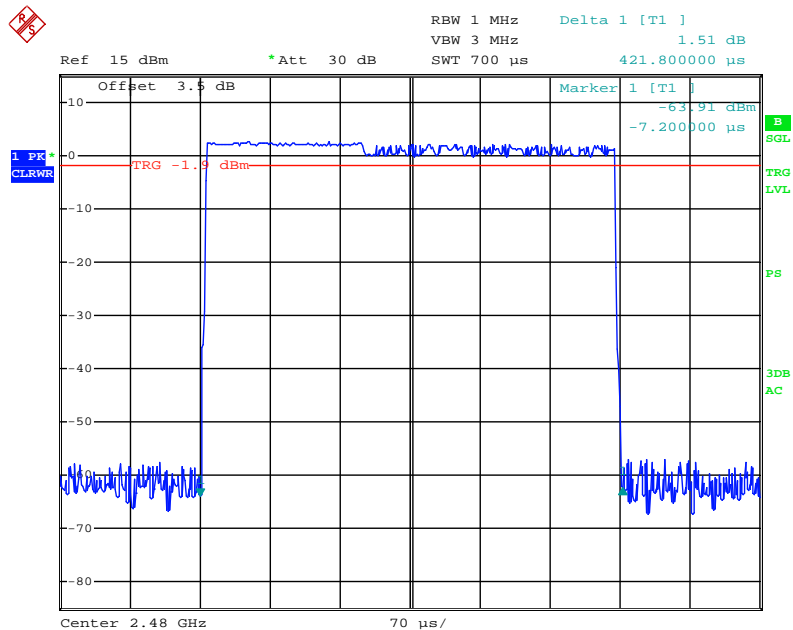
Date: 22.SEP.2012 15:10:40

Pulse time, Middle Channel, DH1



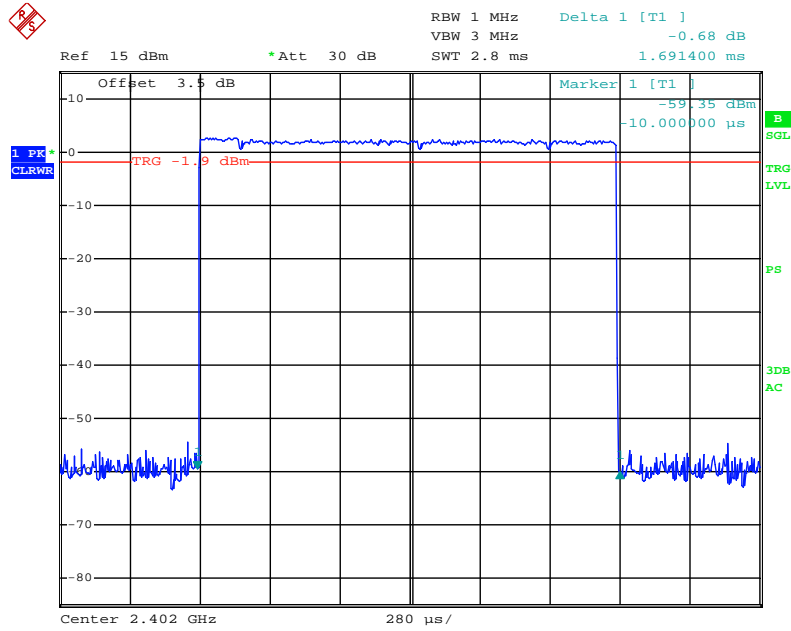
Date: 22.SEP.2012 15:15:05

Pulse time, High Channel, DH1



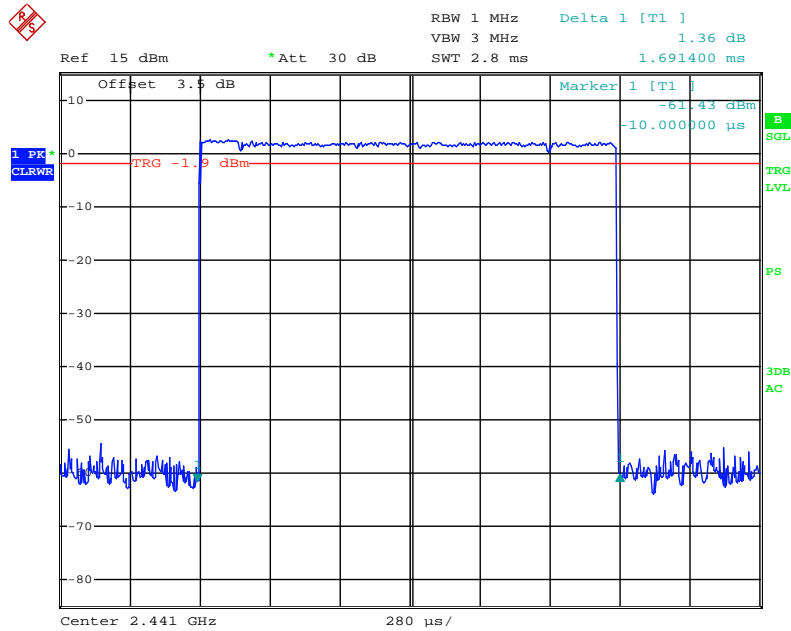
Date: 22.SEP.2012 15:17:46

Pulse time, Low Channel, DH3



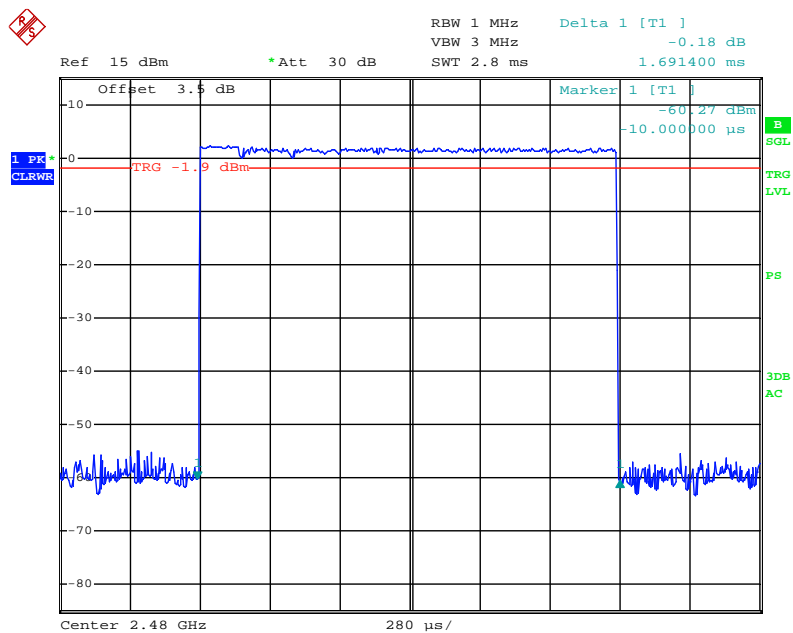
Date: 22.SEP.2012 15:09:16

Pulse time, Middle Channel, DH3



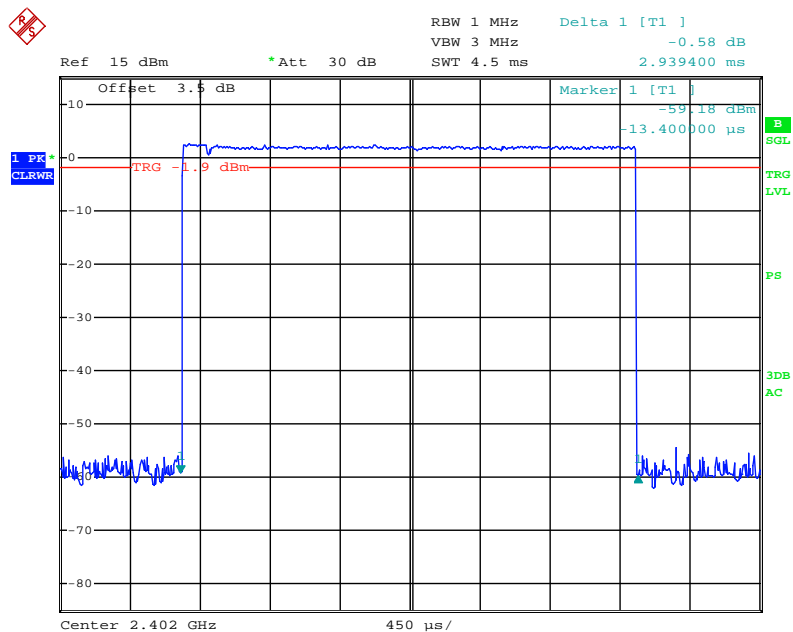
Date: 22.SEP.2012 15:08:53

Pulse time, High Channel, DH3



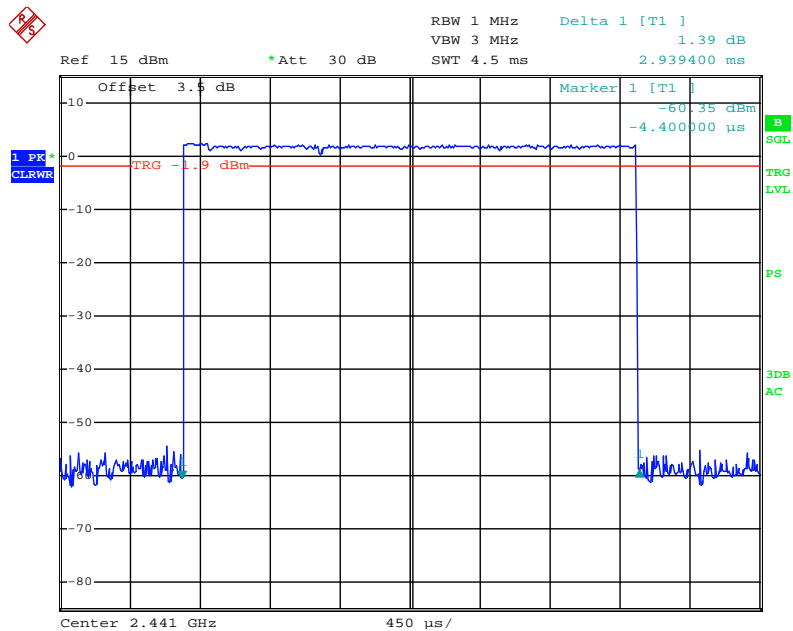
Date: 22.SEP.2012 15:08:08

Pulse time, Low Channel, DH5



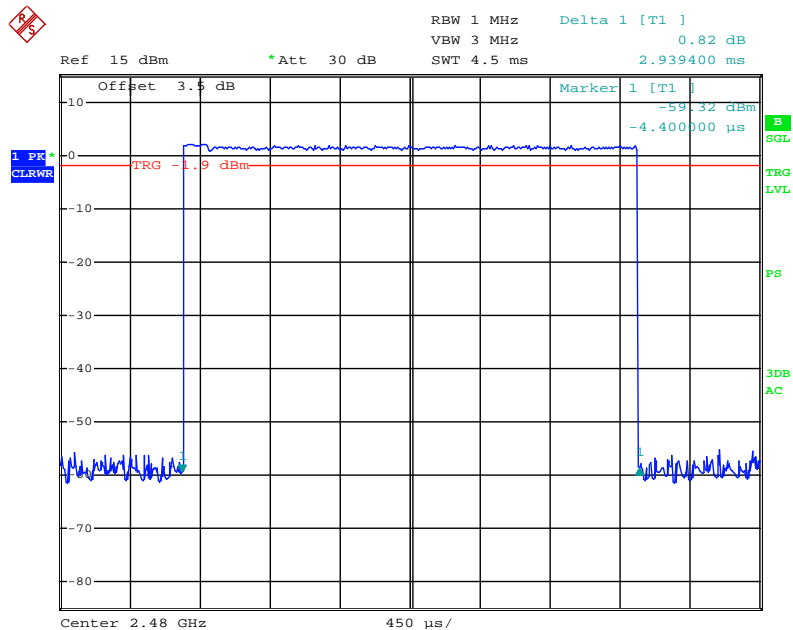
Date: 22.SEP.2012 14:59:53

Pulse time, Middle Channel, DH5

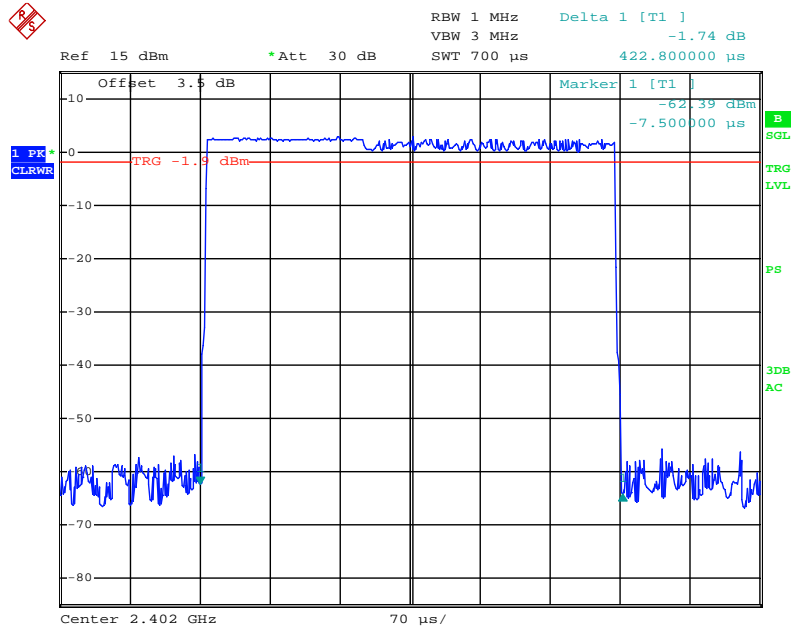


Date: 22.SEP.2012 15:00:54

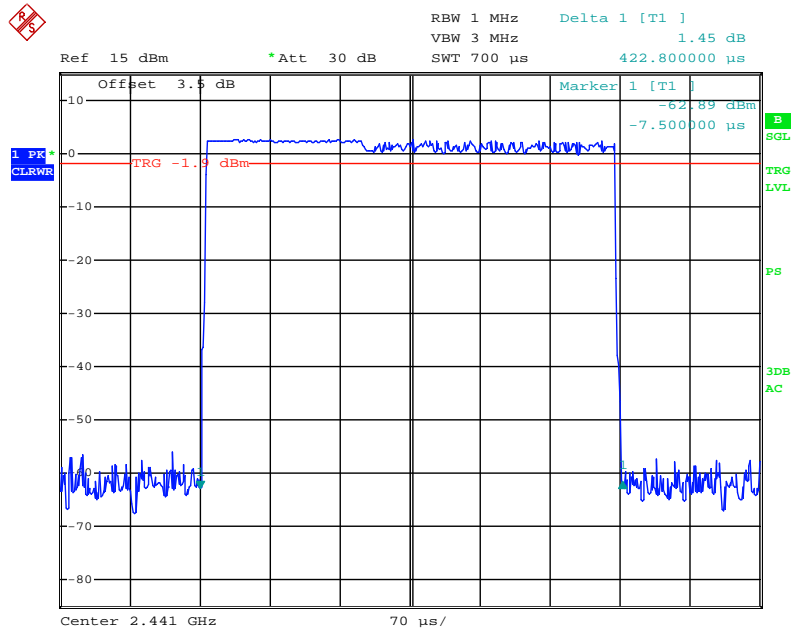
Pulse time, High Channel, DH5



Date: 22.SEP.2012 15:02:04

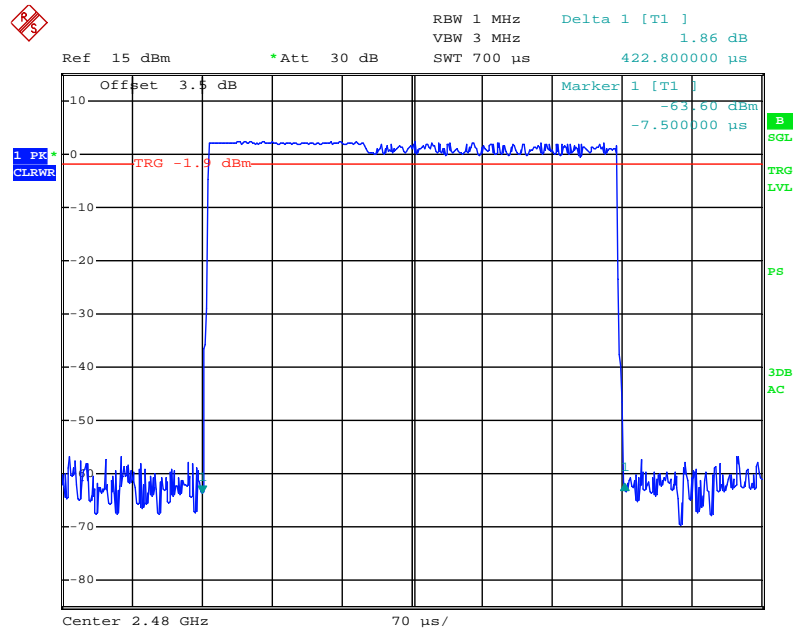
EDR (8DPSK):**Pulse time, Low Channel, DH1**

Date: 22.SEP.2012 16:49:32

Pulse time, Middle Channel, DH1

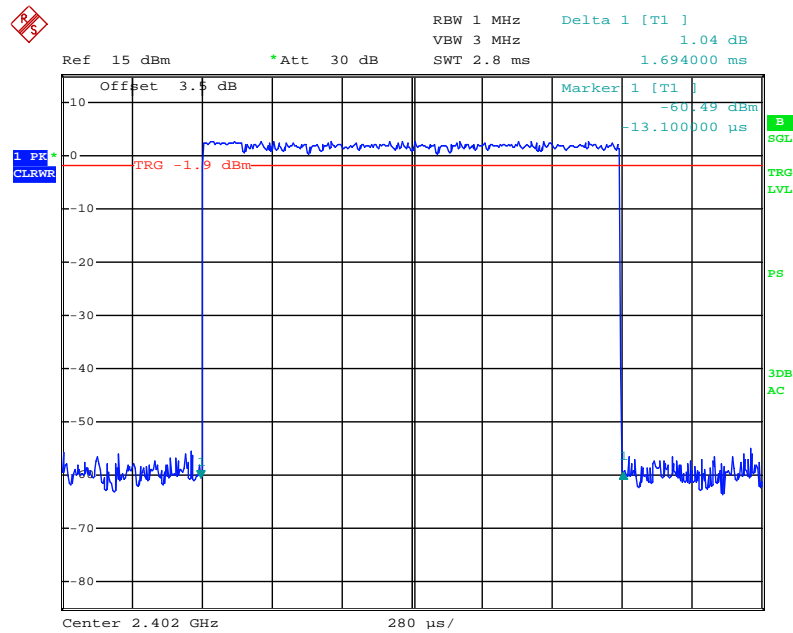
Date: 22.SEP.2012 16:50:13

Pulse time, High Channel, DH1



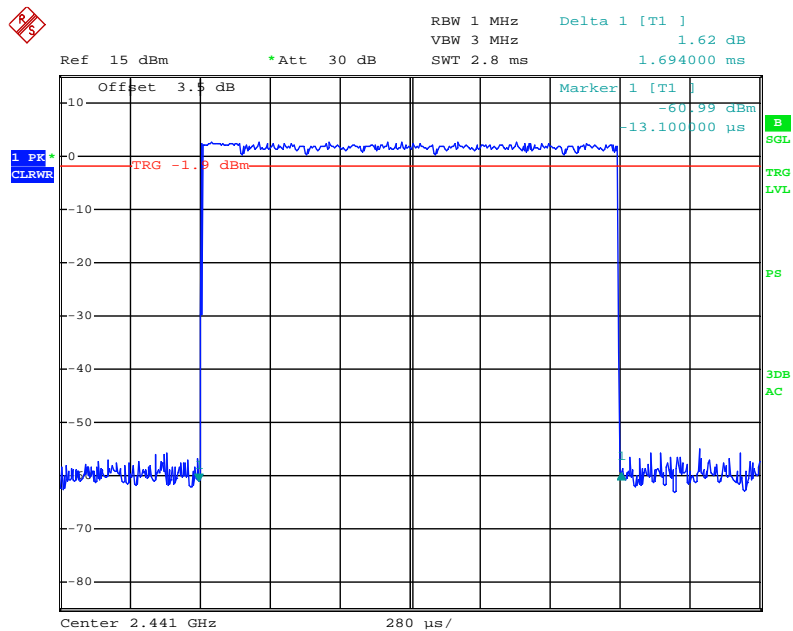
Date: 22.SEP.2012 16:51:01

Pulse time, Low Channel, DH3



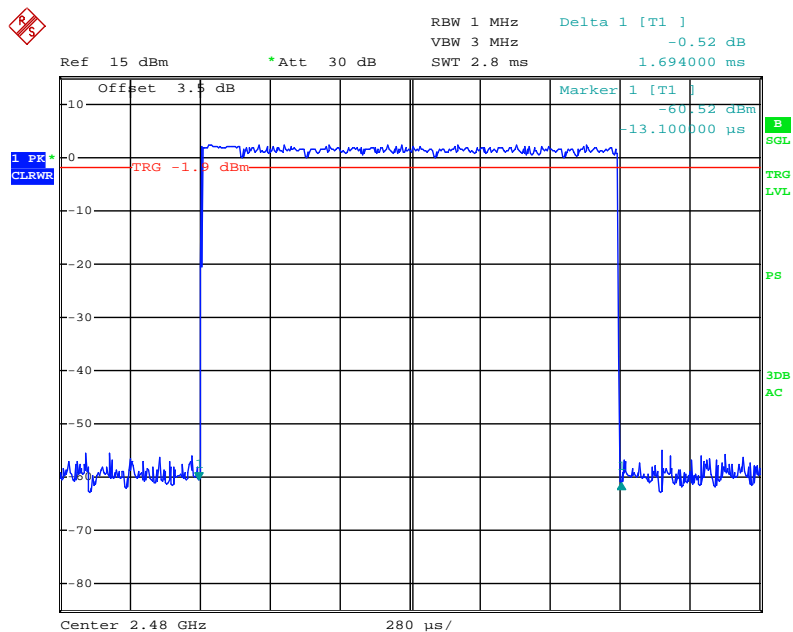
Date: 22.SEP.2012 16:52:42

Pulse time, Middle Channel, DH3



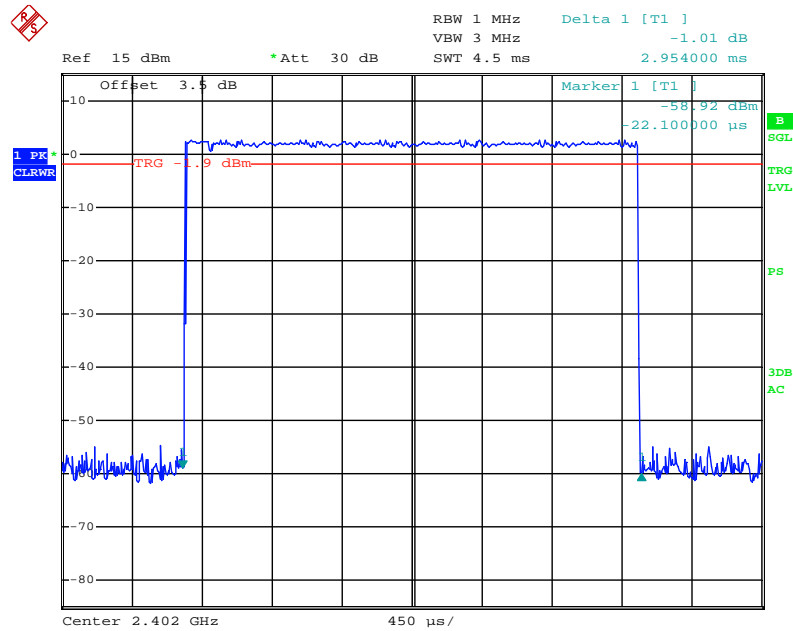
Date: 22.SEP.2012 16:52:23

Pulse time, High Channel, DH3



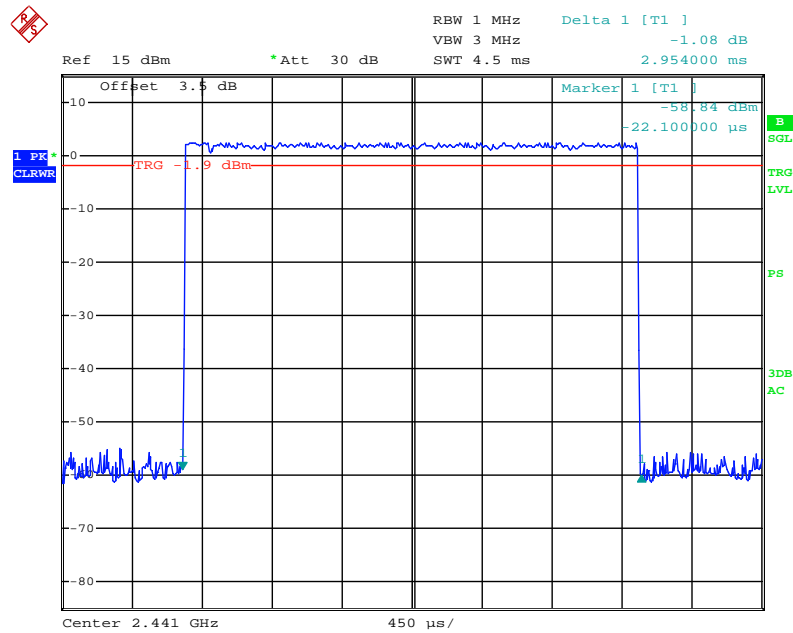
Date: 22.SEP.2012 16:52:00

Pulse time, Low Channel, DH5



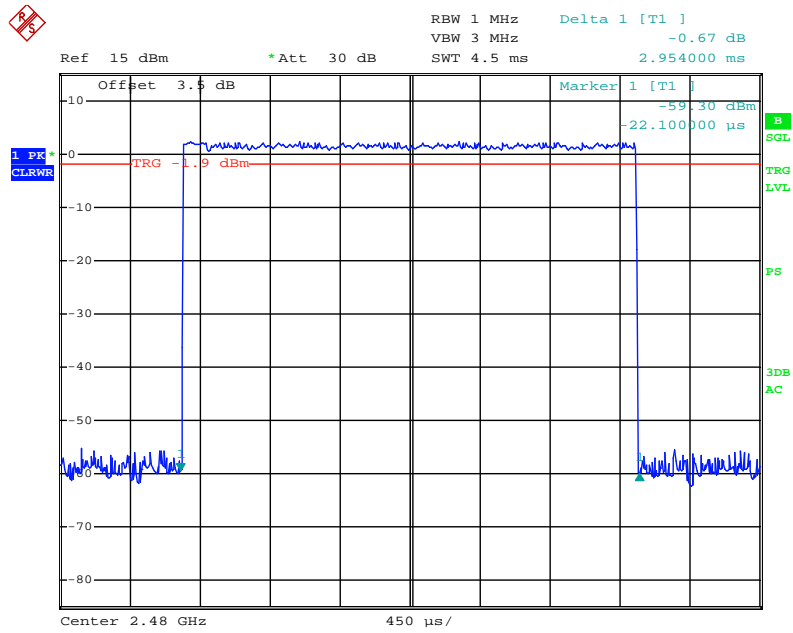
Date: 22.SEP.2012 16:54:20

Pulse time, Middle Channel, DH5



Date: 22.SEP.2012 16:54:45

Pulse time, High Channel, DH5



Date: 22.SEP.2012 16:55:17

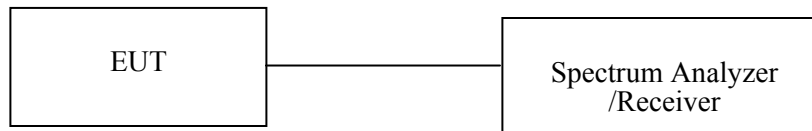
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

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 a Spectrum Analyzer/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 the NIST.

Test Data

Environmental Conditions

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

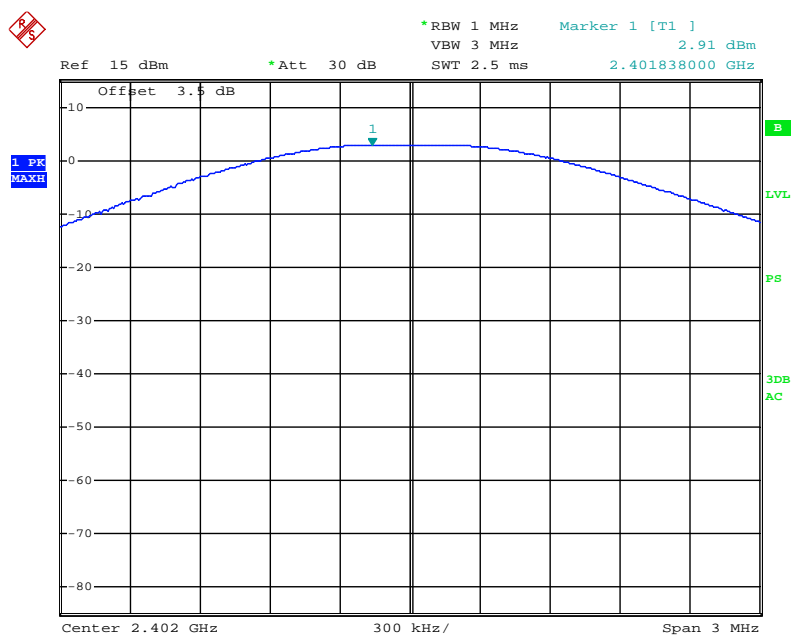
The testing was performed by Gardon Zhang on 2012-09-22.

EUT operation mode: Transmitting

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

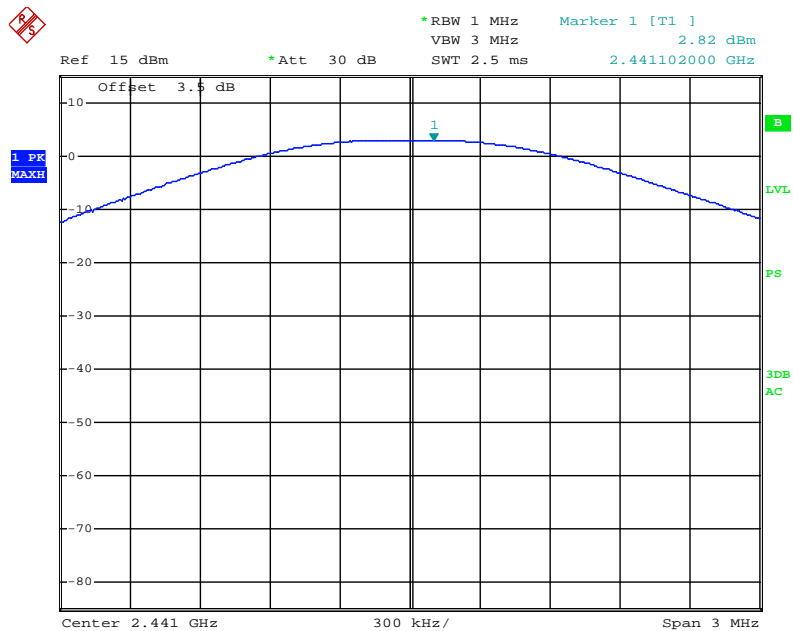
Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	2.91	1.954	1000
	Middle	2441	2.82	1.914	1000
	High	2480	2.64	1.837	1000
EDR ($\pi/4$ -DQPSK)	Low	2402	3.06	2.023	1000
	Middle	2441	2.90	1.950	1000
	High	2480	2.65	1.841	1000
EDR (8DPSK)	Low	2402	3.19	2.084	1000
	Middle	2441	3.17	2.075	1000
	High	2480	2.87	1.936	1000

BDR (GFSK): Low Channel



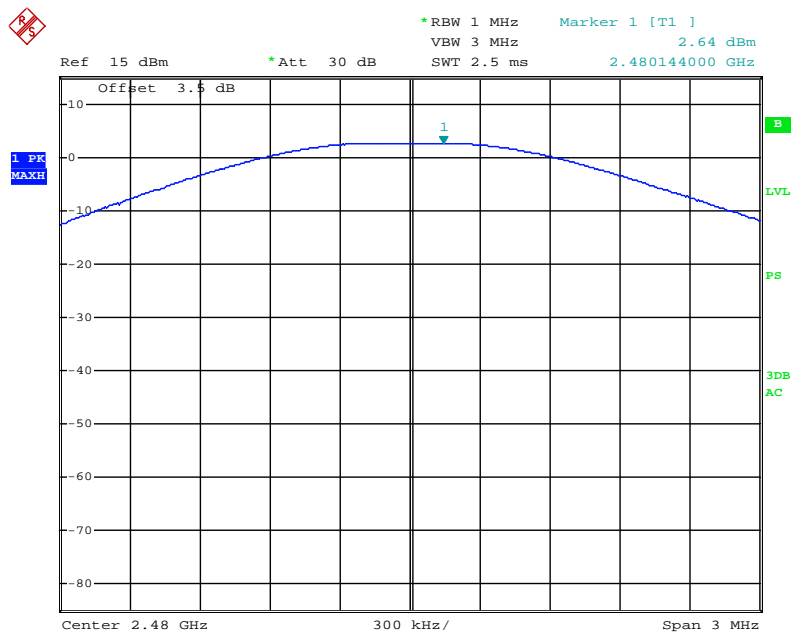
Date: 22.SEP.2012 14:03:55

BDR (GFSK): Middle Channel



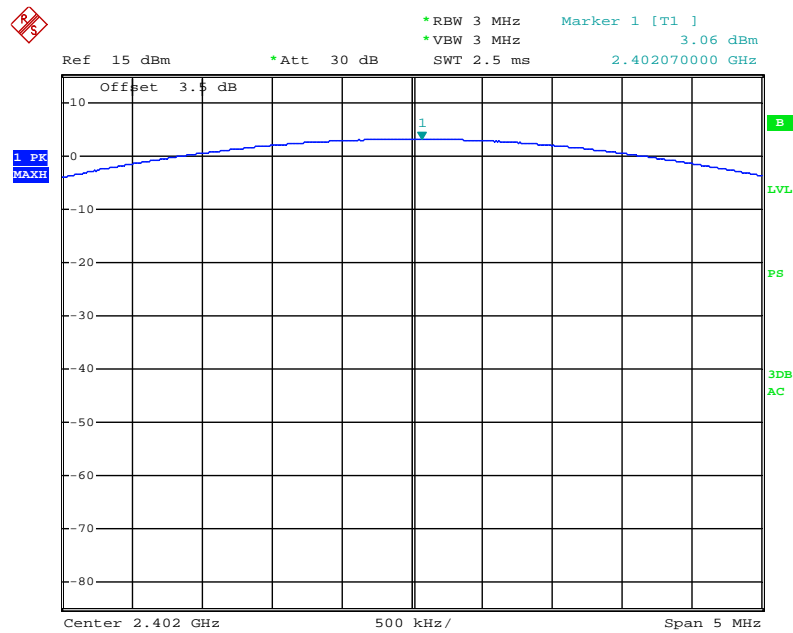
Date: 22.SEP.2012 14:03:17

BDR (GFSK): High Chanel



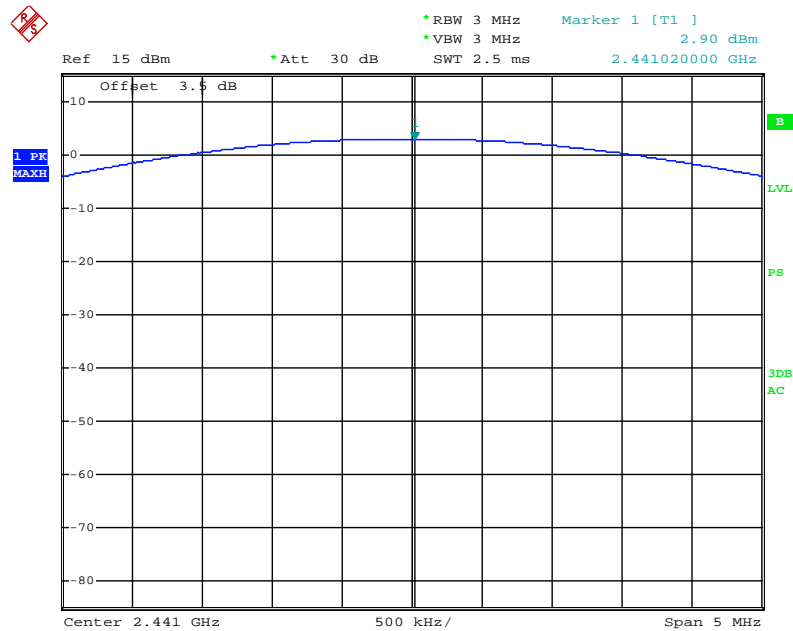
Date: 22.SEP.2012 14:00:06

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



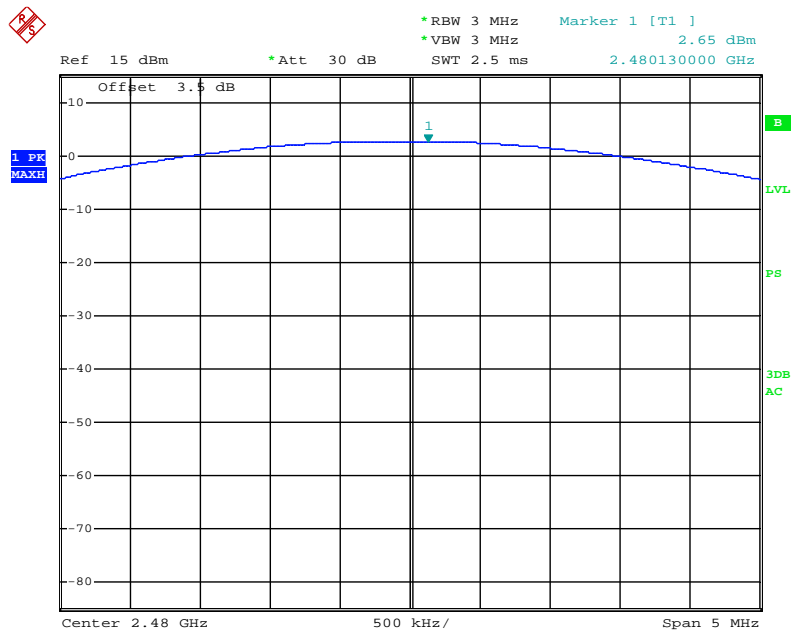
Date: 22.SEP.2012 15:45:42

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



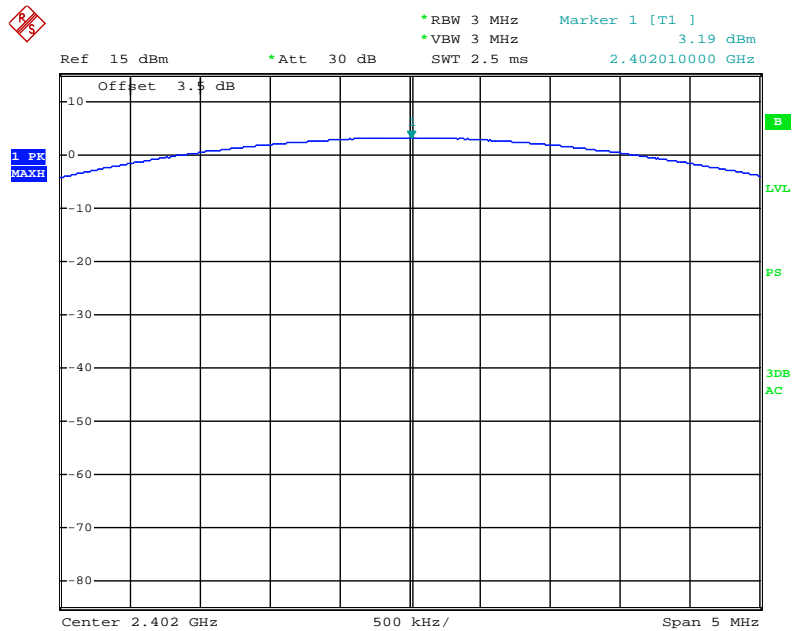
Date: 22.SEP.2012 15:44:17

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



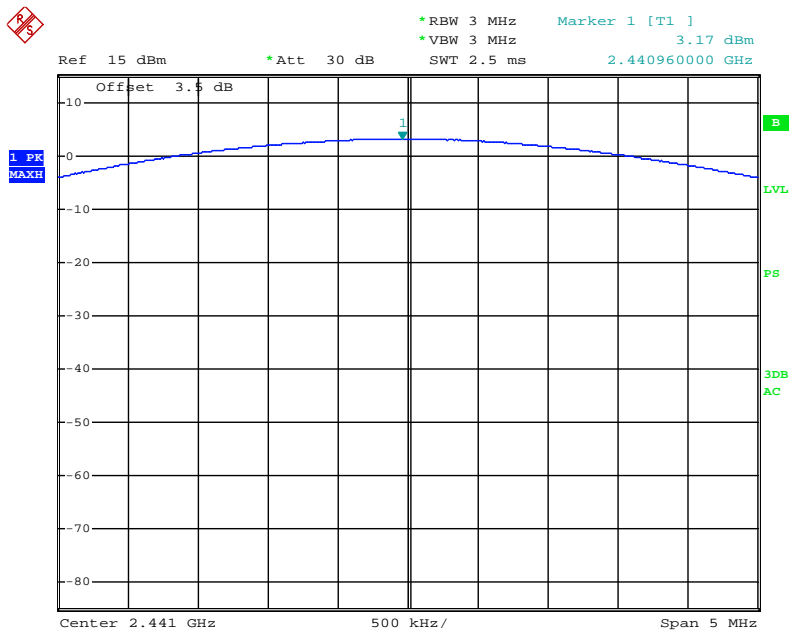
Date: 22.SEP.2012 15:40:10

EDR(8DPSK): Low Channel



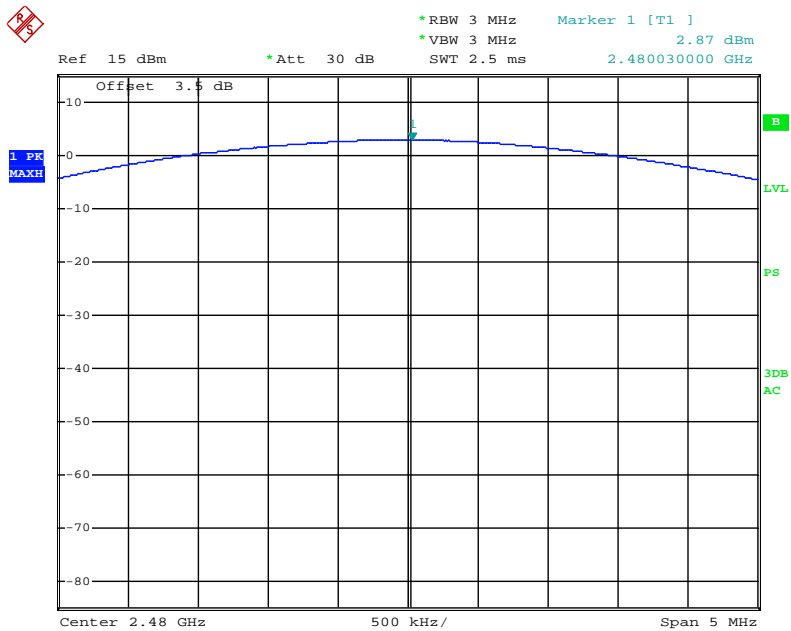
Date: 22.SEP.2012 16:23:09

EDR(8DPSK): Middle Channel



Date: 22.SEP.2012 16:21:12

EDR(8DPSK): High Channel



Date: 22.SEP.2012 16:16:53

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 the NIST.

Test Data**Environmental Conditions**

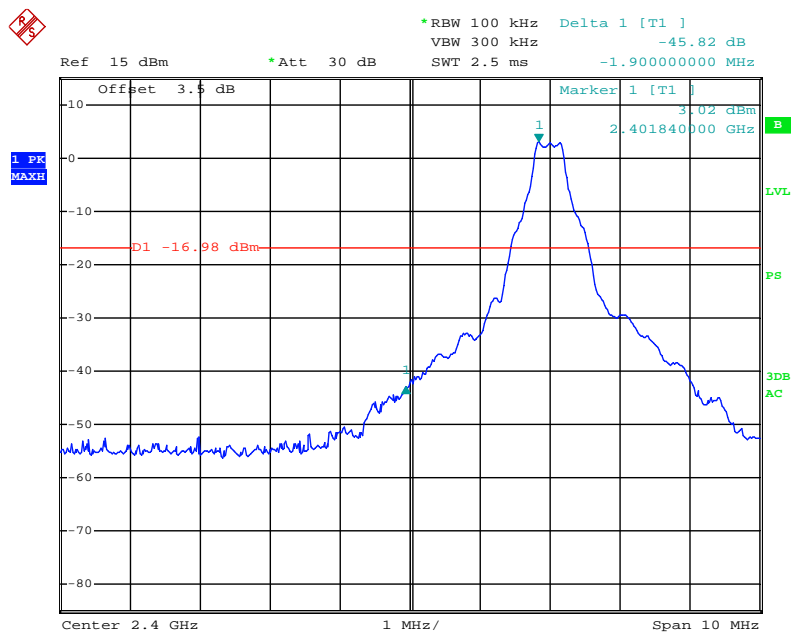
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

The testing was performed by Gardon Zhang on 2012-09-22.

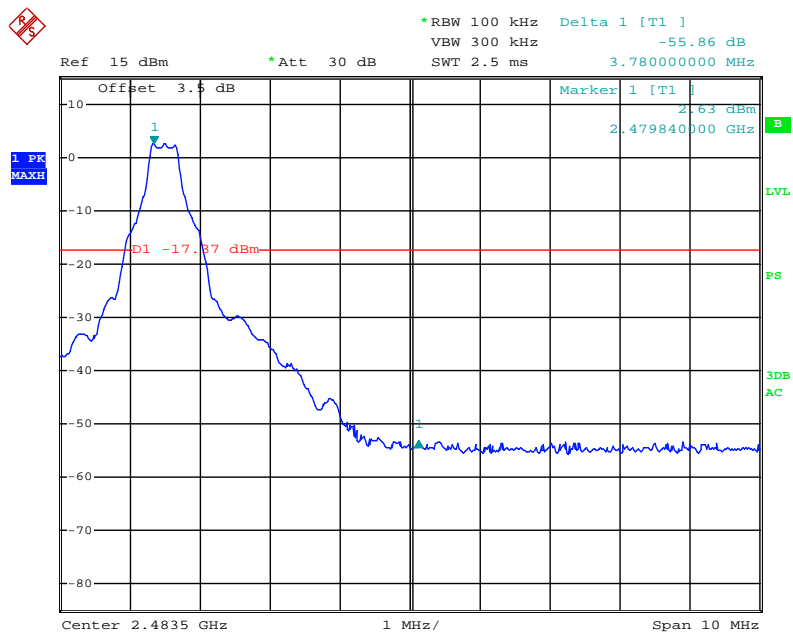
EUT operation mode: Transmitting

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

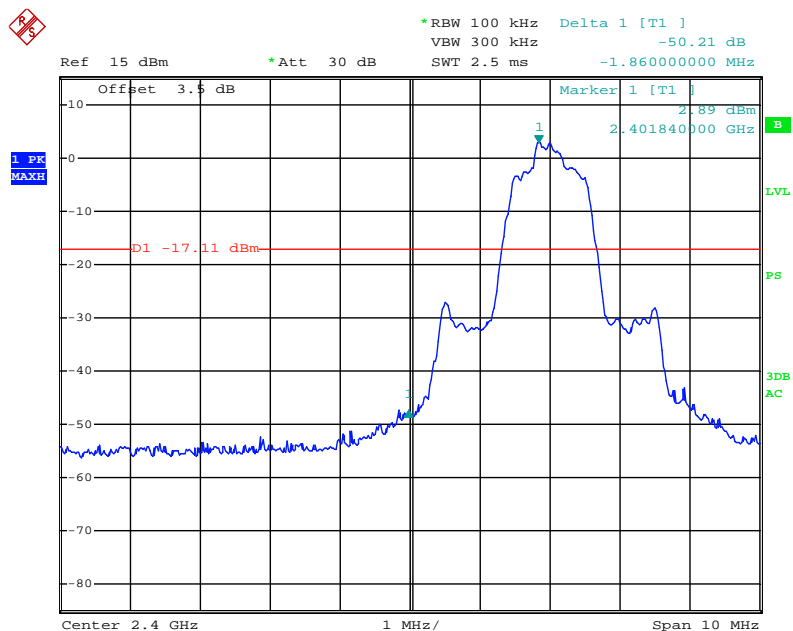
Mode	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR (GFSK)	Left-band	45.82	> 20
	Right-band	55.86	> 20
EDR ($\pi/4$ -DQPSK)	Left-band	50.21	> 20
	Right-band	55.54	> 20
EDR (8DPSK)	Left-band	50.77	> 20
	Right-band	55.53	> 20

BDR (GFSK): Band Edge-Left Side

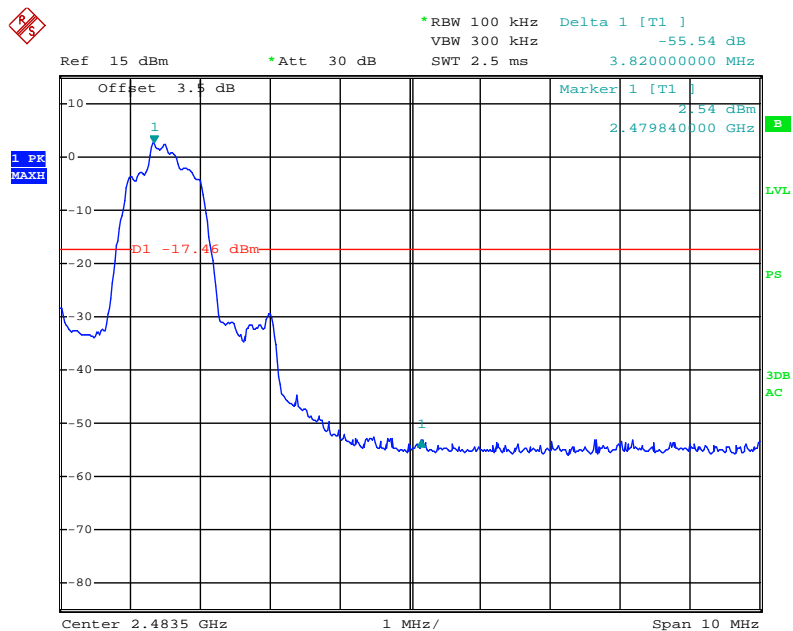
Date: 22.SEP.2012 14:24:34

BDR (GFSK): Band Edge-Right Side

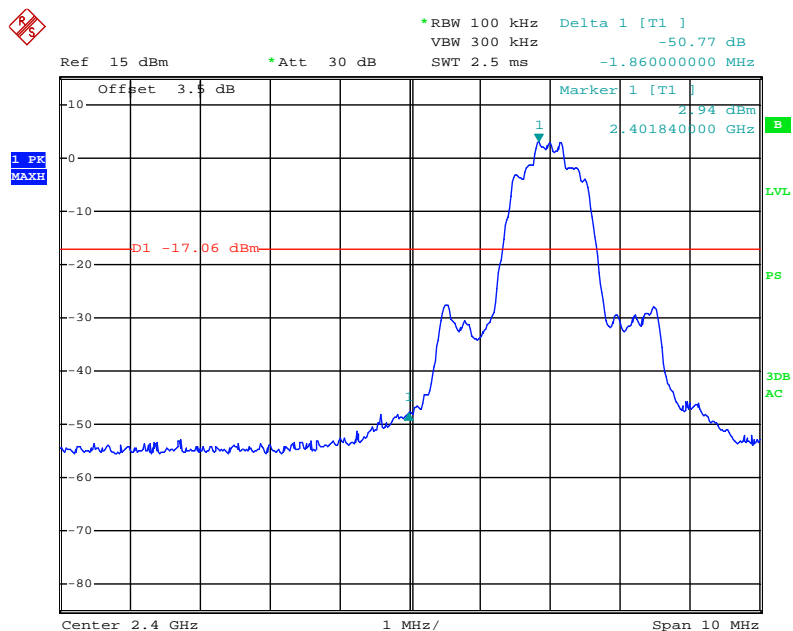
Date: 22.SEP.2012 14:27:10

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

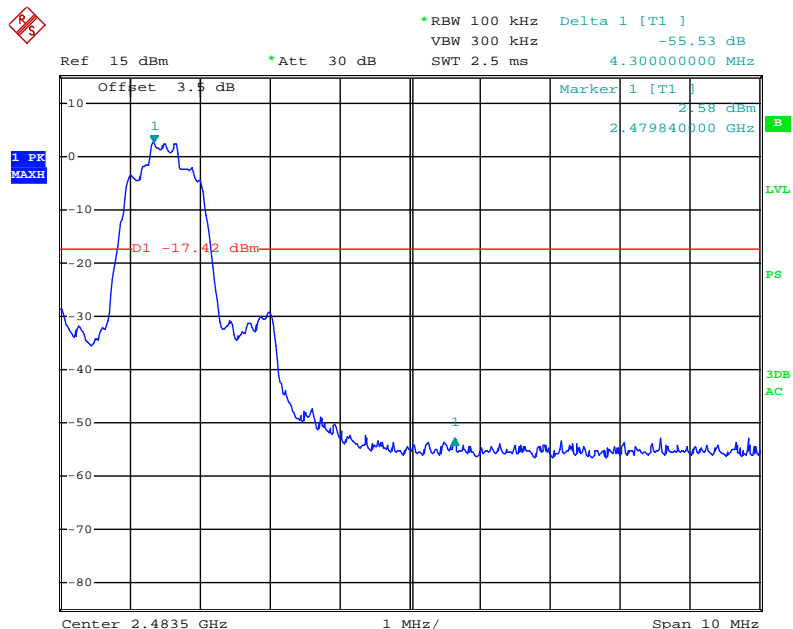
Date: 22.SEP.2012 16:00:23

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

Date: 22.SEP.2012 15:58:23

EDR (8DPSK): Band Edge-Left Side

Date: 22.SEP.2012 16:35:30

BDR (8DPSK): Band Edge-Right Side

Date: 22.SEP.2012 16:38:10

PRODUCT SIMILARITY DECLARATION LETTER



Subject: Product Similarity Declaration

September 25th, 2012

To Whom It May Concern,

We, VOXLAND SARL, hereby declare that our Bluetooth Helicopter model number BBZ352 is electrically identical to model number BBZ302 that was certified by BACL. The differences between BBZ352 and BBZ302 are their appearance color, and related model number due to marketing purpose.

Please contact me if you have any question.

Sincerely,

Jérôme Plateau
Portfolio Management
VOXLAND SARL

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