

FCC PART 15.247 TEST REPORT

For

HONGKONG IPRO TECHNOLOGY CO., LIMITED

ROOM C1D, 6/F, WING HING INDUSTRIAL BUILDING, 14 HING YIP STREET,
KWUN TONG, KOWLOON, HONG KONG.

FCC ID: PQ4IPROS3

Report Type: Original Report	Product Type: GSM Mobile Phone
Test Engineer: <u>Charlie Chen</u>	<i>charlie.chen</i>
Report Number: <u>RSZ130516005-00B</u>	
Report Date: <u>2013-06-06</u>	
Reviewed By: <u>Sula Huang</u>	<i>Sula Huang</i>
Prepared By: <u>RF Engineer</u>	
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
EUT EXERCISE SOFTWARE	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
FCC §15.247 (i) & §2.1093 – RF EXPOSURE	8
APPLICABLE STANDARD	8
RESULT	8
FCC §15.203 – ANTENNA REQUIREMENT	9
APPLICABLE STANDARD	9
ANTENNA CONNECTOR CONSTRUCTION	9
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	10
APPLICABLE STANDARD	10
MEASUREMENT UNCERTAINTY	10
EUT SETUP	10
EMI TEST RECEIVER SETUP.....	11
TEST PROCEDURE	11
TEST EQUIPMENT LIST AND DETAILS.....	11
CORRECTED FACTOR & MARGIN CALCULATION	11
TEST RESULTS SUMMARY	12
TEST DATA	12
FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS.....	15
APPLICABLE STANDARD	15
MEASUREMENT UNCERTAINTY	15
EUT SETUP	15
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	16
TEST PROCEDURE	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST RESULTS SUMMARY	17
TEST DATA	17
FCC §15.247(a) (1)-CHANNEL SEPARATION TEST	19
APPLICABLE STANDARD	19
TEST PROCEDURE	19
TEST EQUIPMENT LIST AND DETAILS.....	19
TEST DATA	19

FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH.....	26
APPLICABLE STANDARD	26
TEST PROCEDURE	26
TEST EQUIPMENT LIST AND DETAILS.....	26
TEST DATA	26
FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST	32
APPLICABLE STANDARD	32
TEST PROCEDURE	32
TEST EQUIPMENT LIST AND DETAILS.....	32
TEST DATA	32
FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....	35
APPLICABLE STANDARD	35
TEST PROCEDURE	35
TEST EQUIPMENT LIST AND DETAILS.....	35
TEST DATA	35
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT	51
APPLICABLE STANDARD	51
TEST PROCEDURE	51
TEST EQUIPMENT LIST AND DETAILS.....	51
TEST DATA	51
FCC §15.247(d) - BAND EDGES TESTING	57
APPLICABLE STANDARD	57
TEST PROCEDURE	57
TEST EQUIPMENT LIST AND DETAILS.....	57
TEST DATA	57

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *HONGKONG IPRO TECHNOLOGY CO., LIMITED*'s product, model number: *S3 Pro (FCC ID: PQ4IPROS3)* or the "EUT" in this report was a *GSM Mobile Phone*, which was measured approximately: 13.65 cm (L) x 7.1 cm (W) x 1.0 cm (H), rated with input voltage: DC 3.7 V Li-ion battery or DC 5.0V charging from adapter.

Adapter Information:

Model: TC-I9350

Input: AC 100-240V, 50/60Hz, 150mA

Output: DC 5.0V, 500mA

**All measurement and test data in this report was gathered from production sample serial number: IPROS3000001 (Assigned by the applicant). The EUT supplied by the applicant was received on 2013-05-16.*

Objective

This test report is prepared on behalf of *HONGKONG IPRO TECHNOLOGY CO., LIMITED* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS, Part 22H&24E PCE and Part 15B JBP submissions with FCC ID: PQ4IPROS3

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 at 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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineer mode.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

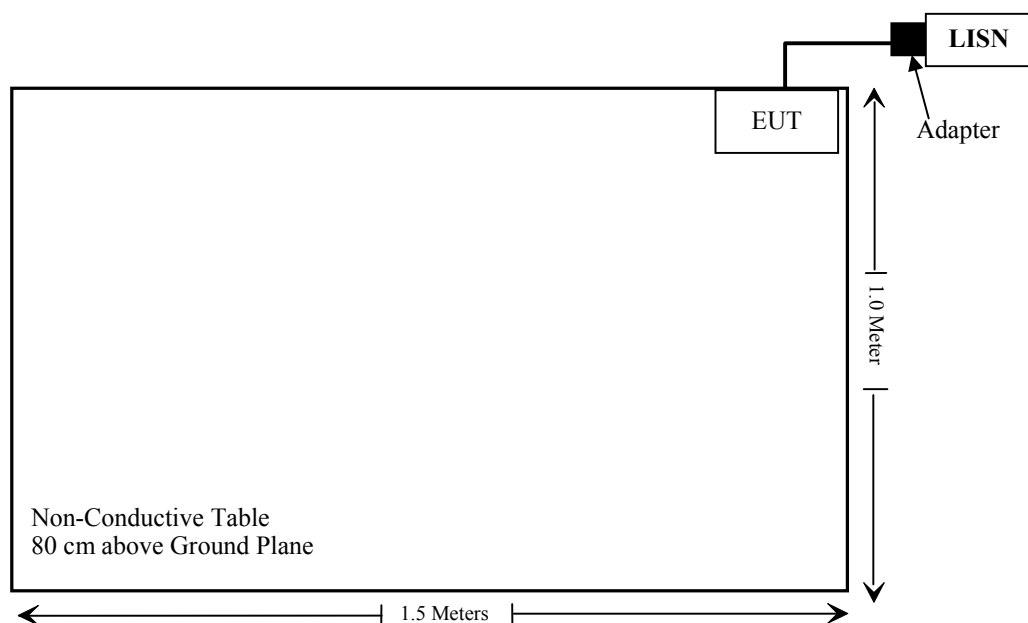
RF test tool built-in the EUT.

External I/O Cable

Cable Description	Length (m)	From Port	To
Shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

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

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

Applicable Standard

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

According to KDB 447498 D01 General RF Exposure Guidance v05

Result

According to FCC KDB 447498 D01 General RF Exposure Guidance v05 generic portable criteria

The distance between antenna and test point is 5 mm

The Max output power: 1.291 mW

According to the Appendix A of KDB 447498, the exclusion thresholds for 2450 MHz is 10 mW.

Conclusion:

The time-averaged output power is 1.291 mW < the exclusion thresholds 10 mW, so stand-alone SAR evaluation is not required.

The other SAR data please refer to the SAR report, report No.: RSZ130516005-20.

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 one integral antenna arrangement for bluetooth, which was permanently attached, the antenna gain is -1.0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

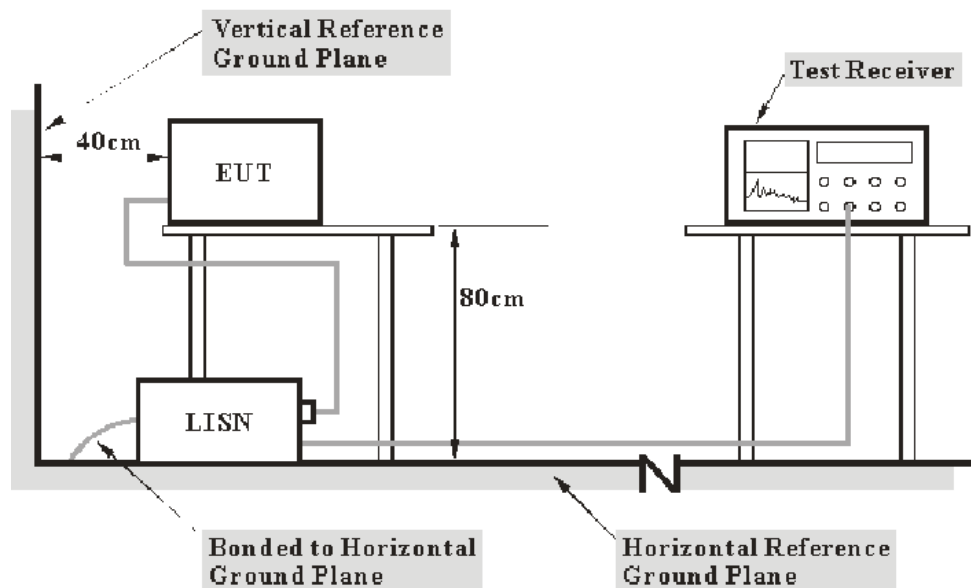
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2009. The related limit was specified in FCC Part 15.207.

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

EMI Test Receiver Setup

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

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

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

Test Procedure

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Rohde & Schwarz	1st LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
COM-POWER	2nd LISN	LI-200	12208	NCR	NCR
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 requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

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

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

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:

22.0 dB at 0.399288 MHz in the **Line** conducted mode

Test Data

Environmental Conditions

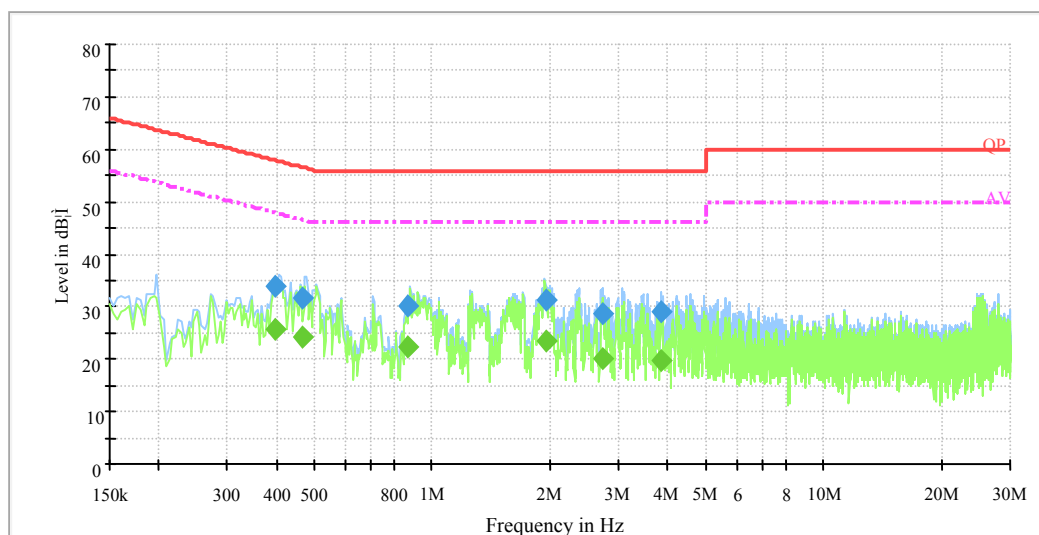
Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Charging & Transmitting

AC 120 V, 60 Hz, Line:

EMI Auto Test L

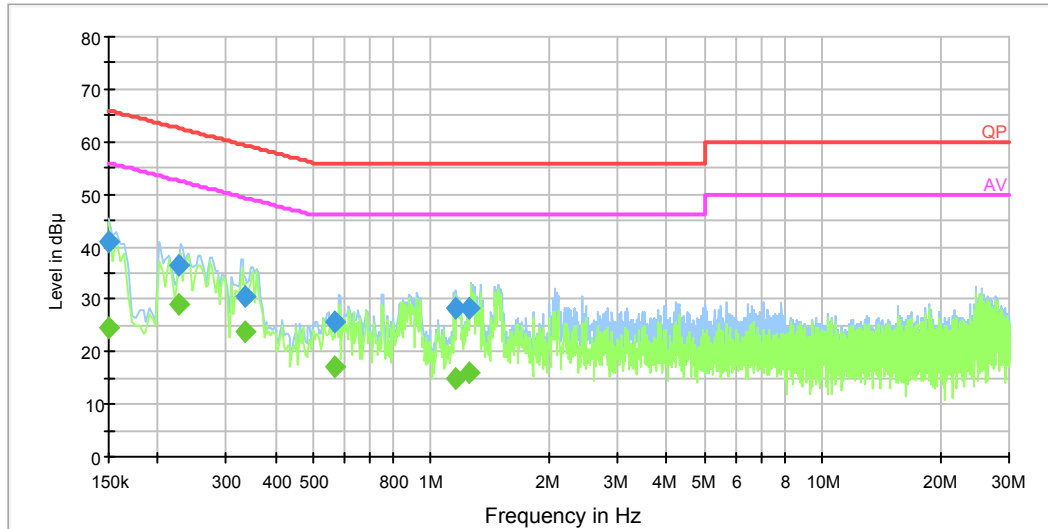


Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.399288	34.0	0.3	57.9	23.9	QP
1.961578	31.4	0.4	56.0	24.6	QP
0.464832	31.7	0.4	56.6	24.9	QP
0.869152	30.1	0.4	56.0	25.9	QP
3.854755	28.9	0.4	56.0	27.1	QP
2.721618	28.8	0.4	56.0	27.2	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.399288	25.8	0.3	47.9	22.0	Ave.
1.961578	23.6	0.4	46.0	22.4	Ave.
0.464832	24.0	0.4	46.6	22.6	Ave.
0.869152	22.2	0.4	46.0	23.8	Ave.
2.721618	20.1	0.4	46.0	25.9	Ave.
3.854755	19.6	0.4	46.0	26.4	Ave.

AC 120V, 60 Hz, Neutral:**EMI Auto Test N****Quasi-peak detection mode**

Frequency (MHz)	Corrected Amplitude (dB μ V)	Corrected Factor (dB)	Limit (dB μ V)	Margin (dB)	Remark (PK/QP/Ave)
0.150481	41.0	0.3	66.0	25.0	QP
0.227478	36.5	0.3	62.5	26.0	QP
1.258541	28.4	0.4	56.0	27.6	QP
1.150536	28.2	0.4	56.0	27.8	QP
0.336576	30.3	0.3	59.3	28.9	QP
0.565449	25.8	0.4	56.0	30.2	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dB μ V)	Corrected Factor (dB)	Limit (dB μ V)	Margin (dB)	Remark (PK/QP/Ave)
0.227478	29.1	0.3	52.5	23.4	Ave.
0.336576	23.8	0.3	49.3	25.5	Ave.
0.565449	17.2	0.4	46.0	28.8	Ave.
1.258541	16.0	0.4	46.0	30.0	Ave.
1.150536	15.0	0.4	46.0	31.0	Ave.
0.150481	24.7	0.3	56.0	31.3	Ave.

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

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

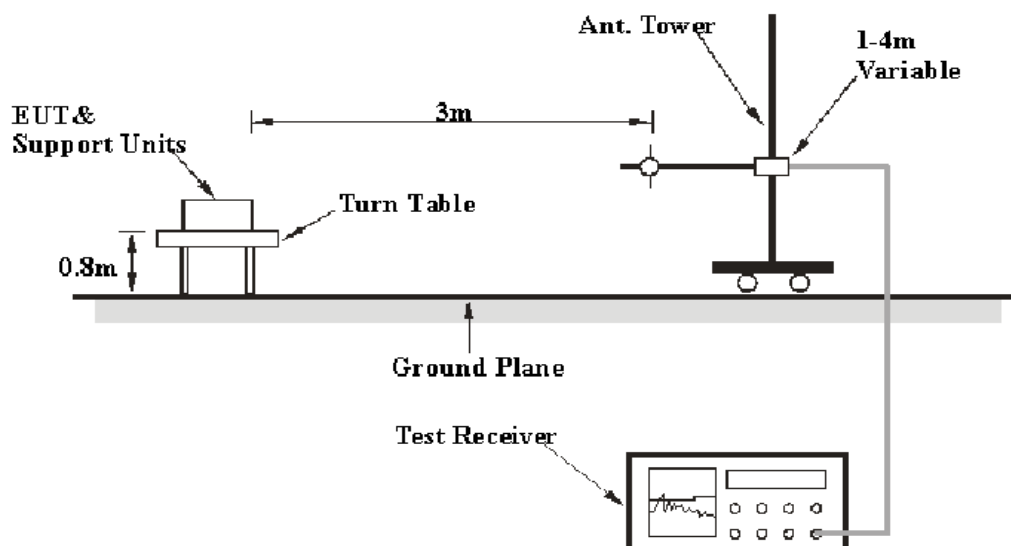
Measurement Uncertainty

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

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	/	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	/	4.92 dB (k=2, 95% level of confidence)

EUT Setup



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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	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:

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

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	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

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

Test Results Summary

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

11.64 dB at 827.8 MHz in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Transmitting

30 MHz -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)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2402 MHz)									
2402.0	89.33	PK	256	1.8	H	6.13	95.46	/	/
2402.0	79.18	Ave.	256	1.8	H	6.13	85.31	/	/
2402.0	89.75	PK	335	1.9	V	6.13	95.88	/	/
2402.0	79.41	Ave.	335	1.9	V	6.13	85.54	/	/
827.8	39.36	QP	80	1.3	H	-5.00	34.36	46	11.64
9608.0	20.03	Ave.	274	1.8	H	19.28	39.31	54	14.69
7206.0	20.11	Ave.	232	1.7	V	17.06	37.17	54	16.83
9608.0	35.76	PK	274	1.8	H	19.28	55.04	74	18.96
4804.0	21.87	Ave.	201	1.8	V	12.40	34.27	54	19.73
7206.0	35.96	PK	232	1.7	V	17.06	53.02	74	20.98
4804.0	36.71	PK	201	1.8	V	12.40	49.11	74	24.89
2499.5	20.07	Ave.	226	1.5	V	7.21	27.28	54	26.72
2366.6	21.53	Ave.	265	1.6	V	5.48	27.01	54	26.99
2358.2	20.09	Ave.	205	1.5	V	5.48	25.57	54	28.43
2499.5	35.11	PK	226	1.5	V	7.21	42.32	74	31.68
2366.6	36.40	PK	265	1.6	V	5.48	41.88	74	32.12
2358.2	35.51	PK	205	1.5	V	5.48	40.99	74	33.01

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2441 MHz)									
2441.0	91.15	PK	161	1.7	H	7.21	98.36	/	/
2441.0	80.28	Ave.	161	1.7	H	7.21	87.49	/	/
2441.0	91.73	PK	253	1.8	V	7.21	98.94	/	/
2441.0	80.95	Ave.	253	1.8	V	7.21	88.16	/	/
827.8	37.95	QP	13	1.5	H	-5.00	32.95	46	13.05
9764.0	20.89	Ave.	114	1.7	V	19.40	40.29	54	13.71
7323.0	21.01	Ave.	22	1.5	V	16.49	37.50	54	16.50
9764.0	35.66	PK	114	1.7	V	19.40	55.06	74	18.94
4882.0	21.37	Ave.	296	1.6	V	12.46	33.83	54	20.17
7323.0	35.72	PK	22	1.5	V	16.49	52.21	74	21.79
4882.0	36.55	PK	296	1.6	V	12.46	49.01	74	24.99
2498.8	20.73	Ave.	215	1.4	V	7.21	27.94	54	26.06
2373.3	21.23	Ave.	346	1.2	H	6.13	27.36	54	26.64
2389.3	21.06	Ave.	335	1.5	V	6.13	27.19	54	26.81
2498.8	35.11	PK	215	1.4	V	7.21	42.32	74	31.68
2373.3	35.86	PK	346	1.2	H	6.13	41.99	74	32.01
2389.3	35.57	PK	335	1.5	V	6.13	41.70	74	32.30
High Channel (2480 MHz)									
2480.0	87.36	PK	335	1.3	H	7.21	94.57	/	/
2480.0	76.55	Ave.	335	1.3	H	7.21	83.76	/	/
2480.0	89.03	PK	135	1.5	V	7.21	96.24	/	/
2480.0	78.08	Ave.	135	1.5	V	7.21	85.29	/	/
827.8	37.62	QP	333	1.4	H	-5.00	32.62	46	13.38
9920.0	20.76	Ave.	86	1.3	V	19.38	40.14	54	13.86
7440.0	21.07	Ave.	327	1.8	V	15.90	36.97	54	17.03
9920.0	35.85	PK	86	1.3	V	19.38	55.23	74	18.77
4960.0	21.26	Ave.	115	1.6	V	12.50	33.76	54	20.24
7440.0	36.05	PK	327	1.8	V	15.90	51.95	74	22.05
2483.5	23.71	Ave.	323	1.6	H	7.21	30.92	54	23.08
2483.6	22.83	Ave.	299	1.8	H	7.21	30.04	54	23.96
4960.0	36.44	PK	115	1.6	V	12.50	48.94	74	25.06
2483.5	41.12	PK	323	1.6	H	7.21	48.33	74	25.67
2483.6	40.35	PK	299	1.8	H	7.21	47.56	74	26.44
2377.9	20.65	Ave.	176	1.7	V	6.13	26.78	54	27.22
2377.9	35.77	PK	176	1.7	V	6.13	41.90	74	32.10

Note:

Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude = Corrected Factor + Reading

Margin = Limit- Corrected. Amplitude

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	2013-05-09	2014-05-09

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

Test Data**Environmental Conditions**

Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

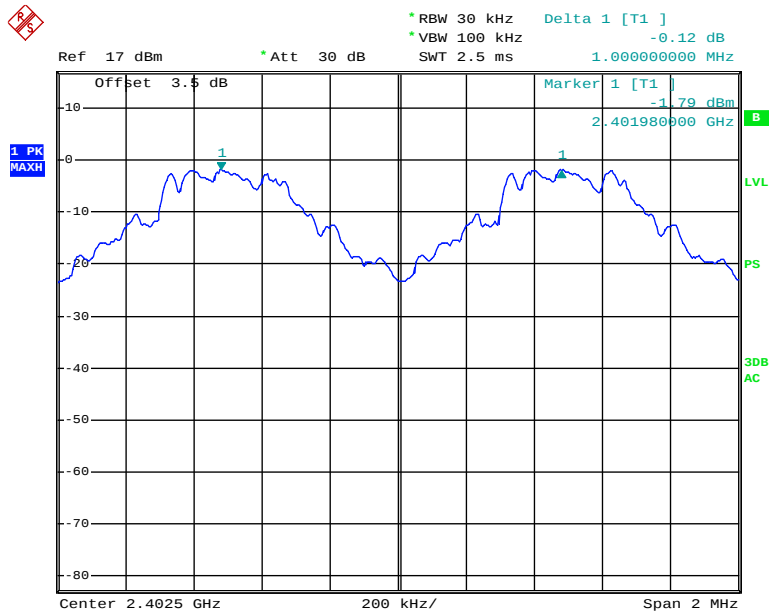
EUT operation mode: Transmitting

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

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	$\geq$ Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.000	0.677	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.677	Pass
	Adjacent	2442			
	High	2480	1.000	0.677	Pass
	Adjacent	2479			
EDR ($\pi/4$-DQPSK)	Low	2402	1.000	0.901	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.890	Pass
	Adjacent	2442			
	High	2480	1.000	0.872	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.000	0.845	Pass
	Adjacent	2403			
	Middle	2441	1.000	0.845	Pass
	Adjacent	2442			
	High	2480	1.000	0.845	Pass
	Adjacent	2479			

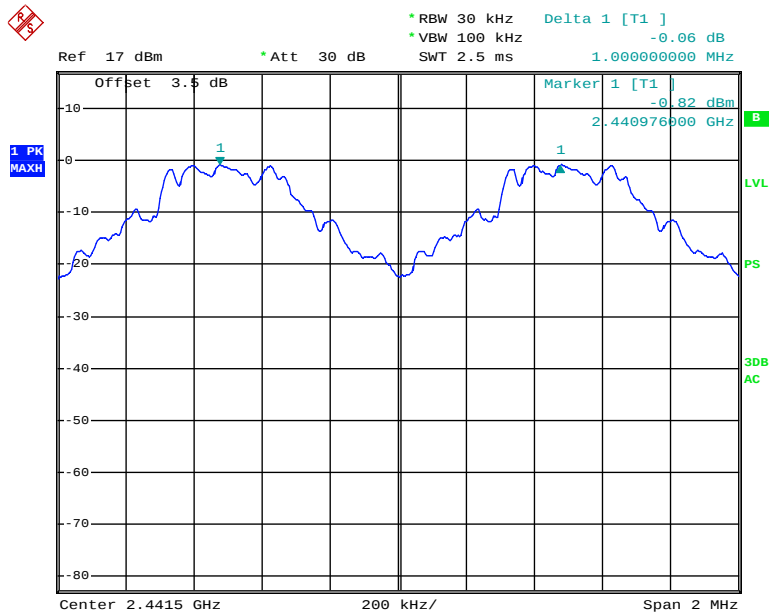
Note: Limit = 2/3 of 20 dB bandwidth

BDR (GFSK): Low Channel



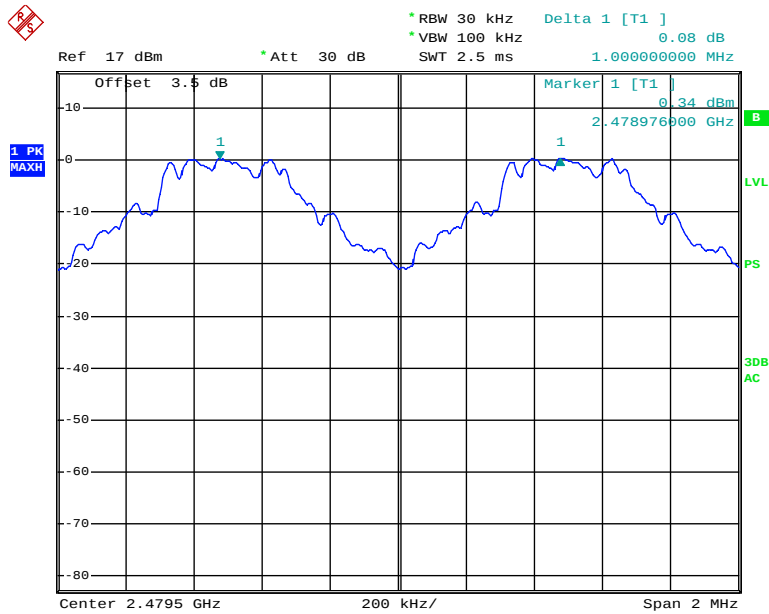
Date: 23.MAY.2013 22:14:53

BDR (GFSK): Middle Channel



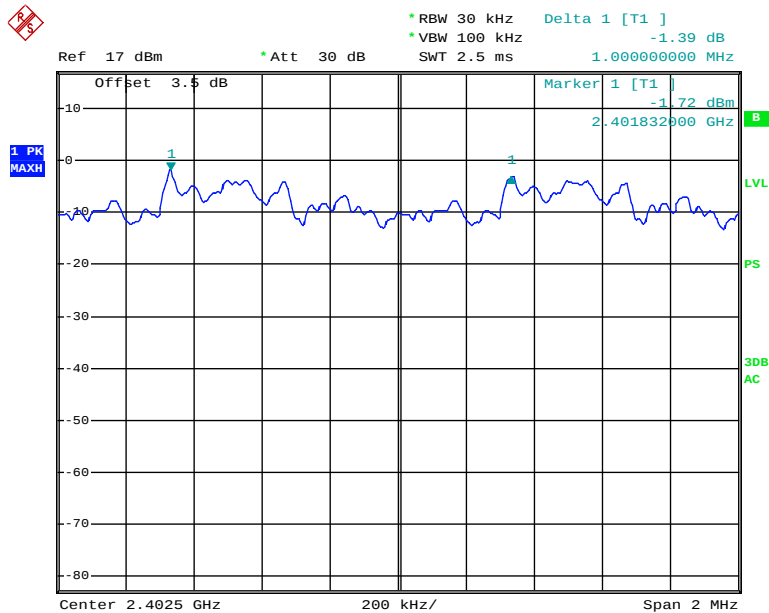
Date: 23.MAY.2013 22:15:54

BDR (GFSK): High Channel



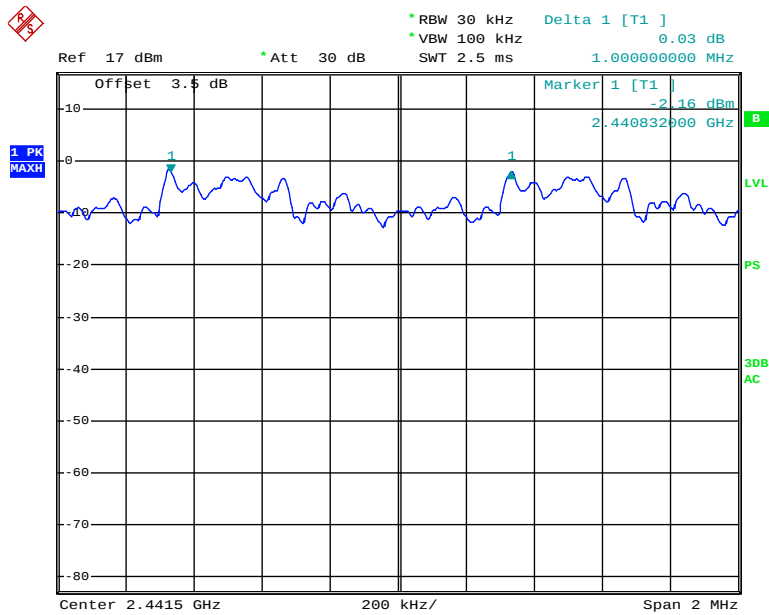
Date: 23.MAY.2013 22:16:56

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



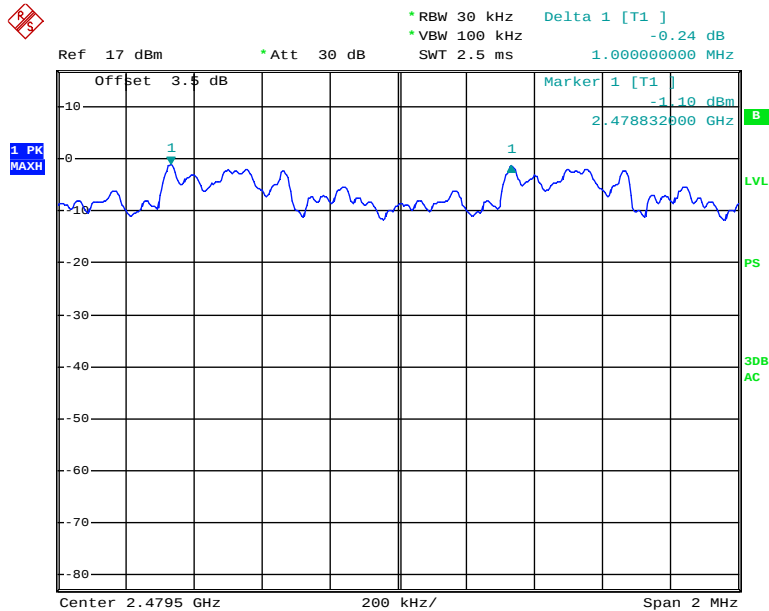
Date: 23.MAY.2013 22:11:16

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



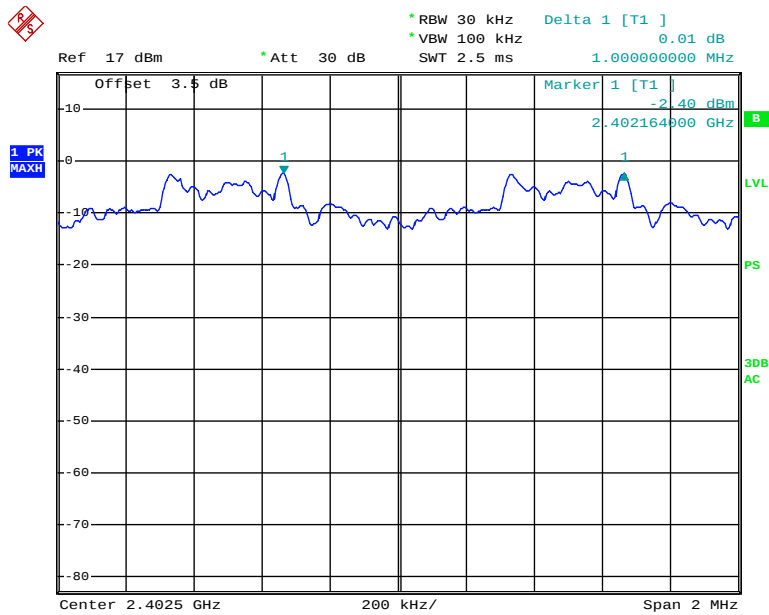
Date: 23.MAY.2013 22:12:56

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



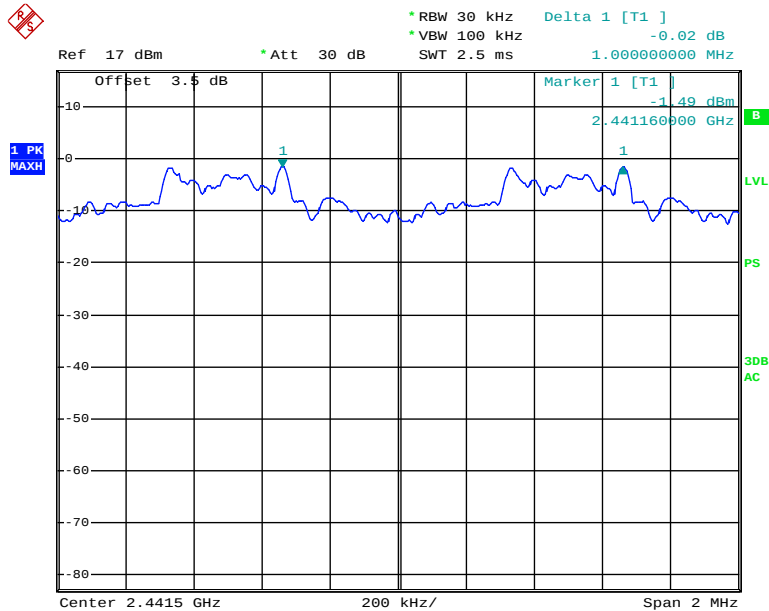
Date: 23.MAY.2013 22:13:38

EDR (8DPSK): Low Channel



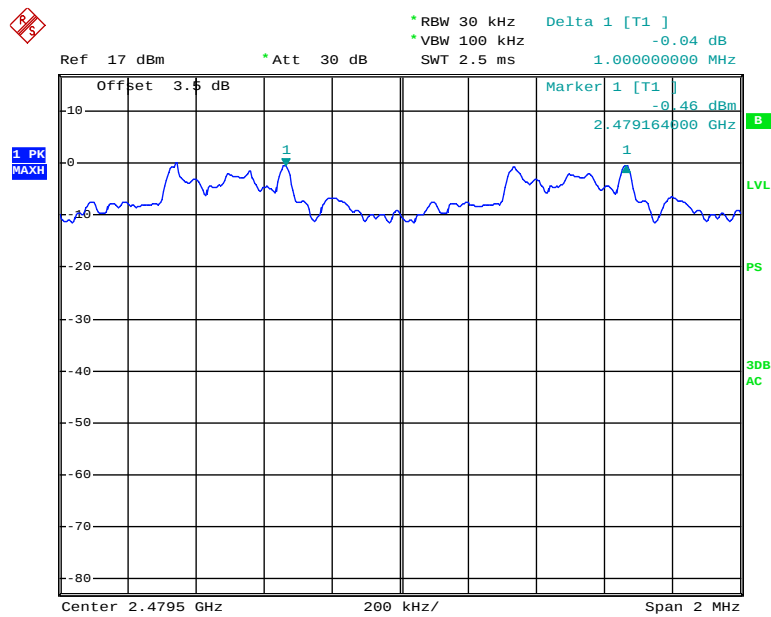
Date: 23.MAY.2013 22:18:25

EDR (8DPSK): Middle Channel



Date: 23.MAY.2013 22:19:47

EDR (8DPSK): High Channel



Date: 23.MAY.2013 22:20:43

FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH**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	2013-05-09	2014-05-09

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

Test Data**Environmental Conditions**

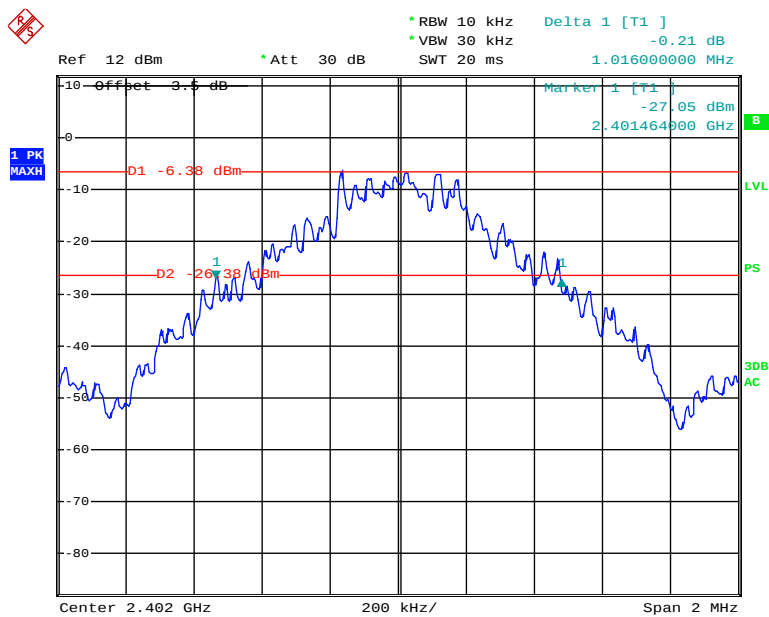
Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Transmitting

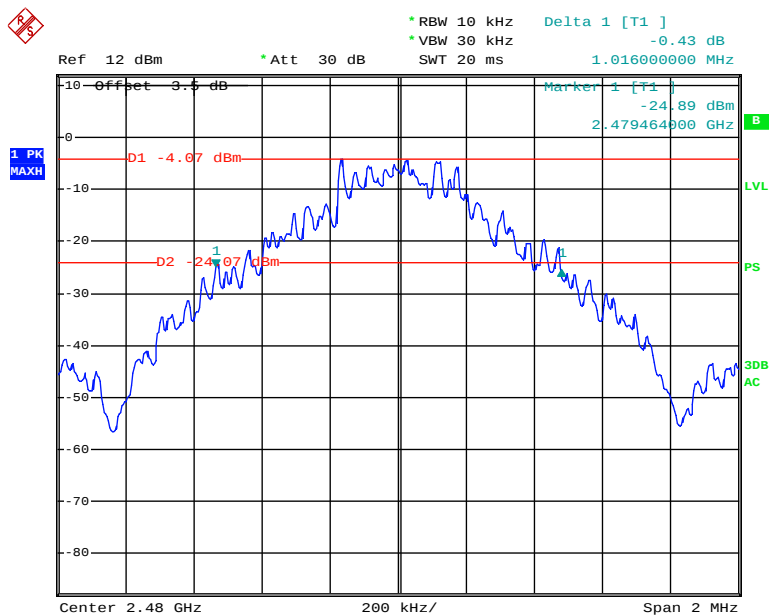
Test Result: Compliance. Please refer to following tables and plots

Mode	Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
BDR (GFSK)	Low	2402	1.016
	Middle	2441	1.016
	High	2480	1.016
EDR ($\pi/4$-DQPSK)	Low	2402	1.352
	Middle	2441	1.336
	High	2480	1.308
EDR (8DPSK)	Low	2402	1.268
	Middle	2441	1.268
	High	2480	1.268

BDR (GFSK): Low Channel

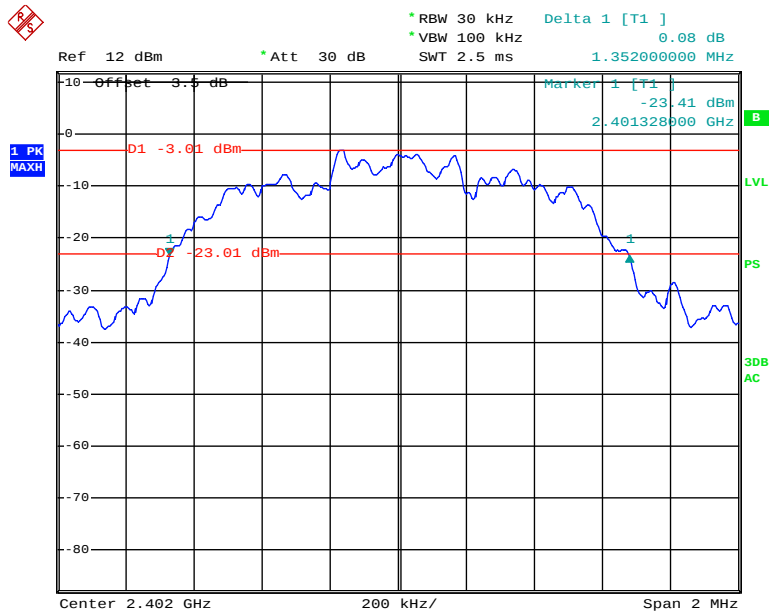
Date: 23.MAY.2013 21:33:29

BDR (GFSK): High Channel



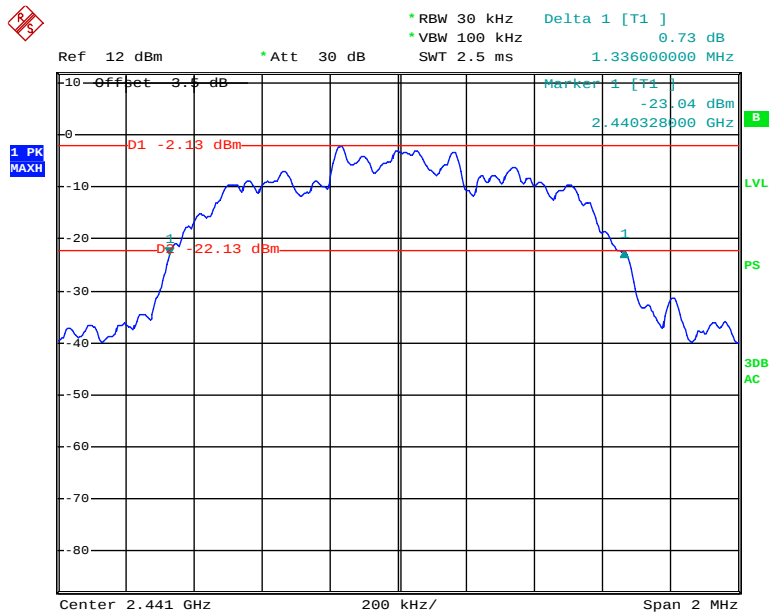
Page 28 of 60

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



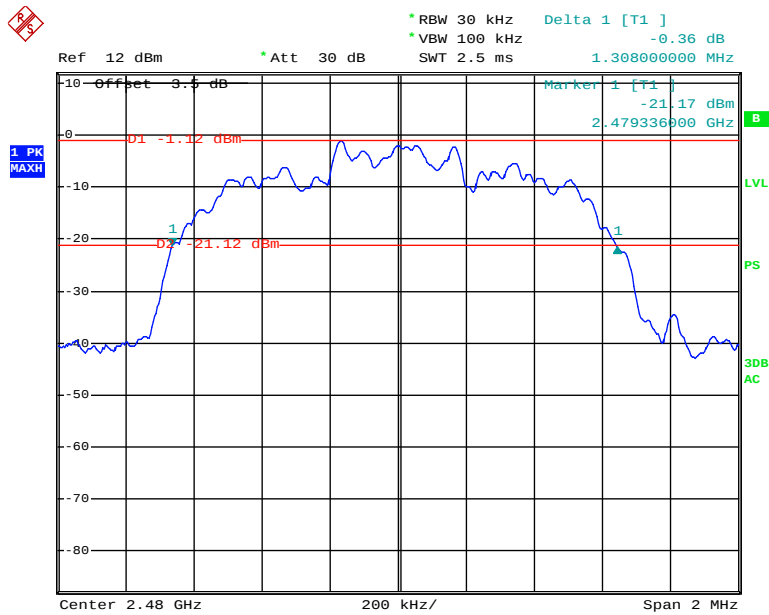
Date: 23.MAY.2013 21:38:20

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



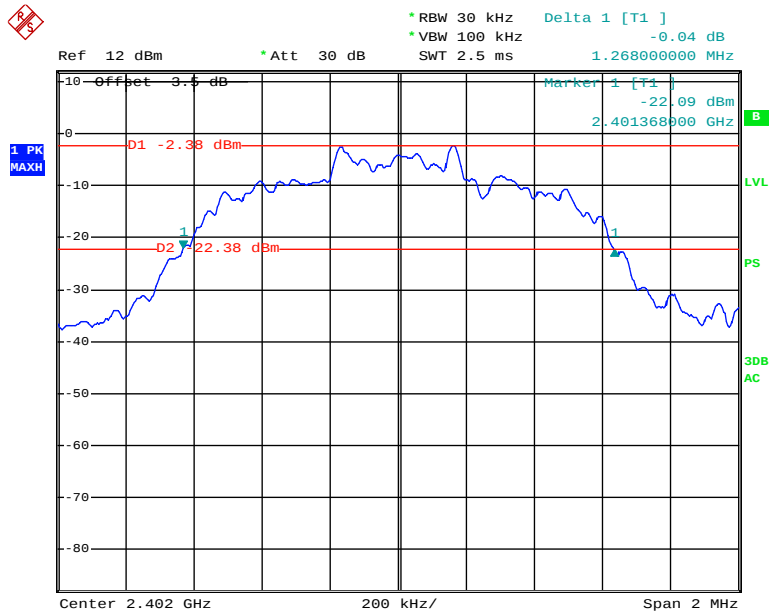
Date: 23.MAY.2013 21:40:31

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



Date: 23.MAY.2013 21:42:55

EDR (8DPSK): Low Channel

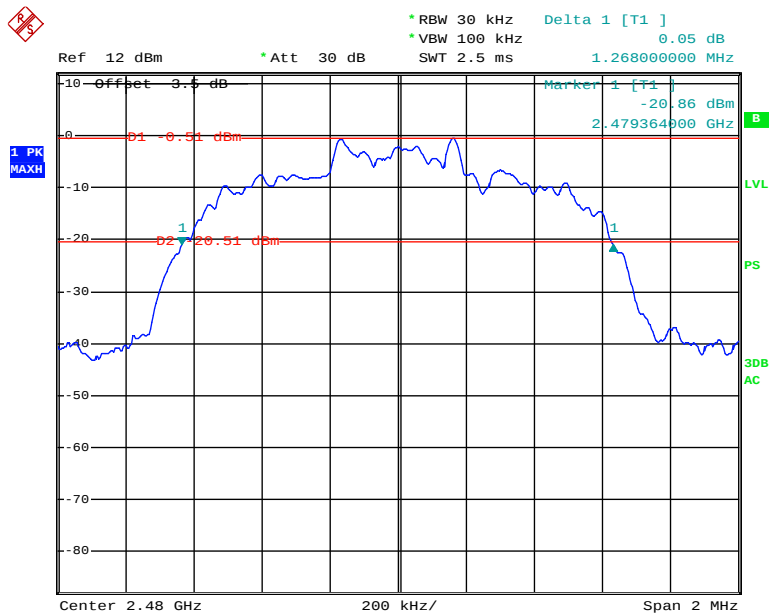


Date: 23.MAY.2013 21:44:37

The screenshot displays a spectrum analyzer interface with the following details:

- Top Bar:**
 - Left: A red square icon with a white 'X' and a small '1'.
 - Center: Measurement parameters including 'Ref 12 dBm', 'Att 30 dB', 'RBW 30 kHz', 'VBW 100 kHz', and 'SWT 2.5 ms'.
 - Right: 'Delta 1 [T1]' with a value of '0.32 dB' and a frequency of '1.268000000 MHz'.
- Plot Area:**
 - Y-axis: Power level in dB, ranging from -80 to 10.
 - X-axis: Frequency in GHz, ranging from 2.41 to 2.44.
 - Signal: A blue line representing the spectrum, showing a peak around 2.43 GHz.
 - Markers: Two red horizontal lines labeled 'D1 -1.56 dBm' and 'D2 -21.56 dBm'. A green marker '1' is placed on the signal at approximately 2.436 GHz.
 - Grid: A grid of 10 dB vertical lines and 10 MHz horizontal lines.
- Bottom Bar:**
 - Left: 'Center 2.441 GHz'.
 - Center: '200 kHz/'.
 - Right: 'Span 2 MHz'.
- Right Margin:**
 - Top: 'Marker 1 [T1]' with a value of '-21.67 dBm'.
 - Below: '2.440364000 GHz'.
 - Bottom: 'LVL', 'PS', '3DB', and 'AC'.

EDR (8DPSK): High Channel



Page 31 of 60

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	2013-05-09	2014-05-09

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

Test Data**Environmental Conditions**

Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

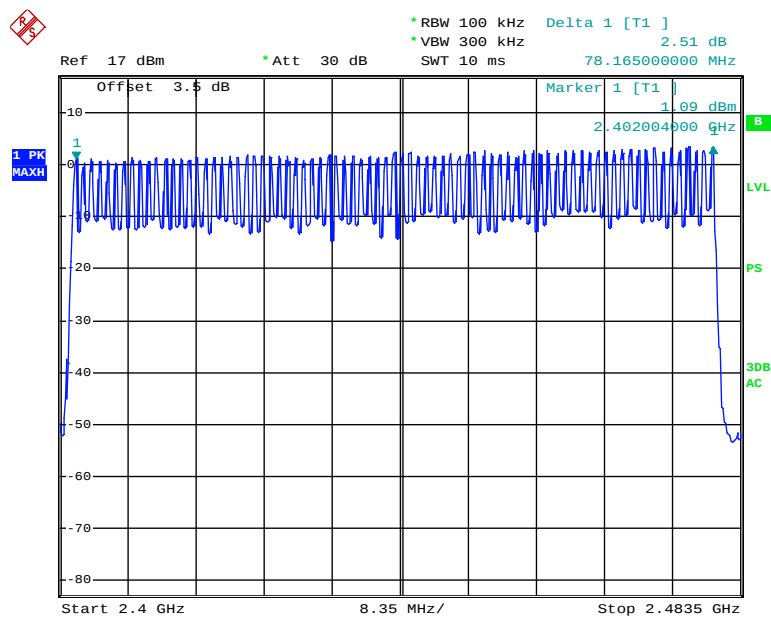
The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Transmitting

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

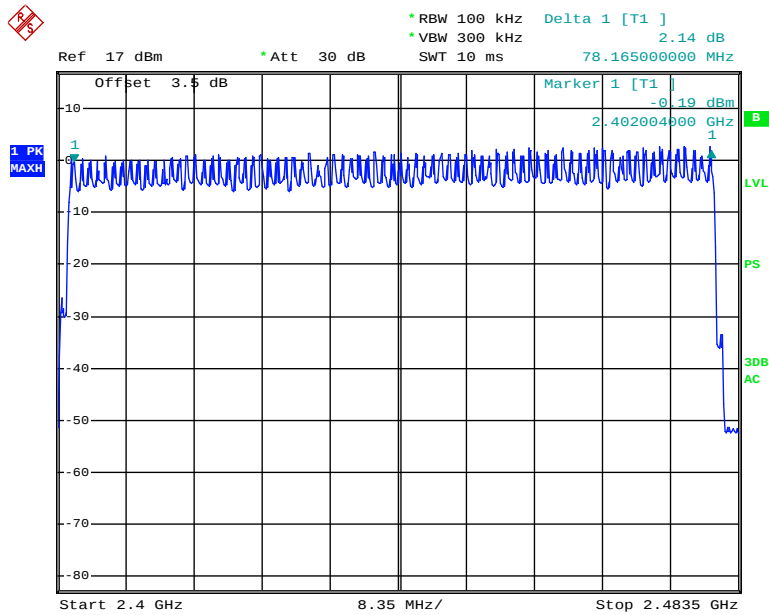
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

BDR (GFSK): Number of Hopping Channels



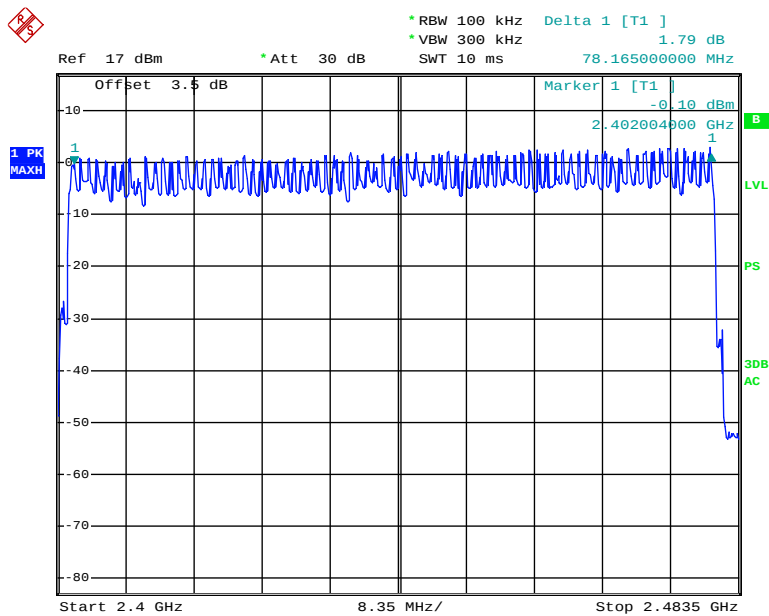
Date: 23.MAY.2013 22:43:28

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



Date: 23.MAY.2013 22:46:16

EDR (8DPSK): Number of Hopping Channels



Date: 23.MAY.2013 22:48:23

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	2013-05-09	2014-05-09

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

Test Data**Environmental Conditions**

Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

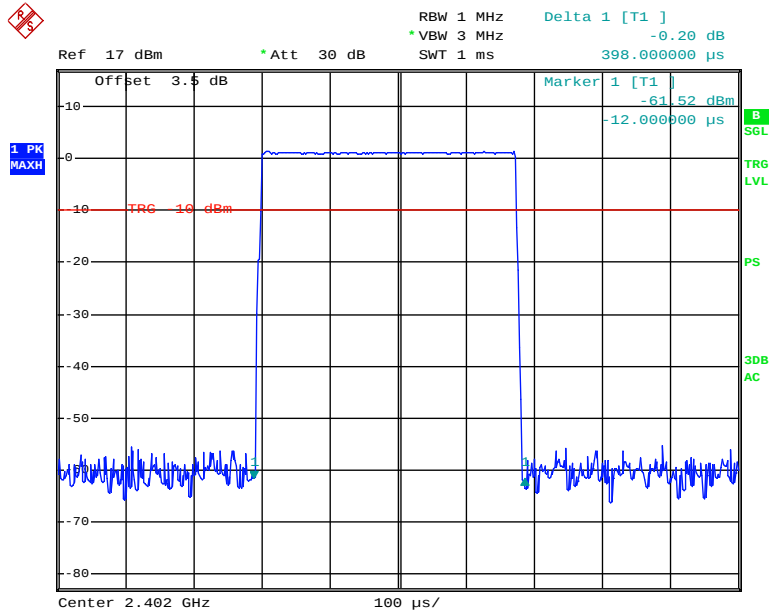
EUT operation mode: Transmitting

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

Mode		Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
BDR (GFSK)	DH 1	Low	0.398	0.127	0.4	Pass
		Middle	0.398	0.127	0.4	Pass
		High	0.398	0.127	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.672	0.268	0.4	Pass
		Middle	1.672	0.268	0.4	Pass
		High	1.672	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.924	0.312	0.4	Pass
		Middle	2.924	0.312	0.4	Pass
		High	2.924	0.312	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR ($\pi/4$ -DQPSK)	DH 1	Low	0.406	0.130	0.4	Pass
		Middle	0.406	0.130	0.4	Pass
		High	0.406	0.130	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.674	0.268	0.4	Pass
		Middle	1.674	0.268	0.4	Pass
		High	1.674	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.940	0.314	0.4	Pass
		Middle	2.924	0.312	0.4	Pass
		High	2.924	0.312	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	DH 1	Low	0.406	0.130	0.4	Pass
		Middle	0.406	0.130	0.4	Pass
		High	0.406	0.130	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.674	0.268	0.4	Pass
		Middle	1.674	0.268	0.4	Pass
		High	1.674	0.268	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.940	0.314	0.4	Pass
		Middle	2.940	0.314	0.4	Pass
		High	2.940	0.314	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

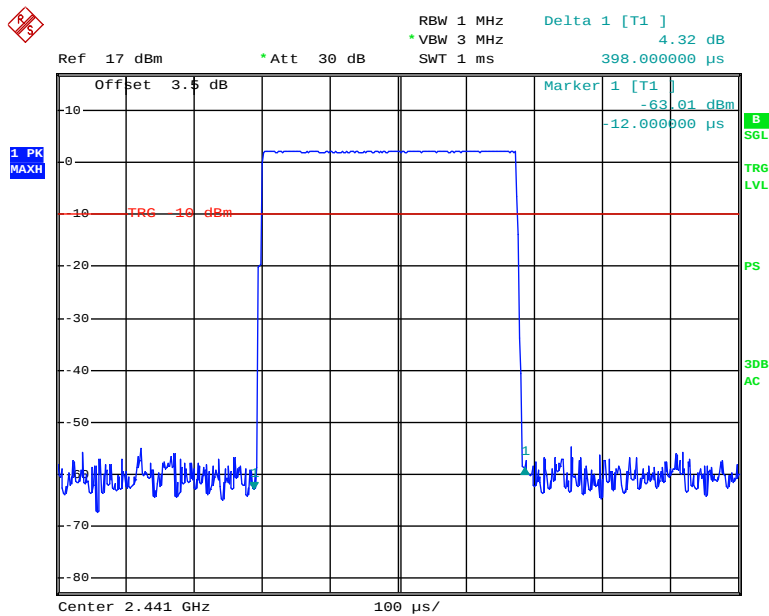
BDR (GFSK):

Pulse time, Low Channel, DH1



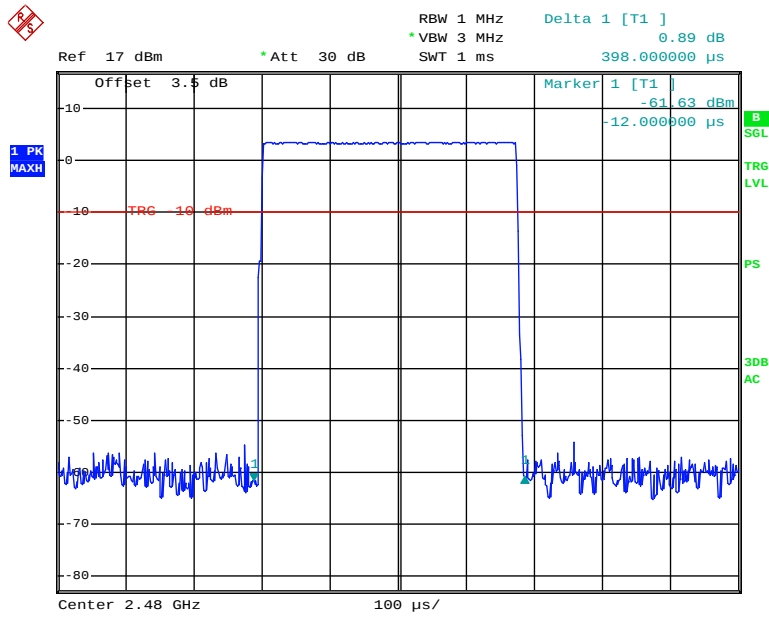
Date: 23.MAY.2013 22:25:14

Pulse time, Middle Channel, DH1



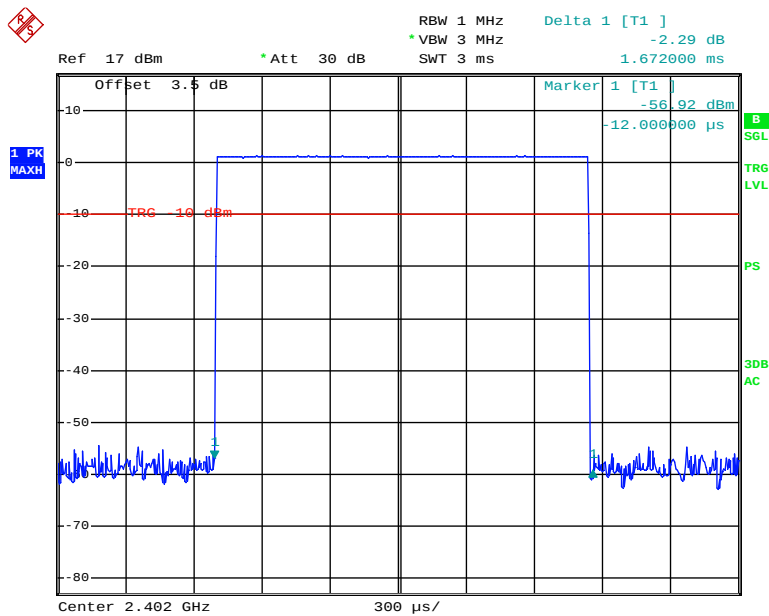
Date: 23.MAY.2013 22:25:38

Pulse time, High Channel, DH1



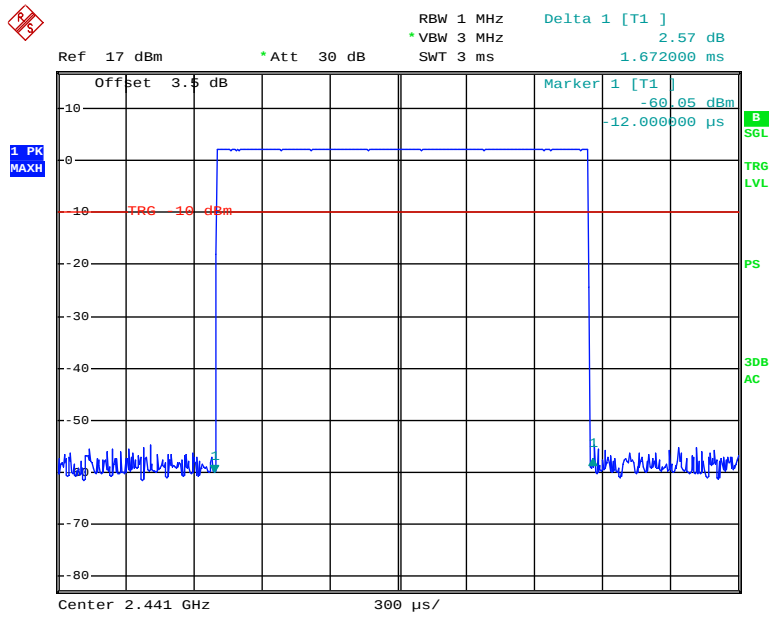
Date: 23.MAY.2013 22:25:58

Pulse time, Low Channel, DH3



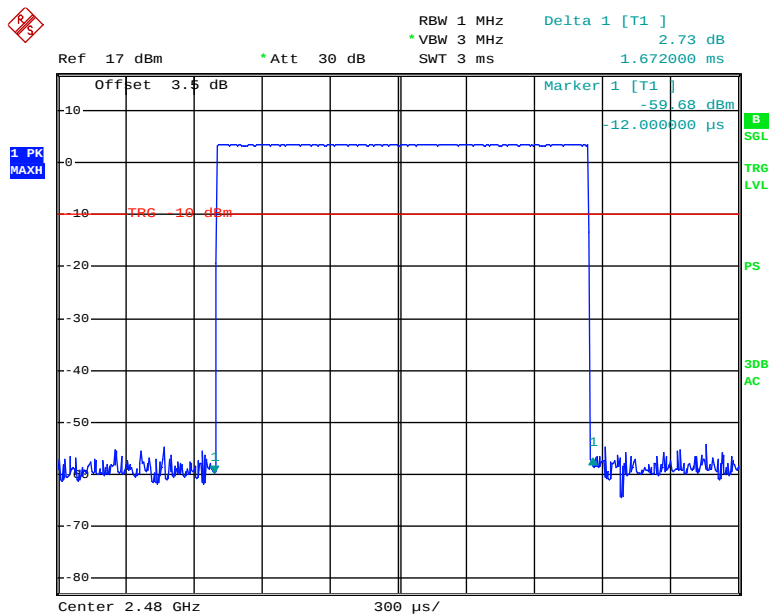
Date: 23.MAY.2013 22:29:56

Pulse time, Middle Channel, DH3



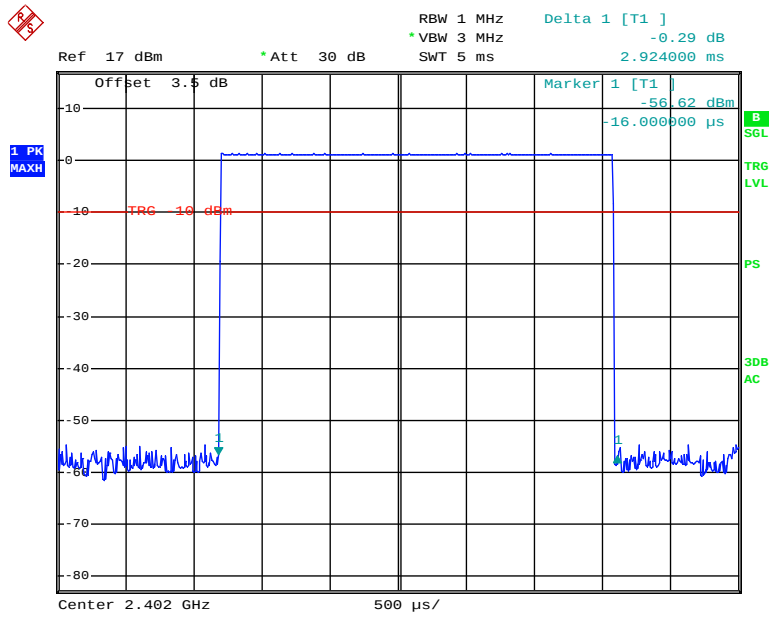
Date: 23.MAY.2013 22:30:23

Pulse time, High Channel, DH3



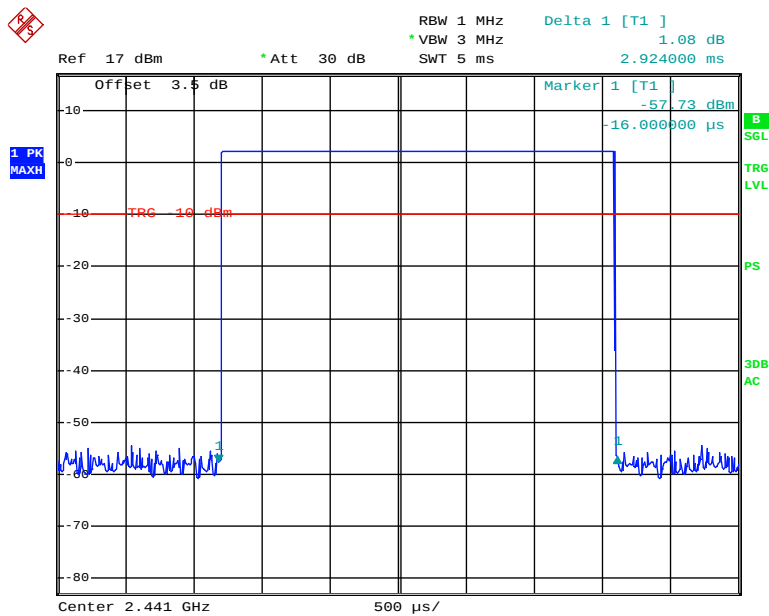
Date: 23.MAY.2013 22:30:48

Pulse time, Low Channel, DH5



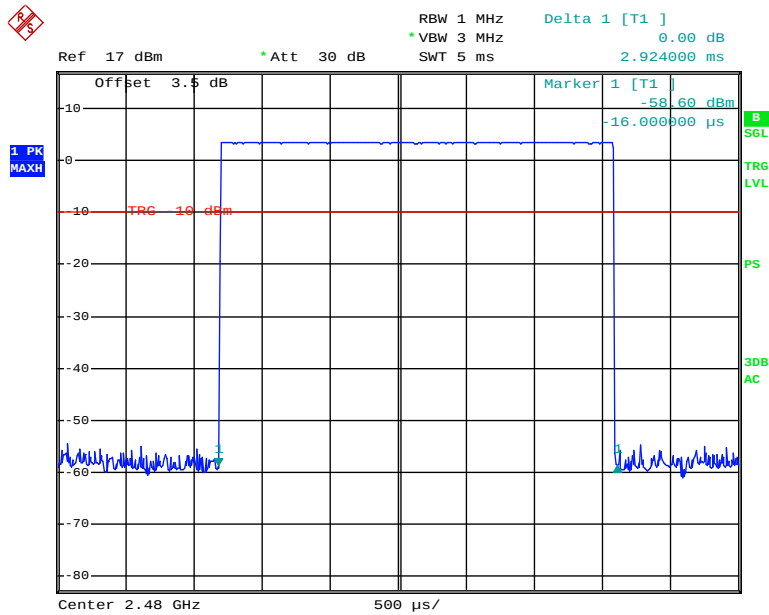
Date: 23.MAY.2013 22:36:45

Pulse time, Middle Channel, DH5



Date: 23.MAY.2013 22:37:03

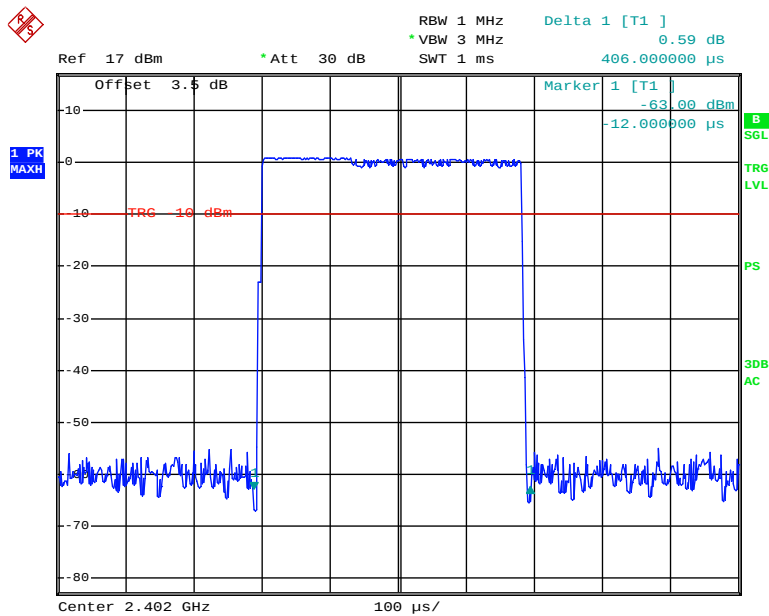
Pulse time, High Channel, DH5



Date: 23.MAY.2013 22:37:19

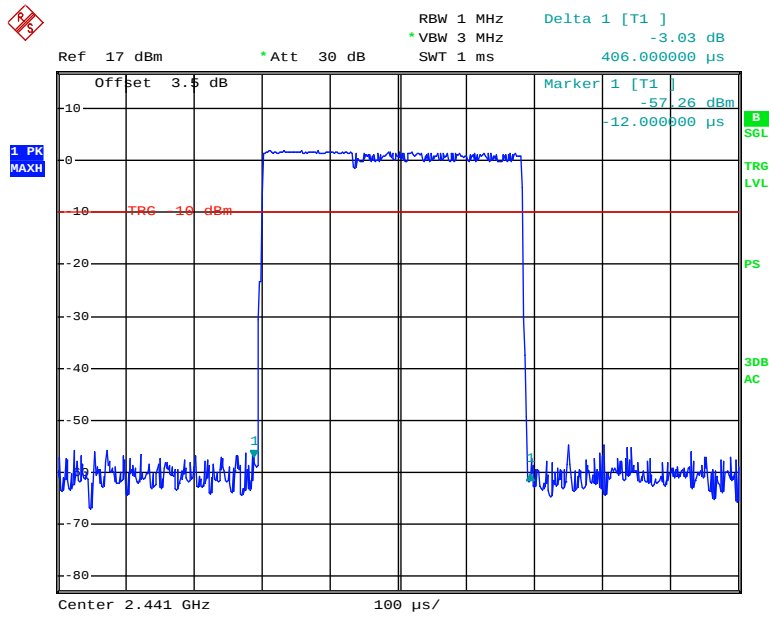
EDR ($\pi/4$ -DQPSK):

Pulse time, Low Channel, DH1



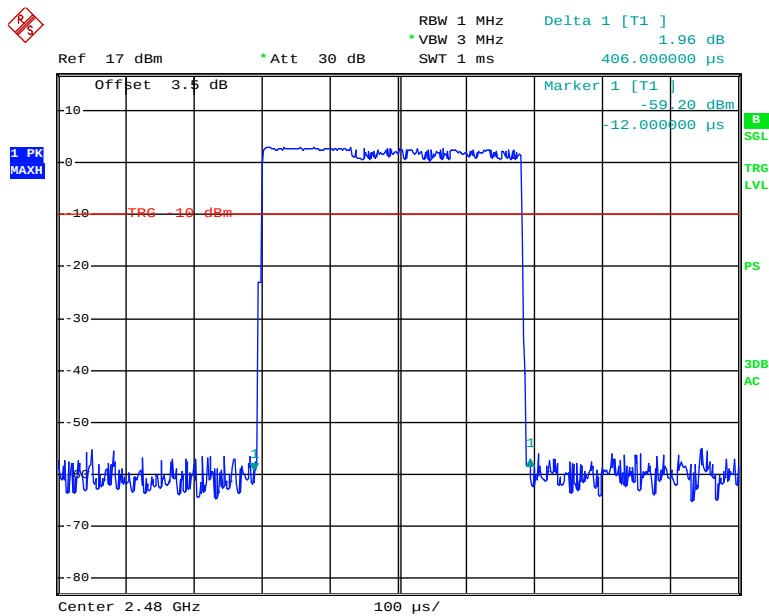
Date: 23.MAY.2013 22:26:44

Pulse time, Middle Channel, DH1



Date: 23.MAY.2013 22:27:06

Pulse time, High Channel, DH1



Date: 23.MAY.2013 22:27:21

RBW 1 MHz
 VBW 3 MHz
 SWT 3 ms
 Delta 1 [T1] 0.21 dB
 Ref 17 dBm
 Att 30 dB
 1.674000 ms

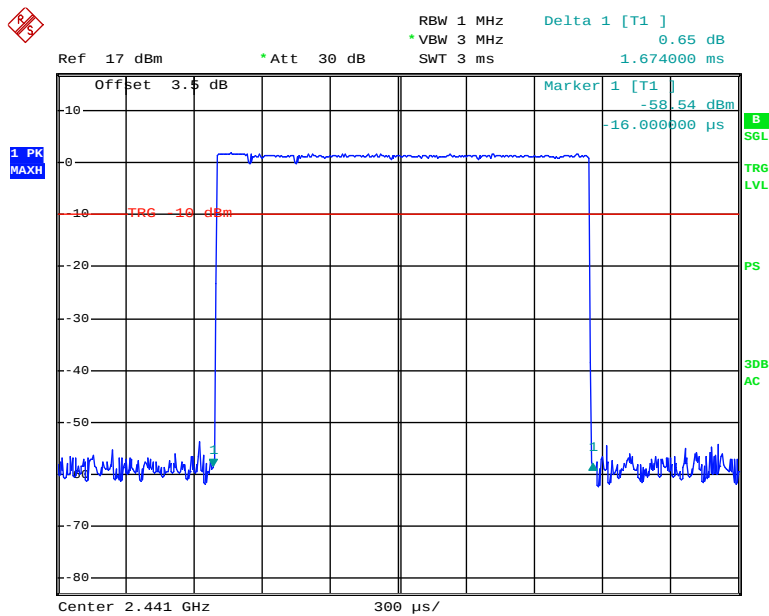
Offset 3.5 dB
 Marker 1 [T1] -57.93 dBm
 -16.000000 μ s

1 PK
 MAXH

TRG -10 dBm
 PS
 3DB
 AC

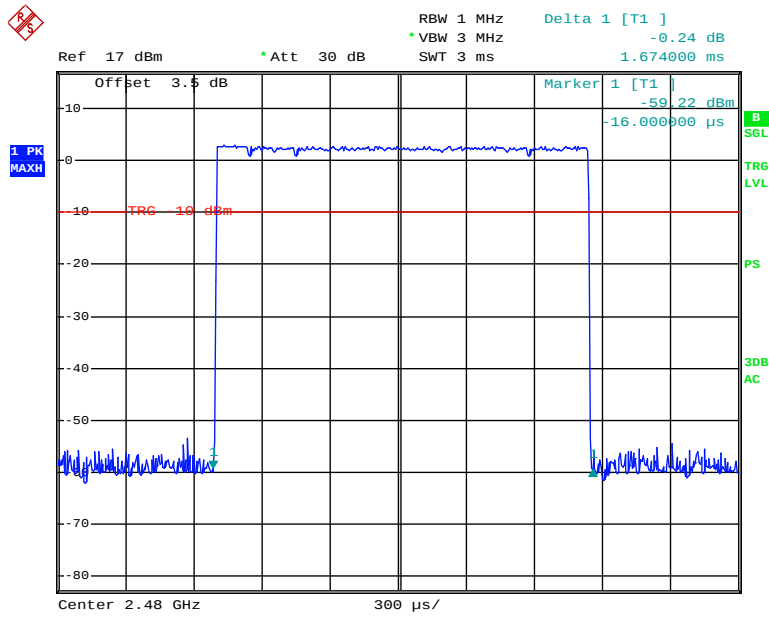
Center 2.402 GHz
 300 μ s/

Pulse time, Middle Channel, DH3



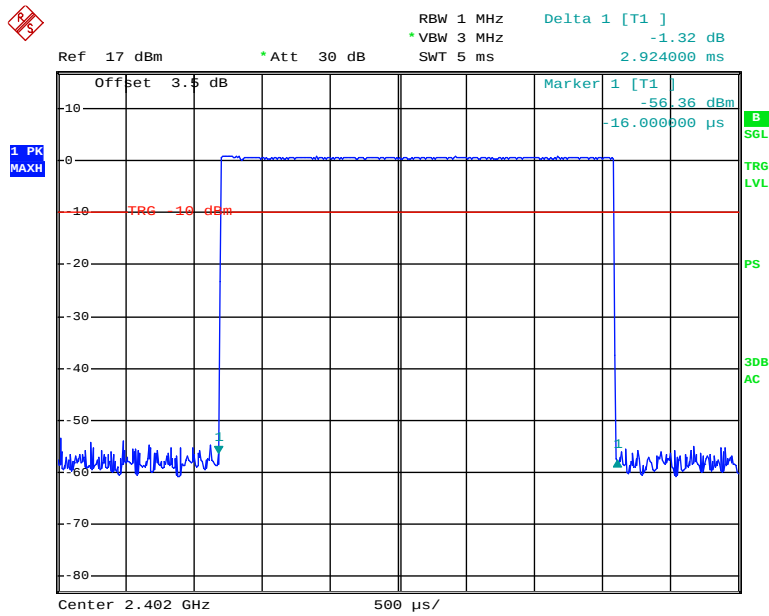
Page 43 of 60

Pulse time, High Channel, DH3



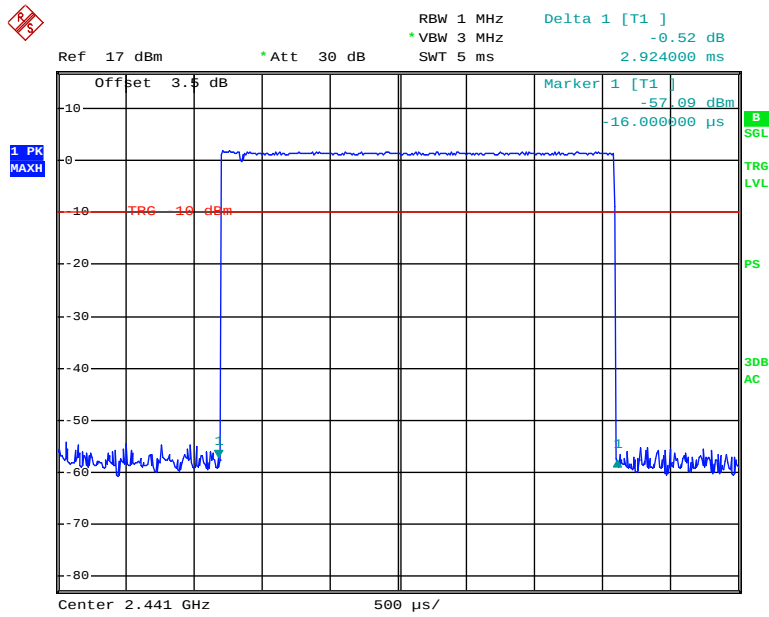
Date: 23.MAY.2013 22:35:25

Pulse time, Low Channel, DH5



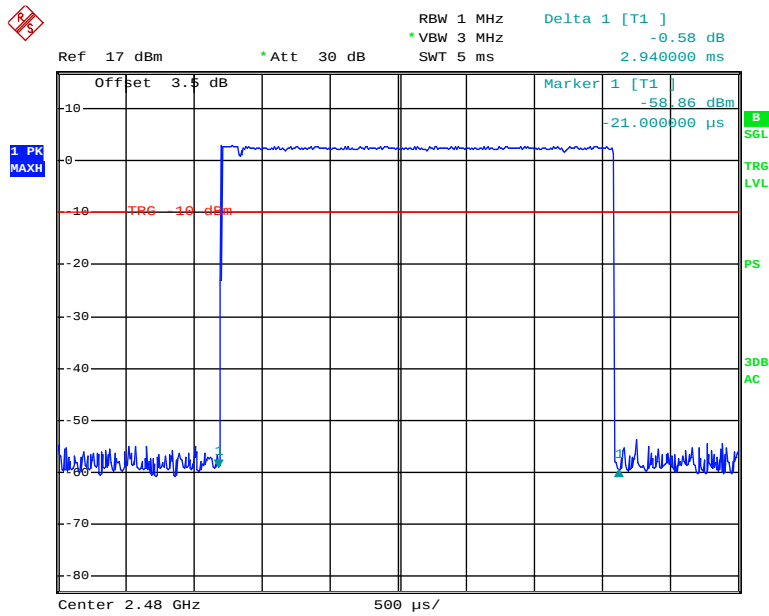
Date: 23.MAY.2013 22:37:45

Pulse time, Middle Channel, DH5



Date: 23.MAY.2013 22:38:01

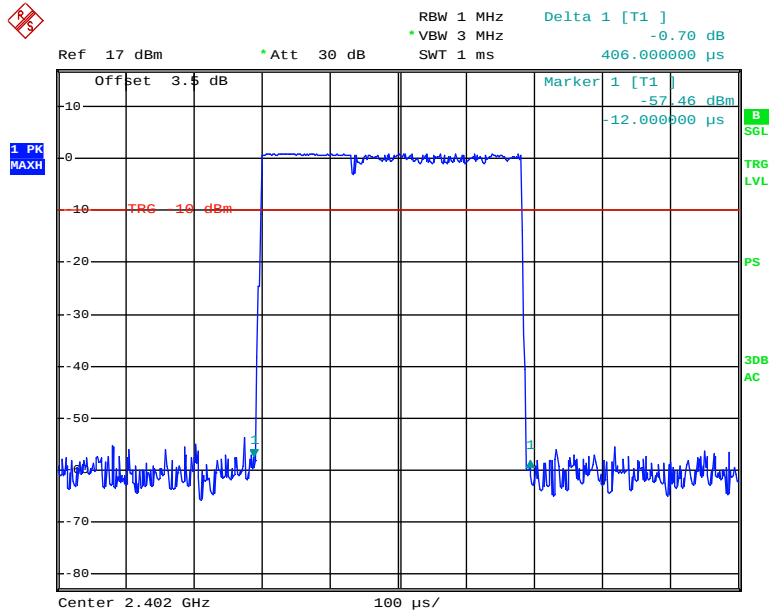
Pulse time, High Channel, DH5



Date: 23.MAY.2013 22:39:30

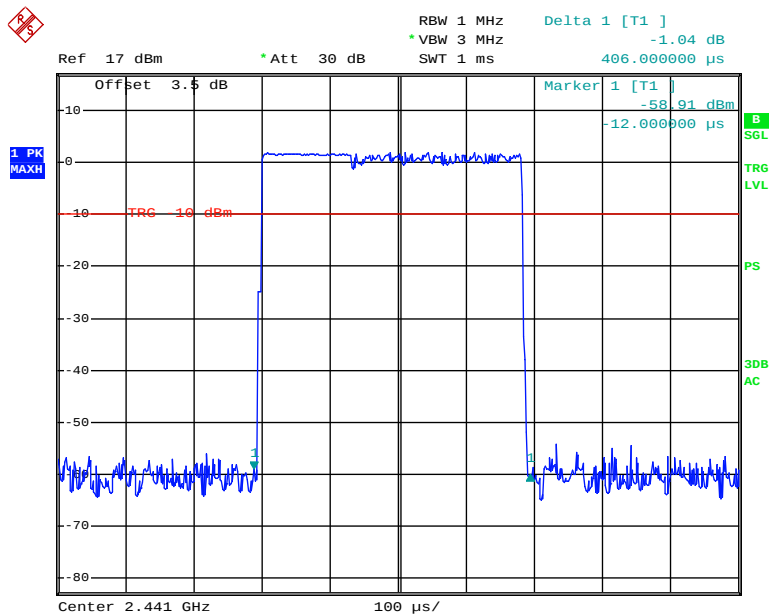
EDR (8DPSK):

Pulse time, Low Channel, DH1



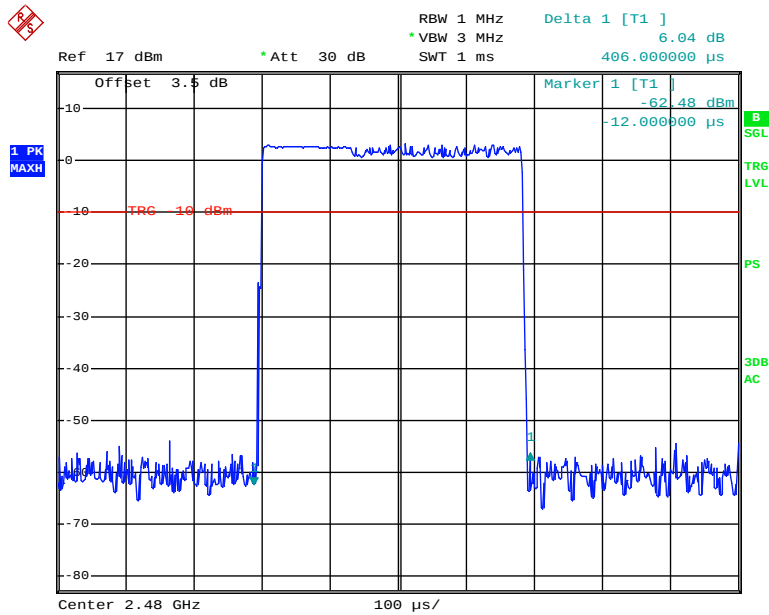
Date: 23.MAY.2013 22:27:51

Pulse time, Middle Channel, DH1



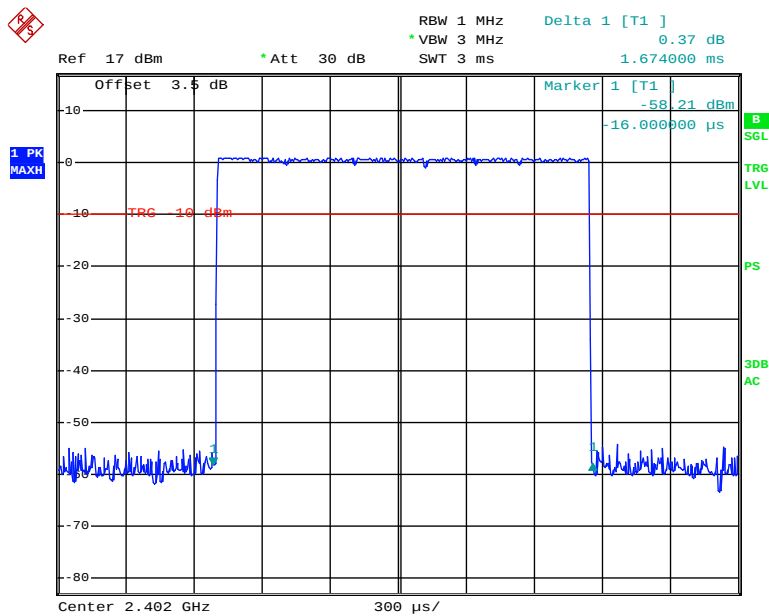
Date: 23.MAY.2013 22:28:16

Pulse time, High Channel, DH1



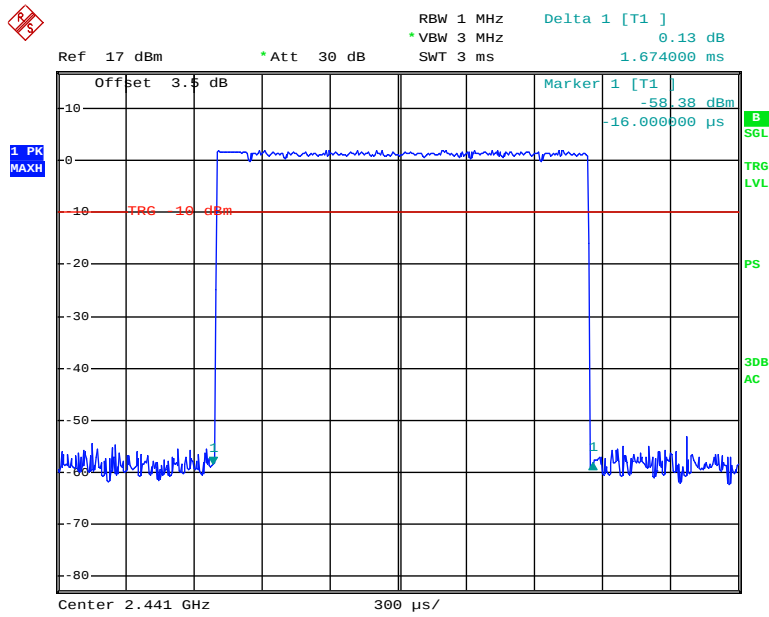
Date: 23.MAY.2013 22:28:31

Pulse time, Low Channel, DH3



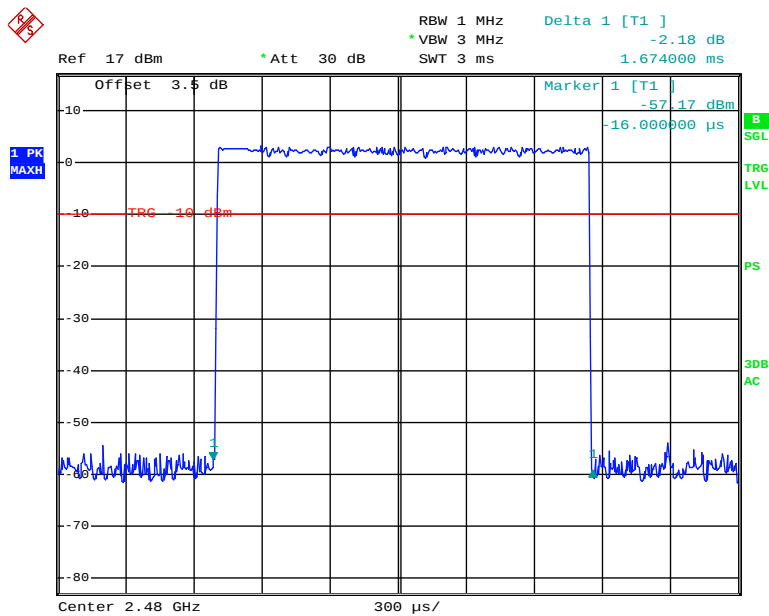
Date: 23.MAY.2013 22:35:41

Pulse time, Middle Channel, DH3



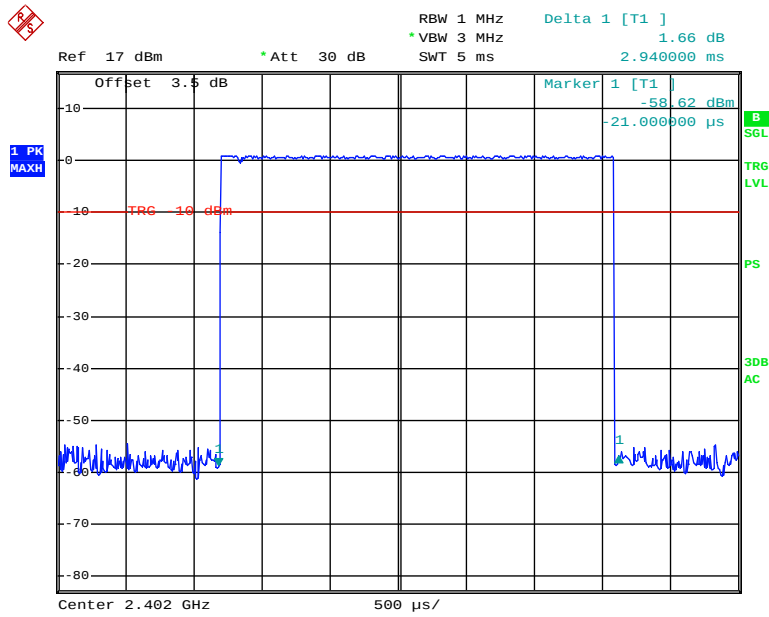
Date: 23.MAY.2013 22:36:02

Pulse time, High Channel, DH3



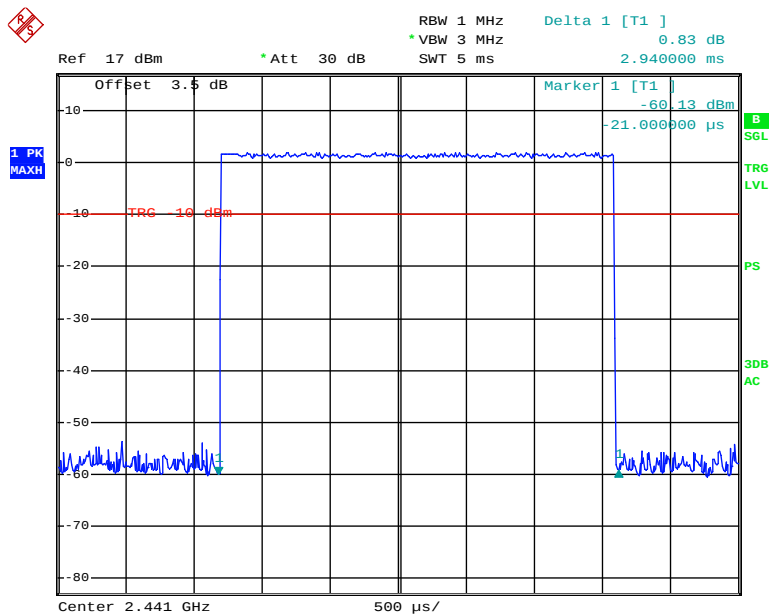
Date: 23.MAY.2013 22:36:12

Pulse time, Low Channel, DH5



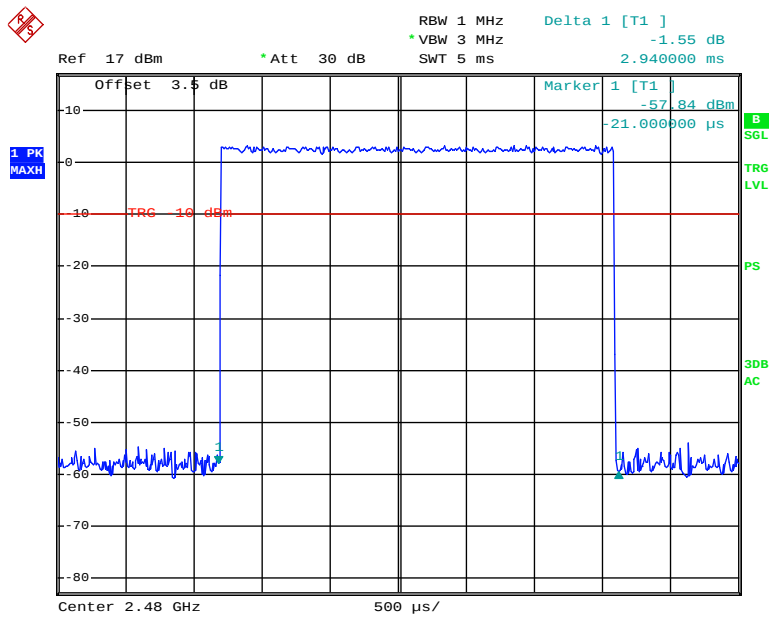
Date: 23.MAY.2013 22:39:52

Pulse time, Middle Channel, DH5



Date: 23.MAY.2013 22:40:12

Pulse time, High Channel, DH5



Date: 23.MAY.2013 22:40:24

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

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09

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

Test Data**Environmental Conditions**

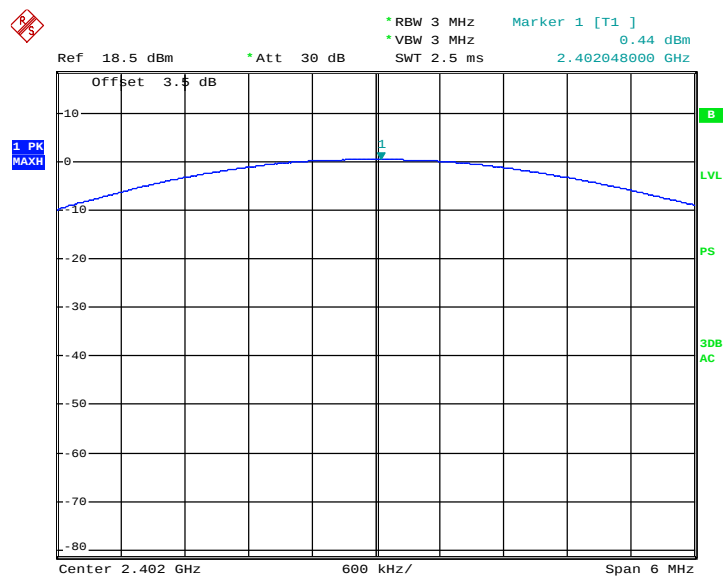
Temperature:	26 °C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Transmitting

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

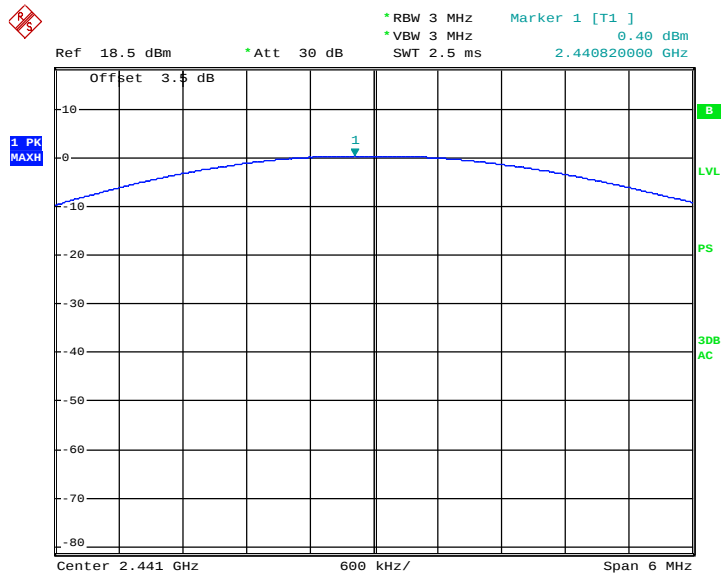
Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	0.44	1.107	1000
	Middle	2441	0.40	1.096	1000
	High	2480	1.11	1.291	1000
EDR ($\pi/4$-DQPSK)	Low	2402	0.28	1.067	1000
	Middle	2441	0.20	1.047	1000
	High	2480	0.88	1.225	1000
EDR (8DPSK)	Low	2402	0.43	1.104	1000
	Middle	2441	0.35	1.084	1000
	High	2480	1.09	1.285	1000

BDR (GFSK): Low Channel

EUT

Date: 23.MAY.2013 20:25:20

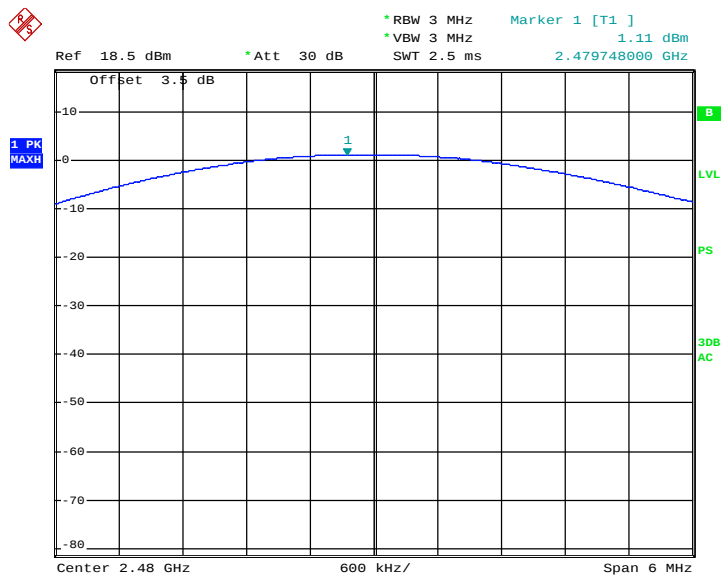
BDR (GFSK): Middle Channel



EUT

Date: 23.MAY.2013 20:25:39

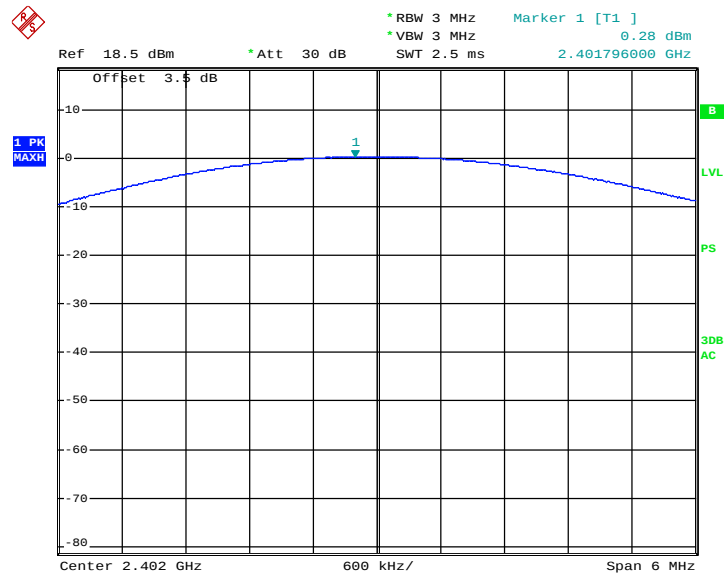
BDR (GFSK): High Channel



EUT

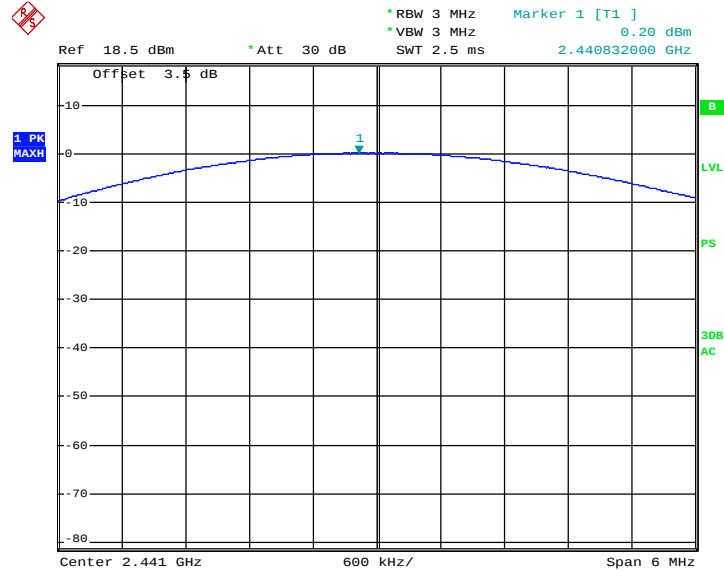
Date: 23.MAY.2013 20:25:59

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



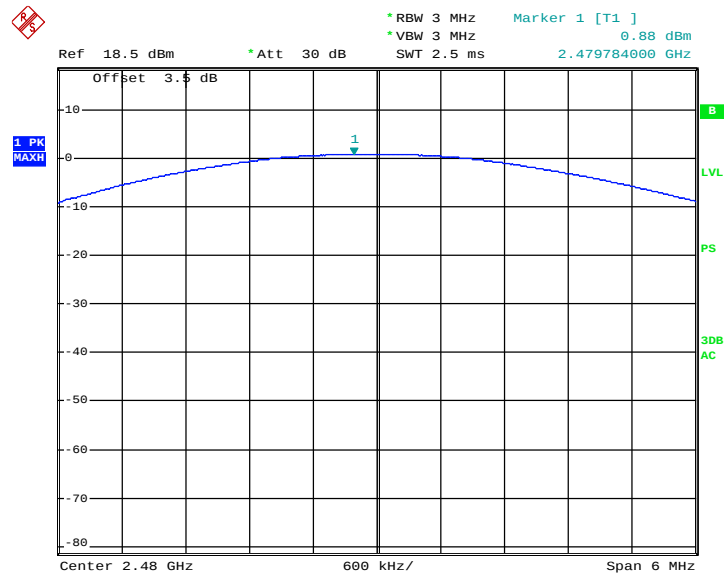
EUT
Date: 23.MAY.2013 20:24:01

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



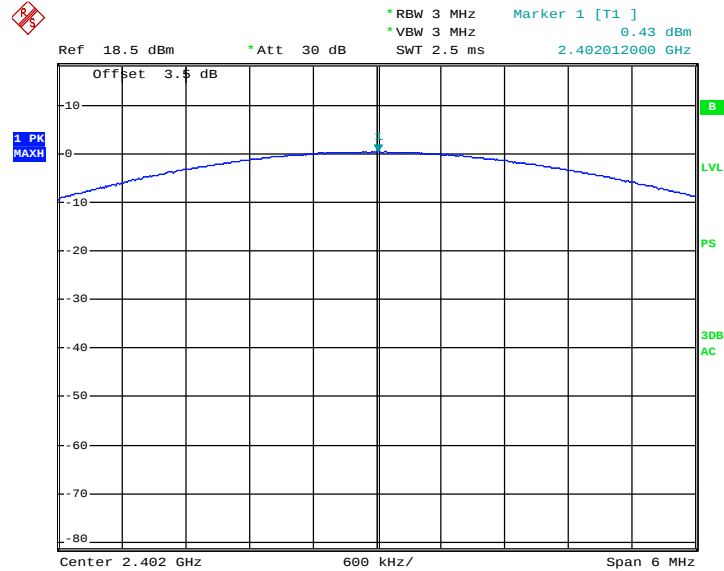
EUT
Date: 23.MAY.2013 20:24:27

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



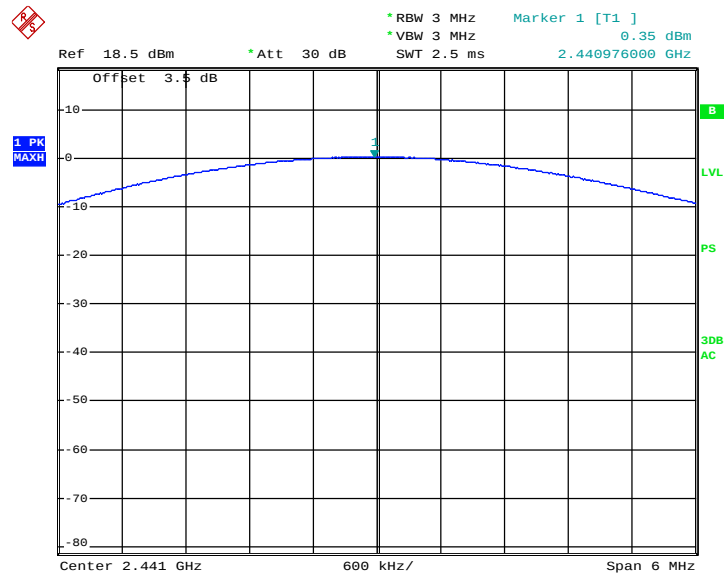
EUT
Date: 23.MAY.2013 20:24:56

EDR(8DPSK): Low Channel



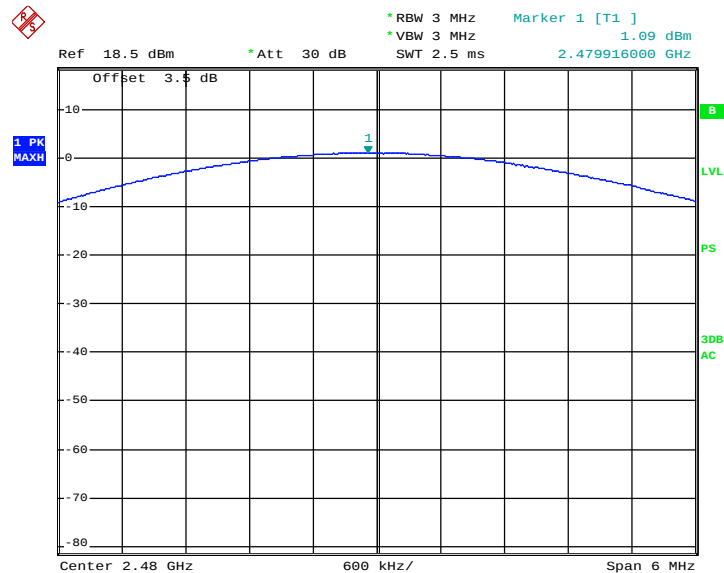
EUT
Date: 23.MAY.2013 20:23:36

EDR(8DPSK): Middle Channel



EUT
Date: 23.MAY.2013 20:22:58

EDR(8DPSK): High Channel



EUT
Date: 23.MAY.2013 20:22:37

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	2013-05-09	2014-05-09

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

Test Data

Environmental Conditions

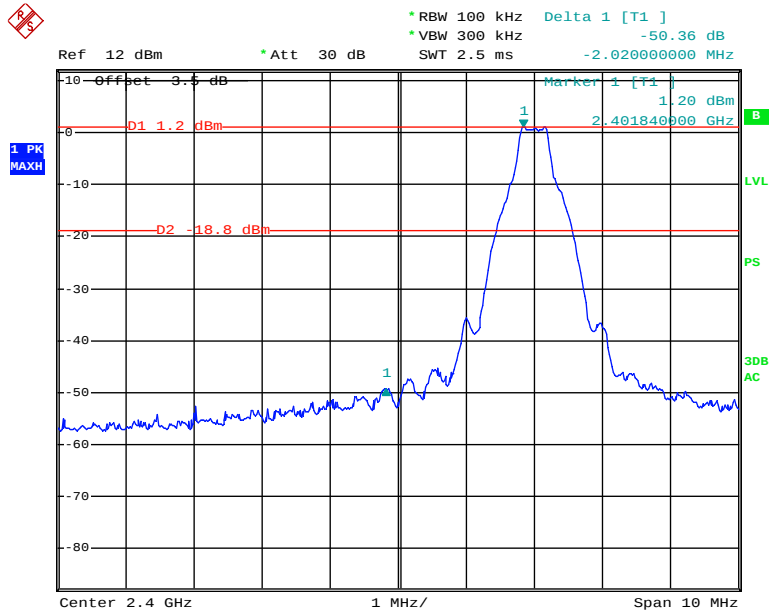
Temperature:	26 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Charlie Chen on 2013-05-23.

EUT operation mode: Transmitting

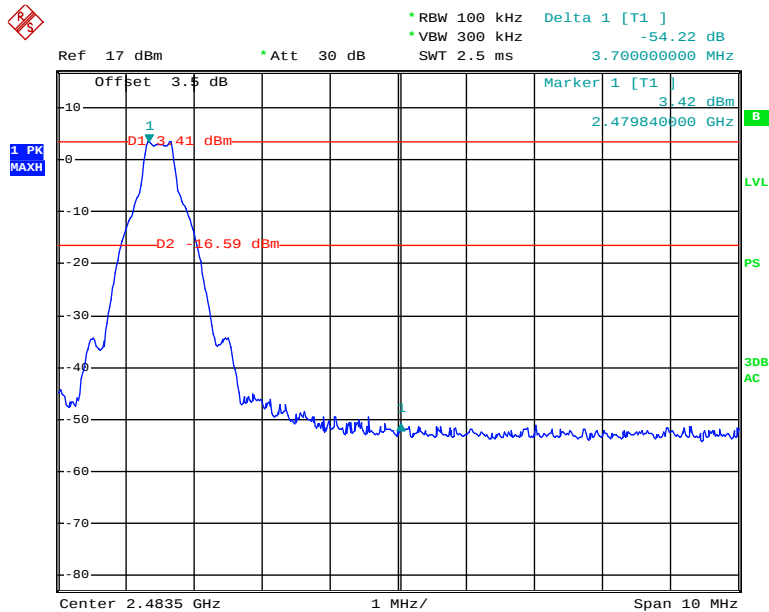
Test Result: Compliance. Please refer to following plots.

BDR (GFSK): Band Edge-Left Side



Date: 23.MAY.2013 21:52:09

BDR (GFSK): Band Edge-Right Side



Date: 23.MAY.2013 21:57:49

Ref 17 dBm * Att 30 dB * RBW 100 kHz Delta 1 [T1] -45.78 dB
 SWT 2.5 ms -2.340000000 MHz

Offset 3.5 dB

Marker 1 [T1] 0.81 dBm
 2.401840000 GHz

1 PK MAXH

D1 0.81 dBm

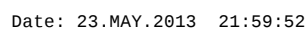
D2 -19.19 dBm

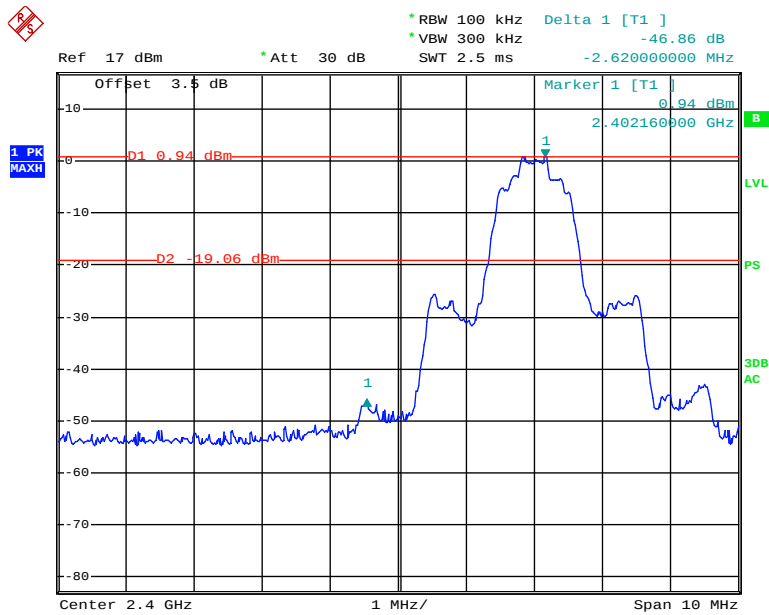
1

1

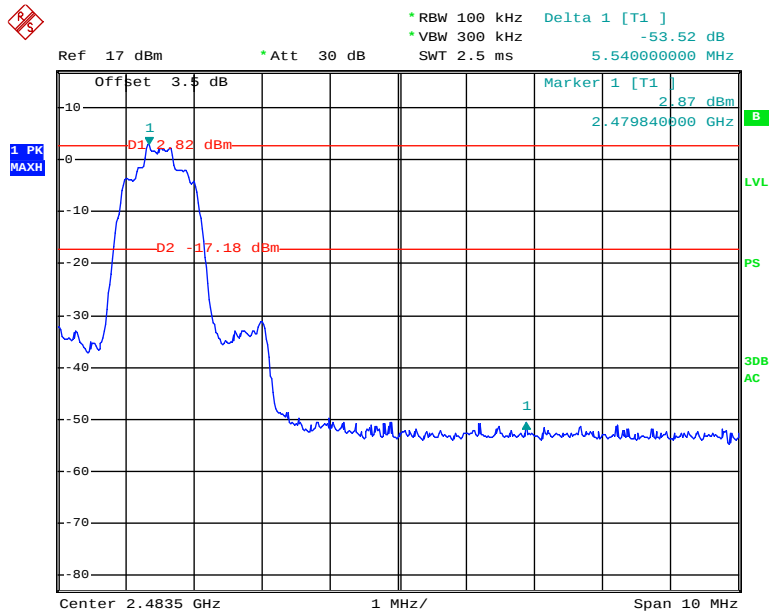
Center 2.4 GHz 1 MHz/ Span 10 MHz

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



EDR (8DPSK): Band Edge-Left Side

Date: 23.MAY.2013 22:01:44

BDR (8DPSK): Band Edge-Right Side

Date: 23.MAY.2013 22:03:16

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