

## FCC PART 15.247

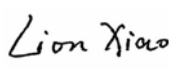

## TEST REPORT

For

### CLC Hong Kong Limited

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**FCC ID: Y7WPLUMZ514**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Might Pro
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<b>Report Number:</b> RDG150430001-00A	
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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *CLC Hong Kong Limited's* product, model number: *Z514 (FCC ID: Y7WPLUMZ514)* (the "EUT") in this report was a *Might Pro*, which was measured approximately: 14.15 cm (L) x 7.35 cm (W) x 1.0 cm (H), rated input voltage: DC 3.7V rechargeable Li-ion battery or DC5V charging from adapter.

Adapter information: plum

Model: PMC43

Input: AC100-240V, 50/60Hz 0.15A

Output: DC5.0V, 1000 mA

*All measurement and test data in this report was gathered from production sample serial number: 150430001 (Assigned by BACL, Dongguan). The EUT was received on 2015-04-30.*

### Objective

This report is prepared on behalf of *CLC Hong Kong Limited* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules

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

### Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: Y7WPLUMZ514.

FCC Part 15C DTS submissions with FCC ID: Y7WPLUMZ514.

FCC Part 22H, 24E PCE submissions with FCC ID: Y7WPLUMZ514.

### Test Methodology

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

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

### Test Facility

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

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode.

### EUT Exercise Software

Test Software Version		Engineering Mode		
Test Frequency		2402MHz	2441MHz	2480MHz
Power Level Setting	GFSK	N/A	N/A	N/A
	$\pi/4$ -DQPSK	N/A	N/A	N/A
	8DPSK	N/A	N/A	N/A

### Equipment Modifications

No modification was made to the EUT.

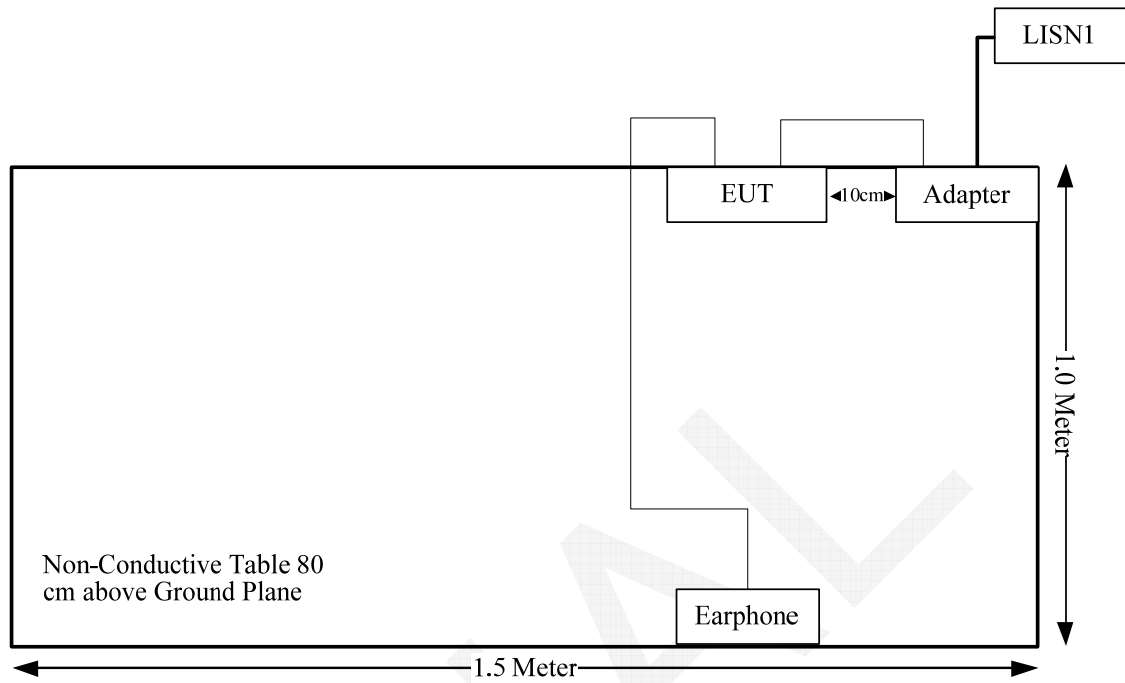
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	109038

### External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	1.2	USB Port of Laptop	EUT
Earphone Cable	No	No	1.2	Audio Port of EUT	Earphone

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

## **FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE**

### **Applicable Standard**

According to §15.247(i) and §1.1310, 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 KDB447498 D01 General RF Exposure Guidance v05r02:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

### **Measurement Result**

The maximum target output power= 2.50 dBm (1.78mW) at 2480 MHz

$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}]$   
 $= 1.78/5 \cdot (\sqrt{2.48}) = 0.56 < 3.0$

**So the stand-alone SAR evaluation is not necessary.**



## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **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, which was permanently attached and the antenna gain is -0.6 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

FCC§15.207

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cisp}$

Measurement	$U_{cisp}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

### EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

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

### EMI Test Receiver Setup

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

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

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

### Test Procedure

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

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

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

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

$V_C$ : corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB 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
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2014-06-09	2015-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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 Part 15.207, with the worst margin reading of:

**13.0 dB at 0.507637 MHz** in the **Neutral** conducted mode

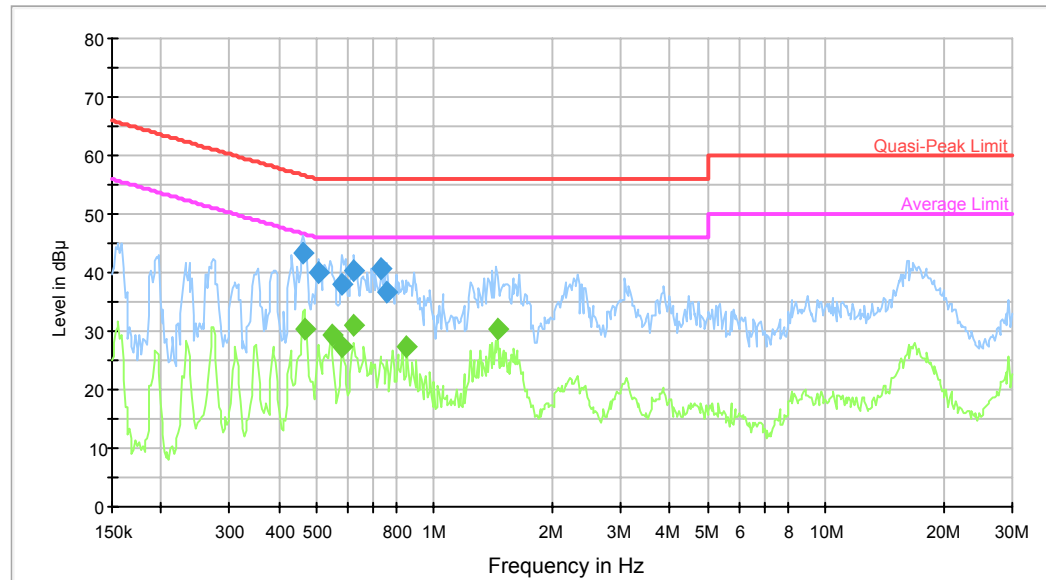
**Test Data****Environmental Conditions**

<b>Temperature:</b>	28.4 °C
<b>Relative Humidity:</b>	63 %
<b>ATM Pressure:</b>	100.3 kPa

*The testing was performed by Lion Xiao on 2015-05-05.*

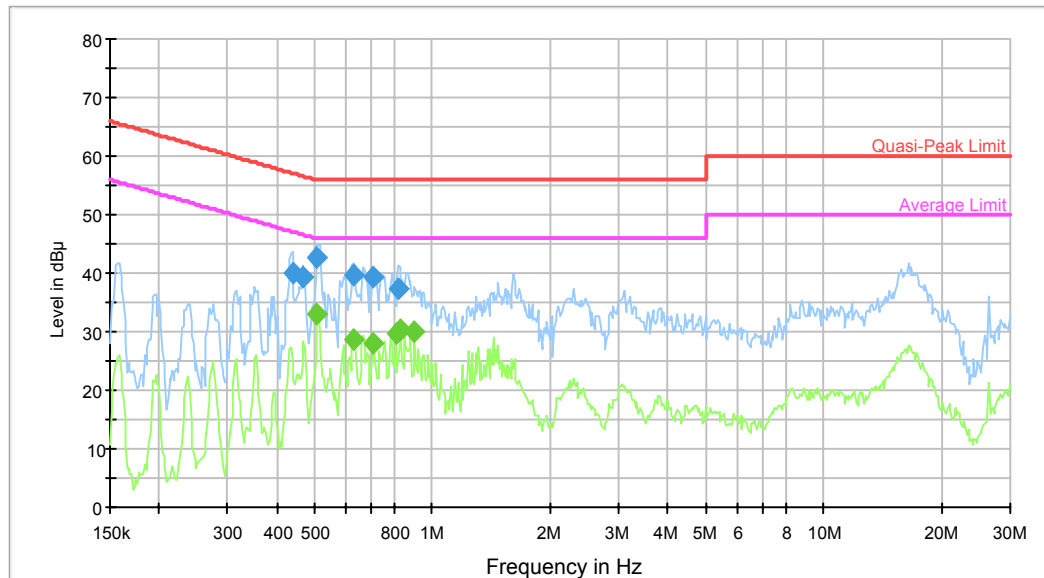
Test Mode: Charging&Transmitting

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.461346	43.5	9.000	L1	10.2	13.2	56.7	Compliance
0.503608	39.9	9.000	L1	10.1	16.1	56.0	Compliance
0.581275	37.9	9.000	L1	10.2	18.1	56.0	Compliance
0.624492	40.4	9.000	L1	10.3	15.6	56.0	Compliance
0.732382	40.7	9.000	L1	10.4	15.3	56.0	Compliance
0.756101	36.7	9.000	L1	10.4	19.3	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.465037	30.5	9.000	L1	10.2	16.1	46.6	Compliance
0.545378	29.2	9.000	L1	10.1	16.8	46.0	Compliance
0.581275	27.2	9.000	L1	10.2	18.8	46.0	Compliance
0.624492	31.1	9.000	L1	10.3	14.9	46.0	Compliance
0.852094	27.2	9.000	L1	10.4	18.8	46.0	Compliance
1.453260	30.2	9.000	L1	10.4	15.8	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.439808	39.9	9.000	N	10.2	17.2	57.1	Compliance
0.468757	39.4	9.000	N	10.1	17.1	56.5	Compliance
0.507637	42.7	9.000	N	10.1	13.3	56.0	Compliance
0.629488	39.7	9.000	N	10.3	16.3	56.0	Compliance
0.709407	39.4	9.000	N	10.4	16.6	56.0	Compliance
0.818813	37.3	9.000	N	10.4	18.7	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.507637	33.0	9.000	N	10.1	13.0	46.0	Compliance
0.629488	28.8	9.000	N	10.3	17.2	46.0	Compliance
0.709407	28.0	9.000	N	10.4	18.0	46.0	Compliance
0.805868	29.6	9.000	N	10.4	16.4	46.0	Compliance
0.831967	30.3	9.000	N	10.4	15.7	46.0	Compliance
0.900972	29.9	9.000	N	10.4	16.1	46.0	Compliance

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

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

6G~18GHz: 5.23 dB

Table 1 – Values of  $U_{cisp}$

Measurement	$U_{cisp}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

### EUT Setup

Below 1GHz:



**Above 1GHz:**

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

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

The spacing between the peripherals was 10 cm.

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
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, peak and Average detection modes for frequencies above 1 GHz.



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-15	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2014-09-06	2015-09-06

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

**Corrected Amplitude & Margin Calculation**

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

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

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

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

**Test Results Summary**

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

**9.11 dB at 2483.5 MHz in the Horizontal polarization of EDR (8-DPSK)**

**Test Data****Environmental Conditions**

Temperature:	24.3 °C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

*The testing was performed by Lion Xiao from 2015-05-03.*

*Test Mode: Transmitting*

*BDR Mode (GFSK):*

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	67.07	PK	H	25.65	3.66	0.00	96.38	N/A	N/A
2402	55.17	AV	H	25.65	3.66	0.00	84.48	N/A	N/A
2402	65.25	PK	V	25.65	3.66	0.00	94.56	N/A	N/A
2402	53.18	AV	V	25.65	3.66	0.00	82.49	N/A	N/A
2390	26.35	PK	H	25.61	3.63	0.00	55.59	74.00	18.41
2390	14.36	AV	H	25.61	3.63	0.00	43.60	54.00	10.40
4804	34.95	PK	H	30.59	5.06	27.41	43.19	74.00	30.81
4804	21.65	AV	H	30.59	5.06	27.41	29.89	54.00	24.11
7206	31.28	PK	H	34.09	6.61	25.91	46.07	74.00	27.93
7206	19.14	AV	H	34.09	6.61	25.91	33.93	54.00	20.07
9608	30.15	PK	H	35.96	8.53	27.55	47.09	74.00	26.91
9608	17.65	AV	H	35.96	8.53	27.55	34.59	54.00	19.41
4365	34.28	PK	H	29.83	5.00	26.92	42.19	74.00	31.81
4365	21.39	AV	H	29.83	5.00	26.92	29.30	54.00	24.70
134.76	37.97	QP	H	13.76	1.40	21.42	31.71	43.50	11.79
Middle Channel: 2441 MHz									
2441	67.41	PK	H	25.75	3.76	0.00	96.92	N/A	N/A
2441	55.83	AV	H	25.75	3.76	0.00	85.34	N/A	N/A
2441	64.75	PK	V	25.75	3.76	0.00	94.26	N/A	N/A
2441	52.59	AV	V	25.75	3.76	0.00	82.10	N/A	N/A
4882	35.33	PK	H	30.79	5.19	27.42	43.89	74.00	30.11
4882	22.06	AV	H	30.79	5.19	27.42	30.62	54.00	23.38
7323	31.65	PK	H	34.38	6.75	25.88	46.90	74.00	27.10
7323	19.67	AV	H	34.38	6.75	25.88	34.92	54.00	19.08
9764	30.6	PK	H	36.33	8.62	27.20	48.35	74.00	25.65
9764	18	AV	H	36.33	8.62	27.20	35.75	54.00	18.25
1176	34.8	PK	H	22.76	2.95	26.77	33.74	74.00	40.26
1176	21.91	AV	H	22.76	2.95	26.77	20.85	54.00	33.15
1437	34.26	PK	H	23.44	2.97	27.15	33.52	74.00	40.48
1437	21.26	AV	H	23.44	2.97	27.15	20.52	54.00	33.48
134.76	37.84	QP	H	13.76	1.40	21.42	31.58	43.50	11.92
High Channel: 2480 MHz									
2480	67.88	PK	H	25.85	3.68	0.00	97.41	N/A	N/A
2480	55.09	AV	H	25.85	3.68	0.00	84.62	N/A	N/A
2480	65.61	PK	V	25.85	3.68	0.00	95.14	N/A	N/A
2480	53.26	AV	V	25.85	3.68	0.00	82.79	N/A	N/A
2483.5	26.24	PK	H	25.86	3.67	0.00	55.77	74.00	18.23
2483.5	14.03	AV	H	25.86	3.67	0.00	43.56	54.00	10.44
4960	35.11	PK	H	31.00	5.34	27.43	44.02	74.00	29.98
4960	21.99	AV	H	31.00	5.34	27.43	30.90	54.00	23.10
7440	31.49	PK	H	34.66	6.89	25.97	47.07	74.00	26.93
7440	19.37	AV	H	34.66	6.89	25.97	34.95	54.00	19.05
9920	30.49	PK	H	36.71	8.71	26.66	49.25	74.00	24.75
9920	18.02	AV	H	36.71	8.71	26.66	36.78	54.00	17.22
3153	34.63	PK	H	27.69	6.93	27.41	41.84	74.00	32.16
3153	21.51	AV	H	27.69	6.93	27.41	28.72	54.00	25.28
134.76	37.77	QP	H	13.76	1.40	21.42	31.51	43.50	11.99

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

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	66.15	PK	H	25.65	3.66	0.00	95.46	N/A	N/A
2402	54.37	AV	H	25.65	3.66	0.00	83.68	N/A	N/A
2402	64.78	PK	V	25.65	3.66	0.00	94.09	N/A	N/A
2402	52.87	AV	V	25.65	3.66	0.00	82.18	N/A	N/A
2390	26.31	PK	H	25.61	3.63	0.00	55.55	74.00	18.45
2390	14.62	AV	H	25.61	3.63	0.00	43.86	54.00	10.14
4804	34.77	PK	H	30.59	5.06	27.41	43.01	74.00	30.99
4804	21.27	AV	H	30.59	5.06	27.41	29.51	54.00	24.49
7206	30.93	PK	H	34.09	6.61	25.91	45.72	74.00	28.28
7206	18.79	AV	H	34.09	6.61	25.91	33.58	54.00	20.42
9608	29.89	PK	H	35.96	8.53	27.55	46.83	74.00	27.17
9608	17.39	AV	H	35.96	8.53	27.55	34.33	54.00	19.67
4365	33.93	PK	H	29.83	5.00	26.92	41.84	74.00	32.16
4365	21.29	AV	H	29.83	5.00	26.92	29.20	54.00	24.80
134.76	38.04	QP	H	13.76	1.40	21.42	31.78	43.50	11.72
Middle Channel: 2441 MHz									
2441	66.73	PK	H	25.75	3.76	0.00	96.24	N/A	N/A
2441	54.78	AV	H	25.75	3.76	0.00	84.29	N/A	N/A
2441	65.03	PK	V	25.75	3.76	0.00	94.54	N/A	N/A
2441	53.29	AV	V	25.75	3.76	0.00	82.80	N/A	N/A
4882	34.96	PK	H	30.79	5.19	27.42	43.52	74.00	30.48
4882	21.74	AV	H	30.79	5.19	27.42	30.30	54.00	23.70
7323	31.43	PK	H	34.38	6.75	25.88	46.68	74.00	27.32
7323	19.27	AV	H	34.38	6.75	25.88	34.52	54.00	19.48
9764	30.29	PK	H	36.33	8.62	27.20	48.04	74.00	25.96
9764	17.87	AV	H	36.33	8.62	27.20	35.62	54.00	18.38
1437	34.62	PK	H	23.44	2.97	27.15	33.88	74.00	40.12
1437	21.81	AV	H	23.44	2.97	27.15	21.07	54.00	32.93
1176	34.11	PK	H	22.76	2.95	26.77	33.05	74.00	40.95
1176	20.98	AV	H	22.76	2.95	26.77	19.92	54.00	34.08
134.76	37.49	QP	H	13.76	1.40	21.42	31.23	43.50	12.27
High Channel: 2480 MHz									
2480	67.03	PK	H	25.85	3.68	0.00	96.56	N/A	N/A
2480	55.06	AV	H	25.85	3.68	0.00	84.59	N/A	N/A
2480	65.24	PK	V	25.85	3.68	0.00	94.77	N/A	N/A
2480	53.52	AV	V	25.85	3.68	0.00	83.05	N/A	N/A
2483.5	26.85	PK	H	25.86	3.67	0.00	56.38	74.00	17.62
2483.5	14.96	AV	H	25.86	3.67	0.00	44.49	54.00	9.51
4960	34.99	PK	H	31.00	5.34	27.43	43.90	74.00	30.10
4960	21.68	AV	H	31.00	5.34	27.43	30.59	54.00	23.41
7440	31.23	PK	H	34.66	6.89	25.97	46.81	74.00	27.19
7440	19.09	AV	H	34.66	6.89	25.97	34.67	54.00	19.33
9920	30.1	PK	H	36.71	8.71	26.66	48.86	74.00	25.14
9920	17.73	AV	H	36.71	8.71	26.66	36.49	54.00	17.51
3153	34.34	PK	H	27.69	6.93	27.41	41.55	74.00	32.45
3153	21.22	AV	H	27.69	6.93	27.41	28.43	54.00	25.57
134.76	37.58	QP	H	13.76	1.40	21.42	31.32	43.50	12.18

## EDR Mode (8-DPSK):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	66.14	PK	H	25.65	3.66	0.00	95.45	N/A	N/A
2402	54.52	AV	H	25.65	3.66	0.00	83.83	N/A	N/A
2402	64.58	PK	V	25.65	3.66	0.00	93.89	N/A	N/A
2402	52.85	AV	V	25.65	3.66	0.00	82.16	N/A	N/A
2390	28.31	PK	H	25.61	3.63	0.00	57.55	74.00	16.45
2390	15.55	AV	H	25.61	3.63	0.00	44.79	54.00	9.21
4804	34.21	PK	H	30.59	5.06	27.41	42.45	74.00	31.55
4804	21.6	AV	H	30.59	5.06	27.41	29.84	54.00	24.16
7206	30.74	PK	H	34.09	6.61	25.91	45.53	74.00	28.47
7206	18.62	AV	H	34.09	6.61	25.91	33.41	54.00	20.59
9608	29.67	PK	H	35.96	8.53	27.55	46.61	74.00	27.39
9608	17.16	AV	H	35.96	8.53	27.55	34.10	54.00	19.90
4365	33.81	PK	H	29.83	5.00	26.92	41.72	74.00	32.28
4365	20.93	AV	H	29.83	5.00	26.92	28.84	54.00	25.16
134.76	37.22	QP	H	13.76	1.40	21.42	30.96	43.50	12.54
Middle Channel: 2441 MHz									
2441	66.68	PK	H	25.75	3.76	0.00	96.19	N/A	N/A
2441	54.21	AV	H	25.75	3.76	0.00	83.72	N/A	N/A
2441	64.88	PK	V	25.75	3.76	0.00	94.39	N/A	N/A
2441	52.04	AV	V	25.75	3.76	0.00	81.55	N/A	N/A
4882	34.3	PK	H	30.79	5.19	27.42	42.86	74.00	31.14
4882	22.16	AV	H	30.79	5.19	27.42	30.72	54.00	23.28
7323	31.2	PK	H	34.38	6.75	25.88	46.45	74.00	27.55
7323	18.93	AV	H	34.38	6.75	25.88	34.18	54.00	19.82
9764	30	PK	H	36.33	8.62	27.20	47.75	74.00	26.25
9764	17.48	AV	H	36.33	8.62	27.20	35.23	54.00	18.77
1437	34.3	PK	H	23.44	2.97	27.15	33.56	74.00	40.44
1437	21.47	AV	H	23.44	2.97	27.15	20.73	54.00	33.27
1176	33.97	PK	H	22.76	2.95	26.77	32.91	74.00	41.09
1176	20.74	AV	H	22.76	2.95	26.77	19.68	54.00	34.32
134.76	37.19	QP	H	13.76	1.40	21.42	30.93	43.50	12.57
High Channel: 2480 MHz									
2480	67.59	PK	H	25.85	3.68	0.00	97.12	N/A	N/A
2480	55.81	AV	H	25.85	3.68	0.00	85.34	N/A	N/A
2480	65.23	PK	V	25.85	3.68	0.00	94.76	N/A	N/A
2480	53.36	AV	V	25.85	3.68	0.00	82.89	N/A	N/A
2483.5	27.37	PK	H	25.86	3.67	0.00	56.90	74.00	17.10
2483.5	15.36	AV	H	25.86	3.67	0.00	44.89	54.00	9.11
4960	34.31	PK	H	31.00	5.34	27.43	43.22	74.00	30.78
4960	21.22	AV	H	31.00	5.34	27.43	30.13	54.00	23.87
7440	31.1	PK	H	34.66	6.89	25.97	46.68	74.00	27.32
7440	18.93	AV	H	34.66	6.89	25.97	34.51	54.00	19.49
9920	29.78	PK	H	36.71	8.71	26.66	48.54	74.00	25.46
9920	17.55	AV	H	36.71	8.71	26.66	36.31	54.00	17.69
3153	33.97	PK	H	27.69	6.93	27.41	41.18	74.00	32.82
3153	21.14	AV	H	27.69	6.93	27.41	28.35	54.00	25.65
134.76	37.35	QP	H	13.76	1.40	21.42	31.09	43.50	12.41

*BDR Mode (GFSK):*

Ref Lvl 10.5 dBm

Marker 1 [T1] 0.32 dBm

RBW 100 kHz

VBW 300 kHz

SWT 6.4 s

RF Att 20 dB

Unit dBm

0.5 dB Offset

D1 0.32 dBm

D2 -19.68 dBm

1MAX

1 [T1] 0.32 dBm

2 [T1] -58.68 dBm

6.88549098 GHz

Start 30 MHz

2.497 GHz

Stop 25 GHz

Date: 03.MAY 2015 13:34:36

Ref Lvl 10.5 dBm

Marker 2 [T1] -59.14 dBm

RBW 100 kHz RF Att 20 dB

VBW 300 kHz Unit dBm

SWT 6.4 s

0.5 dB Offset

-D1 0.67 dBm

-D2 -19.33 dBm

1MAX

2 [T1] -59.14 dBm

6.88549098 GHz

0.67 dBm

2.43192385 GHz

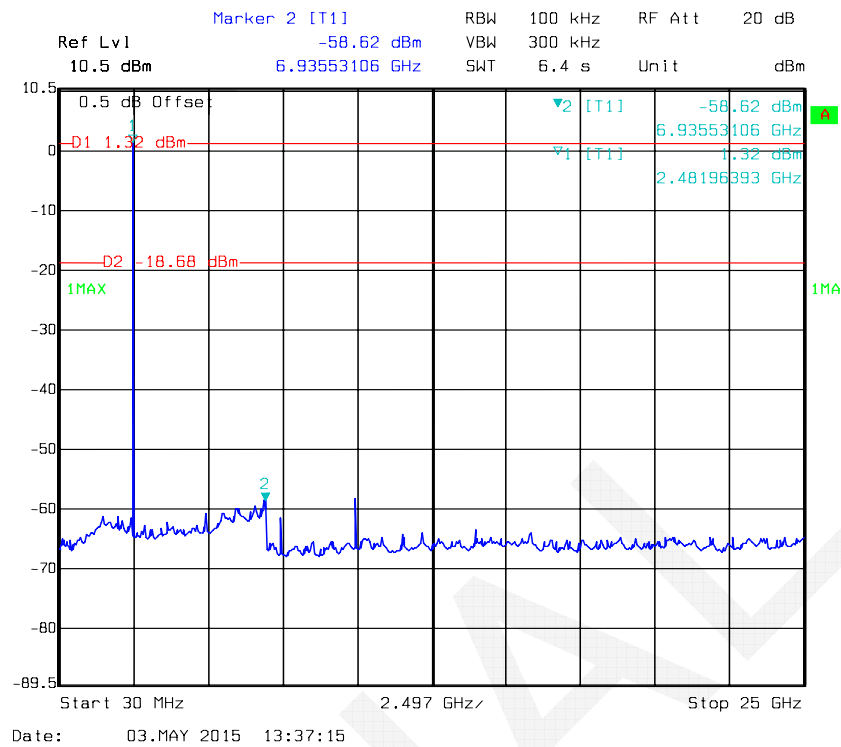
Start 30 MHz

2.497 GHz

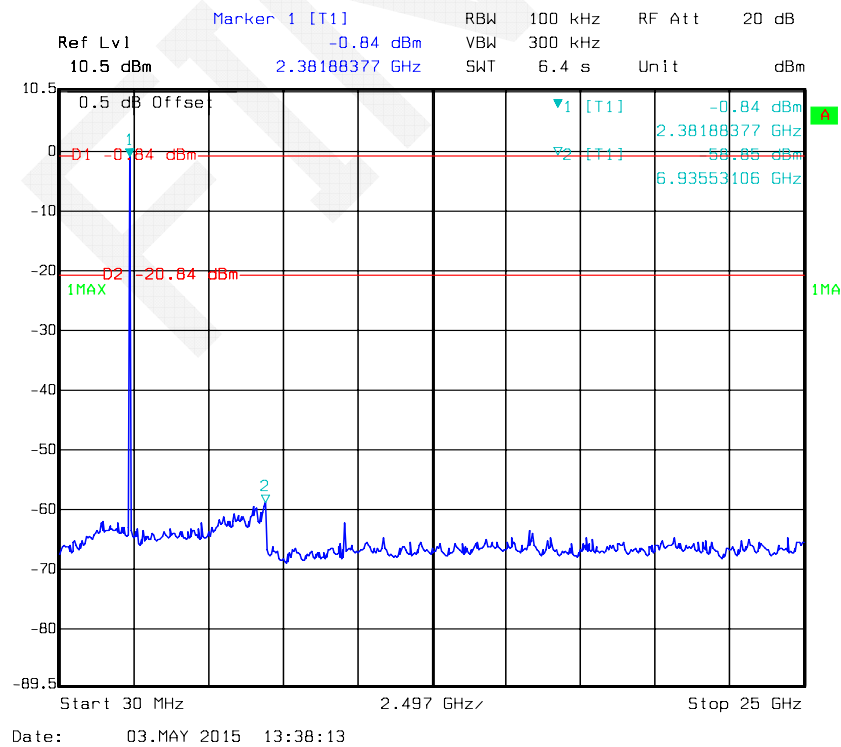
Stop 25 GHz

Date: 03.MAY 2015 13:35:45

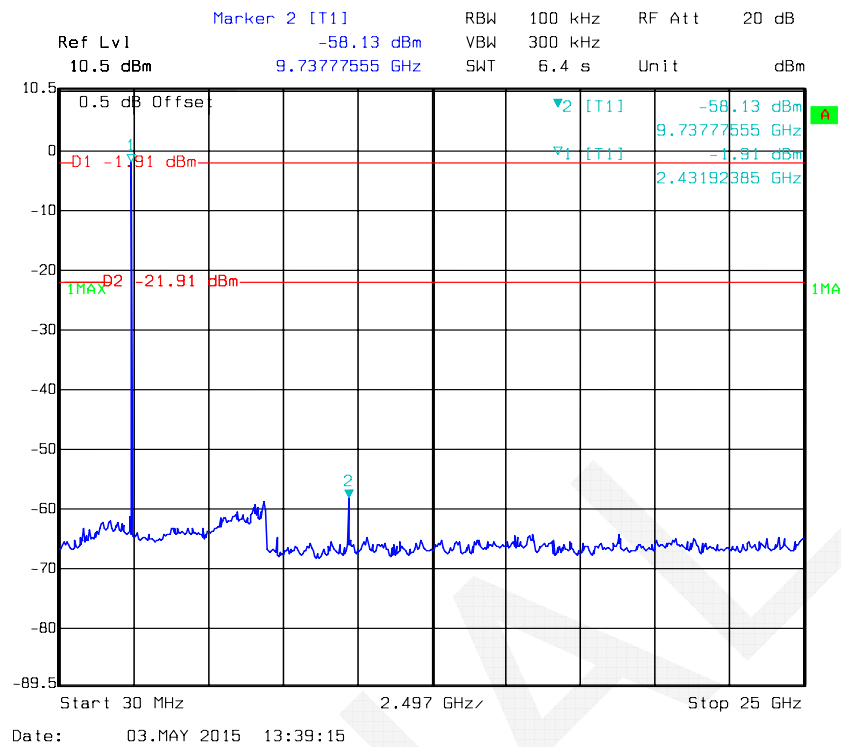
## High Channel

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

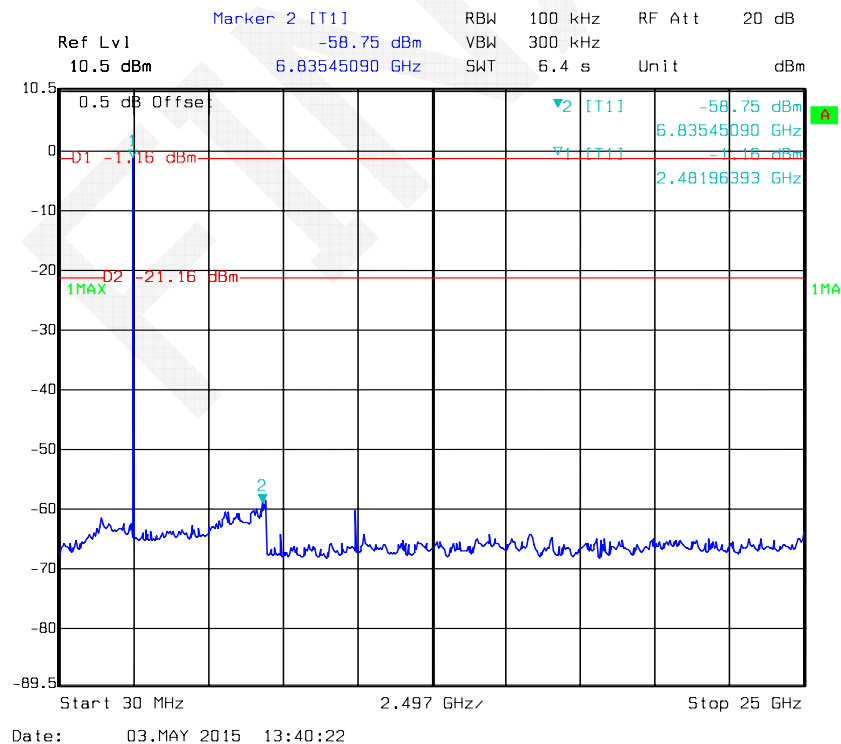
## Low Channel



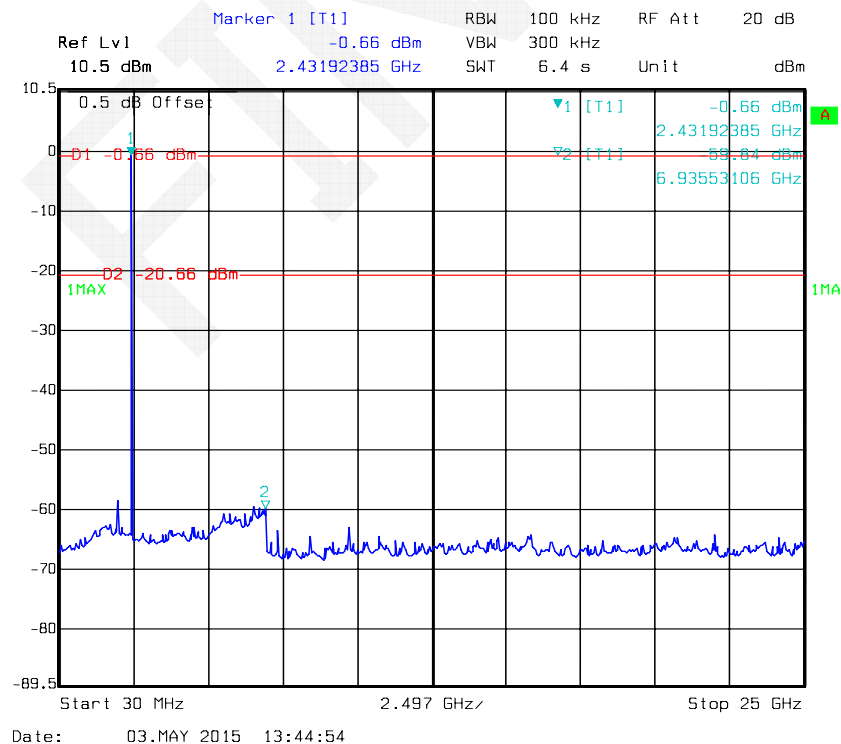
## Middle Channel



## High Channel

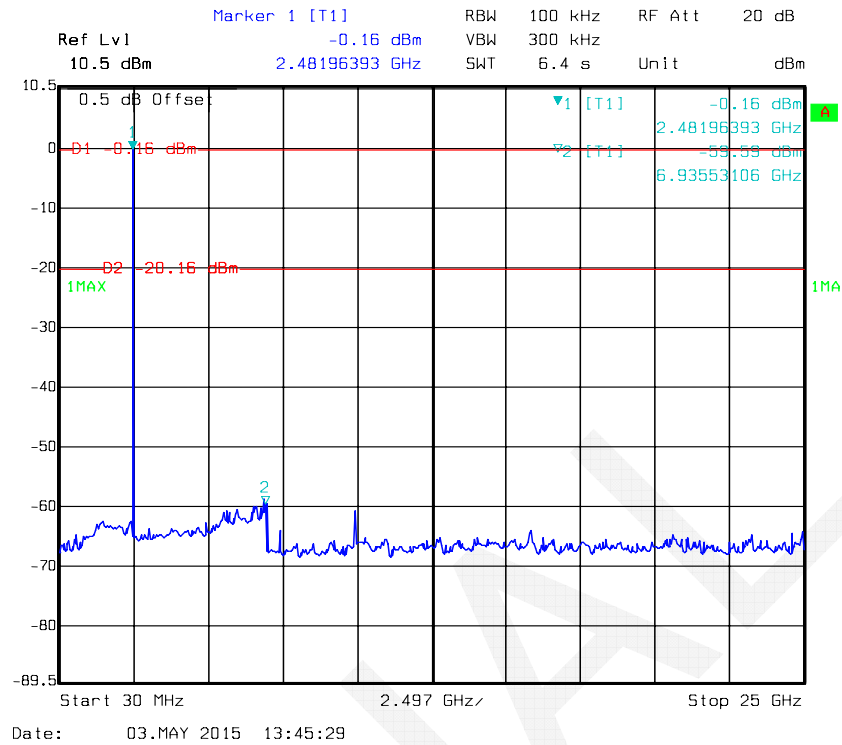


## Low Channel





### High Channel



**FCC §15.247(a) (1) - CHANNEL SEPARATION TEST****Applicable Standard**

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

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Procedure**

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

**Test Data****Environmental Conditions**

Temperature:	25.3 °C
Relative Humidity:	56 %
ATM Pressure:	100.4kPa

\* The testing was performed by Lion Xiao on 2015-05-03.

**Test Result:** Compliance.

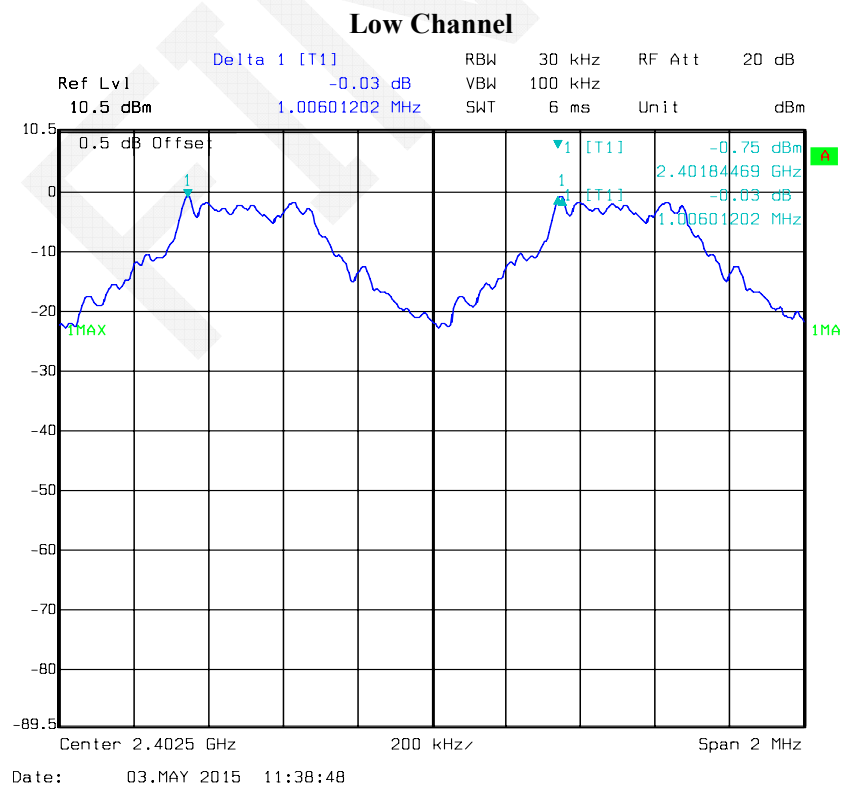
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency	Channel Separation	Limit	Result
		MHz	MHz	MHz	
BDR (GFSK)	Low	2402	1.006	0.628	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.628	Pass
	Adjacent	2442			
	High	2480	1.002	0.628	Pass
	Adjacent	2479			
EDR ( $\pi/4$ -DQPSK)	Low	2402	1.002	0.847	Pass
	Adjacent	2403			
	Middle	2441	1.006	0.847	Pass
	Adjacent	2442			
	High	2480	1.002	0.847	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.002	0.853	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.853	Pass
	Adjacent	2442			
	High	2480	1.002	0.853	Pass
	Adjacent	2479			

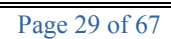
Note: Limit =  $(2/3) \times 20\text{dB bandwidth}$ 

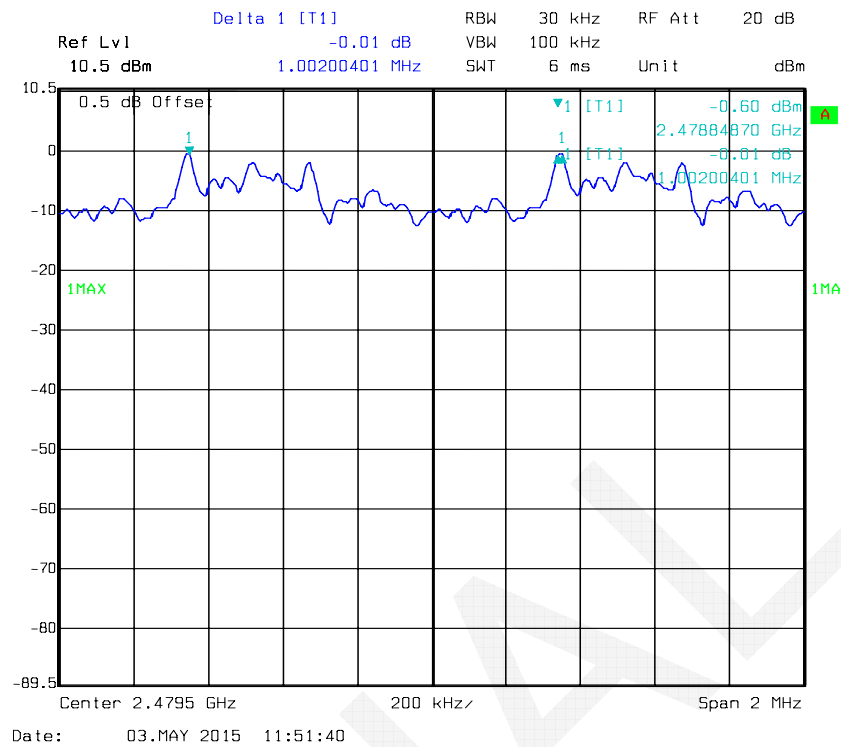
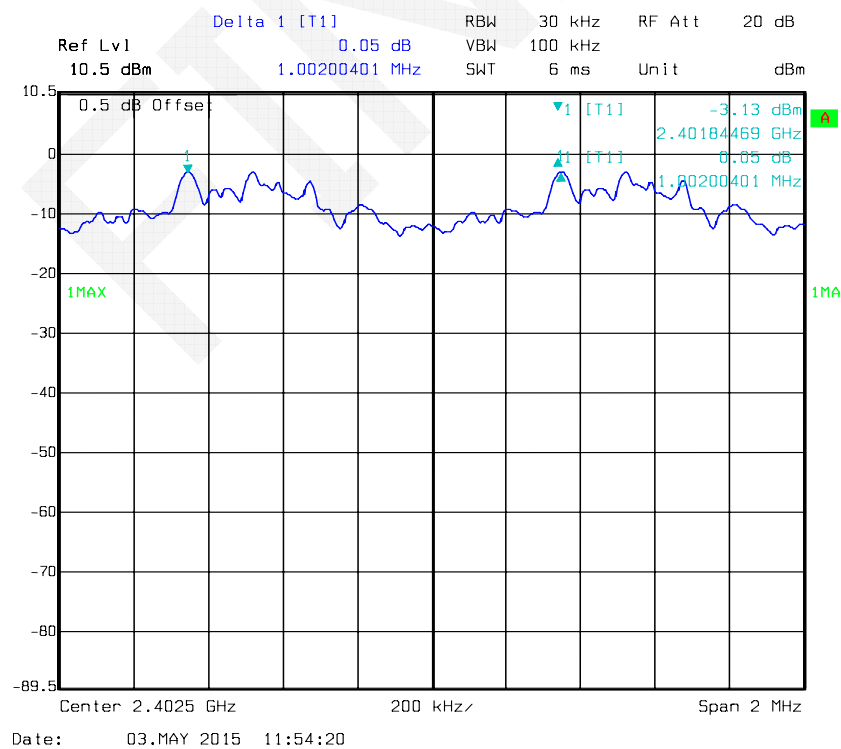
BDR Mode (GFSK):



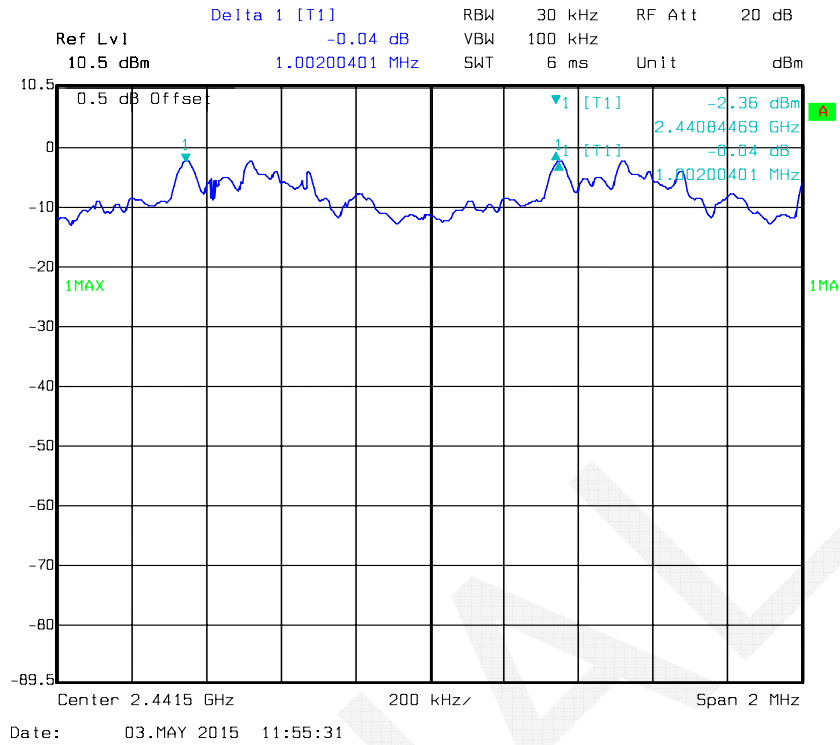


### Low Channel

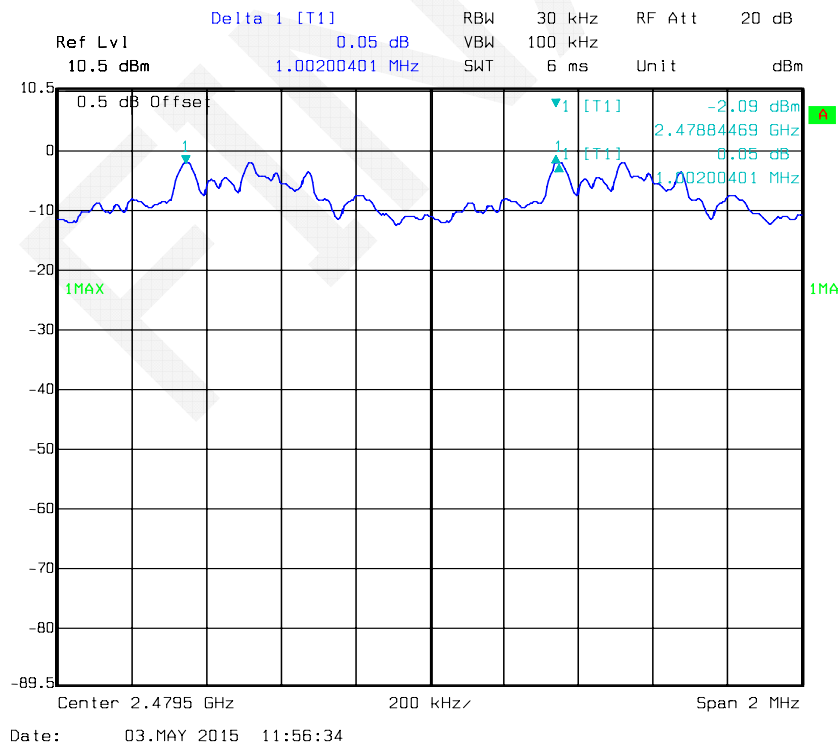


**High Channel***EDR Mode (8-DPSK):***Low Channel**

### Middle Channel



### High Channel



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

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

**Test Procedure**

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

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Data****Environmental Conditions**

Temperature:	25.3 °C
Relative Humidity:	56 %
ATM Pressure:	100.4kPa

\* The testing was performed by Lion Xiao on 2015-05-03.

**Test Result:** Compliance.

Please refer to following tables and plots

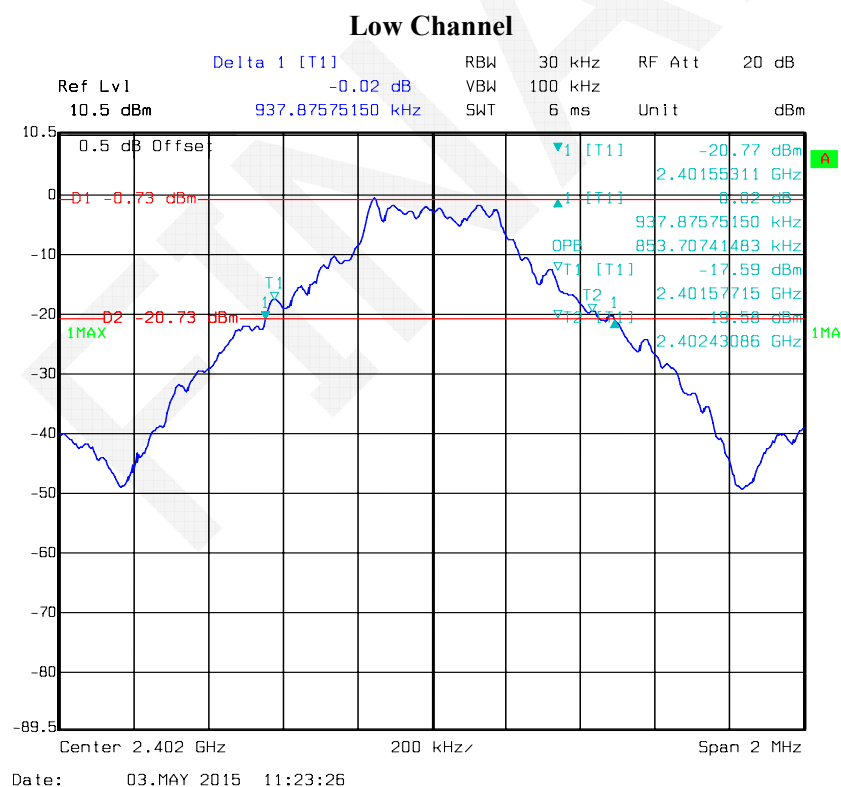


Test Mode: Transmitting

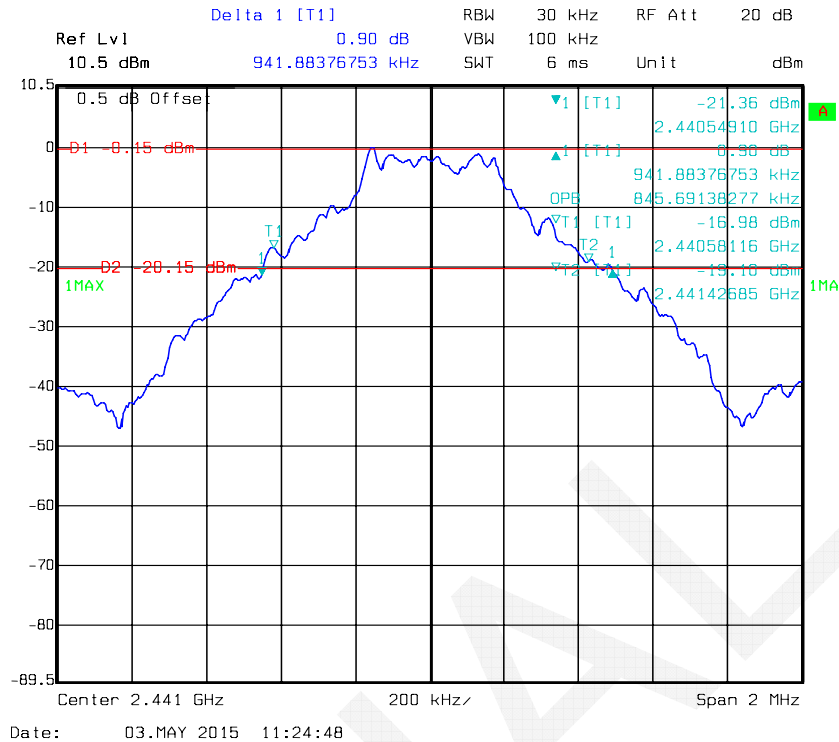
Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.938
	Middle	2441	0.942
	High	2480	0.898
EDR Mode ( $\pi/4$ -DQPSK):	Low	2402	1.267
	Middle	2441	1.271
	High	2480	1.259
EDR Mode (8-DPSK):	Low	2402	1.279
	Middle	2441	1.279
	High	2480	1.275

Please refer to the following plots.

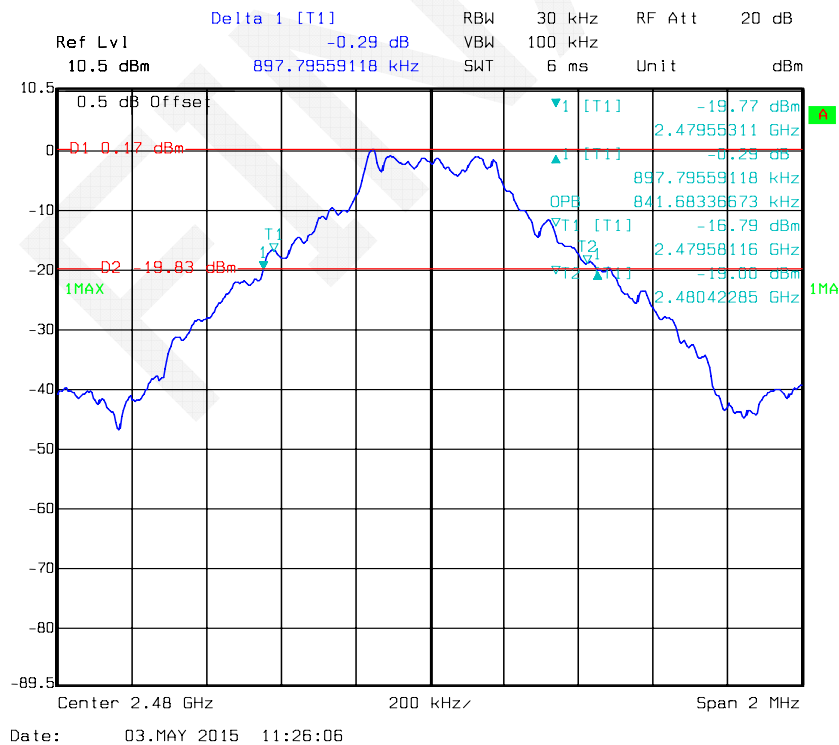
BDR Mode (GFSK):

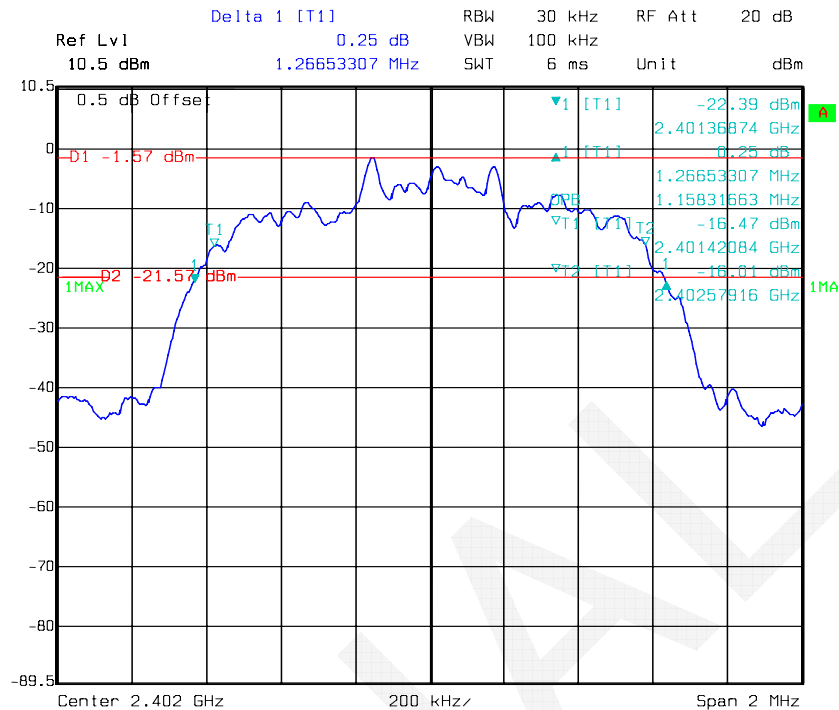


## Middle Channel

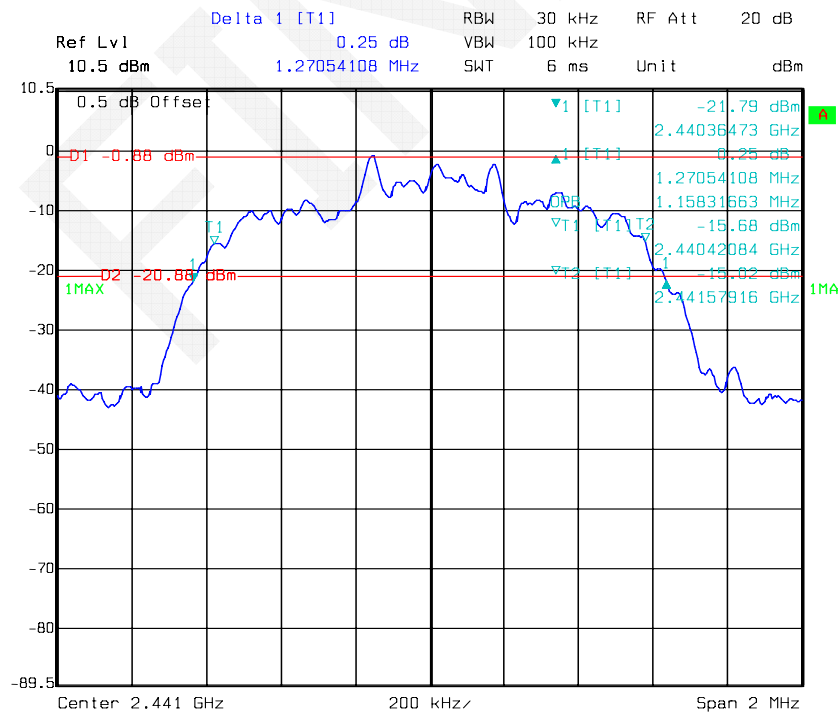


## High Channel



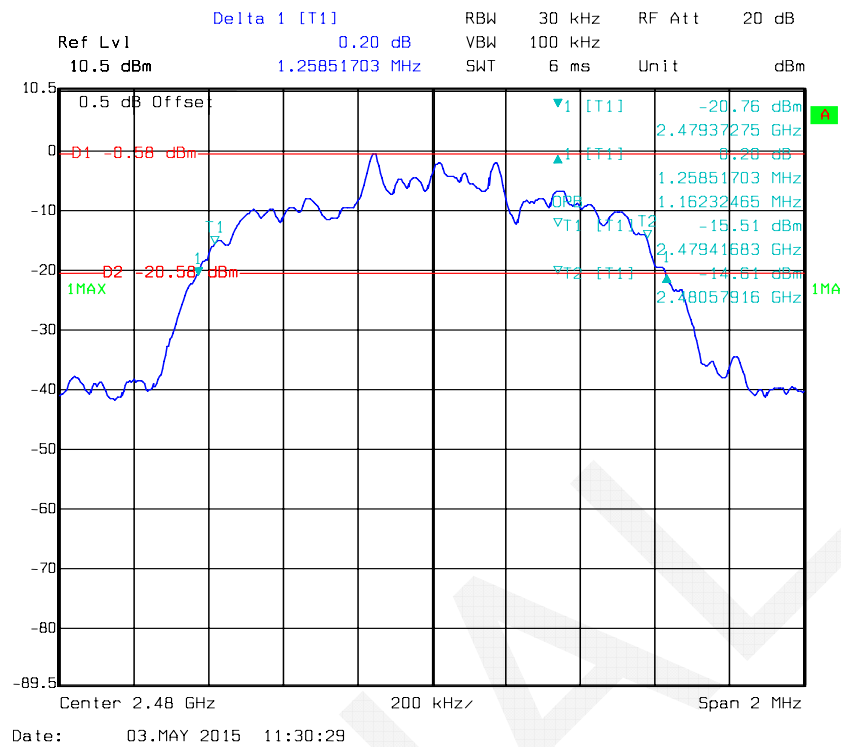
*EDR Mode ( $\pi/4$ -DQPSK):***Low Channel**

Date: 03.MAY 2015 11:27:33

**Middle Channel**

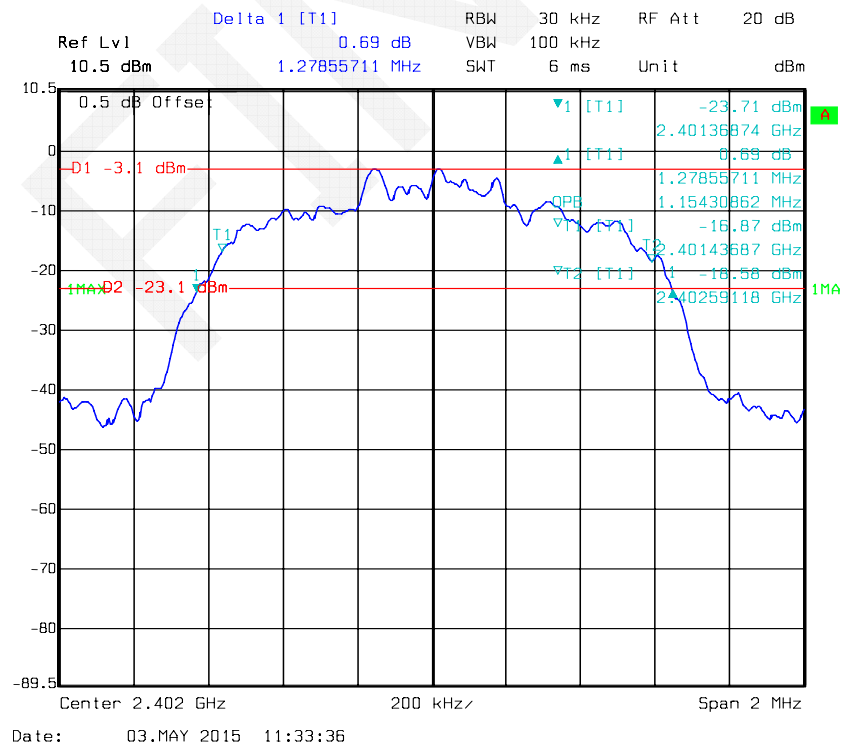
Date: 03.MAY 2015 11:29:01

## High Channel



EDR Mode (8-DPSK):

## Low Channel





## 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
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

#### Environmental Conditions

Temperature:	25.3 °C
Relative Humidity:	56 %
ATM Pressure:	100.4kPa

\* The testing was performed by Lion Xiao on 2015-05-03.

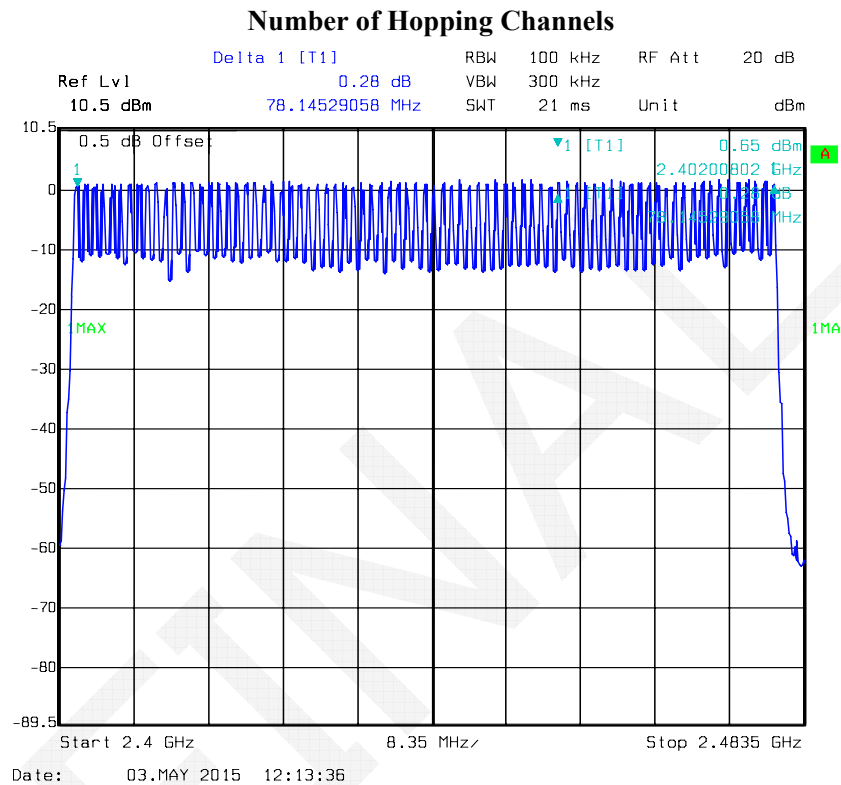
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

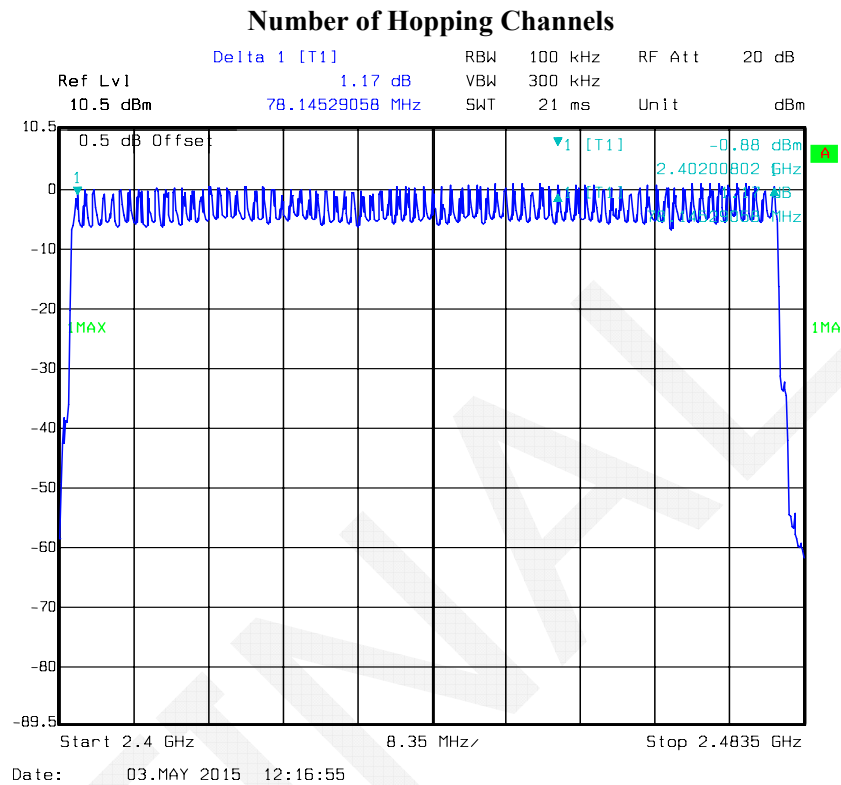
BDR Mode (GFSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15



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

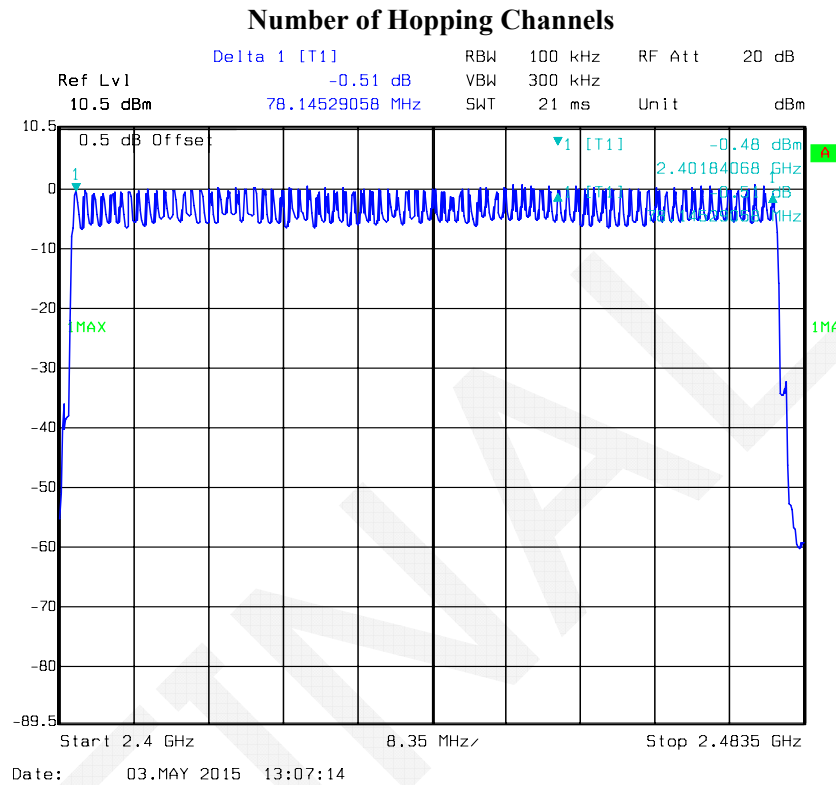
Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	$\geq 15$





EDR Mode (8-DPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	$\geq 15$



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

### **Applicable Standard**

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

### **Test Procedure**

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

Dwell Time= time slot length \* hope rate/ number of hopping channels \* 31.6s  
Hop rate=1600/s

### **Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25.3 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Lion Xiao on 2015-05-03.

**Test Result:** Compliance.

Please refer to following tables and plots

*BDR Mode (GFSK):*

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
<i>DH1</i>	Low	0.389	0.124	0.4	Pass
	Middle	0.389	0.124	0.4	Pass
	High	0.389	0.124	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
<i>DH3</i>	Low	1.651	0.264	0.4	Pass
	Middle	1.651	0.264	0.4	Pass
	High	1.651	0.264	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
<i>DH5</i>	Low	2.910	0.310	0.4	Pass
	Middle	2.910	0.310	0.4	Pass
	High	2.910	0.310	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

Ref Lvl 10.5 dBm  
Delta 1 [T1] -3.66 dB  
RBW 1 MHz  
VBW 3 MHz  
RF Att 20 dB  
Unit dBm  
SWT 1 ms

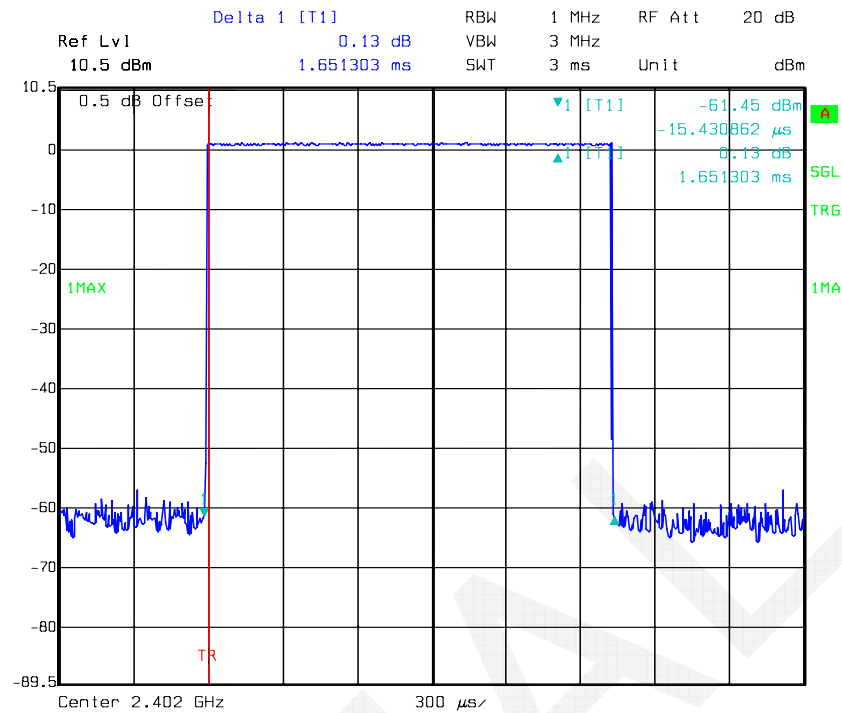
0.5 dB Offset  
-61.19 dBm  
-9.41838 μs  
-3.66 dB  
388.777555 μs

Center 2.402 GHz  
100 μs

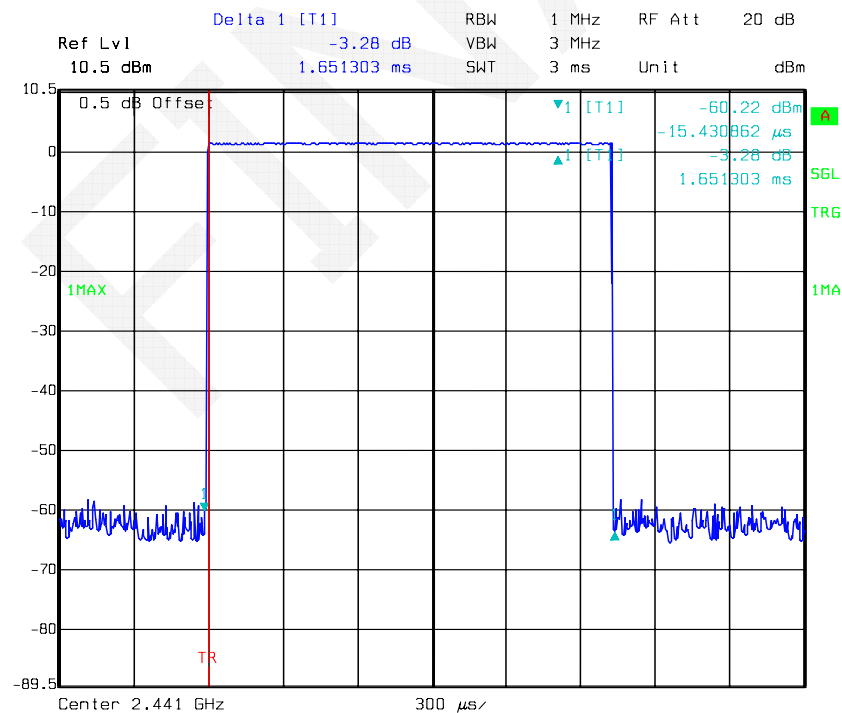
Date: 03.MAY 2015 13:11:48



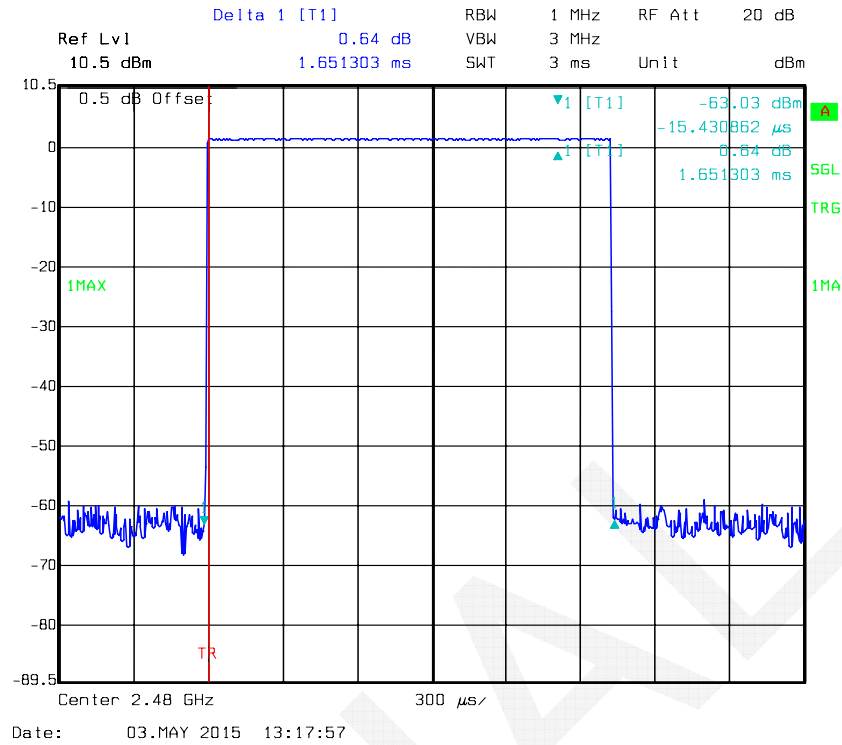
### DH3: Low Channel



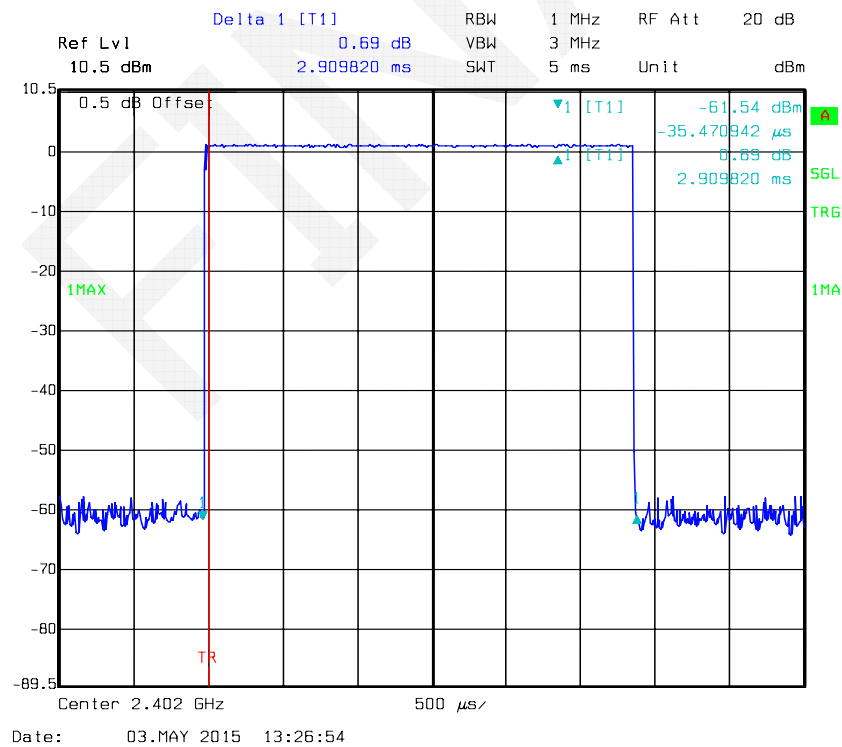
### DH3: Middle Channel



### DH3: High Channel



### DH5: Low Channel



Ref Lvl 10.5 dBm Delta 1 [T1] -0.78 dB RBW 1 MHz RF Att 20 dB

0.5 dB Offset 2.909820 ms VSWR 3 MHz Unit dBm

1MAX

Center 2.441 GHz 500  $\mu$ s

Delta 1 [T1] -0.78 dB

2.909820 ms

1 [T1] -62.59 dBm

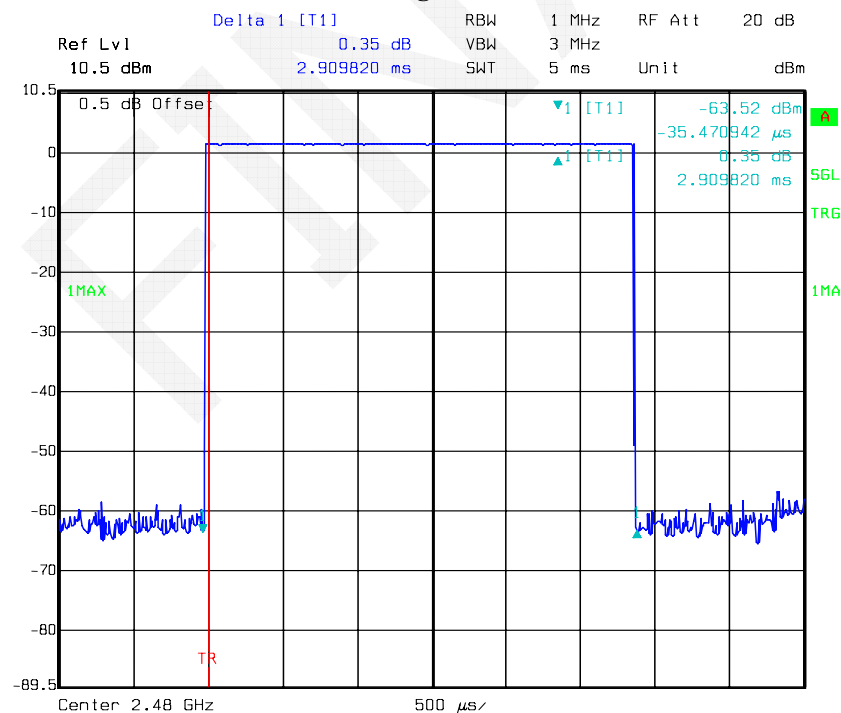
1 [T1] -35.470942  $\mu$ s

1 [T1] -0.78 dB

1 [T1] 2.909820 ms

TR

### DH5: High Channel

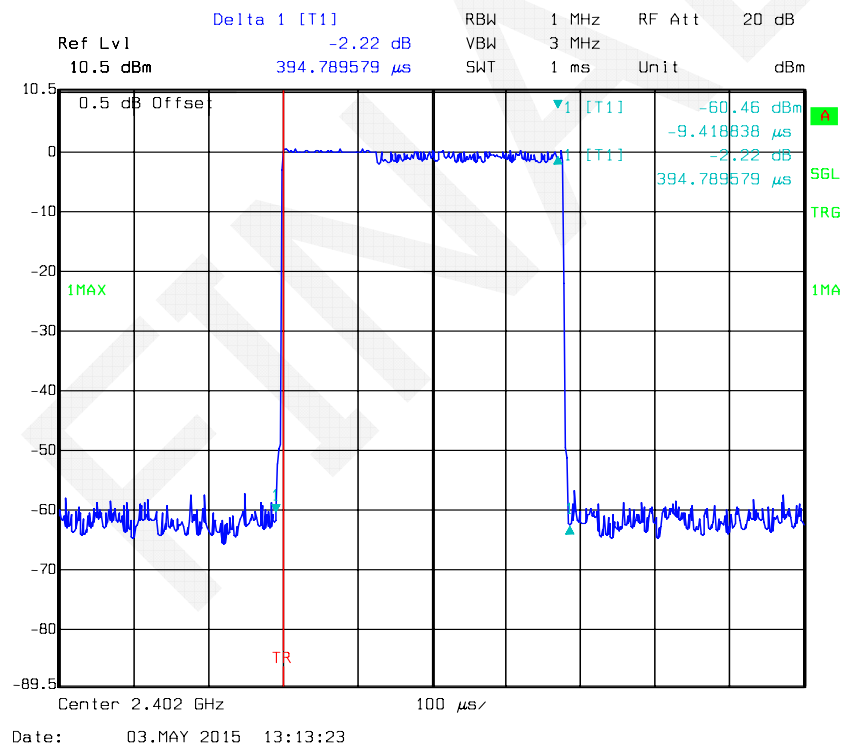


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EDR Mode ( $\pi/4$ -DQPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.395	0.126	0.4	Pass
	Middle	0.395	0.126	0.4	Pass
	High	0.395	0.126	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
DH3	Low	1.657	0.265	0.4	Pass
	Middle	1.657	0.265	0.4	Pass
	High	1.657	0.265	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
DH5	Low	2.910	0.310	0.4	Pass
	Middle	2.910	0.310	0.4	Pass
	High	2.910	0.310	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

## DH1: Low Channel





Ref Lvl 10.5 dBm  
 Delta 1 [T1] 1.25 dB  
 RBW 1 MHz  
 VBW 3 MHz  
 SWT 1 ms  
 RF Att 20 dB  
 Unit dBm

0.5 dB Offset

1MAX

1 [T1]

1 [T1]

-62.20 dBm  
 -9.41838  $\mu$ s  
 1.25 dB  
 394.789579  $\mu$ s

TR

Center 2.441 GHz  
 100  $\mu$ s

Date: 03.MAY 2015 13:13:41

Ref Lvl 10.5 dBm

Delta 1 [T1] 1.40 dB

RBW 1 MHz

RF Att 20 dB

VBW 3 MHz

SWT 1 ms

Unit dBm

0.5 dB Offset

1MAX

TR

Center 2.48 GHz

100 μs

1 [T1] -64.78 dBm

1 [T1] -9.41838 μs

1 [T1] 1.40 dB

394.789579 μs

SGL

TRG

1MA

-89.5

-80

-70

-60

-50

-40

-30

-20

-10

0

10.5

Date: 03.MAY 2015 13:13:57

Ref Lvl 10.5 dBm

Delta 1 [T1] -1.03 dB

RBW 1 MHz

RF Att 20 dB

VBW 3 MHz

Unit dBm

SWT 3 ms

SGL

TRG

IMA

0.5 dB Offset

-58.88 dBm

-15.430862 μs

-1.03 dB

1.657315 ms

TR

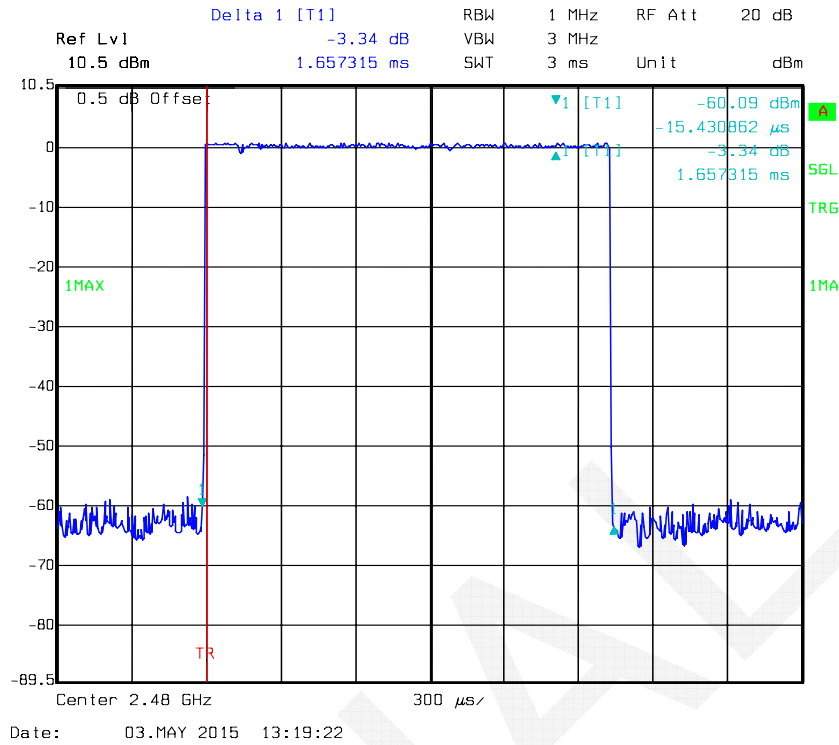
Center 2.402 GHz

300 μs

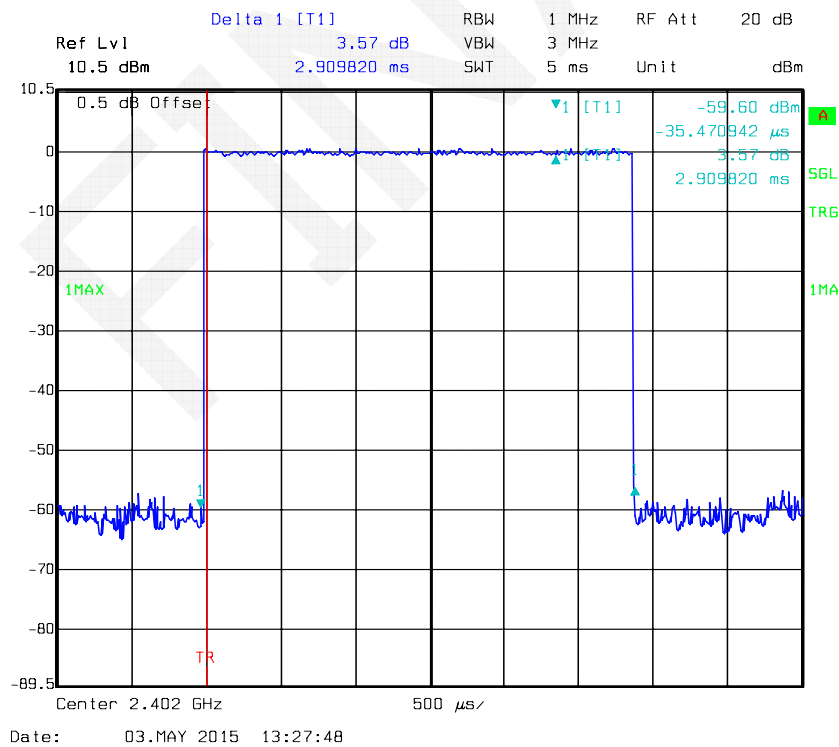
Date: 03.MAY 2015 13:18:49

Ref Lvl 10.5 dBm Delta 1 [T1] 2.64 dB RBW 1 MHz RF Att 20 dB  
 10.5 dBm 1.657315 ms VBW 3 MHz Unit dBm  
 0.5 dB Offset  
 1MAX  
 TR  
 Center 2.441 GHz 300 MHz  
 -62.24 dBm  
 -15.430862 μs  
 2.64 dB  
 1.657315 ms  
 SGL  
 TRG  
 1MA  
 Date: 03.MAY 2015 13:19:10

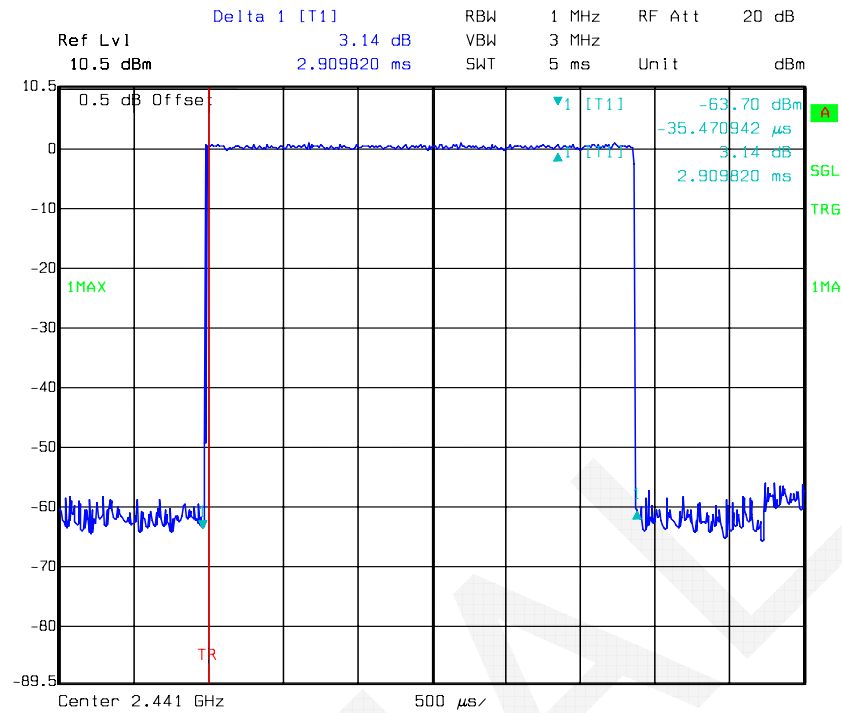
### DH3: High Channel



### DH5: Low Channel

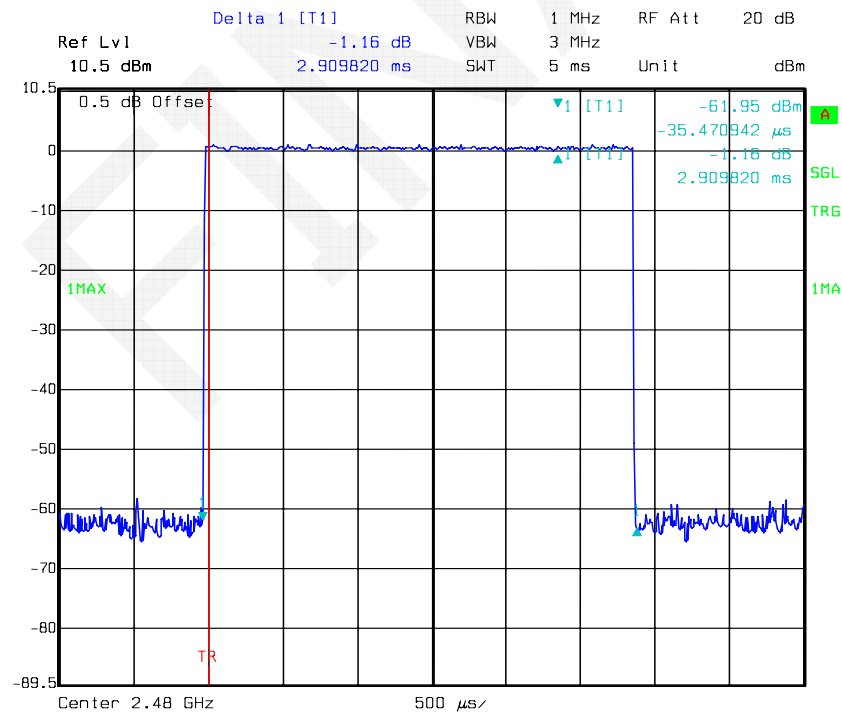


### DH5: Middle Channel



Date: 03.MAY 2015 13:28:21

### DH5: High Channel

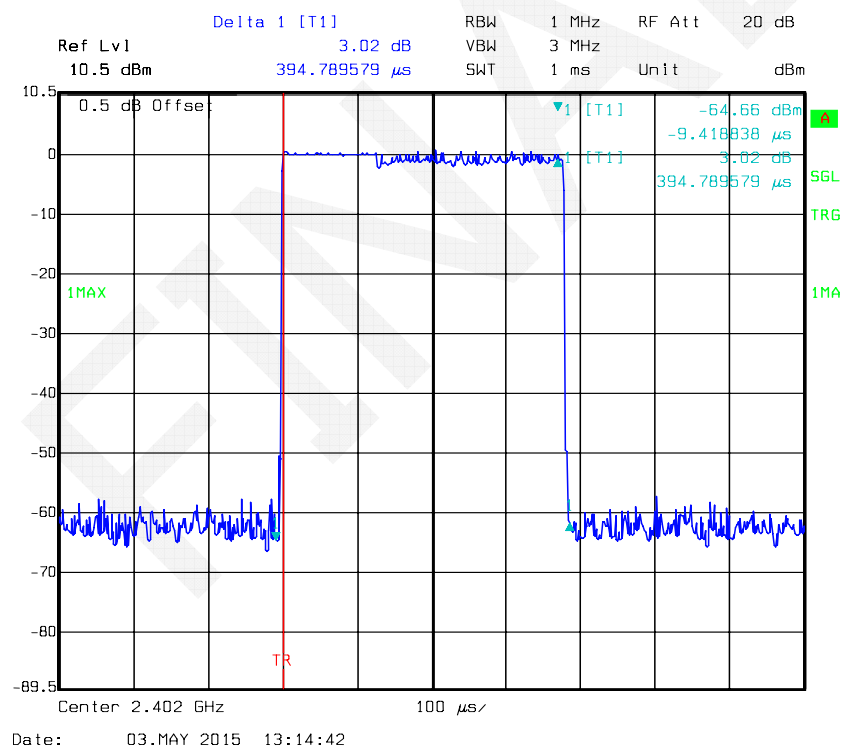


Date: 03.MAY 2015 13:28:51

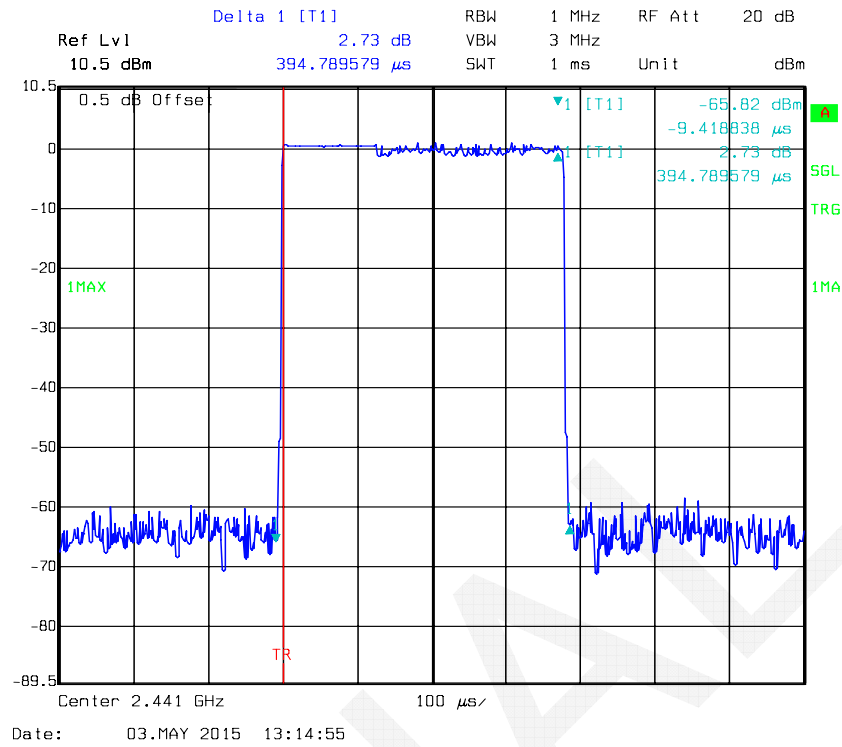
*EDR Mode (8-DPSK):*

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
<i>DH1</i>	Low	0.395	0.126	0.4	Pass
	Middle	0.395	0.126	0.4	Pass
	High	0.395	0.126	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
<i>DH3</i>	Low	1.657	0.265	0.4	Pass
	Middle	1.657	0.265	0.4	Pass
	High	1.657	0.265	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
<i>DH5</i>	Low	2.910	0.310	0.4	Pass
	Middle	2.910	0.310	0.4	Pass
	High	2.910	0.310	0.4	Pass
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

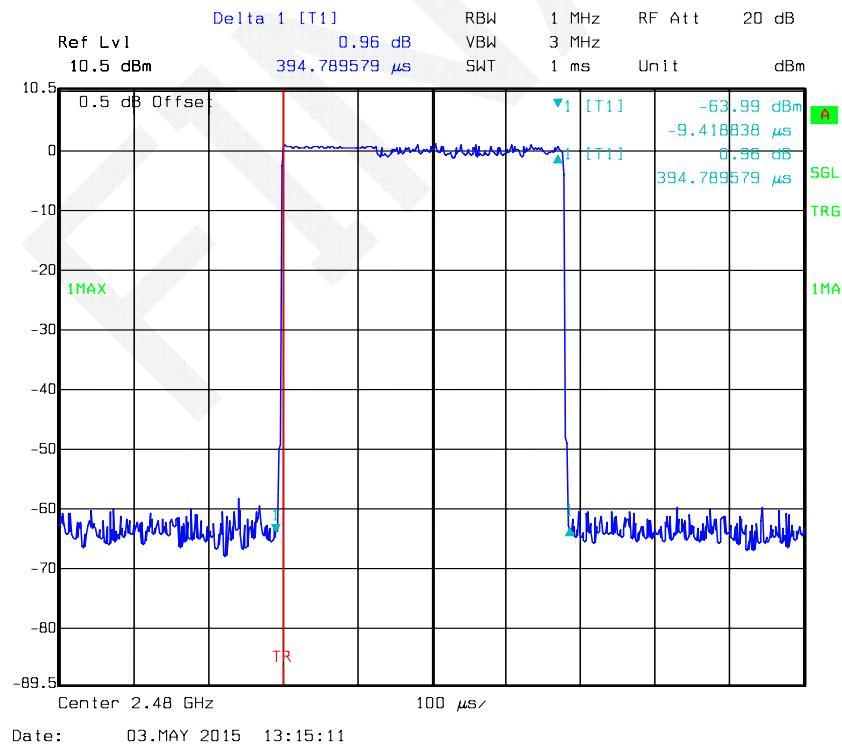
## DH1: Low Channel

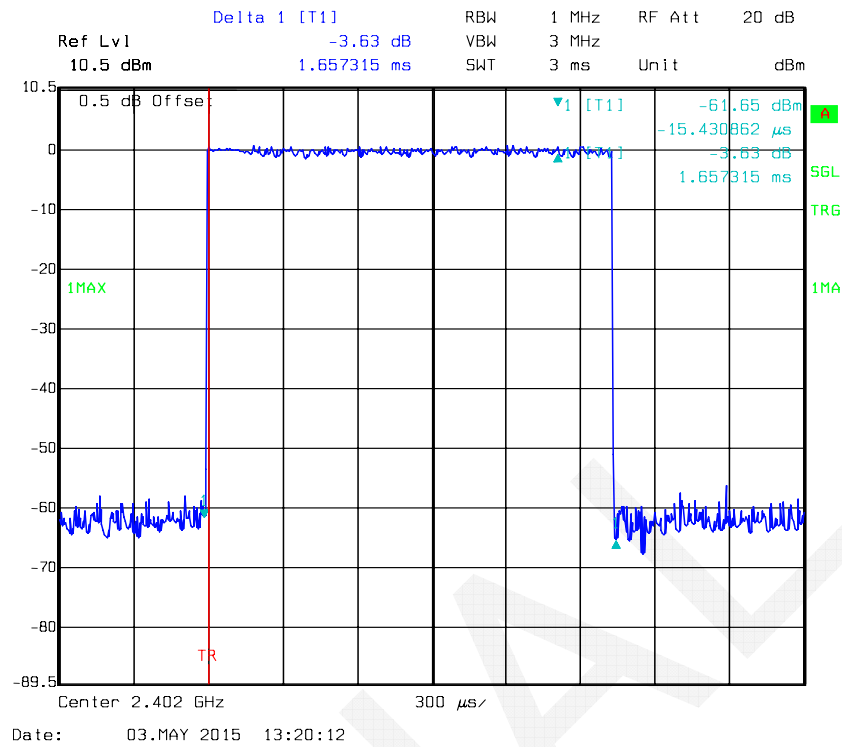
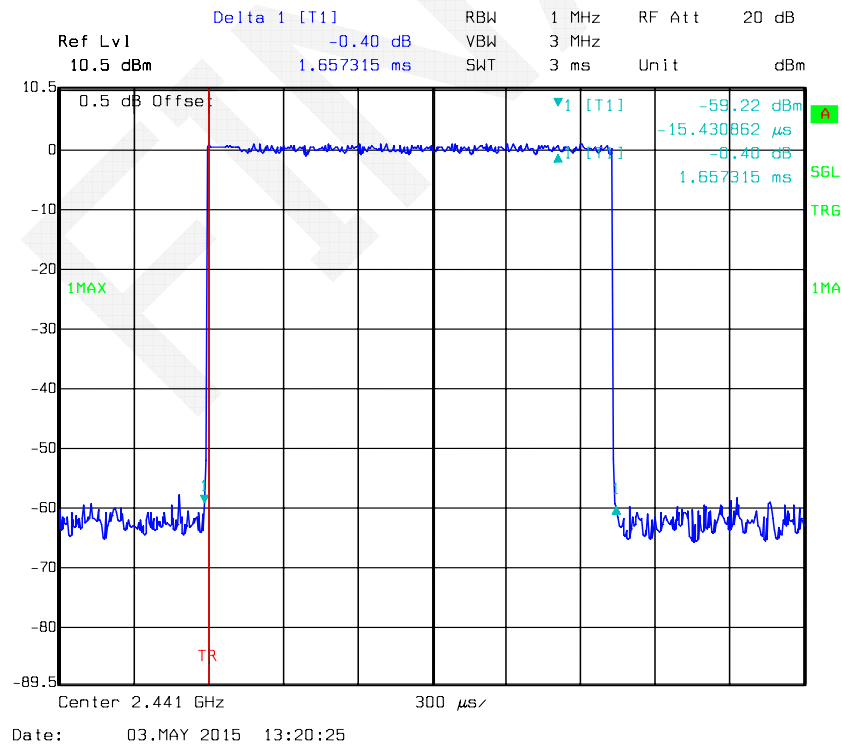


### DH1: Middle Channel

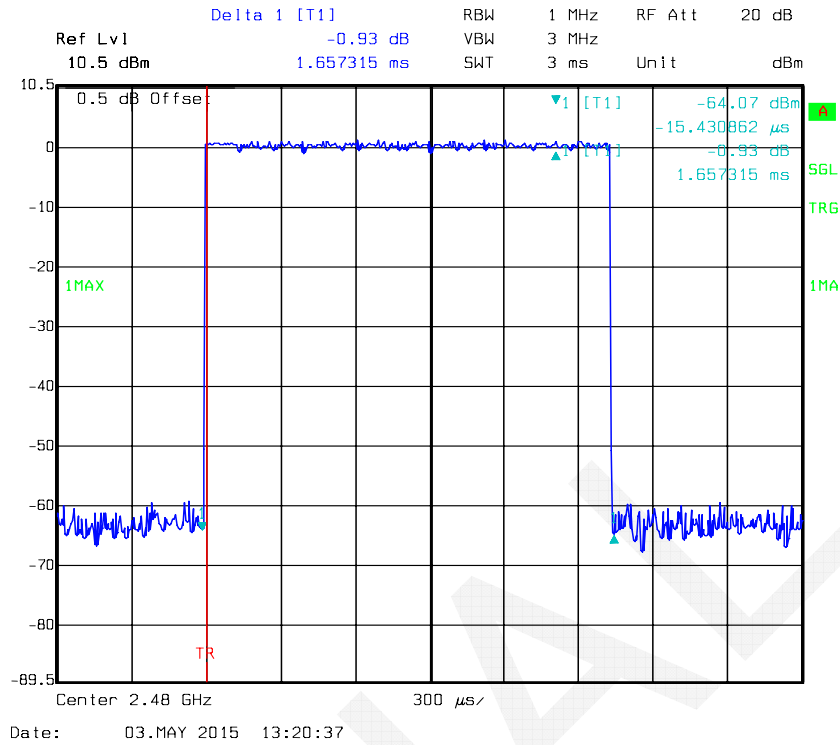


### DH1: High Channel

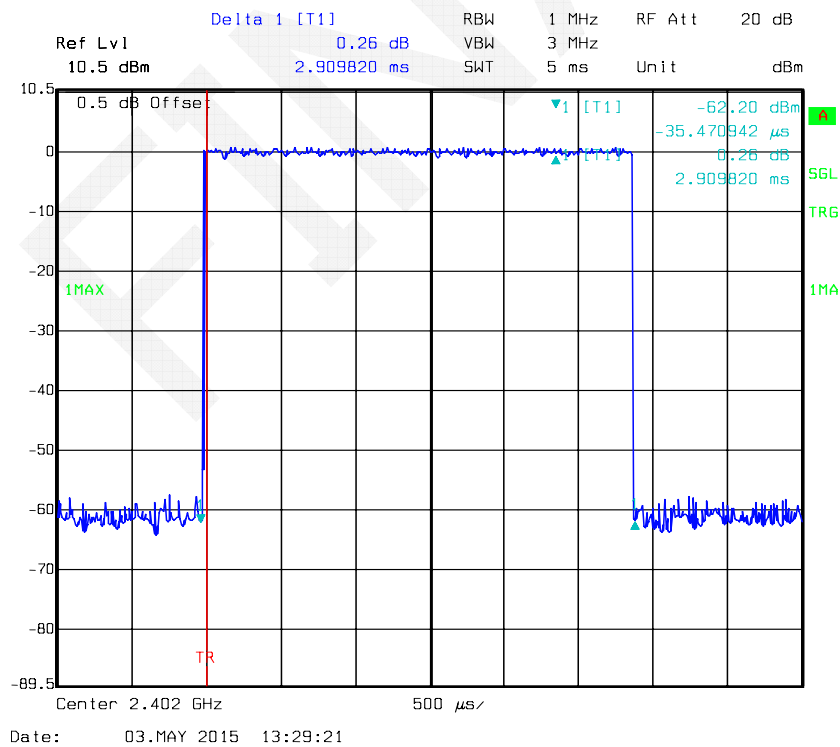


**DH3: Low Channel****DH3: Middle Channel**

### DH3: High Channel



### DH5: Low Channel





Ref Lvl 10.5 dBm Delta 1 [T1] 1.04 dB RBW 1 MHz RF Att 20 dB  
 10.5 dBm 2.909820 ms VBW 3 MHz Unit dBm  
 0.5 dB Offset  
 1MAX  
 -62.26 dBm  
 -35.470942 μs  
 1.04 dB  
 2.909820 ms  
 TR  
 Center 2.441 GHz 500 MHz

Date: 03.MAY 2015 13:29:37

Ref Lvl 10.5 dBm

Delta 1 [T1] 1.22 dB

RBW 1 MHz

RF Att 20 dB

VBW 3 MHz

Unit dBm

SWT 5 ms

0.5 dB Offset

1MAX

TR

Center 2.48 GHz

500 μs

-61.29 dBm

-35.470942 μs

1.22 dB

2.909820 ms

[T1]

[T1]

SGL

TRG

1MA

Date: 03.MAY 2015 13:29:52

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

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

**Test Procedure**

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

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Data****Environmental Conditions**

Temperature:	25.3 °C
Relative Humidity:	56 %
ATM Pressure:	100.4 kPa

\* The testing was performed by Lion Xiao on 2015-05-03.

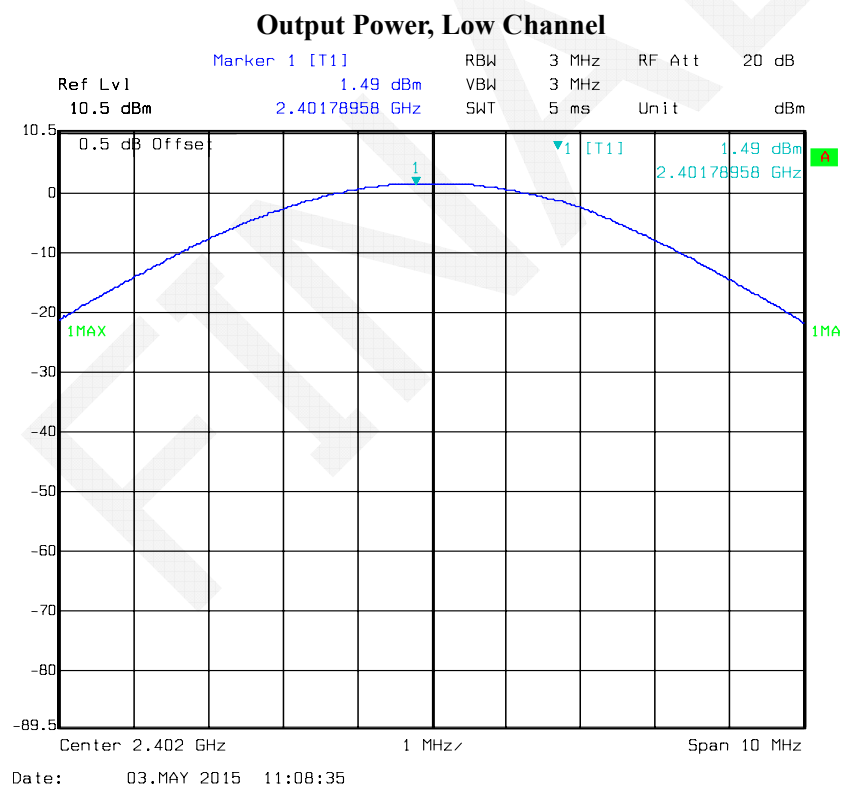
**Test Result:** Compliance.

Test Mode: Transmitting

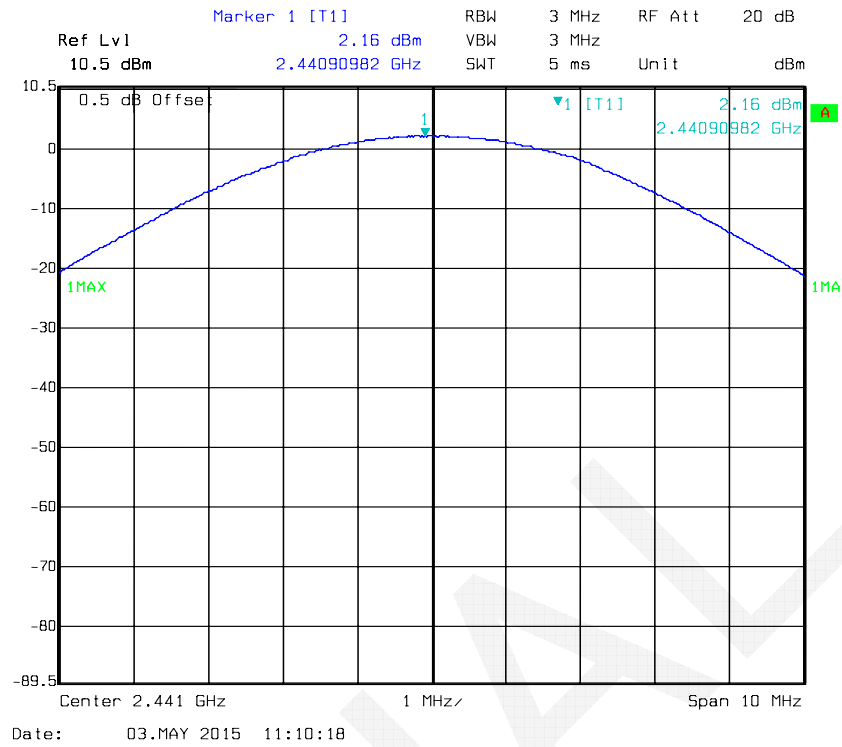
Mode	Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	Low	2402	1.49	30
	Middle	2441	2.16	30
	High	2480	2.24	30
EDR Mode ( $\pi/4$ -DQPSK)	Low	2402	0.96	30
	Middle	2441	1.60	30
	High	2480	1.77	30
EDR Mode (8-DPSK)	Low	2402	1.32	30
	Middle	2441	1.82	30
	High	2480	2.21	30

Note: The data above was tested in conducted mode.

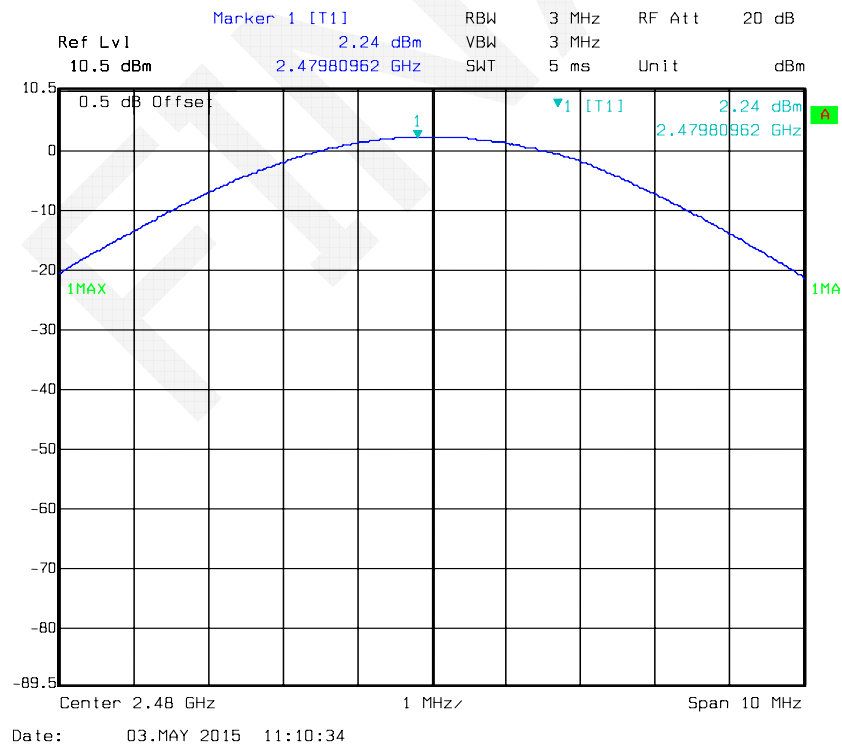
BDR Mode (GFSK):



### Output Power, Middle Channel

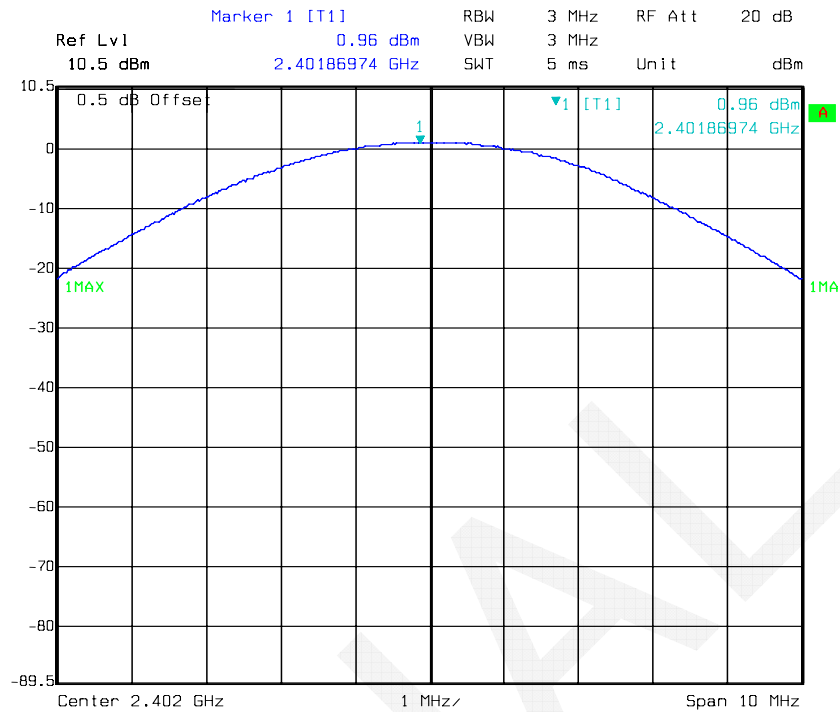


### Output Power, High Channel



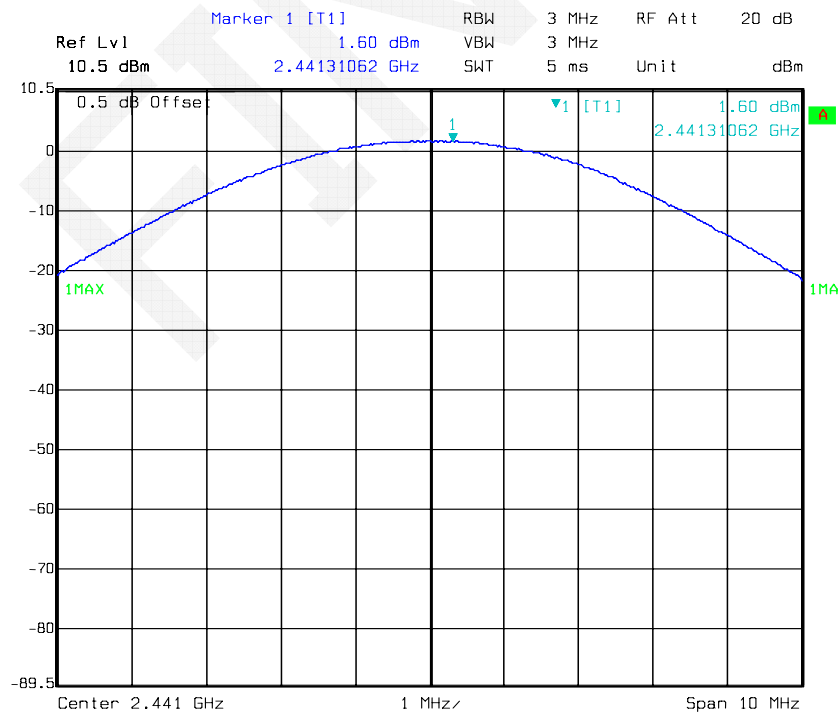
EDR Mode ( $\pi/4$ -DQPSK):

### Output Power, Low Channel



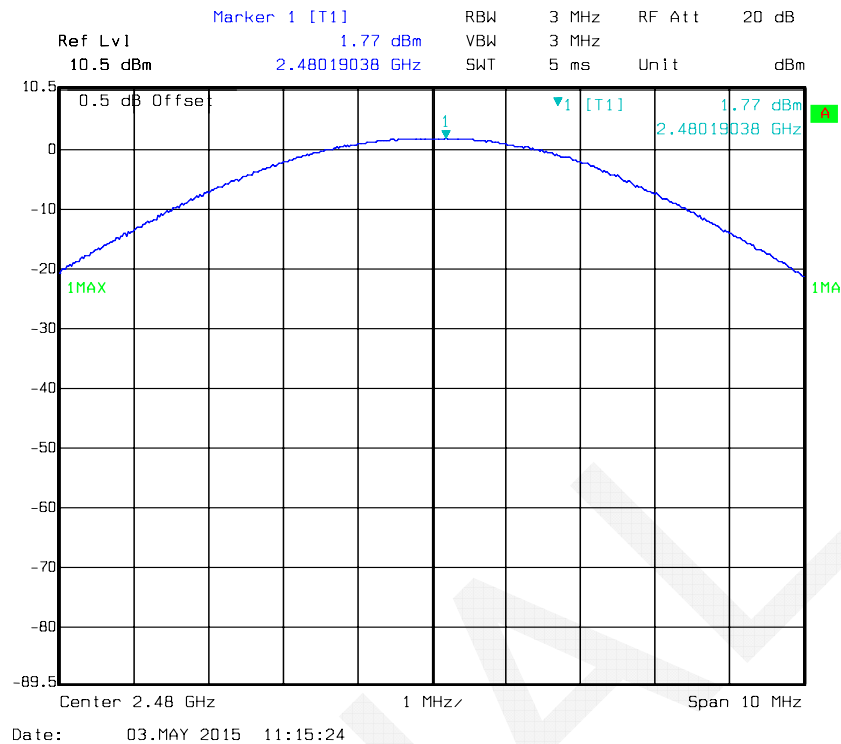
Date: 03.MAY 2015 11:14:48

### Output Power, Middle Channel



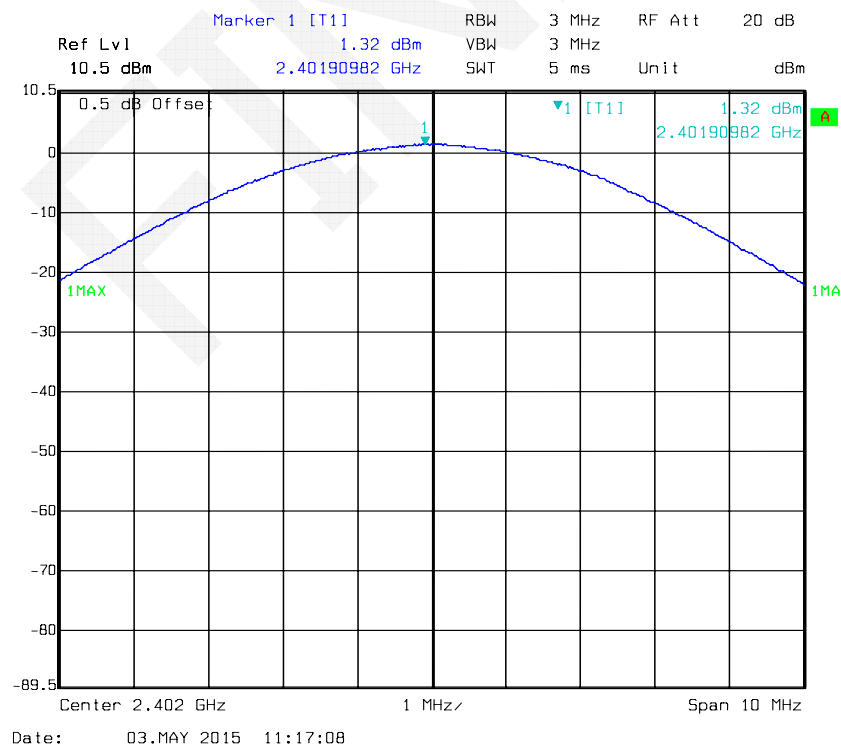
Date: 03.MAY 2015 11:15:09

### Output Power, High Channel



EDR Mode (8-DPSK):

### Output Power, Low Channel



Ref Lvl 10.5 dBm

Marker 1 [T1] 1.82 dBm 2.44094990 GHz

RBW 3 MHz VBW 3 MHz SWT 5 ms RF Att 20 dB Unit dBm

0.5 dB Offset

1 [T1] 1.82 dBm 2.44094990 GHz

1MAX

Center 2.441 GHz 1 MHz Span 10 MHz

Date: 03.MAY 2015 11:17:25

Ref Lvl 10.5 dBm

Marker 1 [T1] 2.21 dBm 2.47996994 GHz

RBW 3 MHz VBW 3 MHz RF Att 20 dB

SWT 5 ms Unit dBm

0.5 dB Offset

1 [T1] 2.21 dBm 2.47996994 GHz

1MAX

1MAX

Center 2.48 GHz 1 MHz/ Span 10 MHz

Date: 03.MAY 2015 11:17:40

## FCC §15.247(d) - BAND EDGES TESTING

### Applicable Standard

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

### Test Procedure

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

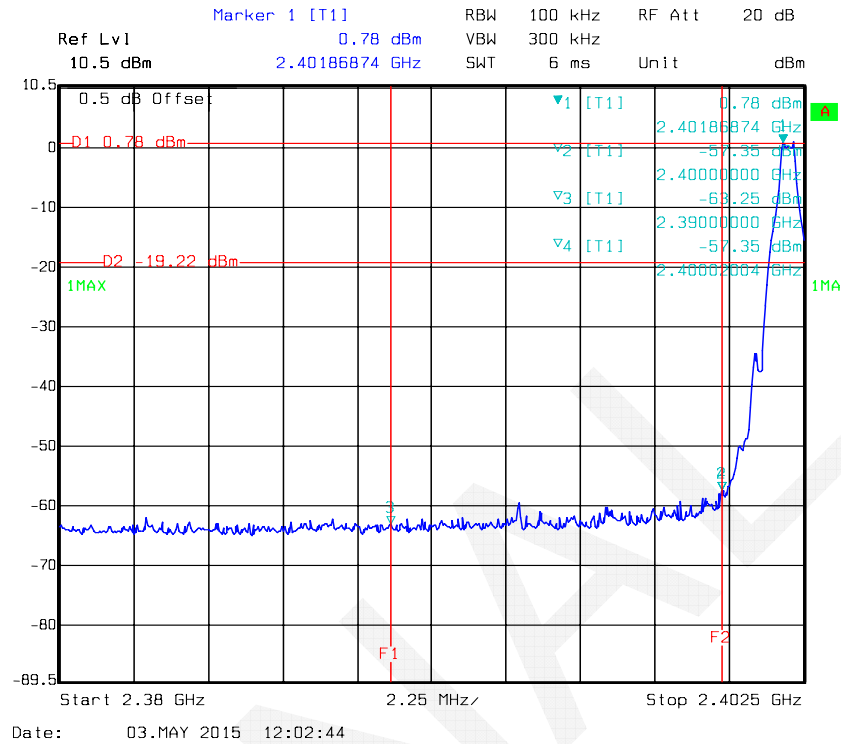
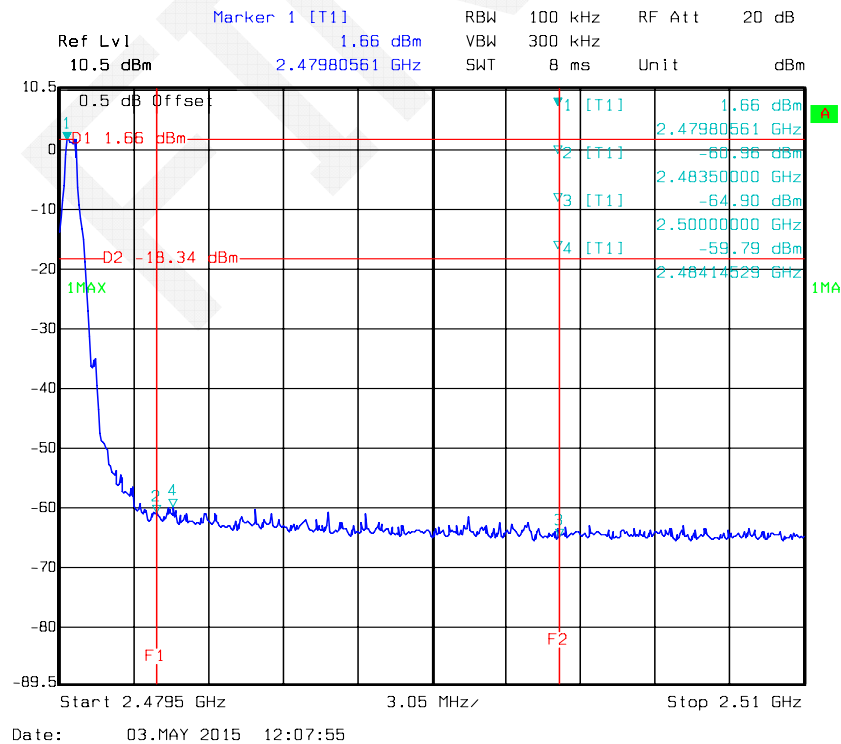
### Test Data

#### Environmental Conditions

Temperature:	25.3°C
Relative Humidity:	56 %
ATM Pressure:	100.4 kPa

\* The testing was performed by Lion Xiao on 2015-05-03.



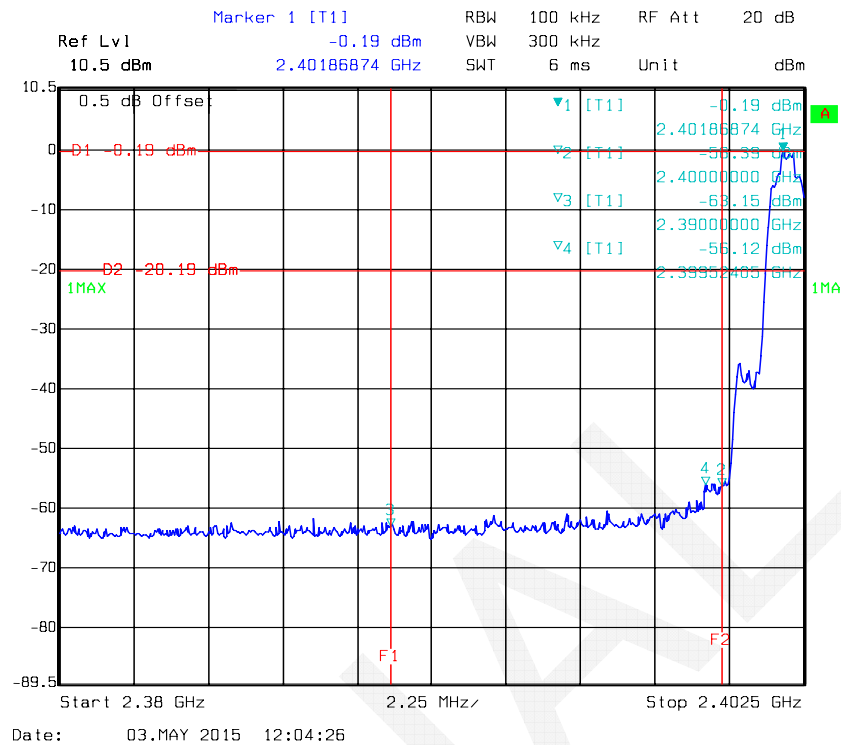
**Test Result: Compliance***BDR Mode (GFSK):***Band Edge, Left Side****Band Edge, Right Side**

### Band Edge, Left Side

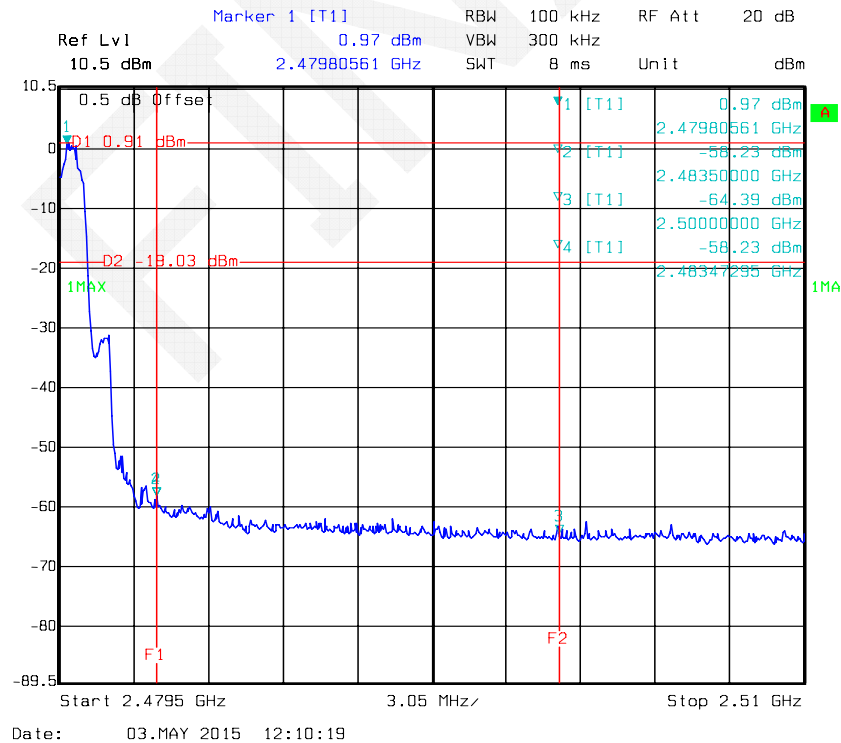


EDR Mode (8-DPSK):

## Band Edge, Left Side



## Band Edge, Right Side



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