



FCC PART 15.247 TEST REPORT

For

Chengdu Vantron Technology, Ltd.

No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China 610045

FCC ID: 2AAGETAB5071-TM

Report Type: Original Report	Equipment Name: Tablet Computer
Report Number: RSC170626001C	
Report Date: 2017-07-10	
Sula Huang	
Reviewed By:	EMC Director Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China
Prepared By:	Tel: +86-28-65525123 Fax: +86-28-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Chengdu Vantron Technology, Ltd.**'s product, model number: **VT-TABLET-5071-TM-FP** (FCC ID: **2AAGETAB5071-TM**) or the "EUT" as referred to in this report was the **Tablet Computer**.

Mechanical Description of EUT

The EUT was measured approximately: 226mm (L) x 127 mm (W) x 18 mm (H).

Rated input voltage: DC 3.7V rechargeable Li-ion battery or DC 5V charging from USB port.

**All measurement and test data in this report were gathered from final production sample, serial number: 170626001/01 (assigned by BACL). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-06-23, and EUT complied with test requirement.*

Objective

This report is prepared on behalf of **Chengdu Vantron Technology, Ltd.** in accordance with Part 2, Subpart J, Part 15, Subparts A 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: 2AAGETAB5071-TM.
FCC Part 15.247 DTS submissions with FCC ID: 2AAGETAB5071-TM.
FCC Part 15.407 NII submissions with FCC ID: 2AAGETAB5071-TM.
FCC Part 15.225 DXX submissions with FCC ID: 2AAGETAB5071-TM.

Measurement Uncertainty

Item			Uncertainty
AC power line conducted emission			2.71 dB
Radiated Emission(Field Strength)	30MHz-200MHz	H	4.57 dB
		V	4.81 dB
	200MHz-1GHz	H	5.69 dB
		V	6.07 dB
	1GHz-6GHz		5.49 dB
	6GHz-18GHz		5.57 dB
Conducted RF Power			±0.61dB
Power Spectrum Density			±0.61dB
Occupied Bandwidth			±5%
Humidity			±5%
Temperature			±1℃

Test Methodology

All measurements contained in this report were conducted with:

ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Test Facility

The test site used by BACL to collect test data is located No. 5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China

Test site at BACL 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 April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

BACL's test facility has been fully described in reports on file and registered with the Innovation, Science and Economic Development Canada under Registration Numbers: 3062C-1.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

Test software: "RF Tool" installed in device was used during test, the system configured maximum power as below setting:

Test Software Version		RF Tool		
Test Frequency		2402MHz	2441MHz	2480MHz
GFSK	Power Level	0	0	0
$\pi/4$ -DQPSK	Power Level	0	0	0
8PSK	Power Level	0	0	0

Support Equipment List and Details

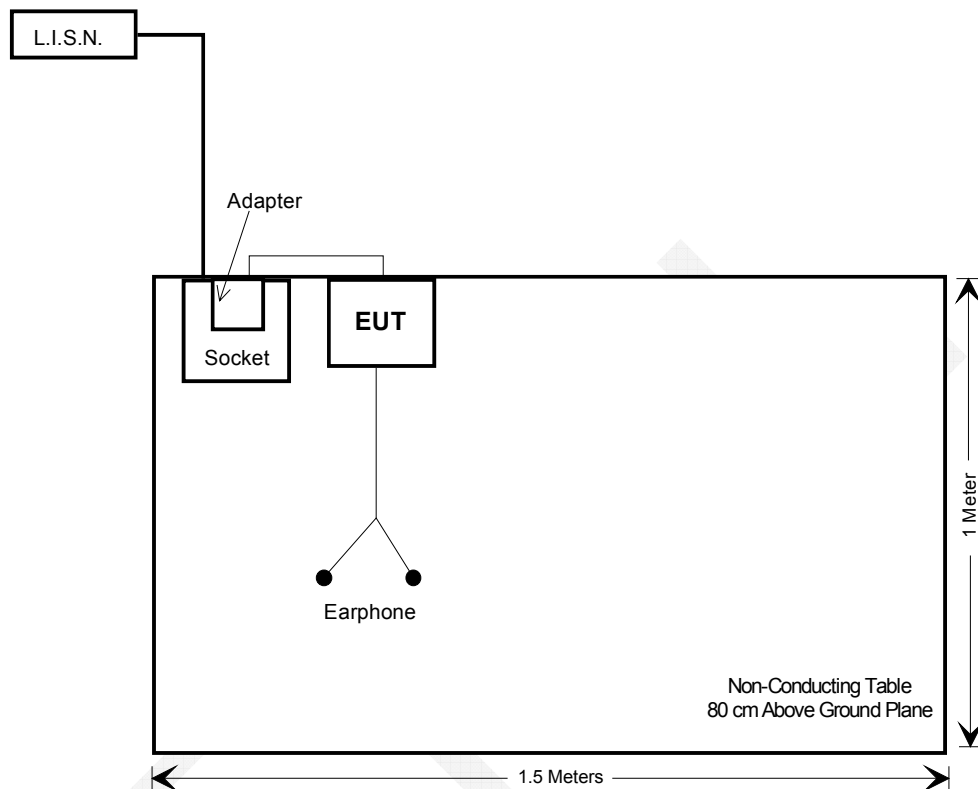
Manufacturer	Description	Model	Serial Number
N/A	Earphone	N/A	N/A
Xinheyuan	Adapter	XHY0501WLC	N/A

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded USB Cable	1.0	Adapter	EUT
Unshielded Earphone Cable	1.2	EUT	Earphone

Block Diagram of Test Setup

AC Power Lines Conducted Emissions Test



Test Equipments List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2017-05-20	2018-05-19
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	DE14781	2016-11-10	2017-11-09
N/A	Conducted Cable	NO.5	N/A	N/A	N/A
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A
Radiated Emissions Test					
Agilent	Pre-Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2017-05-20	2018-05-19
Sunol Sciences	Broadband Antenna	JB3	A121808	2017-05-18	2020-05-17
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2017-05-18	2018-05-17
ETS	Horn Antenna	3115	003-6076	2017-05-19	2020-05-18
A.H.Systems,inc	Horn Antenna	SAS-574	505	2016-12-02	2017-12-01
Mini-circuits	Pre-Amplifier	ZVA-183-S+	771001215	2017-05-20	2018-05-19
Quinstar	Pre-Amplifier	QLW-18405536-JO	15964004001	2017-05-20	2018-05-19
HP	Pre-Amplifier	8449B	3008A00277	2016-12-02	2017-12-01
INMET	Attenuator	N-6dB	/	2016-11-10	2017-11-09
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2016-11-10	2017-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2016-11-10	2017-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2016-11-10	2017-11-09
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2016-12-02	2017-12-01
WEINSCHL ENGINEERING	Attenuator	1A10dB	AA4135	2016-11-10	2017-11-09
Agilent	USB Wideband Power Sensor	U2021XA	MY53320008	2016-12-02	2017-12-01
N/A	RF Cable	NO.3	N/A	2016-11-10	2017-11-09
E-Microwave	DC Block	EMDCB-00036	OE01304225	Each Time	/
N/A	RF Cable	N/A	N/A	Each Time	/

* **Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

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 v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 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 ≤ 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 ≤ 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 max peak conducted output power including tune-up tolerance is 4.5 dBm (2.82 mW).

$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}]$
 $= 2.82/5 \cdot (\sqrt{2.480}) = 0.9 < 3.0$

So the stand-alone SAR evaluation is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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

Antenna Connector Construction

This device used one internal PCB antenna which connected to the main board with I-PEX socket, the maximum gain is 1.5 dBi for 2.4G band and 3.0dBi for 5G band, which fulfill the requirement of this section, and please refer to the EUT photos.

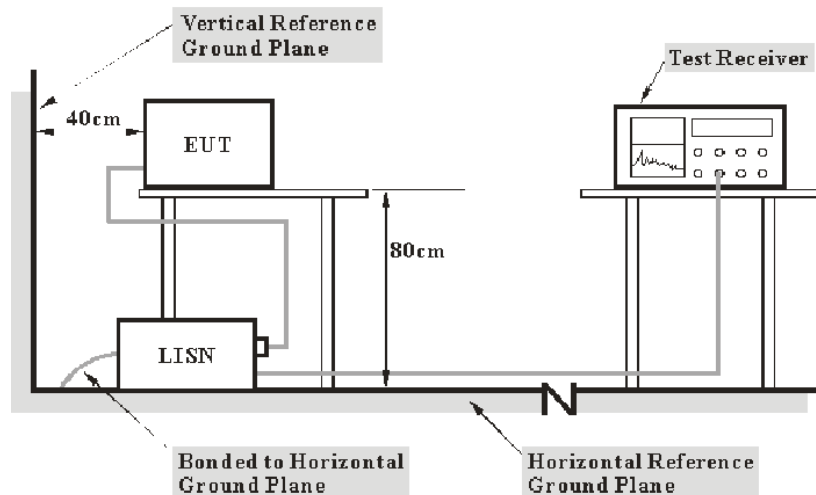
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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 C63.10-2013 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 V/60 Hz AC 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 limit. The equation for margin calculation is as follows:

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

Test Data

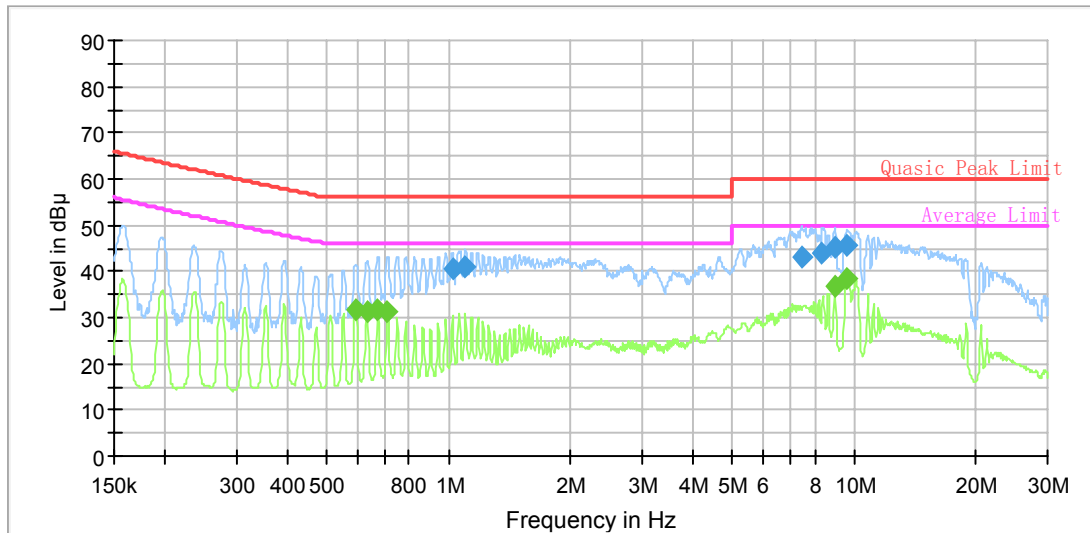
Environmental Conditions

Temperature:	29 °C
Relative Humidity:	54 %
ATM Pressure:	95.1 kPa

The testing was performed by Tom Tang on 2017-07-04.

Test Mode: Transmitting

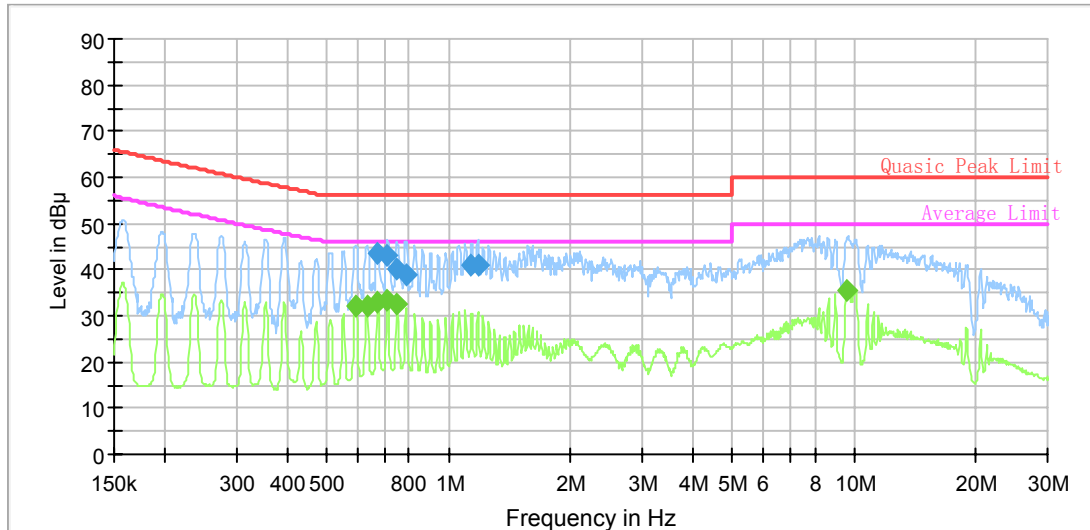
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.027404	40.6	200.0	9.000	L1	19.8	15.4	56.0
1.103946	41.2	200.0	9.000	L1	19.8	14.8	56.0
7.411890	43.0	200.0	9.000	L1	20.0	17.0	60.0
8.354883	43.9	200.0	9.000	L1	20.0	16.1	60.0
8.977330	45.4	200.0	9.000	L1	20.0	14.6	60.0
9.646150	45.5	200.0	9.000	L1	20.0	14.5	60.0

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.589868	31.6	200.0	9.000	L1	19.8	14.4	46.0
0.628774	31.3	200.0	9.000	L1	19.8	14.7	46.0
0.670245	31.5	200.0	9.000	L1	19.8	14.5	46.0
0.708771	31.3	200.0	9.000	L1	19.8	14.7	46.0
8.977330	37.0	200.0	9.000	L1	20.0	13.0	50.0
9.607719	38.3	200.0	9.000	L1	20.0	11.7	50.0

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.670245	43.4	200.0	9.000	N	19.5	12.6	56.0
0.708771	43.0	200.0	9.000	N	19.5	13.0	56.0
0.743550	40.2	200.0	9.000	N	19.5	15.8	56.0
0.792592	39.1	200.0	9.000	N	19.5	16.9	56.0
1.139771	40.9	200.0	9.000	N	19.6	15.1	56.0
1.181466	40.8	200.0	9.000	N	19.6	15.2	56.0

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.589868	32.1	200.0	9.000	N	19.5	13.9	46.0
0.631289	32.2	200.0	9.000	N	19.5	13.8	46.0
0.670245	33.1	200.0	9.000	N	19.5	12.9	46.0
0.708771	33.4	200.0	9.000	N	19.5	12.6	46.0
0.749511	32.6	200.0	9.000	N	19.5	13.4	46.0
9.646150	35.7	200.0	9.000	N	19.8	14.3	50.0

Note:

1) Corrected Amplitude = Reading + Correction Factor

2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter

3) Margin = Limit – Corrected Amplitude

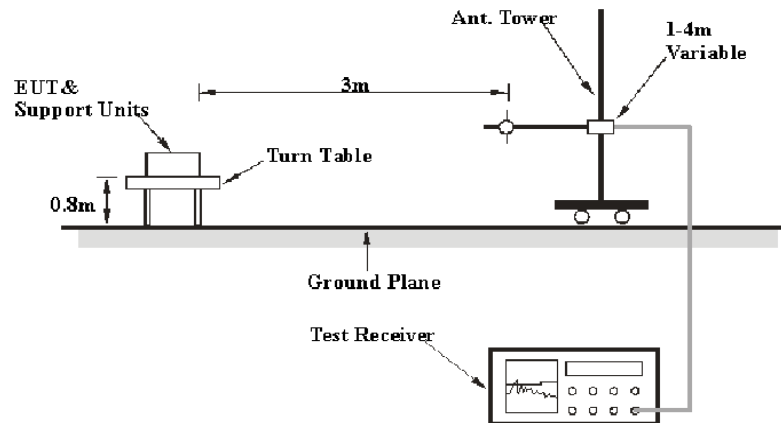
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

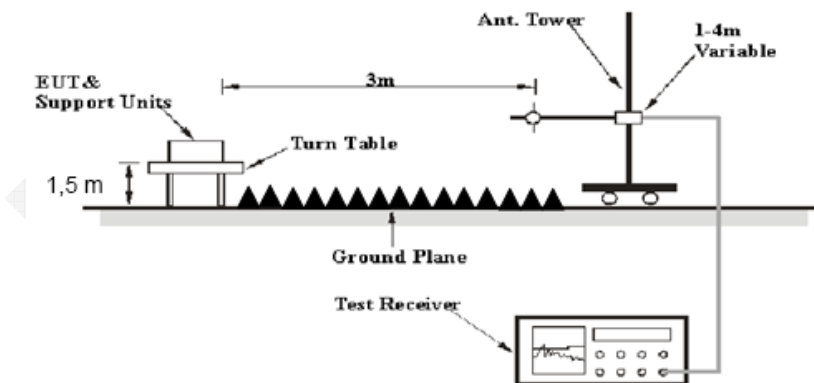
FCC §15.247 (d); §15.209; §15.205;

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 C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

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	/	AV

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.

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 Data

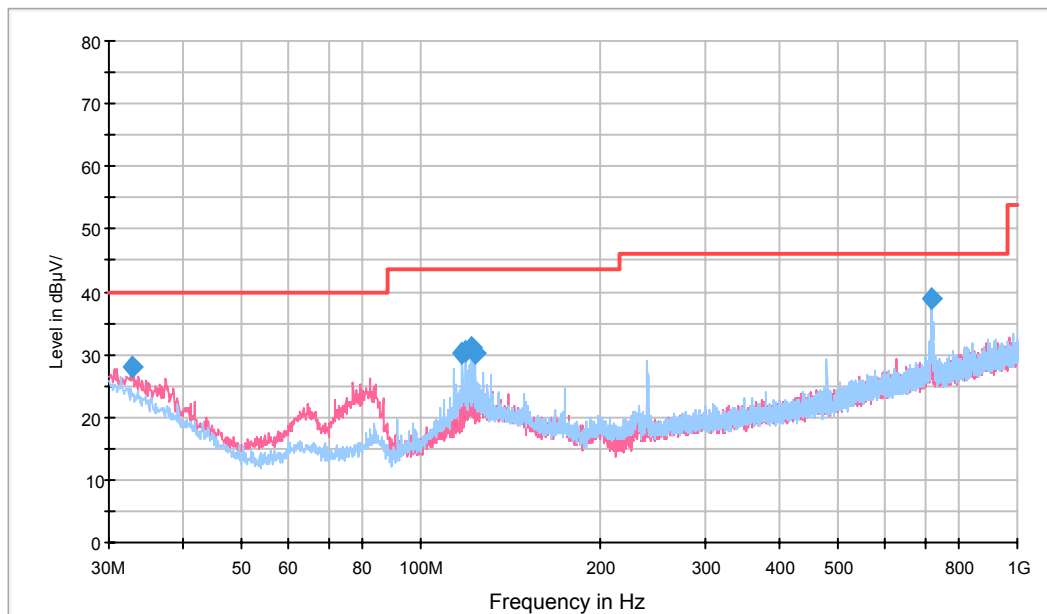
Environmental Conditions

Temperature:	29 °C
Relative Humidity:	42 %
ATM Pressure:	94.5 kPa

* The testing was performed by Tom Tang on 2017-07-07.

Test Mode: Transmitting

1) 30 MHz to 1 GHz:



Frequency (MHz)	QuasicPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
32.910000	28.0	115.0	V	90.0	-3.0	12.0	40.0
117.542500	30.2	100.0	H	307.0	-8.1	13.3	43.5
118.876250	30.4	120.0	H	112.0	-8.0	13.1	43.5
121.665000	31.0	200.0	H	121.0	-7.7	12.5	43.5
122.998750	30.3	150.0	H	278.0	-7.4	13.2	43.5
720.155000	38.8	100.0	V	299.0	0.9	7.2	46.0

2) 1GHz-25GHz:

BDR Mode (GFSK):

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBμV	PK/QP/AV	H/V	dB(1/m)	dB	dB	dBμV/m	dBμV/m	dB
2402 MHz									
2402	70.33	PK	H	28.71	3.00	0.00	102.04	N/A	N/A
2402	59.82	AV	H	28.71	3.00	0.00	91.53	N/A	N/A
2402	69.94	PK	V	28.71	3.00	0.00	101.65	N/A	N/A
2402	58.79	AV	V	28.71	3.00	0.00	90.50	N/A	N/A
2390	30.61	PK	H	28.67	3.00	0.00	62.28	74.00	11.72
2390	15.52	AV	H	28.67	3.00	0.00	47.19	54.00	6.81
4804	34.51	PK	H	33.85	5.12	26.87	46.61	74.00	27.39
4804	19.36	AV	H	33.85	5.12	26.87	31.46	54.00	22.54
7206	32.14	PK	H	36.39	6.16	26.35	48.34	74.00	25.66
7206	18.26	AV	H	36.39	6.16	26.35	34.46	54.00	19.54
2441 MHz									
2441	70.91	PK	H	28.82	3.00	0.00	102.73	N/A	N/A
2441	59.76	AV	H	28.82	3.00	0.00	91.58	N/A	N/A
2441	70.02	PK	V	28.82	3.00	0.00	101.84	N/A	N/A
2441	58.55	AV	V	28.82	3.00	0.00	90.37	N/A	N/A
4882	34.63	PK	H	34.07	5.09	26.87	46.92	74.00	27.08
4882	19.09	AV	H	34.07	5.09	26.87	31.38	54.00	22.62
7323	31.94	PK	H	36.55	6.22	26.40	48.31	74.00	25.69
7323	18.19	AV	H	36.55	6.22	26.40	34.56	54.00	19.44
2480 MHz									
2480	71.69	PK	H	28.94	2.99	0.00	103.62	N/A	N/A
2480	60.74	AV	H	28.94	2.99	0.00	92.67	N/A	N/A
2480	70.33	PK	V	28.94	2.99	0.00	102.26	N/A	N/A
2480	59.02	AV	V	28.94	2.99	0.00	90.95	N/A	N/A
2483.5	30.72	PK	H	28.95	2.99	0.00	62.66	74.00	11.34
2483.5	17.26	AV	H	28.95	2.99	0.00	49.20	54.00	4.80
4960	35.28	PK	H	34.29	5.05	26.88	47.74	74.00	26.26
4960	19.76	AV	H	34.29	5.05	26.88	32.22	54.00	21.78
7440	32.32	PK	H	36.72	6.27	26.45	48.86	74.00	25.14
7440	18.45	AV	H	36.72	6.27	26.45	34.99	54.00	19.01

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

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dB μ V	PK/QP/AV	H/V	dB(1/m)	dB	dB	dB μ V/m	dB μ V/m	dB
2402 MHz									
2402	66.78	PK	H	28.71	3.00	0.00	98.49	N/A	N/A
2402	53.84	AV	H	28.71	3.00	0.00	85.55	N/A	N/A
2402	65.92	PK	V	28.71	3.00	0.00	97.63	N/A	N/A
2402	52.96	AV	V	28.71	3.00	0.00	84.67	N/A	N/A
2390	28.51	PK	H	28.67	3.00	0.00	60.18	74.00	13.82
2390	15.37	AV	H	28.67	3.00	0.00	47.04	54.00	6.96
4804	34.76	PK	H	33.85	5.12	26.87	46.86	74.00	27.14
4804	19.52	AV	H	33.85	5.12	26.87	31.62	54.00	22.38
7206	32.44	PK	H	36.39	6.16	26.35	48.64	74.00	25.36
7206	18.46	AV	H	36.39	6.16	26.35	34.66	54.00	19.34
2441 MHz									
2441	67.27	PK	H	28.82	3.00	0.00	99.09	N/A	N/A
2441	54.29	AV	H	28.82	3.00	0.00	86.11	N/A	N/A
2441	65.99	PK	V	28.82	3.00	0.00	97.81	N/A	N/A
2441	53.33	AV	V	28.82	3.00	0.00	85.15	N/A	N/A
4882	35.57	PK	H	34.07	5.09	26.87	47.86	74.00	26.14
4882	20.03	AV	H	34.07	5.09	26.87	32.32	54.00	21.68
7323	33.04	PK	H	36.55	6.22	26.40	49.41	74.00	24.59
7323	19.16	AV	H	36.55	6.22	26.40	35.53	54.00	18.47
2480 MHz									
2480	67.56	PK	H	28.94	2.99	0.00	99.49	N/A	N/A
2480	54.68	AV	H	28.94	2.99	0.00	86.61	N/A	N/A
2480	65.86	PK	V	28.94	2.99	0.00	97.79	N/A	N/A
2480	52.92	AV	V	28.94	2.99	0.00	84.85	N/A	N/A
2483.5	29.27	PK	H	28.95	2.99	0.00	61.21	74.00	12.79
2483.5	15.67	AV	H	28.95	2.99	0.00	47.61	54.00	6.39
4960	35.68	PK	H	34.29	5.05	26.88	48.14	74.00	25.86
4960	20.30	AV	H	34.29	5.05	26.88	32.76	54.00	21.24
7440	32.59	PK	H	36.72	6.27	26.45	49.13	74.00	24.87
7440	18.80	AV	H	36.72	6.27	26.45	35.34	54.00	18.66

EDR Mode (8-DPSK):

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBμV	PK/QP/AV	H/V	dB(1/m)	dB	dB	dBμV/m	dBμV/m	dB
2402 MHz									
2402	66.72	PK	H	28.71	3.00	0.00	98.43	N/A	N/A
2402	53.46	AV	H	28.71	3.00	0.00	85.17	N/A	N/A
2402	66.27	PK	V	28.71	3.00	0.00	97.98	N/A	N/A
2402	53.07	AV	V	28.71	3.00	0.00	84.78	N/A	N/A
2390	29.11	PK	H	28.67	3.00	0.00	60.78	74.00	13.22
2390	15.68	AV	H	28.67	3.00	0.00	47.35	54.00	6.65
4804	34.73	PK	H	33.85	5.12	26.87	46.83	74.00	27.17
4804	19.37	AV	H	33.85	5.12	26.87	31.47	54.00	22.53
7206	32.34	PK	H	36.39	6.16	26.35	48.54	74.00	25.46
7206	18.50	AV	H	36.39	6.16	26.35	34.70	54.00	19.30
2441 MHz									
2441	67.45	PK	H	28.82	3.00	0.00	99.27	N/A	N/A
2441	54.33	AV	H	28.82	3.00	0.00	86.15	N/A	N/A
2441	66.51	PK	V	28.82	3.00	0.00	98.33	N/A	N/A
2441	53.57	AV	V	28.82	3.00	0.00	85.39	N/A	N/A
4882	35.44	PK	H	34.07	5.09	26.87	47.73	74.00	26.27
4882	19.85	AV	H	34.07	5.09	26.87	32.14	54.00	21.86
7323	32.58	PK	H	36.55	6.22	26.40	48.95	74.00	25.05
7323	19.13	AV	H	36.55	6.22	26.40	35.50	54.00	18.50
2480 MHz									
2480	67.97	PK	H	28.94	2.99	0.00	99.90	N/A	N/A
2480	54.71	AV	H	28.94	2.99	0.00	86.64	N/A	N/A
2480	66.51	PK	V	28.94	2.99	0.00	98.44	N/A	N/A
2480	53.22	AV	V	28.94	2.99	0.00	85.15	N/A	N/A
2483.5	28.67	PK	H	28.95	2.99	0.00	60.61	74.00	13.39
2483.5	15.48	AV	H	28.95	2.99	0.00	47.42	54.00	6.58
4960	35.30	PK	H	34.29	5.05	26.88	47.76	74.00	26.24
4960	20.28	AV	H	34.29	5.05	26.88	32.74	54.00	21.26
7440	32.68	PK	H	36.72	6.27	26.45	49.22	74.00	24.78
7440	18.72	AV	H	36.72	6.27	26.45	35.26	54.00	18.74

Note:

Corrected Amplitude = Corrected Factor + Reading

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

Margin = Limit- Corr. Amplitude

Spurious emissions more than 20 dB below the limit were not reported.

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 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:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

Test Result: Compliance.

Please refer to following tables and plots.

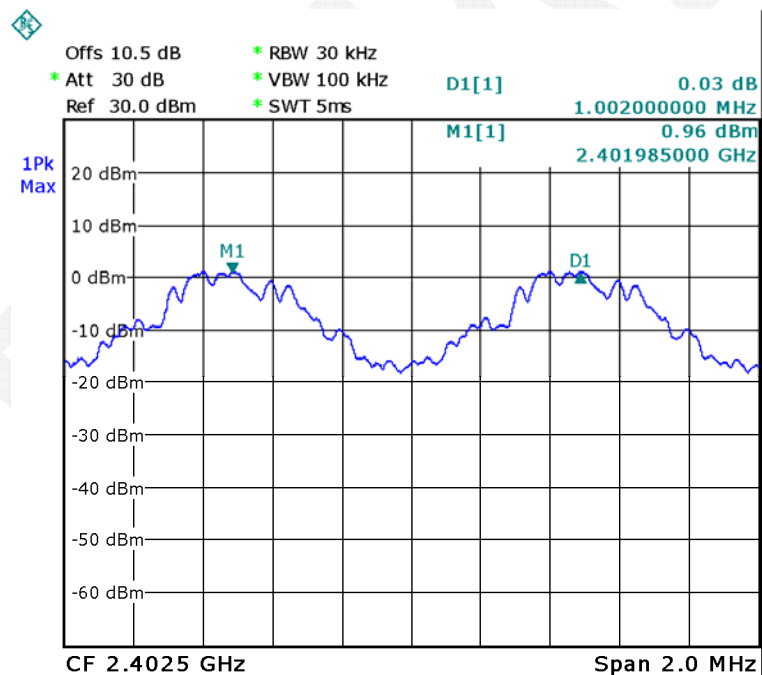
Test Mode: Transmitting

Mode	Channel	Frequency	Channel Separation	Limit
		MHz	MHz	MHz
BDR (GFSK)	Low	2402	1.002	0.70
	Middle	2441	1.002	0.70
	High	2480	1.002	0.72
EDR ($\pi/4$ -DQPSK)	Low	2402	0.998	0.91
	Middle	2441	1.002	0.90
	High	2480	0.998	0.91
EDR (8DPSK)	Low	2402	0.998	0.90
	Middle	2441	1.002	0.90
	High	2480	1.002	0.90

Note: Limit= (2/3) × 20dB bandwidth

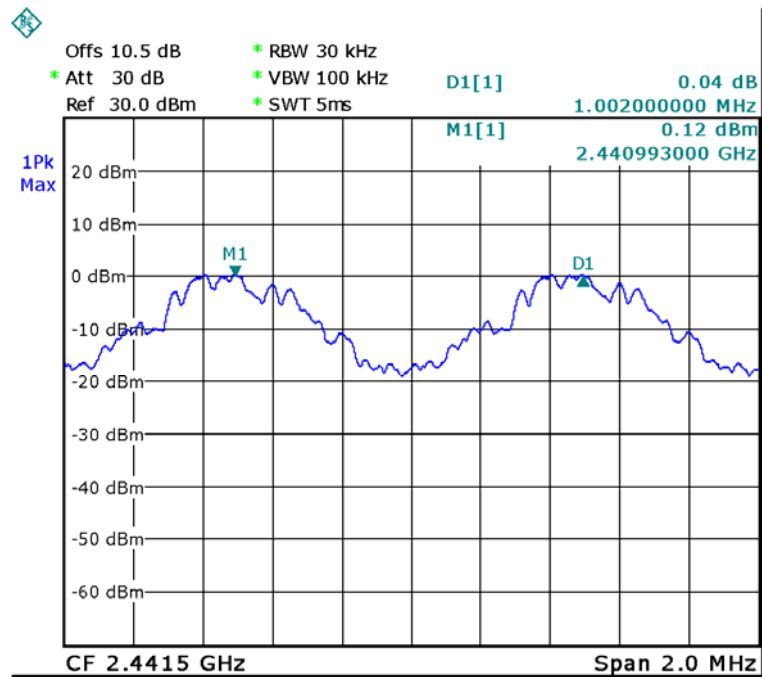
BDR Mode (GFSK):

Low Channel



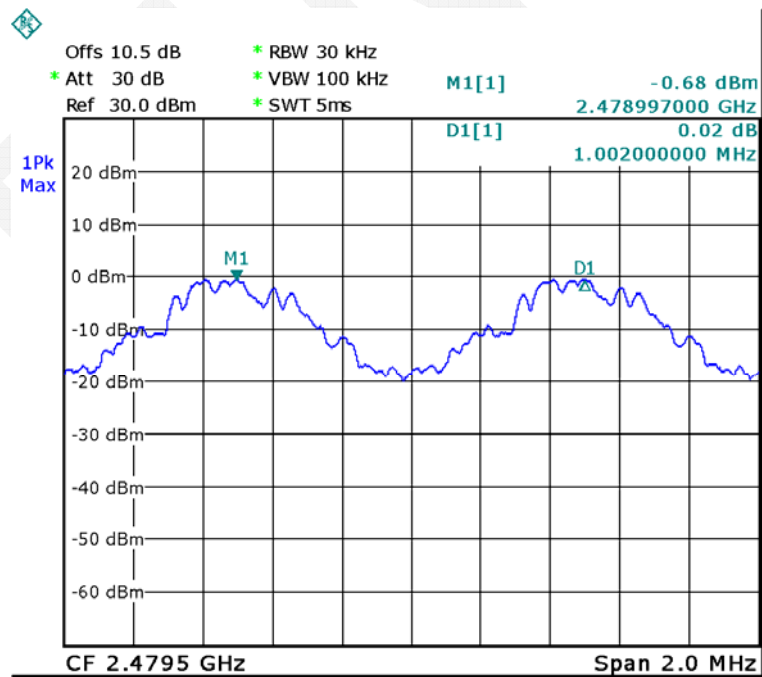
Date: 29.JUN.2017 16:45:49

Middle Channel



Date: 29.JUN.2017 16:46:56

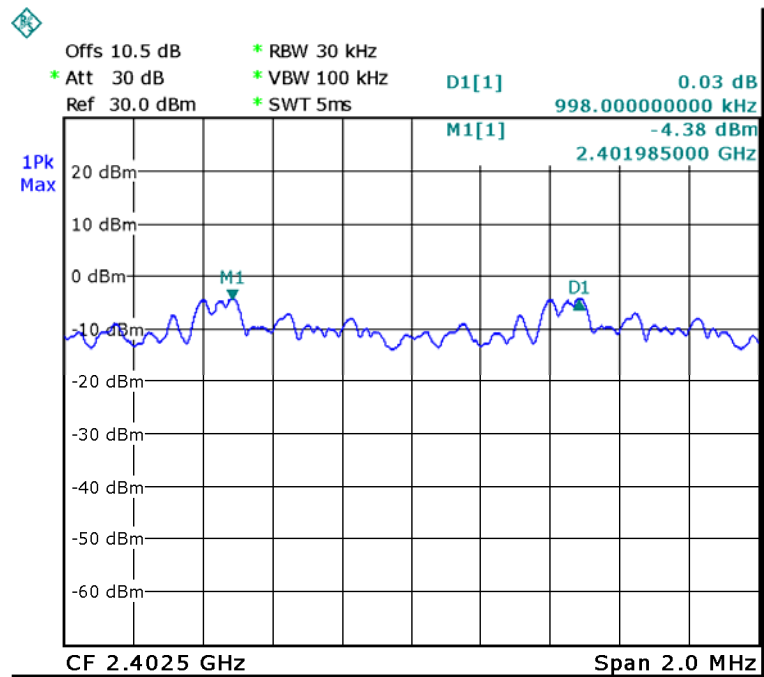
High Channel



Date: 29.JUN.2017 16:48:27

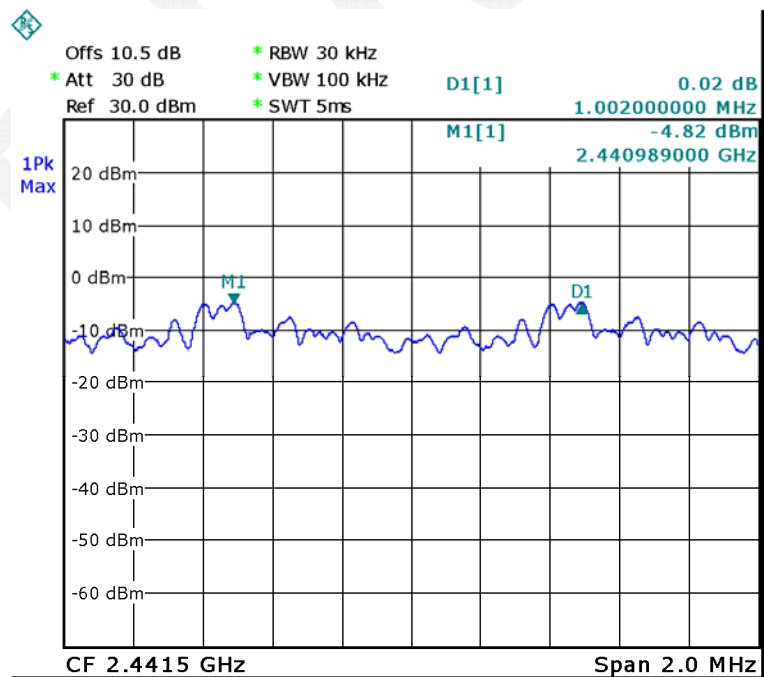
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



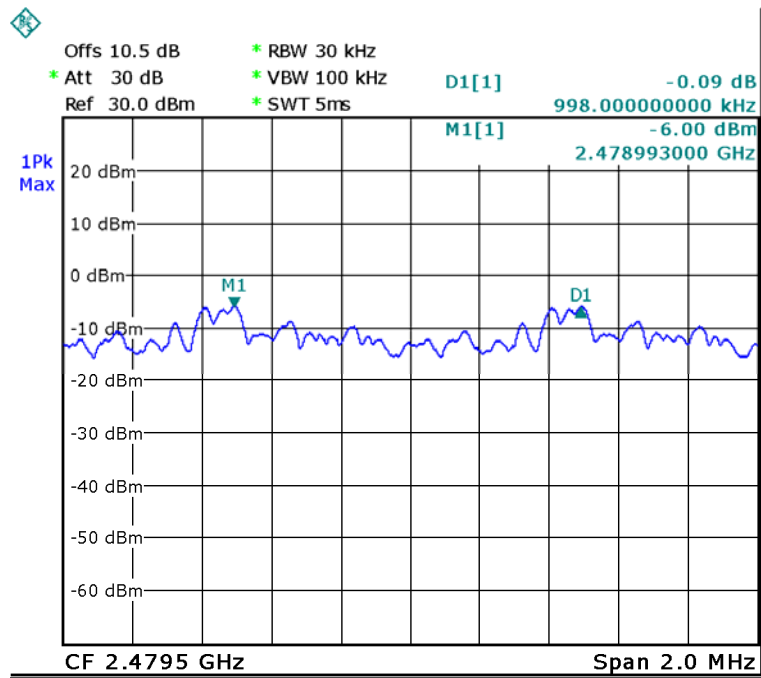
Date: 29.JUN.2017 16:49:20

Middle Channel



Date: 29.JUN.2017 16:50:10

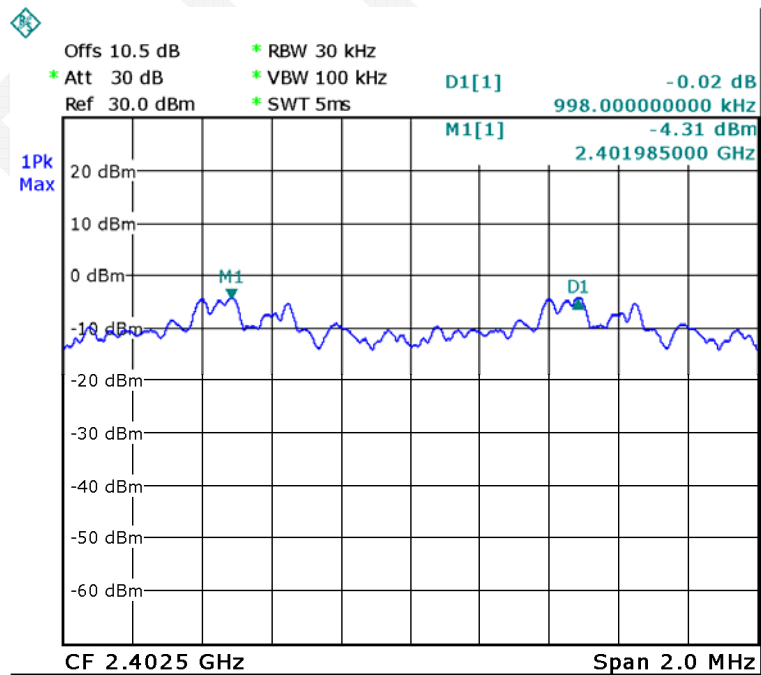
High Channel



Date: 29.JUN.2017 16:50:49

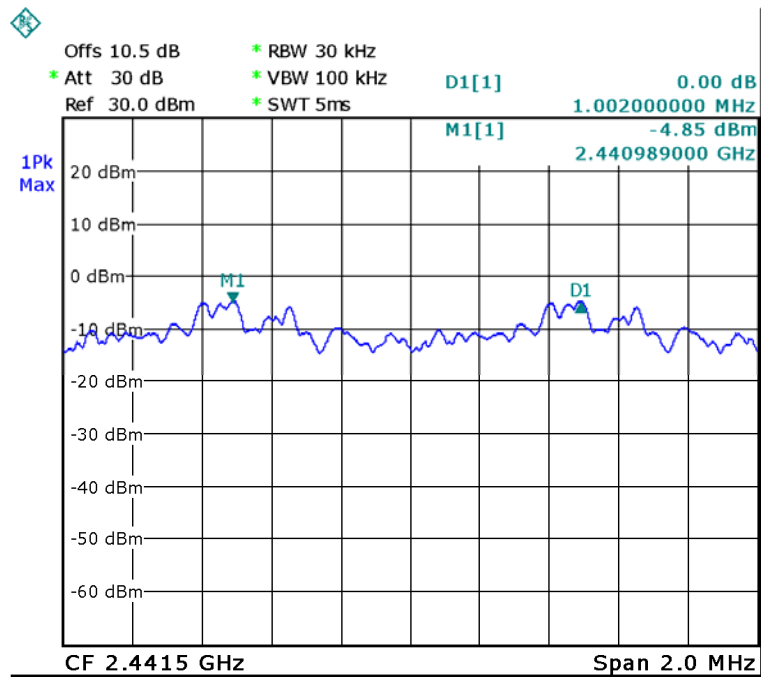
EDR Mode (8-DPSK):

Low Channel



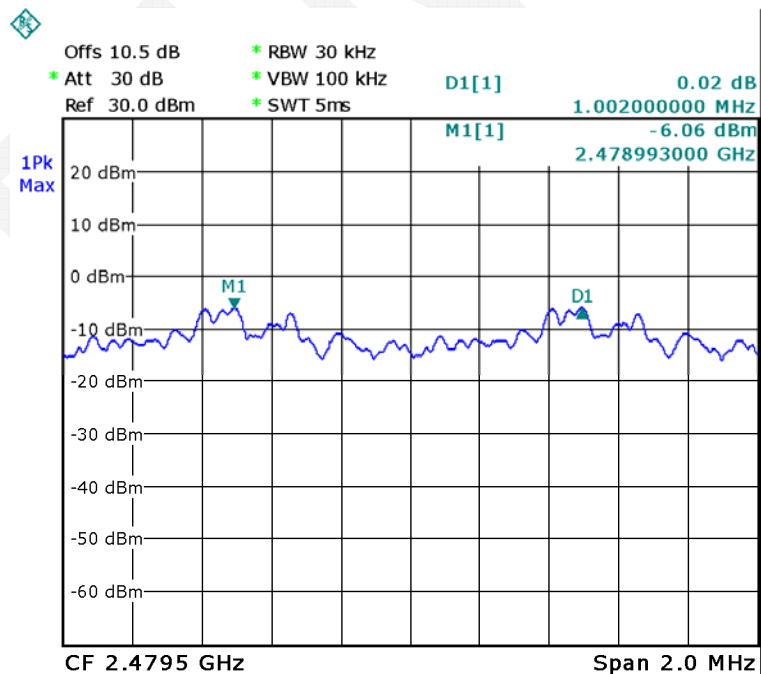
Date: 29.JUN.2017 16:51:40

Middle Channel



Date: 29.JUN.2017 16:52:17

High Channel



Date: 29.JUN.2017 16:52:55

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 Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

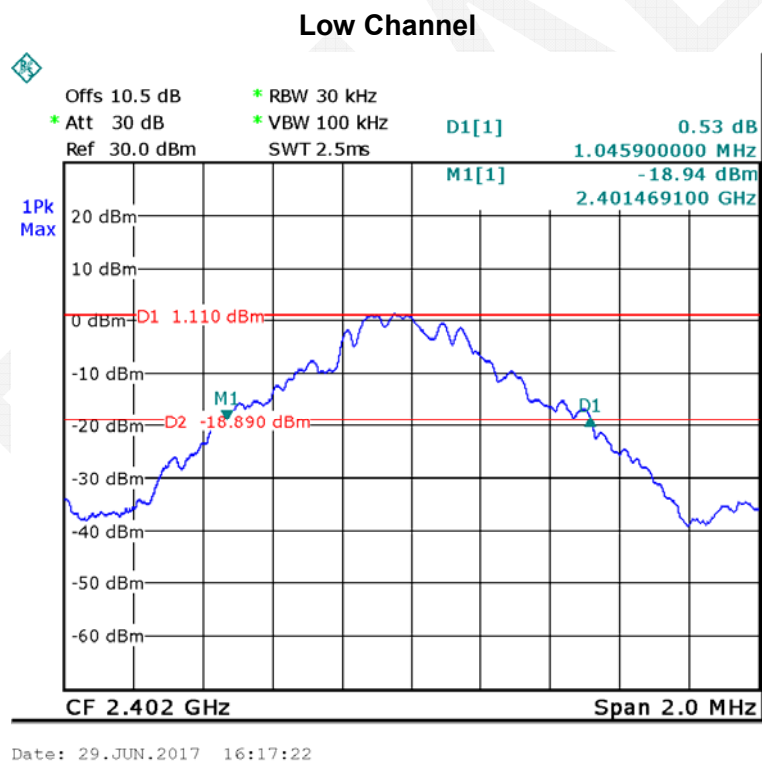
Test Result: Compliance.

Please refer to following tables and plots

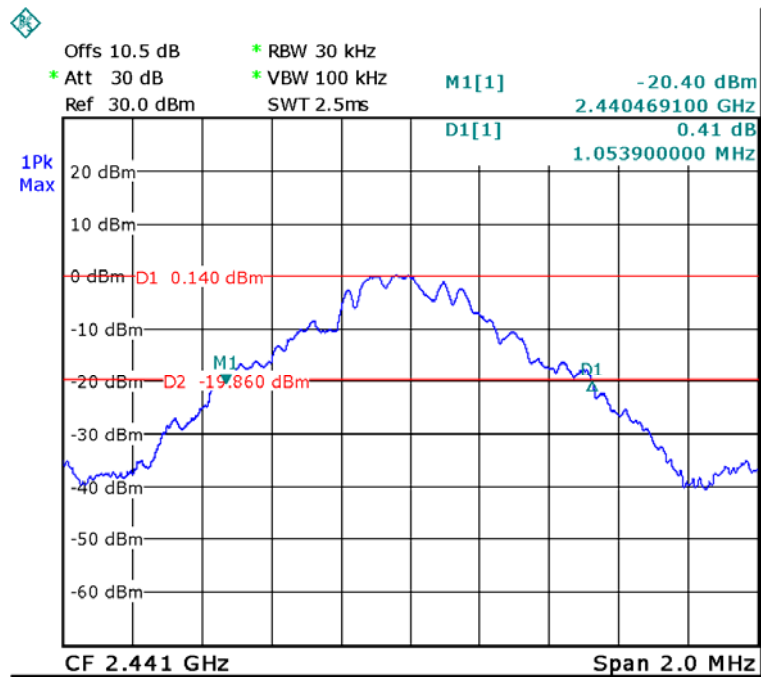
Page 29 of 63

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	1.05
	Middle	2441	1.05
	High	2480	1.08
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	1.36
	Middle	2441	1.35
	High	2480	1.36
EDR Mode (8-DPSK)	Low	2402	1.34
	Middle	2441	1.34
	High	2480	1.35

BDR Mode (GFSK):

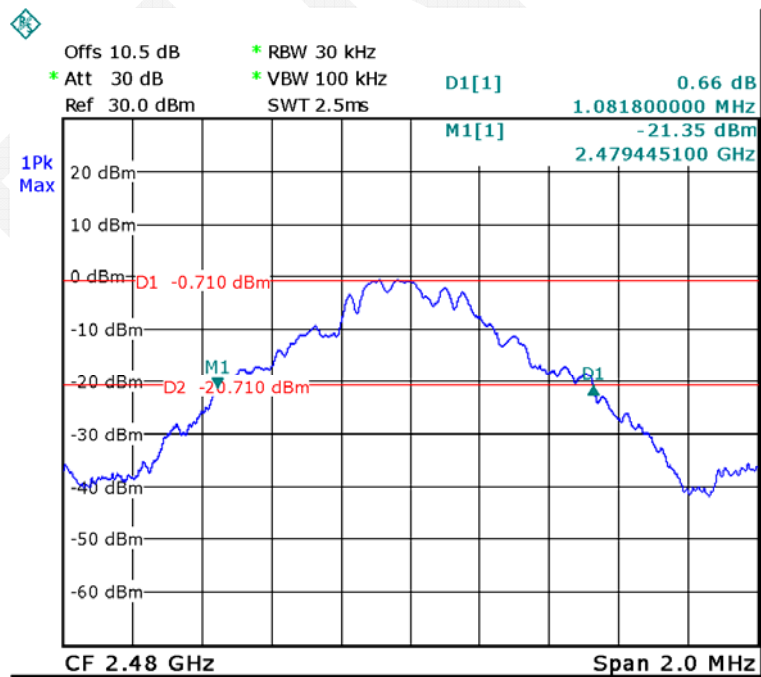


Middle Channel



Date: 29.JUN.2017 16:19:02

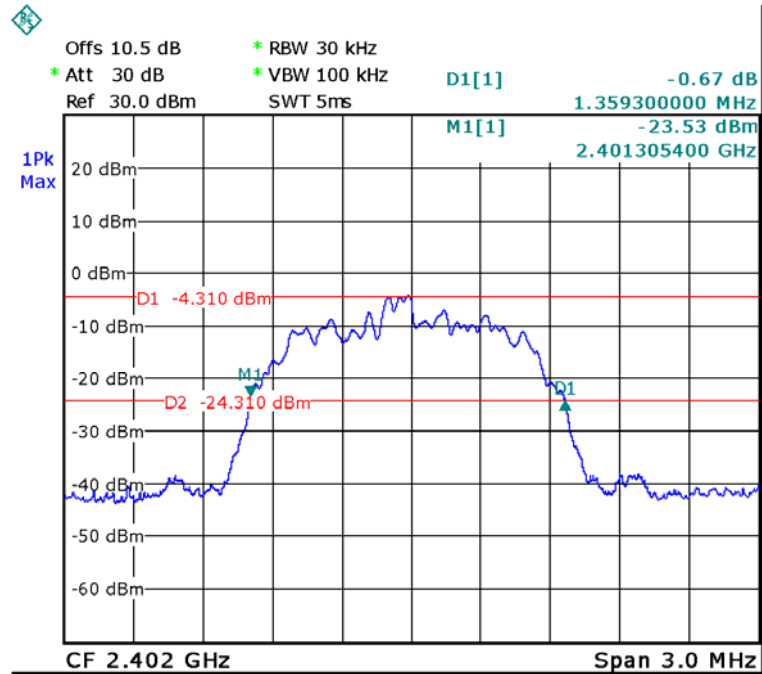
High Channel



Date: 29.JUN.2017 16:20:14

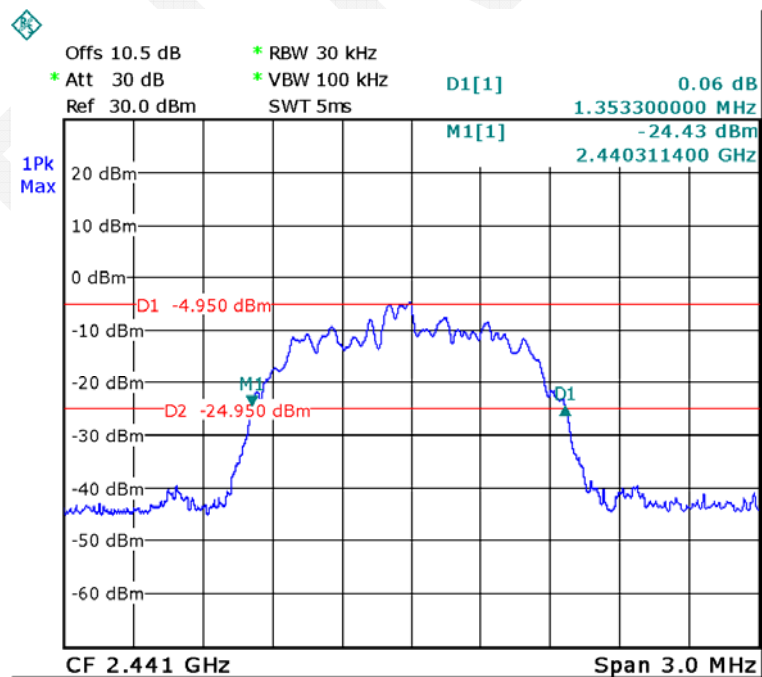
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



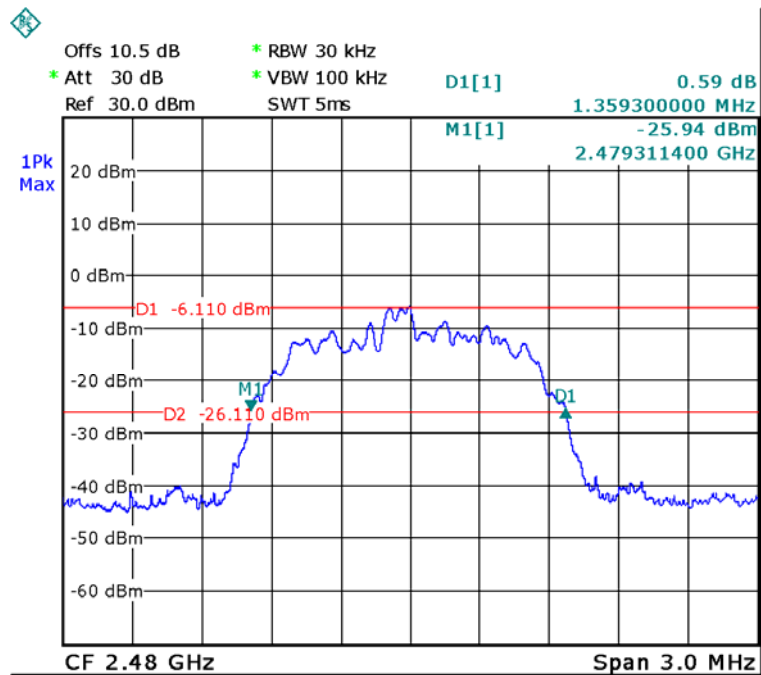
Date: 29.JUN.2017 16:07:14

Middle Channel



Date: 29.JUN.2017 16:08:36

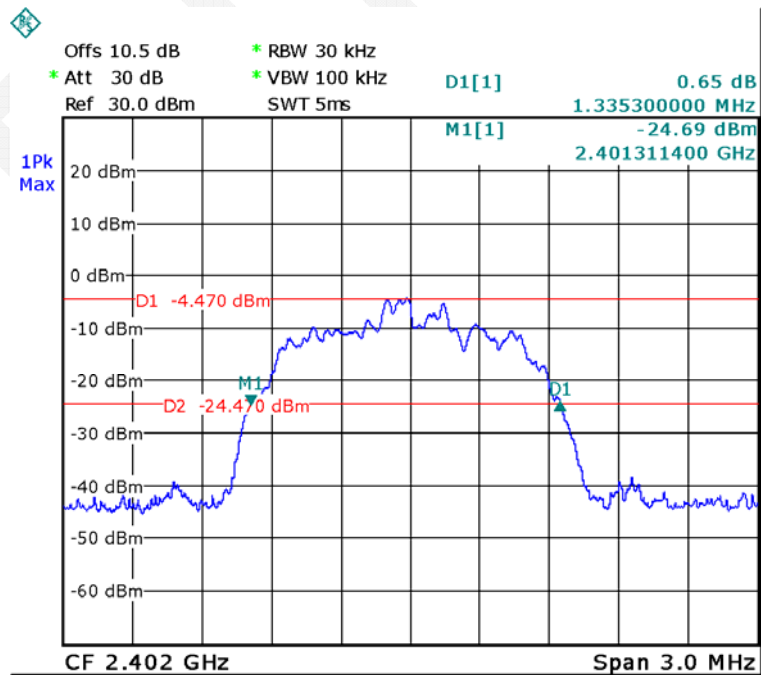
High Channel



Date: 29.JUN.2017 16:09:37

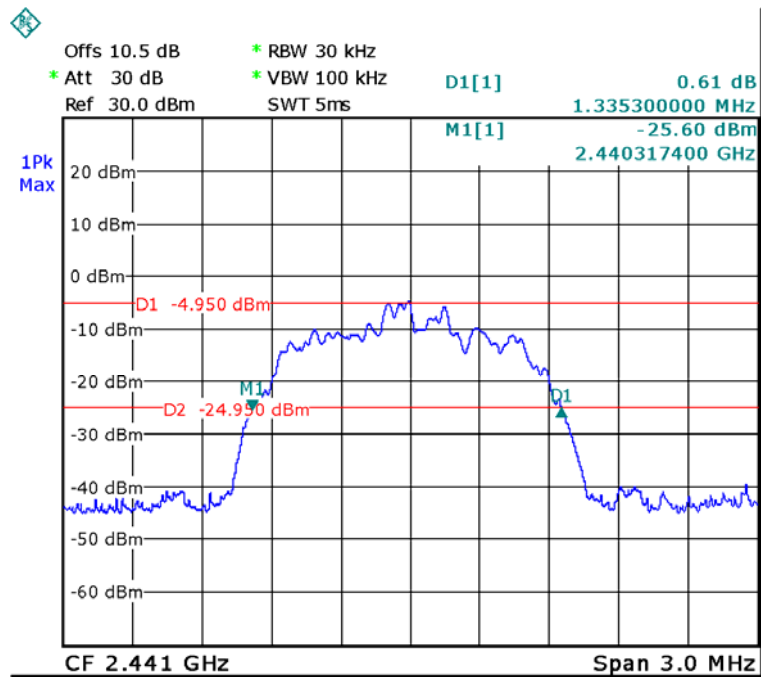
EDR Mode (8-DPSK):

Low Channel



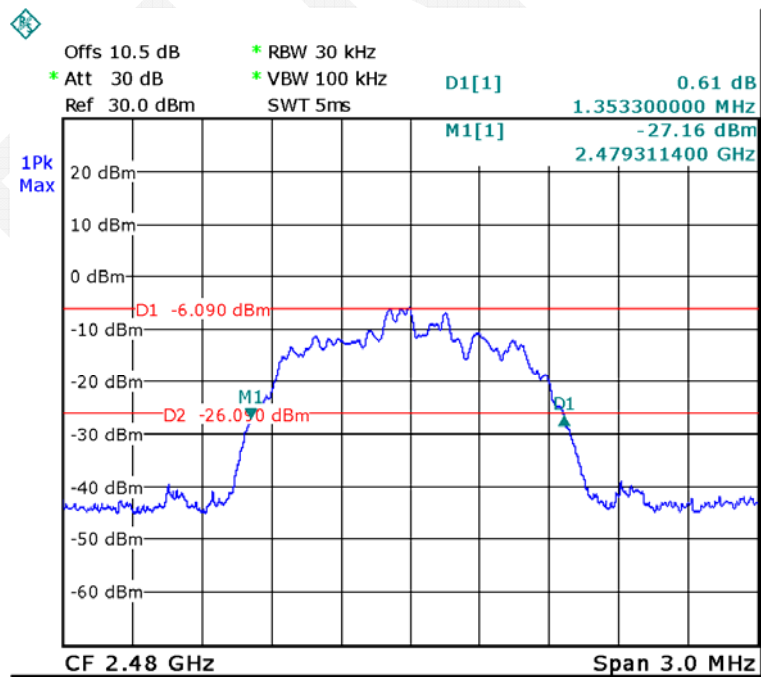
Date: 29.JUN.2017 16:11:32

Middle Channel



Date: 29.JUN.2017 16:12:48

High Channel



Date: 29.JUN.2017 16:14:18

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 Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

Test Result: Compliance.

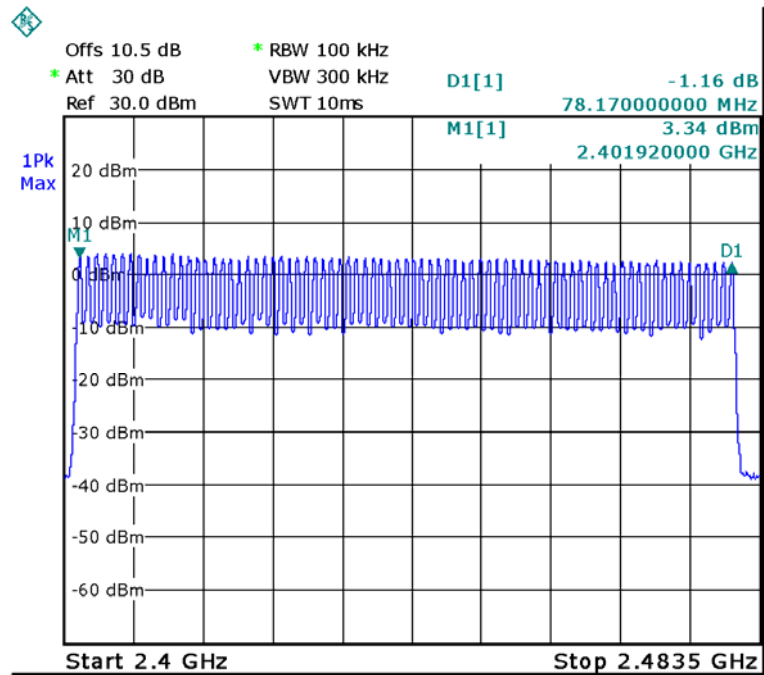
Please refer to following tables and plots.

Test Mode: Transmitting

BDR Mode (GFSK):

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

Number of Hopping Channels

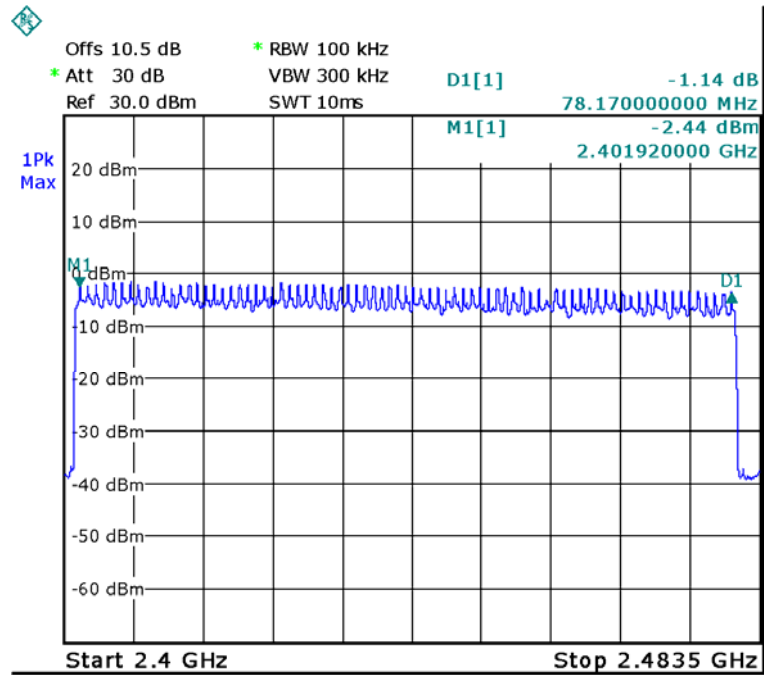


Date: 29.JUN.2017 17:53:36

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

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

Number of Hopping Channels

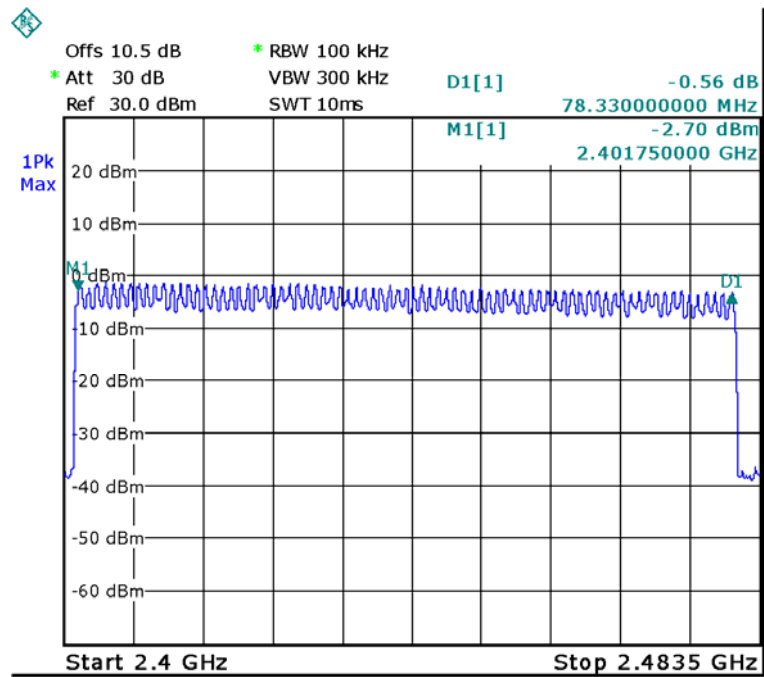


Date: 29.JUN.2017 17:29:20

EDR Mode (8-DPSK):

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

Number of Hopping Channels



Date: 29.JUN.2017 17:42:18

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 hopping mode, Spectrum Analyzer SPAN was set as 0, the time of single pulse was tested.

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

Test Result: Compliance.

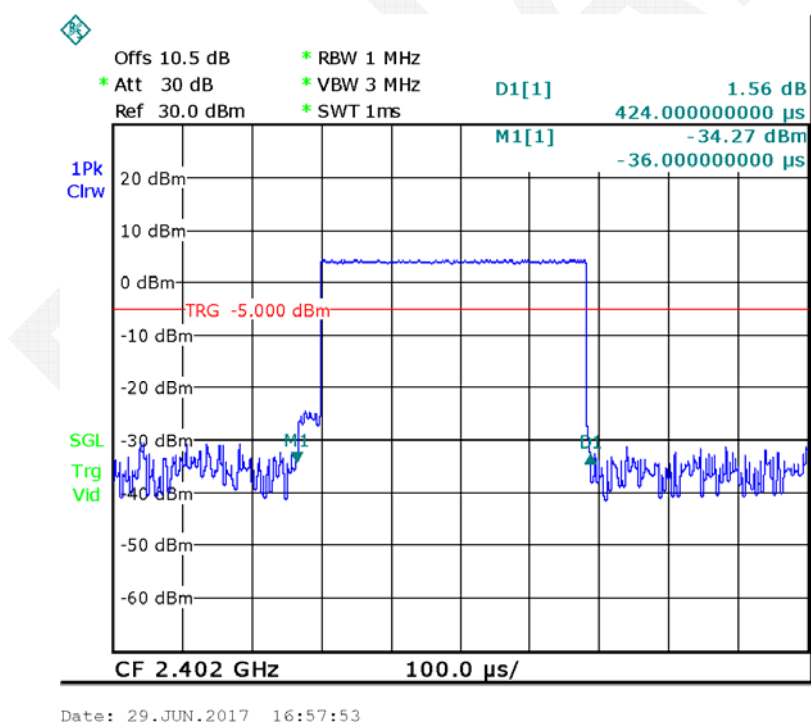
Please refer to following tables and plots

Test Mode: Transmitting

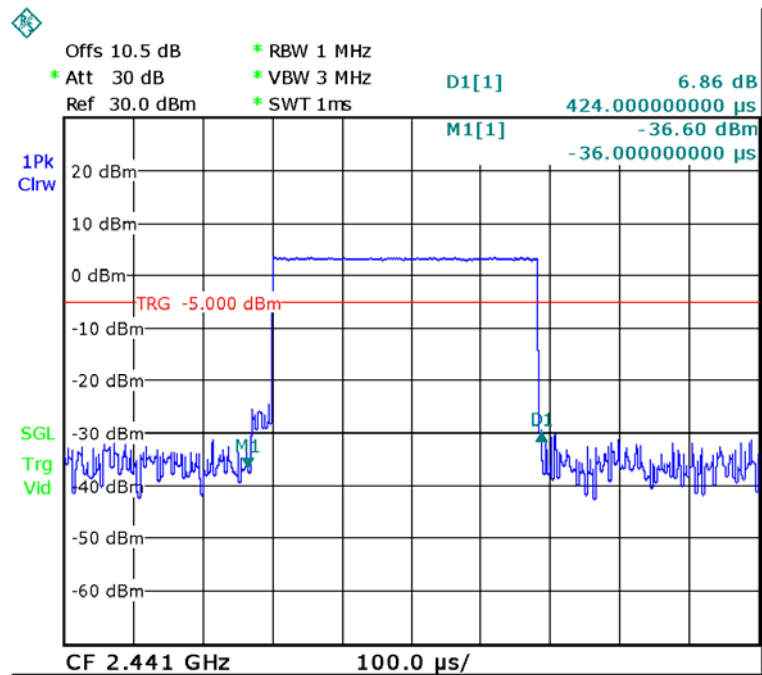
BDR Mode (GFSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.424	0.136	0.4	Compliance
	Middle	0.424	0.136	0.4	Compliance
	High	0.424	0.136	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
DH3	Low	1.686	0.270	0.4	Compliance
	Middle	1.686	0.270	0.4	Compliance
	High	1.686	0.270	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
DH5	Low	2.936	0.313	0.4	Compliance
	Middle	2.936	0.313	0.4	Compliance
	High	2.936	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

DH1: Low Channel

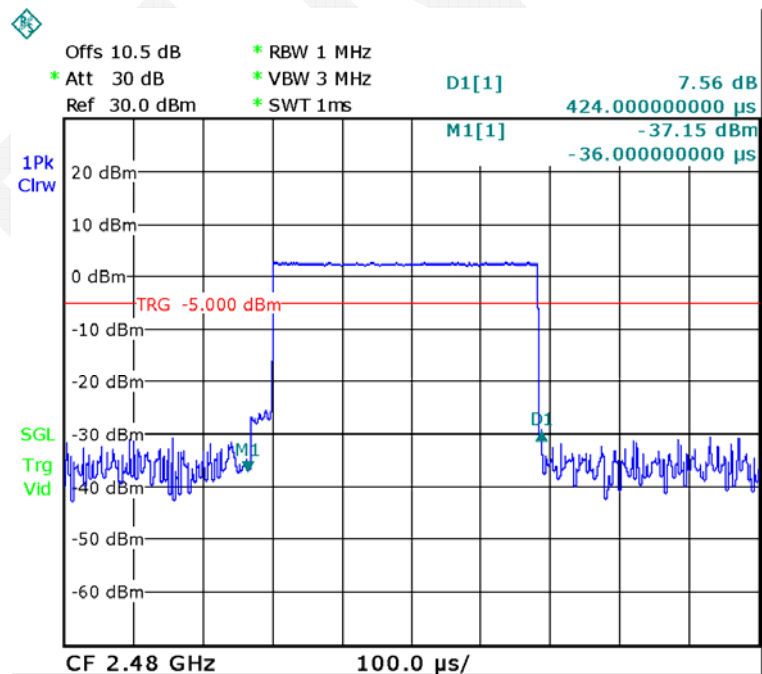


DH1: Middle Channel



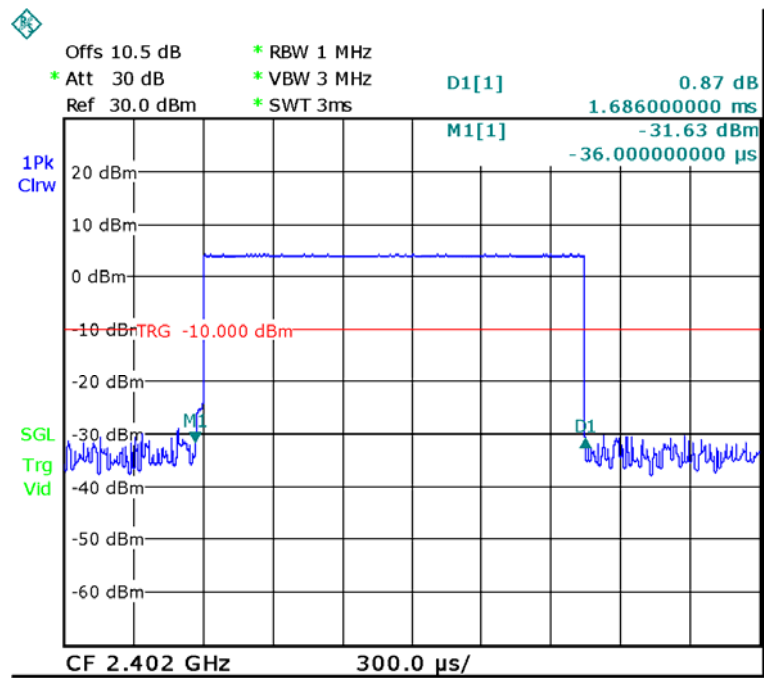
Date: 29.JUN.2017 16:58:40

DH1: High Channel



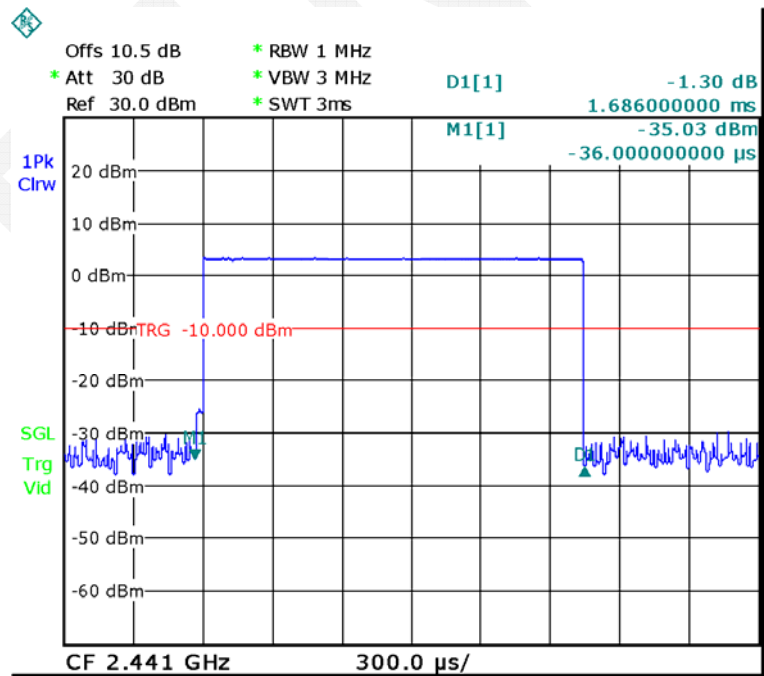
Date: 29.JUN.2017 16:59:17

DH3: Low Channel



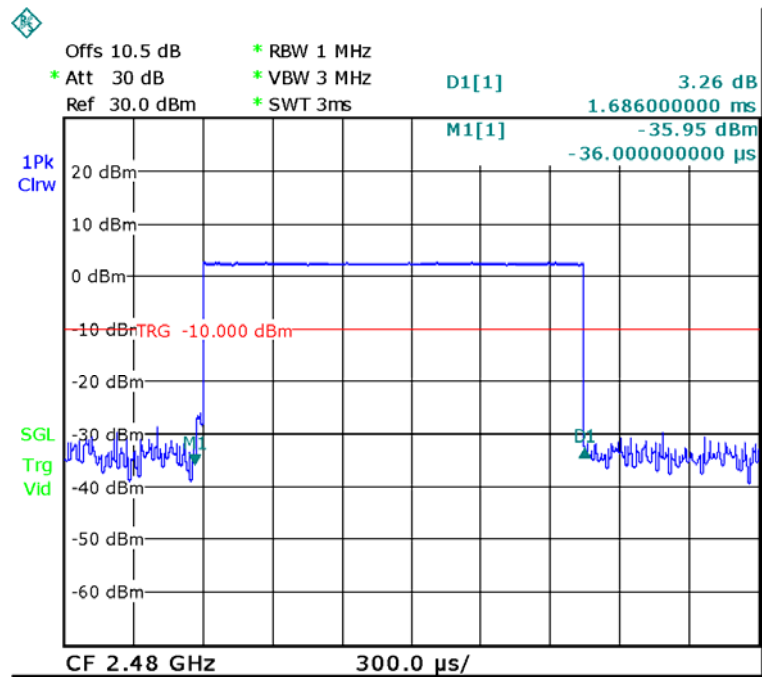
Date: 29.JUN.2017 17:07:20

DH3: Middle Channel



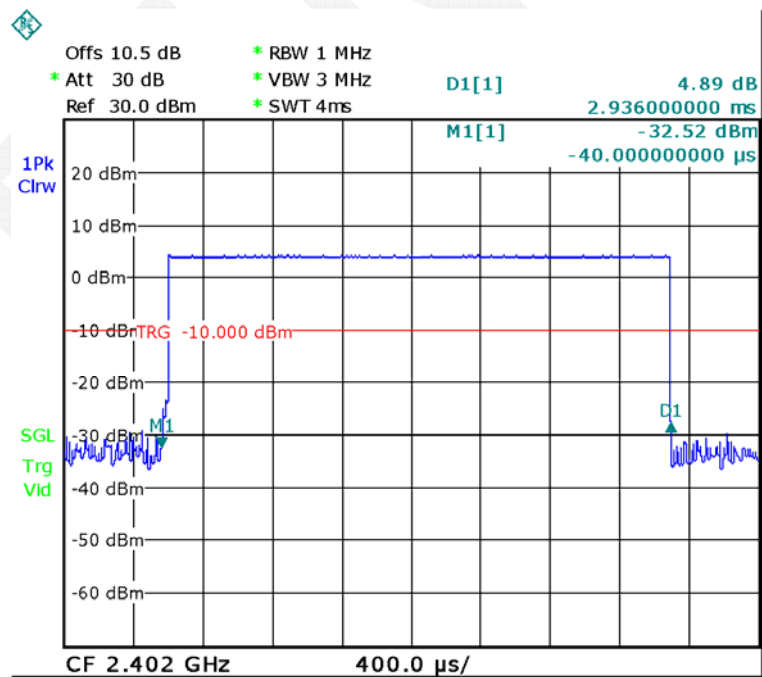
Date: 29.JUN.2017 17:07:46

DH3: High Channel



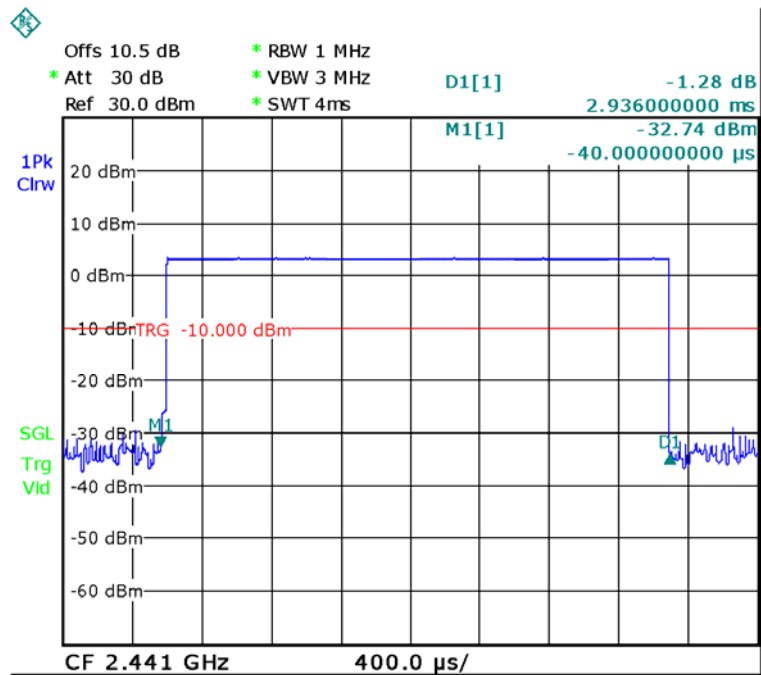
Date: 29.JUN.2017 17:08:07

DH5: Low Channel



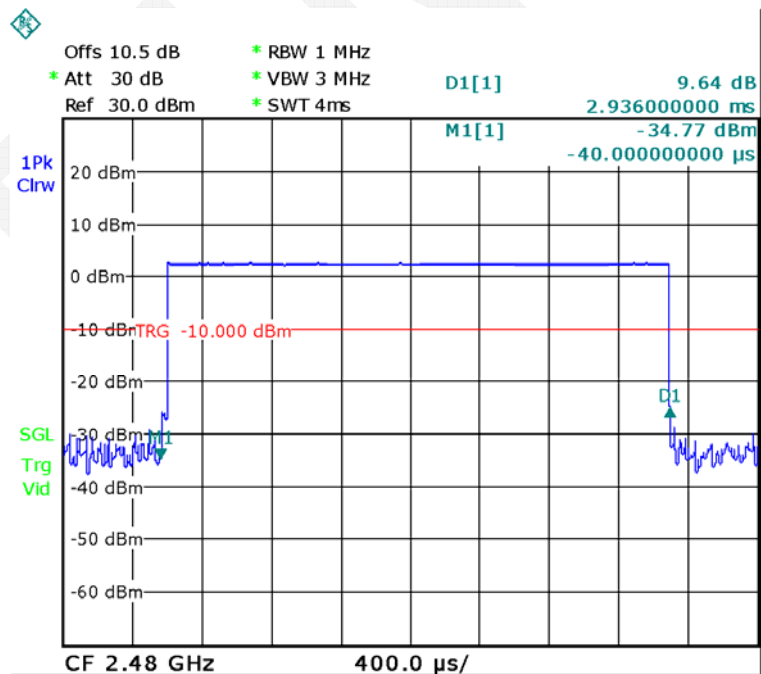
Date: 29.JUN.2017 17:16:19

DH5: Middle Channel



Date: 29.JUN.2017 17:16:47

DH5: High Channel

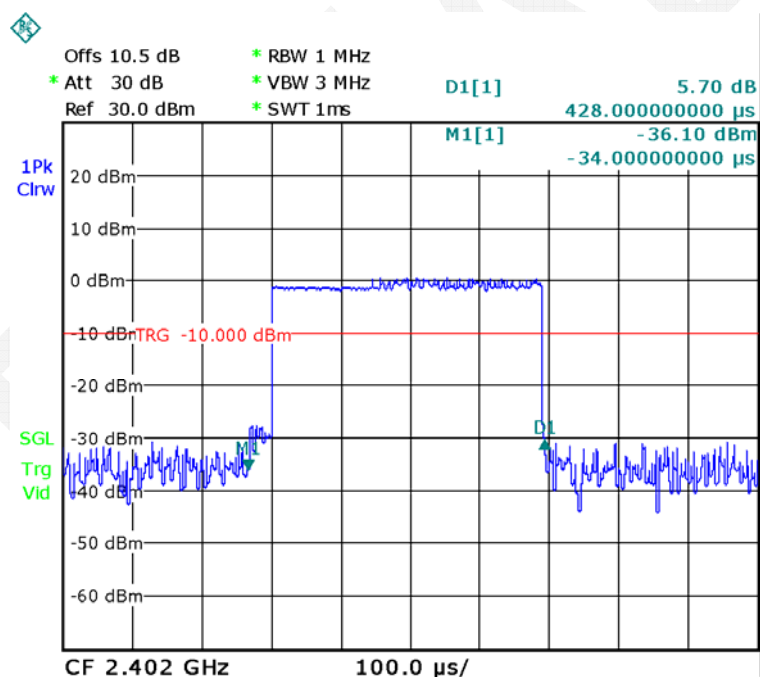


Date: 29.JUN.2017 17:17:18

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

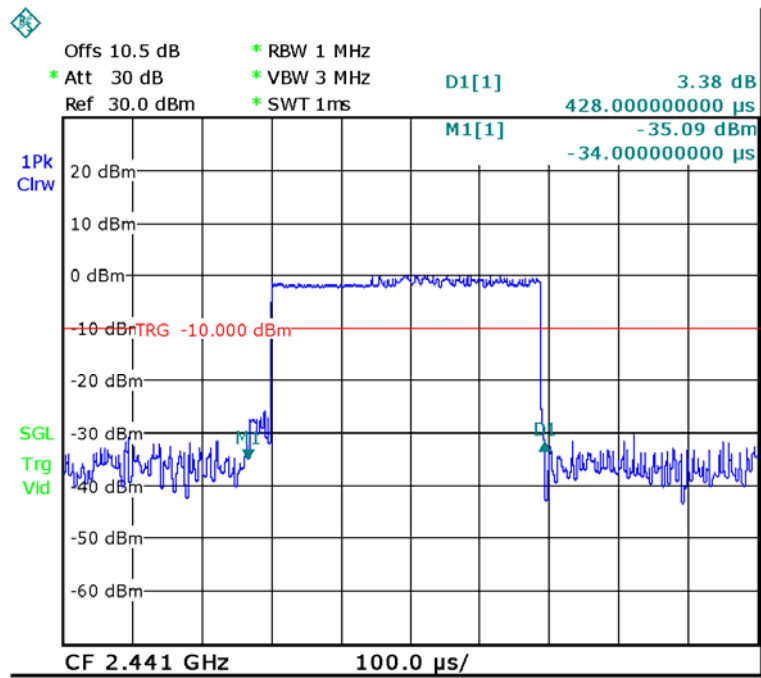
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
2DH1	Low	0.428	0.137	0.4	Compliance
	Middle	0.428	0.137	0.4	Compliance
	High	0.428	0.137	0.4	Compliance
	Note: Dwell time=Pulse time (ms) \times (1600/2/79) \times 31.6 s				
2DH3	Low	1.686	0.270	0.4	Compliance
	Middle	1.686	0.270	0.4	Compliance
	High	1.686	0.270	0.4	Compliance
	Note: Dwell time=Pulse time (ms) \times (1600/4/79) \times 31.6 s				
2DH5	Low	2.944	0.314	0.4	Compliance
	Middle	2.944	0.314	0.4	Compliance
	High	2.944	0.314	0.4	Compliance
	Note: Dwell time=Pulse time (ms) \times (1600/6/79) \times 31.6 s				

2DH1: Low Channel



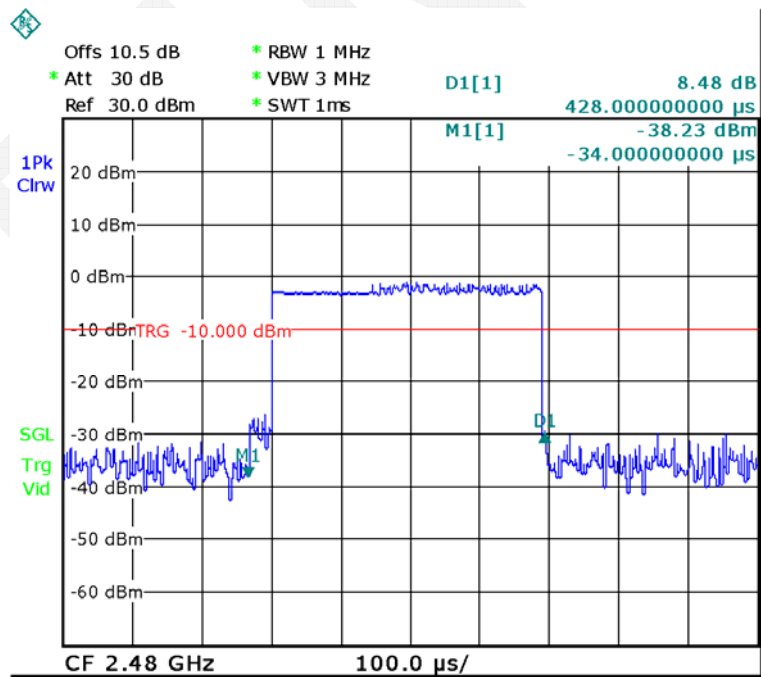
Date: 29.JUN.2017 17:03:19

2DH1: Middle Channel



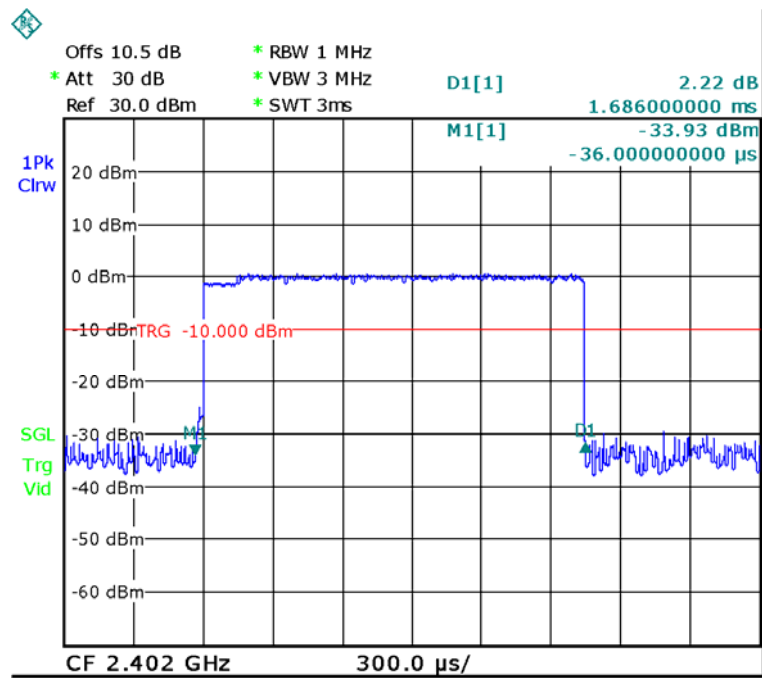
Date: 29.JUN.2017 17:02:44

2DH1: High Channel



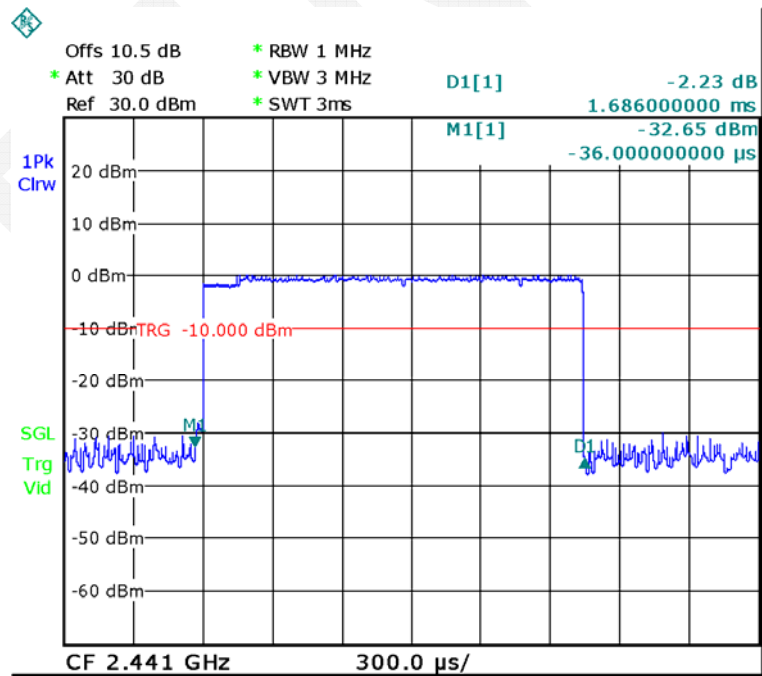
Date: 29.JUN.2017 17:01:57

2DH3: Low Channel



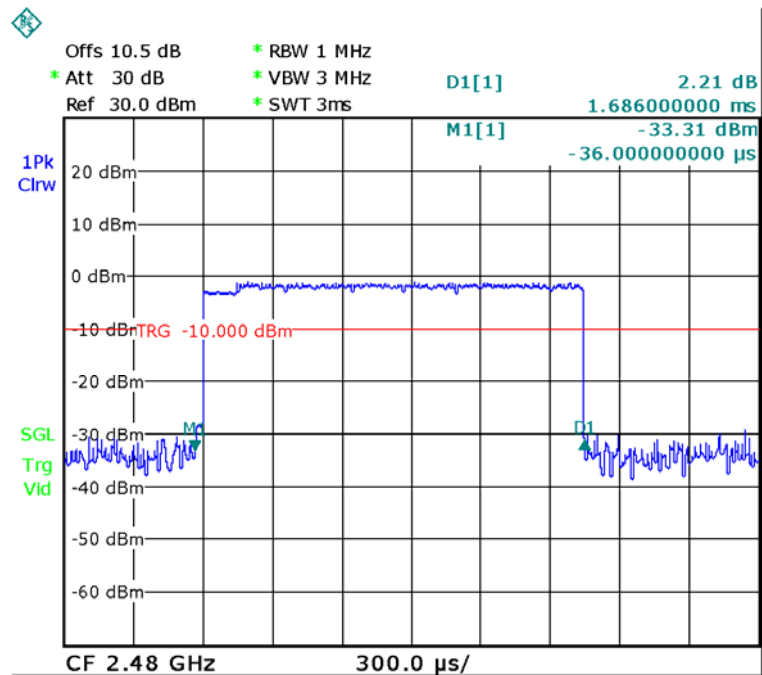
Date: 29.JUN.2017 17:10:18

2DH3: Middle Channel



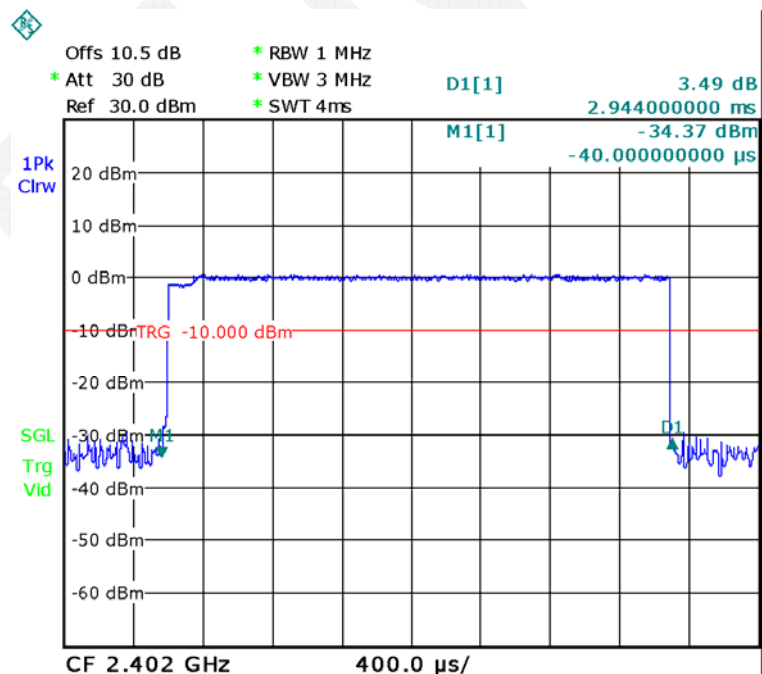
Date: 29.JUN.2017 17:09:47

2DH3: High Channel



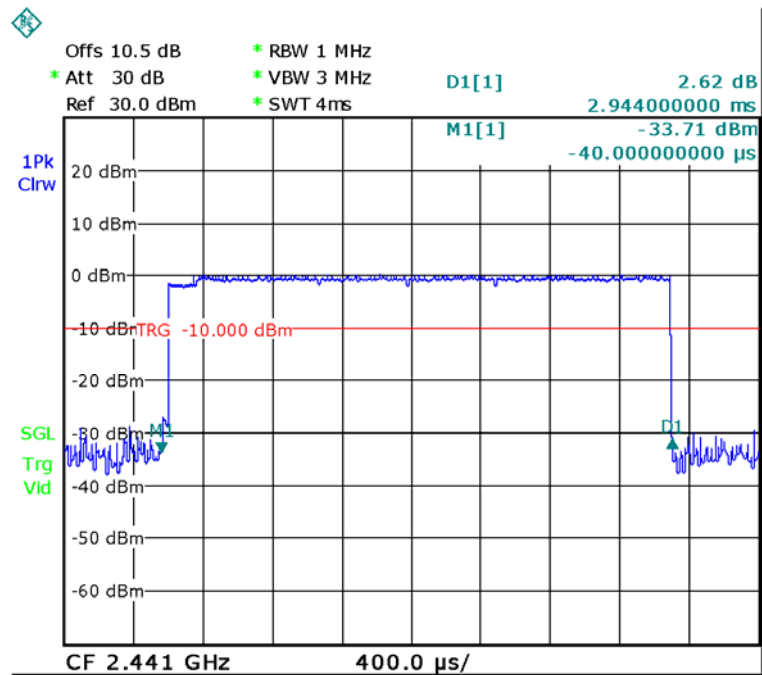
Date: 29.JUN.2017 17:09:22

2DH5: Low Channel



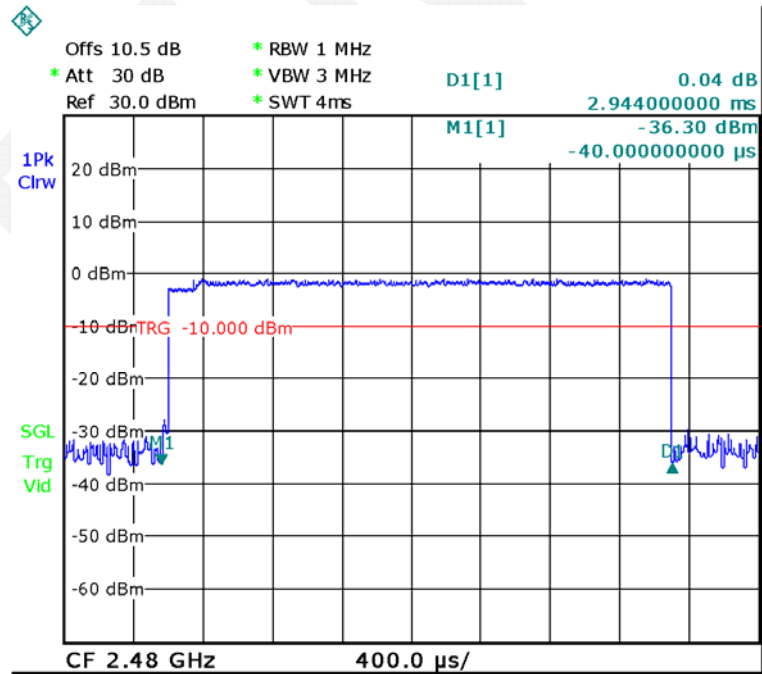
Date: 29.JUN.2017 17:19:17

2DH5: Middle Channel



Date: 29.JUN.2017 17:18:49

2DH5: High Channel

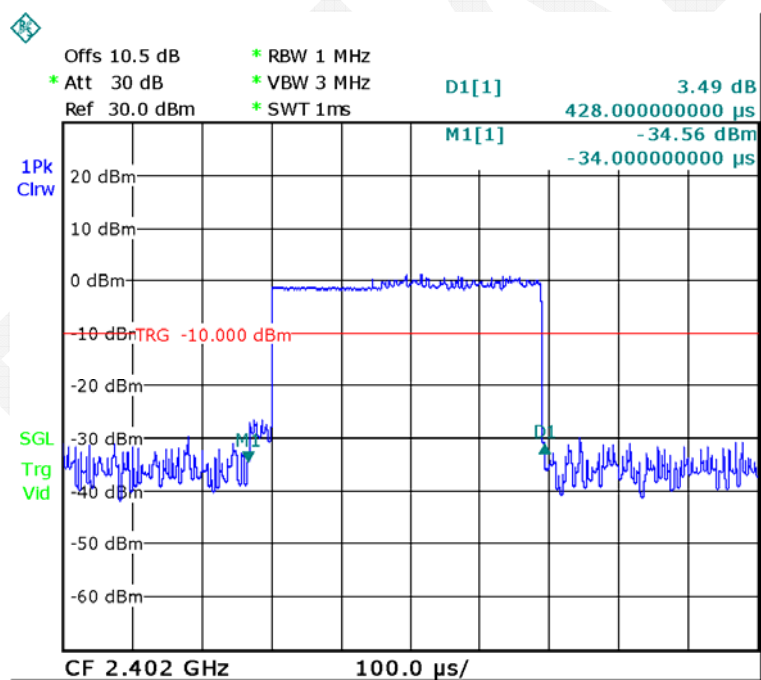


Date: 29.JUN.2017 17:18:15

EDR Mode (8-DPSK):

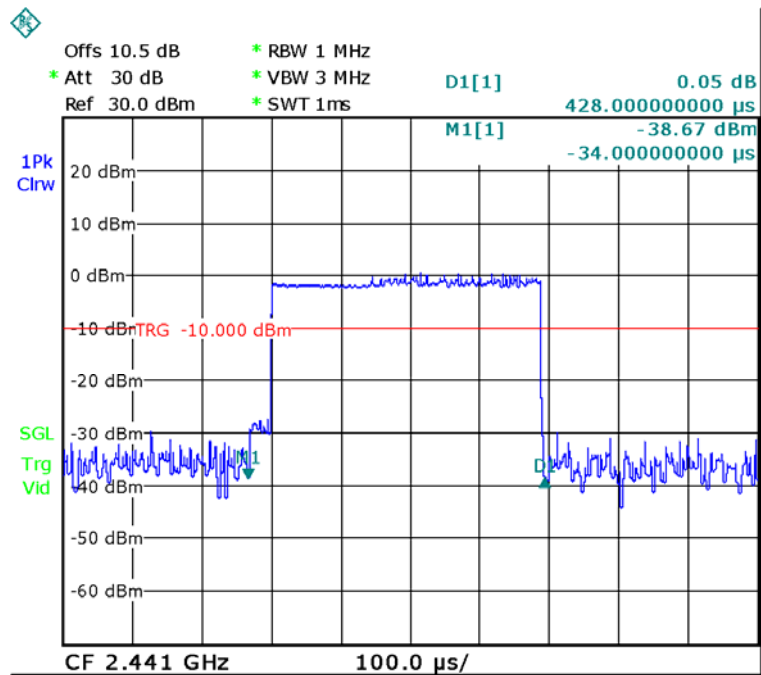
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
3DH1	Low	0.428	0.137	0.4	Compliance
	Middle	0.428	0.137	0.4	Compliance
	High	0.428	0.137	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
3DH3	Low	1.686	0.270	0.4	Compliance
	Middle	1.686	0.270	0.4	Compliance
	High	1.686	0.270	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
3DH5	Low	2.944	0.314	0.4	Compliance
	Middle	2.944	0.314	0.4	Compliance
	High	2.944	0.314	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

3DH1: Low Channel



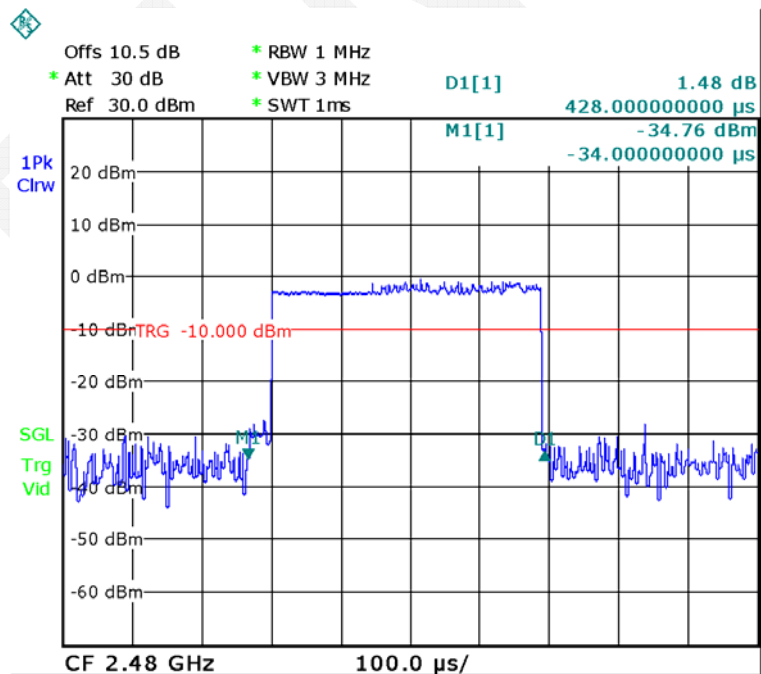
Date: 29.JUN.2017 17:04:06

3DH1: Middle Channel



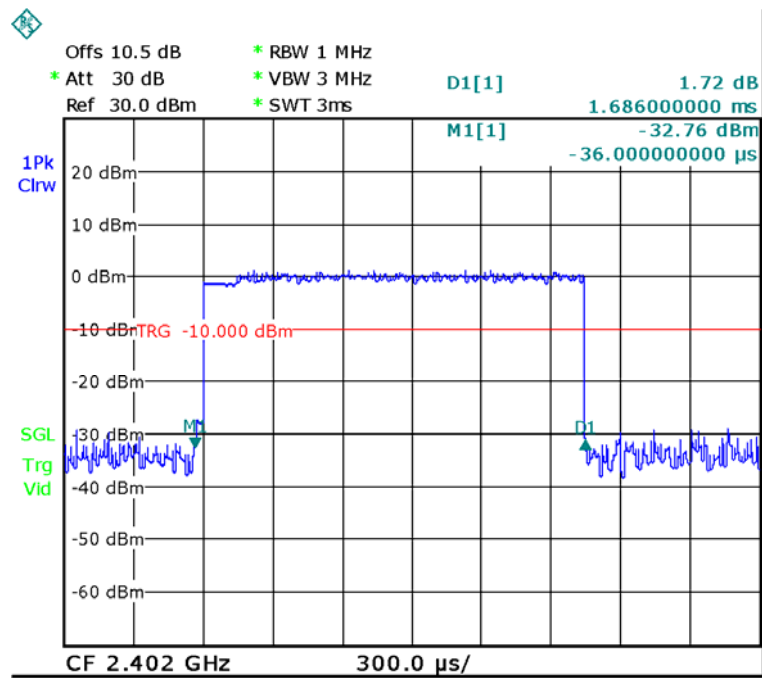
Date: 29.JUN.2017 17:04:41

3DH1: High Channel



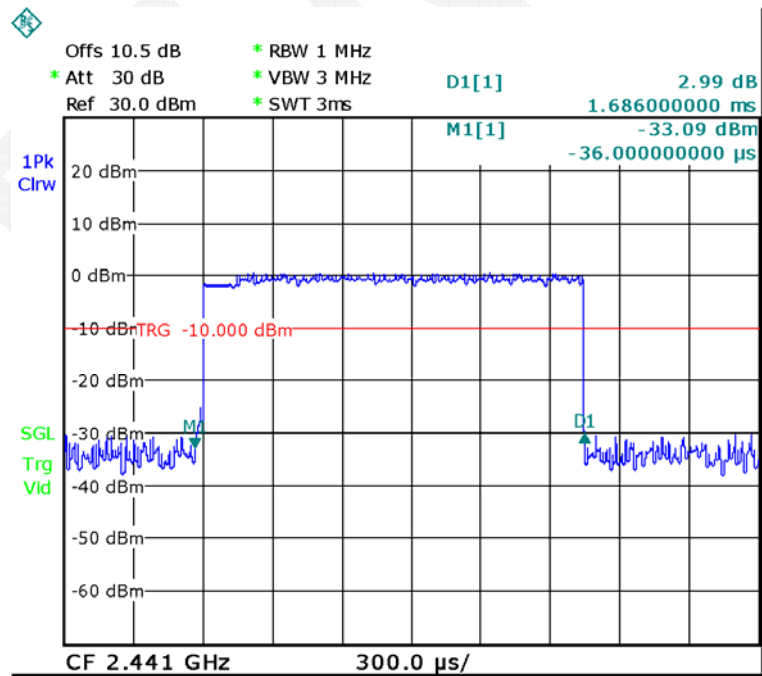
Date: 29.JUN.2017 17:05:08

3DH3: Low Channel



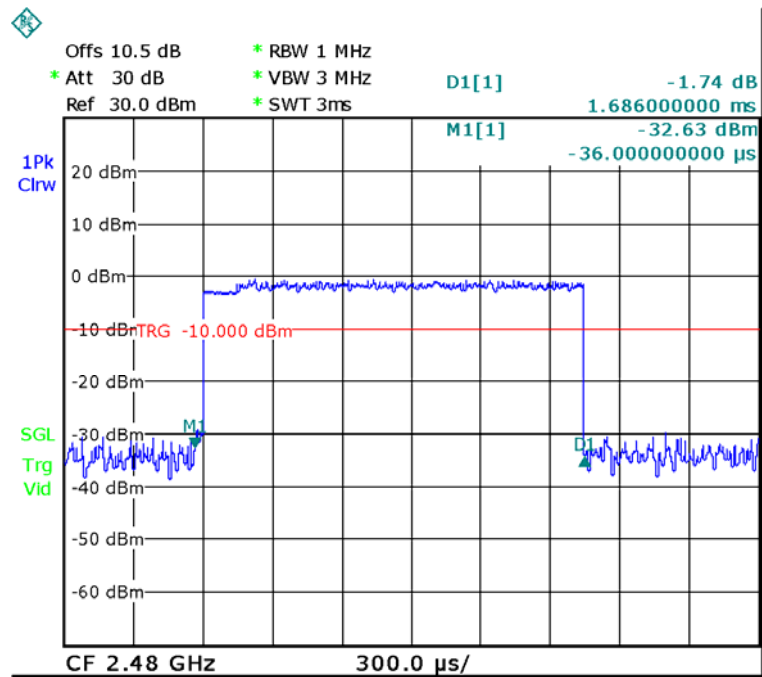
Date: 29.JUN.2017 17:10:56

3DH3: Middle Channel



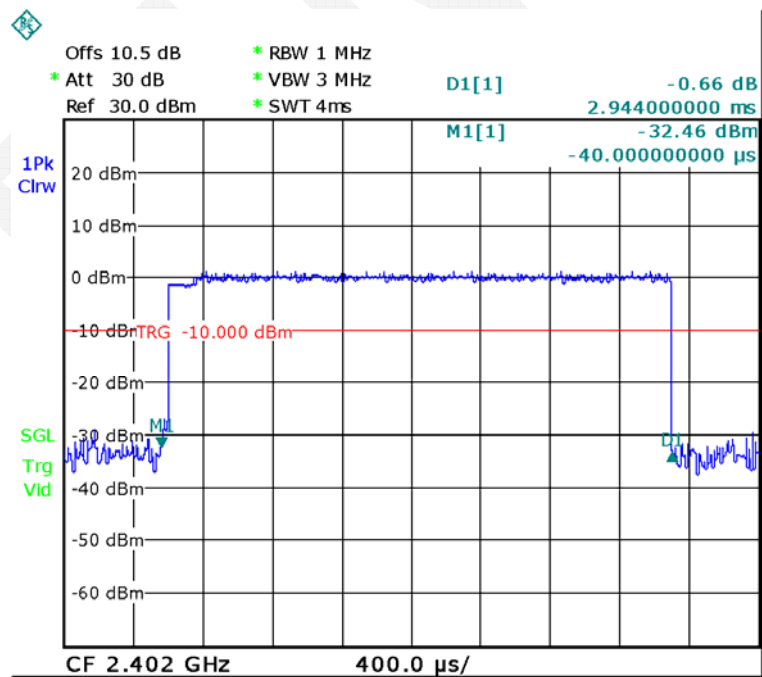
Date: 29.JUN.2017 17:13:50

3DH3: High Channel



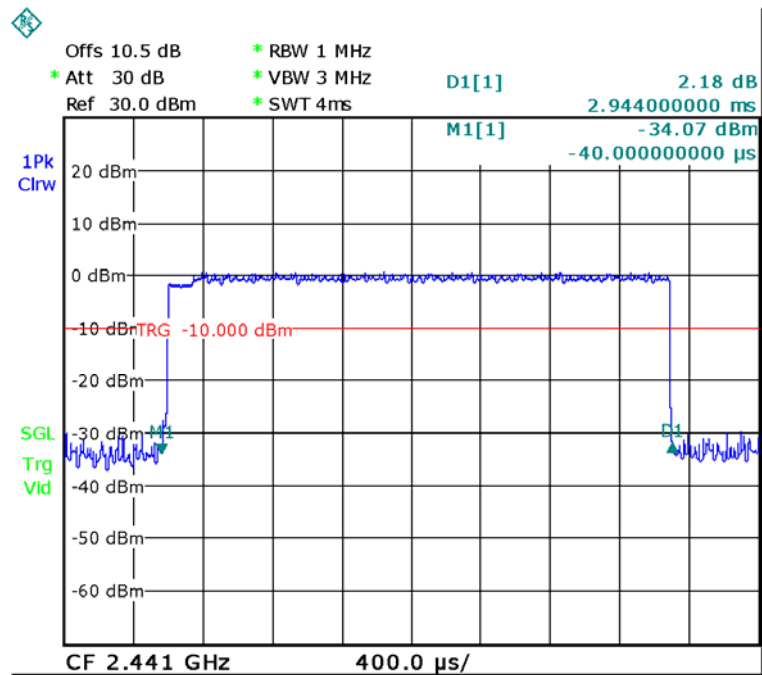
Date: 29.JUN.2017 17:14:15

3DH5: Low Channel



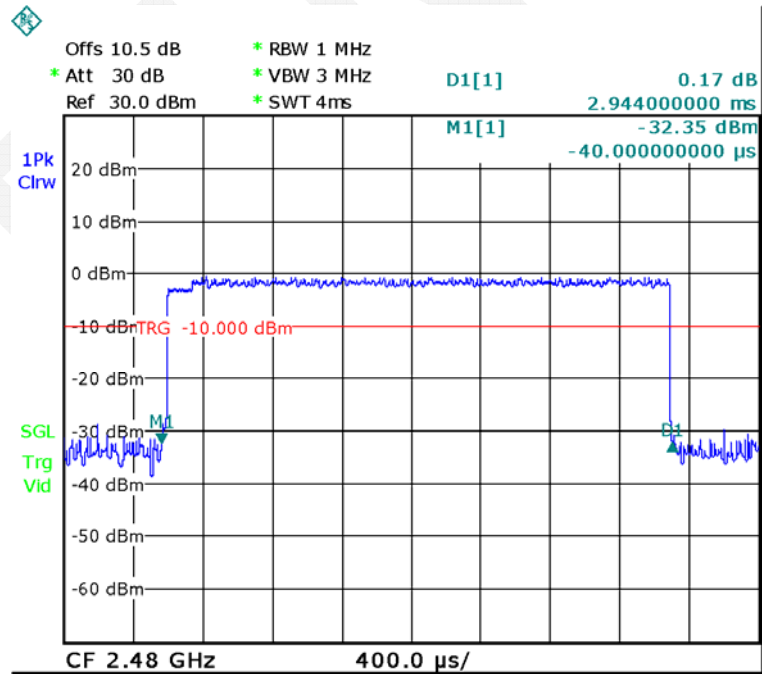
Date: 29.JUN.2017 17:19:45

3DH5: Middle Channel



Date: 29.JUN.2017 17:20:11

3DH5: High Channel



Date: 29.JUN.2017 17:20:35

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 one test equipment.
3. Add a correction factor to the display.

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

Test Result: Compliance.

Please refer to following tables and plots

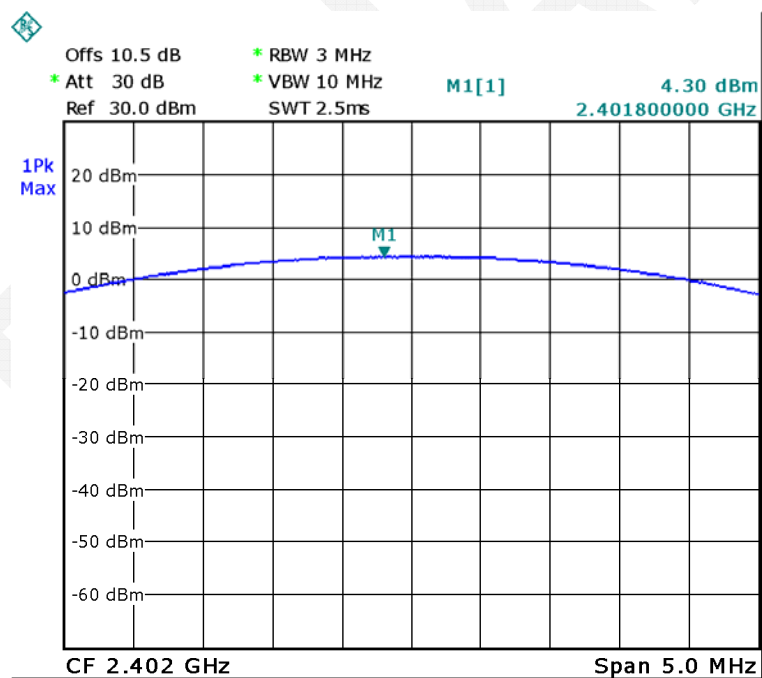
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Peak Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	Low	2402	4.30	30
	Middle	2441	3.46	30
	High	2480	2.69	30
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	1.11	30
	Middle	2441	0.60	30
	High	2480	-0.37	30
EDR Mode (8-DPSK)	Low	2402	1.69	30
	Middle	2441	1.09	30
	High	2480	-0.09	30

Note: The data above was tested in conducted mode.

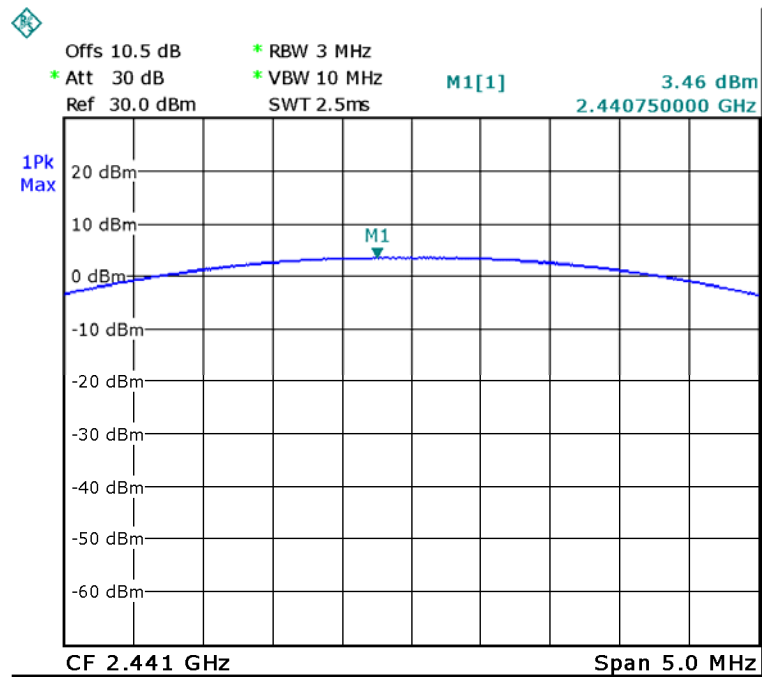
BDR Mode (GFSK):

Low Channel



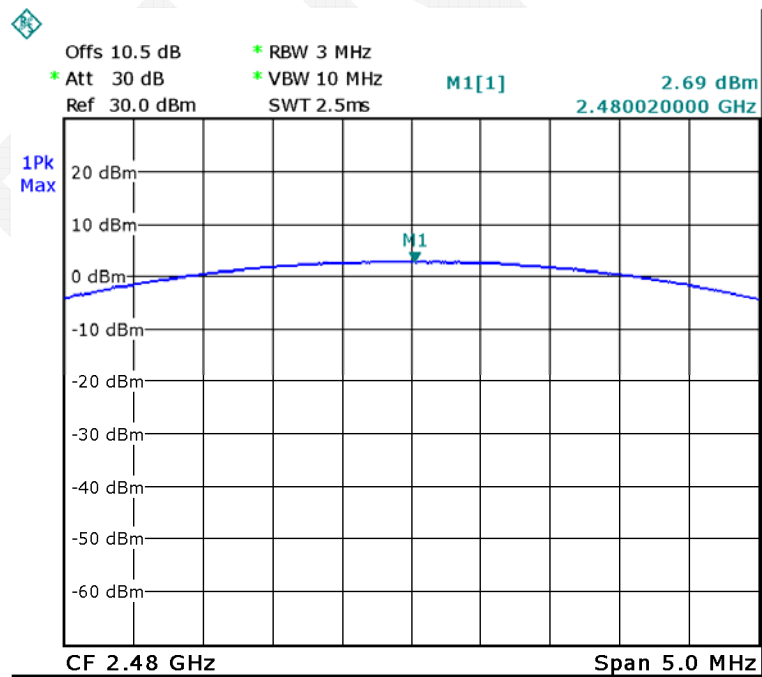
Date: 29.JUN.2017 15:56:28

Middle Channel



Date: 29.JUN.2017 15:56:52

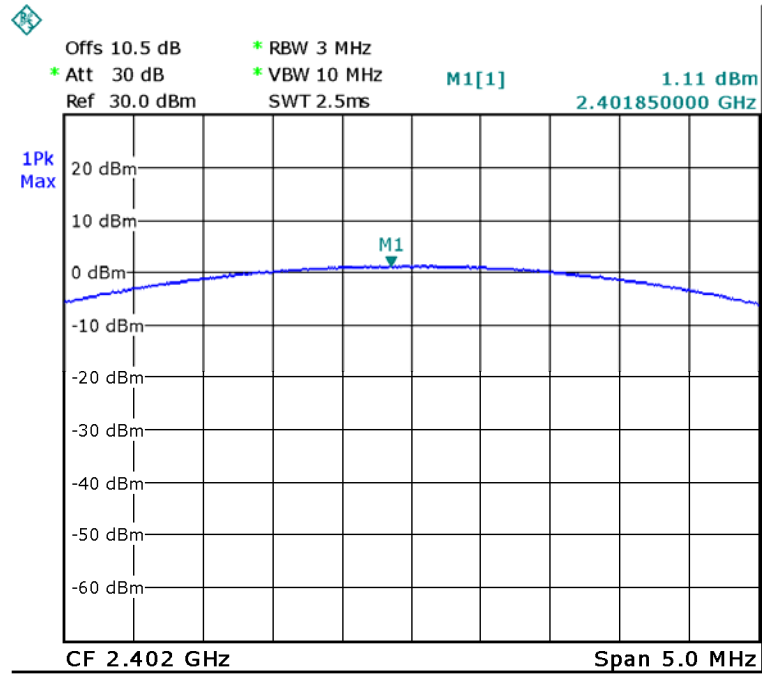
High Channel



Date: 29.JUN.2017 15:57:11

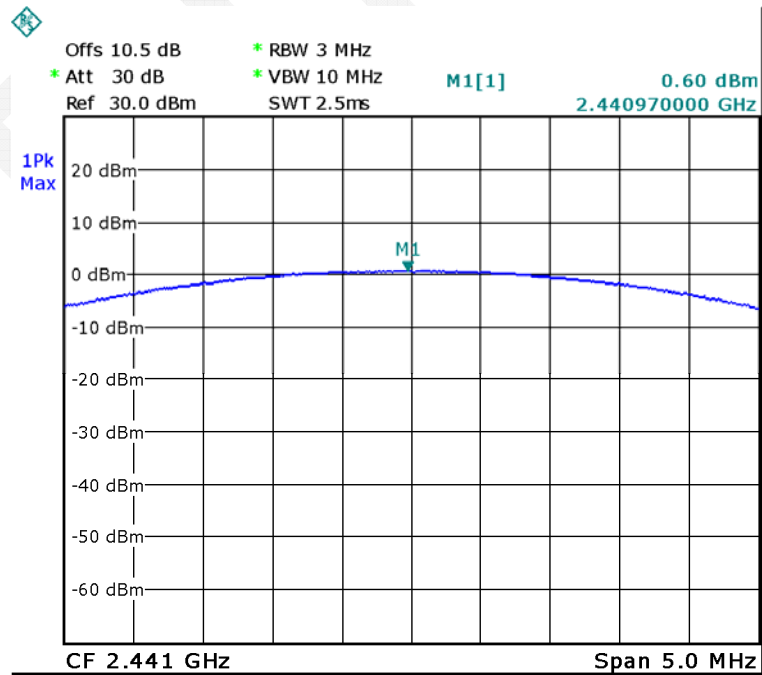
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



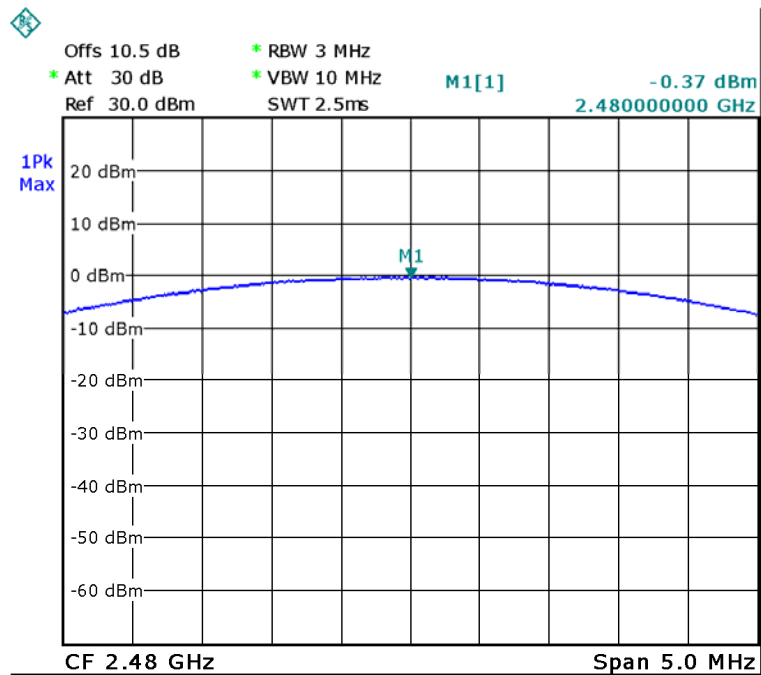
Date: 29.JUN.2017 15:56:03

Middle Channel



Date: 29.JUN.2017 15:55:34

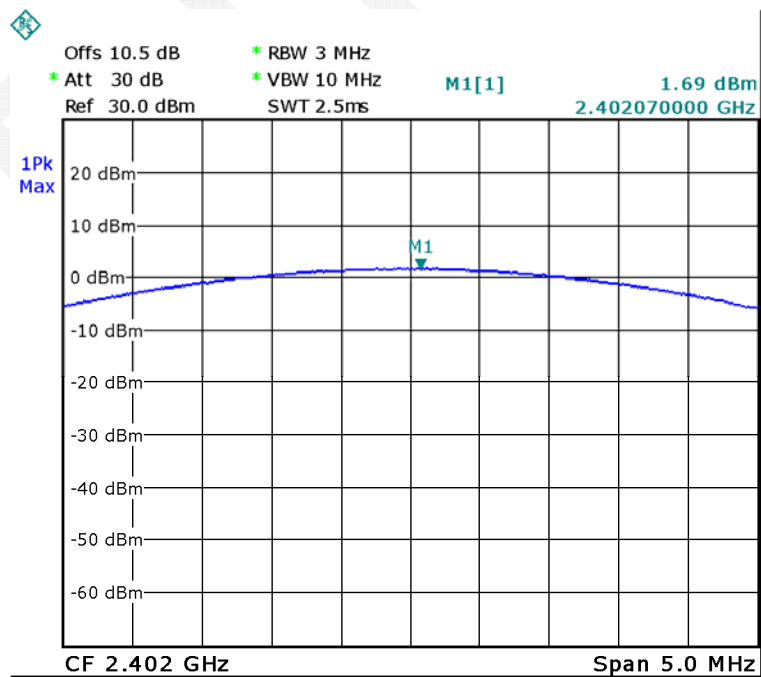
High Channel



Date: 29.JUN.2017 15:55:04

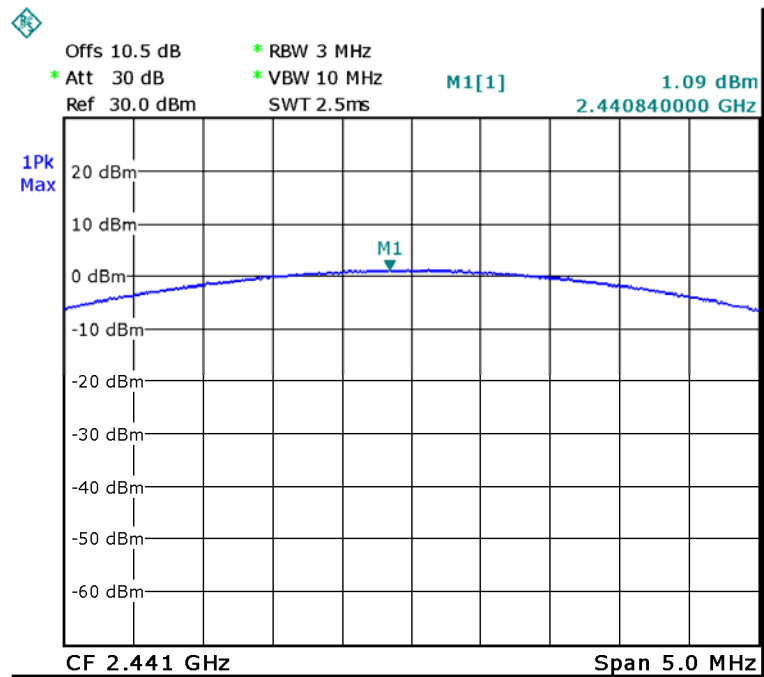
EDR Mode (8-DPSK):

Low Channel



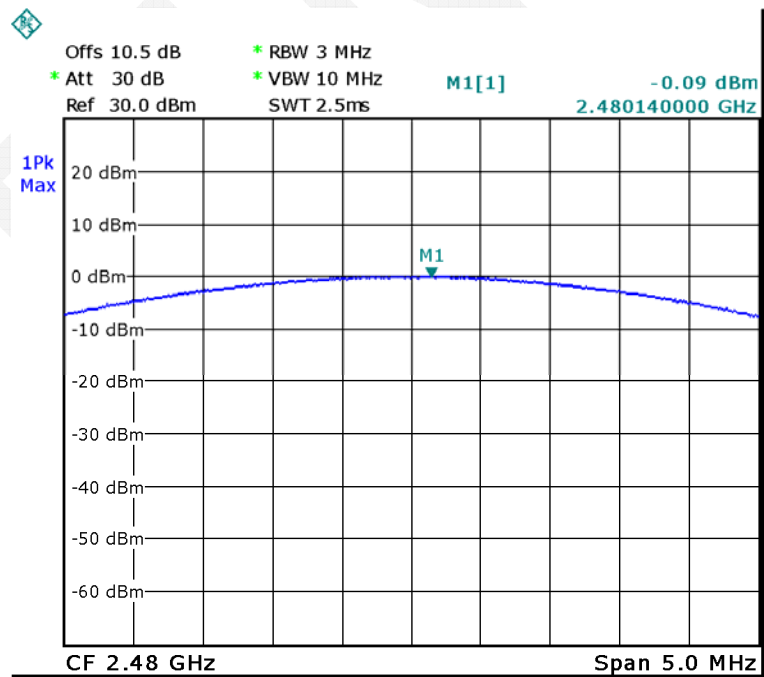
Date: 29.JUN.2017 15:53:04

Middle Channel



Date: 29.JUN.2017 15:53:34

High Channel



Date: 29.JUN.2017 15:54:02

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=100 kHz; VBW=300 kHz.
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 Data

Environmental Conditions

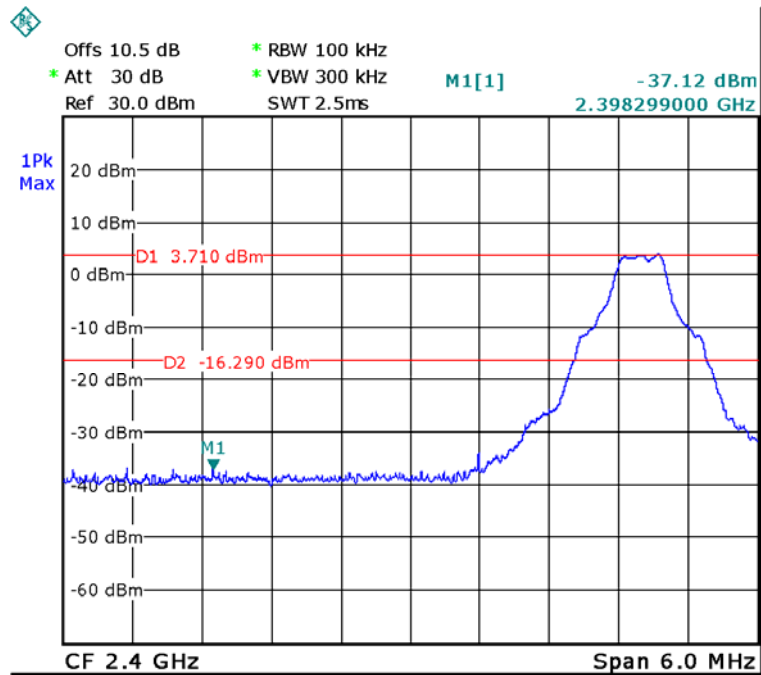
Temperature:	27 °C
Relative Humidity:	42 %
ATM Pressure:	94.8 kPa

** The testing was performed by Tom Tang on 2017-06-29.*

Test Result: Compliance

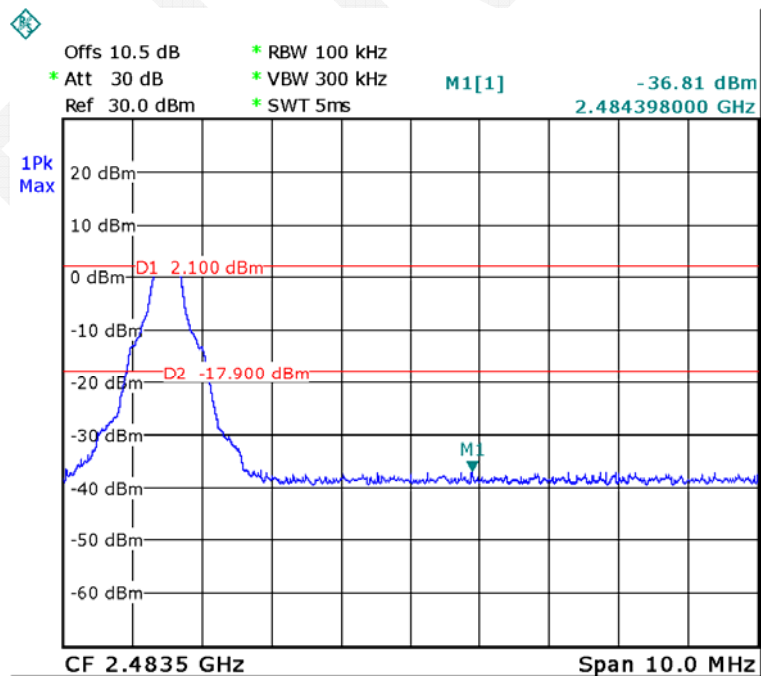
BDR Mode (GFSK):

Band Edge, Left Side



Date: 29.JUN.2017 16:24:16

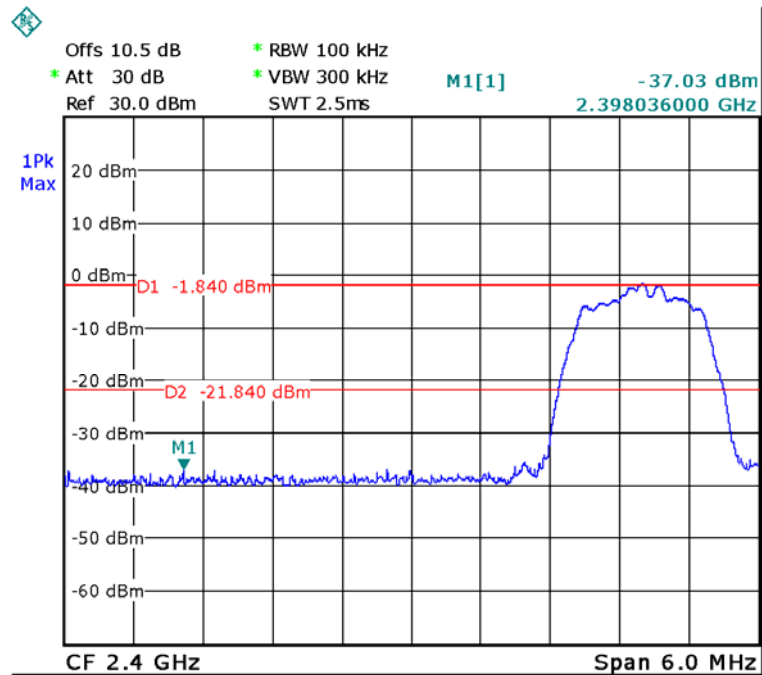
Band Edge, Right Side



Date: 29.JUN.2017 16:42:13

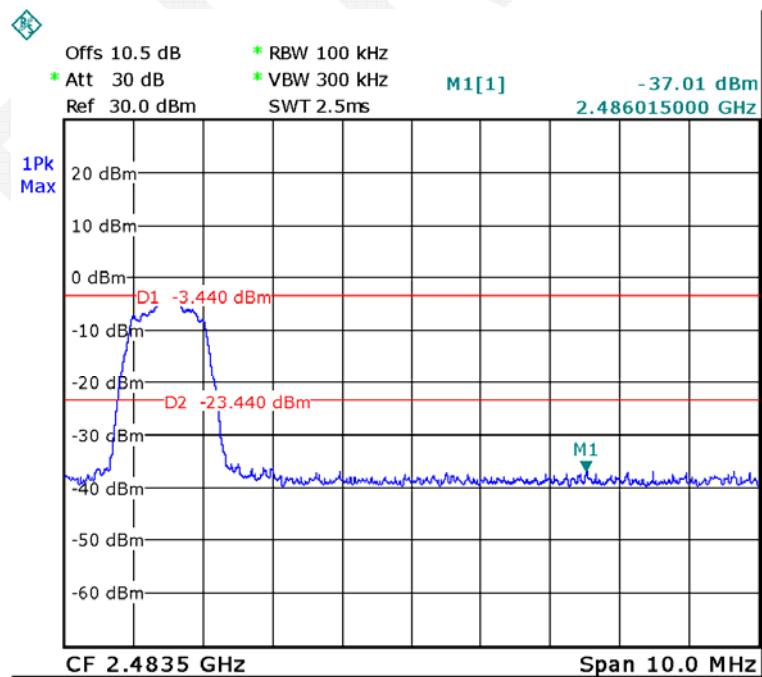
EDR Mode ($\pi/4$ -DQPSK):

Band Edge, Left Side



Date: 29.JUN.2017 16:25:39

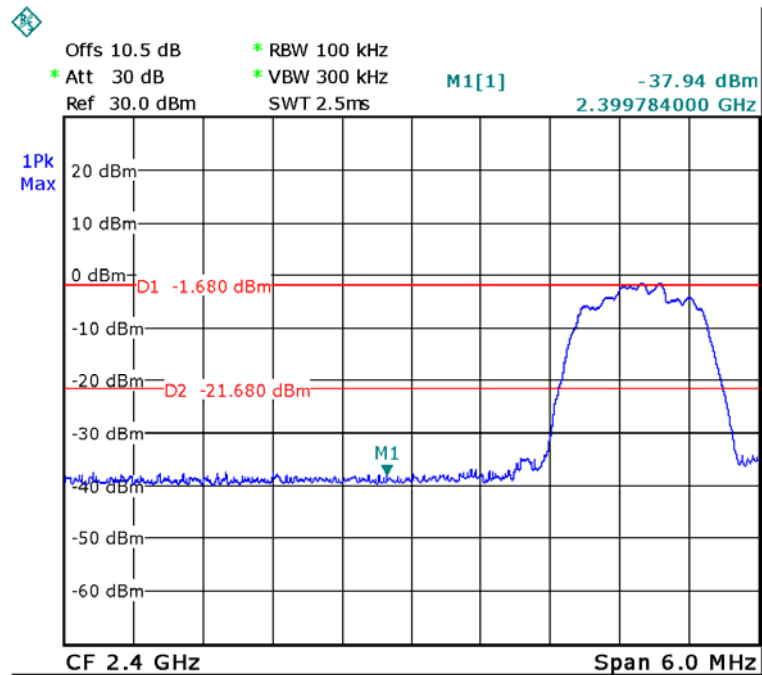
Band Edge, Right Side



Date: 29.JUN.2017 16:35:08

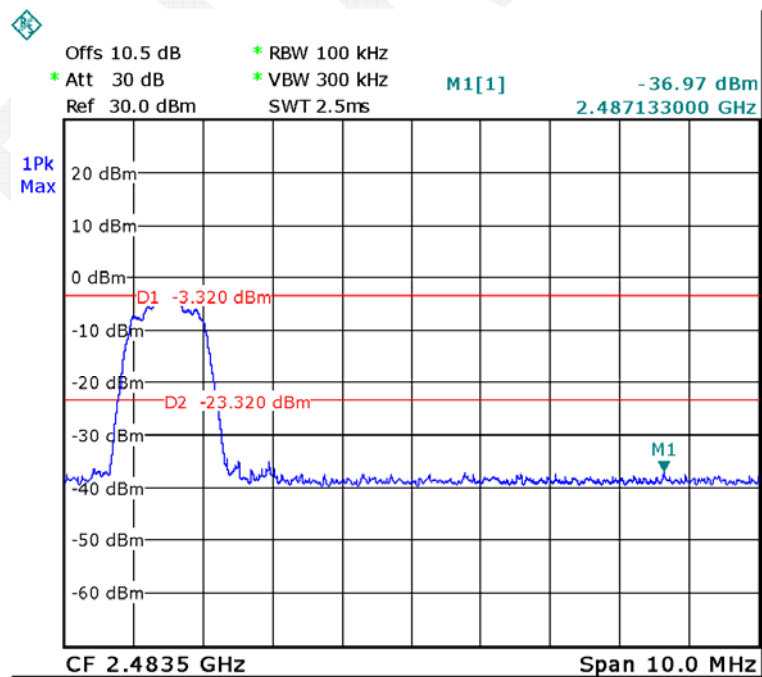
EDR Mode (8-DPSK):

Band Edge, Left Side



Date: 29.JUN.2017 16:27:08

Band Edge, Right Side



Date: 29.JUN.2017 16:33:41

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