FCC Part 15.247

TEST REPORT

For

DT Research Inc.

6F., NO.1, Ning-Po E. Street, Taipei 100, Taiwan.

FCC ID: YE3800J
Model: DT395CR, Atlas 91i

Report Type:	**Product Type:**
Original Report	Mobile Tablet

Report Producer:	Kaylee Chiang
Report Number:	RTWD161214002-00B
Report Date:	2017-01-10
Reviewed By:	Jerry Chang

Bay Area Compliance Laboratories Corp.(Taiwan)
70, Lane 169, Sec. 2, Datong Road,
Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.
Tel: +886 (2) 2647 6898
Fax: +886 (2) 2647 6895
www.bacl.com.tw

REVISION HISTORY

Revision	Issue Date	Description
1.0	2017.01.10	Original

TABLE OF CONTENTS

1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	DT Research Inc. 6F., NO. 1, Ning-Po E. Street, Taipei 100, Taiwan
Manufacturer:	DT Research Inc. 6F., NO. 1, Ning-Po E. Street, Taipei 100, Taiwan
Product:	Mobile Tablet
Model:	DT395CR, Atlas 91i
Trade Name:	DT Research Inc.
Frequency Range:	2402-2480 MHz
Transmit Power:	BT BDR(GFSK) Mode: 4.40 dBm (0.00275W) BT EDR(π/4-DQPSK) Mode: 2.31 dBm(0.00170W) BT EDR(8-DPSK) Mode: 1.84 dBm (0.00153W)
Modulation Technique:	BT BDR Mode: GFSK BT EDR Mode: π/4-DQPSK BT EDR Mode: 8-DPSK
Transmit Data Rate:	BT BDR(GFSK) Mode: 1 Mbps BT EDR (π/4-DQPSK) Mode: 2 Mbps BT EDR (8-DPSK) Mode: 3 Mbps
Number of Channels:	BT Mode: 79 Channels
Antenna Specification:	PCB Antenna/Gain: 4.2 dBi
Voltage Range:	I/P: 100-240Vac, 1.7A O/P: 19Vdc, 3.42A
Date of Test:	Dec 21, 2016~Jan 10, 2017

**All measurement and test data in this report was gathered from production sample serial number: 161214002 (Assigned by BACL, Taiwan) The EUT supplied by the applicant was received on 2016-12-07.*

Model Difference: The major electrical and mechanical constructions of series models are identical to the basic model, except different model name and colors. The model, DT395CR is the testing sample, and the final test data are shown on this test report.

1.2 Objective

This report is prepared on behalf of *DT Research Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication 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.

1.3 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS, UNII submission with FCC ID: YE3800J

1.4 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

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on the 70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Test site at Bay Area Compliance Laboratories Corp. (Taiwan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 431084. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

For BT mode, 79 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	40	2441
2	2403	--	--
3	2404	--	--
4	2405	77	2478
--	--	78	2479
39	2440	79	2480

2.2 Equipment Modifications

No modification was made to the EUT

2.3 EUT Exercise Software

Used "Diagnostics and Regulatory Testing Utility v1.7.4-1041" software.

Test Software Version		Engineering Mode		
Test Frequency		2402MHz	2441MHz	2480MHz
Power Level Setting	GFSK	0	0	0
	π/4-DQPSK	0	0	0
	8DPSK	0	0	0

2.4 Support Equipment List and Details

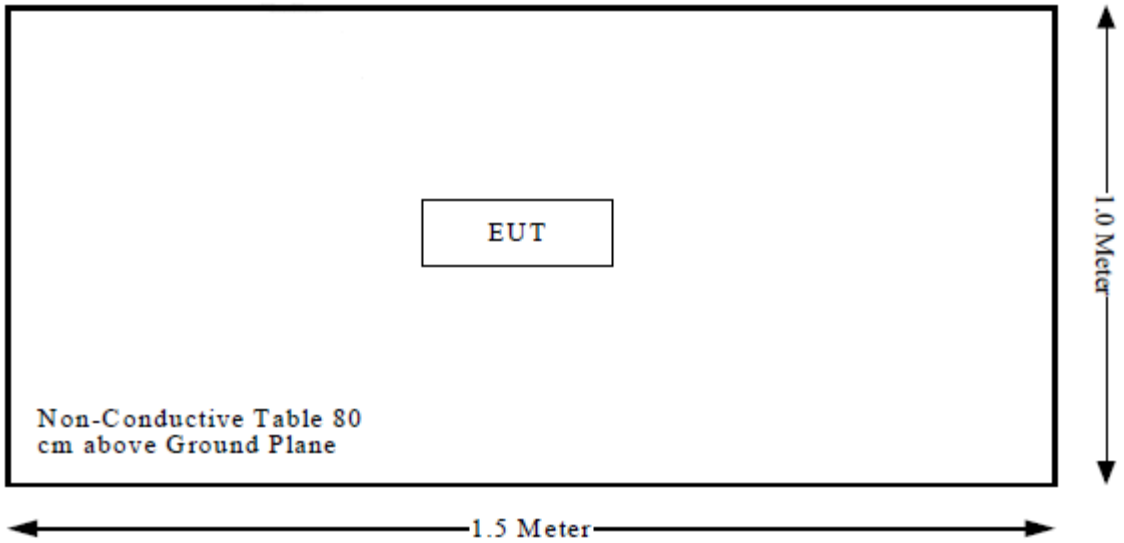
Description	Manufacturer	Model Number	BSMI	FCC ID	S/N
N/A	N/A	N/A	N/A	N/A	N/A

2.5 External Cable List and Details

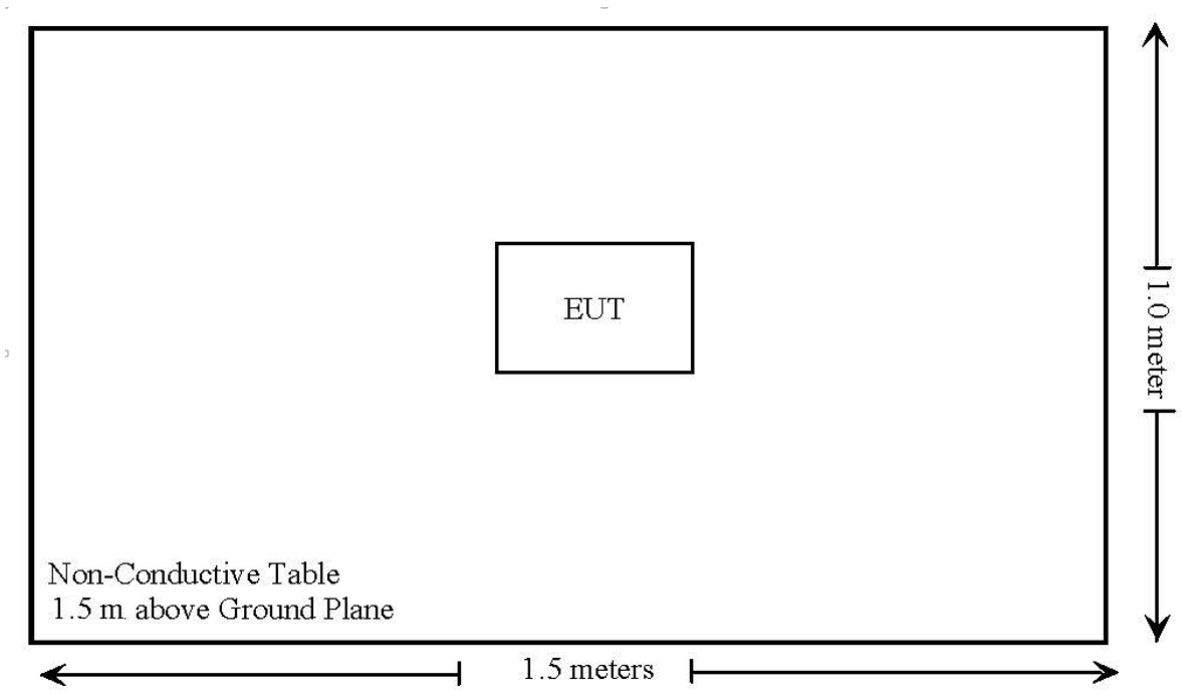
Cable Description	Length (m)	From	To
N/A	N/A	N/A	N/A

2.6 Block Diagram of Test Setup

See test photographs attached in Exhibit A for the actual connections between EUT and support equipment.



Above 1GHz:



3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247 (a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance

4 FCC §15.247(i) &2.1093 - RF Exposure

4.1 Applicable Standard

According to FCC §15.247(i)

Systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance, 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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·
[√ f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

4.2 RF Exposure Evaluation Result

The SAR data please refer to the SAR report, report No.: RTWD161214002-00E.

5 FCC §15.203 – Antenna Requirements

5.1 Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6 dBi.

5.2 Antenna List and Details

Manufacturer	Model	Type	Antenna Gain	Result
Taiwan AnJie Electronics Co.,Ltd	DT395CR	PCB Antenna	4.2 dBi	Compliance

The EUT has one integral antenna arrangement, which was permanently attached; fulfill the requirement of this section. Please refer to the internal photos.

6 FCC §15.207(a) –AC Line Conducted Emissions

6.1 Applicable Standard

According to §15.207

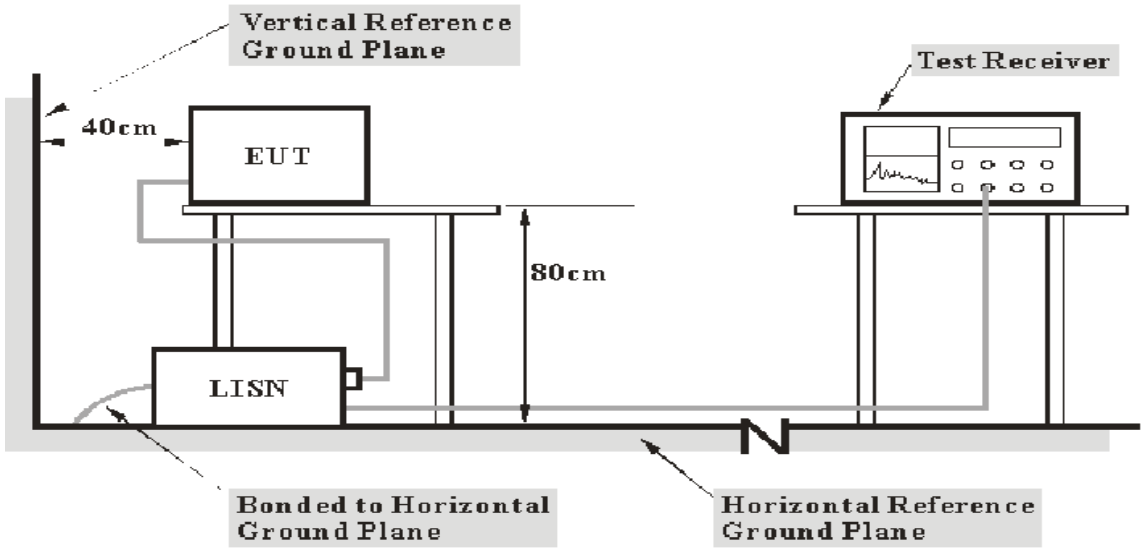
6.2 Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Taiwan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	2.71B

6.3 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 C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 limits.
The spacing between the peripherals was 10 cm.

6.4 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

6.5 Test Procedure

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

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

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

6.6 Corrected Factor & 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 "**Over Limit**" 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:

Over Limit =Level – Limit Line

6.7 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
LISN	Rohde & Schwarz	ENV216	101248	2016/7/27	2017/7/26
LISN	EMCO	3816/2	75848	2016/8/4	2017/8/3
EMI Test Receiver	Rohde & Schwarz	ESCI	100540	2016/7/22	2017/7/21
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM025	2016/8/19	2017/8/18
RF Cable	EMEC	EM-CB5D	001	2016/7/27	2017/7/26
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R

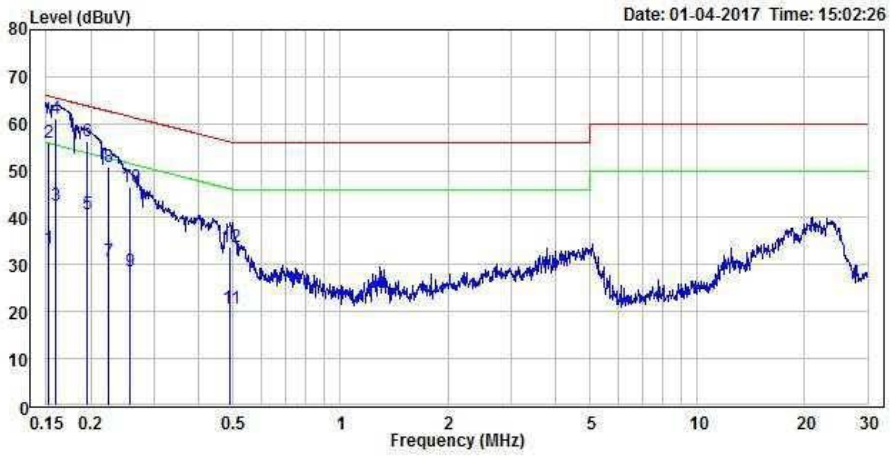
6.8 Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David. Hsu on 2017-01-04.

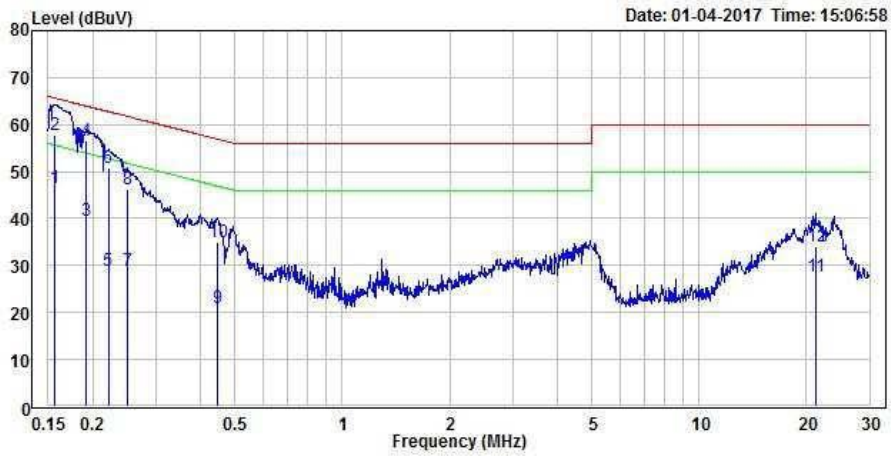
Test Mode: Transmitting
AC120 V, 60 Hz, Line:



Condition: Line
EUT :
Mode :
Note : 120V/60Hz

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.152	33.45	55.90	-22.45	19.56	13.89	Average	Line
2	0.152	55.98	65.90	-9.92	19.56	36.42	QP	Line
3	0.160	42.57	55.47	-12.90	19.56	23.01	Average	Line
4	0.160	61.27	65.47	-4.20	19.56	41.71	QP	Line
5	0.194	40.62	53.84	-13.22	19.58	21.04	Average	Line
6	0.194	56.17	63.84	-7.67	19.58	36.59	QP	Line
7	0.224	30.87	52.68	-21.81	19.57	11.30	Average	Line
8	0.224	50.93	62.68	-11.75	19.57	31.36	QP	Line
9	0.257	28.58	51.52	-22.94	19.56	9.02	Average	Line
10	0.257	46.68	61.52	-14.84	19.56	27.12	QP	Line
11	0.491	20.57	46.15	-25.58	19.55	1.02	Average	Line
12	0.491	33.86	56.15	-22.29	19.55	14.31	QP	Line

AC120 V, 60 Hz, Neutral:



Condition: Neutral
EUT :
Mode :
Note : 120V/60Hz

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.156	46.43	55.67	-9.24	19.55	26.88	Average	Neutral
2	0.156	57.79	65.67	-7.88	19.55	38.24	QP	Neutral
3	0.191	39.69	53.98	-14.29	19.53	20.16	Average	Neutral
4	0.191	56.44	63.98	-7.54	19.53	36.91	QP	Neutral
5	0.221	29.00	52.78	-23.78	19.52	9.48	Average	Neutral
6	0.221	50.72	62.78	-12.06	19.52	31.20	QP	Neutral
7	0.250	28.88	51.76	-22.88	19.52	9.36	Average	Neutral
8	0.250	46.19	61.76	-15.57	19.52	26.67	QP	Neutral
9	0.448	20.98	46.91	-25.93	19.54	1.44	Average	Neutral
10	0.448	34.90	56.91	-22.01	19.54	15.36	QP	Neutral
11	21.196	27.67	50.00	-22.33	20.03	7.64	Average	Neutral
12	21.196	34.20	60.00	-25.80	20.03	14.17	QP	Neutral

7 FCC §15.209, §15.205, §15.247(d) – Spurious Emissions

7.1 Applicable Standard

FCC§15.247 (d); §15.209; §15.205

7.2 Measurement Uncertainty

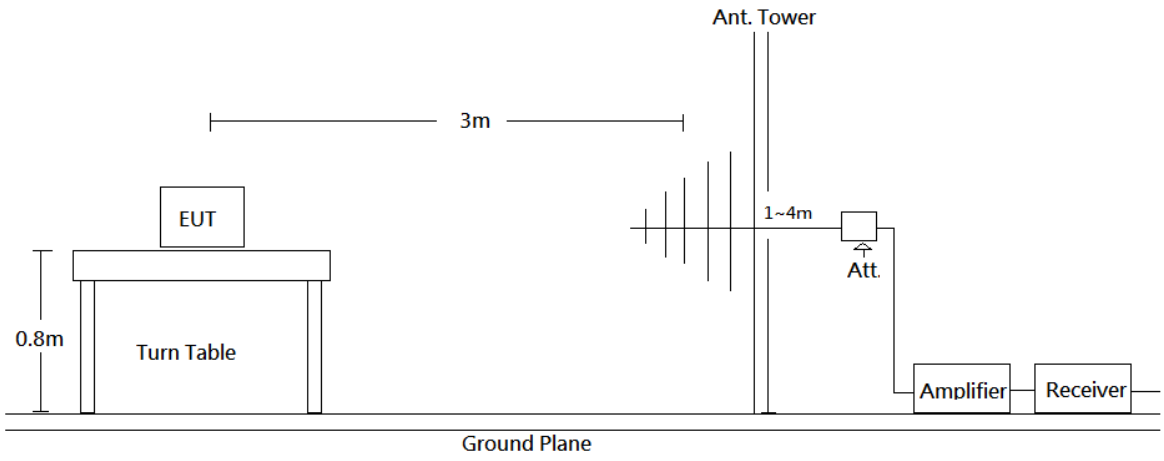
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

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

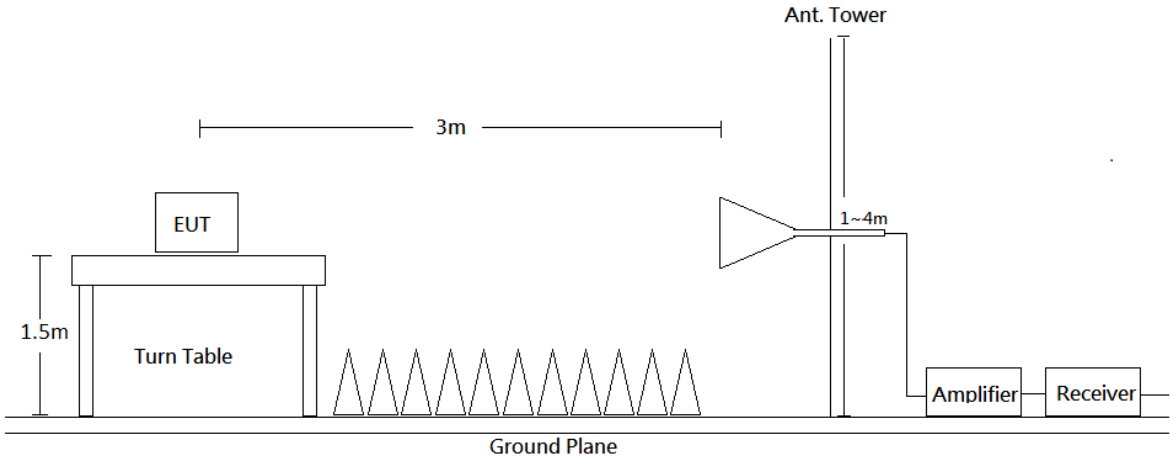
Frequency	Measurement uncertainty
30 MHz~200 MHz	4.21 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	4.41 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	4.51 dB (k=2, 95% level of confidence)
6 GHz~18 GHz	4.88 dB (k=2, 95% level of confidence)
18 GHz~26 GHz	4.30 dB (k=2, 95% level of confidence)
26 GHz~40 GHz	4.30 dB (k=2, 95% level of confidence)

7.3 EUT Setup

Blow 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

7.4 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Frequency Range	RBW	VBW	IF BW	Detector
30-1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave

7.5 Test Procedure

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

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

7.6 Corrected Factor & Margin Calculation

The Correct Factor 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:

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Margin = Result –Limit

7.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.209 Limit. Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$Lm + U(Lm) \leq Llim + Ucispr$

In BACL, U(Lm) is less than Ucispr, if Lm is less than Llim, it implies that the EUT complies with the limit.

7.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Broadband Antenna	Sunol Sciences	JB6	A050115	2016/11/16	2017/11/15
Amplifier	Sonoma	310N	130602	2016/7/15	2017/7/14
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2016/11/3	2017/11/2
Mircoflex Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2016/11/3	2017/11/2
Mircoflex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2016/7/15	2017/7/14
Mircoflex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2016/12/1	2017/11/30
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	060772	N.C.R	N.C.R
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Horn Antenna	EMCO	3115	9311-4158	2016/5/10	2017/5/9
Horn Antenna	ETS-Lindgren	3116	00062638	2016/9/5	2017/9/4
Preamplifier	EMEC	EM01G18G	060657	2016/12/13	2017/12/12
Preamplifier	EMEC	EM18G40G	060656	2016/12/13	2017/12/12
Spectrum Analyzer	Rohde & Schwarz	FSEK30	825084/006	2016/12/15	2017/12/14
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-80CM	160309-2	2016/3/24	2017/3/23
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-450CM	160309-1	2016/3/24	2017/3/23
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

7.9 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21.

7.10 Test Results

Mode: Test Mode
(Scan with GFSK, π/4-DQPSK, 8-DPSK Mode, the worst case is BDR (GFSK) Mode and EDR (8-DPSK) Mode)

BDR Mode (30MHz ~25GHz)
2402 MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	30.0000	27.25	-3.59	23.66	40.00	-16.34	100	200	QP
2	204.6000	29.79	-11.76	18.03	43.50	-25.47	100	221	QP
3	282.2000	29.33	-10.04	19.29	46.00	-26.71	100	78	QP
4	383.0800	32.25	-8.08	24.17	46.00	-21.83	100	141	QP
5	482.0200	31.18	-6.01	25.17	46.00	-20.83	100	196	QP
6	576.1100	30.91	-4.46	26.45	46.00	-19.55	100	5	QP
7	2390.000	57.20	-4.89	52.31	74.00	-21.69	100	163	peak
8	2390.000	45.51	-4.89	40.62	54.00	-13.38	100	163	AVG
9	2402.000	95.83	-4.86	90.97	NA	NA	100	163	peak
10	2402.000	76.78	-4.86	71.92	NA	NA	100	163	AVG
11	4804.000	40.43	0.98	41.41	74.00	-32.59	100	24	peak
12	4804.000	27.62	0.98	28.60	54.00	-25.40	100	24	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	191.9900	37.27	-12.35	24.92	43.50	-18.58	100	251	QP
2	353.0100	28.45	-8.71	19.74	46.00	-26.26	100	315	QP
3	490.7500	30.32	-5.88	24.44	46.00	-21.56	100	97	QP
4	592.6000	28.06	-4.13	23.93	46.00	-22.07	100	356	QP
5	709.9700	28.50	-2.63	25.87	46.00	-20.13	100	292	QP
6	858.3800	27.29	0.58	27.87	46.00	-18.13	100	118	QP
7	2390.000	57.35	-4.89	52.46	74.00	-21.54	100	80	peak
8	2390.000	45.52	-4.89	40.63	54.00	-13.37	100	80	AVG
9	2402.000	95.12	-4.86	90.26	NA	NA	100	80	peak
10	2402.000	75.85	-4.86	70.99	NA	NA	100	80	AVG
11	4804.000	39.30	0.98	40.28	74.00	-33.72	100	98	peak
12	4804.000	29.44	0.98	30.42	54.00	-23.58	100	98	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

2441MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	135.7300	33.32	-10.77	22.55	43.50	-20.95	100	76	QP
2	316.1500	28.15	-9.50	18.65	46.00	-27.35	100	64	QP
3	353.0100	31.28	-8.71	22.57	46.00	-23.43	100	315	QP
4	571.2600	31.96	-4.55	27.41	46.00	-18.59	100	202	QP
5	737.1300	30.96	-2.07	28.89	46.00	-17.11	100	235	QP
6	869.0500	28.53	0.79	29.32	46.00	-16.68	100	196	QP
7	2441.000	93.14	-4.76	88.38	NA	NA	100	162	peak
8	2441.000	83.45	-4.76	78.69	NA	NA	100	162	AVG
9	4882.000	39.17	1.25	40.42	74.00	-33.58	100	16	peak
10	4882.000	29.84	1.25	31.09	54.00	-22.91	100	16	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	105.6600	42.67	-13.06	29.61	43.50	-13.89	100	53	QP
2	191.9900	37.21	-12.35	24.86	43.50	-18.64	100	251	QP
3	355.9200	28.23	-8.65	19.58	46.00	-26.42	100	281	QP
4	518.8800	29.55	-5.45	24.10	46.00	-21.90	100	76	QP
5	780.7800	27.63	-1.04	26.59	46.00	-19.41	100	238	QP
6	869.0500	27.33	0.79	28.12	46.00	-17.88	100	196	QP
7	2441.000	92.33	-4.76	87.57	NA	NA	100	82	peak
8	2441.000	73.16	-4.76	68.40	NA	NA	100	82	AVG
9	4882.000	40.13	1.25	41.38	74.00	-32.62	100	182	peak
10	4882.000	30.71	1.25	31.96	54.00	-22.04	100	182	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

2480 MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	108.5700	32.77	-12.33	20.44	43.50	-23.06	100	31	QP
2	146.4000	32.04	-11.12	20.92	43.50	-22.58	100	82	QP
3	294.8100	29.82	-9.85	19.97	46.00	-26.03	100	149	QP
4	472.3200	30.44	-6.17	24.27	46.00	-21.73	100	316	QP
5	576.1100	31.15	-4.46	26.69	46.00	-19.31	100	5	QP
6	726.4600	28.41	-2.28	26.13	46.00	-19.87	100	221	QP
7	2480.000	91.65	-4.68	86.97	NA	NA	100	164	peak
8	2480.000	81.06	-4.68	76.38	NA	NA	100	164	AVG
9	2483.500	57.46	-4.69	52.77	74.00	-21.23	100	164	peak
10	2483.500	45.72	-4.69	41.03	54.00	-12.97	100	164	AVG
11	4960.000	39.81	1.51	41.32	74.00	-32.68	100	111	peak
12	4960.000	30.27	1.51	31.78	54.00	-22.22	100	111	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	65.8900	31.70	-17.15	14.55	40.00	-25.45	100	48	QP
2	231.7600	27.93	-12.26	15.67	46.00	-30.33	100	70	QP
3	372.4100	28.07	-8.30	19.77	46.00	-26.23	100	291	QP
4	616.8500	28.72	-3.76	24.96	46.00	-21.04	100	37	QP
5	807.9400	29.21	-0.41	28.80	46.00	-17.20	100	133	QP
6	944.7100	26.70	2.53	29.23	46.00	-16.77	100	123	QP
7	2480.000	90.00	-4.68	85.32	NA	NA	100	80	peak
8	2480.000	80.55	-4.68	75.87	NA	NA	100	80	AVG
9	2483.500	57.37	-4.69	52.68	74.00	-21.32	100	80	peak
10	2483.500	45.71	-4.69	41.02	54.00	-12.98	100	80	AVG
11	4960.000	39.64	1.51	41.15	74.00	-32.85	100	217	peak
12	4960.000	29.81	1.51	31.32	54.00	-22.68	100	217	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

EDR Mode (30MHz ~25GHz)
2402 MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	135.7300	32.27	-10.77	21.50	43.50	-22.00	100	76	QP
2	294.8100	30.27	-9.85	20.42	46.00	-25.58	100	149	QP
3	439.3400	31.62	-6.80	24.82	46.00	-21.18	100	156	QP
4	577.0800	31.61	-4.44	27.17	46.00	-18.83	100	210	QP
5	737.1300	30.00	-2.07	27.93	46.00	-18.07	100	235	QP
6	857.4100	28.73	0.57	29.30	46.00	-16.70	100	251	QP
7	2390.000	57.42	-4.89	52.53	74.00	-21.47	100	165	peak
8	2390.000	45.51	-4.89	40.62	54.00	-13.38	100	165	AVG
9	2402.000	92.44	-4.86	87.58	NA	NA	100	165	peak
10	2402.000	74.53	-4.86	69.67	NA	NA	100	165	AVG
11	4804.000	39.86	0.98	40.84	74.00	-33.16	100	67	peak
12	4804.000	27.31	0.98	28.29	54.00	-25.71	100	67	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	165.8000	32.29	-11.88	20.41	43.50	-23.09	100	236	QP
2	273.4700	29.29	-10.23	19.06	46.00	-26.94	100	136	QP
3	405.3900	27.90	-7.60	20.30	46.00	-25.70	100	90	QP
4	550.8900	31.86	-4.97	26.89	46.00	-19.11	100	327	QP
5	753.6200	27.75	-1.70	26.05	46.00	-19.95	100	336	QP
6	919.4900	27.07	1.89	28.96	46.00	-17.04	100	210	QP
7	2390.000	56.92	-4.89	52.03	74.00	-21.97	100	82	peak
8	2390.000	45.50	-4.89	40.61	54.00	-13.39	100	82	AVG
9	2402.000	91.23	-4.86	86.37	NA	NA	100	82	peak
10	2402.000	73.54	-4.86	68.68	NA	NA	100	82	AVG
11	4804.000	41.24	0.98	42.22	74.00	-31.78	100	264	peak
12	4804.000	27.72	0.98	28.70	54.00	-25.30	100	264	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

2441MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	156.1000	28.40	-11.24	17.16	43.50	-26.34	100	78	QP
2	264.7400	28.65	-10.85	17.80	46.00	-28.20	100	59	QP
3	381.1400	29.87	-8.13	21.74	46.00	-24.26	100	152	QP
4	547.9800	29.62	-5.03	24.59	46.00	-21.41	100	27	QP
5	714.8200	28.00	-2.52	25.48	46.00	-20.52	100	5	QP
6	912.7000	27.00	1.73	28.73	46.00	-17.27	100	62	QP
7	2441.000	89.97	-4.76	85.21	NA	NA	100	162	peak
8	2441.000	71.25	-4.76	66.49	NA	NA	100	162	AVG
9	4882.000	39.54	1.25	40.79	74.00	-33.21	100	214	peak
10	4882.000	28.94	1.25	30.19	54.00	-23.81	100	214	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	30.9700	28.10	-4.26	23.84	40.00	-16.16	100	316	QP
2	191.9900	37.26	-12.35	24.91	43.50	-18.59	100	357	QP
3	291.9000	28.88	-9.86	19.02	46.00	-26.98	100	322	QP
4	429.6400	28.88	-7.02	21.86	46.00	-24.14	100	146	QP
5	683.7800	27.26	-3.00	24.26	46.00	-21.74	100	74	QP
6	821.5200	27.32	-0.15	27.17	46.00	-18.83	100	359	QP
7	2441.000	89.17	-4.76	84.41	NA	NA	100	83	peak
8	2441.000	71.06	-4.76	66.30	NA	NA	100	83	AVG
9	4882.000	40.62	1.25	41.87	74.00	-32.13	100	63	peak
10	4882.000	28.04	1.25	29.29	54.00	-24.71	100	63	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

2480 MHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	62.9800	28.84	-17.34	11.50	40.00	-28.50	100	294	QP
2	203.6300	30.65	-11.53	19.12	43.50	-24.38	100	255	QP
3	334.5800	28.73	-9.10	19.63	46.00	-26.37	100	128	QP
4	457.7700	29.35	-6.42	22.93	46.00	-23.07	100	184	QP
5	629.4600	28.51	-3.61	24.90	46.00	-21.10	100	69	QP
6	720.6400	29.14	-2.40	26.74	46.00	-19.26	100	356	QP
7	2480.000	89.15	-4.68	84.47	NA	NA	100	165	peak
8	2480.000	77.41	-4.68	72.73	NA	NA	100	165	AVG
9	2483.500	57.09	-4.69	52.40	74.00	-21.60	100	165	peak
10	2483.500	45.71	-4.69	41.02	54.00	-12.98	100	165	AVG
11	4960.000	40.39	1.51	41.90	74.00	-32.10	100	274	peak
12	4960.000	28.27	1.51	29.78	54.00	-24.22	100	274	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (˚)	Remark
1	105.6600	42.97	-13.06	29.91	43.50	-13.59	100	359	QP
2	258.9200	29.49	-11.41	18.08	46.00	-27.92	100	220	QP
3	421.8800	28.99	-7.20	21.79	46.00	-24.21	100	115	QP
4	591.6300	29.31	-4.14	25.17	46.00	-20.83	100	76	QP
5	737.1300	36.42	-2.07	34.35	46.00	-11.65	100	254	QP
6	946.6500	26.36	2.58	28.94	46.00	-17.06	100	237	QP
7	2480.000	87.36	-4.68	82.68	NA	NA	100	80	peak
8	2480.000	77.04	-4.68	72.36	NA	NA	100	80	AVG
9	2483.500	57.23	-4.69	52.54	74.00	-21.46	100	80	peak
10	2483.500	45.69	-4.69	41.00	54.00	-13.00	100	80	AVG
11	4960.000	39.58	1.51	41.09	74.00	-32.91	100	177	peak
12	4960.000	28.69	1.51	30.20	54.00	-23.80	100	177	AVG

Note: Result = Reading + Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
The other emission levels were very low against the limit.

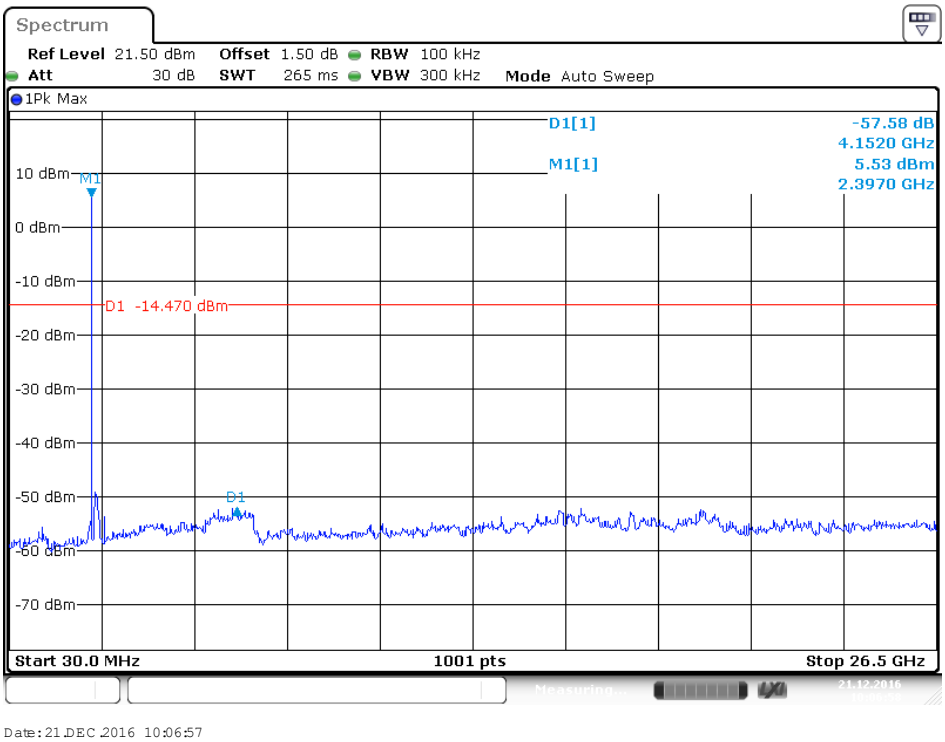
Conducted Spurious Emissions:

:

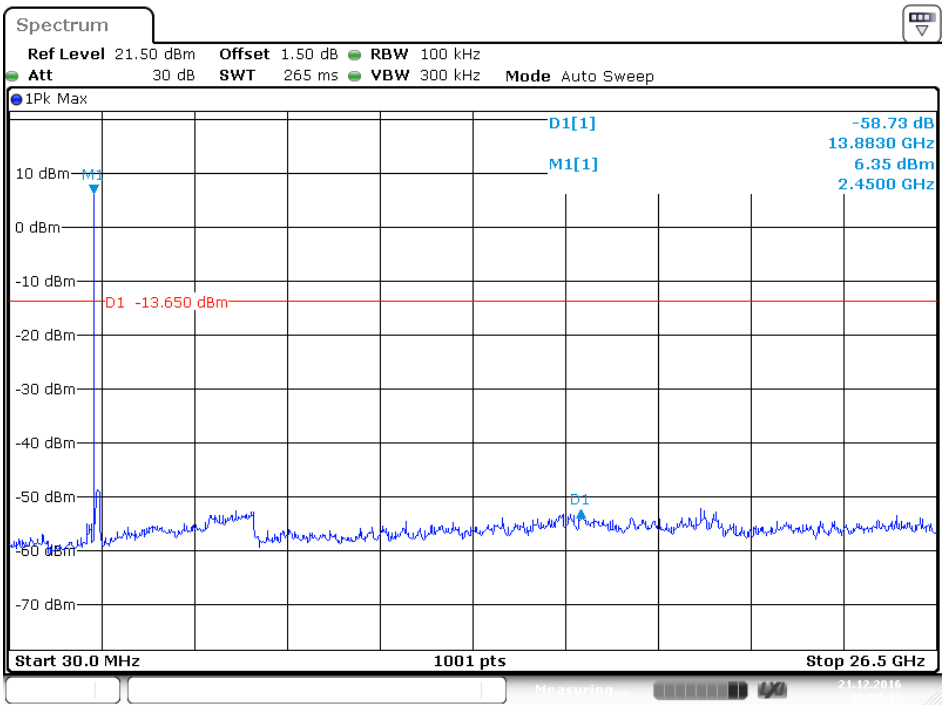
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	RESULT
BDR Mode (GFSK)				
Low	2402	57.58	≥ 20	PASS
Mid	2441	58.73	≥ 20	PASS
High	2480	58.97	≥ 20	PASS
EDR Mode (π/4-DQPSK):				
Low	2402	53.62	≥ 20	PASS
Mid	2441	56.01	≥ 20	PASS
High	2480	55.09	≥ 20	PASS
EDR Mode (8DPSK):				
Low	2402	52.12	≥ 20	PASS
Mid	2441	55.36	≥ 20	PASS
High	2480	54.90	≥ 20	PASS

BDR Mode (GFSK)

Low Channel

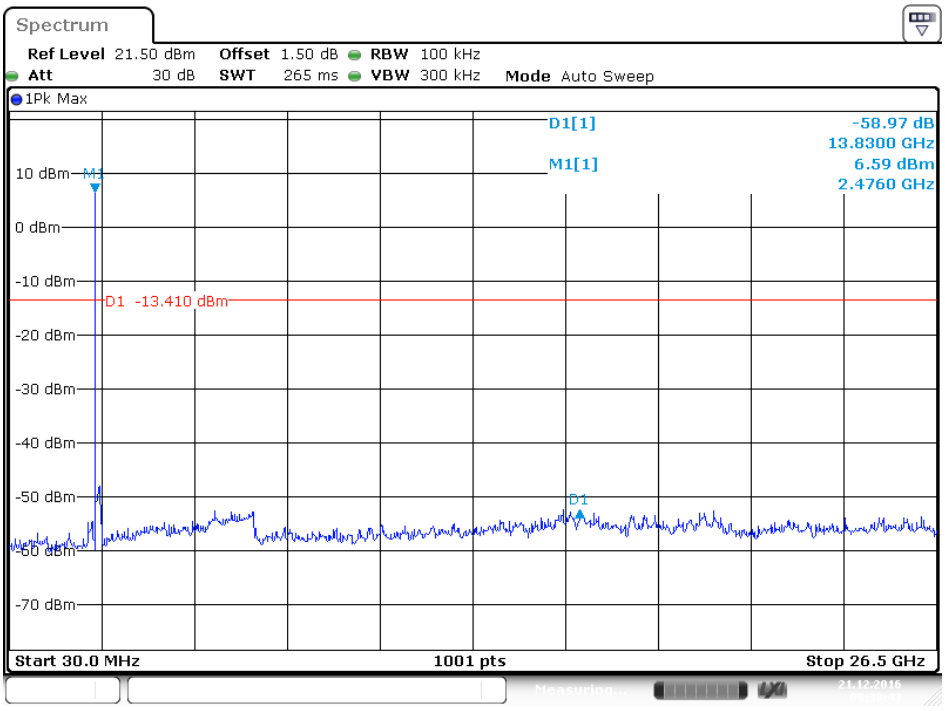


Middle Channel



Date: 21.DEC.2016 10:04:33

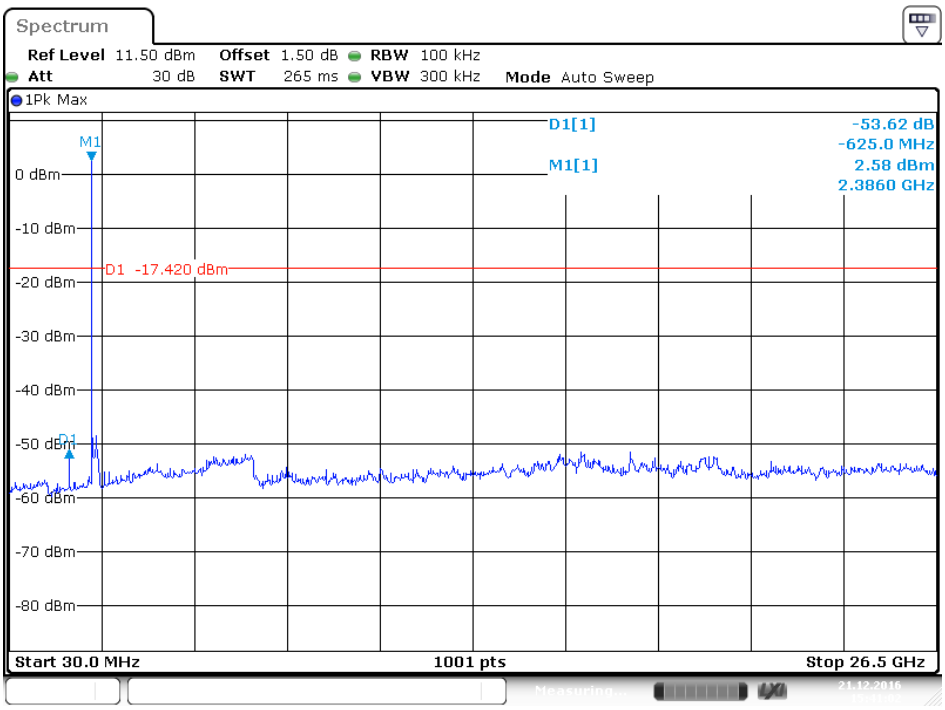
High Channel



Date: 21.DEC.2016 09:38:43

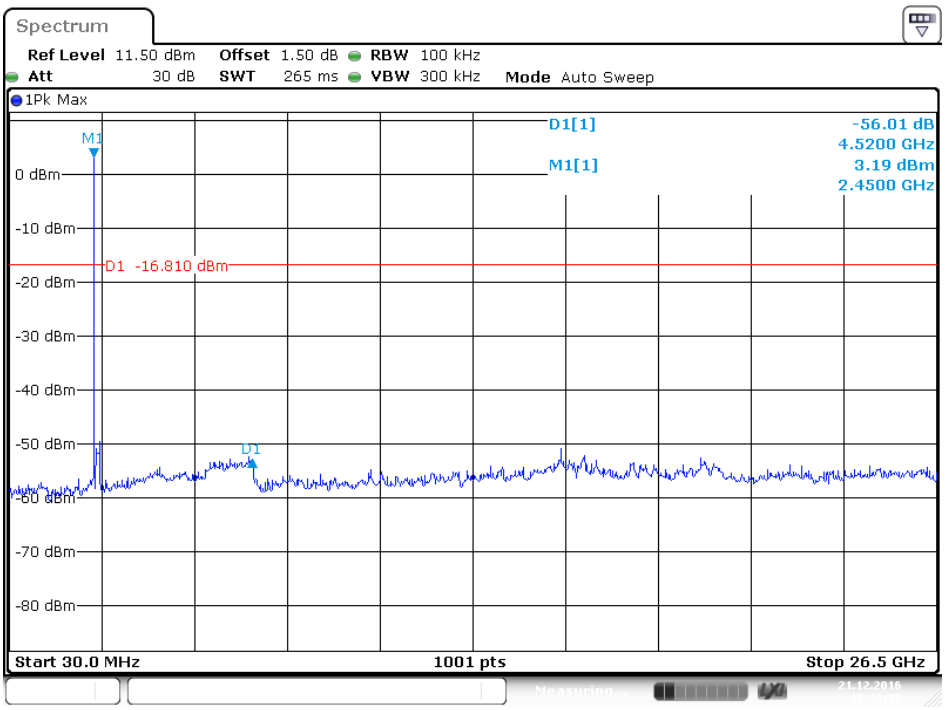
EDR Mode (π/4-DQPSK)

Low Channel



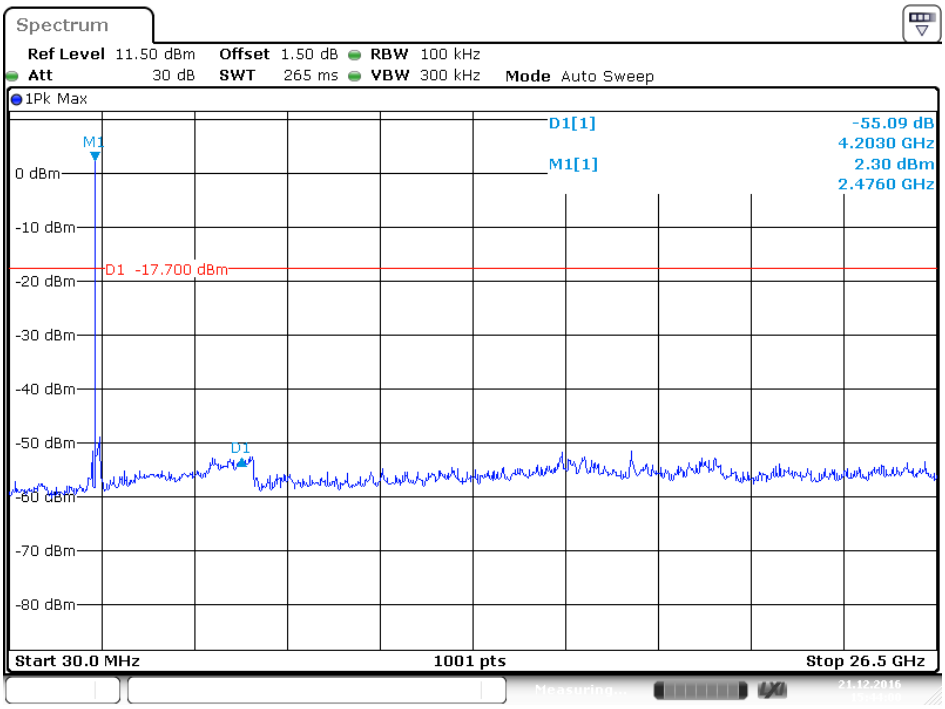
Date: 21.DEC.2016 15:41:02

Middle Channel



Date: 21.DEC.2016 15:42:35

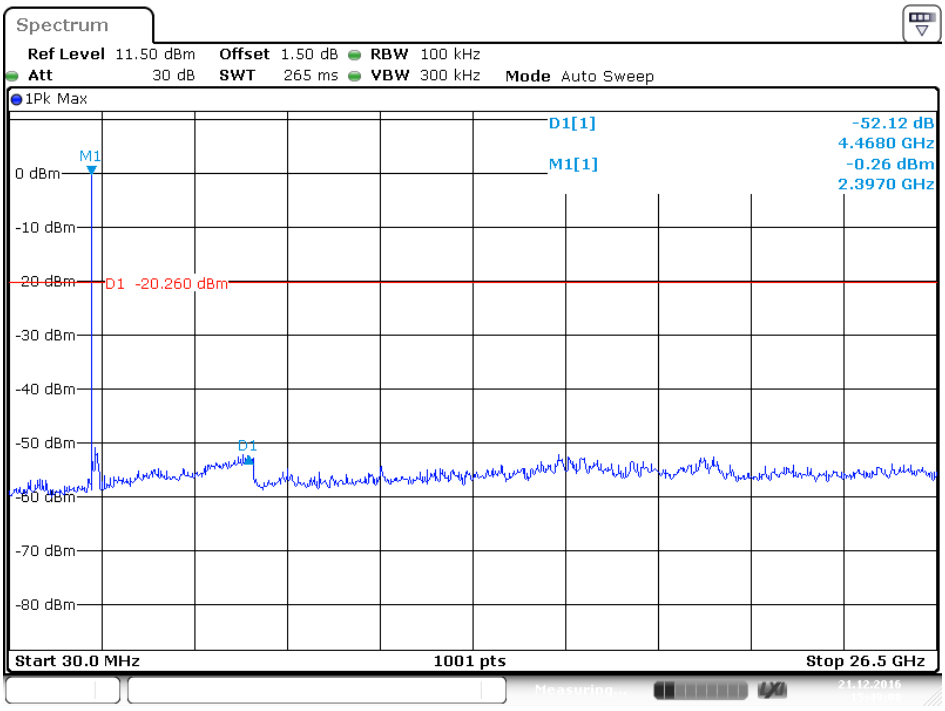
High Channel



Date: 21.DEC.2016 15:44:01

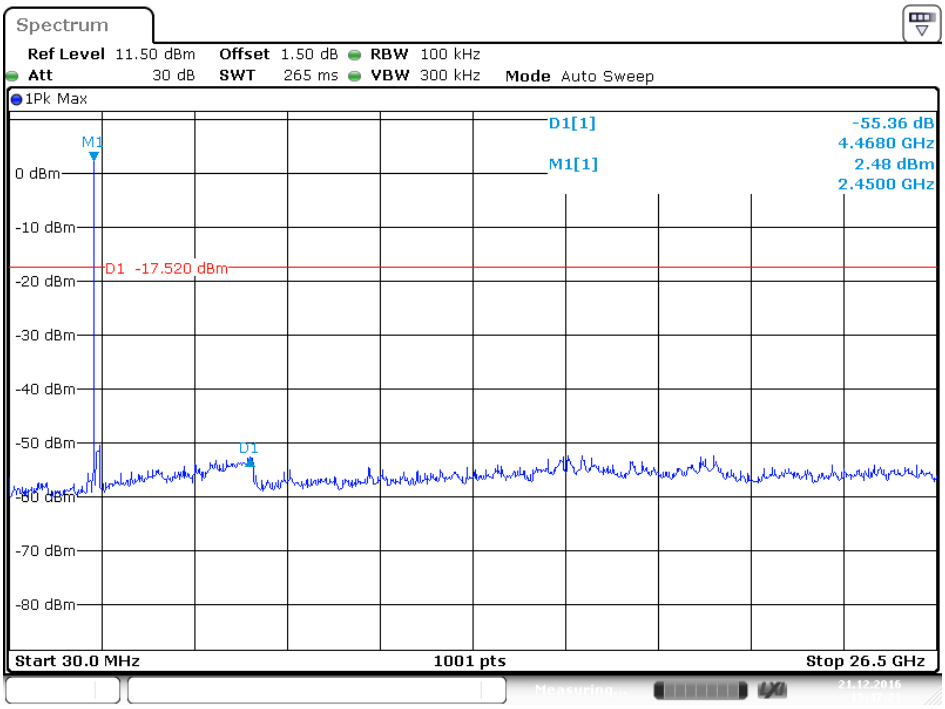
EDR Mode (8-DPSK)

Low Channel



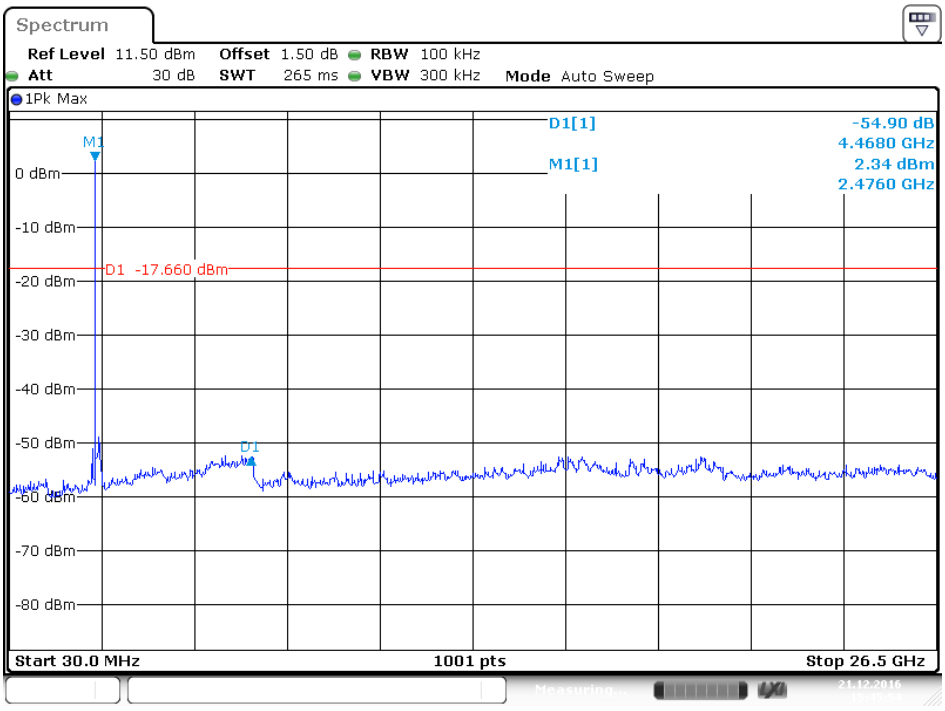
Date: 21.DEC.2016 15:49:08

Middle Channel



Date: 21.DEC.2016 15:47:21

High Channel



Date: 21.DEC.2016 15:45:54

8 FCC §15.247(a)(1) – 20 dB Emission Bandwidth

8.1 Applicable Standard

According to FCC §15.247(a) (1).

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.

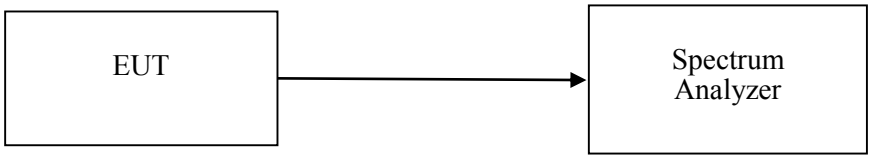
8.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

4. Repeat above procedures until all frequencies measured were complete.



8.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

8.4 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21.

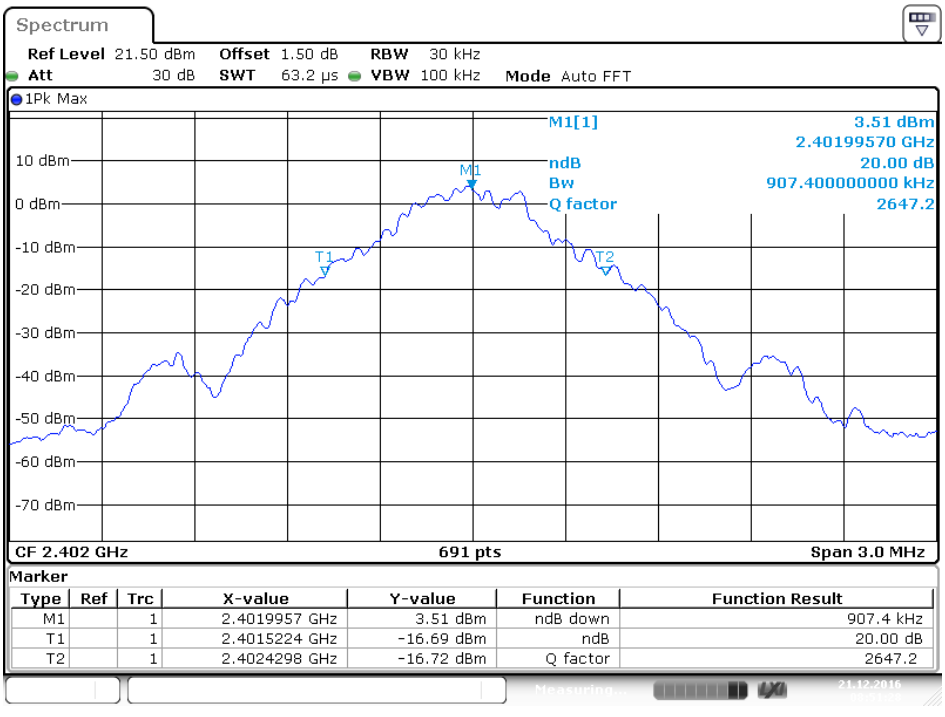
8.5 Test Results

Channel	Frequency (MHz)	20 dBc BW (MHz)
BDR Mode (GFSK)		
Low	2402	0.91
Middle	2441	0.90
High	2480	0.90
EDR Mode (π/4-DQPSK)		
Low	2402	1.43
Middle	2441	1.42
High	2480	1.44
EDR Mode (8-DPSK)		
Low	2402	1.44
Middle	2441	1.44
High	2480	1.44

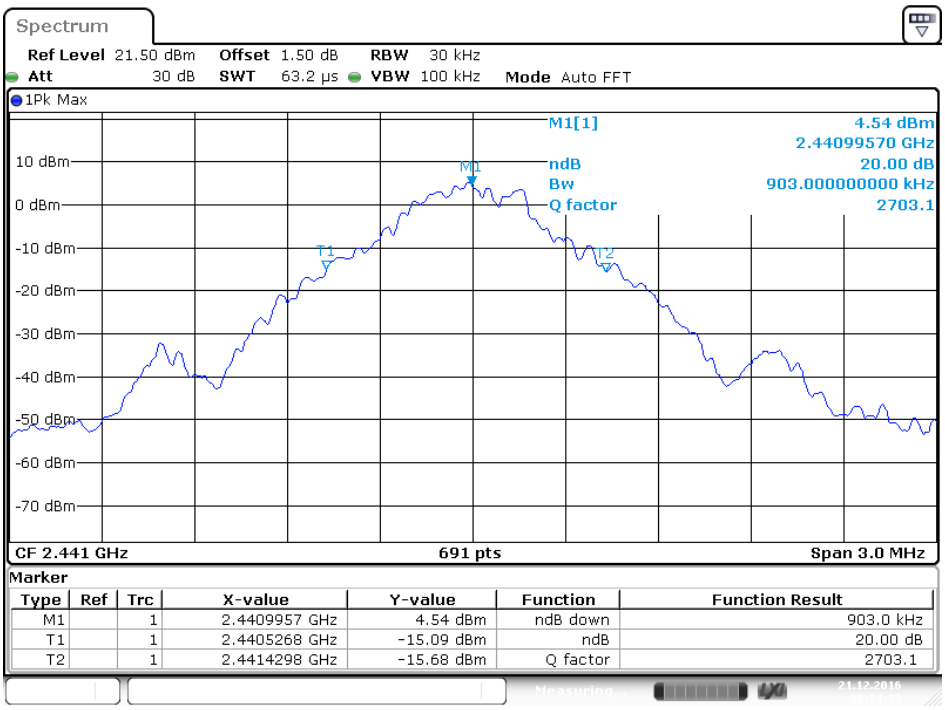
Please refer to the following plots

BDR Mode (GFSK)

Low Channel

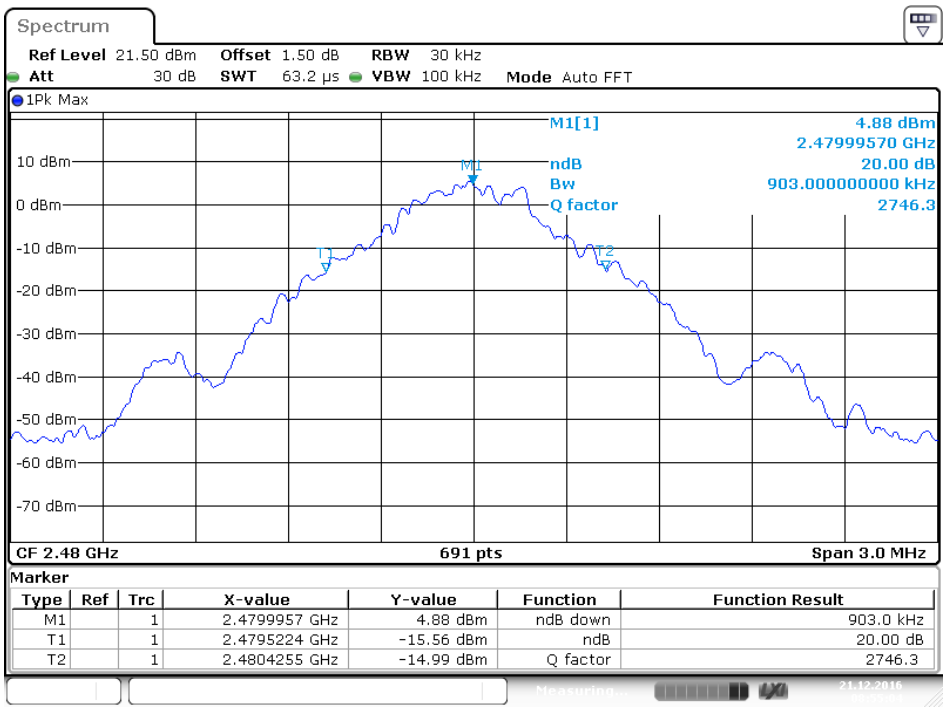


Middle Channel



Date: 21.DEC.2016 08:54:14

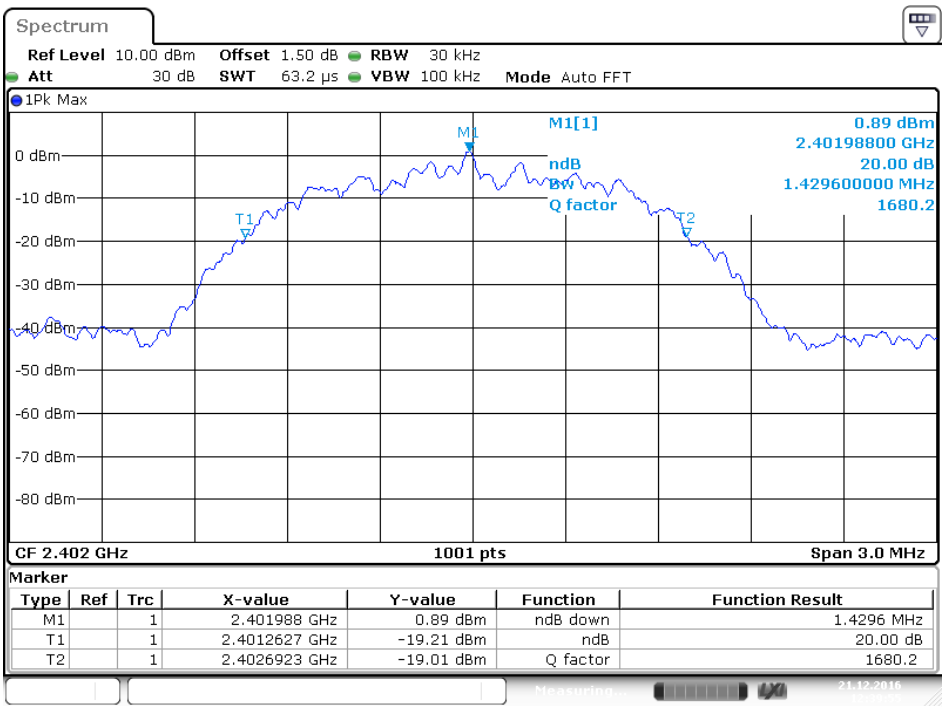
High Channel



Date: 21.DEC.2016 08:55:04

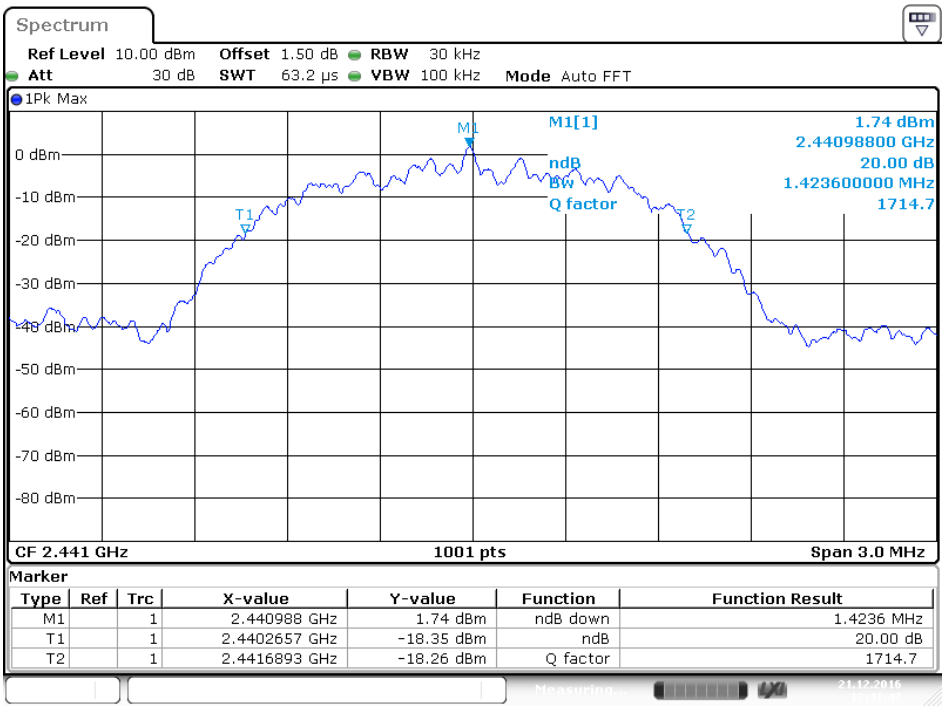
EDR Mode (π/4-DQPSK)

Low Channel



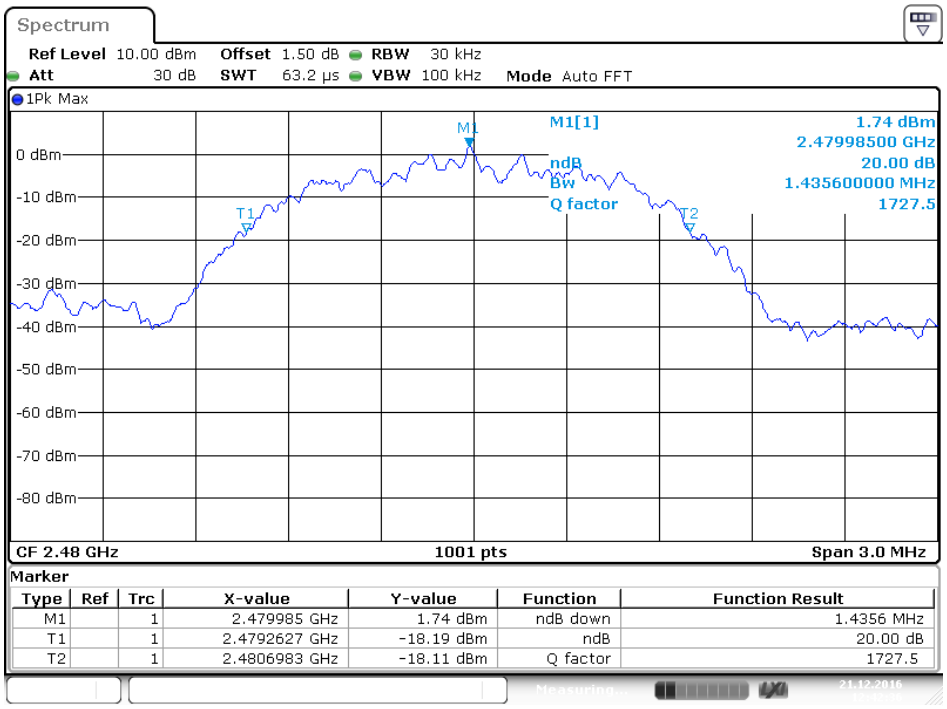
Date: 21.DEC.2016 12:39:54

Middle Channel



Date: 21.DEC.2016 12:41:48

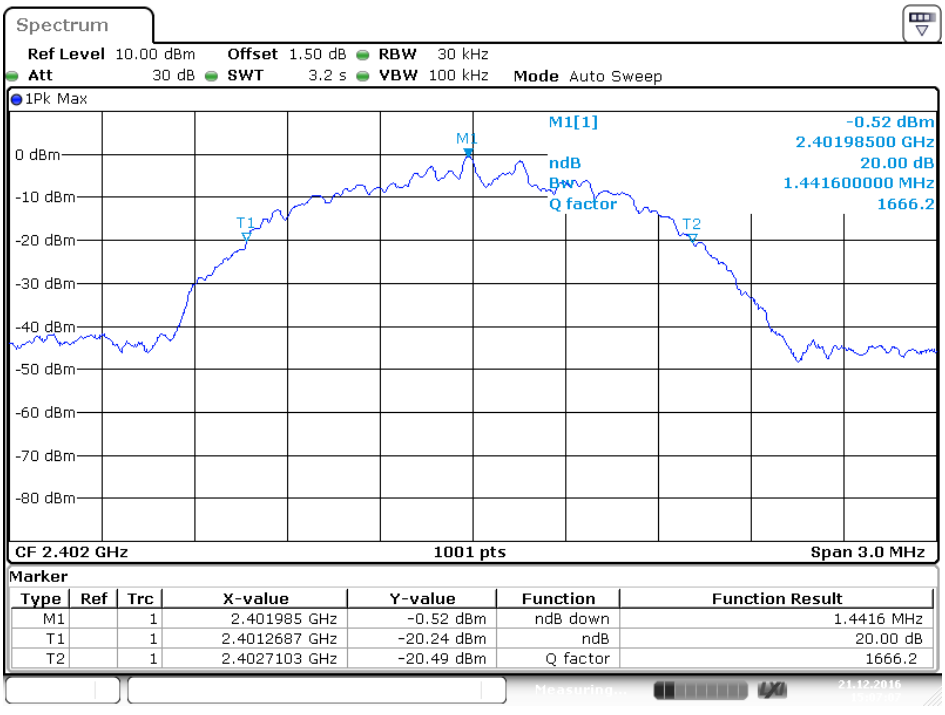
High Channel



Date: 21.DEC.2016 12:42:36

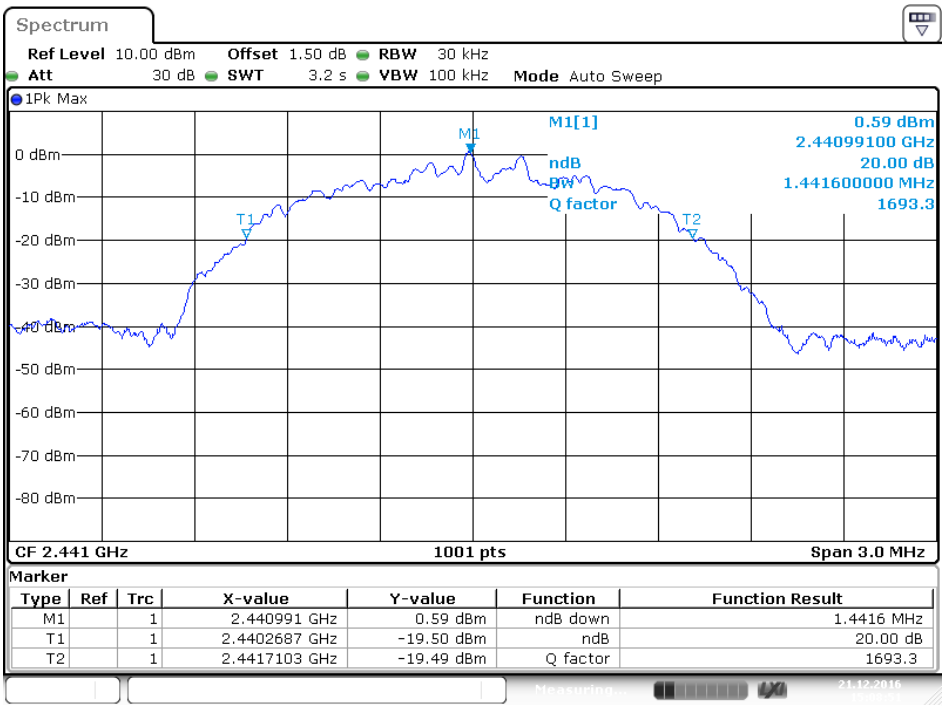
EDR Mode (8-DPSK)

Low Channel



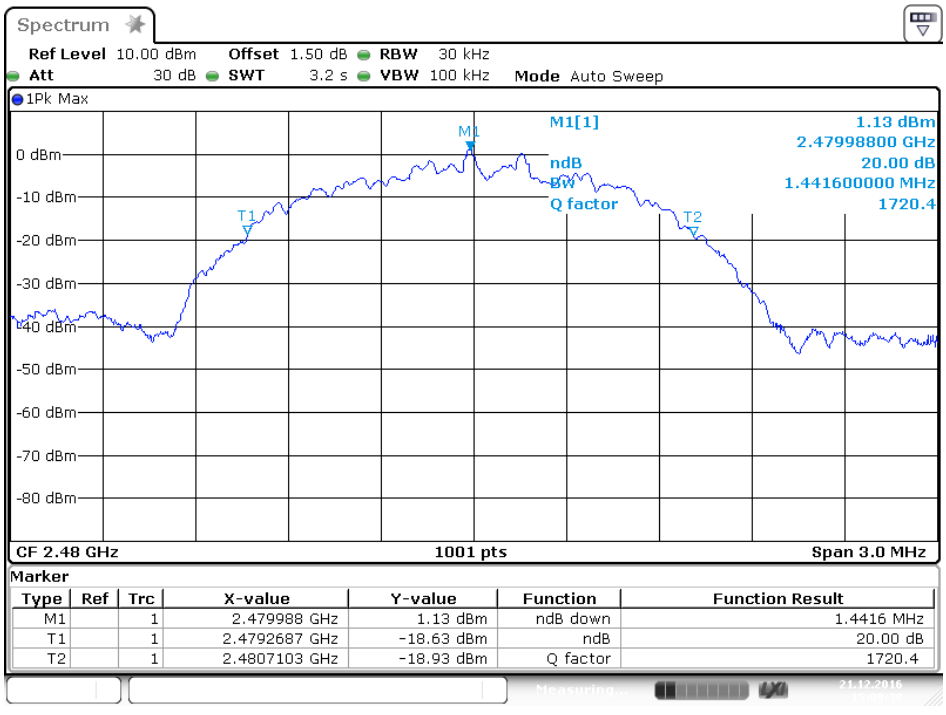
Date: 21.DEC.2016 15:07:07

Middle Channel



Date: 21.DEC.2016 15:08:52

High Channel



Date: 21.DEC.2016 15:09:38

9 FCC §15.247(a)(1) – Channel Separation Test

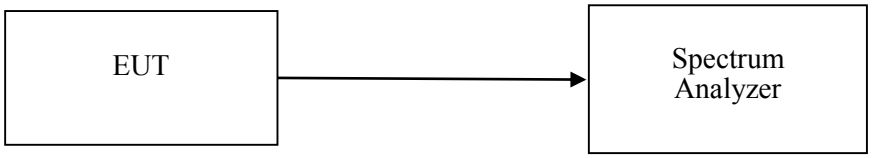
9.1 Applicable Standard

According to FCC §15.247(a) (1).

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.

9.2 Test Procedure

1. Set the EUT in transmitting mode, max hold the channel.
2. Set the adjacent channel of the EUT and max hold another trace.
3. Measure the channel separation.



9.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

9.4 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21.

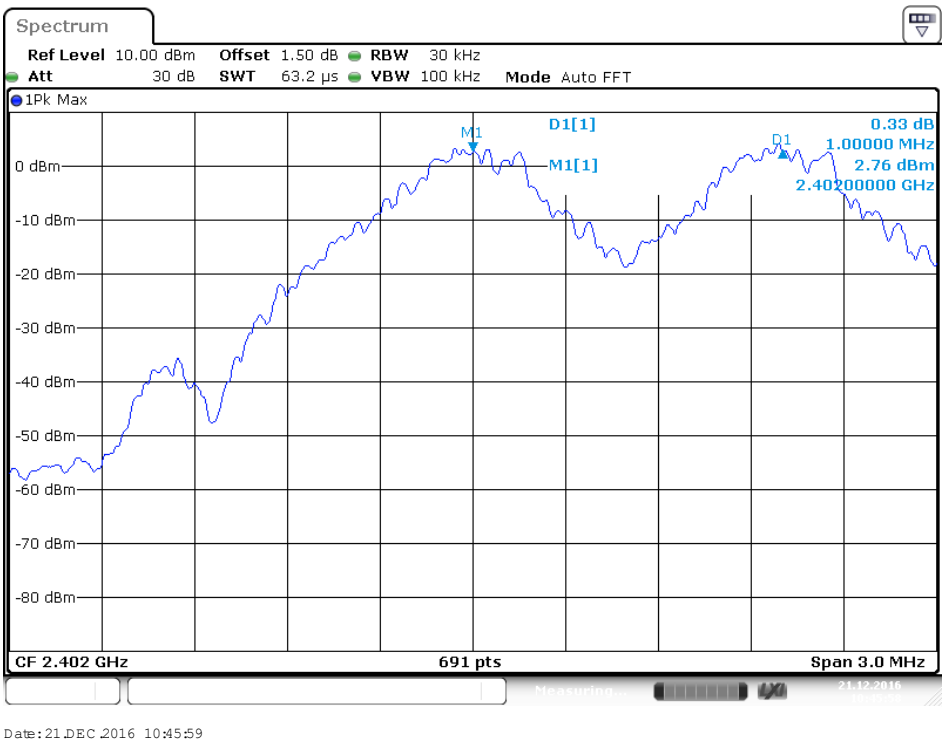
9.5 Test Results

Mode	Channel Separation (MHz)	20 dBc BW (MHz)	Two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
GFSK	1	0.91	0.606	>two-thirds of the 20 dB bandwidth	Compliance
π/4-DQPSK	1	1.44	0.960	>two-thirds of the 20 dB bandwidth	Compliance
8-DPSK	1	1.44	0.960	>two-thirds of the 20 dB bandwidth	Compliance

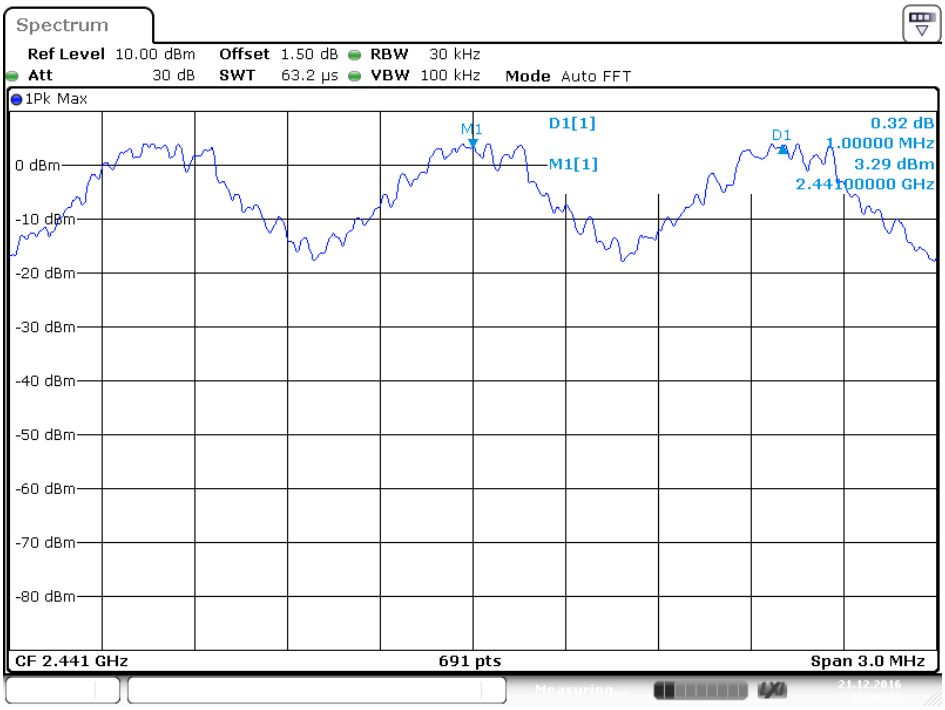
Please refer to the following plots

BDR Mode (GFSK)

Low Channel

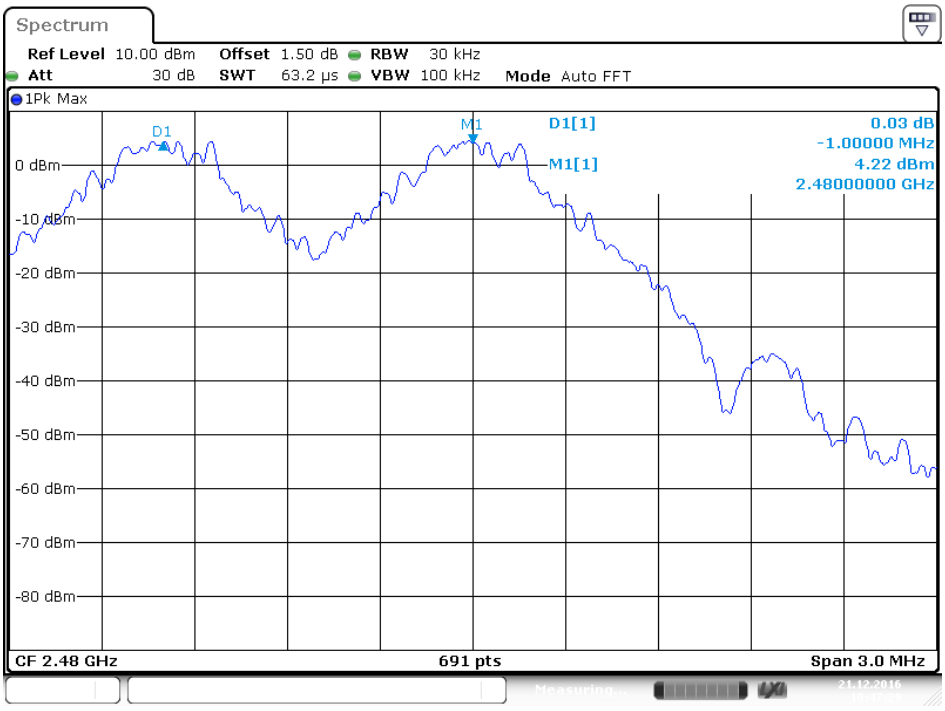


Middle Channel



Date: 21.DEC.2016 10:46:45

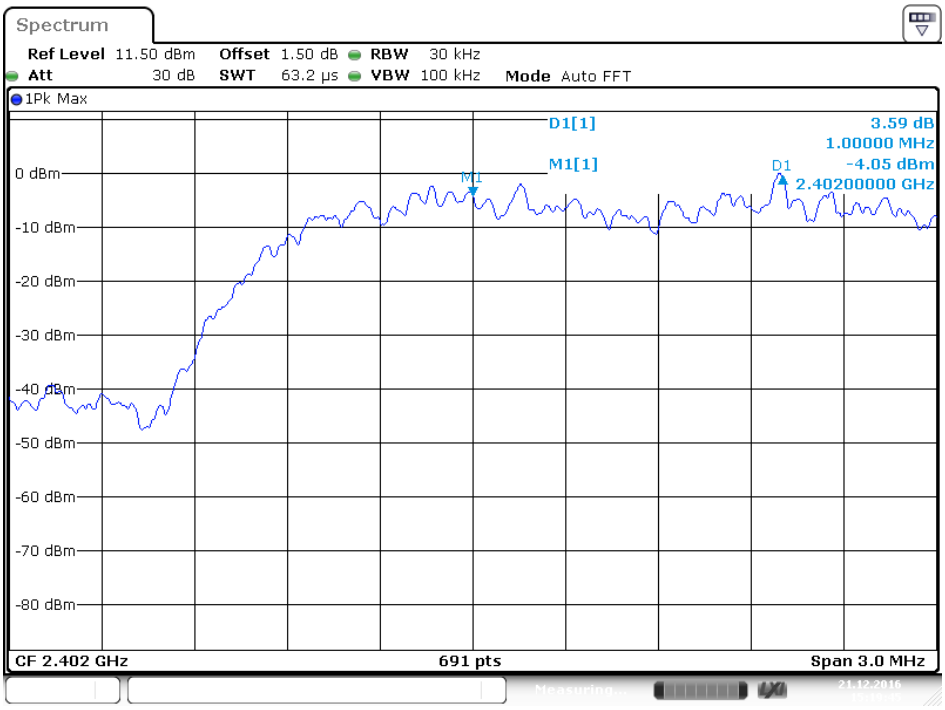
High Channel



Date: 21.DEC.2016 10:47:30

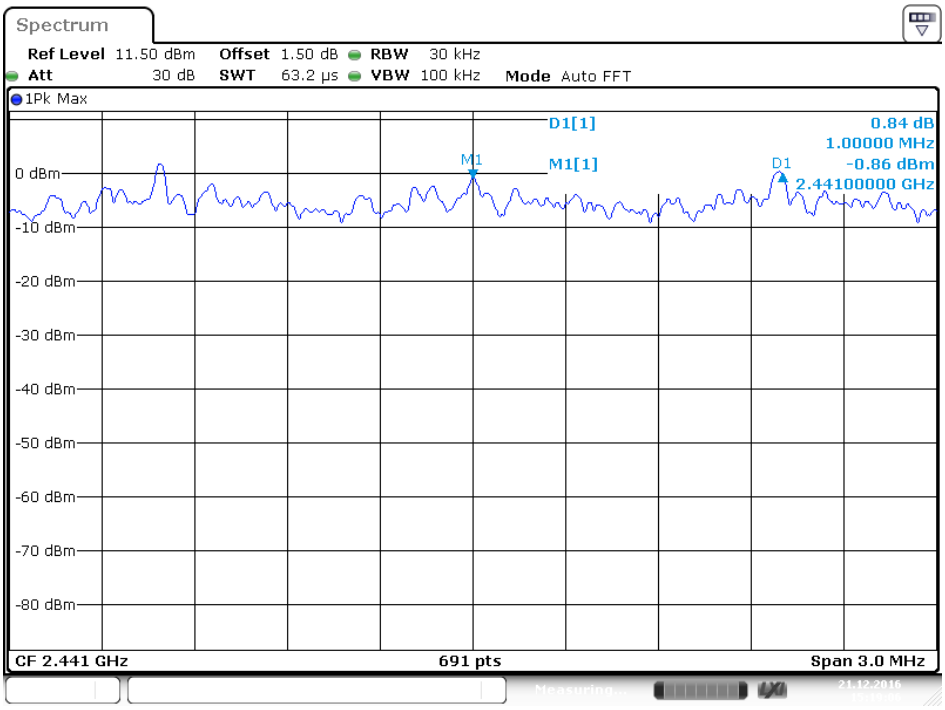
EDR Mode (π/4-DQPSK)

Low Channel



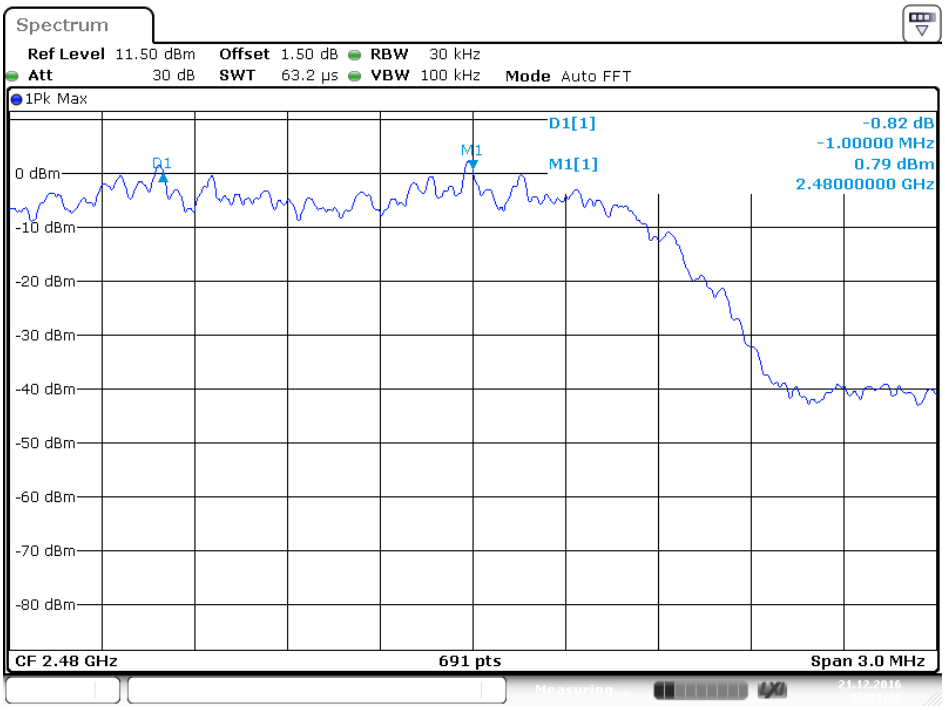
Date: 21.DEC.2016 15:19:45

Middle Channel



Date: 21.DEC.2016 15:19:07

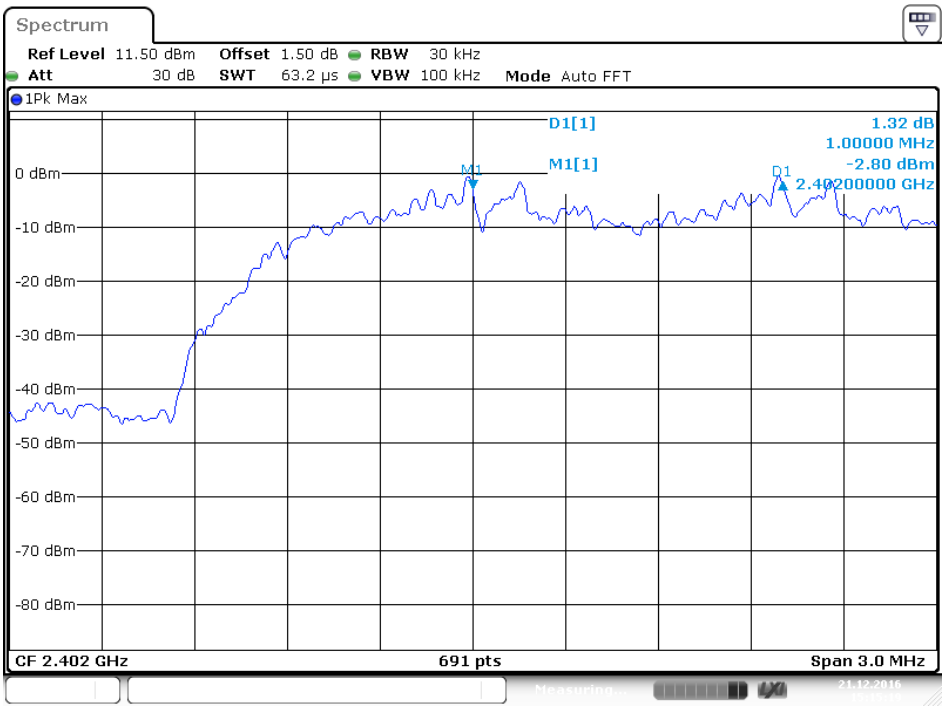
High Channel



Date: 21.DEC.2016 15:18:21

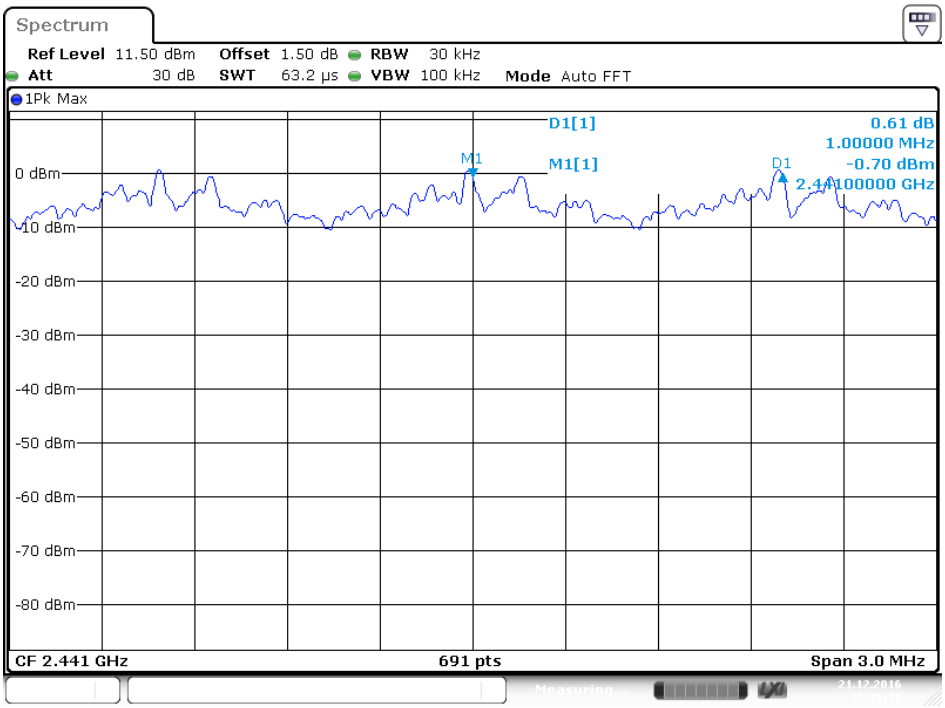
EDR Mode (8-DPSK)

Low Channel



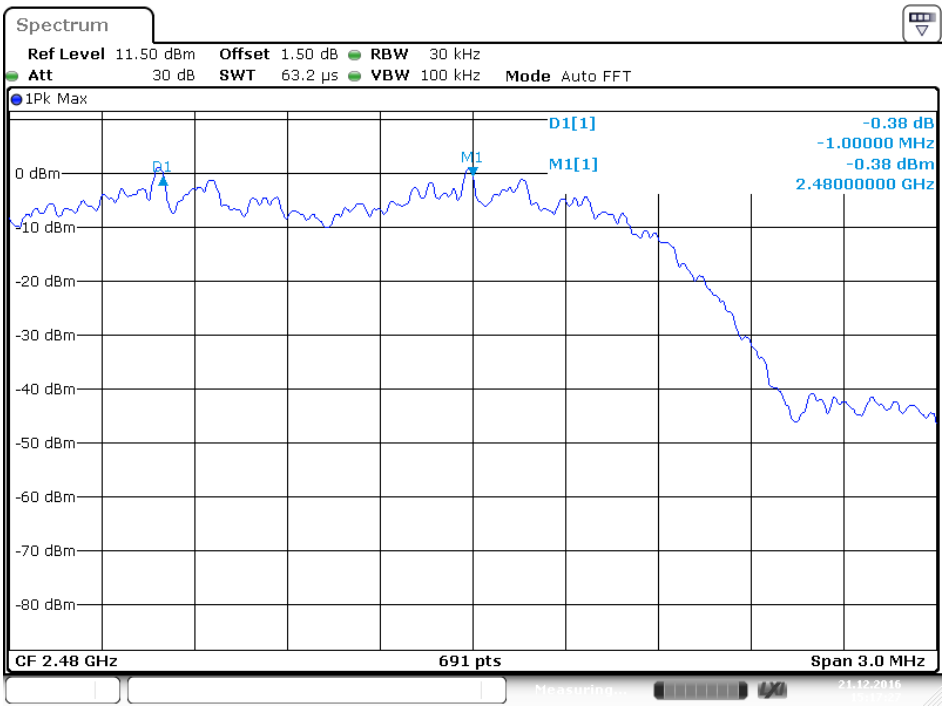
Date: 21.DEC.2016 15:15:19

Middle Channel



Date: 21.DEC.2016 15:16:39

High Channel



Date: 21.DEC.2016 15:17:28

10 FCC §15.247(a)(1)(iii) –Time of Occupancy (Dwell Time)

10.1 Applicable Standard

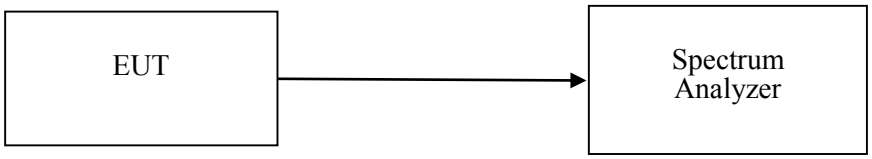
According to FCC §15.247(a) (1)(iii).

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.

10.2 Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * 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



10.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

10.4 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21 to 2017-1-10.

10.5 Test Results

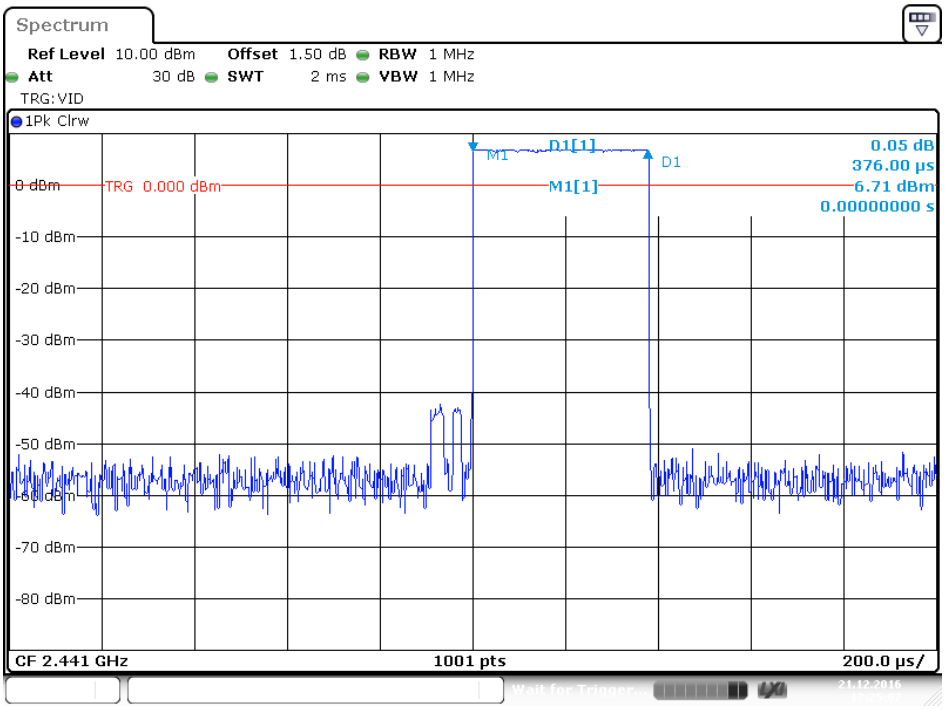
Test mode: BT mode / 2402 ~ 2480MHz(*GFSK*)						
Mode	**Pulse Time (ms)**	**Hopping Number**	**Period Time (s)**	**Total of Dwell (ms)**	**Limit (ms)**	**RESULT**
DH1	0.376	320	31.6	120.32	<400	PASS
DH3	1.625	150	31.6	243.75	<400	PASS
DH5	2.880	90	31.6	259.20	<400	PASS
Test mode: EDR mode / 2402 ~ 2480MHz (*π/4-DQPSK*)						
Mode	**Pulse Time (ms)**	**Hopping Number**	**Period Time (s)**	**Total of Dwell (ms)**	**Limit (ms)**	**RESULT**
2DH1	0.388	320	31.6	124.16	<400	PASS
2DH3	1.635	170	31.6	277.95	<400	PASS
2DH5	2.885	120	31.6	346.20	<400	PASS
Test mode: EDR mode / 2402 ~ 2480MHz (*8-DPSK*)						
Mode	**Pulse Time (ms)**	**Hopping Number**	**Period Time (s)**	**Total of Dwell (ms)**	**Limit (ms)**	**RESULT**
3DH1	0.384	320	31.6	122.88	<400	PASS
3DH3	1.625	180	31.6	292.50	<400	PASS
3DH5	2.890	80	31.6	231.20	<400	PASS

Note: Dwell time=Pulse time (ms) × Hopping Number

Please refer to the following plots

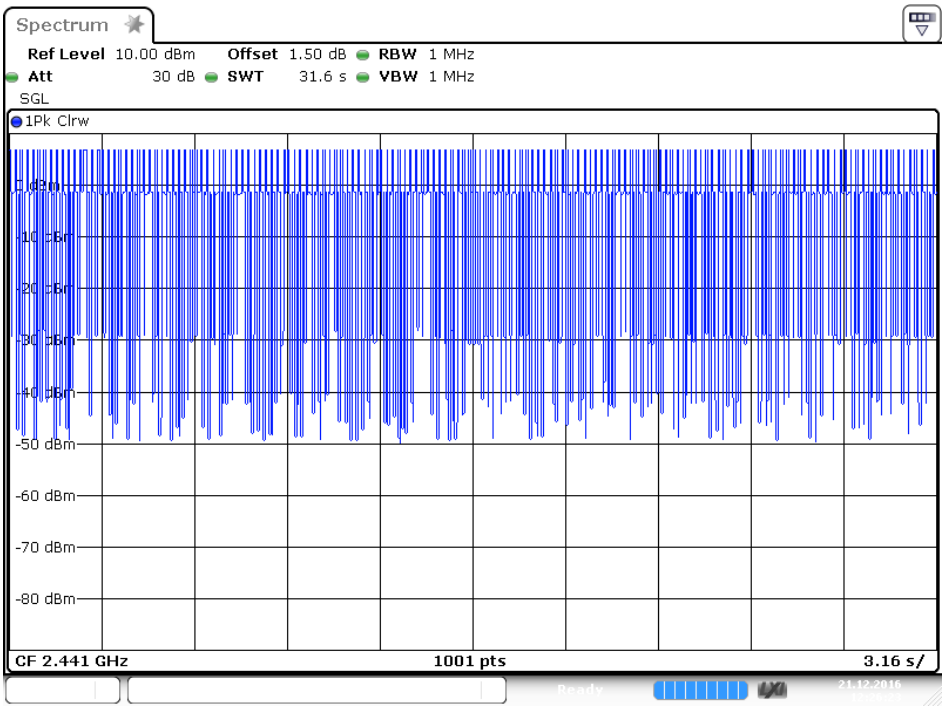
BDR Mode (GFSK)

DH1: Pulse Width



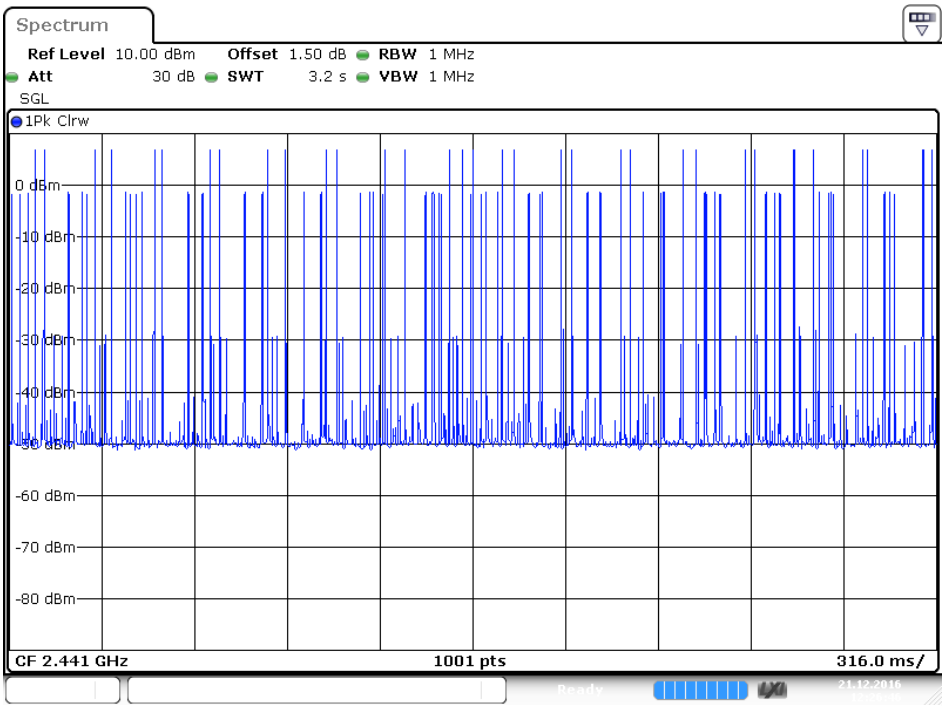
Date: 21.DEC.2016 12:25:08

DH1: Hopping Number



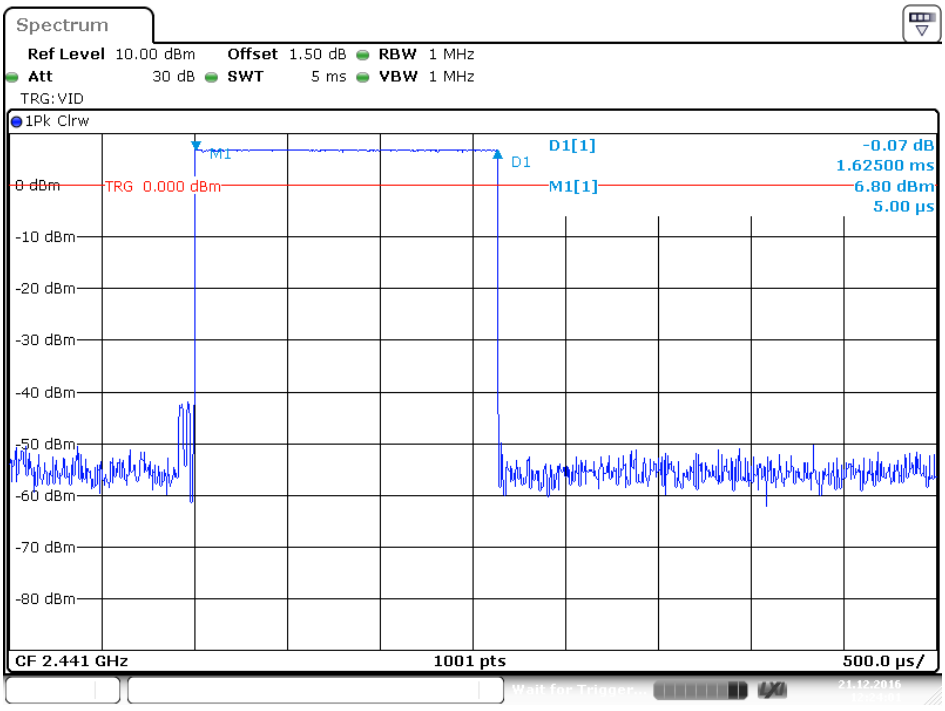
Date: 21.DEC.2016 12:26:24

DH1: Hopping Number /10



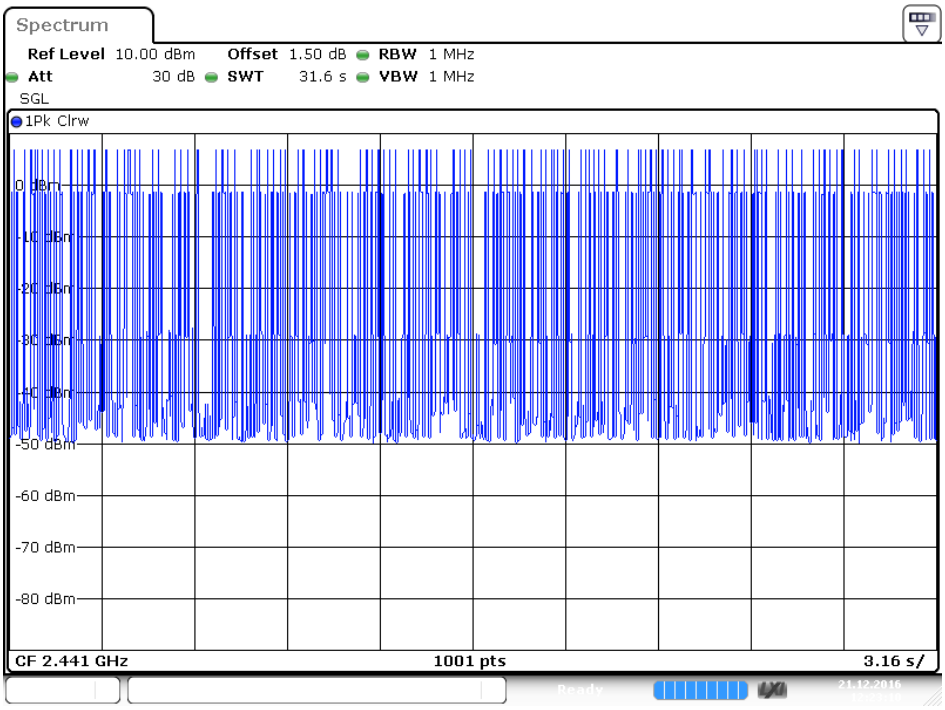
Date: 21.DEC.2016 12:26:46

DH3: Pulse Width



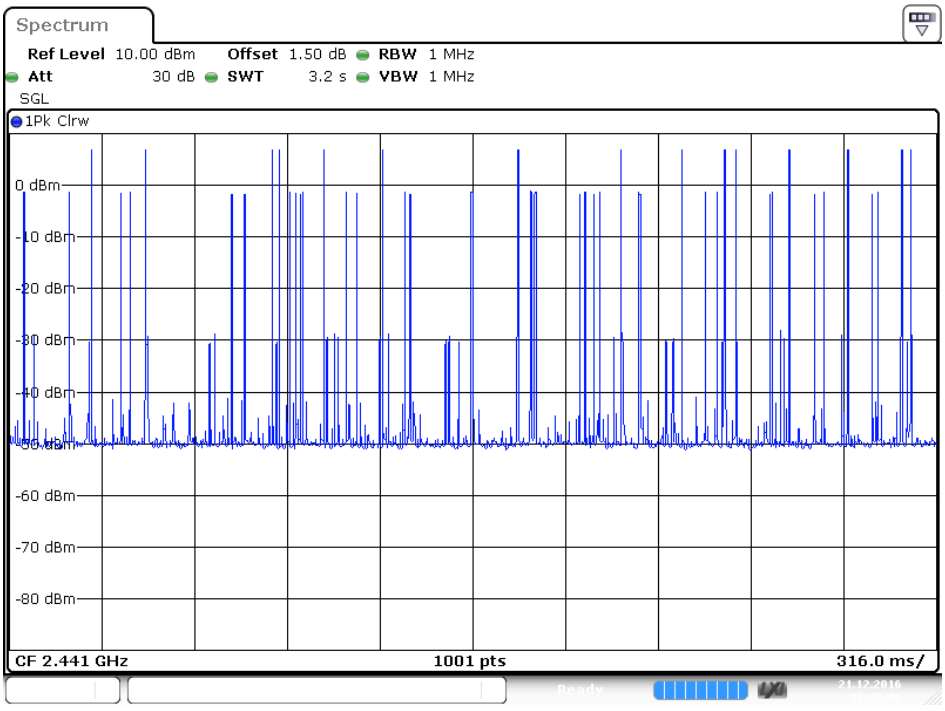
Date: 21.DEC.2016 12:24:02

DH3: Hopping Number



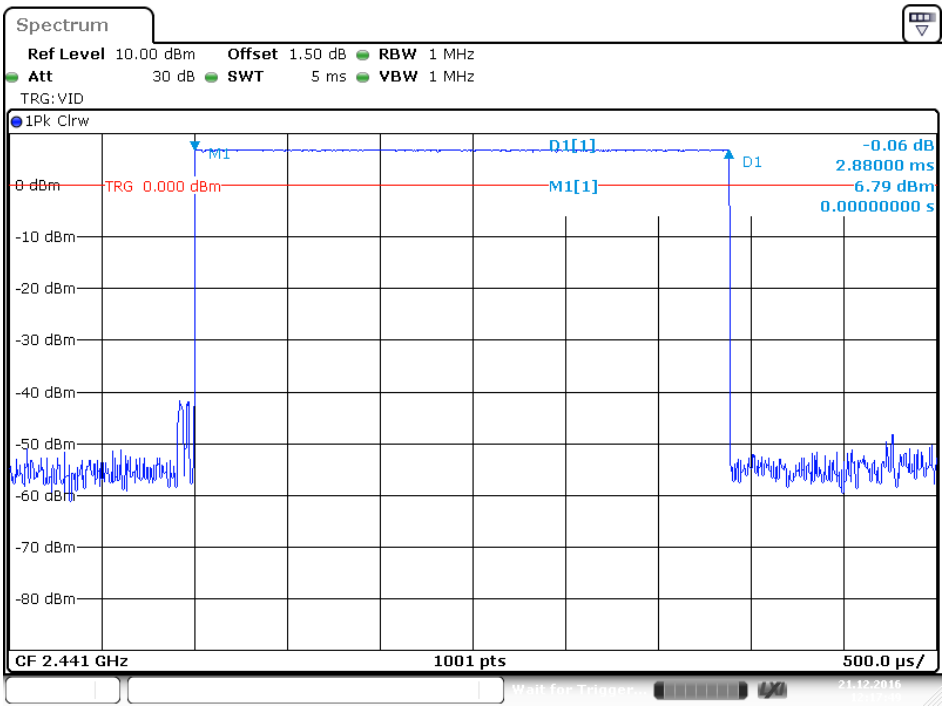
Date: 21.DEC.2016 12:23:10

DH3: Hopping Number /10



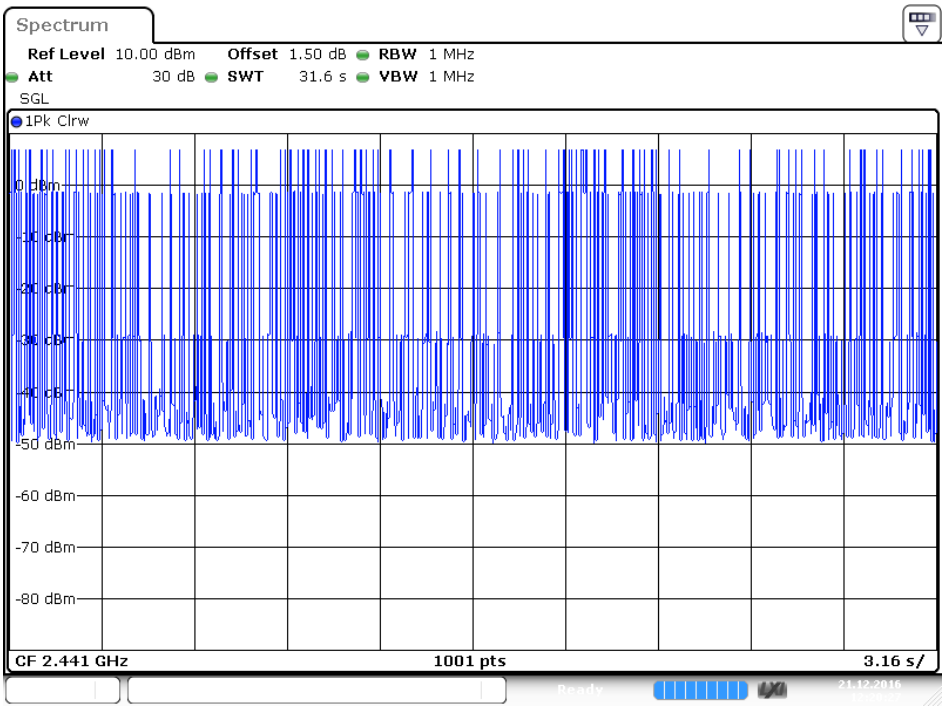
Date: 21.DEC.2016 12:22:00

DH5: Pulse Width



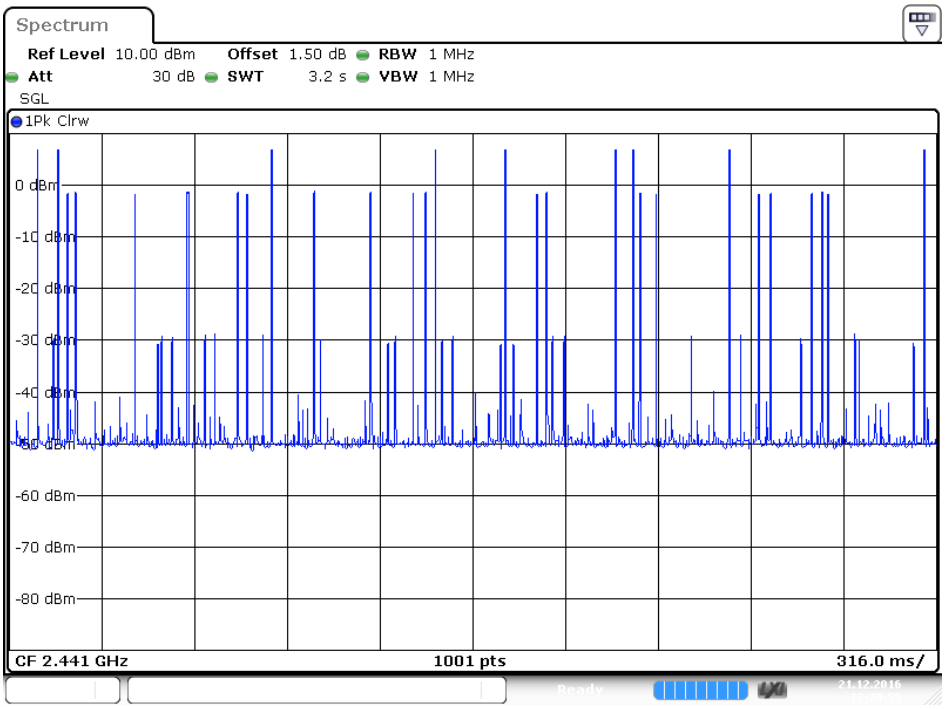
Date:21.DEC.2016 12:17:49

DH5: Hopping Number



Date:21.DEC.2016 12:20:28

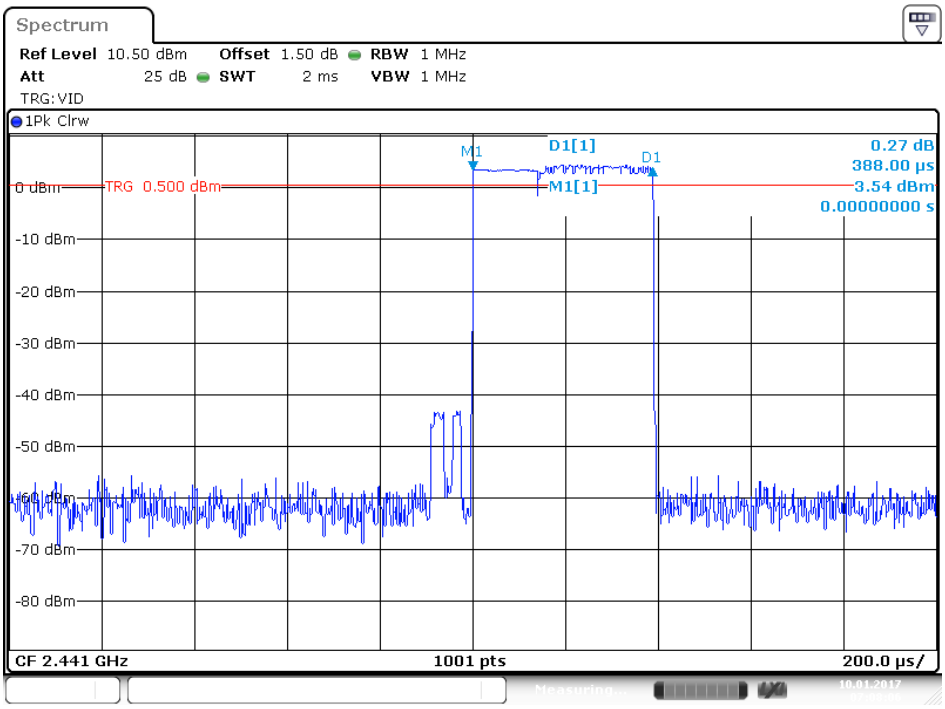
DH5: Hopping Number /10



Date: 21.DEC.2016 12:20:55

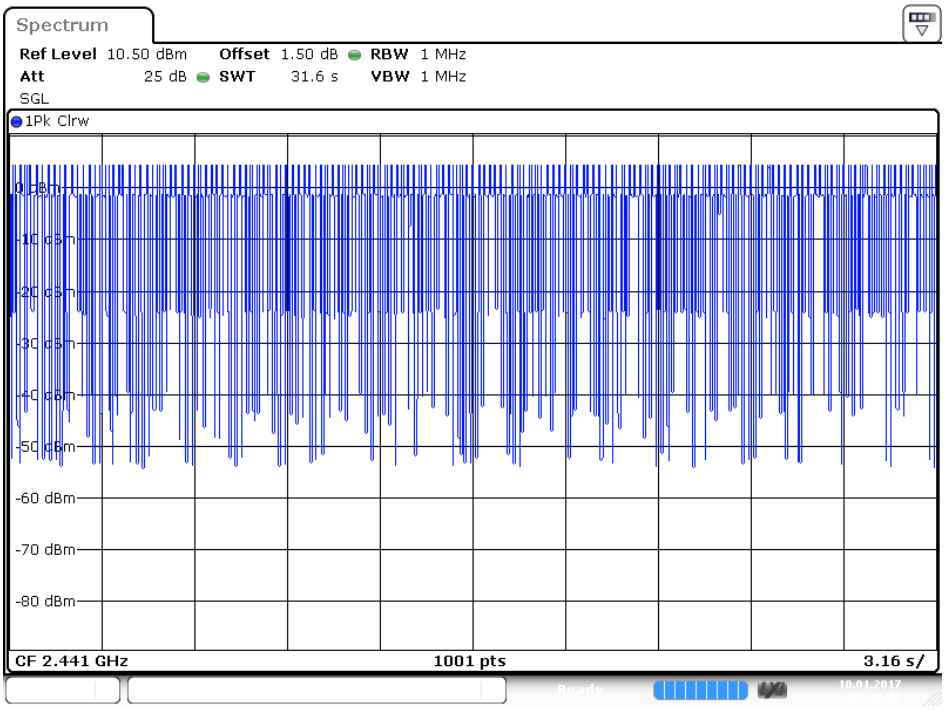
EDR Mode (π/4-DQPSK)

2DH1: Pulse Width



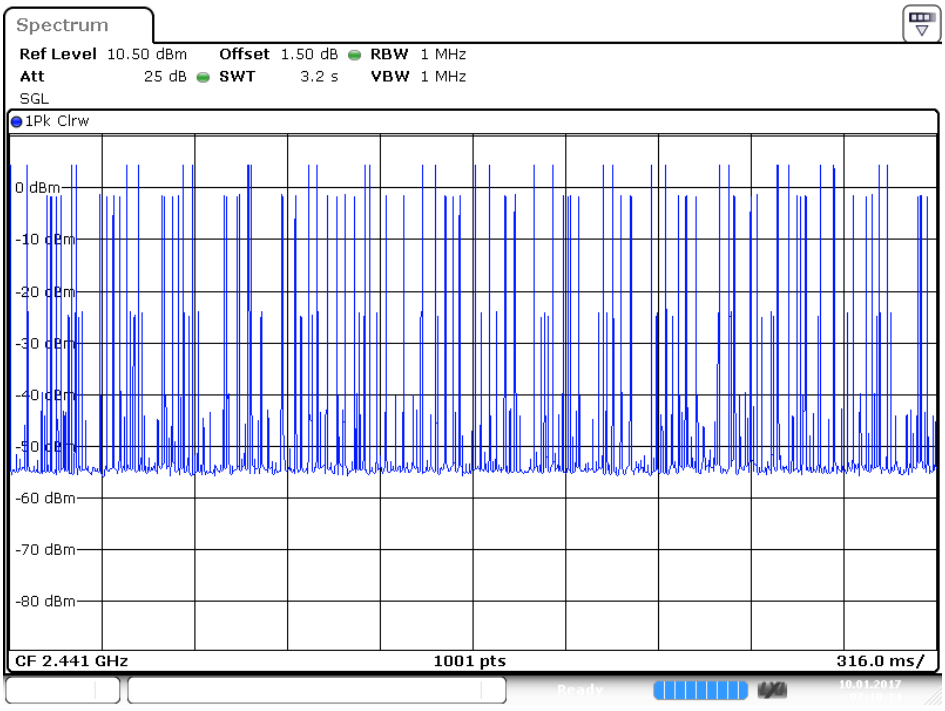
Date: 10.JAN.2017 07:08:07

2DH1: Hopping Number



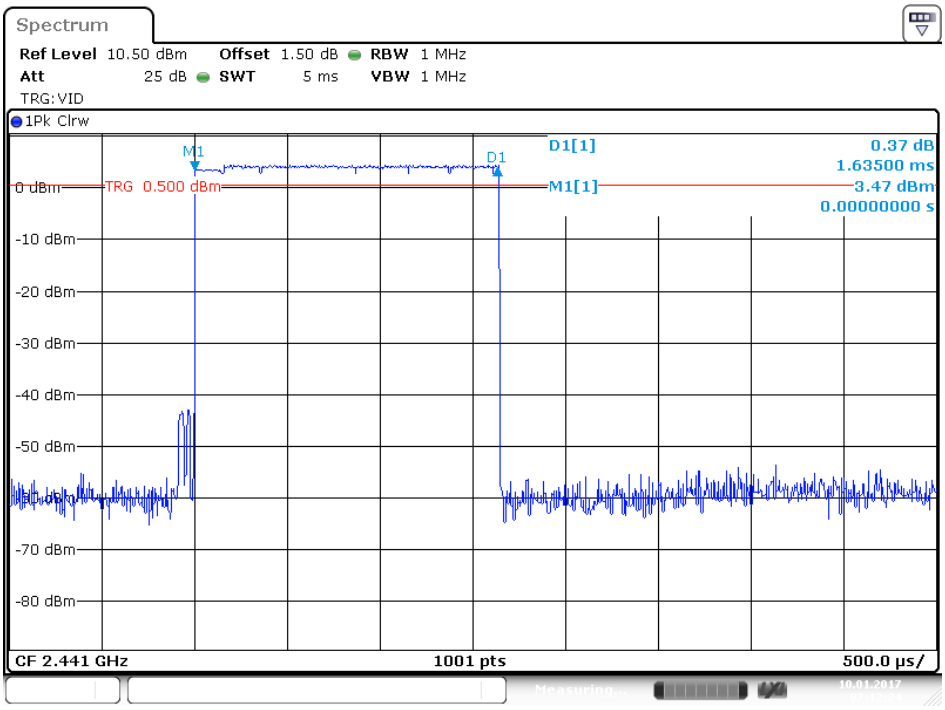
Date: 10.JAN.2017 07:09:48

2DH1: Hopping Number /10



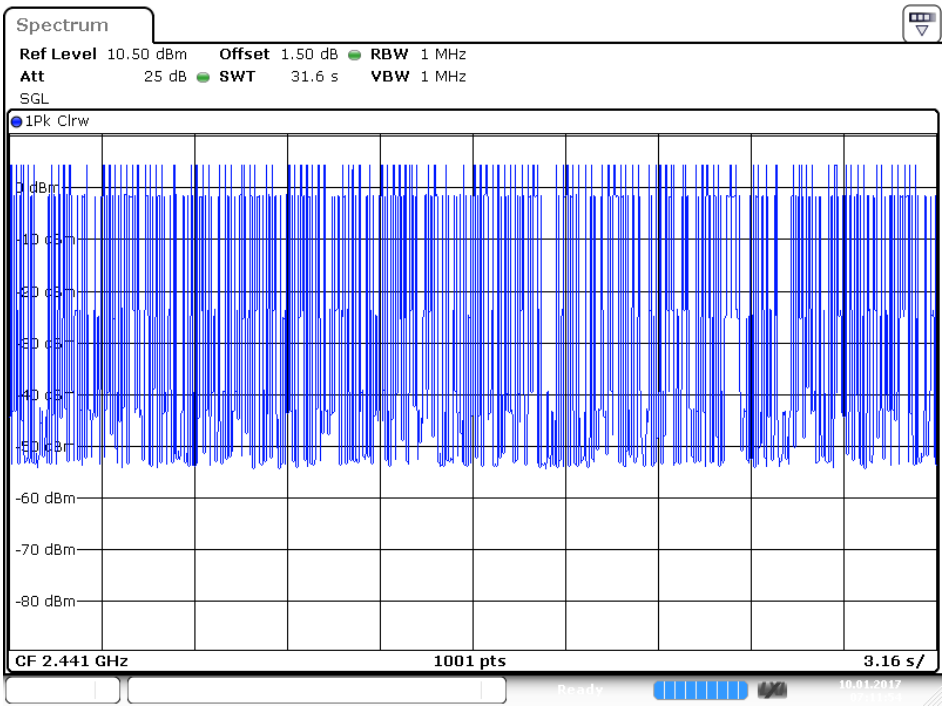
Date: 10.JAN.2017 07:10:15

2DH3: Pulse Width



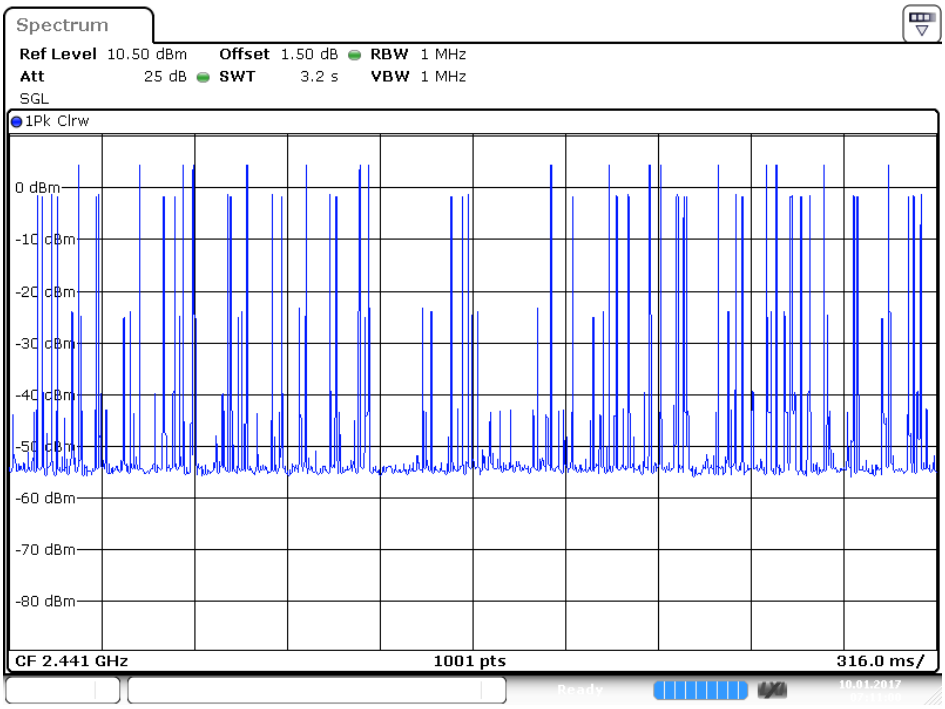
Date: 10.JAN.2017 07:12:25

2DH3: Hopping Number



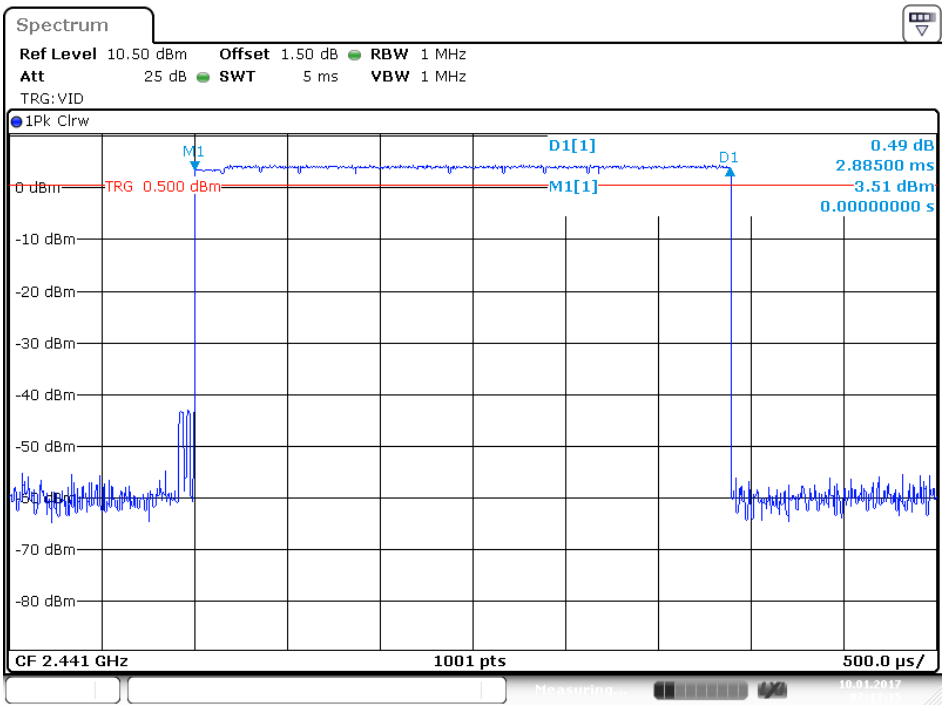
Date: 10.JAN.2017 07:11:54

2DH3: Hopping Number /10



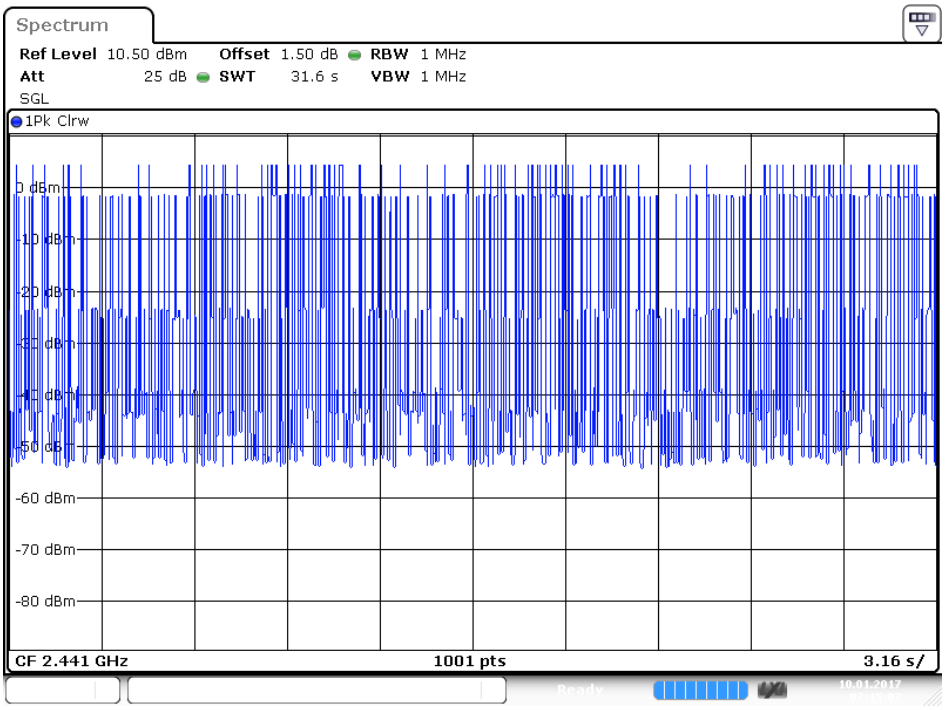
Date: 10.JAN.2017 07:11:01

2DH5: Pulse Width



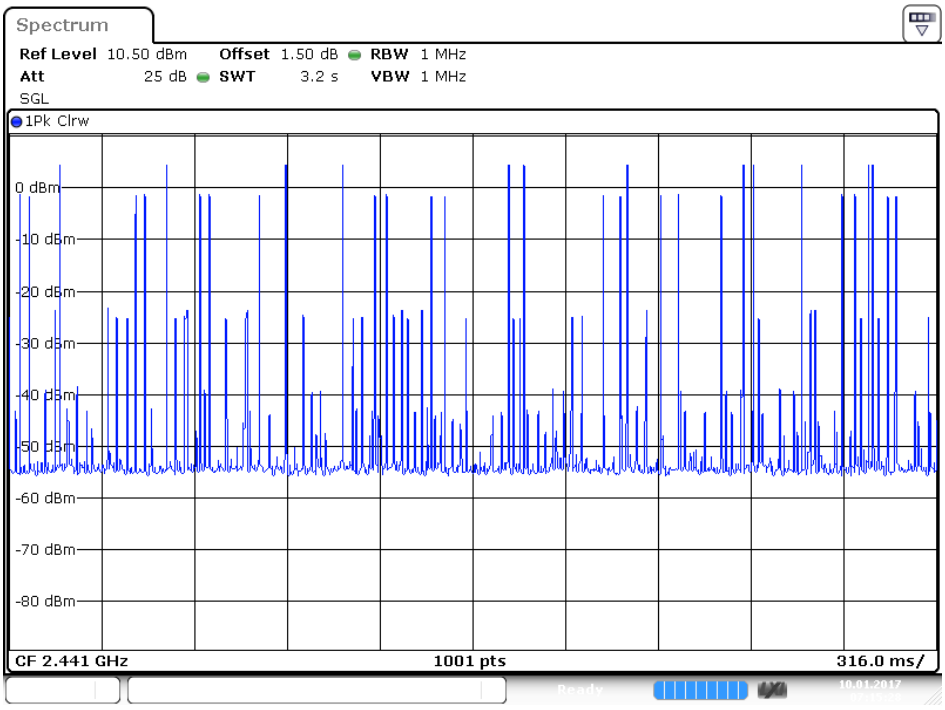
Date: 10.JAN.2017 07:13:15

2DH5: Hopping Number



Date: 10.JAN.2017 07:15:08

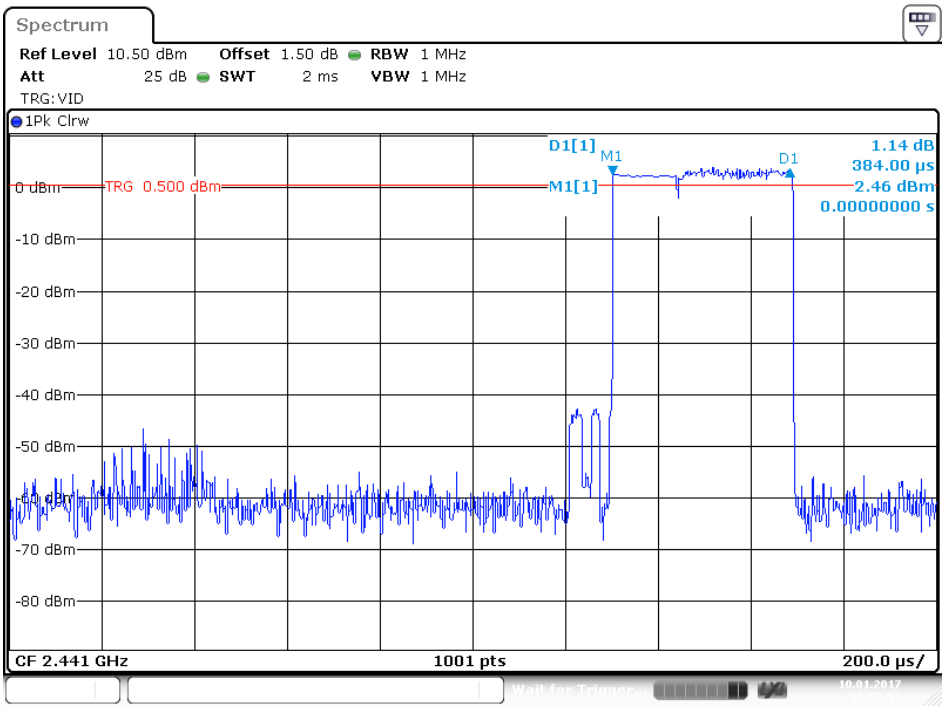
2DH5: Hopping Number /10



Date: 10.JAN.2017 07:15:28

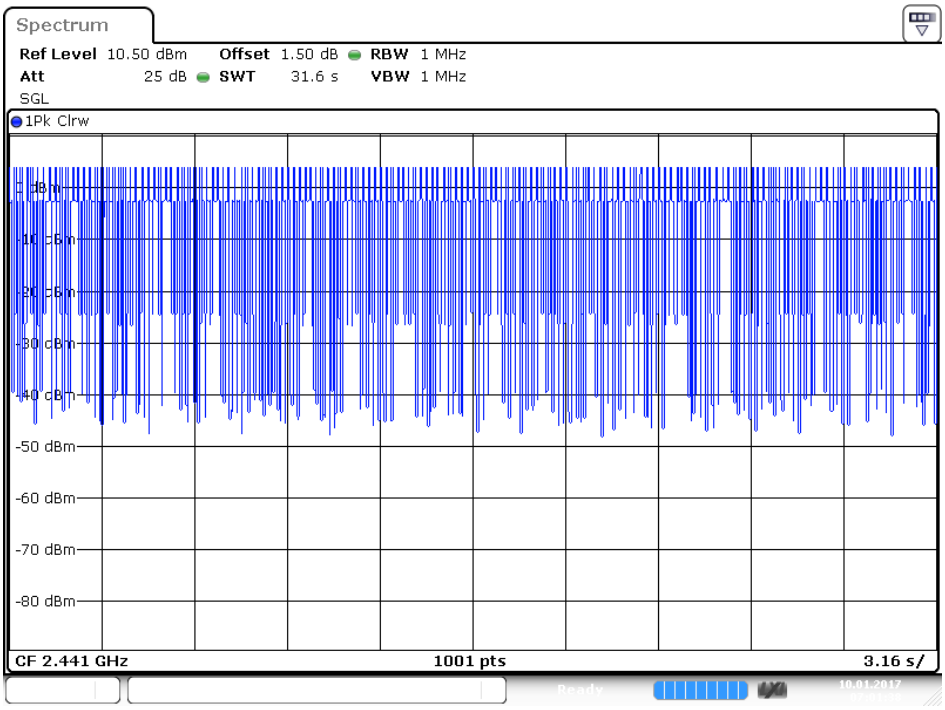
EDR Mode (8-DPSK)

3DH1: Pulse Width



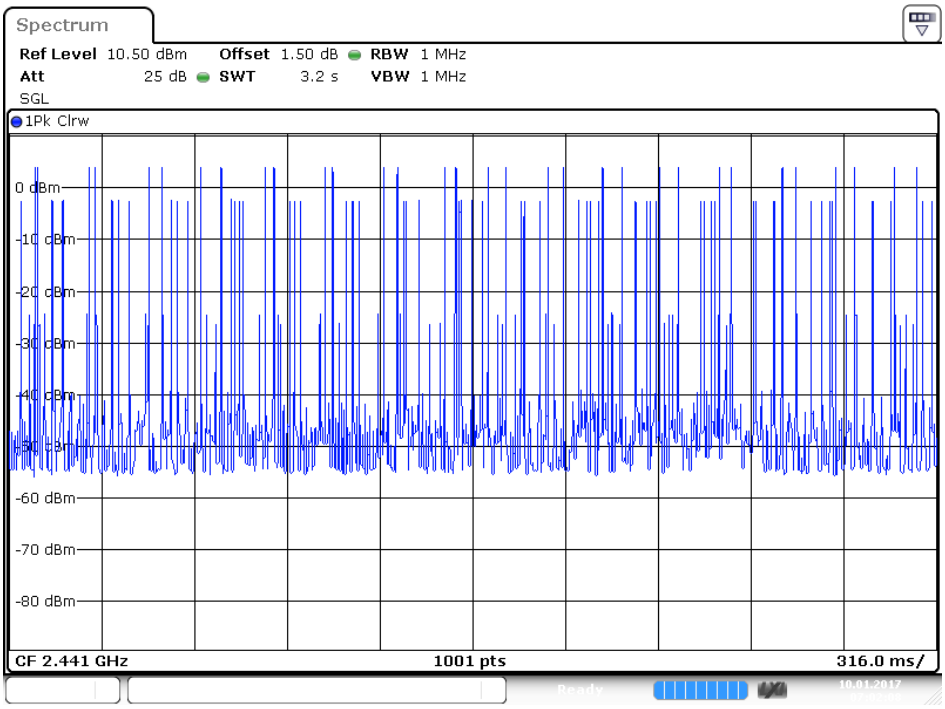
Date: 10.JAN.2017 06:59:53

3DH1: Hopping Number



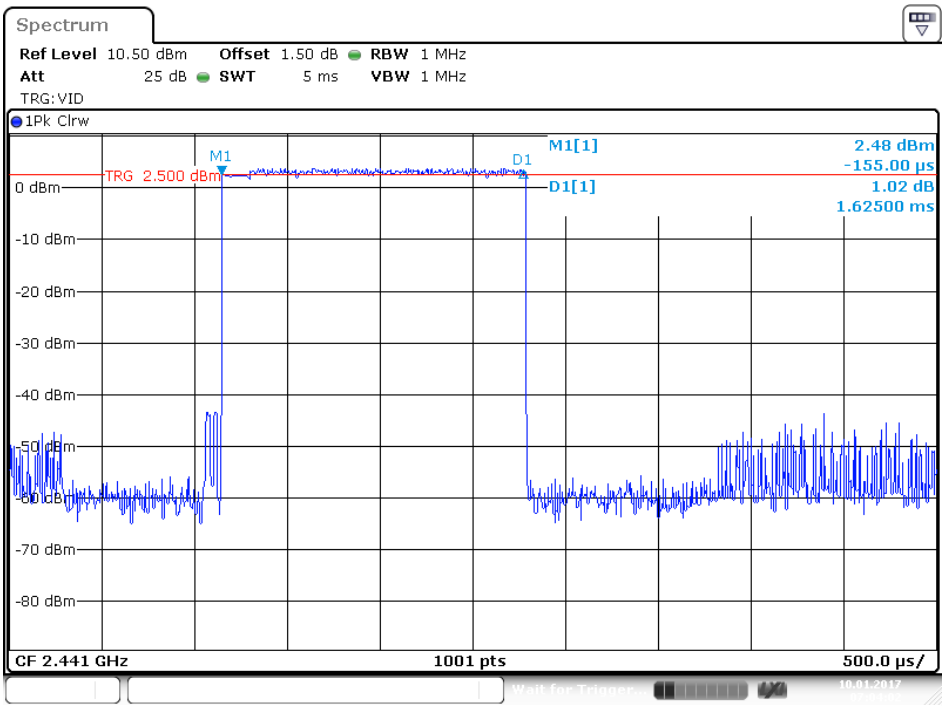
Date: 10.JAN.2017 07:01:38

3DH1: Hopping Number /10



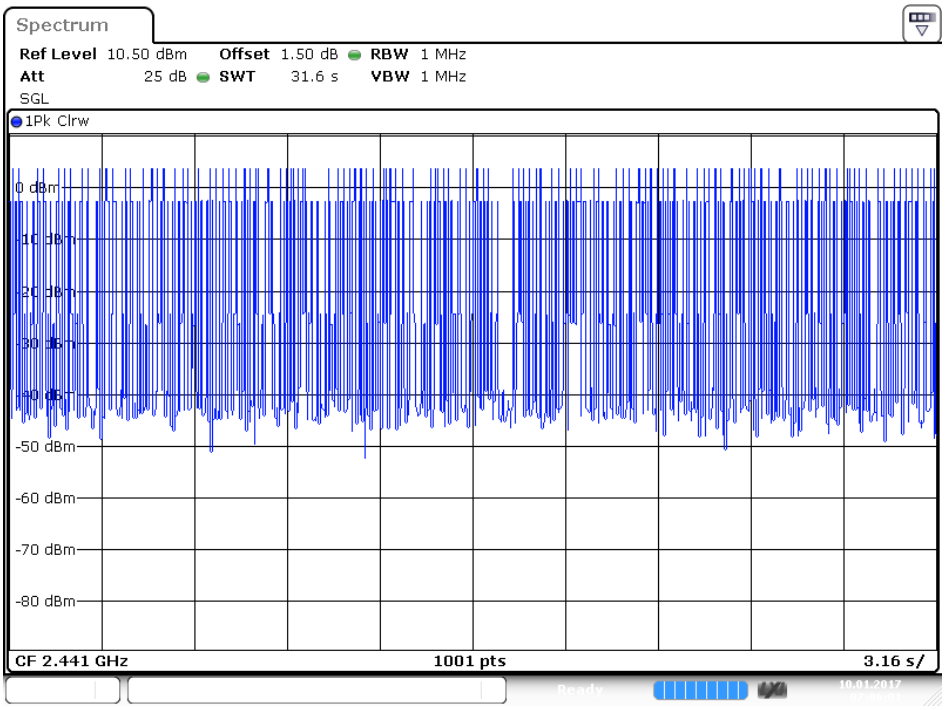
Date: 10.JAN.2017 07:02:08

3DH3: Pulse Width



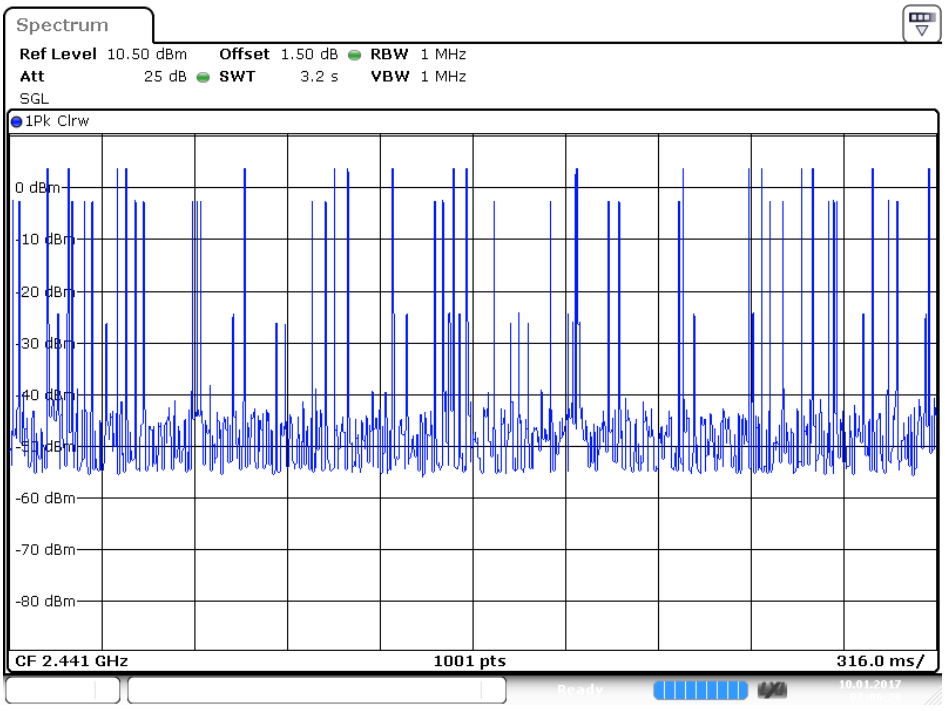
Date: 10.JAN.2017 07:04:02

3DH3: Hopping Number



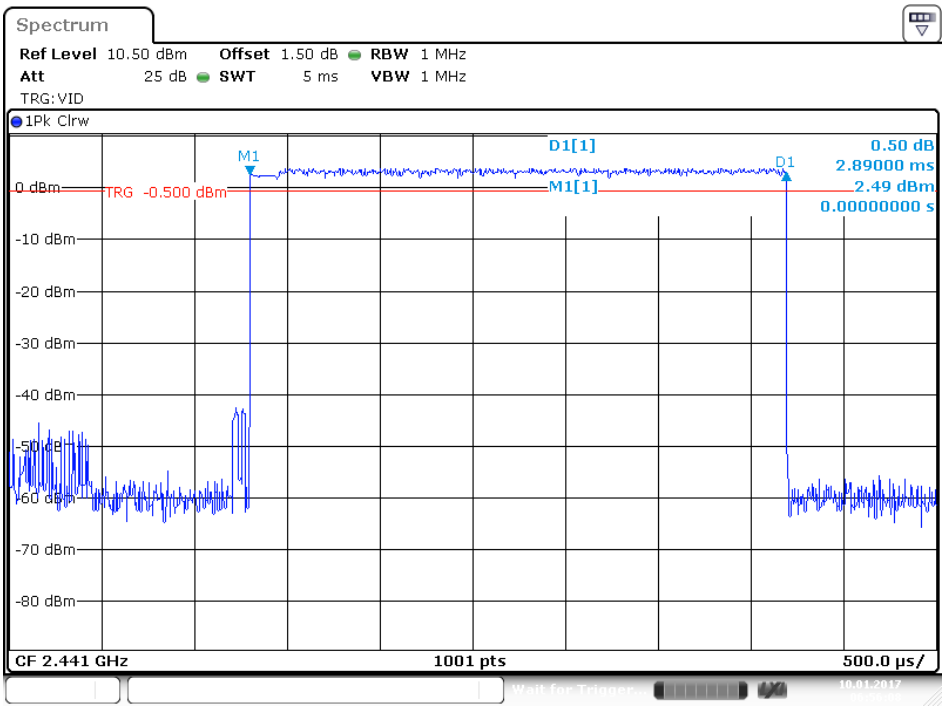
Date: 10.JAN.2017 07:06:01

3DH3: Hopping Number /10



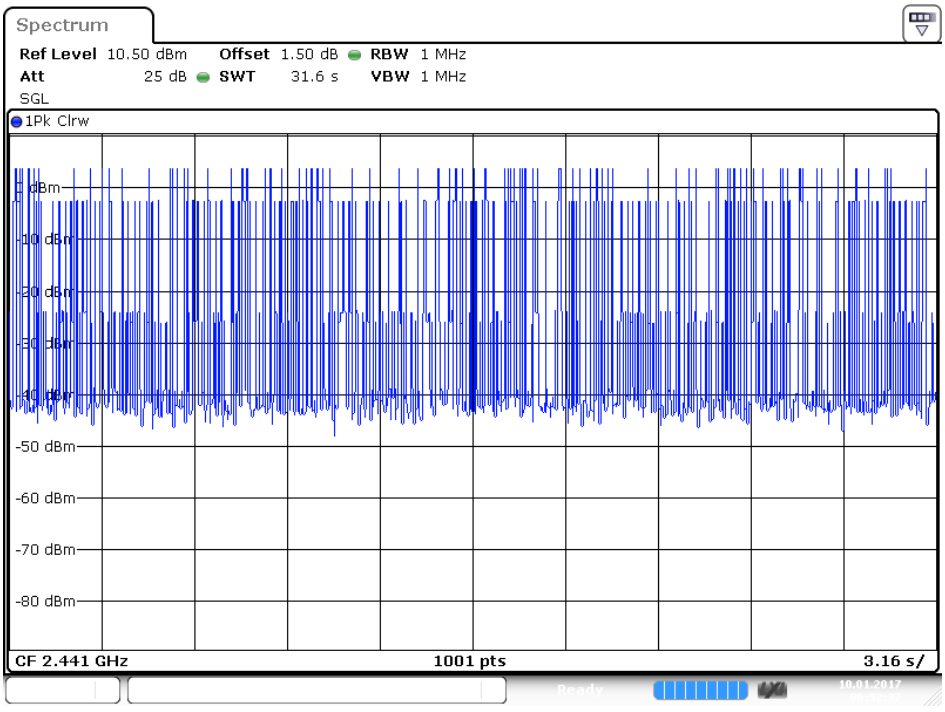
Date: 10.JAN.2017 07:06:20

3DH5: Pulse Width



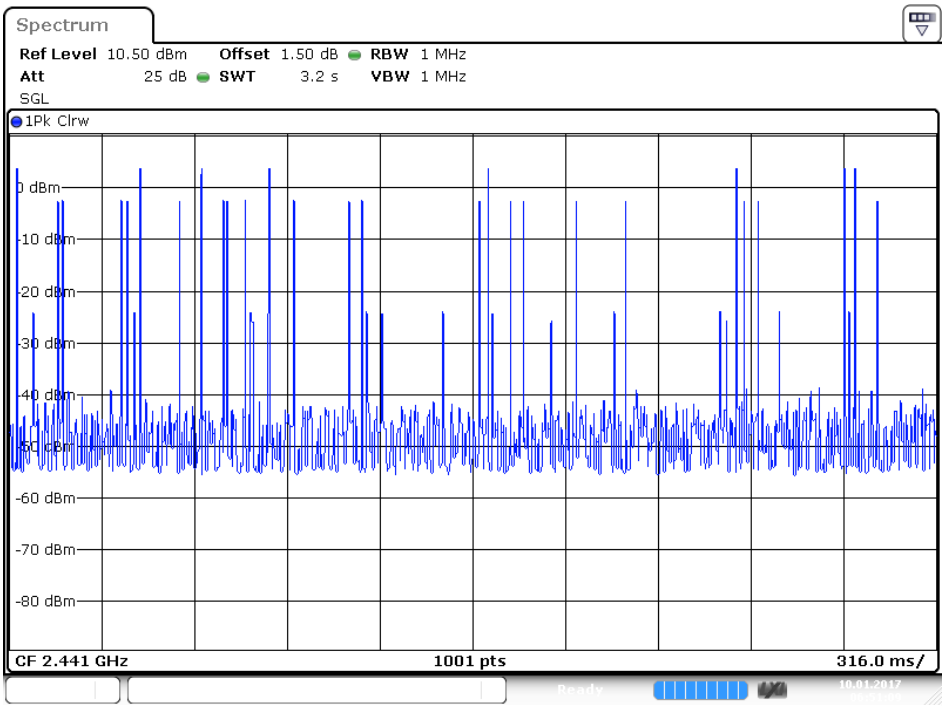
Date: 10.JAN.2017 06:56:08

3DH5: Hopping Number



Date: 10.JAN.2017 06:52:37

3DH5: Hopping Number /10



Date: 10.JAN.2017 06:51:10

11 FCC §15.247(a)(1)(iii) –Quantity of hopping channel Test

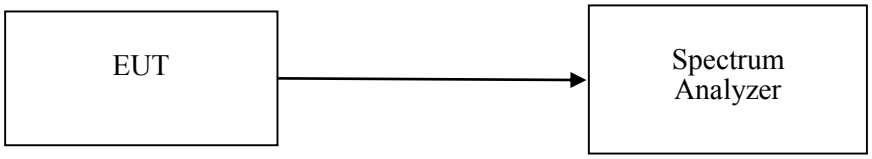
11.1 Applicable Standard

According to FCC §15.247(a) (1) (iii).

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.

11.2 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.



11.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

11.4 Test Environmental Conditions

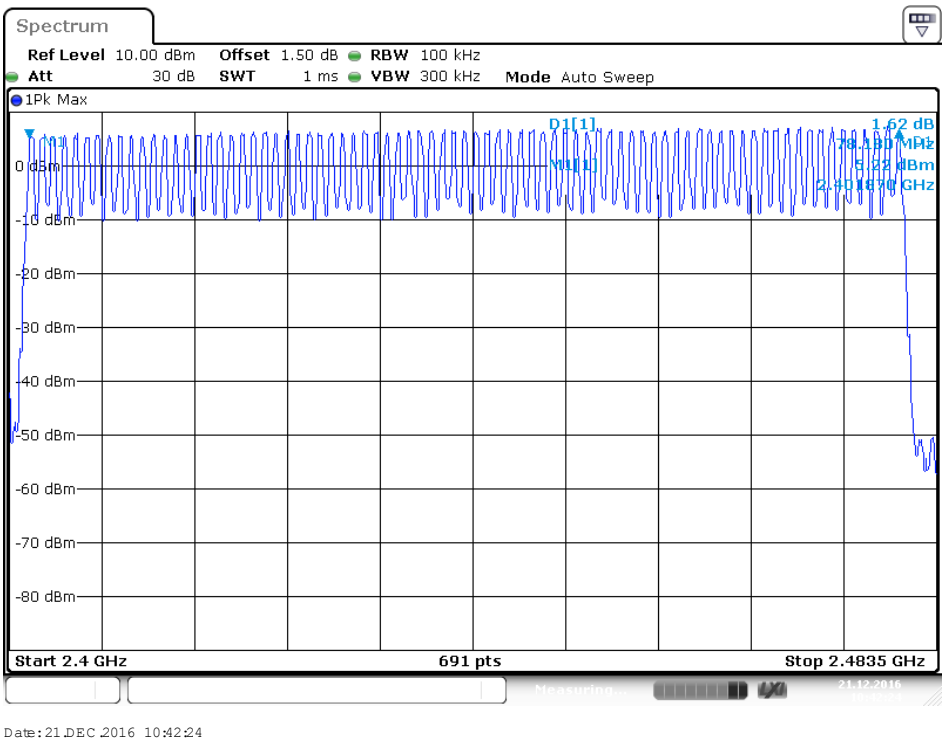
Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21.

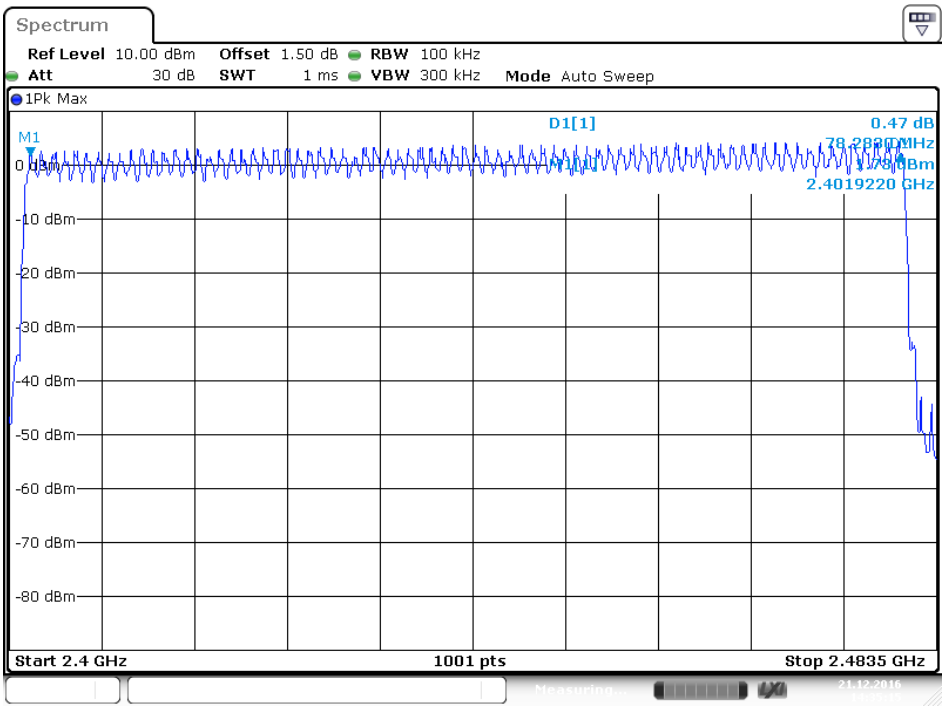
11.5 Test Results

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)	Result
GFSK	2402-2480	79	>15	Compliance
π/4-DQPSK	2402-2480	79	>15	Compliance
8DPSK	2402-2480	79	>15	Compliance

BDR Mode (GFSK)

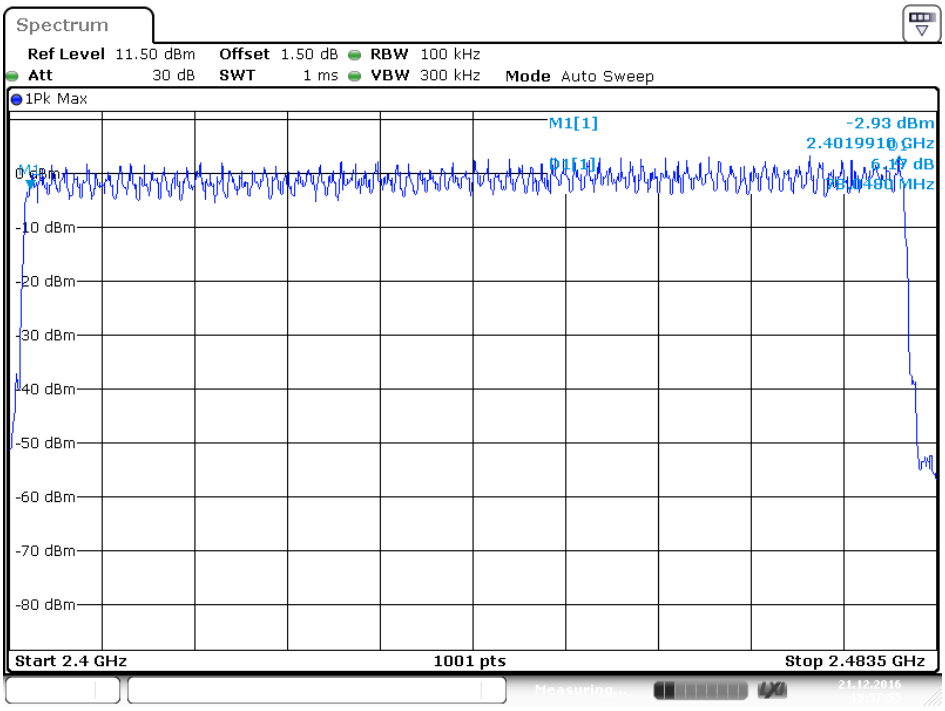


EDR Mode (π/4-DQPSK)



Date: 21.DEC.2016 14:35:15

EDR Mode (8-DPSK)



Date: 21.DEC.2016 15:57:55

12 FCC §15.247(b)(1) – Maximum Output Power

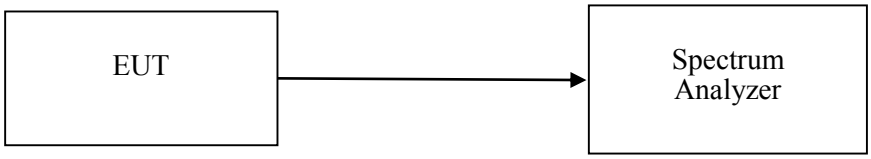
12.1 Applicable Standard

According to FCC §15.247(b) (1).

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.

12.2 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.



12.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

12.4 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-23.

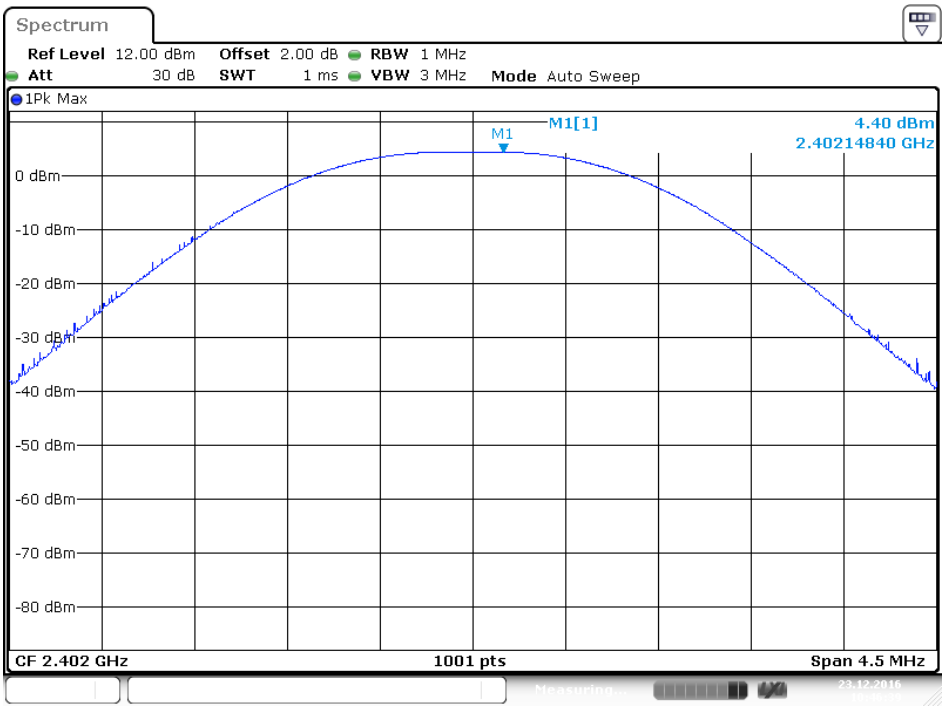
12.5 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (W)	Limit (W)	Result
BDR Mode (GFSK)					
Low	2402	4.40	0.00275	1	Compliance
Middle	2441	3.17	0.00207	1	Compliance
High	2480	2.02	0.00159	1	Compliance
EDR Mode (π/4-DQPSK)					
Low	2402	2.31	0.00170	1	Compliance
Middle	2441	1.30	0.00135	1	Compliance
High	2480	0.05	0.00101	1	Compliance
EDR Mode (8-DPSK)					
Low	2402	1.84	0.00153	1	Compliance
Middle	2441	1.00	0.00126	1	Compliance
High	2480	-0.51	0.00089	1	Compliance

Please refer to the following plots

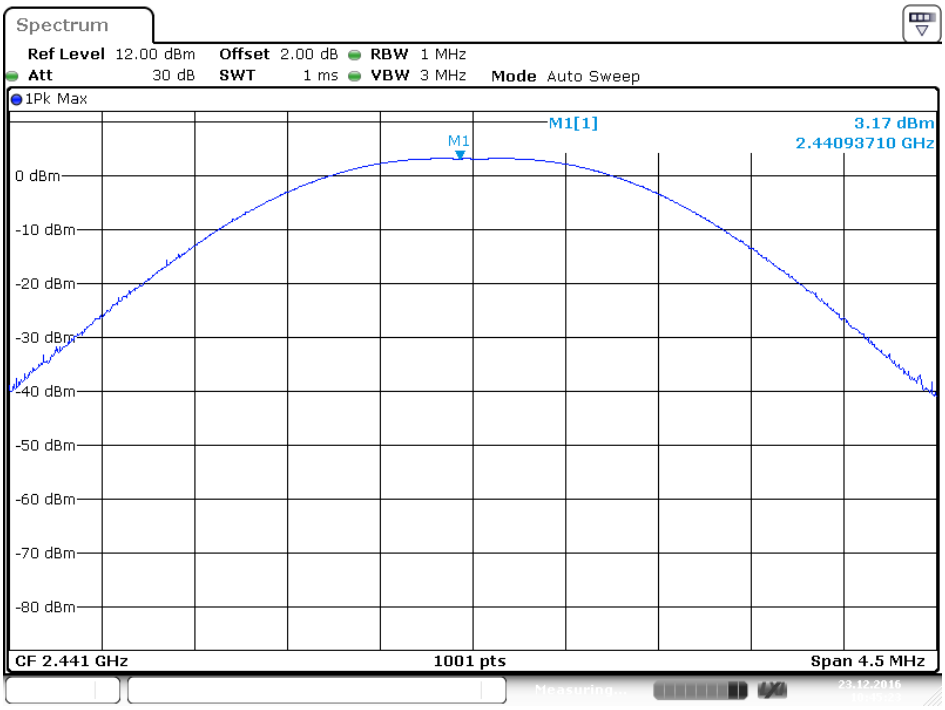
BDR Mode (GFSK)

Low Channel



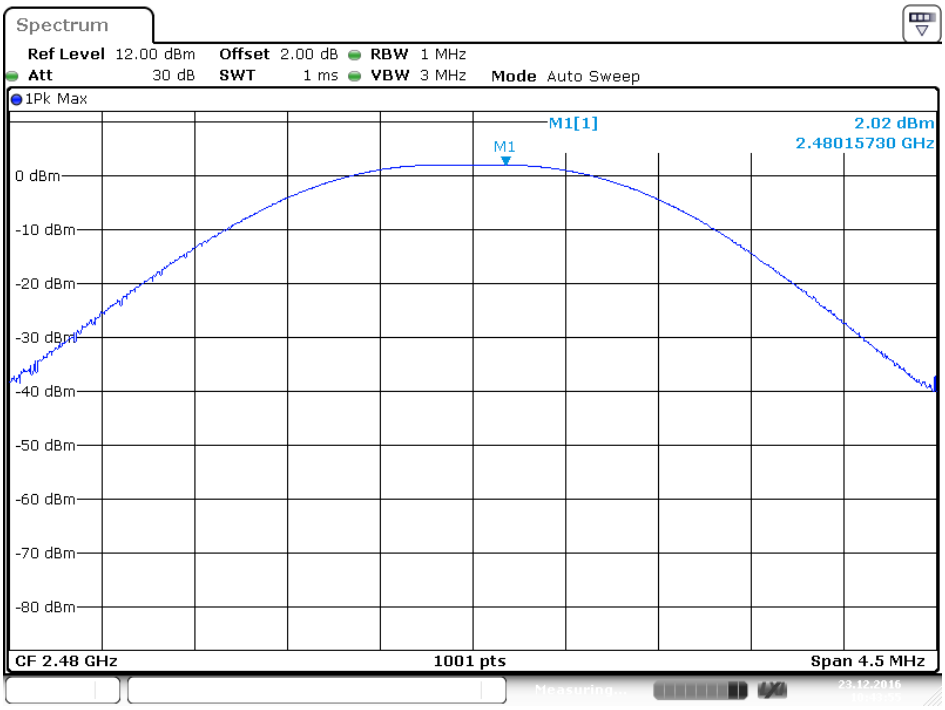
Date: 23.DEC.2016 10:46:40

Middle Channel



Date: 23.DEC.2016 10:45:24

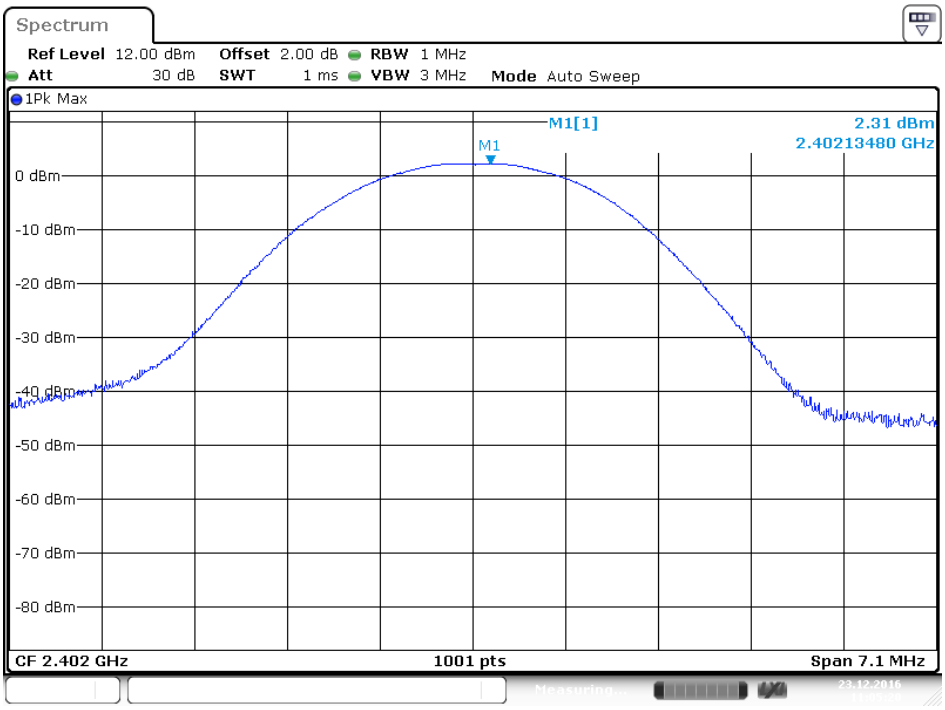
High Channel



Date: 23.DEC.2016 10:43:56

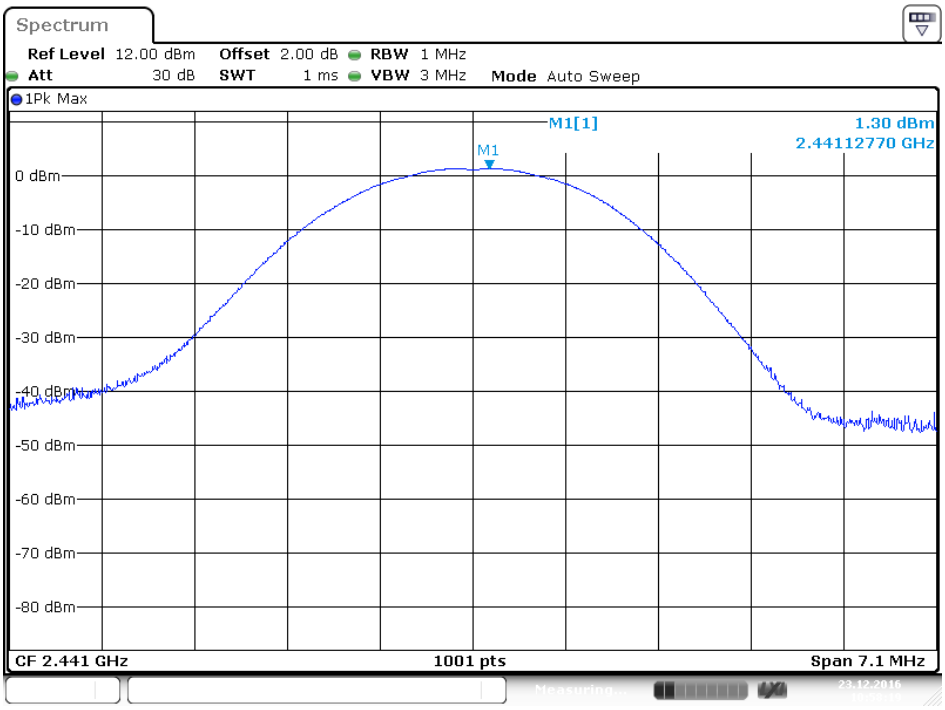
EDR Mode (π/4-DQPSK)

Low Channel



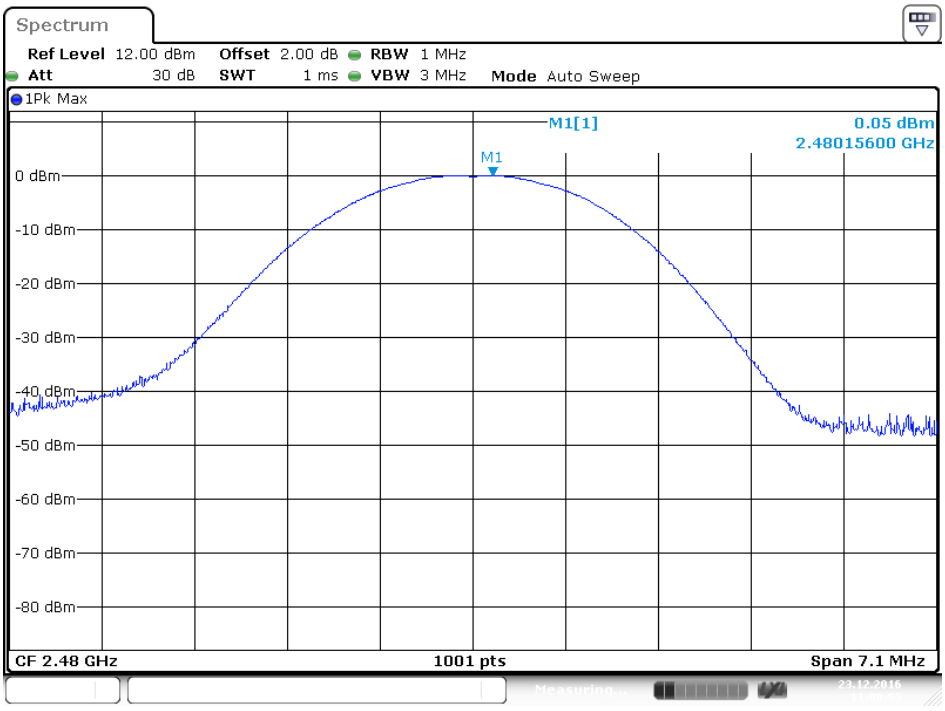
Date: 23.DEC.2016 11:05:20

Middle Channel



Date: 23.DEC.2016 10:58:20

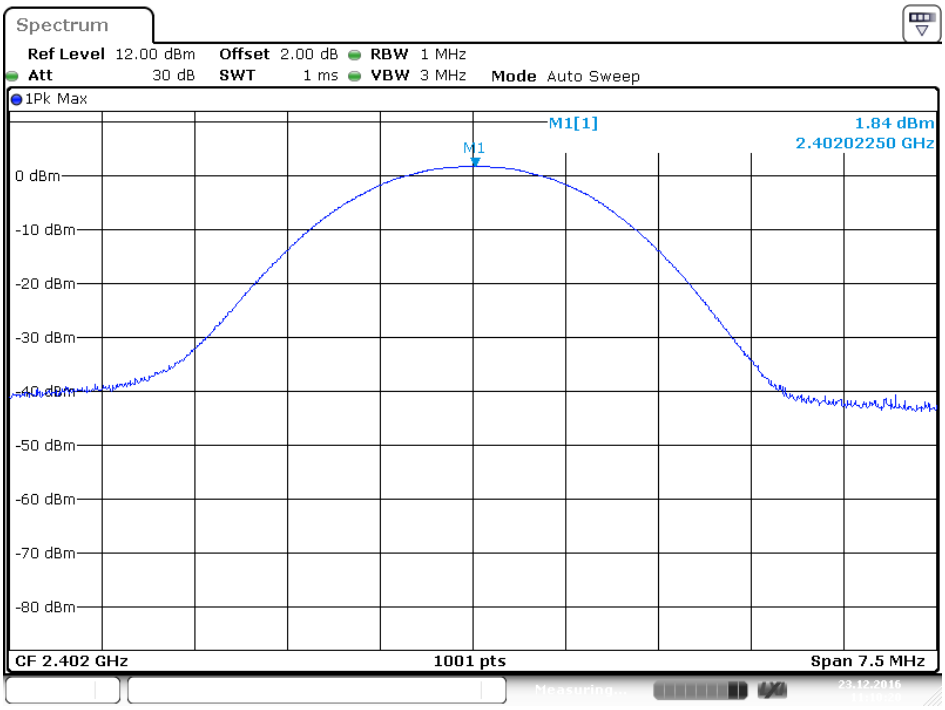
High Channel



Date: 23.DEC.2016 11:00:56

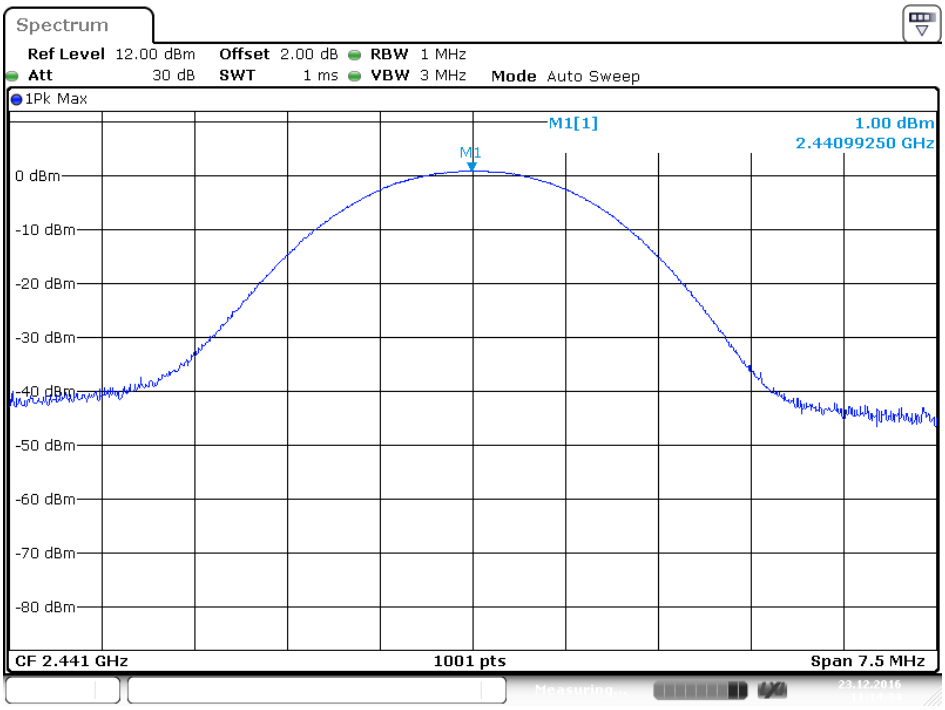
EDR Mode (8-DPSK)

Low Channel



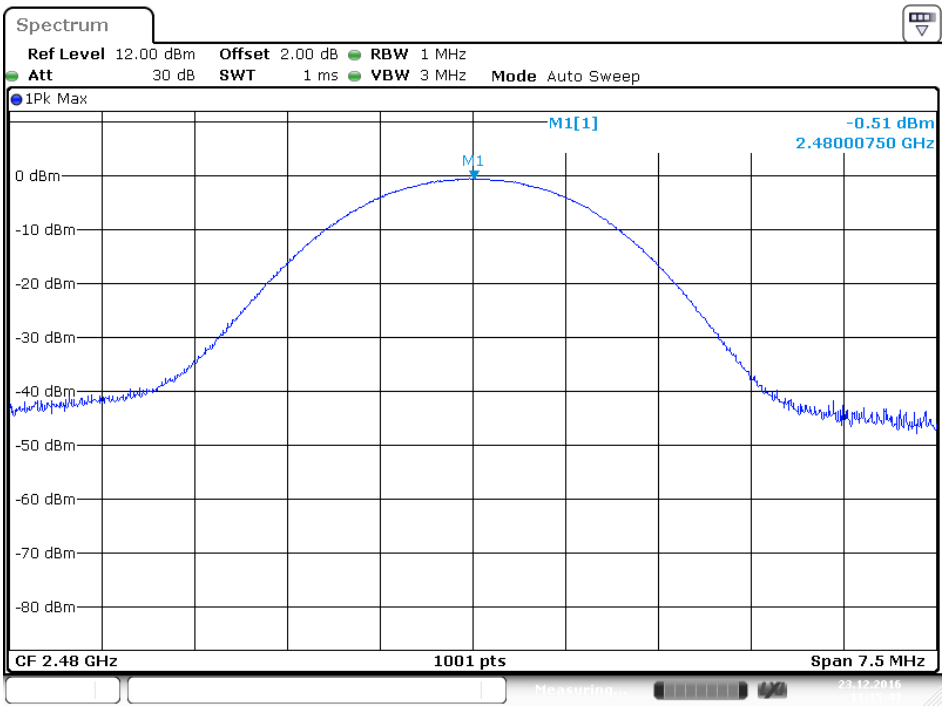
Date: 23.DEC.2016 11:10:20

Middle Channel



Date: 23.DEC.2016 11:14:34

High Channel



Date: 23.DEC.2016 11:15:43

13 FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

13.1 Applicable Standard

According to FCC §15.247(d).

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)).

13.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 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.

13.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/7/14	2017/7/13
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R

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

13.4 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	1010 hPa

The testing was performed by David Hsu on 2016-12-21.

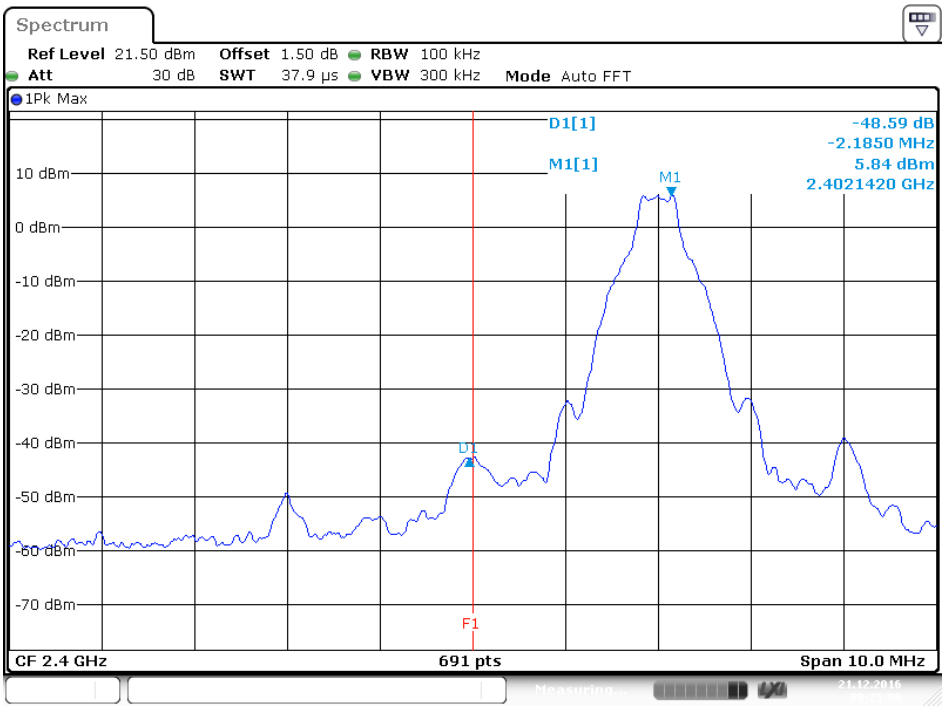
13.5 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	RESULT
BDR Mode (GFSK)				
Low	2402	48.59	≥ 20	PASS
High	2480	49.51	≥ 20	PASS
BDR Hopping Mode (GFSK)				
Low	2402-2480	56.53	≥ 20	PASS
High	2402-2480	56.58	≥ 20	PASS
EDR Mode (π/4-DQPSK)				
Low	2402	49.01	≥ 20	PASS
High	2480	46.67	≥ 20	PASS
EDR Hopping Mode (π/4-DQPSK)				
Low	2402-2480	51.35	≥ 20	PASS
High	2402-2480	54.99	≥ 20	PASS
EDR Mode (8-DPSK)				
Low	2402	49.5	≥ 20	PASS
High	2480	46.57	≥ 20	PASS
EDR Hopping Mode (8-DPSK)				
Low	2402-2480	50.82	≥ 20	PASS
High	2402-2480	46.71	≥ 20	PASS

Please refer to the following plots

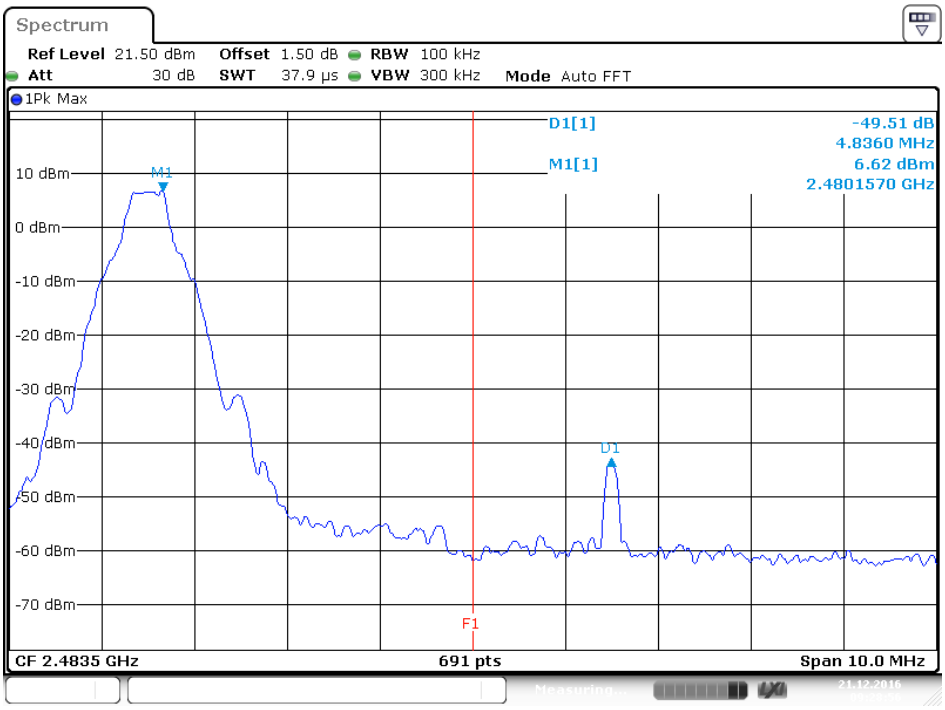
BDR Mode (GFSK)

Band Edge, CH Low



Date: 21.DEC.2016 09:25:00

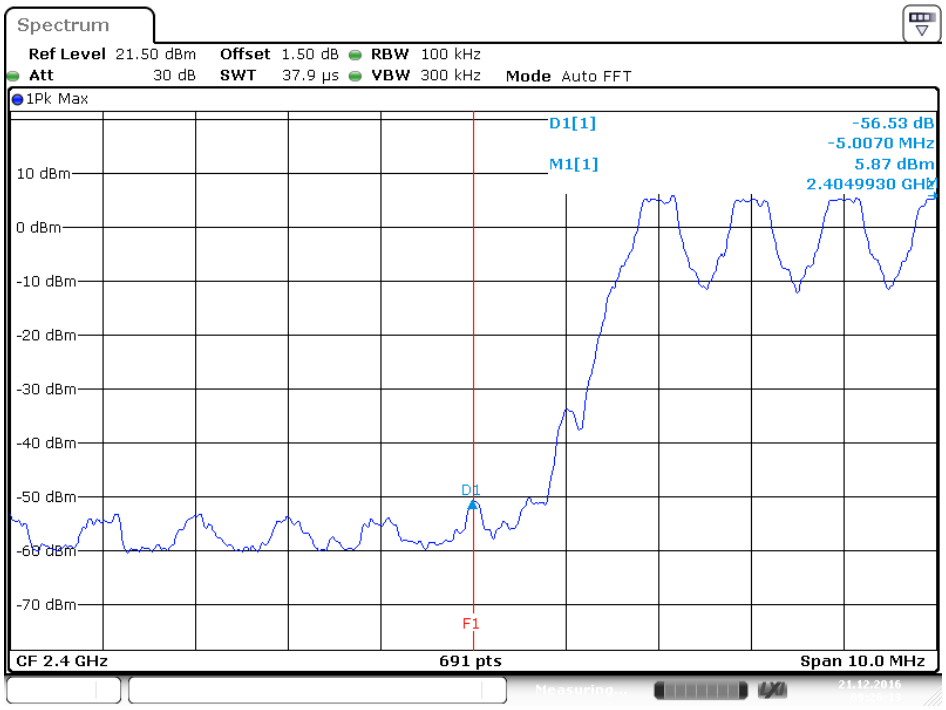
Band Edge, CH High



Date: 21.DEC.2016 09:28:57

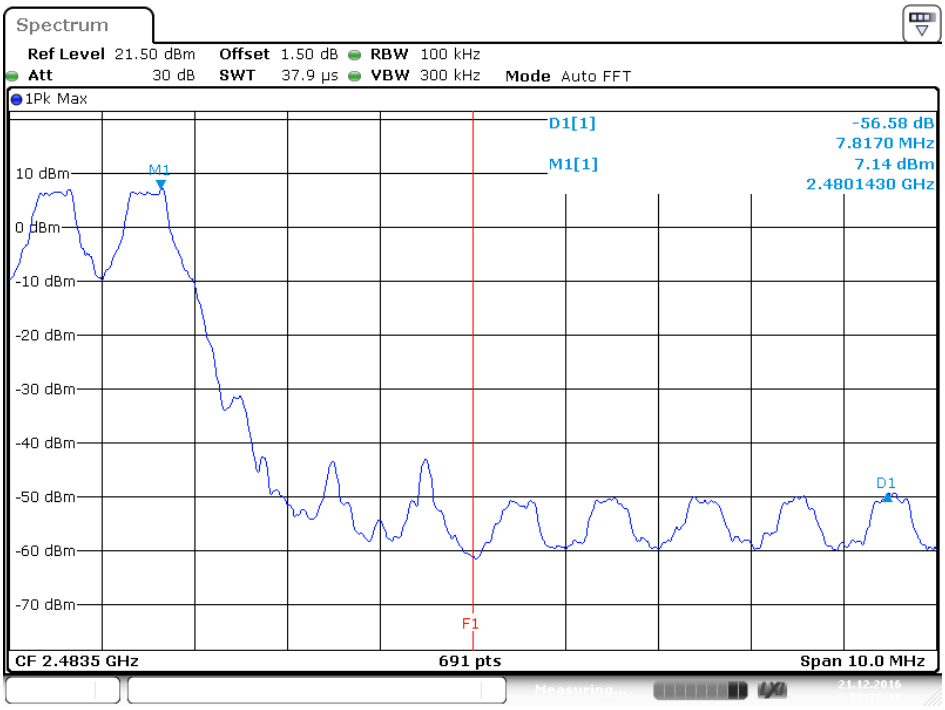
BDR Hopping Mode (GFSK)

Band Edge, CH Low



Date: 21.DEC.2016 09:26:13

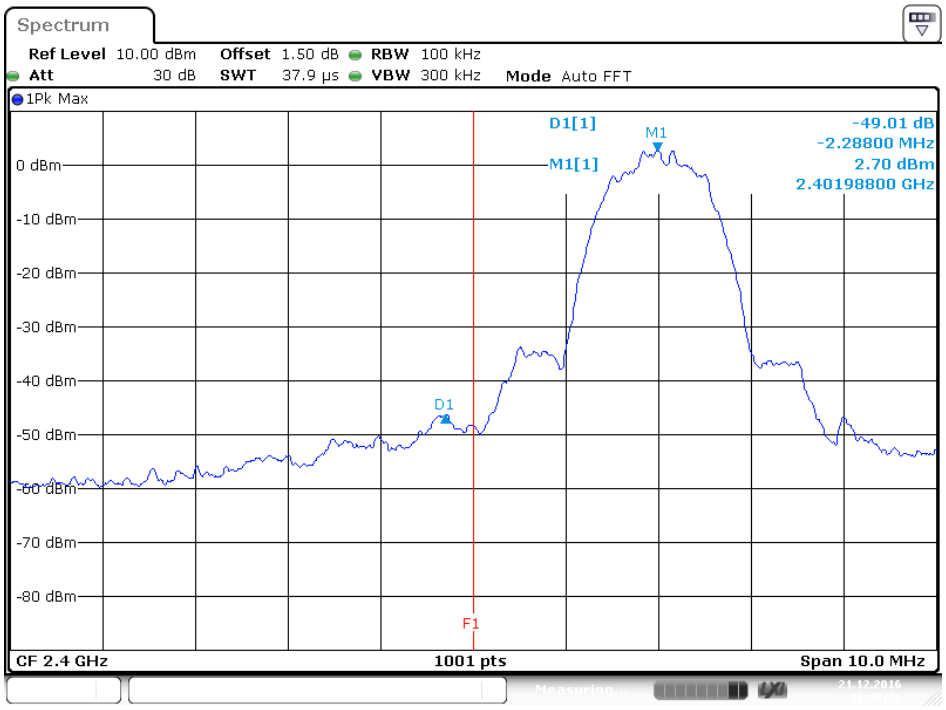
Band Edge, CH High



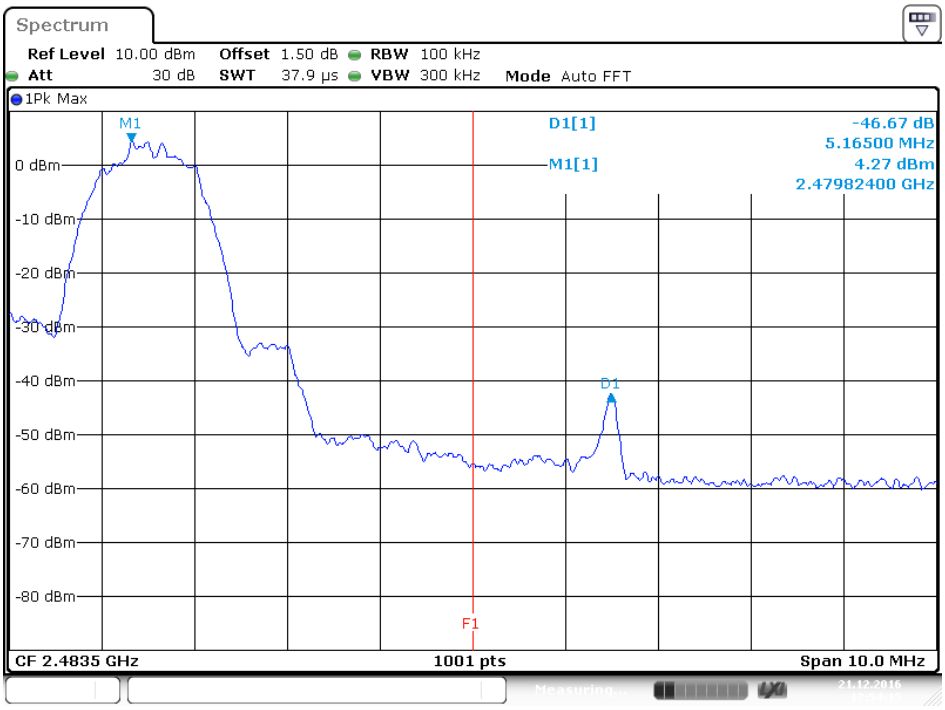
Date: 21.DEC.2016 09:30:19

EDR Mode (π/4-DQPSK)

Band Edge, CH Low

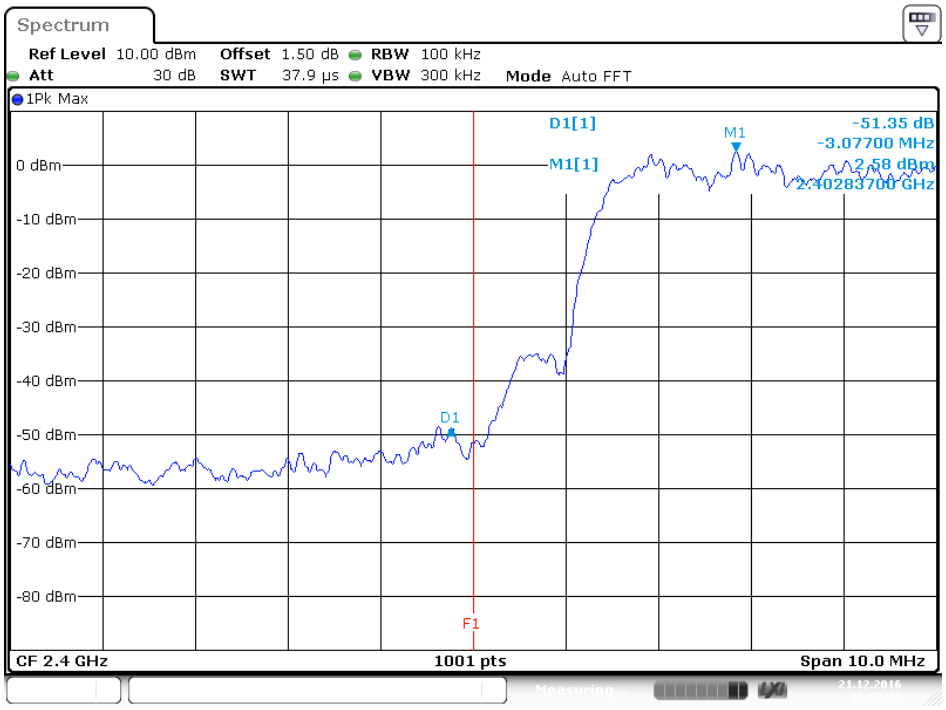


Band Edge, CH High



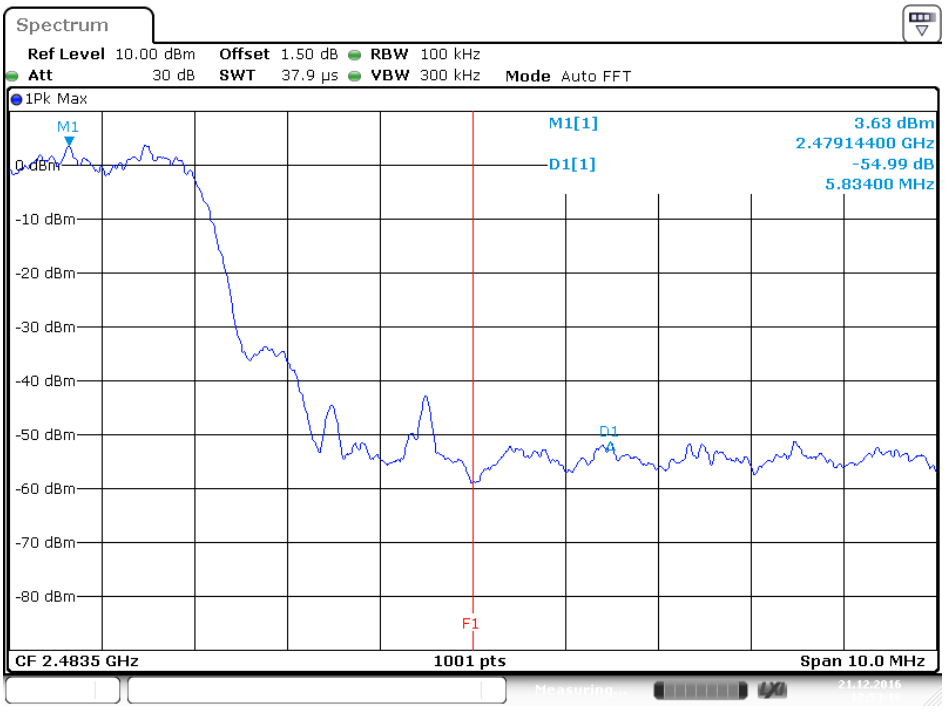
EDR Hopping Mode (π/4-DQPSK)

Band Edge, CH Low



Date: 21.DEC.2016 12:50:24

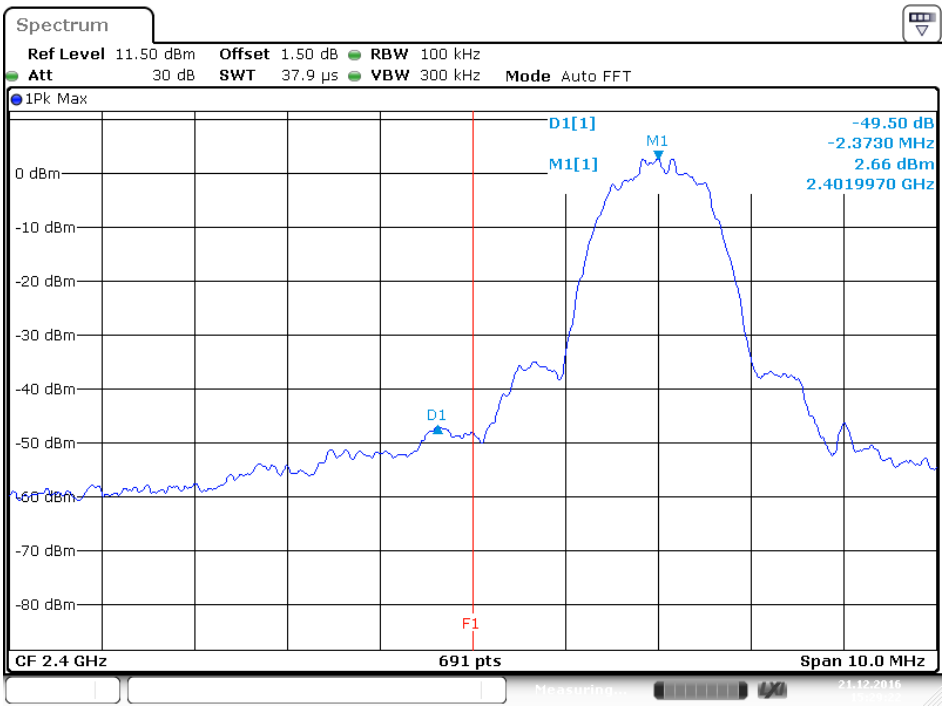
Band Edge, CH High



Date: 21.DEC.2016 12:53:16

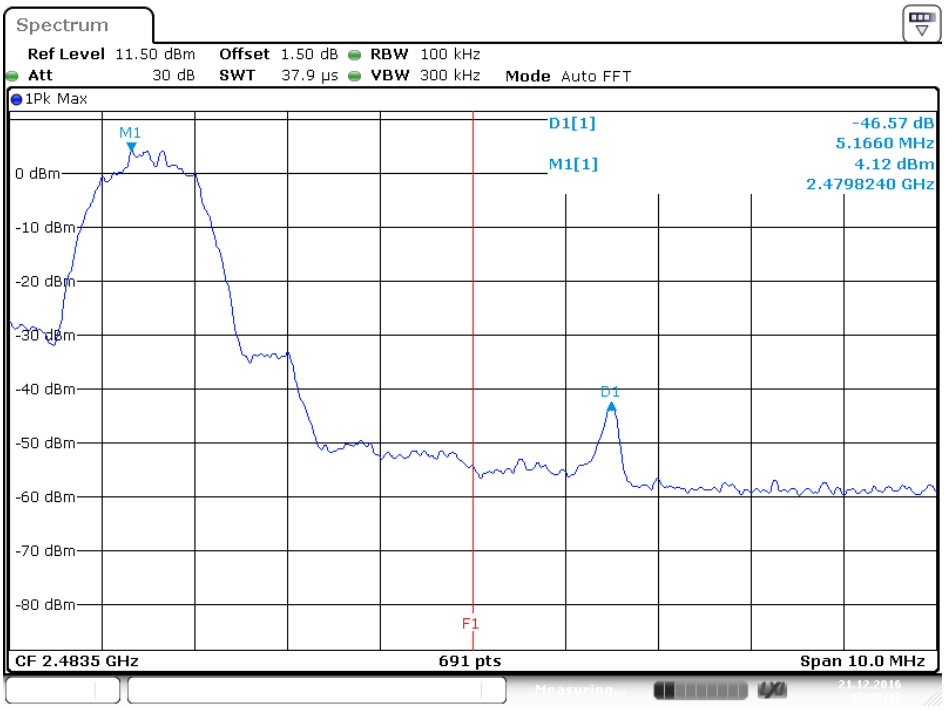
EDR Mode (8-DPSK)

Band Edge, CH Low



Date: 21.DEC.2016 15:29:22

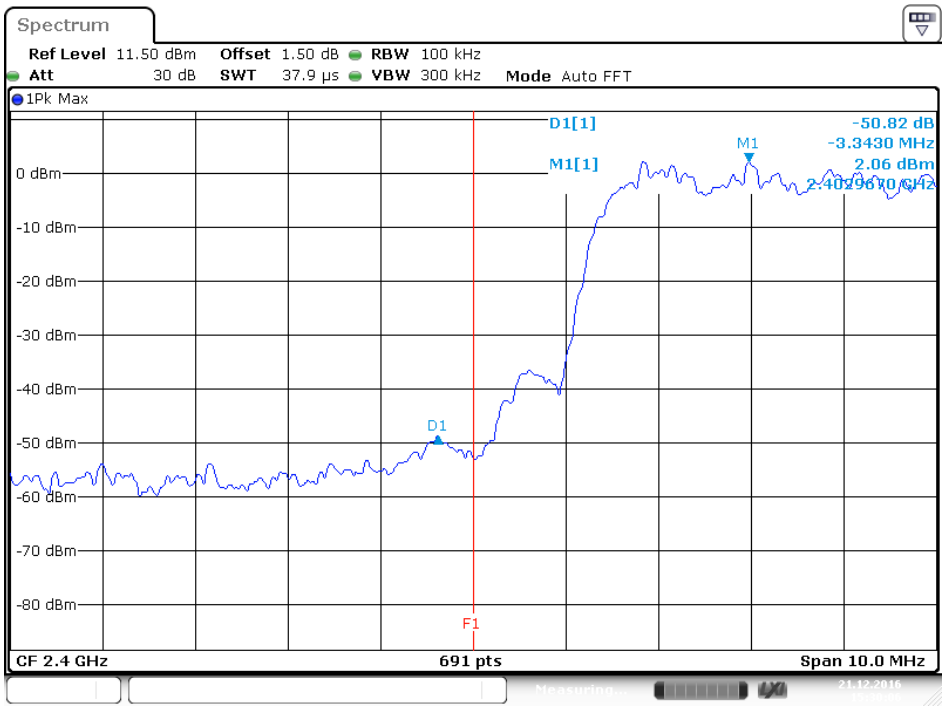
Band Edge, CH High



Date: 21.DEC.2016 15:25:17

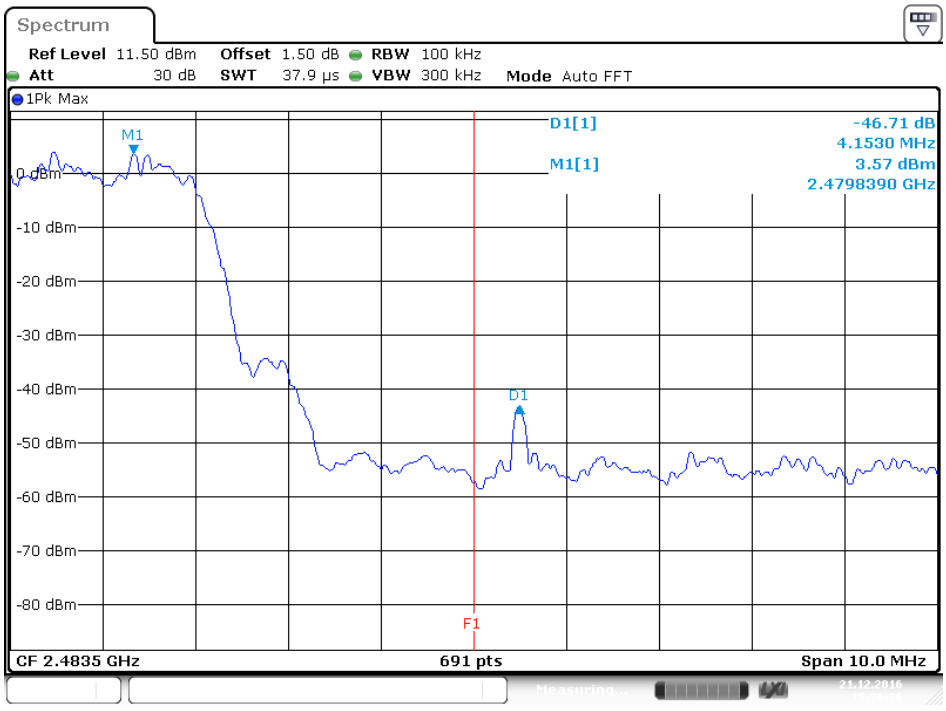
EDR Hopping Mode (8-DPSK)

Band Edge, CH Low



Date: 21.DEC.2016 15:30:05

Band Edge, CH High



Date: 21.DEC.2016 15:26:26

----- END OF REPORT -----