



TESTING LABORATORY
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TEST REPORT

For

SZ DJI TECHNOLOGY CO., LTD

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Shenzhen, Guangdong, China

FCC ID: SS3-RM5001808
IC: 11805A-RM5001808

Report Type: Original Report	Product Name: DJI Smart Controller
Report Number: RDG180812002-00A	
Report Date: 2018-09-15	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		DJI Smart Controller
EUT Model:		RM500
FCC ID:		SS3-RM5001808
IC:		11805A-RM5001808
Rated Input Voltage:		DC7.2V from battery or DC 3.6-12 V from adapter
Nominal Adapter Information	Input:	100-240V-50/60Hz 0.8A Max
	Output:	DC3.6-8V, 3.0A/ DC12V, 2.0A
External Dimension:		17.9cm(L)* 12.2cm(W)* 3.9cm(H)
Serial Number:		180812002
EUT Received Date:		2018.08.12

Objective

This report is prepared on behalf of *SZ DJI TECHNOLOGY CO., LTD* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules and RSS-247, Issue 2, February 2017, RSS-Gen, Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

The tests were performed in order to determine the Bluetooth BDR and EDR mode of EUT compliance with FCC Rules Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules and RSS-247, Issue 2, February 2017, RSS-Gen, Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS, Part 15E NII and Part 15B JAB submissions with FCC ID: SS3-RM5001808.
RSS-247 DTSS, LE-LAN submissions with IC: 11805A-RM5001808.
Part of system Grants with FCC ID: SS3-L1P1805, IC: 11805A-L1P1805.

Test Methodology

All measurements detailed in this test report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices" and KDB 558074 D01 15.247 Meas Guidance v05. And RSS-247, Issue 2, February 2017, RSS-Gen, Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 0.61\text{ dB}$
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Unwanted Emissions, conducted	$\pm 1.5\text{ dB}$
Temperature	$\pm 1^\circ\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 0.4\%$
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

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

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacturer.

The device employs Bluetooth BDR and EDR.

EUT Exercise Software

Test software: ' QRCT ' was used in test, configured maximum power level as below setting:

Mode	Channel	Frequency (MHz)	Power Level Setting
GFSK	Low	2402	8
	Middle	2441	8
	High	2480	8
$\pi/4$ DQPSK	Low	2402	8
	Middle	2441	8
	High	2480	8
8DPSK	Low	2402	8
	Middle	2441	8
	High	2480	8

Equipment Modifications

No modification was made to the EUT.

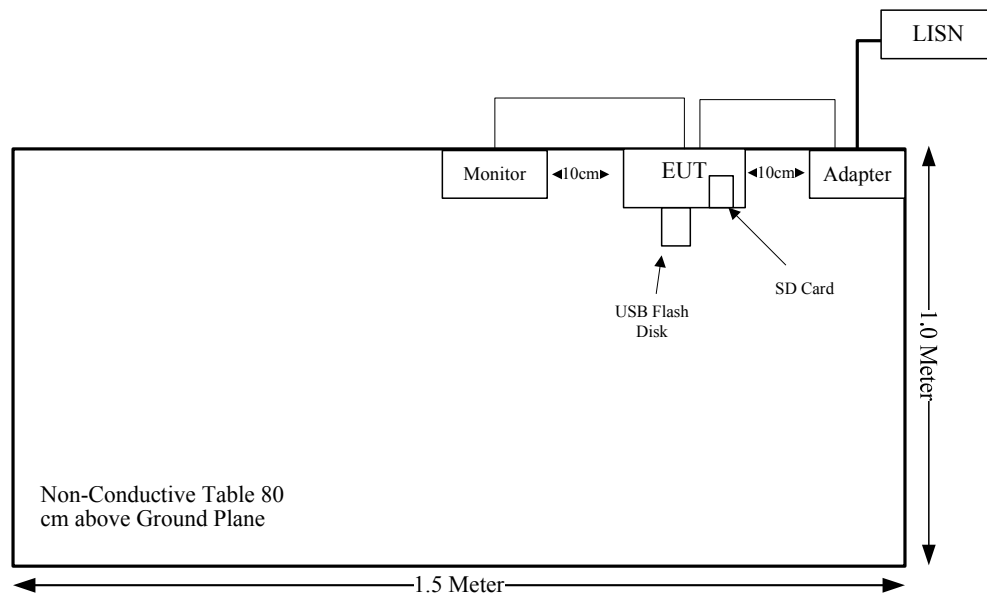
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SAMSUNG	Monitor	S22C330H	ZXDCHTHD101491K
Kingston	SD card	4G	/
Kingston	USB Flash Disk	4G	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	yes	No	1.1	Adapter	EUT
HDMI cable	yes	yes	1.0	EUT	Monitor

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093 RSS-102 §4	RF Exposure	Compliance
FCC§15.203, RSS-GEN Clause 6.8	Antenna Requirement	Compliance
FCC§15.207 (a), RSS-Gen Clause 8.8	Conducted Emissions	Compliance
FCC§15.205, §15.209, FCC §15.247(d), RSS-247 Clause 5.5, RSS-Gen Clause 8.10	Spurious Emissions	Compliance
FCC §15.247 (a)(1), RSS-247 Clause 5.1 b) RSS-Gen Clause 6.7	Emission Bandwidth	Compliance
FCC §15.247(a)(1), RSS-247 Clause 5.1 b)	Channel Separation Test	Compliance
FCC§15.247(a)(1)(iii), RSS-247 Clause 5.1 d)	Time of Occupancy (Dwell Time)	Compliance
FCC§15.247(a)(1)(iii), RSS-247 Clause 5.1 d)	Quantity of hopping channel Test	Compliance
FCC§15.247(b)(1), RSS-247 Clause 5.4 b)	Peak Output Power Measurement	Compliance
FCC§15.247(d) RSS-247 Clause 5.5	Band Edges	Compliance

FCC §15.247 (i) & §1.1310 & §2.1093, RSS-102 §4- RF EXPOSURE**Applicable Standard**

According to §15.247(i), §1.1310 and §2.1093.

According to RSS-102 §4 Table 3, SAR limits for device used by the general public

Body Region	Average SAR (W/Kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

Test Result

Compliant, please refer to the SAR report: RDG180812002-20.

FCC §15.203 & RSS-GEN CLAUSE 6.8 - 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.

According to RSS-Gen §6.8, The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

Antenna Information And Connector Construction

The EUT has 4 PCB antenna arrangement, use unique connector coupling to the radio board, fulfill the requirement of this section. Please refer to the EUT photos and below information:

Antenna	Manufacturer	Model Number	Antenna Type	Connector Type	input impedance (Ohm)	Antenna Gain /Frequency
WIFI Chain 0	DJI	RM500-WIFI-A NT	PCB	IPEX	50	2.5 dBi/2.4GHz 2.8 dBi/5.2GHz 5.0 dBi/5.8GHz
WIFI/BT Chain 1	DJI	RM500-WIFI-A NT	PCB	IPEX	50	2.5 dBi/2.4GHz 2.8 dBi/5.2GHz 5.0 dBi/5.8GHz
SDR Chain 0	DJI	RM500-SDR-A NT	PCB	IPEX	50	3.5 dBi/2.4GHz 4.0 dBi/5.8GHz
SDR Chain 1	DJI	RM500-SDR-A NT	PCB	IPEX	50	3.5 dBi/2.4GHz 4.0 dBi/5.8GHz

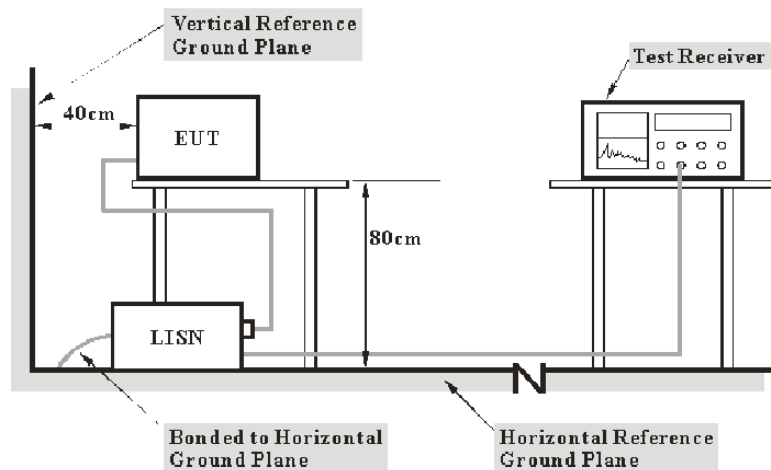
Result: Compliance.

FCC §15.207 (a) & RSS-GEN CLAUSE 8.8 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a), RSS-GEN CLAUSE 8.8.

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 and RSS-Gen limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

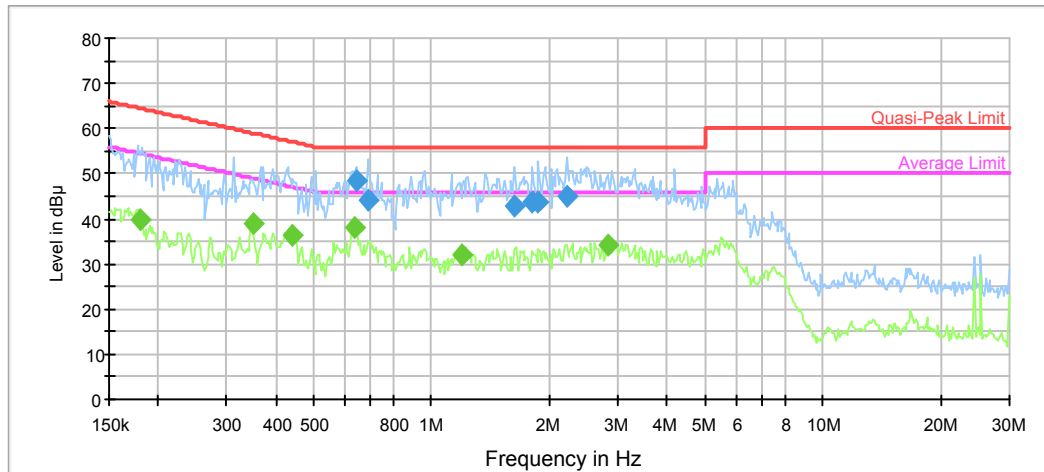
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

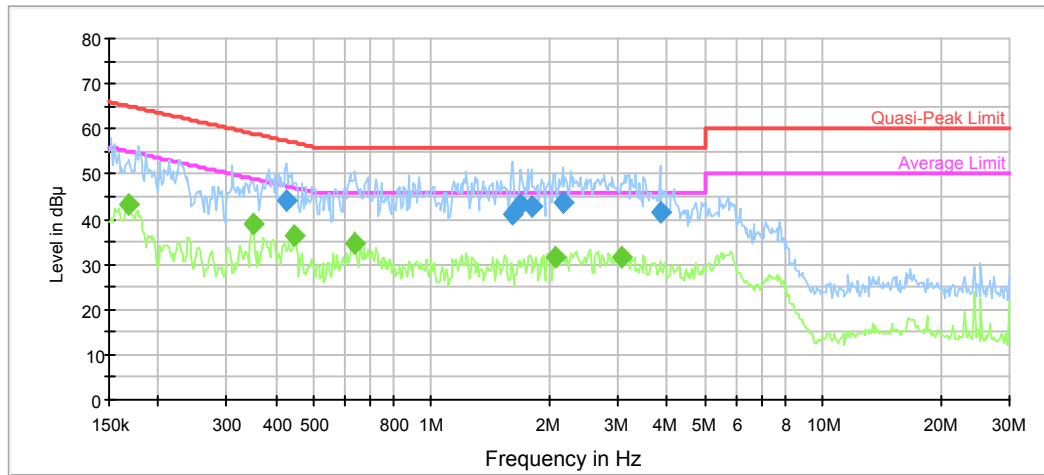
Temperature:	27.6 °C
Relative Humidity:	49 %
ATM Pressure:	100.7 kPa

The testing was performed by Lily Xie on 2018-09-07.

Test Mode: *Transmitting***AC120V, 60 Hz, Line:**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.644717	48.3	9.000	L1	9.8	7.7	56.0	Compliance
0.687153	44.0	9.000	L1	9.8	12.0	56.0	Compliance
1.624765	42.9	9.000	L1	9.7	13.1	56.0	Compliance
1.816511	43.5	9.000	L1	9.7	12.5	56.0	Compliance
1.875341	43.5	9.000	L1	9.7	12.5	56.0	Compliance
2.216927	45.1	9.000	L1	9.7	10.9	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.180171	40.0	9.000	L1	10.8	14.5	54.5	Compliance
0.349066	38.9	9.000	L1	10.0	10.1	49.0	Compliance
0.443327	36.5	9.000	L1	9.9	10.5	47.0	Compliance
0.639600	38.0	9.000	L1	9.8	8.0	46.0	Compliance
1.200302	32.0	9.000	L1	9.8	14.0	46.0	Compliance
2.838101	34.0	9.000	L1	9.8	12.0	46.0	Compliance

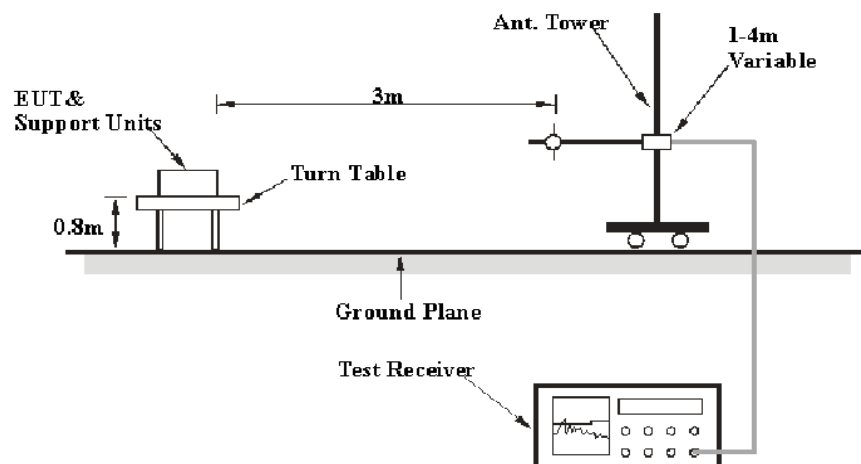
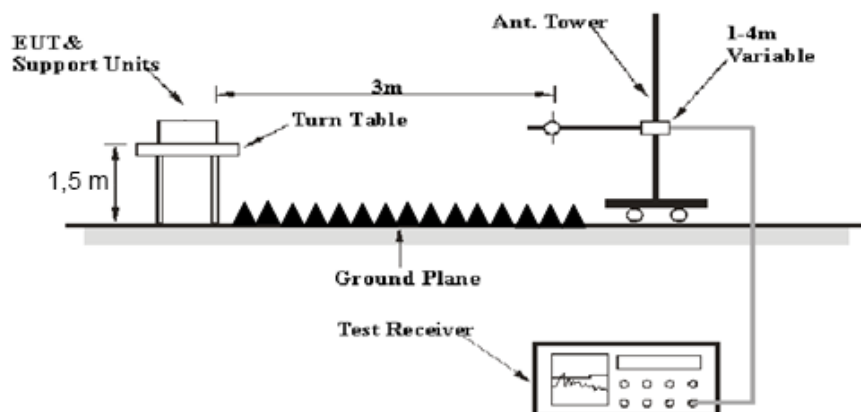
AC120V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.426011	44.2	9.000	N	9.9	13.1	57.3	Compliance
1.611870	41.3	9.000	N	9.7	14.7	56.0	Compliance
1.690804	43.1	9.000	N	9.7	12.9	56.0	Compliance
1.802095	43.0	9.000	N	9.7	13.0	56.0	Compliance
2.164561	43.8	9.000	N	9.8	12.2	56.0	Compliance
3.841741	41.4	9.000	N	9.8	14.6	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.167702	43.4	9.000	N	10.9	11.7	55.1	Compliance
0.349066	38.8	9.000	N	10.0	10.2	49.0	Compliance
0.446873	36.2	9.000	N	9.9	10.7	46.9	Compliance
0.639600	34.4	9.000	N	9.8	11.6	46.0	Compliance
2.063510	31.4	9.000	N	9.8	14.6	46.0	Compliance
3.049107	31.4	9.000	N	9.8	14.6	46.0	Compliance

FCC §15.209, §15.205 & §15.247(d) & RSS-247 CLAUSE 5.5, RSS -GEN CLAUSE 8.10- SPURIOUS EMISSIONS**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205; RSS-247 Clause 5.5, RSS-GEN Clause 8.10

EUT Setup**Below 1GHz:****Above 1GHz:**

The radiated emission below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 and the RSS-247 Clause 5.5, RSS-GEN Clause 8.10 limits.

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 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	Measurement
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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
MITEQ	Amplifier	AFS42-00101800- 25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5- S	OE01601525	2018-06-16	2019-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16

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

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Data**Environmental Conditions**

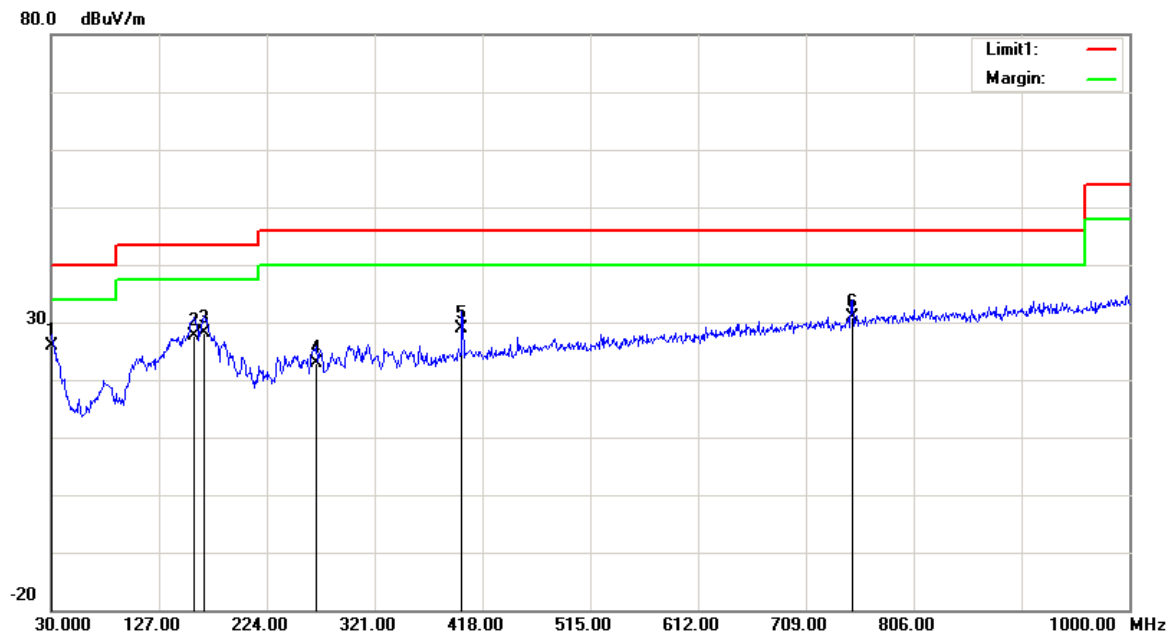
Temperature:	25.9~27.3°C
Relative Humidity:	43~44 %
ATM Pressure:	100.5~100.9 kPa

* The testing was performed by Vern Shen and Blake Yang from 2018-08-31 to 2018-09-04.

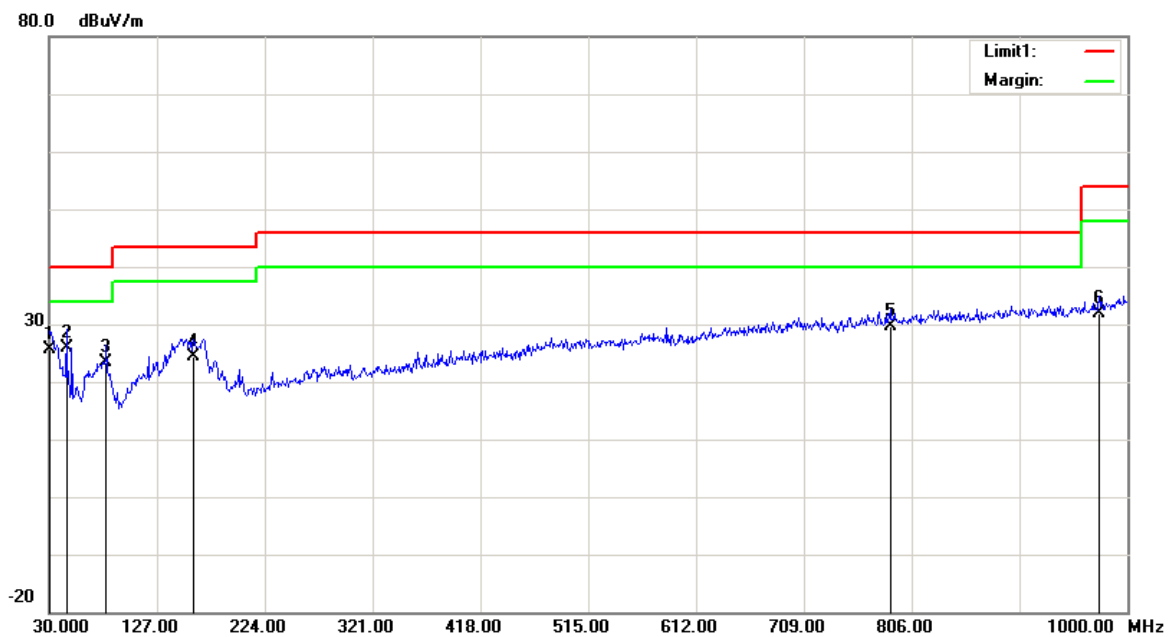
Test Mode: Transmitting

1) 30MHz-1GHz (GFSK middle channel was the worst)

Horizontal:



Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	24.25	QP	1.55	25.80	40.00	14.20
159.0100	33.67	QP	-5.97	27.70	43.50	15.80
167.7400	34.74	QP	-6.54	28.20	43.50	15.30
268.6200	27.28	QP	-4.38	22.90	46.00	23.10
399.5700	30.81	QP	-2.01	28.80	46.00	17.20
750.7100	27.26	QP	3.64	30.90	46.00	15.10

Vertical:

Frequency (MHz)	Receiver Reading (dB μ V)	Detector	Correction Factor (dB/m)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
30.0000	24.15	QP	1.55	25.70	40.00	14.30
45.5200	35.44	QP	-9.44	26.00	40.00	14.00
81.4100	34.68	QP	-11.38	23.30	40.00	16.70
159.9800	30.42	QP	-6.02	24.40	43.50	19.10
786.6000	25.02	QP	4.58	29.60	46.00	16.40
974.7800	2.64	QP	29.26	31.90	54.00	22.10

2) 1GHz-26.5GHz:*BDR Mode (GFSK):*

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	63.82	PK	H	28.10	1.80	0.00	93.72	N/A	N/A
2402.00	53.35	AV	H	28.10	1.80	0.00	83.25	N/A	N/A
2402.00	60.86	PK	V	28.10	1.80	0.00	90.76	N/A	N/A
2402.00	50.41	AV	V	28.10	1.80	0.00	80.31	N/A	N/A
2390.00	24.36	PK	H	28.08	1.80	0.00	54.24	74.00	19.76
2390.00	14.28	AV	H	28.08	1.80	0.00	44.16	54.00	9.84
4804.00	47.18	PK	H	32.91	3.17	37.20	46.06	74.00	27.94
4804.00	34.83	AV	H	32.91	3.17	37.20	33.71	54.00	20.29
7206.00	46.52	PK	H	35.74	4.82	37.23	49.85	74.00	24.15
7206.00	34.02	AV	H	35.74	4.82	37.23	37.35	54.00	16.65
Middle Channel: 2441 MHz									
2441.00	66.11	PK	H	28.18	1.82	0.00	96.11	N/A	N/A
2441.00	55.42	AV	H	28.18	1.82	0.00	85.42	N/A	N/A
2441.00	61.31	PK	V	28.18	1.82	0.00	91.31	N/A	N/A
2441.00	50.56	AV	V	28.18	1.82	0.00	80.56	N/A	N/A
4882.00	47.12	PK	H	33.06	3.27	37.21	46.24	74.00	27.76
4882.00	34.65	AV	H	33.06	3.27	37.21	33.77	54.00	20.23
7323.00	46.31	PK	H	36.04	4.62	37.38	49.59	74.00	24.41
7323.00	33.69	AV	H	36.04	4.62	37.38	36.97	54.00	17.03
High Channel: 2480 MHz									
2480.00	67.83	PK	H	28.26	1.84	0.00	97.93	N/A	N/A
2480.00	57.02	AV	H	28.26	1.84	0.00	87.12	N/A	N/A
2480.00	62.03	PK	V	28.26	1.84	0.00	92.13	N/A	N/A
2480.00	51.85	AV	V	28.26	1.84	0.00	81.95	N/A	N/A
2483.50	26.24	PK	H	28.27	1.84	0.00	56.35	74.00	17.65
2483.50	13.85	AV	H	28.27	1.84	0.00	43.96	54.00	10.04
4960.00	48.55	PK	H	33.22	3.23	37.25	47.75	74.00	26.25
4960.00	35.56	AV	H	33.22	3.23	37.25	34.76	54.00	19.24
7440.00	46.31	PK	H	36.34	4.41	37.52	49.54	74.00	24.46
7440.00	33.74	AV	H	36.34	4.41	37.52	36.97	54.00	17.03

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

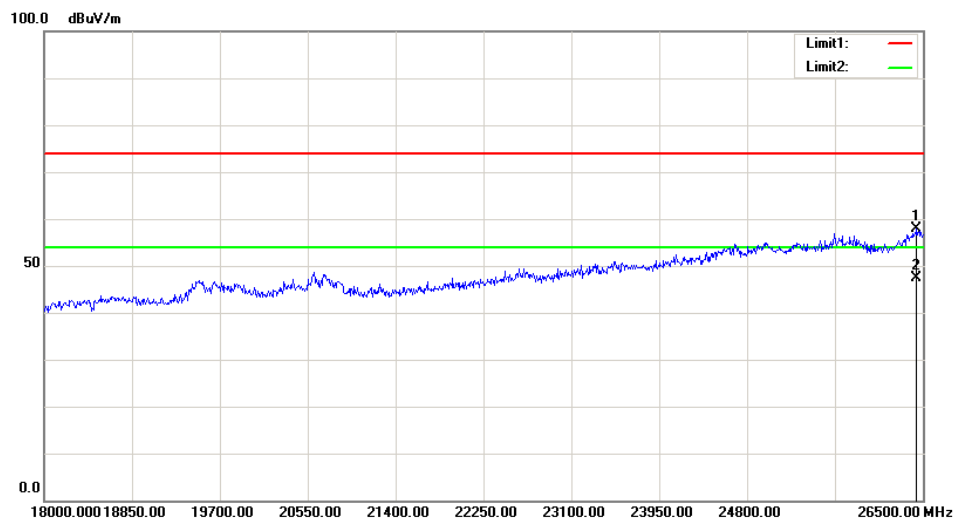
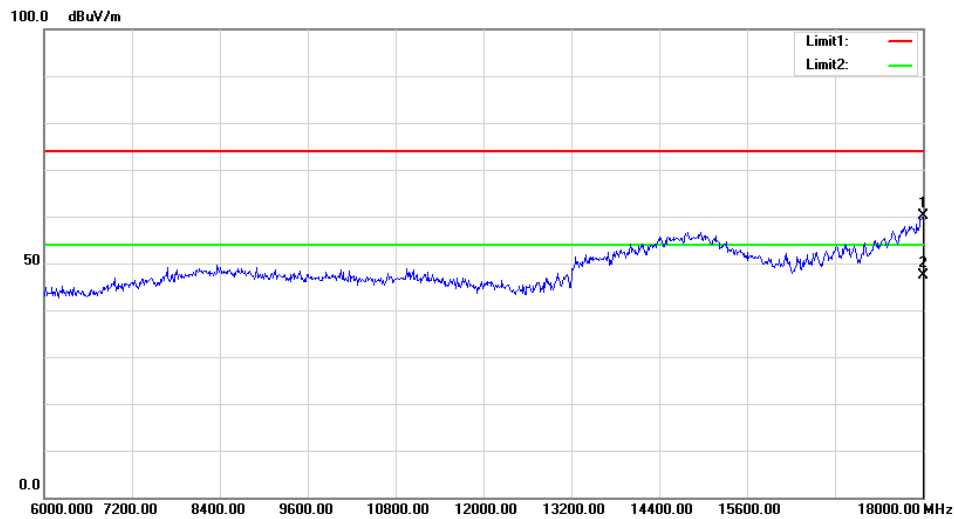
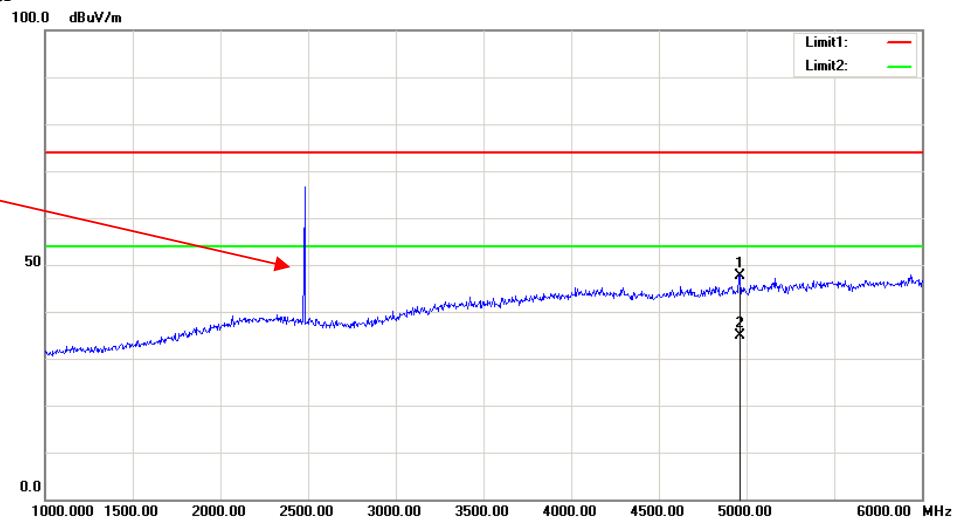
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	63.31	PK	H	28.10	1.80	0.00	93.21	N/A	N/A
2402.00	50.14	AV	H	28.10	1.80	0.00	80.04	N/A	N/A
2402.00	58.92	PK	V	28.10	1.80	0.00	88.82	N/A	N/A
2402.00	45.87	AV	V	28.10	1.80	0.00	75.77	N/A	N/A
2390.00	24.95	PK	H	28.08	1.80	0.00	54.83	74.00	19.17
2390.00	13.54	AV	H	28.08	1.80	0.00	43.42	54.00	10.58
4804.00	47.35	PK	H	32.91	3.17	37.20	46.23	74.00	27.77
4804.00	34.72	AV	H	32.91	3.17	37.20	33.60	54.00	20.40
7206.00	46.25	PK	H	35.74	4.82	37.23	49.58	74.00	24.42
7206.00	34.77	AV	H	35.74	4.82	37.23	38.10	54.00	15.90
Middle Channel: 2441 MHz									
2441.00	65.02	PK	H	28.18	1.82	0.00	95.02	N/A	N/A
2441.00	51.62	AV	H	28.18	1.82	0.00	81.62	N/A	N/A
2441.00	59.76	PK	V	28.18	1.82	0.00	89.76	N/A	N/A
2441.00	46.63	AV	V	28.18	1.82	0.00	76.63	N/A	N/A
4882.00	47.12	PK	H	33.06	3.27	37.21	46.24	74.00	27.76
4882.00	34.63	AV	H	33.06	3.27	37.21	33.75	54.00	20.25
7323.00	46.23	PK	H	36.04	4.62	37.38	49.51	74.00	24.49
7323.00	33.97	AV	H	36.04	4.62	37.38	37.25	54.00	16.75
High Channel: 2480 MHz									
2480.00	65.93	PK	H	28.26	1.84	0.00	96.03	N/A	N/A
2480.00	52.48	AV	H	28.26	1.84	0.00	82.58	N/A	N/A
2480.00	60.13	PK	V	28.26	1.84	0.00	90.23	N/A	N/A
2480.00	47.32	AV	V	28.26	1.84	0.00	77.42	N/A	N/A
2483.50	24.73	PK	H	28.27	1.84	0.00	54.84	74.00	19.16
2483.50	13.52	AV	H	28.27	1.84	0.00	43.63	54.00	10.37
4960.00	47.76	PK	H	33.22	3.23	37.25	46.96	74.00	27.04
4960.00	35.12	AV	H	33.22	3.23	37.25	34.32	54.00	19.68
7440.00	46.53	PK	H	36.34	4.41	37.52	49.76	74.00	24.24
7440.00	33.91	AV	H	36.34	4.41	37.52	37.14	54.00	16.86

EDR Mode (8DPSK):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	63.92	PK	H	28.10	1.80	0.00	93.82	N/A	N/A
2402.00	50.27	AV	H	28.10	1.80	0.00	80.17	N/A	N/A
2402.00	60.08	PK	V	28.10	1.80	0.00	89.98	N/A	N/A
2402.00	47.33	AV	V	28.10	1.80	0.00	77.23	N/A	N/A
2390.00	24.85	PK	H	28.08	1.80	0.00	54.73	74.00	19.27
2390.00	13.54	AV	H	28.08	1.80	0.00	43.42	54.00	10.58
4804.00	47.65	PK	H	32.91	3.17	37.20	46.53	74.00	27.47
4804.00	34.52	AV	H	32.91	3.17	37.20	33.40	54.00	20.60
7206.00	46.13	PK	H	35.74	4.82	37.23	49.46	74.00	24.54
7206.00	33.76	AV	H	35.74	4.82	37.23	37.09	54.00	16.91
Middle Channel: 2441 MHz									
2441.00	65.87	PK	H	28.18	1.82	0.00	95.87	N/A	N/A
2441.00	52.44	AV	H	28.18	1.82	0.00	82.44	N/A	N/A
2441.00	60.79	PK	V	28.18	1.82	0.00	90.79	N/A	N/A
2441.00	47.65	AV	V	28.18	1.82	0.00	77.65	N/A	N/A
4882.00	47.53	PK	H	33.06	3.27	37.21	46.65	74.00	27.35
4882.00	34.85	AV	H	33.06	3.27	37.21	33.97	54.00	20.03
7323.00	46.22	PK	H	36.04	4.62	37.38	49.50	74.00	24.50
7323.00	33.83	AV	H	36.04	4.62	37.38	37.11	54.00	16.89
High Channel: 2480 MHz									
2480.00	66.23	PK	H	28.26	1.84	0.00	96.33	N/A	N/A
2480.00	53.12	AV	H	28.26	1.84	0.00	83.22	N/A	N/A
2480.00	61.38	PK	V	28.26	1.84	0.00	91.48	N/A	N/A
2480.00	48.52	AV	V	28.26	1.84	0.00	78.62	N/A	N/A
2483.50	25.91	PK	H	28.27	1.84	0.00	56.02	74.00	17.98
2483.50	14.13	AV	H	28.27	1.84	0.00	44.24	54.00	9.76
4960.00	47.85	PK	H	33.22	3.23	37.25	47.05	74.00	26.95
4960.00	34.76	AV	H	33.22	3.23	37.25	33.96	54.00	20.04
7440.00	46.31	PK	H	36.34	4.41	37.52	49.54	74.00	24.46
7440.00	33.84	AV	H	36.34	4.41	37.52	37.07	54.00	16.93

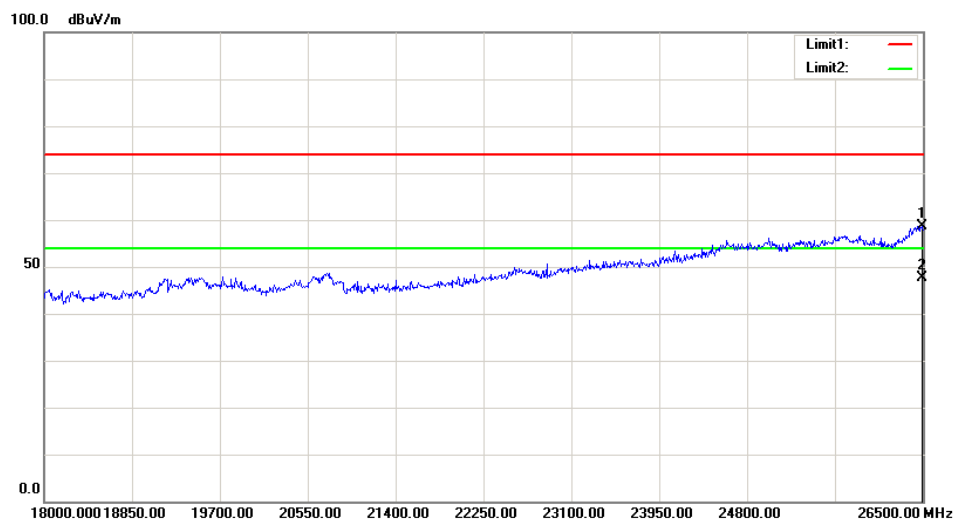
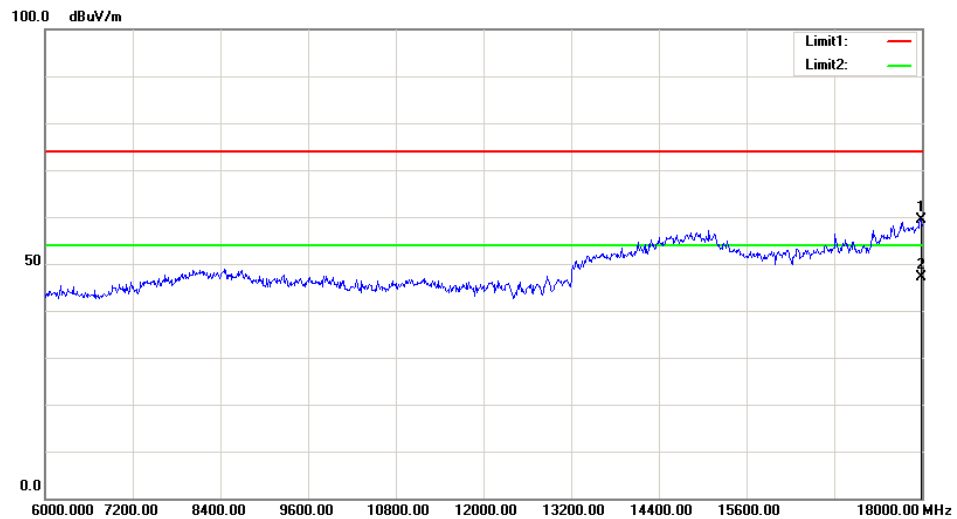
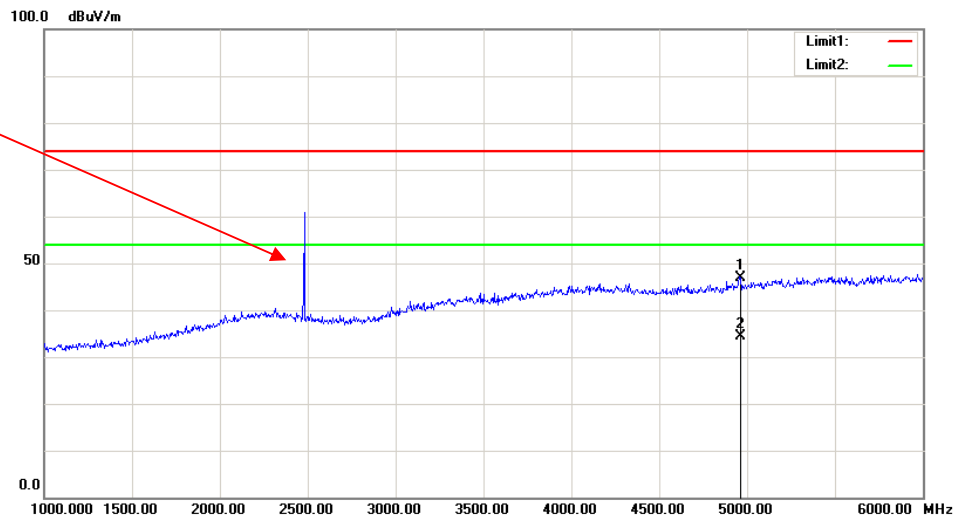
Worst plots (GFSK High channel) **Horizontal**

Fundamental
Test with Band
Rejection Filter



Vertical

Fundamental
Test with Band
Rejection Filter



FCC §15.247(a) (1)& RSS-247 CLAUSE 5.1 b) - CHANNEL SEPARATION TEST

Applicable Standard

According to FCC §15.247(a) (1), RSS-247 Clause 5.1 b)

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test 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:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

* The testing was performed by Nami Quan on 2018-09-01.

Test Result: Compliance.

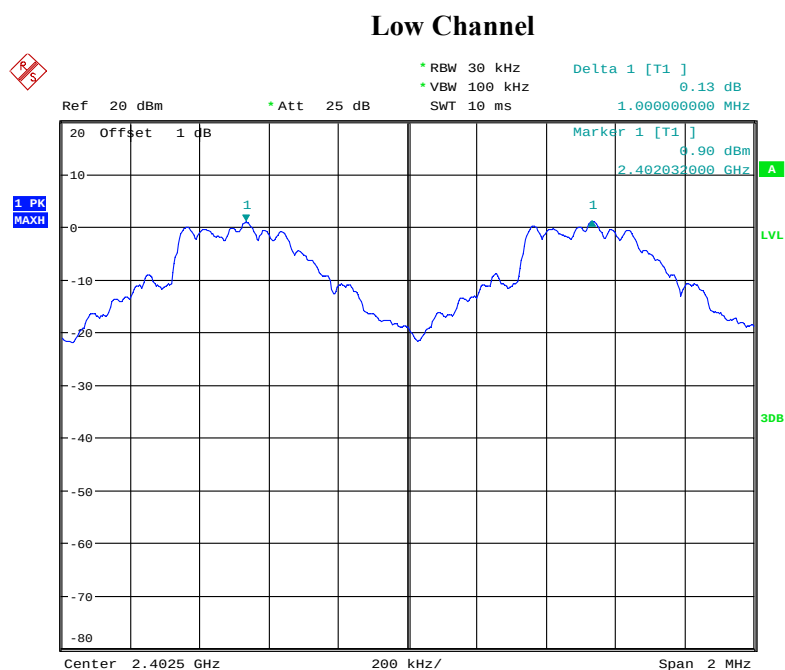
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
BDR (GFSK)	Low	2402	1.000	0.61
	Middle	2441	1.004	0.62
	High	2480	1.004	0.62
EDR ($\pi/4$ -DQPSK)	Low	2402	1.000	0.83
	Middle	2441	1.000	0.83
	High	2480	1.004	0.83
EDR (8DPSK)	Low	2402	1.000	0.81
	Middle	2441	1.000	0.8
	High	2480	1.000	0.81

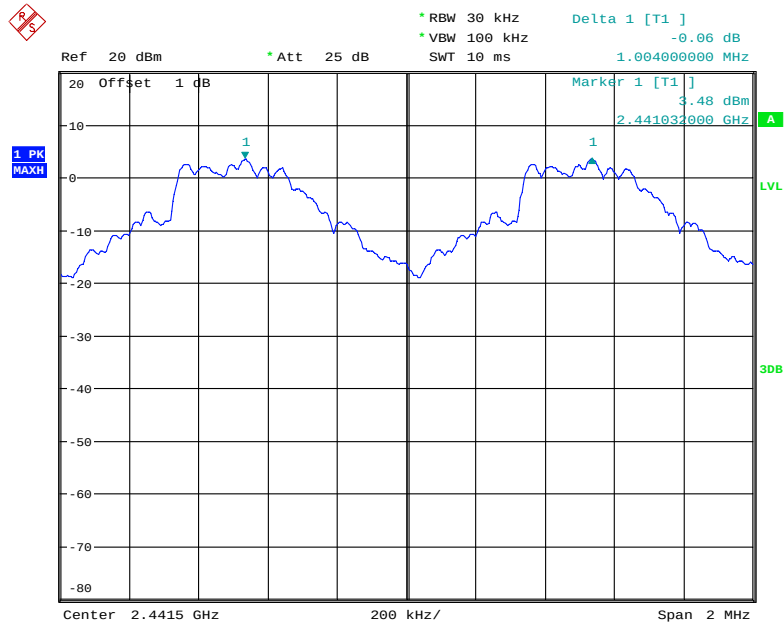
Note: Limit= $(2/3) \times 20\text{dB bandwidth}$

BDR Mode (GFSK):



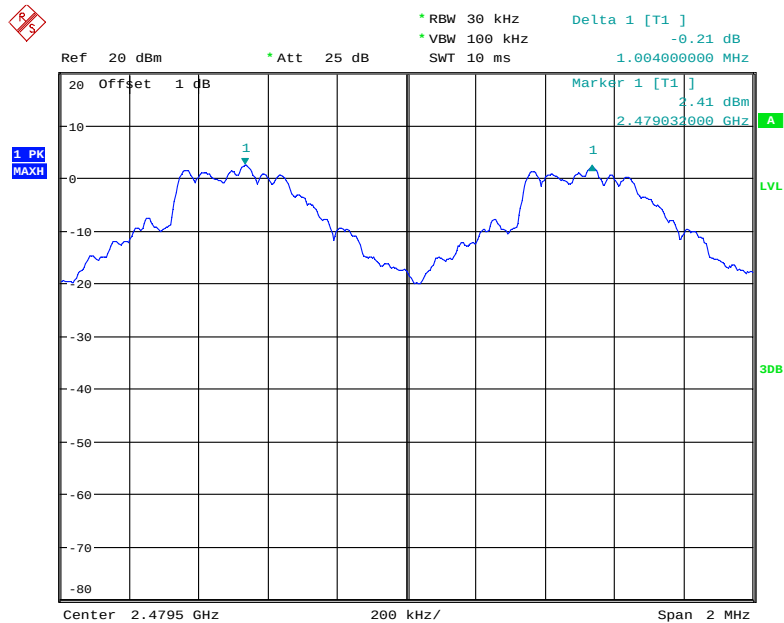
Date: 1.SEP.2018 14:30:20

Middle Channel



Date: 1.SEP.2018 14:31:13

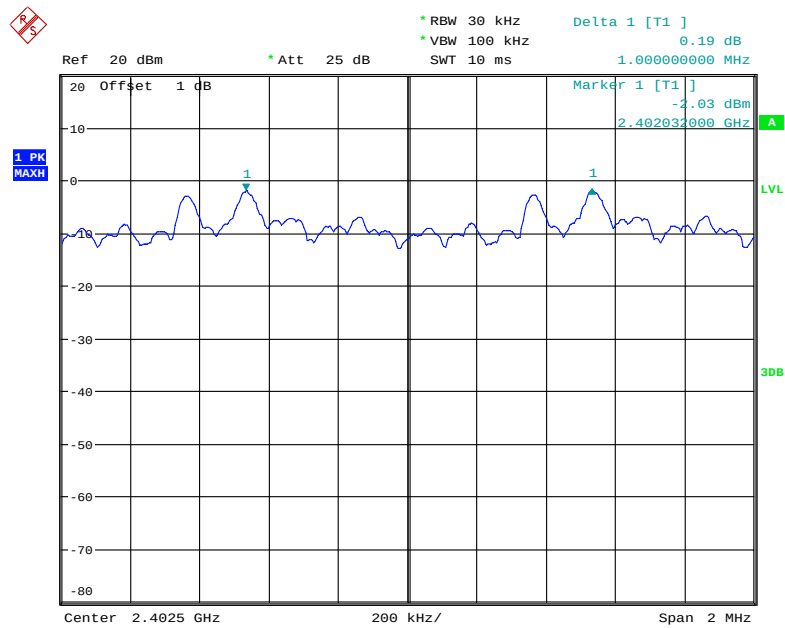
High Channel



Date: 1.SEP.2018 14:33:00

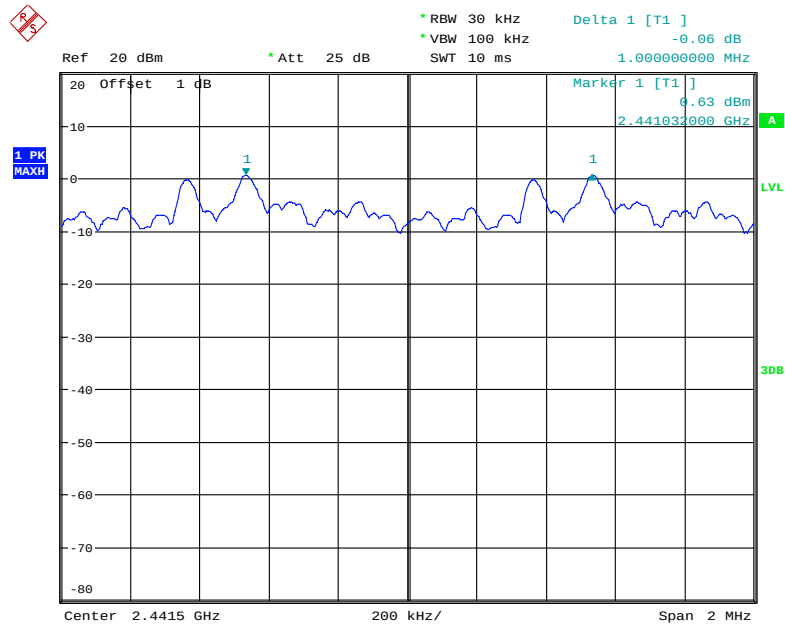
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



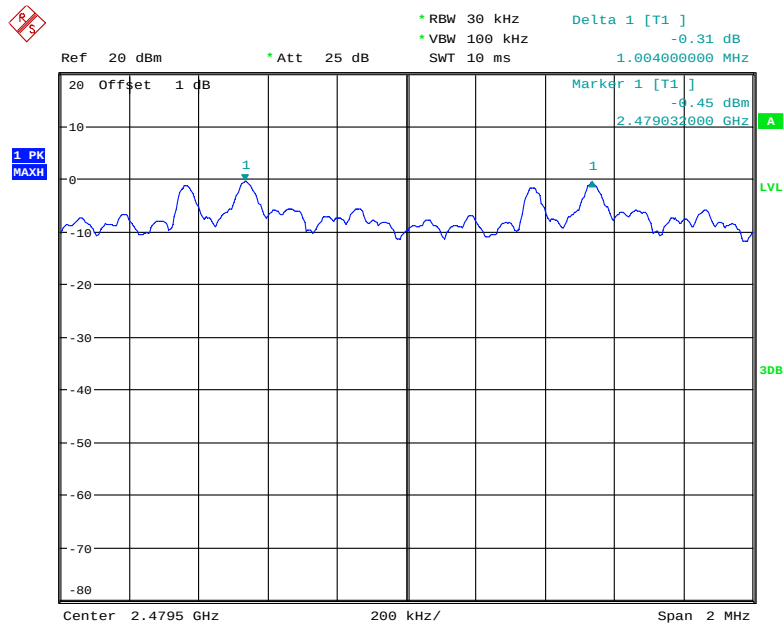
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Middle Channel



Date: 1.SEP.2018 14:35:52

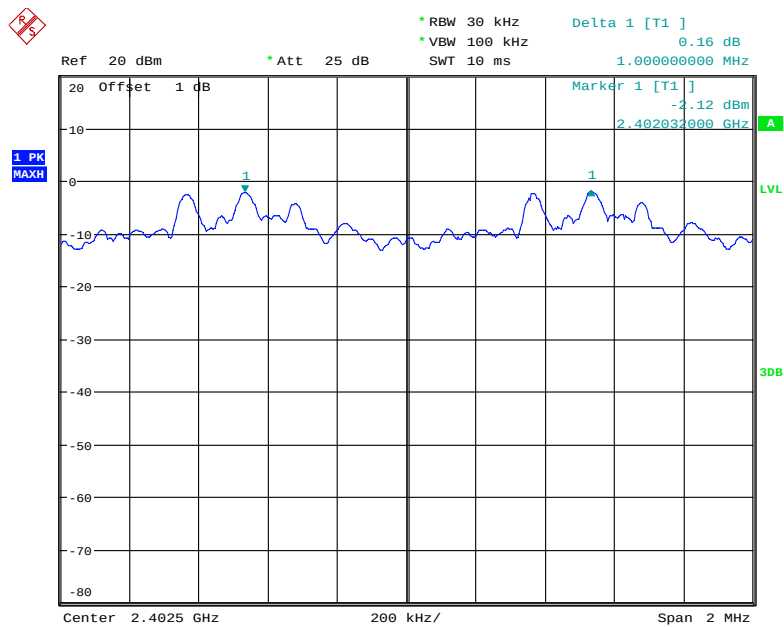
High Channel



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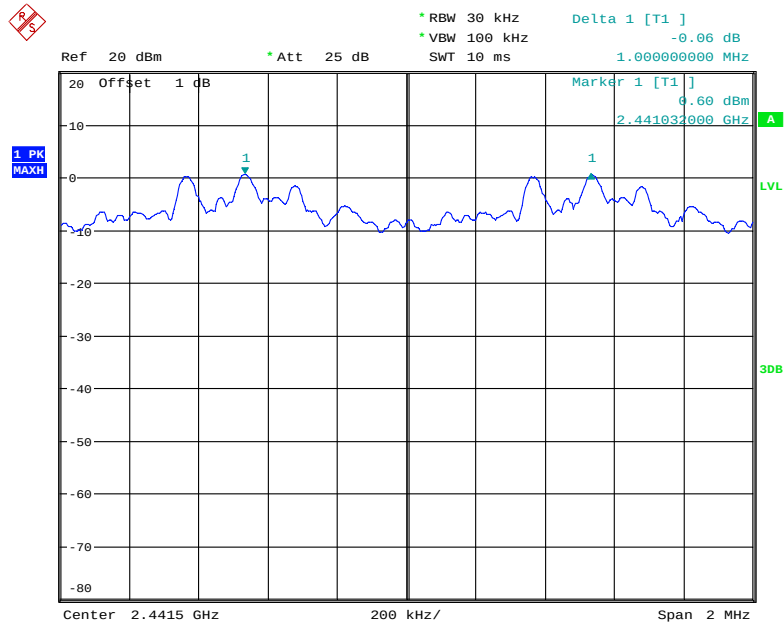
EDR Mode (8DPSK):

Low Channel



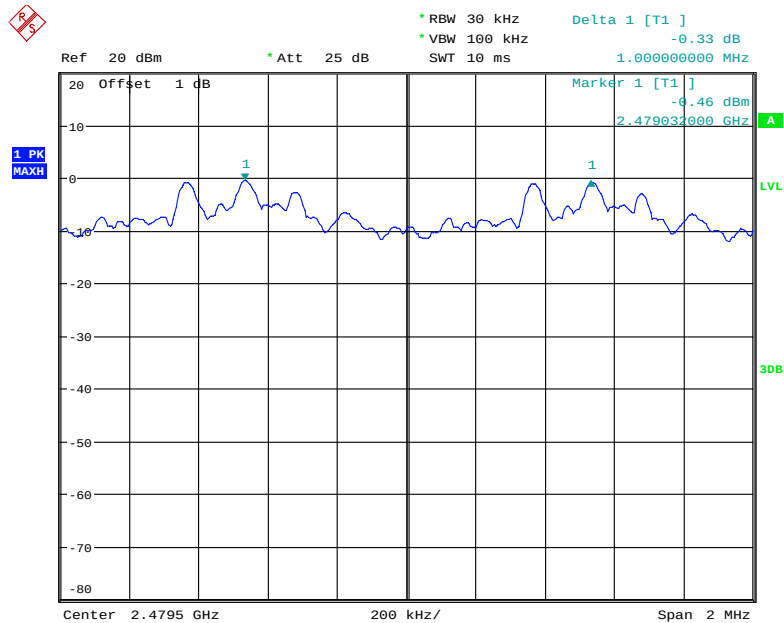
Date: 1.SEP.2018 14:39:11

Middle Channel



Date: 1.SEP.2018 14:43:30

High Channel



Date: 1.SEP.2018 14:41:51

RSS-247 CLUASE 5.1&RSS-GEN CLAUSE 6.7 – 20 dB BANDWIDTH TESTING

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.

According to RSS-247 Clause 5.1 b):

- b) FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz 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 that the systems operate with an output power no greater than 0.125 W.

According to RSS-Gen Clause 6.7:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

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. Use Occupied bandwidth test function, measure the 99% Occupied bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

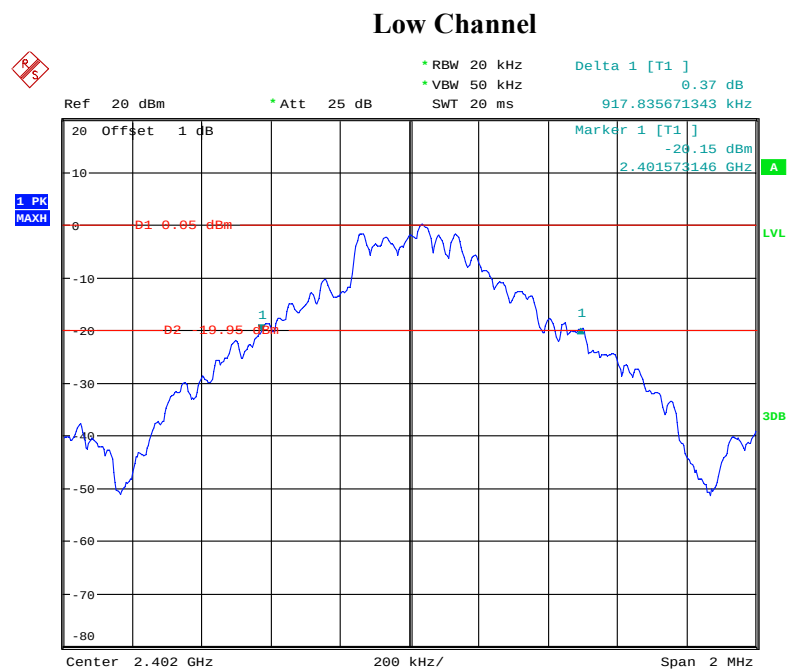
* The testing was performed by Nami Quan on 2018-09-01.

Test Result: Compliance.

Please refer to following tables and plots

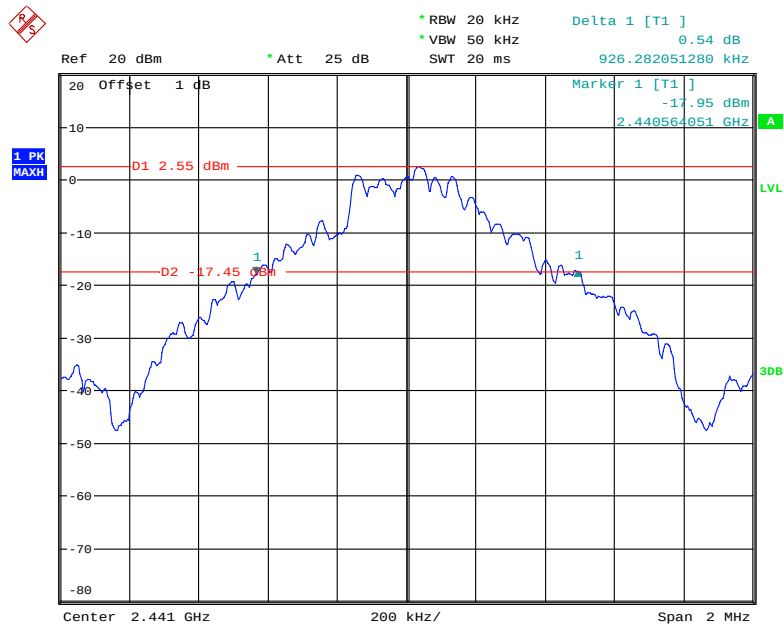
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% occupied Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.92	0.87
	Middle	2441	0.93	0.88
	High	2480	0.93	0.87
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	1.25	1.16
	Middle	2441	1.25	1.17
	High	2480	1.25	1.17
EDR Mode (8DPSK)	Low	2402	1.21	1.15
	Middle	2441	1.20	1.15
	High	2480	1.21	1.16

20dB Bandwidth:*BDR Mode (GFSK):*

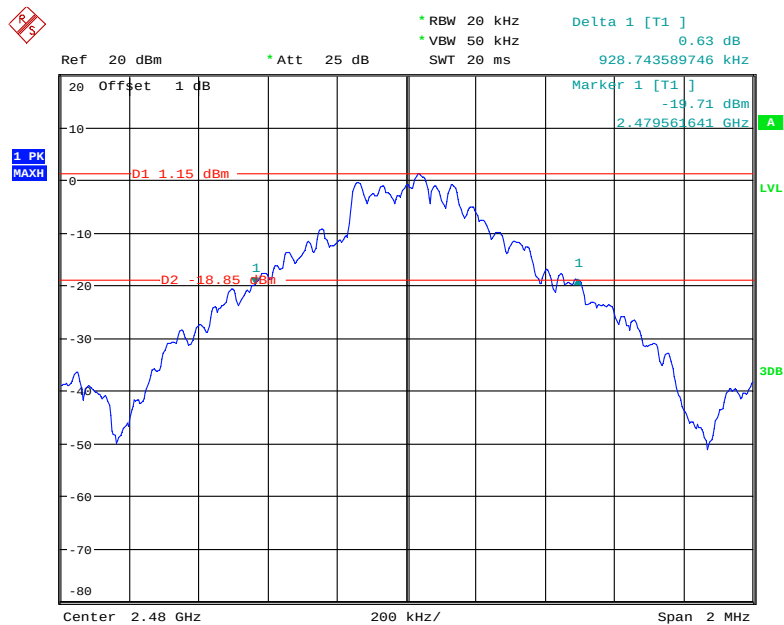
Date: 1.SEP.2018 14:16:56

Middle Channel

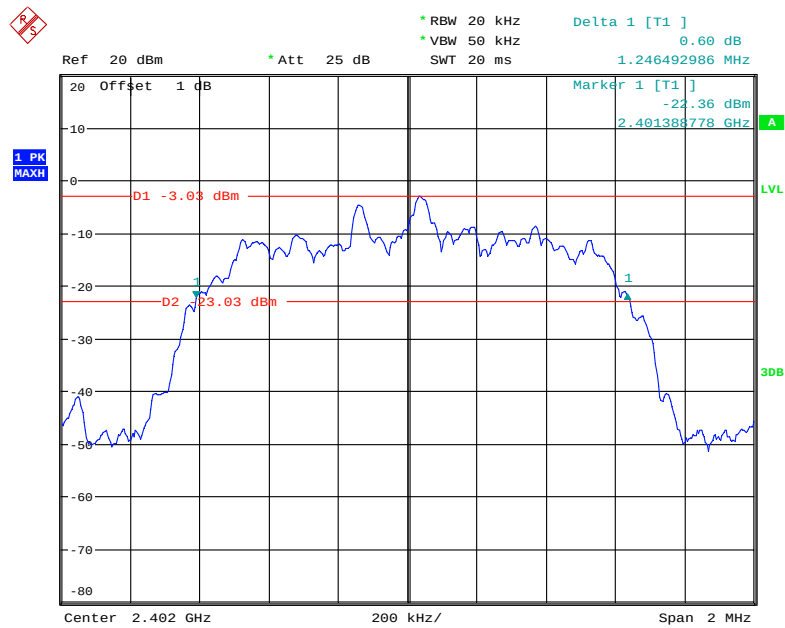


Date: 1.SEP.2018 15:16:57

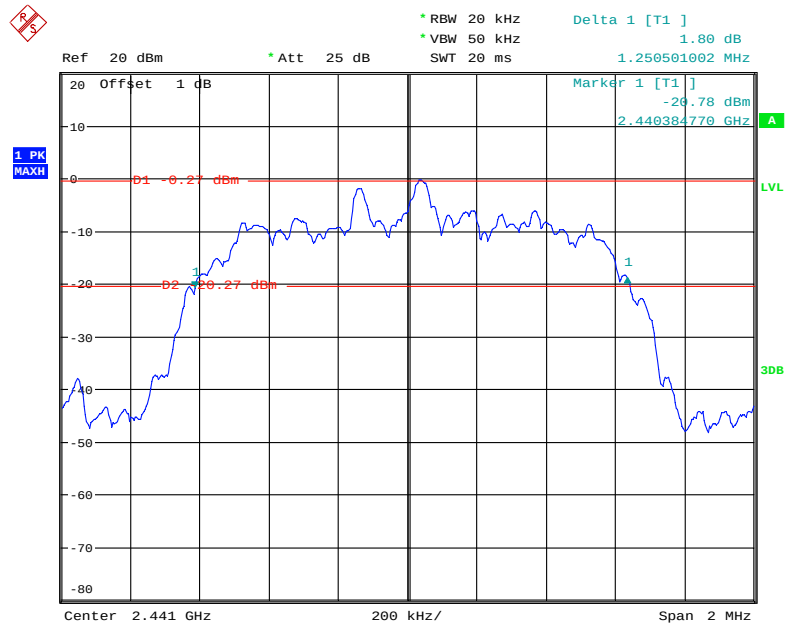
High Channel



Date: 1.SEP.2018 15:18:30

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

Date: 1.SEP.2018 14:24:50

Middle Channel

Date: 1.SEP.2018 14:23:13

Ref 20 dBm * Att 25 dB * RBW 20 kHz Delta 1 [T1] 1.58 dB
 * VBW 50 kHz SWT 20 ms 1.250501002 MHz

20 Offset 1 dB Marker 1 [T1] -22.01 dBm
 2.479384770 GHz

1 PK MAXH

D1 -1.6 dBm D2 -21.6 dBm

Center 2.48 GHz 200 kHz/ Span 2 MHz

EDR Mode (8DPSK):

1 PK
MAXH

Ref 20 dBm * Att 25 dB

* RBW 20 kHz
* VBW 50 kHz
SWT 20 ms

Delta 1 [T1] 1.53 dB
1.206412826 MHz

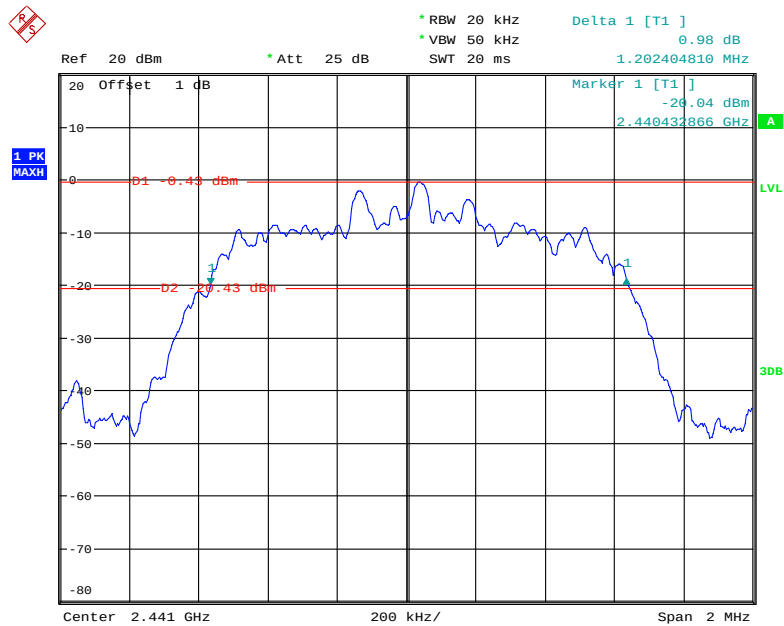
Marker 1 [T1]
-23.73 dBm
2.401428858 GHz

D1 -3.09 dBm
D2 -23.09 dBm

Center 2.402 GHz 200 kHz/ Span 2 MHz

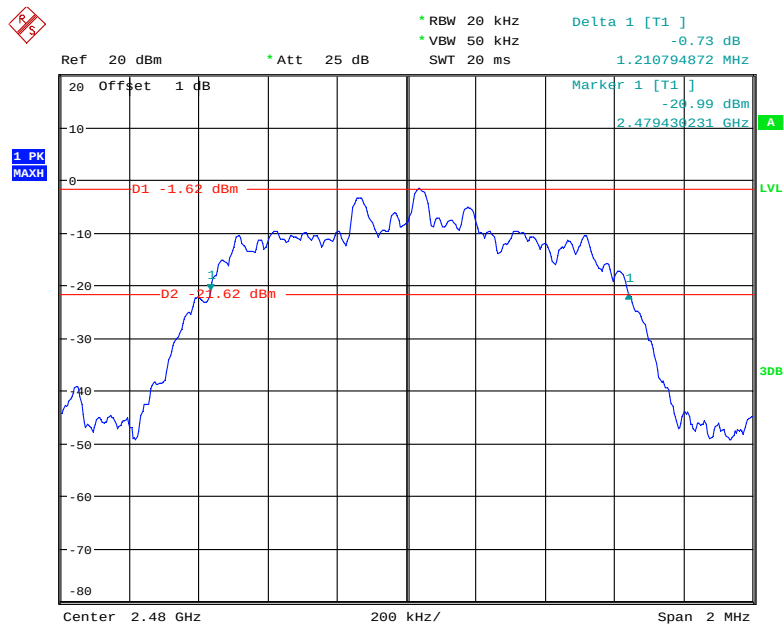
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Middle Channel

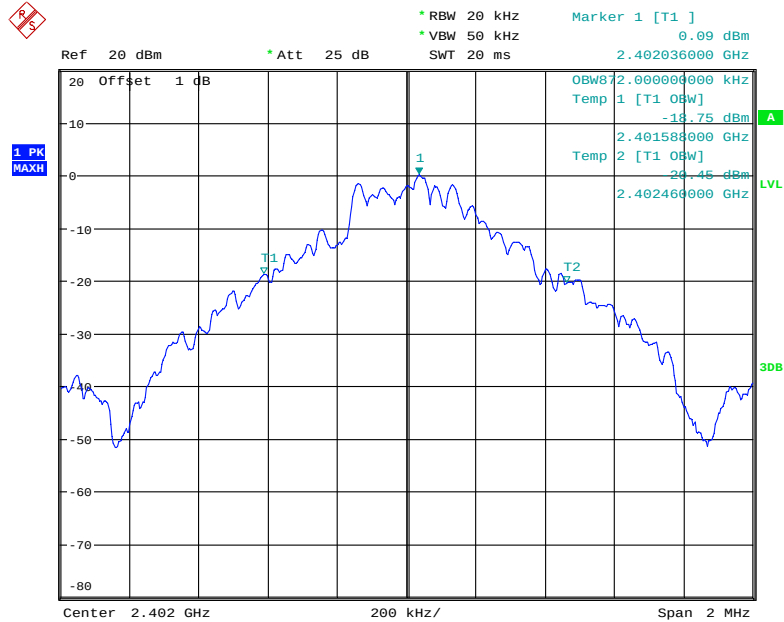


Date: 1.SEP.2018 14:27:17

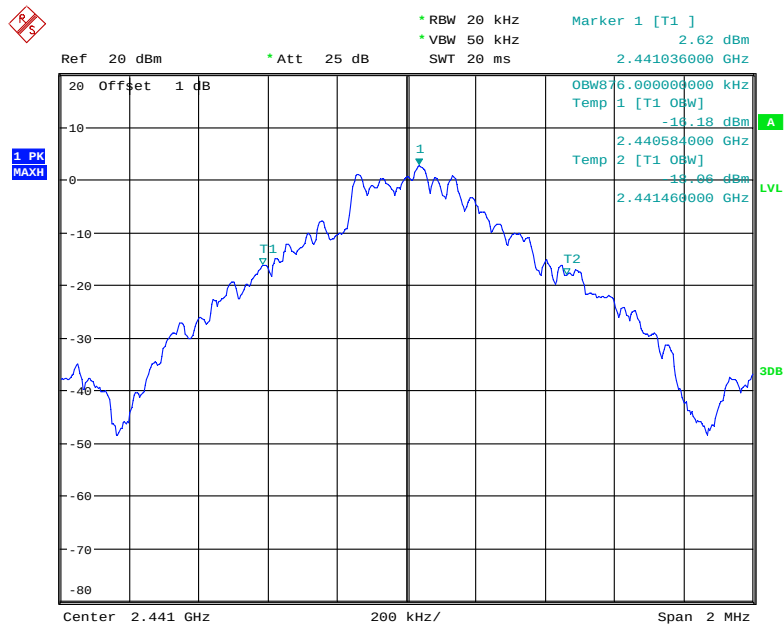
High Channel



Date: 1.SEP.2018 15:20:30

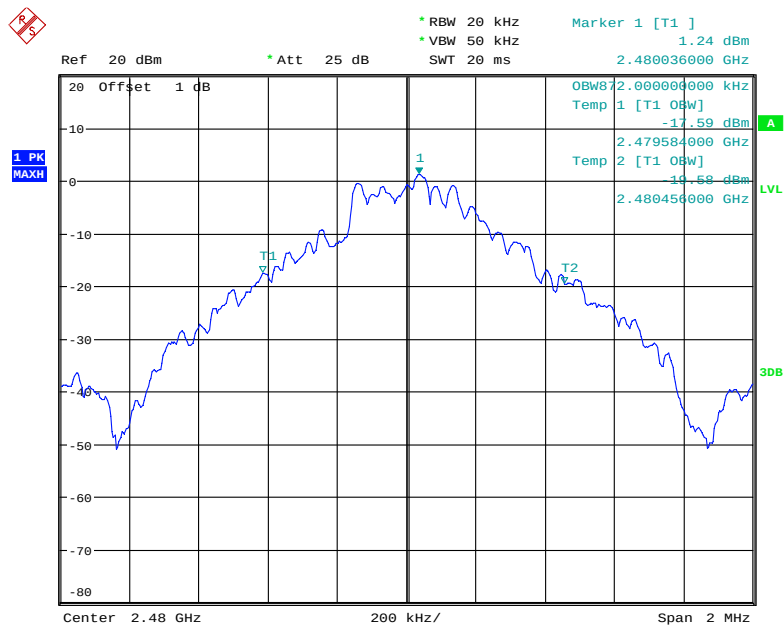
99% Occupied Bandwidth:*BDR Mode (GFSK):***Low Channel**

Date: 1.SEP.2018 14:17:13

Middle Channel

Date: 1.SEP.2018 14:19:15

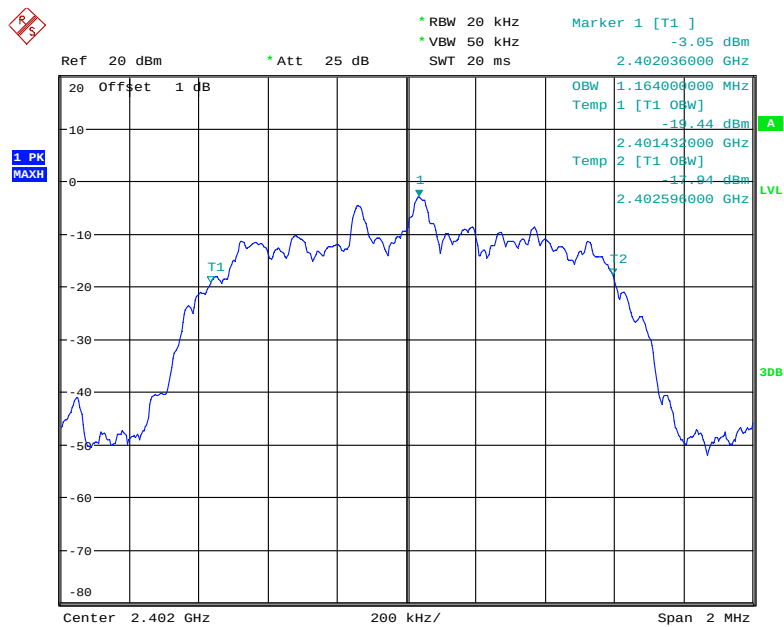
High Channel



Date: 1.SEP.2018 14:20:37

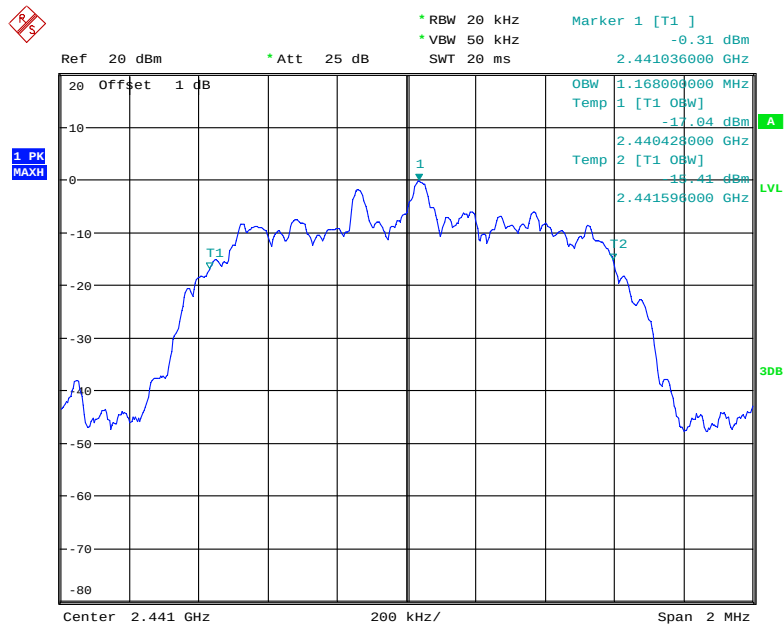
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



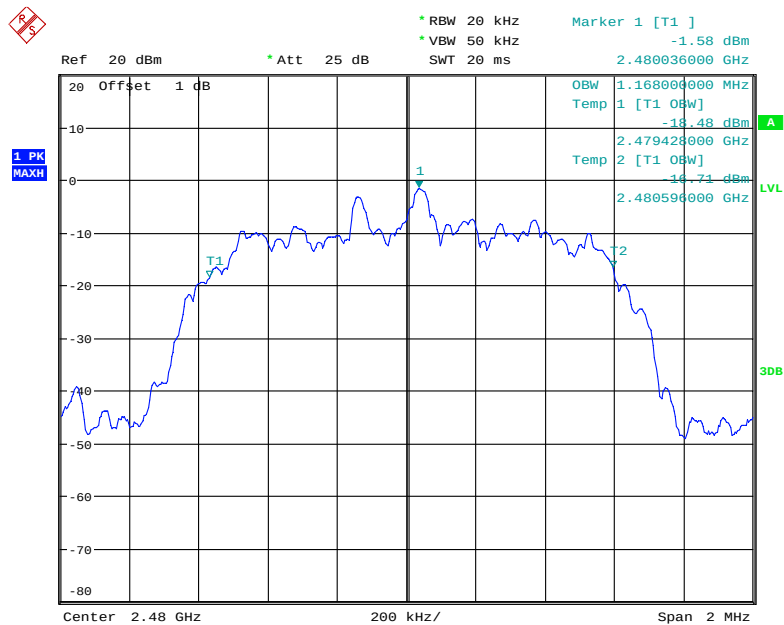
Date: 1.SEP.2018 14:25:03

Middle Channel



Date: 1.SEP.2018 14:23:26

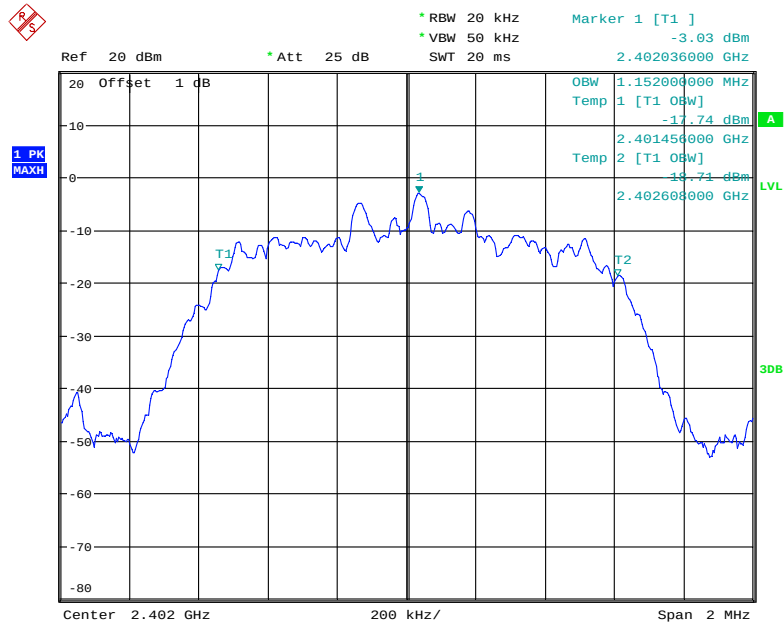
High Channel



Date: 1.SEP.2018 14:21:51

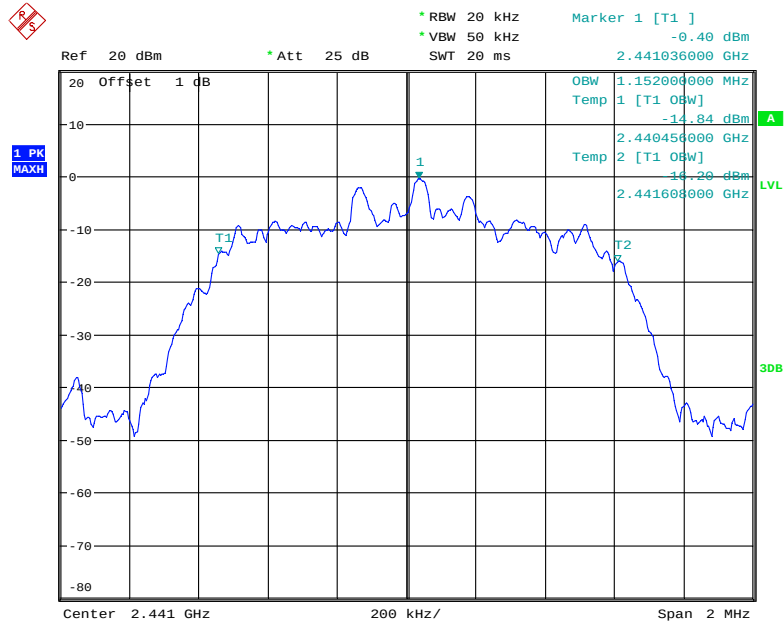
EDR Mode (8DPSK):

Low Channel



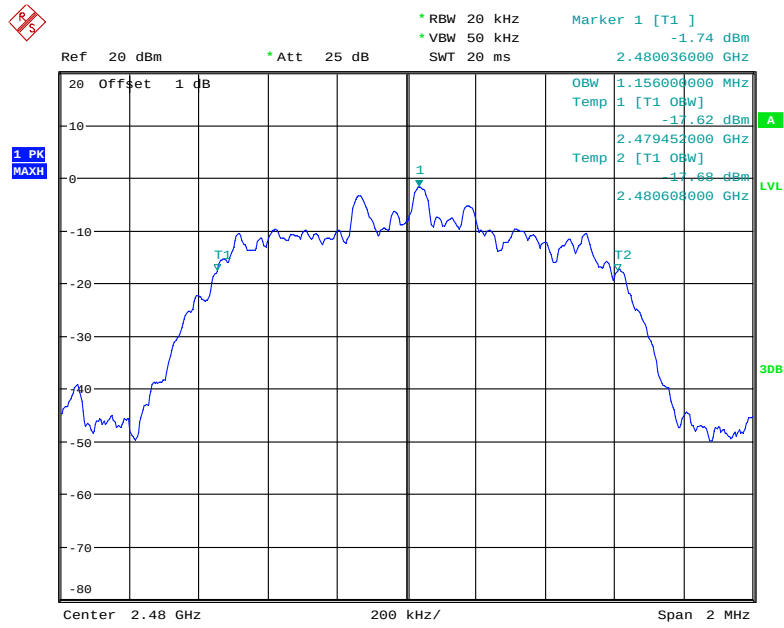
Date: 1.SEP.2018 14:26:10

Middle Channel



Date: 1.SEP.2018 14:27:30

High Channel



Date: 1.SEP.2018 14:28:48

FCC §15.247(a) (1) (iii)& RSS-247 CLAUSE 5.1 d) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

According to FCC §15.247(a) (1) (iii), RSS-247 Clause 5.1 d)

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

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

* The testing was performed by Nami Quan on 2018-09-01.

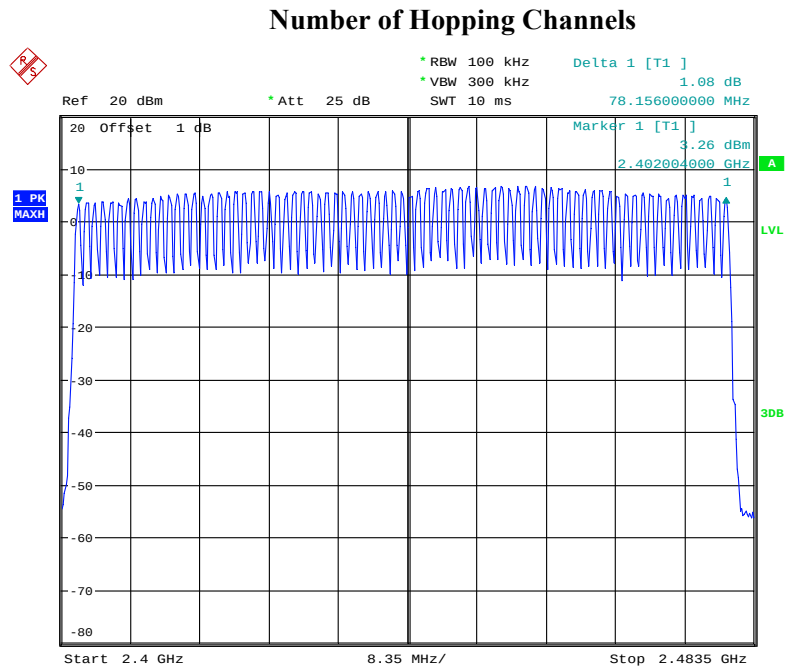
Test Result: Compliance.

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

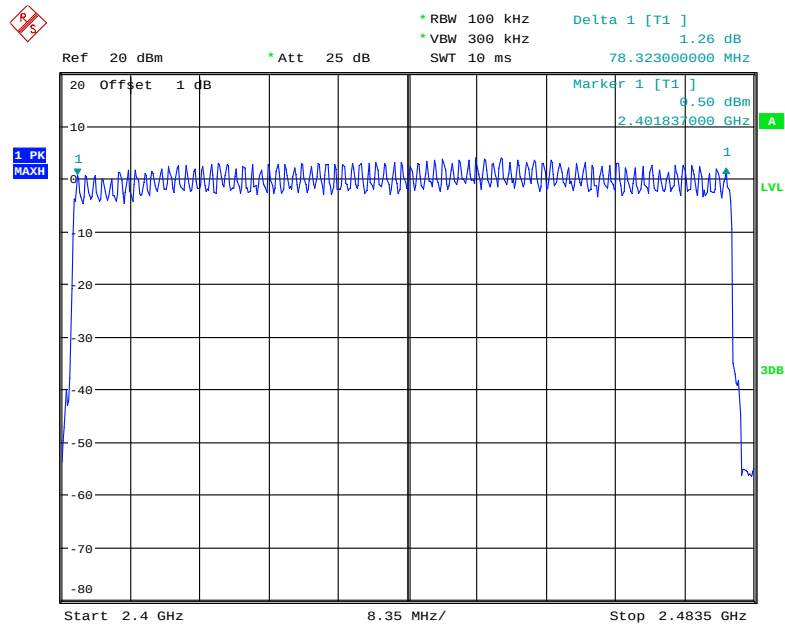


Date: 1.SEP.2018 15:00:47

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

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

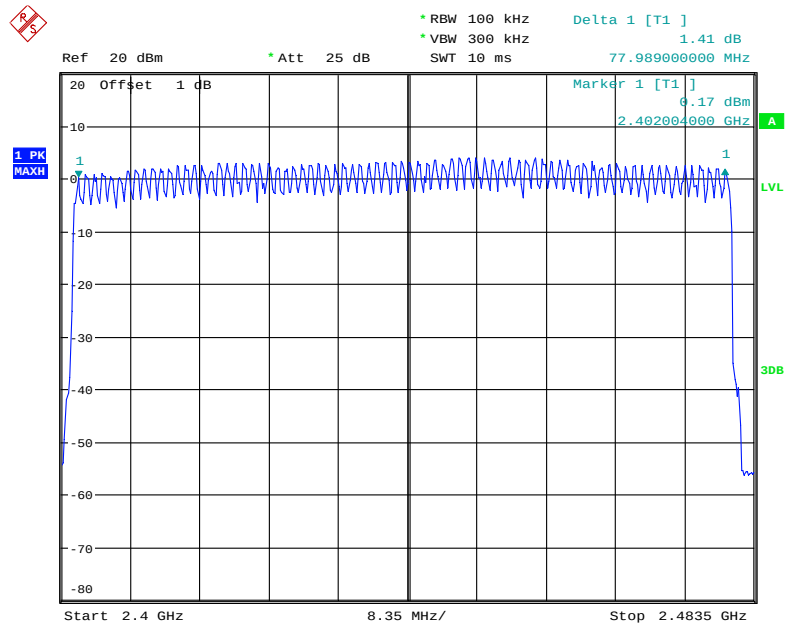
Number of Hopping Channels



Date: 1.SEP.2018 14:54:49

EDR Mode (8DPSK):

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

Number of Hopping Channels

Date: 1.SEP.2018 14:49:22

FCC §15.247(a) (1) (iii)& RSS-247 Clause 5.1 d) - TIME OF OCCUPANCY (DWELL TIME)**Applicable Standard**

According to FCC §15.247(a) (1) (iii), RSS-247 Clause 5.1 d)

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

Test Procedure

The EUT was worked in channel hopping; the time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data**Environmental Conditions**

Temperature:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

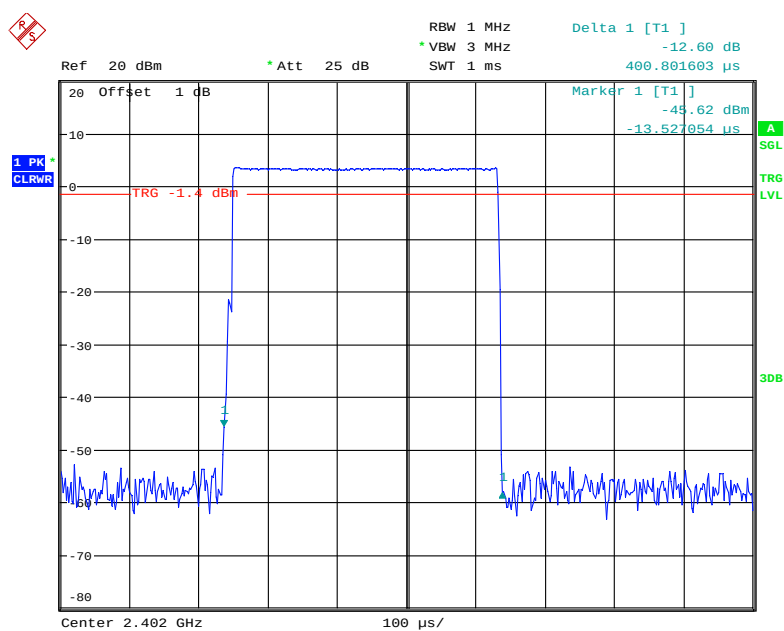
* The testing was performed by Nami Quan on 2018-09-01.

Test Mode: Transmitting

BDR Mode (GFSK):

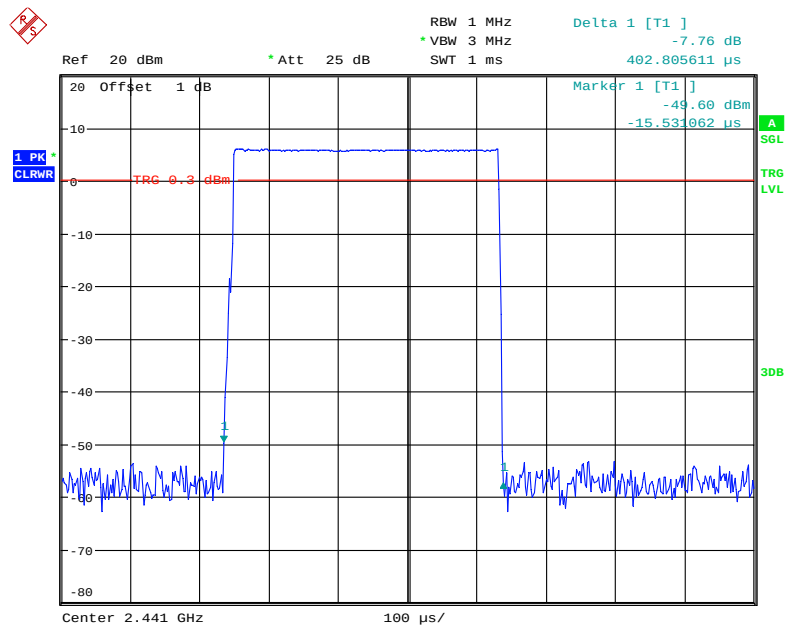
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.401	0.128	0.4	Compliance
	Middle	0.403	0.129	0.4	Compliance
	High	0.401	0.128	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
DH3	Low	1.671	0.267	0.4	Compliance
	Middle	1.671	0.267	0.4	Compliance
	High	1.671	0.267	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
DH5	Low	2.936	0.313	0.4	Compliance
	Middle	2.926	0.312	0.4	Compliance
	High	2.936	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

DH1: Low Channel



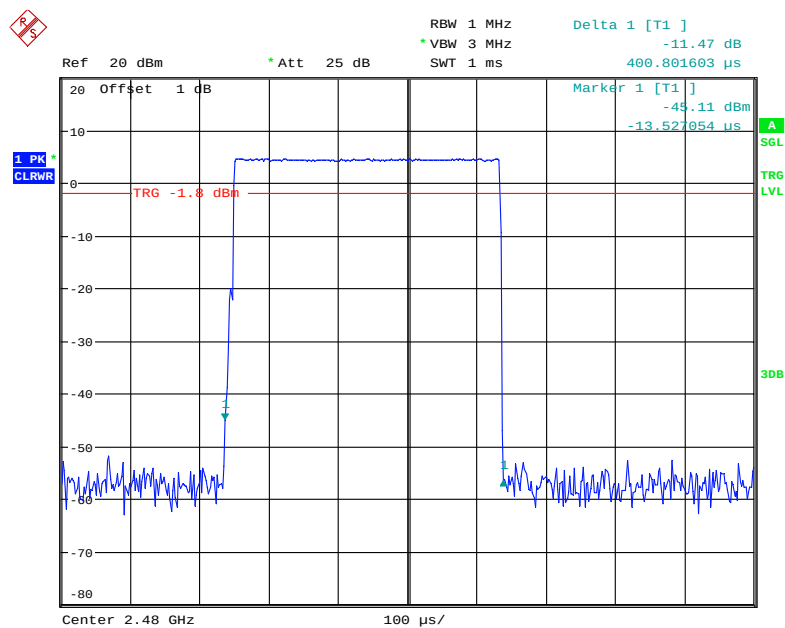
Date: 1.SEP.2018 15:01:06

DH1: Middle Channel



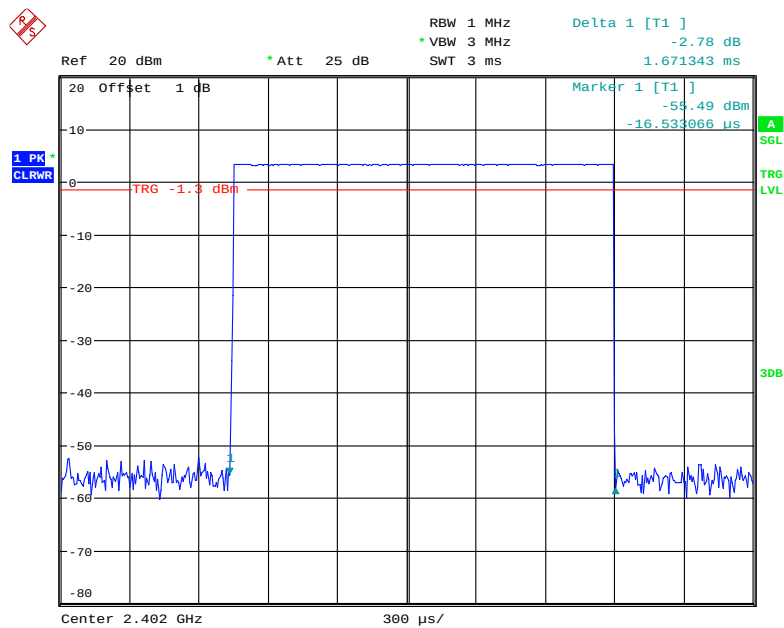
Date: 1.SEP.2018 15:01:10

DH1: High Channel



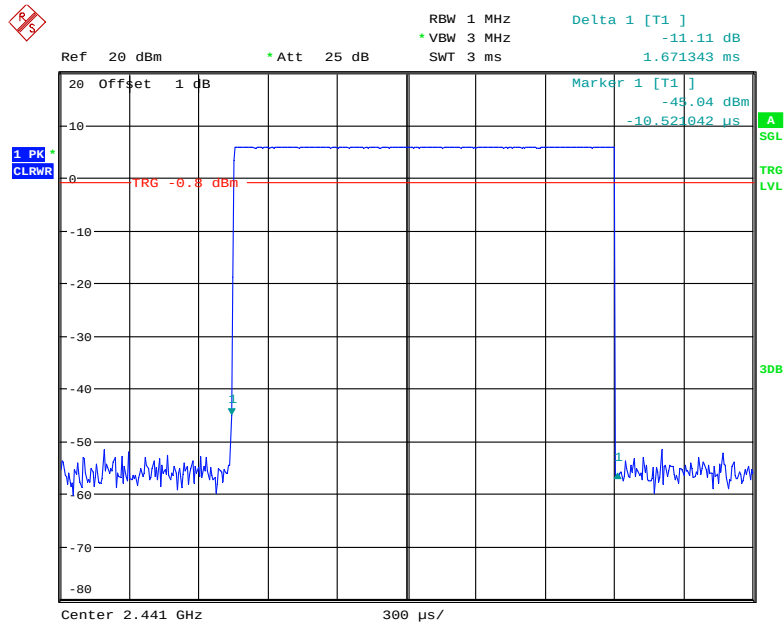
Date: 1.SEP.2018 15:01:14

DH3: Low Channel

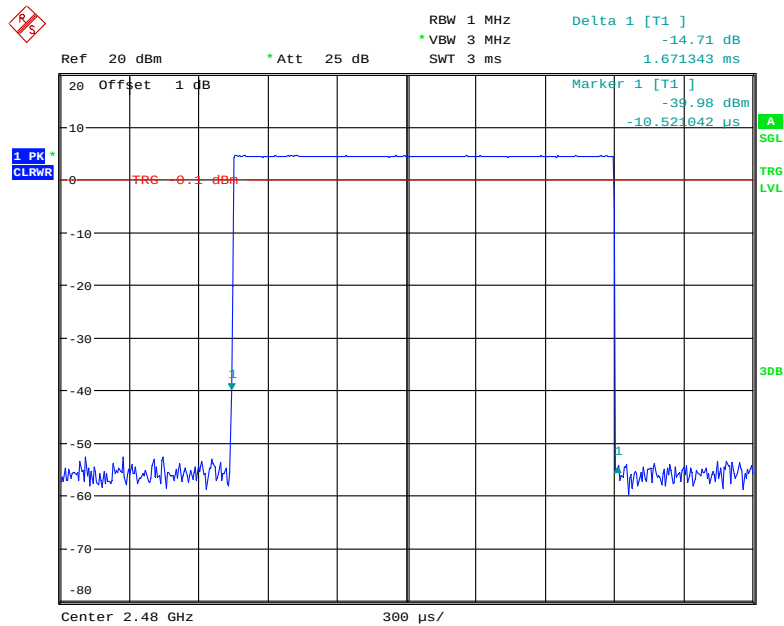


Date: 1.SEP.2018 15:01:37

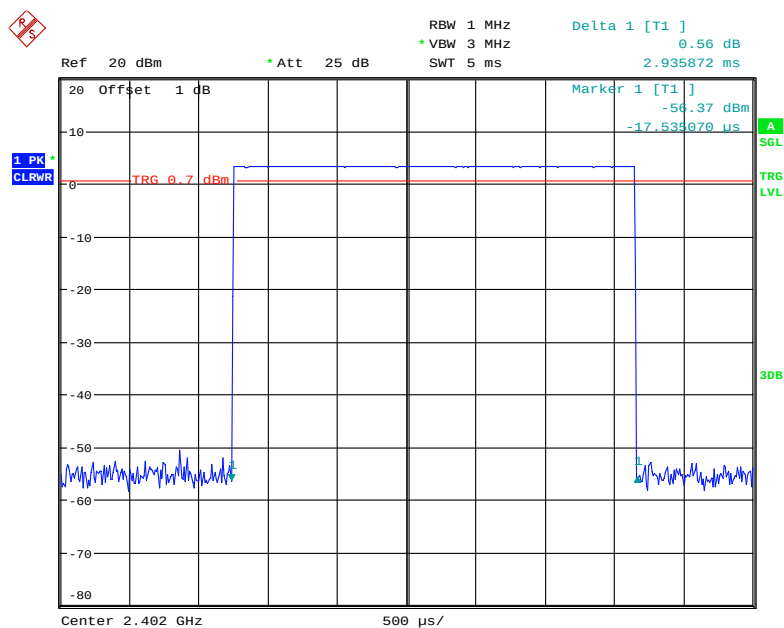
DH3: Middle Channel



Date: 1.SEP.2018 15:01:41

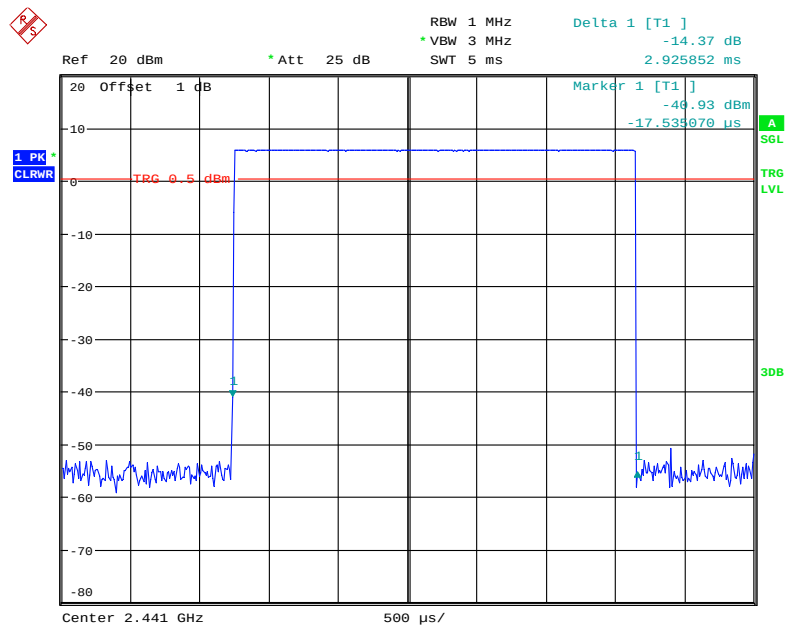
DH3: High Channel

Date: 1.SEP.2018 15:01:45

DH5: Low Channel

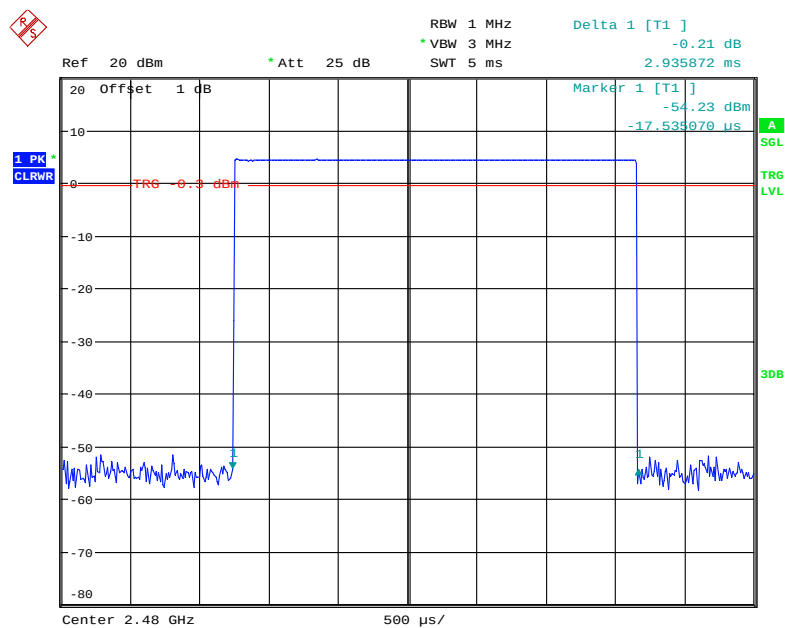
Date: 1.SEP.2018 15:02:03

DH5: Middle Channel



Date: 1.SEP.2018 15:02:07

DH5: High Channel

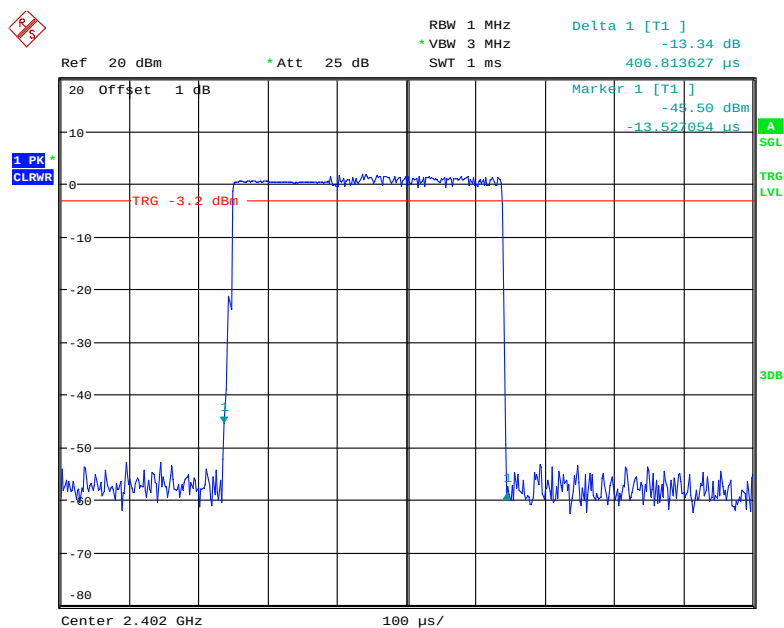


Date: 1.SEP.2018 15:02:11

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

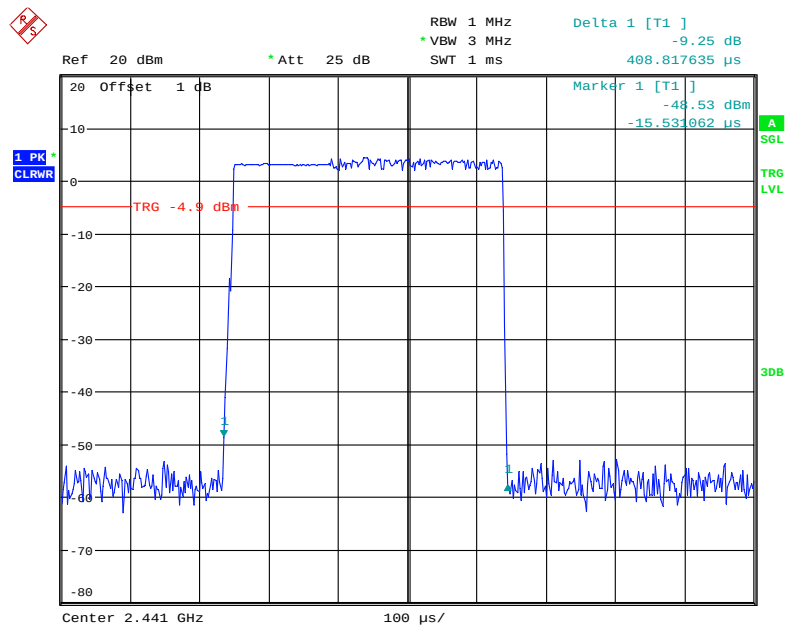
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
2DH1	Low	0.407	0.130	0.4	Compliance
	Middle	0.409	0.131	0.4	Compliance
	High	0.409	0.131	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
2DH3	Low	1.671	0.267	0.4	Compliance
	Middle	1.671	0.267	0.4	Compliance
	High	1.677	0.268	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
2DH5	Low	2.936	0.313	0.4	Compliance
	Middle	2.934	0.313	0.4	Compliance
	High	2.926	0.312	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

2DH1: Low Channel



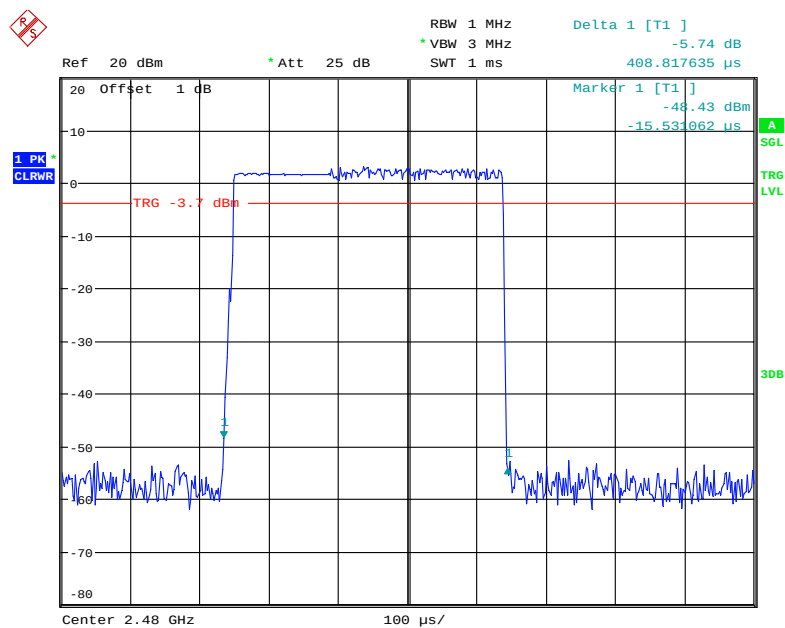
Date: 1.SEP.2018 15:06:42

2DH1: Middle Channel



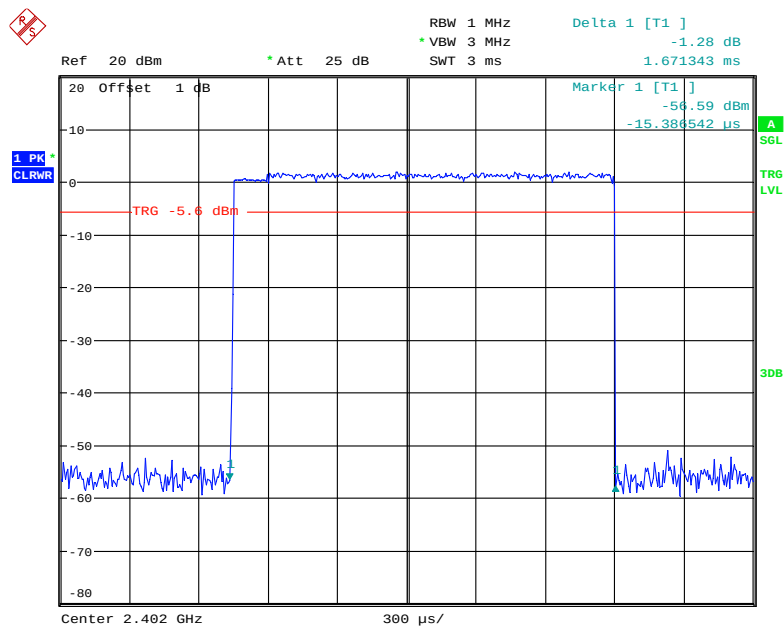
Date: 1.SEP.2018 15:06:53

2DH1: High Channel



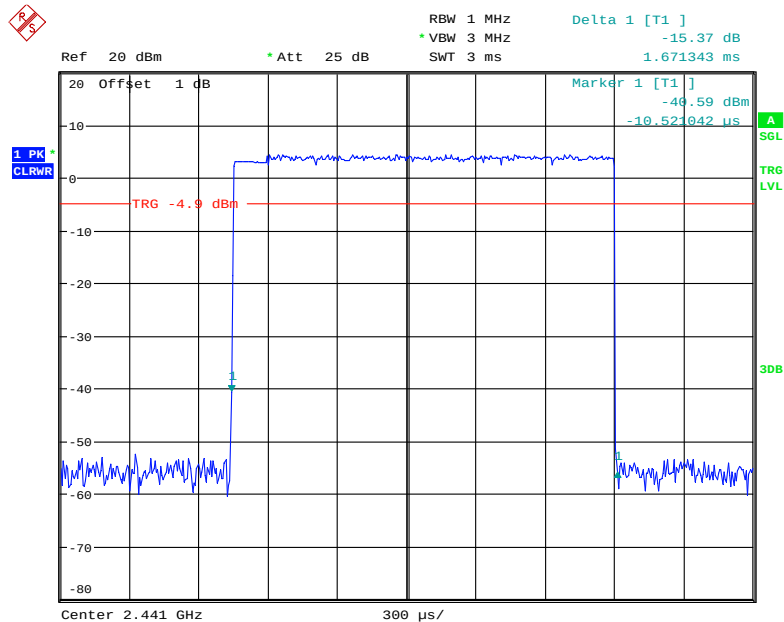
Date: 1.SEP.2018 15:06:57

2DH3: Low Channel

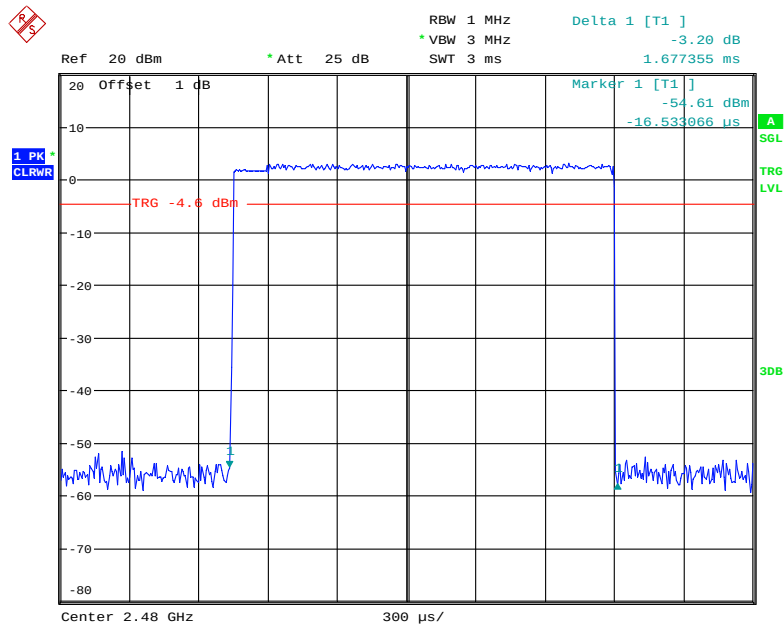


Date: 1.SEP.2018 15:07:37

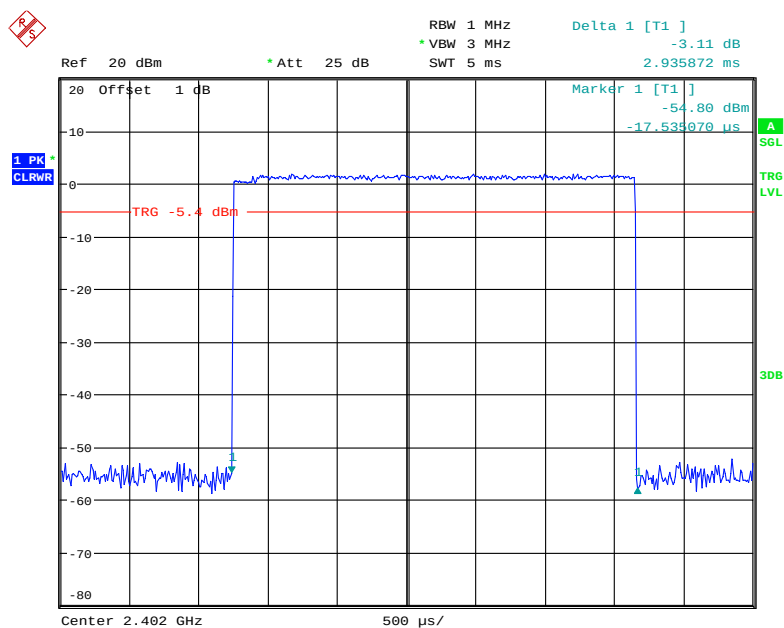
2DH3: Middle Channel



Date: 1.SEP.2018 15:07:41

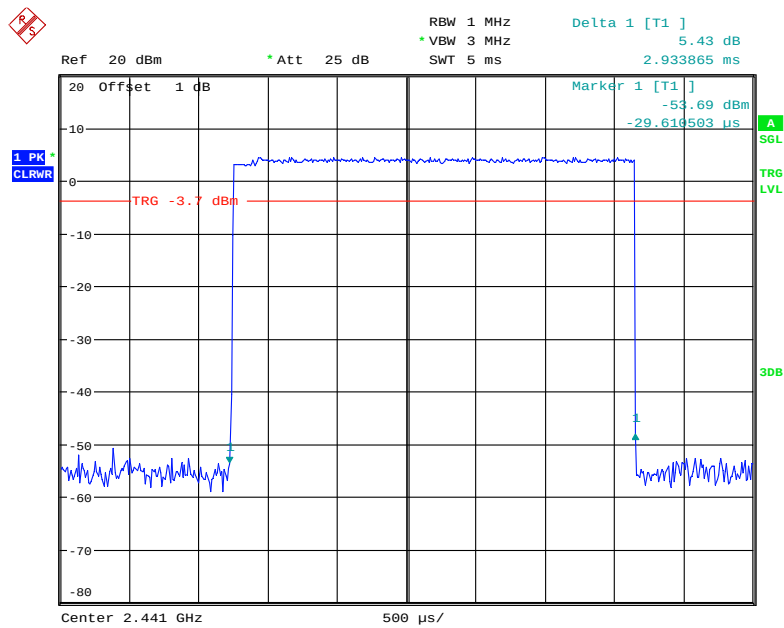
2DH3: High Channel

Date: 1.SEP.2018 15:07:45

2DH5: Low Channel

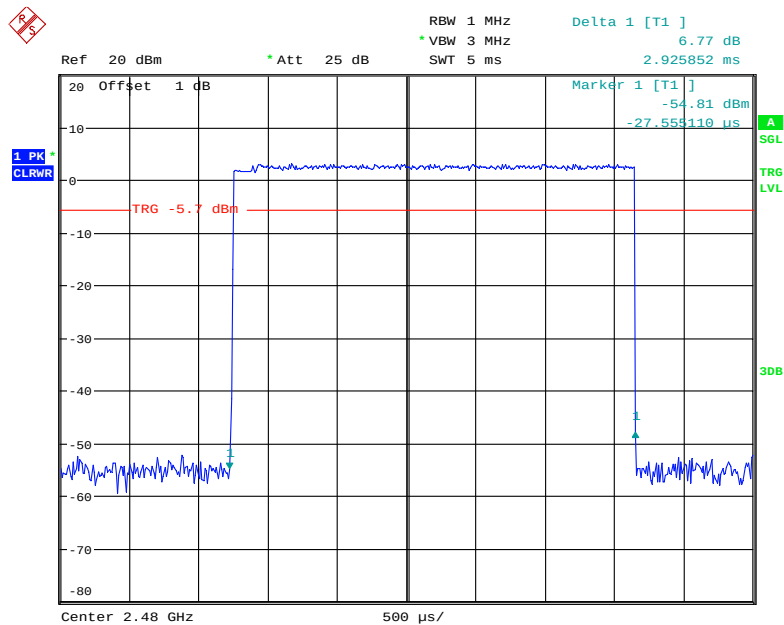
Date: 1.SEP.2018 15:08:47

2DH5: Middle Channel



Date: 1.SEP.2018 15:09:06

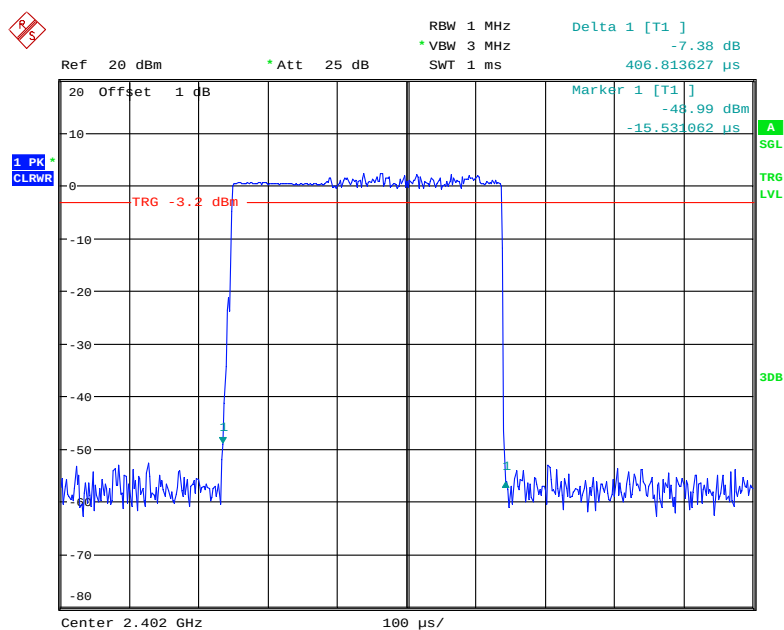
2DH5: High Channel



Date: 1.SEP.2018 15:09:21

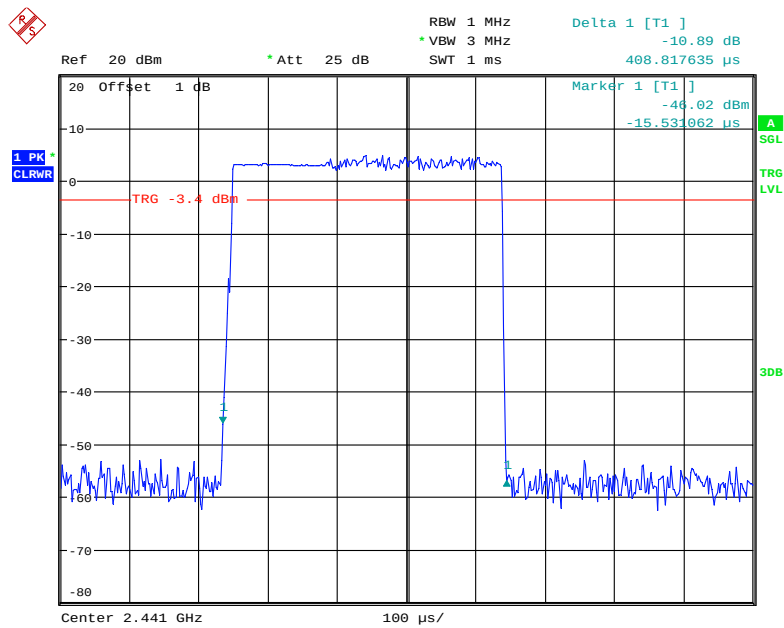
EDR Mode (8DPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
3DH1	Low	0.407	0.130	0.4	Compliance
	Middle	0.409	0.131	0.4	Compliance
	High	0.409	0.131	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/2/79) $\times$ 31.6 s				
3DH3	Low	1.677	0.268	0.4	Compliance
	Middle	1.671	0.267	0.4	Compliance
	High	1.671	0.267	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/4/79) $\times$ 31.6 s				
3DH5	Low	2.936	0.313	0.4	Compliance
	Middle	2.928	0.312	0.4	Compliance
	High	2.936	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) $\times$ (1600/6/79) $\times$ 31.6 s				

3DH1: Low Channel

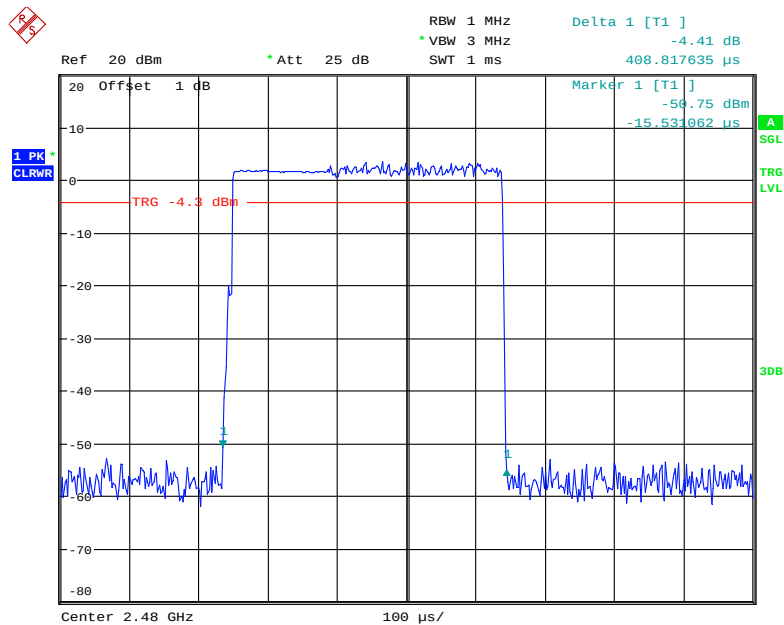
Date: 1.SEP.2018 15:09:59

3DH1: Middle Channel

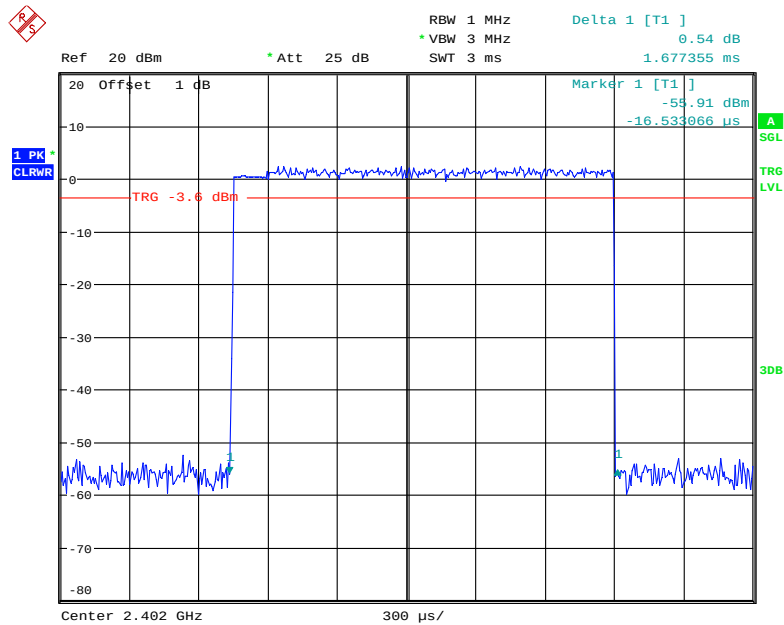


Date: 1.SEP.2018 15:10:08

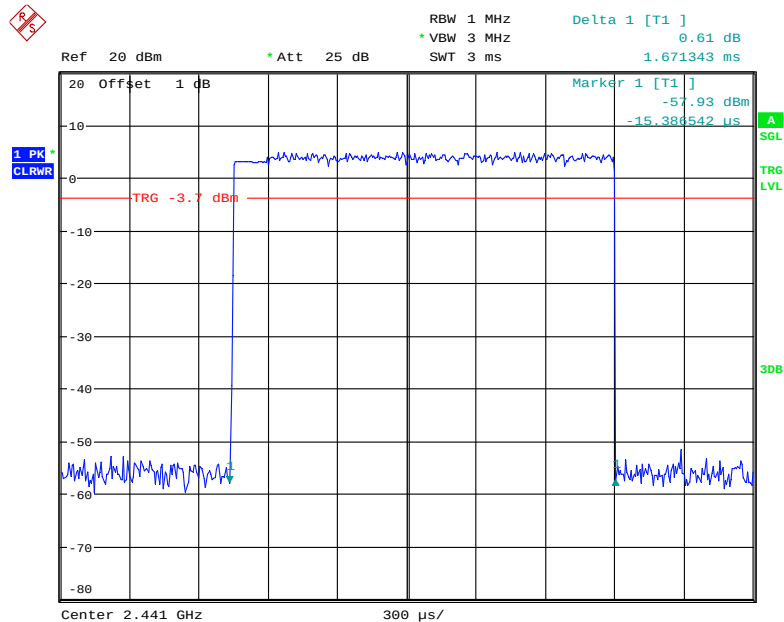
3DH1: High Channel



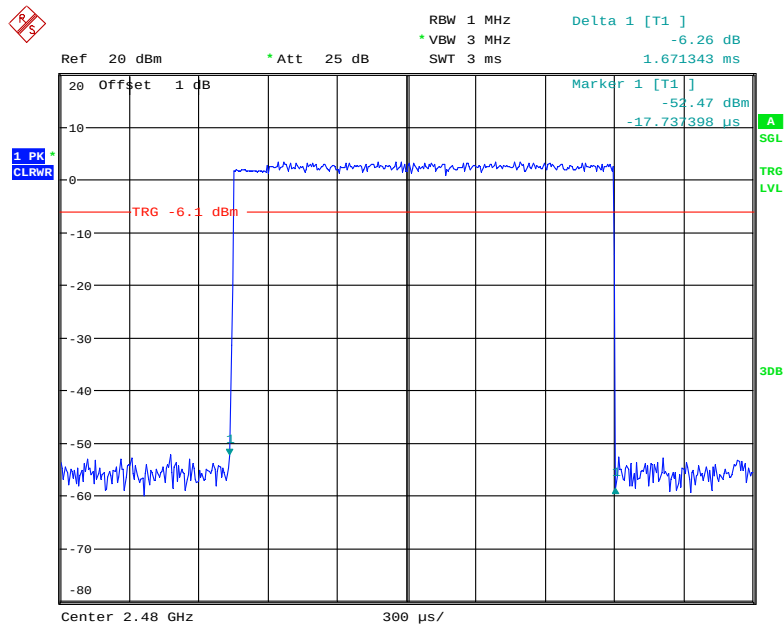
Date: 1.SEP.2018 15:10:13

3DH3: Low Channel

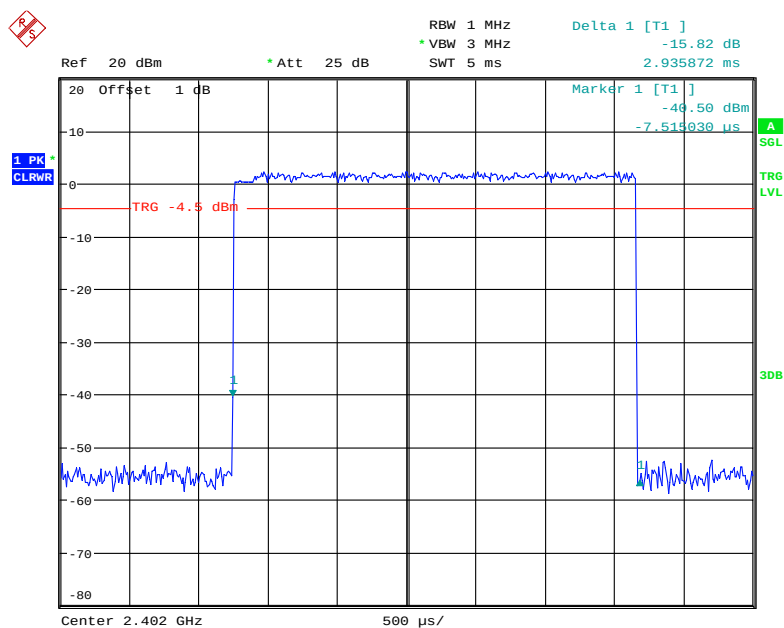
Date: 1.SEP.2018 15:10:30

3DH3: Middle Channel

Date: 1.SEP.2018 15:10:52

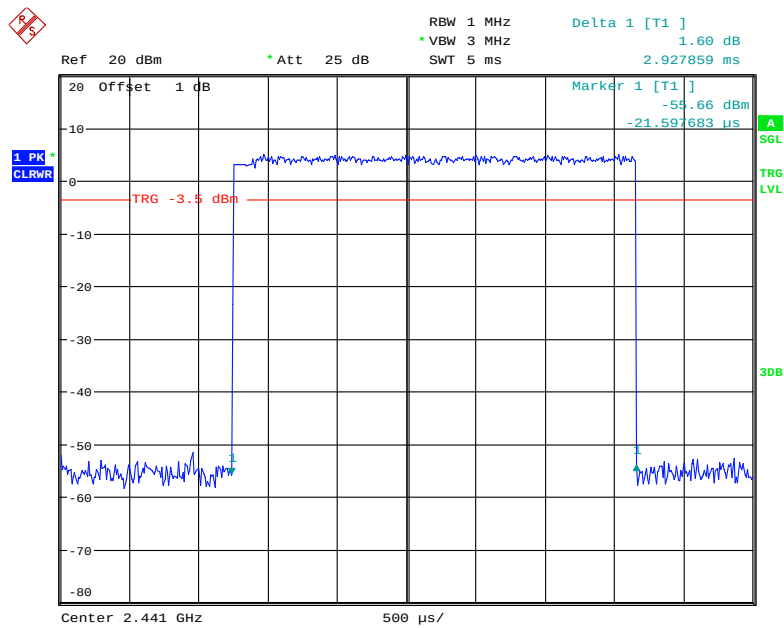
3DH3: High Channel

Date: 1.SEP.2018 15:11:06

3DH5: Low Channel

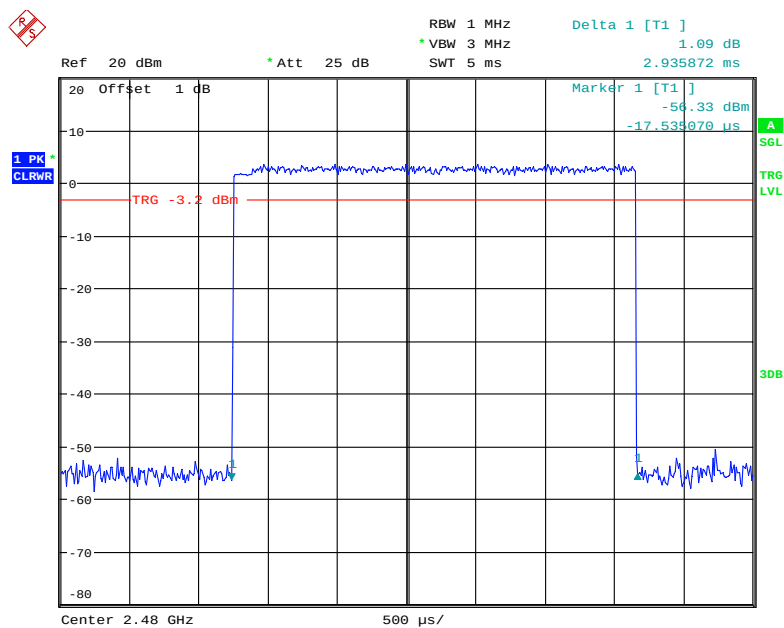
Date: 1.SEP.2018 15:11:23

3DH5: Middle Channel



Date: 1.SEP.2018 15:11:43

3DH5: High Channel



Date: 1.SEP.2018 15:11:48

FCC §15.247(b) (1), RSS-247 Clause 5.4 b) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to FCC §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

According to RSS-247 Clause 5.4 b)

- b) For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

* The testing was performed by Nami Quan on 2018-09-01.

Test Result: Compliance.

Test Mode: Transmitting

Mode	Frequency (MHz)	Peak Conducted Output power (dBm)	Peak Conducted Output power Limit (dBm)	EIRP (dBm)
BDR Mode (GFSK)	2402	3.69	21	6.19
	2441	5.74	21	8.24
	2456	6.11	21	8.61
	2480	4.63	21	7.13
EDR Mode ($\pi/4$ -DQPSK)	2402	0.70	21	3.2
	2441	2.86	21	5.36
	2453	3.21	21	5.71
	2480	1.79	21	4.29
EDR Mode (8DPSK)	2402	0.74	21	3.24
	2441	2.93	21	5.43
	2451	3.32	21	5.82
	2480	1.84	21	4.34

Note: The data above was tested in conducted mode, the antenna gain is 2.5dBi.

FCC §15.247(d) & RSS-247 CLAUSE 5.5- BAND EDGES TESTING

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)).

According to RSS-247 Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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/ VBW of spectrum analyzer to 100/300 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data**Environmental Conditions**

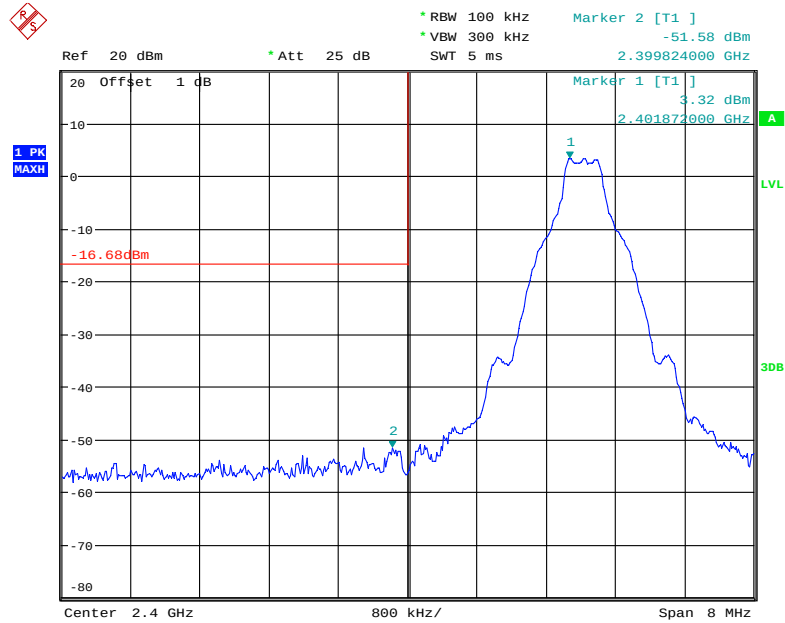
Temperature:	27.9 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

* The testing was performed by Nami Quan on 2018-09-01.

Test Result: Compliance

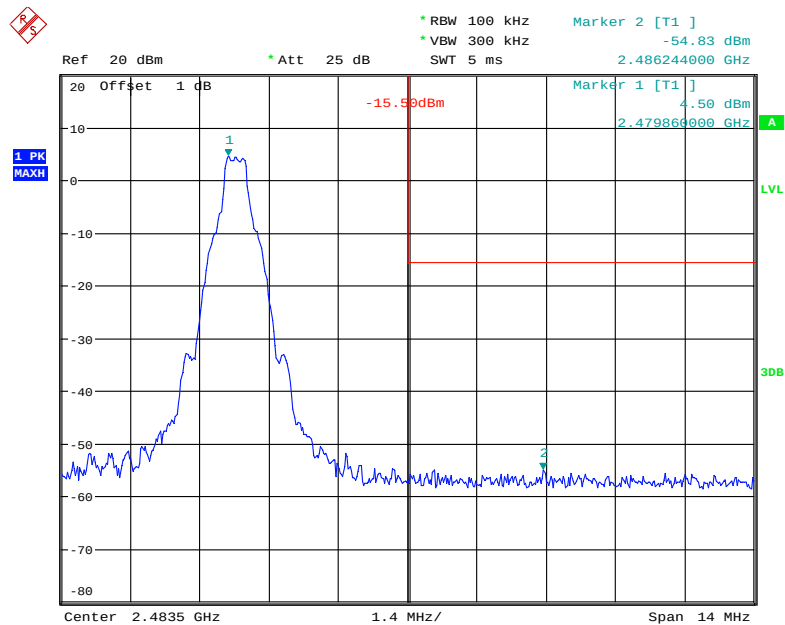
Single mode:
BDR Mode (GFSK):

Band Edge, Left Side

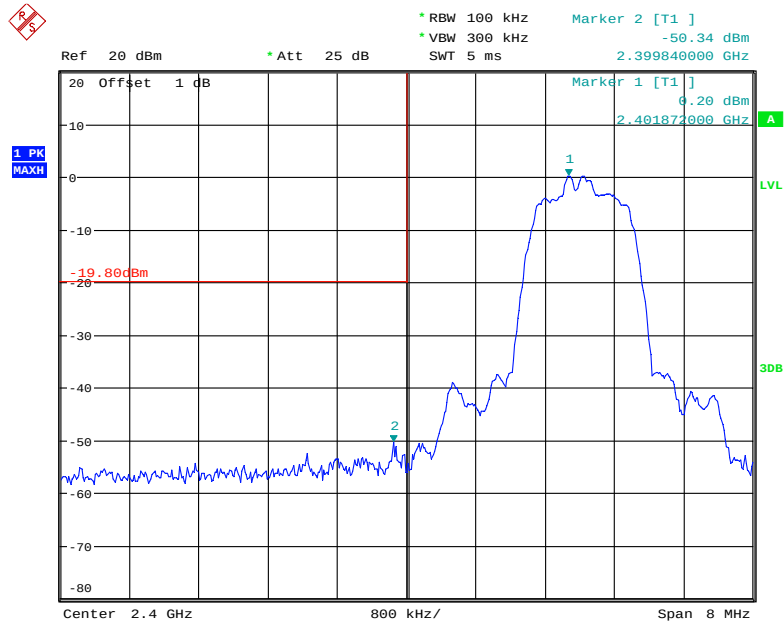


Date: 1.SEP.2018 14:18:14

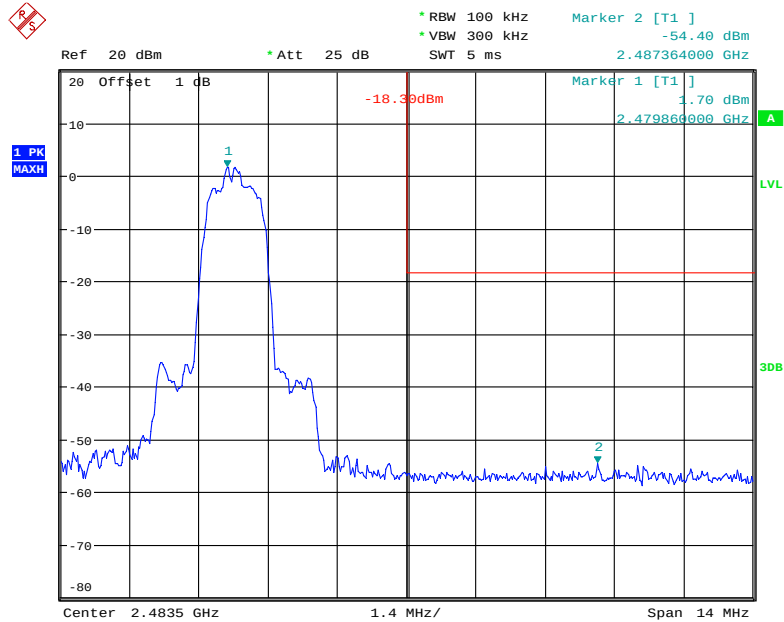
Band Edge, Right Side



Date: 1.SEP.2018 14:21:02

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

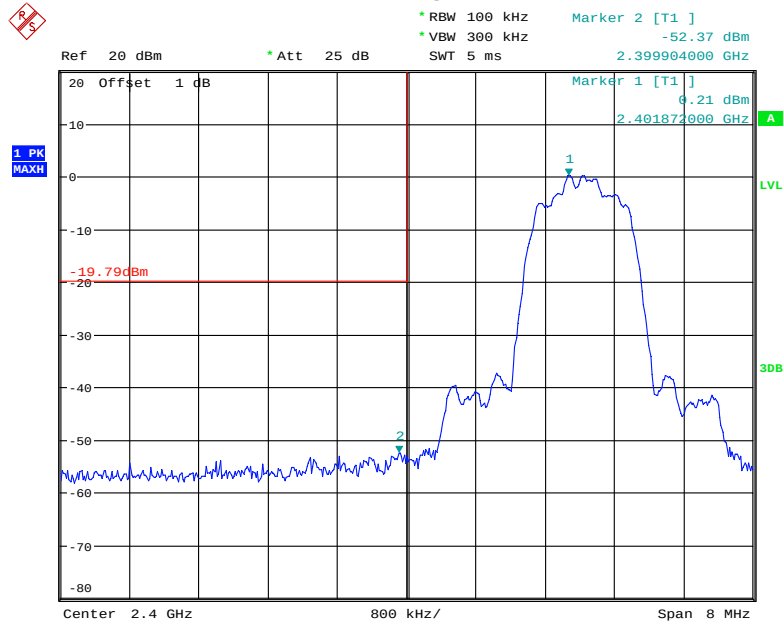
Date: 1.SEP.2018 14:25:29

Band Edge, Right Side

Date: 1.SEP.2018 14:22:21

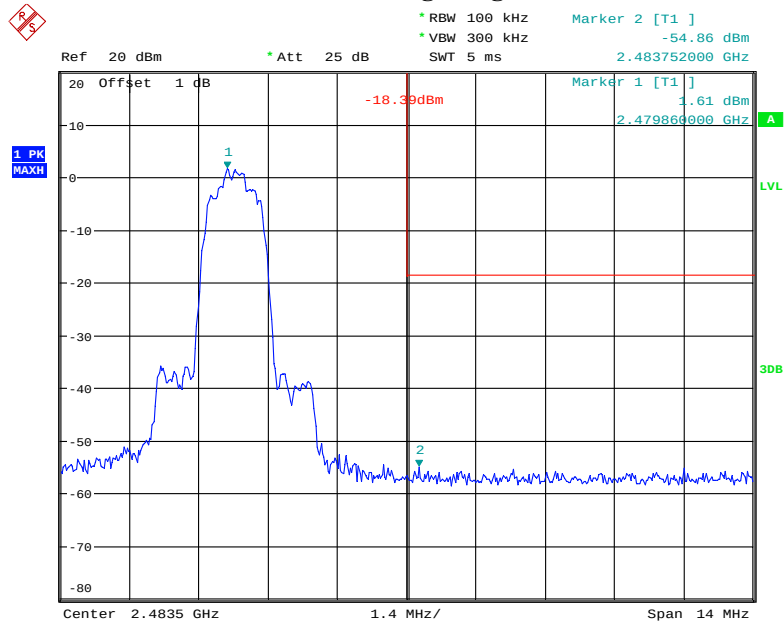
EDR Mode (8DPSK):

Band Edge, Left Side



Date: 1.SEP.2018 14:26:39

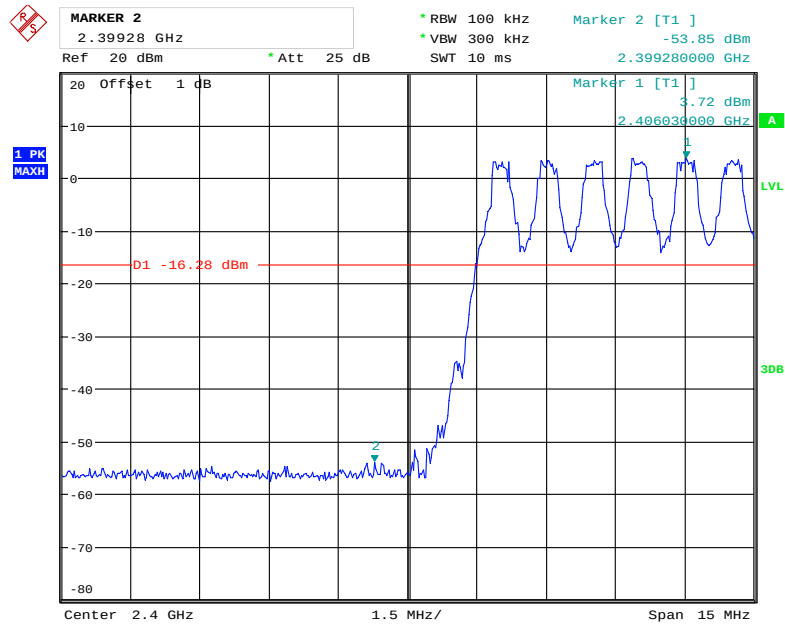
Band Edge, Right Side



Date: 1.SEP.2018 14:29:14

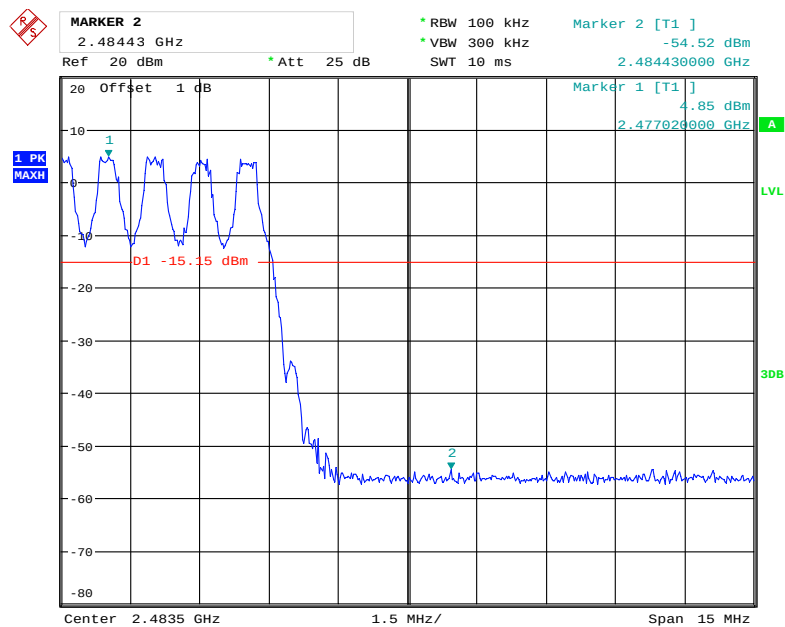
Hopping mode:
BDR Mode (GFSK):

Band Edge, Left Side



Date: 1.SEP.2018 15:25:29

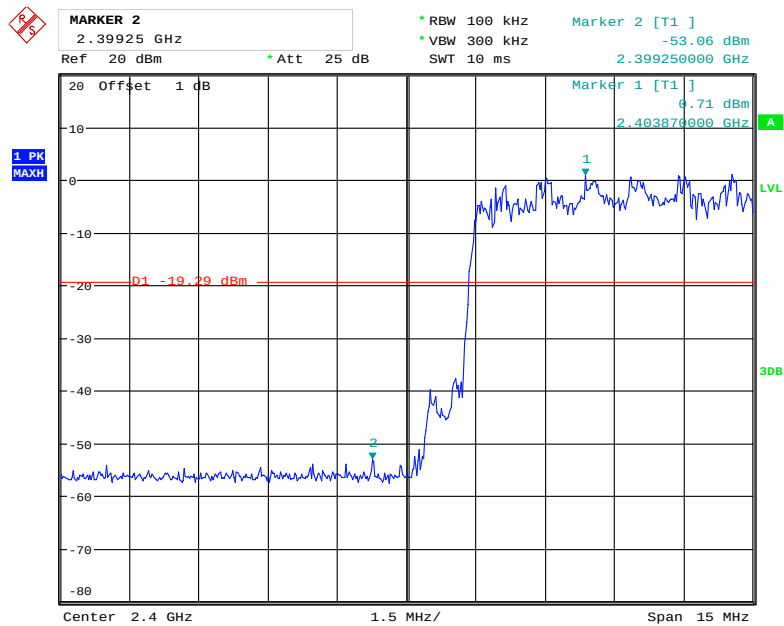
Band Edge, Right Side



Date: 1.SEP.2018 15:28:16

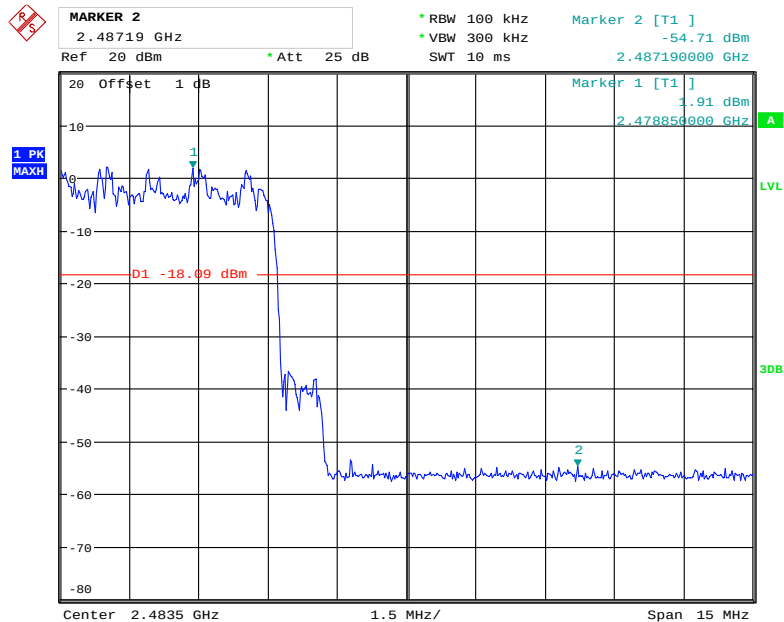
EDR Mode ($\pi/4$ -DQPSK):

Band Edge, Left Side

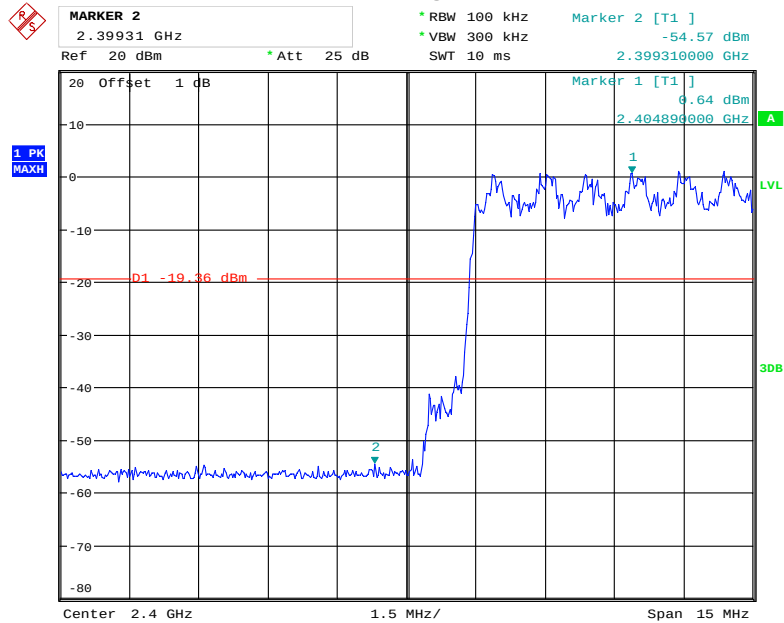


Date: 1.SEP.2018 15:34:00

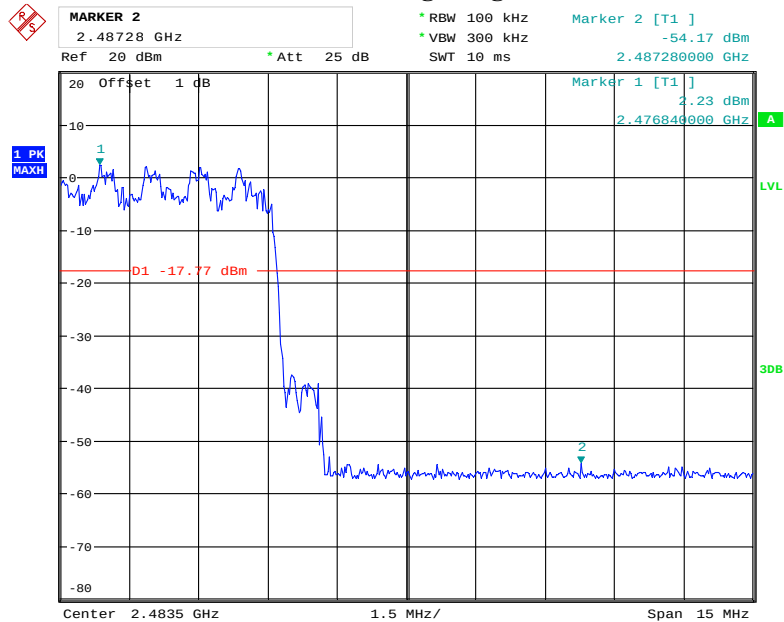
Band Edge, Right Side



Date: 1.SEP.2018 15:36:36

*EDR Mode (8DPSK):***Band Edge, Left Side**

Date: 1.SEP.2018 15:38:02

Band Edge, Right Side

Date: 1.SEP.2018 15:39:55

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