TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.247

RSS-GEN, ISSUE 5, MARCH 2019 AMENDMENT 1

RSS-247, ISSUE 2, FEBRUARY 2017

TEST REPORT

For

MPOW TECHNOLOGY CO.,LIMITED

FLAT/RM 605 6/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONGKOK KL HONG KONG

FCC ID: 2AMH2-BH453A
IC: 25122-BH453A

Report Type:	**Product Name:**
Original Report	MPOW BLUETOOTH HEADSET

Report Number:	RDG200720004-00A
Report Date:	2020-08-17
Reviewed By:	Ivan Cao Assistant Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	MPOW BLUETOOTH HEADSET
EUT Model:	BH453A
Multiple Model For FCC Only:	BH453B
Operation Frequency:	2402-2480MHz
Maximum Peak Output Power (Conducted):	4.59 dBm
Modulation Type:	GFSK, π/4-DQPSK, 8DPSK
Rated Input Voltage:	DC 3.7V from battery or DC 5V from USB port
Serial Number:	RDG200720004-RF-S1
EUT Received Date:	2020.07.18
EUT Received Status:	Good

Note: The series product, models BH453A, BH453B are electrically identical, only BH453A was tested for this report, the details of the differences between them were explained in the declaration letter.

Objective

This report is prepared on behalf of ***MPOW TECHNOLOGY CO.,LIMITED*** 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, March 2019 Amendment 1 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,March 2019 Amendment 1 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

No related submittal(s)/grant(s)

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 v05r02. And RSS-247, Issue 2, February 2017, RSS-Gen, Issue 5, March 2019 Amendment 1 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	±5 %
RF output power, conducted	±0.61dB
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	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "△ ". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

EUT Exercise Software

The software "Blue Test3"was used for testing and the maximum power was configured as below, which was provided by the manufacturer:

Mode	Channel	Frequency (MHz)	Power Level Setting
GFSK	Low	2402	250
	Middle	2441	250
	High	2480	250
π/4 DQPSK	Low	2402	250
	Middle	2441	250
	High	2480	250
8DPSK	Low	2402	250
	Middle	2441	250
	High	2480	250

Equipment Modifications

No modification was made to the EUT.

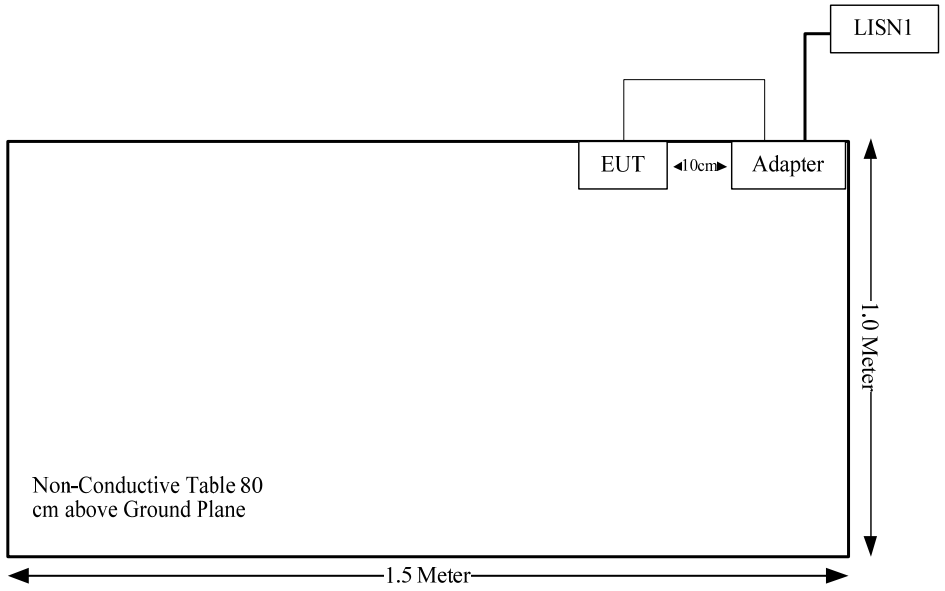
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Huawei	Adapter	HW-050200C3W	H333L5F4M06947

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	yes	No	0.8	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
RSS-102 Clause 2.5.1	Exemption Limit For Routine Evaluation-SAR Evaluation	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- RF Exposure

Applicable Standard

According to§15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

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

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

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

Measurement Result

The max conducted power including tune-up tolerance is 5.0 dBm (3.16 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
=3.16/5*(√2.480) = 1.0< 3.0

Result: Compliance. The stand-alone SAR evaluation is not necessary.

RSS-102 § 2.5.1 EXEMPTION LIMITS FOR ROUTINE EVALUATION – SAR EVALUATION

Applicable Standard

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Measurement Result:

The max tune-up conducted power is 5.0 dBm(3.16 mW), Antenna Gain:0 dBi,

The exemption power(P) limits for routine evaluation in 2402-2480MHz is:
(2480-2450)/(3500-2450)=(P -4)/(2-4)
=>P=3.94 mW@2480 MHz
> 3.16mW

So the stand-alone SAR evaluation can be exempted.

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 one internal antenna arrangement, fulfill the requirement of this section. Please refer to below information and the EUT photos:

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
PCB	50	0 dBi/2.4~2.5GHz

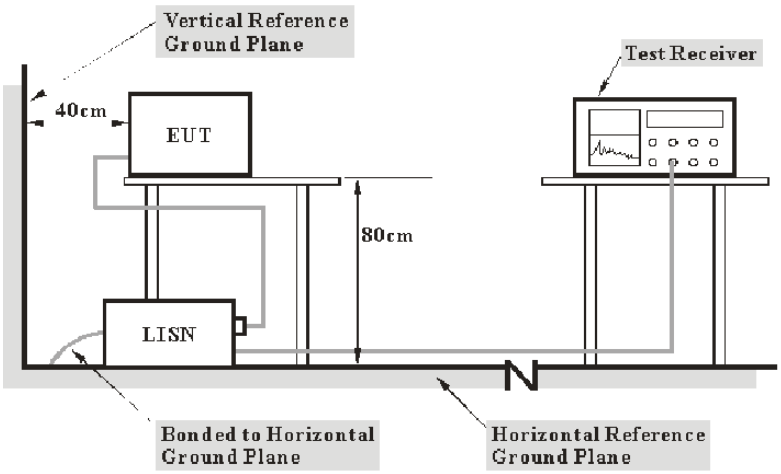
Result: Compliance.

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.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

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:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV 216	101614	2019-09-12	2020-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-07-07	2021-07-07
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A

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

Test Data

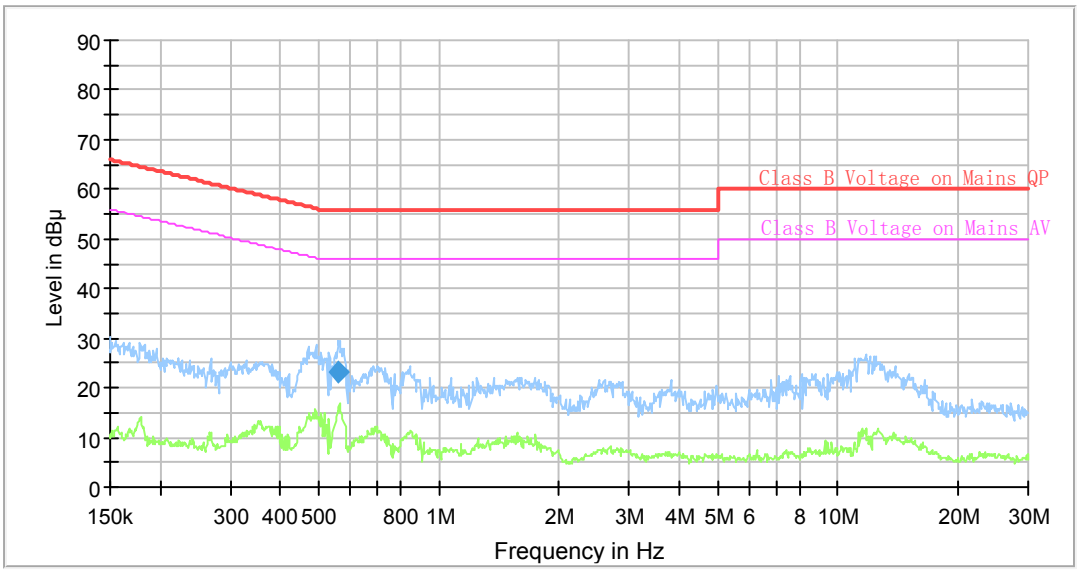
Environmental Conditions

Temperature:	27.4℃
Relative Humidity:	63%
ATM Pressure:	100.9kPa
Test by:	Barry Yang
Test Date:	2020-07-24

Test Result: Compliance

Test Mode: Transmitting

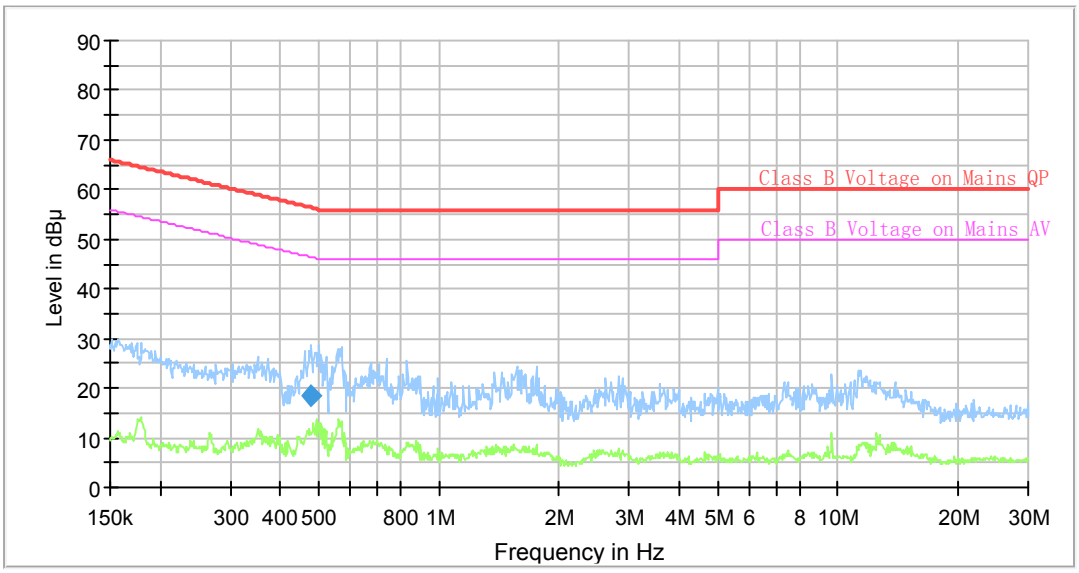
AC120V, 60 Hz, Line:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.559669	23.26	---	56.00	32.74	9.000	L1	9.7

AC120V, 60 Hz, Neutral:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.479495	18.60	---	56.35	37.75	9.000	N	9.6

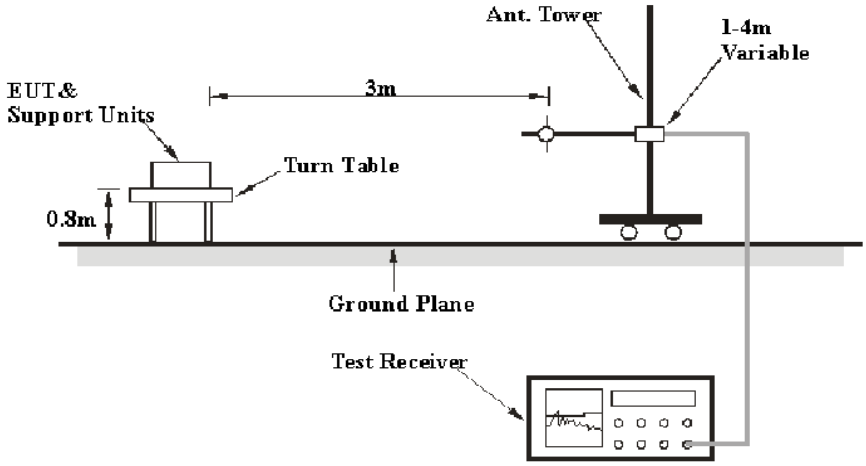
FCC §15.209, §15.205 & §15.247(d) & RSS-247 CLAUSE 5.5,RSS -GEN CLAUSE 8.10- SPURIOUS EMISSIONS

Applicable Standard

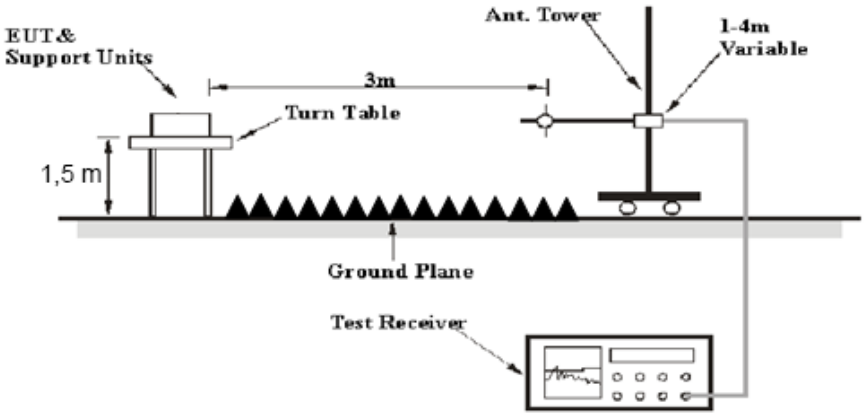
FCC §15.247 (d); §15.209; §15.205; RSS-247 Clause 5.5, RSS-GEN Clause 8.10

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission below 1GHz tests were performed in the 10 meters chamber test site, 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 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

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
Radiation Below 1GHz					
R&S	EMI Test Receiver	ESR3	102453	2019-09-12	2020-09-12
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2019-09-24	2020-09-24
Sonoma	Amplifier	310N	185914	2019-10-13	2020-10-13
Radiation Above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2017-12-06	2020-12-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2020-06-27	2021-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2019-09-05	2020-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2020-06-27	2021-06-27
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2020-06-16	2021-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2020-06-16	2021-06-16

**** 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:

Corrected Amplitude = Meter Reading + 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 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

Environmental Conditions

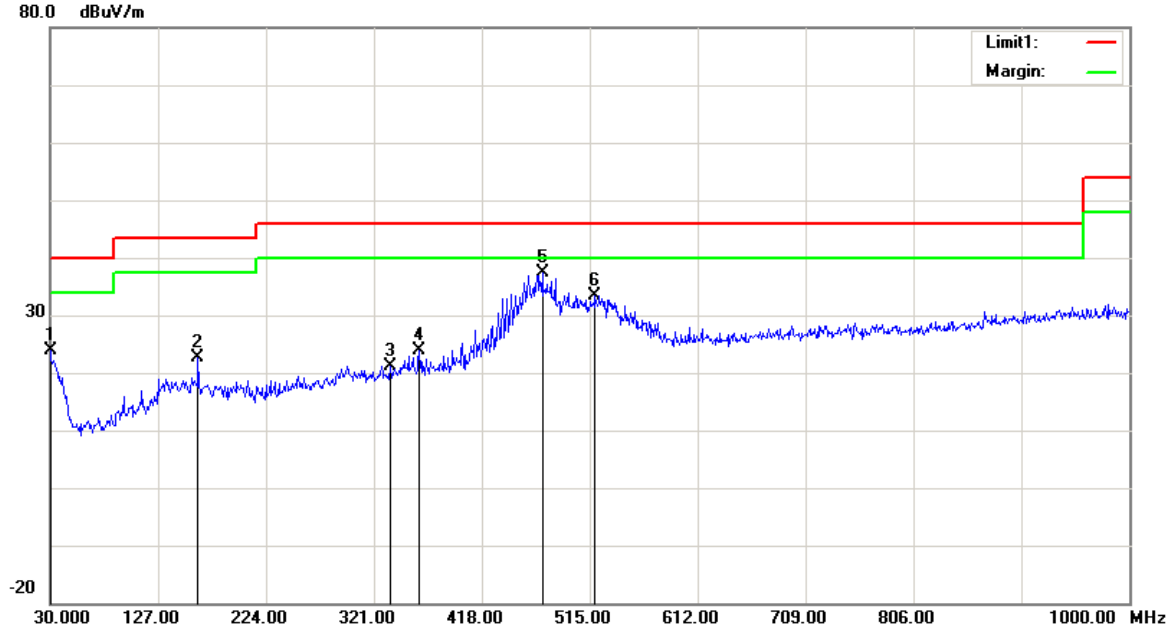
Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	21.9°C	29°C
Relative Humidity:	42%	45%
ATM Pressure:	100.7 kPa	99.8 kPa
Tester:	Jackson Zhang	Felix Wang
Test Date:	2020-08-05	2020-08-09

Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plots.

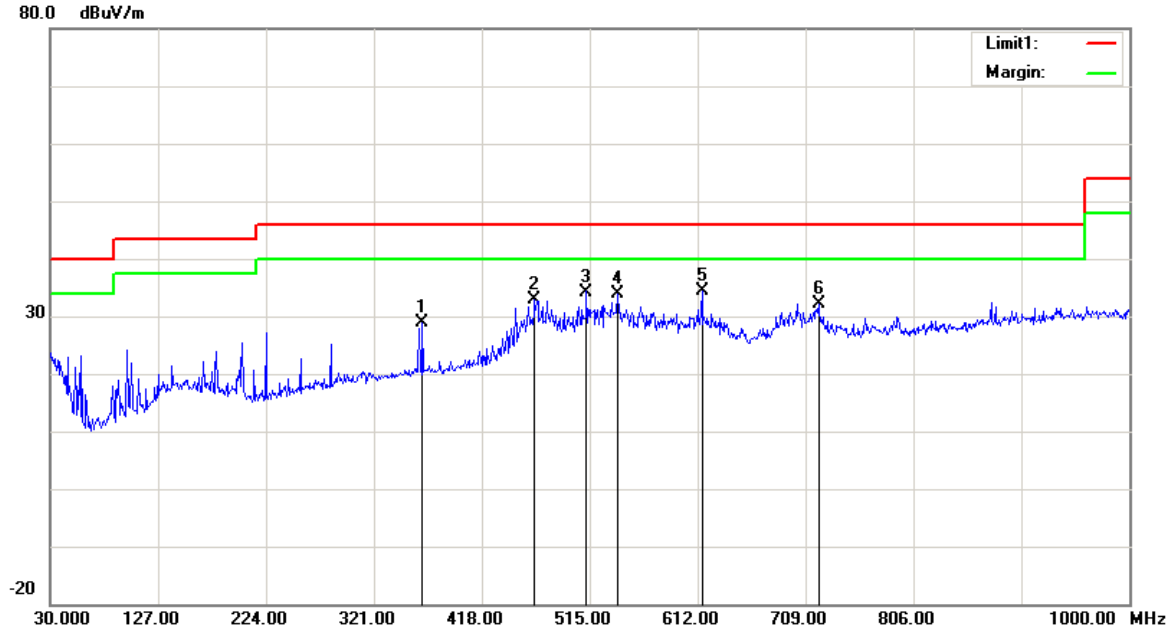
1) 30MHz-1GHz (GFSK high channel was the worst)

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	28.20	peak	-4.33	23.87	40.00	16.13
162.8900	32.27	peak	-9.53	22.74	43.50	20.76
335.5500	28.12	peak	-6.90	21.22	46.00	24.78
361.7400	29.93	peak	-6.05	23.88	46.00	22.12
472.3200	41.30	peak	-3.92	37.38	46.00	8.62
519.8500	36.08	peak	-2.63	33.45	46.00	12.55

Vertical:



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
364.6500	35.16	peak	-6.17	28.99	46.00	17.01
465.5300	36.90	peak	-3.97	32.93	46.00	13.07
512.0900	37.18	peak	-2.93	34.25	46.00	11.75
540.2200	36.02	peak	-2.02	34.00	46.00	12.00
615.8800	35.10	peak	-0.83	34.27	46.00	11.73
720.6400	31.66	peak	0.57	32.23	46.00	13.77

2) 1GHz-25GHz:

BDR Mode (GFSK was the worst case):

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	61.89	PK	H	28.10	1.80	0.00	91.79	N/A	N/A
2402.00	51.63	AV	H	28.10	1.80	0.00	81.53	N/A	N/A
2402.00	58.93	PK	V	28.10	1.80	0.00	88.83	N/A	N/A
2402.00	48.83	AV	V	28.10	1.80	0.00	78.73	N/A	N/A
2390.00	26.16	PK	H	28.08	1.80	0.00	56.04	74.00	17.96
2390.00	13.53	AV	H	28.08	1.80	0.00	43.41	54.00	10.59
4804.00	44.84	PK	H	32.91	3.17	25.60	55.32	74.00	18.68
4804.00	34.29	AV	H	32.91	3.17	25.60	44.77	54.00	9.23
7206.00	35.64	PK	H	35.74	4.82	25.60	50.60	74.00	23.40
7206.00	23.37	AV	H	35.74	4.82	25.60	38.33	54.00	15.67
Middle Channel: 2441 MHz									
2441.00	66.69	PK	H	28.18	1.82	0.00	96.69	N/A	N/A
2441.00	55.65	AV	H	28.18	1.82	0.00	85.65	N/A	N/A
2441.00	63.42	PK	V	28.18	1.82	0.00	93.42	N/A	N/A
2441.00	52.34	AV	V	28.18	1.82	0.00	82.34	N/A	N/A
4882.00	48.76	PK	H	33.06	3.27	25.66	59.43	74.00	14.57
4882.00	38.03	AV	H	33.06	3.27	25.66	48.70	54.00	5.30
7323.00	36.45	PK	H	36.04	4.62	25.73	51.38	74.00	22.62
7323.00	24.23	AV	H	36.04	4.62	25.73	39.16	54.00	14.84
High Channel: 2480 MHz									
2480.00	65.43	PK	H	28.26	1.84	0.00	95.53	N/A	N/A
2480.00	55.47	AV	H	28.26	1.84	0.00	85.57	N/A	N/A
2480.00	62.27	PK	V	28.26	1.84	0.00	92.37	N/A	N/A
2480.00	52.18	AV	V	28.26	1.84	0.00	82.28	N/A	N/A
2483.50	26.79	PK	H	28.27	1.84	0.00	56.90	74.00	17.10
2483.50	14.09	AV	H	28.27	1.84	0.00	44.20	54.00	9.80
4960.00	50.82	PK	H	33.22	3.23	25.63	61.64	74.00	12.36
4960.00	39.64	AV	H	33.22	3.23	25.63	50.46	54.00	3.54
7440.00	36.23	PK	H	36.34	4.41	25.85	51.13	74.00	22.87
7440.00	24.11	AV	H	36.34	4.41	25.85	39.01	54.00	14.99

EDR(π/4-DQPSK) Mode

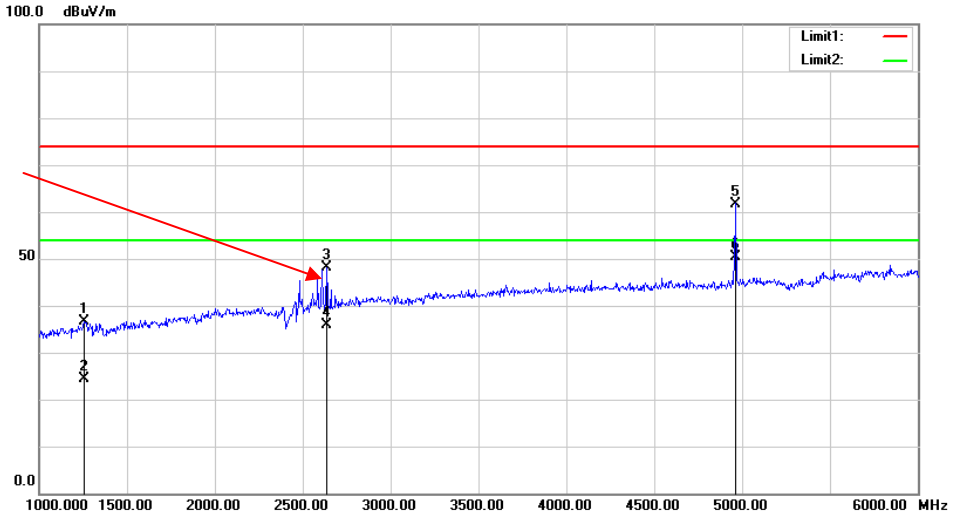
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	58.96	PK	H	28.10	1.80	0.00	88.86	N/A	N/A
2402.00	47.20	AV	H	28.10	1.80	0.00	77.10	N/A	N/A
2402.00	56.24	PK	V	28.10	1.80	0.00	86.14	N/A	N/A
2402.00	44.48	AV	V	28.10	1.80	0.00	74.38	N/A	N/A
2390.00	26.56	PK	H	28.08	1.80	0.00	56.44	74.00	17.56
2390.00	13.54	AV	H	28.08	1.80	0.00	43.42	54.00	10.58
4804.00	42.38	PK	H	32.91	3.17	25.60	52.86	74.00	21.14
4804.00	29.43	AV	H	32.91	3.17	25.60	39.91	54.00	14.09
7206.00	35.38	PK	H	35.74	4.82	25.60	50.34	74.00	23.66
7206.00	23.12	AV	H	35.74	4.82	25.60	38.08	54.00	15.92
Middle Channel: 2441 MHz									
2441.00	62.76	PK	H	28.18	1.82	0.00	92.76	N/A	N/A
2441.00	50.81	AV	H	28.18	1.82	0.00	80.81	N/A	N/A
2441.00	60.55	PK	V	28.18	1.82	0.00	90.55	N/A	N/A
2441.00	48.33	AV	V	28.18	1.82	0.00	78.33	N/A	N/A
4882.00	45.59	PK	H	33.06	3.27	25.66	56.26	74.00	17.74
4882.00	33.03	AV	H	33.06	3.27	25.66	43.70	54.00	10.30
7323.00	35.76	PK	H	36.04	4.62	25.73	50.69	74.00	23.31
7323.00	23.54	AV	H	36.04	4.62	25.73	38.47	54.00	15.53
High Channel: 2480 MHz									
2480.00	63.84	PK	H	28.26	1.84	0.00	93.94	N/A	N/A
2480.00	52.11	AV	H	28.26	1.84	0.00	82.21	N/A	N/A
2480.00	61.77	PK	V	28.26	1.84	0.00	91.87	N/A	N/A
2480.00	50.63	AV	V	28.26	1.84	0.00	80.73	N/A	N/A
2483.50	27.55	PK	H	28.27	1.84	0.00	57.66	74.00	16.34
2483.50	14.05	AV	H	28.27	1.84	0.00	44.16	54.00	9.84
4960.00	46.35	PK	H	33.22	3.23	25.63	57.17	74.00	16.83
4960.00	33.87	AV	H	33.22	3.23	25.63	44.69	54.00	9.31
7440.00	36.19	PK	H	36.34	4.41	25.85	51.09	74.00	22.91
7440.00	24.05	AV	H	36.34	4.41	25.85	38.95	54.00	15.05

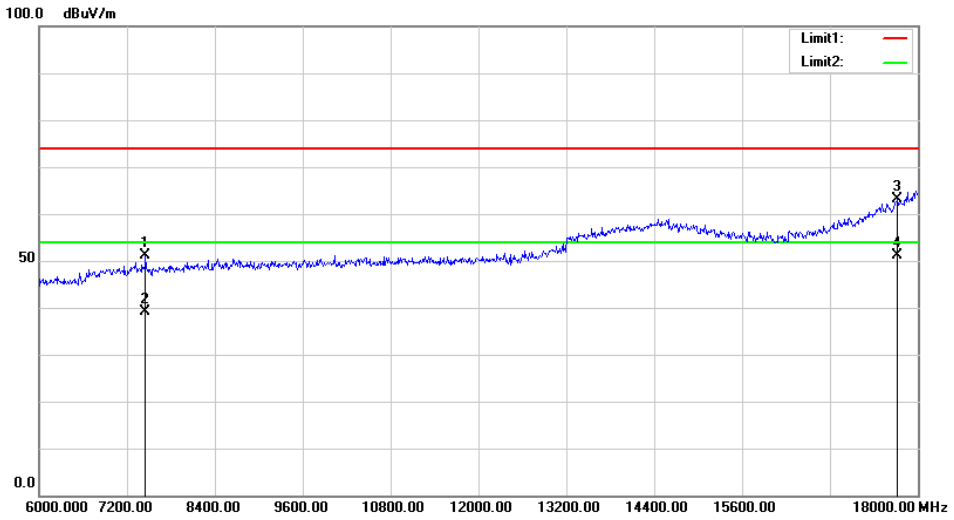
EDR(8DPSK)Mode

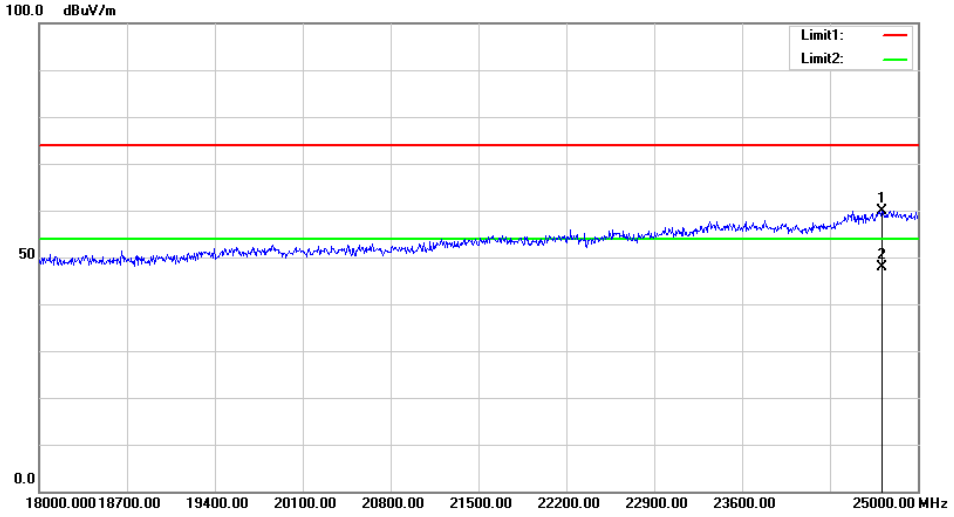
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	59.39	PK	H	28.10	1.80	0.00	89.29	N/A	N/A
2402.00	47.30	AV	H	28.10	1.80	0.00	77.20	N/A	N/A
2402.00	55.01	PK	V	28.10	1.80	0.00	84.91	N/A	N/A
2402.00	43.12	AV	V	28.10	1.80	0.00	73.02	N/A	N/A
2390.00	26.78	PK	H	28.08	1.80	0.00	56.66	74.00	17.34
2390.00	13.56	AV	H	28.08	1.80	0.00	43.44	54.00	10.56
4804.00	41.40	PK	H	32.91	3.17	25.60	51.88	74.00	22.12
4804.00	29.82	AV	H	32.91	3.17	25.60	40.30	54.00	13.70
7206.00	35.85	PK	H	35.74	4.82	25.60	50.81	74.00	23.19
7206.00	23.63	AV	H	35.74	4.82	25.60	38.59	54.00	15.41
Middle Channel: 2441 MHz									
2441.00	63.64	PK	H	28.18	1.82	0.00	93.64	N/A	N/A
2441.00	51.43	AV	H	28.18	1.82	0.00	81.43	N/A	N/A
2441.00	59.38	PK	V	28.18	1.82	0.00	89.38	N/A	N/A
2441.00	47.24	AV	V	28.18	1.82	0.00	77.24	N/A	N/A
4882.00	45.97	PK	H	33.06	3.27	25.66	56.64	74.00	17.36
4882.00	33.10	AV	H	33.06	3.27	25.66	43.77	54.00	10.23
7323.00	36.32	PK	H	36.04	4.62	25.73	51.25	74.00	22.75
7323.00	24.18	AV	H	36.04	4.62	25.73	39.11	54.00	14.89
High Channel: 2480 MHz									
2480.00	63.09	PK	H	28.26	1.84	0.00	93.19	N/A	N/A
2480.00	50.57	AV	H	28.26	1.84	0.00	80.67	N/A	N/A
2480.00	59.16	PK	V	28.26	1.84	0.00	89.26	N/A	N/A
2480.00	46.08	AV	V	28.26	1.84	0.00	76.18	N/A	N/A
2483.50	26.74	PK	H	28.27	1.84	0.00	56.85	74.00	17.15
2483.50	14.06	AV	H	28.27	1.84	0.00	44.17	54.00	9.83
4960.00	45.47	PK	H	33.22	3.23	25.63	56.29	74.00	17.71
4960.00	32.69	AV	H	33.22	3.23	25.63	43.51	54.00	10.49
7440.00	36.39	PK	H	36.34	4.41	25.85	51.29	74.00	22.71
7440.00	24.24	AV	H	36.34	4.41	25.85	39.14	54.00	14.86

Worst plots(GFSK High channel)
Horizontal

Fundamental Test with Band Rejection Filter

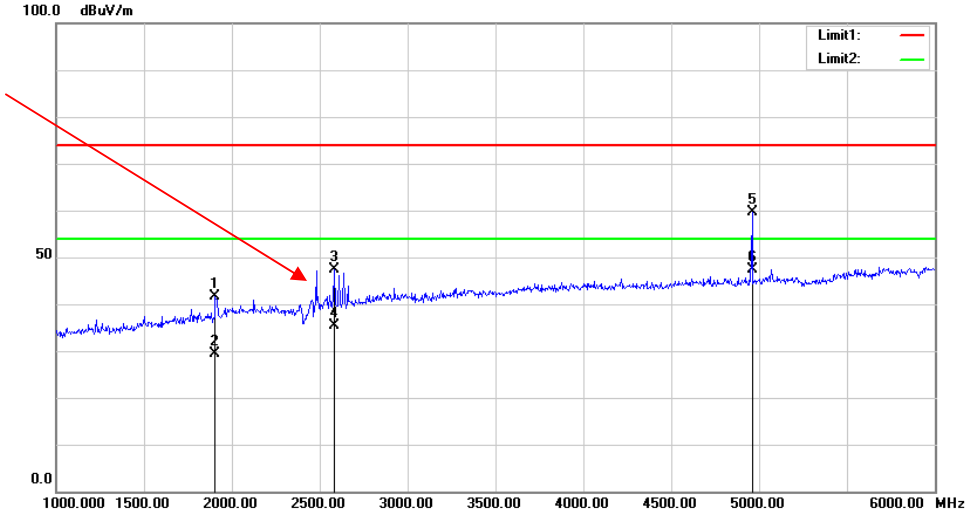


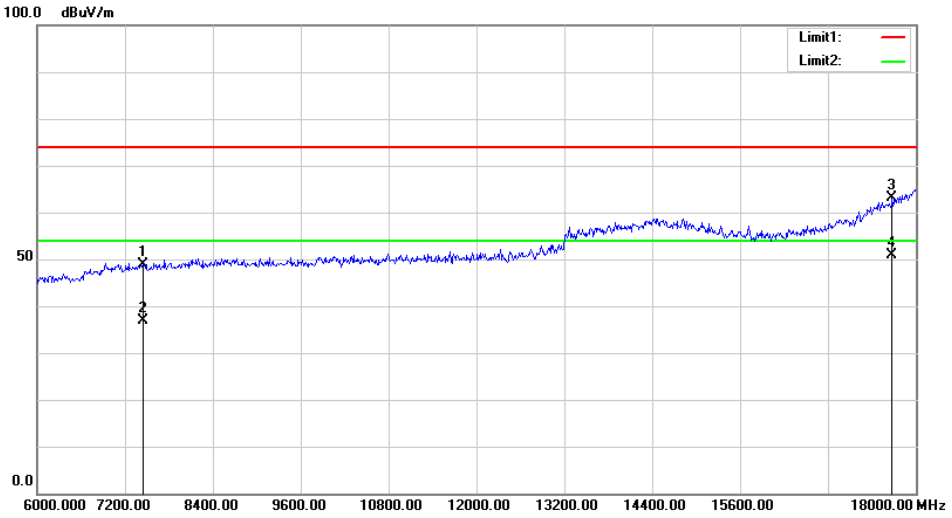


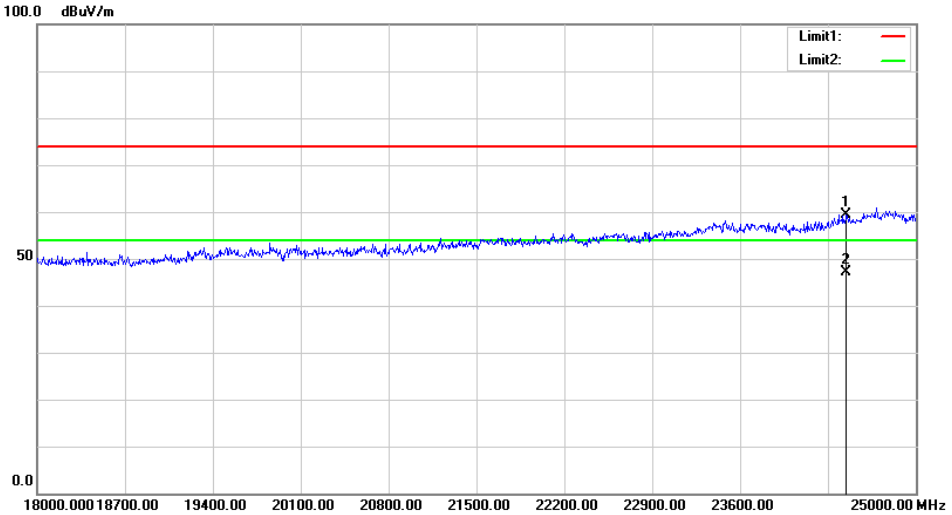


Vertical

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 hoping 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	2020-07-07	2021-07-07
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:	25.3°C
Relative Humidity:	64%
ATM Pressure:	100.3Pa
Tester:	Taylor Li
Test Date:	2020-08-04

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

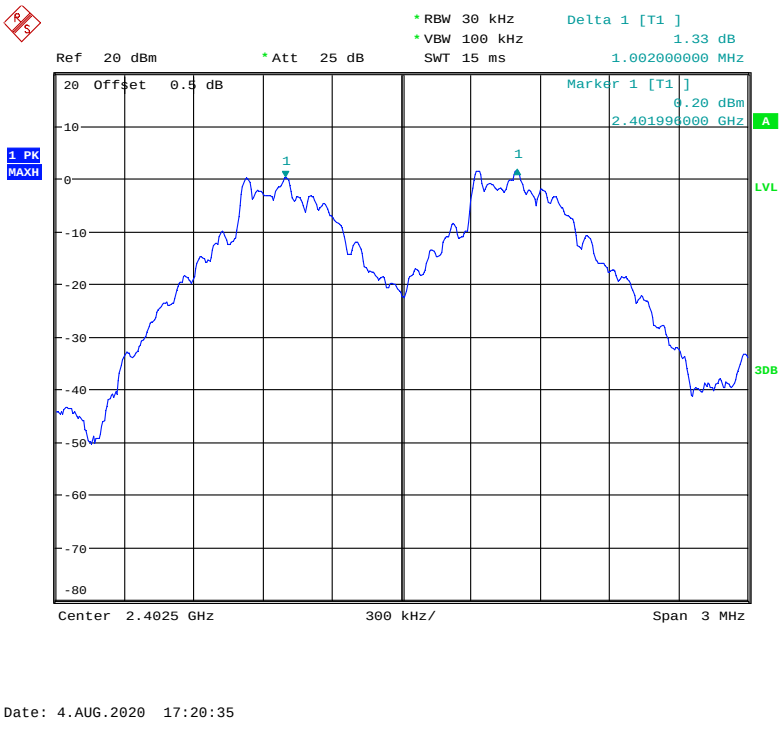
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
BDR (GFSK)	Low	2402	1.002	0.62
	Middle	2441	1.002	0.62
	High	2480	1.002	0.62
EDR (π/4-DQPSK)	Low	2402	1.002	0.8
	Middle	2441	1.002	0.81
	High	2480	1.002	0.81
EDR (8DPSK)	Low	2402	1.002	0.8
	Middle	2441	1.002	0.8
	High	2480	1.002	0.8

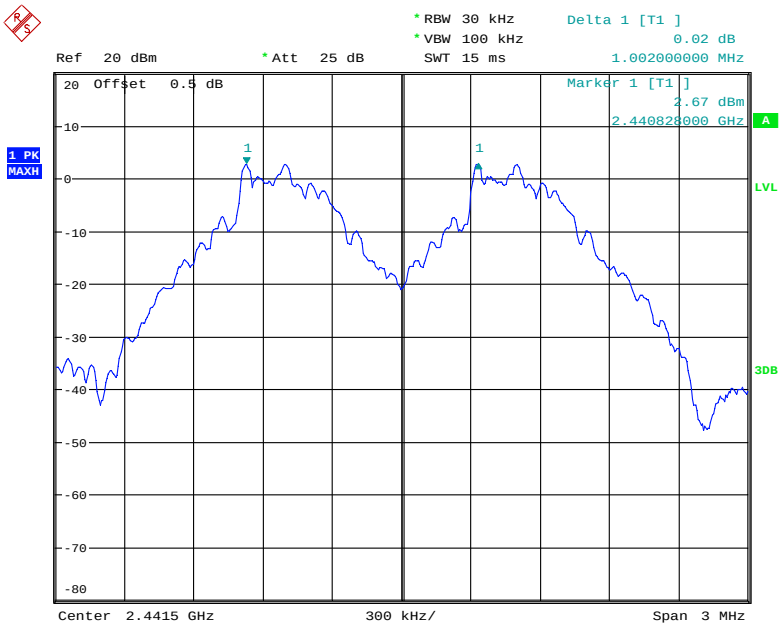
Note: Limit= (2/3) × 20dB bandwidth

BDR Mode (GFSK):

Low Channel

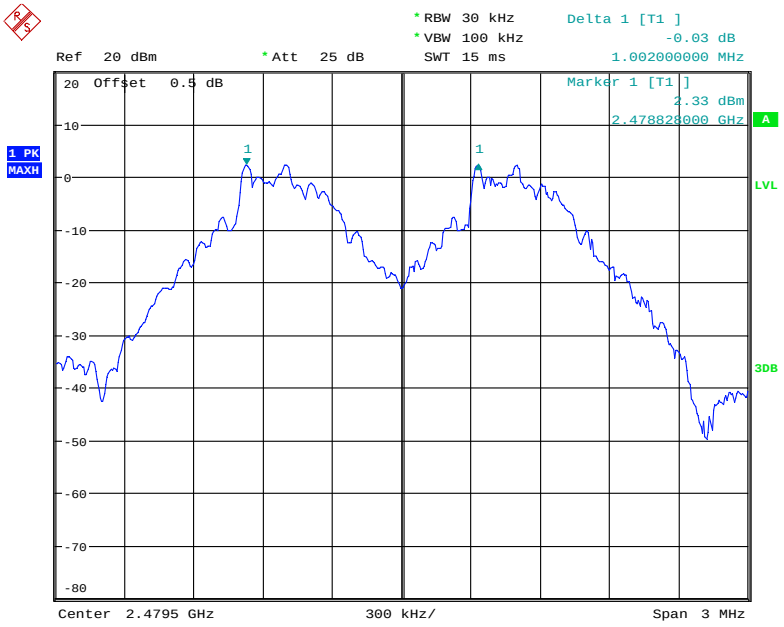


Middle Channel



Date: 4.AUG.2020 17:21:55

High Channel



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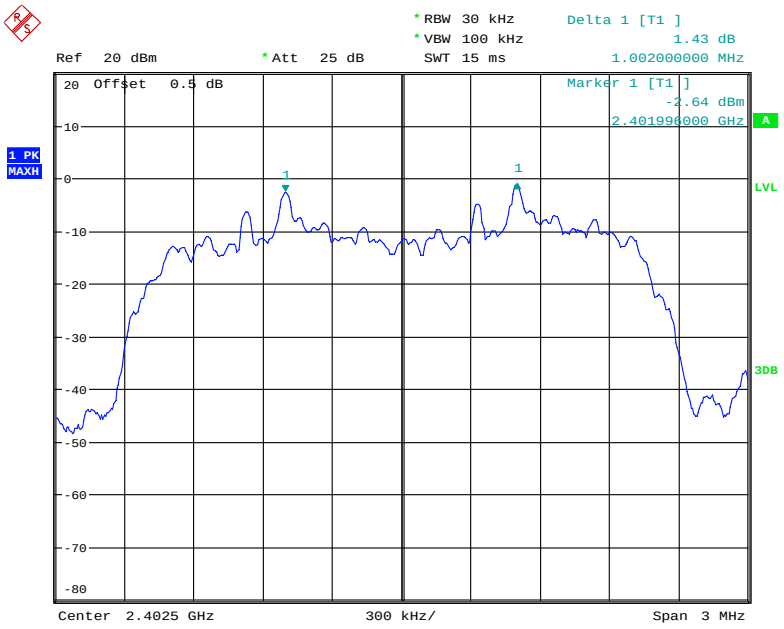
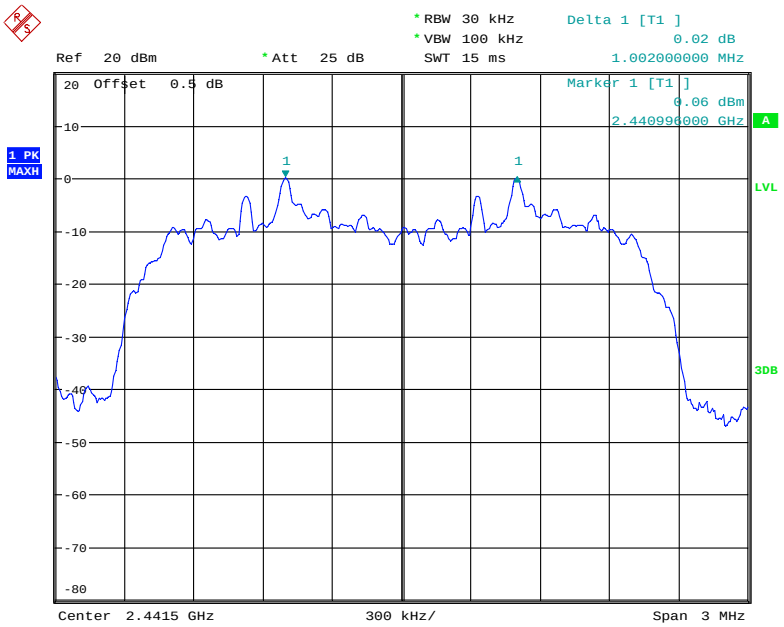
EDR Mode (π/4-DQPSK):

Low Channel



Date: 4.AUG.2020 17:26:39

Middle Channel



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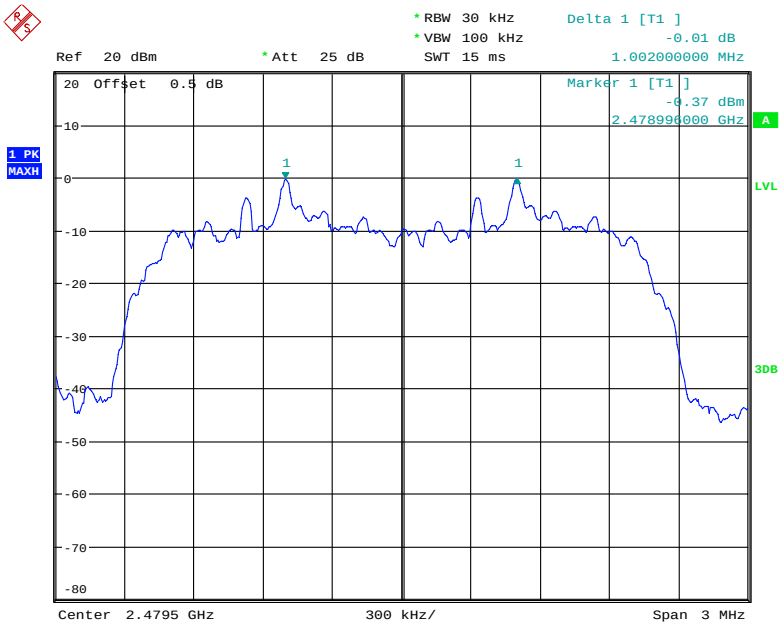
High Channel



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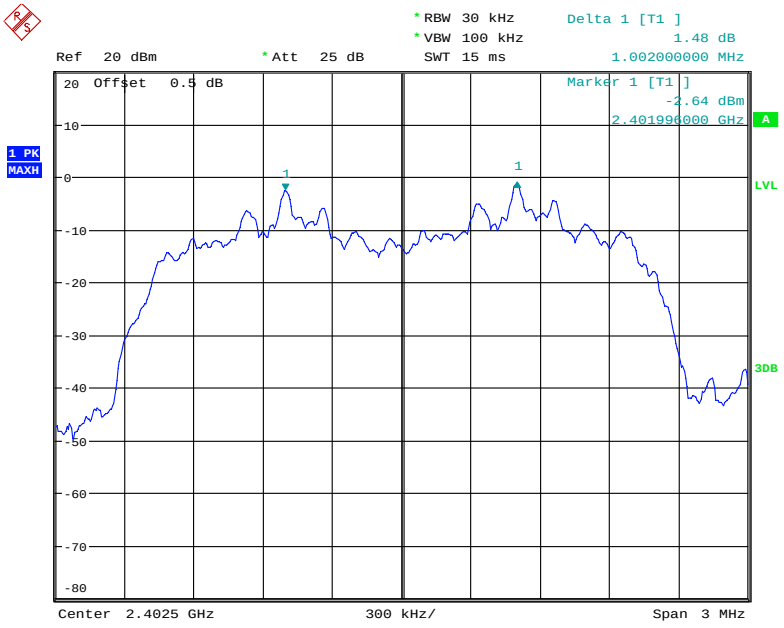
EDR Mode (8DPSK):

Low Channel



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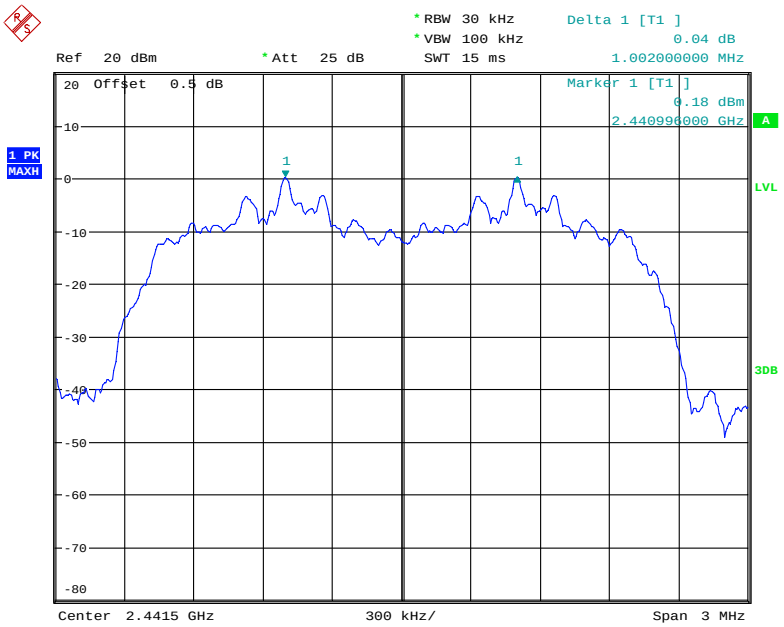
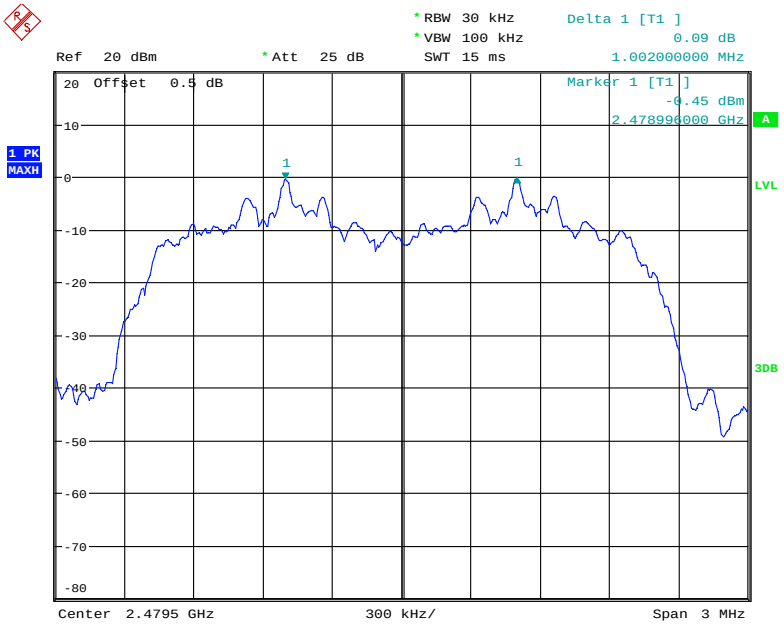
Middle Channel



Date: 4.AUG.2020 17:38:04

High Channel



Date: 4.AUG.2020 17:39:50

RSS-247 CLUASE 5.1&RSS-GEN CLAUSE 6.7 – 20 dB BANDWIDTH AND 99% OCCUPIED 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	2020-07-07	2021-07-07
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:	25.3°C
Relative Humidity:	64%
ATM Pressure:	100.3 Pa
Tester:	Taylor Li
Test Date:	2020-08-04

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

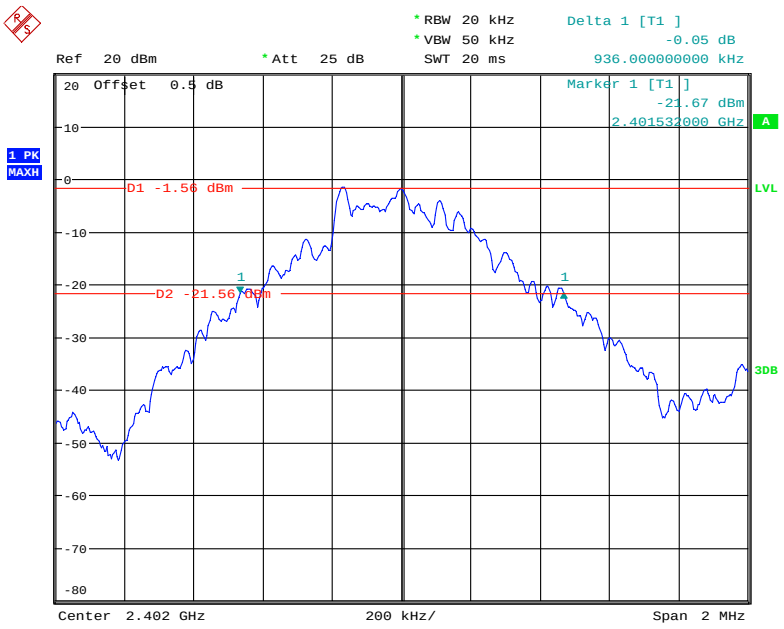
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% occupied Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.936	0.848
	Middle	2441	0.932	0.844
	High	2480	0.932	0.848
EDR Mode (π/4-DQPSK)	Low	2402	1.196	1.156
	Middle	2441	1.216	1.160
	High	2480	1.216	1.160
EDR Mode (8DPSK)	Low	2402	1.204	1.148
	Middle	2441	1.204	1.140
	High	2480	1.204	1.140

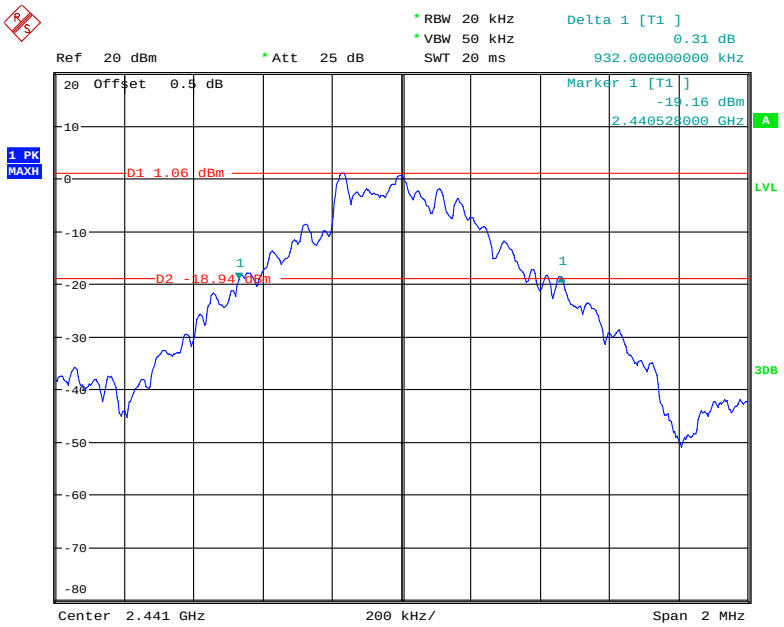
20dB Bandwidth:

BDR Mode (GFSK):

Low Channel



Middle Channel



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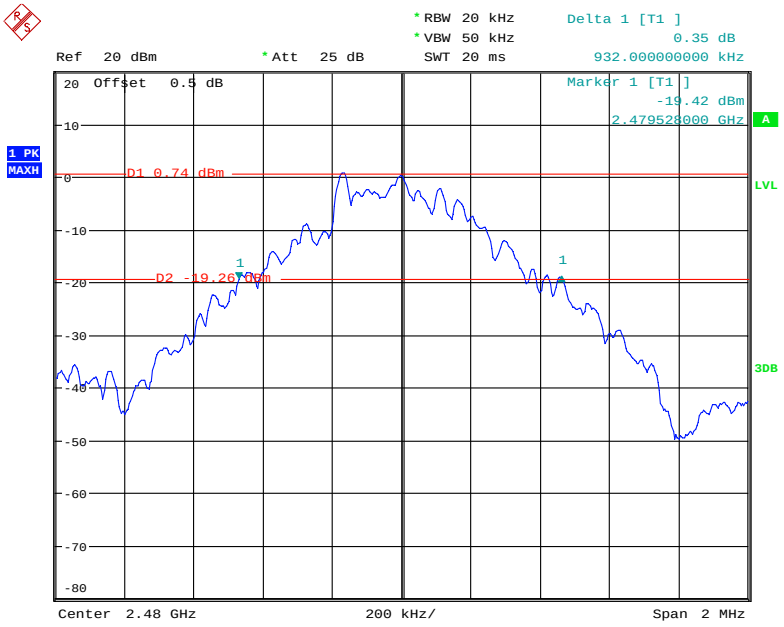
High Channel



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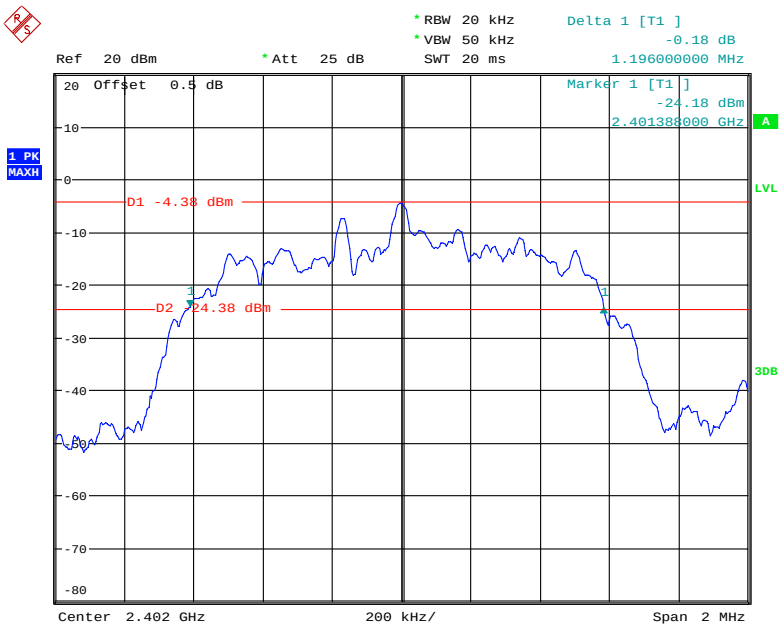
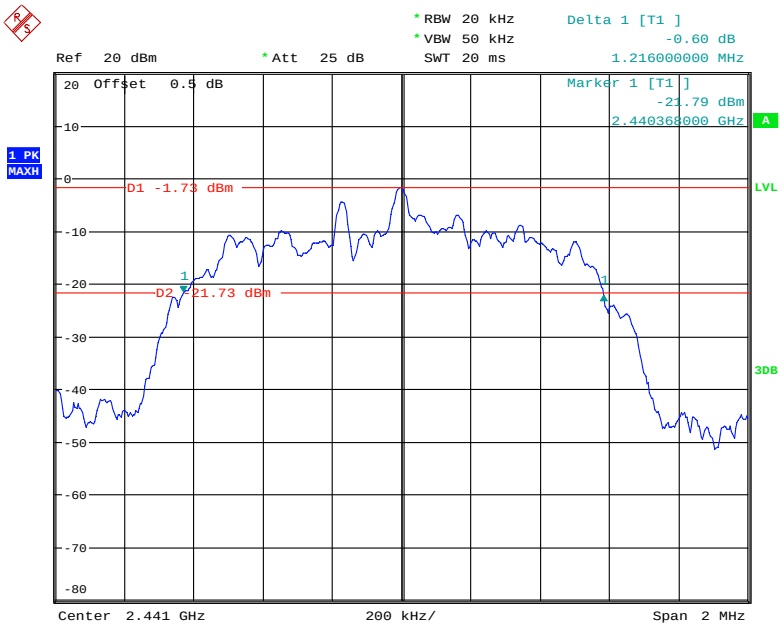
EDR Mode (π/4-DQPSK):

Low Channel



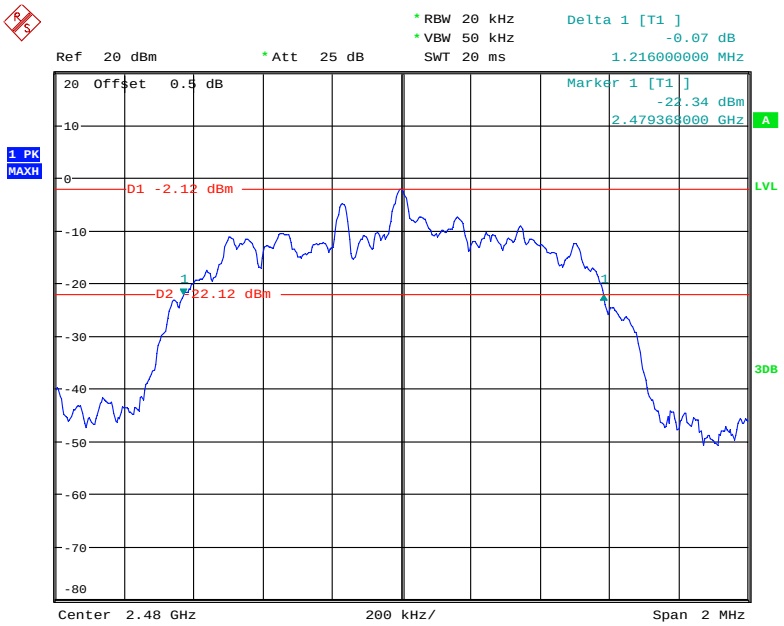
Date: 4.AUG.2020 17:25:35

Middle Channel



Date: 4.AUG.2020 17:27:12

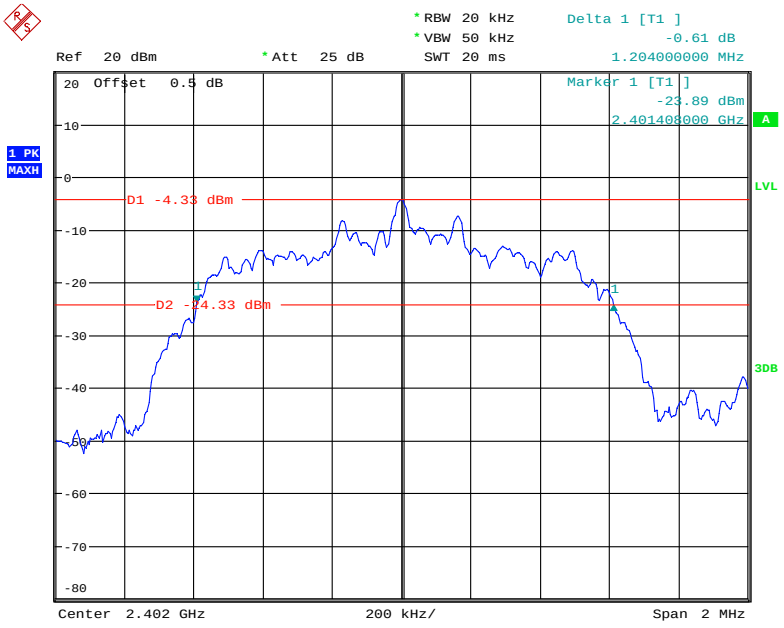
High Channel



Date: 4.AUG.2020 17:29:07

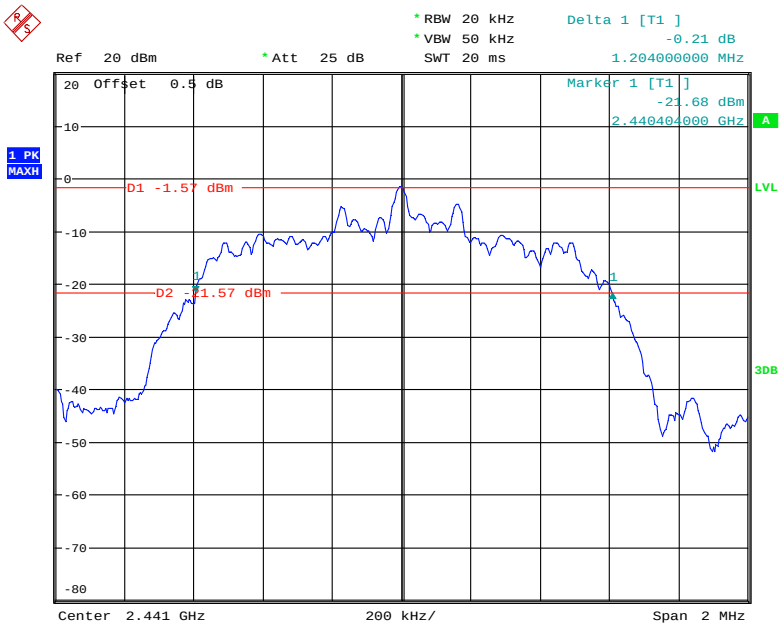
EDR Mode (8DPSK):

Low Channel



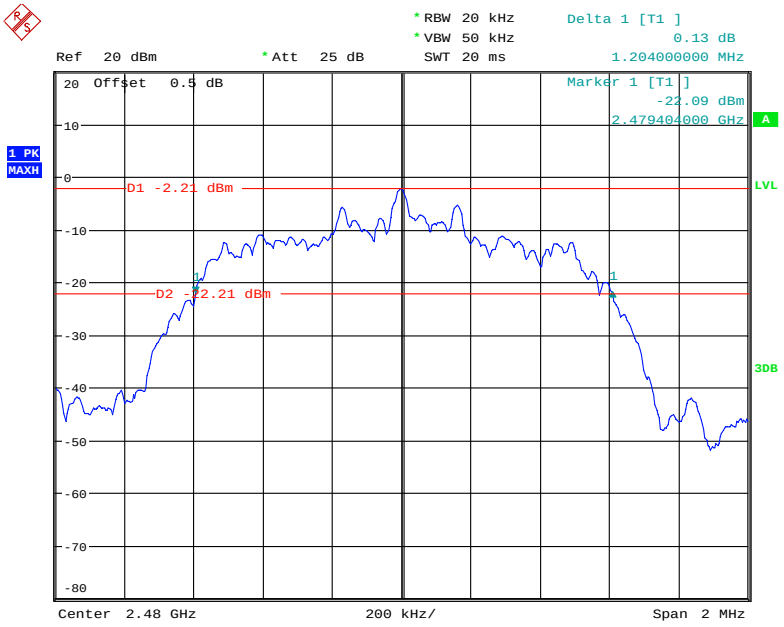
Date: 4.AUG.2020 17:32:07

Middle Channel



Date: 4.AUG.2020 17:37:15

High Channel

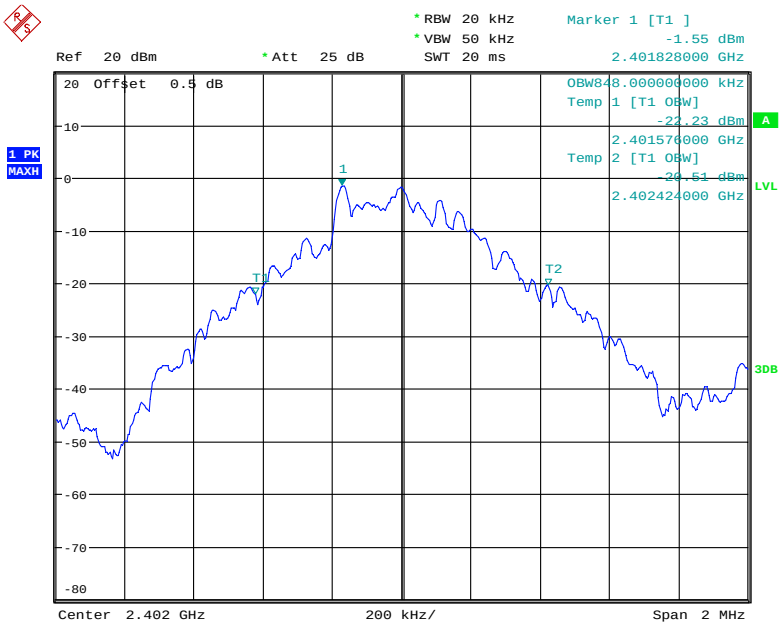


Date: 4.AUG.2020 17:38:40

99% Occupied Bandwidth:

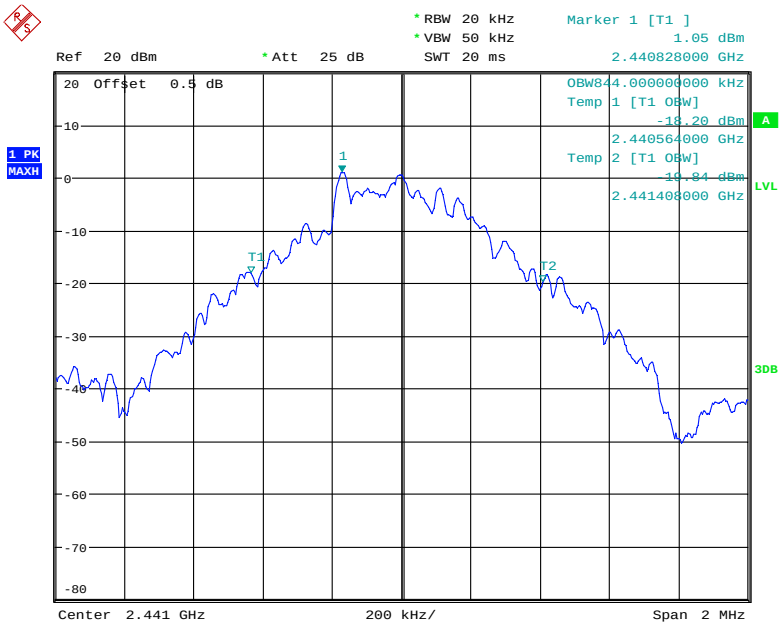
BDR Mode (GFSK):

Low Channel



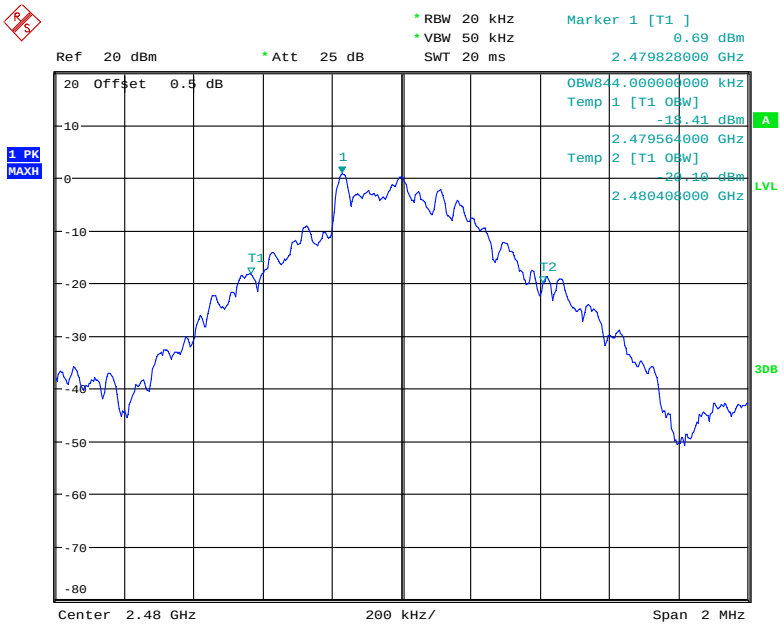
Date: 4.AUG.2020 17:19:50

Middle Channel



Date: 4.AUG.2020 17:21:18

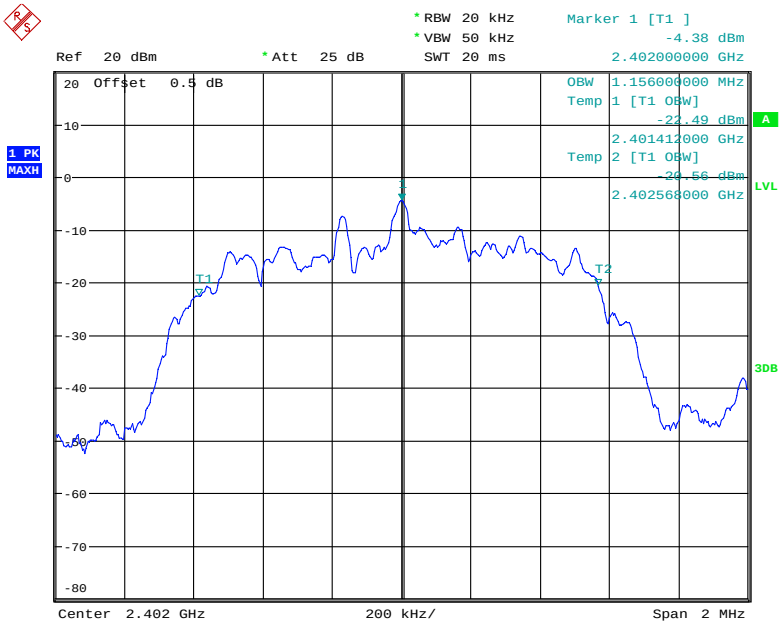
High Channel



Date: 4.AUG.2020 17:22:31

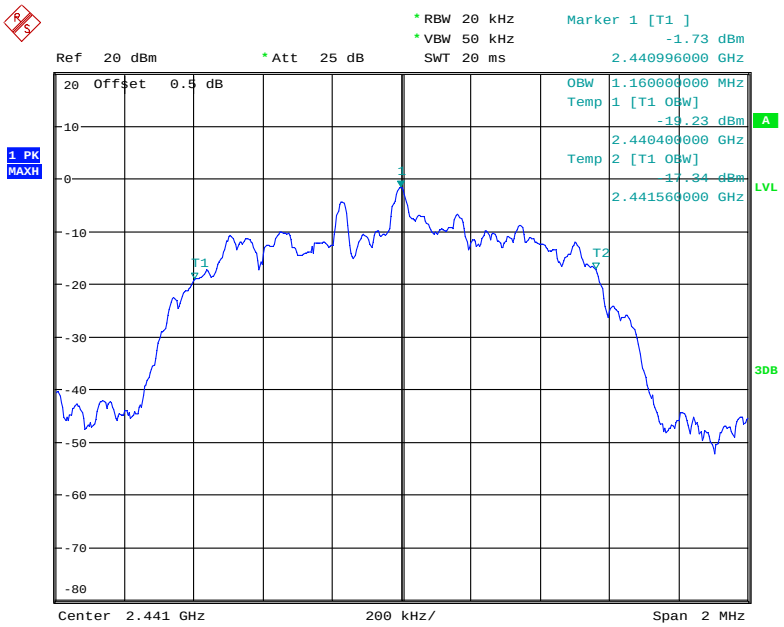
EDR Mode (π/4-DQPSK):

Low Channel



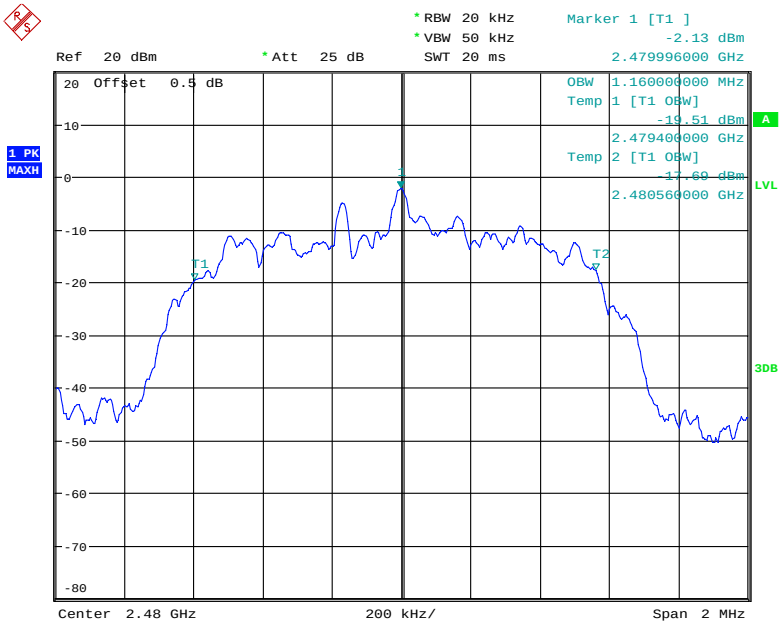
Date: 4.AUG.2020 17:25:43

Middle Channel



Date: 4.AUG.2020 17:27:20

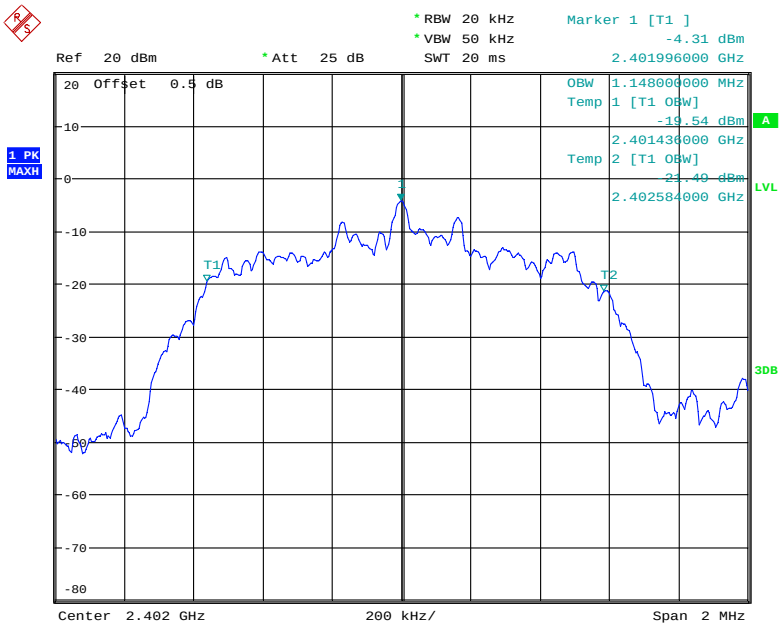
High Channel



Date: 4.AUG.2020 17:29:19

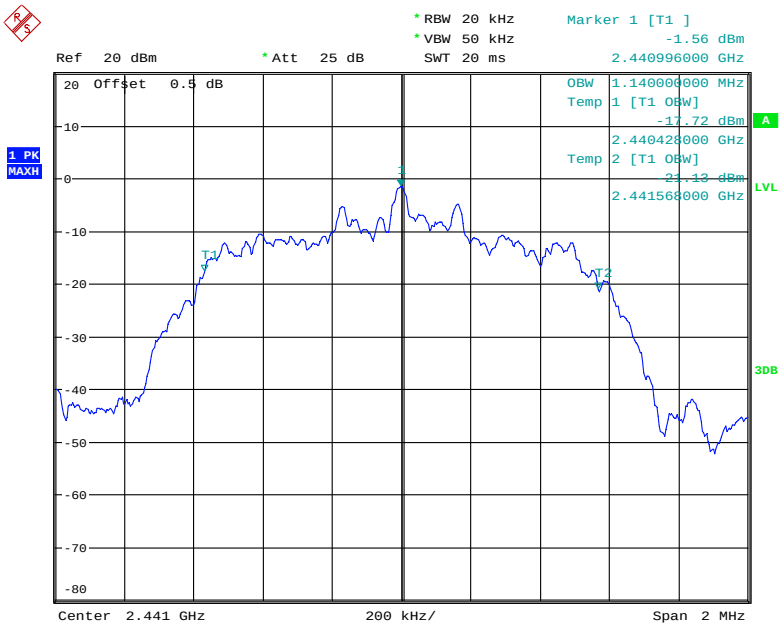
EDR Mode (8DPSK):

Low Channel



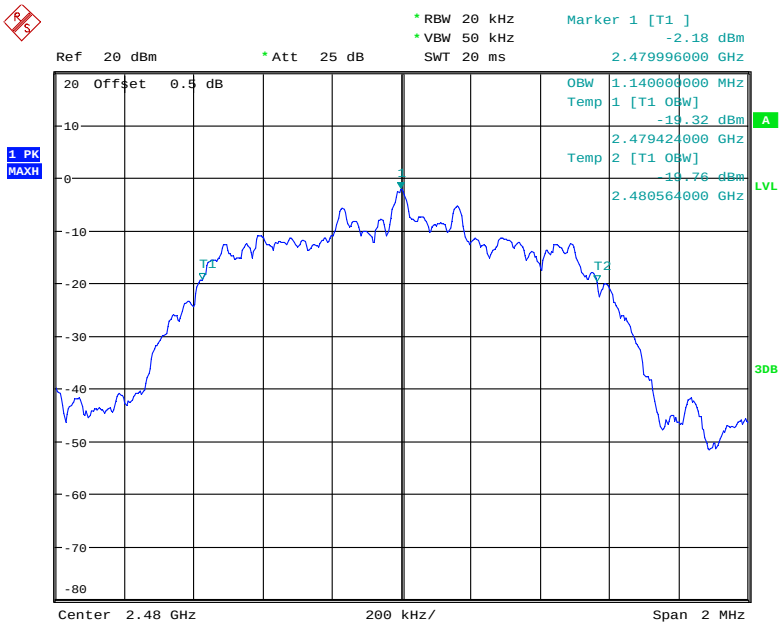
Date: 4.AUG.2020 17:32:19

Middle Channel



Date: 4.AUG.2020 17:37:23

High Channel



Date: 4.AUG.2020 17:38:52

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	2020-07-07	2021-07-07
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

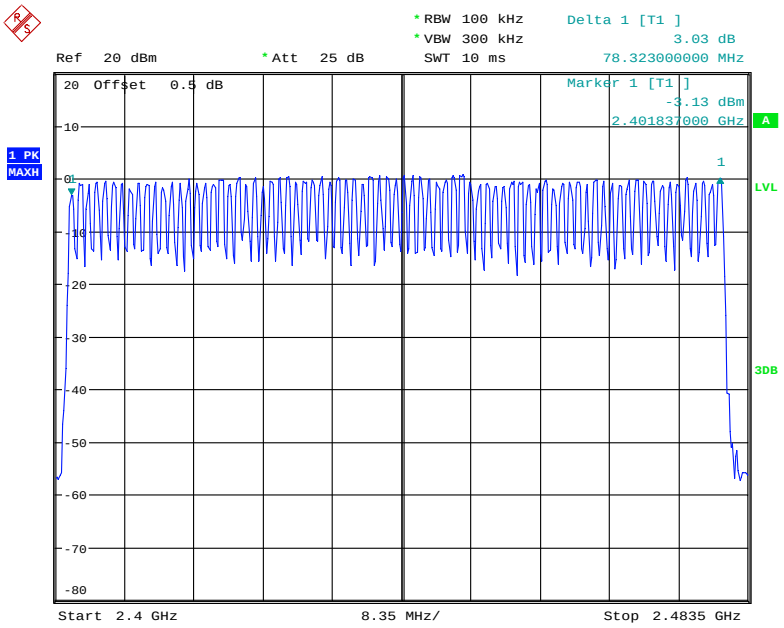
Temperature:	25.3°C
Relative Humidity:	64%
ATM Pressure:	100.3 Pa
Tester:	Taylor Li
Test Date:	2020-08-04

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

Test Mode: Transmitting

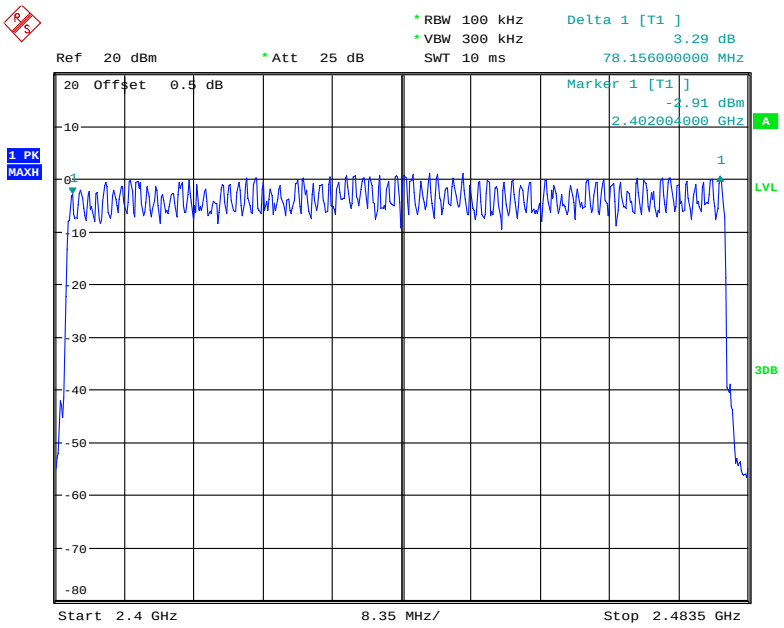
Test mode	Frequency Range (MHz)	Number of Hopping Channel	Limit
GFSK	2400-2483.5	79	≥15
π/4-DQPSK	2400-2483.5	79	≥15
8DPSK	2400-2483.5	79	≥15

GFSK



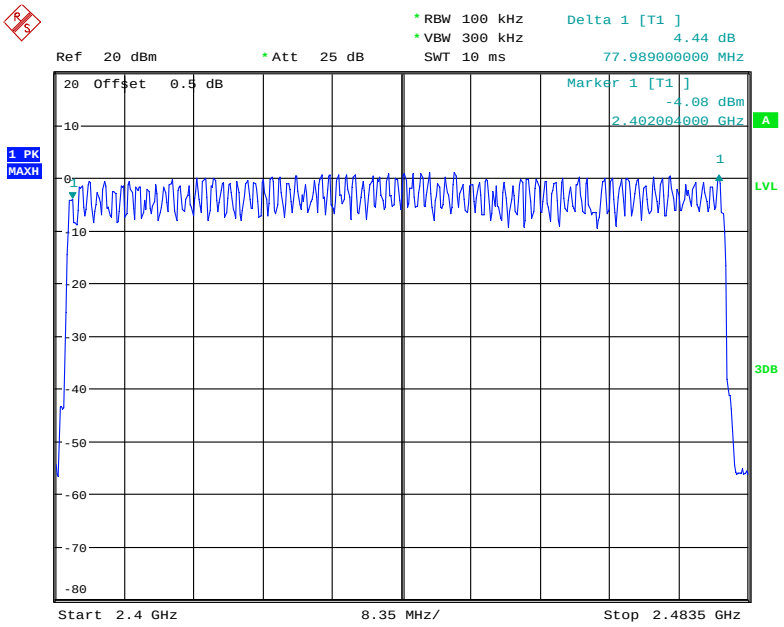
Date: 4.AUG.2020 18:18:58

π/4-DQPSK



Date: 4.AUG.2020 18:21:06

8DPSK



Date: 4.AUG.2020 18:22:48

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	2020-07-07	2021-07-07
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

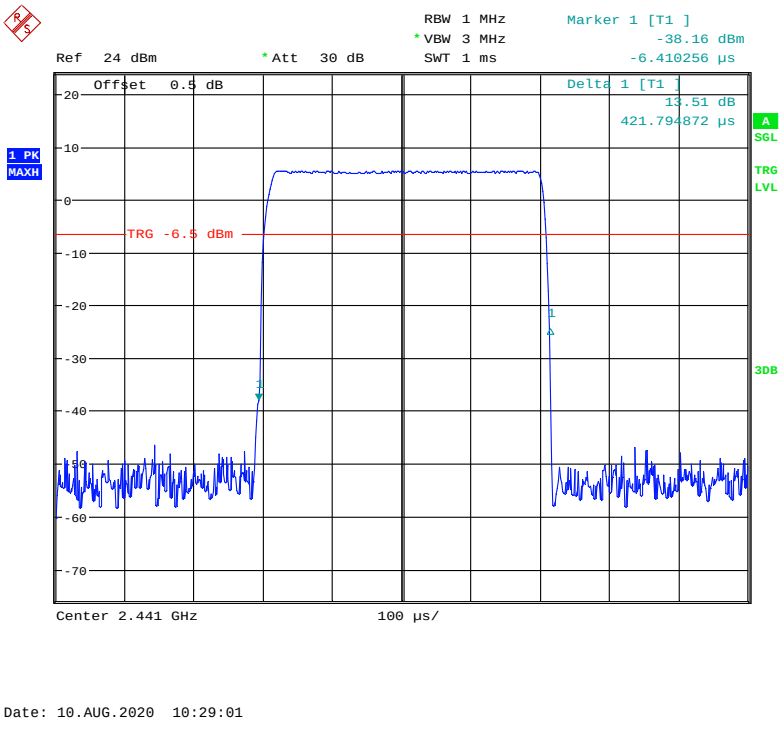
Temperature:	26.6°C
Relative Humidity:	72%
ATM Pressure:	100.5 Pa
Tester:	Taylor Li
Test Date:	2020-08-10

Test Mode: Transmitting

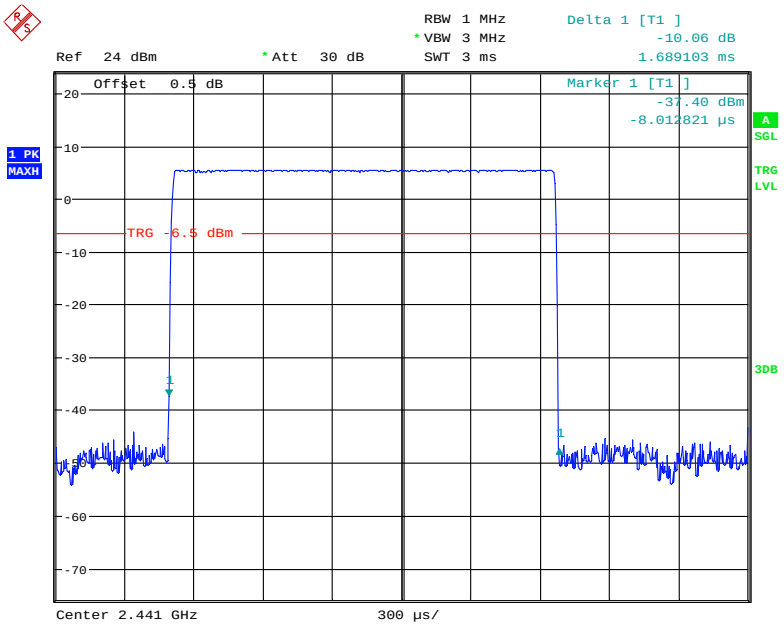
Mode	Packet type	Channel	Frequency (MHz)	Puse width (ms)	Result (s)	Limit (s)
GFSK	DH1	Middle	2441	0.422	0.135	0.4
	DH3	Middle	2441	1.689	0.27	
	DH5	Middle	2441	2.936	0.313	
π/4-DQPSK	2DH1	Middle	2441	0.435	0.139	
	2DH3	Middle	2441	1.689	0.27	
	2DH5	Middle	2441	2.950	0.315	
8DPSK	3DH1	Middle	2441	0.436	0.14	
	3DH3	Middle	2441	1.694	0.271	
	3DH5	Middle	2441	2.950	0.315	
Note: DH1:Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s DH3:Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s DH5:Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s						

BDR Mode (GFSK):

DH1: Middle Channel

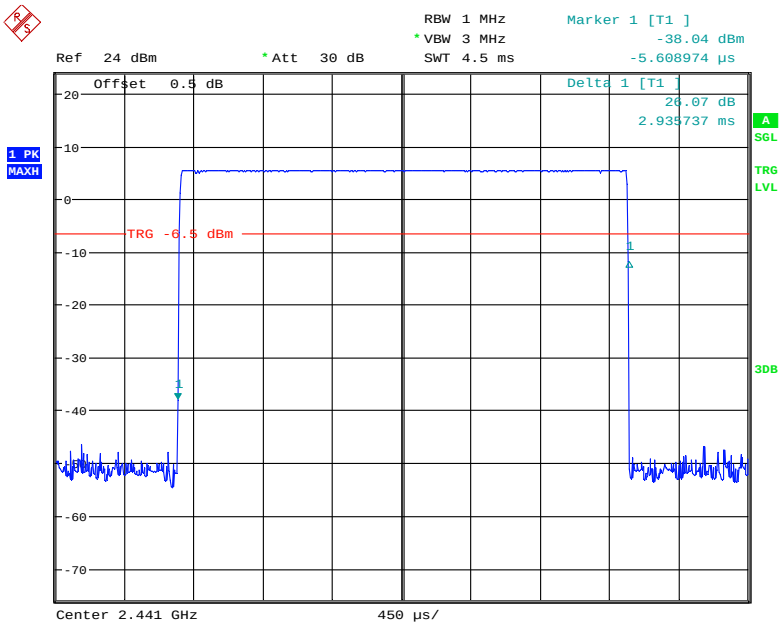


DH3: Middle Channel



Date: 10.AUG.2020 10:36:40

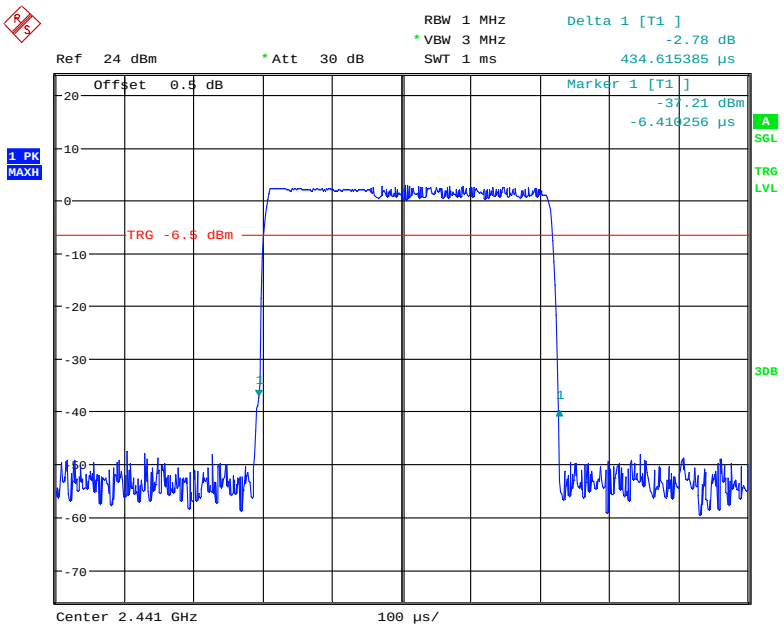
DH5: Middle Channel



Date: 10.AUG.2020 10:52:02

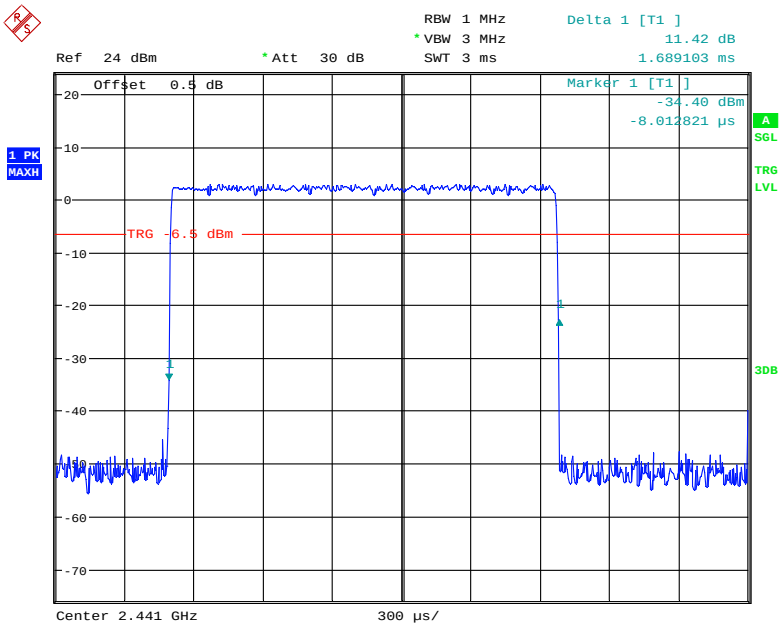
EDR Mode (π/4-DQPSK):

2DH1: Middle Channel



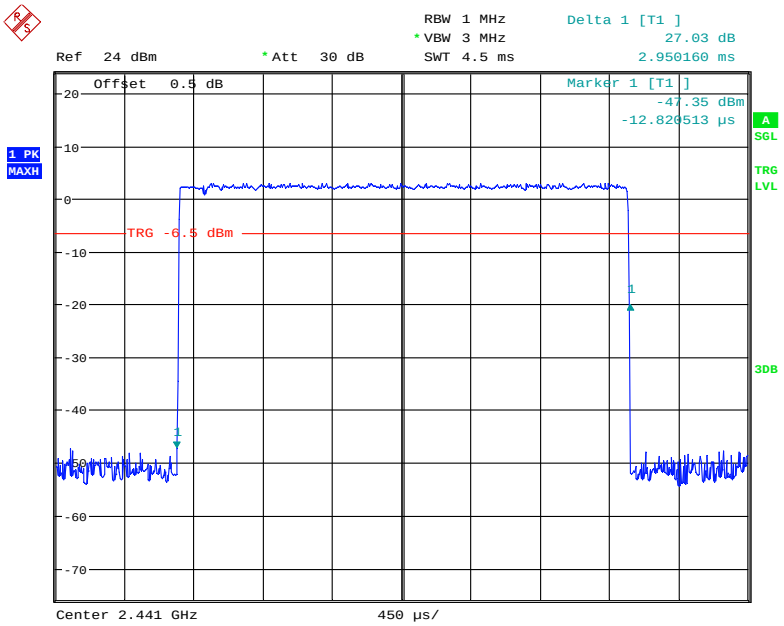
Date: 10.AUG.2020 10:30:53

2DH3: Middle Channel



Date: 10.AUG.2020 10:45:52

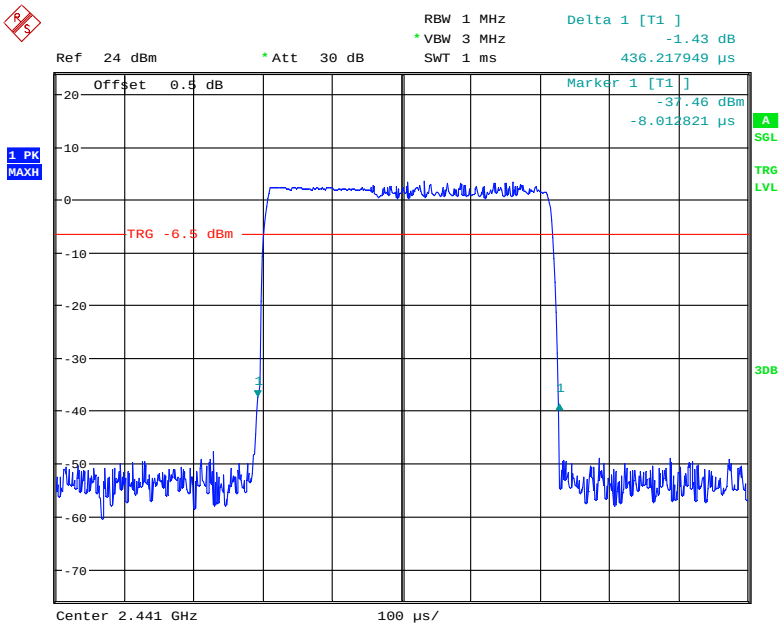
2DH5: Middle Channel



Date: 10.AUG.2020 10:54:20

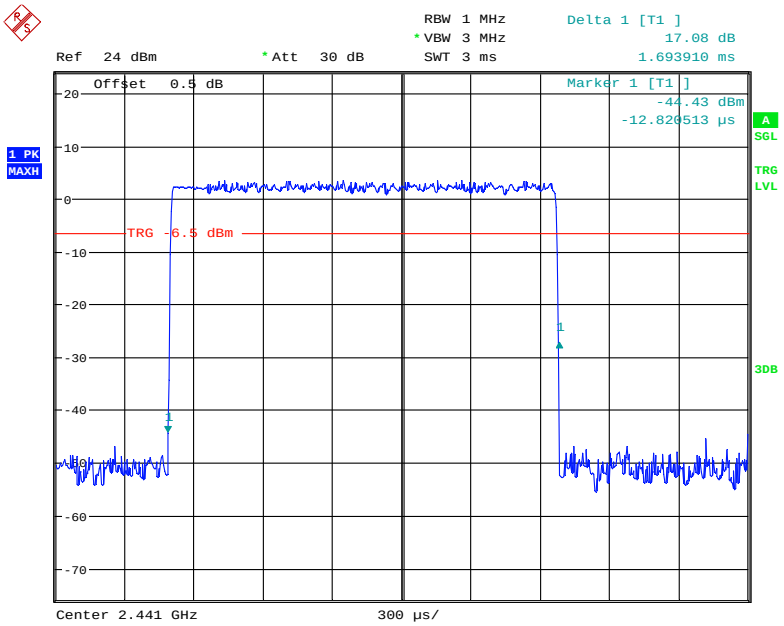
EDR Mode (8DPSK):

3DH1: Middle Channel



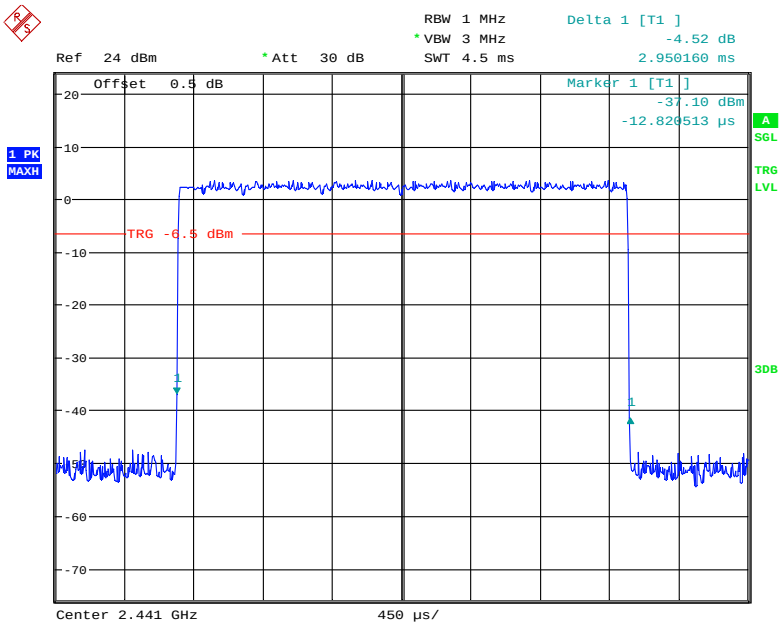
Date: 10.AUG.2020 10:32:55

3DH3: Middle Channel



Date: 10.AUG.2020 10:48:57

3DH5: Middle Channel



Date: 10.AUG.2020 10:56:08

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	2019-09-23	2020-09-23
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:	25.3°C
Relative Humidity:	64%
ATM Pressure:	100.3 Pa
Tester:	Taylor Li
Test Date:	2020-08-04

Test Result: Compliance.

Test Mode: Transmitting

Mode	Frequency (MHz)	Peak Conducted Output power (dBm)	Peak Conducted Output power Limit (dBm)	EIRP (dBm)	EIRP Limit For ISED (dBm)
BDR Mode (GFSK)	2402	2.18	21	2.18	36
	2441	**4.59**	21	4.59	36
	2480	4.27	21	4.27	36
EDR Mode (π/4-DQPSK)	2402	-0.26	21	-0.26	36
	2441	2.37	21	2.37	36
	2480	1.94	21	1.94	36
EDR Mode (8DPSK)	2402	0.52	21	0.52	36
	2441	2.98	21	2.98	36
	2480	2.61	21	2.61	36

Note: The data above was tested in conducted mode, the antenna gain is 0 dBi.

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	2020-07-07	2021-07-07
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

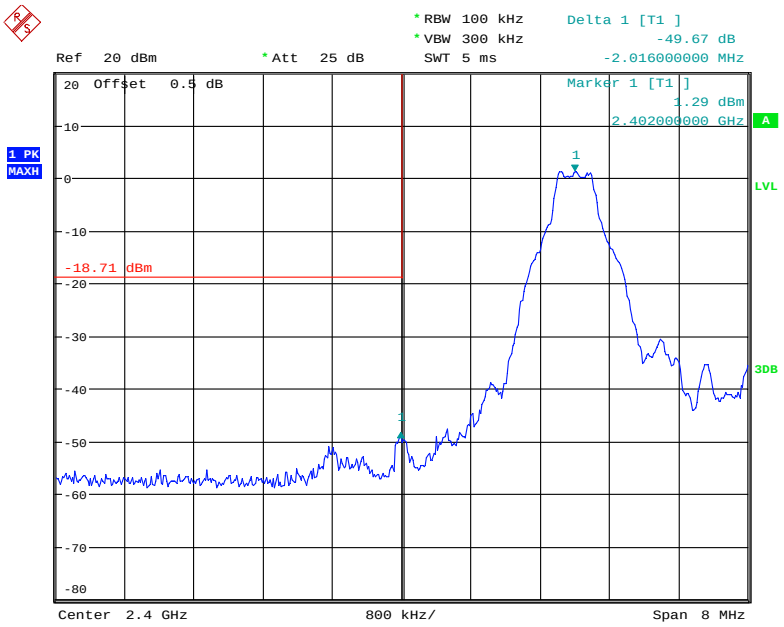
Environmental Conditions

Temperature:	25.3°C
Relative Humidity:	64%
ATM Pressure:	100.3 Pa
Tester:	Taylor Li
Test Date:	2020-08-04

Test Result: Compliance

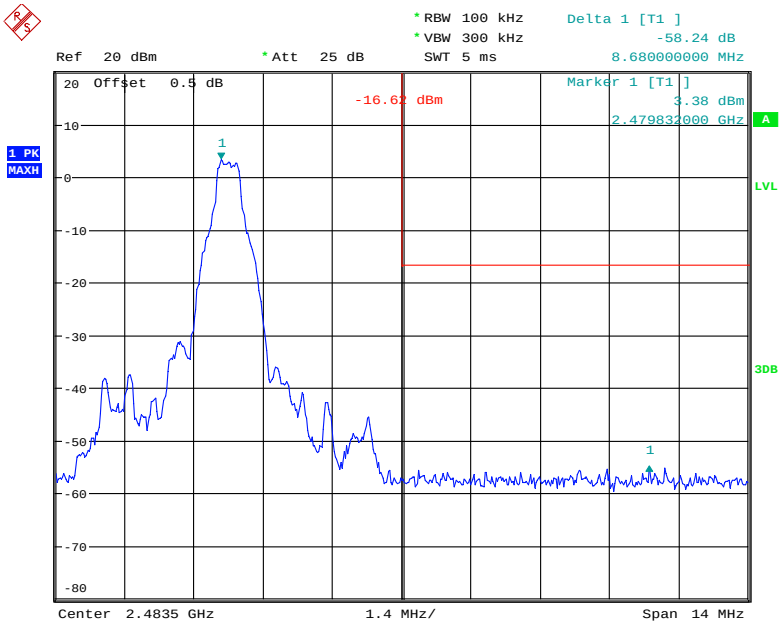
Single mode:
BDR Mode (GFSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:15:11

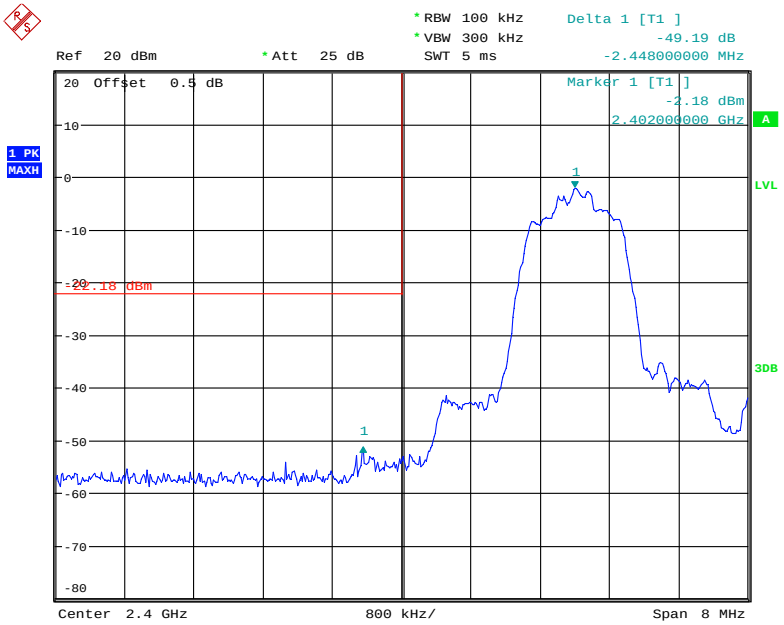
Band Edge, Right Side



Date: 4.AUG.2020 18:15:33

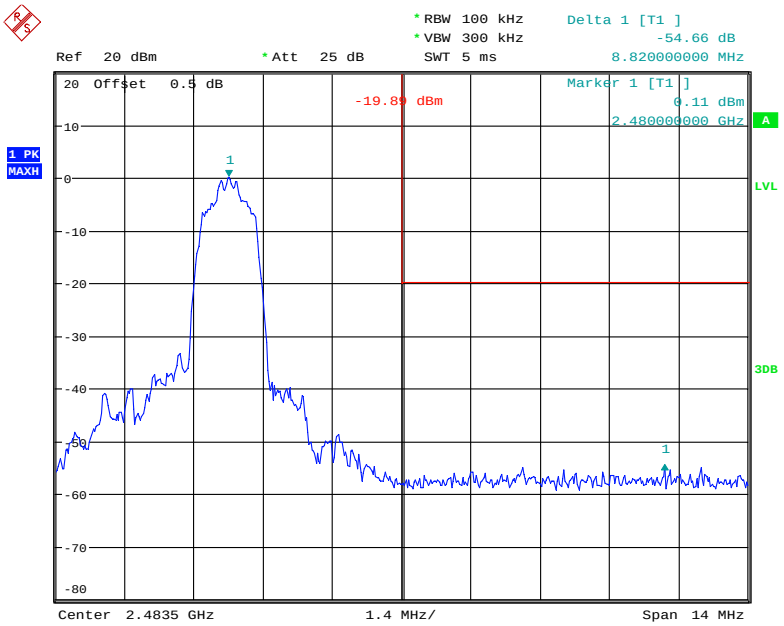
EDR Mode (π/4-DQPSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:15:59

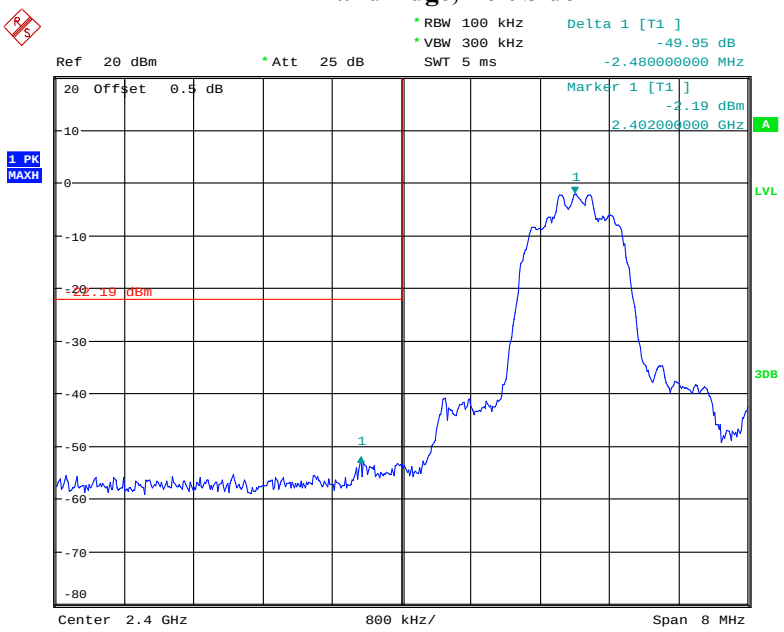
Band Edge, Right Side



Date: 4.AUG.2020 18:16:22

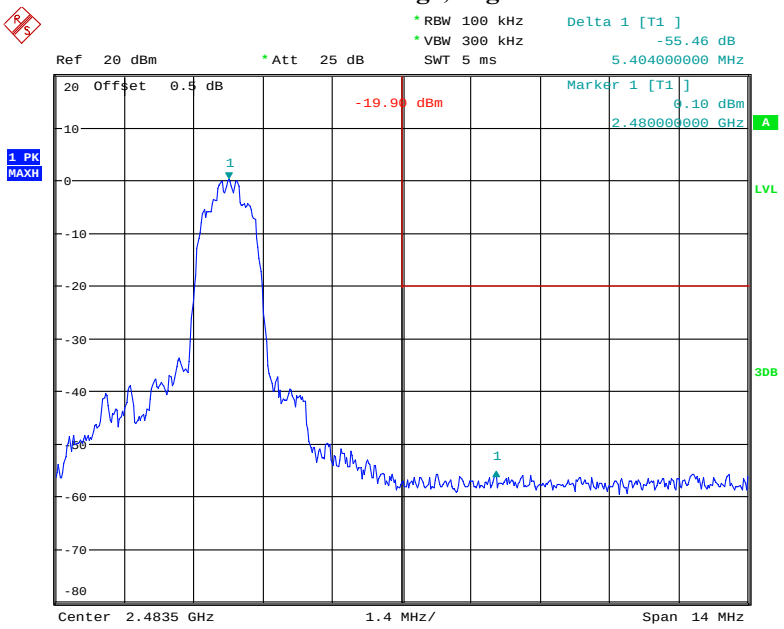
EDR Mode (8DPSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:16:54

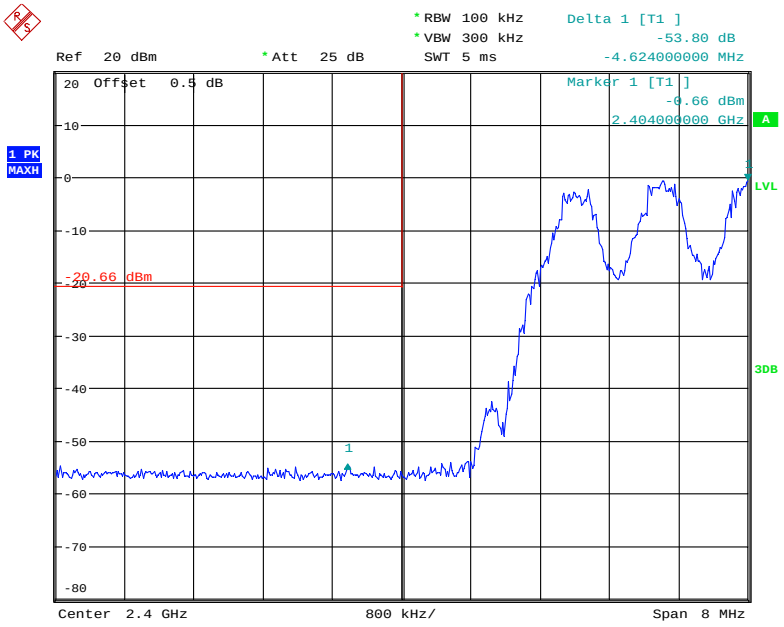
Band Edge, Right Side



Date: 4.AUG.2020 18:17:21

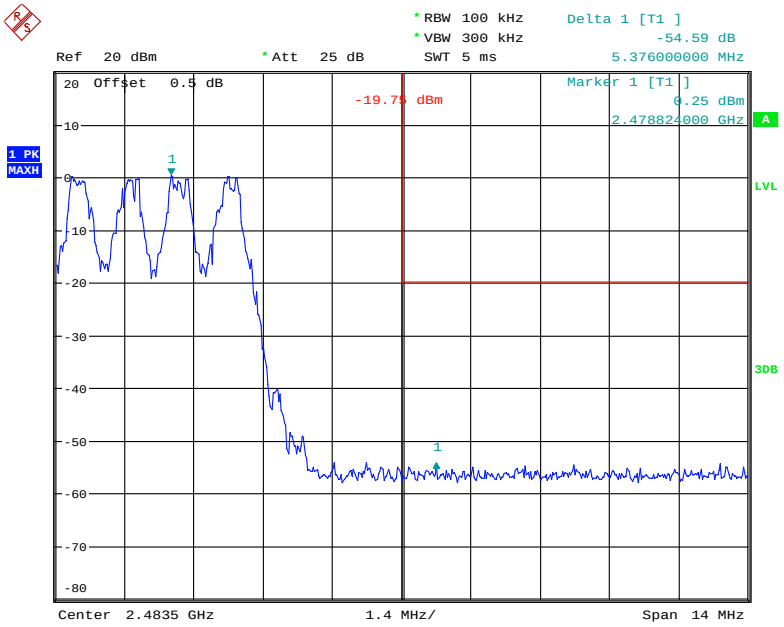
Hopping mode:
BDR Mode (GFSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:27:35

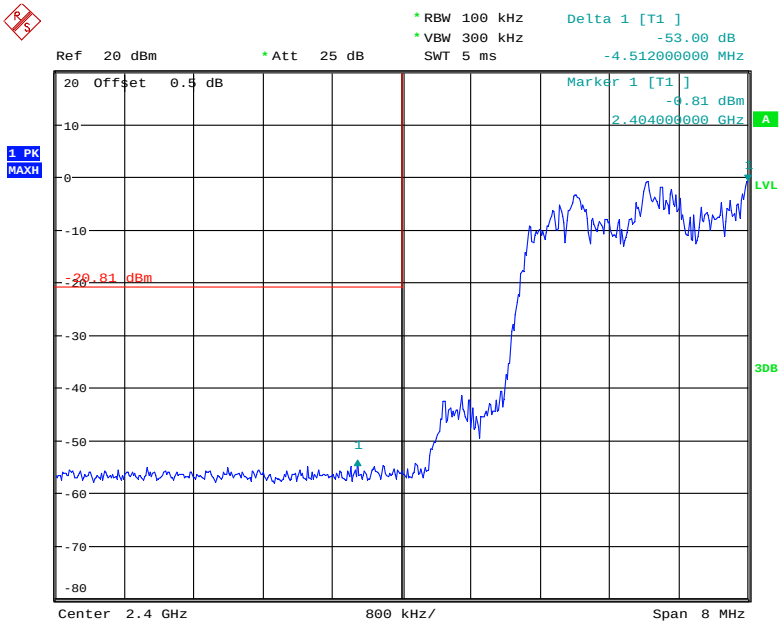
Band Edge, Right Side



Date: 4.AUG.2020 18:29:08

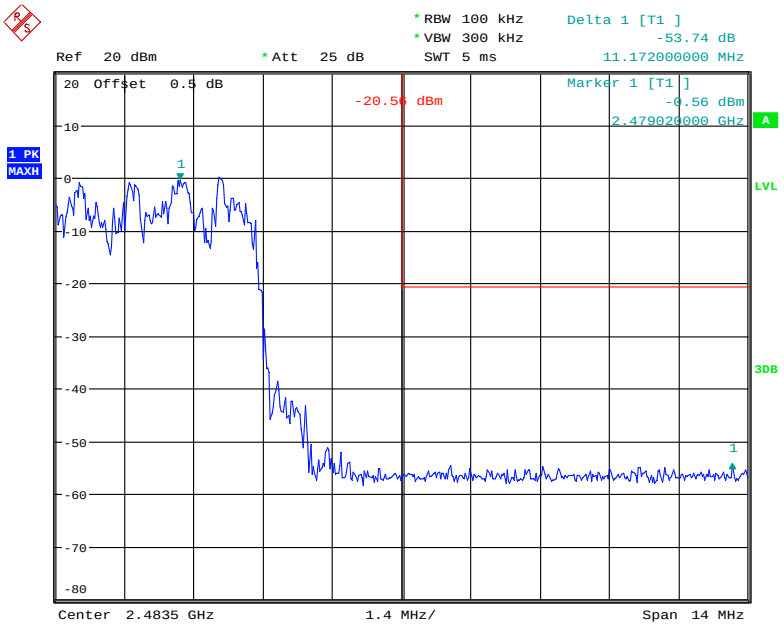
EDR Mode (π/4-DQPSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:30:04

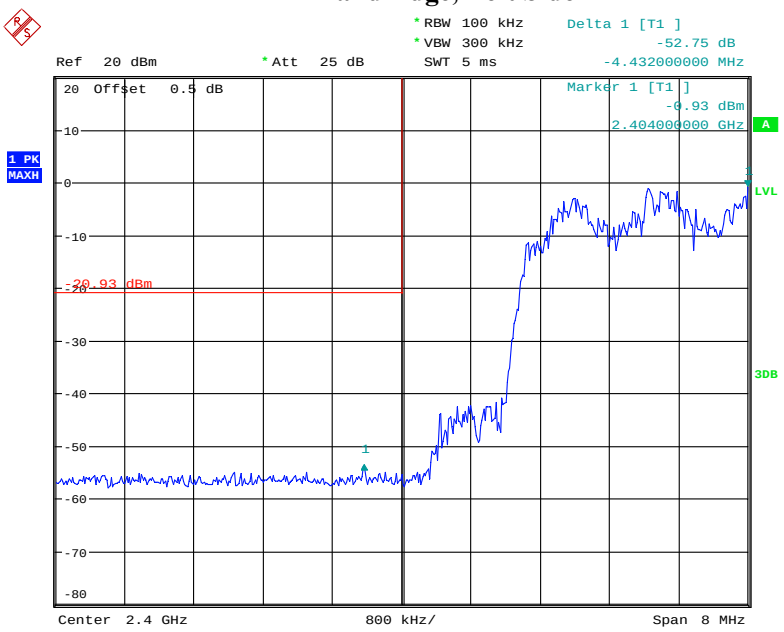
Band Edge, Right Side



Date: 4.AUG.2020 18:31:09

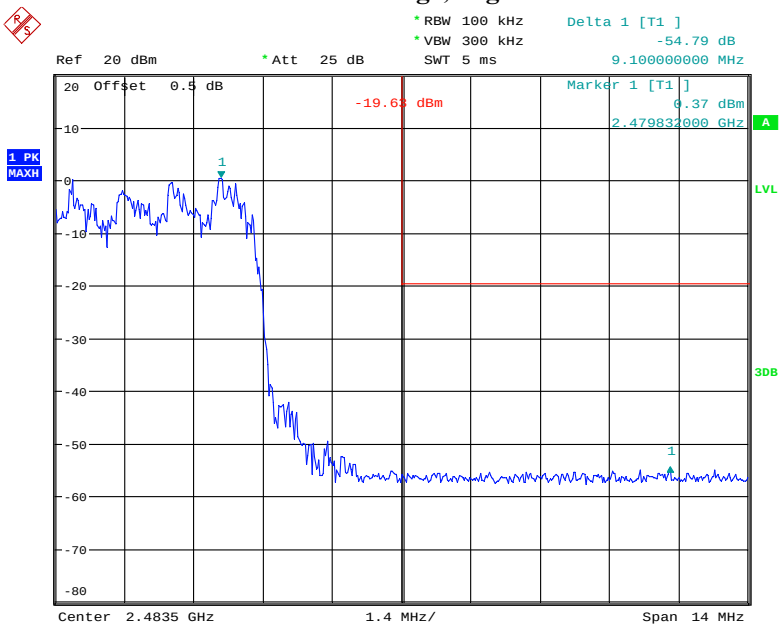
EDR Mode (8DPSK):

Band Edge, Left Side



Date: 4.AUG.2020 18:23:56

Band Edge, Right Side



Date: 4.AUG.2020 18:25:51

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