TEST REPORT

Applicant Name :	YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.
Address :	No.666 Hu'an Rd. Huli District Xiamen City, Fujian, P.R. China
Report Number :	SZNS220511-19758E-RFA
FCC ID:	T2C-M800
IC:	10741A-M800

Test Standard (s)

FCC PART 15.247; RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT 2; RSS-247, ISSUE 2, FEBRUARY 2017

Sample Description

Product Type:	Video Conferencing Endpoint
Model No.:	MeetingEye 800
Multiple Model(s) No.:	N/A
Trade Mark:	Yealink
Date Received:	2022/05/11
Report Date:	2022/12/09
Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Audy Yu
EMC Engineer

Approved By:

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★ ".
Shenzhen Accurate Technology Co., Ltd. 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 an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

HVIN	MeetingEye 800
FVIN	1.2.1.0
Frequency Range	Bluetooth: 2402~2480MHz
Transmit Peak Power	7.19dBm
Modulation Technique	Bluetooth: GFSK, π/4-DQPSK, 8DPSK
Antenna Specification*	4.61dBi (It is provided by the applicant)
Voltage Range	DC 48V from adapter
Sample serial number	SZNS220511-19758E-RF-S1for Conducted and Radiated Emissions SZNS220511-19758E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 information	Model: NSA96EC-48020000 Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 48.0V, 2.0A ,96.0W
Adapter 2 information	Model: YLPS482000C Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 48.0V, 2.0A ,96.0W
Note 1: the device installed two RF module, module D845 and module YL43455, for module D845 use the 2.4GHz/5GHz Wi-Fi function, for module YL43455 use the BT/BLE/2.4GHz/5GHz Wi-Fi function. Note 2: the two adapters were electrical identical just difference with model number which was declared by manufacturer, the adapter 1 was selected to test.	

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules and RSS-247, Issue 2, February 2017, RSS-GEN Issue 5, Feb. 2021Amendment 2 of the Innovation, Science and Economic Development Canada rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and RSS-247, Issue 2, February 2017, RSS-GEN Issue 5, Feb. 2021Amendment 2 of the Innovation, Science and Economic Development Canada rules.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz- 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

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

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. 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.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA). The Certificate Number is 4297.01

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

EUT Exercise Software

“AuthenticTool”* exercise software was made to the EUT tested and the power level is Default*.The software and power level was provided by the applicant.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

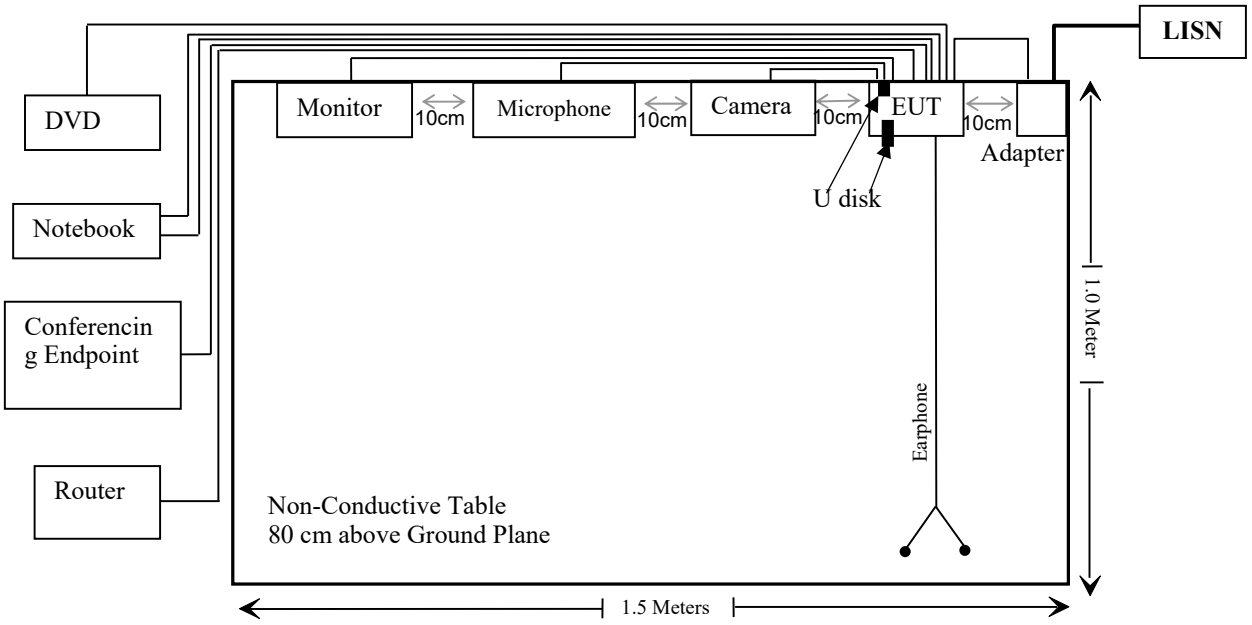
Manufacturer	Description	Model	Serial Number
DELL	Note Book	Latitude E4710	PC201911252059
Unknown	U disk	Unknown	Unknown
YEALINK	Microphone	Unknown	Unknown
YEALINK	Camera	UVC84	Unknown
YEALINK	Conferencing Endpoint	A20	Unknown
DELL	Monitor	RVE A00	506250042400R
HUAWEI	Router	WS5100	A4933FEF1D01
SAST	DVD	SA-016	25113

External I/O Cable

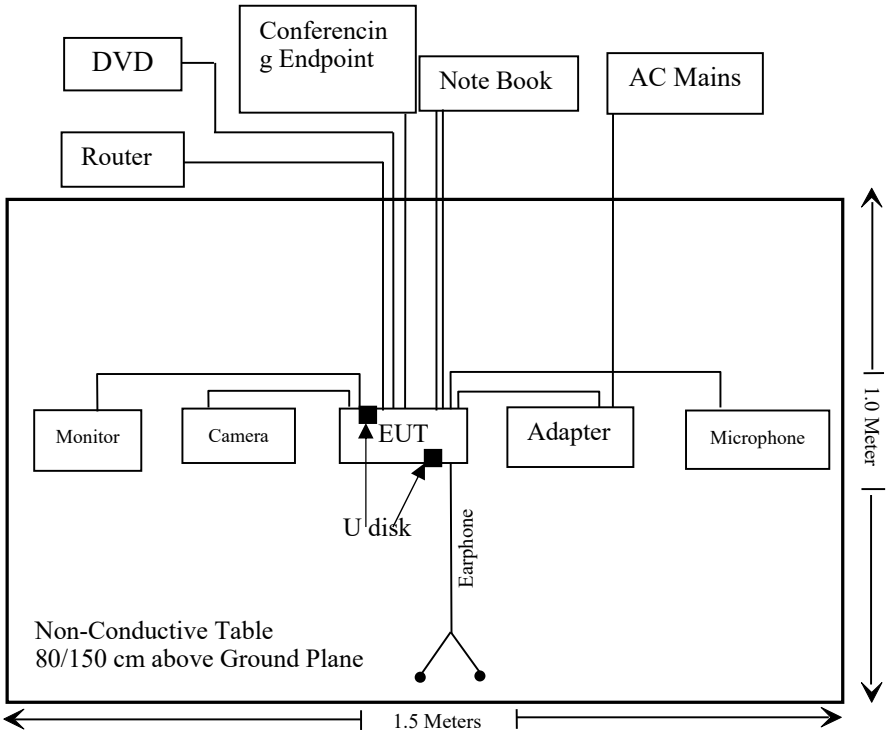
Cable Description	Length (m)	From Port	To
Un-shielded detachable AC cable	1.0	Adapter	LISN
Un-shielded Un-detachable DC cable	2.0	Adapter	EUT
Un-shielded detachable USB cable	8.0	EUT	NoteBook
Un-shielded detachable HDMI cable	5.0	EUT	NoteBook
Un-shielded detachable HDMI cable	5.0	EUT	DVD
Un-shielded detachable HDMI cable	5.0	EUT	Monitor
Unshielded detachable RJ45 cable	8.0	EUT	Camera
Un-shielded detachable RJ45 cable	8.0	EUT	Conferencing Endpoint
Un-shielded detachable RJ45 cable	8.0	EUT	Router
Un-shielded detachable RJ45 cable	8.0	EUT	Microphone

Block Diagram of Test Setup

For conducted emission:



For Radiated Emissions:



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (3) & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
RSS-102 § 2.5.2	EXEMPTION LIMITS FOR ROUTINE EVALUATION-RF EXPOSURE EVALUATION	Compliant
FCC §15.203 RSS-Gen §6.8	Antenna Requirement	Compliant
FCC §15.207(a) RSS-Gen §8.8	AC Line Conducted Emissions	Compliant
FCC §15.205, §15.209, §15.247(d) RSS-247 § 5.5, RSS-GEN § 8.10	Radiated Emissions	Compliant
FCC §15.247(a)(1) RSS-247 § 5.1(a), RSS-GEN § 6.7	20 dB Emission Bandwidth & 99% Occupied Bandwidth	Compliant
FCC §15.247(a)(1) RSS-247 § 5.1 (b)	Channel Separation Test	Compliant
FCC §15.247(a)(1)(iii) RSS-247 § 5.1 (d)	Time of Occupancy (Dwell Time)	Compliant
FCC §15.247(a)(1)(iii) RSS-247 § 5.1 (d)	Quantity of hopping channel Test	Compliant
FCC §15.247(b)(1) RSS-247 § 5.1(b) &§ 5.4(b)	Peak Output Power Measurement	Compliant
FCC §15.247(d) RSS-247 § 5.5	Band edges	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2021/12/13	2022/12/12
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Wainwright	High Pass Filter	WHKX3.6/18 G-10SS	5	2021/12/14	2022/12/13
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSU26	200982	2021/07/06	2022/07/05
Rohde&Schwarz	Spectrum Analyzer	FSU26	200982	2022/07/06	2023/07/05
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2021/12/13	2022/12/12
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
Unknown	RF Cable	Unknown	2	Each time	/

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.247 (i) & §1.1307 (b) (3) & §2.1091- RF EXPOSURE EVALUATETION

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemptionfrom further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

Ris the minimum separation distance in meters
f = frequency in MHz

Result

For worst case：

For Module YL43455:

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBm)	(dBi)	(dBd)	(dBm)	(W)		
BT	2402-2480	8.5	4.61	2.46	10.96	0.012	0.2	0.768
BLE	2402-2480	3.0	4.61	2.46	5.46	0.004	0.2	0.768
2.4G Wi-Fi	2412-2462	19.0	4.61	2.46	21.46	0.140	0.2	0.768
5G Wi-Fi	5180-5240	15.0	2.47	0.32	15.32	0.034	0.2	0.768
	5260-5320	14.5	2.47	0.32	14.82	0.030	0.2	0.768
	5500-5700	10.0	2.47	0.32	10.32	0.011	0.2	0.768
	5745-5825	14.0	2.47	0.32	14.32	0.027	0.2	0.768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The BT/2.4GHz Wi-Fi/5GHz Wi-Fi cannot Simultaneous transmitting

For Module D845:

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBm)	(dBi)	(dBd)	(dBm)	(W)		
2.4G Wi-Fi	2412-2462	22.0	4.61	2.46	24.46	0.279	0.2	0.768
5G Wi-Fi	5180-5240	18.0	2.47	0.32	18.32	0.068	0.2	0.768
	5260-5320	18.0	2.47	0.32	18.32	0.068	0.2	0.768
	5500-5700	16.0	2.47	0.32	16.32	0.043	0.2	0.768
	5745-5825	18.0	2.47	0.32	18.32	0.068	0.2	0.768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The 2.4GHz Wi-Fi/5GHz Wi-Fi cannot Simultaneous transmitting

Note: the Module YL43455 and Module D845 cannot transmit at same time.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

RSS-102 § 2.5.2 –EXEMPTION LIMITS FOR ROUTINE EVALUATION-RF EXPOSURE EVALUATION

Applicable Standard

According to RSS-102 § (2.5.2):

2.5.2 Exemption Limits for Routine Evaluation — RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $22.48/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Calculated Data:

For Module YL43455:

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain	EIRP		Exemption Limit (W)
		(dBm)	(dBi)	(dBm)	(W)	
BT	2402-2480	8.5	4.61	13.11	0.020	2.68
BLE	2402-2480	3.0	4.61	7.61	0.006	2.68
2.4G Wi-Fi	2412-2462	19.0	4.61	23.61	0.230	2.68
5G Wi-Fi	5180-5240	15.0	2.47	17.47	0.056	4.53
	5260-5320	14.5	2.47	16.97	0.050	4.57
	5500-5700	10.0	2.47	12.47	0.018	4.71
	5745-5825	14.0	2.47	16.47	0.044	4.86

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The BT/2.4GHz Wi-Fi/5GHz Wi-Fi cannot Simultaneous transmitting

For Module D845:

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain	EIRP		Exemption Limit (W)
		(dBm)	(dBi)	(dBm)	(W)	
2.4G Wi-Fi	2412-2462	22.0	4.61	26.61	0.458	2.68
5G Wi-Fi	5180-5240	18.0	2.47	20.47	0.111	4.53
	5260-5320	18.0	2.47	20.47	0.111	4.57
	5500-5700	16.0	2.47	18.47	0.070	4.71
	5745-5825	18.0	2.47	20.47	0.111	4.86

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The 2.4GHz Wi-Fi/5GHz Wi-Fi cannot Simultaneous transmitting

Note: the Module YL43455 and Module D845 cannot transmit at same time.

So the RF Exposure evaluation can be compliance.

FCC §15.203 & RSS-GEN §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 FCC § 15.203, 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 Connector Construction

The EUT have one integral antenna which was permanently attached to the unit for BT, please refer to the EUT photos.

ANT	Antenna Type	Antenna Gain	Impedance	Frequency Range
YL43455 BT ANT	FPC	4.61dBi	50Ω	2.4~2.5GHz

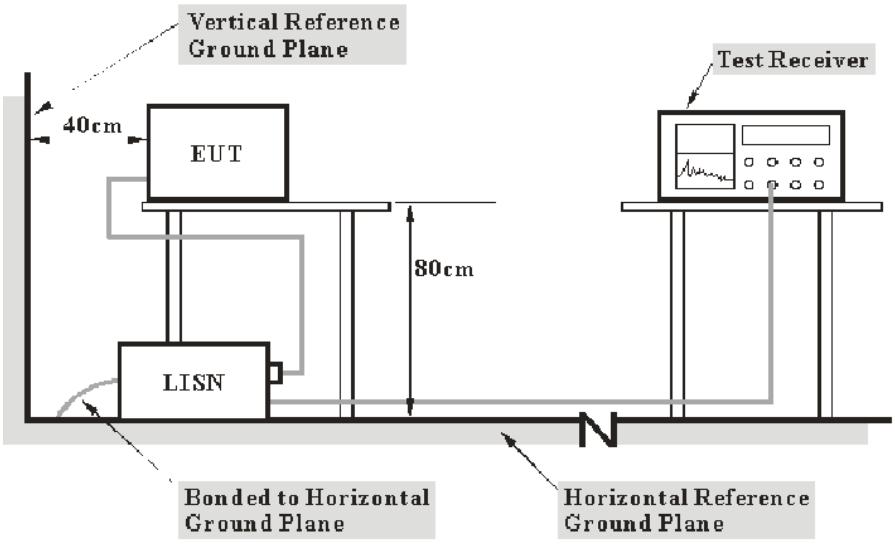
Result: Compliance

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

Applicable Standard

FCC §15.207(a), RSS-GEN § 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 measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207 & RSS-Gen.

The spacing between the peripherals was 10 cm.

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

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

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

Transd Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Transd Factor = LISN VDF + Cable Loss

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

Over limit = Level - Limit
Level= Reading level+ Transd Factor

Test Data

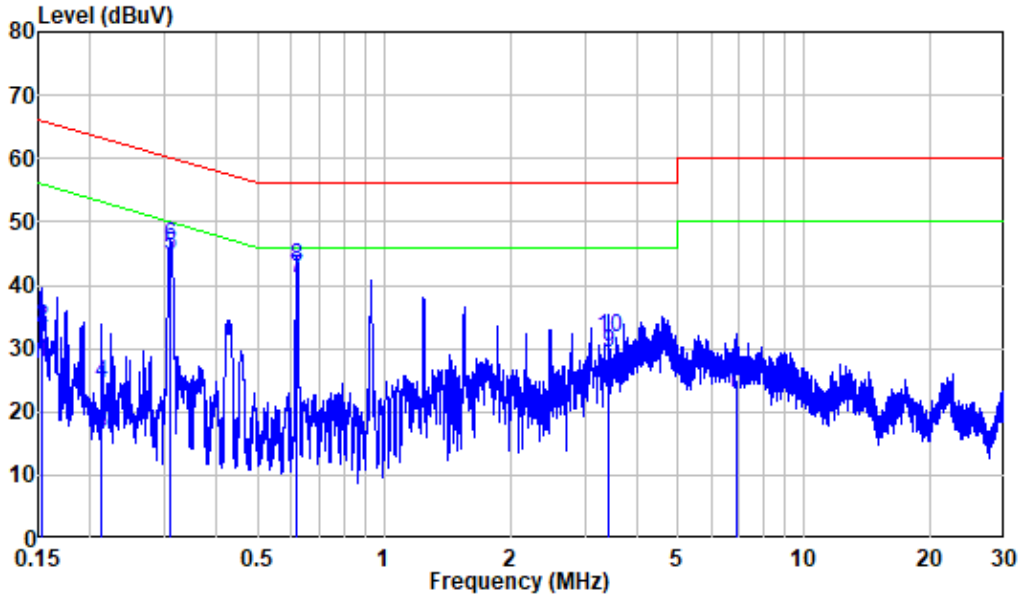
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Jason liu on 2022-08-08.

EUT operation mode: Transmitting (worst case is GFSK, low channel)

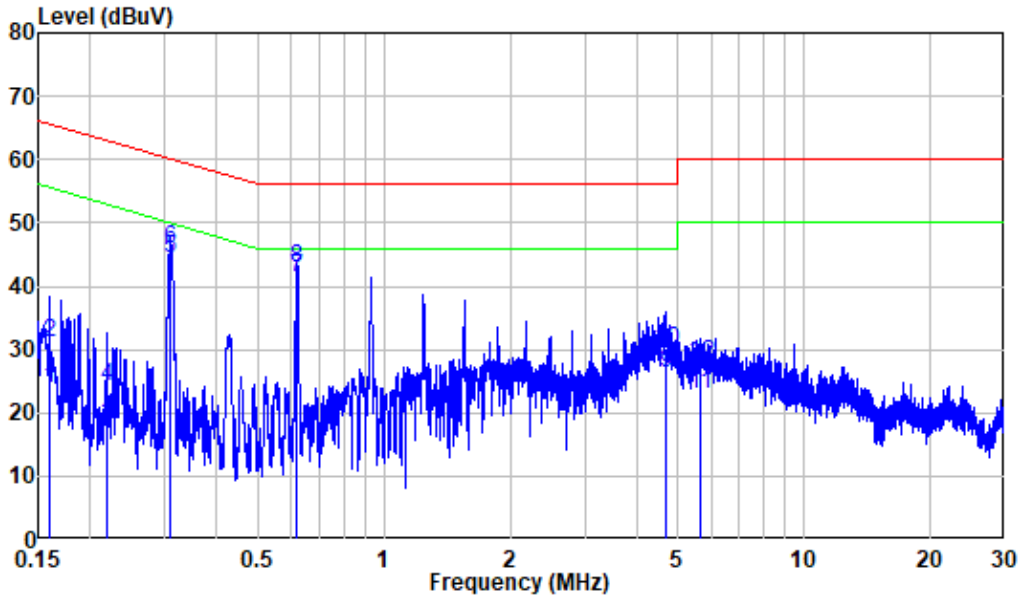
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : SZNS220511-19758E-RF
Mode : BT
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.154	9.80	18.02	27.82	55.80	-27.98	Average
2	0.154	9.80	23.38	33.18	65.80	-32.62	QP
3	0.212	9.80	6.68	16.48	53.13	-36.65	Average
4	0.212	9.80	14.57	24.37	63.13	-38.76	QP
5	0.310	9.80	34.78	44.58	49.98	-5.40	Average
6	0.310	9.80	36.39	46.19	59.98	-13.79	QP
7	0.620	9.81	31.27	41.08	46.00	-4.92	Average
8	0.620	9.81	33.07	42.88	56.00	-13.12	QP
9	3.411	9.83	19.48	29.31	46.00	-16.69	Average
10	3.411	9.83	21.81	31.64	56.00	-24.36	QP
11	6.910	9.87	12.93	22.80	50.00	-27.20	Average
12	6.910	9.87	15.25	25.12	60.00	-34.88	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
Condition: Neutral
Job No. : SZNS220511-19758E-RF
Mode : BT
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.160	9.80	13.90	23.70	55.48	-31.78	Average
2	0.160	9.80	21.16	30.96	65.48	-34.52	QP
3	0.218	9.80	7.93	17.73	52.89	-35.16	Average
4	0.218	9.80	14.35	24.15	62.89	-38.74	QP
5	0.310	9.80	34.65	44.45	49.98	-5.53	Average
6	0.310	9.80	36.14	45.94	59.98	-14.04	QP
7	0.621	9.81	31.40	41.21	46.00	-4.79	Average
8	0.621	9.81	33.17	42.98	56.00	-13.02	QP
9	4.699	9.88	16.33	26.21	46.00	-19.79	Average
10	4.699	9.88	20.08	29.96	56.00	-26.04	QP
11	5.649	9.92	12.91	22.83	50.00	-27.17	Average
12	5.649	9.92	17.77	27.69	60.00	-32.31	QP

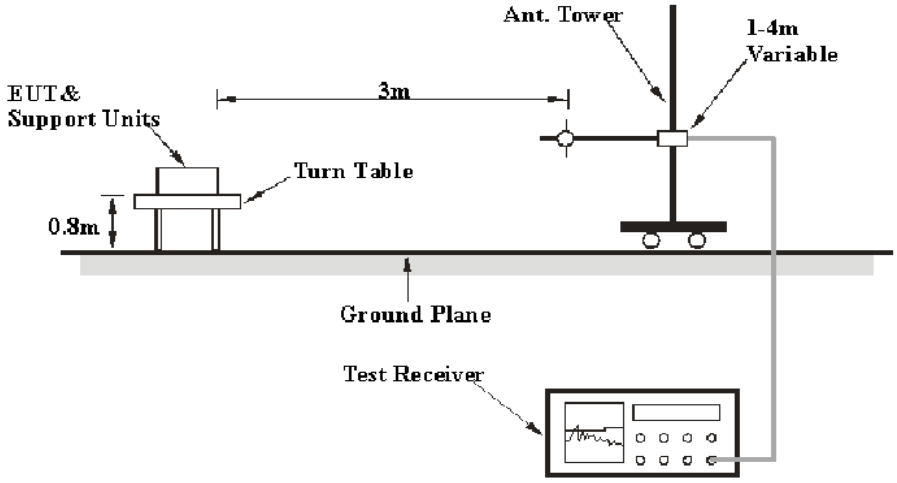
FCC §15.209, §15.205 & §15.247(d) & RSS-247§ 5.5 - Spurious Emissions

Applicable Standard

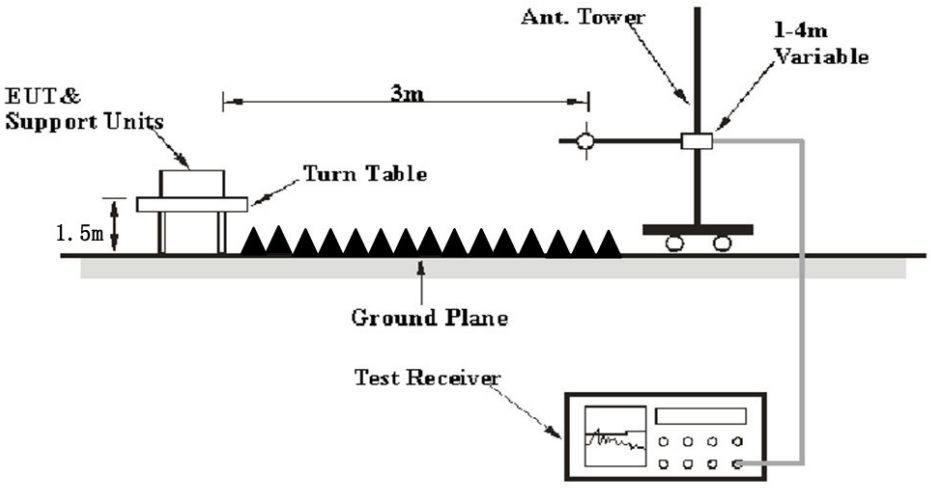
FCC §15.205; §15.209; §15.247(d); RSS-247§ 5.5; RSS-GEN § 8.10

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247, RSS-247, RSS-Gen limits.

EMI Test Receiver & Spectrum Analyzer Setup

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	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Average

Test Procedure

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

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Factor & Margin Calculation

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

Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit/Margin = Level / Corrected Amplitude – Limit
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	25~26.8℃
Relative Humidity:	52~60%
ATM Pressure:	101.2kPa

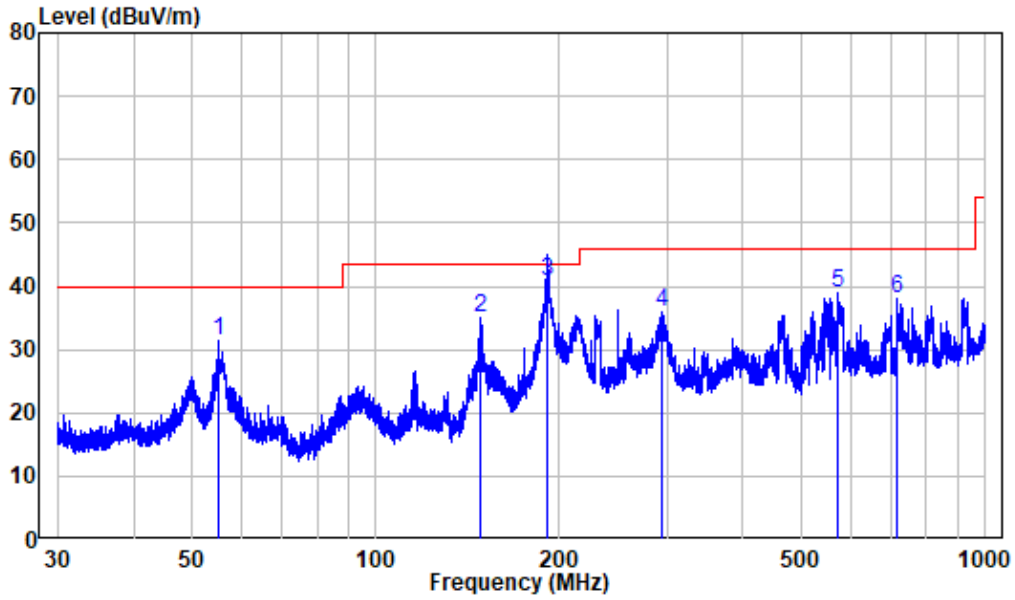
The testing was performed by Level Li on 2022-11-09 for below 1GHz, and on 2022-06-10 for above 1GHz.

EUT operation mode: Transmitting(Pre-scan in the X, Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Below 1GHz: *(Worst case for GFSK Mode, Low channel)*

Note: When the test result of Peak was less than the limit of QP more than 6dB, just the peak level was recorded

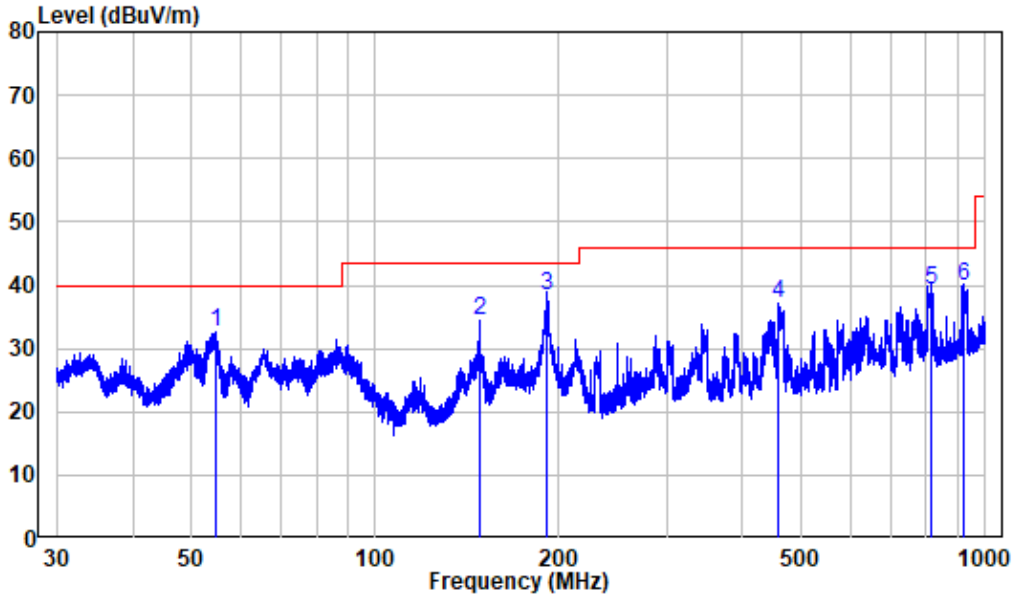
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS220511-19758E-RF
Test Mode: BT

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	55.076	-10.28	41.64	31.36	40.00	-8.64	Peak
2	148.506	-15.35	50.23	34.88	43.50	-8.62	Peak
3	191.158	-11.39	52.00	40.61	43.50	-2.89	QP
4	295.147	-9.27	45.31	36.04	46.00	-9.96	Peak
5	573.871	-3.81	42.68	38.87	46.00	-7.13	Peak
6	716.368	-1.33	39.49	38.16	46.00	-7.84	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : SZNS220511-19758E-RF
Test Mode: BT

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	54.763	-10.29	42.80	32.51	40.00	-7.49	Peak
2	148.506	-15.35	49.65	34.30	43.50	-9.20	Peak
3	191.158	-11.39	49.70	38.31	43.50	-5.19	QP
4	458.511	-5.44	42.65	37.21	46.00	-8.79	Peak
5	817.042	-0.13	39.50	39.37	46.00	-6.63	QP
6	920.093	1.55	38.30	39.85	46.00	-6.15	QP

Above 1GHz: (worst case for GFSK)

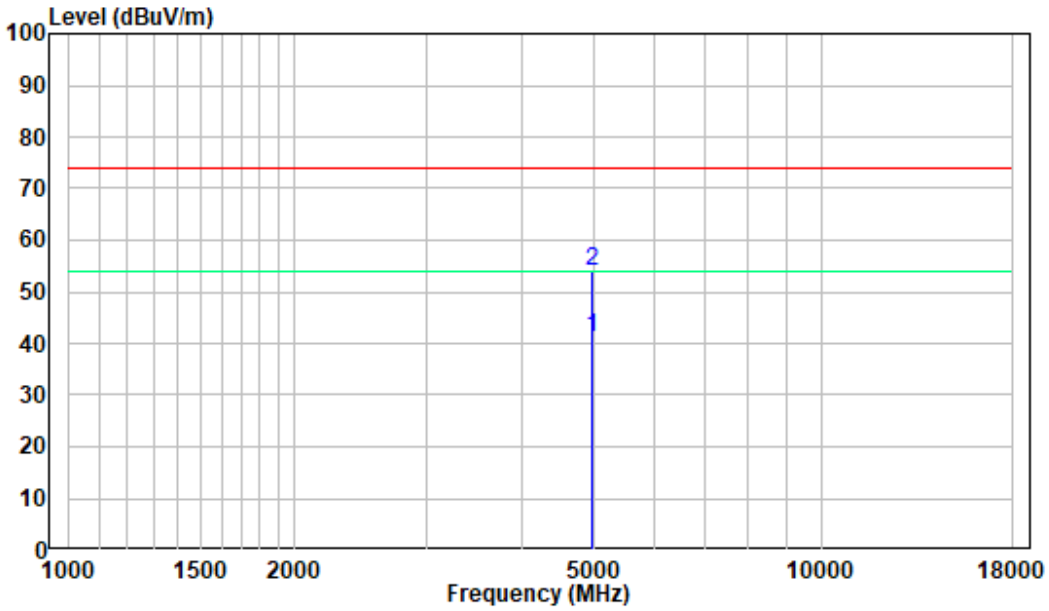
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
Low Channel 2402MHz									
2310	68.36	PK	327	1.6	H	-7.24	61.12	74	-12.88
2310	53.49	AV	327	1.6	H	-7.24	46.25	54	-7.75
2310	68.27	PK	321	1.8	V	-7.24	61.03	74	-12.97
2310	53.40	AV	321	1.8	V	-7.24	46.16	54	-7.84
2390	69.42	PK	280	1.7	H	-7.22	62.20	74	-11.80
2390	54.24	AV	280	1.7	H	-7.22	47.02	54	-6.98
2390	69.33	PK	27	1.2	V	-7.22	62.11	74	-11.89
2390	54.15	AV	27	1.2	V	-7.22	46.93	54	-7.07
4804	57.41	PK	225	1.2	H	-3.51	53.90	74	-20.10
4804	56.25	PK	183	1.2	V	-3.51	52.74	74	-21.26
Middle Channel 2441MHz									
4882	56.69	PK	326	1.4	H	-3.37	53.32	74	-20.68
4882	55.64	PK	312	2.1	V	-3.37	52.27	74	-21.73
High Channel 2480MHz									
2483.5	70.20	PK	331	1.5	H	-7.20	63	74	-11.00
2483.5	55.01	AV	331	1.5	H	-7.20	47.81	54	-6.19
2483.5	70.08	PK	275	1.3	V	-7.20	62.88	74	-11.12
2483.5	54.92	AV	275	1.3	V	-7.20	47.72	54	-6.28
2500	69.22	PK	207	2	H	-7.18	62.04	74	-11.96
2500	54.73	AV	207	2	H	-7.18	47.55	54	-6.45
2500	69.11	PK	312	1.6	V	-7.18	61.93	74	-12.07
2500	54.64	AV	312	1.6	V	-7.18	47.46	54	-6.54
4960	57.08	PK	7	2.2	H	-3.01	54.07	74	-19.93
4960	44.20	AV	7	2.2	H	-3.01	41.19	54	-12.81
4960	55.92	PK	88	2.1	V	-3.01	52.91	74	-21.09

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Absolute Level (Corrected Amplitude) = Factor + Reading
Margin = Absolute Level (Corrected Amplitude) – Limit
The other spurious emission which is in the noise floor level was not recorded.
The test result of peak was less than the limit of average, so just peak value were recorded.

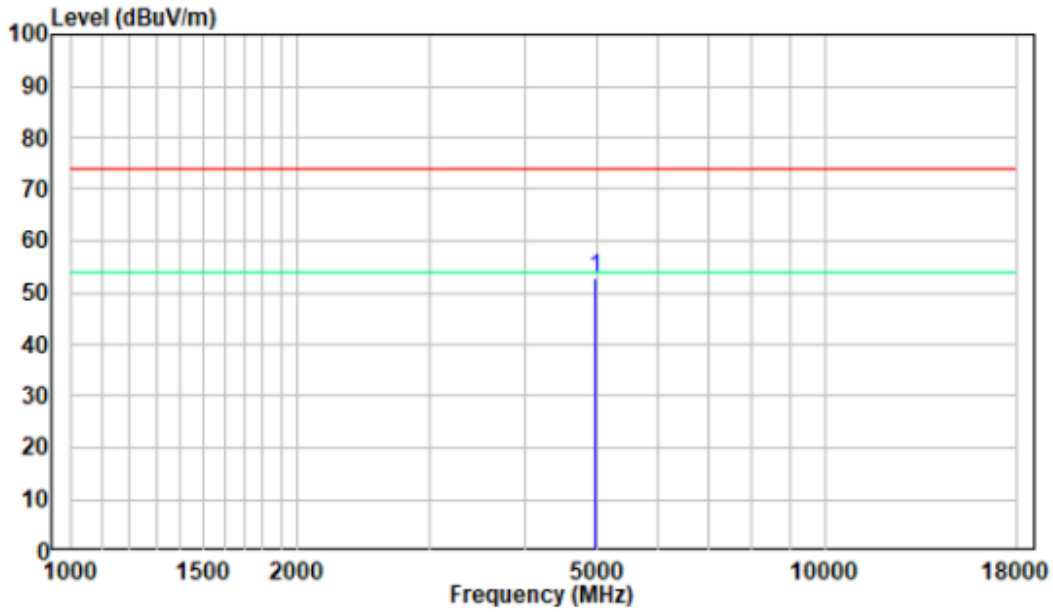
1 GHz - 18 GHz: (Pre-Scan plots)

Pre-scan for High Channel

Horizontal



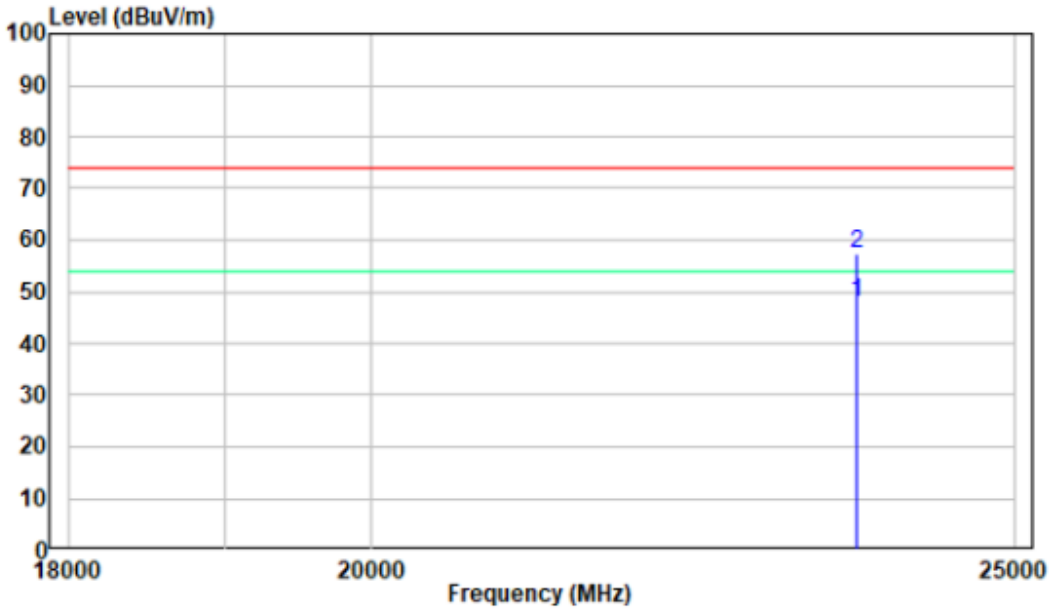
Vertical



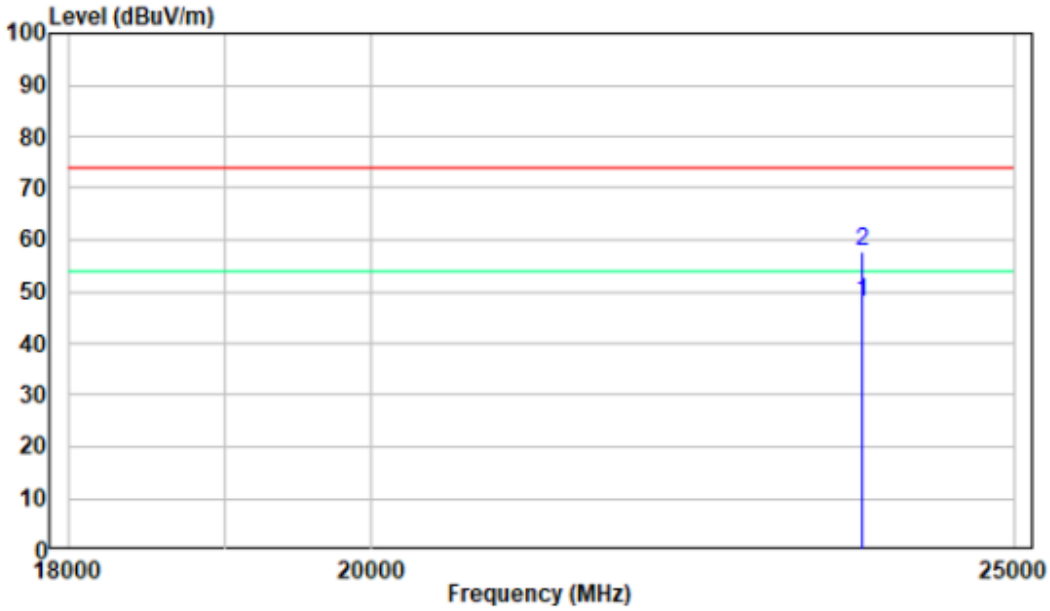
18-25GHz: (Pre-Scan plots)

Pre-scan for High Channel

Horizontal



Vertical



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

Applicable Standard

According to FCC §15.247(a) (1):

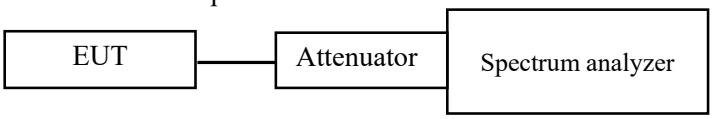
Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to RSS-247 § 5.1 (b):

Frequency hopping systems (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. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	27.1℃
Relative Humidity:	53%
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling on 2022-06-25.

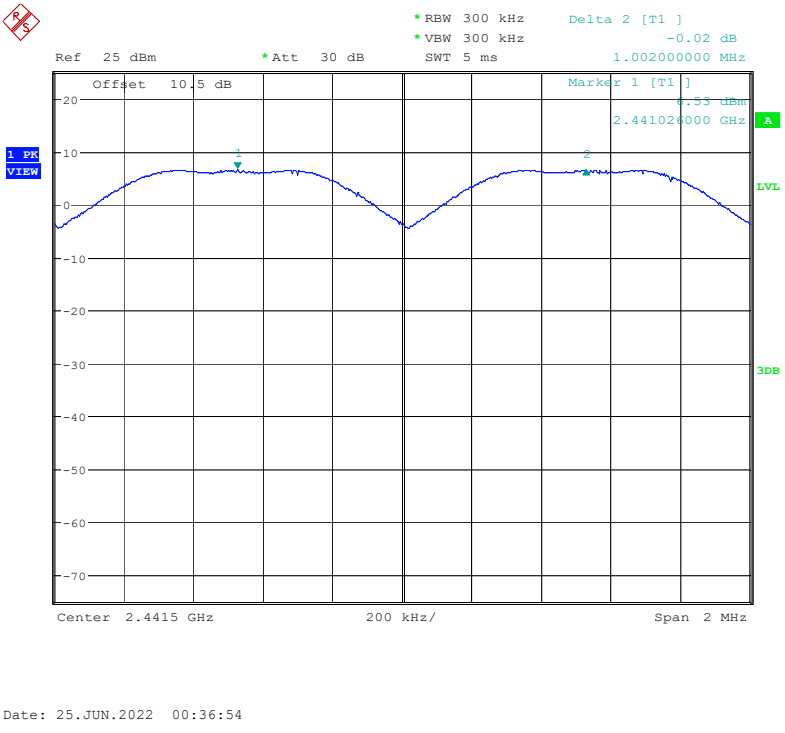
EUT operation mode: Transmitting

Test Result: Compliant.

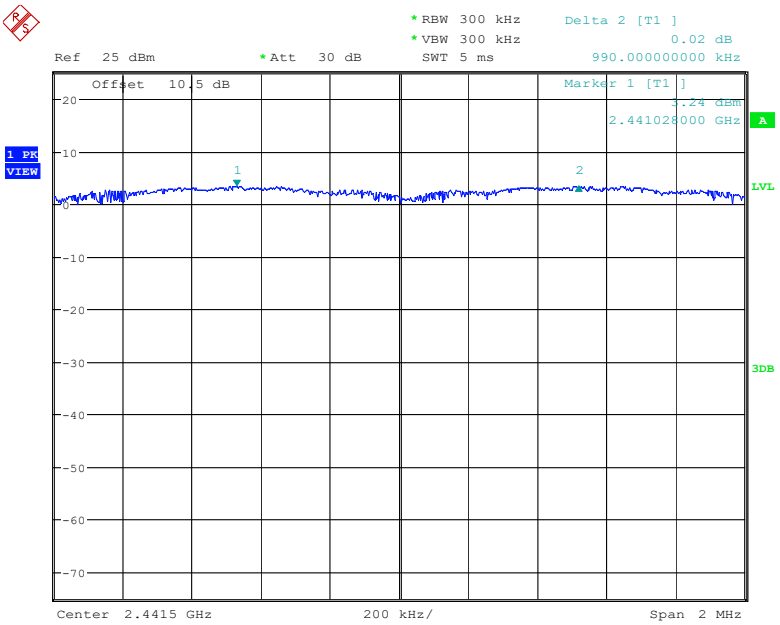
Channel	Channel Separation (MHz)	20 dBc BW (MHz)	Two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit
BDR(GFSK)				
Middle	1.002	1.020	0.680	0.680
EDR(π/4-DQPSK)				
Middle	0.990	1.365	0.910	0.910
EDR(8DPSK)				
Middle	0.996	1.326	0.884	0.884

Please refer to the below plots:

BDR (GFSK)

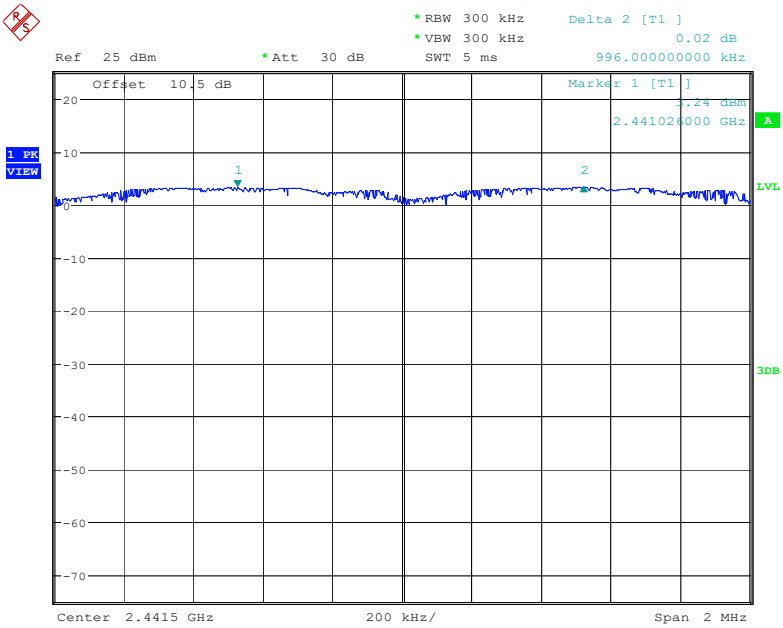


EDR (π/4-DQPSK)



Date: 25.JUN.2022 00:46:05

EDR (8DPSK)



Date: 25.JUN.2022 00:55:23

FCC §15.247(a) (1) & RSS-247 § 5.1 (a), RSS-GEN § 6.7 – 20 dB EMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH

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 § 5.1 (a), RSS-GEN § 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 "20 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 20 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.

Test Procedure

The following conditions shall be observed for measuring the occupied bandwidth and 20 dB bandwidth:

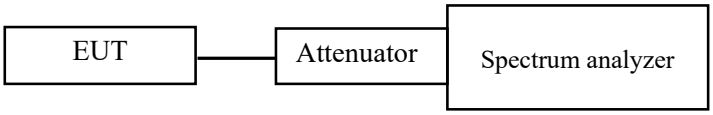
• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

• 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 / 20 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 / 20 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 Data

Environmental Conditions

Temperature:	24.1-27.2℃
Relative Humidity:	50-53%
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-24 to 2022-11-28.

EUT operation mode: Transmitting

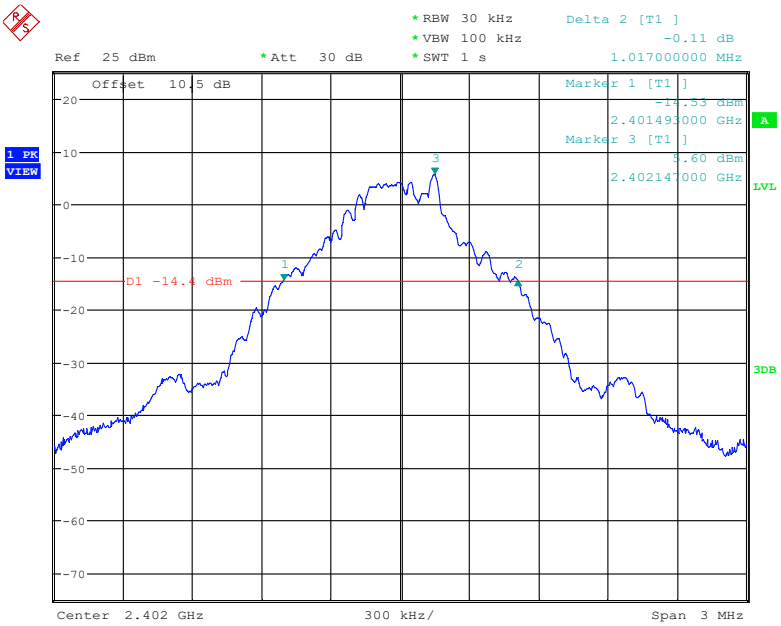
Test Result: Compliant.

Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	20 dB Emission Bandwidth (MHz)
BDR (GFSK)	Low	2402	0.948	1.017
	Middle	2441	0.945	1.020
	High	2480	0.951	1.017
EDR (π/4-DQPSK)	Low	2402	1.200	1.362
	Middle	2441	1.203	1.362
	High	2480	1.206	1.365
EDR (8DPSK)	Low	2402	1.185	1.317
	Middle	2441	1.185	1.320
	High	2480	1.188	1.326

Please refer to the below plots:

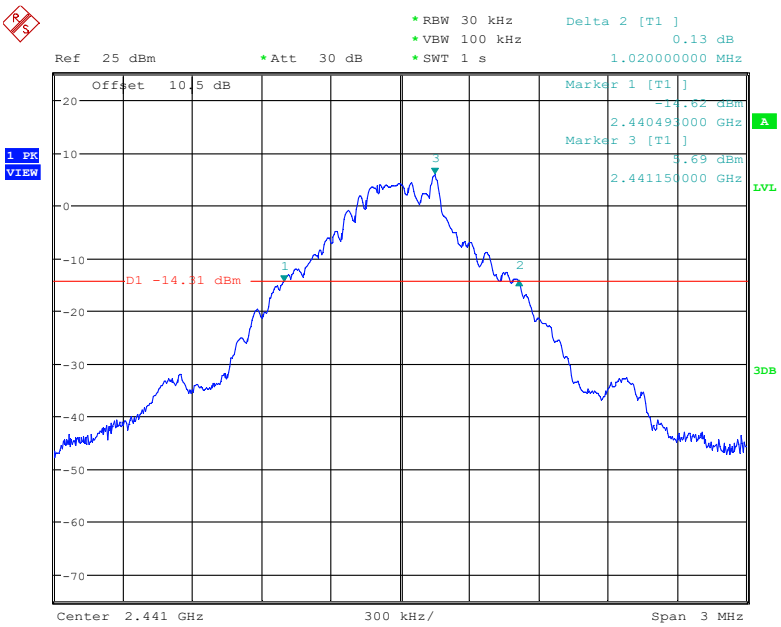
20 dB Emission Bandwidth

BDR (GFSK): Low Channel



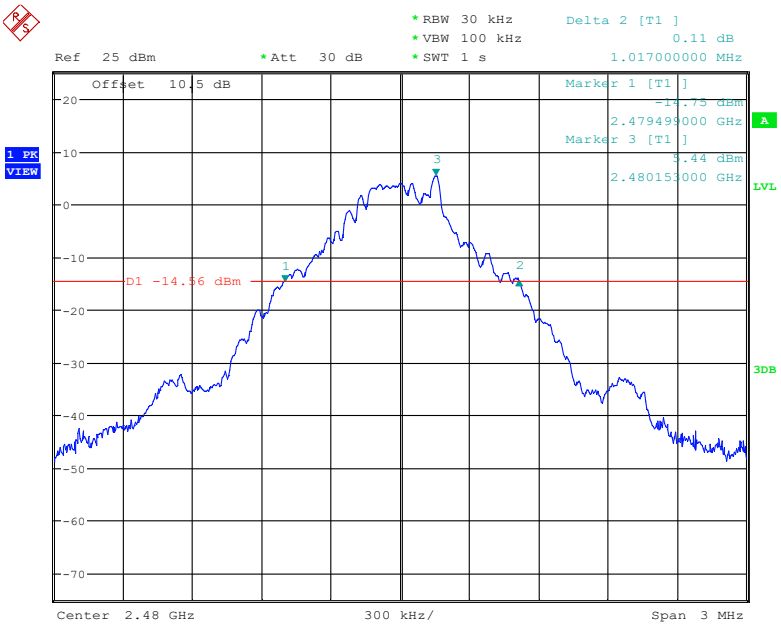
Date: 28.NOV.2022 15:54:43

BDR (GFSK): Middle Channel



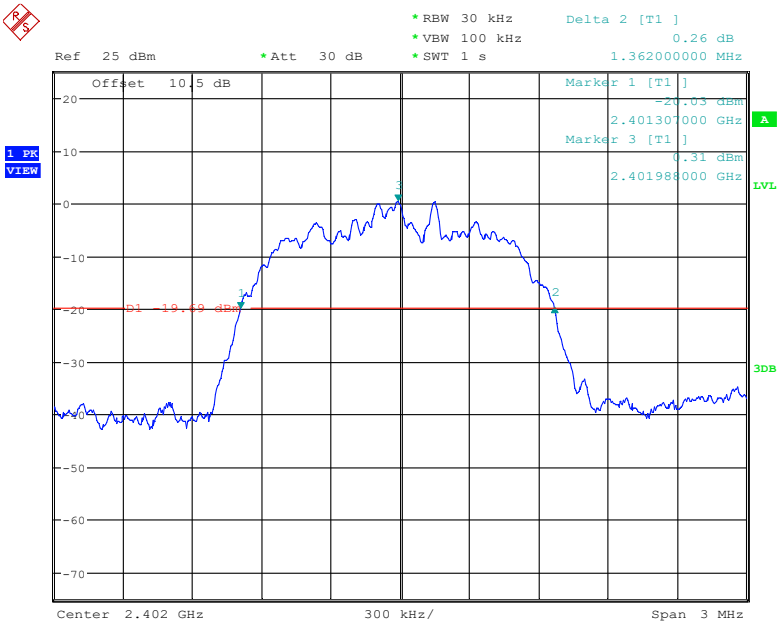
Date: 28.NOV.2022 15:57:49

BDR (GFSK): High Channel



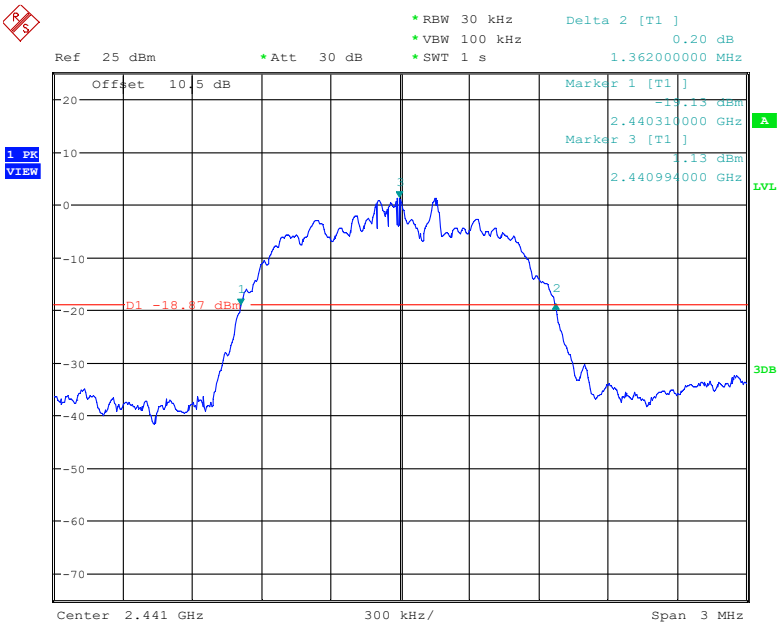
Date: 28.NOV.2022 16:01:11

EDR (π/4-DQPSK): Low Channel



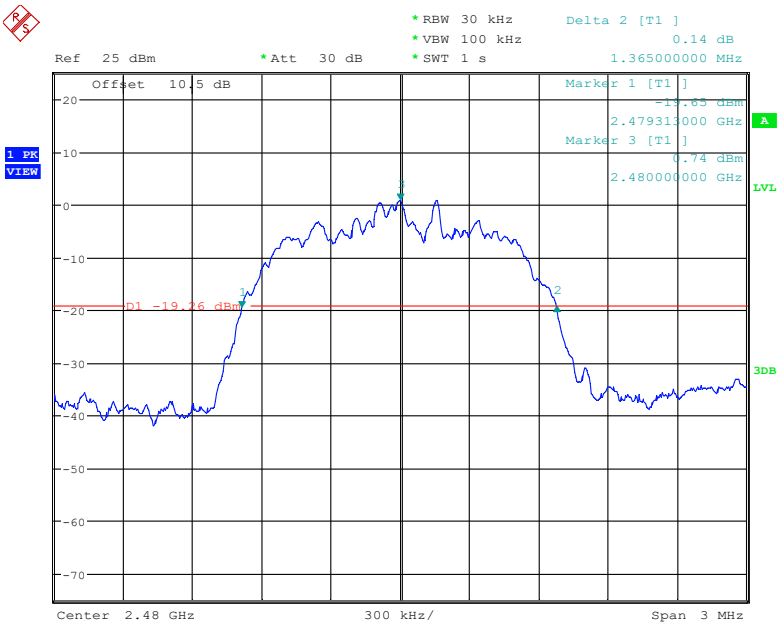
Date: 28.NOV.2022 15:55:45

EDR (π/4-DQPSK): Middle Channel



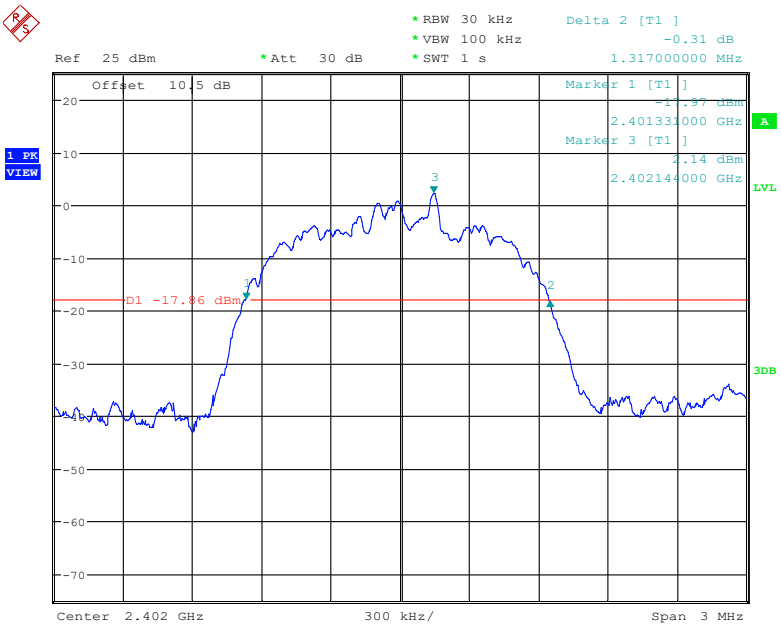
Date: 28.NOV.2022 16:03:52

EDR (π/4-DQPSK): High Channel



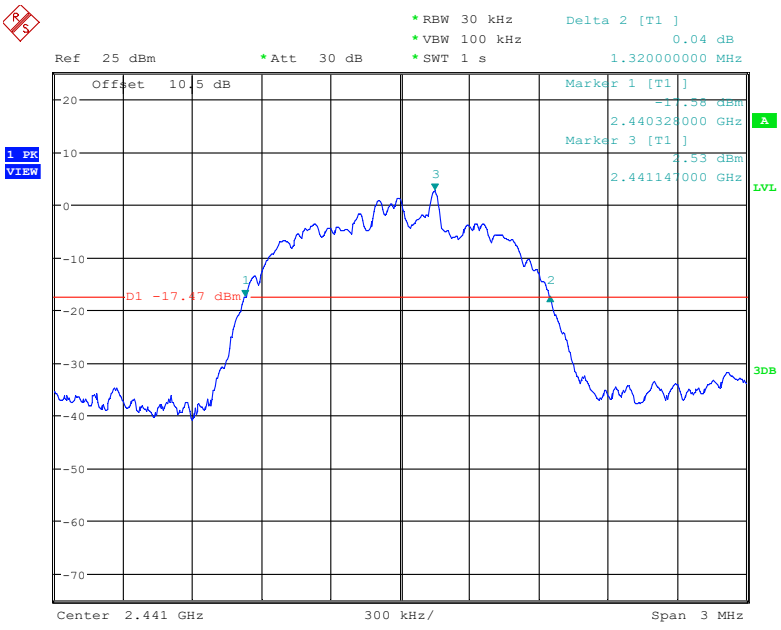
Date: 28.NOV.2022 16:01:52

EDR (8DPSK): Low Channel



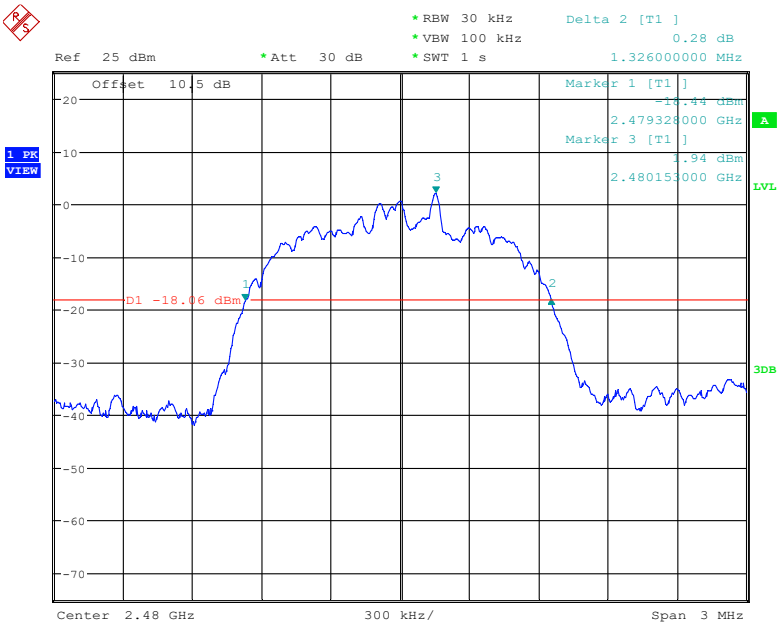
Date: 28.NOV.2022 15:56:32

EDR (8DPSK): Middle Channel



Date: 28.NOV.2022 16:04:37

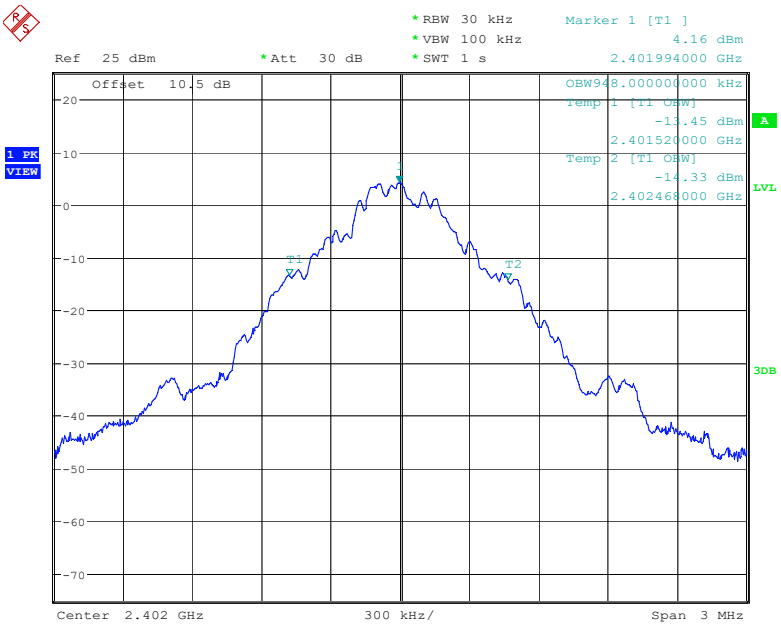
EDR (8DPSK): High Channel



Date: 28.NOV.2022 16:02:43

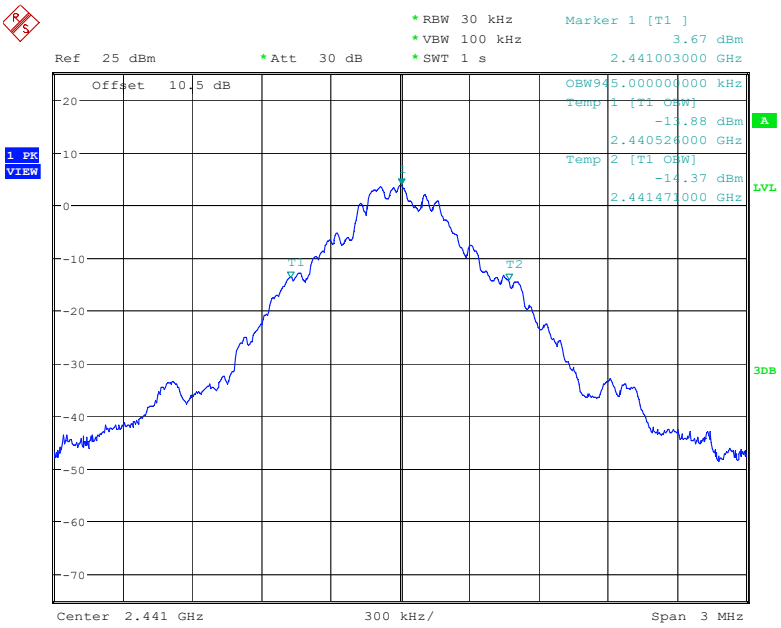
99% Occupied Bandwidth

BDR (GFSK): Low Channel



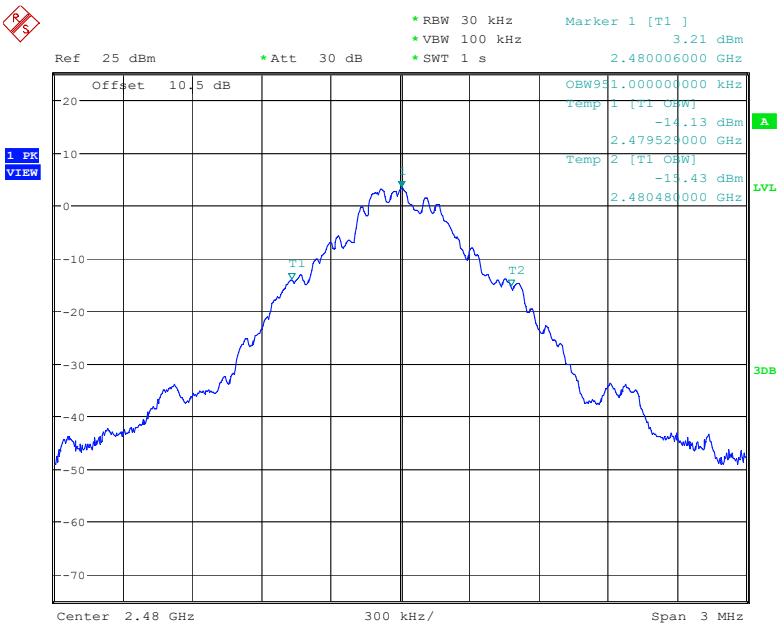
Date: 24.JUN.2022 23:37:29

BDR (GFSK): Middle Channel



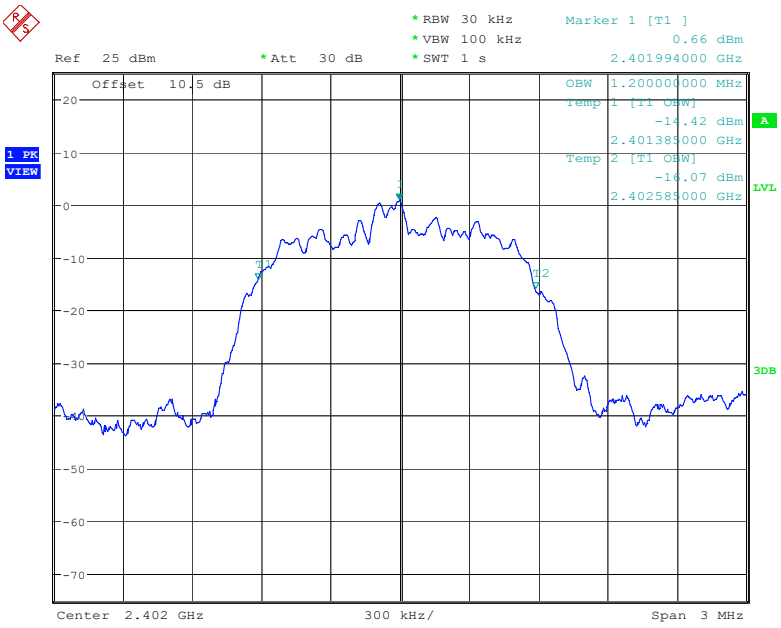
Date: 24.JUN.2022 23:45:15

BDR (GFSK): High Channel



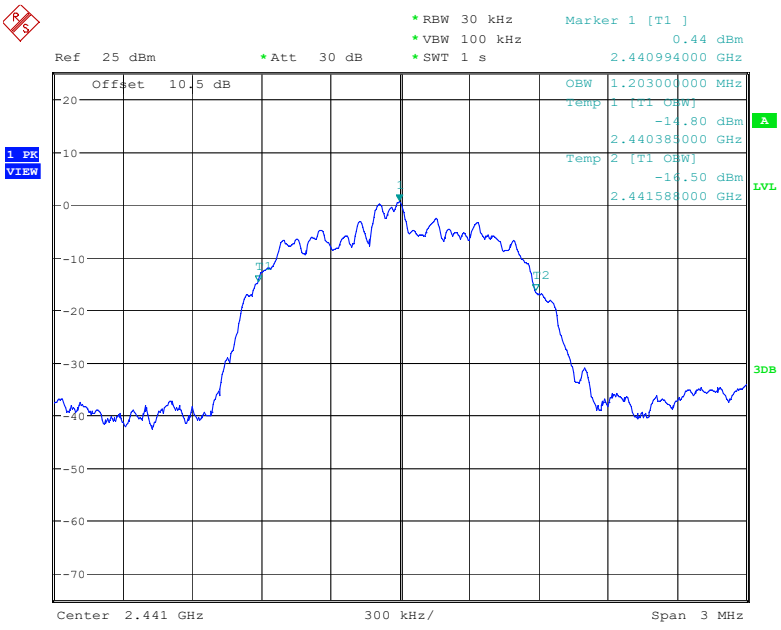
Date: 24.JUN.2022 23:56:37

EDR (π/4-DQPSK): Low Channel



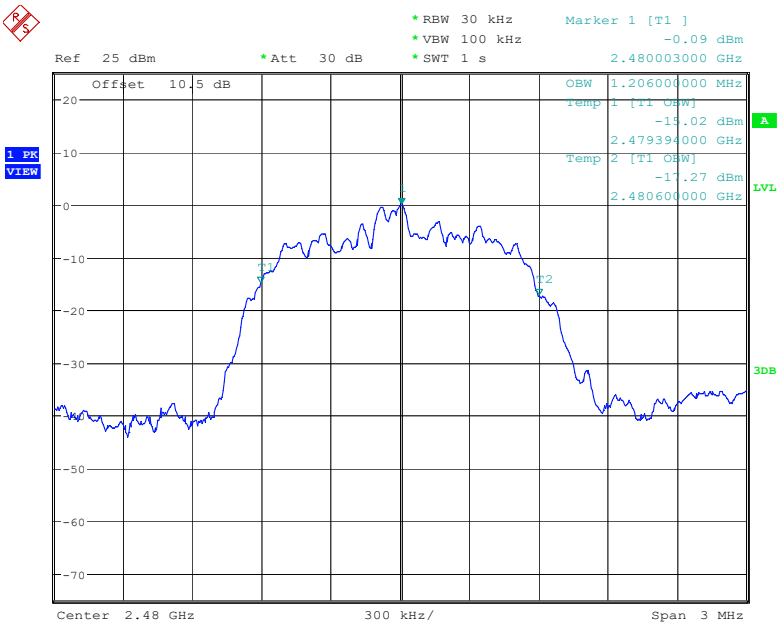
Date: 24.JUN.2022 23:38:17

EDR (π/4-DQPSK): Middle Channel



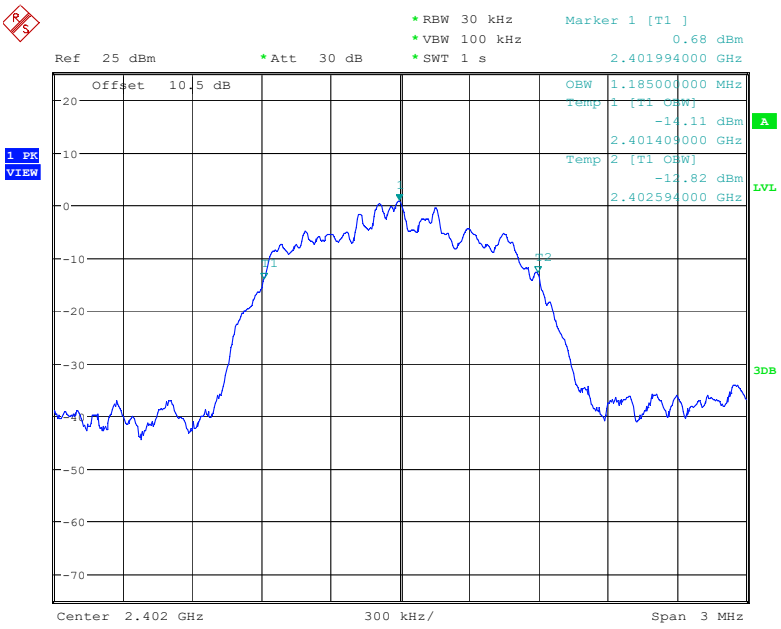
Date: 25.JUN.2022 01:04:58

EDR (π/4-DQPSK): High Channel



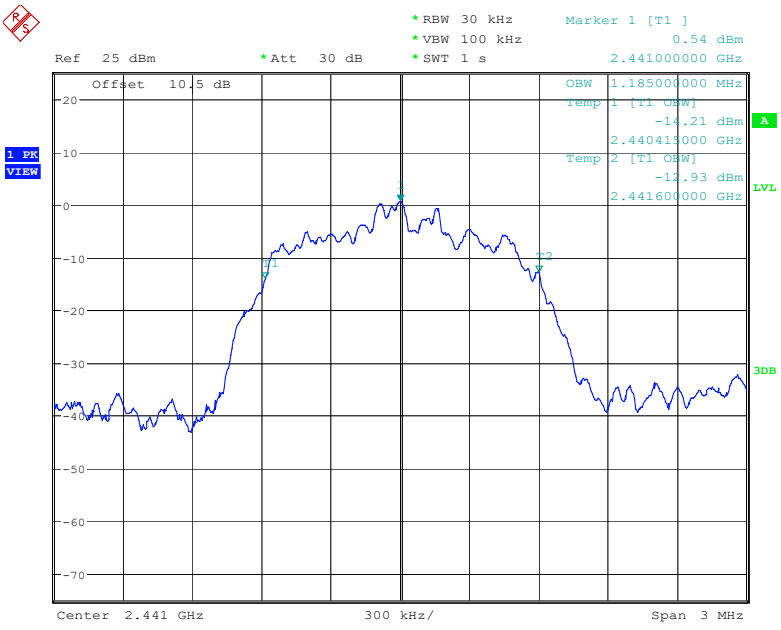
Date: 25.JUN.2022 00:04:55

EDR (8DPSK): Low Channel



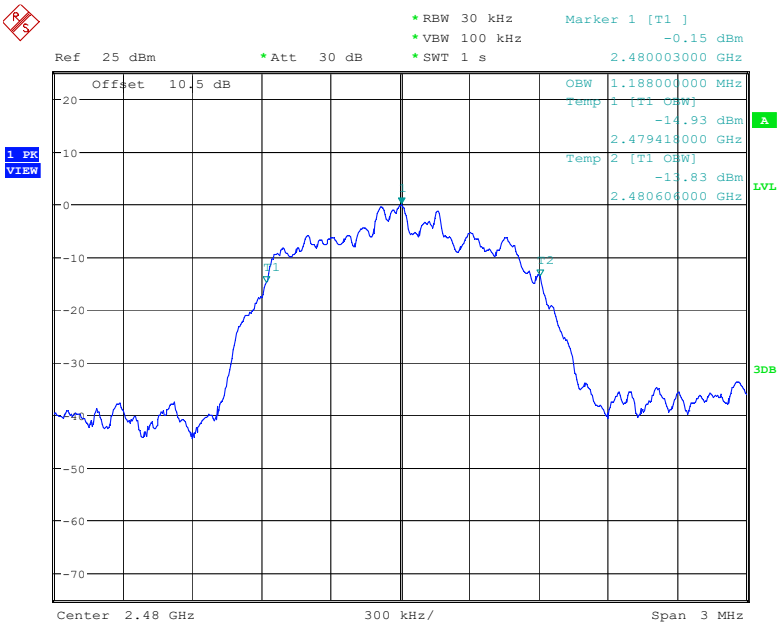
Date: 24.JUN.2022 23:39:10

EDR (8DPSK): Middle Channel



Date: 24.JUN.2022 23:52:53

EDR (8DPSK): High Channel



Date: 25.JUN.2022 00:08:14

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

Applicable Standard

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

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

According to RSS-247 § 5.1 (d):

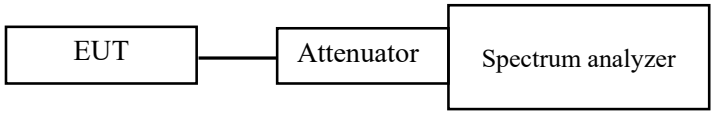
Frequency hopping systems (FHSS) operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Procedure

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

2. Set the EUT in hopping mode from first channel to last.

3. By using the max-hold function record the quantity of the channel.



Test Data

Environmental Conditions

Temperature:	27.1℃
Relative Humidity:	53%
ATM Pressure:	101.0 kPa

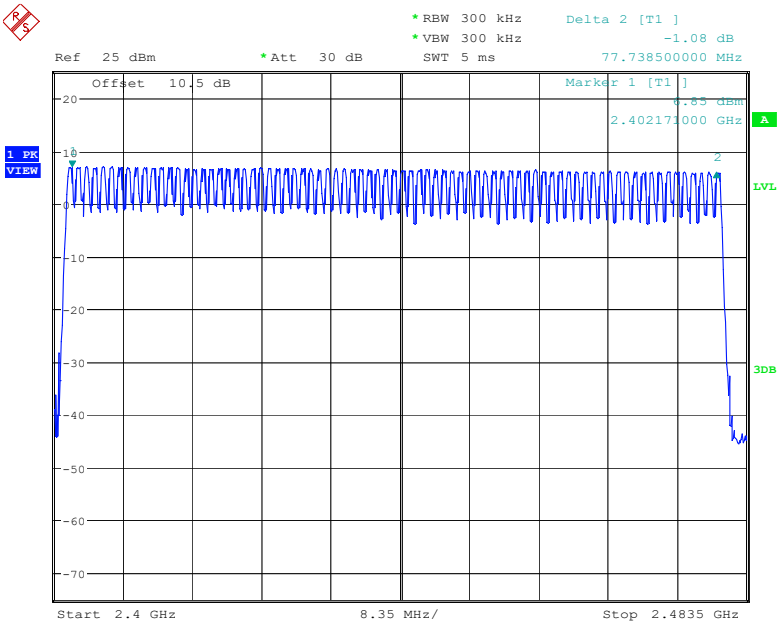
The testing was performed by Roger Ling on 2022-06-25

EUT operation mode: Transmitting

Test Result: Compliant.

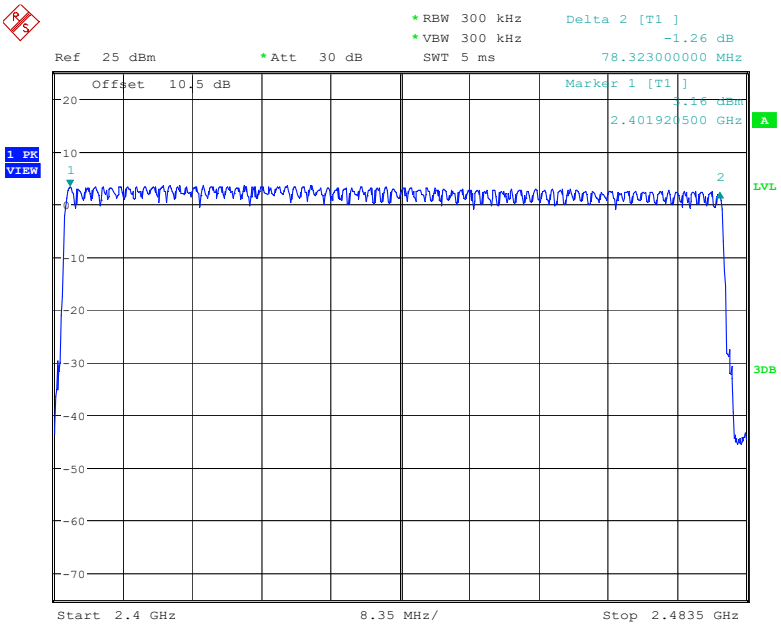
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

BDR (GFSK): Number of Hopping Channels



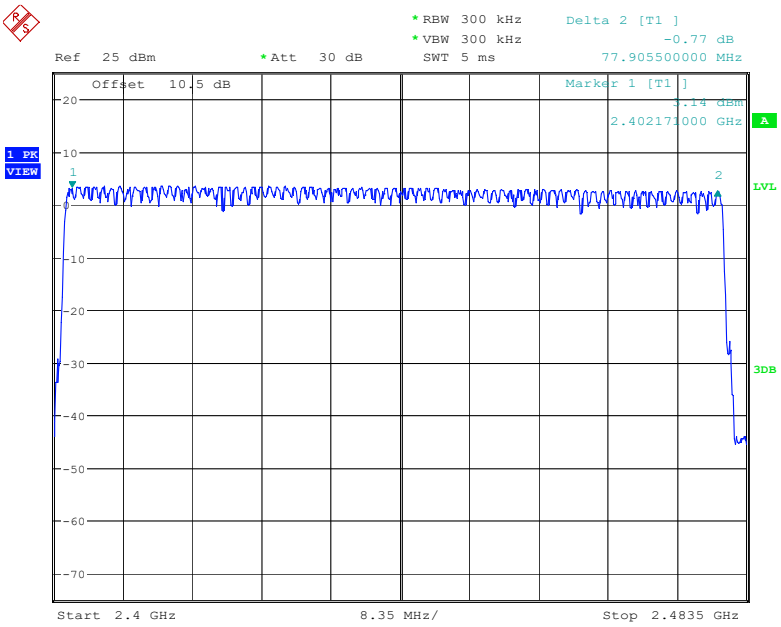
Date: 25.JUN.2022 00:35:04

EDR (π/4-DQPSK): Number of Hopping Channels



Date: 25.JUN.2022 00:44:16

EDR (8DPSK): Number of Hopping Channels



Date: 25.JUN.2022 00:53:33

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

Applicable Standard

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

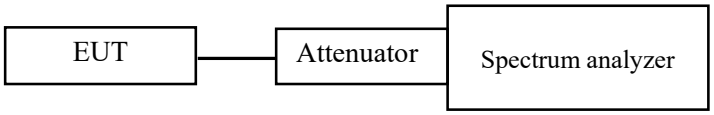
Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions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

According to RSS-247 § 5.1 (d):

Frequency hopping systems (FHSs) operating in the band 2400-2483.5 MHz shall use at least 15 hopping 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Procedure

1. The EUT was worked in channel hopping.
2. Set the RBW to: 1MHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 0Hz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Recorded the time of single pulses



Test Data

Environmental Conditions

Temperature:	27.1℃
Relative Humidity:	53%
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling on 2022-06-25.

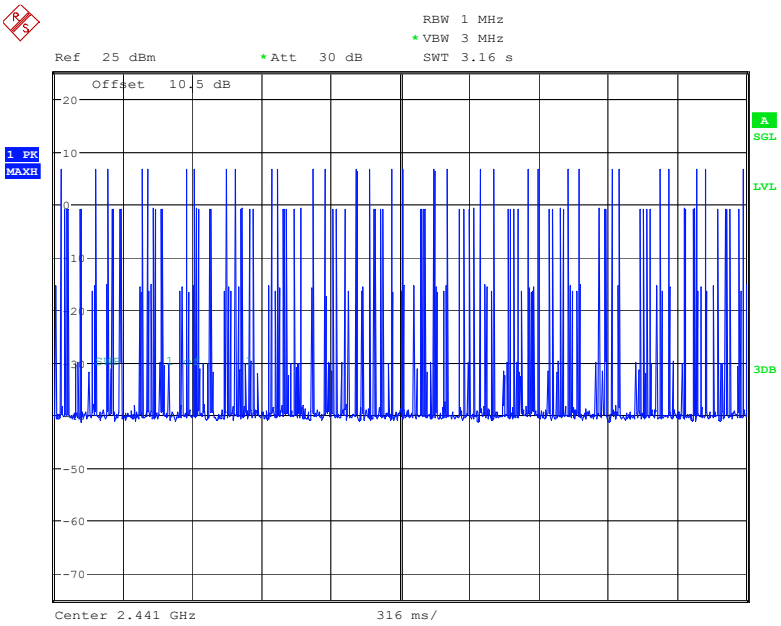
EUT operation mode: Transmitting

Test Result: Compliant. Please refer to below table and plots.

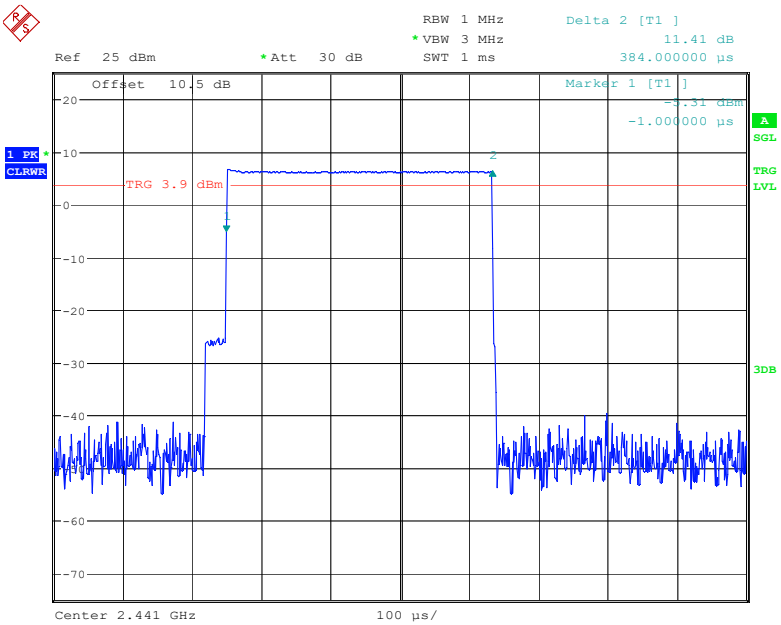
Test Mode	Channel	Pulse Time [ms]	Total Hops [Num]	Result[s]	Limit[s]	Verdict
DH1	Hop	0.384	320	0.123	<=0.4	PASS
DH3	Hop	1.641	160	0.263	<=0.4	PASS
DH5	Hop	2.905	120	0.349	<=0.4	PASS
2DH1	Hop	0.390	320	0.125	<=0.4	PASS
2DH3	Hop	1.644	170	0.279	<=0.4	PASS
2DH5	Hop	2.905	130	0.378	<=0.4	PASS
3DH1	Hop	0.390	310	0.121	<=0.4	PASS
3DH3	Hop	1.644	170	0.279	<=0.4	PASS
3DH5	Hop	2.910	100	0.291	<=0.4	PASS

Note 1: A period time=0.4*79=31.6(S), Result= Pulse Time *Total hops
Note 2: Total hops=Hopping Number in 3.16s*10
Note 3: Hopping Number in 3.16s=Total of highest signals in 3.16s (Second high signals were other channel)

BDR (GFSK):
DH1

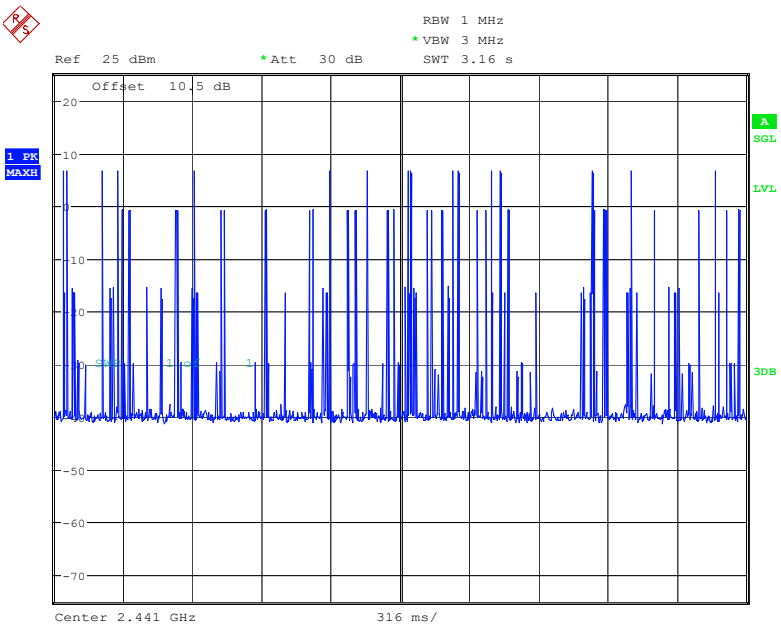


Date: 25.JUN.2022 00:37:06

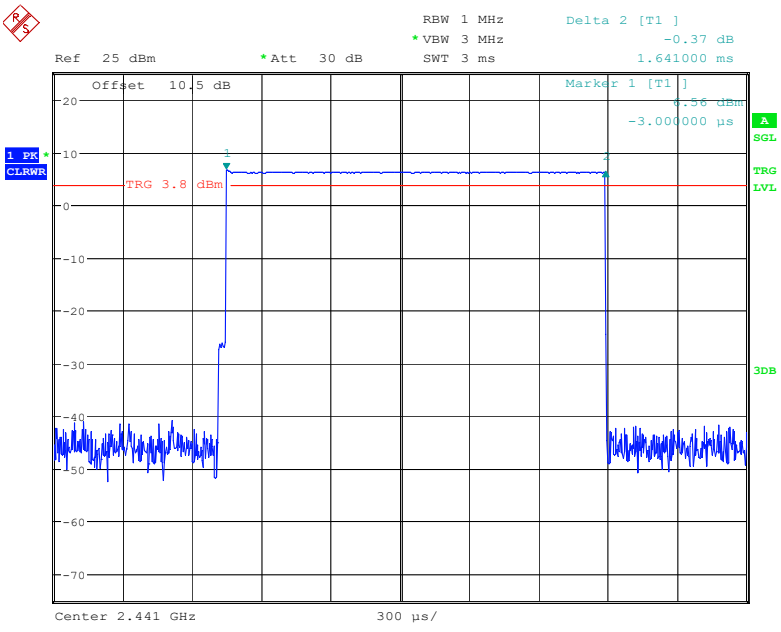


Date: 25.JUN.2022 00:37:21

DH3

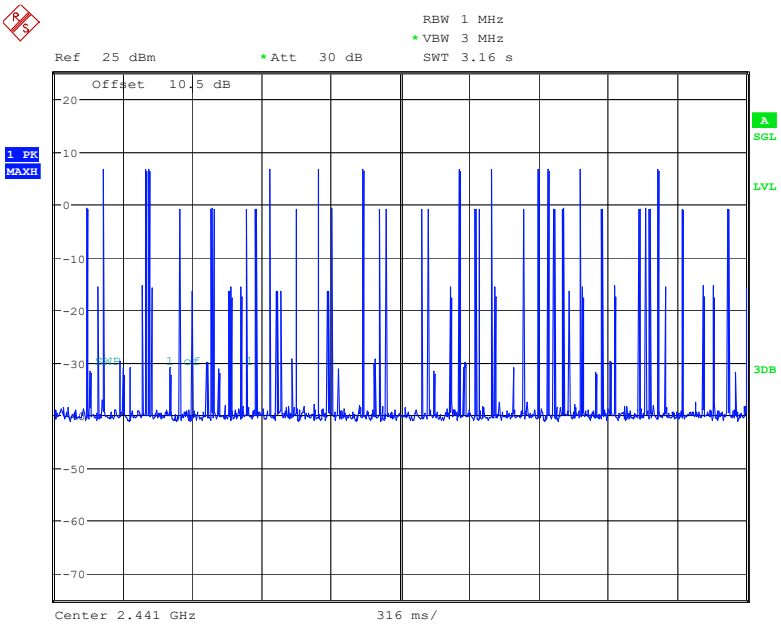


Date: 25.JUN.2022 00:41:30

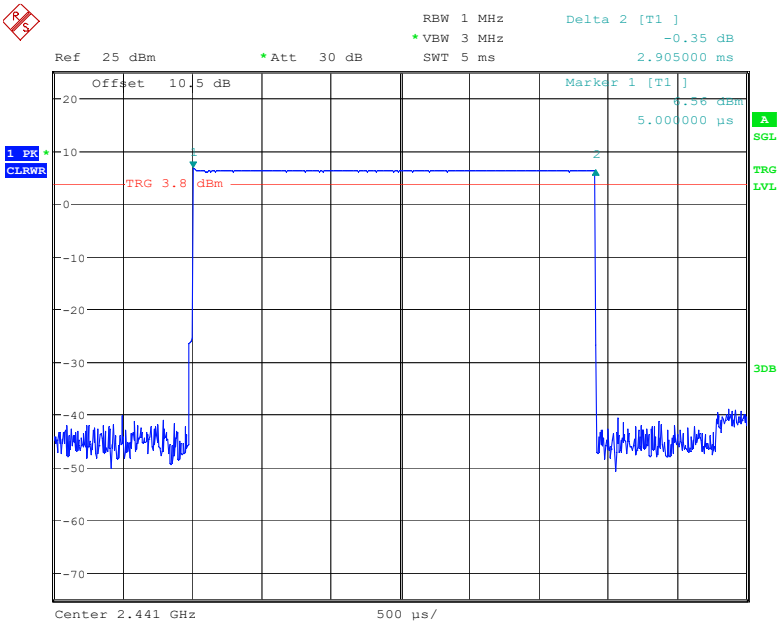


Date: 25.JUN.2022 00:41:45

DH5

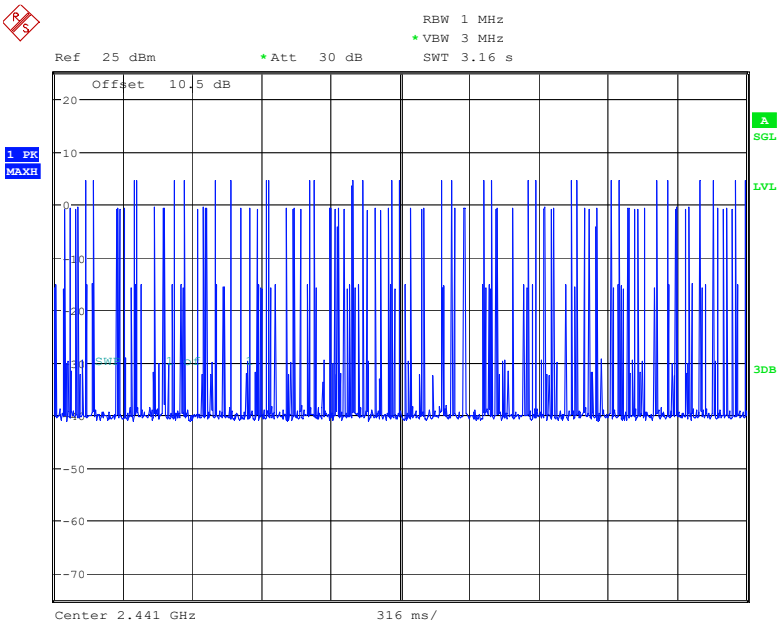


Date: 25.JUN.2022 00:42:15

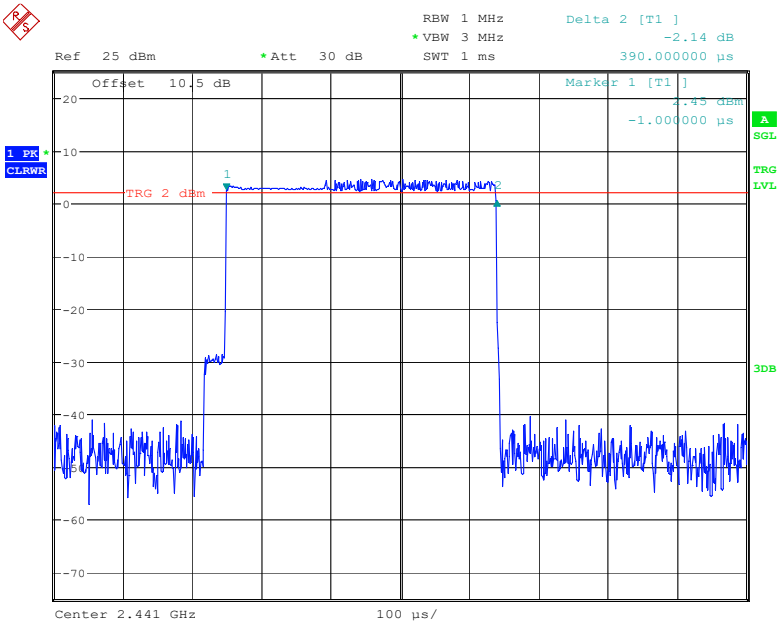


Date: 25.JUN.2022 00:42:30

EDR(π/4-DQPSK):
2DH1

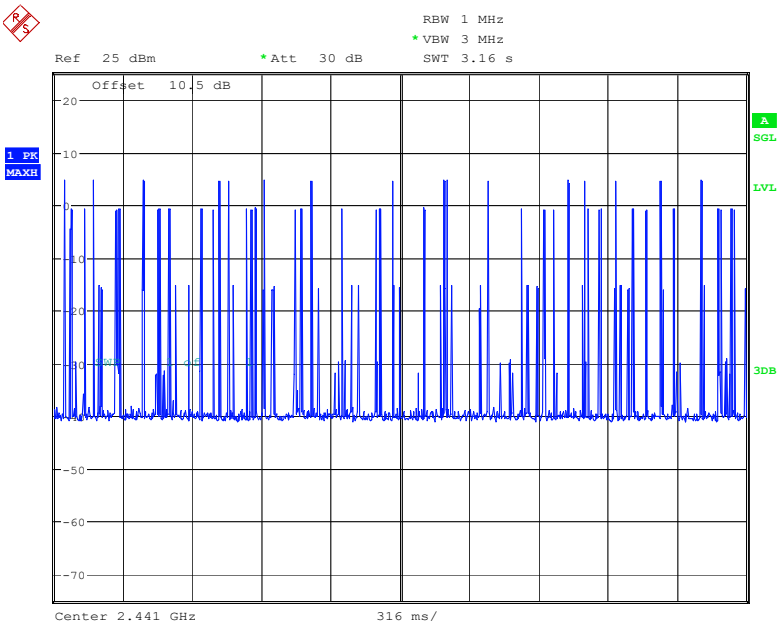


Date: 25.JUN.2022 00:46:18

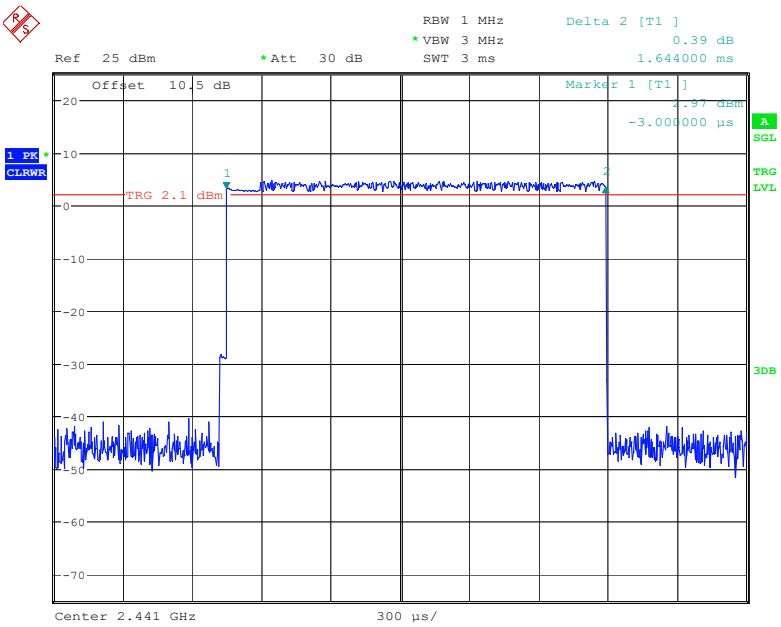


Date: 25.JUN.2022 00:46:33

2DH3

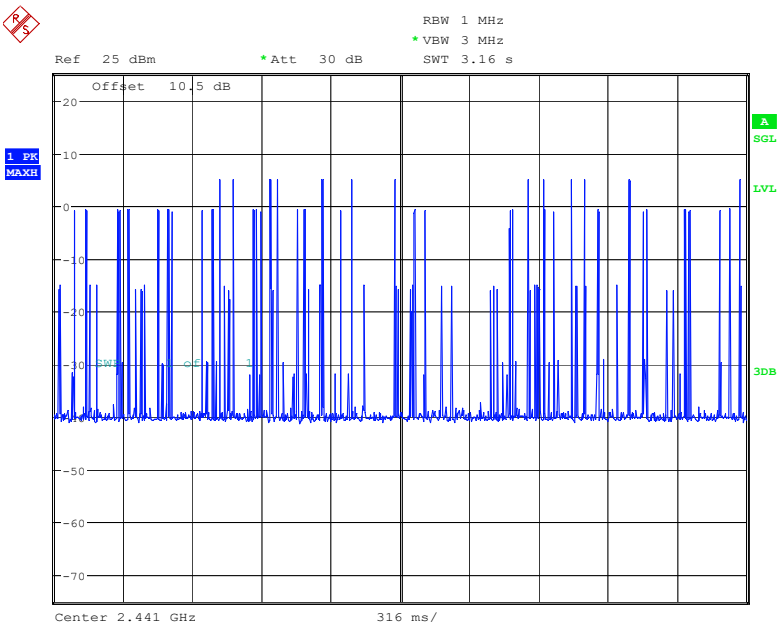


Date: 25.JUN.2022 00:51:08

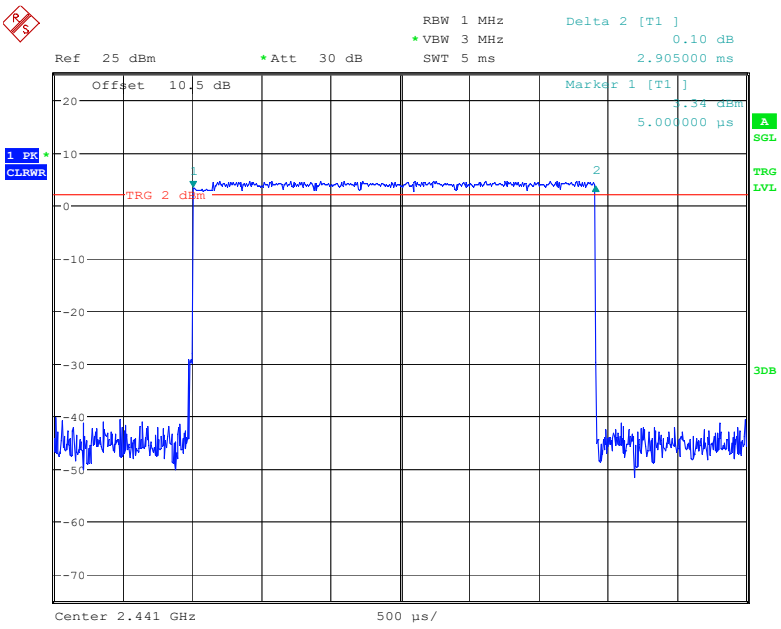


Date: 25.JUN.2022 00:51:23

2DH5

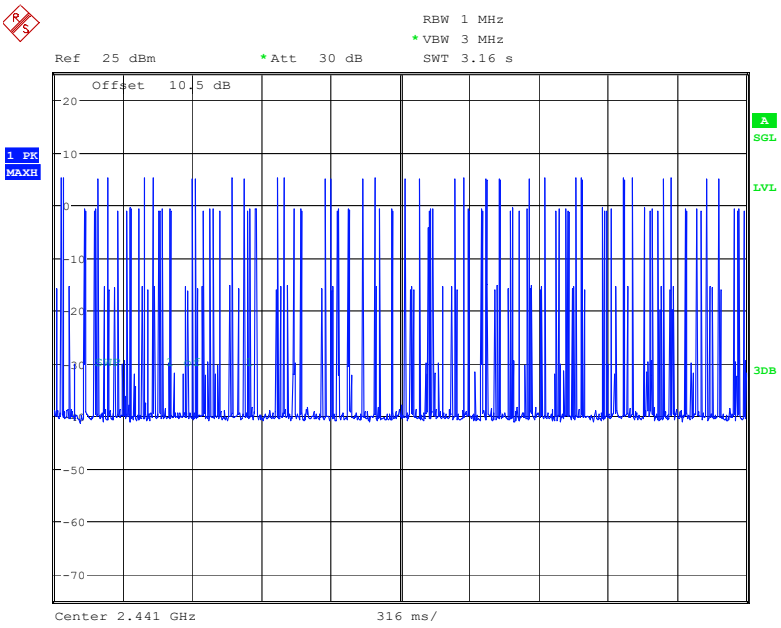


Date: 25.JUN.2022 00:59:53

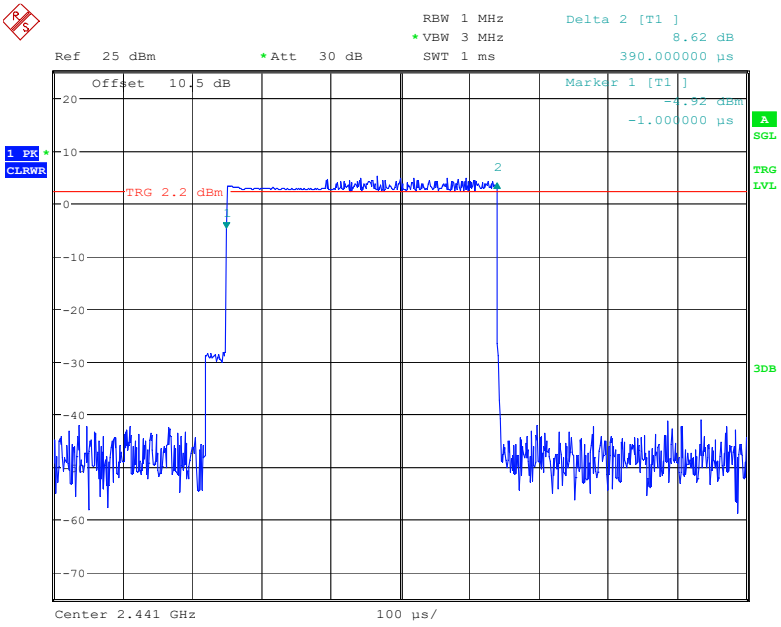


Date: 25.JUN.2022 00:52:03

EDR (8DPSK):
3DH1

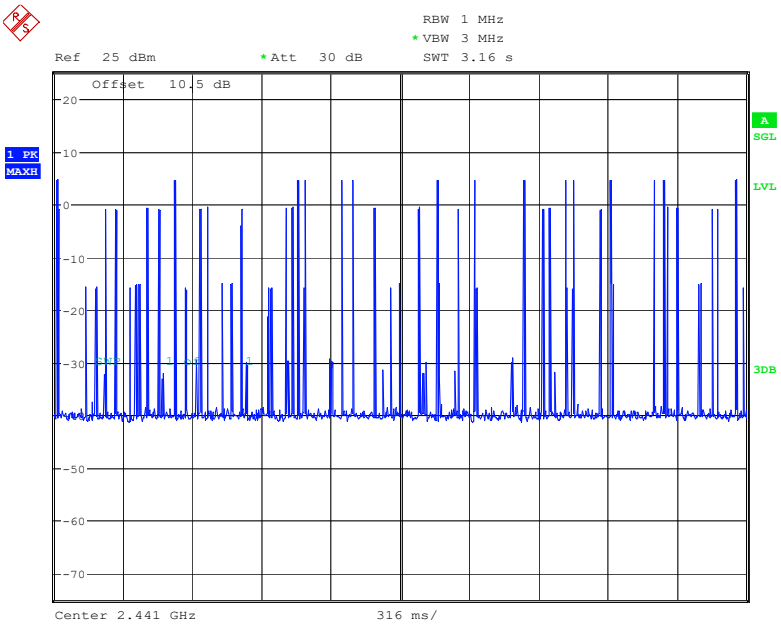


Date: 25.JUN.2022 00:55:35

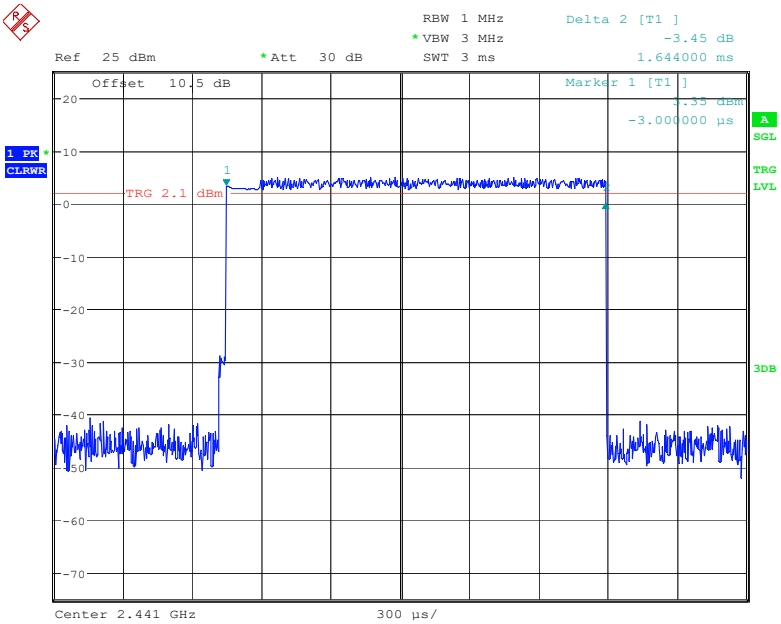


Date: 25.JUN.2022 00:55:50

3DH3

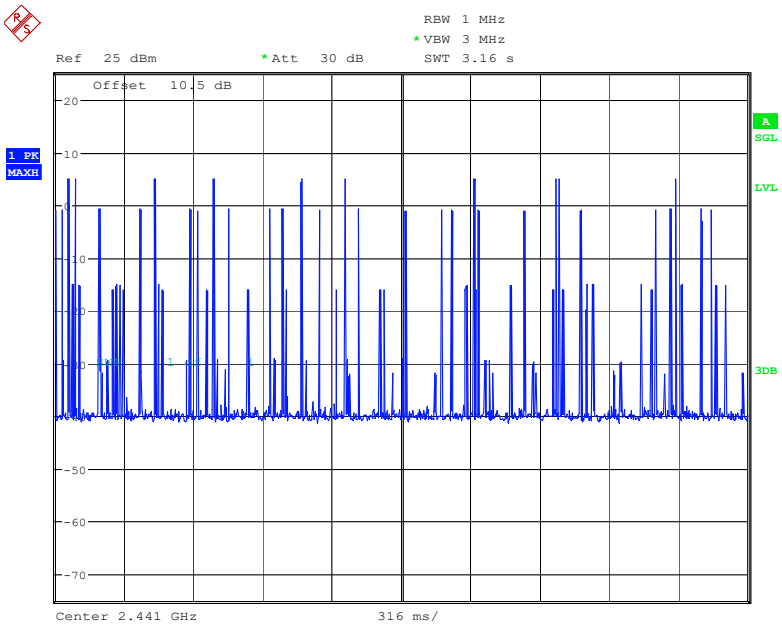


Date: 25.JUN.2022 00:51:48

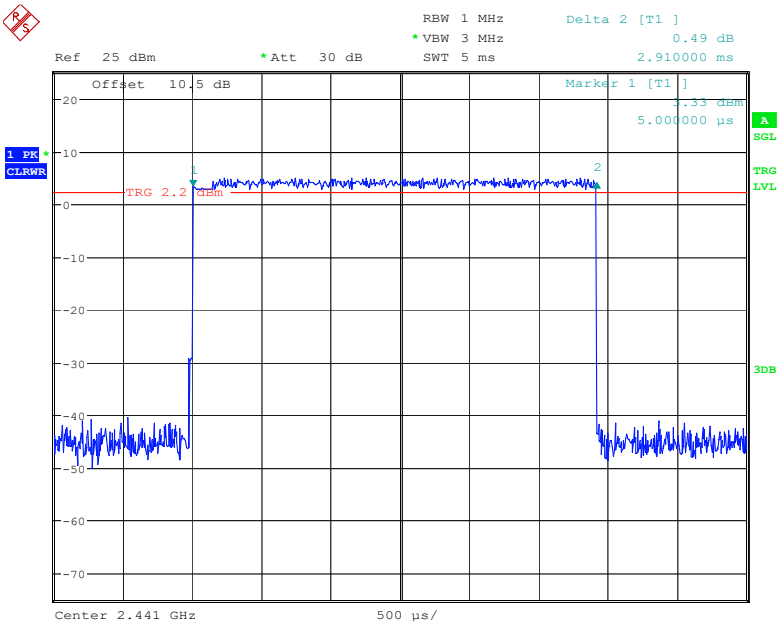


Date: 25.JUN.2022 01:00:08

3DH5



Date: 25.JUN.2022 01:00:38



Date: 25.JUN.2022 01:00:53

FCC §15.247(b) (1) & RSS-247§ 5.1(b) &§ 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. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

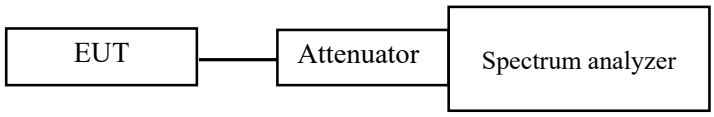
According to RSS-247§ 5.1(b) &§ 5.4(b):

For frequency hopping systems (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 (see Section 5.4(e) for exceptions).

Frequency hopping systems (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.

Test Procedure

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



Test Data

Environmental Conditions

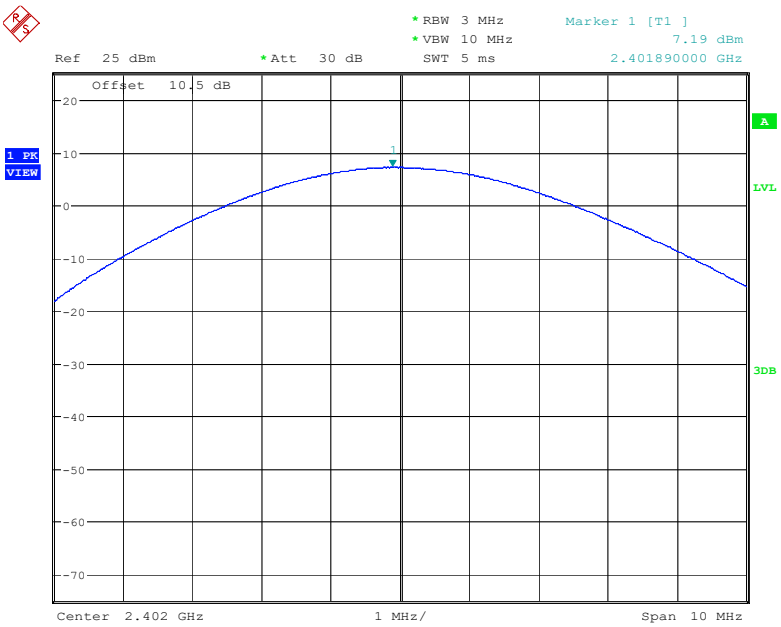
Temperature:	27.1-27.2℃
Relative Humidity:	50-53%
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-24 to 2022-06-25

EUT operation mode: Transmitting

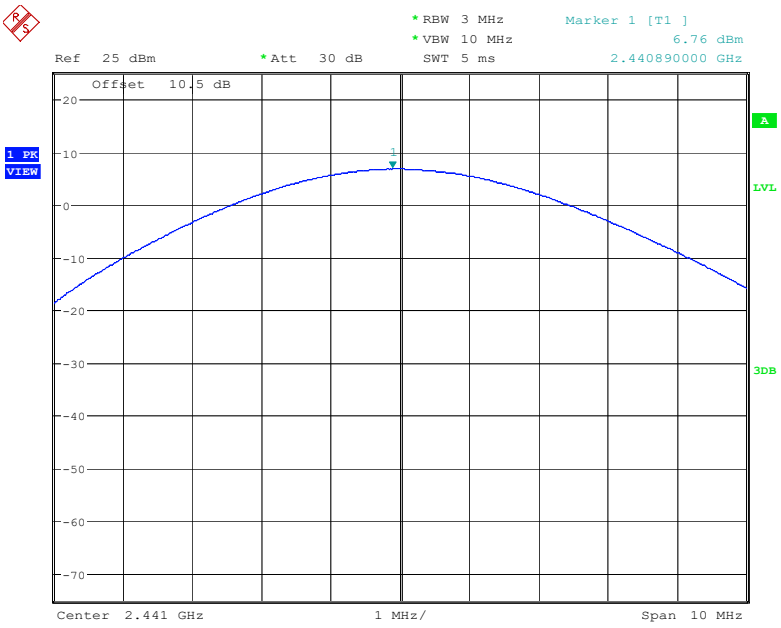
Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
BDR (GFSK)	Low	2402	7.19	21
	Middle	2441	6.76	21
	High	2480	6.34	21
EDR (π/4-DQPSK)	Low	2402	5.14	21
	Middle	2441	5.04	21
	High	2480	4.47	21
EDR (8DPSK)	Low	2402	5.86	21
	Middle	2441	5.54	21
	High	2480	4.94	21
Note: the antenna gain=4.61dBi, the maximum EIRP=11.80dBm<36dBm				

BDR (GFSK): Low Channel



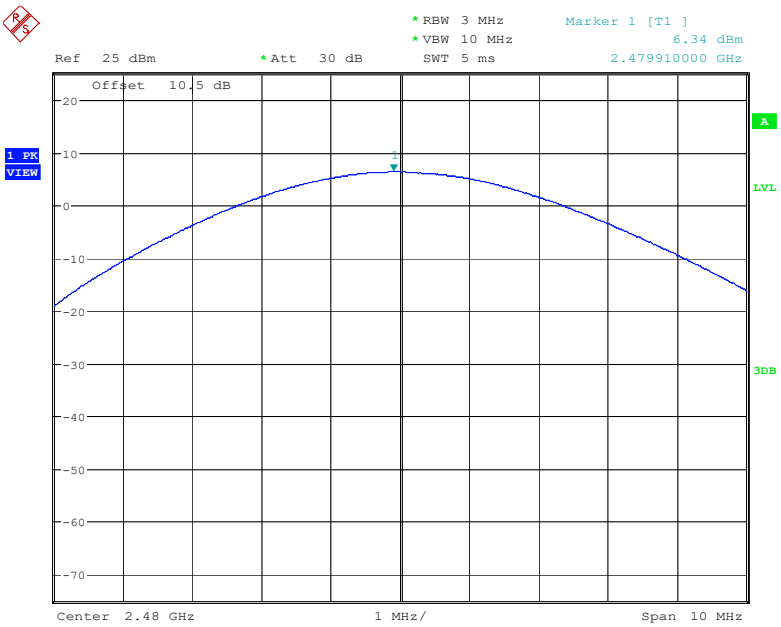
Date: 24.JUN.2022 23:23:44

BDR (GFSK): Middle Channel



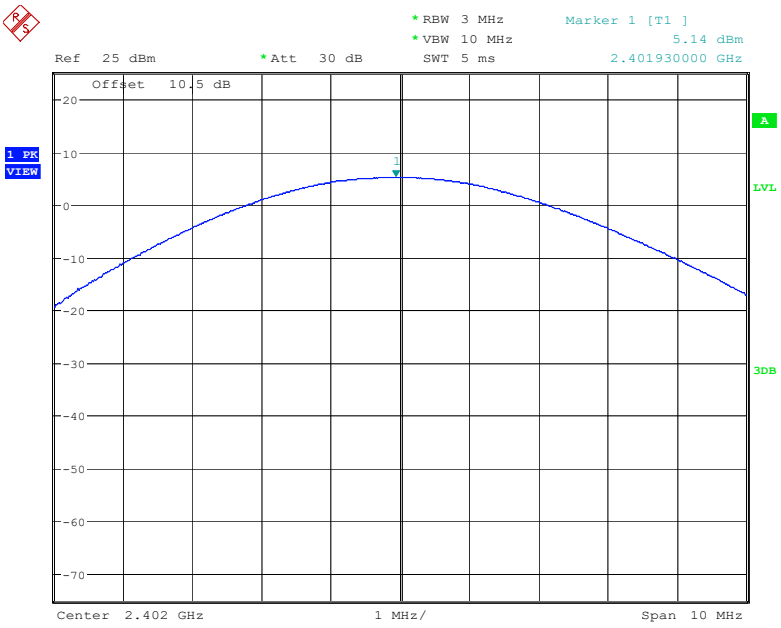
Date: 24.JUN.2022 23:44:38

BDR (GFSK): High Channel



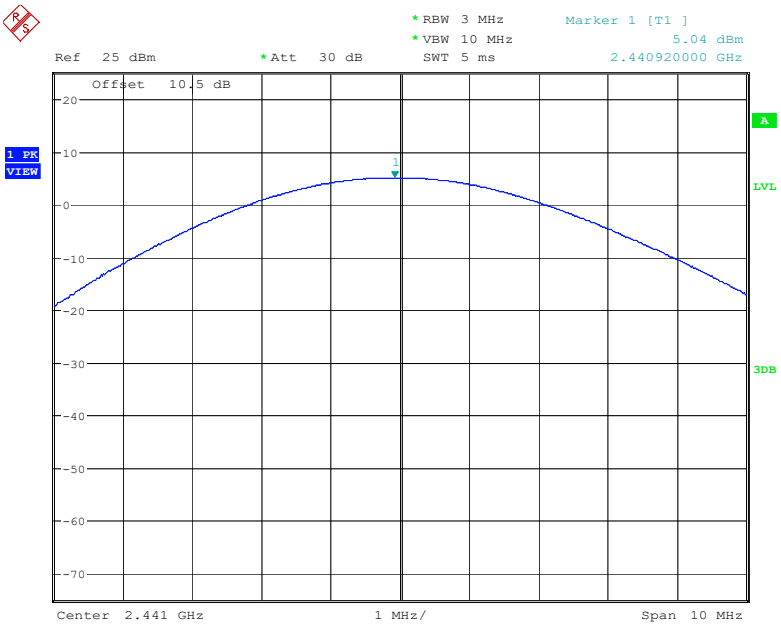
Date: 24.JUN.2022 23:56:00

EDR (π/4-DQPSK): Low Channel



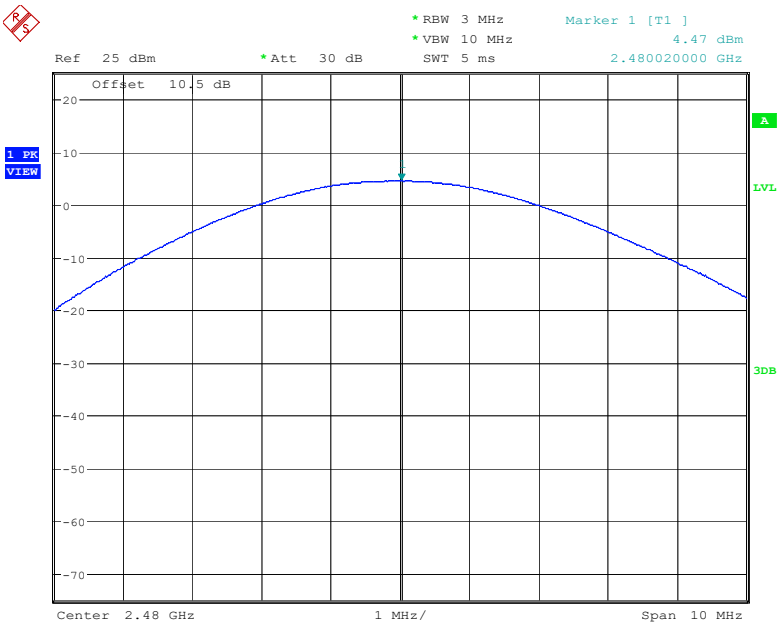
Date: 24.JUN.2022 23:27:33

EDR (π/4-DQPSK): Middle Channel



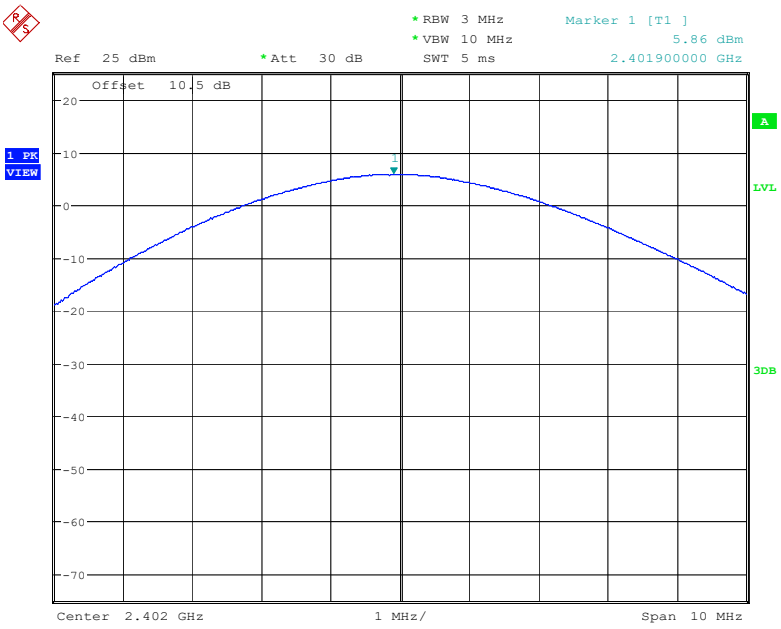
Date: 25.JUN.2022 01:04:20

EDR (π/4-DQPSK): High Channel



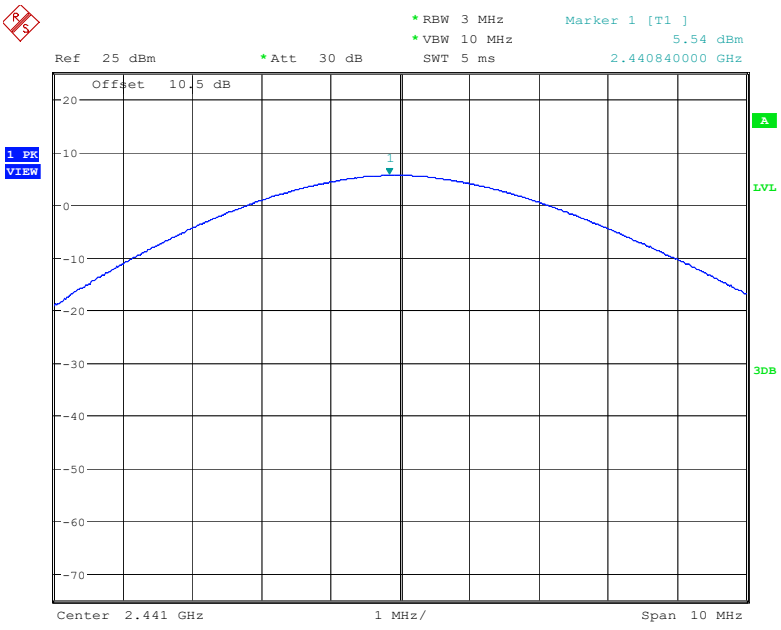
Date: 25.JUN.2022 00:04:17

EDR (8DPSK): Low Channel



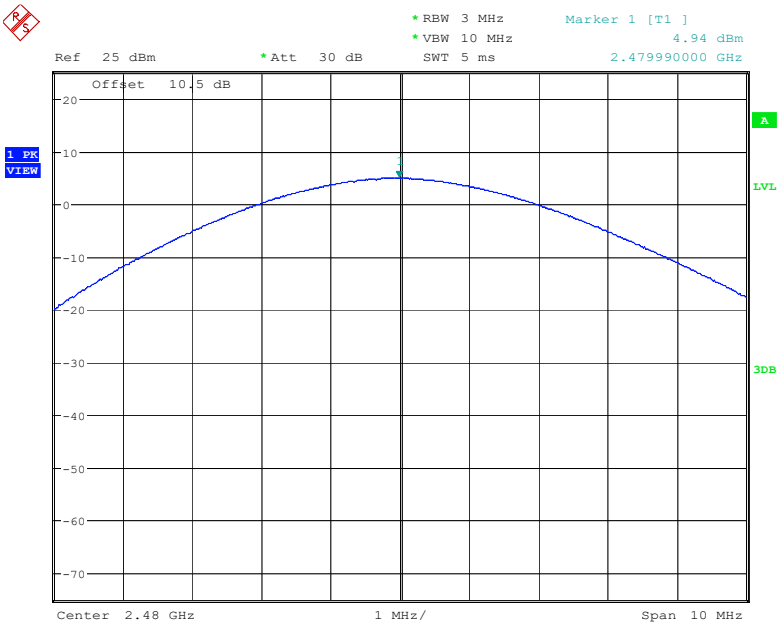
Date: 24.JUN.2022 23:30:49

EDR (8DPSK): Middle Channel



Date: 24.JUN.2022 23:52:15

EDR (8DPSK): High Channel



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

Applicable Standard

According to FCC §15.247(d).

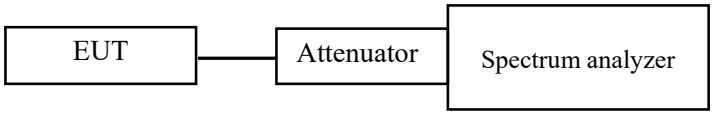
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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 § 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(e), 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 of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

Temperature:	24.2℃
Relative Humidity:	51%
ATM Pressure:	101.0 kPa

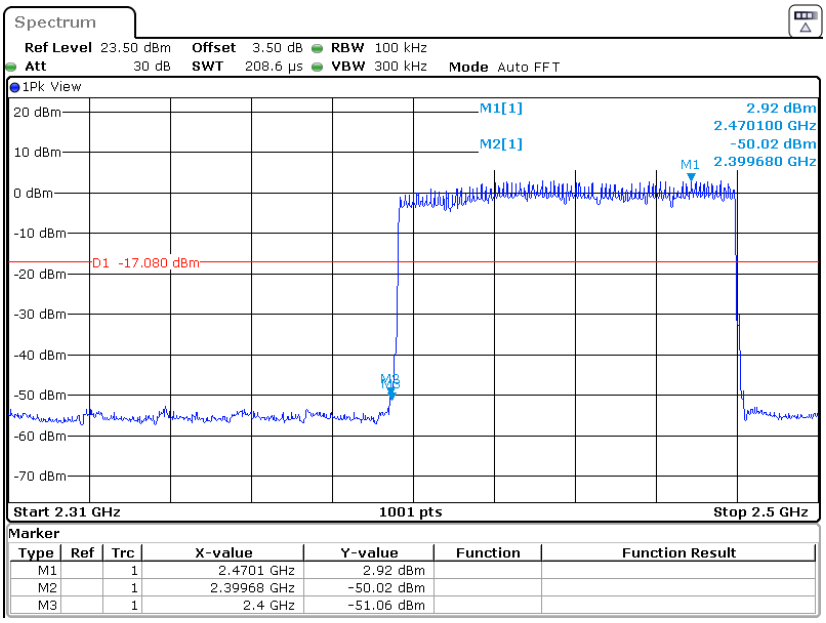
The testing was performed by Roger Ling from2022-12-09.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to following plots

BDR (GFSK): Band Edge-Left Side Hopping

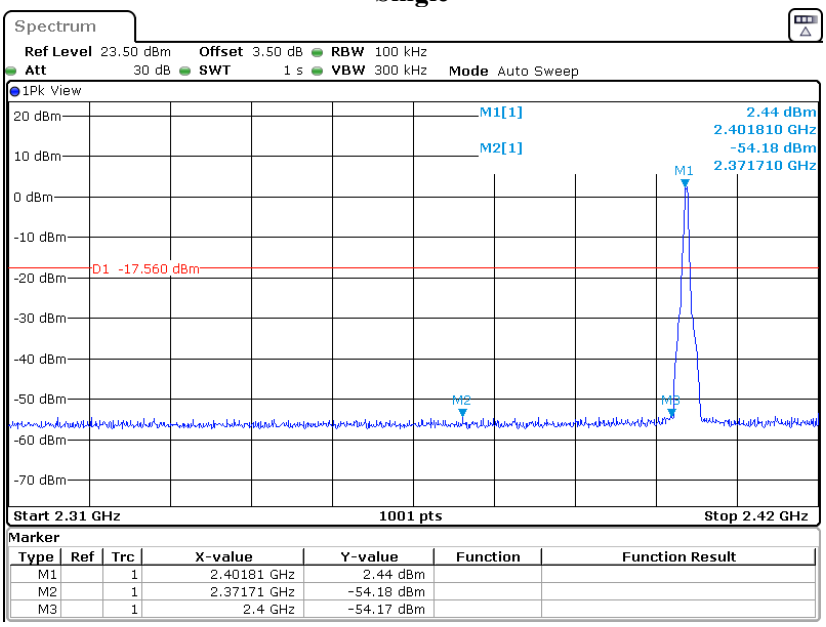


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4701 GHz	2.92 dBm		
M2		1	2.39968 GHz	-50.02 dBm		
M3		1	2.4 GHz	-51.06 dBm		

Date: 9.DEC.2022 20:48:49

Single

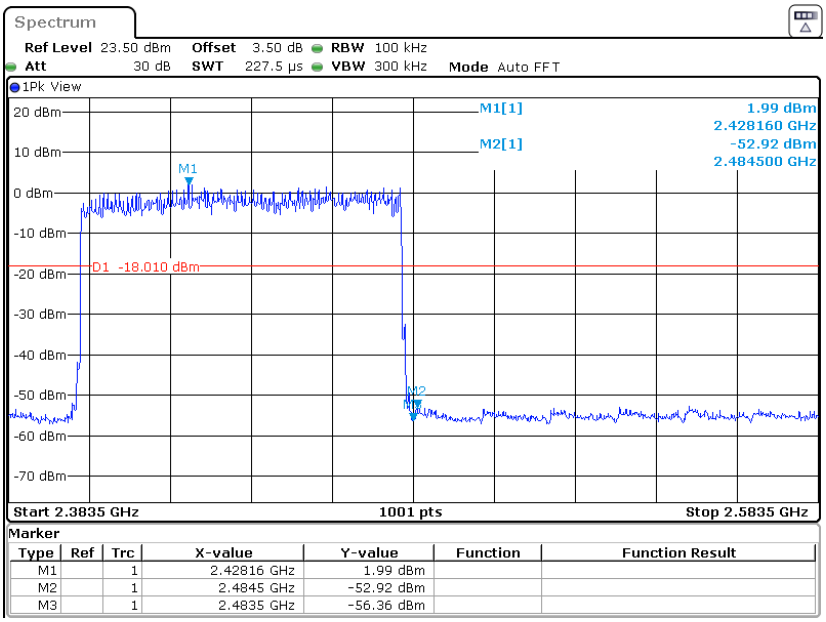


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40181 GHz	2.44 dBm		
M2		1	2.37171 GHz	-54.18 dBm		
M3		1	2.4 GHz	-54.17 dBm		

Date: 9.DEC.2022 20:36:25

BDR (GFSK): Band Edge-Right Side Hopping

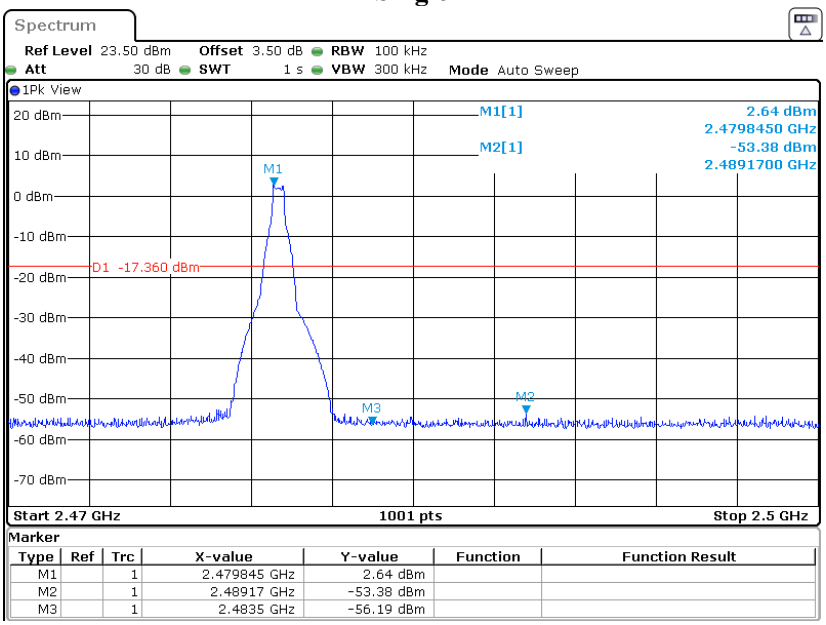


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42816 GHz	1.99 dBm		
M2		1	2.4845 GHz	-52.92 dBm		
M3		1	2.4835 GHz	-56.36 dBm		

Date: 9.DEC.2022 20:53:19

Single

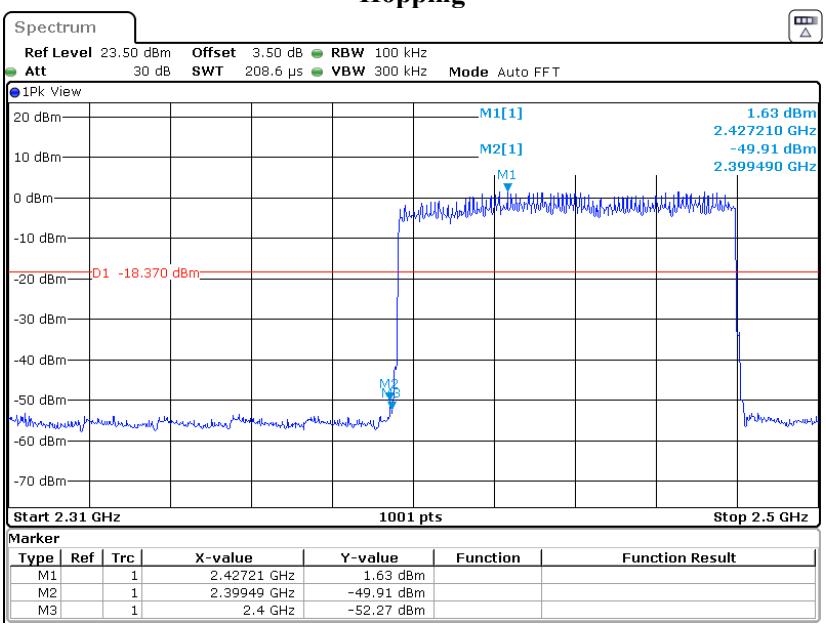


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479845 GHz	2.64 dBm		
M2		1	2.48917 GHz	-53.38 dBm		
M3		1	2.4835 GHz	-56.19 dBm		

Date: 9.DEC.2022 20:41:21

EDR (π/4-DQPSK): Band Edge-Left Side Hopping

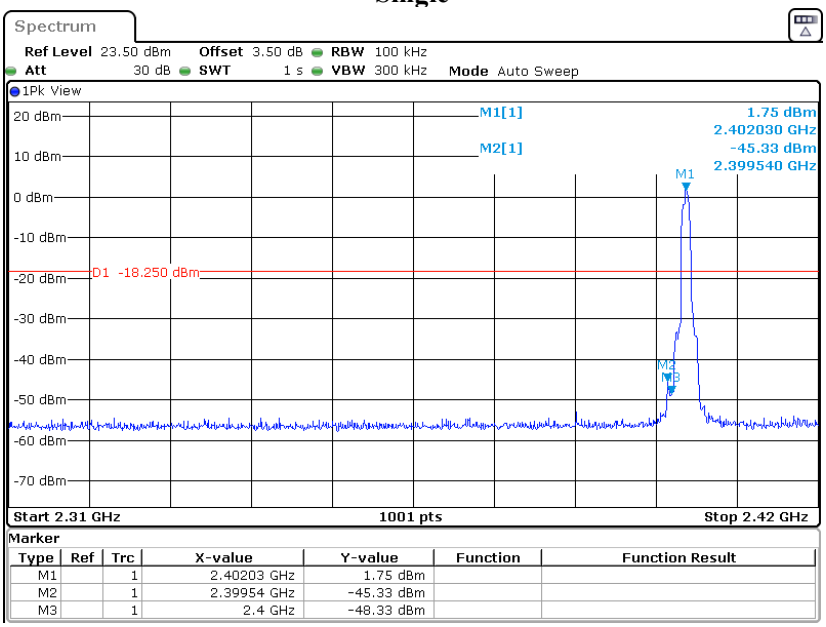


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42721 GHz	1.63 dBm		
M2		1	2.39949 GHz	-49.91 dBm		
M3		1	2.4 GHz	-52.27 dBm		

Date: 9.DEC.2022 20:55:09

Single

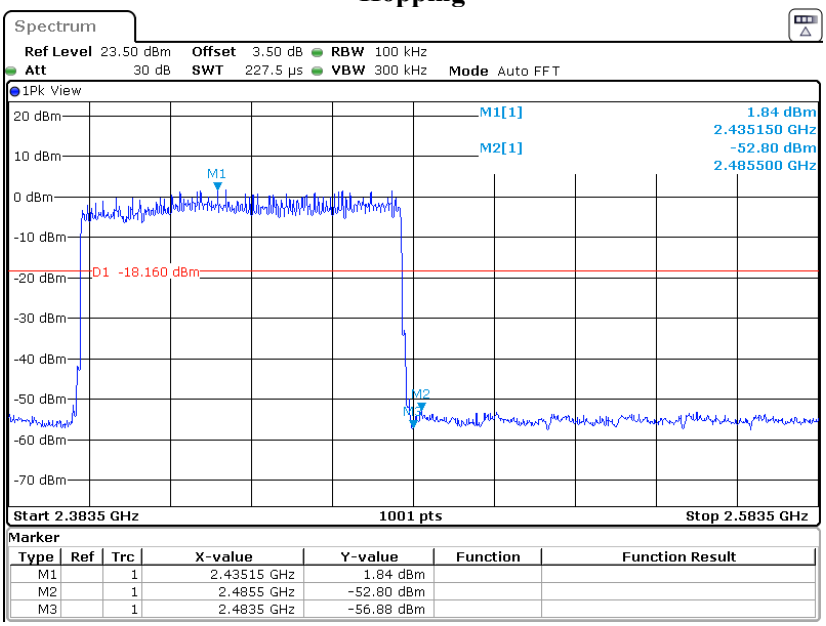


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40203 GHz	1.75 dBm		
M2		1	2.39954 GHz	-45.33 dBm		
M3		1	2.4 GHz	-48.33 dBm		

Date: 9.DEC.2022 20:39:25

EDR (π/4-DQPSK): Band Edge-Right Side Hopping

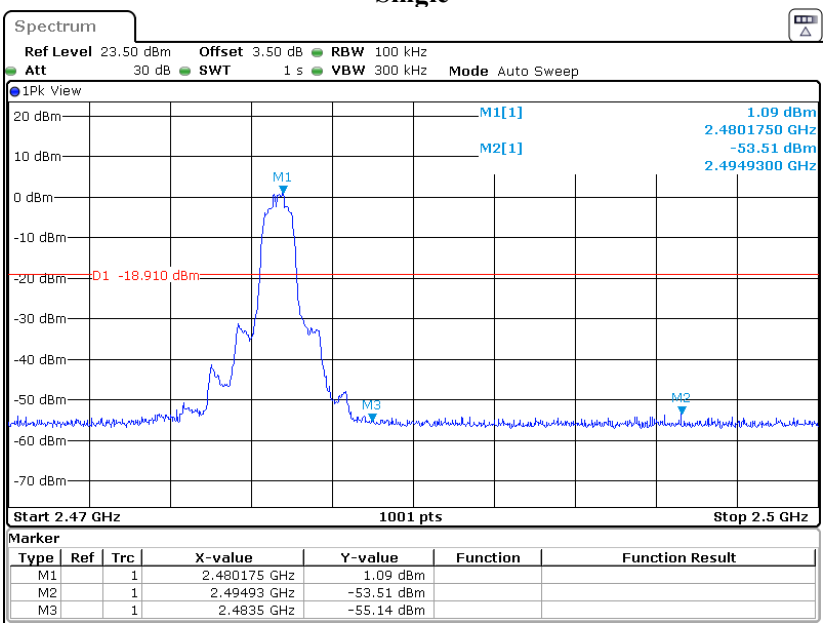


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43515 GHz	1.84 dBm		
M2		1	2.4855 GHz	-52.80 dBm		
M3		1	2.4835 GHz	-56.88 dBm		

Date: 9.DEC.2022 20:56:07

Single



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.480175 GHz	1.09 dBm		
M2		1	2.49493 GHz	-53.51 dBm		
M3		1	2.4835 GHz	-55.14 dBm		

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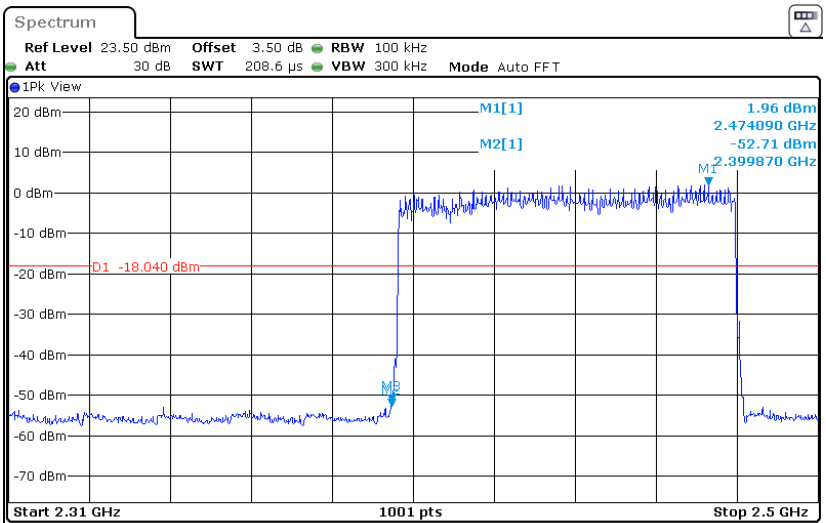
EDR (8DPSK): Band Edge-Left Side Hopping



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47409 GHz	1.96 dBm		
M2		1	2.39987 GHz	-52.71 dBm		
M3		1	2.4 GHz	-51.71 dBm		

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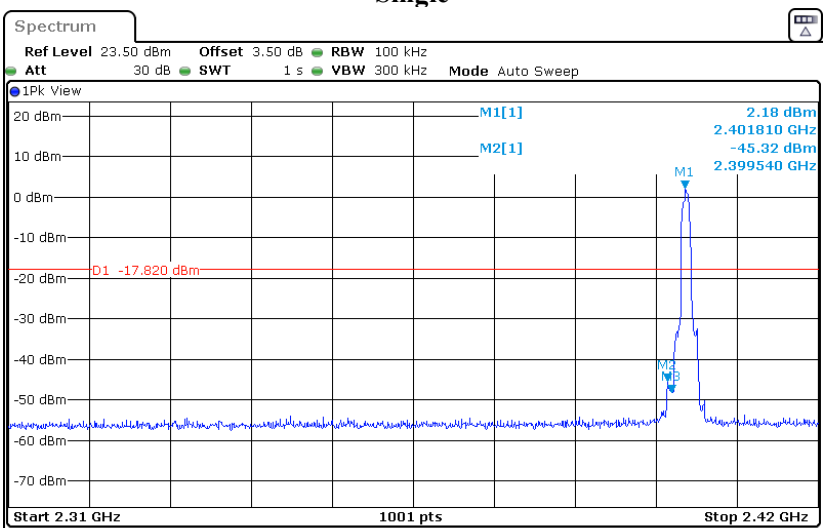
Single

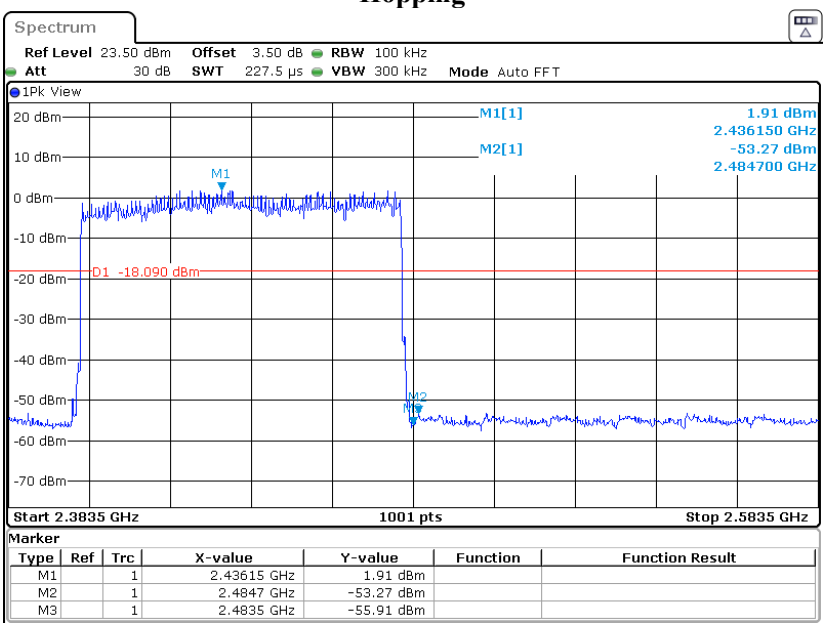


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40181 GHz	2.18 dBm		
M2		1	2.39954 GHz	-45.32 dBm		
M3		1	2.4 GHz	-48.19 dBm		

Date: 9.DEC.2022 20:40:19

EDR (8DPSK): Band Edge-Right Side Hopping



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43615 GHz	1.91 dBm		
M2		1	2.4847 GHz	-53.27 dBm		
M3		1	2.4835 GHz	-55.91 dBm		

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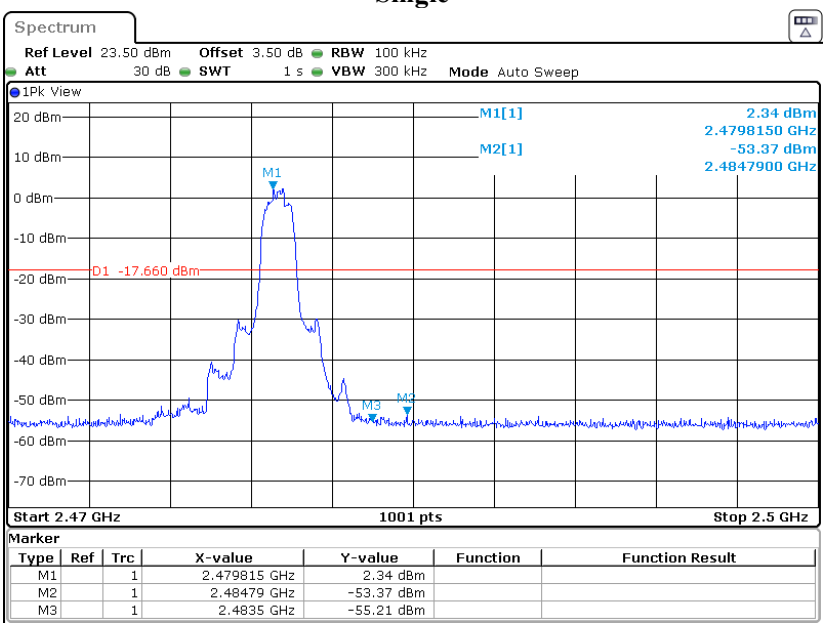
Single



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479815 GHz	2.34 dBm		
M2		1	2.48479 GHz	-53.37 dBm		
M3		1	2.4835 GHz	-55.21 dBm		

Date: 9.DEC.2022 20:43:00

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