FCC PART 15.247
TEST REPORT

For

Xiamen Ilead Tek Co., Ltd.

Room 01, Unit 2101, No.50 Chengyi North Street, Software Park Phase III, Xiamen, Fujian, China

FCC ID: 2ASPY-ALD-Y200

Report Type:	**Product Name:**
Original Report	PeriPage Mini Printer

Report Number:	XMTN1240325-15534E-RF-01
Report Date:	2024-04-17
Reviewed By:	Stein Peng
Approved By:	Miles Chen
Prepared By:	Bay Area Compliance Laboratories Corp. (Xiamen) Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen Tel: +86-592-3200111 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	XMTN1240325-15534E-RF-01	R1V1	2024-04-17	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product Name:	PeriPage Mini Printer
Tested Model:	ALD-Y200
Multiple Model(s):	A40, P40, ALD-P900
Power Supply:	DC 5V from USB port or 7.4V from battery
Maximum Output Power:	GFSK:-1.71 dBm π/4-DQPSK:-1.58 dBm 8DPSK:-1.61 dBm
RF Function:	Classic BT
Operating Band/Frequency:	2402-2480 MHz
Channel Number:	79
Channel Separation:	1 MHz
Modulation Type:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type:	PCB on-board
★Maximum Antenna Gain:	-4.73 dBi
EUT Received Status:	Good
Note: *1. The Maximum Antenna Gain was declared by manufacturer.* *2. The model difference please refer to declaration letter.* *2. All measurement and test data in this report was gathered from production sample serial number: XMTN1240325-15534E-RF-2. (Assigned by the BACL(Xiamen). The EUT supplied by the applicant was received on 2024-03-25)*	

Objective

This test report is prepared for *Xiamen Ilead Tek Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine Compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and 558074 D01 15.247 Meas Guidance v05r02.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Xiamen) to collect test data is located on the Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen.

Bay Area Compliance Laboratories Corp. (Xiamen) Lab is accredited to ISO/IEC 17025 by A2LA (Certificate Number: 7134.01) and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN1384.

Measurement Uncertainty

Item		U_{lab}
AC Power Lines Conducted Emissions	150kHz-30MHz	2.33 dB
Radiated emission	9kHz-30MHz	2.59 dB
	30MHz~1GHz	4.79 dB
	1GHz~6GHz	4.6 dB
	6GHz~18GHz	5.42 dB
	18GHz~26.5GHz	5.37 dB
Occupied Bandwidth		±0.10MHz
Transmitter Conducted Power		±0.624 dB
Conducted Spurious Emission		±2.52 dB
Temperature		±1℃
Humidity		±5%

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.

SYSTEM TEST CONFIGURATION

Test Mode and Voltage

The system was configured for testing in a typical mode (as normally used by a typical user).	
Test mode:	Test mode 1: Transmitting
Test voltage:	Test mode 1: DC 7.4V
Remark:	During all emission tests, the EUT was configured to measure its highest possible emission level and the worst case's test data was presented in this test report.

Description of Test Configuration

Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	40	2442
1	2403	…	…
…	…	…	…
…	…	78	2480
39	2441	/	/

EUT was tested with Channel 0, 39 and 78.

EUT Exercise Software

RF Test Tool: BlueTest3

★Power level: 3

Note: The power level was declared by the applicant.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

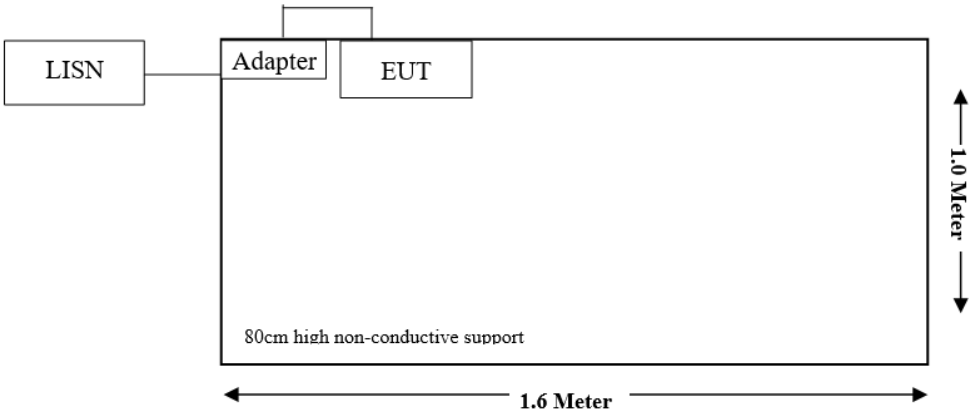
Manufacturer	Description	Model	Serial Number
CARREGADOR PORTATIL	Adapter	S64A38BL	222700047954T4
/	/	/	/

External I/O Cable

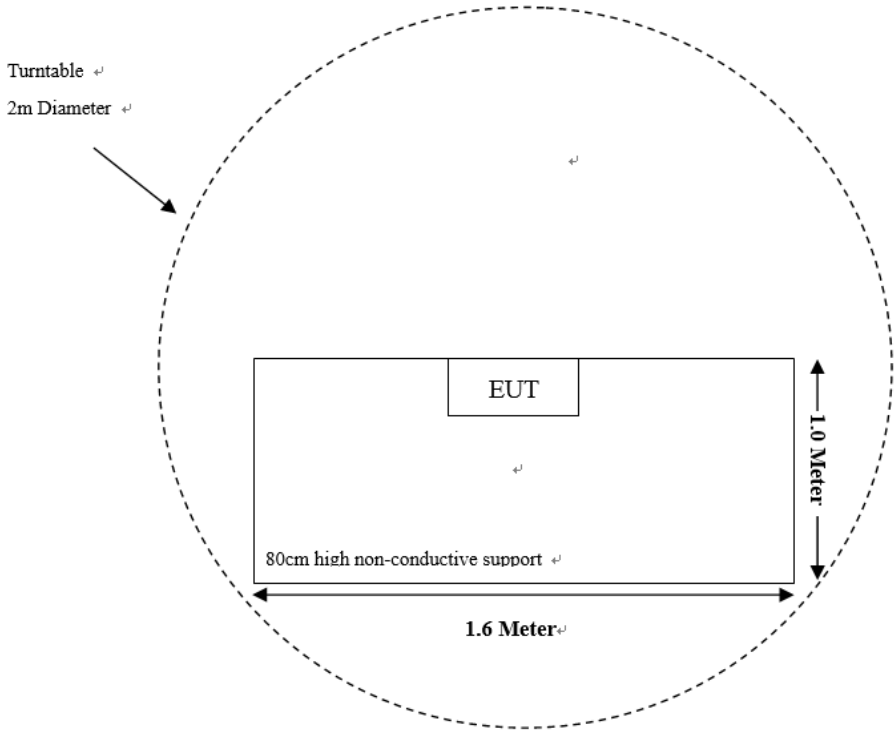
Cable Description	Length (m)	From Port	To
USB cable	0.5	EUT	Adapter

Block Diagram of Test Setup

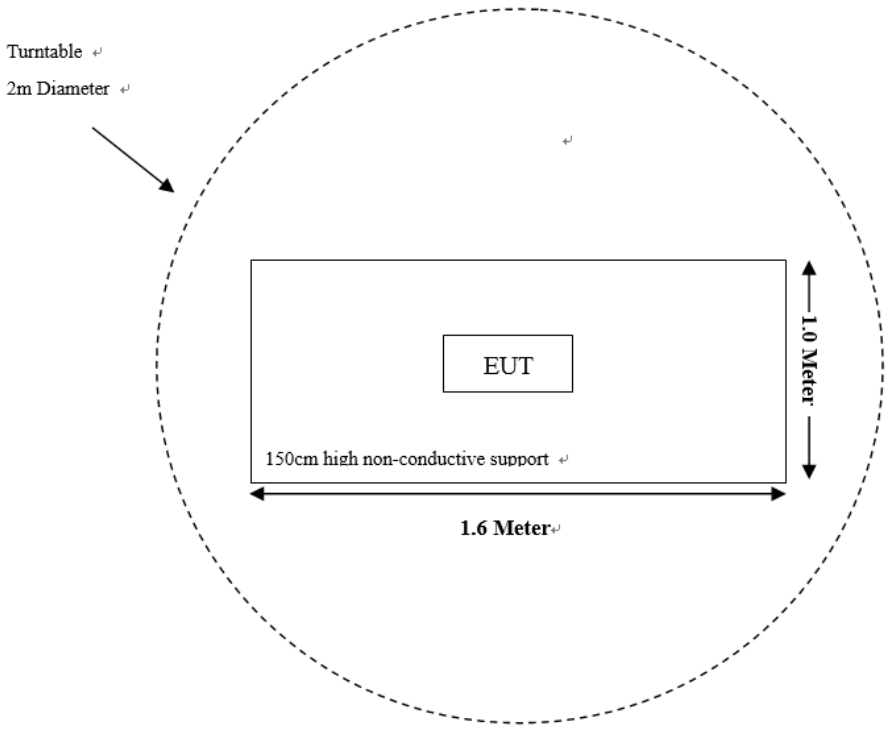
Conducted Emission:



Radiated Emission：
Below 1GHz



Above 1GHz:


Turntable
2m Diameter
EUT
150cm high non-conductive support
1.0 Meter
1.6 Meter

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209 & §15.247(d)	Radiated Emissions & Restricted Bands Emissions & Conducted Spurious Emissions at Antenna Port	Compliant
§15.247(a)(1)	20 dB Emission Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

TEST EQUIPMENT LIST

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
EMI Test Receiver	Rohde & Schwarz	ESR	103105	2023/09/12	2024/09/11
LISN	Rohde & Schwarz	ENV216	100129	2023/09/12	2024/09/11
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54	2023/09/12	2024/09/11
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC001	2023/08/29	2024/08/28
Test Software	Audix	E3	18621a	N/A	N/A
Radiated Emissions Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESR	103103	2023/09/12	2024/09/11
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/001	2023/07/27	2026/07/26
Antenna	Sunol Sciences	JB6	A122022-5	2023/07/27	2026/07/26
Amplifier	Sonoma	310B	120903	2023/09/12	2024/09/11
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC002	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-2M	CC006	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-12M	CC007	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2023/09/20	2024/09/19
Test Software	Audix	E3	18621a	N/A	N/A
Radiated Emission Above 1 GHz					
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102051	2023/09/12	2024/09/11
Double Ridge Guide Horn Antenna	A.H.Systems	SAS-571	1980	2023/07/28	2026/07/27
Horn Antenna	EMCO	3116	9407-2232	2023/07/31	2026/07/30
Preamplifier	A.H.Systems	PAM-0118P	489	2023/09/12	2024/09/11
Preamplifier	A.H.Systems	PAM-1840	200	2023/09/12	2024/09/11
Coaxial Cable	XINHANGWEIBO	XH800A-N-6M	CC004	2023/08/29	2024/08/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-1M	CC005	2023/08/29	2024/08/28
Test Software	Audix	E3	18621a	N/A	N/A
RF Conducted Test					
Spectrum Analyzer	Rohde & Schwarz	FSU	100405	2023/09/12	2024/09/11
Coaxial Cable	N/A	N/A	N/A	Each time	N/A

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

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one PCB on-board antenna for Bluetooth, which was permanently attached and the antenna gain is -4.73 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

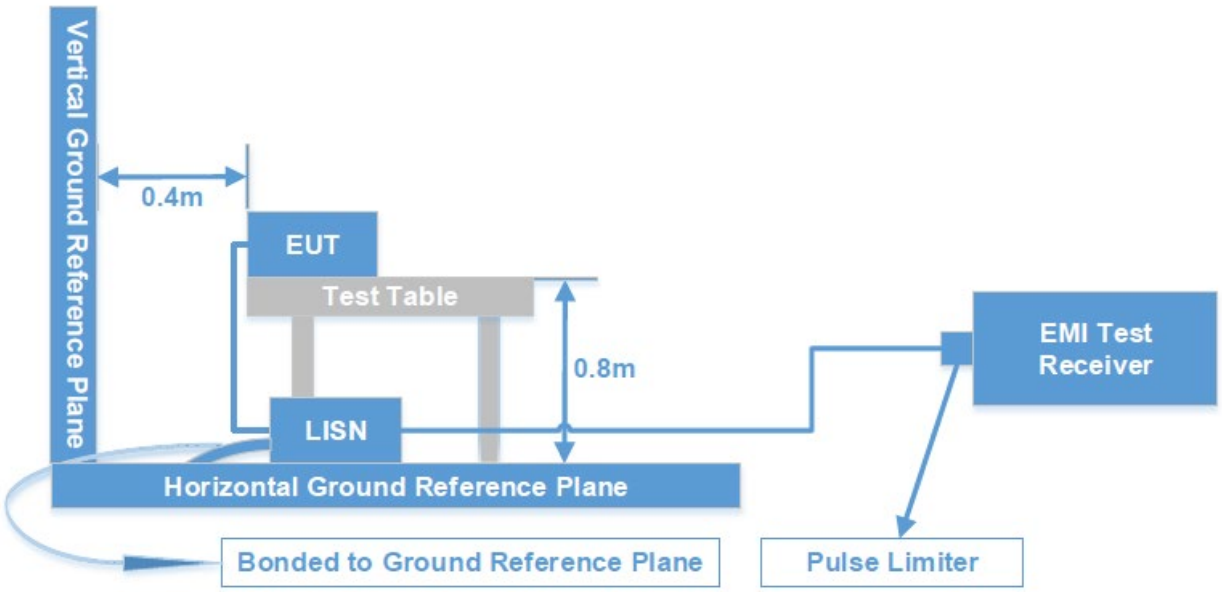
Result: Compliance

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

Test System Setup



The measurement procedure of EUT setup is according with ANSI C63.10-2020. The related limit was specified in FCC Part 15.207.

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	RBW	VBW	Detector
150 kHz – 30 MHz	9 kHz	30 kHz	QP/AV

Test Procedure

ANSI C63.10-2020 clause 6.2

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

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

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

Level &Margin Calculation

The Level is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
Level (dBμV) = Reading (dBμV) + Factor (dB)

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:

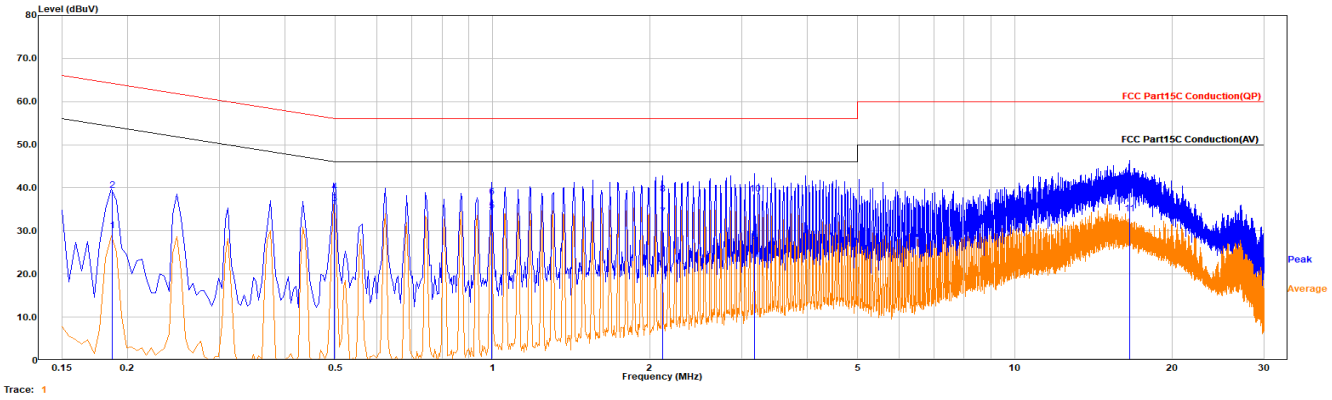
Margin (dB) = Limit (dBμV) – Level (dBμV)

Test Data

EUT operation mode: Transmitting in the high channel of EDR (π/4-DQPSK) mode (worst case)

Date: 2024-04-16 time: 16:48:14

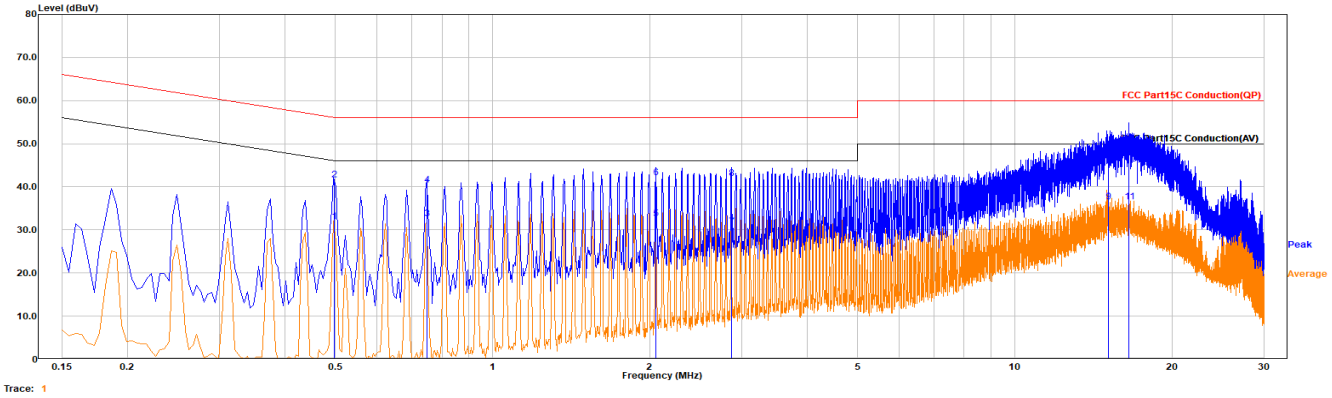
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/66%
Test Mode: Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBµV	Margin dB	Phase	Remark
0.187	10.49	19.50	29.99	54.17	24.18	Line	Average
0.187	19.96	19.50	39.47	64.17	24.70	Line	QP
0.498	16.67	19.61	36.28	46.03	9.75	Line	Average
0.498	19.43	19.61	39.04	56.03	17.00	Line	QP
0.997	14.98	19.65	34.63	46.00	11.37	Line	Average
0.997	18.15	19.65	37.80	56.00	18.20	Line	QP
2.118	13.64	19.64	33.27	46.00	12.73	Line	Average
2.118	18.94	19.64	38.58	56.00	17.42	Line	QP
3.179	7.92	19.63	27.55	46.00	18.45	Line	Average
3.179	18.97	19.63	38.60	56.00	17.40	Line	QP
16.601	14.09	19.95	34.04	50.00	15.96	Line	Average
16.601	20.98	19.95	40.93	60.00	19.07	Line	QP

Date: 2024-04-16 time: 16:44:26

Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1°C/66%
Test Mode: Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBµV	Margin dB	Phase	Remark
0.498	12.29	19.63	31.92	46.03	14.11	Neutral	Average
0.498	22.03	19.63	41.66	56.03	14.38	Neutral	QP
0.748	13.00	19.58	32.58	46.00	13.42	Neutral	Average
0.748	20.76	19.58	40.34	56.00	15.66	Neutral	QP
2.058	12.93	19.69	32.62	46.00	13.38	Neutral	Average
2.058	22.48	19.69	42.17	56.00	13.83	Neutral	QP
2.869	11.16	19.65	30.82	46.00	15.18	Neutral	Average
2.869	22.32	19.65	41.97	56.00	14.03	Neutral	QP
15.122	16.59	19.95	36.53	50.00	13.47	Neutral	Average
15.122	28.05	19.95	48.00	60.00	12.00	Neutral	QP
16.560	16.64	19.93	36.57	50.00	13.43	Neutral	Average
16.560	29.69	19.93	49.61	60.00	10.39	Neutral	QP

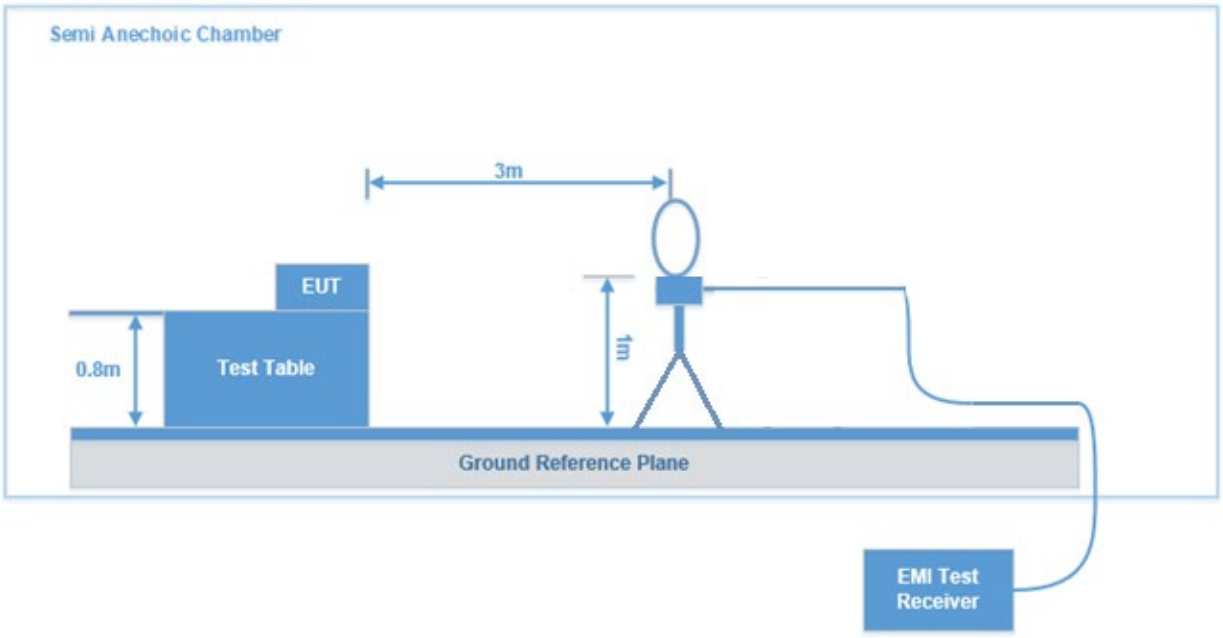
FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

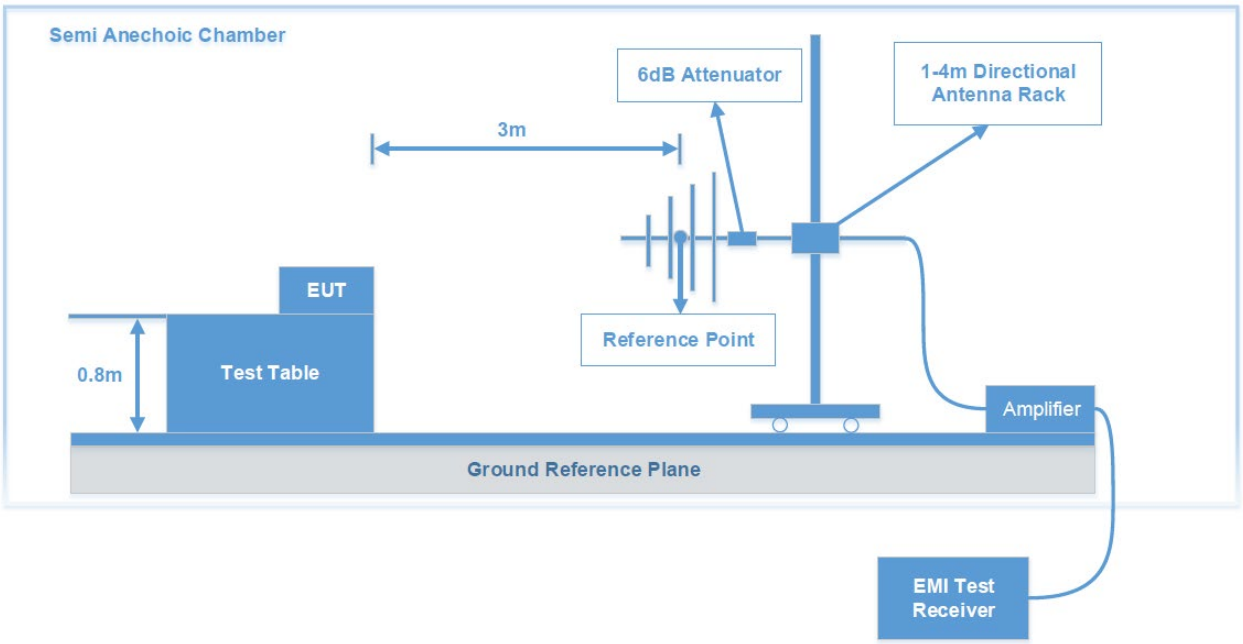
FCC §15.205; §15.209; §15.247(d)

Test System Setup

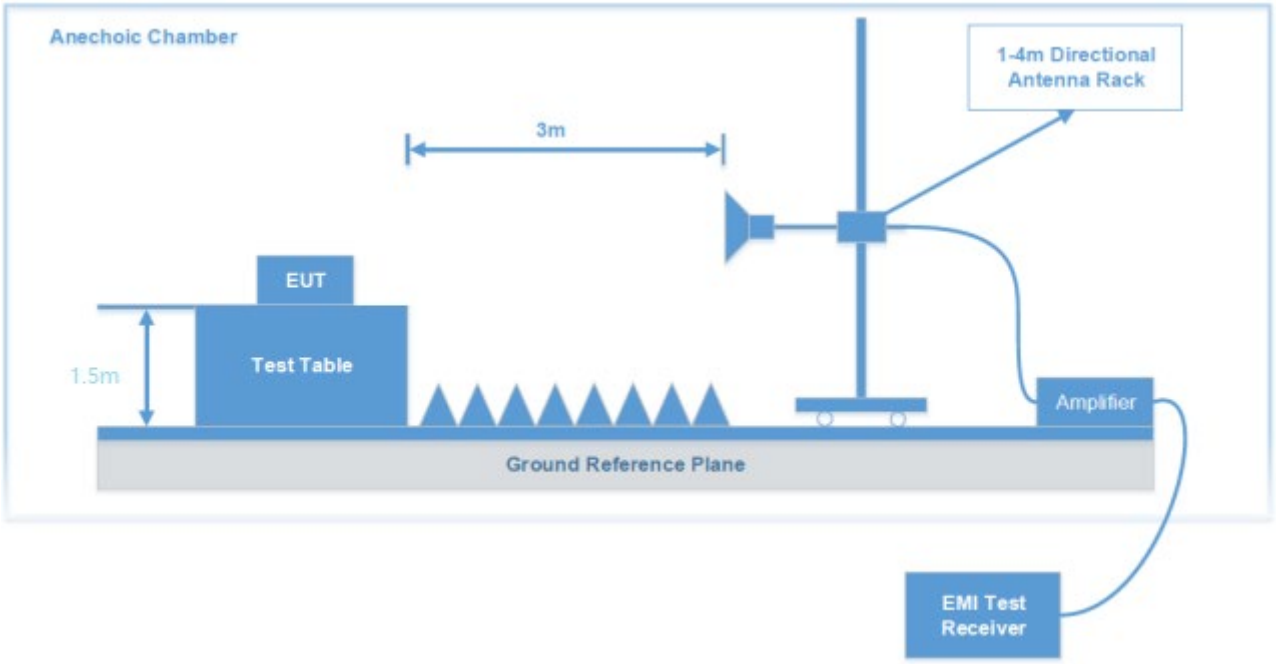
9 kHz-30MHz



Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209 and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200Hz	1 kHz	/	PK
	/	/	200Hz	QP/AV
150 kHz – 30 MHz	10 kHz	30 kHz	/	PK
	/	/	9kHz	QP/AV
30 MHz – 1000 MHz	100 kHz	300 kHz	/	PK
	/	/	120kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	/	10Hz	AV

Test Procedure

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

For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. The report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground parallel) unless the margin is greater than 20 dB, then the following statement shall be made: "all emissions were greater than 20 dB below the limit."

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 10 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

Level &Margin Calculation

The Level 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:

Factor (dB/m) =Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)
Level (dBμV/m) = Reading (dBμV) + Factor (dB/m)

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 (dB) = Limit (dBμV/m) –Level (dBμV/m)

Test Data

Please refer to the below table and plots.
After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

Frequency Range:	Below 1 GHz	Above 1 GHz	Conducted Spurious Emissions at Antenna Port
Temperature:	20.0℃	21.1℃~23.9℃	23.9℃
Relative Humidity:	62 %	60%~68 %	60%
ATM Pressure:	101kPa	100.8 kPa~101.0kPa	100.8 kPa
Test Date:	2024-04-02	2024-03-27~2024-04-07	2024-03-27
Test Engineer:	Ash Lin	Ash Lin	Ash Lin

1) 9 kHz ~30MHz

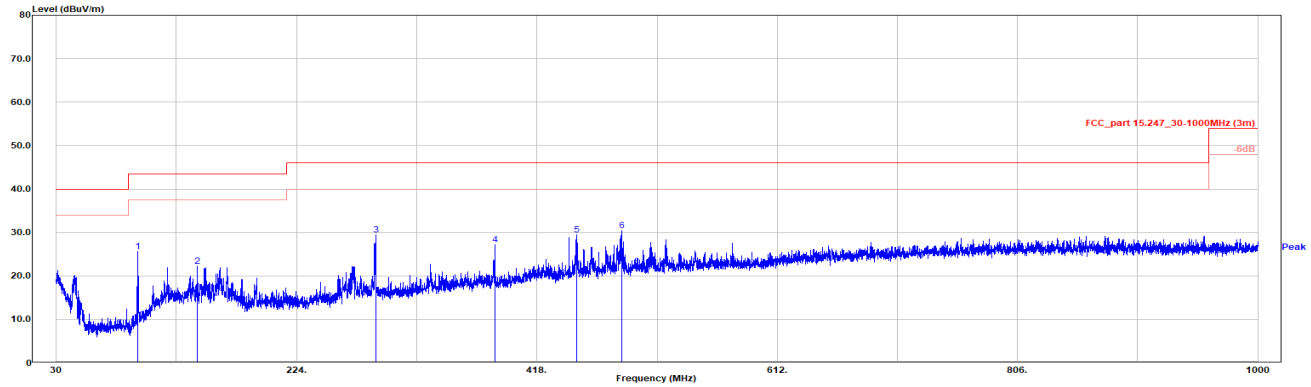
EUT operation mode: Transmitting in EDR high channel (π/4-DQPSK) (worst case)

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

2) 30MHz-1GHz

Date: 2024-04-02 time: 10:44:36

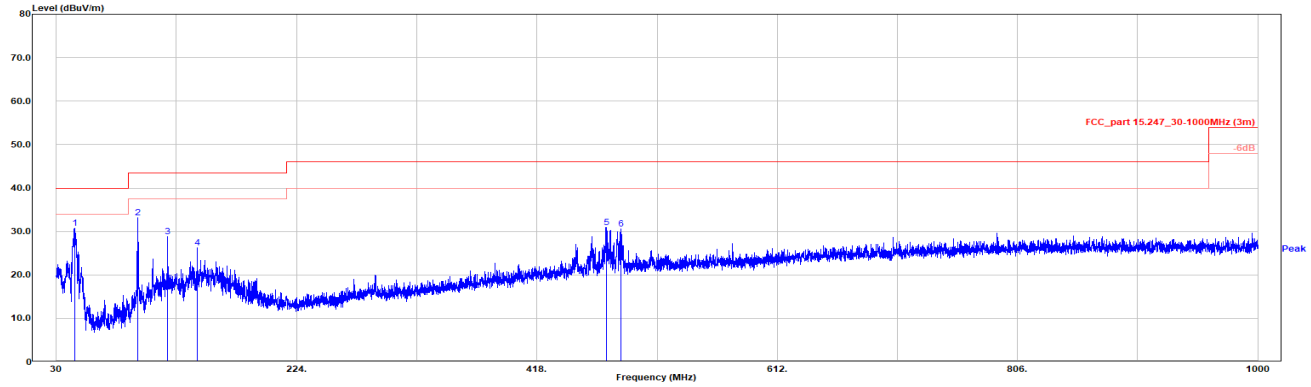
Project No.: XMTN1240325-15534E-RF Temp/Humi : 20°C/62%
Test Mode : BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin



Freq	Reading	Factor	Level	Limit	Margin	Pol	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
95.960	41.67	-16.13	25.54	43.50	17.96	Horizontal	QP
143.975	33.27	-10.98	22.29	43.50	21.21	Horizontal	QP
288.020	38.73	-9.25	29.48	46.00	16.52	Horizontal	QP
384.050	34.13	-6.93	27.20	46.00	18.80	Horizontal	QP
450.301	34.37	-4.92	29.46	46.00	16.54	Horizontal	QP
486.191	34.08	-3.61	30.46	46.00	15.54	Horizontal	QP

Date: 2024-04-02 time: 10:42:52

Project No.: XMTN1240325-15534E-RF Temp/Humi : 20°C/62%
Test Mode : BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin

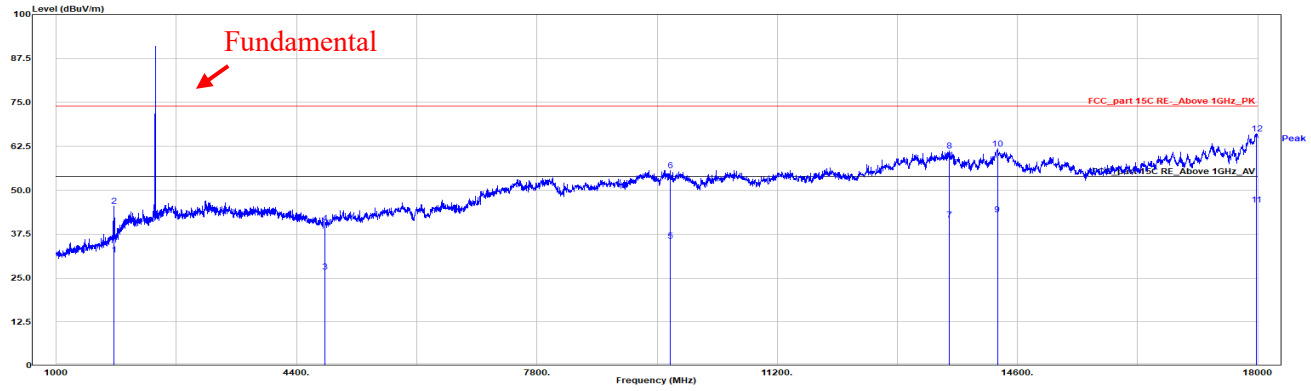


Freq	Reading	Factor	Level	Limit	Margin	Pol	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
45.035	45.97	-15.20	30.76	40.00	9.24	Vertical	Peak
95.960	49.27	-16.13	33.15	43.50	10.35	Vertical	Peak
119.919	39.19	-10.39	28.80	43.50	14.70	Vertical	Peak
143.975	37.14	-10.98	26.17	43.50	17.33	Vertical	Peak
474.357	35.01	-4.08	30.93	46.00	15.07	Vertical	Peak
485.512	34.26	-3.61	30.66	46.00	15.34	Vertical	Peak

3) 1 GHz-18 GHz

Date: 2024-04-07 time: 17:07:49

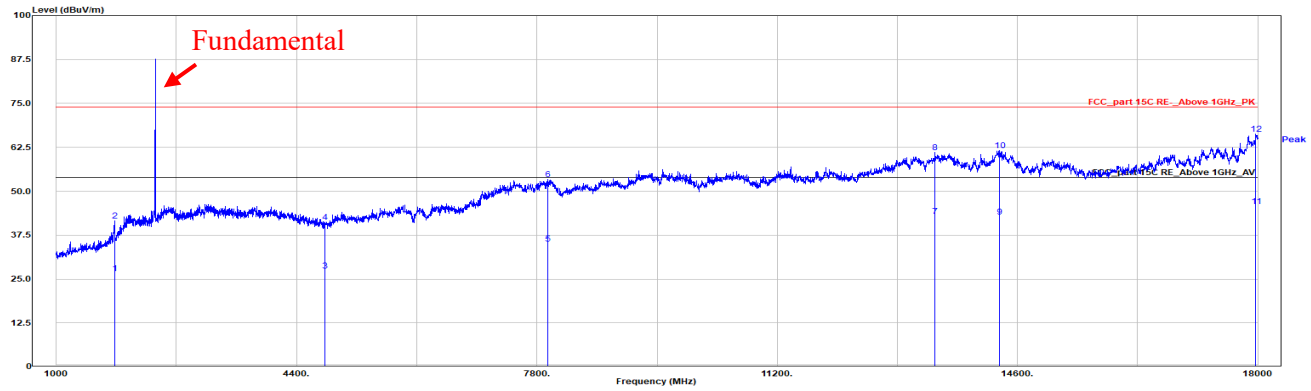
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/68%
Test Mode : BT π/4-DQPSK CH0 Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1816.000	38.79	-7.20	31.59	54.00	22.41	horizontal	Average
1816.000	52.79	-7.20	45.59	74.00	28.41	horizontal	Peak
4804.000	29.41	-2.72	26.69	54.00	27.31	horizontal	Average
4804.000	43.41	-2.72	40.69	74.00	33.31	horizontal	Peak
9687.000	26.78	8.83	35.61	54.00	18.39	horizontal	Average
9687.000	46.87	8.83	55.70	74.00	18.30	horizontal	Peak
13631.000	27.27	14.37	41.64	54.00	12.36	horizontal	Average
13631.000	46.92	14.38	61.30	74.00	12.70	horizontal	Peak
14314.400	28.39	14.77	43.16	54.00	10.84	horizontal	Average
14314.400	47.03	14.77	61.80	74.00	12.20	horizontal	Peak
17979.600	27.26	18.66	45.92	54.00	8.08	horizontal	Average
17979.600	47.42	18.66	66.08	74.00	7.92	horizontal	Peak

Date: 2024-04-07 time: 17:13:05

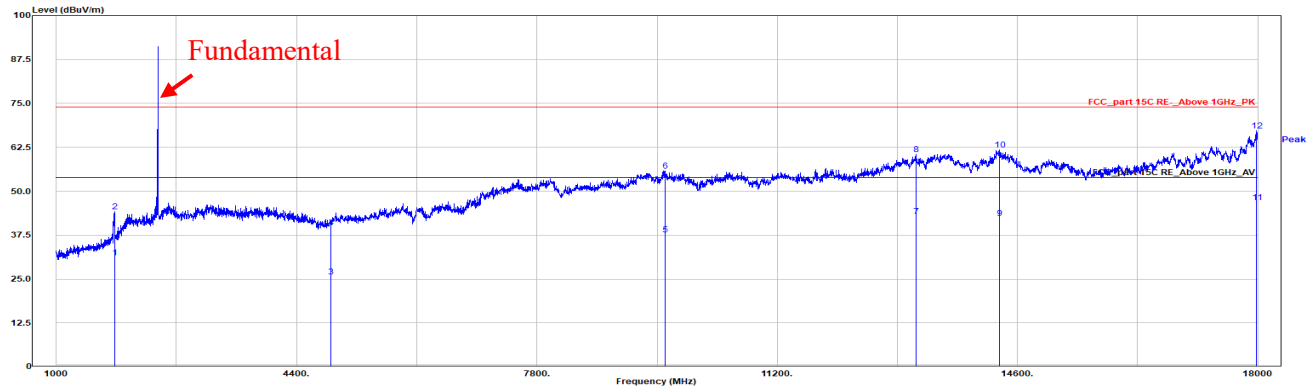
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1°C/68%
Test Mode : BT π/4-DQPSK CH0 Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1822.800	33.83	-7.17	26.66	54.00	27.34	vertical	Average
1822.800	48.83	-7.17	41.66	74.00	32.34	vertical	Peak
4804.000	29.99	-2.72	27.27	54.00	26.73	vertical	Average
4804.000	43.99	-2.72	41.27	74.00	32.73	vertical	Peak
7949.600	28.45	6.66	35.11	54.00	18.89	vertical	Average
7949.600	46.65	6.66	53.31	74.00	20.69	vertical	Peak
13430.400	27.92	15.01	42.93	54.00	11.07	vertical	Average
13430.400	46.09	15.01	61.10	74.00	12.90	vertical	Peak
14341.600	28.08	14.61	42.69	54.00	11.31	vertical	Average
14341.600	47.01	14.61	61.62	74.00	12.38	vertical	Peak
17969.400	27.11	18.60	45.71	54.00	8.29	vertical	Average
17969.400	47.70	18.60	66.30	74.00	7.70	vertical	Peak

Date: 2024-04-07 time: 17:22:03

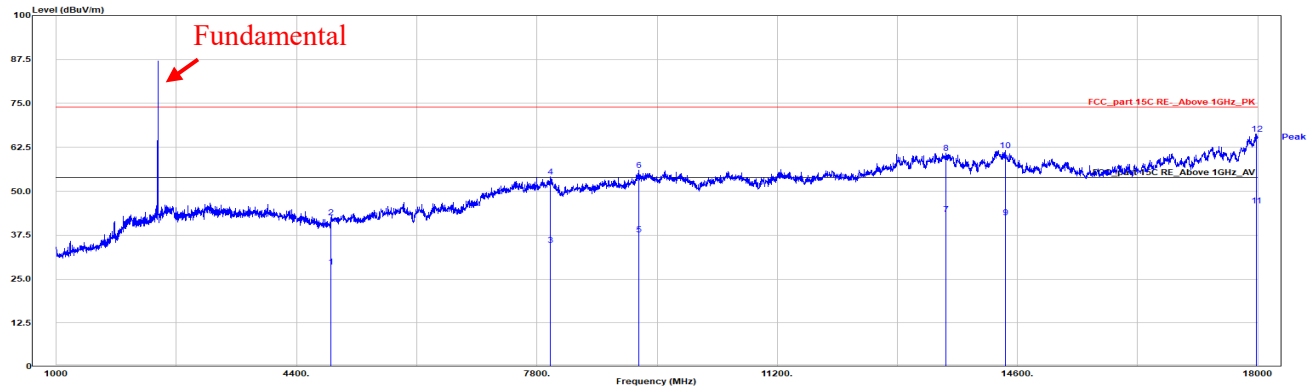
Project No.: XMTN1240325-15534E-RF Temp/Humi : 21.1℃/68%
Test Mode: BT π/4-DQPSK CH39 Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1822.800	38.33	-7.17	31.16	54.00	22.84	horizontal	Average
1822.800	51.33	-7.17	44.16	74.00	29.84	horizontal	Peak
4882.000	27.42	-1.75	25.67	54.00	28.33	horizontal	Average
4882.000	41.42	-1.75	39.67	74.00	34.33	horizontal	Peak
9619.000	28.38	9.23	37.61	54.00	16.39	horizontal	Average
9619.000	46.54	9.23	55.77	74.00	18.23	horizontal	Peak
13161.800	28.29	14.52	42.81	54.00	11.19	horizontal	Average
13161.800	46.06	14.52	60.58	74.00	13.42	horizontal	Peak
14348.400	27.77	14.57	42.34	54.00	11.66	horizontal	Average
14348.400	47.18	14.57	61.75	74.00	12.25	horizontal	Peak
17983.000	28.10	18.67	46.77	54.00	7.23	horizontal	Average
17983.000	48.51	18.67	67.18	74.00	6.82	horizontal	Peak

Date: 2024-04-07 time: 17:16:05

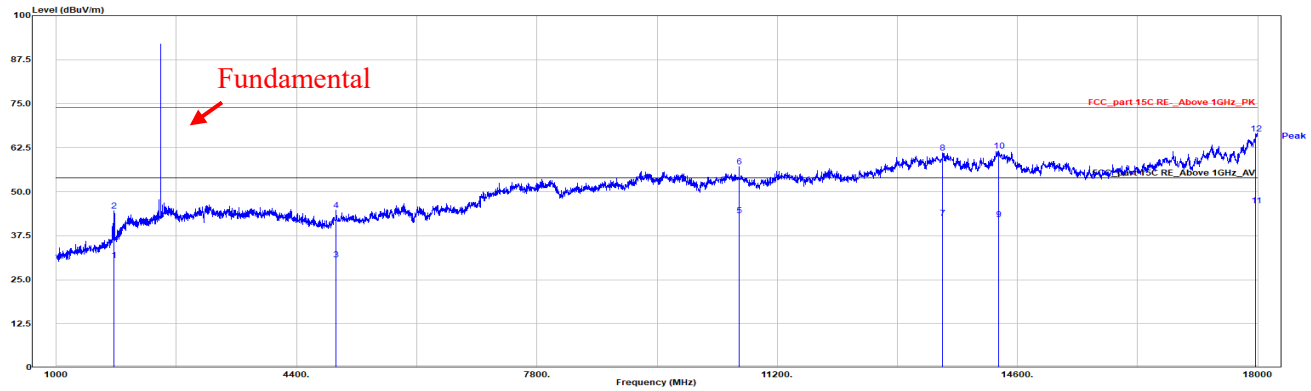
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/68%
Test Mode: BT π/4-DQPSK CH39 Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
4882.800	30.27	-1.73	28.54	54.00	25.46	vertical	Average
4882.800	44.27	-1.73	42.54	74.00	31.46	vertical	Peak
7990.400	28.21	6.44	34.65	54.00	19.35	vertical	Average
7990.400	47.61	6.44	54.05	74.00	19.95	vertical	Peak
9238.200	29.88	7.75	37.63	54.00	16.37	vertical	Average
9238.200	48.29	7.75	56.04	74.00	17.96	vertical	Peak
13583.400	28.67	14.72	43.39	54.00	10.61	vertical	Average
13583.400	46.17	14.72	60.89	74.00	13.11	vertical	Peak
14423.200	28.34	14.26	42.60	54.00	11.40	vertical	Average
14423.200	47.44	14.26	61.70	74.00	12.30	vertical	Peak
17979.600	27.26	18.66	45.92	54.00	8.08	vertical	Average
17979.600	47.72	18.66	66.38	74.00	7.62	vertical	Peak

Date: 2024-04-07 time: 17:23:10

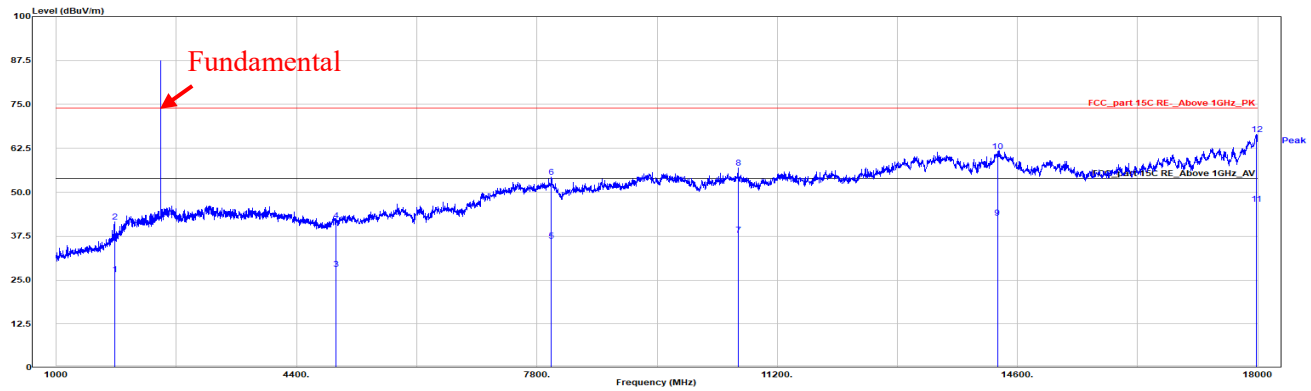
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1°C/68%
Test Mode: BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin



Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1816.000	37.72	-7.20	30.52	54.00	23.48	horizontal	Average
1816.000	51.72	-7.20	44.52	74.00	29.48	horizontal	Peak
4957.600	31.76	-0.98	30.78	54.00	23.22	horizontal	Average
4957.600	45.76	-0.98	44.78	74.00	29.22	horizontal	Peak
10659.400	33.51	9.68	43.19	54.00	10.81	horizontal	Average
10659.400	47.51	9.68	57.19	74.00	16.81	horizontal	Peak
13539.200	27.64	14.92	42.56	54.00	11.44	horizontal	Average
13539.200	46.07	14.92	60.99	74.00	13.01	horizontal	Peak
14331.400	27.50	14.66	42.16	54.00	11.84	horizontal	Average
14331.400	46.96	14.66	61.62	74.00	12.38	horizontal	Peak
17969.400	27.42	18.60	46.02	54.00	7.98	horizontal	Average
17969.400	47.83	18.60	66.43	74.00	7.57	horizontal	Peak

Date: 2024-04-07 time: 17:25:28

Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/68%
Test Mode: BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin

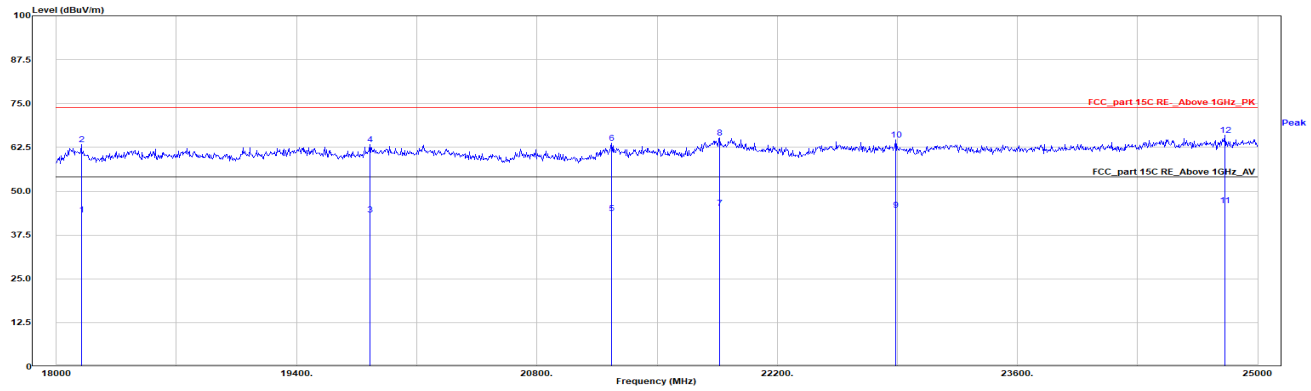


Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
1822.800	33.80	-7.17	26.63	54.00	27.37	vertical	Average
1822.800	48.80	-7.17	41.63	74.00	32.37	vertical	Peak
4960.000	28.99	-0.98	28.01	54.00	25.99	vertical	Average
4960.000	42.99	-0.98	42.01	74.00	31.99	vertical	Peak
8000.600	29.76	6.37	36.13	54.00	17.87	vertical	Average
8000.600	47.88	6.37	54.25	74.00	19.75	vertical	Peak
10645.800	28.13	9.66	37.79	54.00	16.21	vertical	Average
10645.800	47.30	9.66	56.96	74.00	17.04	vertical	Peak
14314.400	27.86	14.77	42.63	54.00	11.37	vertical	Average
14314.400	46.78	14.77	61.55	74.00	12.45	vertical	Peak
17979.600	27.98	18.66	46.64	54.00	7.36	vertical	Average
17979.600	47.89	18.66	66.55	74.00	7.45	vertical	Peak

4) 18 GHz - 25 GHz

Date: 2024-04-07 time: 17:42:03

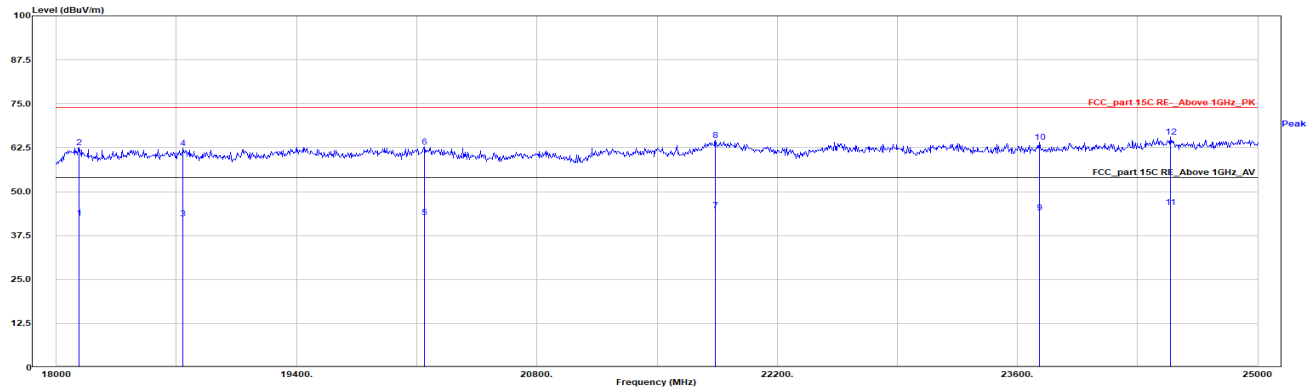
Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/68%
Test Mode : BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin



Freq	Reading	Factor	Level	Limit	Margin	Pol	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
18145.200	19.12	24.45	43.57	54.00	10.43	horizontal	Average
18145.200	38.90	24.45	63.35	74.00	10.65	horizontal	Peak
19826.000	18.16	24.35	42.51	54.00	11.49	horizontal	Average
19826.000	38.91	24.35	63.26	74.00	10.74	horizontal	Peak
21234.000	18.78	25.07	43.85	54.00	10.15	horizontal	Average
21234.000	38.58	25.07	63.65	74.00	10.35	horizontal	Peak
21863.200	19.64	25.92	45.56	54.00	8.44	horizontal	Average
21863.200	39.32	25.92	65.24	74.00	8.76	horizontal	Peak
22888.400	18.97	26.03	45.00	54.00	9.00	horizontal	Average
22888.400	38.57	26.03	64.60	74.00	9.40	horizontal	Peak
24806.800	18.21	28.02	46.23	54.00	7.77	horizontal	Average
24806.800	37.89	28.02	65.91	74.00	8.09	horizontal	Peak

Date: 2024-04-07 time: 17:49:03

Project No.: XMTN1240325-15534E-RF Temp/Humi: 21.1℃/68%
Test Mode : BT π/4-DQPSK CH78 Transmitting Tested by : Ash Lin

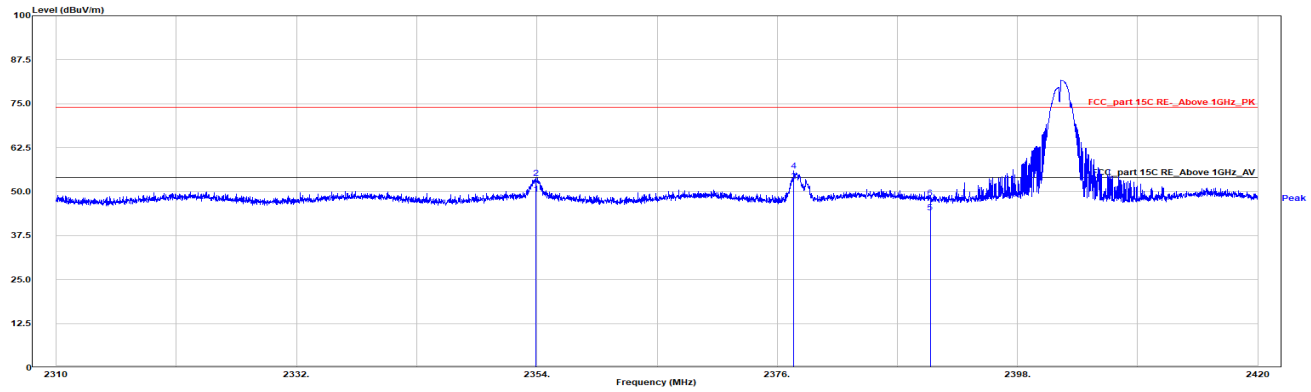


Freq	Reading	Factor	Level	Limit	Margin	Pol	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
18132.000	18.36	24.46	42.82	54.00	11.18	vertical	Average
18132.000	38.10	24.46	62.56	74.00	11.44	vertical	Peak
18739.200	18.67	23.99	42.66	54.00	11.34	vertical	Average
18739.200	38.42	23.99	62.41	74.00	11.59	vertical	Peak
20142.800	18.55	24.39	42.94	54.00	11.06	vertical	Average
20142.800	38.30	24.39	62.69	74.00	11.31	vertical	Peak
21841.200	19.32	25.75	45.07	54.00	8.93	vertical	Average
21841.200	38.93	25.75	64.68	74.00	9.32	vertical	Peak
23728.800	17.97	26.77	44.74	54.00	9.26	vertical	Average
23728.800	37.31	26.77	64.08	74.00	9.92	vertical	Peak
24490.000	18.06	28.18	46.24	54.00	7.76	vertical	Average
24490.000	37.46	28.18	65.64	74.00	8.36	vertical	Peak

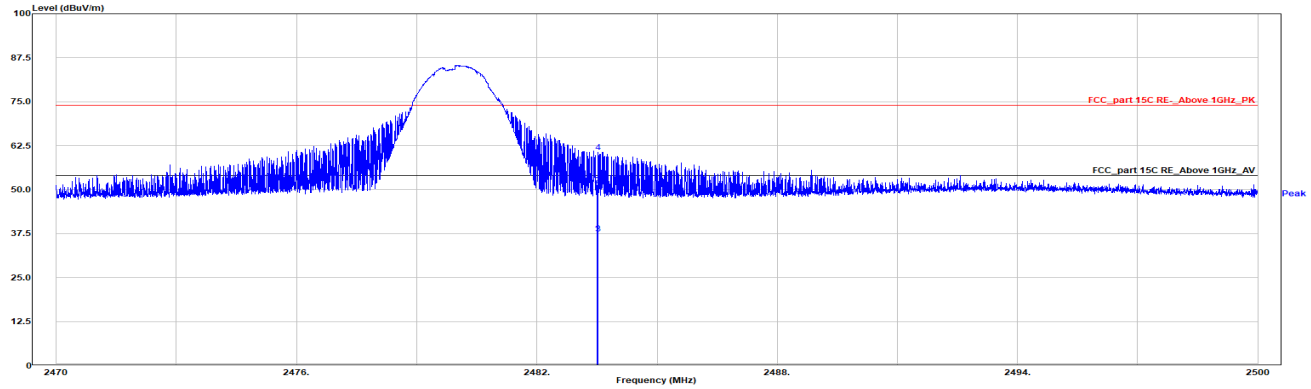
Restricted Bands Emissions:

Pre-Scan with GFSK, π/4-DQPSK, 8DPSK modes of operation in the X,Y and Z axes of orientation, the worst case ***π/4-DQPSK Mode in Z-axis of orientation*** *in horizontal polarization was recorded*

Note:
1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB/m)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)



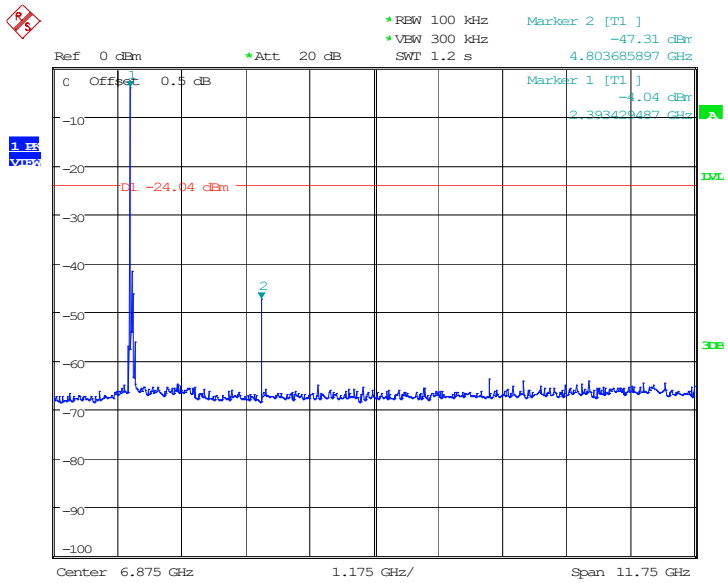
Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Pol	Remark
2353.890	45.51	3.85	49.36	54.00	4.64	horizontal	Average
2353.890	50.02	3.85	53.87	74.00	20.13	horizontal	Peak
2377.518	48.87	4.14	53.01	54.00	0.99	horizontal	Average
2377.518	51.84	4.14	55.98	74.00	18.02	horizontal	Peak
2390.000	39.87	4.28	44.15	54.00	9.85	horizontal	Average
2390.000	43.85	4.28	48.13	74.00	25.87	horizontal	Peak



Freq	Reading	Factor	Level	Limit	Margin	Pol	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
2483.500	32.38	5.03	37.41	54.00	16.59	horizontal	Average
2483.500	46.23	5.03	51.26	74.00	22.74	horizontal	Peak
2483.524	32.51	5.03	37.54	54.00	16.46	horizontal	Average
2483.524	55.67	5.03	60.70	74.00	13.30	horizontal	Peak

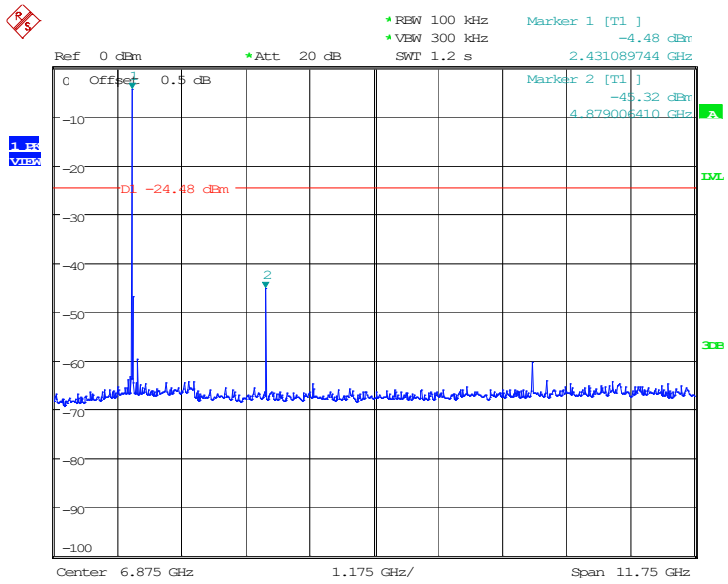
Conducted Spurious Emissions at Antenna Port

BDR (GFSK): Low Channel



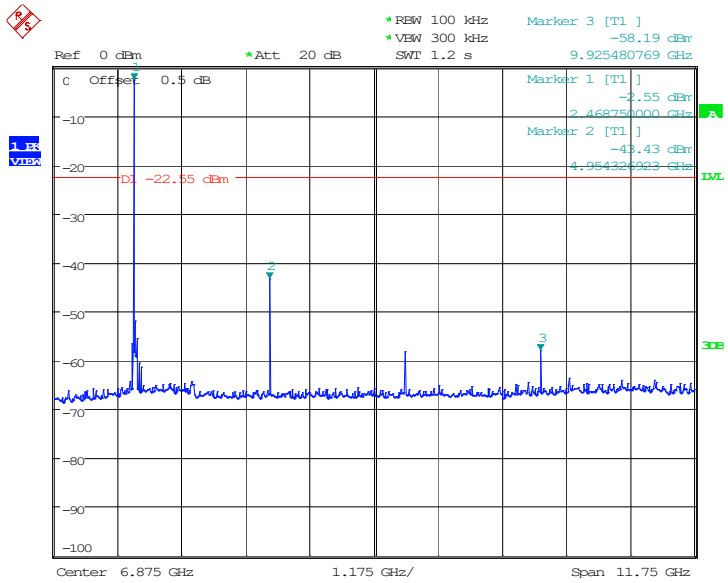
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:18:46

BDR (GFSK): Middle Channel



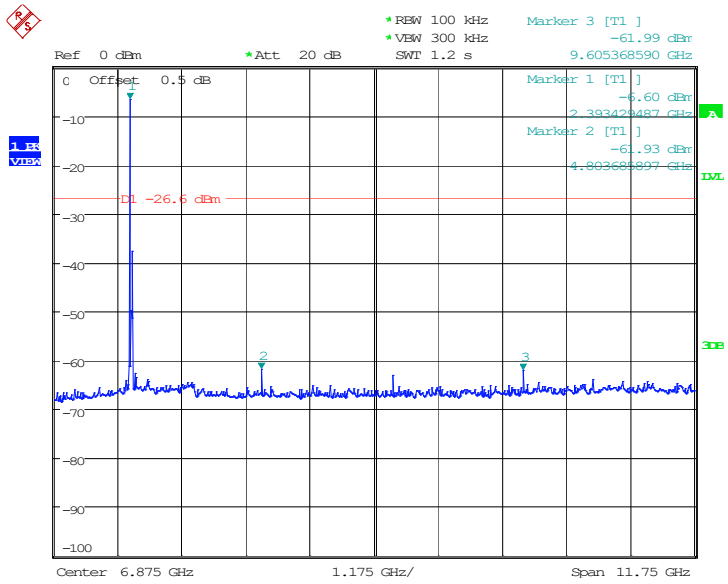
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:20:41

BDR (GFSK): High Channel



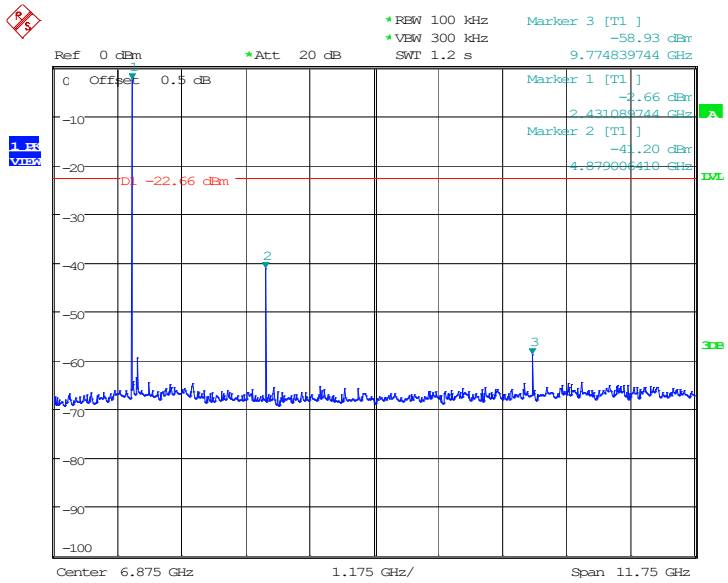
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:22:27

EDR (π/4-DQPSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:26:29

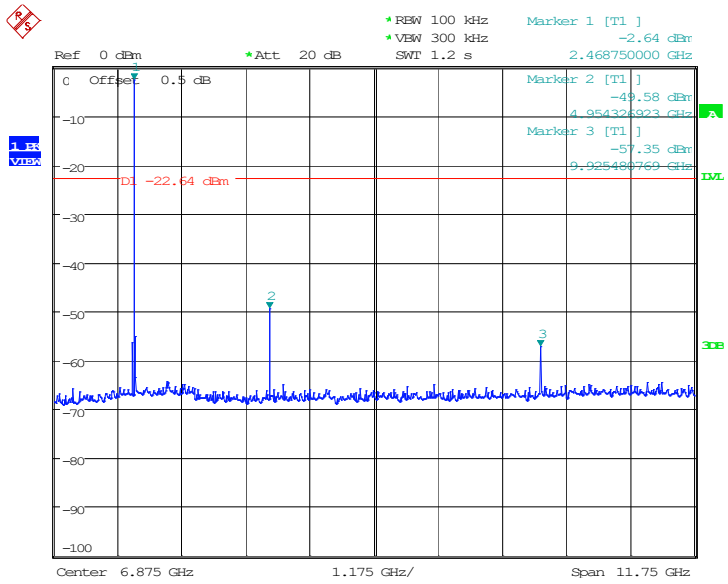
EDR (π/4-DQPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:24:33

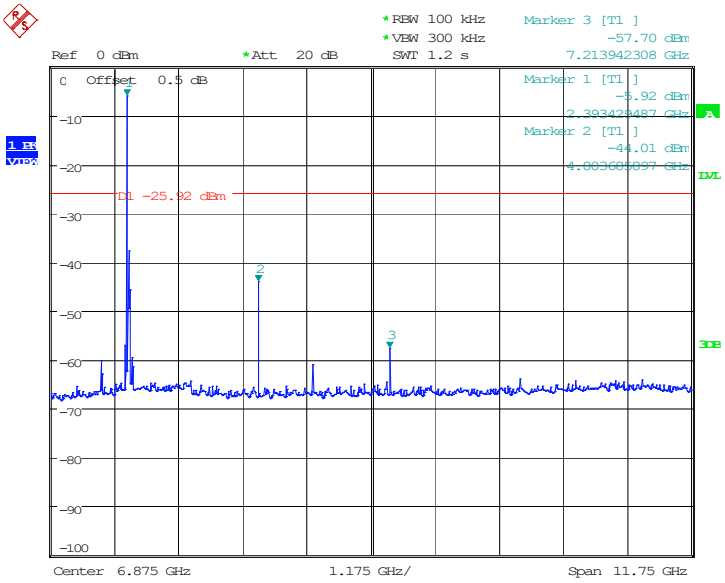
EDR (π/4-DQPSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

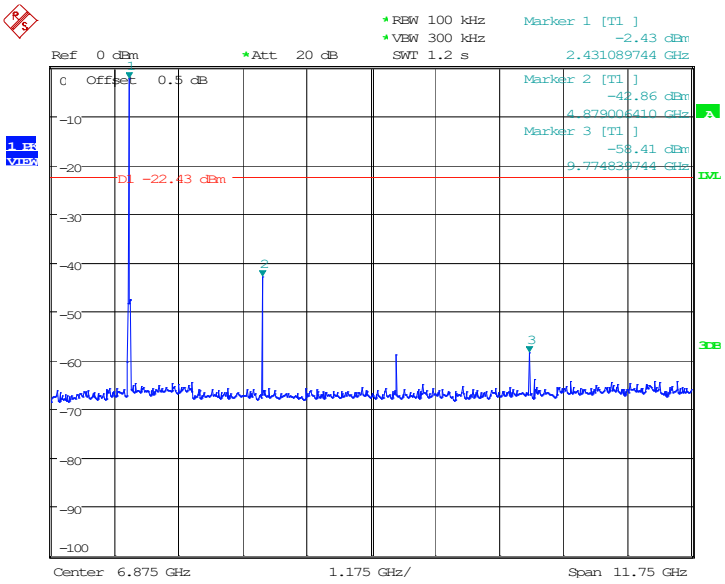
Date: 27.MAR.2024 16:23:18

EDR (8DPSK): Low Channel



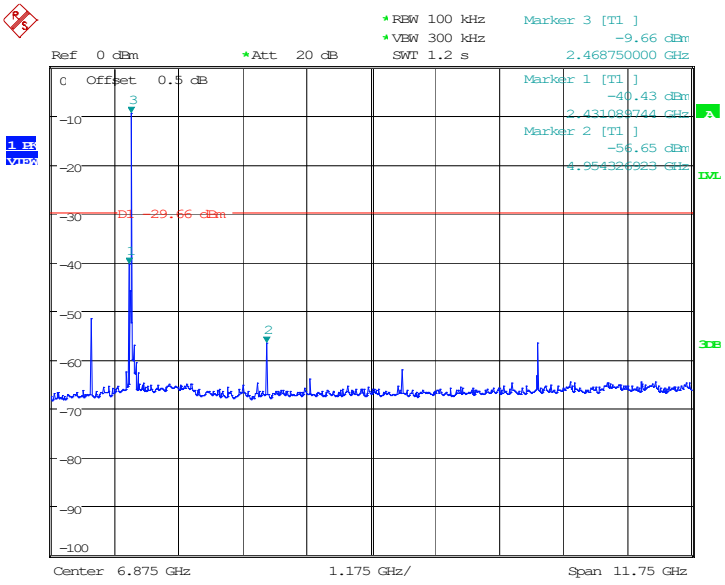
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:28:09

EDR (8DPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 16:29:20

EDR (8DPSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

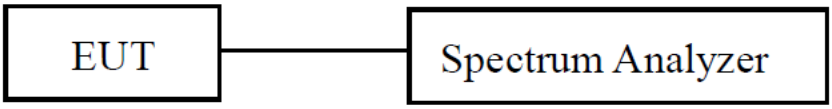
Date: 27.MAR.2024 16:30:43

FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

Applicable Standard

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.

EUT Setup



Test Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a. Span: Wide enough to capture the peaks of two adjacent channels.
b. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
c. Video (or average) bandwidth (VBW) ≥ RBW.
d. Sweep: Auto.
e. Detector function: Peak.
f. Trace: Max hold.
g. Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

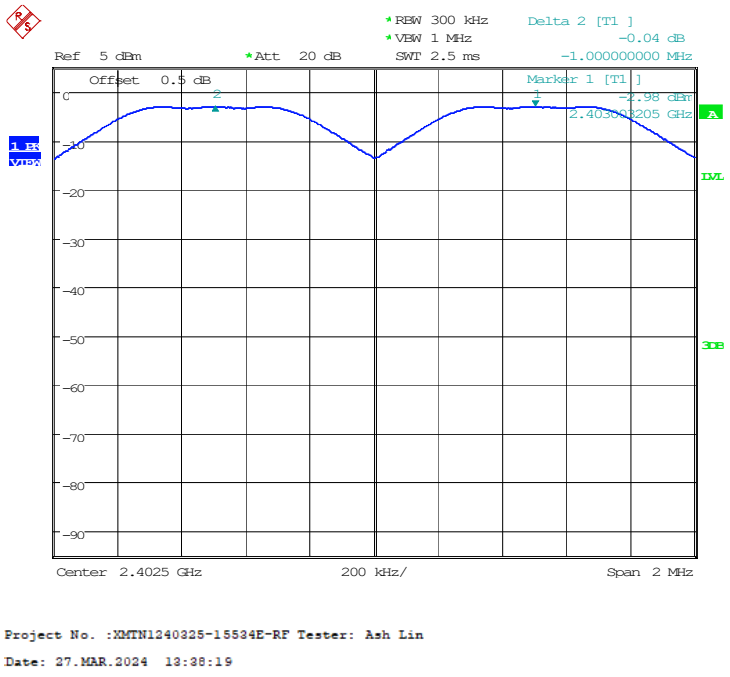
Test Data

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-03-27	Environment:	Temp.: 23.9℃ Humi.: 60% Atm:100.8kPa

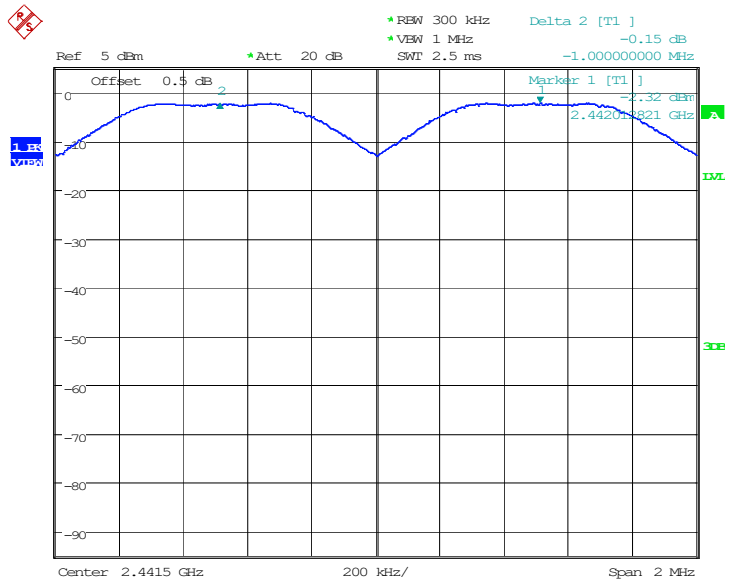
Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR (GFSK)	Low	2402	1	0.628	Pass
	Middle	2441	1	0.625	Pass
	High	2480	0.997	0.625	Pass
EDR (π/4-DQPSK)	Low	2402	1.006	0.805	Pass
	Middle	2441	1.01	0.801	Pass
	High	2480	0.997	0.805	Pass
EDR (8DPSK)	Low	2402	1.01	0.805	Pass
	Middle	2441	0.997	0.805	Pass
	High	2480	1	0.805	Pass

Note: Limit = 20 dB bandwidth*2/3

BDR (GFSK): Low Channel



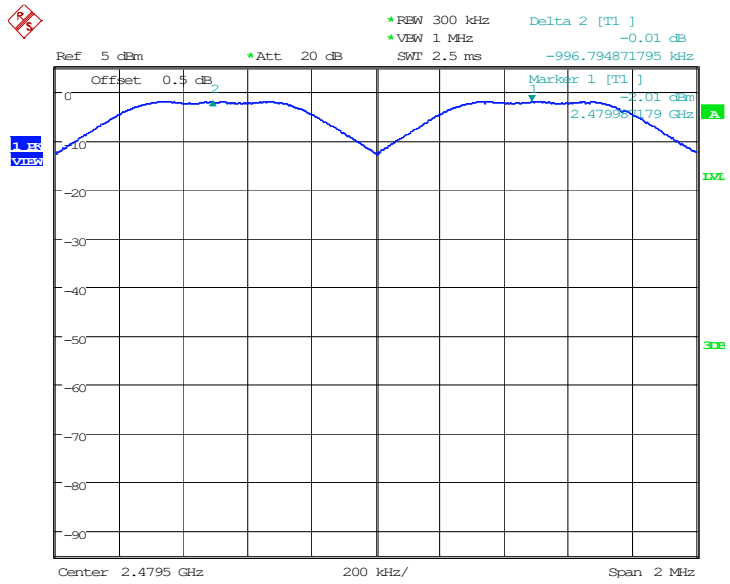
BDR (GFSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 13:44:54

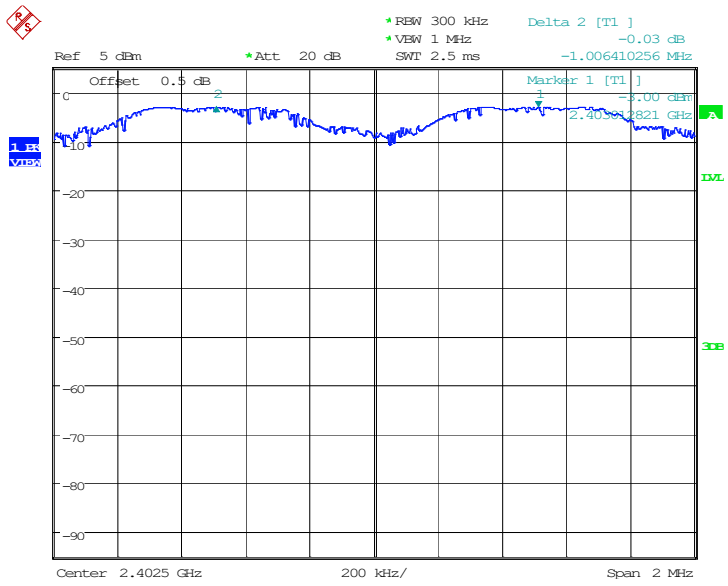
BDR (GFSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 13:51:47

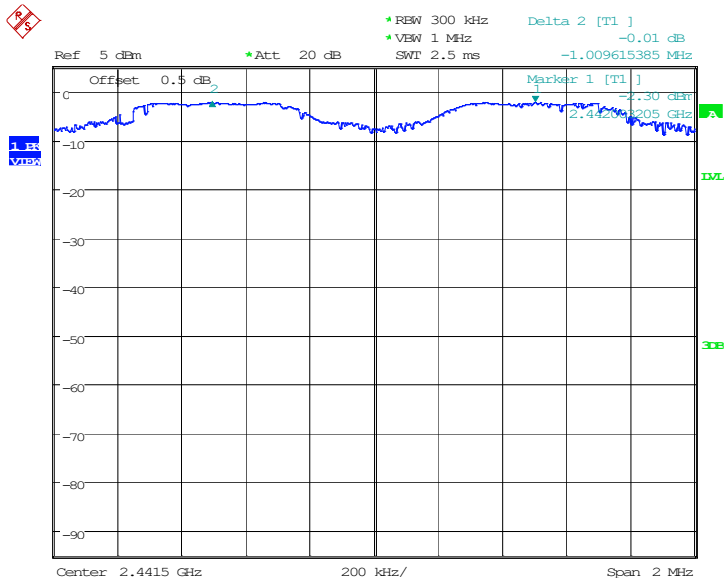
EDR (π/4-DQPSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:07:32

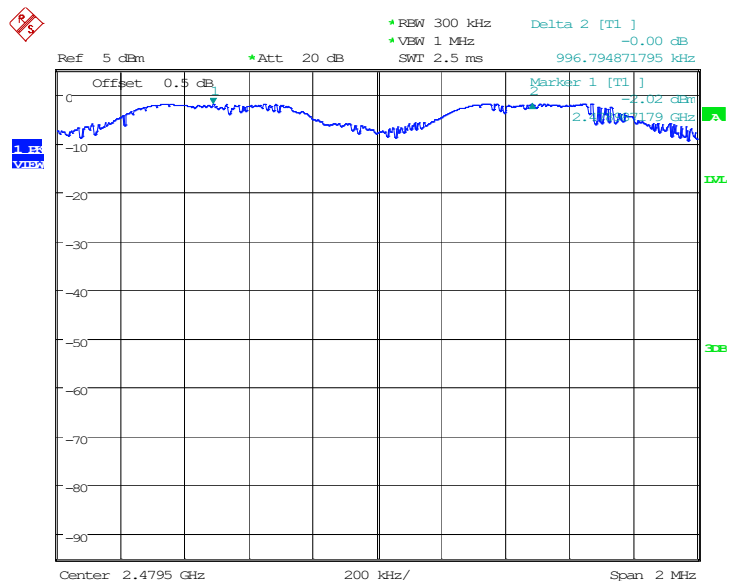
EDR (π/4-DQPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:01:38

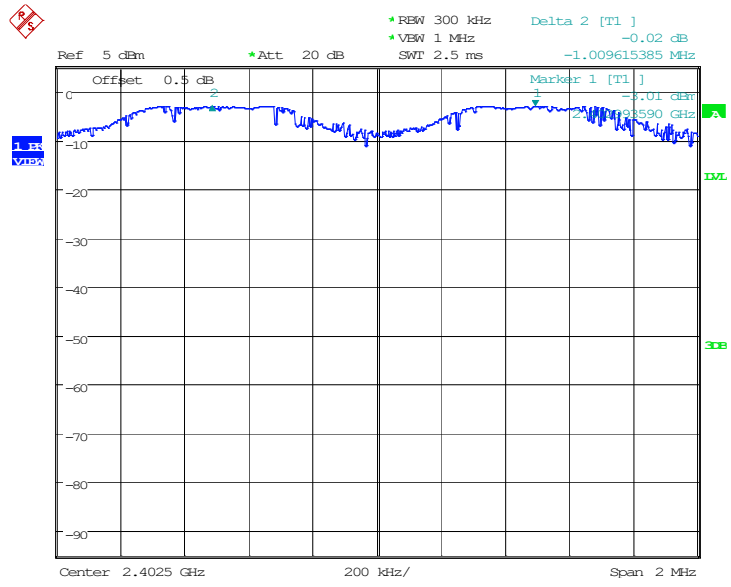
EDR (π/4-DQPSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 13:56:27

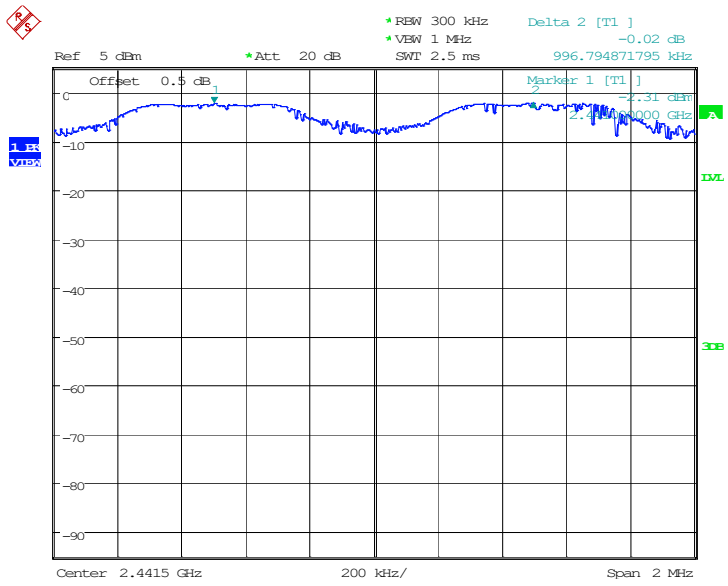
EDR (8DPSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:11:39

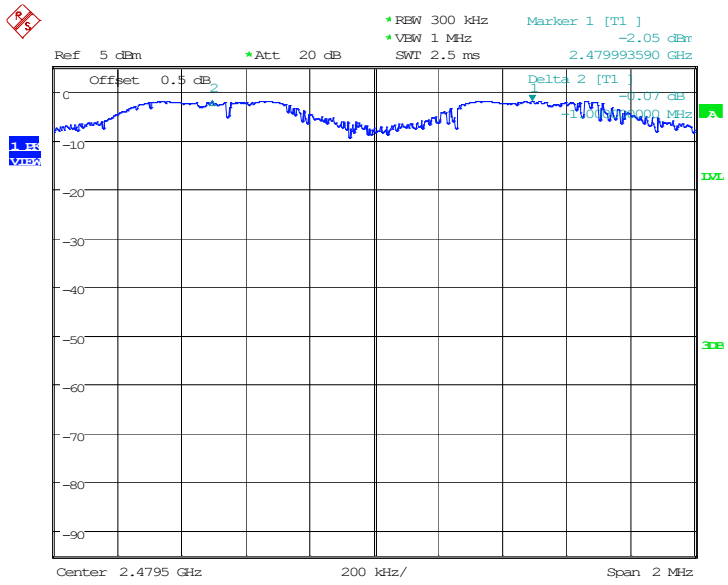
EDR (8DPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:16:40

EDR (8DPSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

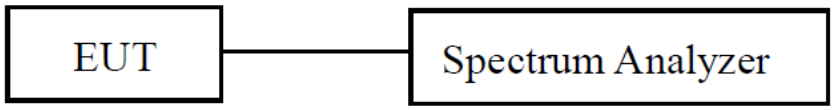
Date: 27.MAR.2024 14:21:28

FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH

Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

EUT Setup



Test Procedure

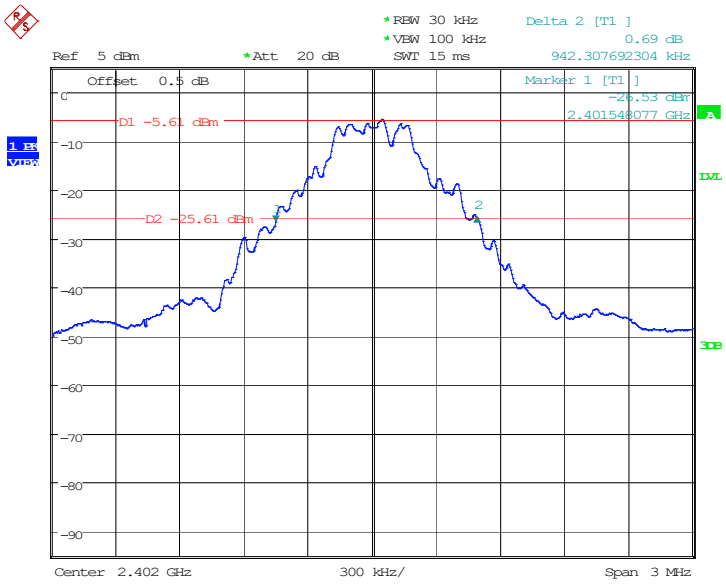
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Test Mode:	Transmitting	**Test Engineer:**	Ash Lin
Test Date:	2024-03-27	**Environment:**	Temp.: 23.9℃ Humi.: 60% Atm :100.8kPa

Mode	**Channel**	**Frequency (MHz)**	**20 dB Emission Bandwidth (MHz)**
BDR (GFSK)	Low	2402	0.942
	Middle	2441	0.937
	High	2480	0.937
EDR (π/4-DQPSK)	Low	2402	1.207
	Middle	2441	1.202
	High	2480	1.207
EDR (8DPSK)	Low	2402	1.207
	Middle	2441	1.207
	High	2480	1.207

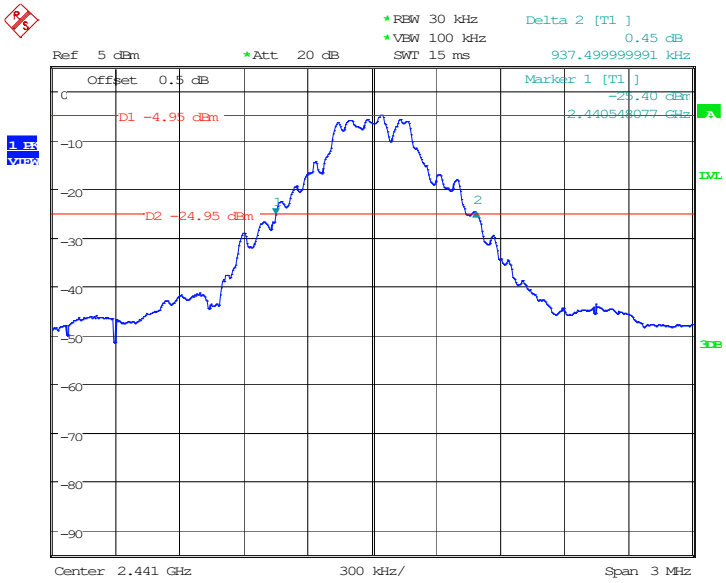
BDR (GFSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 13:13:22

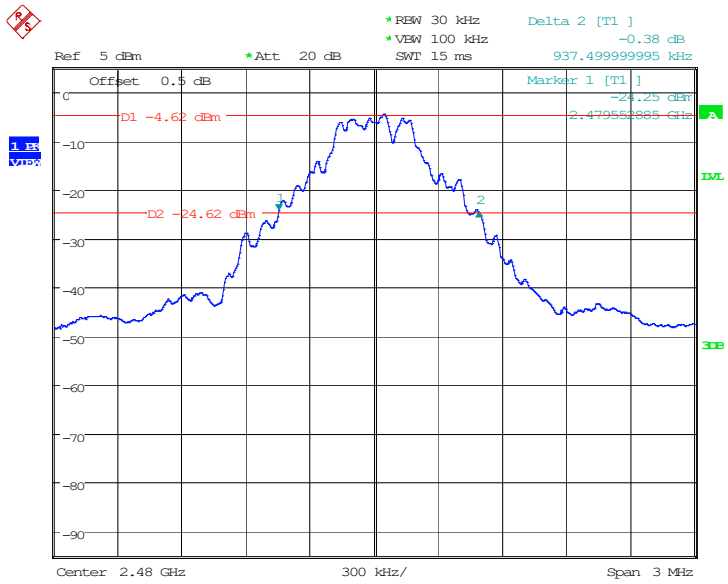
BDR (GFSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

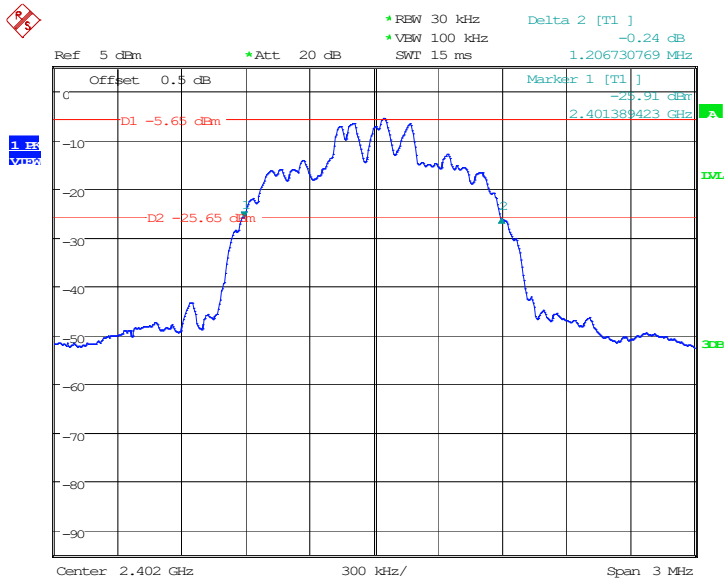
Date: 27.MAR.2024 11:59:15

BDR (GFSK): High Channel



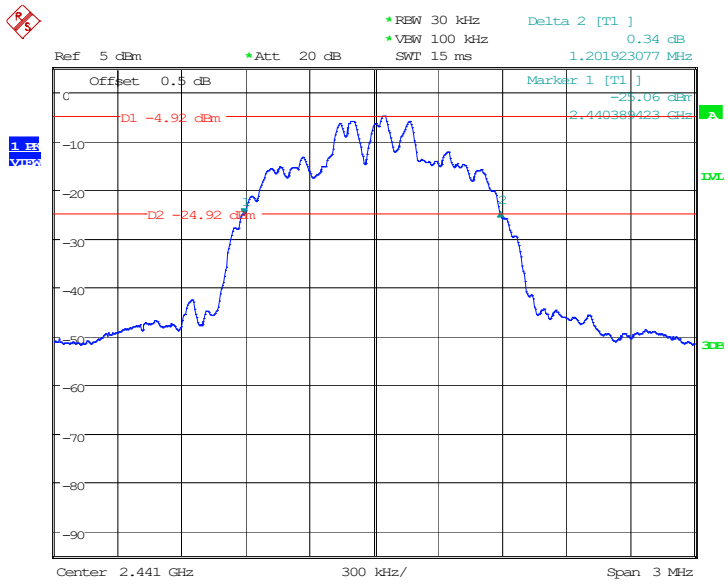
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:57:04

EDR (π/4-DQPSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:51:19

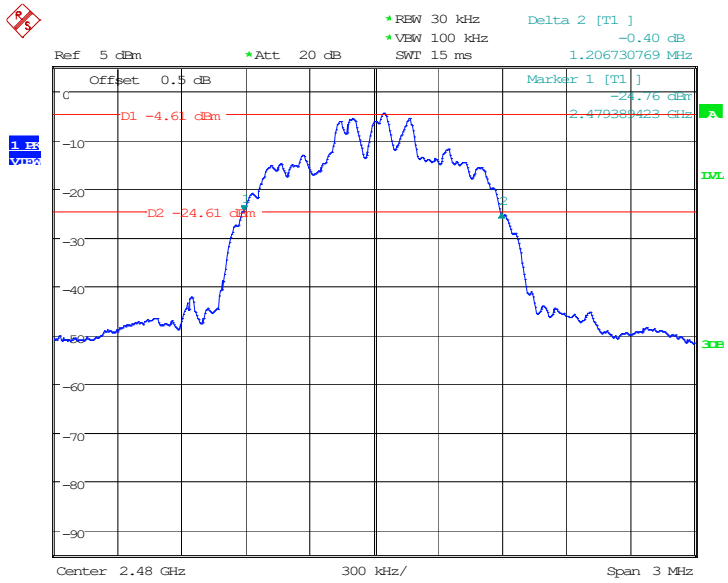
EDR(π/4-DQPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 11:53:23

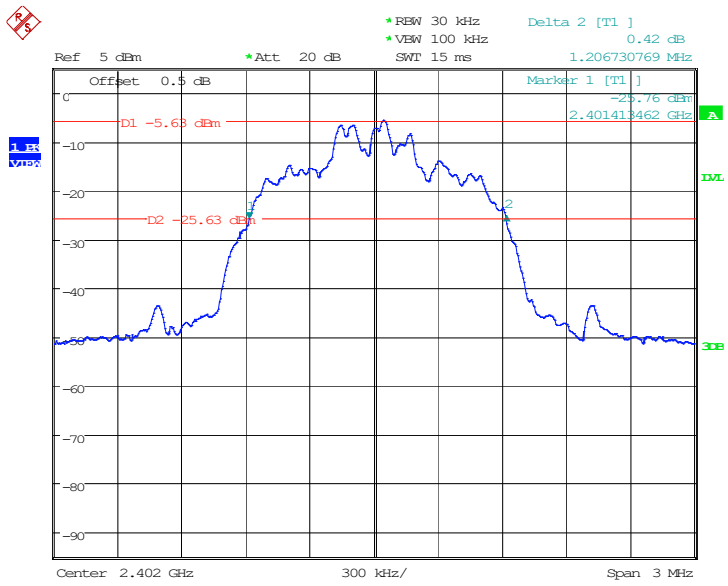
EDR (π/4-DQPSK): High Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 11:55:11

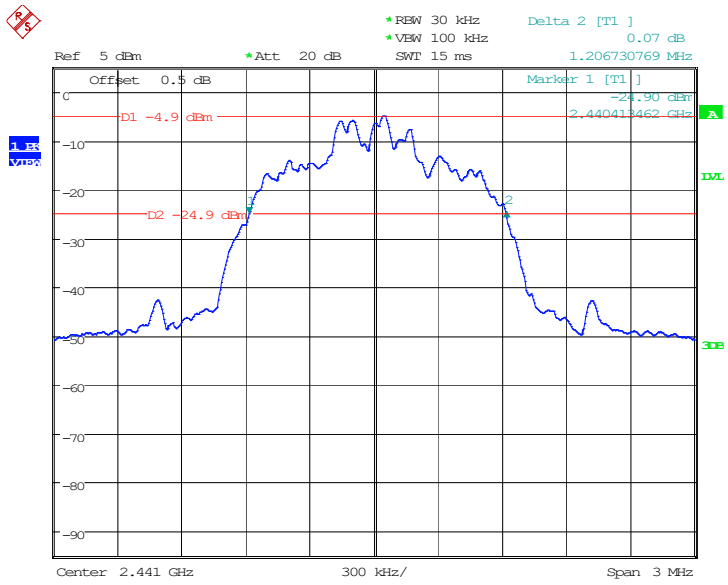
EDR (8DPSK): Low Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 11:49:33

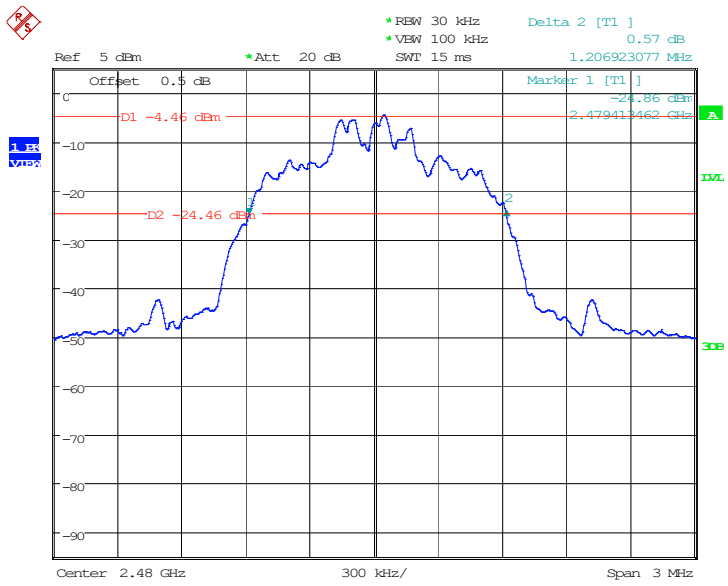
EDR (8DPSK): Middle Channel



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 11:47:42

EDR (8DPSK): High Channel



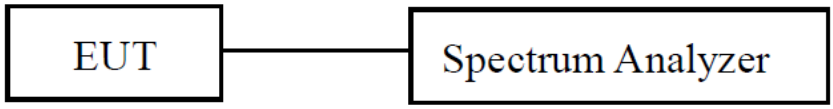
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:43:57

FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

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

EUT Setup



Test Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
b. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
c. VBW ≥ RBW.
d. Sweep: Auto.
e. Detector function: Peak.
f. Trace: Max hold.
g. Allow the trace to stabilize.

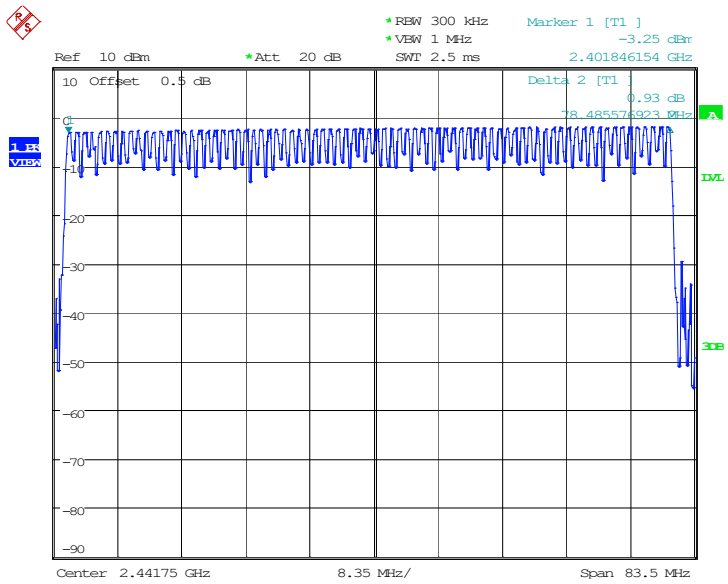
It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies.

Test Data

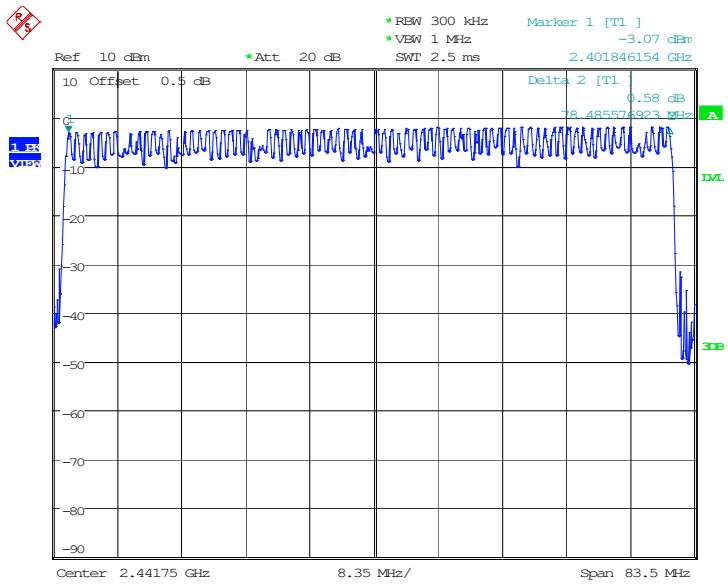
Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-03-27	Environment:	Temp.: 23.9℃ Humi.: 60% Atm :100.8kPa

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

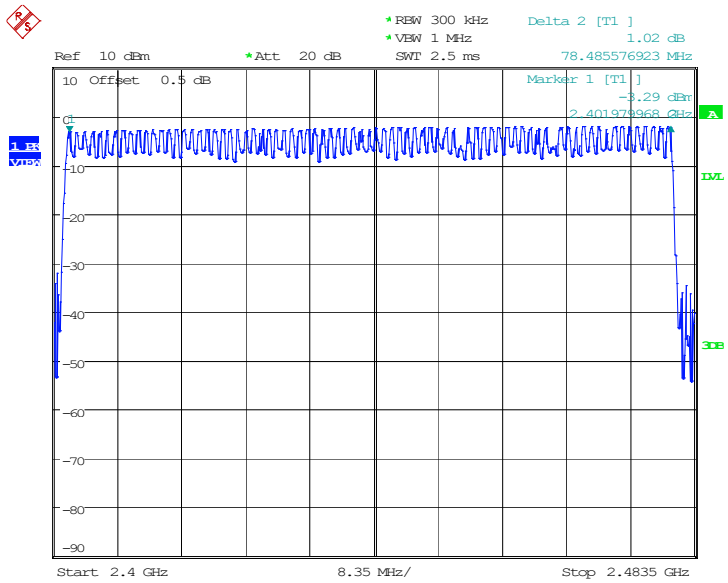


EDR (π/4-DQPSK): Number of Hopping Channels



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 14:35:09

EDR (8DPSK): Number of Hopping Channels



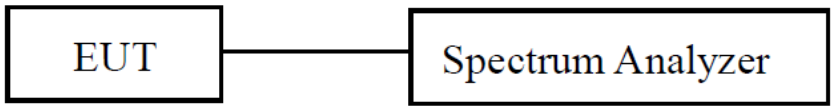
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 14:31:50

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

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

EUT Setup



Test Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

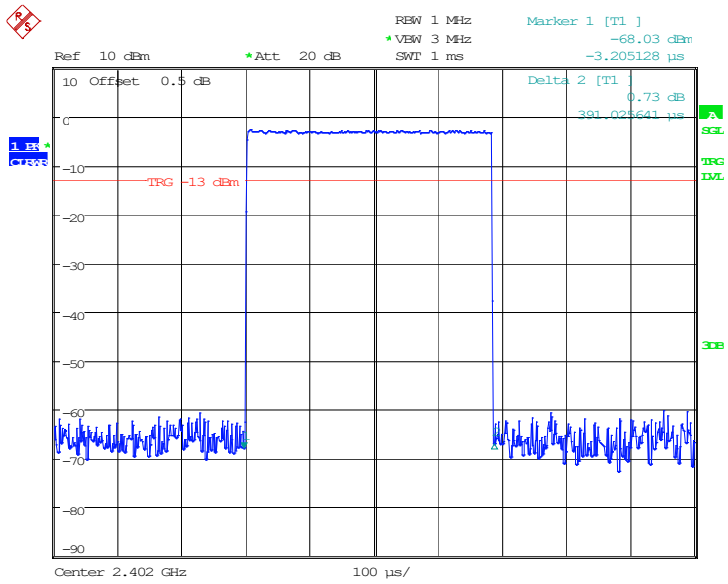
a Span: Zero span, centered on a hopping channel.
b RBW shall be ≤ channel spacing and where possible RBW should be set ≥ 1 / T, where T is the expected dwell time per channel.
c Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
d Detector function: Peak.
e Trace: Max hold.

Test Data

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-03-27 ~ 2024-03-28	Environment:	Temp.: 22.5~23.9℃ Humi.: 60%~62% Atm :100.8kPa~101.0kPa

Mode		Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR (GFSK)	DH1	Low	0.391	0.125	0.400	Pass
		Middle	0.389	0.124	0.400	Pass
		High	0.389	0.124	0.400	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH3	Low	1.662	0.266	0.400	Pass
		Middle	1.662	0.266	0.400	Pass
		High	1.667	0.267	0.400	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH5	Low	2.912	0.311	0.400	Pass
		Middle	2.912	0.311	0.400	Pass
		High	2.912	0.311	0.400	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (π/4-DQPSK)	2DH1	Low	0.401	0.128	0.400	Pass
		Middle	0.401	0.128	0.400	Pass
		High	0.399	0.128	0.400	Pass
		Note: 2DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	2DH3	Low	1.667	0.267	0.400	Pass
		Middle	1.662	0.266	0.400	Pass
		High	1.667	0.267	0.400	Pass
		Note: 2DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	2DH5	Low	2.928	0.312	0.400	Pass
		Middle	2.928	0.312	0.400	Pass
		High	2.928	0.312	0.400	Pass
		Note: 2DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	3DH1	Low	0.402	0.129	0.400	Pass
		Middle	0.402	0.129	0.400	Pass
		High	0.402	0.129	0.400	Pass
		Note:3 DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	3DH3	Low	1.662	0.266	0.400	Pass
		Middle	1.662	0.266	0.400	Pass
		High	1.662	0.266	0.400	Pass
		Note: 3DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	3DH5	Low	2.920	0.311	0.400	Pass
		Middle	2.920	0.311	0.400	Pass
		High	2.912	0.311	0.400	Pass
		Note: 3DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

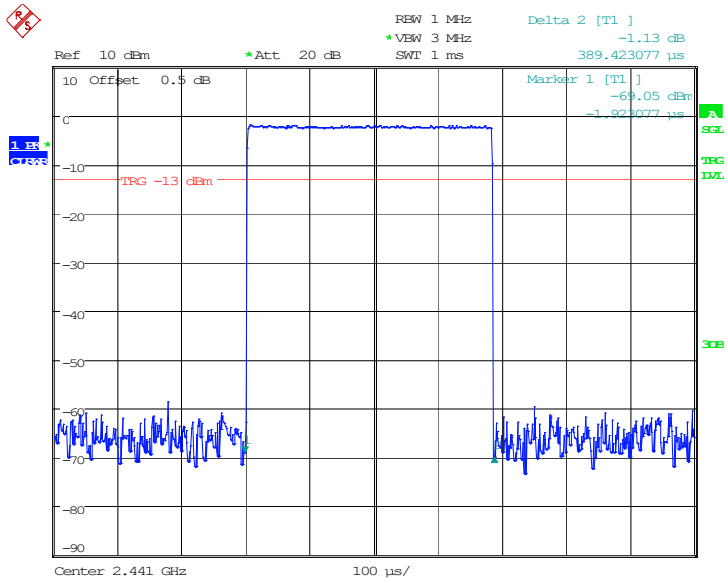
BDR (GFSK): Pulse time, Low Channel, DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:48:42

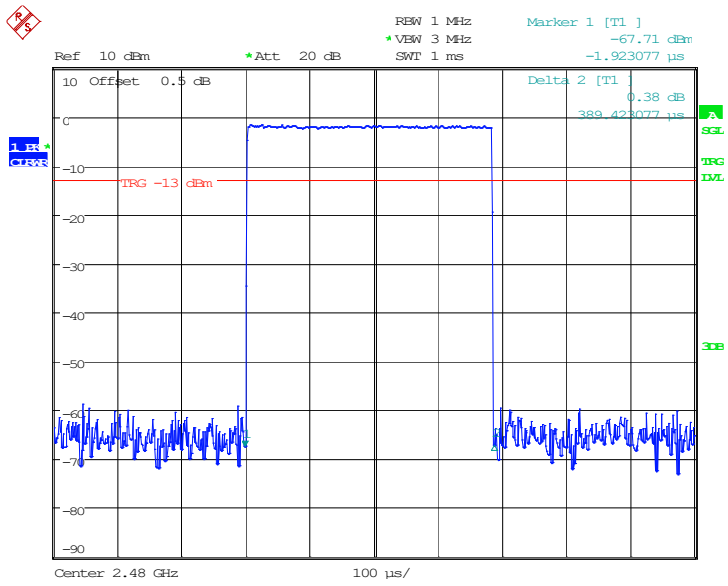
BDR (GFSK): Pulse time, Middle Channel, DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:32:57

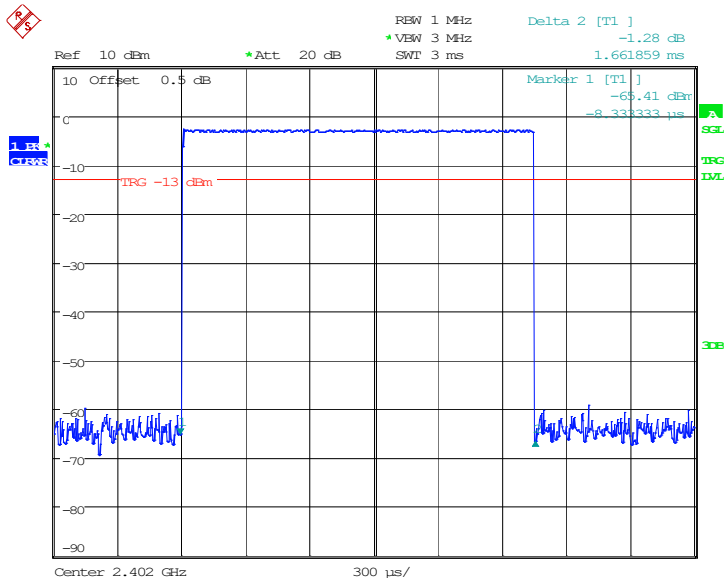
BDR (GFSK): Pulse time, High Channel, DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:34:02

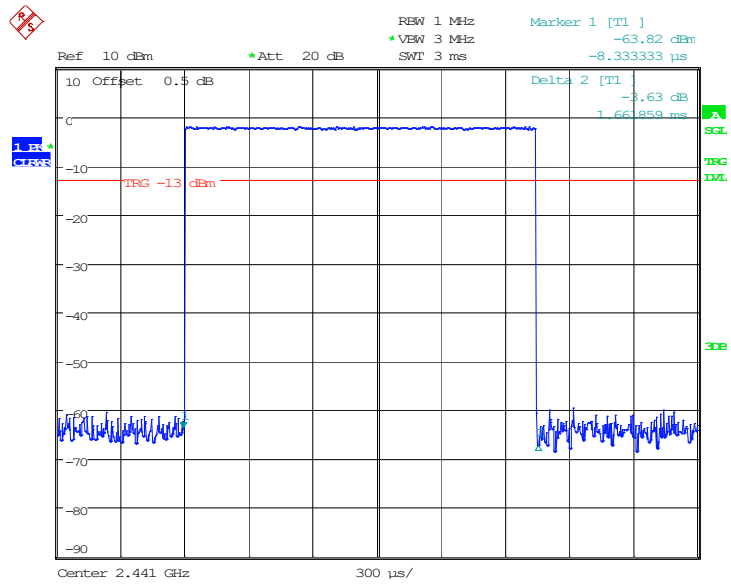
BDR (GFSK): Pulse time, Low Channel, DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:55:09

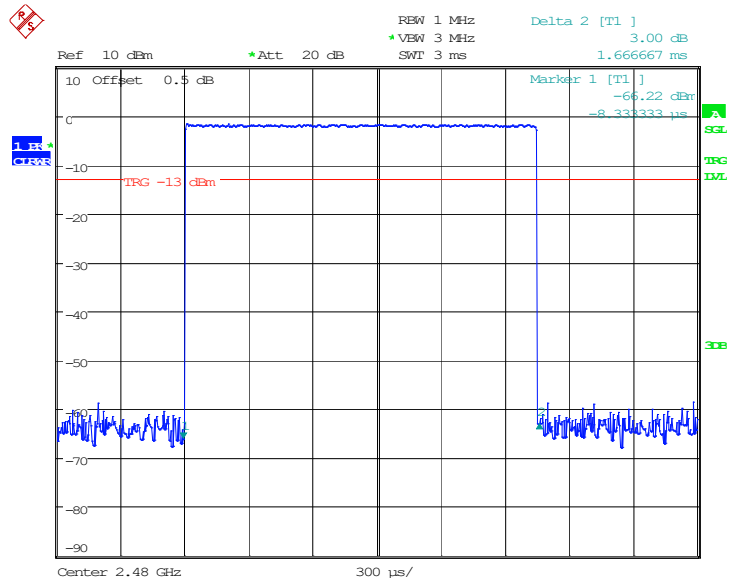
BDR (GFSK): Pulse time, Middle Channel, DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:46:54

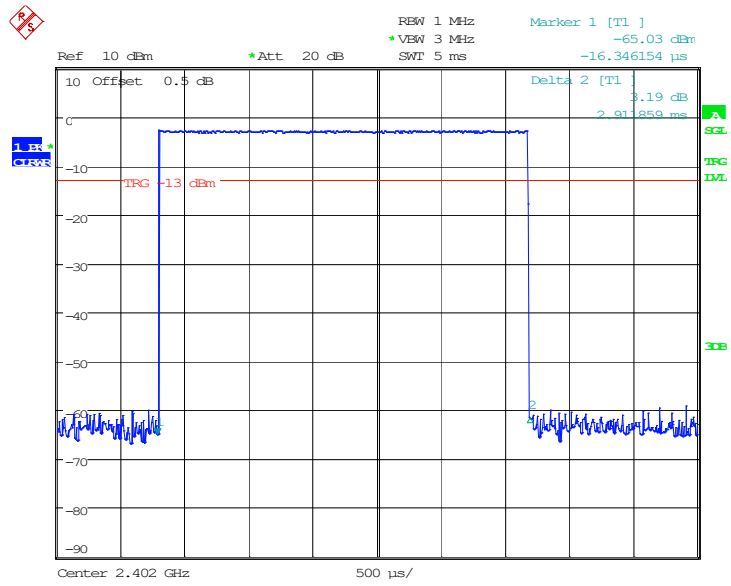
BDR (GFSK): Pulse time, High Channel, DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

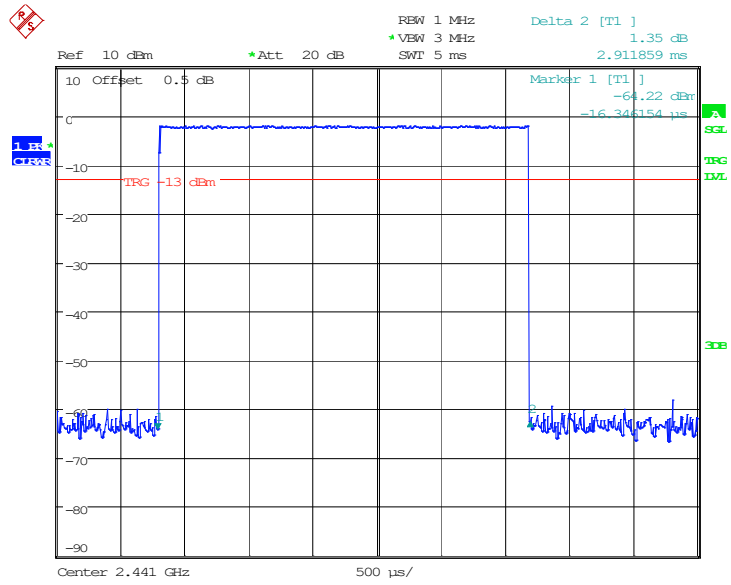
Date: 28.MAR.2024 13:45:47

BDR (GFSK): Pulse time, Low Channel, DH5



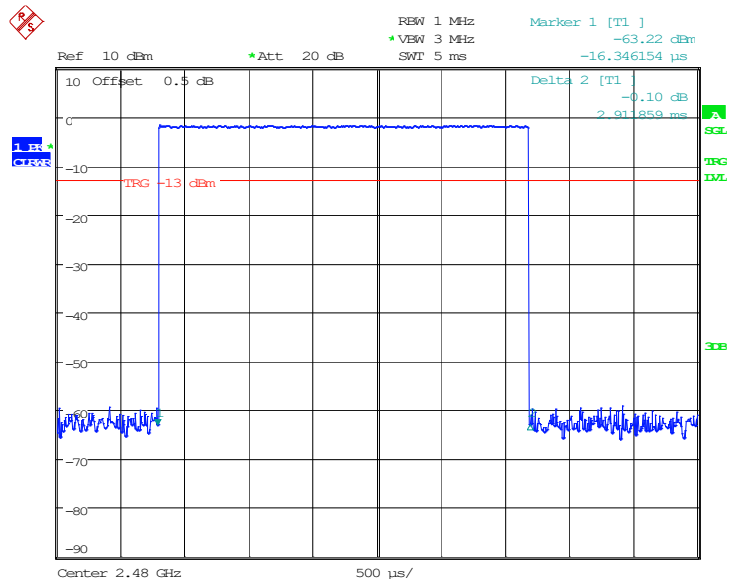
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:57:30

BDR (GFSK): Pulse time, Middle Channel, DH5



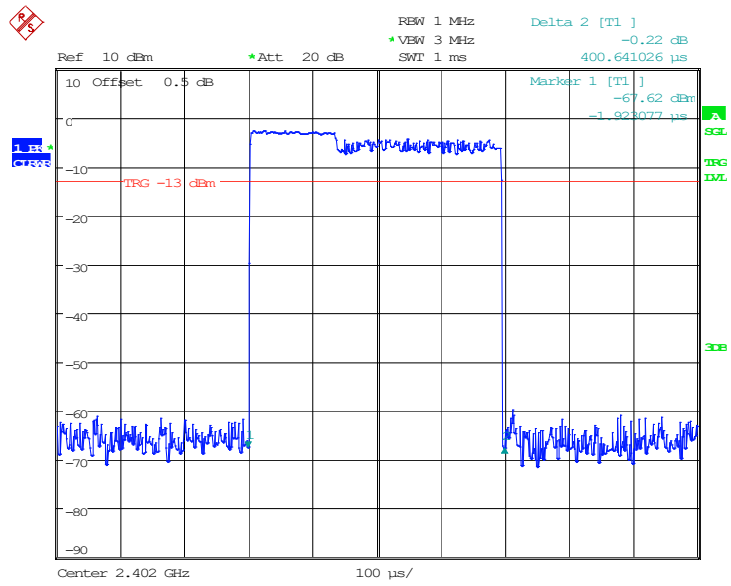
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:58:13

BDR (GFSK): Pulse time, High Channel, DH5



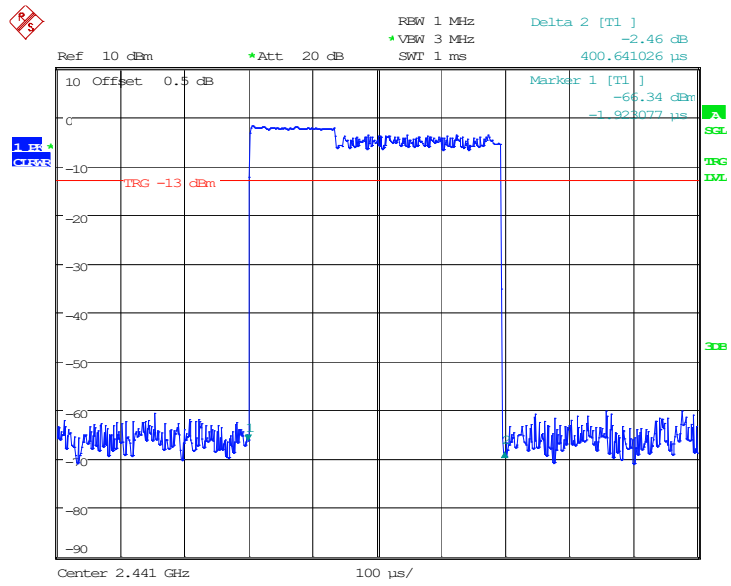
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:59:08

EDR (π/4-DQPSK): Pulse time, Low Channel, 2DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:37:22

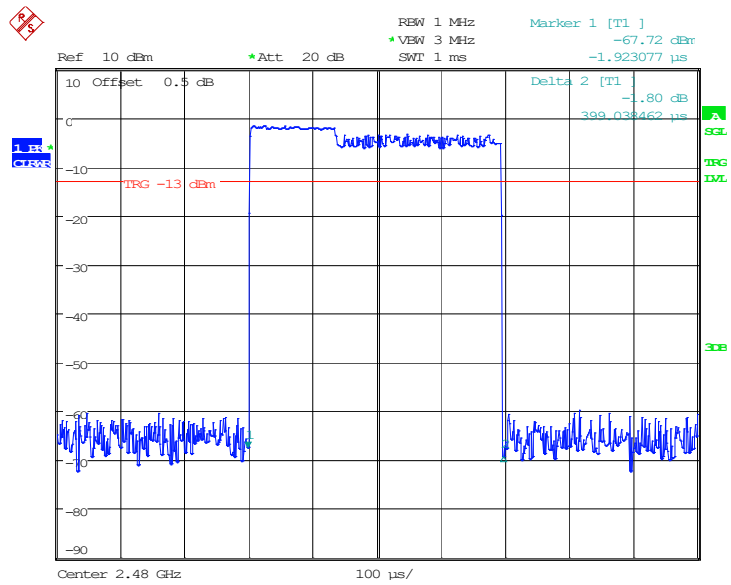
EDR (π/4-DQPSK):Pulse time, Middle Channel, 2DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:36:43

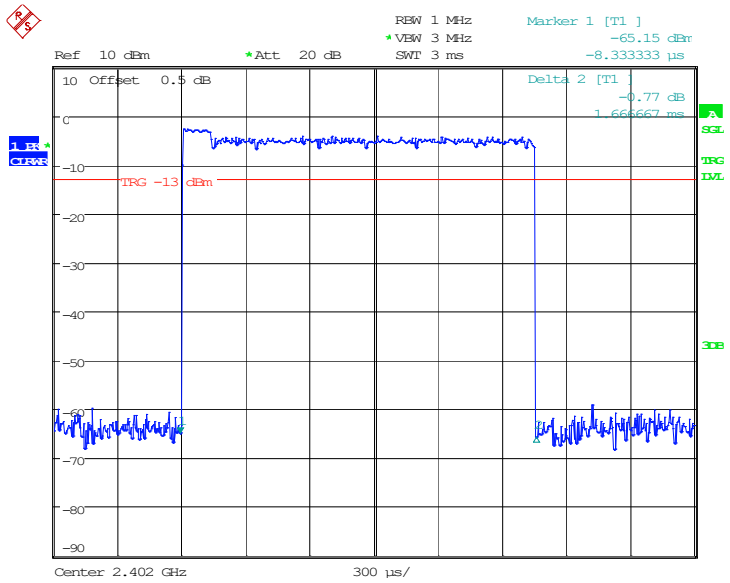
EDR (π/4-DQPSK):Pulse time, High Channel, 2DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

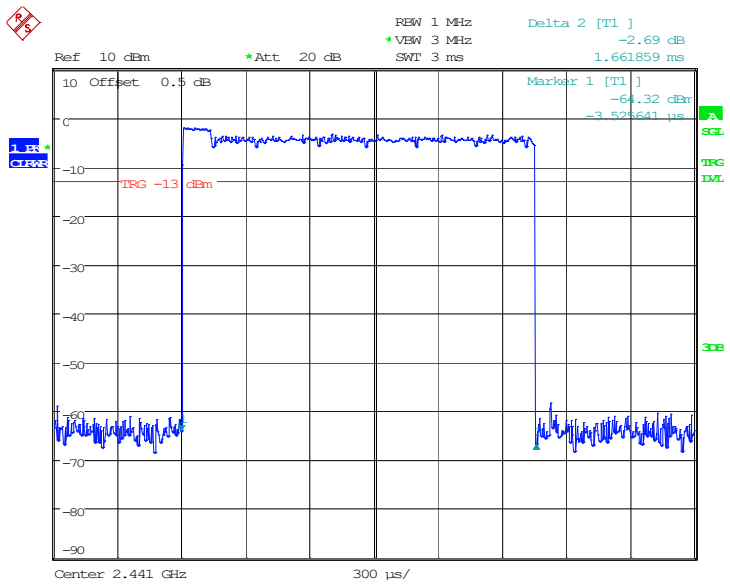
Date: 28.MAR.2024 13:35:17

EDR (π/4-DQPSK):Pulse time, Low Channel, 2DH3



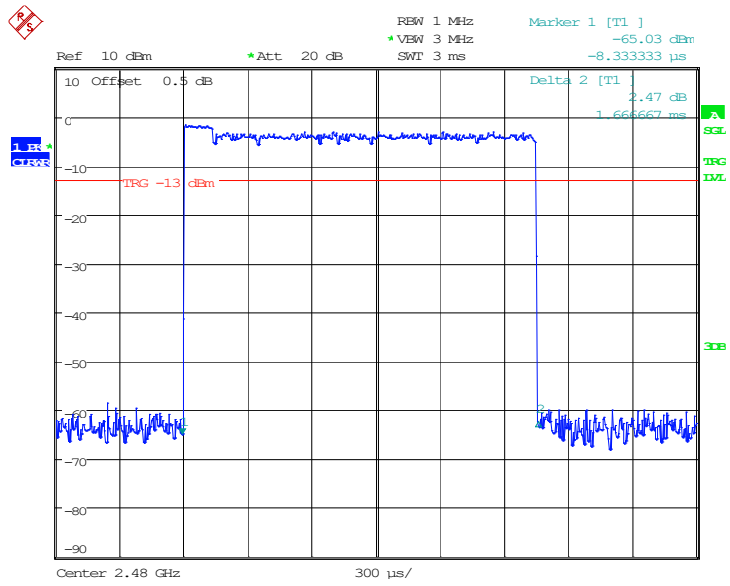
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:43:14

EDR (π/4-DQPSK):Pulse time, Middle Channel, 2DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:44:05

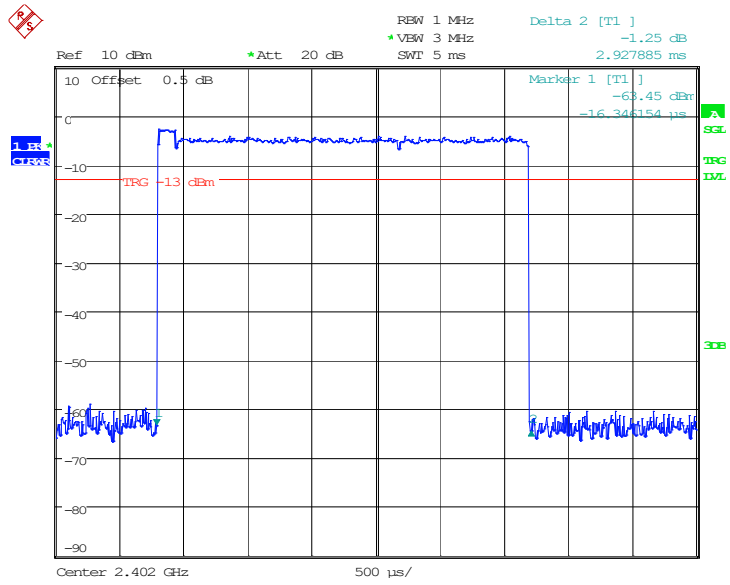
EDR (π/4-DQPSK):Pulse time, High Channel, 2DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:44:59

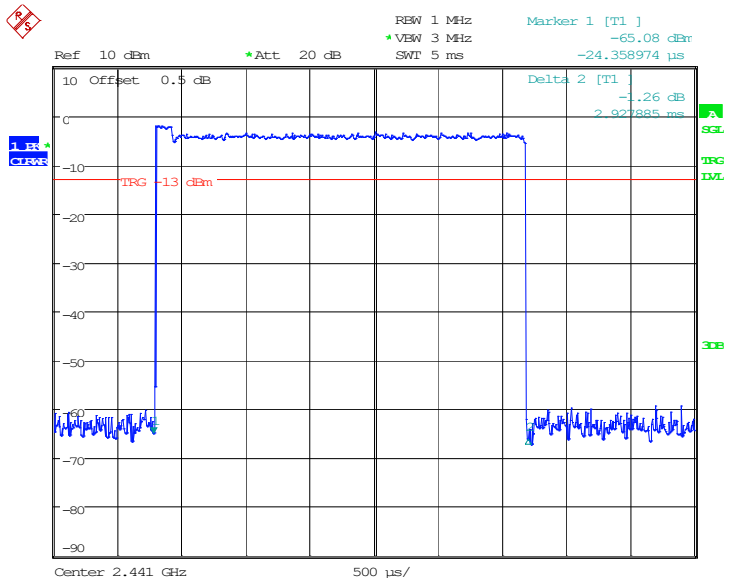
EDR (π/4-DQPSK):Pulse time, Low Channel, 2DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 14:01:36

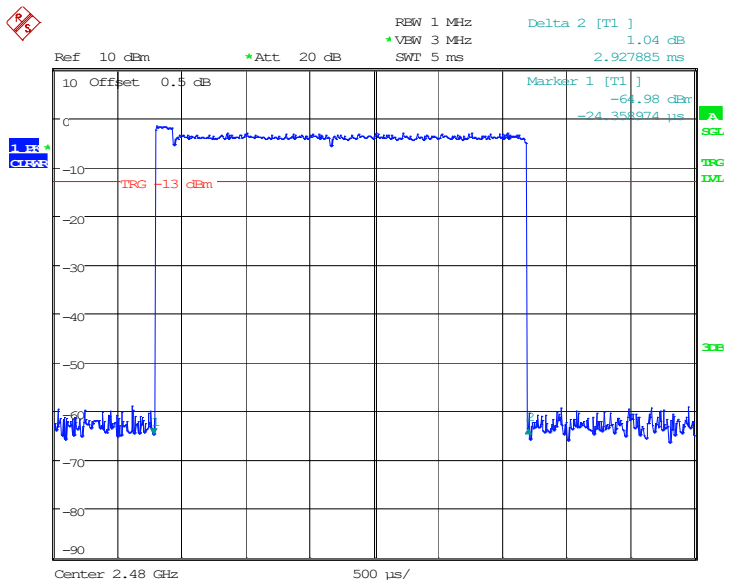
EDR (π/4-DQPSK):Pulse time, Middle Channel, 2DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 14:00:48

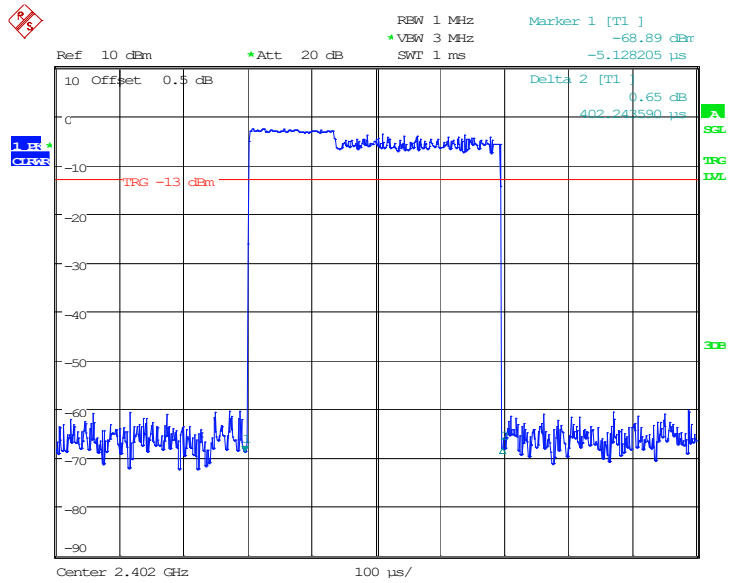
EDR (π/4-DQPSK):Pulse time, High Channel, 2DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

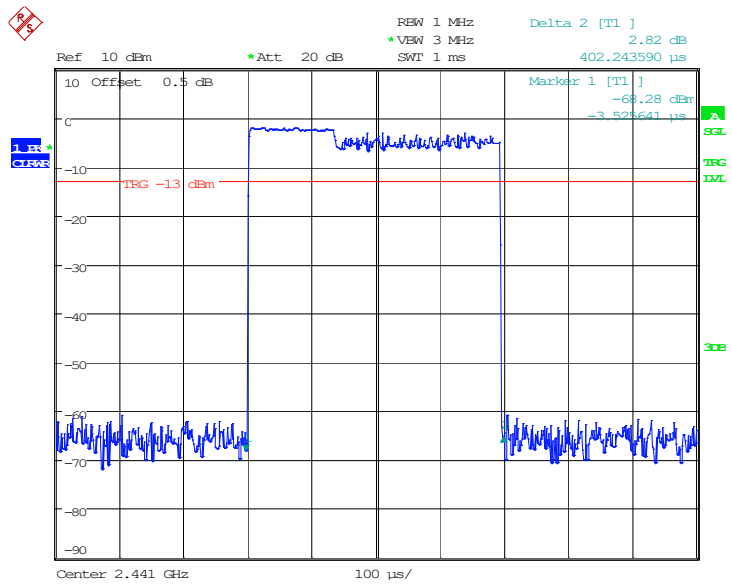
Date: 28.MAR.2024 13:59:52

EDR (8DPSK): Pulse time, Low Channel, 3DH1



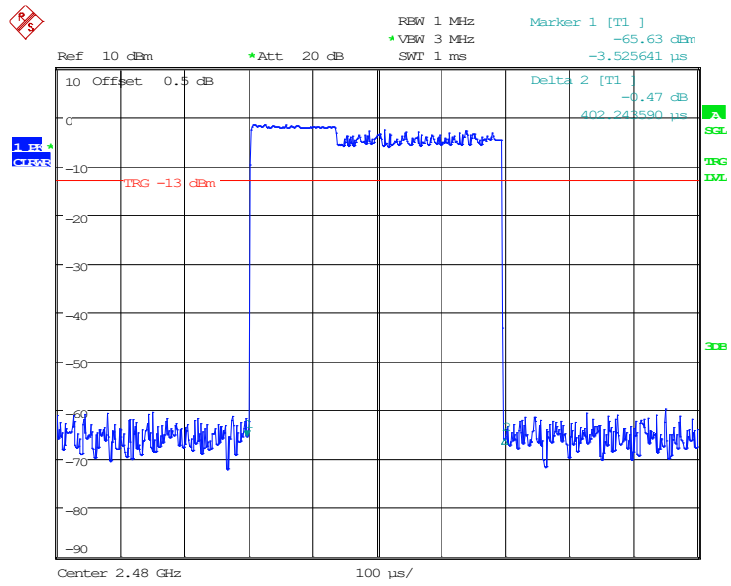
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:38:12

EDR (8DPSK): Pulse time, Middle Channel, 3DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:39:17

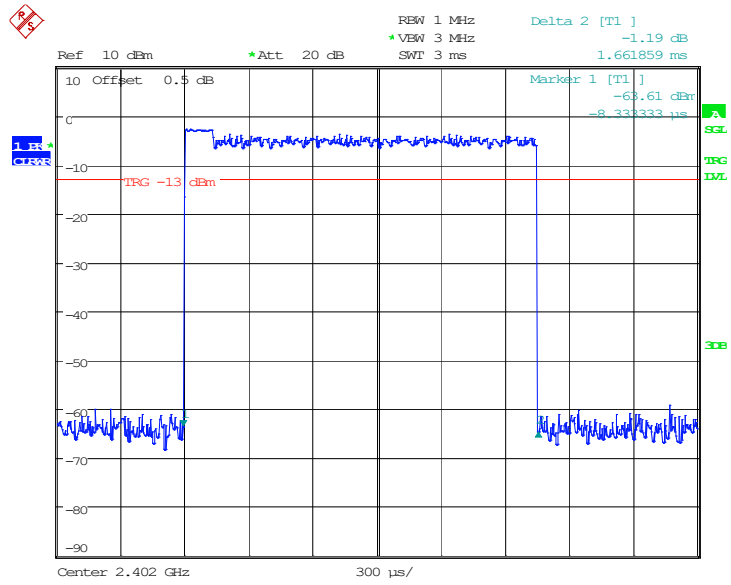
EDR (8DPSK): Pulse time, High Channel, 3DH1



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 13:39:55

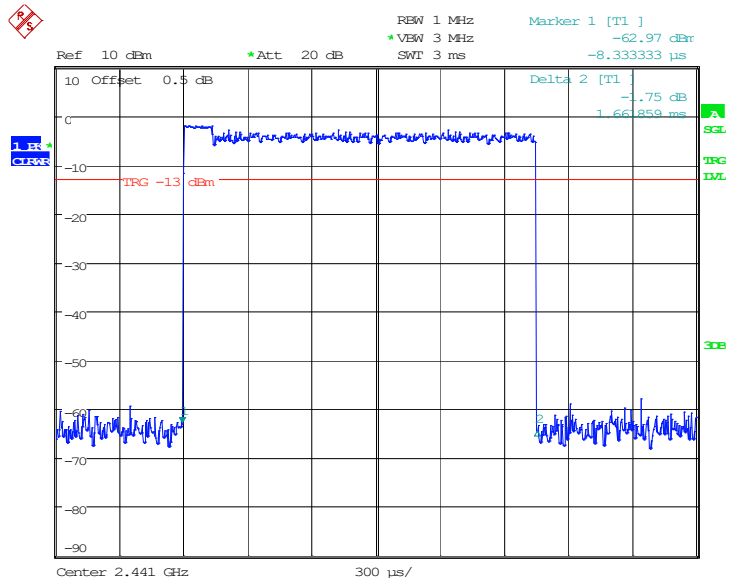
EDR (8DPSK): Pulse time, Low Channel, 3DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

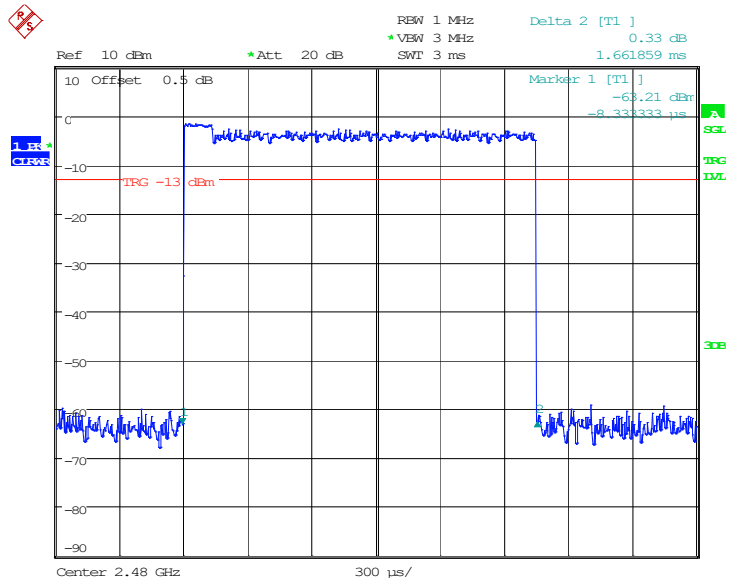
Date: 28.MAR.2024 13:42:34

EDR (8DPSK): Pulse time, Middle Channel, 3DH3



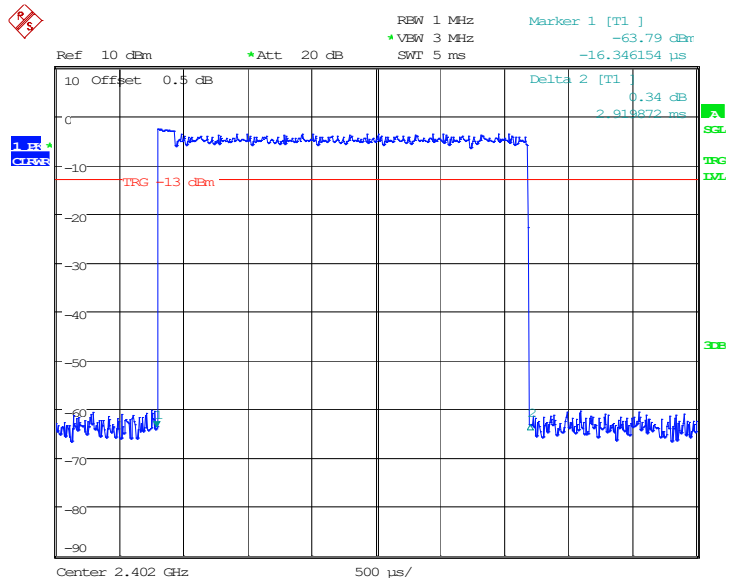
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:41:52

EDR (8DPSK): Pulse time, High Channel, 3DH3



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 28.MAR.2024 13:41:14

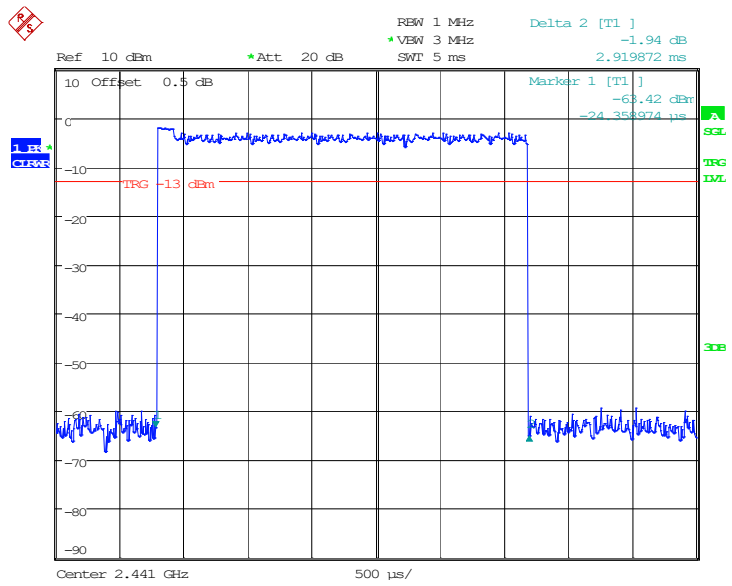
EDR (8DPSK): Pulse time, Low Channel, 3DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 14:27:48

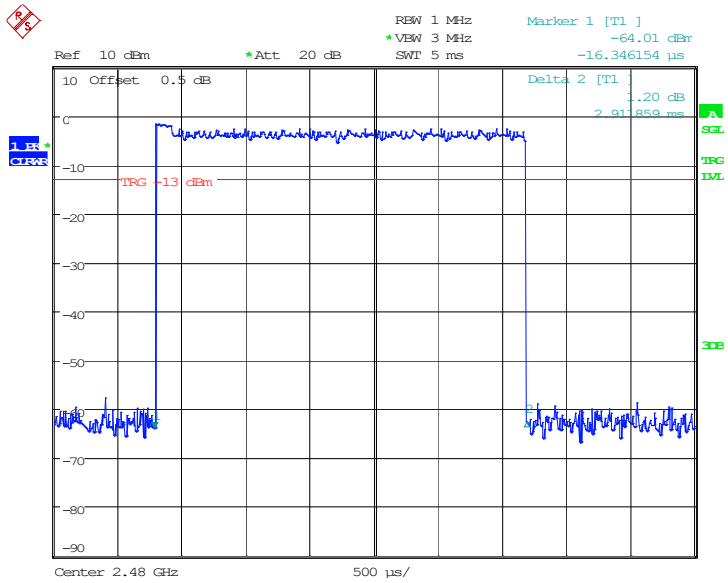
EDR (8DPSK): Pulse time, Middle Channel, 3DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 28.MAR.2024 14:28:27

EDR (8DPSK): Pulse time, High Channel, 3DH5



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

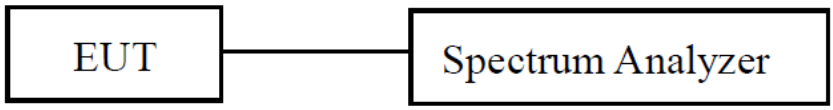
Date: 28.MAR.2024 14:29:03

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

EUT Setup



Test Procedure

a. Use the following spectrum analyzer settings:
   1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   2) RBW > 20 dB bandwidth of the emission being measured.
   3) VBW ≥ RBW.
   4) Sweep: Auto.
   5) Detector function: Peak.
   6) Trace: Max hold.

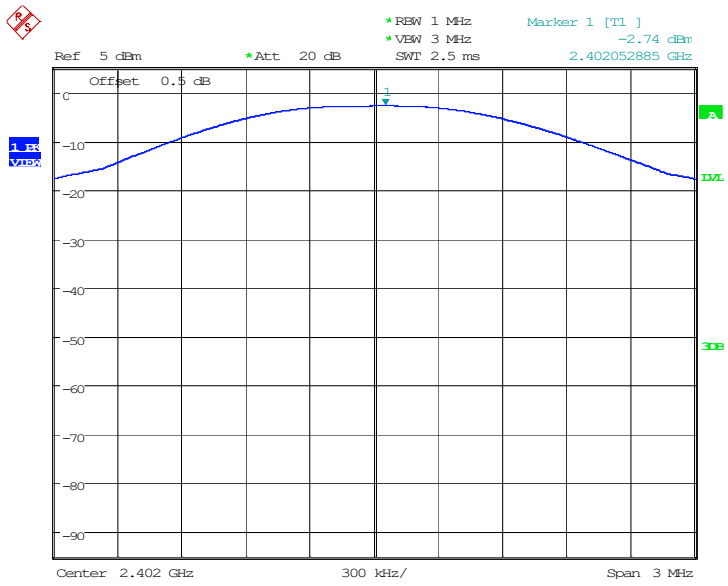
b. Allow trace to stabilize.
c. Use the marker-to-peak function to set the marker to the peak of the emission.
d. The indicated level is the peak output power, after any corrections for external attenuators and cables.
e. A plot of the test results and setup description shall be included in the test report.

Test Data

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-03-27	Environment:	Temp.: 23.9℃ Humi.: 60% Atm :100.8kPa

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)	Limit (dBm)
BDR (GFSK)	2402	-2.74	21
	2441	-2.00	21
	2480	-1.71	21
EDR (π/4-DQPSK)	2402	-2.92	21
	2441	-1.78	21
	2480	-1.58	21
EDR (8DPSK)	2402	-2.94	21
	2441	-1.82	21
	2480	-1.61	21

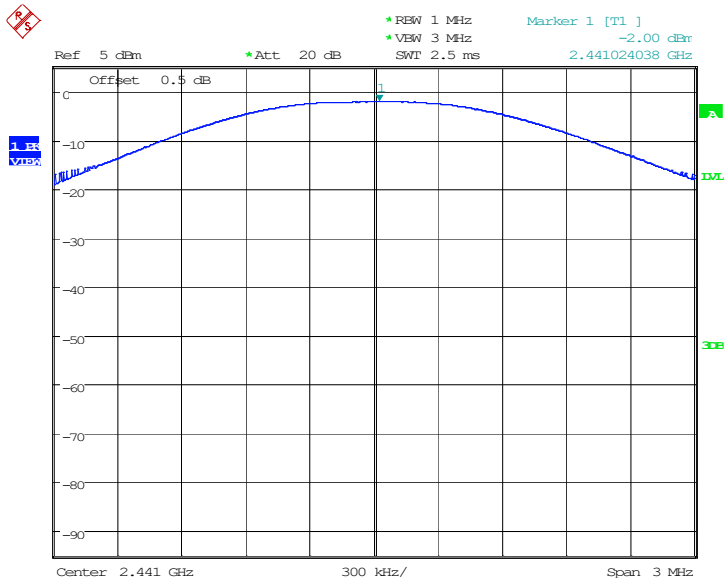
BDR (GFSK): 2402MHz



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 11:14:40

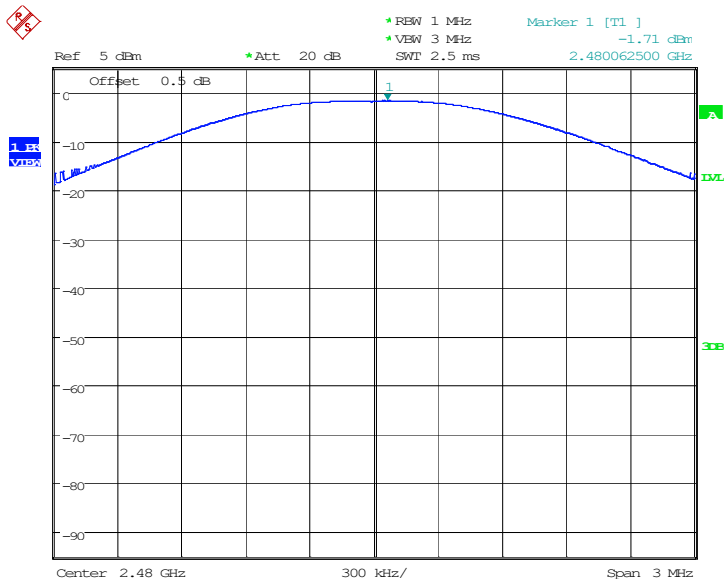
BDR (GFSK): 2441MHz



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

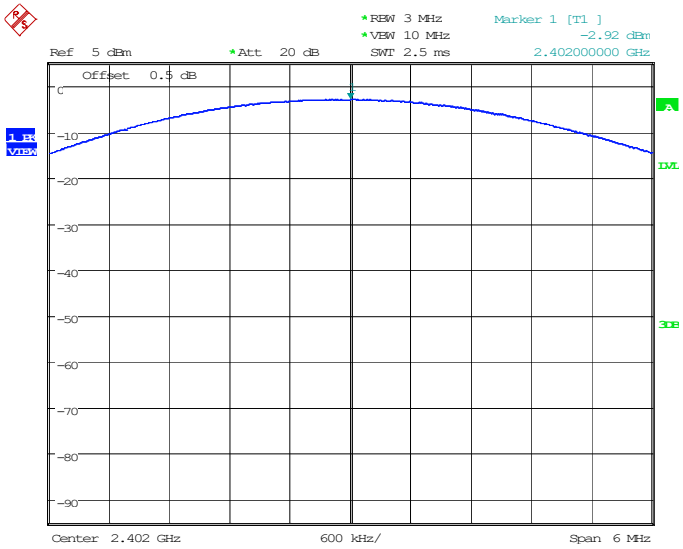
Date: 27.MAR.2024 11:18:13

BDR (GFSK): 2480MHz



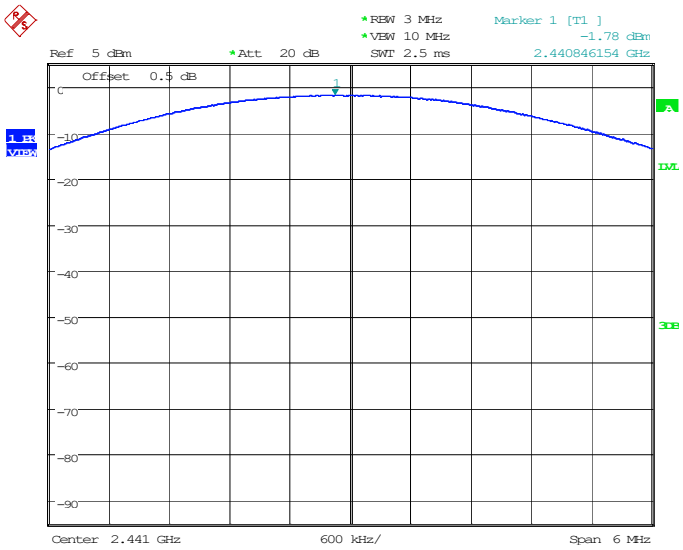
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:18:45

EDR(π/4-DQPSK): 2402MHz



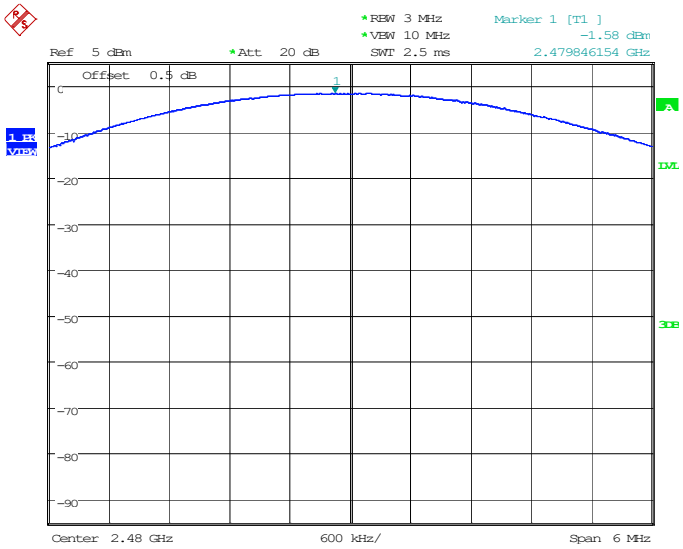
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:21:39

EDR(π/4-DQPSK): 2441MHz



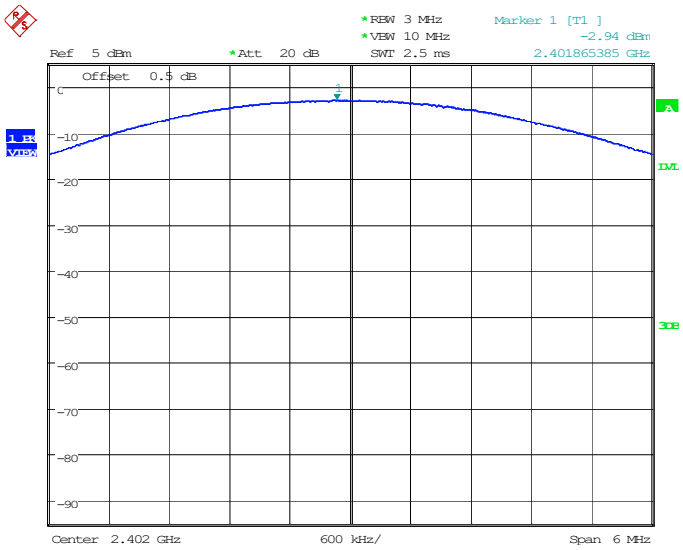
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:20:51

EDR(π/4-DQPSK): 2480MHz



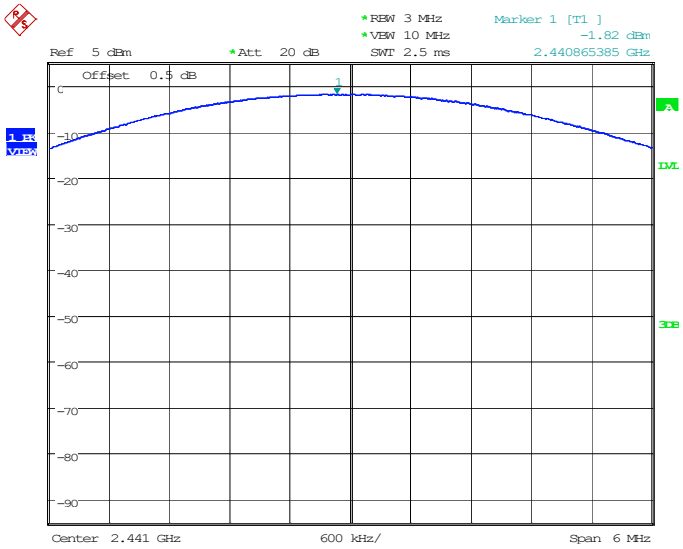
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:22:22

EDR(8DPSK): 2402MHz



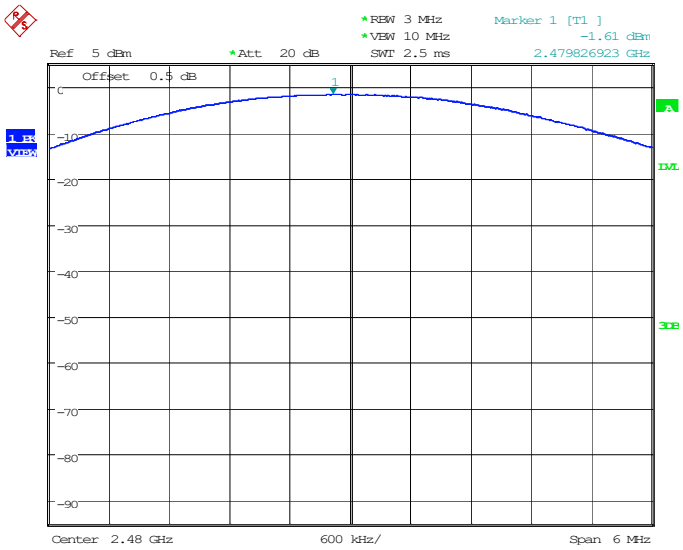
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:25:15

EDR(8DPSK): 2441MHz



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:24:25

EDR(8DPSK): 2480MHz



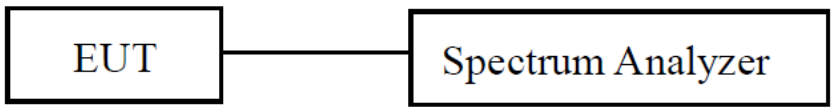
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 11:23:12

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates Compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

EUT Setup



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.

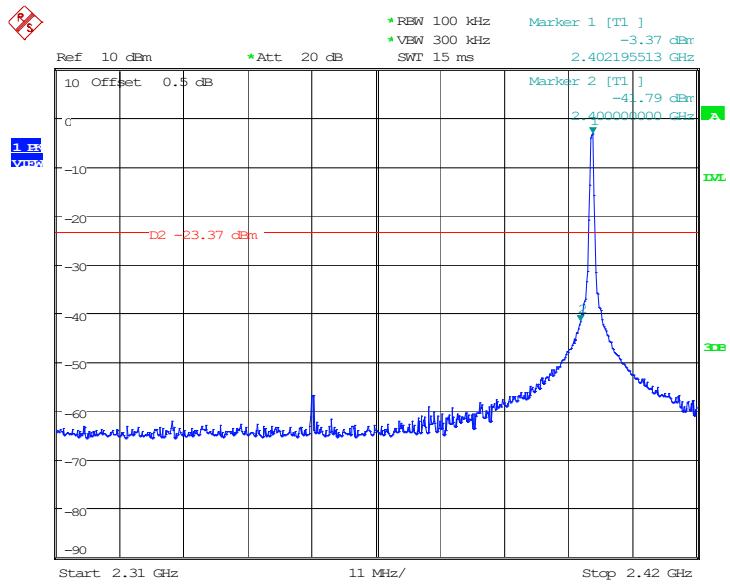
Test Data

Test Mode:	Transmitting	Test Engineer:	Ash Lin
Test Date:	2024-03-27	Environment:	Temp.: 23.9℃ Humi.: 60% Atm :100.8kPa

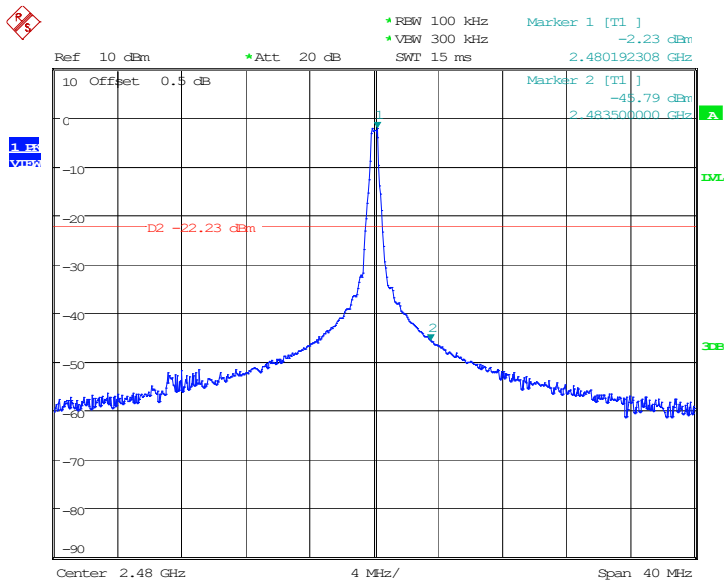
Please refer to the below plots:

Band Edge

BDR (GFSK): Left Side



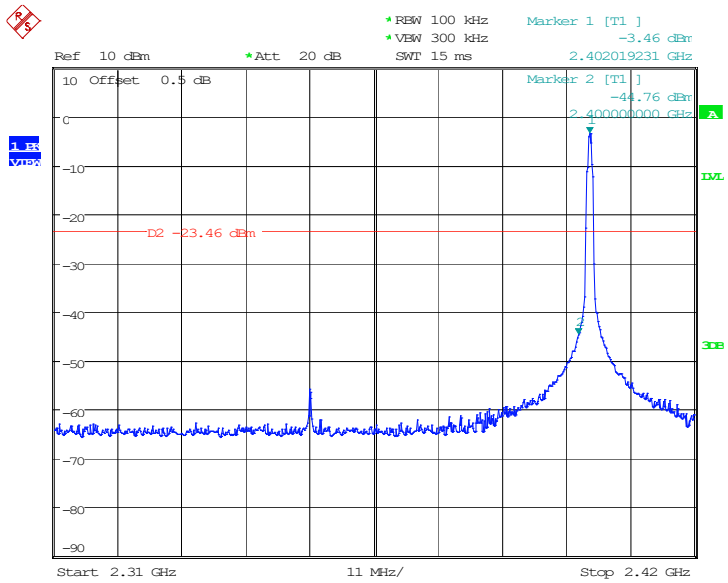
BDR (GFSK): Right Side



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:59:50

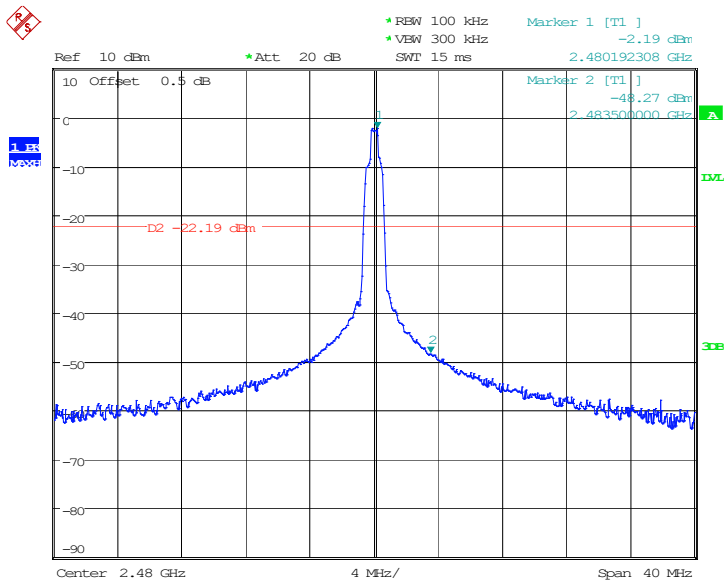
EDR (π/4-DQPSK): Left Side



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:53:59

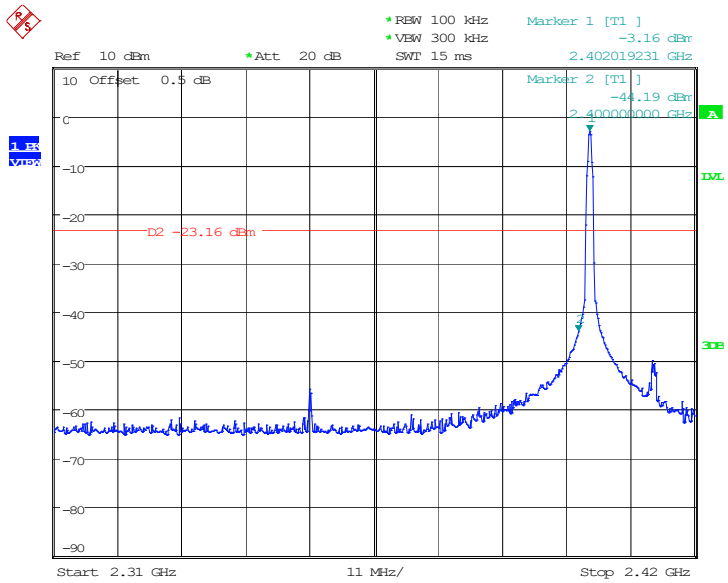
EDR (π/4-DQPSK): Right Side



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 14:58:22

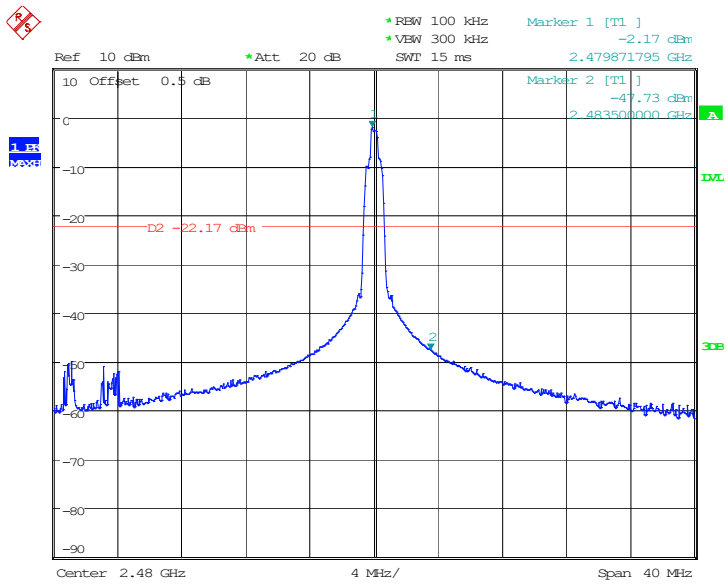
EDR (8DPSK): Left Side



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

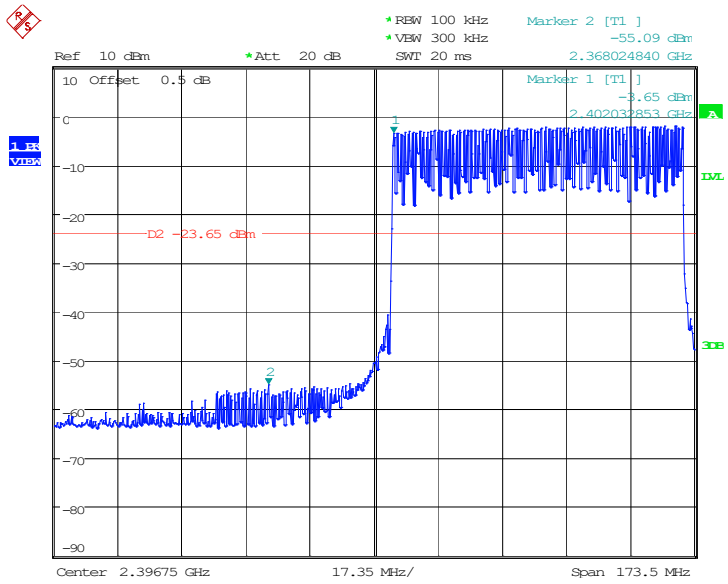
Date: 27.MAR.2024 14:52:50

EDR (8DPSK): Right Side



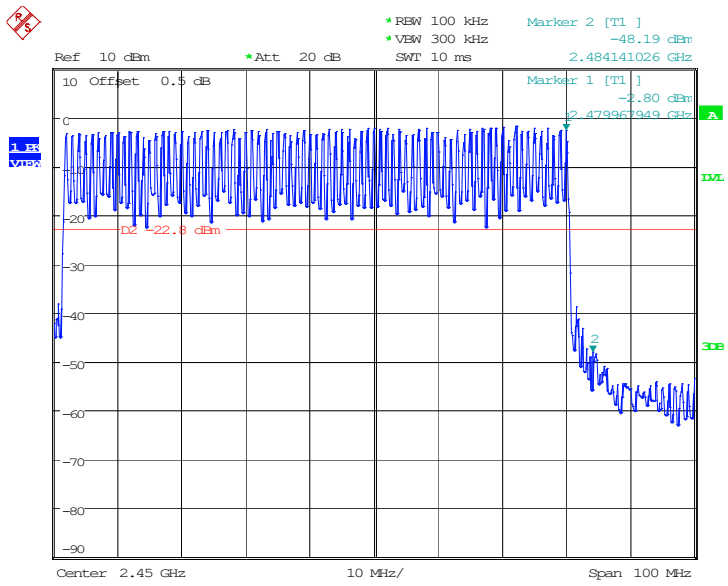
Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 15:05:56

BDR (GFSK): Left Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin
Date: 27.MAR.2024 15:48:54

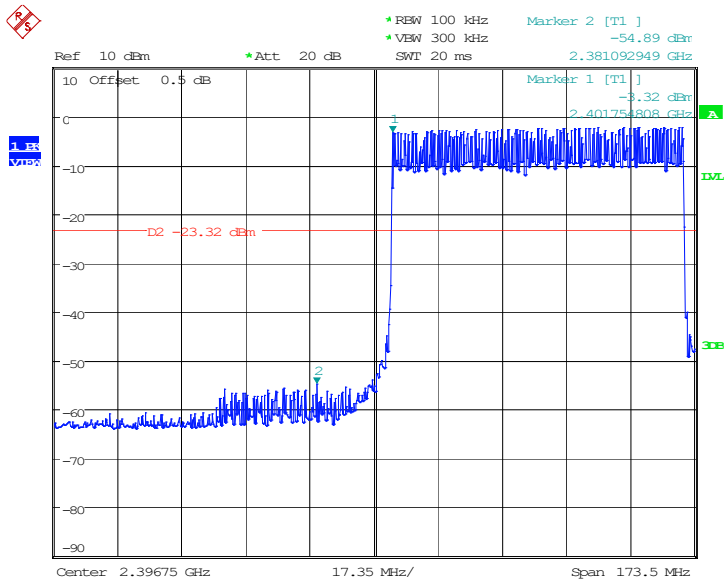
BDR (GFSK): Right Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:40:15

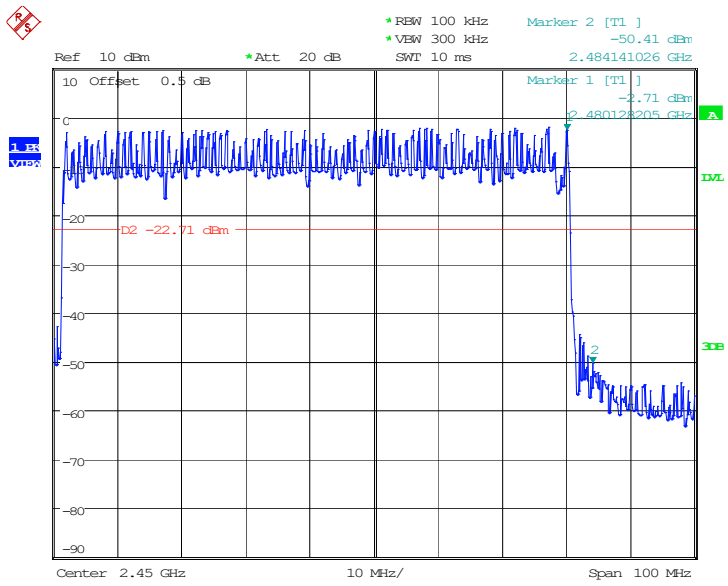
EDR (π/4-DQPSK): Left Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 15:56:07

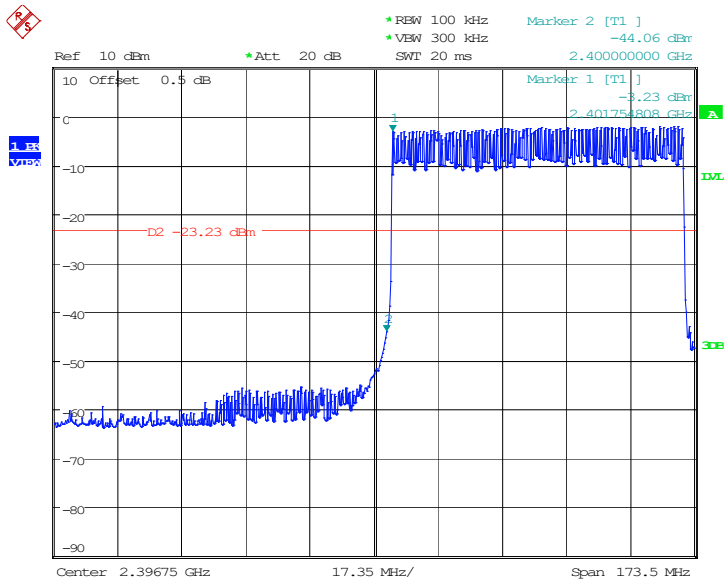
EDR (π/4-DQPSK): Right Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:36:08

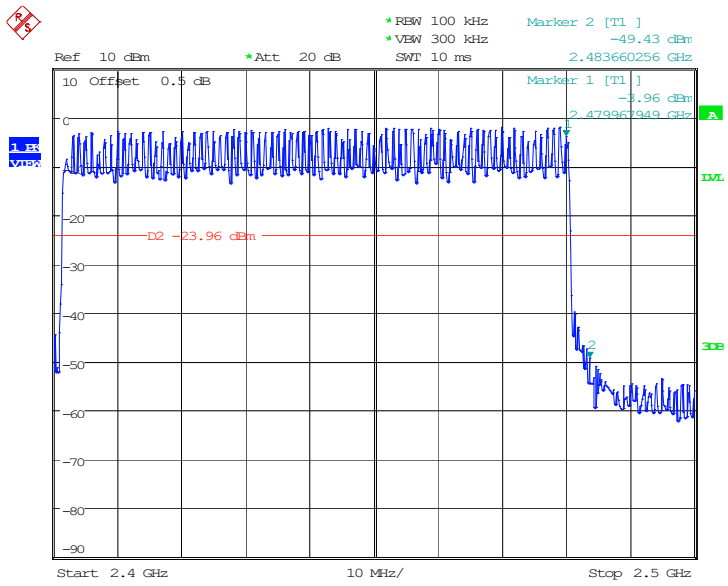
EDR (8DPSK): Left Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:13:07

EDR (8DPSK): Right Side - Hopping



Project No. :XMTN1240325-15534E-RF Tester: Ash Lin

Date: 27.MAR.2024 16:31:23

EUT PHOTOGRAPHS

Please refer to the attachment XMTN1240325-15534E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and XMTN1240325-15534E-RF-INP EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment XMTN1240325-15534E-RF-TSP_TEST SETUP PHOTOGRAPHS.

Declarations

1. Bay Area Compliance Laboratories Corp. (Xiamen) is not responsible for authenticity of any information provided by the applicant. Information from the applicant that may affect test results are marked with an asterisk "★".

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

3. Unless required by the rule provided by the applicant or product regulations, then decision rule in this report did not consider the uncertainty.

4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

5. This report cannot be reproduced except in full, without prior written approval of Bay Area Compliance Laboratories Corp. (Xiamen).

6. This report is valid only with a valid digital signature. The digital signature may be available only under the adobe software above version 7.0.

7. This report may contain standards and test items that are not covered by the accreditation scope and shall be marked with an asterisk "▲".

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