FCC PART 15.247
RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT2
RSS-247 ISSUE 3, AUGUST 2023

TEST REPORT

For

FCC: Quanzhou WenTeLai Import and Export Trade Co., Ltd.

Room 2207, Building 1, Vanke Phase I, No. 209 Fuxi Road, Fengze District, Quanzhou City,
Fujian Province, China

IC: Quanzhou WenTeLai Import and Export Trade Co., Ltd.

Room 2207, Building 1, Vanke Phase I, No. 209 Fuxi Road, Fengze District Quanzhou City
Fujian 362000 China

FCC ID: 2BH4T-VP02
IC: 33323-VP02

Report Type:	**Product Name:**
Original Report	Vertical Vibration Exercise Plate

Report Number:	2407A50315E-RF-02
Report Date:	2025-04-27
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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	2407A50315E-RF-02	R1V1	2025-04-27	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Quanzhou WenTeLai Import and Export Trade Co., Ltd.
Product Name:	Vertical Vibration Exercise Plate
Tested Model:	VP-02
HVIN:	VP02
Multiple Model(s):	N/A
Power Supply:	AC 120V/60Hz
Maximum Peak Output Power (Conducted):	-1.07 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 Antenna
★Maximum Antenna Gain:	3dBi
EUT Received Status:	Good

Note:
1. The Maximum Antenna Gain was declared by manufacturer.
2. All measurement and test data in this report was gathered from production sample serial number: 2W7K-2 (Assigned by the BACL (Xiamen). The EUT supplied by the applicant was received on 2024-12-18)

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 KDB 558074 D01 15.247 Meas Guidance v05r02. And RSS-247 Issue 3, August 2023 and RSS-Gen, Issue 5, February 2021 Amendment 2 of the Innovation, Science and Economic Development Canada.

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.

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 IC accredited lab under the KDB 974614 D01, the IC Designation No. : CN0176.

Measurement Uncertainty

Item		U_{lab}
Conducted Emission	150kHz-30MHz	2.45 dB
Radiated Emission	9kHz-150kHz	2.82dB
	150kHz-30MHz	2.74dB
	30MHz~200MHz	3.47 dB
	200MHz~1GHz	4.86 dB
	1GHz~6GHz	4.88 dB
	6GHz-18GHz	4.95 dB
	18GHz~26.5GHz	4.45 dB
Occupied Channel Bandwidth		2%
Transmitter Conducted Power(Conducted RF power)		1.49 dB
Conducted Spurious Emission		2.92 dB
Power Spectral Density		0.61 dB
Duty Cycle		1 %
Temperature		1 ℃
Humidity		5 %
Supply voltages		1 %

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: AC 120V/60Hz
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: BK32xx RF Test_V1.8.2

Test Modes	Power Level Setting		
	Lowest Channel	Middle Channel	Highest Channel
GFSK	1	1	1
π/4-DQPSK	1	1	1
8DPSK	1	1	1

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

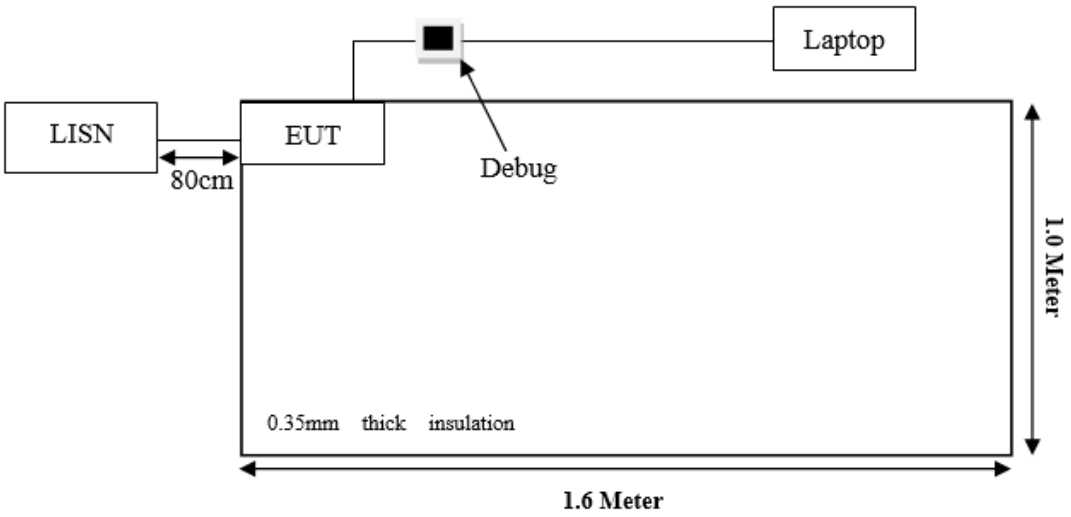
Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	T480	PF1P5K4F
Unknown	Debug	Unknown	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Cable	0.1	EUT	Debug
USB Cable	10	Debug	Laptop

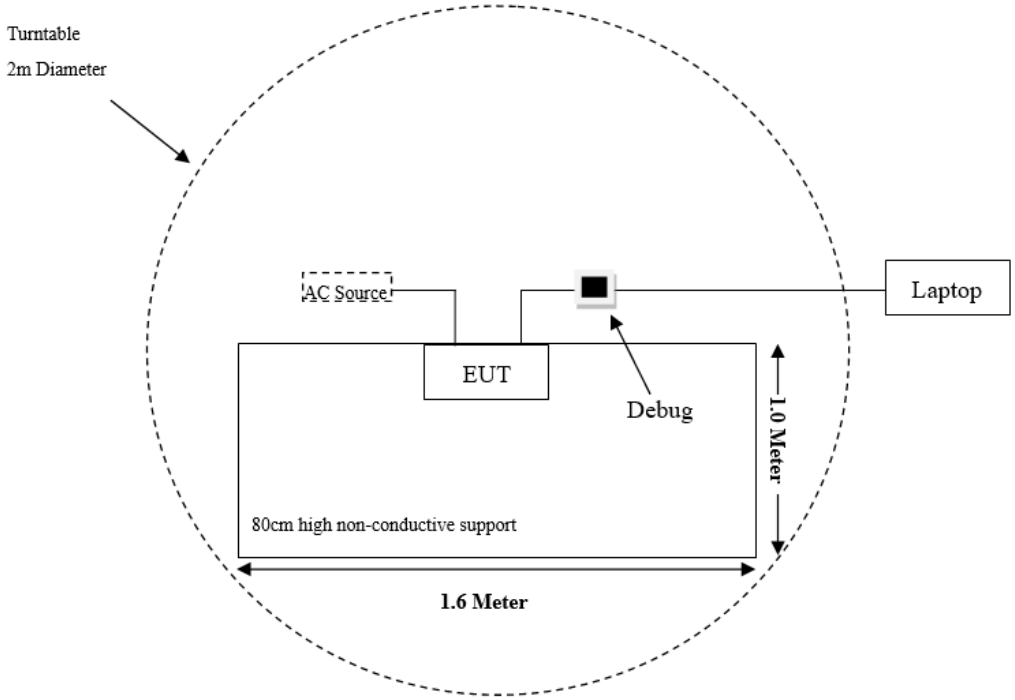
Block Diagram of Test Setup

Conducted Emission:

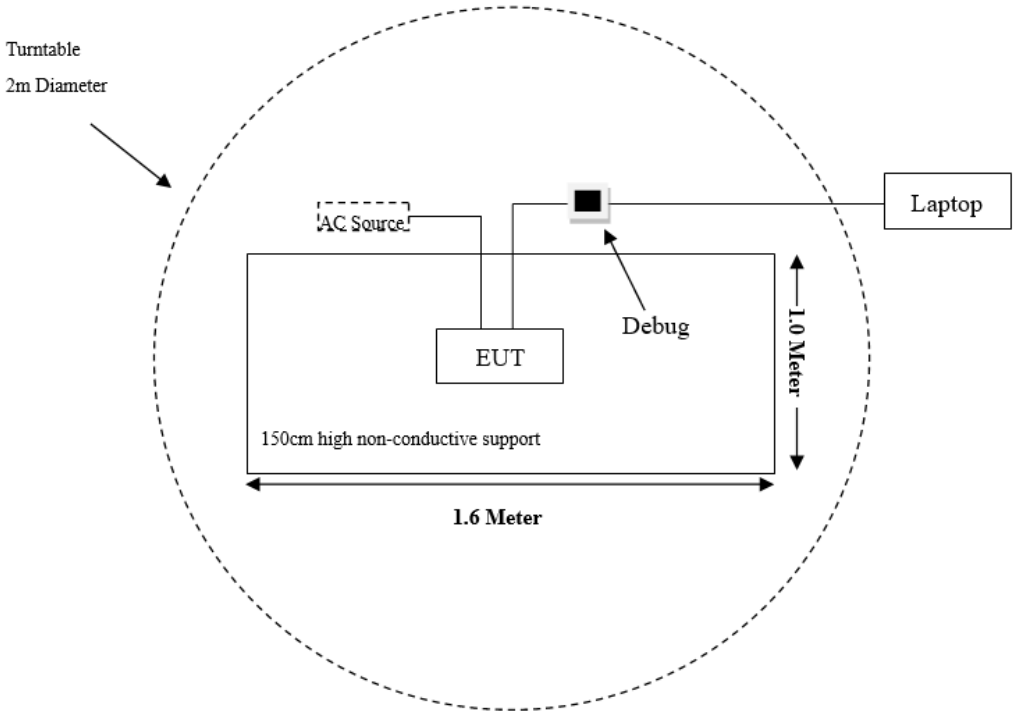


Radiated Emission:

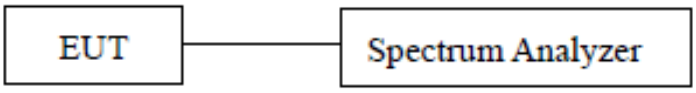
Below 1GHz:



Above 1GHz:



RF Conduction:



Note: The cable assembly insertion loss of 0.5dB was entered as an offset in the spectrum analyzer. (Actual cable loss was unavailable at the time of testing, therefore loss of 0.5dB was assumed as worst case.) This was later verified to be true by laboratory.

SUMMARY OF TEST RESULTS

Standard(s)/Rule(s)	Description of Test	Result
FCC§15.203 RSS-Gen Clause 6.8	Antenna Requirement	Compliant
FCC§15.207(a) RSS-Gen Clause 8.8	AC Line Conducted Emissions	Compliant
FCC§15.205, §15.209 & §15.247(d) RSS-Gen Clause 8.10	Radiated Emissions & Restricted Bands Emissions	Compliant
FCC§15.247(a)(1) RSS-247 Clause 5.1 b)	20 dB Emission Bandwidth	Compliant
RSS-Gen Clause 6.7	99% Occupied Bandwidth	Compliant
FCC§15.247(a)(1) RSS-247 Clause 5.1 b)	Channel Separation Test	Compliant
FCC§15.247(a)(1)(iii) RSS-247 Clause 5.1 d)	Time of Occupancy (Dwell Time)	Compliant
FCC§15.247(a)(1)(iii) RSS-247 Clause 5.1 d)	Quantity of hopping channel Test	Compliant
FCC§15.247(b)(1) RSS-247 Clause 5.4 b)	Peak Output Power Measurement	Compliant
FCC§15.247(d) RSS-247 Clause 5.5	Band edges	Compliant

TEST EQUIPMENT LIST

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions					
EMI Test Receiver	Rohde & Schwarz	ESR	103105	2024/03/29	2025/03/28
LISN	Rohde & Schwarz	ENV216	100129	2024/03/29	2025/03/28
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC001	2024/03/29	2025/03/28
Test Software	Audix	E3	18621a	N/A	N/A
Radiated Emissions Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESR	103103	2024/03/29	2025/03/28
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	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC002	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-2M	CC006	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-12M	CC007	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2024/03/29	2025/03/28
Test Software	Audix	E3	18621a	N/A	N/A
Radiated Emissions Above 1 GHz					
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102051	2024/03/29	2025/03/28
Filter Switch Unit	Decentest	DT7220FSU	DS79904	2024/02/23	2025/02/22
Multiplex Switch Test & Control Set	Decentest	DT7220SCU	DS79901	2024/02/23	2025/02/22
Horn Aantenna	EMCO	3115	9002-3355	2024/11/19	2027/11/18
Preamplifier	A.H.Systems	PAM-0118P	489	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-6M	CC003	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-1M	CC005	2024/03/29	2025/03/28
Horn Antenna	EMCO	3116	9407-2232	2023/07/31	2026/07/30
Preamplifier	A.H.Systems	PAM-1840	200	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH360A-2.92-3M	CC008	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH360A-2.92-1M	CC009	2024/03/29	2025/03/28
Test Software	Audix	E3	18621a	N/A	N/A
RF Conducted Test					
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102051	2024/3/29	2025/3/28
Coaxial Cable	Lianxun	RF133	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 & RSS-Gen Clause 6.8 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 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.

According to RSS-Gen Clause 6.8 The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent is otropically 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 has one PCB antenna for Bluetooth, which was permanently attached and the antenna gain is 3 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

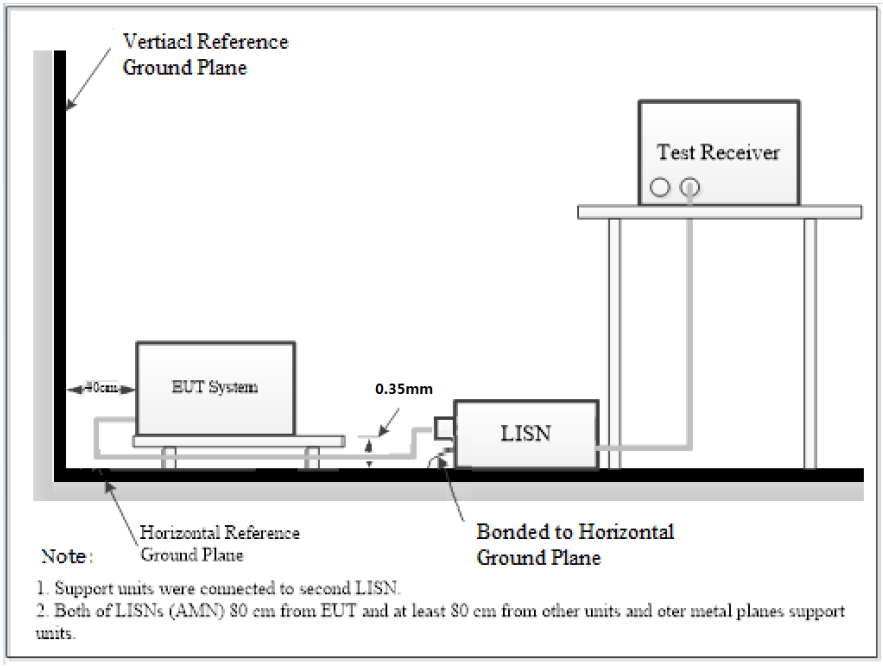
Result: Compliance

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

Applicable Standard

FCC §15.207(a), RSS-Gen Clause 8.8

Test System Setup



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 limits.

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

ANSI C63.10-2013 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.

Result &Margin Calculation

The Result 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)
Result (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) –Result (dBμV)

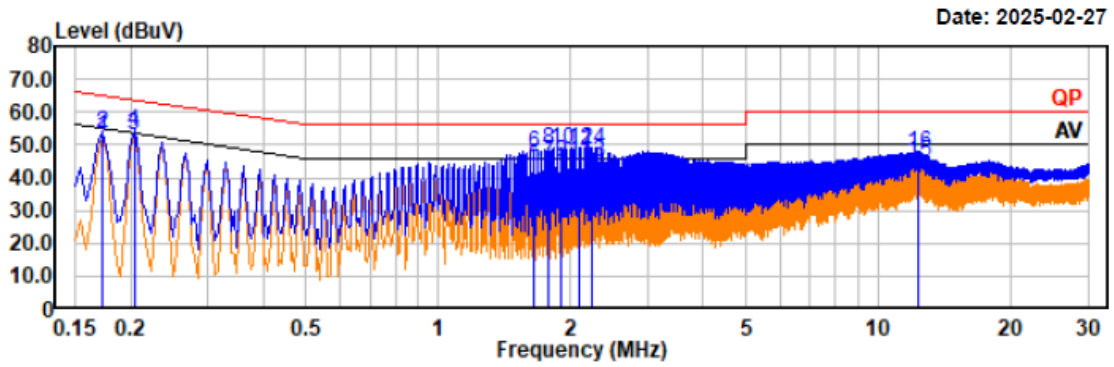
Test Data

Temperature:	22.9°C
Relative Humidity:	51%
ATM Pressure:	100.1kPa
Test Date:	2025-02-27
Test Engineer:	Spike Gao

Note: The maximum output power mode: 8DPSK Low channel was tested.

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02

Temp/Humi/ATM: 22.9℃/51%/100.1kPa
Tested by: Spike Gao
Power Source: AC 120V/60Hz

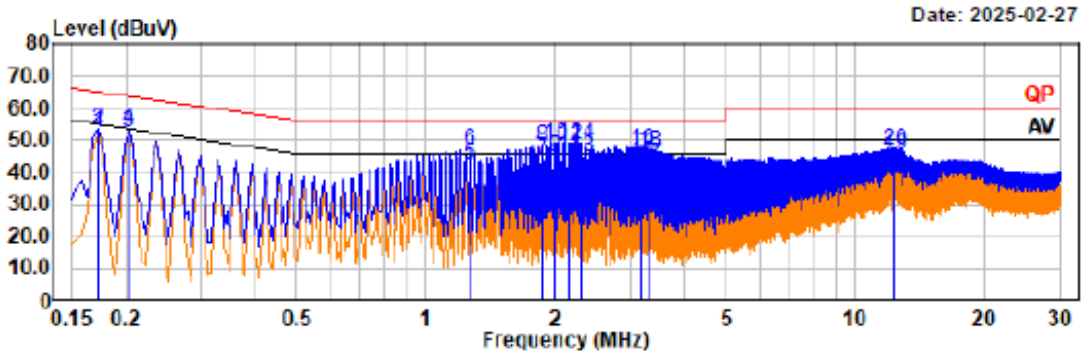


Trace: 1
Condition: IF B/W 9kHz PK/AV

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.17	31.30	21.15	52.45	54.84	2.39	Line	Average
0.17	32.46	21.15	53.61	64.84	11.23	Line	QP
0.20	31.60	21.25	52.85	53.45	0.60	Line	Average
0.20	32.73	21.25	53.98	63.45	9.47	Line	QP
1.65	22.88	20.92	43.80	46.00	2.20	Line	Average
1.65	26.76	20.92	47.68	56.00	8.32	Line	QP
1.77	23.53	20.96	44.49	46.00	1.51	Line	Average
1.77	27.35	20.96	48.31	56.00	7.69	Line	QP
1.90	23.55	21.00	44.55	46.00	1.45	Line	Average
1.90	27.38	21.00	48.38	56.00	7.62	Line	QP
2.09	23.86	21.02	44.88	46.00	1.12	Line	Average
2.09	27.58	21.02	48.60	56.00	7.40	Line	QP
2.24	23.90	21.01	44.91	46.00	1.09	Line	Average
2.24	27.57	21.01	48.58	56.00	7.42	Line	QP
12.37	23.83	21.00	44.83	50.00	5.17	Line	Average
12.37	26.27	21.00	47.27	60.00	12.73	Line	QP

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02

Temp/Humi/ATM: 22.9℃/51%/100.1kPa
Tested by: Spike Gao
Power Source: AC 120V/60Hz



Trace: 1
Condition: IF B/W 9kHz PK/AV

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.17	31.30	20.95	52.25	54.84	2.59	Neutral	Average
0.17	32.44	20.95	53.39	64.84	11.45	Neutral	QP
0.20	31.61	21.05	52.66	53.46	0.80	Neutral	Average
0.20	32.74	21.05	53.79	63.46	9.67	Neutral	QP
1.27	21.89	20.86	42.75	46.00	3.25	Neutral	Average
1.27	25.88	20.86	46.74	56.00	9.26	Neutral	QP
1.87	23.16	21.09	44.25	46.00	1.75	Neutral	Average
1.87	27.17	21.09	48.26	56.00	7.74	Neutral	QP
1.99	23.40	21.13	44.53	46.00	1.47	Neutral	Average
1.99	27.40	21.13	48.53	56.00	7.47	Neutral	QP
2.15	23.46	21.11	44.57	46.00	1.43	Neutral	Average
2.15	27.43	21.11	48.54	56.00	7.46	Neutral	QP
2.30	23.44	21.10	44.54	46.00	1.46	Neutral	Average
2.30	27.32	21.10	48.42	56.00	7.58	Neutral	QP
3.18	21.94	21.02	42.96	46.00	3.04	Neutral	Average
3.18	25.72	21.02	46.74	56.00	9.26	Neutral	QP
3.31	21.62	21.00	42.62	46.00	3.38	Neutral	Average
3.31	25.43	21.00	46.43	56.00	9.57	Neutral	QP
12.34	24.07	20.95	45.02	50.00	4.98	Neutral	Average
12.34	26.11	20.95	47.06	60.00	12.94	Neutral	QP

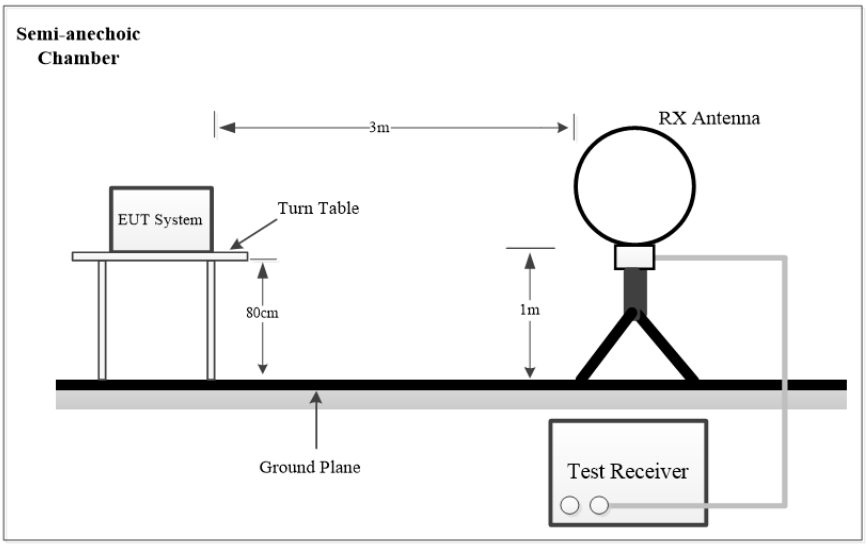
FCC §15.205, §15.209 & §15.247(d) & RSS-247 Clause 5.5, RSS-GEN ISSUE5 Clause 8.10 – RADIATED EMISSIONS

Applicable Standard

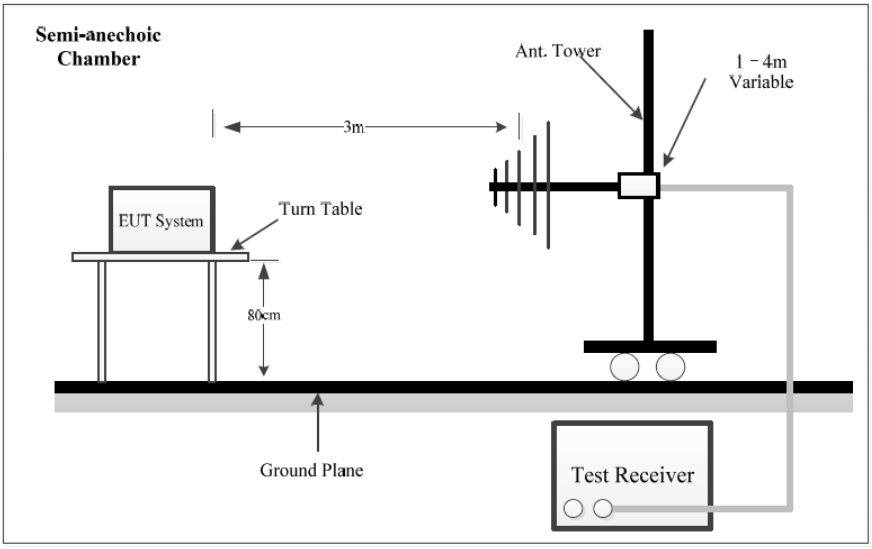
FCC §15.205; §15.209; §15.247(d); RSS-247 Clause 5.5; RSS-GEN ISSUE5 Clause 8.10

Test System Setup

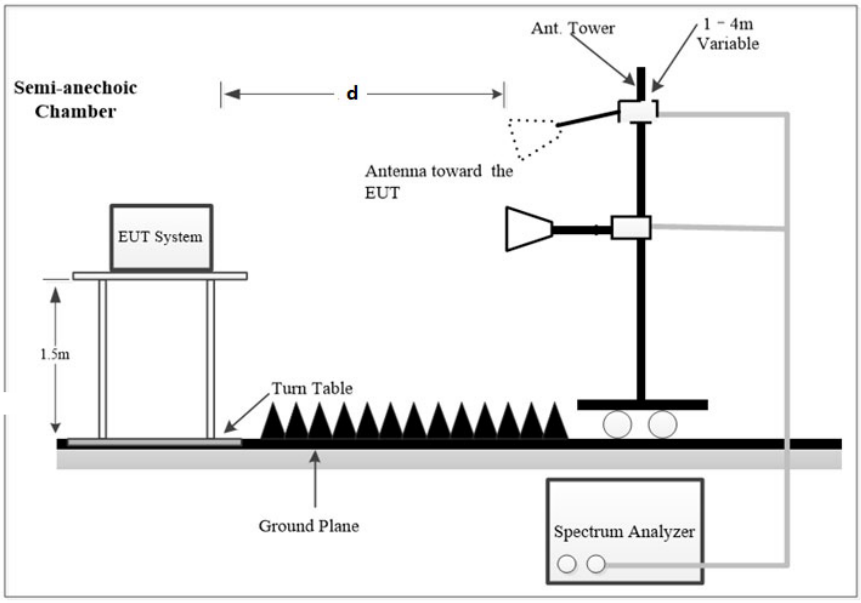
9 kHz-30MHz



Below 1 GHz:



Above 1GHz:



The radiated emission tests 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.

NOTE: d is testing distance;
For Radiated Emission test (1GHz-18GHz) and Bandedge Emission test, which was performed at 3 m distance.

For Radiated Emission test (18GHz-25GHz), which was performed at 1.0 m distance, according to ANSI C63.10-2013, the test result shall be extrapolated to the specified distance using an extrapolation Factor of 20dB/decade from 3m to 1.0m.
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.0m]) dB= 9.54 dB

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI Test Receiver & Spectrum Analyzer Setup was set with the following configurations:

Frequency Range	RBW	VBW	Measurement
9 kHz – 150 kHz	300Hz	1 kHz	PK
	200Hz	/	QP
150 kHz – 30 MHz	10 kHz	30 kHz	PK
	9kHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	PK
	120kHz	/	QP

1GHz~25GHz:
Pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3MHz	PK
Ave.	1MHz	5kHz	PK

Final measuurement for emission identifed ding the pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3MHz	PK
Ave.	1MHz	10Hz	PK

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.”

Below 1GHz, 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.

Above 1GHz, if the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is below the AV emission limit, there's no need to record the measured AV level of the emissions in the report.

Result &Margin Calculation

The Result 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:

For 9 kHz to 18GHz Radiated emission test
Factor (dB/m) =Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

For 18GHz to 25GHz Radiated emission test and Bandedge emissions test
Factor (dB/m) =Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB) - Extrapolation factor (dB)

Extrapolation factor=9.54dB (distance=1m)

Result (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) –Result (dBμV/m)

The spurious emission from 9 kHz-30MHz of IC RSS-Gen standard, the unit of final result on the test plots are dBμV/m, so the limit should be added by 51.5dB from dBμA/m to dBμV/m.

Test Data

Please refer to the below table and plots.

Frequency Range:	Below 1 GHz	Above 1 GHz
Temperature:	21.4℃~21.7℃	21.4℃
Relative Humidity:	51%~60.5%	51 %
ATM Pressure:	100.1kPa	100.1kPa
Test Date:	2025-01-06~2025-03-27	2025-01-06
Test Engineer:	Wlif Wu & Spike Gao	Wlif Wu

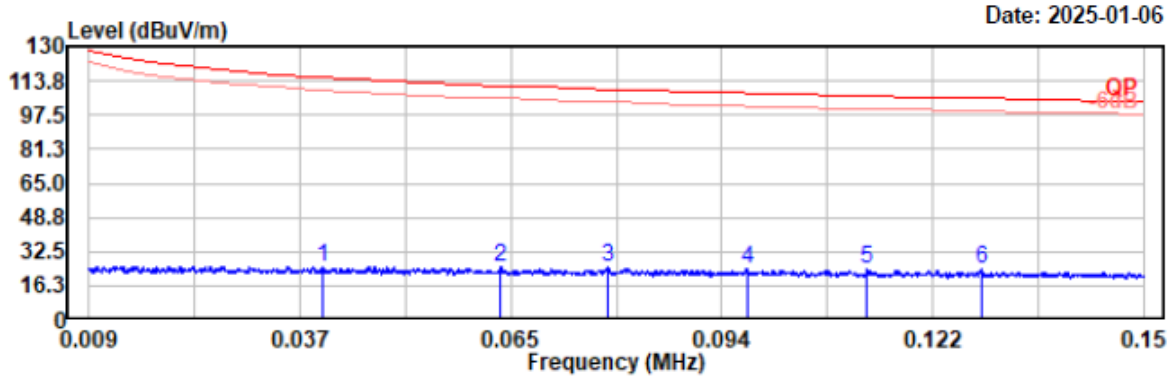
1) 9 kHz ~30 MHz

Pre-scan in parallel, ground-parallel and perpendicular of orientation of loop antenna, parallel is worst case.

Note: The maximum output power mode: 8DPSK Low channel was tested.

Project No.:2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source:AC 120V/60Hz

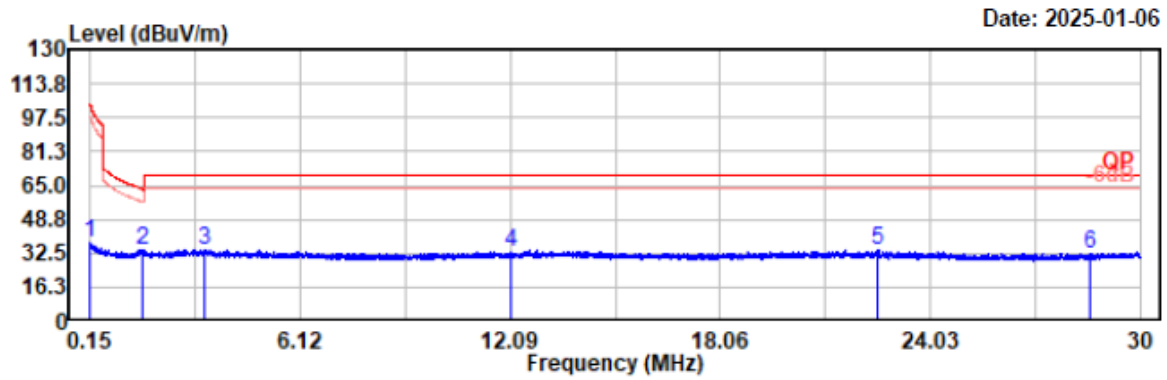


Condition: PK RBW:300Hz VBW:1kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.040	5.61	19.91	25.52	115.52	90.00	Peak
0.064	5.61	19.87	25.48	111.47	85.99	Peak
0.078	5.24	19.73	24.97	109.73	84.76	Peak
0.097	4.29	19.75	24.04	107.88	83.84	Peak
0.113	4.49	19.73	24.22	106.55	82.33	Peak
0.128	4.23	19.73	23.96	105.44	81.48	Peak

Project No.:2407A50315E-RF
Test Mode:3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source:AC 120V/60Hz



Condition: PK RBW:10kHz VBW:30kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.156	18.04	19.72	37.76	103.74	65.98	Peak
1.616	14.87	19.64	34.51	63.44	28.93	Peak
3.380	14.62	19.81	34.43	69.54	35.11	Peak
12.132	13.68	19.73	33.41	69.54	36.13	Peak
22.555	14.08	20.16	34.24	69.54	35.30	Peak
28.582	12.31	20.03	32.34	69.54	37.20	Peak

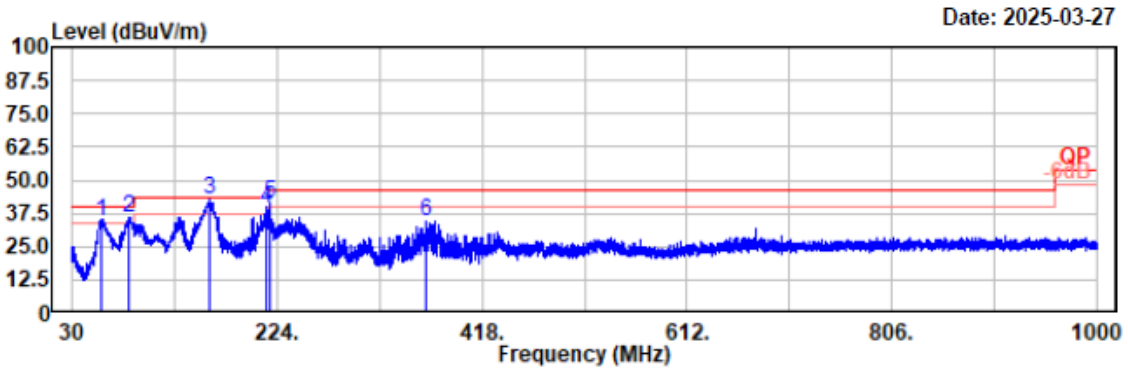
Note: dBuV/m=dBuA/m+51.5dB

2) 30MHz-1GHz

Note: The maximum output power mode: 8DPSK Low channel was tested.

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.7℃/60.5%/100.1kPa
Tested by: Spike Gao
Power Source: AC 120V/60Hz

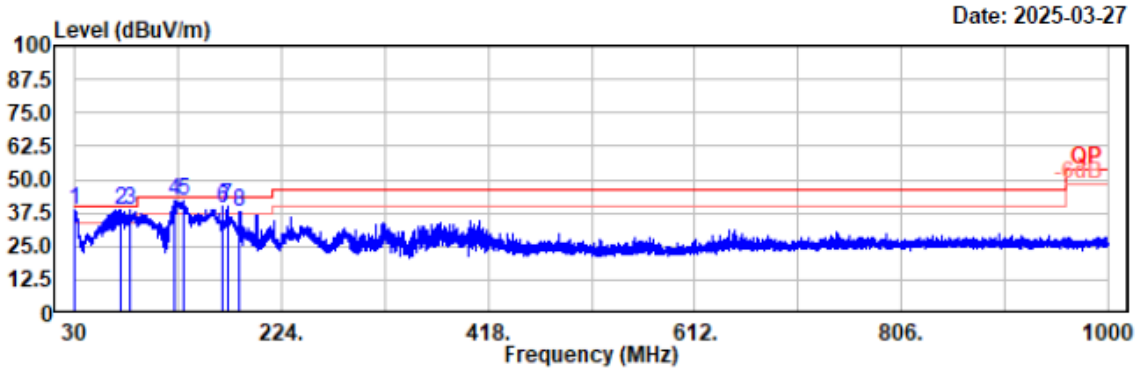


Condition: PK RBW:100kHz VBW:300kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
57.35	52.43	-17.64	34.79	40.00	5.21	Horizontal	QP
83.93	52.96	-17.14	35.82	40.00	4.18	Horizontal	QP
160.37	54.08	-11.49	42.59	43.50	0.91	Horizontal	QP
213.82	52.25	-12.68	39.57	43.50	3.93	Horizontal	QP
216.92	54.04	-12.68	41.36	46.00	4.64	Horizontal	QP
364.46	42.28	-7.53	34.75	46.00	11.25	Horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.7℃/60.5%/100.1kPa
Tested by: Spike Gao
Power Source: AC 120V/60Hz



Condition: PK RBW:100kHz VBW:300kHz SWT:auto

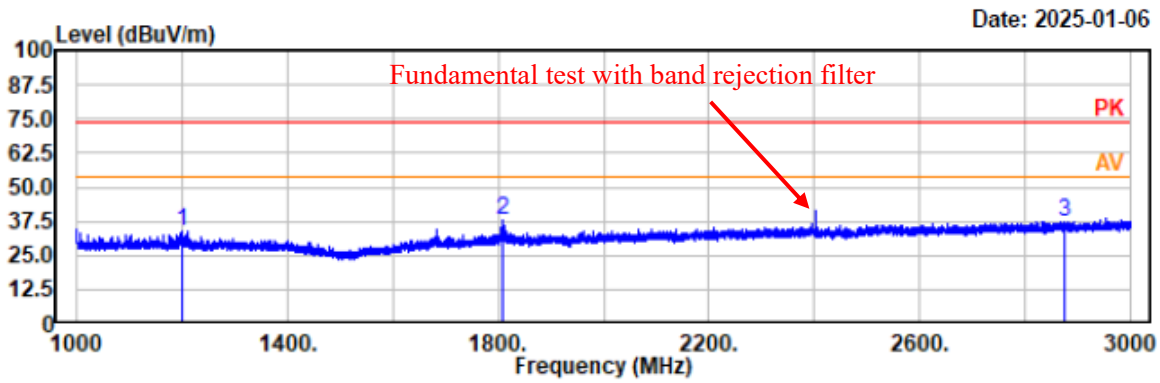
Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
30.39	44.04	-5.70	38.34	40.00	1.66	Vertical	QP
72.78	55.38	-17.03	38.35	40.00	1.65	Vertical	QP
81.12	55.41	-17.07	38.34	40.00	1.66	Vertical	QP
123.31	52.05	-9.95	42.10	43.50	1.40	Vertical	QP
132.04	51.91	-10.09	41.82	43.50	1.68	Vertical	QP
168.81	51.03	-11.82	39.21	43.50	4.29	Vertical	QP
172.98	51.98	-11.94	40.04	43.50	3.46	Vertical	QP
185.01	50.37	-12.46	37.91	43.50	5.59	Vertical	QP

3) 1 GHz-3 GHz

EUT operation mode: Transmitting in the BDR (GFSK) mode

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

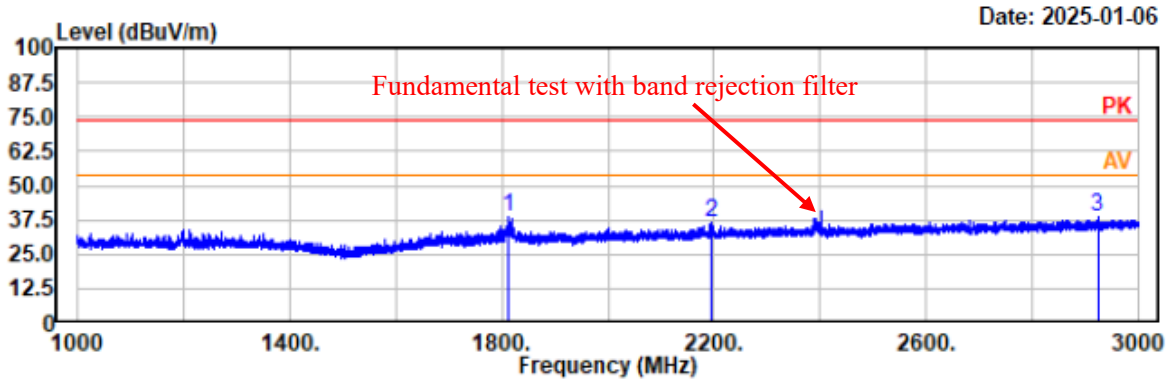


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1199.80	49.18	-15.08	34.10	74.00	39.90	horizontal	Peak
1809.20	51.25	-13.47	37.78	74.00	36.22	horizontal	Peak
2875.00	46.40	-8.85	37.55	74.00	36.45	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

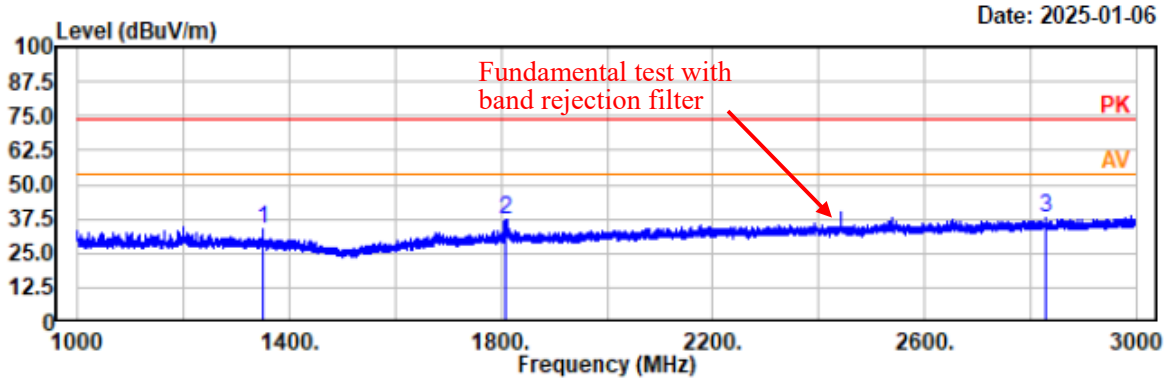


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1812.80	51.95	-13.46	38.49	74.00	35.51	vertical	Peak
2195.80	47.93	-11.39	36.54	74.00	37.46	vertical	Peak
2923.80	47.12	-8.66	38.46	74.00	35.54	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

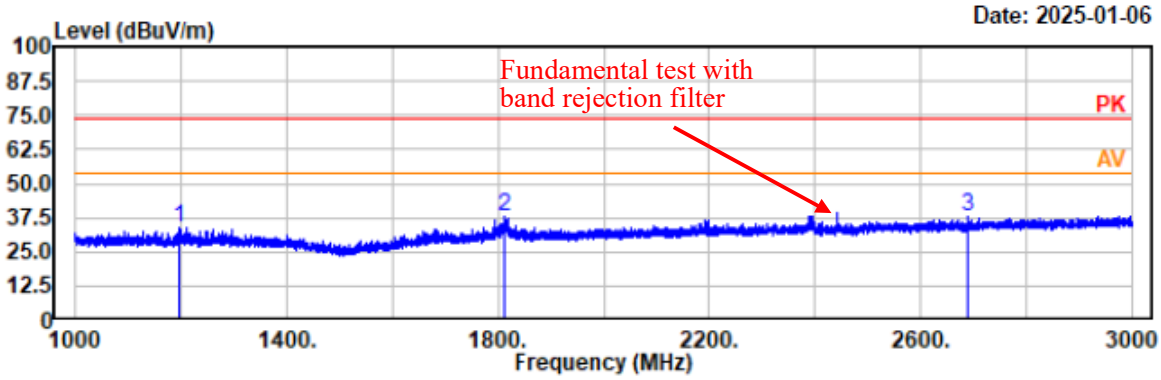


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1350.00	48.98	-15.46	33.52	74.00	40.48	horizontal	Peak
1810.20	50.65	-13.47	37.18	74.00	36.82	horizontal	Peak
2829.80	46.76	-9.01	37.75	74.00	36.25	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

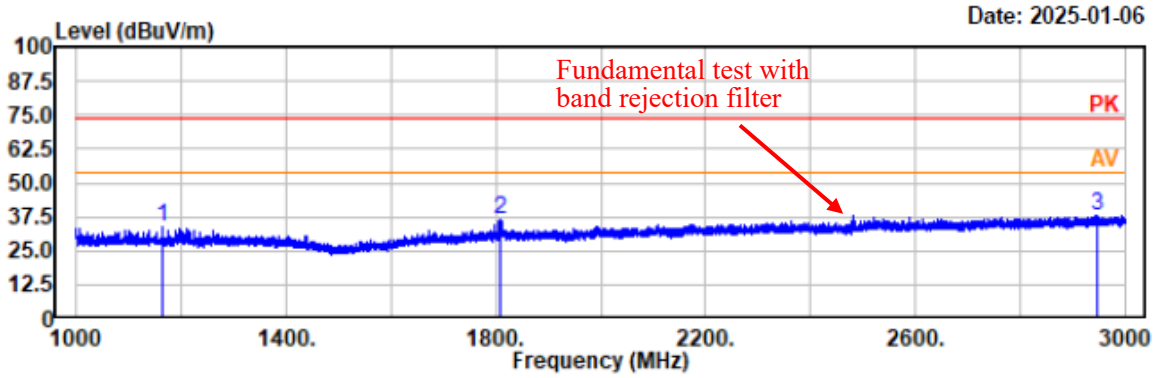


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1197.00	48.98	-15.08	33.90	74.00	40.10	vertical	Peak
1812.00	51.60	-13.47	38.13	74.00	35.87	vertical	Peak
2690.40	47.36	-9.50	37.86	74.00	36.14	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

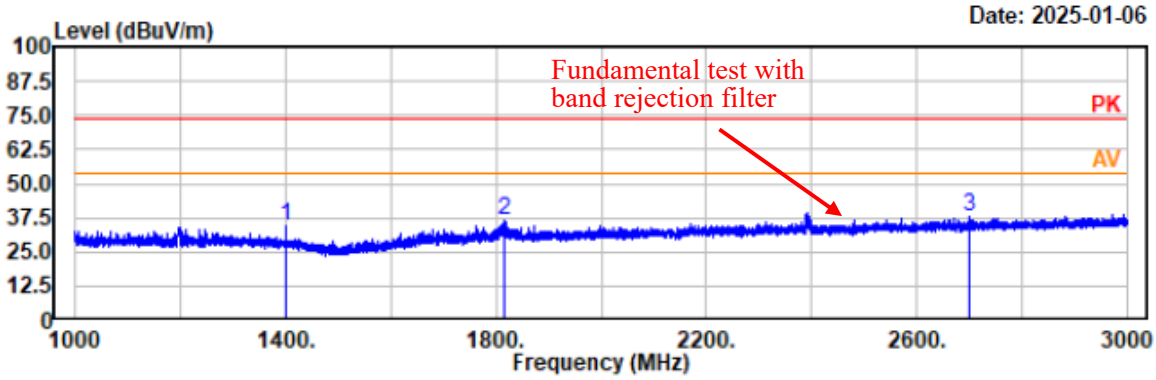


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1164.00	49.25	-15.18	34.07	74.00	39.93	horizontal	Peak
1808.80	49.71	-13.47	36.24	74.00	37.76	horizontal	Peak
2947.40	46.52	-8.54	37.98	74.00	36.02	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



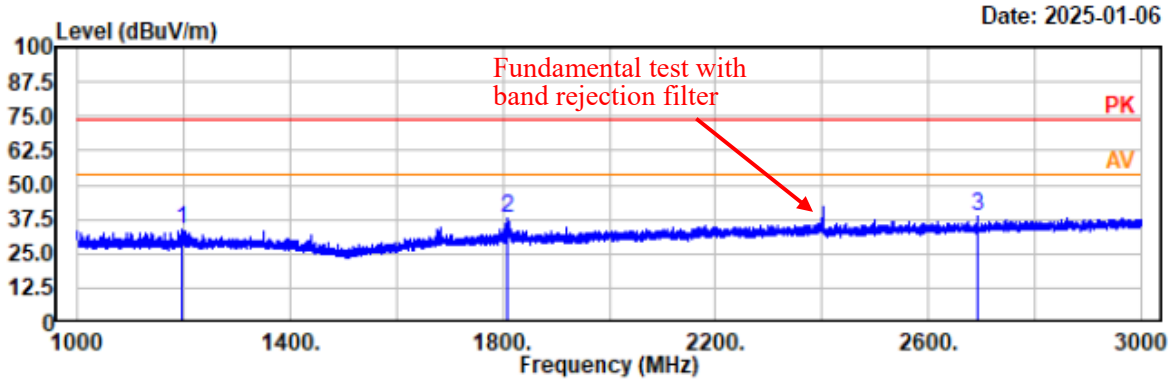
Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1399.80	49.84	-15.70	34.14	74.00	39.86	vertical	Peak
1817.20	50.14	-13.45	36.69	74.00	37.31	vertical	Peak
2700.40	47.08	-9.46	37.62	74.00	36.38	vertical	Peak

EUT operation mode: Transmitting in the EDR (π/4-DQPSK) mode

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

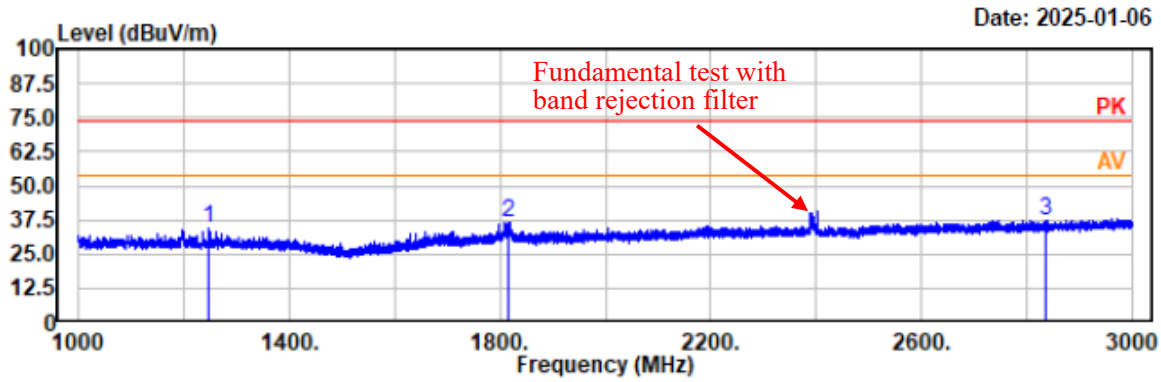


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1197.40	48.65	-15.09	33.56	74.00	40.44	horizontal	Peak
1809.40	51.14	-13.47	37.67	74.00	36.33	horizontal	Peak
2691.40	47.92	-9.49	38.43	74.00	35.57	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

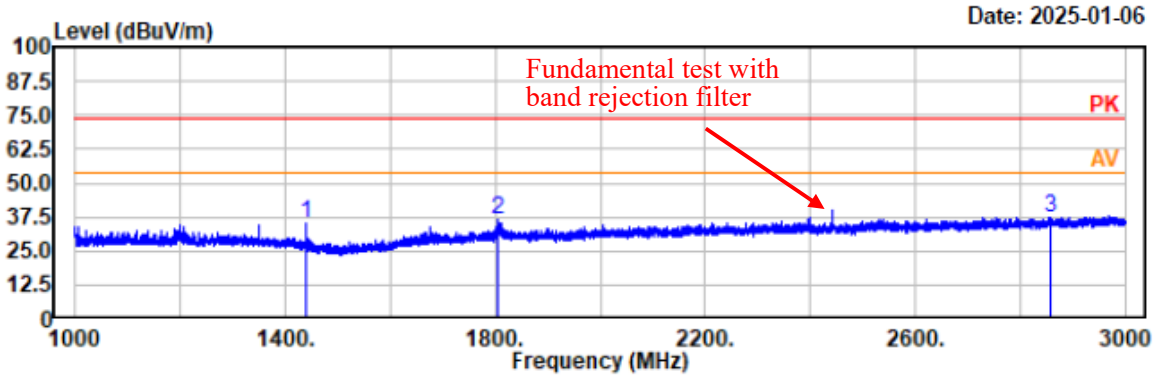


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1248.00	49.42	-15.15	34.27	74.00	39.73	vertical	Peak
1817.40	50.29	-13.45	36.84	74.00	37.16	vertical	Peak
2835.00	46.38	-8.98	37.40	74.00	36.60	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

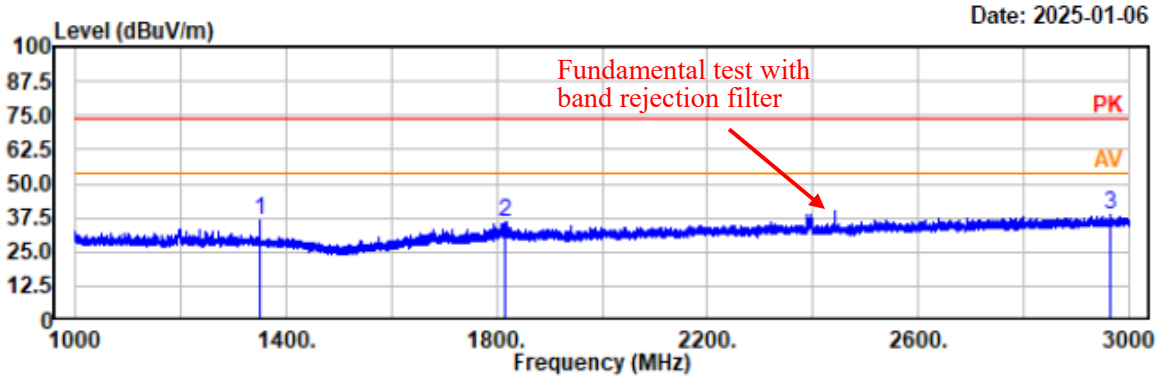


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1440.40	52.17	-16.95	35.22	74.00	38.78	horizontal	Peak
1806.40	49.74	-13.49	36.25	74.00	37.75	horizontal	Peak
2856.40	46.40	-8.90	37.50	74.00	36.50	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

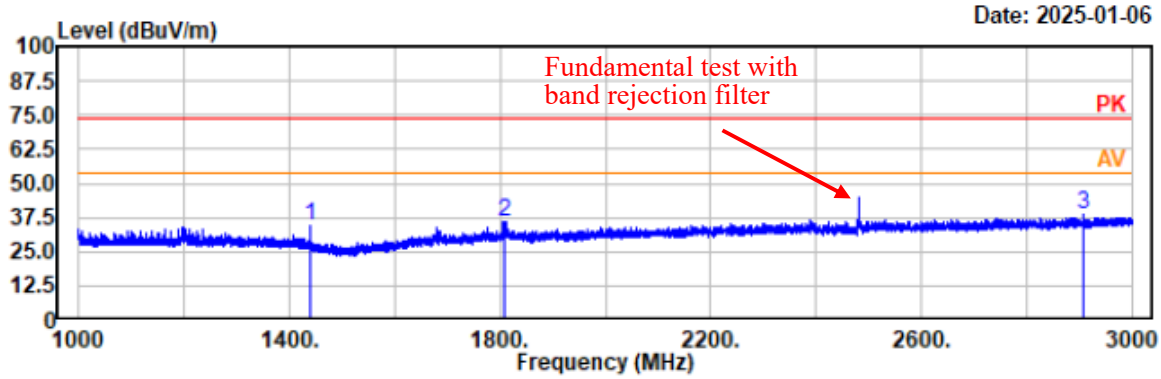


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1350.20	52.32	-15.46	36.86	74.00	37.14	vertical	Peak
1816.80	49.14	-13.45	35.69	74.00	38.31	vertical	Peak
2964.40	47.36	-8.46	38.90	74.00	35.10	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

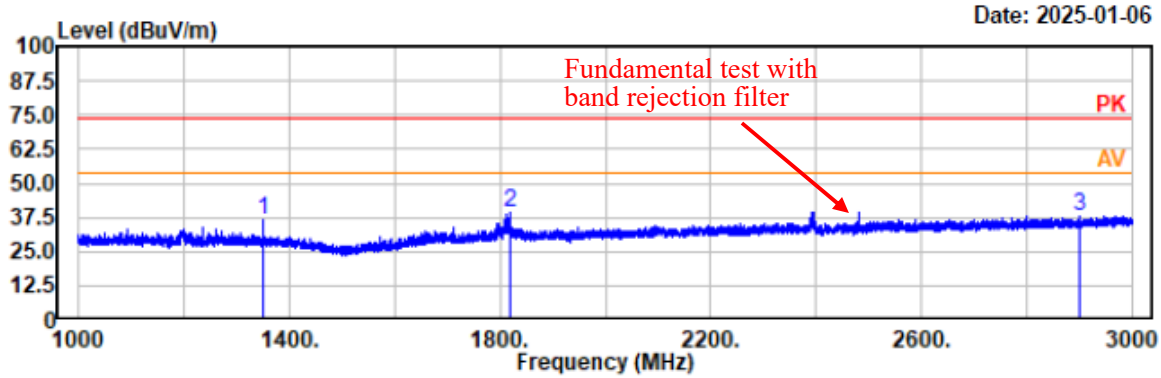


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1440.60	51.21	-16.96	34.25	74.00	39.75	horizontal	Peak
1808.20	49.43	-13.48	35.95	74.00	38.05	horizontal	Peak
2909.20	47.11	-8.73	38.38	74.00	35.62	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



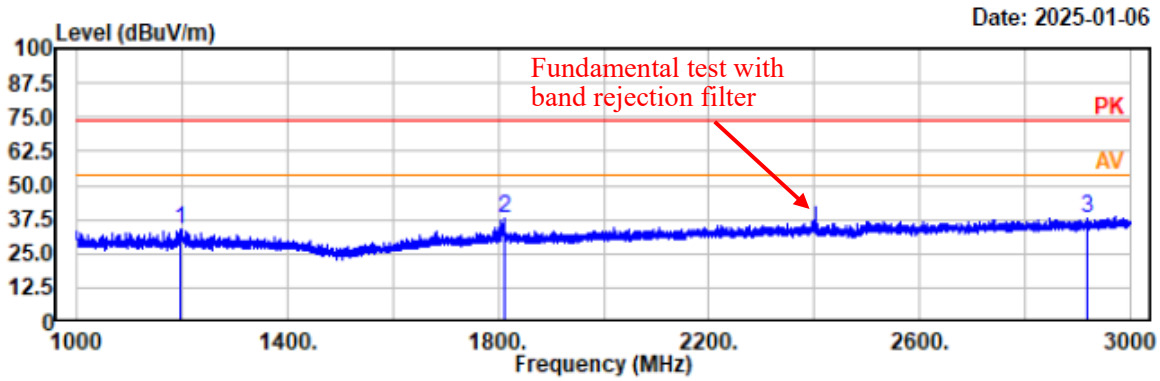
Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1350.00	51.67	-15.46	36.21	74.00	37.79	vertical	Peak
1818.20	52.73	-13.44	39.29	74.00	34.71	vertical	Peak
2901.40	46.93	-8.77	38.16	74.00	35.84	vertical	Peak

EUT operation mode: Transmitting in the EDR (8DPSK) mode

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

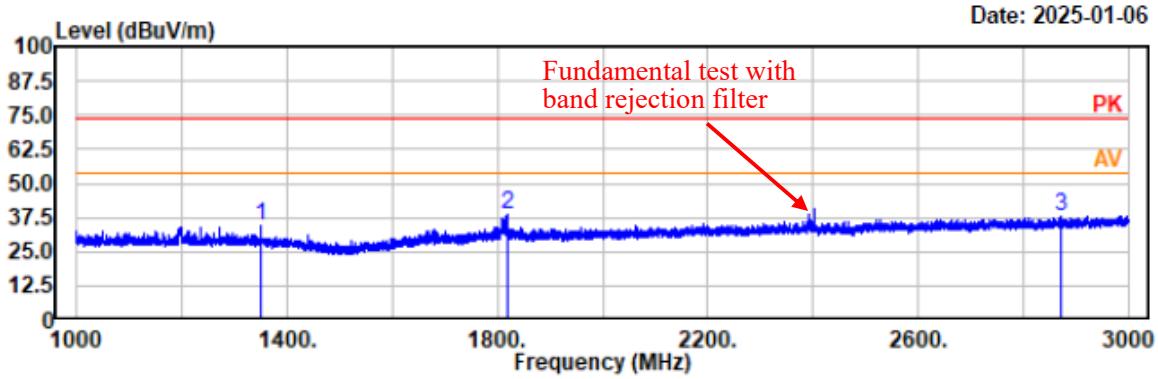


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1197.20	48.63	-15.08	33.55	74.00	40.45	horizontal	Peak
1811.00	51.38	-13.47	37.91	74.00	36.09	horizontal	Peak
2917.60	46.92	-8.68	38.24	74.00	35.76	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

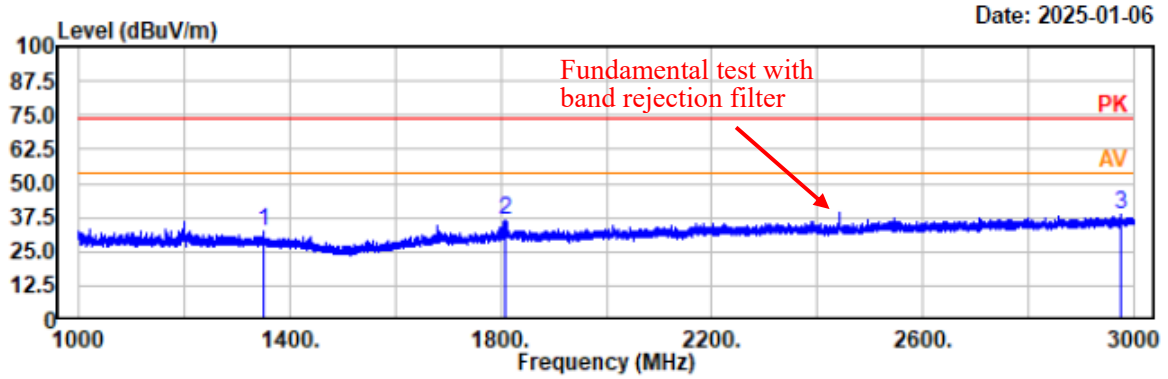


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1350.00	49.73	-15.46	34.27	74.00	39.73	vertical	Peak
1818.20	52.35	-13.44	38.91	74.00	35.09	vertical	Peak
2871.00	46.55	-8.86	37.69	74.00	36.31	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

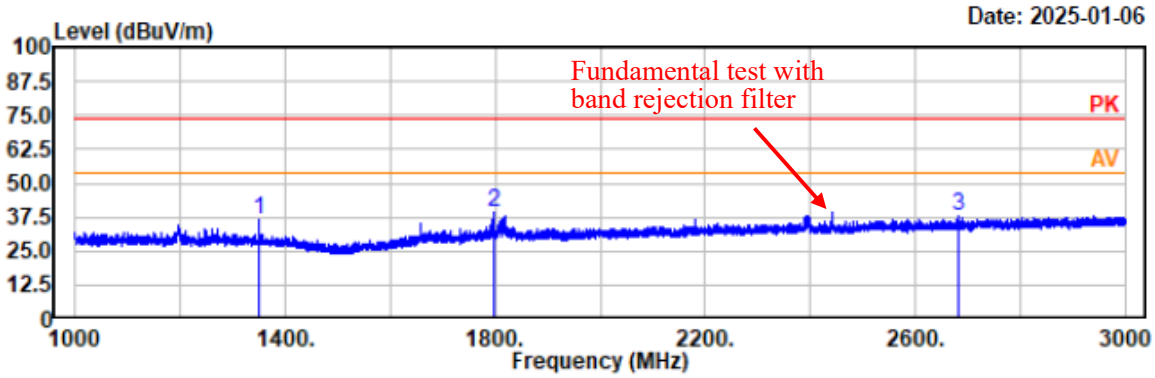


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1349.80	47.72	-15.46	32.26	74.00	41.74	horizontal	Peak
1809.80	49.96	-13.47	36.49	74.00	37.51	horizontal	Peak
2974.00	47.11	-8.43	38.68	74.00	35.32	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

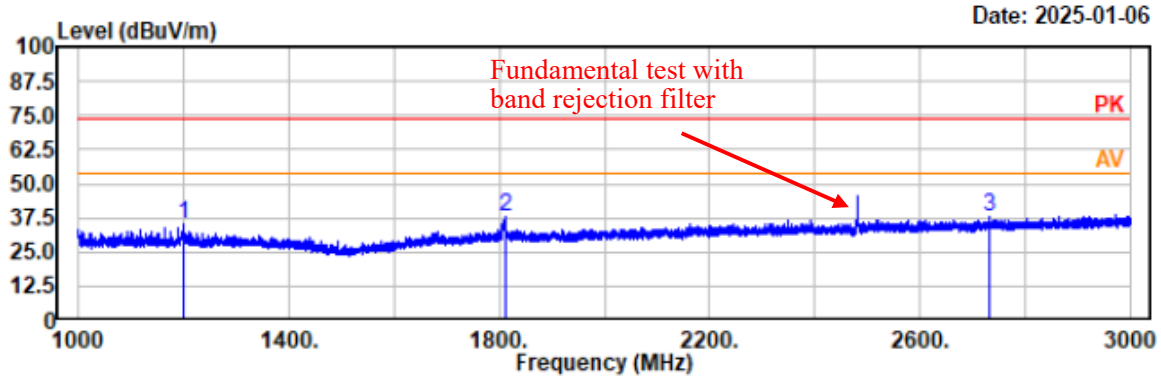


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1350.00	52.33	-15.46	36.87	74.00	37.13	vertical	Peak
1798.60	52.56	-13.53	39.03	74.00	34.97	vertical	Peak
2680.40	47.19	-9.54	37.65	74.00	36.35	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

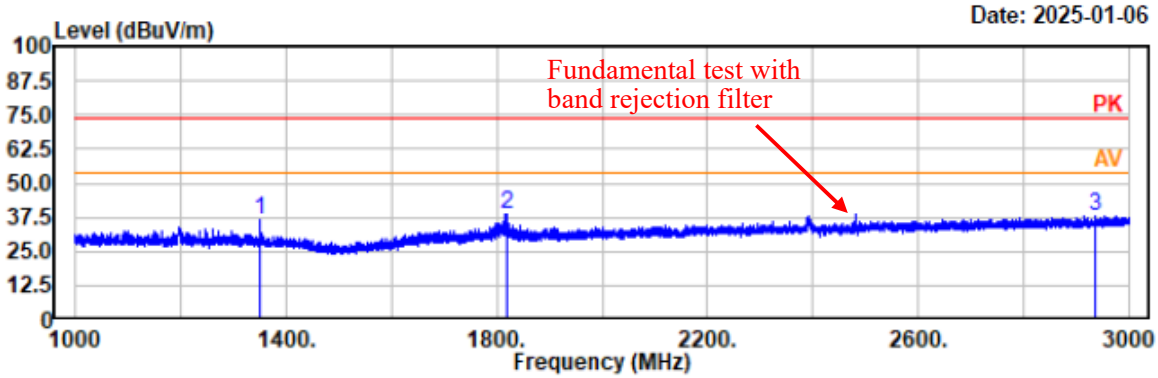


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1200.00	50.12	-15.08	35.04	74.00	38.96	horizontal	Peak
1811.60	51.41	-13.47	37.94	74.00	36.06	horizontal	Peak
2732.00	47.46	-9.40	38.06	74.00	35.94	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



Condition: PK RBW:1MHz VBW:3MHz SWT:auto

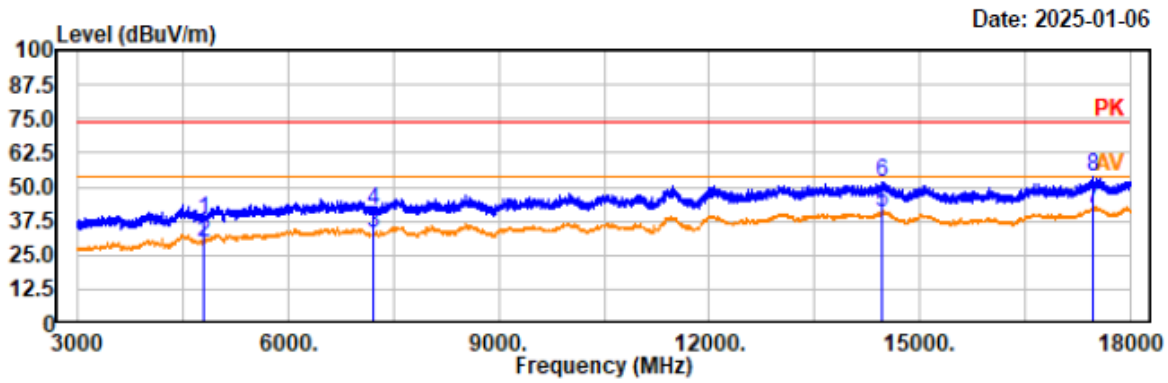
Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
1349.80	51.70	-15.46	36.24	74.00	37.76	vertical	Peak
1817.80	52.00	-13.44	38.56	74.00	35.44	vertical	Peak
2934.80	46.68	-8.60	38.08	74.00	35.92	vertical	Peak

4) 3 GHz - 18 GHz

EUT operation mode: Transmitting in the BDR (GFSK) mode

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

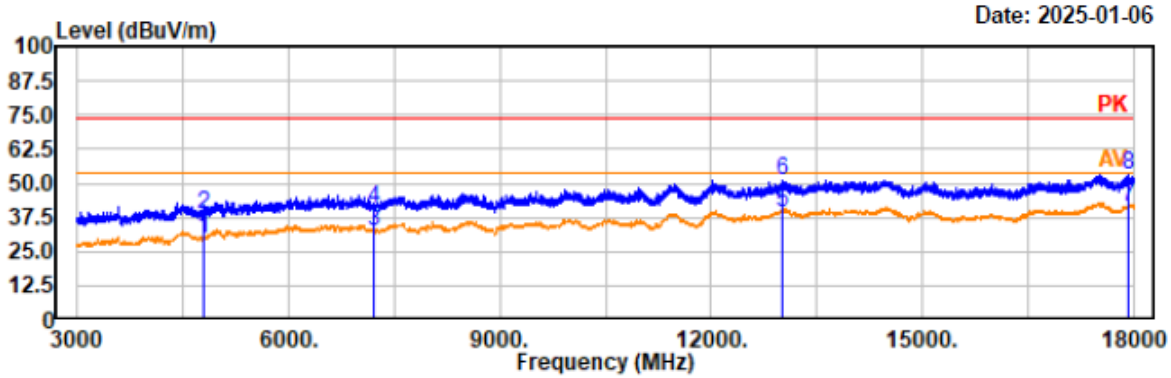


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	42.40	-4.45	37.95	74.00	36.05	horizontal	Peak
4804.00	33.87	-4.45	29.42	54.00	24.58	horizontal	Average
7206.00	34.57	-1.73	32.84	54.00	21.16	horizontal	Average
7206.00	43.31	-1.73	41.58	74.00	32.42	horizontal	Peak
14455.50	35.46	5.05	40.51	54.00	13.49	horizontal	Average
14455.50	46.65	5.05	51.70	74.00	22.30	horizontal	Peak
17467.50	36.05	6.20	42.25	54.00	11.75	horizontal	Average
17467.50	47.40	6.20	53.60	74.00	20.40	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

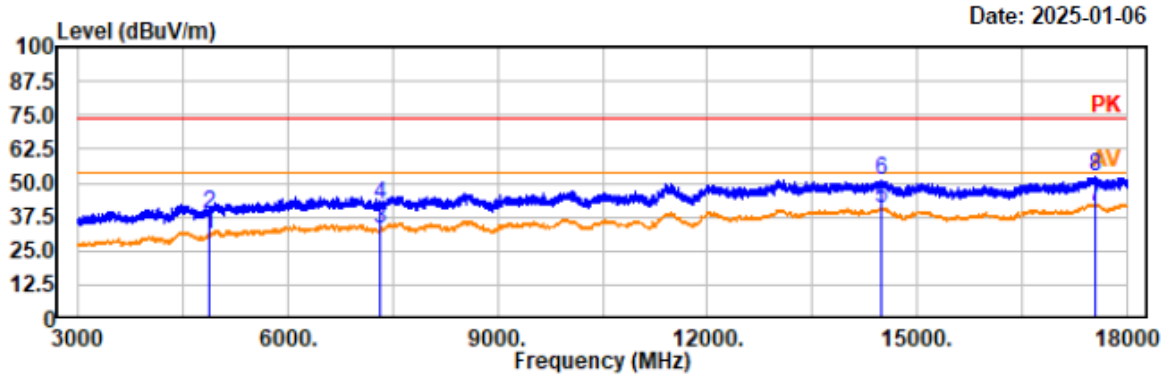


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	34.14	-4.45	29.69	54.00	24.31	vertical	Average
4804.00	42.83	-4.45	38.38	74.00	35.62	vertical	Peak
7206.00	33.83	-1.73	32.10	54.00	21.90	vertical	Average
7206.00	42.41	-1.73	40.68	74.00	33.32	vertical	Peak
13009.50	34.48	5.17	39.65	54.00	14.35	vertical	Average
13009.50	46.16	5.17	51.33	74.00	22.67	vertical	Peak
17928.00	34.08	7.64	41.72	54.00	12.28	vertical	Average
17928.00	45.67	7.64	53.31	74.00	20.69	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

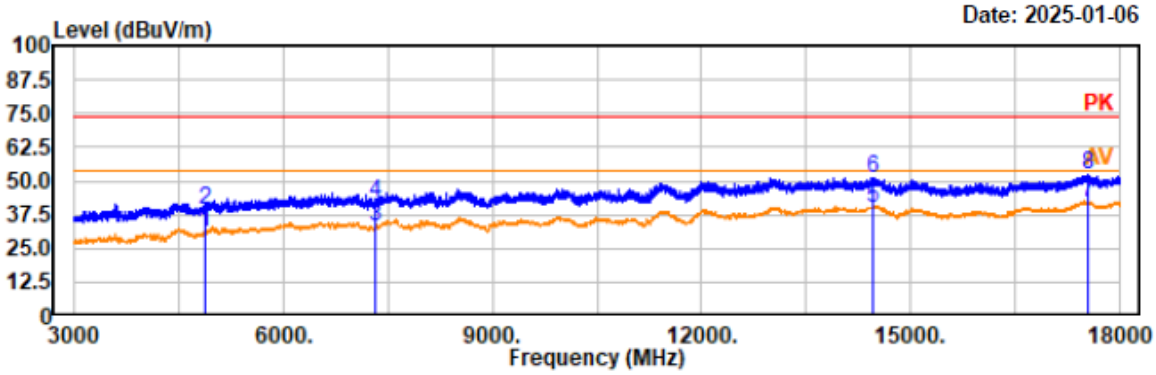


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	35.10	-4.25	30.85	54.00	23.15	horizontal	Average
4882.00	43.05	-4.25	38.80	74.00	35.20	horizontal	Peak
7323.00	35.03	-1.61	33.42	54.00	20.58	horizontal	Average
7323.00	43.68	-1.61	42.07	74.00	31.93	horizontal	Peak
14494.50	35.67	4.99	40.66	54.00	13.34	horizontal	Average
14494.50	45.88	4.99	50.87	74.00	23.13	horizontal	Peak
17556.00	35.23	6.48	41.71	54.00	12.29	horizontal	Average
17556.00	45.60	6.48	52.08	74.00	21.92	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

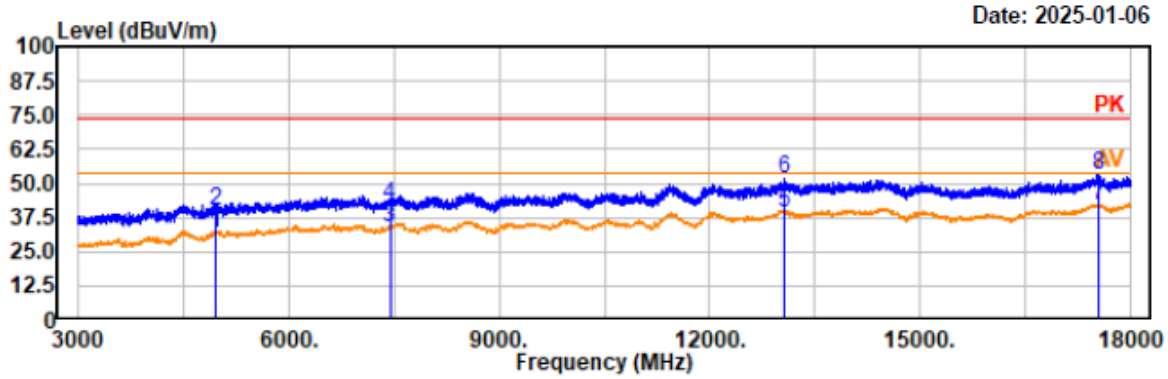


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	34.99	-4.24	30.75	54.00	23.25	vertical	Average
4882.00	43.60	-4.24	39.36	74.00	34.64	vertical	Peak
7323.00	34.46	-1.61	32.85	54.00	21.15	vertical	Average
7323.00	43.50	-1.61	41.89	74.00	32.11	vertical	Peak
14451.00	34.82	5.06	39.88	54.00	14.12	vertical	Average
14451.00	46.19	5.06	51.25	74.00	22.75	vertical	Peak
17544.00	35.39	6.43	41.82	54.00	12.18	vertical	Average
17544.00	45.73	6.43	52.16	74.00	21.84	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

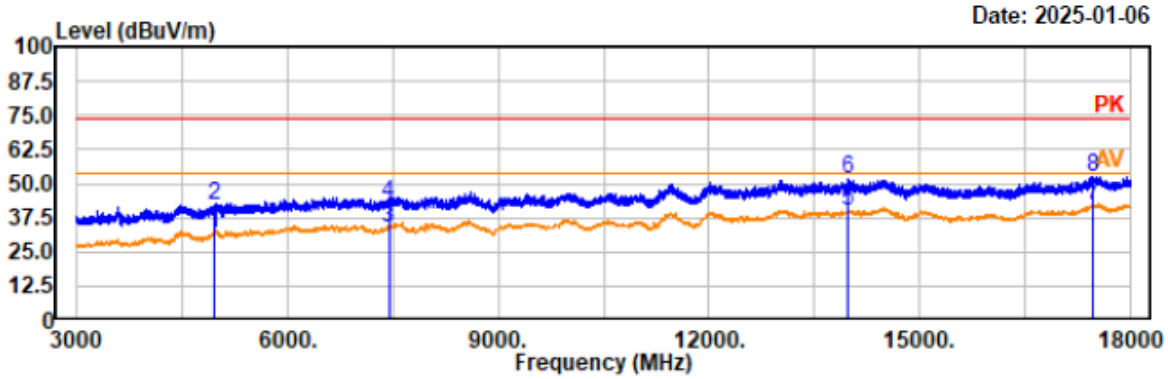


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	35.87	-4.01	31.86	54.00	22.14	horizontal	Average
4960.00	44.16	-4.01	40.15	74.00	33.85	horizontal	Peak
7440.00	35.47	-1.59	33.88	54.00	20.12	horizontal	Average
7440.00	43.96	-1.59	42.37	74.00	31.63	horizontal	Peak
13059.00	34.41	5.12	39.53	54.00	14.47	horizontal	Average
13059.00	46.33	5.12	51.45	74.00	22.55	horizontal	Peak
17548.50	35.51	6.45	41.96	54.00	12.04	horizontal	Average
17548.50	46.39	6.45	52.84	74.00	21.16	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



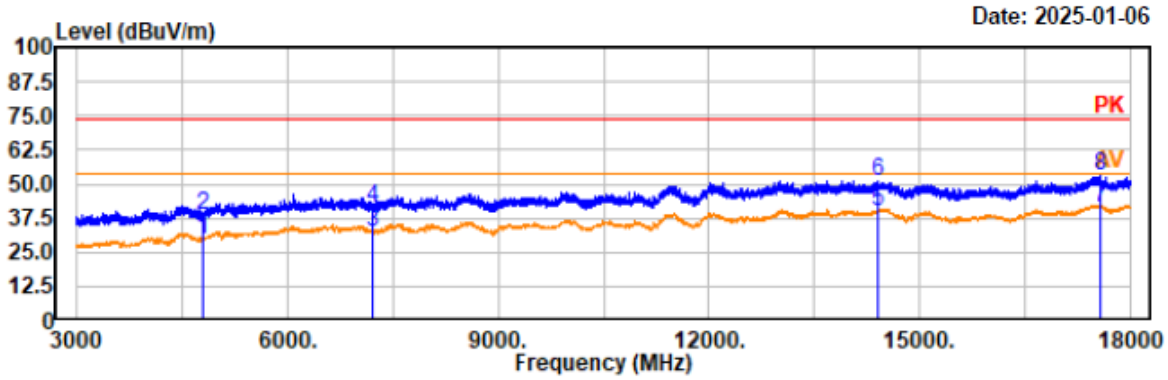
Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	35.73	-4.01	31.72	54.00	22.28	vertical	Average
4960.00	45.79	-4.01	41.78	74.00	32.22	vertical	Peak
7440.00	35.47	-1.59	33.88	54.00	20.12	vertical	Average
7440.00	44.44	-1.59	42.85	74.00	31.15	vertical	Peak
13989.00	34.65	5.09	39.74	54.00	14.26	vertical	Average
13989.00	46.75	5.09	51.84	74.00	22.16	vertical	Peak
17461.50	35.64	6.18	41.82	54.00	12.18	vertical	Average
17461.50	46.43	6.18	52.61	74.00	21.39	vertical	Peak

EUT operation mode: Transmitting in the EDR (π/4-DQPSK) mode

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

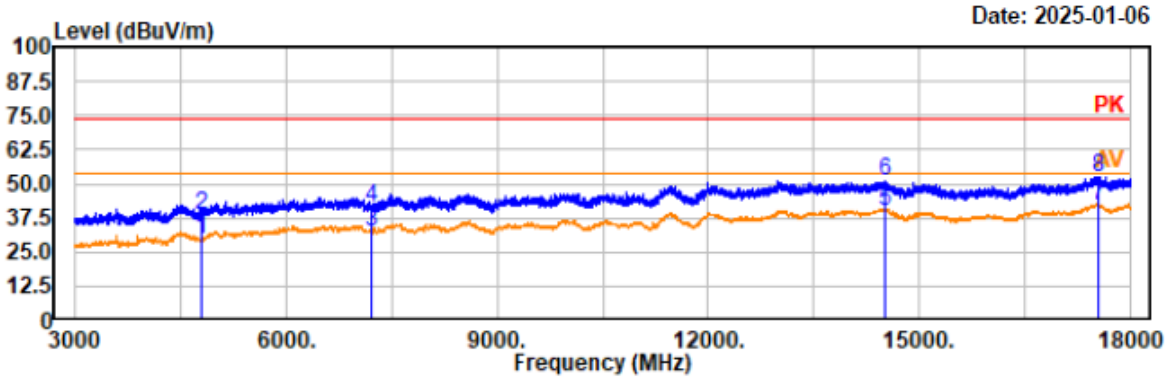


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	33.81	-4.45	29.36	54.00	24.64	horizontal	Average
4804.00	42.77	-4.45	38.32	74.00	35.68	horizontal	Peak
7206.00	33.98	-1.73	32.25	54.00	21.75	horizontal	Average
7206.00	42.82	-1.73	41.09	74.00	32.91	horizontal	Peak
14403.00	34.82	5.14	39.96	54.00	14.04	horizontal	Average
14403.00	45.97	5.14	51.11	74.00	22.89	horizontal	Peak
17575.50	35.04	6.55	41.59	54.00	12.41	horizontal	Average
17575.50	46.79	6.55	53.34	74.00	20.66	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

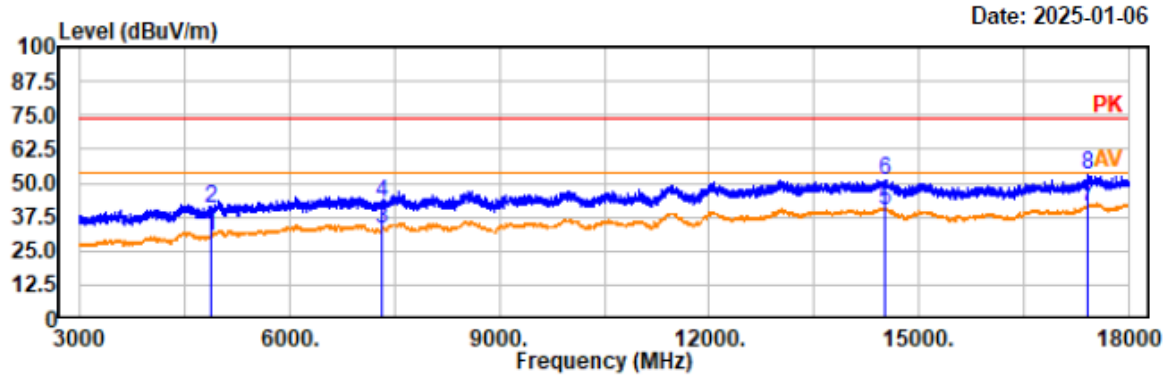


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	33.85	-4.45	29.40	54.00	24.60	vertical	Average
4804.00	42.97	-4.45	38.52	74.00	35.48	vertical	Peak
7206.00	33.82	-1.73	32.09	54.00	21.91	vertical	Average
7206.00	42.89	-1.73	41.16	74.00	32.84	vertical	Peak
14503.50	35.35	4.98	40.33	54.00	13.67	vertical	Average
14503.50	46.34	4.98	51.32	74.00	22.68	vertical	Peak
17536.50	35.53	6.41	41.94	54.00	12.06	vertical	Average
17536.50	46.06	6.41	52.47	74.00	21.53	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

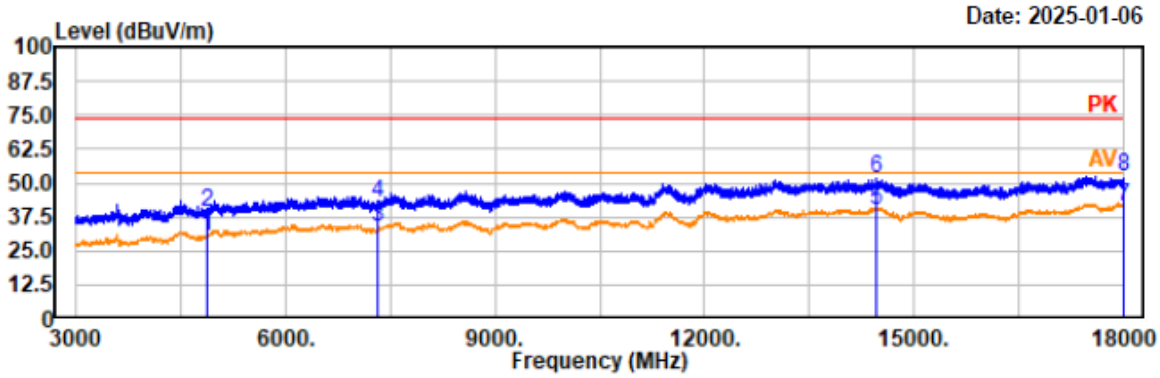


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	34.57	-4.25	30.32	54.00	23.68	horizontal	Average
4882.00	44.89	-4.25	40.64	74.00	33.36	horizontal	Peak
7323.00	34.53	-1.61	32.92	54.00	21.08	horizontal	Average
7323.00	44.08	-1.61	42.47	74.00	31.53	horizontal	Peak
14511.00	35.25	4.97	40.22	54.00	13.78	horizontal	Average
14511.00	46.14	4.97	51.11	74.00	22.89	horizontal	Peak
17422.50	35.18	6.11	41.29	54.00	12.71	horizontal	Average
17422.50	46.83	6.11	52.94	74.00	21.06	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

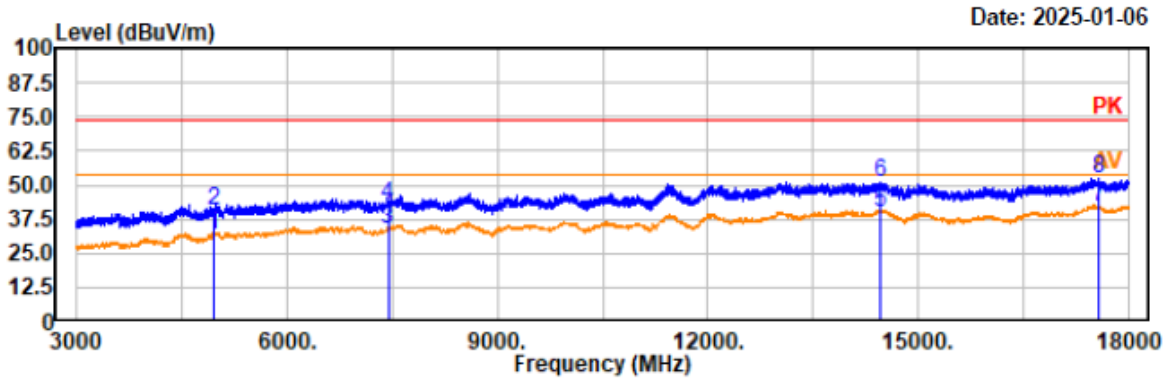


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	34.73	-4.24	30.49	54.00	23.51	vertical	Average
4882.00	43.67	-4.24	39.43	74.00	34.57	vertical	Peak
7323.00	35.08	-1.61	33.47	54.00	20.53	vertical	Average
7323.00	44.51	-1.61	42.90	74.00	31.10	vertical	Peak
14470.50	35.04	5.03	40.07	54.00	13.93	vertical	Average
14470.50	46.82	5.03	51.85	74.00	22.15	vertical	Peak
17999.99	33.92	7.74	41.66	54.00	12.34	vertical	Average
17999.99	44.54	7.74	52.28	74.00	21.72	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

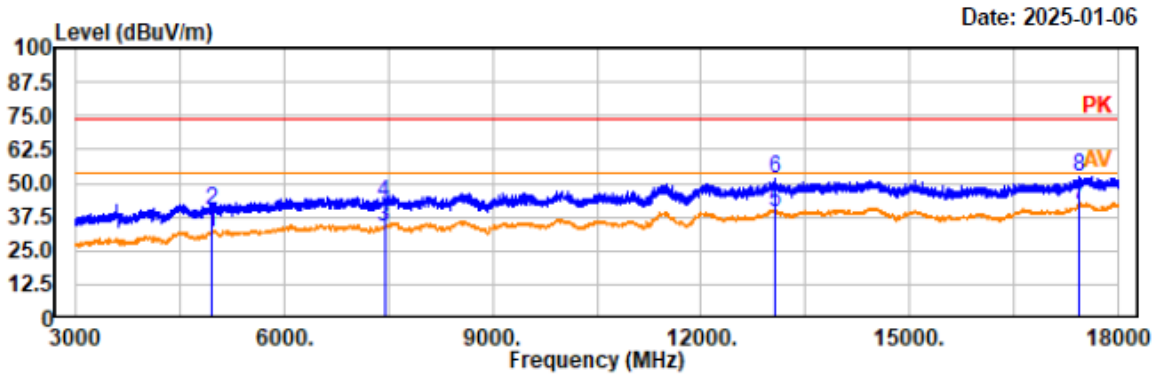


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	35.85	-4.01	31.84	54.00	22.16	horizontal	Average
4960.00	44.90	-4.01	40.89	74.00	33.11	horizontal	Peak
7440.00	35.35	-1.59	33.76	54.00	20.24	horizontal	Average
7440.00	44.56	-1.59	42.97	74.00	31.03	horizontal	Peak
14460.00	35.16	5.04	40.20	54.00	13.80	horizontal	Average
14460.00	46.27	5.04	51.31	74.00	22.69	horizontal	Peak
17565.00	35.26	6.52	41.78	54.00	12.22	horizontal	Average
17565.00	45.90	6.52	52.42	74.00	21.58	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



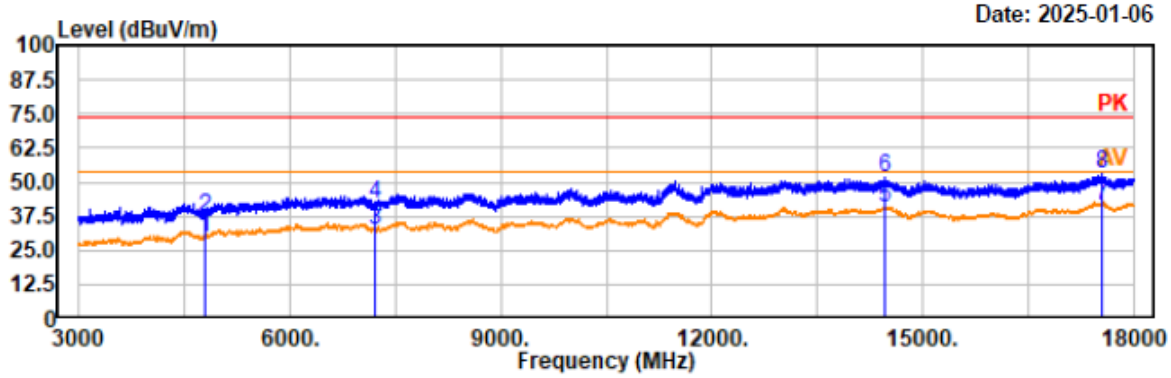
Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	36.08	-4.01	32.07	54.00	21.93	vertical	Average
4960.00	44.29	-4.01	40.28	74.00	33.72	vertical	Peak
7440.00	35.24	-1.59	33.65	54.00	20.35	vertical	Average
7440.00	44.48	-1.59	42.89	74.00	31.11	vertical	Peak
13074.00	33.99	5.09	39.08	54.00	14.92	vertical	Average
13074.00	46.91	5.09	52.00	74.00	22.00	vertical	Peak
17452.50	35.58	6.18	41.76	54.00	12.24	vertical	Average
17452.50	45.94	6.18	52.12	74.00	21.88	vertical	Peak

EUT operation mode: Transmitting in the EDR (8DPSK) mode

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

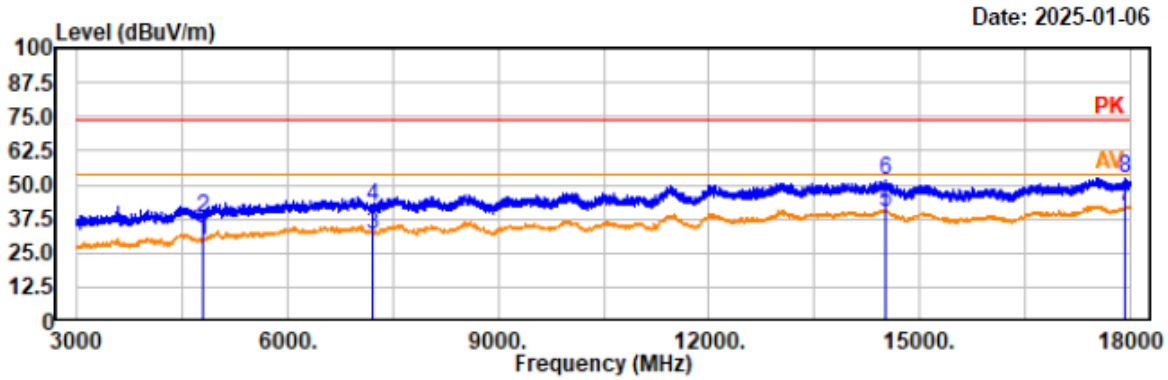


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	34.18	-4.45	29.73	54.00	24.27	horizontal	Average
4804.00	41.98	-4.45	37.53	74.00	36.47	horizontal	Peak
7206.00	33.98	-1.73	32.25	54.00	21.75	horizontal	Average
7206.00	43.54	-1.73	41.81	74.00	32.19	horizontal	Peak
14454.00	35.31	5.06	40.37	54.00	13.63	horizontal	Average
14454.00	46.52	5.06	51.58	74.00	22.42	horizontal	Peak
17557.50	34.96	6.48	41.44	54.00	12.56	horizontal	Average
17557.50	46.56	6.48	53.04	74.00	20.96	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

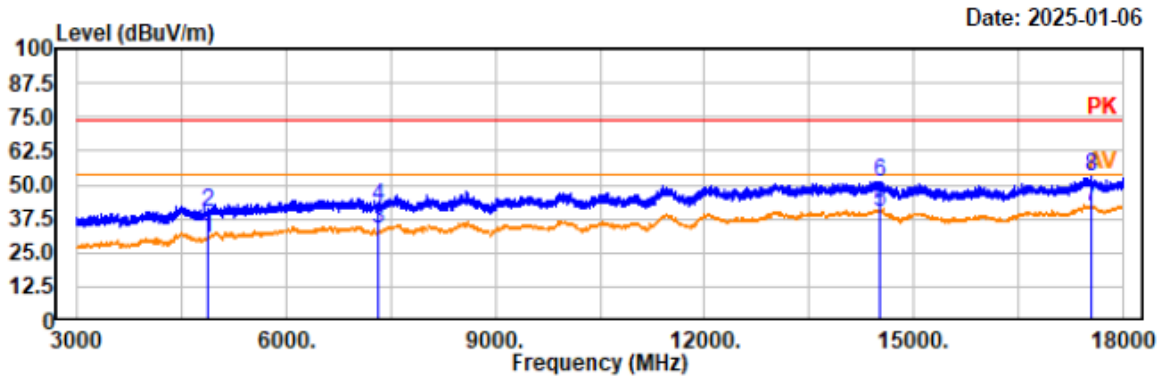


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4804.00	34.21	-4.45	29.76	54.00	24.24	vertical	Average
4804.00	42.10	-4.45	37.65	74.00	36.35	vertical	Peak
7206.00	33.79	-1.73	32.06	54.00	21.94	vertical	Average
7206.00	44.01	-1.73	42.28	74.00	31.72	vertical	Peak
14505.00	35.16	4.97	40.13	54.00	13.87	vertical	Average
14505.00	46.98	4.97	51.95	74.00	22.05	vertical	Peak
17934.00	34.24	7.63	41.87	54.00	12.13	vertical	Average
17934.00	45.12	7.63	52.75	74.00	21.25	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

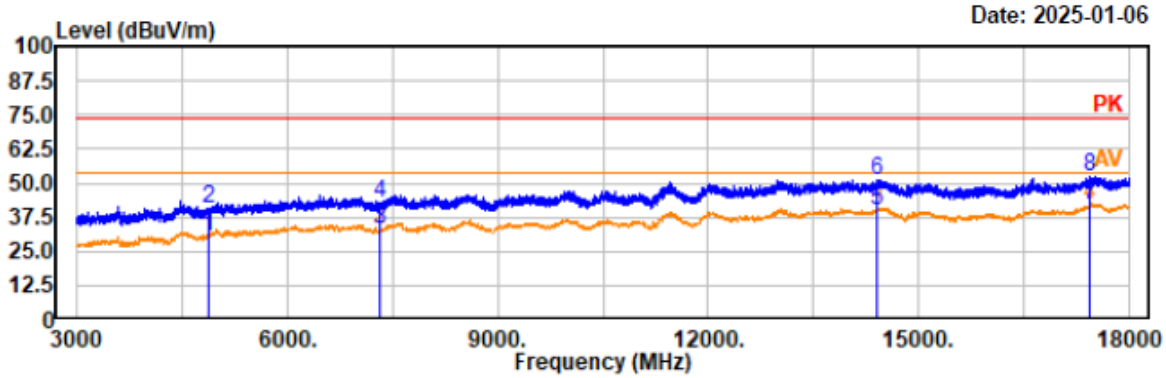


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	34.83	-4.25	30.58	54.00	23.42	horizontal	Average
4882.00	43.91	-4.25	39.66	74.00	34.34	horizontal	Peak
7323.00	35.10	-1.61	33.49	54.00	20.51	horizontal	Average
7323.00	43.71	-1.61	42.10	74.00	31.90	horizontal	Peak
14511.00	35.27	4.97	40.24	54.00	13.76	horizontal	Average
14511.00	46.16	4.97	51.13	74.00	22.87	horizontal	Peak
17536.50	35.39	6.41	41.80	54.00	12.20	horizontal	Average
17536.50	46.85	6.41	53.26	74.00	20.74	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2441MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

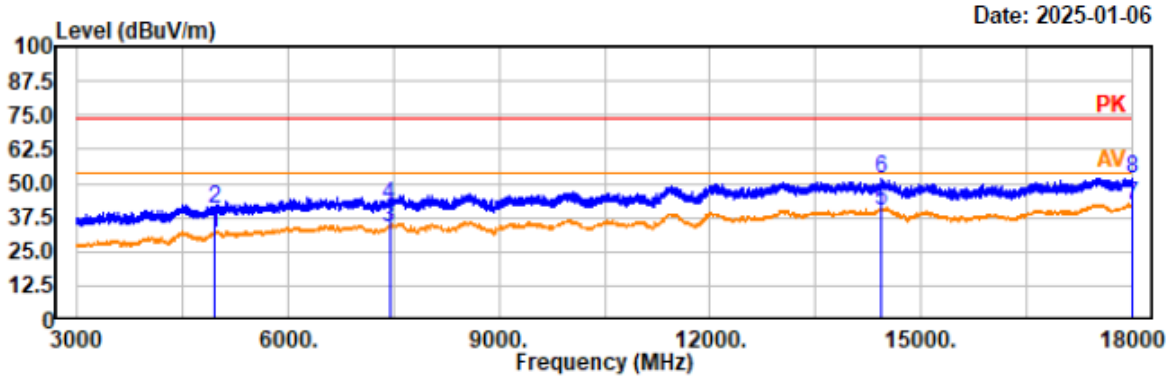


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4882.00	34.70	-4.24	30.46	54.00	23.54	vertical	Average
4882.00	44.64	-4.24	40.40	74.00	33.60	vertical	Peak
7323.00	34.96	-1.61	33.35	54.00	20.65	vertical	Average
7323.00	44.36	-1.61	42.75	74.00	31.25	vertical	Peak
14400.00	34.79	5.15	39.94	54.00	14.06	vertical	Average
14400.00	45.87	5.15	51.02	74.00	22.98	vertical	Peak
17446.50	35.62	6.16	41.78	54.00	12.22	vertical	Average
17446.50	46.24	6.16	52.40	74.00	21.60	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

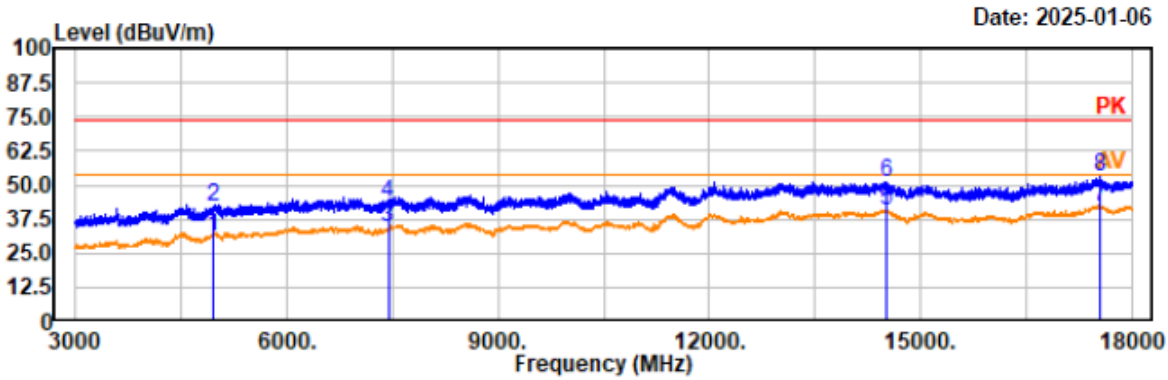


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	35.43	-4.01	31.42	54.00	22.58	horizontal	Average
4960.00	44.52	-4.01	40.51	74.00	33.49	horizontal	Peak
7440.00	35.68	-1.59	34.09	54.00	19.91	horizontal	Average
7440.00	43.63	-1.59	42.04	74.00	31.96	horizontal	Peak
14428.50	35.14	5.10	40.24	54.00	13.76	horizontal	Average
14428.50	46.31	5.10	51.41	74.00	22.59	horizontal	Peak
17998.50	34.26	7.74	42.00	54.00	12.00	horizontal	Average
17998.50	44.29	7.74	52.03	74.00	21.97	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

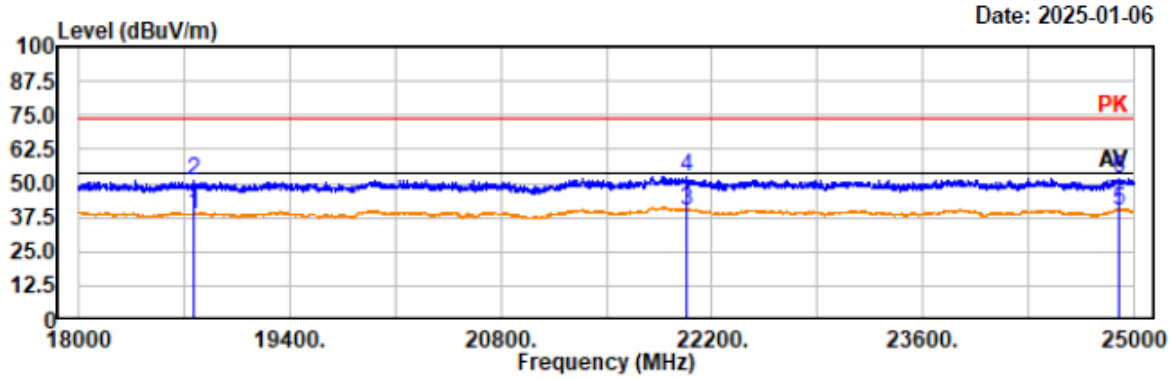
Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
4960.00	35.29	-4.01	31.28	54.00	22.72	vertical	Average
4960.00	46.15	-4.01	42.14	74.00	31.86	vertical	Peak
7440.00	35.93	-1.59	34.34	54.00	19.66	vertical	Average
7440.00	44.95	-1.59	43.36	74.00	30.64	vertical	Peak
14512.50	35.53	4.97	40.50	54.00	13.50	vertical	Average
14512.50	46.06	4.97	51.03	74.00	22.97	vertical	Peak
17538.00	35.44	6.41	41.85	54.00	12.15	vertical	Average
17538.00	46.96	6.41	53.37	74.00	20.63	vertical	Peak

5) 18GHz-25GHz

Note: The maximum output power mode: 8DPSK Low channel was tested.

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 1m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

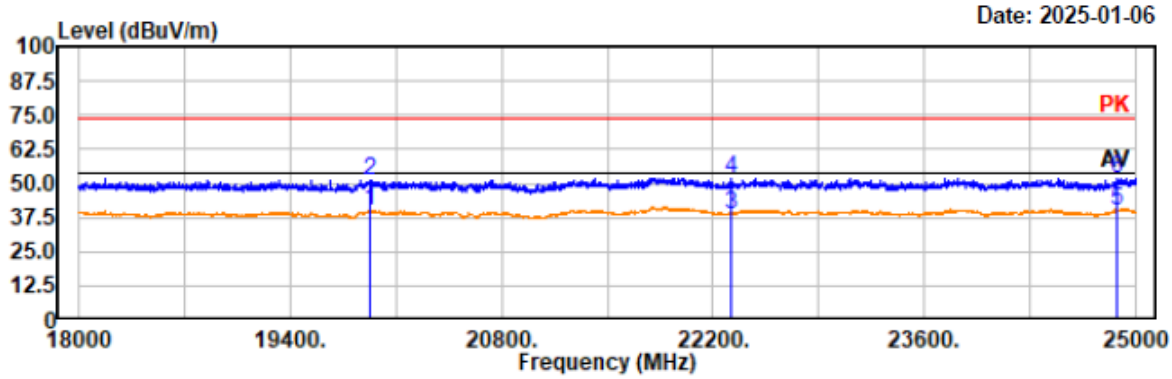


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
18759.00	40.53	-1.74	38.79	54.00	15.21	horizontal	Average
18759.00	52.77	-1.74	51.03	74.00	22.97	horizontal	Peak
22037.00	38.47	1.62	40.09	54.00	13.91	horizontal	Average
22037.00	50.97	1.62	52.59	74.00	21.41	horizontal	Peak
24908.00	37.24	2.77	40.01	54.00	13.99	horizontal	Average
24908.00	48.86	2.77	51.63	74.00	22.37	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 1m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



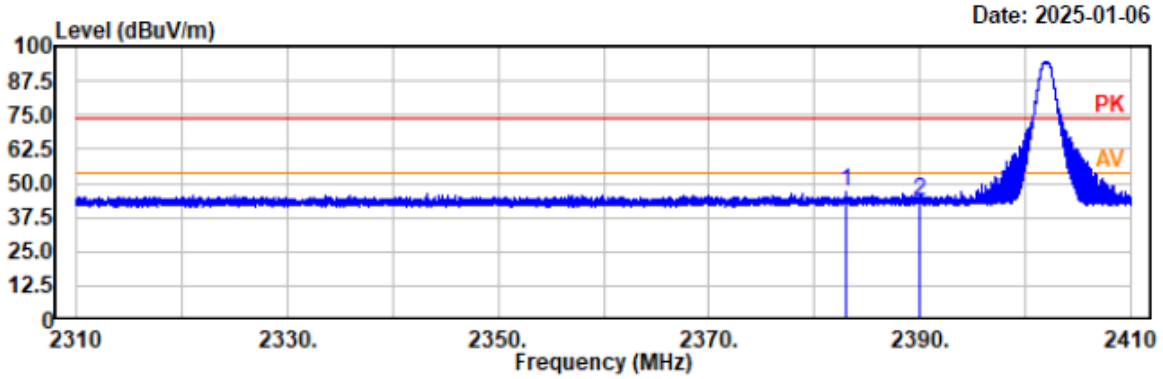
Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
19927.20	39.89	-0.06	39.83	54.00	14.17	vertical	Average
19927.20	51.28	-0.06	51.22	74.00	22.78	vertical	Peak
22323.00	37.91	0.98	38.89	54.00	15.11	vertical	Average
22323.00	51.02	0.98	52.00	74.00	22.00	vertical	Peak
24879.40	37.46	2.76	40.22	54.00	13.78	vertical	Average
24879.40	49.11	2.76	51.87	74.00	22.13	vertical	Peak

Restricted Bands Emissions:

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

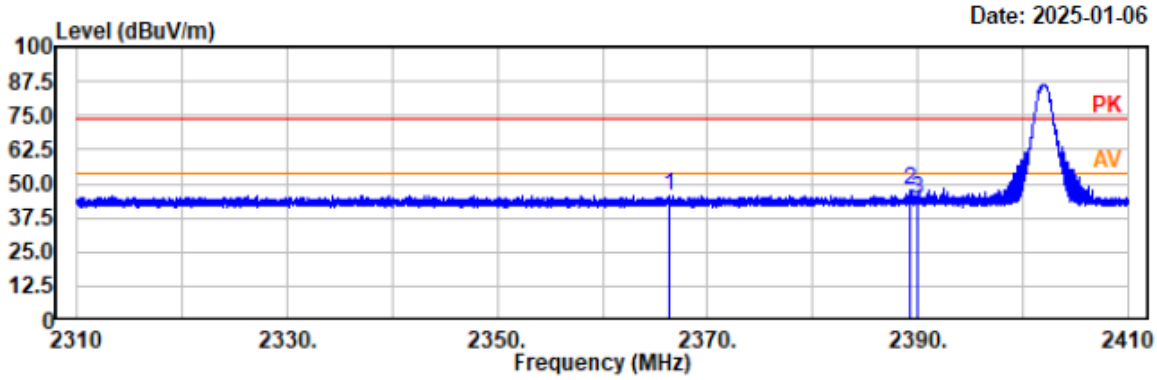


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2382.99	47.45	-0.68	46.77	74.00	27.23	horizontal	Peak
2390.00	43.74	-0.63	43.11	74.00	30.89	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

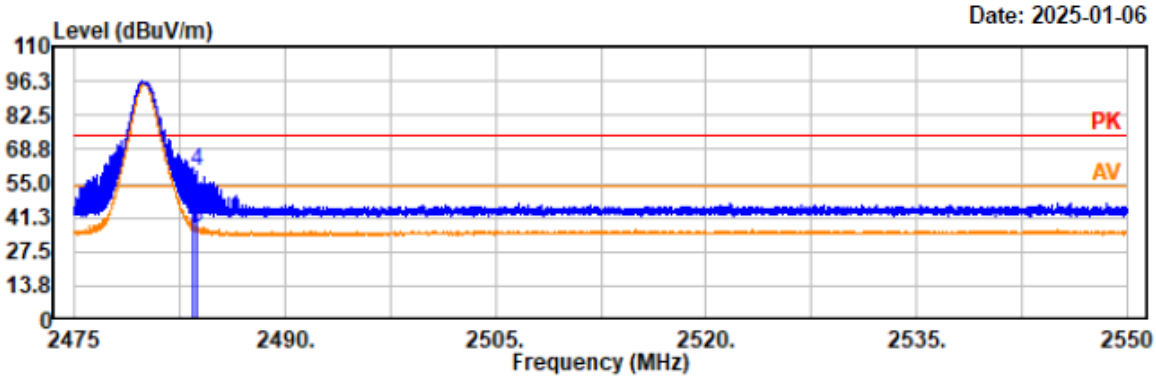


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2366.39	46.49	-0.74	45.75	74.00	28.25	vertical	Peak
2389.26	48.54	-0.63	47.91	74.00	26.09	vertical	Peak
2390.00	44.97	-0.63	44.34	74.00	29.66	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

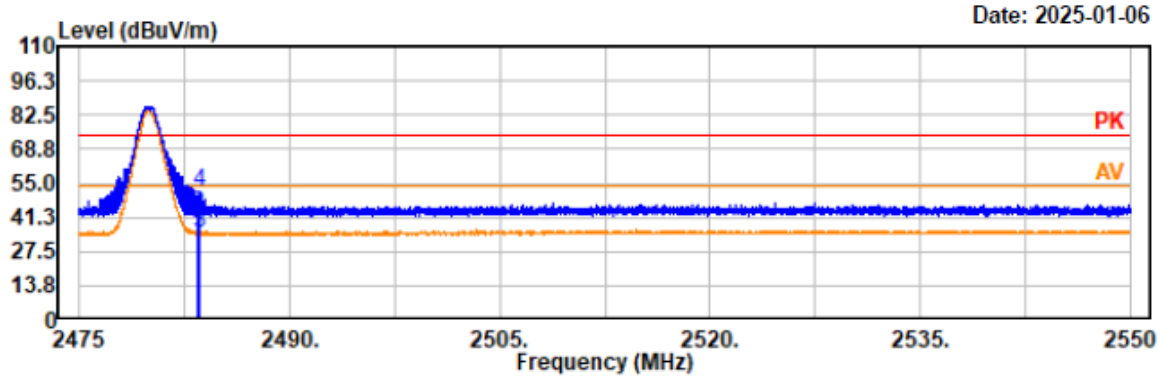


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	36.46	-0.17	36.29	54.00	17.71	horizontal	Average
2483.50	44.86	-0.17	44.69	74.00	29.31	horizontal	Peak
2483.65	37.31	-0.17	37.14	54.00	16.86	horizontal	Average
2483.65	59.86	-0.17	59.69	74.00	14.31	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

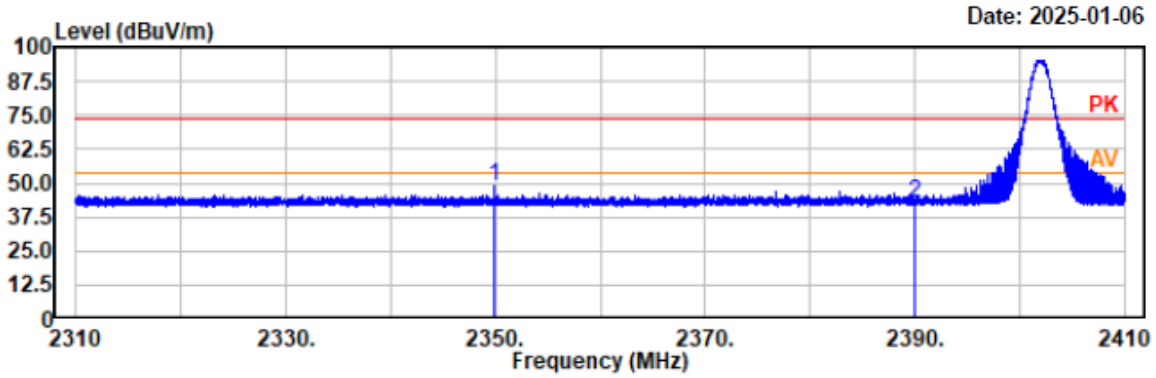


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	34.65	-0.17	34.48	54.00	19.52	vertical	Average
2483.50	42.86	-0.17	42.69	74.00	31.31	vertical	Peak
2483.57	34.87	-0.17	34.70	54.00	19.30	vertical	Average
2483.57	51.40	-0.17	51.23	74.00	22.77	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

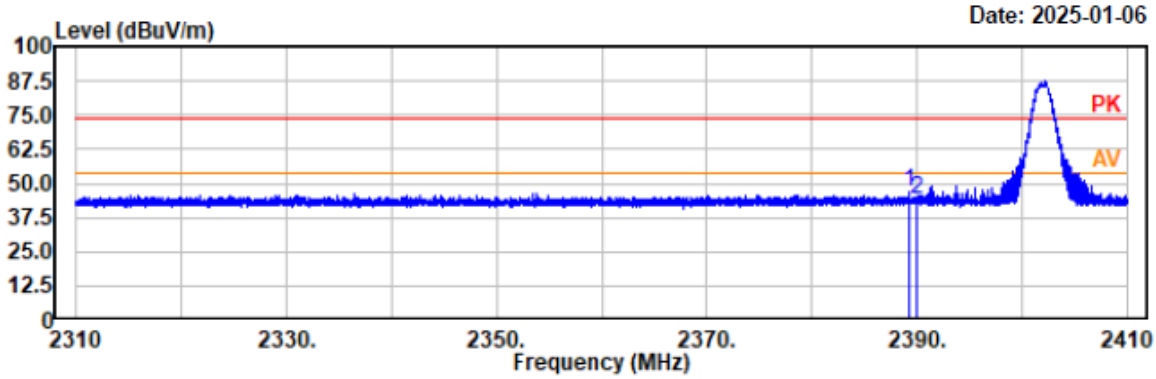


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2349.85	49.78	-0.83	48.95	74.00	25.05	horizontal	Peak
2390.00	43.54	-0.63	42.91	74.00	31.09	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

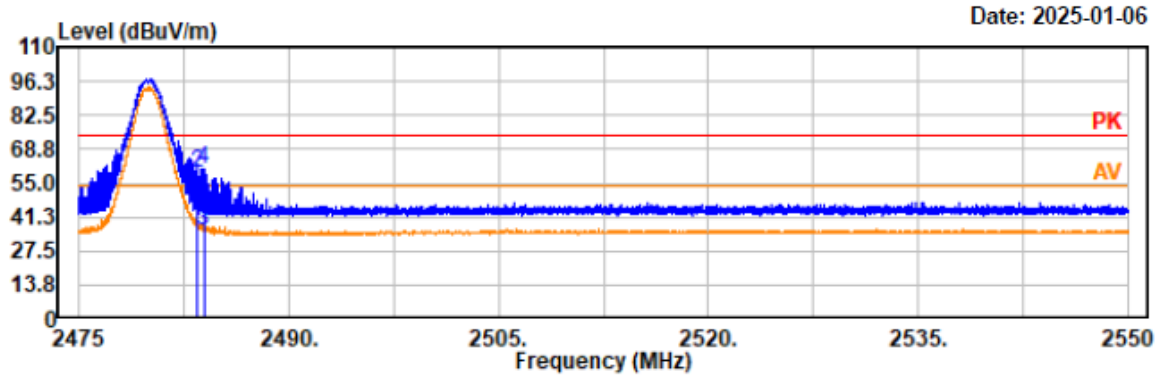


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2389.31	47.73	-0.63	47.10	74.00	26.90	vertical	Peak
2390.00	45.01	-0.63	44.38	74.00	29.62	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

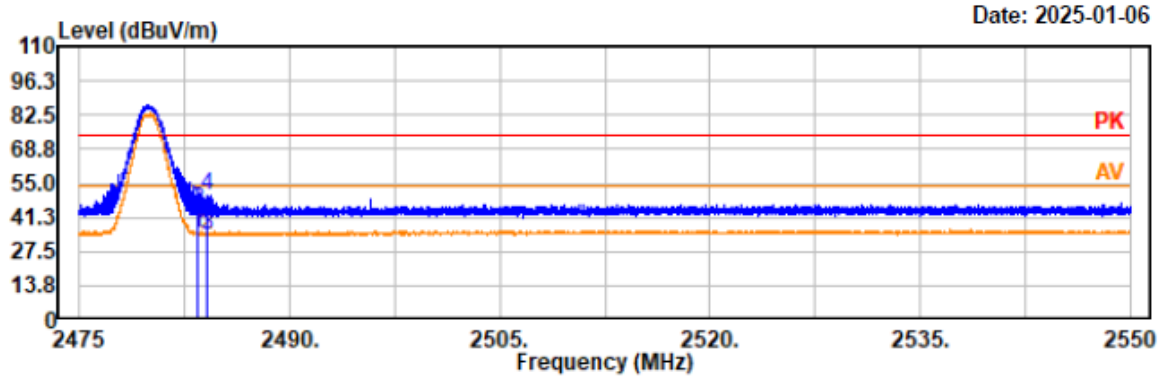


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	39.64	-0.17	39.47	54.00	14.53	horizontal	Average
2483.50	58.98	-0.17	58.81	74.00	15.19	horizontal	Peak
2483.91	36.13	-0.16	35.97	54.00	18.03	horizontal	Average
2483.91	61.12	-0.16	60.96	74.00	13.04	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 2DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

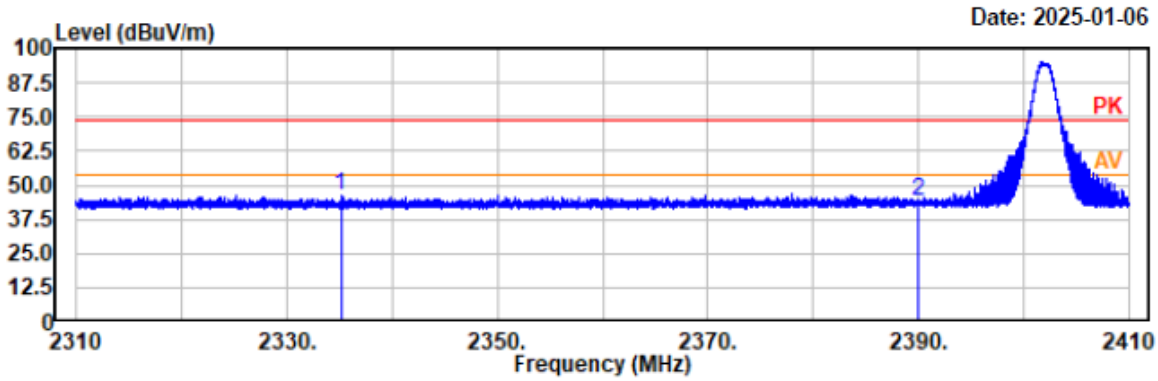


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	34.73	-0.17	34.56	54.00	19.44	vertical	Average
2483.50	43.92	-0.17	43.75	74.00	30.25	vertical	Peak
2484.12	34.47	-0.16	34.31	54.00	19.69	vertical	Average
2484.12	50.37	-0.16	50.21	74.00	23.79	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

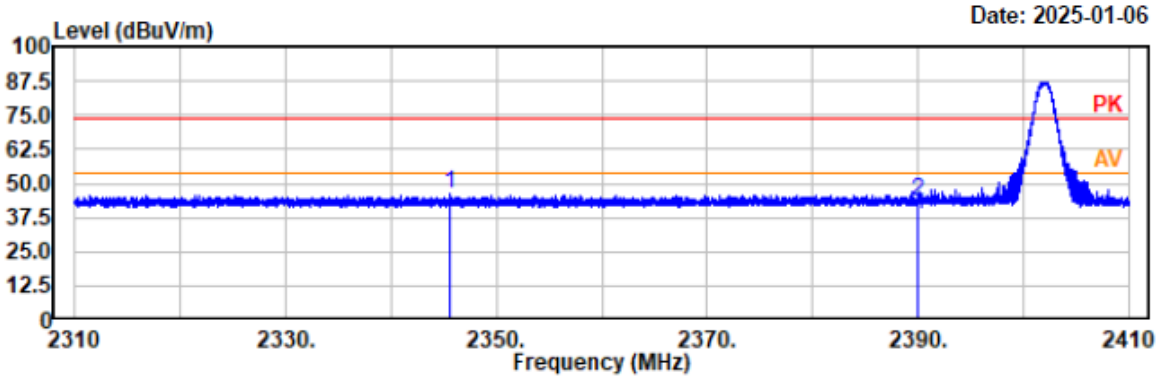


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2335.12	46.91	-0.88	46.03	74.00	27.97	horizontal	Peak
2390.00	44.79	-0.63	44.16	74.00	29.84	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2402MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

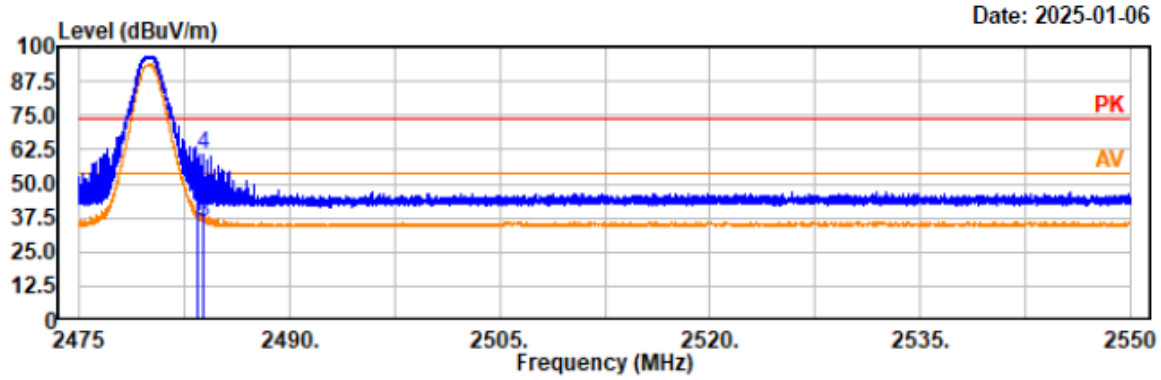


Condition: PK RBW:1MHz VBW:3MHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2345.56	47.04	-0.85	46.19	74.00	27.81	vertical	Peak
2390.00	43.78	-0.63	43.15	74.00	30.85	vertical	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz

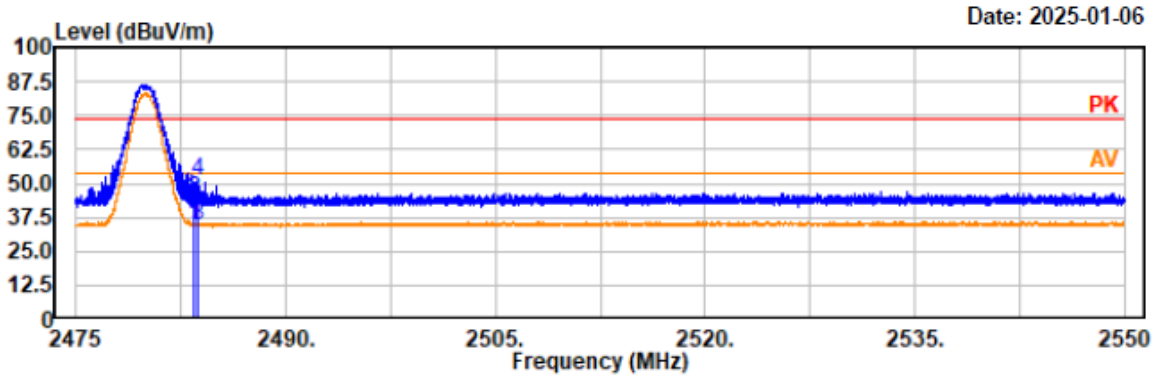


Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	38.11	-0.17	37.94	54.00	16.06	horizontal	Average
2483.50	45.11	-0.17	44.94	74.00	29.06	horizontal	Peak
2483.90	35.95	-0.16	35.79	54.00	18.21	horizontal	Average
2483.90	60.69	-0.16	60.53	74.00	13.47	horizontal	Peak

Project No.: 2407A50315E-RF
Test Mode: 3DH1 2480MHz
EUT Model: VP-02
Test distance: 3m

Temp/Humi/ATM: 21.4℃/51%/100.1kPa
Tested by: Wlif Wu
Power Source: AC 120V/60Hz



Trace: 1
Condition: PK RBW:1MHz VBW:3MHz SWT:auto
AV RBW:1MHz VBW:5kHz SWT:auto

Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
2483.50	34.69	-0.17	34.52	54.00	19.48	vertical	Average
2483.50	44.62	-0.17	44.45	74.00	29.55	vertical	Peak
2483.72	34.96	-0.17	34.79	54.00	19.21	vertical	Average
2483.72	51.12	-0.17	50.95	74.00	23.05	vertical	Peak

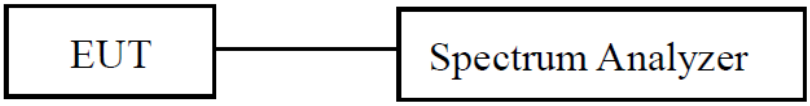
FCC §15.247(a) (1) & RSS-247 ISSUE 3 Clause 5.1 b) -CHANNEL SEPARATION TEST

Applicable Standard

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.

RSS-247 ISSUE 3 Clause 5.1 b)
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

According to ANSI C63.10-2013 Section 7.8.2

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. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

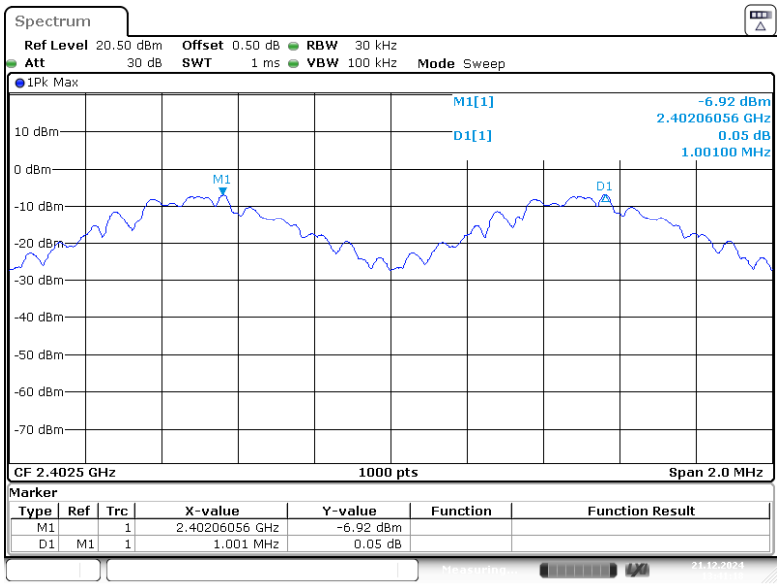
Test Data

Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.001	0.903	Pass
	Middle	2441	1.001	0.905	Pass
	High	2480	1.001	0.905	Pass

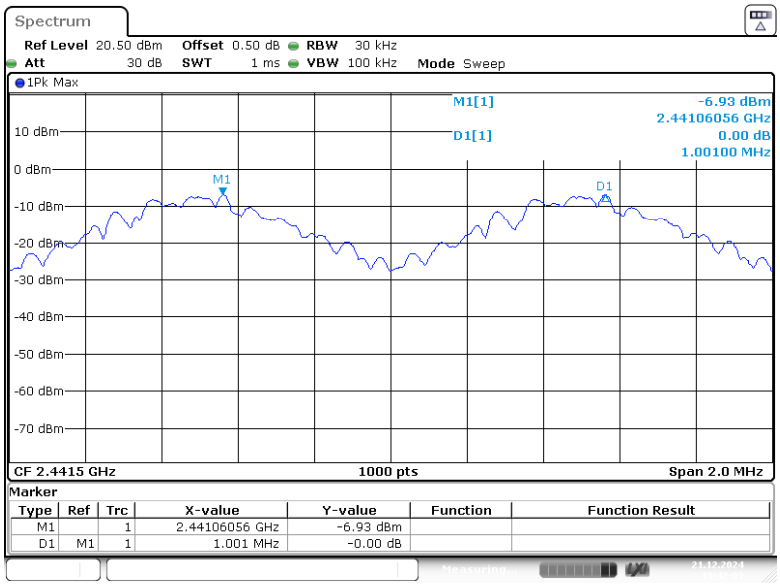
Note:
1. Limit = 20 dB bandwidth*2/3
2. Only BDR (GFSK) mode result is reported since EDR(π/4-DQPSK, 8DPSK) has the same channel plan.

BDR (GFSK): Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:41:18

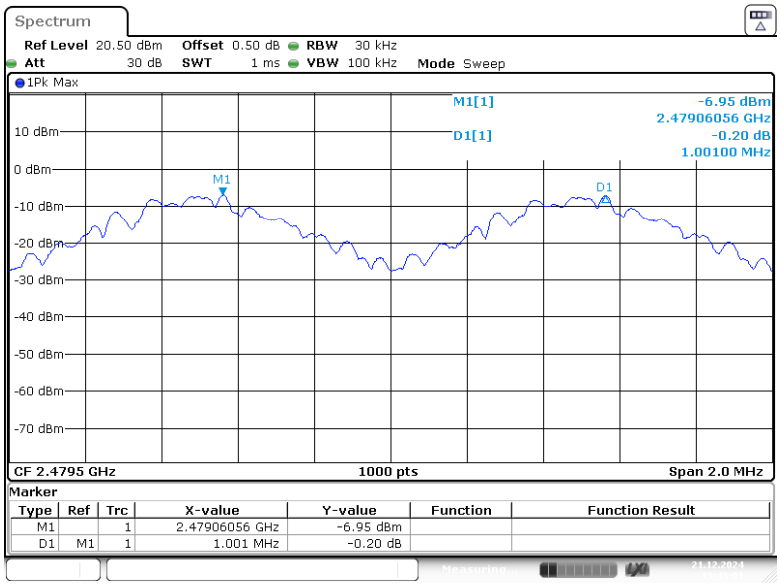
BDR (GFSK): Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:42:03

BDR (GFSK): High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:43:01

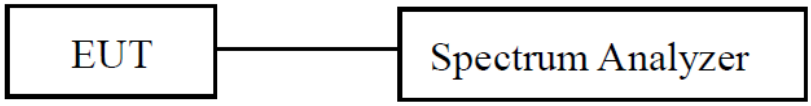
FCC §15.247(a) (1) & RSS-247 ISSUE 3 Clause 5.1 b) – 20 dB EMISSION BANDWIDTH

Applicable Standard

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.

RSS-247 ISSUE 3 Clause 5.1 b)
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

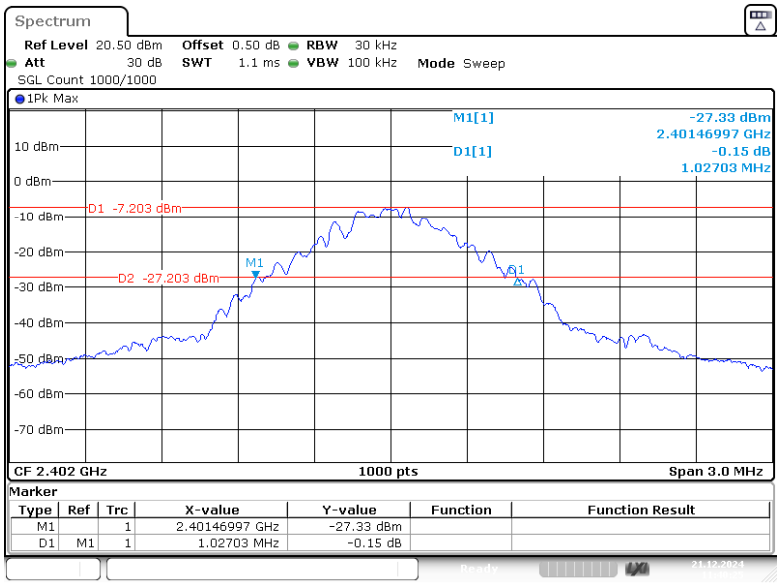
According to ANSI C63.10-2013 Section 6.9.2

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

Test Data

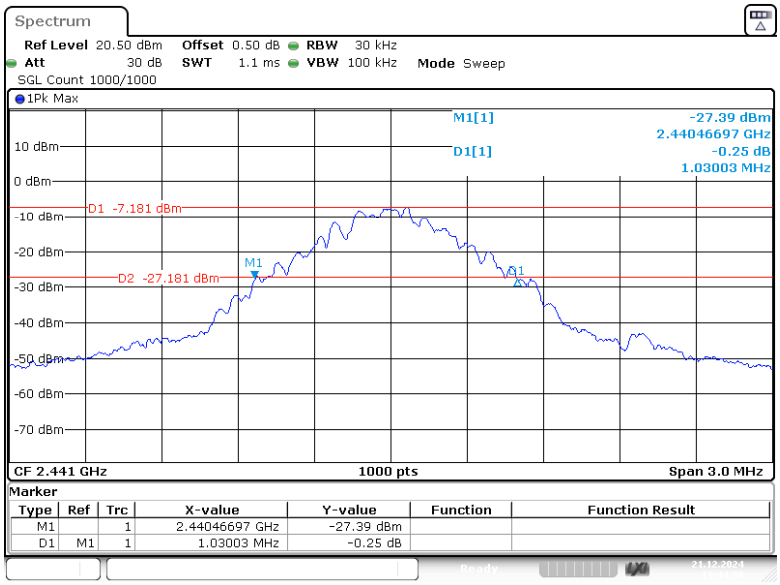
Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa
Mode	**Channel**	**Frequency (MHz)**	**20 dB Emission Bandwidth (MHz)**
BDR Mode (GFSK)	Low	2402	1.027
	Middle	2441	1.03
	High	2480	1.024
EDR (π/4-DQPSK)	Low	2402	1.354
	Middle	2441	1.357
	High	2480	1.357
EDR (8DPSK)	Low	2402	1.351
	Middle	2441	1.351
	High	2480	1.348

BDR(GFSK) : Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:40:26

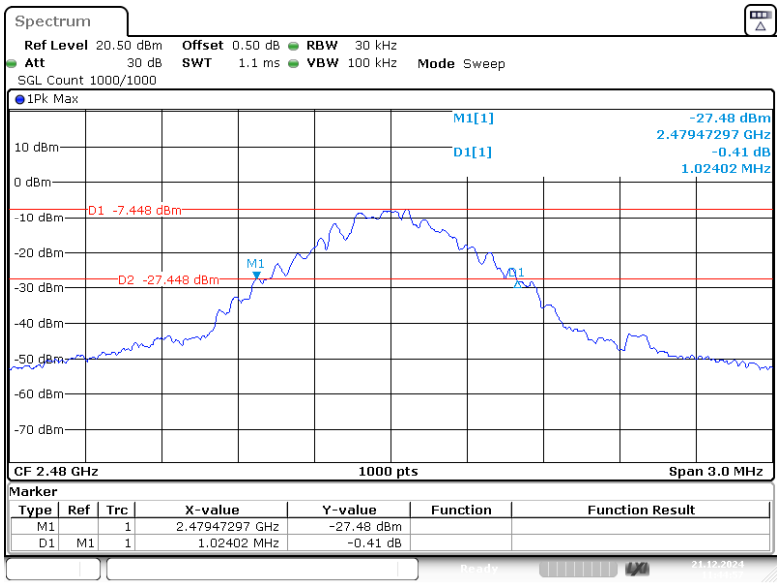
BDR(GFSK) : Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:44:08

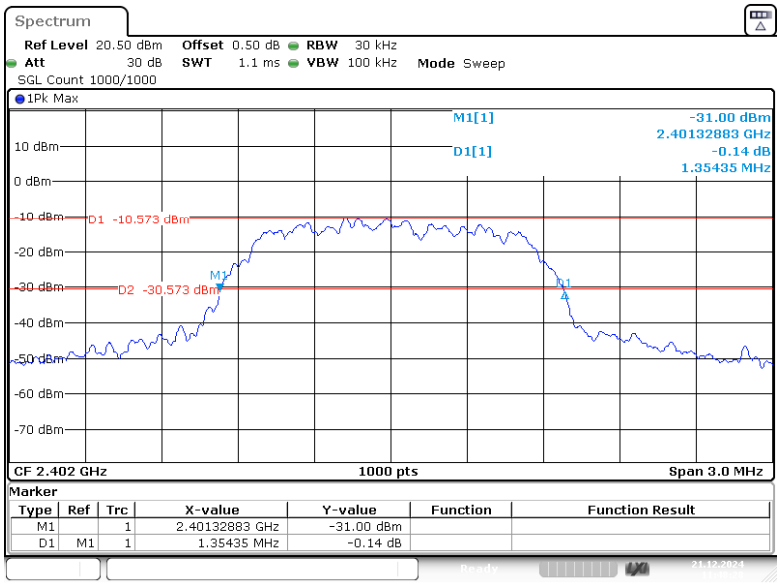
BDR(GFSK) : High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:44:57

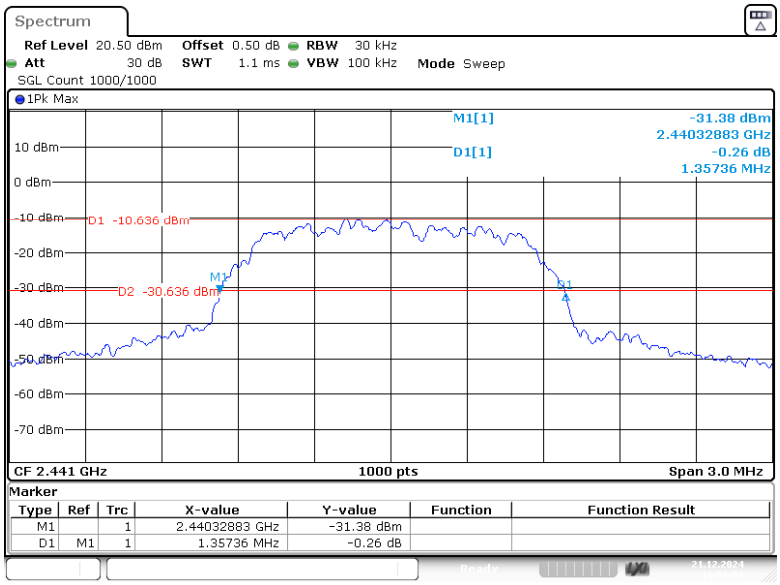
EDR (π/4-DQPSK): Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:48:27

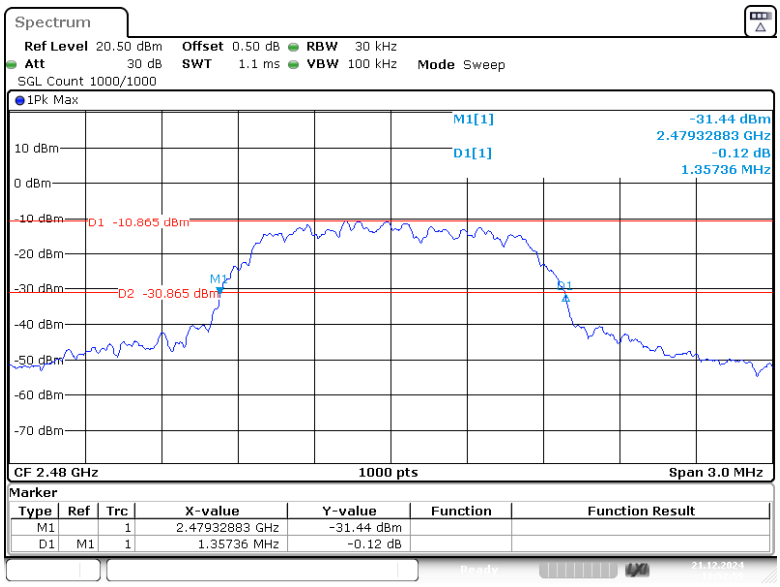
EDR(π/4-DQPSK): Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:52:09

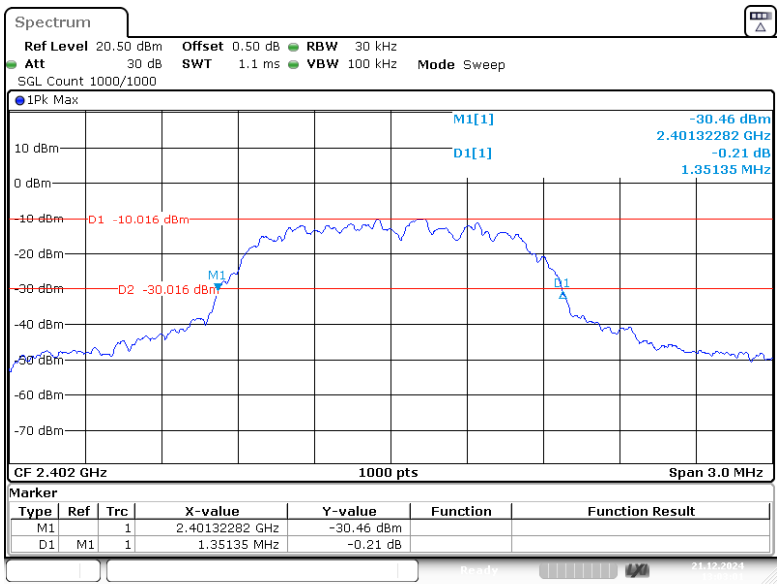
EDR (π/4-DQPSK): High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:52:58

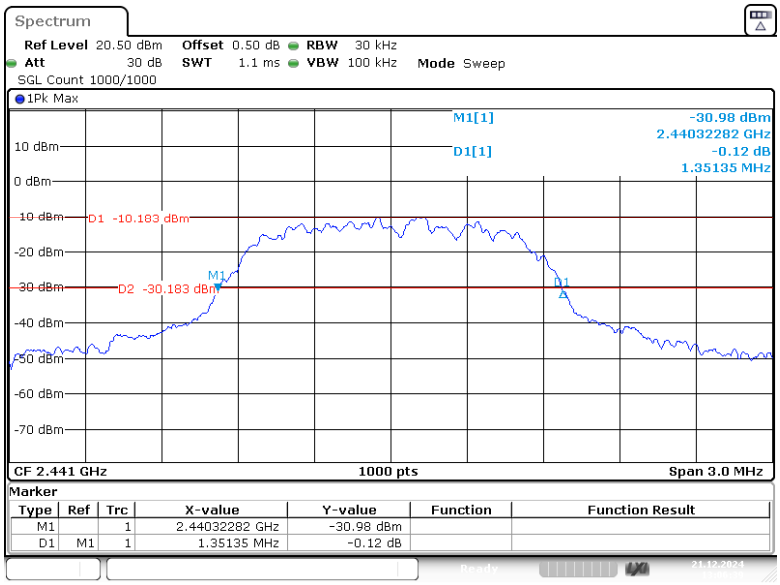
EDR (8DPSK): Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

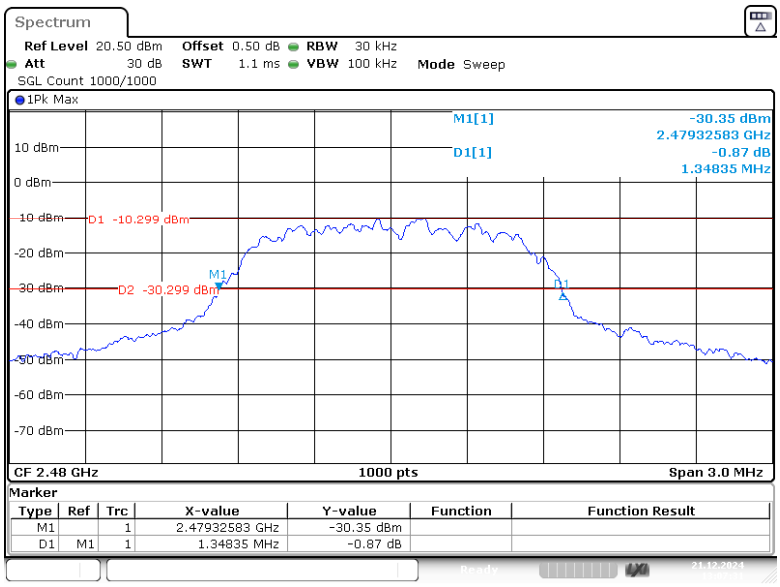
Date: 21.DEC.2024 13:03:01

EDR (8DPSK): Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:06:40

EDR (8DPSK): High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:07:32

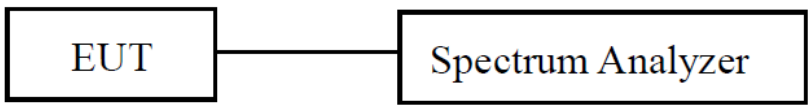
RSS-Gen Clause 6.7 99% Occupied Bandwidth

Applicable Standard

RSS-Gen Clause 6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.
In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.
The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:
The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.
Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.
For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 6.9.3

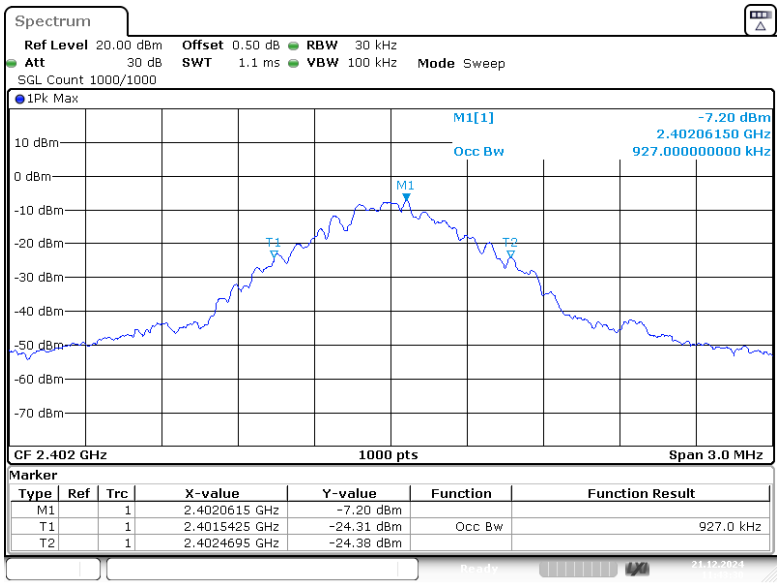
The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power 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; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Test Data

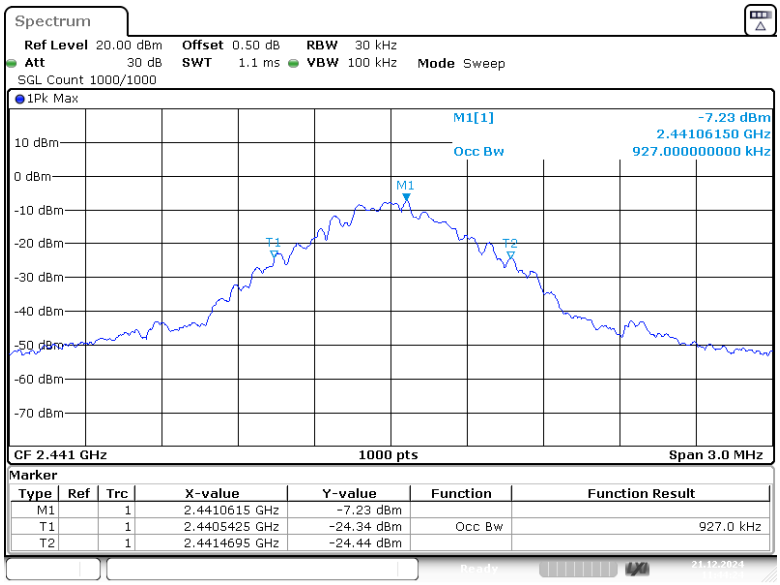
Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa
Mode	**Channel**	**Frequency (MHz)**	**99% Emission Bandwidth (MHz)**
BDR (GFSK)	Low	2402	0.927
	Middle	2441	0.927
	High	2480	0.930
EDR (π/4-DQPSK)	Low	2402	1.194
	Middle	2441	1.197
	High	2480	1.197
EDR (8DPSK)	Low	2402	1.197
	Middle	2441	1.197
	High	2480	1.197

BDR (GFSK): Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:43:31

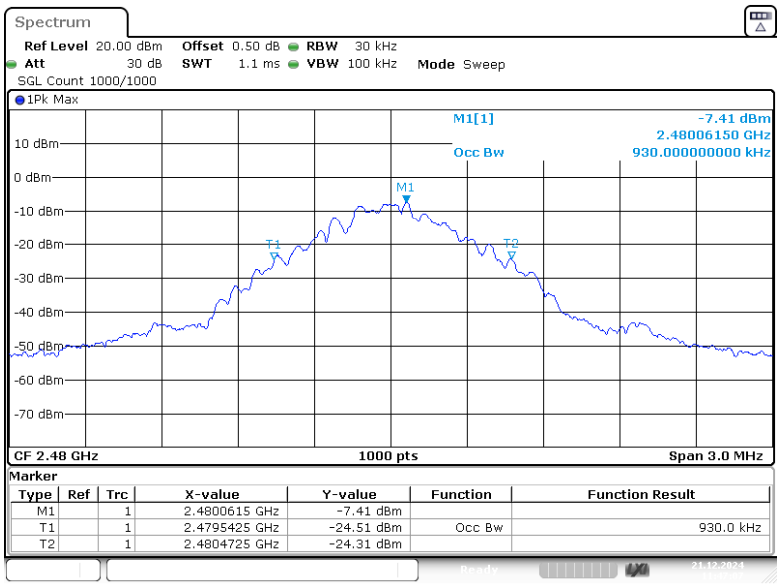
BDR (GFSK): Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:44:23

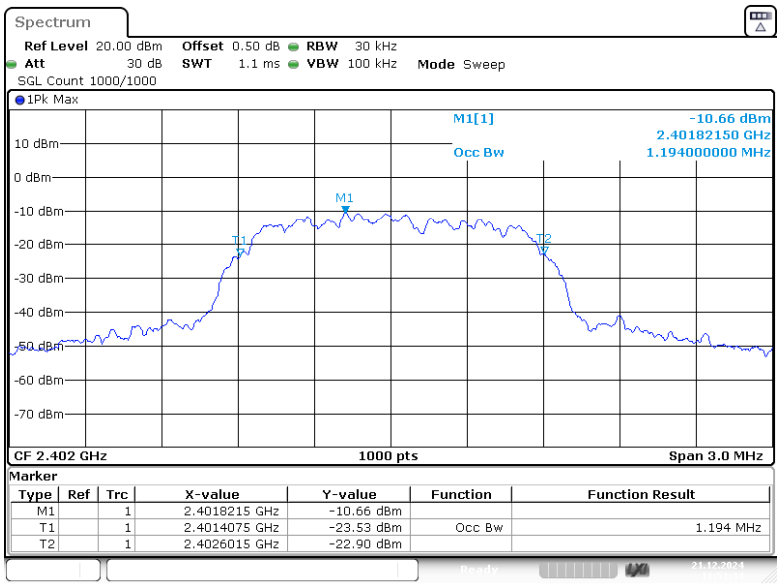
BDR (GFSK): High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:47:07

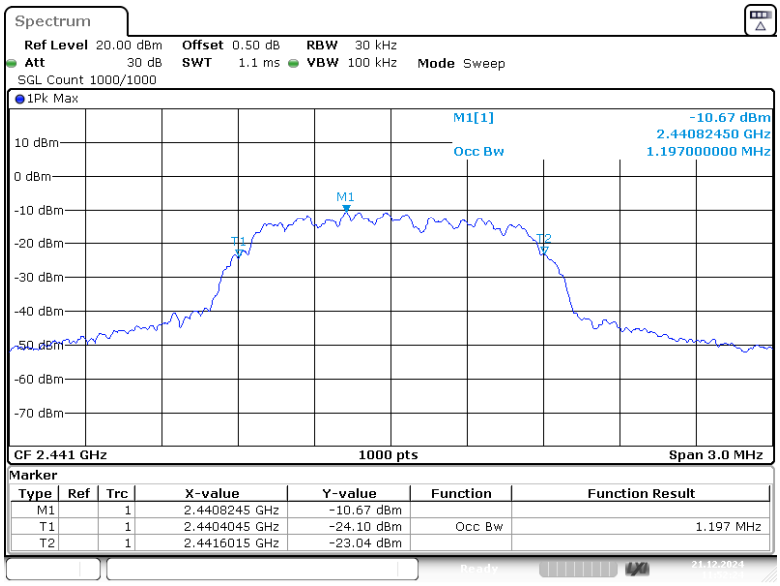
EDR (π/4-DQPSK): Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:51:34

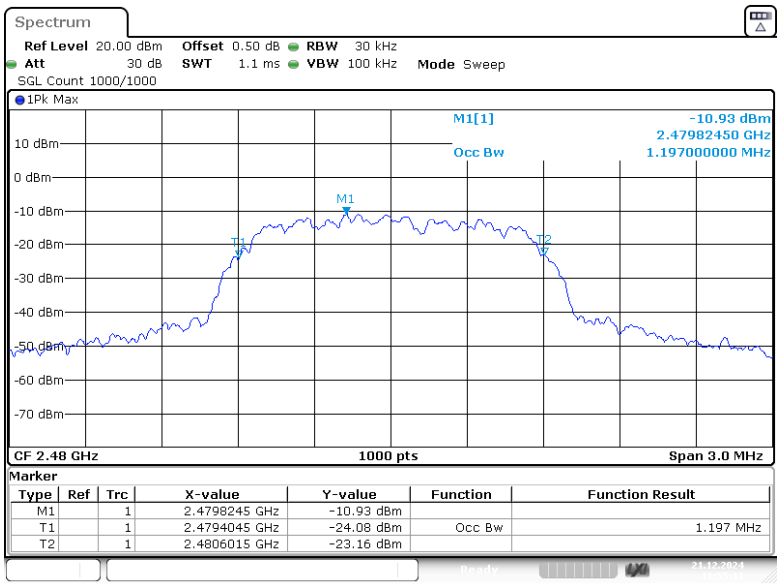
EDR (π/4-DQPSK): Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:52:24

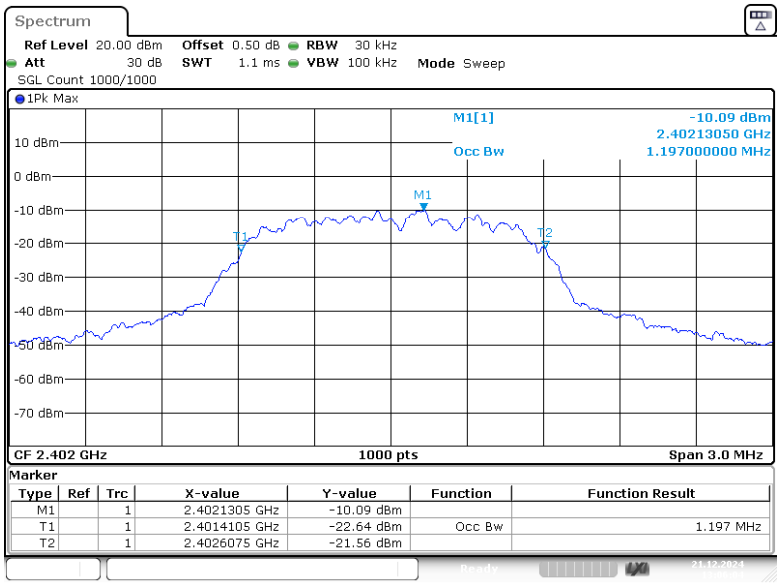
EDR (π/4-DQPSK):High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:55:11

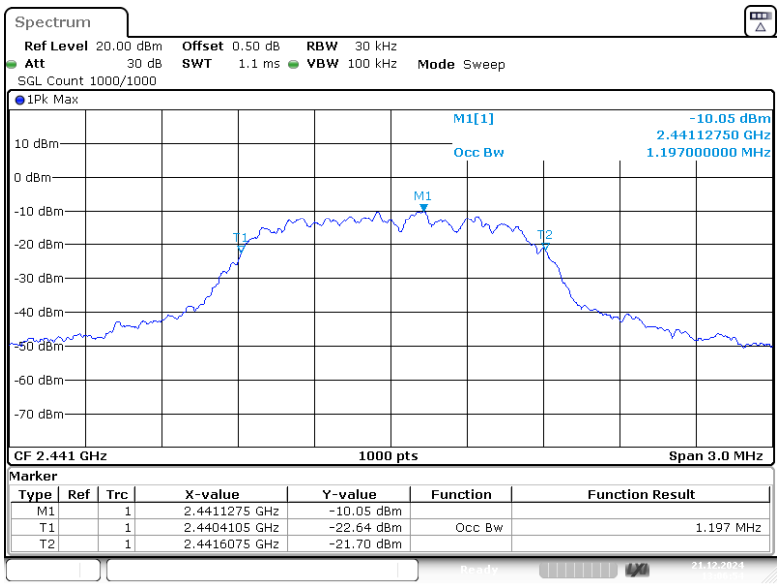
EDR (8DPSK):Low Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:06:04

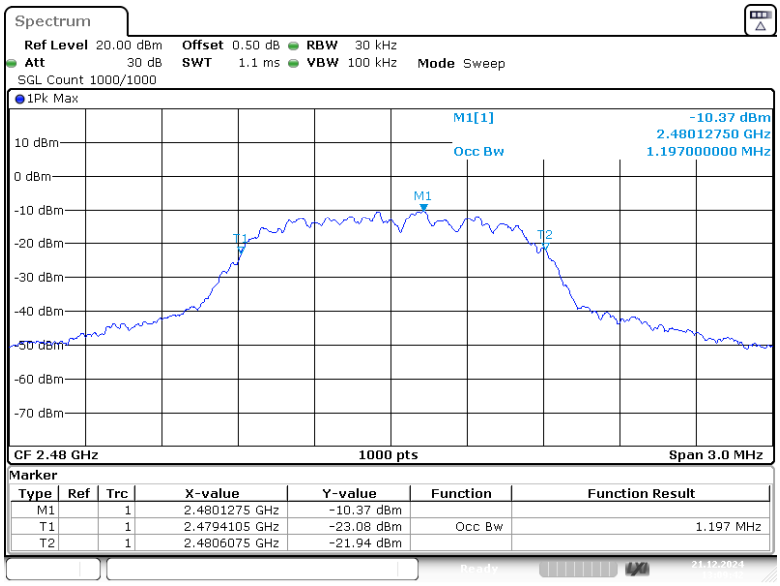
EDR (8DPSK):Middle Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:06:54

EDR (8DPSK):High Channel



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:09:43

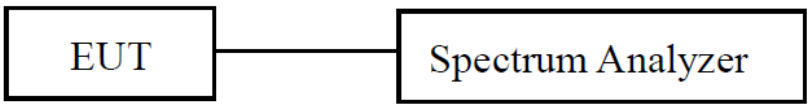
FCC §15.247(a) (1) (iii) & RSS-247 Clause 5.1 d) -QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

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.

RSS-247 Clause 5.1 d)
Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 7.8.3

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

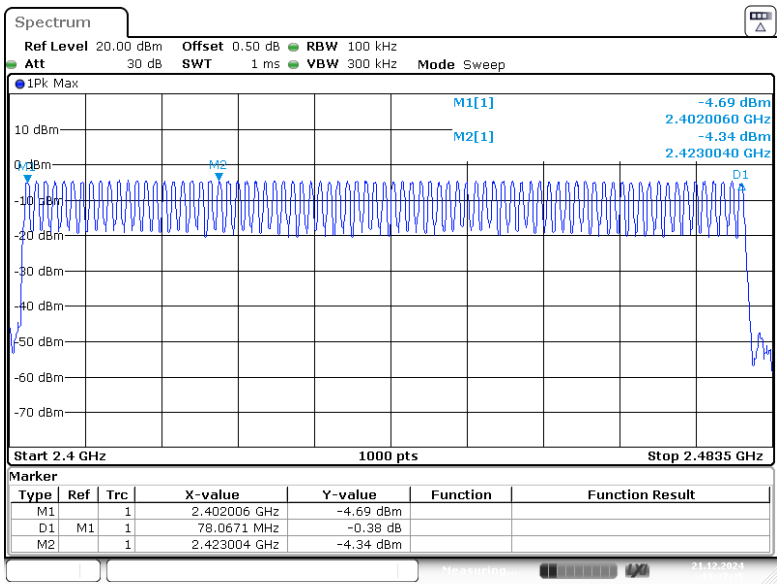
a. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
b. RBW: To identify clearly the individual channels, set the RBW 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. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

Test Data

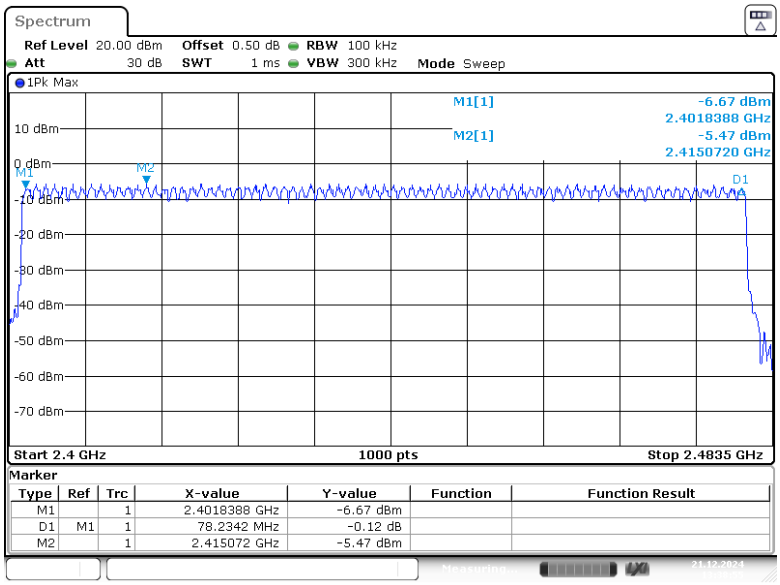
Test Mode:	Transmitting	**Test Engineer:**	Braylon Ma
Test Date:	2024-12-21	**Environment:**	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa
Mode	**Frequency Range (MHz)**	**Number of Hopping Channel (CH)**	**Limit (CH)**
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

BDR (GFSK): Number of Hopping Channels



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:37:35

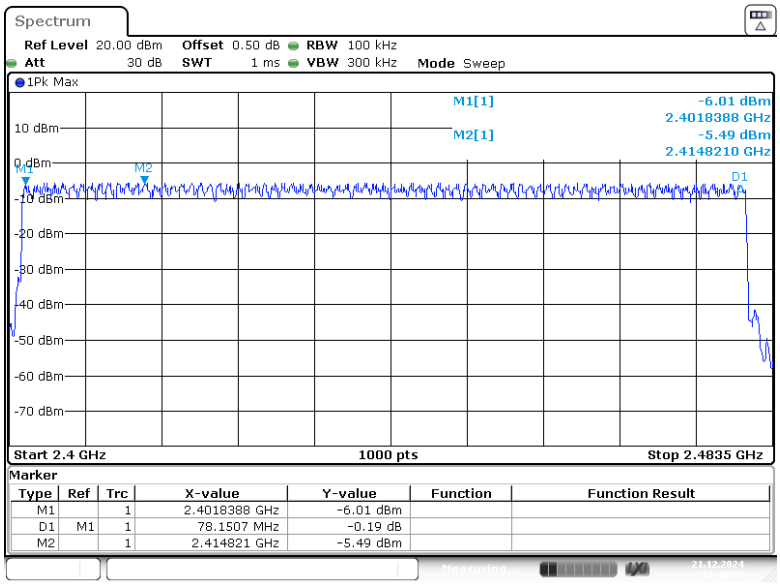
EDR (π/4-DQPSK): Number of Hopping Channels



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:38:54

EDR (8DPSK): Number of Hopping Channels



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:40:12

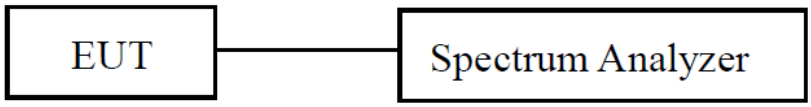
FCC §15.247(a) (1) (iii) & RSS-247 ISSUE 3 Clause 5.1 d)- TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

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.

RSS-247 ISSUE 3 Clause 5.1 d)
Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 7.8.4

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.
Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.
Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:
(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)
The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.
The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

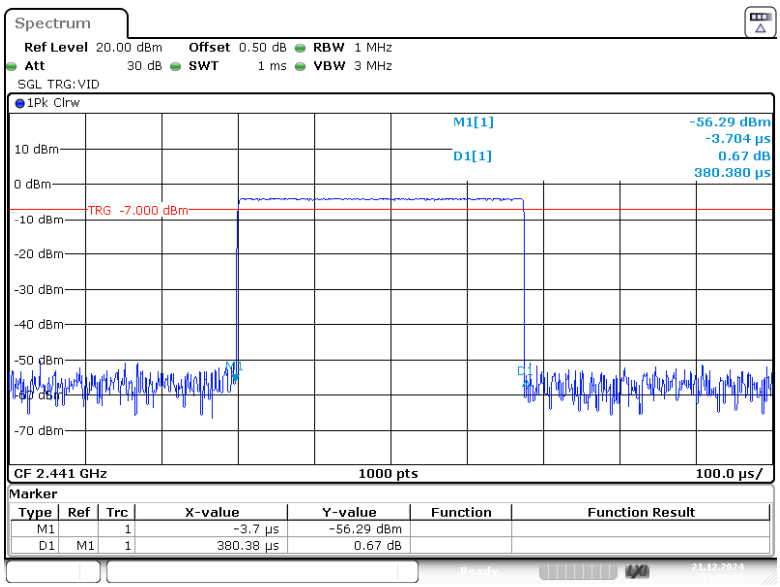
Test Data

Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5°C Humi.: 42% Atm :100.3kPa

Test Modes	Packet Type	Test Frequency (MHz)	Pulse width (ms)	Dwell times (s)	Limit (s)
BDR Mode (GFSK)	DH1	2441	0.380	0.122	0.400
	DH3	2441	1.673	0.268	0.400
	DH5	2441	2.938	0.313	0.400
EDR Mode (π/4-DQPSK)	2DH1	2441	0.401	0.128	0.400
	2DH3	2441	1.664	0.266	0.400
	2DH5	2441	2.953	0.315	0.400
EDR Mode (8DPSK)	3DH1	2441	0.396	0.127	0.400
	3DH3	2441	1.673	0.268	0.400
	3DH5	2441	2.943	0.314	0.400

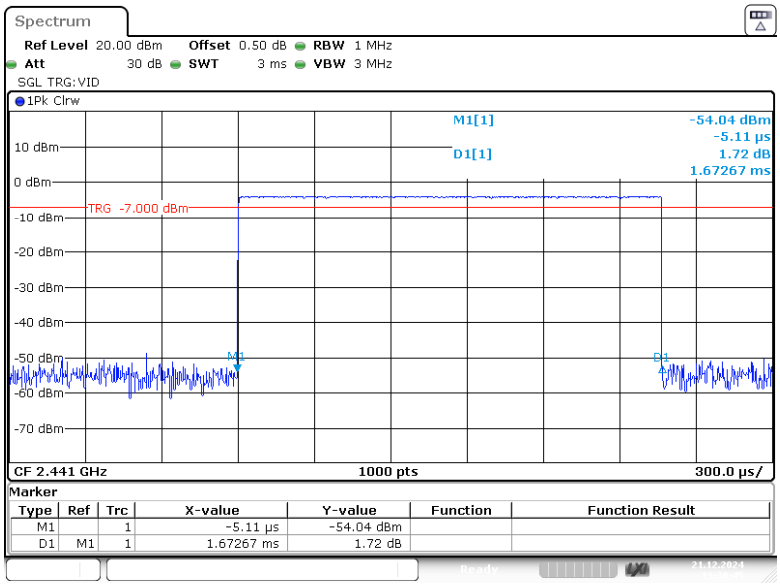
DH1/2DH1/3DH1:Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s
DH3/2DH3/3DH3:Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s
DH5/2DH5/3DH5:Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s

BDR (GFSK)_Hopping_DH1



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:29:19

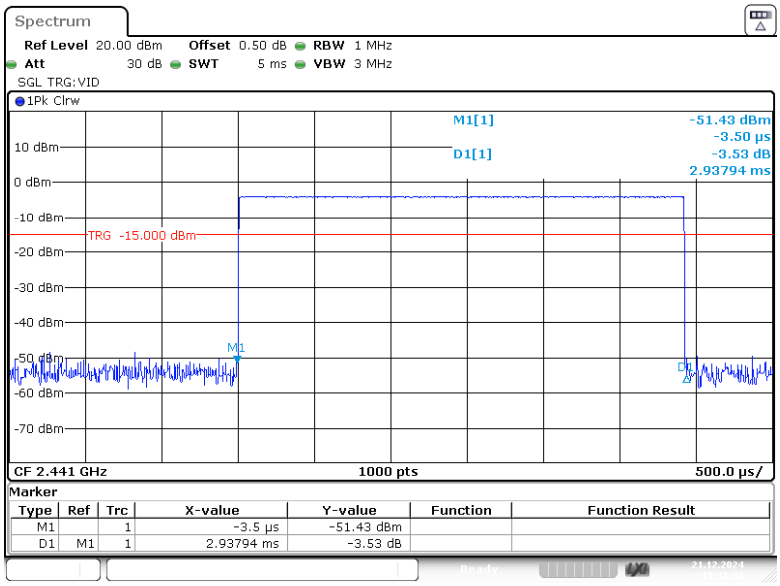
BDR (GFSK)_Hopping_DH3



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:30:45

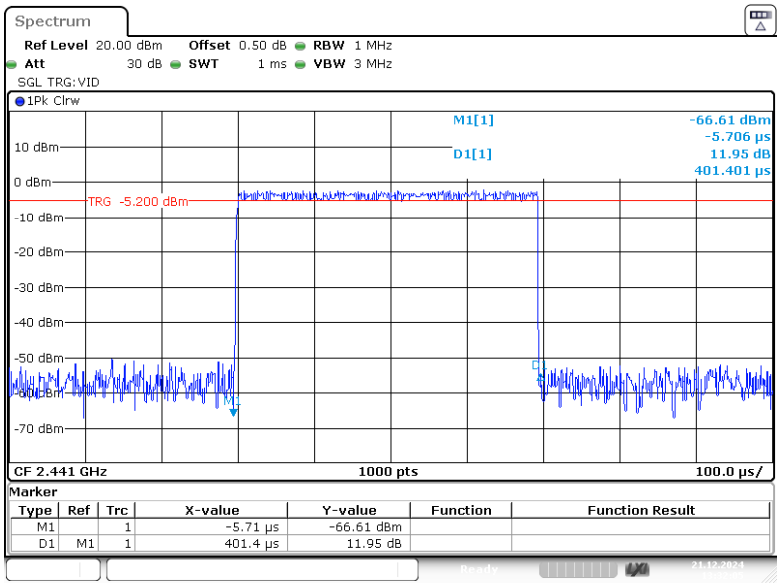
BDR (GFSK)_Hopping_DH5



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:31:28

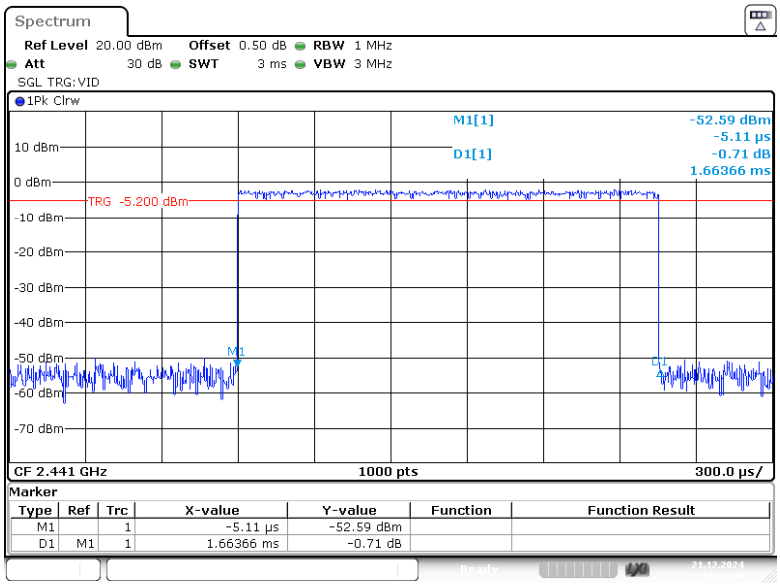
EDR (π/4-DQPSK)_Hopping_2DH1



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:32:05

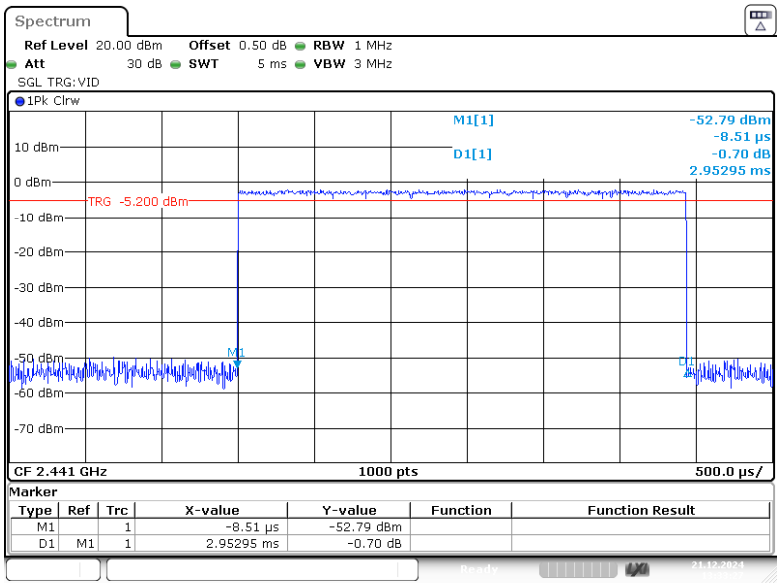
EDR (π/4-DQPSK)_Hopping_2DH3



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:32:48

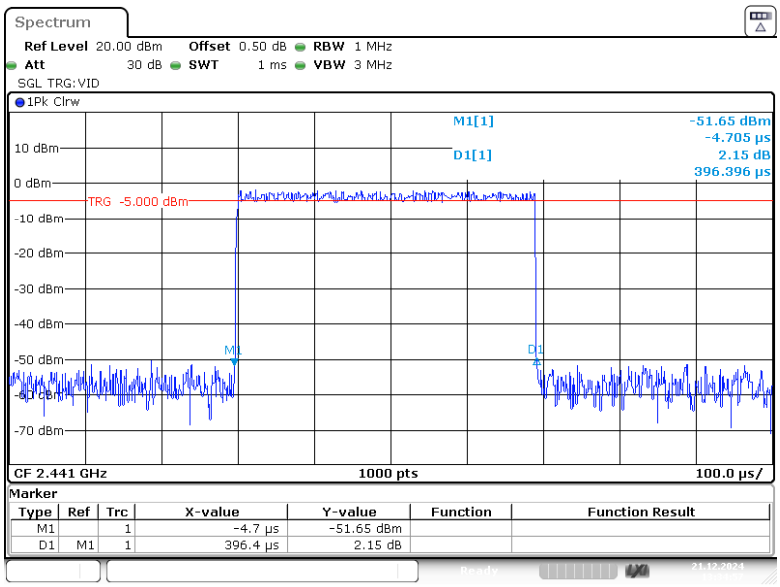
EDR (π/4-DQPSK)_Hopping_2DH5



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:33:27

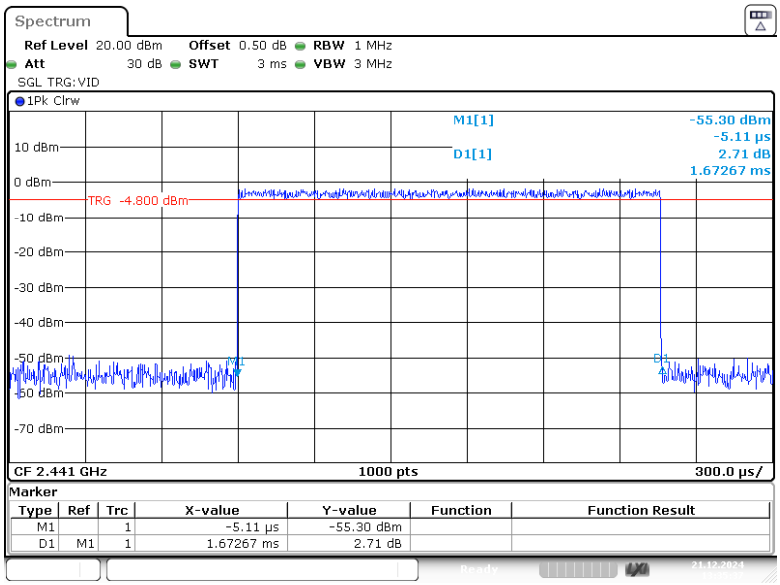
EDR (8DPSK) _Hopping_3DH1



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:34:57

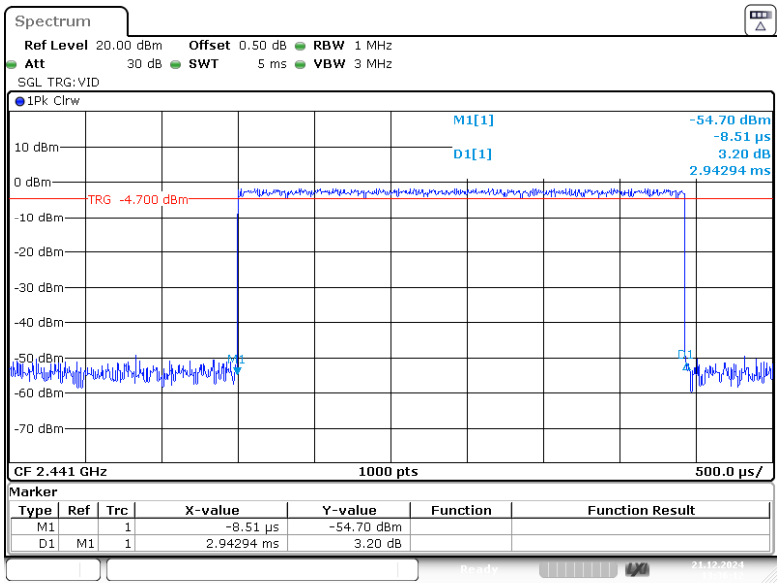
EDR (8DPSK) _Hopping_3DH3



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:35:38

EDR (8DPSK) _Hopping_3DH5



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:36:12

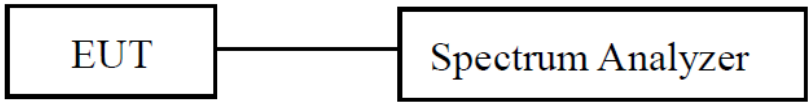
FCC §15.247(b) (1) & RSS-247 ISSUE 3 Clause 5.4 b) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

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 ISSUE 3 Clause 5.4 b)
For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 7.8.5

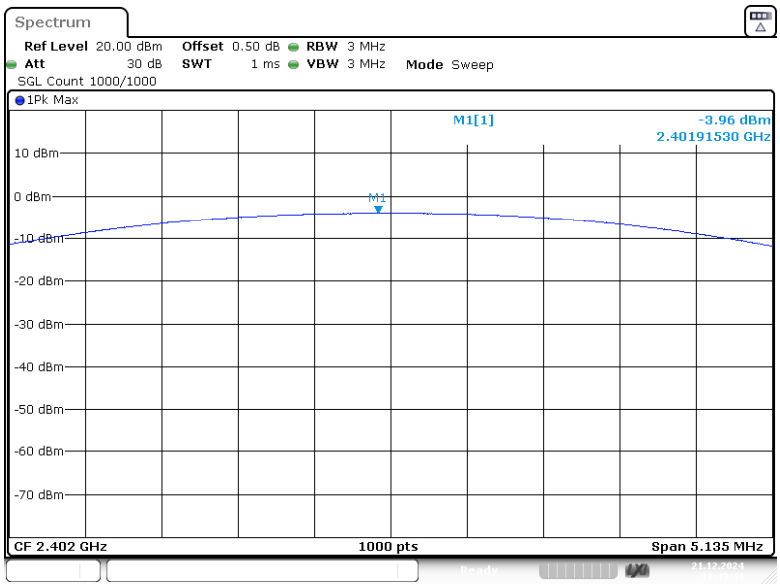
This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation, Offset the Insertion loss of the RF cable, DC Block/ Attenuator into the spectrum analyzer.
The hopping shall be disabled for this test:

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.
NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer..

Test Data

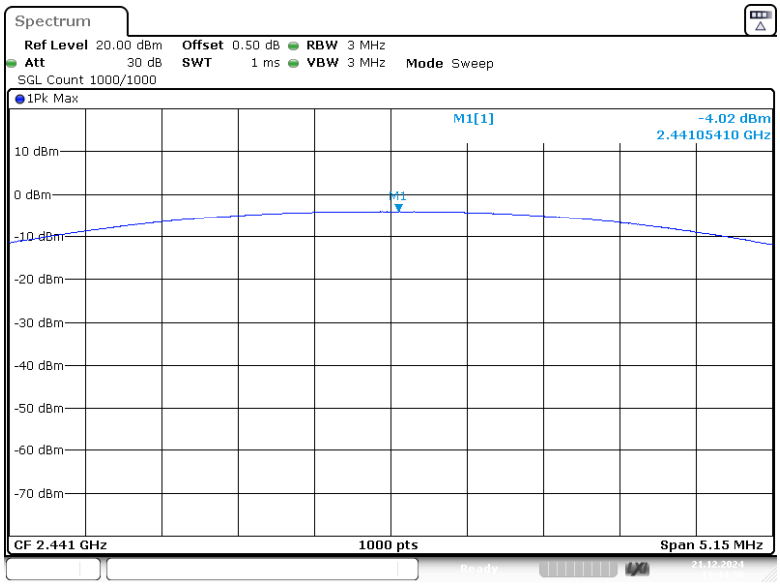
Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa
Mode	**Frequency (MHz)**	**Peak Conducted Output Power (dBm)**	**Limit (dBm)**
BDR (GFSK)	2402	-3.96	21
	2441	-4.02	21
	2480	-4.24	21
EDR (π/4-DQPSK)	2402	-1.64	21
	2441	-1.66	21
	2480	-1.89	21
EDR (8DPSK)	2402	-1.07	21
	2441	-1.18	21
	2480	-1.41	21
Antenna Gain(dBi):	3	Max.EIRP(dBm):	1.93
EIRP Limit for RSS-247: 36 dBm			

BDR(GFSK): 2402MHz



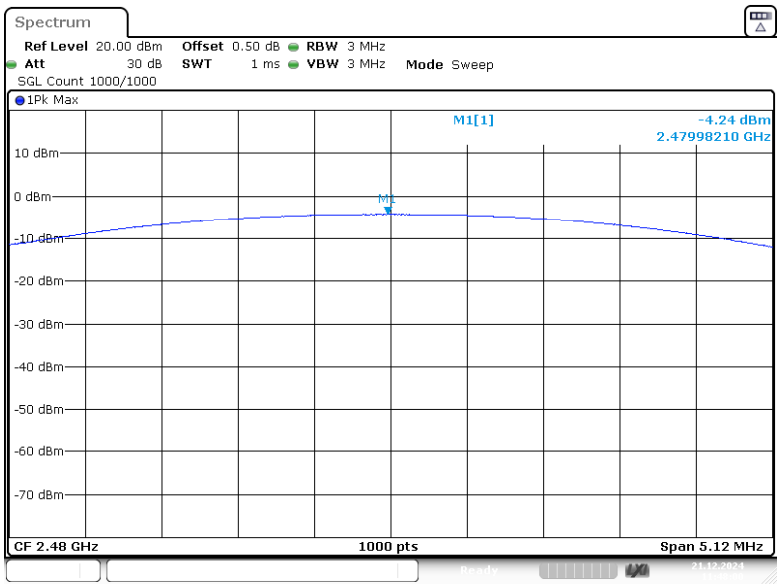
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:43:44

BDR(GFSK): 2441MHz



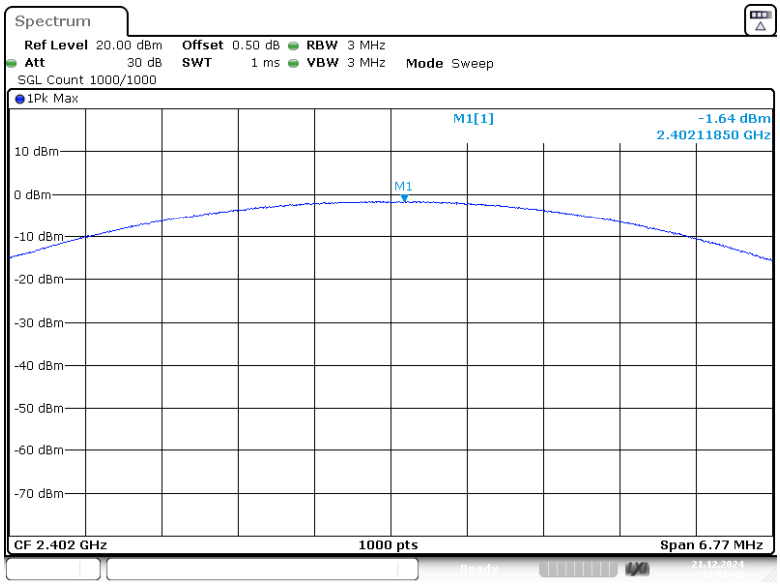
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:44:36

BDR(GFSK): 2480MHz



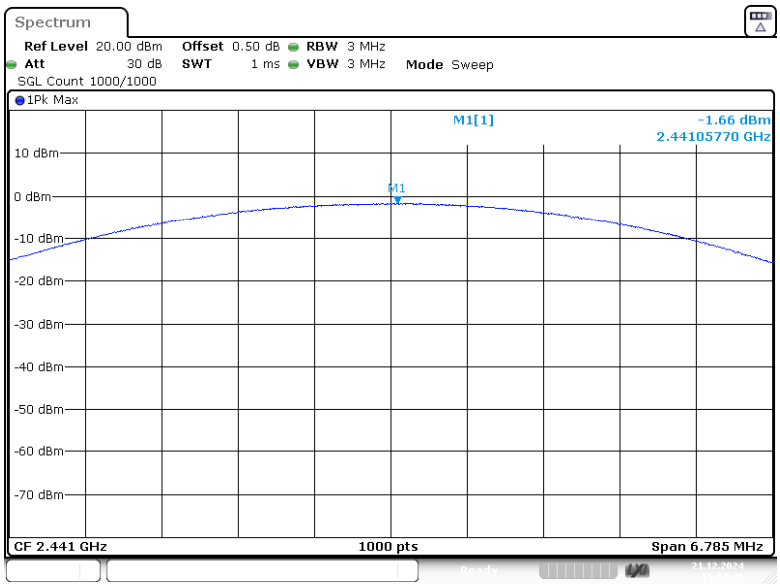
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:48:01

EDR(π/4-DQPSK): 2402MHz



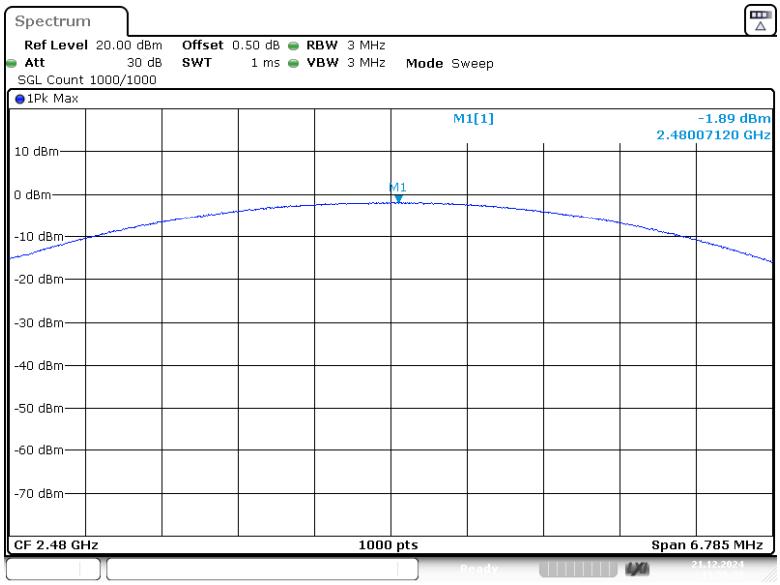
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:51:48

EDR(π/4-DQPSK): 2441MHz



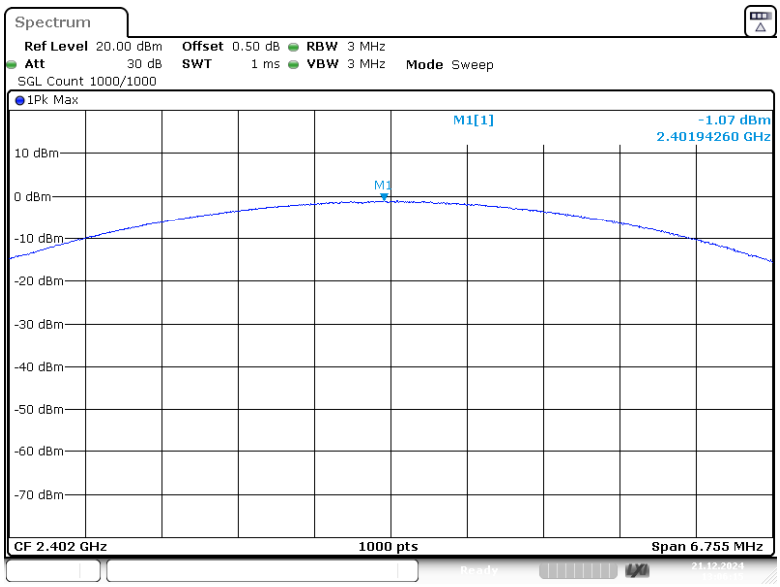
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:52:37

EDR(π/4-DQPSK): 2480MHz



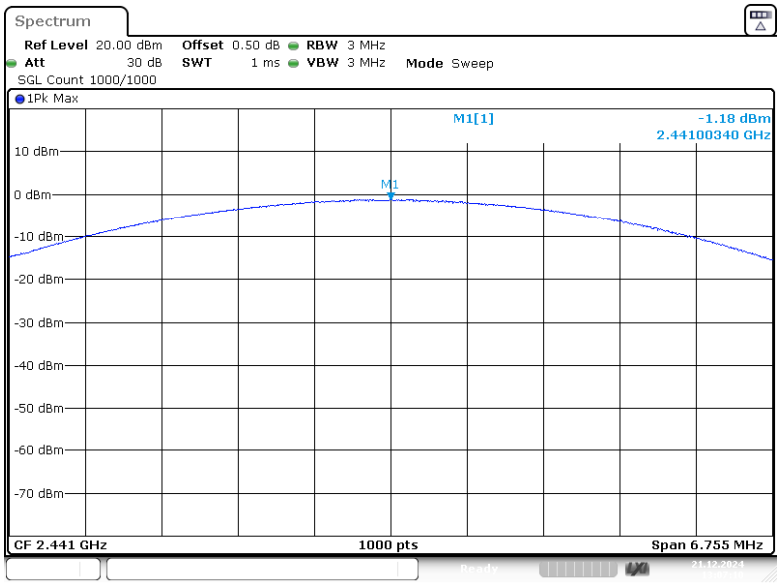
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:55:23

EDR(8DPSK): 2402MHz



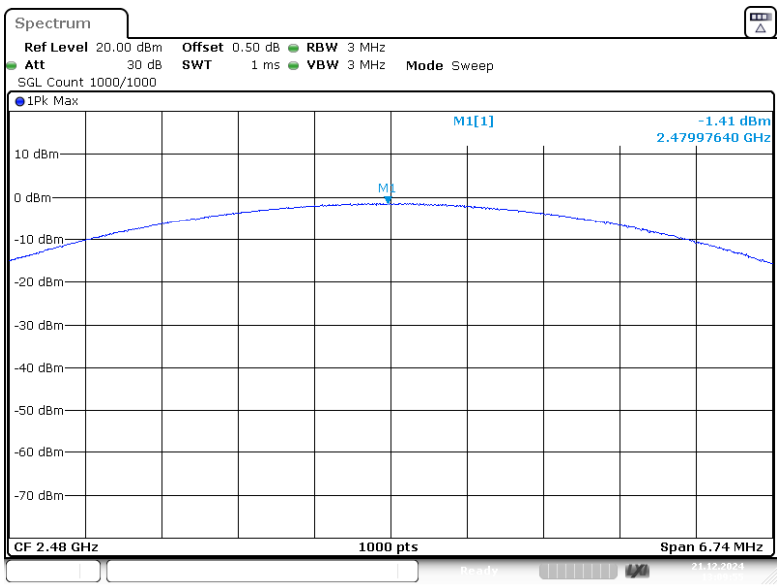
ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:06:16

EDR(8DPSK): 2441MHz



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:07:10

EDR(8DPSK): 2480MHz



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 13:09:55

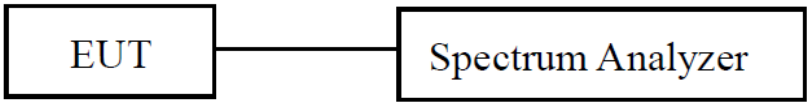
FCC §15.247(d) & RSS-247 ISSUE 3 Clause 5.5- BAND EDGES TESTING

Applicable Standard

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 ISSUE 3 Clause 5.5
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz andwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below general field strength limits specified in RSS-Gen is not required.

EUT Setup



Test Procedure

According to ANSI C63.10-2013 Section 7.8.6

For band-edge measurements, use the band-edge procedure in 6.10. Band-edge measurements shall be tested both on single channels, and with the EUT hopping.
a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements.
Report the three highest emissions relative to the limit.

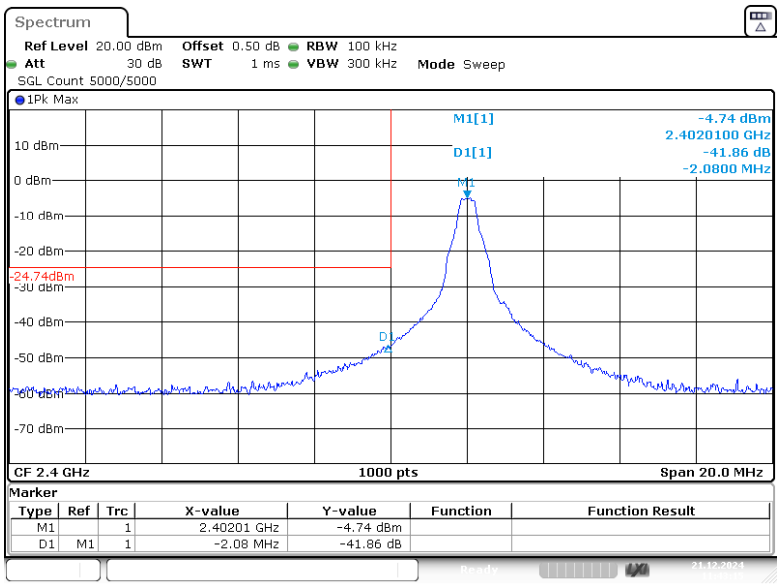
Test Data

Test Mode:	Transmitting	Test Engineer:	Braylon Ma
Test Date:	2024-12-21	Environment:	Temp.: 23.5℃ Humi.: 42% Atm :100.3kPa

Please refer to the below plots:

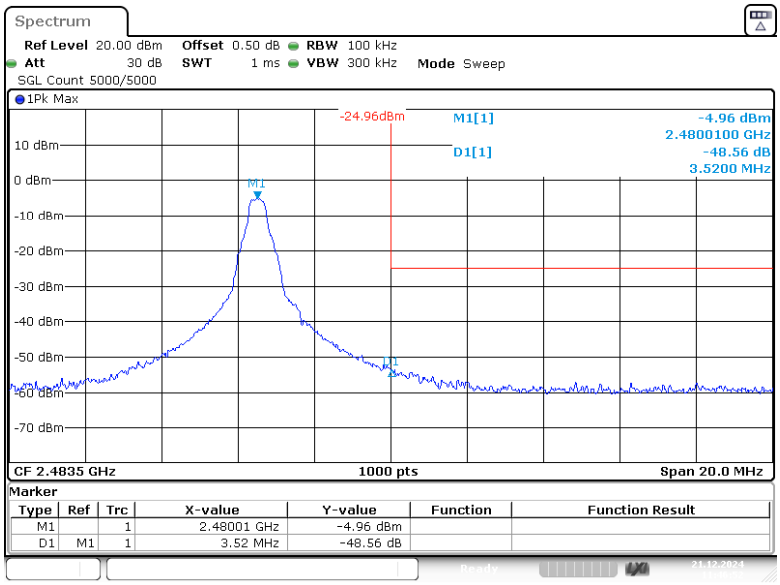
Band Edge

BDR (GFSK): Left Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma
Date: 21.DEC.2024 11:43:16

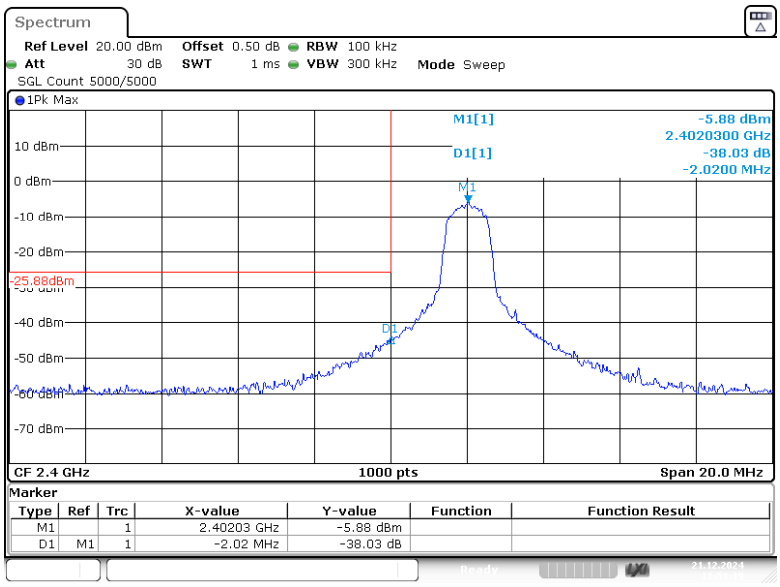
BDR (GFSK): Right Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:46:52

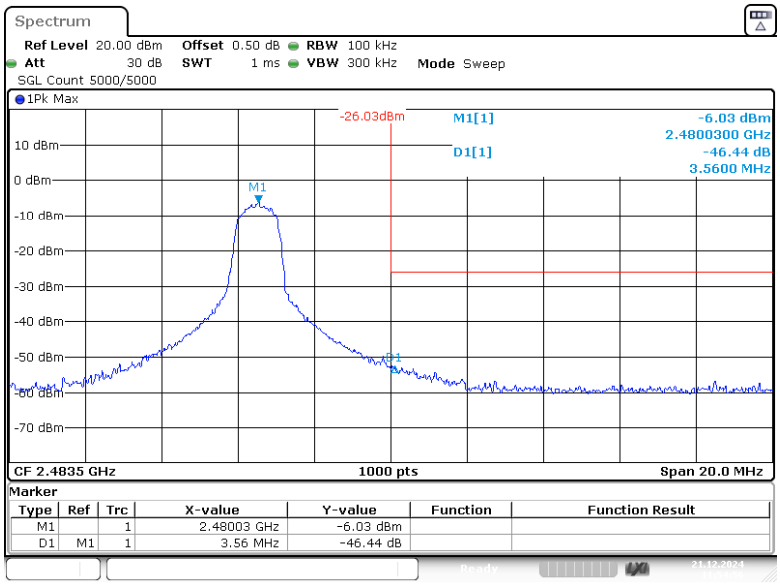
EDR (π/4-DQPSK_): Left Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:51:18

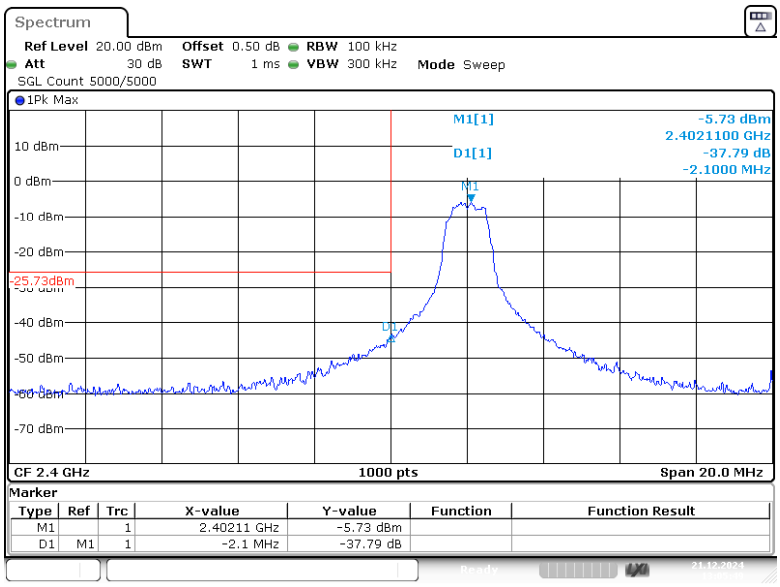
EDR (π/4-DQPSK): Right Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 11:54:56

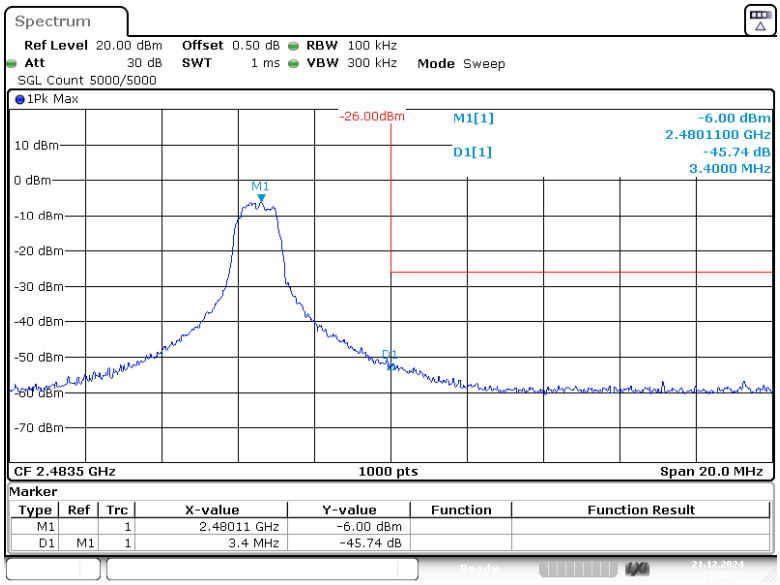
EDR (8DPSK): Left Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:05:49

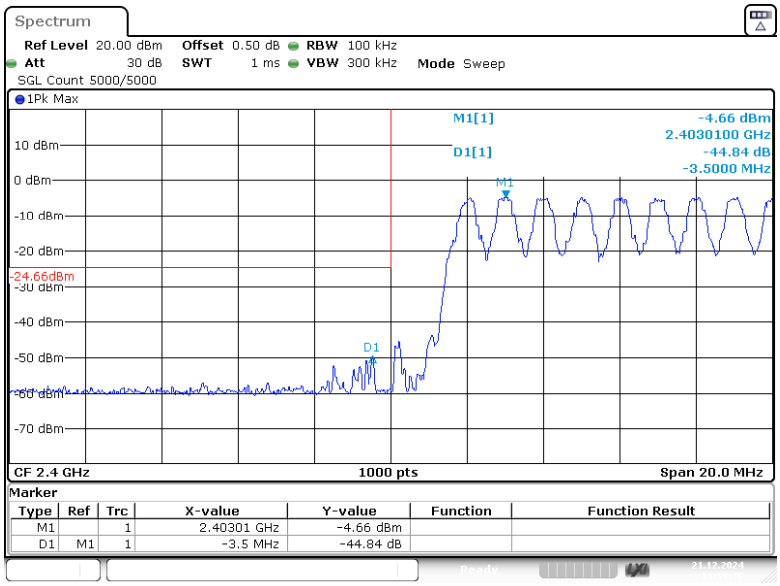
EDR (8DPSK): Right Side



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:09:28

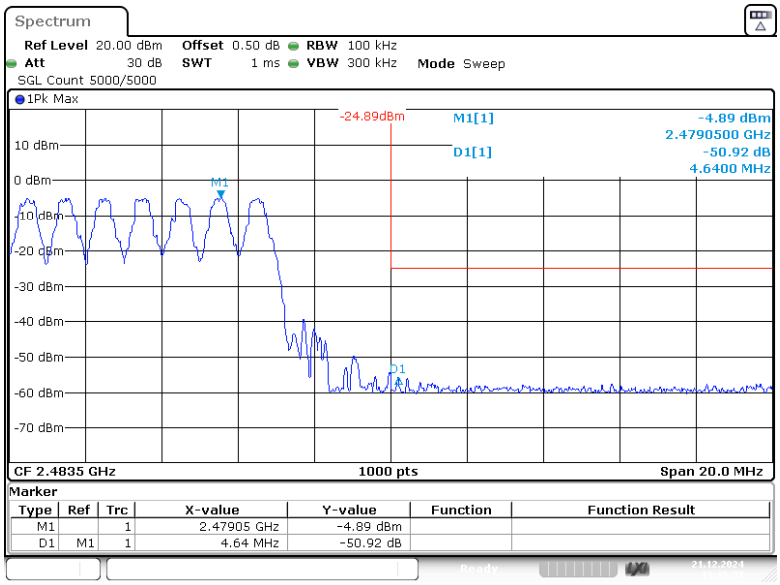
BDR (GFSK): Left Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:13:37

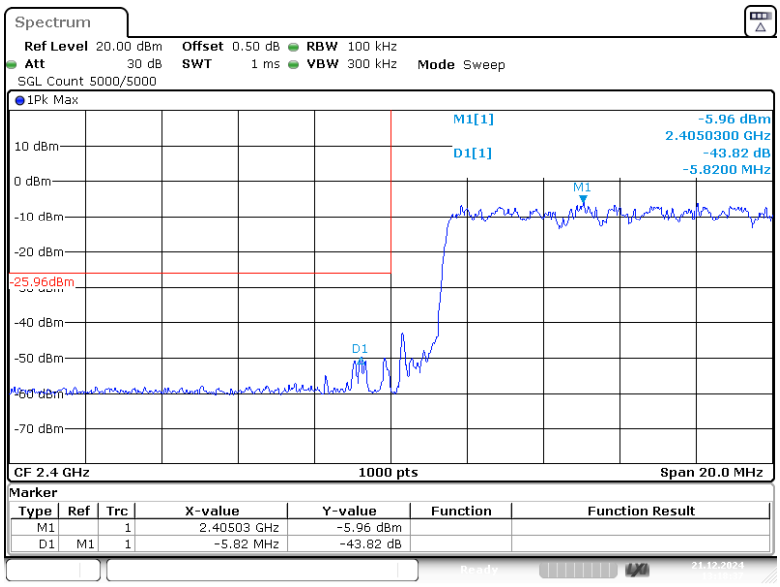
BDR (GFSK): Right Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:15:36

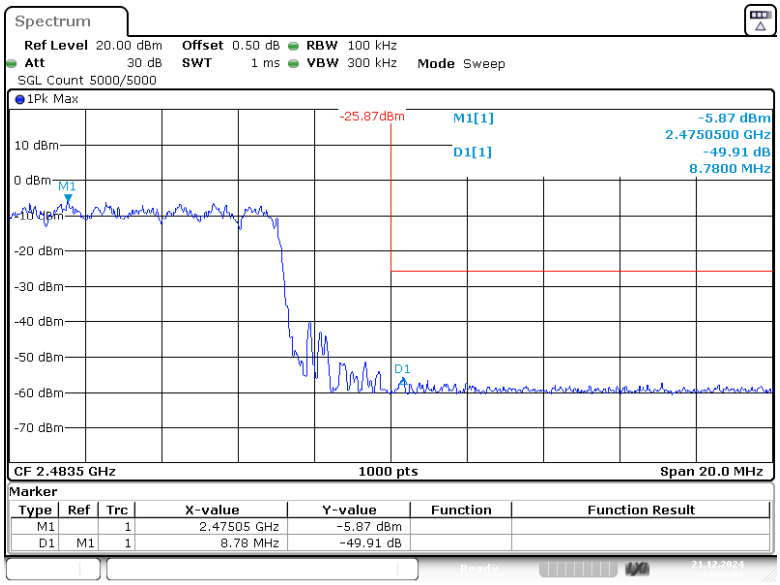
EDR (π/4-DQPSK): Left Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:18:37

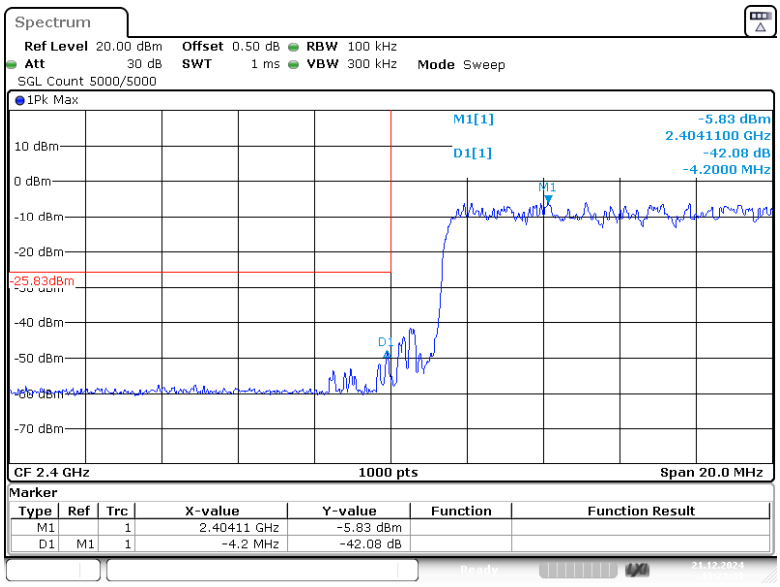
EDR (π/4-DQPSK): Right Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:20:37

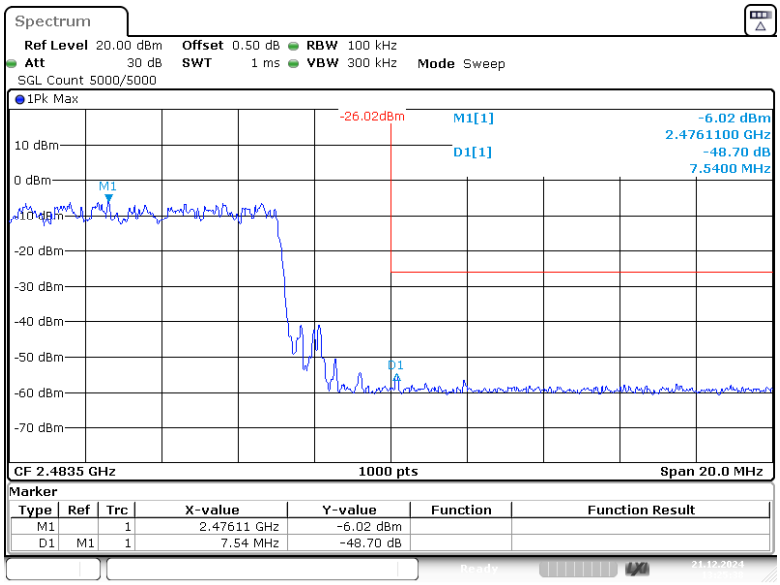
EDR (8DPSK): Left Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:23:39

EDR (8DPSK): Right Side - Hopping



ProjectNo.:2407A50315E-RF Tester:Braylon Ma

Date: 21.DEC.2024 13:25:38

EUT PHOTOGRAPHS

Please refer to the attachment 2407A50315E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and 2407A50315E-RF-INP EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2407A50315E-RF-TSP 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% 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.

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