

FCC Part 15.247
RSS-247, ISSUE 4, July 24
RSS-GEN, ISSUE 5, February 2021 Amendment 2
TEST REPORT

For

Technology Solutions (UK) Ltd

Suite A, Loughborough Technology Centre, Epinal Way, Loughborough, Leicestershire,
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IC: 8948A-3138

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Product Type:
RFID READER

Report Producer : Jojo Lu

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Revision History

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1. General Information

1.1. Product Description for Equipment under Test (EUT)

Applicant	Technology Solutions (UK) Ltd
	Suite A, Loughborough Technology Centre, Epinal Way, Loughborough, Leicestershire, LE11 3GE, United Kingdom
Brand Name	TSL
Product (Equipment)	RFID READER
Model Name /HVIN	3138-AS1-US , 3138-AS2-US , 3138-AX1-US , 3138-AX2-US
PMN	3138
Model Discrepancy	Please refer to the difference declaration letter provided by the Applicant.
Frequency Range	2402~2480 MHz
Modulation Technique	BR Mode: GFSK EDR Mode: $\pi/4$ -DQPSK, 8DPSK
Maximum Conducted Peak Output Power	BR(GFSK) Mode: 2.12 dBm EDR($\pi/4$ -DQPSK) Mode: -0.48 dBm EDR(8DPSK) Mode: 0.02 dBm
Transmit Data Rate	BR(GFSK) Mode: 1 Mbps EDR($\pi/4$ -DQPSK) Mode: 2 Mbps EDR(8DPSK) Mode: 3 Mbps
Power Operation (Voltage Range)	7.2Vdc from Battery 5.2Vdc from Adapter
Received Date	2025/01/06

*All measurement and test data in this report was gathered from production sample serial number:

RXZ241220075-1 、RXZ241220075-2 、RXZ241220075-3 、RXZ241220075-4 (Assigned by BACL, New Taipei Laboratory.)

1.2. Objective

This report is prepared on behalf of *Technology Solutions (UK) Ltd* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules and RSS-247, Issue 4, July 24, RSS-Gen, Issue 5, February 2021 Amendment 2 of the Innovation, Science and Economic Development Canada.

1.3. Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, 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 4, July 24, RSS-Gen, Issue 5, February 2021 Amendment 2 of the Innovation, Science and Economic Development Canada.

1.4. Statement

Decision Rule: No, (The test results do not include MU judgment)

1. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory).
2. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
5. Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.5. Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 3.02 dB
RF output power, conducted		+/- 0.57 dB
Emission Bandwidth		+/- 0.09 %
Unwanted Emissions, conducted		+/- 1.09 dB
Emissions, radiated	9 kHz~30 MHz	+/- 3.20 dB
	30 MHz~1 GHz	+/- 3.30 dB
	1 GHz~18 GHz	+/- 5.14 dB
	18 GHz~40 GHz	+/- 4.75 dB
Temperature		+/- 0.76 °C
Humidity		+/- 0.41 %

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.

1.6. Environmental Conditions

Test Site	Test Date	Temperature (°C)	Relative Humidity (%)	Test Engineer
AC Line Conducted Emissions	2025/2/20	19.9	62	Aaron
Radiation Spurious Emissions	2025/1/15~2025/9/9	16.2-25.4	57-62	Nick
Conducted Spurious Emissions	2025/3/6	23.7	58	Wayne
Emission Bandwidth	2025/3/6	23.7	58	Wayne
Channel Separation Test	2026/1/22	23.9	46	Sean
Time of Occupancy	2025/3/6	23.7	58	Wayne
Quantity of hopping channel	2025/3/6	23.7	58	Wayne
Maximum Output Power	2025/3/6	23.7	58	Wayne
100 kHz Bandwidth of Frequency Band Edge	2025/3/6	23.7	58	Wayne

1.7. Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

☒ 70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 221, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: TW3732.

2. System Test Configuration

2.1. Description of Test Configuration

For BT mode, 79 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	40	2442
1	2403	--	--
2	2404	76	2478
3	2405	77	2479
--	--	78	2480
39	2441	/	/

For BT Modes were tested with channel 0, 39 and 78.

2.2. Equipment Modifications

No modification was made to the EUT.

2.3. EUT Exercise Software

The test software was used “RF Test USB v1.8.1”.

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

Test Frequency		2402MHz	2441MHz	2480MHz
Power Level Setting	GFSK	14	14	14
	$\pi/4$ -DQPSK	14	14	14
	8DPSK	14	14	14

2.4. Support Equipment List and Details

Description	Manufacturer	Model Number
Adapter	HANG	C13
Docking	TSL	3138-CRD-01
Phone	Datalogic	Memor 10

2.5. External Cable List and Details

Description	Manufacturer	Model Number
Micro USB	BACL	1m

2.6. Test Mode

Pre-scan

Mode 1: model (3138-AS1-US), USB Type-C handle

Mode 2: model (3138-AX1-US), USB Type-C handle

Mode 3: model (3138-AS2-US), 8 pad connector handle

Mode 4: model (3138-AX2-US), 8 pad connector handle

Worst case is the Mode 1

Mode 1: model (3138-AS1-US) for all test item, Tx Test status.

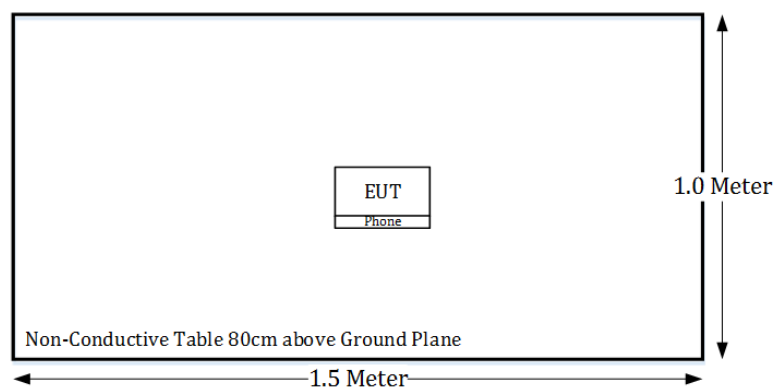
Mode 2: model (3138-AX1-US) test Below 1GHz Radiated Spurious Emissions.

2.7. Block Diagram of Test Setup

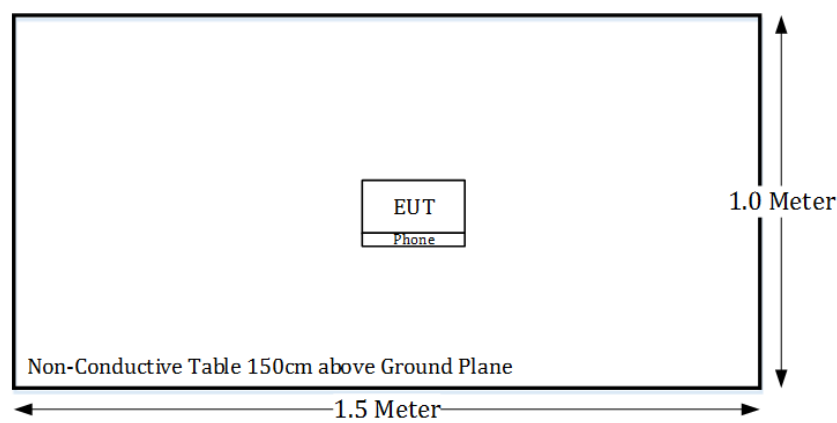
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

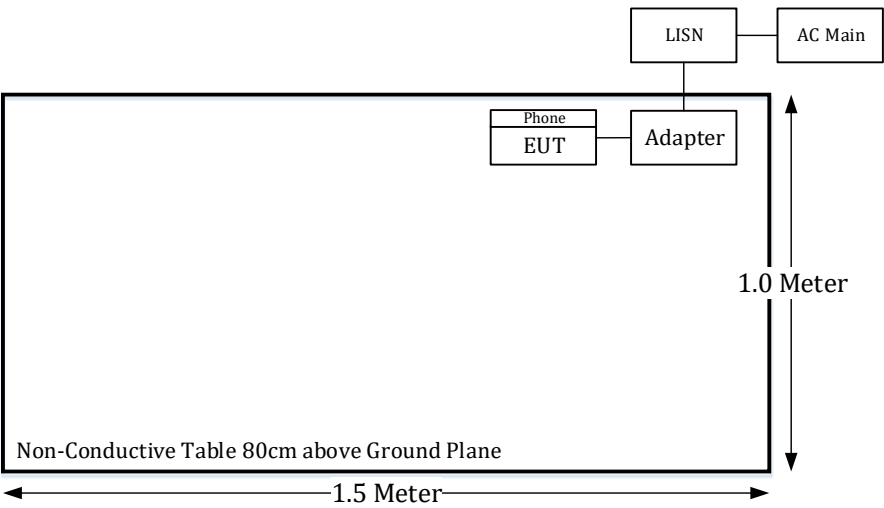
Below 1GHz:



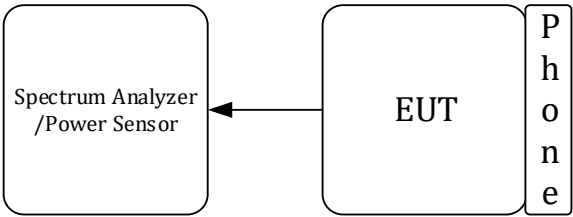
Above 1GHz:



Conduction:



Conducted:



3. Summary of Test Results

Rules	Description of Test	Results
FCC §15.203 RSS-GEN §6.8	Antenna Requirement	Compliance
FCC §15.207(a) RSS-GEN §8.8	AC Line Conducted Emissions	Compliance
FCC §15.205, §15.209, §15.247(d) RSS-247 §6.6 RSS-GEN §8.9 RSS-GEN §8.10	Spurious Emissions	Compliance
FCC §15.247(a)(1) RSS-247 §6.2.3.1 (a) RSS-GEN §6.7	Emission Bandwidth	Compliance
FCC §15.247 (a)(1) RSS-247 §6.2.3.1 (a)	Channel Separation Test	Compliance
FCC §15.247(a)(1)(iii) RSS-247 §6.2.3.1 (b)	Time of Occupancy (Dwell Time)	Compliance
FCC §15.247(a)(1)(iii) RSS-247 §6.2.3.1 (b)	Quantity of hopping channel Test	Compliance
FCC §15.247(b)(1) RSS-247 §6.2.3.2	Maximum Peak Output Power	Compliance
FCC §15.247(d) RSS-247 §6.6	100 kHz Bandwidth of Frequency Band Edge	Compliance

4. Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conduction Room (CON-A)					
LISN	Rohde & Schwarz	ENV216	101612	2025/2/17	2026/2/17
EMI Test Receiver	Rohde & Schwarz	ESR	102759	2024/9/19	2025/9/19
RF Cable	EMEC	EM-CB5D	1	2024/6/5	2025/6/5
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiation 3M Room - Below 1GHz (966-A)					
Active Loop Antenna	ETS-Lindgren	6502	35796	2024/3/27	2025/3/27
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/1554 2_01	2025/1/16	2026/1/16
Preamplifier	Sonoma	310N	130602	2024/6/18 2025/6/17	2025/6/18 2026/6/17
Spectrum Analyzer	Rohde & Schwarz	FSV40	101941	2024/12/25	2025/12/25
EMI Test Receiver	Rohde & Schwarz(R&S)	ESR3	102759	2024/9/19	2025/9/19
Microflex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2024/12/20	2025/12/20
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2024/12/20	2025/12/20
Coaxial Cable	COMMATE	PEWC	8Dr	2024/12/20	2025/12/20
Cable	EMC	EMC105-SM-SM-10000	201003	2024/12/20	2025/12/20
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2024/12/20	2025/12/20
Software	AUDIX	E3	18621a	N.C.R	N.C.R
Radiation 3M Room - Above 1GHz (966-A)					
Horn Antenna	A.H. system	SAS-571	1020	2024/5/21	2025/5/21
Horn Antenna	ETS-Lindgren	3116	62638	2024/8/30	2025/8/30
Preamplifier	Channel	ERA-100M-18G-01D1748	EC2300049	2024/12/12	2025/12/12
Preamplifier	BACL	BACL-1313-A1840	4011511	2024/2/1	2025/2/1
Spectrum Analyzer	Rohde & Schwarz	FSV40	101941	2024/12/25	2025/12/25
EMI Test Receiver	Rohde & Schwarz(R&S)	ESR3	102759	2024/9/19	2025/9/19
Microflex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2024/12/20	2025/12/20
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2024/12/20	2025/12/20
Coaxial Cable	COMMATE	PEWC	8Dr	2024/12/20	2025/12/20
Cable	EMC	EMC105-SM-SM-10000	201003	2024/12/20	2025/12/20
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2024/12/20	2025/12/20
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2024/1/23	2025/1/23
Microflex Cable	ROSNOL	K1K50-UP0264-K1K50-80CM	160309-2	2024/1/23	2025/1/23
Band-stop filter	Woken	STI15-9831	STI15-9831-1	2024/10/19	2025/10/19
High-pass filter	XINGBOKEJI	XBLBQ-GTA54	200108-3-2	2024/10/19	2025/10/19
Software	AUDIX	E3	18621a	N.C.R	N.C.R

Conducted Room					
Spectrum Analyzer	Rohde & Schwarz(R&S)	FSV40	101204	2024/5/30	2025/5/30
				2025/6/4	2026/6/4
Cable	UTIFLEX	UFA210A	9435	2024/10/1	2025/10/1
				2025/9/30	2026/9/30
Power Sensor	Boonton	RTP5006	11037	2024/5/21	2025/5/21
Attenuator	MCL	BW-S10W5+	1419	2025/3/6	2026/3/6

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.

5 FCC §15.203 & RSS-Gen §6.8 – Antenna Requirements

5.1 Applicable Standard

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 user of a standard antenna jack or electrical connector is prohibited.

According to RSS-Gen 6.8:

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

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

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

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

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

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

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

5.2 Antenna Information

Model	Type	Antenna Gain	Impedance
AMAN301512ST01	Dielectric Chip	2.1 dBi	50Ω

The antenna is permanently connected to the EUT.

Result: Compliance

6. FCC §15.207(a) & RSS-Gen §8.8 – AC Line Conducted Emissions

6.1. Applicable Standard

According to §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

According to RSS-GEN §8.8

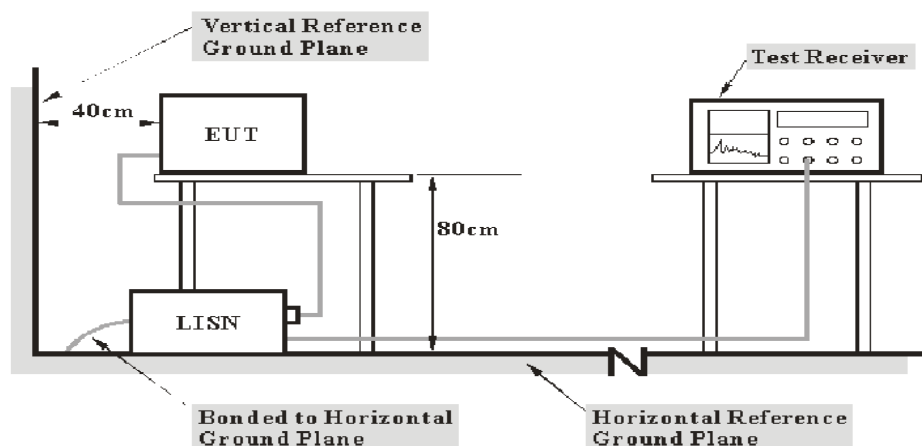
Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μ H / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 ^{Note 1}	56 to 46 ^{Note 1}
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

6.2. EUT Setup



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 measurement procedure. The specification used was with the FCC Part 15.207 and RSS-GEN limits.

6.3. EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W
150kHz – 30MHz	9kHz

6.4. Test Procedure

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.

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

6.5. Corrected Factor & Over Limit Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

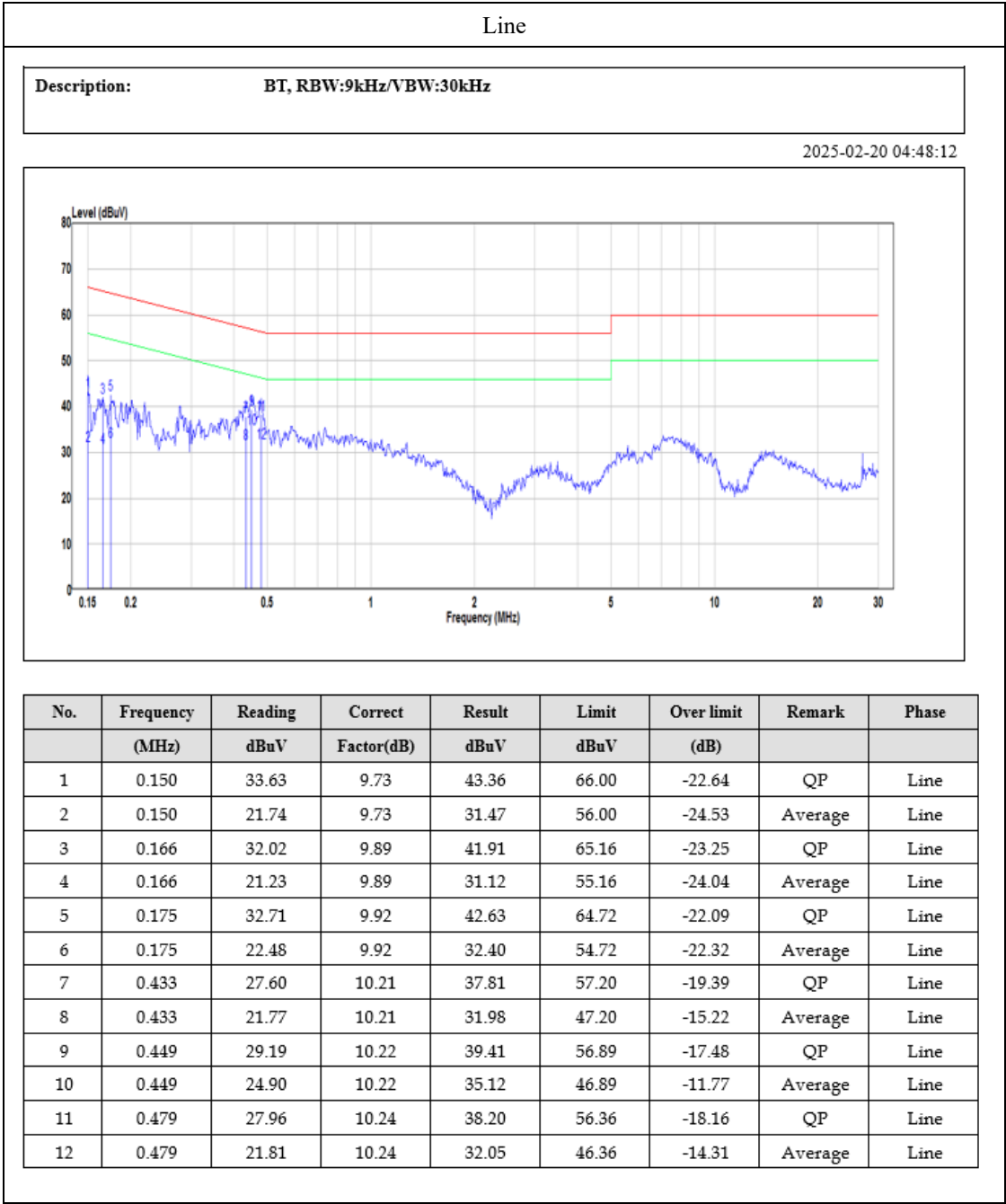
$$\text{Over Limit} = \text{Level} - \text{Limit Line}$$

6.6. Test Results

Test Mode: Transmitting

Main: AC120 V, 60 Hz

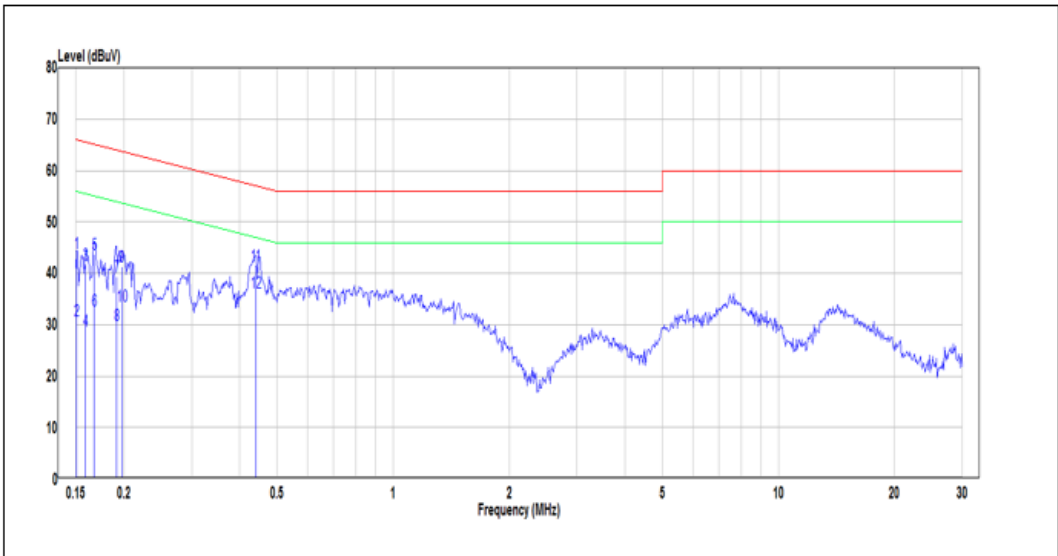
(Worst case is Adapter mode)



Neutral

Description: BT, RBW:9kHz/VBW:30kHz

2025-02-20 04:44:04



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark	Phase
	(MHz)	dBuV	Factor(dB)	dBuV	dBuV	(dB)		
1	0.151	34.13	9.83	43.96	65.96	-22.00	QP	Neutral
2	0.151	21.02	9.83	30.85	55.96	-25.10	Average	Neutral
3	0.159	31.84	9.87	41.71	65.52	-23.81	QP	Neutral
4	0.159	18.89	9.87	28.76	55.52	-26.76	Average	Neutral
5	0.168	33.75	9.90	43.65	65.08	-21.43	QP	Neutral
6	0.168	22.80	9.90	32.70	55.08	-22.38	Average	Neutral
7	0.191	29.29	10.00	39.29	63.98	-24.69	QP	Neutral
8	0.191	19.88	10.00	29.88	53.98	-24.10	Average	Neutral
9	0.198	31.19	10.03	41.22	63.71	-22.49	QP	Neutral
10	0.198	23.64	10.03	33.67	53.71	-20.04	Average	Neutral
11	0.440	31.32	10.22	41.54	57.07	-15.53	QP	Neutral
12	0.440	26.02	10.22	36.24	47.07	-10.83	Average	Neutral

Note:
Result = Read Level + Factor
Over Limit = Result – Limit Line
Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

7. FCC §15.209, §15.205 , §15.247(d) & RSS-247 §6.6, RSS-GEN §8.9, §8.10 – Spurious Emissions

7.1. Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As per RSS-Gen 8.10,

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

- (a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	608 – 614	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3.3458 – 3.358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per RSS-GEN §8.9: Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field Strength (μV/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency (MHz)	Field Strength (H-Field) (μA/m)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

Note 2: The limit was added 51.5dB to convert the limit from dBuA/m to dBuV/m.

According to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 5.3.3

Measurements may be performed at a distance other than the limit distance provided they are not performed in the near-field, and the emissions to be measured can be detected by the measurement equipment (see 4.3.4).

Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. Measurements

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from 18 GHz to 40 GHz are typically made at distances significantly less than 3 m from the EUT. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade of distance (inverse of linear distance for field strength measurements or inverse of linear distance squared for power density measurements).

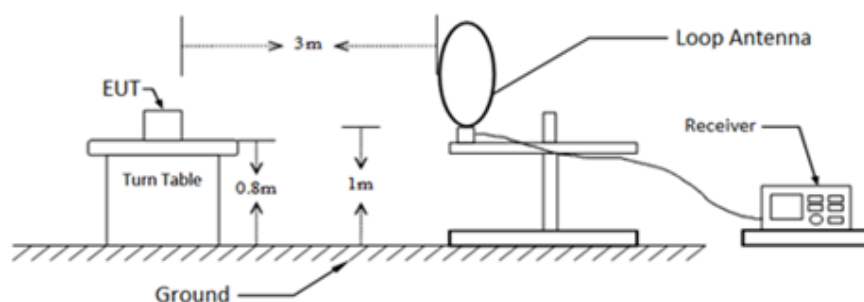
As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the 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)).

As per RSS-247 6.6,

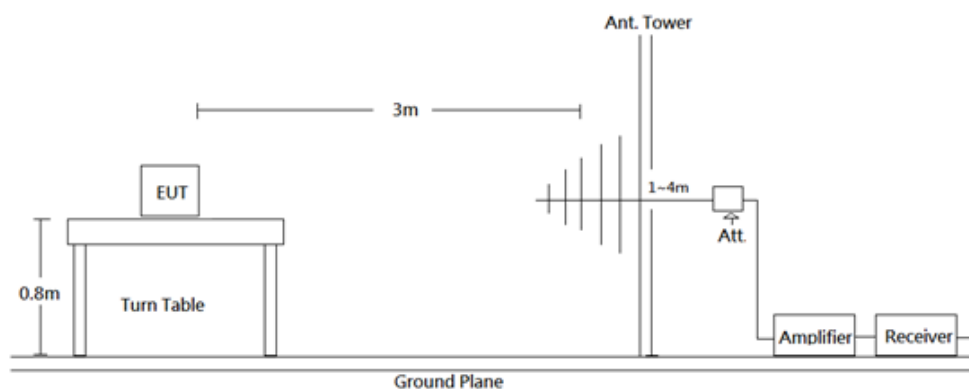
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum device, digitally modulated device, or hybrid system is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power – based on either an RF conducted or a radiated measurement – provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 6.3.2, the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

7.2. EUT Setup

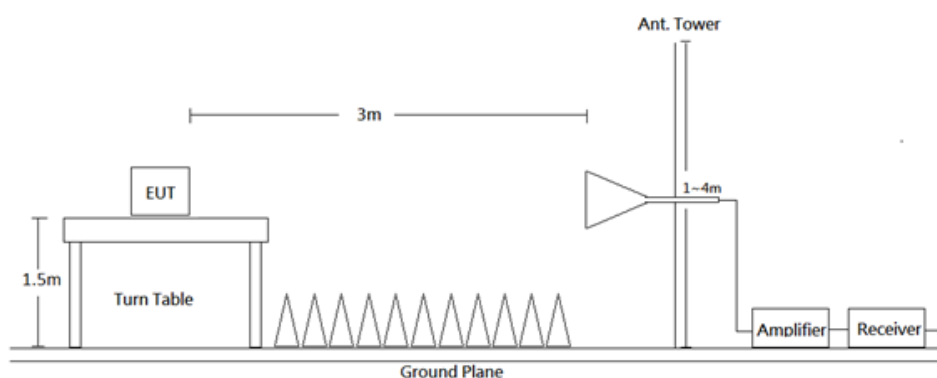
9kHz-30MHz:



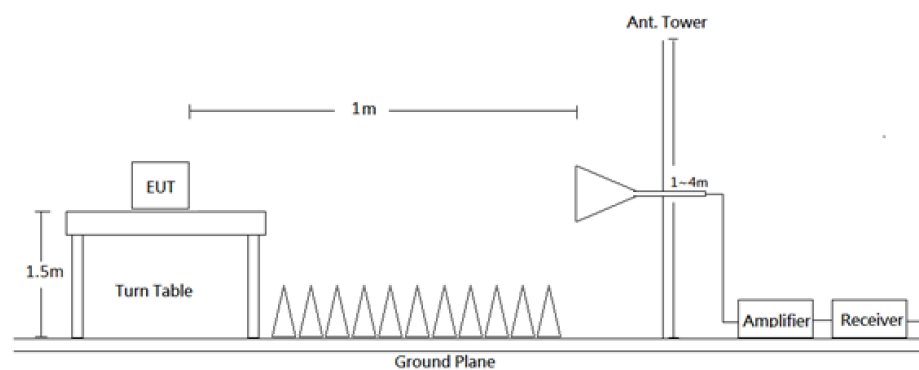
Below 1 GHz:



1-18 GHz:



18-26.5 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

7.3. EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	Video B/W	IF B/W	Measurement method	Detector
9 kHz - 150 kHz	300 Hz	1 kHz	200 Hz	QP/AV	QP/AV
150 kHz - 30 MHz	10 kHz	30 kHz	9 kHz	QP/AV	QP/AV
30-1000 MHz	100 kHz	300 kHz	/	PK	PK
	/	/	120 kHz	QP	QP
Above 1 GHz	Pre-scan :				
	1 MHz	3 MHz	/	PK	PK
	1 MHz	1 kHz	/	Ave	PK
	Final measurement for emission identified during pre-scan :				
	1 MHz	3 MHz	/	PK	PK
	1 MHz	10 Hz	/	Ave	PK

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

7.4. Test Procedure

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

All data was recorded in Quasi-peak and average detector mode from 9 kHz to 30 MHz, Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

7.5. Corrected Factor & Margin Calculation

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

$$\text{Correct Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Level} - \text{Limit}$$

7.6. Test Results

Test Mode: Transmitting

(Pre-scan with three orthogonal axis, and worse case as X axis.)

9kHz-30MHz:

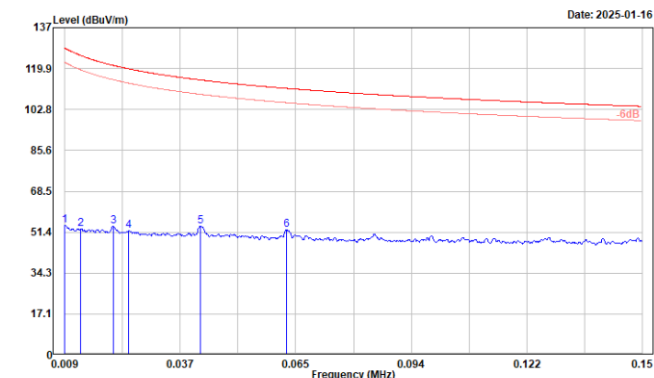
(Worst case is Mode 1)

(Worst case is BR(GFSK) mode High channel)

(Pre-scan using three directional polarities, worst case as parallel.)

9kHz-150kHz

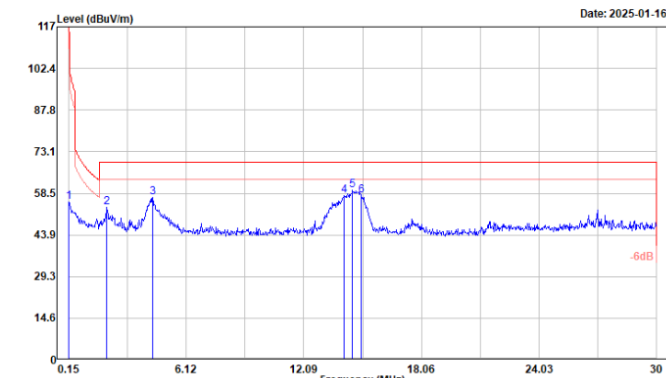
Description: RBW:300Hz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
0.009	36.41	17.81	54.22	128.52	-74.30	100	0	Average
0.013	36.95	15.89	52.84	125.36	-72.52	100	0	Average
0.021	38.90	14.99	53.89	121.23	-67.34	100	0	Average
0.025	37.38	14.46	51.84	119.77	-67.93	100	0	Average
0.042	41.03	12.86	53.89	115.11	-61.22	100	0	Average
0.063	40.80	11.71	52.51	111.60	-59.09	100	0	Average

150kHz-30MHz

Description: RBW:10kHz/VBW:30kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
0.150	44.10	11.37	55.47	104.08	-48.61	100	360	Average
2.090	43.00	10.71	53.71	69.54	-15.83	100	360	QP
4.419	46.32	10.63	56.95	69.54	-12.59	100	360	QP
14.150	46.04	11.57	57.61	69.54	-11.93	100	360	QP
14.568	47.89	11.57	59.46	69.54	-10.08	100	360	QP
15.015	46.20	11.59	57.79	69.54	-11.75	100	360	QP

30MHz-1GHz:

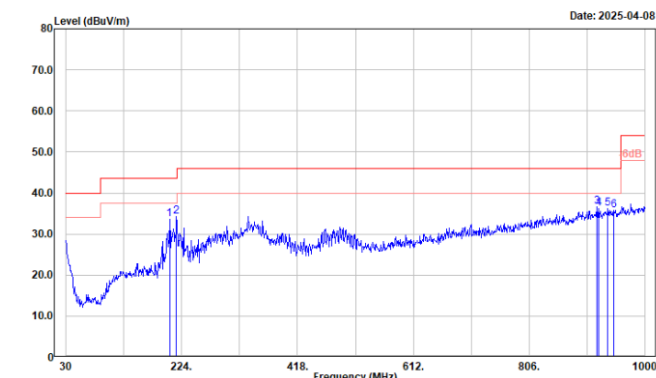
(worst case is BR(GFSK) mode)

TX Mode 1

Low channel

Horizontal

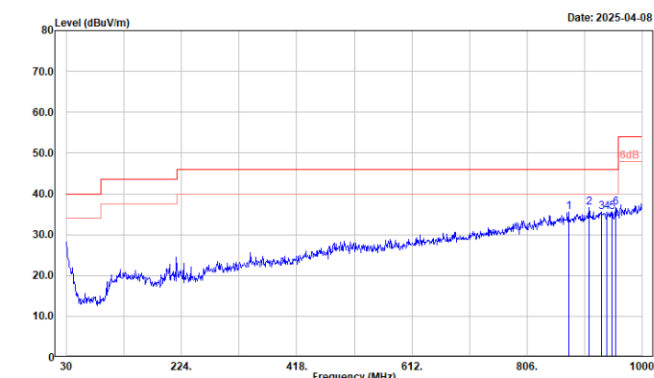
Description: BT-LOW, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
203.630	44.17	-10.65	33.52	43.50	-9.98	100	1	QP
215.270	45.77	-11.57	34.20	43.50	-9.30	100	21	QP
919.490	31.12	5.44	36.56	46.00	-9.44	100	312	QP
922.400	30.73	5.54	36.27	46.00	-9.73	100	345	QP
937.920	30.23	5.93	36.16	46.00	-9.84	100	70	QP
947.620	29.94	5.92	35.86	46.00	-10.14	100	345	QP

Vertical

Description: BT-LOW, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
875.840	31.26	4.26	35.52	46.00	-10.48	100	94	QP
910.760	31.50	5.15	36.65	46.00	-9.35	100	2	QP
931.130	29.73	5.90	35.63	46.00	-10.37	100	0	QP
940.830	29.61	5.89	35.50	46.00	-10.50	100	105	QP
949.560	29.66	5.91	35.57	46.00	-10.43	100	215	QP
955.380	30.45	6.10	36.55	46.00	-9.45	100	196	QP

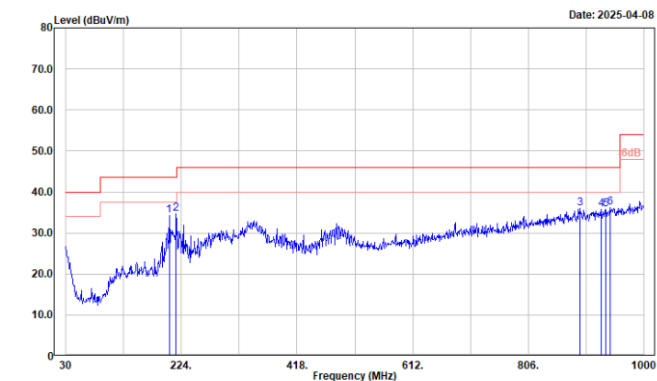
Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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Middle channel

Horizontal

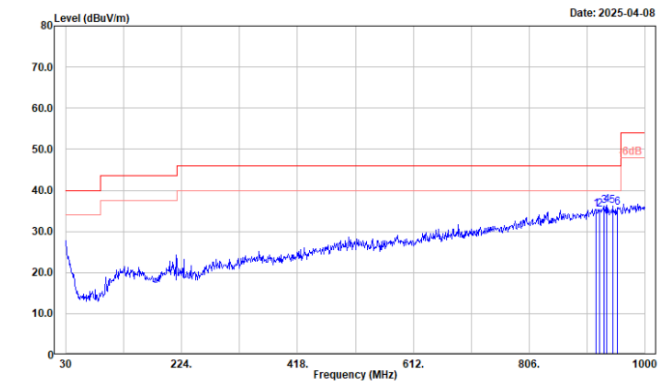
Description: BT-Middle, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
203.630	44.90	-10.65	34.25	43.50	-9.25	100	188	QP
215.270	46.34	-11.57	34.77	43.50	-8.73	100	192	QP
893.300	31.09	4.90	35.99	46.00	-10.01	100	360	QP
929.190	29.91	5.83	35.74	46.00	-10.26	100	0	QP
935.980	29.73	5.99	35.72	46.00	-10.28	100	237	QP
942.770	30.33	5.91	36.24	46.00	-9.76	100	237	QP

Vertical

Description: BT-Middle, RBW:100kHz/VBW:300kHz

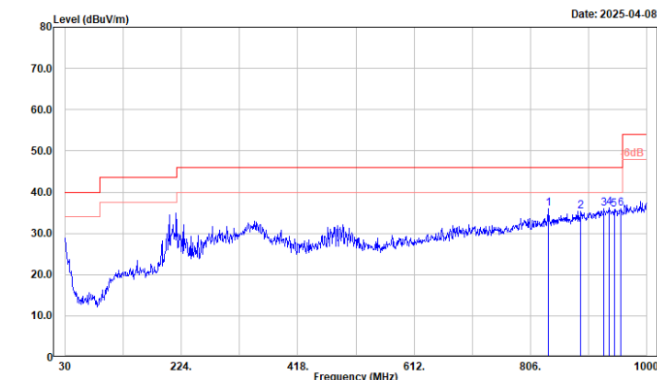


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
917.550	29.95	5.37	35.32	46.00	-10.68	100	120	QP
923.370	29.85	5.56	35.41	46.00	-10.59	100	209	QP
931.130	30.31	5.90	36.21	46.00	-9.79	100	327	QP
935.980	30.40	5.99	36.39	46.00	-9.61	100	154	QP
945.680	30.34	5.94	36.28	46.00	-9.72	100	177	QP
953.440	29.71	6.04	35.75	46.00	-10.25	100	185	QP

High channel

Horizontal

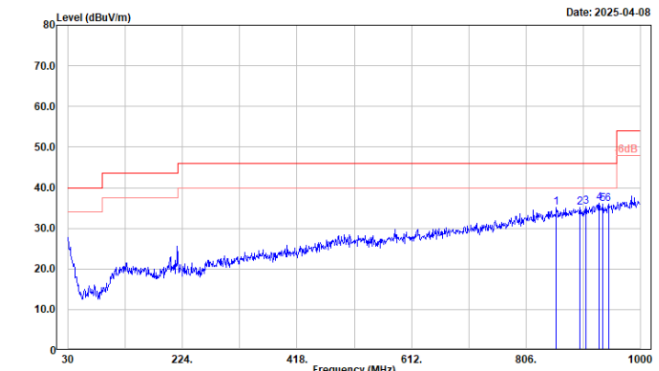
Description: BT-High, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
836.070	32.36	3.54	35.90	46.00	-10.10	100	327	QP
890.390	30.57	4.85	35.42	46.00	-10.58	100	157	QP
929.190	30.20	5.83	36.03	46.00	-9.97	100	161	QP
937.920	30.20	5.93	36.13	46.00	-9.87	100	5	QP
945.680	29.76	5.94	35.70	46.00	-10.30	100	164	QP
957.320	29.84	6.14	35.98	46.00	-10.02	100	20	QP

Vertical

Description: BT-High, RBW:100kHz/VBW:300kHz



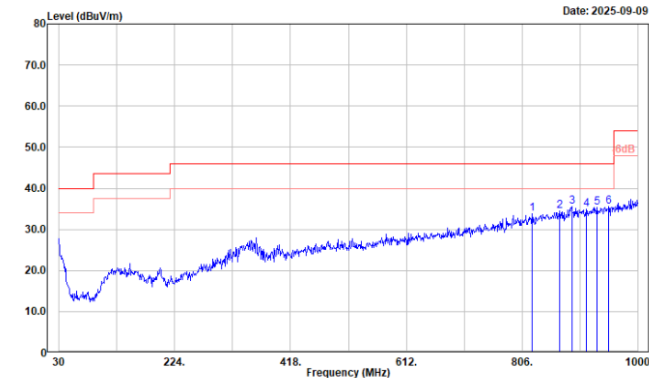
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
857.410	31.15	4.04	35.19	46.00	-10.81	100	247	QP
897.180	30.24	4.92	35.16	46.00	-10.84	100	235	QP
907.850	30.31	5.09	35.40	46.00	-10.60	100	185	QP
930.160	30.35	5.88	36.23	46.00	-9.77	100	14	QP
935.980	29.91	5.99	35.90	46.00	-10.10	100	359	QP
945.680	29.95	5.94	35.89	46.00	-10.11	100	173	QP

TX Mode 2

Low channel

Horizontal

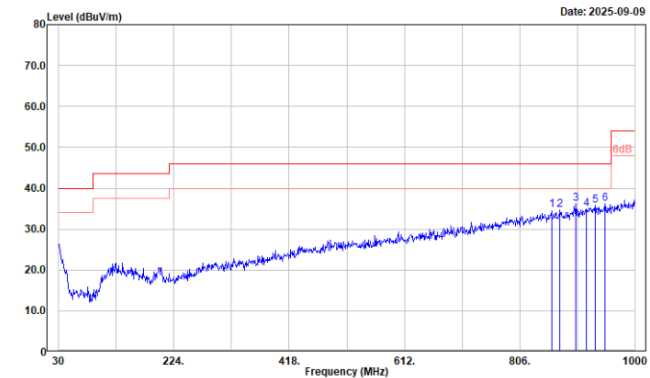
Description: BT-LOW, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
822.490	30.59	3.23	33.82	46.00	-12.18	100	84	QP
869.050	30.29	4.14	34.43	46.00	-11.57	100	285	QP
889.420	30.66	4.83	35.49	46.00	-10.51	100	39	QP
913.670	29.77	5.24	35.01	46.00	-10.99	100	9	QP
932.100	29.37	5.94	35.31	46.00	-10.69	100	323	QP
951.500	29.55	5.96	35.51	46.00	-10.49	100	123	QP

Vertical

Description: BT-LOW, RBW:100kHz/VBW:300kHz

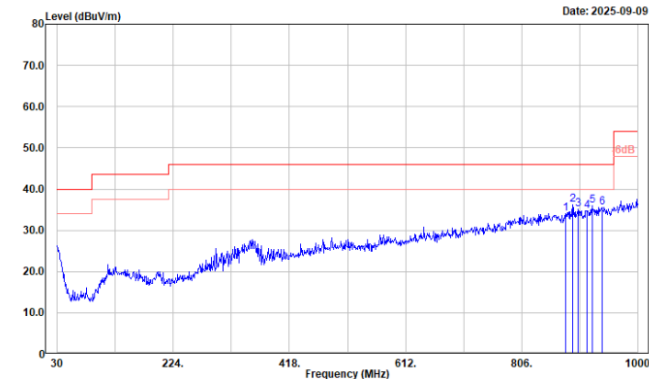


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
859.350	30.51	4.07	34.58	46.00	-11.42	100	34	QP
873.900	30.58	4.20	34.78	46.00	-11.22	100	137	QP
900.090	31.28	4.91	36.19	46.00	-9.81	100	171	QP
918.520	29.56	5.40	34.96	46.00	-11.04	100	201	QP
933.070	29.77	5.97	35.74	46.00	-10.26	100	19	QP
949.560	30.21	5.91	36.12	46.00	-9.88	100	73	QP

Middle channel

Horizontal

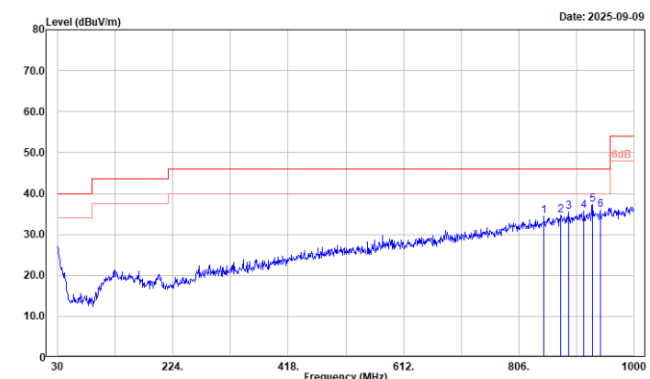
Description: BT-Middle, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
878.750	29.68	4.42	34.10	46.00	-11.90	100	0	QP
891.360	31.34	4.87	36.21	46.00	-9.79	100	266	QP
900.090	30.13	4.91	35.04	46.00	-10.96	100	162	QP
914.640	29.51	5.27	34.78	46.00	-11.22	100	240	QP
923.370	30.46	5.56	36.02	46.00	-9.98	100	6	QP
939.860	29.68	5.88	35.56	46.00	-10.44	100	240	QP

Vertical

Description: BT-Middle, RBW:100kHz/VBW:300kHz

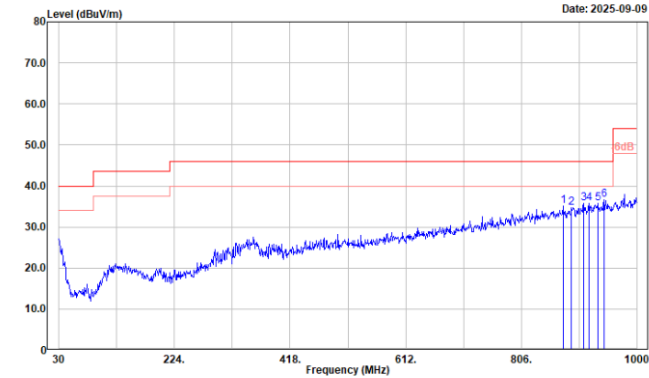


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
848.680	30.61	3.90	34.51	46.00	-11.49	100	272	QP
876.810	30.36	4.31	34.67	46.00	-11.33	100	99	QP
890.390	30.65	4.85	35.50	46.00	-10.50	100	167	QP
915.610	30.46	5.30	35.76	46.00	-10.24	100	156	QP
930.160	31.34	5.88	37.22	46.00	-8.78	100	360	QP
942.770	30.10	5.91	36.01	46.00	-9.99	100	141	QP

High channel

Horizontal

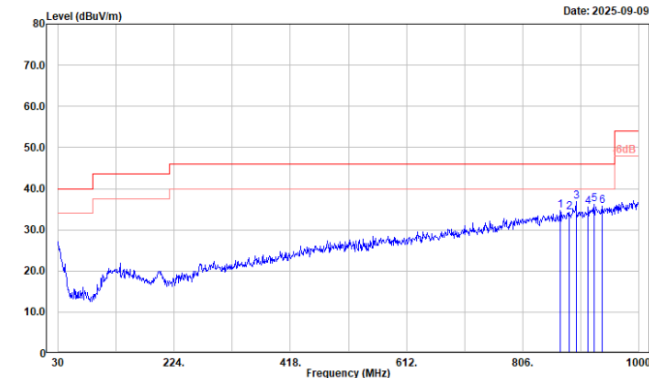
Description: BT-High, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
875.840	30.86	4.26	35.12	46.00	-10.88	100	194	QP
890.390	29.94	4.85	34.79	46.00	-11.21	100	228	QP
910.760	30.72	5.15	35.87	46.00	-10.13	100	175	QP
919.490	30.33	5.44	35.77	46.00	-10.23	100	0	QP
934.040	29.70	6.00	35.70	46.00	-10.30	100	289	QP
944.710	30.71	5.93	36.64	46.00	-9.36	100	148	QP

Vertical

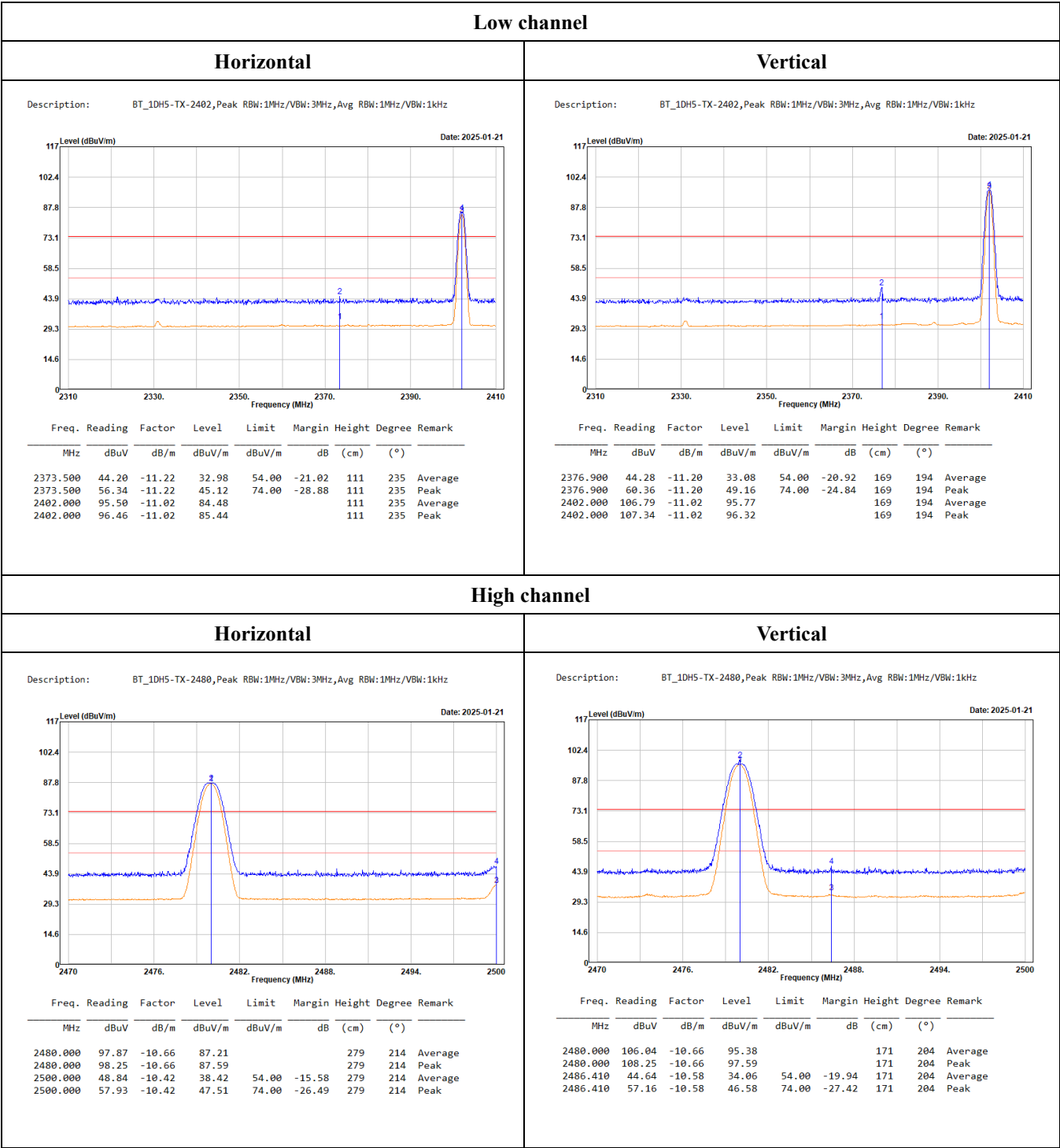
Description: BT-High, RBW:100kHz/VBW:300kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
869.050	30.63	4.14	34.77	46.00	-11.23	100	90	QP
883.600	29.73	4.62	34.35	46.00	-11.65	100	167	QP
895.240	32.01	4.93	36.94	46.00	-9.06	100	129	QP
915.610	30.15	5.30	35.45	46.00	-10.55	100	125	QP
925.310	30.60	5.63	36.23	46.00	-9.77	100	78	QP
938.890	29.78	5.91	35.69	46.00	-10.31	100	56	QP

Level = Reading + Factor.
Margin = Level - Limit.
Factor = Antenna Factor + Cable Loss - Amplifier Gain.

Band-Edge:
BR (GFSK) Mode

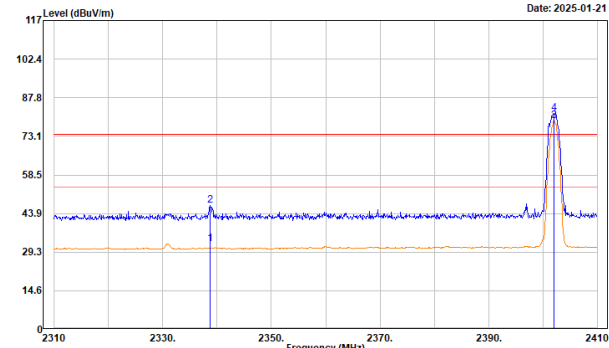


EDR ($\pi/4$ -DQPSK) Mode

Low channel

Horizontal

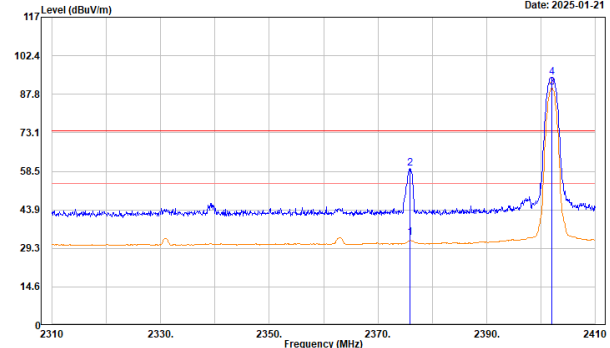
Description: BT_2DH5-TX-2402,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2338.800	43.82	-11.49	32.33	54.00	-21.67	139	235	Average
2338.800	58.44	-11.49	46.95	74.00	-27.05	139	235	Peak
2402.000	90.10	-11.02	79.08			139	235	Average
2402.000	92.82	-11.02	81.80			139	235	Peak

Vertical

Description: BT_2DH5-TX-2402,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz

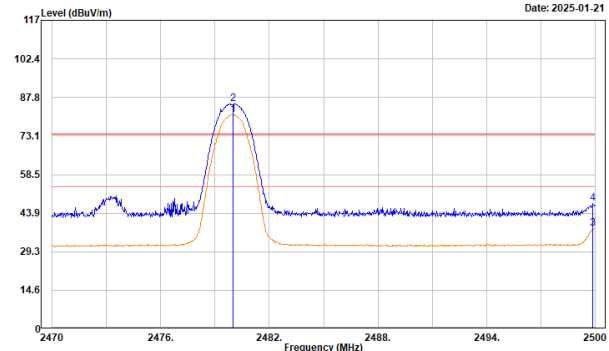


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2375.900	44.57	-11.20	33.37	54.00	-20.63	168	196	Average
2375.900	70.85	-11.20	59.65	74.00	-14.35	168	196	Peak
2402.000	101.29	-11.02	90.27			168	196	Average
2402.000	105.17	-11.02	94.15			168	196	Peak

High channel

Horizontal

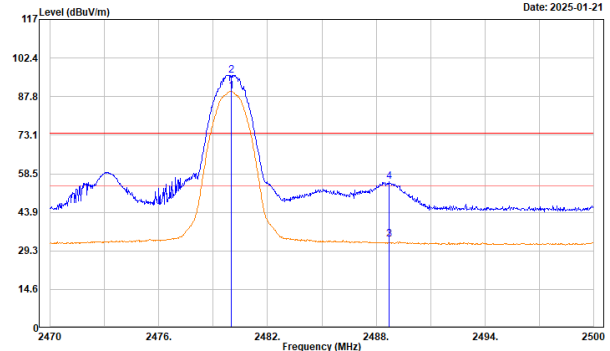
Description: BT_2DH5-TX-2480,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2480.000	91.98	-10.66	81.32			280	214	Average
2480.000	95.88	-10.66	85.22			280	214	Peak
2499.880	48.49	-10.42	38.07	54.00	-15.93	280	214	Average
2499.880	57.84	-10.42	47.42	74.00	-26.58	280	214	Peak

Vertical

Description: BT_2DH5-TX-2480,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2480.000	100.41	-10.66	89.75			254	203	Average
2480.000	106.52	-10.66	95.86			254	203	Peak
2488.690	44.22	-10.56	33.66	54.00	-20.34	254	203	Average
2488.690	65.98	-10.56	55.42	74.00	-18.58	254	203	Peak

EDR (8DPSK) Mode

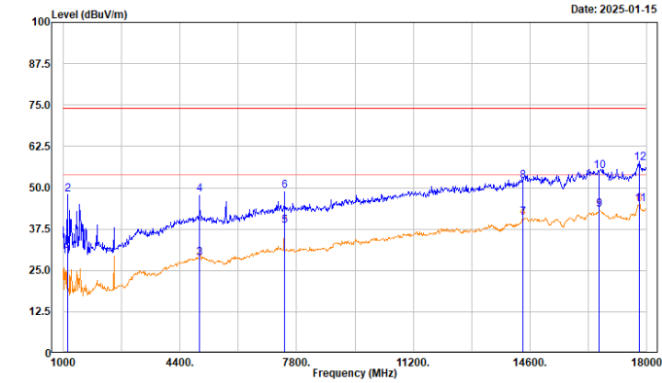


1GHz-18GHz:

(BR (GFSK) mode worst case is High channel)

Horizontal

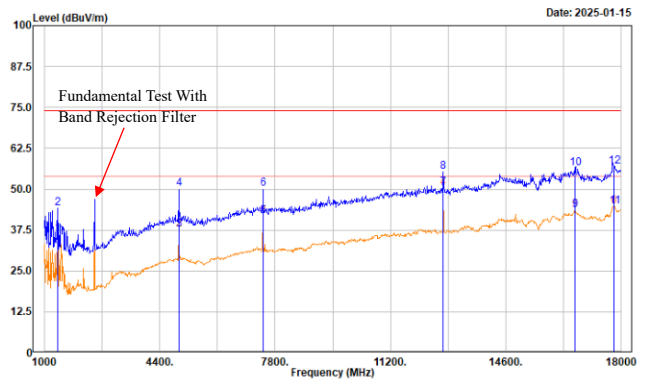
Description: BT_1DH5-TX-2480,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	45.00	-15.76	29.24	54.00	-24.76	150	151	Average
1119.000	63.62	-15.76	47.86	74.00	-26.14	150	151	Peak
4960.000	32.51	-3.67	28.84	54.00	-25.16	100	232	Average
4960.000	51.74	-3.67	48.07	74.00	-25.93	100	232	Peak
7440.000	38.33	0.28	38.61	54.00	-15.39	111	267	Average
7440.000	48.78	0.28	49.06	74.00	-24.94	111	267	Peak
14396.000	29.69	11.16	40.85	54.00	-13.15	150	339	Average
14396.000	40.90	11.16	52.06	74.00	-21.94	150	339	Peak
16623.000	31.34	12.07	43.41	54.00	-10.59	150	319	Average
16623.000	43.00	12.07	55.07	74.00	-18.93	150	319	Peak
17796.000	32.22	12.88	45.10	54.00	-8.90	150	327	Average
17796.000	44.46	12.88	57.34	74.00	-16.66	150	327	Peak

Vertical

Description: BT_1DH5-TX-2480,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz

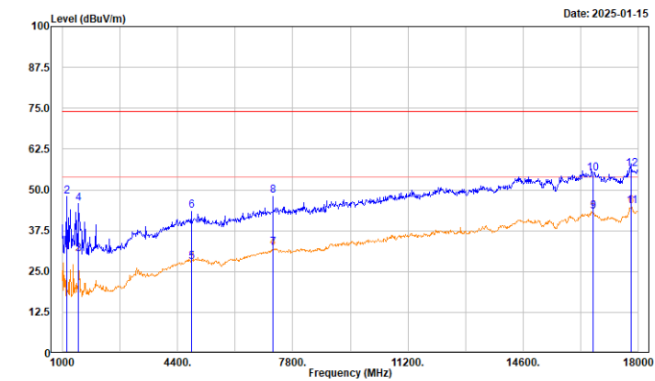


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1391.000	50.74	-14.39	36.35	54.00	-17.65	150	199	Average
1391.000	58.63	-14.39	44.24	74.00	-29.76	150	199	Peak
4960.000	41.37	-3.67	37.70	54.00	-16.30	116	183	Average
4960.000	53.77	-3.67	50.10	74.00	-23.90	116	183	Peak
7440.000	41.35	0.28	41.63	54.00	-12.37	251	224	Average
7440.000	49.85	0.28	50.13	74.00	-23.87	251	224	Peak
12764.000	41.91	8.58	50.49	54.00	-3.51	150	199	Average
12764.000	46.74	8.58	55.32	74.00	-18.68	150	199	Peak
16640.000	31.56	12.04	43.60	54.00	-10.40	150	89	Average
16640.000	44.23	12.04	56.27	74.00	-17.73	150	89	Peak
17796.000	31.76	12.88	44.64	54.00	-9.36	150	279	Average
17796.000	44.11	12.88	56.99	74.00	-17.01	150	279	Peak

(EDR ($\pi/4$ -DQPSK) mode worst case is low channel)

Horizontal

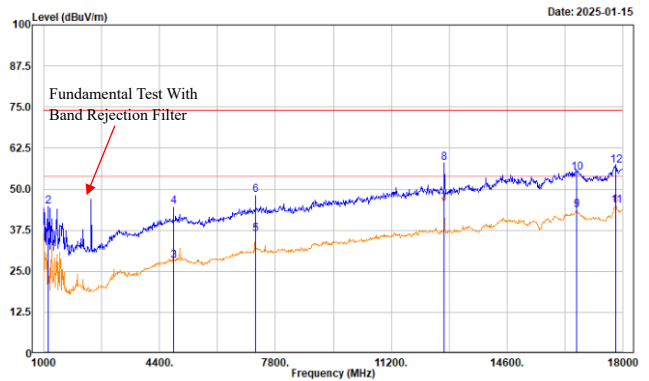
Description: BT_2DH5-TX-2402,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	46.57	-15.76	30.81	54.00	-23.19	150	186	Average
1119.000	63.86	-15.76	48.10	74.00	-25.90	150	186	Peak
1476.000	45.17	-14.79	30.38	54.00	-23.62	150	227	Average
1476.000	60.51	-14.79	45.72	74.00	-28.28	150	227	Peak
4804.000	32.12	-4.09	28.03	54.00	-25.97	388	89	Average
4804.000	47.72	-4.09	43.63	74.00	-30.37	388	89	Peak
7206.000	31.91	0.43	32.34	54.00	-21.66	135	277	Average
7206.000	47.74	0.43	48.17	74.00	-25.83	135	277	Peak
16657.000	31.38	11.99	43.37	54.00	-10.63	150	323	Average
16657.000	43.00	11.99	54.99	74.00	-19.01	150	323	Peak
17796.000	32.03	12.88	44.91	54.00	-9.09	150	167	Average
17796.000	43.53	12.88	56.41	74.00	-17.59	150	167	Peak

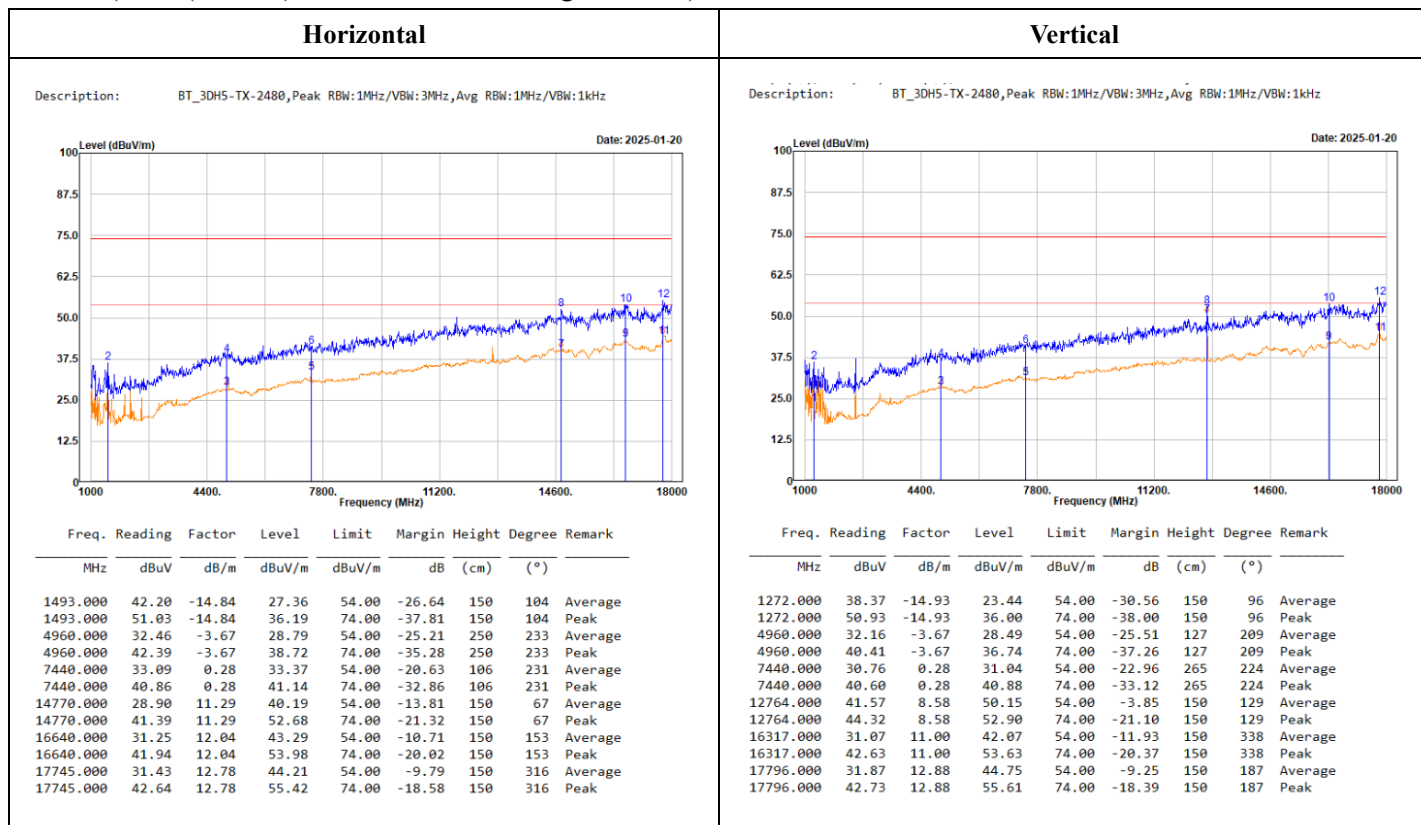
Vertical

Description: BT_2DH5-TX-2402,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



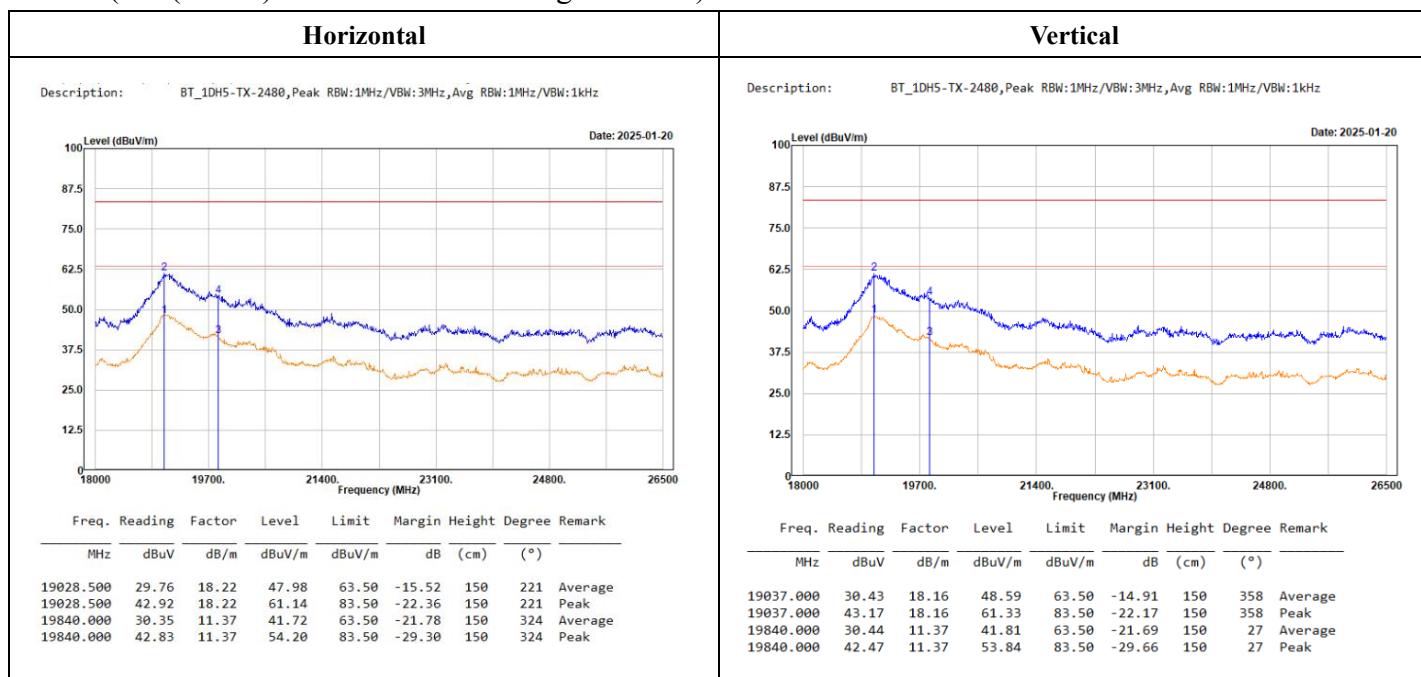
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	52.27	-15.76	36.51	54.00	-17.49	150	141	Average
1119.000	60.43	-15.76	44.67	74.00	-29.33	150	141	Peak
4804.000	32.14	-4.09	28.05	54.00	-25.95	112	202	Average
4804.000	48.67	-4.09	44.58	74.00	-29.42	112	202	Peak
7206.000	36.00	0.43	36.43	54.00	-17.57	324	205	Average
7206.000	47.71	0.43	48.14	74.00	-25.86	324	205	Peak
12764.000	37.08	8.58	45.66	54.00	-8.34	150	198	Average
12764.000	49.41	8.58	57.99	74.00	-16.01	150	198	Peak
16640.000	31.47	12.04	43.51	54.00	-10.49	150	153	Average
16640.000	43.10	12.04	55.14	74.00	-18.86	150	153	Peak
17796.000	32.05	12.88	44.93	54.00	-9.07	150	165	Average
17796.000	44.32	12.88	57.20	74.00	-16.80	150	165	Peak

(EDR (8DPSK) mode worst case is High channel)



18GHz-26.5GHz:

(BR (GFSK) mode worst case is high channel)



Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

For 18-26.5GHz Convert the test distance limit of 3 meters to a limit of 1 meter:

Conversion factor = $20 \log(1\text{m}/3\text{m}) = 9.5 \text{ dB}$,Average Limit = $54 + 9.5 = 63.50 \text{ dBuV/m@1m}$, Peak Limit = $63.50 + 20 = 83.50 \text{ dBuV/m@1m}$

Note: It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.
(New Taipei Laboratory)

Above 1GHz

BR (GFSK)

Low channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	48.95	-15.76	33.19	54.00	-20.81	150	167	Average	1391.000	47.17	-14.39	32.78	54.00	-21.22	150	211	Average
1119.000	63.89	-15.76	48.13	74.00	-25.87	150	167	Peak	1391.000	59.07	-14.39	44.68	74.00	-29.32	150	211	Peak
4804.000	32.53	-4.09	28.44	54.00	-25.56	101	244	Average	4804.000	34.25	-4.09	30.16	54.00	-23.84	100	174	Average
4804.000	50.93	-4.09	46.84	74.00	-27.16	101	244	Peak	4804.000	52.21	-4.09	48.12	74.00	-25.88	100	174	Peak
7206.000	45.73	0.43	46.16	54.00	-7.84	100	224	Average	7206.000	32.63	0.43	33.06	54.00	-20.94	321	202	Average
7206.000	52.64	0.43	53.07	74.00	-20.93	100	224	Peak	7206.000	51.70	0.43	52.13	74.00	-21.87	321	202	Peak
15331.000	31.62	9.41	41.03	54.00	-12.97	150	1	Average	12764.000	35.09	8.58	43.67	54.00	-10.33	150	196	Average
15331.000	43.46	9.41	52.87	74.00	-21.13	150	1	Peak	12764.000	47.82	8.58	56.40	74.00	-17.60	150	196	Peak
16640.000	31.56	12.04	43.60	54.00	-10.40	150	171	Average	16640.000	31.41	12.04	43.45	54.00	-10.55	150	302	Average
16640.000	42.97	12.04	55.01	74.00	-18.99	150	171	Peak	16640.000	43.38	12.04	55.42	74.00	-18.58	150	302	Peak
17813.000	31.90	12.95	44.85	54.00	-9.15	150	48	Average	17796.000	32.25	12.88	45.13	54.00	-8.87	150	279	Average
17813.000	43.72	12.95	56.67	74.00	-17.33	150	48	Peak	17796.000	43.64	12.88	56.52	74.00	-17.48	150	279	Peak

Middle channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	44.17	-15.76	28.41	54.00	-25.59	150	189	Average	1238.000	51.95	-15.20	36.75	54.00	-17.25	150	202	Average
1119.000	60.67	-15.76	44.91	74.00	-29.09	150	189	Peak	1238.000	59.57	-15.20	44.37	74.00	-29.63	150	202	Peak
4882.000	37.83	-3.52	34.31	54.00	-19.69	100	239	Average	4882.000	43.19	-3.52	39.67	54.00	-14.33	108	187	Average
4882.000	50.43	-3.52	46.91	74.00	-27.09	100	239	Peak	4882.000	53.64	-3.52	50.12	74.00	-23.88	108	187	Peak
7323.000	31.04	0.53	31.57	54.00	-22.43	100	251	Average	7323.000	42.83	0.53	43.36	54.00	-10.64	261	207	Average
7323.000	50.84	0.53	51.37	74.00	-22.63	100	251	Peak	7323.000	50.64	0.53	51.17	74.00	-22.83	261	207	Peak
14498.000	29.40	11.47	40.87	54.00	-13.13	150	216	Average	12764.000	31.61	8.58	40.19	54.00	-13.81	150	198	Average
14498.000	41.46	11.47	52.93	74.00	-21.07	150	216	Peak	12764.000	48.45	8.58	57.03	74.00	-16.97	150	198	Peak
16640.000	31.16	12.04	43.20	54.00	-10.80	150	323	Average	16640.000	31.48	12.04	43.52	54.00	-10.48	150	359	Average
16640.000	42.57	12.04	54.61	74.00	-19.39	150	323	Peak	16640.000	43.98	12.04	56.02	74.00	-17.98	150	359	Peak
17762.000	31.99	12.83	44.82	54.00	-9.18	150	80	Average	17813.000	32.33	12.95	45.28	54.00	-8.72	150	293	Average
17762.000	44.23	12.83	57.06	74.00	-16.94	150	80	Peak	17813.000	43.56	12.95	56.51	74.00	-17.49	150	293	Peak

High channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	45.00	-15.76	29.24	54.00	-24.76	150	151	Average	1391.000	50.74	-14.39	36.35	54.00	-17.65	150	199	Average
1119.000	63.62	-15.76	47.86	74.00	-26.14	150	151	Peak	1391.000	58.63	-14.39	44.24	74.00	-29.76	150	199	Peak
4960.000	32.51	-3.67	28.84	54.00	-25.16	100	232	Average	4960.000	41.37	-3.67	37.70	54.00	-16.30	116	183	Average
4960.000	51.74	-3.67	48.07	74.00	-25.93	100	232	Peak	4960.000	53.77	-3.67	50.10	74.00	-23.90	116	183	Peak
7440.000	38.33	0.28	38.61	54.00	-15.39	111	267	Average	7440.000	41.35	0.28	41.63	54.00	-12.37	251	224	Average
7440.000	48.78	0.28	49.06	74.00	-24.94	111	267	Peak	7440.000	49.85	0.28	50.13	74.00	-23.87	251	224	Peak
14396.000	29.69	11.16	40.85	54.00	-13.15	150	339	Average	12764.000	41.91	8.58	50.49	54.00	-3.51	150	199	Average
14396.000	40.90	11.16	52.06	74.00	-21.94	150	339	Peak	12764.000	46.74	8.58	55.32	74.00	-18.68	150	199	Peak
16623.000	31.34	12.07	43.41	54.00	-10.59	150	319	Average	16640.000	31.56	12.04	43.60	54.00	-10.40	150	89	Average
16623.000	43.00	12.07	55.07	74.00	-18.93	150	319	Peak	16640.000	44.23	12.04	56.27	74.00	-17.73	150	89	Peak
17796.000	32.22	12.88	45.10	54.00	-8.90	150	327	Average	17796.000	31.76	12.88	44.64	54.00	-9.36	150	279	Average
17796.000	44.46	12.88	57.34	74.00	-16.66	150	327	Peak	17796.000	44.11	12.88	56.99	74.00	-17.01	150	279	Peak

Level = Reading + Factor.

Margin = Level – Limit.

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain.

EDR ($\pi/4$ -DQPSK)

Low channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	46.57	-15.76	30.81	54.00	-23.19	150	186	Average	1119.000	52.27	-15.76	36.51	54.00	-17.49	150	141	Average
1119.000	63.86	-15.76	48.10	74.00	-25.90	150	186	Peak	1119.000	60.43	-15.76	44.67	74.00	-29.33	150	141	Peak
1476.000	45.17	-14.79	30.38	54.00	-23.62	150	227	Average	4804.000	32.14	-4.09	28.05	54.00	-25.95	112	202	Average
1476.000	60.51	-14.79	45.72	74.00	-28.28	150	227	Peak	4804.000	48.67	-4.09	44.58	74.00	-29.42	112	202	Peak
4804.000	32.12	-4.09	28.03	54.00	-25.97	388	89	Average	7206.000	36.00	0.43	36.43	54.00	-17.57	324	205	Average
4804.000	47.72	-4.09	43.63	74.00	-30.37	388	89	Peak	7206.000	47.71	0.43	48.14	74.00	-25.86	324	205	Peak
7206.000	31.91	0.43	32.34	54.00	-21.66	135	277	Average	12764.000	37.08	8.58	45.66	54.00	-8.34	150	198	Average
7206.000	47.74	0.43	48.17	74.00	-25.83	135	277	Peak	12764.000	49.41	8.58	57.99	74.00	-16.01	150	198	Peak
16657.000	31.38	11.99	43.37	54.00	-10.63	150	323	Average	16640.000	31.47	12.04	43.51	54.00	-10.49	150	153	Average
16657.000	43.00	11.99	54.99	74.00	-19.01	150	323	Peak	16640.000	43.10	12.04	55.14	74.00	-18.86	150	153	Peak
17796.000	32.03	12.88	44.91	54.00	-9.09	150	167	Average	17796.000	32.05	12.88	44.93	54.00	-9.07	150	165	Average
17796.000	43.53	12.88	56.41	74.00	-17.59	150	167	Peak	17796.000	44.32	12.88	57.20	74.00	-16.80	150	165	Peak

Middle channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4264.000	31.82	-5.49	26.33	54.00	-27.67	150	246	Average	1493.000	50.55	-14.84	35.71	54.00	-18.29	150	137	Average
4264.000	43.22	-5.49	37.73	74.00	-36.27	150	246	Peak	1493.000	54.71	-14.84	39.87	74.00	-34.13	150	137	Peak
4882.000	31.99	-3.52	28.47	54.00	-25.53	165	162	Average	4882.000	32.57	-3.52	29.05	54.00	-24.95	113	184	Average
4882.000	43.42	-3.52	39.90	74.00	-34.10	165	162	Peak	4882.000	46.20	-3.52	42.68	74.00	-31.32	113	184	Peak
7323.000	30.51	0.53	31.04	54.00	-22.96	114	262	Average	7323.000	31.87	0.53	32.40	54.00	-21.60	271	208	Average
7323.000	43.11	0.53	43.64	74.00	-30.36	114	262	Peak	7323.000	44.09	0.53	44.62	74.00	-29.38	271	208	Peak
14396.000	28.69	11.16	39.85	54.00	-14.15	150	135	Average	14447.000	28.57	11.31	39.88	54.00	-14.12	150	96	Average
14396.000	40.14	11.16	51.30	74.00	-22.70	150	135	Peak	14447.000	41.56	11.31	52.87	74.00	-21.13	150	96	Peak
16317.000	30.72	11.00	41.72	54.00	-12.28	150	74	Average	16555.000	29.82	12.09	41.91	54.00	-12.09	150	253	Average
16317.000	44.67	11.00	55.67	74.00	-18.33	150	74	Peak	16555.000	40.87	12.09	52.96	74.00	-21.04	150	253	Peak
17745.000	31.74	12.78	44.52	54.00	-9.48	150	321	Average	17813.000	31.73	12.95	44.68	54.00	-9.32	150	305	Average
17745.000	42.87	12.78	55.65	74.00	-18.35	150	321	Peak	17813.000	43.21	12.95	56.16	74.00	-17.84	150	305	Peak

High channel																	
Horizontal									Vertical								
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1493.000	42.33	-14.84	27.49	54.00	-26.51	150	50	Average	1000.000	43.86	-15.87	27.99	54.00	-26.01	150	179	Average
1493.000	49.73	-14.84	34.89	74.00	-39.11	150	50	Peak	1000.000	55.17	-15.87	39.30	74.00	-34.70	150	179	Peak
4960.000	31.79	-3.67	28.12	54.00	-25.88	104	236	Average	4960.000	31.93	-3.67	28.26	54.00	-25.74	111	222	Average
4960.000	42.10	-3.67	38.43	74.00	-35.57	104	236	Peak	4960.000	41.40	-3.67	37.73	74.00	-36.27	111	222	Peak
7440.000	33.41	0.28	33.69	54.00	-20.31	115	264	Average	7440.000	36.07	0.28	36.35	54.00	-17.65	285	228	Average
7440.000	40.38	0.28	40.66	74.00	-33.34	115	264	Peak	7440.000	43.44	0.28	43.72	74.00	-30.28	285	228	Peak
16079.000	30.26	10.46	40.72	54.00	-13.28	150	143	Average	14736.000	28.76	11.30	40.06	54.00	-13.94	150	66	Average
16079.000	43.16	10.46	53.62	74.00	-20.38	150	143	Peak	14736.000	41.06	11.30	52.36	74.00	-21.64	150	66	Peak
16640.000	31.19	12.04	43.23	54.00	-10.77	150	82	Average	16623.000	30.81	12.07	42.88	54.00	-11.12	150	123	Average
16640.000	41.92	12.04	53.96	74.00	-20.04	150	82	Peak	16623.000	42.24	12.07	54.31	74.00	-19.69	150	123	Peak
17813.000	31.93	12.95	44.88	54.00	-9.12	150	345	Average	17762.000	31.68	12.83	44.51	54.00	-9.49	150	45	Average
17813.000	41.84	12.95	54.79	74.00	-19.21	150	345	Peak	17762.000	42.09	12.83	54.92	74.00	-19.08	150	45	Peak

Level = Reading + Factor.
Margin = Level – Limit.
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain.

EDR (8DPSK)

Low channel																	
Horizontal								Vertical									
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1119.000	46.77	-15.76	31.01	54.00	-22.99	150	94	Average	1476.000	37.59	-14.79	22.80	54.00	-31.20	150	114	Average
1119.000	55.86	-15.76	40.10	74.00	-33.90	150	94	Peak	1476.000	53.77	-14.79	38.98	74.00	-35.02	150	114	Peak
4804.000	31.91	-4.09	27.82	54.00	-26.18	148	315	Average	4804.000	31.87	-4.09	27.78	54.00	-26.22	159	203	Average
4804.000	41.27	-4.09	37.18	74.00	-36.82	148	315	Peak	4804.000	42.36	-4.09	38.27	74.00	-35.73	159	203	Peak
7206.000	35.50	0.43	35.93	54.00	-18.07	100	226	Average	7206.000	30.86	0.43	31.29	54.00	-22.71	366	204	Average
7206.000	42.49	0.43	42.92	74.00	-31.08	100	226	Peak	7206.000	41.59	0.43	42.02	74.00	-31.98	366	204	Peak
15297.000	30.05	9.53	39.58	54.00	-14.42	150	121	Average	16096.000	30.18	10.46	40.64	54.00	-13.36	150	18	Average
15297.000	42.18	9.53	51.71	74.00	-22.29	150	121	Peak	16096.000	42.11	10.46	52.57	74.00	-21.43	150	18	Peak
16334.000	30.91	11.05	41.96	54.00	-12.04	150	337	Average	16742.000	30.21	11.76	41.97	54.00	-12.03	150	300	Average
16334.000	43.42	11.05	54.47	74.00	-19.53	150	337	Peak	16742.000	43.09	11.76	54.85	74.00	-19.15	150	300	Peak
17745.000	31.68	12.78	44.46	54.00	-9.54	150	32	Average	17796.000	31.70	12.88	44.58	54.00	-9.42	150	187	Average
17745.000	41.92	12.78	54.70	74.00	-19.30	150	32	Peak	17796.000	42.23	12.88	55.11	74.00	-18.89	150	187	Peak

Middle channel																	
Horizontal								Vertical									
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1425.000	48.17	-14.55	33.62	54.00	-20.38	150	77	Average	1051.000	42.54	-15.80	26.74	54.00	-27.26	150	171	Average
1425.000	53.57	-14.55	39.02	74.00	-34.98	150	77	Peak	1051.000	55.35	-15.80	39.55	74.00	-34.45	150	171	Peak
4882.000	31.96	-3.52	28.44	54.00	-25.56	128	228	Average	4882.000	32.32	-3.52	28.80	54.00	-25.20	125	207	Average
4882.000	42.06	-3.52	38.54	74.00	-35.46	128	228	Peak	4882.000	41.79	-3.52	38.27	74.00	-35.73	125	207	Peak
7323.000	30.87	0.53	31.40	54.00	-22.60	235	226	Average	7323.000	34.76	0.53	35.29	54.00	-18.71	270	209	Average
7323.000	40.94	0.53	41.47	74.00	-32.53	235	226	Peak	7323.000	39.73	0.53	40.26	74.00	-33.74	270	209	Peak
14549.000	28.76	11.48	40.24	54.00	-13.76	150	103	Average	15399.000	30.83	9.20	40.03	54.00	-13.97	150	48	Average
14549.000	40.38	11.48	51.86	74.00	-22.14	150	103	Peak	15399.000	42.70	9.20	51.90	74.00	-22.10	150	48	Peak
16351.000	30.78	11.10	41.88	54.00	-12.12	150	350	Average	16606.000	30.55	12.12	42.67	54.00	-11.33	150	349	Average
16351.000	42.83	11.10	53.93	74.00	-20.07	150	350	Peak	16606.000	43.34	12.12	55.46	74.00	-18.54	150	349	Peak
17813.000	31.54	12.95	44.49	54.00	-9.51	150	125	Average	17745.000	31.49	12.78	44.27	54.00	-9.73	150	156	Average
17813.000	42.29	12.95	55.24	74.00	-18.76	150	125	Peak	17745.000	42.43	12.78	55.21	74.00	-18.79	150	156	Peak

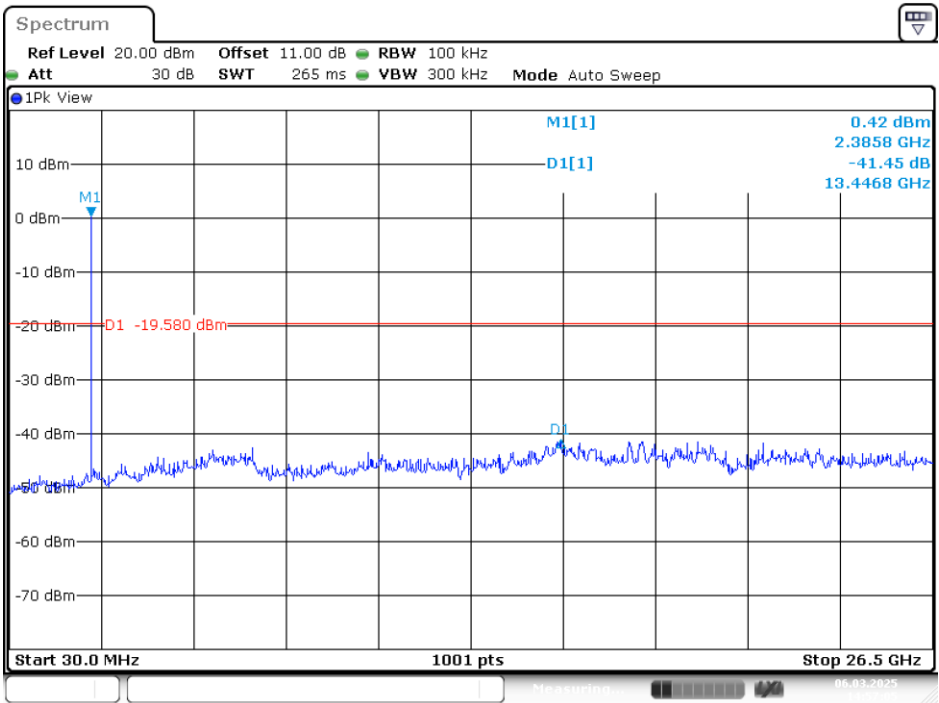
High channel																	
Horizontal								Vertical									
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
1493.000	42.20	-14.84	27.36	54.00	-26.64	150	104	Average	1272.000	38.37	-14.93	23.44	54.00	-30.56	150	96	Average
1493.000	51.03	-14.84	36.19	74.00	-37.81	150	104	Peak	1272.000	50.93	-14.93	36.00	74.00	-38.00	150	96	Peak
4960.000	32.46	-3.67	28.79	54.00	-25.21	250	233	Average	4960.000	32.16	-3.67	28.49	54.00	-25.51	127	209	Average
4960.000	42.39	-3.67	38.72	74.00	-35.28	250	233	Peak	4960.000	40.41	-3.67	36.74	74.00	-37.26	127	209	Peak
7440.000	33.09	0.28	33.37	54.00	-20.63	106	231	Average	7440.000	30.76	0.28	31.04	54.00	-22.96	265	224	Average
7440.000	40.86	0.28	41.14	74.00	-32.86	106	231	Peak	7440.000	40.60	0.28	40.88	74.00	-33.12	265	224	Peak
14770.000	28.90	11.29	40.19	54.00	-13.81	150	67	Average	12764.000	41.57	8.58	50.15	54.00	-3.85	150	129	Average
14770.000	41.39	11.29	52.68	74.00	-21.32	150	67	Peak	12764.000	44.32	8.58	52.90	74.00	-21.10	150	129	Peak
16640.000	31.25	12.04	43.29	54.00	-10.71	150	153	Average	16317.000	31.07	11.00	42.07	54.00	-11.93	150	338	Average
16640.000	41.94	12.04	53.98	74.00	-20.02	150	153	Peak	16317.000	42.63	11.00	53.63	74.00	-20.37	150	338	Peak
17745.000	31.43	12.78	44.21	54.00	-9.79	150	316	Average	17796.000	31.87	12.88	44.75	54.00	-9.25	150	187	Average
17745.000	42.64	12.78	55.42	74.00	-18.58	150	316	Peak	17796.000	42.73	12.88	55.61	74.00	-18.39	150	187	Peak

Level = Reading + Factor.
Margin = Level – Limit.
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Conducted Spurious Emissions:

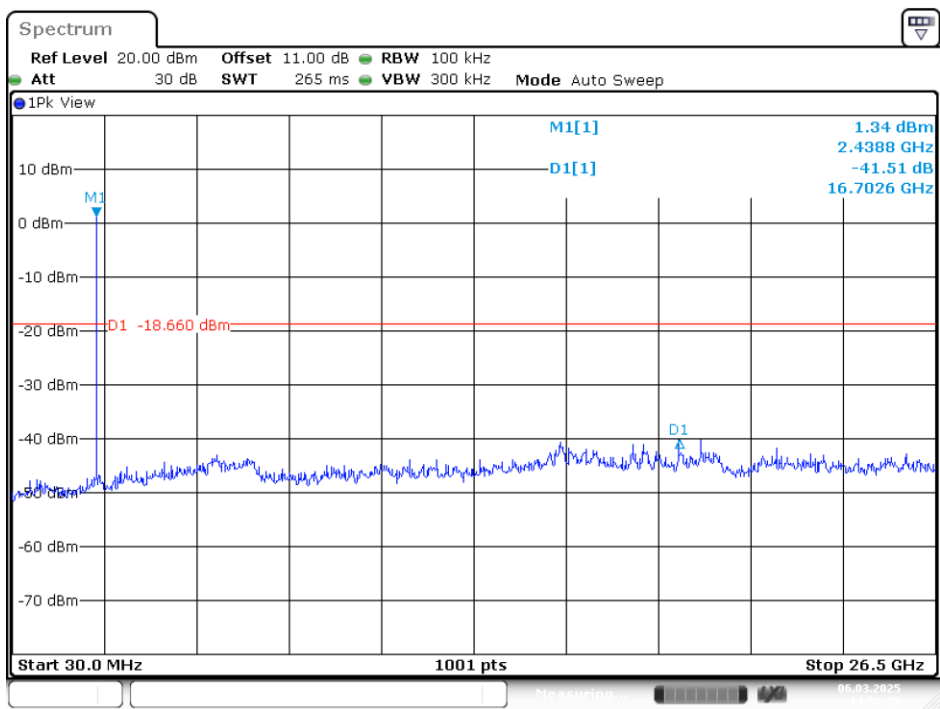
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BR Mode (GFSK)				
Low	2402	41.45	≥ 20	PASS
Mid	2441	41.51	≥ 20	PASS
High	2480	42.73	≥ 20	PASS
EDR Mode (π/4-DQPSK)				
Low	2402	33.38	≥ 20	PASS
Mid	2441	35.11	≥ 20	PASS
High	2480	36.66	≥ 20	PASS
EDR Mode (8DPSK)				
Low	2402	35.95	≥ 20	PASS
Mid	2441	34.35	≥ 20	PASS
High	2480	36.27	≥ 20	PASS

BR Mode (GFSK)
Low Channel



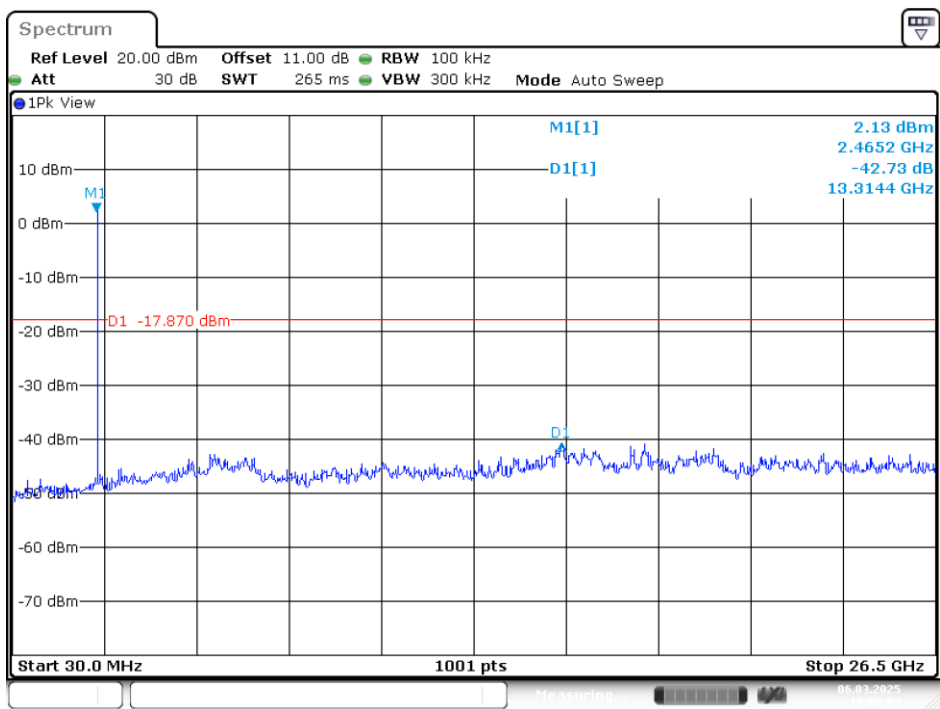
Date: 6.MAR.2025 14:57:05

Middle Channel



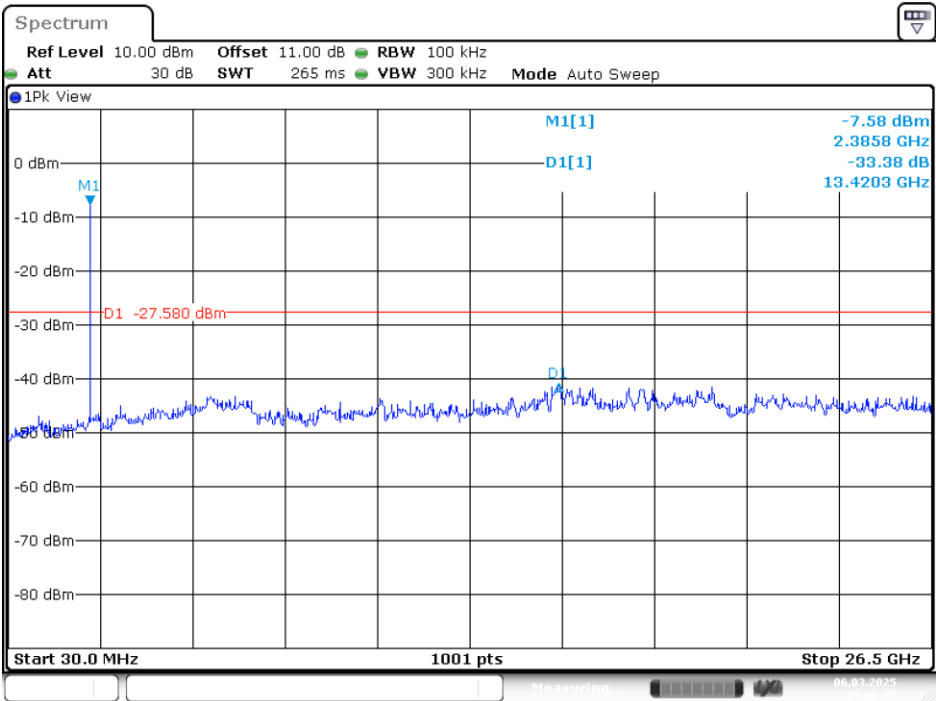
Date: 6.MAR.2025 14:58:25

High Channel

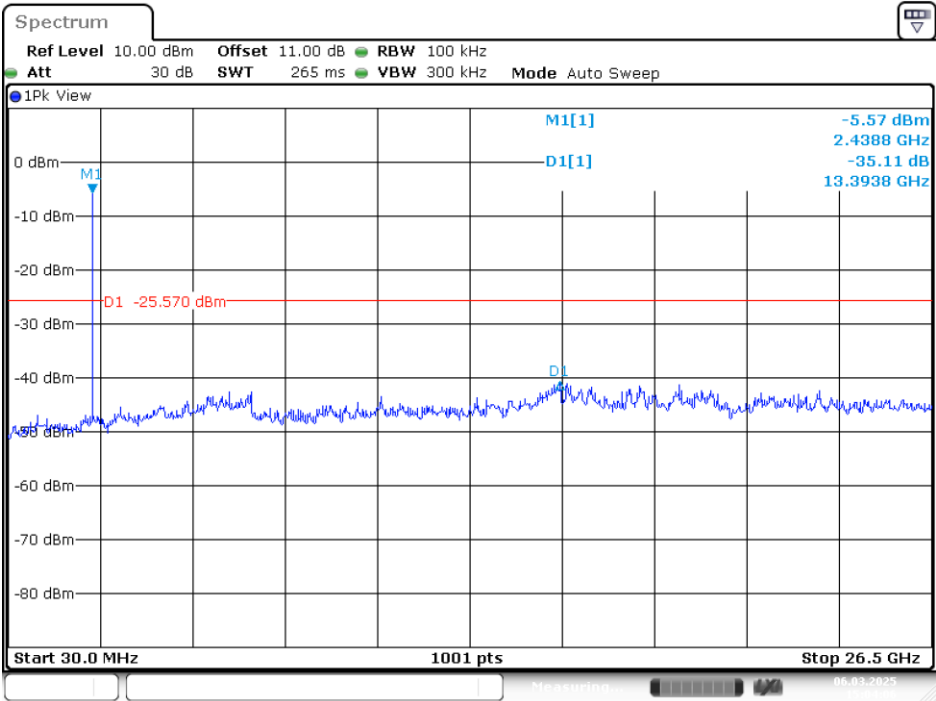


Date: 6.MAR.2025 15:00:04

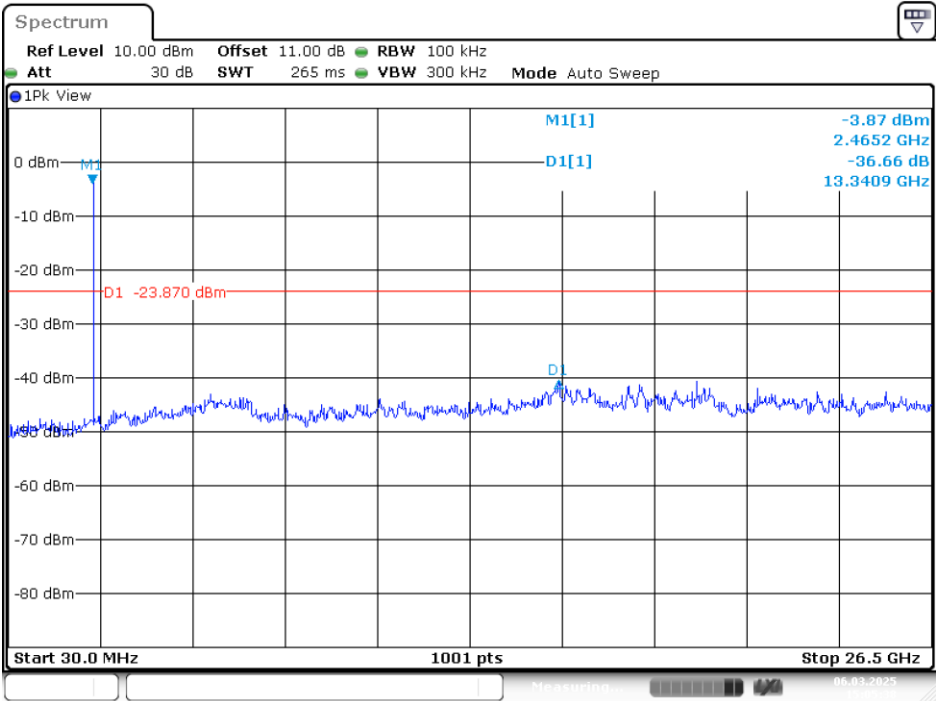
EDR Mode ($\pi/4$ -DQPSK)
Low Channel



Middle Channel



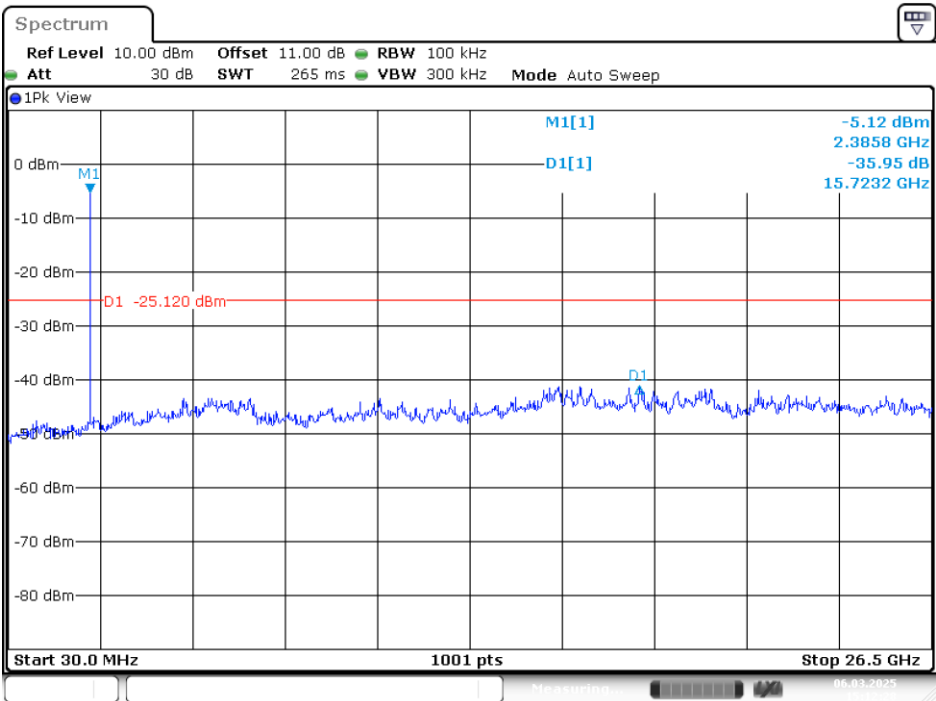
High Channel



Date: 6.MAR.2025 15:05:38

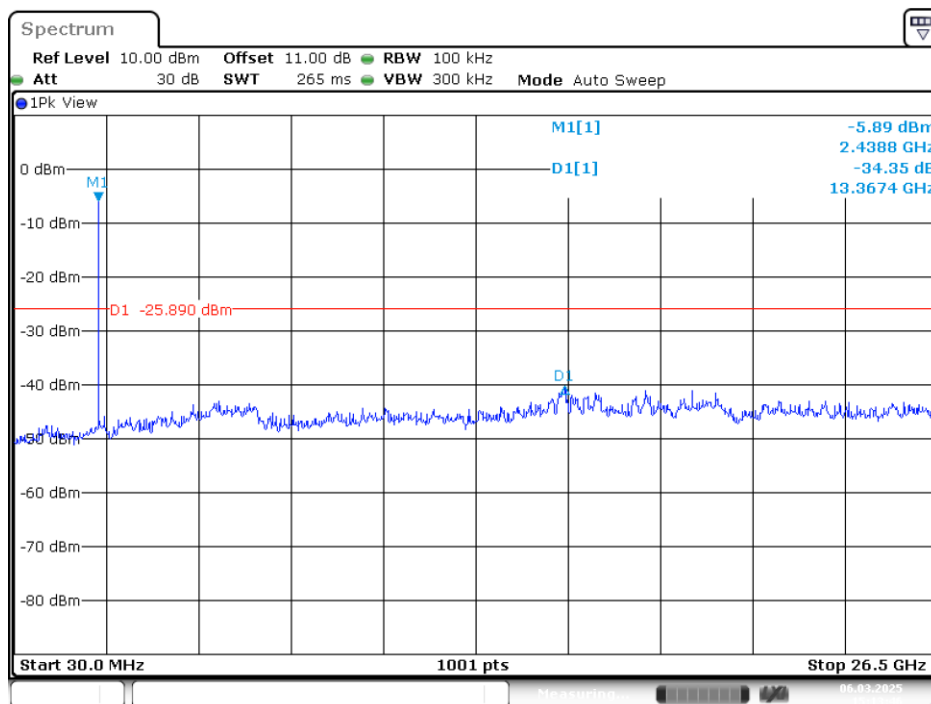
EDR Mode (8DPSK)

Low Channel



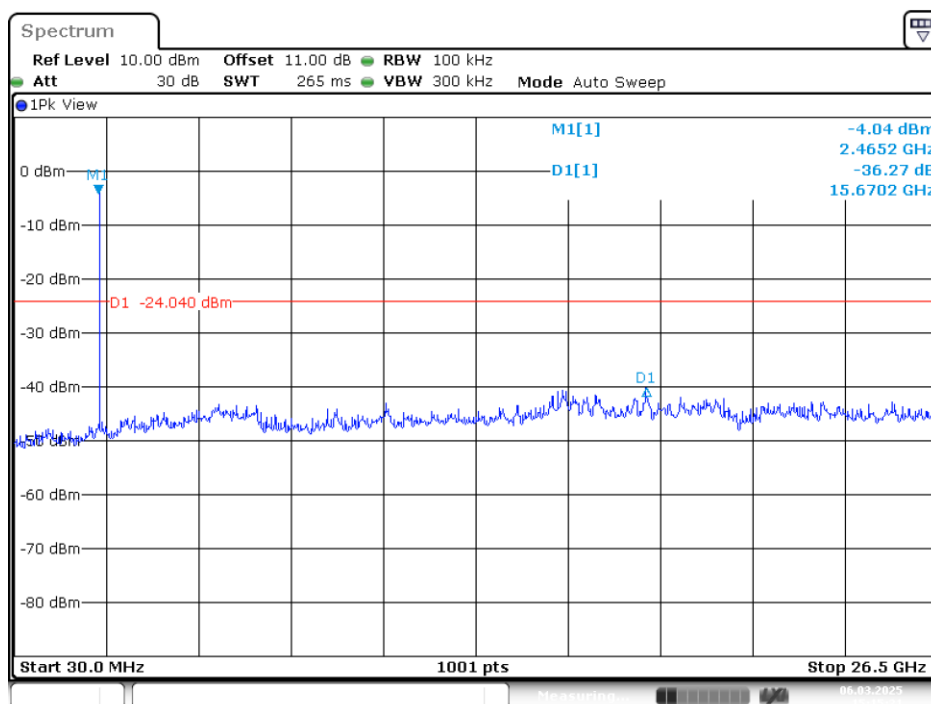
Date: 6.MAR.2025 15:12:28

Middle Channel



Date: 6.MAR.2025 15:13:46

High Channel



Date: 6.MAR.2025 15:15:21

8. FCC §15.247(a)(1) & RSS-247 §6.2.3.1(a), RSS-GEN §6.7 – Emission Bandwidth

8.1. Applicable Standard

According to FCC §15.247(a) (1) the maximum 20 dB bandwidth of the hopping channel shall be presented.

According to RSS-247 §6.2.3.1(a)

FHS operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

According to RSS-GEN §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.

8.2. Test Procedure

According to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 6.9.2

20 dB Emission Bandwidth

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

According to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 6.9.3

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).

8.3. Test Results

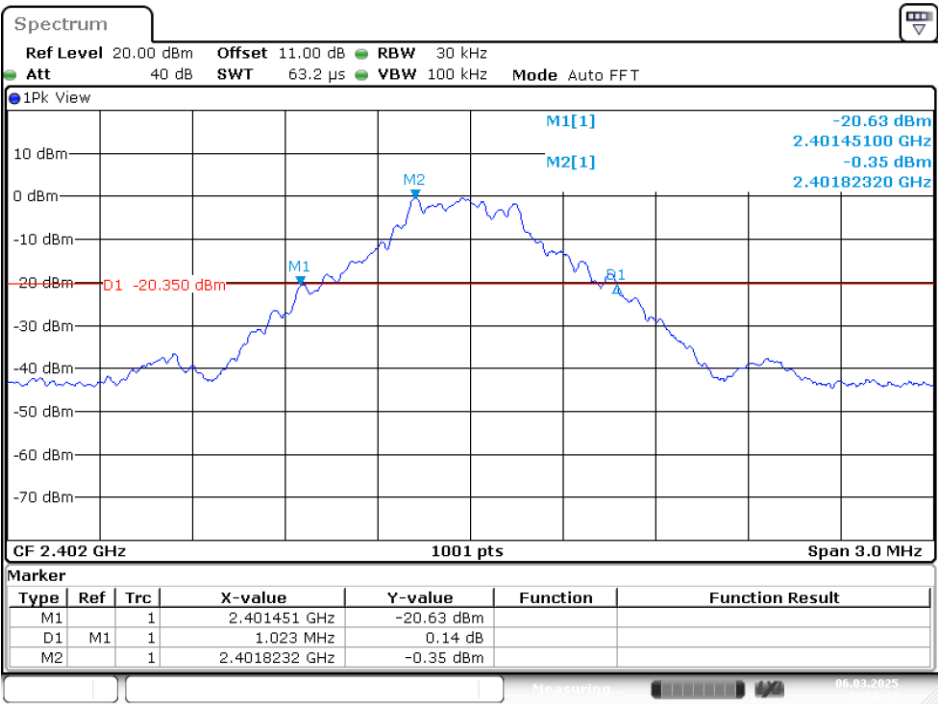
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
BR Mode (GFSK)			
Low	2402	1.02	0.85
Middle	2441	1.02	0.85
High	2480	1.03	0.86
EDR Mode ($\pi/4$ -DQPSK)			
Low	2402	1.34	1.20
Middle	2441	1.34	1.19
High	2480	1.34	1.20
EDR Mode (8DPSK)			
Low	2402	1.33	1.18
Middle	2441	1.33	1.18
High	2480	1.33	1.19

Please refer to the following plots

20 dB Emission Bandwidth

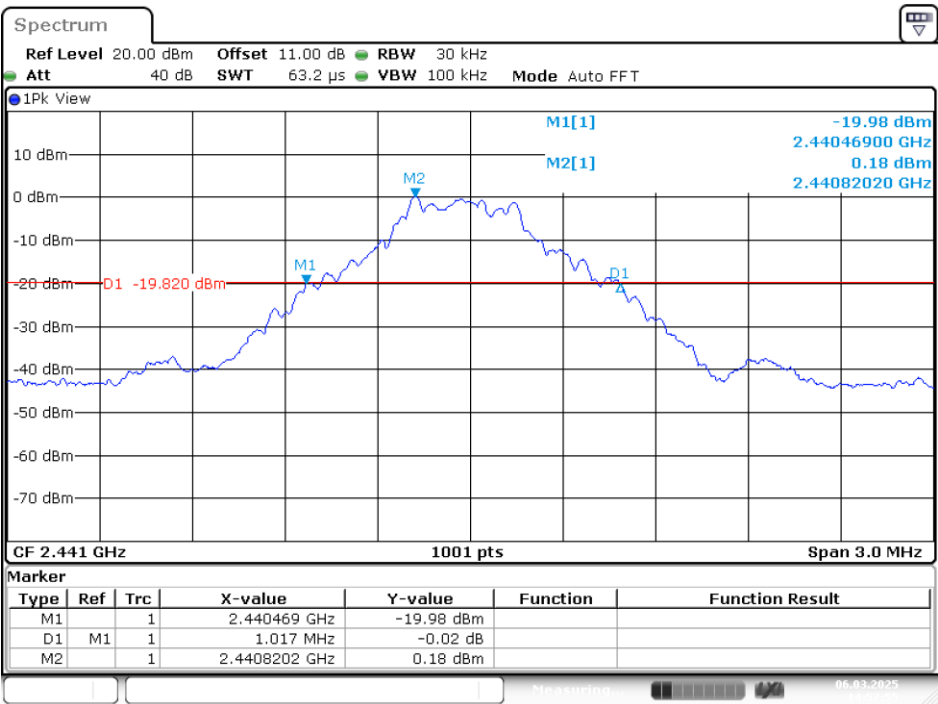
BR Mode (GFSK)

Low Channel



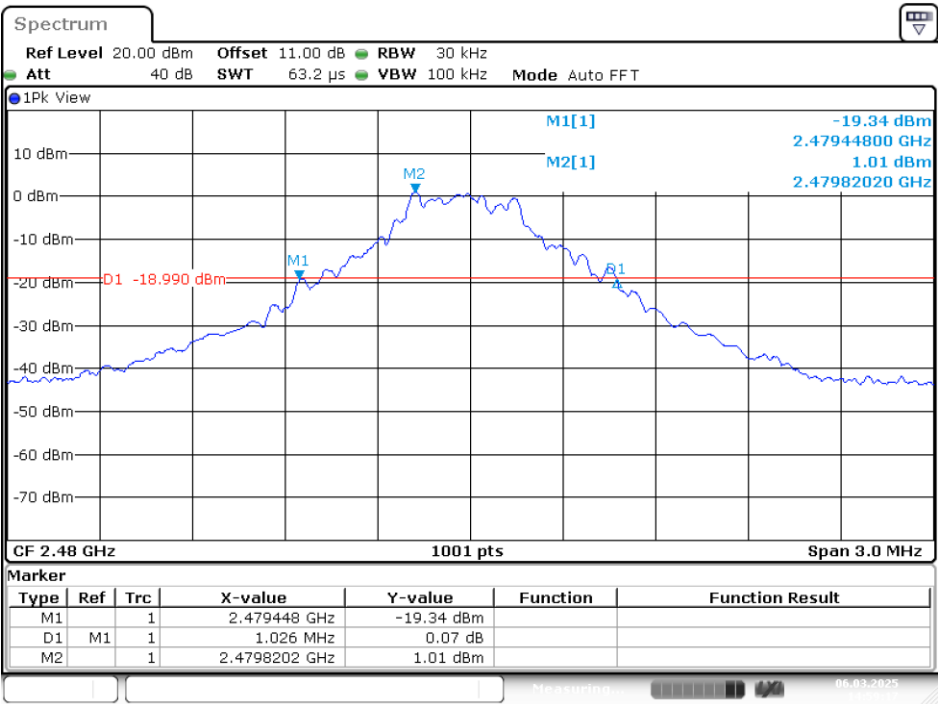
Date: 6.MAR.2025 14:56:18

Middle Channel



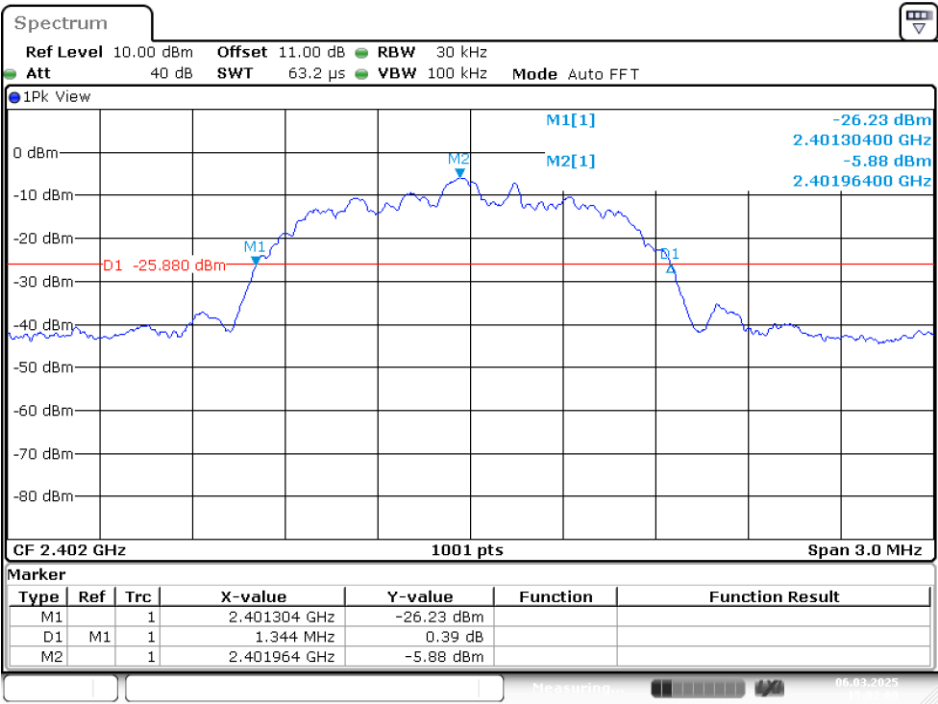
Date: 6.MAR.2025 14:57:54

High Channel



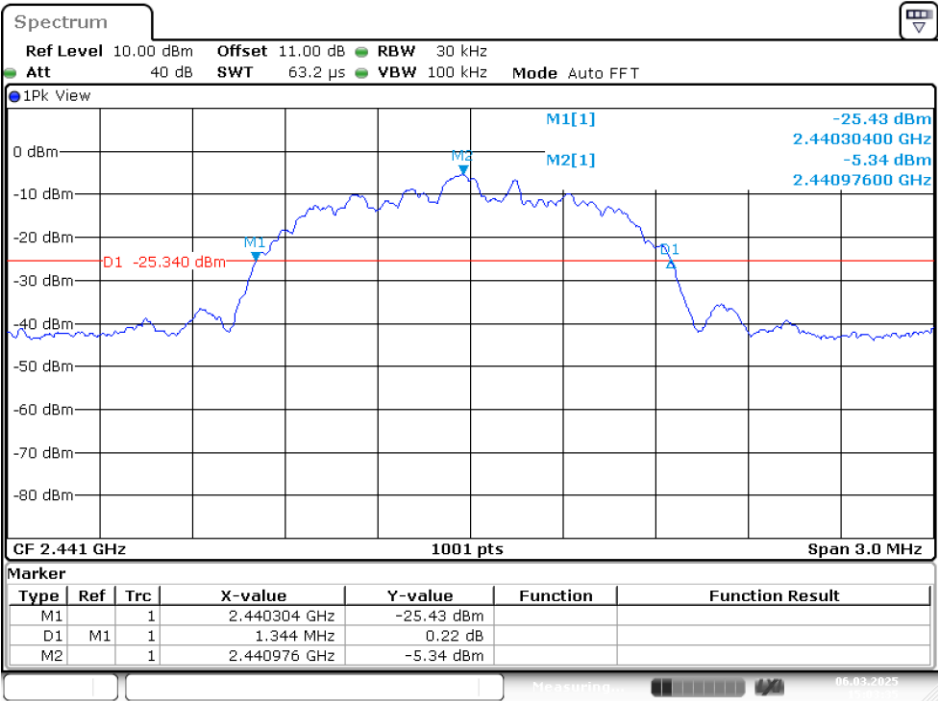
Date: 6.MAR.2025 14:59:17

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



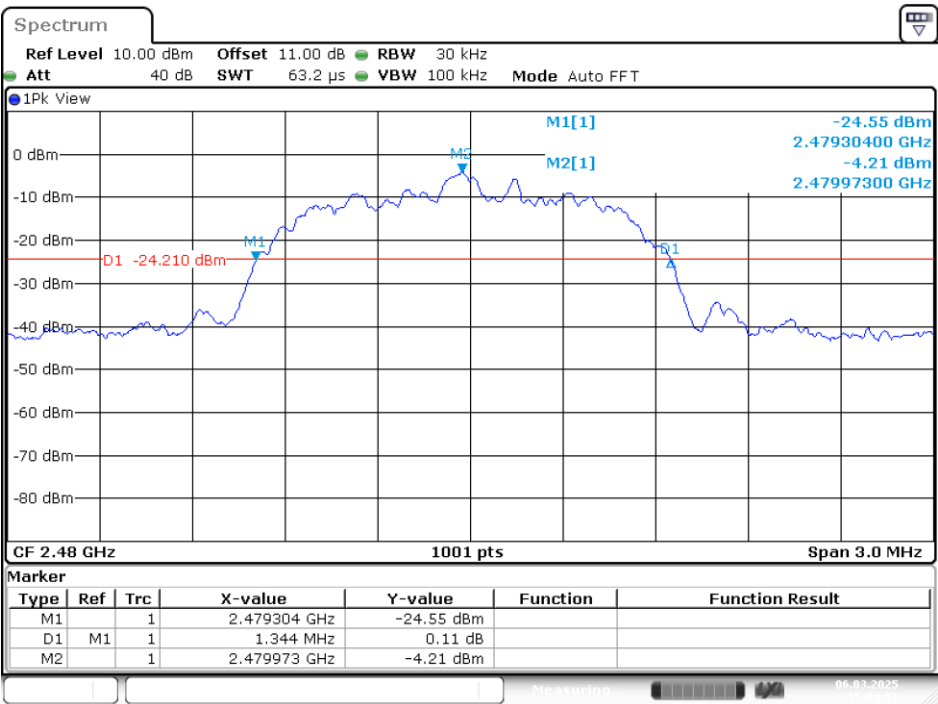
Date: 6.MAR.2025 15:02:00

Middle Channel



Date: 6.MAR.2025 15:03:35

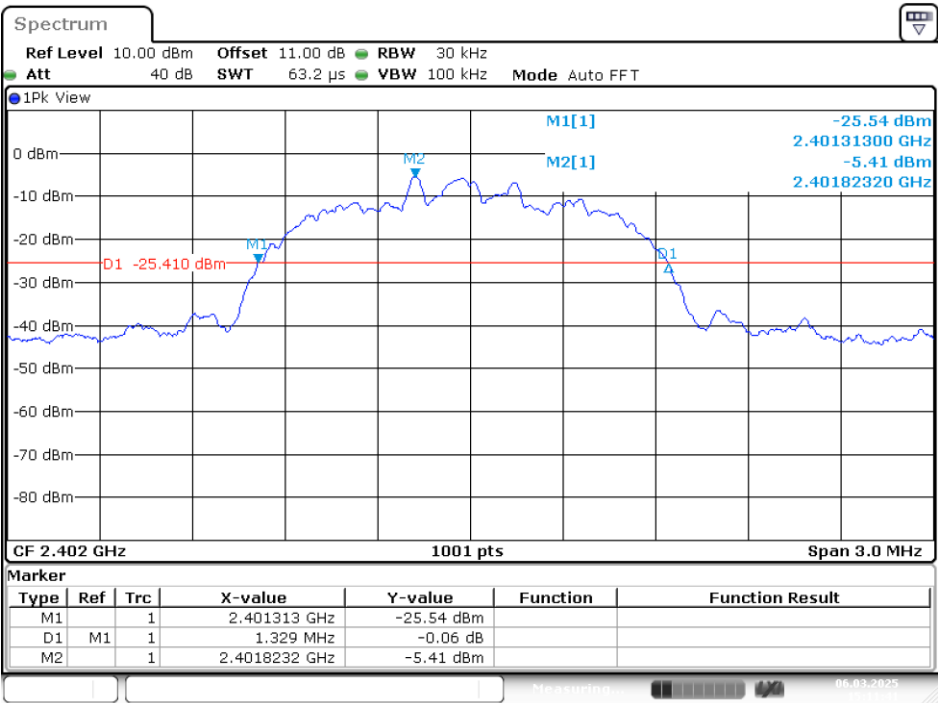
High Channel



Date: 6.MAR.2025 15:04:51

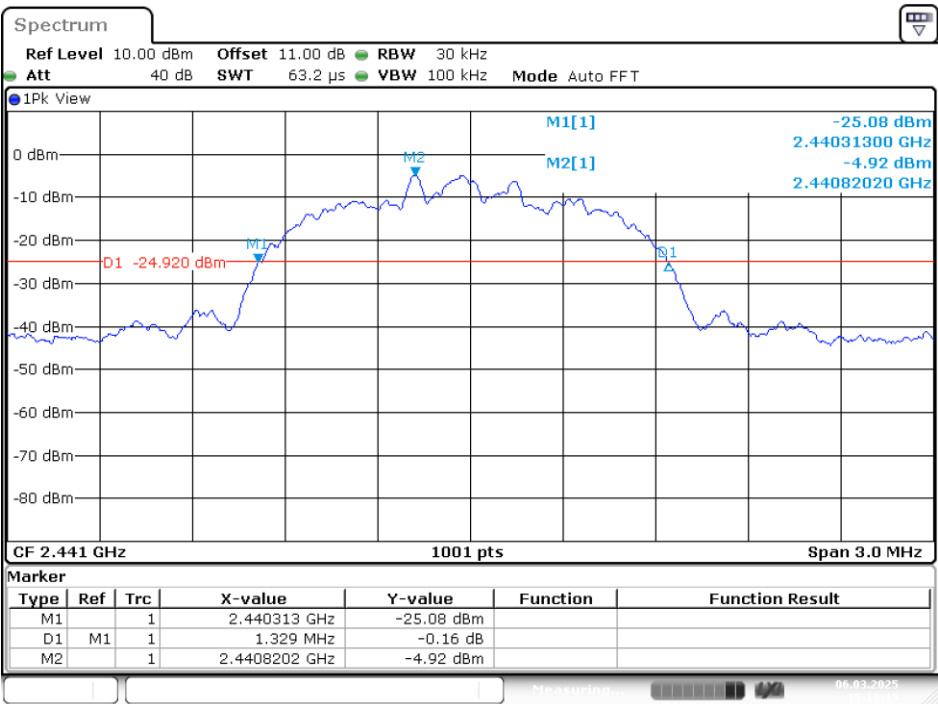
EDR Mode (8DPSK)

Low Channel



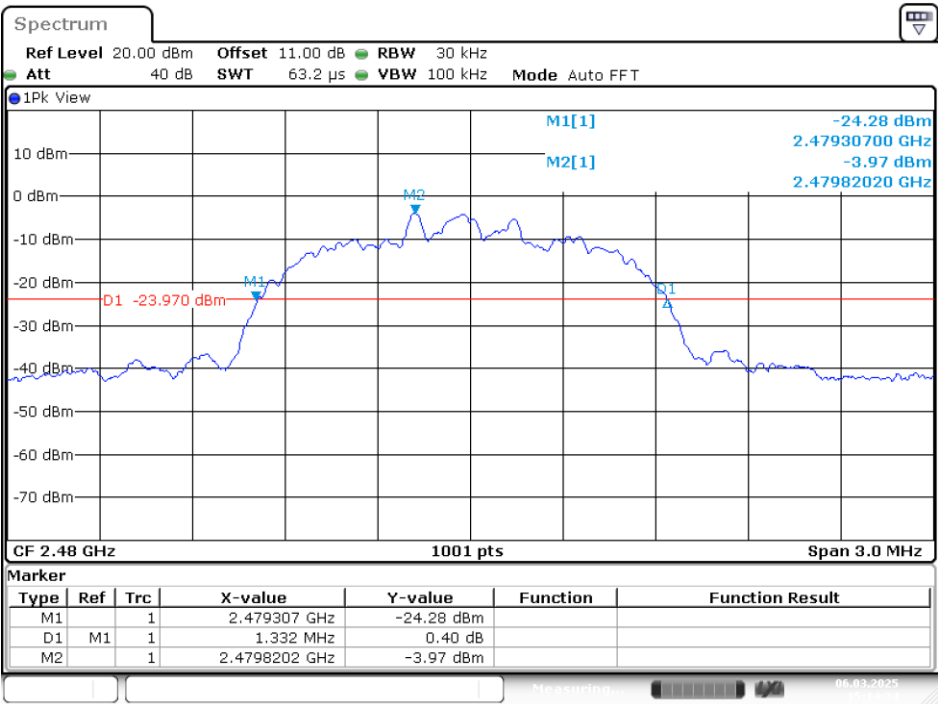
Date: 6.MAR.2025 15:11:41

Middle Channel



Date: 6.MAR.2025 15:13:15

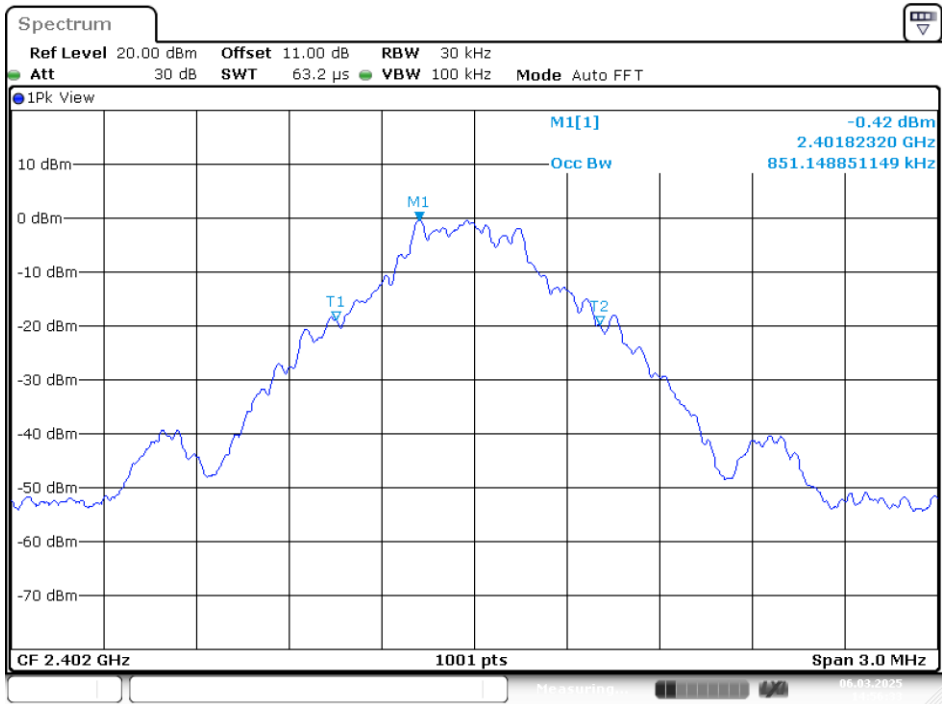
High Channel



Date: 6.MAR.2025 15:14:34

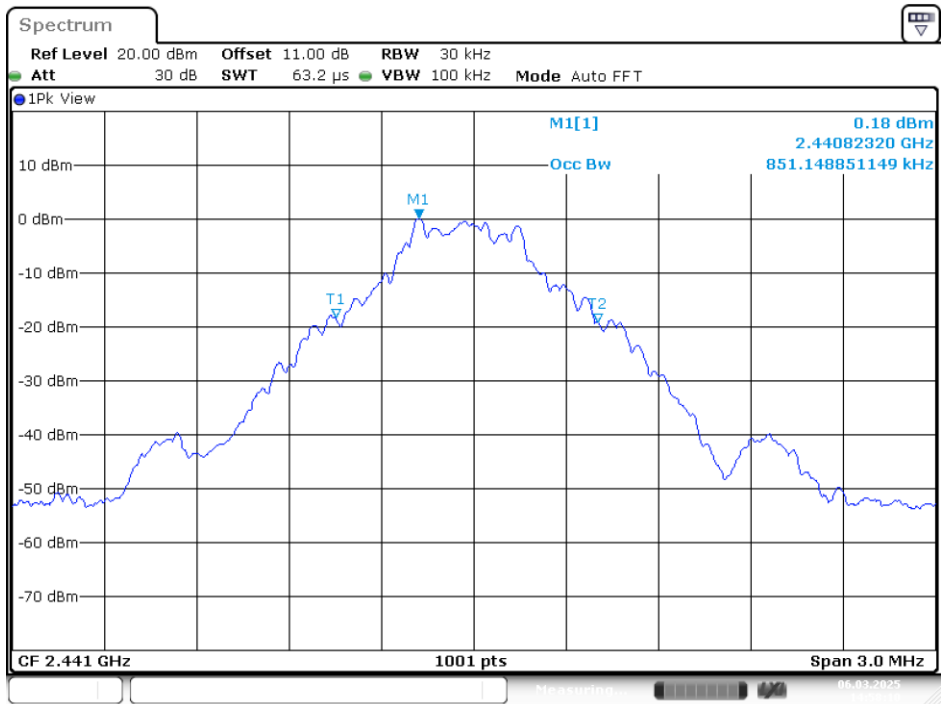
99% Bandwidth

BR Mode (GFSK)
Low Channel



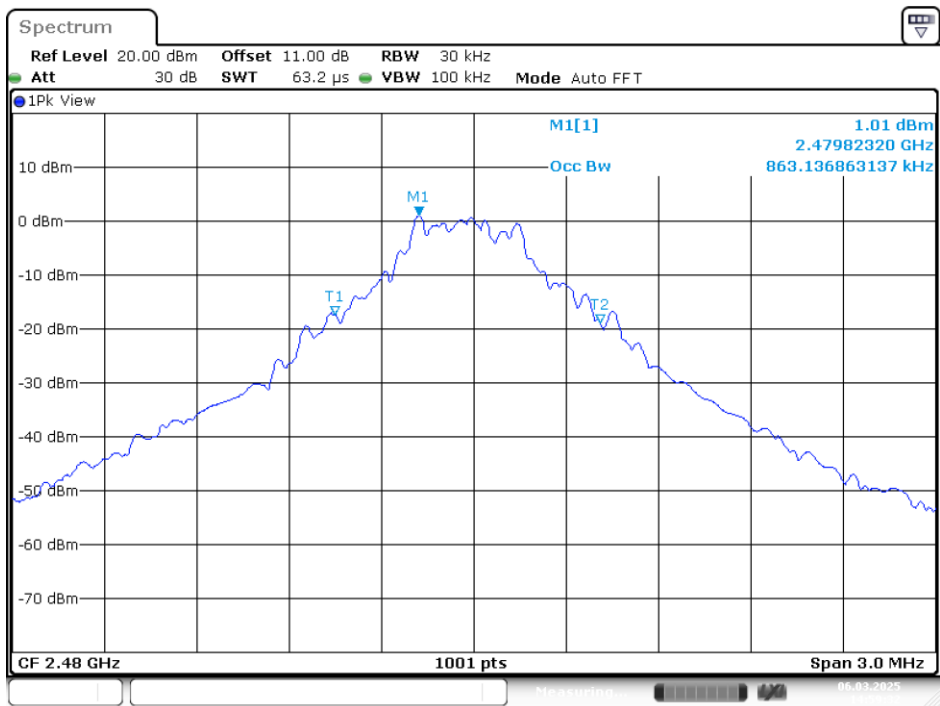
Date: 6.MAR.2025 14:56:33

Middle Channel



Date: 6.MAR.2025 14:58:10

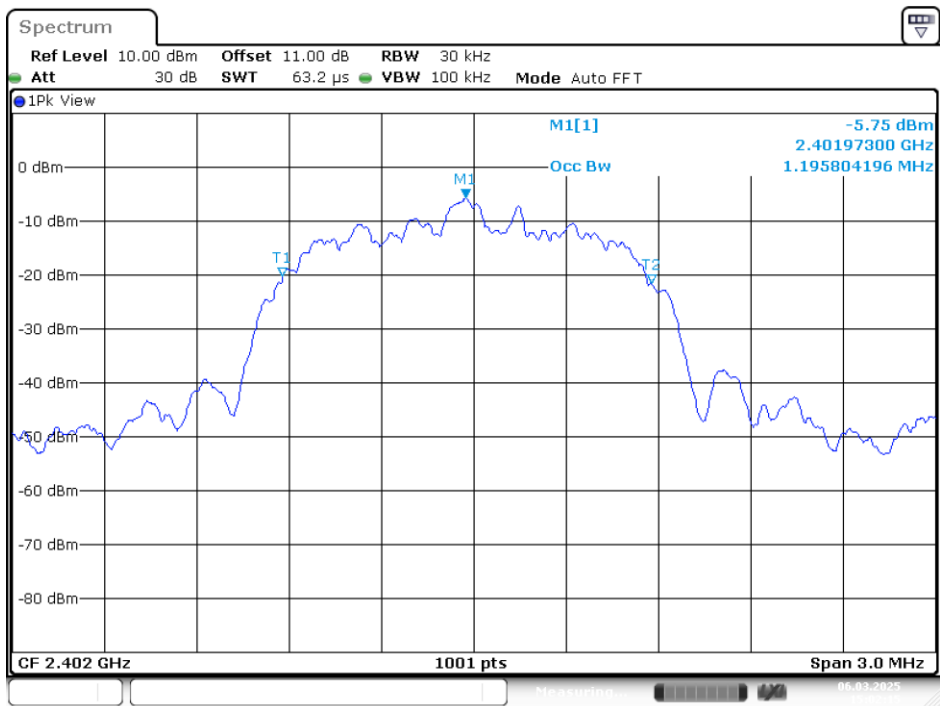
High Channel



Date: 6.MAR.2025 14:59:32

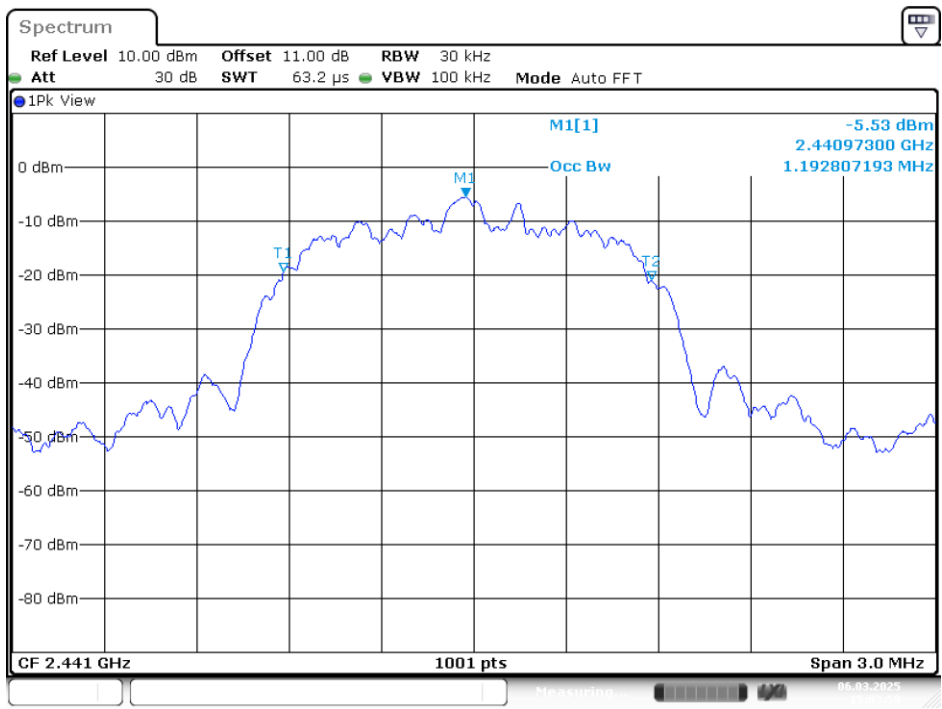
EDR Mode ($\pi/4$ -DQPSK)

Low Channel



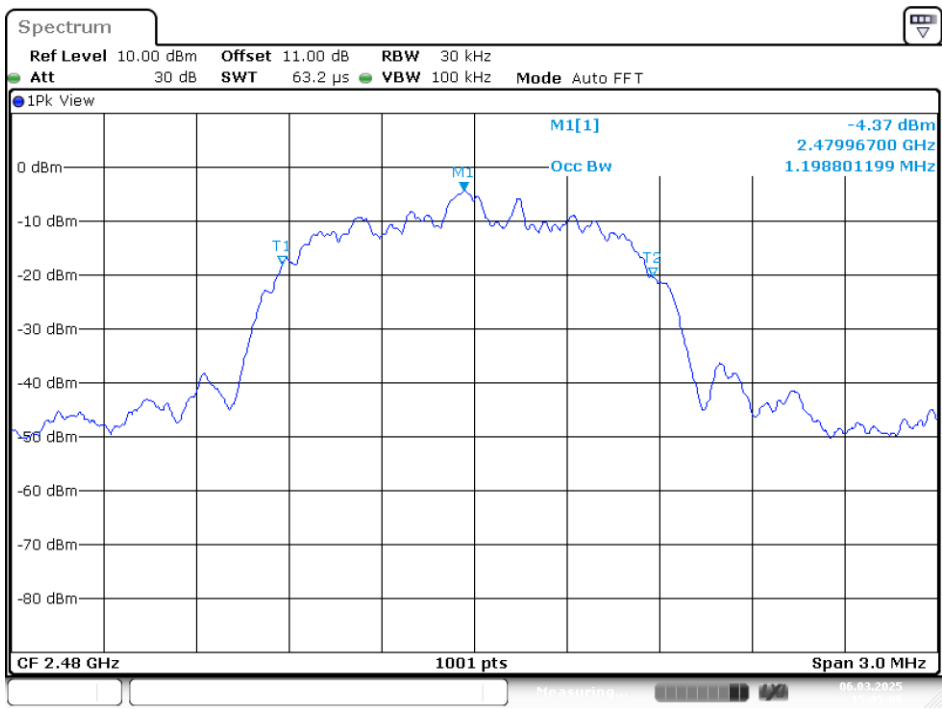
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Middle Channel



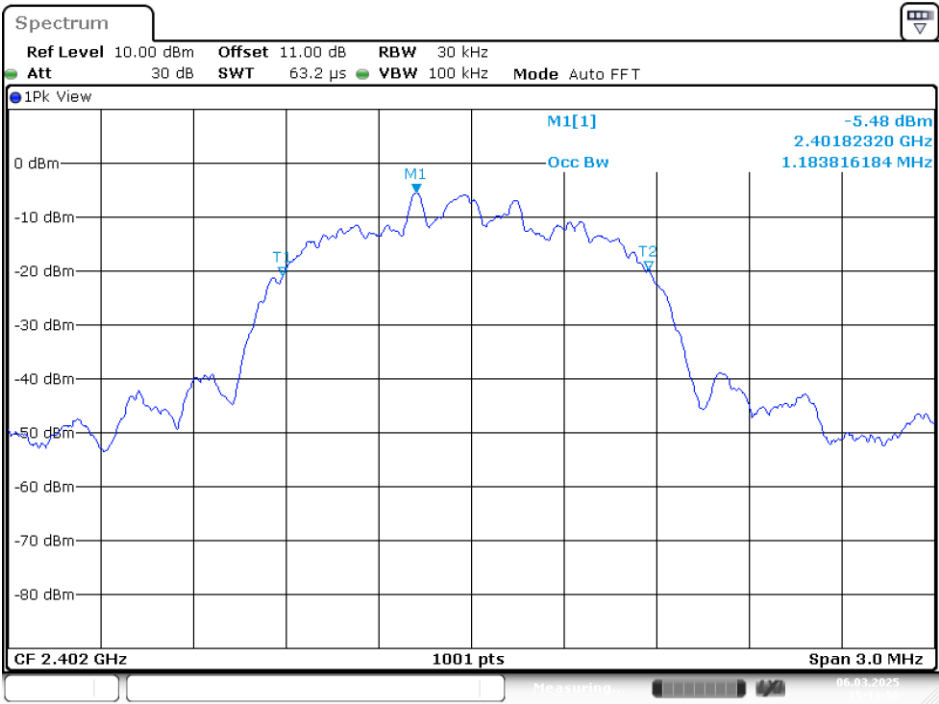
Date: 6.MAR.2025 15:03:50

High Channel



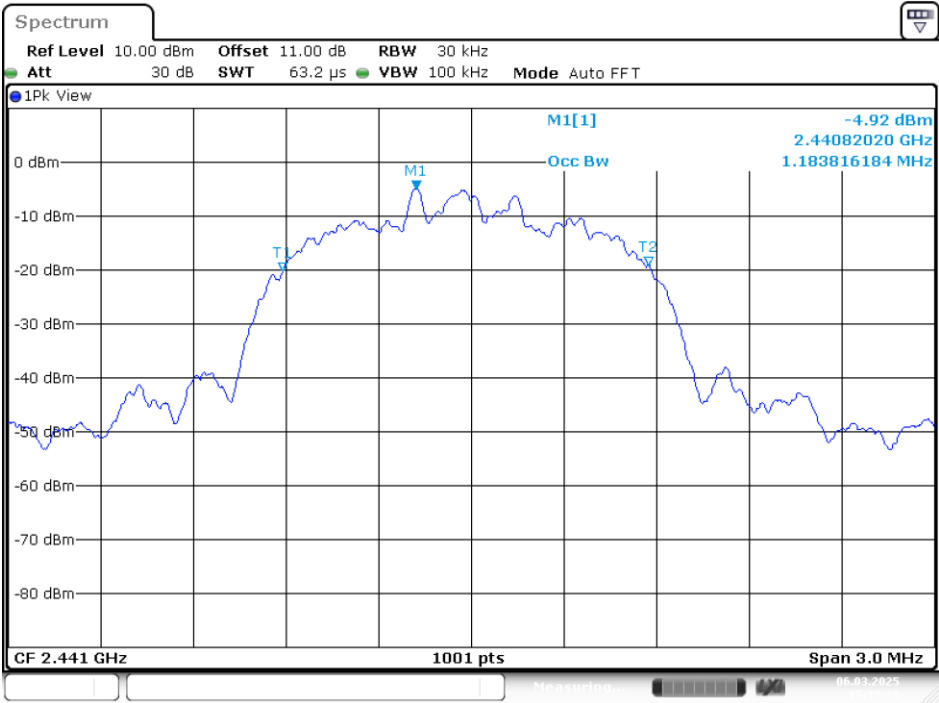
Date: 6.MAR.2025 15:05:06

EDR Mode (8DPSK)
Low Channel



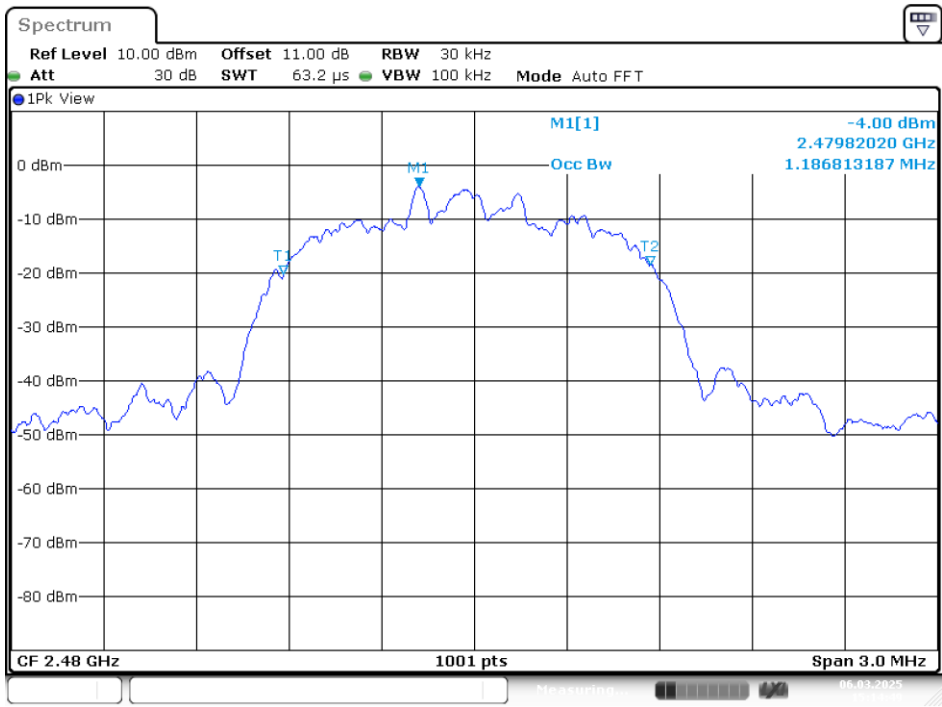
Date: 6.MAR.2025 15:11:56

Middle Channel



Date: 6.MAR.2025 15:13:30

High Channel



Date: 6.MAR.2025 15:14:49

9. FCC §15.247(a)(1) & RSS-247 §6.2.3.1(a) – Channel Separation Test

9.1. Applicable Standard

According to FCC §15.247(a) (1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to RSS-247 §6.2.3.1(a)

FHS operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

9.2. Test Procedure

According to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 7.8.2

- 1) Span: Wide enough to capture the peaks of two adjacent channels.
- 2) 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.
- 3) Video (or average) bandwidth (VBW) $\geq 1/10^{\text{th}}$ the RBW.
- 4) Sweep: No faster than coupled (auto) time.
- 5) Detector function: Peak.
- 6) Trace: Max-hold.
- 7) Allow the trace to stabilize.

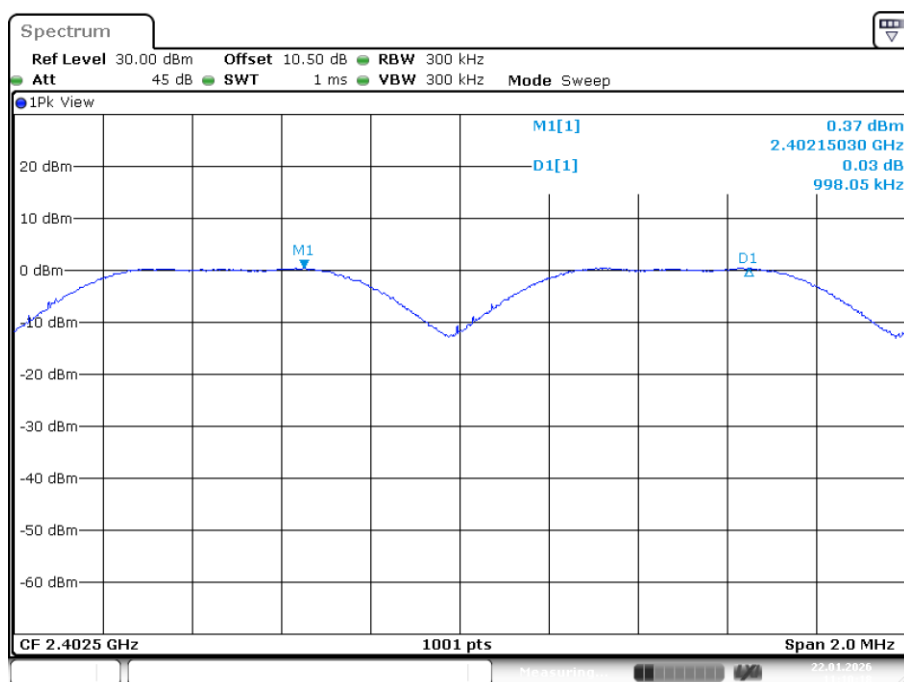
9.3. Test Results

Channel	Channel Separation (MHz)	20 dBc BW (MHz)	Two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
BR Mode (GFSK)					
Low	1.00	1.34	0.89	>two-thirds of the 20 dB bandwidth	Compliance
Middle	0.99	1.34	0.89	>two-thirds of the 20 dB bandwidth	Compliance
High	0.99	1.34	0.89	>two-thirds of the 20 dB bandwidth	Compliance

Note: Only the BDR (GFSK) mode result is reported since EDR ($\pi/4$ -DQPSK) and EDR (8DPSK) modes have the exact same channel plan, and the limit is the maximum 20dB bandwidth *2/3.

Please refer to the following plots.

BR Mode (GFSK) Low Channel



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