

FCC Part 15.247
RSS-247, ISSUE 3, August 2023
RSS-GEN, ISSUE 5, February 2021 Amendment 2
TEST REPORT

For

Fortinet, Inc.

909 Kifer Road, Sunnyvale, CA 94086, USA

FCC ID: TVE-FON780B
IC: 7280B-FON780B

Report Type: Original Report	Product Type: FortiFone 780B
Report Producer : <u>Coco Lin</u>	
Report Number : <u>RXZ250213056RF01</u>	
Report Date : <u>2025-05-26</u>	
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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ250213056	RXZ250213056RF01	2025-05-26	Original Report	Coco Lin

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Fortinet, Inc. 909 Kifer Road, Sunnyvale, CA 94086, USA
Brand(Trade) Name	FORTINET
Product (Equipment) / PMN	FortiFone 780B
Main Model Name	FON-780B
HVIN	FON-780B
Series Model Name (Only FCC)	FON-780Bxxxxxxxxx, FortiFone 780Bxxxxxxxxx, FORTIFONE 780Bxxxxxxxxx (where “x” can be used as “0-9”, or“A-Z”,or“_”, or blank for software changes or marketing purpose only)
Frequency Range	IEEE 802.11b/ g/ n HT20 Mode: 2412 ~ 2462 MHz IEEE 802.11n HT40 Mode: 2422 ~ 2452 MHz BLE(1M)/ BLE(2M): 2402 ~ 2480 MHz
Maximum Conducted Peak Output Power	IEEE 802.11b Mode: 18.08 dBm IEEE 802.11g Mode: 23.14 dBm IEEE 802.11n HT20 Mode: 23.35 dBm IEEE 802.11n HT40 Mode: 23.04 dBm BLE(1M) Mode : 6.57 dBm BLE(2M) Mode : 6.71 dBm
Modulation Technique	IEEE 802.11b Mode: DSSS IEEE 802.11g Mode: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM BLE(1M)/ BLE(2M) Mode : GFSK
Power Operation (Voltage Range)	12Vdc from Adapter, 48Vdc from POE
Sample Received Date	2025/03/24

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

RXZ250213056-1 (Assigned by BACL, New Taipei Laboratory).

1.2 Objective

This report is prepared on behalf of *Fortinet, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules and RSS-247, Issue 3, August 2023, 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 C63.10-2013, 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, 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
Power Spectral Density, conducted	+/- 0.60 dB
Occupied Bandwidth	+/- 0.09 %
Unwanted Emissions, conducted	+/- 1.09 dB
Emissions, radiated	9 kHz~30 MHz
	30 MHz~1 GHz
	1 GHz~18 GHz
	18 GHz~40 GHz
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	2025/5/5	19.2	46	Sean
Radiation Spurious Emissions	2025/4/16~2025/5/23	23.3~24.6	57~68	Nick
Duty Cycle	2025/4/16~2025/5/21	25.9	47	Jing
Conducted Spurious Emissions	2025/4/16~2025/5/21	25.5~26.7	44~57	Jing
Emission Bandwidth	2025/4/16~2025/5/21	25.5~26.7	44~57	Jing
Maximum Output Power	2025/4/16~2025/5/21	25.5~26.7	44~57	Jing
100 kHz Bandwidth of Frequency Band Edge	2025/4/16~2025/5/21	25.5~26.7	44~57	Jim
Power Spectral Density	2025/4/16~2025/5/21	25.5~26.7	44~57	Jing

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 WIFI 2.4GHz mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11 b/g/n HT20 Modes were tested with channel 1, 6 and 11.

For 802.11n HT40 Mode were tested with channel 3, 6 and 9.

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	--	--
2	2406	--	--
3	2408	37	2476
--	--	38	2478
19	2440	39	2480

For BLE Modes were tested with channel 0, 19 and 39.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

The test software was used “adb v1.0.41”

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

Test Frequency		Low	Middle	High
Power Level Setting	802.11b Mode	13	13	13
	802.11g Mode	12	12	12
	802.11n HT20 Mode	12	12	12
	802.11n HT40 Mode	10	10	10
	BLE 1M	default	default	default
	BLE 2M	default	default	default

The worst case data rates are as follows:

802.11b: 1Mbps

802.11g: 6Mbps

802.11n HT20: MCS0

802.11n HT40: MCS0

BLE 1M : 1 Mbps

BLE 1M : 2 Mbps

2.4 Support Equipment List and Details

Description	Manufacturer	Model Number
NB	DELL	E6410
POE Adapter	Cisco	SB-PWR-INJ2
Adapter	Zhuzhou Dachuan Electronic Technology Co., Ltd	DCT18W120150US-A0

2.5 External Cable List and Details

Description	Manufacturer	Model Number
USB Cable	BACL	1.5m
RJ-45 Cable	BACL	8m
RJ-45 Cable	BACL	8m
RJ-11 Cable	BACL	1m
RJ-11 Cable	Dongguan Haoyu Yong Industrial Co., Ltd.	4C2.8mP+P B019#

2.6 Test Mode

Pre-scan

AC Line Conducted Emissions and Radiated Spurious Emissions

Mode 1: FON-780B + Adapter

Mode 2: FON-780B + POE

Worst case is the Mode 1: FON-780B + Adapter

Mode 1: FON-780B + Adapter tested all measure item.

Mode 2: FON-780B + POE test Below 1GHz Radiated Spurious Emissions and AC Line Conducted Emissions.

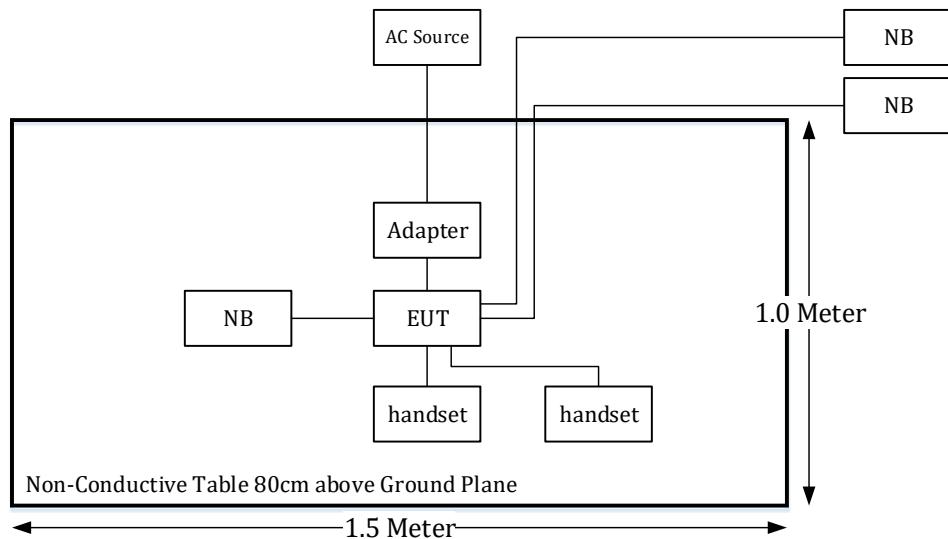
2.7 Block Diagram of Test Setup

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

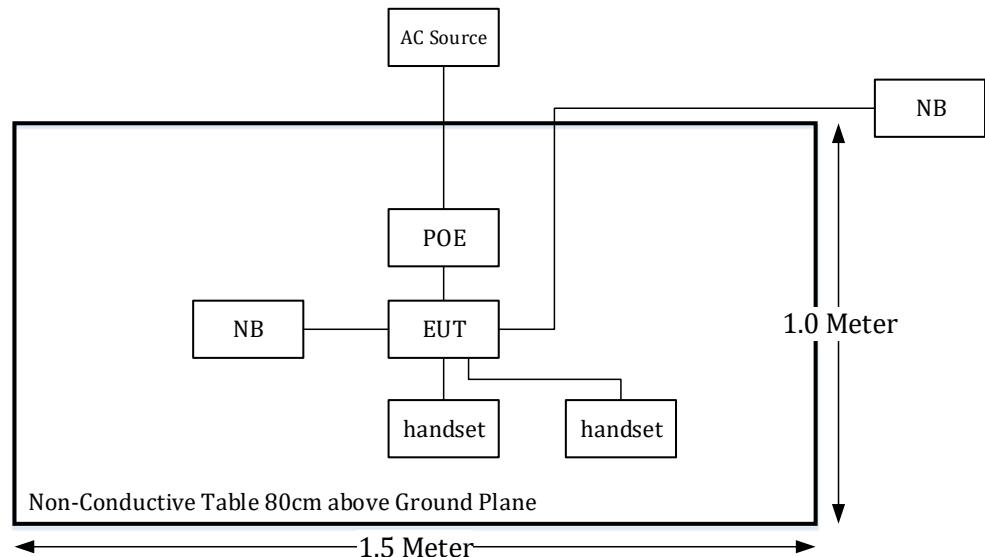
Radiation:

Below 1GHz

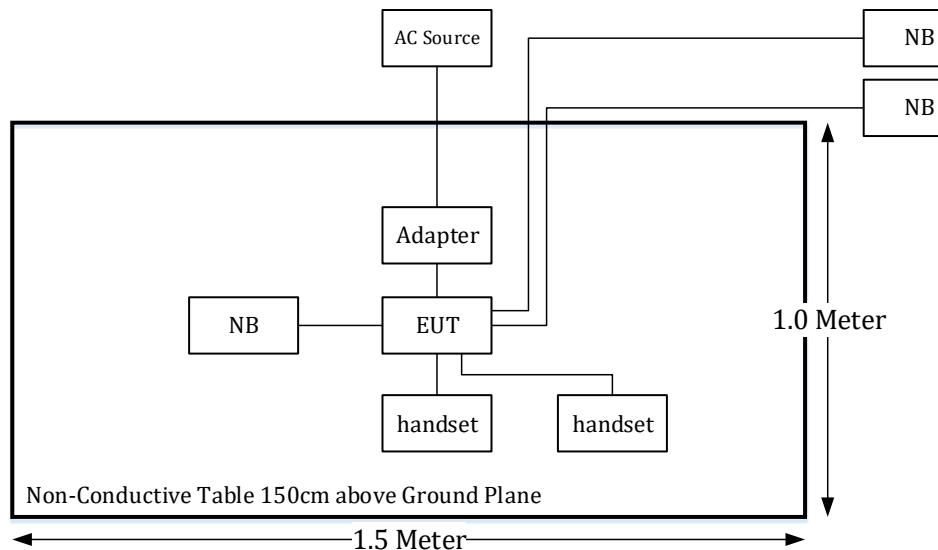
Adapter:



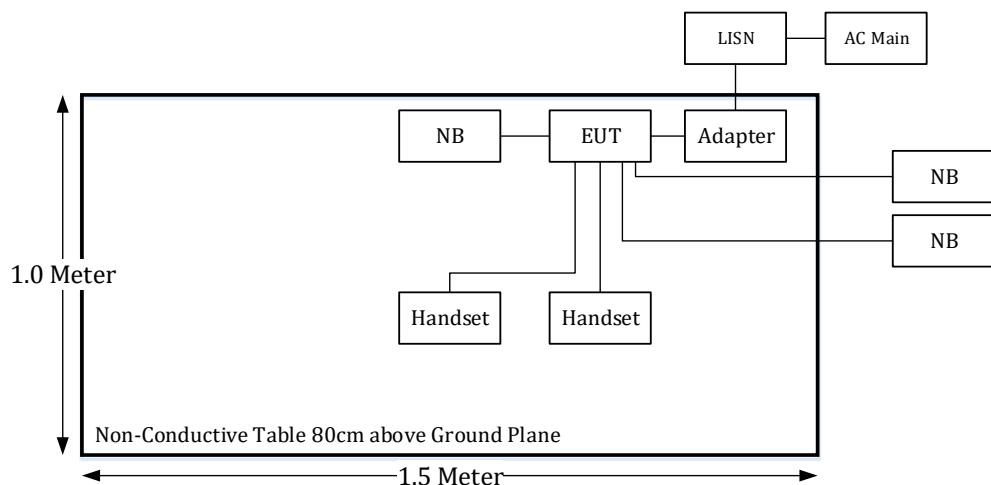
POE:



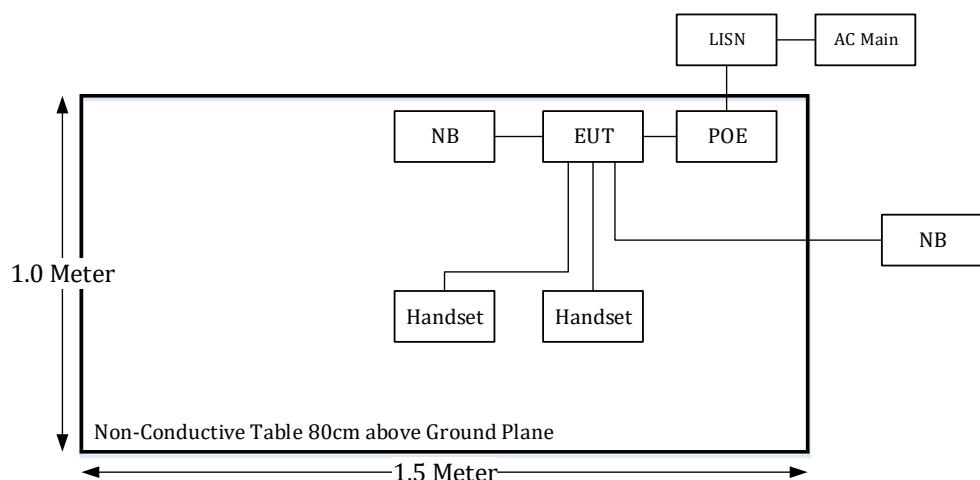
Above 1GHz:

**Conduction:**

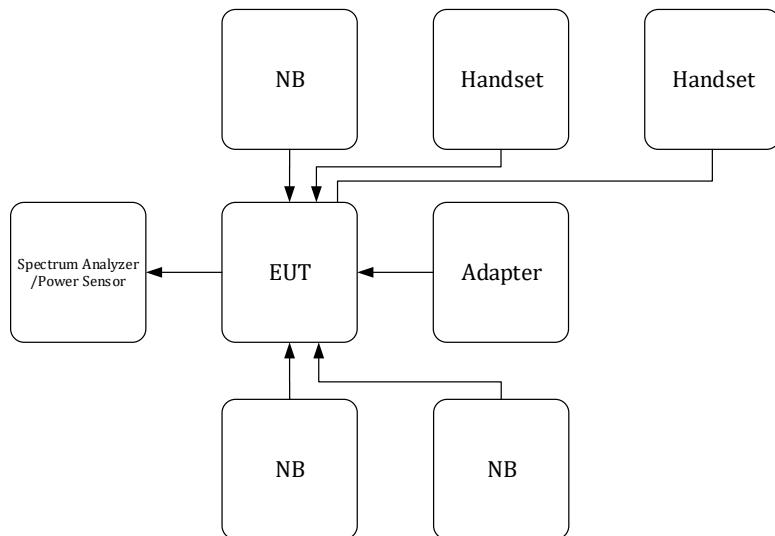
Adapter:



POE:



Conducted:



2.8 Duty Cycle

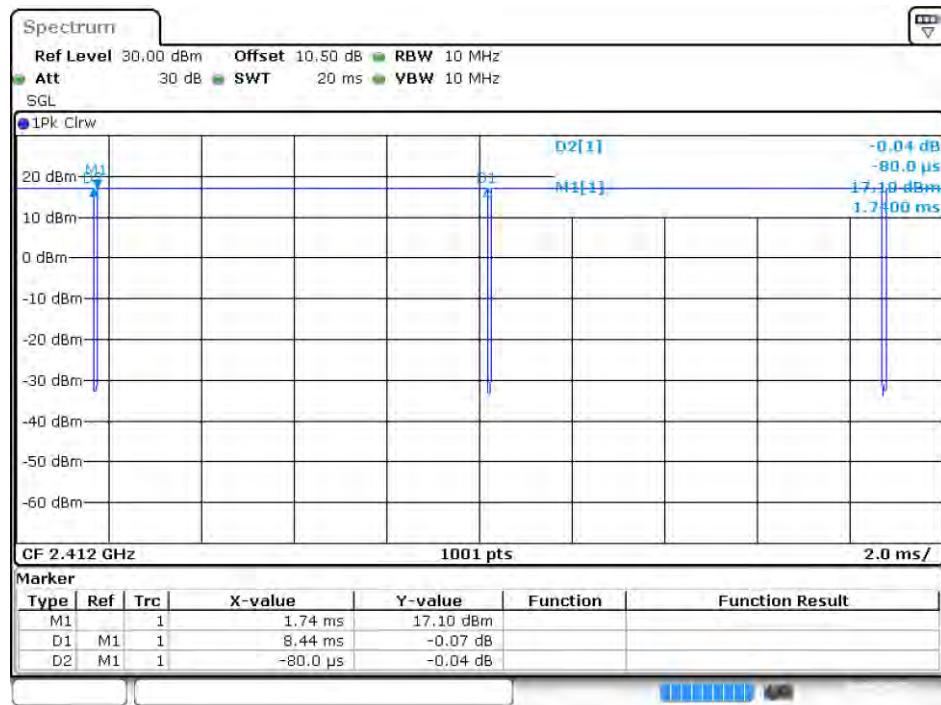
The duty cycle as below:

Radio Mode	On Time (ms)	Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T (kHz)	1/T VBW setting (kHz)
802.11b	8.44	0.08	99	0.04	/	0.01
802.11g	1.375	0.13	91	0.41	0.73	1
802.11n20	1.28	0.125	91	0.41	0.78	1
802.11n40	0.616	0.07	90	0.46	1.62	2
BLE(1M)	0.388	0.236	62	2.08	2.58	3
BLE(2M)	1.064	0.806	57	2.44	0.94	1

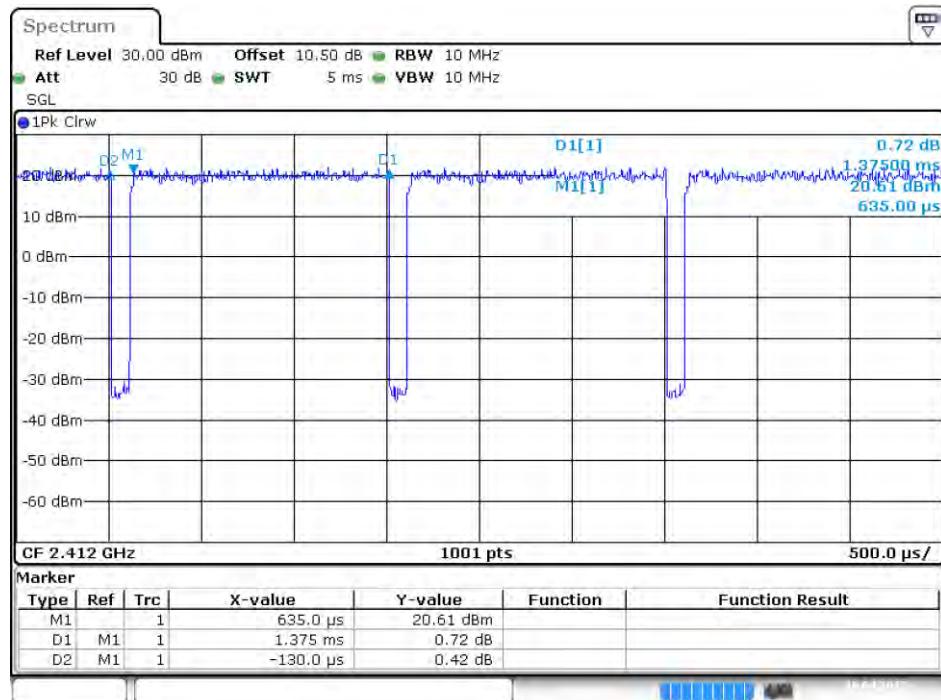
Note: Duty Factor = $10 \times \log(1/\text{duty cycle})$

Please refer to the following plots.

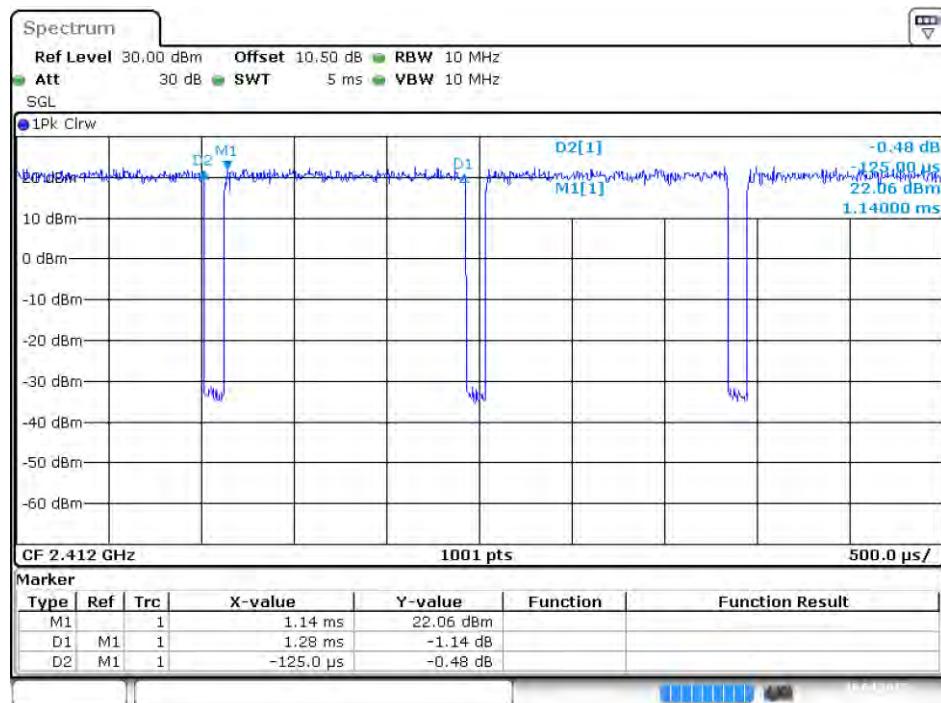
B Mode



Date: 16 APR 2025, 12:26:50

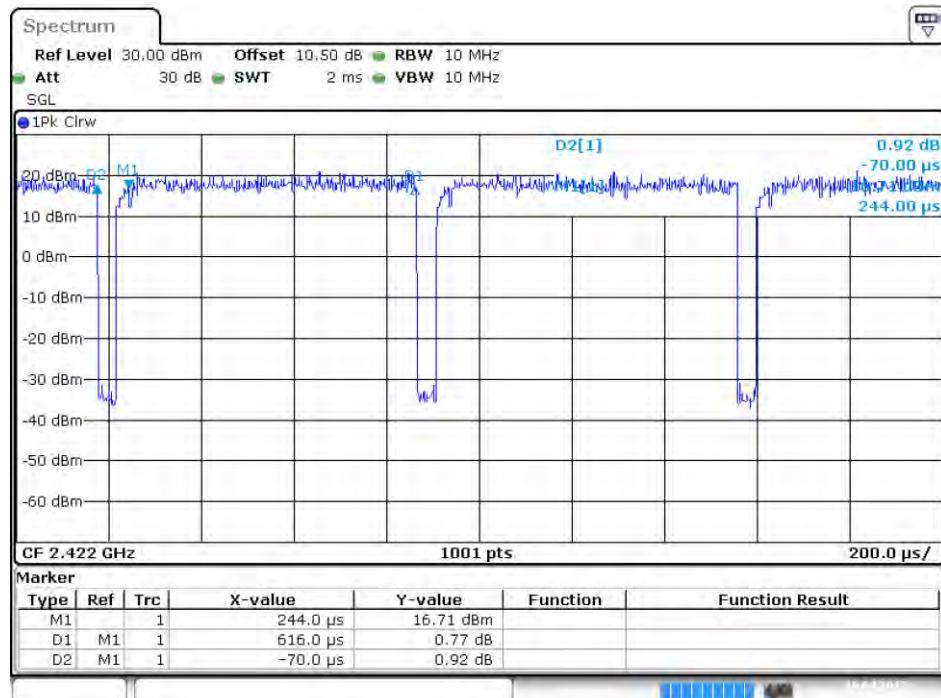
G Mode

Date: 16 APR 2025 12:31:49

N20 Mode

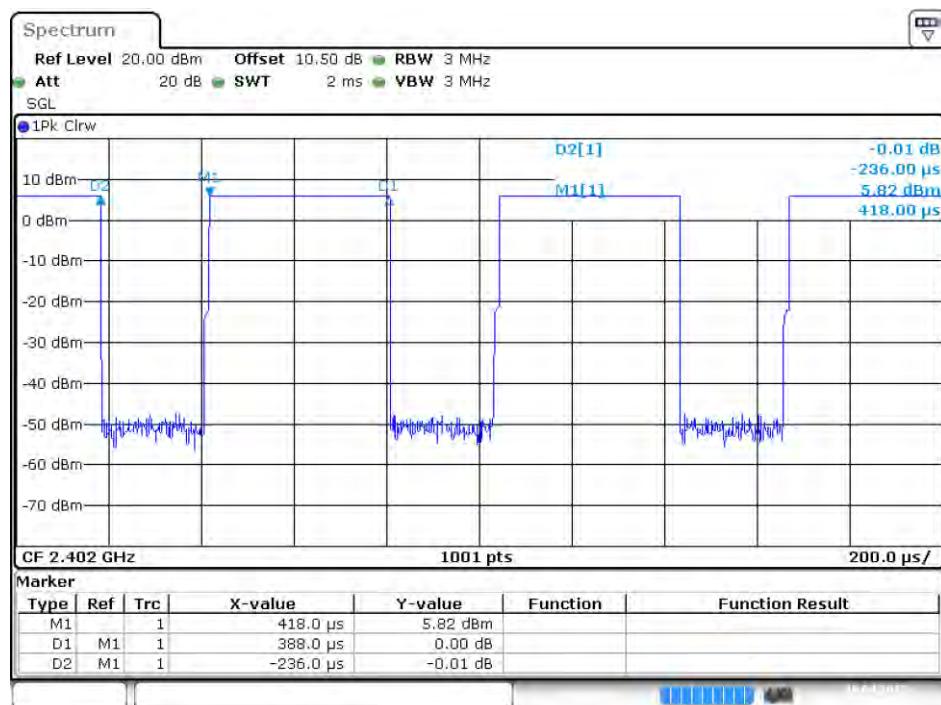
Date: 16 APR 2025 12:34:56

N40 Mode



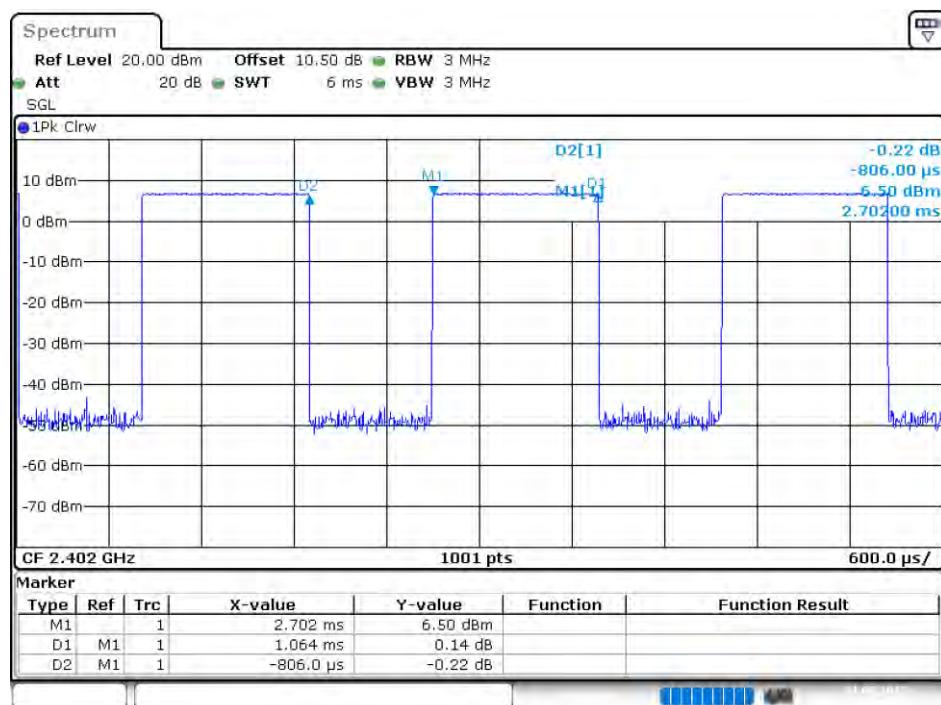
Date: 16 APR 2025, 12:43:36

BLE(1M) Mode



Date: 16 APR 2025, 16:09:25

BLE(2M) Mode



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 §5.5 RSS-Gen §8.9 RSS-Gen §8.10	Spurious Emissions	Compliance
FCC §15.247(a)(2) RSS-247 §5.2(a) RSS-Gen §6.7	Emission Bandwidth	Compliance
FCC §15.247(b)(3) RSS-247 §5.4(d)	Maximum Peak Output Power	Compliance
FCC §15.247(d) RSS-247 §5.5	100 kHz Bandwidth of Frequency Band Edge	Compliance
FCC §15.247(e) RSS-247 §5.2(b)	Power Spectral Density	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	ESW8	100947	2024/5/24	2025/5/24
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 (966-A)					
Active Loop Antenna	ETS-Lindgren	6502	35796	2025/3/27	2026/3/27
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/1554 2_01	2025/1/16	2026/1/16
Horn Antenna	A.H. system	SAS-571	1020	2024/5/21	2025/5/21
Horn Antenna	ETS-Lindgren	3115	40736	2025/5/6	2026/5/6
Horn Antenna	ETS-Lindgren	3116	62638	2024/8/30	2025/8/30
Preamplifier	Sonoma	310N	130602	2024/6/18	2025/6/18
Preamplifier	Channel	ERA-100M-18G-01D1748	EC2300051	2025/4/10	2026/4/10
Preamplifier	BACL	BACL-1313-A18 40	4011511	2025/2/12	2026/2/12
Spectrum Analyzer	Rohde & Schwarz	FSV40	101939	2025/3/27	2026/3/27
EMI Test Receiver	Rohde & Schwarz(R&S)	ESR3	102099	2024/6/24	2025/6/24
Microflex Cable	UTIFLEX	UFB197C-1-2362 -70U-70U	225757-001	2024/12/20	2025/12/20
Coaxial Cable	UTIFLEX	UFB311A-Q-144 0-300300	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-07-15-0 44	2024/12/20	2025/12/20
Coaxial Cable	ROSNOL	K1K50-UP0264- K1K50-450CM	160309-1	2025/1/21	2026/1/21
Microflex Cable	ROSNOL	K1K50-UP0264- K1K50-80CM	160309-2	2025/1/21	2026/1/21
Band-stop filter	Woken	STI15-9831	STI15-9831-1	2024/10/19	2025/10/19
High-pass filter	XINGBOKEJI	XLBLBQ-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
Cable	UTIFLEX	UFA210A	9435	2024/10/1	2025/10/1
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

According to § 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 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

Manufacturer	Model	Type	Antenna Gain	Impedance
Dongguan Yijia Electronics Communication Technology Co.,Ltd.	YJL01.106.071.302A	FPC Antenna	4.1 dBi	50Ω

Unit uses a unique coupling to the intentional radiator.

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 frequency ranges.

According to RSS-GEN §8.8

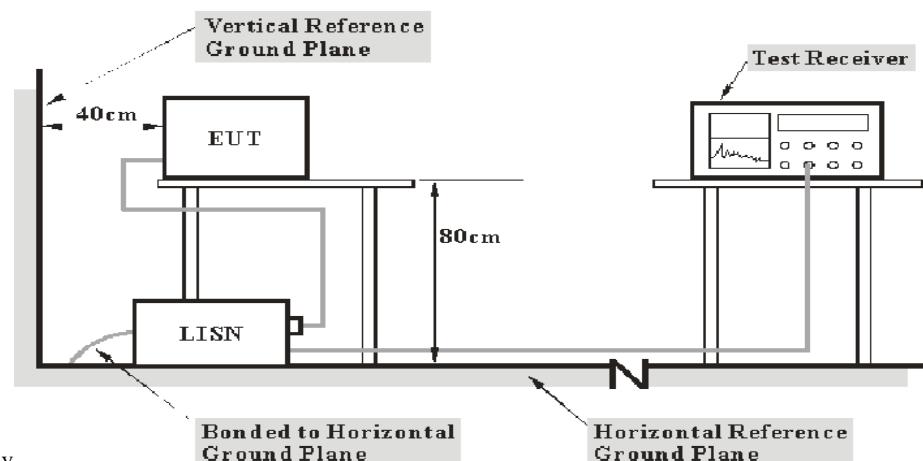
Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the 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: It may
(New Taipei

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.

as Corp.
age 21 of 108

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 and RSS-GEN limits.

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:

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

6.6 Test Results

Test Mode: Transmitting

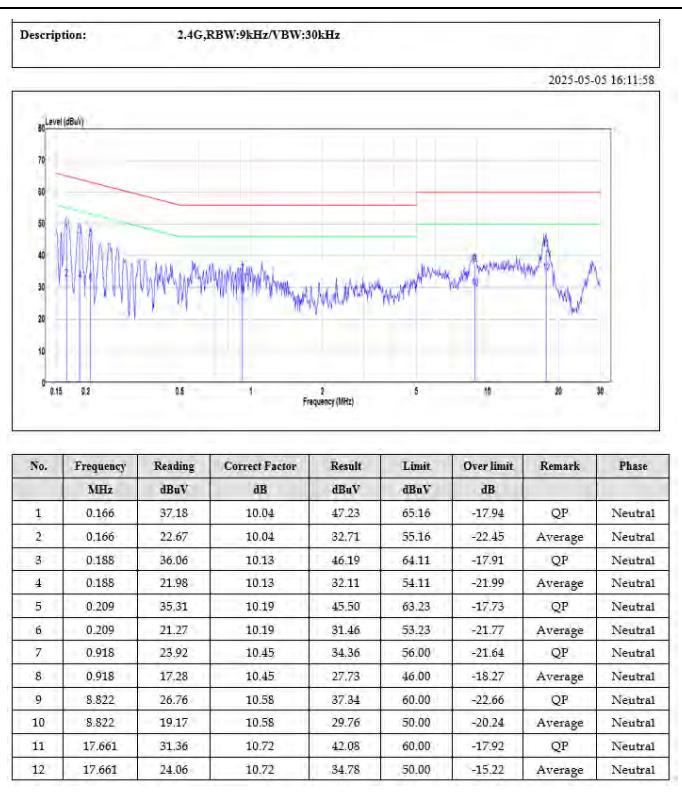
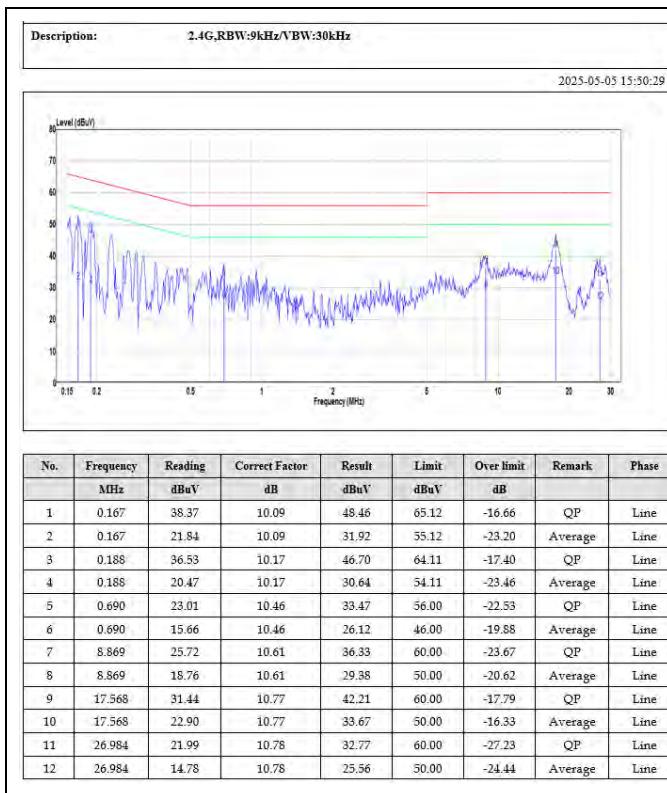
Main: AC120 V, 60 Hz

WIFI 2.4G

(Worst case is 802.11n HT20 mode, low channel)

Adapter:

Line	Neutral
------	---------



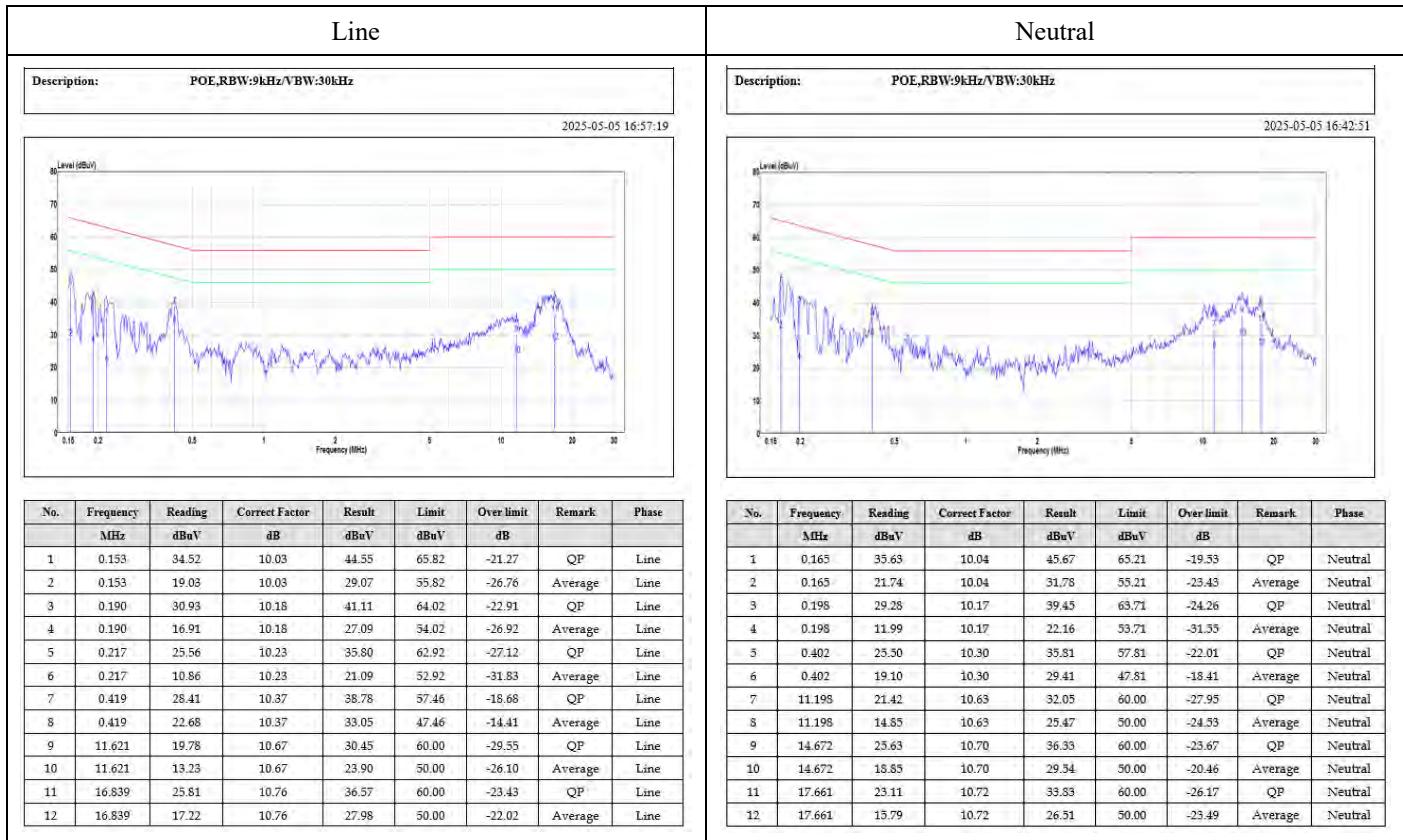
Note:

Result = Reading + Factor

Over Limit = Result – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

POE:



Note:

Result = Reading + Factor

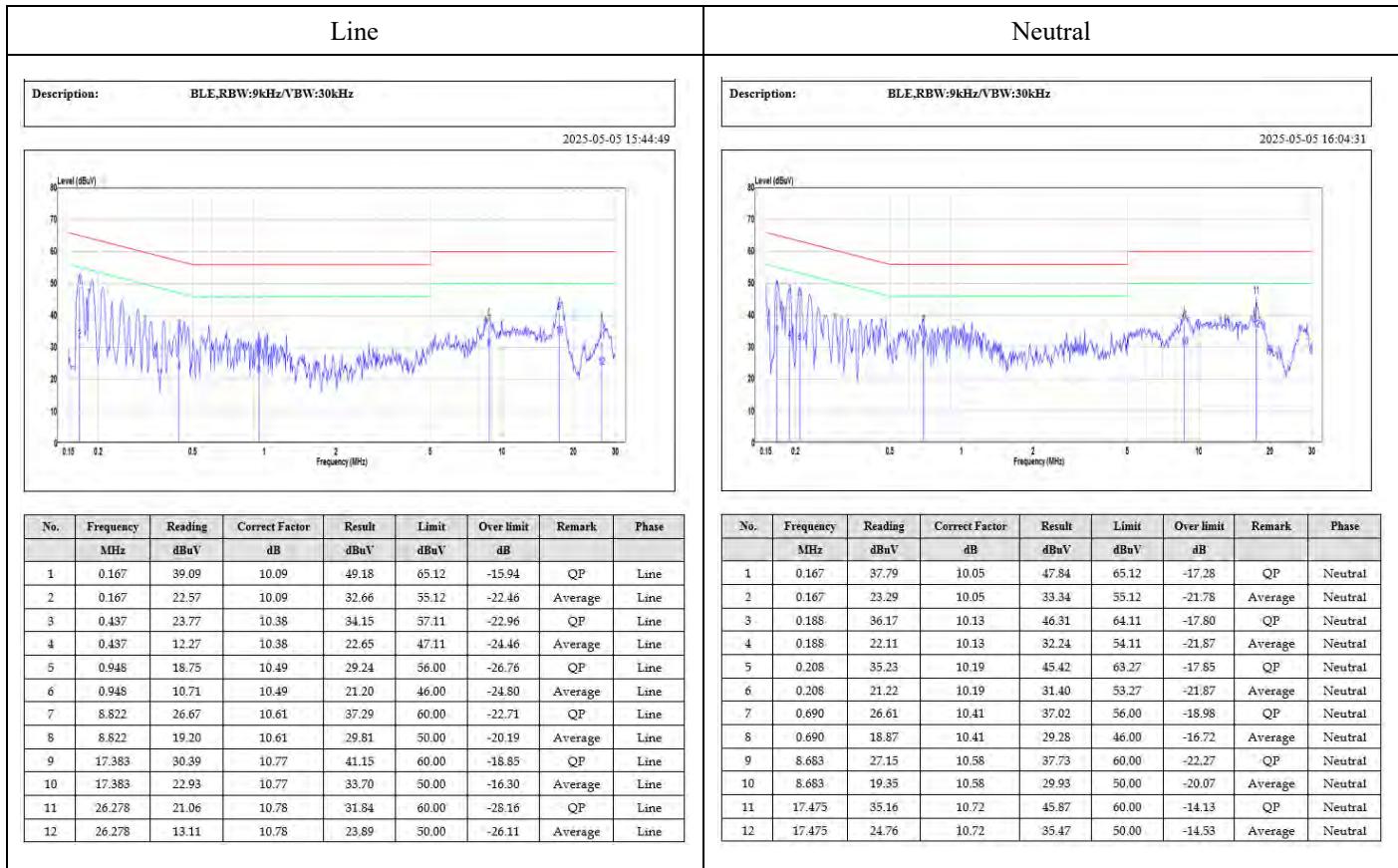
Over Limit = Result – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

BLE

(Worst case is BLE 2M mode, Low Channel)

Adapter:



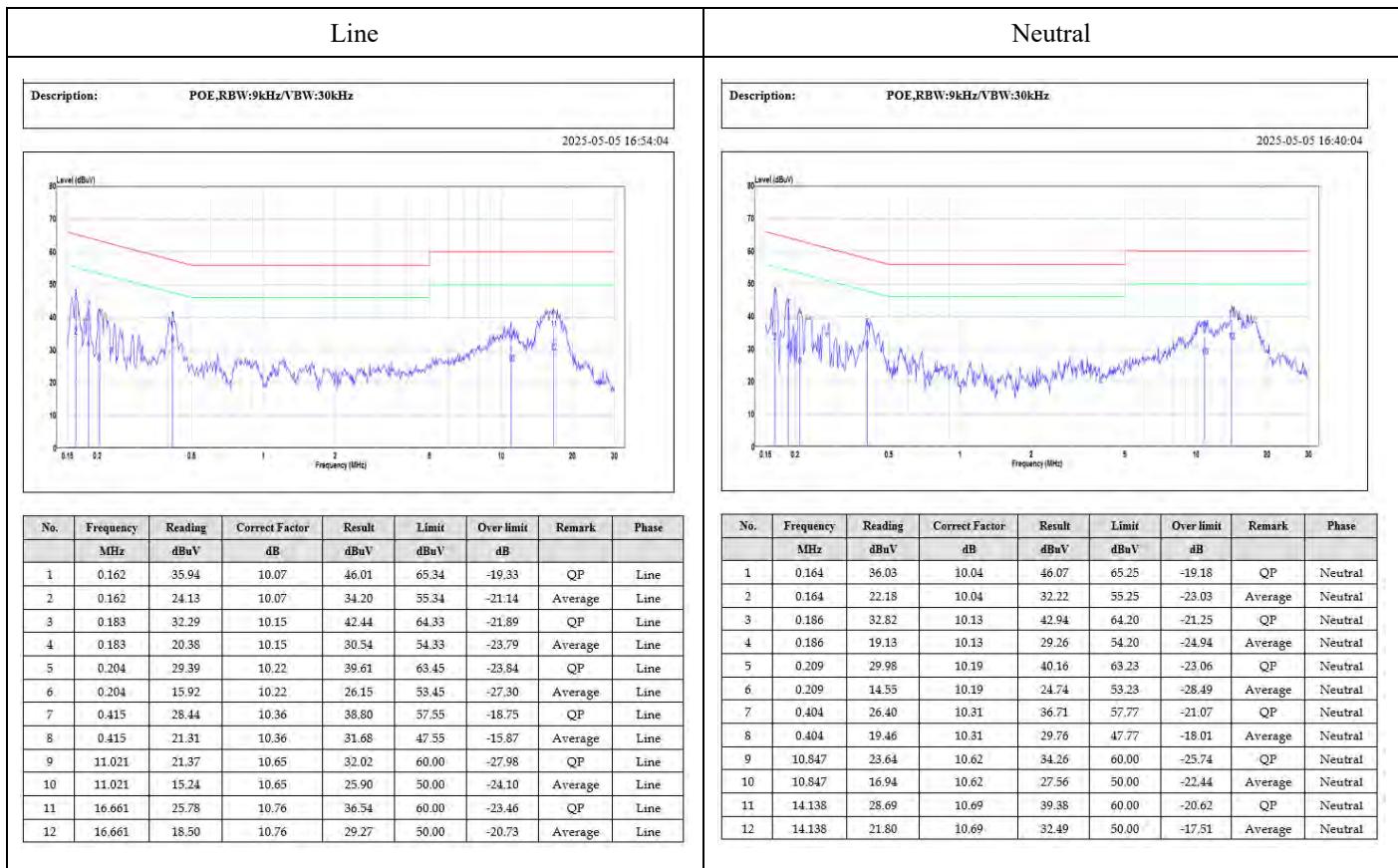
Note:

Result = Reading + Factor

Over Limit = Result – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

POE:



Note:

Result = Reading + 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 §5.5, 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) and RSS-GEN §8.9: 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 (μ V/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) (μ A/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 C63.10-2013, 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 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).

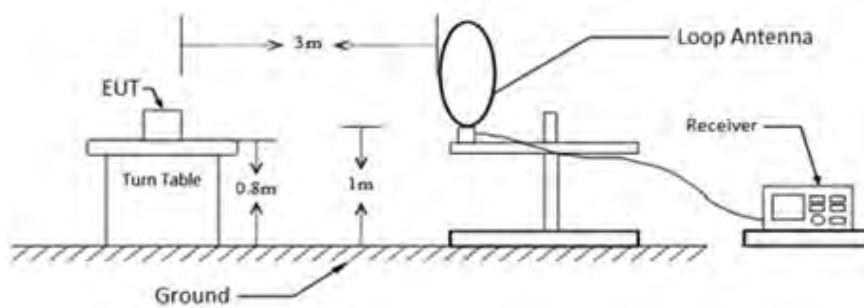
As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the 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 5.5,

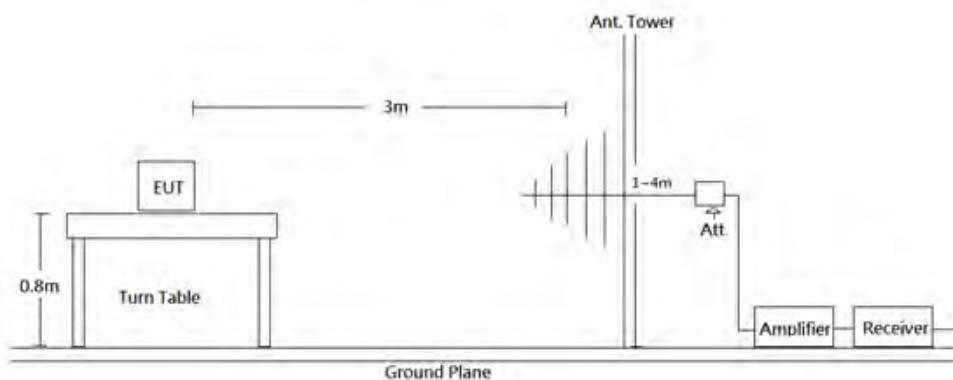
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either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

7.2 EUT Setup

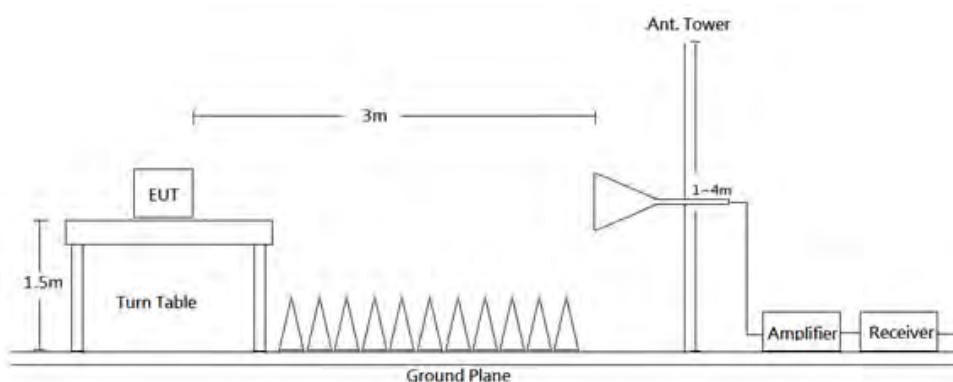
9kHz-30MHz:



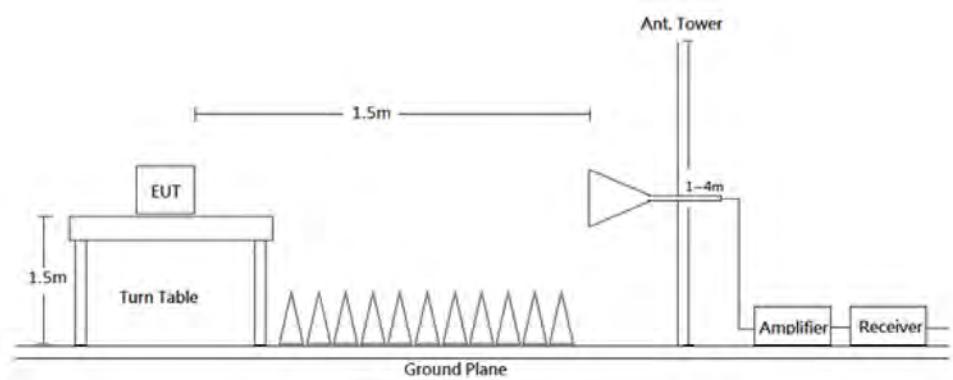
30MHz-1GHz:



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 C63.10-2013. The specification used was the FCC Part 15.209, FCC 15.247 and RSS-Gen, RSS-247 Limits.

7.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz 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	VBW	Duty cycle	Measurement method	Detector
9 kHz - 150 kHz	200 Hz/300 Hz	1 kHz	/	QP/AV	QP/AV
150 kHz - 30 MHz	9 kHz/10 kHz	30 kHz	/	QP/AV	QP/AV
30-1000 MHz	100 kHz	300 kHz	/	QP	QP
Pre-scan :					
Above 1 GHz	1 MHz	3 MHz	/	PK	PK
	1 MHz	1 kHz	>98%	Ave	PK
	1 MHz	≥ 1/Ton, not less than 1 kHz	<98%	Ave	PK
Final measurement for emission identified during pre-scan :					
Above 1 GHz	1 MHz	3 MHz	/	PK	PK
	1 MHz	10 Hz	>98%	Ave	PK
	1 MHz	≥ 1/Ton	<98%	Ave	PK

Note: T is minimum transmission duration

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:

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

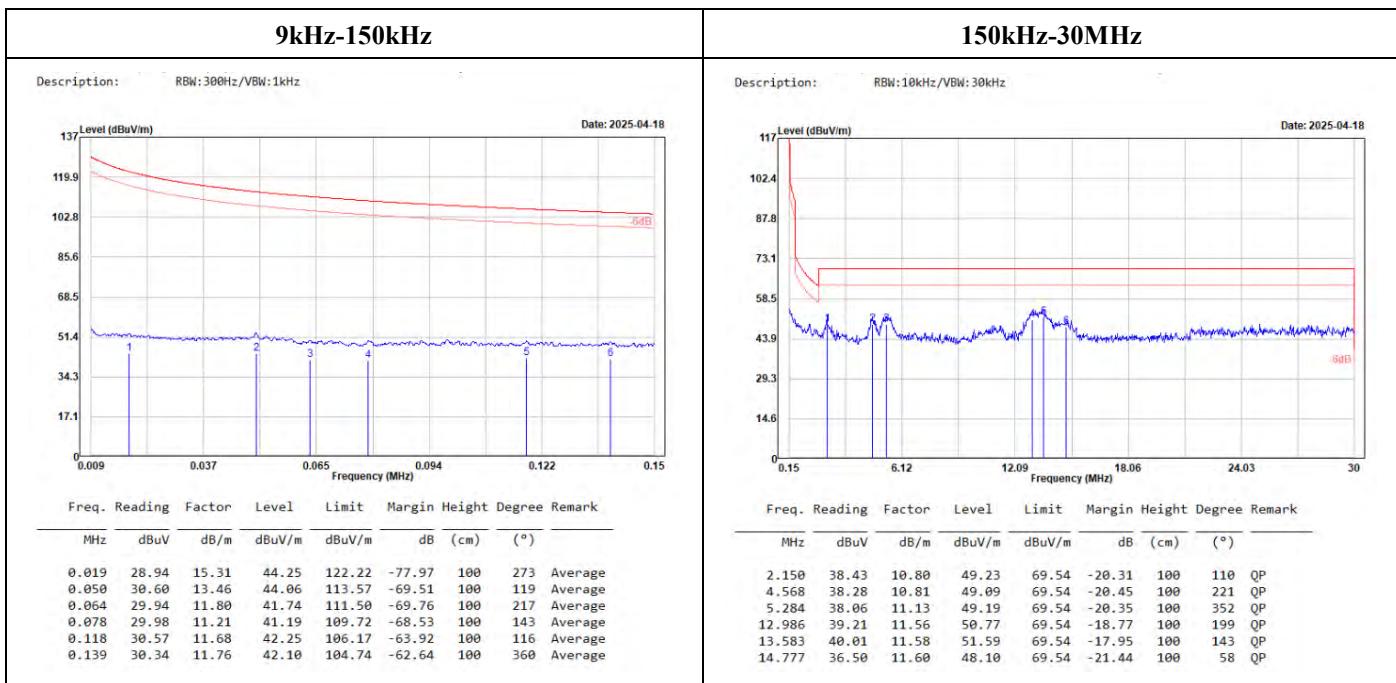
7.6 Test Results

Test Mode: Transmitting
(Use Y axis test)

WIFI 2.4G

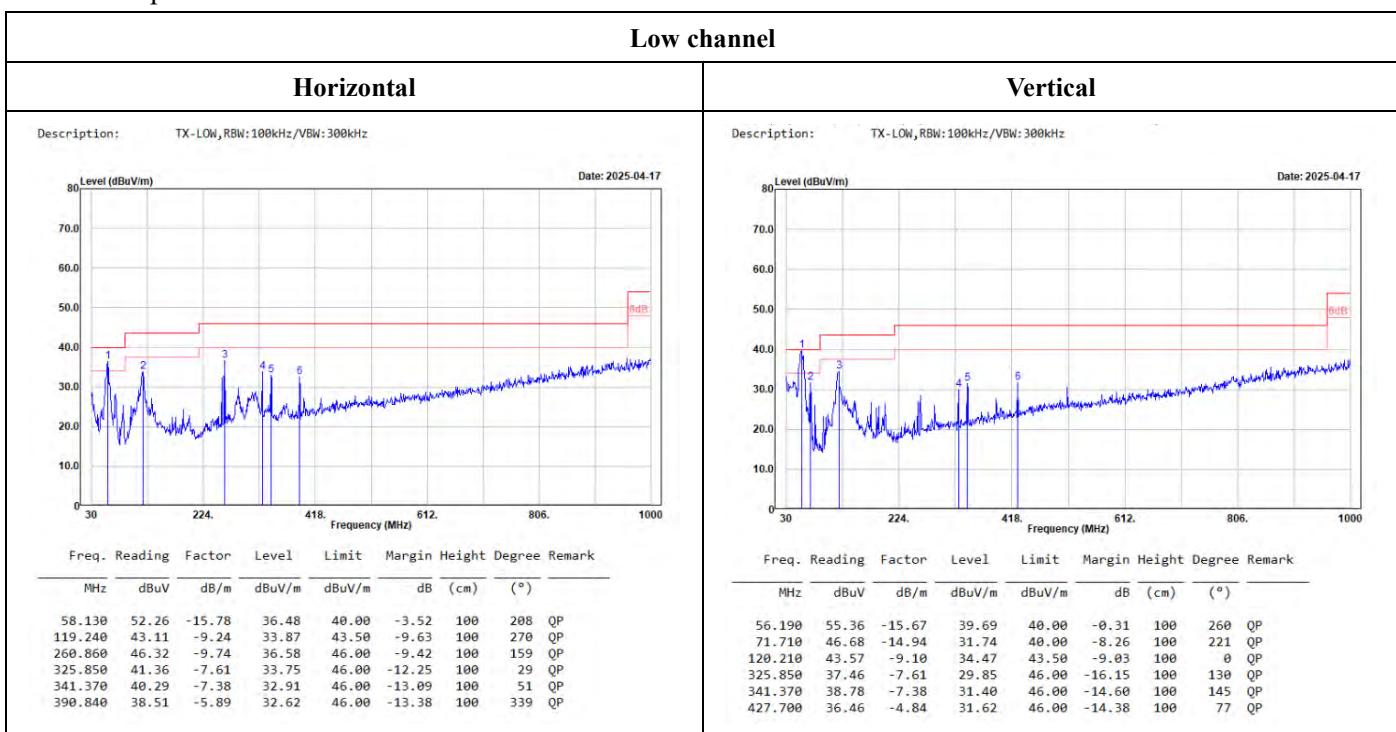
9kHz-30MHz: (Worst case is 802.11n HT20 mode low channel)

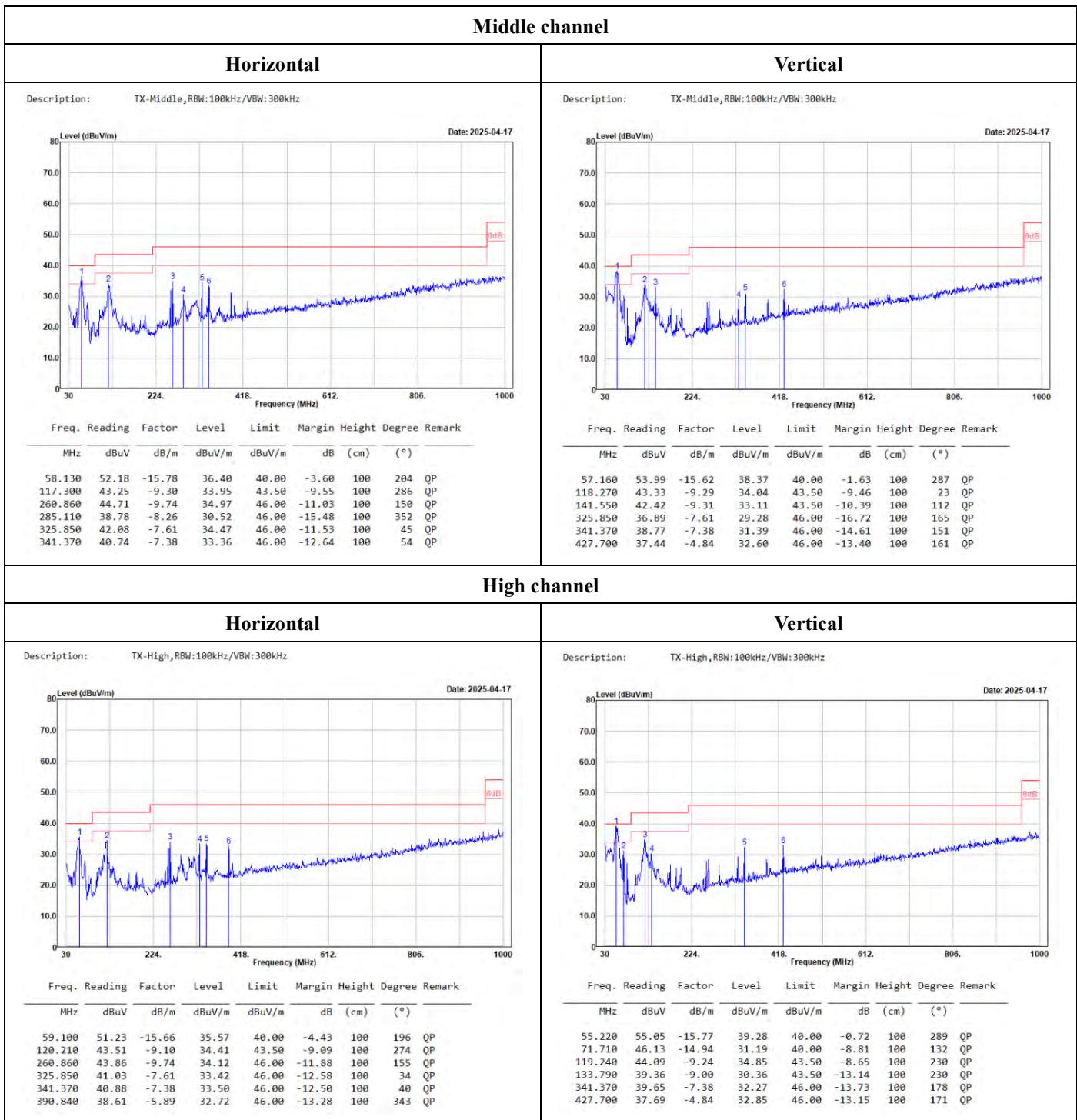
(Pre-scan using three directional polarities, worst case as parallel.)



30MHz-1GHz: (Worst case is 802.11n HT20 mode)

Adapter Mode:



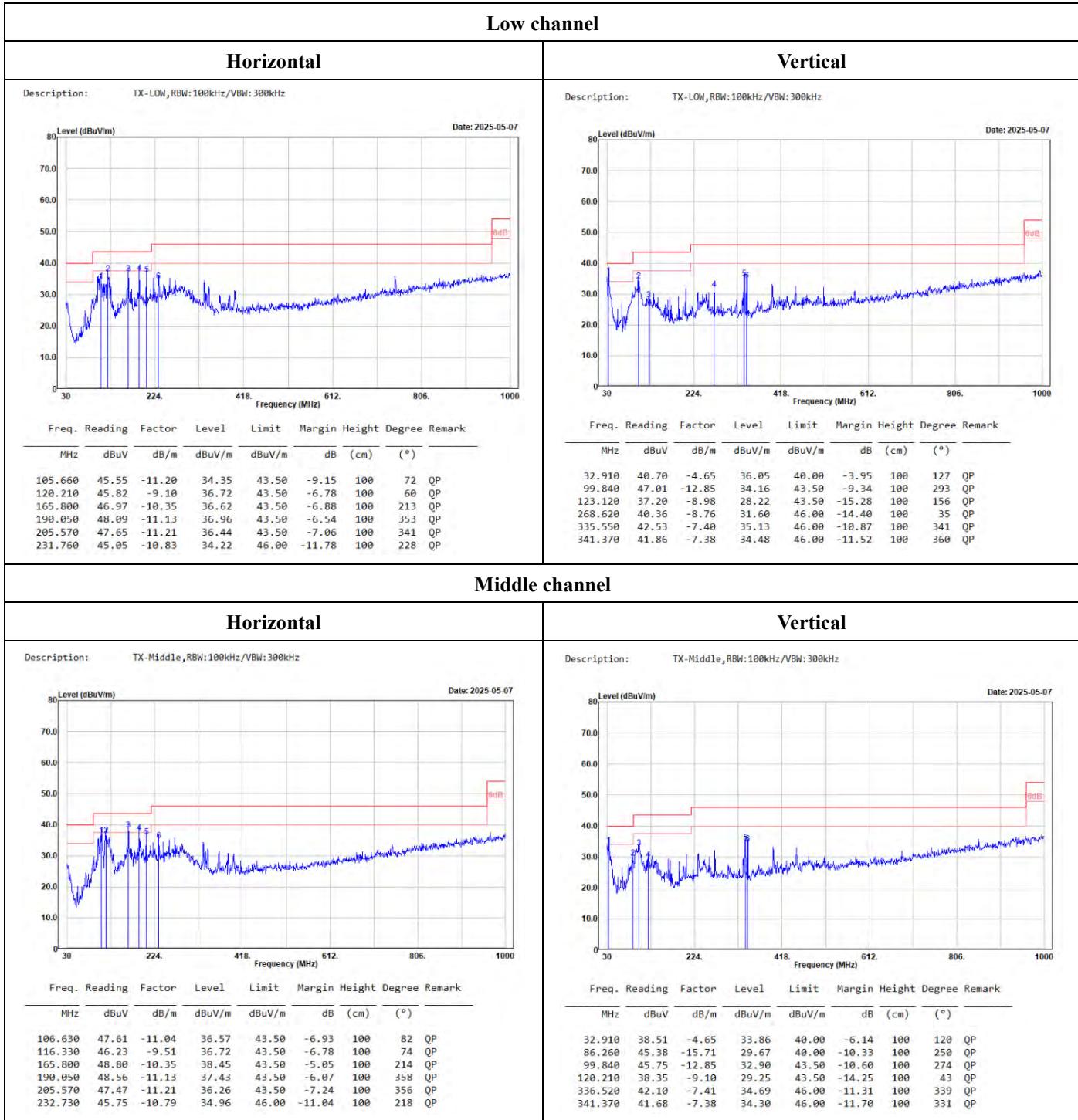


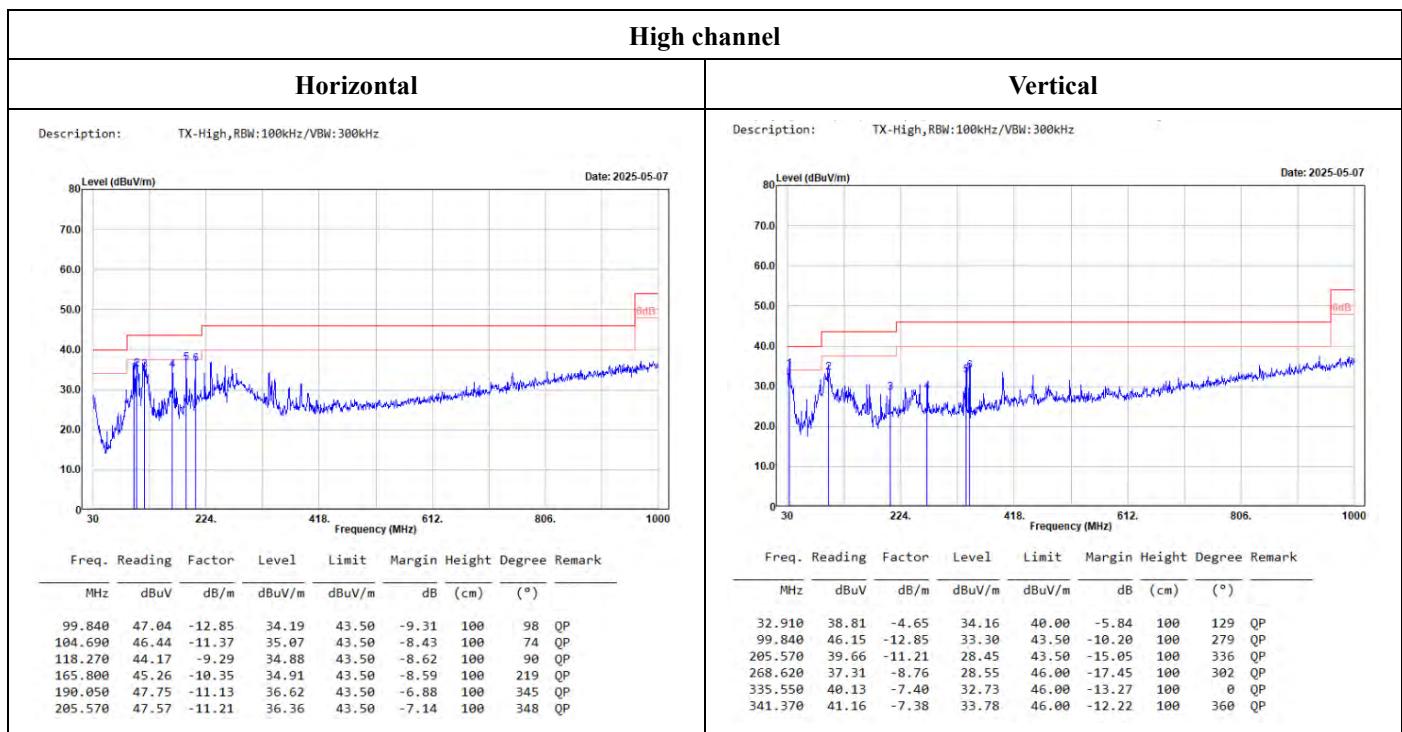
Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

POE:





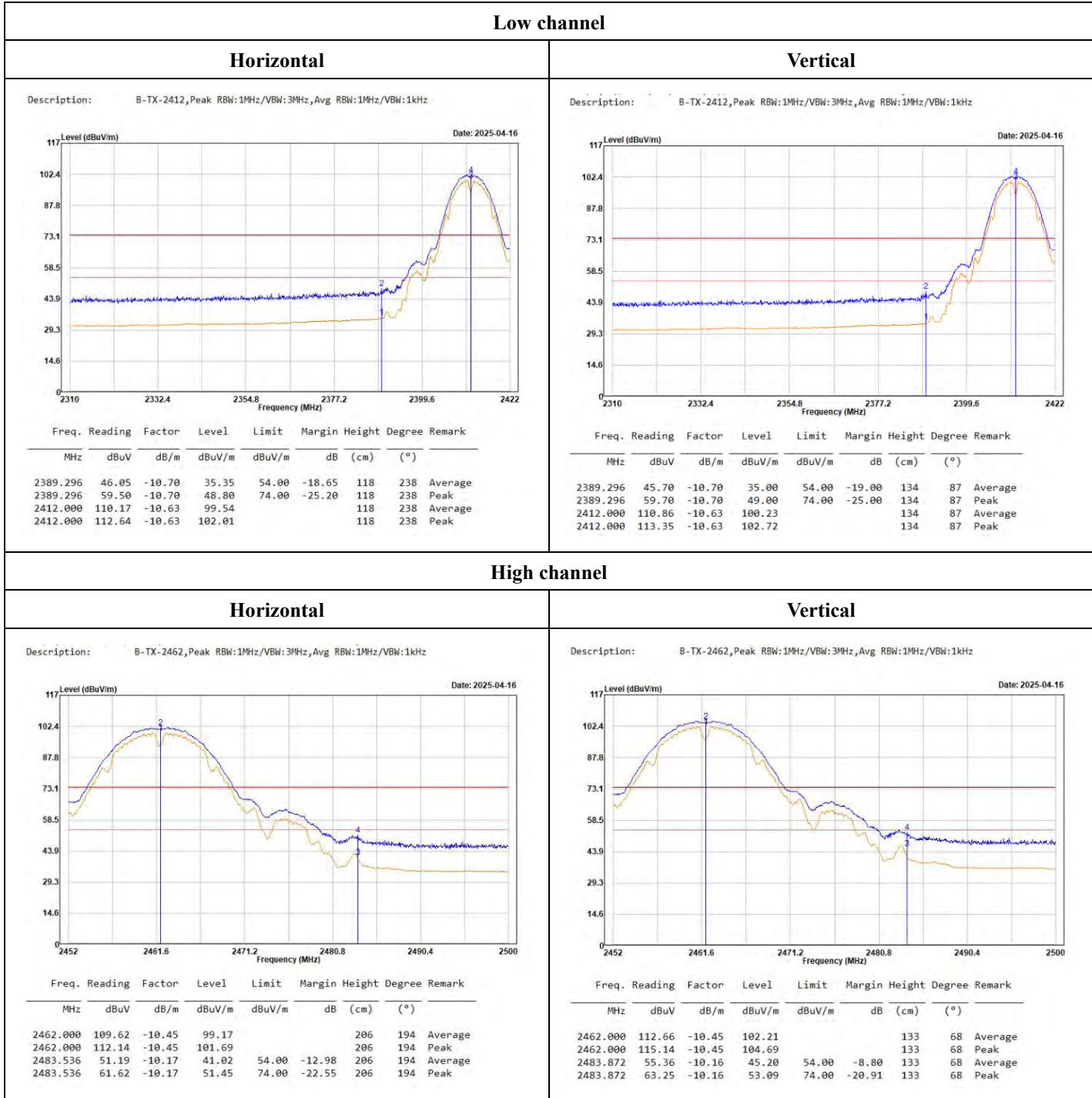
Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

Band-Edge:

802.11b Mode

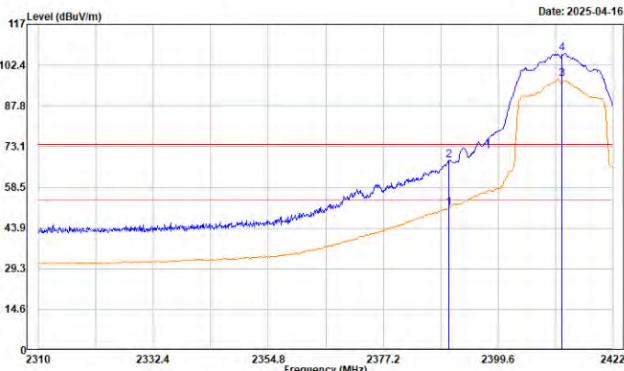


802.11g Mode

Low channel

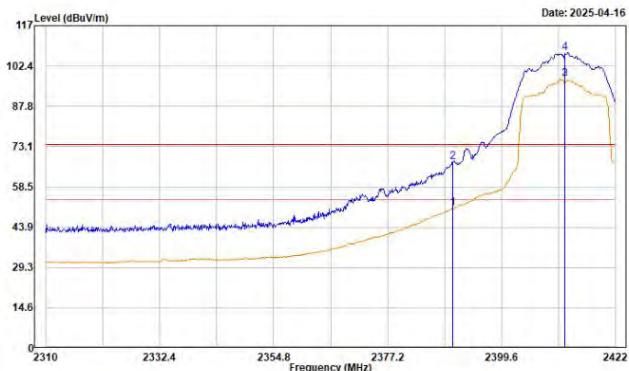
Horizontal

Description: G-TX-2412, 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)	(°)	
2389.968	61.74	-10.70	51.04	54.00	-2.96	116	236	Average
2389.968	78.93	-10.70	68.23	74.00	-5.77	116	236	Peak
2412.000	107.83	-10.63	97.20			116	236	Average
2412.000	117.19	-10.63	106.56			116	236	Peak

Description: G-TX-2412, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz

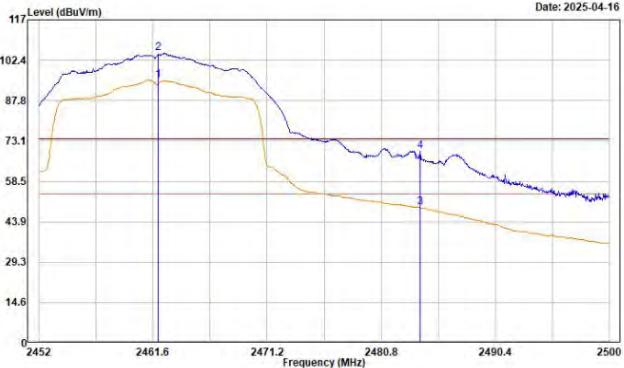


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2389.968	61.42	-10.70	50.72	54.00	-3.28	162	67	Average
2389.968	78.23	-10.70	67.53	74.00	-6.47	162	67	Peak
2412.000	108.26	-10.63	97.63			162	67	Average
2412.000	117.75	-10.63	107.12			162	67	Peak

High channel

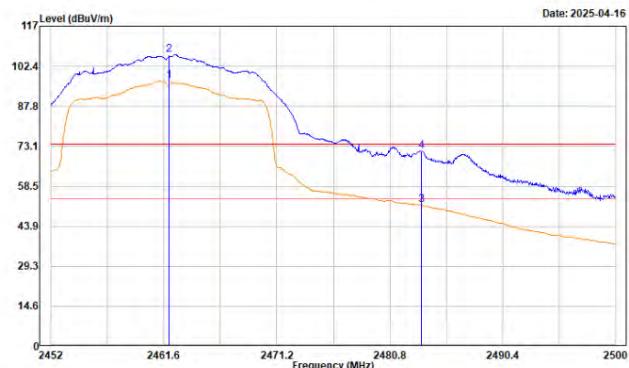
Horizontal

Description: G-TX-2462, 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)	(°)	
2462.000	105.71	-10.45	95.26		204	196	196	Average
2462.000	115.27	-10.45	104.82		204	196	196	Peak
2484.064	59.37	-10.16	49.21	54.00	-4.79	204	196	Average
2484.064	79.49	-10.16	69.33	74.00	-4.67	204	196	Peak

Description: G-TX-2462, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz



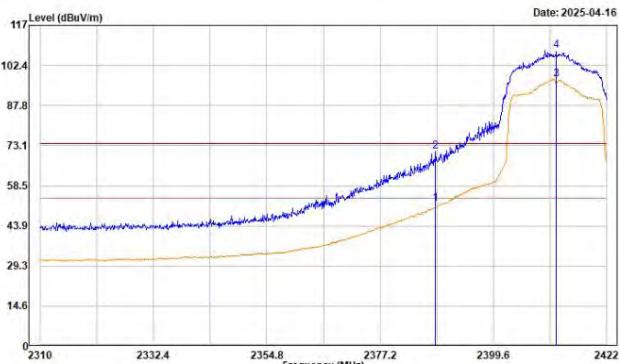
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	107.45	-10.45	97.00			262	161	Average
2462.000	116.96	-10.45	106.51			262	161	Peak
2483.500	61.78	-10.17	51.61	54.00	-2.39	262	161	Average
2483.500	81.57	-10.17	71.40	74.00	-2.60	262	161	Peak

802.11n HT20 Mode

Low channel

Horizontal

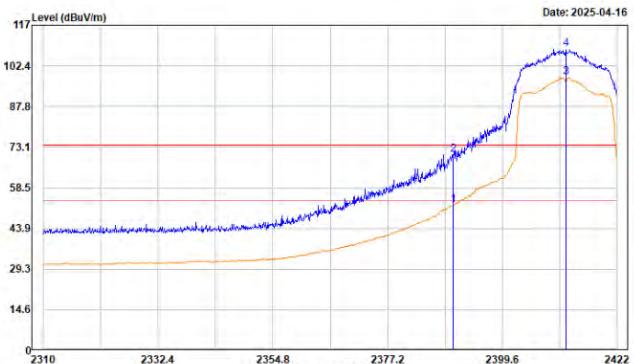
Description: N20-TX-2412, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz



Freq. Reading Factor Level Limit Margin Height Degree Remark

MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2388.176	62.84	-18.71	52.13	54.00	-1.87	121	236	Average
2388.176	81.86	-18.71	71.15	74.00	-2.85	121	236	Peak
2412.000	187.93	-18.63	97.30			121	236	Average
2412.000	118.45	-18.63	107.82			121	236	Peak

Description: N20-TX-2412, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz



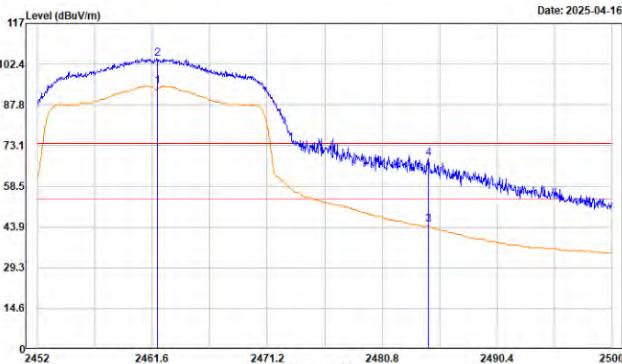
Freq. Reading Factor Level Limit Margin Height Degree Remark

MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2389.968	62.98	-10.70	52.28	54.00	-1.72	103	67	Average
2389.968	81.24	-10.70	70.54	74.00	-3.46	103	67	Peak
2412.000	108.77	-10.63	98.14			103	67	Average
2412.000	119.11	-10.63	108.48			103	67	Peak

High channel

Horizontal

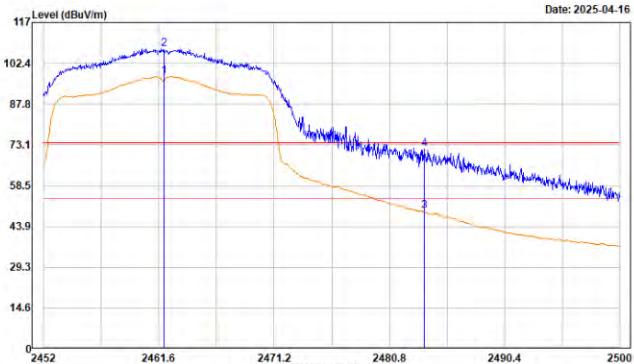
Description: N20-TX-2462, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz



Freq. Reading Factor Level Limit Margin Height Degree Remark

MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	104.87	-10.45	94.42		212	195	212	Average
2462.000	114.91	-10.45	104.46		212	195	212	Peak
2484.688	54.86	-10.15	44.71	54.00	-9.29	212	195	Average
2484.688	78.71	-10.15	68.56	74.00	-5.44	212	195	Peak

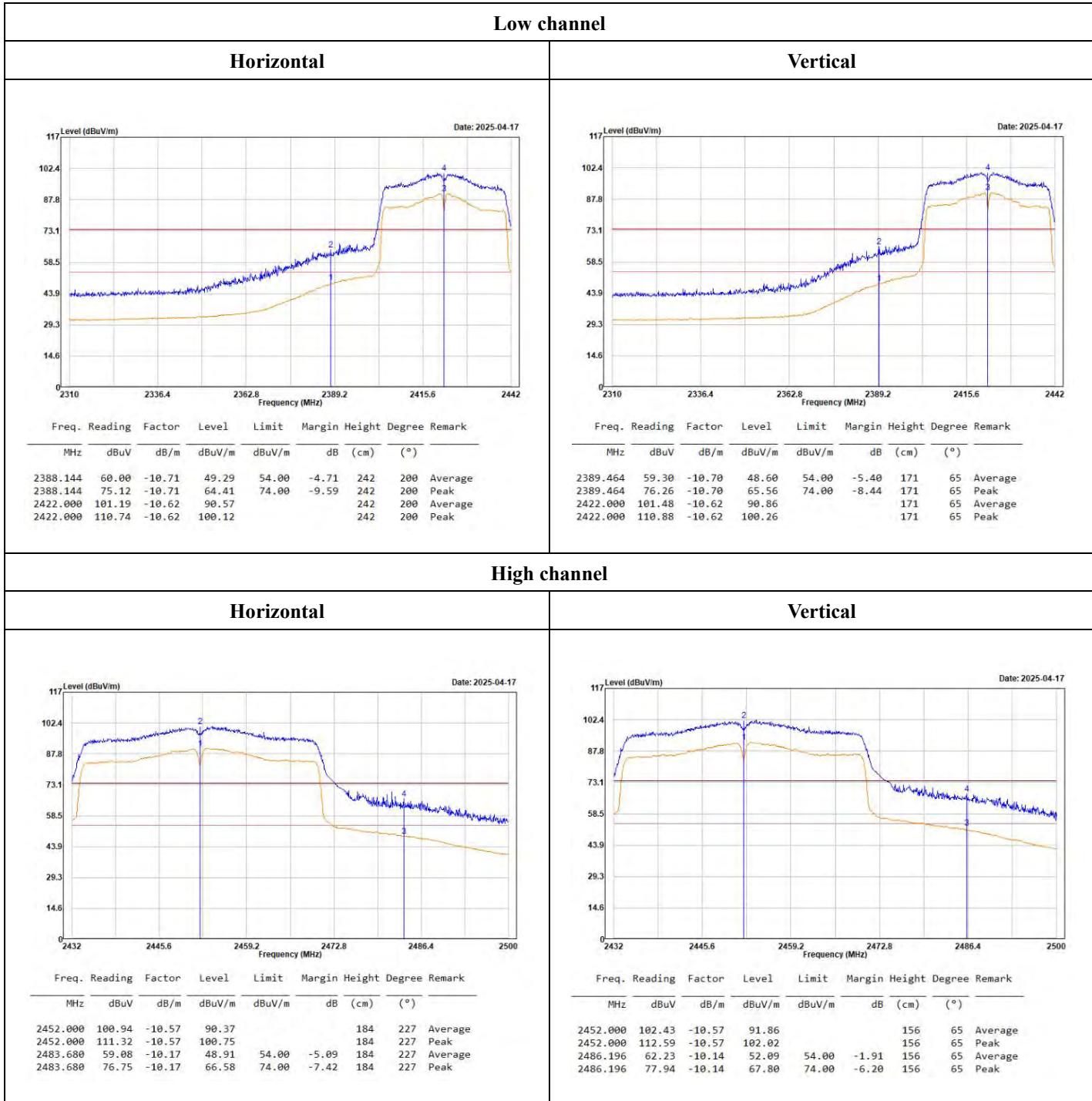
Description: N20-TX-2462, Peak RBW:1MHz/VBW:3MHz, Avg RBW:1MHz/VBW:1kHz



Freq. Reading Factor Level Limit Margin Height Degree Remark

MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	108.10	-10.45	97.65		127	67	127	Average
2462.000	117.91	-10.45	107.46		127	67	127	Peak
2483.728	59.59	-10.17	49.42	54.00	-4.58	127	67	Average
2483.728	81.84	-10.17	71.67	74.00	-2.33	127	67	Peak

802.11n HT40 Mode



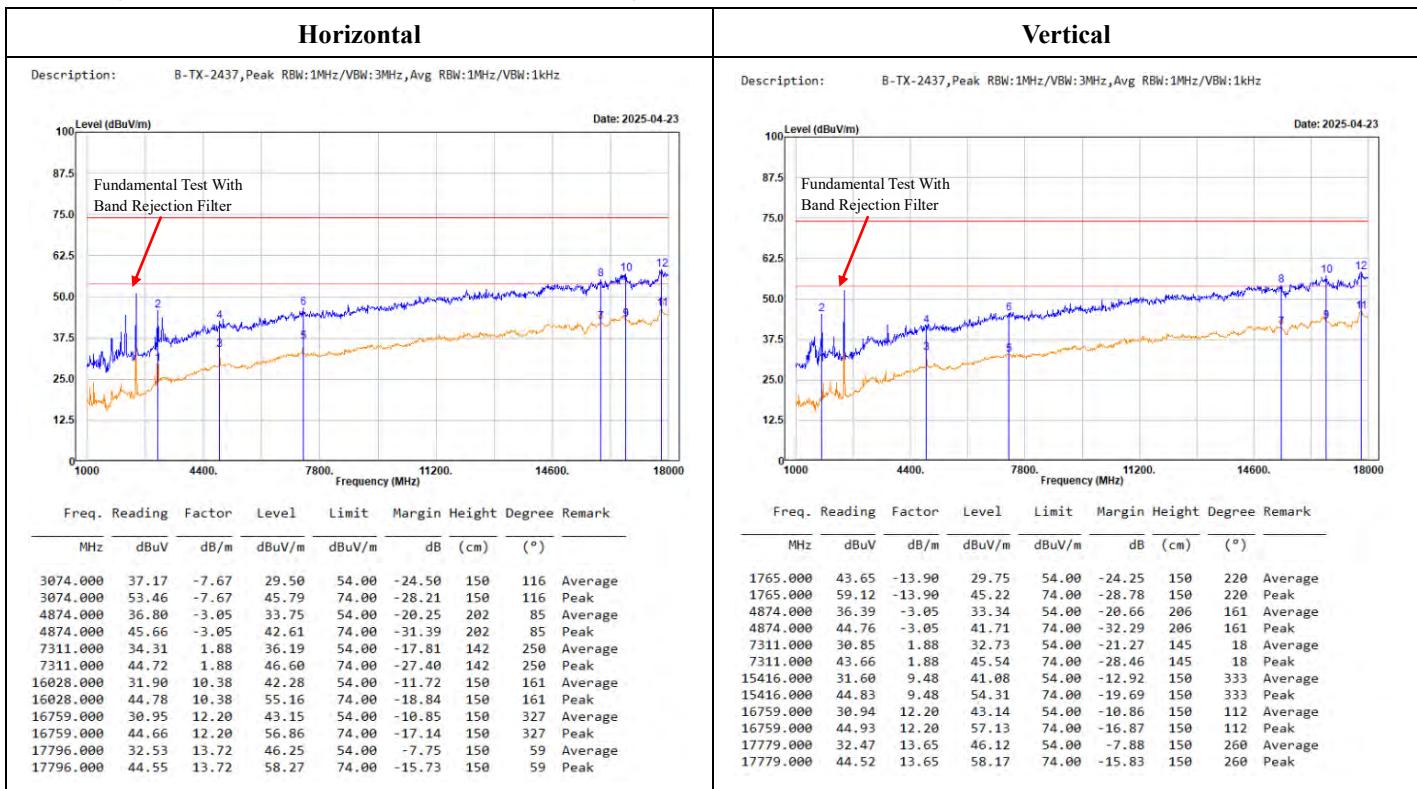
Level = Reading + Factor.

Margin = Level - Limit.

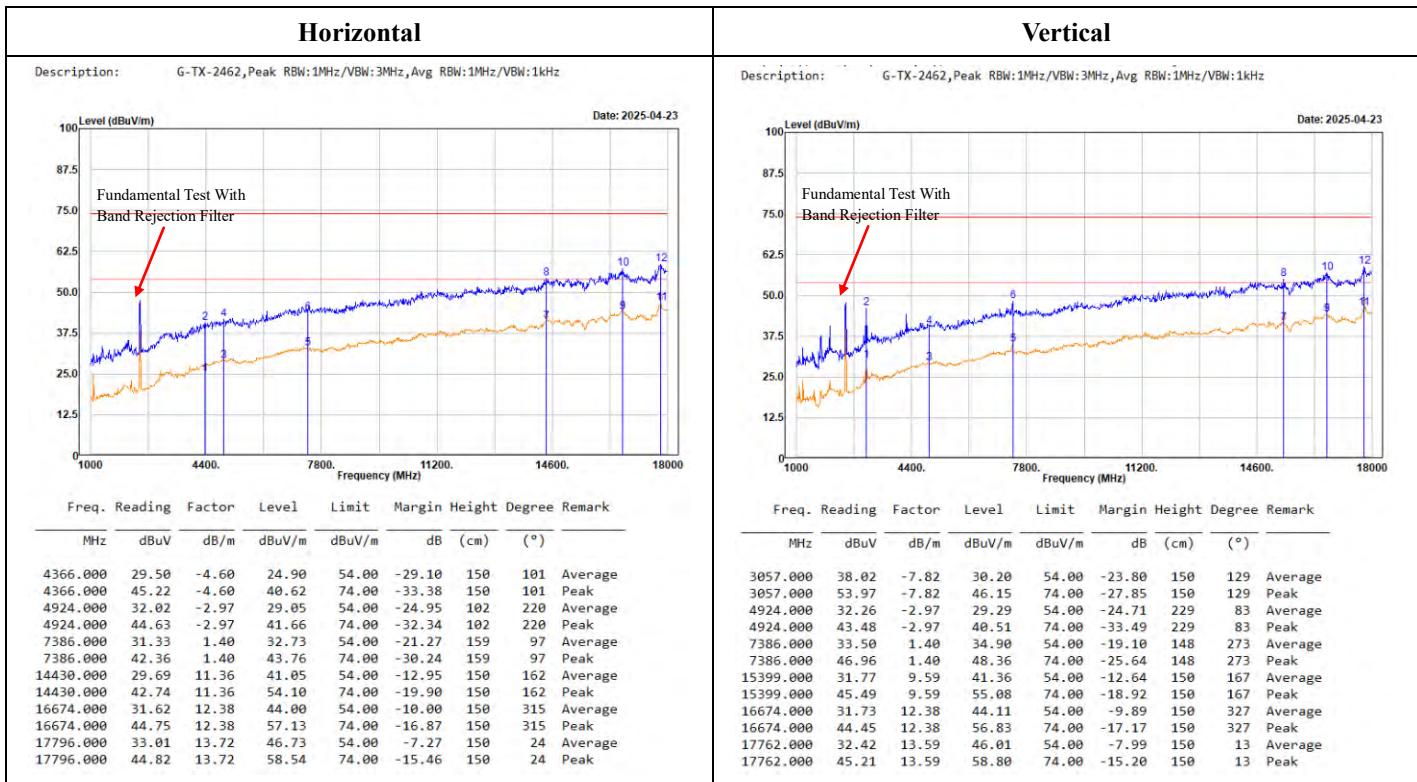
Factor = Antenna Factor + Cable Loss - Amplifier Gain.

1GHz-18GHz:

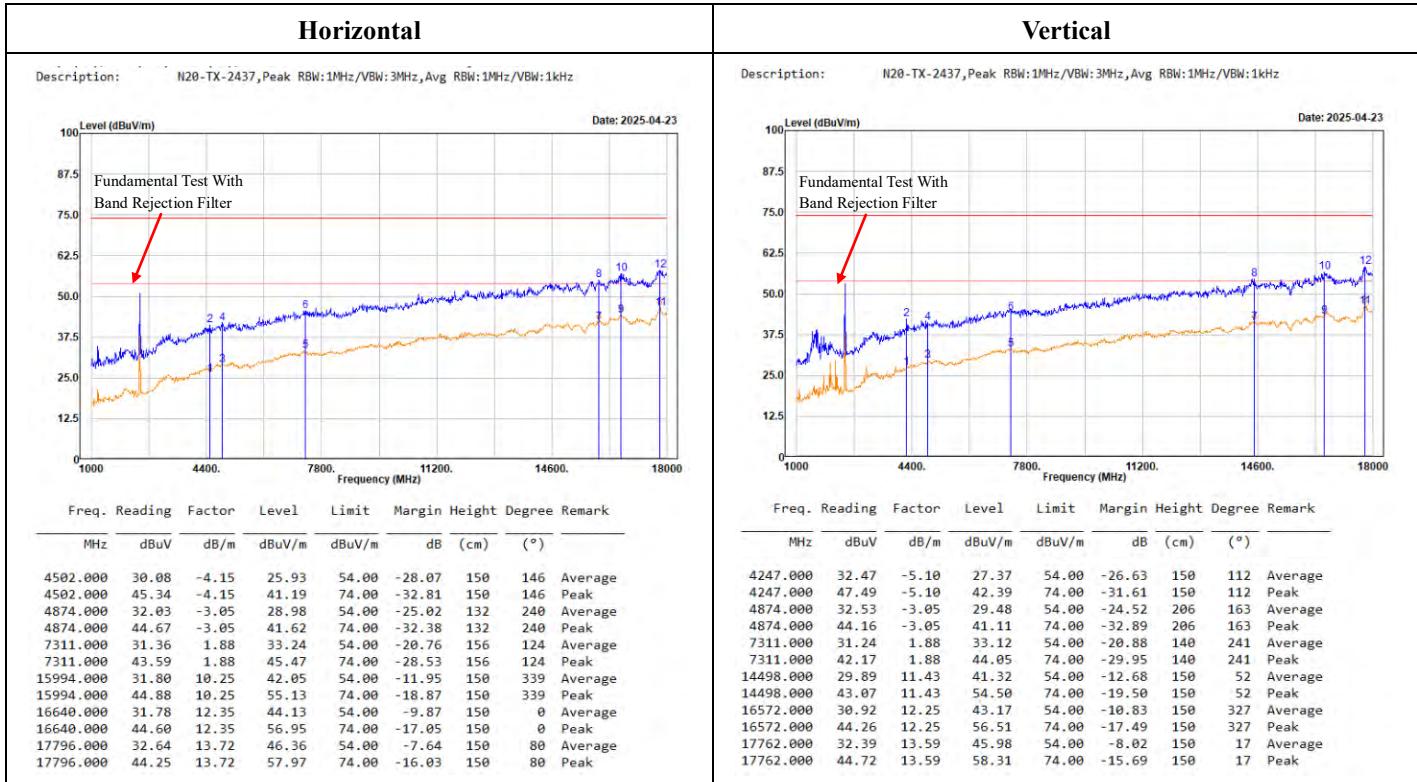
(802.11b mode worst case is middle channel)



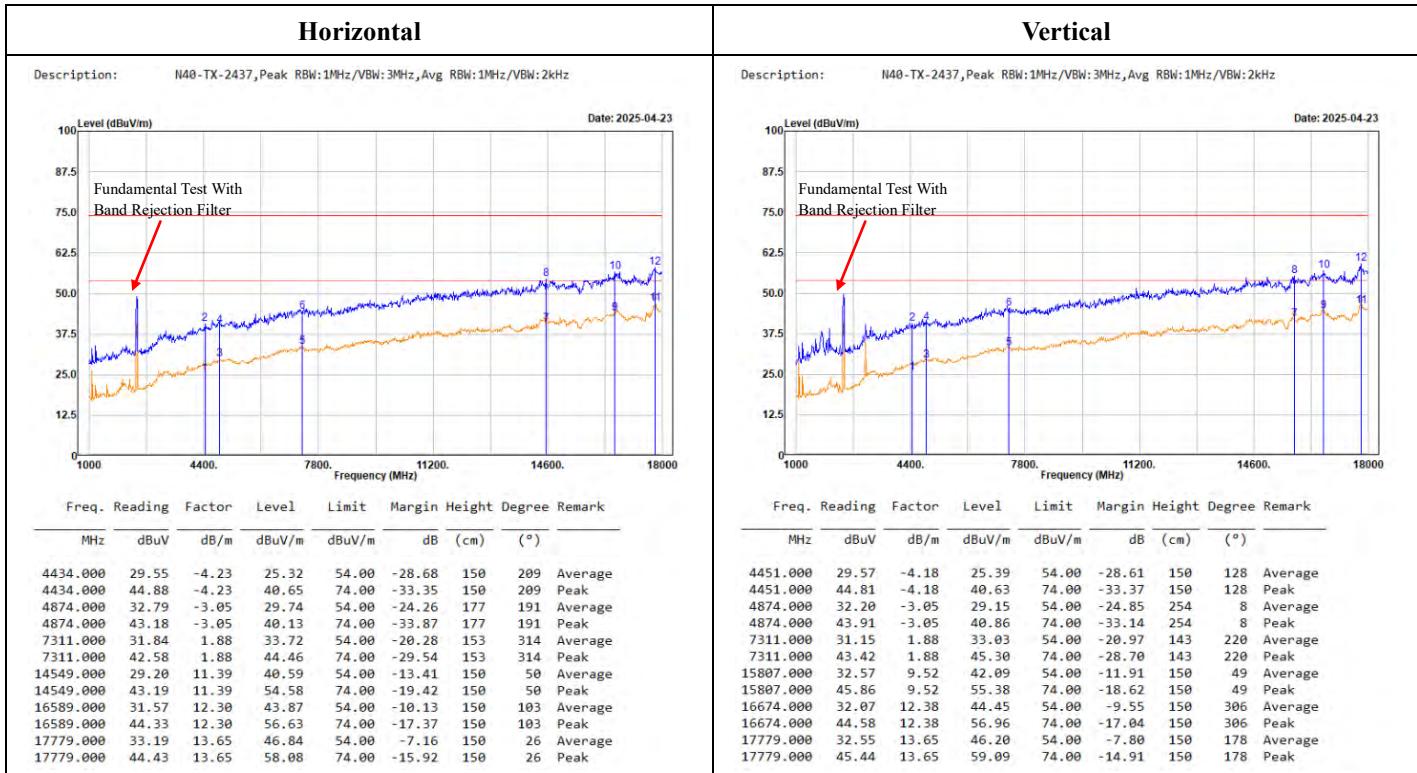
(802.11g mode worst case is high channel)



(802.11n HT20 mode worst case is middle channel)



(802.11n HT40 mode worst case is middle channel)



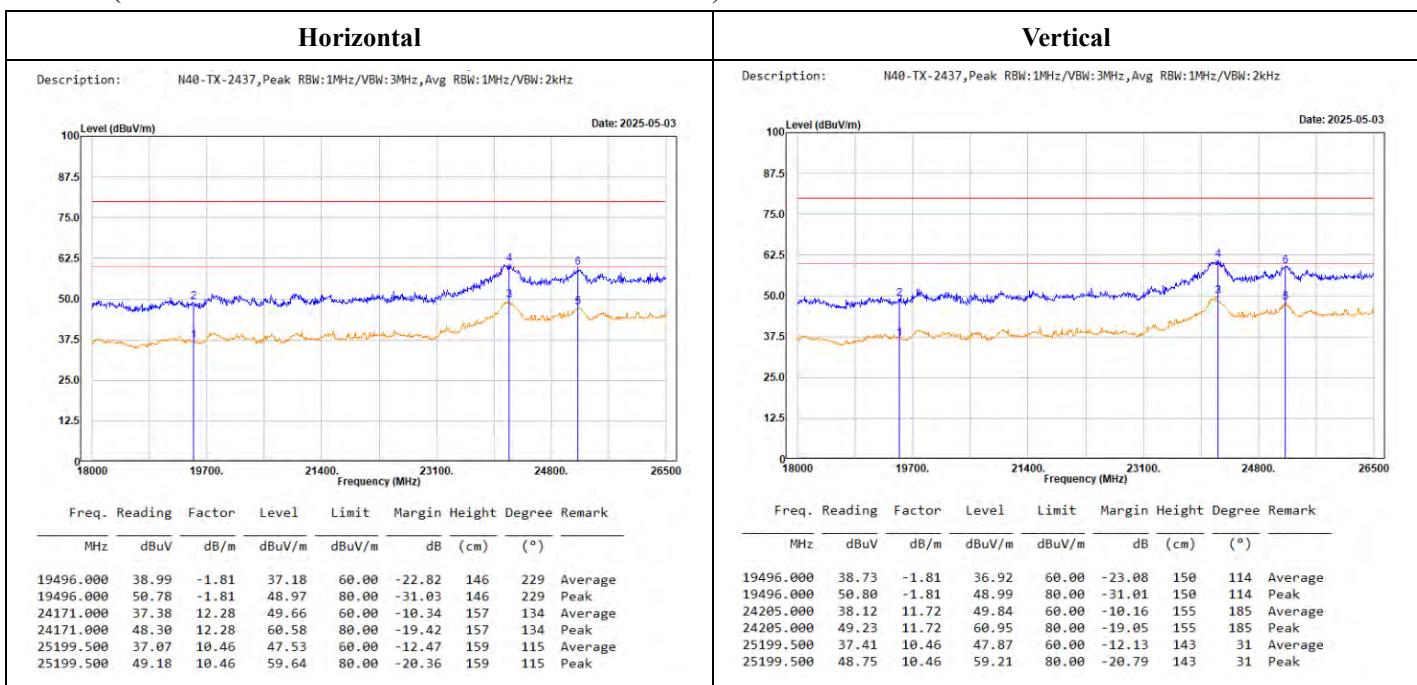
Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

18GHz-26.5GHz:

(worst case is 802.11n HT40 mode Middle 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 1.5 meter:

Conversion factor = $20 \log (1.5m/3m) = 6 \text{ dB}$,Average Limit = $54+6 = 60 \text{ dBuV/m@1.5m}$, Peak Limit = $60+20 = 80 \text{ dBuV/m@1.5m}$

Above 1GHz**802.11b Mode:**

Low channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
1714.000	44.80	-14.32	30.48	54.00	-23.52	150	49	Average	
1714.000	60.09	-14.32	45.77	74.00	-28.23	150	49	Peak	
4824.000	32.33	-3.44	28.89	54.00	-25.11	114	236	Average	
4824.000	43.62	-3.44	40.18	74.00	-33.82	114	236	Peak	
7236.000	31.17	1.85	33.02	54.00	-28.98	159	145	Average	
7236.000	42.98	1.85	44.75	74.00	-29.25	159	145	Peak	
14651.000	29.68	11.35	41.03	54.00	-12.97	150	96	Average	
14651.000	43.31	11.35	54.66	74.00	-19.34	150	96	Peak	
16657.000	31.98	12.36	44.26	54.00	-9.74	150	177	Average	
16657.000	44.09	12.36	56.45	74.00	-17.55	150	177	Peak	
17745.000	32.31	13.52	45.83	54.00	-8.17	150	315	Average	
17745.000	44.54	13.52	58.06	74.00	-15.94	150	315	Peak	
3074.000	36.55	-7.67	28.88	54.00	-25.12	150	123	Average	
3074.000	52.67	-7.67	45.00	74.00	-29.00	150	123	Peak	
4824.000	33.93	-3.44	30.49	54.00	-23.51	177	83	Average	
4824.000	44.85	-3.44	41.41	74.00	-32.59	177	83	Peak	
7236.000	33.21	1.85	35.06	54.00	-18.94	141	283	Average	
7236.000	44.55	1.85	46.40	74.00	-27.60	141	283	Peak	
15739.000	32.27	9.18	41.45	54.00	-12.55	150	183	Average	
15739.000	45.79	9.18	54.97	74.00	-19.03	150	183	Peak	
16708.000	31.32	12.37	43.69	54.00	-10.31	150	301	Average	
16708.000	44.74	12.37	57.11	74.00	-16.89	150	301	Peak	
17796.000	32.51	13.72	46.23	54.00	-7.77	150	21	Average	
17796.000	45.28	13.72	59.00	74.00	-15.00	150	21	Peak	
Middle channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
3074.000	37.17	-7.67	29.50	54.00	-24.50	150	116	Average	
3074.000	53.46	-7.67	45.79	74.00	-28.21	150	116	Peak	
4874.000	36.88	-3.05	33.75	54.00	-20.25	202	85	Average	
4874.000	45.66	-3.05	42.61	74.00	-31.39	202	85	Peak	
7311.000	34.31	1.88	36.19	54.00	-17.81	142	250	Average	
7311.000	44.72	1.88	46.60	74.00	-27.40	142	250	Peak	
16028.000	31.90	10.38	42.28	54.00	-11.72	150	161	Average	
16028.000	44.78	10.38	55.16	74.00	-18.84	150	161	Peak	
16759.000	30.95	12.20	43.15	54.00	-10.85	150	327	Average	
16759.000	44.66	12.20	56.86	74.00	-17.14	150	327	Peak	
17796.000	32.53	13.72	46.25	54.00	-7.75	150	59	Average	
17796.000	44.55	13.72	58.27	74.00	-15.73	150	59	Peak	
1765.000	43.65	-13.90	29.75	54.00	-24.25	150	220	Average	
1765.000	59.12	-13.90	45.22	74.00	-28.78	150	220	Peak	
4874.000	36.39	-3.05	33.34	54.00	-20.66	206	161	Average	
7311.000	30.85	1.88	32.73	54.00	-21.27	145	18	Average	
7311.000	43.66	1.88	45.54	74.00	-28.46	145	18	Peak	
15416.000	31.60	9.48	41.08	54.00	-12.92	150	333	Average	
15416.000	44.83	9.48	54.31	74.00	-19.69	150	333	Peak	
16759.000	30.94	12.20	43.14	54.00	-10.86	150	112	Average	
16759.000	44.93	12.20	57.13	74.00	-16.87	150	112	Peak	
17779.000	32.47	13.65	46.12	54.00	-7.88	150	260	Average	
17779.000	44.52	13.65	58.17	74.00	-15.83	150	260	Peak	
High channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4179.000	31.83	-5.39	26.44	54.00	-27.56	150	128	Average	
4179.000	47.56	-5.39	42.17	74.00	-31.83	150	128	Peak	
4924.000	31.43	-2.97	28.46	54.00	-25.54	188	193	Average	
4924.000	45.57	-2.97	42.60	74.00	-31.40	188	193	Peak	
7386.000	27.06	1.40	28.46	54.00	-25.54	157	37	Average	
7386.000	43.85	1.40	45.25	74.00	-28.75	157	37	Peak	
15416.000	25.66	9.48	35.14	54.00	-18.86	150	185	Average	
15416.000	45.03	9.48	54.51	74.00	-19.49	150	185	Peak	
16623.000	28.89	12.34	41.23	54.00	-12.77	150	338	Average	
16623.000	44.76	12.34	57.10	74.00	-16.90	150	338	Peak	
17762.000	30.24	13.59	43.83	54.00	-10.17	150	93	Average	
17762.000	44.73	13.59	58.32	74.00	-15.68	150	93	Peak	
3074.000	39.98	-7.67	32.31	54.00	-21.69	150	137	Average	
3074.000	55.59	-7.67	47.92	74.00	-26.08	150	137	Peak	
4924.000	38.00	-2.97	35.03	54.00	-18.97	211	100	Average	
4924.000	46.12	-2.97	43.15	74.00	-30.85	211	100	Peak	
7386.000	31.54	1.40	32.94	54.00	-21.06	146	244	Average	
7386.000	44.28	1.40	45.68	74.00	-28.32	146	244	Peak	
14549.000	29.49	11.39	40.88	54.00	-13.12	150	64	Average	
14549.000	42.50	11.39	53.89	74.00	-20.11	150	64	Peak	
16691.000	31.35	12.39	43.74	54.00	-10.26	150	318	Average	
16691.000	44.73	12.39	57.12	74.00	-16.88	150	318	Peak	
17762.000	32.51	13.59	46.10	54.00	-7.90	150	36	Average	
17762.000	45.14	13.59	58.73	74.00	-15.27	150	36	Peak	

Note:

Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

802.11g Mode:

Low channel								
Horizontal							Vertical	
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3907.000	31.00	-6.35	24.65	54.00	-29.35	150	86	Average
3907.000	46.11	-6.35	39.76	74.00	-34.24	150	86	Peak
4824.000	32.25	-3.44	28.81	54.00	-25.19	141	235	Average
4824.000	42.74	-3.44	39.30	74.00	-34.70	141	235	Peak
7236.000	30.75	1.85	32.60	54.00	-21.40	157	132	Average
7236.000	42.47	1.85	44.32	74.00	-29.68	157	132	Peak
15785.000	32.23	8.99	41.22	54.00	-12.78	150	7	Average
15785.000	45.76	8.99	54.75	74.00	-19.25	150	7	Peak
16725.000	31.09	12.31	43.49	54.00	-10.60	150	334	Average
16725.000	44.86	12.31	57.17	74.00	-16.83	150	334	Peak
17949.000	30.21	14.46	44.67	54.00	-9.33	150	192	Average
17949.000	43.59	14.46	58.05	74.00	-15.95	150	192	Peak
4264.000	32.32	-5.01	27.31	54.00	-26.69	150	59	Average
4264.000	47.74	-5.01	42.73	74.00	-31.27	150	59	Peak
4824.000	32.47	-3.44	29.03	54.00	-24.97	238	158	Average
4824.000	44.82	-3.44	41.38	74.00	-32.62	238	158	Peak
7236.000	31.06	1.85	32.91	54.00	-21.09	141	101	Average
7236.000	42.74	1.85	44.59	74.00	-29.41	141	101	Peak
14379.000	29.93	11.22	41.15	54.00	-12.85	150	222	Average
14379.000	42.48	11.22	53.70	74.00	-20.30	150	222	Peak
16657.000	31.66	12.36	44.02	54.00	-9.98	150	309	Average
16657.000	44.55	12.36	56.91	74.00	-17.09	150	309	Peak
17745.000	32.30	13.52	45.82	54.00	-8.18	150	44	Average
17745.000	45.31	13.52	58.83	74.00	-15.17	150	44	Peak
Middle channel								
Horizontal							Vertical	
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4383.000	29.35	-4.47	24.88	54.00	-29.12	150	77	Average
4383.000	45.17	-4.47	40.70	74.00	-33.30	150	77	Peak
4874.000	32.41	-3.05	29.36	54.00	-24.64	174	194	Average
4874.000	44.19	-3.05	41.14	74.00	-32.86	174	194	Peak
7311.000	31.79	1.88	33.67	54.00	-20.33	155	264	Average
7311.000	42.07	1.88	43.95	74.00	-30.05	155	264	Peak
14736.000	29.48	11.33	40.81	54.00	-13.19	150	149	Average
14736.000	43.07	11.33	54.40	74.00	-19.60	150	149	Peak
16640.000	31.80	12.35	44.15	54.00	-9.85	150	307	Average
16640.000	44.29	12.35	56.64	74.00	-17.36	150	307	Peak
17779.000	32.65	13.65	46.30	54.00	-7.70	150	1	Average
17779.000	44.32	13.65	57.97	74.00	-16.03	150	1	Peak
4247.000	32.46	-5.10	27.36	54.00	-26.64	150	68	Average
4247.000	49.27	-5.10	44.17	74.00	-29.83	150	68	Peak
4874.000	32.54	-3.05	29.49	54.00	-24.51	200	158	Average
4874.000	45.59	-3.05	42.54	74.00	-31.46	206	158	Peak
7311.000	31.34	1.88	33.22	54.00	-20.78	145	244	Average
7311.000	42.09	1.88	43.97	74.00	-30.03	145	244	Peak
14447.000	29.91	11.38	41.29	54.00	-12.71	150	113	Average
14447.000	43.03	11.38	54.41	74.00	-19.59	150	113	Peak
16453.000	31.09	11.81	42.90	54.00	-11.10	150	308	Average
16453.000	44.33	11.81	56.14	74.00	-17.86	150	308	Peak
17796.000	32.48	13.72	46.12	54.00	-7.88	150	29	Average
17796.000	44.66	13.72	58.38	74.00	-15.62	150	29	Peak
High channel								
Horizontal							Vertical	
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4366.000	29.50	-4.60	24.90	54.00	-29.10	150	101	Average
4366.000	45.22	-4.60	40.62	74.00	-33.38	150	101	Peak
4924.000	32.02	-2.97	29.05	54.00	-24.95	192	220	Average
4924.000	44.63	-2.97	41.66	74.00	-32.34	192	220	Peak
7386.000	31.33	1.40	32.73	54.00	-21.27	159	97	Average
7386.000	42.36	1.40	43.76	74.00	-30.24	159	97	Peak
14430.000	29.69	11.36	41.05	54.00	-12.95	150	162	Average
14430.000	42.74	11.36	54.10	74.00	-19.90	150	162	Peak
16674.000	31.62	12.38	44.00	54.00	-10.00	150	315	Average
16674.000	44.75	12.38	57.13	74.00	-16.87	150	315	Peak
17796.000	33.01	13.72	46.73	54.00	-7.27	150	24	Average
17796.000	44.82	13.72	58.54	74.00	-15.46	150	24	Peak
3057.000	38.02	-7.82	30.20	54.00	-23.80	150	129	Average
3057.000	53.97	-7.82	46.15	74.00	-27.85	150	129	Peak
4924.000	32.26	-2.97	29.29	54.00	-24.71	229	83	Average
4924.000	43.48	-2.97	40.51	74.00	-33.49	229	83	Peak
7386.000	33.50	1.40	34.90	54.00	-19.18	148	273	Average
7386.000	46.96	1.40	48.36	74.00	-25.64	148	273	Peak
15399.000	31.77	9.59	41.36	54.00	-12.64	150	167	Average
15399.000	45.49	9.59	55.08	74.00	-18.92	150	167	Peak
16674.000	31.73	12.38	44.11	54.00	-9.89	150	327	Average
16674.000	44.45	12.38	56.83	74.00	-17.17	150	327	Peak
17762.000	32.42	13.59	46.01	54.00	-7.99	150	13	Average
17762.000	45.21	13.59	58.80	74.00	-15.20	150	13	Peak

Note:

Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

802.11n HT20 Mode:

Low channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4366.000	29.68	-4.60	25.08	54.00	-28.92	150	133	Average	
4366.000	44.84	-4.60	40.24	74.00	-33.76	150	133	Peak	
4824.000	31.88	-3.44	28.44	54.00	-25.56	116	236	Average	
4824.000	43.26	-3.44	39.82	74.00	-34.18	116	236	Peak	
7236.000	30.79	1.85	32.64	54.00	-21.36	152	71	Average	
7236.000	41.66	1.85	43.51	74.00	-30.49	152	71	Peak	
14447.000	30.05	11.38	41.43	54.00	-12.57	150	196	Average	
14447.000	43.69	11.38	55.07	74.00	-18.93	150	196	Peak	
16453.000	31.08	11.81	42.89	54.00	-11.11	150	347	Average	
16453.000	44.33	11.81	56.14	74.00	-17.86	150	347	Peak	
17949.000	30.05	14.46	44.51	54.00	-9.49	150	30	Average	
17949.000	43.76	14.46	58.22	74.00	-15.78	150	30	Peak	
Middle channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4502.000	30.08	-4.15	25.93	54.00	-28.07	150	146	Average	
4502.000	45.34	-4.15	41.19	74.00	-32.81	150	146	Peak	
4874.000	32.03	-3.05	28.98	54.00	-25.02	132	244	Average	
4874.000	44.67	-3.05	41.62	74.00	-32.38	132	240	Peak	
7311.000	31.36	1.88	33.24	54.00	-20.76	156	124	Average	
7311.000	43.59	1.88	45.47	74.00	-28.53	156	124	Peak	
15994.000	31.80	10.25	42.05	54.00	-11.95	150	339	Average	
15994.000	44.88	10.25	55.13	74.00	-18.87	150	339	Peak	
16640.000	31.78	12.35	44.13	54.00	-9.87	150	0	Average	
16640.000	44.60	12.35	56.95	74.00	-17.05	150	0	Peak	
17796.000	32.64	13.72	46.36	54.00	-7.64	150	80	Average	
17796.000	44.25	13.72	57.97	74.00	-16.03	150	80	Peak	
High channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4383.000	29.56	-4.47	25.09	54.00	-28.91	150	147	Average	
4383.000	45.21	-4.47	40.74	74.00	-33.26	150	147	Peak	
4924.000	32.02	-2.97	29.05	54.00	-24.95	130	218	Average	
4924.000	43.44	-2.97	40.47	74.00	-33.53	130	218	Peak	
7386.000	31.11	1.40	32.51	54.00	-21.49	159	179	Average	
7386.000	42.86	1.40	44.26	74.00	-29.74	159	179	Peak	
15314.000	31.09	9.70	40.79	54.00	-13.21	150	303	Average	
15314.000	44.75	9.70	54.45	74.00	-19.55	150	303	Peak	
16640.000	32.67	12.35	45.02	54.00	-8.98	150	99	Average	
16640.000	44.81	12.35	57.16	74.00	-16.84	150	99	Peak	
17745.000	32.61	13.52	46.13	54.00	-7.87	150	55	Average	
17745.000	45.21	13.52	58.73	74.00	-15.27	150	55	Peak	

Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

802.11n HT40 Mode:

Low channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4468.000	29.80	-4.18	25.62	54.00	-28.38	150	104	Average	
4468.000	44.93	-4.18	40.75	74.00	-33.25	150	104	Peak	
4844.000	32.39	-3.31	29.08	54.00	-24.92	179	193	Average	
4844.000	45.73	-3.31	42.42	74.00	-31.58	179	193	Peak	
7266.000	31.45	1.93	33.38	54.00	-20.62	152	214	Average	
7266.000	43.54	1.93	45.47	74.00	-28.53	152	214	Peak	
14430.000	30.18	11.36	41.54	54.00	-12.46	150	305	Average	
14430.000	43.42	11.36	54.78	74.00	-19.22	150	305	Peak	
16696.000	31.58	12.33	43.91	54.00	-10.09	150	3	Average	
16696.000	44.15	12.33	56.48	74.00	-17.52	150	3	Peak	
17932.000	30.03	14.48	44.43	54.00	-9.57	150	66	Average	
17932.000	43.06	14.48	57.46	74.00	-16.54	150	66	Peak	
Middle channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4434.000	29.55	-4.23	25.32	54.00	-28.68	150	209	Average	
4434.000	44.88	-4.23	40.65	74.00	-33.35	150	209	Peak	
4874.000	32.79	-3.05	29.74	54.00	-24.26	177	191	Average	
4874.000	43.18	-3.05	40.13	74.00	-33.87	177	191	Peak	
7311.000	31.84	1.88	33.72	54.00	-20.28	153	314	Average	
7311.000	42.58	1.88	44.46	74.00	-29.54	153	314	Peak	
14549.000	29.20	11.39	40.59	54.00	-13.41	150	50	Average	
14549.000	43.19	11.39	54.58	74.00	-19.42	150	50	Peak	
16589.000	31.57	12.30	43.87	54.00	-10.13	150	103	Average	
16589.000	44.33	12.30	56.63	74.00	-17.37	150	103	Peak	
17779.000	33.19	13.65	46.84	54.00	-7.16	150	26	Average	
17779.000	44.43	13.65	58.08	74.00	-15.92	150	26	Peak	
High channel									
Horizontal					Vertical				
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark	
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)		
4434.000	29.54	-4.23	25.31	54.00	-28.69	150	37	Average	
4434.000	45.16	-4.23	40.93	74.00	-33.07	150	37	Peak	
4904.000	32.28	-2.84	29.44	54.00	-24.56	179	192	Average	
4904.000	43.63	-2.84	40.79	74.00	-33.21	179	192	Peak	
7356.000	31.38	1.62	33.00	54.00	-21.00	158	289	Average	
7356.000	43.60	1.62	45.22	74.00	-28.78	158	289	Peak	
15365.000	32.95	9.64	41.69	54.00	-12.31	150	62	Average	
15365.000	44.52	9.64	54.16	74.00	-19.84	150	62	Peak	
16402.000	31.67	11.51	43.18	54.00	-10.82	150	303	Average	
16402.000	44.56	11.51	56.07	74.00	-17.93	150	303	Peak	
17762.000	33.04	13.59	46.63	54.00	-7.37	150	125	Average	
17762.000	45.37	13.59	58.96	74.00	-15.04	150	125	Peak	

Note:

Level = Reading + Factor.

Margin = Level - Limit.

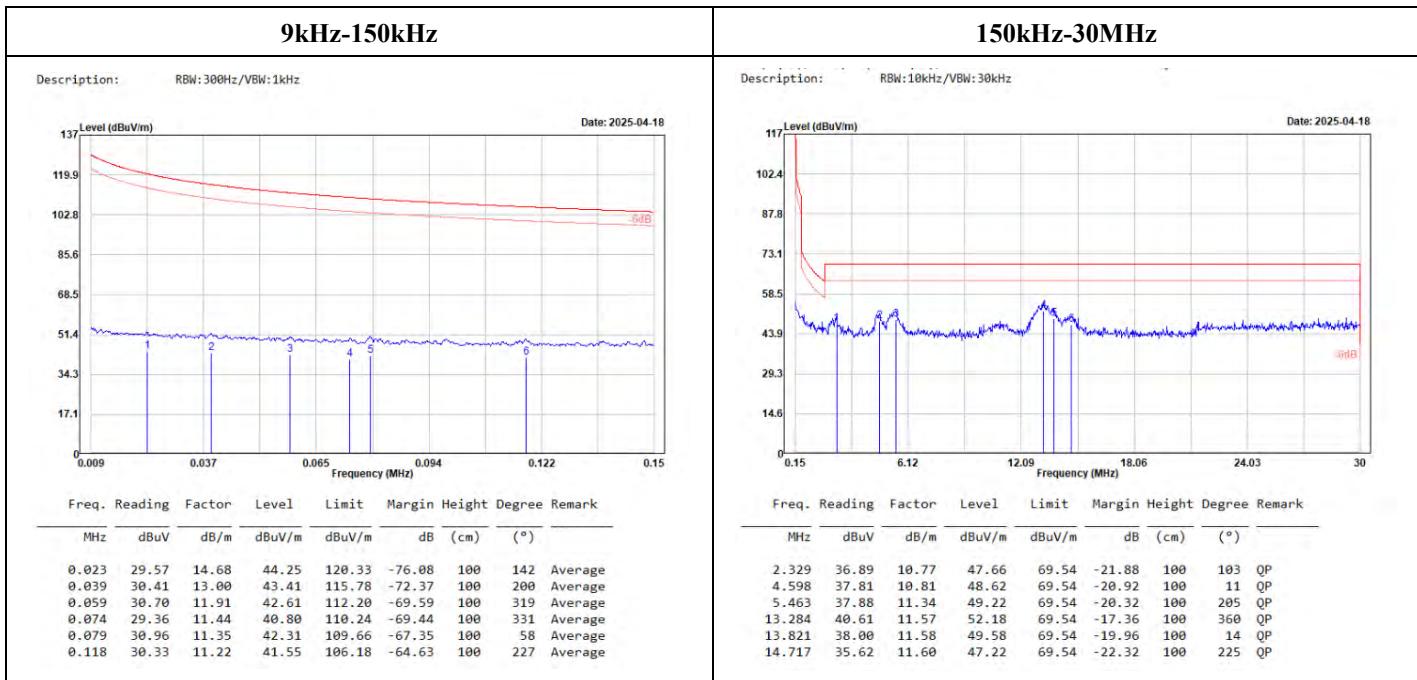
Factor = Antenna Factor + Cable Loss - Amplifier Gain.

BLE Mode

9kHz-30MHz:

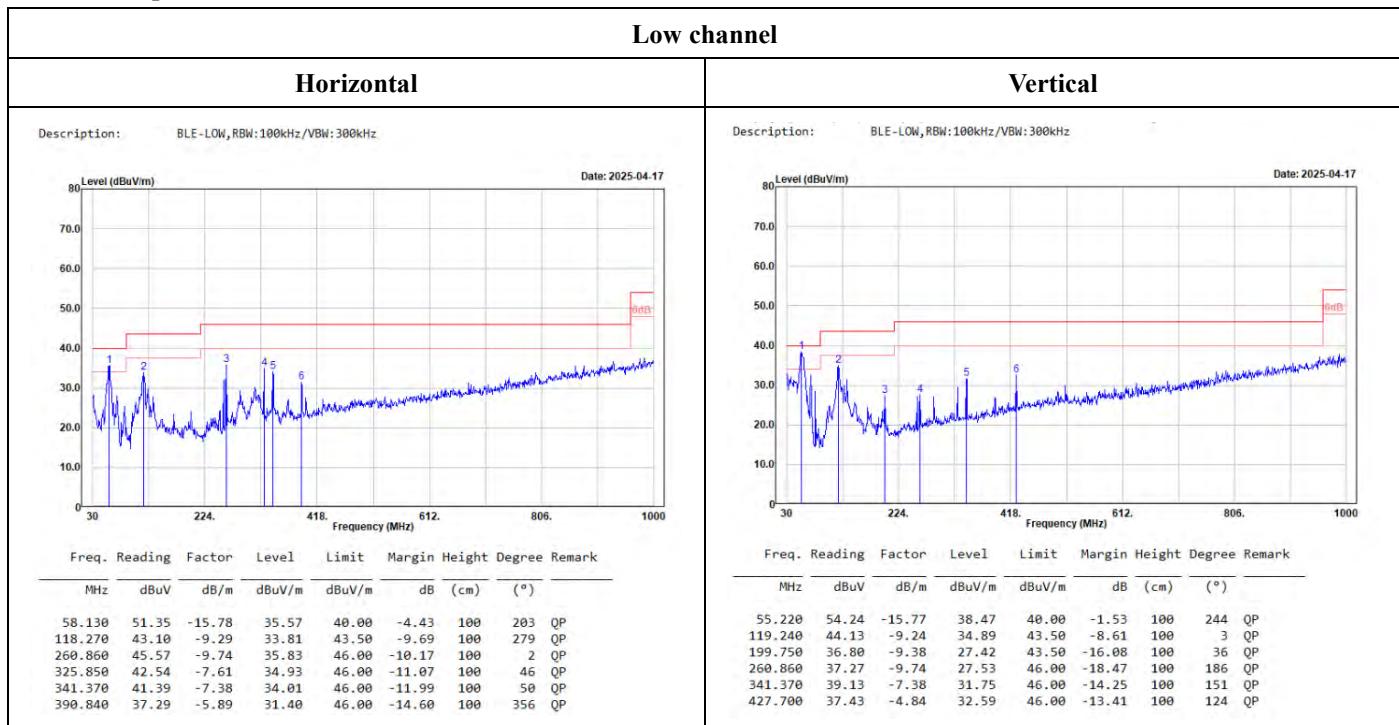
(Worst case is BLE 2M, low channel)

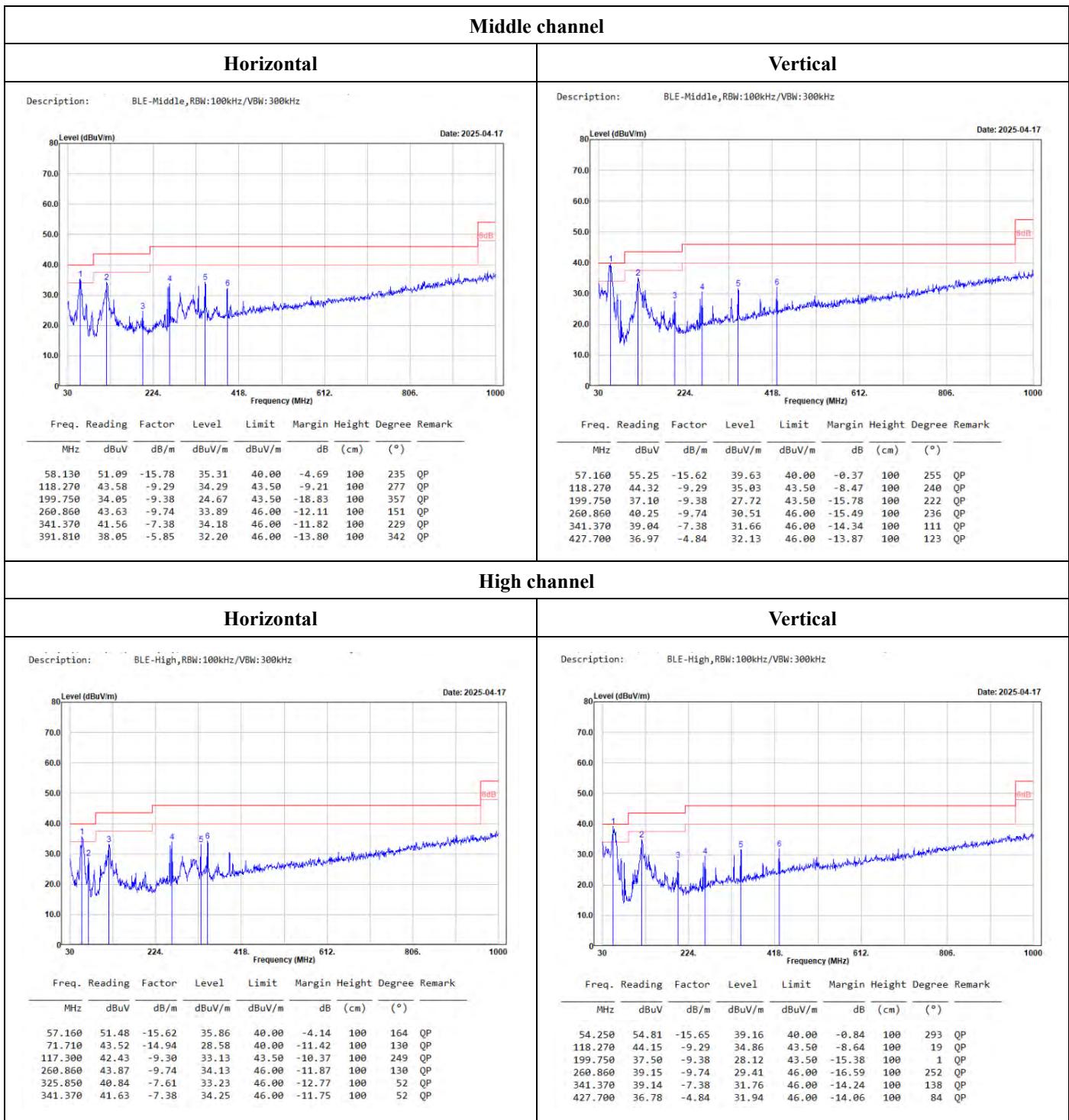
(Pre-scan using three directional polarities, worst case as parallel.)



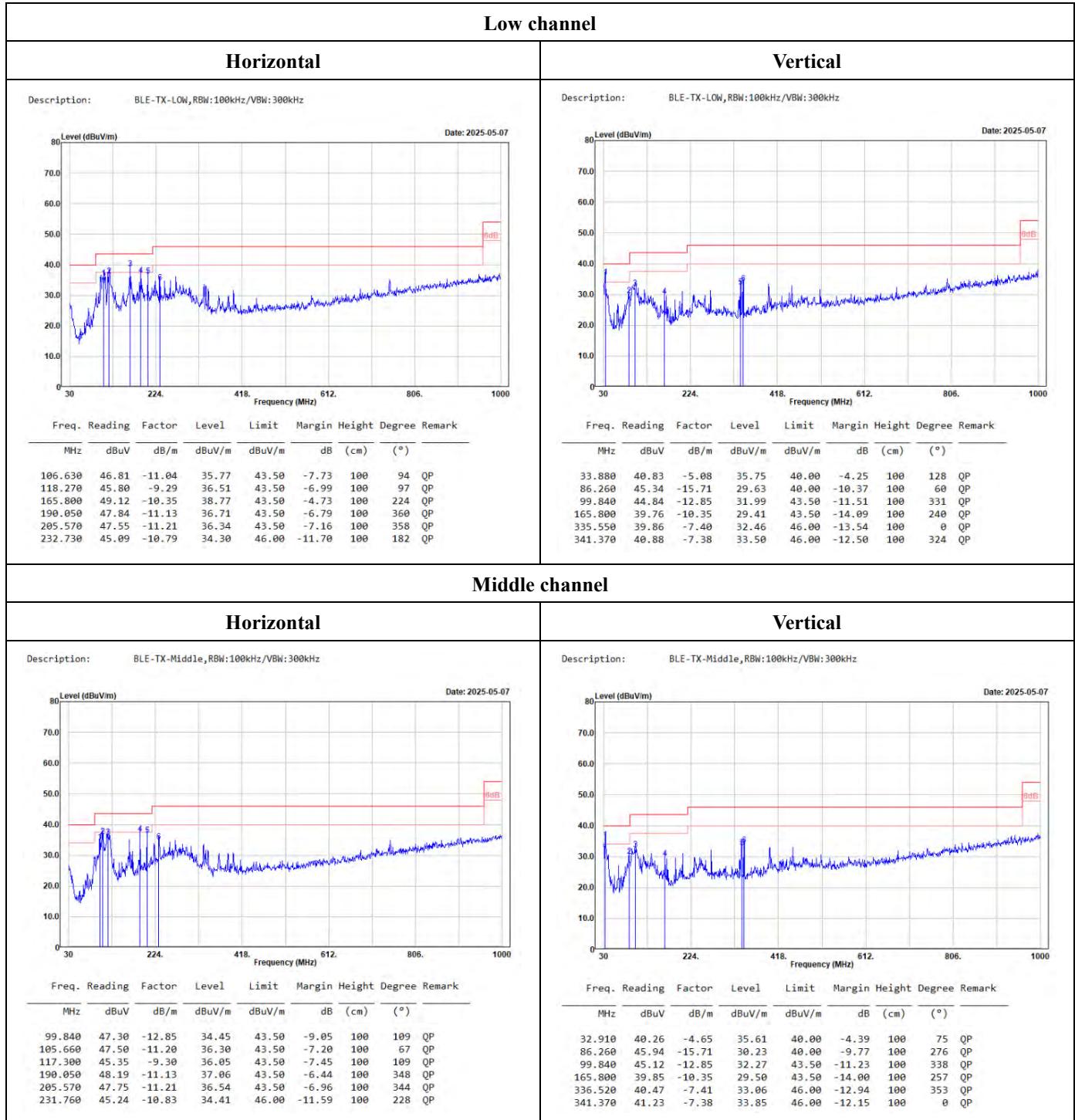
30MHz-1GHz:

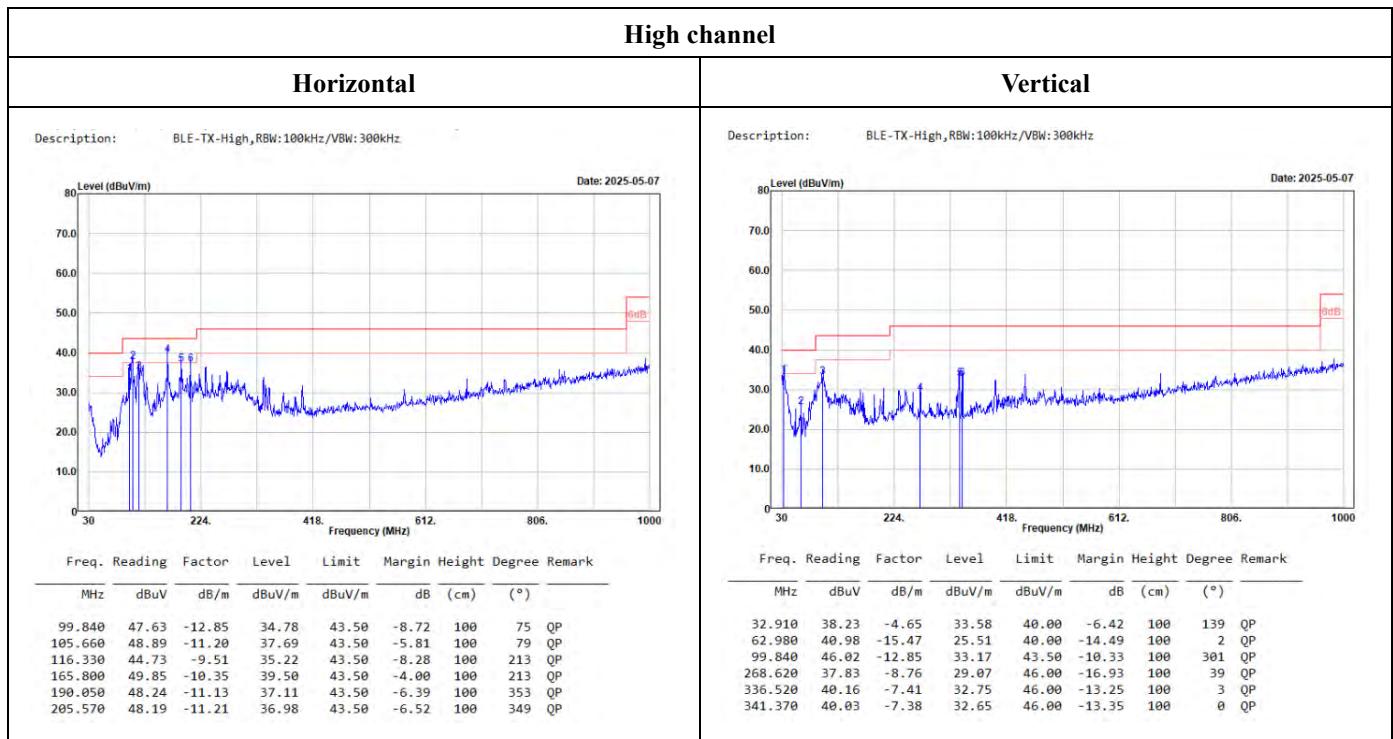
Adapter Mode:





POE Mode:





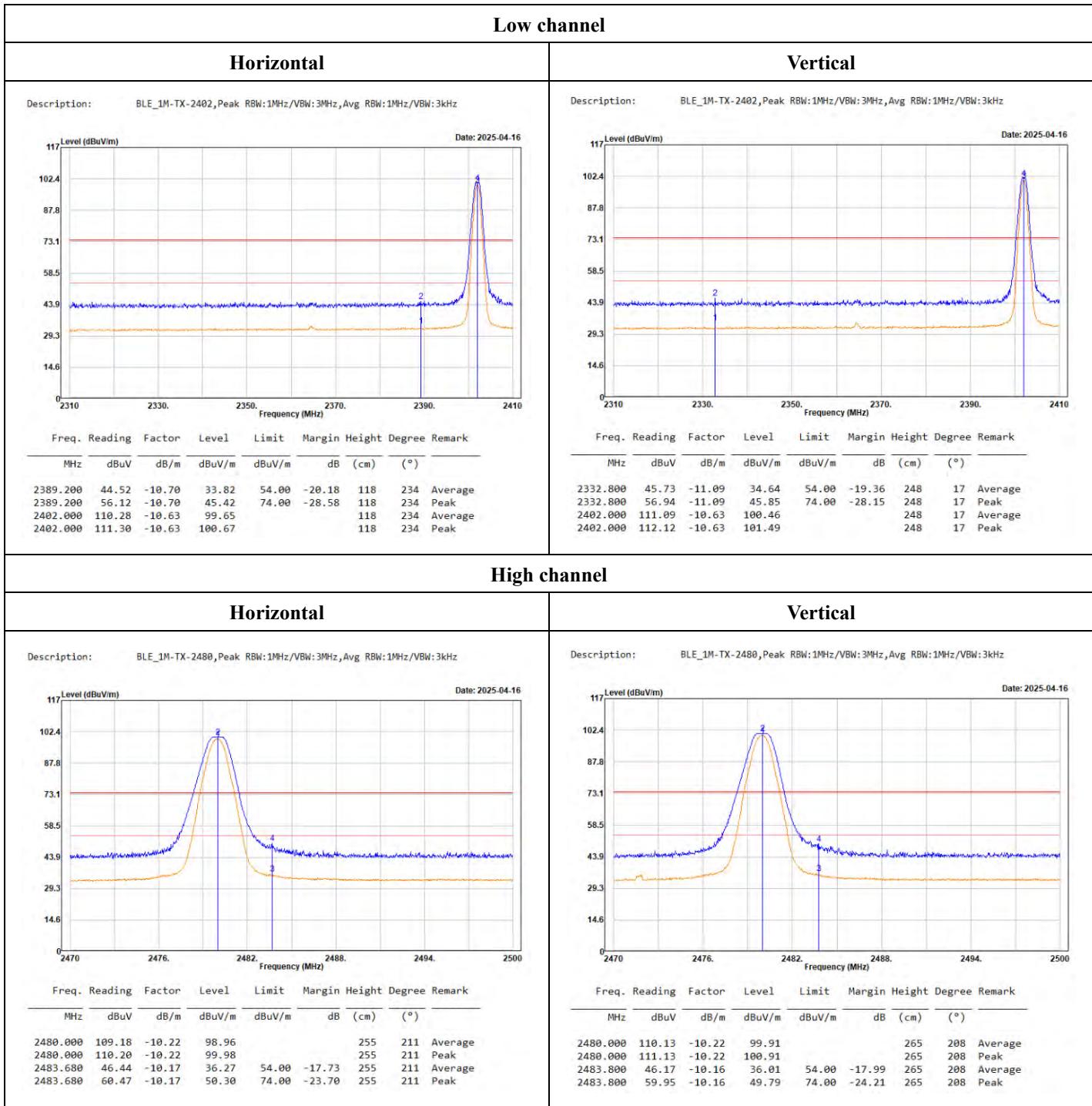
Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

Band-Edge:

BLE 1M

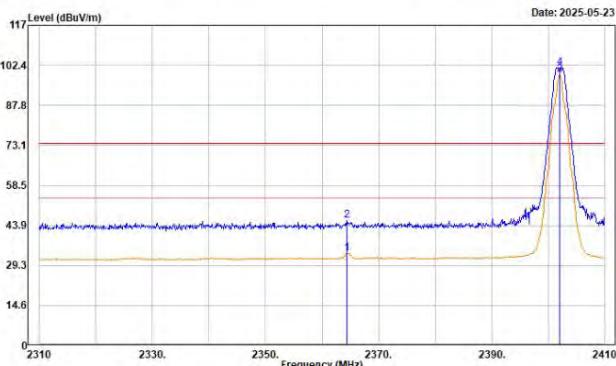


BLE 2M

Low channel

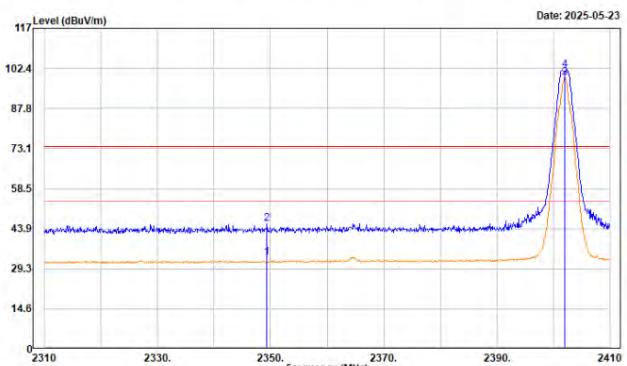
Horizontal

Description: BLE_2M-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)	(°)	
2364.400	44.64	-10.88	33.76	54.00	-20.24	138	196	Average
2364.400	56.64	-10.88	45.76	74.00	-28.24	138	196	Peak
2402.000	109.41	-10.63	98.78			138	196	Average
2402.000	112.19	-10.63	101.56			138	196	Peak

Description: BLE_2M-TX-2402,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz

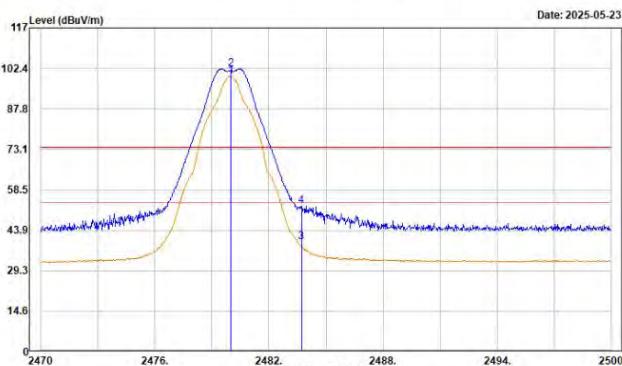


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2349.400	44.35	-10.97	33.38	54.00	-20.62	183	165	Average
2349.400	56.65	-10.97	45.68	74.00	-28.32	183	165	Peak
2402.000	109.54	-10.63	98.91			183	165	Average
2402.000	112.35	-10.63	101.72			183	165	Peak

High channel

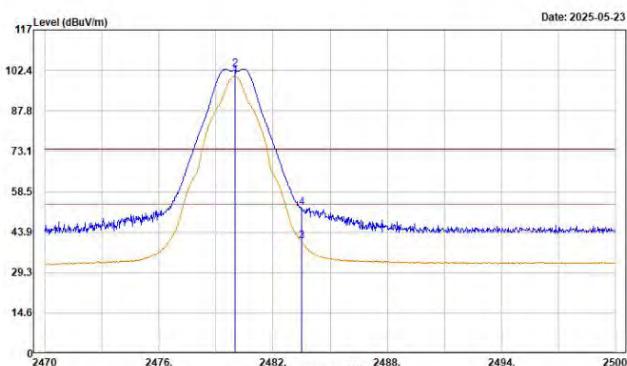
Horizontal

Description: BLE_2M-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	109.69	-10.22	99.47		174	201	Average	
2480.000	112.35	-10.22	102.13		174	201	Peak	
2483.710	49.92	-10.17	39.75	54.00	-14.25	174	201	Average
2483.710	62.87	-10.17	52.70	74.00	-21.30	174	201	Peak

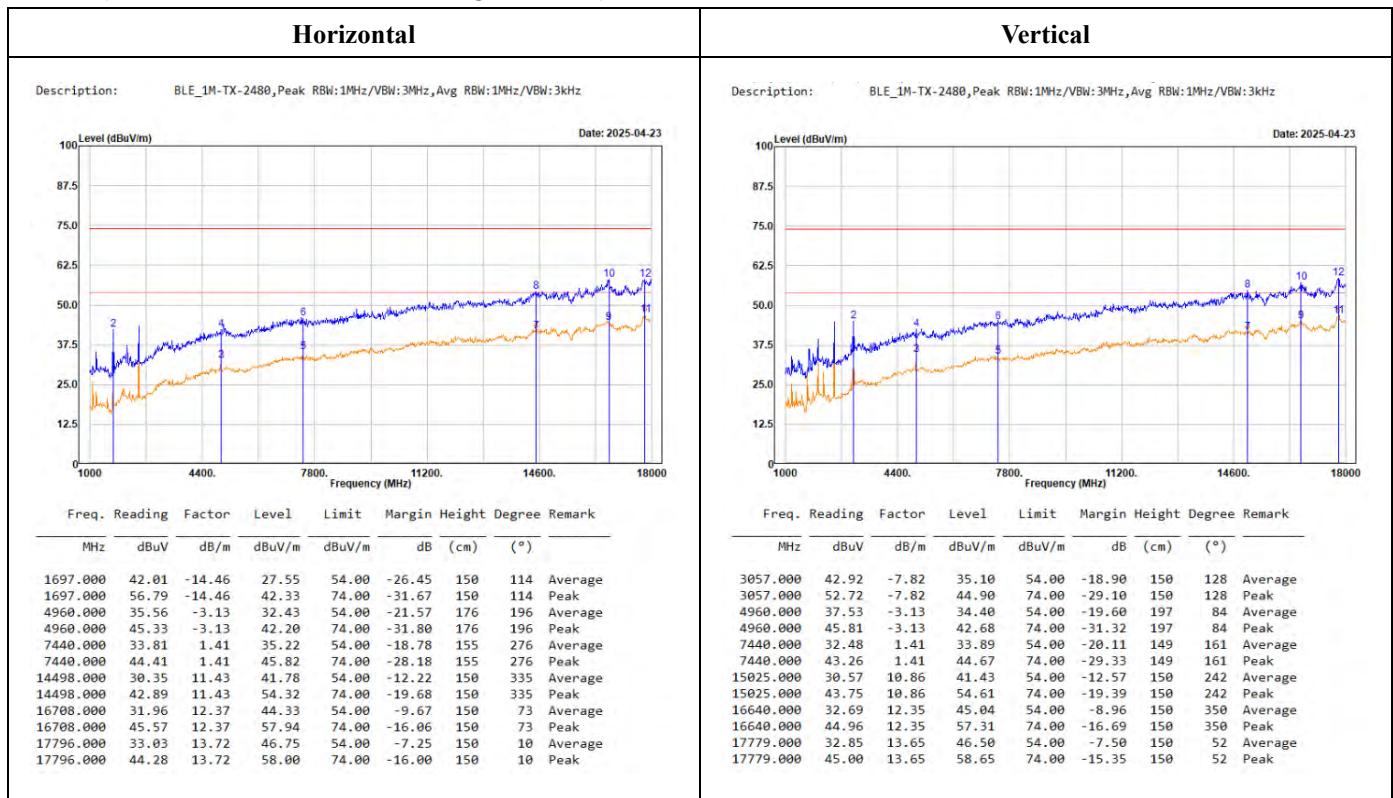
Description: BLE_2M-TX-2480,Peak RBW:1MHz/VBW:3MHz,Avg RBW:1MHz/VBW:1kHz



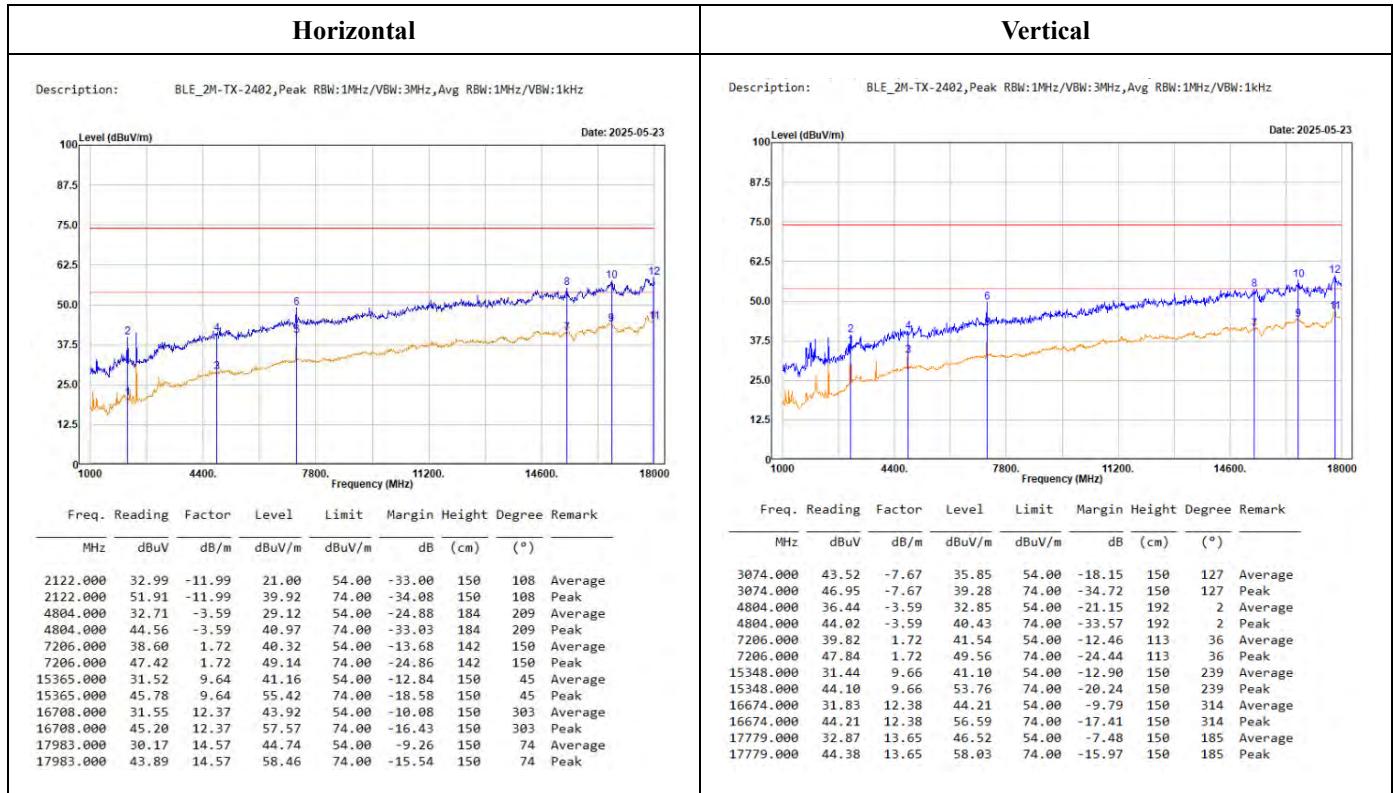
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2480.000	110.48	-10.22	100.18			138	81	Average
2480.000	113.07	-10.22	102.85			138	81	Peak
2483.500	50.79	-10.17	40.62	54.00	-13.38	138	81	Average
2483.500	62.81	-10.17	52.64	74.00	-21.36	138	81	Peak

1GHz-18GHz:

(BLE 1M mode worst case is high channel)

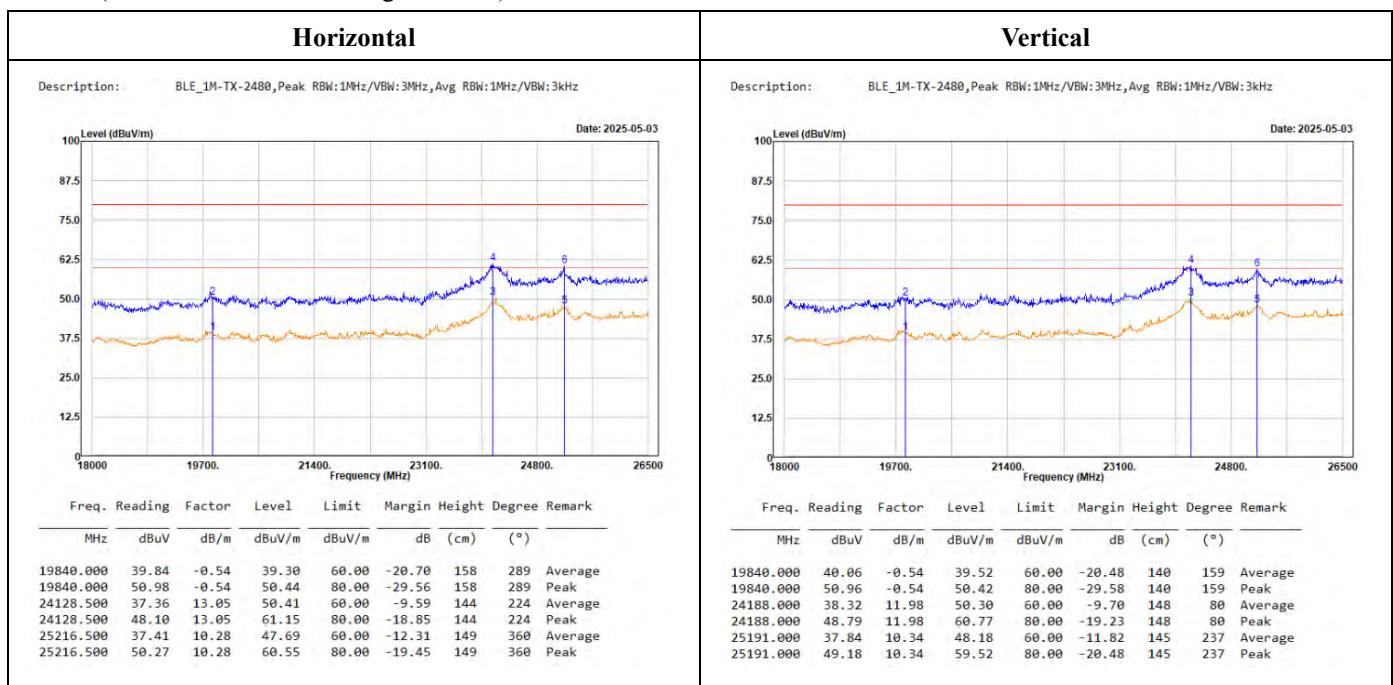


(BLE 2M mode worst case is low channel)



18GHz-26.5GHz:

(Worst case is BLE 1M, 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 1.5 meter:

Conversion factor = $20 \log (1.5m/3m) = 6 \text{ dB}$,Average Limit = $54+6 = 60 \text{ dBuV/m@1.5m}$, Peak Limit = $60+20 = 80 \text{ dBuV/m@1.5m}$

Above 1GHz**BLE 1M Mode:**

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)	(°)	
3839.000	35.02	-6.89	28.13	54.00	-25.87	150	168	Average	3074.000	37.83	-7.67	30.16	54.00	-23.84	150	230	Average
3839.000	45.76	-6.89	38.87	74.00	-35.13	150	168	Peak	3074.000	46.71	-7.67	39.04	74.00	-34.96	150	230	Peak
4804.000	33.07	-3.59	29.48	54.00	-24.52	116	233	Average	4804.000	32.42	-3.59	28.83	54.00	-25.17	233	158	Average
4804.000	43.56	-3.59	39.97	74.00	-34.03	116	233	Peak	4804.000	44.03	-3.59	40.44	74.00	-33.56	233	158	Peak
7206.000	33.20	1.72	34.92	54.00	-19.08	158	99	Average	7206.000	31.46	1.72	33.18	54.00	-20.82	145	67	Average
7206.000	42.84	1.72	44.56	74.00	-29.44	158	99	Peak	7206.000	45.62	1.72	47.34	74.00	-26.66	145	67	Peak
15042.000	31.36	10.80	42.16	54.00	-11.84	150	107	Average	15739.000	33.71	9.18	42.89	54.00	-11.11	150	103	Average
15042.000	43.59	10.80	54.39	74.00	-19.61	150	107	Peak	15739.000	45.27	9.18	54.45	74.00	-19.55	150	103	Peak
16606.000	32.33	12.33	44.66	54.00	-9.34	150	44	Average	16606.000	32.04	12.33	44.37	54.00	-9.63	150	308	Average
16606.000	44.40	12.33	56.73	74.00	-17.27	150	44	Peak	16606.000	44.30	12.33	56.63	74.00	-17.37	150	308	Peak
17779.000	32.65	13.65	46.30	54.00	-7.70	150	314	Average	17779.000	32.52	13.65	46.17	54.00	-7.83	150	35	Average
17779.000	45.06	13.65	58.71	74.00	-15.29	150	314	Peak	17779.000	44.36	13.65	58.01	74.00	-15.99	150	35	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)	(°)	
3261.000	32.81	-6.62	26.19	54.00	-27.81	150	109	Average	3057.000	42.54	-7.82	34.72	54.00	-19.28	150	147	Average
3261.000	45.64	-6.62	39.02	74.00	-34.98	150	109	Peak	3057.000	52.23	-7.82	44.41	74.00	-29.59	150	147	Peak
4880.000	33.18	-2.99	30.19	54.00	-23.81	138	236	Average	4880.000	34.55	-2.99	31.56	54.00	-22.44	196	83	Average
4880.000	44.04	-2.99	41.05	74.00	-32.95	138	236	Peak	4880.000	45.00	-2.99	42.01	74.00	-31.99	196	83	Peak
7320.000	31.40	1.84	33.24	54.00	-20.76	156	176	Average	7320.000	31.22	1.84	33.06	54.00	-20.94	143	220	Average
7320.000	42.57	1.84	44.41	74.00	-29.59	156	176	Peak	7320.000	44.15	1.84	45.99	74.00	-28.01	143	220	Peak
14362.000	29.90	11.13	41.03	54.00	-12.97	150	324	Average	14855.000	29.97	11.12	41.09	54.00	-12.91	150	197	Average
14362.000	43.83	11.13	54.96	74.00	-19.04	150	324	Peak	14855.000	43.52	11.12	54.64	74.00	-19.36	150	197	Peak
16521.000	31.04	12.15	43.19	54.00	-18.81	150	87	Average	16759.000	31.91	12.20	44.11	54.00	-9.89	150	349	Average
16521.000	44.59	12.15	56.74	74.00	-17.26	150	87	Peak	16759.000	44.08	12.20	56.28	74.00	-17.72	150	349	Peak
17796.000	32.62	13.72	46.34	54.00	-7.66	150	40	Average	17745.000	32.18	13.52	45.70	54.00	-8.30	150	30	Average
17796.000	44.60	13.72	58.32	74.00	-15.68	150	40	Peak	17745.000	44.78	13.52	58.30	74.00	-15.70	150	30	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)	(°)	
1697.000	42.01	-14.46	27.55	54.00	-26.45	150	114	Average	3057.000	42.92	-7.82	35.10	54.00	-18.90	150	128	Average
1697.000	56.79	-14.46	42.33	74.00	-31.67	150	114	Peak	3057.000	52.72	-7.82	44.90	74.00	-29.10	150	128	Peak
4960.000	35.56	-3.13	32.43	54.00	-21.57	176	196	Average	4960.000	37.53	-3.13	34.40	54.00	-19.60	197	84	Average
4960.000	45.33	-3.13	42.20	74.00	-31.80	176	196	Peak	4960.000	45.81	-3.13	42.68	74.00	-31.32	197	84	Peak
7440.000	33.81	1.41	35.22	54.00	-18.78	155	276	Average	7440.000	32.48	1.41	33.89	54.00	-20.11	149	161	Average
7440.000	44.41	1.41	45.82	74.00	-28.18	155	276	Peak	7440.000	43.26	1.41	44.67	74.00	-29.33	149	161	Peak
14498.000	30.35	11.43	41.78	54.00	-12.22	150	335	Average	15025.000	30.57	10.86	41.43	54.00	-12.57	150	242	Average
14498.000	42.89	11.43	54.32	74.00	-19.68	150	335	Peak	15025.000	43.75	10.86	54.61	74.00	-19.39	150	242	Peak
16708.000	31.96	12.37	44.33	54.00	-9.67	150	73	Average	16640.000	32.69	12.35	45.04	54.00	-8.96	150	350	Average
16708.000	45.57	12.37	57.94	74.00	-16.06	150	73	Peak	16640.000	44.96	12.35	57.31	74.00	-16.69	150	350	Peak
17796.000	33.03	13.72	46.75	54.00	-7.25	150	10	Average	17779.000	32.85	13.65	46.50	54.00	-7.50	150	52	Average
17796.000	44.28	13.72	58.00	74.00	-16.00	150	10	Peak	17779.000	45.00	13.65	58.65	74.00	-15.35	150	52	Peak

Note:

Level = Reading + Factor.

Margin = Level - Limit.

Factor = Antenna Factor + Cable Loss - Amplifier Gain.

BLE 2M Mode:

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)	(°)	
2122.000	32.99	-11.99	21.00	54.00	-33.00	150	108	Average	3074.000	43.52	-7.67	35.85	54.00	-18.15	150	127	Average
2122.000	51.91	-11.99	39.92	74.00	-34.08	150	108	Peak	3074.000	46.95	-7.67	39.28	74.00	-34.72	150	127	Peak
4804.000	32.71	-3.59	29.12	54.00	-24.88	184	209	Average	4804.000	36.44	-3.59	32.85	54.00	-21.15	192	2	Average
4804.000	44.56	-3.59	40.97	74.00	-33.03	184	209	Peak	4804.000	44.02	-3.59	40.43	74.00	-33.57	192	2	Peak
7206.000	38.60	1.72	40.32	54.00	-13.68	142	150	Average	7206.000	39.82	1.72	41.54	54.00	-12.46	113	36	Average
7206.000	47.42	1.72	49.14	74.00	-24.86	142	150	Peak	7206.000	47.84	1.72	49.56	74.00	-24.44	113	36	Peak
15365.000	31.52	9.64	41.16	54.00	-12.84	150	45	Average	15348.000	31.44	9.66	41.10	54.00	-12.90	150	239	Average
15365.000	45.78	9.64	55.42	74.00	-18.58	150	45	Peak	15348.000	44.10	9.66	53.76	74.00	-20.24	150	239	Peak
16708.000	31.55	12.37	43.92	54.00	-10.08	150	303	Average	16674.000	31.83	12.38	44.21	54.00	-9.79	150	314	Average
16708.000	45.20	12.37	57.57	74.00	-16.43	150	303	Peak	16674.000	44.21	12.38	56.59	74.00	-17.41	150	314	Peak
17983.000	30.17	14.57	44.74	54.00	-9.26	150	74	Average	17779.000	32.87	13.65	46.52	54.00	-7.48	150	185	Average
17983.000	43.89	14.57	58.46	74.00	-15.54	150	74	Peak	17779.000	44.38	13.65	58.03	74.00	-15.97	150	185	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)	(°)	
4366.000	32.59	-4.60	27.99	54.00	-26.01	150	68	Average	1714.000	34.99	-14.32	20.67	54.00	-33.33	150	124	Average
4366.000	45.29	-4.60	40.69	74.00	-33.31	150	68	Peak	1714.000	62.54	-14.32	48.22	74.00	-25.78	150	124	Peak
4888.000	32.17	-2.99	29.18	54.00	-24.82	157	206	Average	4888.000	37.91	-2.99	34.92	54.00	-19.98	174	1	Average
4888.000	44.62	-2.99	41.63	74.00	-32.37	157	206	Peak	4888.000	48.04	-2.99	45.05	74.00	-28.95	174	1	Peak
7320.000	35.55	1.84	37.39	54.00	-16.61	136	151	Average	7320.000	38.37	1.84	40.21	54.00	-13.79	113	34	Average
7320.000	45.57	1.84	47.41	74.00	-26.59	136	151	Peak	7320.000	47.93	1.84	49.77	74.00	-24.23	113	34	Peak
15688.000	32.49	8.97	41.46	54.00	-12.54	150	5	Average	15960.000	31.88	10.06	41.94	54.00	-12.06	150	187	Average
15688.000	46.32	8.97	55.29	74.00	-18.71	150	5	Peak	15960.000	45.65	10.06	55.71	74.00	-18.29	150	187	Peak
16623.000	32.11	12.34	44.45	54.00	-9.55	150	132	Average	16606.000	31.53	12.33	43.86	54.00	-10.14	150	311	Average
16623.000	43.83	12.34	56.17	74.00	-17.83	150	132	Peak	16606.000	44.24	12.33	56.57	74.00	-17.43	150	311	Peak
17949.000	29.88	14.46	44.34	54.00	-9.66	150	335	Average	17813.000	32.45	13.79	46.24	54.00	-7.76	150	247	Average
17949.000	43.56	14.46	58.02	74.00	-15.98	150	335	Peak	17813.000	45.65	13.79	59.44	74.00	-14.56	150	247	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)	(°)	
4689.000	32.23	-3.31	28.92	54.00	-25.08	150	324	Average	4434.000	32.29	-4.23	28.06	54.00	-25.94	150	124	Average
4689.000	43.90	-3.31	40.59	74.00	-33.41	150	324	Peak	4434.000	45.26	-4.23	41.03	74.00	-32.97	150	124	Peak
4960.000	39.85	-3.13	35.92	54.00	-18.08	218	40	Average	4960.000	38.95	-3.13	35.82	54.00	-18.18	161	358	Average
4960.000	48.39	-3.13	45.26	74.00	-28.74	218	40	Peak	4960.000	49.64	-3.13	46.51	74.00	-27.49	161	358	Peak
7440.000	35.11	1.41	36.52	54.00	-17.48	209	33	Average	7440.000	32.31	1.41	33.72	54.00	-20.28	132	26	Average
7440.000	44.77	1.41	46.18	74.00	-27.82	209	33	Peak	7440.000	44.48	1.41	45.89	74.00	-28.11	132	26	Peak
14736.000	29.87	11.33	41.20	54.00	-12.80	150	147	Average	14413.000	29.73	11.34	41.07	54.00	-12.93	150	225	Average
14736.000	42.84	11.33	54.17	74.00	-19.83	150	147	Peak	14413.000	44.09	11.34	55.43	74.00	-18.57	150	225	Peak
16555.000	31.06	12.22	43.28	54.00	-10.72	150	286	Average	16368.000	31.24	11.35	42.59	54.00	-11.41	150	174	Average
16555.000	44.44	12.22	56.66	74.00	-17.34	150	286	Peak	16368.000	45.13	11.35	56.48	74.00	-17.52	150	174	Peak
17762.000	32.61	13.59	46.20	54.00	-7.80	150	197	Average	17779.000	32.76	13.65	46.41	54.00	-7.59	150	10	Average
17762.000	45.03	13.59	58.62	74.00	-15.38	150	197	Peak	17779.000	44.66	13.65	58.31	74.00	-15.69	150	10	Peak

Note:

Level = Reading + Factor.

Margin = Level - Limit.

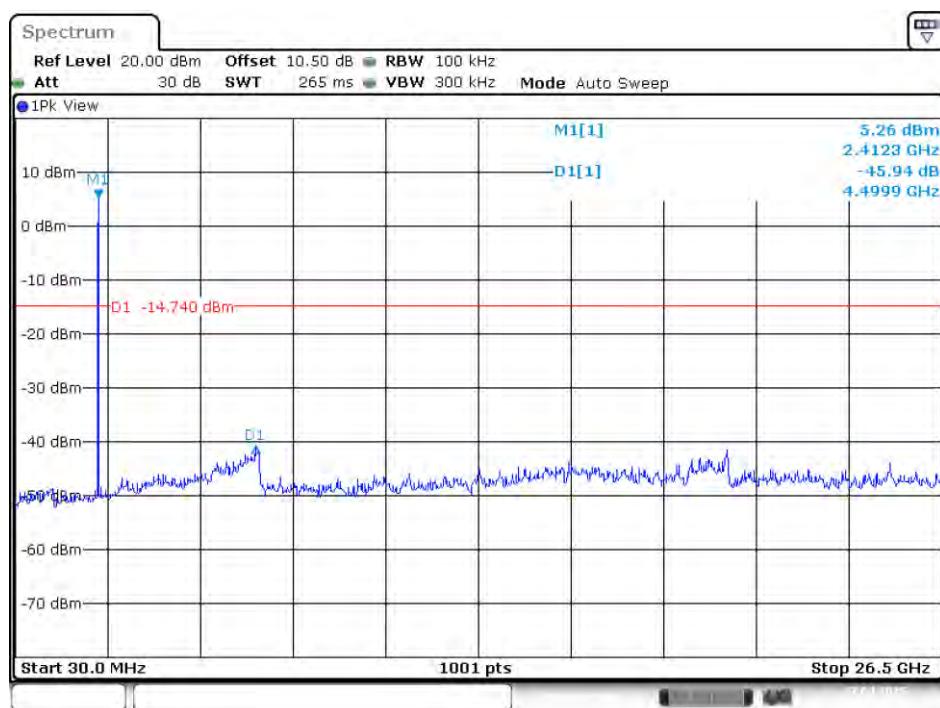
Factor = Antenna Factor + Cable Loss - Amplifier Gain.

Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	45.94	≥ 20	PASS
Mid	2437	45.81	≥ 20	PASS
High	2462	44.27	≥ 20	PASS
G Mode				
Low	2412	42.70	≥ 20	PASS
Mid	2437	40.77	≥ 20	PASS
High	2462	41.70	≥ 20	PASS
N20 Mode				
Low	2412	41.84	≥ 20	PASS
Mid	2437	41.01	≥ 20	PASS
High	2462	40.96	≥ 20	PASS
N40 Mode				
Low	2422	38.25	≥ 20	PASS
Mid	2437	37.75	≥ 20	PASS
High	2452	35.96	≥ 20	PASS
BLE(1M) Mode				
Low	2402	45.17	≥ 20	PASS
Mid	2440	44.01	≥ 20	PASS
High	2480	42.20	≥ 20	PASS
BLE(2M) Mode				
Low	2402	46.14	≥ 20	PASS
Mid	2440	42.92	≥ 20	PASS
High	2480	42.31	≥ 20	PASS

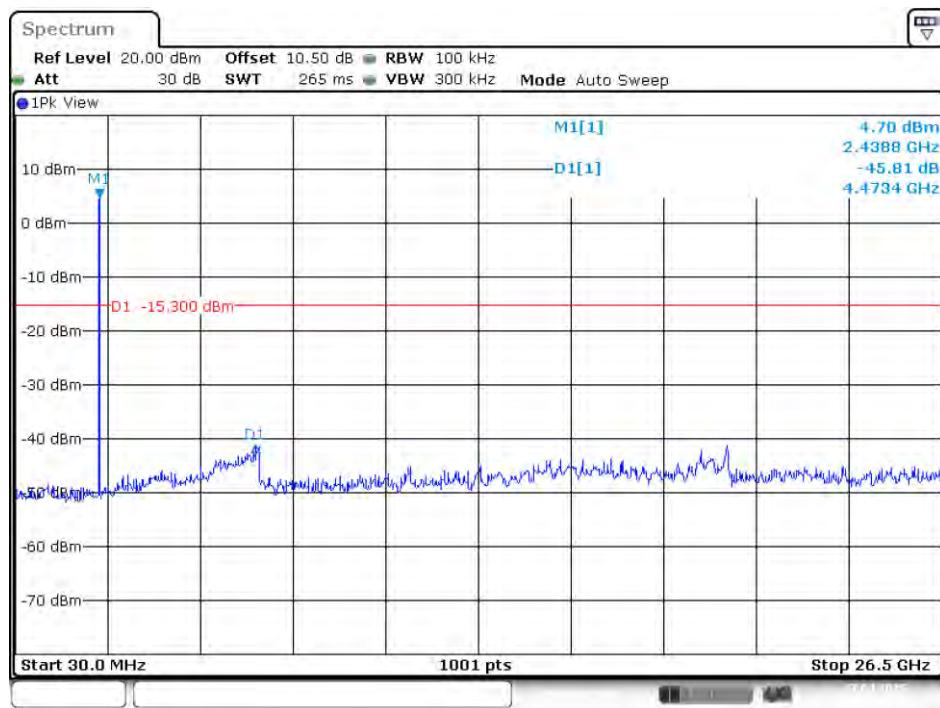
B Mode

Low Channel



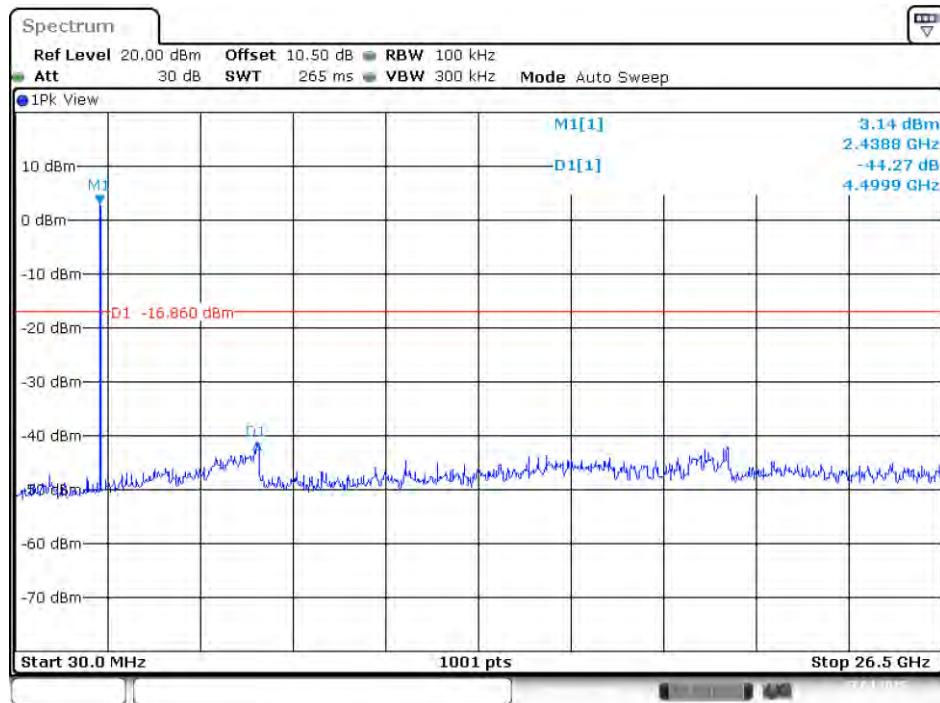
Date: 17.APR.2025 10:48:07

Middle Channel



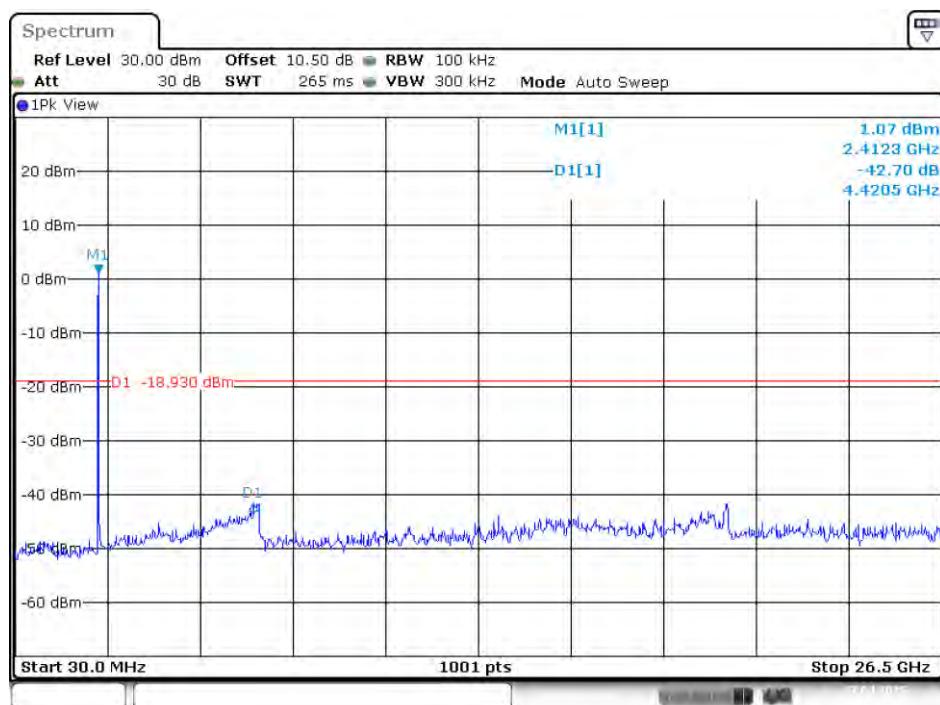
Date: 17.APR.2025 10:54:50

High Channel

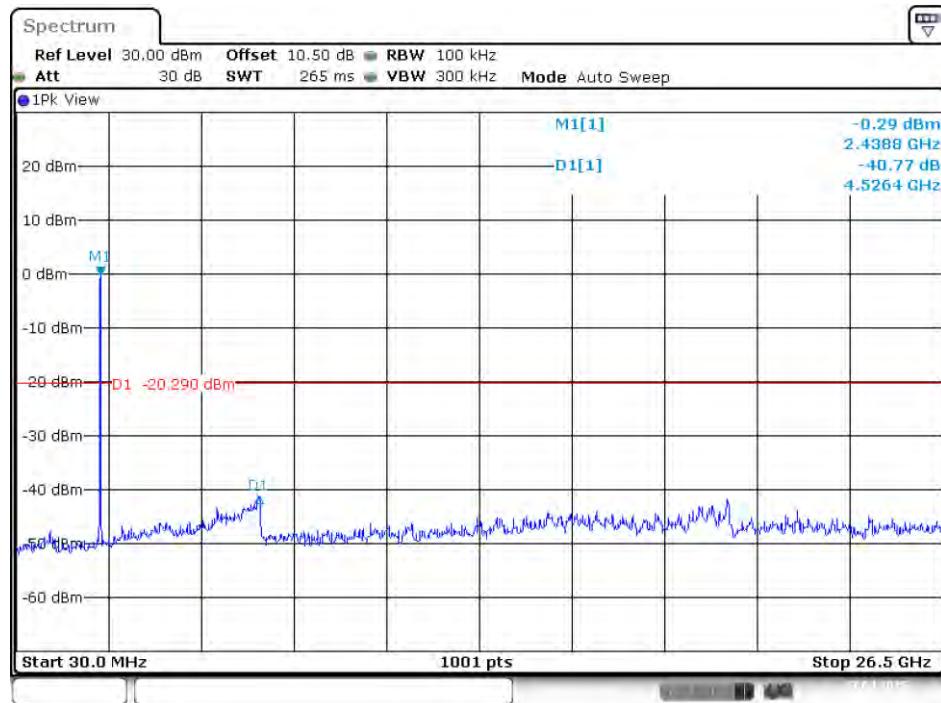


Date: 17.APR.2025 10:57:47

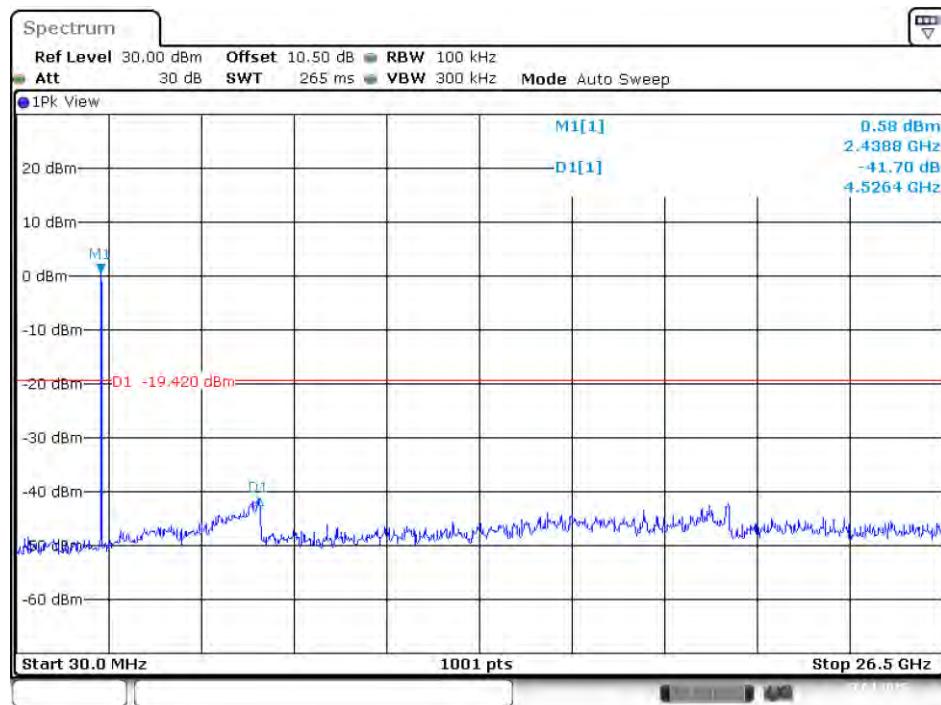
G Mode Low Channel



Date: 17.APR.2025 11:01:40

Middle Channel

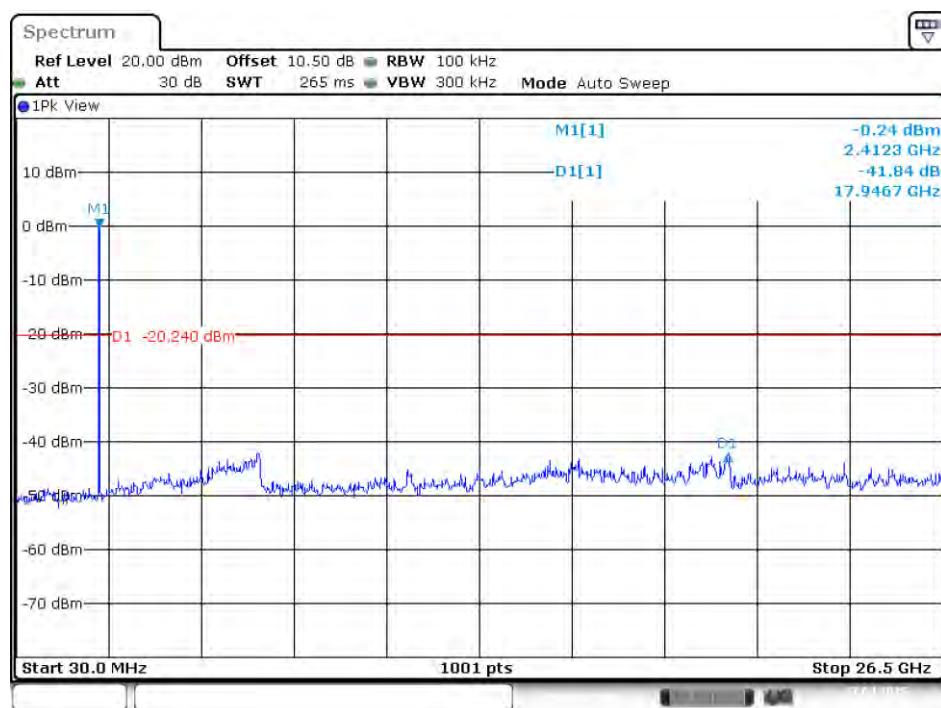
Date: 17.APR.2025 11:08:32

High Channel

Date: 17.APR.2025 11:10:53

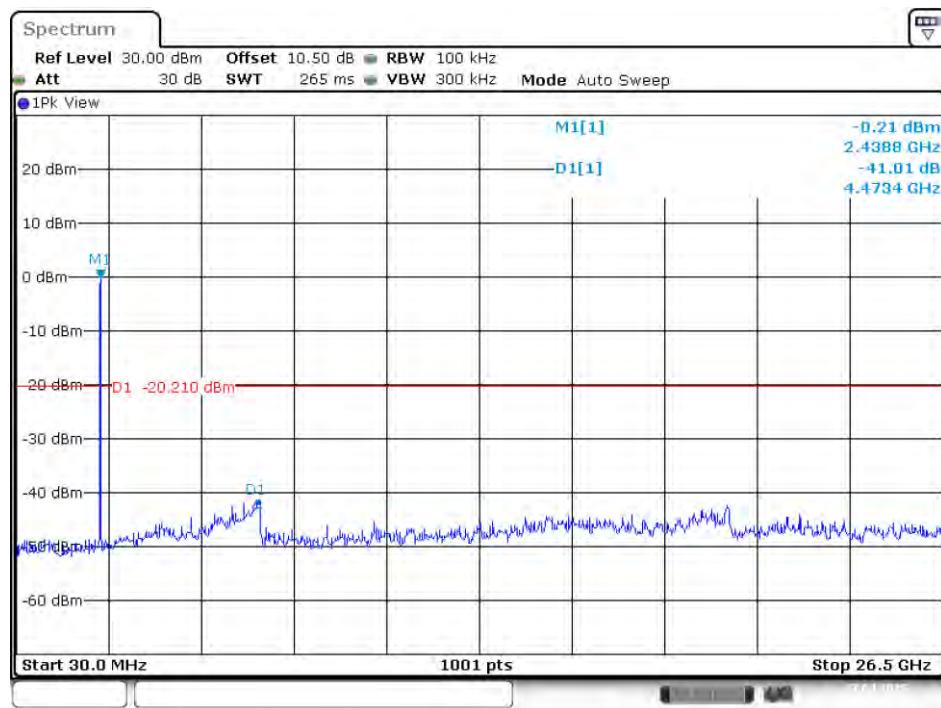
N20 Mode

Low Channel



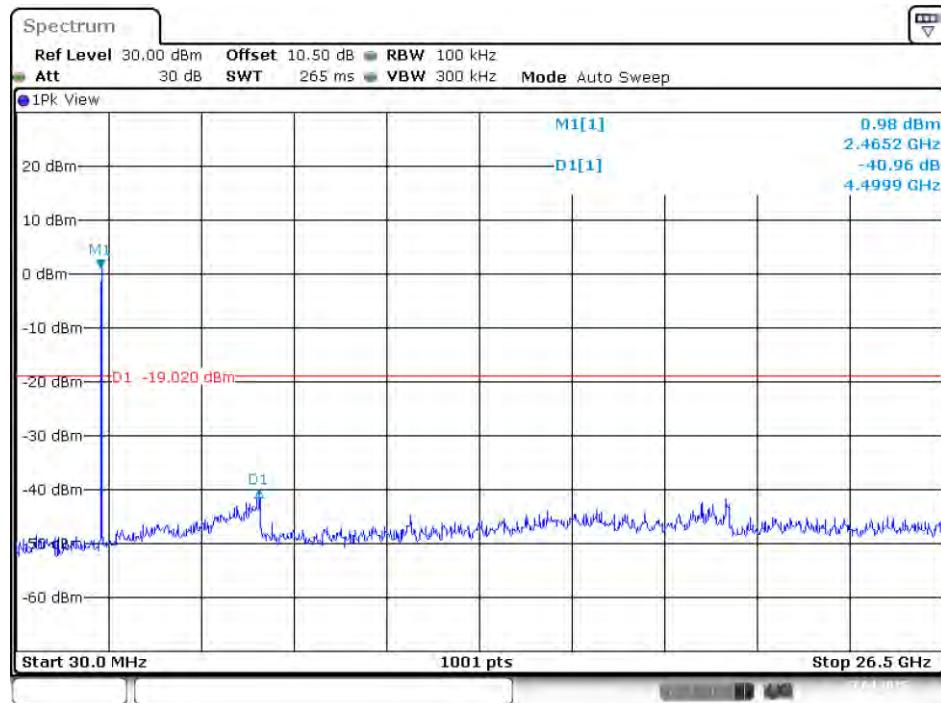
Date: 17.APR.2025 11:25:38

Middle Channel



Date: 17.APR.2025 11:28:28

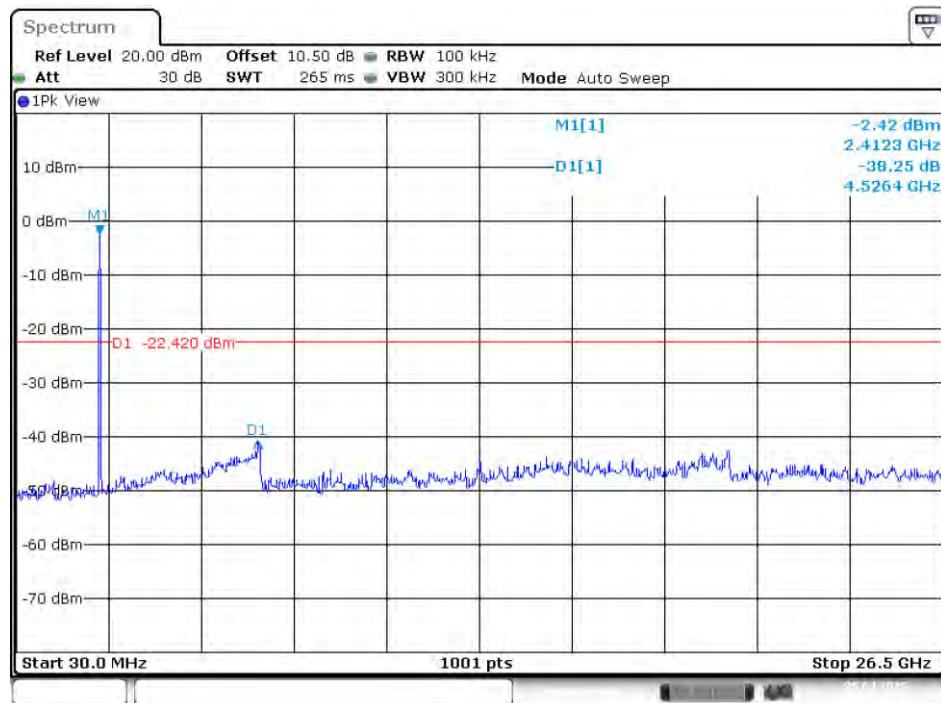
High Channel



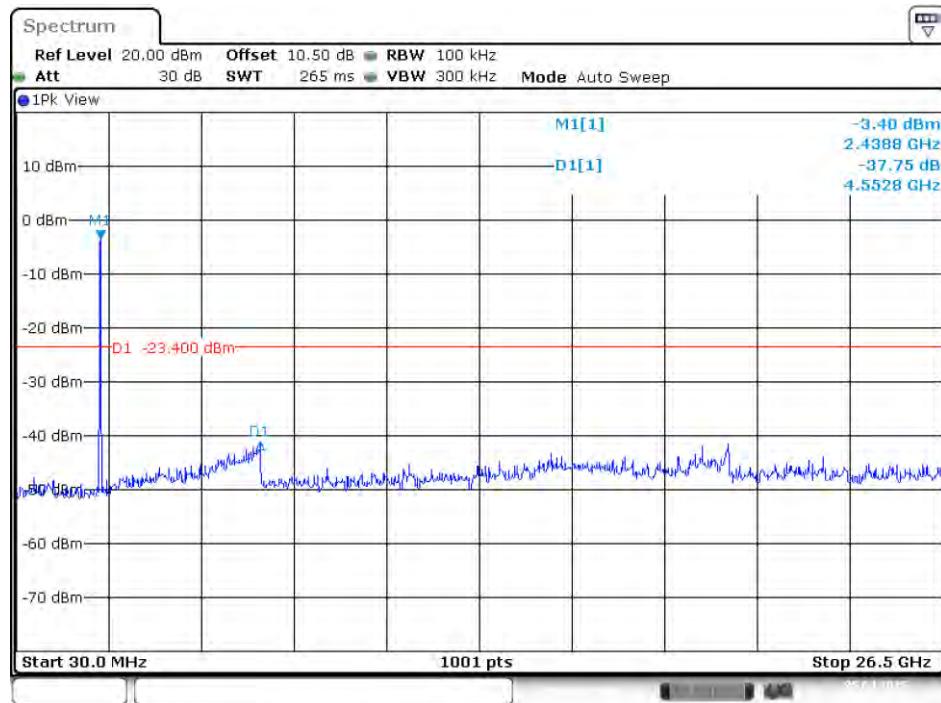
Date: 17.APR.2025 11:31:59

N40 Mode

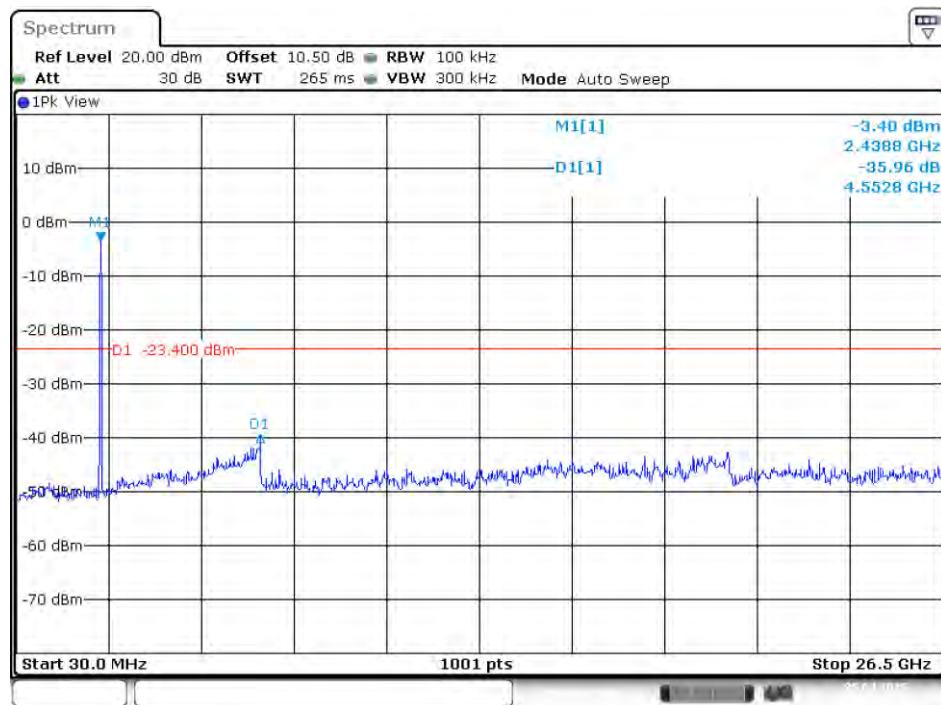
Low Channel



Date: 25 APR 2025 12:21:32

Middle Channel

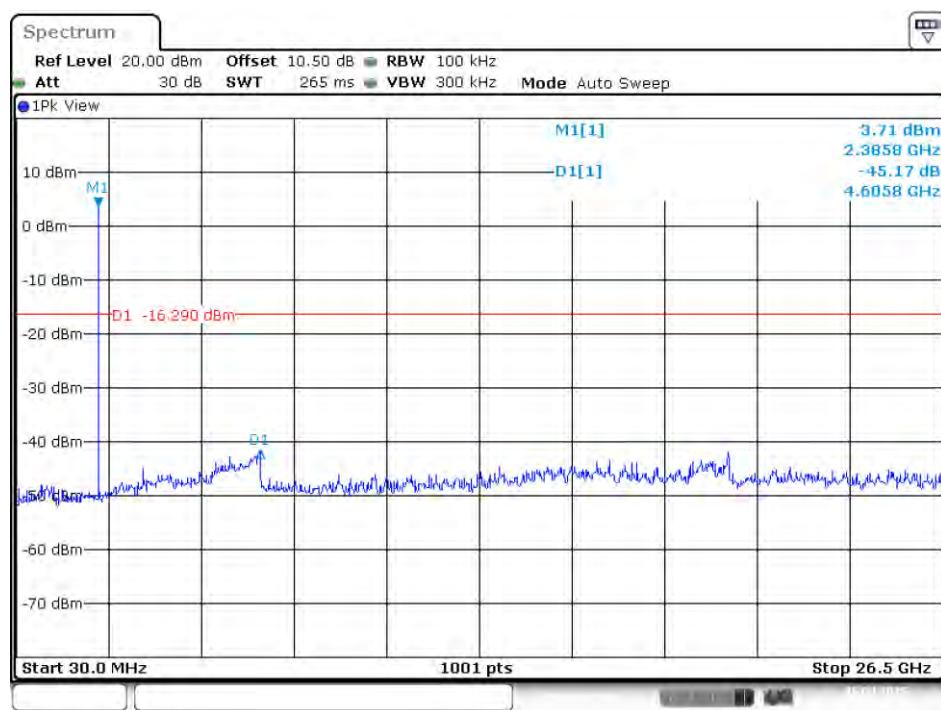
Date: 25 APR 2025 12:23:43

High Channel

Date: 25 APR 2025 12:26:18

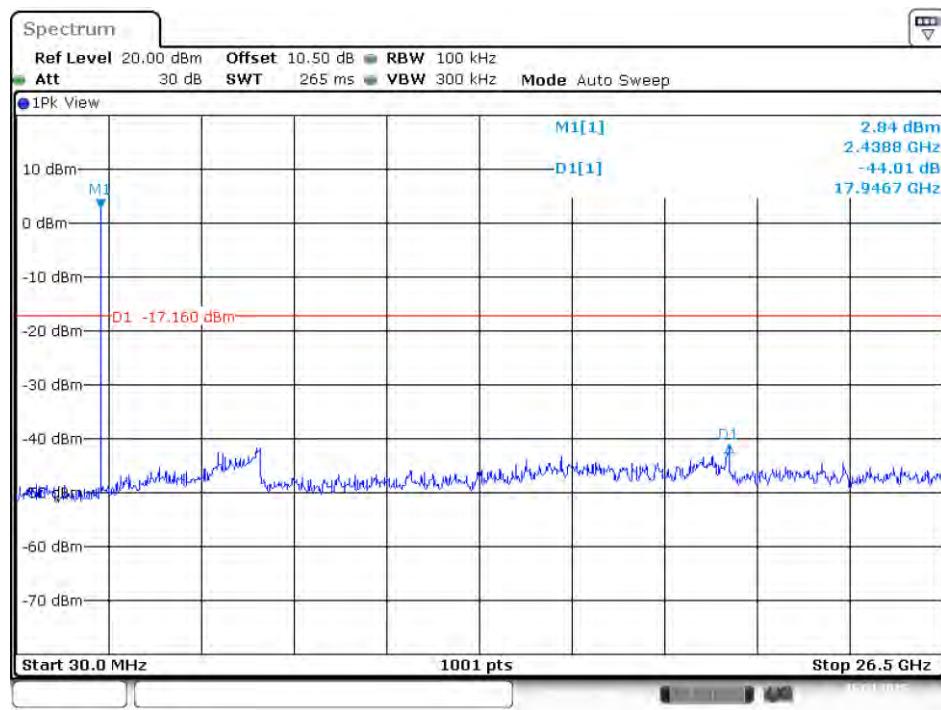
BLE(1M) Mode

Low Channel



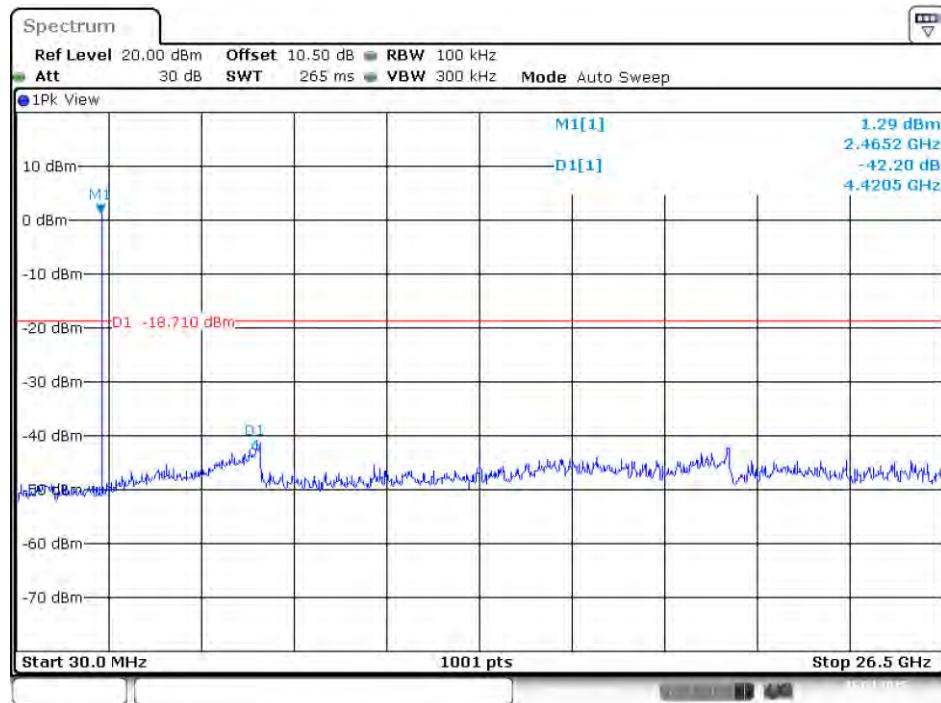
Date: 16 APR 2025 16:45:13

Middle Channel



Date: 16 APR 2025 16:46:44

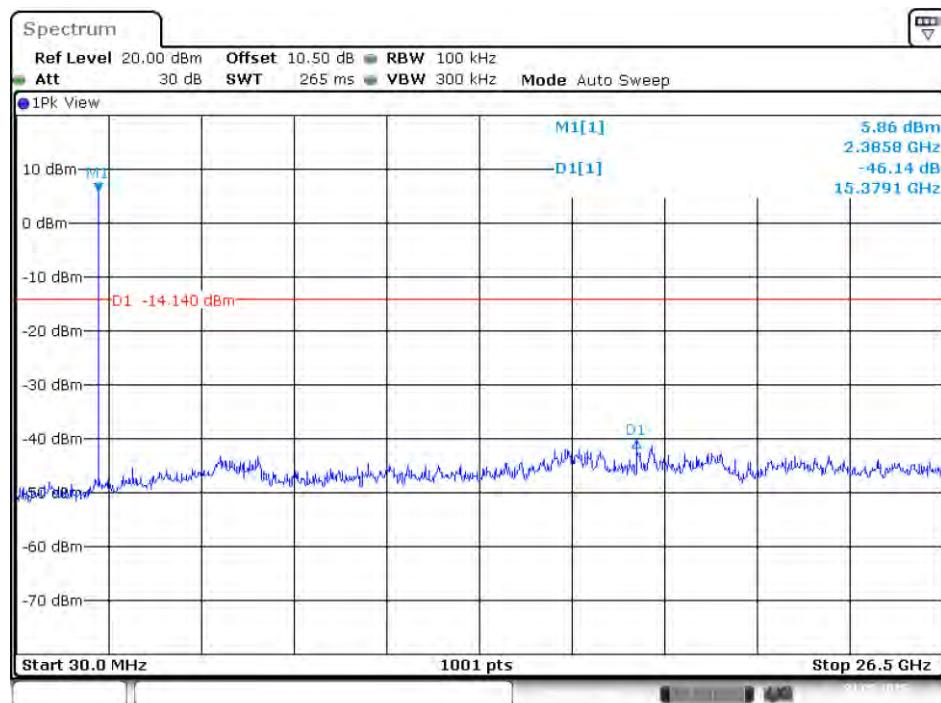
High Channel



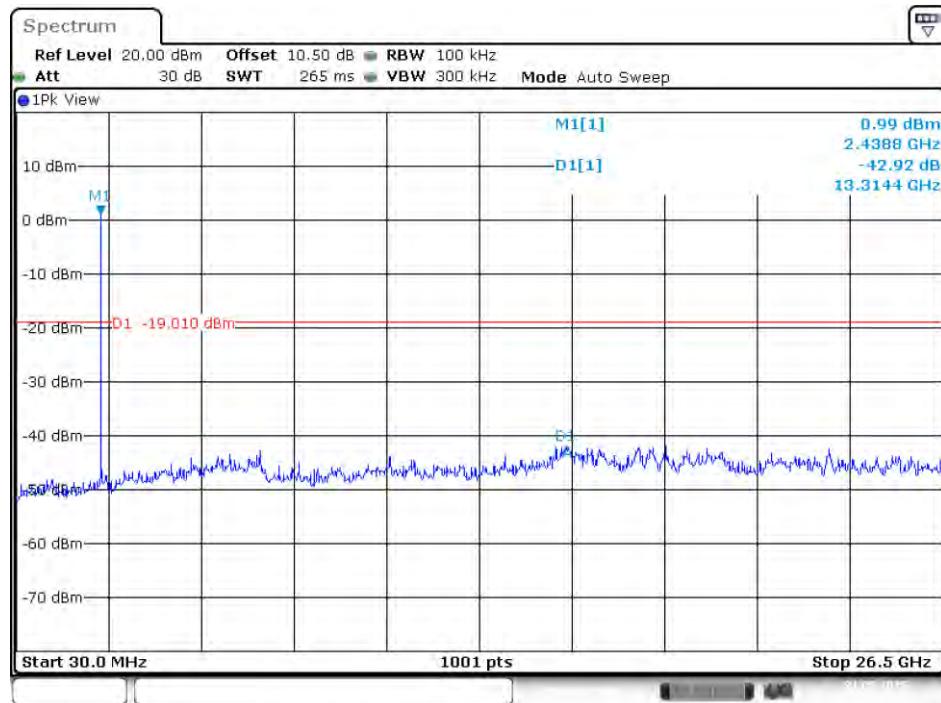
Date: 16 APR 2025 16:48:47

BLE(2M) Mode

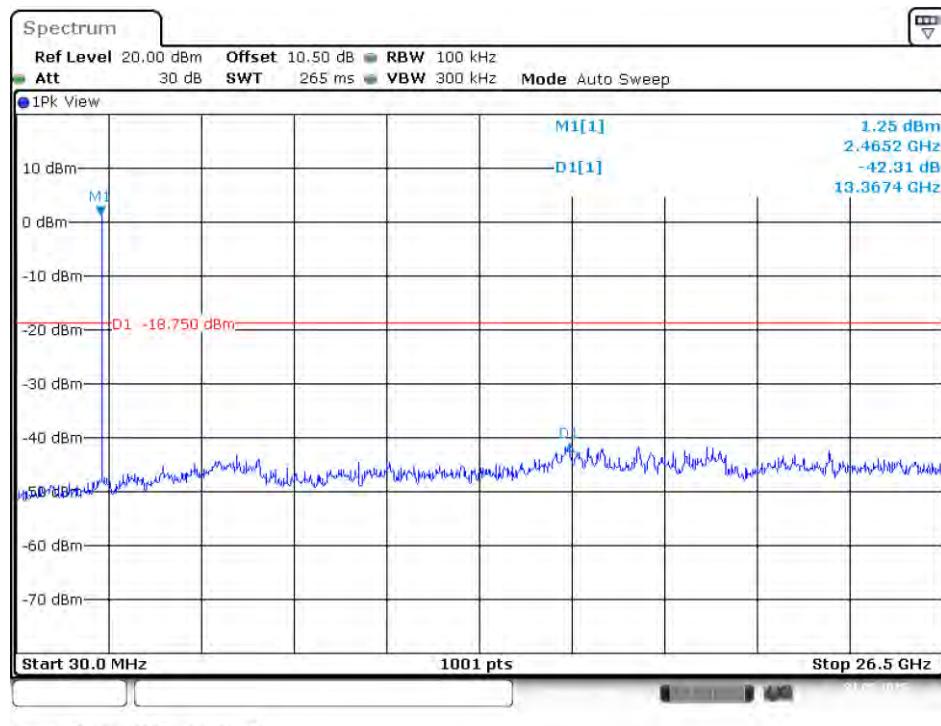
Low Channel



Date: 21.MAY.2025 10:13:44

Middle Channel

Date: 21.MAY.2025 10:19:28

High Channel

Date: 21.MAY.2025 10:24:57

8 FCC §15.247(a)(2) & RSS-247 §5.2(a), RSS-GEN §6.7 – 6 dB Emission Bandwidth & Occupied Bandwidth

8.1 Applicable Standard

According to FCC §15.247(a)(2).

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

According to RSS-247 §5.2 (a)

The minimum 6 dB bandwidth shall be 500 kHz.

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 C63.10-2013, section 11.8

The steps for the first option are as follows:

- a) Set RBW = 100 kHz.
- b) Set the VBW $\geq [3 \times \text{RBW}]$.
- c) Detector = peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

According to ANSI C63.10-2013 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

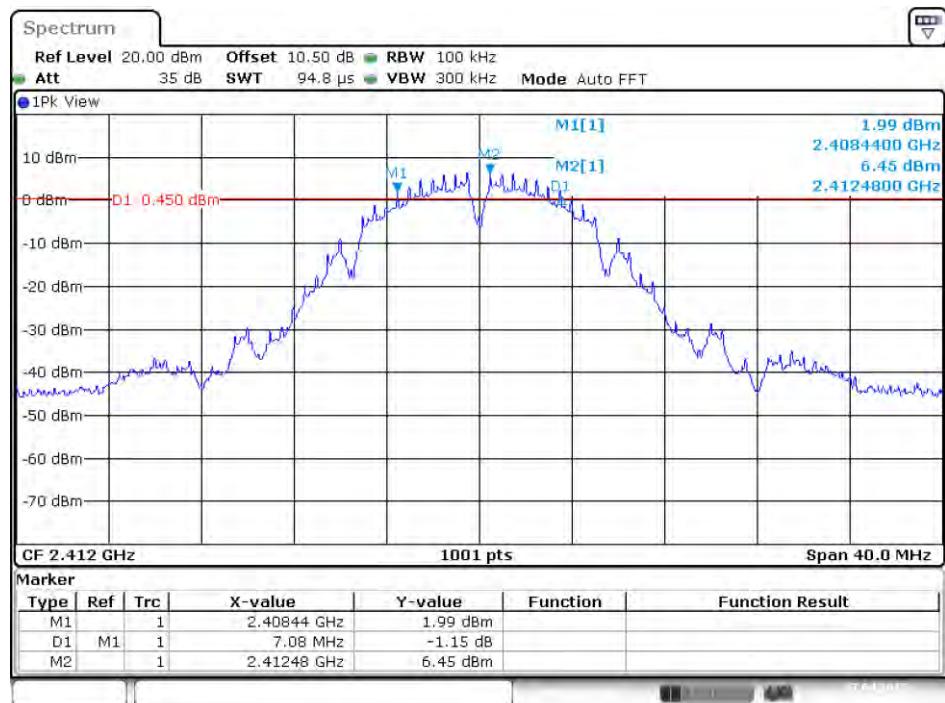
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
B Mode					
Low	2412	7.08	11.19	> 500	PASS
Middle	2437	7.08	11.35	> 500	PASS
High	2462	7.08	11.63	> 500	PASS
G Mode					
Low	2412	15.52	16.38	> 500	PASS
Middle	2437	15.76	16.38	> 500	PASS
High	2462	15.20	16.38	> 500	PASS
N20 Mode					
Low	2412	16.04	17.50	> 500	PASS
Middle	2437	16.52	17.54	> 500	PASS
High	2462	15.48	17.42	> 500	PASS
N40 Mode					
Low	2422	35.20	36.04	> 500	PASS
Middle	2437	35.20	35.96	> 500	PASS
High	2452	35.20	36.04	> 500	PASS
BLE(1M) Mode					
Low	2402	0.74	1.05	> 500	PASS
Middle	2440	0.74	1.05	> 500	PASS
High	2480	0.74	1.05	> 500	PASS

BLE(2M) Mode					
Low	2402	1.12	2.07	> 500	PASS
Middle	2440	1.12	2.07	> 500	PASS
High	2480	1.13	2.07	> 500	PASS

Please refer to the following plots

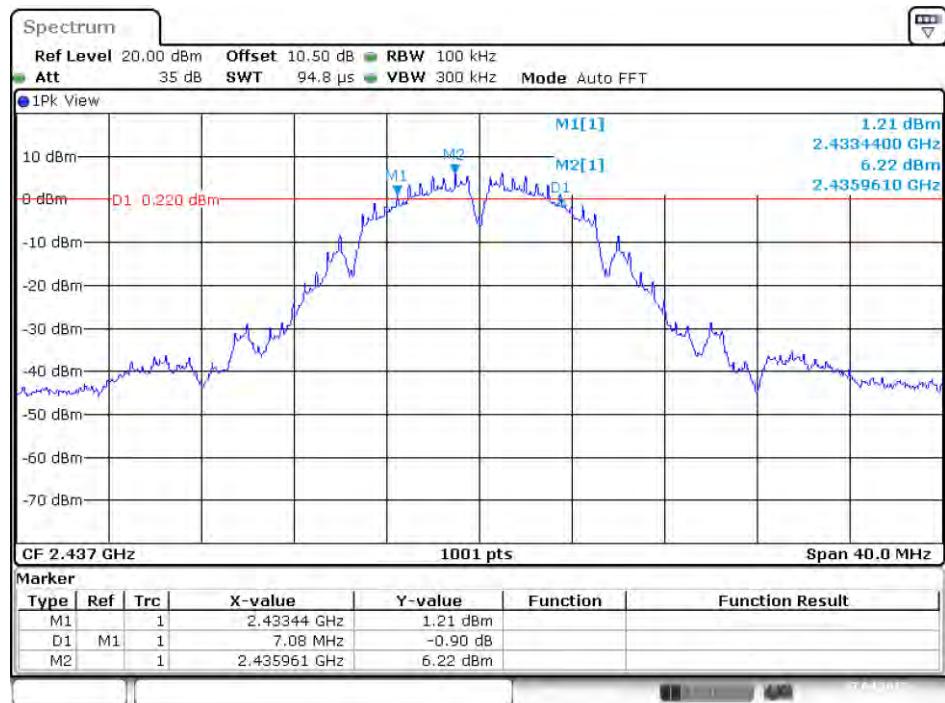
6 dB Emission Bandwidth

B Mode Low Channel



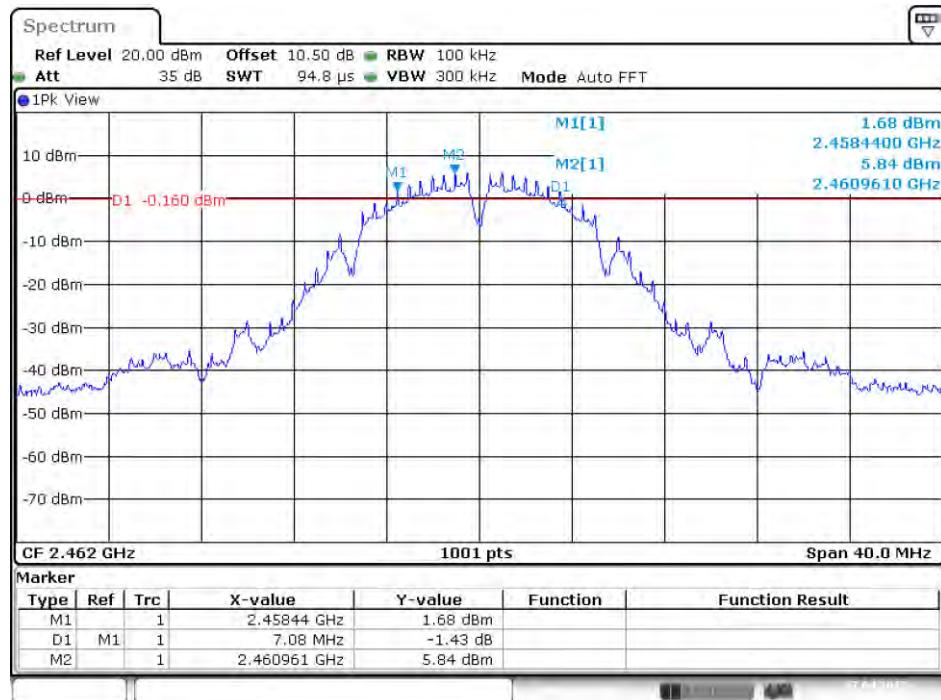
Date: 17/APR/2025 10:47:26

Middle Channel



Date: 17/APR/2025 10:54:26

High Channel



G Mode Low Channel

