

TEST REPORT

of

FCC Part 15 Subpart C §15.247
IC RSS-247 Issue 4 and RSS-Gen Issue 5

FCC ID: 2BO3LLANR62
IC Certification: 2703H-LANR62

Equipment Under Test : CONT ASSY-CDC
Model Name : LANR62
Variant Model Name(s) : -
FCC Applicant : LG Electronics Inc.
IC Applicant : LG ELECTRONICS INC.
Manufacturer : LG Electronics Inc.
Date of Receipt : 2025.10.24
Date of Test(s) : 2025.11.06 ~ 2026.03.17
Date of Issue : 2026.05.26

In the configuration tested, the EUT complied with the standards specified above.
This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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We are responsible for all the information of this test report except for the data(※) provided by the customer

Tested by:



Dave Kim

Technical
Manager:



Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

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- Designation number: KR0150

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1.2. Details of Applicant

FCC Applicant : LG Electronics Inc.

FCC Address : 222 LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, South Korea, 17709

IC Applicant : LG ELECTRONICS INC.

IC Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea (Republic of), 451-713

Contact Person : Kwon, Yong-deok

Phone No. : +82 31 8066 5538

1.3. Details of Manufacturer

Company : LG Electronics Inc.

Address : 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea, 07336

Factory 1 : LG Electronics Inc.

Factory 1 Address : 222 LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 17709, Republic of Korea

Factory 2 : LG Electronics Vietnam Haiphong Co., Ltd.

Factory 2 Address : Lots CN2, Trang Due Industrial Park, Le Loi Commune, An Duong District, Hai Phong City, Vietnam

Factory 3 : LG Electronics Reynosa S.A. de C.V.

Factory 3 Address : Av. Olimpia #2342, Parque Industrial Santa Maria 2da Etapa, 25903 Ramos Arizpe, Coahuila, Mexico

1.4. Description of EUT

Kind of Product	CONT ASSY-CDC
Model Name	LANR62
Serial Number	Conducted: 001 Radiated: 002
Power Supply	DC 12 V
Frequency Range	2 402 MHz ~ 2 480 MHz (Bluetooth Low Energy)
Modulation Technique	GFSK
Number of Channels	40 channels (Bluetooth Low Energy)
Antenna Type	Ant.1: Internal Chip Antenna Ant.2: External Metal Antenna Ant.3: Internal Chip Antenna
Antenna Gain[※]	Ant. 1 BT&BLE: 2 402 MHz ~ 2 480 MHz: 0.99 dB i WLAN5: 5 180 MHz ~ 5 240 MHz: 0.90 dB i 5 745 MHz ~ 5 805 MHz: 0.71 dB i
	Ant. 2 WLAN2: 2 412 MHz ~ 2 462 MHz: 3.09 dB i WLAN5: 5 180 MHz ~ 5 240 MHz: 2.95 dB i 5 745 MHz ~ 5 805 MHz: 4.04 dB i
	Ant. 3 WLAN2: 2 412 MHz ~ 2 462 MHz: 0.71 dB i WLAN5: 5 180 MHz ~ 5 240 MHz: 0.68 dB i 5 745 MHz ~ 5 805 MHz: 0.02 dB i
H/W Version	1.0
S/W Version	1.0
FVIN	1.0

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMA100B	106887	10/20/2025	Annual	10/20/2026
Spectrum Analyzer	R&S	FSV30	103453	10/17/2025	Annual	10/17/2026
Spectrum Analyzer	Agilent	N9020A	MY53421758	09/10/2025	Annual	09/10/2026
Spectrum Analyzer ¹⁾	Agilent	N9030A	US51350132	11/29/2024	Annual	11/29/2025
				12/03/2025		12/03/2026
Attenuator	AEROFLEX/INMET	40AH2W-10	40G-1	06/17/2025	Annual	06/17/2026
High Pass Filter	Wainwright Instrument GmbH	WHKX3.0/18G-10SS	21	06/17/2025	Annual	06/17/2026
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	15	06/09/2025	Annual	06/09/2026
Low Pass Filter ²⁾	Mini-Circuits	NLP-1200+	V8979400903-2	02/04/2025	Annual	02/04/2026
				02/02/2026		02/02/2027
Power Sensor	R&S	NRP-Z81	100669	05/24/2025	Annual	05/24/2026
DC Power Supply	R&S	HMP2020	022802107	10/24/2025	Annual	10/24/2026
Preamplifier	H.P.	8447F	2944A03909	08/07/2025	Annual	08/07/2026
Signal Conditioning Unit ³⁾	R&S	SCU-18F	101058	02/27/2025	Annual	02/27/2026
			100959	01/05/2026	Annual	01/05/2027
Preamplifier ⁴⁾	TESTEK	TK-PA1840H	130016	03/13/2025	Annual	03/13/2026
				03/06/2026		03/06/2027
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	10/01/2025	Biennial	10/01/2027
Bilog Antenna ⁵⁾	Schwarzbeck Mess-Elektronik	VULB 9163	01126	03/05/2025	Biennial	03/05/2027
				03/09/2026		03/09/2028
Horn Antenna ⁶⁾	R&S	HF906	100326	02/24/2025	Annual	02/24/2026
				03/03/2026		03/03/2027
Horn Antenna ⁷⁾	Schwarzbeck Mess-Elektronik	BBHA 9170	9170-540	12/11/2024	Annual	12/11/2025
				12/05/2025		12/05/2026
EMI Test Receiver ⁸⁾	R&S	ESU26	100109	01/13/2025	Annual	01/13/2026
				01/21/2026		01/21/2027
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38330 516/L	N.C.R.	N/A	N.C.R.
Antenna Mast	Innco systems GmbH	MA4640-XP-ET	MA4640/536/38330 516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-5 m	TPC2402190004	10/13/2025	Semi-Annual	04/13/2026
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-10 m	TPC2402190001	10/13/2025	Semi-Annual	04/13/2026
Coaxial Cable	Qualwave	QT50P-40-KK-1.5	24270074	10/10/2025	Semi-Annual	04/10/2026

Note;

- 1) The equipment was not used for testing during the period from 11/27/2025 to 12/08/2025.
- 2) The equipment was not used for testing during the period from 02/02/2026 to 02/05/2026.
- 3) As of 02/05/2026, use of the 101058 was discontinued, and the 100959 was used instead.
- 4) The equipment was not used for testing during the period from 03/03/2026 to 03/09/2026.
- 5) The equipment was not used for testing during the period from 03/03/2026 to 03/12/2026.
- 6) The equipment was not used for testing during the period from 02/24/2026 to 03/05/2026.
- 7) The equipment was not used for testing during the period from 12/05/2025 to 12/08/2025.
- 8) The equipment was not used for testing during the period from 01/13/2026 to 01/22/2026.

1.6. Declaration by the Manufacturer

- The EUT supports BLE version 5.4

1.7. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart C, ISSED RSS-247 Issue 4 and RSS-Gen Issue 5			
Section in FCC	Section in IC	Test Item(s)	Result
15.205(a) 15.209 15.247(d)	RSS-247 Issue 4 6.6 RSS-Gen Issue 5 8.9	Transmitter Radiated Spurious Emissions and Conducted Spurious Emission	Pass
15.247(a)(2)	RSS-247 Issue 4 6.3.1(a) RSS-Gen Issue 5 6.7	6 dB Bandwidth & 99 % Bandwidth	Pass
15.247(b)(3)	RSS-247 Issue 4 6.3.2	Maximum Peak Conducted Output Power	Pass
15.247(e)	RSS-247 Issue 4 6.3.1(b)	Power Spectral Density	Pass
15.207	RSS-Gen Issue 5 8.8	AC Power Line Conducted Emission	N/A ¹⁾

Note;

1) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

1.8. Test Procedure(s)

The measurement procedures described in the American National Standard of Procedure for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2020 for FCC and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 for ISSED), as well as the guidance provided in KDB 558074 D01 15.247 Meas Guidance v05r02, were used in the measurement of the DUT.

All measurement procedures in the test report comply with both ANSI versions, with no effect on the test results

1.9. Sample Calculation

Where relevant, the following sample calculation is provided:

1.9.1. Conducted Test

Offset value (dB) = Attenuator (dB) + Cable loss (dB)

1.9.2. Radiation Test

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB/m) + Cable loss (dB) - Amplifier gain (dB)
+ Duty factor (dB)

1.10. Information of software for test

- Operating software of EUT has integrated test interface. No additional software was used.

1.11. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
Maximum Peak Conducted Output Power	0.32 dB	
Power Spectral Density	0.63 dB	
99 % Bandwidth	0.04 MHz	
6 dB Bandwidth	0.05 MHz	
Conducted Spurious Emission	0.89 dB	
Radiated Emission, 9 kHz to 30 MHz	H	3.60 dB
	V	3.60 dB
Radiated Emission, below 1 GHz	H	5.50 dB
	V	5.10 dB
Radiated Emission, above 1 GHz	H	3.50 dB
	V	3.40 dB

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

1.12. Test Report Revision

Revision	Report number	Date of Issue	Description
0	F690501-RF-RTL006895	2026.04.21	Initial
1	F690501-RF-RTL006895-1	2026.05.26	Updated the test equipment list

1.13. Worst-Case Configuration and Test Mode (Bluetooth 5.4)

Modulation	Bandwidth	Mode	Frequency (MHz)	RF Output Power (dBm)
GFSK	1M	PHY 1M	2 440	<u>1.22</u>
		125k Coded		1.08
		500k Coded		1.10
	2M	PHY 2M		<u>1.40</u>

Remark;

The EUT supported PHY 1M, PHY 2M.

All modes were investigated.

For PHY 1M and PHY 2M 255 bytes is tested as worst condition.

Radiated emission below 1 GHz was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1 GHz was performed with the EUT set to transmit Low/Middle/High Channels as worst-case scenario.

Conducted tests were performed with the EUT set to transmit Low/Middle/High channels with highest output power.

1.14. Device Capabilities

Mode	SISO			CDD / MIMO	
	Ant. 1	Ant. 2	Ant. 3	Ant. 1 + Ant. 2	Ant. 1 + Ant. 3
Bluetooth Low Energy	O	X	X	X	X
Bluetooth	O	X	X	X	X
WLAN 2 GHz	X	O	O	X	X
WLAN 5 GHz	O	O	O	O	O

Note;

- The EUT has three ports and all ports transmit by one WLAN module.

1.15. Duty Cycle of EUT

Regarding to KDB 558074 D01 15.247 Meas Guidance v05r02, 6, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below;

Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100.

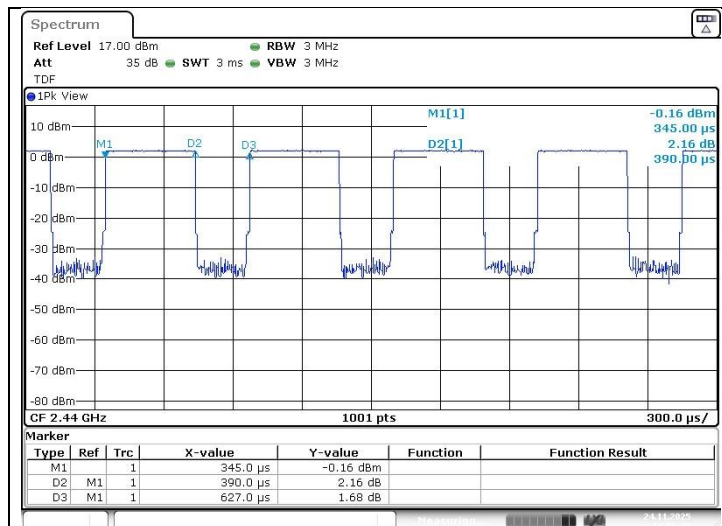
Test Mode	PHY 1M	PHY 2M
Duty Cycle (%)	62.20	33.17
Correction Factor (dB)	2.06	4.79

Remark;

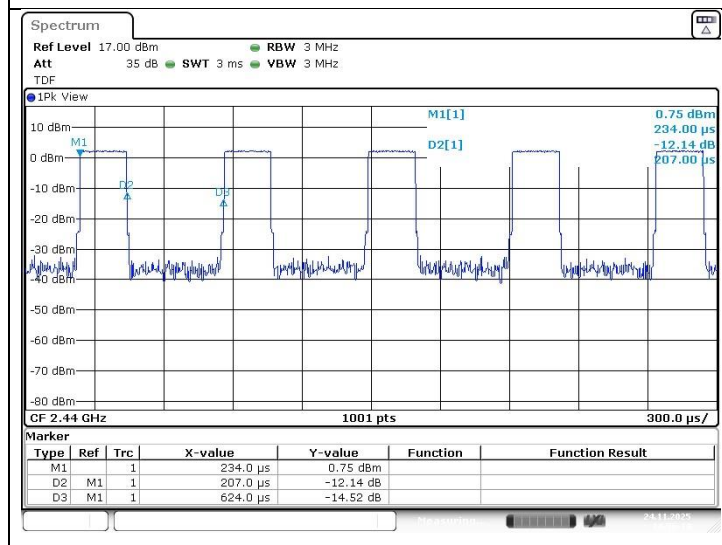
- Duty Cycle (%) = (Tx on time / Tx on + off time) x 100
- Correction Factor (dB) = 10 log (1 / Duty Cycle)

- Test plots

PHY 1M



PHY 2M

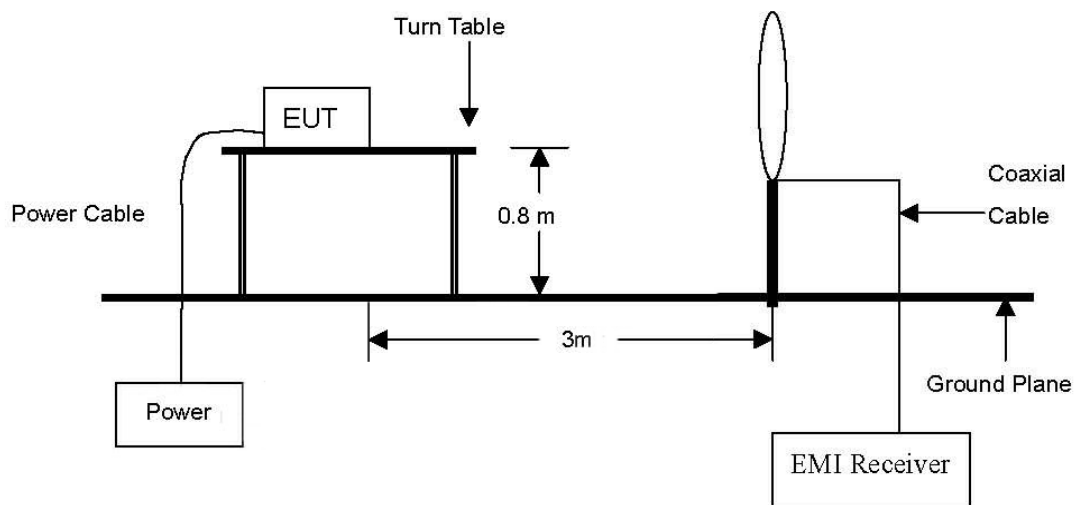


2. Transmitter Radiated Spurious Emissions and Conducted Spurious Emissions

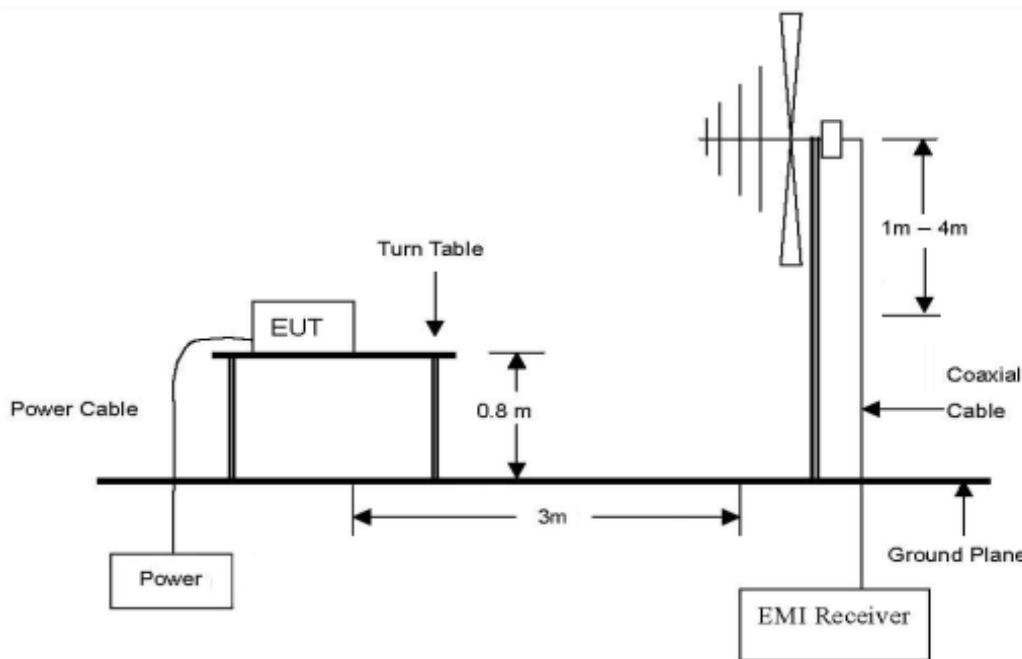
2.1. Test Setup

2.1.1. Transmitter Radiated Spurious Emissions

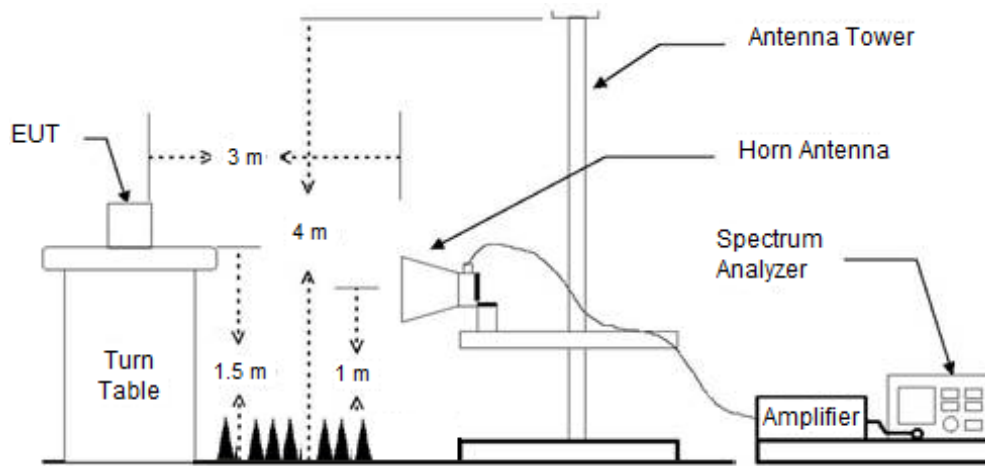
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated from 1 GHz to the 10th harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.



2.1.2. Conducted Spurious Emissions



2.2. Limit

2.2.1. FCC

According to §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 emission which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to §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 ($\mu\text{V}/\text{m}$)	Measurement Distance (Meters)
0.009-0.490	2 400/F(kHz)	300
0.490-1.705	24 000/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., §§15.231 and 15.241.

2.2.2. IC

According to RSS-247 Issue 4, 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.

According to RSS-Gen Issue 5, 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 ($\mu V/m$ 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	Magnetic Field Strength (H-Field) ($\mu A/m$)	Measurement Distance (meters)
9-490 kHz ¹	6.37/F (F in kHz)	300
490-1 705 kHz	63.7/F (F in kHz)	30
1.705-30 MHz	0.08	30

Note¹: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

2.3. Test Procedures

Radiated emissions from the EUT were measured in accordance with sections 11.11 & 11.12 of ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISSED).

2.3.1. Test Procedures for emission below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meters above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. For measurements below 1 GHz resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.
6. For measurements Above 1 GHz resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

2.3.3. Test Procedures for Radiated Spurious Emissions

1. Unwanted Emissions into Non-Restricted Frequency Bands

- The Reference Level Measurement refer to section 11.11.2

Set analyzer center frequency to DTS channel center frequency, SPAN ≥ 1.5 times the DTS bandwidth, the RBW = 100 kHz and VBW $\geq 3 \times$ RBW, Detector = Peak, Sweep time = No faster than coupled (auto) time, Trace = Max hold.

- Unwanted Emissions Level Measurement refer to section 11.11.3

Set the center frequency and span to encompass frequency range to be measured, the RBW = 100 kHz and VBW $\geq 3 \times$ RBW, Detector = Peak, Sweep time = No faster than coupled (auto) time, Trace = Max hold.

2. Unwanted Emissions into Restricted Frequency Bands

- Peak Power measurement procedure refer to section 11.12.2.4

Set RBW = as specified in Table 16, VBW $\geq 3 \times$ RBW, Detector = Peak, Sweep time = No faster than coupled (auto) time, Trace = Max hold.

Table 16 – RBW as a function of frequency

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

If the peak – detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

- Average Power measurements procedure refer to section 11.12.2.5.2

The EUT shall be configured to operate at the maximum achievable duty cycle.

Measure the duty cycle D of the transmitter output signal as described in section 11.6.

Set RBW = 1 MHz, VBW $\geq 3 \times$ RBW, Detector = Power averaging (rms), if span / (# of points in sweep) $\leq$ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied then the detector mode shall be set to peak.

Averaging type = power (i.e., RMS).

As an alternative the detector and averaging type may be set for linear voltage averaging.

Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used. Sweep time = auto, Perform a trace average of at least 100 traces.

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

- 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is $[10 \log (1 / D)]$, where D is the duty cycle.
- 2) If a specific emission is demonstrated to be continuous (D $\geq 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycled correction is required for that emission.

3. Definition of DUT Axis.

The radiation test of the EUT was investigated in three orthogonal orientations X, Y, and Z described in the test setup photo. All radiated testing of EUT was performed with worst case axis.

2.3.4. Test Procedures for Conducted Spurious Emissions

Per the guidance of ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISED), the reference level for out of band emissions is established from the plots of this section since the band edge emissions are measured with a RBW of 100 kHz. This reference level is then used as the limit in subsequent plots for out of band spurious emissions shown in section 2.4.3. The limit for out of band spurious emission at the band edge is 20 dB below the fundamental emission level measured in a 100 kHz bandwidth.

1. Conducted Emissions at Band Edge

- The Measurement refer to section 11.11.3

Set the center frequency and span to encompass frequency range to be measured, the RBW = 100 kHz and VBW $\geq 3 \times$ RBW, Detector = Peak, Sweep time = No faster than coupled (auto) time, Trace mode = Max hold, The trace was allowed to stabilize.

2. Conducted Spurious Emissions

- The Measurement refer to section 11.11.3

Start frequency was set to 9 kHz and stop frequency was set to 25 GHz (separated plots per channel), RBW = 1 MHz, VBW $\geq 3 \times$ RBW, Detector = Peak, Sweep time = No faster than coupled (auto) time, Trace = Max hold, The trace was allowed to stabilize.

3. TDF function

- For plots showing conducted spurious emissions from 9 kHz to 25 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.
So, the reading values shown in plots were final result.

2.4. Test Results

Ambient temperature : $(23 \pm 1) ^\circ\text{C}$

Relative humidity : 47 %

2.4.1. Radiated Spurious Emissions below 1 000 MHz

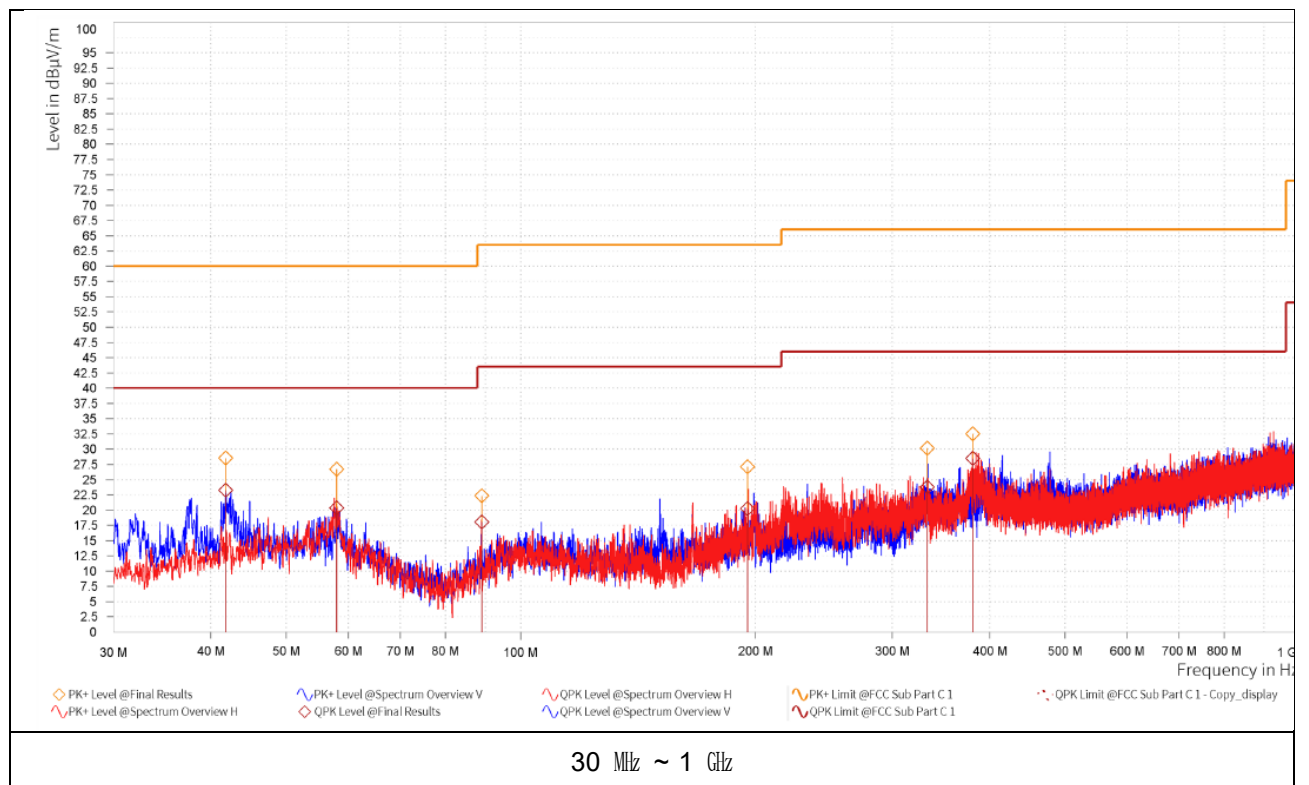
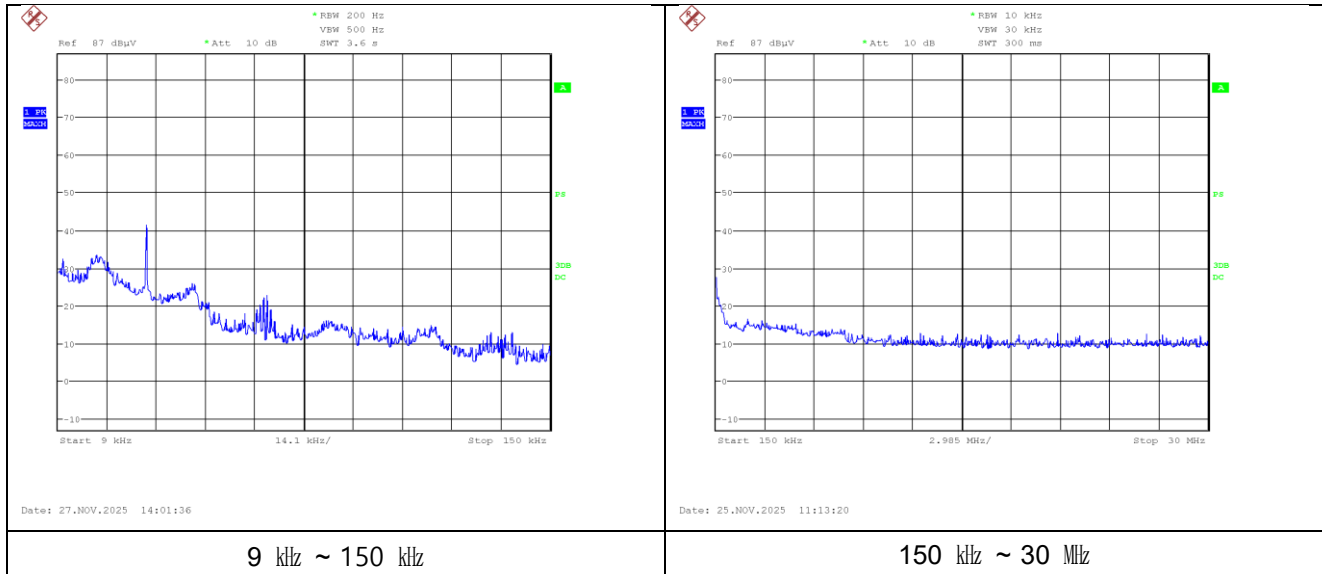
The frequency spectrum from 9 MHz to 1 000 MHz was investigated.

Radiated Emissions			Ant.	Correction Factors (dB/m)	Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.		Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
41.80	31.46	Quasi Peak	V	-8.19	23.27	40.00	16.73
58.02	28.40	Quasi Peak	H	-8.09	20.31	40.00	19.69
380.28	32.52	Quasi Peak	H	-4.06	28.46	46.00	17.54
Above 400.00	Not detected	-	-	-	-	-	-

Remark;

1. Spurious emissions for all channels were investigated and almost the same below 1 GHz.
2. Test from 30 MHz to 1 000 MHz was performed using the software of ELEKTRA(V5.02) from Rohde & Schwarz GmbH & Co. KG.
3. Reported spurious emissions are in **PHY 2M / Middle channel** as worst case among other mode and channels.
4. Radiated spurious emission measurement as below.
(Actual = Reading + Correction)
(Correction = Antenna Factor + AMP Factor + Cable Loss)
5. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Test plots



2.4.2. Radiated Spurious Emissions above 1 000 MHz

The frequency spectrum above 1 000 MHz was investigated. All reading values are peak and average values.

Test mode: PHY 1M

Low Channel (2 402 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*2 310.00	13.15	Peak	H	27.94	7.33	-	48.42	74.00	25.58
*2 310.00	3.64	Average	H	27.94	7.33	2.06	40.97	54.00	13.03
*2 385.19	14.97	Peak	H	28.17	7.55	-	50.69	74.00	23.31
*2 386.68	3.87	Average	H	28.17	7.56	2.06	41.66	54.00	12.34
*2 390.00	13.92	Peak	H	28.18	7.59	-	49.69	74.00	24.31
*2 390.00	3.94	Average	H	28.18	7.59	2.06	41.77	54.00	12.23

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

Middle Channel (2 440 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

High Channel (2 480 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	15.05	Peak	H	28.34	7.58	-	50.97	74.00	23.03
*2 483.50	4.38	Average	H	28.34	7.58	2.06	42.36	54.00	11.64
*2 483.61	14.75	Peak	H	28.34	7.58	-	50.67	74.00	23.33
*2 483.64	4.30	Average	H	28.34	7.58	2.06	42.28	54.00	11.72
*2 500.00	14.05	Peak	H	28.50	7.74	-	50.29	74.00	23.71
*2 500.00	4.15	Average	H	28.50	7.74	2.06	42.45	54.00	11.55

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

Test mode: PHY 2M

Low Channel (2 402 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 310.00	14.93	Peak	H	27.94	7.33	-	50.20	74.00	23.80
*2 310.00	3.69	Average	H	27.94	7.33	4.79	43.75	54.00	10.25
*2 373.81	13.98	Peak	H	28.15	7.47	-	49.60	74.00	24.40
*2 383.86	3.96	Average	H	28.17	7.54	4.79	44.46	54.00	9.54
*2 390.00	14.82	Peak	H	28.18	7.59	-	50.59	74.00	23.41
*2 390.00	3.91	Average	H	28.18	7.59	4.79	44.47	54.00	9.53

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

Middle Channel (2 440 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

High Channel (2 480 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*2 483.50	15.11	Peak	H	28.34	7.58	-	51.03	74.00	22.97
*2 483.50	4.25	Average	H	28.34	7.58	4.79	44.96	54.00	9.04
*2 483.64	15.71	Peak	H	28.34	7.58	-	51.63	74.00	22.37
*2 483.64	4.14	Average	H	28.34	7.58	4.79	44.85	54.00	9.15
*2 500.00	14.79	Peak	H	28.50	7.74	-	51.03	74.00	22.97
*2 500.00	4.14	Average	H	28.50	7.74	4.79	45.17	54.00	8.83

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

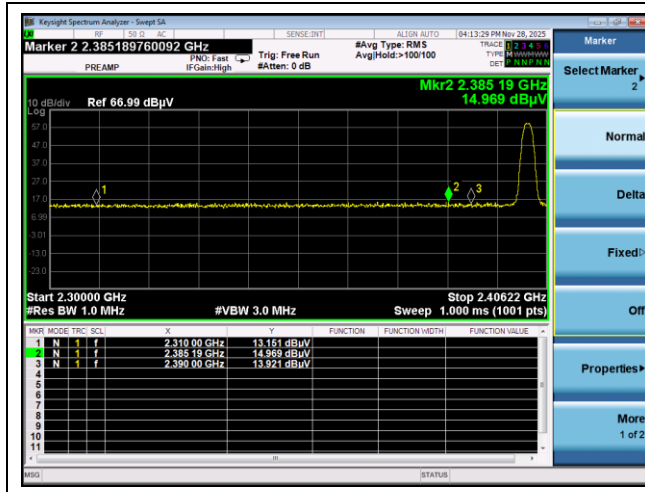
Remarks;

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
3. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
4. Actual = Reading + AF + CL + (DF) or Reading + AF + AMP + CL + (DF).
5. According to § 15.31(o), emission levels are not reported much lower than the limits by over 20 dB.
6. The maximized peak measured value complies with the average limit, to perform an average measurement is unnecessary.
7. AF = Antenna Factor, CL = Cable Loss, DF = Duty Correction Factor.

- Test plots

Test mode: PHY 1M

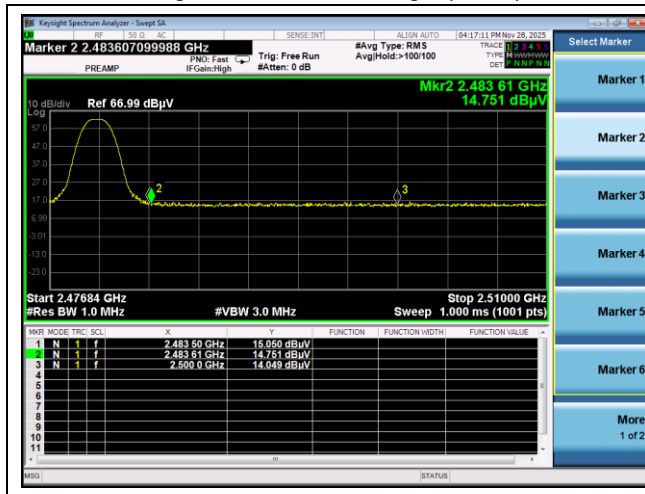
Low channel band edge (Peak)



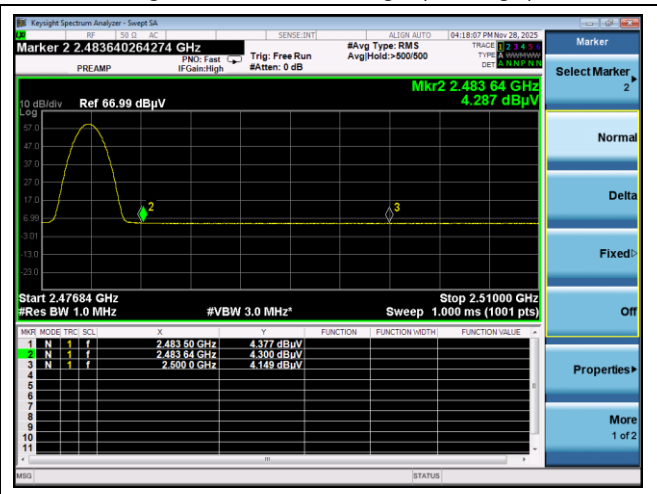
Low channel band edge (Average)



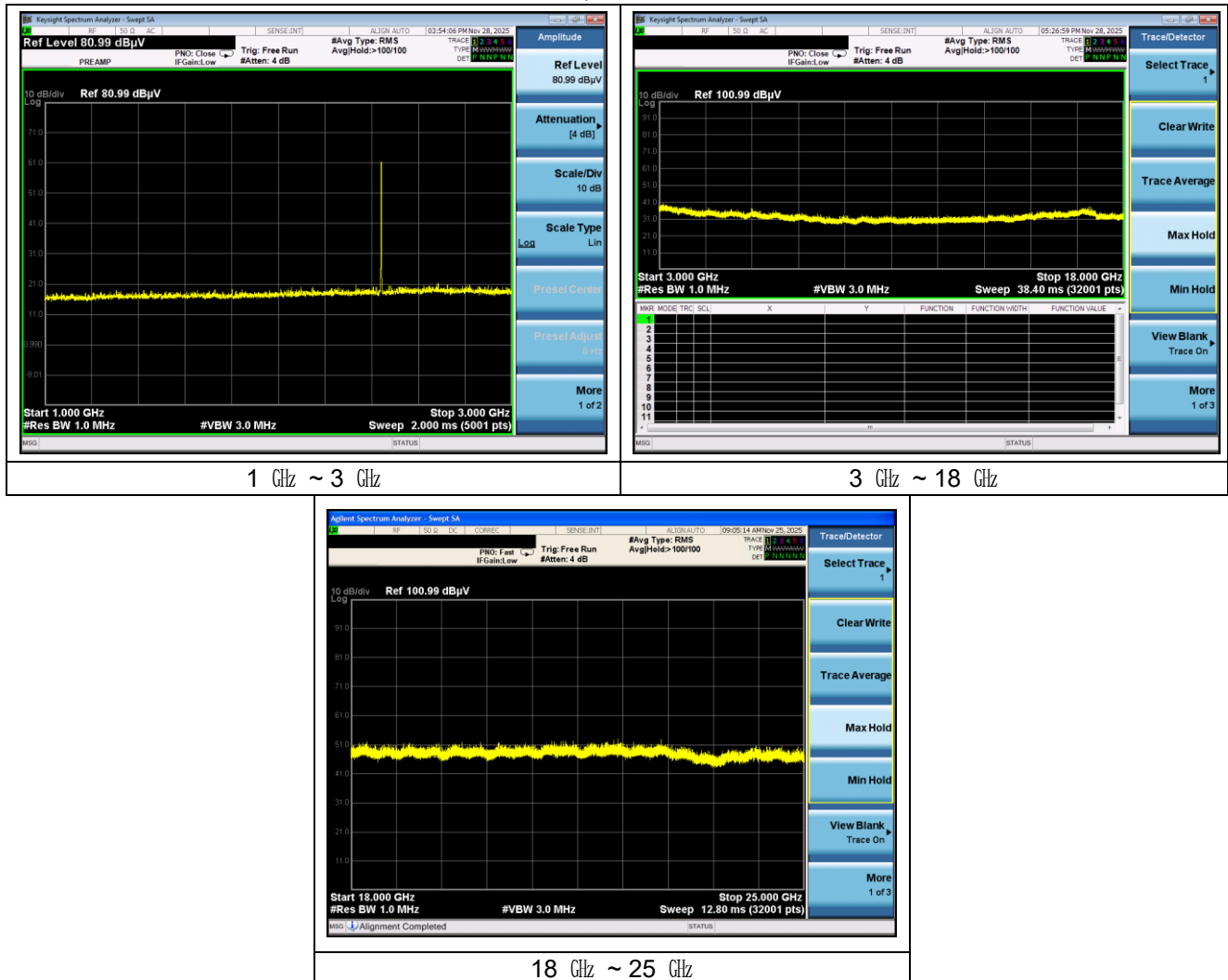
High channel band edge (Peak)



High channel band edge (Average)

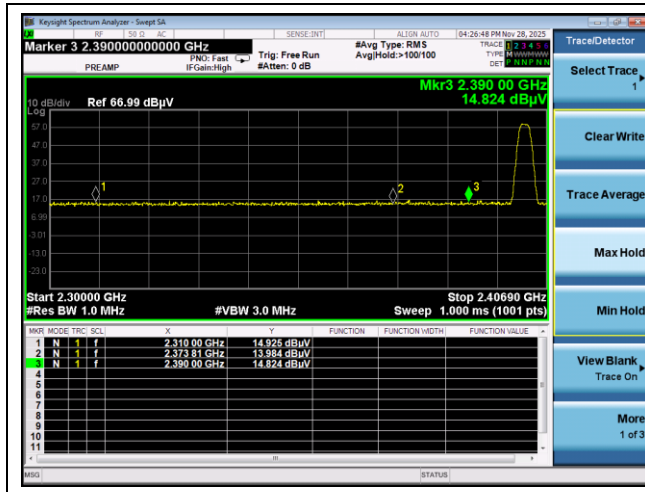


Radiated Spurious Emissions

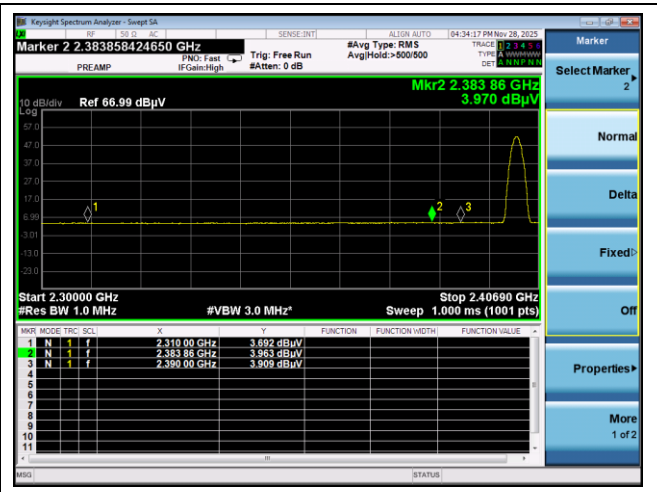


Test mode: PHY 2M

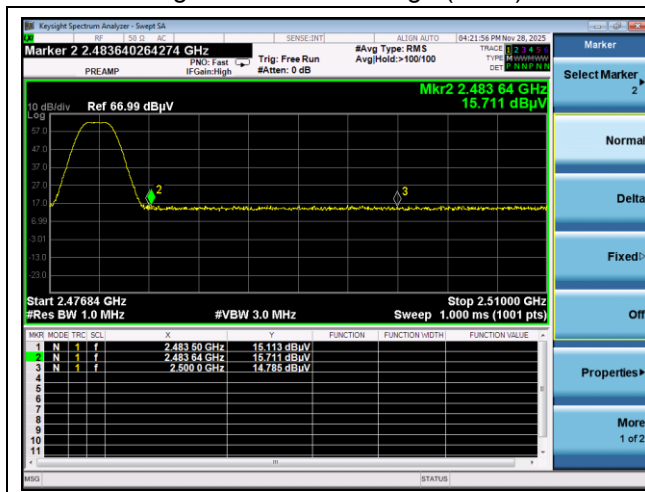
Low channel band edge (Peak)



Low channel band edge (Average)



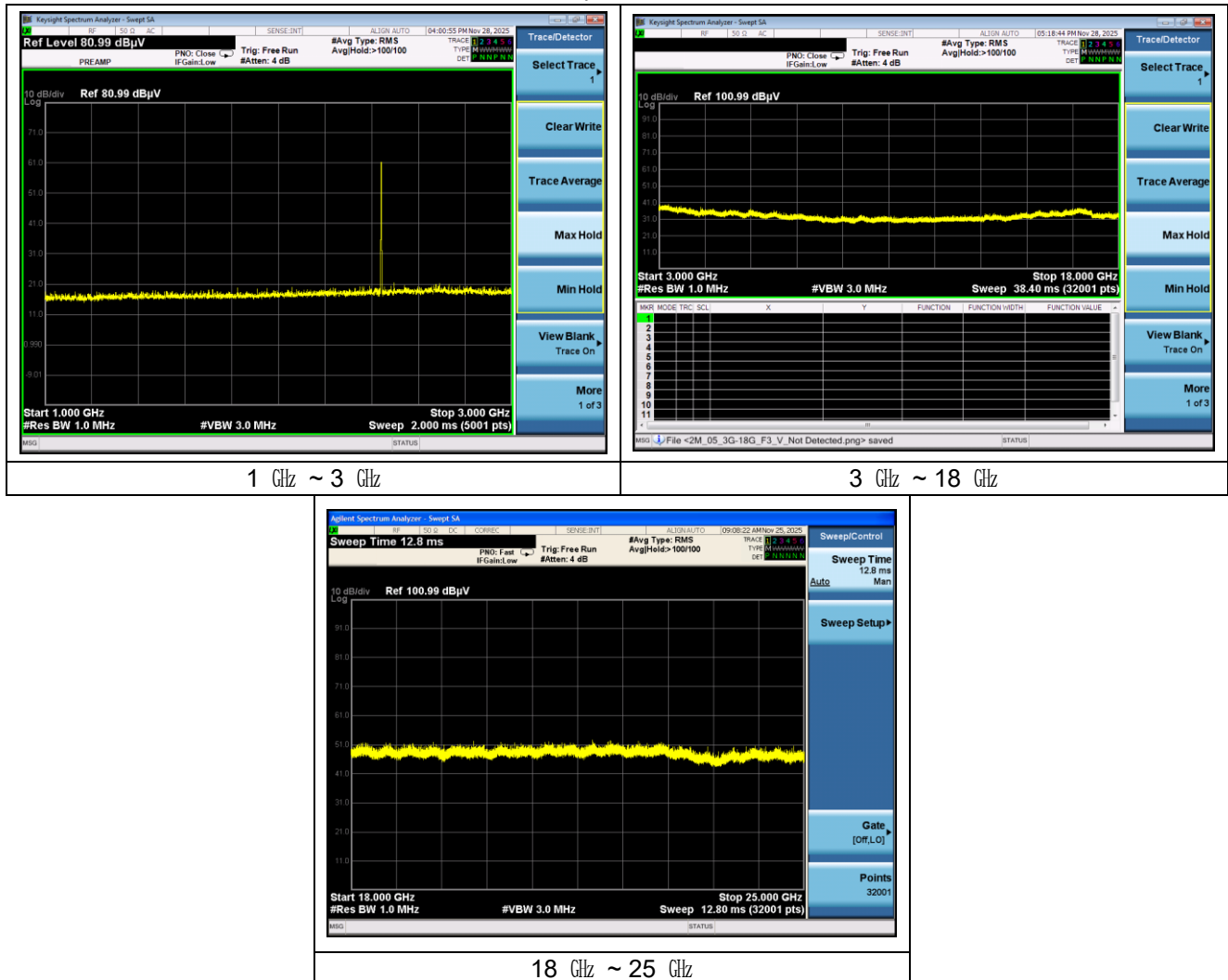
High channel band edge (Peak)



High channel band edge (Average)



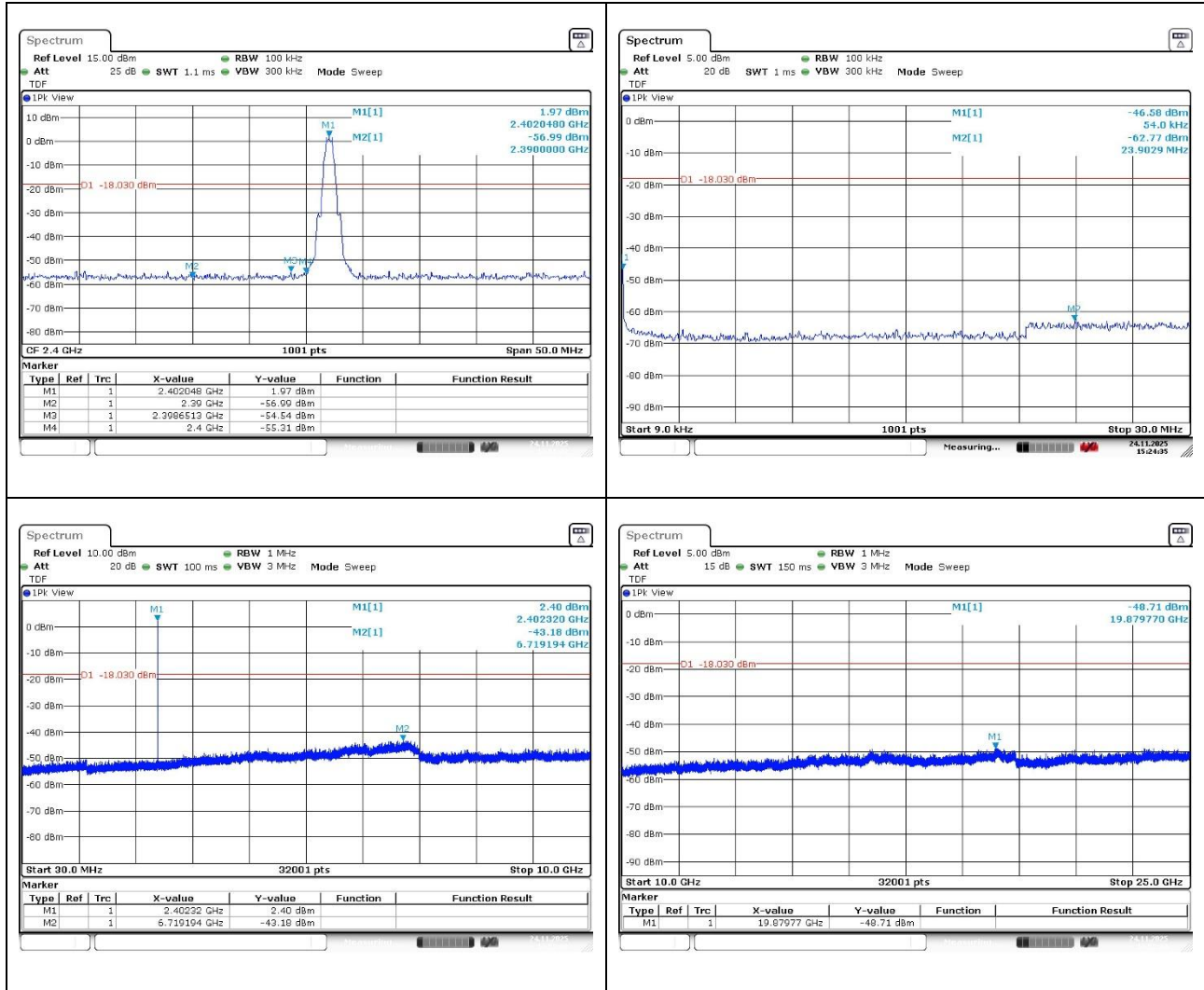
Radiated Spurious Emissions



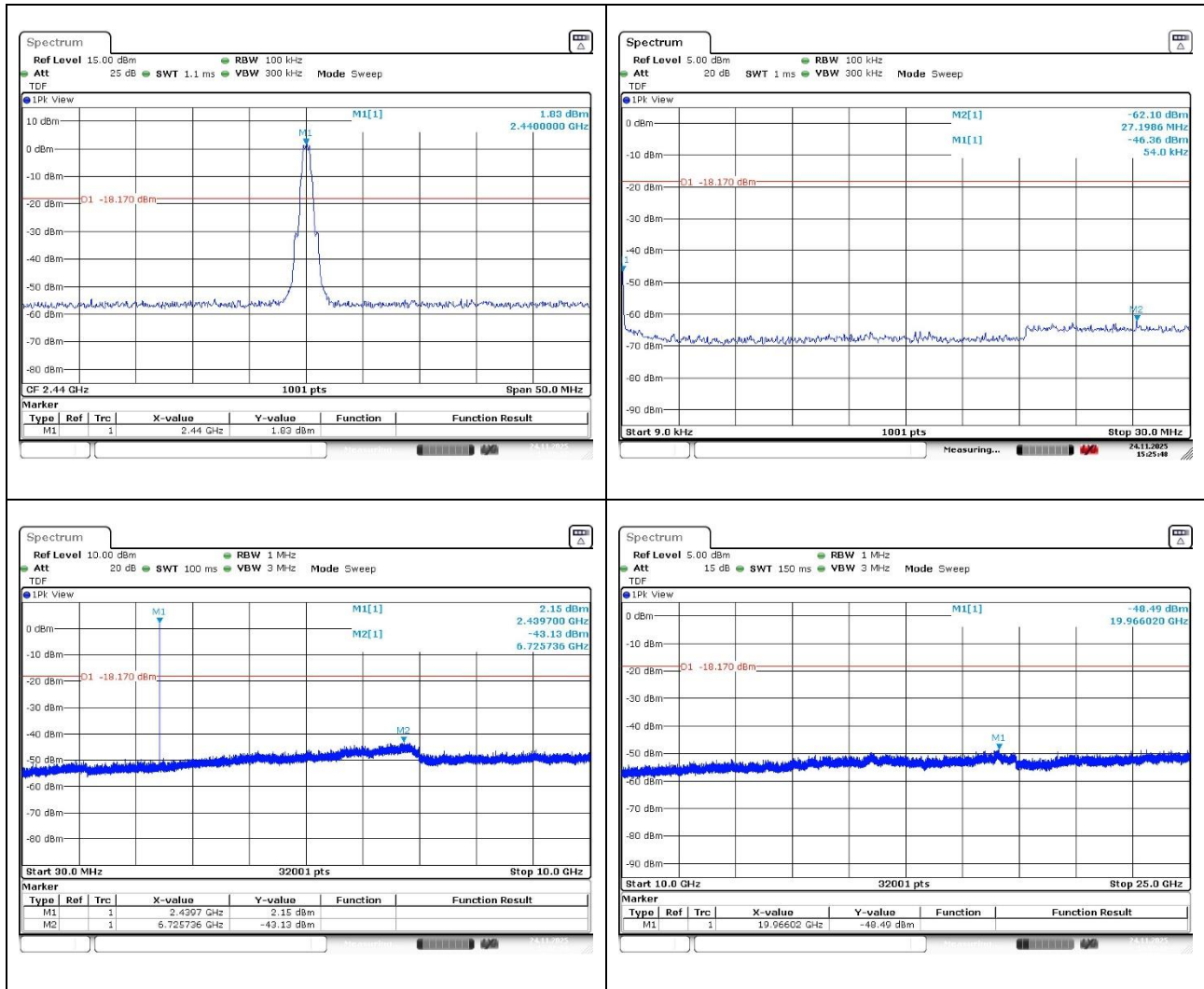
2.4.3. Plot of Conducted Spurious Emissions

Test mode: PHY 1M

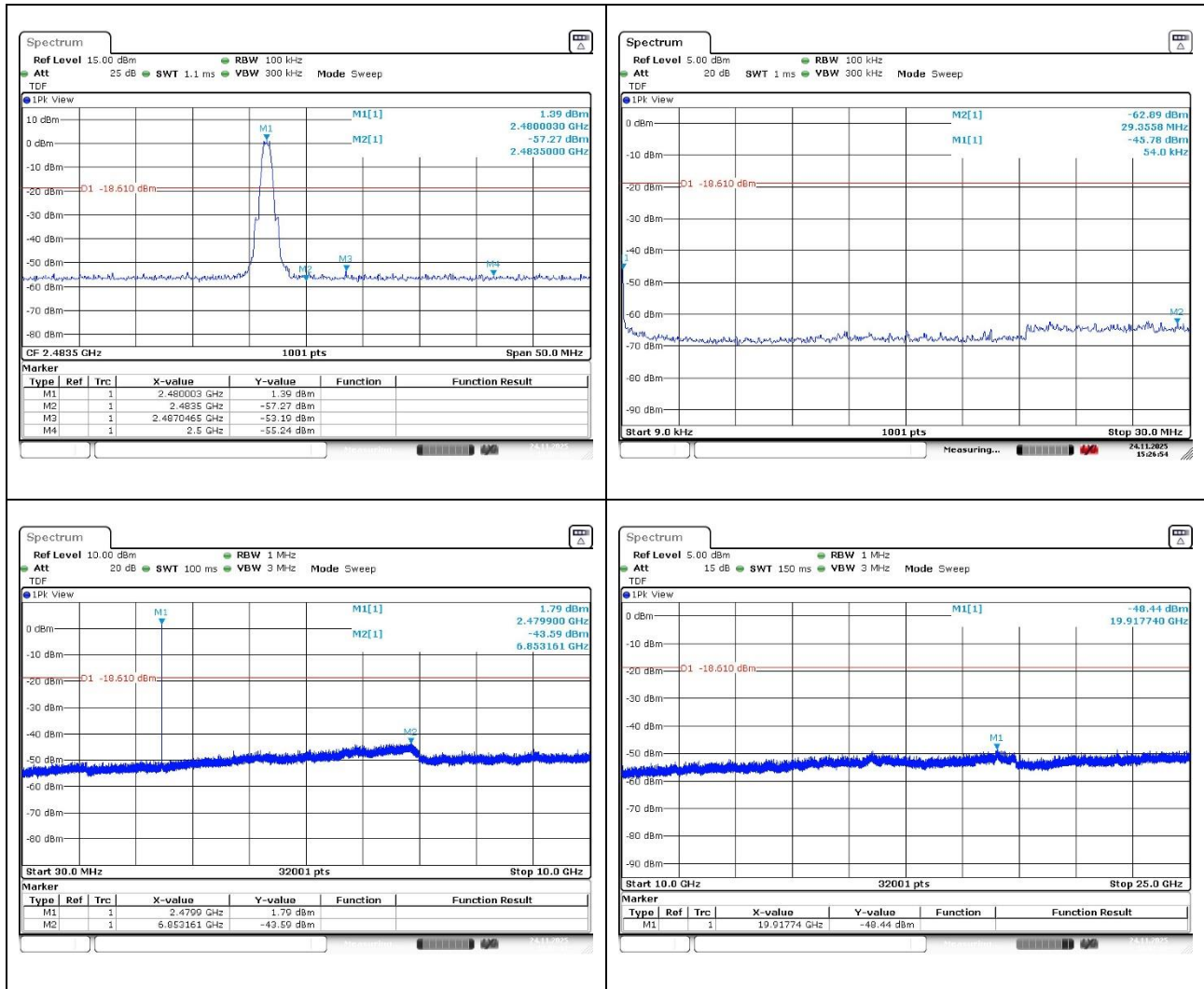
Low Channel



Middle Channel

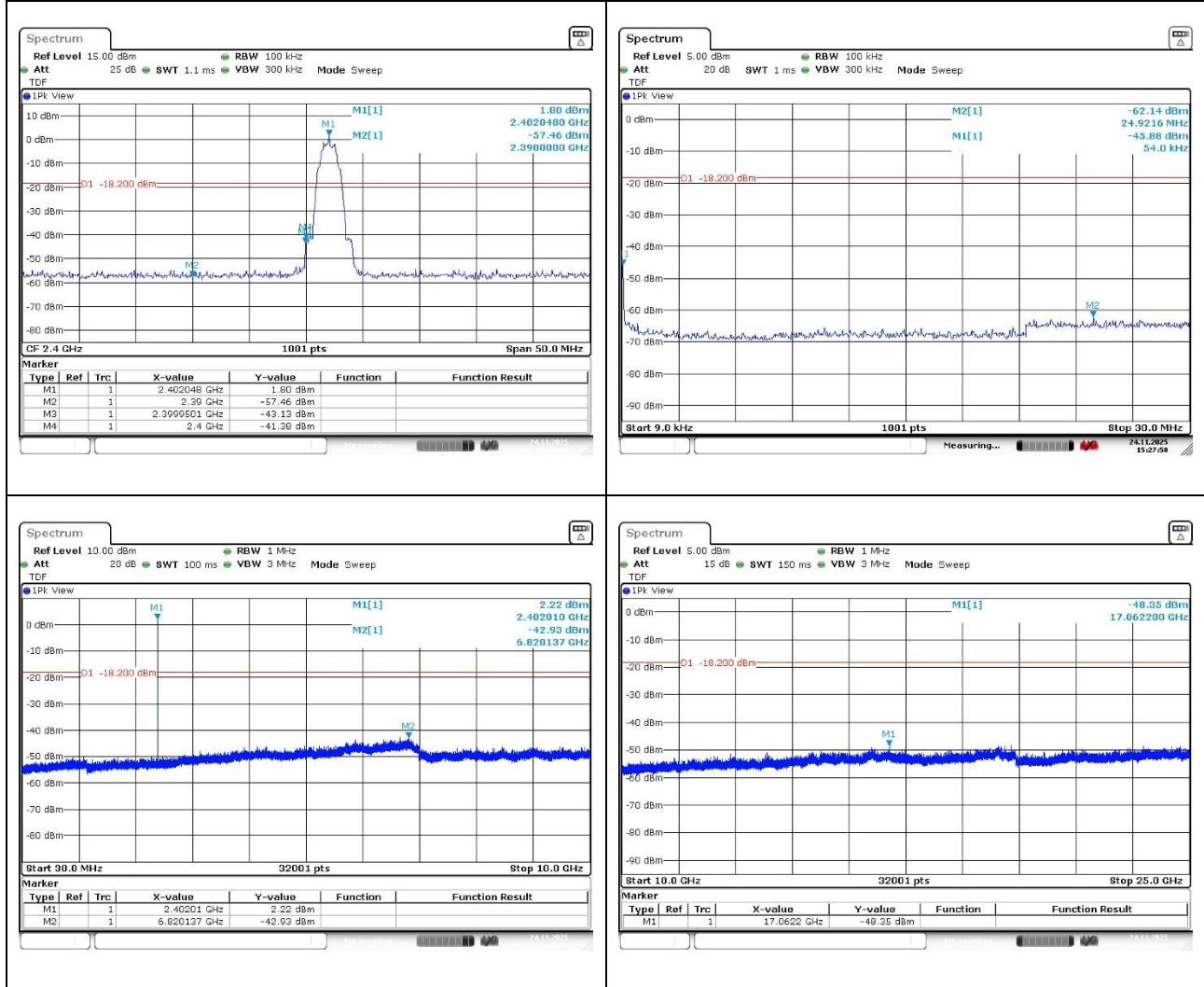


High Channel

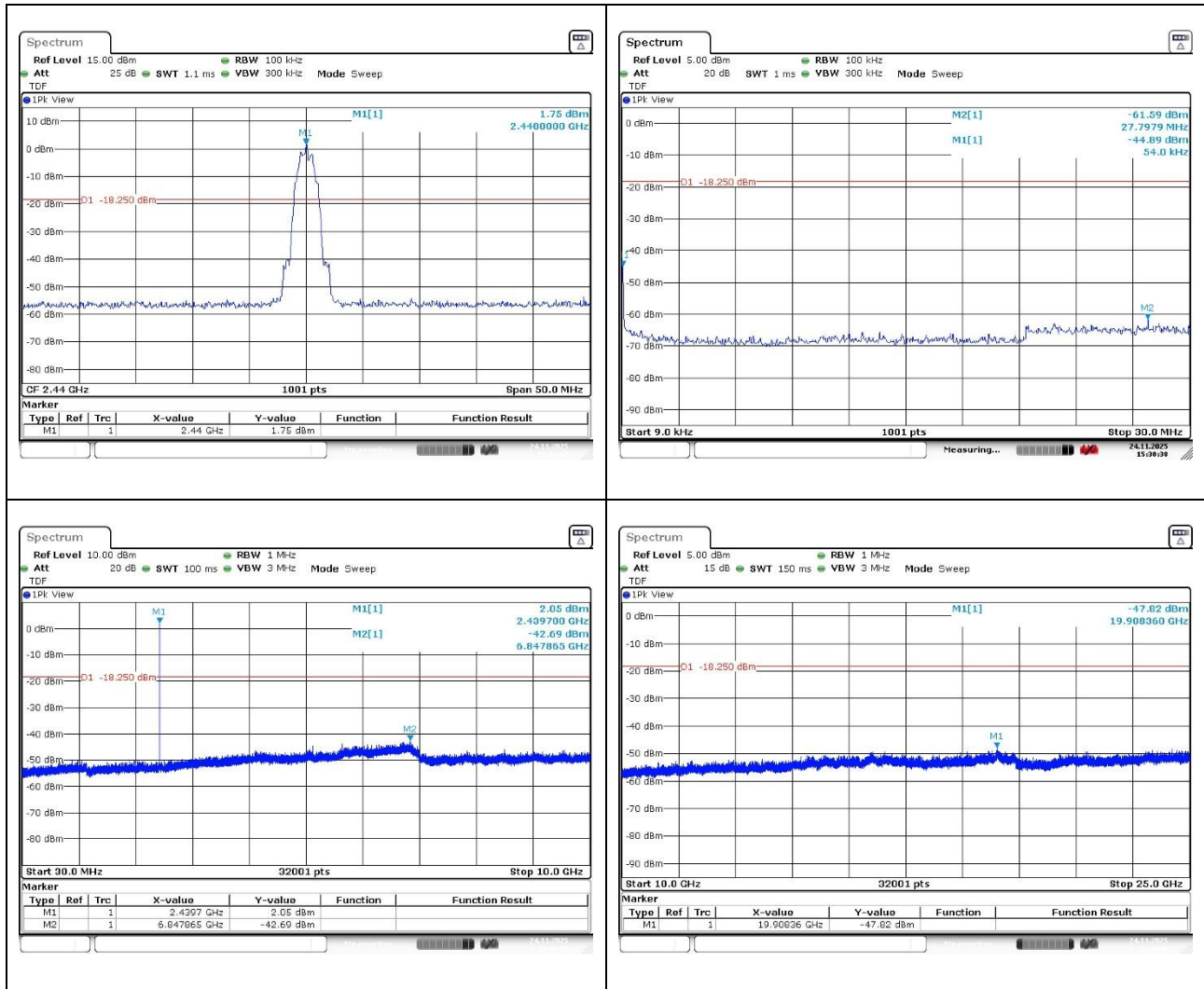


Test mode: PHY 2M

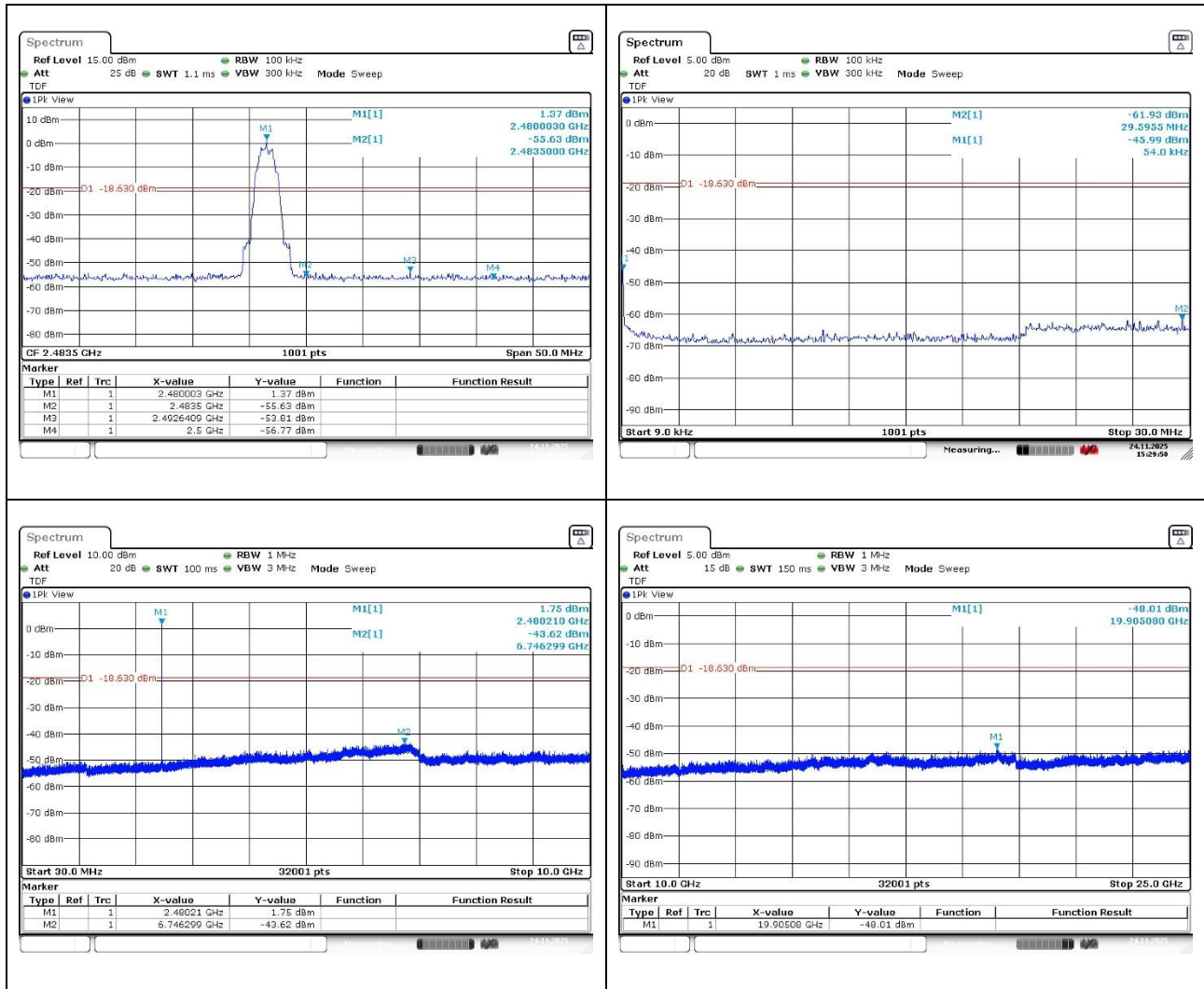
Low Channel



Middle Channel

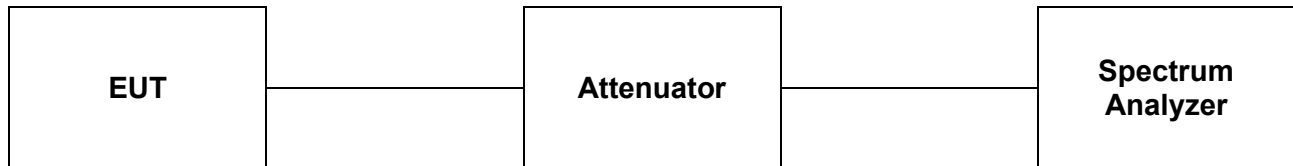


High Channel



3.6 dB Bandwidth and 99 % Bandwidth

3.1. Test Setup



3.2. Limit

3.2.1. FCC

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902-928 MHz, 2 400-2 483.5 MHz, and 5 725-5 850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

3.2.2. IC

According to RSS-247 Issue 4, 6.3.1(a), the minimum 6 dB bandwidth shall be 500 kHz

3.3. Test Procedure

The test follows section 11.8 DTS bandwidth of ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISED).

3.3.1. 6 dB Bandwidth

Tests performed using section 11.8.1 Option 1.

- Option 1:

1. Set RBW to = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
2. Set the VBW $\geq [3 \times \text{RBW}]$.
3. Detector = peak.
4. Trace mode = max hold.
5. Sweep = No faster than coupled (auto) time.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "-6 dB down amplitude". If a marker is below this "-6 dB down amplitude" value, then it shall be as close as possible to this value.

3.3.2. 99 % Bandwidth

The test follows section 6.9.3 of ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISSED).

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

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.
 - 1) When measuring OBW for UWB, the VBW shall be set to three times the RBW or the maximum available VBW of the measuring instrument.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW/RBW})]$ below the reference level. Specific guidance is given in 4.1.6.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3.4. Test Results

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 %

- 6 dB Bandwidth

Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Bandwidth (kHz)
PHY 1M	Low	2 402	0.719	500
	Middle	2 440	0.719	
	High	2 480	0.719	
PHY 2M	Low	2 402	1.169	
	Middle	2 440	1.169	
	High	2 480	1.169	

- 99 % Bandwidth

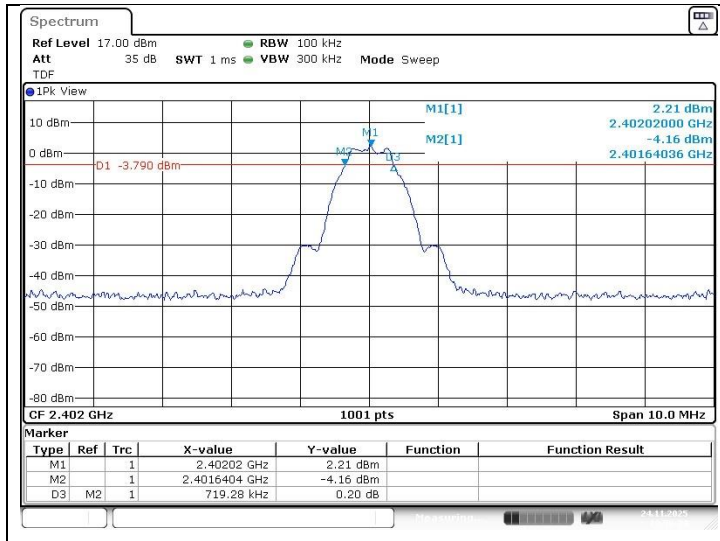
Mode	Channel	Frequency (MHz)	99 % Bandwidth (MHz)	Limit
PHY 1M	Low	2 402	1.019	-
	Middle	2 440	1.019	
	High	2 480	1.019	
PHY 2M	Low	2 402	1.998	
	Middle	2 440	1.993	
	High	2 480	1.998	

- Test plots

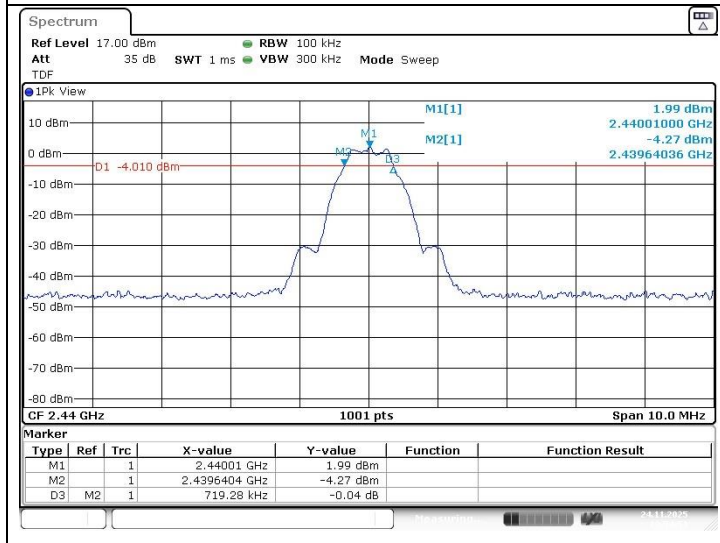
Test mode: PHY 1M

- 6 dB Bandwidth

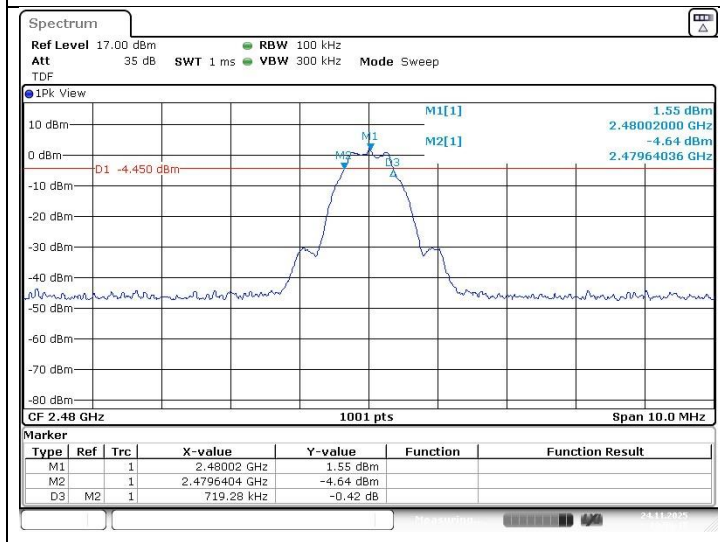
Low Channel



Middle Channel

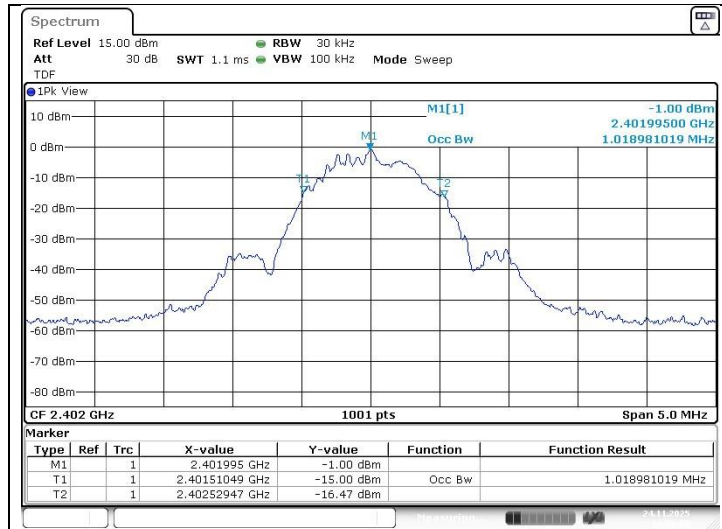


High Channel

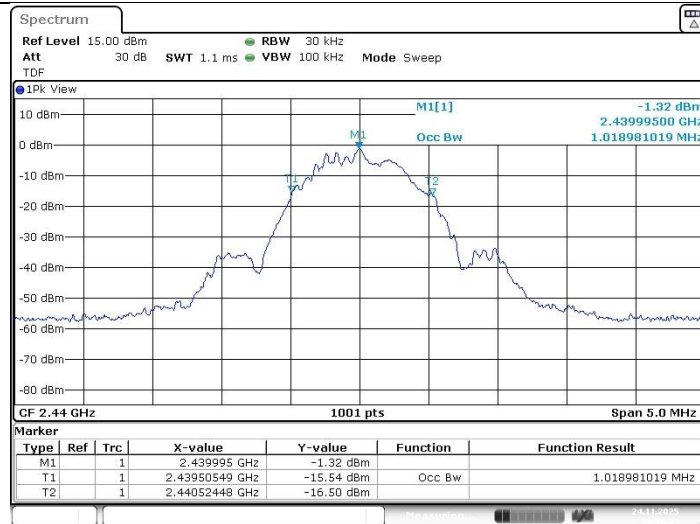


- 99 % Bandwidth

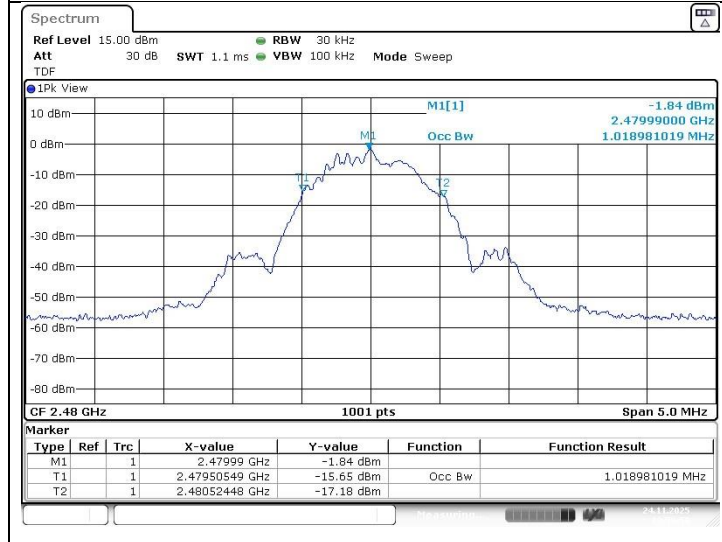
Low Channel



Middle Channel



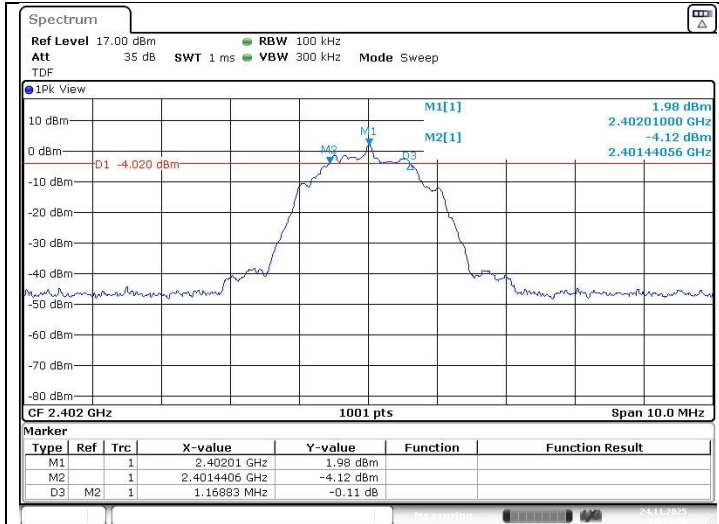
High Channel



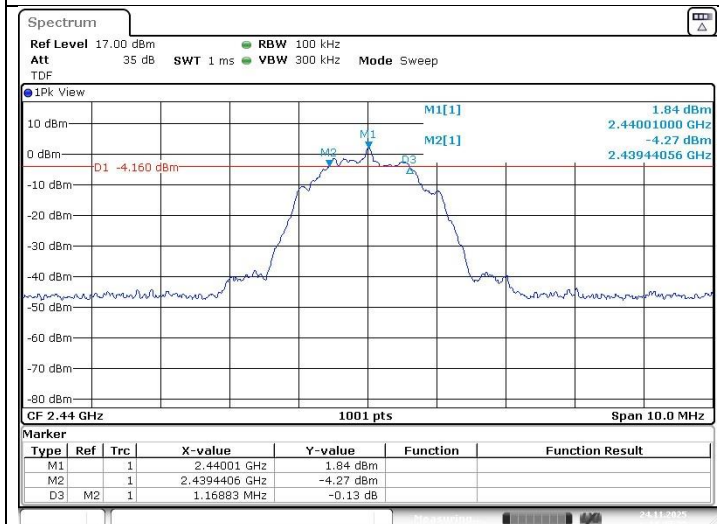
Test mode: PHY 2M

- 6 dB Bandwidth

Low Channel



Middle Channel



High Channel

