



FCC RADIO TEST REPORT

FCC ID : 2ADZRBEACON24
Equipment : NOKIA WiFi Beacon 24
Brand Name : NOKIA
Model Name : Beacon 24
Applicant : Nokia Shanghai Bell Co., Ltd.
No.388, Ningqiao Rd, Pilot Free Trade
Zone, Shanghai, 201206 P.R. China
Manufacturer : Nokia of America Corporation
2301 Sugar Bush Rd. Raleigh, NC 27612
Standard : FCC PART 15 Subpart C §15.247

The product was received on Nov. 09, 2023 and testing was performed from Nov. 11, 2023 to Dec. 29, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR3N0940A	01	Initial issue of report	Jan. 18, 2024
FR3N0940A	02	Revise Product Feature of Equipment Under Test and Test Mode This report is an updated version, replacing the report issued on Jan. 18, 2024.	Jan. 26, 2024
FR3N0940A	03	Revise Product Feature This report is an updated version, replacing the report issued on Jan. 26, 2024.	Jan. 30, 2024
FR3N0940A	04	Revise AOT gain This report is an updated version, replacing the report issued on Jan. 30, 2024.	Feb. 06, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	0.33 dB under the limit at 2389.49 MHz 0.33 dB under the limit at 2387.98 MHz
3.6	15.207	AC Conducted Emission	Pass	8.25 dB under the limit at 0.15 MHz
3.7	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Wei Chen

Report Producer: Rachel Hsieh



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature		
General Specs Wi-Fi 2.4GHz 802.11b/g/n/ax/be, Wi-Fi 5GHz 802.11a/n/ac/ax/be, and Wi-Fi 6GHz 802.11ax/be.		
Antenna Type WLAN: PCB Antenna		
Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<AOT gain>: Ant. A: 3.14 Ant. B: 2.67 Ant. C: 3.71 Ant. D: 2.25
		<PSA gain>: Ant. A: 2.10 Ant. B: 2.11 Ant. C: 2.43 Ant. D: 3.11
Antenna information for Directional Gain / TXBF Gain		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<AOT gain>: <Ant. A+B+C+D>: 5.83
		<PSA gain>: <Ant. A+B+C+D>: 4.78

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.



1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY, 03CH07-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY (TAF Code: 3786)
Remark	The Conducted test items subcontracted to Sporton International Inc. Wensan Laboratory

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

This device supports full RU and OFDMA modes for 802.11be mode (Partial RU including RU52*4 (20MHz), RU52*8 (40MHz).

The TxBF mode of this device supports full RB.

The PSD of partial RU is reduced to be smaller than full RU according to TCB workshop interim guidance Oct. 2018.

The 802.11be mode is investigated among different tones, full resource units (RU), partial resource units. The partial RU has no higher power than full RU's, thus the full RU is chosen as main test configuration.

The SISO mode conducted power is covered by MIMO mode per chain, so only the MIMO mode is tested.

The power for 802.11ax mode is not greater than 802.11be mode, so all other conducted and radiated test is covered by 802.11be mode.

The final test modes include the worst data rates for each modulation shown in the table below.

MIMO Mode

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ax HE20 (Cover by EHT20)	MCS0
802.11ax HE40 (Cover by EHT40)	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0

TXBF Mode

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ax HE20 (Cover by EHT20)	MCS0
802.11ax HE40 (Cover by EHT40)	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0

Remark: The conducted power level of each chain in MIMO mode is equal or higher than SISO mode.

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Link + LAN Link with Notebook + AC Adapter 1
Remark: For Radiated Test Cases, the tests were performed with Adapter 1.	

<CDD Mode>

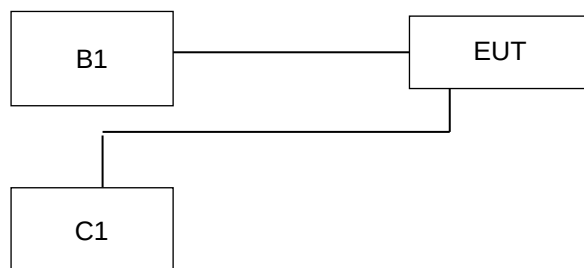
Ch. #	2400-2483.5 MHz			
	802.11b	802.11g	802.11be EHT20	802.11be EHT40
Low	01	01	01	03
Middle	06	06	06	06
High	11	11	11	09

<TXBF Mode>

Ch. #	2400-2483.5 MHz	
	802.11be EHT20	802.11be EHT40
Low	01	03
	02	04
Middle	06	06
	-	07
	10	08
High	11	09

Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

2.3 Connection Diagram of Test System



RF Test Setup									
No.	Power Source	Connection Type	Test Mode						
			1	2	-	-	-	-	-
B1	AC : 120V/60Hz	AC Power Cable	X	X	-	-	-	-	-
No.	Setup Peripherals	Connection Type	1	2	-	-	-	-	-
C1	Notebook	RJ-45 Cable	X	X	-	-	-	-	-

2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Dell	Latitude 3340	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	Dell	Latitude 3420	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	Dell	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m



2.5 EUT Operation Test Setup

The RF test items, utility “QSPR Version:5.0-00202” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

For TXBF mode, the modulation modes and data rates manipulated by the command lines in the engineering program made the EUT link to another EUT by power under the normal operation. The “iperf” software tool was used to enable the EUT to transmit signals continuously.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

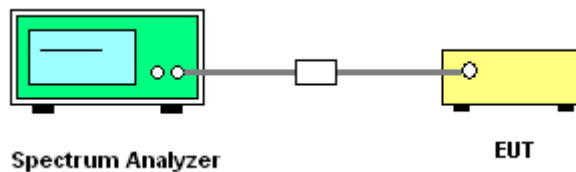
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) $\geq 3 * RBW$.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna with directional gain greater than 6 dBi is used, the output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

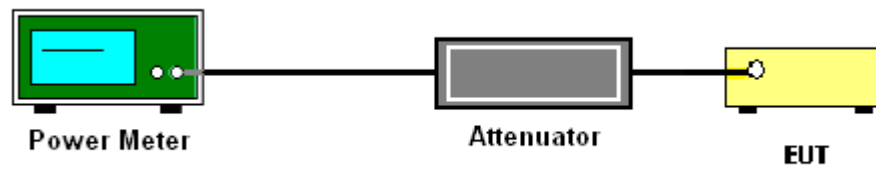
<CDD Modes>

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

<TXBF Modes>

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

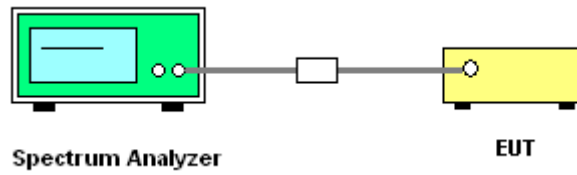
Method AVGPSD-3

1. The testing follows the ANSI C63.10 Section 11.10.7 Method AVGPSD-3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 10 kHz. Video bandwidth VBW = 30 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW).
5. Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is $\leq$ RBW/2, so that narrowband signals are not lost between frequency bins).
6. Detector = RMS, Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
9. Measure and record the results in the test report.
10. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (c): Measure and add $10 \log(N_{\text{ANT}})$ dB.

With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{\text{ANT}})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{\text{ANT}})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{\text{ANT}}^{\text{th}}$ of the PSD limit .

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

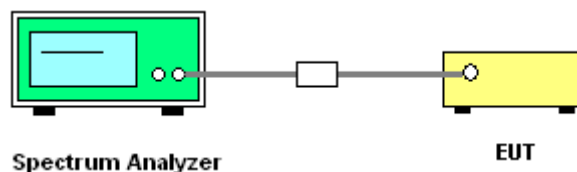
3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Please refer to Appendix A.



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device is measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.5.2 Measuring Instruments

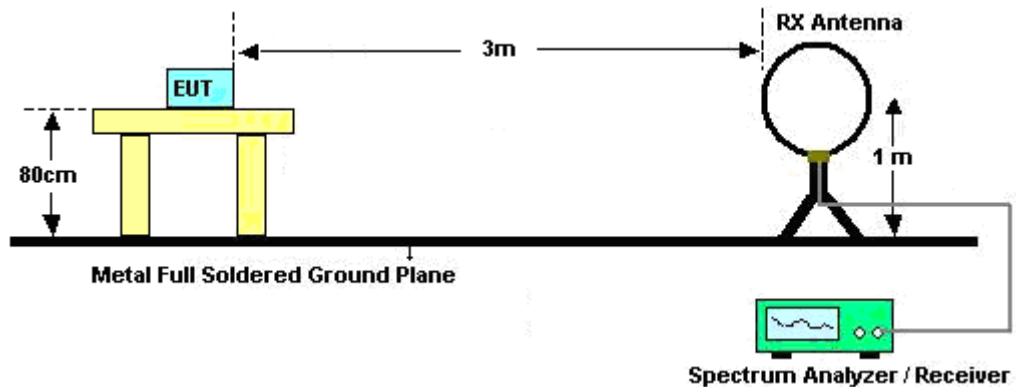
Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamplifier Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW = 3 MHz for $f \geq 1$ GHz for peak measurement.For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

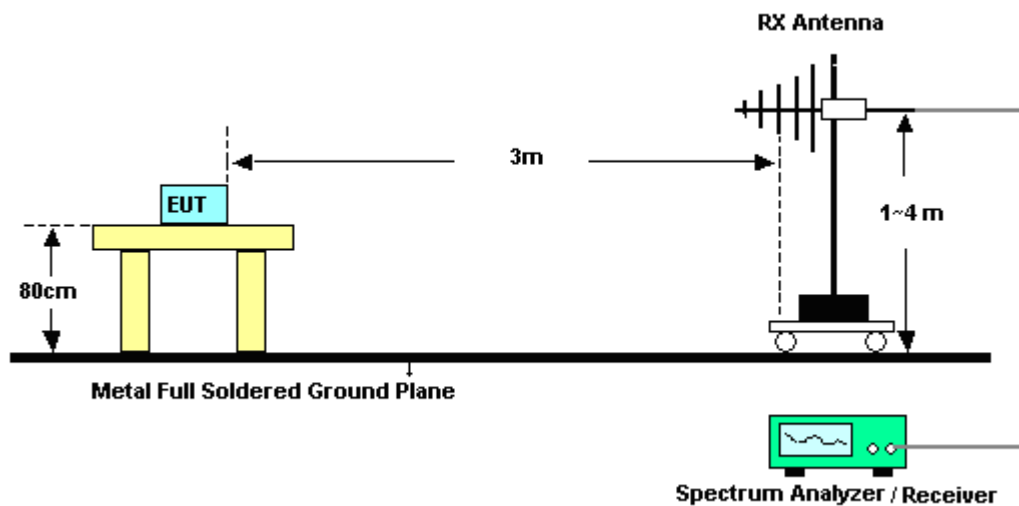
3.5.4 Test Setup

For radiated emissions below 30MHz

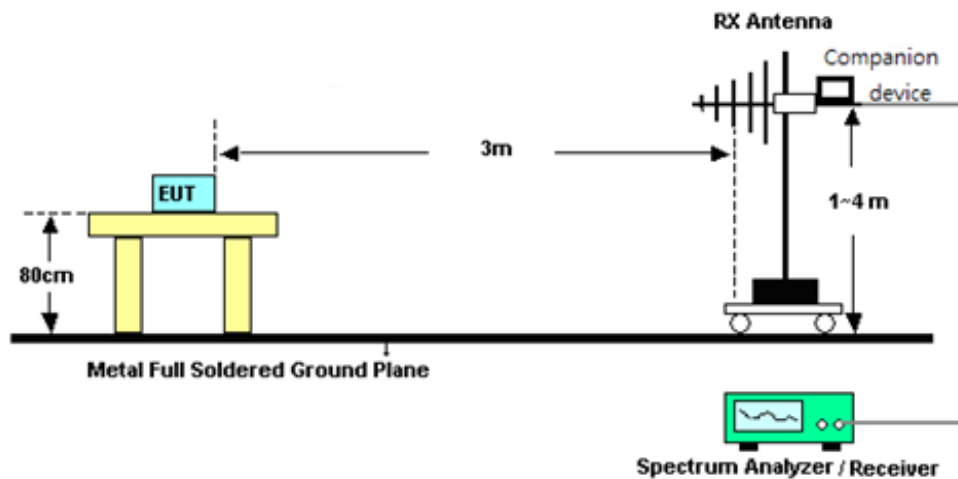


For radiated emissions from 30MHz to 1GHz

<CDD Mode>

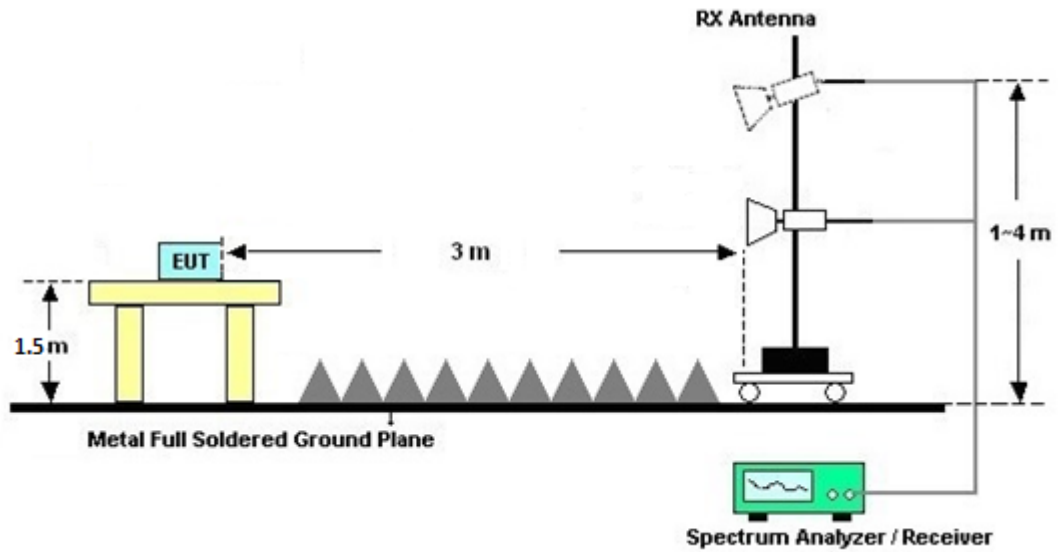


<TXBF Modes>

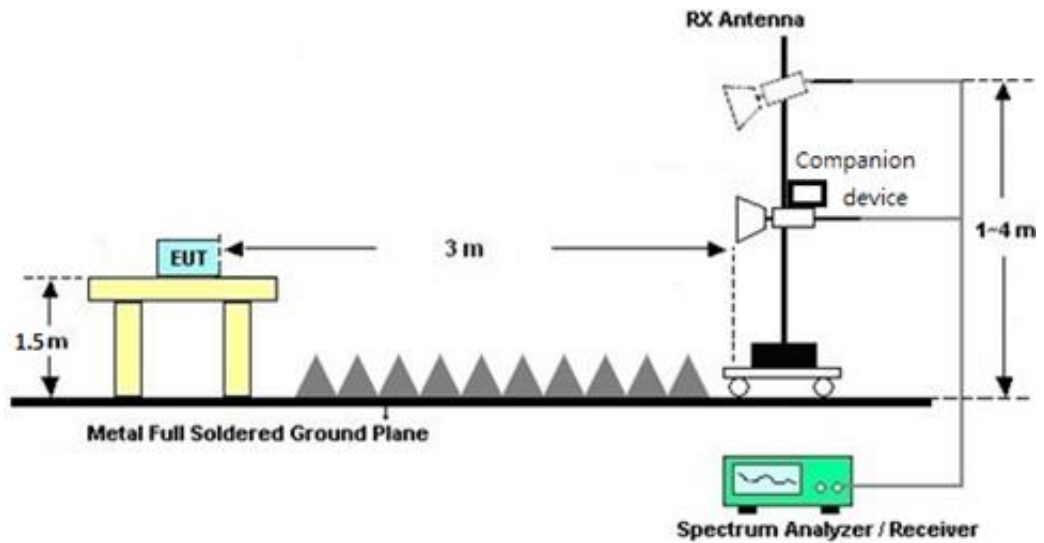


For radiated test from 1GHz to 18GHz

<CDD Mode>

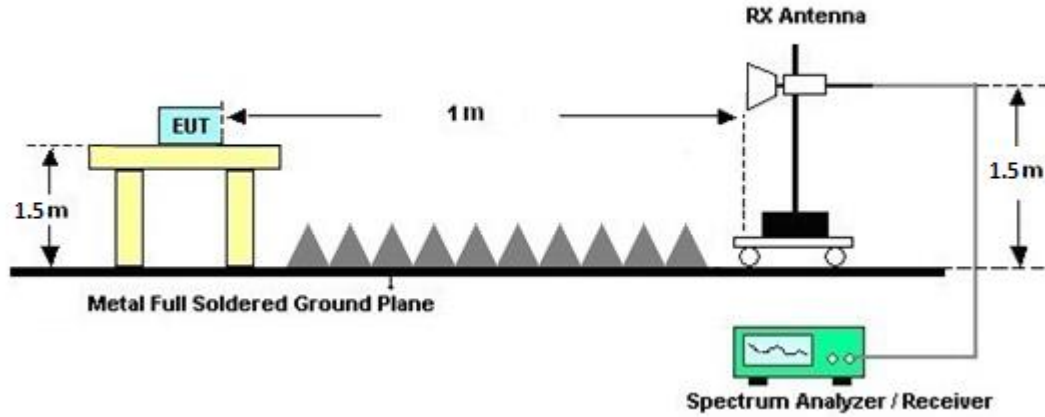


<TXBF Modes>

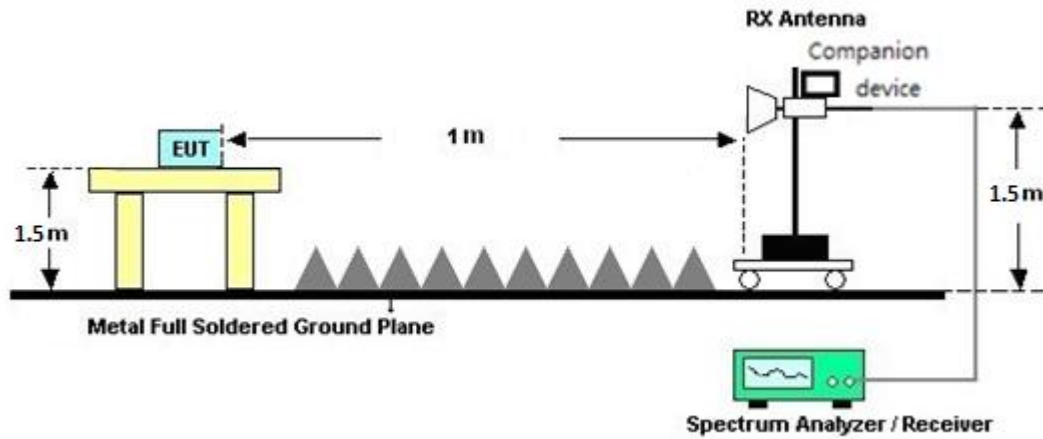


For radiated test above 18GHz

<CDD Mode>



<TXBF Modes>



**3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)**

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

3.5.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment 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.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

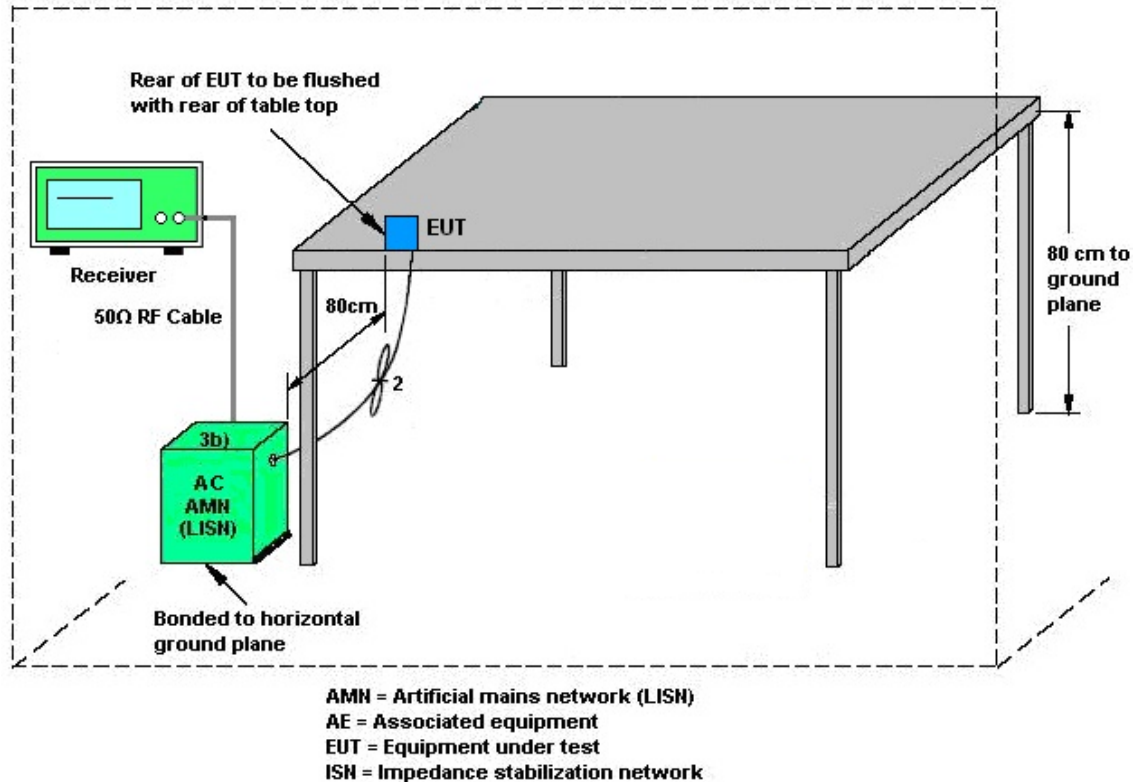
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9 kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

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 rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35419 & 03	30MHz~1GHz	Apr. 23, 2023	Nov. 11, 2023~Dec. 26, 2023	Apr. 22, 2024	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 01, 2022	Nov. 11, 2023~Nov. 19, 2023	Nov. 30, 2023	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00066584	1GHz~18GHz	Dec. 20, 2023	Nov. 20, 2023~Dec. 04, 2023	Dec. 19, 2024	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Nov. 27, 2023	Dec. 05, 2023~Dec. 26, 2023	Nov. 26, 2024	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Feb. 28, 2023	Nov. 11, 2023~Dec. 26, 2023	Feb. 27, 2024	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz~18GHz	Apr. 20, 2023	Nov. 11, 2023~Dec. 26, 2023	Apr. 19, 2024	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 02, 2023	Nov. 11, 2023~Dec. 26, 2023	Oct. 01, 2024	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Mar. 24, 2023	Nov. 11, 2023~Dec. 26, 2023	Mar. 23, 2024	Radiation (03CH07-HY)
Preamplifier	EMEC	EM18G40G	0600789	18-40GHz	Jul. 25, 2023	Nov. 11, 2023~Dec. 26, 2023	Jul. 24, 2024	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 28, 2023	Nov. 11, 2023~Dec. 26, 2023	Mar. 27, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15682/4	30MHz to 18GHz	Feb. 22, 2023	Nov. 11, 2023~Dec. 26, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4	9kHz to 18GHz	Feb. 22, 2023	Nov. 11, 2023~Dec. 26, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4	9kHz to 18GHz	Feb. 22, 2023	Nov. 11, 2023~Dec. 26, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126	532078/126E	30MHz~18GHz	Sep. 15, 2023	Nov. 11, 2023~Dec. 26, 2023	Sep. 14, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2	18GHz~40GHz	Feb. 22, 2023	Nov. 11, 2023~Dec. 26, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801606/2	9KHz ~ 40GHz	Apr. 20, 2023	Nov. 11, 2023~Dec. 26, 2023	Apr. 19, 2024	Radiation (03CH07-HY)
Controller	EMEC	EM1000	N/A	Control Ant Mast	N/A	Nov. 11, 2023~Dec. 26, 2023	N/A	Radiation (03CH07-HY)
Antenna Mast	EMEC	AM-BS-4500E	N/A	Boresight mast 1M~4M	N/A	Nov. 11, 2023~Dec. 26, 2023	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Nov. 11, 2023~Dec. 26, 2023	N/A	Radiation (03CH07-HY)
Software	Audix	E3	N/A	N/A	N/A	Nov. 11, 2023~Dec. 26, 2023	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	Mar. 14, 2023	Nov. 11, 2023~Dec. 26, 2023	Mar. 13, 2024	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00991	18GHz-40GHz	Jun. 01, 2023	Nov. 11, 2023~Dec. 26, 2023	May. 31, 2024	Radiation (03CH07-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Nov. 15, 2023~ Dec. 29, 2023	Nov. 06, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3008W	RPR8W-2301 0011 (NO:109)	10MHz~8GHz	Jul. 26, 2023	Nov. 15, 2023~ Dec. 29, 2023	Jul. 25, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3008W	RPR8W-2301 016 (NO:54)	10MHz~8GHz	Jul. 26, 2023	Nov. 15, 2023~ Dec. 29, 2023	Jul. 25, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	RPR6W-2101 001 (NO:206)	10MHz~8GHz	Feb. 15, 2023	Nov. 15, 2023~ Dec. 29, 2023	Feb. 14, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	RPR6W-2101 002 (NO:123)	10MHz~8GHz	Jan. 10, 2023	Nov. 15, 2023~ Dec. 29, 2023	Jan. 09, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101468	10HZ~44GHZ	Mar. 13, 2023	Nov. 15, 2023~ Dec. 29, 2023	Mar. 12, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101435	10HZ~44GHZ	Nov. 01, 2023	Nov. 15, 2023~ Dec. 29, 2023	Oct. 31, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101466	10HZ~44GHZ	Feb. 01, 2023	Nov. 15, 2023~ Dec. 29, 2023	Jan. 31, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101467	10HZ~44GHZ	Feb. 01, 2023	Nov. 15, 2023~ Dec. 29, 2023	Jan. 31, 2024	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 23, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Nov. 23, 2023	Nov. 30, 2023	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Oct. 26, 2023	Nov. 23, 2023	Oct. 25, 2024	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Nov. 23, 2023	Nov. 30, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Nov. 23, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	9kHz-200MHz	Jul. 28, 2023	Nov. 23, 2023	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Nov. 23, 2023	Dec. 28, 2023	Conduction (CO05-HY)

5 Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.5 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.3 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
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Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.3 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.3 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Willy Chang	Temperature:	21~25	°C
Test Date:	2023/11/15~2023/11/23	Relative Humidity:	51~54	%

<CDD Mode>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D														
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Occupied BW (MHz)				6dB BW (MHz)				6dB BW Limit (MHz)	Pass/Fail
					AntA	AntB	AntC	AntD	AntA	AntB	AntC	AntD		
11b	1Mbps	4	1	2412	14.02	13.74	13.75	13.54	13.14	13.14	13.14	13.14	0.50	Pass
11b	1Mbps	4	6	2437	13.99	13.62	13.44	13.19	13.62	13.62	14.08	14.08	0.50	Pass
11b	1Mbps	4	11	2462	13.29	13.07	12.88	12.88	13.16	13.14	13.16	13.16	0.50	Pass
11g	6Mbps	4	1	2412	15.30	14.67	15.20	14.46	16.38	16.38	16.38	16.38	0.50	Pass
11g	6Mbps	4	6	2437	15.48	14.68	14.90	14.94	16.40	16.38	16.42	16.38	0.50	Pass
11g	6Mbps	4	11	2462	14.92	14.24	14.55	14.64	16.38	16.36	16.40	16.38	0.50	Pass
HT20	MCS0	4	1	2412	10.89	10.85	11.54	11.13	17.62	17.64	17.64	17.66	0.50	Pass
HT20	MCS0	4	6	2437	14.74	14.45	14.67	14.43	17.64	17.64	17.66	17.66	0.50	Pass
HT20	MCS0	4	11	2462	13.48	13.13	12.98	13.28	17.62	17.64	17.64	17.64	0.50	Pass
HT40	MCS0	4	3	2422	16.42	15.78	16.58	16.56	36.44	36.44	36.44	36.44	0.50	Pass
HT40	MCS0	4	6	2437	17.05	16.53	18.06	17.41	36.44	36.44	36.44	36.44	0.50	Pass
HT40	MCS0	4	9	2452	16.66	17.15	16.68	16.97	36.44	36.44	36.44	36.04	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D														
Mod.	Data Rate	N _T	CH	Freq. (MHz)	Average Conducted Power (dBm)					Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
					AntA	AntB	AntC	AntD	SUM					
11b	1Mbps	4	1	2412	23.70	23.95	23.84	24.35	29.99	30.00	3.71	33.70	36.00	Pass
11b	1Mbps	4	6	2437	23.56	24.04	23.45	24.43	29.91	30.00	3.71	33.62	36.00	Pass
11b	1Mbps	4	11	2462	23.14	23.44	23.09	23.29	29.26	30.00	3.71	32.97	36.00	Pass
11g	6Mbps	4	1	2412	23.11	23.10	23.03	23.28	29.15	30.00	3.71	32.86	36.00	Pass
11g	6Mbps	4	6	2437	23.16	23.50	23.37	23.88	29.51	30.00	3.71	33.22	36.00	Pass
11g	6Mbps	4	11	2462	22.82	23.02	22.84	23.06	28.96	30.00	3.71	32.67	36.00	Pass
HT20	MCS0	4	1	2412	24.09	24.43	23.16	23.68	29.89	30.00	3.71	33.60	36.00	Pass
HT20	MCS0	4	6	2437	23.52	24.02	23.56	23.17	29.60	30.00	3.71	33.31	36.00	Pass
HT20	MCS0	4	11	2462	23.85	24.33	23.72	23.69	29.93	30.00	3.71	33.64	36.00	Pass
HT40	MCS0	4	3	2422	24.26	24.15	23.71	23.11	29.85	30.00	3.71	33.56	36.00	Pass
HT40	MCS0	4	6	2437	23.98	23.49	23.50	23.82	29.72	30.00	3.71	33.43	36.00	Pass
HT40	MCS0	4	9	2452	23.77	23.33	23.35	23.92	29.62	30.00	3.71	33.33	36.00	Pass

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D												
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)					DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
					AntA	AntB	AntC	AntD	Worse + 6.02			
11b	1Mbps	4	1	2412	-1.85	-2.18	-2.46	-2.37	4.17	5.83	8.00	Pass
11b	1Mbps	4	6	2437	-1.64	-2.04	-2.20	-2.32	4.38	5.83	8.00	Pass
11b	1Mbps	4	11	2462	-3.12	-3.37	-3.52	-3.53	2.90	5.83	8.00	Pass
11g	6Mbps	4	1	2412	-1.81	-2.38	-2.06	-2.80	4.21	5.83	8.00	Pass
11g	6Mbps	4	6	2437	-2.56	-1.94	-1.61	-2.85	4.41	5.83	8.00	Pass
11g	6Mbps	4	11	2462	-2.86	-2.31	-3.16	-3.36	3.71	5.83	8.00	Pass
HT20	MCS0	4	1	2412	-5.51	-6.83	-6.29	-6.54	0.51	5.83	8.00	Pass
HT20	MCS0	4	6	2437	-2.36	-2.20	-3.17	-3.66	3.82	5.83	8.00	Pass
HT20	MCS0	4	11	2462	-4.30	-3.36	-4.03	-4.09	2.66	5.83	8.00	Pass
HT40	MCS0	4	3	2422	-7.67	-7.77	-7.06	-8.15	-1.04	5.83	8.00	Pass
HT40	MCS0	4	6	2437	-5.78	-6.17	-5.86	-6.63	0.24	5.83	8.00	Pass
HT40	MCS0	4	9	2452	-5.33	-6.50	-6.88	-6.37	0.69	5.83	8.00	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D															
Mod.	Data Rate	N _T	CH	Freq. (MHz)	RU Config.	Average Conducted Power (dbm)					Conducted Power Limit (dbm)	DG (dBi)	EIRP Power Limit (dbm)	EIRP Power Limit (dbm)	Pass /Fail
						AntA	AntB	AntC	AntD	SUM					
HE20	MCS0	4	1	2412	Full	19.87	20.07	19.83	20.13	26.00	30.00	3.71	29.71	36.00	Pass
HE20	MCS0	4	1	2412	OFDMA 52*4	18.71	18.93	19.01	18.98	24.93	30.00	3.71	28.64	36.00	Pass
HE20	MCS0	4	6	2437	Full	23.62	23.25	22.67	24.39	29.55	30.00	3.71	33.26	36.00	Pass
HE20	MCS0	4	6	2437	OFDMA 52*4	21.83	21.93	22.08	21.96	27.97	30.00	3.71	31.68	36.00	Pass
HE20	MCS0	4	11	2462	Full	21.85	22.14	21.87	22.25	28.05	30.00	3.71	31.76	36.00	Pass
HE20	MCS0	4	11	2462	OFDMA 52*4	20.54	20.74	20.51	21.00	26.72	30.00	3.71	30.43	36.00	Pass
HE40	MCS0	4	3	2422	Full	22.06	22.15	21.96	22.27	28.13	30.00	3.71	31.84	36.00	Pass
HE40	MCS0	4	3	2422	OFDMA 52*8	19.76	20.74	20.05	19.88	26.15	30.00	3.71	29.86	36.00	Pass
HE40	MCS0	4	6	2437	Full	23.44	23.51	23.26	23.61	29.48	30.00	3.71	33.19	36.00	Pass
HE40	MCS0	4	6	2437	OFDMA 52*8	22.54	22.59	22.91	22.92	28.76	30.00	3.71	32.47	36.00	Pass
HE40	MCS0	4	9	2452	Full	22.35	22.33	22.21	22.66	28.41	30.00	3.71	32.12	36.00	Pass
HE40	MCS0	4	9	2452	OFDMA 52*8	20.43	20.56	20.70	20.83	26.65	30.00	3.71	30.36	36.00	Pass

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D															
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	RU Config	99% Occupied BW (MHz)				6dB BW (MHz)				6dB BW Limit (MHz)	Pass/Fail
						AntA	AntB	AntC	AntD	AntA	AntB	AntC	AntD		
EHT20	MCS0	4	1	2412	Full	12.30	12.72	13.07	11.92	19.10	19.08	19.15	19.10	0.50	Pass
EHT20	MCS0	4	6	2437	Full	15.10	15.27	15.53	14.16	19.13	19.13	19.13	19.15	0.50	Pass
EHT20	MCS0	4	11	2462	Full	14.18	14.79	14.28	14.60	19.10	18.98	19.10	18.95	0.50	Pass
EHT40	MCS0	4	3	2422	Full	19.08	19.56	19.61	17.99	38.20	38.20	38.20	38.16	0.50	Pass
EHT40	MCS0	4	6	2437	Full	19.95	19.95	20.32	20.03	38.24	38.20	38.28	38.20	0.50	Pass
EHT40	MCS0	4	9	2452	Full	18.80	18.09	19.02	18.00	38.08	38.08	38.12	38.08	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D																
Mod.	Data Rate	N _{Tx}	CH	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)					Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail	
						AntA	AntB	AntC	AntD	SUM						
EHT20	MCS0	4	1	2412	Full	19.97	20.17	19.93	20.23	26.10	30.00	3.71	29.81	36.00	Pass	
EHT20	MCS0	4	1	2412	OFDMA_52*4	18.83	19.18	19.06	19.08	25.06						
EHT20	MCS0	4	6	2437	Full	23.64	23.96	23.55	23.21	29.62	30.00	3.71	33.33	36.00	Pass	
EHT20	MCS0	4	6	2437	OFDMA_52*4	21.85	22.06	22.25	21.96	28.05						
EHT20	MCS0	4	11	2462	Full	21.95	22.24	21.97	22.35	28.15	30.00	3.71	31.86	36.00	Pass	
EHT20	MCS0	4	11	2462	OFDMA_52*4	20.51	20.86	20.94	21.02	26.86						
EHT40	MCS0	4	3	2422	Full	22.16	22.27	22.07	22.37	28.24	30.00	3.71	31.95	36.00	Pass	
EHT40	MCS0	4	3	2422	OFDMA_52*8	19.85	20.85	20.17	19.99	26.25						
EHT40	MCS0	4	6	2437	Full	23.97	23.48	23.48	23.84	29.72	30.00	3.71	33.43	36.00	Pass	
EHT40	MCS0	4	6	2437	OFDMA_52*8	22.65	22.72	23.00	23.04	28.88						
EHT40	MCS0	4	9	2452	Full	22.49	22.44	22.33	22.76	28.53	30.00	3.71	32.24	36.00	Pass	
EHT40	MCS0	4	9	2452	OFDMA_52*8	20.52	20.67	20.81	20.93	26.76						

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D													
Mod.	Data Rate	N _{Tx}	CH.	Freq. (MHz)	RU Config.	Peak PSD (dBm/3kHz)					DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
						AntA	AntB	AntC	AntD	Worse + 6.02	AntA+AntB+AntC+AntD	AntA+AntB+AntC+AntD	
EHT20	MCS0	4	1	2412	Full	-4.48	-4.66	-5.23	-5.88	1.54	5.83	8.00	Pass
EHT20	MCS0	4	1	2412	OFDMA_52*4	-6.37	-6.52	-6.11	-7.02	-0.09	5.83	8.00	Pass
EHT20	MCS0	4	6	2437	Full	-2.53	-2.94	-3.24	-3.40	3.49	5.83	8.00	Pass
EHT20	MCS0	4	6	2437	OFDMA_52*4	-3.27	-2.75	-3.06	-3.55	3.27	5.83	8.00	Pass
EHT20	MCS0	4	11	2462	Full	-2.01	-3.04	-2.10	-2.91	4.01	5.83	8.00	Pass
EHT20	MCS0	4	11	2462	OFDMA_52*4	-4.22	-3.58	-3.81	-4.65	2.44	5.83	8.00	Pass
EHT40	MCS0	4	3	2422	Full	-5.88	-6.12	-6.09	-6.57	0.14	5.83	8.00	Pass
EHT40	MCS0	4	3	2422	OFDMA_52*8	-8.43	-8.55	-8.51	-8.53	-2.41	5.83	8.00	Pass
EHT40	MCS0	4	6	2437	Full	-3.73	-4.55	-3.58	-3.94	2.44	5.83	8.00	Pass
EHT40	MCS0	4	6	2437	OFDMA_52*8	-4.09	-5.11	-4.47	-4.24	1.93	5.83	8.00	Pass
EHT40	MCS0	4	9	2452	Full	-5.37	-5.66	-5.33	-5.51	0.69	5.83	8.00	Pass
EHT40	MCS0	4	9	2452	OFDMA_52*8	-6.51	-6.63	-7.65	-6.95	-0.49	5.83	8.00	Pass

<TXBF Mode>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)				6dB BW (MHz)				6dB BW Limit (MHz)	Pass/Fail
					AntA	AntB	AntC	AntD	AntA	AntB	AntC	AntD		
HT20	MCS0	4	1	2412	18.18	18.16	18.10	18.09	17.48	17.62	17.62	17.60	0.50	Pass
HT20	MCS0	4	6	2437	18.23	18.16	18.17	18.18	17.62	17.60	17.64	17.62	0.50	Pass
HT20	MCS0	4	11	2462	18.14	18.09	18.11	18.10	17.32	17.60	17.36	17.60	0.50	Pass
HT40	MCS0	4	3	2422	37.31	37.37	37.23	37.21	35.20	35.16	35.20	35.20	0.50	Pass
HT40	MCS0	4	6	2437	37.47	37.40	37.35	37.28	35.16	35.16	35.20	35.16	0.50	Pass
HT40	MCS0	4	9	2452	37.38	37.34	37.31	37.22	35.16	35.16	35.12	35.16	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D															
Mod.	Data Rate	N	Tx CH	Freq. (MHz)	Average Conducted Power (dBm)					Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)		Pass /Fail
					AntA	AntB	AntC	AntD	SUM						
HT20	MCS0	4	1	2412	16.48	17.12	17.24	17.17	23.03	30.00	5.83	28.86	36.00		Pass
HT20	MCS0	4	6	2437	22.71	23.01	23.22	23.04	29.02	30.00	5.83	34.85	36.00		Pass
HT20	MCS0	4	11	2462	17.69	17.92	18.07	18.03	23.95	30.00	5.83	29.78	36.00		Pass
HT40	MCS0	4	3	2422	19.69	20.09	20.23	20.34	26.11	30.00	5.83	31.94	36.00		Pass
HT40	MCS0	4	6	2437	23.25	23.51	23.80	23.72	29.60	30.00	5.83	35.43	36.00		Pass
HT40	MCS0	4	9	2452	21.21	21.75	21.55	21.66	27.57	30.00	5.83	33.40	36.00		Pass

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D												
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)					DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
					AntA	AntB	AntC	AntD	Worse + 6.02			
HT20	MCS0	4	1	2412	-8.77	-8.34	-8.48	-8.40	-2.32	5.83	8.00	Pass
HT20	MCS0	4	6	2437	-2.88	-2.73	-2.14	-2.85	3.88	5.83	8.00	Pass
HT20	MCS0	4	11	2462	-7.59	-7.46	-7.11	-7.80	-1.09	5.83	8.00	Pass
HT40	MCS0	4	3	2422	-6.54	-5.80	-6.10	-6.43	0.22	5.83	8.00	Pass
HT40	MCS0	4	6	2437	-3.42	-1.95	-3.98	-3.09	4.07	5.83	8.00	Pass
HT40	MCS0	4	9	2452	-5.44	-3.73	-5.31	-4.22	2.29	5.83	8.00	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D															
Mod.	Data Rate	N	Tx CH	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)					Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						AntA	AntB	AntC	AntD	SUM					
HE20	MCS 0	4	1	2412	Full	17.18	17.60	17.93	17.14	23.50	30.00	5.83	29.33	36.00	Pass
HE20	MCS 0	4	6	2437	Full	22.93	23.09	23.49	23.13	29.19	30.00	5.83	35.02	36.00	Pass
HE20	MCS 0	4	11	2462	Full	17.75	17.92	17.93	17.89	23.89	30.00	5.83	29.72	36.00	Pass
HE40	MCS 0	4	3	2422	Full	19.64	20.25	20.33	20.31	26.16	30.00	5.83	31.99	36.00	Pass
HE40	MCS 0	4	6	2437	Full	23.49	23.91	23.38	23.84	29.68	30.00	5.83	35.51	36.00	Pass
HE40	MCS 0	4	9	2452	Full	21.31	21.58	21.84	21.63	27.61	30.00	5.83	33.44	36.00	Pass

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D															
Mod.	Data Rate	NtX	CH.	Freq. (MHz)	RU Config	99% Occupied BW (MHz)				6dB BW (MHz)				6dB BW Limit (MHz)	Pass/Fail
						AntA	AntB	AntC	AntD	AntA	AntB	AntC	AntD		
EHT20	MCS 0	4	1	2412	Full	19.25	19.18	19.16	19.19	19.15	18.70	19.05	19.05	0.50	Pass
EHT20	MCS 0	4	6	2437	Full	19.14	19.13	19.17	19.17	17.03	16.10	16.73	16.48	0.50	Pass
EHT20	MCS 0	4	11	2462	Full	19.10	19.12	19.08	19.20	19.08	18.98	18.90	19.20	0.50	Pass
EHT40	MCS 0	4	3	2422	Full	38.47	37.99	38.04	38.36	35.21	35.16	36.44	35.16	0.50	Pass
EHT40	MCS 0	4	6	2437	Full	37.99	38.08	38.11	38.19	36.56	35.20	35.55	34.12	0.50	Pass
EHT40	MCS 0	4	9	2452	Full	38.28	38.30	38.32	38.13	35.96	35.16	36.34	36.08	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D																
Mod.	Data Rate	NTX	CH	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)					Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail	
						AntA	AntB	AntC	AntD	SUM						
EHT20	MCS 0	4	1	2412	Full	17.28	17.70	18.03	17.24	23.60	30.00	5.83	29.43	36.00	Pass	
EHT20	MCS 0	4	6	2437	Full	23.03	23.19	23.59	23.23	29.29	30.00	5.83	35.12	36.00	Pass	
EHT20	MCS 0	4	11	2462	Full	17.85	18.02	18.03	17.99	23.99	30.00	5.83	29.82	36.00	Pass	
EHT40	MCS 0	4	3	2422	Full	19.74	20.35	20.43	20.41	26.26	30.00	5.83	32.09	36.00	Pass	
EHT40	MCS 0	4	6	2437	Full	23.59	24.01	23.48	23.94	29.78	30.00	5.83	35.61	36.00	Pass	
EHT40	MCS 0	4	9	2452	Full	21.41	21.68	21.94	21.73	27.71	30.00	5.83	33.54	36.00	Pass	

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO 4Tx Mode Ant A + B + C + D													
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config.	Peak PSD (dBm/3kHz)					DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
						AntA	AntB	AntC	AntD	Worse + 6.02	AntA+AntB+AntC+AntD	AntA+AntB+AntC+AntD	
EHT20	MCS 0	4	1	2412	Full	-6.95	-8.42	-7.30	-6.17	-0.15	5.83	8.00	Pass
EHT20	MCS 0	4	6	2437	Full	-1.66	-2.13	-2.00	-0.97	5.05	5.83	8.00	Pass
EHT20	MCS 0	4	11	2462	Full	-8.14	-8.02	-6.68	-8.22	-0.66	5.83	8.00	Pass
EHT40	MCS 0	4	3	2422	Full	-5.30	-7.07	-6.44	-7.53	0.72	5.83	8.00	Pass
EHT40	MCS 0	4	6	2437	Full	-0.73	-0.79	-2.26	-0.71	5.31	5.83	8.00	Pass
EHT40	MCS 0	4	9	2452	Full	-4.31	-4.85	-3.31	-3.49	2.71	5.83	8.00	Pass

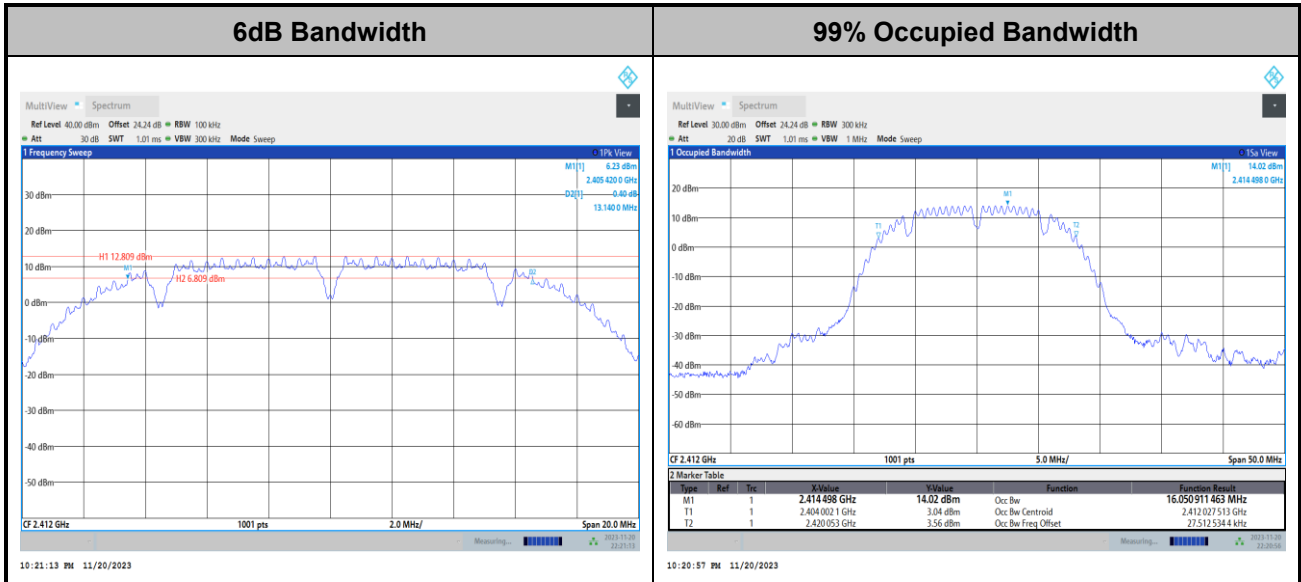


<CDD Mode>

6dB and 99% Occupied Bandwidth

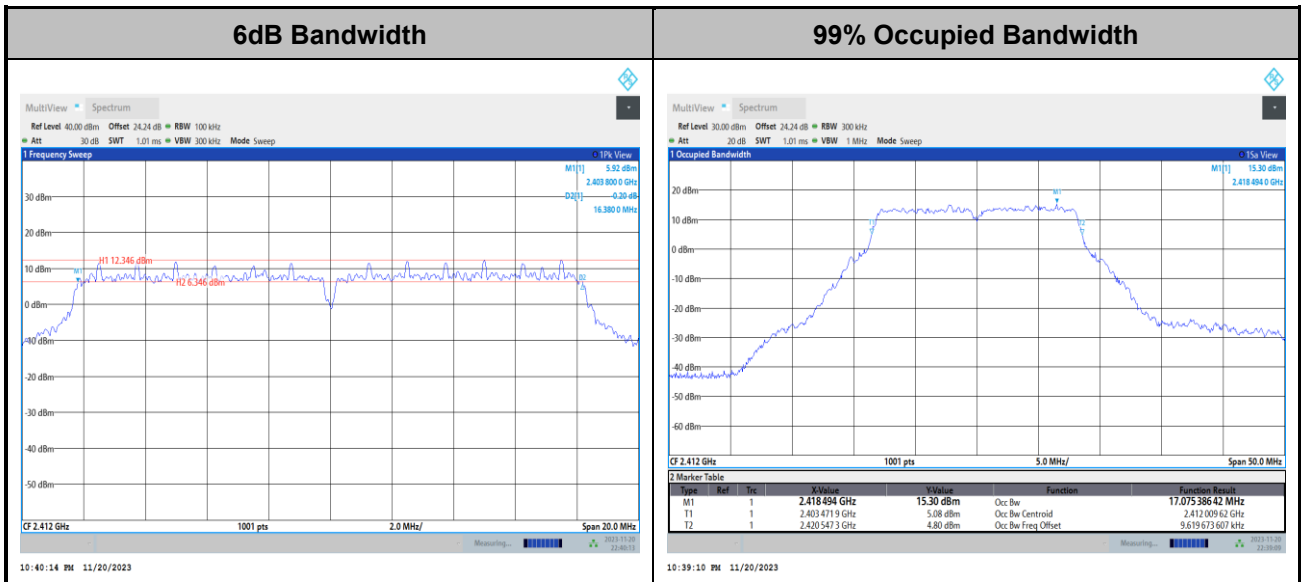
MIMO <Antenna A+B+C+D>

<802.11b>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

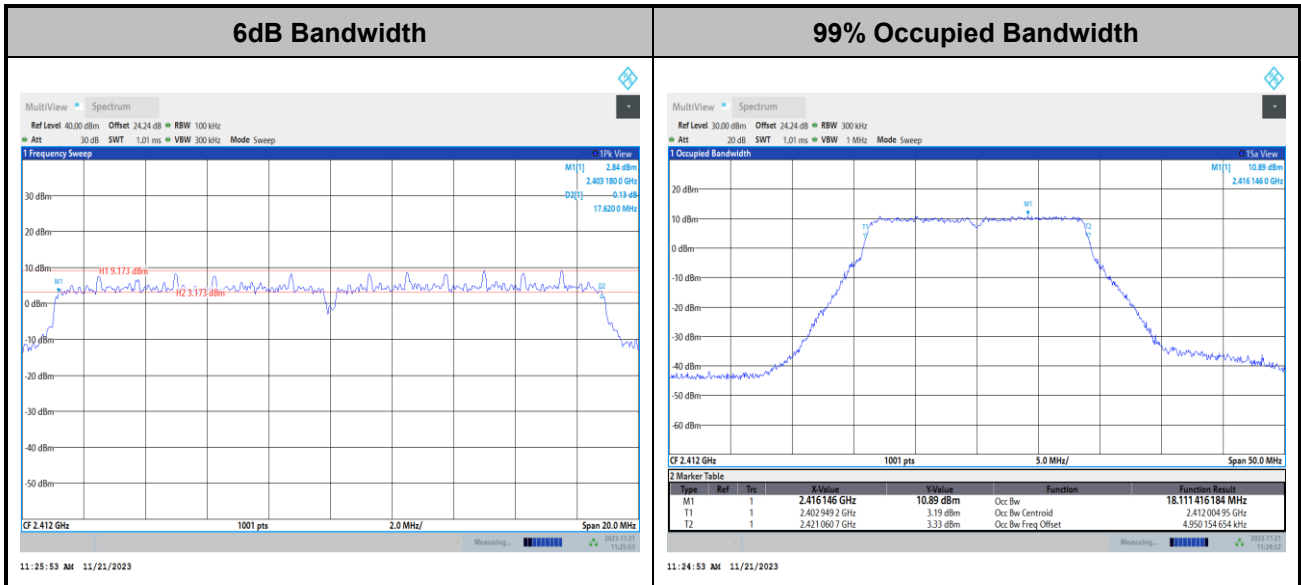
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

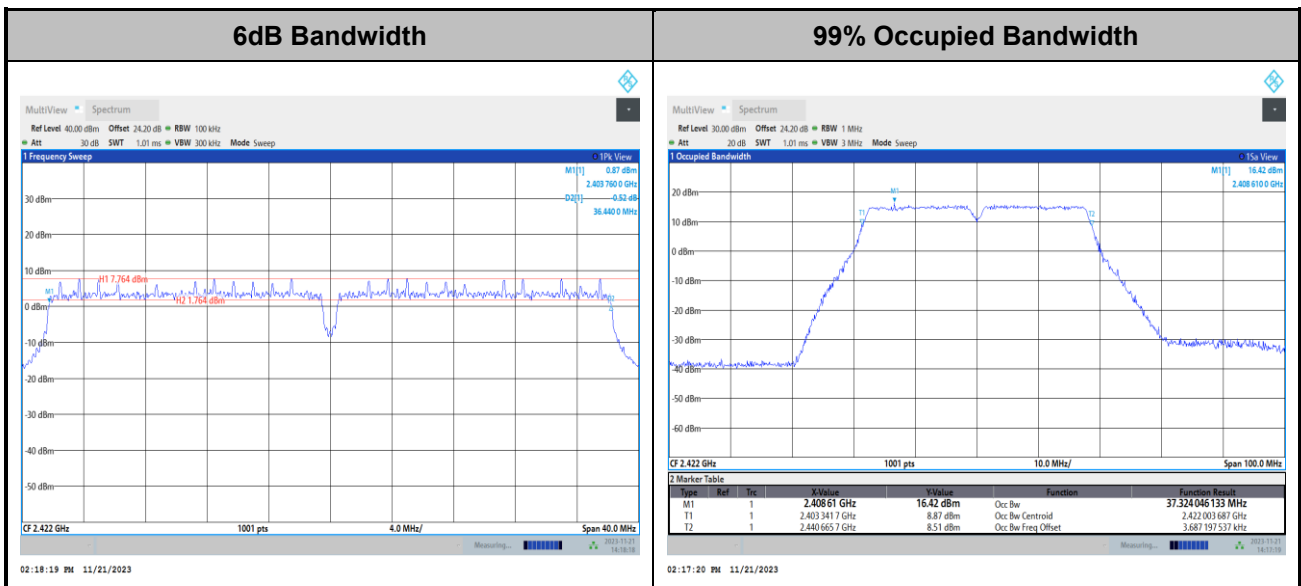


<802.11n HT20>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

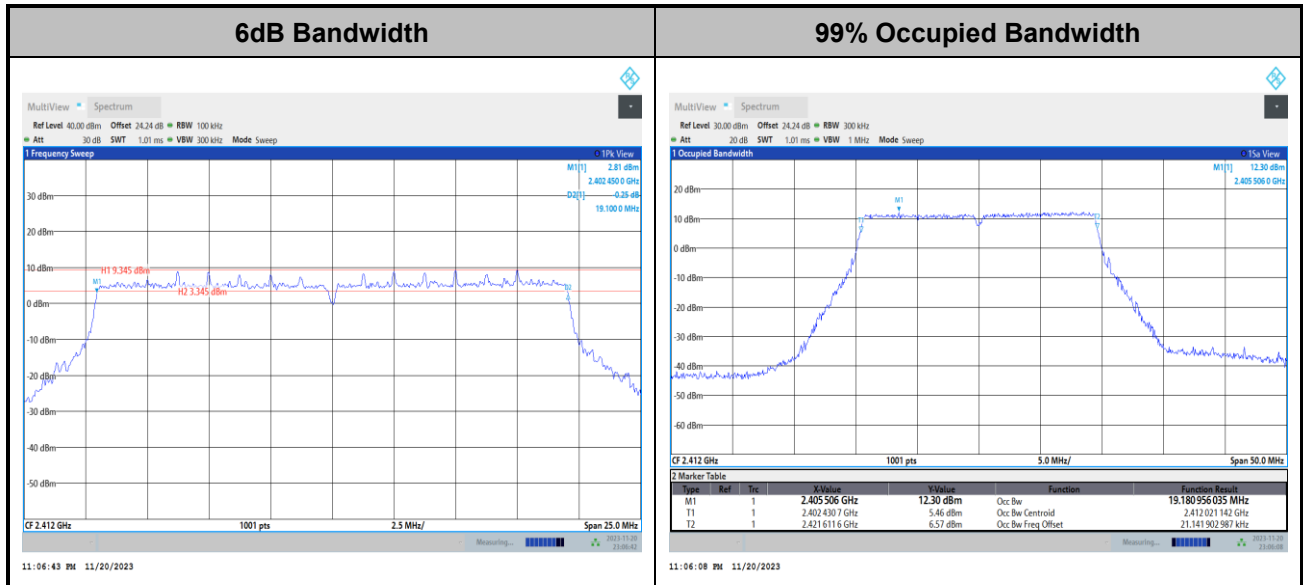
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

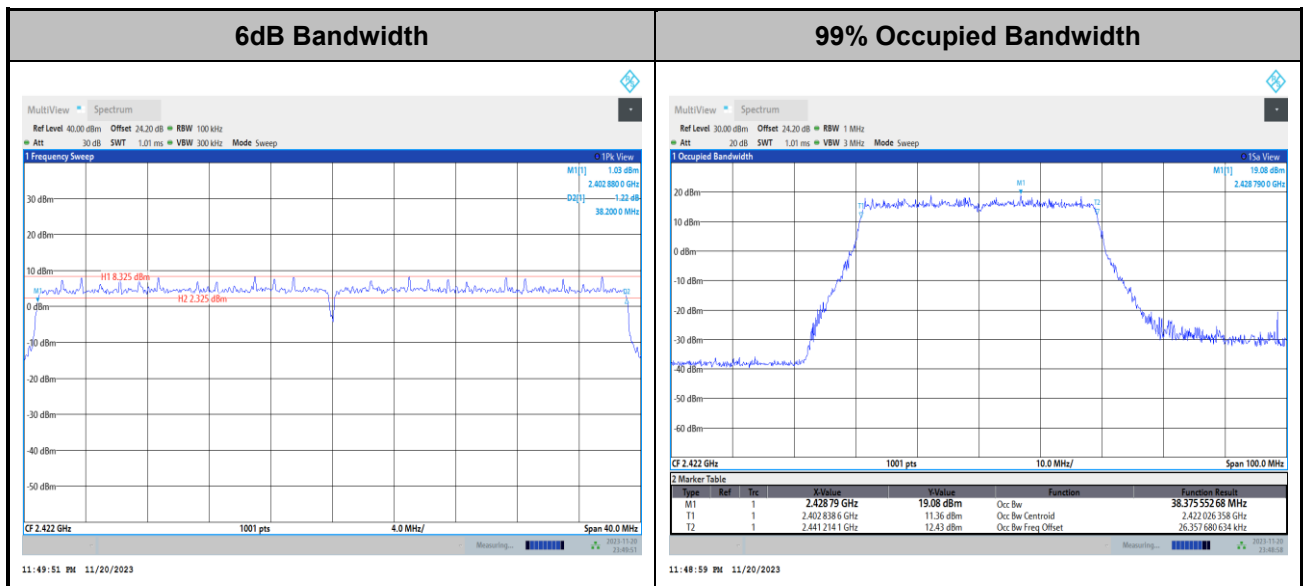


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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

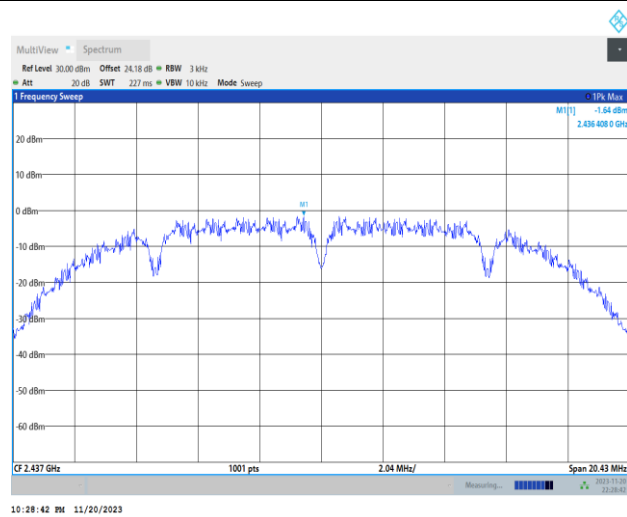
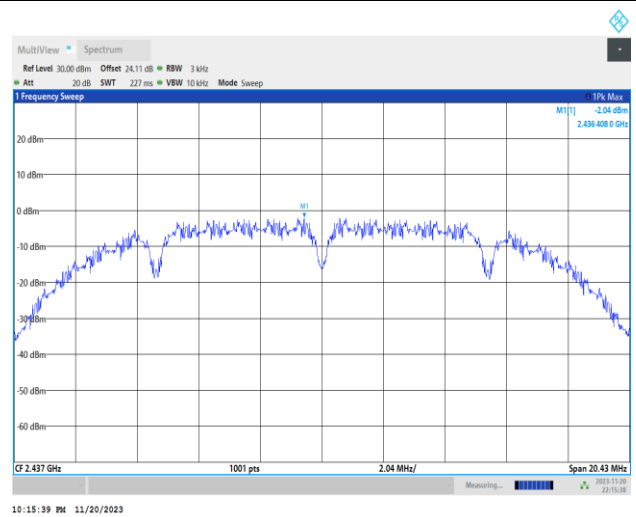
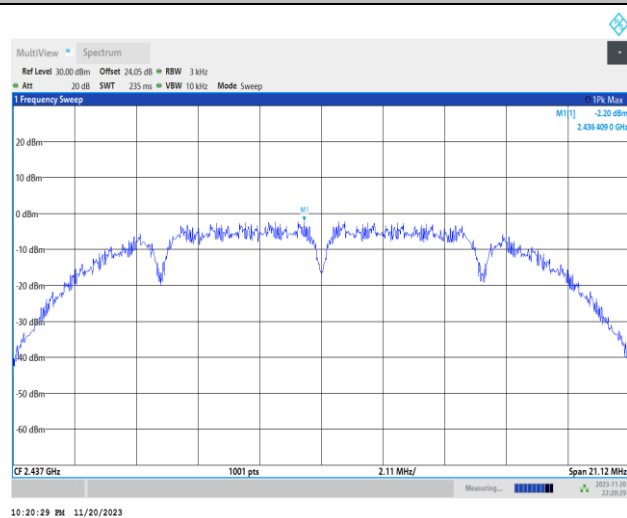
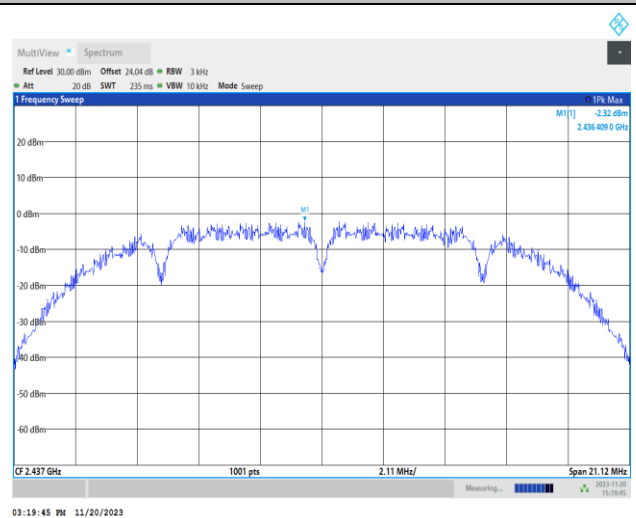
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

**Power Spectral Density(dBm/3kHz)**

<802.11b>

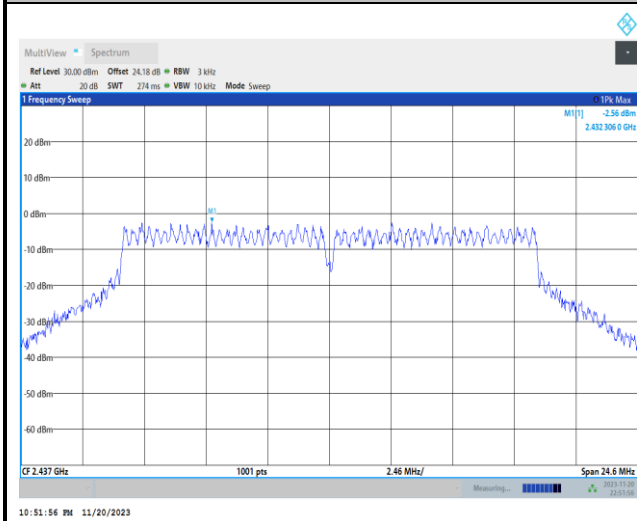
Maximum Power Density Plot (dBm/3kHz)**MIMO Ant A****MIMO Ant B****MIMO Ant C****MIMO Ant D**



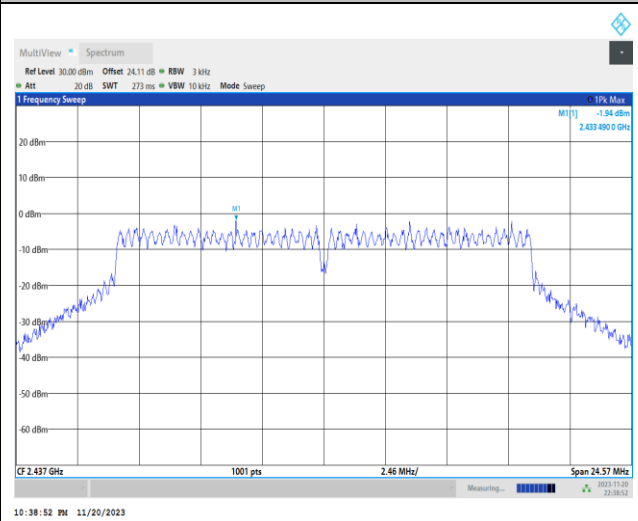
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Maximum Power Density Plot (dBm/3kHz)

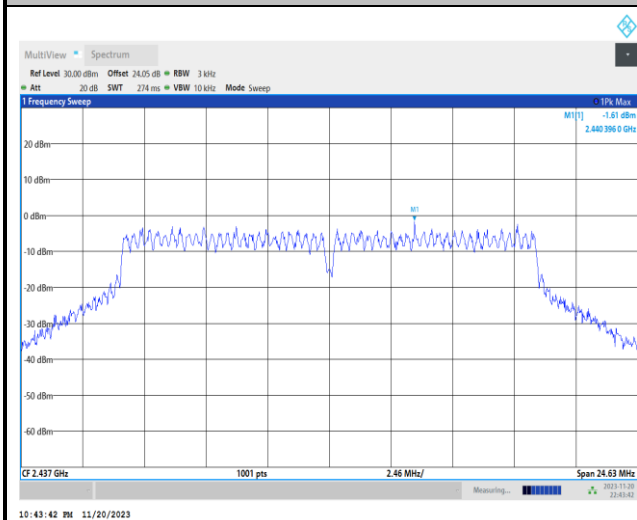
MIMO Ant A



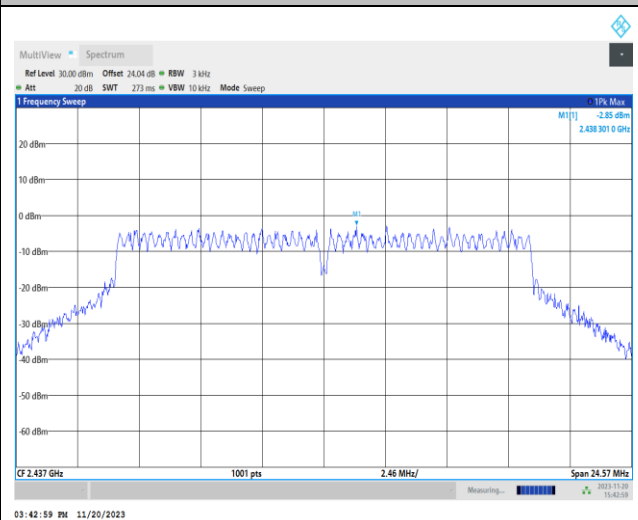
MIMO Ant B



MIMO Ant C



MIMO Ant D

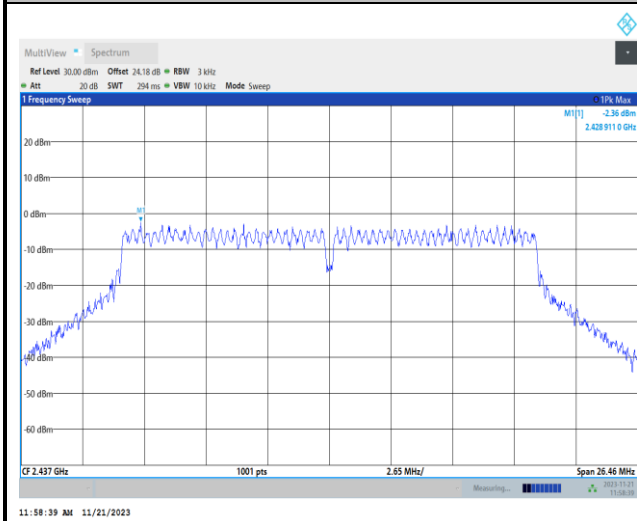




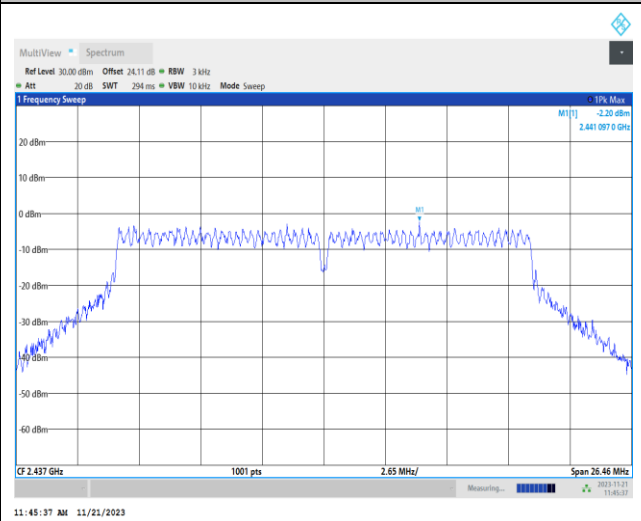
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Maximum Power Density Plot (dBm/3kHz)

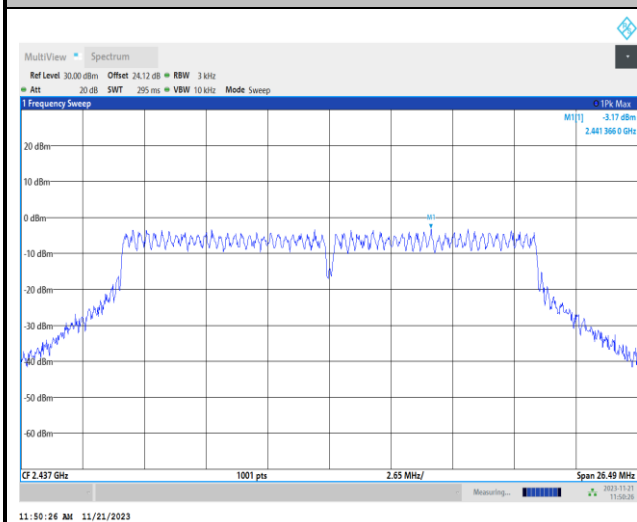
MIMO Ant A



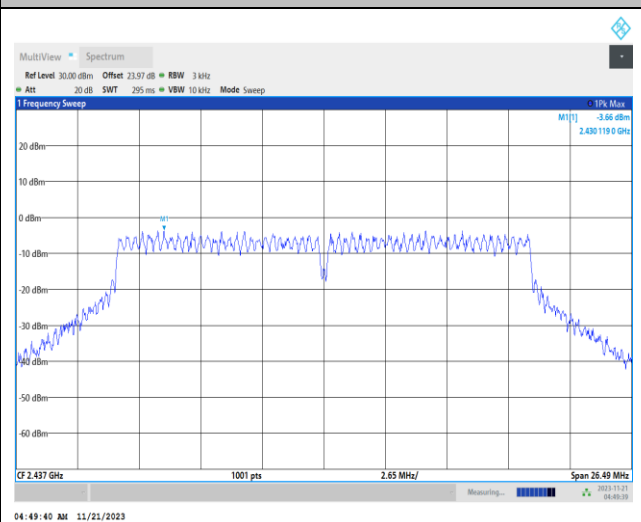
MIMO Ant B



MIMO Ant C



MIMO Ant D

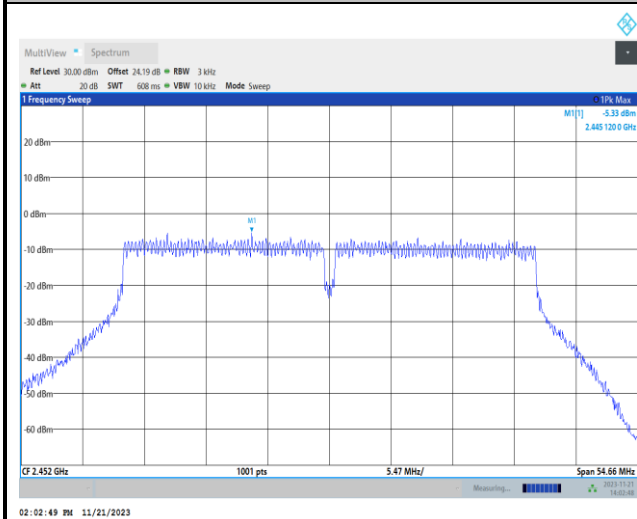




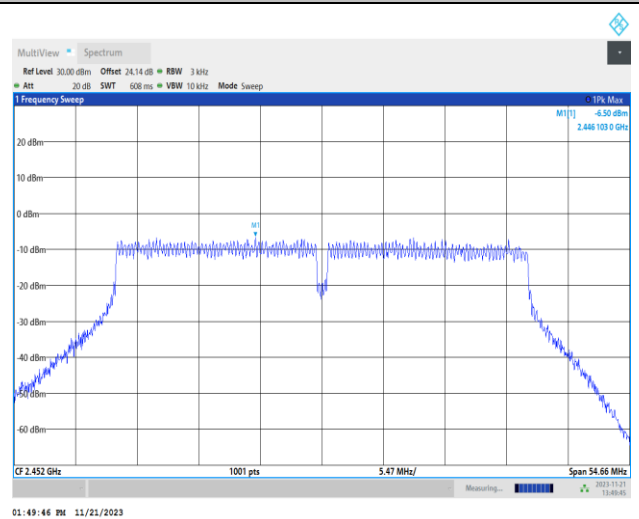
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Maximum Power Density Plot (dBm/3kHz)

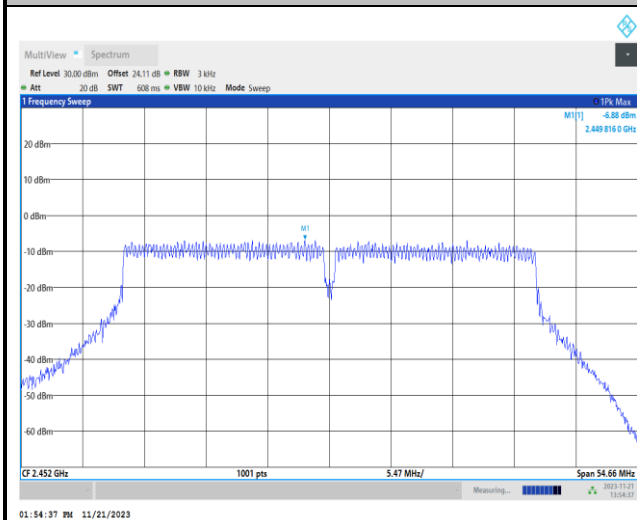
MIMO Ant A



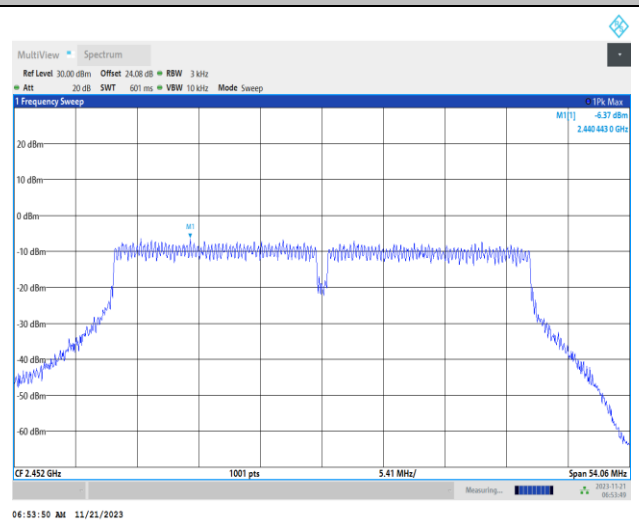
MIMO Ant B



MIMO Ant C



MIMO Ant D

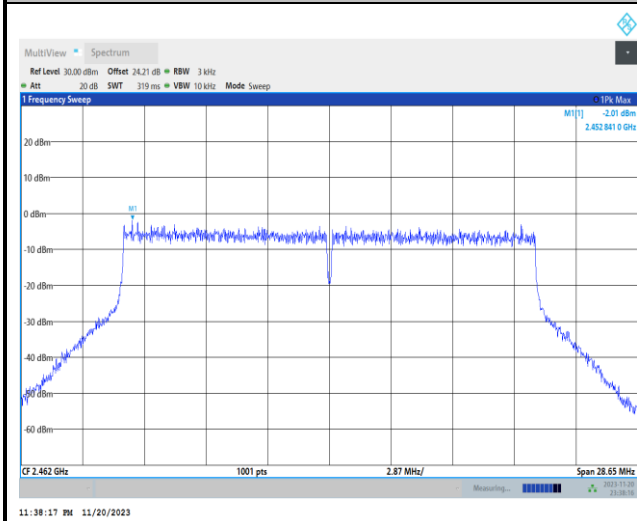




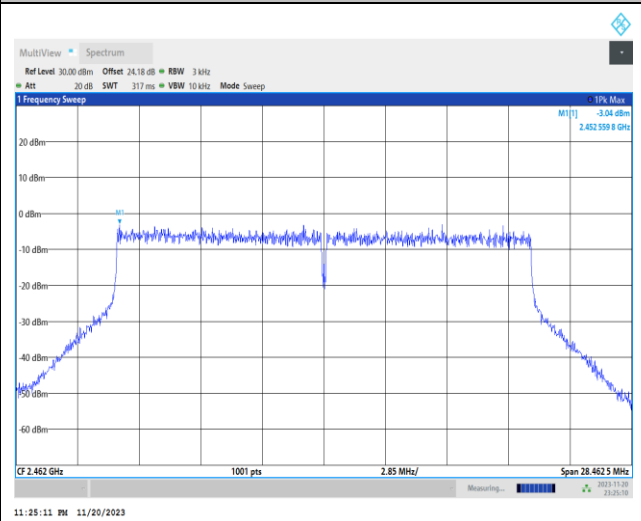
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Maximum Power Density Plot (dBm/3kHz)

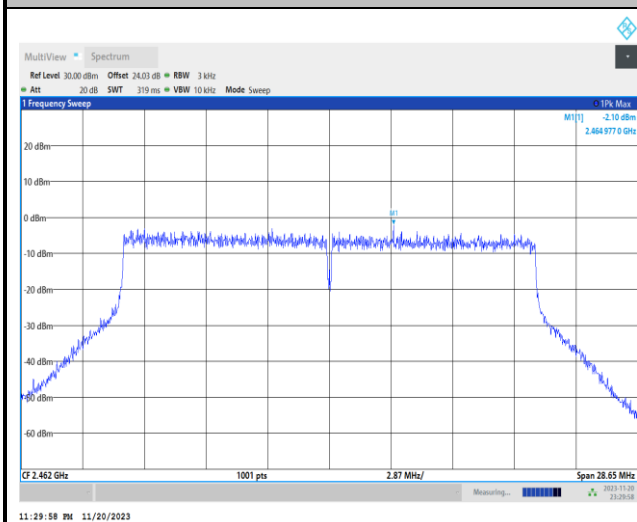
MIMO Ant A



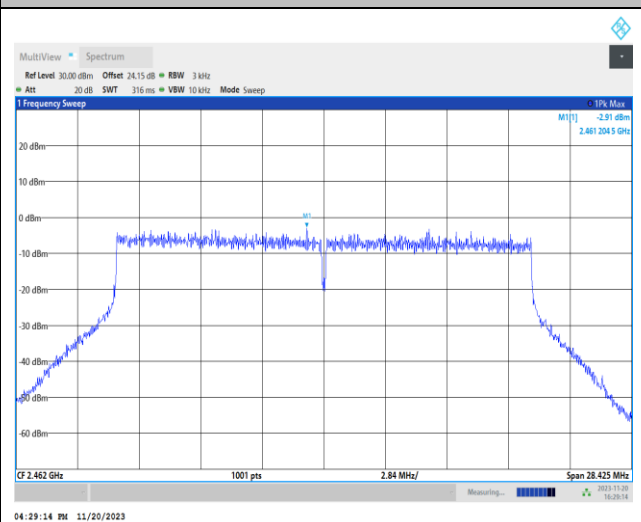
MIMO Ant B



MIMO Ant C



MIMO Ant D

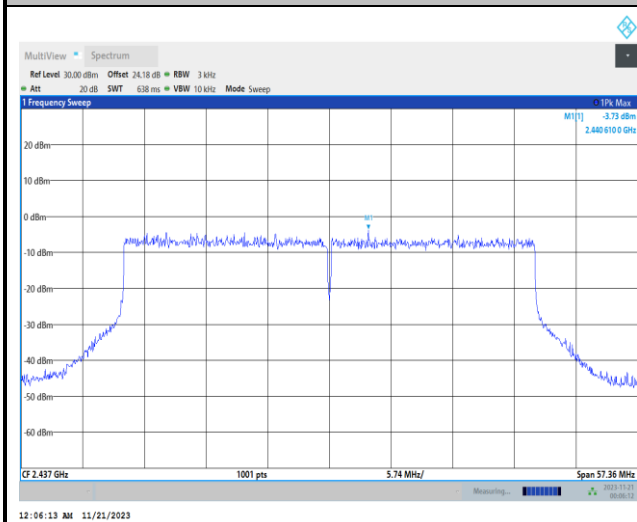




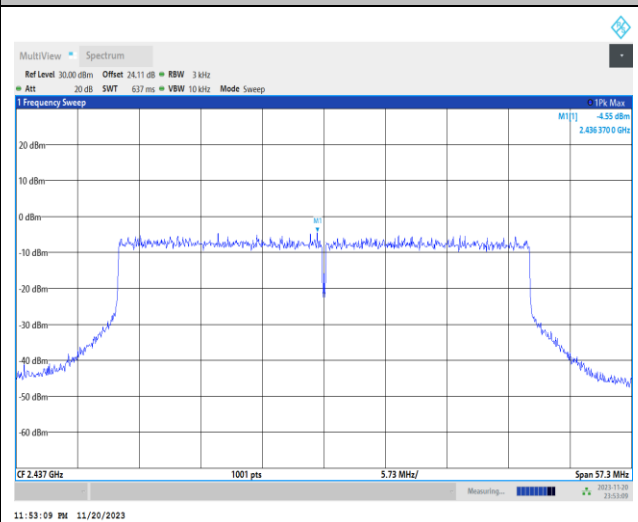
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Maximum Power Density Plot (dBm/3kHz)

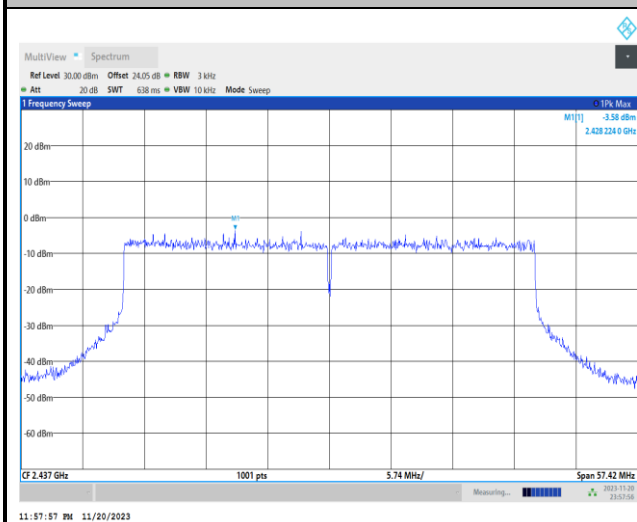
MIMO Ant A



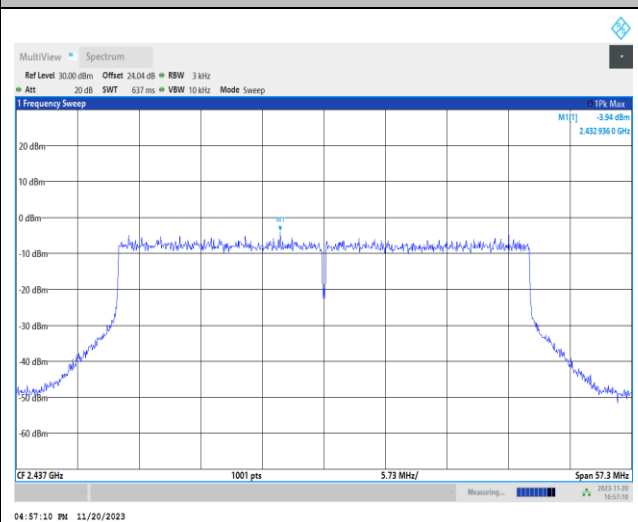
MIMO Ant B



MIMO Ant C



MIMO Ant D

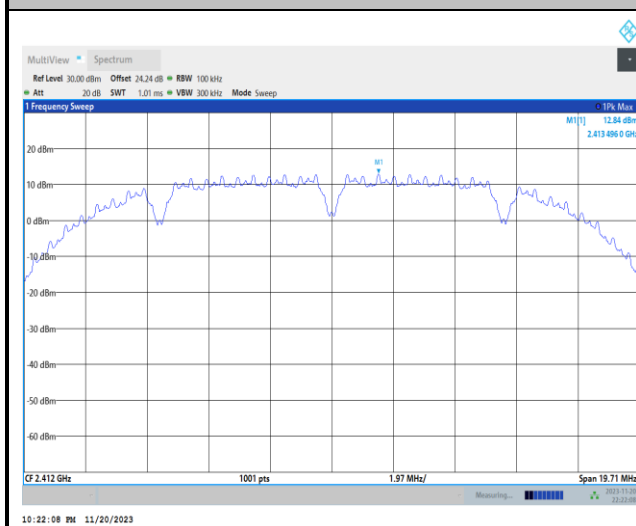
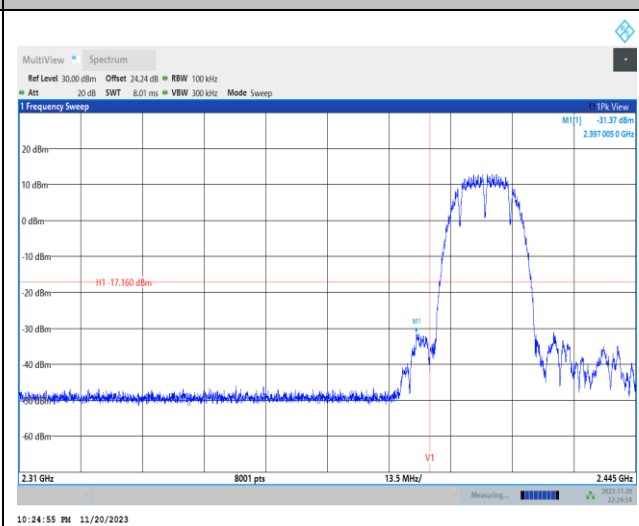
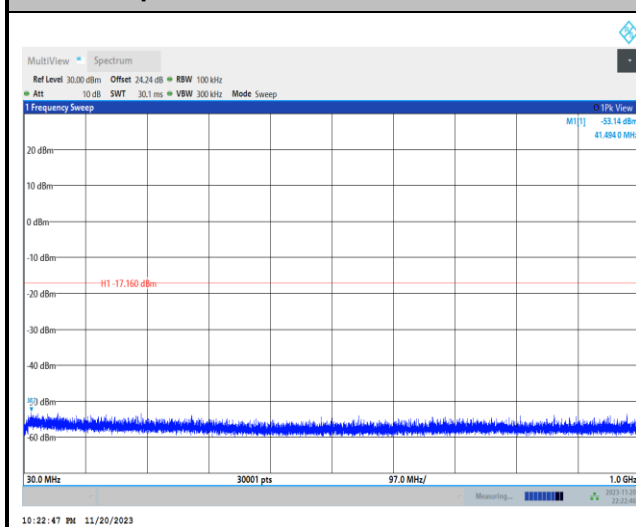
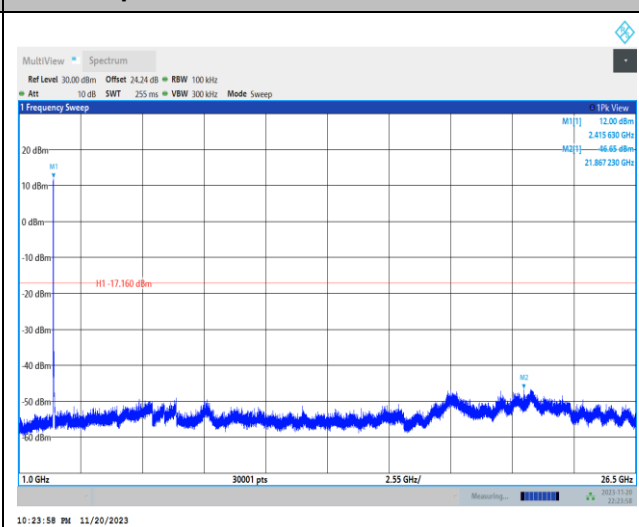


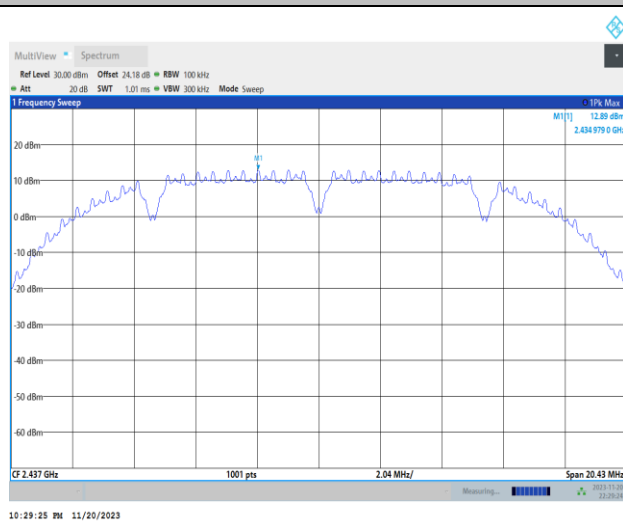
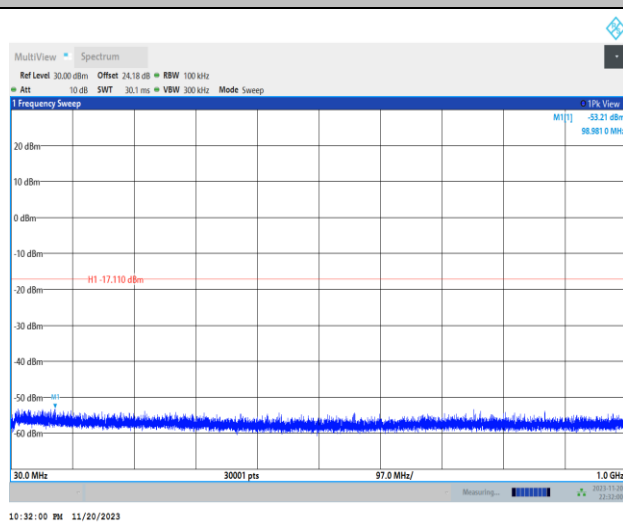
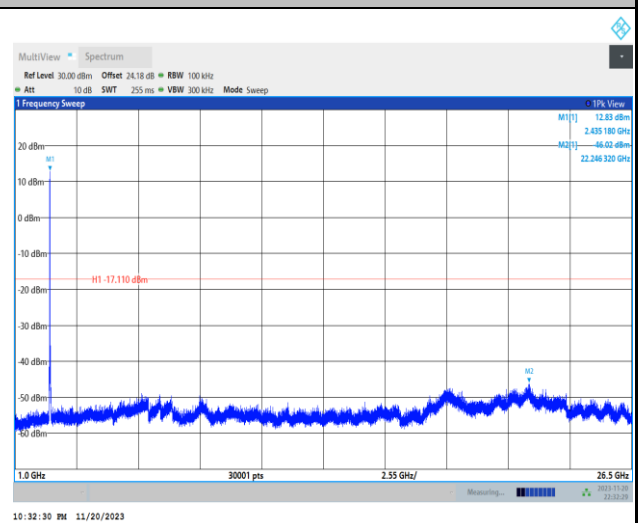
**Band Edges and Spurious Emission**

Number of TX = 4, Ant. A (Measured)

Test Mode : 802.11b

Test Channel : 01

100kHz PSD reference Level**Low Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**

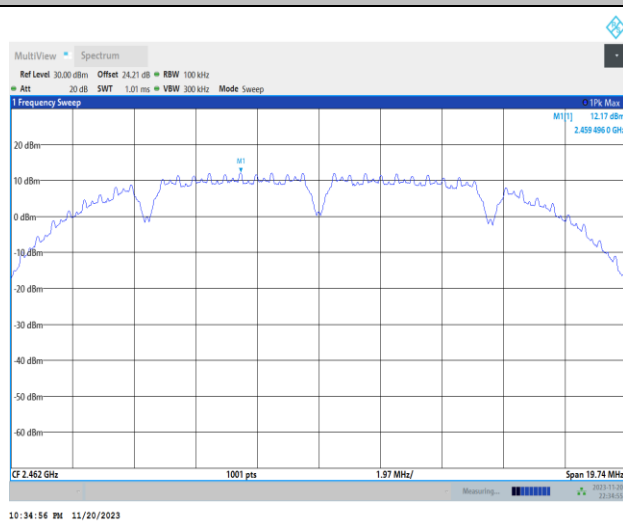
**Test Mode :** 802.11b**Test Channel :** 06**100kHz PSD reference Level****Middle Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**



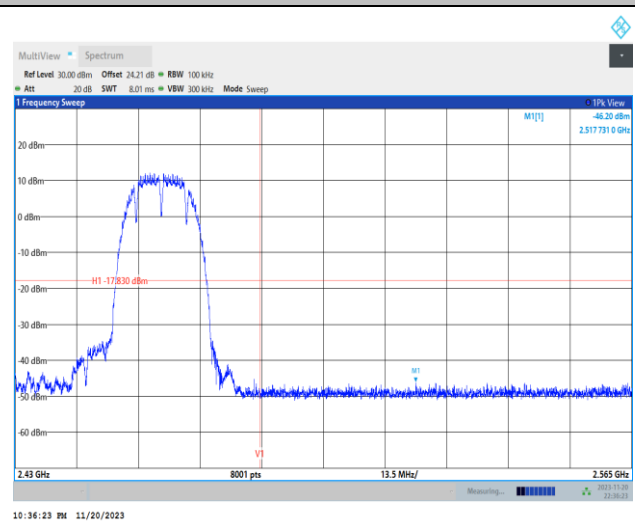
Test Mode : 802.11b

Test Channel : 11

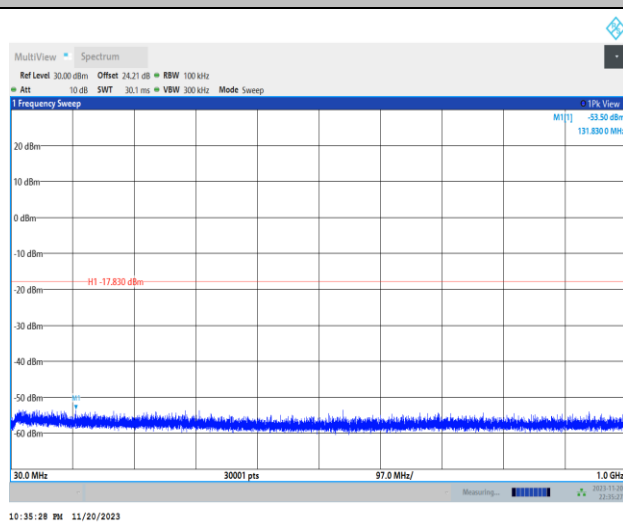
100kHz PSD reference Level



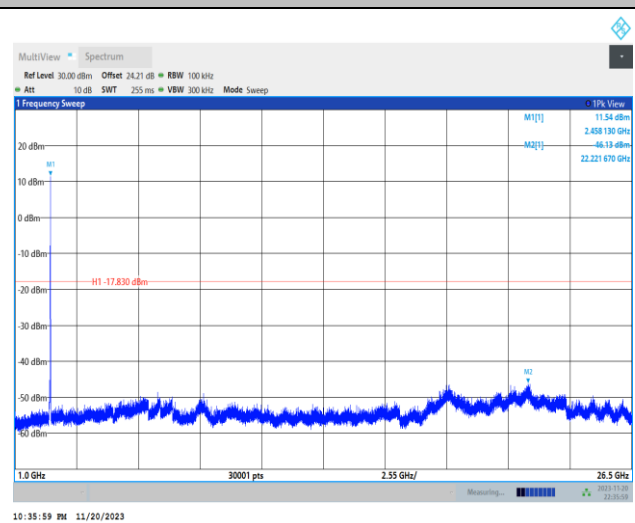
High Channel Plot

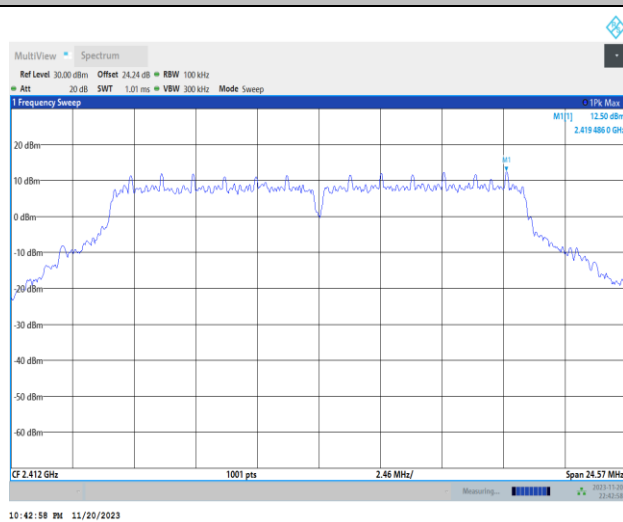


Spurious Emission 30MHz~1GHz

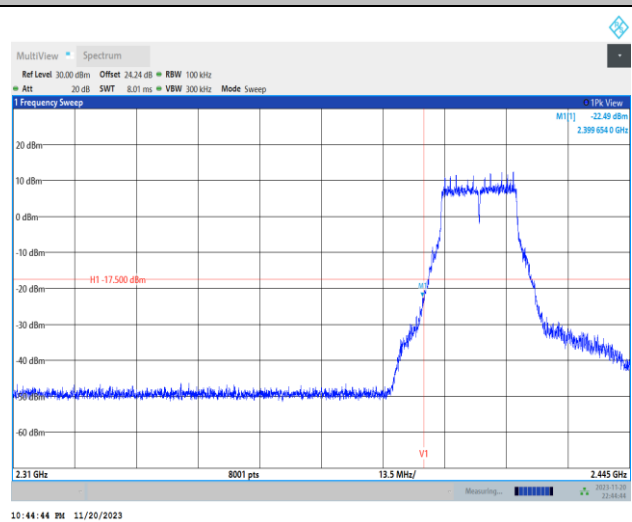


Spurious Emission 1GHz~26.5GHz

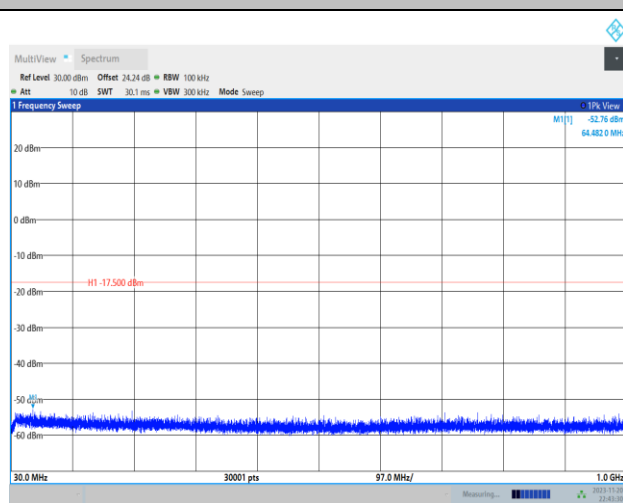


**Test Mode :** 802.11g**Test Channel :** 01**100kHz PSD reference Level**

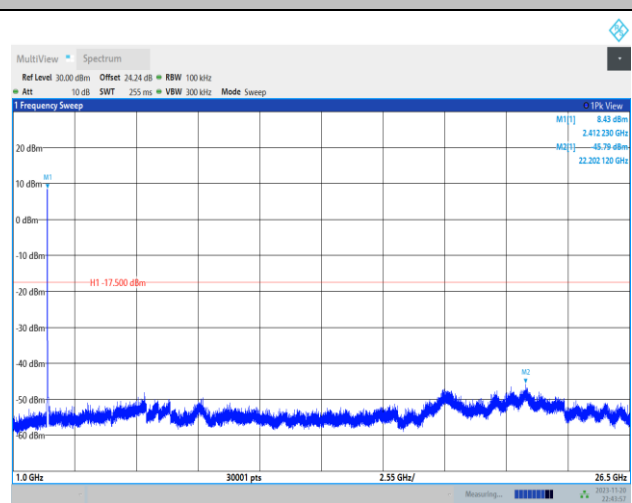
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Low Channel Plot

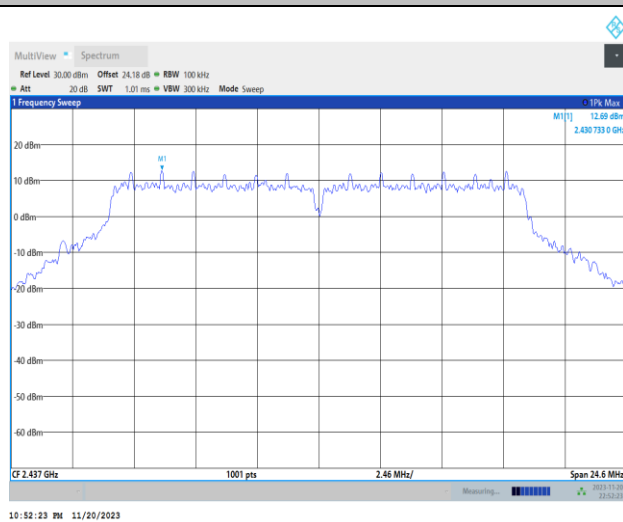
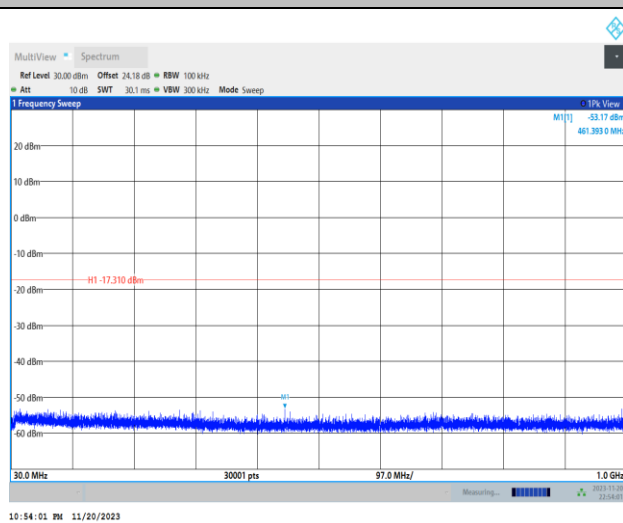
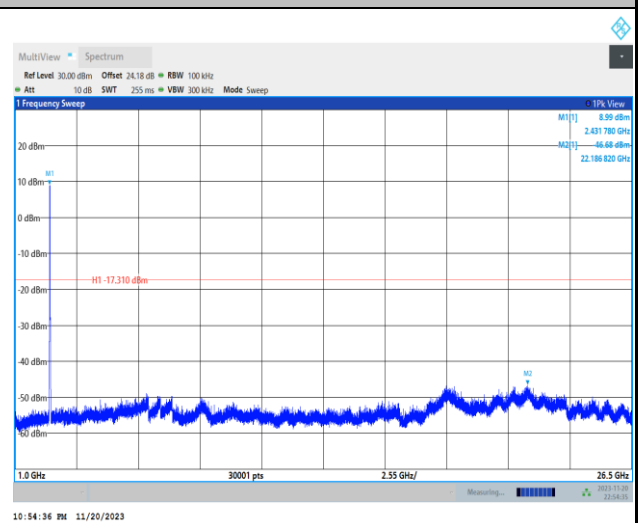
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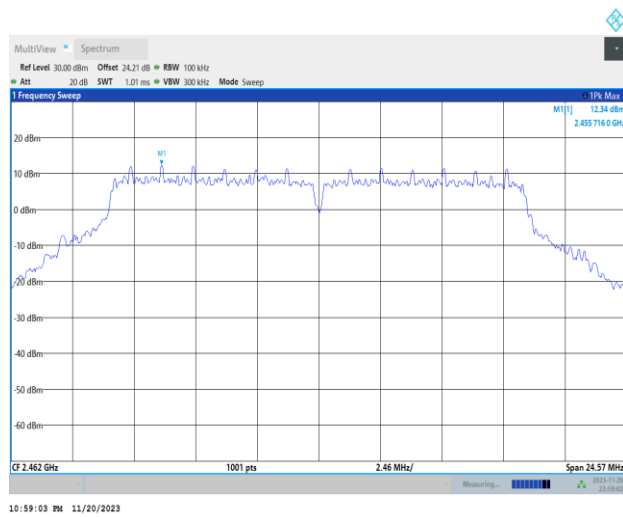
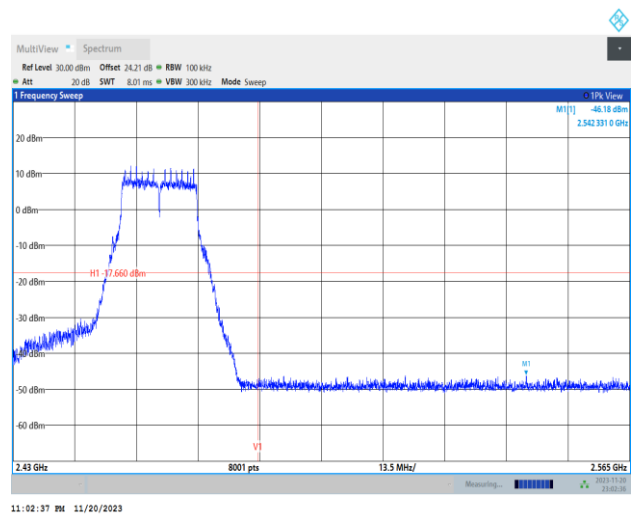
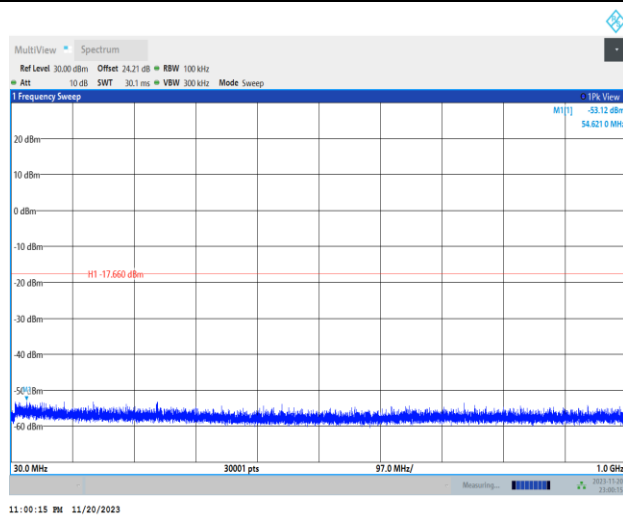
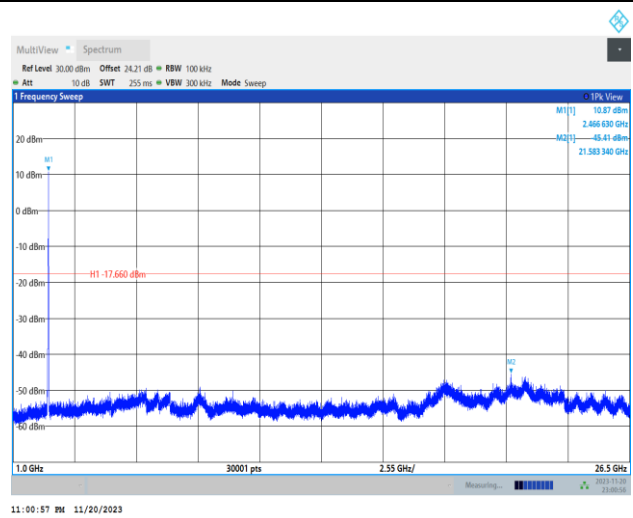
Spurious Emission 30MHz~1GHz

10:43:30 PM 11/20/2023

Spurious Emission 1GHz~26.5GHz

10:43:57 PM 11/20/2023

**Test Mode :** 802.11g**Test Channel :** 06**100kHz PSD reference Level****Middle Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**

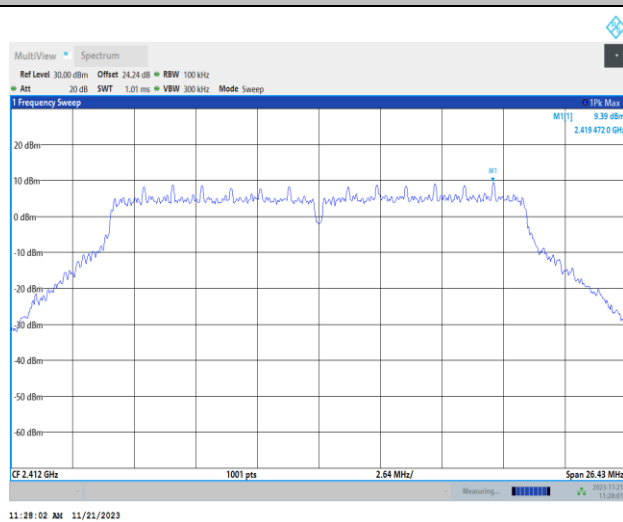
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Test Mode : 802.11n HT20

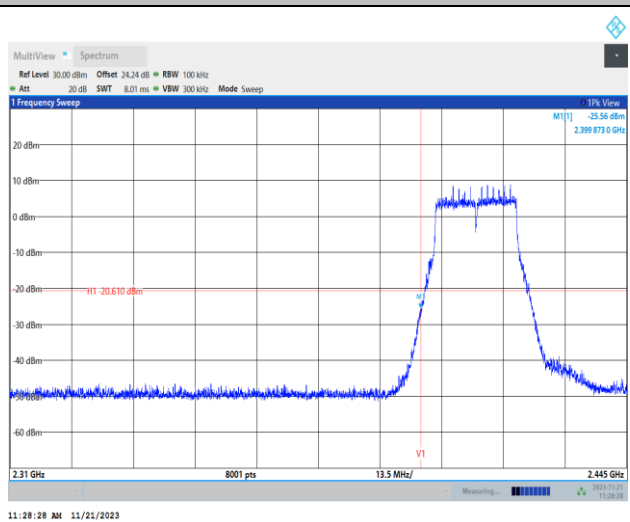
Test Channel : 01

100kHz PSD reference Level



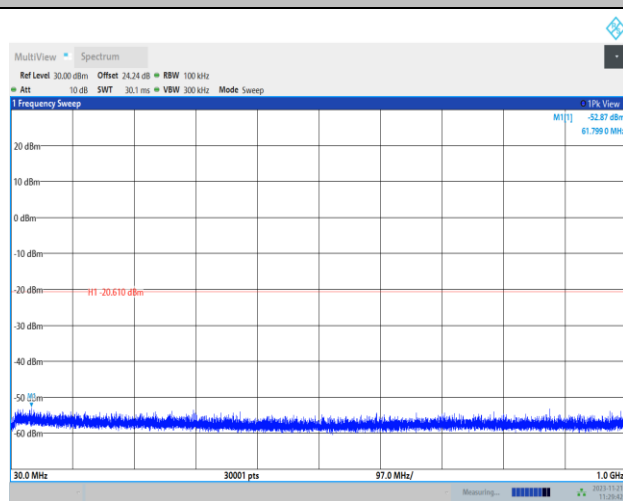
11:28:02 AM 11/21/2023

Low Channel Plot



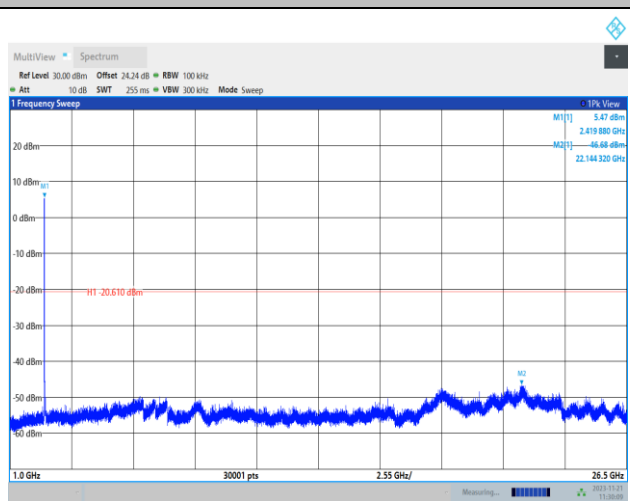
11:28:28 AM 11/21/2023

Spurious Emission 30MHz~1GHz



11:29:42 AM 11/21/2023

Spurious Emission 1GHz~26.5GHz



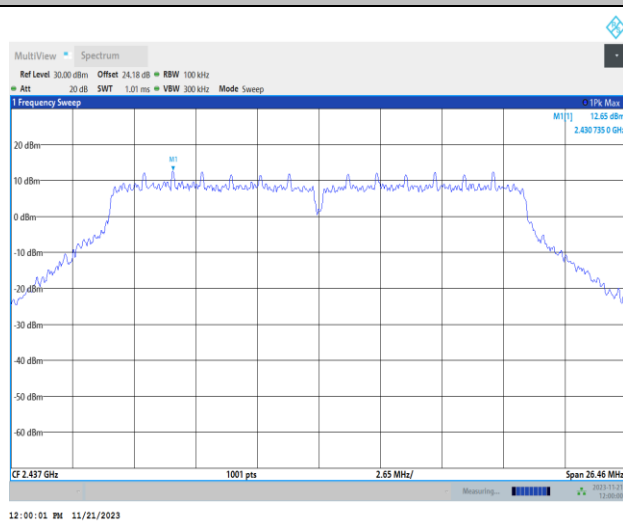
11:30:10 AM 11/21/2023



Test Mode : 802.11n HT20

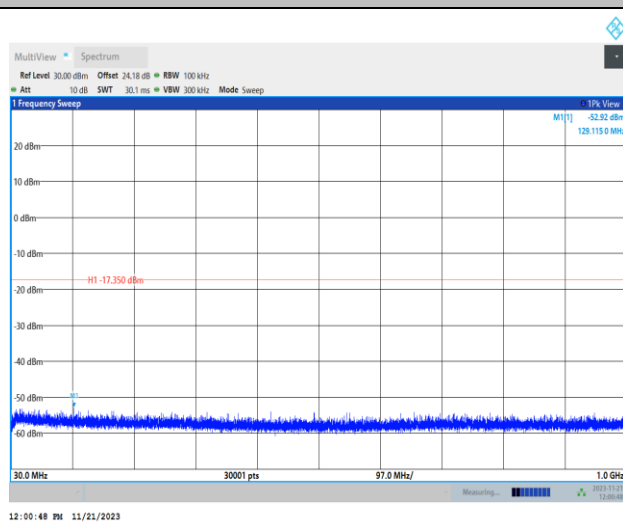
Test Channel : 06

100kHz PSD reference Level

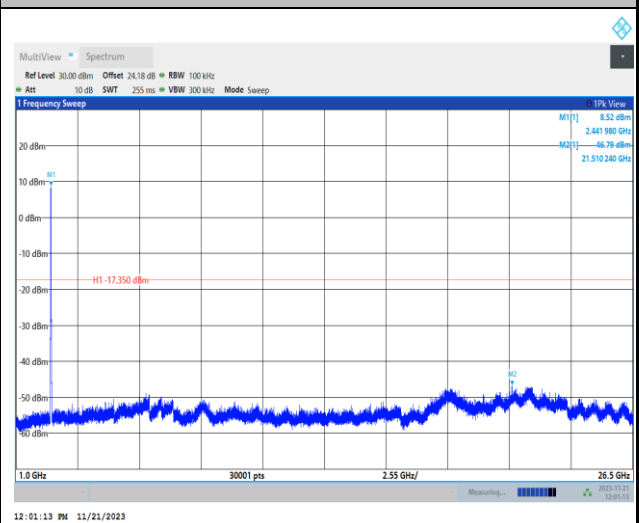


Middle Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

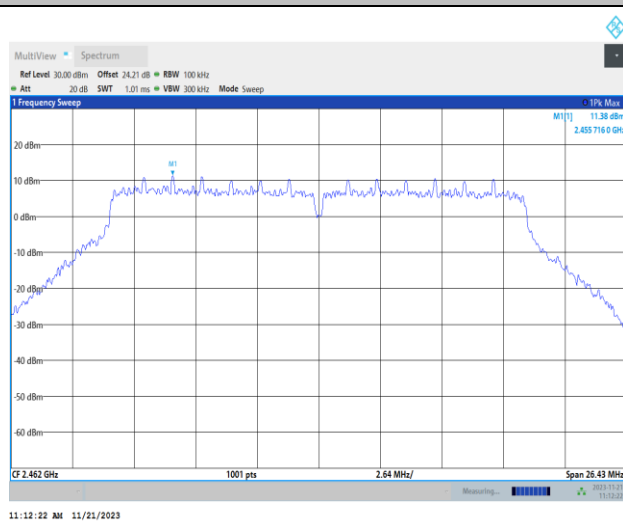




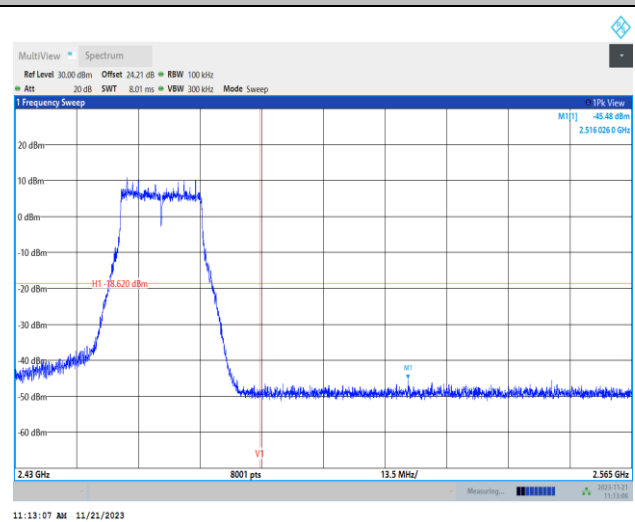
Test Mode : 802.11n HT20

Test Channel : 11

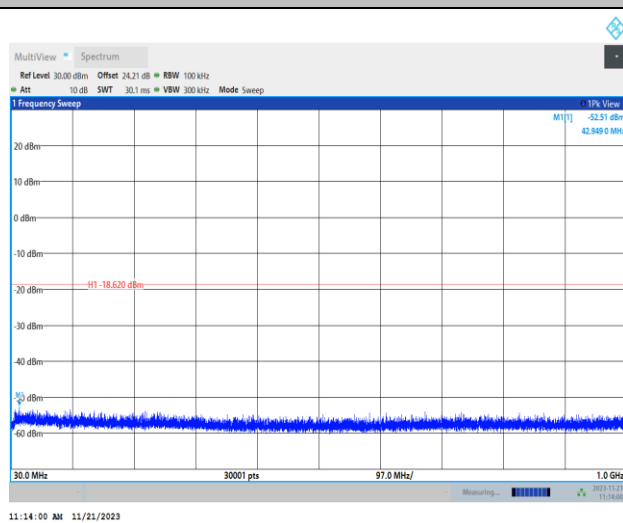
100kHz PSD reference Level



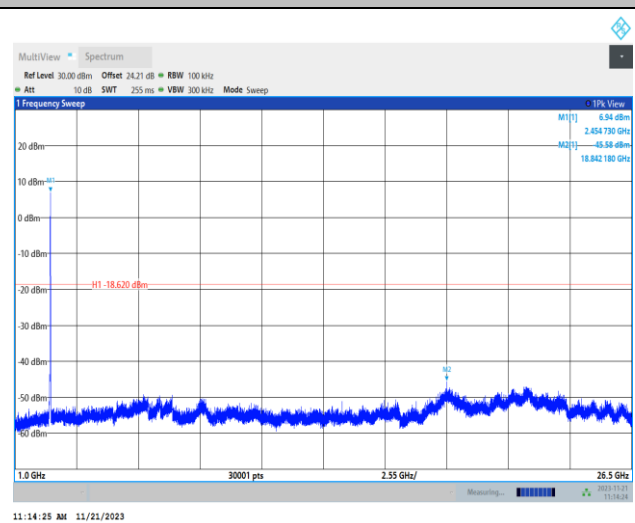
High Channel Plot

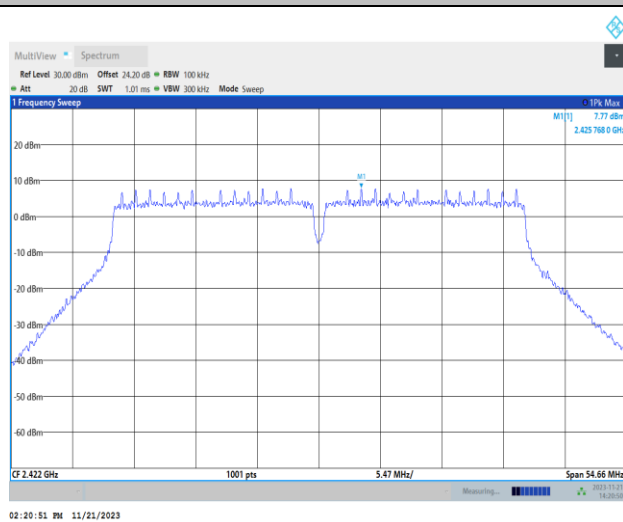
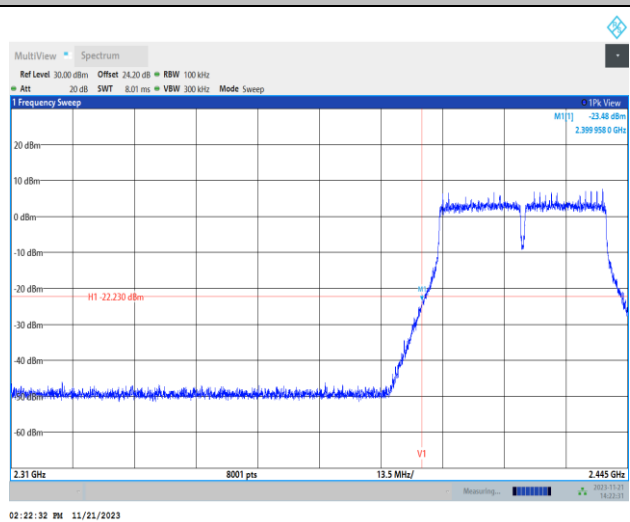
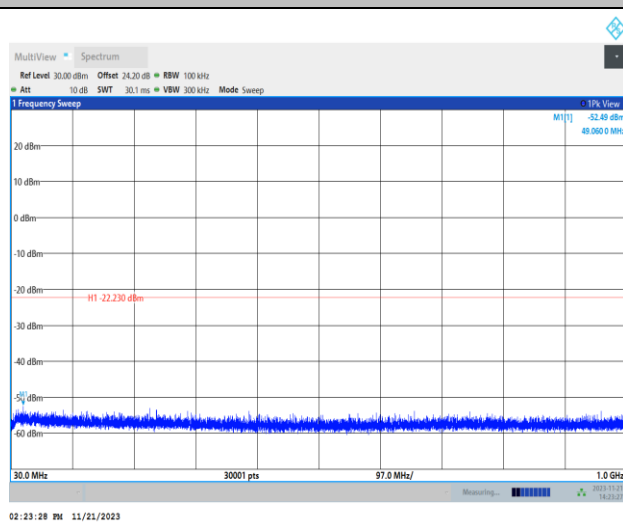
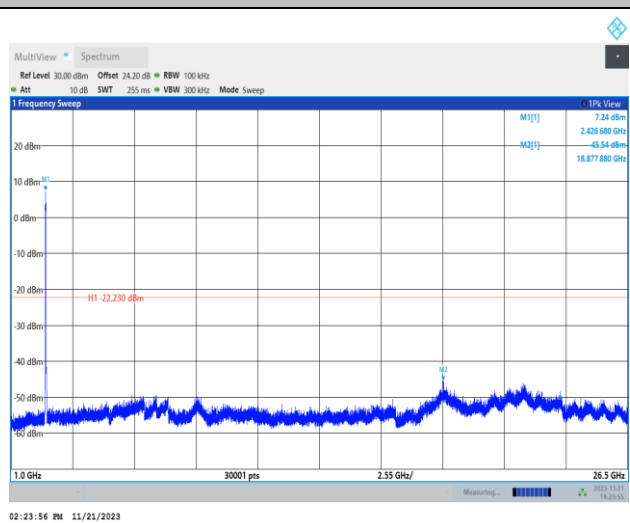


Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz



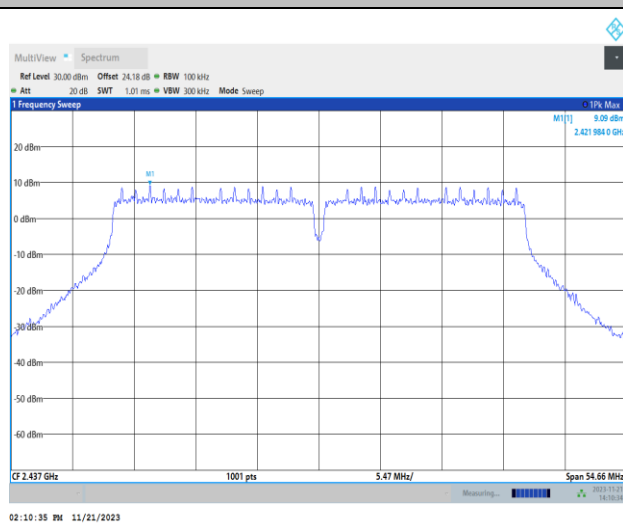
**Test Mode :** 802.11n HT40**Test Channel :** 03**100kHz PSD reference Level****Low Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**



Test Mode : 802.11n HT40

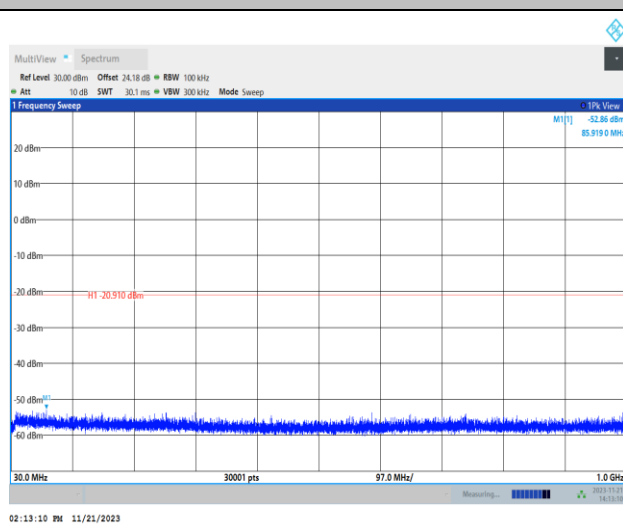
Test Channel : 06

100kHz PSD reference Level

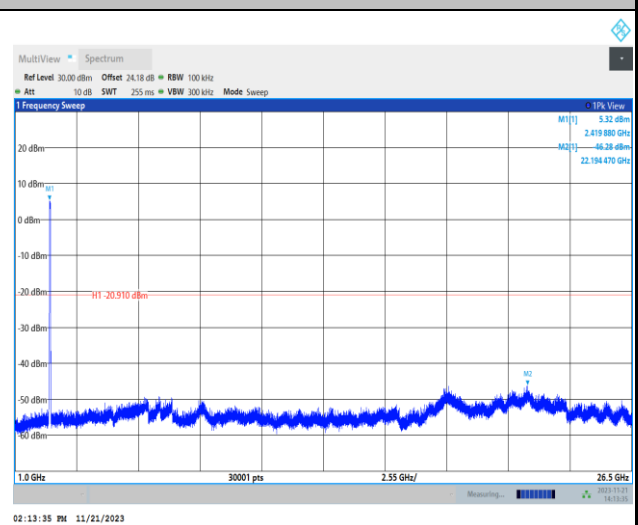


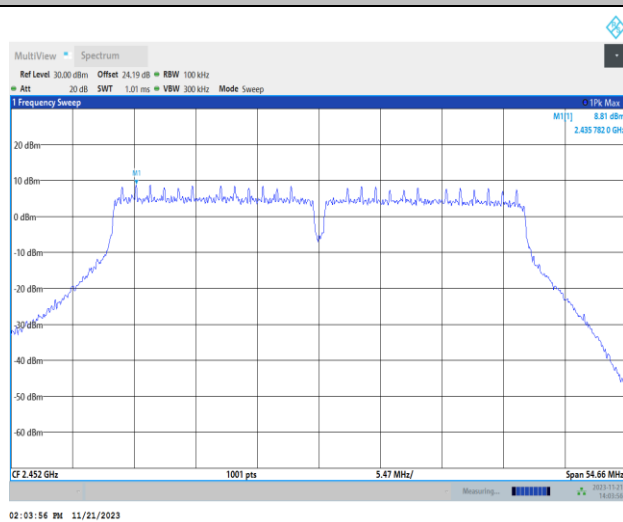
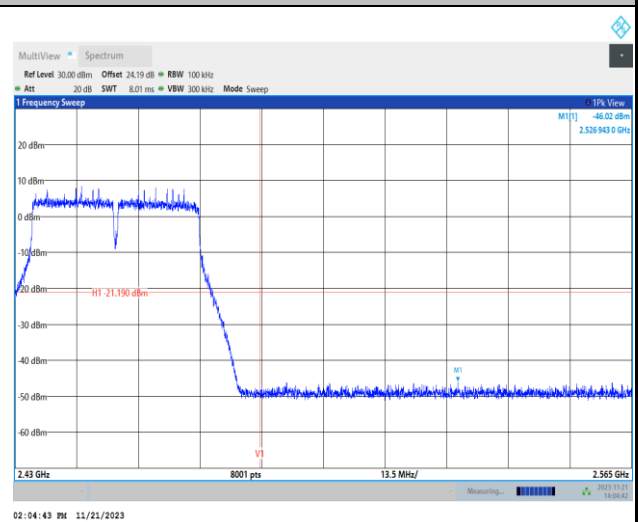
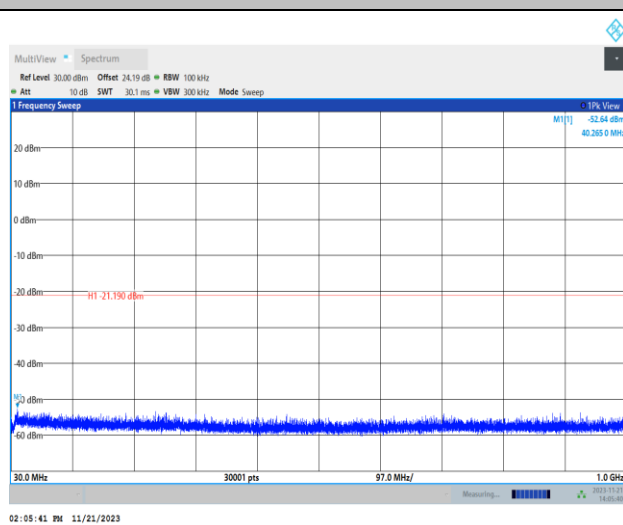
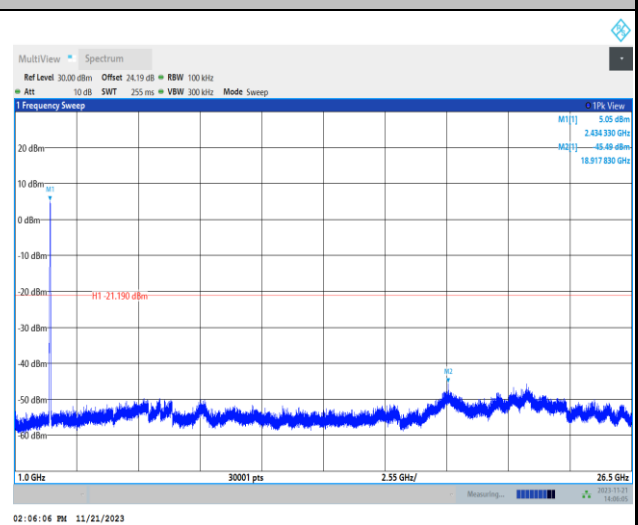
Middle Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz



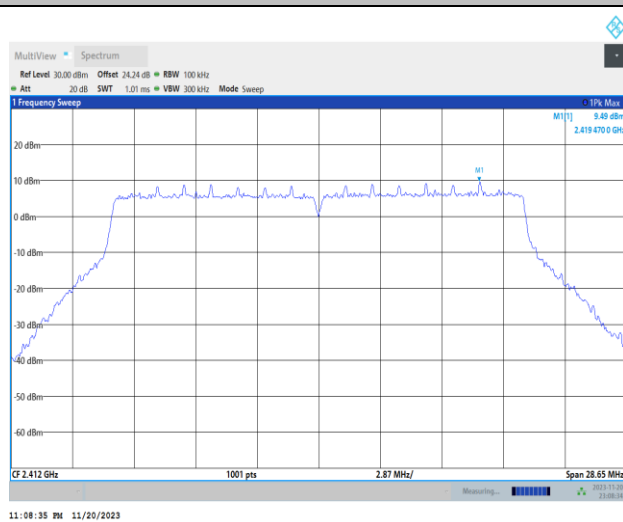
**Test Mode :** 802.11n HT40**Test Channel :** 09**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**



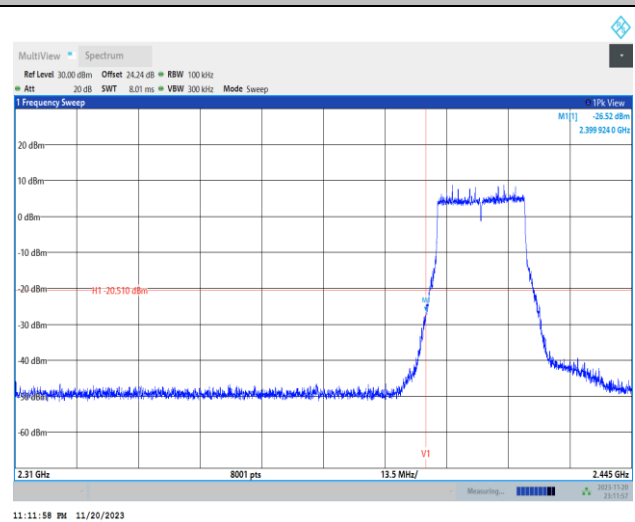
Test Mode : 802.11be EHT20

Test Channel : 01

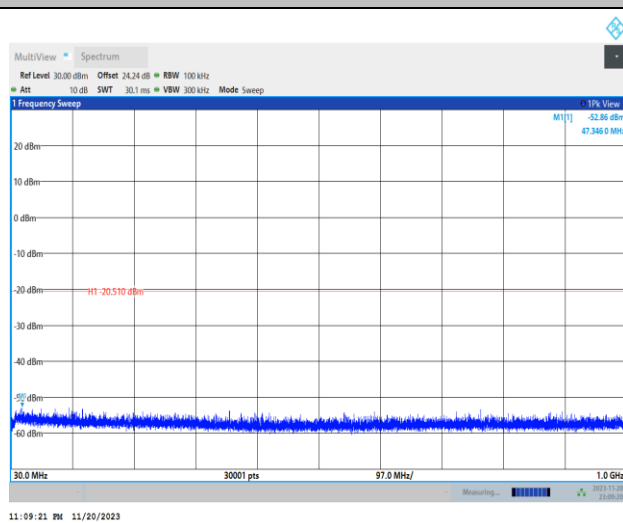
100kHz PSD reference Level



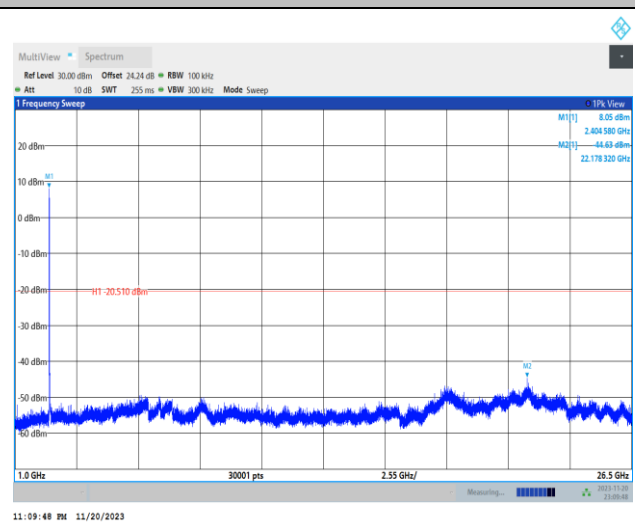
Low Channel Plot

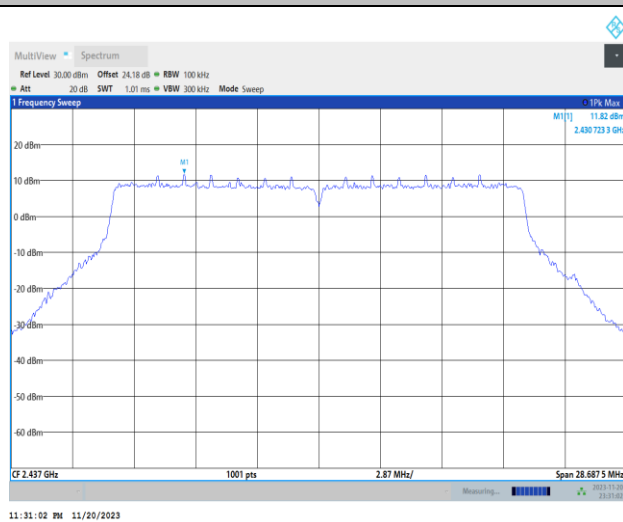
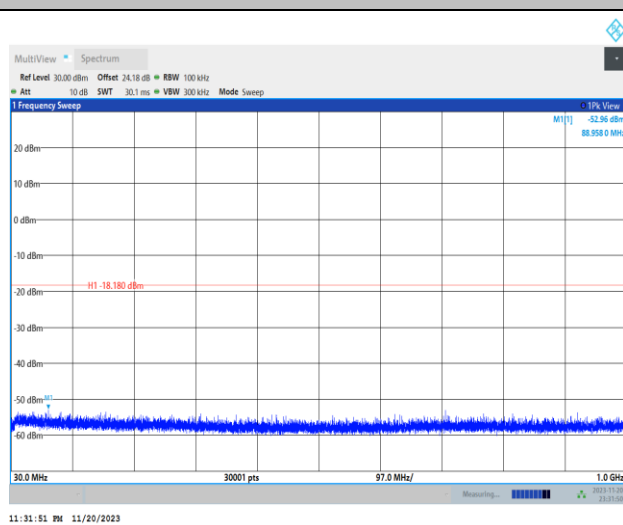
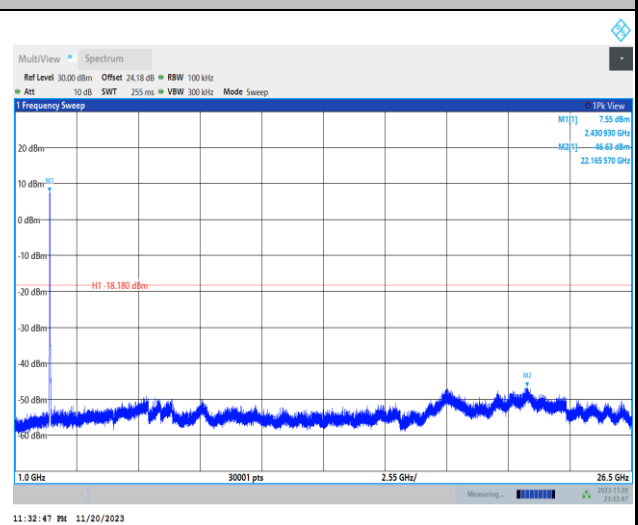


Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz



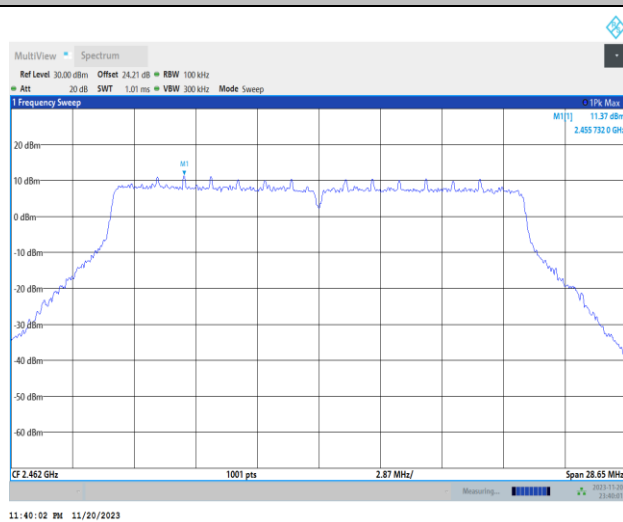
**Test Mode :** 802.11be EHT20**Test Channel :** 06**100kHz PSD reference Level****Middle Channel Plot****Spurious Emission 30MHz~1GHz****Spurious Emission 1GHz~26.5GHz**



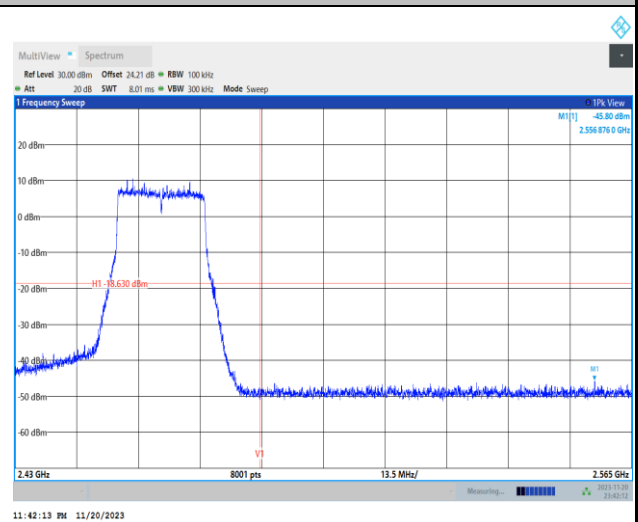
Test Mode : 802.11be EHT20

Test Channel : 11

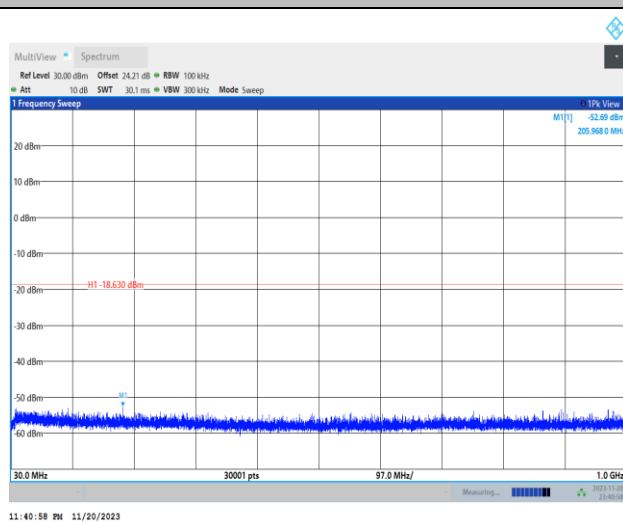
100kHz PSD reference Level



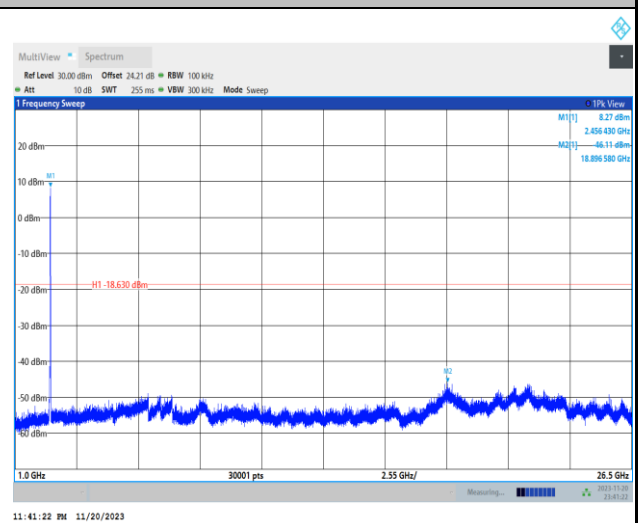
High Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

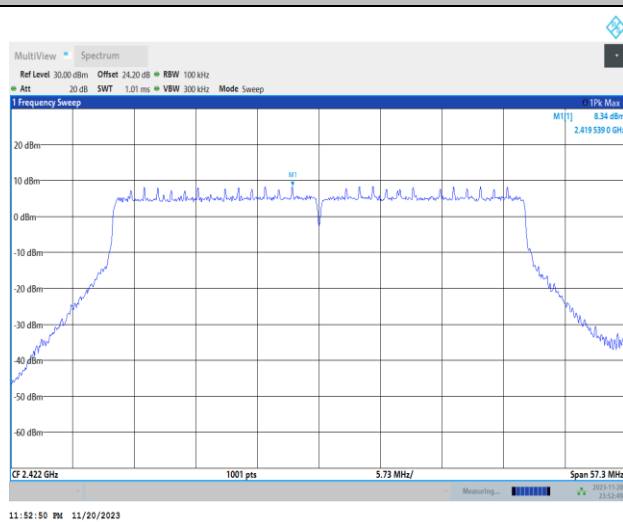




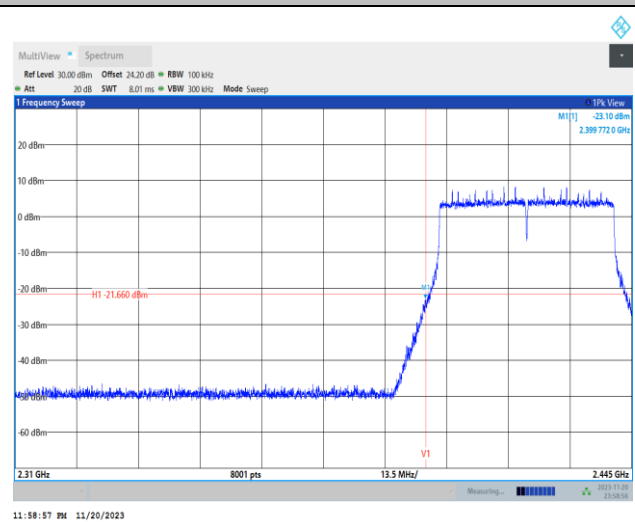
Test Mode : 802.11be EHT40

Test Channel : 03

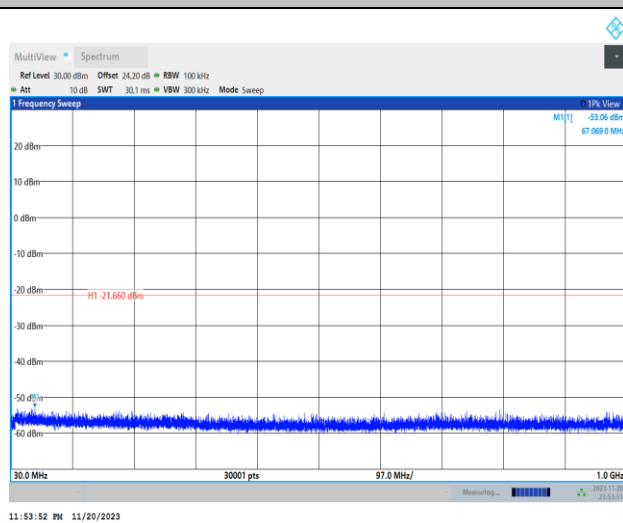
100kHz PSD reference Level



Low Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

