



FCC RADIO TEST REPORT

FCC ID : S9GR670
Equipment : R670 Access Point
Brand Name : RUCKUS
Model Name : R670
Applicant : Ruckus Wireless, LLC
350 W. Java Dr., Sunnyvale CA 94089 USA
Manufacturer : Ruckus Wireless, LLC
350 W. Java Dr., Sunnyvale CA 94089 USA
Standard : FCC Part 15 Subpart E §15.407

The product was received on Nov. 03, 2023 and testing was performed from Nov. 06, 2023 to Jul. 04, 2024. We, Sporton International (USA) Inc., 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 (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035



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History of this test report

Report No.	Version	Description	Issue Date
FR240104006B	01	Initial issue of report	Jul. 08, 2024
FR240104006B	02	1. Revise Equipment and Model name 2. Revise Section 1.1 This report is an updated version, replacing the report issued on Jul. 08, 2024.	Aug. 29, 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	0.20 dB under the limit at 2390.00 MHz
3.6	15.207	AC Conducted Emission	Pass	13.96 dB under the limit at 0.65 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.

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs Bluetooth - LE, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax/be, Wi-Fi 5GHz 802.11a/n/ac/ax/be, Wi-Fi 6GHz 802.11a/n/ac/ax/be, and ZigBee.
Antenna Type Bluetooth – LE: Omni-Directional Antenna WLAN: <Ant. 1>: Omni-Directional Antenna <Ant. 2>: Omni-Directional Antenna <Ant. 3>: Omni-Directional Antenna <Ant. 4>: Omni-Directional Antenna ZigBee: Omni-Directional Antenna

Antenna information		
2412 MHz ~ 2462 MHz	Peak Gain (dBi)	<Ant. 1>: 2.1 <Ant. 3>: 2.0

Remark:

1. The device is a special case of MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas which are vertically/horizontally mounted on the main board as indicated in equipment photo exhibits.
2. Channel puncturing is not implemented.
3. The above EUT's information was declared by manufacturer. Please refer to Disclaimer in report summary.

1.1.1 Antenna Directional Gain

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F2)c)i)

Cross-polarized antennas. For a system in which the antennas have fixed orientations relative to one another that ensure that the antennas are cross-polarized regardless of any user actions, the directional gain is computed as follows.

- (i) Cross-polarized antennas with $N_{ANT} = 2$. In the case of a transmitter with only two outputs driving a pair of antennas that are cross-polarized (e.g., vertical and horizontal or left-circular and right-circular), directional gain is the gain of an individual antenna. If the two antennas have different gains, the larger gain applies.

The directional gain "DG" is calculated as following table.

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant 1 (dBi)	Ant 3 (dBi)				
2.4GHz	2.10	2.00	2.10	2.10	0.00	0.00

Calculation example:

If a device has two cross-polarized antenna, $G_{ANT1} = 2.10\text{dBi}$; $G_{ANT2} = 2.00\text{dBi}$

Directional gain of power measurement = $\max(2.10, 2.00) = 2.10\text{ dBi}$

Directional gain of PSD measurement = $\max(2.10, 2.00) = 2.10\text{ dBi}$

Power and PSD limit reduction = Directional gain – 6dBi, (min = 0)

1.2 Modification of EUT

No modifications made to the EUT during the testing.



1.3 Testing Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	Sporton Site No.
	TH01-CA, CO01-CA, 03CH01-CA

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

FCC Designation No.: US1250

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: All the test items were validated and recorded in accordance with the standards without any modification during the testing.

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). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.
- 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

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

MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20 (Covered by EHT20)	MCS0
802.11n HT40 (Covered by EHT40)	MCS0
802.11ac VHT20 (Covered by EHT20)	MCS0
802.11ac VHT40 (Covered by EHT40)	MCS0
802.11ax HE20 (Covered by EHT20)	MCS0
802.11ax HE40(Covered by EHT40)	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0

Remark:

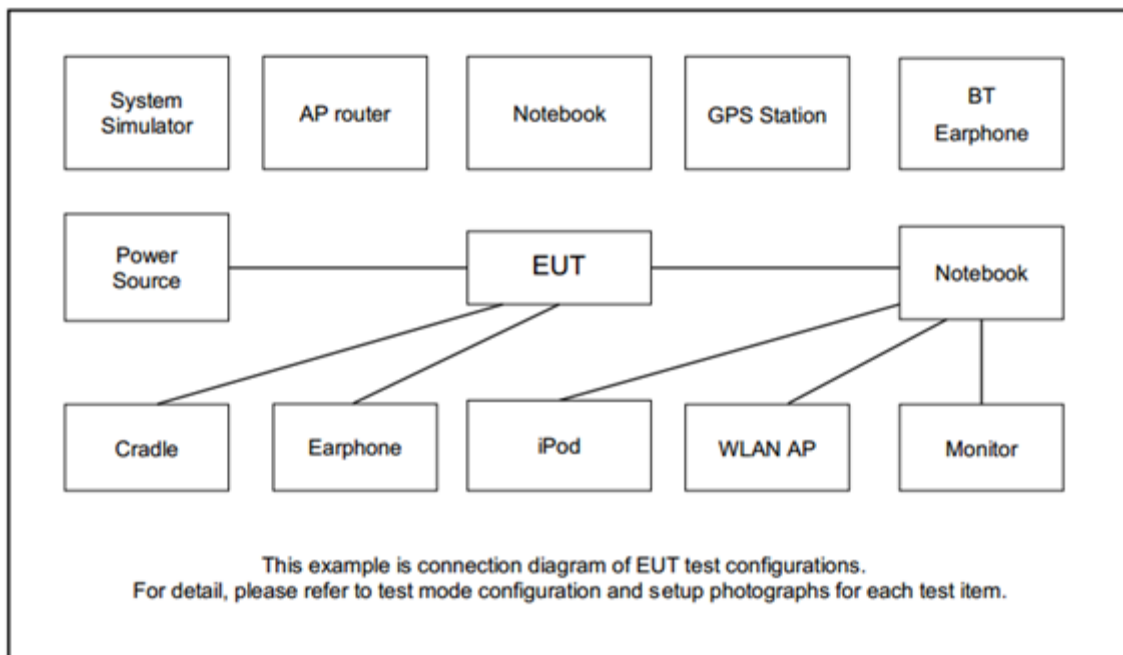
- Based on the manufacturer's declaration, 802.11be covers the 802.11n, 11ac and 11ax due to the same modulation family scheme. For 802.11be, only full resource unit assignment mode is tested since the EUT does not support partial resource unit assignment mode.
- Based on the manufacturer's declaration, RF power on each chain in MIMO mode is parameterized to be greater than the power in SISO mode, giving the condition that the SISO Mode is covered by MIMO Mode which is deemed the worst case selected for testing.

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Normal Link + LAN 1 Link + LAN 2 Link + Adapter

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

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



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 5440	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	Acer	N18Q13	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Adapter	Ruckus	740-64277-001	N/A	N/A	N/A
4.	PoE Adapter	RUCKUS	740-64310-001	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility "PuTTY Release 0.77 & QSPR V5.0-00202" 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.

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.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

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.

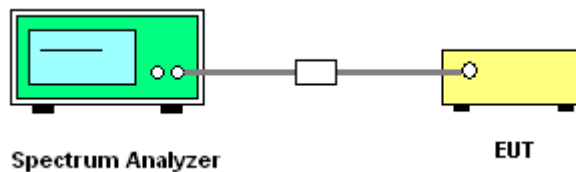
3.1.2 Measuring Instruments

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



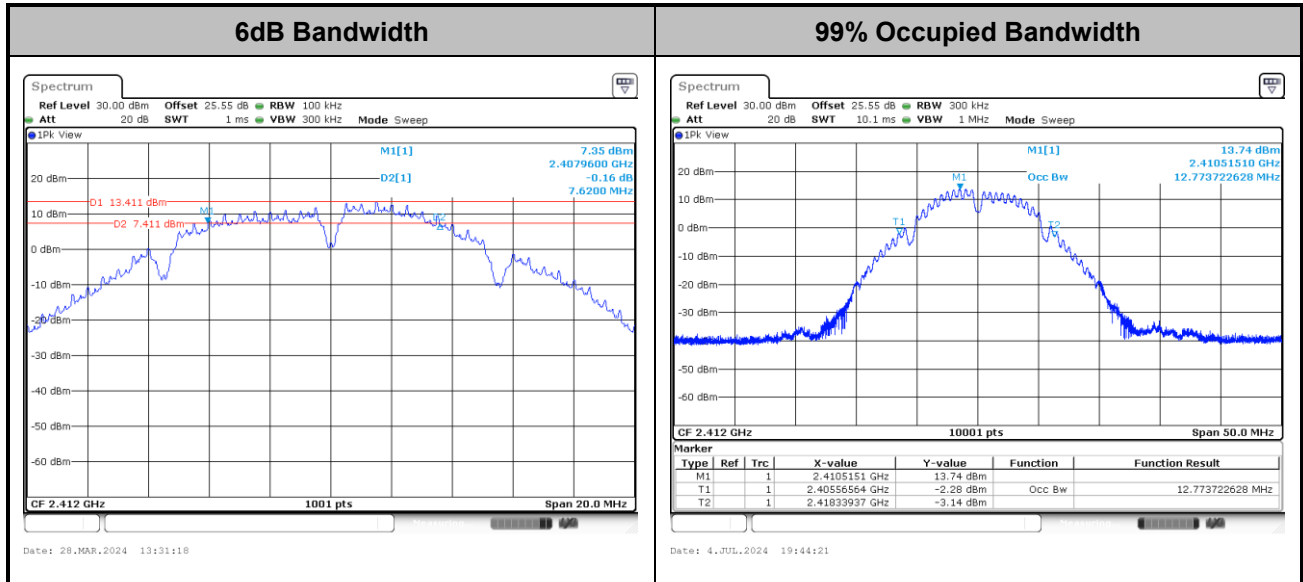


3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

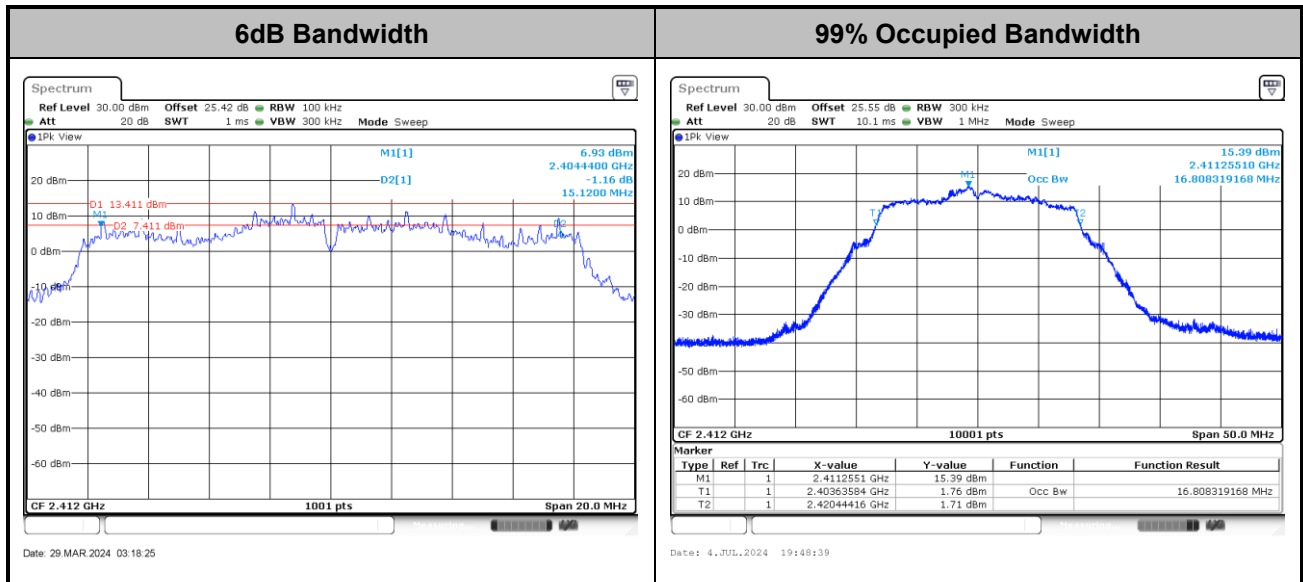
MIMO <Ant. 1+3>

<802.11b>



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

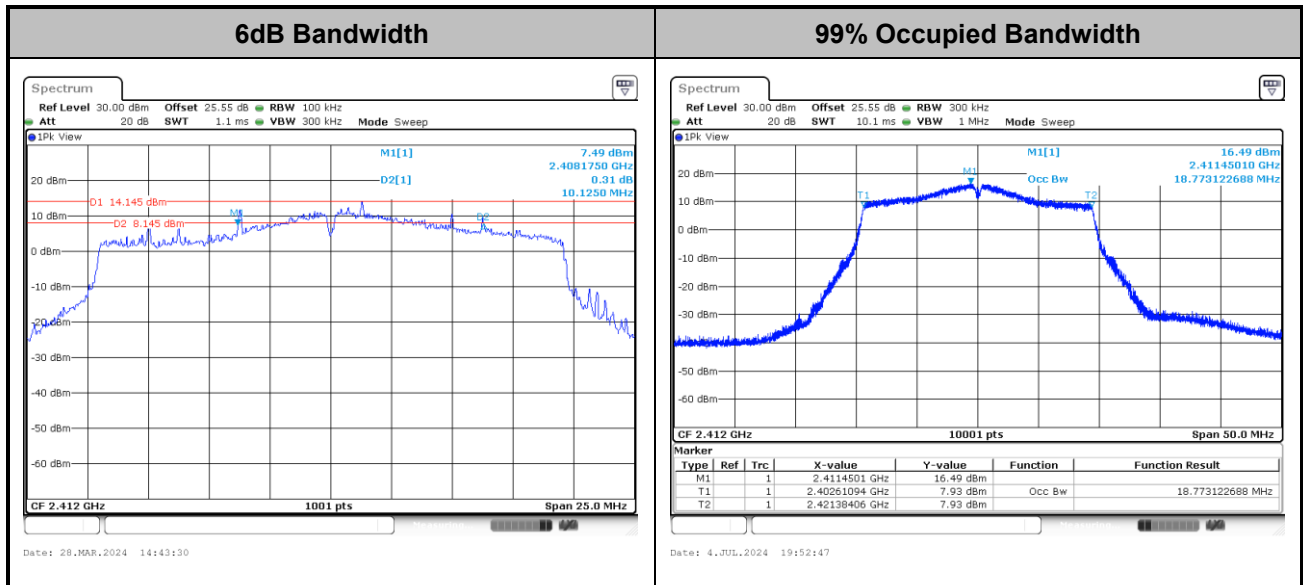
<802.11g>



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

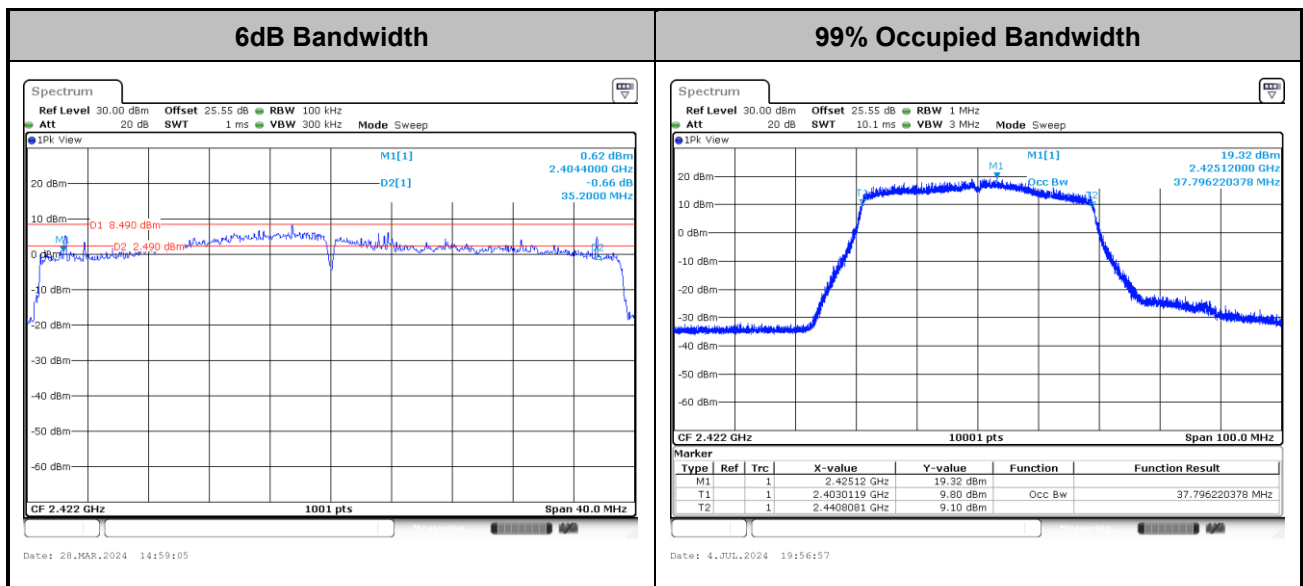


<802.11be EHT20>



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

<802.1be EHT40>



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

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 peak 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.

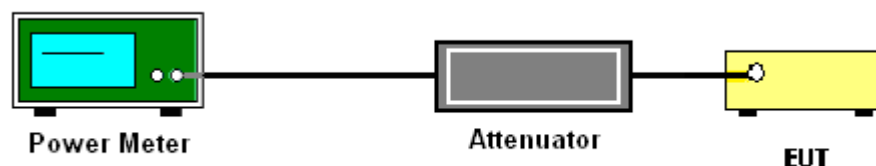
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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.

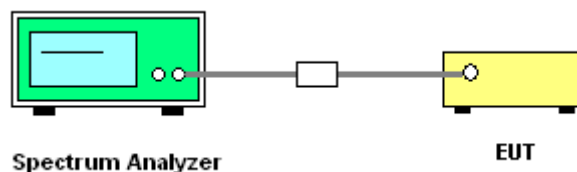
3.3.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
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) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. 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

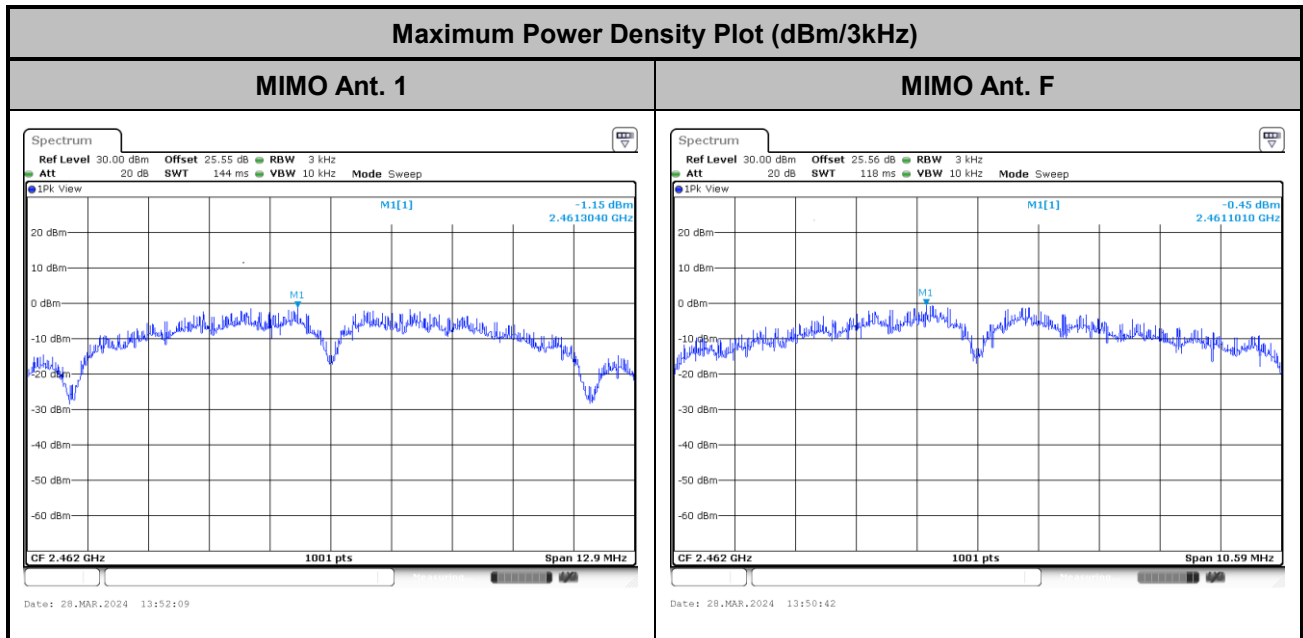




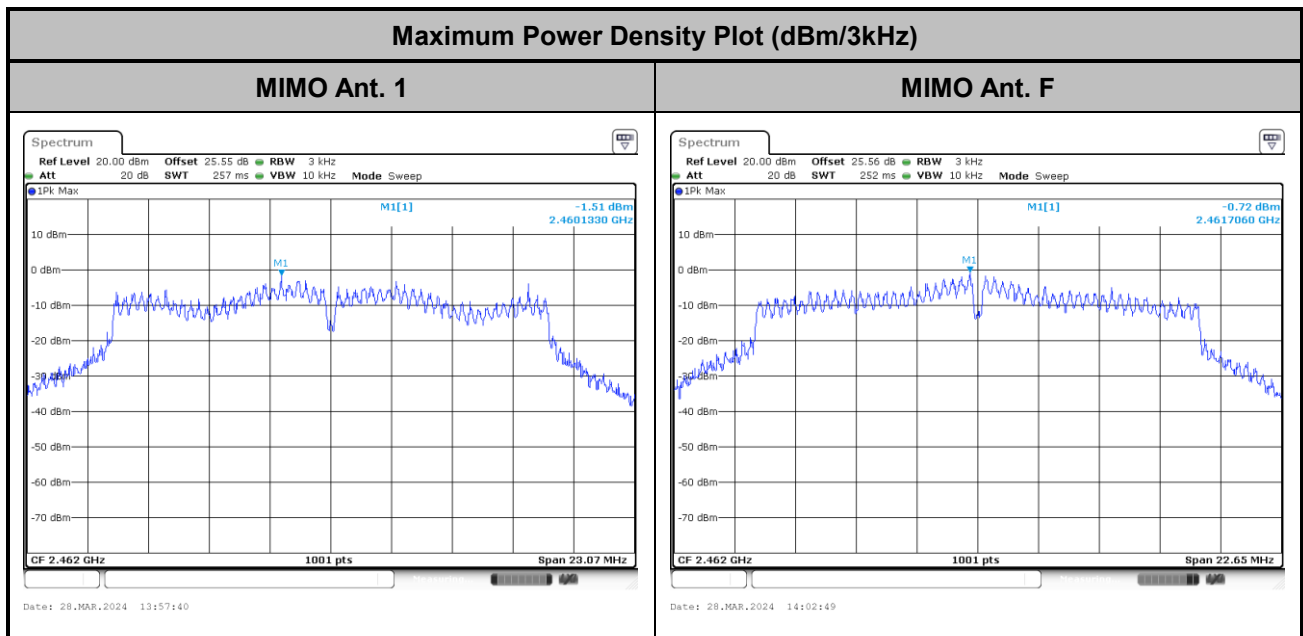
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

<802.11b>

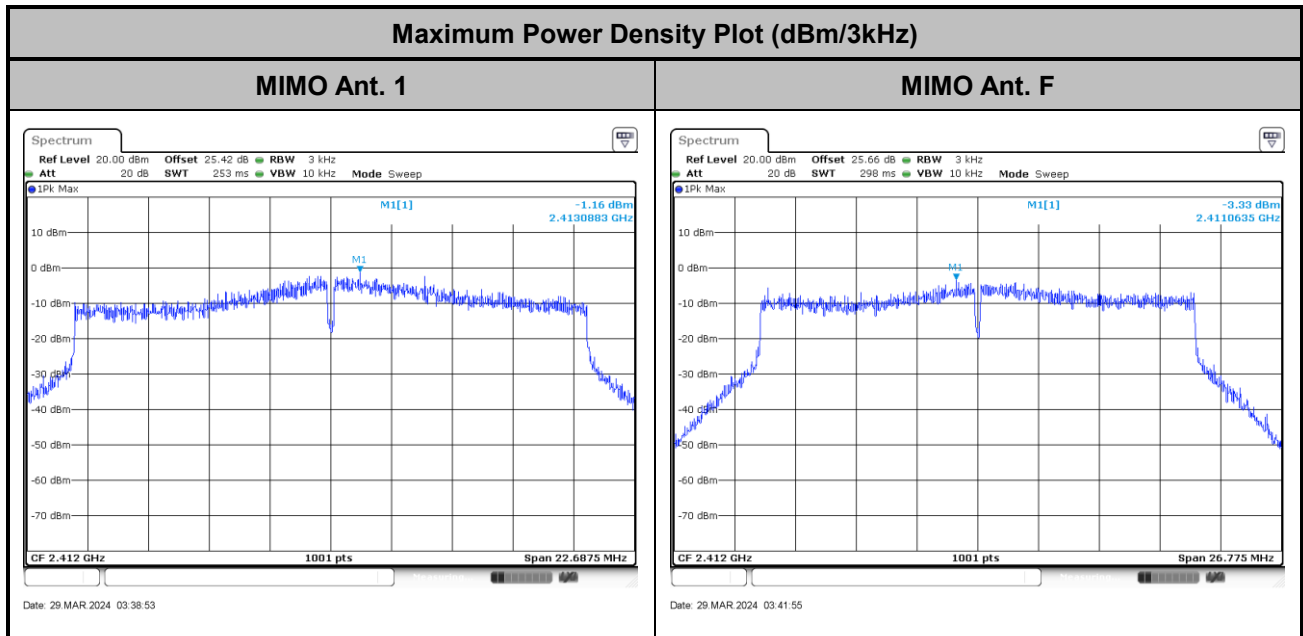


<802.11g>

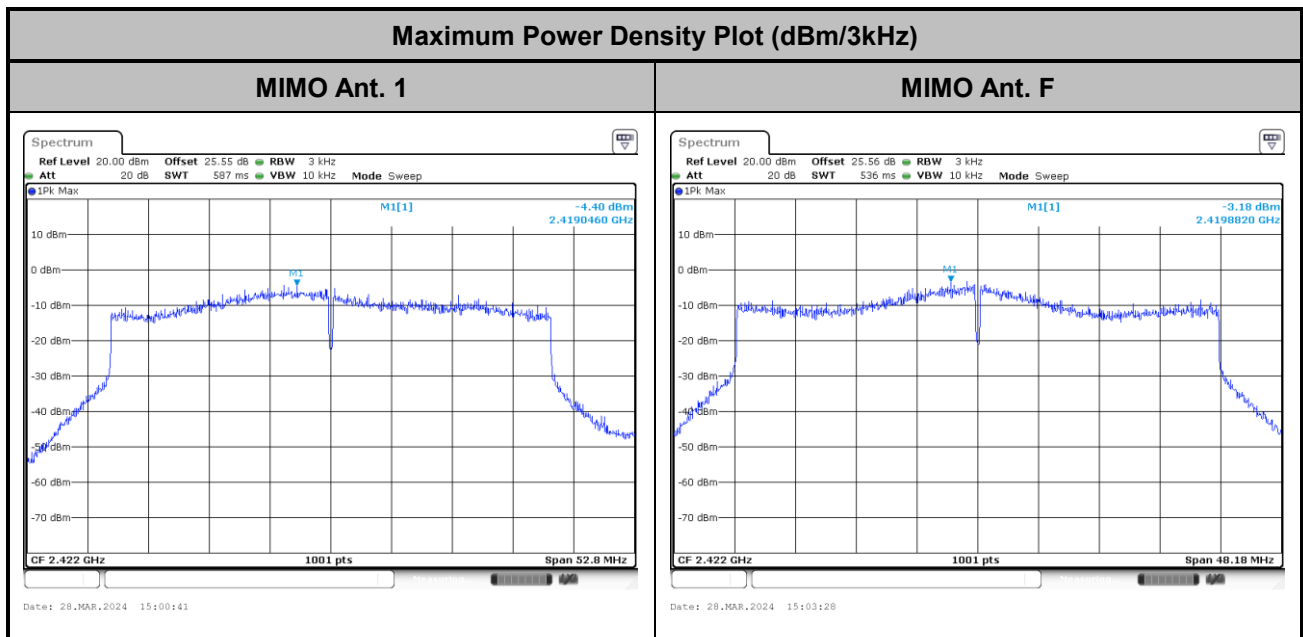




<802.11be EHT20>



<802.11be EHT40>



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.

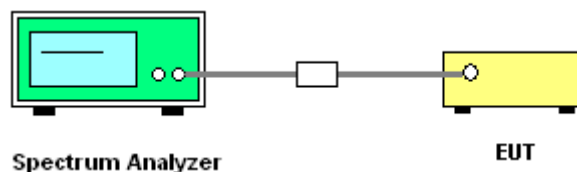
3.4.2 Measuring Instruments

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.

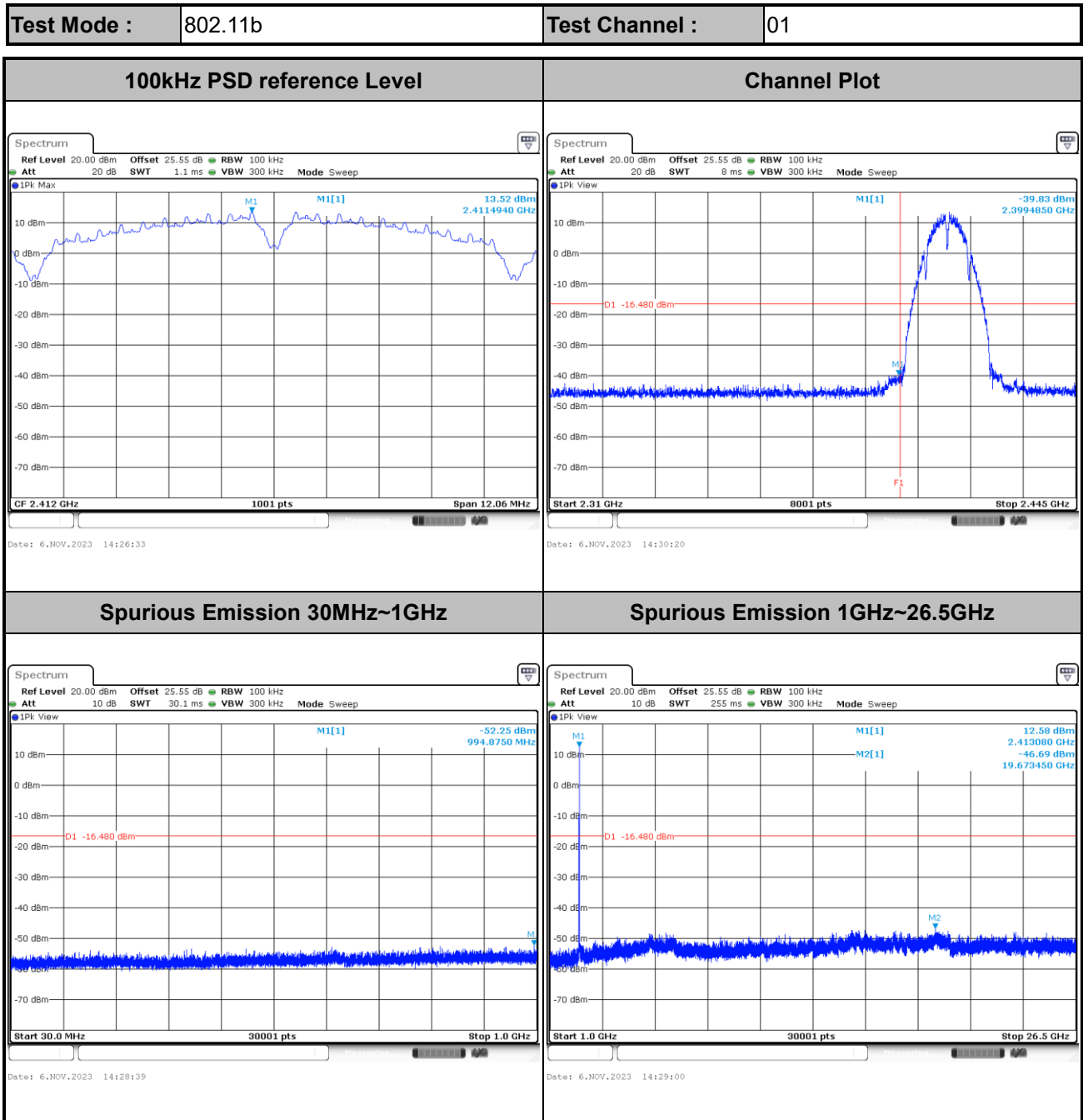
3.4.4 Test Setup





3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 2, Ant. 1

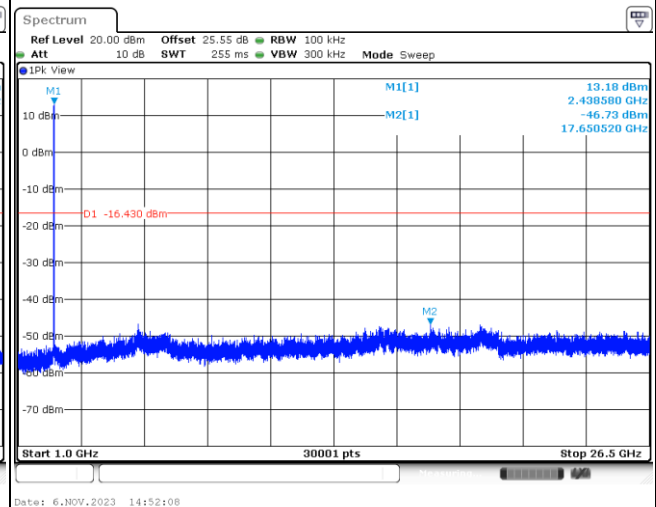




Test Mode :	802.11b	Test Channel :	06
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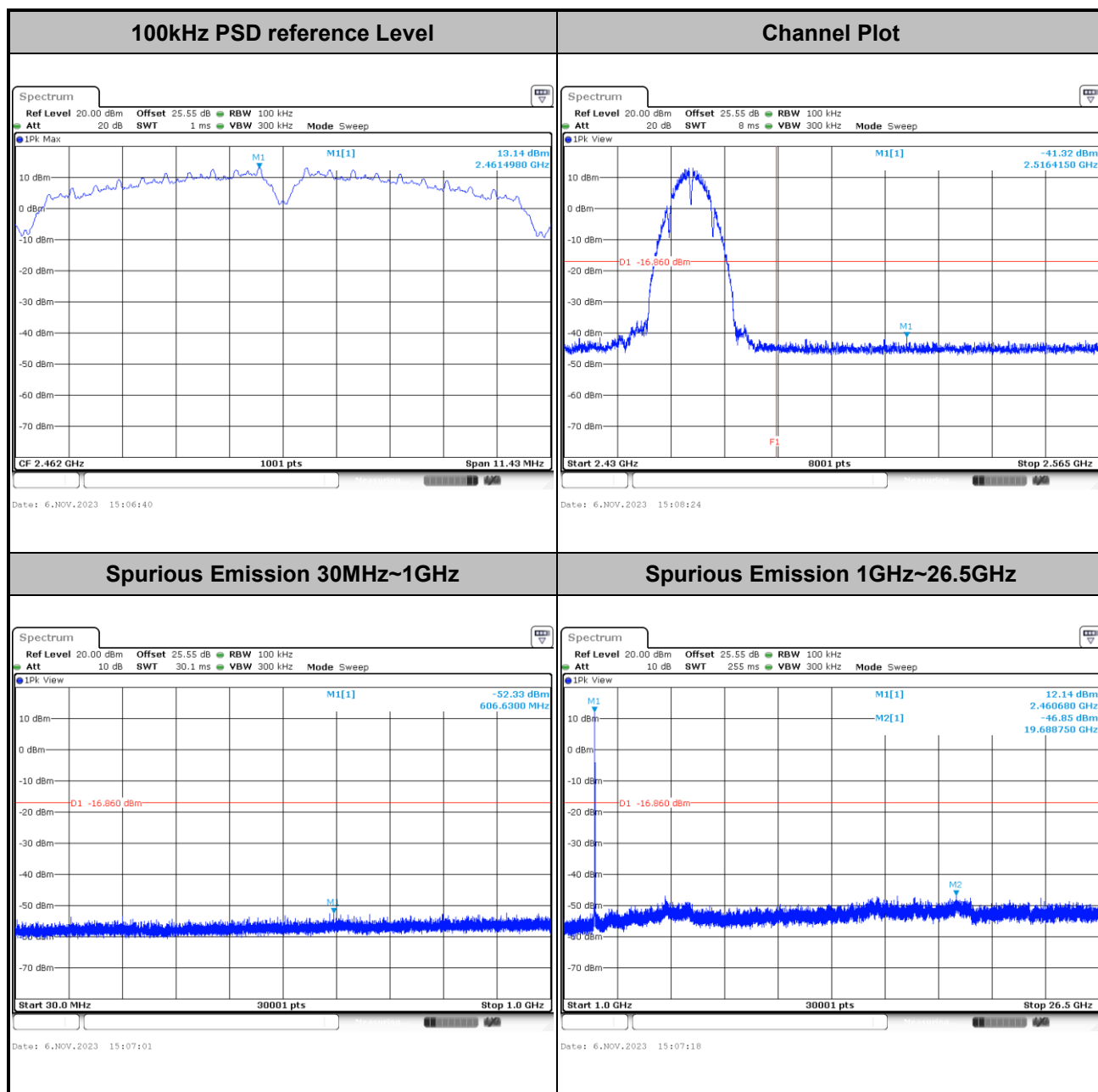
Channel Plot

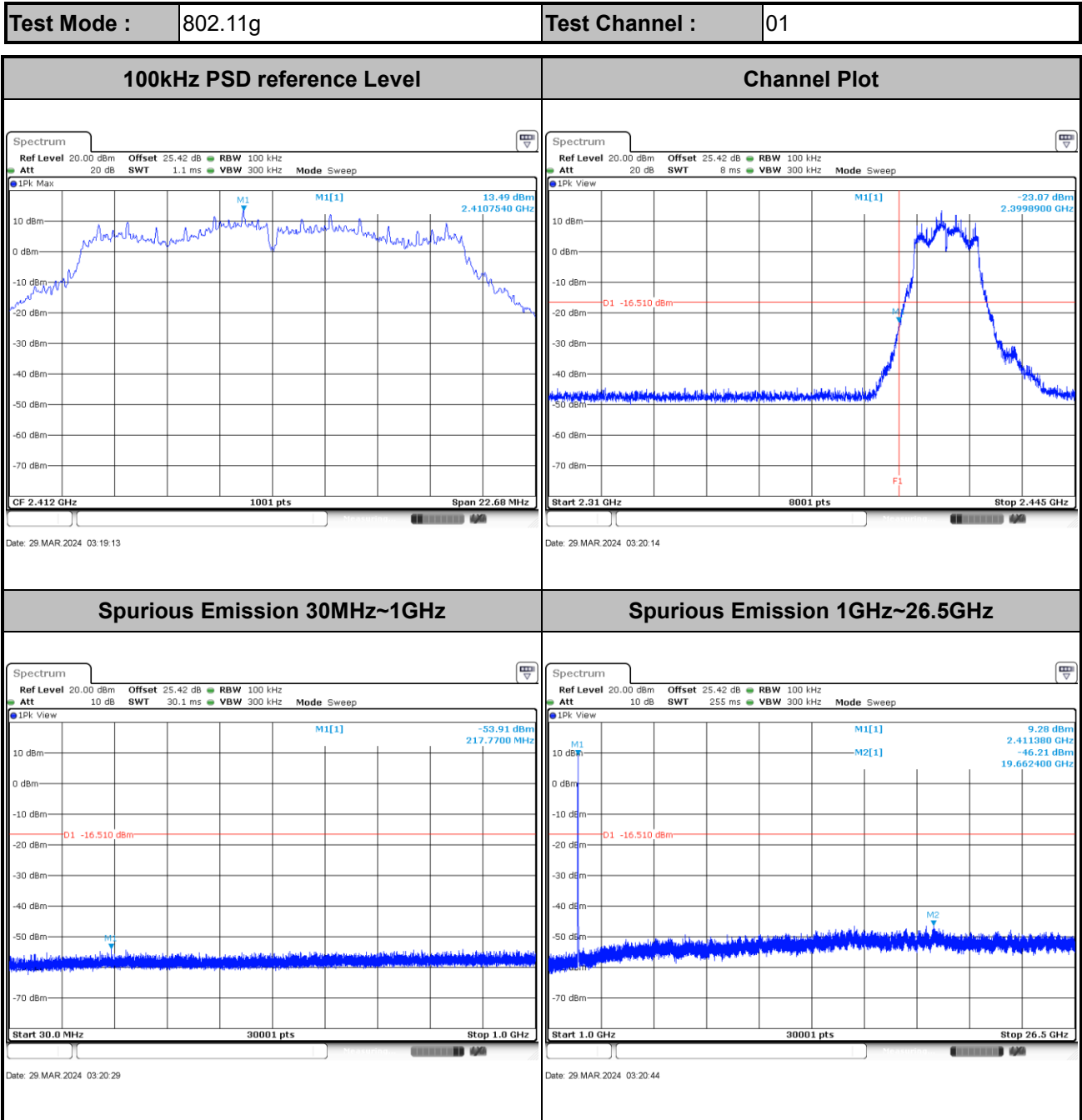
Spurious Emission 1GHz~26.5GHz





Test Mode :	802.11b	Test Channel :	11
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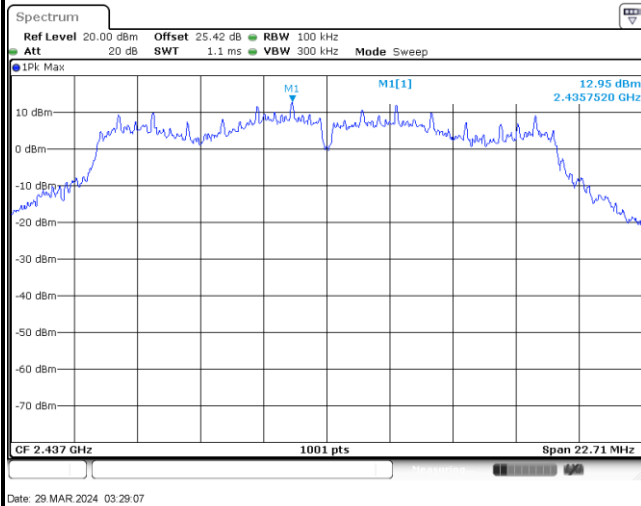






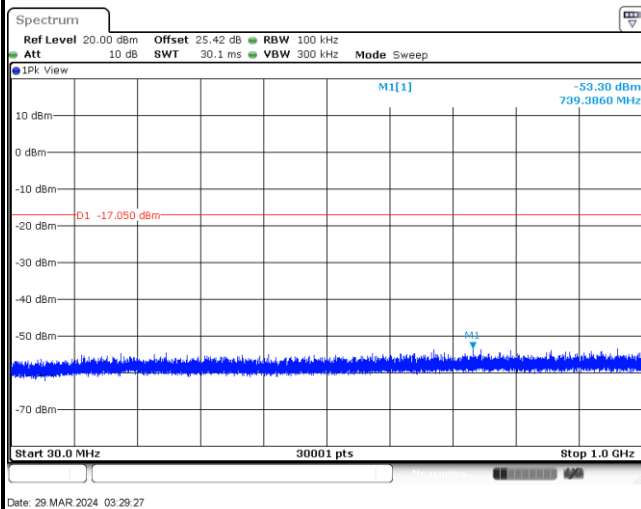
Test Mode :	802.11g	Test Channel :	06
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100kHz PSD reference Level

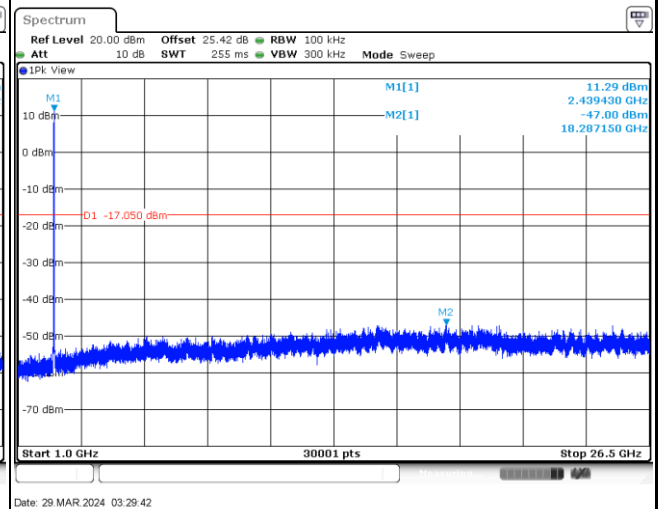


Channel Plot

Spurious Emission 30MHz~1GHz

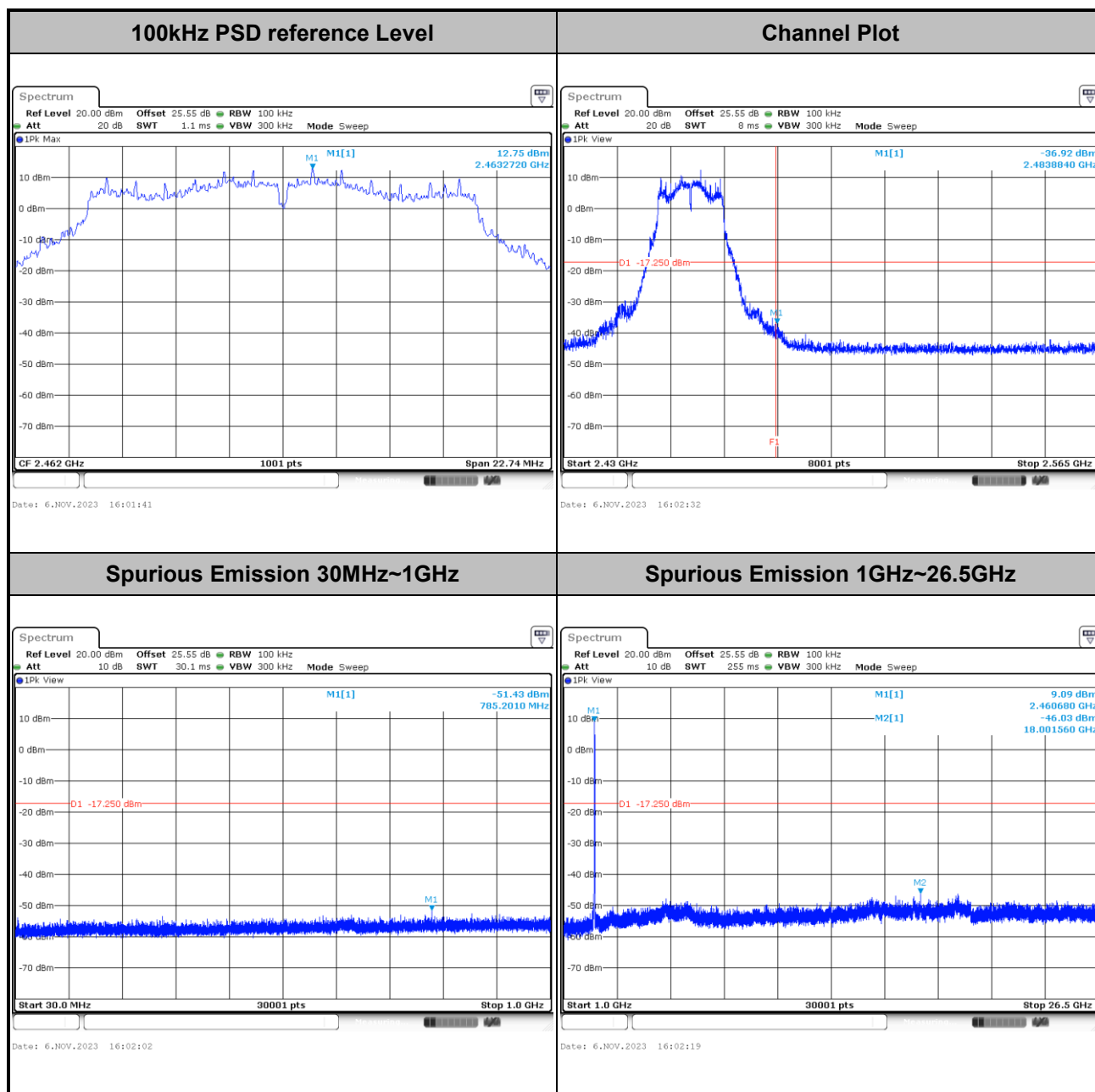


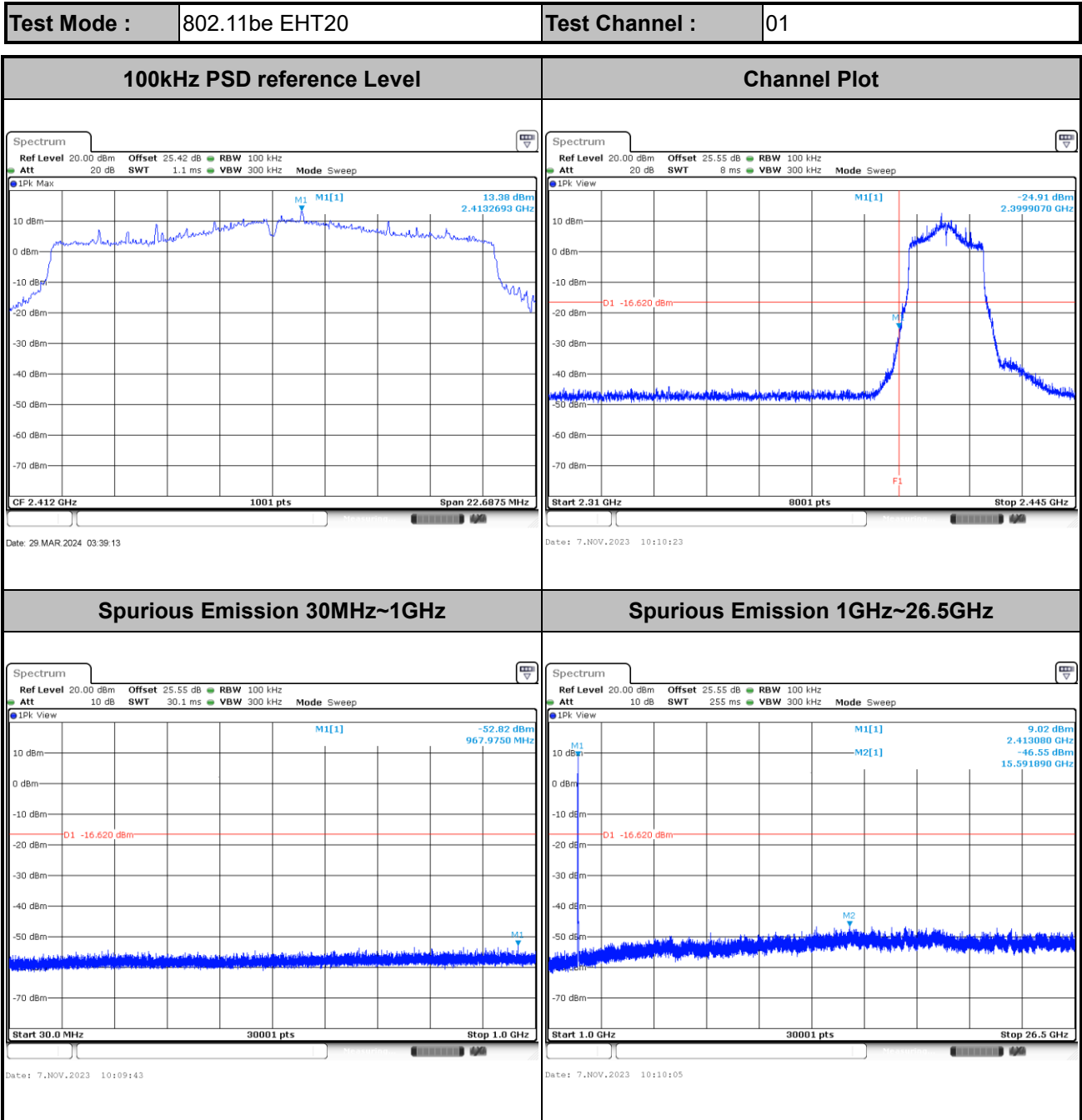
Spurious Emission 1GHz~26.5GHz





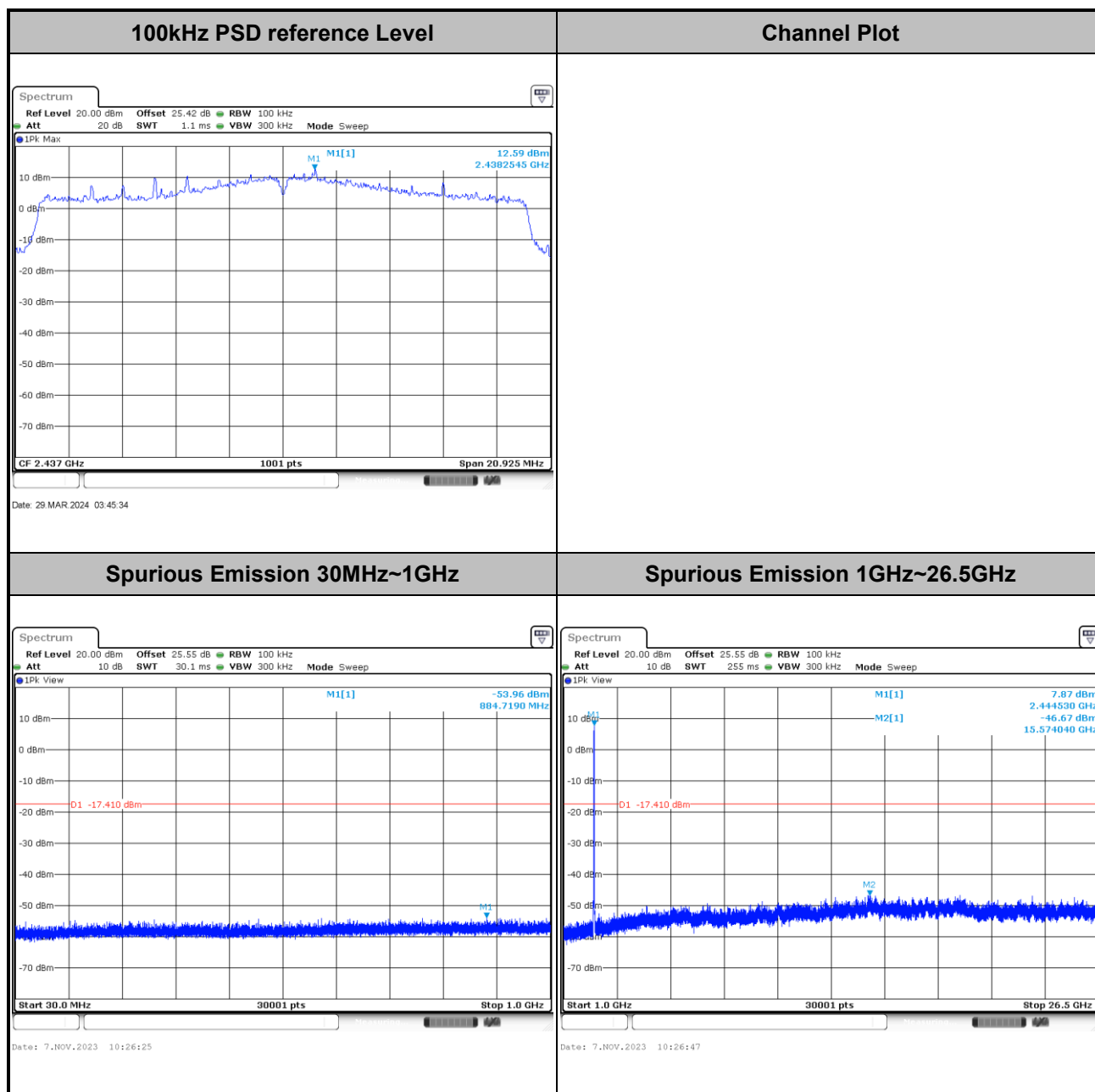
Test Mode :	802.11g	Test Channel :	11
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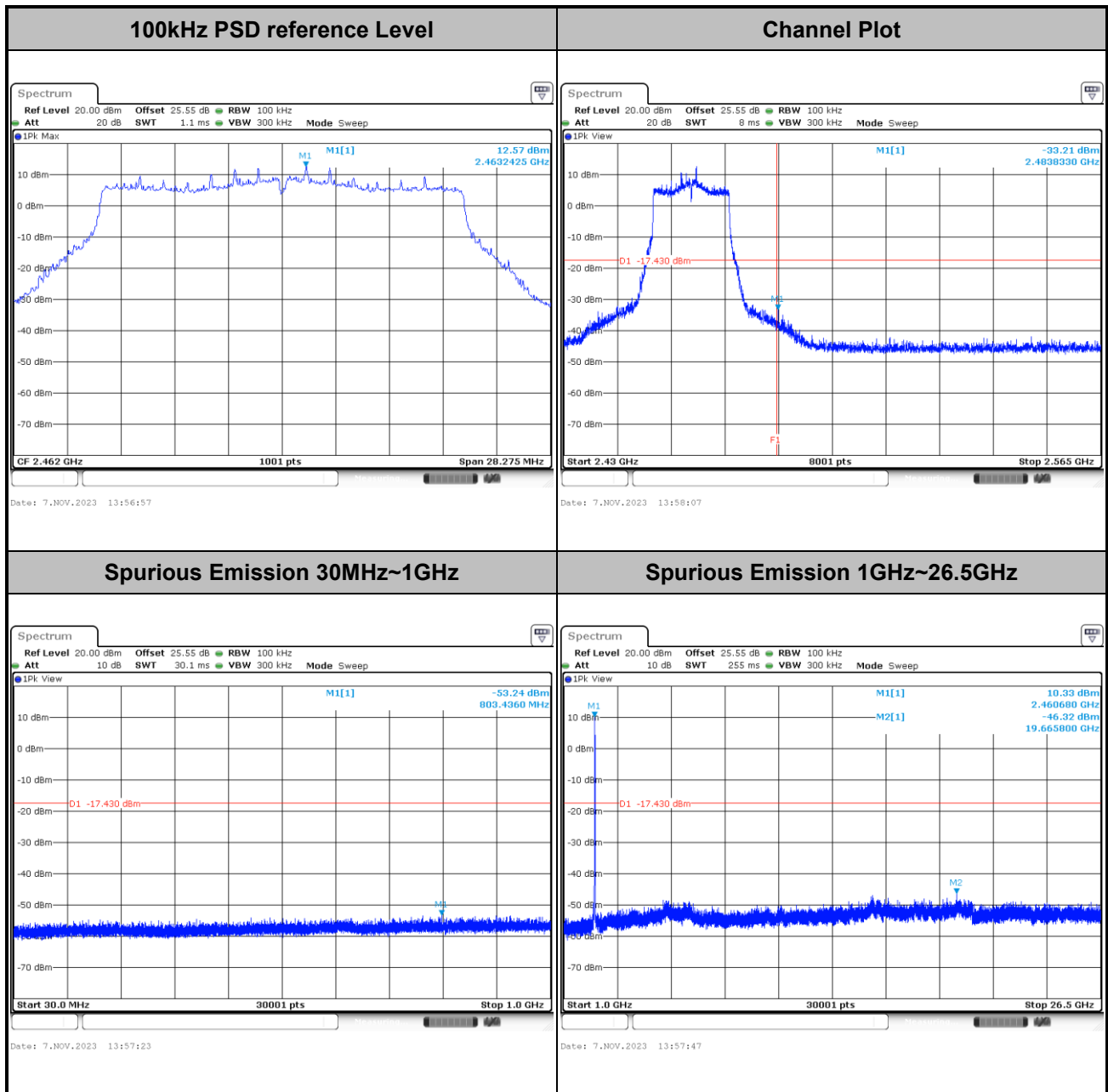


Test Mode :	802.11be EHT20	Test Channel :	06
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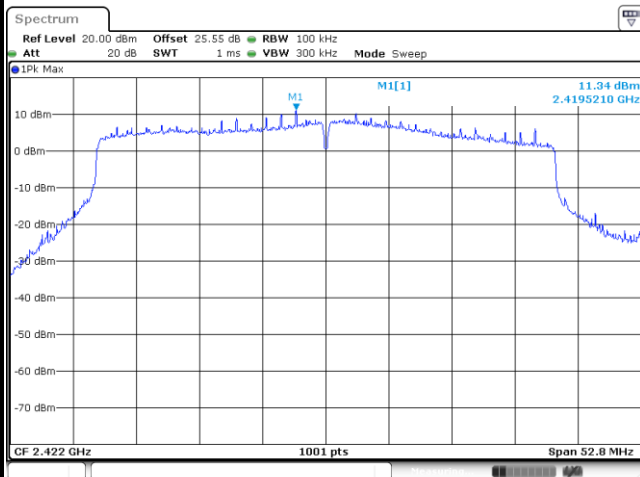
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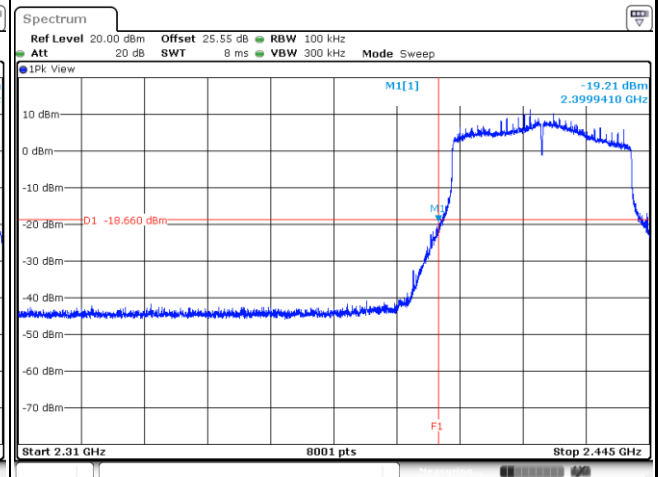
Test Mode :	802.11be EHT40	Test Channel :	03
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100kHz PSD reference Level



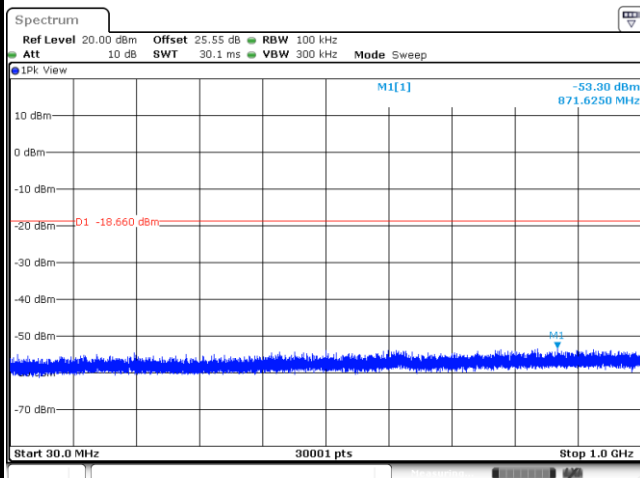
Date: 7,NOV,2023 14:49:12

Channel Plot



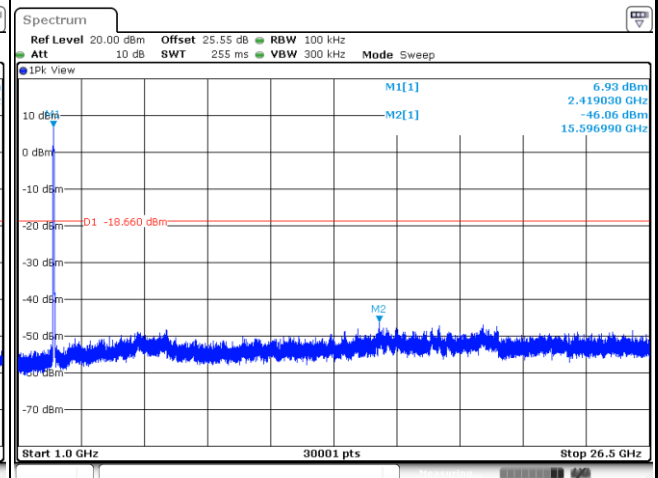
Date: 7,NOV,2023 14:52:29

Spurious Emission 30MHz~1GHz



Date: 7,NOV,2023 14:49:28

Spurious Emission 1GHz~26.5GHz



Date: 7,NOV,2023 14:49:47



Test Mode :	802.11be EHT40	Test Channel :	06
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Channel Plot

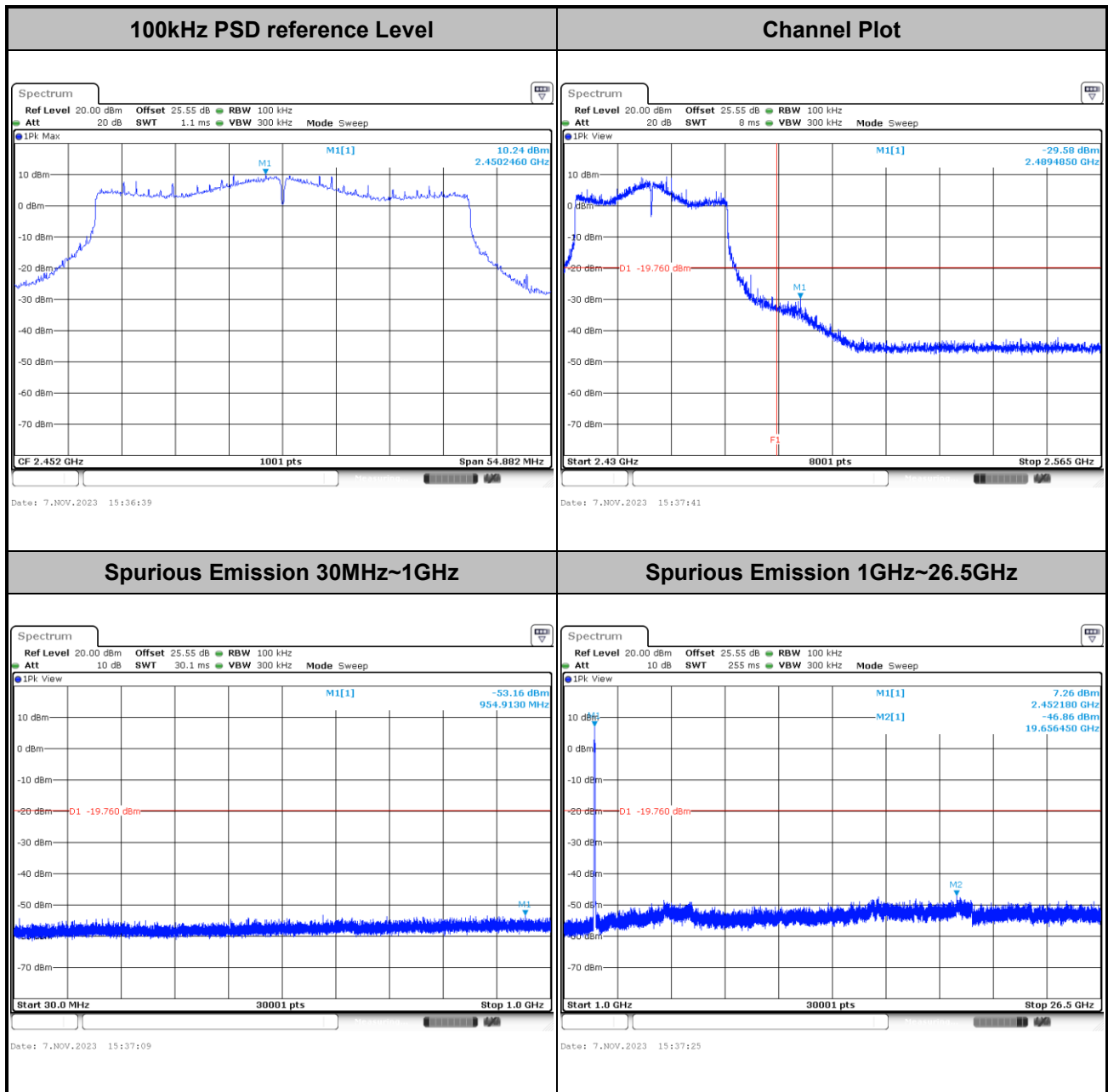


Spurious Emission 1GHz~26.5GHz



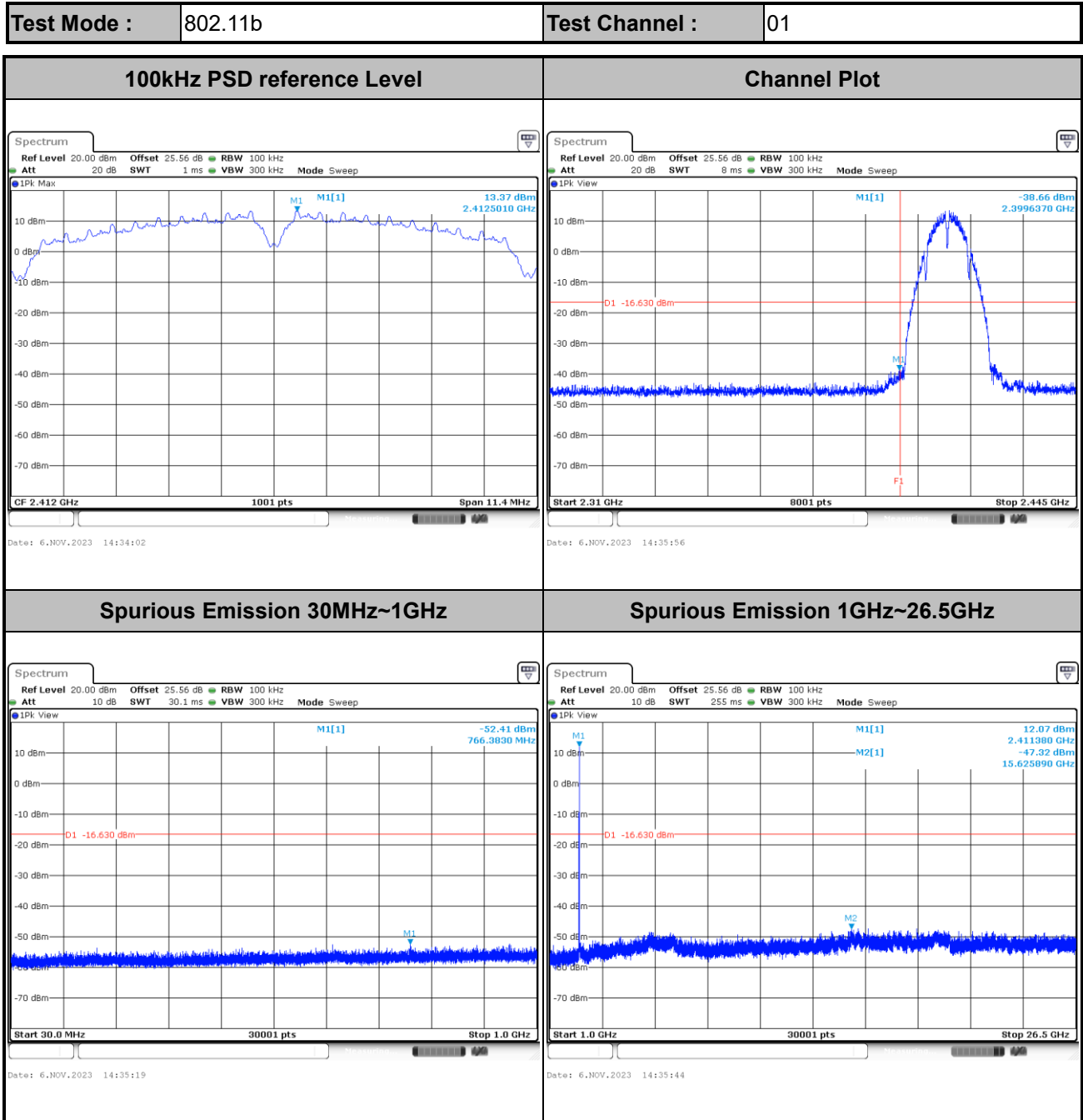


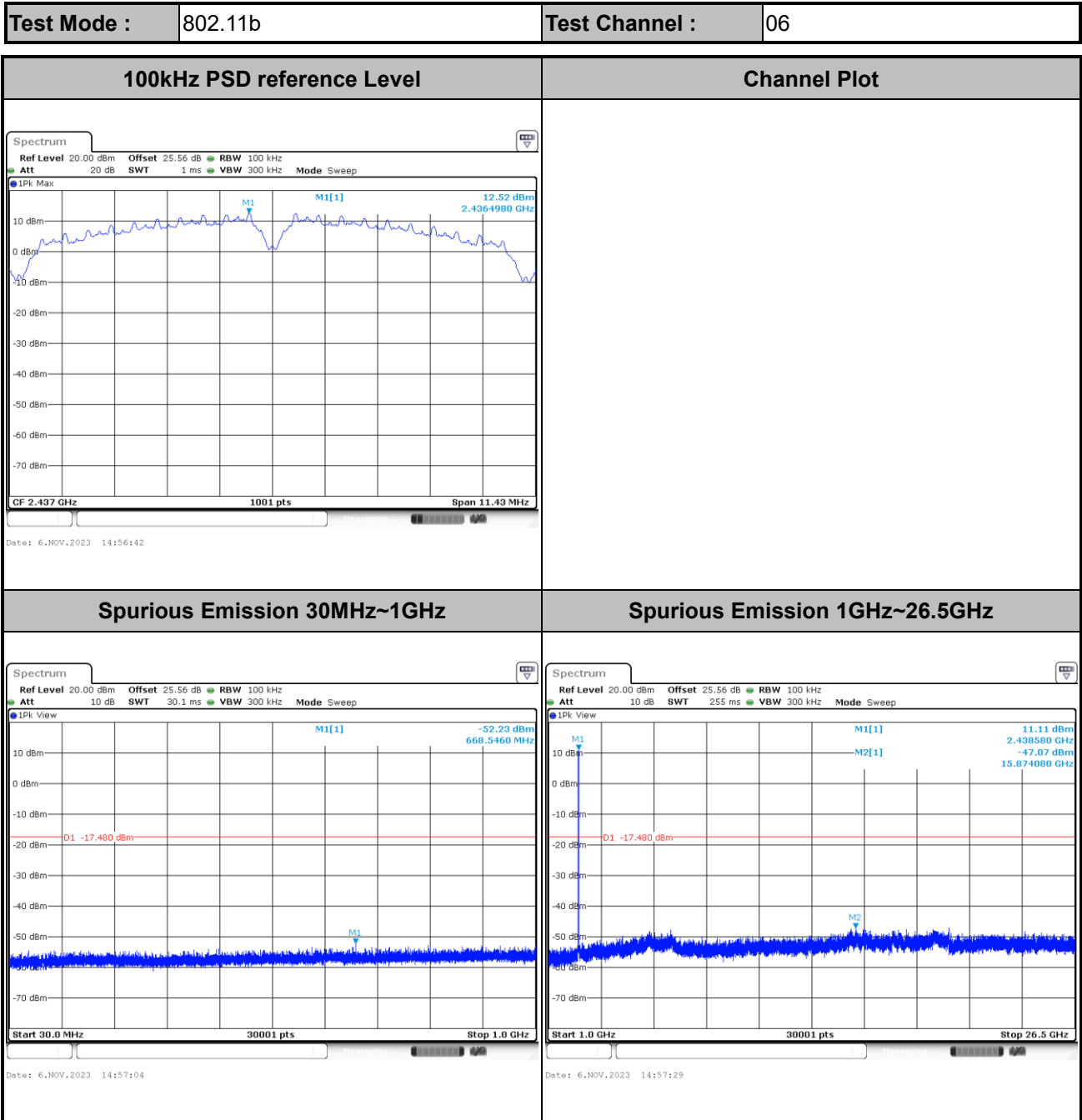
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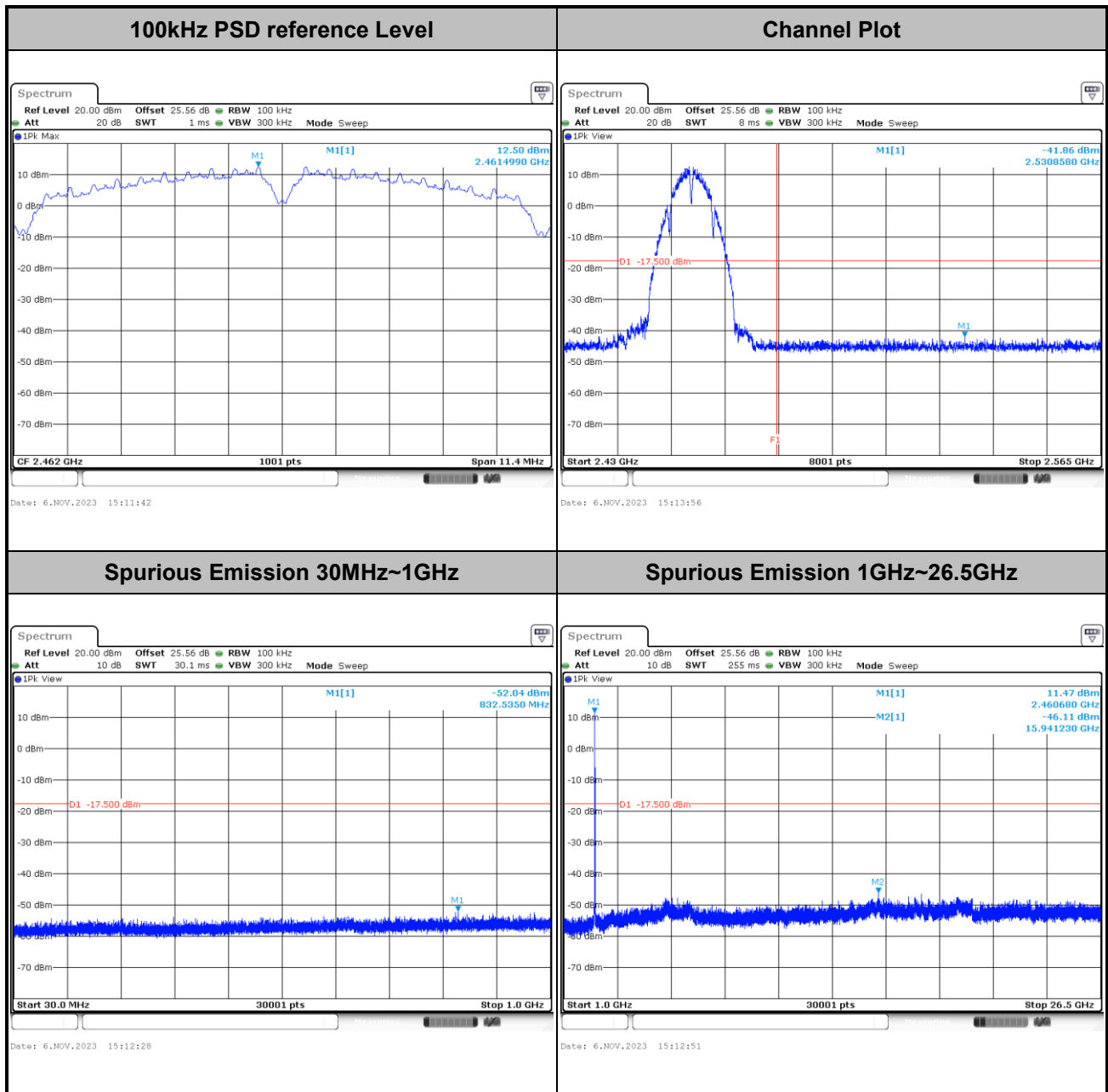
Number of TX = 2, Ant. 3







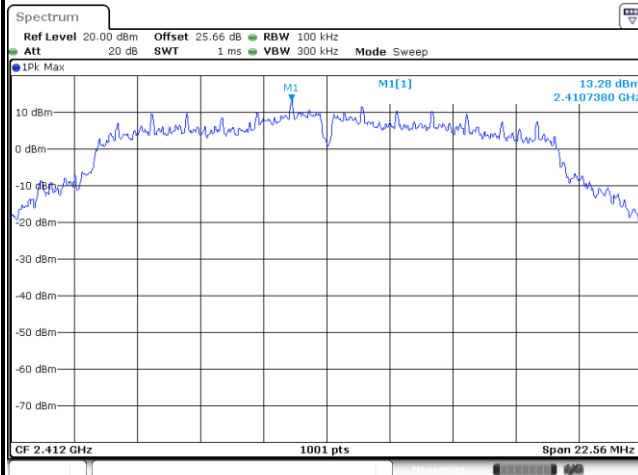
Test Mode :	802.11b	Test Channel :	11
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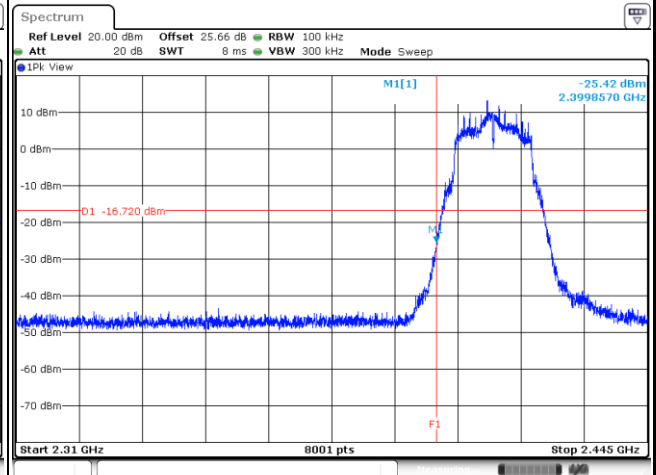
Test Mode :	802.11g	Test Channel :	01
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100kHz PSD reference Level



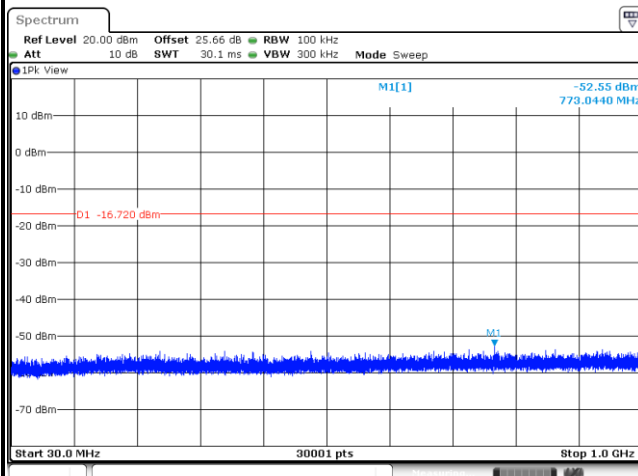
Date: 29 MAR 2024 03:24:45

Channel Plot



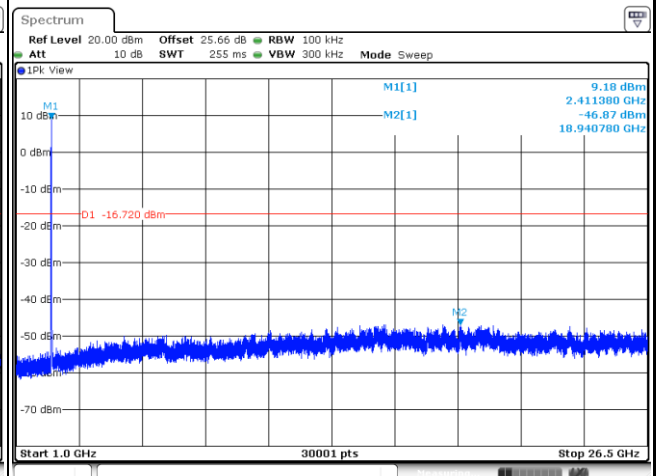
Date: 29 MAR 2024 03:24:56

Spurious Emission 30MHz~1GHz

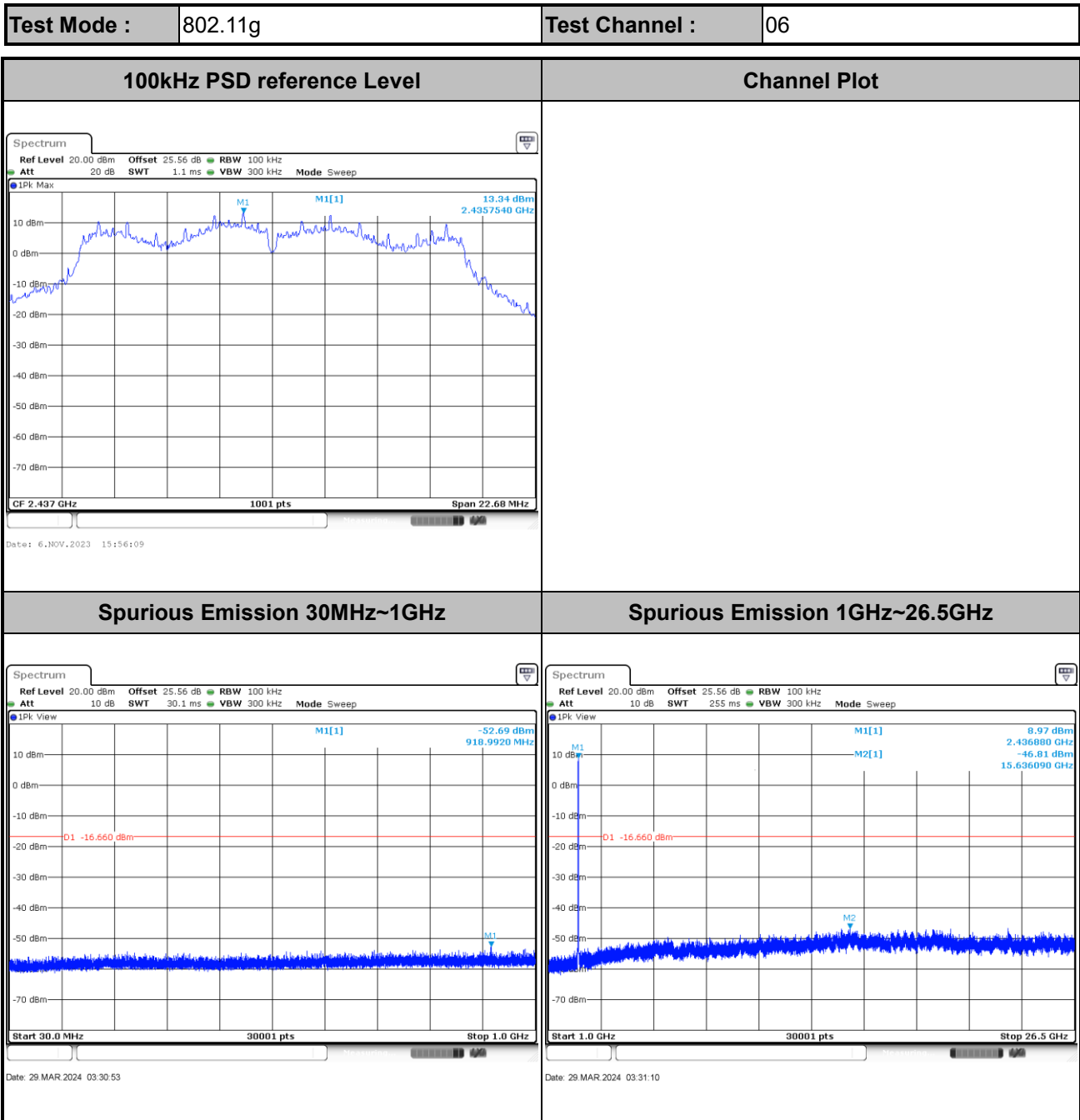


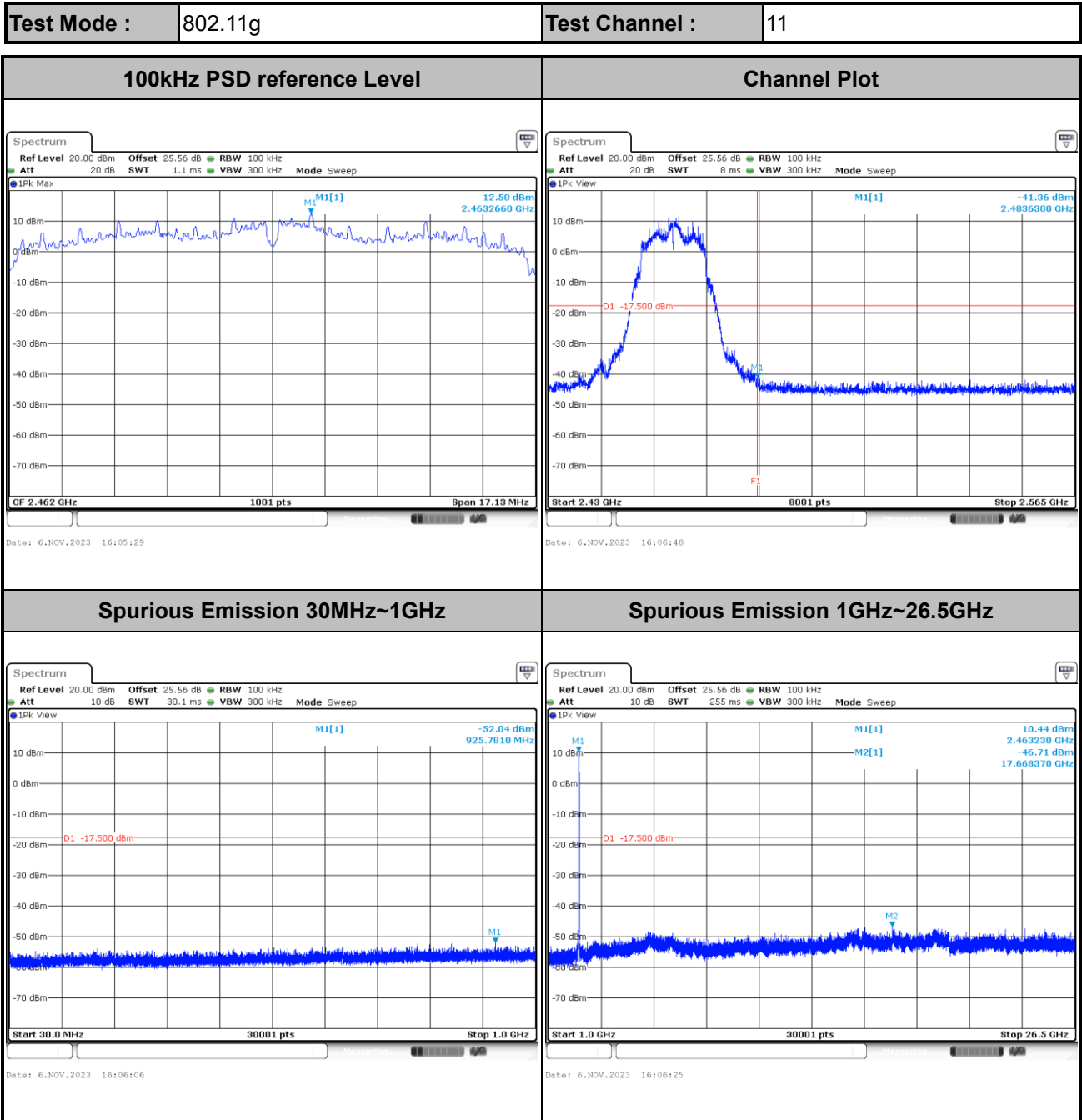
Date: 29 MAR 2024 03:25:14

Spurious Emission 1GHz~26.5GHz



Date: 29 MAR 2024 03:25:29

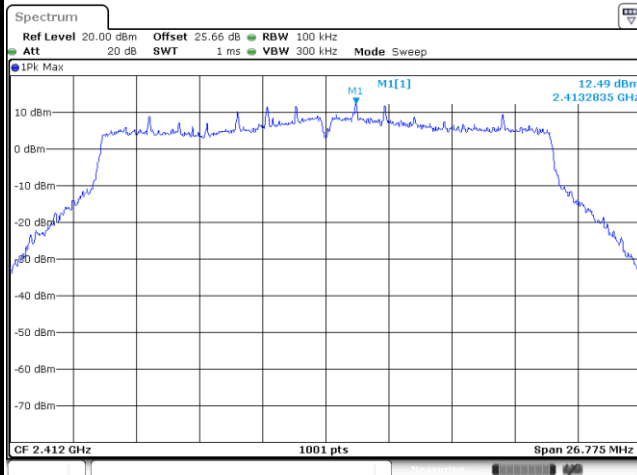






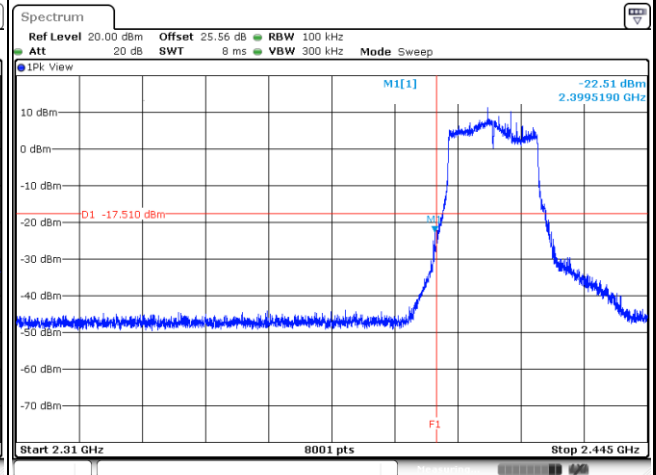
Test Mode :	802.11be EHT20	Test Channel :	01
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100kHz PSD reference Level



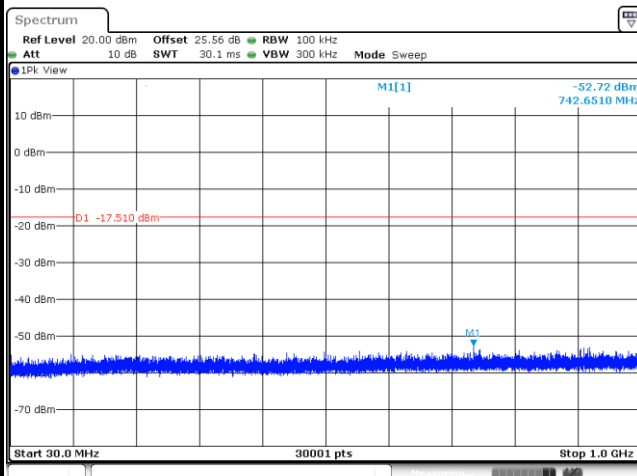
Date: 29.MAR.2024 03:42:13

Channel Plot



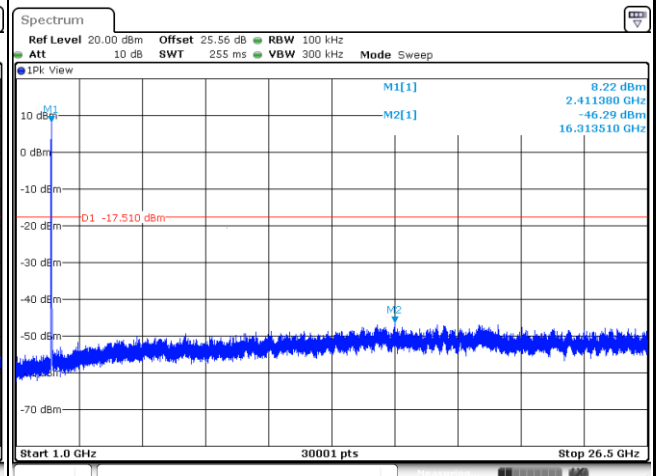
Date: 7.NOV.2023 10:16:14

Spurious Emission 30MHz~1GHz



Date: 7.NOV.2023 10:15:44

Spurious Emission 1GHz~26.5GHz

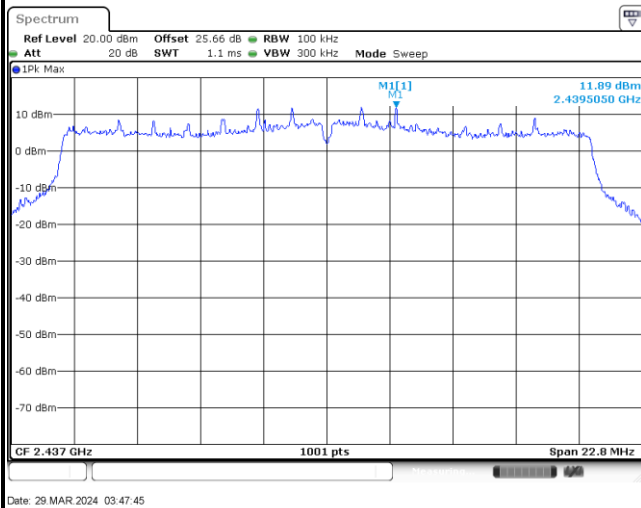


Date: 7.NOV.2023 10:16:01



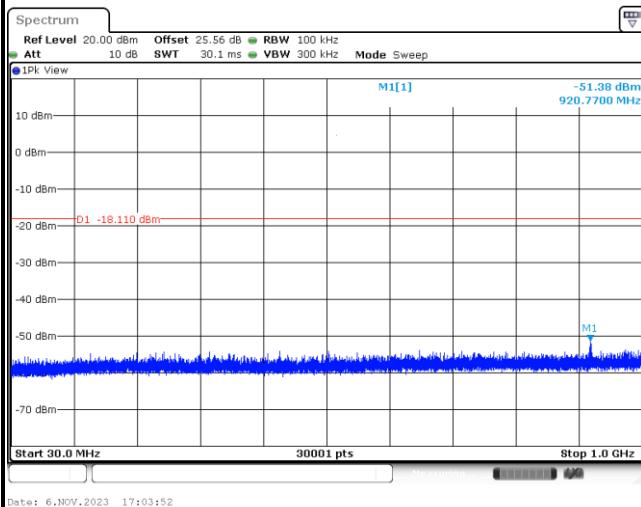
Test Mode :	802.11be EHT20	Test Channel :	06
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100kHz PSD reference Level

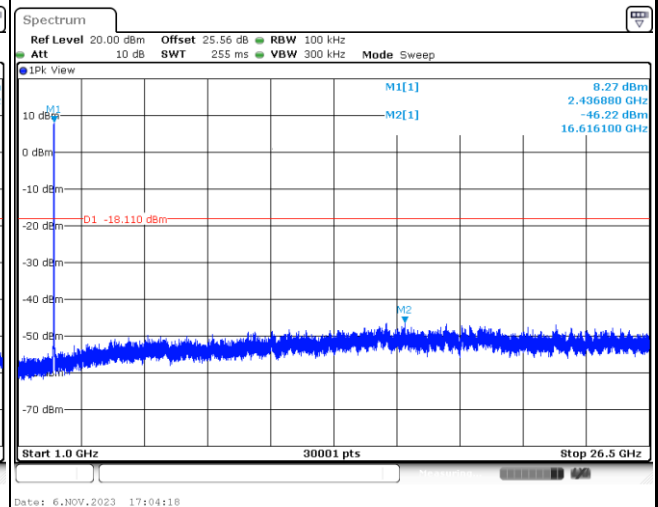


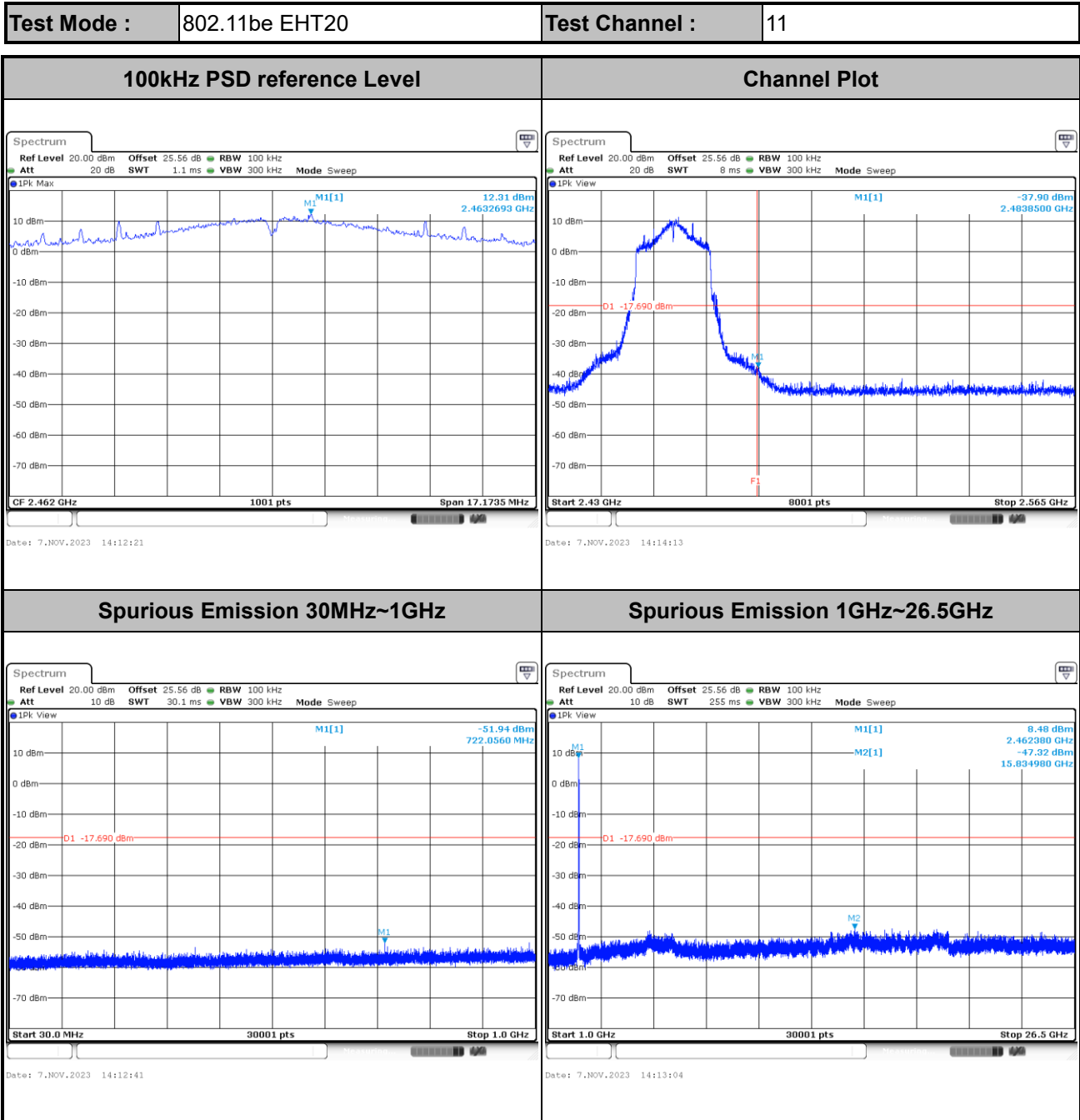
Channel Plot

Spurious Emission 30MHz~1GHz



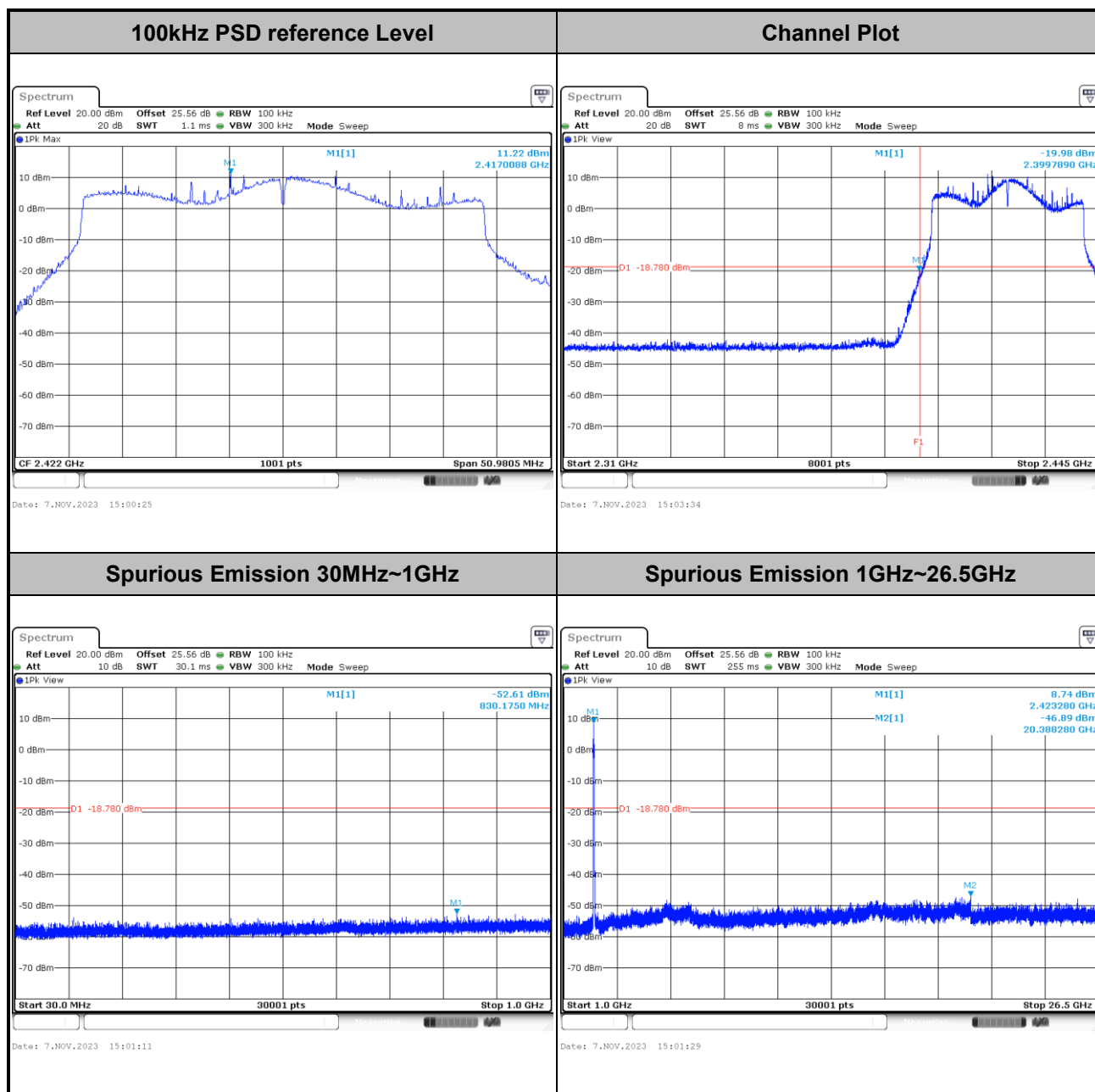
Spurious Emission 1GHz~26.5GHz







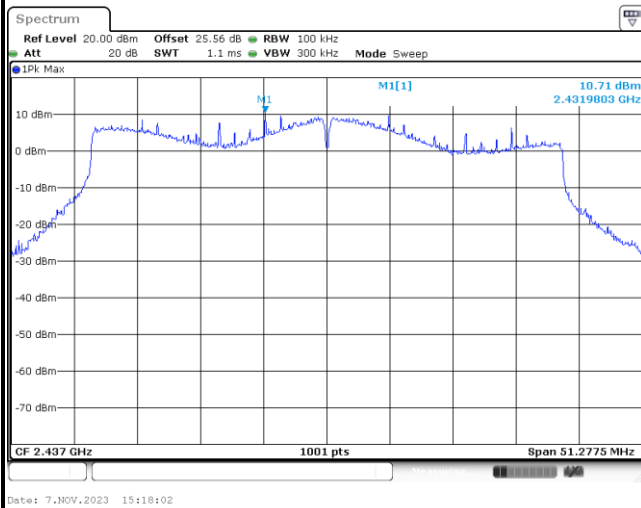
Test Mode :	802.11be EHT40	Test Channel :	03
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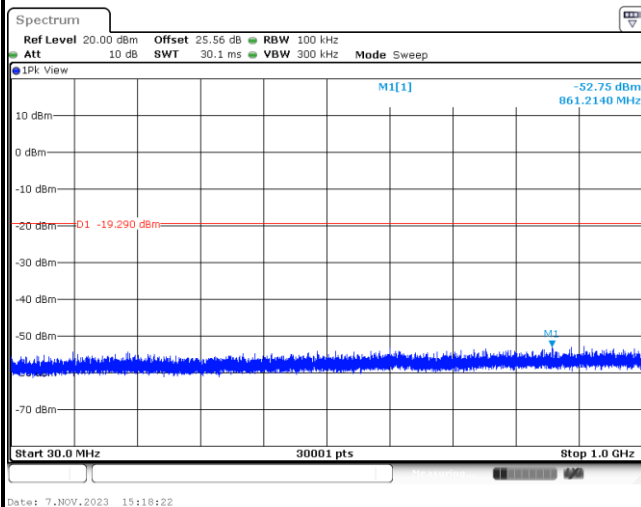
Test Mode :	802.11be EHT40	Test Channel :	06
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100kHz PSD reference Level

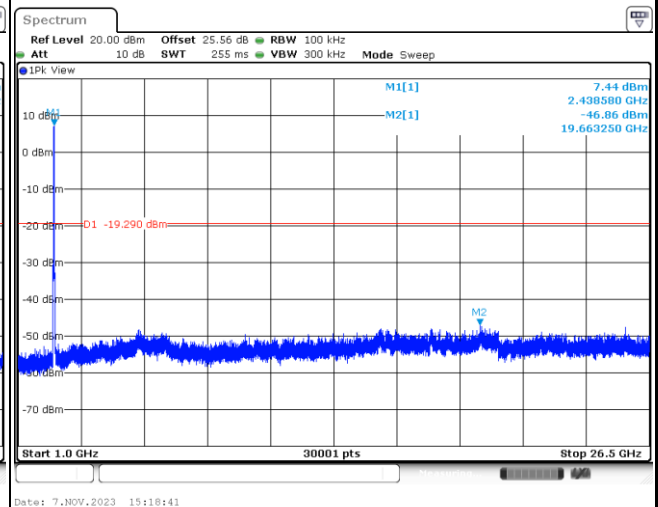


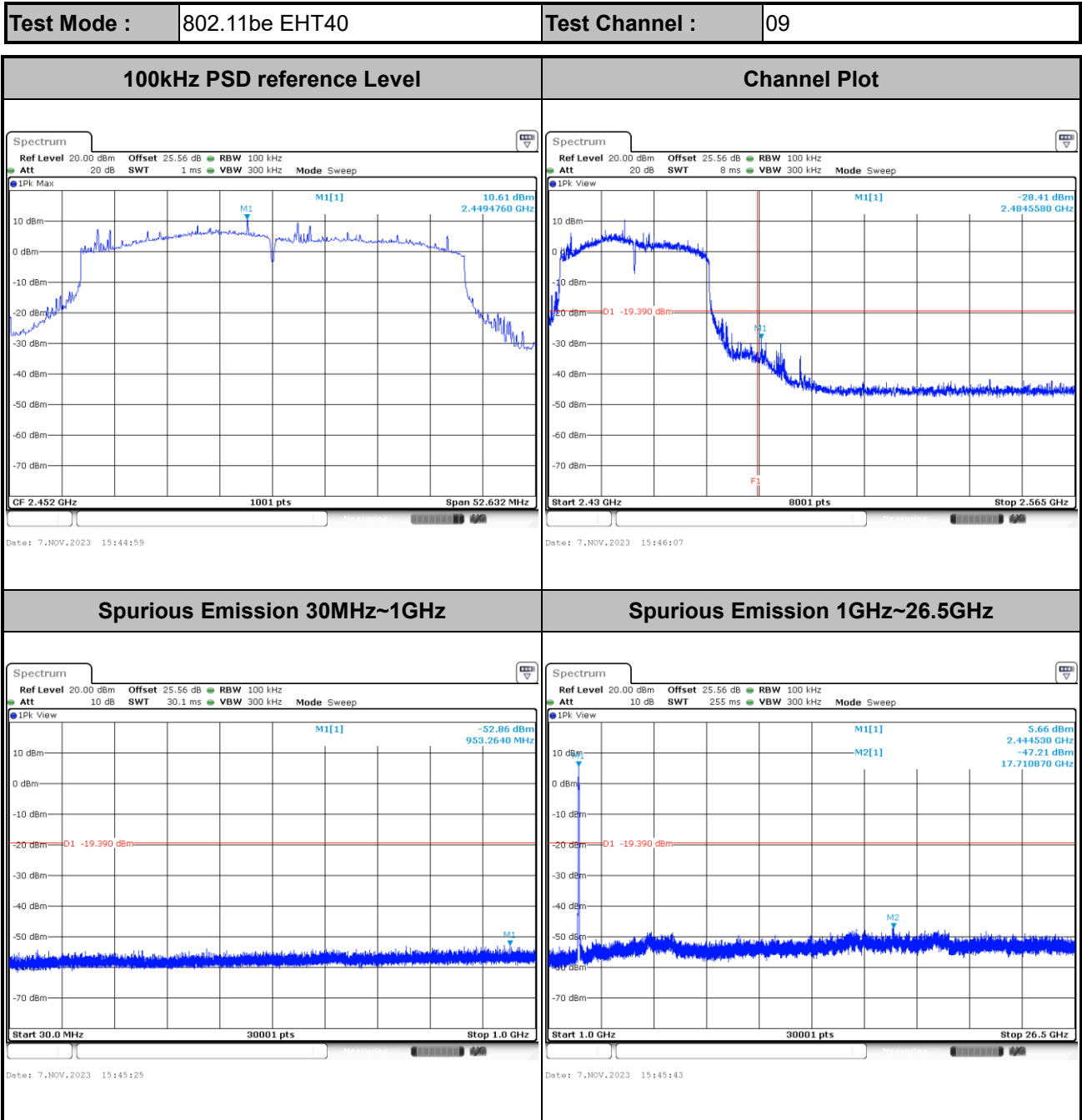
Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz





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 - Preamp 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 “-”.

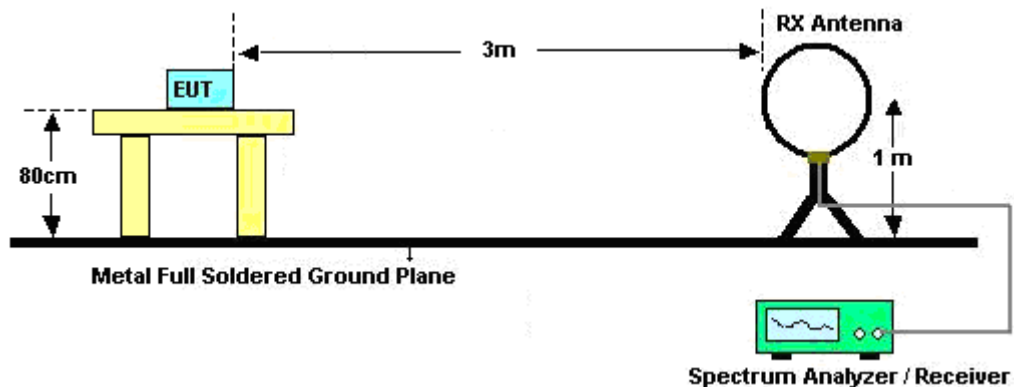
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with 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:

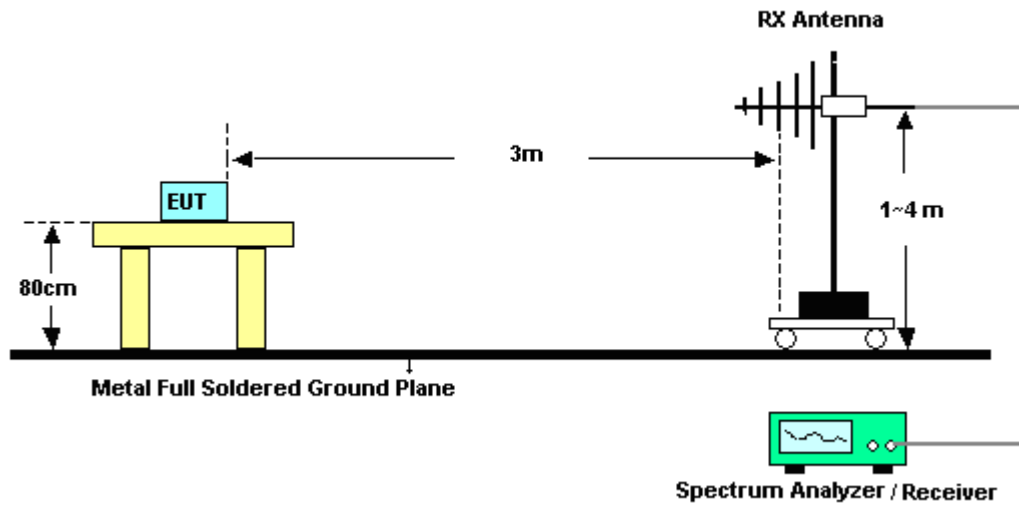
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

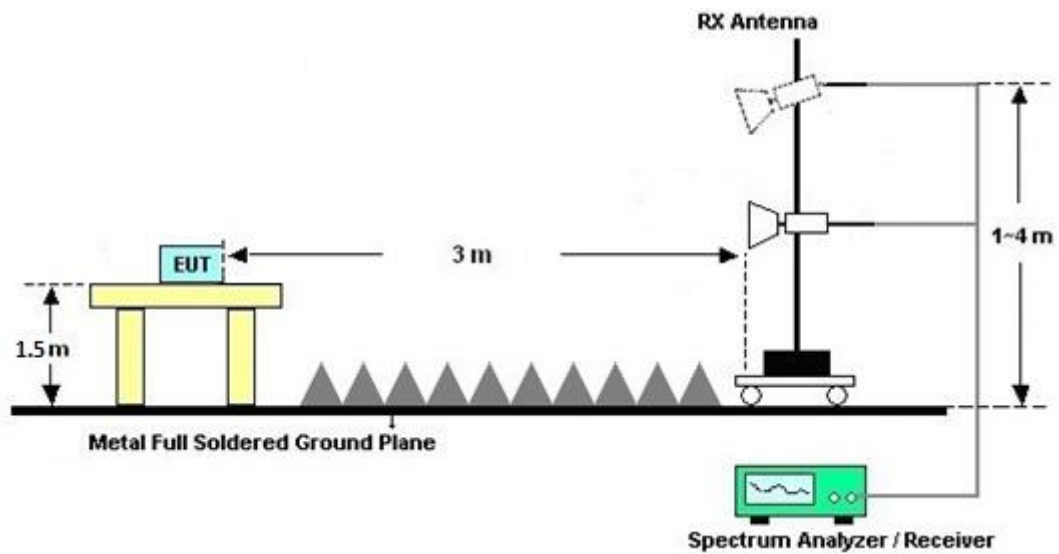
For radiated emissions below 30MHz



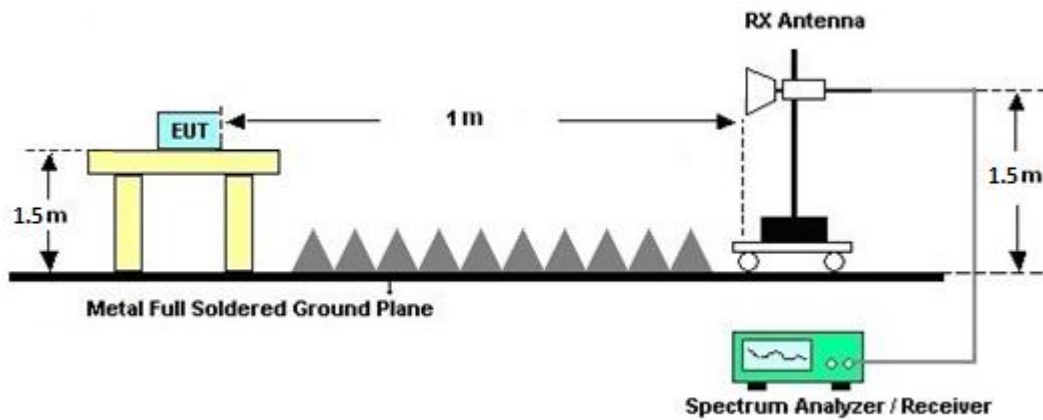
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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 (30MHz ~ 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.

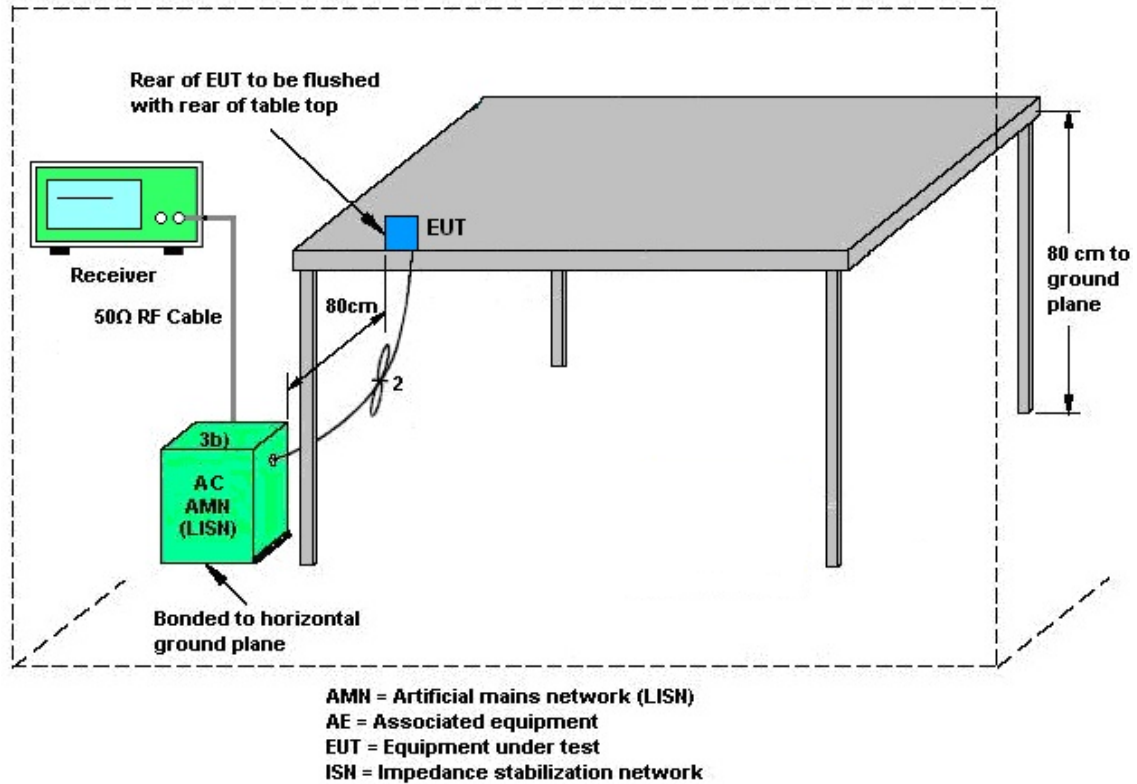
3.6.2 Measuring Instruments

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 = 9kHz) 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
Loop Antenna	R&S	HFH2-Z2E	100840	9kHz~30MHz	Jun. 29, 2023	Apr. 17, 2024~ Apr. 29, 2024	Jun. 28, 2024	Radiation (03CH01-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Nov. 13, 2023	Apr. 17, 2024~ Apr. 29, 2024	Nov. 12, 2024	Radiation (03CH01-CA)
Amplifier	SONOMA	310N	372241	N/A	May 03, 2023	Apr. 17, 2024~ Apr. 29, 2024	May 02, 2024	Radiation (03CH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	02115	1GHz~18GHz	Aug. 09, 2023	Apr. 17, 2024~ Apr. 29, 2024	Aug. 08, 2024	Radiation (03CH01-CA)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00842	18GHz~40GHz	Jul. 17, 2023	Apr. 17, 2024~ Apr. 29, 2024	Jul. 16, 2024	Radiation (03CH01-CA)
Preamplifier	Keysight	83017A	MY53270321	1GHz~26.5GHz	May 04, 2023	Apr. 17, 2024~ Apr. 29, 2024	May 03, 2024	Radiation (03CH01-CA)
Preamplifier	E-instrument	ERA-100M-18G-56-01-A70	EC1900251	1GHz~18GHz	Jun. 27, 2023	Apr. 17, 2024~ Apr. 29, 2024	Jun. 26, 2024	Radiation (03CH01-CA)
Preamplifier	EMEC	EMC18G40G	060725	18GHz-40GHz	May 04, 2023	Apr. 17, 2024~ Apr. 29, 2024	May 03, 2024	Radiation (03CH01-CA)
Spectrum Analyzer	Keysight	N9010B	MY63440343	10Hz - 44GHz	Jan. 16, 2024	Apr. 17, 2024~ Apr. 29, 2024	Jan. 15, 2025	Radiation (03CH01-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2GHz Low Pass Filter	Jun. 05, 2023	Apr. 17, 2024~ Apr. 29, 2024	Jun. 04, 2024	Radiation (03CH01-CA)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN9	3GHz High Pass Filter	Jun. 05, 2023	Apr. 17, 2024~ Apr. 29, 2024	Jun. 04, 2024	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2, 8015762/2, 804938/2	N/A	Mar. 05, 2024	Apr. 17, 2024~ Apr. 29, 2024	Mar. 04, 2025	Radiation (03CH01-CA)
Hygrometer	TESEO	608-H1	45142559	N/A	Aug. 30, 2023	Apr. 17, 2024~ Apr. 29, 2024	Aug. 29, 2024	Radiation (03CH01-CA)
Controller	ChainTek	EM-1000	060881	5.11	N/A	Apr. 17, 2024~ Apr. 29, 2024	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Apr. 17, 2024~ Apr. 29, 2024	N/A	Radiation (03CH01-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Apr. 17, 2024~ Apr. 29, 2024	N/A	Radiation (03CH01-CA)
Audix E3	E6.2009-8-24d	PK-002093	Audix E3	E6.2009-8-24d	N/A	Apr. 17, 2024~ Apr. 29, 2024	N/A	Radiation (03CH01-CA)
LISN	TESEQ	NNB51	47415	N/A	Aug. 04, 2023	May 08, 2024	Aug. 03, 2024	Conduction (CO01-CA)
LISN	TESEQ	NNB51	47407	N/A	Apr. 23, 2024	May 08, 2024	Apr. 22, 2025	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9kHz~7GHz	Apr. 23, 2024	May 08, 2024	Apr. 22, 2025	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F-N00412	N/A	Jun. 05, 2023	May 08, 2024	Jun. 04, 2024	Conduction (CO01-CA)
Test Software	R&S	EMC32 V10.30.0	N/A	N/A	N/A	May 08, 2024	N/A	Conduction (CO01-CA)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	45141354	N/A	Jul. 26, 2023	Nov. 06, 2023~ Jul. 04, 2024	Jul. 25, 2024	Conducted (TH01-CA)
Power Sensor	Raditeq	RPR3006W#10	RPR6W-2101 003	10MHz-8GHz	May 04, 2023	Nov. 06, 2023~ Apr. 24, 2024	May 03, 2024	Conducted (TH01-CA)
Power Sensor	Raditeq	RPR3006W	RPR6W-1901 024	10MHz-8GHz	Apr. 25, 2024	Apr. 25, 2024~ Jul. 04, 2024	Apr. 24, 2025	Conducted (TH01-CA)
Switch Box	EM Electronics	EMSW26	1070902	N/A	Oct. 09, 2023	Nov. 06, 2023~ Jul. 04, 2024	Oct. 08, 2024	Conducted (TH01-CA)
Spectrum Analyzer	R&S	FSV40	101089	10Hz~40GHz	May 22, 2023	Nov. 06, 2023~ Apr. 23, 2024	May 21, 2024	Conducted (TH01-CA)
Spectrum Analyzer	R&S	FSV40	101089	10Hz~40GHz	Apr. 24, 2024	Apr. 24, 2023~ Jul. 04, 2024	Apr. 23, 2025	Conducted (TH01-CA)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.70 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.60 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.10 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Leon Huang, Venkata Kondepudi and Sharon Chen	Temperature:	15.2~23.8	°C
Test Date:	2023/11/06-2024/07/04	Relative Humidity:	28.03~64.7	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant A	Ant B	Ant A	Ant B		
11b	1Mbps	2	1	2412	12.77	13.20	7.62	6.60	0.50	Pass
11b	1Mbps	2	6	2437	13.25	12.86	6.08	8.12	0.50	Pass
11b	1Mbps	2	11	2462	12.92	13.51	8.60	7.06	0.50	Pass
11g	6Mbps	2	1	2412	16.81	16.69	15.12	15.04	0.50	Pass
11g	6Mbps	2	6	2437	17.01	16.79	15.14	15.06	0.50	Pass
11g	6Mbps	2	11	2462	16.85	17.00	15.38	15.10	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant A	Ant B	SUM	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	
11b	1Mbps	2	1	2412	22.14	22.49	25.33	30.00		2.10		27.43		36.00		Pass
11b	1Mbps	2	6	2437	21.73	22.15	24.96	30.00		2.10		27.06		36.00		Pass
11b	1Mbps	2	11	2462	22.28	22.59	25.45	30.00		2.10		27.55		36.00		Pass
11g	6Mbps	2	1	2412	21.79	22.13	24.97	30.00		2.10		27.07		36.00		Pass
11g	6Mbps	2	6	2437	21.40	21.83	24.63	30.00		2.10		26.73		36.00		Pass
11g	6Mbps	2	11	2462	21.60	21.73	24.68	30.00		2.10		26.78		36.00		Pass
HT20	MCS0	2	1	2412	20.92	21.91	24.45	30.00		2.10		26.55		36.00		Pass
HT20	MCS0	2	6	2437	20.88	21.77	24.36	30.00		2.10		26.46		36.00		Pass
HT20	MCS0	2	11	2462	19.85	20.88	23.41	30.00		2.10		25.51		36.00		Pass
HT40	MCS0	2	3	2422	20.98	21.57	24.30	30.00		2.10		26.40		36.00		Pass
HT40	MCS0	2	6	2437	20.95	21.55	24.27	30.00		2.10		26.37		36.00		Pass
HT40	MCS0	2	9	2452	19.59	20.21	22.92	30.00		2.10		25.02		36.00		Pass
VHT20	MCS0	2	1	2412	21.75	21.28	24.53	30.00		2.10		26.63		36.00		Pass
VHT20	MCS0	2	6	2437	20.52	21.78	24.21	30.00		2.10		26.31		36.00		Pass
VHT20	MCS0	2	11	2462	20.84	20.12	23.51	30.00		2.10		25.61		36.00		Pass
VHT40	MCS0	2	3	2422	21.24	21.21	24.24	30.00		2.10		26.34		36.00		Pass
VHT40	MCS0	2	6	2437	20.57	21.26	23.94	30.00		2.10		26.04		36.00		Pass
VHT40	MCS0	2	9	2452	19.59	20.21	22.92	30.00		2.10		25.02		36.00		Pass

Note 1: The device has 2 antennas, each one has polarization which is orthogonal to the other.

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant A	Ant B	Worse + 3.01	Ant A	Ant B	Ant A	Ant B	
11b	1Mbps	2	1	2412	-0.58	-0.50	2.51	2.10		8.00		Pass
11b	1Mbps	2	6	2437	-1.47	-2.28	1.54	2.10		8.00		Pass
11b	1Mbps	2	11	2462	-1.15	-0.45	2.56	2.10		8.00		Pass
11g	6Mbps	2	1	2412	-1.56	-2.42	1.45	2.10		8.00		Pass
11g	6Mbps	2	6	2437	-4.35	-3.17	-0.16	2.10		8.00		Pass
11g	6Mbps	2	11	2462	-1.51	-0.72	2.29	2.10		8.00		Pass

Note 1: The device has 2 antennas, each one has polarization which is orthogonal to the other.

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO												
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config	Average Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	
						Ant A	Ant B	SUM	Ant A	Ant B	Ant A	Ant B
HE20	MCS0	2	1	2412	Full	21.62	21.27	24.46	2.10		26.56	
HE20	MCS0	2	6	2437	Full	21.52	21.17	24.36	2.10		26.46	
HE20	MCS0	2	11	2462	Full	19.98	20.97	23.51	2.10		25.61	
HE40	MCS0	2	3	2422	Full	20.97	21.64	24.33	2.10		26.43	
HE40	MCS0	2	6	2437	Full	20.60	21.32	23.99	2.10		26.09	
HE40	MCS0	2	9	2452	Full	19.54	20.21	22.90	2.10		25.00	

Note 1: The device has 2 antennas, each one has polarization which is orthogonal to the other.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO											
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	RU Config	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
						Ant A	Ant B	Ant A	Ant B		
EHT20	MCS0	2	1	2412	Full	18.77	19.01	10.13	19.10	0.50	Pass
EHT20	MCS0	2	6	2437	Full	19.08	18.80	13.15	11.40	0.50	Pass
EHT20	MCS0	2	11	2462	Full	19.07	18.72	16.98	15.48	0.50	Pass
EHT40	MCS0	2	3	2422	Full	37.80	38.10	35.20	32.12	0.50	Pass
EHT40	MCS0	2	6	2437	Full	38.23	37.79	31.44	33.16	0.50	Pass
EHT40	MCS0	2	9	2452	Full	37.86	38.37	35.16	36.64	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																	
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
						Ant A	Ant B	SUM	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	
EHT20	MCS0	2	1	2412	Full	21.87	21.59	24.74	30.00		2.10		26.84		36.00		Pass
EHT20	MCS0	2	6	2437	Full	20.87	21.96	24.46	30.00		2.10		26.56		36.00		Pass
EHT20	MCS0	2	11	2462	Full	20.89	20.30	23.62	30.00		2.10		25.72		36.00		Pass
EHT40	MCS0	2	3	2422	Full	21.25	21.98	24.64	30.00		2.10		26.74		36.00		Pass
EHT40	MCS0	2	6	2437	Full	20.96	21.60	24.30	30.00		2.10		26.40		36.00		Pass
EHT40	MCS0	2	9	2452	Full	19.93	20.58	23.28	30.00		2.10		25.38		36.00		Pass

Note 1: The device has 2 antennas, each one has polarization which is orthogonal to the other.

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO													
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	RU Config	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
						Ant A	Ant B	Worse + 3.01	Ant A	Ant B	Ant A	Ant B	
EHT20	MCS0	2	1	2412	Full	-1.16	-3.33	1.85	2.10		8.00		Pass
EHT20	MCS0	2	6	2437	Full	-1.40	-2.08	1.61	2.10		8.00		Pass
EHT20	MCS0	2	11	2462	Full	-3.74	-1.31	1.70	2.10		8.00		Pass
EHT40	MCS0	2	3	2422	Full	-4.40	-3.18	-0.17	2.10		8.00		Pass
EHT40	MCS0	2	6	2437	Full	-4.61	-3.78	-0.77	2.10		8.00		Pass
EHT40	MCS0	2	9	2452	Full	-6.60	-4.52	-1.51	2.10		8.00		Pass

Note 1: The device has 2 antennas, each one has polarization which is orthogonal to the other.



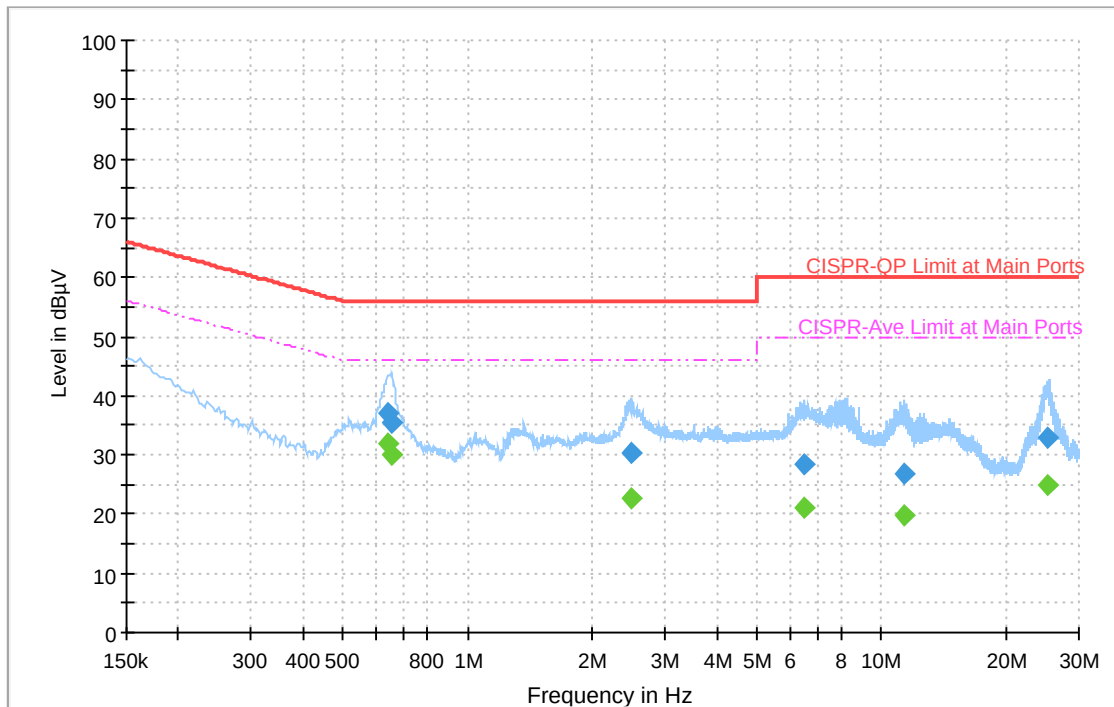
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Leo Liu	Temperature :	19.7~22.3°C
		Relative Humidity :	42.6~46.2%

EUT Information

Test Site Location : CO01-CA
Project 240104006
Power: 120Vac/60Hz
Mode 1
Line

Full Spectrum



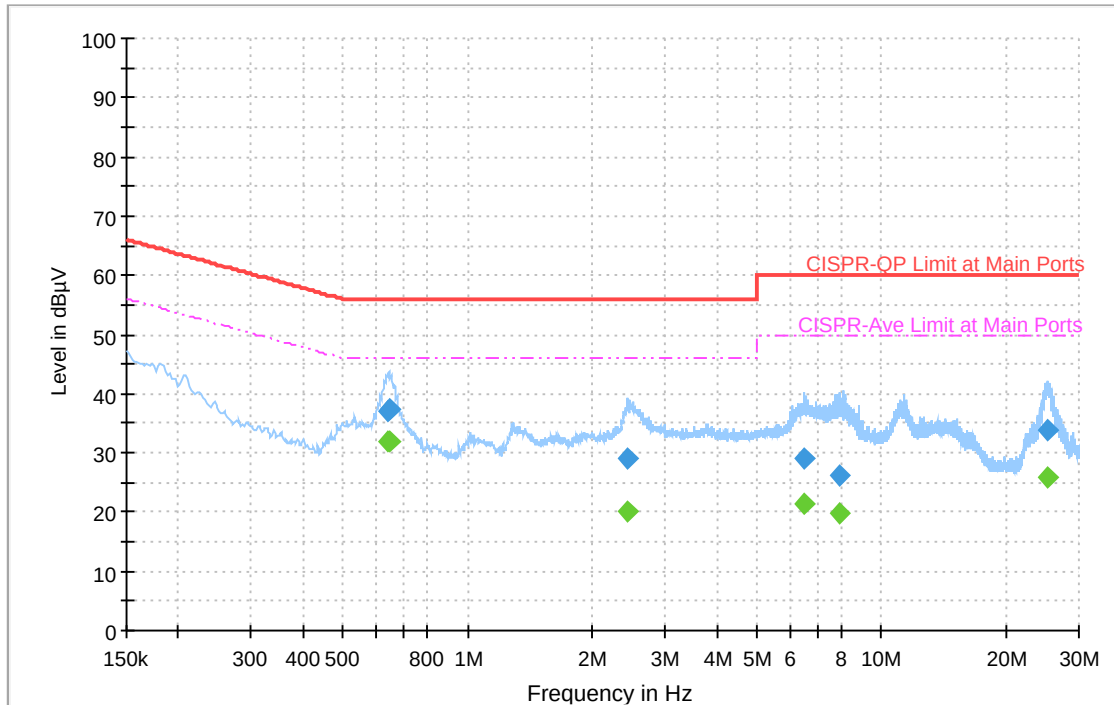
Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.641238	36.91	---	56.00	19.09	L1	OFF	20.3
0.641238	---	31.90	46.00	14.10	L1	OFF	20.3
0.657087	35.40	---	56.00	20.60	L1	OFF	20.3
0.657087	---	29.93	46.00	16.07	L1	OFF	20.3
2.493528	30.43	---	56.00	25.57	L1	OFF	20.3
2.493528	---	22.83	46.00	23.17	L1	OFF	20.3
6.510525	28.53	---	60.00	31.47	L1	OFF	20.5
6.510525	---	21.05	50.00	28.95	L1	OFF	20.5
11.316624	26.85	---	60.00	33.15	L1	OFF	20.6
11.316624	---	19.67	50.00	30.33	L1	OFF	20.6
25.208115	32.75	---	60.00	27.25	L1	OFF	21.2
25.208115	---	24.97	50.00	25.03	L1	OFF	21.2

EUT Information

Test Site Location : CO01-CA
Project 240104006
Power: 120Vac/60Hz
Mode 1
Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.642039	---	31.92	46.00	14.08	N	OFF	20.3
0.642039	37.07	---	56.00	18.93	N	OFF	20.3
0.646629	---	32.04	46.00	13.96	N	OFF	20.3
0.646629	37.32	---	56.00	18.68	N	OFF	20.3
2.431122	---	20.26	46.00	25.74	N	OFF	20.3
2.431122	29.15	---	56.00	26.85	N	OFF	20.3
6.475659	---	21.37	50.00	28.63	N	OFF	20.5
6.475659	29.04	---	60.00	30.96	N	OFF	20.5
7.887282	---	19.73	50.00	30.27	N	OFF	20.5
7.887282	26.06	---	60.00	33.94	N	OFF	20.5
25.158165	---	25.90	50.00	24.10	N	OFF	21.2
25.158165	33.91	---	60.00	26.09	N	OFF	21.2



Appendix C. Radiated Spurious Emission

Test Engineer :	Howard Huang	Temperature :	17.3~20.6
		Relative Humidity :	42.1~56.6

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2361.45	55.82	-18.18	74	42.45	27.29	17.54	31.46	302	11	P	H
		2389.065	43.96	-10.04	54	30.3	27.49	17.58	31.41	302	11	A	H
	*	2412	114.74	-	-	100.91	27.59	17.62	31.38	302	11	P	H
	*	2412	111.61	-	-	97.78	27.59	17.62	31.38	302	11	A	H
													H
													H
		2361.24	55.23	-18.77	74	41.8	27.35	17.54	31.46	215	320	P	V
		2386.755	44.32	-9.68	54	30.72	27.43	17.58	31.41	215	320	A	V
	*	2412	114.74	-	-	101	27.5	17.62	31.38	215	320	P	V
	*	2412	111.59	-	-	97.85	27.5	17.62	31.38	215	320	A	V
													V
													V
802.11b CH 06 2437MHz		2385.52	55.63	-18.37	74	42	27.46	17.58	31.41	222	310	P	H
		2389.2	43.93	-10.07	54	30.26	27.5	17.58	31.41	222	310	A	H
	*	2437	115.57	-	-	101.49	27.76	17.66	31.34	222	310	P	H
	*	2437	112.39	-	-	98.31	27.76	17.66	31.34	222	310	A	H
		2493.12	55.48	-18.52	74	40.96	28.05	17.75	31.28	222	310	P	H
		2498	44.9	-9.1	54	30.36	28.04	17.76	31.26	222	310	A	H
		2367.28	55.45	-18.55	74	41.98	27.35	17.55	31.43	200	11	P	V
		2388.56	43.83	-10.17	54	30.22	27.44	17.58	31.41	200	11	A	V
	*	2437	113.58	-	-	99.61	27.65	17.66	31.34	200	11	P	V
	*	2437	110.42	-	-	96.45	27.65	17.66	31.34	200	11	A	V
		2490.64	55.55	-18.45	74	41.23	27.86	17.75	31.29	200	11	P	V
		2499.92	44.72	-9.28	54	30.33	27.89	17.76	31.26	200	11	A	V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz	*	2462	113.56	-	-	99.27	27.9	17.7	31.31	100	310	P	H
	*	2462	110.42	-	-	96.13	27.9	17.7	31.31	100	310	A	H
		2484.16	57.89	-16.11	74	43.42	28.04	17.73	31.3	100	310	P	H
		2483.52	45.73	-8.27	54	31.27	28.03	17.73	31.3	100	310	A	H
													H
													H
	*	2462	114.02	-	-	99.89	27.74	17.7	31.31	298	31	P	V
	*	2462	110.86	-	-	96.73	27.74	17.7	31.31	298	31	A	V
		2486.6	56.43	-17.57	74	42.15	27.84	17.74	31.3	298	31	P	V
		2486.92	47.03	-6.97	54	32.74	27.84	17.74	31.29	298	31	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**2.4GHz 2400~2483.5MHz****WIFI 802.11b (Harmonic @ 3m)**

WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		3585	51.83	-22.17	74	77.49	29.69	10.15	65.5	193	44	P	H
		3585	38.85	-15.15	54	64.51	29.69	10.15	65.5	193	44	A	H
		4824	51.92	-22.08	74	73.97	32.68	11.49	66.22	205	350	P	H
		4824	49.51	-4.49	54	71.56	32.68	11.49	66.22	205	350	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		3600	52.76	-21.24	74	78.55	29.58	10.15	65.52	185	2	P	V
		3600	39.39	-14.61	54	65.18	29.58	10.15	65.52	185	2	A	V
		4824	51.86	-22.14	74	73.91	32.68	11.49	66.22	285	26	P	V
		4824	48.96	-5.04	54	71.01	32.68	11.49	66.22	285	26	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 06 2437MHz		3600	52.56	-21.44	74	78.24	29.69	10.15	65.52	218	43	P	H
		3600	40.09	-13.91	54	65.77	29.69	10.15	65.52	218	43	A	H
		4874	52.19	-21.81	74	73.93	32.86	11.53	66.13	117	3	P	H
		4874	49.54	-4.46	54	71.28	32.86	11.53	66.13	117	3	A	H
		7311	46.29	-27.71	74	61.71	36.8	13.77	65.99	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		3600	53.04	-20.96	74	78.83	29.58	10.15	65.52	179	3	P	V
		3600	39.45	-14.55	54	65.24	29.58	10.15	65.52	179	3	A	V
		4874	50.9	-23.1	74	72.71	32.79	11.53	66.13	204	318	P	V
		4874	48.08	-5.92	54	69.89	32.79	11.53	66.13	204	318	A	V
		7311	46.5	-27.5	74	61.86	36.86	13.77	65.99	-	-	P	V
													V
													V
													V
													V
													V
													V
													V

[illegible]

**2.4GHz 2400~2483.5MHz****WIFI 802.11g (Band Edge @ 3m)**

WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/ m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2390	58.62	-15.38	74	44.94	27.5	17.59	31.41	359	295	P	H
		2390	46.87	-7.13	54	33.19	27.5	17.59	31.41	359	295	A	H
	*	2412	116.46	-	-	102.63	27.59	17.62	31.38	359	295	P	H
	*	2412	108.91	-	-	95.08	27.59	17.62	31.38	359	295	A	H
													H
													H
		2389.17	58.4	-15.6	74	44.78	27.45	17.58	31.41	292	325	P	V
		2390.01	47.12	-102.88	150	33.49	27.45	17.59	31.41	292	325	A	V
	*	2412	117.64	-	-	103.9	27.5	17.62	31.38	292	325	P	V
	*	2412	110.34	-	-	96.6	27.5	17.62	31.38	292	325	A	V
													V
													V
802.11g CH 06 2437MHz		2388.56	54.74	-19.26	74	41.08	27.49	17.58	31.41	316	292	P	H
		2389.52	43.96	-10.04	54	30.29	27.5	17.58	31.41	316	292	A	H
	*	2437	118.01	-	-	103.93	27.76	17.66	31.34	316	292	P	H
	*	2437	111.27	-	-	97.19	27.76	17.66	31.34	316	292	A	H
		2494.96	55.86	-18.14	74	41.34	28.04	17.75	31.27	316	292	P	H
		2484.64	45.08	-8.92	54	30.6	28.04	17.74	31.3	316	292	A	H
		2368.88	55.1	-18.9	74	41.63	27.35	17.55	31.43	400	331	P	V
		2389.84	43.94	-10.06	54	30.31	27.45	17.59	31.41	400	331	A	V
	*	2437	117.22	-	-	103.25	27.65	17.66	31.34	400	331	P	V
	*	2437	110.18	-	-	96.21	27.65	17.66	31.34	400	331	A	V
		2493.44	55.87	-18.13	74	41.53	27.87	17.75	31.28	400	331	P	V
		2499.52	44.82	-9.18	54	30.43	27.89	17.76	31.26	400	331	A	V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz	*	2462	117.96	-	-	103.25	27.73	17.7	30.72	224	58	P	H
	*	2462	110.27	-	-	95.56	27.73	17.7	30.72	224	58	A	H
		2484.88	63.93	-10.07	74	49.01	27.88	17.74	30.7	224	58	P	H
		2483.5	52.07	-1.93	54	37.17	27.87	17.73	30.7	224	58	A	H
													H
													H
	*	2462	115.51	-	-	100.92	27.61	17.7	30.72	100	321	P	V
	*	2462	108.54	-	-	93.95	27.61	17.7	30.72	100	321	A	V
		2483.64	62.2	-11.8	74	47.47	27.7	17.73	30.7	100	321	P	V
		2483.52	50.67	-3.33	54	35.94	27.7	17.73	30.7	100	321	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**2.4GHz 2400~2483.5MHz****WIFI 802.11g (Harmonic @ 3m)**

WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		3585	51.6	-22.4	74	77.26	29.69	10.15	65.5	201	47	P	H
		3585	39.08	-14.92	54	64.74	29.69	10.15	65.5	201	47	A	H
		4824	52.21	-21.79	74	74.26	32.68	11.49	66.22	125	0	P	H
		4824	40.93	-13.07	54	62.98	32.68	11.49	66.22	125	0	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		3585	52.83	-21.17	74	78.62	29.56	10.15	65.5	192	0	P	V
		3585	39.69	-14.31	54	65.48	29.56	10.15	65.5	192	0	A	V
		4824	50.26	-23.74	74	72.31	32.68	11.49	66.22	120	360	P	V
		4824	39.71	-14.29	54	61.76	32.68	11.49	66.22	120	360	A	V
													V
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													V
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													V
													V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 06 2437MHz		3585	53.8	-20.2	74	79.46	29.69	10.15	65.5	200	45	P	H
		3585	40.71	-13.29	54	66.37	29.69	10.15	65.5	200	45	A	H
		4874	49.52	-24.48	74	71.26	32.86	11.53	66.13	231	0	P	H
		4874	39.02	-14.98	54	60.76	32.86	11.53	66.13	231	0	A	H
		7311	45.83	-28.17	74	61.25	36.8	13.77	65.99	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		3585	54.02	-19.98	74	79.81	29.56	10.15	65.5	183	0	P	V
		3585	41	-13	54	66.79	29.56	10.15	65.5	183	0	A	V
		4874	48.28	-25.72	74	70.09	32.79	11.53	66.13	184	0	P	V
		4874	36.84	-17.16	54	58.65	32.79	11.53	66.13	184	0	A	V
		7311	46.03	-27.97	74	61.39	36.86	13.77	65.99	-	-	P	V
													V
													V
													V
													V
													V
													V
													V

[illegible]



2.4GHz 2400~2483.5MHz

WIFI 802.11be EHT20 Full (Band Edge @ 3m)

WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT20 Full CH 01 2412MHz		2388.855	63.08	-10.92	74	48.91	27.37	17.58	30.78	400	299	P	H
		2390	50.72	-3.28	54	36.53	27.38	17.59	30.78	400	299	A	H
	*	2412	120.87	-	-	106.5	27.52	17.62	30.77	400	299	P	H
	*	2412	107.92	-	-	93.55	27.52	17.62	30.77	400	299	A	H
													H
													H
		2390.01	62.51	-87.49	150	48.49	27.21	17.59	30.78	389	360	P	V
		2390	49.54	-4.46	54	35.52	27.21	17.59	30.78	389	360	A	V
	*	2412	113.56	-	-	99.41	27.3	17.62	30.77	389	360	P	V
	*	2412	104.56	-	-	90.41	27.3	17.62	30.77	389	360	A	V
													V
													V
802.11be EHT20 Full CH 06 2437MHz		2360.72	55.57	-18.43	74	41.65	27.2	17.54	30.82	202	64	P	H
		2388.88	44.33	-9.67	54	30.16	27.37	17.58	30.78	202	64	A	H
	*	2437	120.93	-	-	106.41	27.61	17.66	30.75	202	64	P	H
	*	2437	112.18	-	-	97.66	27.61	17.66	30.75	202	64	A	H
		2488.56	56.57	-17.43	74	41.63	27.89	17.74	30.69	202	64	P	H
		2483.68	45.69	-8.31	54	30.79	27.87	17.73	30.7	202	64	A	H
		2385.04	55.25	-18.75	74	41.25	27.21	17.58	30.79	400	39	P	V
		2378.16	44.09	-9.91	54	30.12	27.21	17.57	30.81	400	39	A	V
	*	2437	116.33	-	-	101.96	27.46	17.66	30.75	400	39	P	V
	*	2437	107.59	-	-	93.22	27.46	17.66	30.75	400	39	A	V
		2493.84	56.37	-17.63	74	41.58	27.73	17.75	30.69	400	39	P	V
		2484.48	45.21	-8.79	54	30.47	27.7	17.74	30.7	400	39	A	V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT20 Full CH 11 2462MHz		2483.76	65.97	-8.03	74	51.07	27.87	17.73	30.7	192	57	P	H
		2483.52	52.45	-1.55	54	37.55	27.87	17.73	30.7	192	57	A	H
	*	2462	118.2	-	-	103.49	27.73	17.7	30.72	192	57	P	H
	*	2462	109.21	-	-	94.5	27.73	17.7	30.72	192	57	A	H
													H
													H
		2483.56	64.79	-9.21	74	50.06	27.7	17.73	30.7	300	38	P	V
		2483.52	51.47	-2.53	54	36.74	27.7	17.73	30.7	300	38	A	V
	*	2462	114.42	-	-	99.84	27.6	17.7	30.72	300	38	P	V
	*	2462	105.88	-	-	91.29	27.61	17.7	30.72	300	38	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

[illegible]



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT20 Full CH 06 2437MHz		4874	54.85	-19.15	74	76.72	32.73	11.53	66.13	100	351	P	H
		4874	43.92	-10.08	54	65.79	32.73	11.53	66.13	100	351	A	H
		7311	45.9	-28.1	74	61.24	36.88	13.77	65.99	-	-	P	H
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		4874	47.8	-26.2	74	69.78	32.62	11.53	66.13	-	-	P	V
		7311	45.57	-28.43	74	60.87	36.92	13.77	65.99	-	-	P	V
		9748	51.19	-22.81	74	64.99	38.27	15.68	67.75	-	-	P	V
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2.4GHz 2400~2483.5MHz

WIFI 802.11be EHT40 Full (Band Edge @ 3m)

WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT40 Full CH 03 2422MHz		2389.52	63.96	-10.04	74	49.78	27.38	17.58	30.78	113	296	P	H
		2390	53.5	-0.5	54	39.31	27.38	17.59	30.78	113	296	A	H
	*	2422	110.8	-	-	96.38	27.56	17.64	30.78	113	296	P	H
	*	2422	101.31	-	-	86.89	27.56	17.64	30.78	113	296	A	H
		2486.4	56.72	-17.28	74	41.79	27.88	17.74	30.69	113	296	P	H
		2483.52	45.59	-8.41	54	30.69	27.87	17.73	30.7	113	296	A	H
		2388.4	64.59	-9.41	74	50.58	27.21	17.58	30.78	343	0	P	V
		2390	53.8	-0.2	54	39.78	27.21	17.59	30.78	343	0	A	V
	*	2422	110.4	-	-	96.16	27.38	17.64	30.78	343	0	P	V
	*	2422	101.42	-	-	87.18	27.38	17.64	30.78	343	0	A	V
		2488.24	56.3	-17.7	74	41.55	27.7	17.74	30.69	343	0	P	V
		2483.92	45.27	-8.73	54	30.54	27.7	17.73	30.7	343	0	A	V
802.11be EHT40 Full CH 06 2437MHz		2388.56	57.66	-16.34	74	43.49	27.37	17.58	30.78	100	314	P	H
		2390	46.58	-7.42	54	32.39	27.38	17.59	30.78	100	314	A	H
	*	2437	108.55	-	-	94.03	27.61	17.66	30.75	100	314	P	H
	*	2437	99.05	-	-	84.53	27.61	17.66	30.75	100	314	A	H
		2484.32	57.36	-16.64	74	42.46	27.87	17.73	30.7	100	314	P	H
		2483.6	46.58	-7.42	54	31.68	27.87	17.73	30.7	100	314	A	H
		2378.48	55.17	-18.83	74	41.2	27.21	17.57	30.81	357	28	P	V
		2390	44.79	-9.21	54	30.77	27.21	17.59	30.78	357	28	A	V
	*	2437	111.52	-	-	97.15	27.46	17.66	30.75	357	28	P	V
	*	2437	101.61	-	-	87.24	27.46	17.66	30.75	357	28	A	V
		2485.04	65.26	-8.74	74	50.51	27.7	17.74	30.69	357	28	P	V
		2483.6	51.56	-2.44	54	36.83	27.7	17.73	30.7	357	28	A	V



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT40 Full CH 09 2452MHz		2374.96	55.09	-18.91	74	41.05	27.29	17.56	30.81	400	8	P	H
		2389.36	44.09	-9.91	54	29.92	27.37	17.58	30.78	400	8	A	H
	*	2452	110.19	-	-	95.58	27.66	17.68	30.73	400	8	P	H
	*	2452	101.01	-	-	86.4	27.66	17.68	30.73	400	8	A	H
		2485.2	64.43	-9.57	74	49.5	27.88	17.74	30.69	400	8	P	H
		2483.6	52.73	-1.27	54	37.83	27.87	17.73	30.7	400	8	A	H
		2321.52	55.24	-18.76	74	41.48	27.12	17.49	30.85	301	42	P	V
		2387.28	43.96	-10.04	54	29.96	27.21	17.58	30.79	301	42	A	V
	*	2452	111.24	-	-	96.75	27.54	17.68	30.73	301	42	P	V
	*	2452	101.52	-	-	87.03	27.54	17.68	30.73	301	42	A	V
		2486.48	64.56	-9.44	74	49.81	27.7	17.74	30.69	301	42	P	V
		2485.76	52.31	-1.69	54	37.56	27.7	17.74	30.69	301	42	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

[illegible]



WIFI Ant. 1+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11be EHT40 Full CH 06 2437MHz		4874	47.43	-26.57	74	69.3	32.73	11.53	66.13	-	-	P	H
		7311	45.27	-28.73	74	60.61	36.88	13.77	65.99	-	-	P	H
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													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	44.87	-29.13	74	66.85	32.62	11.53	66.13	-	-	P	V
		7311	45.88	-28.12	74	61.18	36.92	13.77	65.99	-	-	P	V
		9748	52.19	-21.81	74	65.99	38.27	15.68	67.75	-	-	P	V
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