FCC RADIO TEST REPORT

FCC ID	:	**I28-WYSBHVDXP**
Equipment	:	**WLAN/BTLE module**
Brand Name	:	**ZEBRA**
Model Name	:	**WYSBHVDXP**
Applicant	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069, United States**
Manufacturer	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069, United States**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Jun. 27, 2023 and testing was performed from Jul. 05, 2023 to Aug. 01, 2023. We, Sporton International Inc. Wensan 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 variant report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
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History of this test report

Report No.	Version	Description	Issue Date
FR0D2423-05C	01	Initial issue of report	Sep. 25, 2023

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	1.11 dB under the limit at 2390.00 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.6	15.203	Antenna Requirement	Pass	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by changing the Bluetooth antenna trace design and additionally assess Bluetooth and WLAN antennas. All the test cases were performed on original report which can be referred to Sporton Report Number FR0D2423-04A. Based on the original report, only worst case was verified.

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/manufacturer 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	
Equipment	WLAN/BTLE module
Brand Name	ZEBRA
Model Name	WYSBHVDXP
FCC ID	I28-WYSBHVDXP
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 WLAN 11ax HE20/HE40/HE80 Bluetooth BR/EDR/LE
HW Version	Revision G
SW Version	17.68.01.p94
EUT Stage	Identical Prototype

Remark: The EUT's information above is declared by manufacturer.

Supported Unit Used in Test Configuration and System				
Test Fixture	**Brand Name**	ZEBRA	**Model Name**	P1129126-101
AC Adapter	**Brand Name**	ZEBRA	**Model Name**	FSP025-DYAA3
Bluetooth Antenna 1	**Brand Name**	gigaAnt	**Model Name**	3030A5645-01
Bluetooth Antenna 2	**Brand Name**	TAIYO YUDEN	**Model Name**	AH 168M245001
Bluetooth Antenna 3	**Brand Name**	Johanson Technology	**Model Name**	2450AT07A0100
Bluetooth Antenna 4	**Brand Name**	Laird	**Model Name**	RD2458-5
Bluetooth Antenna 5	**Brand Name**	Auden	**Model Name**	220370-09
Bluetooth Antenna 6	**Brand Name**	Auden	**Model Name**	A73009-00
Bluetooth Antenna 7	**Brand Name**	Auden	**Model Name**	B53026-90
WLAN Antenna 1	**Brand Name**	Laird	**Model Name**	RD2458-5
WLAN Antenna 2	**Brand Name**	Pulse	**Model Name**	W3006
WLAN Antenna 3	**Brand Name**	Auden	**Model Name**	220370-09
WLAN Antenna 4	**Brand Name**	Auden	**Model Name**	B91882-30
WLAN Antenna 5	**Brand Name**	Auden	**Model Name**	B53023-30
WLAN Antenna 6	**Brand Name**	Auden	**Model Name**	B53025-30

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum Output Power to Antenna	**<Ant. 1>** 802.11b : 16.10 dBm / 0.0407 W 802.11g : 14.40 dBm / 0.0275 W **<Ant. 2>** 802.11b : 16.80 dBm / 0.0479 W 802.11g : 14.10 dBm / 0.0257 W **MIMO<Ant. 1+2>** 802.11n HT20 : 13.15 dBm / 0.0207 W 802.11n HT40 : 12.01 dBm / 0.0159 W 802.11ac VHT20: 13.15 dBm / 0.0207 W 802.11ac VHT40: 12.01 dBm / 0.0159 W 802.11ax HE20: 13.35 dBm / 0.0216 W 802.11ax HE40: 12.21 dBm / 0.0166 W
99% Occupied Bandwidth	**<Ant. 1>** 802.11b : 13.49 MHz 802.11g : 16.83 MHz **<Ant. 2>** 802.11b : 13.44 MHz 802.11g : 16.78 MHz **MIMO <Ant. 1>** 802.11ax HE20 : 18.78 MHz 802.11ax HE40 : 37.86 MHz **MIMO <Ant. 2>** 802.11ax HE20 : 18.78 MHz 802.11ax HE40 : 37.76 MHz
Antenna Type / Gain	**<RD2458-5>:** <Ant. 1>: Dipole Antenna with gain 3.00 dBi <Ant. 2>: Dipole Antenna with gain 3.00 dBi **<W3006>:** <Ant. 1>: Chip Antenna with gain 3.20 dBi <Ant. 2>: Chip Antenna with gain 3.20 dBi **<220370-09>:** <Ant. 1>: Mylar Antenna with gain 3.81 dBi <Ant. 2>: Mylar Antenna with gain 3.81 dBi **<B91882-30>:** <Ant. 1>: Mylar Antenna with gain 0.30 dBi <Ant. 2>: Mylar Antenna with gain 0.30 dBi **<B53023-30>:** <Ant. 1>: Monopole Antenna with gain 3.30 dBi <Ant. 2>: Monopole Antenna with gain 3.30 dBi **<B53025-30>:** <Ant. 1>: Monopole Antenna with gain 5.10 dBi <Ant. 2>: Monopole Antenna with gain 5.10 dBi

<table>
<tr><th colspan="2">Product Specification is subject to this standard</th></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
802.11ax : OFDMA
(BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)</td></tr>
<tr><td>Antenna Function Description</td><td><table>
<tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr>
<tr><td>802.11 b/g</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n/ac/ax MIMO</td><td>V</td><td>V</td></tr>
</table></td></tr>
</table>

Remark:

1. MIMO Ant. 1+2 Directional Gain is a calculated result from MIMO Ant. 1 and MIMO Ant. 2. The formula used in calculation is documented in section 1.2.1.
2. Power of MIMO Ant. 1 + Ant. 2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2.1 Antenna Directional Gain

<For CDD Mode>

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)ii)

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows:

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

G_{ANT} is set equal to the gain of the antenna having the highest gain.

For PSD measurements, the directional gain calculation.

Array Gain = 10 log(NANT/NSS) dB.

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

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4GHz	5.10	5.10	5.10	8.11	0.00	2.11

Calculation example:

If a device has two antenna, G_{ANT1}= 5.10dBi; G_{ANT2}= 5.10dBi

Directional gain of power measurement = max(5.10, 5.10) + 0 = 5.10 dBi

Directional gain of PSD derived from formula which is

10 x log { { [10^ (5.10 dBi / 20) + 10^ (5.10 dBi / 20)] ^ 2 } / 2 }

= 8.11 dBi

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

1.3 Modification of EUT

No modifications made to the EUT during the testing.

1.4 Testing Location

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, 03CH20-HY

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

FCC designation No.: TW3786

1.5 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.

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: 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 two antenna polarization (Horizontal and Vertical), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

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 power for 802.11n and 802.11ac mode is smaller than 802.11ax mode, so all other conducted and radiated test is covered by 802.11ax mode.

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

Single Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps

MIMO Antenna

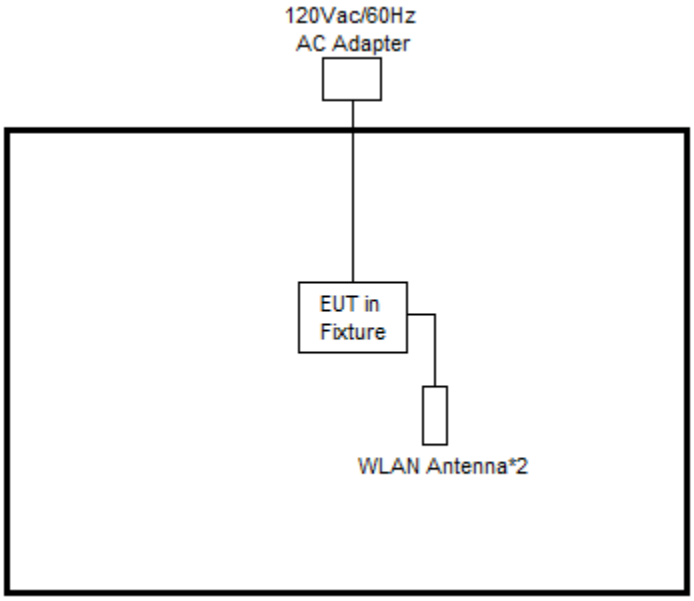
Modulation	Data Rate
802.11n HT20 (Covered by HE20)	MCS0
802.11n HT40 (Covered by HE40)	MCS0
802.11ac VHT20 (Covered by HE20)	MCS0
802.11ac VHT40 (Covered by HE40)	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0

Ch. #	2400-2483.5 MHz			
	802.11b	802.11g	802.11ax HE20	802.11ax HE40
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

<WLAN Tx Mode>



2.4 EUT Operation Test Setup

The RF test items, utility "Tool box Version 1.84" 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.

2.5 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.

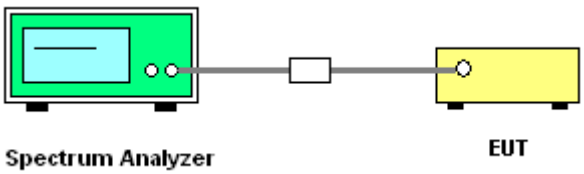
3.1.2 Measuring Instruments

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) ≥ 3 * RBW.
6. Measure and record the results in the test report.

3.1.4 Test Setup

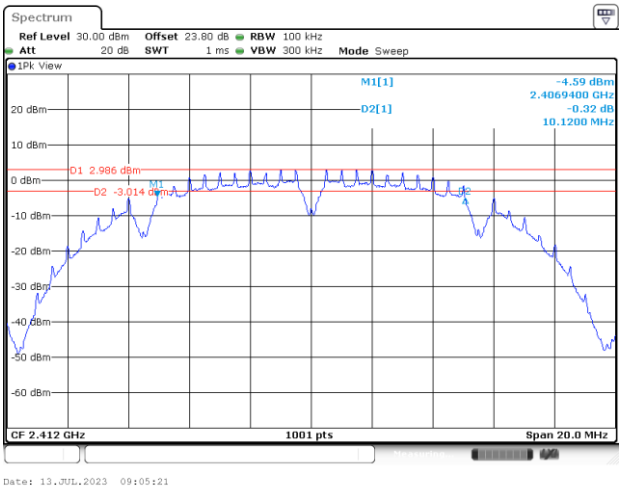
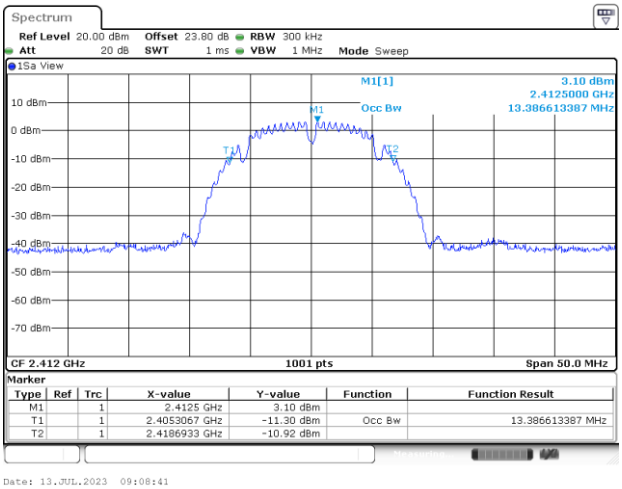


3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

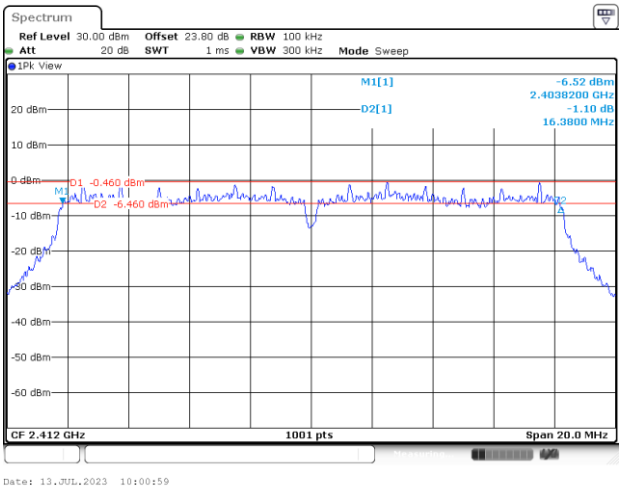
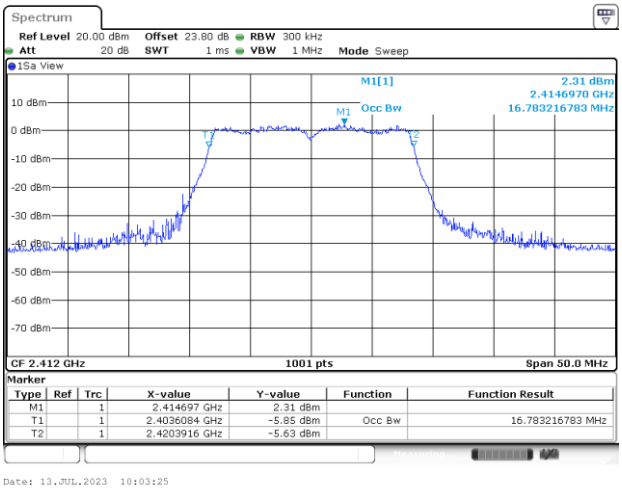
<Ant. 1>

<802.11b>

6dB Bandwidth	99% Occupied Bandwidth
	

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

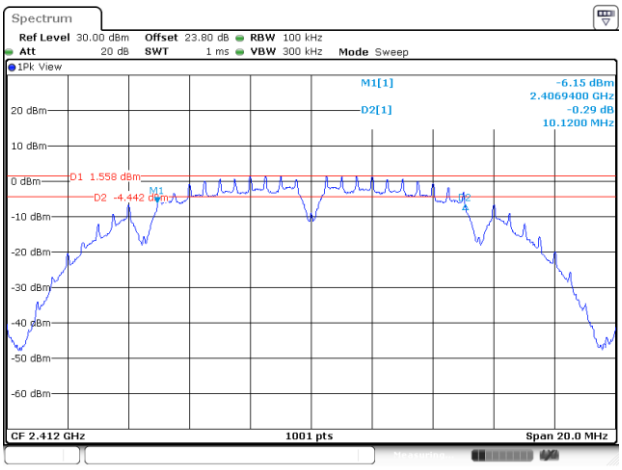
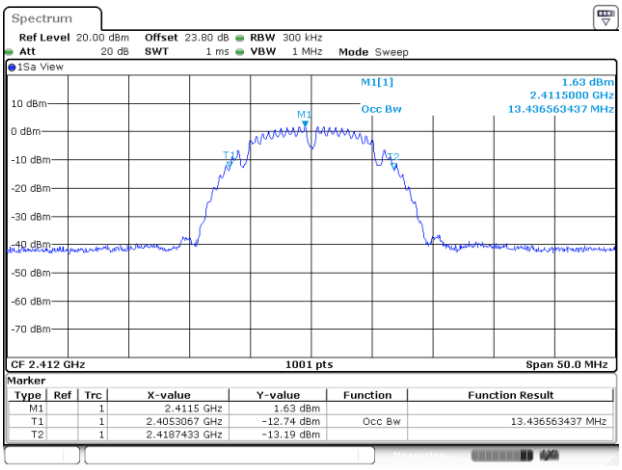
<802.11g>

6dB Bandwidth	99% Occupied Bandwidth
	

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

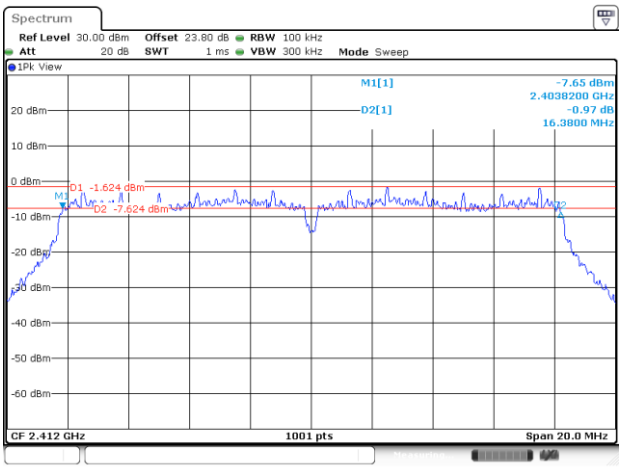
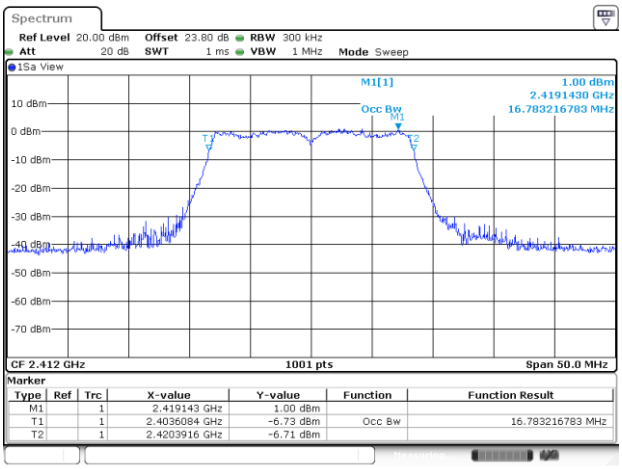
<Ant. 2>

<802.11b>

6dB Bandwidth	99% Occupied Bandwidth
	

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

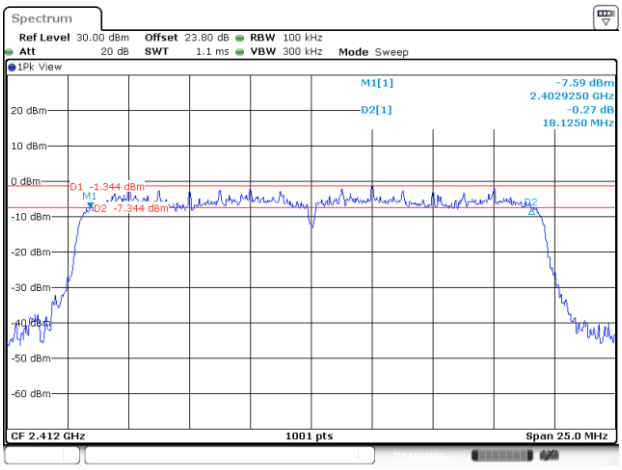
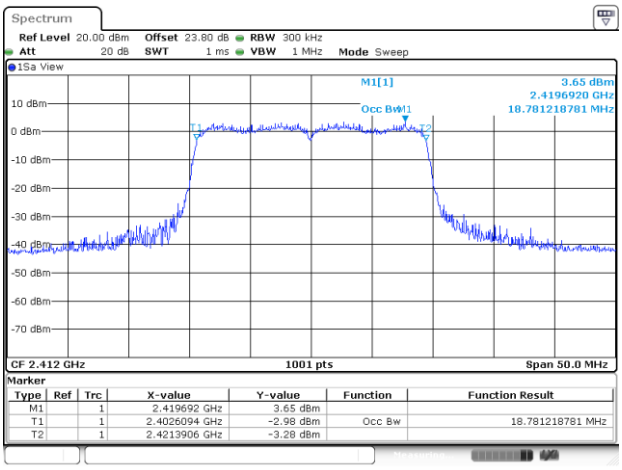
<802.11g>

6dB Bandwidth	99% Occupied Bandwidth
	

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

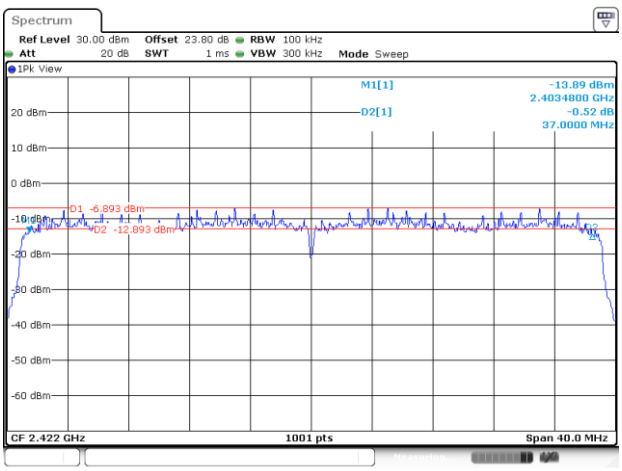
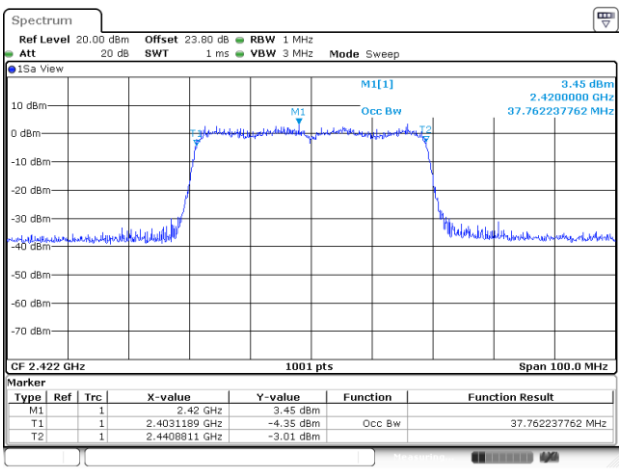
MIMO <Ant. 1+2>

<802.11ax HE20>

6dB Bandwidth	99% Occupied Bandwidth
	

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

<802.11ax HE40>

6dB Bandwidth	99% Occupied Bandwidth
	

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.

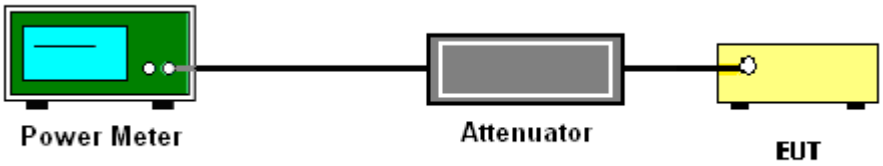
3.2.2 Measuring Instruments

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.

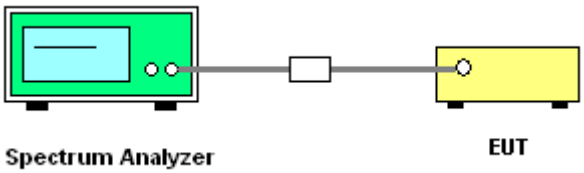
3.3.3 Test Procedures

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_{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_{ANT}) dB is added to each spectrum value before comparing to the emission limit. The addition of 10 log(N_{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_{ANT} th of the PSD limit .

3.3.4 Test Setup



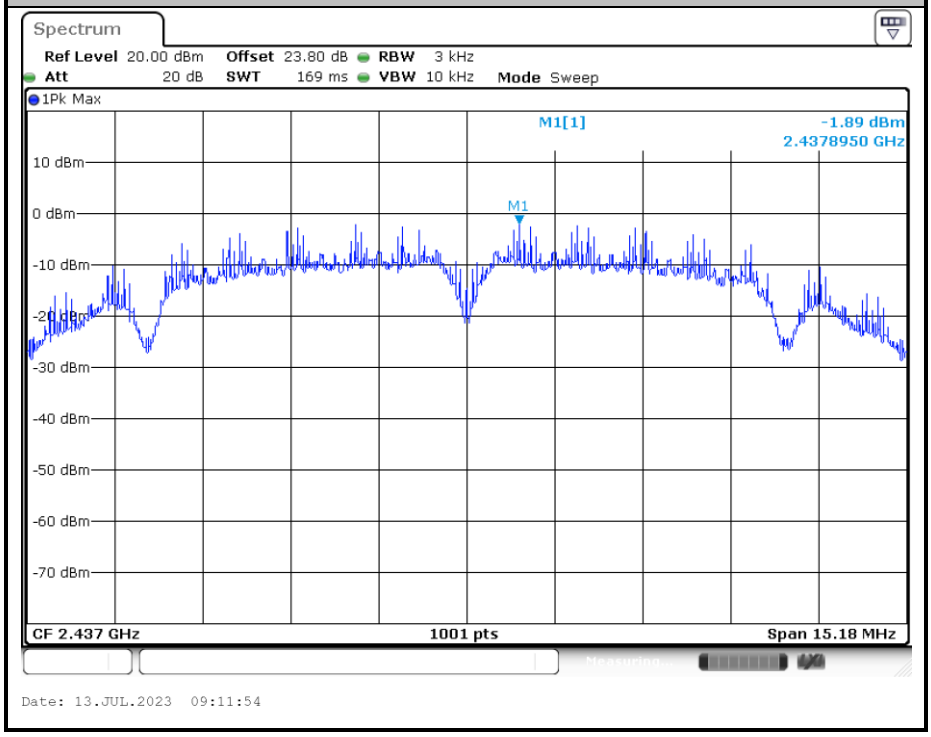
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

<Ant. 1>

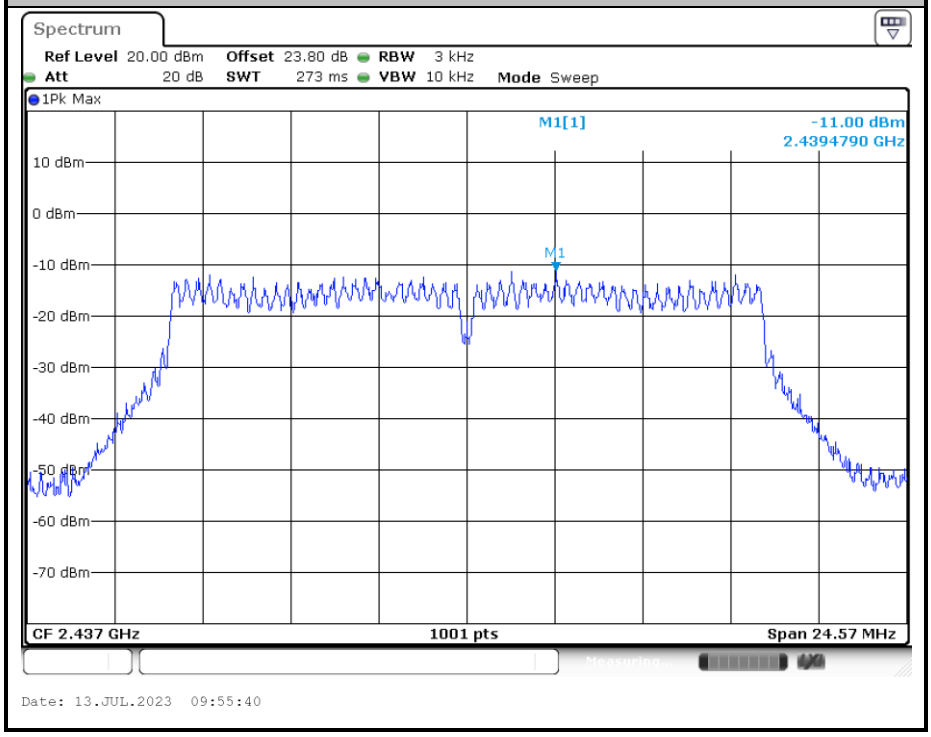
<802.11b>

Maximum Power Density Plot (dBm/3kHz)



<802.11g>

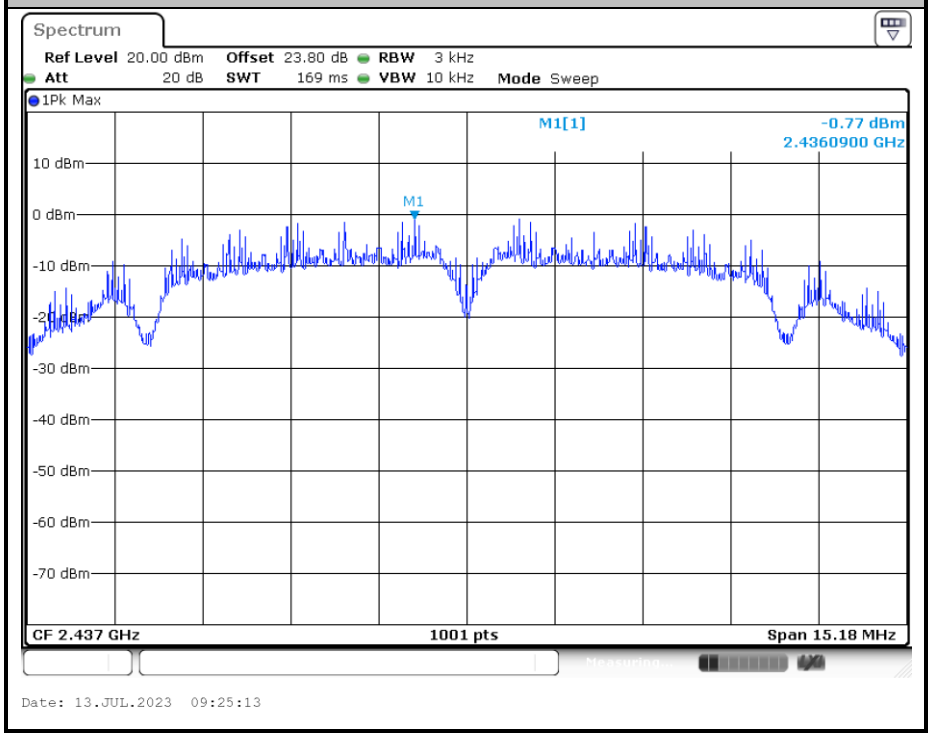
Maximum Power Density Plot (dBm/3kHz)



<Ant. 2>

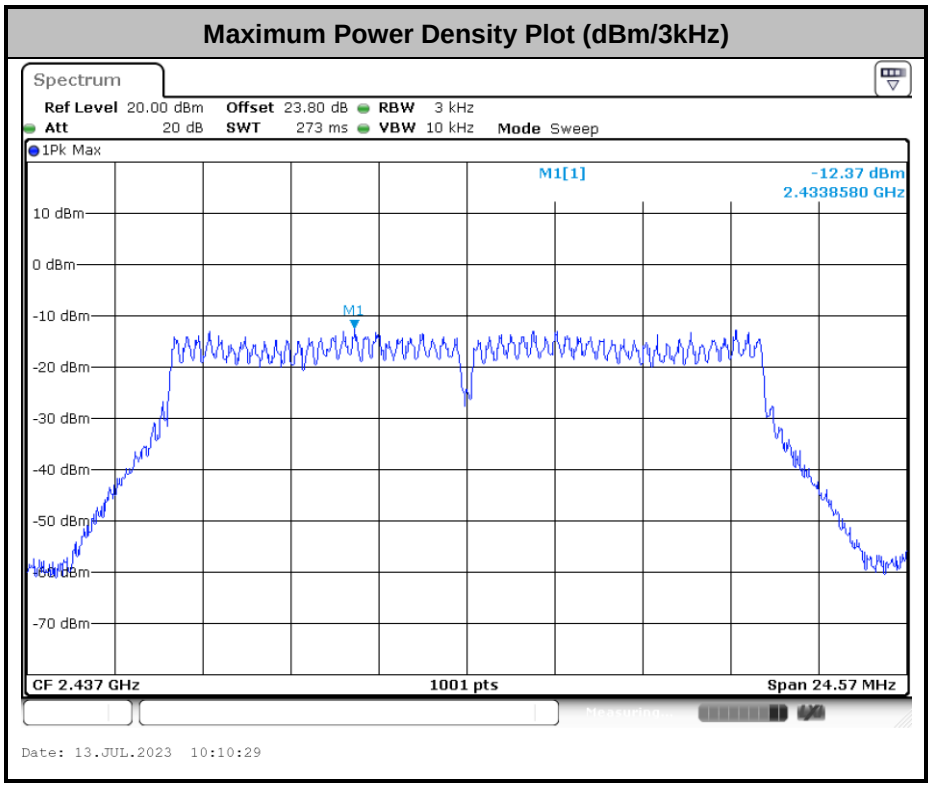
<802.11b>

Maximum Power Density Plot (dBm/3kHz)

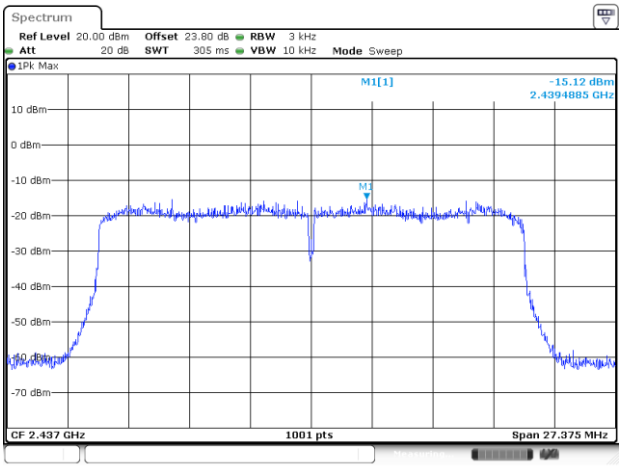
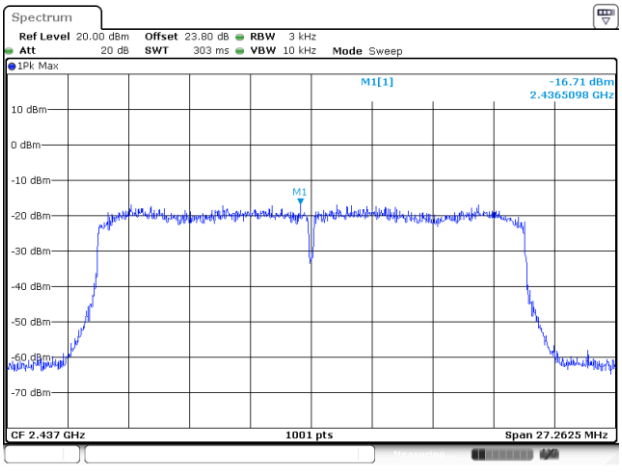


<802.11g>

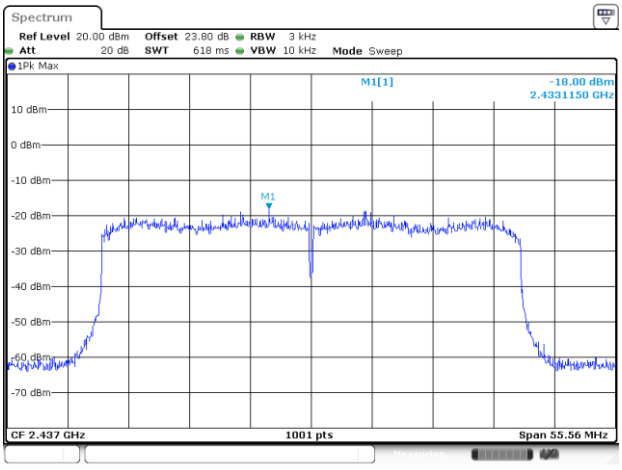
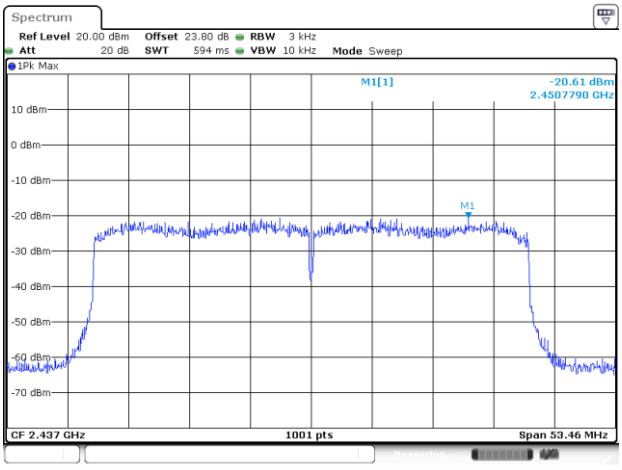
Maximum Power Density Plot (dBm/3kHz)



<802.11ax HE20>

Maximum Power Density Plot (dBm/3kHz)	
MIMO Ant. 1	**MIMO Ant. 2**
	

<802.11ax HE40>

Maximum Power Density Plot (dBm/3kHz)	
MIMO Ant. 1	**MIMO Ant. 2**
	

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.

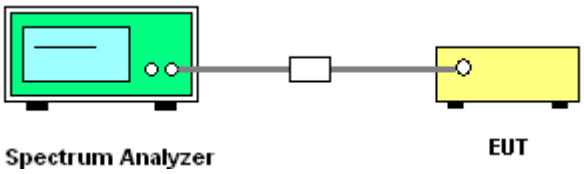
3.4.2 Measuring Instruments

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.

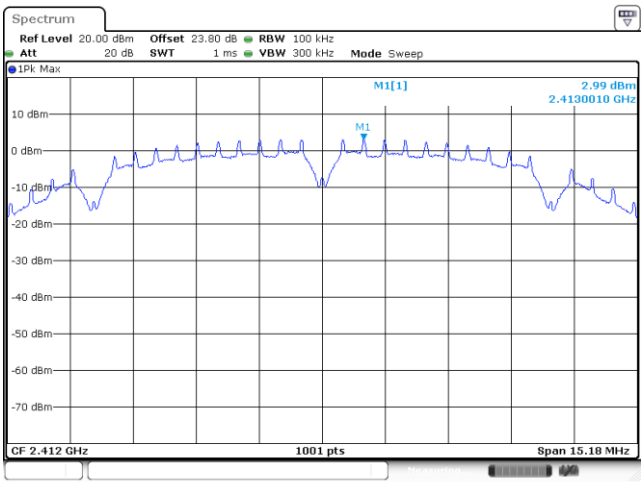
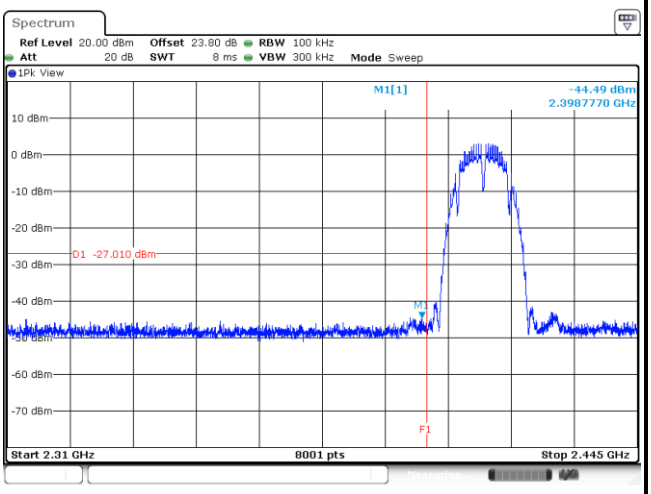
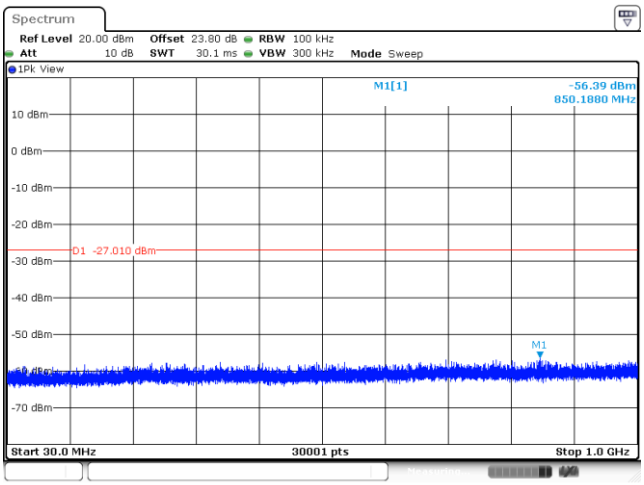
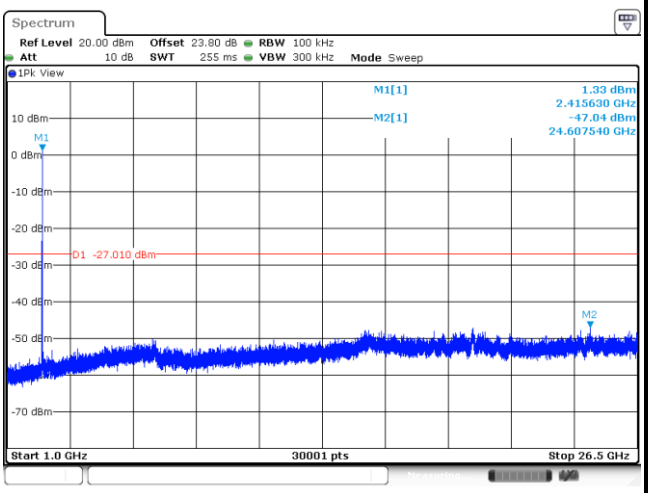
3.4.4 Test Setup



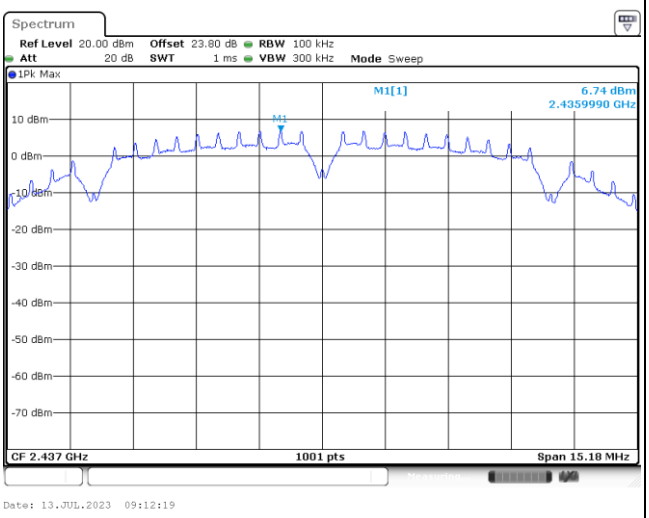
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

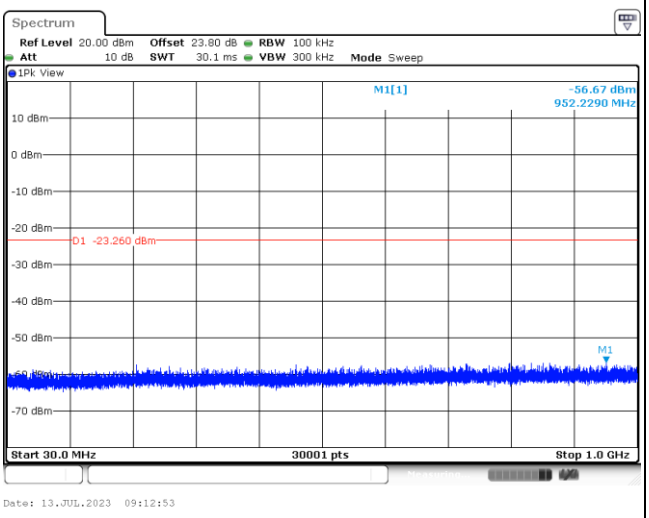
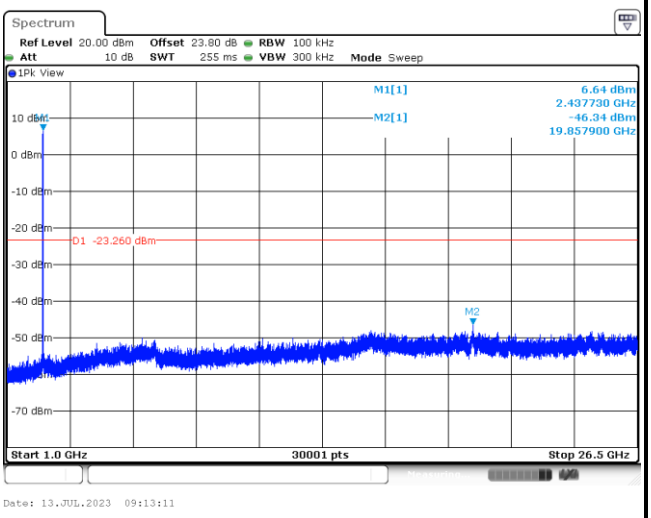
Number of TX = 1, Ant. 1 (Measured)

Test Mode :	802.11b	Test Channel :	01

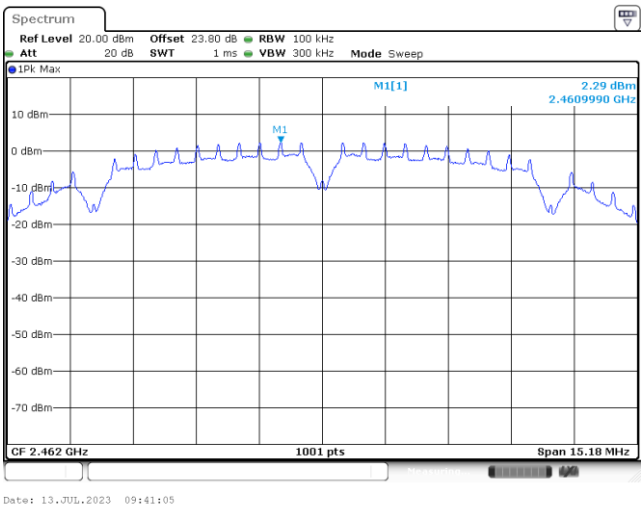
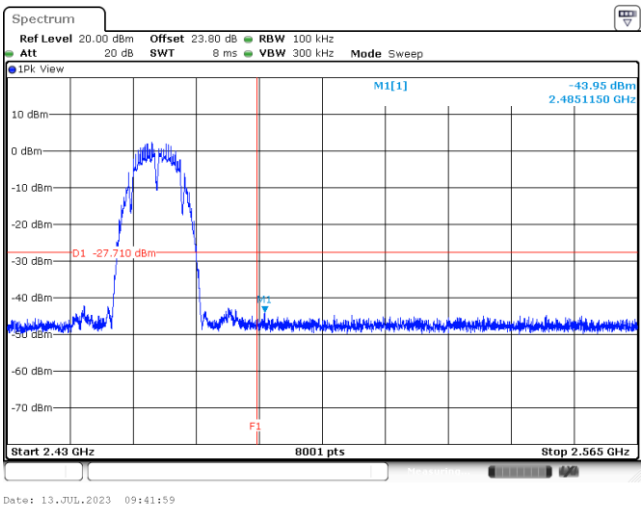
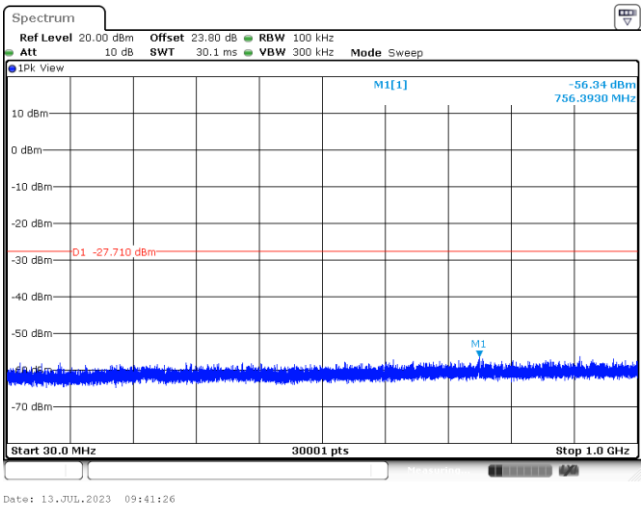
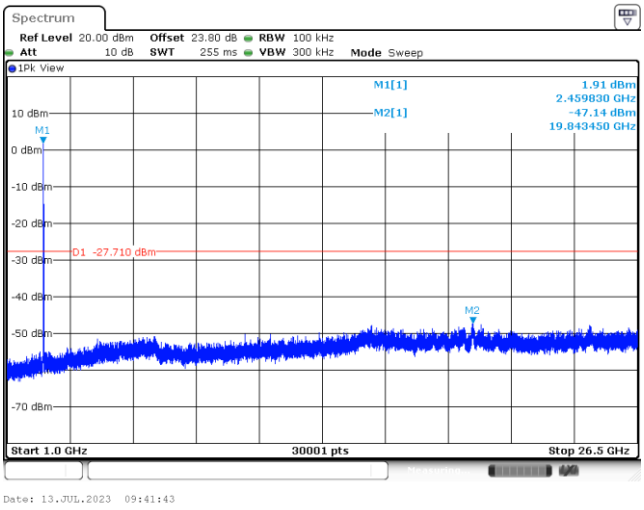
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11b	Test Channel :	06

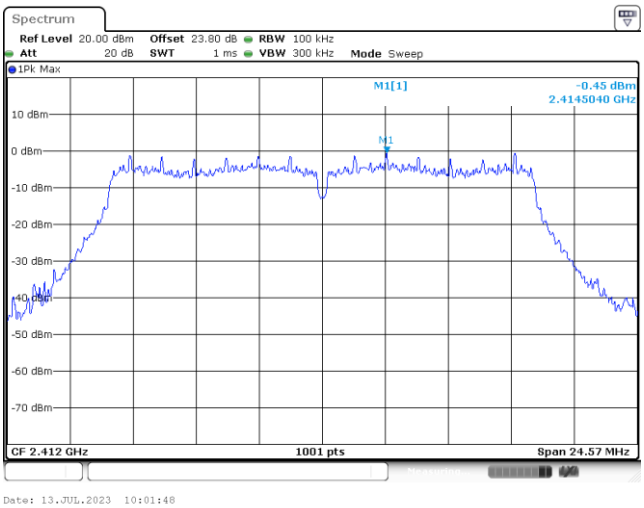
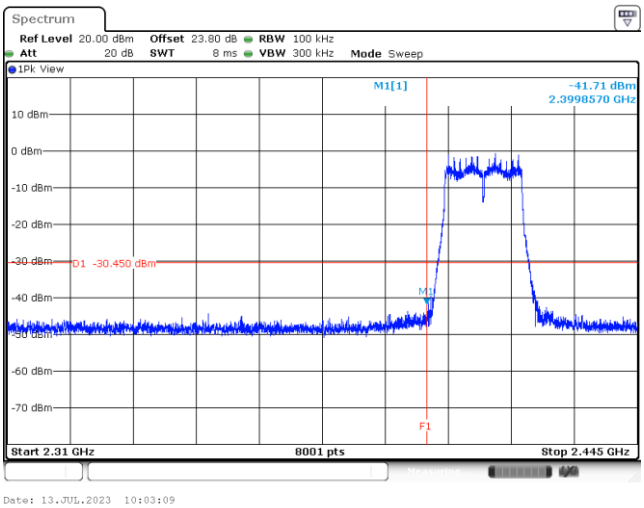
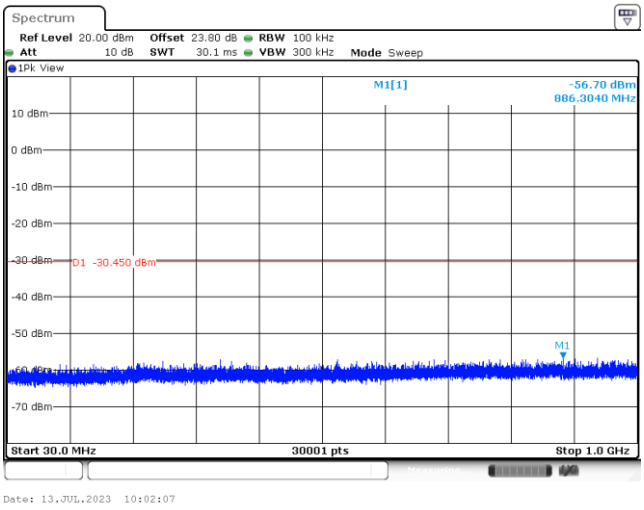
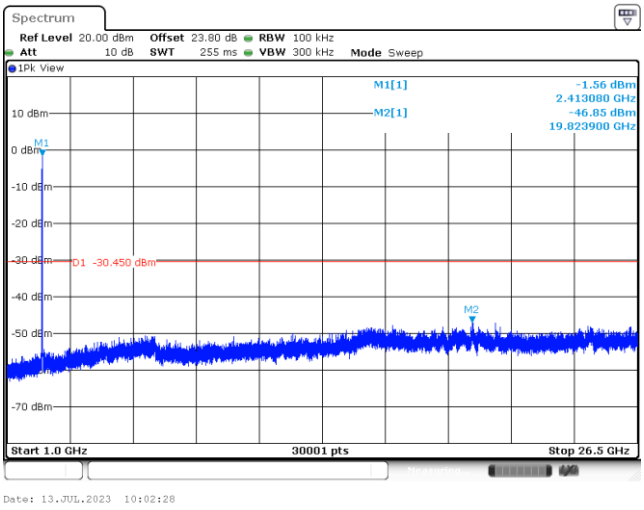
100kHz PSD reference Level	Mid Channel Plot
	

Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

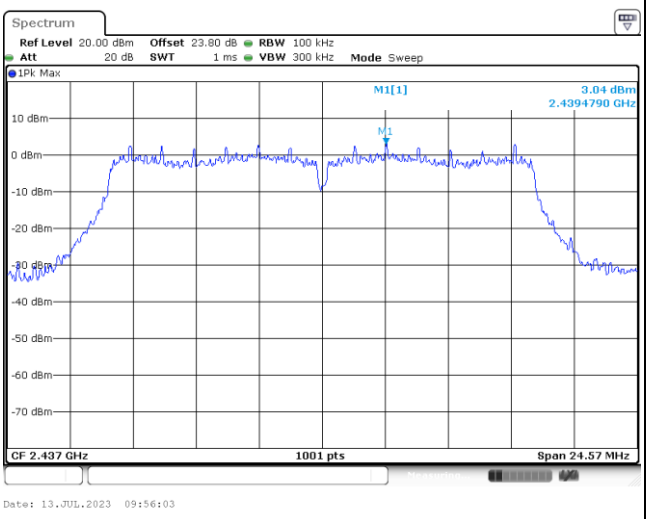
Test Mode :	802.11b	Test Channel :	11

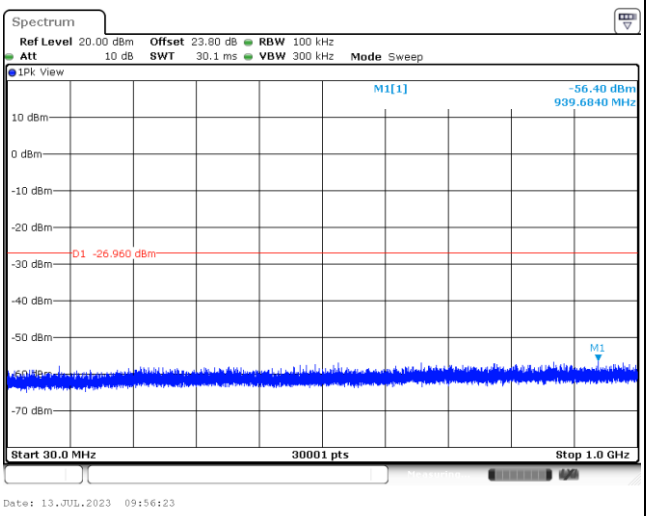
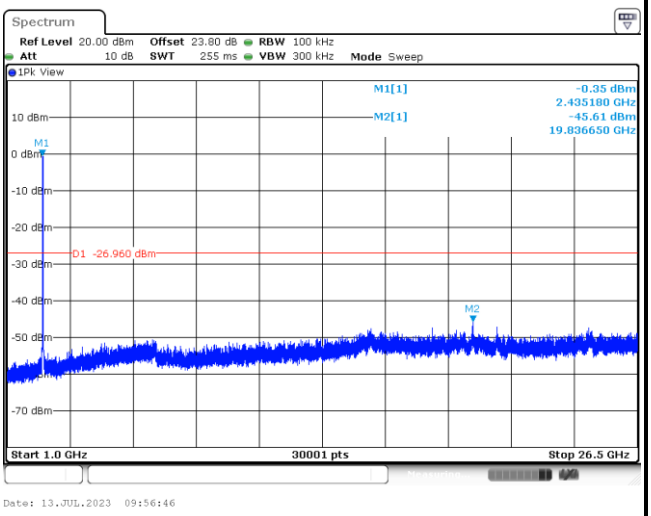
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11g	Test Channel :	01

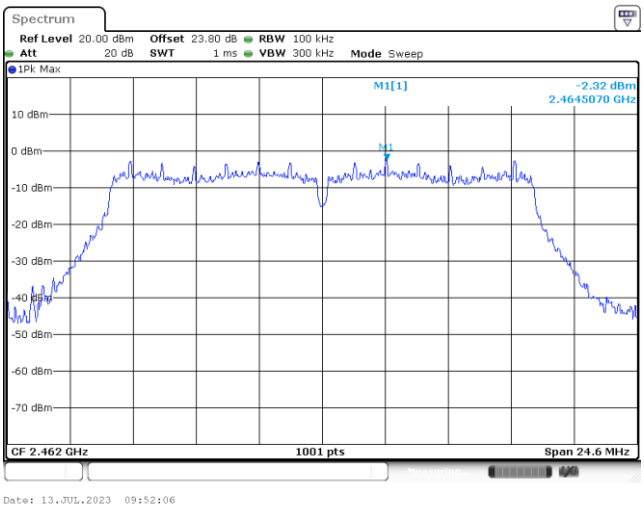
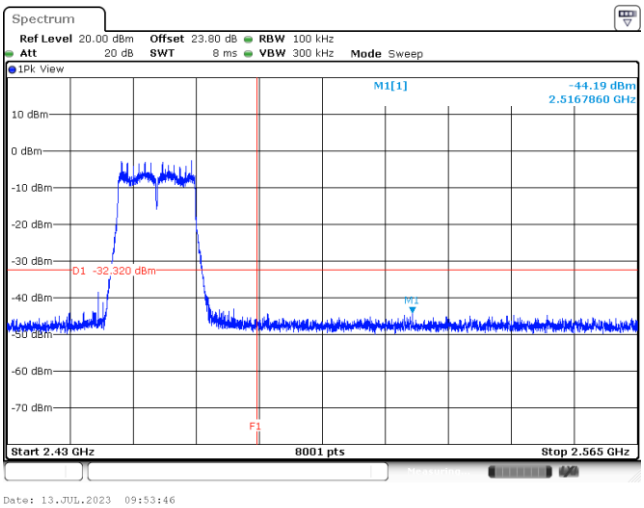
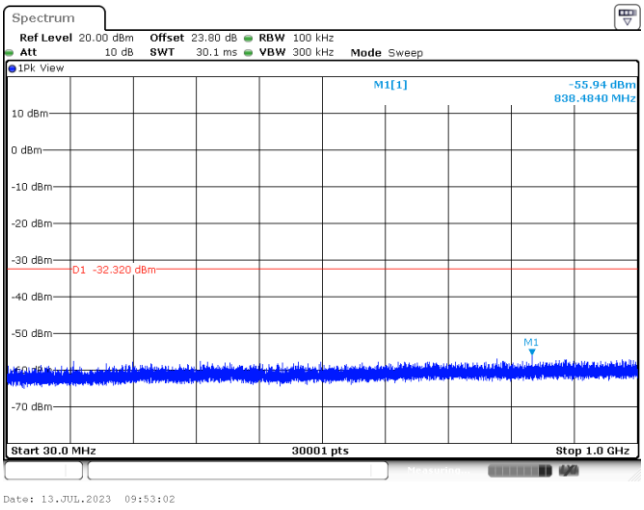
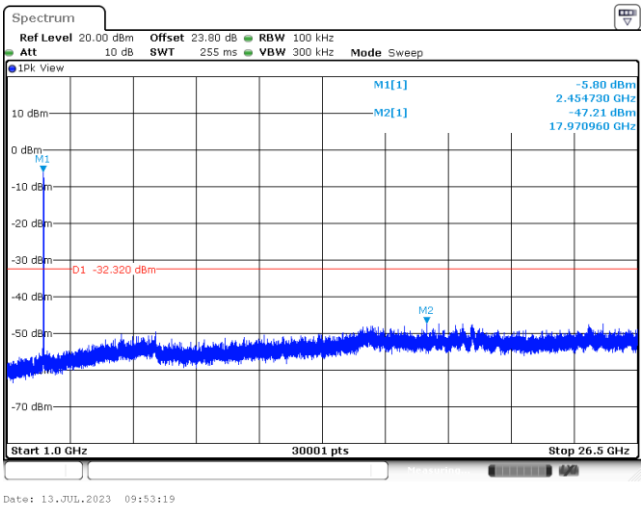
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Mid Channel Plot
	

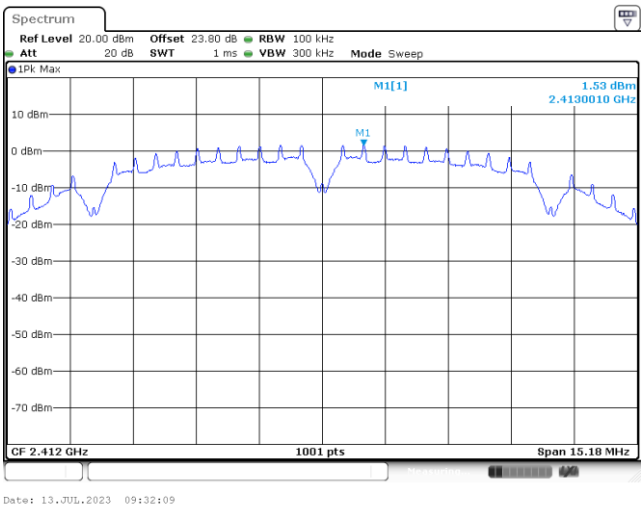
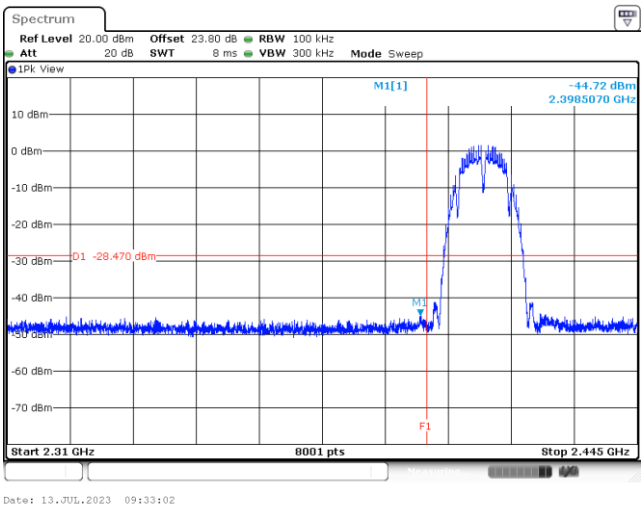
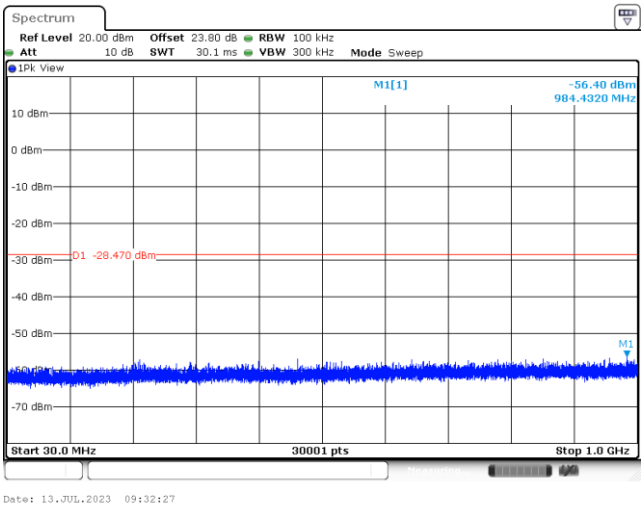
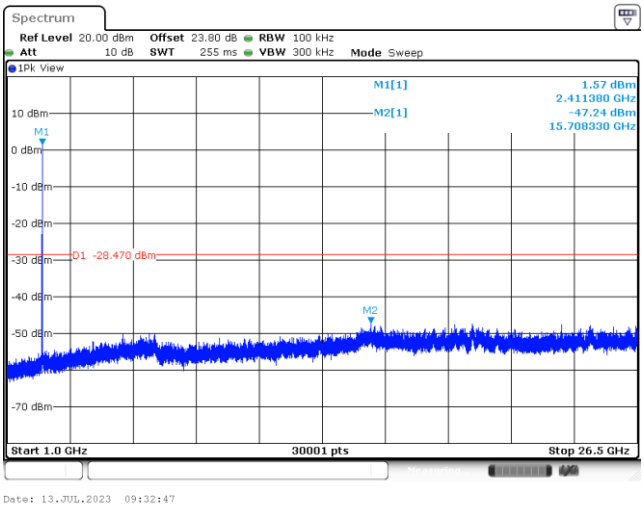
Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

Test Mode :	802.11g	Test Channel :	11

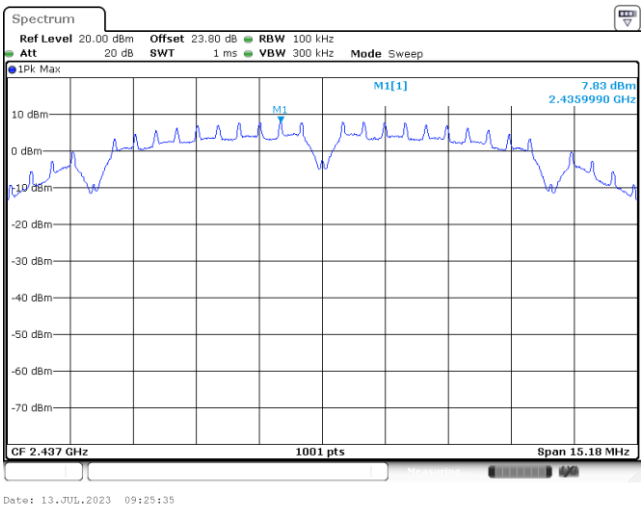
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

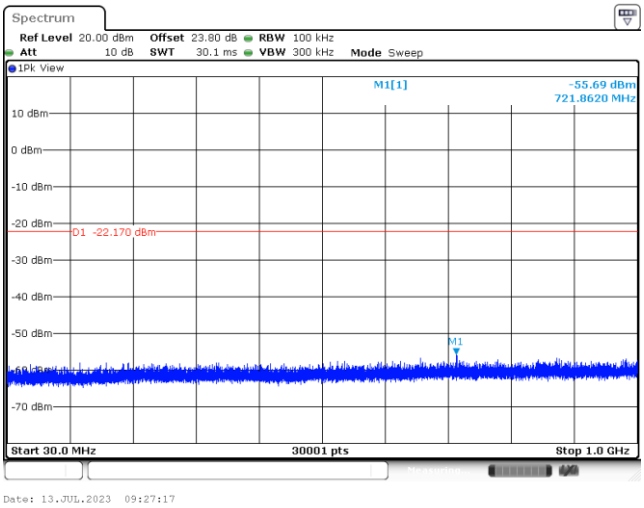
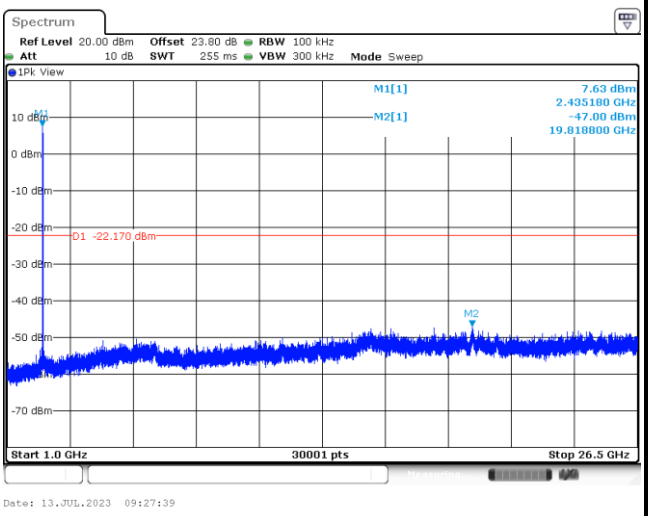
Number of TX = 1, Ant. 2 (Measured)

Test Mode :	802.11b	Test Channel :	01

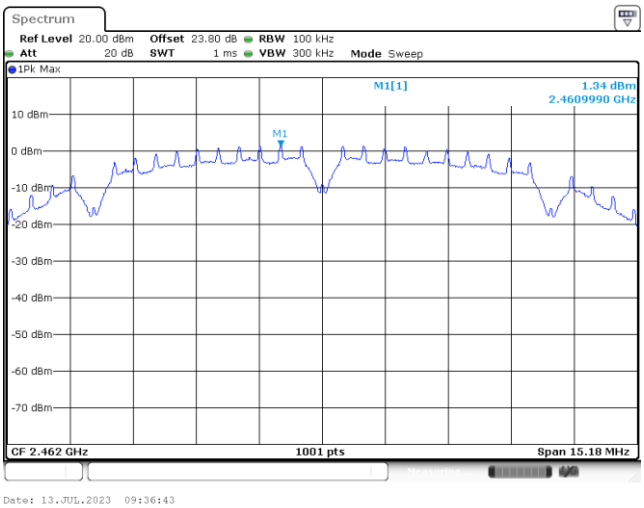
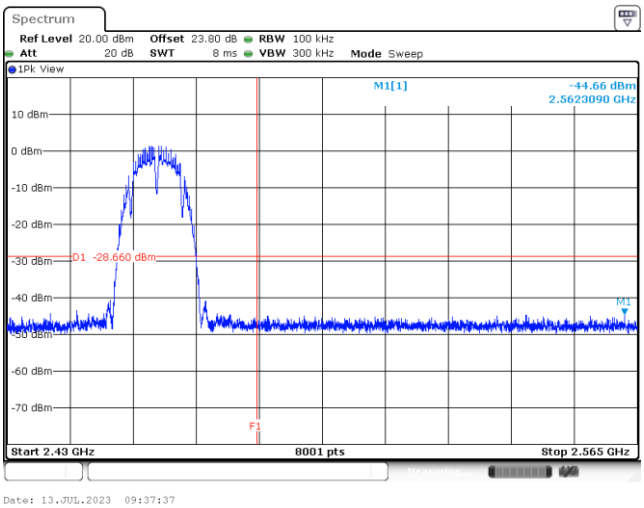
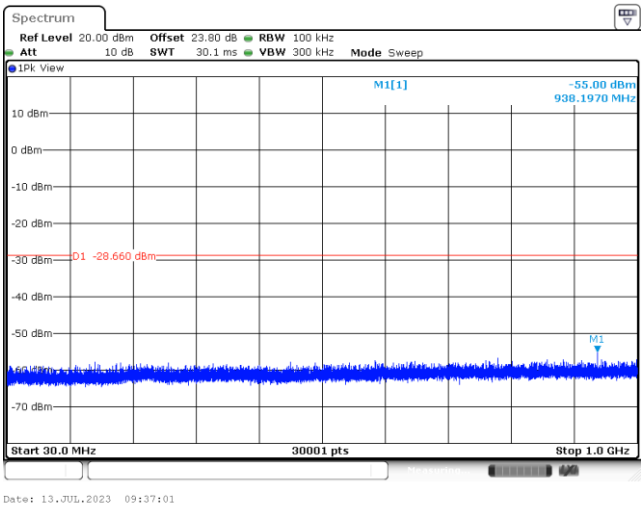
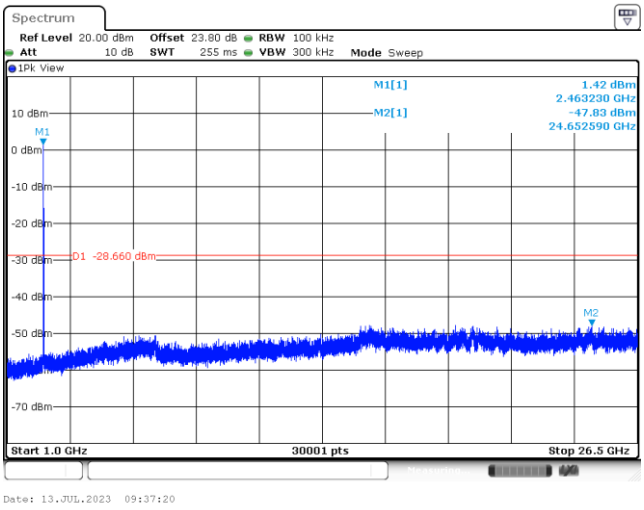
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11b	Test Channel :	06

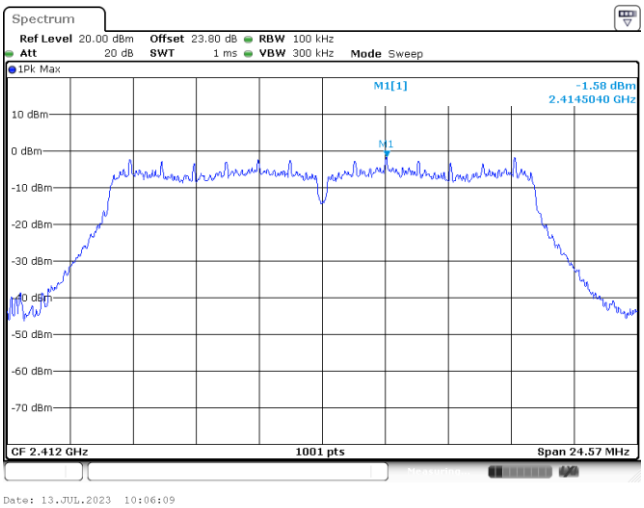
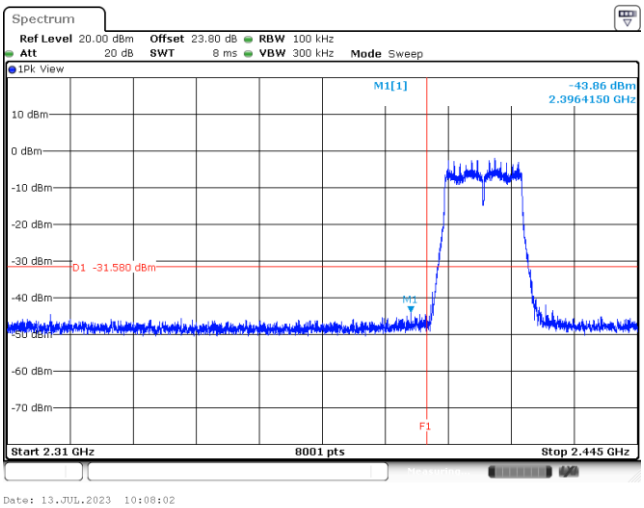
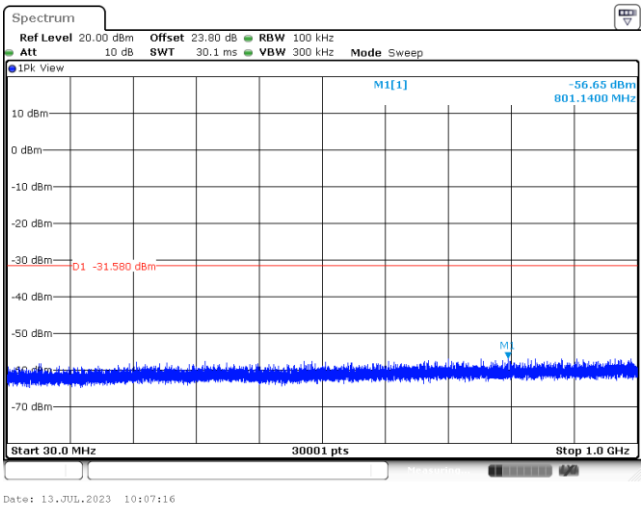
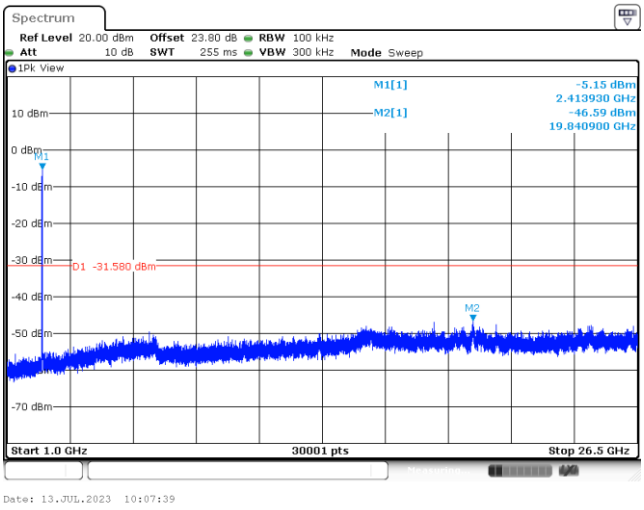
100kHz PSD reference Level	Mid Channel Plot
	

Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

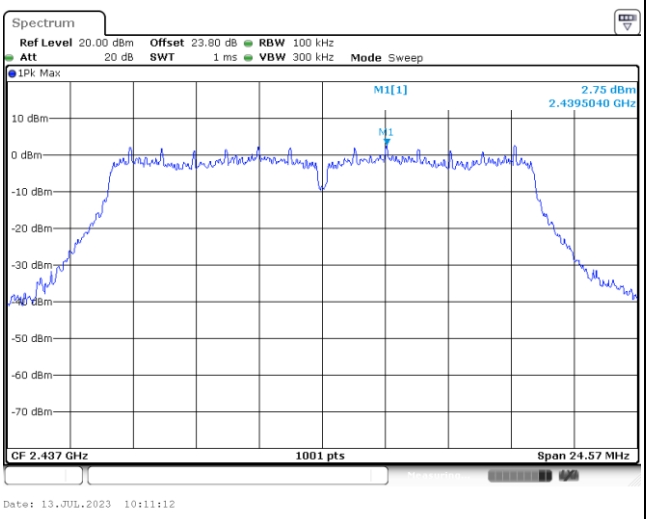
Test Mode :	802.11b	Test Channel :	11

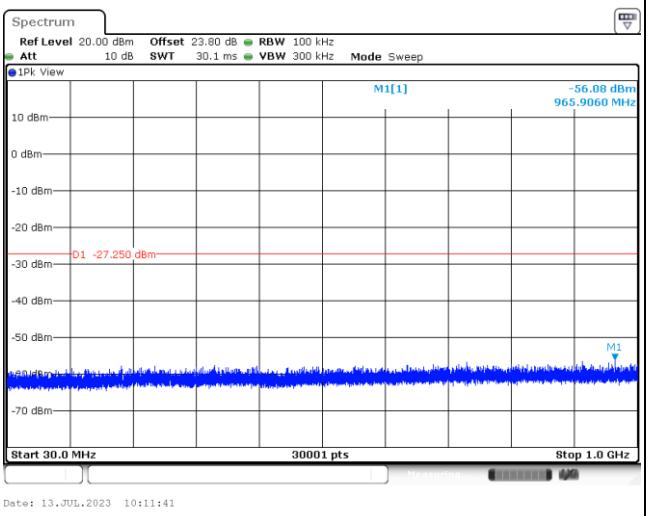
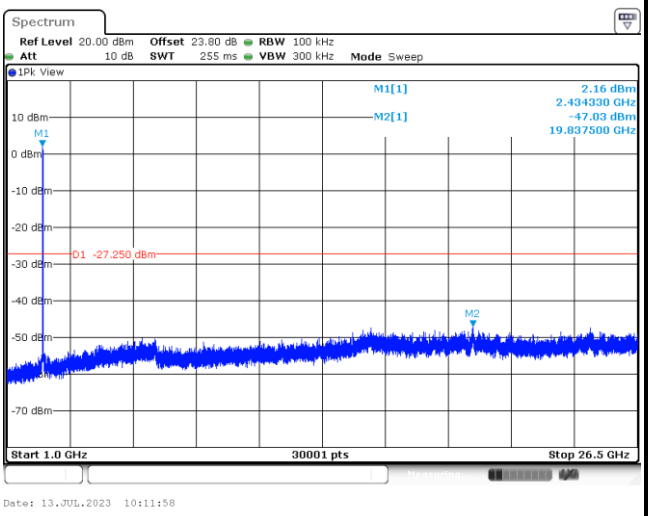
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11g	Test Channel :	01

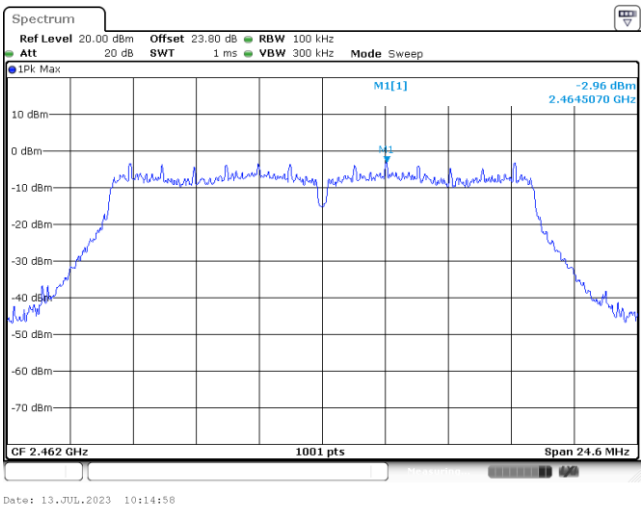
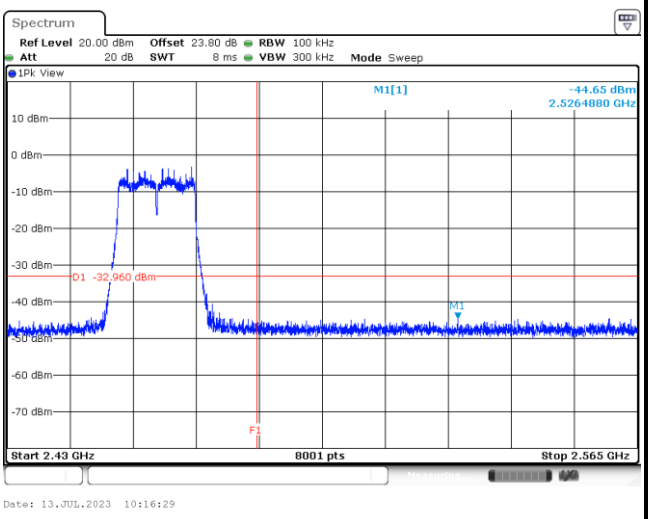
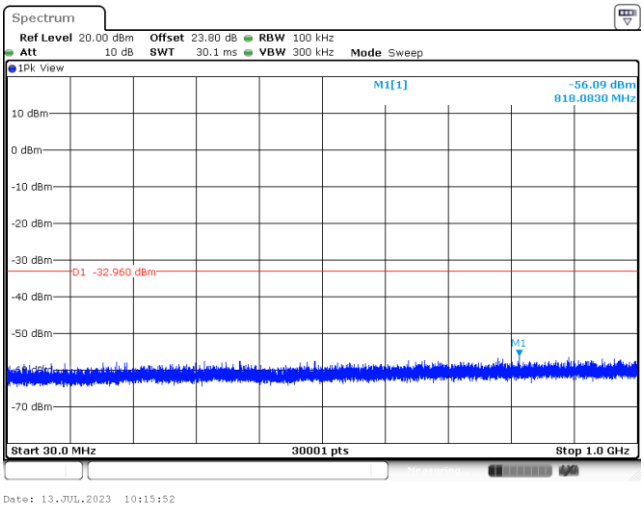
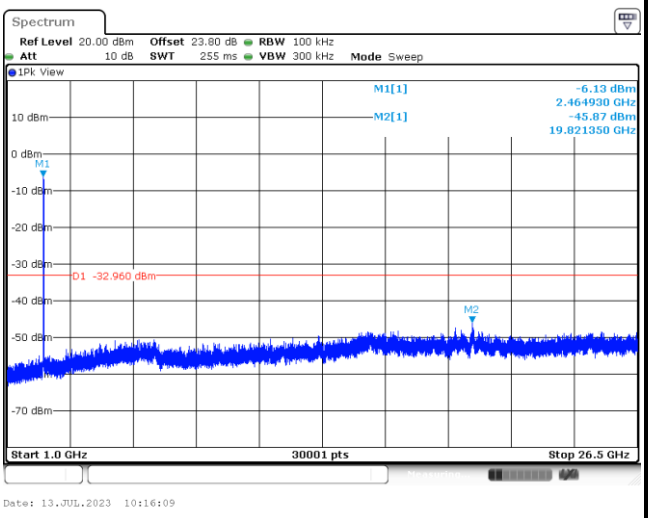
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Mid Channel Plot
	

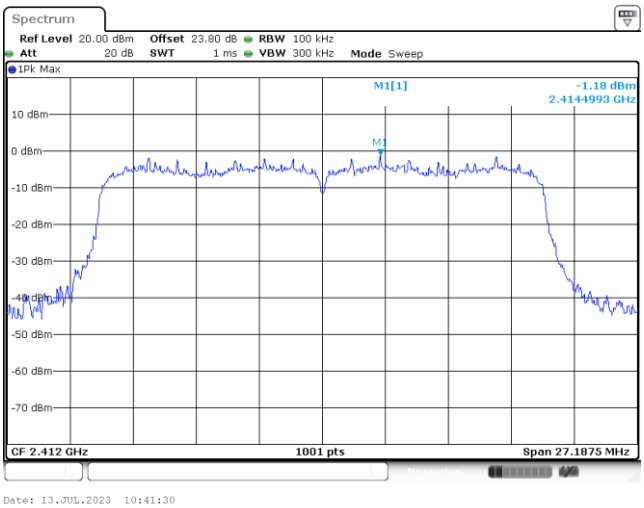
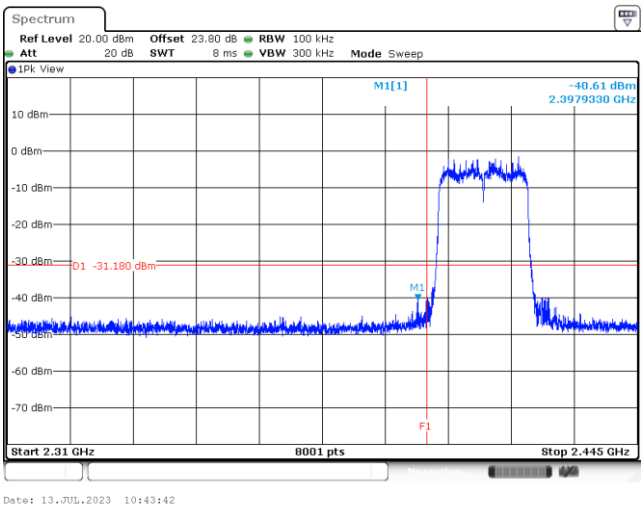
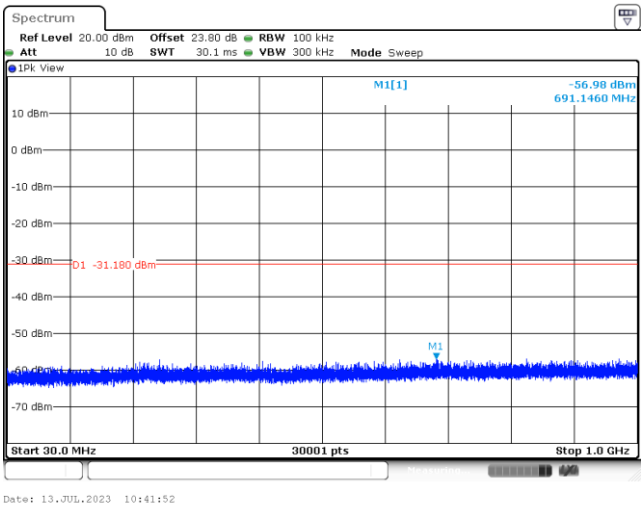
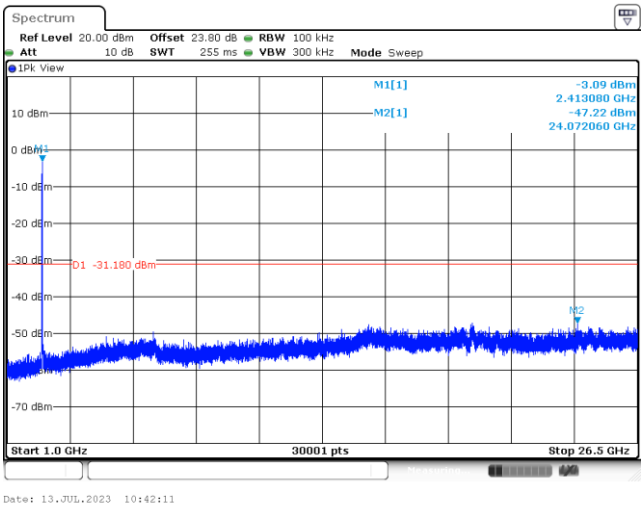
Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

Test Mode :	802.11g	Test Channel :	11

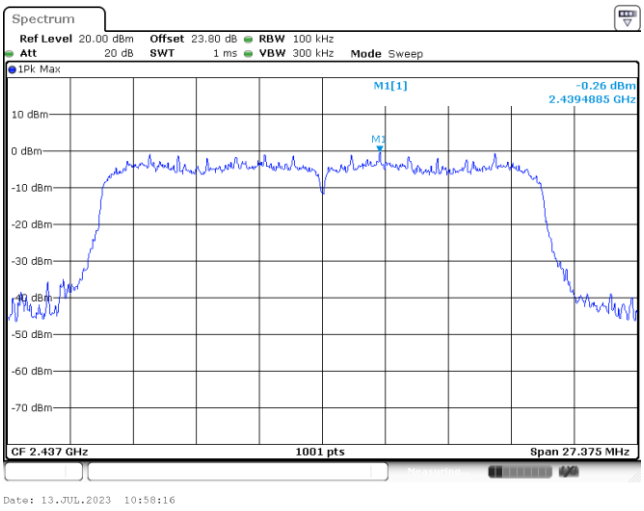
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

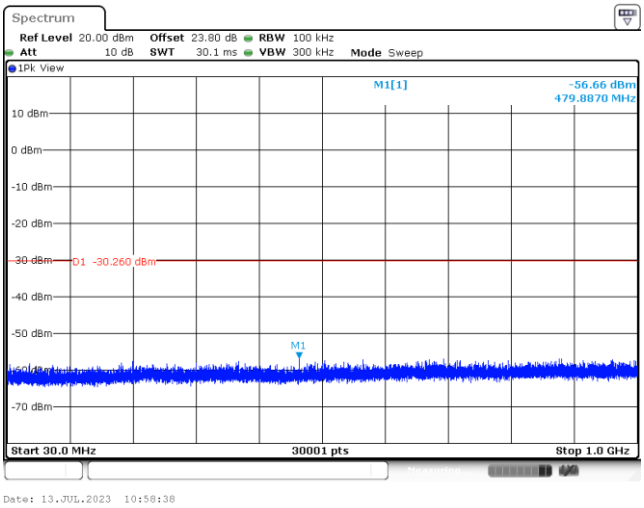
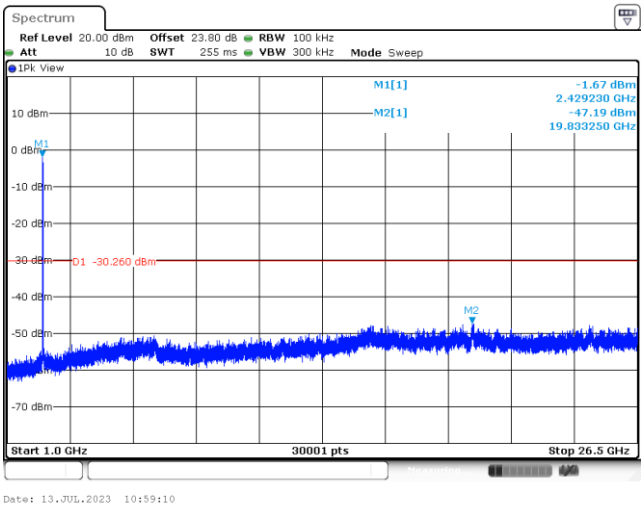
Number of TX = 2, Ant. 1 (Measured)

Test Mode :	802.11ax HE20	Test Channel :	01 Full RU

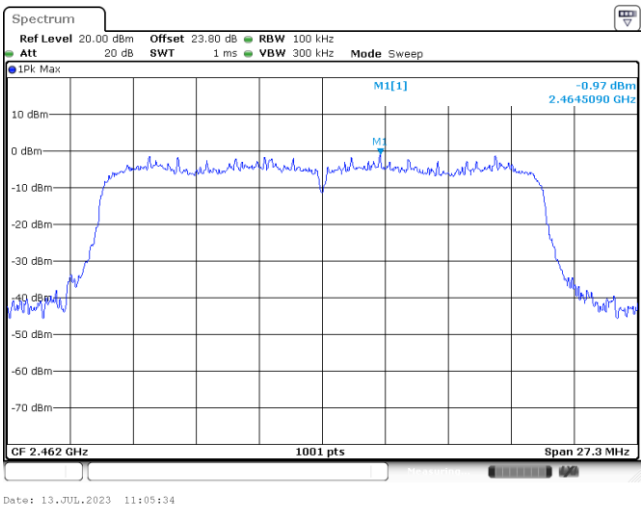
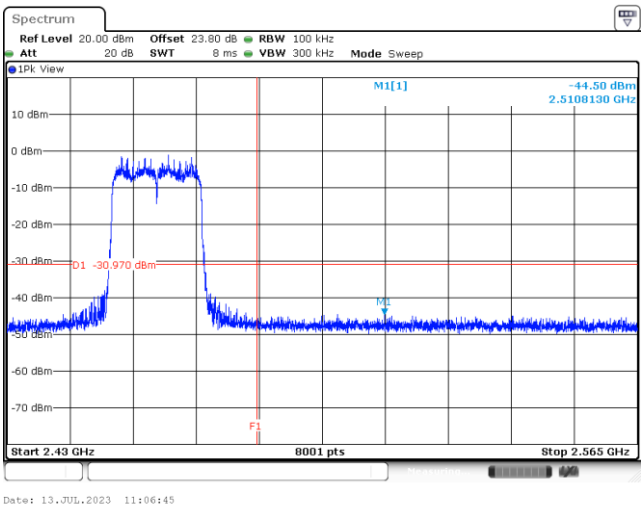
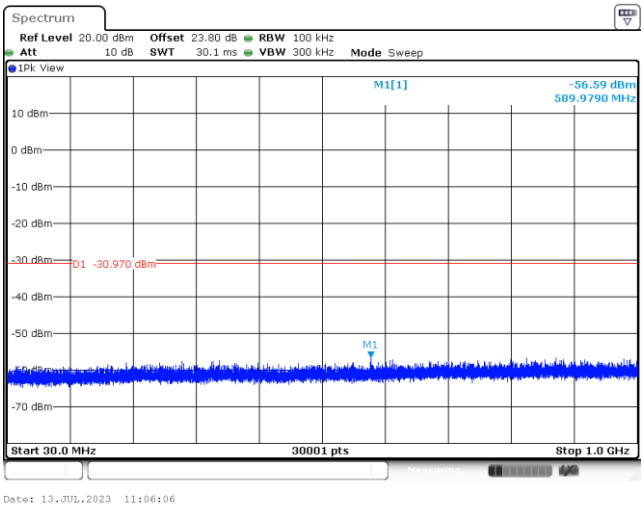
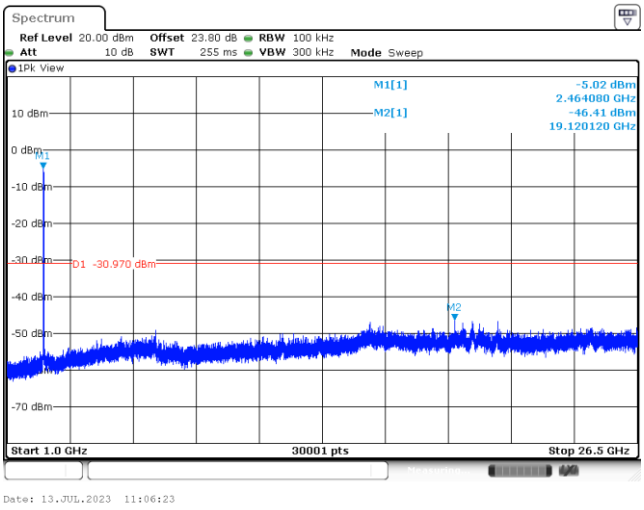
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE20	Test Channel :	06 Full RU

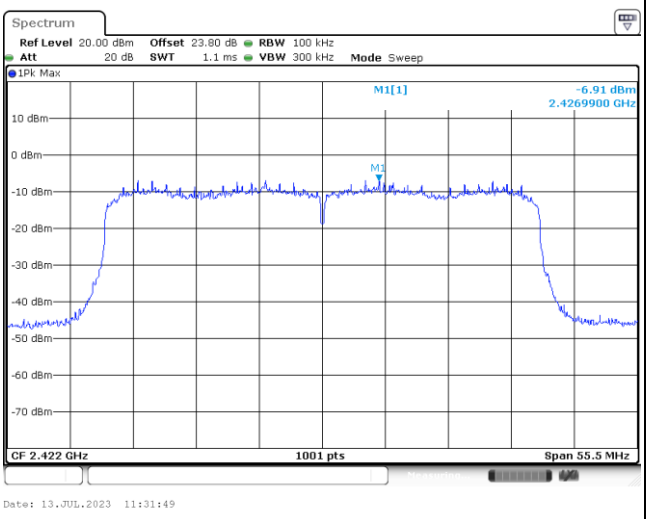
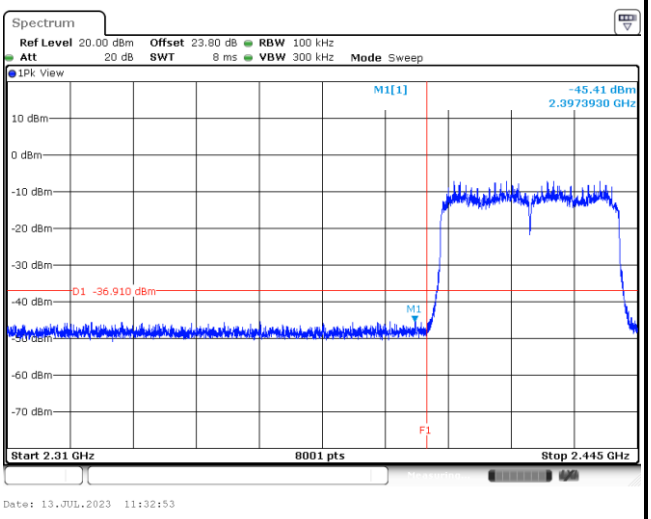
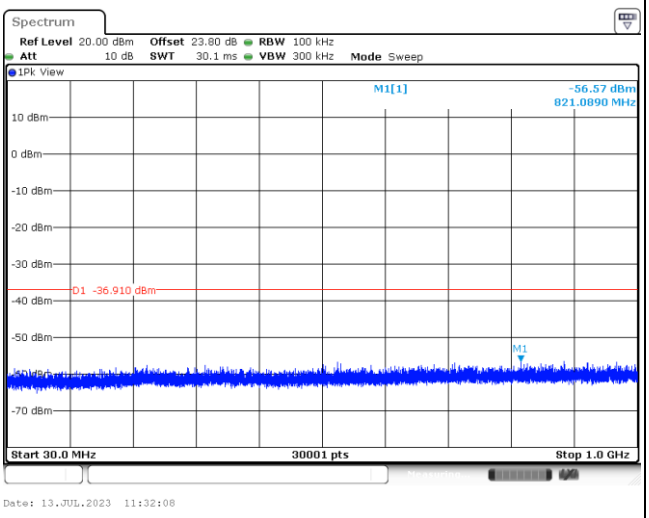
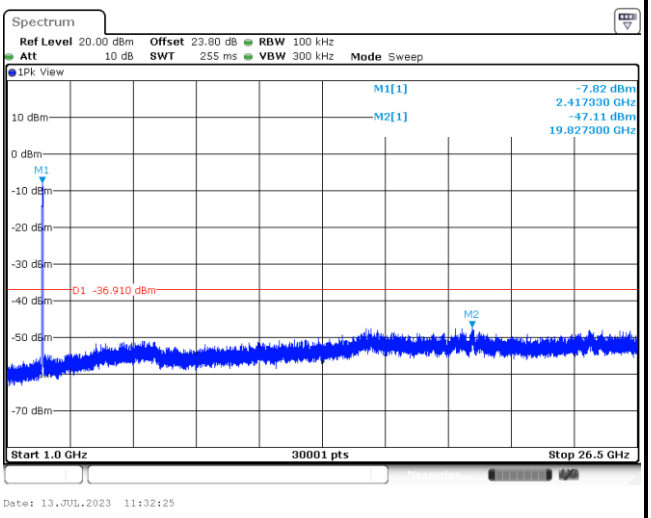
100kHz PSD reference Level	Mid Channel Plot
	

Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

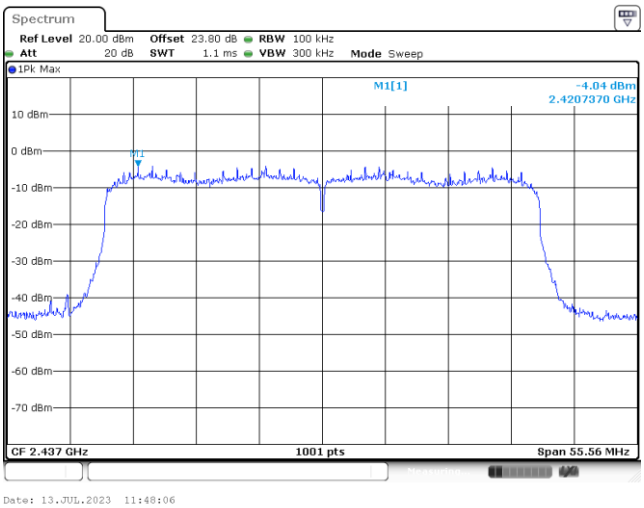
Test Mode :	802.11ax HE20	Test Channel :	11 Full RU

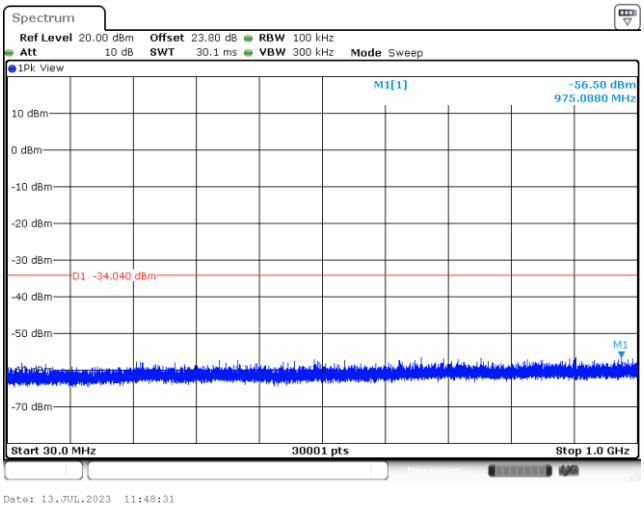
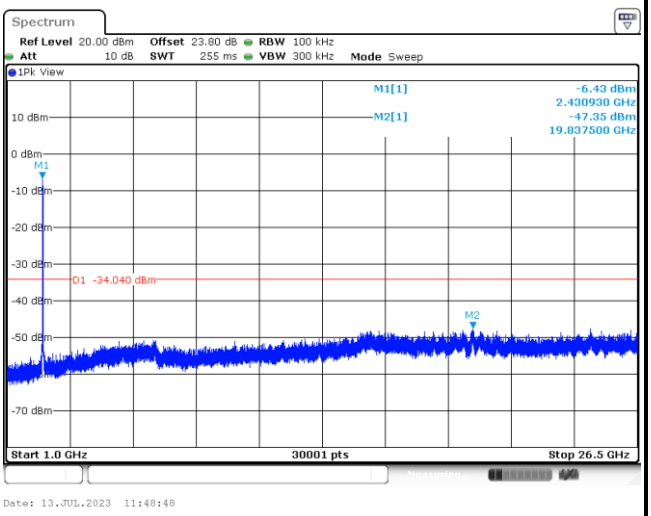
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE40	Test Channel :	03 Full RU

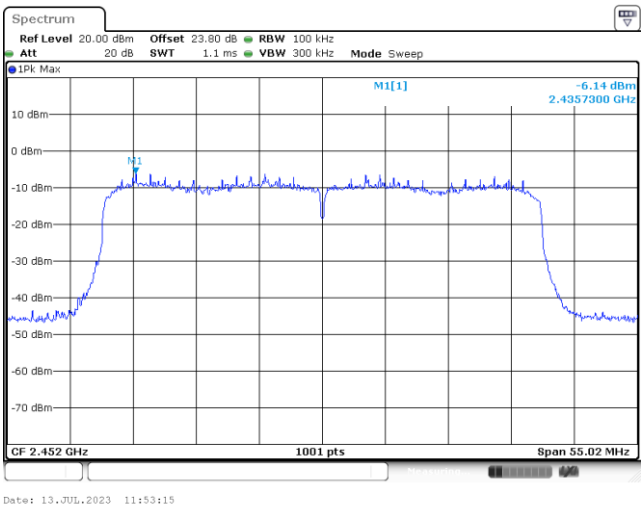
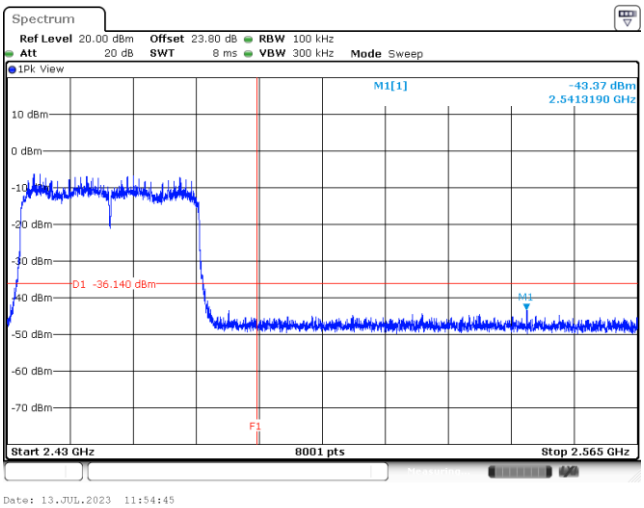
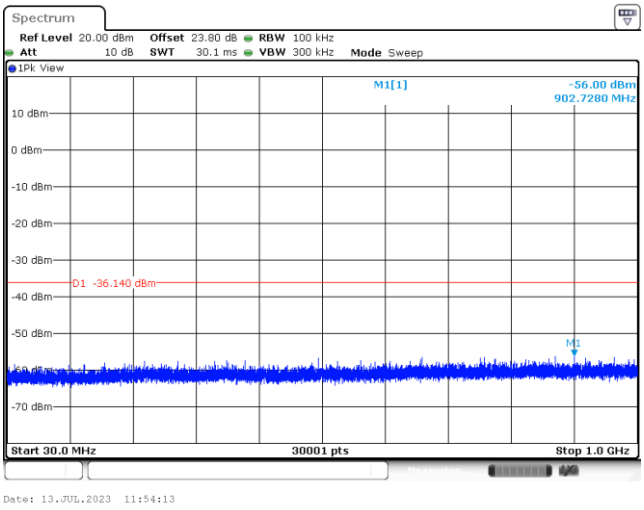
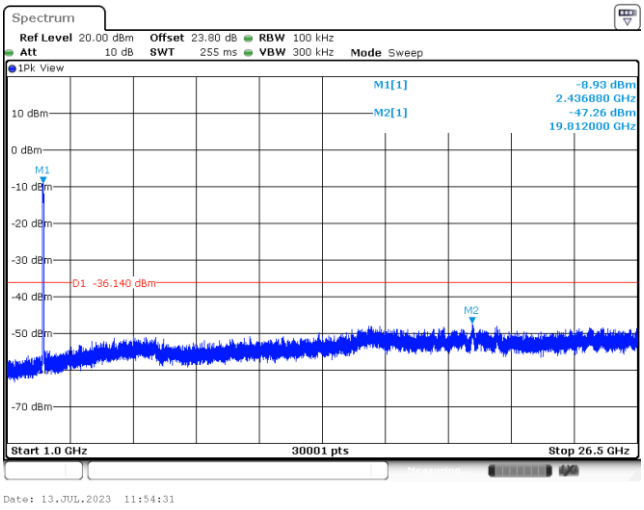
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE40	Test Channel :	06 Full RU

100kHz PSD reference Level	Mid Channel Plot
	

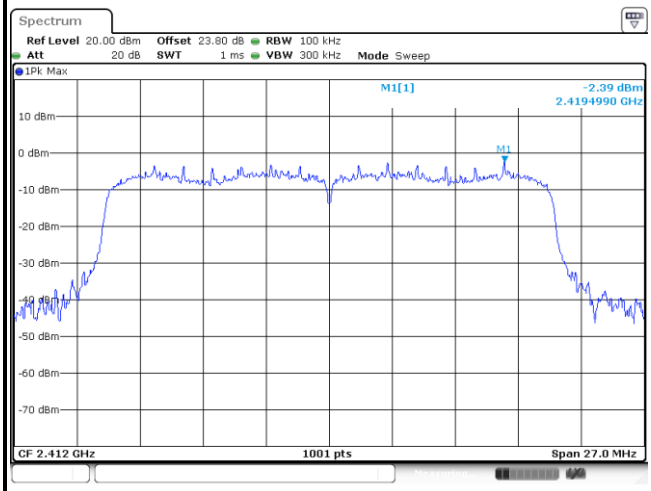
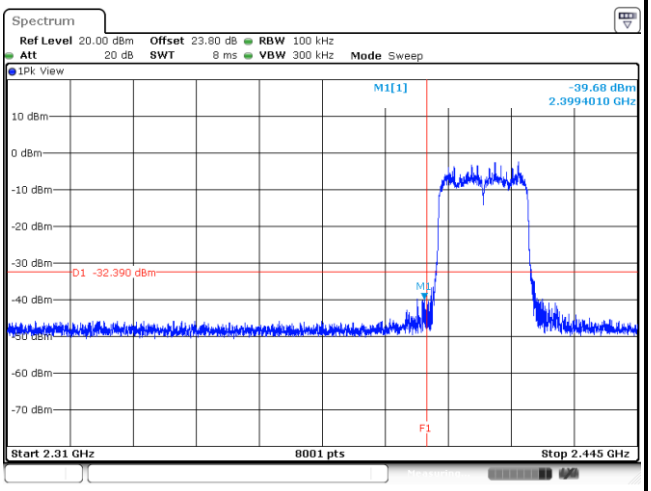
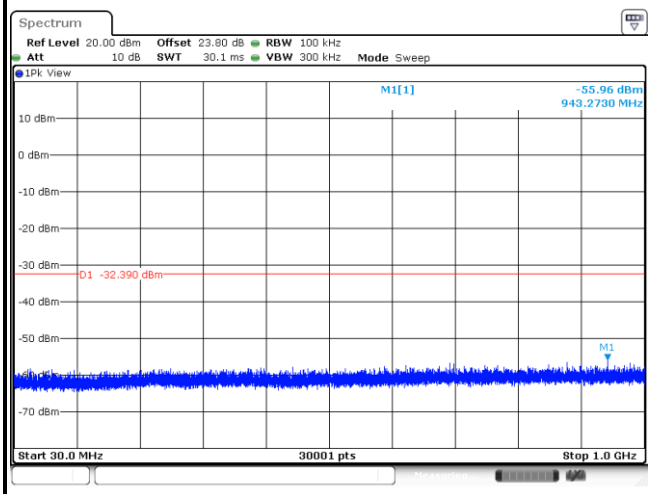
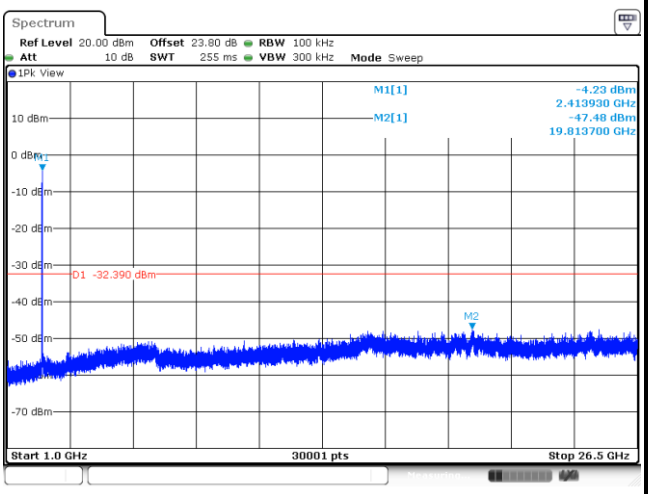
Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

Test Mode :	802.11ax HE40	Test Channel :	09 Full RU

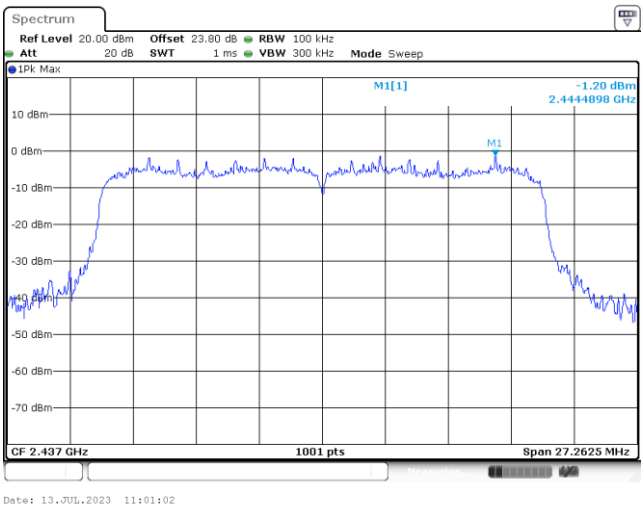
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

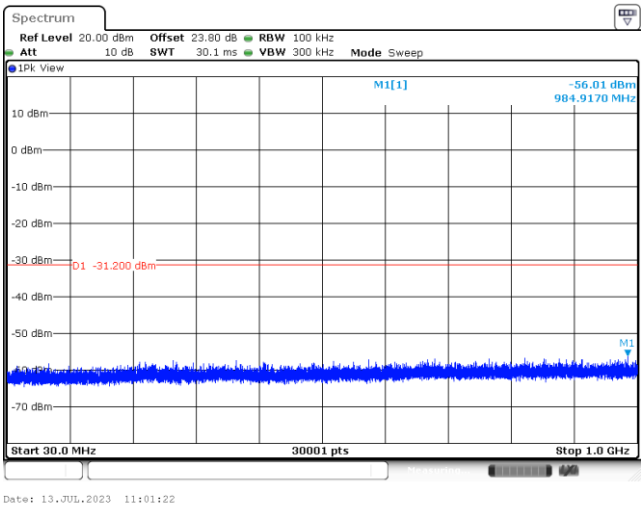
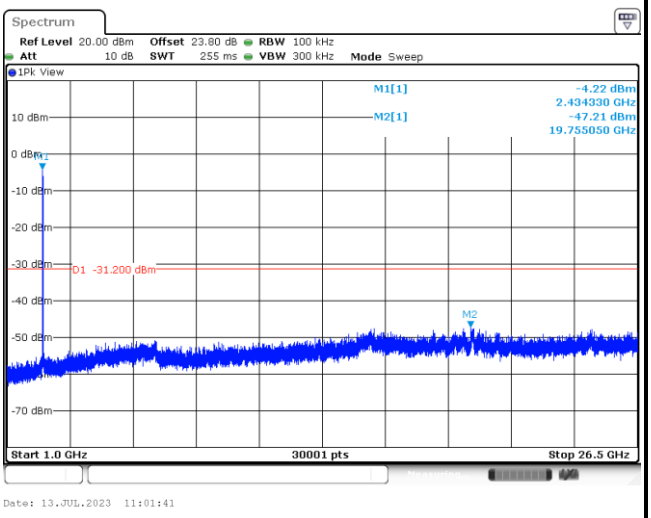
Number of TX = 2, Ant. 2 (Measured)

Test Mode :	802.11ax HE20	Test Channel :	01 Full RU

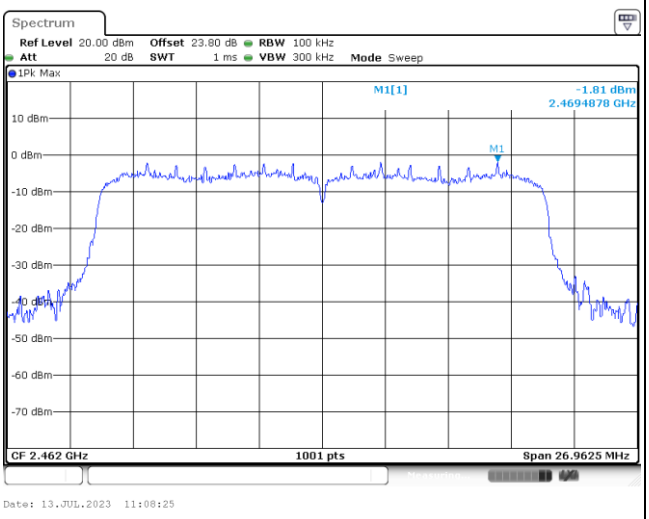
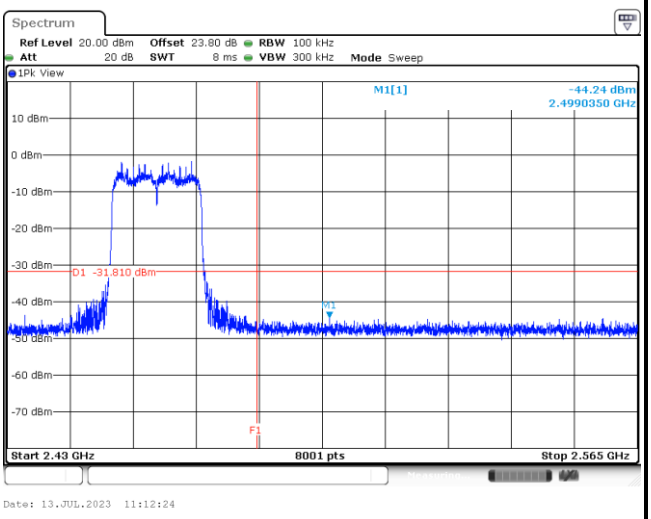
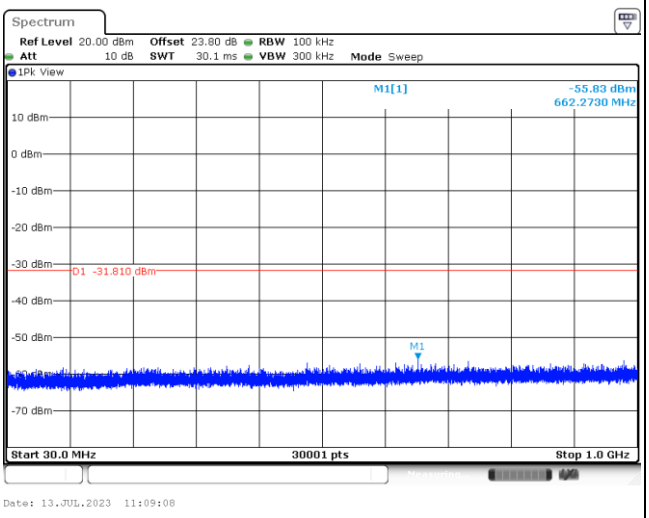
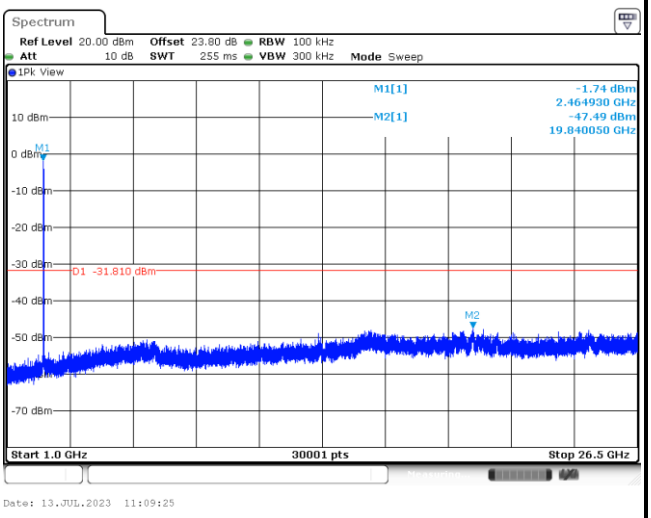
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE20	Test Channel :	06 Full RU

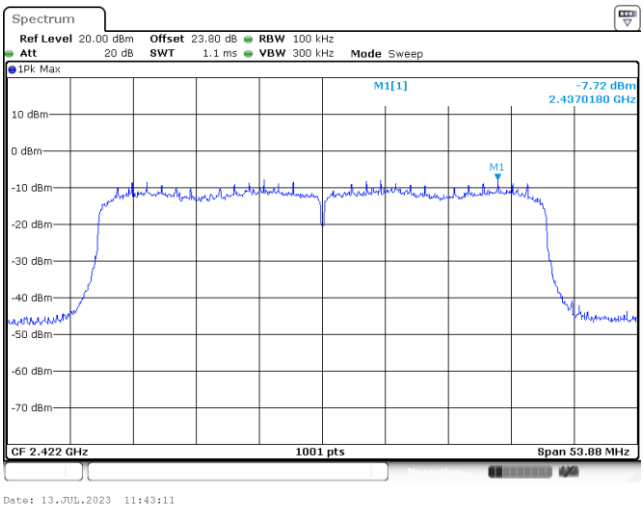
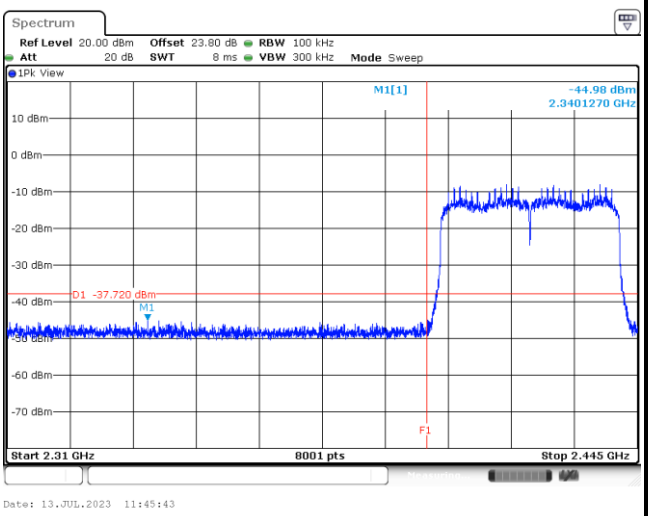
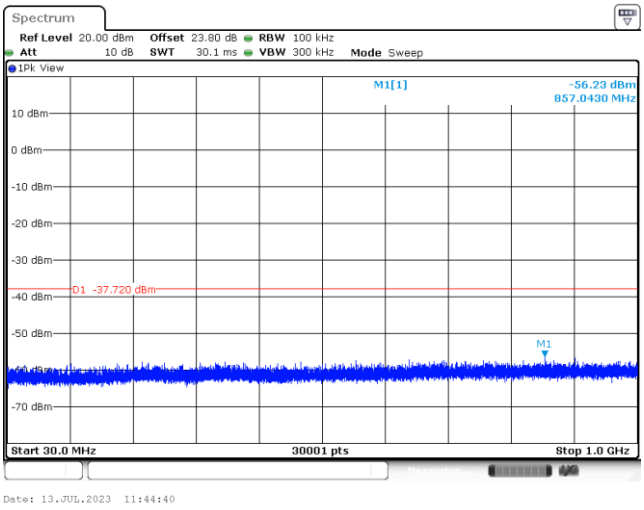
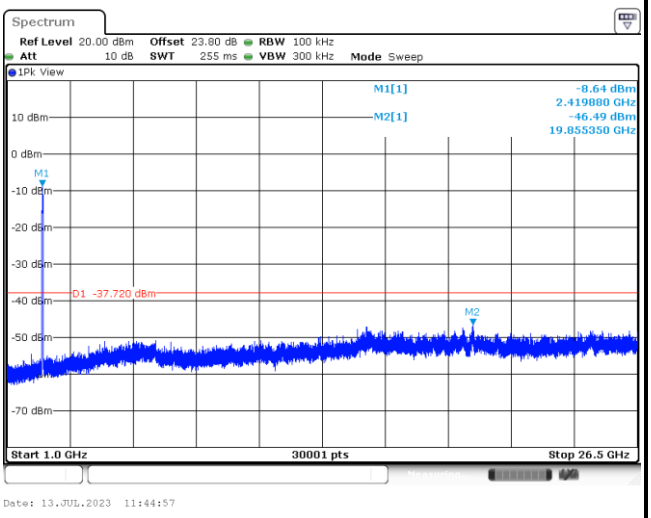
100kHz PSD reference Level	Mid Channel Plot
	

Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

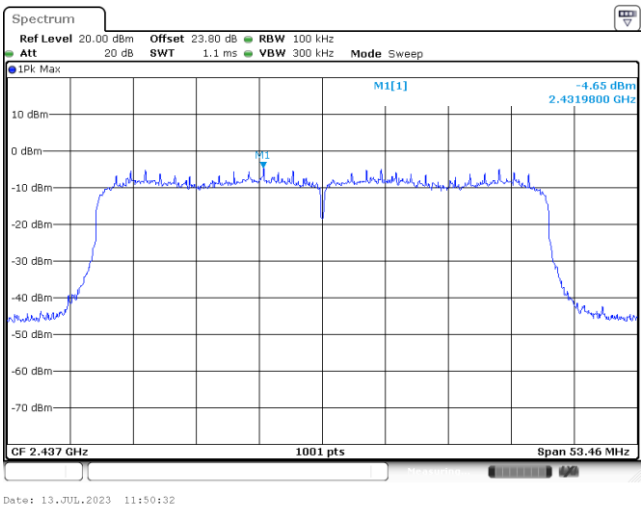
Test Mode :	802.11ax HE20	Test Channel :	11 Full RU

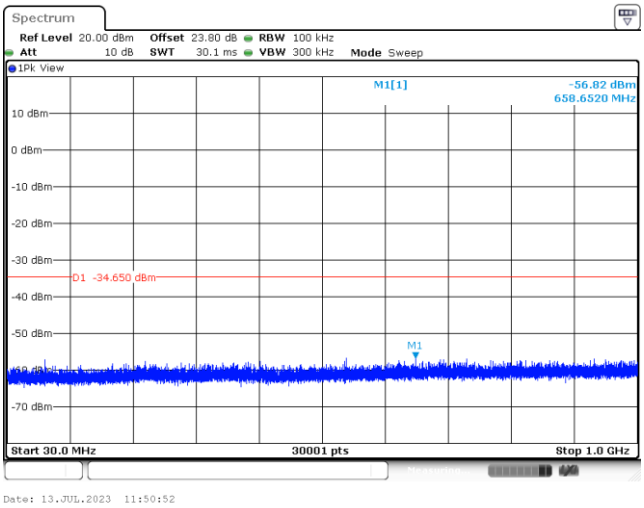
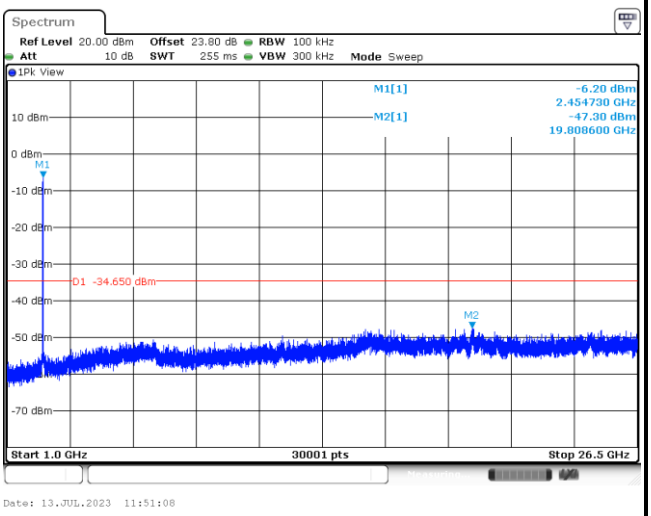
100kHz PSD reference Level	High Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE40	Test Channel :	03 Full RU

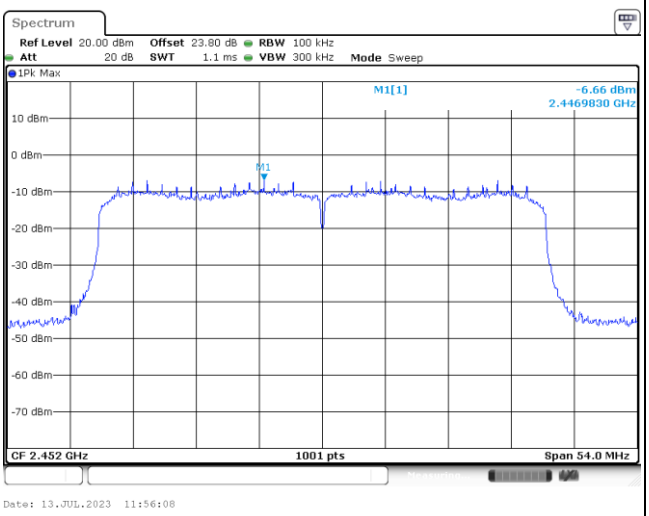
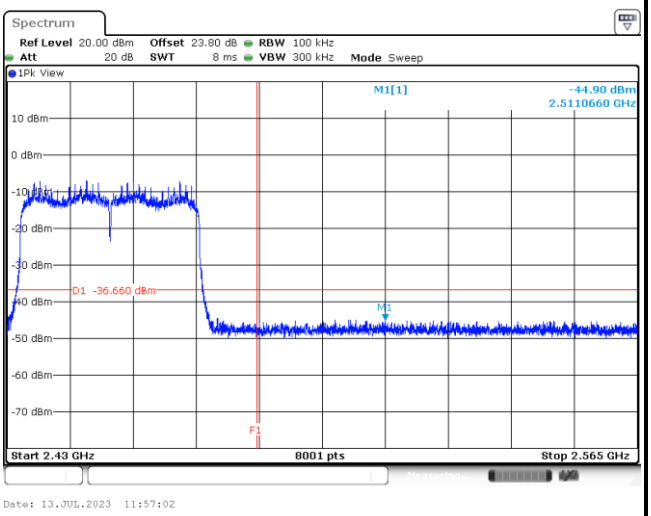
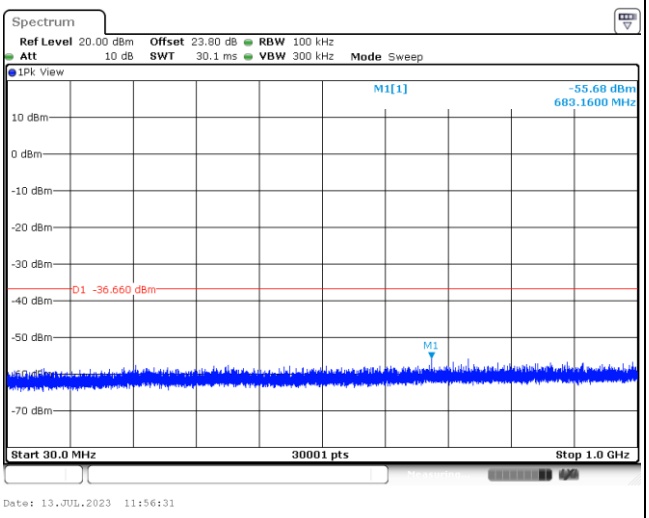
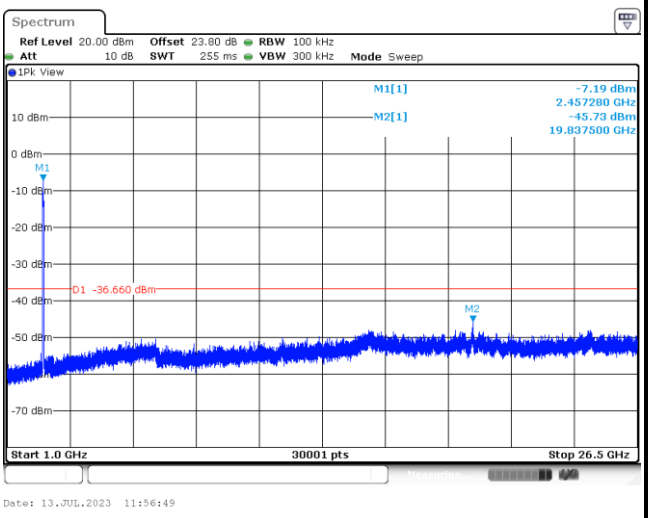
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~1GHz	**Spurious Emission 1GHz~26.5GHz**
	

Test Mode :	802.11ax HE40	Test Channel :	06 Full RU

100kHz PSD reference Level	Mid Channel Plot
	

Spurious Emission 30MHz~1GHz	Spurious Emission 1GHz~26.5GHz
	

Test Mode :	802.11ax HE40	Test Channel :	09 Full RU

100kHz PSD reference Level	High 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.

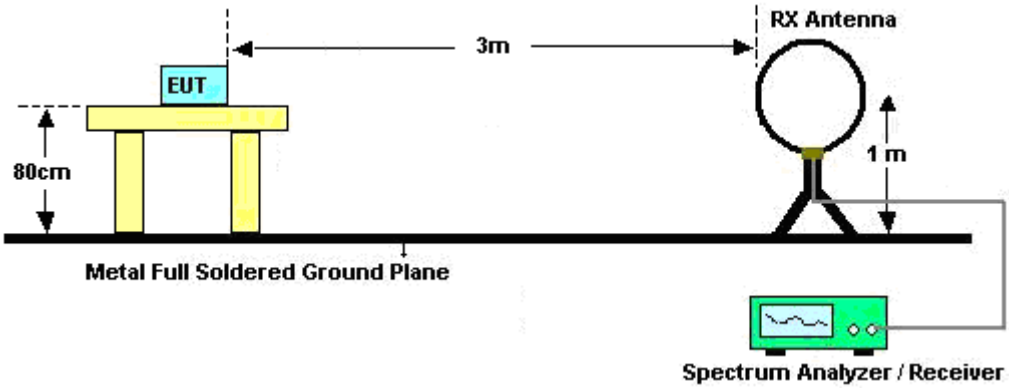
3.5.3 Test Procedures

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 “-“.

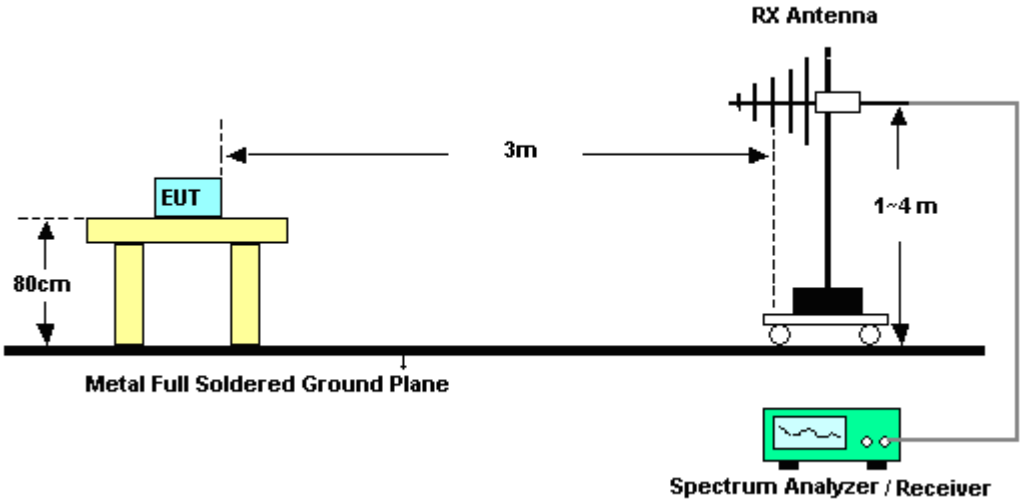
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3 MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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

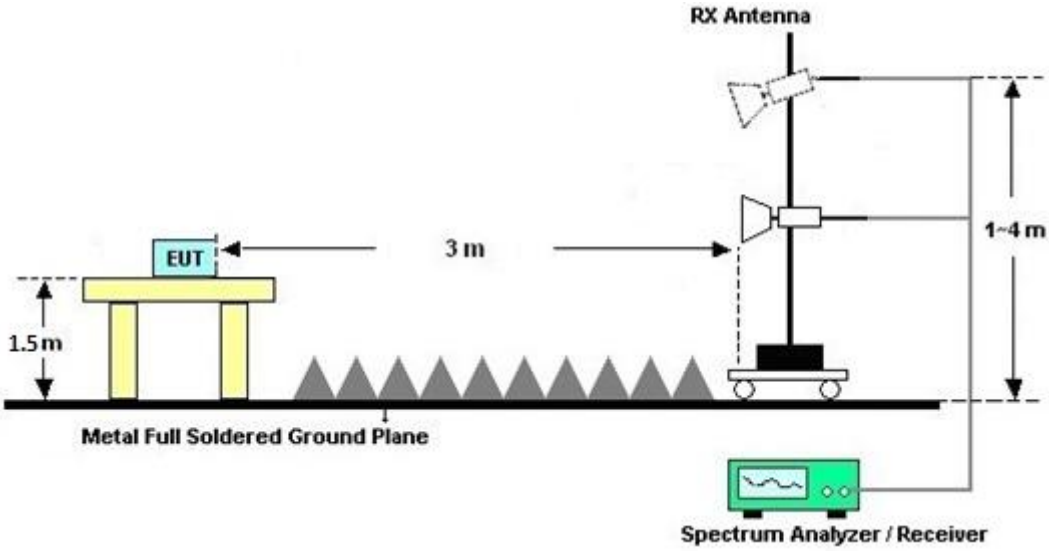
For radiated emissions below 30MHz



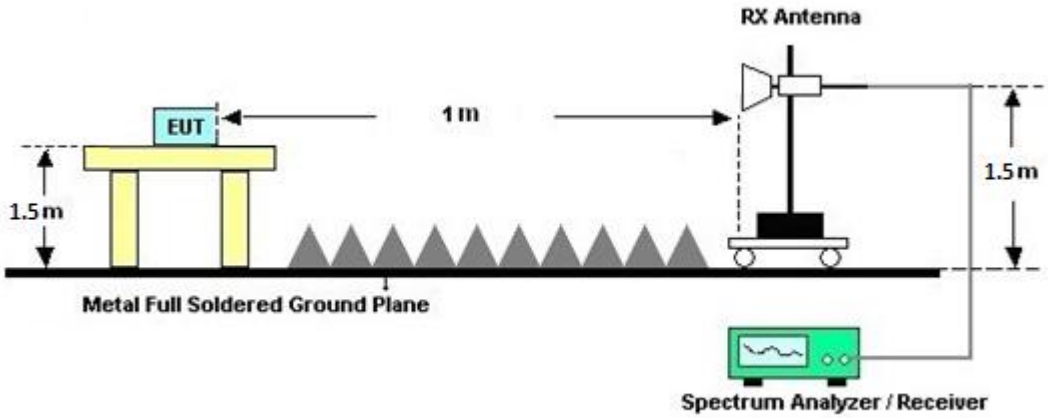
For radiated emissions from 30MHz to 1GHz



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 B and C.

3.5.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix B and C.

3.6 Antenna Requirements

3.6.1 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.

3.6.2 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
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 17, 2022	Jul. 05, 2023~ Jul. 15, 2023	Nov. 16, 2023	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12 (NO:113)	10MHz~6GHz	Dec. 13, 2022	Jul. 05, 2023~ Jul. 15, 2023	Dec. 12, 2023	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101905	10Hz - 40GHz	Aug. 03, 2022	Jul. 05, 2023~ Jul. 15, 2023	Aug. 02, 2023	Conducted (TH05-HY)
EMI Test Receiver	Keysight	N9038A	MY59053012	N/A	Nov. 18, 2022	Jul. 11, 2023~ Aug. 01, 2023	Nov. 17, 2023	Radiation (03CH20-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 20, 2022	Jul. 11, 2023~ Aug. 01, 2023	Sep. 19, 2023	Radiation (03CH20-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 07, 2022	Jul. 11, 2023~ Aug. 01, 2023	Dec. 06, 2023	Radiation (03CH20-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Jul. 11, 2023~ Aug. 01, 2023	N/A	Radiation (03CH20-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jul. 11, 2023~ Aug. 01, 2023	N/A	Radiation (03CH20-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jul. 11, 2023~ Aug. 01, 2023	N/A	Radiation (03CH20-HY)
Signal Analyzer	Keysight	N9010B	MY60240520	N/A	Dec. 22, 2022	Jul. 11, 2023~ Aug. 01, 2023	Dec. 21, 2023	Radiation (03CH20-HY)
Bilog Antenna	TESEQ	CBL 6111D&00802N 1D01N-06	55606 & 08	30MHz~1GHz	Oct. 22, 2022	Jul. 11, 2023~ Aug. 01, 2023	Oct. 21, 2023	Radiation (03CH20-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	02360	1GHz-18GHz	Nov. 04, 2022	Jul. 11, 2023~ Aug. 01, 2023	Nov. 03, 2023	Radiation (03CH20-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	00994	18GHz-40GHz	Nov. 04, 2022	Jul. 11, 2023~ Aug. 01, 2023	Nov. 03, 2023	Radiation (03CH20-HY)
Preamplifier	COM-POWER	PAM-103	18020201	1MHz-1000MHz	Jan. 02, 2023	Jul. 11, 2023~ Aug. 01, 2023	Jan. 01, 2024	Radiation (03CH20-HY)
Amplifier	EMCI	EMC118A45SE	980792	N/A	Nov. 14, 2022	Jul. 11, 2023~ Aug. 01, 2023	Nov. 13, 2023	Radiation (03CH20-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519229/2,804 015/2,804027 /2	N/A	Jan. 18, 2023	Jul. 11, 2023~ Aug. 01, 2023	Jan. 17, 2024	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303B	TP200728	N/A	Mar. 28, 2023	Jul. 11, 2023~ Aug. 01, 2023	Mar. 27, 2024	Radiation (03CH20-HY)
Software	Audix	N/A	RK-002156	N/A	N/A	Jul. 11, 2023~ Aug. 01, 2023	N/A	Radiation (03CH20-HY)

5 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.5 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.4 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Ray Wang	Temperature:	21~25	°C
Test Date:	2023/7/5~2023/7/15	Relative Humidity:	51~54	%

Report Number : FR0D2423-05C

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band Single Antenna										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	1	1	2412	13.39	13.44	10.12	10.12	0.50	Pass
11b	1Mbps	1	6	2437	13.34	13.39	10.12	10.12	0.50	Pass
11b	1Mbps	1	11	2462	13.49	13.44	10.12	10.12	0.50	Pass
11g	6Mbps	1	1	2412	16.78	16.78	16.38	16.38	0.50	Pass
11g	6Mbps	1	6	2437	16.83	16.73	16.38	16.38	0.50	Pass
11g	6Mbps	1	11	2462	16.73	16.73	16.40	16.40	0.50	Pass

Report Number : FR0D2423-05C

TEST RESULTS DATA
Average Output Power

2.4GHz Band Single Antenna																
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
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	12.40	10.90		30.00	30.00	5.10	5.10	17.50	16.00	36.00	36.00	Pass
11b	1Mbps	1	6	2437	16.10	16.80		30.00	30.00	5.10	5.10	21.20	21.90	36.00	36.00	Pass
11b	1Mbps	1	11	2462	11.60	10.70		30.00	30.00	5.10	5.10	16.70	15.80	36.00	36.00	Pass
11g	6Mbps	1	1	2412	10.80	9.50		30.00	30.00	5.10	5.10	15.90	14.60	36.00	36.00	Pass
11g	6Mbps	1	6	2437	14.40	14.10		30.00	30.00	5.10	5.10	19.50	19.20	36.00	36.00	Pass
11g	6Mbps	1	11	2462	8.90	8.50		30.00	30.00	5.10	5.10	14.00	13.60	36.00	36.00	Pass

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
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
HT20	MCS0	2	1	2412	9.80	8.30	12.12	30.00		5.10		17.22		36.00		Pass
HT20	MCS0	2	6	2437	10.70	9.50	13.15	30.00		5.10		18.25		36.00		Pass
HT20	MCS0	2	11	2462	10.10	9.20	12.68	30.00		5.10		17.78		36.00		Pass
HT40	MCS0	2	3	2422	6.80	5.60	9.25	30.00		5.10		14.35		36.00		Pass
HT40	MCS0	2	6	2437	9.60	8.30	12.01	30.00		5.10		17.11		36.00		Pass
HT40	MCS0	2	9	2452	7.30	6.60	9.97	30.00		5.10		15.07		36.00		Pass
VHT20	MCS0	2	1	2412	9.80	8.30	12.12	30.00		5.10		17.22		36.00		Pass
VHT20	MCS0	2	6	2437	10.70	9.50	13.15	30.00		5.10		18.25		36.00		Pass
VHT20	MCS0	2	11	2462	10.10	9.20	12.68	30.00		5.10		17.78		36.00		Pass
VHT40	MCS0	2	3	2422	6.80	5.60	9.25	30.00		5.10		14.35		36.00		Pass
VHT40	MCS0	2	6	2437	9.60	8.30	12.01	30.00		5.10		17.11		36.00		Pass
VHT40	MCS0	2	9	2452	7.30	6.60	9.97	30.00		5.10		15.07		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR0D2423-05C

TEST RESULTS DATA
Average Power Spectral Density

2.4GHz Band													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average PSD (dBm/3kHz)			DG (dBi)		Average PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-5.63	-7.07	-	5.10	5.10	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-1.89	-0.77		5.10	5.10	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-6.38	-7.23		5.10	5.10	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-14.92	-15.14		5.10	5.10	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-11.00	-12.37		5.10	5.10	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-17.24	-17.15		5.10	5.10	8.00	8.00	Pass

Measured power density (dBm) has offset with cable loss.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
						Ant1	Ant2	Ant1	Ant2		
HE20	MCS0	2	1	2412	Full	18.78	18.78	18.13	18.00	0.50	Pass
HE20	MCS0	2	6	2437	Full	18.78	18.78	18.25	18.18	0.50	Pass
HE20	MCS0	2	11	2462	Full	18.78	18.78	18.20	17.98	0.50	Pass
HE40	MCS0	2	3	2422	Full	37.76	37.76	37.00	35.92	0.50	Pass
HE40	MCS0	2	6	2437	Full	37.86	37.76	37.04	35.64	0.50	Pass
HE40	MCS0	2	9	2452	Full	37.76	37.76	36.68	36.00	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																		
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
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
HE20	MCS0	2	1	2412	Full	10.00	8.80	12.45	30.00		5.10		17.55		36.00		Pass
HE20	MCS0	2	6	2437	Full	10.90	9.70	13.35	30.00		5.10		18.45		36.00		Pass
HE20	MCS0	2	11	2462	Full	10.30	9.40	12.88	30.00		5.10		17.98		36.00		Pass
HE40	MCS0	2	3	2422	Full	7.20	6.00	9.65	30.00		5.10		14.75		36.00		Pass
HE40	MCS0	2	6	2437	Full	9.80	8.50	12.21	30.00		5.10		17.31		36.00		Pass
HE40	MCS0	2	9	2452	Full	7.60	6.80	10.23	30.00		5.10		15.33		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO													
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config.	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
						Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
HE20	MCS0	2	1	2412	Full	-16.92	-16.95	-13.91	8.11		5.89		Pass
HE20	MCS0	2	6	2437	Full	-15.12	-16.71	-12.11	8.11		5.89		Pass
HE20	MCS0	2	11	2462	Full	-15.62	-16.72	-12.61	8.11		5.89		Pass
HE40	MCS0	2	3	2422	Full	-22.09	-22.60	-19.08	8.11		5.89		Pass
HE40	MCS0	2	6	2437	Full	-18.00	-20.61	-14.99	8.11		5.89		Pass
HE40	MCS0	2	9	2452	Full	-20.99	-20.60	-17.59	8.11		5.89		Pass

Measured power density (dBm) has offset with cable loss.

Appendix B. Radiated Spurious Emission

Test Engineer :	John Chuang, David Dai and Howard Huang	Temperature :	18.6~22.4°C
		Relative Humidity :	66.8~69.2%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2386.545	56.85	-17.15	74	46.92	27.37	18.62	36.06	100	159	P	H
		2386.125	52.54	-1.46	54	42.61	27.37	18.62	36.06	100	159	A	H
	*	2412	105.65	-	-	95.59	27.45	18.67	36.06	100	159	P	H
	*	2412	102.53	-	-	92.47	27.45	18.67	36.06	100	159	A	H
													H
		2386.02	55.2	-18.8	74	45.27	27.37	18.62	36.06	309	169	P	V
		2386.125	49.85	-4.15	54	39.92	27.37	18.62	36.06	309	169	A	V
	*	2412	102.96	-	-	92.9	27.45	18.67	36.06	309	169	P	V
	*	2412	99.93	-	-	89.87	27.45	18.67	36.06	309	169	A	V
													V
													V
802.11b CH 06 2437MHz		2389.52	54.57	-19.43	74	44.62	27.38	18.63	36.06	160	158	P	H
		2389.2	49.07	-4.93	54	39.12	27.38	18.63	36.06	160	158	A	H
	*	2437	109.44	-	-	99.24	27.55	18.72	36.07	160	158	P	H
	*	2437	106.3	-	-	96.1	27.55	18.72	36.07	160	158	A	H
		2484	54.86	-19.14	74	44.39	27.74	18.82	36.09	160	158	P	H
		2483.92	48.75	-5.25	54	38.28	27.74	18.82	36.09	160	158	A	H
		2389.2	52.99	-21.01	74	43.04	27.38	18.63	36.06	308	181	P	V
		2389.2	46.35	-7.65	54	36.4	27.38	18.63	36.06	308	181	A	V
	*	2437	106.58	-	-	96.38	27.55	18.72	36.07	308	181	P	V
	*	2437	103.49	-	-	93.29	27.55	18.72	36.07	308	181	A	V
		2485.12	53.35	-20.65	74	42.88	27.74	18.82	36.09	308	181	P	V
		2483.92	46.55	-7.45	54	36.08	27.74	18.82	36.09	308	181	A	V

WIFI Ant. 1	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	102.35	-	-	92.01	27.65	18.77	36.08	154	156	P	H
	*	2462	99.24	-	-	88.9	27.65	18.77	36.08	154	156	A	H
		2487.92	57.11	-16.89	74	46.62	27.75	18.83	36.09	154	156	P	H
		2487.8	52.69	-1.31	54	42.2	27.75	18.83	36.09	154	156	A	H
													H
													H
	*	2462	100.27	-	-	89.93	27.65	18.77	36.08	305	177	P	V
	*	2462	97.1	-	-	86.76	27.65	18.77	36.08	305	177	A	V
		2488	55.68	-18.32	74	45.19	27.75	18.83	36.09	305	177	P	V
		2487.84	50.84	-3.16	54	40.35	27.75	18.83	36.09	305	177	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

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	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		4824	44.68	-29.32	74	36.51	32.44	12.95	37.22	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	44.01	-29.99	74	35.84	32.44	12.95	37.22	-	-	P	V
													V
													V
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													V

WIFI Ant. 1	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		4874	44.81	-29.19	74	36.33	32.65	13.09	37.26	-	-	P	H
		7311	49.37	-24.63	74	34.8	36.86	15.88	38.17	100	53	P	H
		7311	38.72	-15.28	54	24.15	36.86	15.88	38.17	100	53	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	44.47	-29.53	74	35.99	32.65	13.09	37.26	-	-	P	V
		7311	49.07	-24.93	74	34.5	36.86	15.88	38.17	203	86	P	V
		7311	38.74	-15.26	54	24.17	36.86	15.88	38.17	203	86	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 1	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		4924	44.18	-29.82	74	35.45	32.8	13.23	37.3	-	-	P	H
		7386	47.9	-26.1	74	33.58	36.56	15.98	38.22	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4924	44.02	-29.98	74	35.29	32.8	13.23	37.3	-	-	P	V
		7386	47.91	-26.09	74	33.59	36.56	15.98	38.22	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	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	65.32	-8.68	74	55.37	27.38	18.63	36.06	133	161	P	H
		2390	52.89	-1.11	54	42.94	27.38	18.63	36.06	133	161	A	H
	*	2412	104.35	-	-	94.29	27.45	18.67	36.06	133	161	P	H
	*	2412	96.5	-	-	86.44	27.45	18.67	36.06	133	161	A	H
													H
													H
		2388.96	61.7	-12.3	74	51.75	27.38	18.63	36.06	317	172	P	V
		2390	50.35	-3.65	54	40.4	27.38	18.63	36.06	317	172	A	V
	*	2412	102.59	-	-	92.53	27.45	18.67	36.06	317	172	P	V
	*	2412	94.41	-	-	84.35	27.45	18.67	36.06	317	172	A	V
													V
													V
802.11g CH 06 2437MHz		2387.12	54.54	-19.46	74	44.61	27.37	18.62	36.06	300	120	P	H
		2390	42.84	-11.16	54	32.89	27.38	18.63	36.06	300	120	A	H
	*	2437	105.82	-	-	95.62	27.55	18.72	36.07	300	120	P	H
	*	2437	98.22	-	-	88.02	27.55	18.72	36.07	300	120	A	H
		2489.04	56.92	-17.08	74	46.42	27.76	18.83	36.09	300	120	P	H
		2483.52	44.29	-9.71	54	33.83	27.73	18.82	36.09	300	120	A	H
		2385.36	53.77	-20.23	74	43.84	27.37	18.62	36.06	300	186	P	V
		2390	41.75	-12.25	54	31.8	27.38	18.63	36.06	300	186	A	V
	*	2437	105.53	-	-	95.33	27.55	18.72	36.07	300	186	P	V
	*	2437	97.96	-	-	87.76	27.55	18.72	36.07	300	186	A	V
		2484.16	55.91	-18.09	74	45.44	27.74	18.82	36.09	300	186	P	V
		2483.6	43.2	-10.8	54	32.74	27.73	18.82	36.09	300	186	A	V

WIFI Ant. 1	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	102.28	-	-	91.94	27.65	18.77	36.08	153	158	P	H
	*	2462	94.46	-	-	84.12	27.65	18.77	36.08	153	158	A	H
		2483.56	64.39	-9.61	74	53.93	27.73	18.82	36.09	153	158	P	H
		2483.52	52.47	-1.53	54	42.01	27.73	18.82	36.09	153	158	A	H
													H
													H
	*	2462	100.3	-	-	89.96	27.65	18.77	36.08	305	179	P	V
	*	2462	92.5	-	-	82.16	27.65	18.77	36.08	305	179	A	V
		2485.6	61.47	-12.53	74	51	27.74	18.82	36.09	305	179	P	V
		2483.52	49.72	-4.28	54	39.26	27.73	18.82	36.09	305	179	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

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	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		4824	43.86	-30.14	74	35.69	32.44	12.95	37.22	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	43.98	-30.02	74	35.81	32.44	12.95	37.22	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 1	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		4874	44.28	-29.72	74	35.8	32.65	13.09	37.26	-	-	P	H
		7311	50.27	-23.73	74	35.7	36.86	15.88	38.17	200	107	P	H
		7311	38.62	-15.38	54	24.05	36.86	15.88	38.17	200	107	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	44.57	-29.43	74	36.09	32.65	13.09	37.26	-	-	P	V
		7311	48.55	-25.45	74	33.98	36.86	15.88	38.17	100	146	P	V
		7311	38.63	-15.37	54	24.06	36.86	15.88	38.17	100	146	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 1	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		4924	44.44	-29.56	74	35.71	32.8	13.23	37.3	-	-	P	H
		7386	47.98	-26.02	74	33.66	36.56	15.98	38.22	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4924	44.62	-29.38	74	35.89	32.8	13.23	37.3	-	-	P	V
		7386	48.48	-25.52	74	34.16	36.56	15.98	38.22	200	42	P	V
		7386	38.09	-15.91	54	23.77	36.56	15.98	38.22	200	42	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

Emission above 18GHz

2.4GHz WIFI 802.11g (SHF)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g SHF		24692	42.38	-31.62	74	36.4	39.62	19.64	53.28	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		24986	42.68	-31.32	74	36.3	39.69	19.8	53.11	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												