



# FCC RF Test Report

APPLICANT : OnePlus Technology (Shenzhen) Co., Ltd.  
EQUIPMENT : Mobile Phone  
BRAND NAME : ONEPLUS, [1+]  
MODEL NAME : CPH2655  
FCC ID : 2ABZ2-OP23895  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DTS) Digital Transmission System  
TEST DATE(S) : Jul. 31, 2024 ~ Sep. 26, 2024

We, Sporton International Inc. (Shenzhen), 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 of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia



Approved by: Jason Jia

**Sporton International Inc. (ShenZhen)**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055**

**People's Republic of China**



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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR461101C	Rev. 01	Initial issue of report	Sep. 27, 2024



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report Only	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.94 dB at 2389.970 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 7.48 dB at 0.150 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

**Conformity Assessment Condition:**

- 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.
- 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 Applicant

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.

## 1.2 Manufacturer

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	ONEPLUS,
Model Name	CPH2655
FCC ID	2ABZ2-OP23895
IMEI Code	Conducted: 866493070031950/ 866493070031943 Conduction: 866493070032859/866493070032842 Radiation: 866493070032636
HW Version	11
SW Version	OxygenOS V15.0
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	<p>&lt;SISO Ant 13&gt;</p> <p>802.11b : 23.81 dBm (0.2404 W)  802.11g : 26.97 dBm (0.4977 W)  802.11n HT20 : 26.98 dBm (0.4989 W)  802.11n HT40 : 26.92 dBm (0.4920 W)  802.11ax HE20 : 26.95 dBm (0.4955 W)  802.11ax HE40 : 26.89 dBm (0.4887 W)</p> <p>&lt;SISO Ant 10&gt;</p> <p>802.11b : 24.15 dBm (0.2600 W)  802.11g : 26.88 dBm (0.4875 W)  802.11n HT20 : 26.93 dBm (0.4932 W)  802.11n HT40 : 26.95 dBm (0.4955 W)  802.11ax HE20 : 26.96 dBm (0.4966 W)</p>



	802.11ax HE40 : 26.98 dBm (0.4989 W) <b>&lt;MIMO Ant 13+10&gt;</b> 802.11b : 26.98 dBm (0.4989 W) 802.11g : 26.92 dBm (0.4920 W) 802.11n HT20 : 26.98 dBm (0.4989 W) 802.11n HT40 : 26.73 dBm (0.4710 W) 802.11ax HE20 : 26.67 dBm (0.4645W) 802.11ax HE40 : 26.75 dBm (0.4732 W) 802.11be EHT20 : 26.70 dBm (0.4677 W) 802.11be EHT40 : 26.84 dBm (0.4831 W) RU_802.11ax HE20 : 27.55 dBm (0.5689 W) RU_802.11be EHT20 : 27.24 dBm (0.5297 W) MRU_802.11be EHT20 : 27.31 dBm (0.5383 W)
99% Occupied Bandwidth	<b>&lt;SISO Ant 13&gt;</b> 802.11b : 12.607MHz 802.11g : 17.494MHz 802.11n HT20 : 18.85MHz 802.11n HT40 : 37.796MHz 802.11ax HE20 : 19.270MHz 802.11ax HE40 : 38.532MHz <b>&lt;SISO Ant 10&gt;</b> 802.11b : 12.535MHz 802.11g : 17.594MHz 802.11n HT20 : 18.654MHz 802.11n HT40 : 37.308MHz 802.11ax HE20 : 19.374MHz 802.11ax HE40 : 38.756MHz <b>&lt;MIMO Ant 13+10&gt;</b> 802.11b : 12.587MHz 802.11g : 17.750MHz 802.11n HT20 : 18.838MHz 802.11n HT40 : 37.588MHz 802.11ax HE20 : 19.586MHz 802.11ax HE40 : 38.420MHz 802.11be EHT20 : 19.534MHz 802.11be EHT40 : 38.732MHz
Antenna Type / Gain	<Ant 13>IFA Antenna type with gain -0.50 dBi <Ant 10>IFA Antenna type with gain 1.50 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM) 802.11be: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM)

Note:

1. The device supports WLAN MIMO CDD mode.
2. The device support WLAN SISO & MIMO mode. For 802.11be mode, the whole testing has assessed only MIMO mode by referring to the higher normal output power.
3. For 802.11ac mode, power is set less than 11ax power, thus the whole testing have assessed only 802.11ax HE20/HE40 by referring to the higher output power.
4. 802.11ax/be support OFDMA full RU tone and partial RU tone.



5. 802.11be support OFDMA for small size RU, 52Tone + 26 Tone or 106Tone + 26Tone, test combination as below,

6. <Small size RU 52+26 Tone>:

Bandwidth	Tones		Index		For test modes configure
20MHz	26	52	1	38	1
20MHz	52	26	38	4	2
20MHz	52	26	39	7	3

<Small size RU 106+26 Tone>:

Bandwidth	Tones		Index		For test modes configure
20MHz	106	26	53	4	1
20MHz	26	106	4	54	2

7. The worse cases of RSE for partial RU and small size RU are shown in this report.

### 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

### 1.6 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

<b>Test Firm</b>	Sporton International Inc. (ShenZhen)		
<b>Test Site Location</b>	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People’s Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	CO01-SZ TH01-SZ	CN1256	421272

<b>Test Firm</b>	Sporton International Inc. (ShenZhen)		
<b>Test Site Location</b>	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People’s Republic of China TEL: +86-755-86066985		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH03-SZ	CN1256	421272



### 1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

### 1.8 Applicable Standards

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

- ♦ 47 CFR Part 15 Subpart C §15.247
- ♦ FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.





## 2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded 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

Final test modes are considering the modulation and worse data rates as below table.

SISO and MIMO mode:

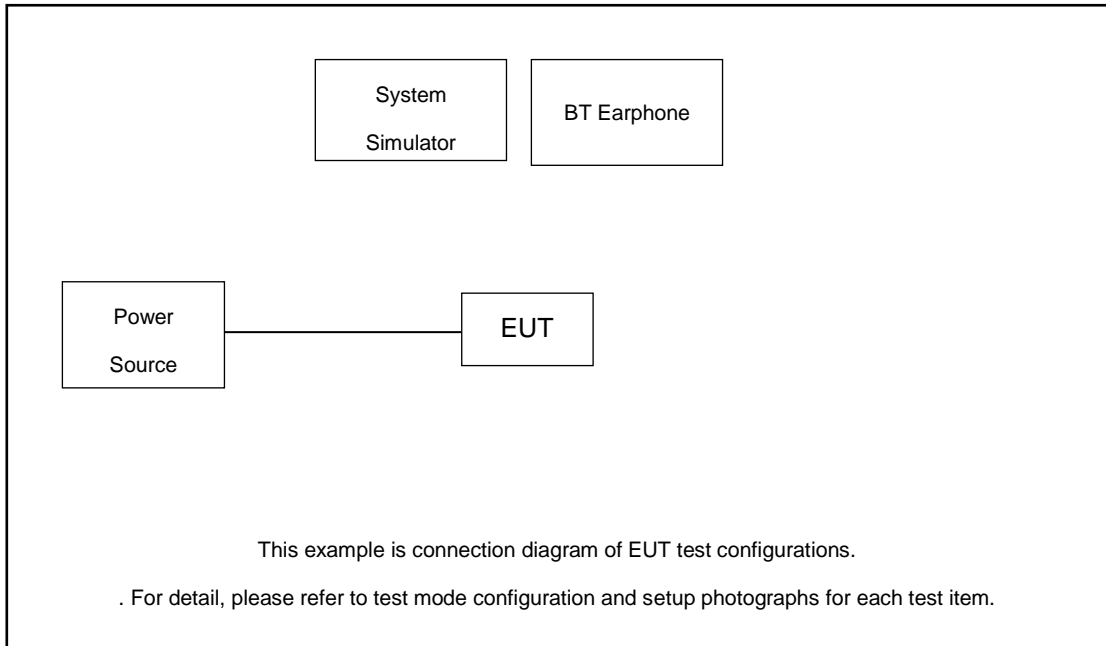
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11VHT20 Covered by HE20	MCS0
802.11VHT40 Covered by HE40	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0

Test Cases	
<b>AC Conducted Emission</b>	Mode 1 :GSM850 Idle + Bluetooth Link + USB Cable 1 (charging from Adapter 1)+ Battery 1 Mode 2 GSM850 Idle + WLAN Link(2.4G) + NFC TX + USB Cable 1 (charging from Adapter 1) + Battery 1
<b>Remark:</b>	
1. For Radiated Test Cases, the tests were performance with Adapter 1, Battery 1, USB Cable 1 2. The worst case of AC is mode 1; only the test data of this mode is reported.	

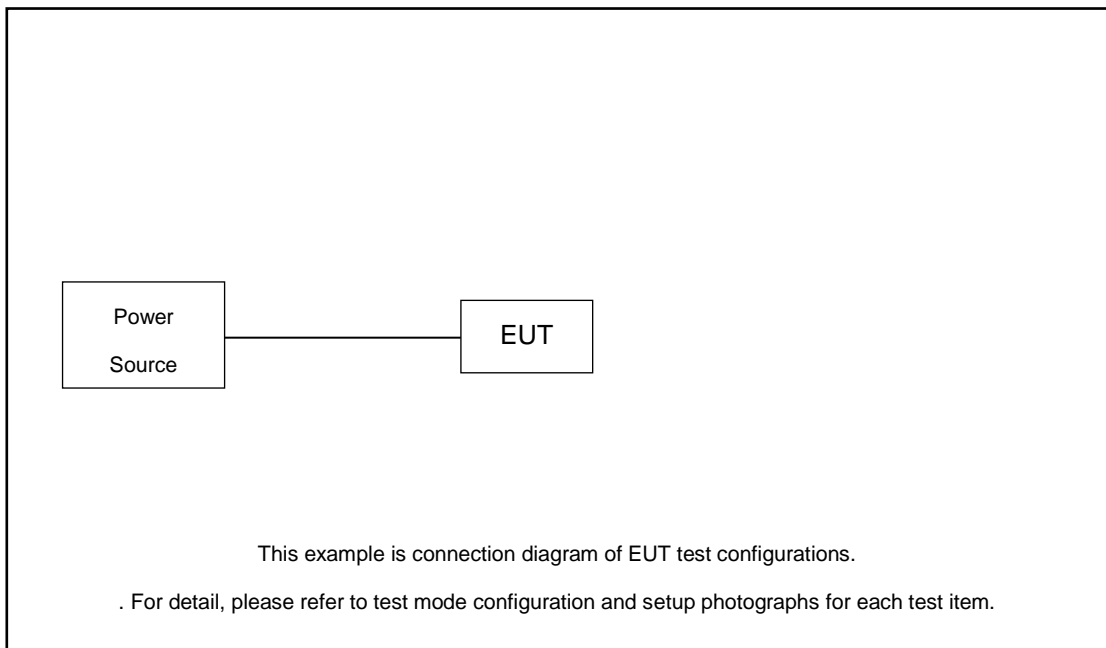
RSE Co-location
Bluetooth LE(2 Mbps) CH38_TX + LTE Band 48 link Bluetooth LE(2 Mbps) CH38_TX + 802.11be EHT20 CH01 2412 + LTE Band 48 link Bluetooth LE(2 Mbps) CH38_TX + 802.11n HT20 CH01 2412 + LTE Band 48 link

## 2.3 Connection Diagram of Test System

AC Conducted Emission:



Radiated Emission:





### 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
3.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
4.	NFC Card	N/A	N/A	N/A	N/A	N/A

### 2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the BT earphone.

### 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 1.5 dB and 10dB attenuator.

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

$$= 1.5 + 10 = 11.5 (dB)$$

### 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

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW)  $\geq 3 \times$  RBW. 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) = 1%~5% of OBW and set the Video bandwidth (VBW) approximately three times the RBW.
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi 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 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

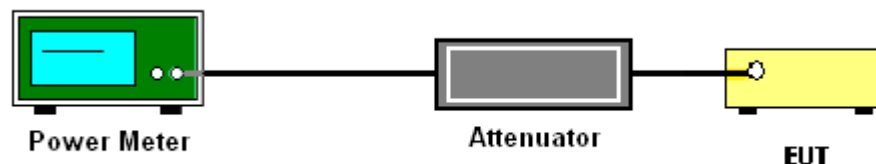
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT 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 Peak Output Power

Please refer to Appendix A.

### 3.2.6 Test Result of Average Output Power (Reporting Only)

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 8dBm in any 3kHz band at any time interval of continuous transmission.

#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT 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 (a): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

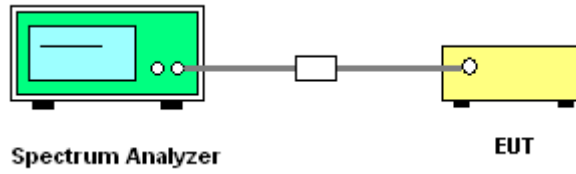
Method (b): Measure and sum spectral maxima across the outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

Method (c): Measure and add  $10 \log(N_{ANT})$  dB, where  $N_{ANT}$  is the number of outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The quantity  $10 \log(N_{ANT})$  dB is added to each spectrum value before comparing to the emission limit.

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

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

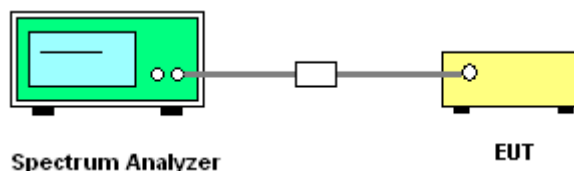
### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.11
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT 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

Refer to the Appendix A



### 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was 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

The measuring equipment is listed in the section 4 of this test report.

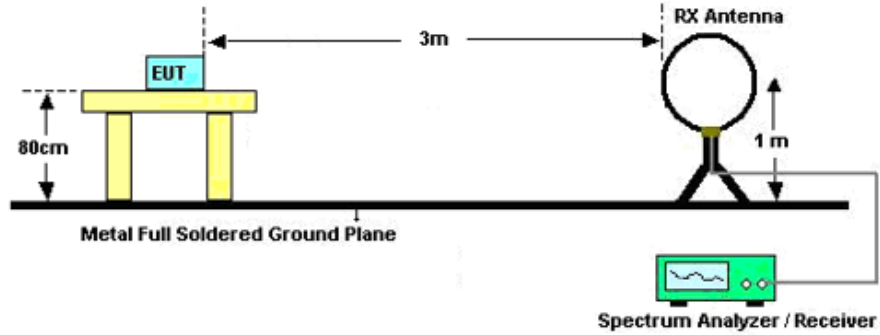


### 3.5.3 Test Procedures

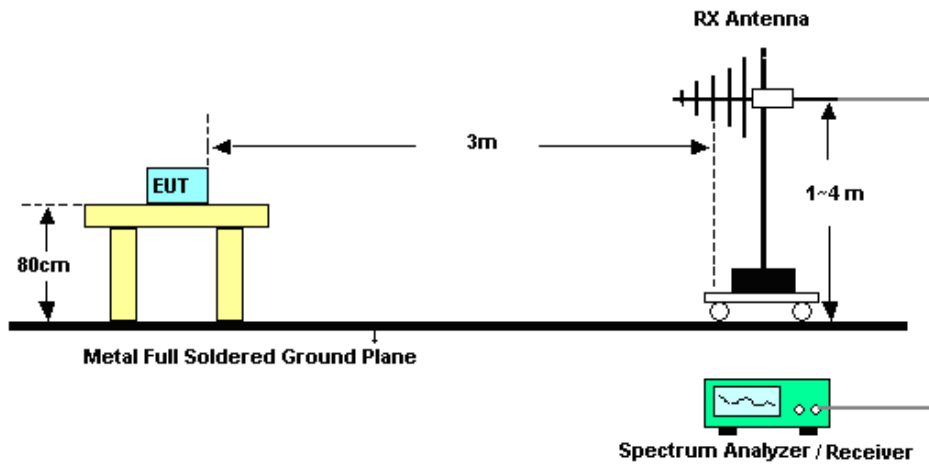
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
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= 3MHz 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

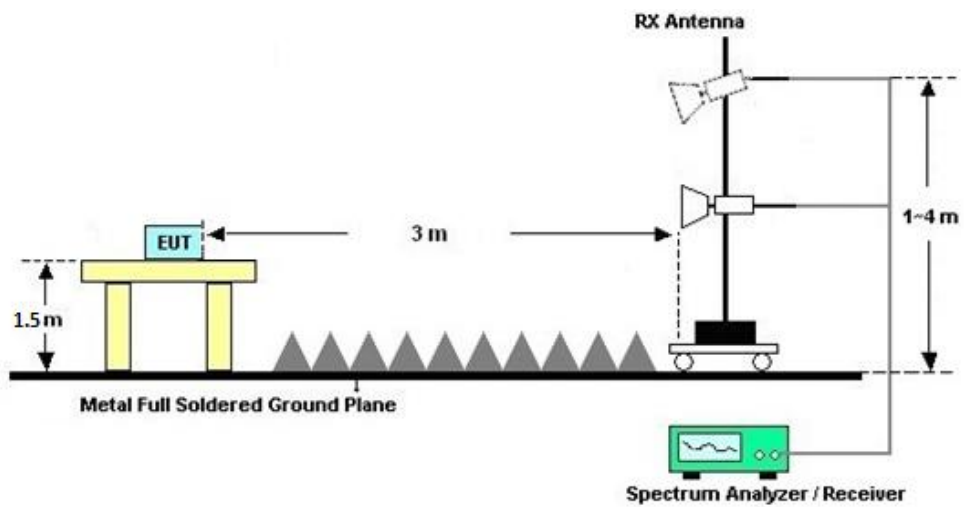
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





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

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### **3.5.6 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix C

### **3.5.7 Duty Cycle**

Please refer to Appendix D.

### **3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)**

Please refer to Appendix C



### 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 (dBµV)	
	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.

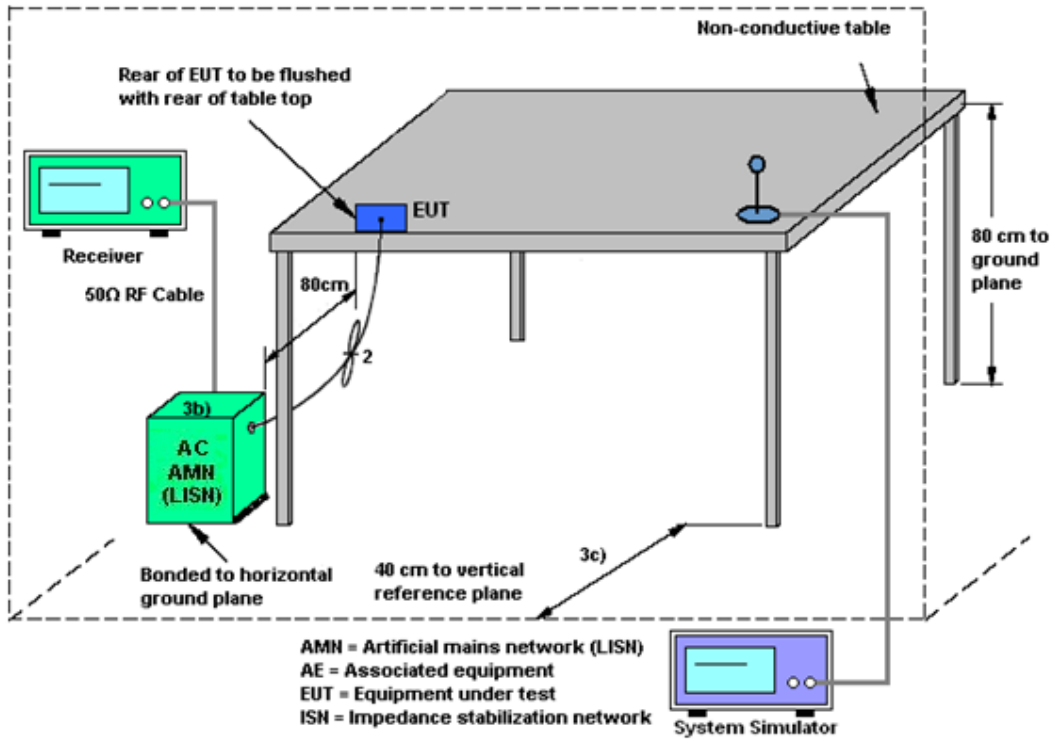
#### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was 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 should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
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

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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.

#### 3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

For power spectral density (PSD) measurements on all devices,

Array Gain =  $10 \log(N_{ANT}/N_{SS}=1)$  dB.

For power measurements on IEEE 802.11 devices,

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

Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain  $G_{ANT}$  is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

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

<CDD Modes>						
			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 13 (dBi)	Ant. 10 (dBi)				
2.4 GHz	-0.50	1.50	1.50	3.57	0.00	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$





## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Sep. 02, 2024~ Sep. 26, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 29, 2023	Sep. 02, 2024~ Sep. 26, 2024	Dec. 28, 2024	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Aug. 20, 2024	Sep. 02, 2024~ Sep. 26, 2024	Aug. 19, 2025	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY544500 83	20Hz~8.4GHz	Apr. 09, 2024	Jul .31, 2024 ~Sep. 04, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
EXA Spectrum Anaizyer	KEYSIGHT	N9010A	MY551502 46	10Hz~44GHz;	Apr. 09, 2024	Jul .31, 2024 ~Sep. 04, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Jul .31, 2024 ~Sep. 04, 2024	Dec. 28, 2024	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Aug. 20, 2023	Jul .31, 2024 ~Sep. 04, 2024	Aug. 19, 2025	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-135 5	1GHz~18GHz	Apr. 09, 2024	Jul .31, 2024 ~Sep. 04, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 03, 2024	Jul .31, 2024 ~Sep. 04, 2024	Jul.02, 2025	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 09, 2024	Jul .31, 2024 ~Sep. 04, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Jul .31, 2024 ~Sep. 04, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Jul .31, 2024 ~Sep. 04, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY395013 02	500MHz~26.5G Hz	Dec. 27, 2023	Jul .31, 2024 ~Sep. 04, 2024	Dec. 26, 2024	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010002 729	N/A	Oct. 18, 2023	Jul .31, 2024 ~Sep. 04, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul .31, 2024 ~Sep. 04, 2024	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul .31, 2024 ~Sep. 04, 2024	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 04, 2024	Aug. 13, 2024	Jul. 03, 2025	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Jul. 04, 2024	Aug. 13, 2024	Jul. 03, 2025	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 16, 2023	Aug. 13, 2024	Oct. 15, 2024	Conduction (CO01-SZ)
AC Power Source	CHROMA	61601	616010002 470	100Vac~250Vac	Dec.25, 2022	Aug. 13, 2024	Dec. 24, 2024	Conduction (CO01-SZ)

NCR: No Calibration Required



## 5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

### Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

### Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB
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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))	5.0dB
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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### Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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----- THE END -----



## Appendix A. Conducted Test Results

Report Number : FR461101C

Test Engineer:	Wen Shiwei	Temperature:	21-25	°C
Test Date:	2024/9/2-2024/9/26	Relative Humidity:	51-54	%

**TEST RESULTS DATA**  
**Average Output Power**

2.4GHz Band Single Antenna																
Mod.	Data Rate	Nrx	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
11b	1Mbps	1	1	2412	21.00	21.20		30.00	30.00	-0.50	1.50	20.50	22.70	36.00	36.00	Pass
11b	1Mbps	1	6	2437	20.90	21.10		30.00	30.00	-0.50	1.50	20.40	22.60	36.00	36.00	Pass
11b	1Mbps	1	11	2462	20.50	21.00		30.00	30.00	-0.50	1.50	20.00	22.50	36.00	36.00	Pass
11g	6Mbps	1	1	2412	17.20	19.20		30.00	30.00	-0.50	1.50	16.70	20.70	36.00	36.00	Pass
11g	6Mbps	1	2	2417	19.10	-		30.00	-	-0.50	1.50	18.60	-	36.00	-	Pass
11g	6Mbps	1	6	2437	20.90	21.20		30.00	30.00	-0.50	1.50	20.40	22.70	36.00	36.00	Pass
11g	6Mbps	1	11	2462	18.70	18.50		30.00	30.00	-0.50	1.50	18.20	20.00	36.00	36.00	Pass
HT20	MCS0	1	1	2412	15.80	19.80		30.00	30.00	-0.50	1.50	15.30	21.30	36.00	36.00	Pass
HT20	MCS0	1	2	2417	19.20	-		30.00	-	-0.50	1.50	18.70	-	36.00	-	Pass
HT20	MCS0	1	6	2437	20.90	21.30		30.00	30.00	-0.50	1.50	20.40	22.80	36.00	36.00	Pass
HT20	MCS0	1	10	2457	19.90	19.60		30.00	30.00	-0.50	1.50	19.40	21.10	36.00	36.00	Pass
HT20	MCS0	1	11	2462	17.50	17.00		30.00	30.00	-0.50	1.50	17.00	18.50	36.00	36.00	Pass
HT40	MCS0	1	3	2422	17.50	18.00		30.00	30.00	-0.50	1.50	17.00	19.50	36.00	36.00	Pass
HT40	MCS0	1	6	2437	20.50	20.60		30.00	30.00	-0.50	1.50	20.00	22.10	36.00	36.00	Pass
HT40	MCS0	1	8	2447	18.00	17.00		30.00	30.00	-0.50	1.50	17.50	18.50	36.00	36.00	Pass
HT40	MCS0	1	9	2452	17.60	17.00		30.00	30.00	-0.50	1.50	17.10	18.50	36.00	36.00	Pass

Setting	
Ant 13	Ant 10
21.00	21.00
21.00	21.00
21.00	21.00
17.50	19.00
19.50	-
21.00	21.00
19.00	18.50
16.00	19.50
19.50	-
21.00	21.00
20.00	19.50
17.50	17.00
18.00	18.00
20.50	20.50
18.50	17.00
18.00	17.00

2.4GHz Band MIMO																
Mod.	Data Rate	Nrx	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
11b	1Mbps	2	1	2412	21.00	21.20	24.11	30.00	30.00	1.50	1.50	25.61	25.61	36.00	36.00	Pass
11b	1Mbps	2	6	2437	20.90	21.10	24.01	30.00	30.00	1.50	1.50	25.51	25.51	36.00	36.00	Pass
11b	1Mbps	2	11	2462	20.60	20.70	23.66	30.00	30.00	1.50	1.50	25.16	25.16	36.00	36.00	Pass
11g	6Mbps	2	1	2412	17.30	17.40	20.36	30.00	30.00	1.50	1.50	21.86	21.86	36.00	36.00	Pass
11g	6Mbps	2	6	2437	17.80	17.80	20.81	30.00	30.00	1.50	1.50	22.31	22.31	36.00	36.00	Pass
11g	6Mbps	2	11	2462	16.90	17.30	20.11	30.00	30.00	1.50	1.50	21.61	21.61	36.00	36.00	Pass
HT20	MCS0	2	1	2412	15.90	16.00	18.96	30.00	30.00	1.50	1.50	20.46	20.46	36.00	36.00	Pass
HT20	MCS0	2	6	2437	17.90	17.90	20.91	30.00	30.00	1.50	1.50	22.41	22.41	36.00	36.00	Pass
HT20	MCS0	2	11	2462	16.00	16.40	19.21	30.00	30.00	1.50	1.50	20.71	20.71	36.00	36.00	Pass
HT40	MCS0	2	3	2422	16.10	16.30	19.21	30.00	30.00	1.50	1.50	20.71	20.71	36.00	36.00	Pass
HT40	MCS0	2	6	2437	16.20	16.30	19.26	30.00	30.00	1.50	1.50	20.76	20.76	36.00	36.00	Pass
HT40	MCS0	2	9	2452	15.00	15.40	18.21	30.00	30.00	1.50	1.50	19.71	19.71	36.00	36.00	Pass

Setting	
Ant 13	Ant 10
21.00	21.00
21.00	21.00
21.00	21.00
17.50	17.50
18.00	18.00
17.50	17.50
16.00	16.00
18.00	18.00
16.50	16.50
16.50	16.50
16.50	16.50
15.50	15.50

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

**TEST RESULTS DATA**  
**Peak Output Power**

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
11b	1Mbps	1	1	2412	23.72	24.15		30.00	30.00	-0.50	1.50	23.22	25.65	36.00	36.00	Pass
11b	1Mbps	1	6	2437	23.81	24.03		30.00	30.00	-0.50	1.50	23.31	25.53	36.00	36.00	Pass
11b	1Mbps	1	11	2462	23.49	23.91		30.00	30.00	-0.50	1.50	22.99	25.41	36.00	36.00	Pass
11g	6Mbps	1	1	2412	22.71	25.14		30.00	30.00	-0.50	1.50	22.21	26.64	36.00	36.00	Pass
11g	6Mbps	1	2	2417	25.14	-		30.00	30.00	-0.50	1.50	24.64	-	36.00	-	Pass
11g	6Mbps	1	6	2437	26.97	26.88		30.00	30.00	-0.50	1.50	26.47	28.38	36.00	36.00	Pass
11g	6Mbps	1	11	2462	24.20	24.08		30.00	30.00	-0.50	1.50	23.70	25.58	36.00	36.00	Pass
HT20	MCS0	1	1	2412	21.08	25.95		30.00	30.00	-0.50	1.50	20.58	27.45	36.00	36.00	Pass
HT20	MCS0	1	2	2417	24.98	-		30.00	30.00	-0.50	1.50	24.48	-	36.00	-	Pass
HT20	MCS0	1	6	2437	26.98	26.93		30.00	30.00	-0.50	1.50	26.48	28.43	36.00	36.00	Pass
HT20	MCS0	1	10	2457	25.55	25.34		30.00	30.00	-0.50	1.50	25.05	26.84	36.00	36.00	Pass
HT20	MCS0	1	11	2462	22.85	22.58		30.00	30.00	-0.50	1.50	22.35	24.08	36.00	36.00	Pass
HT40	MCS0	1	3	2422	24.94	25.11		30.00	30.00	-0.50	1.50	24.44	26.61	36.00	36.00	Pass
HT40	MCS0	1	6	2437	26.92	26.95		30.00	30.00	-0.50	1.50	26.42	28.45	36.00	36.00	Pass
HT40	MCS0	1	8	2447	25.12	23.99		30.00	30.00	-0.50	1.50	24.62	25.49	36.00	36.00	Pass
HT40	MCS0	1	9	2452	24.96	24.00		30.00	30.00	-0.50	1.50	24.46	25.50	36.00	36.00	Pass

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
11b	1Mbps	2	1	2412	23.78	24.15	26.98	30.00		1.50		28.48		36.00		Pass
11b	1Mbps	2	6	2437	23.81	24.06	26.95	30.00		1.50		28.45		36.00		Pass
11b	1Mbps	2	11	2462	23.62	24.02	26.83	30.00		1.50		28.33		36.00		Pass
11g	6Mbps	2	1	2412	23.42	23.84	26.65	30.00		1.50		28.15		36.00		Pass
11g	6Mbps	2	6	2437	23.88	23.93	26.92	30.00		1.50		28.42		36.00		Pass
11g	6Mbps	2	11	2462	23.15	23.61	26.40	30.00		1.50		27.90		36.00		Pass
HT20	MCS0	2	1	2412	21.32	21.74	24.55	30.00		1.50		26.05		36.00		Pass
HT20	MCS0	2	6	2437	23.81	24.13	26.98	30.00		1.50		28.48		36.00		Pass
HT20	MCS0	2	11	2462	21.73	22.15	24.96	30.00		1.50		26.46		36.00		Pass
HT40	MCS0	2	3	2422	23.56	23.87	26.73	30.00		1.50		28.23		36.00		Pass
HT40	MCS0	2	6	2437	23.51	23.84	26.69	30.00		1.50		28.19		36.00		Pass
HT40	MCS0	2	9	2452	21.77	22.28	25.04	30.00		1.50		26.54		36.00		Pass

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

**TEST RESULTS DATA**  
**Average Output Power**

2.4GHz Band Single Antenna																	
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
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
HE20	MCS0	1	1	2412	Full	16.10	18.90		30.00	30.00	-0.50	1.50	15.60	20.40	36.00	36.00	Pass
HE20	MCS0	1	2	2417	Full	18.60	-		30.00	-	-0.50	1.50	18.10	-	36.00	-	Pass
HE20	MCS0	1	6	2437	Full	20.50	20.70		30.00	30.00	-0.50	1.50	20.00	22.20	36.00	36.00	Pass
HE20	MCS0	1	10	2457	Full	18.40	18.70		30.00	30.00	-0.50	1.50	17.90	20.20	36.00	36.00	Pass
HE20	MCS0	1	11	2462	Full	17.30	16.60		30.00	30.00	-0.50	1.50	16.80	18.10	36.00	36.00	Pass
HE40	MCS0	1	3	2422	Full	16.50	17.90		30.00	30.00	-0.50	1.50	16.00	19.40	36.00	36.00	Pass
HE40	MCS0	1	4	2427	Full	16.50	-		30.00	-	-0.50	1.50	16.00	-	36.00	-	Pass
HE40	MCS0	1	6	2437	Full	20.30	20.50		30.00	30.00	-0.50	1.50	19.80	22.00	36.00	36.00	Pass
HE40	MCS0	1	8	2447	Full	-	16.40		-	30.00	-0.50	1.50	-	17.90	-	36.00	Pass
HE40	MCS0	1	9	2452	Full	18.40	16.40		30.00	30.00	-0.50	1.50	17.90	17.90	36.00	36.00	Pass

Setting	
Ant 13	Ant 10
16.00	18.50
18.50	-
20.50	20.50
18.50	18.50
17.50	16.50
17.00	18.00
17.00	0.00
20.50	20.50
0.00	16.50
19.00	16.50

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
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
HE20	MCS0	2	1	2412	Full	15.30	15.60	18.46	30.00		1.50		19.96		36.00		Pass
HE20	MCS0	2	6	2437	Full	16.90	17.00	19.96	30.00		1.50		21.46		36.00		Pass
HE20	MCS0	2	11	2462	Full	15.60	15.90	18.76	30.00		1.50		20.26		36.00		Pass
HE40	MCS0	2	3	2422	Full	15.50	15.70	18.61	30.00		1.50		20.11		36.00		Pass
HE40	MCS0	2	6	2437	Full	16.30	16.30	19.31	30.00		1.50		20.81		36.00		Pass
HE40	MCS0	2	9	2452	Full	14.90	15.30	18.11	30.00		1.50		19.61		36.00		Pass

Setting	
Ant 13	Ant 10
15.50	
17.00	
16.00	
16.00	
16.50	
15.50	

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

**TEST RESULTS DATA**  
**Peak Output Power**

2.4GHz Band Single Antenna																	
Mod.	Data Rate	Nrx	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
HE20	MCS0	1	1	2412	Full	21.57	25.11		30.00	30.00	-0.50	1.50	21.07	26.61	36.00	36.00	Pass
HE20	MCS0	1	2	2417	Full	24.30	-		30.00	30.00	-0.50	1.50	23.80	-	36.00	-	Pass
HE20	MCS0	1	6	2437	Full	26.95	26.96		30.00	30.00	-0.50	1.50	26.45	28.46	36.00	36.00	Pass
HE20	MCS0	1	10	2457	Full	24.37	24.87		30.00	30.00	-0.50	1.50	23.87	26.37	36.00	36.00	Pass
HE20	MCS0	1	11	2462	Full	23.23	23.95		30.00	30.00	-0.50	1.50	22.73	25.45	36.00	36.00	Pass
HE40	MCS0	1	3	2422	Full	23.57	25.09		30.00	30.00	-0.50	1.50	23.07	26.59	36.00	36.00	Pass
HE40	MCS0	1	4	2427	Full	23.71	-		30.00	30.00	-0.50	1.50	23.21	-	36.00	-	Pass
HE40	MCS0	1	6	2437	Full	26.89	26.98		30.00	30.00	-0.50	1.50	26.39	28.48	36.00	36.00	Pass
HE40	MCS0	1	8	2447	Full	-	23.24		30.00	30.00	-0.50	1.50	-	24.74	-	36.00	Pass
HE40	MCS0	1	9	2452	Full	25.78	23.99		30.00	30.00	-0.50	1.50	25.28	25.49	36.00	36.00	Pass

2.4GHz Band MIMO																	
Mod.	Data Rate	Nrx	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
HE20	MCS0	2	1	2412	Full	21.35	22.08	24.74	30.00		1.50		26.24		36.00		Pass
HE20	MCS0	2	6	2437	Full	23.42	23.89	26.67	30.00		1.50		28.17		36.00		Pass
HE20	MCS0	2	11	2462	Full	21.64	22.17	24.92	30.00		1.50		26.42		36.00		Pass
HE40	MCS0	2	3	2422	Full	23.32	23.48	26.41	30.00		1.50		27.91		36.00		Pass
HE40	MCS0	2	6	2437	Full	23.63	23.84	26.75	30.00		1.50		28.25		36.00		Pass
HE40	MCS0	2	9	2452	Full	22.40	23.09	25.77	30.00		1.50		27.27		36.00		Pass

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



**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
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
EHT20	MCS0	2	1	2412	Full	15.30	15.70	18.51	30.00		1.50		20.01		36.00		Pass
EHT20	MCS0	2	6	2437	Full	16.90	17.00	19.96	30.00		1.50		21.46		36.00		Pass
EHT20	MCS0	2	11	2462	Full	15.20	15.40	18.31	30.00		1.50		19.81		36.00		Pass
EHT40	MCS0	2	3	2422	Full	16.00	16.20	19.11	30.00		1.50		20.61		36.00		Pass
EHT40	MCS0	2	6	2437	Full	16.20	16.20	19.21	30.00		1.50		20.71		36.00		Pass
EHT40	MCS0	2	9	2452	Full	14.80	15.30	18.07	30.00		1.50		19.57		36.00		Pass

Setting	
Ant 13	Ant 10
15.50	
17.00	
15.50	
16.50	
16.50	
15.50	

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

**TEST RESULTS DATA**  
**Peak Output Power**

2.4GHz Band MIMO																	
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant13	Ant10	SUM	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	Ant13	Ant10	
EHT20	MCS0	2	1	2412	Full	21.33	22.04	24.71	30.00		1.50		26.21		36.00		Pass
EHT20	MCS0	2	6	2437	Full	23.61	23.77	26.70	30.00		1.50		28.20		36.00		Pass
EHT20	MCS0	2	11	2462	Full	21.44	21.92	24.70	30.00		1.50		26.20		36.00		Pass
EHT40	MCS0	2	3	2422	Full	23.75	23.90	26.84	30.00		1.50		28.34		36.00		Pass
EHT40	MCS0	2	6	2437	Full	23.71	23.82	26.78	30.00		1.50		28.28		36.00		Pass
EHT40	MCS0	2	9	2452	Full	21.99	22.96	25.51	30.00		1.50		27.01		36.00		Pass

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



# For 802.11be Single RU

## Maximum conducted output power

### Test Result Peak

Test Mode	Antenna	Freq(MHz)	Ru Size	Ru Index	Set Power	Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11AX20MIMO	Ant13	2412	26Tone	RU0	9.5	17.14	≤30.00	16.64	≤36.00	PASS
			52Tone	RU37	12.5	20.35	≤30.00	19.85	≤36.00	PASS
			106Tone	RU53	15.5	23.58	≤30.00	23.08	≤36.00	PASS
	Ant10	2412	26Tone	RU0	9.5	17.29	≤30.00	18.79	≤36.00	PASS
			52Tone	RU37	12.5	20.88	≤30.00	22.38	≤36.00	PASS
			106Tone	RU53	15.5	24.50	≤30.00	26.00	≤36.00	PASS
	total	2412	26Tone	RU0	---	20.23	≤30.00	21.73	≤36.00	PASS
			52Tone	RU37	---	23.63	≤30.00	25.13	≤36.00	PASS
			106Tone	RU53	---	27.07	≤30.00	28.57	≤36.00	PASS
	Ant13	2462	26Tone	RU8	10	17.52	≤30.00	17.02	≤36.00	PASS
			52Tone	RU40	13	20.89	≤30.00	20.39	≤36.00	PASS
			106Tone	RU54	16	23.60	≤30.00	23.10	≤36.00	PASS
	Ant10	2462	26Tone	RU8	10	17.94	≤30.00	19.44	≤36.00	PASS
			52Tone	RU40	13	21.13	≤30.00	22.63	≤36.00	PASS
			106Tone	RU54	16	25.32	≤30.00	26.82	≤36.00	PASS
	total	2462	26Tone	RU8	---	20.75	≤30.00	22.25	≤36.00	PASS
			52Tone	RU40	---	24.02	≤30.00	25.52	≤36.00	PASS
			106Tone	RU54	---	27.55	≤30.00	29.05	≤36.00	PASS
11BE20MIMO	Ant13	2412	26Tone	RU0	9.5	16.96	≤30.00	16.46	≤36.00	PASS
			52Tone	RU37	12.5	20.48	≤30.00	19.98	≤36.00	PASS
			106Tone	RU53	15.5	23.50	≤30.00	23.00	≤36.00	PASS
	Ant10	2412	26Tone	RU0	9.5	17.64	≤30.00	19.14	≤36.00	PASS
			52Tone	RU37	12.5	20.92	≤30.00	22.42	≤36.00	PASS
			106Tone	RU53	15.5	23.66	≤30.00	25.16	≤36.00	PASS
	total	2412	26Tone	RU0	---	20.32	≤30.00	21.82	≤36.00	PASS
			52Tone	RU37	---	23.72	≤30.00	25.22	≤36.00	PASS
			106Tone	RU53	---	26.59	≤30.00	28.09	≤36.00	PASS
	Ant13	2462	26Tone	RU8	10	17.37	≤30.00	16.87	≤36.00	PASS
			52Tone	RU40	13	20.38	≤30.00	19.88	≤36.00	PASS
			106Tone	RU54	16	23.61	≤30.00	23.11	≤36.00	PASS
	Ant10	2462	26Tone	RU8	10	17.92	≤30.00	19.42	≤36.00	PASS
			52Tone	RU40	13	21.06	≤30.00	22.56	≤36.00	PASS
			106Tone	RU54	16	24.78	≤30.00	26.28	≤36.00	PASS
	total	2462	26Tone	RU8	---	20.66	≤30.00	22.16	≤36.00	PASS
			52Tone	RU40	---	23.74	≤30.00	25.24	≤36.00	PASS
			106Tone	RU54	---	27.24	≤30.00	28.74	≤36.00	PASS



Test Result Average

Test Mode	Antenna	Freq (MHz)	Ru Size	Ru Index	Set Power	Average power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict	
11AX20MIMO	Ant13	2412	26Tone	RU0	9.5	7.71	99.63	0.02	7.73	≤30.00	-0.50	7.23	≤36.00	PASS	
			52Tone	RU37	12.5	10.91	99.63	0.02	10.93	≤30.00	-0.50	10.43	≤36.00	PASS	
			106Tone	RU53	15.5	14.09	99.63	0.02	14.11	≤30.00	-0.50	13.61	≤36.00	PASS	
	Ant10	2412	26Tone	RU0	9.5	8.48	99.63	0.02	8.50	≤30.00	1.50	10.00	≤36.00	PASS	
			52Tone	RU37	12.5	11.63	99.63	0.02	11.65	≤30.00	1.50	13.15	≤36.00	PASS	
			106Tone	RU53	15.5	14.47	99.63	0.02	14.49	≤30.00	1.50	15.99	≤36.00	PASS	
	total	2412	26Tone	RU0	---	---	---	---	---	11.14	≤30.00	1.50	12.64	≤36.00	PASS
			52Tone	RU37	---	---	---	---	---	14.32	≤30.00	1.50	15.82	≤36.00	PASS
			106Tone	RU53	---	---	---	---	---	17.31	≤30.00	1.50	18.81	≤36.00	PASS
	Ant13	2462	26Tone	RU8	10	7.49	99.63	0.02	7.51	≤30.00	-0.50	7.01	≤36.00	PASS	
			52Tone	RU40	13	10.54	99.63	0.02	10.56	≤30.00	-0.50	10.06	≤36.00	PASS	
			106Tone	RU54	16	13.80	99.63	0.02	13.82	≤30.00	-0.50	13.32	≤36.00	PASS	
	Ant10	2462	26Tone	RU8	10	8.65	99.63	0.02	8.67	≤30.00	1.50	10.17	≤36.00	PASS	
			52Tone	RU40	13	11.57	99.63	0.02	11.59	≤30.00	1.50	13.09	≤36.00	PASS	
			106Tone	RU54	16	14.63	99.63	0.02	14.65	≤30.00	1.50	16.15	≤36.00	PASS	
	total	2462	26Tone	RU8	---	---	---	---	---	11.14	≤30.00	1.50	12.64	≤36.00	PASS
			52Tone	RU40	---	---	---	---	---	14.12	≤30.00	1.50	15.62	≤36.00	PASS
			106Tone	RU54	---	---	---	---	---	17.27	≤30.00	1.50	18.77	≤36.00	PASS
11BE20MIMO	Ant13	2412	26Tone	RU0	9.5	7.74	99.63	0.02	7.76	≤30.00	-0.50	7.26	≤36.00	PASS	
			52Tone	RU37	12.5	10.97	99.63	0.02	10.99	≤30.00	-0.50	10.49	≤36.00	PASS	
			106Tone	RU53	15.5	14.07	99.63	0.02	14.09	≤30.00	-0.50	13.59	≤36.00	PASS	
	Ant10	2412	26Tone	RU0	9.5	8.45	99.63	0.02	8.47	≤30.00	1.50	9.97	≤36.00	PASS	
			52Tone	RU37	12.5	11.65	99.63	0.02	11.67	≤30.00	1.50	13.17	≤36.00	PASS	
			106Tone	RU53	15.5	14.45	99.63	0.02	14.47	≤30.00	1.50	15.97	≤36.00	PASS	
	total	2412	26Tone	RU0	---	---	---	---	---	11.14	≤30.00	1.50	12.64	≤36.00	PASS
			52Tone	RU37	---	---	---	---	---	14.35	≤30.00	1.50	15.85	≤36.00	PASS
			106Tone	RU53	---	---	---	---	---	17.29	≤30.00	1.50	18.79	≤36.00	PASS
	Ant13	2462	26Tone	RU8	10	7.52	99.63	0.02	7.54	≤30.00	-0.50	7.04	≤36.00	PASS	
			52Tone	RU40	13	10.55	99.63	0.02	10.57	≤30.00	-0.50	10.07	≤36.00	PASS	
			106Tone	RU54	16	13.80	99.63	0.02	13.82	≤30.00	-0.50	13.32	≤36.00	PASS	
	Ant10	2462	26Tone	RU8	10	8.57	99.63	0.02	8.59	≤30.00	1.50	10.09	≤36.00	PASS	
			52Tone	RU40	13	11.66	99.63	0.02	11.68	≤30.00	1.50	13.18	≤36.00	PASS	
			106Tone	RU54	16	14.80	99.63	0.02	14.82	≤30.00	1.50	16.32	≤36.00	PASS	
	total	2462	26Tone	RU8	---	---	---	---	---	11.11	≤30.00	1.50	12.61	≤36.00	PASS
			52Tone	RU40	---	---	---	---	---	14.17	≤30.00	1.50	15.67	≤36.00	PASS
			106Tone	RU54	---	---	---	---	---	17.36	≤30.00	1.50	18.86	≤36.00	PASS



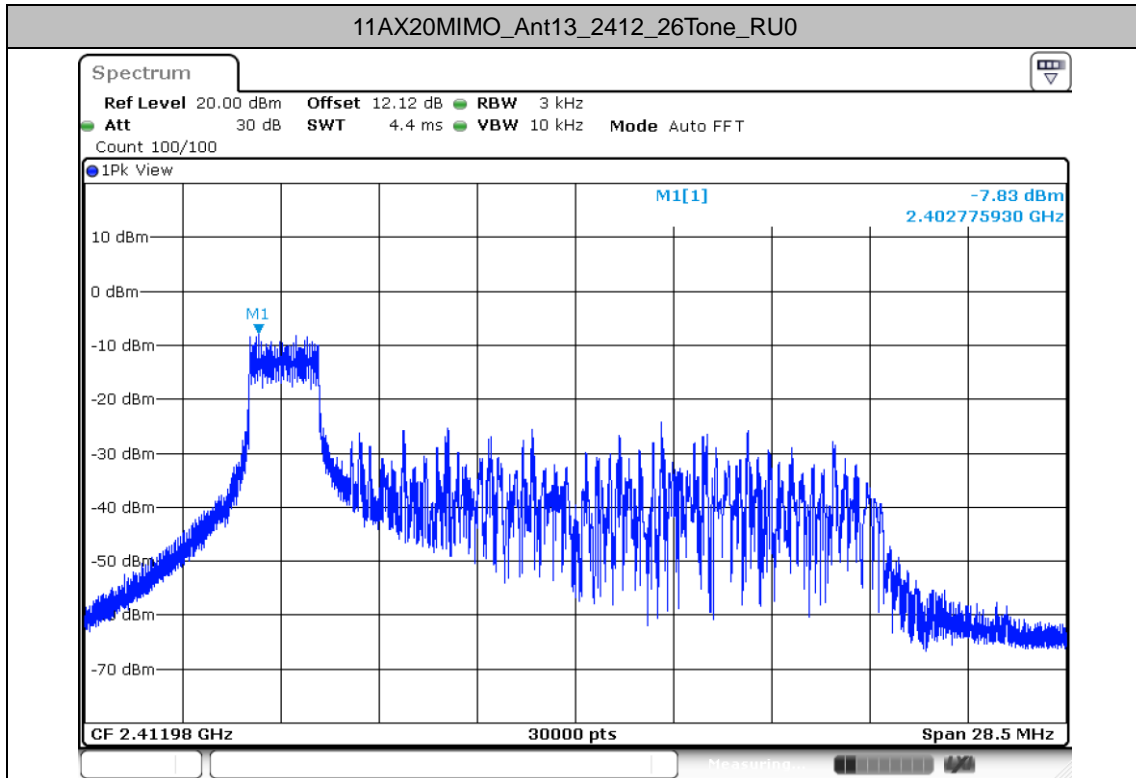
## Maximum power spectral density

### Test Result

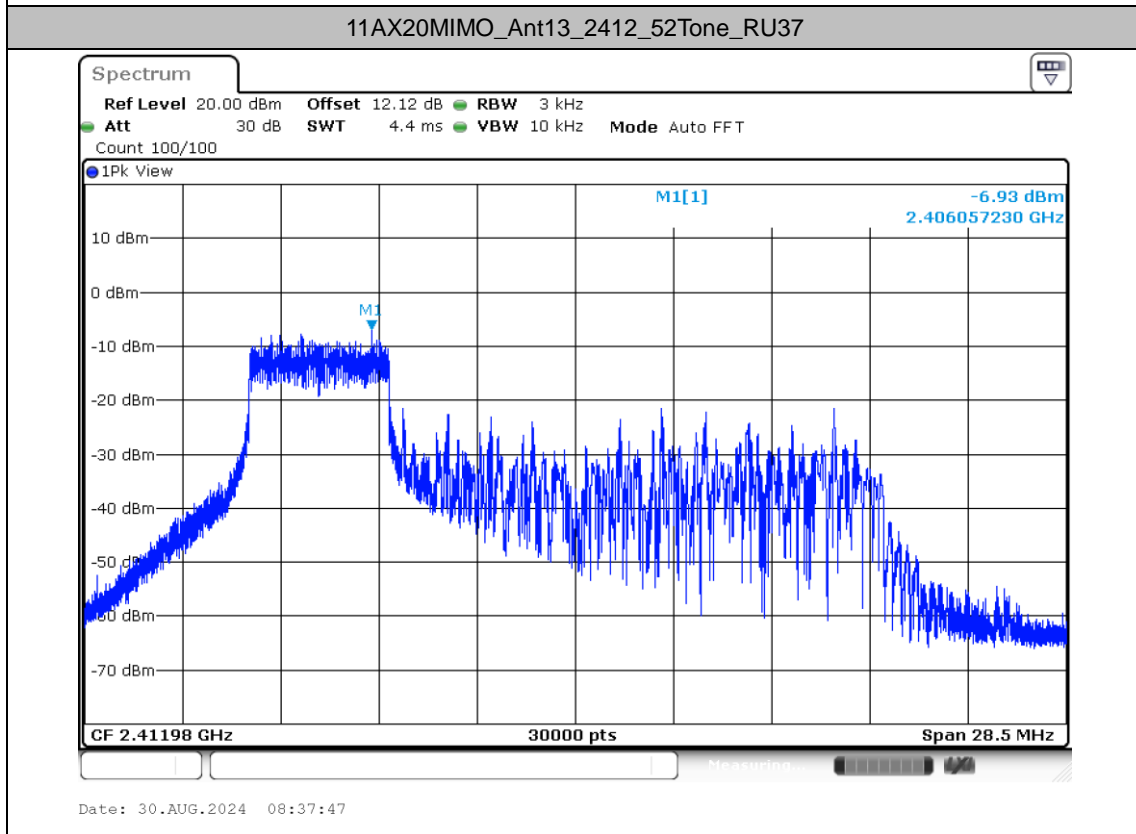
TestMode	Antenna	Freq(MHz)	RuSize	RuIndex	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11AX20MIMO	Ant13	2412	26Tone	RU0	-7.83	≤8.00	PASS
			52Tone	RU37	-6.93	≤8.00	PASS
			106Tone	RU53	-7.09	≤8.00	PASS
	Ant10	2412	26Tone	RU0	-7.48	≤8.00	PASS
			52Tone	RU37	-6.80	≤8.00	PASS
			106Tone	RU53	-6.61	≤8.00	PASS
	total	2412	26Tone	RU0	-4.64	≤8.00	PASS
			52Tone	RU37	-3.85	≤8.00	PASS
			106Tone	RU53	-3.83	≤8.00	PASS
	Ant13	2462	26Tone	RU8	-8.63	≤8.00	PASS
			52Tone	RU40	-8.18	≤8.00	PASS
			106Tone	RU54	-6.64	≤8.00	PASS
	Ant10	2462	26Tone	RU8	-7.43	≤8.00	PASS
			52Tone	RU40	-6.78	≤8.00	PASS
			106Tone	RU54	-5.80	≤8.00	PASS
	total	2462	26Tone	RU8	-4.98	≤8.00	PASS
			52Tone	RU40	-4.41	≤8.00	PASS
			106Tone	RU54	-3.19	≤8.00	PASS
11BE20MIMO	Ant13	2412	26Tone	RU0	-6.54	≤8.00	PASS
			52Tone	RU37	-7.80	≤8.00	PASS
			106Tone	RU53	-6.64	≤8.00	PASS
	Ant10	2412	26Tone	RU0	-6.71	≤8.00	PASS
			52Tone	RU37	-7.25	≤8.00	PASS
			106Tone	RU53	-6.26	≤8.00	PASS
	total	2412	26Tone	RU0	-3.61	≤8.00	PASS
			52Tone	RU37	-4.51	≤8.00	PASS
			106Tone	RU53	-3.44	≤8.00	PASS
	Ant13	2462	26Tone	RU8	-8.46	≤8.00	PASS
			52Tone	RU40	-7.71	≤8.00	PASS
			106Tone	RU54	-7.74	≤8.00	PASS
	Ant10	2462	26Tone	RU8	-7.70	≤8.00	PASS
			52Tone	RU40	-6.43	≤8.00	PASS
			106Tone	RU54	-6.70	≤8.00	PASS
	total	2462	26Tone	RU8	-5.05	≤8.00	PASS
			52Tone	RU40	-4.01	≤8.00	PASS
			106Tone	RU54	-4.18	≤8.00	PASS



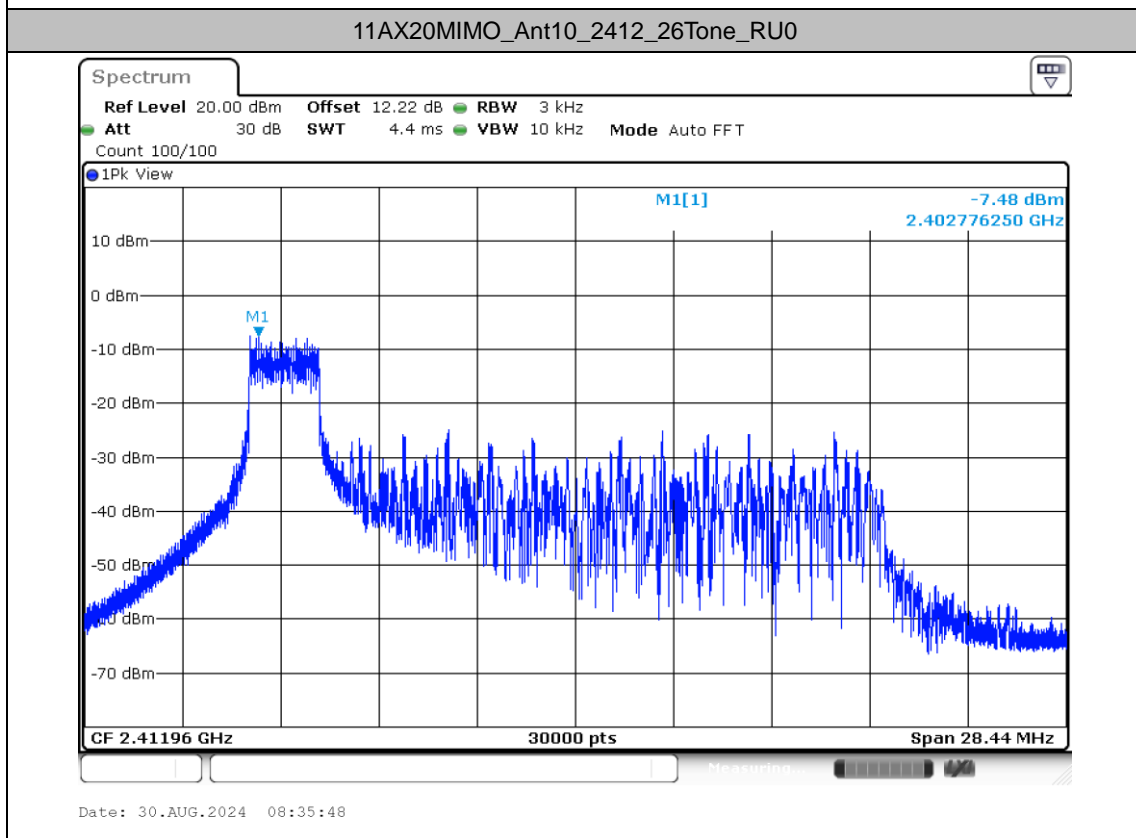
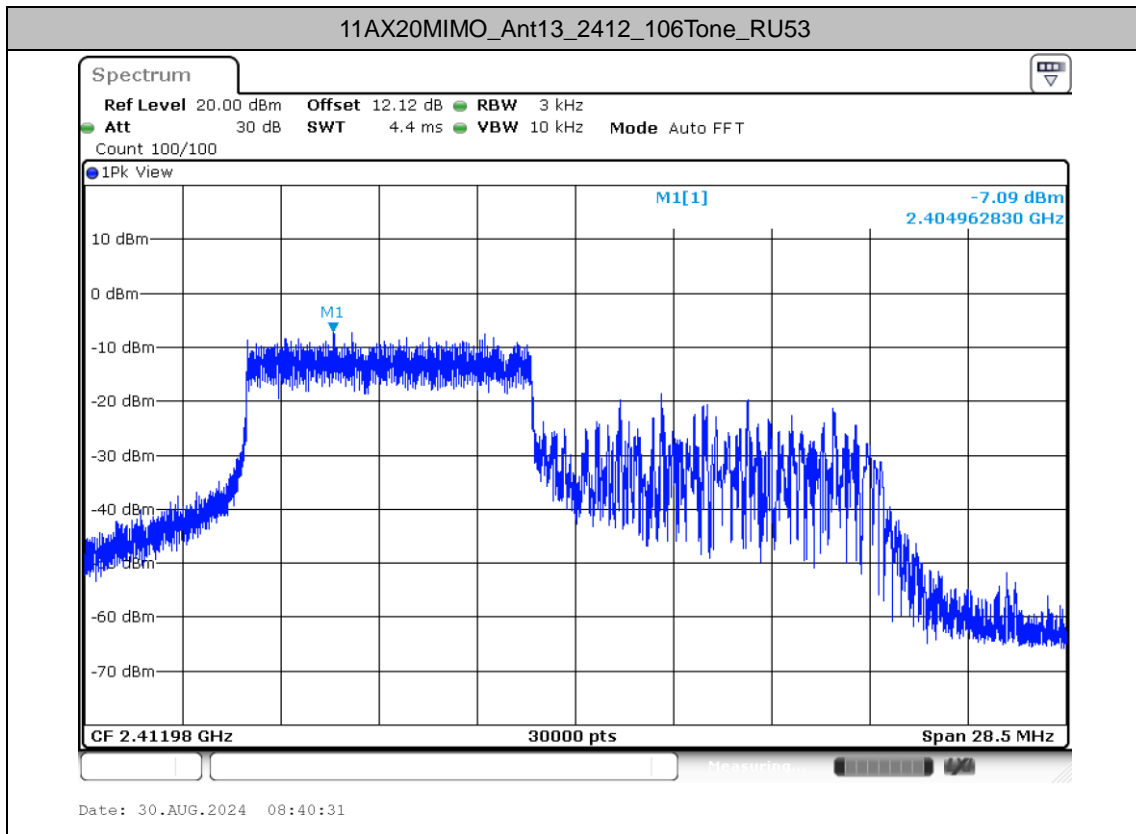
Test Graphs

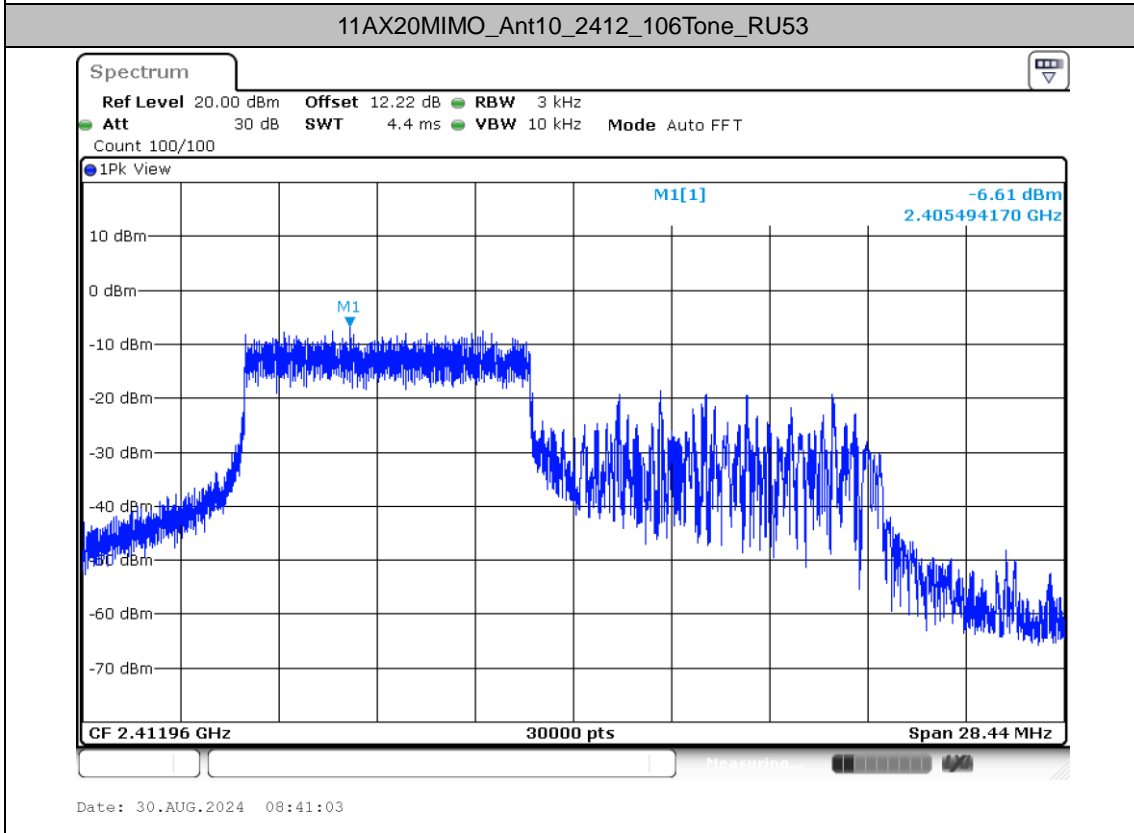
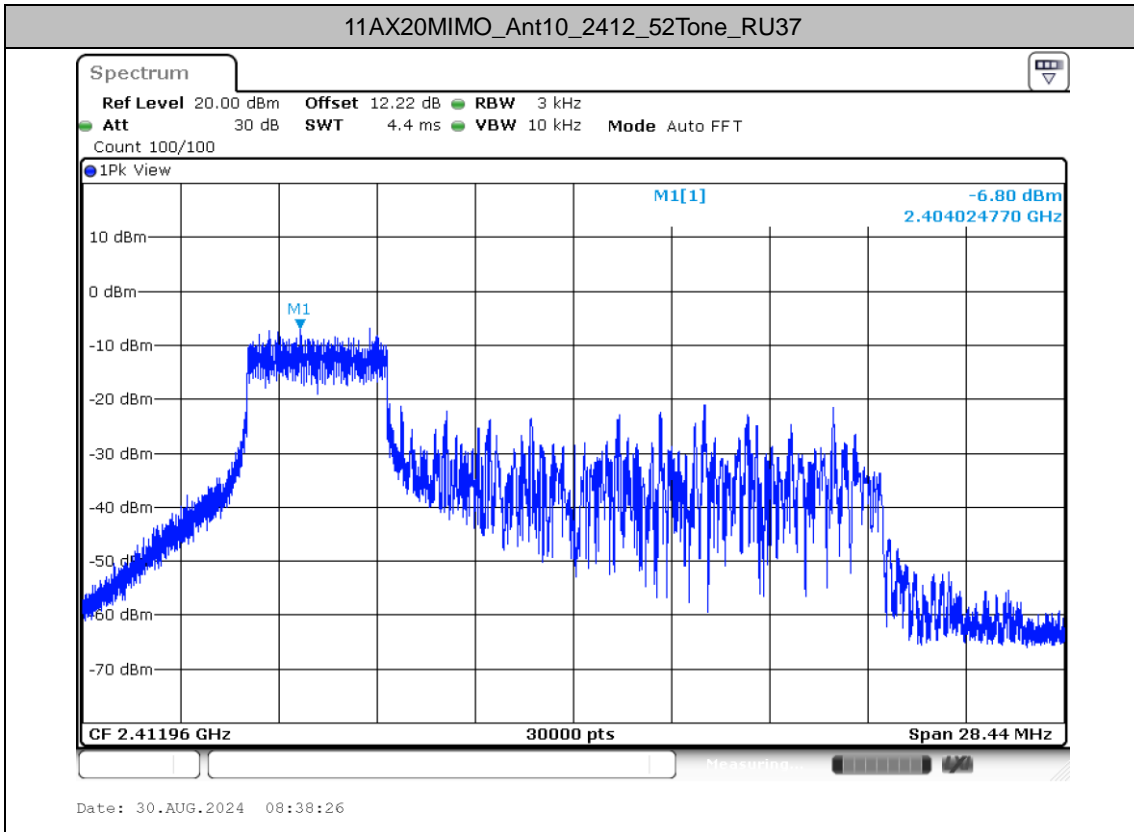


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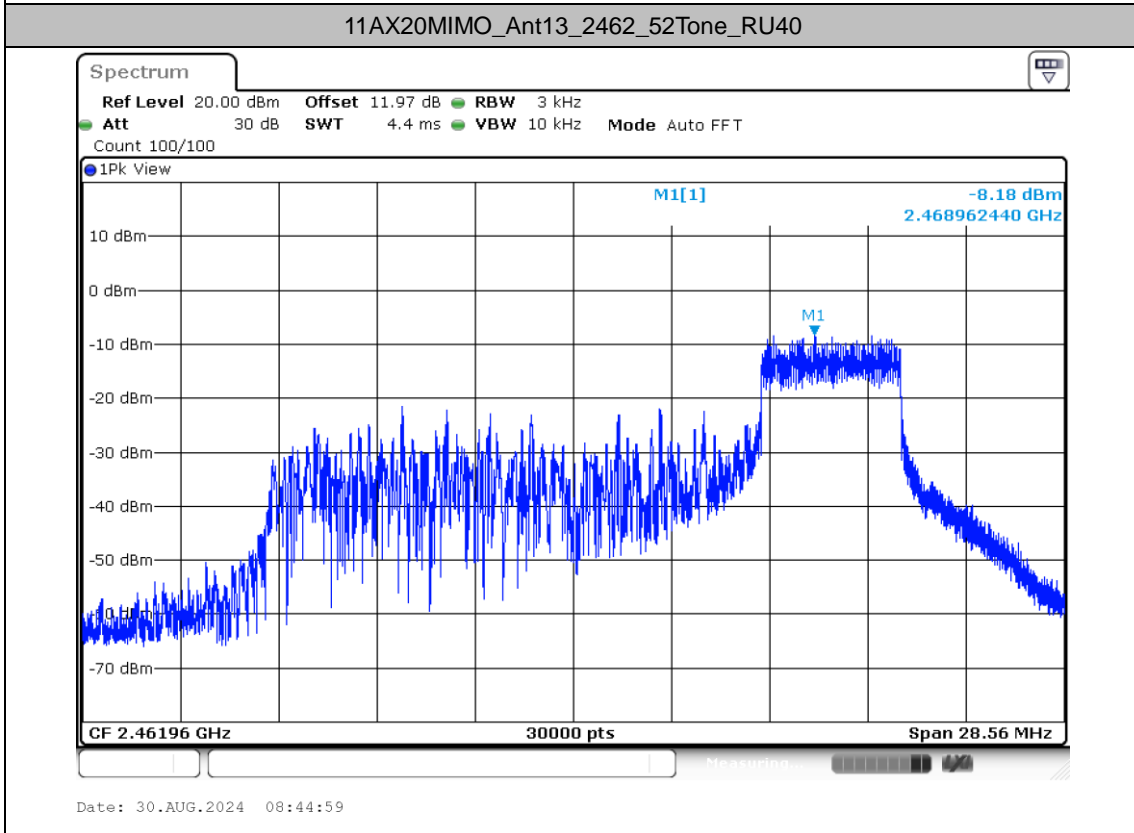
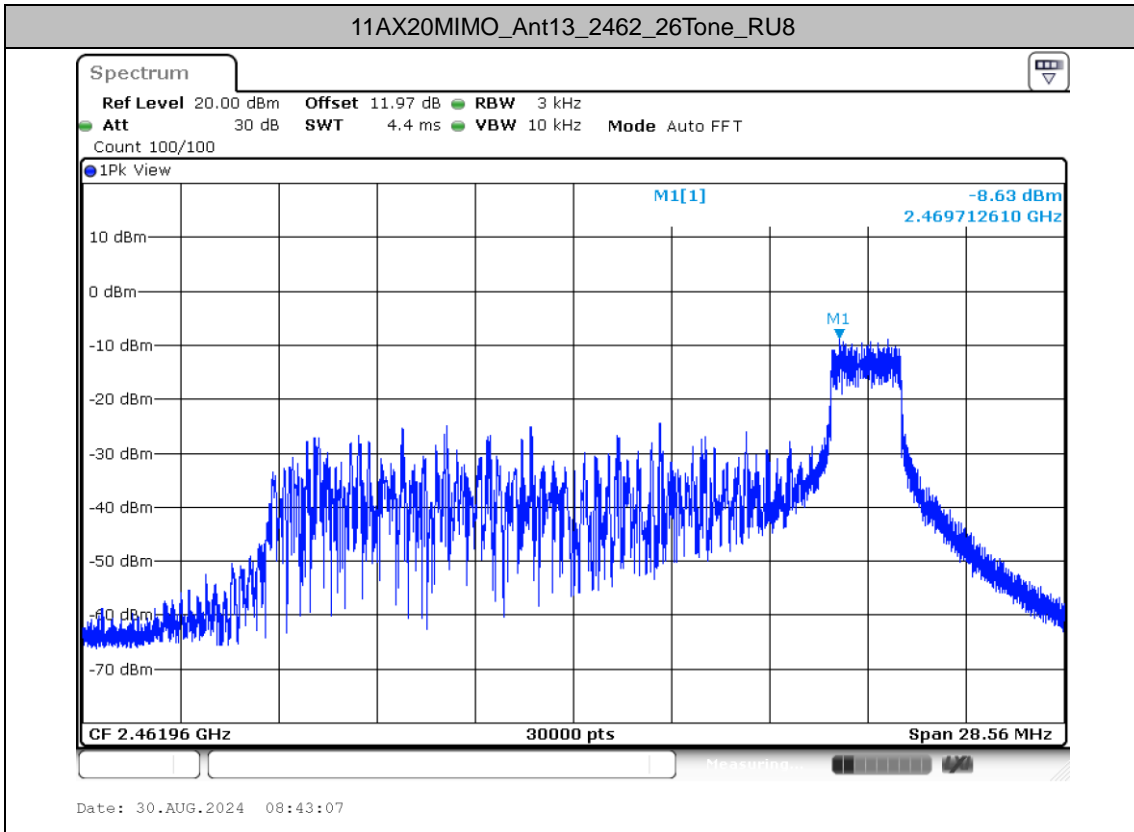


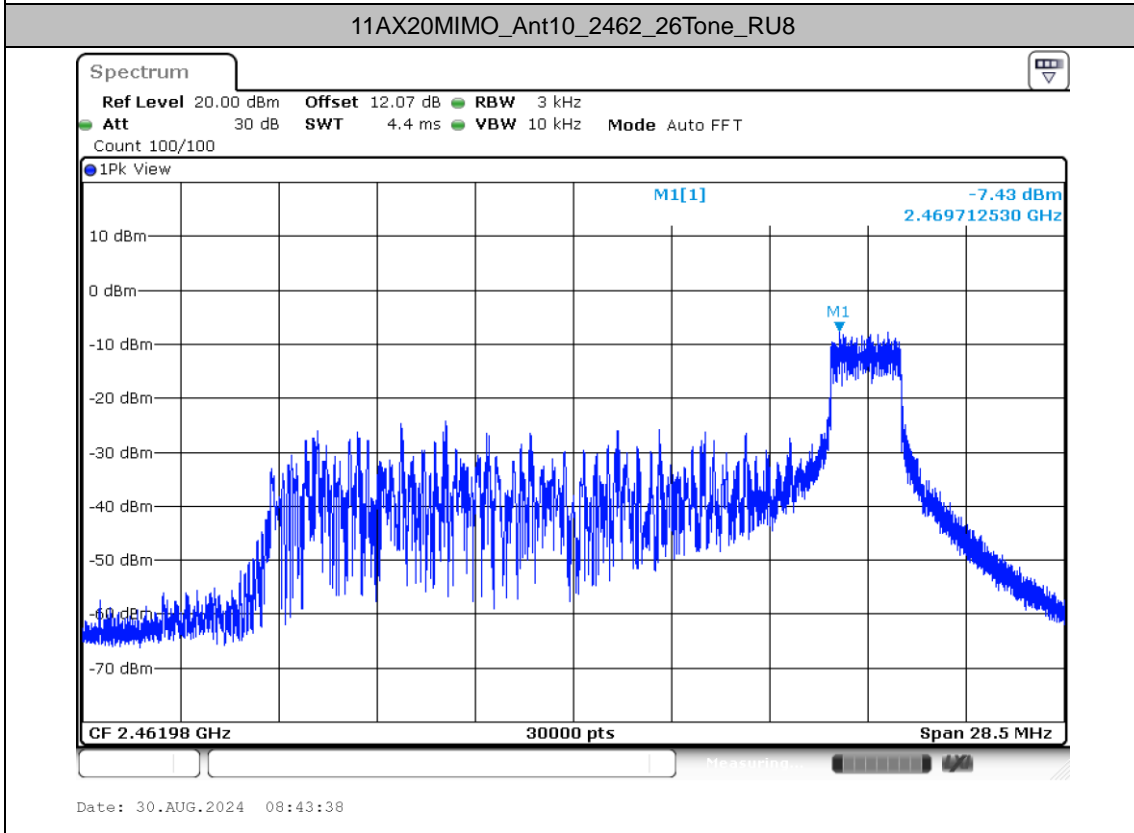
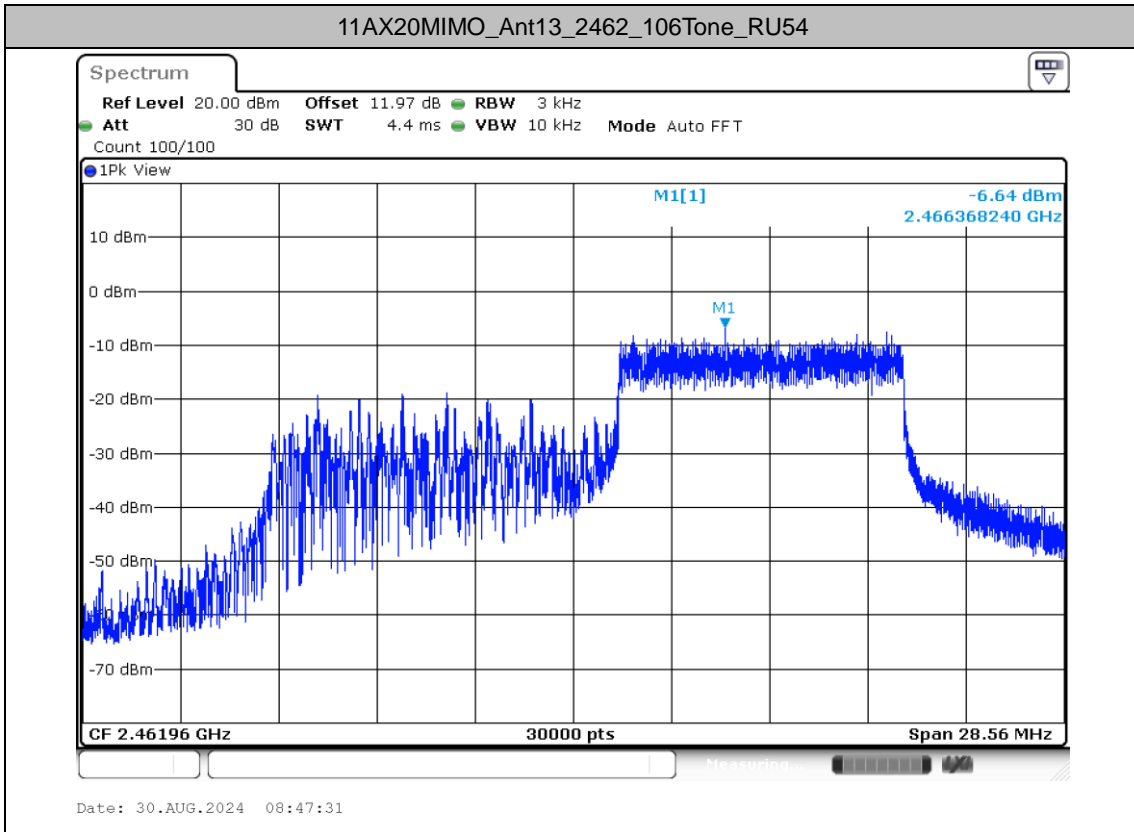
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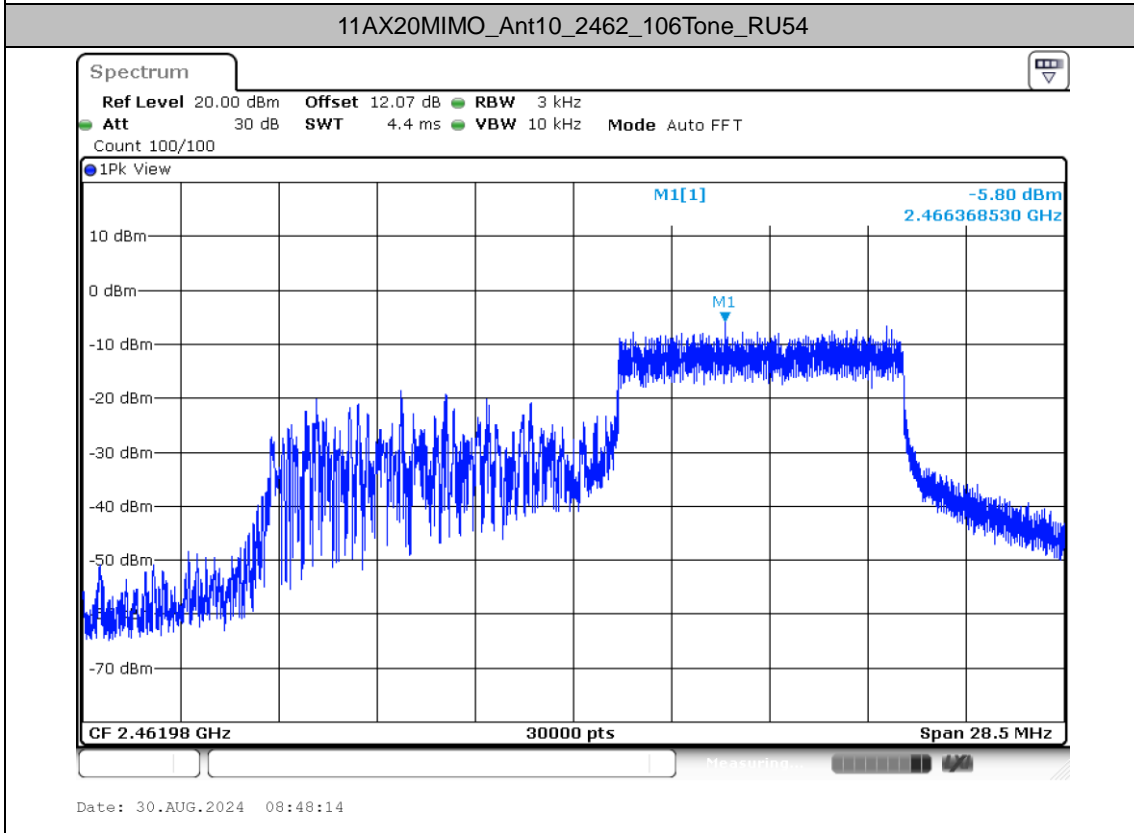
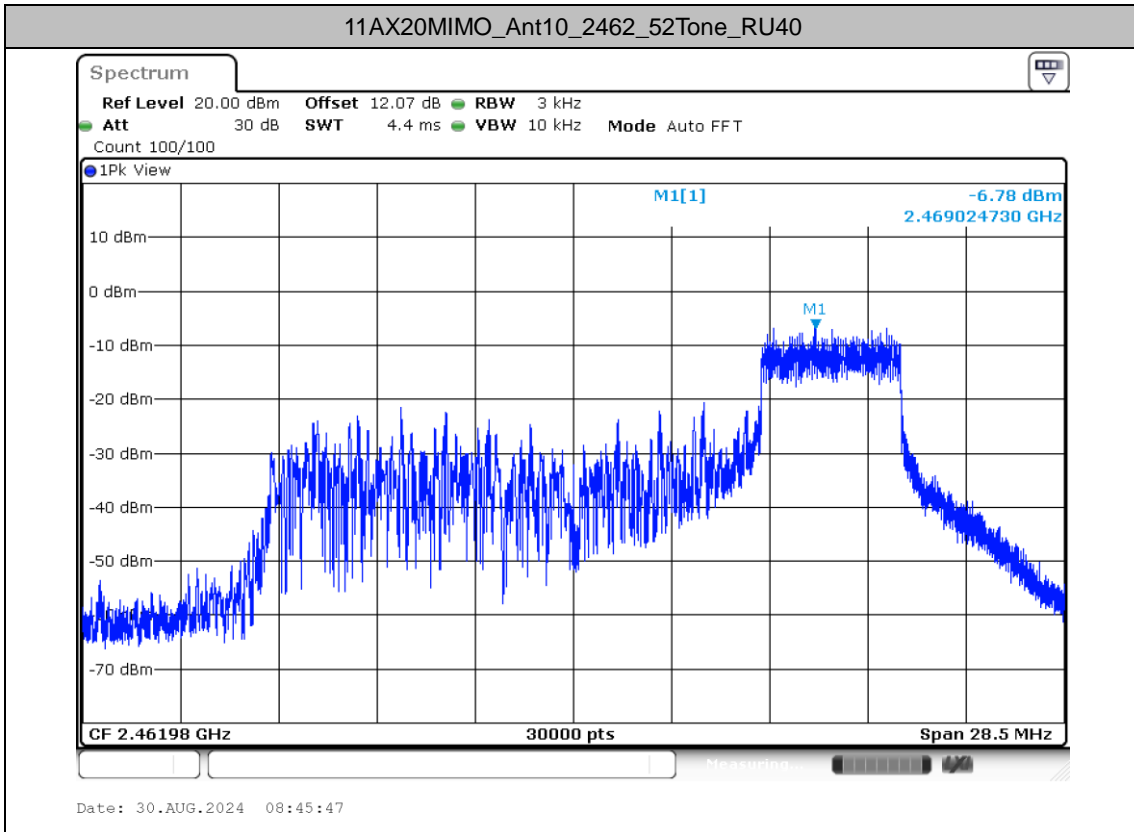


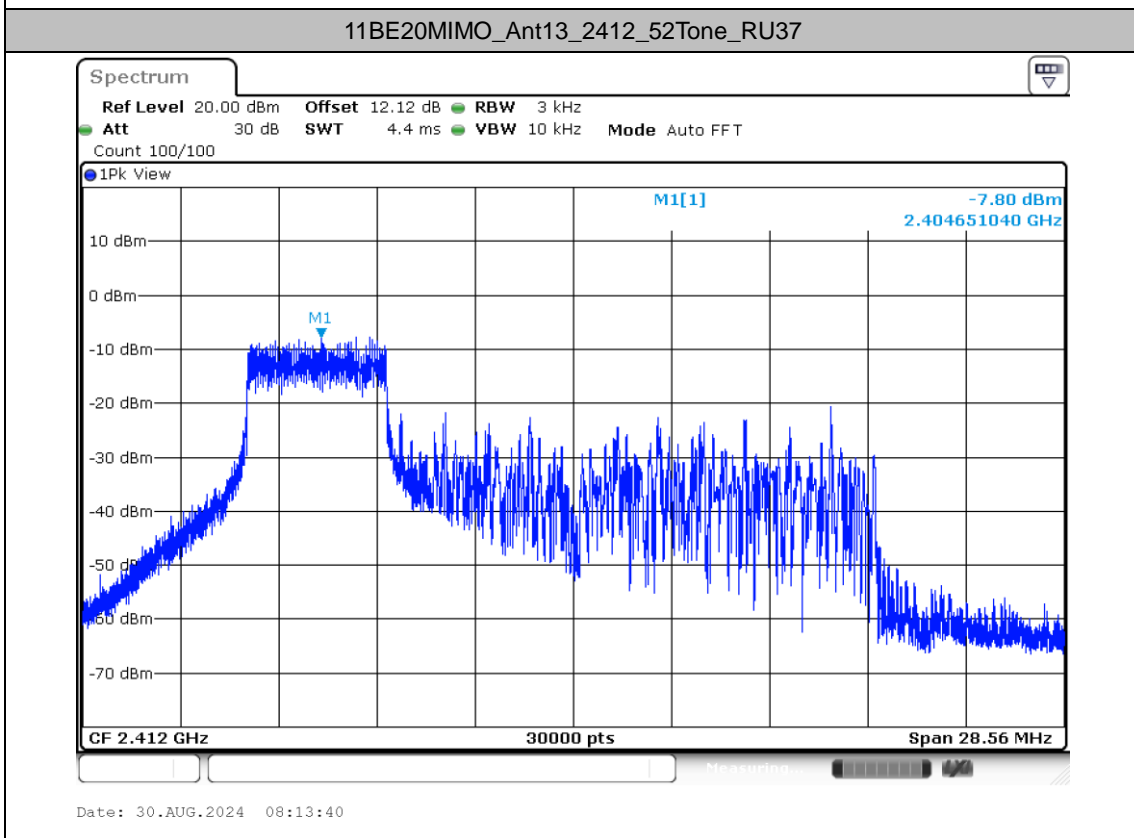
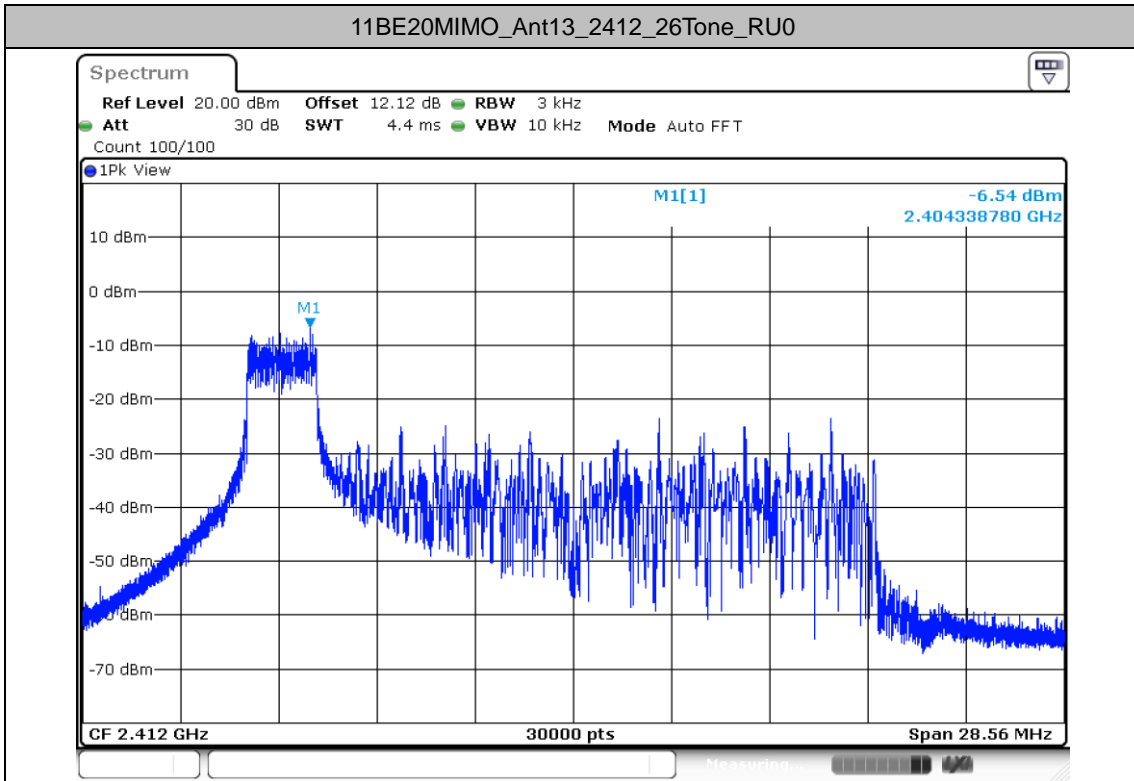


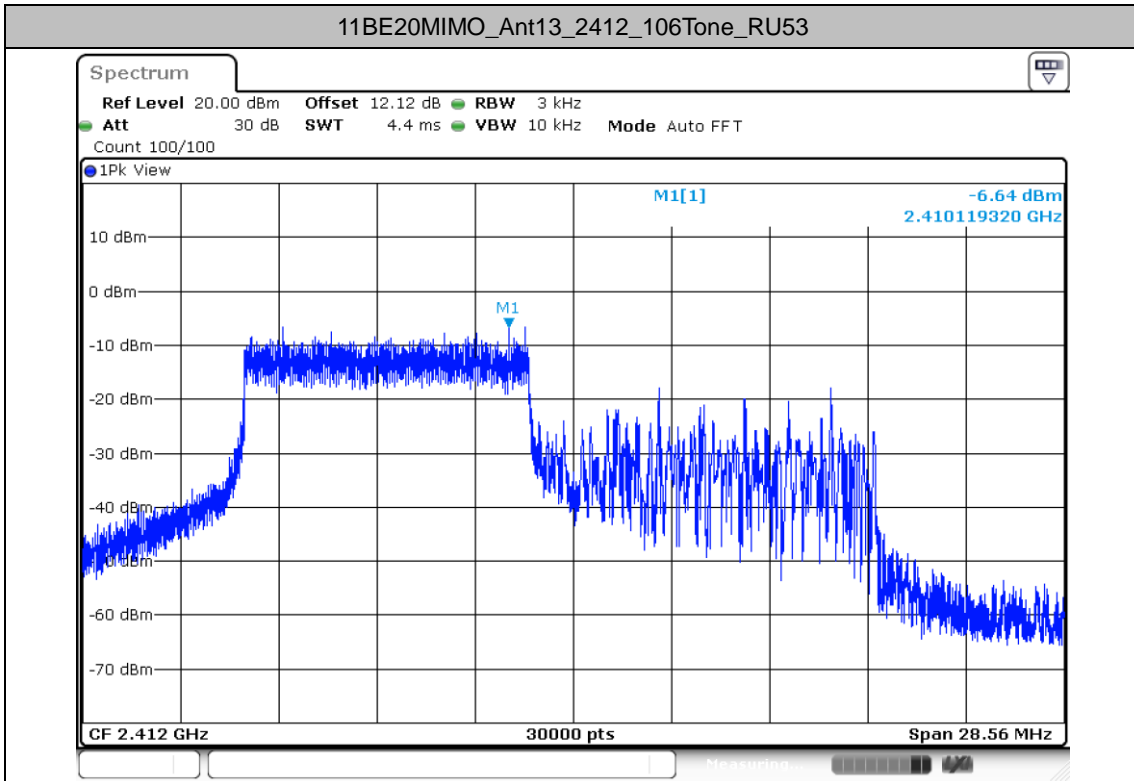




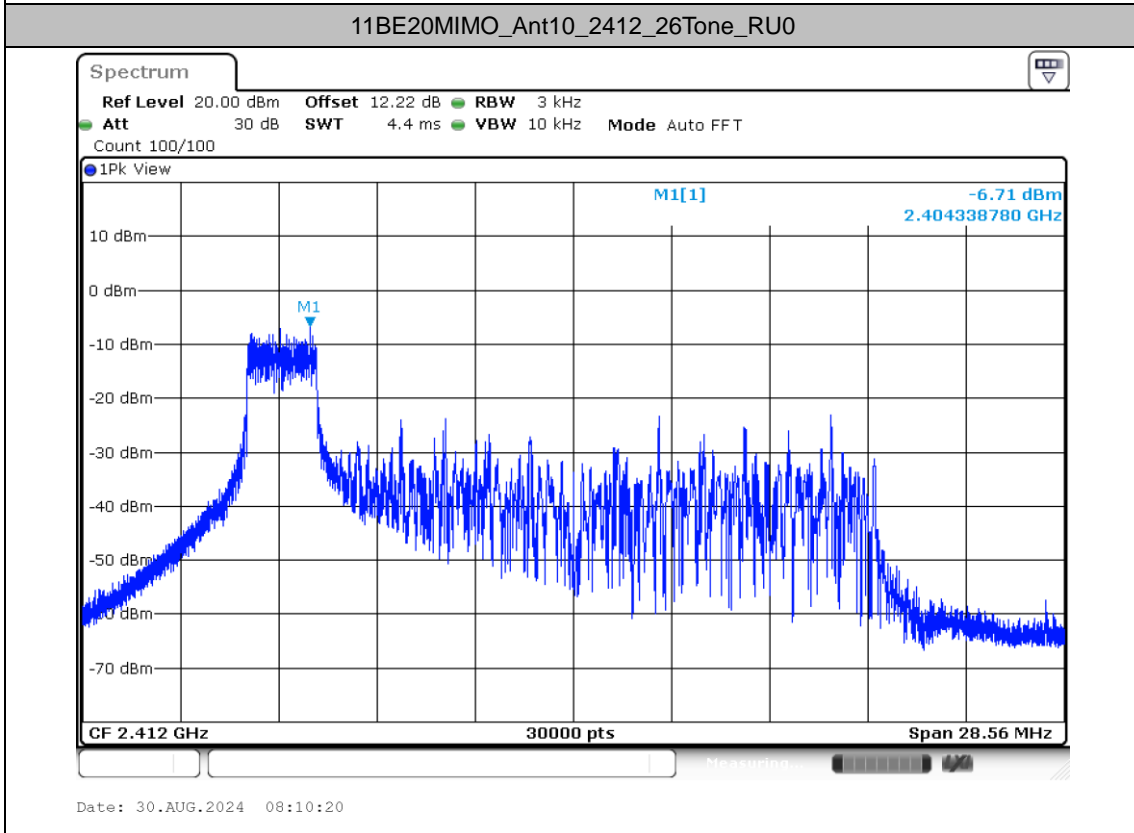




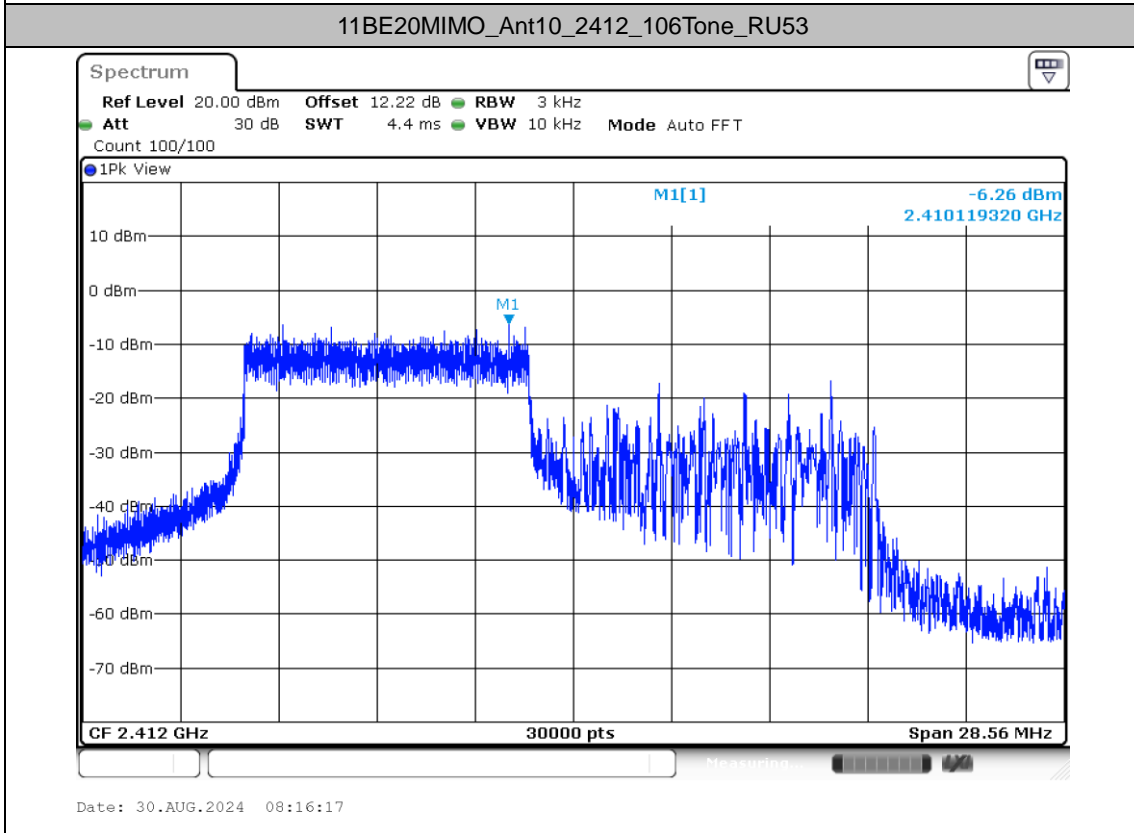
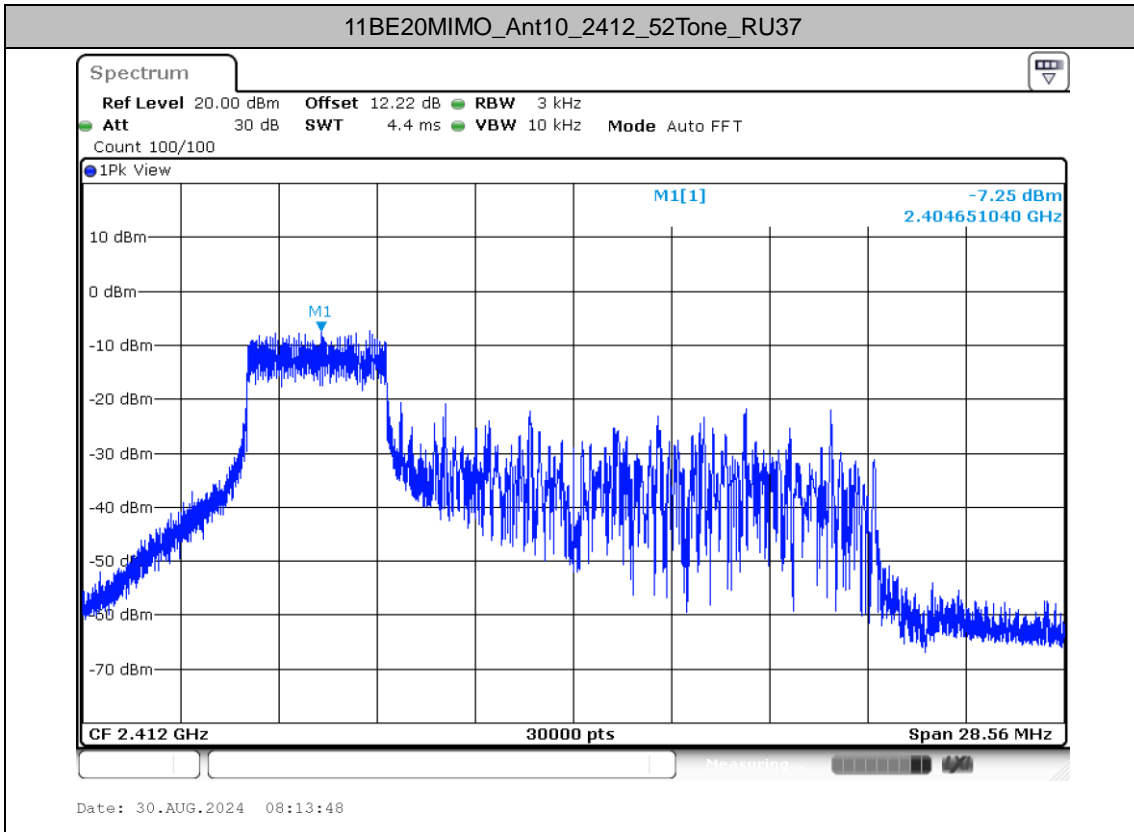


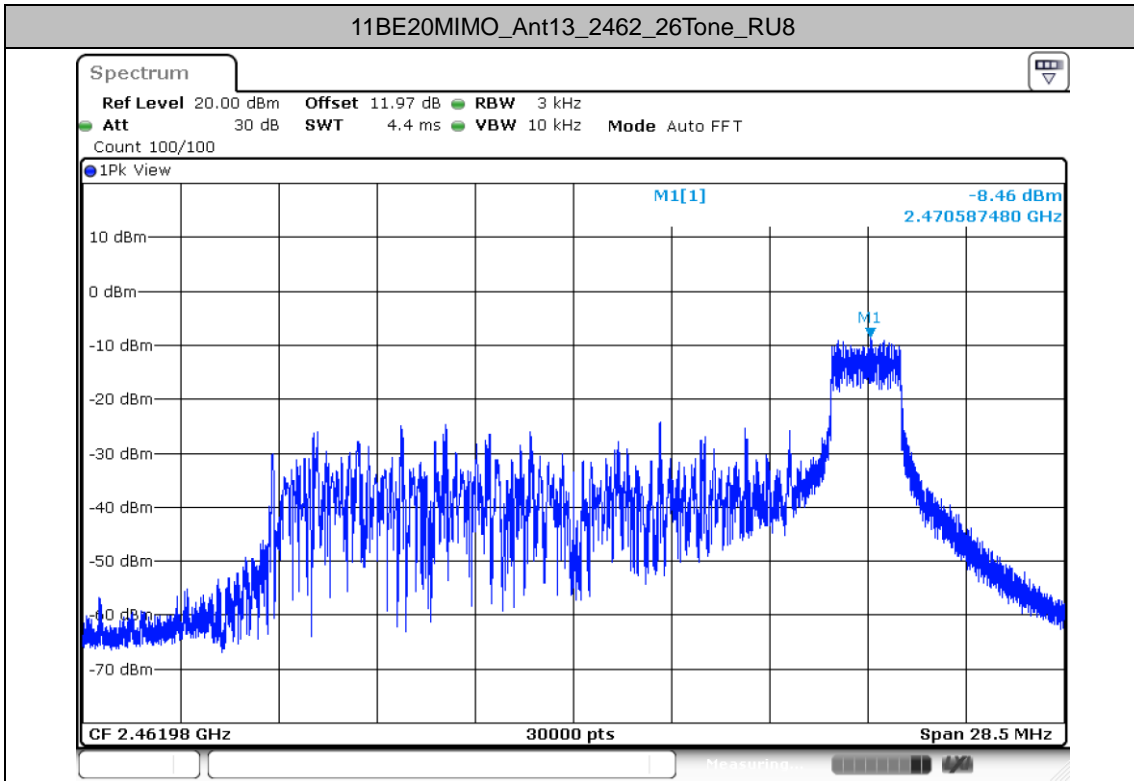


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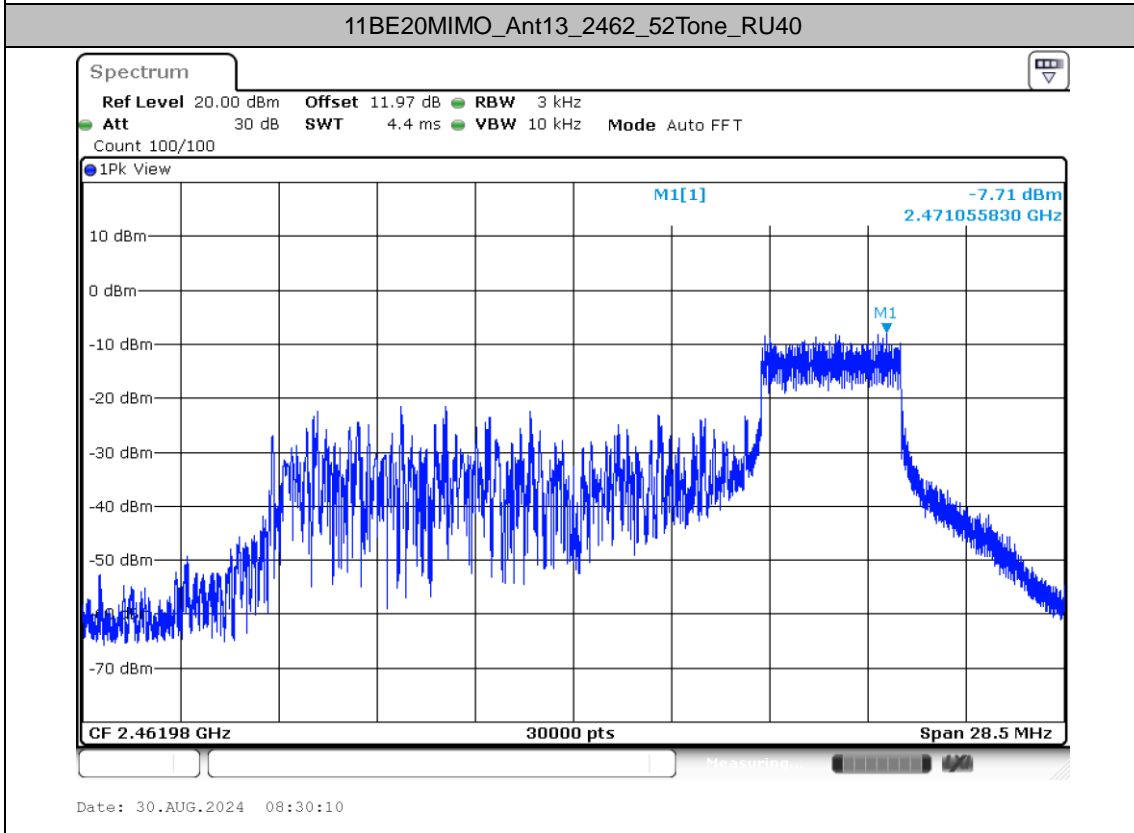


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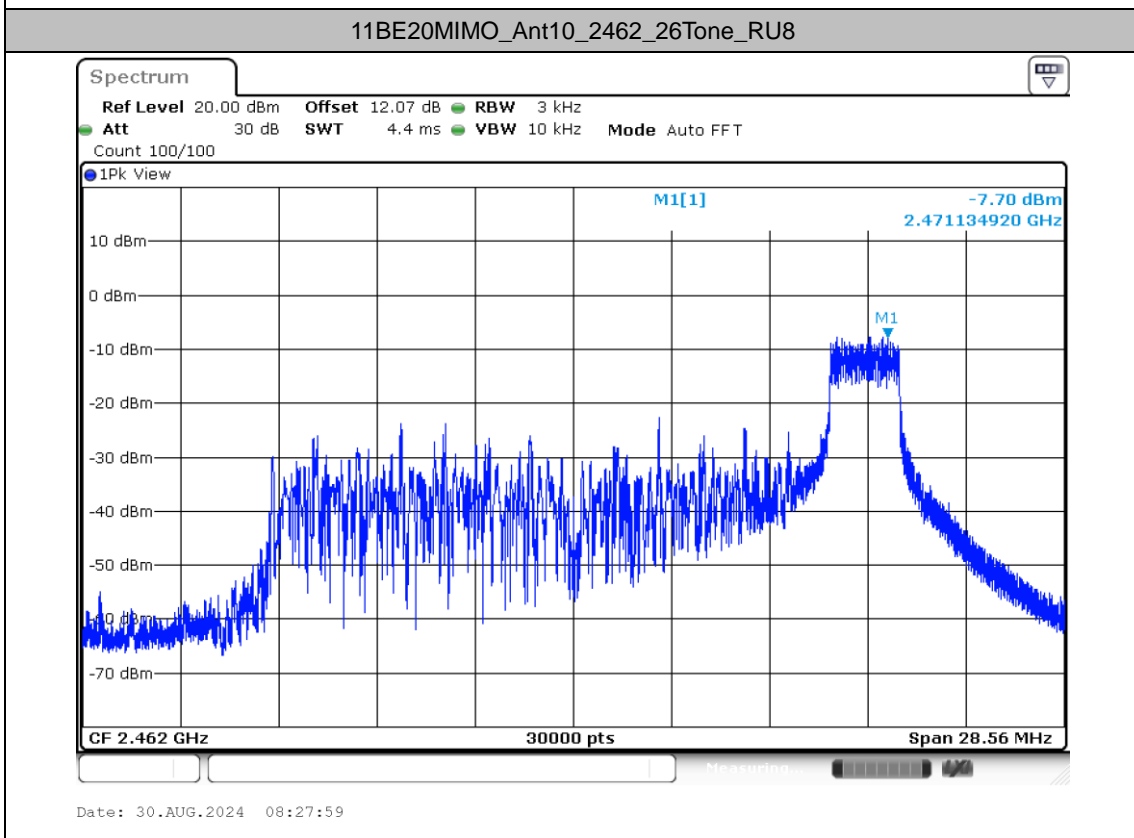
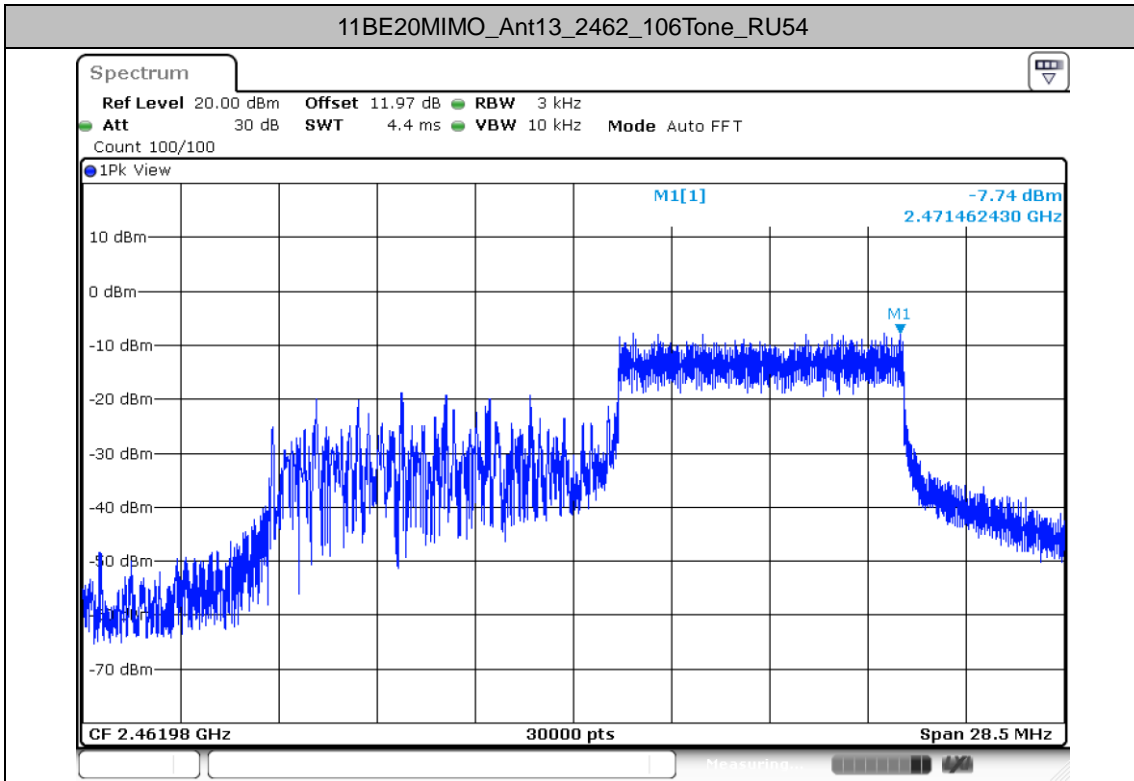




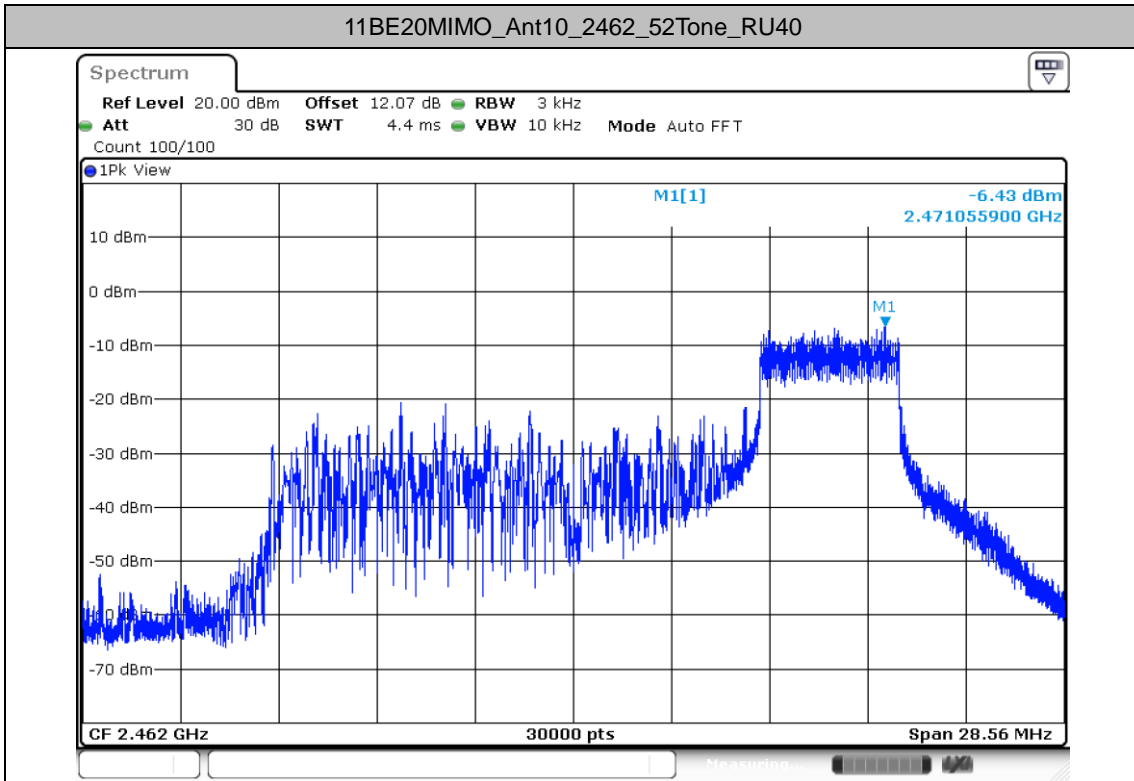
Date: 30.AUG.2024 08:27:16



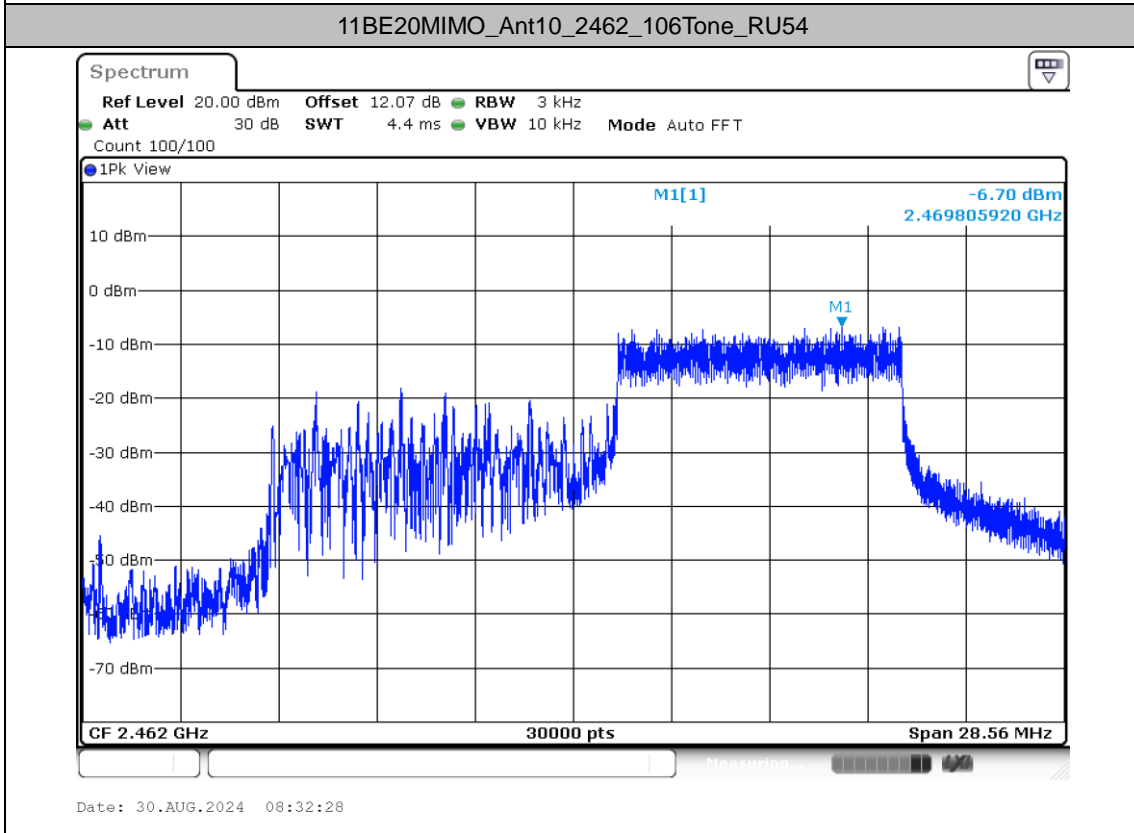
Date: 30.AUG.2024 08:30:10







Date: 30.AUG.2024 08:30:40



Date: 30.AUG.2024 08:32:28



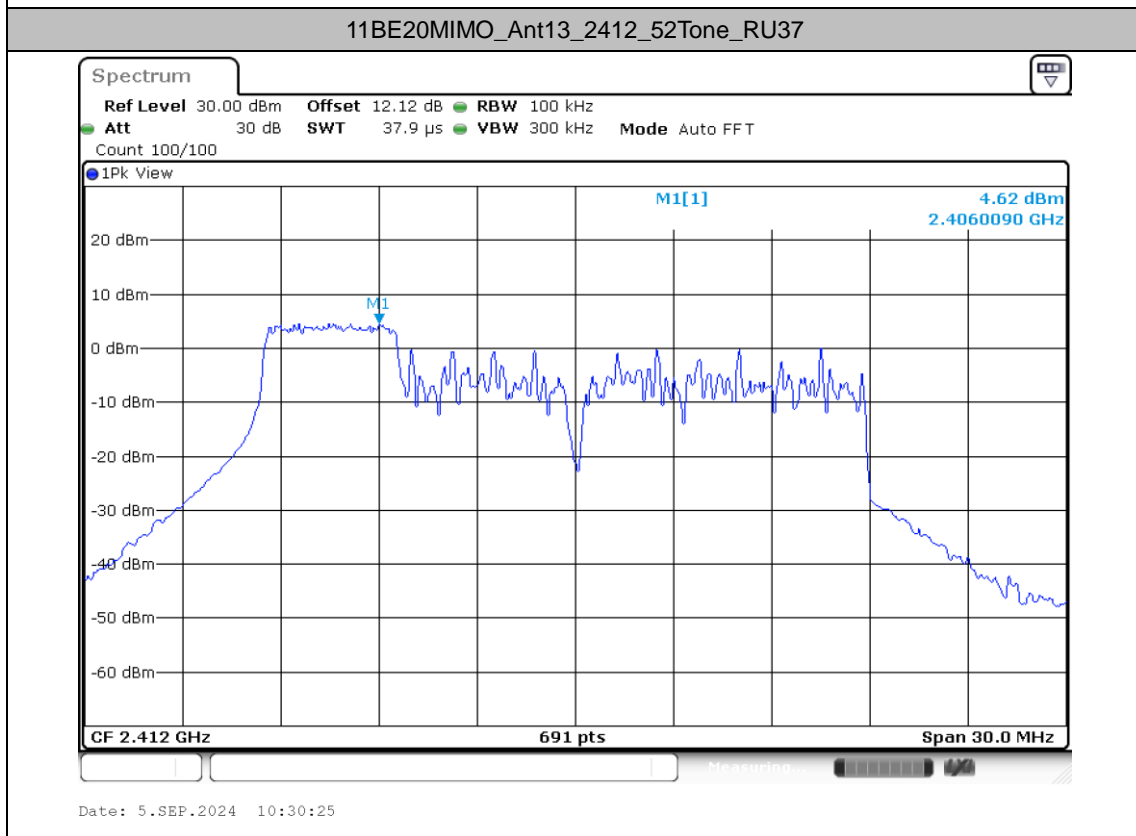
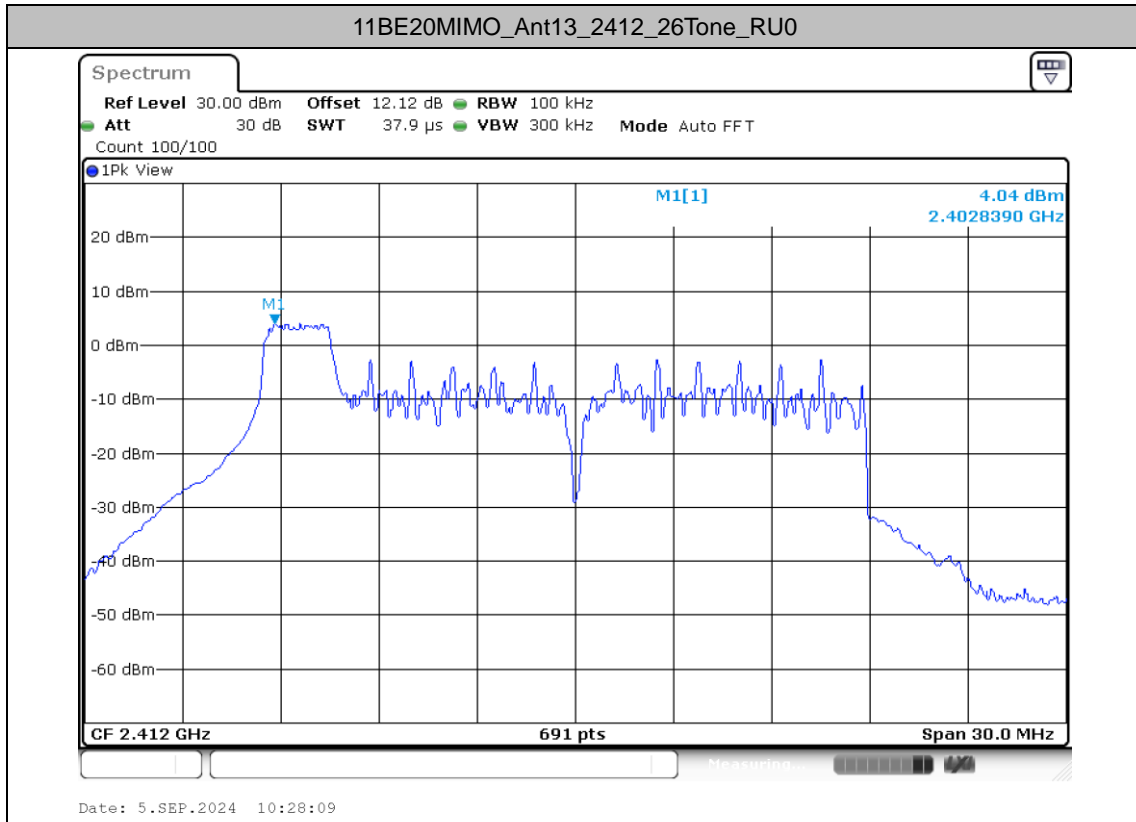
## Reference level measurement

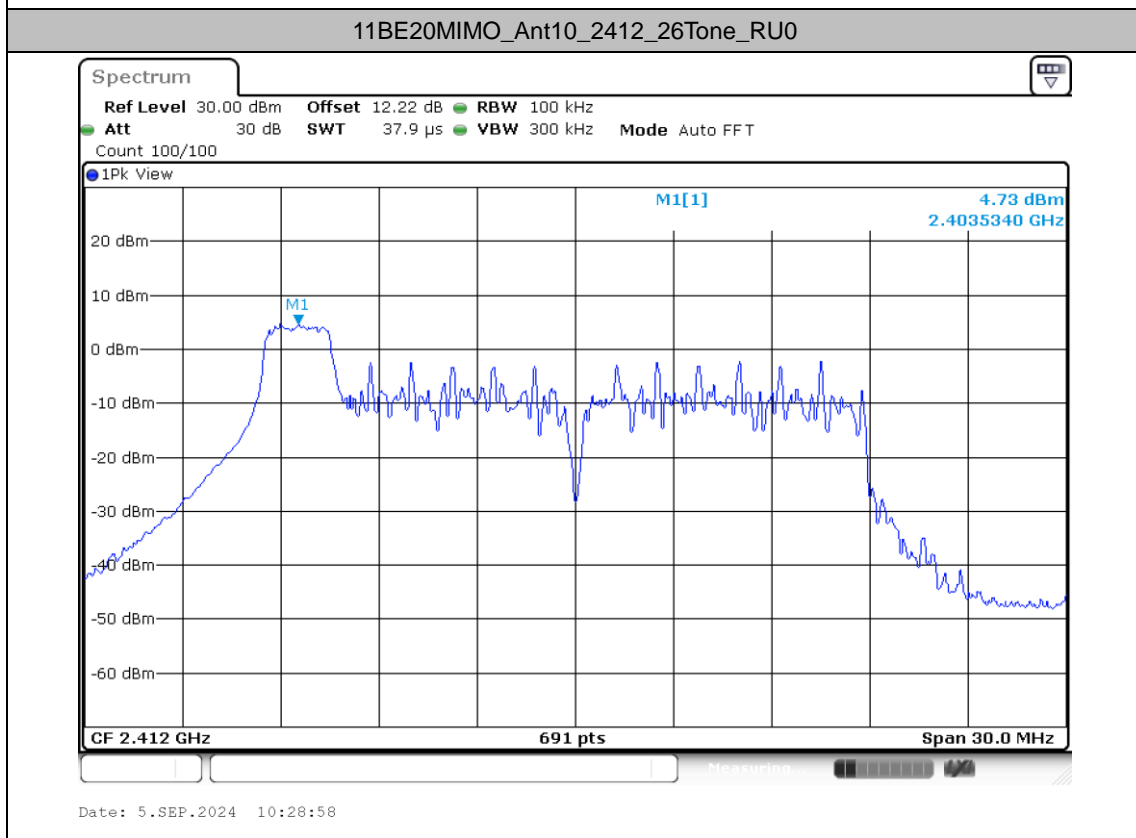
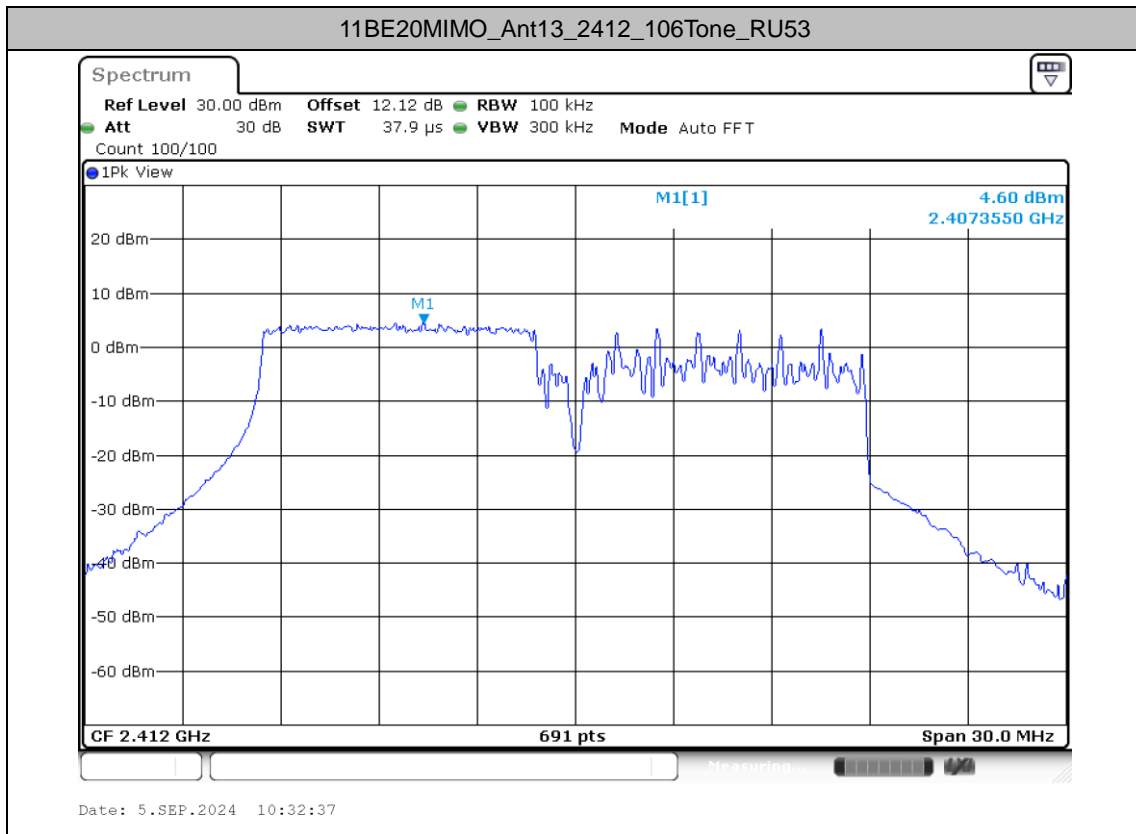
### Test Result

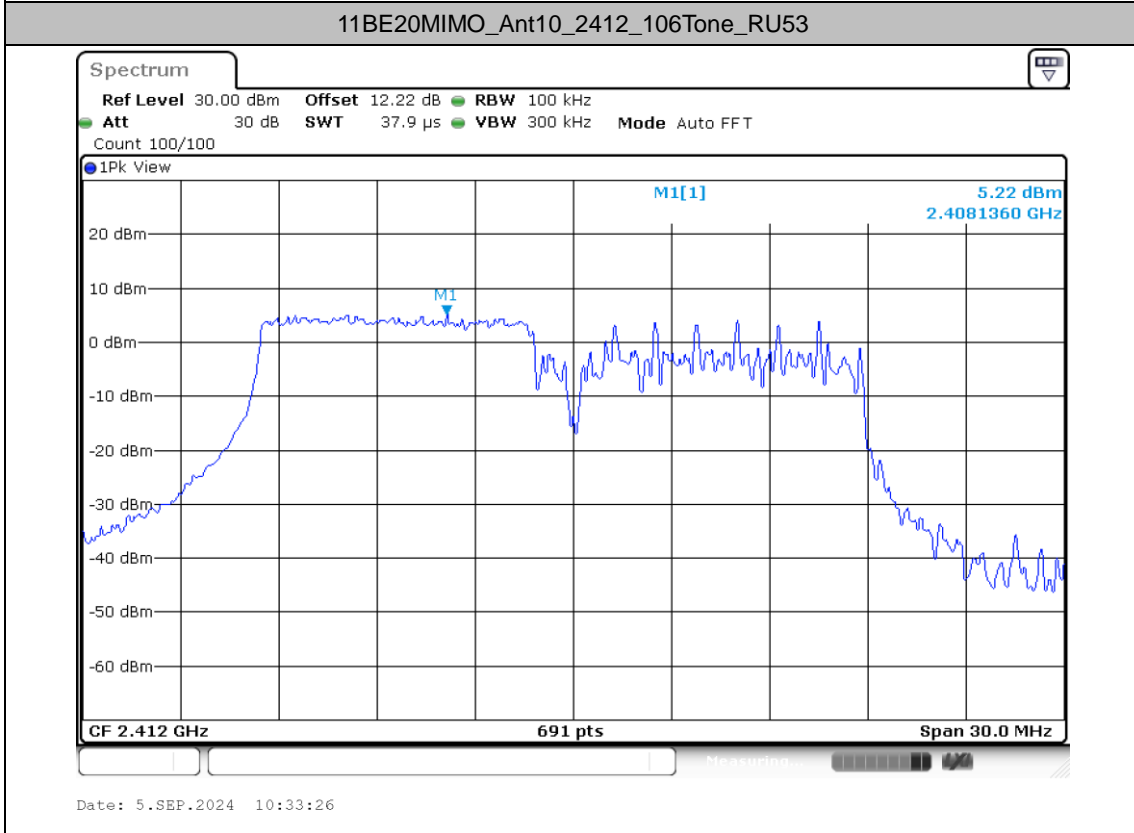
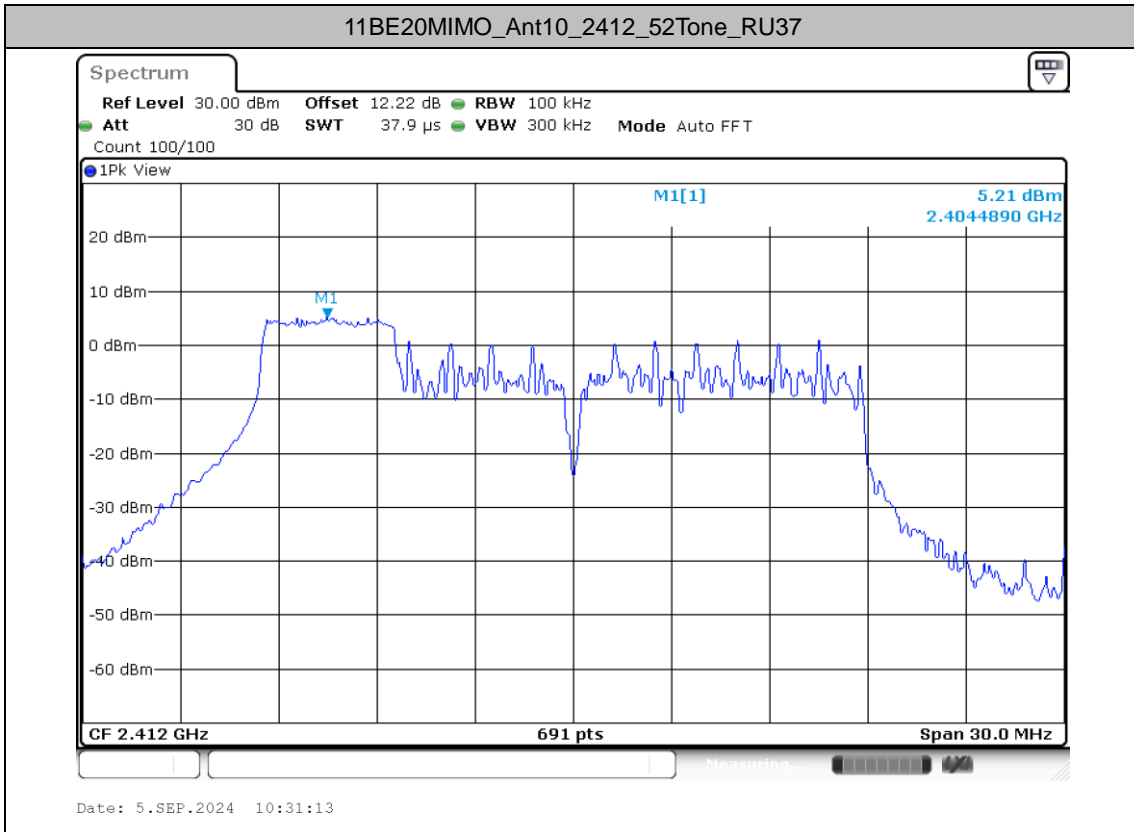
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm/100KHZ]
11BE20MIMO	Ant13	2412	2402.84	4.04
			2406.01	4.62
			2407.36	4.60
	Ant10	2412	2403.53	4.73
			2404.49	5.21
			2408.14	5.22
	Ant13	2462	2470.34	4.10
			2470.86	4.63
			2471.03	4.54
	Ant10	2462	2470.42	5.17
			2469.12	5.71
			2471.03	5.84

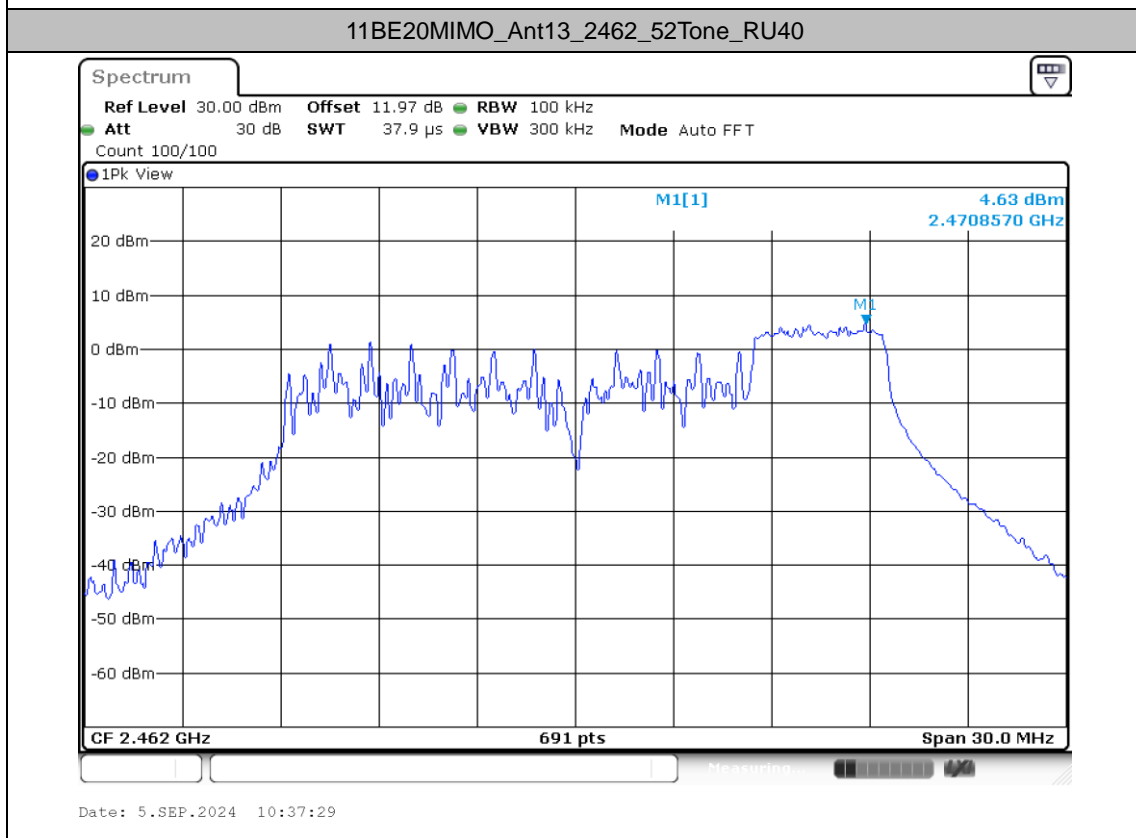
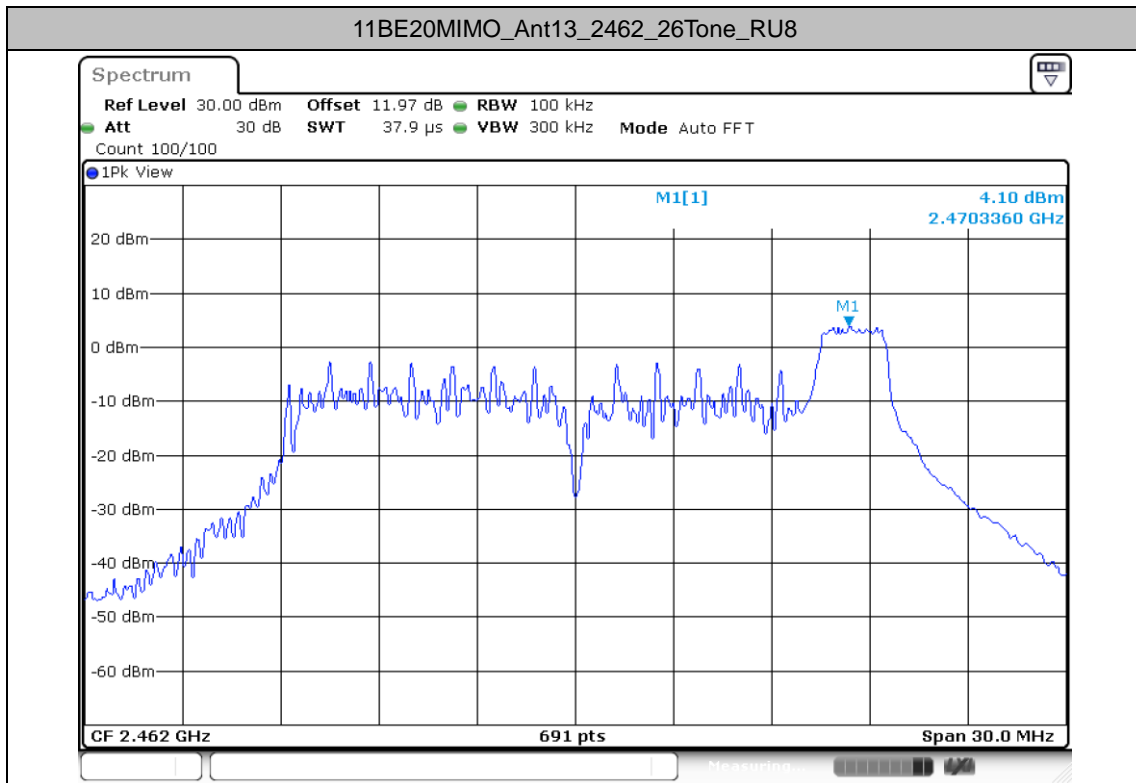


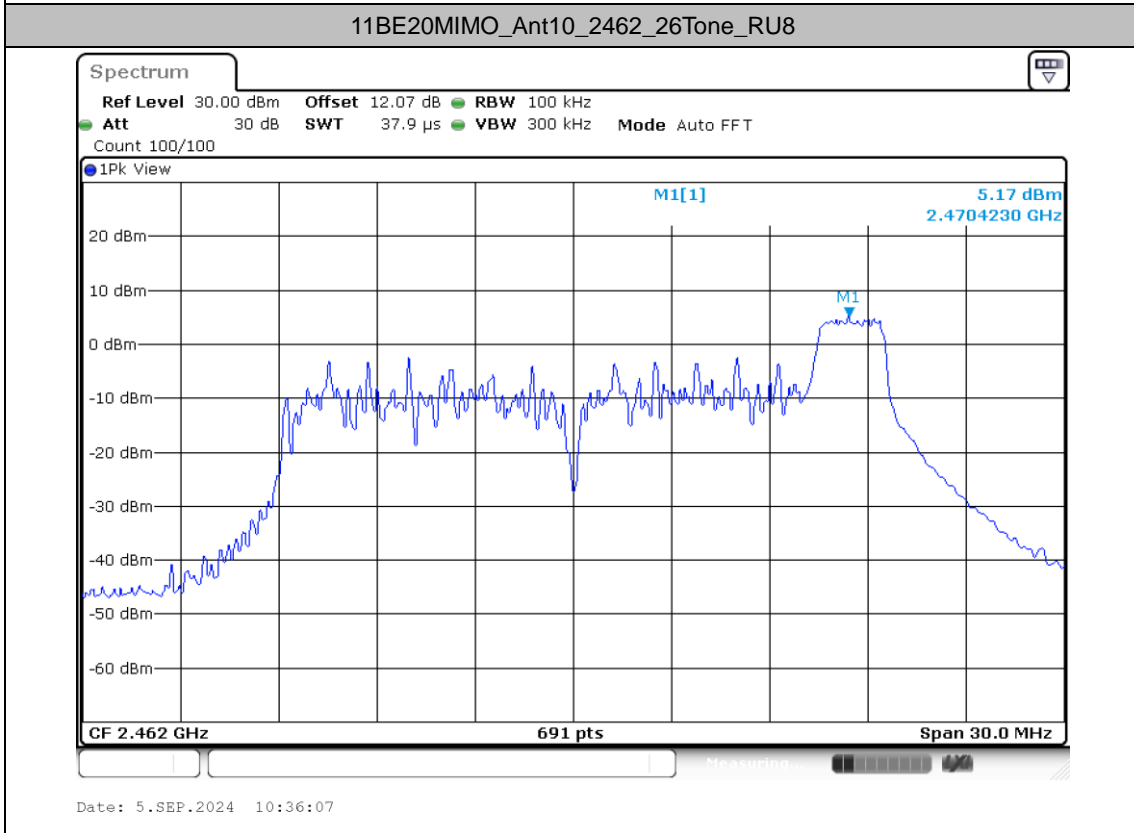
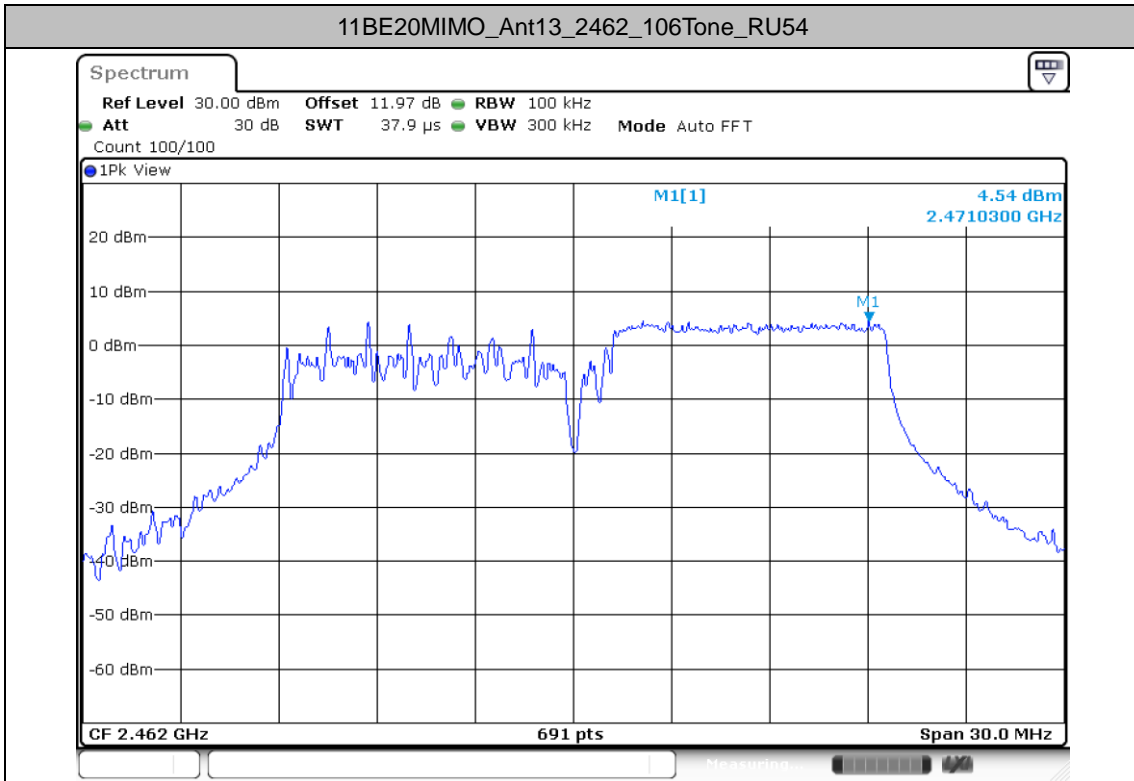
Test Graphs

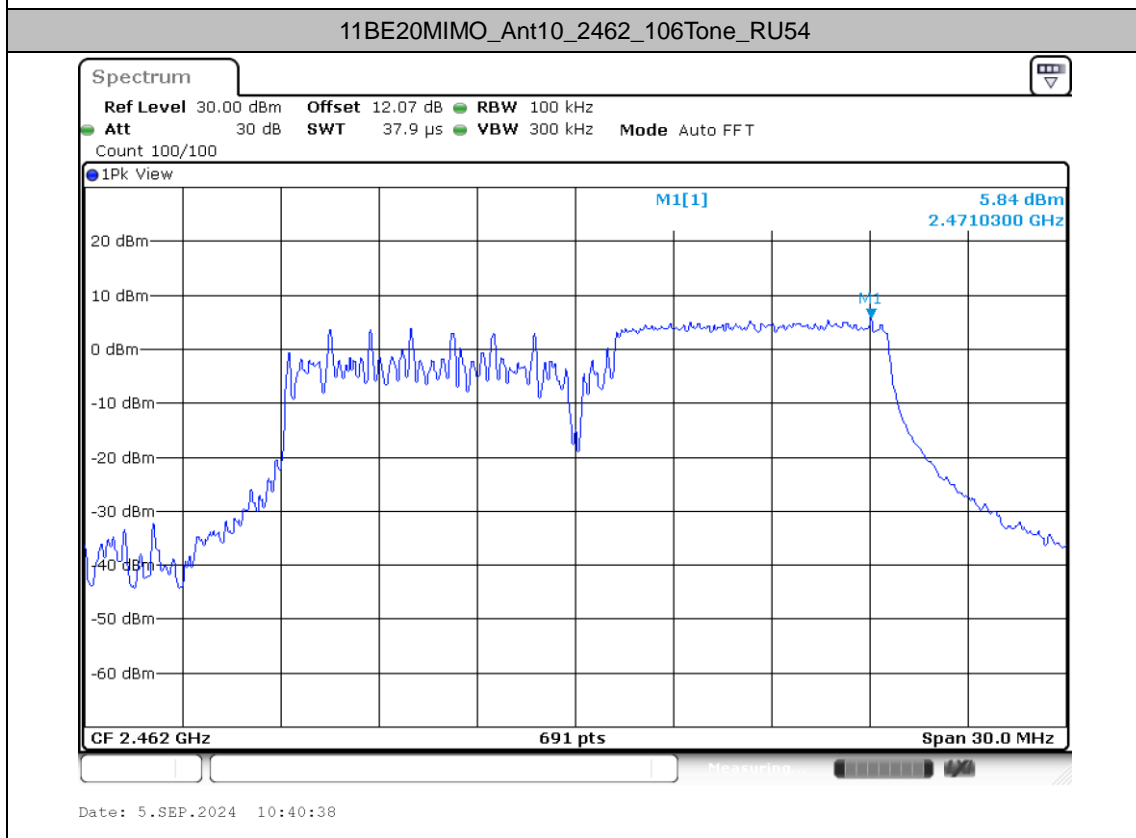
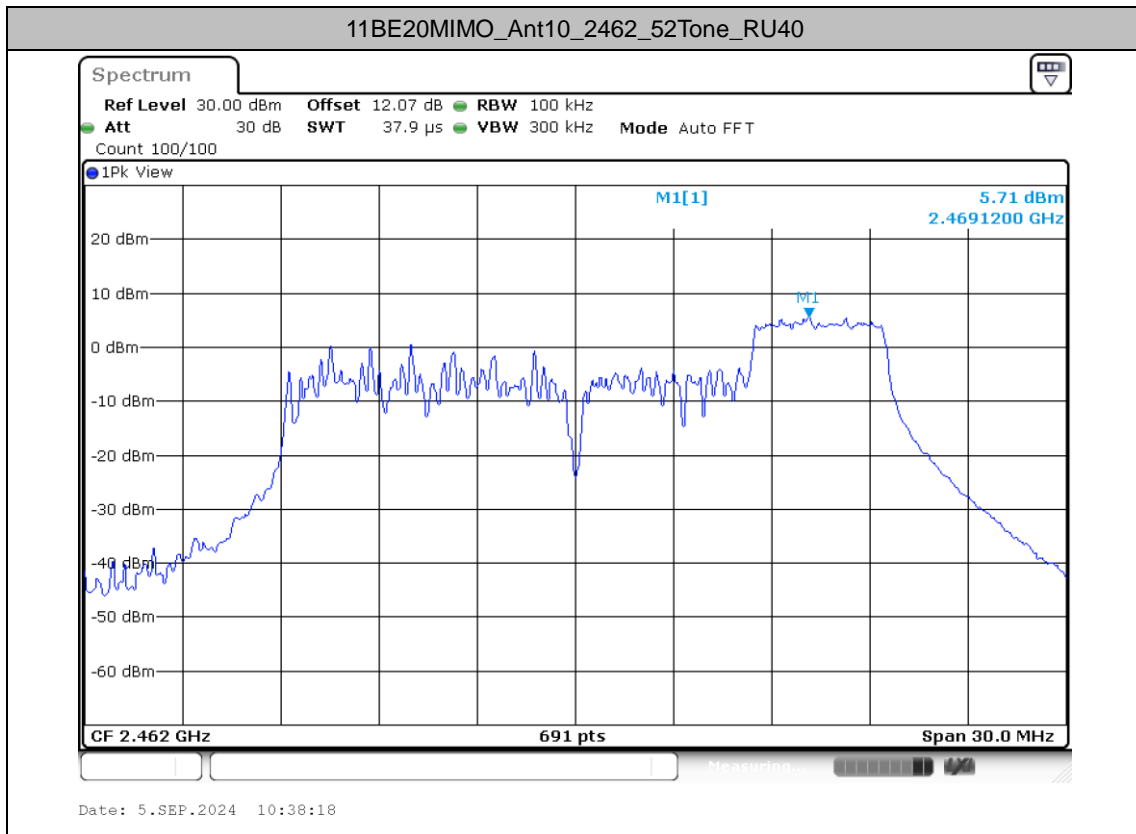
















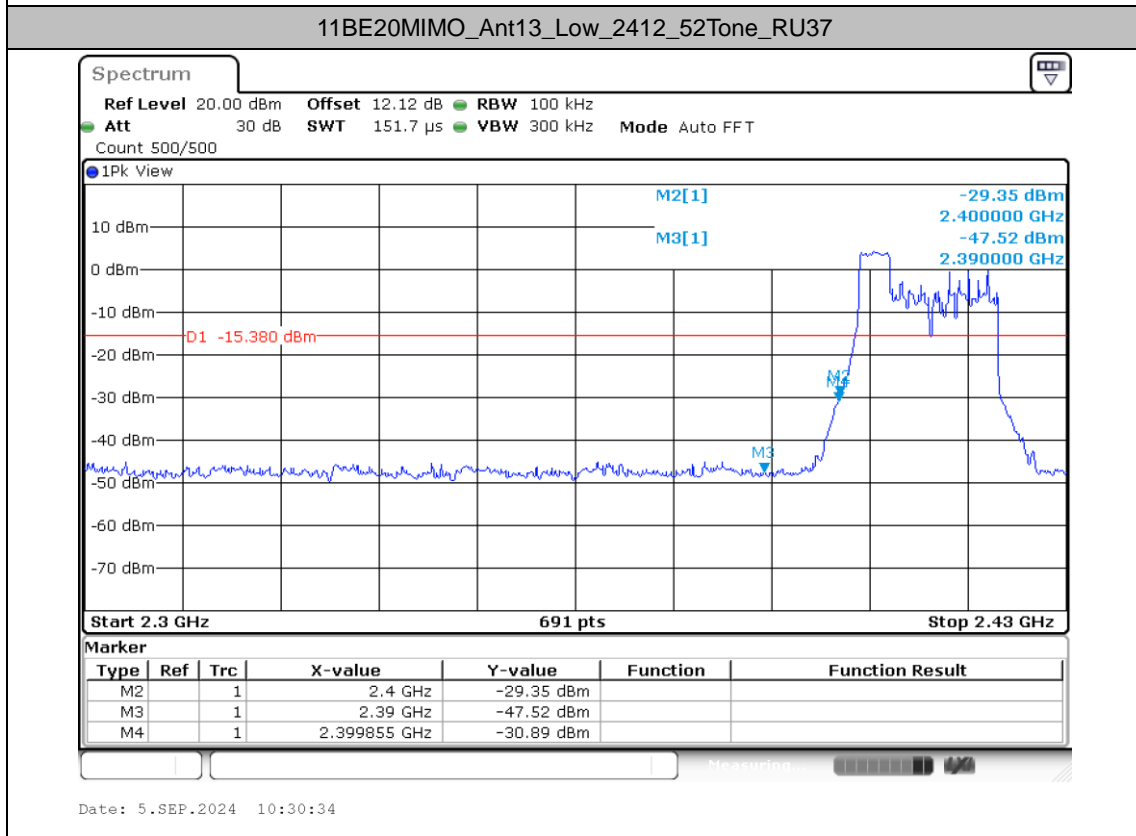
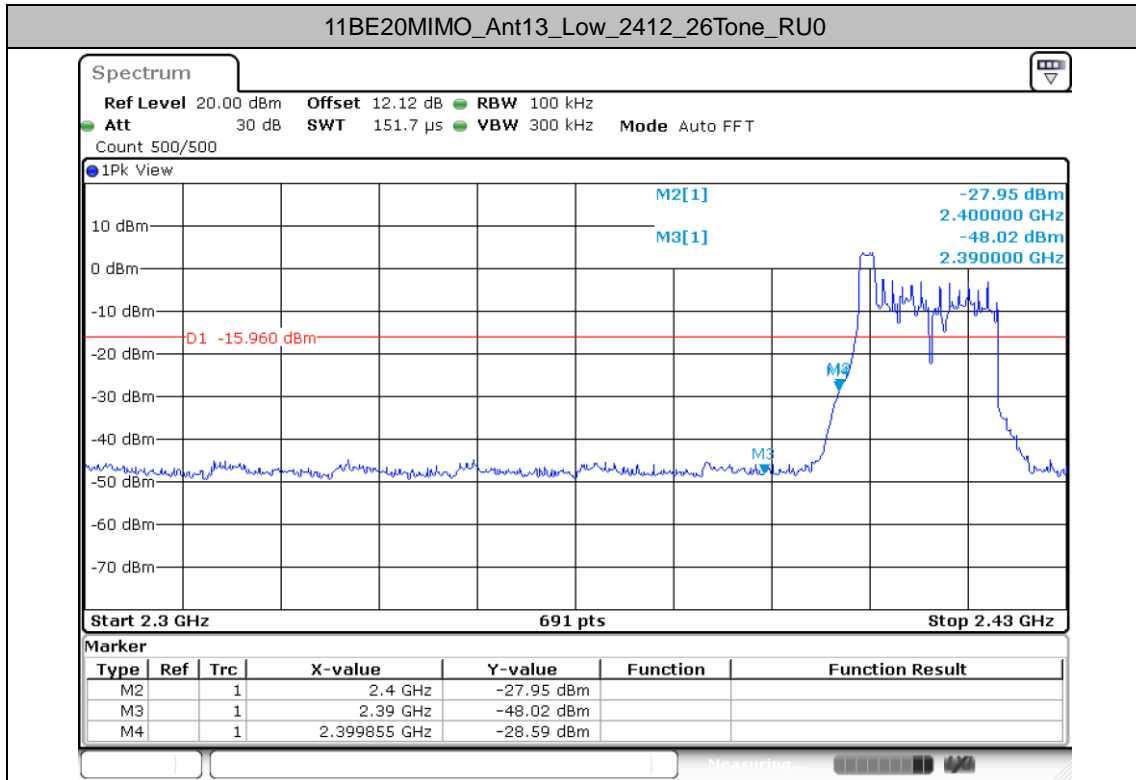
### Band edge measurements

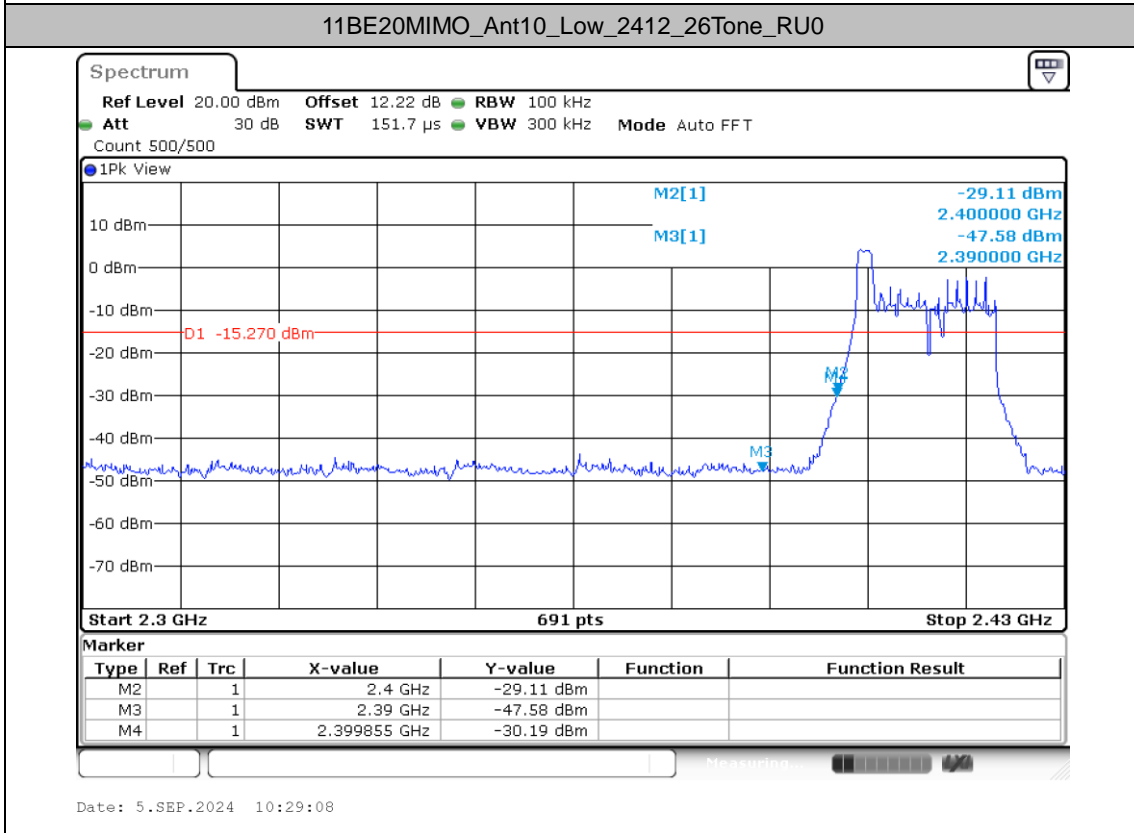
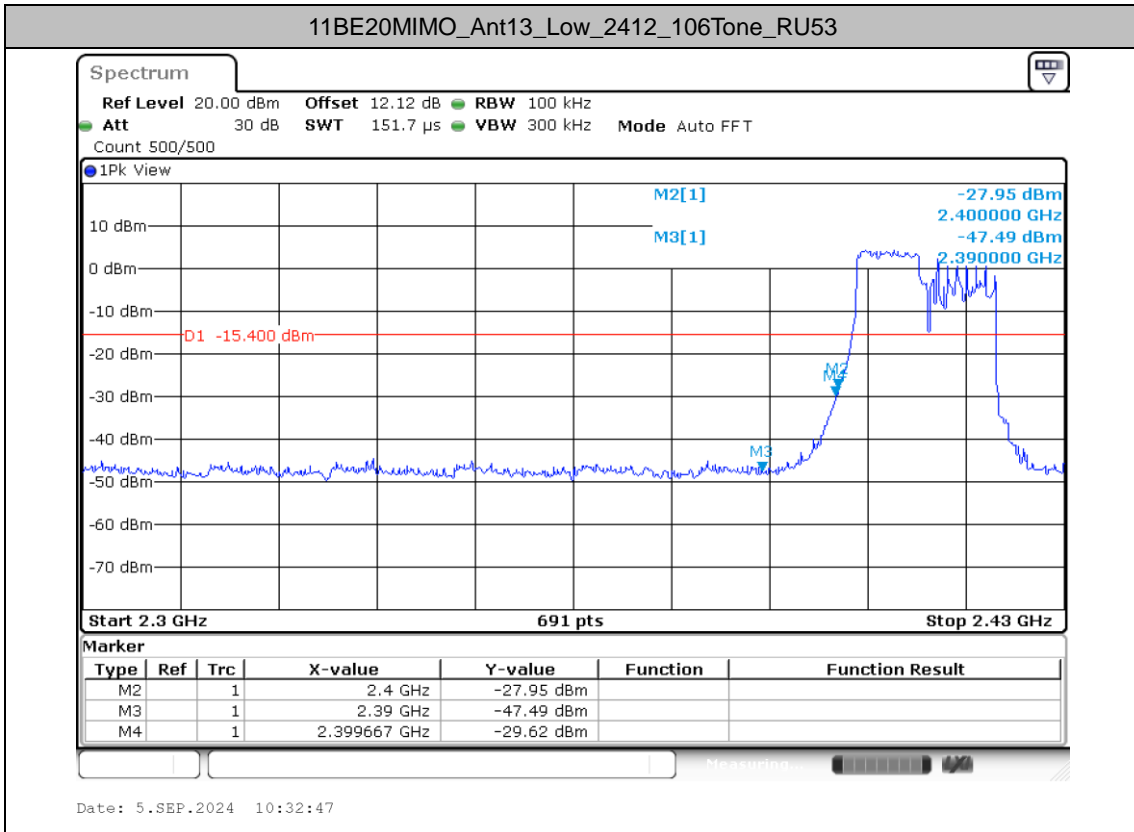
#### Test Result

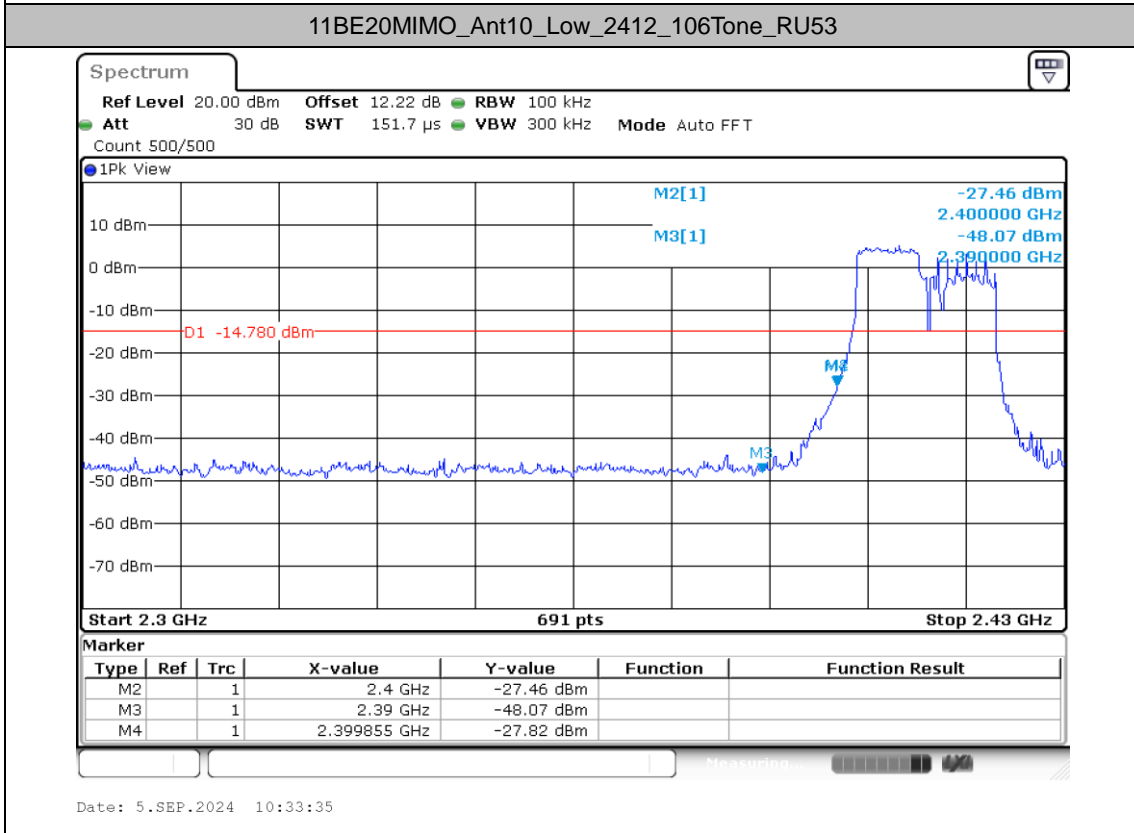
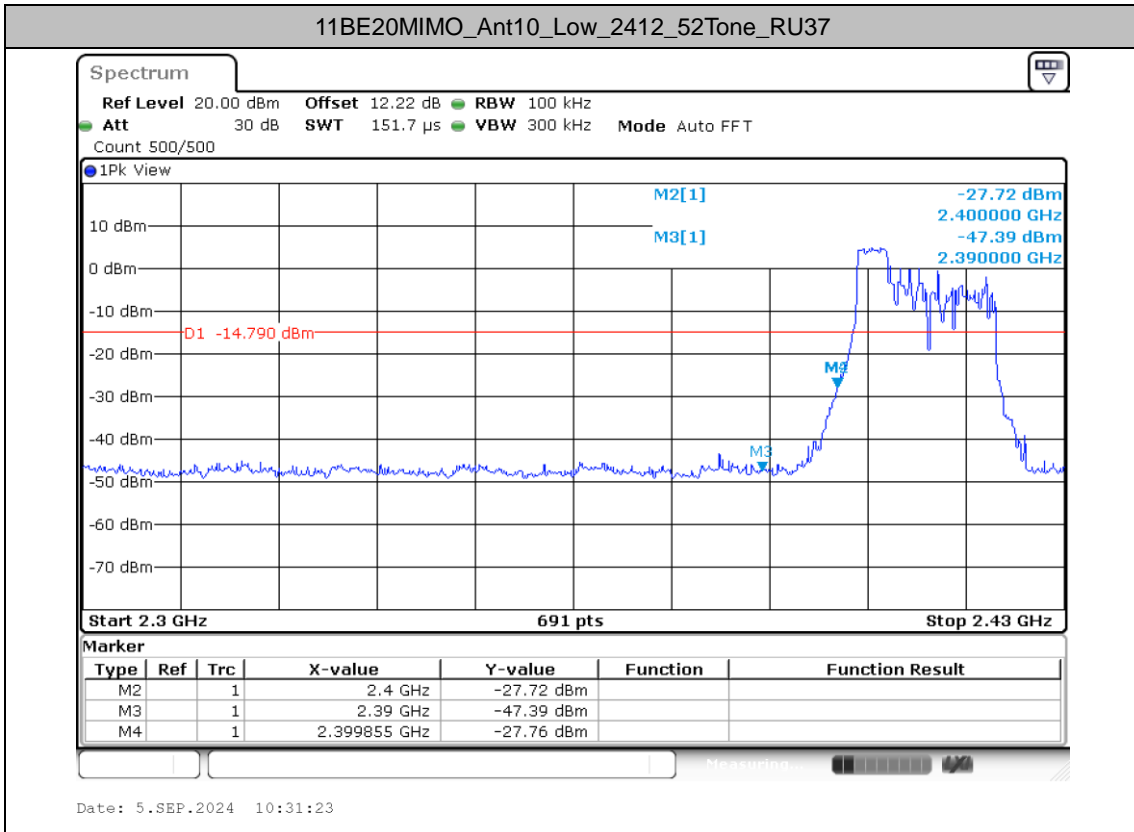
TestMode	Antenna	ChName	Freq(MHz)	Ru Size	Ru Index	RefLevel [dBm/100KHZ]	Result [dBm/100KHZ]	Limit [dBm/100KHZ]	Verdict
11BE20MIMO	Ant13	Low	2412	26Tone	RU0	4.04	-28.59	≤-15.96	PASS
				52Tone	RU37	4.62	-30.89	≤-15.38	PASS
				106Tone	RU53	4.60	-29.62	≤-15.4	PASS
	Ant10	Low	2412	26Tone	RU0	4.73	-30.19	≤-15.27	PASS
				52Tone	RU37	5.21	-27.76	≤-14.79	PASS
				106Tone	RU53	5.22	-27.82	≤-14.78	PASS
	Ant13	High	2462	26Tone	RU8	4.10	-44.38	≤-15.9	PASS
				52Tone	RU40	4.63	-44.77	≤-15.37	PASS
				106Tone	RU54	4.54	-44.17	≤-15.46	PASS
	Ant10	High	2462	26Tone	RU8	5.17	-43.92	≤-14.83	PASS
				52Tone	RU40	5.71	-43.56	≤-14.29	PASS
				106Tone	RU54	5.84	-44	≤-14.16	PASS

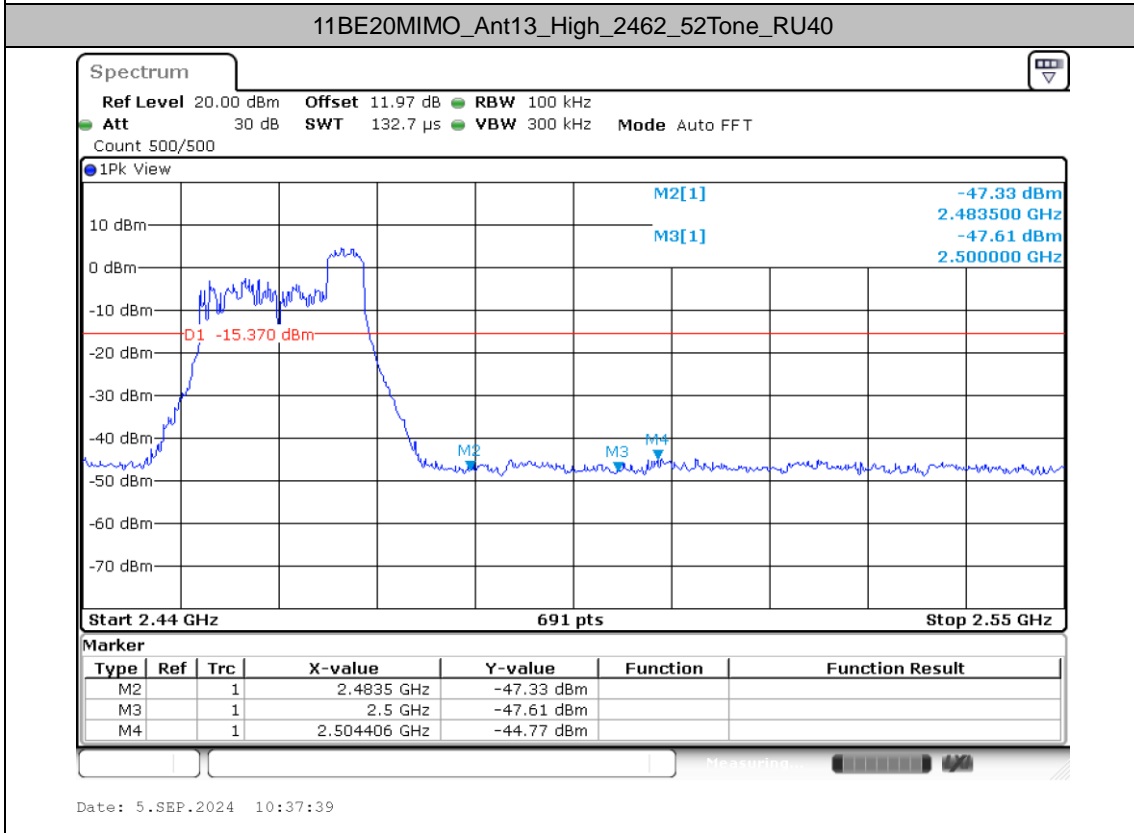
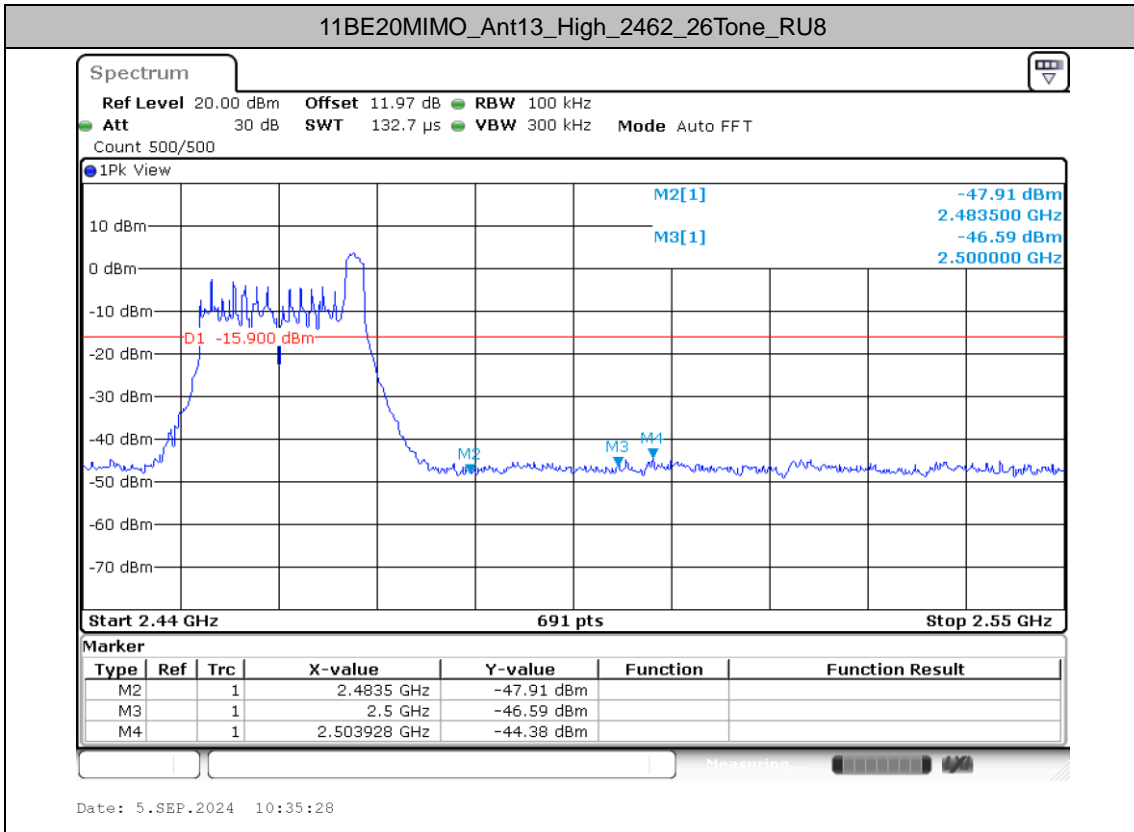


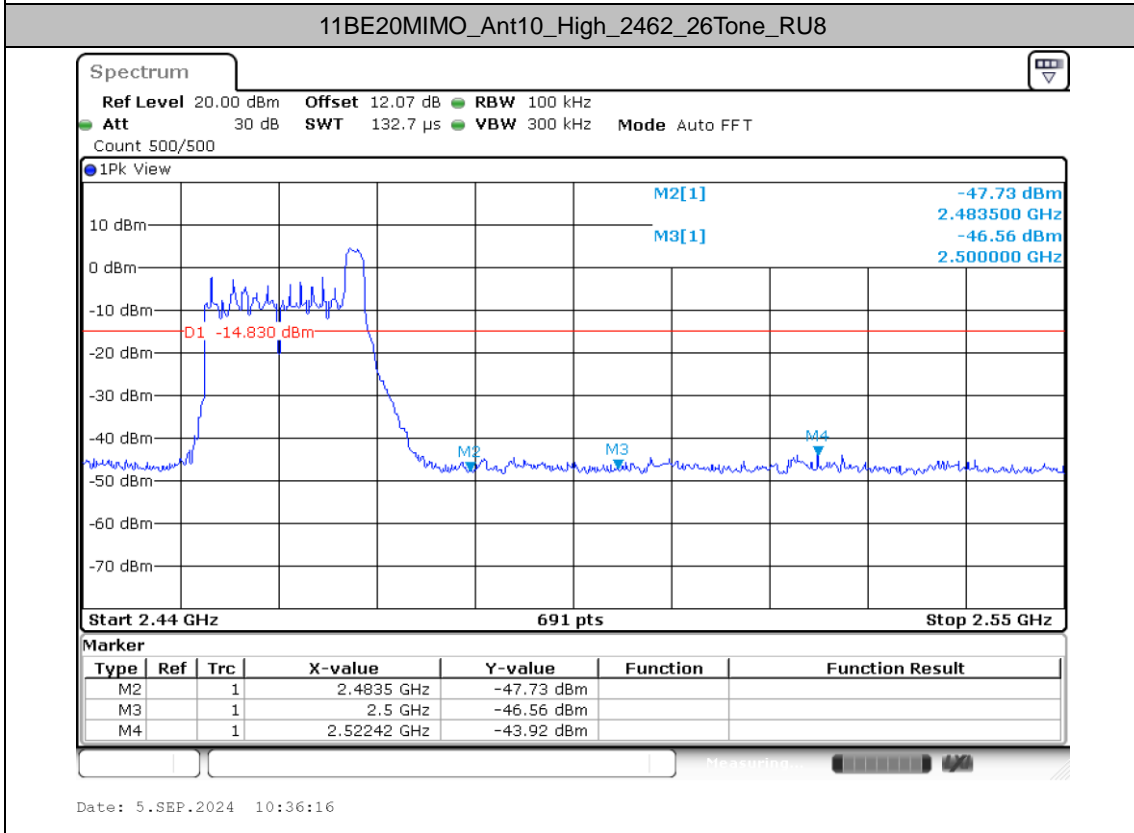
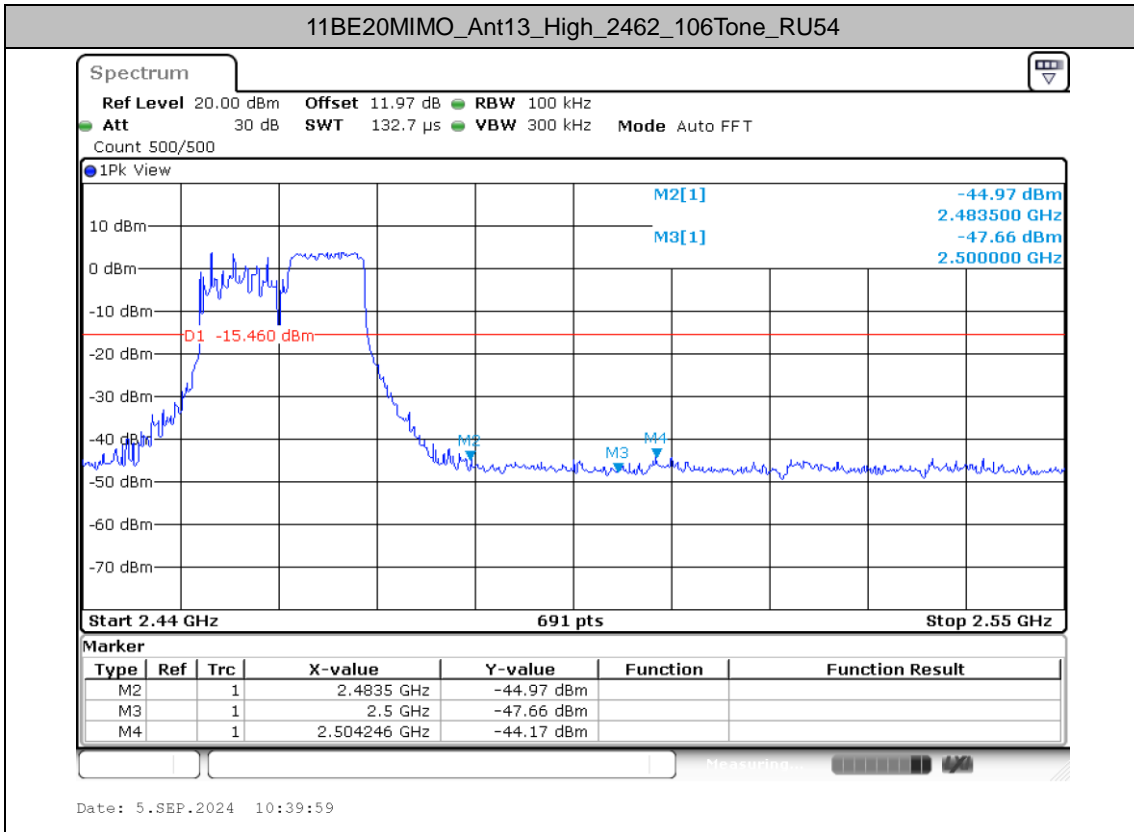
Test Graphs

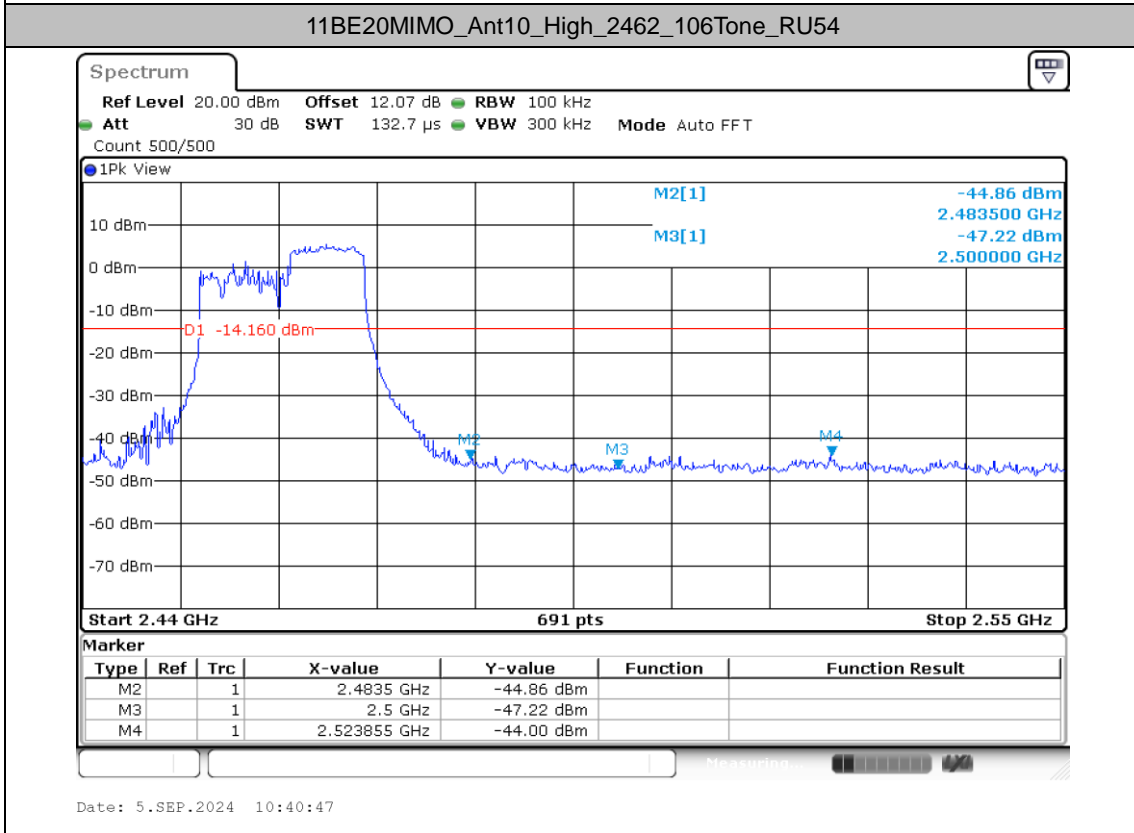
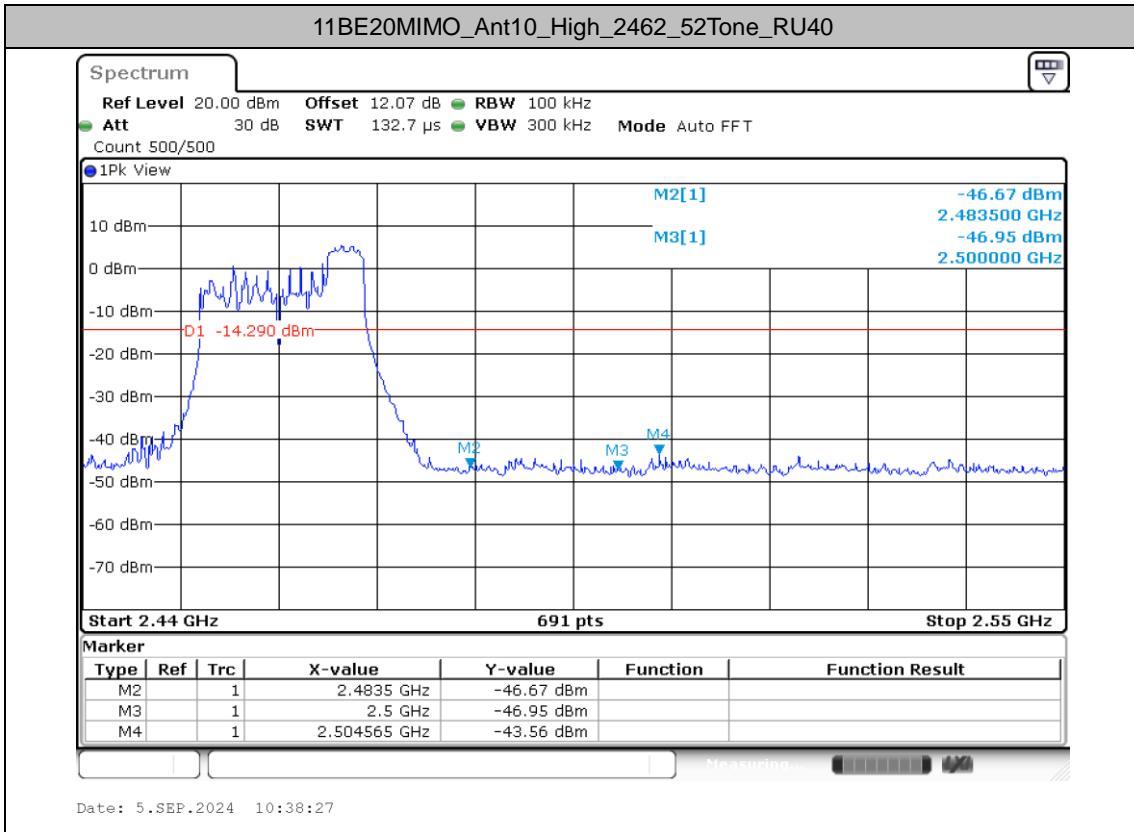














### Conducted Spurious Emission

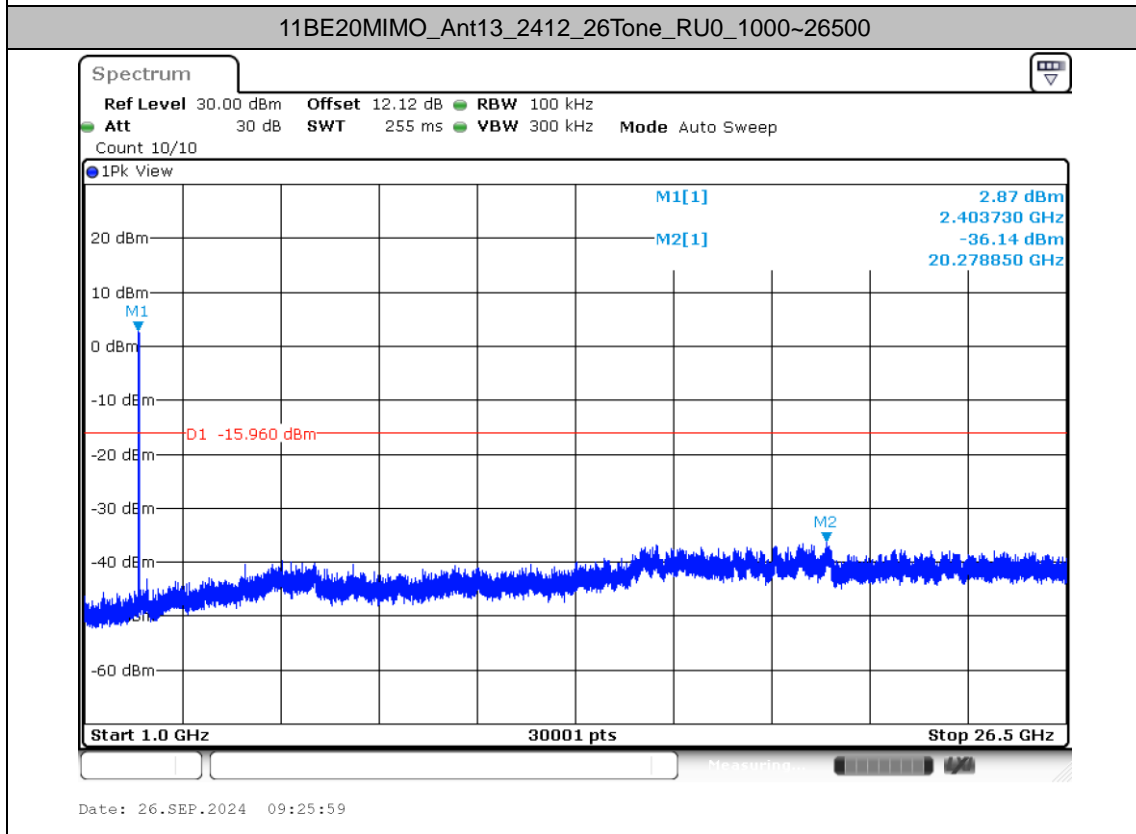
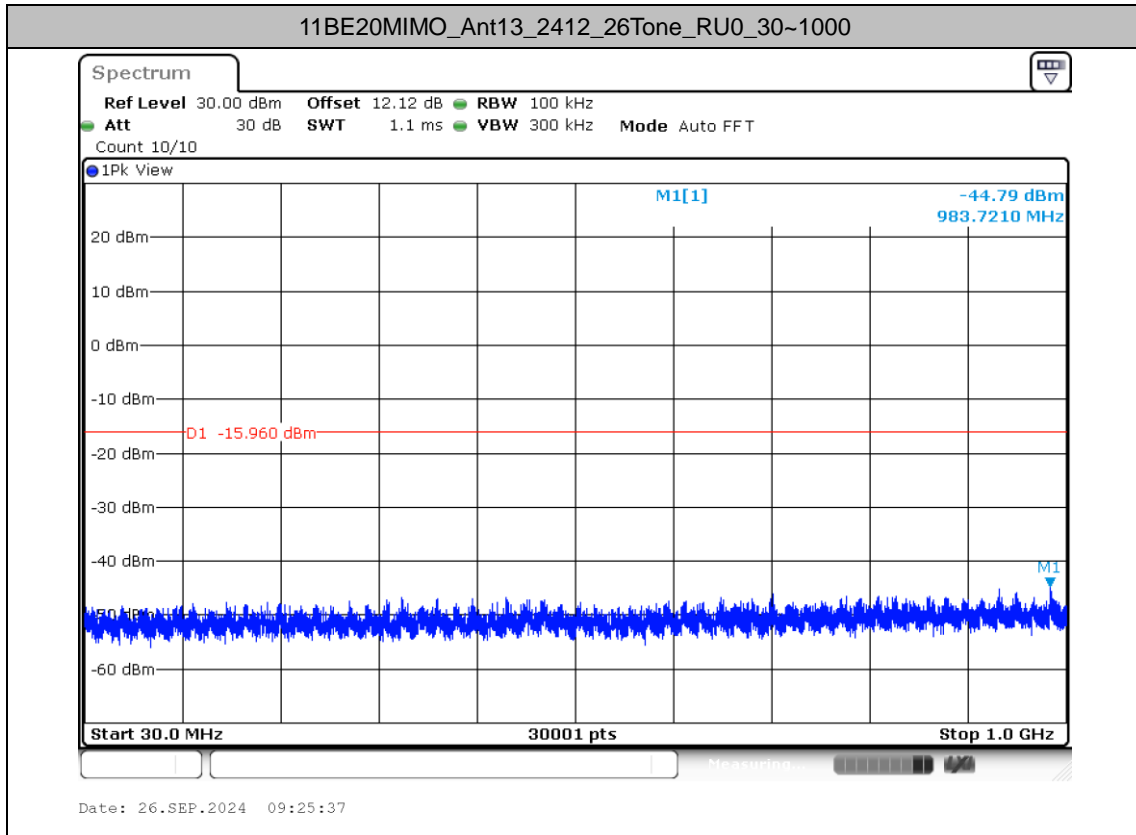
#### Test Result

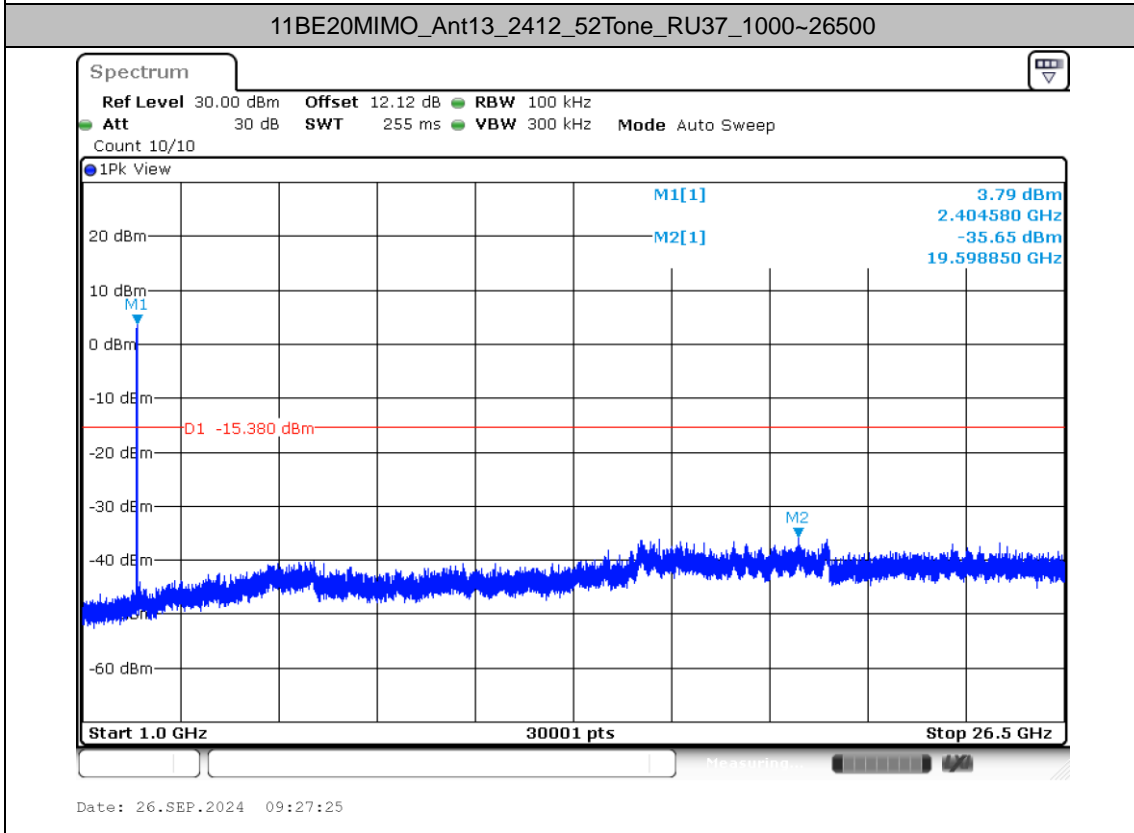
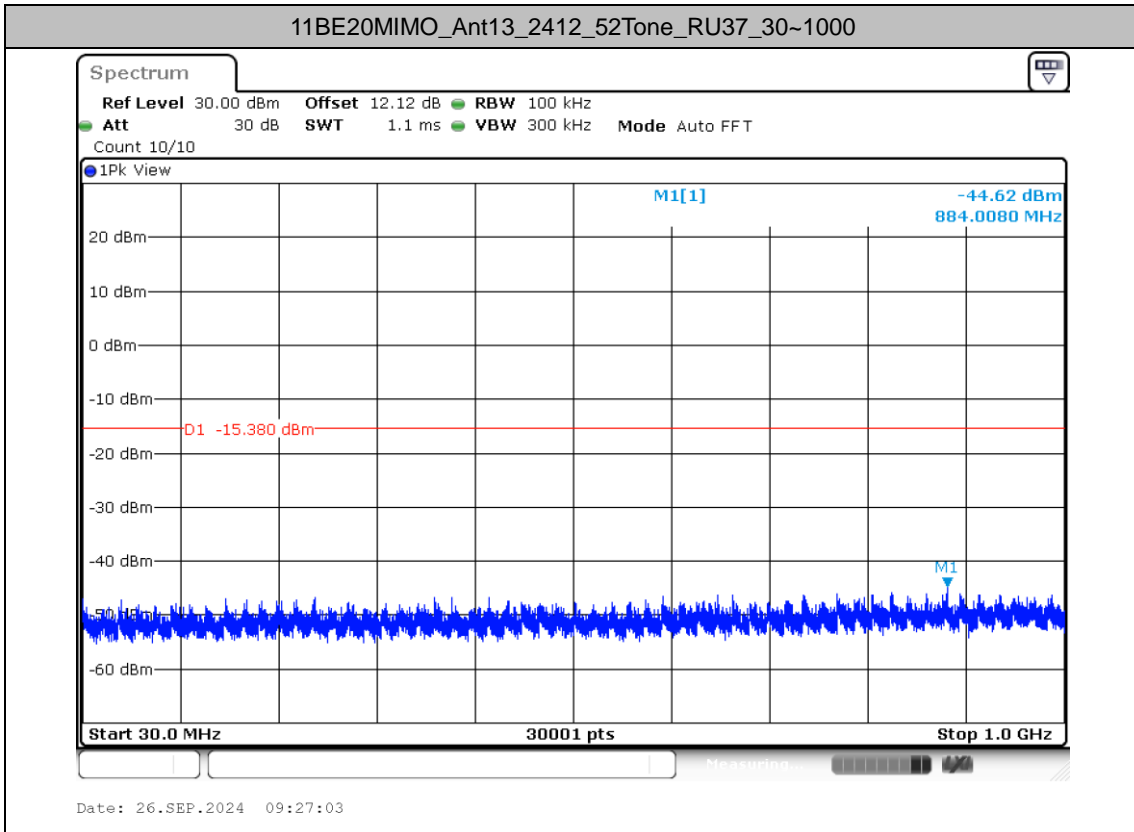
TestMode	Antenna	Freq(MHz)	Ru Size	Ru Index	FreqRange [Mhz]	RefLevel [dBm/100KHZ]	Result [dBm/100KHZ]	Limit [dBm/100KHZ]	Verdict
11BE20MIMO	Ant13	2412	26Tone	RU0	30~1000	4.04	-44.79	≤-15.96	PASS
				RU0	1000~26500	4.04	-36.14	≤-15.96	PASS
			52Tone	RU37	30~1000	4.62	-44.62	≤-15.38	PASS
				RU37	1000~26500	4.62	-35.65	≤-15.38	PASS
			106Tone	RU53	30~1000	4.60	-45.00	≤-15.4	PASS
				RU53	1000~26500	4.60	-35.73	≤-15.4	PASS
	Ant10	2412	26Tone	RU0	30~1000	4.73	-45.40	≤-15.27	PASS
				RU0	1000~26500	4.73	-36.04	≤-15.27	PASS
			52Tone	RU37	30~1000	5.21	-44.53	≤-14.79	PASS
				RU37	1000~26500	5.21	-35.64	≤-14.79	PASS
			106Tone	RU53	30~1000	5.22	-45.39	≤-14.78	PASS
				RU53	1000~26500	5.22	-35.54	≤-14.78	PASS
	Ant13	2462	26Tone	RU8	30~1000	4.10	-45.63	≤-15.9	PASS
				RU8	1000~26500	4.10	-36.24	≤-15.9	PASS
			52Tone	RU40	30~1000	4.63	-44.61	≤-15.37	PASS
				RU40	1000~26500	4.63	-35.95	≤-15.37	PASS
			106Tone	RU54	30~1000	4.54	-44.60	≤-15.46	PASS
				RU54	1000~26500	4.54	-35.97	≤-15.46	PASS
	Ant10	2462	26Tone	RU8	30~1000	5.17	-45.66	≤-14.83	PASS
				RU8	1000~26500	5.17	-35.88	≤-14.83	PASS
52Tone			RU40	30~1000	5.71	-44.69	≤-14.29	PASS	
			RU40	1000~26500	5.71	-35.82	≤-14.29	PASS	
106Tone			RU54	30~1000	5.84	-45.49	≤-14.16	PASS	
			RU54	1000~26500	5.84	-35.70	≤-14.16	PASS	

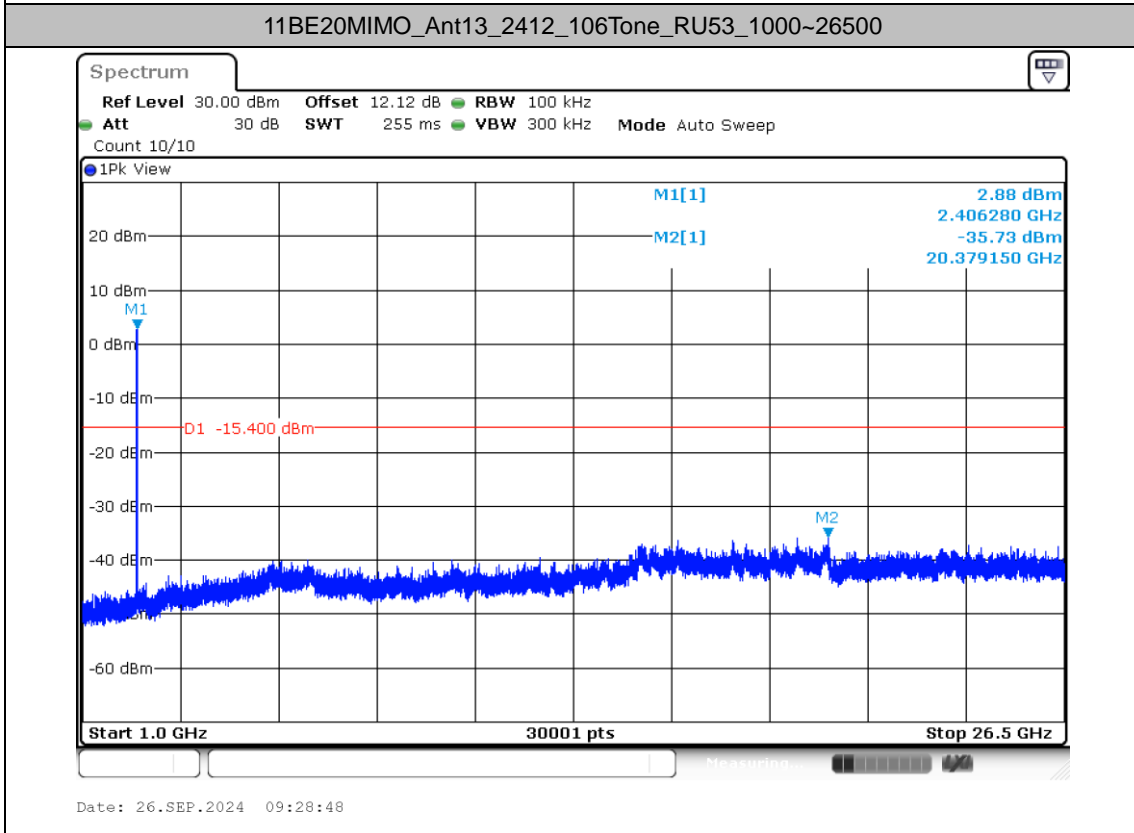
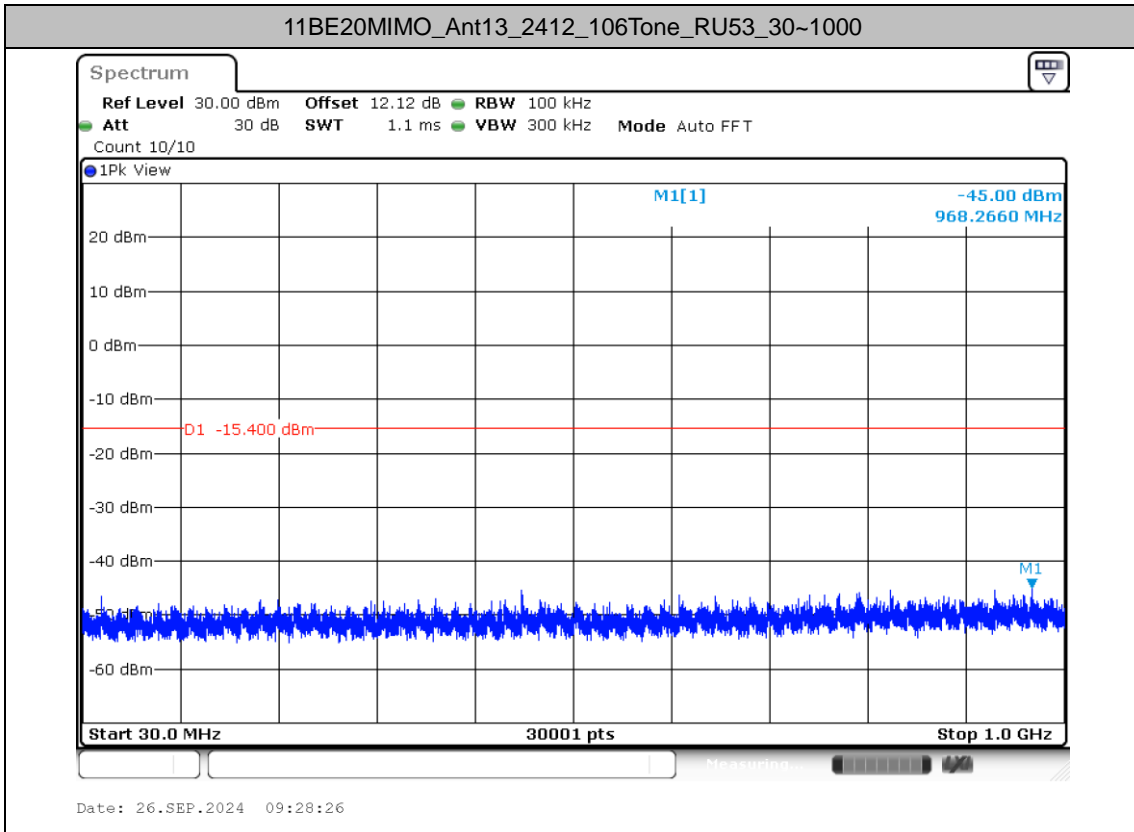


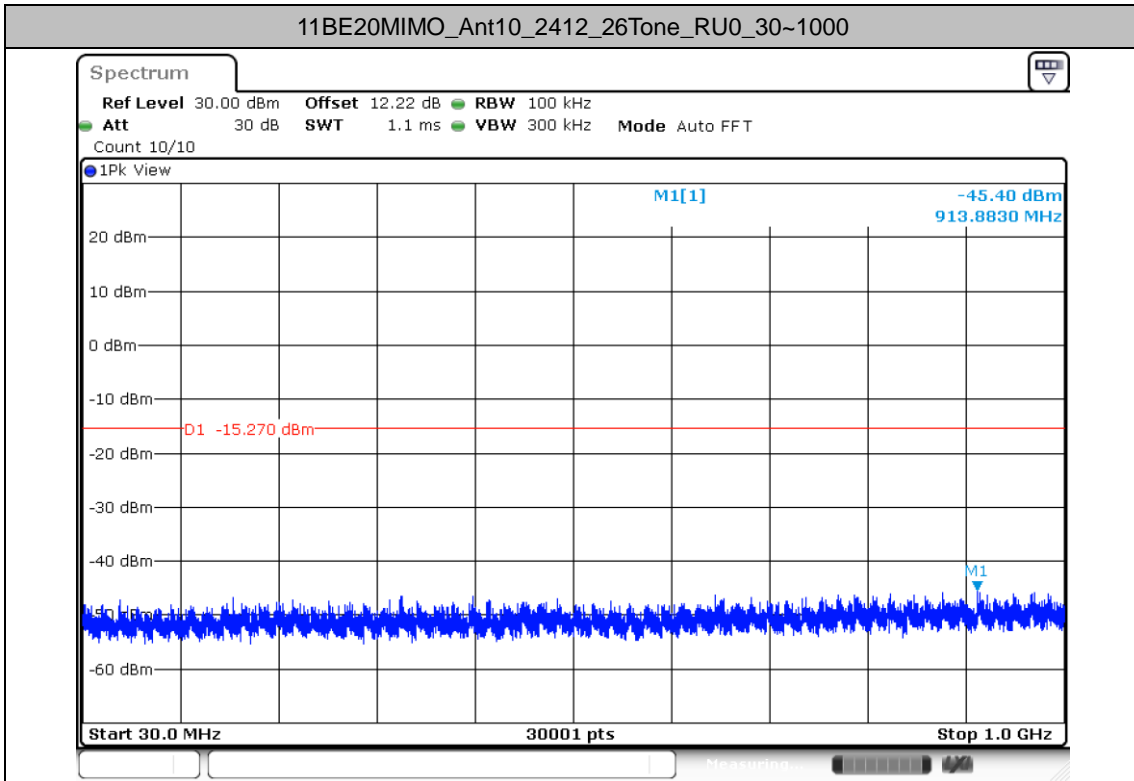


### Test Graphs

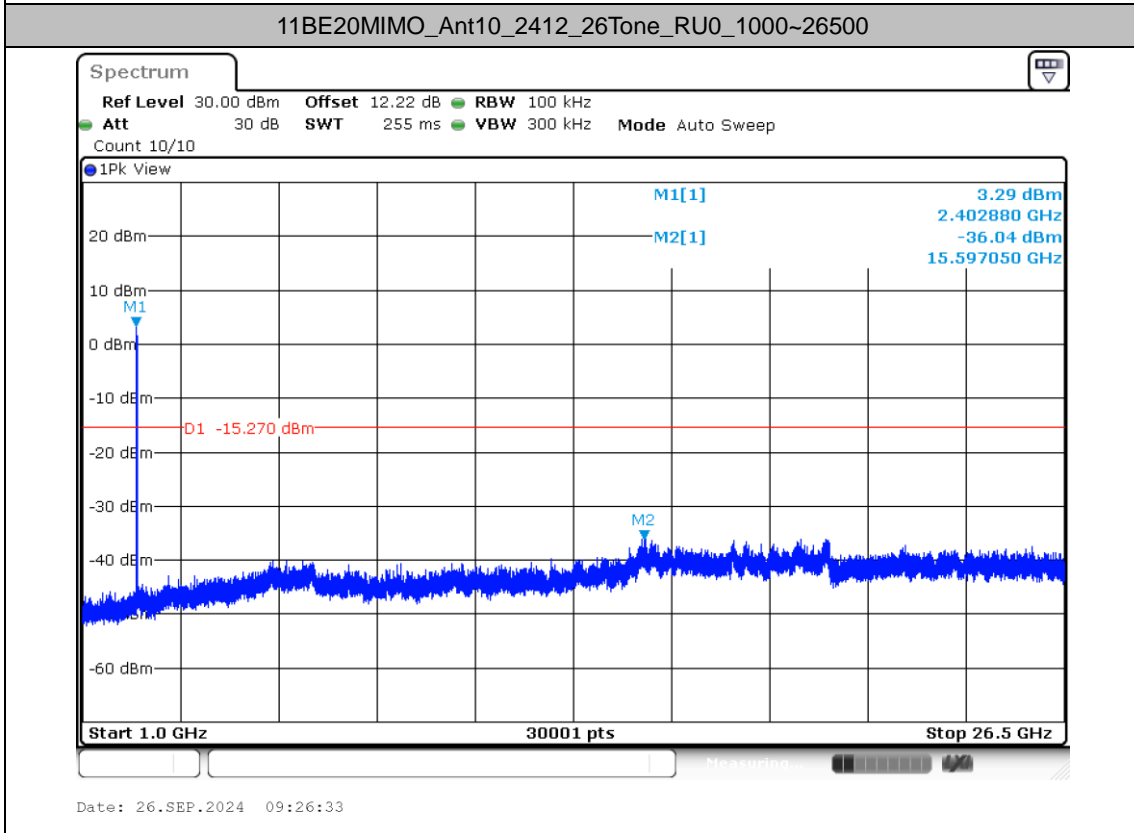








Date: 26.SEP.2024 09:26:11



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