



FCC PART 15C TEST REPORT

No.24T04Z101589-008

for

POINTMOBILE CO., LTD

Mobile Computer

PM452

FCC ID: V2X-PM452W

with

Hardware Version: MP

Software Version: 452.00.XX

Issued Date: 2024-09-06

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z101589-008	Rev.0	1st edition	2024-09-06

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. TEST LABORATORY	5
1.1. INTRODUCTION & ACCREDITATION	5
1.2. TESTING LOCATION	5
1.3. TESTING ENVIRONMENT.....	6
1.4. PROJECT DATE	6
1.5. SIGNATURE	6
2. CLIENT INFORMATION.....	7
2.1. APPLICANT INFORMATION	7
2.2. MANUFACTURER INFORMATION	7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	8
3.1. ABOUT EUT	8
3.2. INTERNAL IDENTIFICATION OF EUT	8
3.3. INTERNAL IDENTIFICATION OF AE.....	8
3.4. GENERAL DESCRIPTION.....	8
3.5. INTERPRETATION OF THE TEST ENVIRONMENT.....	8
4. REFERENCE DOCUMENTS.....	9
4.1. DOCUMENTS SUPPLIED BY APPLICANT	9
4.2. REFERENCE DOCUMENTS FOR TESTING	9
5. LABORATORY ENVIRONMENT.....	10
6. TEST RESULTS	10
6.1. SUMMARY OF TEST RESULTS.....	10
6.2. STATEMENTS.....	10
6.3. TEST CONDITIONS	10
7. TEST FACILITIES UTILIZED	11
8. MEASUREMENT UNCERTAINTY	12
8.1. MAXIMUM OUTPUT POWER.....	12
8.2. PEAK POWER SPECTRAL DENSITY	12
8.3. DTS 6-DB SIGNAL BANDWIDTH.....	12
8.4. BAND EDGES COMPLIANCE.....	12
8.5. TRANSMITTER SPURIOUS EMISSION	12
8.7. AC POWER-LINE CONDUCTED EMISSION	12
ANNEX A: DETAILED TEST RESULTS.....	13
A.1. MEASUREMENT METHOD.....	13
A.2. MAXIMUM OUTPUT POWER.....	14
A.2.1 ANTENNA GAIN	14

A.2.2. PEAK OUTPUT POWER-CONDUCTED	14
A.3. PEAK POWER SPECTRAL DENSITY.....	18
A.4. DTS 6-DB SIGNAL BANDWIDTH	30
A.5. BAND EDGES COMPLIANCE.....	36
A.6. TRANSMITTER SPURIOUS EMISSION.....	46
A.6.1 TRANSMITTER SPURIOUS EMISSION – CONDUCTED	46
A.7. RADIATED UNWANTED EMISSION	90
A.8. AC POWER-LINE CONDUCTED EMISSION	105
ANNEX B: EUT PARAMETERS.....	110
ANNEX C: ACCREDITATION CERTIFICATE	110

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1:CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2:CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
100191, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2024-06-21

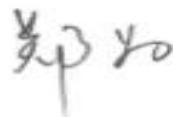
Testing End Date: 2024-09-06

1.5. Signature



Dong Jiaxuan

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Pang Shuai

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: POINTMOBILE CO., LTD
Address/Post: A-26F, Building Gasan Publik 178, Digital-ro, Geumcheon-gu
Seoul, 08513 Republic of Korea
Contact: Hanna Chae
Email: certi.manager@pointmobile.com
Tel.: +82 10 7773 8827
Fax: +82 2-3397-7872

2.2. Manufacturer Information

Company Name: POINTMOBILE CO., LTD
Address/Post: A-26F, Building Gasan Publik 178, Digital-ro, Geumcheon-gu
Seoul, 08513 Republic of Korea
Contact: Hanna Chae
Email: certi.manager@pointmobile.com
Tel.: +82 10 7773 8827
Fax: +82 2-3397-7872

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Mobile Computer
Model name	PM452
FCC ID	V2X-PM452W
With WLAN Function	Yes
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM/OFDMA
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	22.85dBm
Nominal Voltage	3.63V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT14a	/	MP	452.00.XX	2024-06-21
UT05a	/	MP	452.00.XX	2024-06-21
UT17a	356658610000189	MP	452.00.XX	2024-08-30

*EUT ID: is used to identify the test sample in the lab internally.

UT05a/17a is used for Conduction test, UT14a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	Model	Manufacturer
AE1-1	Battery1	451-BTEC	ZhuHai Gushine Electronic Technology Co.,Ltd
AE1-2	Battery2	451-BTSC/BP19-002770	ETI CA Battery Inc.

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Mobile Computer with integrated antenna and inbuilt battery.

It consists of normal options: travel charger, USB cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor $k=2$.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2021
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2013
KDB 558074 D01		2019

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. Test Results

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	BR
Occupied 6dB Bandwidth	15.247 (a)	/	BR
Band Edges Compliance	15.247 (d)	/	BR
Transmitter Spurious Emission - Conducted	15.247 (d)	/	BR
Radiated Unwanted Emission	15.247, 15.205, 15.209	/	BR
AC Powerline Conducted Emission	15.107, 15.207	/	BR

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard
BR	BR Re-use test data from basic model report.

6.2. Statements

CTTL has evaluated the test cases as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.

This report only deals with the WLAN function among the features described in section 3.

The Equipment Under Test (EUT) model PM452 are variant product of PM452, according to the declaration of changes provided by the applicant and FCC KDB publication 178919 D01, except Maximum Output Power , other results are derived from test report No.24T04Z101463-019.

For detail differences between two models please refer the Declaration of Changes document.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.63V
Humidity	44%

7. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2025-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2025-04-06
3	Test Receiver	ESCI 3	100344	R&S	1 year	2025-04-01
4	LISN	ENV216	101200	R&S	1 year	2025-05-16
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	R&S	1 year	2024-11-26
2	EMI Antenna	VULB 9163	01223	SCHWARZBECK	1 year	2024-08-18
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2025-05-11

Test Software

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V10.60.20	R&S
Conducted Emission	EMC32 V8.53.0	R&S

8. Measurement Uncertainty

8.1. Maximum Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. DTS 6-dB Signal Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Transmitter Spurious Emission

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤ 3.6GHz	1.22
3.6GHz ≤ f ≤ 8GHz	1.22
8GHz ≤ f ≤ 12.75GHz	1.51
12.75GHz ≤ f ≤ 26GHz	1.51
26GHz ≤ f ≤ 40GHz	1.59

8.6. Radiated Unwanted Emission

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	4.72
1GHz ≤ f ≤ 18GHz	4.84
18GHz ≤ f ≤ 40GHz	5.12

8.7. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2

ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

Connect the EUT to the test system as Fig.A.1.1.1 shows.

Set the EUT to the required work mode.

Set the EUT to the required channel.

Set the Vector Signal Analyzer and start measurement.

Record the values. Vector Signal Analyzer

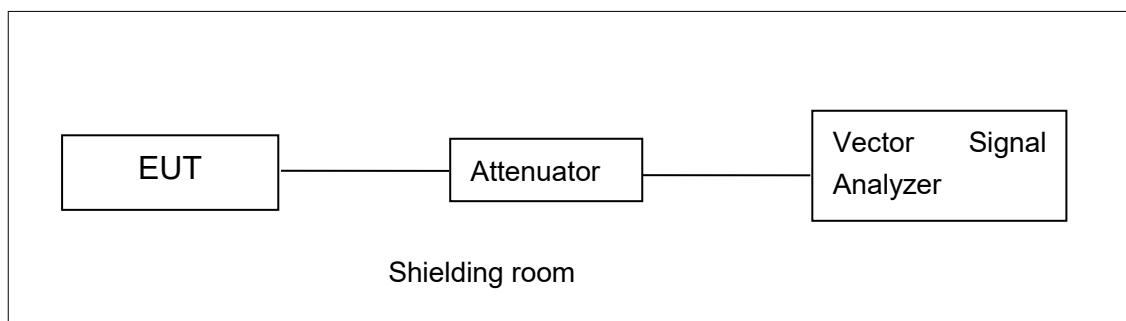


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The EUT was placed on a non-conductive table with 80cm above the ground plane for measurement below 1GHz and 1.5m above the ground plane for measurement above 1GHz. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated from 0° to 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. The maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.2. Maximum Output Power

Method of Measurement: See ANSI C63.10-2013-clause 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

A.2.1 Antenna Gain

Antenna gain is -3.2dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Peak Output Power-conducted

EUT ID: UT05a/17a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	20.31	20.41	20.83
802.11g	54	22.68	22.15	22.85

The spot check result of average output power are 22.85dBm (802.11g 54Mbps ch11 prototype result: 23.12dBm)

The data rate 1Mbps and 54Mbps are selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	21.02	21.38	21.35

The spot check result of average output power are 21.02dBm (802.11n20 MCS0 ch1 prototype result: 21.57dBm)

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax (20MHz)	MCS11	20.72	20.54	20.49

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU26-L mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU26-L (20MHz)	MCS11	19.15	19.23	19.45

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU26-R mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU26-R (20MHz)	MCS11	19.89	19.38	18.92

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU52-L mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU52-L (20MHz)	MCS11	21.38	21.33	21.47

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU52-R mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU52-R (20MHz)	MCS11	21.79	21.44	21.14

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU106-L mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU106-L (20MHz)	MCS11	21.26	21.10	21.15

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HE20 RU106-R mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax RU106-R (20MHz)	MCS11	21.51	21.18	20.94

The data rate MCS11 is selected as worst condition, and the following cases are performed with this condition.

Conclusion: Pass
Duty Cycle

Mode	11b			
Duty Cycle	96%			
Mode	11g	11n-20	11ax-20	11ax-20 RU
Duty Cycle	32%	98%	98%	53%

A.3. Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-2013-clause 11.10.2

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to RBW = 3 kHz.
- d) Set the VBW = 10 kHz.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.

Measurement Limit:

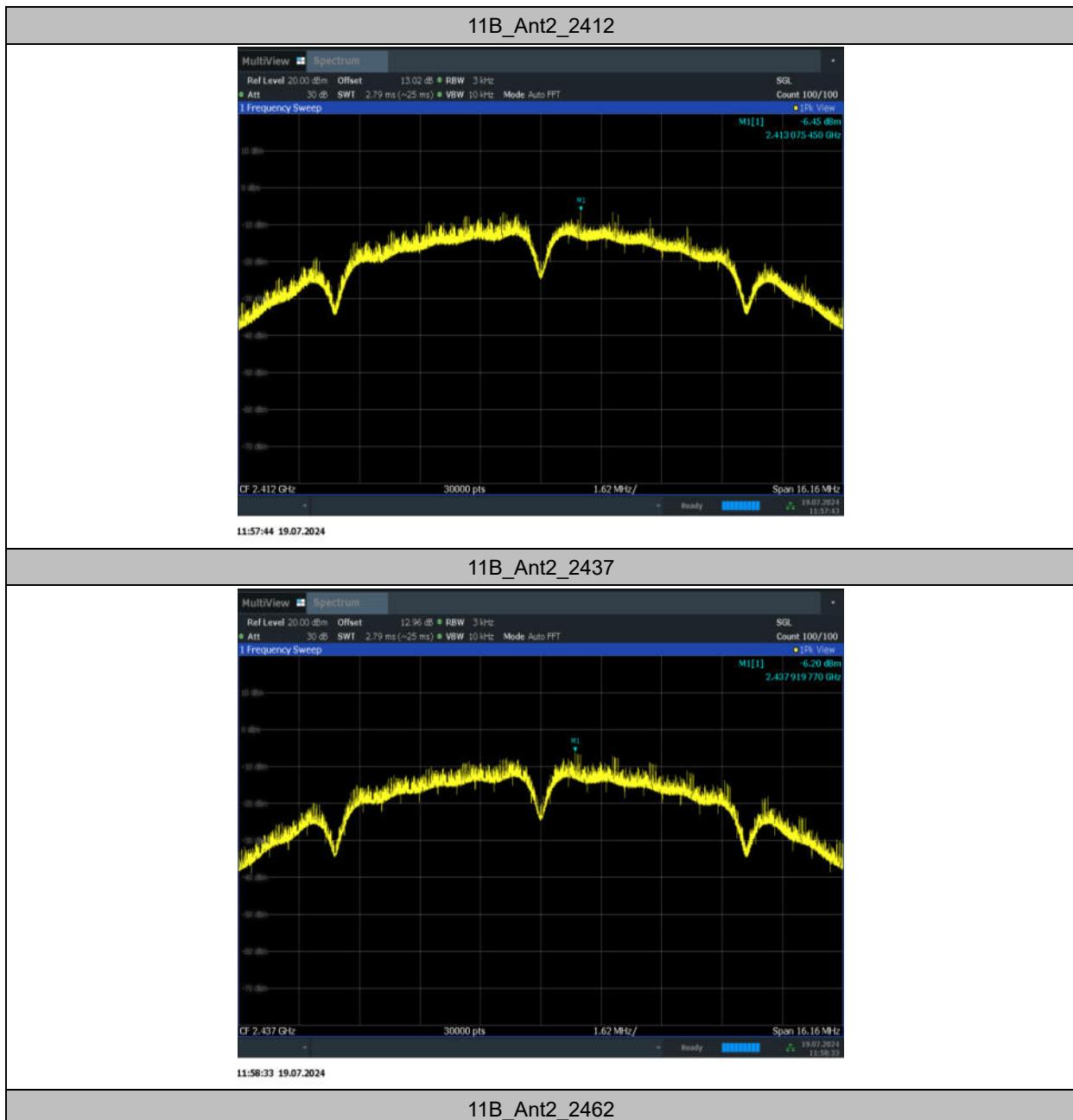
Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

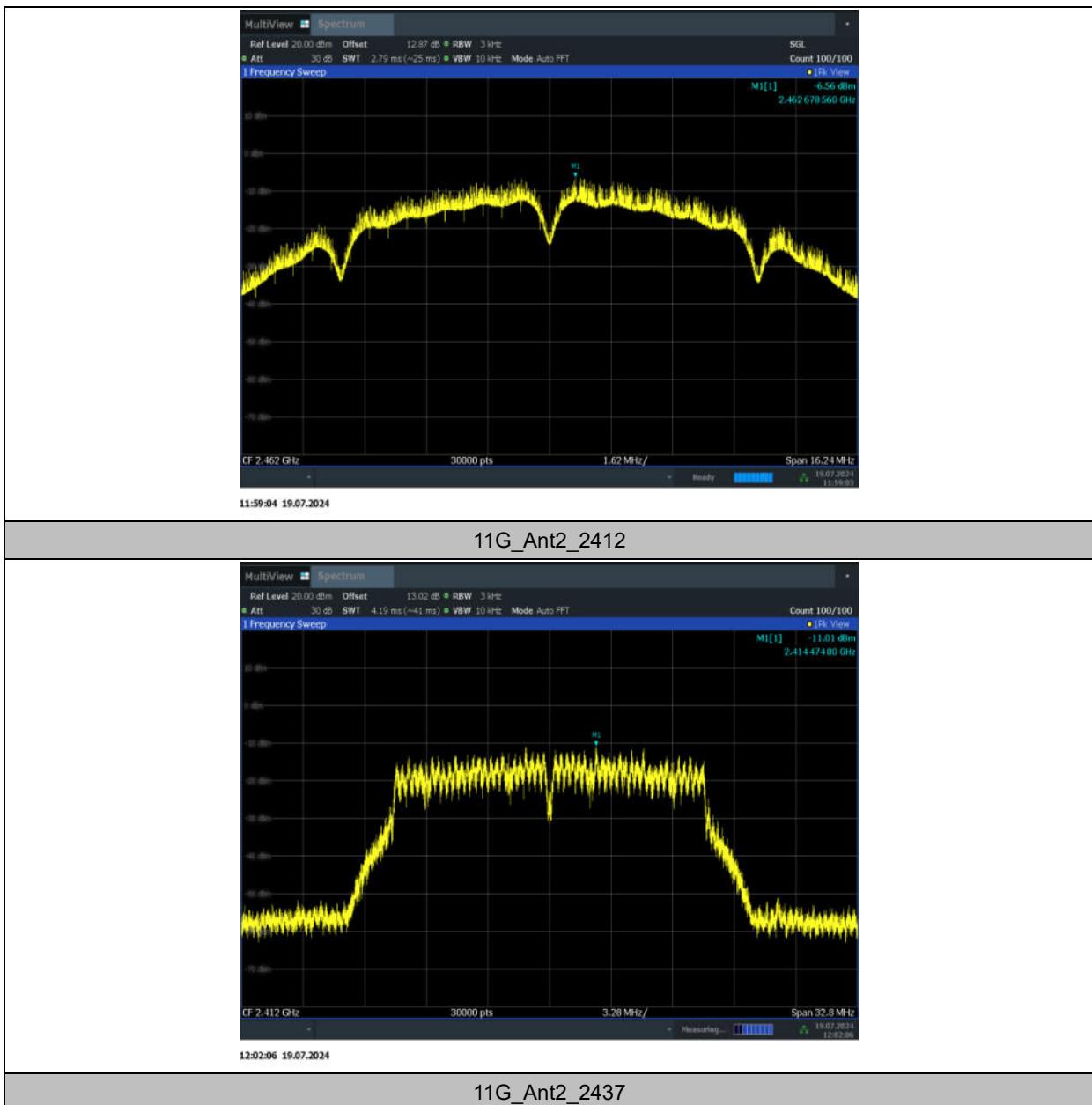
EUT ID: UT05a

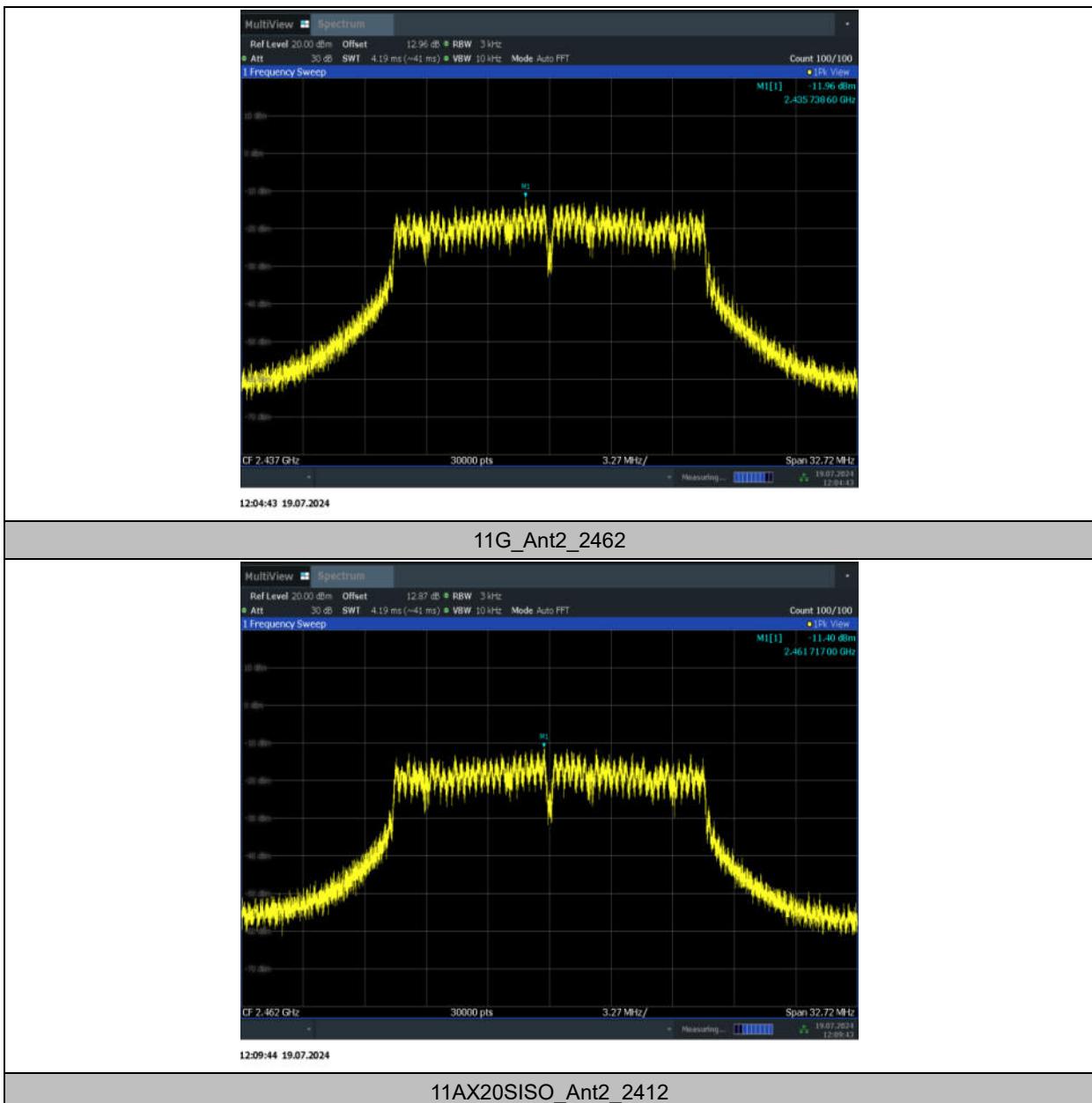
Measurement Results:

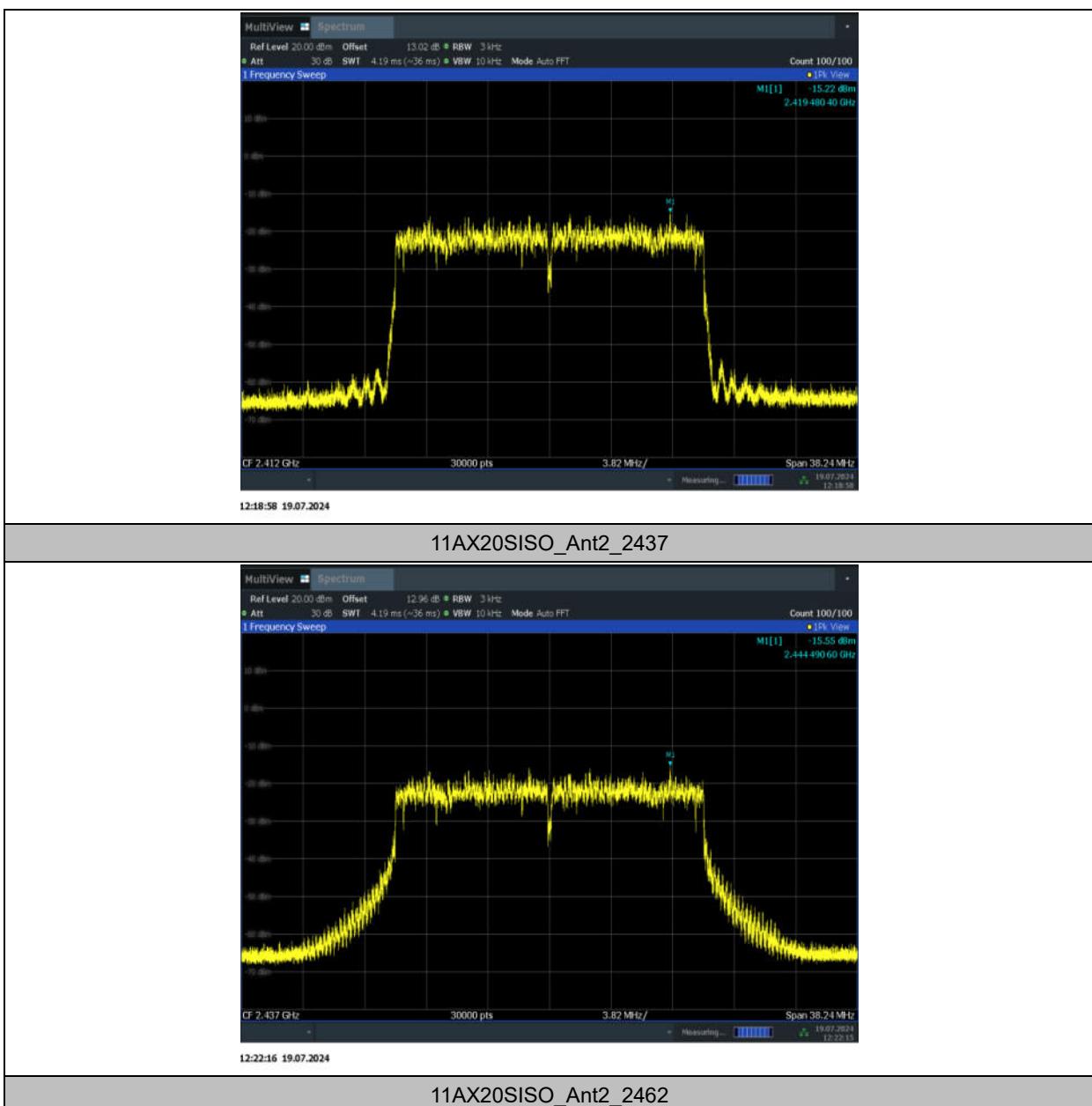
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant2	2412	-6.45	≤8.00	PASS
		2437	-6.20	≤8.00	PASS
		2462	-6.56	≤8.00	PASS
11G	Ant2	2412	-11.01	≤8.00	PASS
		2437	-11.96	≤8.00	PASS
		2462	-11.40	≤8.00	PASS
11AX20SISO	Ant2	2412	-15.22	≤8.00	PASS
		2437	-15.55	≤8.00	PASS
		2462	-15.46	≤8.00	PASS

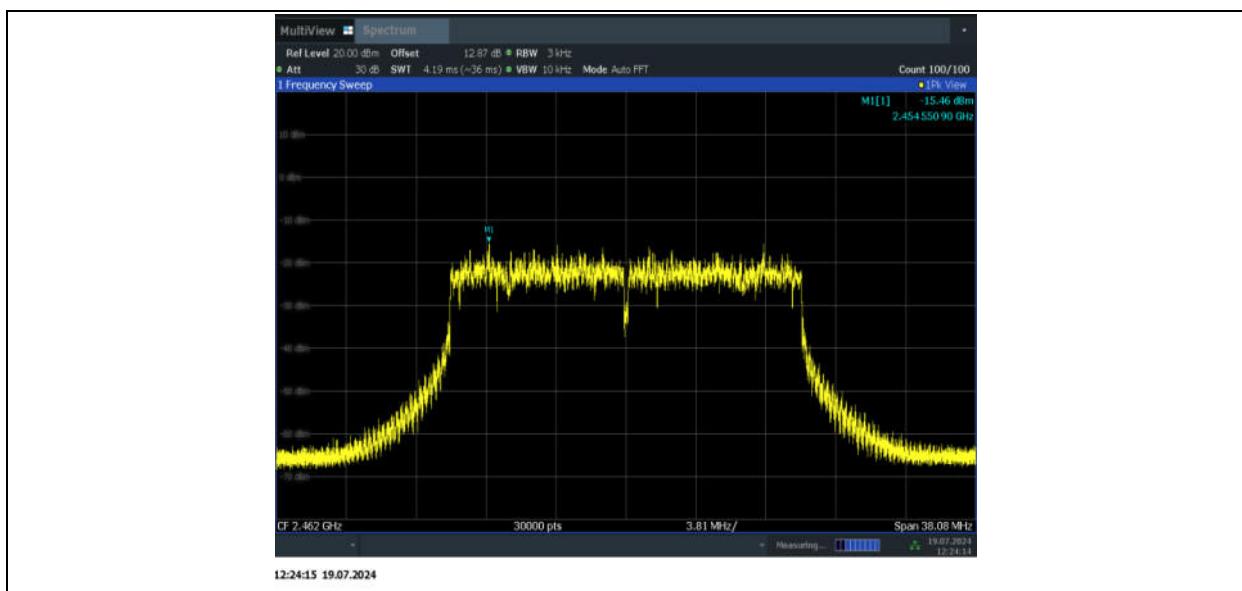
Test graphs as below:









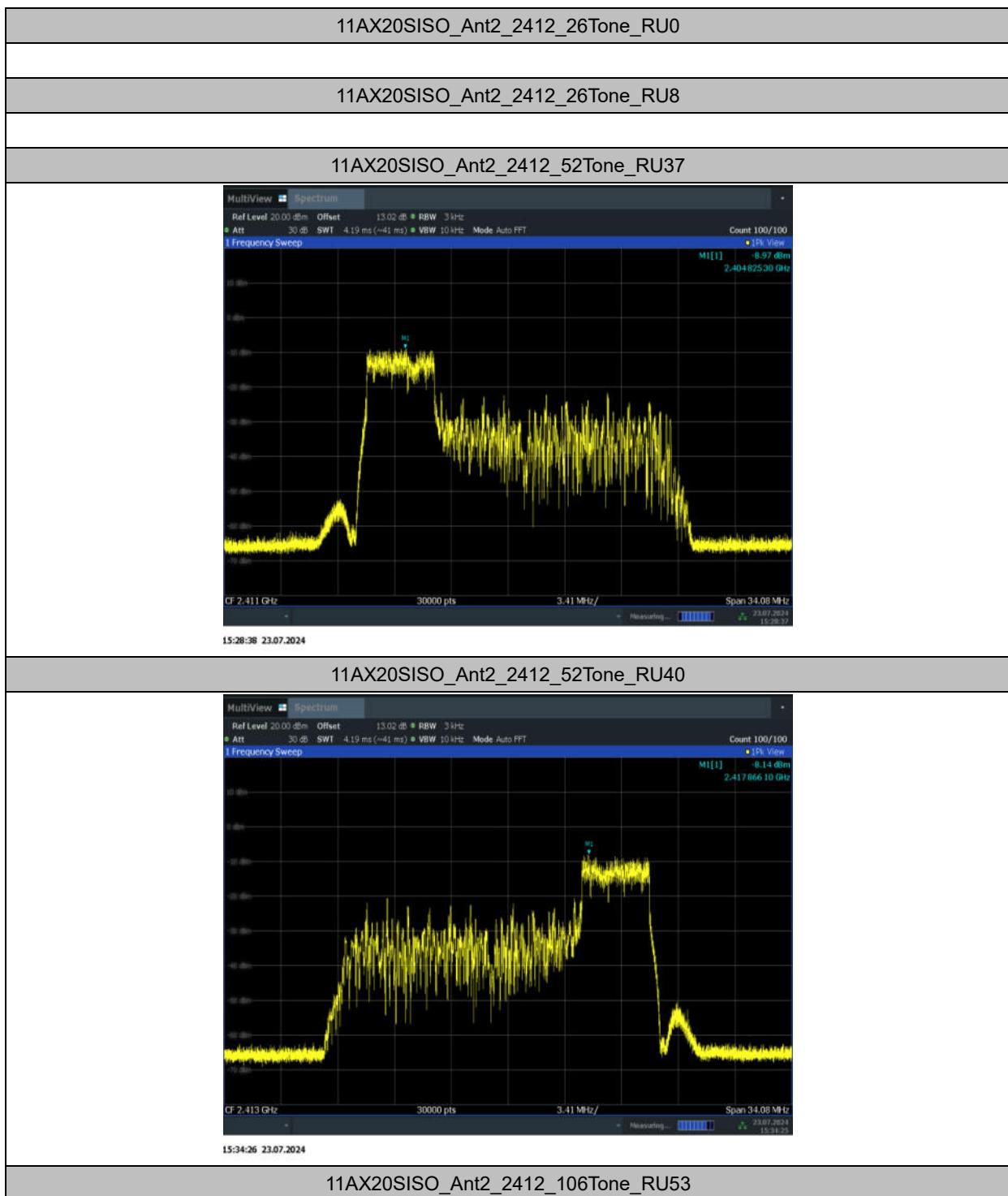


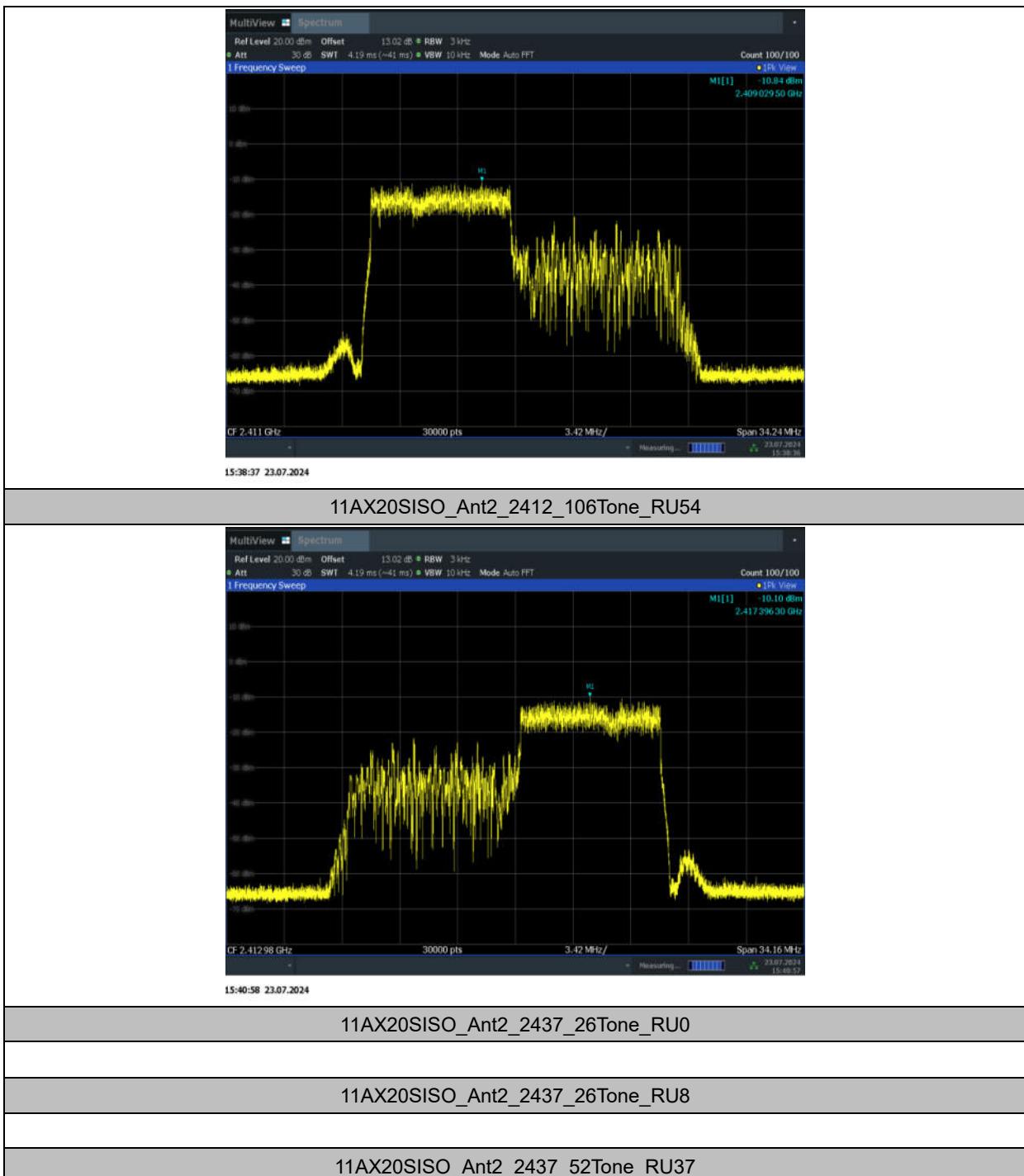
Conclusion: Pass

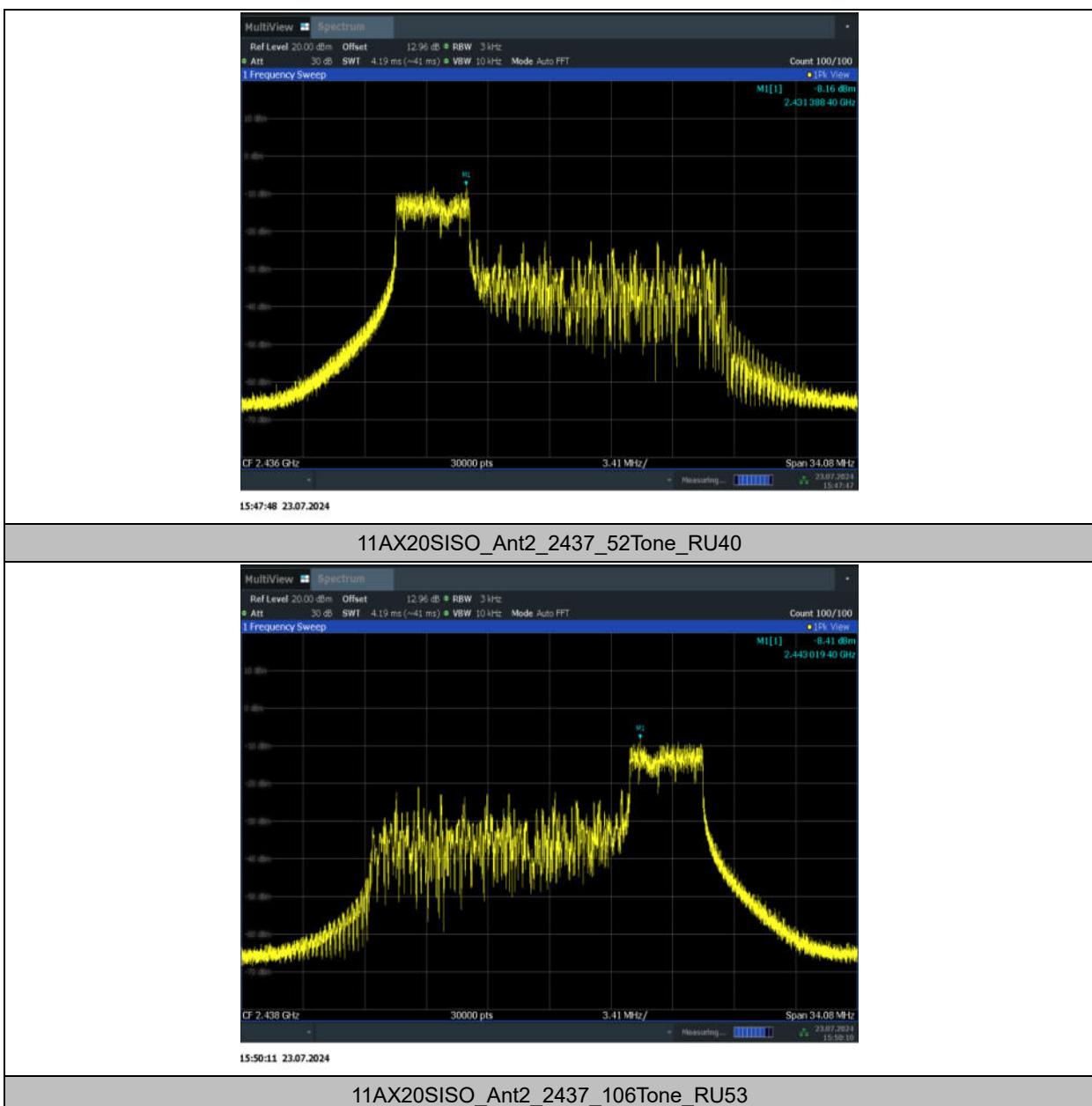
11ax-RU

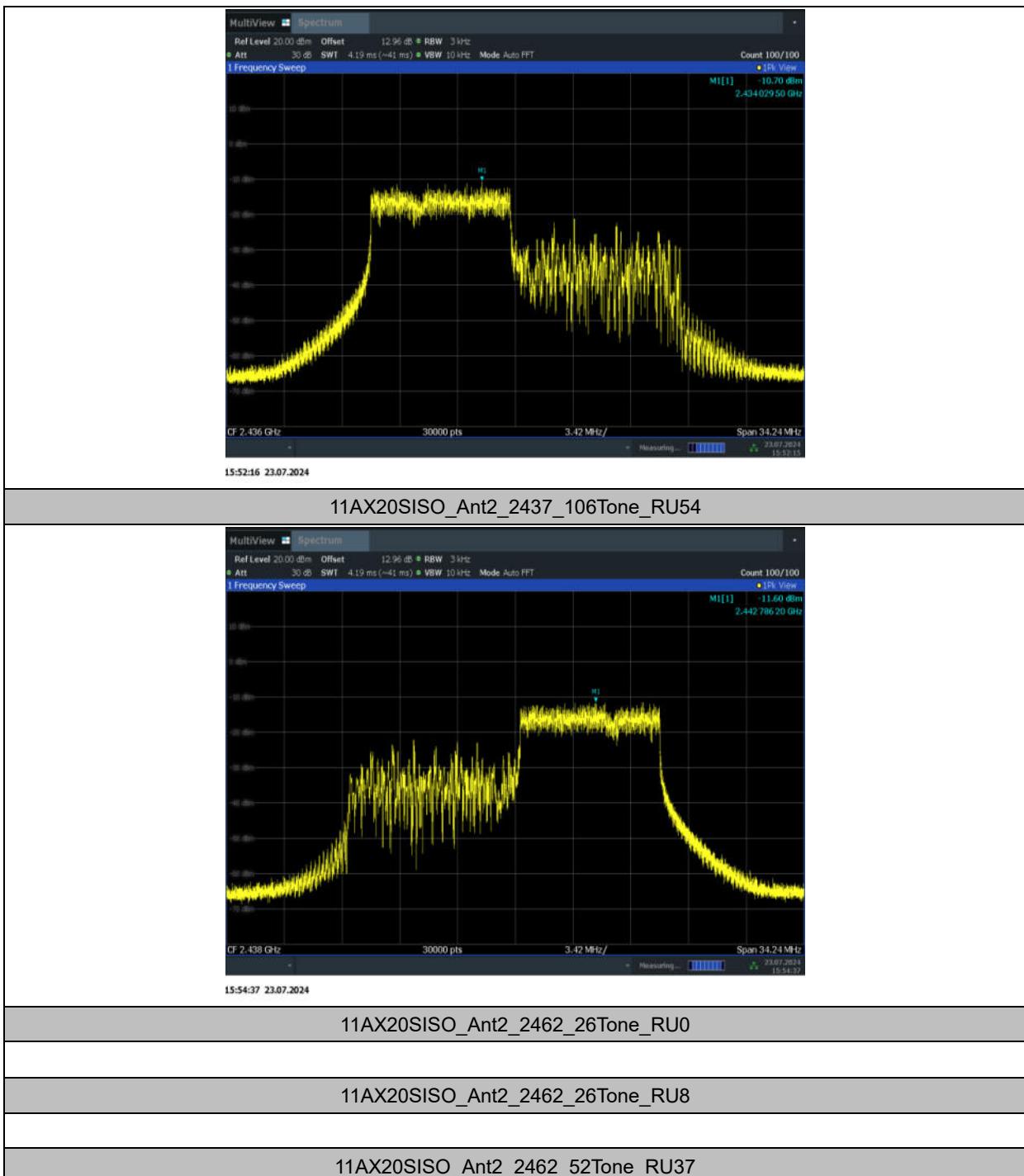
TestMode	Antenna	Frequency[MHz]	RuSize	RuIndex	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11AX20SISO	Ant2	2412	26Tone	RU0		≤8.00	PASS
				RU8		≤8.00	PASS
			52Tone	RU37	-8.97	≤8.00	PASS
				RU40	-8.14	≤8.00	PASS
			106Tone	RU53	-10.84	≤8.00	PASS
				RU54	-10.10	≤8.00	PASS
		2437	26Tone	RU0		≤8.00	PASS
				RU8		≤8.00	PASS
			52Tone	RU37	-8.16	≤8.00	PASS
				RU40	-8.41	≤8.00	PASS
			106Tone	RU53	-10.70	≤8.00	PASS
				RU54	-11.60	≤8.00	PASS

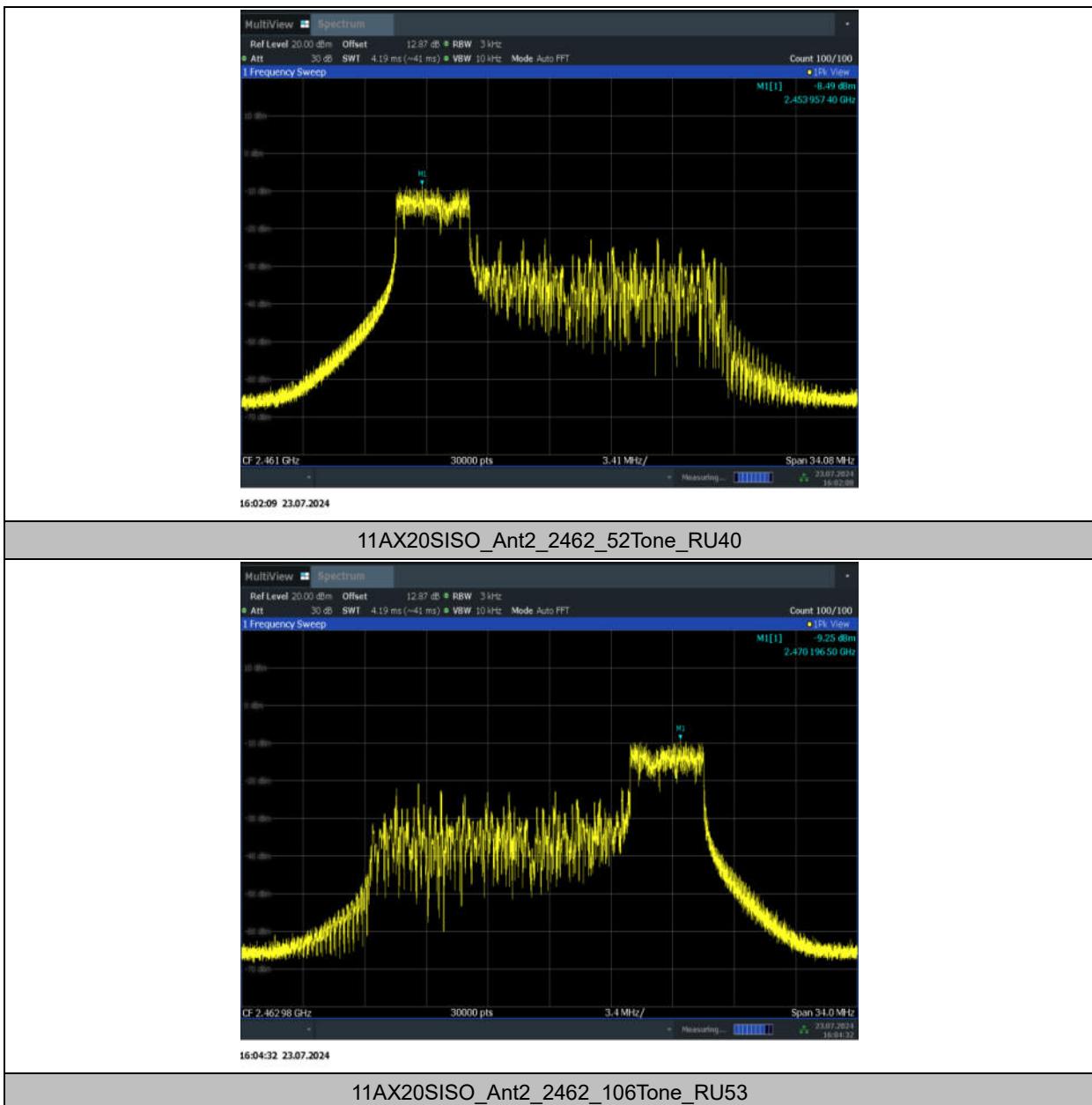
2462	26Tone	RU0		≤ 8.00	PASS
		RU8		≤ 8.00	PASS
	52Tone	RU37	-8.49	≤ 8.00	PASS
		RU40	-9.25	≤ 8.00	PASS
	106Tone	RU53	-11.06	≤ 8.00	PASS
		RU54	-11.55	≤ 8.00	PASS

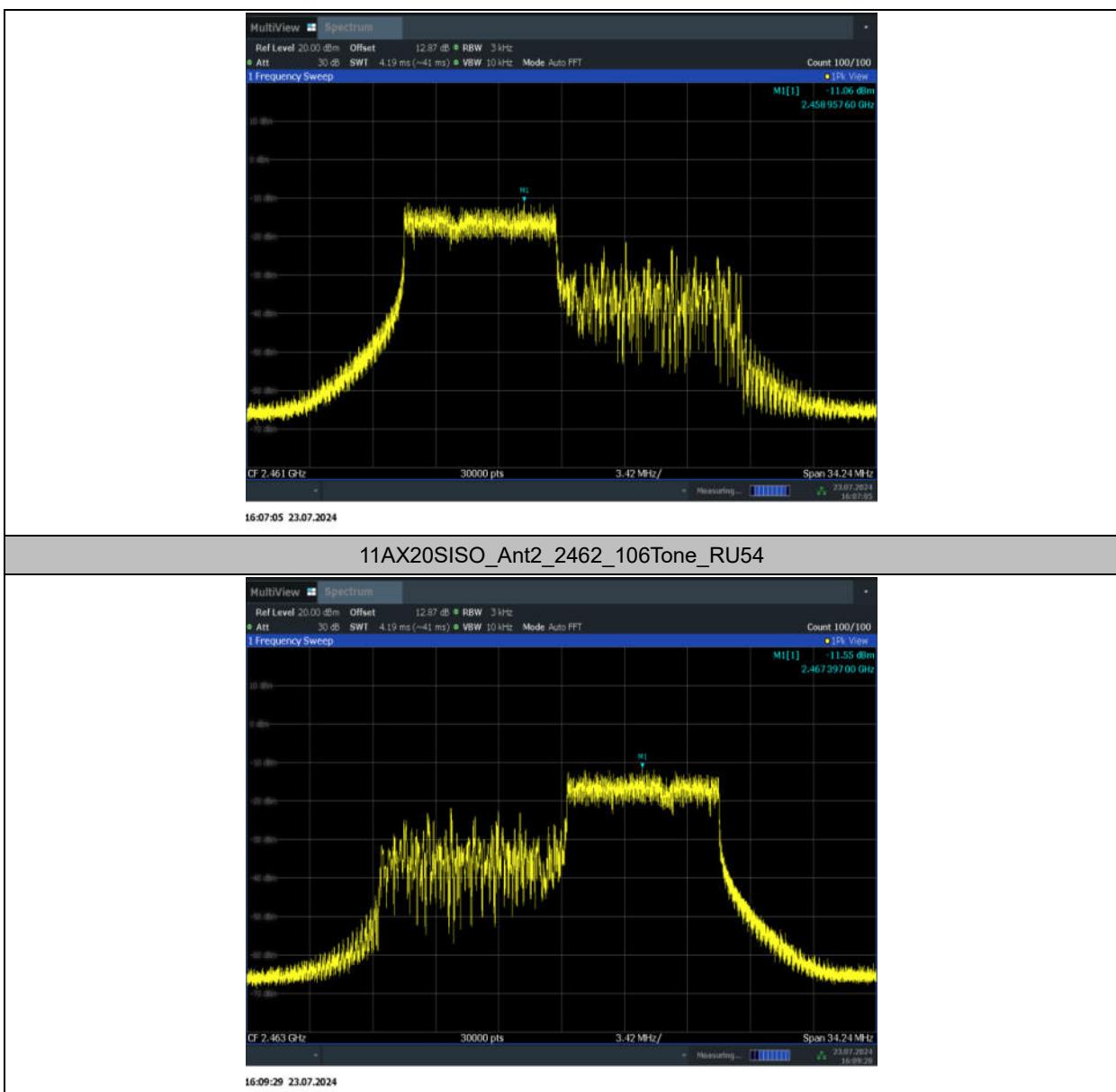












A.4. DTS 6-dB Signal Bandwidth

Method of Measurement: See ANSI C63.10-2013 section 11.8.1.

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) = 300 kHz.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

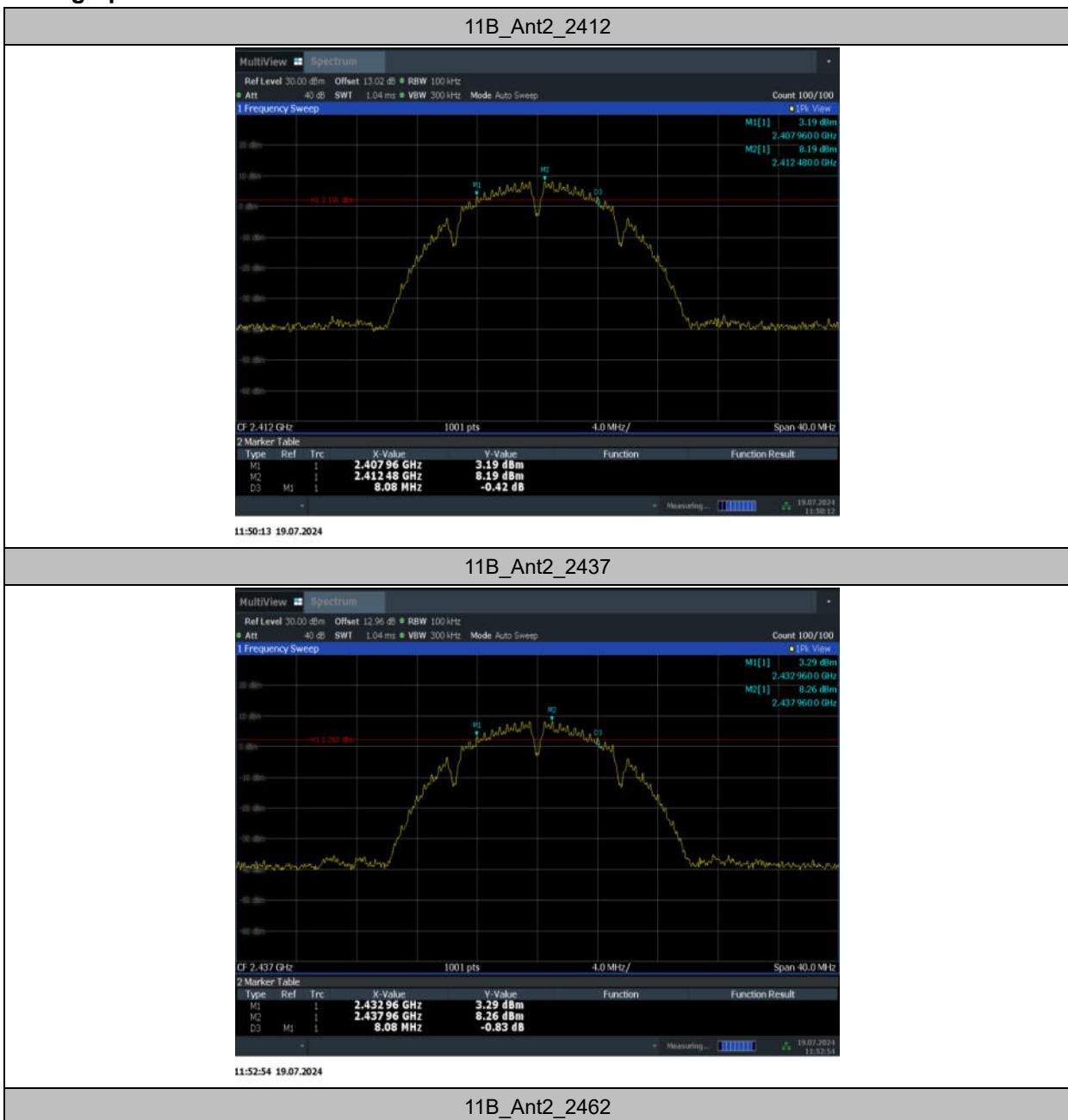
Measurement Limit:

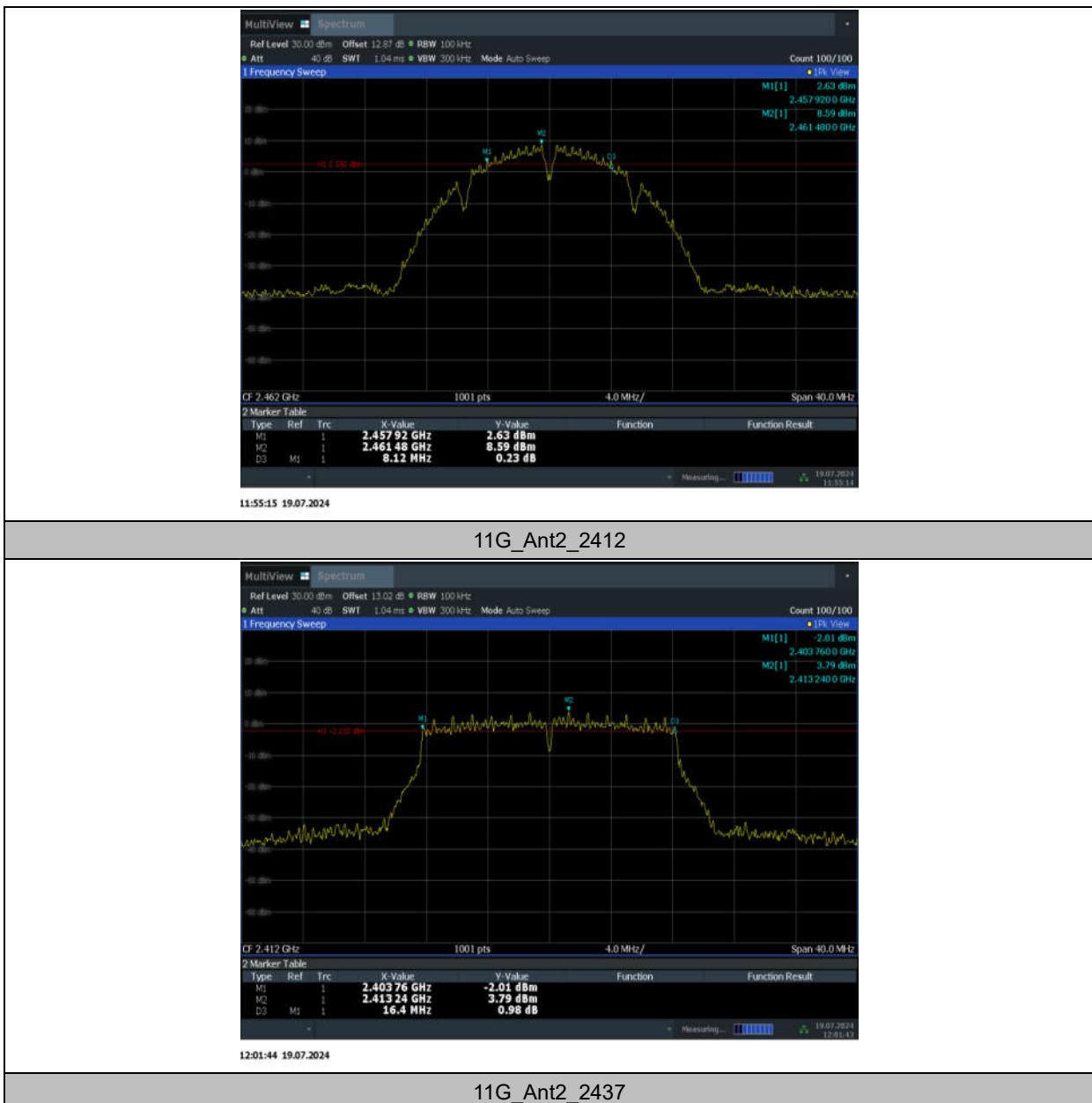
Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

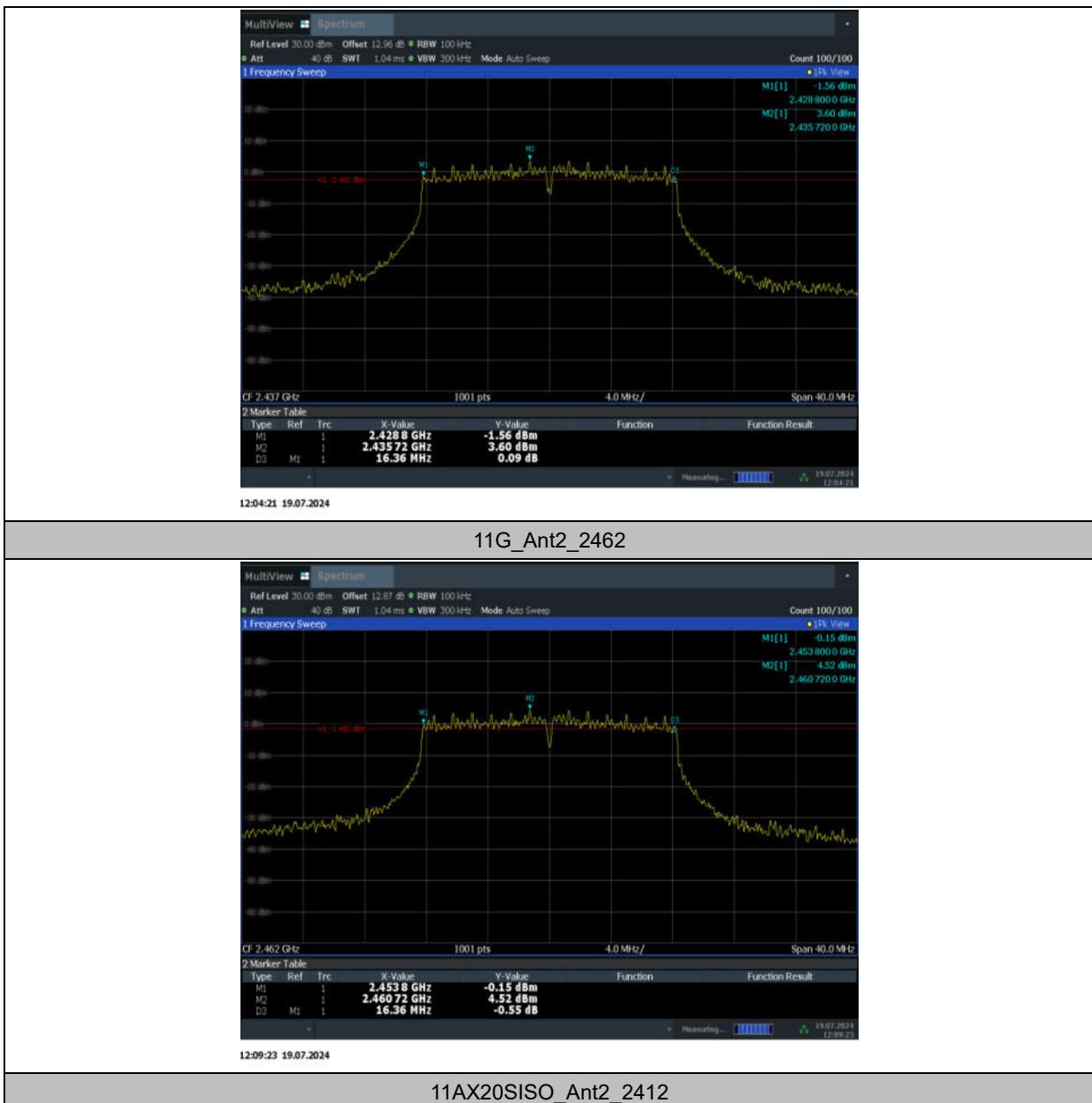
EUT ID: UT05a

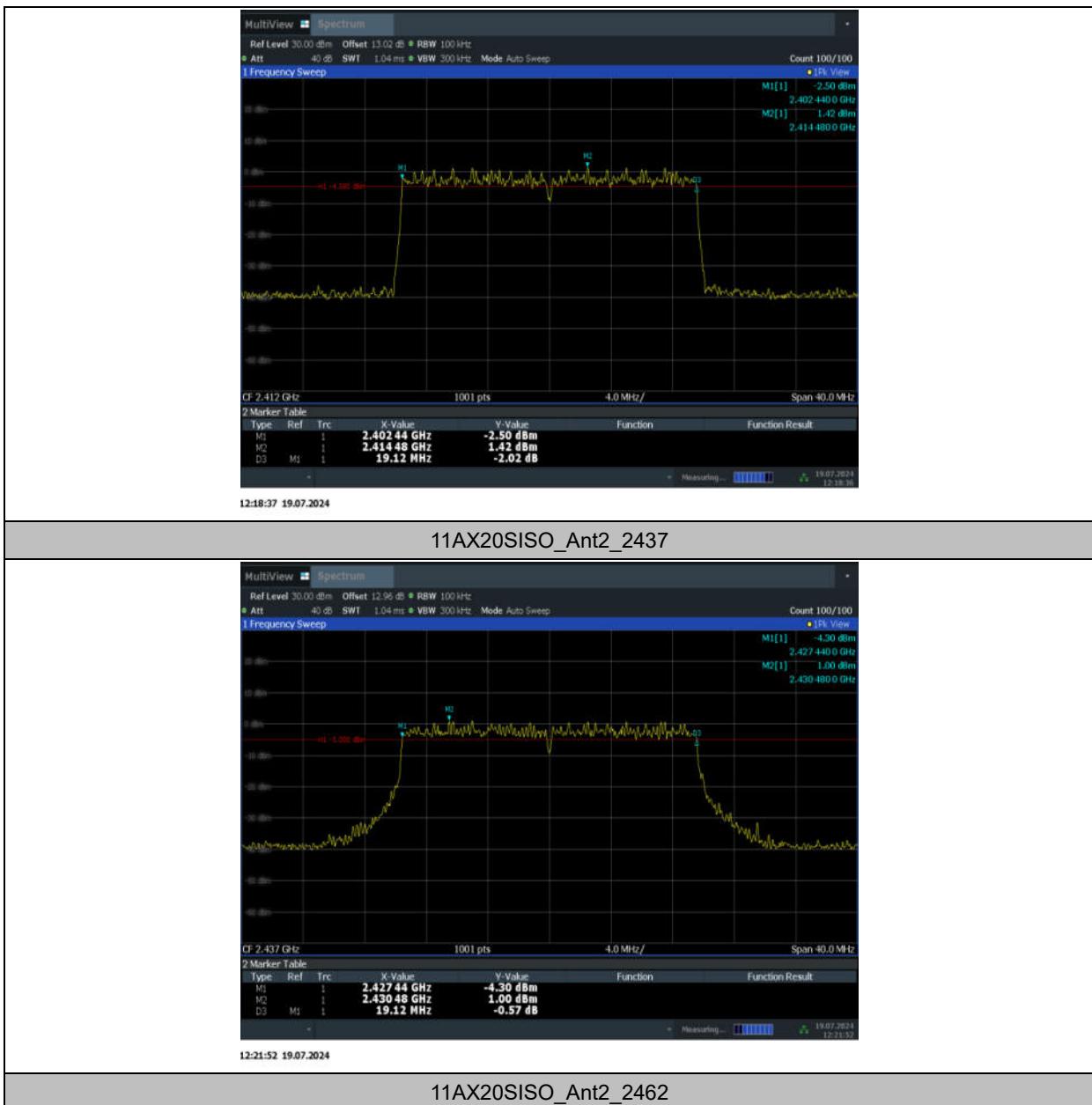
Measurement Result:

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant2	2412	8.08	2407.96	2416.04	0.5	PASS
		2437	8.08	2432.96	2441.04	0.5	PASS
		2462	8.12	2457.92	2466.04	0.5	PASS
11G	Ant2	2412	16.40	2403.76	2420.16	0.5	PASS
		2437	16.36	2428.80	2445.16	0.5	PASS
		2462	16.36	2453.80	2470.16	0.5	PASS
11N20SISO	Ant2	2412	15.08	2404.48	2419.56	0.5	PASS
		2437	15.12	2429.44	2444.56	0.5	PASS
		2462	15.12	2454.44	2469.56	0.5	PASS
11AX20SISO	Ant2	2412	19.12	2402.44	2421.56	0.5	PASS
		2437	19.12	2427.44	2446.56	0.5	PASS
		2462	19.04	2452.44	2471.48	0.5	PASS

Test graphs as below:










Conclusion: Pass

A.5. Band Edges Compliance

Method of Measurement: See ANSI C63.10-2013-clause 6.10.4

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below.

- Set Span = 100MHz
- Sweep Time: coupled
- Set the RBW= 100 kHz
- Set the VBW= 300 kHz
- Detector: Peak
- Trace: Max hold

Measurement Limit:

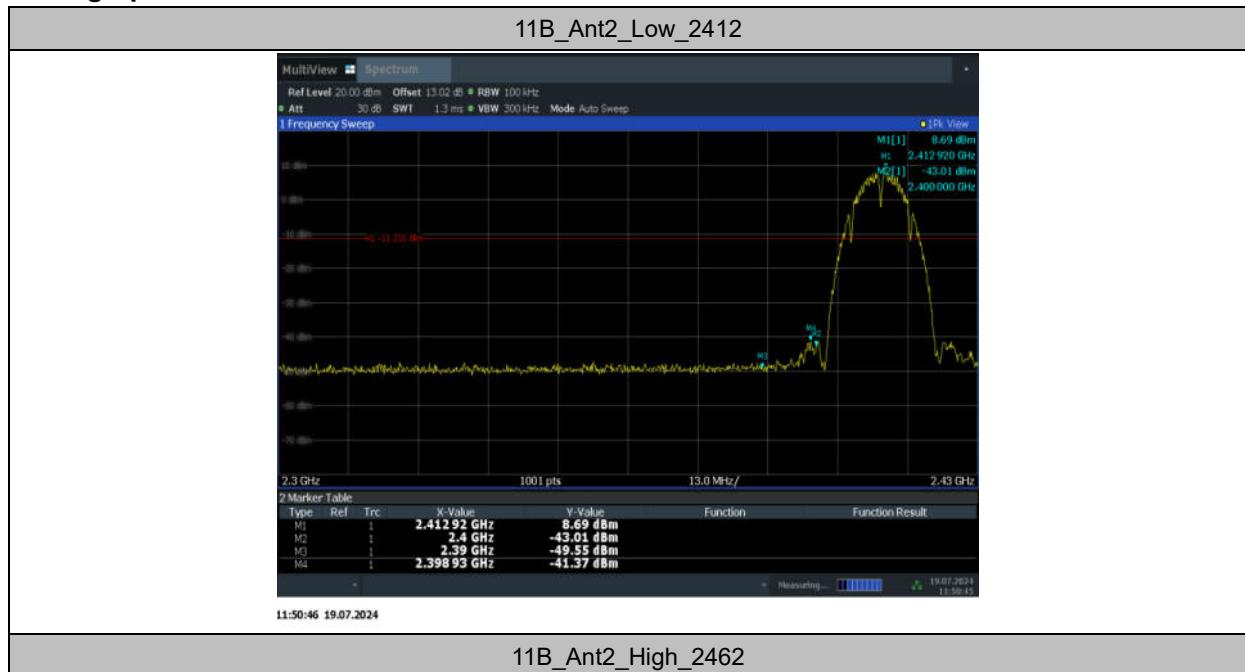
Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

EUT ID: UT05a

Measurement Result:

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant2	Low	2412	8.69	-41.37	≤-11.31	PASS
		High	2462	8.64	-41.42	≤-11.36	PASS
11G	Ant2	Low	2412	3.68	-32.55	≤-16.32	PASS
		High	2462	4.51	-39.1	≤-15.49	PASS
11AX20SISO	Ant2	Low	2412	1.77	-39.36	≤-18.23	PASS
		High	2462	1.10	-46.65	≤-18.9	PASS

Test graphs as below:



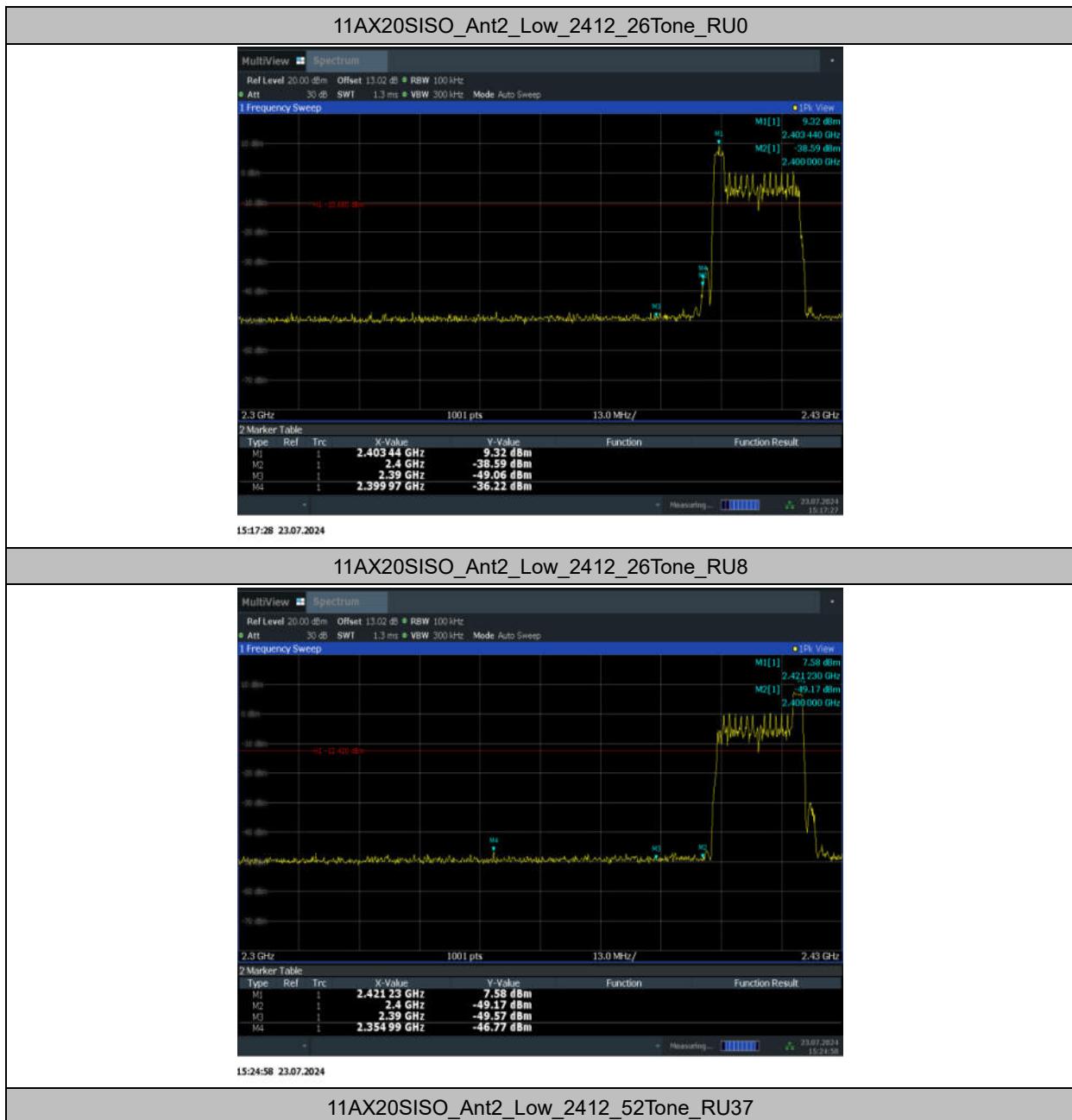






11ax-RU

TestMode	Antenna	ChName	Frequency[MHz]	Ru Size	Ru Index	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11AX20SISO	Ant2	Low	2412	26Tone	RU0	9.32	-36.22	≤-10.68	PASS
					RU8	7.58	-46.77	≤-12.42	PASS
				52Tone	RU37	5.02	-39.39	≤-14.98	PASS
					RU40	4.76	-46.31	≤-15.24	PASS
				106Tone	RU53	3.16	-42.75	≤-16.84	PASS
					RU54	3.72	-46.51	≤-16.28	PASS
		High	2462	26Tone	RU0	8.47	-38.07	≤-11.53	PASS
					RU8	7.87	-42.84	≤-12.13	PASS
				52Tone	RU37	5.03	-40.93	≤-14.97	PASS
					RU40	4.83	-45.28	≤-15.17	PASS
				106Tone	RU53	3.19	-35.14	≤-16.81	PASS
					RU54	2.91	-36.31	≤-17.09	PASS

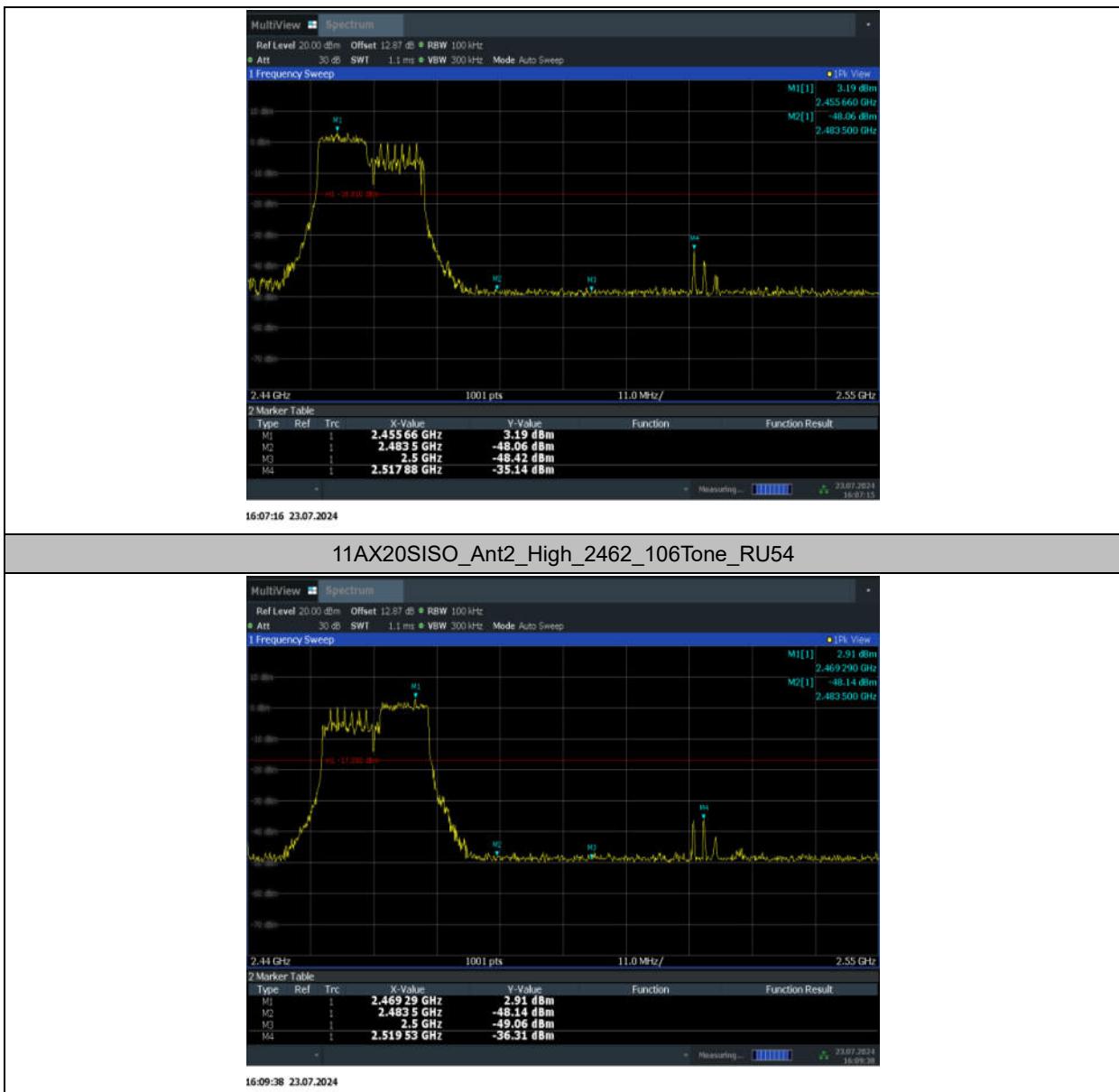












Conclusion: Pass

A.6. Transmitter Spurious Emission

A.6.1 Transmitter Spurious Emission – Conducted

Method of Measurement: See ANSI C63.10-2013-clause 11.11

Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency
- b) Set the span to ≥ 1.5 times the DTS bandwidth
- c) Set the RBW= 100 kHz
- d) Set the VBW= 300 kHz
- e) Detector = Peak
- f) Sweep time = auto couple
- g) Trace mode = max hold
- h) Allow trace to fully stabilize
- i) Use the peak marker function to determine the maximum PSD level

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW = 300 kHz.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

EUT ID: UT05a

Measurement Results:

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant2	2412	Reference	9.60	9.60	---	PASS
			30~1000	9.60	-56.54	≤-10.4	PASS
			1000~26500	9.60	-43.86	≤-10.4	PASS
		2437	Reference	8.37	8.37	---	PASS
			30~1000	8.37	-56.95	≤-11.63	PASS
			1000~26500	8.37	-43.76	≤-11.63	PASS
		2462	Reference	9.29	9.29	---	PASS
			30~1000	9.29	-56.66	≤-10.71	PASS
			1000~26500	9.29	-43.85	≤-10.71	PASS
11G	Ant2	2412	Reference	4.05	4.05	---	PASS
			30~1000	4.05	-56.58	≤-15.95	PASS
			1000~26500	4.05	-44.45	≤-15.95	PASS
		2437	Reference	3.78	3.78	---	PASS
			30~1000	3.78	-54.23	≤-16.22	PASS
			1000~26500	3.78	-43.72	≤-16.22	PASS
		2462	Reference	4.66	4.66	---	PASS
			30~1000	4.66	-57.14	≤-15.34	PASS
			1000~26500	4.66	-44.35	≤-15.34	PASS
11AX20SISO	Ant2	2412	Reference	1.38	1.38	---	PASS
			30~1000	1.38	-56.13	≤-18.62	PASS
			1000~26500	1.38	-43.55	≤-18.62	PASS
		2437	Reference	2.31	2.31	---	PASS
			30~1000	2.31	-56.19	≤-17.69	PASS
			1000~26500	2.31	-44.5	≤-17.69	PASS
		2462	Reference	1.83	1.83	---	PASS
			30~1000	1.83	-56.35	≤-18.17	PASS
			1000~26500	1.83	-35.55	≤-18.17	PASS

Test graphs as below:
