



FCC PART 15C TEST REPORT No.23T04Z80629-026

for

BLU Products,Inc.

Smart phone

B160V

FCC ID: YHLBLUB160V

with

Hardware Version: V1.0

Software Version: BLU_B160V_V14.0.01.01.01.03_FSec

Issued Date: 2024-01-10

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z80629-026	Rev.0	1st edition	2024-01-10

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.....	9
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
8.6. RADIATED UNWANTED 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. PEAK OUTPUT POWER-CONDUCTED 14

A.3. PEAK POWER SPECTRAL DENSITY..... 16

A.4. DTS 6-DB SIGNAL BANDWIDTH 22

A.5. BAND EDGES COMPLIANCE 28

A.6. TRANSMITTER SPURIOUS EMISSION..... 32

 A.6.1 TRANSMITTER SPURIOUS EMISSION – CONDUCTED 32

A.7. RADIATED UNWANTED EMISSION 48

A.7. AC POWER-LINE CONDUCTED EMISSION 60

ANNEX B: EUT PARAMETERS..... 64

ANNEX C: ACCREDITATION CERTIFICATE 64



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%

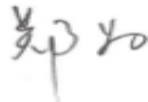
1.4. Project date

Testing Start Date: 2023-12-07
Testing End Date: 2024-01-10

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: BLU Products, Inc.
Address: 8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact: Zeng wei
Email: zwei@ctasiasz.com
Telephone: 305.715.7171
Fax: 305.436.8819

2.2. Manufacturer Information

Company Name: BLU Products, Inc.
Address: 8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact: Zeng wei
Email: zwei@ctasiasz.com
Telephone: 305.715.7171
Fax: 305.436.8819

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

3.1. About EUT

Description	Smart phone
Model name	B160V
FCC ID	YHLBLUB160V
With WLAN Function	Yes
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	25.80 dBm
Nominal Voltage	3.88/3.85V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT59a	356197680004110	V1.0	BLU_B160V_ V14.0.01.01.01.03_FSec	2023-12-13
UT46a	356197680006255	V1.0	BLU_B160V_ V14.0.01.01.01.03_FSec	2023-12-13

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

UT46a is used for Conduction test, UT59a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	Model	Manufacturer
AE1	Battery1	C846345400P	Huizhou Highpower Technology Co., Ltd.

*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 Smart phone 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	2013
KDB 558074 D01	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	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)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Radiated Unwanted Emission	15.247, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

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

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.

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	3.88/3.85V
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	2024-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2024-03-06
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2024-06-05
4	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2024-02-21
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	103023	R&S	13 months	2024-07-08
2	EMI Antenna	VULB 9163	01222	SCHWARZBECK	13 months	2024-02-28
3	EMI Antenna	3115	6914	ETS-Lindgren	13 months	2024-06-07
4	EMI Antenna	3116	2661	ETS-Lindgren	13 months	2024-02-28
5	EMI Antenna	HF-H2-Z2	829304/007	R&S	13 months	2024-01-22

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)
$30\text{MHz} \leq f \leq 2\text{GHz}$	1.22
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	1.22
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.22
$8\text{GHz} \leq f \leq 12.75\text{GHz}$	1.51
$12.75\text{GHz} \leq f \leq 26\text{GHz}$	1.51
$26\text{GHz} \leq f \leq 40\text{GHz}$	1.59

8.6. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB) k=2
9kHz-30MHz	4.92
$30\text{MHz} \leq f \leq 1\text{GHz}$	4.72
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.84
$18\text{GHz} \leq f \leq 40\text{GHz}$	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

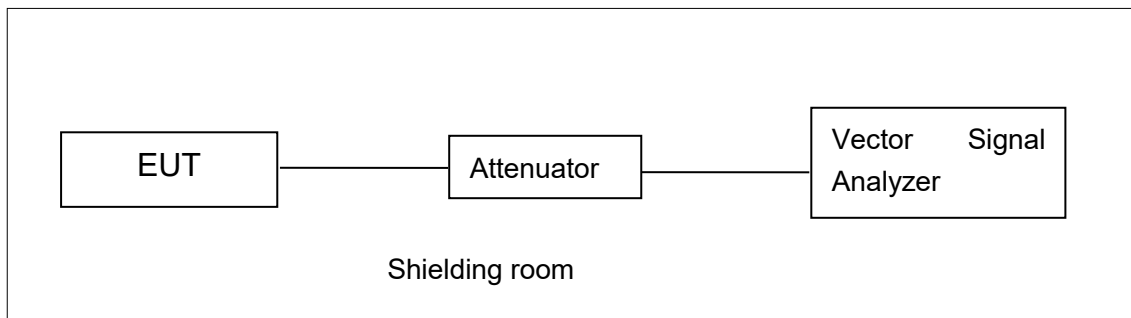


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 3MHz;

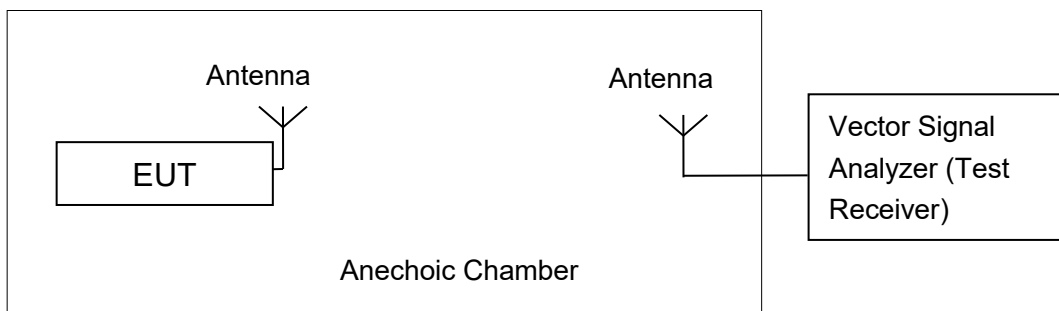


Fig.A.1.2.1: Test Setup Diagram for Radiated Measurements

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. Peak Output Power-conducted

EUT ID: UT46a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	21.65	21.19	21.51
	2	/	/	/
	5.5	/	/	/
	11	/	/	/
802.11g	6	25.80	25.66	25.72
	9	/	/	/
	12	/	/	/
	18	/	/	/
	24	/	/	/
	36	/	/	/
	48	/	/	/
54	/	/	/	

The data rate 1Mbps and 6Mbps 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	25.67	25.55	25.67
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

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

The duty cycle of all mode are 100%

Conclusion: Pass

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:

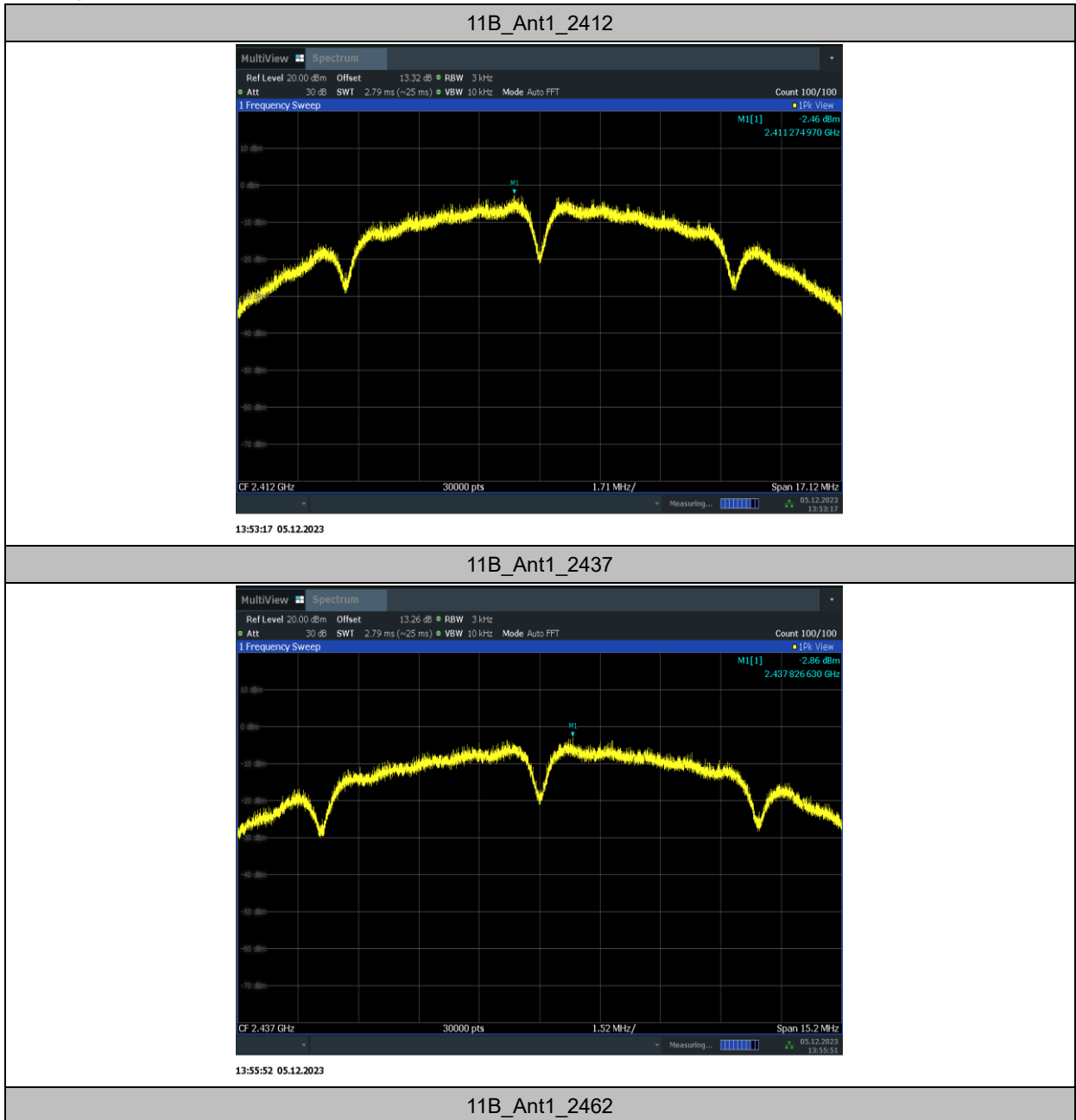
Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

EUT ID: UT46a

Measurement Results:

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-2.46	≤8.00	PASS
		2437	-2.86	≤8.00	PASS
		2462	-2.99	≤8.00	PASS
11G	Ant1	2412	-6.22	≤8.00	PASS
		2437	-6.22	≤8.00	PASS
		2462	-6.71	≤8.00	PASS
11N20SISO	Ant1	2412	-6.50	≤8.00	PASS
		2437	-6.60	≤8.00	PASS
		2462	-6.50	≤8.00	PASS

Test graphs as below:

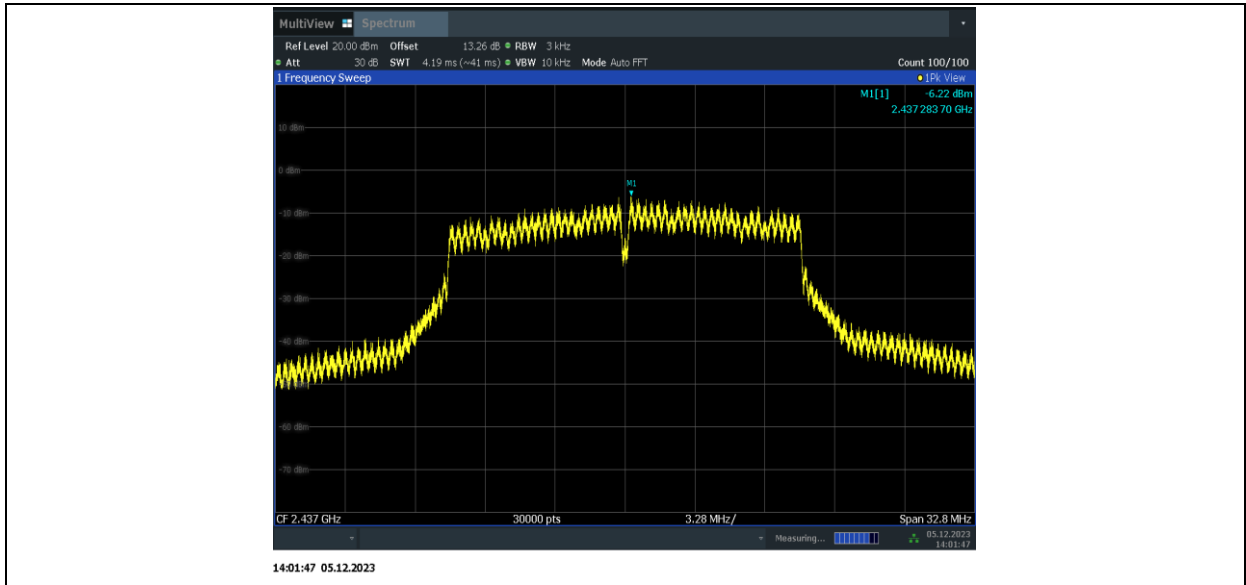




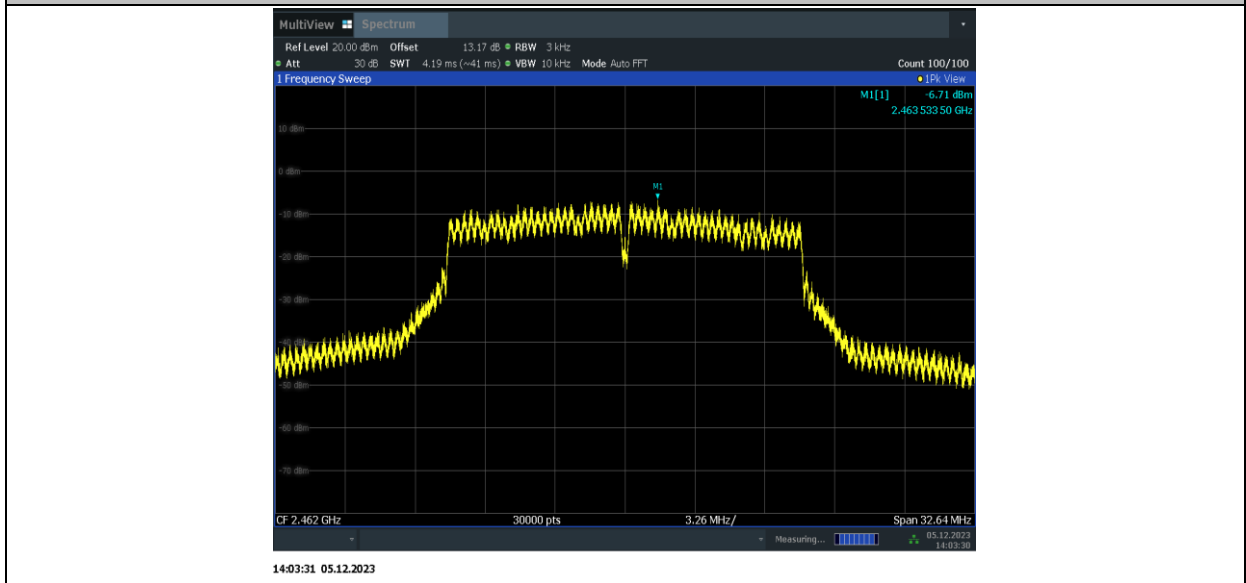
11G_Ant1_2412



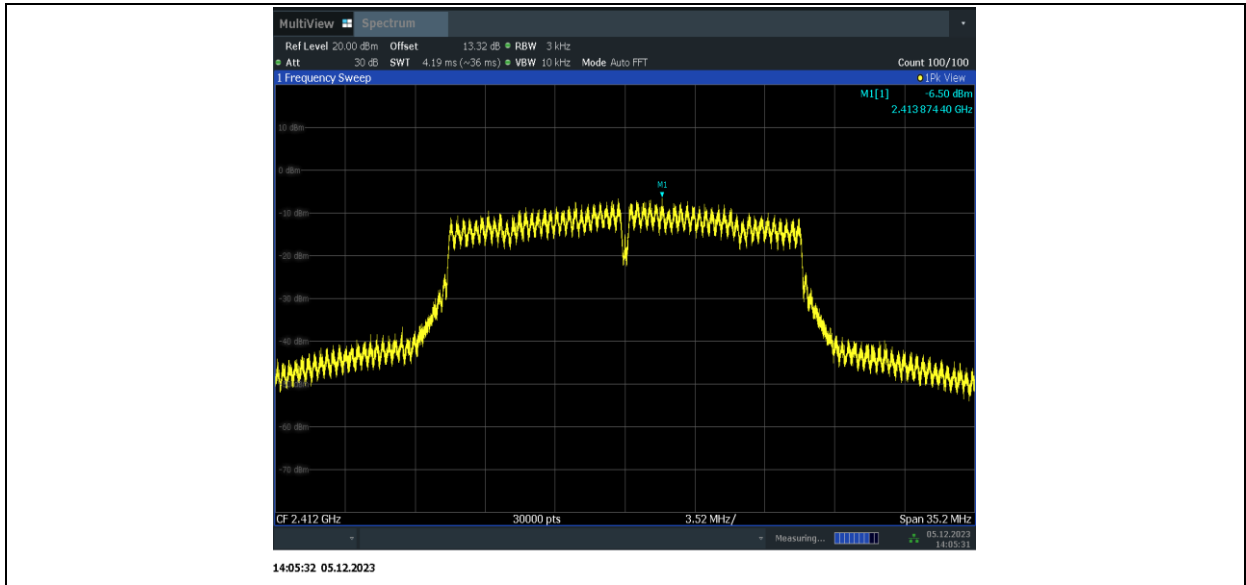
11G_Ant1_2437



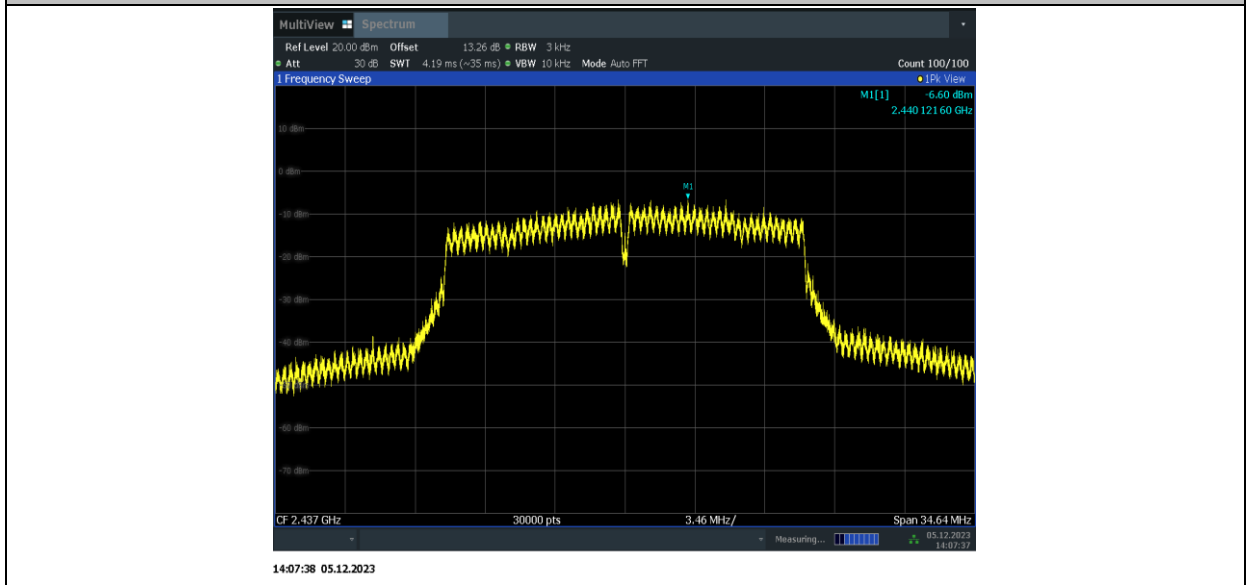
11G_Ant1_2462



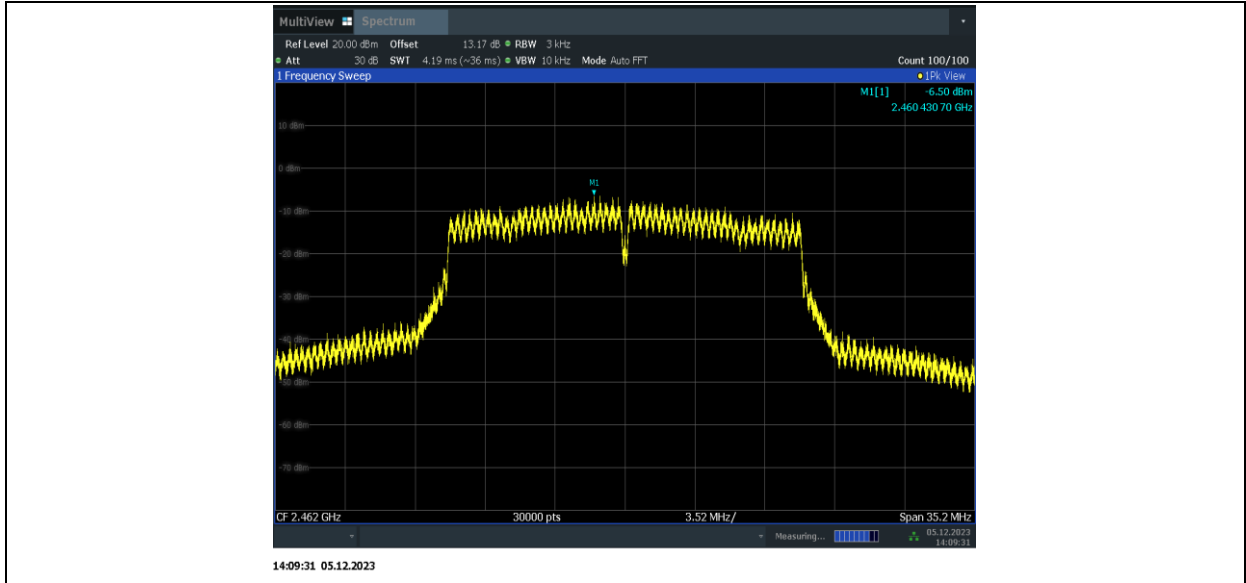
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



Conclusion: 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:

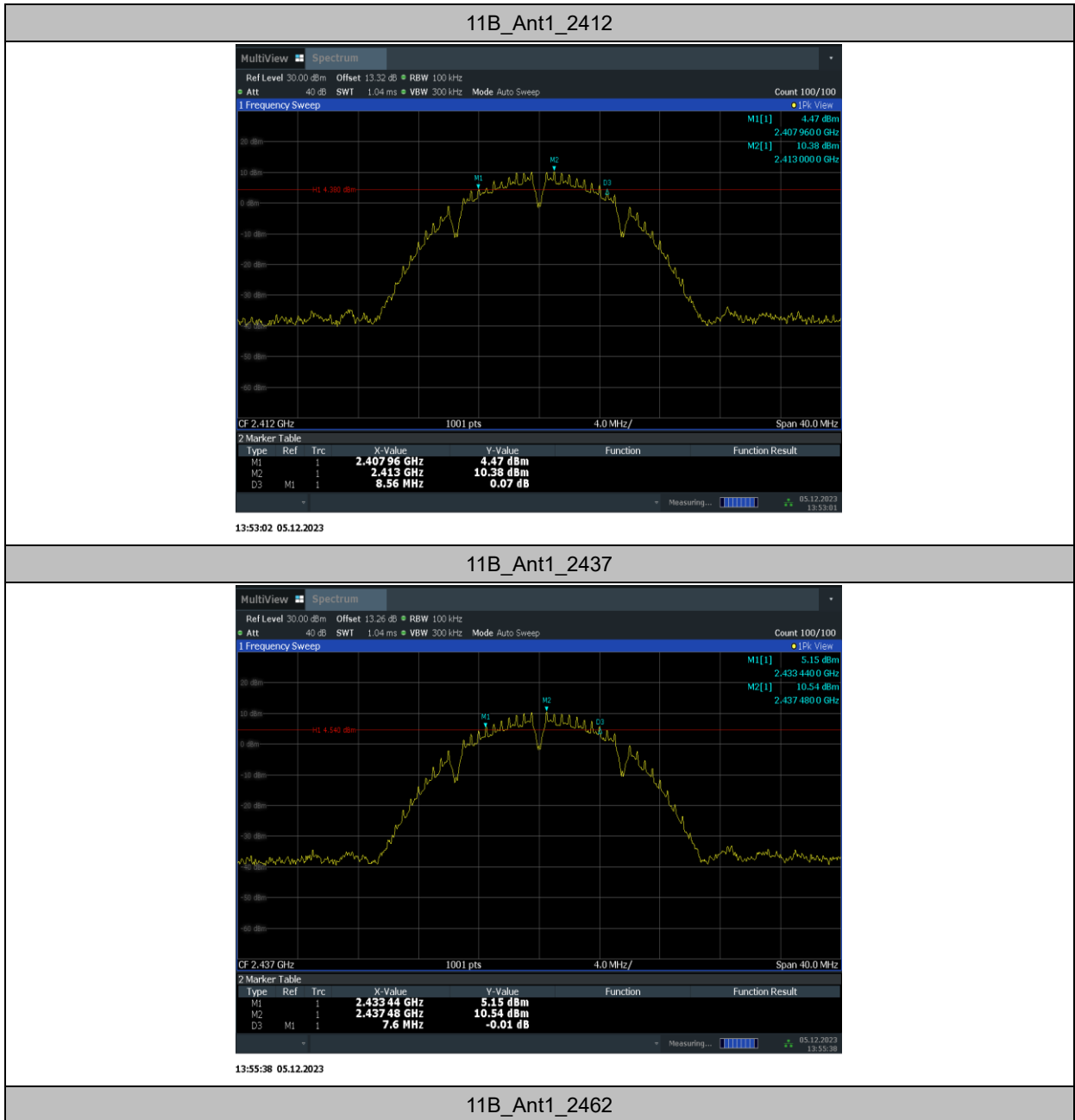
Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

EUT ID: UT46a

Measurement Result:

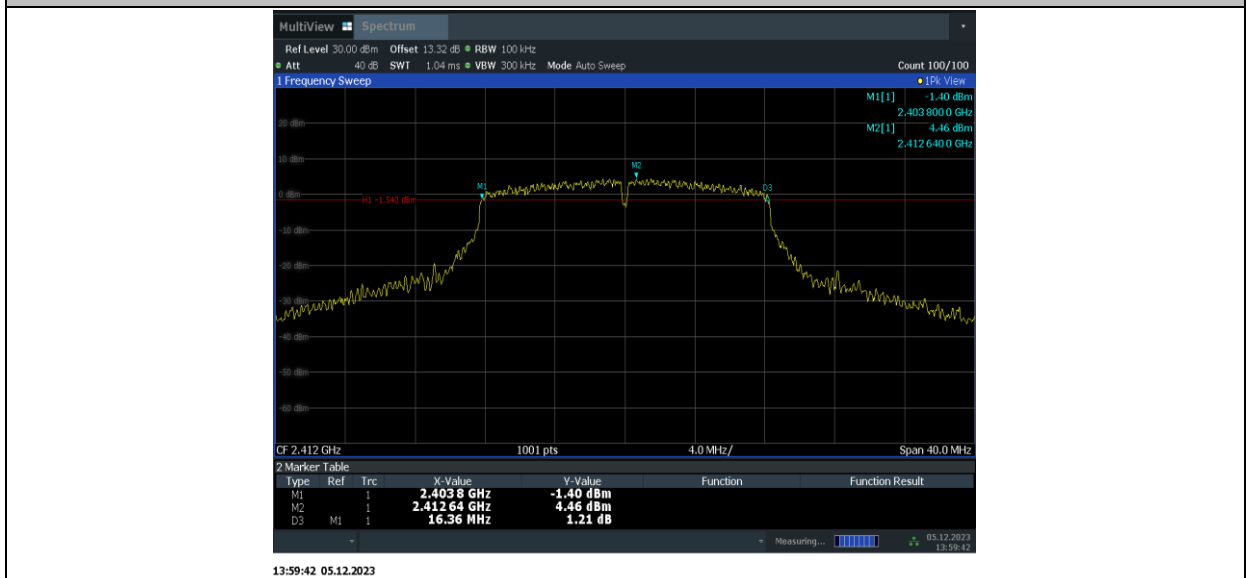
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.56	2407.96	2416.52	0.5	PASS
		2437	7.60	2433.44	2441.04	0.5	PASS
		2462	8.52	2457.48	2466.00	0.5	PASS
11G	Ant1	2412	16.36	2403.80	2420.16	0.5	PASS
		2437	16.40	2428.84	2445.24	0.5	PASS
		2462	16.32	2453.80	2470.12	0.5	PASS
11N20SISO	Ant1	2412	17.60	2403.20	2420.80	0.5	PASS
		2437	17.32	2428.48	2445.80	0.5	PASS
		2462	17.60	2453.16	2470.76	0.5	PASS

Test graphs as below:

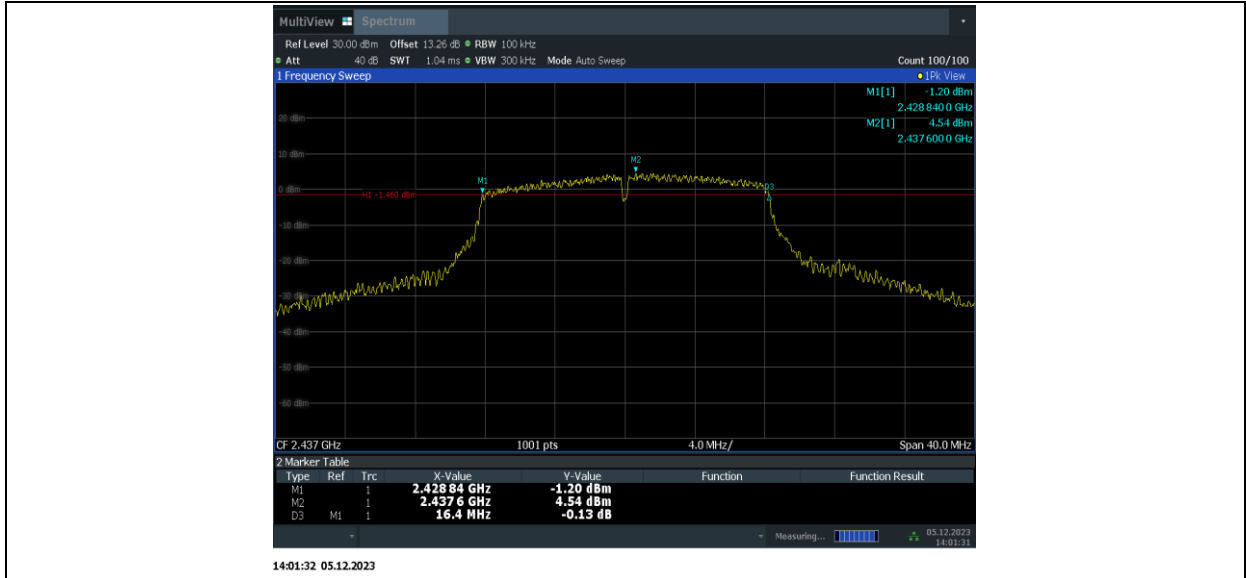




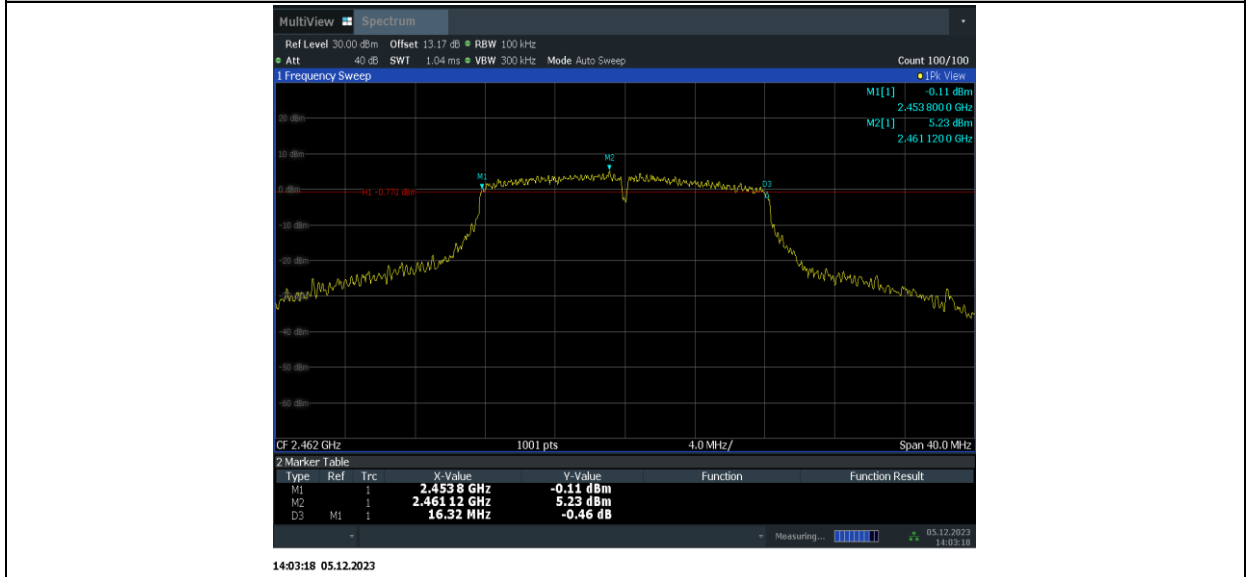
11G_Ant1_2412



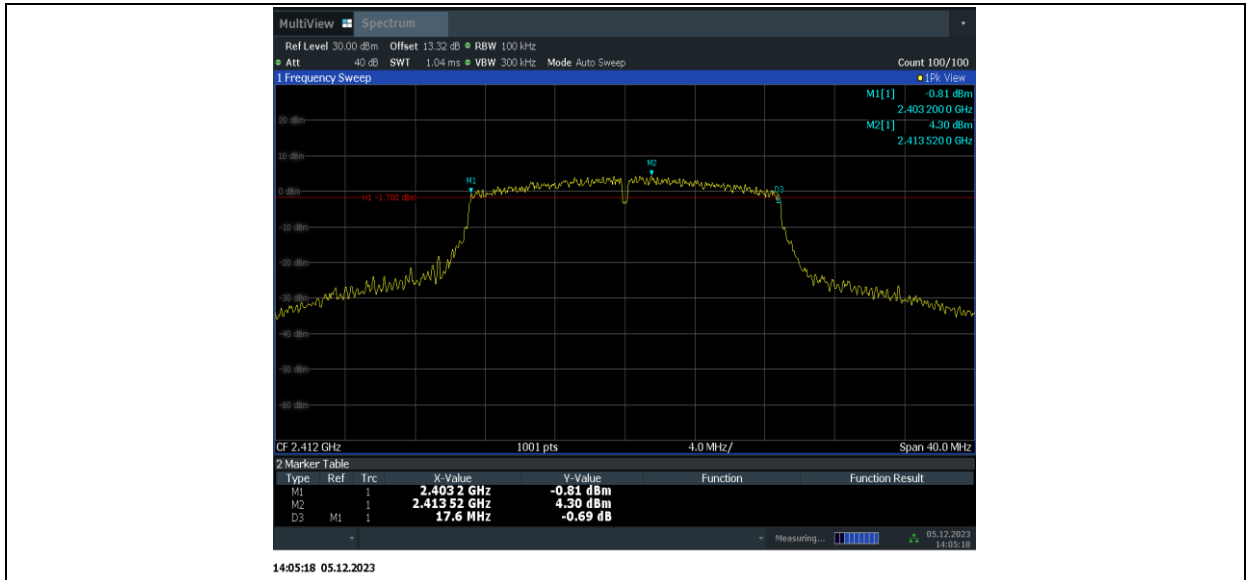
11G_Ant1_2437



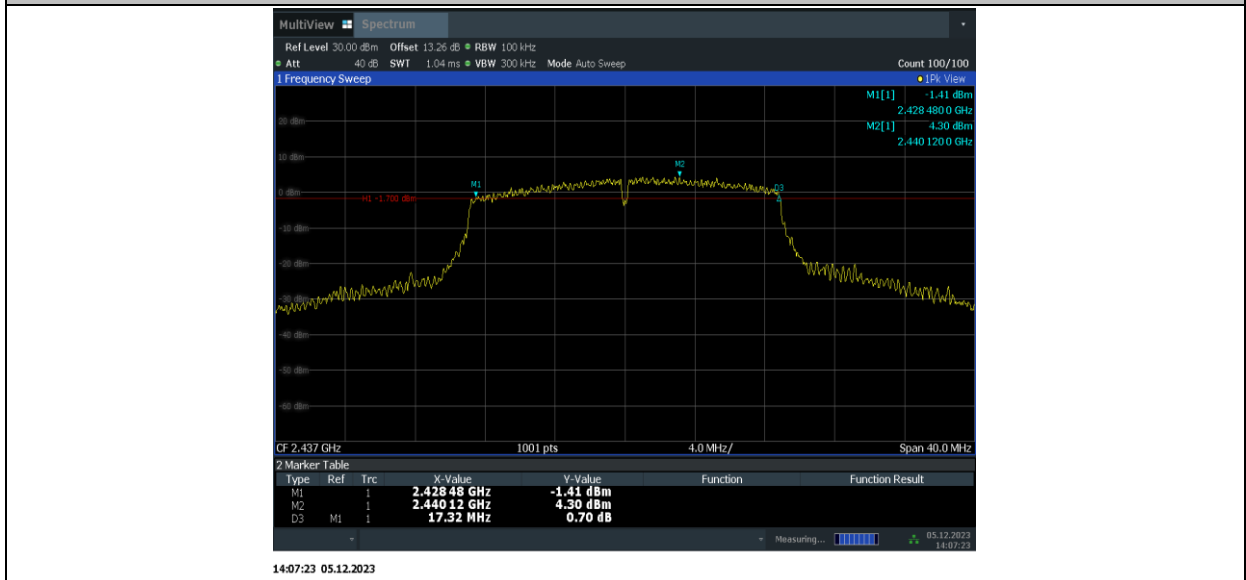
11G_Ant1_2462



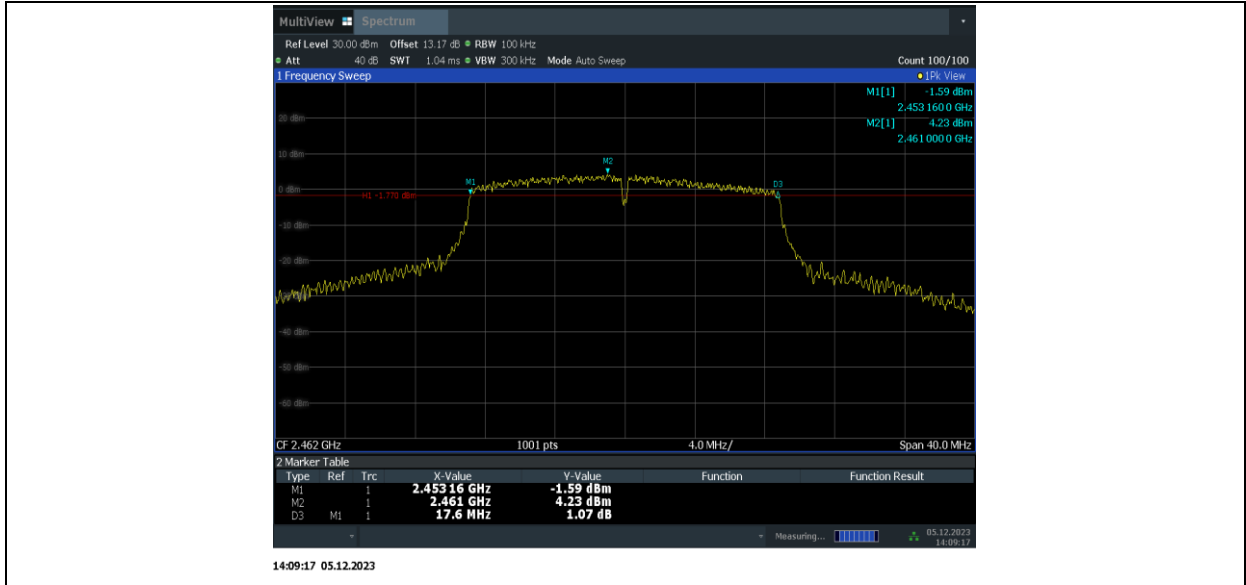
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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.

- a) Set Span = 100MHz
- b) Sweep Time: coupled
- c) Set the RBW= 100 kHz
- c) Set the VBW= 300 kHz
- d) Detector: Peak
- e) Trace: Max hold

Measurement Limit:

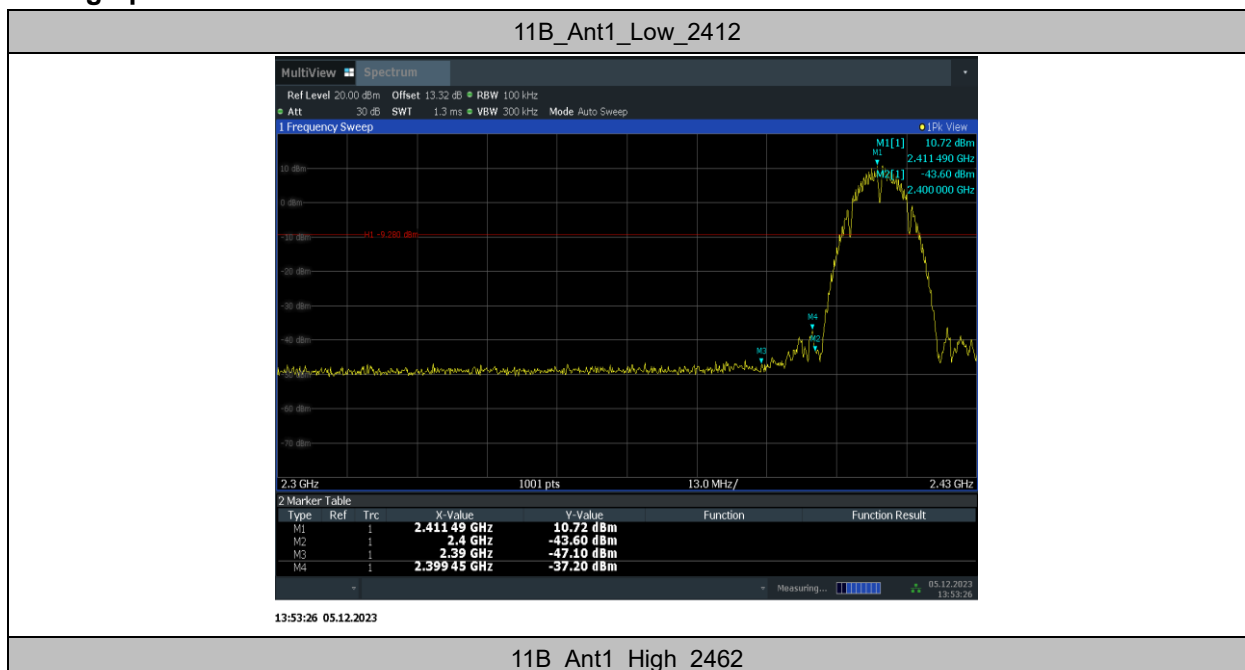
Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

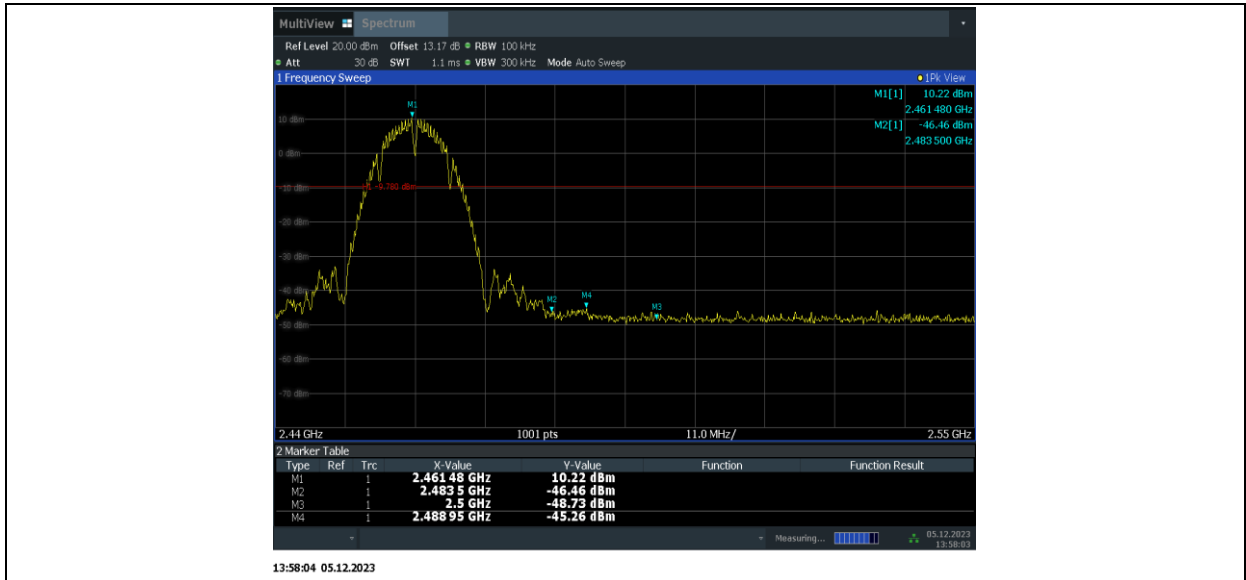
EUT ID: UT46a

Measurement Result:

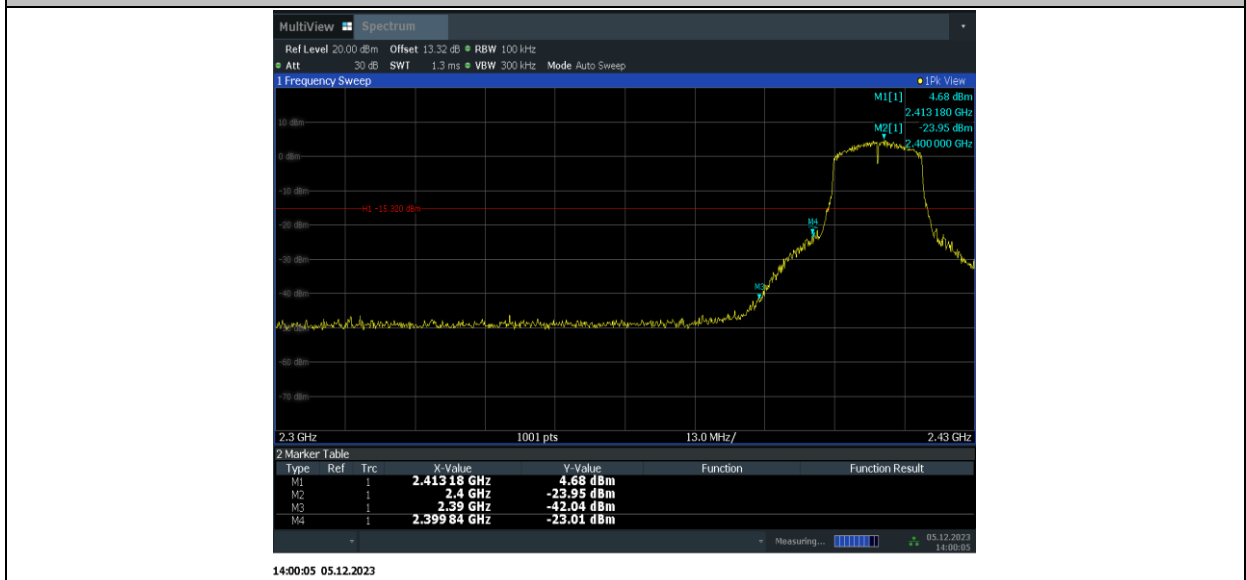
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	10.72	-37.2	≤-9.28	PASS
		High	2462	10.22	-45.26	≤-9.78	PASS
11G	Ant1	Low	2412	4.68	-23.01	≤-15.32	PASS
		High	2462	4.73	-40.25	≤-15.27	PASS
11N20SISO	Ant1	Low	2412	4.52	-21.49	≤-15.48	PASS
		High	2462	4.37	-38.11	≤-15.63	PASS

Test graphs as below:

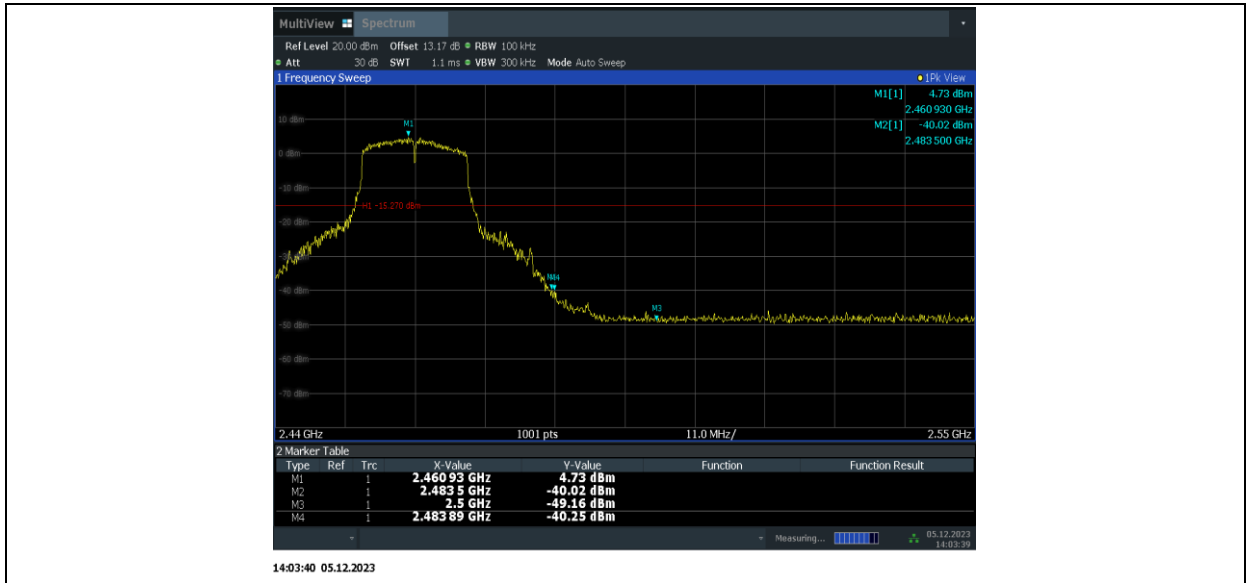




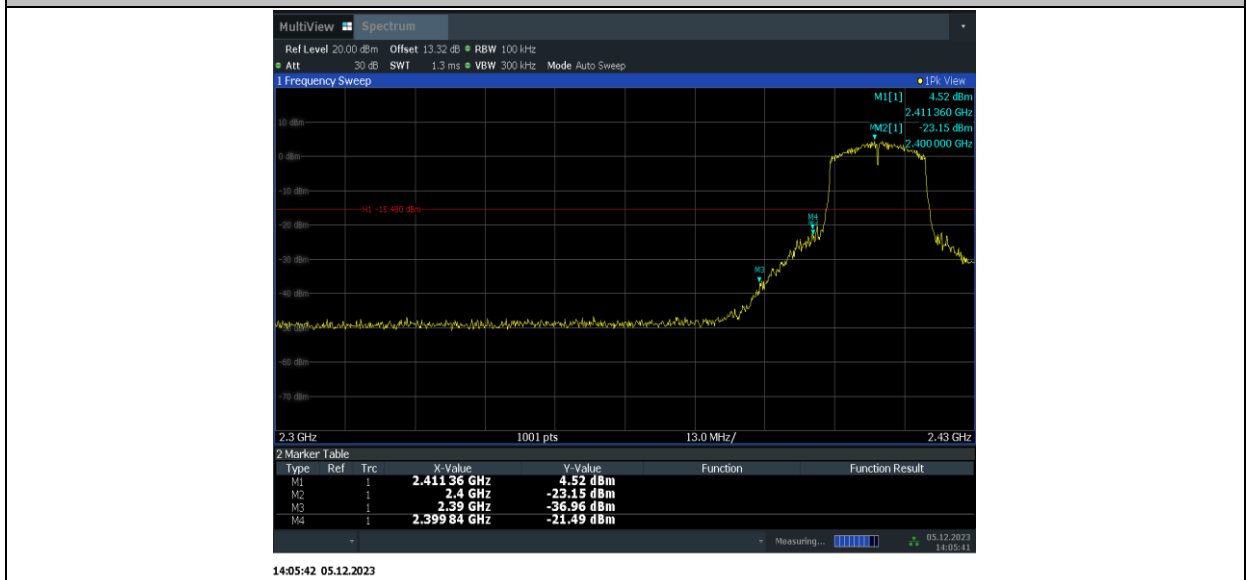
11G_Ant1_Low_2412



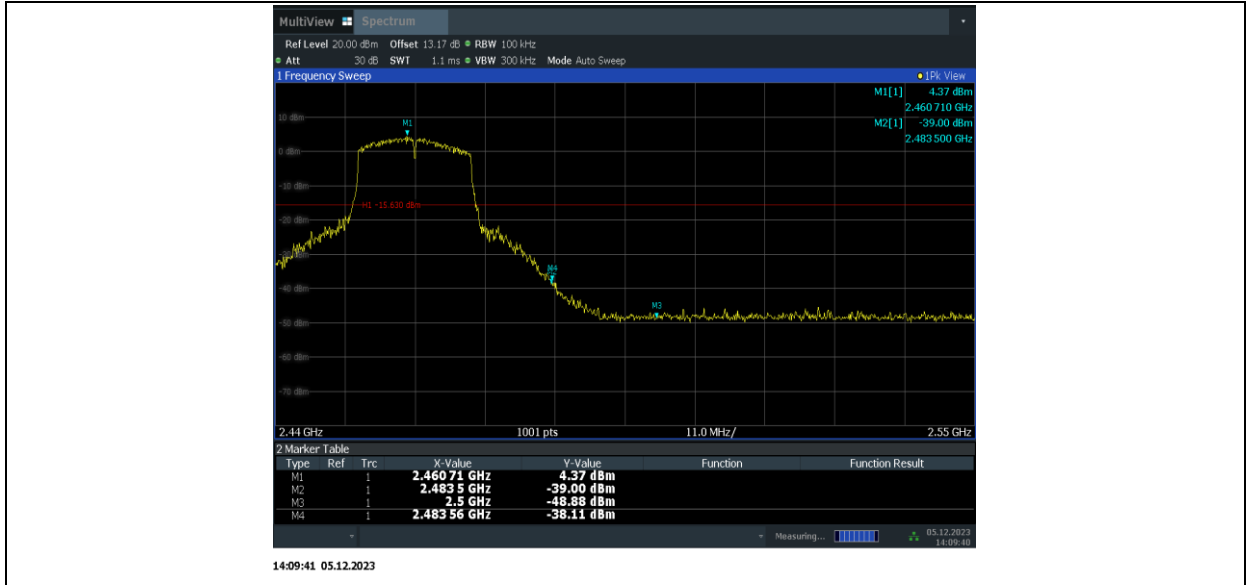
11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



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:

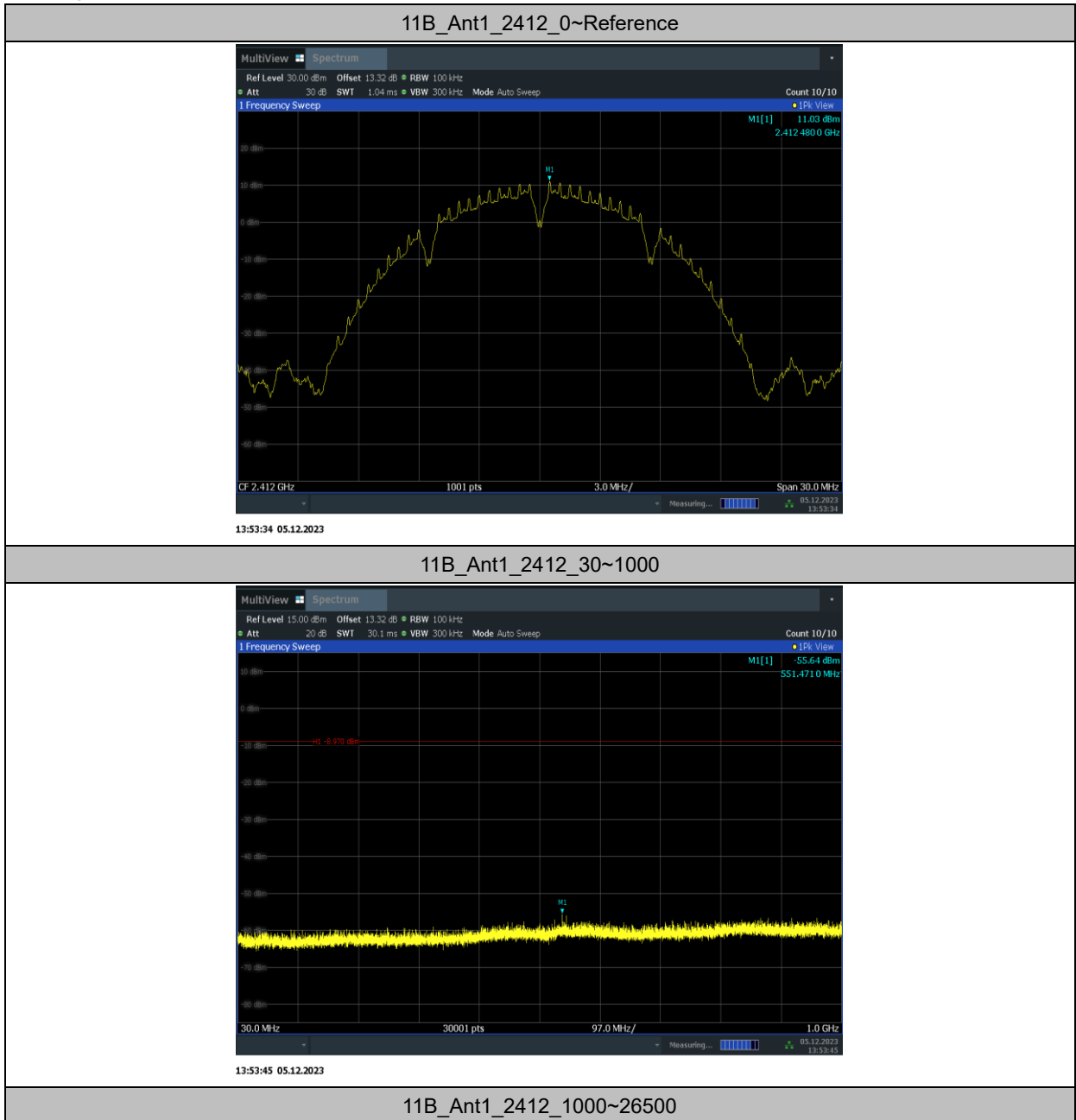
Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

EUT ID: UT46a

Measurement Results:

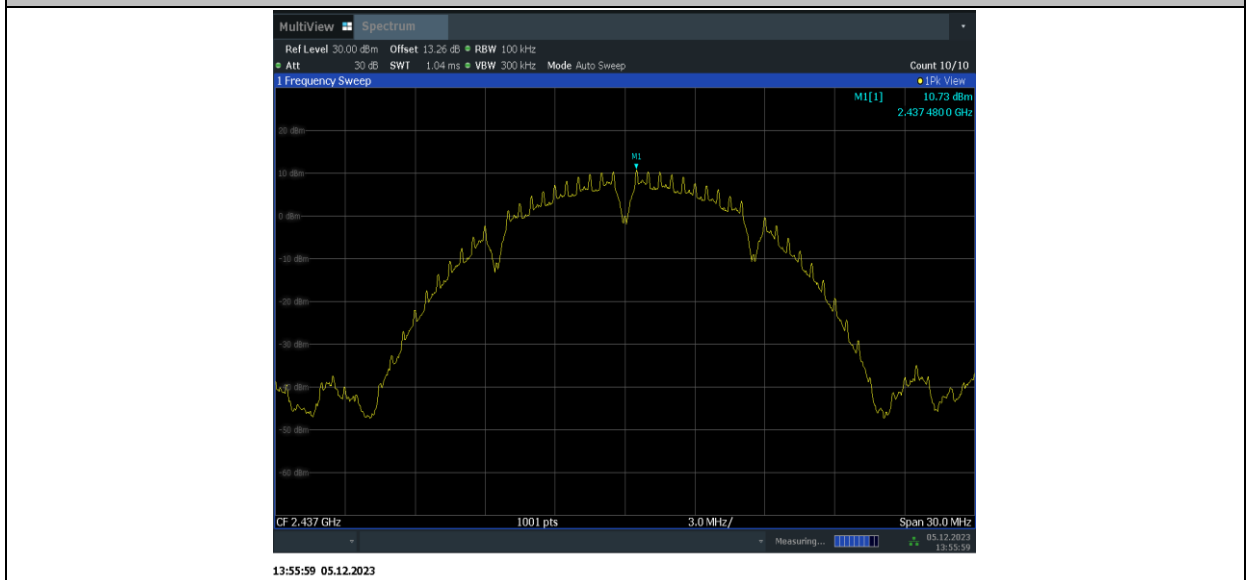
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	11.03	11.03	---	PASS
			30~1000	11.03	-55.64	≤-8.97	PASS
			1000~26500	11.03	-43.76	≤-8.97	PASS
		2437	Reference	10.73	10.73	---	PASS
			30~1000	10.73	-56.38	≤-9.27	PASS
			1000~26500	10.73	-42.35	≤-9.27	PASS
		2462	Reference	10.61	10.61	---	PASS
			30~1000	10.61	-56.24	≤-9.39	PASS
			1000~26500	10.61	-42.96	≤-9.39	PASS
11G	Ant1	2412	Reference	5.39	5.39	---	PASS
			30~1000	5.39	-55.89	≤-14.61	PASS
			1000~26500	5.39	-43.39	≤-14.61	PASS
		2437	Reference	5.60	5.60	---	PASS
			30~1000	5.60	-56.41	≤-14.4	PASS
			1000~26500	5.60	-43.72	≤-14.4	PASS
		2462	Reference	4.80	4.80	---	PASS
			30~1000	4.80	-56.78	≤-15.2	PASS
			1000~26500	4.80	-43.44	≤-15.2	PASS
11N20SISO	Ant1	2412	Reference	5.11	5.11	---	PASS
			30~1000	5.11	-56.39	≤-14.89	PASS
			1000~26500	5.11	-43.21	≤-14.89	PASS
		2437	Reference	4.72	4.72	---	PASS
			30~1000	4.72	-55.96	≤-15.28	PASS
			1000~26500	4.72	-42.82	≤-15.28	PASS
		2462	Reference	4.69	4.69	---	PASS
			30~1000	4.69	-56.05	≤-15.31	PASS
			1000~26500	4.69	-43.76	≤-15.31	PASS

Test graphs as below:

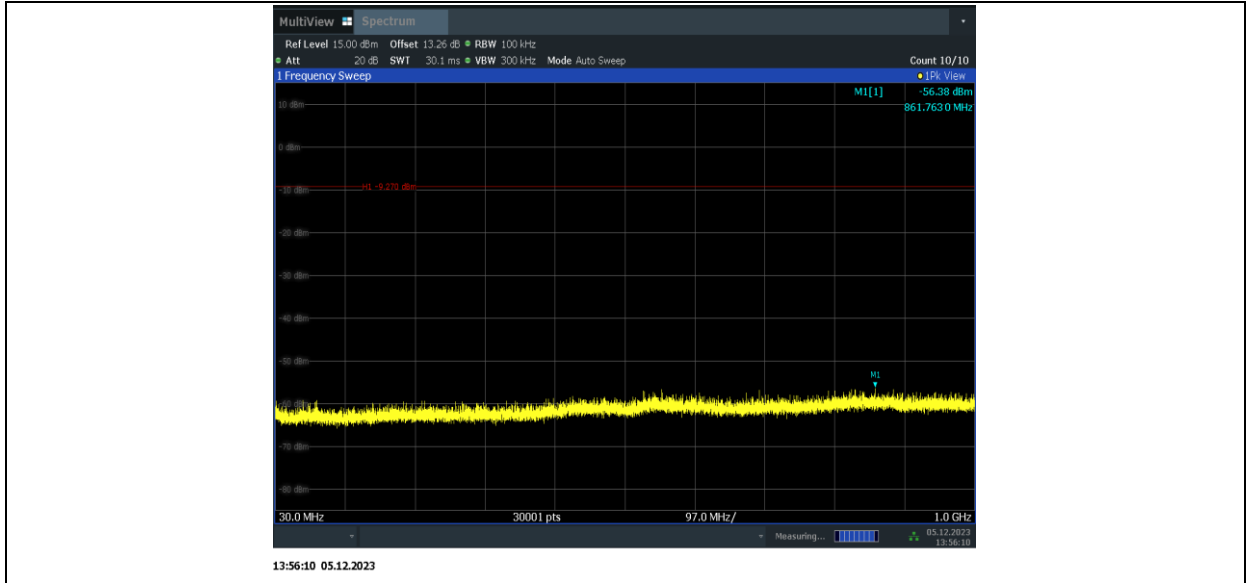




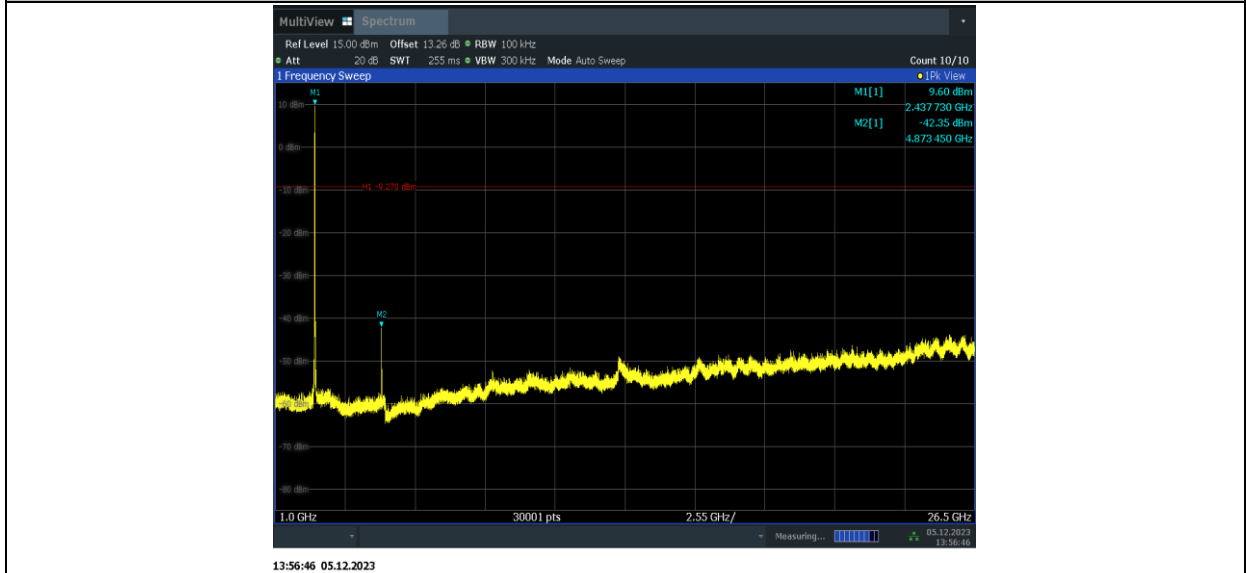
11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000



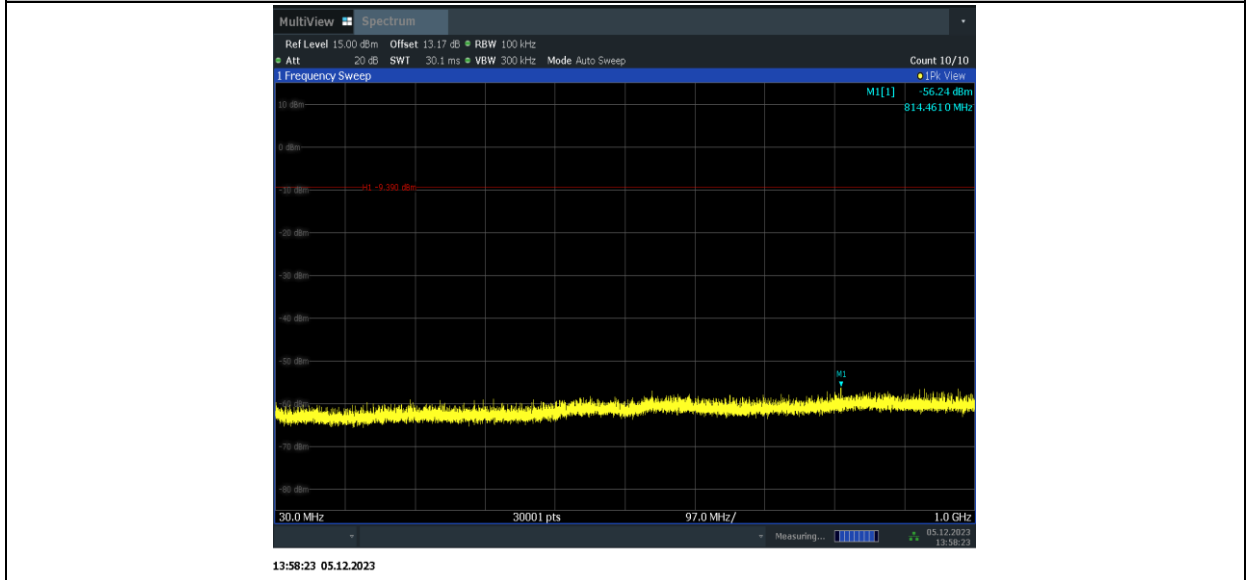
11B_Ant1_2437_1000~26500



11B_Ant1_2462_0~Reference



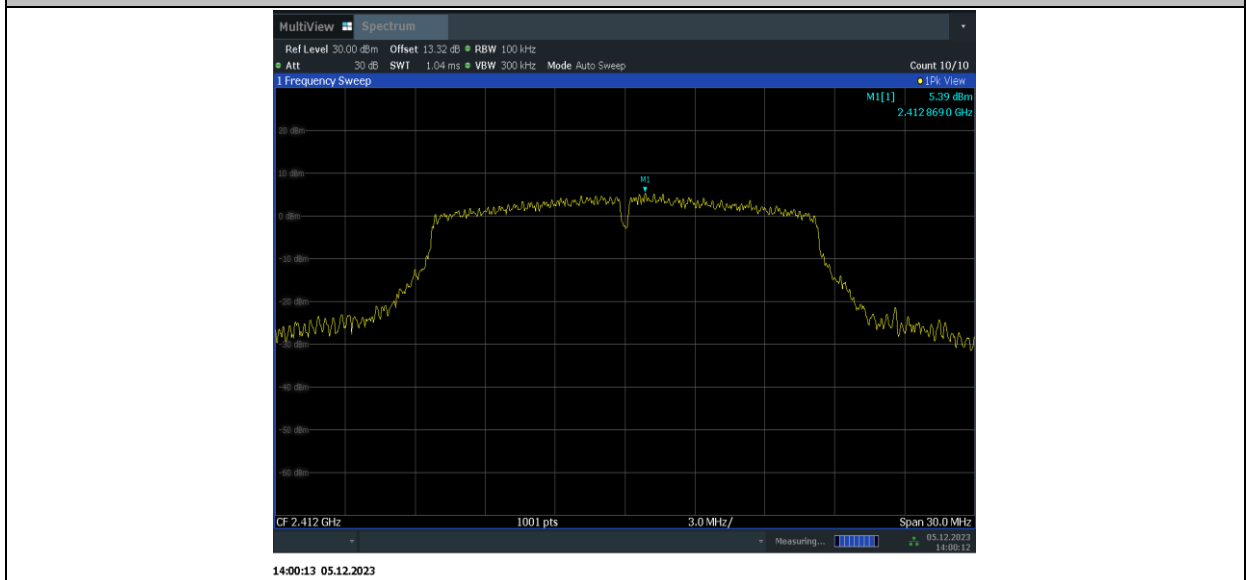
11B_Ant1_2462_30~1000



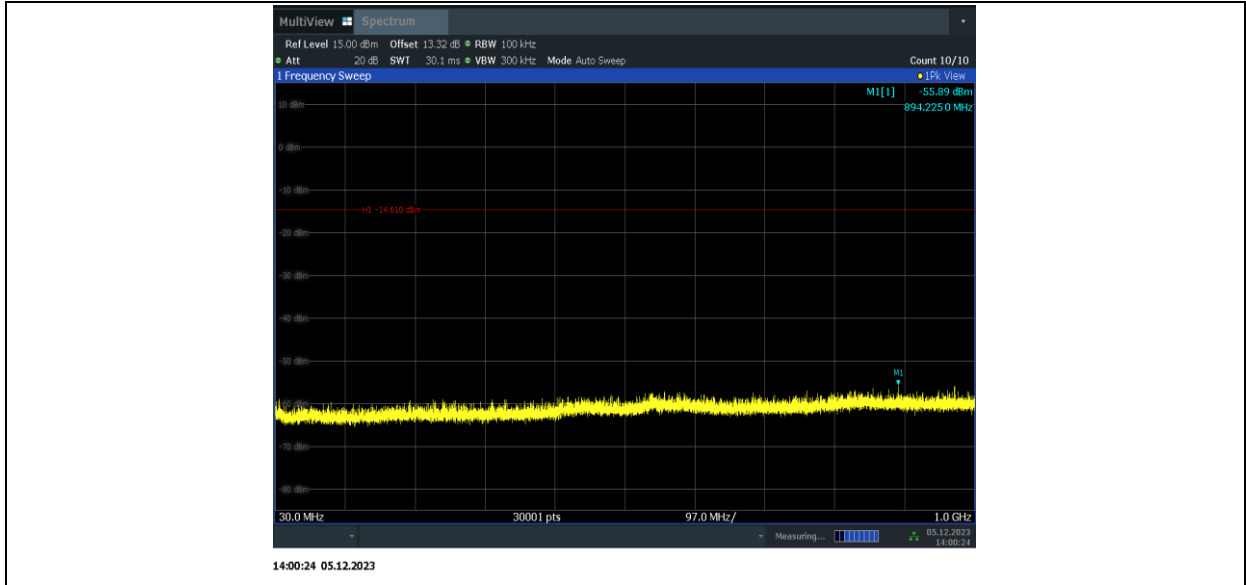
11B_Ant1_2462_1000~26500



11G_Ant1_2412_0~Reference



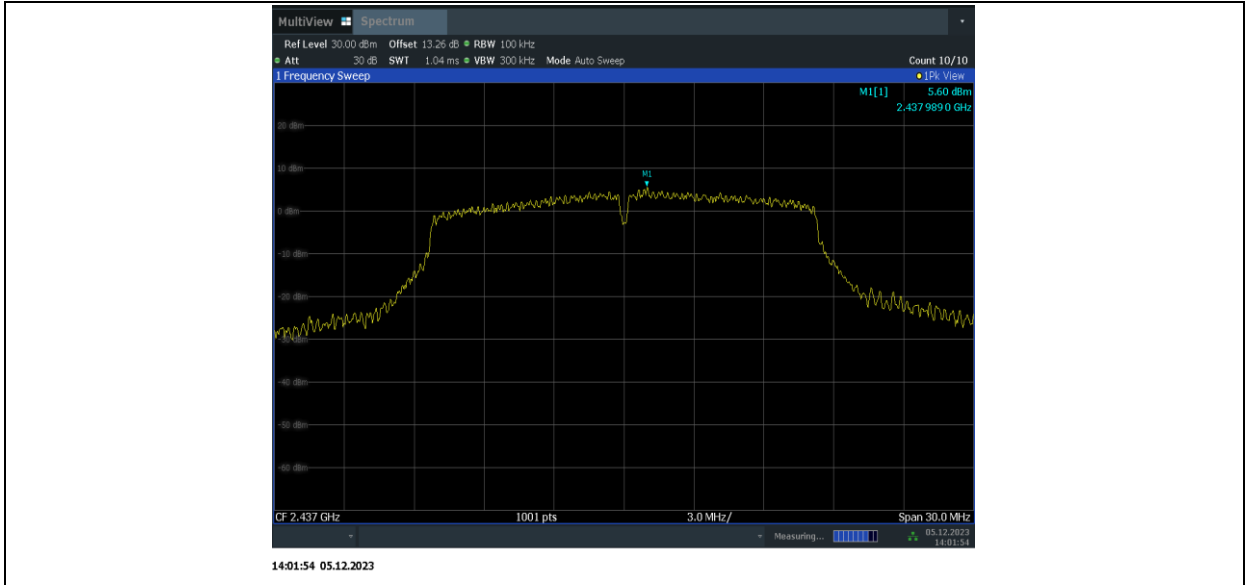
11G_Ant1_2412_30~1000



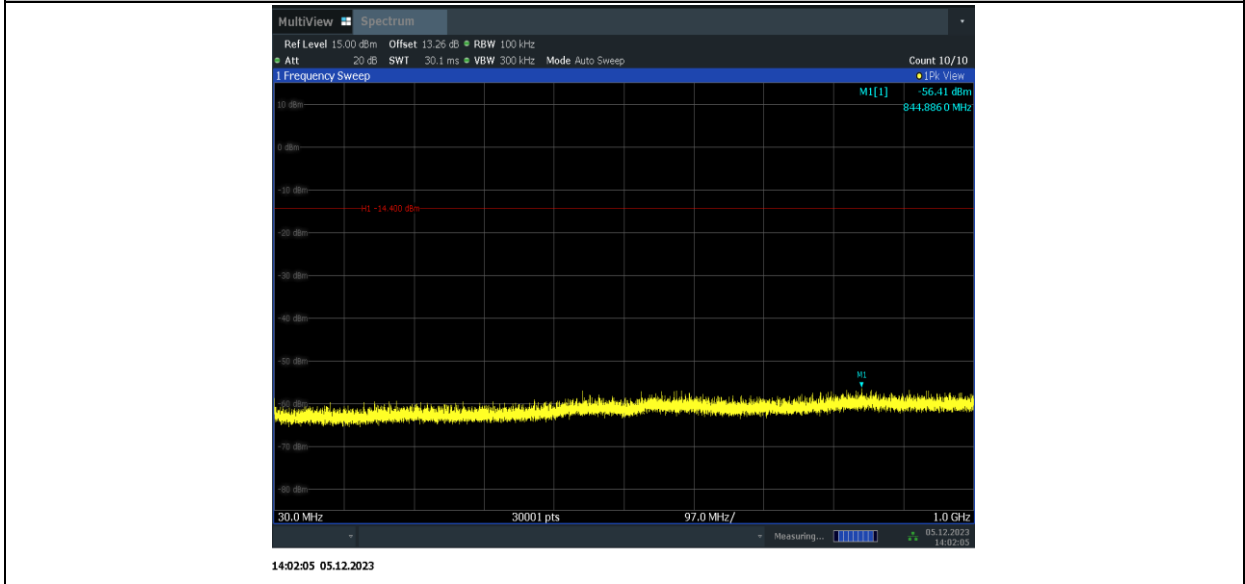
11G_Ant1_2412_1000~26500



11G_Ant1_2437_0~Reference



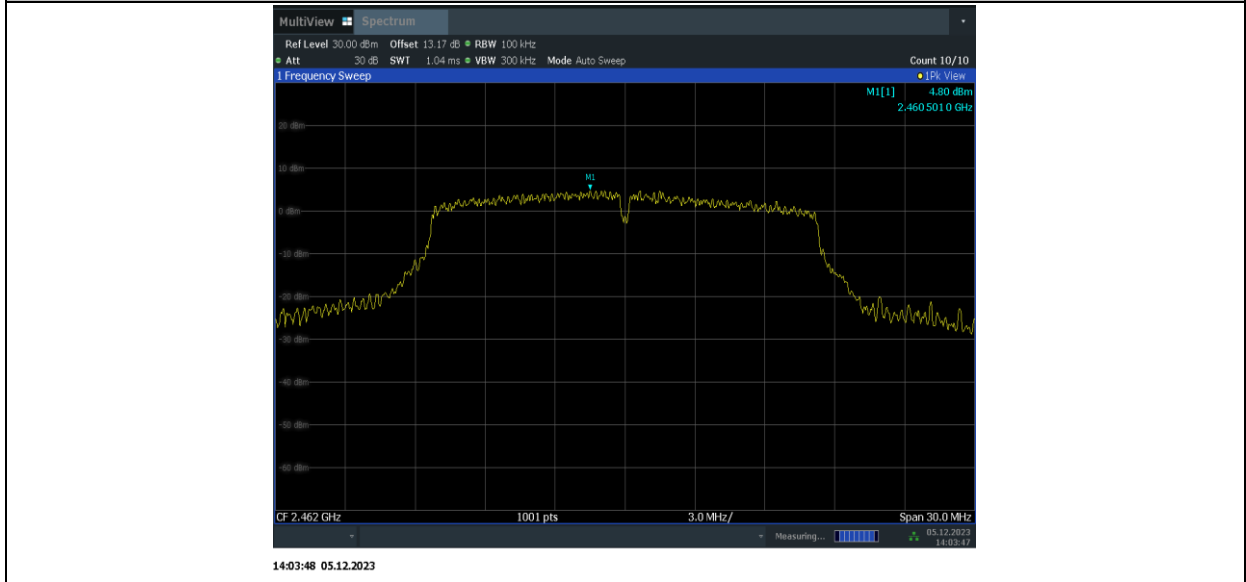
11G_Ant1_2437_30~1000



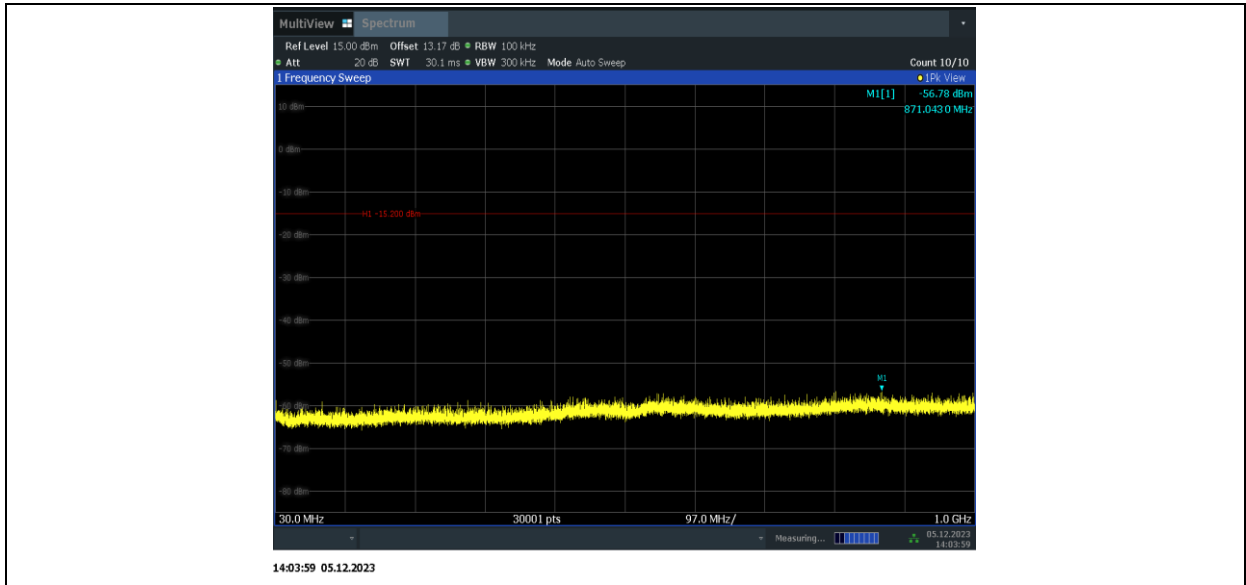
11G_Ant1_2437_1000~26500



11G_Ant1_2462_0~Reference



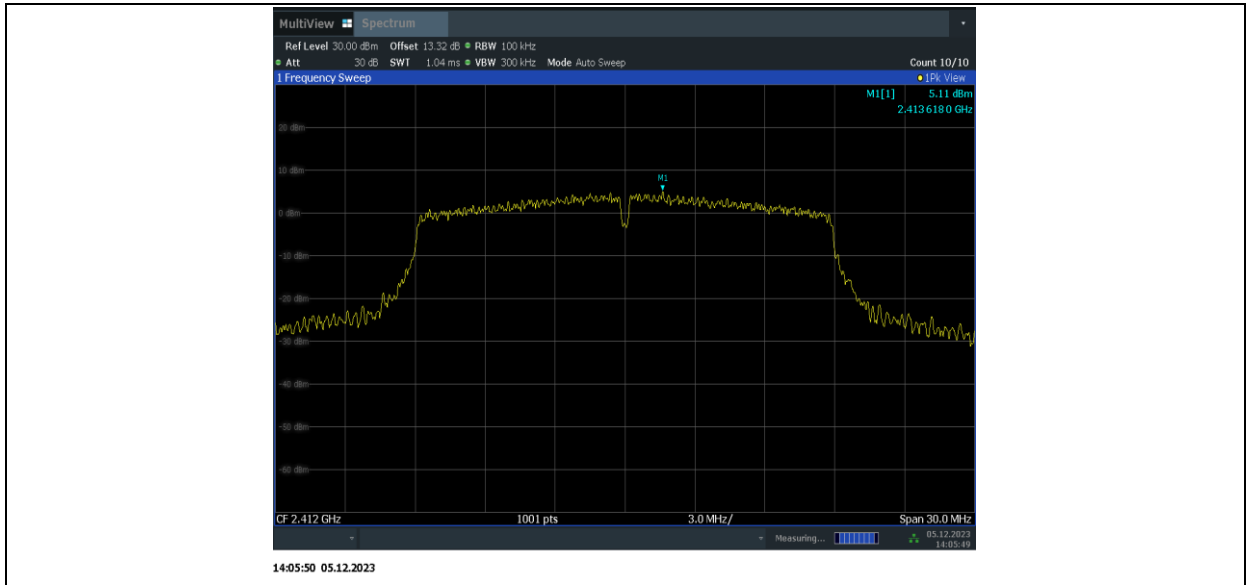
11G_Ant1_2462_30~1000



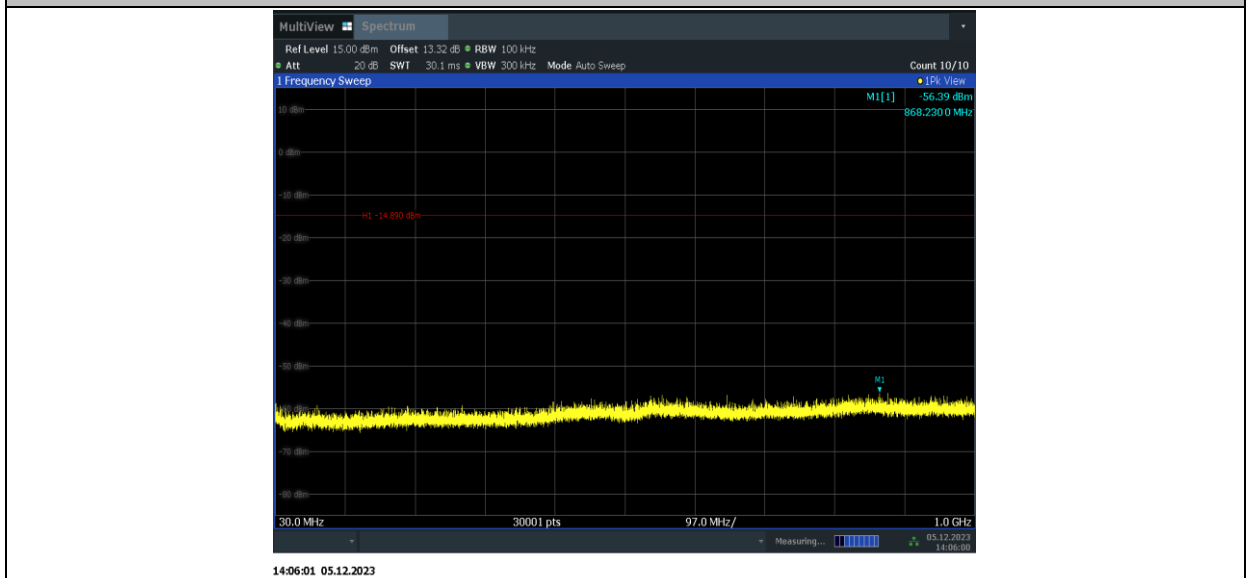
11G_Ant1_2462_1000~26500



11N20SISO_Ant1_2412_0~Reference



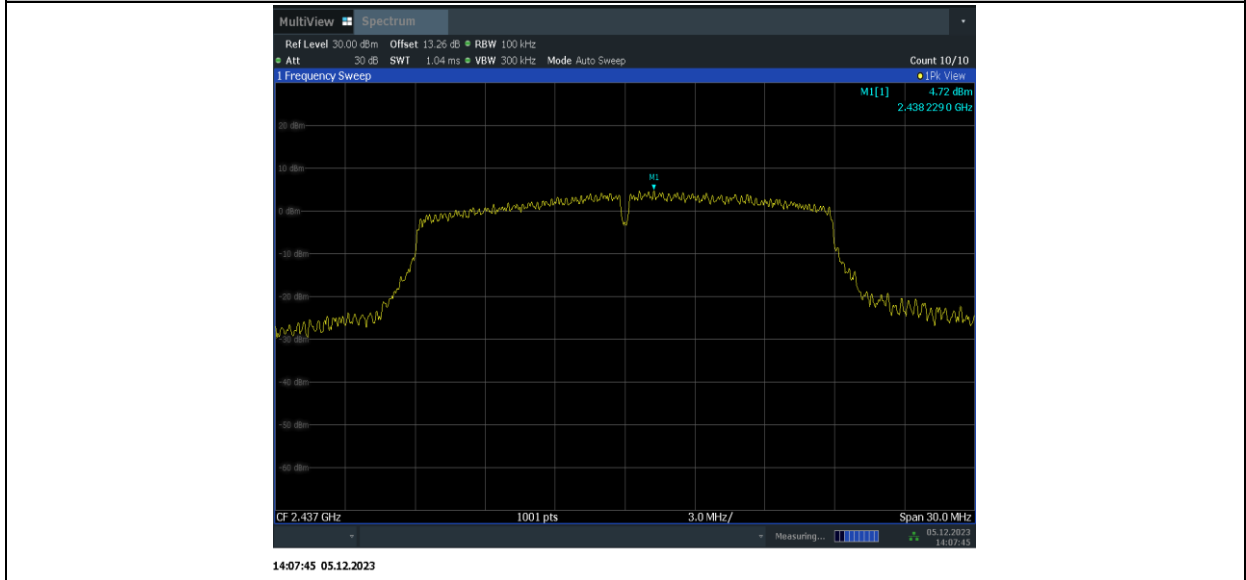
11N20SISO_Ant1_2412_30~1000



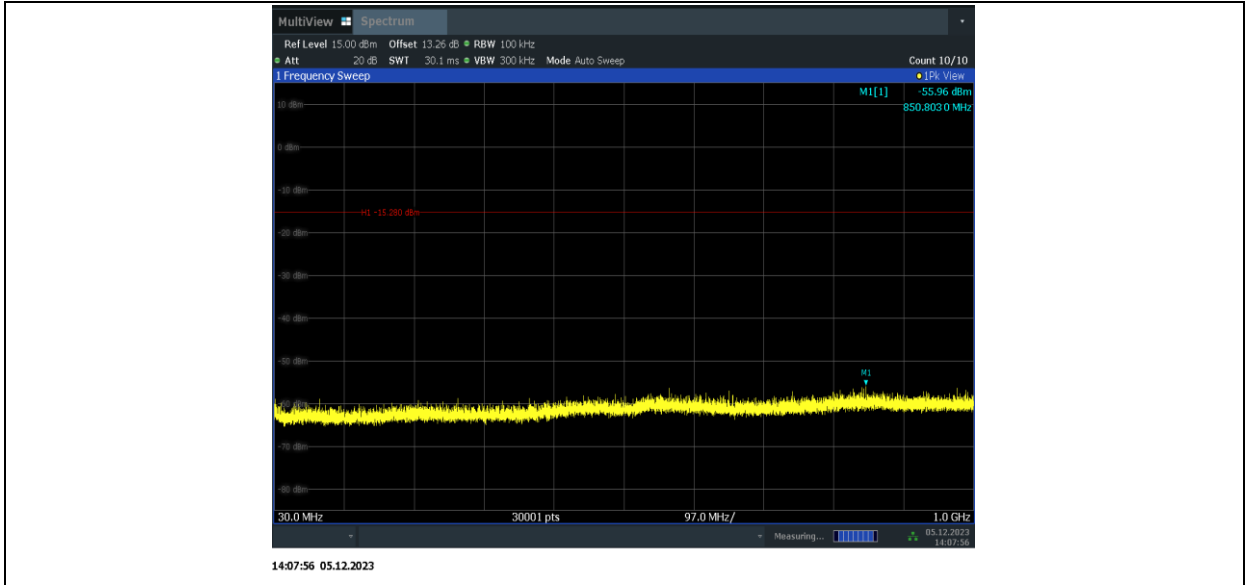
11N20SISO_Ant1_2412_1000~26500



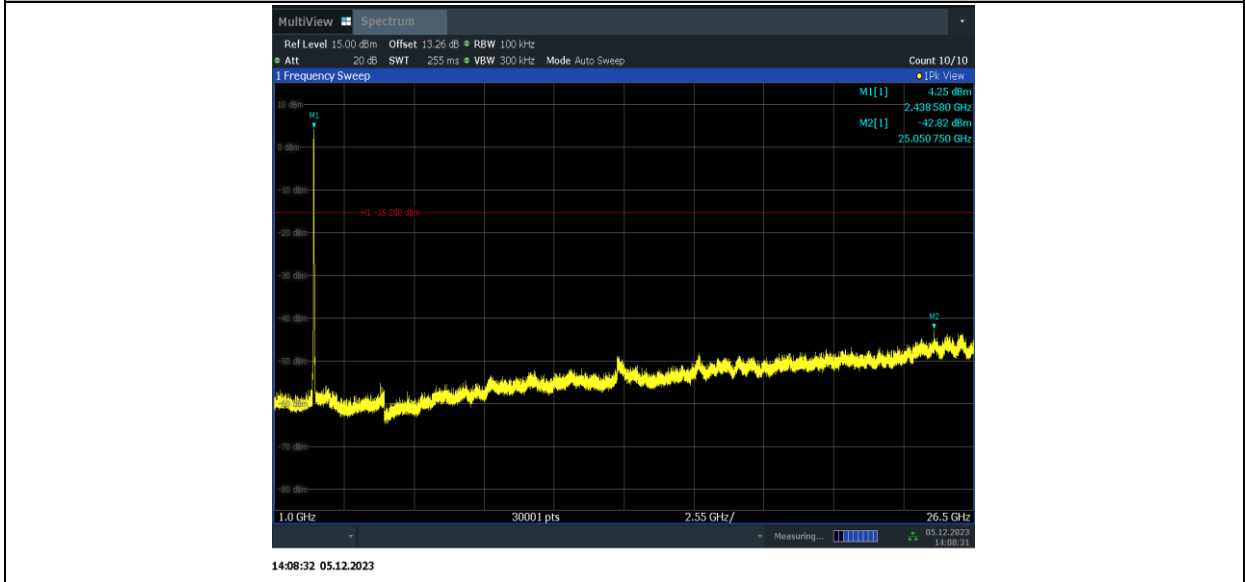
11N20SISO_Ant1_2437_0~Reference



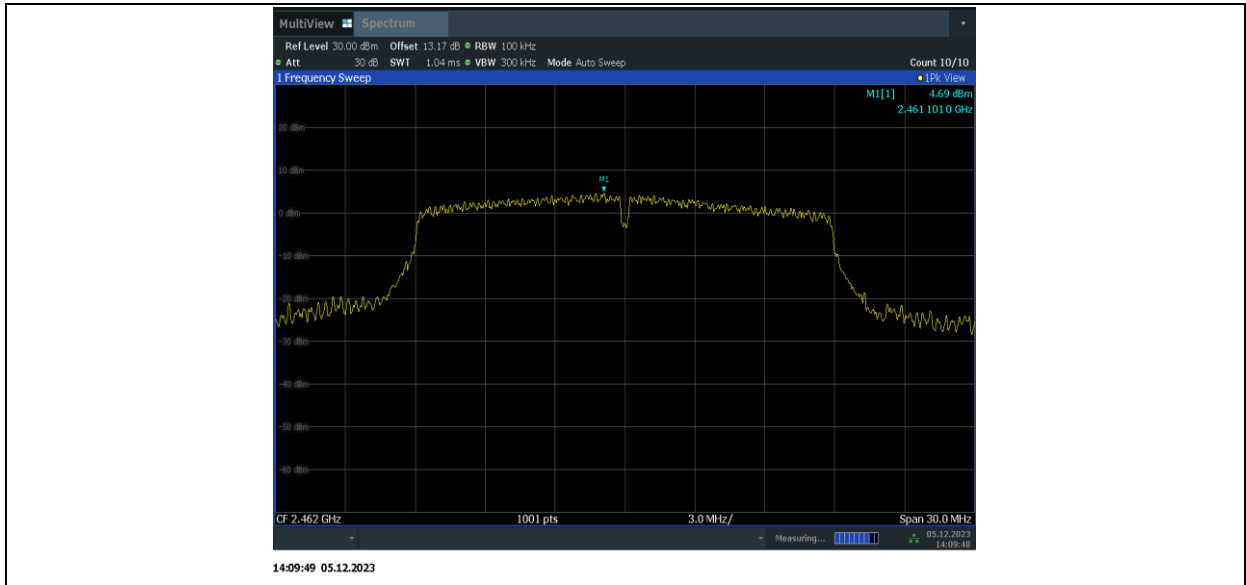
11N20SISO_Ant1_2437_30~1000



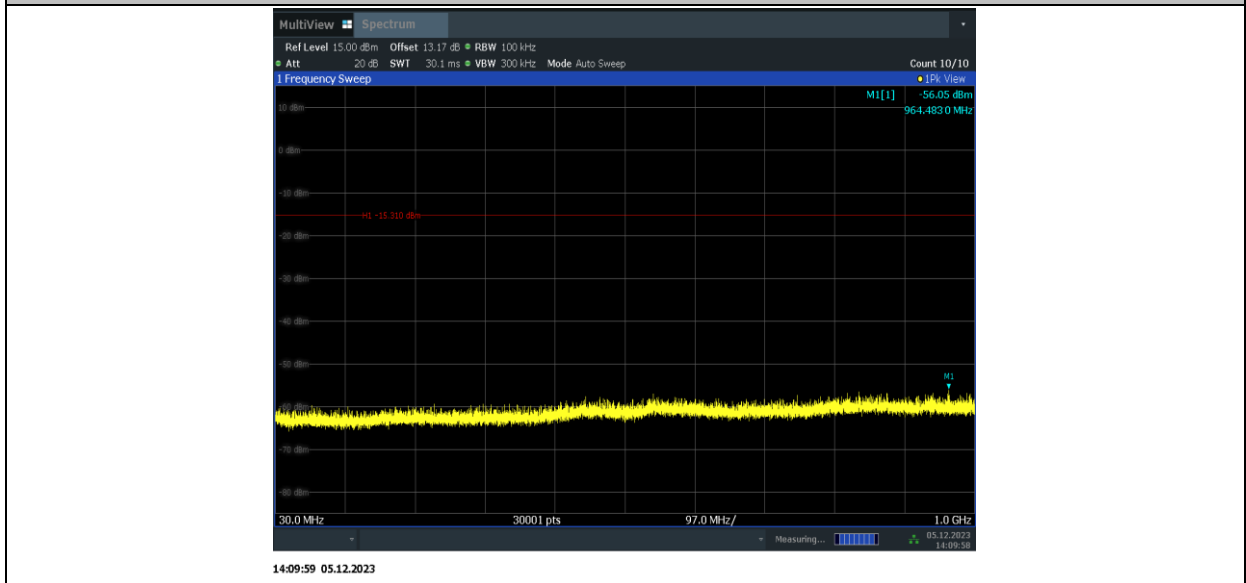
11N20SISO_Ant1_2437_1000~26500



11N20SISO_Ant1_2462_0~Reference



11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500



Conclusion: Pass

A.7. Radiated Unwanted Emission

Limits

Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

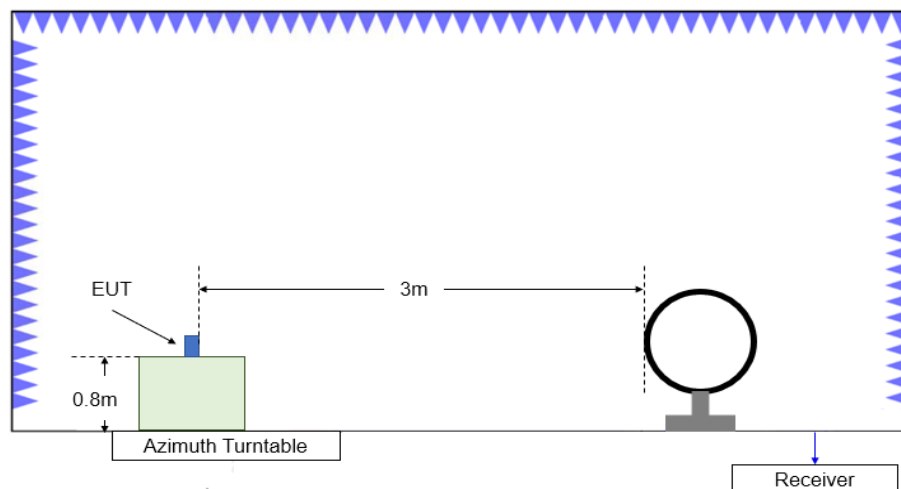
Limit in restricted band

Frequency (MHz)	Field strength($\mu\text{V}/\text{m}$)	Measurement distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 – 30.0	30	30

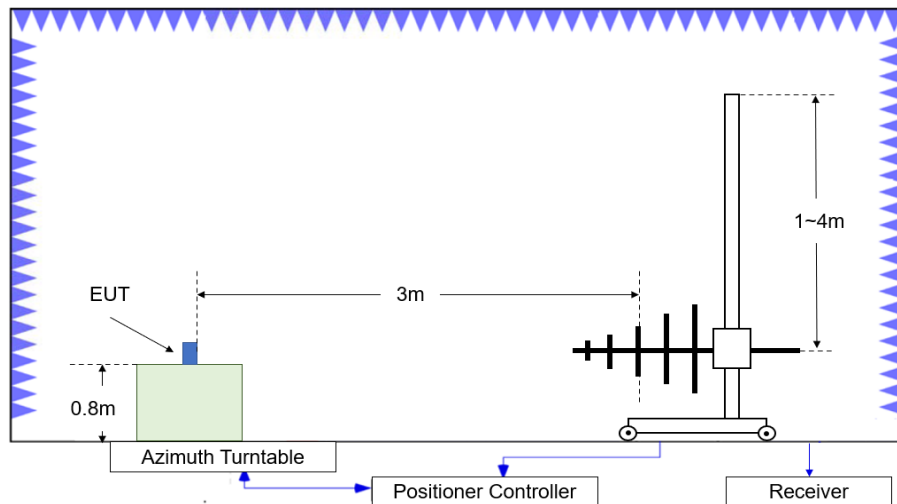
Frequency of emission (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

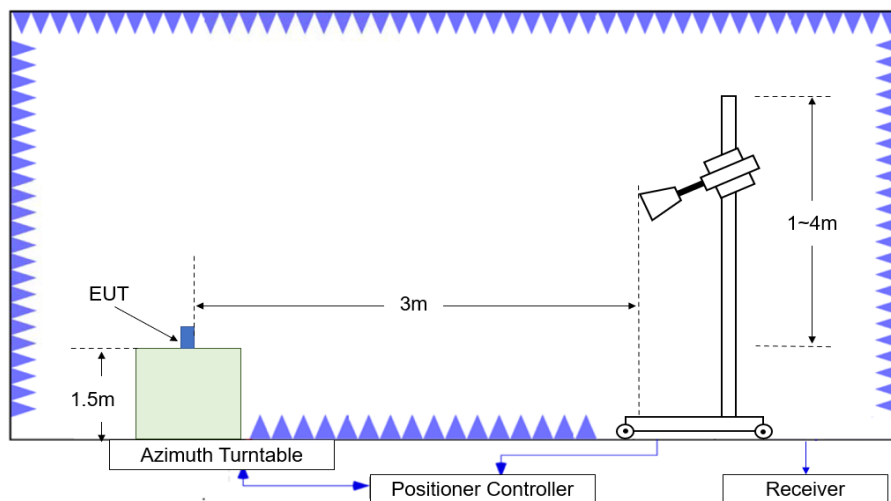
Test setup



Test Site Diagram (9kHz-30MHz)



Test Site Diagram (30MHz-1GHz)



Test Site Diagram (1GHz-40GHz)

Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10.

Test setting

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-3000	1MHz/3MHz	15
3000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Sample Calculation

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.



The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + \text{Cable Loss} + \text{Antenna Factor}$$

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
 2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
 3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
 4. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency or 40GHz, whichever is lower.
-

Test Result

Peak

802.11b

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
16574.500	49.90	-29.90	39.20	40.60	74.00	24.10	H
14675.000	47.35	-30.00	41.50	35.85	74.00	26.65	V
12537.500	46.55	-31.20	39.20	38.55	74.00	27.45	V
4823.500	43.29	-37.70	33.00	47.99	74.00	30.71	V
9138.000	43.04	-34.30	37.70	39.64	74.00	30.96	H
2389.800	58.28	-19.80	28.20	49.88	74.00	15.72	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17978.000	51.27	-29.40	46.00	34.67	74.00	22.73	H
13156.000	46.82	-31.90	40.30	38.42	74.00	27.18	H
12531.500	46.42	-31.20	39.20	38.42	74.00	27.58	V
4873.500	44.45	-37.50	33.40	48.55	74.00	29.55	V
9882.500	42.64	-33.90	37.90	38.64	74.00	31.36	V
7580.000	41.59	-35.60	36.30	40.89	74.00	32.41	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17948.500	50.89	-29.40	46.00	34.29	74.00	23.11	H
14790.000	47.34	-30.40	41.20	36.54	74.00	26.66	H
12557.000	46.71	-31.20	39.20	38.71	74.00	27.29	H
4924.000	45.25	-37.60	33.30	49.55	74.00	28.75	H
9209.000	42.57	-34.30	37.60	39.27	74.00	31.43	H
2486.100	55.48	-19.70	28.20	46.98	74.00	18.52	H

802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17977.000	49.64	-29.40	46.00	33.04	74.00	24.36	H
14864.000	46.99	-30.10	40.90	36.19	74.00	27.01	V
12575.500	46.50	-32.20	39.30	39.40	74.00	27.50	H
9035.000	42.69	-34.30	37.80	39.19	74.00	31.31	H
7979.000	40.88	-35.40	36.90	39.38	74.00	33.12	H
2389.900	63.90	-19.80	28.20	55.50	74.00	10.10	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17951.500	51.39	-29.40	46.00	34.79	74.00	22.61	V
14789.000	47.80	-30.40	41.20	37.00	74.00	26.20	H
12585.500	46.25	-32.20	39.30	39.15	74.00	27.75	H
9749.000	43.01	-34.50	37.80	39.71	74.00	30.99	V
7562.000	40.54	-35.50	36.30	39.74	74.00	33.46	V
4880.500	38.79	-37.50	33.40	42.89	74.00	35.21	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17093.500	50.14	-29.20	41.40	37.94	74.00	23.86	V
14766.500	47.13	-30.40	41.20	36.33	74.00	26.87	V
12792.000	46.43	-31.50	39.80	38.13	74.00	27.57	V
9625.500	42.52	-34.30	37.60	39.22	74.00	31.48	H
7525.000	41.10	-35.50	36.30	40.30	74.00	32.90	V
2485.100	59.06	-19.70	28.20	50.56	74.00	14.94	H

802.11n-HT20

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17982.500	50.21	-29.40	46.00	33.61	74.00	23.79	H
12538.000	46.52	-31.20	39.20	38.52	74.00	27.48	H
14857.500	46.46	-30.10	40.90	35.66	74.00	27.54	V
9135.500	42.55	-34.30	37.70	39.15	74.00	31.45	V
7532.000	41.29	-35.50	36.30	40.49	74.00	32.71	V
2389.800	65.66	-19.80	28.20	57.26	74.00	8.34	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17104.000	49.79	-29.20	41.40	37.59	74.00	24.21	H
14031.000	47.02	-31.10	41.60	36.52	74.00	26.98	V
12315.000	46.79	-32.10	39.00	39.89	74.00	27.21	H
9159.000	42.71	-34.70	37.70	39.71	74.00	31.29	V
7975.500	40.64	-35.40	36.90	39.14	74.00	33.36	H
4867.000	39.31	-37.50	33.40	43.41	74.00	34.69	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17952.500	49.68	-29.40	46.00	33.08	74.00	24.32	H
14784.500	47.73	-30.40	41.20	36.93	74.00	26.27	V
12543.500	46.24	-31.20	39.20	38.24	74.00	27.76	H
8374.000	42.16	-34.40	37.30	39.26	74.00	31.84	H
7618.500	40.96	-35.60	36.30	40.26	74.00	33.04	V
2485.100	63.52	-19.70	28.20	55.02	74.00	10.48	V

Average
802.11b
Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17954.500	41.06	-29.40	46.00	24.46	54.00	12.94	V
4823.500	39.28	-37.70	33.00	43.98	54.00	14.72	V
14720.000	37.99	-30.20	41.40	26.89	54.00	16.01	V
12540.000	36.95	-31.20	39.20	28.95	54.00	17.05	H
9166.000	32.68	-34.70	37.70	29.68	54.00	21.32	H
2385.500	48.22	-19.80	28.20	39.82	54.00	5.78	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17952.000	41.08	-29.40	46.00	24.48	54.00	12.92	H
4873.500	40.56	-37.50	33.40	44.66	54.00	13.44	V
14760.500	37.69	-30.40	41.20	26.89	54.00	16.31	V
12542.500	37.11	-31.20	39.20	29.11	54.00	16.89	V
9634.500	32.90	-34.30	37.60	29.60	54.00	21.10	V
7968.500	31.65	-35.40	36.80	30.25	54.00	22.35	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
4923.500	42.20	-37.60	33.30	46.50	54.00	11.80	H
17948.500	40.88	-29.40	46.00	24.28	54.00	13.12	V
14678.000	37.44	-30.00	41.50	25.94	54.00	16.56	V
12538.000	37.29	-31.20	39.20	29.29	54.00	16.71	H
9626.500	32.94	-34.30	37.60	29.64	54.00	21.06	H
2485.700	45.75	-19.70	28.20	37.25	54.00	8.25	V

802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17982.000	40.91	-29.40	46.00	24.31	54.00	13.09	H
14764.500	37.34	-30.40	41.20	26.54	54.00	16.66	H
12562.500	37.11	-31.20	39.20	29.11	54.00	16.89	V
9178.000	32.80	-34.70	37.70	29.80	54.00	21.20	V
7989.000	31.61	-35.40	36.90	30.11	54.00	22.39	V
2389.900	50.81	-19.80	28.20	42.41	54.00	3.19	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17958.000	41.08	-29.40	46.00	24.48	54.00	12.92	H
14785.000	37.42	-30.40	41.20	26.62	54.00	16.58	V
12560.000	37.29	-31.20	39.20	29.29	54.00	16.71	V
9134.000	32.81	-34.30	37.70	29.41	54.00	21.19	V
7989.500	31.49	-35.40	36.90	29.99	54.00	22.51	H
4875.000	30.18	-37.50	33.40	34.28	54.00	23.82	V

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17950.500	40.79	-29.40	46.00	24.19	54.00	13.21	V
14627.500	37.25	-30.80	41.70	26.35	54.00	16.75	V
12562.000	37.13	-31.20	39.20	29.13	54.00	16.87	V
9169.000	32.84	-34.70	37.70	29.84	54.00	21.16	H
7990.500	31.70	-35.40	36.90	30.20	54.00	22.30	H
2485.100	48.21	-19.70	28.20	39.71	54.00	5.79	V

802.11n-HT20

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17980.000	41.05	-29.40	46.00	24.45	54.00	12.95	H
14717.000	37.56	-30.20	41.40	26.46	54.00	16.44	H
12543.000	37.55	-31.20	39.20	29.55	54.00	16.45	V
9702.000	32.99	-34.00	37.70	29.29	54.00	21.01	H
7991.000	31.41	-35.40	36.90	29.91	54.00	22.59	H
2389.800	52.11	-19.80	28.20	43.71	54.00	1.89	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17952.000	40.86	-29.40	46.00	24.26	54.00	13.14	V
14743.000	37.45	-30.20	41.40	26.35	54.00	16.55	H
12563.000	37.34	-31.20	39.20	29.34	54.00	16.66	H
9163.000	33.11	-34.70	37.70	30.11	54.00	20.89	H
7991.000	31.63	-35.40	36.90	30.13	54.00	22.37	V
4873.500	30.03	-37.50	33.40	34.13	54.00	23.97	V

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17950.000	41.21	-29.40	46.00	24.61	54.00	12.79	V
14742.500	37.44	-30.20	41.40	26.34	54.00	16.56	H
12559.500	37.09	-31.20	39.20	29.09	54.00	16.91	V
9766.000	32.90	-33.80	38.00	28.70	54.00	21.10	H
7991.500	31.75	-35.40	36.90	30.25	54.00	22.25	H
2485.100	48.90	-19.70	28.20	40.40	54.00	5.10	V

Band edge compliance

802.11b mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.31GHz~2.43GHz---L	Fig.1	P
	11	2.45GHz~2.50GHz---H	Fig.2	P

802.11g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11g	1	2.31GHz~2.43GHz---L	Fig.3	P
	11	2.45GHz~2.50GHz---H	Fig.4	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	1	2.31GHz~2.43GHz---L	Fig.5	P
	11	2.45GHz~2.50GHz---H	Fig.6	P

Test graphs as below:

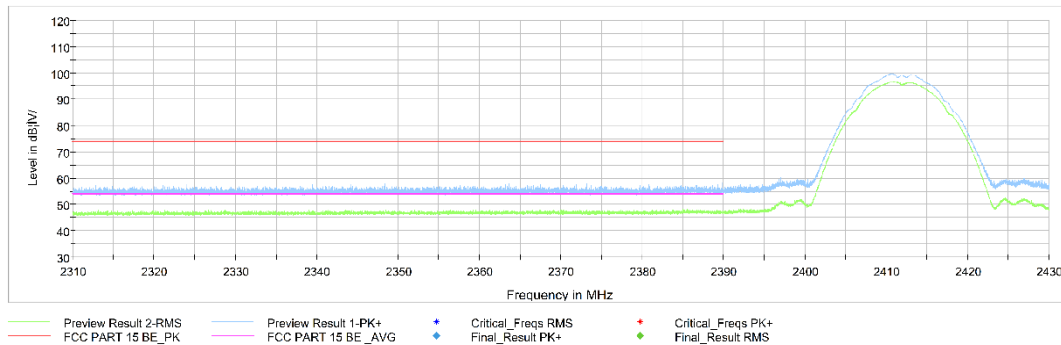


Fig.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.31 GHz – 2.43GHz

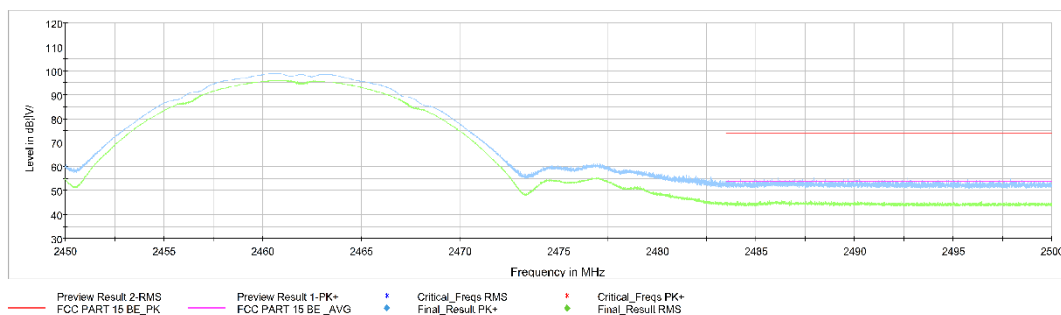


Fig.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

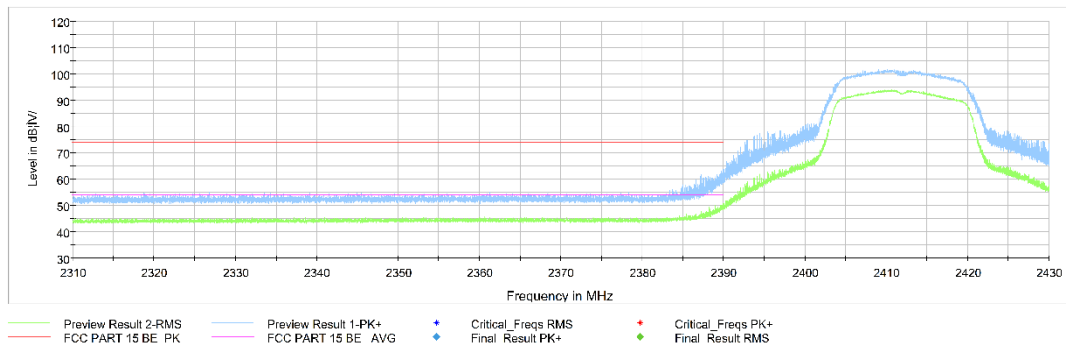


Fig.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.31 GHz - 2.43GHz

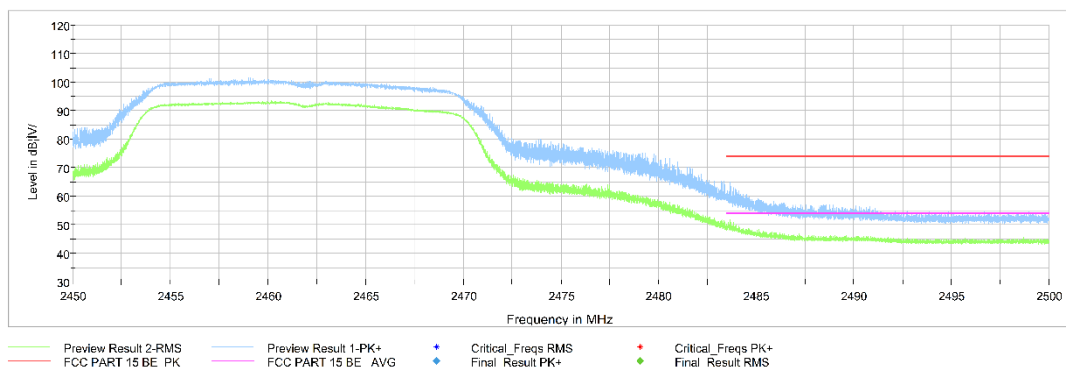


Fig.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

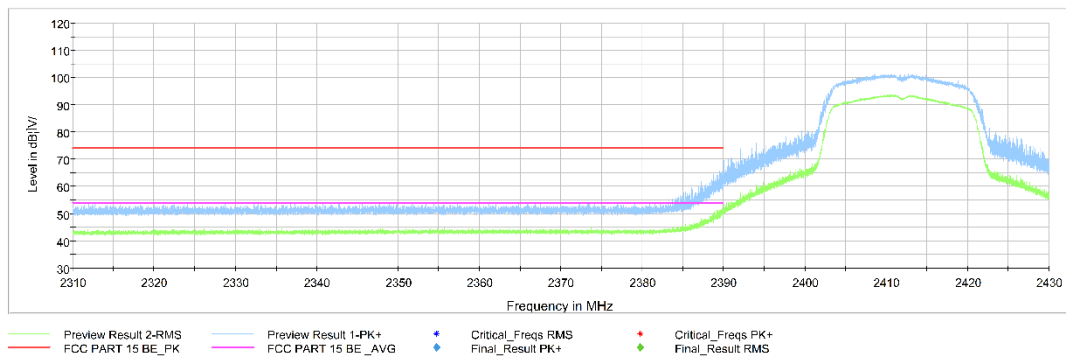


Fig.5 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.31 GHz - 2.43GHz

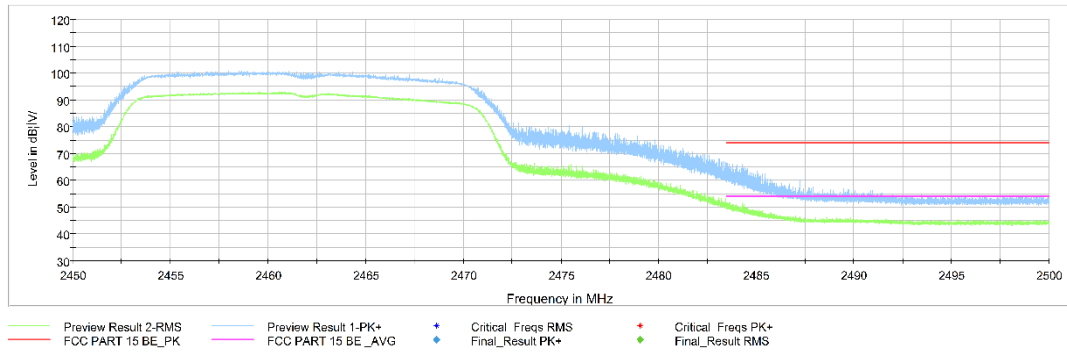


Fig.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

A.7. AC Power-line Conducted Emission

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

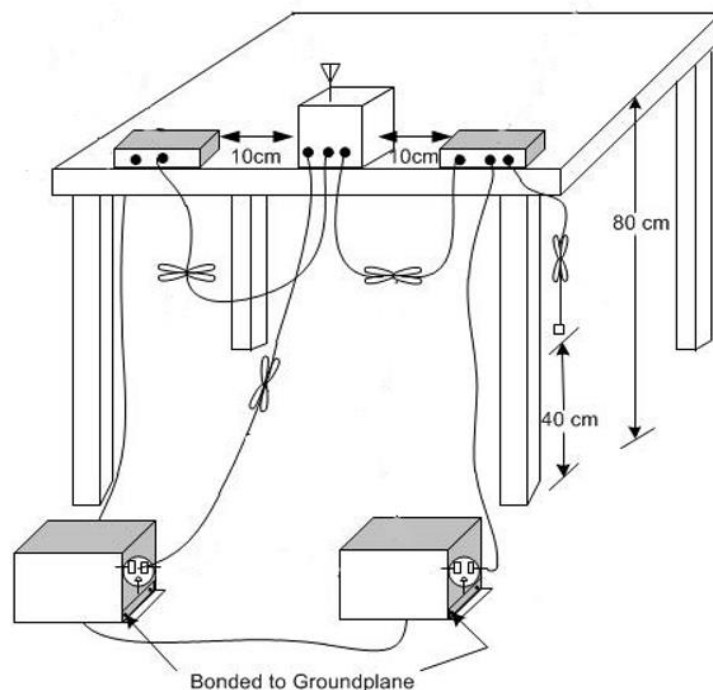
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Test setup



Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	66 to 56	Fig.A.8.1	Fig.A.8.2	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	56 to 46	Fig.A.8.1	Fig.A.8.2	P
0.5 to 5	46			
5 to 30	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: Pass
Test graphs as below:

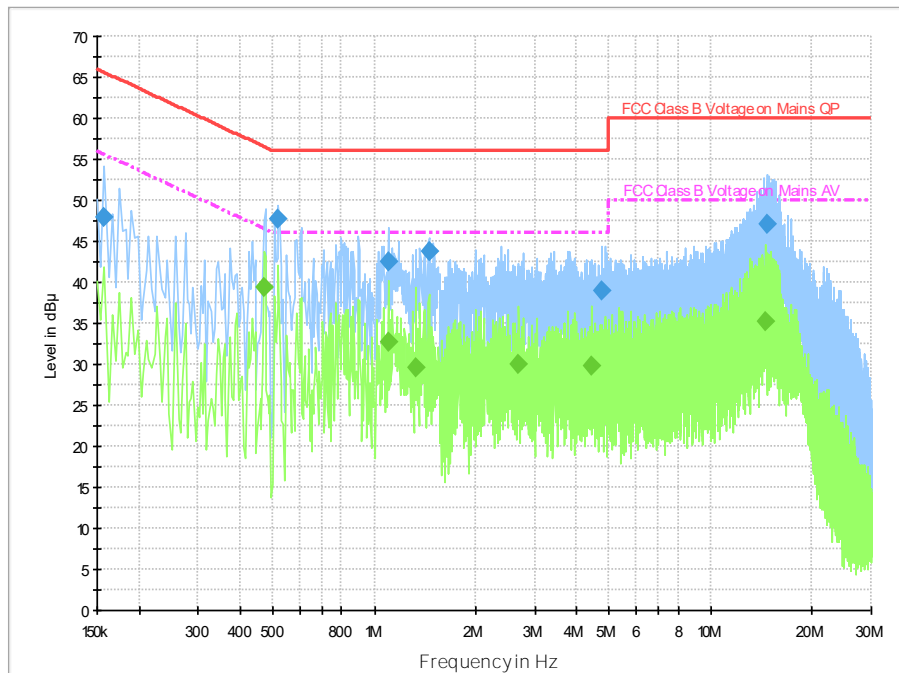


Fig.A.8.1 AC Powerline Conducted Emission-802.11b

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	47.9	2000.0	9.000	On	L1	19.8	17.6	65.6
0.518000	47.6	2000.0	9.000	On	L1	19.7	8.4	56.0
1.098000	42.4	2000.0	9.000	On	L1	19.6	13.6	56.0
1.454000	43.8	2000.0	9.000	On	L1	19.7	12.2	56.0
4.758000	38.9	2000.0	9.000	On	L1	19.6	17.1	56.0
14.762000	47.1	2000.0	9.000	On	L1	19.7	12.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.470000	39.4	2000.0	9.000	On	L1	19.7	7.1	46.5
1.098000	32.8	2000.0	9.000	On	L1	19.6	13.2	46.0
1.330000	29.6	2000.0	9.000	On	L1	19.6	16.4	46.0
2.694000	30.0	2000.0	9.000	On	L1	19.6	16.0	46.0
4.410000	29.7	2000.0	9.000	On	L1	19.6	16.3	46.0
14.630000	35.2	2000.0	9.000	On	L1	19.7	14.8	50.0

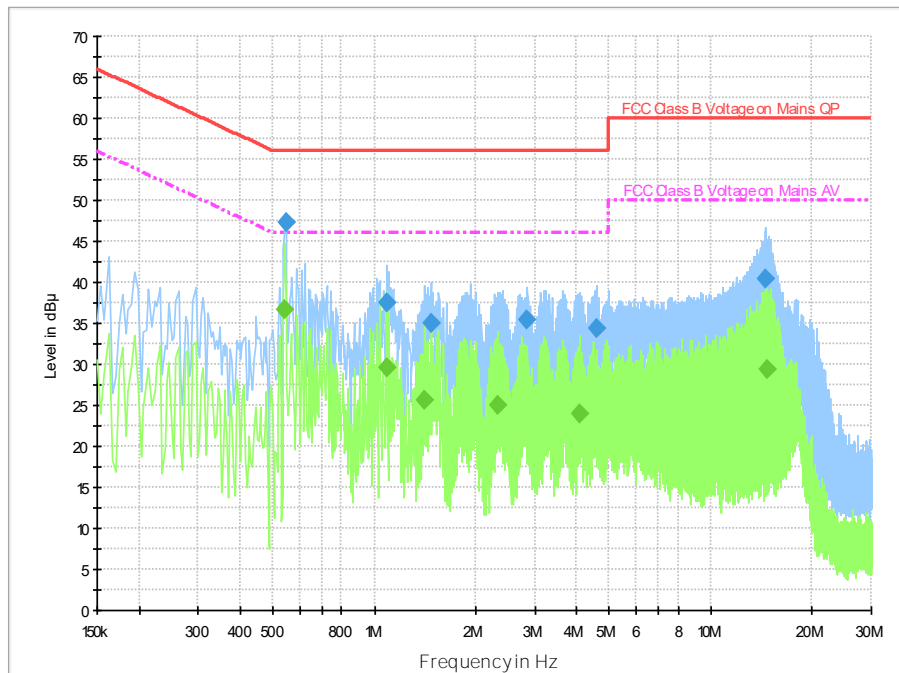


Fig.A.8.2 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546000	47.2	2000.0	9.000	On	L1	19.7	8.8	56.0
1.086000	37.4	2000.0	9.000	On	L1	19.7	18.6	56.0
1.474000	35.0	2000.0	9.000	On	L1	19.7	21.0	56.0
2.854000	35.5	2000.0	9.000	On	L1	19.6	20.5	56.0
4.598000	34.3	2000.0	9.000	On	L1	19.6	21.7	56.0
14.570000	40.4	2000.0	9.000	On	L1	19.7	19.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.542000	36.7	2000.0	9.000	On	L1	19.7	9.3	46.0
1.086000	29.5	2000.0	9.000	On	L1	19.7	16.5	46.0
1.406000	25.7	2000.0	9.000	On	L1	19.7	20.3	46.0
2.330000	24.9	2000.0	9.000	On	L1	19.6	21.1	46.0
4.074000	23.9	2000.0	9.000	On	L1	19.6	22.1	46.0
14.726000	29.3	2000.0	9.000	On	L1	19.7	20.7	50.0

ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate



Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT
Beijing, People's Republic of China

for technical competence in the field of
Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 26th day of June 2023.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

END OF REPORT