DEKRA Testing and Certification (Suzhou) Co., Ltd.
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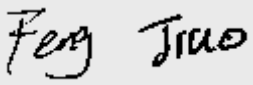
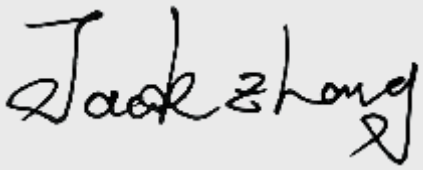
Test report No:
23A0637R-RF-US-P06V01

FCC TEST REPORT

Product Name	IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2
Trademark	GSD
Model and /or type reference	WXT28M2111
FCC ID	2A769-WXT28M2111
Applicant´s name / address	K-tronics(Su Zhou)Technology Co.,LTD No.1088, Dajing Road,Economic and Technological Development Zone,Wujiang District, Suzhou, Jiangsu Province, 215200, P.R. China
Test method requested, standard	47 CFR FCC Part 15 (Section 15.247) ANSI C63.10: 2013
Verdict Summary	IN COMPLIANCE
Tested By (name / position & signature)	Feng Jiao/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2024-01-04
Report Version	V1.0
Report template No	Template_FCC Part 15C-RF-V1.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Oct. 26, 2023
Date (start test)	Nov. 01, 2023
Date (finish test)	Nov. 30, 2023

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. The 2.4G WLAN part of AirEngine6761-21T is exactly the same as AirEngine5761-11, so we only verified the power and AC Power Line Conducted Emission, and other data are quoted from AirEngine5761-11.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	:	Equipment Under Test
QP	:	Quasi-Peak
CAV	:	CISPR Average
AV	:	Average
CDN	:	Coupling Decoupling Network
SAC	:	Semi-Anechoic Chamber
OATS	:	Open Area Test Site
BW	:	Bandwidth
AM	:	Amplitude Modulation
PM	:	Pulse Modulation
HCP	:	Horizontal Coupling Plane
VCP	:	Vertical Coupling Plane
U_N	:	Nominal voltage
*T*x	:	Transmitter
*R*x	:	Receiver
N/A	:	Not Applicable
N/M	:	Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
23A0637R-RF-US-P06V01	V1.0	Initial issue of report.	2024-01-04

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with 47 CFR FCC Part 15 (Section 15.247).
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

- Chapter 1.1 General Description of the Item(s);
- Chapter 1.2 Antenna Informaion;
- Chapter 1.3 Data Rate;
- Chapter 1.4 Channel List;

USED EQUIPMENT

Conducted Test/ TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
Wireless Connectivity Tester	R&S	CMW 270	102593	2023.05.20	2024.05.19	V 4.0.60	N/A
Coaxial Cable	N/A	N/A	2477	2023.06.08	2024.06.07	N/A	N/A
Coaxial Cable	N/A	N/A	2478	2023.06.08	2024.06.07	N/A	N/A
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2023.05.20	2024.05.19	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2023.08.25	2024.08.24	N/A	N/A
Test system							
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
MAX Signal Analyzer	Keysight	N9010A	MY48030494	2023.11.08	2024.11.07	A.14.03	N/A
RF Control Unit	Tonscend	JS0806-2	22G8060594	2023.02.04	2024.02.03	N/A	N/A
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY61252529	2023.05.20	2024.05.19	B.01.96	N/A
Frequency extender for EXG or MXG	Keysight	N5182BX07	MY59362500	2023.05.20	2024.05.19	N/A	N/A
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2023.08.26	2024.08.25	B.01.95	N/A
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A	N/A	V3.0.22

AC Power Line Conducted Emission / TR1

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EMI Test Receiver	R&S	ESCI	100726	2023.08.26	2024.08.25	4.42 SP1	N/A
Two-Line V-Network	R&S	ENV 216	101044	2023.01.07	2024.01.06	N/A	N/A
Two-Line V-Network	R&S	ENV 216	101189	2023.05.14	2024.05.13	N/A	N/A
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2023.05.14	2024.05.13	N/A	N/A
Coaxial Cable	Huber+Suhner	RG 223	TR1-C1	2023.05.14	2024.05.13	N/A	N/A
Impedance Stabilization Network	Teseq GmbH	ISN T800	57318	2023.03.07	2024.03.06	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	EMC01	2023.05.19	2024.05.18	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	N/A

Radiated Emission(9KHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EMI Test Receiver	R&S	ESCI	100176	2023.05.20	2024.05.19	4.42 SP3	N/A
Loop Antenna	R&S	HFH2-Z2E	101149	2023.04.25	2024.04.24	N/A	N/A
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2023.02.20	2024.02.19	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2023.05.19	2024.05.18	N/A	N/A
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2023.05.21	2024.05.20	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

Radiated Emission (1GHz-40GHz) / AC5

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EXA Spectrum Analyzer	Keysight	N9020B	MY60112218	2023.11.08	2024.11.07	A.31.05	N/A
Pre-Amplifier	SKET	LNPA_0118G-45	SK2021090101	2023.05.14	2024.05.13	N/A	N/A
Preamplifier	CHENGYI	EMC184045SE	980263	2023.07.09	2024.07.08	N/A	N/A
DRG Horn	ETS-Lindgren	3117	00123988	2023.11.07	2024.11.06	N/A	N/A
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2023.05.31	2024.05.30	N/A	N/A
Filter Switch Box	MVE	MSW-F196	C070001S	2023.05.21	2024.05.20	N/A	N/A
Temperature / Humidity Meter	RTS	RTS-8S	AC5-TH	2023.05.19	2024.05.18	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-5.00M	651945-0001	2023.11.07	2024.11.06	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-6.00M	651946-0001	2023.11.07	2024.11.06	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-0.50M	651944-0001	2023.11.07	2024.11.06	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test item	Uncertainty
AC Power Line Conducted Emission	± 2.92 dB
Peak Power Output	± 1.13 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 4.60 dB 200MHz~1GHz: 4.10 dB Vertical: 30MHz~200MHz: 4.80 dB 200MHz~1GHz: 4.10 dB
Radiated Emission(1GHz~40GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~40GHz: 4.70 dB Vertical: 18GHz~40GHz: 4.60 dB
RF antenna conducted test	± 1.13 dB
Radiated Emission Band Edge	± 5.00 dB
DTS Bandwidth	± 279 Hz
Occupied Bandwidth	± 279 Hz
Power Density	± 1.13 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name..... :	IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2
Model No. ..... :	WXT28M2111
Trademark. ..... :	GSD
FCC ID..... :	2A769-WXT28M2111
Hardware Version ..... :	V1.0
Software Version..... :	V1.0
Manufacturer..... :	HUIZHOU GAOSHENGDA TECHNOLOGY CO.,LTD
Manufacturer Address..... :	No. 2 Jinda Road, Sandong Town, HUIZHOU, CHINA
Factory..... :	HUIZHOU GAOSHENGDA TECHNOLOGY CO.,LTD
Factory address ..... :	No. 2 Jinda Road, Sandong Town, HUIZHOU, CHINA

Wireless specifiction..... :	WIFI	
Operating frequency range(s)..... :	2412~2462MHz	
Number of channel..... :	802.11b/g/n/ax(20MHz) : 11 802.11n/ax(40MHz) : 07	
Type of Modulation & Data Rate.... :	Refer to Clause 1.3	
Device category ..... :	☐	Fixed point-to-point
	☐	Emit multiple directional beams, simultaneously or sequentially
	☒	Other cases

Rated power supply .....:	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 V, 50/60 Hz
	☒	DC: 5 Vdc
	☐	Poe:
	☐	Adapter:
Mounting position.....:	☐	Tabletop equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held/Portable equipment
	☒	Other: Module

1.2 Antenna Information

Antenna model / type number..... :	N/A			
Antenna serial number ..... :	N/A			
Antenna Delivery ..... :	☒	1TX + 1RX		
	☒	2TX + 2RX		
	☐	Others:……		
Antenna technology..... :	☒	SISO		
	☒	MIMO	☒	CDD
			☐	Beam-forming
Antenna Type..... :	☒	External	☒	Dipole
			☐	Sectorized
	☐	Internal	☐	FPC
			☐	PCB
			☐	Metal Monopole Antenna
			☐	Ceramic chip
			☐	Others……..
Antenna Gain ..... :	SISO:	Antenna1	1.35dBi	
		Antenna2	1.35dBi	
	CDD:	1.35dBi for Power; 4.36dBi for PSD		

1.3 Data Rate

IEEE 802.11b

Modulation	Data Rate(Mb/s)
DSSS	1
DSSS	2
CCK	5.5
CCK	11

IEEE 802.11g

Modulation	R	Data Rate(Mb/s)
BPSK	1/2	6
BPSK	3/4	9
QPSK	1/2	12
QPSK	3/4	18
16-QAM	1/2	24
16-QAM	3/4	36
64-QAM	2/3	48
64-QAM	3/4	54

IEEE 802.11n

Spatial streames	MCS Index	Modulation	R	Data Rate(Mb/s)			
				800ns GI		400ns GI	
				20MHz	40MHz	20MHz	40MHz
1	0	BPSK	1/2	6.5	13.5	7.2	15.0
1	1	QPSK	1/2	13.0	27.0	14.4	30.0
1	2	QPSK	3/4	19.5	40.5	21.7	45.0
1	3	16-QAM	1/2	26.0	54.0	28.9	60.0
1	4	16-QAM	3/4	39.0	81.0	43.3	90.0
1	5	64-QAM	2/3	52.0	108.0	57.8	120.0
1	6	64-QAM	3/4	58.5	121.5	65.0	135.0
1	7	64-QAM	5/6	65.0	135.0	72.2	150.0
2	8	BPSK	1/2	13	27	14.4	30
2	9	QPSK	1/2	26	54	28.8	60
2	10	QPSK	3/4	39	81	43.4	90
2	11	16-QAM	1/2	52	108	57.8	120
2	12	16-QAM	3/4	78	162	86.6	180
2	13	64-QAM	2/3	104	216	115.6	240
2	14	64-QAM	3/4	117	243	130	270
2	15	64-QAM	5/6	130	270	144.4	300

IEEE 802.11ax

Spatial streames	MCS Index	Modulation	R	Data Rate(Mb/s)					
				800ns GI		1600ns GI		3200ns GI	
				20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
1	0	BPSK	1/2	8.6	17.2	8.1	16.3	7.3	14.6
1	1	QPSK	1/2	17.2	34.4	16.3	32.5	14.6	29.3
1	2	QPSK	3/4	25.8	51.6	24.4	48.8	21.9	43.9
1	3	16-QAM	1/2	34.4	68.8	32.5	65	29.3	58.5
1	4	16-QAM	3/4	51.6	103.2	48.8	97.5	43.9	87.8
1	5	64-QAM	2/3	68.8	137.6	65	130	58.5	117
1	6	64-QAM	3/4	77.4	154.9	73.1	146.3	65.8	131.6
1	7	64-QAM	5/6	86	172.1	81.3	162.5	73.1	146.3
1	8	256QAM	3/4	103.2	206.5	97.5	195	87.8	175.5
1	9	256QAM	5/6	114.7	229.4	108.3	216.7	97.5	195
1	10	1024QAM	3/4	129	258.1	121.9	243.8	109.7	219.4
1	11	1024QAM	5/6	143.4	286.8	135.4	270.8	121.9	243.8
2	0	BPSK	1/2	17.2	34.4	16.2	32.6	14.6	29.2
2	1	QPSK	1/2	34.4	68.8	32.6	65	29.2	58.6
2	2	QPSK	3/4	51.6	103.2	48.8	97.6	43.8	87.8
2	3	16-QAM	1/2	68.8	137.6	65	130	58.6	117
2	4	16-QAM	3/4	103.2	206.4	97.6	195	87.8	175.6
2	5	64-QAM	2/3	137.6	275.2	130	260	117	234
2	6	64-QAM	3/4	154.8	309.8	146.2	292.6	131.6	263.2
2	7	64-QAM	5/6	172	344.2	162.6	325	146.2	292.6
2	8	256QAM	3/4	206.4	413	195	390	175.6	351
2	9	256QAM	5/6	229.4	458.8	216.6	433.4	195	390
2	10	1024QAM	3/4	258	516.2	243.8	487.6	219.4	438.8
2	11	1024QAM	5/6	286.8	573.6	270.8	541.6	243.8	487.6

Symbol	Explanation	Symbol	Explanation
R	Code rate	GI	guard interval
Note: We have evaluated low/mid/high data rate, the blue font is the highest power data rate.			

1.4 Channel List

IEEE 802.11b/g & IEEE 802.11n (20MHz) /ax(20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412 MHz	2	2417 MHz	3	2422 MHz	4	2427 MHz
5	2432 MHz	6	2437 MHz	7	2442 MHz	8	2447 MHz
9	2452 MHz	10	2457 MHz	11	2462 MHz	-	-

IEEE 802.11n(40MHz) /ax(40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
3	2422 MHz	4	2427 MHz	5	2432 MHz	6	2437 MHz
7	2442 MHz	8	2447 MHz	9	2452 MHz	-	-

Note: The General Description of the Item, antenna information,Test Data Rate and Channel List in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode	Mode 1: Transmit by 802.11b
	Mode 2: Transmit by 802.11g
	Mode 3: Transmit by 802.11n(20MHz)
	Mode 4: Transmit by 802.11n(40MHz)
	Mode 5: Transmit by 802.11ax(20MHz)
	Mode 6: Transmit by 802.11ax(40MHz)

Note 1: Regards to the frequency band operation: the lowest, middle and highest frequency channel were selected to perform the test, then shown on this report.

Note 2: For portable device, radiated tests was verified over X, Y, Z axis, and shown the worst case on this report.

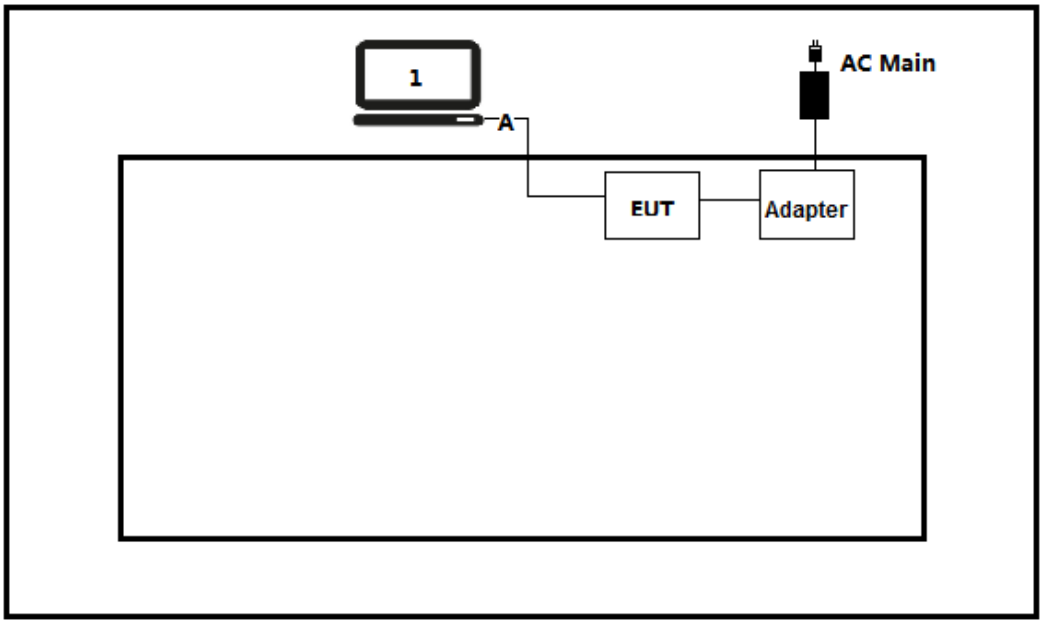
2.2 Auxiliary equipment / Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) Notebook	Think pad x220	Lenovo	Adapter
(2) USB Control Cable	N/A	N/A	N/A
(3) USB Control Cable	N/A	N/A	N/
software	Type / Version	Manufacturer	Supplied by
QA-tool	N/A	N/A	N/A

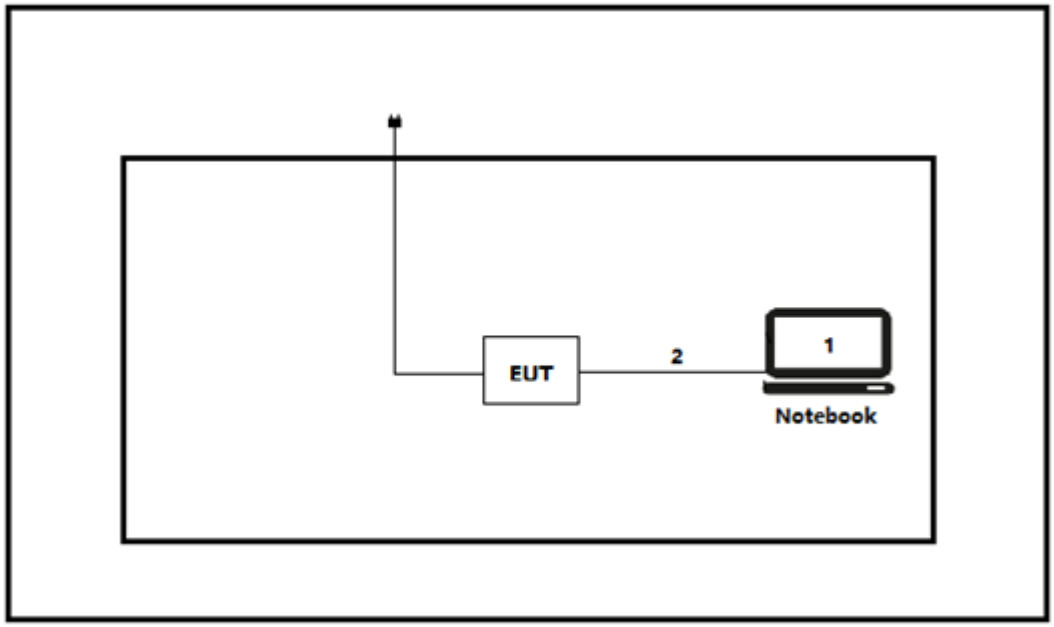
Accessories Information	Cable		
	Length used during test [m]	Attached during test	Shielded
(2)USB Control Cable	1	☒	☒
(3)USB Control Cable	8	☒	☒

2.3 Test Configuration / Block diagram used for tests

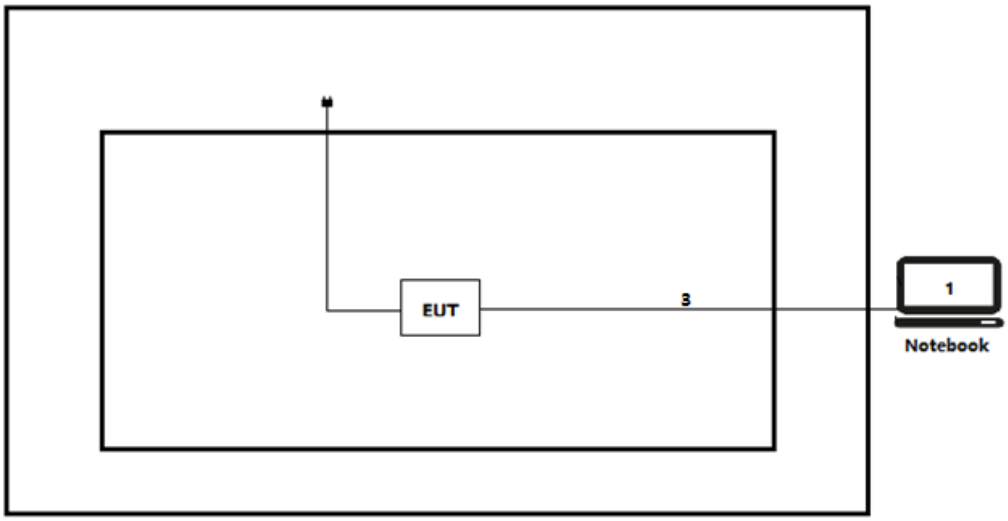
Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Conducted test



Test setup Diagram- Radiated Emission



2.4 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Run the software “QA-tool” on the notebook computer.
3	Open the serial port and enter the corresponding commands to configure the test mode, test channel, test power and data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2023	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01V05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247
KDB 662911	2020	Provision to Allow Measurement of Directional Gain of Multi-Antenna Systems for Compliance Verification

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Requirement – Test Item of FCC	Standard(s)	Verdict	Remark
20dB Emission Bandwidth	FCC 15.247(a)(2)	PASS	Test data please refer to **Appendix A**
Maximum conducted output power	15.247 (b)(3)	PASS	Test data please refer to **Appendix B**
Maximum power spectral density	FCC 15.247(e)	PASS	Test data please refer to **Appendix C**
Band edge measurements	FCC 15.247(d) FCC 15.205 FCC 15.209	PASS	Test data please refer to **Appendix D**
Conducted Spurious Emission	FCC 15.247(d), FCC 15.209	PASS	Test data please refer to **Appendix E**
Duty cycle	ANSI C63.10:2013	PASS	Test data please refer to **Appendix F**
Emissions in Restricted Bands	FCC 15.205 FCC 15.209	PASS	Test data please refer to **Appendix G**
AC Power Line Conducted Emission	FCC 15.207	N/A	N/A
Antenna Requirement	FCC 15.203	PASS	---

3.4 Power setting in test

Mode	Channel	Frequency (MHz)	Power setting		
			SISO:ANT1	SISO:ANT2	CDD:ANT1+2
Mode1	01	2412	22.5	22.5	19.5
	06	2437	22.5	22.5	19.5
	11	2462	22.5	22.5	19.5
Mode2	01	2412	18.5	18.5	17
	06	2437	18.5	18.5	17
	11	2462	18.5	18.5	17
Mode3	01	2412	18	18	17
	06	2437	18	18	17
	11	2462	18	18	17
Mode4	03	2422	18	18	16.5
	06	2437	18	18	16.5
	09	2452	18	18	16.5
Mode5	01	2412	19.5	19.5	19
	06	2437	19.5	19.5	19
	11	2462	19.5	19.5	19
Mode6	03	2422	17	17	16.5
	06	2437	17	17	16.5
	09	2452	17	17	16.5

3.5 Test Matrix

Test item	Model: WXT28M2111	
	1(#1)	2(#2)
DTS Bandwidth	☒	☐
Occupied Channel Bandwidth	☒	☐
Maximum conducted output power	☒	☐
Maximum power spectral density	☒	☐
Band edge measurements	☐	☒
Conducted Spurious Emission	☒	☐
Duty cycle	☒	☐
Emissions in Restricted Bands	☐	☒
AC Power Line Conducted Emission	☐	☐
Note1: The only difference between sample #1 and sample #2 is whether to keep the original antenna, sample #1 is a conduction test product that removes the original antenna and is equipped with SMA wires, and sample #2 is a complete product that retains the original antenna.		

3.6 Test Facility

USA	**:**	**FCC Designation Number: CN1199**

4 TEST RESULTS

4.1 Emissions in restricted frequency bands	VERDICT: PASS

4.1.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.205; 15.209

Restricted Bands of operation for FCC

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	Above 38.6
13.36 – 13.41	--	--	--

Restricted Band Emissions Limit

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

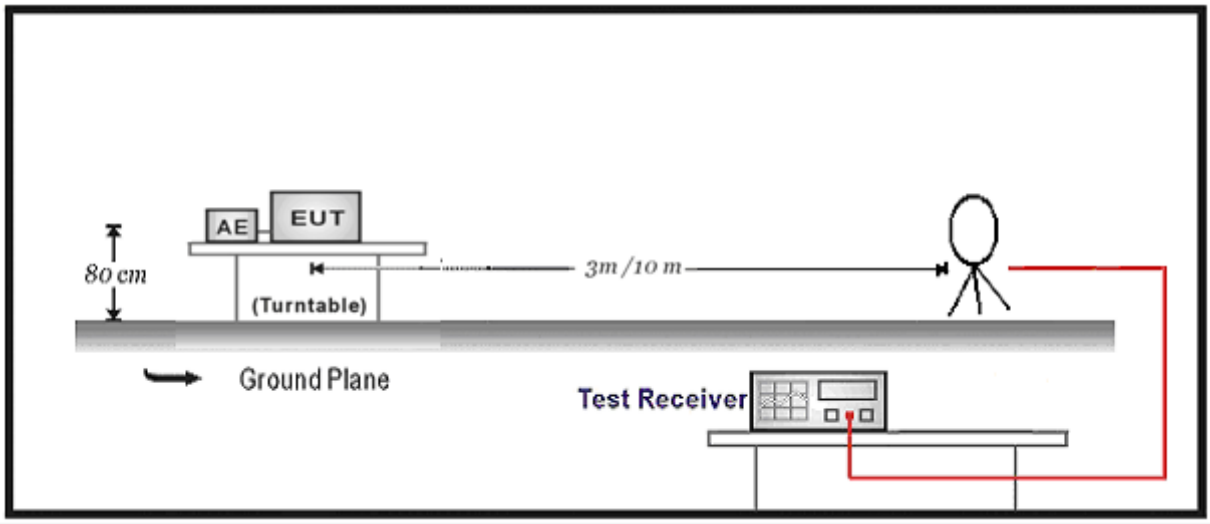
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field

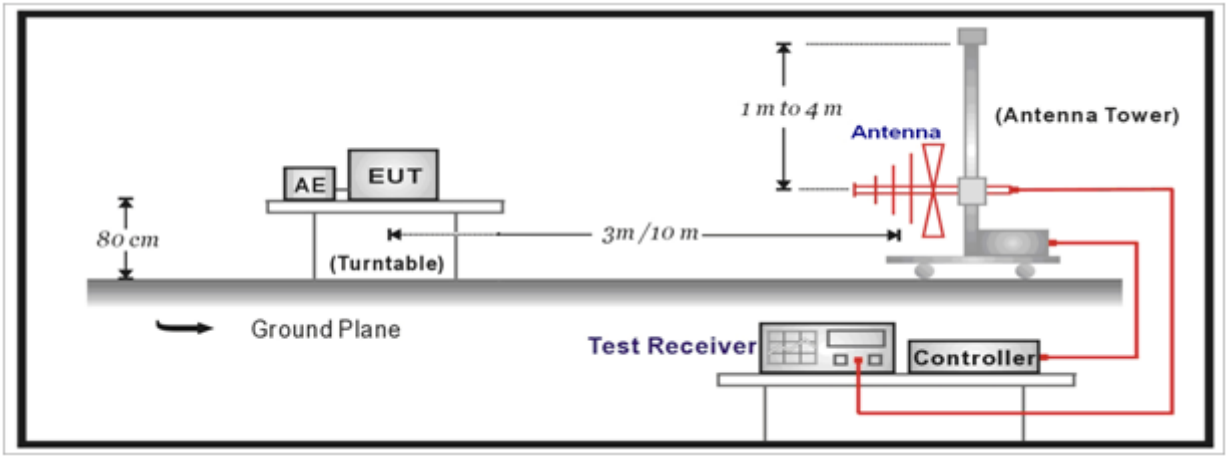
measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.1.2 Test Setup

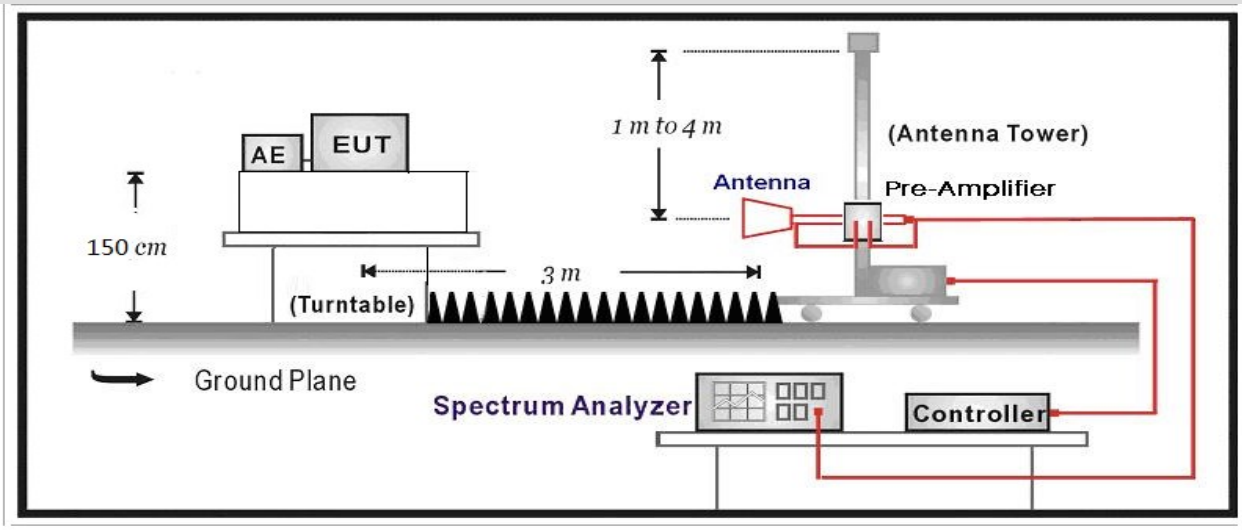
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.1.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
	☒ ANSI C63.10	11.12.1	Radiated emission measurements
	☒ ANSI C63.10	6.3	Radiated spurious emission test
	☒ ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☒ ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☒ ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☐ ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐ ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
	☐ ANSI C63.10	11.12.2.4	Peak power measurement procedure
	☐ ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐ ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
	☐ ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
	☐ ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.2 Emissions in non-restricted frequency band	VERDICT: PASS

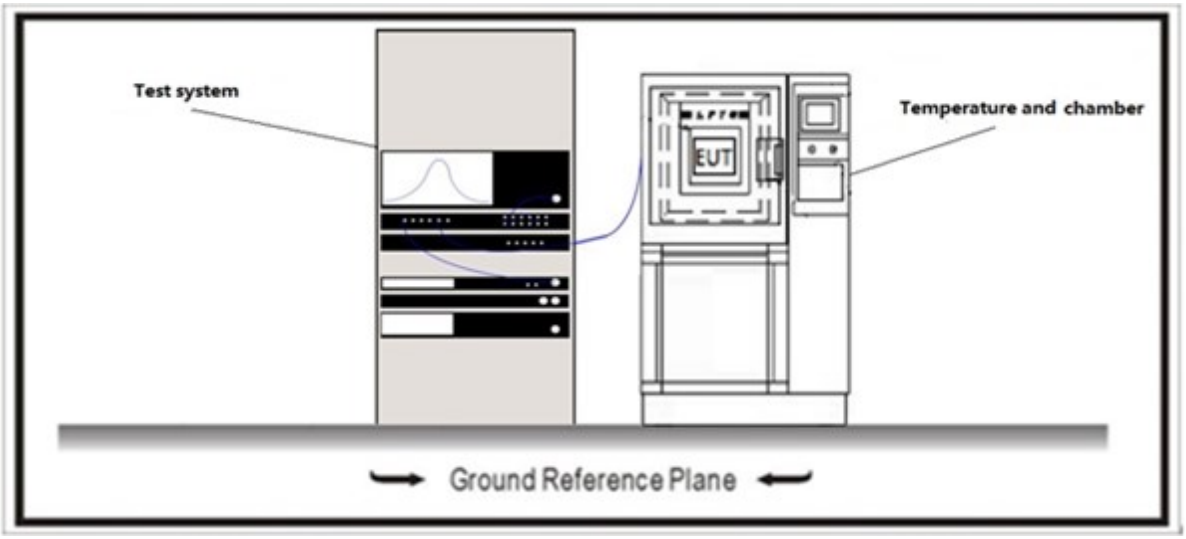
4.2.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power 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 (i.e., 20 dBc).

4.2.2 Test Setup



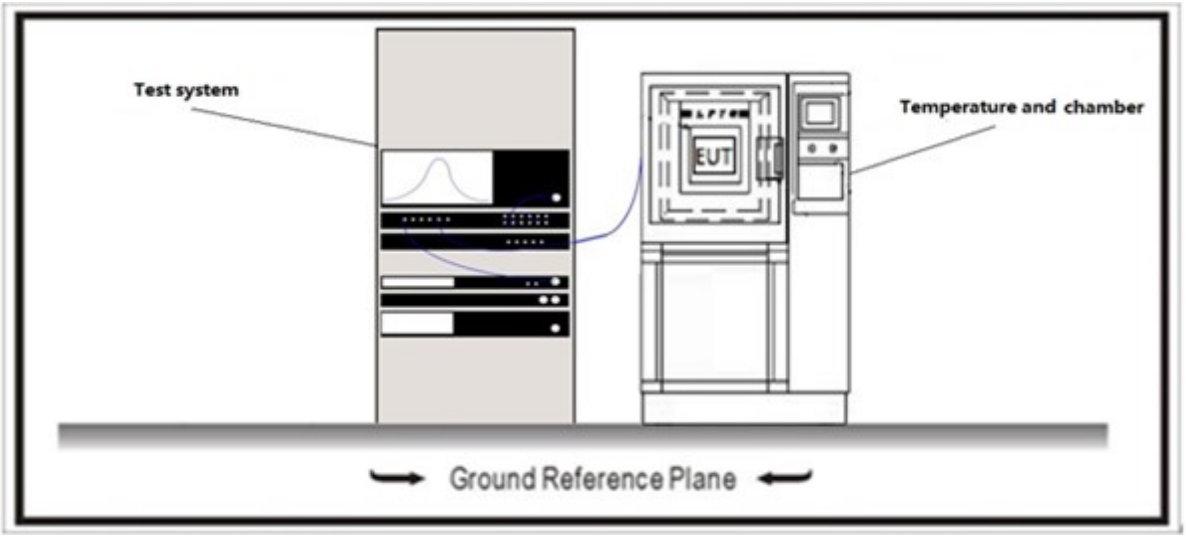
4.2.3 Test Procedure

References Rule			Chapter	Description
☒	ANSI C63.10		11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10	11.11.1	General
	☒	ANSI C63.10	11.11.2	Reference level measurement
	☒	ANSI C63.10	11.11.3	Emission level measurement

4.3 Duty cycle	VERDICT: PASS

4.3.1 Limit
N/A

4.3.2 Test Setup



4.3.3 Test Procedure			
References Rule		Chapter	Description
☒	ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

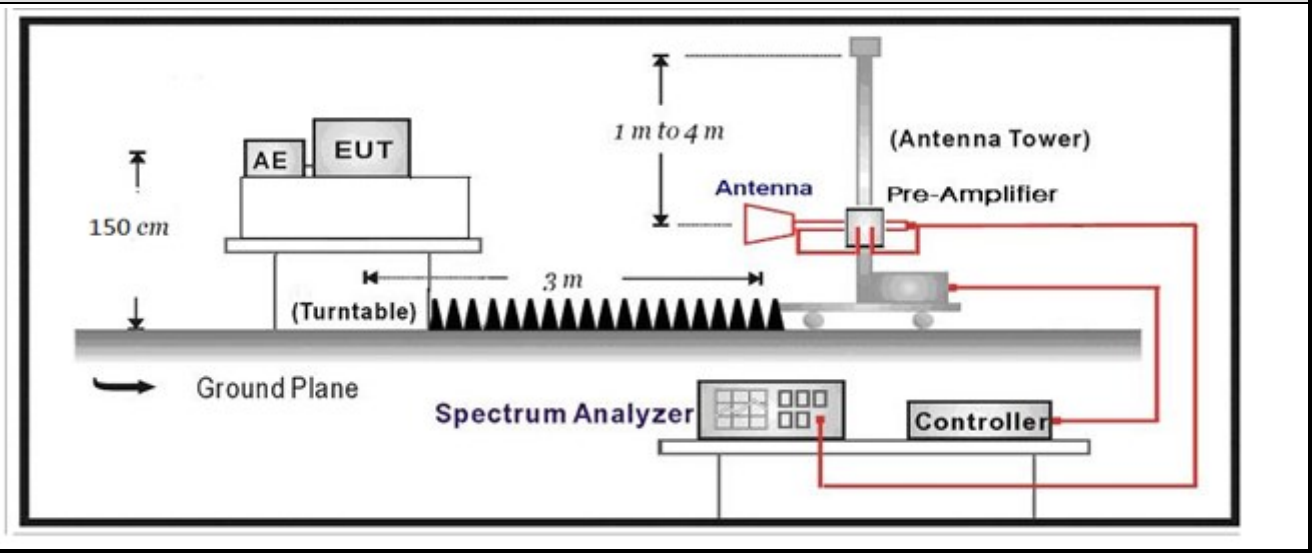
4.4 Radiated Emission Band Edge	VERDICT: PASS

4.4.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d) , 15.205, 15.209			
Frequency bands (MHz)	Detector	Limit (dBμV/m)	RBW (MHz)	Distance (m)
2310-2390 2483.5-2500	PK	74	1	3
	AV	54	1	3
Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.				

4.4.2 Test Setup

Above 1GHz Test Setup:



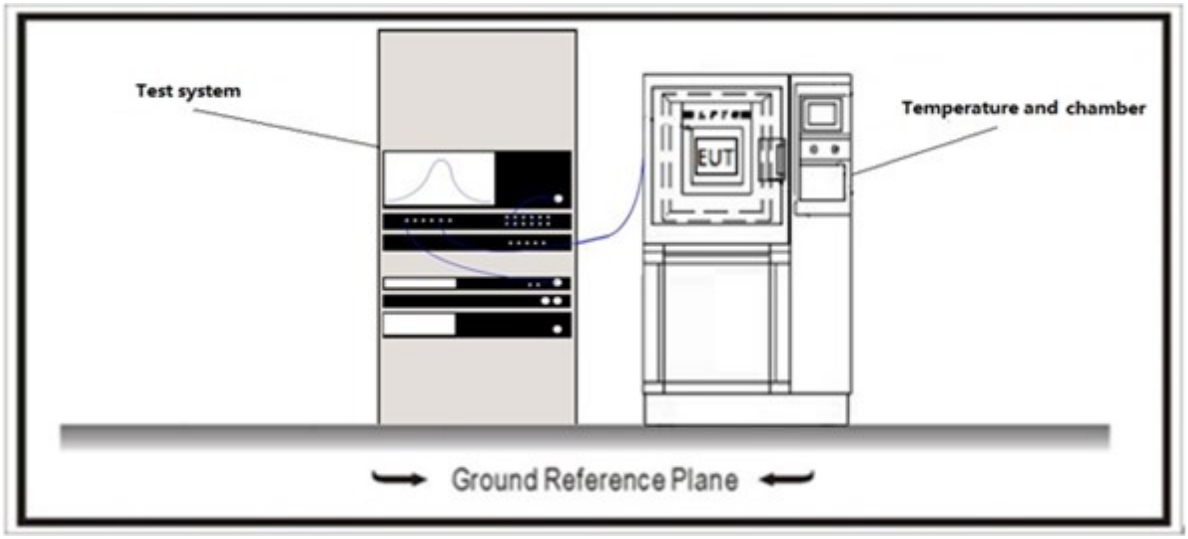
4.4.3 Test Procedure

	References Rule	Chapter	Description
☒	ANSI C63.10	6.10	Band-edge testing
	☒ ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐ ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
	☒ ANSI C63.10	11.12.1	Radiated emission measurements
	☒ ANSI C63.10	6.3	Radiated spurious emission test
☐	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.5 DTS Bandwidth	VERDICT: PASS

4.5.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2)
Systems using digital modulation techniques operate in the2400-2483.5 MHz .The minimum 6 dB bandwidth shall be at least 500 kHz	
Standard	ANSI C63.10 Paragraph 6.7
The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs. The occupied bandwidth should within the required frequency range.	

4.5.2 Test Setup



4.5.3 Test Procedure

	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2
☒	ANSI C63.10		6.9	Occupied bandwidth
	☐	ANSI C63.10	6.9.2	relative measurement procedure
	☒	ANSI C63.10	6.9.3	power bandwidth (99%) measurement procedure

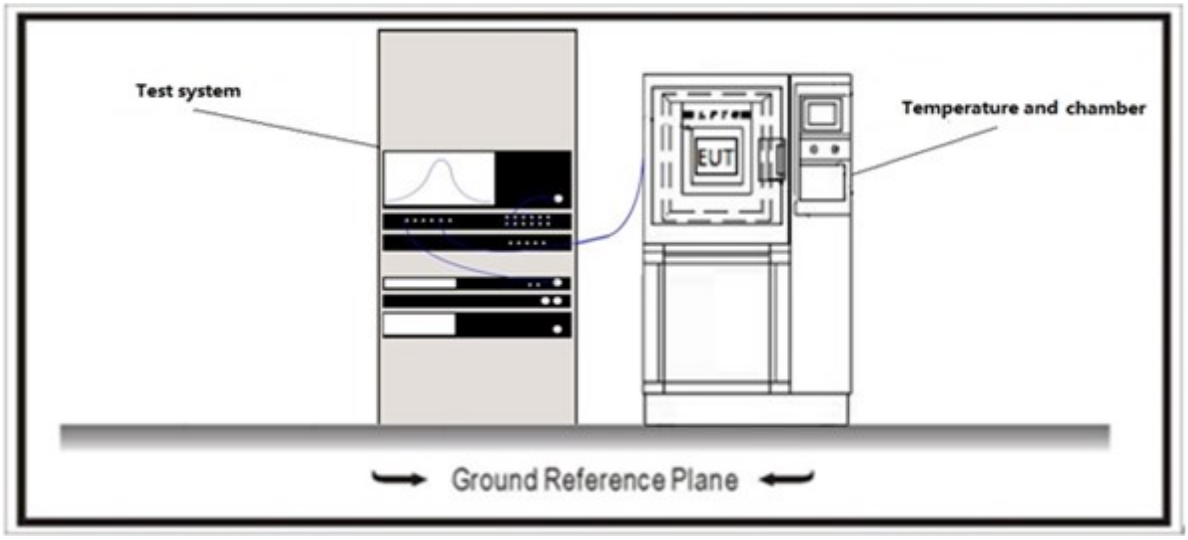
4.6 Fundamental emission output power	VERDICT: PASS

4.6.1 Limit

Standard			FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
☒	GTX ＜6dBi		Pout≤30dBm
☐	GTX ＞6dBi		
	☐	Non-Fix point-point	Pout≤30-(GTX -6)
	☐	Fix point-point	Pout≤30-[(GTX-6)]/3
	☐	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	Pout≤30-[(GTX-6)]/3
	☐	Avgregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3
	☐	single directional beam	Pout≤30-[(GTX-6)]/3+8dB

Note 1 : GTX directional gain of transmitting antennas.
Note 2 : Pout is maximum conducted output power .

4.6.2 Test Setup



4.6.3 Test Procedure

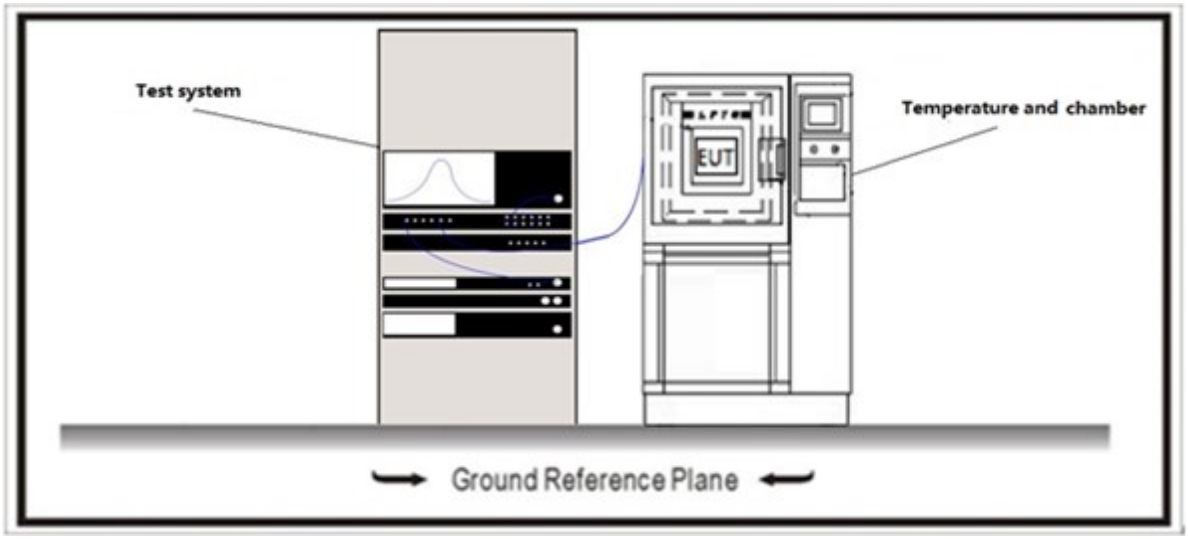
	References Rule	Chapter	Description
☒	ANSI C63.10	11.9	Fundamental emission output power
	☒ ANSI C63.10	11.9.1	Maximum peak conducted output power
	☐ ANSI C63.10	11.9.1.1	RBW ≥ DTS bandwidth
	☒ ANSI C63.10	11.9.1.2	Integrated band power method
	☐ ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method
	☐ ANSI C63.10	11.9.2	Maximum conducted (average) output power
	☐ ANSI C63.10	11.9.2.2	Measurement using a spectrum analyzer (SA)
	☐ ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle≥98%)
	☐ ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle≥98%)
	☐ ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle≤98%)
	☐ ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle≤98%)
	☐ ANSI C63.10	11.9.2.2.4	Method AVGSA-3
	☐ ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
	☐ ANSI C63.10	11.9.2.3	Measurement using a power meter (PM)
	☐ ANSI C63.10	11.9.2.3.1	Method AVGPM
	☐ ANSI C63.10	11.9.2.3.2	Method AVGPM-G

Directional Gain Calculations for In-Band test method				
	References Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial stream
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☒	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

4.7 Power Density	VERDICT: PASS

4.7.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (e)
Power Spectral Density≤8dBm/3kHz	

4.7.2 Test Setup



4.7.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle＜98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle＜98%)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

Directional Gain Calculations for In-Band test method				
	References Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial stream
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☒	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

4.8 AC Power Line Conducted Emission — VERDICT: N/A

4.8.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.207; RSS-Gen Issue 5 Paragraph 8.8.	
Frequency range [MHz]	Limit: QP [dB(μV)[1)]]	Limit: AV [dB(μV)[1)]]
0,15 - 0,50	66 – 56 [2)]	56 - 46 [2)]
0,50 - 5,0	56	46
5,0 - 30	60	50

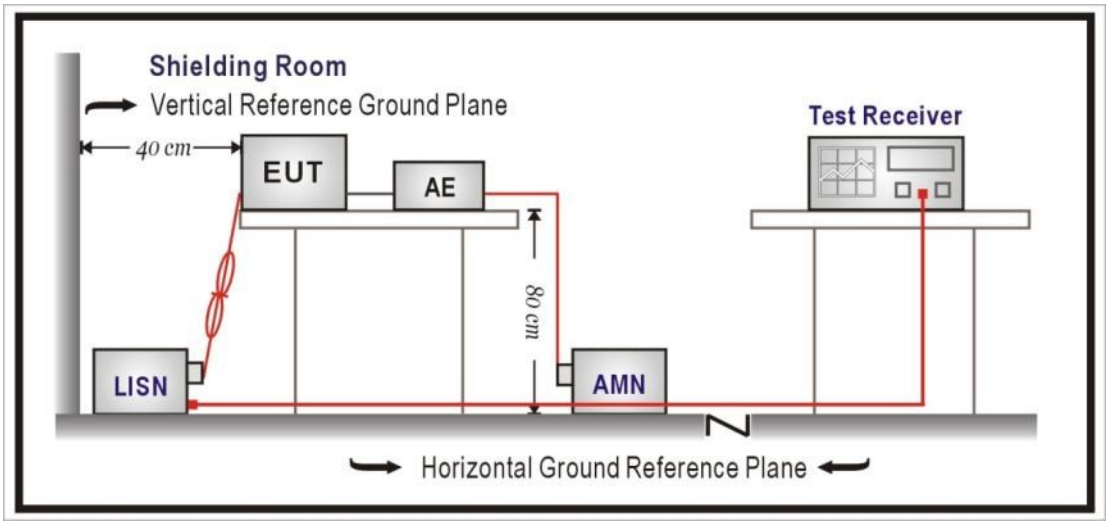
[1)] At the transition frequency, the lower limit applies.

[2)] The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.8.2 Test Setup



4.8.3 Test Procedure

	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.9 Antenna Requirement	VERDICT: PASS

4.9.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	

4.9.2 Antenna Connector Construction:	
☐	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☒	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.	

5 TEST SETUP PHOTO AND EUT PHOTO

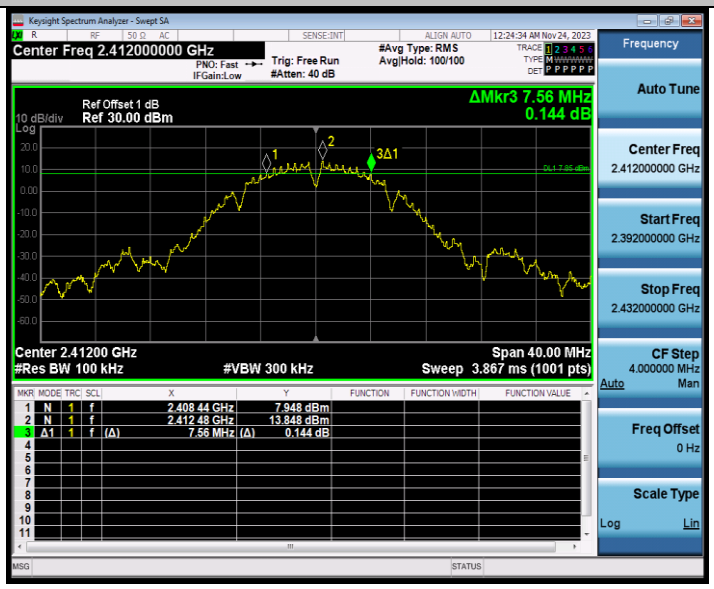
Remark: The test setup photo and EUT Photo please see appendix.

6 TEST RESULT

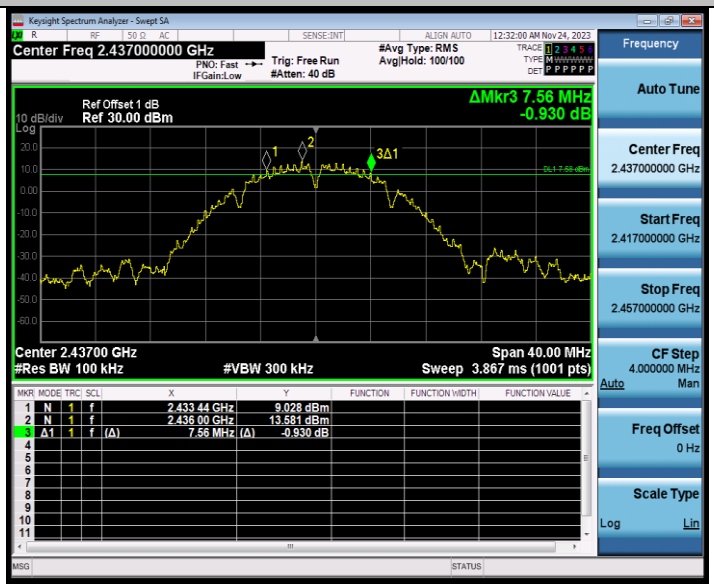
Appendix A: DTS Bandwidth

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant2	2412	7.560	2408.440	2416.000	0.5	PASS
		2437	7.560	2433.440	2441.000	0.5	PASS
		2462	8.560	2457.480	2466.040	0.5	PASS
11G	Ant1+2	2412	14.680	2404.440	2419.120	0.5	PASS
		2437	15.640	2429.120	2444.760	0.5	PASS
		2462	16.320	2453.840	2470.160	0.5	PASS
11N20	Ant1+2	2412	14.160	2405.120	2419.280	0.5	PASS
		2437	17.520	2428.240	2445.760	0.5	PASS
		2462	15.680	2454.440	2470.120	0.5	PASS
11N40	Ant1+2	2422	33.840	2405.680	2439.520	0.5	PASS
		2437	35.040	2419.480	2454.520	0.5	PASS
		2452	31.280	2438.160	2469.440	0.5	PASS
11AX20	Ant1+2	2412	17.600	2402.560	2420.160	0.5	PASS
		2437	16.720	2428.280	2445.000	0.5	PASS
		2462	18.200	2452.560	2470.760	0.5	PASS
11AX40	Ant1+2	2422	35.280	2404.240	2439.520	0.5	PASS
		2437	35.520	2419.400	2454.920	0.5	PASS
		2452	36.240	2434.480	2470.720	0.5	PASS
Note: We have evaluated SISO, MIMO mode, shown in the report is the worst data.							

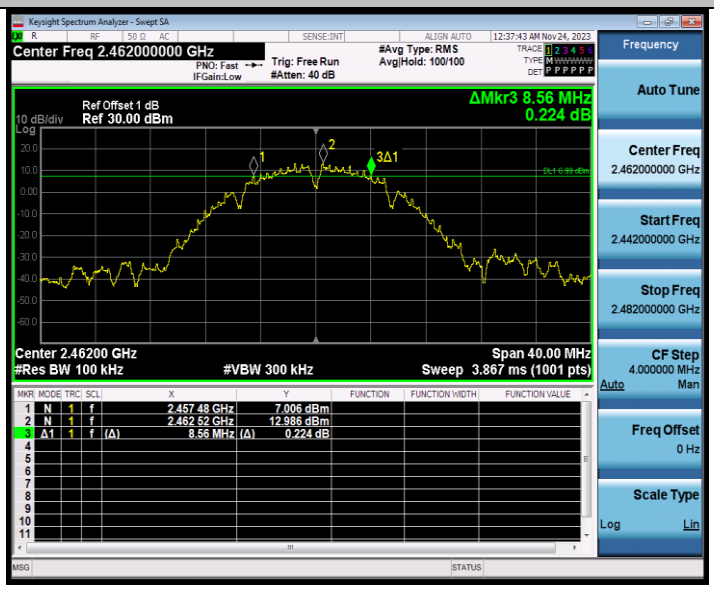
11B_2412



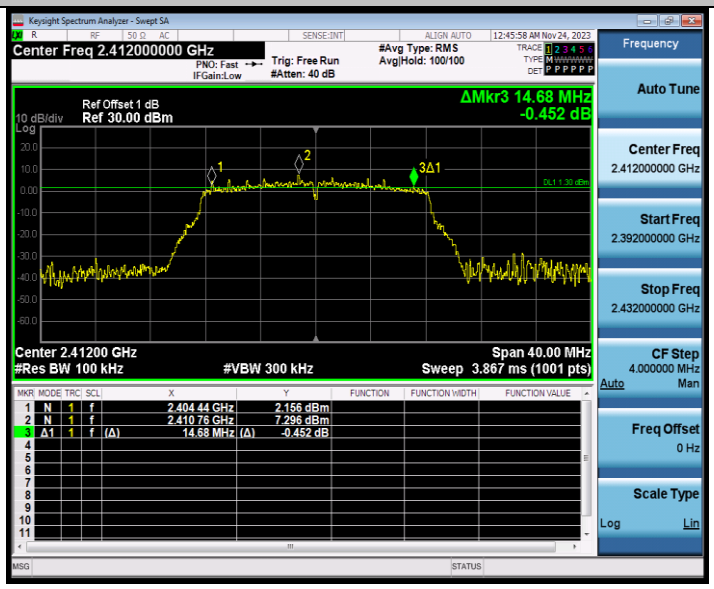
11B_2437



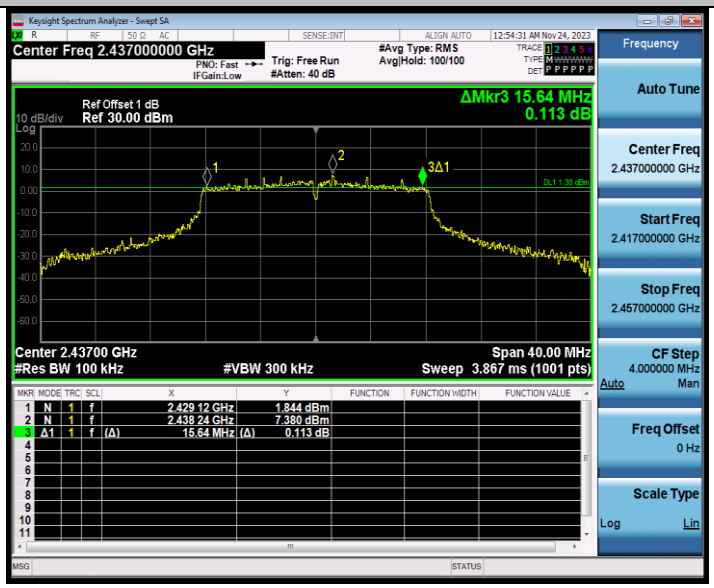
11B_2462



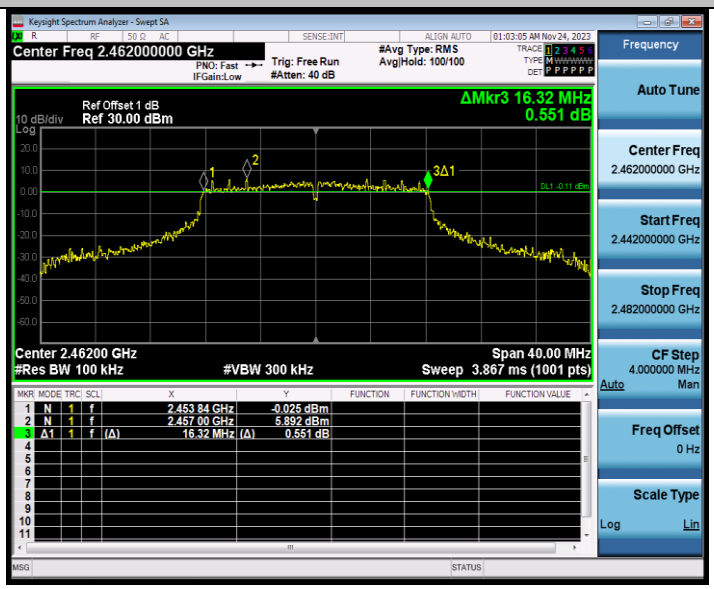
11G_2412



11G_2437



11G_2462



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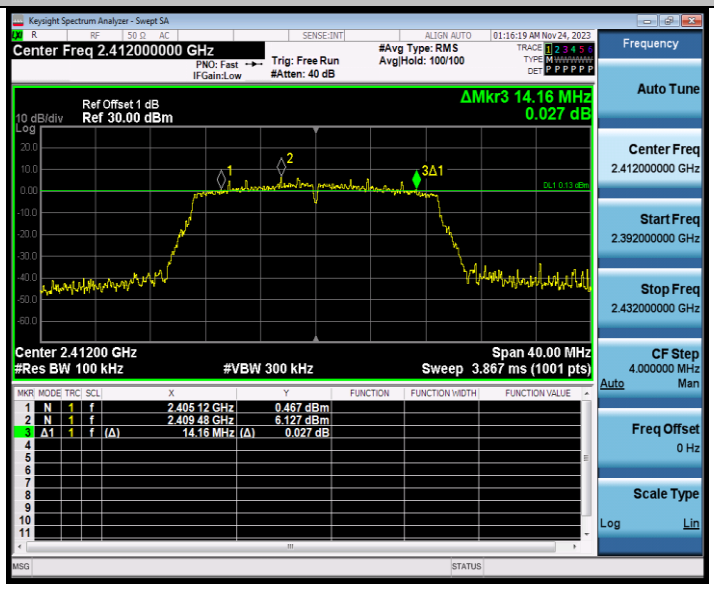

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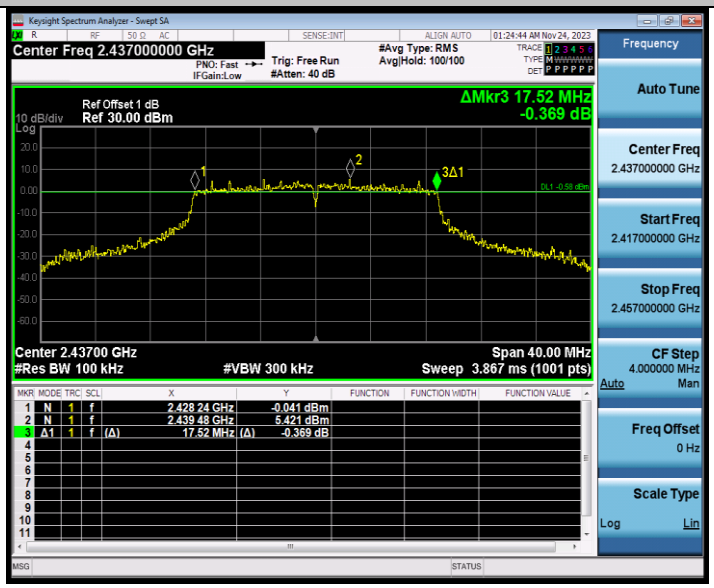

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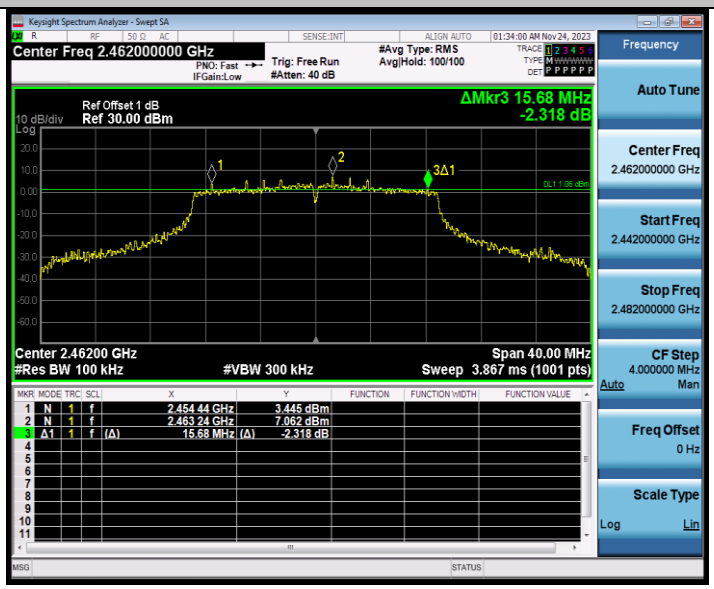

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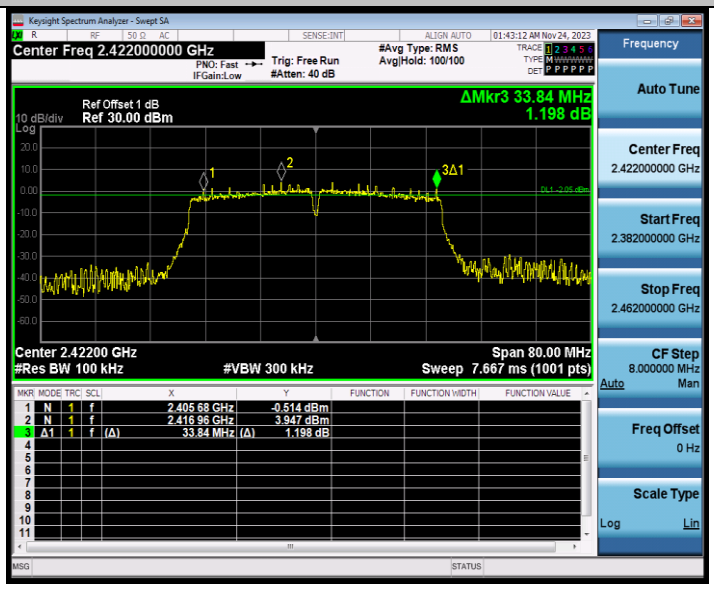

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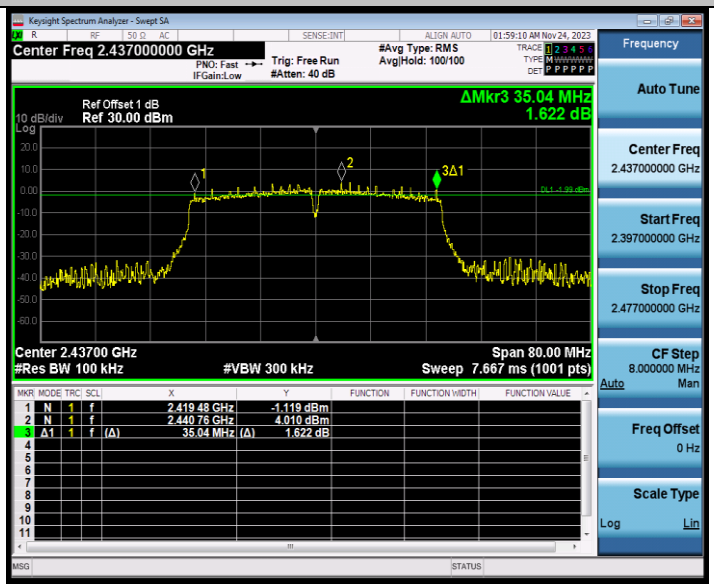

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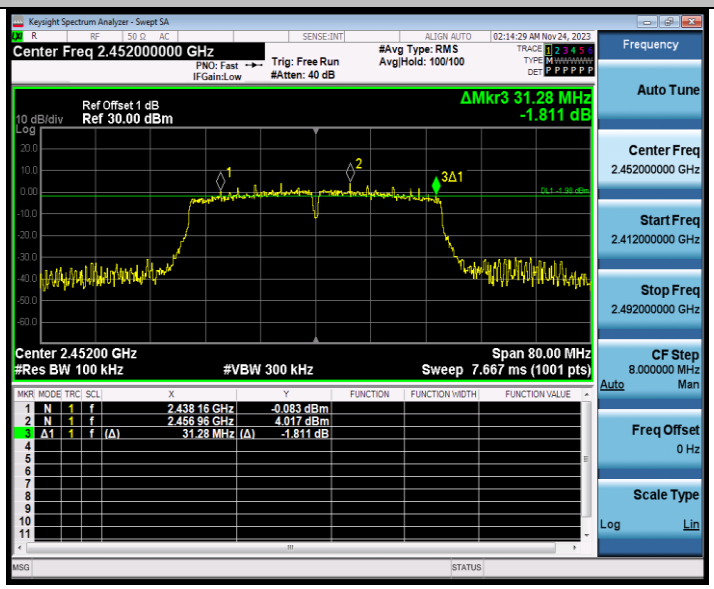

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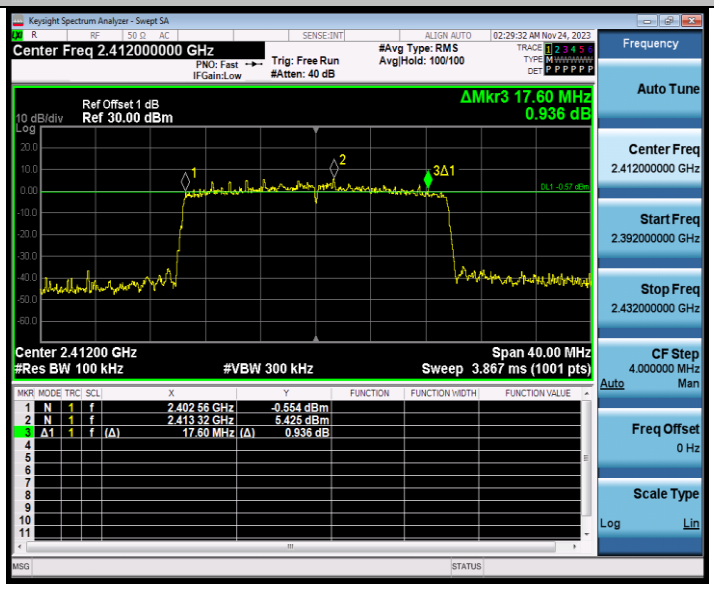

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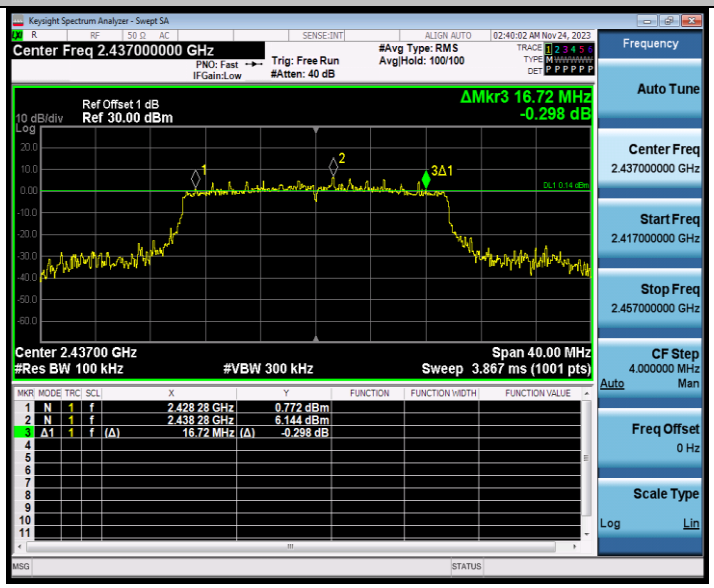

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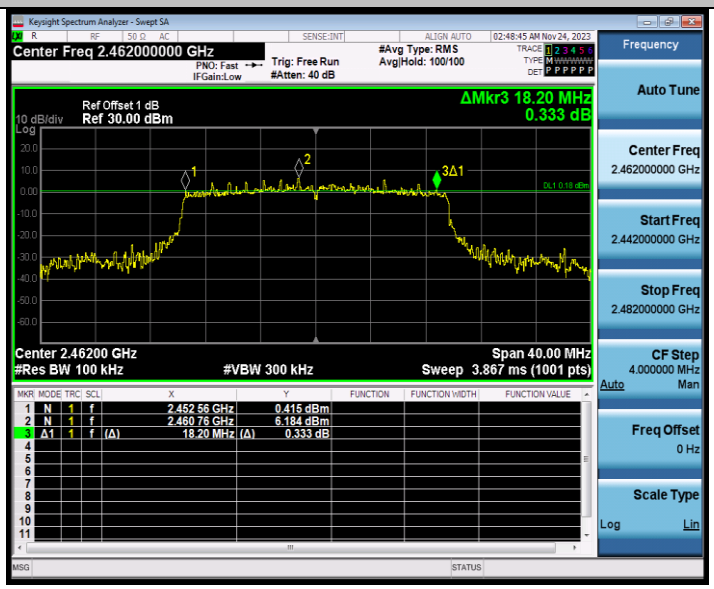

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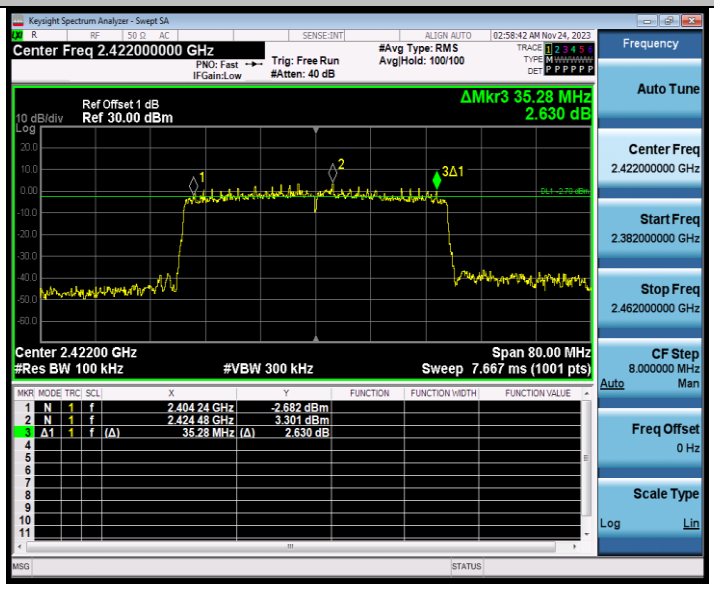

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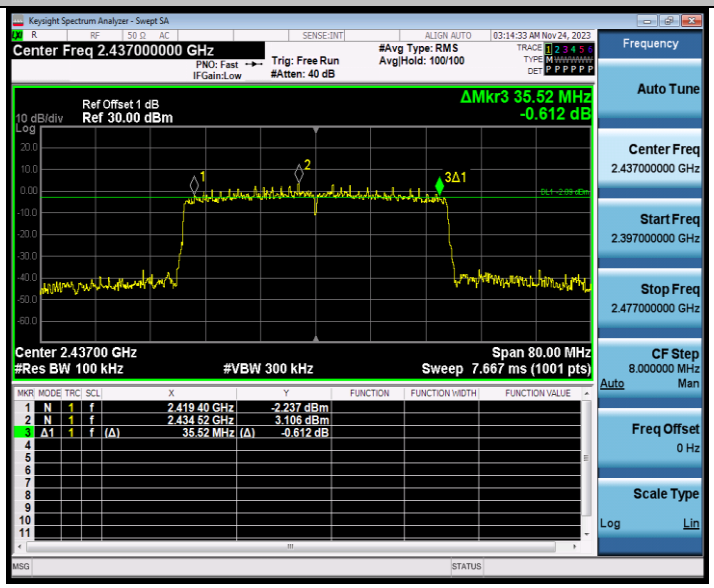

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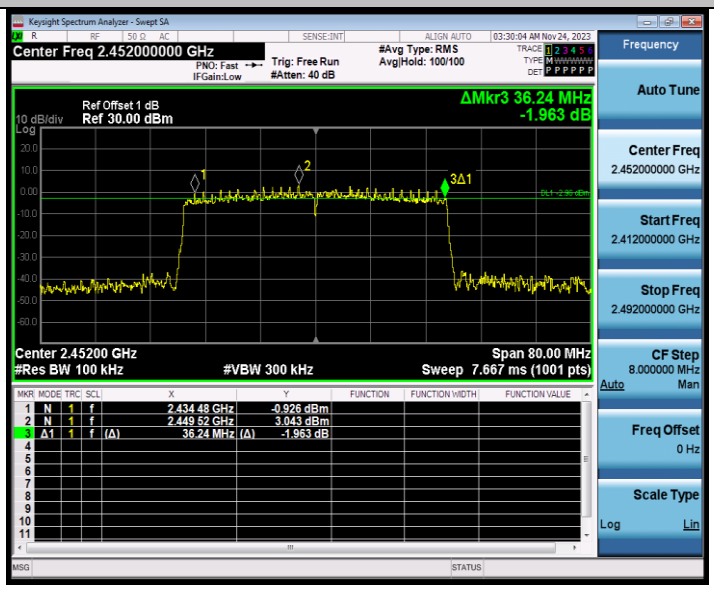


Appendix B: Maximum conducted output power

SISO Antenna1：							
Mode	Channel	Test Frequency (MHz)	Conducted Power (dBm)	EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
Mode 1	1	2412	23.61	24.96	≤30	≤36	Pass
	6	2437	23.56	24.91	≤30	≤36	Pass
	11	2462	23.84	25.19	≤30	≤36	Pass
Mode 2	1	2412	24.53	25.88	≤30	≤36	Pass
	6	2437	24.64	25.99	≤30	≤36	Pass
	11	2462	24.49	25.84	≤30	≤36	Pass
Mode 3	1	2412	23.10	24.45	≤30	≤36	Pass
	6	2437	23.81	25.16	≤30	≤36	Pass
	11	2462	23.84	25.19	≤30	≤36	Pass
Mode 4	3	2422	23.85	25.2	≤30	≤36	Pass
	6	2437	23.83	25.18	≤30	≤36	Pass
	9	2452	23.76	25.11	≤30	≤36	Pass
Mode 5	1	2412	23.48	24.83	≤30	≤36	Pass
	6	2437	23.31	24.66	≤30	≤36	Pass
	11	2462	23.51	24.86	≤30	≤36	Pass
Mode 6	3	2422	23.38	24.73	≤30	≤36	Pass
	6	2437	23.26	24.61	≤30	≤36	Pass
	9	2452	23.16	24.51	≤30	≤36	Pass
Note 1: EIRP Power = Conducted Power + Antenna gain							
Note 2: The Antenna gain please refer to clause 1.2							

SISO Antenna2:

Mode	Channel	Test Frequency (MHz)	Conducted Power (dBm)	EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
Mode 1	1	2412	24.10	25.45	≤30	≤36	Pass
	6	2437	24.34	25.69	≤30	≤36	Pass
	11	2462	24.57	25.92	≤30	≤36	Pass
Mode 2	1	2412	24.86	26.21	≤30	≤36	Pass
	6	2437	25.13	26.48	≤30	≤36	Pass
	11	2462	25.27	26.62	≤30	≤36	Pass
Mode 3	1	2412	24.14	25.49	≤30	≤36	Pass
	6	2437	24.44	25.79	≤30	≤36	Pass
	11	2462	24.12	25.47	≤30	≤36	Pass
Mode 4	3	2422	24.47	25.82	≤30	≤36	Pass
	6	2437	24.55	25.90	≤30	≤36	Pass
	9	2452	24.60	25.95	≤30	≤36	Pass
Mode 5	1	2412	24.51	25.86	≤30	≤36	Pass
	6	2437	24.58	25.93	≤30	≤36	Pass
	11	2462	24.72	26.07	≤30	≤36	Pass
Mode 6	3	2422	23.91	25.26	≤30	≤36	Pass
	6	2437	24.01	25.36	≤30	≤36	Pass
	9	2452	24.14	25.49	≤30	≤36	Pass

Note 1: EIRP Power = Conducted Power + Antenna gain

Note 2: The Antenna gain please refer to clause 1.2

CDD Antenna1+2:

Mode	Channel	Test Frequency (MHz)	Conducted Power (dBm)			EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
			ANT1	ANT2	ANT1+2				
Mode 1	1	2412	20.83	21.15	24.00	25.35	⩽30	⩽36	Pass
	6	2437	20.35	21.27	23.84	25.19	⩽30	⩽36	Pass
	11	2462	20.46	21.48	24.01	25.36	⩽30	⩽36	Pass
Mode 2	1	2412	22.45	23.64	26.10	27.45	⩽30	⩽36	Pass
	6	2437	24.04	23.74	26.90	28.25	⩽30	⩽36	Pass
	11	2462	22.56	23.93	26.31	27.66	⩽30	⩽36	Pass
Mode 3	1	2412	21.65	23.48	25.67	27.02	⩽30	⩽36	Pass
	6	2437	23.91	23.88	26.91	28.26	⩽30	⩽36	Pass
	11	2462	22.04	24.11	26.21	27.56	⩽30	⩽36	Pass
Mode 4	3	2422	22.37	23.26	25.85	27.20	⩽30	⩽36	Pass
	6	2437	22.28	23.38	25.88	27.23	⩽30	⩽36	Pass
	9	2452	21.96	23.41	25.76	27.11	⩽30	⩽36	Pass
Mode 5	1	2412	23.45	23.93	26.71	28.06	⩽30	⩽36	Pass
	6	2437	23.59	23.93	26.77	28.12	⩽30	⩽36	Pass
	11	2462	23.40	23.61	26.52	27.87	⩽30	⩽36	Pass
Mode 6	3	2422	22.84	23.36	26.12	27.47	⩽30	⩽36	Pass
	6	2437	22.67	23.32	26.02	27.37	⩽30	⩽36	Pass
	9	2452	22.55	23.61	26.12	27.47	⩽30	⩽36	Pass

Note 1: EIRP Power = Conducted Power + Antenna gain

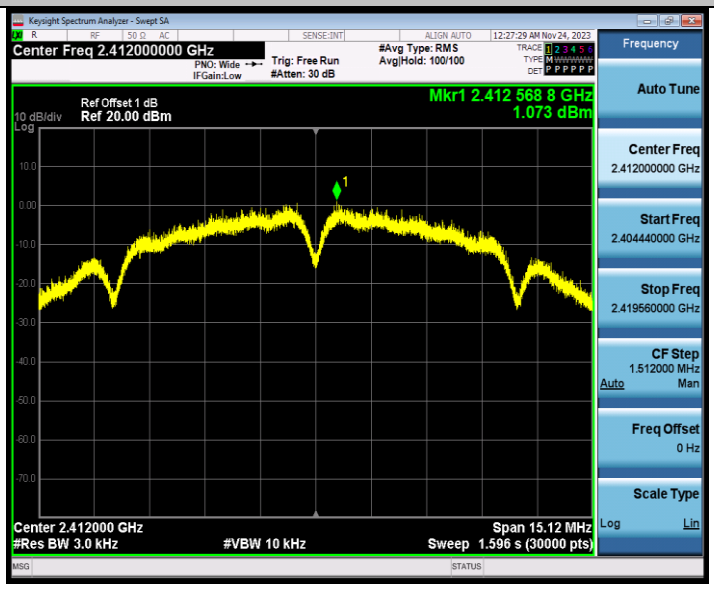
Note 2: The Antenna gain please refer to clause 1.2

Appendix C: Maximum power spectral density

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	[dBm/3kHz]	Verdict
11B	Ant2	2412	1.07	≤8.00	PASS
		2437	0.64	≤8.00	PASS
		2462	0.98	≤8.00	PASS
11G	Ant2	2412	-4.88	≤8.00	PASS
		2437	-5.65	≤8.00	PASS
		2462	-5.56	≤8.00	PASS
11N20	Ant2	2412	-6.67	≤8.00	PASS
		2437	-6.53	≤8.00	PASS
		2462	-6.35	≤8.00	PASS
11N40	Ant2	2422	-8.45	≤8.00	PASS
		2437	-8.87	≤8.00	PASS
		2452	-9.32	≤8.00	PASS
11AX20	Ant2	2412	-6.6	≤8.00	PASS
		2437	-8.38	≤8.00	PASS
		2462	-7.48	≤8.00	PASS
11AX40	Ant2	2422	-10.85	≤8.00	PASS
		2437	-10.98	≤8.00	PASS
		2452	-10.63	≤8.00	PASS
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	[dBm/3kHz]	Verdict
11B	Ant2	2412	1.07	≤4.99	PASS
		2437	0.64	≤4.99	PASS
		2462	0.98	≤4.99	PASS
11G	Ant2	2412	-4.88	≤4.99	PASS
		2437	-5.65	≤4.99	PASS
		2462	-5.56	≤4.99	PASS
11N20	Ant2	2412	-6.67	≤4.99	PASS
		2437	-6.53	≤4.99	PASS
		2462	-6.35	≤4.99	PASS
11N40	Ant2	2422	-8.45	≤4.99	PASS
		2437	-8.87	≤4.99	PASS
		2452	-9.32	≤4.99	PASS
11AX20	Ant2	2412	-6.6	≤4.99	PASS
		2437	-8.38	≤4.99	PASS
		2462	-7.48	≤4.99	PASS
11AX40	Ant2	2422	-10.85	≤4.99	PASS
		2437	-10.98	≤4.99	PASS
		2452	-10.63	≤4.99	PASS

Note 1: MIMO PSD Limit = 8dBm/3KHz - 10*LOG(Antenna number)
Note 2: We have evaluated SISO, MIMO mode, shown in the report is the worst data.

11B_2412



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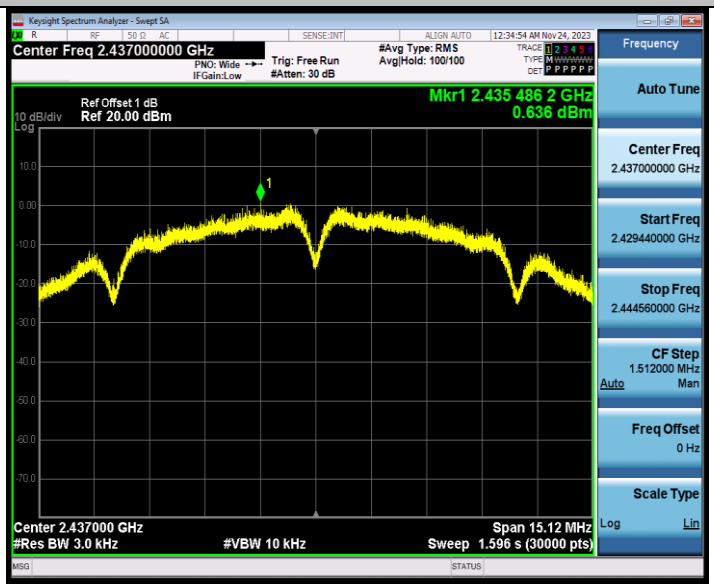

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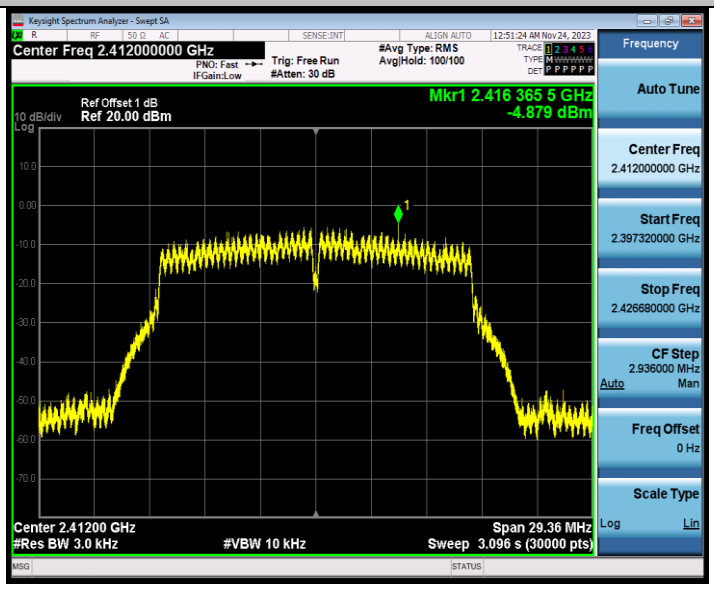
11G_2412


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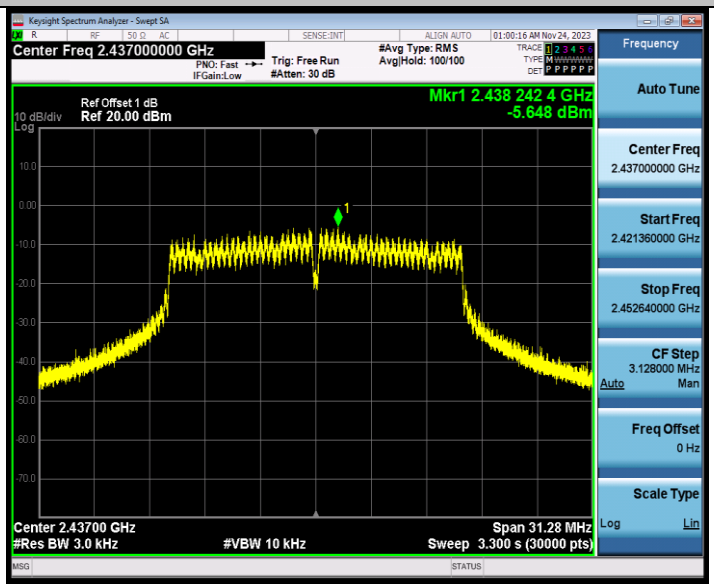

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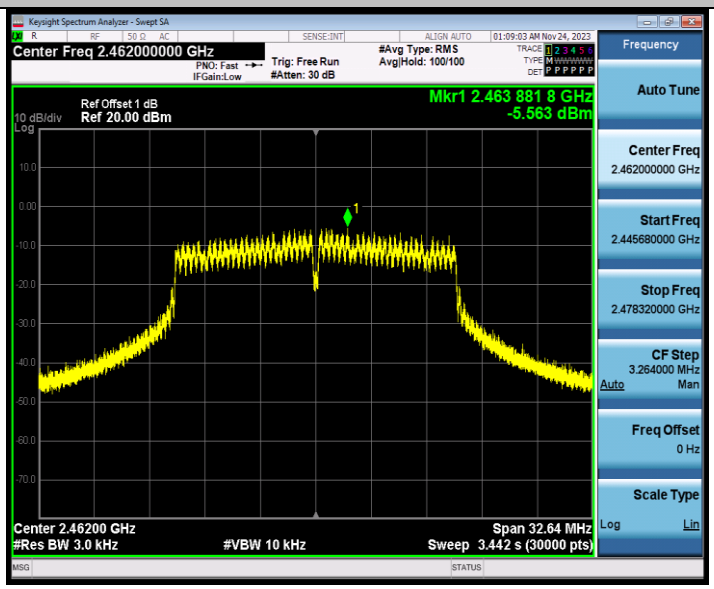

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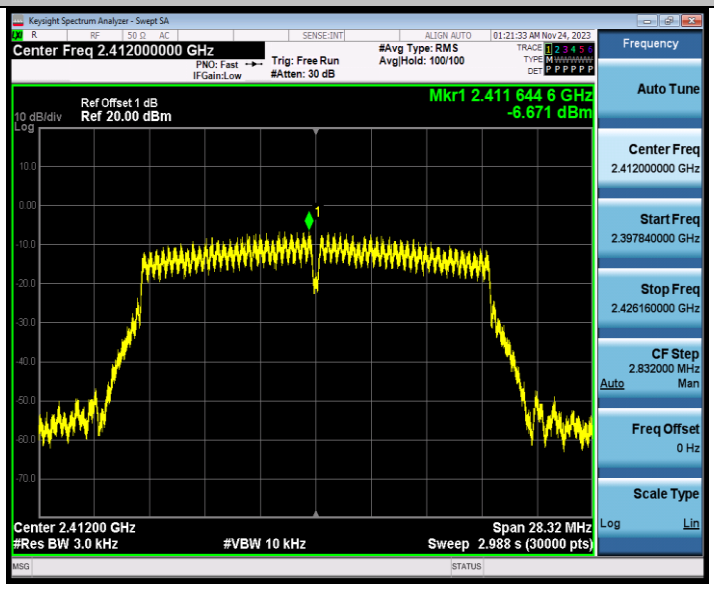

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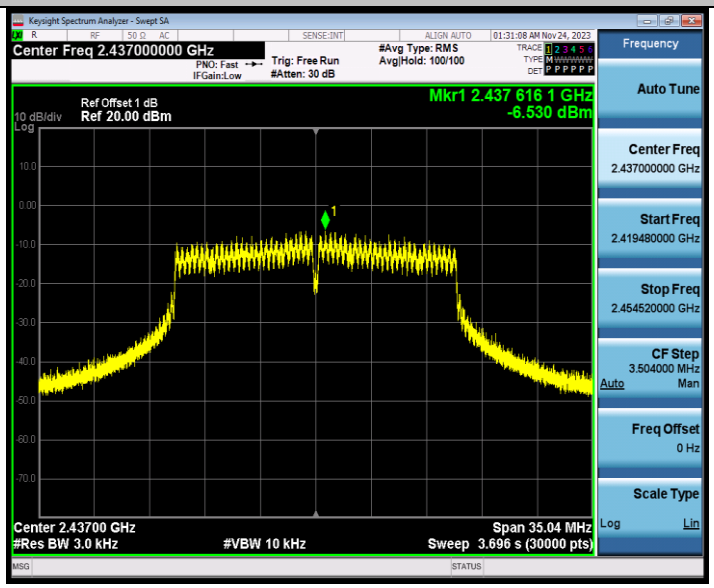

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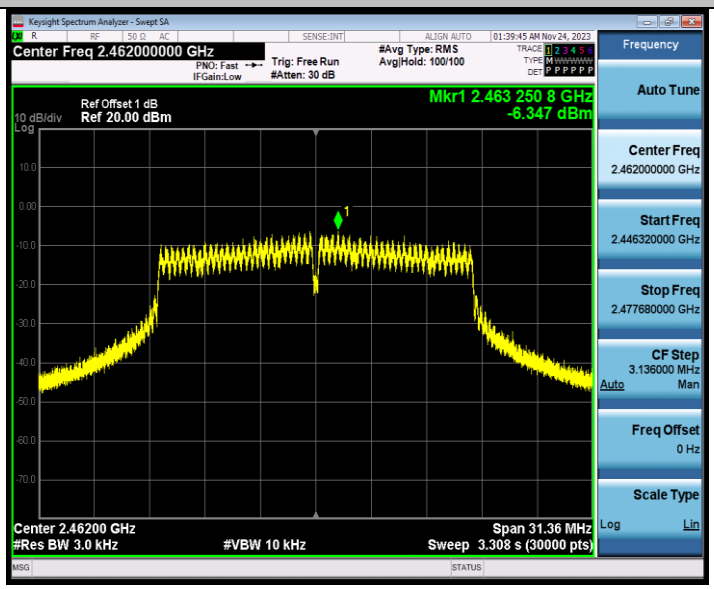

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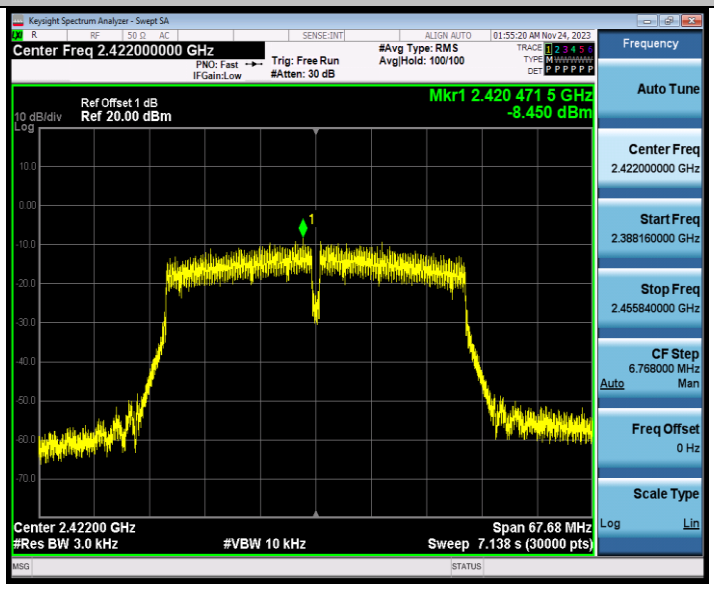

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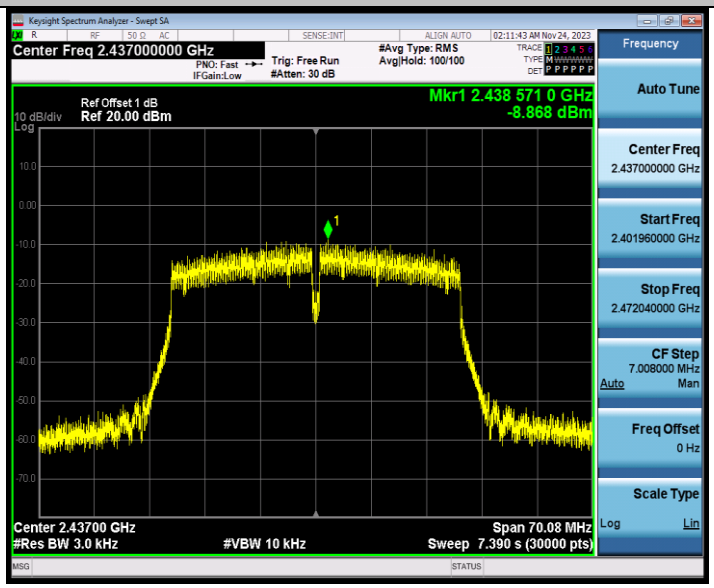

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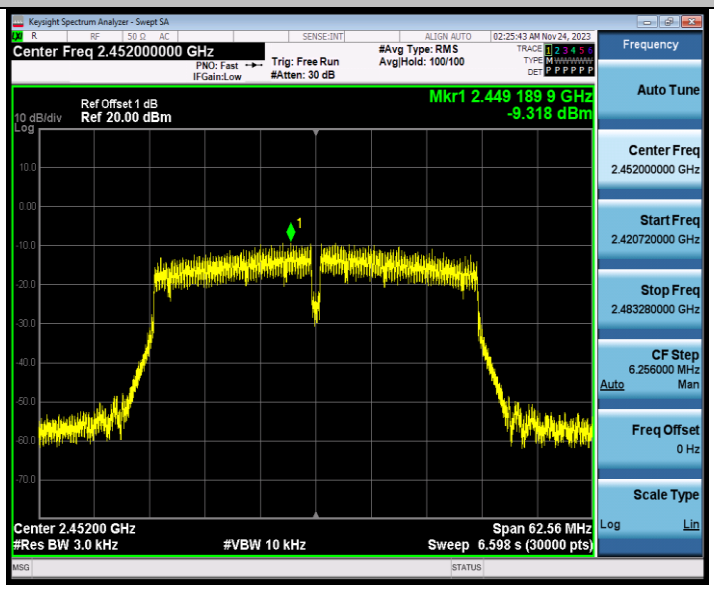

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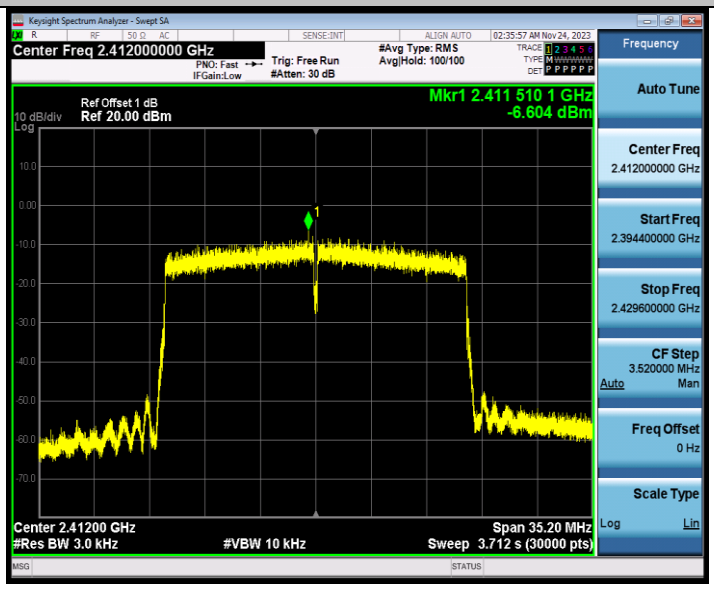

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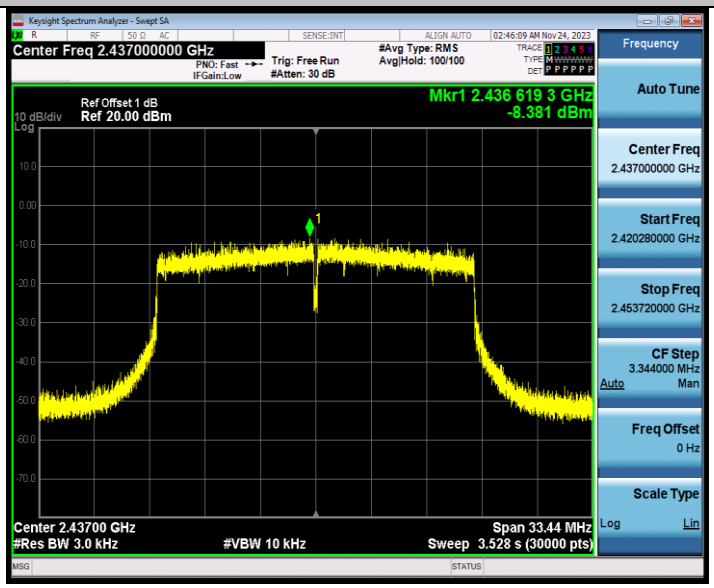

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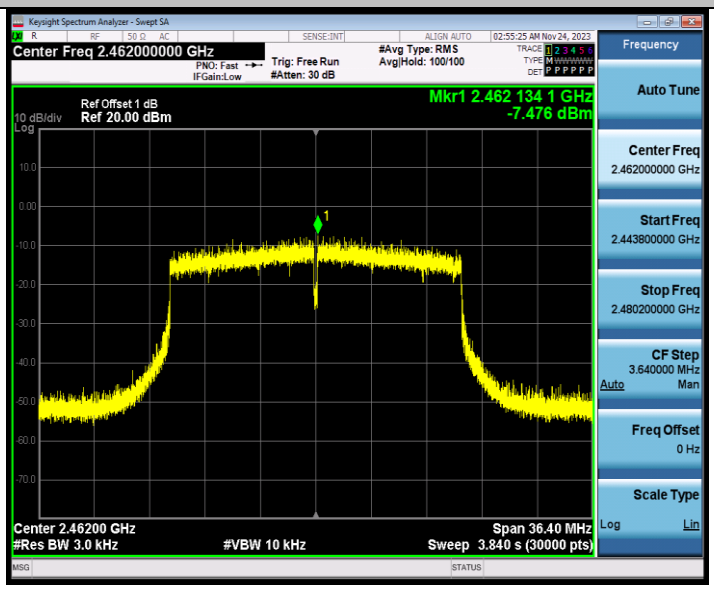

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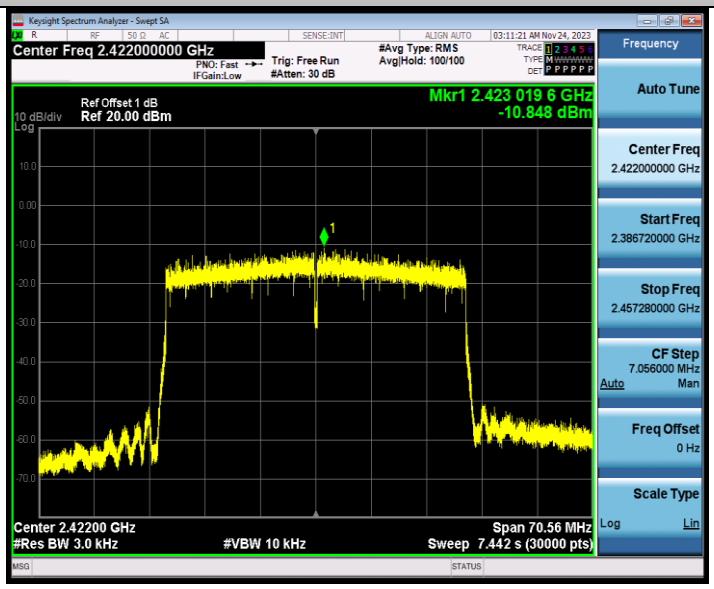

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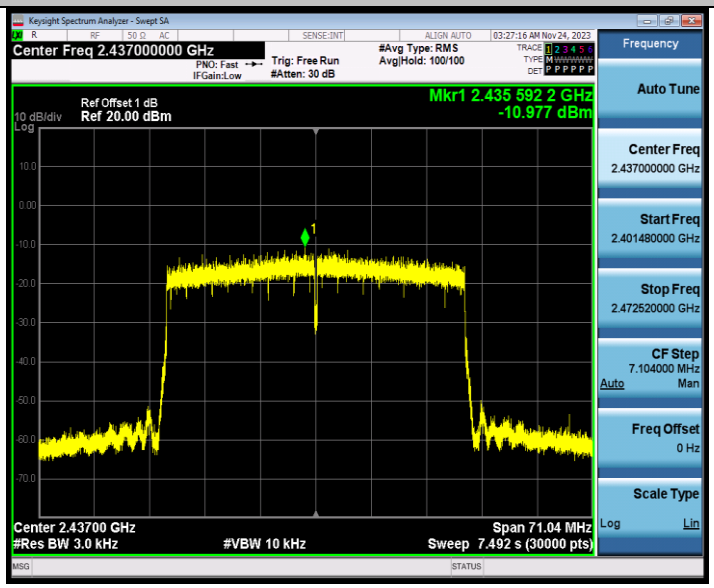

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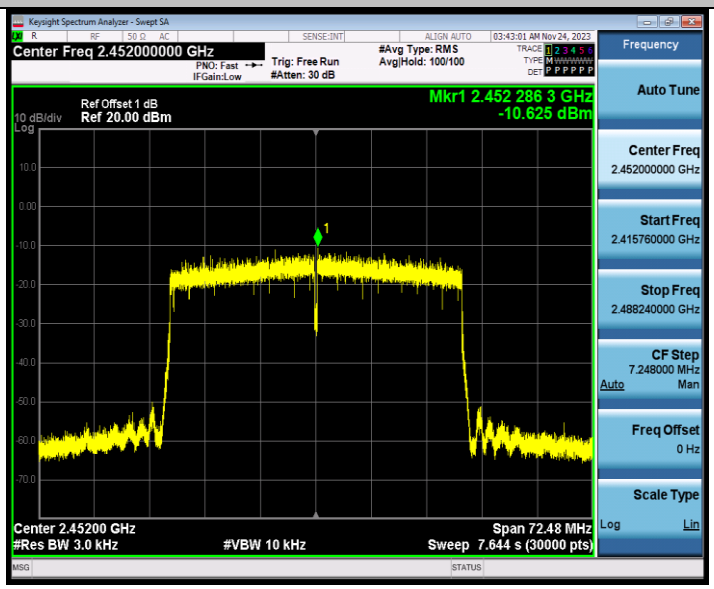
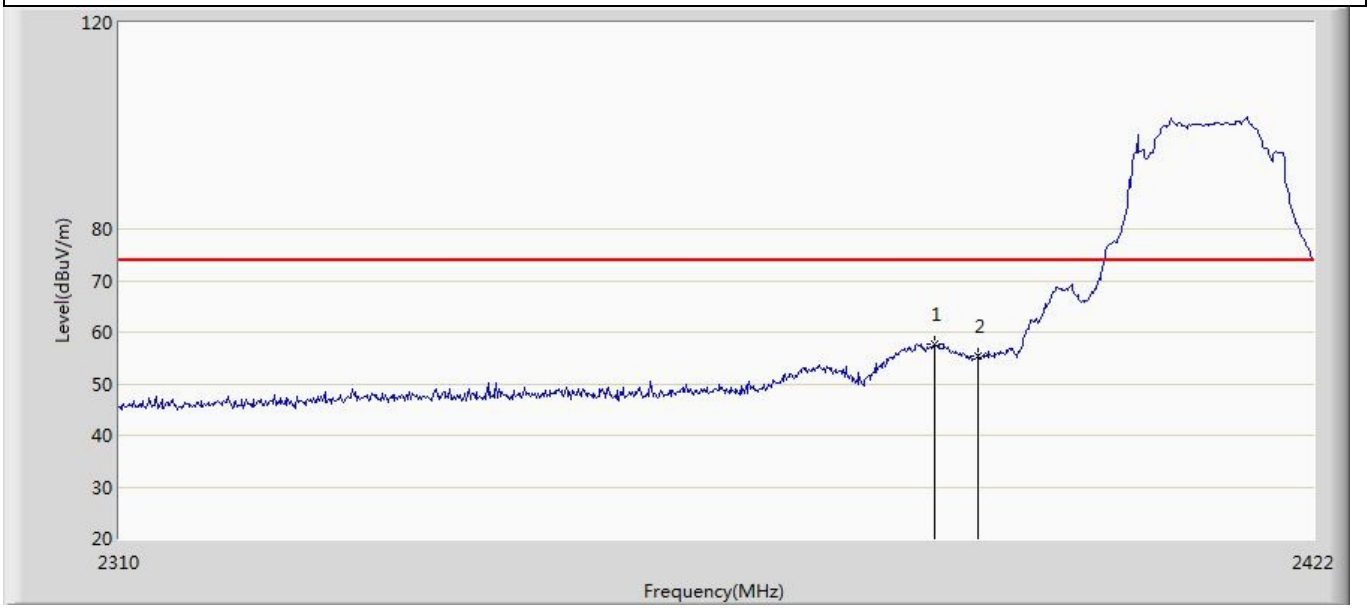


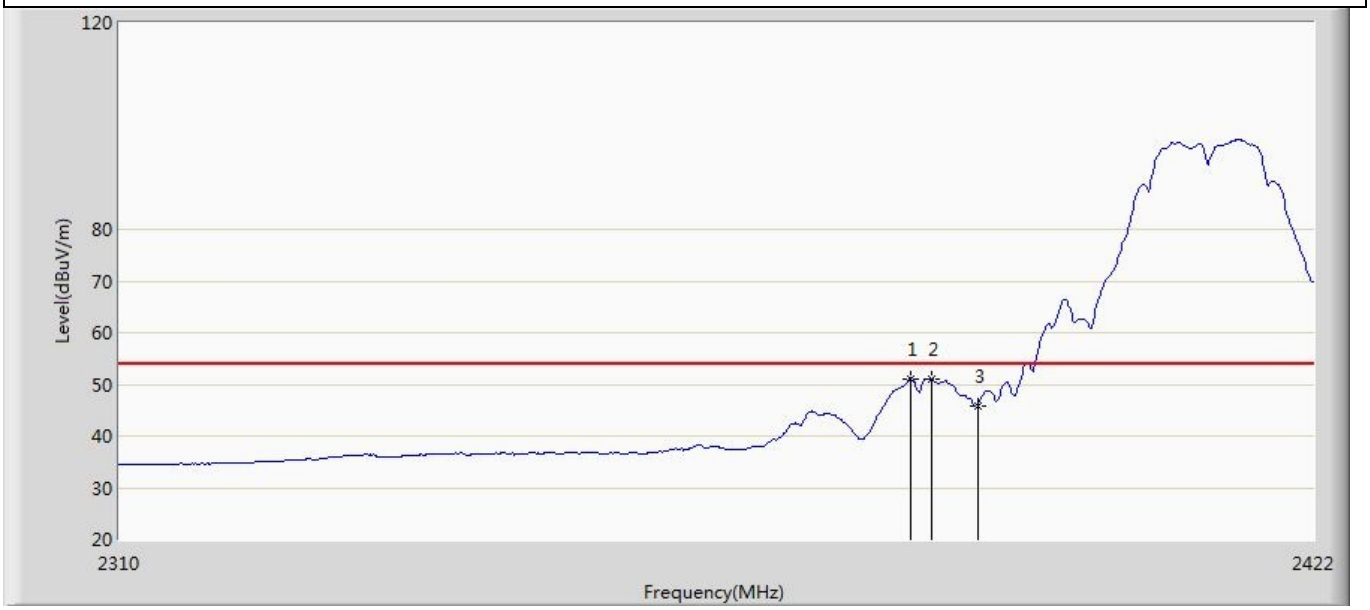
Appendix D: Band edge measurements

Profile: 23A0637R	Page No.: 1
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2412MHz by 802.11b with Ant2	



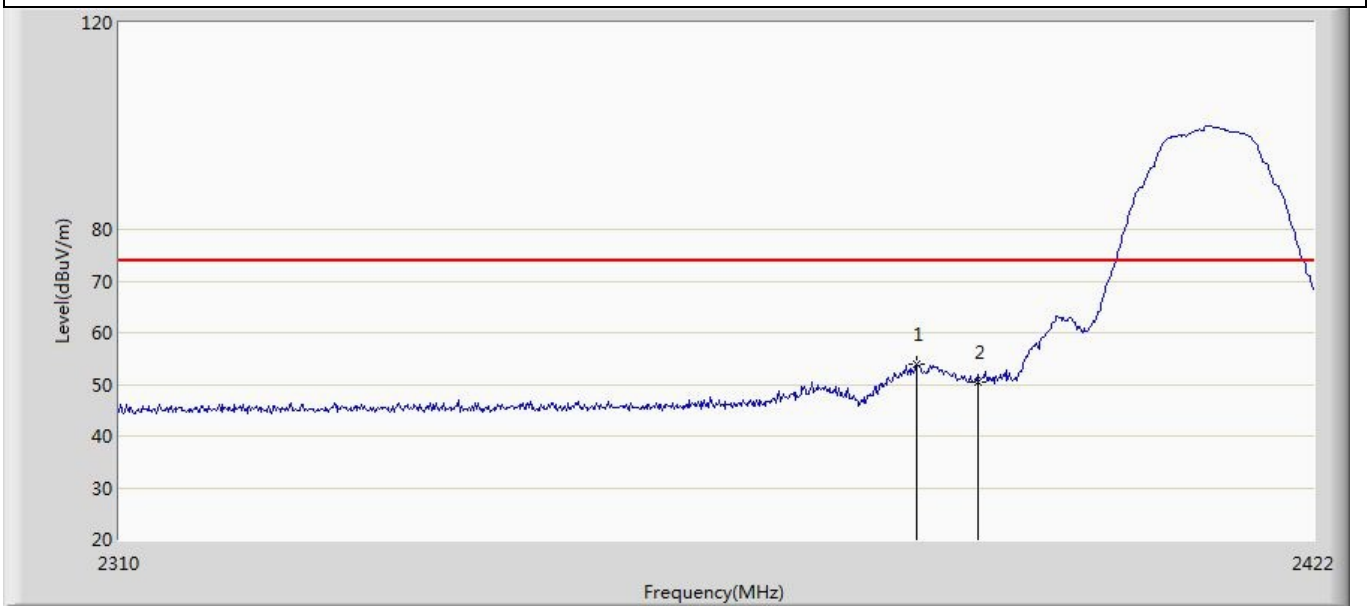
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2385.936	57.775	23.751	-16.225	74.000	34.024	PK
2		2390.000	55.444	21.398	-18.556	74.000	34.046	PK

Profile: 23A0637R	Page No.: 2
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2412MHz by 802.11b with Ant2	



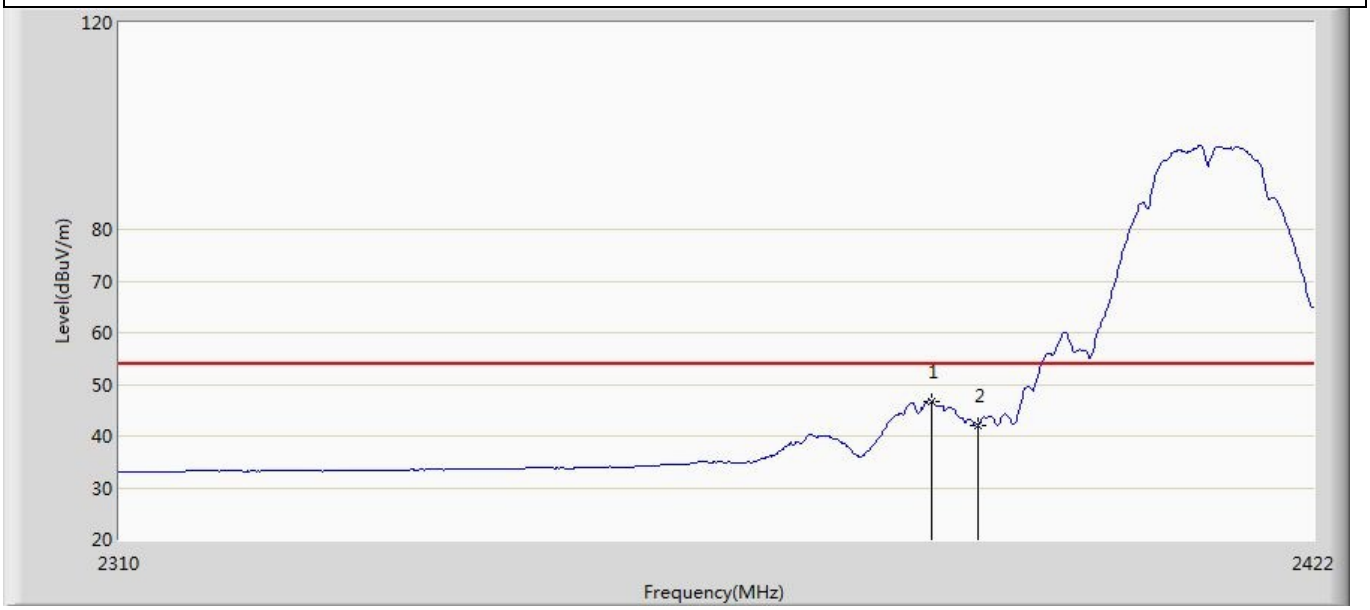
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2383.584	51.093	17.082	-2.907	54.000	34.011	AV
2		2385.600	51.050	17.028	-2.950	54.000	34.022	AV
3		2390.000	45.834	11.788	-8.166	54.000	34.046	AV

Profile: 23A0637R	Page No.: 3
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2412MHz by 802.11b with Ant2	



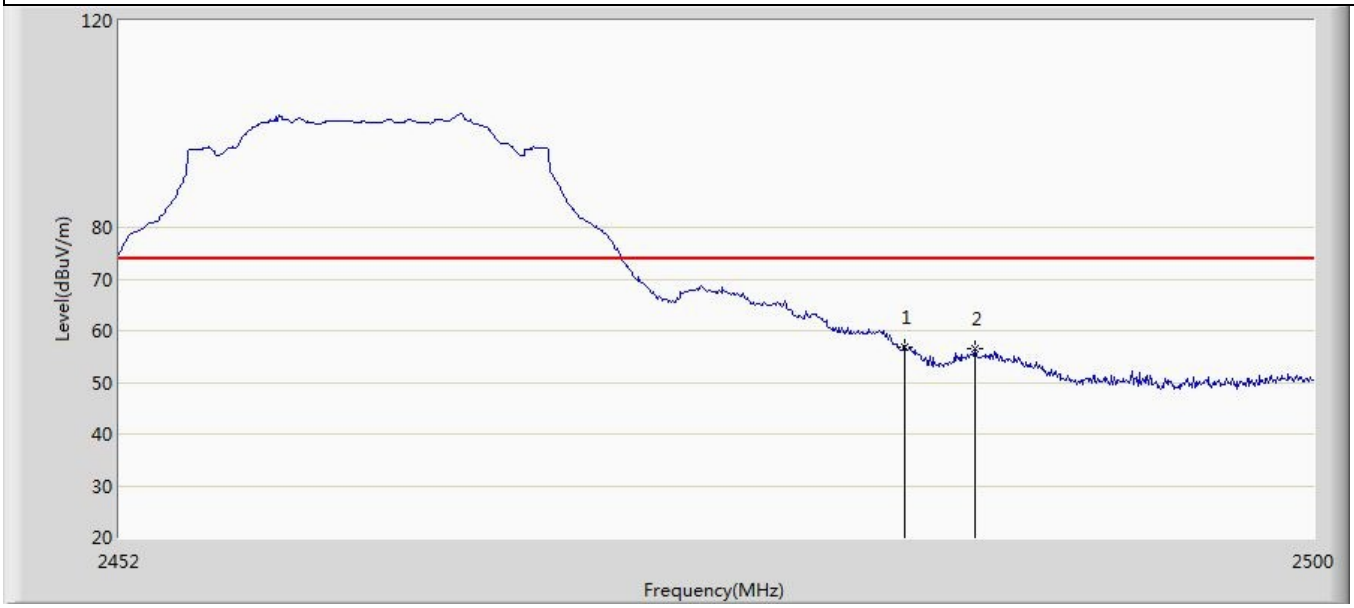
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2384.256	53.813	19.798	-20.187	74.000	34.015	PK
2		2390.000	50.521	16.475	-23.479	74.000	34.046	PK

Profile: 23A0637R	Page No.: 4
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2412MHz by 802.11b with Ant2	



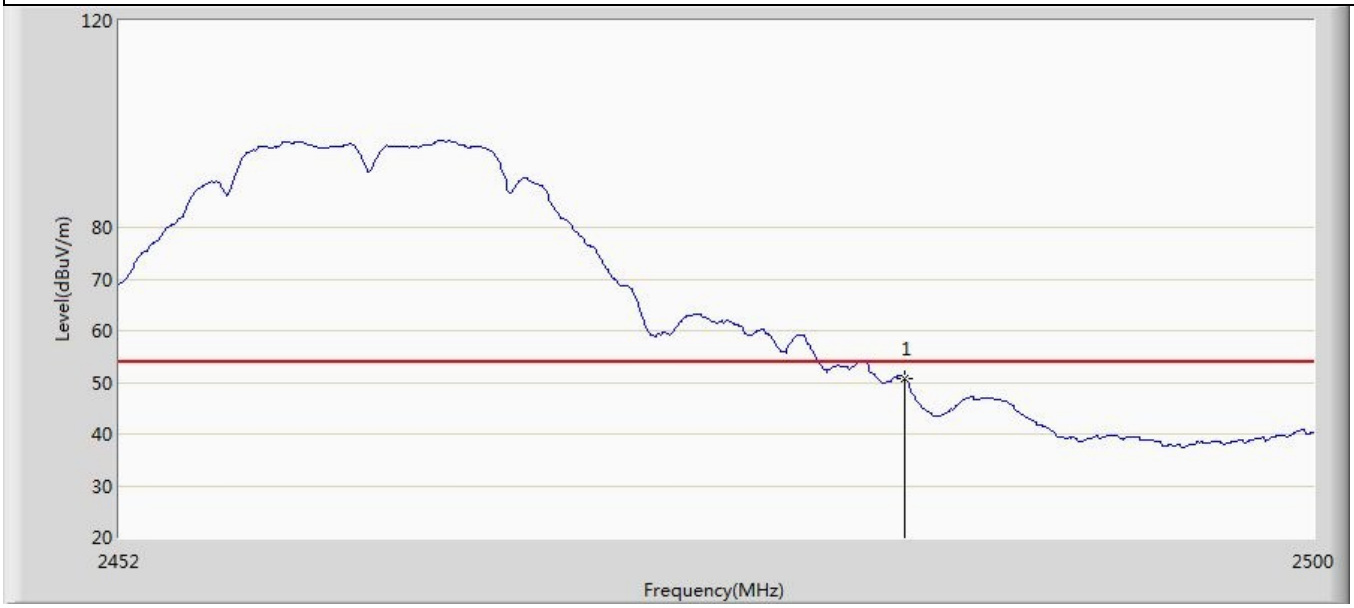
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2385.600	46.746	12.724	-7.254	54.000	34.022	AV
2		2390.000	41.889	7.843	-12.111	54.000	34.046	AV

Profile: 23A0637R	Page No.: 5
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2462MHz by 802.11b with Ant2	



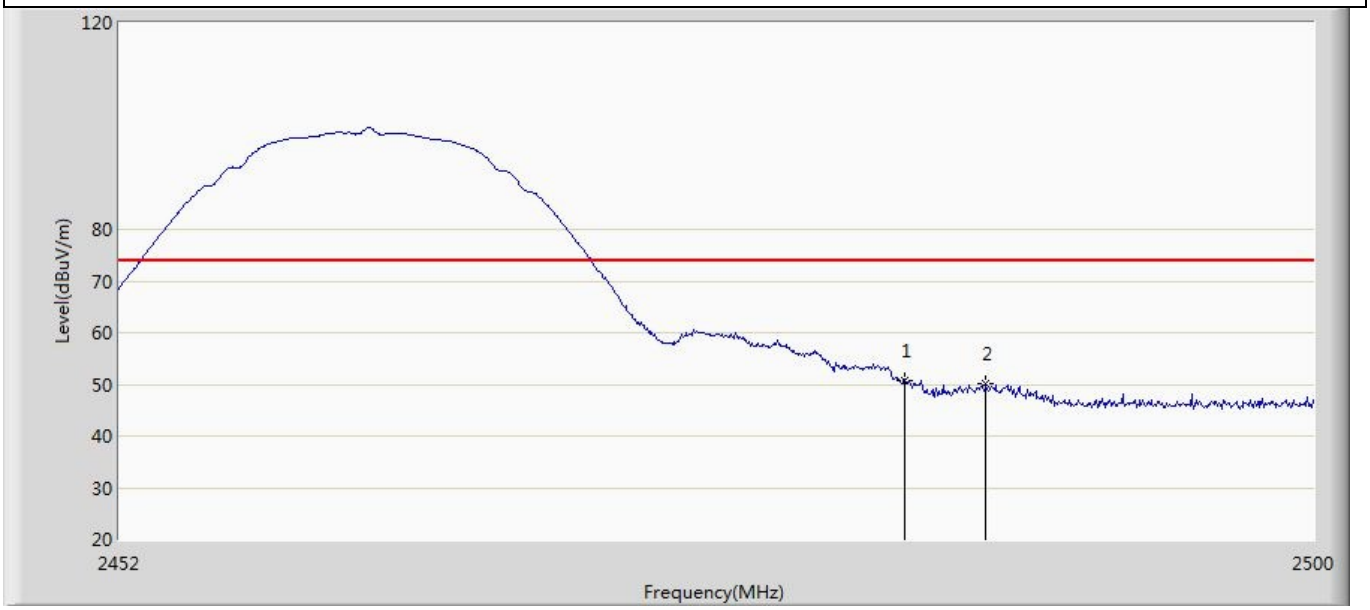
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	56.875	22.369	-17.125	74.000	34.506	PK
2		2486.320	56.464	21.952	-17.536	74.000	34.512	PK

Profile: 23A0637R	Page No.: 6
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:46
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2462MHz by 802.11b with Ant2	



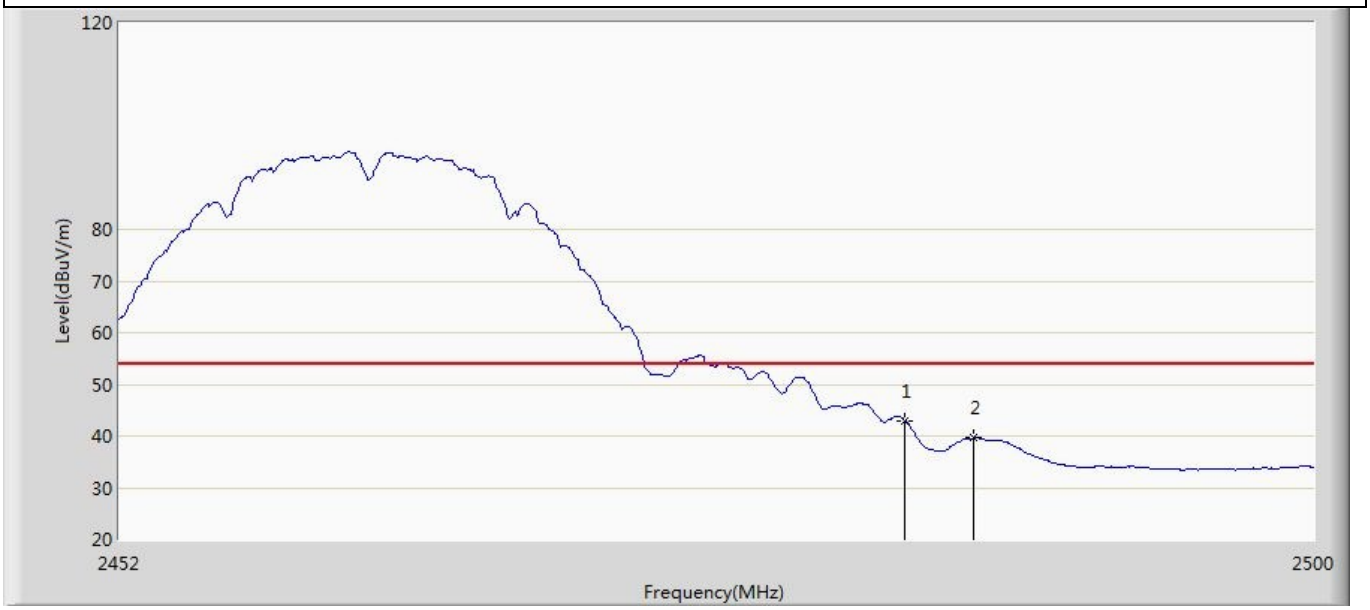
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	50.646	16.140	-3.354	54.000	34.506	AV

Profile: 23A0637R	Page No.: 7
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2462MHz by 802.11b with Ant2	



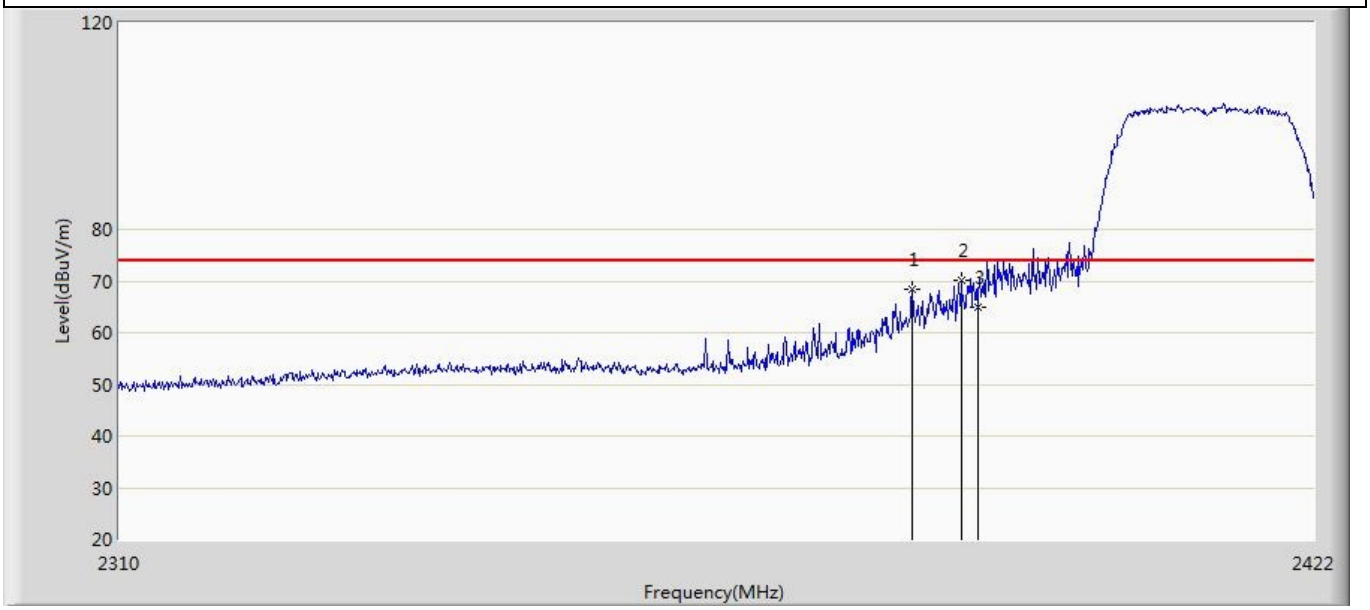
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	50.808	16.302	-23.192	74.000	34.506	PK
2		2486.752	50.034	15.521	-23.966	74.000	34.513	PK

Profile: 23A0637R	Page No.: 8
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:50
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 1:Transmit at 2462MHz by 802.11b with Ant2	



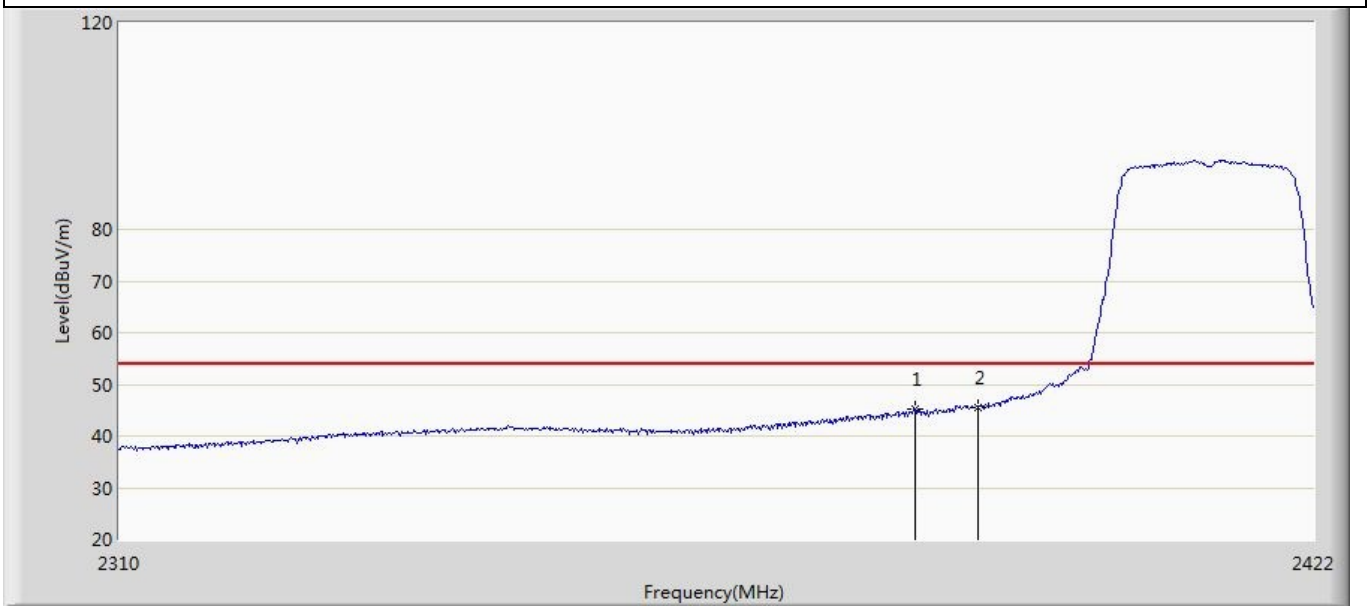
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	42.922	8.416	-11.078	54.000	34.506	AV
2		2486.272	39.596	5.084	-14.404	54.000	34.512	AV

Profile: 23A0637R	Page No.: 9
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2412MHz by 802.11g with Ant2	



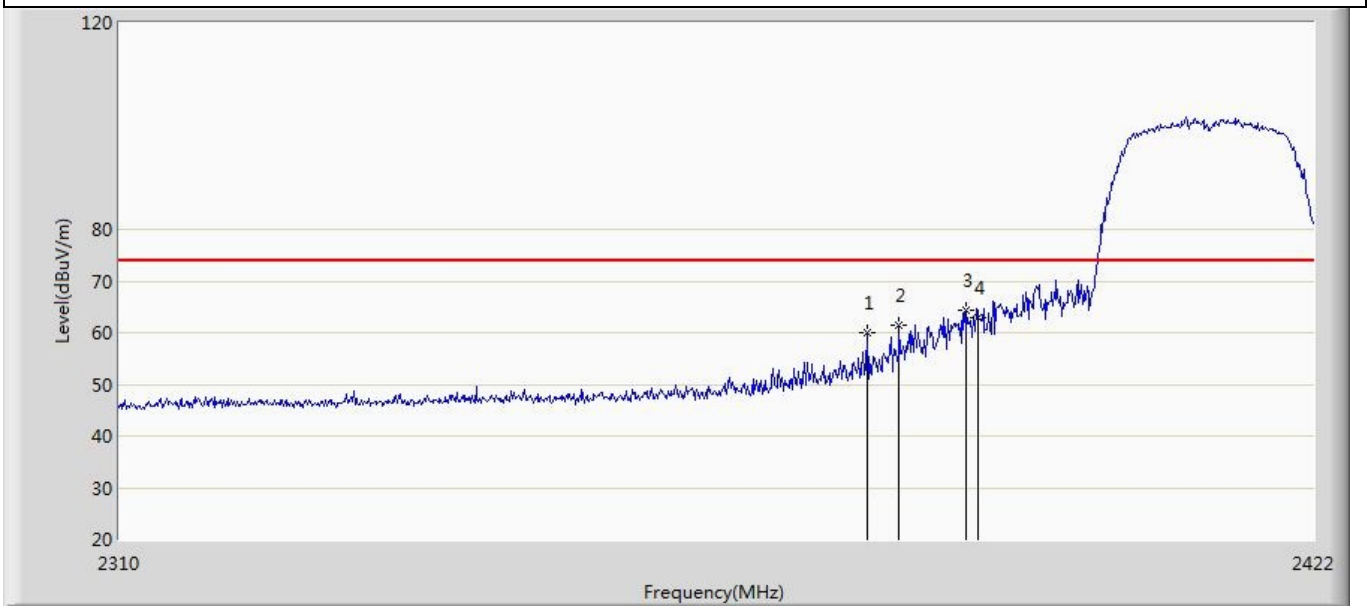
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2383.808	68.516	34.504	-5.484	74.000	34.012	PK
2	*	2388.400	70.188	36.151	-3.812	74.000	34.037	PK
3		2390.000	64.873	30.827	-9.127	74.000	34.046	PK

Profile: 23A0637R	Page No.: 10
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 15:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2412MHz by 802.11g with Ant2	



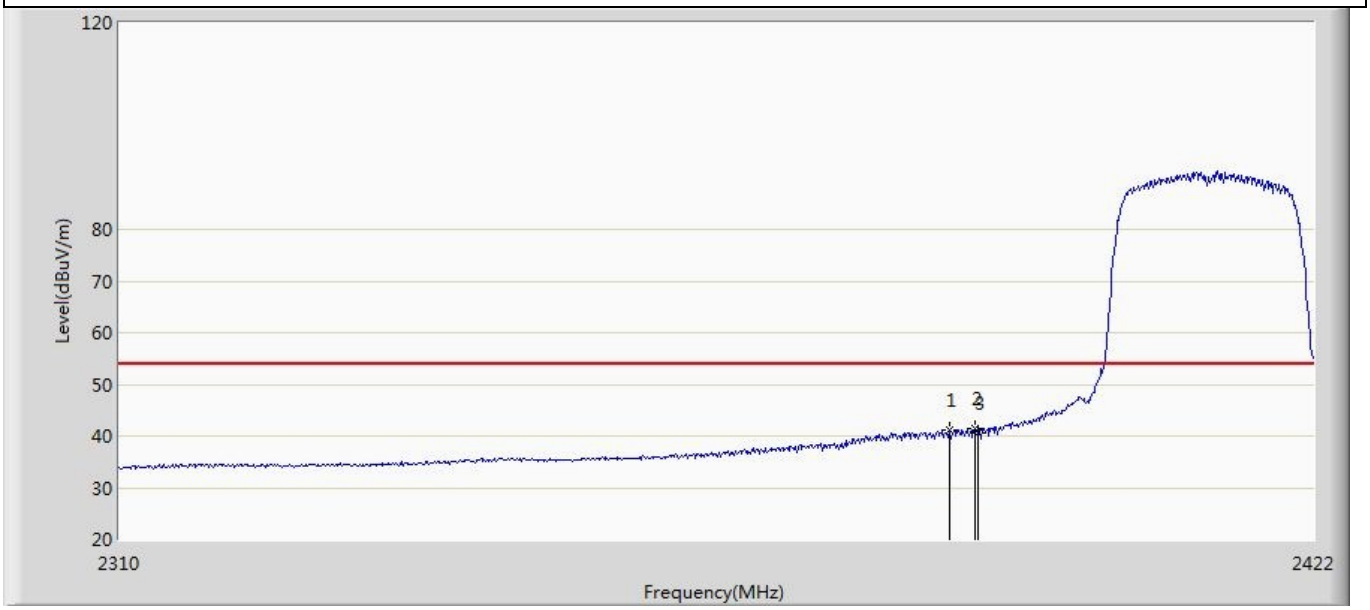
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2384.032	45.102	11.089	-8.898	54.000	34.013	AV
2	*	2390.000	45.587	11.541	-8.413	54.000	34.046	AV

Profile: 23A0637R	Page No.: 11
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2412MHz by 802.11g with Ant2	



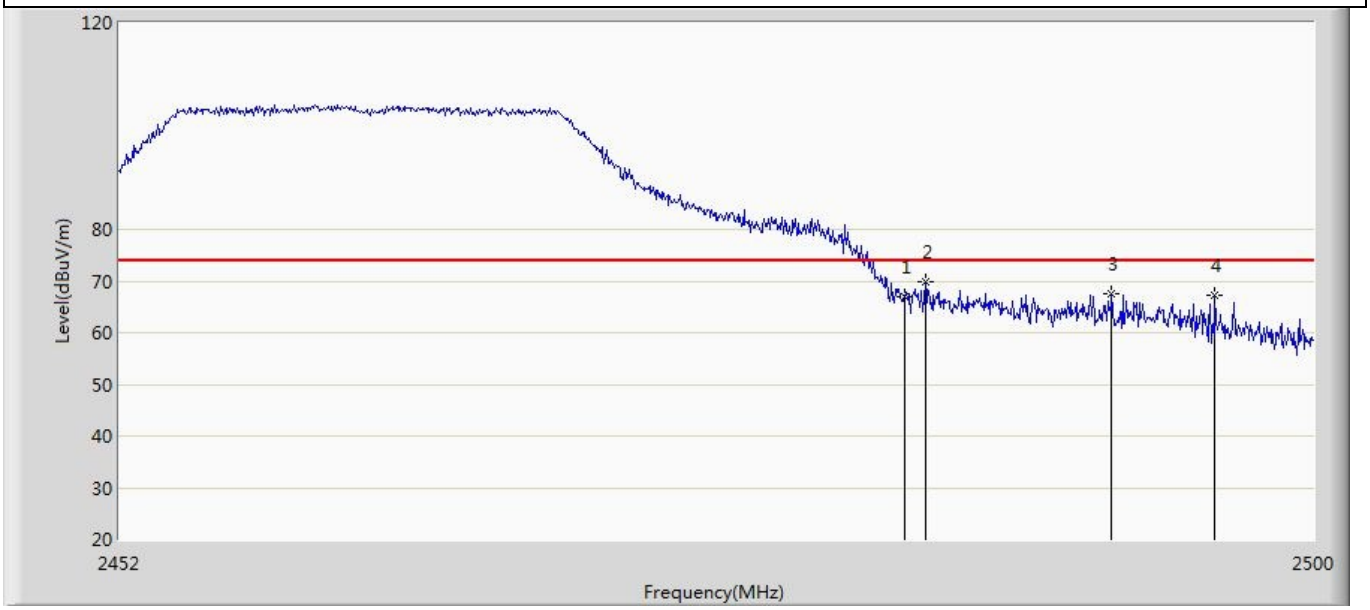
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2379.552	59.874	25.885	-14.126	74.000	33.989	PK
2		2382.576	61.528	27.522	-12.472	74.000	34.006	PK
3	*	2388.960	64.411	30.371	-9.589	74.000	34.040	PK
4		2390.000	62.850	28.804	-11.150	74.000	34.046	PK

Profile: 23A0637R	Page No.: 12
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2412MHz by 802.11g with Ant2	



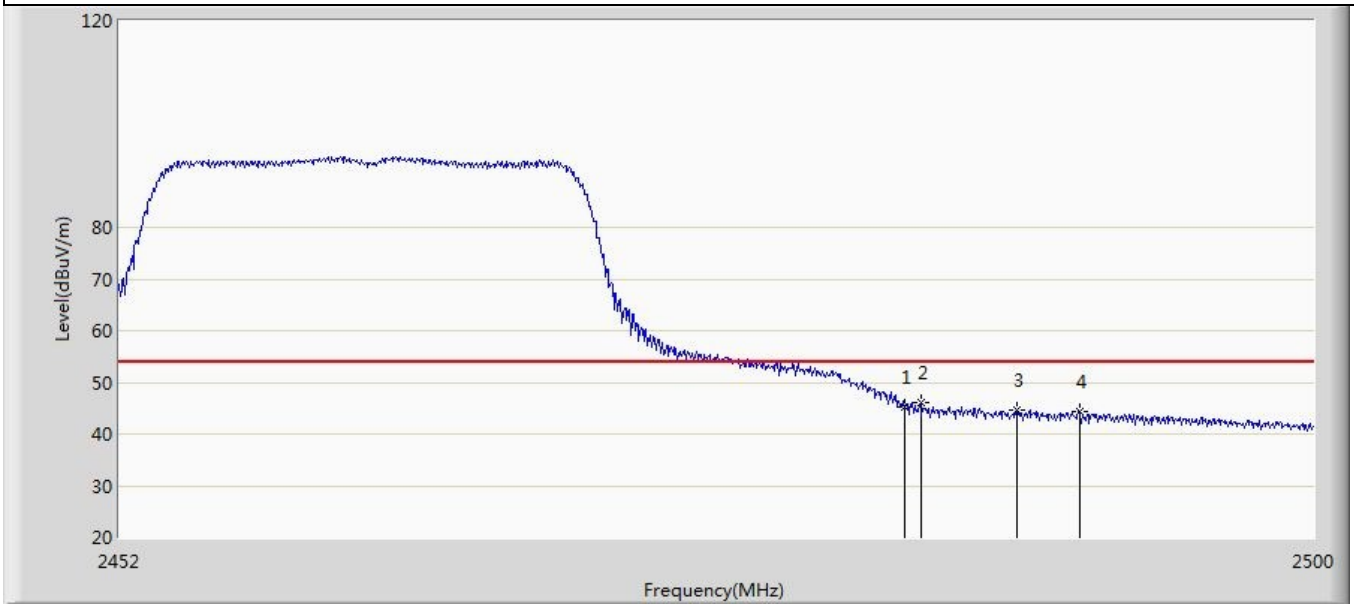
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2387.280	41.037	7.006	-12.963	54.000	34.031	AV
2	*	2389.744	41.487	7.442	-12.513	54.000	34.044	AV
3		2390.000	40.587	6.541	-13.413	54.000	34.046	AV

Profile: 23A0637R	Page No.: 13
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2462MHz by 802.11g with Ant2	



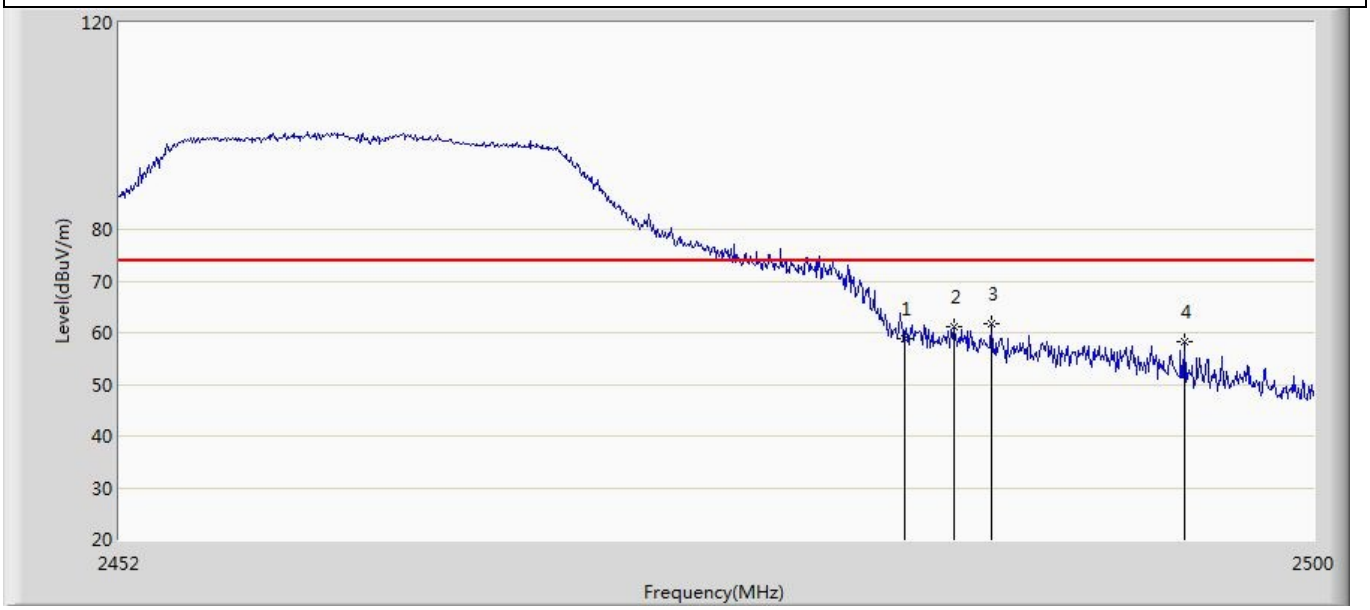
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	67.088	32.582	-6.912	74.000	34.506	PK
2	*	2484.304	69.742	35.234	-4.258	74.000	34.508	PK
3		2491.840	67.448	32.923	-6.552	74.000	34.524	PK
4		2496.016	67.260	32.726	-6.740	74.000	34.534	PK

Profile: 23A0637R	Page No.: 14
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2462MHz by 802.11g with Ant2	



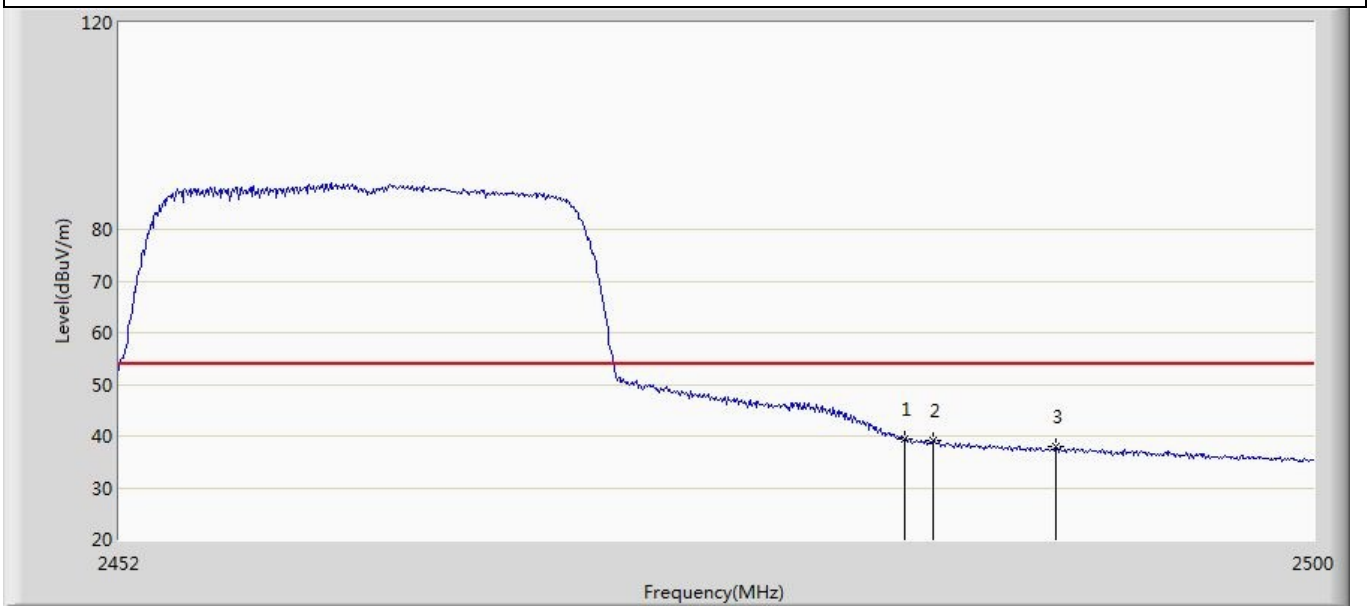
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	45.077	10.571	-8.923	54.000	34.506	AV
2	*	2484.112	46.080	11.573	-7.920	54.000	34.507	AV
3		2488.000	44.696	10.180	-9.304	54.000	34.516	AV
4		2490.544	44.427	9.905	-9.573	54.000	34.522	AV

Profile: 23A0637R	Page No.: 15
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2462MHz by 802.11g with Ant2	



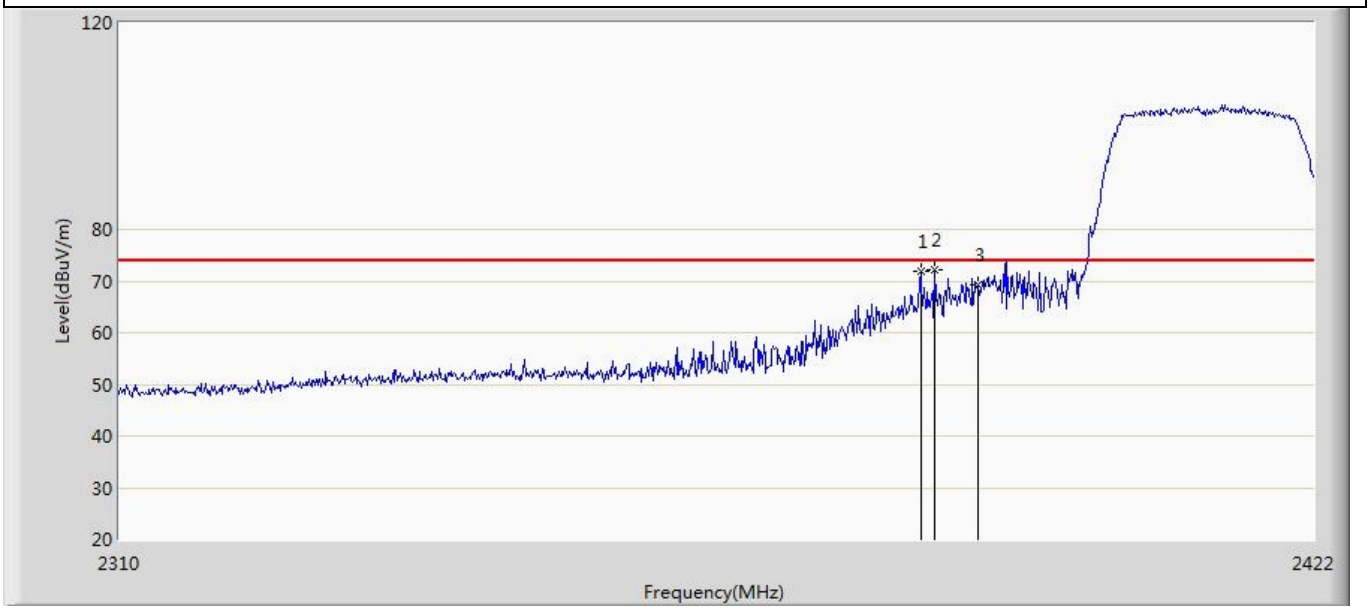
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	58.907	24.401	-15.093	74.000	34.506	PK
2		2485.456	61.178	26.668	-12.822	74.000	34.511	PK
3	*	2486.992	61.767	27.253	-12.233	74.000	34.514	PK
4		2494.768	58.232	23.701	-15.768	74.000	34.531	PK

Profile: 23A0637R	Page No.: 16
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:07
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 2:Transmit at 2462MHz by 802.11g with Ant2	



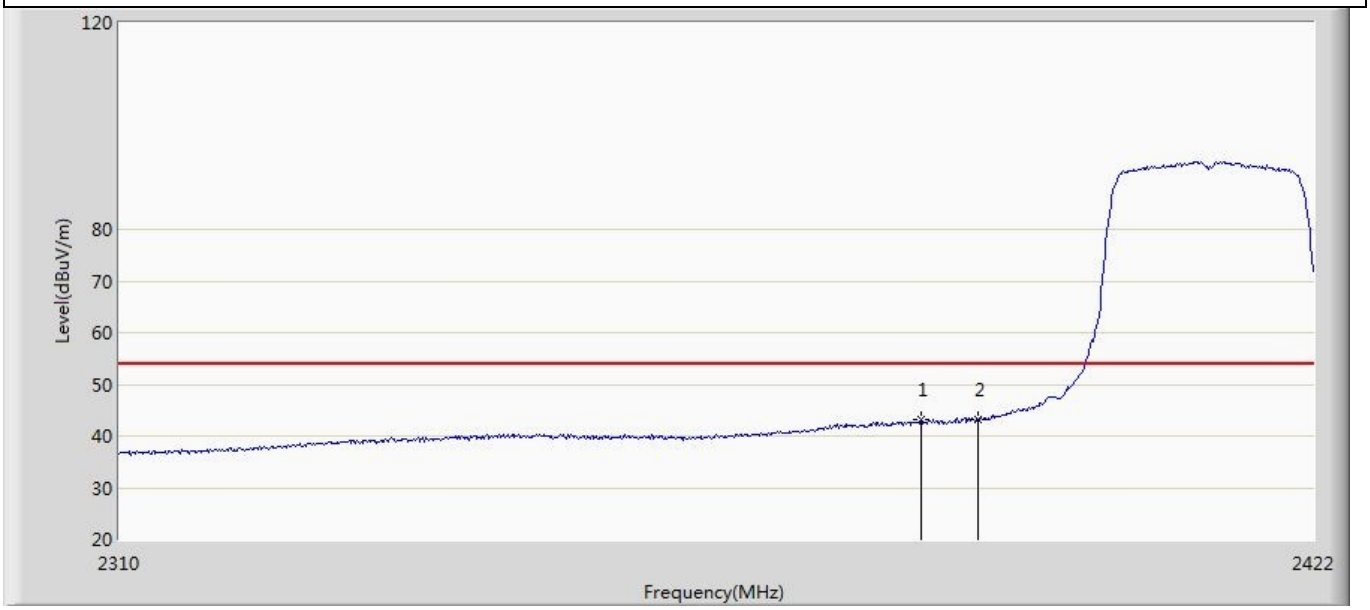
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	39.431	4.925	-14.569	54.000	34.506	AV
2		2484.640	39.214	4.705	-14.786	54.000	34.509	AV
3		2489.584	37.905	3.385	-16.095	54.000	34.519	AV

Profile: 23A0637R	Page No.: 17
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz) with Ant2	



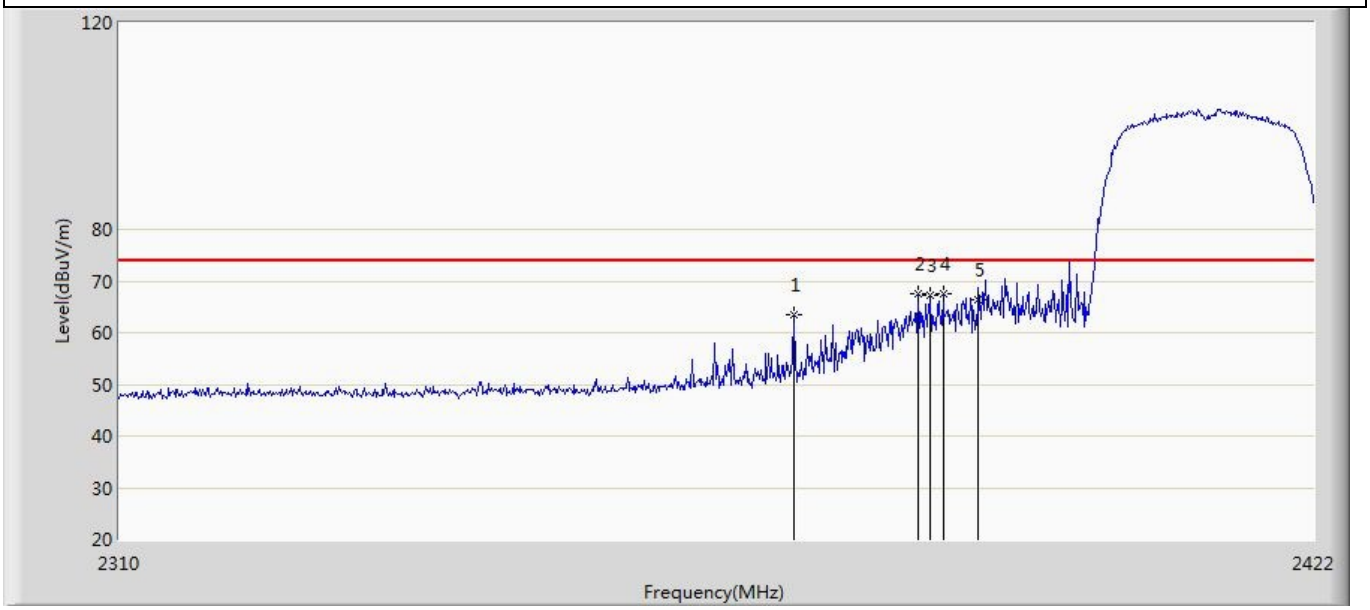
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2384.592	71.948	37.931	-2.052	74.000	34.016	PK
2	*	2385.936	72.055	38.031	-1.945	74.000	34.024	PK
3		2390.000	69.311	35.265	-4.689	74.000	34.046	PK

Profile: 23A0637R	Page No.: 18
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz) with Ant2	



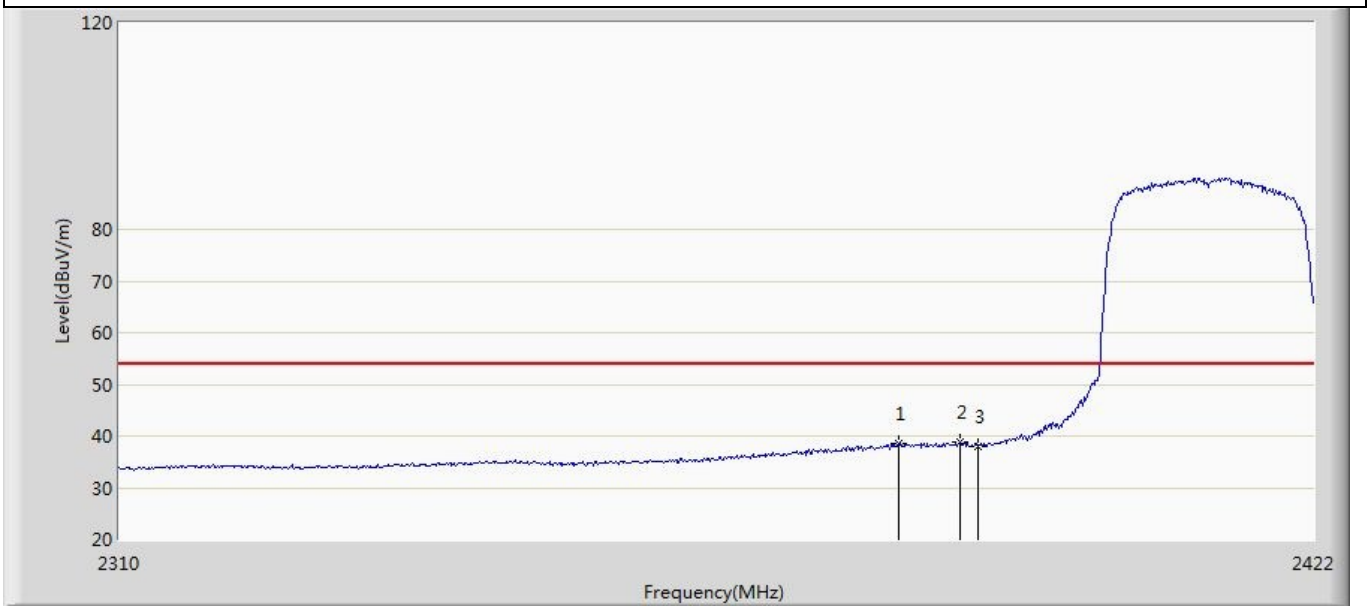
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2384.592	43.152	9.135	-10.848	54.000	34.016	AV
2		2390.000	43.152	9.106	-10.848	54.000	34.046	AV

Profile: 23A0637R	Page No.: 19
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz) with Ant2	



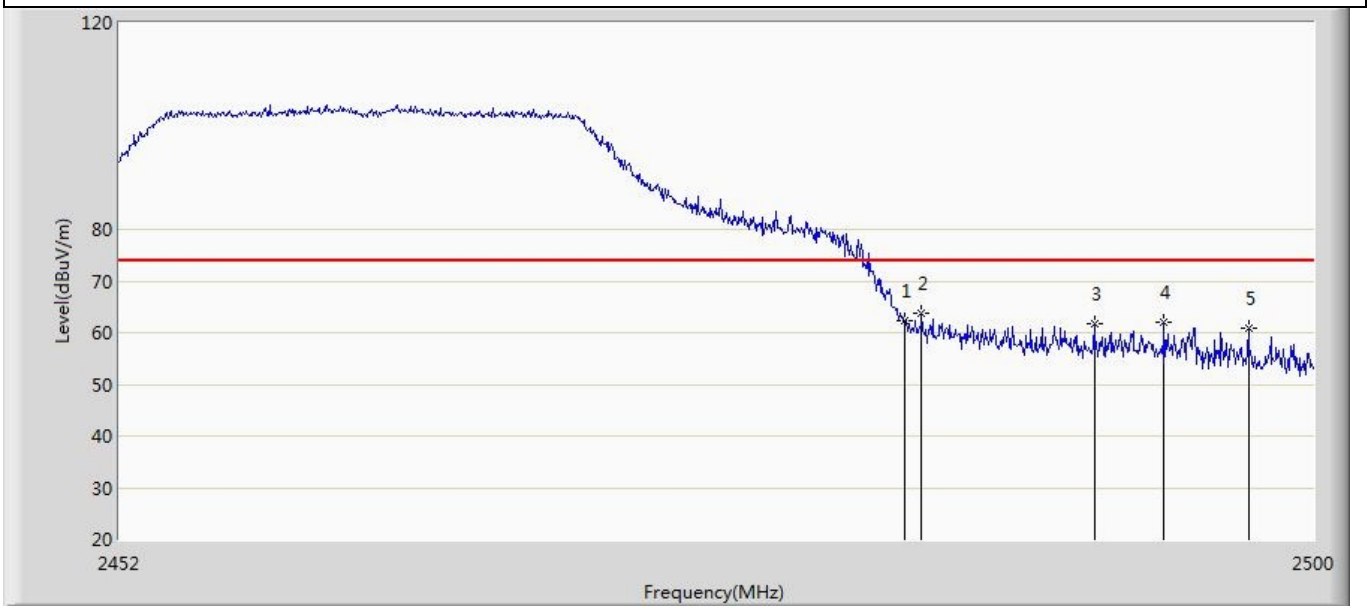
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2372.608	63.542	27.065	-10.458	74.000	36.478	PK
2	*	2384.368	67.529	31.065	-6.471	74.000	36.464	PK
3		2385.488	67.284	30.833	-6.716	74.000	36.451	PK
4		2386.720	67.425	30.988	-6.575	74.000	36.437	PK
5		2390.000	66.236	29.837	-7.764	74.000	36.399	PK

Profile: 23A0637R	Page No.: 20
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz) with Ant2	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2382.576	38.561	4.555	-15.439	54.000	34.006	AV
2	*	2388.288	38.827	4.790	-15.173	54.000	34.037	AV
3		2390.000	38.107	4.061	-15.893	54.000	34.046	AV

Profile: 23A0637R	Page No.: 21
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/11/17 - 16:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: IEEE 802.11 a/b/g/n/ac/ax 2T/2R+ Bluetooth V2.1/4.2/5.2	Power: 5 Vdc
Note: Mode 3:Transmit at 2462MHz by 802.11n(20MHz) with Ant2	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	62.286	27.780	-11.714	74.000	34.506	PK
2	*	2484.160	63.807	29.299	-10.193	74.000	34.508	PK
3		2491.120	61.810	27.287	-12.190	74.000	34.523	PK
4		2493.952	61.954	27.425	-12.046	74.000	34.530	PK
5		2497.360	60.732	26.194	-13.268	74.000	34.538	PK