Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

SRD TEST REPORT

PRODUCT	WiFi sensor
BRAND	NA
MODEL	MUGIC 2.0
APPLICANT	KIMARI, LLC
FCC ID	2BHDJ-MUGIC
ISSUE DATE	August 12, 2024
STANDARD(S)	FCC Part15C

Prepared by: ***Tao Lingyan*** **Reviewed by:** ***Yang Fan*** **Approved by:** ***Zhang Min***

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1. Summary of Test Report

1.1 Test Standard(s)

No.	Test Standard	Title	Version
1	FCC Part15C	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, 2400-2483.5MHz, and 5725-5850MHz.	--

1.2 Reference Documents

No.	Test Standard	Title	Version
1	ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
2	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for Performing Compliance Measurements on Frequency Hopping Spread Spectrum systems (DSS) Operating Under §15.247	--
Note: KDB 558074 D01 15.247 Meas Guidance v05r02 is not A2LA certified.			

1.3 Summary of Test Results

No.	Measurement Items	FCC Rules	Verdict
1	Maximum Peak Output Power	15.247(b)	Pass
2	Peak Power Spectral Density	15.247(e)	Pass
3	6dB Occupied Bandwidth	15.247(a)	Pass
4	99% Occupied Bandwidth	N/A	Pass
5	Band Edges Compliance	15.247(d)	Pass
6	Transmitter Spurious Emission-Conducted	15.247(d)	Pass
7	Transmitter Spurious Emission-Radiated	15.247/15.205/15.209	Pass
8	AC Powerline Conducted Emission	15.207	Pass
9	Antenna requirement	15.203/15.247(c)	Pass Note 2

NOTE1：
The MUGIC 2.0 manufactured by KIMARI, LLC is a new products for testing.
Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.
Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.
Note2:
2.4G WLAN used a internal PCB antenna with max Gain 3.9 dBi that complied with 15.203 Requirements.

Note3: All the test data for each data were verified, but only the worst case was reported.

1.4 Data Provided by Applicant

No.	Item(s)	Data
1	Antenna gain of EUT	3.9 dBi
Note: The data of antenna gain is provided by the Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.		

2. General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4，No. 766，Jingang Road，Pudong，Shanghai，China
Telephone	021-68866880
FCC Registration No.	708870
FCC Designation No.	CN1364

2.2 Laboratory Environmental Requirements

Temperature	15°C~35°C
Relative Humidity	86kPa~106kPa
Atmospheric Pressure	86kPa~106kPa

2.3 Project Information

Project Manager	Zhang Heng
Test Date	June 25, 2024 to July 09, 2024

3. General Information of The Customer

3.1 Applicant

Company	KIMARI, LLC
Address	13 Misty Meadows, Irvine CA 92612 USA
Telephone	+33625028368

3.2 Manufacturer

Company	KIMARI, LLC
Address	13 Misty Meadows, Irvine CA 92612 USA
Telephone	+33625028368

4. General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product Name	WiFi sensor
Model name	MUGIC 2.0
Date of Receipt	S01aa/S04aa: June 25,2024
EUT ID*	S01aa/S04aa
SN/IMEI	S01aa/S04aa: NA
Supported Radio Technology and Bands	WLAN 802.11b,g,n BLE
Hardware Version	P2
Software Version	MU218 v1.1.4
FCC ID	2BHDJ-MUGIC
Power supply	DC 3.7V from Battery & DC 5V from Adapter
NOTE1：EUT ID is the internal identification code of the laboratory. NOTE2: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

4.2 Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
CA06	Adapter	ASUC65a-050100	Shenzhen Aquilstar TechnologyCo.,Ltd.INPUT: 100-240V~50/60Hz 0.35AOUTPUT: 5V 1A
UA06	AC Cable	N/A	N/A
AE1	Notebook PC	ThinkPad X1 Carbon	N/A
AE2	Software	ESP32	N/A
AE3	PC Adapter	ADLX65NCC3A	N/A
NOTE1: AE ID is the internal identification code of the laboratory.			

4.3 Additional Information

WLAN Frequency	2412MHz-2462MHz
WLAN Channel	CH1-11
WLAN type of modulation	802.11b: DSSS 802.11g/n: OFDM

Test frequency list:

BW_20M	Channel	1	6	11
	Freq. (MHz)	2412	2437	2462

Note: This report is for 2.4G WLAN only.

4.4 Emissions Information WIFI2.4G

Test Mode	Frequency Min(MHz)	Frequency Max(MHz)	Max OutPut Power EIRP(dBm)	Max OutPut Power EIRP(W)	OBW (KHz)	Necessary Bandwidth & Emission Classification
11B	2412	2462	20.62	0.1153	13240	13M2D1D
11G	2412	2462	20.65	0.1161	17920	17M9D1D
11N20	2412	2462	18.38	0.0689	17600	17M6D1D

5. Test Configuration Information

5.1 Laboratory Environmental Conditions

5.1.1 Permanent Facilities

Relative Humidity	Min. = 45 %, Max. = 55 %		
Atmospheric Pressure	101kPa		
Temperature	Normal	Minimum	Maximum
	25℃	-20℃	60℃
Working Voltage of EUT	Normal	Minimum	Maximum
	3.7V	3.3V	5.5V

5.2 Test Equipments Utilized

5.2.1 Conducted Test System

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Test Software	TS1120	10727	V3.2.22	N/A	Tonscend	N/A	N/A
2	Automatic control unit	JS0806-2	2218060623	N/A	N/A	Tonscend	2024-03-25	1 Year
3	Wireless communication comprehensive tester	CMW500	164865	V3.8.12	N/A	R&S	2023-07-26	1 Year
4	Spectrum Analyzer	FSQ40	200063	V4.75	N/A	R&S	2023-10-16	1 Year
5	Analog Signal Generator	SMF	104770	V3.0.13.0-2.20.530.15.4	N/A	R&S	2023-10-16	1 year
6	Vector Signal Generator	SMCV100B	103691	V5.00.122.24	N/A	R&S	2023-07-27	1 Year
7	Programmable Power Supply	Keithley 2303	4039070	N/A	N/A	Keithley	2024-06-07	1 Year
8	Temperature box	B-TF-107C	BTF107C-201804107	N/A	N/A	Boyi	2024-06-07	1 Year
9	Network test unit AP	GT-AXE11000	N2IG0X401637KWF	V3.0.0.4.386_45940	N/A	ASUS	N/A	N/A
10	Vector Signal Generator	SMBV100A	257904	V4.15.125.49	N/A	R&S	2023-10-16	1 Year

5.2.2 Radiated Emission Test System

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123126	V5.2.1	B12	R&S	2023-10-16	1 Year
2	Universal Radio Communication Tester	CMW500	104178	V3.7.20	1206.0600.00	R&S	2023-10-16	1 Year
3	EMI Test Receiver	ESU40	100307	V5.1-24-3	01	R&S	2023-12-19	1 Year
4	Trilog Antenna	VULB9162	00426	N/A	N/A	Schwarzbeck	2023-07-18	1 year
5	Double Ridged Guide Antenna	ETS-3117	00135885	N/A	N/A	ETS	2023-03-23	2 years
6	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
7	Horn Antenna	3160-09	LM6321	N/A	N/A	R&S	2023-07-16	1 Year
8	Horn Antenna	3160-10	LM5942	N/A	N/A	R&S	2023-07-16	1 Year
9	Loop Antenna	AL-130R	121083	N/A	N/A	COM-POWER	2023-9-13	1 Year
10	Preamplifier	SCU08F1	8320024	N/A	N/A	R&S	2023-10-16	1 Year
11	Preamplifier	SCU18	10155	N/A	N/A	R&S	2023-10-16	1 Year
12	Preamplifier	SCU26	10025	N/A	N/A	R&S	2023-10-16	1 Year
13	Preamplifier	SCU40	10020	N/A	N/A	R&S	2023-10-16	1 Year
14	2-Line V-Network	ENV216	101380	N/A	N/A	R&S	2023-12-19	1 Year
15	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
16	Test Receiver	ESCI	101235	V5.1-24-3	0	R&S	2023-12-19	1 Year
17	Antenna Tower	TPMDC-LF	N/A	N/A	N/A	Top Precision	N/A	N/A
18	Antenna Tower	TPMDC-HF	N/A	N/A	N/A	Top Precision	N/A	N/A

5.2.3 Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω
Temperature	Min. = 15 ℃, Max. = 35 ℃

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (9.8 meters×6.7 meters×6.7 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz

5.3 Measurement Uncertainty

Measurement Uncertainty of Conduction test

Item(s)	Frequency range	Confidence Level	Uncertainty
DTS Bandwidth	2400–2483.5MHz	95%	±1.9%
Maximum Conducted Output Power	2400–2483.5MHz	95%	± 1.18 dB
Maximum Power Spectral Density Level	2400–2483.5MHz	95%	±0.98 dB
Band-edge Compliance	2400–2483.5MHz	95%	±1.21dB
Unwanted Emissions In Non-restricted Freq Bands	9kHz-7GHz	95%	9kHz-7GHz:±1.21dB

	7GHz-40GHz	95%	7GHz-40GHz:±3.31dB

Measurement Uncertainty of Radiation test

Measurement Items	Uncertainty(dB)
Radiated Emission 30MHz-1000MHz	±5.10
Radiated Emission 1000MHz-18000MHz	±5.66
Radiated Emission 18000MHz-40000MHz	±5.22
AC Powerline Conducted Emission	±4.38
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

6 Test Results

6.2 Duty cycle

6.2.1 Measurement Limit

Standard	Limit (dBm)
FCC 47 Part 15.247(b)	NA

6.2.2 Test Procedure

This measurement is according to ANSI C63.10 clause 11.6

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

1) Set the center frequency of the instrument to the center frequency of the transmission.

2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

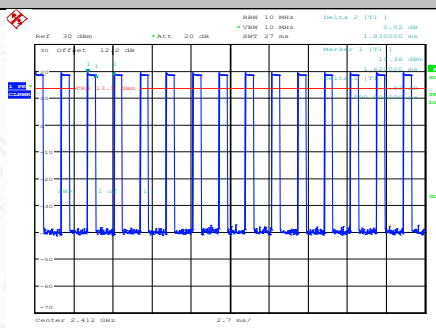
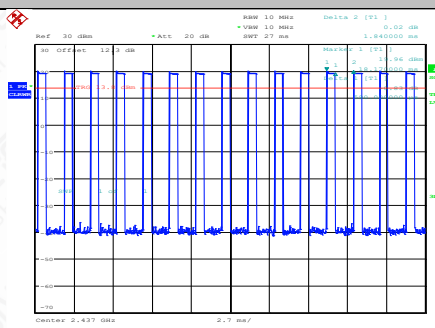
3) Set VBW ≥ RBW. Set detector = peak or average.

4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 μs.)

6.2.3 Measurement Results

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
11B	Ant1	2412	0.59	1.83	32.24	4.92
11B	Ant1	2437	0.59	1.84	32.07	4.94
11B	Ant1	2462	0.57	1.81	31.49	5.02
11G	Ant1	2412	0.56	1.81	30.94	5.09
11G	Ant1	2437	0.56	1.81	30.94	5.09
11G	Ant1	2462	0.57	1.81	31.49	5.02
11N20SISO	Ant1	2412	0.54	1.78	30.34	5.18
11N20SISO	Ant1	2437	0.54	1.78	30.34	5.18
11N20SISO	Ant1	2462	0.54	1.78	30.34	5.18

Test Graphs

NTNV-11B-Ant1-2412	NTNV-11B-Ant1-2437
	
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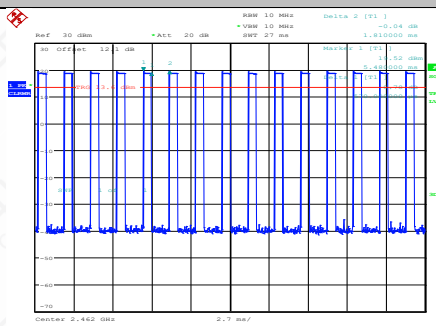
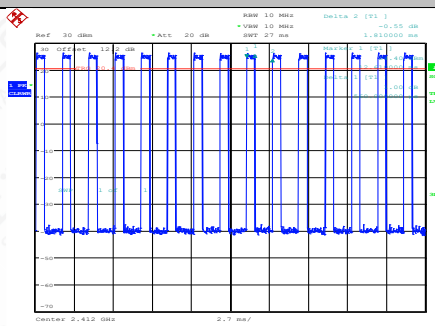
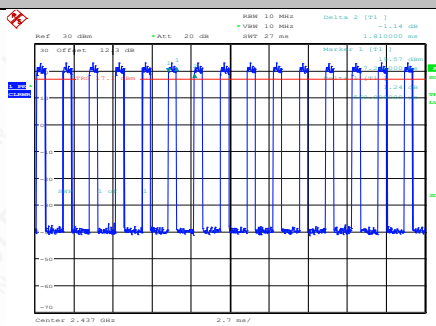
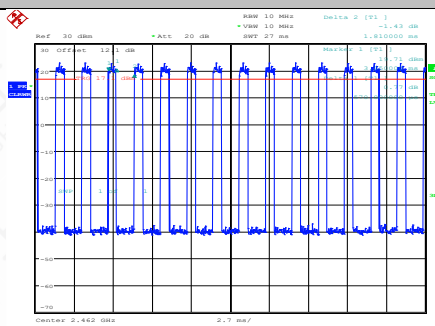
	
NTNV-11G-Ant1-2437	NTNV-11G-Ant1-2462
	
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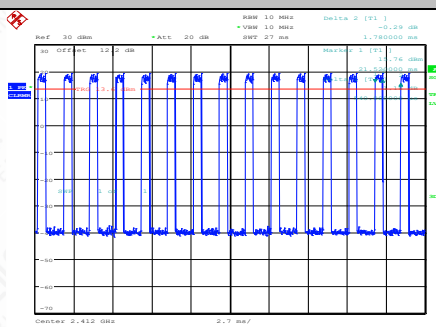	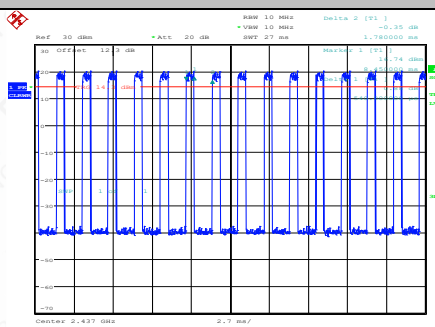

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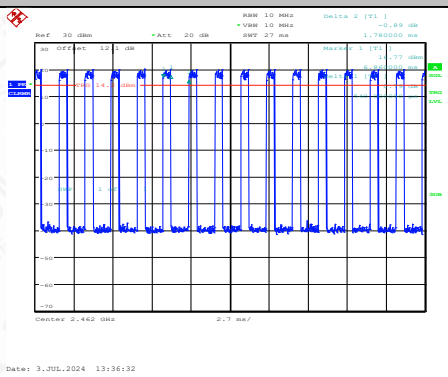
	/

6.3 Output Power-Conducted

6.3.1 Measurement Limit

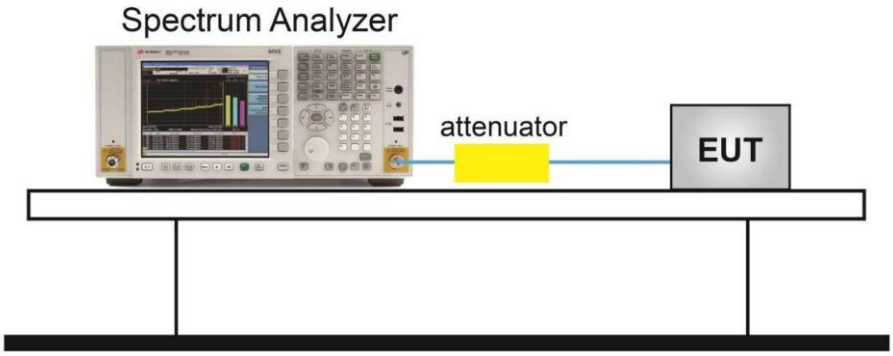
Standard	Limit (dBm)
FCC 47 Part 15.247(b)(3)	<30
Note: Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	

6.3.2 Test Procedure

The measurement is according to ANSI C63.10 clause 11.9.

1. Measure the duty cycle D of the transmitter output signal as described in 11.6.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
4. Set VBW ≥ [3 × RBW].
5. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
8. Do not use sweep triggering. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
10. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.

6.3.3 Test setup



6.3.4 Measurement Results

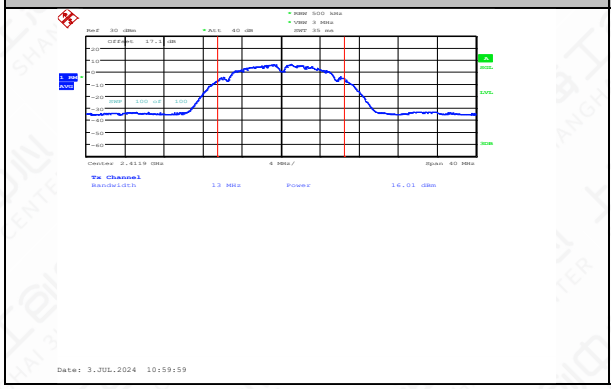
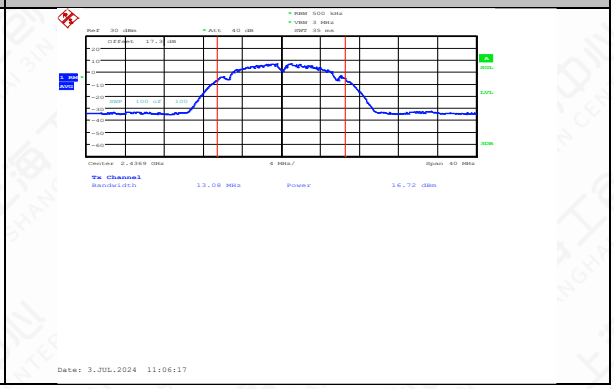
TestMode	Antenna	Frequency [MHz]	Conducted Output Power [dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	16.01	≤30.00	PASS
11B	Ant1	2437	16.72	≤30.00	PASS
11B	Ant1	2462	16.46	≤30.00	PASS
11G	Ant1	2412	16.40	≤30.00	PASS
11G	Ant1	2437	16.75	≤30.00	PASS
11G	Ant1	2462	16.49	≤30.00	PASS
11N20SISO	Ant1	2412	13.86	≤30.00	PASS
11N20SISO	Ant1	2437	14.48	≤30.00	PASS
11N20SISO	Ant1	2462	14.27	≤30.00	PASS

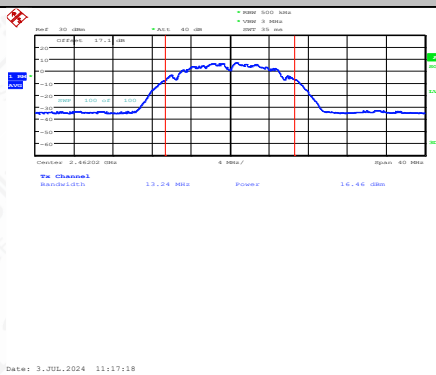
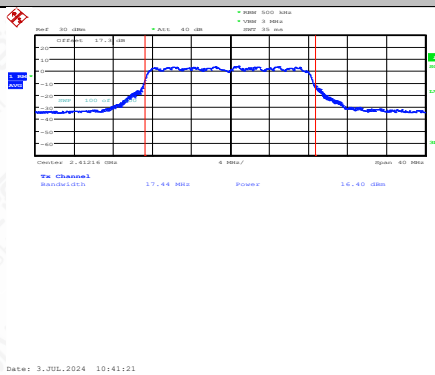
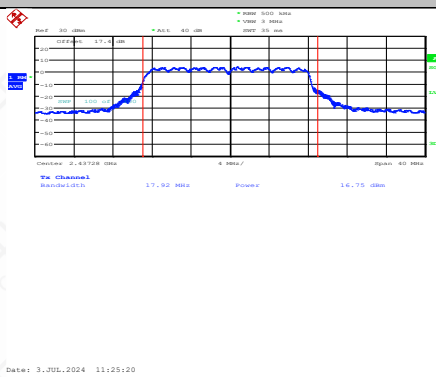
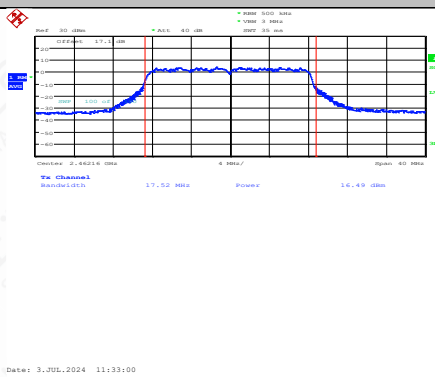
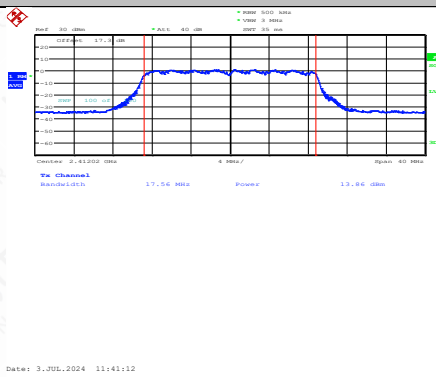
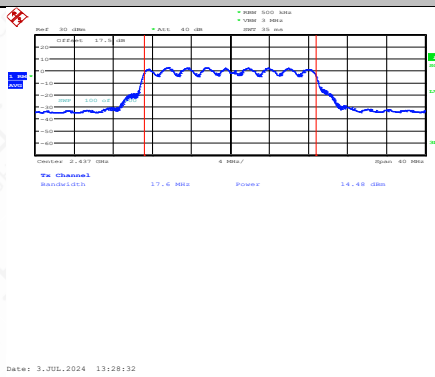
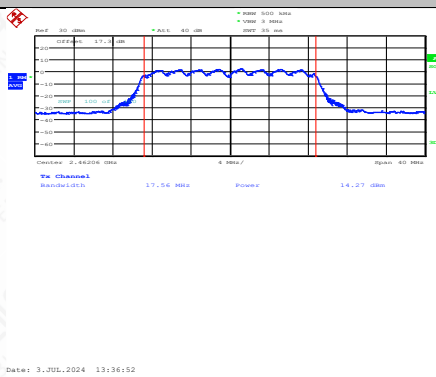
Note：

1.The Duty Cycle Factor is compensated in the graph.

2. In the graph, the Center frequency = (Low frequency of 99% OBW + High frequency of 99% OBW) /2.

Test Graphs Peak

11B-Ant1-2412-PASS	11B-Ant1-2437-PASS
	

11B-Ant1-2462-PASS	11G-Ant1-2412-PASS
	
11G-Ant1-2437-PASS	11G-Ant1-2462-PASS
	
11N20SISO-Ant1-2412-PASS	11N20SISO-Ant1-2437-PASS
	
11N20SISO-Ant1-2462-PASS	/
	/

6.4 Peak Power Spectral Density

6.4.1 Measurement Limit

Standard	Limit
FCC 47 Part 15.247(e)	≤ 8dBm/3 KHz

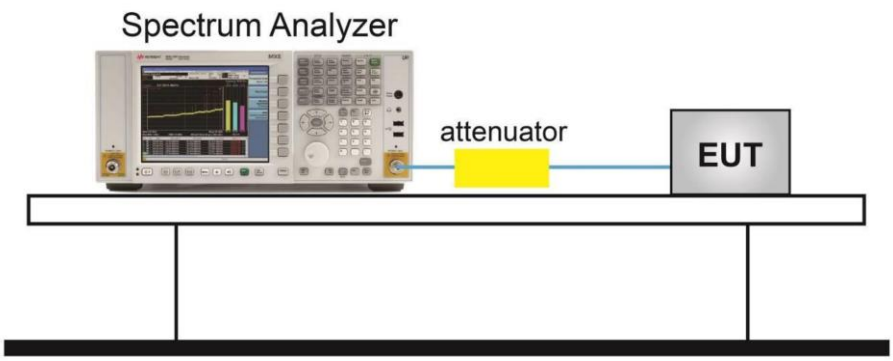
6.4.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.

1. Measure the duty cycle (D) of the transmitter output signal as described in 11.6.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
5. Set VBW ≥ [3 × RBW].
6. Detector = power averaging (rms) or sample detector (when rms not available).
7. Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
8. Sweep time = auto couple.
9. Do not use sweep triggering; allow sweep to “free run.”
10. Employ trace averaging (rms) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
13. If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

6.4.3 Test setup



6.4.4 Measurement Result

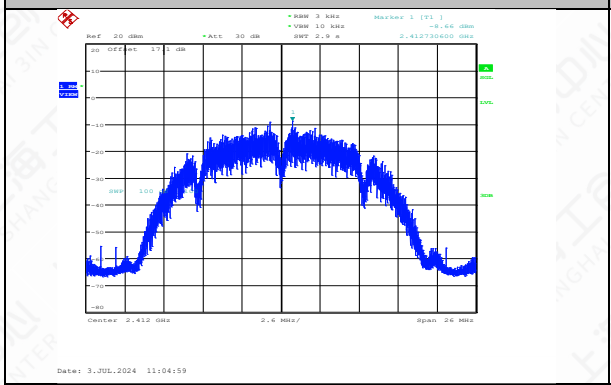
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-8.66	≤8.00	PASS
11B	Ant1	2437	-9.78	≤8.00	PASS
11B	Ant1	2462	-10.45	≤8.00	PASS
11G	Ant1	2412	-13.32	≤8.00	PASS
11G	Ant1	2437	-12.84	≤8.00	PASS
11G	Ant1	2462	-13.75	≤8.00	PASS
11N20SISO	Ant1	2412	-15.69	≤8.00	PASS
11N20SISO	Ant1	2437	-14.56	≤8.00	PASS
11N20SISO	Ant1	2462	-14.71	≤8.00	PASS

Note：

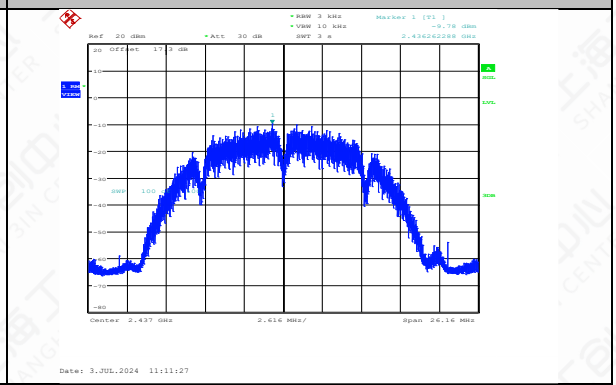
1.The Duty Cycle Factor is compensated in the graph.

Test Graphs

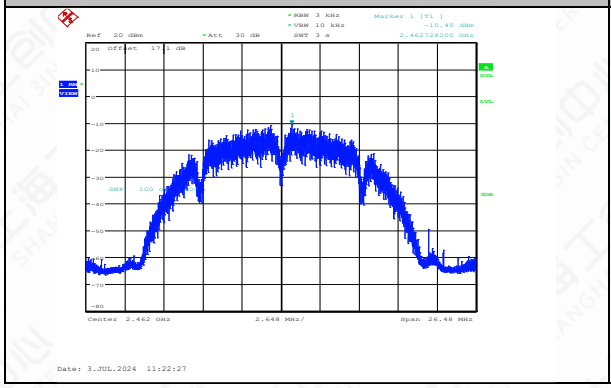
11B-Ant1-2412-PASS



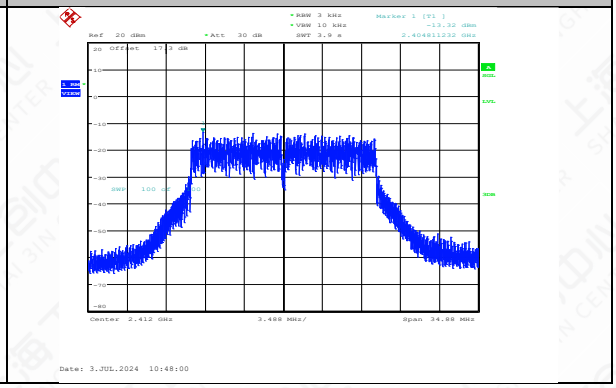
11B-Ant1-2437-PASS

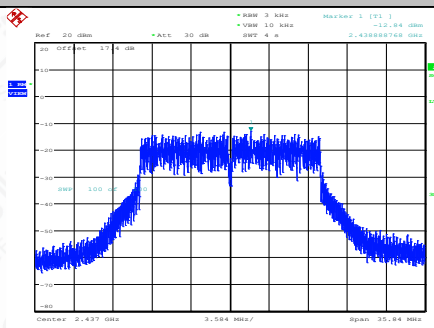
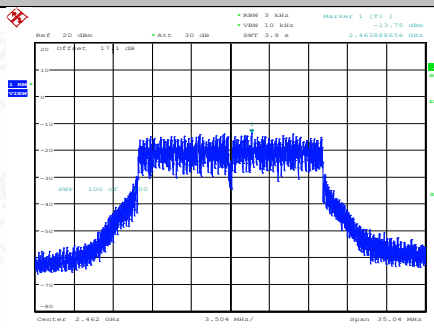
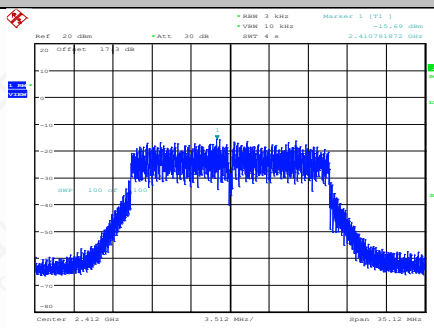
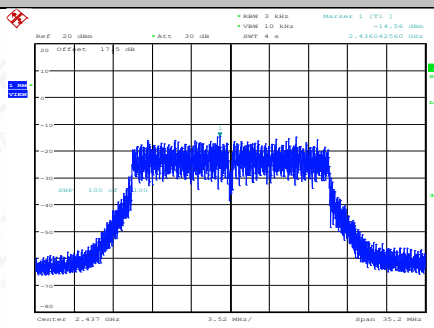
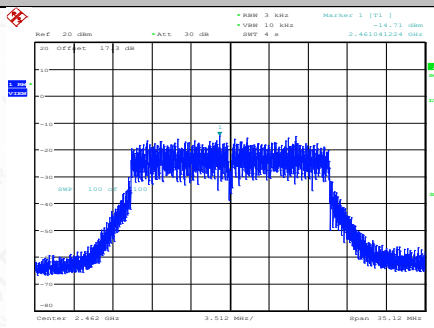


11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



11G-Ant1-2437-PASS	11G-Ant1-2462-PASS
	
11N20SISO-Ant1-2412-PASS	11N20SISO-Ant1-2437-PASS
	
11N20SISO-Ant1-2462-PASS	/
	/

6.5 Occupied 6dB Bandwidth

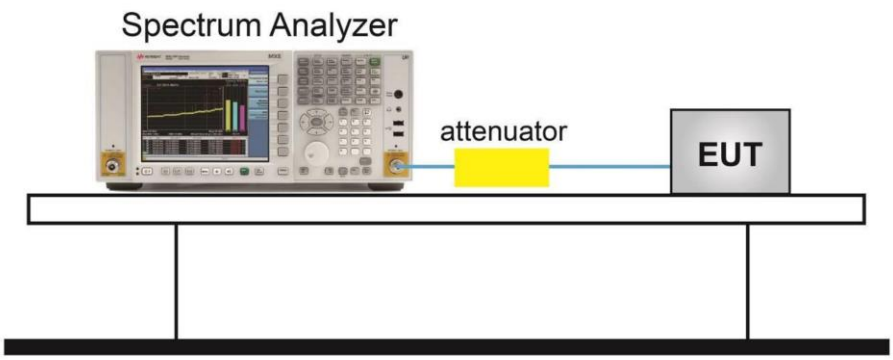
6.5.1 Measurement Limt

Standard	Limit(KHz)
FCC 47 Part 15.247(a) (2)	≥500KHz

6.5.2 Test procedures

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW = 100 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. 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.

6.5.3 Test Setup

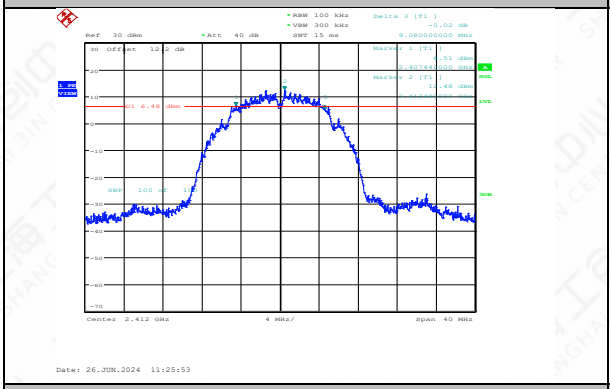


6.5.4 Measurement Results

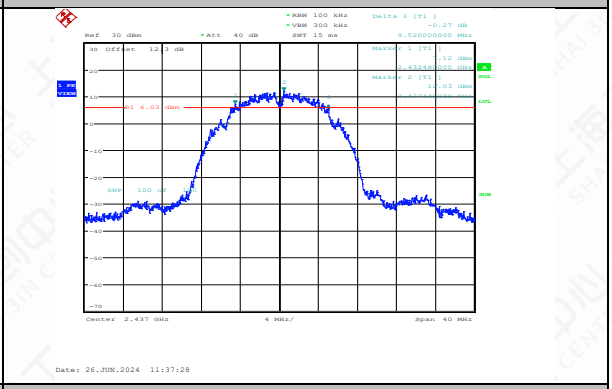
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.08	2407.44	2416.52	0.5	PASS
11B	Ant1	2437	9.52	2432.48	2442.00	0.5	PASS
11B	Ant1	2462	9.12	2457.44	2466.56	0.5	PASS
11G	Ant1	2412	16.08	2404.04	2420.12	0.5	PASS
11G	Ant1	2437	16.28	2428.84	2445.12	0.5	PASS
11G	Ant1	2462	16.08	2453.84	2469.92	0.5	PASS
11N20SISO	Ant1	2412	16.52	2403.60	2420.12	0.5	PASS
11N20SISO	Ant1	2437	16.32	2428.84	2445.16	0.5	PASS
11N20SISO	Ant1	2462	16.32	2453.84	2470.16	0.5	PASS

Test graphs as below

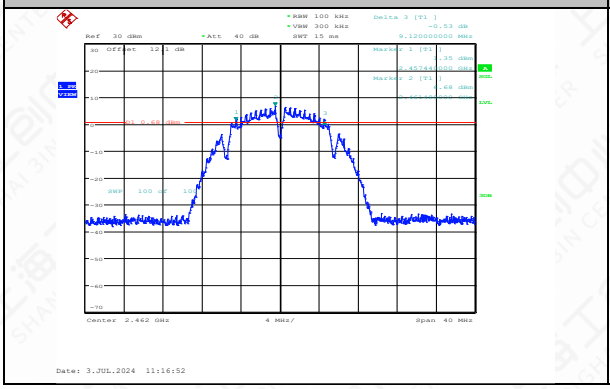
11B-Ant1-2412-PASS



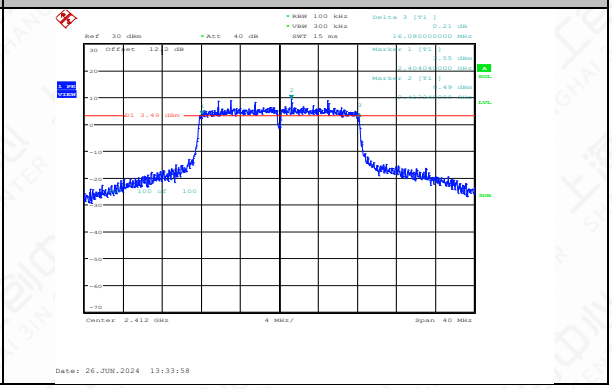
11B-Ant1-2437-PASS

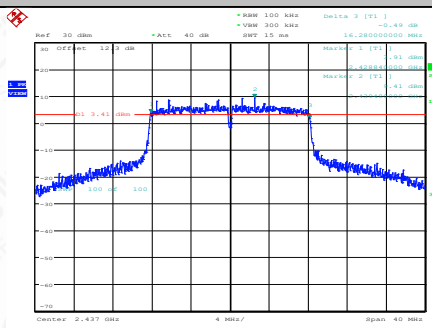
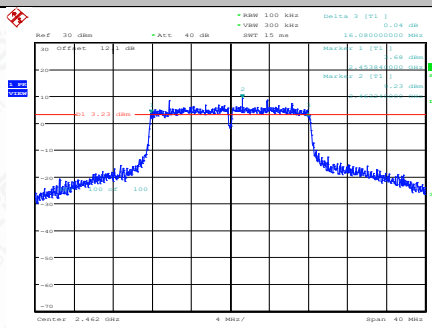
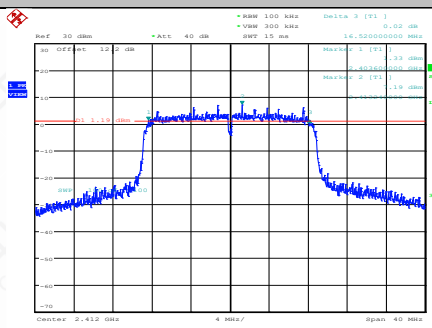
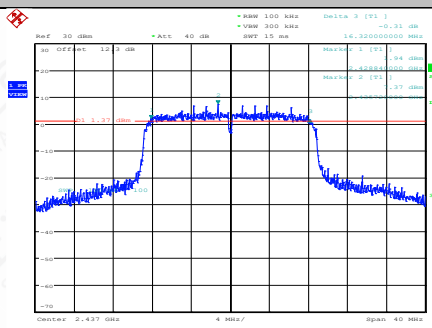
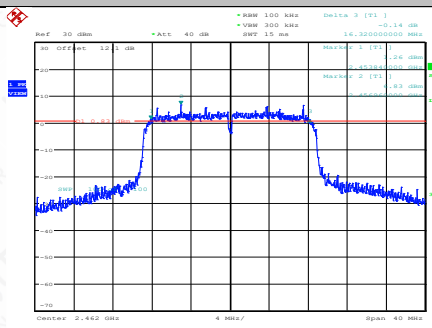


11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



11G-Ant1-2437-PASS	11G-Ant1-2462-PASS
	
11N20SISO-Ant1-2412-PASS	11N20SISO-Ant1-2437-PASS
	
11N20SISO-Ant1-2462-PASS	/
	/

6.6 99% Occupied Bandwidth

6.6.1 Measurement Limit

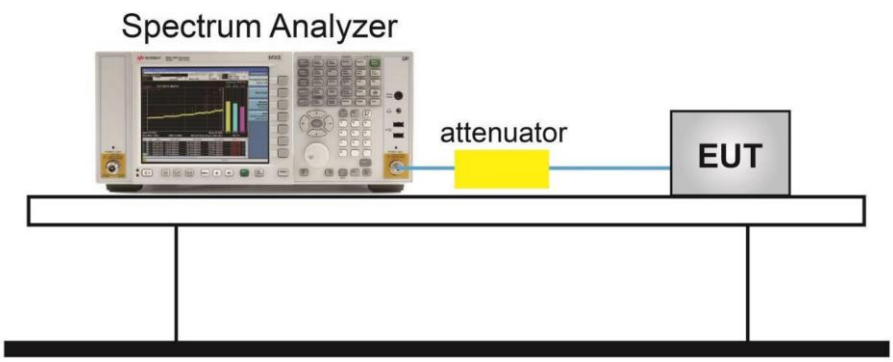
Standard	Limit
N/A	N/A

6.6.2 Test procedures

The measurement is according to ANSI C63.10 clause 6.9.3.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW shall be in the range of 1% to 5% of the OBW.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

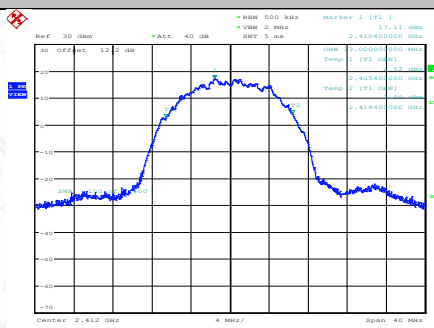
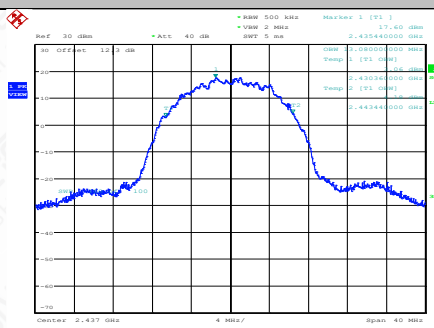
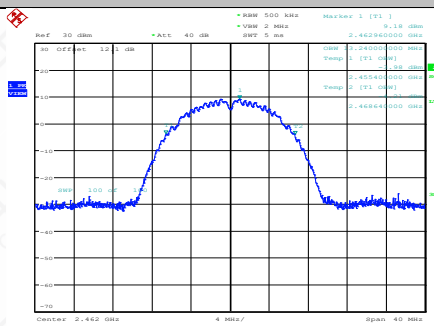
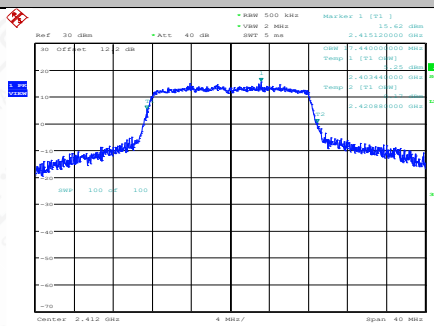
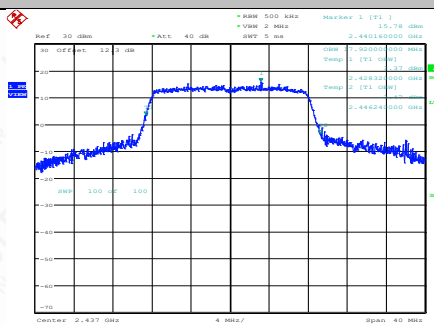
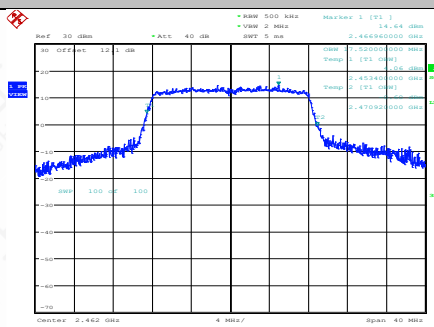
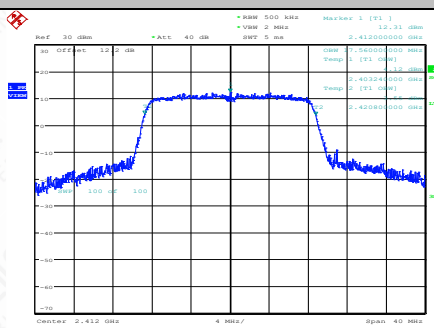
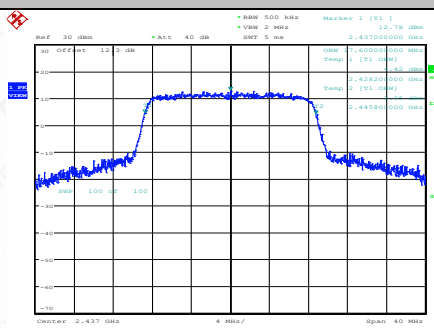
6.6.3 Test setup

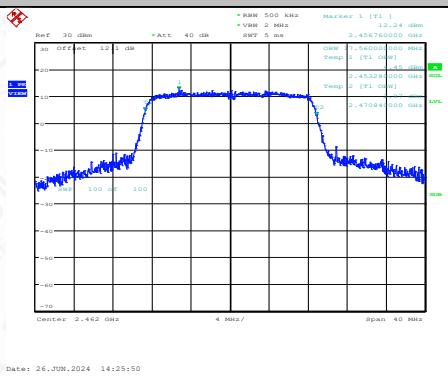


6.6.4 Measurement Result

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13	2405.4000	2418.4000	---	---
11B	Ant1	2437	13.08	2430.3600	2443.4400	---	---
11B	Ant1	2462	13.24	2455.4000	2468.6400	---	---
11G	Ant1	2412	17.44	2403.4400	2420.8800	---	---
11G	Ant1	2437	17.92	2428.3200	2446.2400	---	---
11G	Ant1	2462	17.52	2453.4000	2470.9200	---	---
11N20SISO	Ant1	2412	17.56	2403.2400	2420.8000	---	---
11N20SISO	Ant1	2437	17.6	2428.2000	2445.8000	---	---
11N20SISO	Ant1	2462	17.56	2453.2800	2470.8400	---	---

graphs as below

11B-Ant1-2412	11B-Ant1-2437
	
11B-Ant1-2462	11G-Ant1-2412
	
11G-Ant1-2437	11G-Ant1-2462
	
11N20SISO-Ant1-2412	11N20SISO-Ant1-2437
	

11N20SISO-Ant1-2462	/
	/

6.7 Band Edges Compliance

6.7.1 Measurement limt

Standard	Limit(dBc)
FCC 47 Part 15.247(d)	>30

6.7.2 Test procedures

The measurement is according to ANSI C63.10 clause11.11.

The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement. Enable EUT transmitter maximum power continuously.

Reference level measurement

1. Set instrument center frequency to DTS channel center frequency.
2. Set the span to ≥ 1.5 times the DTS bandwidth.
3. Set the RBW = 100 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum PSD level.

Emission level measurement

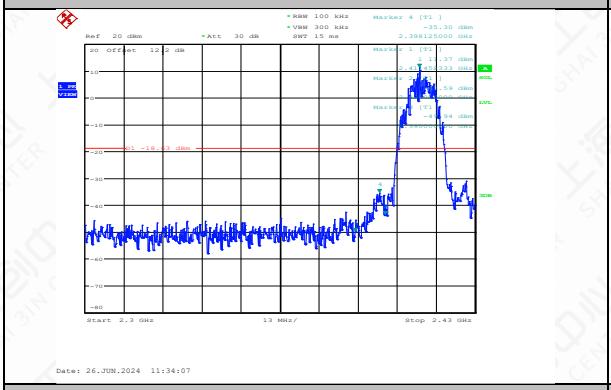
1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ [3 × RBW].
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

6.7.3 Measurement results

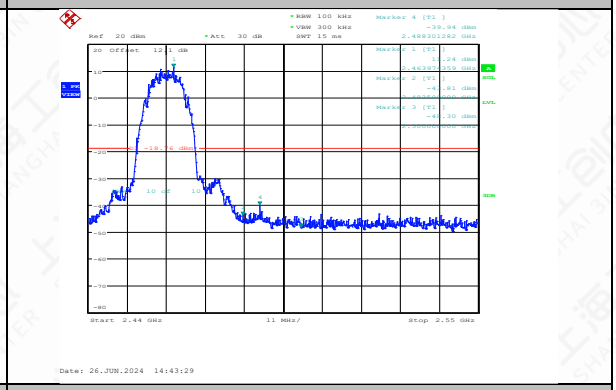
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	11.37	-35.3	≤-18.63	PASS
11B	Ant1	High	2462	11.24	-39.94	≤-18.76	PASS
11G	Ant1	Low	2412	3.50	-32.74	≤-26.5	PASS
11G	Ant1	High	2462	5.58	-31.05	≤-24.42	PASS
11N20SISO	Ant1	Low	2412	3.42	-26.76	≤-26.58	PASS
11N20SISO	Ant1	High	2462	3.66	-33.87	≤-26.34	PASS

Test Graphs

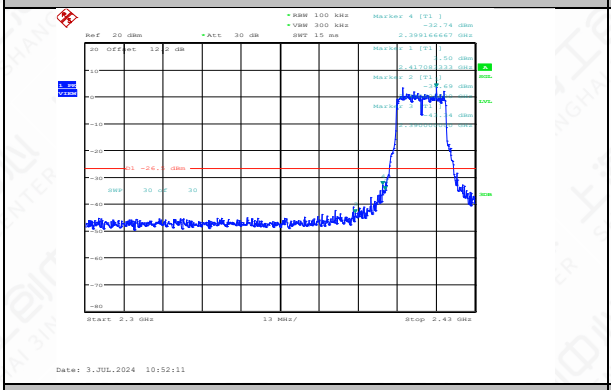
11B-Ant1-2412-PASS



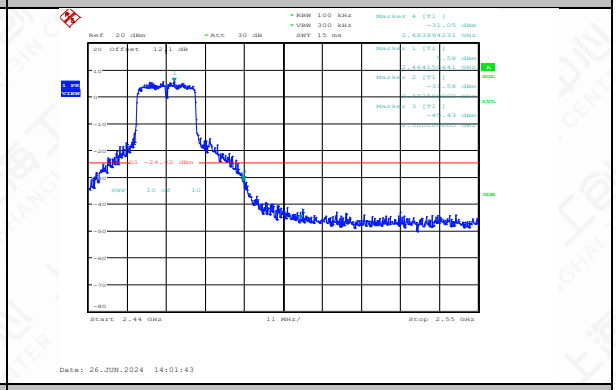
11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



11G-Ant1-2462-PASS



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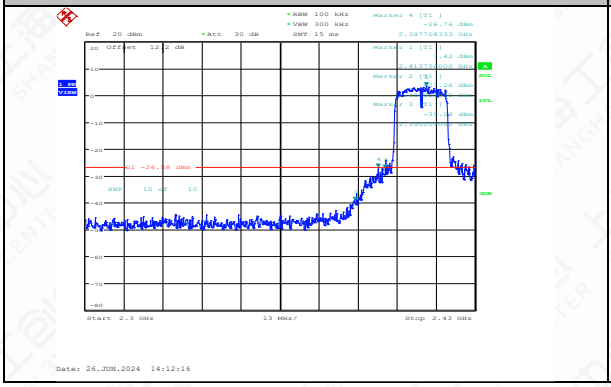
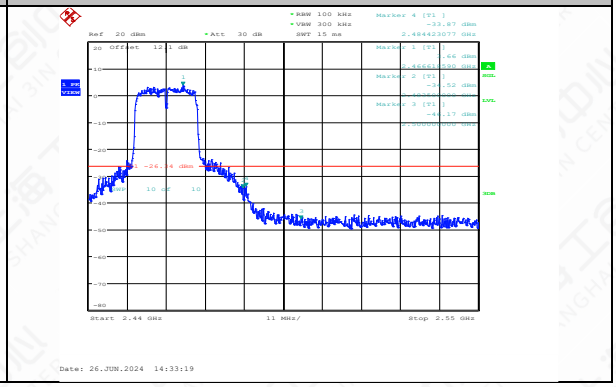


11N20SISO-Ant1-2462-PASS



6.8 Transmitter Spurious Emission-conducted

6.8.1 Measurement Limit

Standard	Limit
FCC 47 Part 15.247(d)	30dB below highest level power in 100KHz bandwidth

6.8.2 Test procedures

This measurement is according to ANSI C63.10 clause 11.11.

The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.

Enable EUT transmitter maximum power continuously.

Reference level measurement

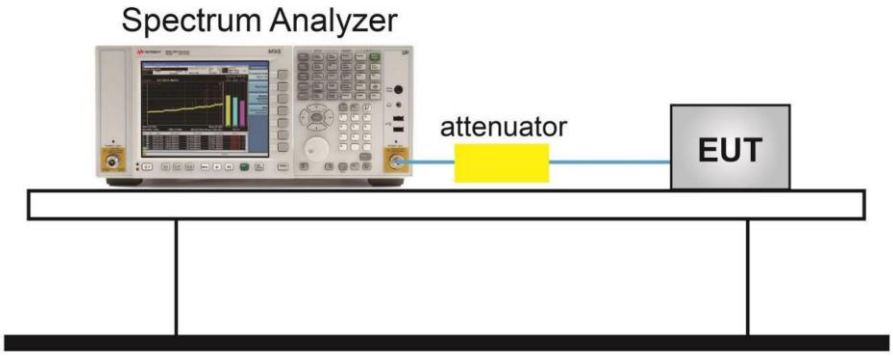
1. Set instrument center frequency to DTS channel center frequency.
2. Set the span to ≥ 1.5 times the DTS bandwidth.
3. Set the RBW = 100 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum PSD level.

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ [3 × RBW].
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

Note: Not recorded emission from 9 KHz to 30 MHz as emission level at least 20dBc lower than emission limit.

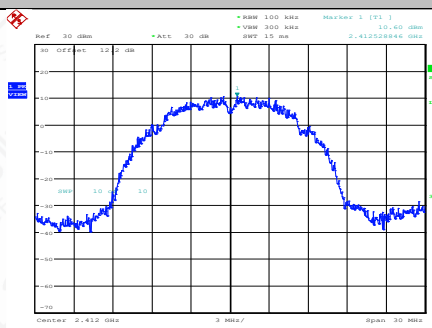
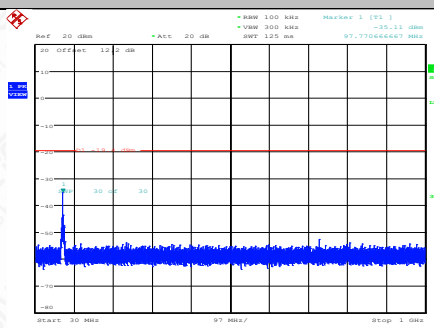
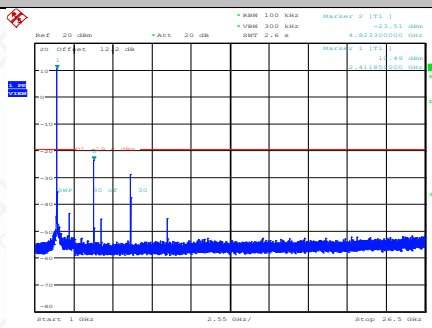
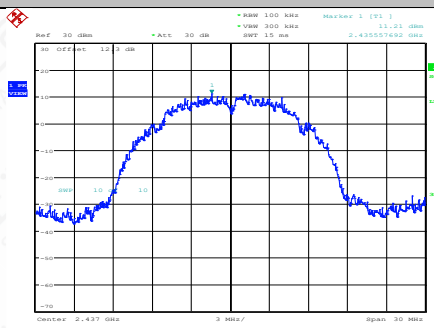
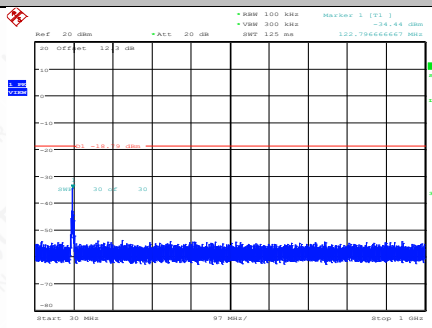
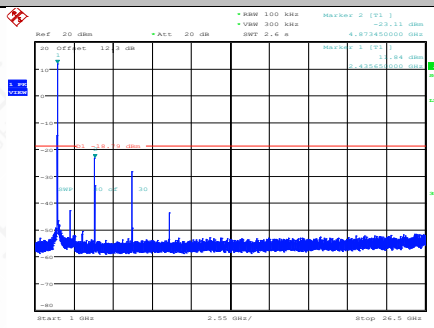
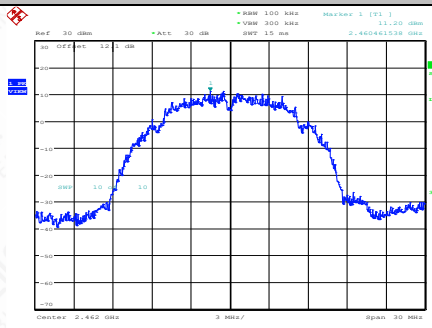
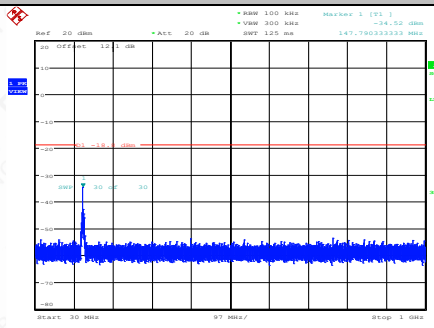
6.8.3 Test Setup



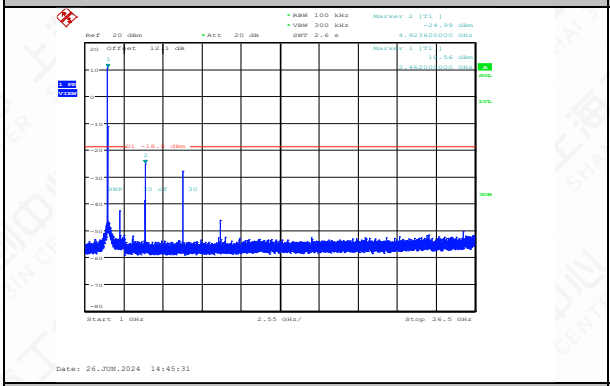
6.8.4 Measurement Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	0~Reference	10.60	10.60	---	PASS
11B	Ant1	2412	30~1000	10.60	-35.11	≤-19.4	PASS
11B	Ant1	2412	1000~26500	10.60	-23.51	≤-19.4	PASS
11B	Ant1	2437	0~Reference	11.21	11.21	---	PASS
11B	Ant1	2437	30~1000	11.21	-34.44	≤-18.79	PASS
11B	Ant1	2437	1000~26500	11.21	-23.11	≤-18.79	PASS
11B	Ant1	2462	0~Reference	11.20	11.20	---	PASS
11B	Ant1	2462	30~1000	11.20	-34.52	≤-18.8	PASS
11B	Ant1	2462	1000~26500	11.20	-24.99	≤-18.8	PASS
11G	Ant1	2412	0~Reference	6.49	6.49	---	PASS
11G	Ant1	2412	30~1000	6.49	-41.22	≤-23.51	PASS
11G	Ant1	2412	1000~26500	6.49	-29.38	≤-23.51	PASS
11G	Ant1	2437	0~Reference	7.80	7.80	---	PASS
11G	Ant1	2437	30~1000	7.80	-39.74	≤-22.2	PASS
11G	Ant1	2437	1000~26500	7.80	-29.11	≤-22.2	PASS
11G	Ant1	2462	0~Reference	7.77	7.77	---	PASS
11G	Ant1	2462	30~1000	7.77	-41.18	≤-22.23	PASS
11G	Ant1	2462	1000~26500	7.77	-29.74	≤-22.23	PASS
11N20SISO	Ant1	2412	0~Reference	6.95	6.95	---	PASS
11N20SISO	Ant1	2412	30~1000	6.95	-44.66	≤-23.05	PASS
11N20SISO	Ant1	2412	1000~26500	6.95	-33.2	≤-23.05	PASS
11N20SISO	Ant1	2437	0~Reference	5.67	5.67	---	PASS
11N20SISO	Ant1	2437	30~1000	5.67	-44.51	≤-24.33	PASS
11N20SISO	Ant1	2437	1000~26500	5.67	-32.15	≤-24.33	PASS
11N20SISO	Ant1	2462	0~Reference	5.90	5.90	---	PASS
11N20SISO	Ant1	2462	30~1000	5.90	-43.6	≤-24.1	PASS
11N20SISO	Ant1	2462	1000~26500	5.90	-33.52	≤-24.1	PASS

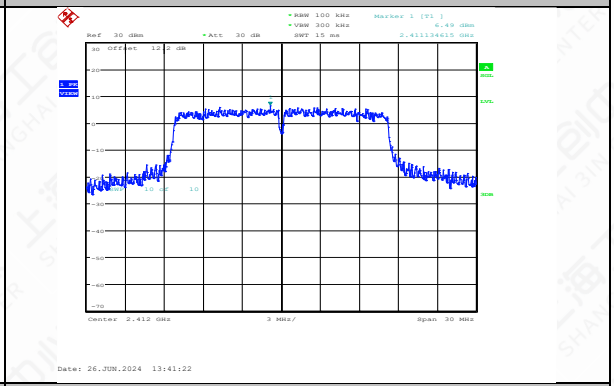
Test Graphs

11B-Ant1-2412-0~Reference-PASS	11B-Ant1-2412-30~1000-PASS
	
11B-Ant1-2412-1000~26500-PASS	11B-Ant1-2437-0~Reference-PASS
	
11B-Ant1-2437-30~1000-PASS	11B-Ant1-2437-1000~26500-PASS
	
11B-Ant1-2462-0~Reference-PASS	11B-Ant1-2462-30~1000-PASS
	

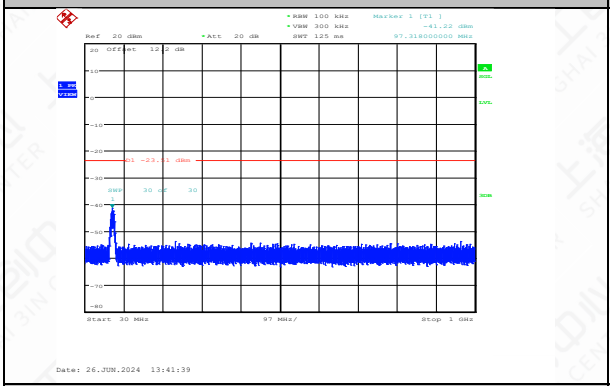
11B-Ant1-2462-1000~26500-PASS



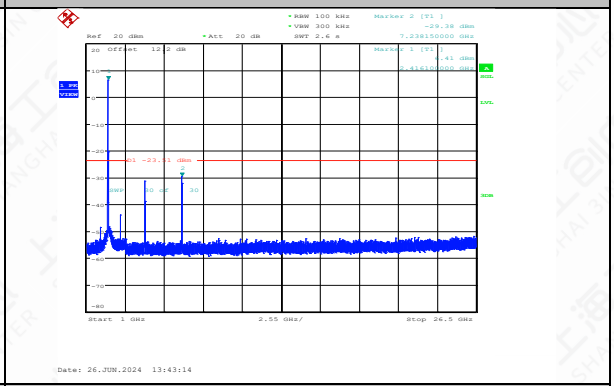
11G-Ant1-2412-0~Reference-PASS



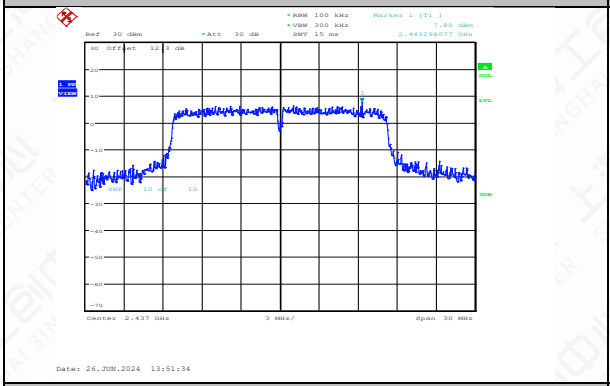
11G-Ant1-2412-30~1000-PASS



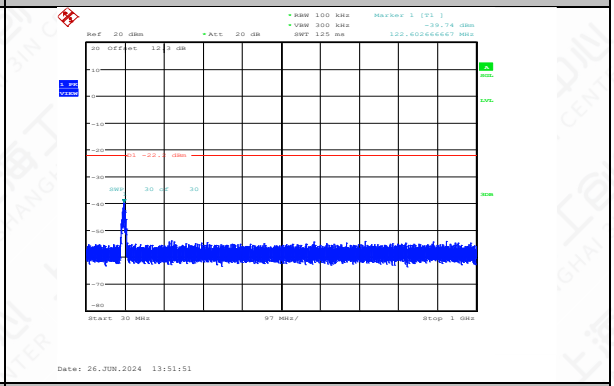
11G-Ant1-2412-1000~26500-PASS



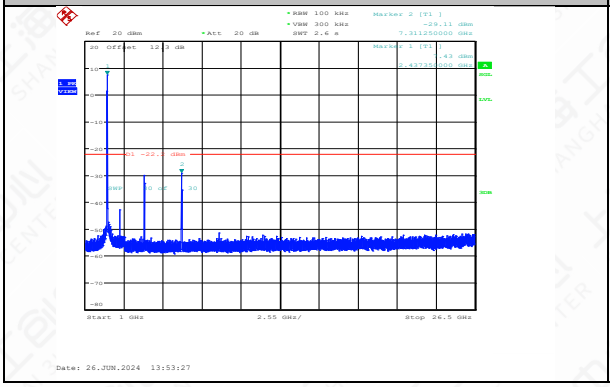
11G-Ant1-2437-0~Reference-PASS



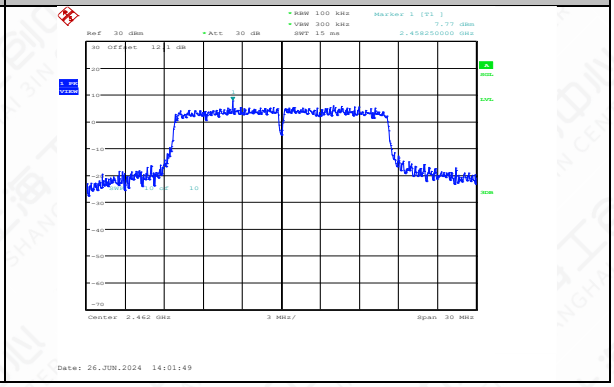
11G-Ant1-2437-30~1000-PASS

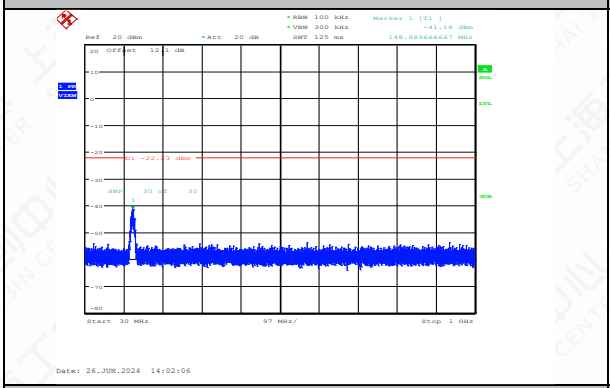
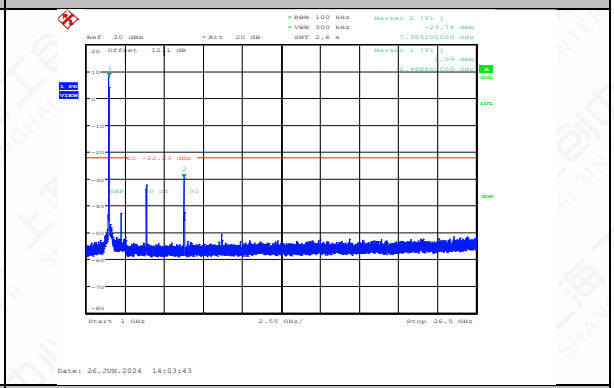


11G-Ant1-2437-1000~26500-PASS



11G-Ant1-2462-0~Reference-PASS



11G-Ant1-2462-30~1000-PASS	11G-Ant1-2462-1000~26500-PASS
	
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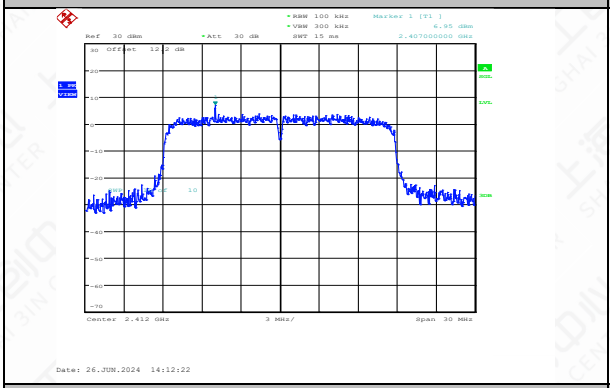	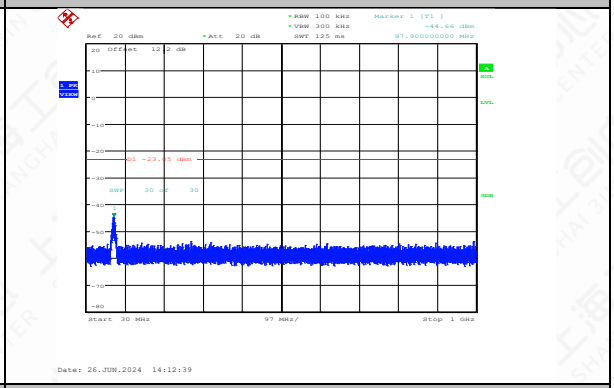
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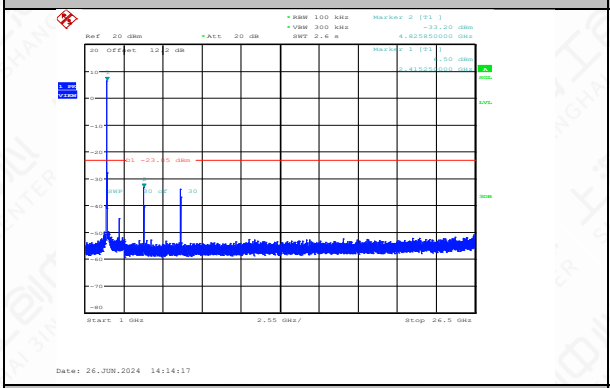	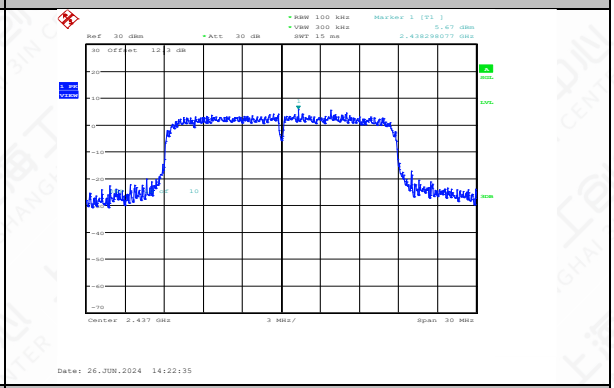
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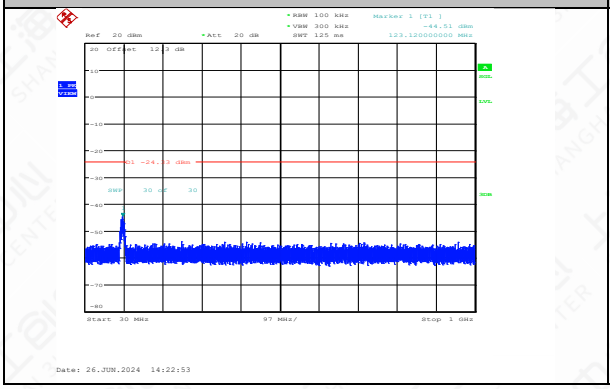
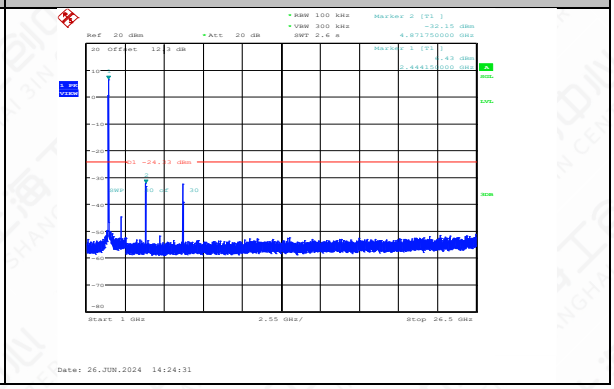
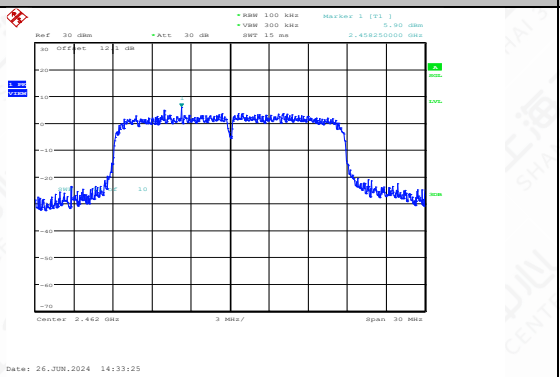
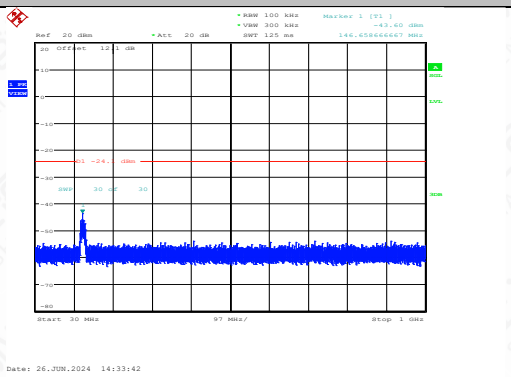
	

11N20SISO-Ant1-2462-0~Reference-PASS	11N20SISO-Ant1-2462-30~1000-PASS
	
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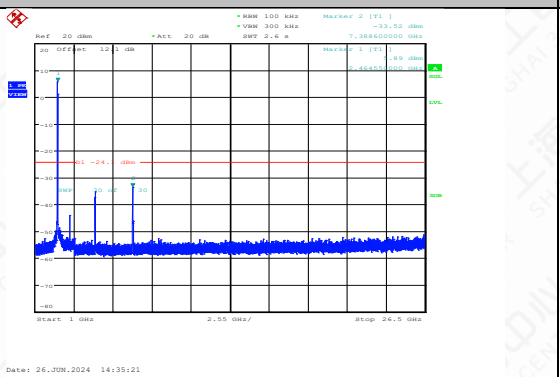
	/

6.9 Transmitter Spurious Emission-Radiated

6.9.1 Measurement Limit

Standard	Limit
FCC 47 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 25.205(a), must also comply with the radiated emission limits specified in 15.209(a)(see 15.205(c)).

The measurement is according to ANSI C63.10 clause 11.11 and 11.12.

6.9.2 Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009~0.49	2400/F (kHz)	129-94
0.49~1.705	24000/F (kHz)	74-63
1.705~30	30	70
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

6.9.3 Test procedures

The measurement is according to ANSI C63.10 clause 11.11 and 11.12.

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Test Settings – Below 1GHz (Quasi-Peak Field Strength Measurements)

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Detector = quasi-peak.
5. Sweep time = auto couple.

6. Trace mode = max hold.
7. Trace was allowed to stabilize.

Test Settings – Above 1GHz (Peak Field Strength Measurements)

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 1MHz.
3. Set the VBW = 3MHz.
4. Detector = peak
5. Trace mode = max hold
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces.

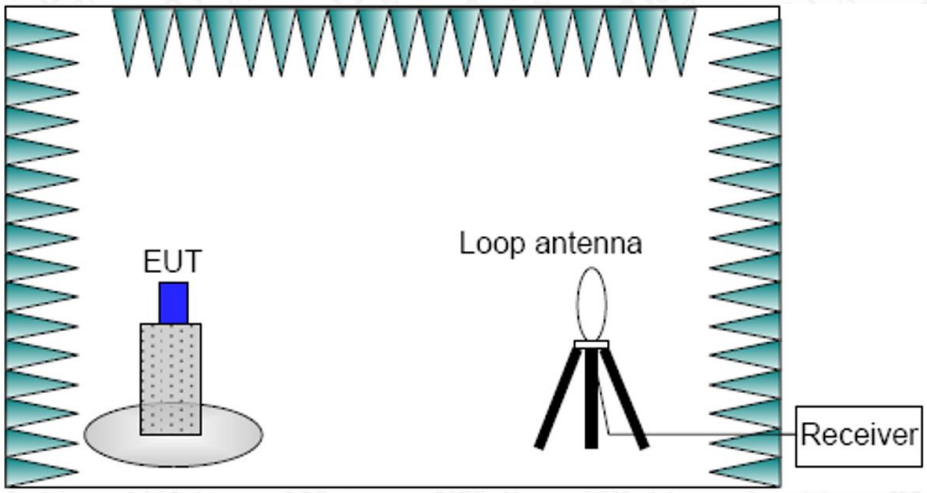
Test Settings – Above 1GHz (Average Field Strength Measurements)

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 1MHz.
3. Set the VBW = 3MHz.
4. Detector = power average (RMS).
5. Number of measurement points = 1001 (Number of points must be ≥ 2 × span\\RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces.

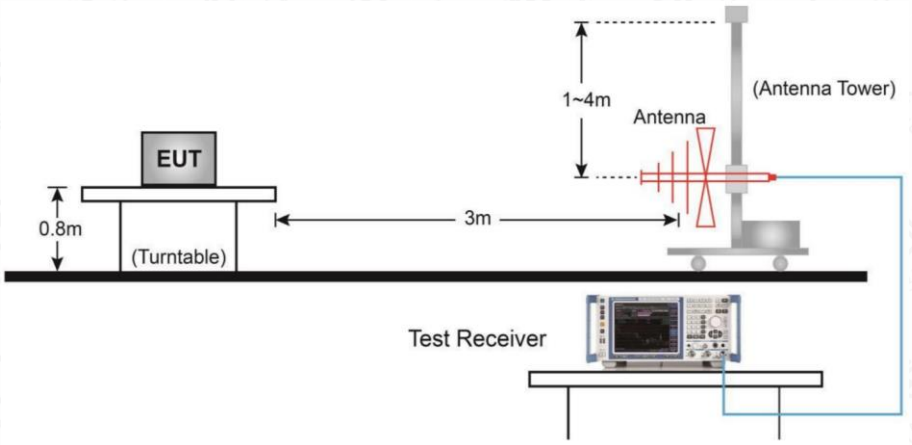
Frequency of emission	RBW/VBW	Sweep Time (s)
0.009~30	9KHz/30KHz	Auto
30~1000	100KHz/300KHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

6.9.4 Test Setup

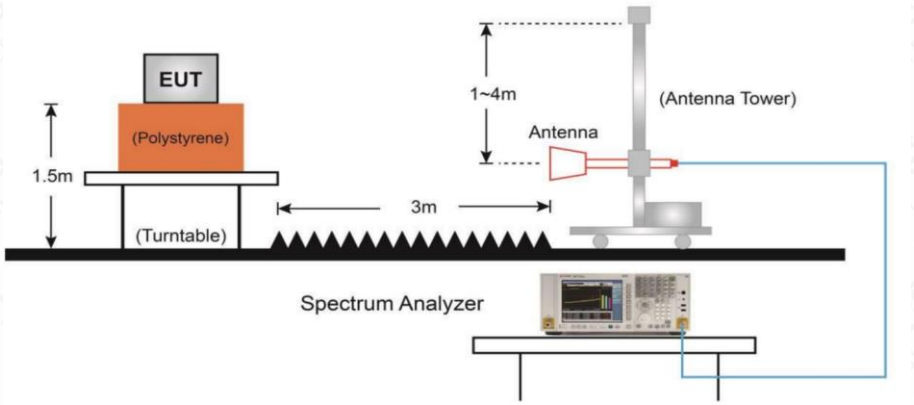
Below 30MHz Test Setup



Below 1GHz Test Setup



Above 1GHz Test Setup



6.9.5 Measurement Results

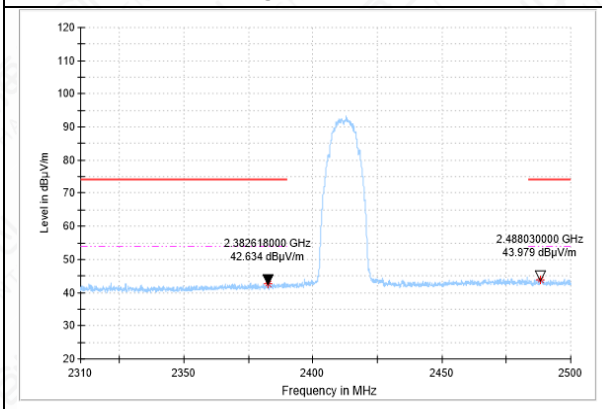
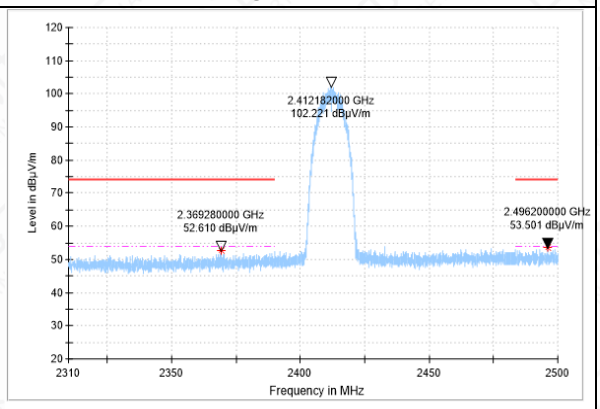
A ”reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna , the gain of the preamplifier, the cable loss.

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

The measurement results are obtained as described below:

A_{Rpi} = Cable loss + Antenna Factor-Preamplifier gain

Result = PMea + Cable loss + Antenna Factor-Preamplifier gain = PMea + ARpi .

Bandedge-11B-CH1-AV	Bandedge-11B-CH1-PK
	
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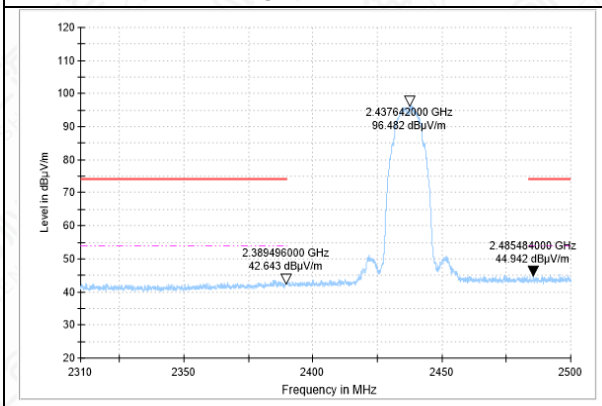	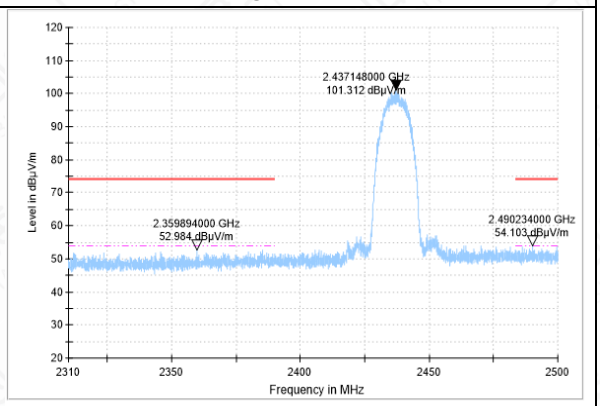
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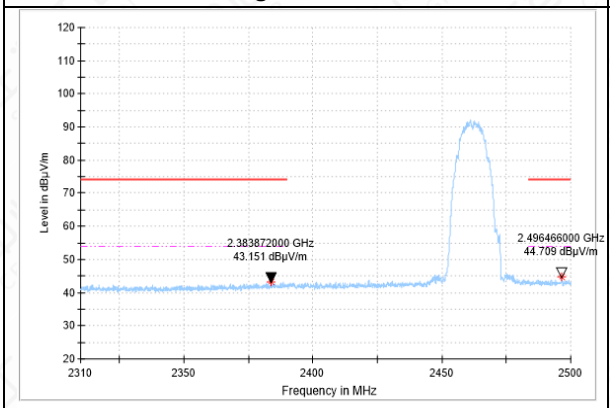	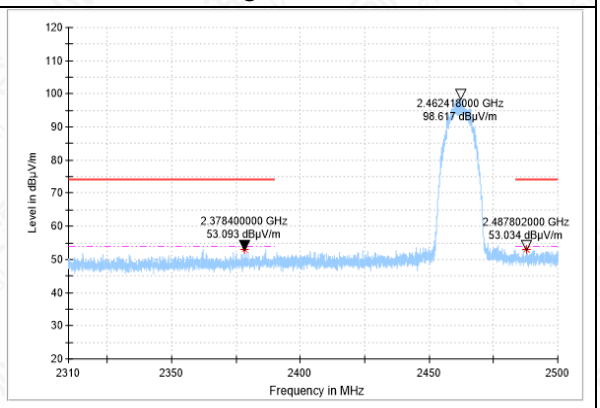

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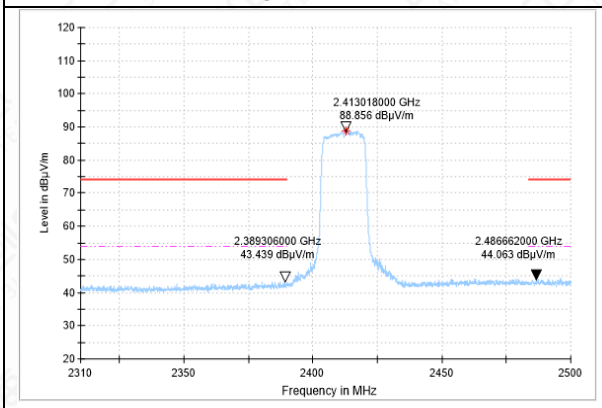

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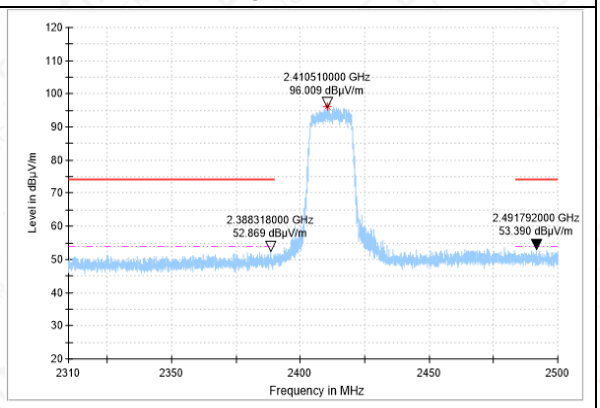

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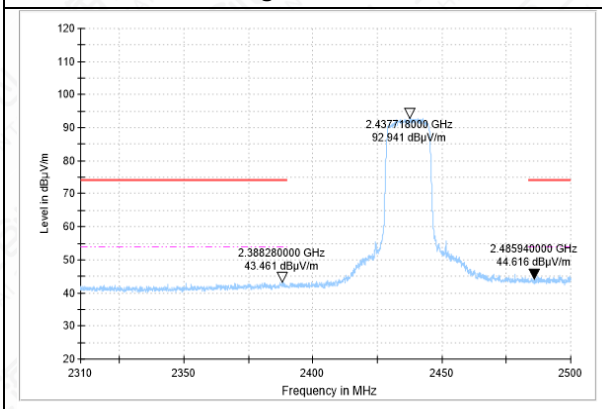

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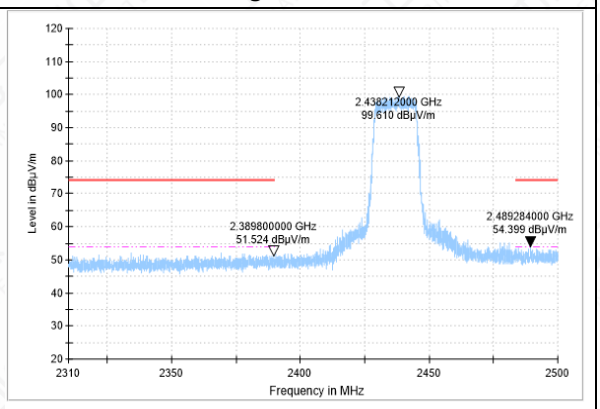

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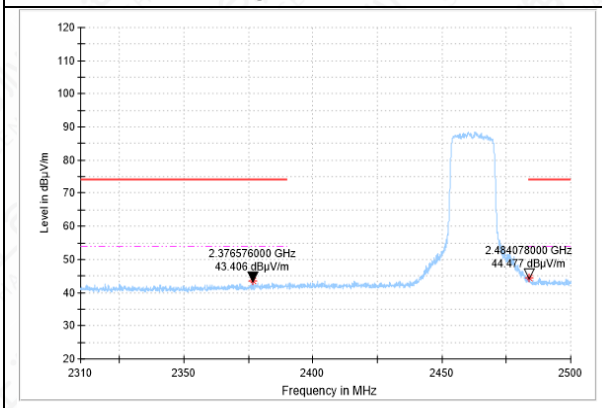

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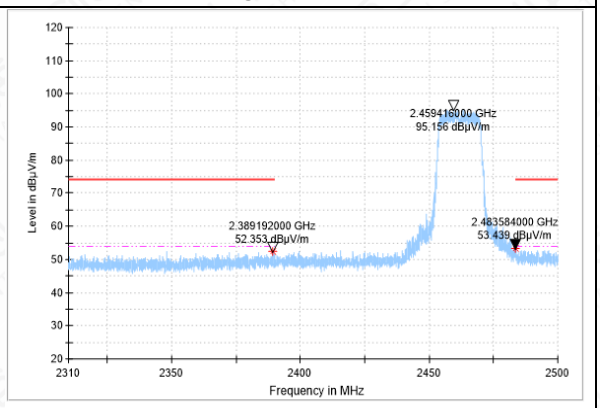

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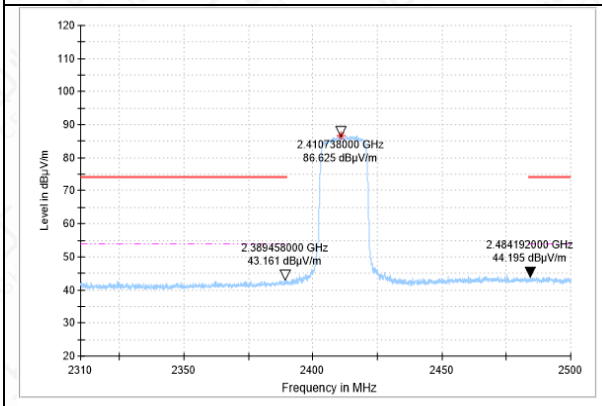

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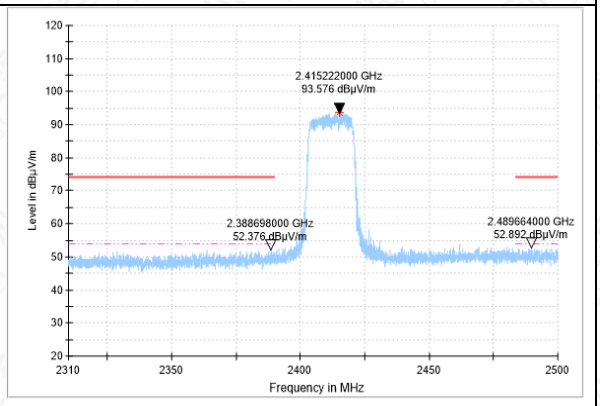
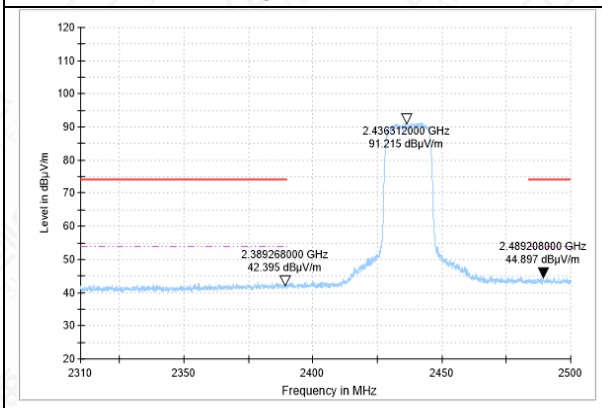
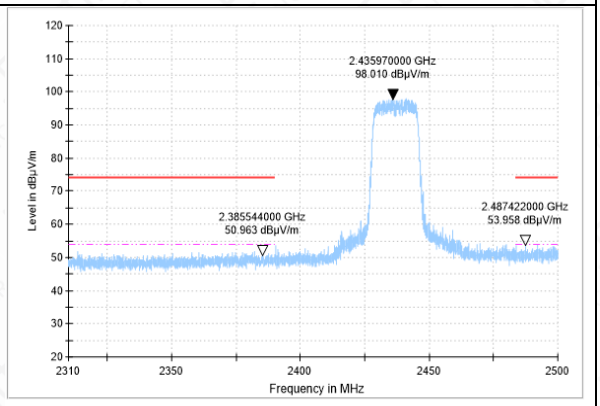


Bandedge-11N-CH6-AV	Bandedge-11N-CH6-PK
	
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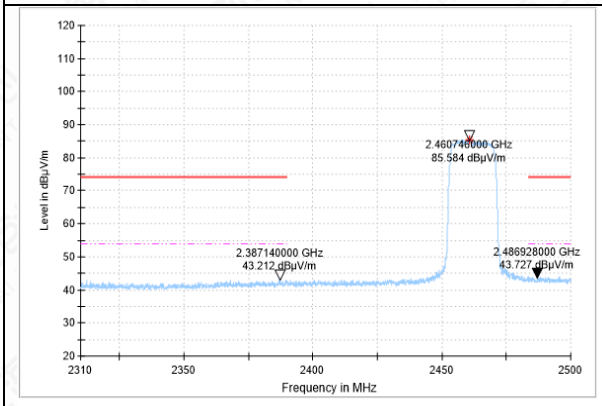
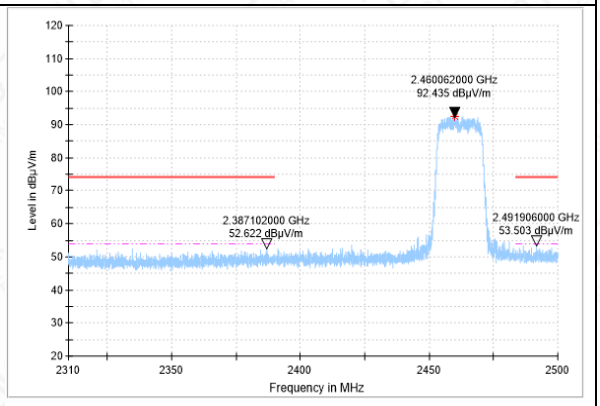
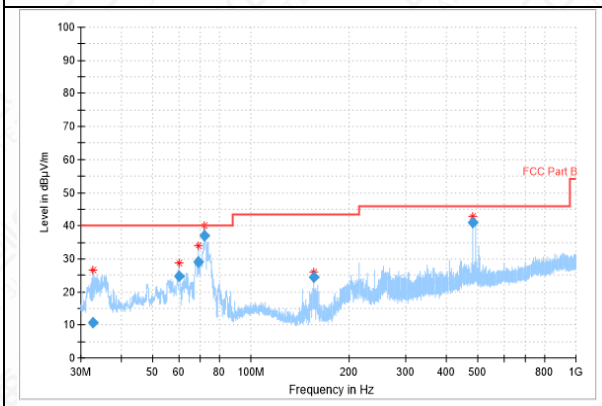
	

RSE-11B-CH1-30M-1GHz



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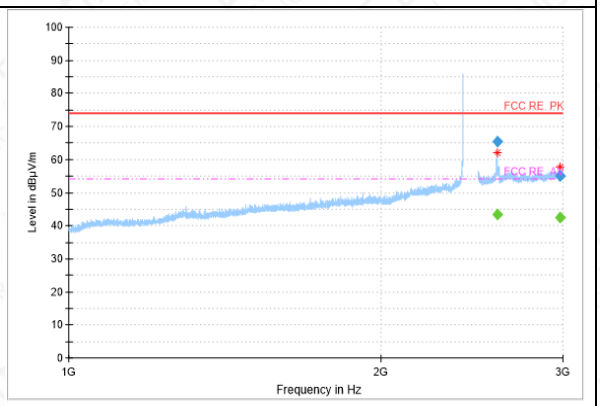
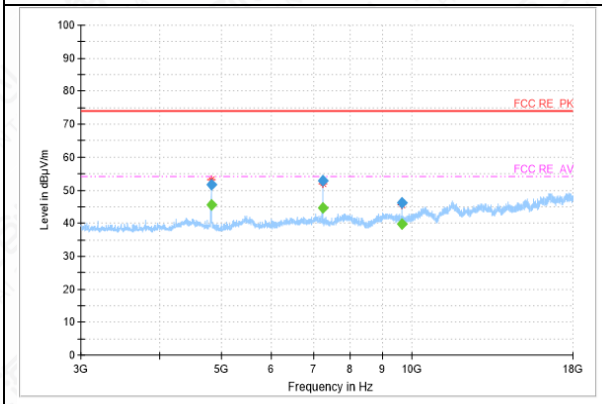
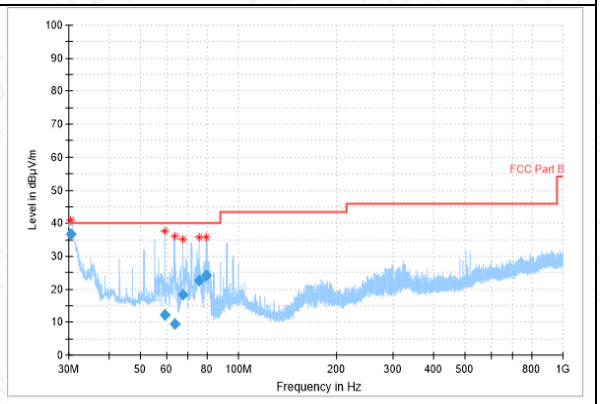


RSE-11B-CH1-3GHz-18GHz



RSE-11B-CH6-30MHz-1GHz



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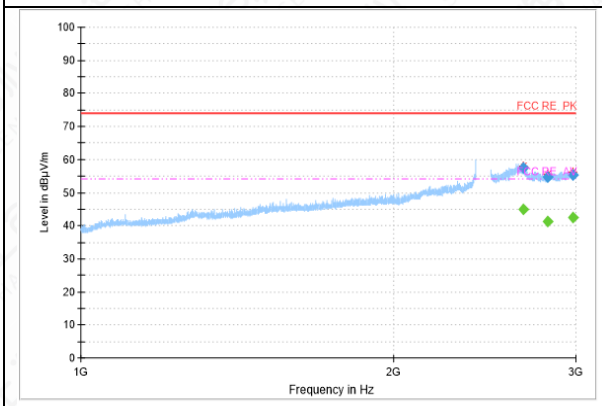
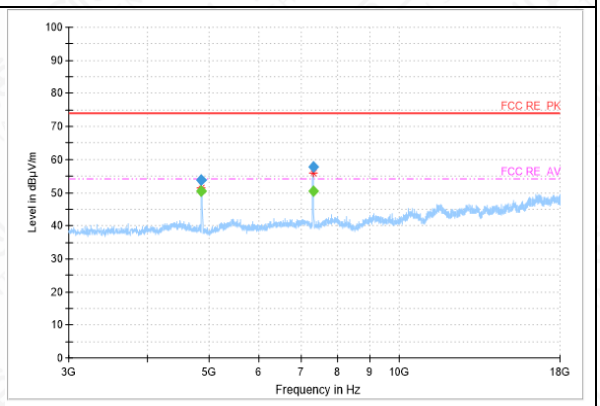
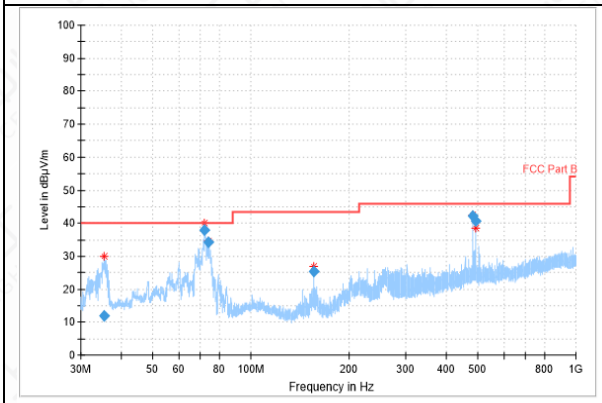


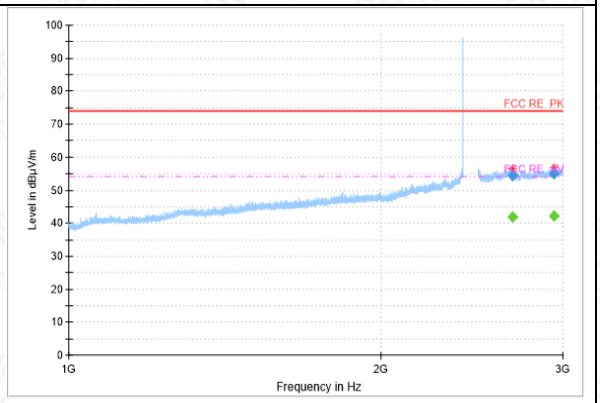
RSE-11B-CH6-3GHz-18GHz



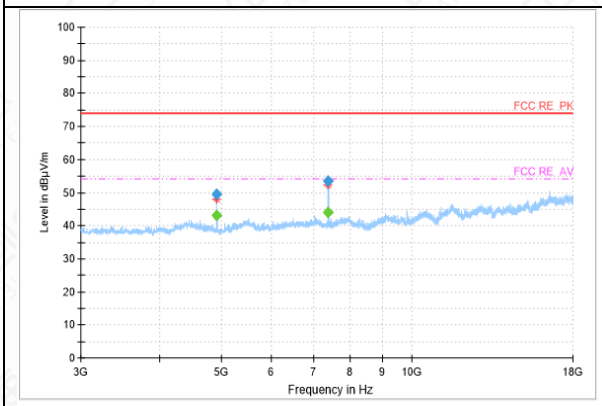
RSE-11B-CH11-30M-1GHz



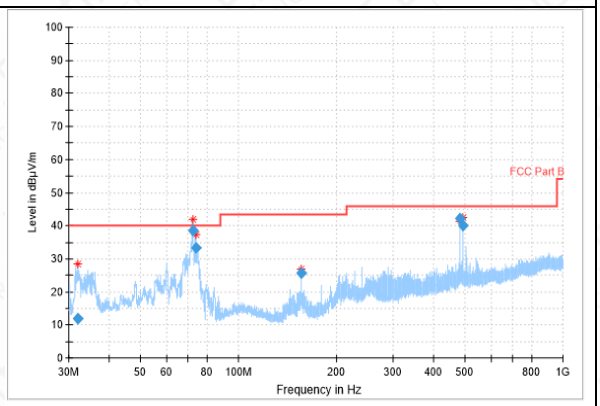
RSE-11B-CH11-1GHz-3GHz



RSE-11B-CH11-3GHz-18GHz



RSE-11G-CH1-30M-1GHz



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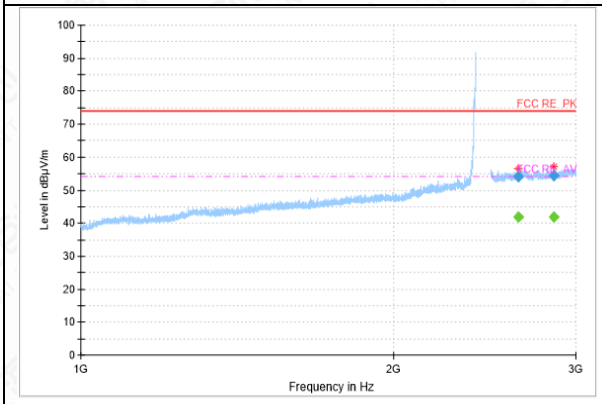
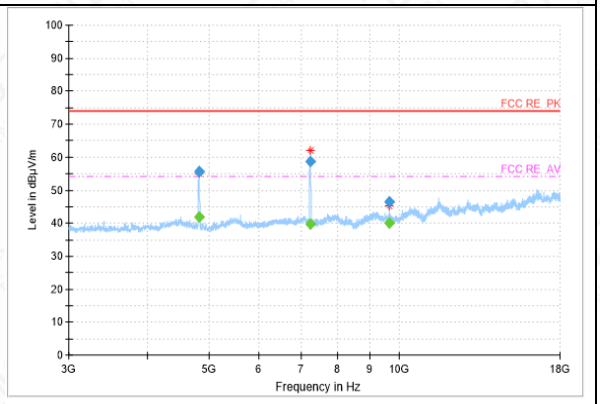
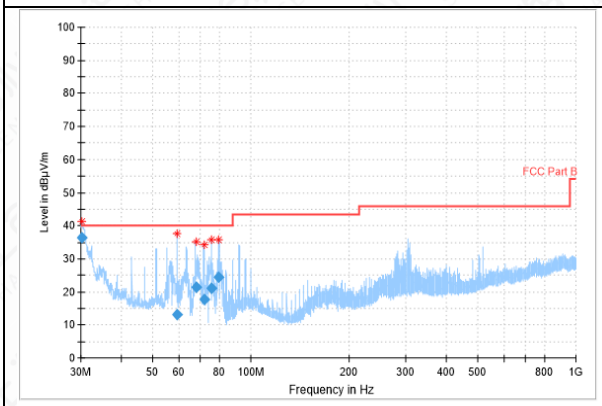


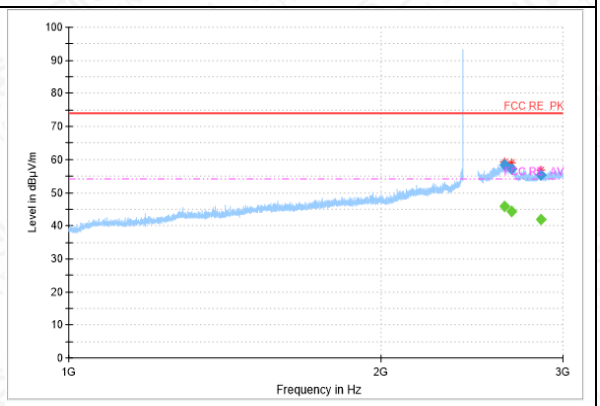
RSE-11G-CH1-3GHz-18GHz



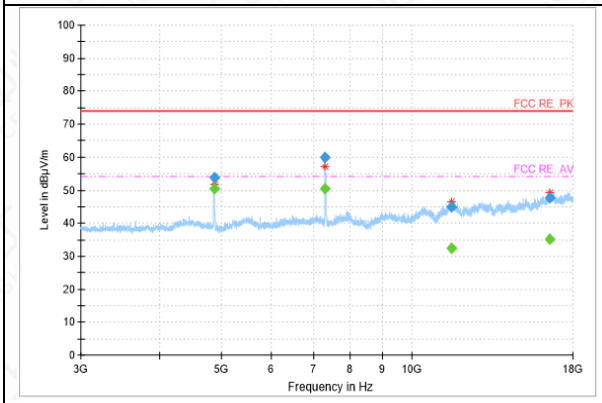
RSE-11G-CH6-30MHz-1GHz



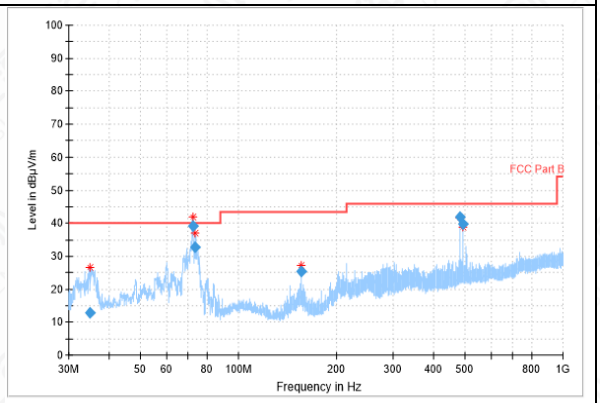
RSE-11G-CH6-1GHz-3GHz



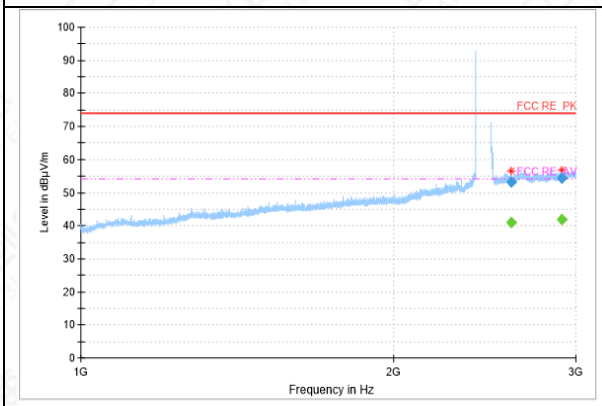
RSE-11G-CH6-3GHz-18GHz



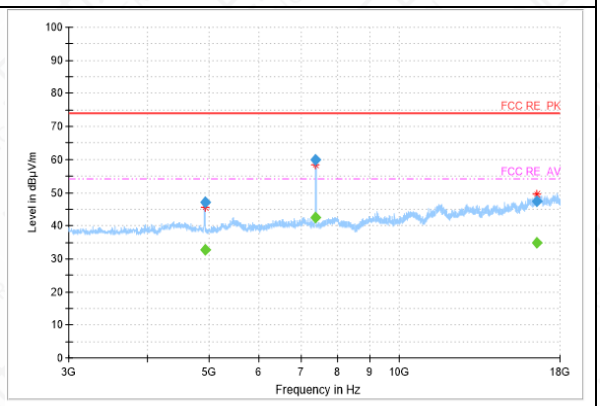
RSE-11G-CH11-30M-1GHz



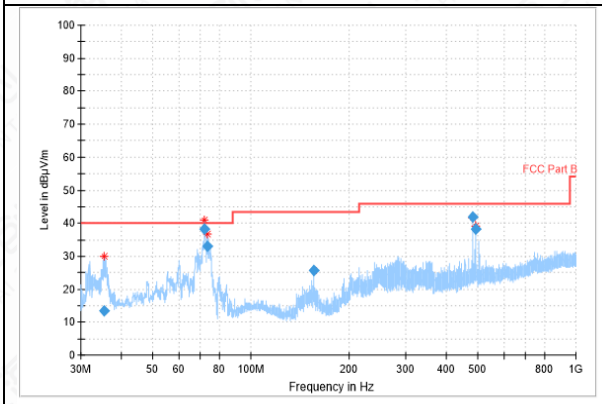
RSE-11G-CH11-1GHz-3GHz



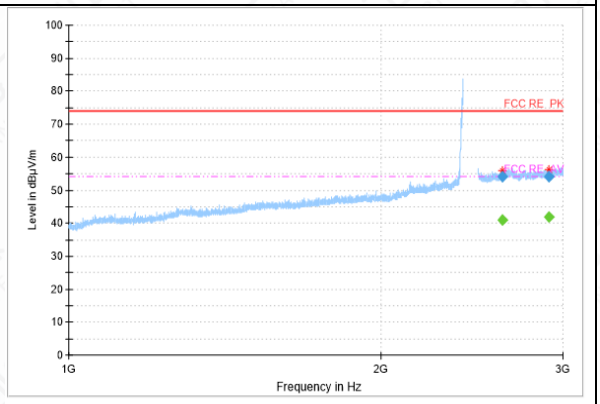
RSE-11G-CH11-3GHz-18GHz



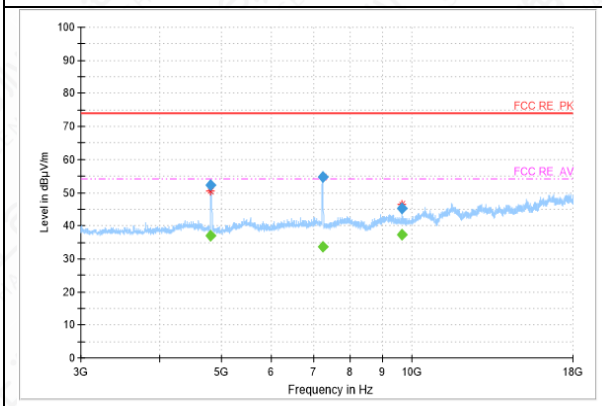
RSE-11N-CH1-30M-1GHz



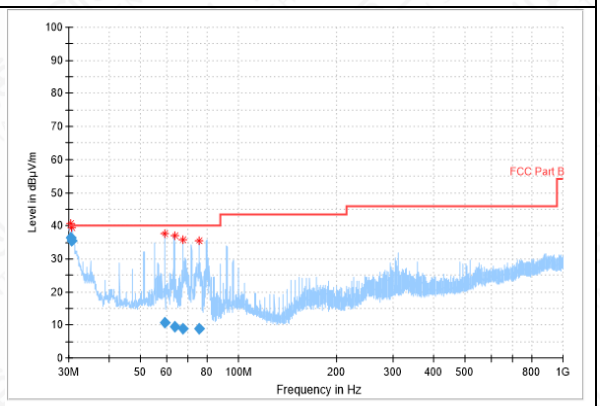
RSE-11N-CH1-1GHz-3GHz



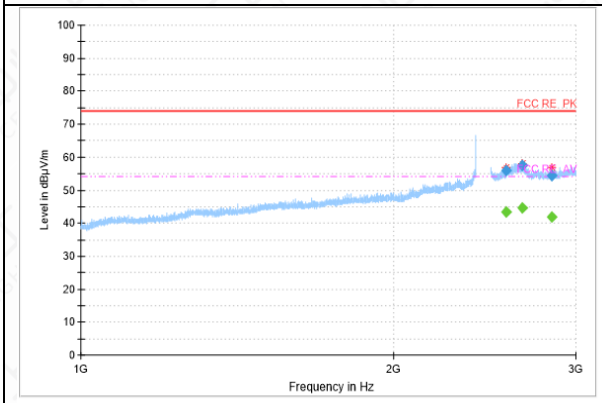
RSE-11N-CH1-3GHz-18GHz



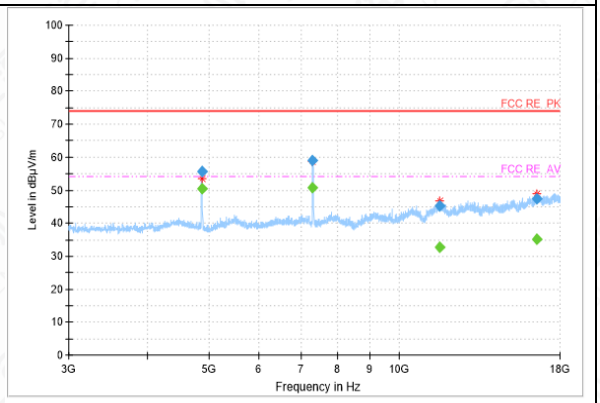
RSE-11N-CH6-30MHz-1GHz

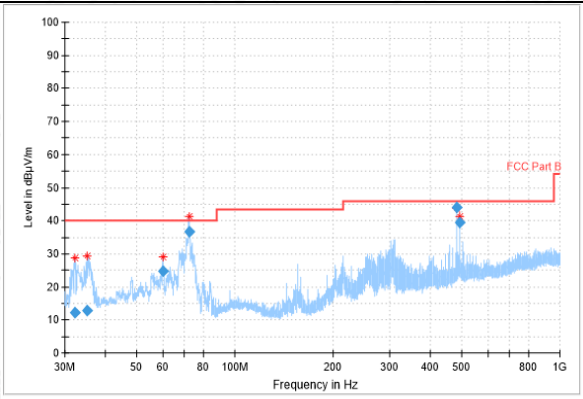
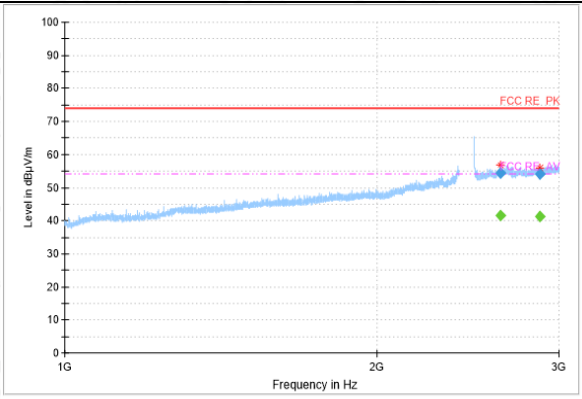


RSE-11N-CH6-1GHz-3GHz



RSE-11N-CH6-3GHz-18GHz



RSE-11N-CH11-30M-1GHz	RSE-11N-CH11-1GHz-3GHz
	
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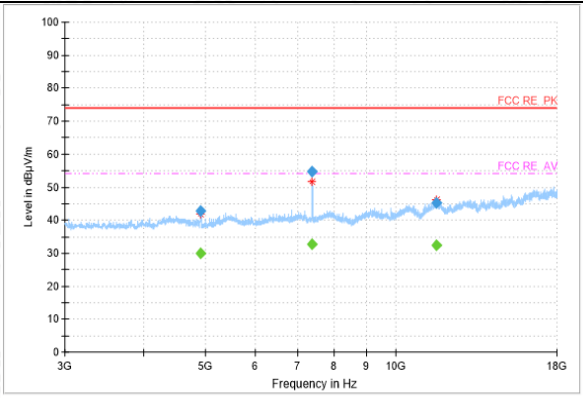
	/

Note:

1. The out-of- limit signal in the picture is the main frequency signal.
2. Only data in worst mode is provided.
3. Sweep the whole frequency band through the range from 30MHz to the 10th harmonic of the carrier, the Emissions in the frequency band 18GHz-26.5GHz is more than 20dB below the limit are not report.
4. The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.
5. Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

RSE-11B-CH1-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
32.7	10.82	-15	25.82	29.18	40.00	V
60.0	24.79	-13	37.79	15.21	40.00	V
68.9	29.17	-15	44.17	10.83	40.00	V
72.0	37.14	-16	53.14	2.86	40.00	V
156.0	24.52	-16	40.52	18.98	43.50	H
480.0	40.92	-6	46.92	5.08	46.00	V

RSE-11B-CH1-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2592.9	65.3	17	48.3	8.70	74.00	V
2978.4	54.99	18	36.99	19.01	74.00	V

RSE-11B-CH1-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2592.9	43.39	17	26.39	10.61	54.00	V
2978.4	42.37	18	24.37	11.63	54.00	V

RSE-11B-CH1-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4823.5	51.56	-4	55.56	22.44	74.00	V
7235.1	52.82	-2	54.82	21.18	74.00	V
9647.8	46.05	-1	47.05	27.95	74.00	V

RSE-11B-CH1-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4823.5	45.47	-4	49.47	8.53	54.00	V
7235.1	44.5	-2	46.5	9.50	54.00	V
9647.8	39.9	-1	40.9	14.10	54.00	V

RSE-11B-CH6-30MHz-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
30.4	36.56	-15	51.56	3.44	40.00	V

59.3	12.24	-12	24.24	27.76	40.00	V
63.5	9.55	-13	22.55	30.45	40.00	V
67.6	18.45	-15	33.45	21.55	40.00	V
75.8	22.73	-17	39.73	17.27	40.00	V
79.8	24.16	-17	41.16	15.84	40.00	V

RSE-11B-CH6-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2667.2	57.39	18	39.39	16.61	74.00	H
2815.4	54.59	17	37.59	19.41	74.00	H
2980.8	55.27	18	37.27	18.73	74.00	V

RSE-11B-CH6-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2667.2	44.85	18	26.85	9.15	54.00	H
2815.4	41.36	17	24.36	12.64	54.00	H
2980.8	42.36	18	24.36	11.64	54.00	V

RSE-11B-CH6-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4870.4	53.77	-3	56.77	20.23	74.00	H
7309.8	57.86	-2	59.86	16.14	74.00	V

RSE-11B-CH6-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4870.4	50.61	-3	53.61	3.39	54.00	H
7309.8	50.58	-2	52.58	3.42	54.00	V

RSE-11B-CH11-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
35.3	11.98	-15	26.98	28.02	40.00	V
72.0	37.92	-16	53.92	2.08	40.00	V
74.1	34.23	-17	51.23	5.77	40.00	V
156.1	25.39	-16	41.39	18.11	43.50	H

480.0	42.26	-6	48.26	3.74	46.00	V
492.0	40.57	-6	46.57	5.43	46.00	H

RSE-11B-CH11-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2680.2	54.41	17	37.41	19.59	74.00	V
2940.8	54.9	18	36.9	19.10	74.00	H

RSE-11B-CH11-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2680.2	41.95	17	24.95	12.05	54.00	V
2940.8	42.28	18	24.28	11.72	54.00	H

RSE-11B-CH11-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4923.8	49.5	-3	52.5	24.50	74.00	V
7385.6	53.41	-2	55.41	20.59	74.00	V

RSE-11B-CH11-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4923.8	43.26	-3	46.26	10.74	54.00	V
7385.6	44.1	-2	46.1	9.90	54.00	V

RSE-11G-CH1-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
32.0	12.01	-15	27.01	27.99	40.00	V
72.2	38.44	-16	54.44	1.56	40.00	V
74.0	33.38	-17	50.38	6.62	40.00	V
156.1	25.59	-16	41.59	17.91	43.50	H
480.0	42.19	-6	48.19	3.81	46.00	V
491.9	40.18	-6	46.18	5.82	46.00	V

RSE-11G-CH1-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2641.5	54.18	17	37.18	19.82	74.00	H

2854.6	54.48	18	36.48	19.52	74.00	H

RSE-11G-CH1-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2641.5	41.77	17	24.77	12.23	54.00	H
2854.6	41.75	18	23.75	12.25	54.00	H

RSE-11G-CH1-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4821.6	55.77	-4	59.77	18.23	74.00	V
7239.4	58.63	-2	60.63	15.37	74.00	V
9647.9	46.39	-1	47.39	27.61	74.00	V

RSE-11G-CH1-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4821.6	41.77	-4	45.77	12.23	54.00	V
7239.4	39.89	-2	41.89	14.11	54.00	V
9647.9	40.15	-1	41.15	13.85	54.00	V

RSE-11G-CH6-30MHz-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
30.3	36.46	-15	51.46	3.54	40.00	V
59.4	13.13	-12	25.13	26.87	40.00	V
67.7	21.49	-15	36.49	18.51	40.00	V
71.8	17.66	-16	33.66	22.34	40.00	V
75.7	21.18	-17	38.18	18.82	40.00	V
79.8	24.59	-17	41.59	15.41	40.00	V

RSE-11G-CH6-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2635.4	58.38	17	41.38	15.62	74.00	H
2675.1	57.34	18	39.34	16.66	74.00	H
2855.1	55.36	18	37.36	18.64	74.00	H

RSE-11G-CH6-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2635.4	45.74	17	28.74	8.26	54.00	H
2675.1	44.4	18	26.4	9.60	54.00	H
2855.1	41.77	18	23.77	12.23	54.00	H

RSE-11G-CH6-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4876.9	53.93	-3	56.93	20.07	74.00	H
7302.6	59.85	-2	61.85	14.15	74.00	V
11552.9	45.09	3	42.09	28.91	74.00	V
16523.5	47.64	10	37.64	26.36	74.00	H

RSE-11G-CH6-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4876.9	50.58	-3	53.58	3.42	54.00	H
7302.6	50.57	-2	52.57	3.43	54.00	V
11552.9	32.49	3	29.49	21.51	54.00	V
16523.5	35.2	10	25.2	18.80	54.00	H

RSE-11G-CH11-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
34.9	12.99	-15	27.99	27.01	40.00	V
72.4	39.11	-16	55.11	0.89	40.00	V
73.8	32.85	-17	49.85	7.15	40.00	V
156.0	25.45	-16	41.45	18.05	43.50	H
480.0	42.03	-6	48.03	3.97	46.00	V
491.9	39.72	-6	45.72	6.28	46.00	V

RSE-11G-CH11-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2596.1	53.36	17	36.36	20.64	74.00	V
2907.9	54.29	18	36.29	19.71	74.00	V

RSE-11G-CH11-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2596.1	40.92	17	23.92	13.08	54.00	V
2907.9	42.01	18	24.01	11.99	54.00	V

RSE-11G-CH11-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4927.5	47.05	-3	50.05	26.95	74.00	V
7388.4	59.96	-2	61.96	14.04	74.00	V
16544.1	47.26	10	37.26	26.74	74.00	H

RSE-11G-CH11-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4927.5	32.85	-3	35.85	21.15	54.00	V
7388.4	42.59	-2	44.59	11.41	54.00	V
16544.1	34.85	10	24.85	19.15	54.00	H

RSE-11N-CH1-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
35.5	13.48	-14	27.48	26.52	40.00	V
72.1	38.19	-16	54.19	1.81	40.00	V
73.8	33.12	-17	50.12	6.88	40.00	V
156.1	25.68	-16	41.68	17.82	43.50	H
480.0	41.91	-6	47.91	4.09	46.00	V
491.9	38.35	-6	44.35	7.65	46.00	H

RSE-11N-CH1-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2620.4	54.1	17	37.1	19.90	74.00	V
2907.5	54.19	18	36.19	19.81	74.00	V

RSE-11N-CH1-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2620.4	41.13	17	24.13	12.87	54.00	V

2907.5	42.04	18	24.04	11.96	54.00	V

RSE-11N-CH1-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4817.9	52.28	-4	56.28	21.72	74.00	V
7228.6	54.7	-2	56.7	19.30	74.00	H
9647.8	45.2	-1	46.2	28.80	74.00	V

RSE-11N-CH1-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4817.9	37.11	-4	41.11	16.89	54.00	V
7228.6	33.52	-2	35.52	20.48	54.00	H
9647.8	37.4	-1	38.4	16.60	54.00	V

RSE-11N-CH6-30MHz-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
30.4	36.26	-15	51.26	3.74	40.00	V
30.6	35.56	-16	51.56	4.44	40.00	V
59.3	10.63	-12	22.63	29.37	40.00	V
63.5	9.46	-13	22.46	30.54	40.00	V
67.6	8.8	-15	23.8	31.20	40.00	V
75.7	8.82	-17	25.82	31.18	40.00	V

RSE-11N-CH6-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2567.8	55.86	17	38.86	18.14	74.00	H
2665.7	57.48	18	39.48	16.52	74.00	H
2840.2	54.44	18	36.44	19.56	74.00	H

RSE-11N-CH6-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2567.8	43.34	17	26.34	10.66	54.00	H
2665.7	44.67	18	26.67	9.33	54.00	H
2840.2	41.83	18	23.83	12.17	54.00	H

RSE-11N-CH6-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4874.1	55.66	-3	58.66	18.34	74.00	H
7307.9	58.88	-2	60.88	15.12	74.00	V
11593.6	45.35	4	41.35	28.65	74.00	V
16522.5	47.37	10	37.37	26.63	74.00	H

RSE-11N-CH6-3GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
4874.1	50.43	-3	53.43	3.57	54.00	H
7307.9	50.61	-2	52.61	3.39	54.00	V
11593.6	32.8	4	28.8	21.20	54.00	V
16522.5	35.13	10	25.13	18.87	54.00	H

RSE-11N-CH11-30M-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
32.2	12.34	-15	27.34	27.66	40.00	V
35.2	12.82	-15	27.82	27.18	40.00	V
60.0	24.78	-13	37.78	15.22	40.00	V
72.2	36.81	-16	52.81	3.19	40.00	V
480.0	44.16	-6	50.16	1.84	46.00	H
491.9	39.49	-6	45.49	6.51	46.00	H

RSE-11N-CH11-1GHz-3GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2634.6	54.41	17	37.41	19.59	74.00	V
2873.7	54.23	18	36.23	19.77	74.00	V

RSE-11N-CH11-1GHz-3GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
2634.6	41.69	17	24.69	12.31	54.00	V
2873.7	41.42	18	23.42	12.58	54.00	V

RSE-11N-CH11-3GHz-18GHz

Frequency (MHz)	MaxPeak(dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Margin(dB)	Limit(dBµV/m)	Polarity
4924.6	42.72	-3	45.72	31.28	74.00	V
7374.9	54.62	-2	56.62	19.38	74.00	V
11626.9	45.25	4	41.25	28.75	74.00	V

RSE-11N-CH11-3GHz-18GHz

Frequency (MHz)	Average(dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Margin(dB)	Limit(dBµV/m)	Polarity
4924.6	29.92	-3	32.92	24.08	54.00	V
7374.9	32.82	-2	34.82	21.18	54.00	V
11626.9	32.3	4	28.3	21.70	54.00	V

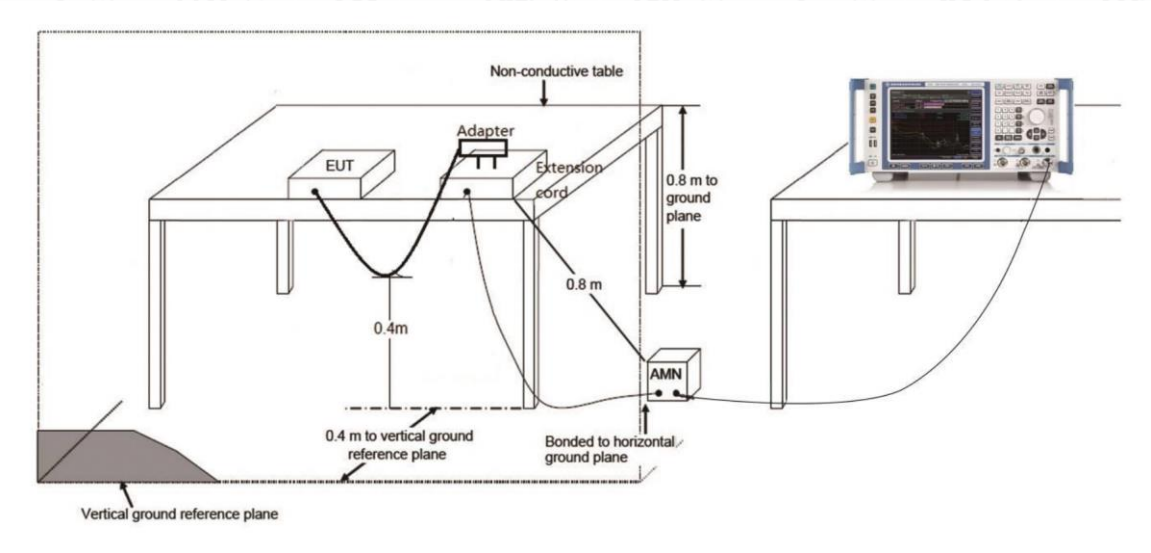
6.10 AC Powerline Conducted Emission

6.10.1 Method of Measurement: ANSI C63.10-2013-clause 6.2

1. The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
2. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
3. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
4. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

6.10.2 Test Setup



6.10.3 Test Condition

Voltage（V）	Frequency（Hz）
120	60

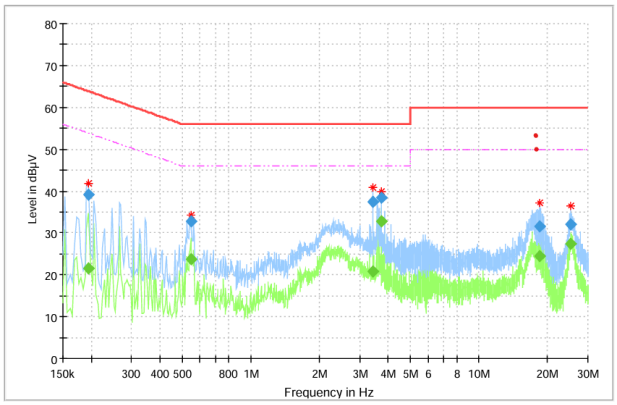
6.10.4 Measurement limit

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	56 to 46	P
0.5 to 5	56	46	
5 to 30	60	50	
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.			

NOTE: When EUT connected adapter, the WIFI/BLE wireless function will be disable. The charging mode test data for this test item see the FCC Part 15B test report.

6.10.5 Measurement Result

11G CH2437	/
	/

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas.Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.194775	---	21.44	53.83	32.39	15000.0	9.000	L1	ON	9.6
0.194775	39.13	---	63.83	24.70	15000.0	9.000	L1	ON	9.6
0.545513	32.67	---	56.00	23.33	15000.0	9.000	N	ON	9.6
0.545513	---	23.74	46.00	22.26	15000.0	9.000	N	ON	9.6
3.433500	37.48	---	56.00	18.52	15000.0	9.000	N	ON	9.6
3.433500	---	20.86	46.00	25.14	15000.0	9.000	N	ON	9.6
3.732000	38.50	---	56.00	17.50	15000.0	9.000	L1	ON	9.6
3.732000	---	32.70	46.00	13.30	15000.0	9.000	L1	ON	9.6
18.496556	---	24.45	50.00	25.55	15000.0	9.000	N	ON	10.0
18.496556	31.49	---	60.00	28.51	15000.0	9.000	N	ON	10.0
25.186688	32.13	---	60.00	27.87	15000.0	9.000	L1	ON	10.0
25.186688	---	27.48	50.00	22.52	15000.0	9.000	L1	ON	10.0

Note: All modes have been tested and only the worst mode is recorded in the report.

Annex A: Revised History

Version	Revised Content
V0	Initial

Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, 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 20th day of September 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2025

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

END OF REPORT