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

SRD TEST REPORT

PRODUCT	Smart POS System
BRAND	SUNMI
MODEL	T6F10
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T6F10
ISSUE DATE	January 25, 2024
STANDARD(S)	FCC Part15C

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

CONTENTS

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 T6F10 manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new products for testing. There are two configurations S16aa&S14aa (Mainly Supply) and S21aa (Secondary Supply) in this project. We mainly tested the S16aa&S14aa (Mainly Supply), and the S21aa (Secondary Supply) tested the worst mode of the mainly supply, and recorded the test results of the worst mode respectively in the report.
The description of the differences between S16aa&S14aa (Mainly Supply) and S21aa (Secondary Supply) are as follows:

Model / Difference	T6F10（High Configuration） S16aa&S14aa (Mainly Supply)	T6F10（Basic Configuration） S21aa (Secondary Supply)
Scanner	Yes	No
LCD(Just different manufacturers)	SHENZHEN DJN PHOTOELECTRIC TECHNOLOGY CO., LTD	CPT Technology (Group) Co.,Ltd
DDR	It's just that the manufacturer and memory are different	
EMMC	It's just that the manufacturer and memory are different	

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 FPC antenna with max Gain 2.21dBi that complied with 15.203 Requirements

a. 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	2.21 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℃~35℃
Relative Humidity	86kPa~106kPa
Atmospheric Pressure	86kPa~106kPa

2.3 Project Information

Project Manager	Gao Hongning
Test Date	December 5, 2023 to December 29, 2023

3. General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Telephone	18826519551

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Telephone	18826519551

4. General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product Name	Smart POS System
Model name	T6F10
Date of Receipt	S16aa/ S14aa /s21aa: December 05,2023
EUT ID*	S16aa/ S14aa /s21aa
SN/IMEI	S16aa:P305D3BP10037 S14aa:P305D3BP10020 S21aa:P302D3BF10251
Supported Radio Technology and Bands	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band I/II/IV/V/VI/VIII/XIX LTE Band 1/2/3/4/5/7/8/18/19/20/26/28/34/38/39/40/41 BT 5.0 BR/EDR/BLE WLAN 802.11b,g,n WLAN 802.11a,n,ac GPS/Galileo/GLONASS/BDS NFC
Hardware Version	V1.0(LA+EU)
Software Version	V3.0.0
FCC ID	2AH25T6F10
Power Rating	DC 7.7V form battery, DC 5V form 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
AE1	RF Cable	N/A	N/A
CD01	Adapter	TPA-141A050200UU01	N/A
CH02	Adapter	UC13US	N/A
CI02	Adapter	TPA-23A050200UU01	N/A
UA09	USB Cable	N/A	N/A
BA12	Battery	HPPA	ICON ENERGY SYSTEM (SHENZHEN) CO., LTD.
BB07	Battery	HPPA	Guangdong Highpower New Energy Technology Co., Ltd.

NOTE1: AE ID is the internal identification code of the laboratory. NOTE2: By verifying that BA12+CI02 is the worst battery and adapter combination, this battery and adapter are used in all tests.

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
BW_40M	Channel	3	6	9
	Freq. (MHz)	2422	2437	2452

Note: This report is for 2.4G WLAN only.

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℃	-10℃	50℃
Working Voltage of EUT	Normal	Minimum	Maximum
	7.7V	6.0V	8.8V

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	2023-05-06	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	2023-06-23	1 Year
8	Temperature box	B-TF-107C	BTF107C-201804107	N/A	N/A	Boyi	2023-06-28	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	2022-12-19	1 Year
4	TRILOG Broadband Antenna	VULB9163	01345	N/A	N/A	Schwarzbeck	2023-03-23	1 Year
5	Double- ridged Waveguide Antenna	ETS-3117	00135890	N/A	N/A	ETS	2022-03-09	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	2022-12-29 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	2022-12-29 2023-12-19	1 Year

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

6.1 Duty cycle

6.1.1 Measurement Limit

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

6.1.2 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.

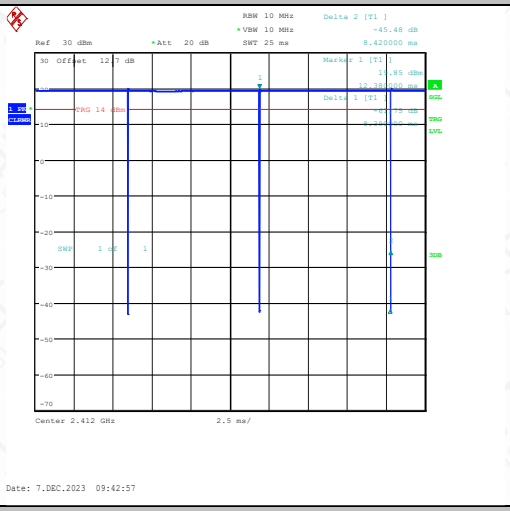
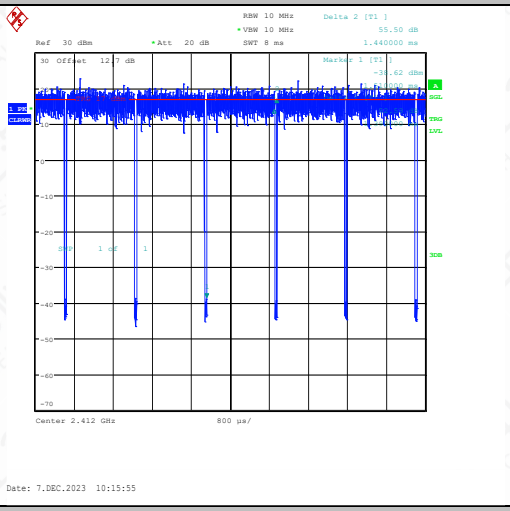
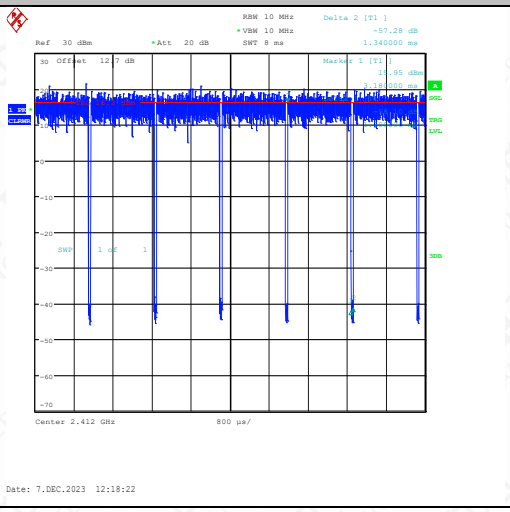
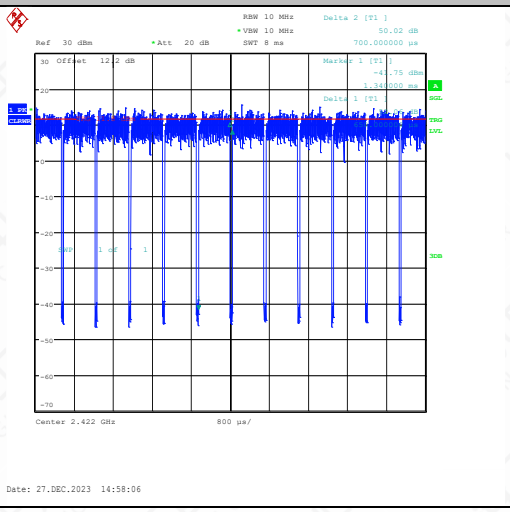
3) Set VBW ≥ RBW. Set detector = peak or average.

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.)

6.1.3 Measurement Results

TestMode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
11B	Ant1	2412	8.39	8.42	99.64	0.02
11G	Ant1	2412	1.39	1.44	96.53	0.15
11N20SISO	Ant1	2412	1.30	1.34	97.01	0.13
11N40SISO	Ant1	2422	0.65	0.70	92.86	0.32

Test Graphs

NTNV-11B-Ant1-2412	NTNV-11G-Ant1-2412
	
NTNV-11N20SISO-Ant1-2412	NTNV-11N40SISO-Ant1-2422
	

6.2 Output Power-Conducted

6.2.1 Measurement Limit

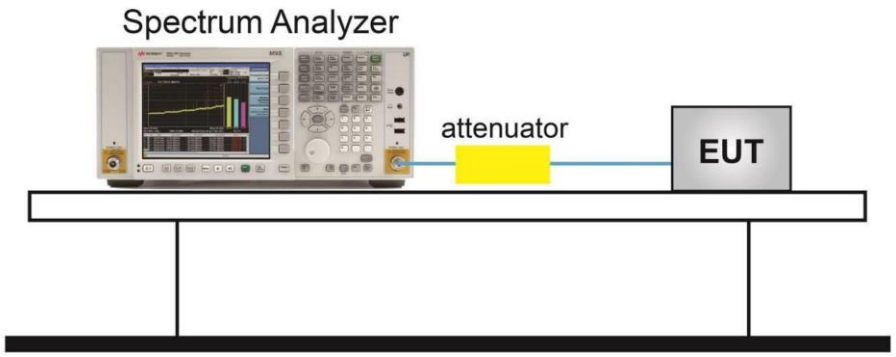
Standard	Limit (dBm)
FCC 47 Part 15.247(b)(3)	<30
Note: Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs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

6.2.2 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%.

6.2.3 Test setup



6.2.4 Measurement Results

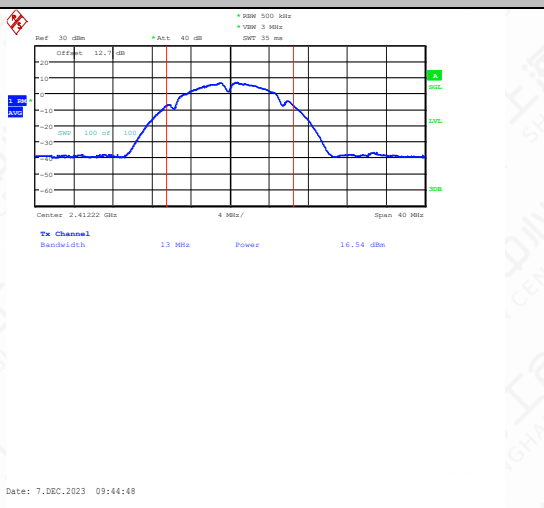
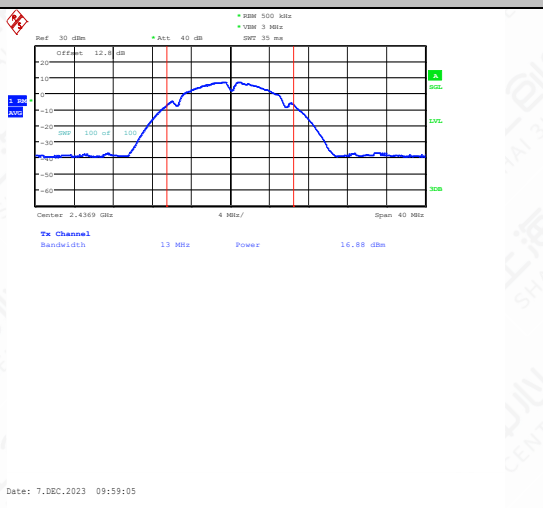
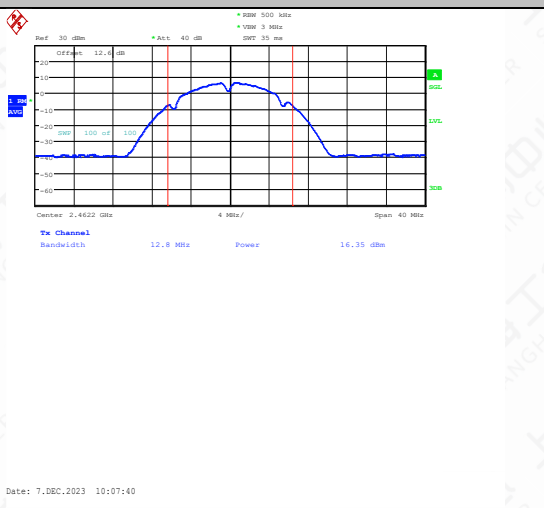
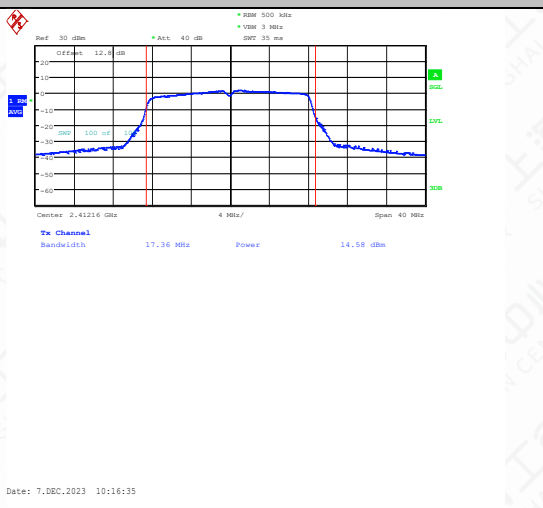
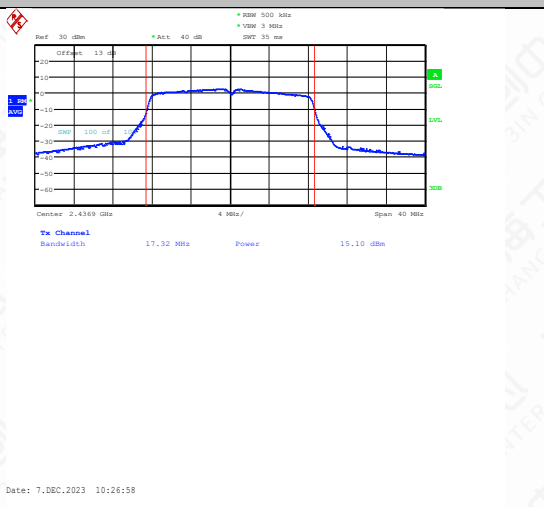
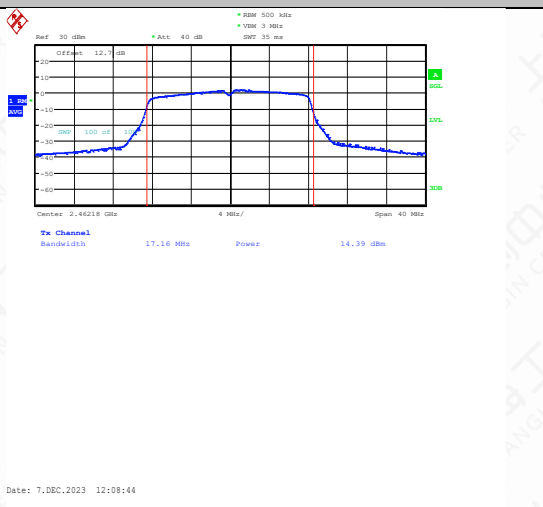
TestMode	Antenna	Frequency [MHz]	Set Power	Conducted Power [dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	18	16.54	≤30.00	PASS
11B	Ant1	2437	18	16.88	≤30.00	PASS
11B	Ant1	2462	18	16.35	≤30.00	PASS
11G	Ant1	2412	16	14.58	≤30.00	PASS
11G	Ant1	2437	16	15.10	≤30.00	PASS
11G	Ant1	2462	16	14.39	≤30.00	PASS
11N20SISO	Ant1	2412	15.5	13.93	≤30.00	PASS
11N20SISO	Ant1	2437	15.5	13.11	≤30.00	PASS
11N20SISO	Ant1	2462	15.5	12.69	≤30.00	PASS
11N40SISO	Ant1	2422	13	10.62	≤30.00	PASS
11N40SISO	Ant1	2437	14	13.15	≤30.00	PASS
11N40SISO	Ant1	2452	14	12.96	≤30.00	PASS

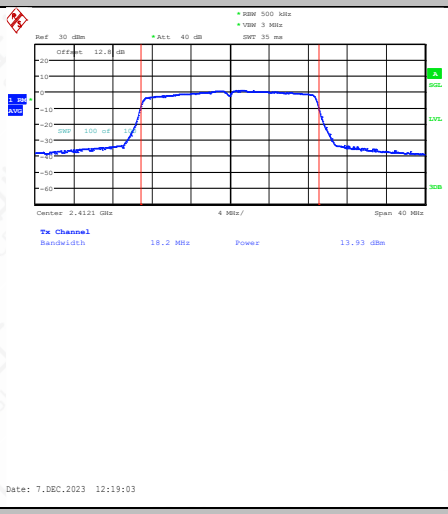
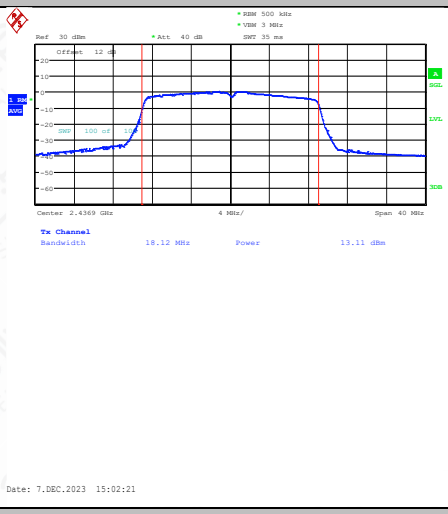
Note：

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
	
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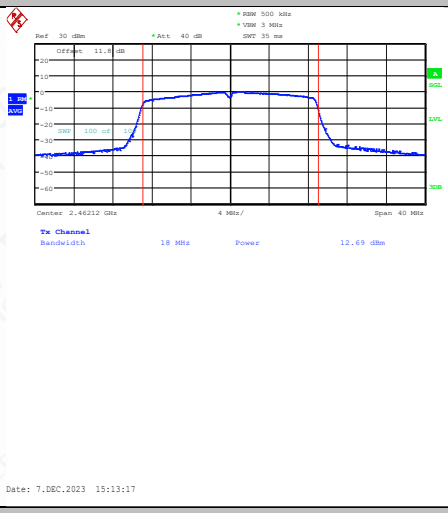	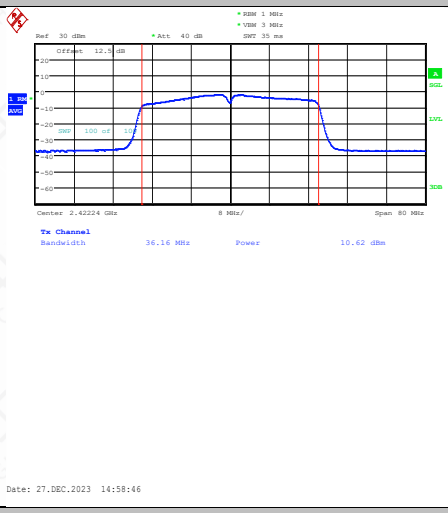
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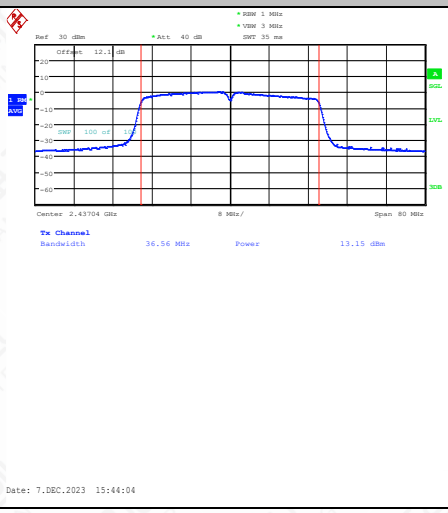
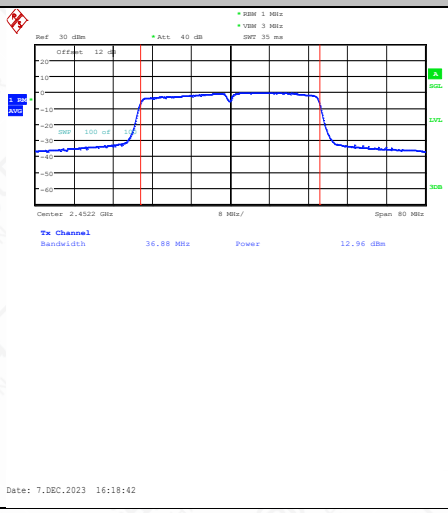
	

6.3 Peak Power Spectral Density

6.3.1 Measurement Limit

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

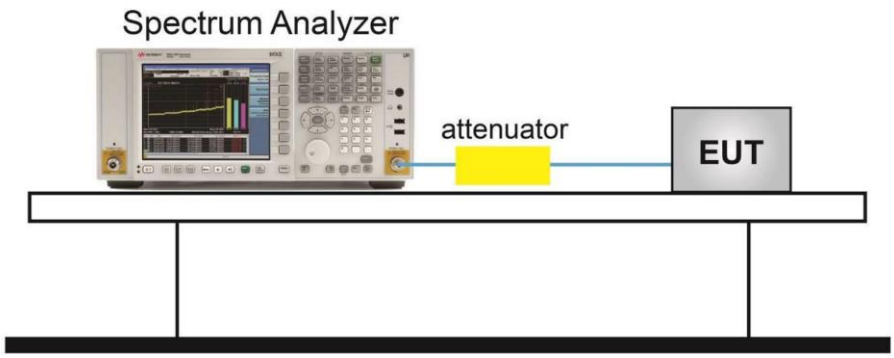
6.3.2 Test procedures

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).

6.3.3 Test setup



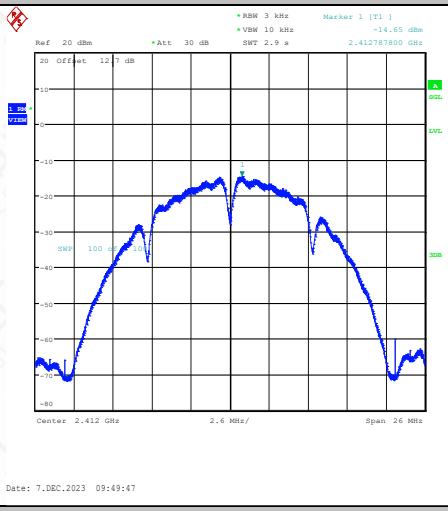
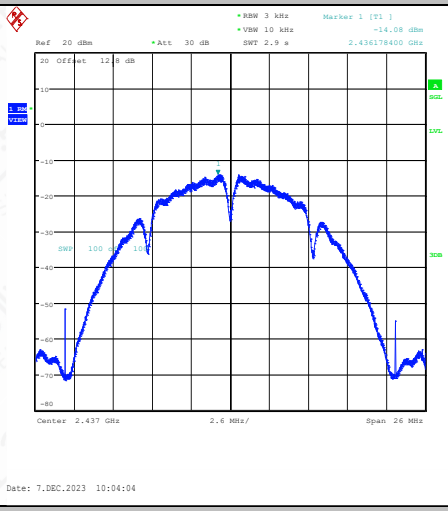
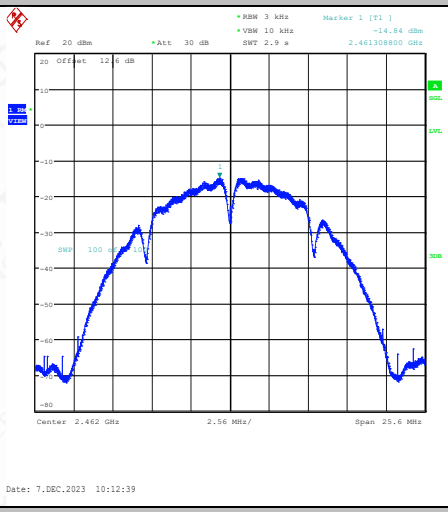
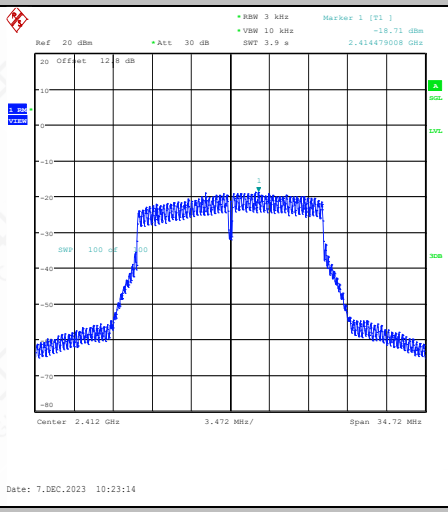
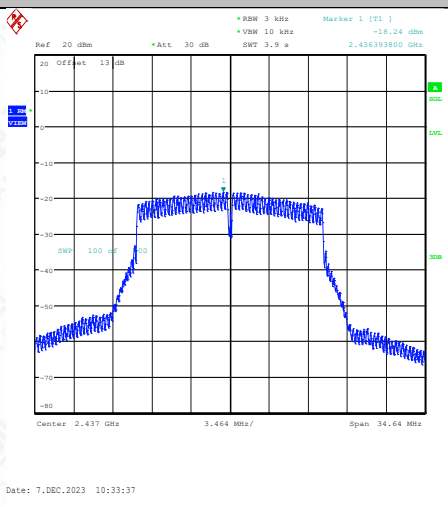
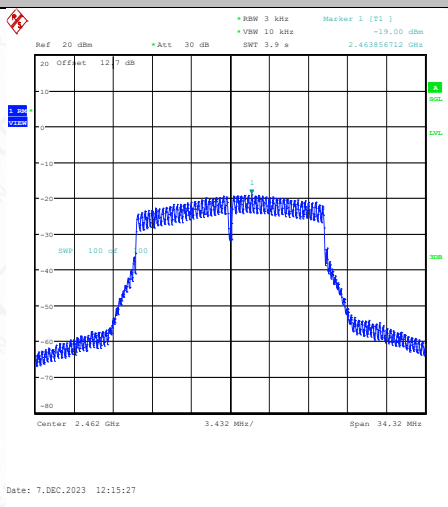
6.3.4 Measurement Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-14.65	≤8.00	PASS
11B	Ant1	2437	-14.08	≤8.00	PASS
11B	Ant1	2462	-14.84	≤8.00	PASS
11G	Ant1	2412	-18.71	≤8.00	PASS
11G	Ant1	2437	-18.24	≤8.00	PASS
11G	Ant1	2462	-19.00	≤8.00	PASS
11N20SISO	Ant1	2412	-19.71	≤8.00	PASS
11N20SISO	Ant1	2437	-20.02	≤8.00	PASS
11N20SISO	Ant1	2462	-20.16	≤8.00	PASS
11N40SISO	Ant1	2422	-24.02	≤8.00	PASS
11N40SISO	Ant1	2437	-22.09	≤8.00	PASS
11N40SISO	Ant1	2452	-22.56	≤8.00	PASS

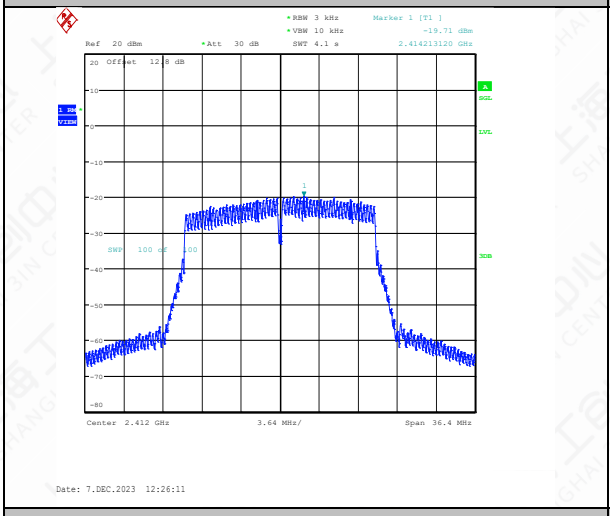
Note：

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

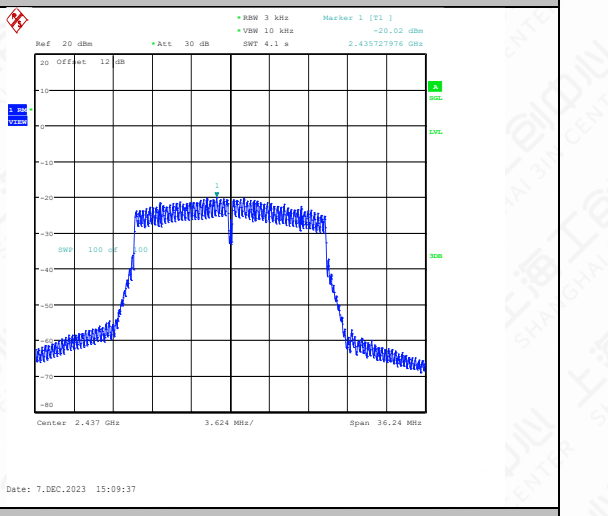
Test Graphs

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

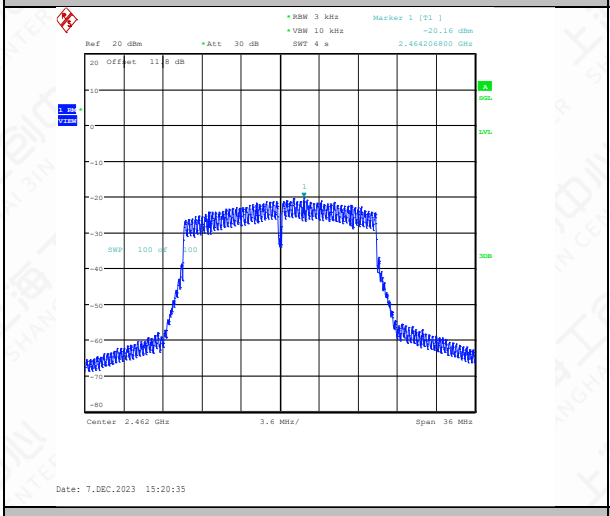
11N20SISO-Ant1-2412-PASS



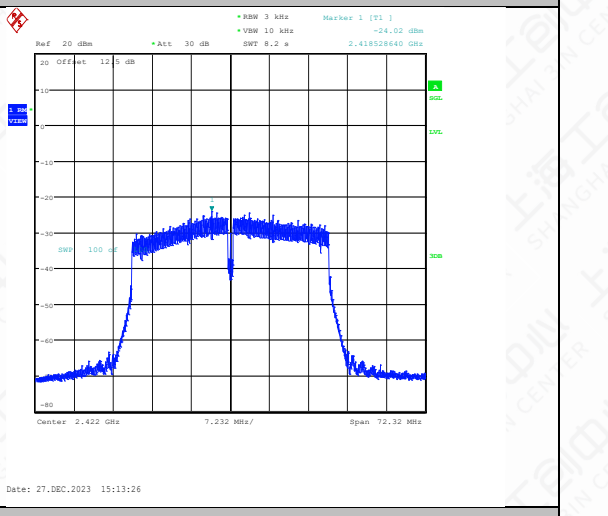
11N20SISO-Ant1-2437-PASS



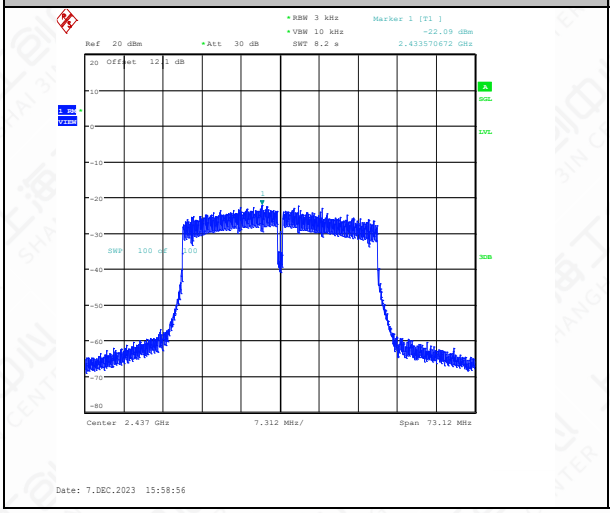
11N20SISO-Ant1-2462-PASS



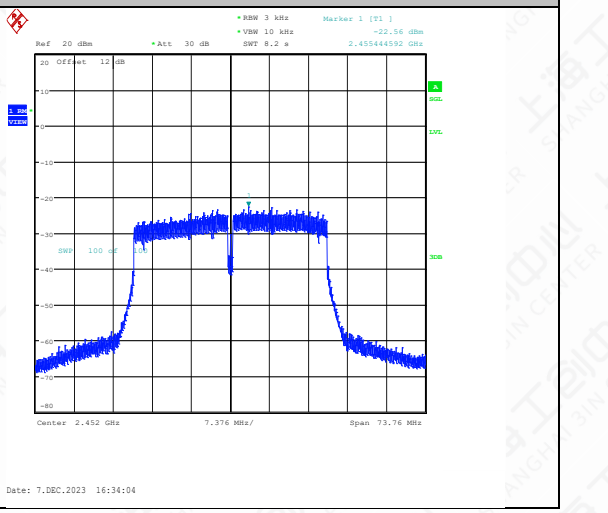
11N40SISO-Ant1-2422-PASS



11N40SISO-Ant1-2437-PASS



11N40SISO-Ant1-2452-PASS



6.4 Occupied 6dB Bandwidth

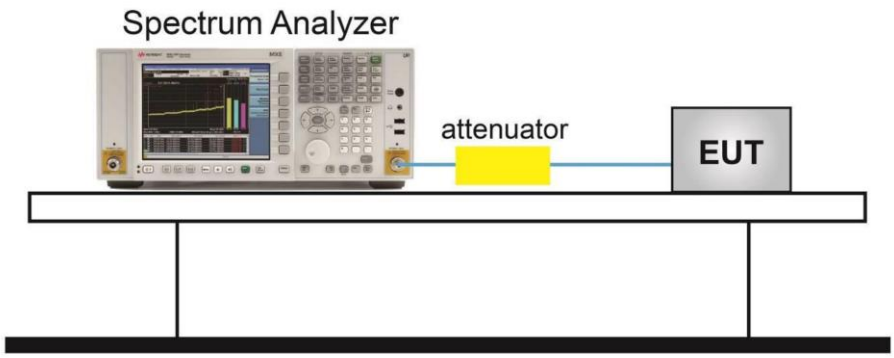
6.4.1 Measurement Limt

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

6.4.2 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.

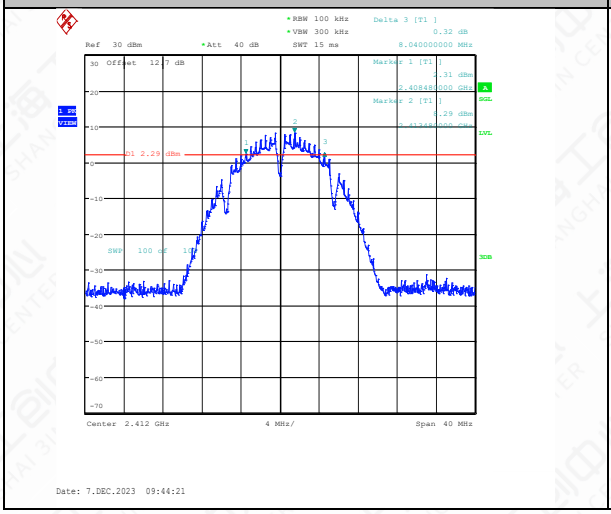
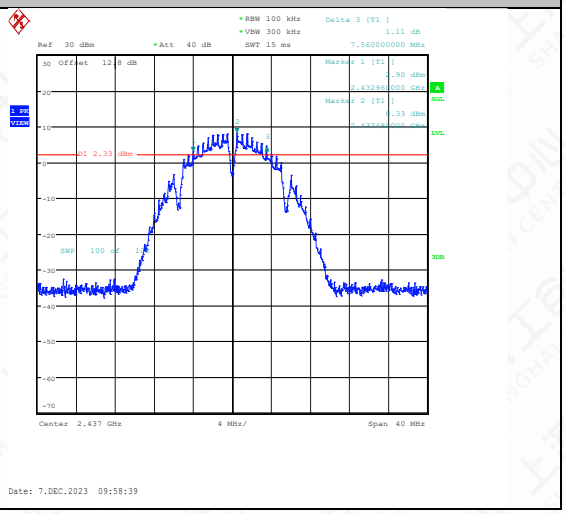
6.4.3 Test Setup

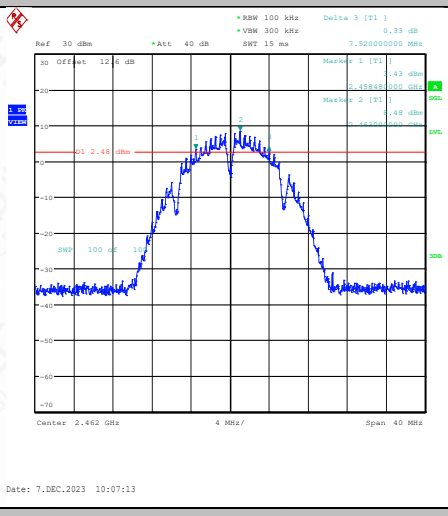
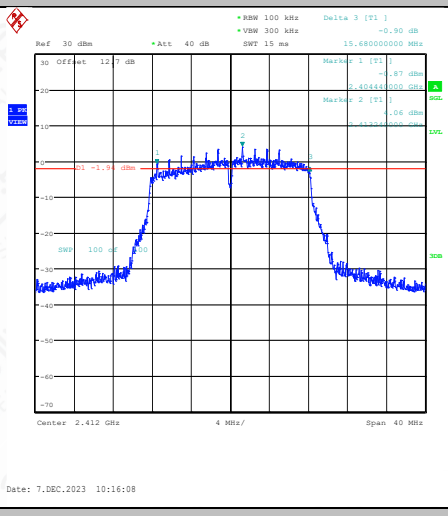
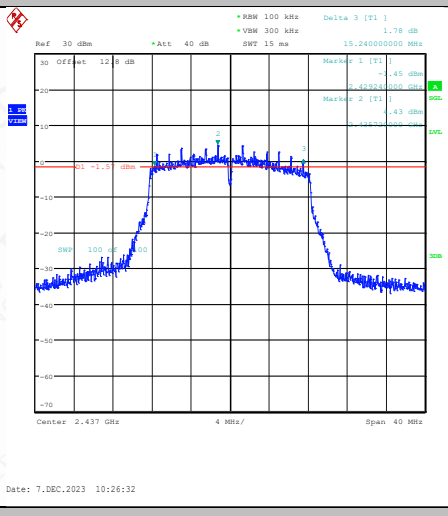
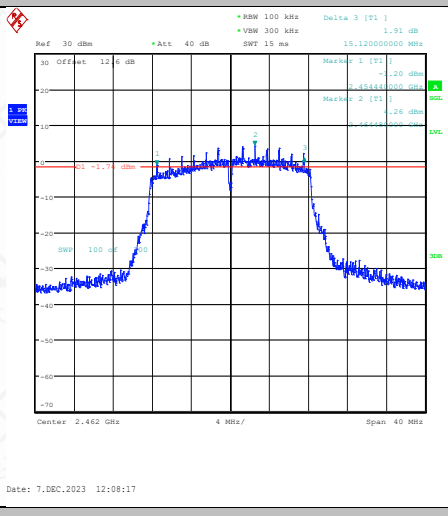
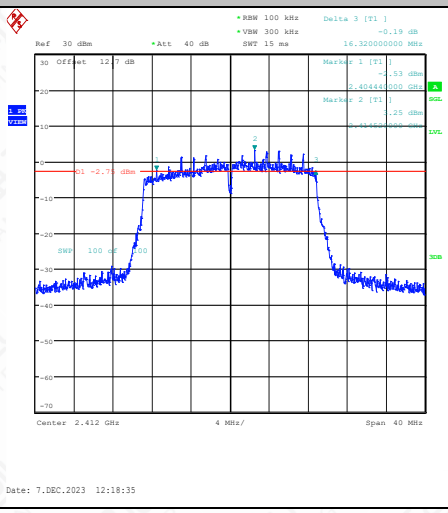
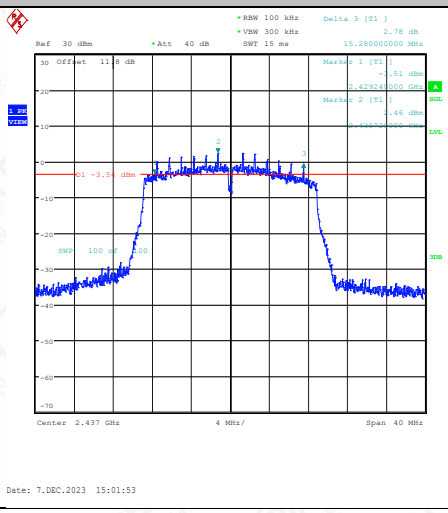


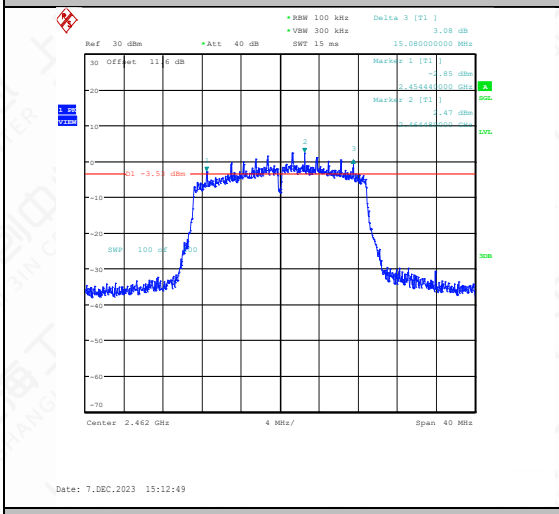
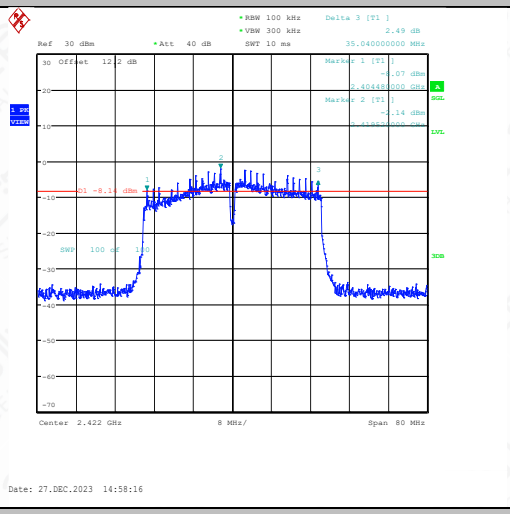
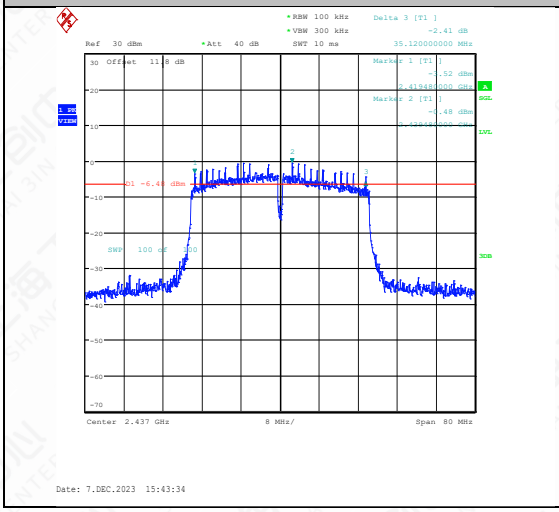
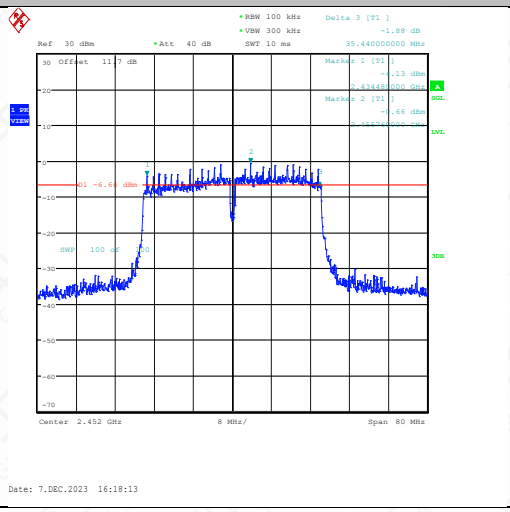
6.4.4 Measurement Results

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.04	2408.48	2416.52	0.5	PASS
11B	Ant1	2437	7.56	2432.96	2440.52	0.5	PASS
11B	Ant1	2462	7.52	2458.48	2466.00	0.5	PASS
11G	Ant1	2412	15.68	2404.44	2420.12	0.5	PASS
11G	Ant1	2437	15.24	2429.24	2444.48	0.5	PASS
11G	Ant1	2462	15.12	2454.44	2469.56	0.5	PASS
11N20SISO	Ant1	2412	16.32	2404.44	2420.76	0.5	PASS
11N20SISO	Ant1	2437	15.28	2429.24	2444.52	0.5	PASS
11N20SISO	Ant1	2462	15.08	2454.44	2469.52	0.5	PASS
11N40SISO	Ant1	2422	35.04	2404.48	2439.52	0.5	PASS
11N40SISO	Ant1	2437	35.12	2419.48	2454.60	0.5	PASS
11N40SISO	Ant1	2452	35.44	2434.48	2469.92	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	11N40SISO-Ant1-2422-PASS
	
11N40SISO-Ant1-2437-PASS	**11N40SISO-Ant1-2452-PASS**
	

6.5 99% Occupied Bandwidth

6.5.1 Measurement Limit

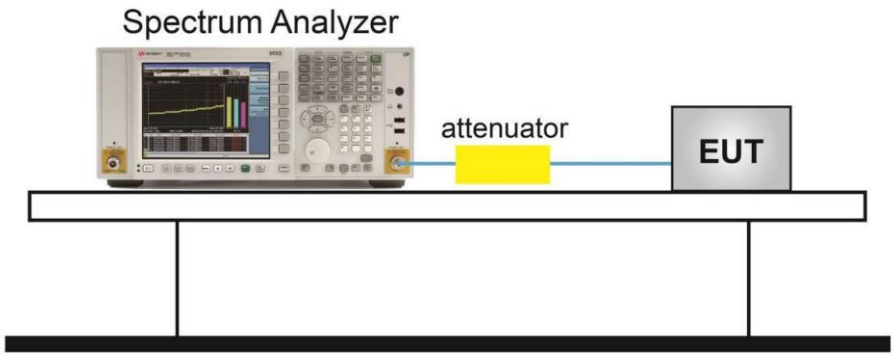
Standard	Limit
RSS-Gen 6.7	N/A

6.5.2 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.

6.5.3 Test setup



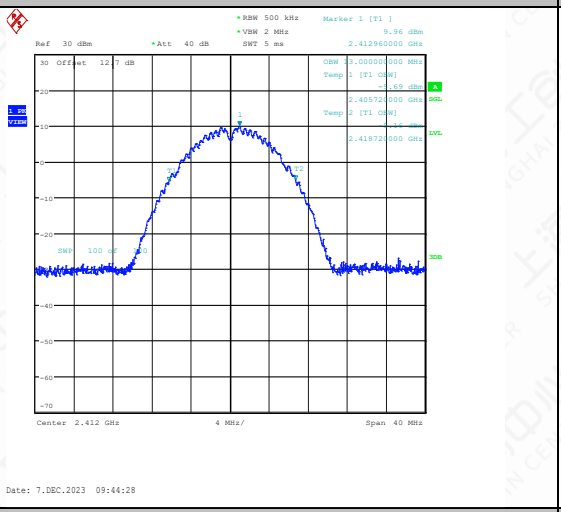
6.5.4 Measurement Result

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13	2405.7200	2418.7200	---	---
11B	Ant1	2437	13	2430.4000	2443.4000	---	---
11B	Ant1	2462	12.8	2455.8000	2468.6000	---	---
11G	Ant1	2412	17.36	2403.4800	2420.8400	---	---
11G	Ant1	2437	17.32	2428.2400	2445.5600	---	---
11G	Ant1	2462	17.16	2453.6000	2470.7600	---	---

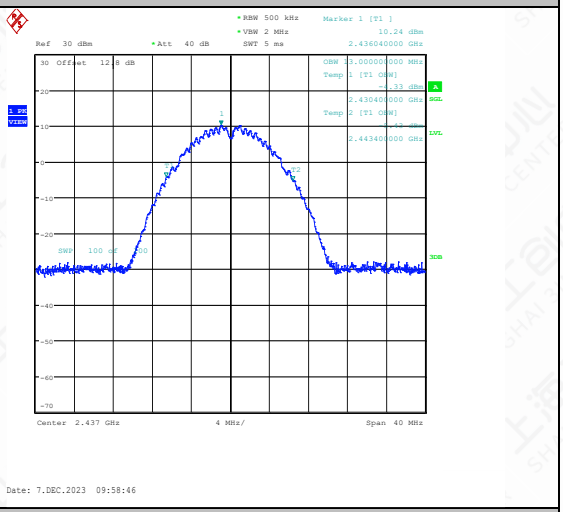
11N20SISO	Ant1	2412	18.2	2403.0000	2421.2000	---	---
11N20SISO	Ant1	2437	18.12	2427.8400	2445.9600	---	---
11N20SISO	Ant1	2462	18	2453.1200	2471.1200	---	---
11N40SISO	Ant1	2422	36.16	2404.1600	2440.3200	---	---
11N40SISO	Ant1	2437	36.56	2418.7600	2455.3200	---	---
11N40SISO	Ant1	2452	36.88	2433.7600	2470.6400	---	---

Test graphs as below

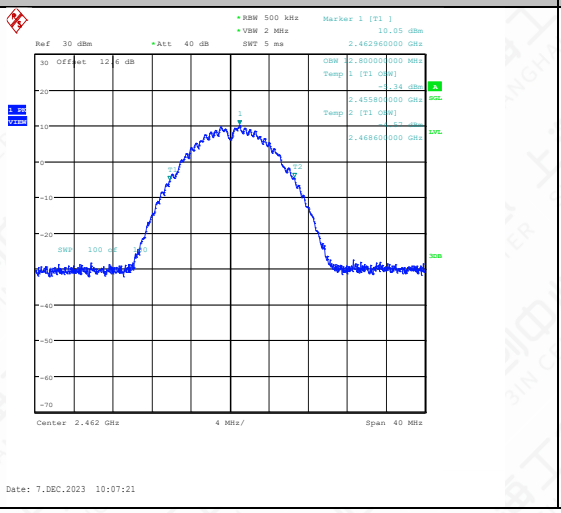
11B-Ant1-2412



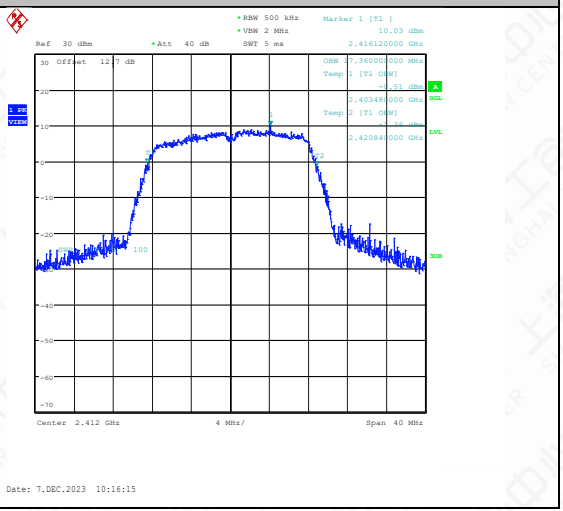
11B-Ant1-2437

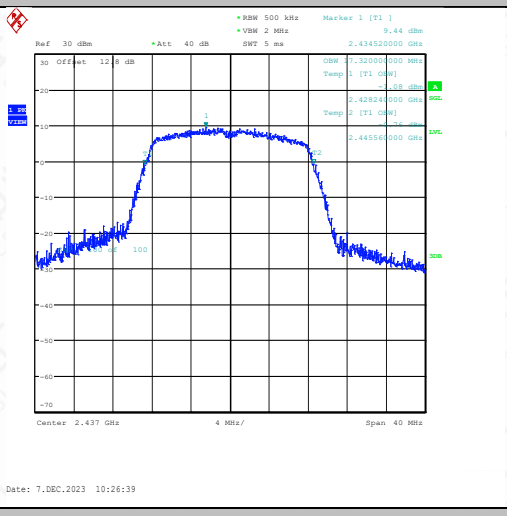
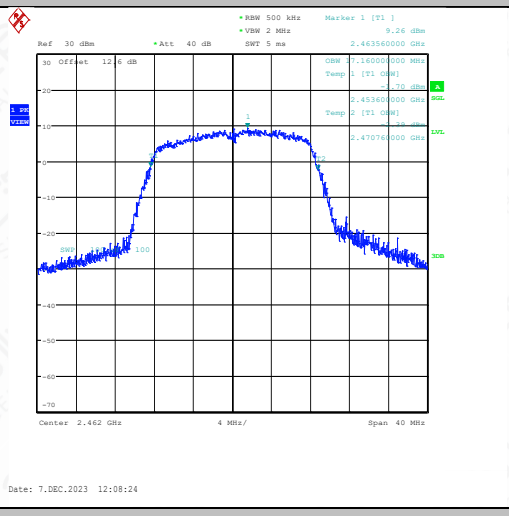
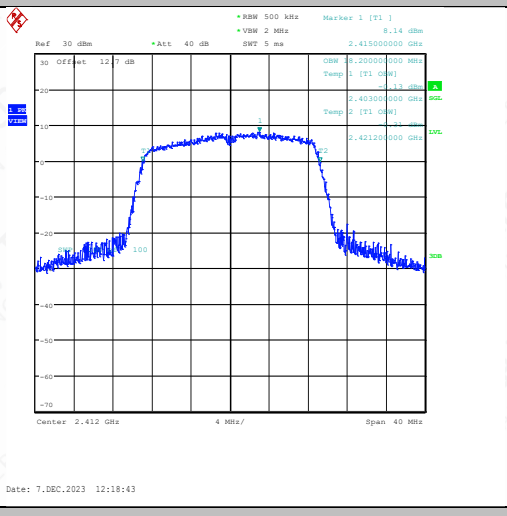
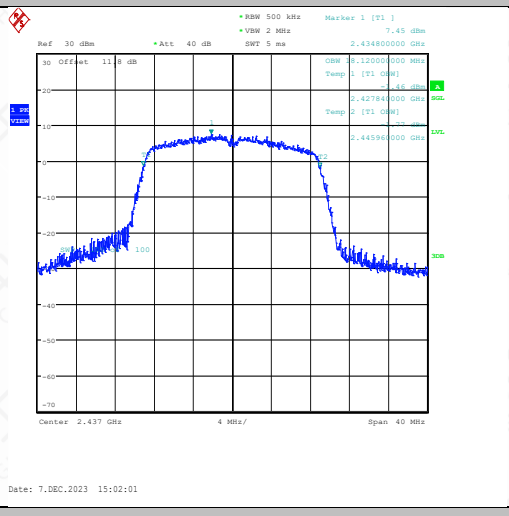
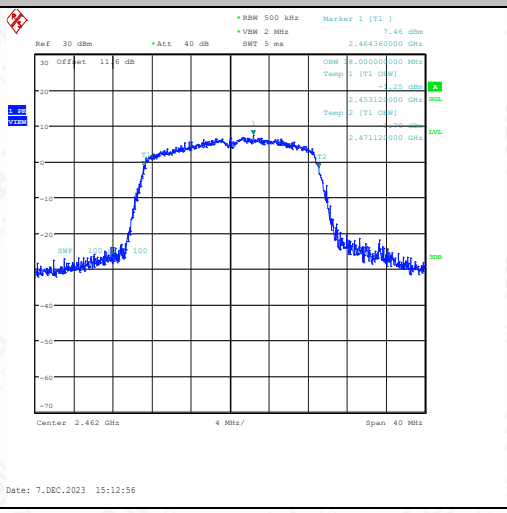
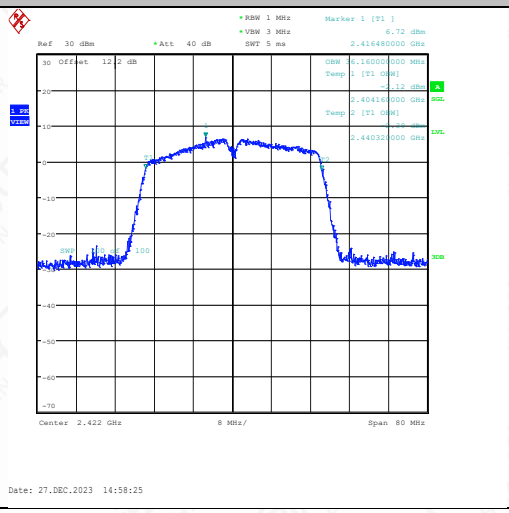


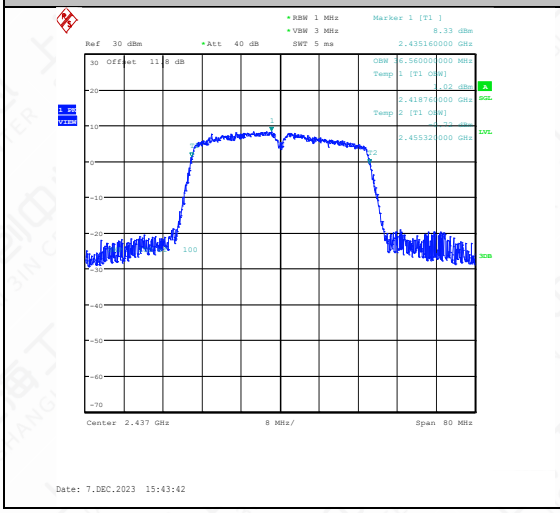
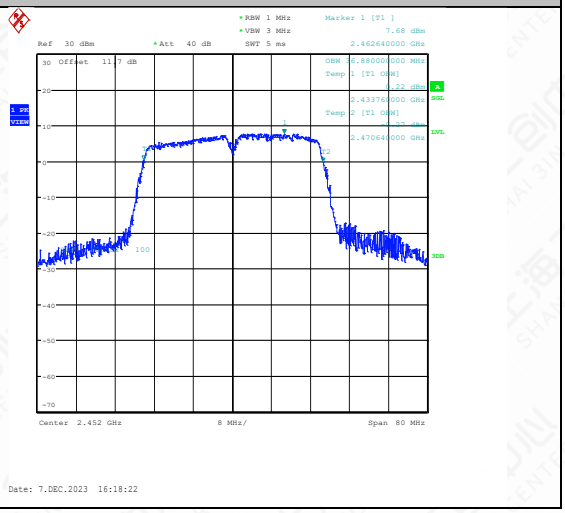
11B-Ant1-2462



11G-Ant1-2412



11G-Ant1-2437	11G-Ant1-2462
	
11N20SISO-Ant1-2412	11N20SISO-Ant1-2437
	
11N20SISO-Ant1-2462	11N40SISO-Ant1-2422
	

11N40SISO-Ant1-2437	11N40SISO-Ant1-2452
	

6.6 Band Edges Compliance

6.6.1 Measurement limt

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

6.6.2 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

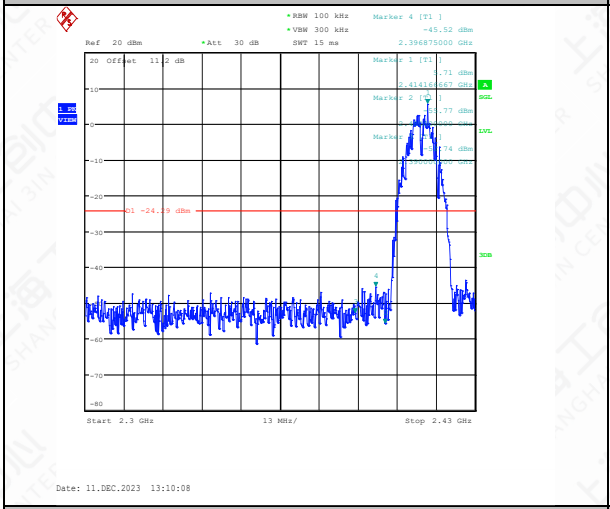
1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ [3 × RBW].
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum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

6.6.3 Measurement results

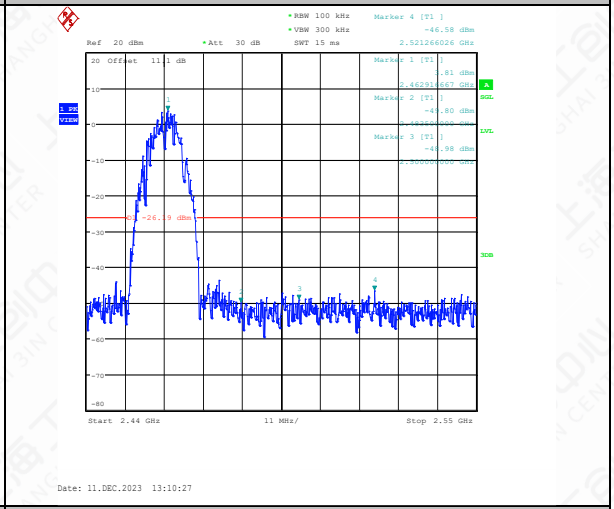
TestMode	Antenna	ChName	Frequency [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	5.71	-45.52	≤-24.29	PASS
11B	Ant1	High	2462	3.81	-46.58	≤-26.19	PASS
11G	Ant1	Low	2412	0.23	-37.08	≤-29.77	PASS
11G	Ant1	High	2462	-1.19	-44	≤-31.19	PASS
11N20SISO	Ant1	Low	2412	-2.13	-36.11	≤-32.13	PASS
11N20SISO	Ant1	High	2462	-2.41	-45.65	≤-32.41	PASS
11N40SISO	Ant1	Low	2422	-4.13	-38.18	≤-34.13	PASS
11N40SISO	Ant1	High	2452	-4.86	-42.59	≤-34.86	PASS

Test Graphs

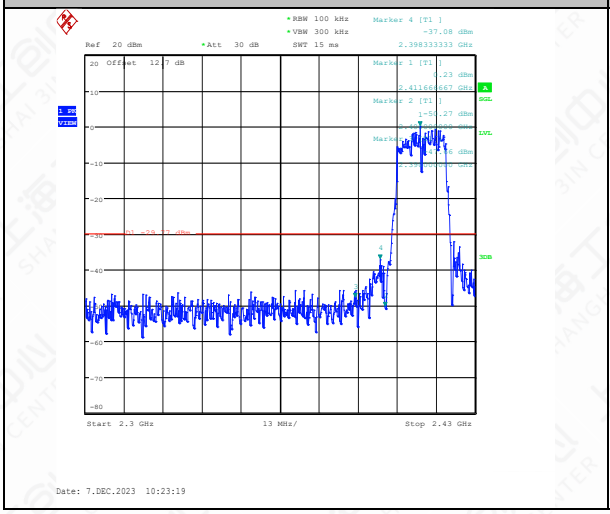
11B-Ant1-2412-PASS



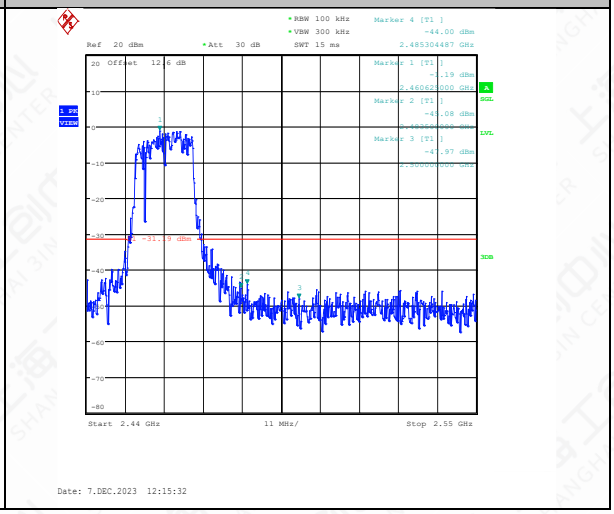
11B-Ant1-2462-PASS

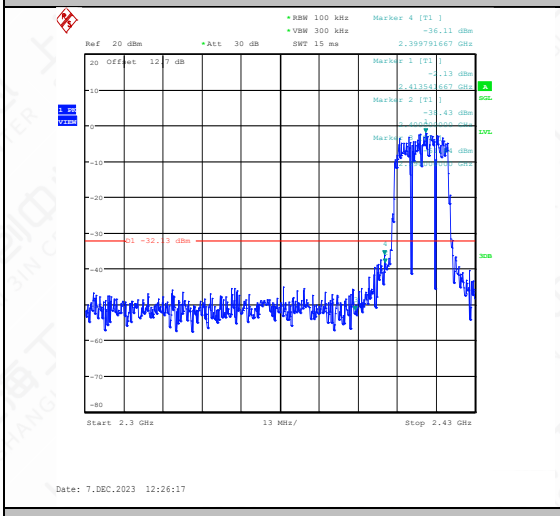
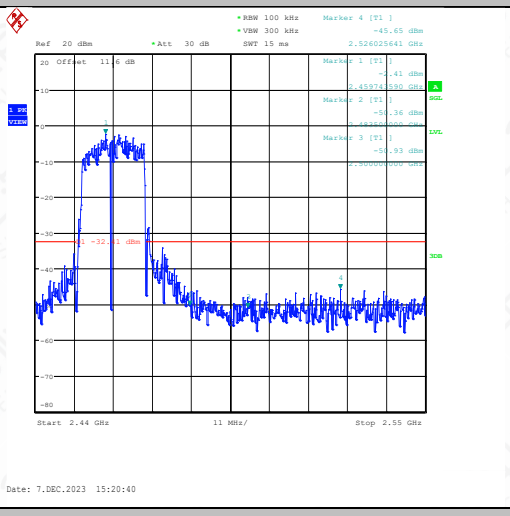
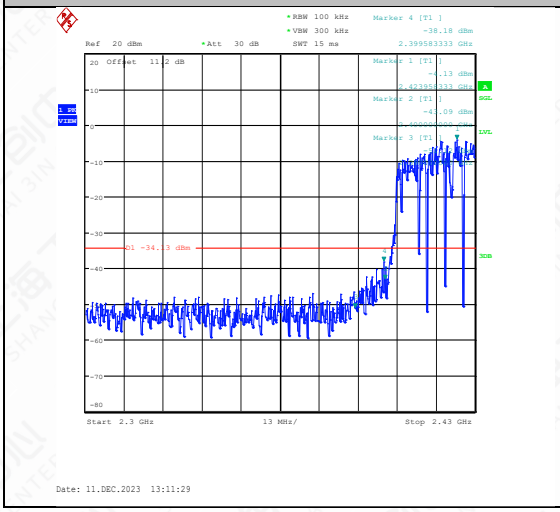
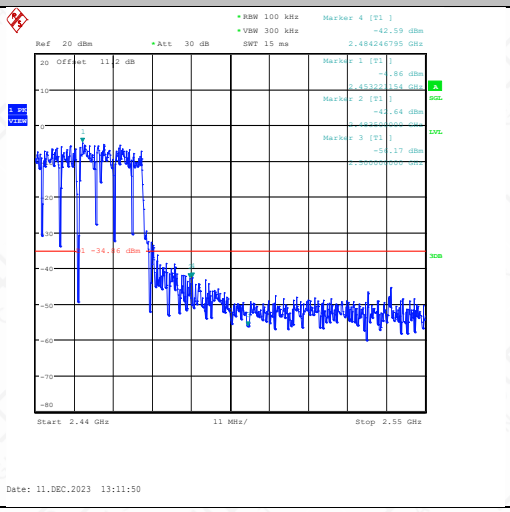


11G-Ant1-2412-PASS



11G-Ant1-2462-PASS



11N20SISO-Ant1-2412-PASS	11N20SISO-Ant1-2462-PASS
	
11N40SISO-Ant1-2422-PASS	11N40SISO-Ant1-2452-PASS
	

6.7 Transmitter Spurious Emission-conducted

6.7.1 Measurement Limit

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

6.7.2 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.

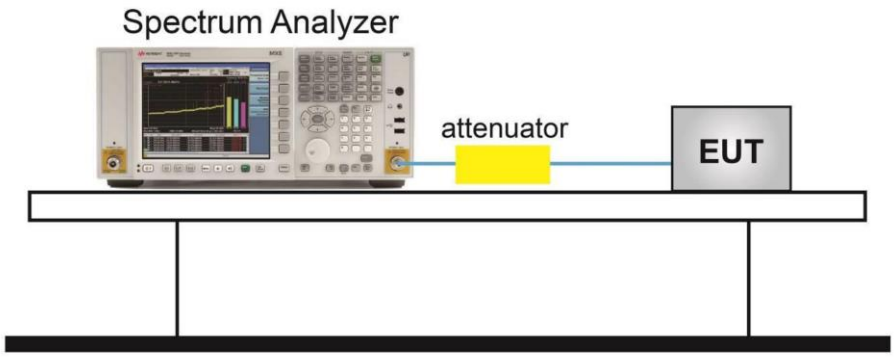
Reference level measurement

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.

6.7.3 Test Setup

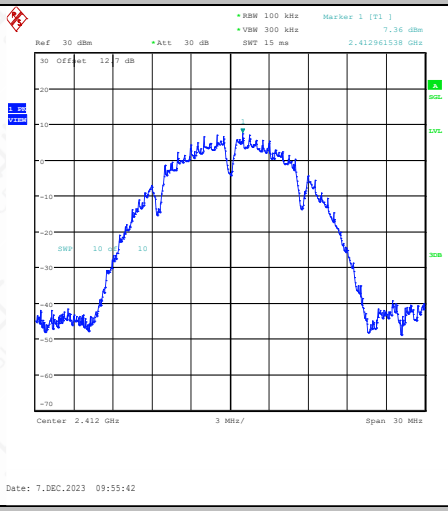
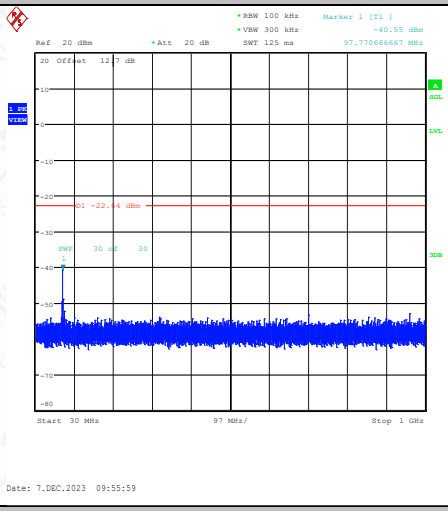
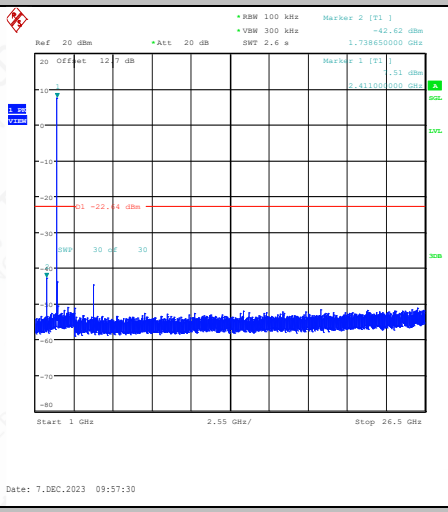
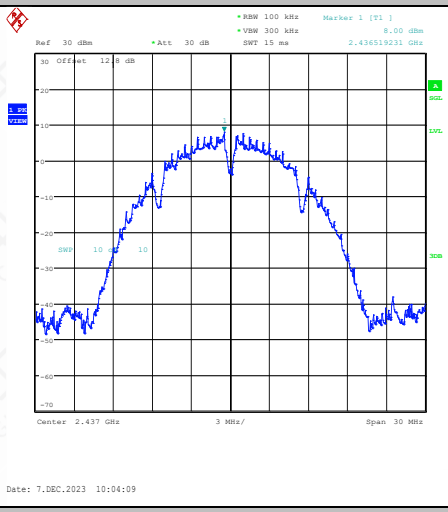
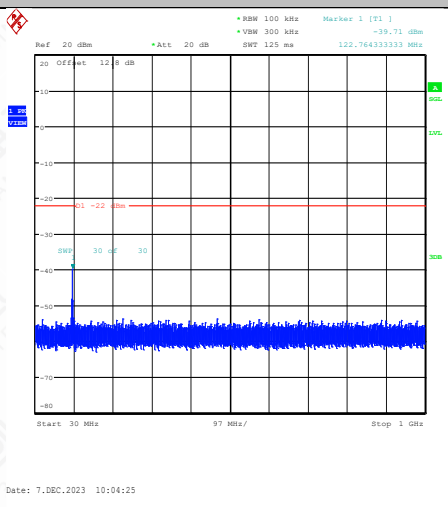
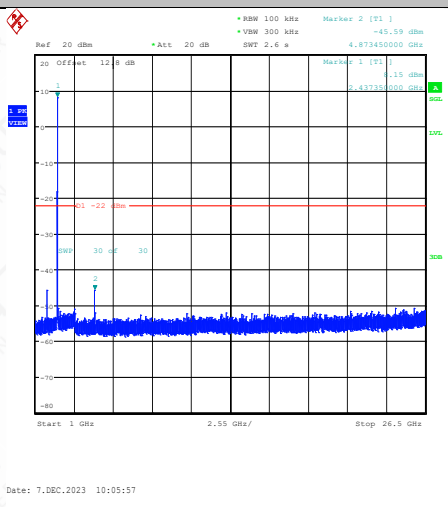


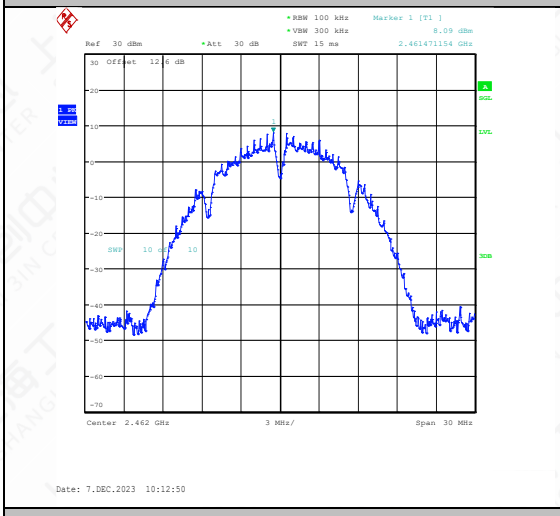
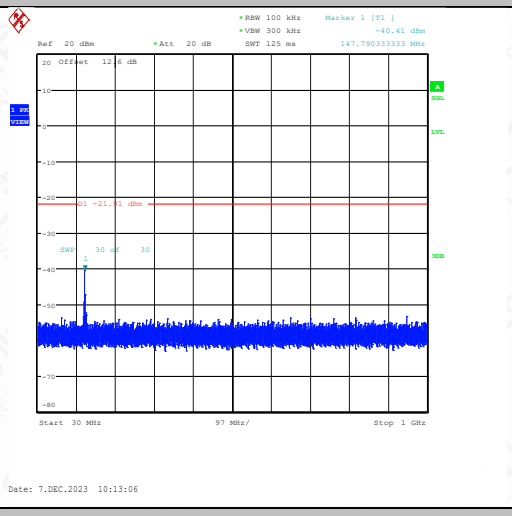
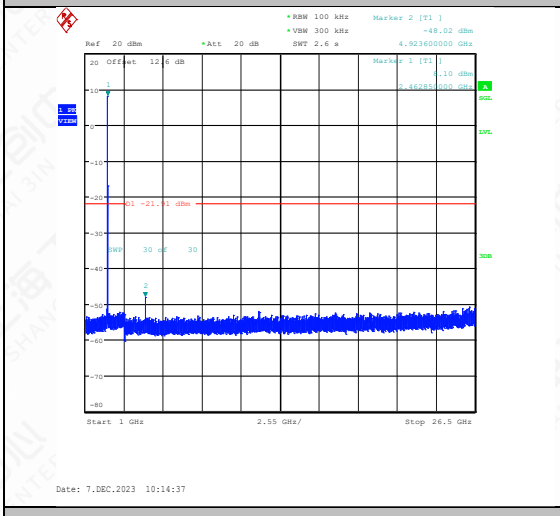
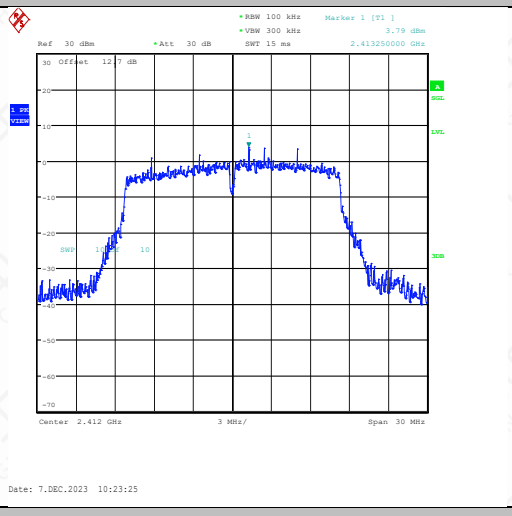
6.7.4 Measurement Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	0~Reference	7.36	7.36	---	PASS
11B	Ant1	2412	30~1000	7.36	-40.55	≤-22.64	PASS
11B	Ant1	2412	1000~26500	7.36	-42.62	≤-22.64	PASS
11B	Ant1	2437	0~Reference	8.00	8.00	---	PASS
11B	Ant1	2437	30~1000	8.00	-39.71	≤-22	PASS
11B	Ant1	2437	1000~26500	8.00	-45.59	≤-22	PASS
11B	Ant1	2462	0~Reference	8.09	8.09	---	PASS
11B	Ant1	2462	30~1000	8.09	-40.41	≤-21.91	PASS
11B	Ant1	2462	1000~26500	8.09	-48.02	≤-21.91	PASS
11G	Ant1	2412	0~Reference	3.79	3.79	---	PASS
11G	Ant1	2412	30~1000	3.79	-50.63	≤-26.21	PASS
11G	Ant1	2412	1000~26500	3.79	-50.86	≤-26.21	PASS
11G	Ant1	2437	0~Reference	3.06	3.06	---	PASS
11G	Ant1	2437	30~1000	3.06	-50.95	≤-26.94	PASS
11G	Ant1	2437	1000~26500	3.06	-46.8	≤-26.94	PASS
11G	Ant1	2462	0~Reference	3.62	3.62	---	PASS
11G	Ant1	2462	30~1000	3.62	-49.81	≤-26.38	PASS
11G	Ant1	2462	1000~26500	3.62	-47.32	≤-26.38	PASS
11N20SISO	Ant1	2412	0~Reference	3.05	3.05	---	PASS
11N20SISO	Ant1	2412	30~1000	3.05	-53.22	≤-26.95	PASS
11N20SISO	Ant1	2412	1000~26500	3.05	-41.14	≤-26.95	PASS
11N20SISO	Ant1	2437	0~Reference	2.29	2.29	---	PASS
11N20SISO	Ant1	2437	30~1000	2.29	-51.75	≤-27.71	PASS
11N20SISO	Ant1	2437	1000~26500	2.29	-46.13	≤-27.71	PASS
11N20SISO	Ant1	2462	0~Reference	1.99	1.99	---	PASS

11N20SISO	Ant1	2462	30~1000	1.99	-53.22	≤-28.01	PASS
11N20SISO	Ant1	2462	1000~26500	1.99	-48.59	≤-28.01	PASS
11N40SISO	Ant1	2422	0~Reference	-2.01	-2.01	---	PASS
11N40SISO	Ant1	2422	30~1000	-2.01	-52.76	≤-32.01	PASS
11N40SISO	Ant1	2422	1000~26500	-2.01	-51.84	≤-32.01	PASS
11N40SISO	Ant1	2437	0~Reference	-2.77	-2.77	---	PASS
11N40SISO	Ant1	2437	30~1000	-2.77	-51.78	≤-32.77	PASS
11N40SISO	Ant1	2437	1000~26500	-2.77	-44.08	≤-32.77	PASS
11N40SISO	Ant1	2452	0~Reference	-1.55	-1.55	---	PASS
11N40SISO	Ant1	2452	30~1000	-1.55	-53.86	≤-31.55	PASS
11N40SISO	Ant1	2452	1000~26500	-1.55	-45.15	≤-31.55	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
	
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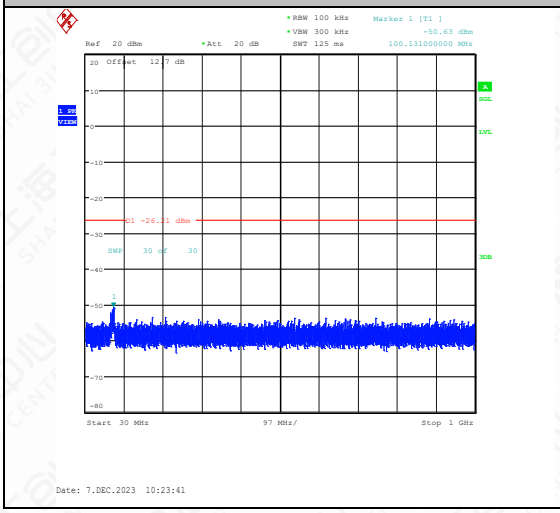
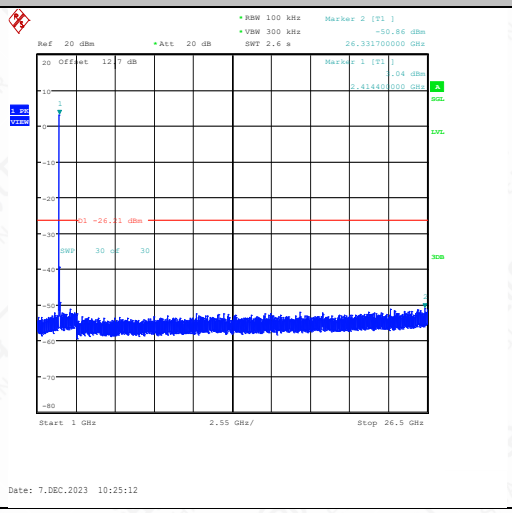
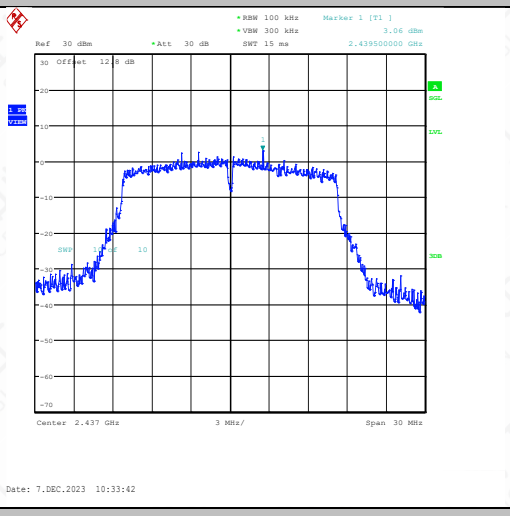
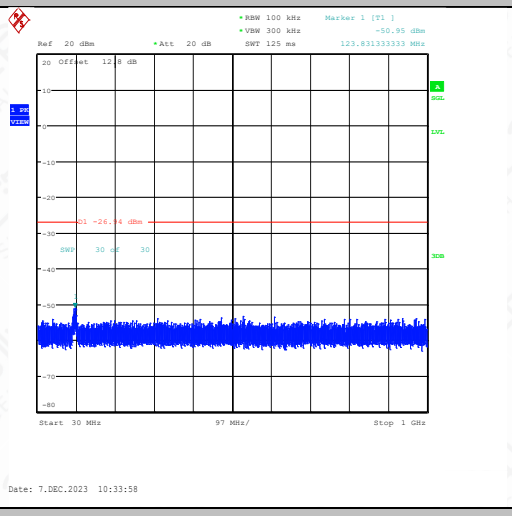
	

11G-Ant1-2437-0~Reference-PASS	11G-Ant1-2437-30~1000-PASS
	
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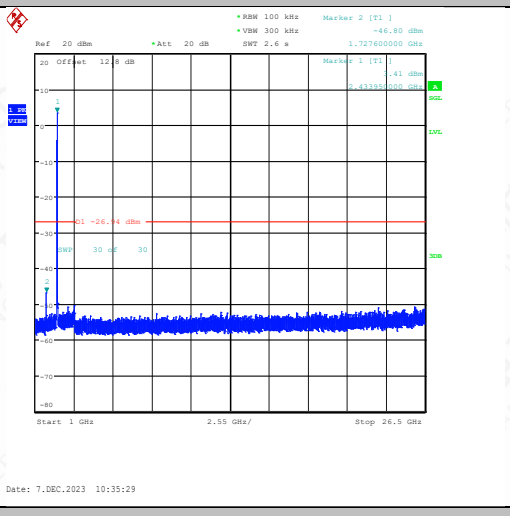
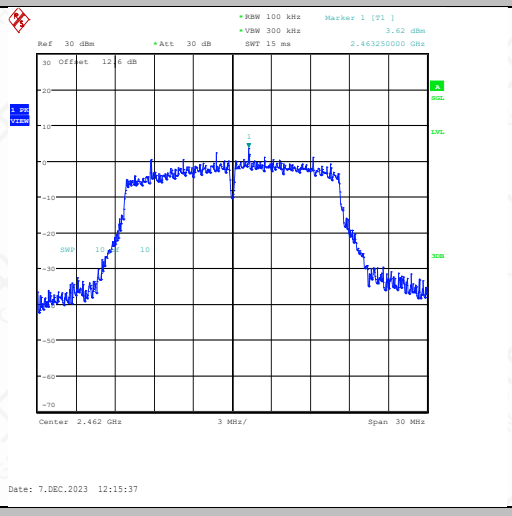
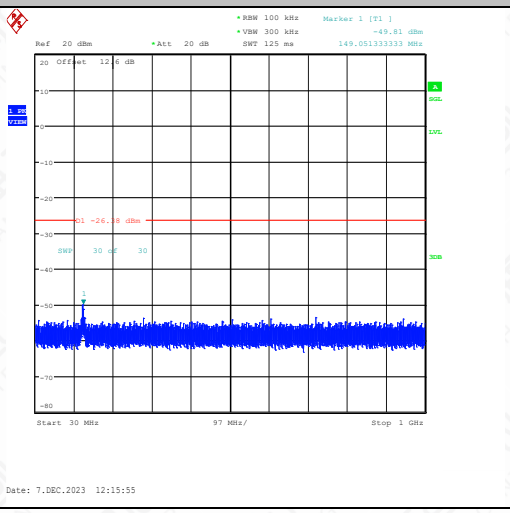
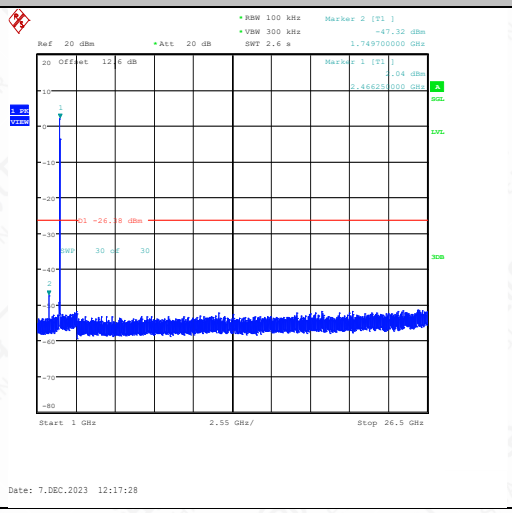
	
11G-Ant1-2462-30~1000-PASS	11G-Ant1-2462-1000~26500-PASS
	

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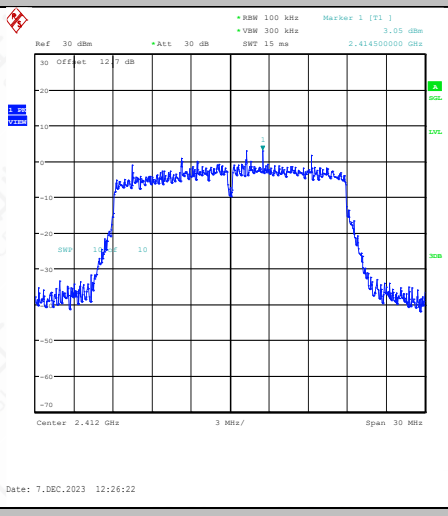	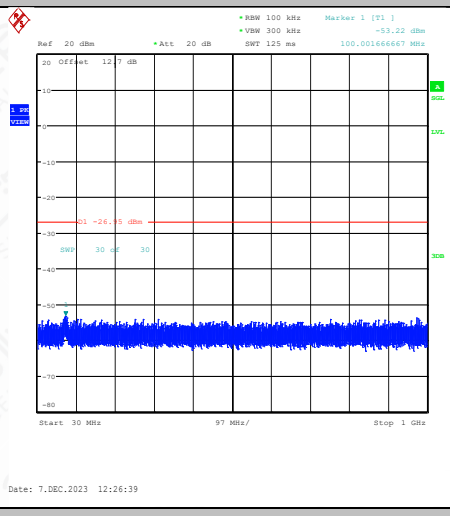
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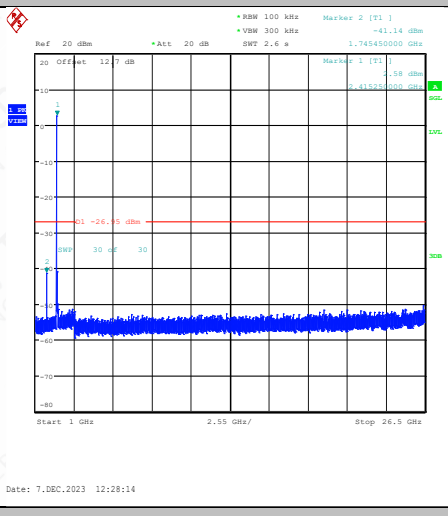	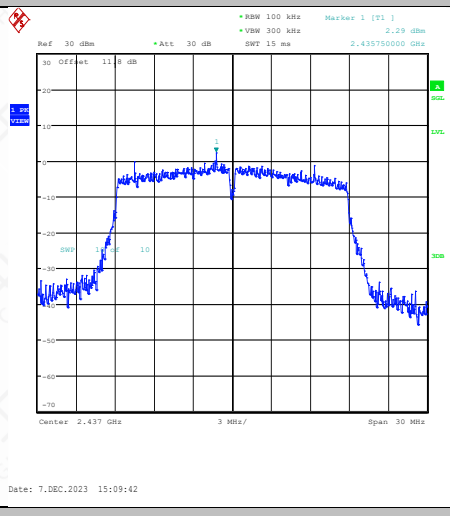
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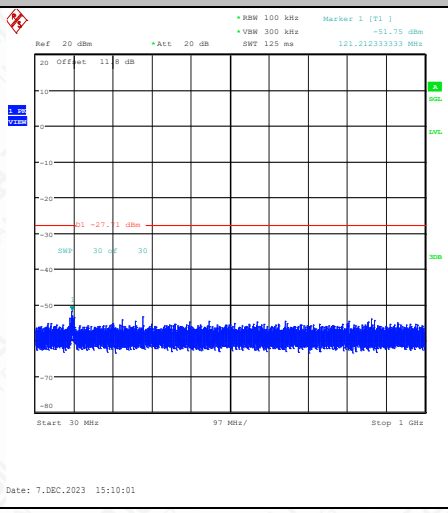
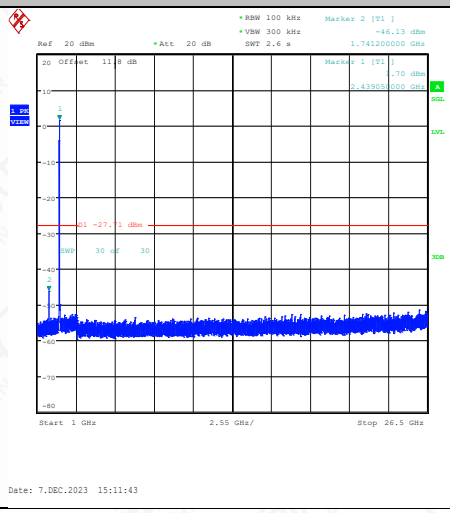
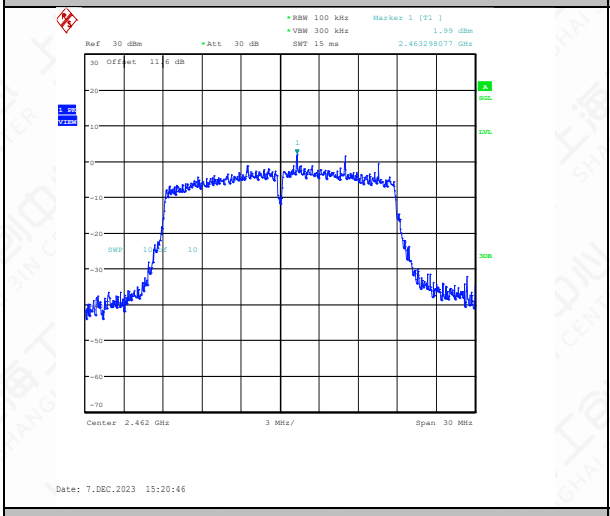
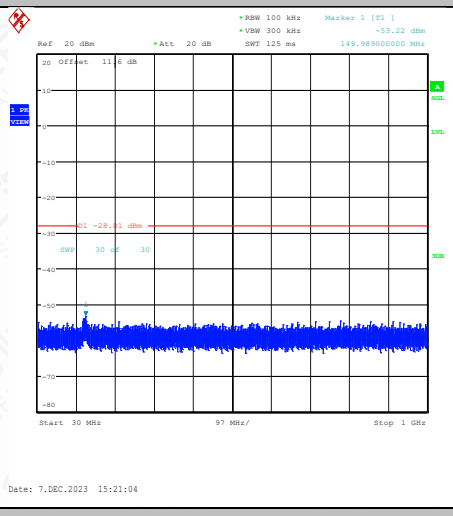
	

11N20SISO-Ant1-2462-0~Reference-PASS	11N20SISO-Ant1-2462-30~1000-PASS
	
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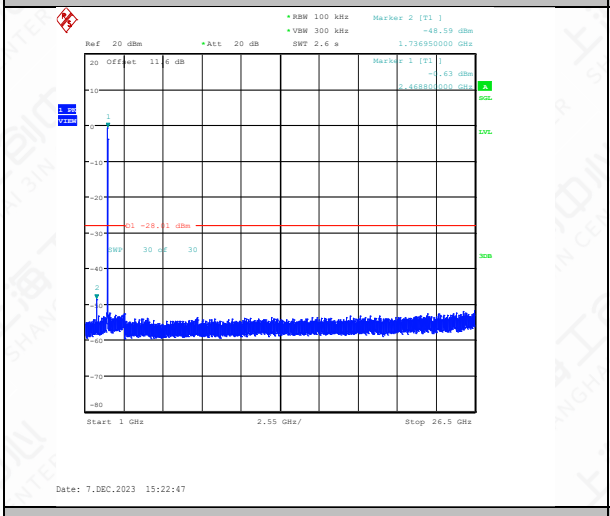	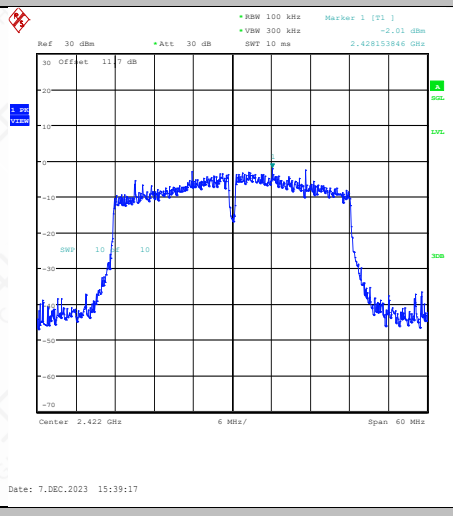
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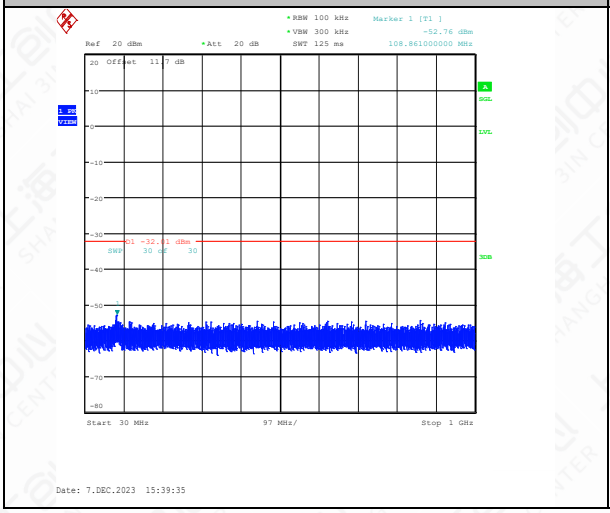
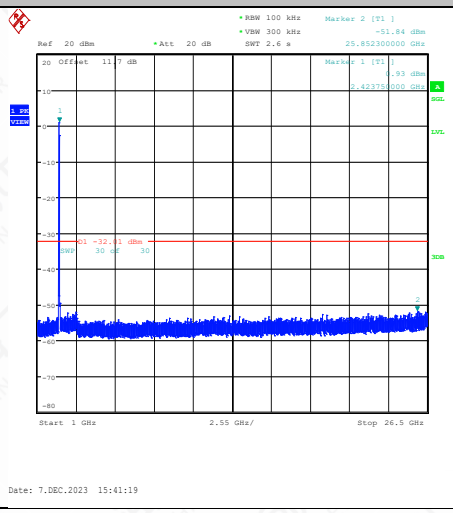
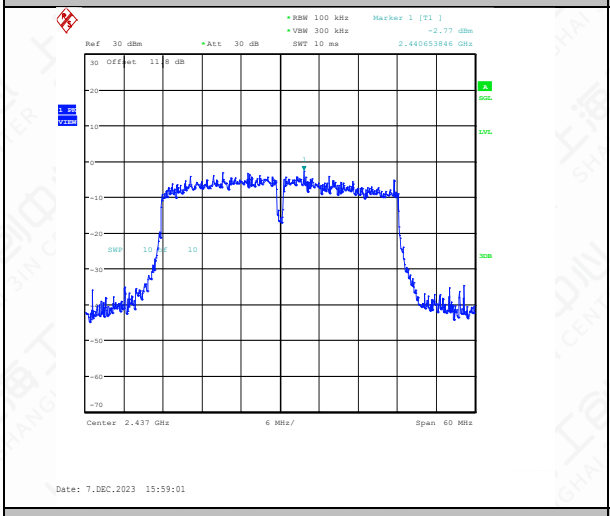
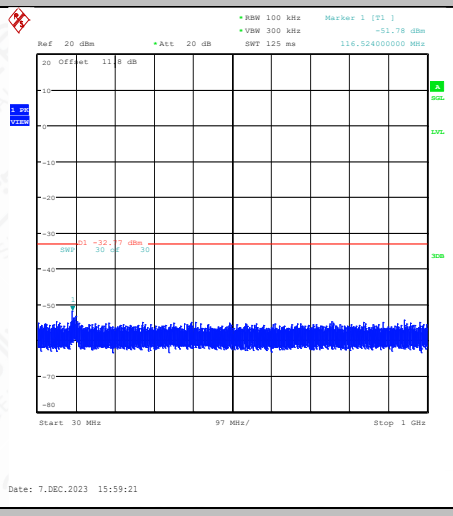
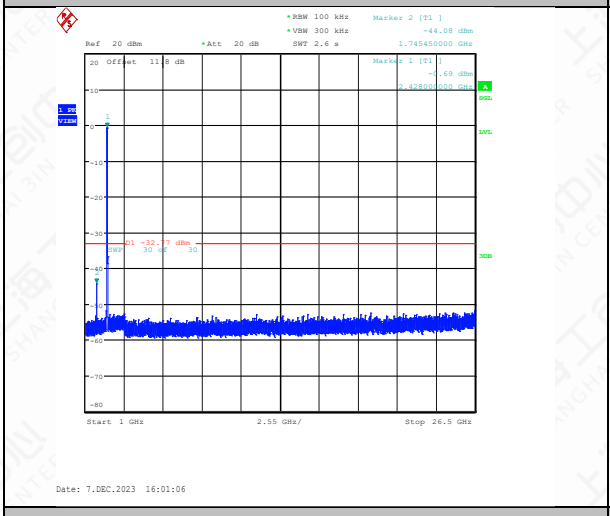
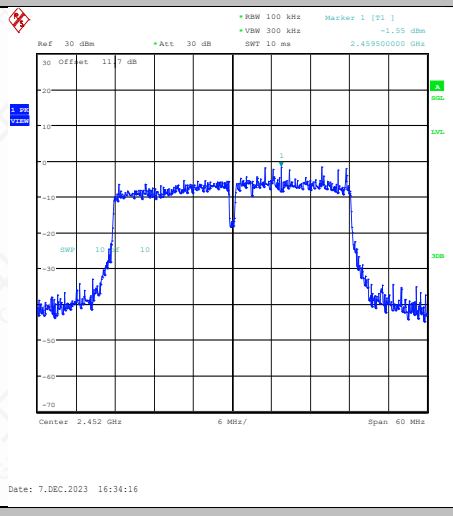
	

11N40SISO-Ant1-2437-0~Reference-PASS	11N40SISO-Ant1-2437-30~1000-PASS
	
11N40SISO-Ant1-2437-1000~26500-PASS	11N40SISO-Ant1-2452-0~Reference-PASS
	
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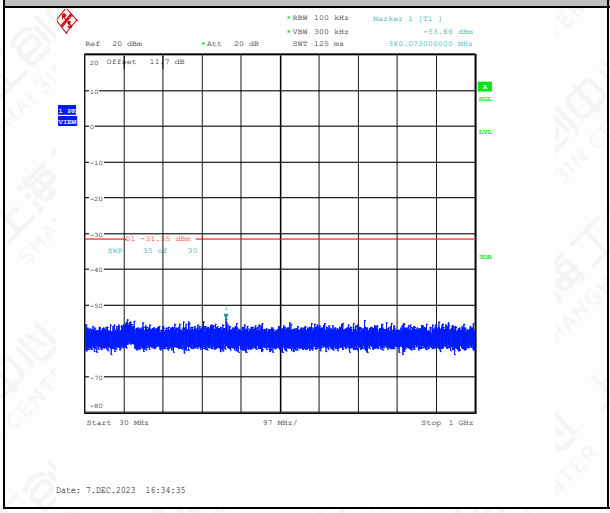
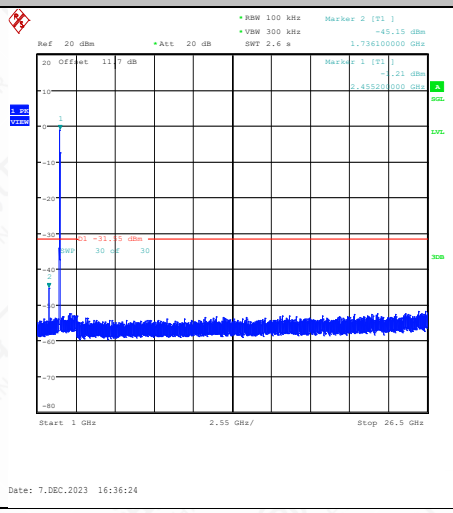
	

6.8 Transmitter Spurious Emission-Radiated

6.8.1 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.

6.8.2 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

6.8.3 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.

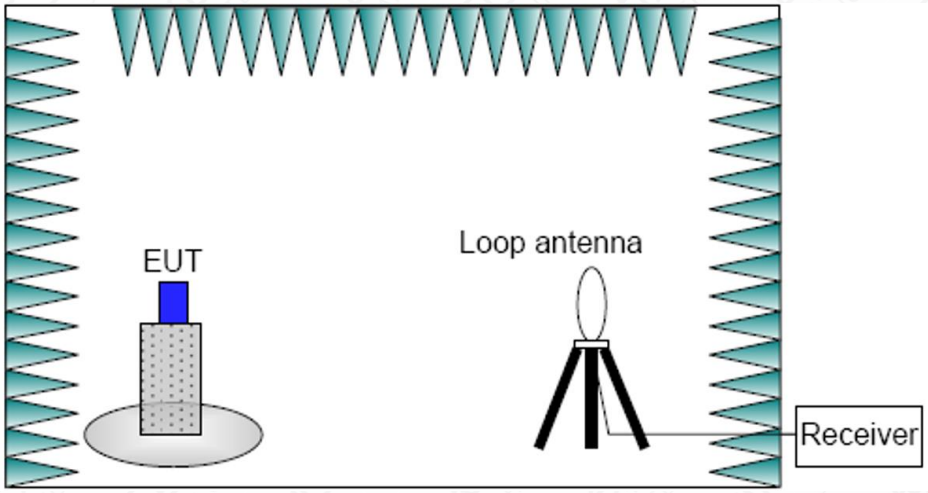
Test Settings – Above 1GHz (Average Field Strength Measurements)

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.

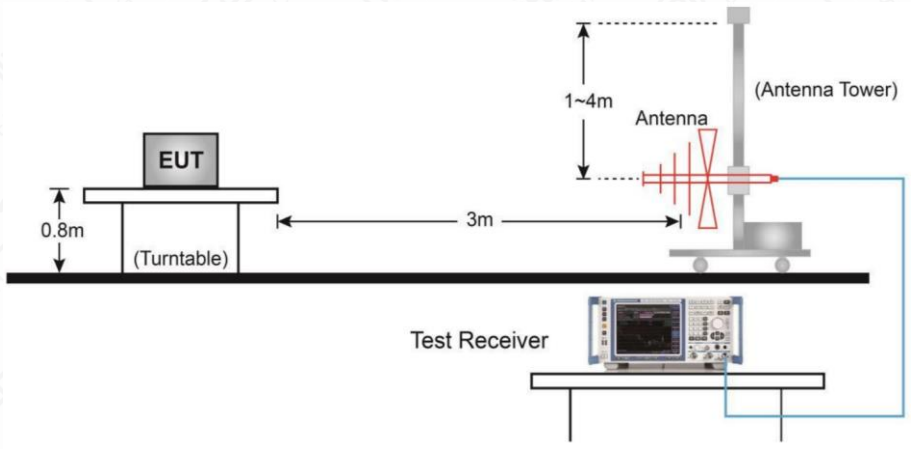
Frequency of emission	RBW/VBW	Sweep Time (s)
0.009~30	9KHz/30KHz	Auto
30~1000	100KHz/300KHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

6.8.4 Test Setup

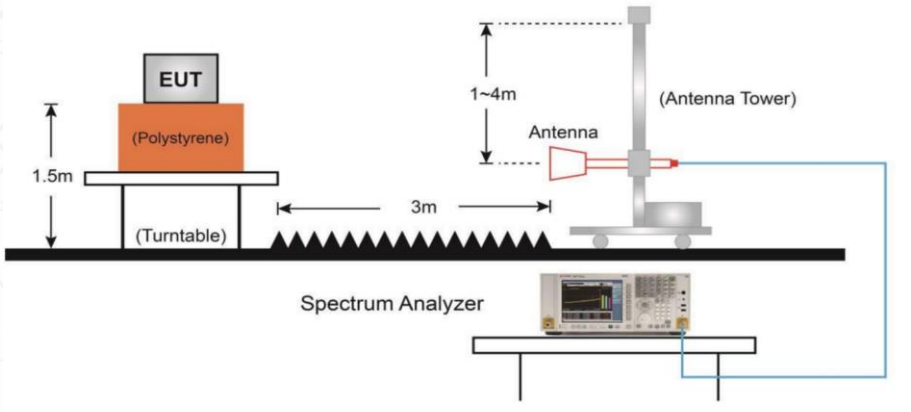
Below 30MHz Test Setup



Below 1GHz Test Setup



Above 1GHz Test Setup



6.8.5 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.

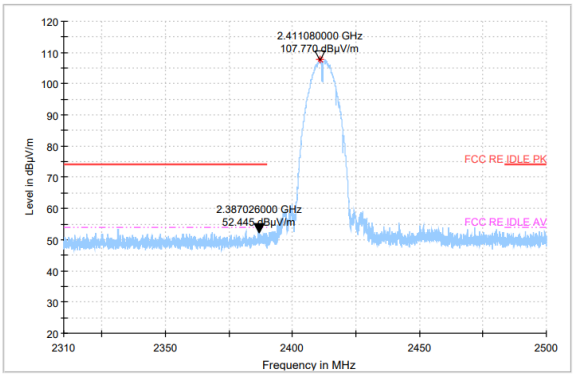
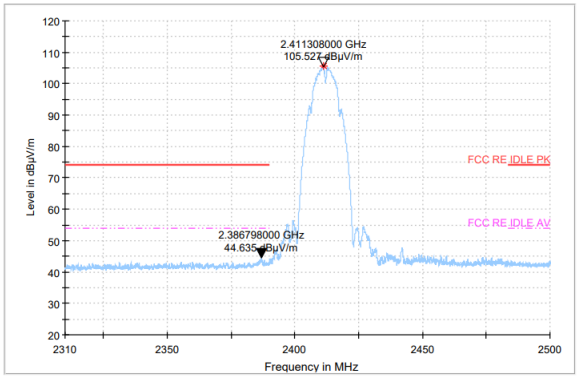
P_{Mea} is the field strength recorded from the instrument.

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 .

Mainly Supply (S14)

<table>
<tr><td colspan="2">Band edge: 802.11b, low channel</td></tr>
<tr><td>Peak detector</td><td>AV detector</td></tr>
<tr><td> 
</td><td> 
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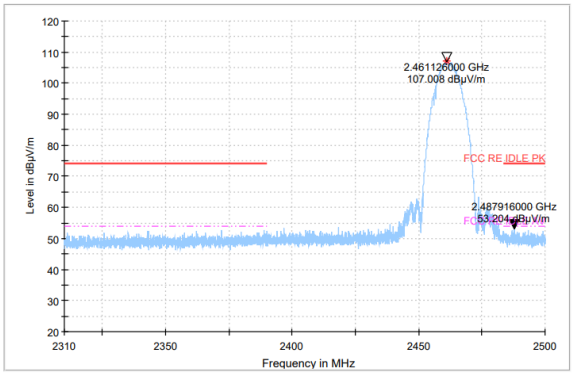
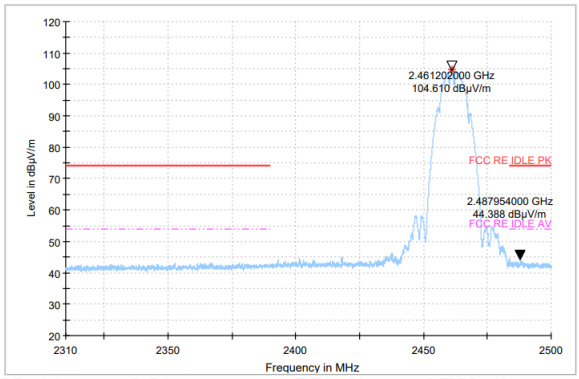
<tr><td colspan="2">Band edge: 802.11b, high channel</td></tr>
<tr><td>Peak detector</td><td>AV detector</td></tr>
<tr><td> 
</td><td> 
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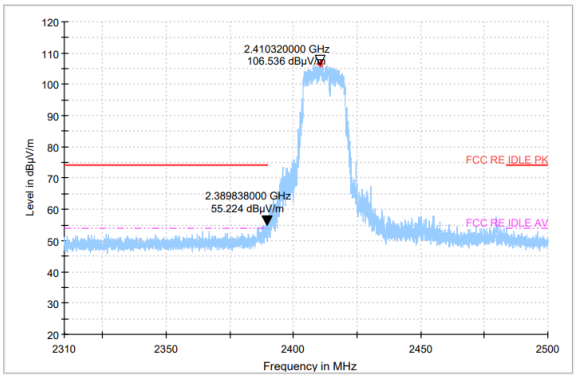
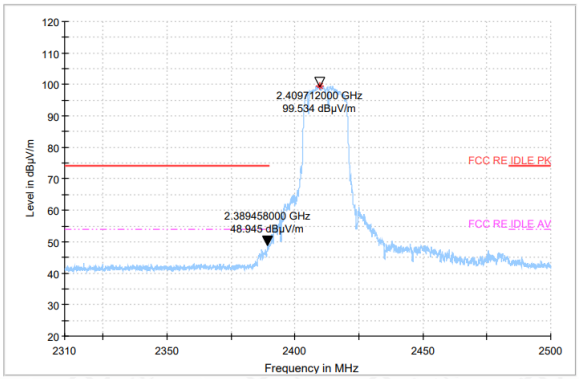
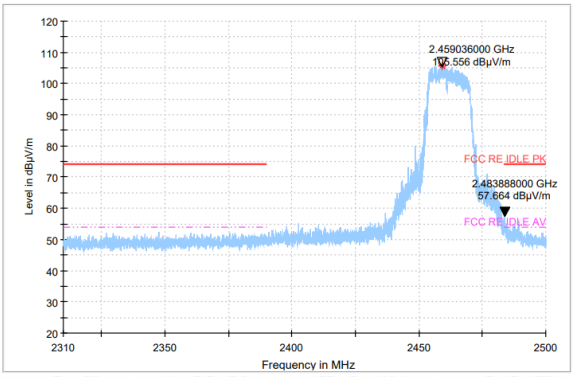
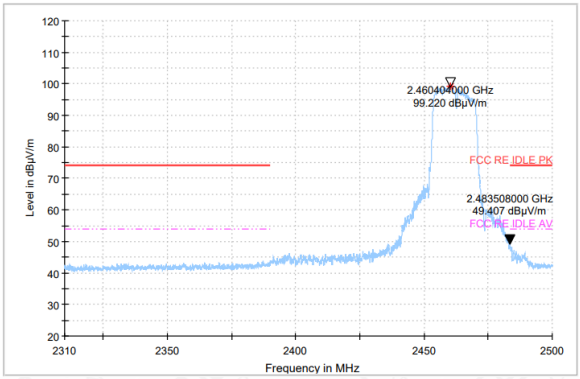
Band edge: 802.11g, low channel	
Peak detector	AV detector
	
Band edge: 802.11g, high channel	
Peak detector	AV detector
	
Band edge: 802.11n(20M), low channel	
Peak detector	AV detector