FCC TEST REPORT

FCC ID:2A5MMB2-4010

Product	:	treadmill
Model Name	:	B2-4010
Brand	:	SYTIRY
Report No.	:	PTC22022404101E-FC01

Prepared for

Zhejiang Dapao Technologyco,Ltd

NO.65,Baihuanshan Development Avenue,Wuyi County,Jinhua City Zhejiang Province

Prepared by

Precise Testing & Certification Co., Ltd

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

1 TEST RESULT CERTIFICATION

Applicant's name	:	Zhejiang Dapao Technologyco,Ltd
Address	:	NO.65,Baihuanshan Development Avenue,Wuyi County,Jinhua City Zhejiang Province
Manufacture's name	:	Zhejiang Dapao Technologyco,Ltd
Address	:	NO.65,Baihuanshan Development Avenue,Wuyi County,Jinhua City Zhejiang Province
Product name	:	treadmill
Model name	:	B2-4010
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10:2013
Test Date	:	Mar. 02, 2022 to Mar. 12, 2022
Date of Issue	:	Mar. 12, 2022
Test Result	:	Pass

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Test Engineer:

Abel Yu / Engineer

Technical Manager:

Wu Weimin / Manager

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2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Spurious Emission	15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
20dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203	PASS
Remark: N/A: Not Applicable		

3 General Information

3.1 General Description of E.U.T.

Product Name	:	treadmill
Model Name	:	B2-4010
Specification	:	802.11b/g/n HT20/HT40
Operation Frequency	:	2412-2462MHz
Number of Channel	:	11 channels for 802.11b/g; n(HT20) 7 channels for 802.11n(HT40)
Type of Modulation	:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Antenna installation	:	Internal Antenna
Antenna Gain	:	2.0 dBi
Power supply	:	AC120V/60Hz
Hardware Version	:	N/A
Software Version	:	N/A

3.2 Channel List

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20): MCS0;) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n (HT20)

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

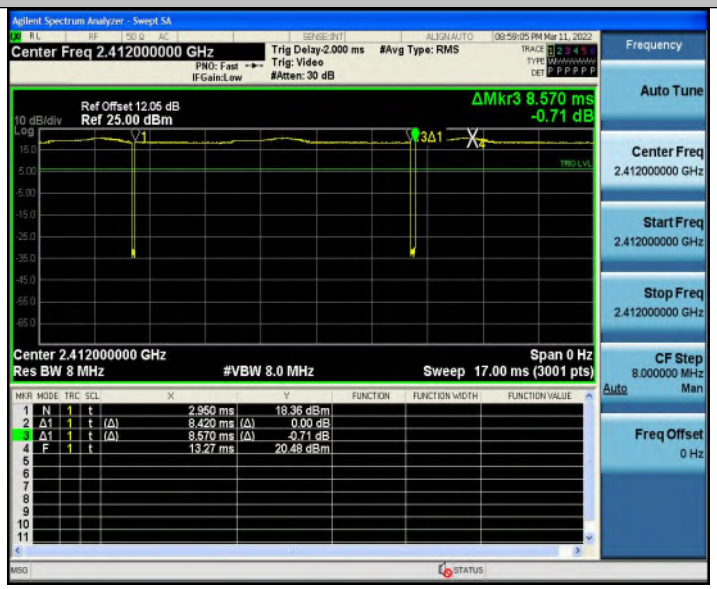
Frequency and Channel list for 802.11n (HT40)

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
--	--	5	2432	9	2452
--	--	6	2437		
3	2422	7	2442		
4	2427	8	2447		

The maximum duty cycle as following table:

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	8.42	8.57	98.25	---	---
		2437	8.42	8.46	99.53	---	---
		2462	8.42	8.54	98.59	---	---
11G	Ant1	2412	1.40	1.55	90.32	---	---
		2437	1.40	1.56	89.74	---	---
		2462	1.40	1.55	90.32	---	---
11N20SISO	Ant1	2412	1.31	1.48	88.51	---	---
		2437	1.31	1.46	89.73	---	---
		2462	1.31	1.43	91.61	---	---
11N40SISO	Ant1	2422	0.65	0.76	85.53	---	---
		2437	0.65	0.75	86.67	---	---
		2452	0.65	0.81	80.25	---	---

Test Plots:

11B_Ant1_2412

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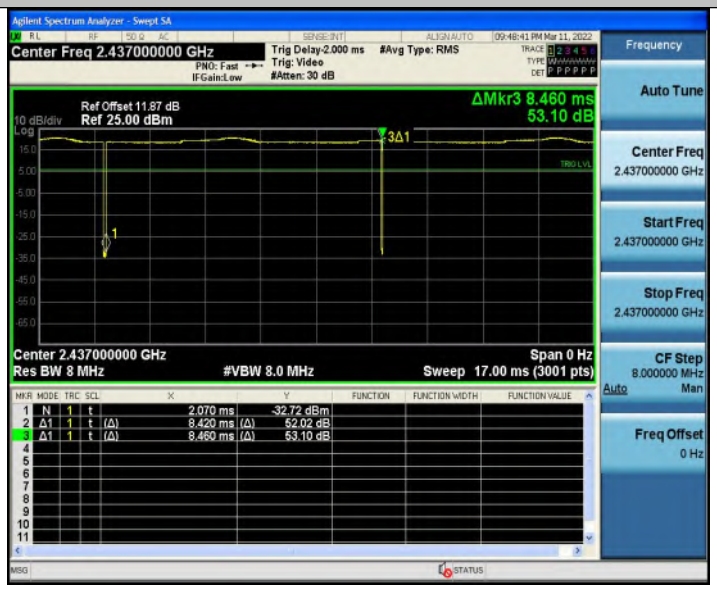
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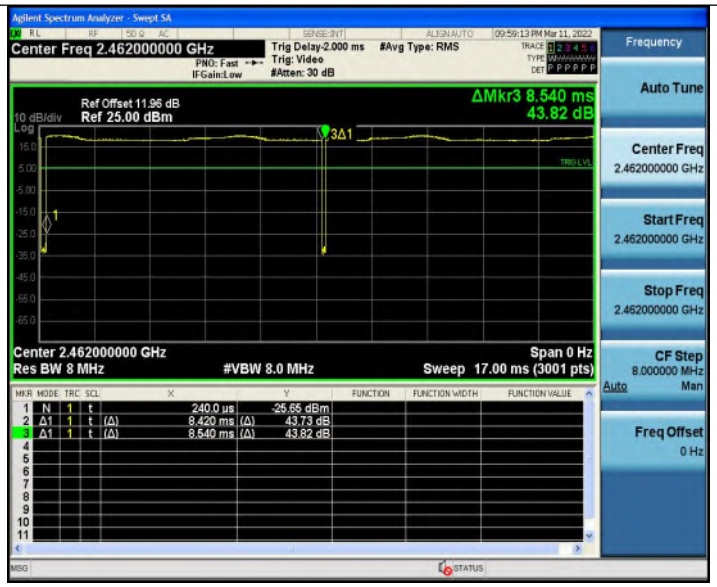

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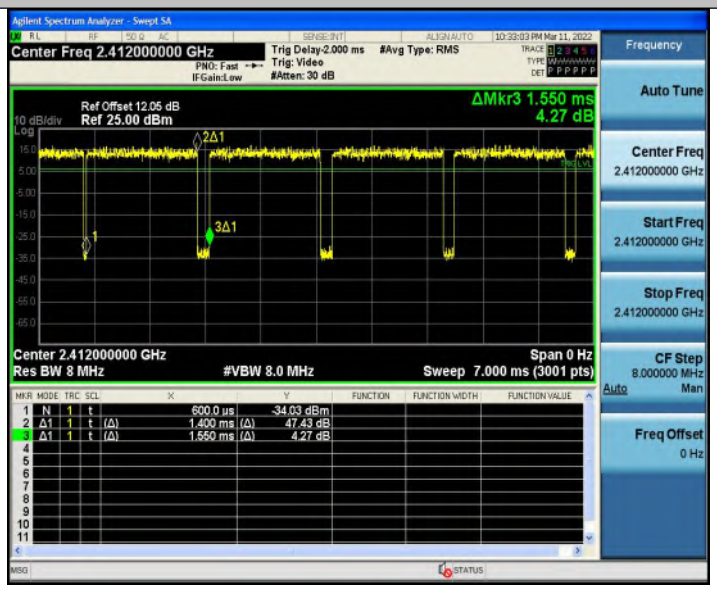

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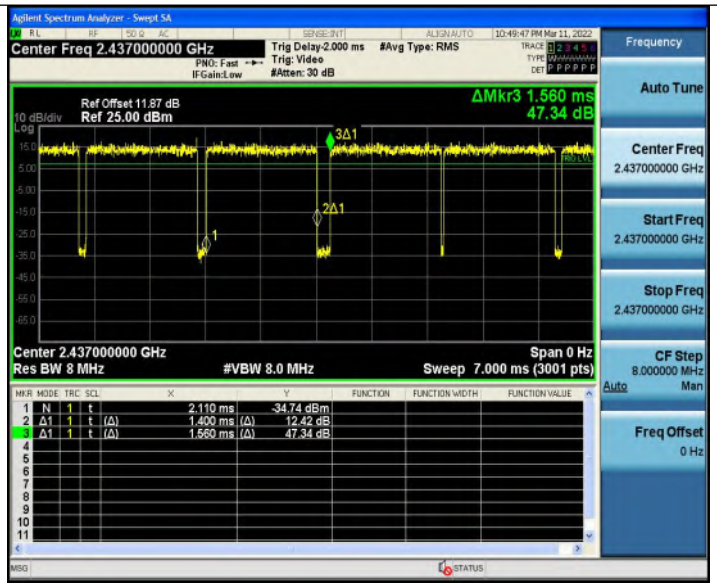
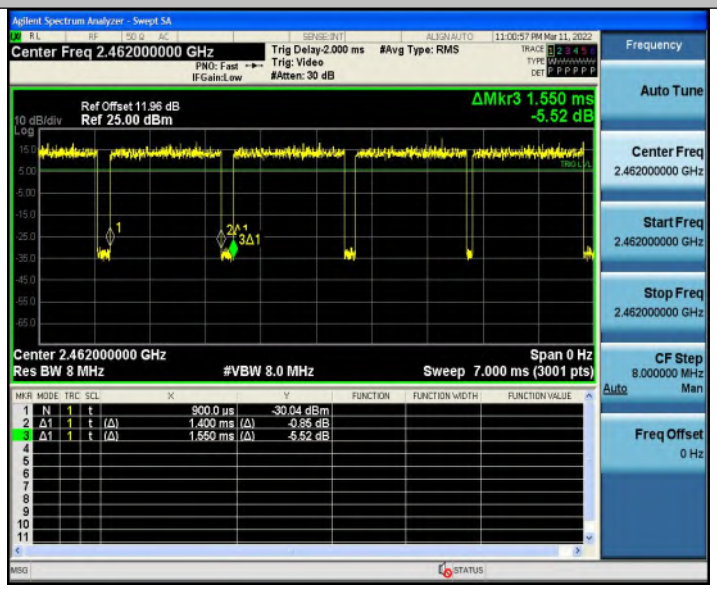
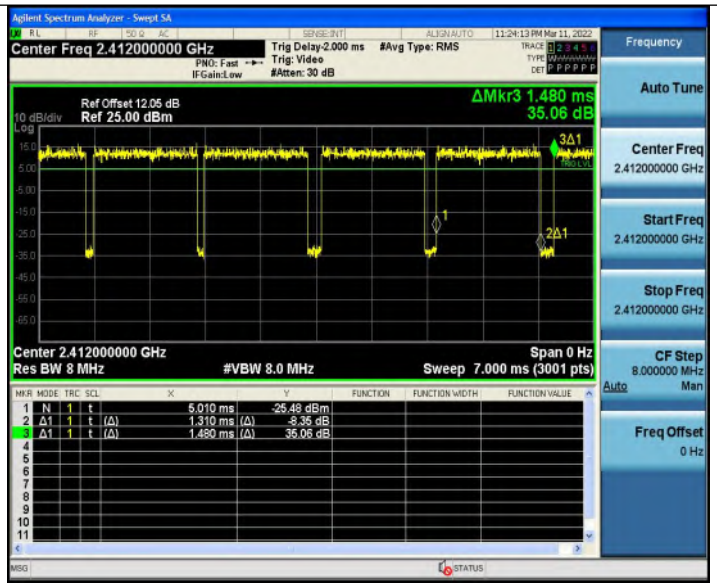


11G_Ant1_2462



11N20SISO_Ant1_2412



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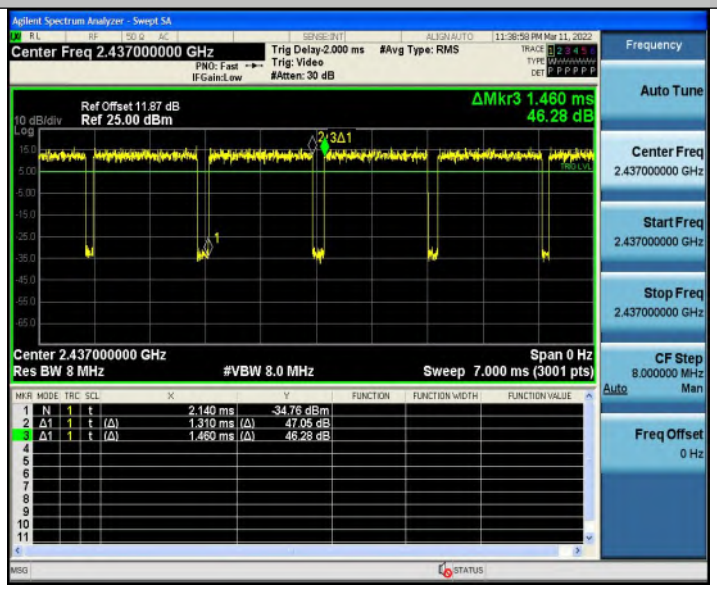

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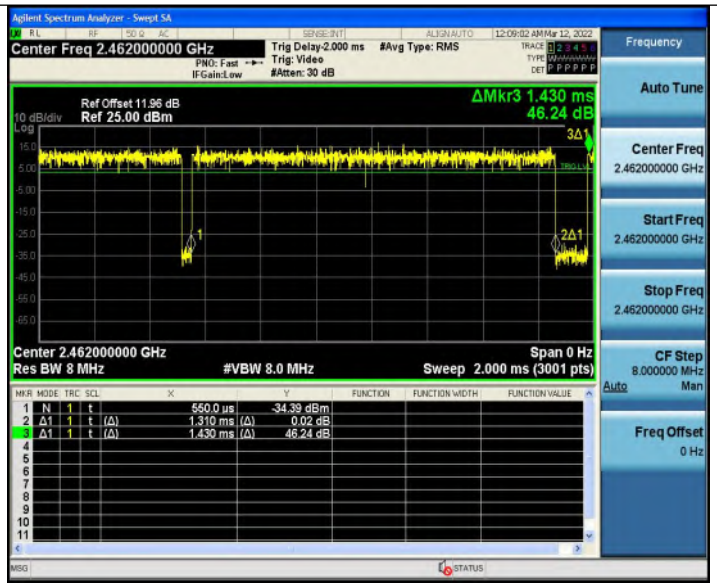
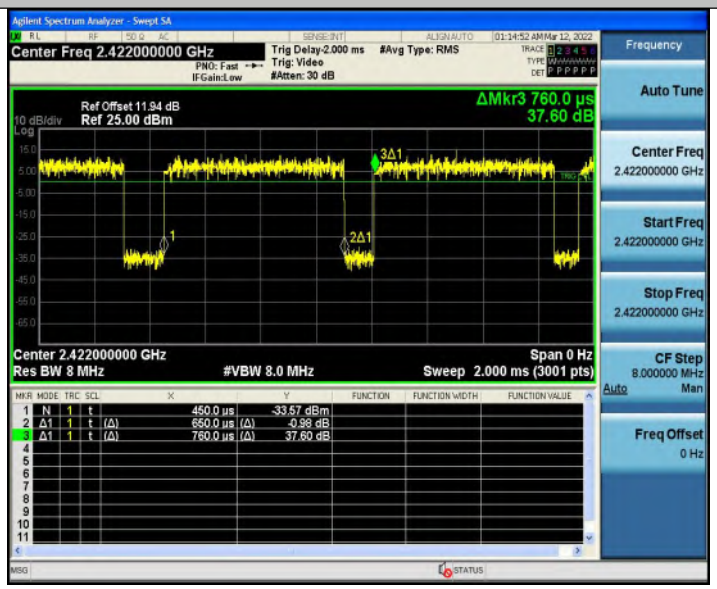
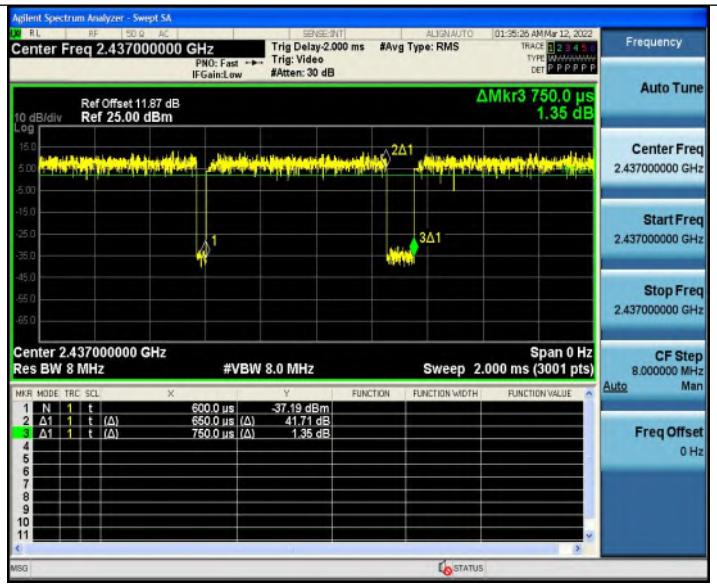


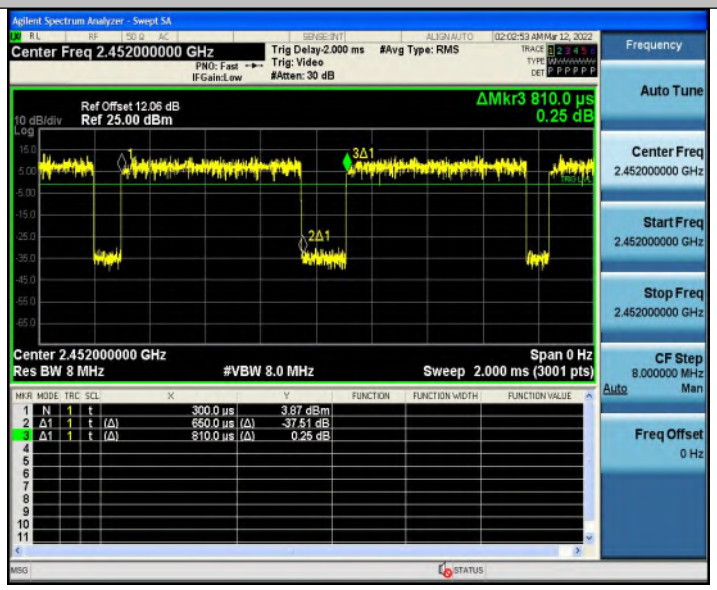
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



3.3 Test Site

Precise Testing & Certification Co., Ltd

Address: Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A

4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	SER MY5111038	10Hz-30GHz	Aug. 22, 2022
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 22, 2022
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 22, 2022
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 22, 2022

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 22, 2022
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug. 22, 2022
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 22, 2022
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 22, 2022
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 22, 2022
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Aug. 22, 2022
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 22, 2022
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 22, 2022
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Aug. 22, 2022
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 22, 2022

Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 22, 2022
RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 22, 2022

Conducted Emissions

Name of Equipment	**Manufacturer**	**Model**	**Serial No.**	**Characteristics**	**Calibration Due**
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 22, 2022
Artificial Mains Network	Rohde&Schwarz	ENV216	102453	9KHz-300MHz	Aug. 22, 2022
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Aug. 22, 2022

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Radiated Emission(9kHz~30MHz)	±3.15dB
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

4.3 Description of Support Units

Equipment	Model No.	Series No.
N/A	N/A	N/A

5 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207
Test Method	:	ANSI C63.10: 2013
Test Result	:	PASS
Frequency Range	:	150kHz to 30MHz
Class/Severity	:	Class B

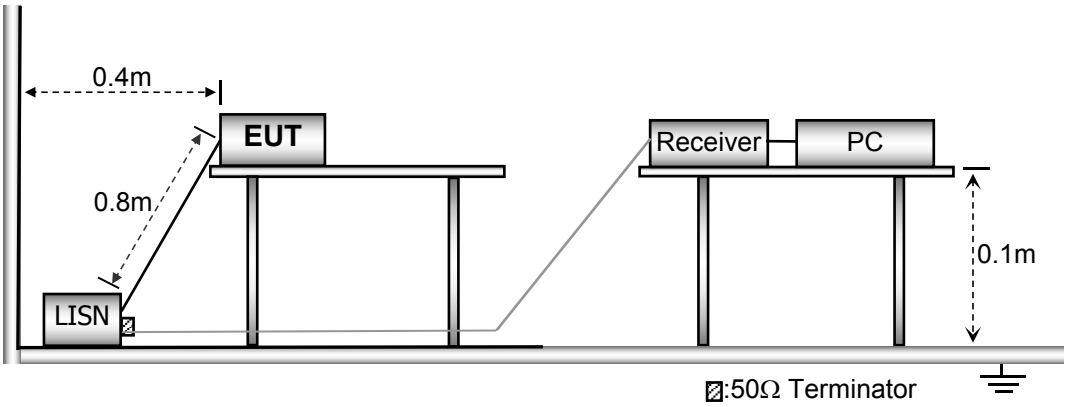
5.1 E.U.T. Operation

Operating Environment :

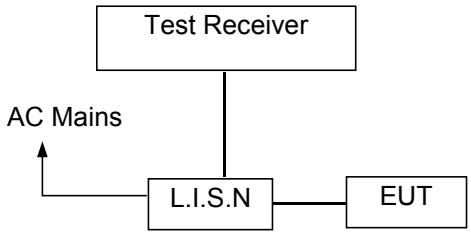
Temperature	:	23.9 °C
Humidity	:	51.4 % RH
Atmospheric Pressure	:	101.21kPa

5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.1m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:
1. The lower limit shall apply at the transition frequencies
2.The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

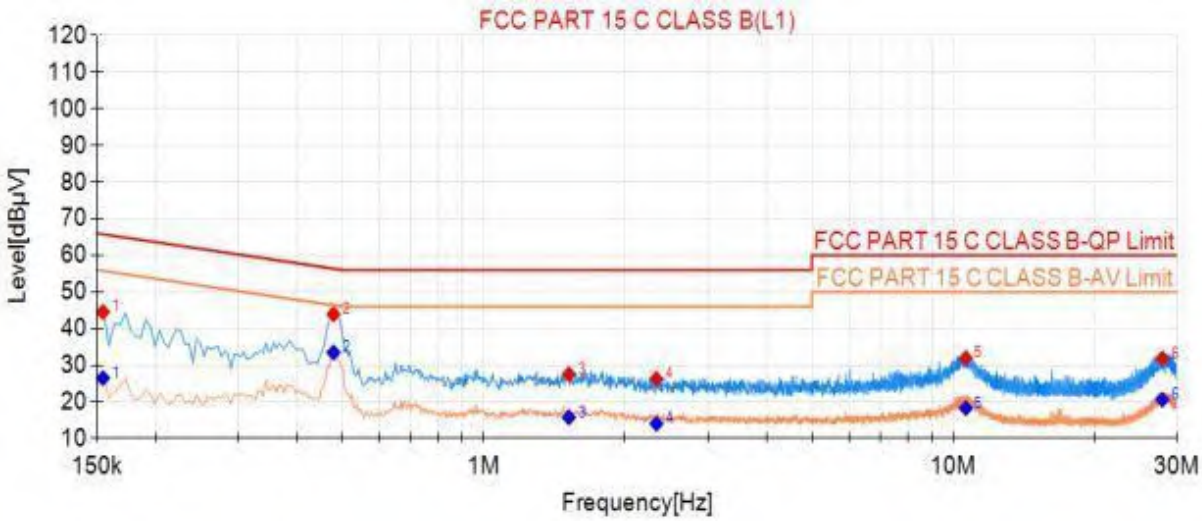
5.7 Conducted Emission Test Result

Pass.

During the test, the 120Vac/60Hz and 240Vac/60Hz power supplies were scanned in advance, and it was found that (120Vac/60Hz, TX 802.11b Low Channel) was a poor mode, and the report only reflected the poor mode.

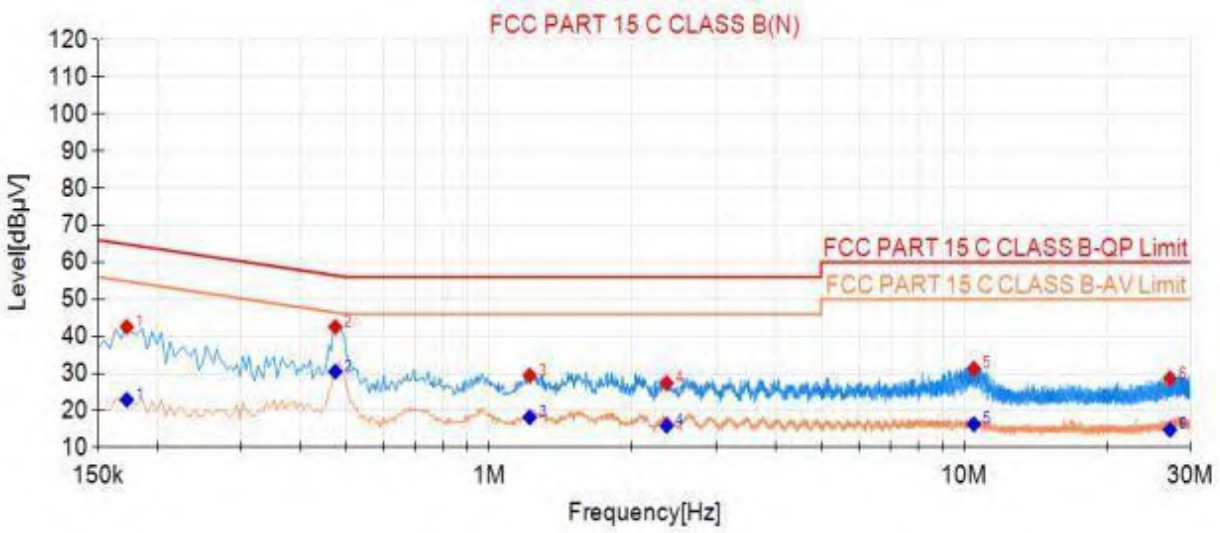
Please refer to the following pages.

Line- AC 120V/60Hz



Final Data List								
NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1545	44.55	65.75	21.20	26.50	55.75	29.25	PASS
2	0.4785	43.90	56.37	12.47	33.48	46.37	12.89	PASS
3	1.518	27.53	56.00	28.47	15.76	46.00	30.24	PASS
4	2.3325	26.27	56.00	29.73	14.03	46.00	31.97	PASS
5	10.6395	31.98	60.00	28.02	18.29	50.00	31.71	PASS
6	27.897	31.85	60.00	28.15	20.60	50.00	29.40	PASS

Neutral-AC 120V/60Hz



Final Data List								
NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1725	42.55	64.84	22.29	22.88	54.84	31.96	PASS
2	0.474	42.54	56.44	13.90	30.48	46.44	15.96	PASS
3	1.2165	29.42	56.00	26.58	18.12	46.00	27.88	PASS
4	2.364	27.35	56.00	28.65	15.86	46.00	30.14	PASS
5	10.4865	31.30	60.00	28.70	16.26	50.00	33.74	PASS
6	27.1275	28.69	60.00	31.31	14.76	50.00	35.24	PASS

6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method : ANSI C63.10:2013

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

Operating Environment :

Temperature: : 24.5 °C

Humidity: : 52 % RH

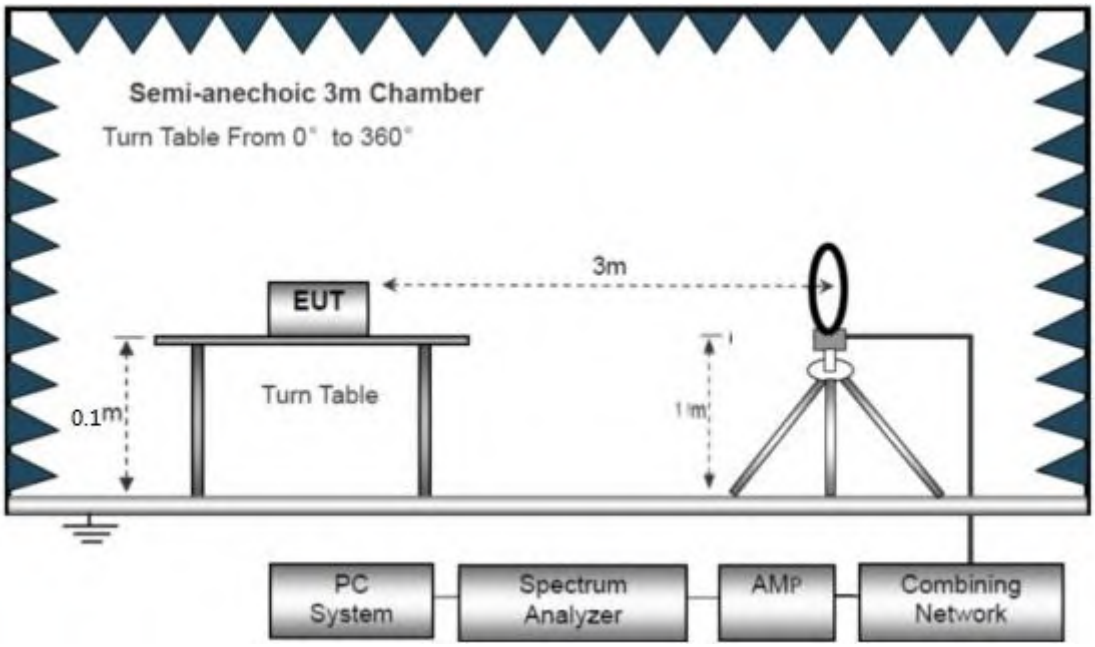
Atmospheric Pressure: : 101.3kPa

Test Voltage : AC 120V 60Hz

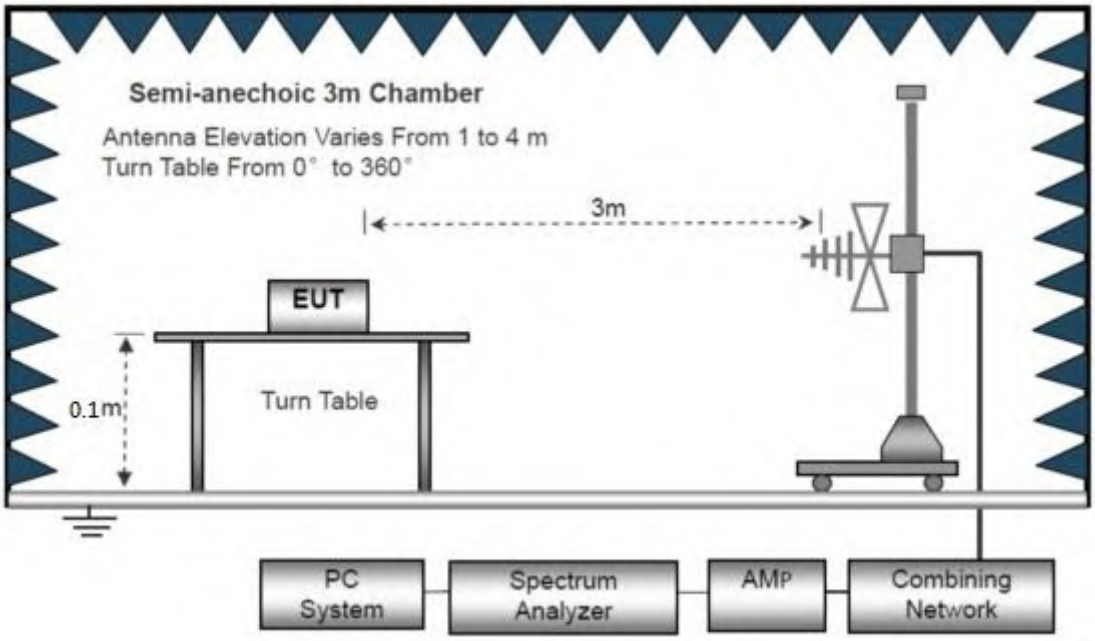
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

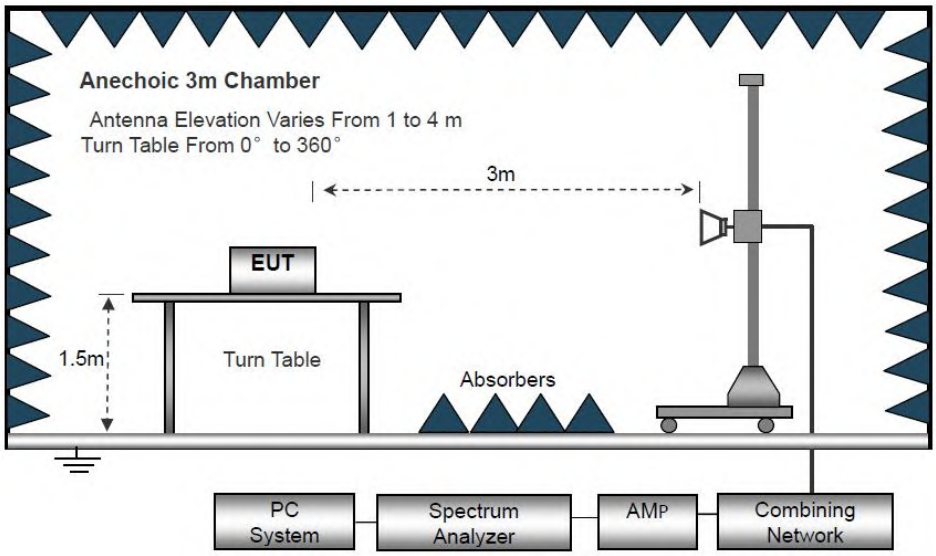
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

	Frequency	Detector	RBW	VBW	Remark
Receiver Setup	Below 30MHz	--	10kHz	10kHz	--
	30MHz ~ 1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value

6.4 Test Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.1m above ground plane, And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Repeat above procedures until the measurements for all frequencies are complete.

7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8. The test above 1GHz must be use the fully anechoic room, and the test below 1GHz use the half anechoic room

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

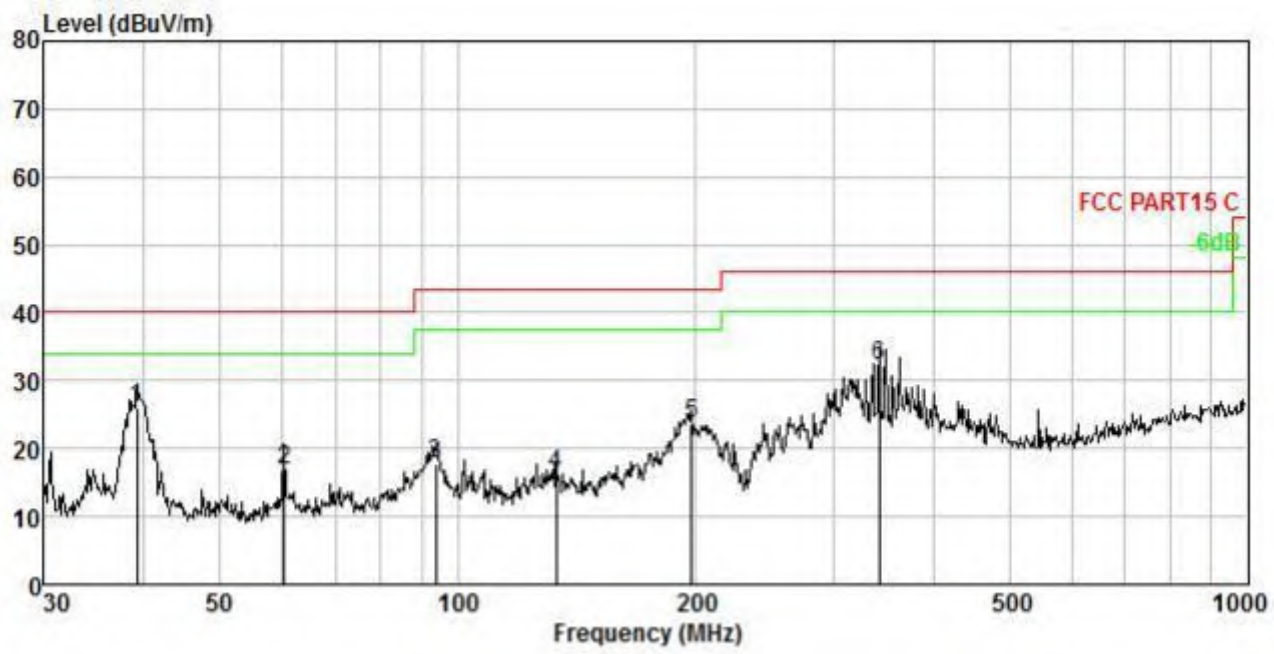
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

All the modulation modes were tested the data of the worst mode (TX 802.11b Low Channel) are recorded in the following pages and the others modulation methods do not exceed the limits.

Please refer to the following test plots:

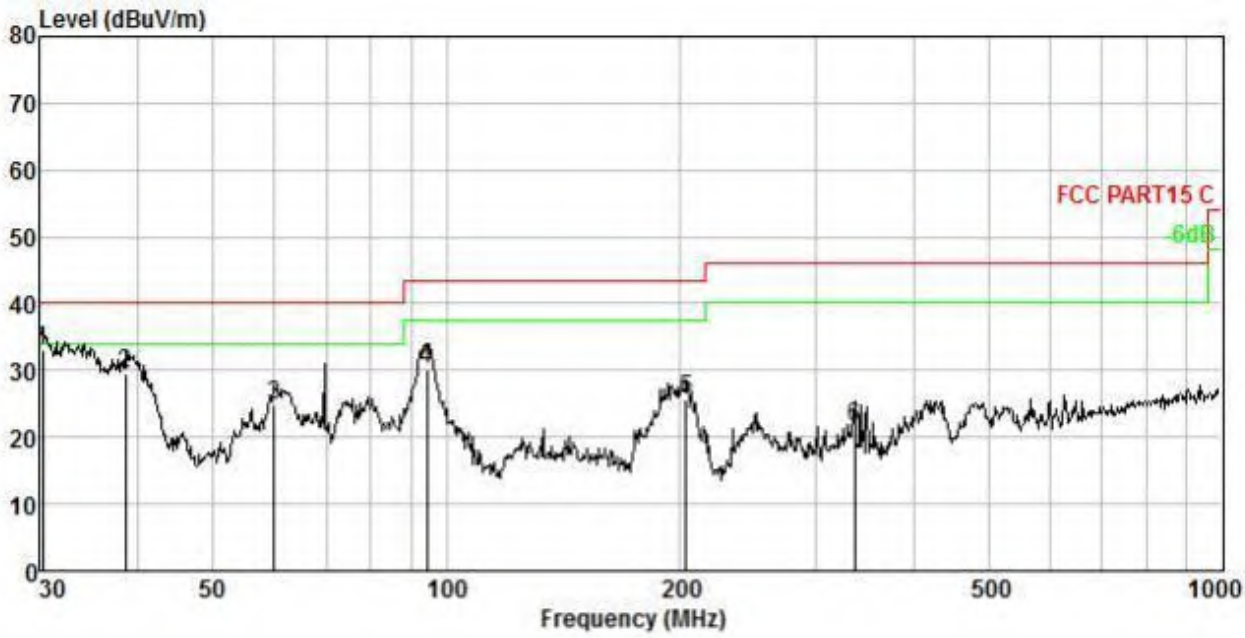
Antenna Polarization: Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	39.340	1.67	12.11	42.09	29.91	25.96	40.00	-14.04	QP
2.	60.304	2.40	11.66	32.69	29.94	16.81	40.00	-23.19	QP
3.	93.846	3.16	9.12	35.31	29.98	17.61	43.50	-25.89	QP
4.	133.379	3.77	12.89	29.61	30.01	16.26	43.50	-27.24	QP
5.	197.614	4.44	11.17	38.13	30.04	23.70	43.50	-19.80	QP
6.	341.866	5.39	14.22	43.03	30.49	32.15	46.00	-13.85	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Antenna Polarization: Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	30.194	1.21	11.72	49.88	29.89	32.92	40.00	-7.08	QP
2.	38.604	1.64	12.13	45.77	29.91	29.63	40.00	-10.37	QP
3.	60.076	2.39	11.69	40.62	29.94	24.76	40.00	-15.24	QP
4.	94.558	3.17	9.11	47.79	29.98	30.09	43.50	-13.41	QP
5.	203.681	4.49	11.12	40.02	30.05	25.58	43.50	-17.92	QP
6.	335.465	5.35	14.07	32.46	30.47	21.41	46.00	-24.59	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Test Frequency: From 1GHz to 18GHz

Worst case 802.11b

Test Mode: 2412					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	46.53	32.29	4.1	28.45	54.47	74	-19.53	V
7236	41.05	35.99	6.22	27.83	55.43	74	-18.57	V
9648	37.52	38.11	7.83	25.1	58.36	74	-15.64	V
4824	48.25	32.29	4.1	28.45	56.19	74	-17.81	H
7236	42.61	35.99	6.22	27.83	56.99	74	-17.01	H
9648	35.89	38.11	7.83	25.1	56.73	74	-17.27	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	32.05	32.29	4.1	28.45	39.99	54	-14.01	V
7236	25.97	35.99	6.22	27.83	40.35	54	-13.65	V
9648	20.47	38.11	7.83	25.1	41.31	54	-12.69	V
4824	33.56	32.29	4.1	28.45	41.5	54	-12.5	H
7236	26.02	35.99	6.22	27.83	40.4	54	-13.6	H
9648	20.12	38.11	7.83	25.1	40.96	54	-13.04	H

Worst case 802.11b

Test Mode: 2437					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	47.52	32.35	4.12	28.44	55.55	74	-18.45	V
7311	39.69	36.08	6.3	27.74	54.33	74	-19.67	V
9748	35.22	38.25	7.91	24.65	56.73	74	-17.27	V
4874	46.18	32.35	4.12	28.44	54.21	74	-19.79	H
7311	41.97	36.08	6.3	27.74	56.61	74	-17.39	H
9748	35.54	38.25	7.91	24.65	57.05	74	-16.95	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	32.26	32.35	4.12	28.44	40.29	54	-13.71	V
7311	26.74	36.08	6.3	27.74	41.38	54	-12.62	V
9748	19.58	38.25	7.91	24.65	41.09	54	-12.91	V
4874	33.05	32.35	4.12	28.44	41.08	54	-12.92	H
7311	27.84	36.08	6.3	27.74	42.48	54	-11.52	H
9748	20.05	38.25	7.91	24.65	41.56	54	-12.44	H

Worst case 802.11b

Test Mode: 2462					Test channel: High			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	47.52	32.41	4.14	28.42	55.65	74	-18.35	V
7386	43.36	36.15	6.36	27.68	58.19	74	-15.81	V
9848	33.82	38.35	7.97	24.33	55.81	74	-18.19	V
4924	48.79	32.41	4.14	28.42	56.92	74	-17.08	H
7386	42.25	36.15	6.36	27.68	57.08	74	-16.92	H
9848	36.05	38.35	7.97	24.33	58.04	74	-15.96	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	33.06	32.41	4.14	28.42	41.19	54	-12.81	V
7386	25.79	36.15	6.36	27.68	40.62	54	-13.38	V
9848	19.25	38.35	7.97	24.33	41.24	54	-12.76	V
4924	31.56	32.41	4.14	28.42	39.69	54	-14.31	H
7386	26.83	36.15	6.36	27.68	41.66	54	-12.34	H
9848	18.76	38.35	7.97	24.33	40.75	54	-13.25	H

Worst case 802.11g

Test Mode: 2412					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	48.93	32.29	4.1	28.45	56.87	74	-17.13	V
7236	40.15	35.99	6.22	27.83	54.53	74	-19.47	V
9648	36.58	38.11	7.83	25.1	57.42	74	-16.58	V
4824	47.85	32.29	4.1	28.45	55.79	74	-18.21	H
7236	43.69	35.99	6.22	27.83	58.07	74	-15.93	H
9648	38.52	38.11	7.83	25.1	59.36	74	-14.64	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	32.09	32.29	4.1	28.45	40.03	54	-13.97	V
7236	25.53	35.99	6.22	27.83	39.91	54	-14.09	V
9648	20.17	38.11	7.83	25.1	41.01	54	-12.99	V
4824	32.26	32.29	4.1	28.45	40.2	54	-13.8	H
7236	26.55	35.99	6.22	27.83	40.93	54	-13.07	H
9648	20.18	38.11	7.83	25.1	41.02	54	-12.98	H

Worst case 802.11g

Test Mode: 2437					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	49.35	32.35	4.12	28.44	57.38	74	-16.62	V
7311	42.56	36.08	6.3	27.74	57.2	74	-16.8	V
9748	36.34	38.25	7.91	24.65	57.85	74	-16.15	V
4874	48.52	32.35	4.12	28.44	56.55	74	-17.45	H
7311	42.28	36.08	6.3	27.74	56.92	74	-17.08	H
9748	36.31	38.25	7.91	24.65	57.82	74	-16.18	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	31.92	32.35	4.12	28.44	39.95	54	-14.05	V
7311	25.57	36.08	6.3	27.74	40.21	54	-13.79	V
9748	19.06	38.25	7.91	24.65	40.57	54	-13.43	V
4874	32.21	32.35	4.12	28.44	40.24	54	-13.76	H
7311	25.88	36.08	6.3	27.74	40.52	54	-13.48	H
9748	21.07	38.25	7.91	24.65	42.58	54	-11.42	H

Worst case 802.11g

Test Mode: 2462					Test channel: High			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	49.58	32.41	4.14	28.42	57.71	74	-16.29	V
7386	41.25	36.15	6.36	27.68	56.08	74	-17.92	V
9848	36.05	38.35	7.97	24.33	58.04	74	-15.96	V
4924	45.97	32.41	4.14	28.42	54.1	74	-19.9	H
7386	41.28	36.15	6.36	27.68	56.11	74	-17.89	H
9848	36.07	38.35	7.97	24.33	58.06	74	-15.94	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	31.88	32.41	4.14	28.42	40.01	54	-13.99	V
7386	27.14	36.15	6.36	27.68	41.97	54	-12.03	V
9848	20.58	38.35	7.97	24.33	42.57	54	-11.43	V
4924	32.29	32.41	4.14	28.42	40.42	54	-13.58	H
7386	27.11	36.15	6.36	27.68	41.94	54	-12.06	H
9848	19.63	38.35	7.97	24.33	41.62	54	-12.38	H

2.4G WiFi (802.11b/g/n)mode have been tested, and the worst result(802.11b/g) was report as Above

Note:

1. The testing has been conformed to 10*2462MHz=24620MHz.
2. All other emissions more than 30dB below the limit.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
   Margin=Emission Level-Limit
4. X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

2.4G WiFi (802.11b/g/n)mode have been tested, and the worst result(802.11g) was report as below
Test Mode: Worst case 802.11g Low Channel 2412MHz

Test Mode: 802.11g Low Channel 2412MHz									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	Test Value
2390	46.58	27.39	2.77	34.01	42.73	74	-31.27	H	Peak
2310	45.96	27.42	2.78	34.01	42.15	74	-31.85	H	
2390	46.05	27.39	2.77	34.01	42.2	74	-31.8	V	
2310	45.77	27.42	2.78	34.01	41.96	74	-32.04	V	
2390	40.63	27.39	2.77	34.01	36.78	54	-17.22	H	Average
2310	39.97	27.42	2.78	34.01	36.16	54	-17.84	H	
2390	39.62	27.39	2.77	34.01	35.77	54	-18.23	V	
2310	40.15	27.42	2.78	34.01	36.34	54	-17.66	V	

Test Mode: Worst case 802.11g High Channel 2462MHz

Test Mode: 802.11g High Channel 2462MHz									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	Test Value
2483.5	66.58	27.7	2.84	34.03	63.09	74	-10.91	H	Peak
2500	47.24	27.75	2.86	34.03	43.82	74	-30.18	H	
2483.5	68.93	27.7	2.84	34.03	65.44	74	-8.56	V	
2500	45.87	27.75	2.86	34.03	42.45	74	-31.55	V	
2483.5	46.08	27.7	2.84	34.03	42.59	54	-11.41	H	Average
2500	41.11	27.75	2.86	34.03	37.69	54	-16.31	H	
2483.5	47.52	27.7	2.84	34.03	44.03	54	-9.97	V	
2500	40.28	27.75	2.86	34.03	36.86	54	-17.14	V	

Test Frequency: From 18GHz to 25GHz

The measurements were more than 20dB below the limit and not reported.

7 Conducted Spurious Emission

Test Requirement : FCC CFR47 Part 15 Section 15.247
Test Method : ANSI C63.10:2013
Test Limit : Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

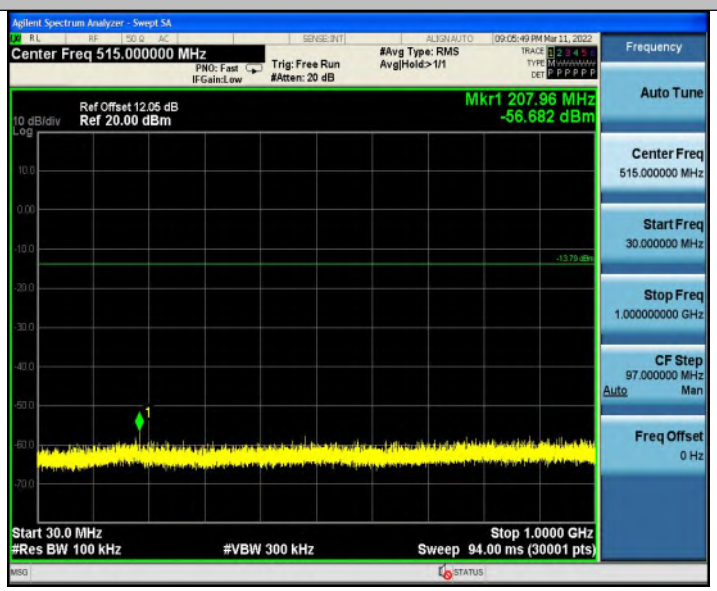
7.2 Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	6.21	-56.68	≤-13.79	PASS
			1000~26500	6.21	-26.68	≤-13.79	PASS
		2437	30~1000	6.71	-54.5	≤-13.29	PASS
			1000~26500	6.71	-25.66	≤-13.29	PASS
		2462	30~1000	6.47	-57.68	≤-13.53	PASS
			1000~26500	6.47	-25.38	≤-13.53	PASS
11G	Ant1	2412	30~1000	-0.57	-57.56	≤-20.57	PASS
			1000~26500	-0.57	-36.64	≤-20.57	PASS
		2437	30~1000	-46.04	-57.47	≤-66.04	FAIL
			1000~26500	-46.04	-44.51	≤-66.04	FAIL
		2462	30~1000	-0.53	-55.23	≤-20.53	PASS

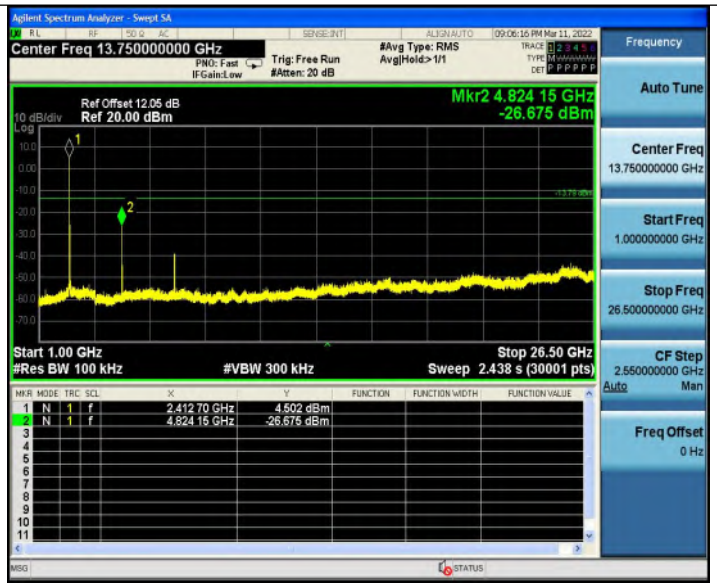
			1000~26500	-0.53	-37.07	≤-20.53	PASS
11N20SISO	Ant1	2412	30~1000	-1.34	-56.67	≤-21.34	PASS
			1000~26500	-1.34	-36.85	≤-21.34	PASS
		2437	30~1000	-1.35	-56.09	≤-21.35	PASS
			1000~26500	-1.35	-36.69	≤-21.35	PASS
		2462	30~1000	-1.36	-57.68	≤-21.36	PASS
			1000~26500	-1.36	-37.5	≤-21.36	PASS
11N40SISO	Ant1	2422	30~1000	-4.16	-56.74	≤-24.16	PASS
			1000~26500	-4.16	-36.68	≤-24.16	PASS
		2437	30~1000	-4.11	-57.66	≤-24.11	PASS
			1000~26500	-4.11	-36.89	≤-24.11	PASS
		2452	30~1000	-3.97	-57.58	≤-23.97	PASS
			1000~26500	-3.97	-36.49	≤-23.97	PASS

Test Graphs

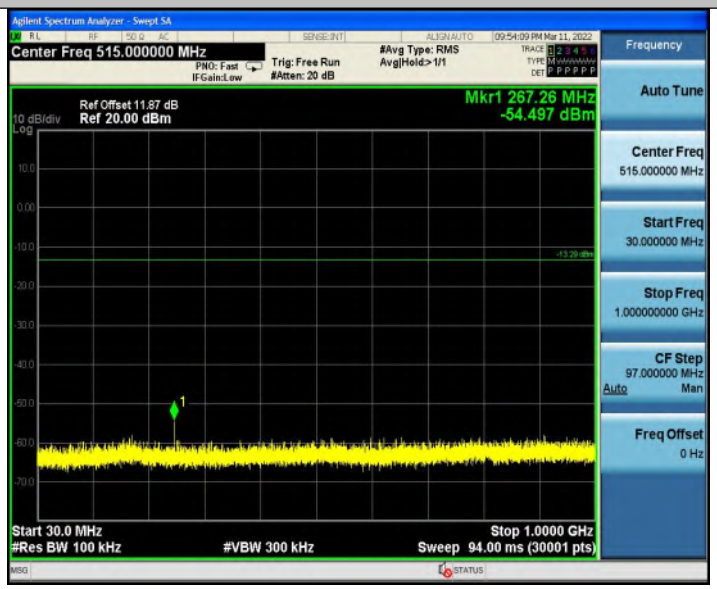
11B_Ant1_2412_30~1000



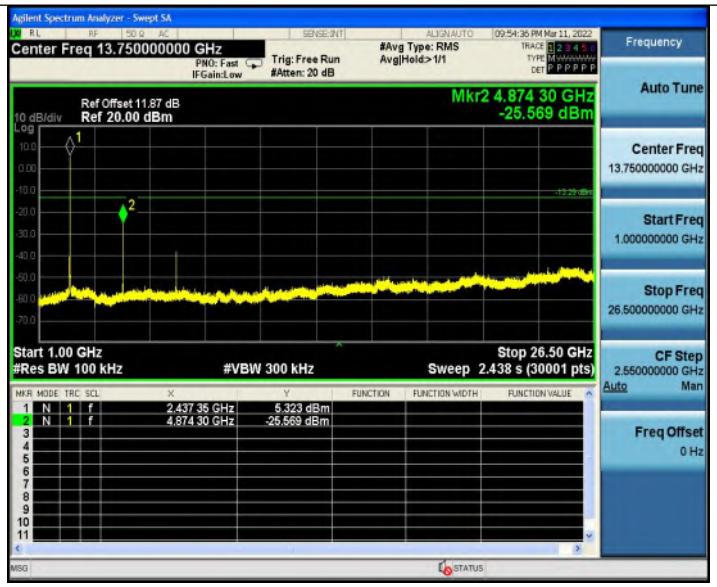
11B_Ant1_2412_1000~26500



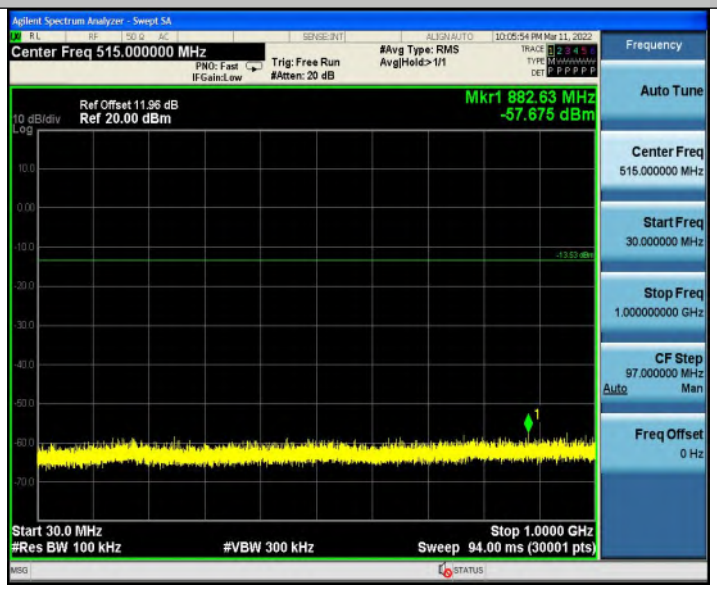
11B_Ant1_2437_30~1000



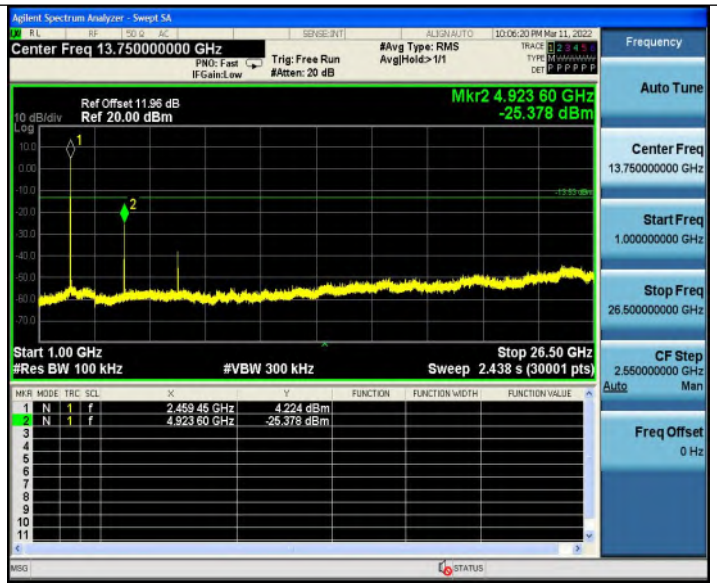
11B_Ant1_2437_1000~26500



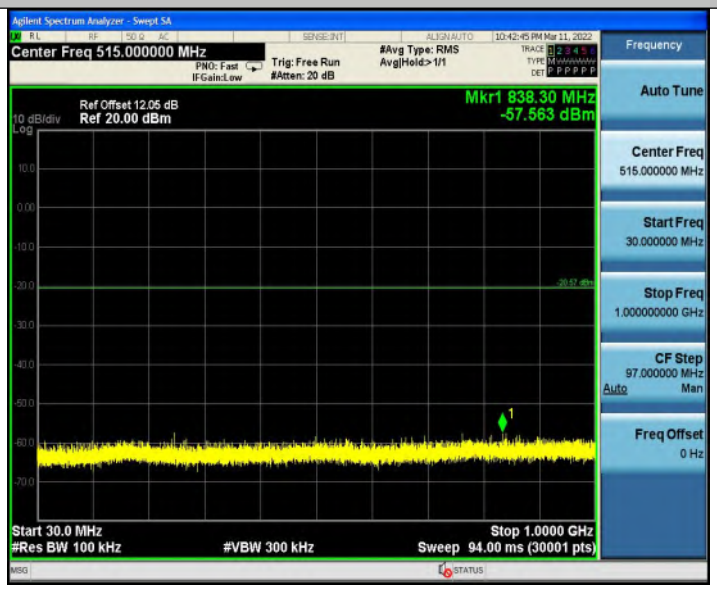
11B_Ant1_2462_30~1000



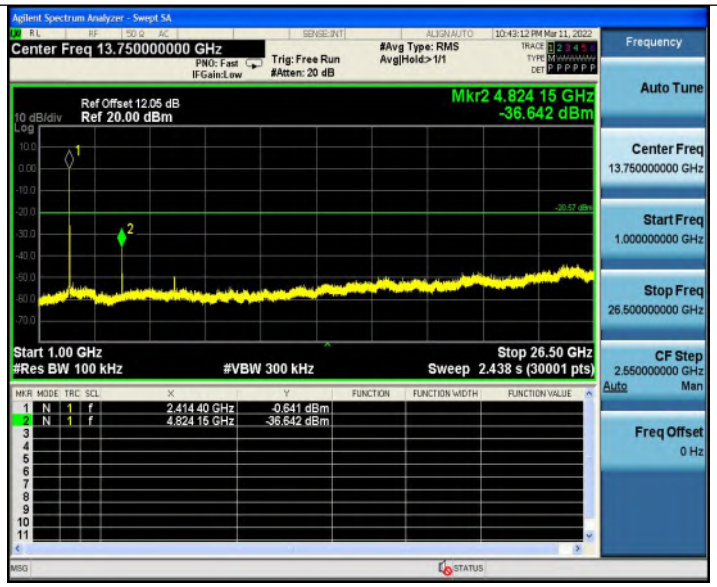
11B_Ant1_2462_1000~26500



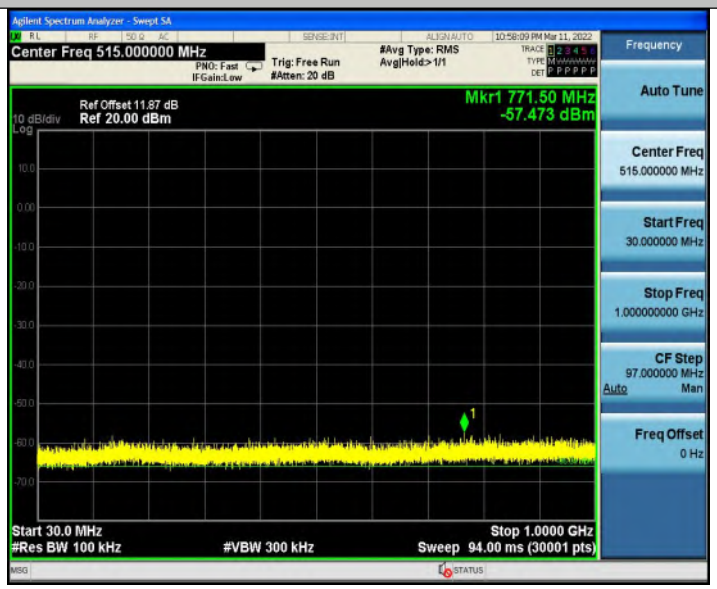
11G_Ant1_2412_30~1000



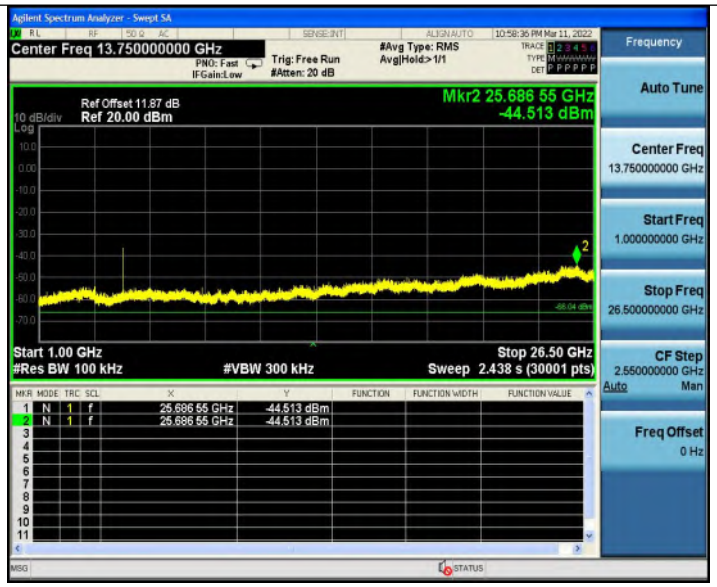
11G_Ant1_2412_1000~26500



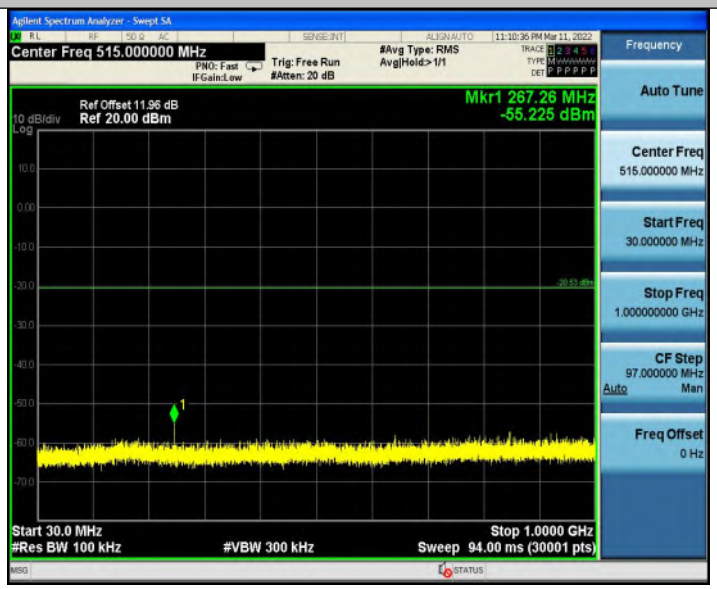
11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

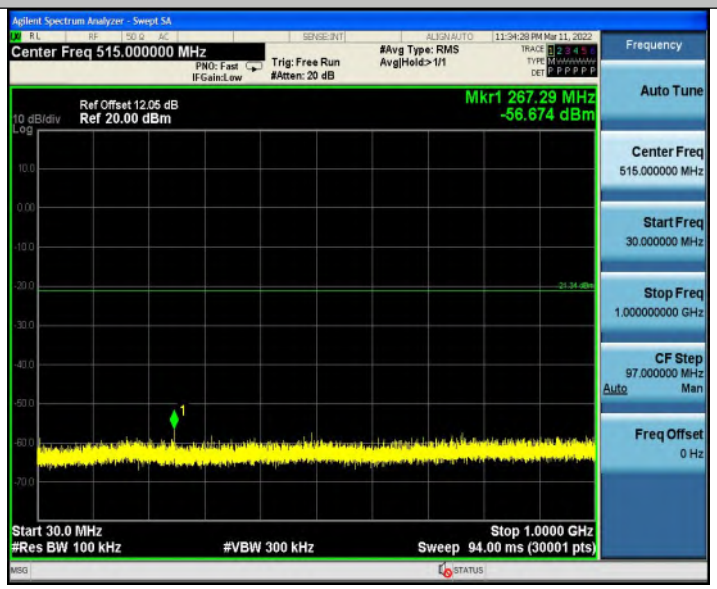


11G_Ant1_2462_30~1000

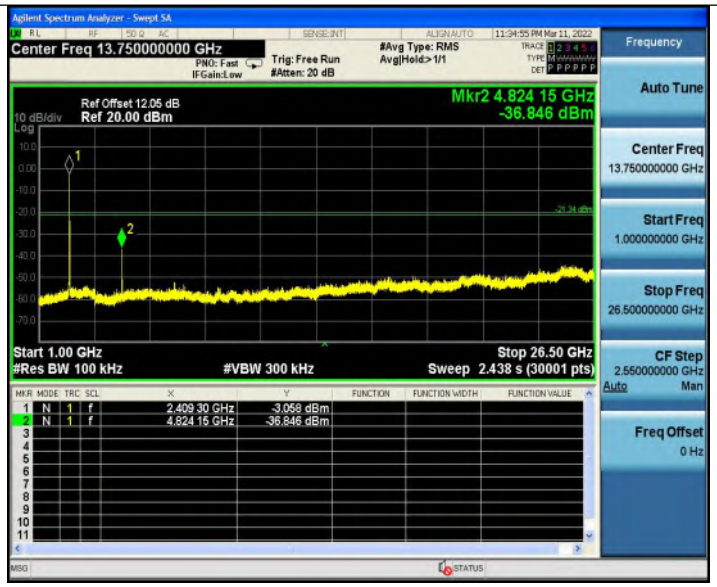


11G_Ant1_2462_1000~26500

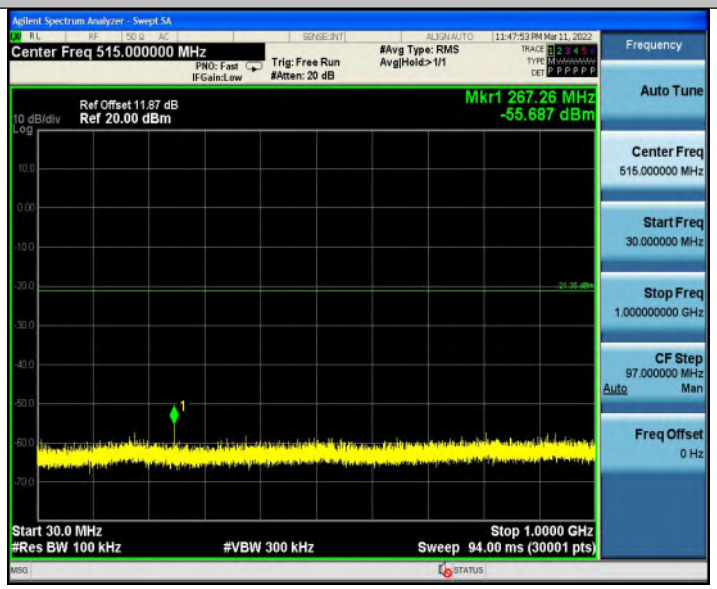
11N20SISO_Ant1_2412_30~1000



11N20SISO_Ant1_2412_1000~26500

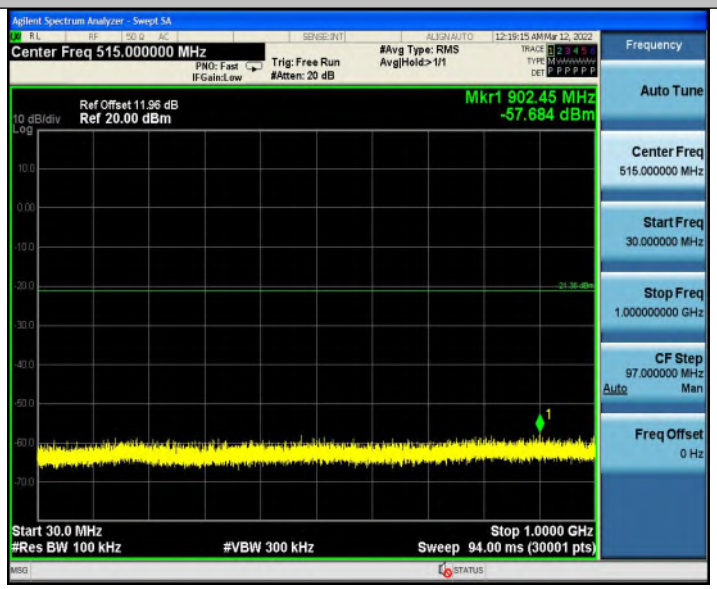


11N20SISO_Ant1_2437_30~1000



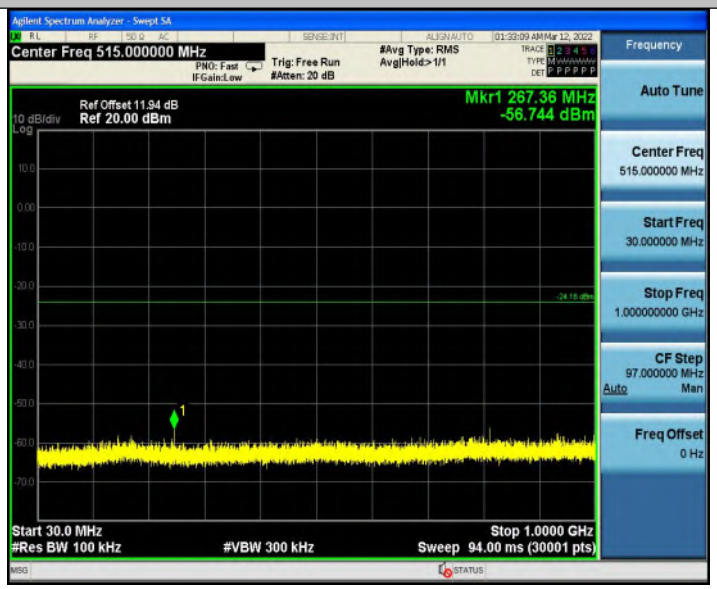
11N20SISO_Ant1_2437_1000~26500

11N20SISO_Ant1_2462_30~1000

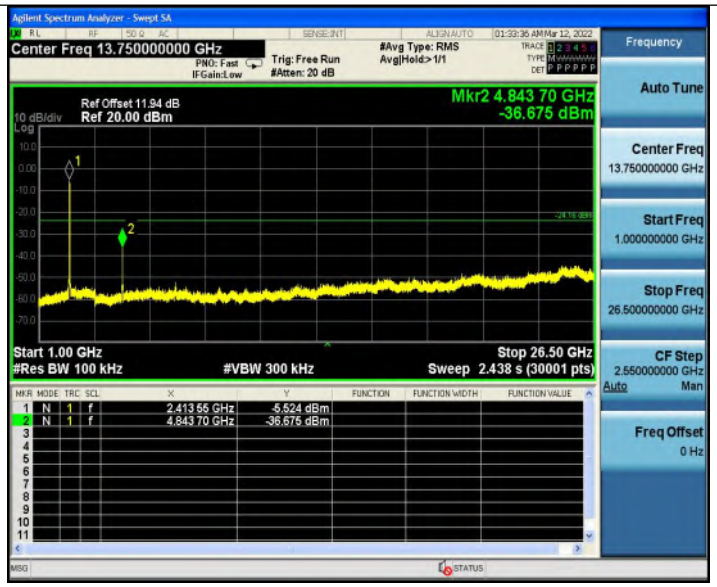


11N20SISO_Ant1_2462_1000~26500

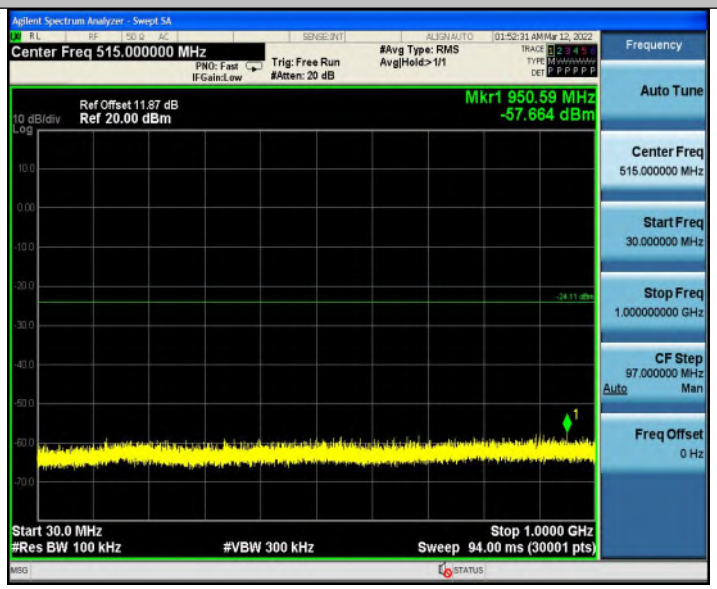
11N40SISO_Ant1_2422_30~1000



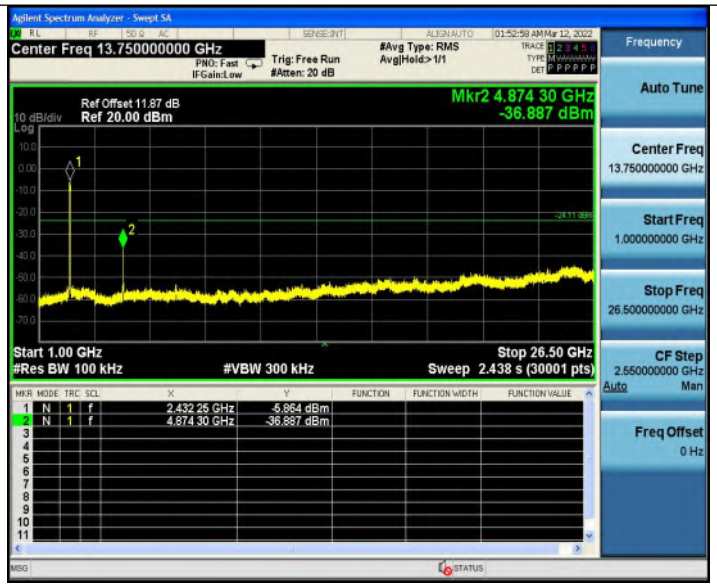
11N40SISO_Ant1_2422_1000~26500



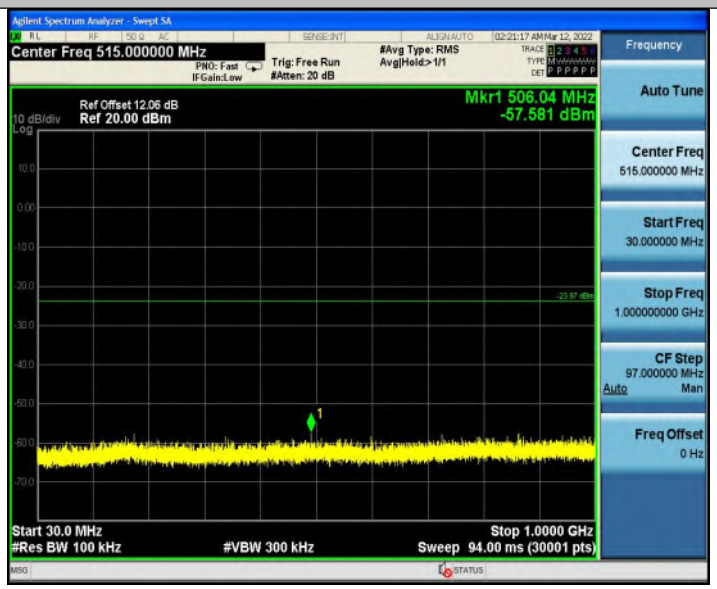
11N40SISO_Ant1_2437_30~1000



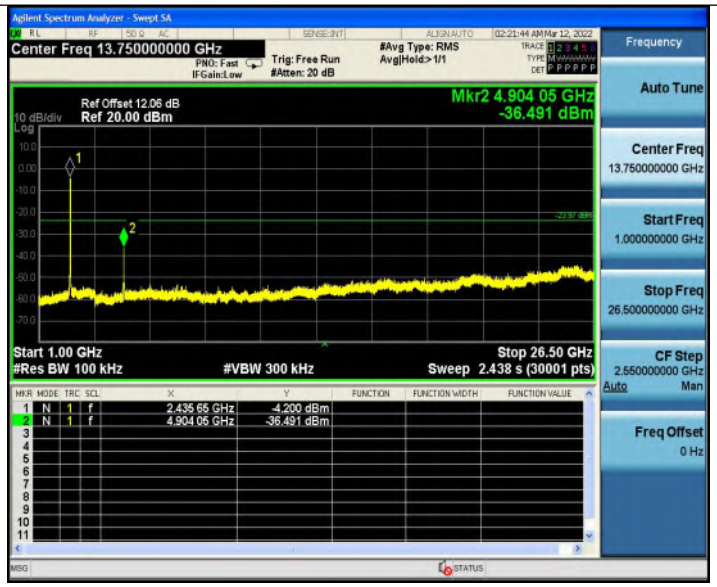
11N40SISO_Ant1_2437_1000~26500



11N40SISO_Ant1_2452_30~1000



11N40SISO_Ant1_2452_1000~26500


Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold:>1/1
Frequency
Auto Tune
Ref Offset 12.06 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 4.904 05 GHz
-36.491 dBm
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
1 N 1 f 2.435 65 GHz -4.200 dBm
2 N 1 f 4.904 05 GHz -36.491 dBm

8 Band Edge Measurement

Test Requirement	:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method	:	ANSI C63.10:2013
Test Limit	:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

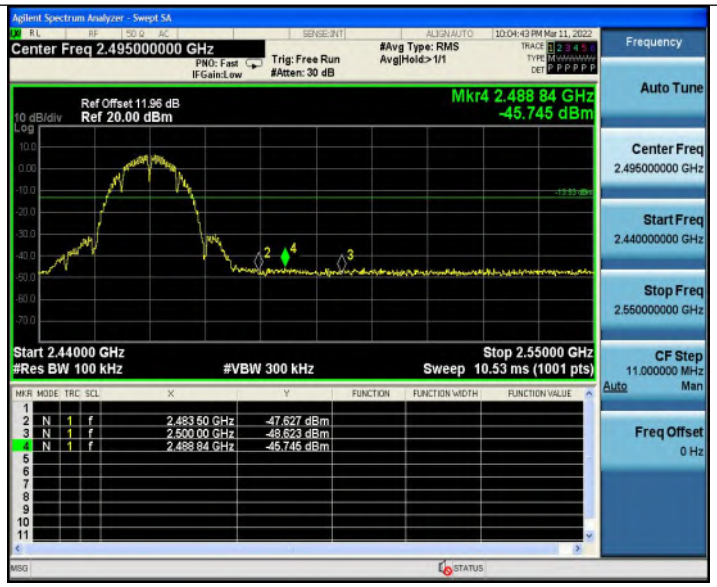
8.2 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.21	-31.65	≤-13.79	PASS
		High	2462	6.47	-45.75	≤-13.53	PASS
11G	Ant1	Low	2412	-0.57	-32.79	≤-20.57	PASS
		High	2462	-0.53	-45.63	≤-20.53	PASS
11N20SISO	Ant1	Low	2412	-1.34	-33.04	≤-21.34	PASS
		High	2462	-1.36	-45.28	≤-21.36	PASS
11N40SISO	Ant1	Low	2422	-4.16	-31.35	≤-24.16	PASS
		High	2452	-3.97	-45.54	≤-23.97	PASS

Test Graphs

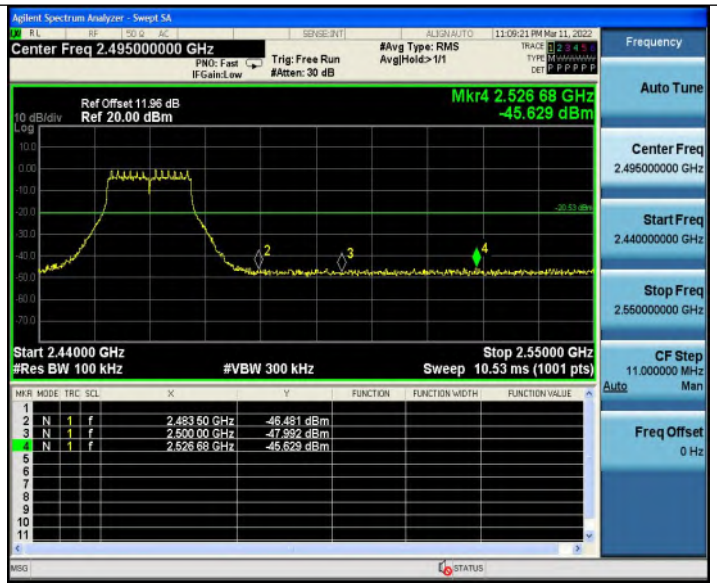
11B_Ant1_Low_2412

11B_Ant1_High_2462



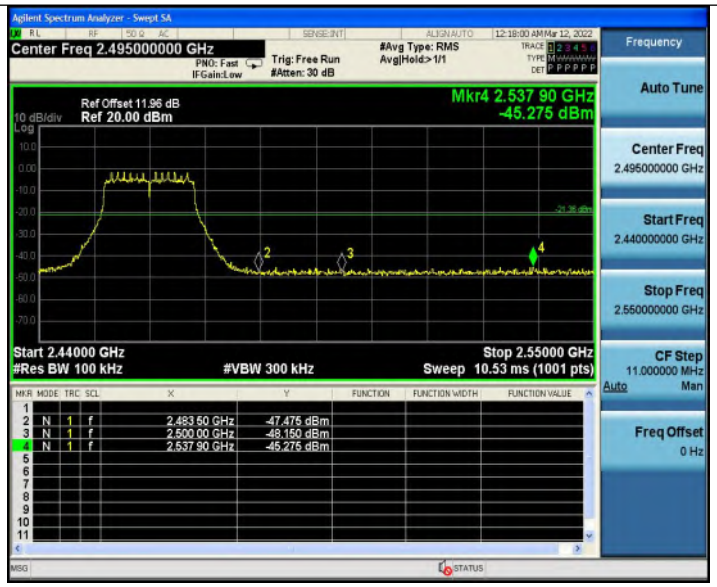
11G_Ant1_Low_2412

11G_Ant1_High_2462



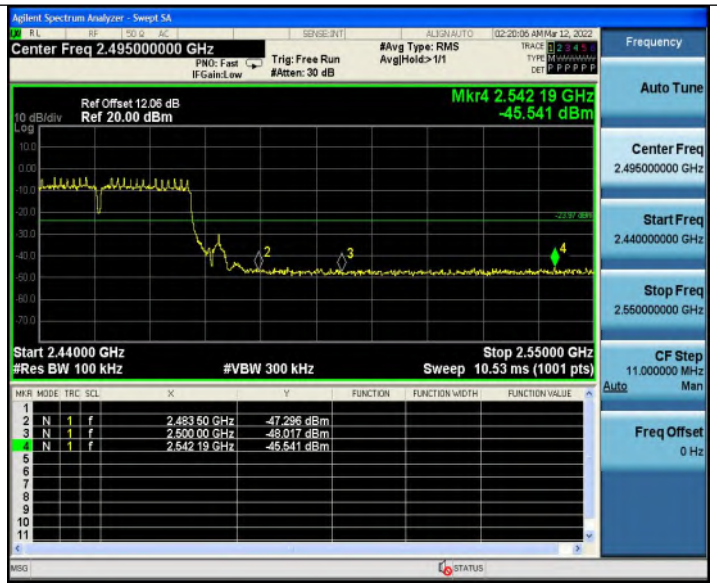
11N20SISO_Ant1_Low_2412

11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422

11N40SISO_Ant1_High_2452


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.495000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>1/1
Frequency
Auto Tune
Ref Offset 12.06 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr4 2.542 19 GHz
-45.541 dBm
Center Freq
2.495000000 GHz
Start Freq
2.440000000 GHz
Stop Freq
2.550000000 GHz
Start 2.44000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 10.53 ms (1001 pts)
CF Step
11.000000 MHz
Auto
Man
Freq Offset
0 Hz
2 N 1 f 2.483 50 GHz -47.296 dBm
3 N 1 f 2.500 00 GHz -48.017 dBm
4 N 1 f 2.542 19 GHz -45.541 dBm

9 20dB Bandwidth Measurement

Test Requirement	:	FCC CFR47 Part 15 Section 15.247
Test Method	:	ANSI C63.10:2013
Test Limit		Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 20 dB bandwidth shall be at least 500 kHz.

9.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

9.2 Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	15.079	2404.470	2419.549	---	---
		2437	15.052	2429.443	2444.495	---	---
		2462	15.091	2454.441	2469.532	---	---
11G	Ant1	2412	16.580	2403.720	2420.300	---	---
		2437	16.548	2428.690	2445.238	---	---
		2462	16.583	2453.674	2470.257	---	---
11N20SISO	Ant1	2412	17.776	2403.099	2420.875	---	---
		2437	17.754	2428.079	2445.833	---	---
		2462	17.758	2453.097	2470.855	---	---
11N40SISO	Ant1	2422	36.077	2403.974	2440.051	---	---
		2437	36.111	2418.930	2455.041	---	---
		2452	36.082	2433.924	2470.006	---	---

Test Graphs

11B_Ant1_2412

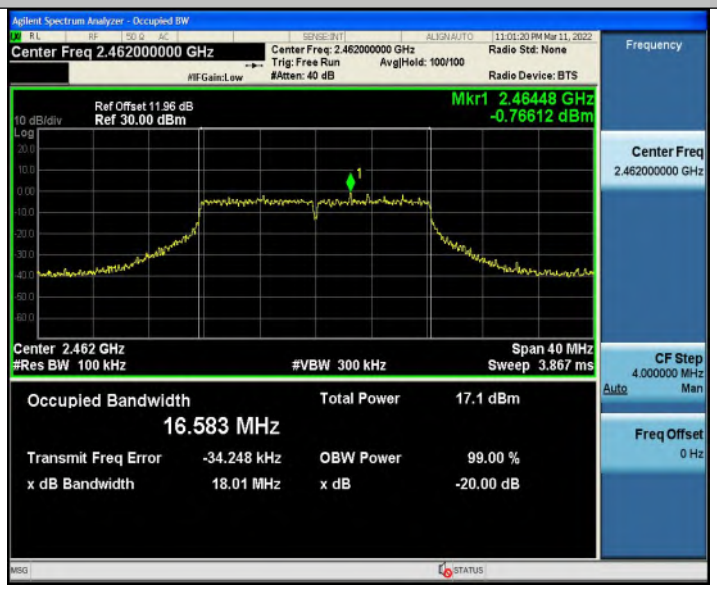
11B_Ant1_2437

11B_Ant1_2462

11G_Ant1_2412

11G_Ant1_2437

11G_Ant1_2462



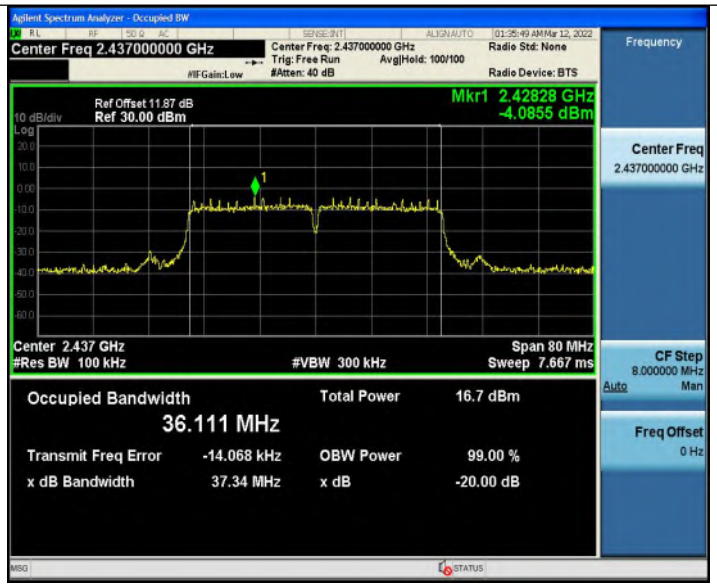
11N20SISO_Ant1_2412

11N20SISO_Ant1_2437

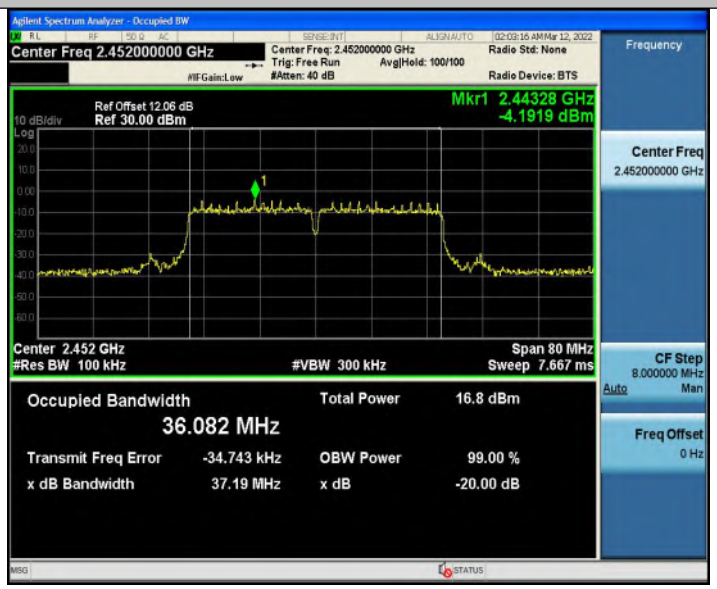
11N20SISO_Ant1_2462

11N40SISO_Ant1_2422

11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



10 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

10.1 Test Procedure

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 D01 15.247 Meas Guidance v05 section 8.3.1.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

10.2 Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	17.91	≤30.00	PASS
		2437	18.08	≤30.00	PASS
		2462	17.80	≤30.00	PASS
11G	Ant1	2412	17.82	≤30.00	PASS
		2437	18.11	≤30.00	PASS
		2462	17.84	≤30.00	PASS
11N20SISO	Ant1	2412	16.94	≤30.00	PASS
		2437	17.16	≤30.00	PASS
		2462	16.96	≤30.00	PASS
11N40SISO	Ant1	2422	17.02	≤30.00	PASS
		2437	17.08	≤30.00	PASS
		2452	17.04	≤30.00	PASS

Test Graphs

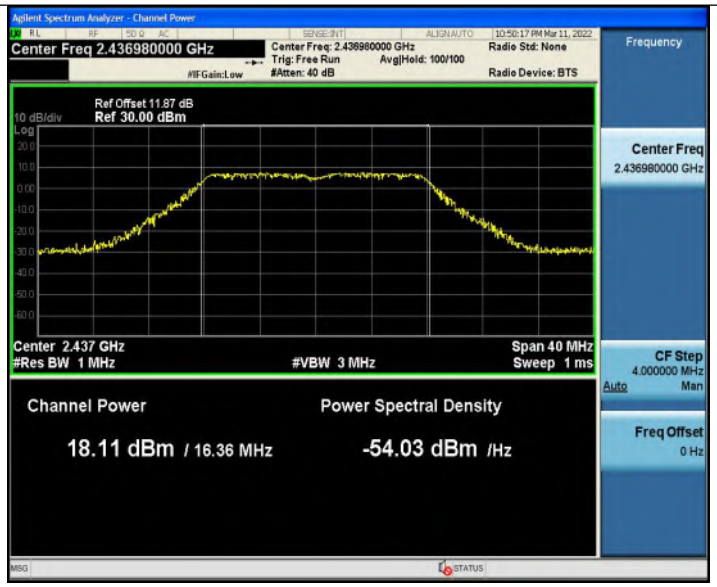
11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

11G_Ant1_2412

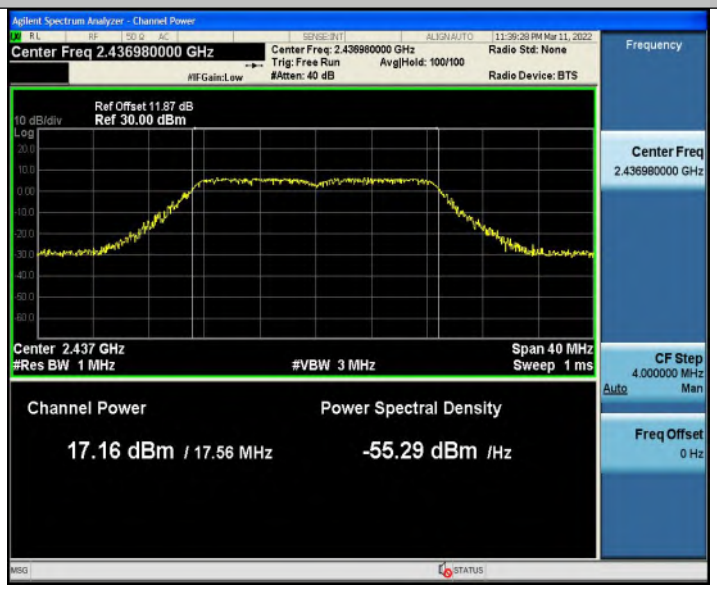
11G_Ant1_2437



11G_Ant1_2462

11N20SISO_Ant1_2412

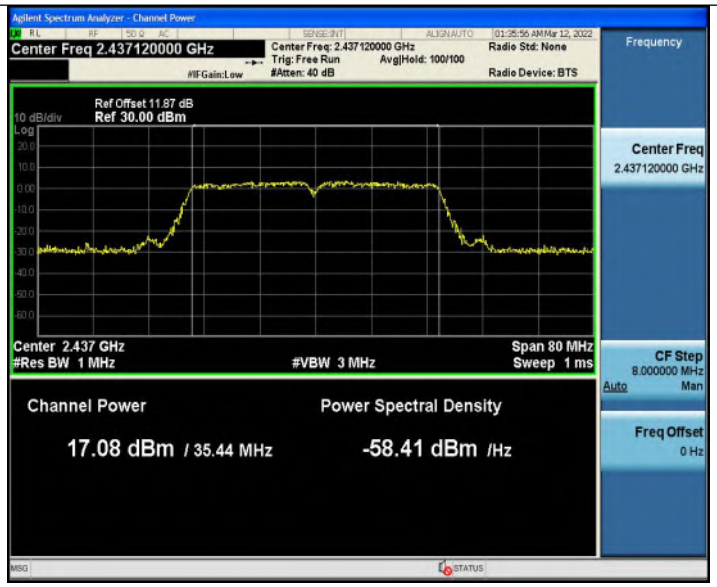
11N20SISO_Ant1_2437



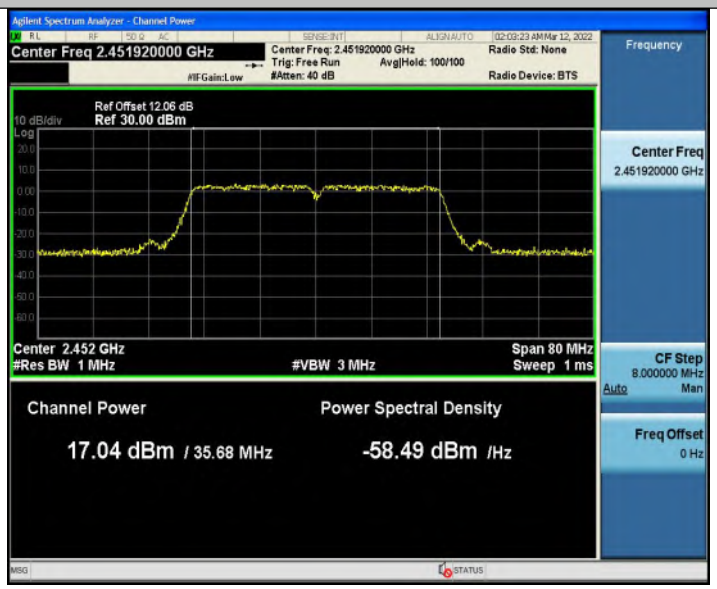
11N20SISO_Ant1_2462

11N40SISO_Ant1_2422

11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



11 Power Spectral density

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

11.1 Test Procedure

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below:
   Center frequency=DTS channel center frequency
   Span = 1.5 times the DTS bandwidth
   RBW = 10KHz, VBW = 30KHz
   Sweep time = auto couple
   Detector = peak
   Trace mode =max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW(no less than 3KHz) and repeat.

11.2 Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-6.3	≤8.00	PASS
		2437	-5.73	≤8.00	PASS
		2462	-6.33	≤8.00	PASS
11G	Ant1	2412	-14.21	≤8.00	PASS
		2437	-14.11	≤8.00	PASS
		2462	-14.82	≤8.00	PASS
11N20SISO	Ant1	2412	-15.49	≤8.00	PASS
		2437	-14.23	≤8.00	PASS
		2462	-14.85	≤8.00	PASS
11N40SISO	Ant1	2422	-18.36	≤8.00	PASS
		2437	-17.35	≤8.00	PASS
		2452	-17.25	≤8.00	PASS

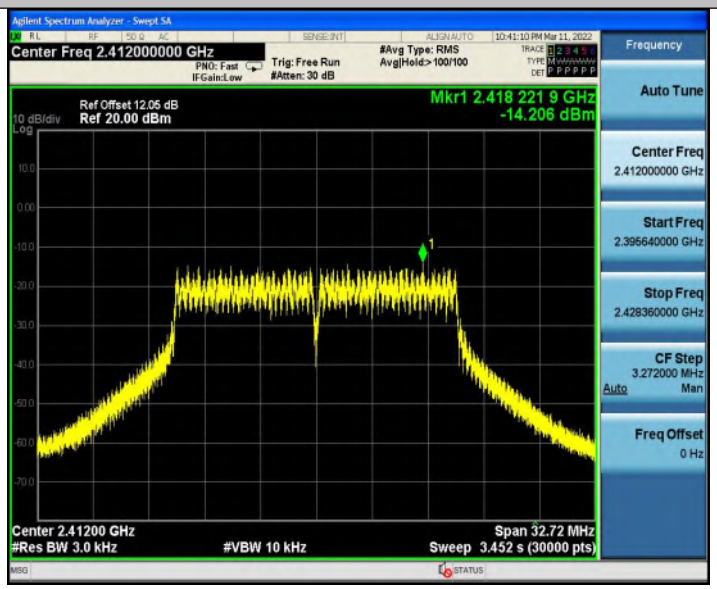
Test Graphs

11B_Ant1_2412

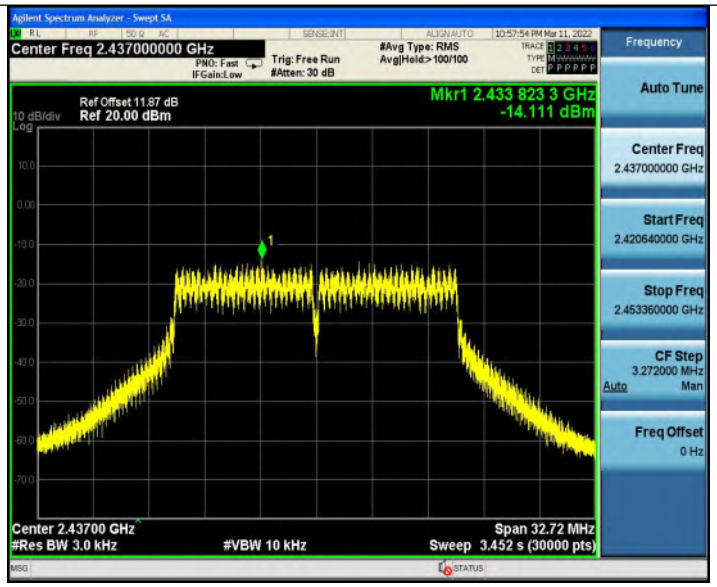
11B_Ant1_2437

11B_Ant1_2462

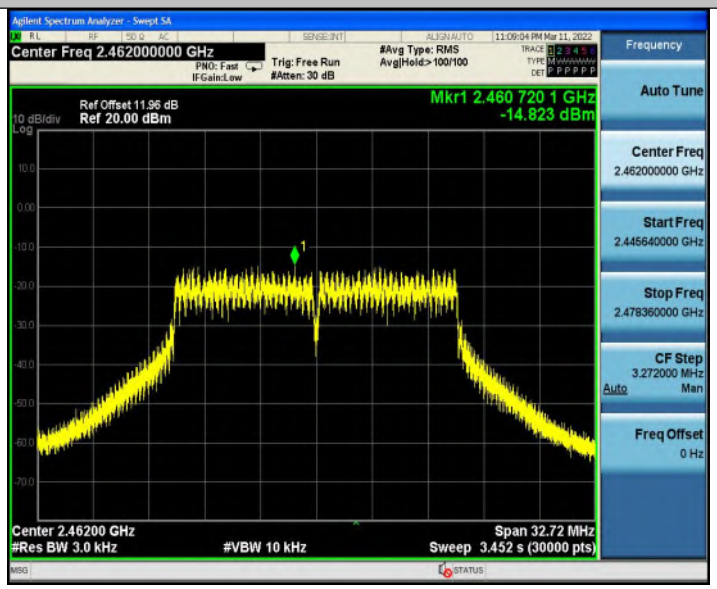
11G_Ant1_2412



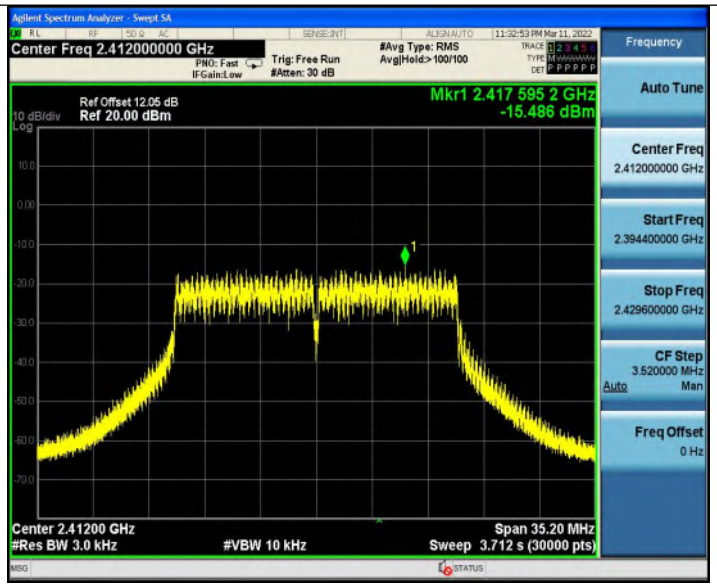
11G_Ant1_2437



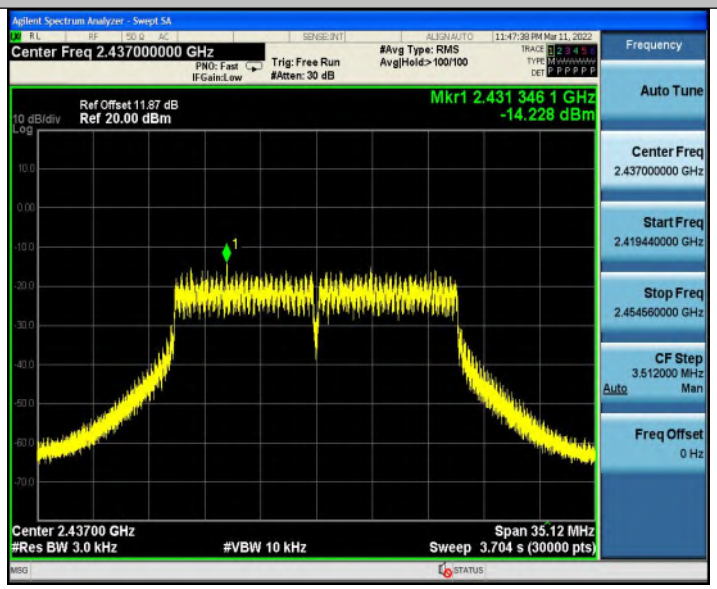
11G_Ant1_2462



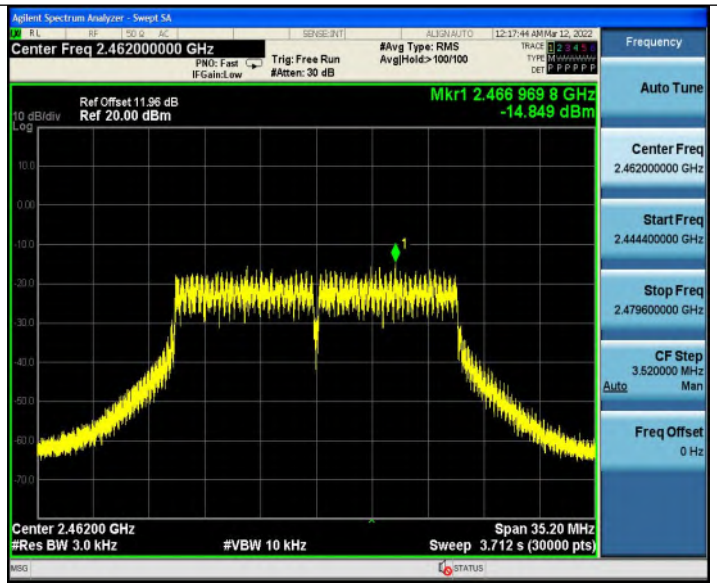
11N20SISO_Ant1_2412



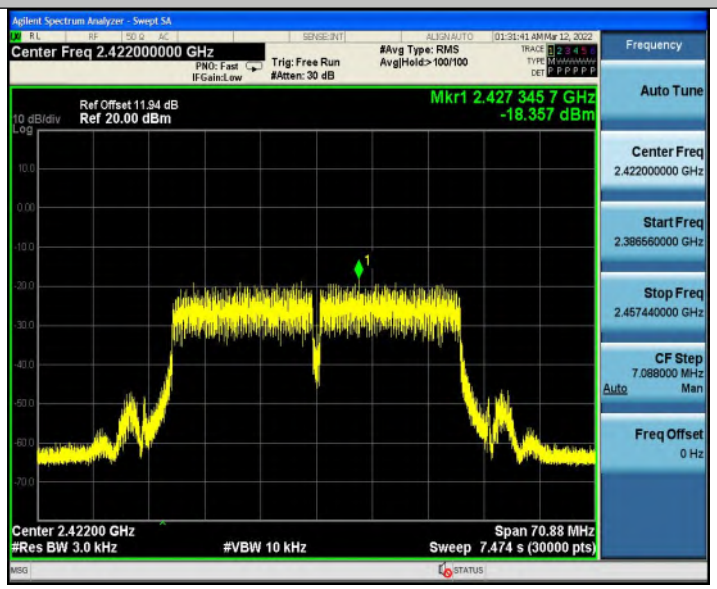
11N20SISO_Ant1_2437



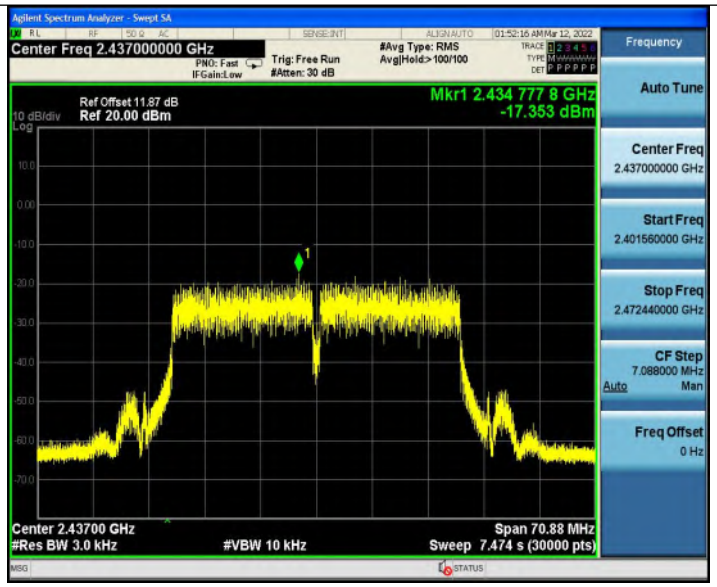
11N20SISO_Ant1_2462



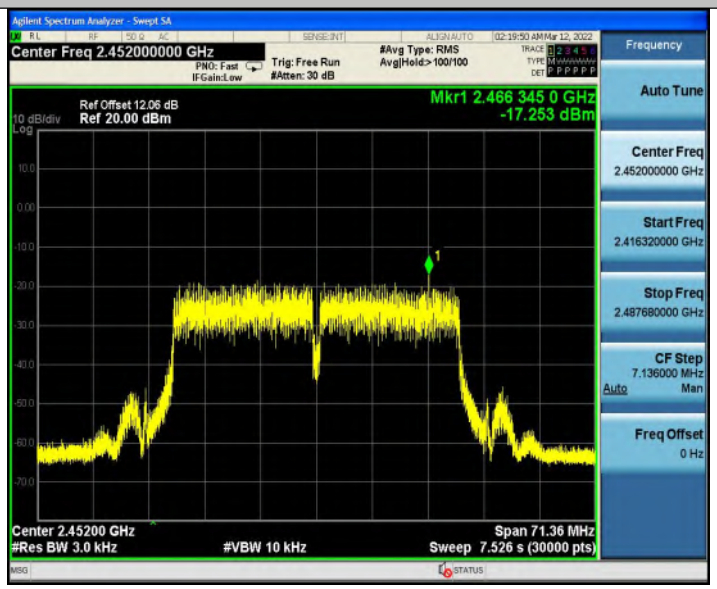
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



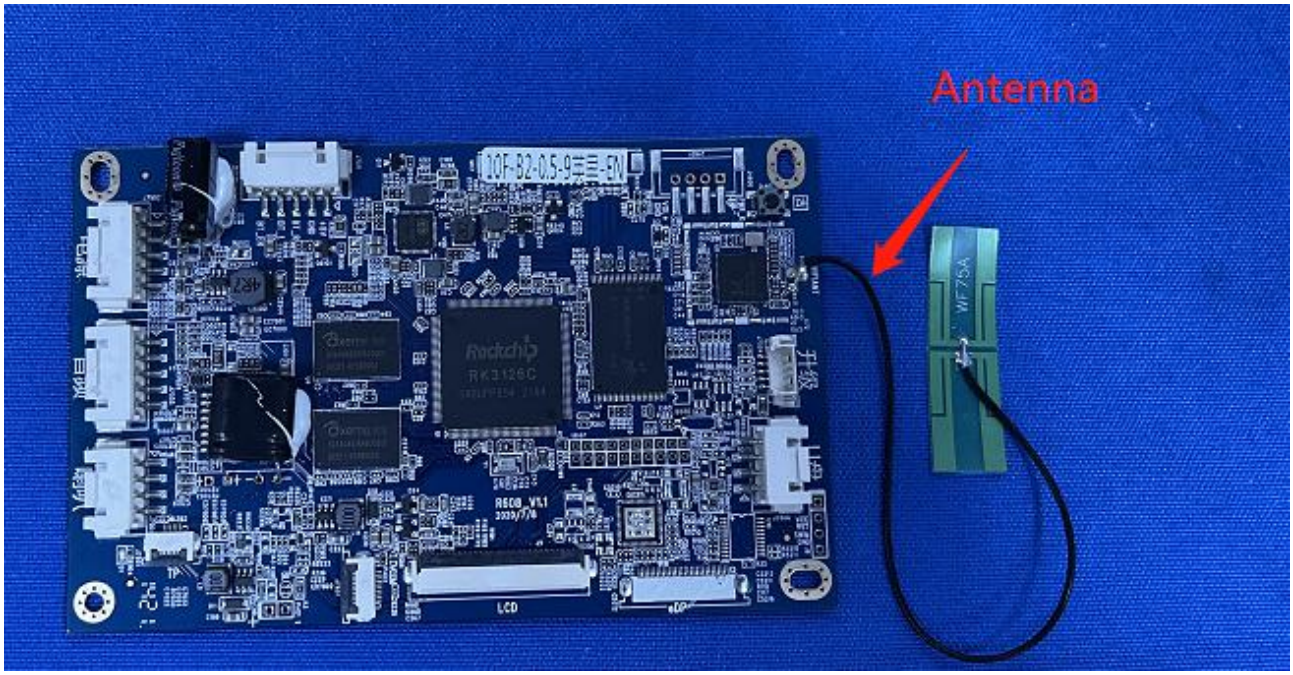
12 Antenna Application

12.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

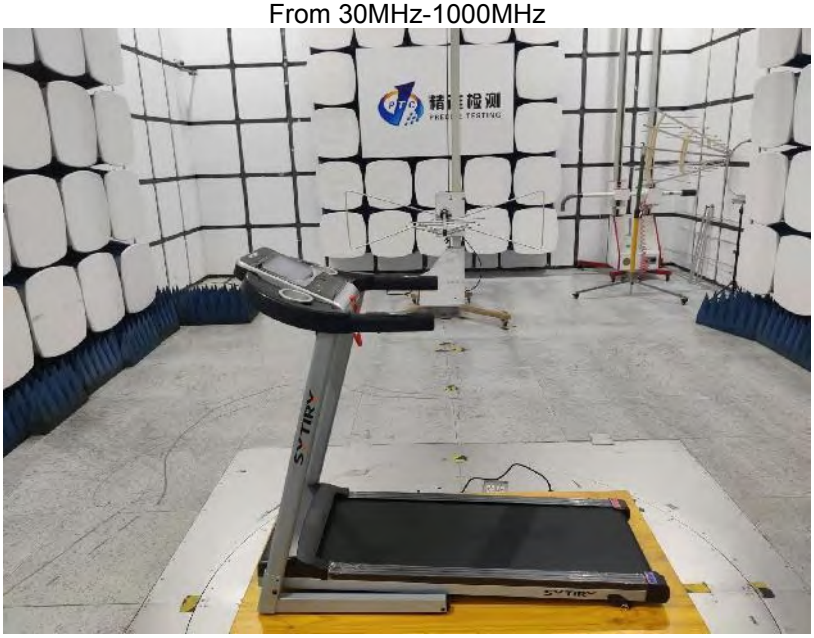
12.2 Result

The EUT'S antenna, permanent attached antenna,is Internal Antenna. The antenna's gain is 2.0 dBi and meets the requirement.

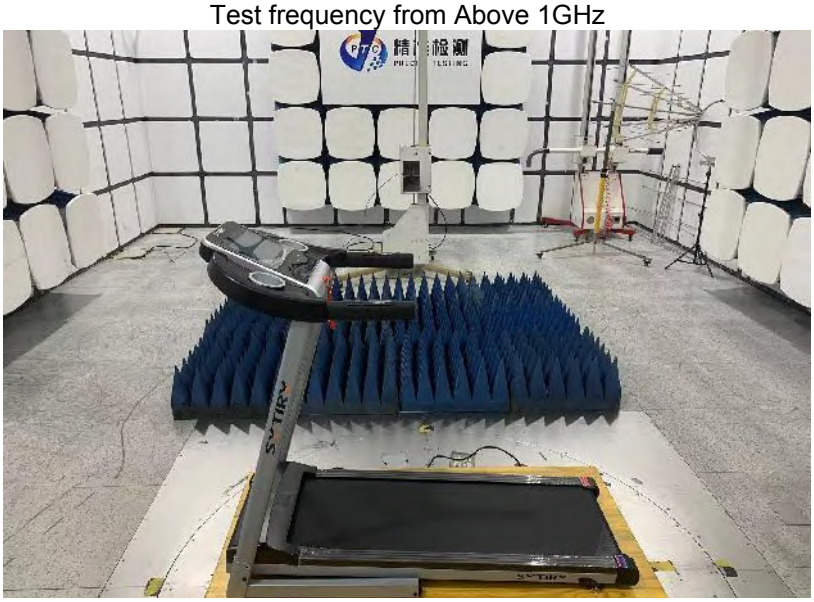


13 Test Setup

Radiated Spurious Emissions
From 30MHz-1000MHz



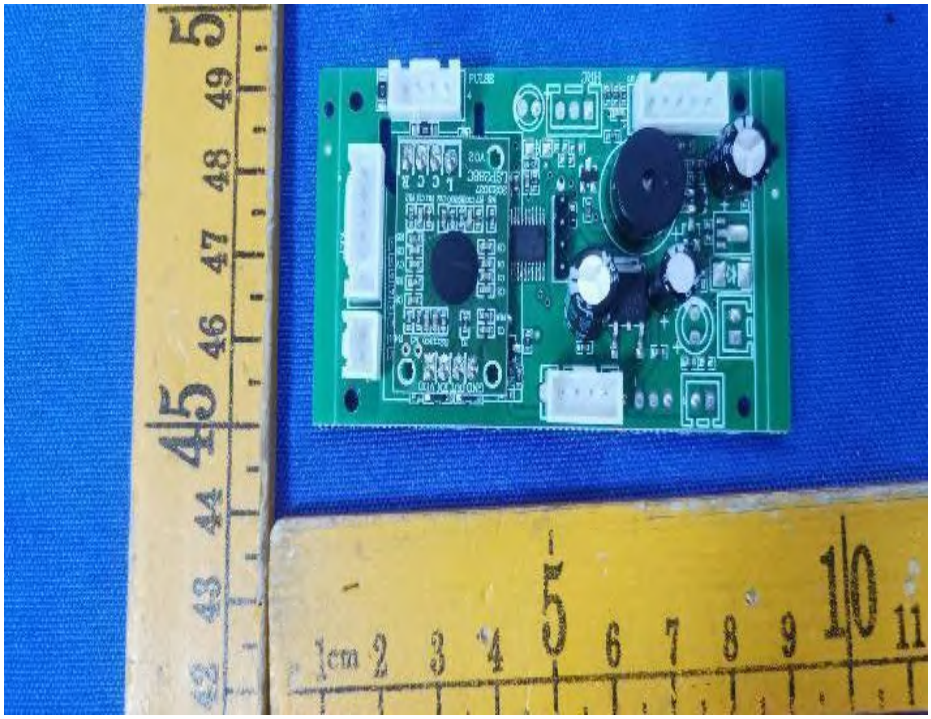
Test frequency from Above 1GHz

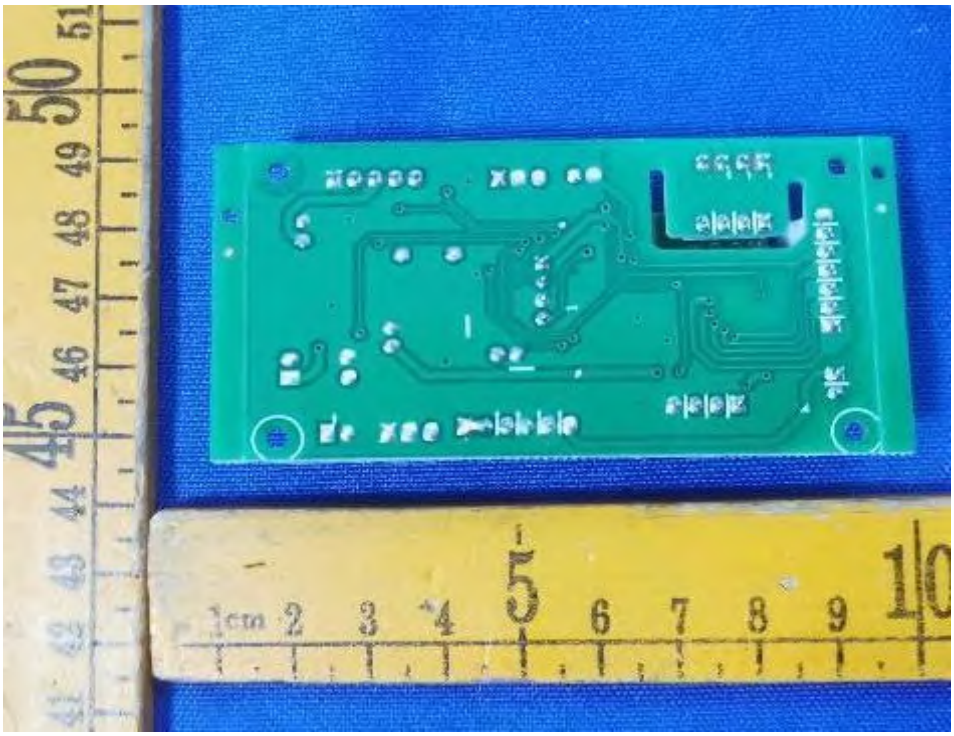


Conducted Emissions

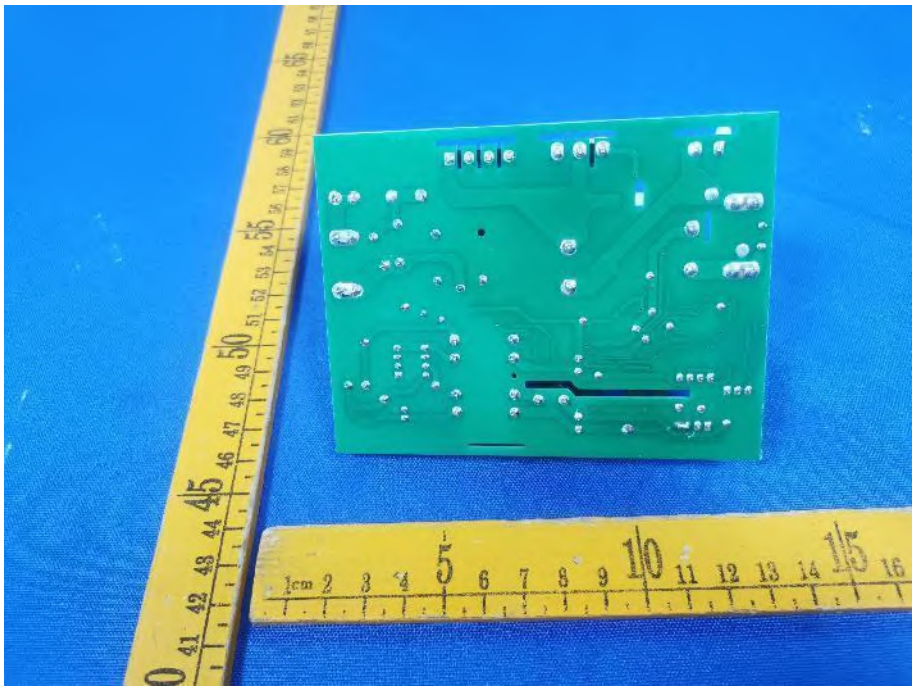
14 EUT PHOTOS

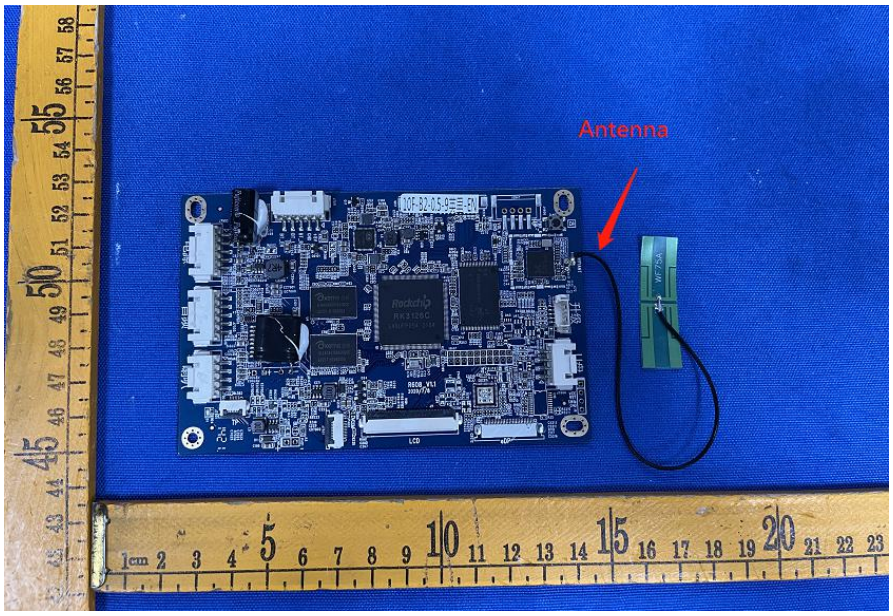
SYTRY
LCD/OLED WALL UNIT
液晶拼接单元

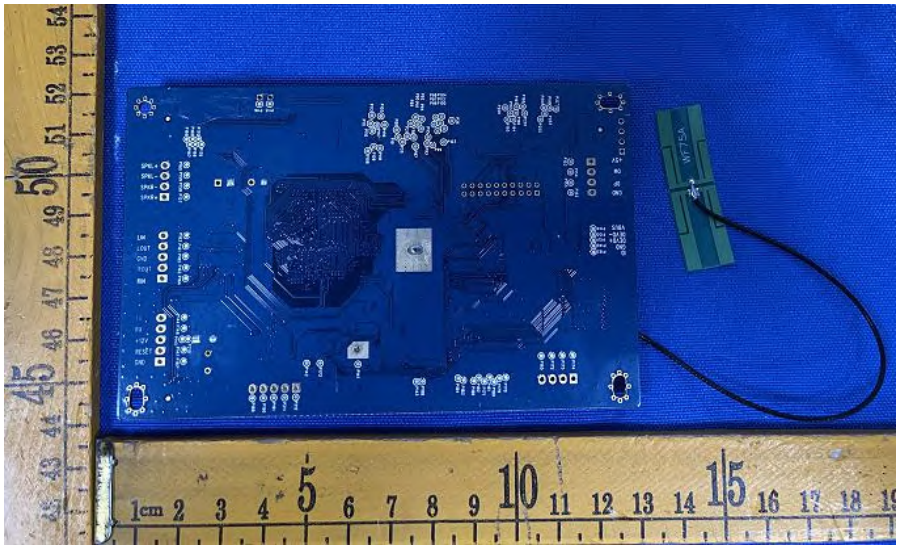




QC3
PASSED
JF115R200/110V1.3







********THE END REPORT********