



FCC TEST REPORT

FCC ID: 2AR6U-R3

Product	:	Wireless Router
Model Name	:	Netduma R3
Brand	:	Netduma
Report No.	:	PTC22102407101E-FC01
Sample ID	:	PTC22102407101E-01#
Prepared for		
Netduma Limited		
20-22 Wenlock Road, London, N1 7GU, United Kingdom		
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 : Netduma Limited
Address : 20-22 Wenlock Road, London, N1 7GU, United Kingdom
Manufacture's name : Visonicom Technology Corporation Limited
Address : Block B2, No. 14 Jian'an Road, Shajing Subdistrict, Baoan District Shenzhen 518104 China
Product name : Wireless Router
Model name : Netduma R3
Standards : FCC CFR47 Part 15 Section 15.247
Test procedure : ANSI C63.10:2013
Test Date : Oct. 28, 2022 to Dec. 08, 2022
Date of Issue : Dec. 08, 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.

This report shall not be reproduced except in full, without the written approval of PTC, this document may be altered or revised by PTC, personal only, and shall be noted in the revision of the document.

Test Engineer:

A handwritten signature in black ink that reads "Simon Pu Pu".

Simon Pu / Engineer

Technical Manager:

A handwritten signature in black ink that reads "Ronnie Liu".

Ronnie Liu / 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
6dB 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		

2.1 Test Site

Precise Testing & Certification Co., Ltd.

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

FCC Registration Number: 790290

Designation Number: CN1219

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A

CAB identifier: CN0080



3 General Information

3.1 General Description of E.U.T.

Product Name	:	Wireless Router
Model Name	:	Netduma R3
Specification	:	802.11b/g/n HT20/HT40
Operation Frequency	:	2412-2462MHz for 802.11b/g/ n(HT20) 2422-2452MHz for 802.11n(HT40)
Number of Channel	:	11 channels for 802.11b/g/ n(HT20) 7 channels for 802.11 n(HT40)
Type of Modulation	:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Antenna installation	:	Rod Antenna
Antenna Gain	:	5.25 dBi
Power supply	:	DC 12V 1.5A adaptor input AC120V 60Hz (Adapter model: P018W1201500HU)
Hardware Version	:	V01
Software Version	:	V1.2



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/HT40): 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		

Test Frequency and Channel for 802.11 b/g/n (HT20/HT40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
3	2422	6	2437	9	2452



The maximum duty cycle as following table:

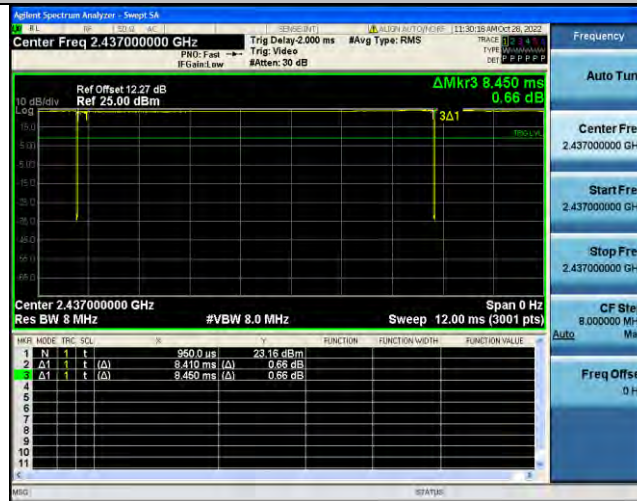
TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
11B	Ant1	2412	8.42	8.45	99.64	0.02
11B	Ant1	2437	8.41	8.45	99.53	0.02
11B	Ant1	2462	8.42	8.45	99.64	0.02
11G	Ant1	2412	1.40	1.44	97.22	0.12
11G	Ant1	2437	1.40	1.44	97.22	0.12
11G	Ant1	2462	1.39	1.44	96.53	0.15
11B	Ant2	2412	8.41	8.45	99.53	0.02
11B	Ant2	2437	8.42	8.45	99.64	0.02
11B	Ant2	2462	8.42	8.46	99.53	0.02
11G	Ant2	2412	1.40	1.44	97.22	0.12
11G	Ant2	2437	1.40	1.44	97.22	0.12
11G	Ant2	2462	1.40	1.44	97.22	0.12
11N20SISO	Ant1	2412	1.30	1.35	96.30	0.16
11N20SISO	Ant2	2412	1.31	1.35	97.04	0.13
11N20SISO	Ant1	2437	1.31	1.35	97.04	0.13
11N20SISO	Ant2	2437	1.31	1.35	97.04	0.13
11N20SISO	Ant1	2462	1.30	1.35	96.30	0.16
11N20SISO	Ant2	2462	1.31	1.35	97.04	0.13
11N40SISO	Ant1	2422	5.43	5.44	99.82	0.01
11N40SISO	Ant1	2437	5.43	5.44	99.82	0.01
11N40SISO	Ant1	2452	5.43	5.44	99.82	0.01
11N40SISO	Ant2	2422	5.43	5.45	99.63	0.02
11N40SISO	Ant2	2437	5.43	5.44	99.82	0.01
11N40SISO	Ant2	2452	5.43	5.44	99.82	0.01



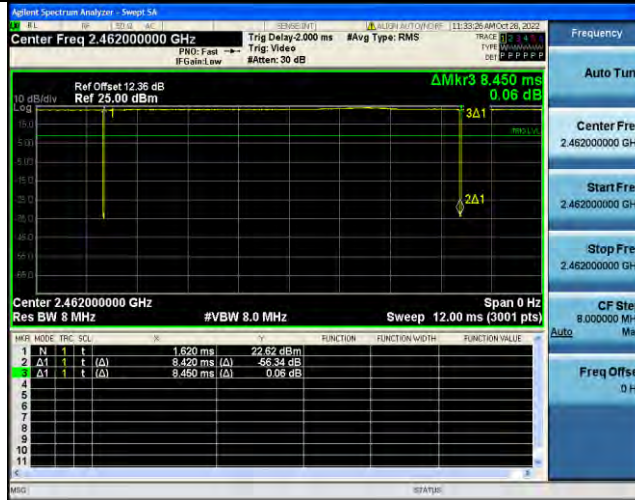
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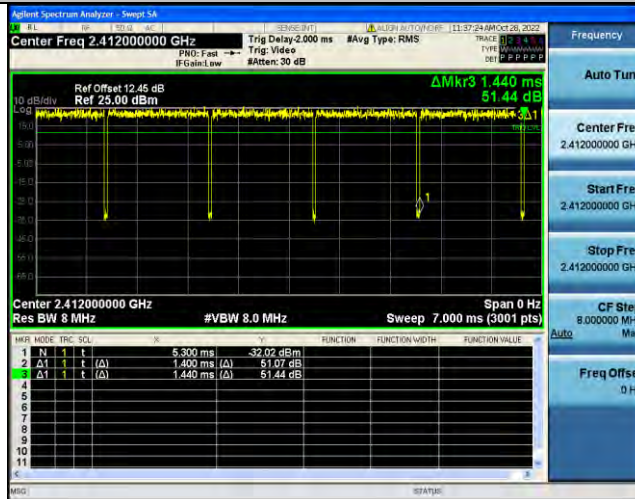
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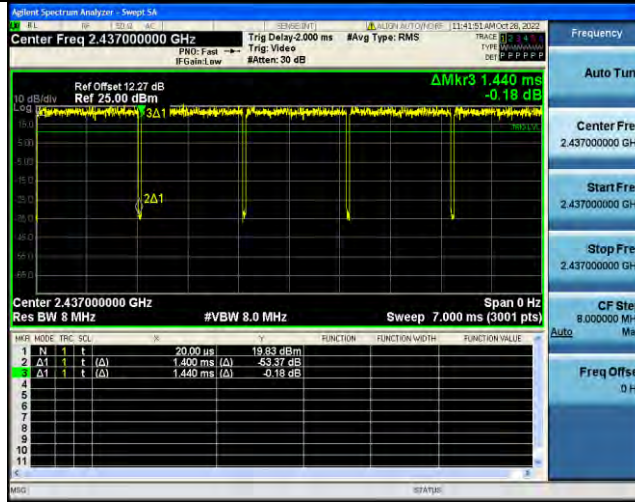
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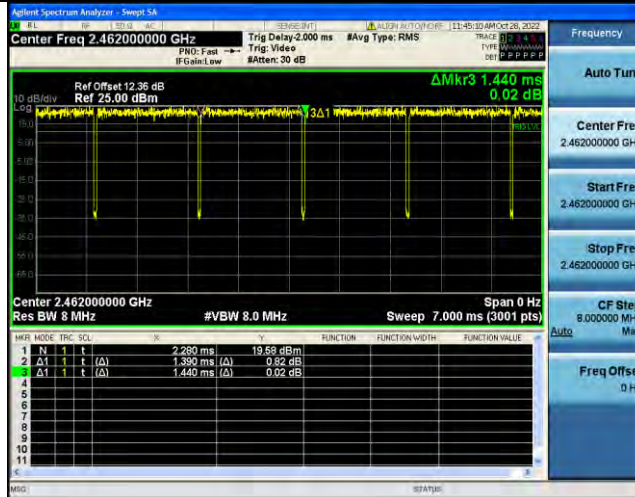
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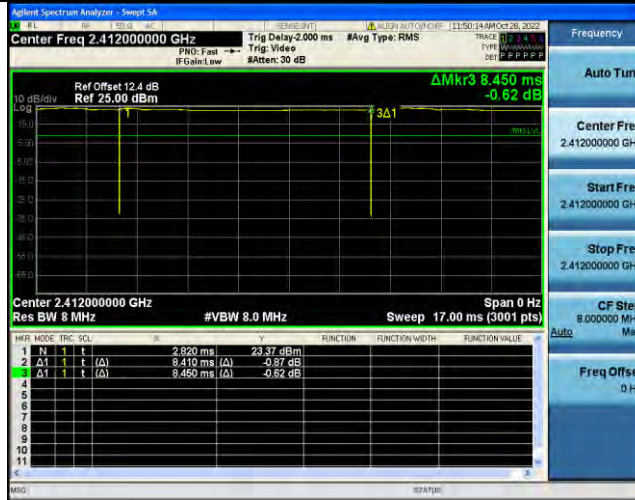
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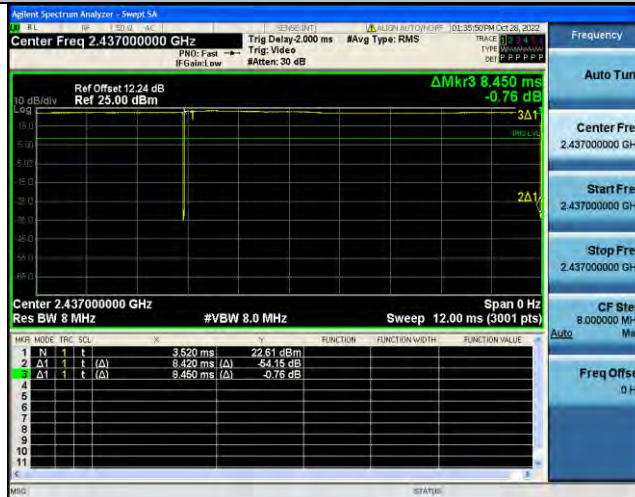
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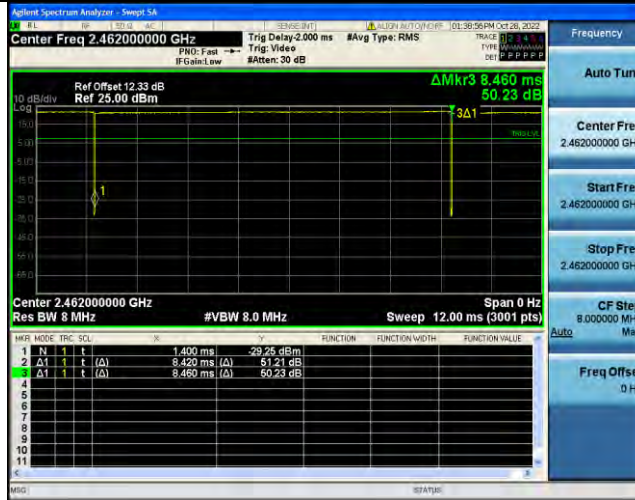
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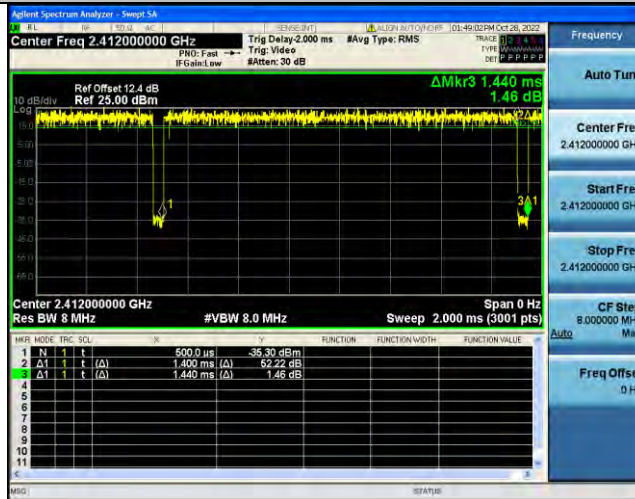
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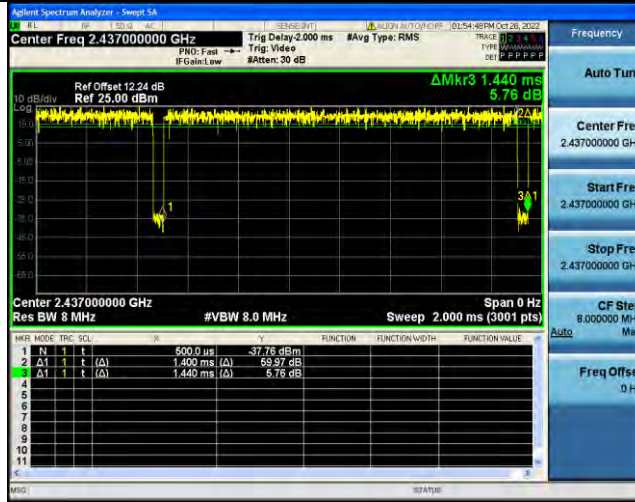
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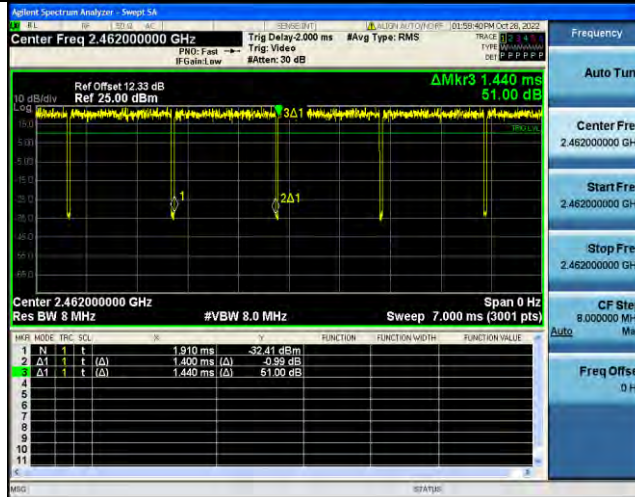
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NTNV-11G-Ant2-2437



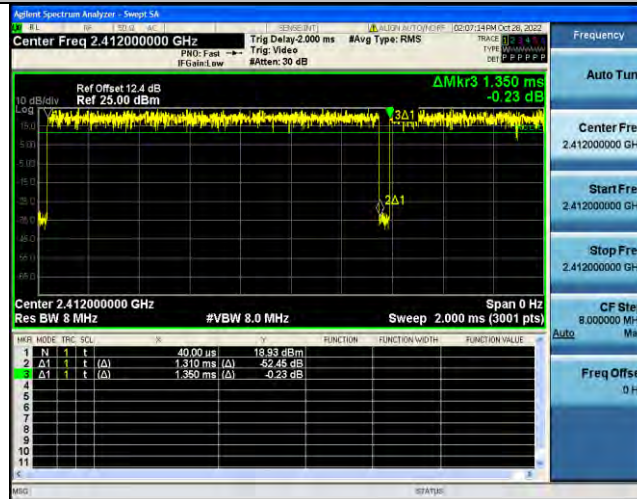
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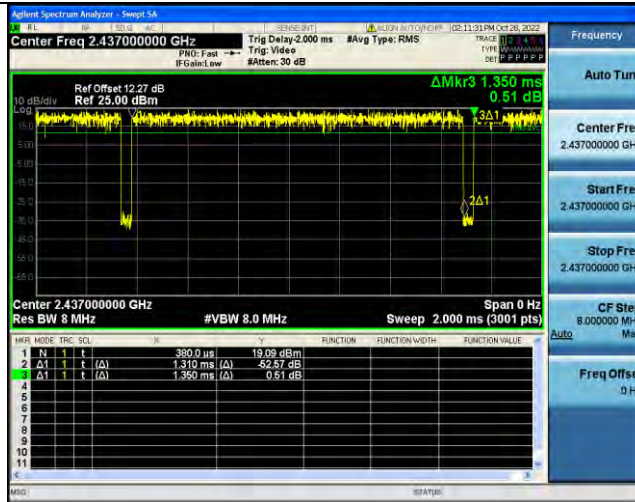
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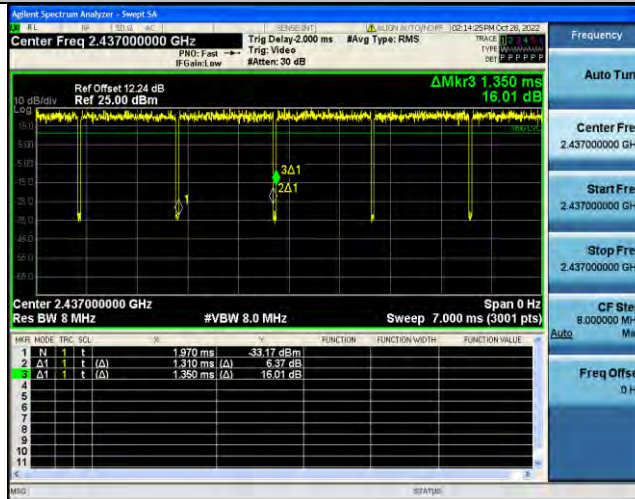
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NTNV-11N20SISO-Ant1-2437



NTNV-11N20SISO-Ant2-2437



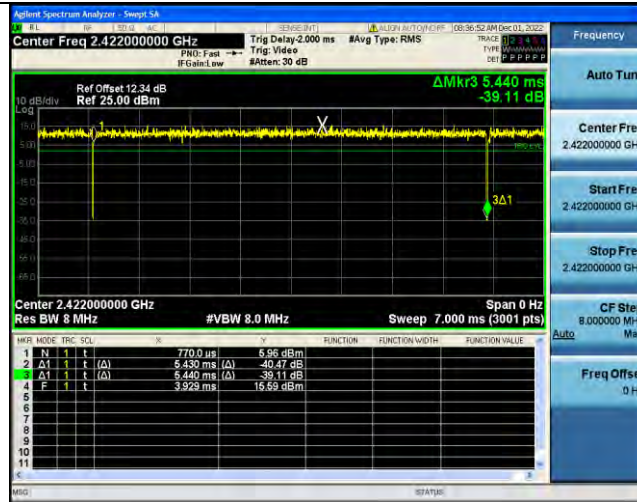
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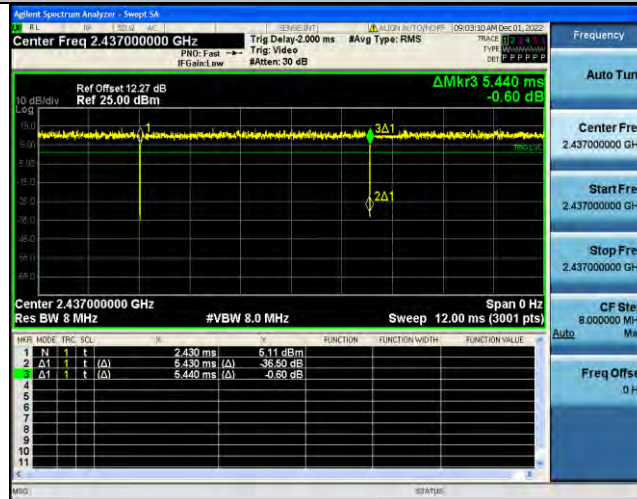
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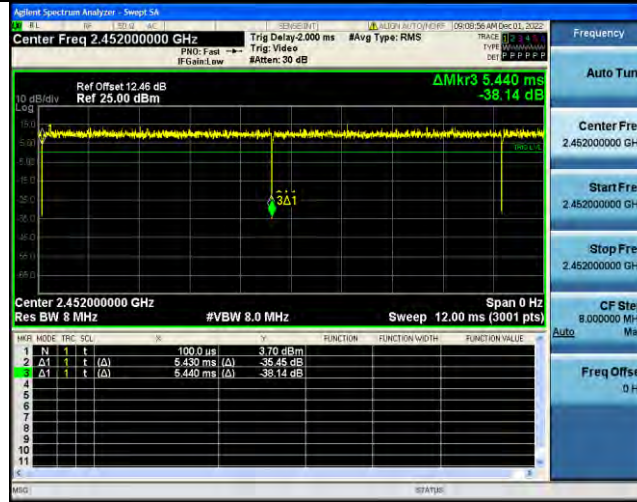
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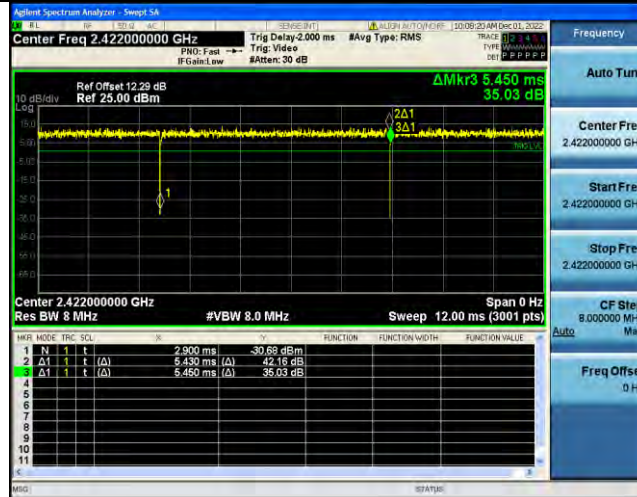
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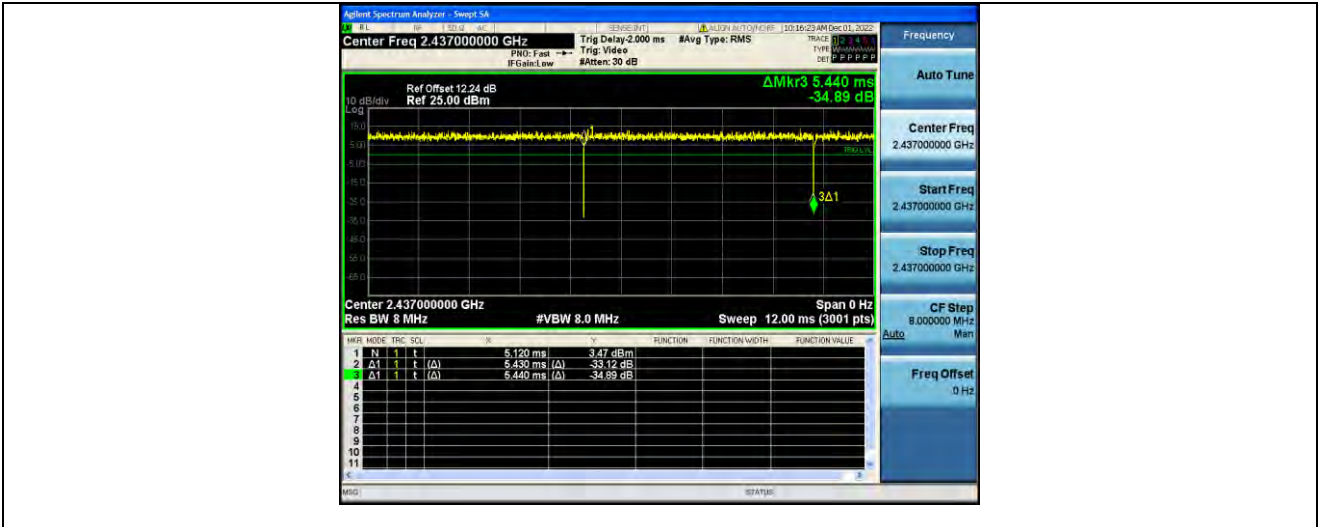
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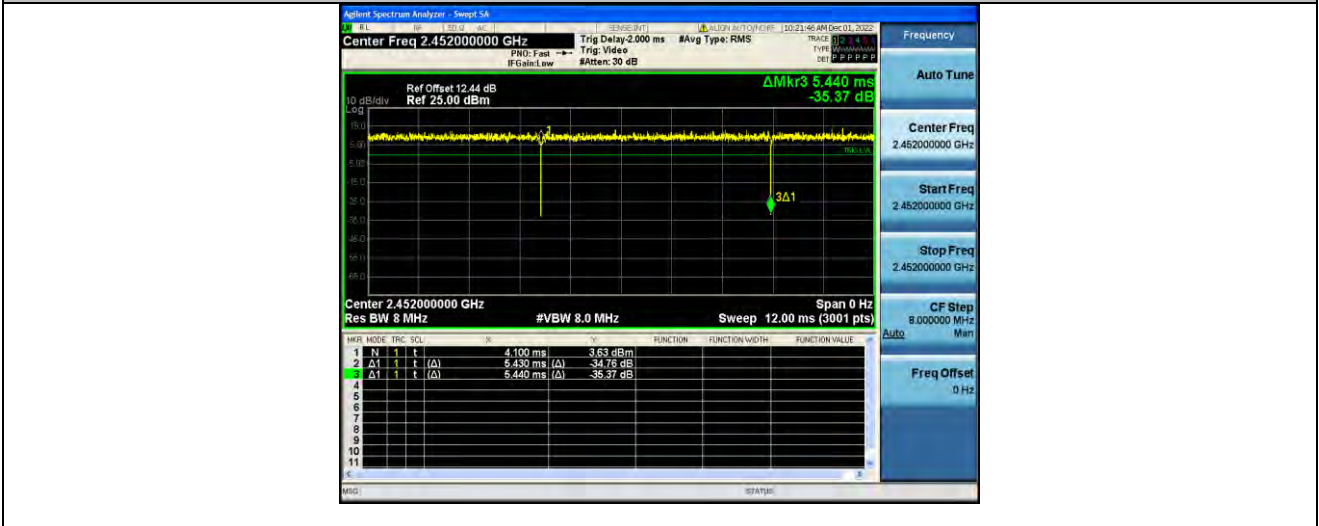
NTNV-11N40SISO-Ant2-2422



NTNV-11N40SISO-Ant2-2437



NTNV-11N40SISO-Ant2-2452





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	MY56070279	10Hz-30GHz	Aug21,2023
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug21,2023
Antenna Connector	Florida RF Labs	N/A	RF01#	N/A	Aug21,2023
Scope	Tektronix	TDS3032B	B014131	300MHz BW; 2 way scope	Aug21,2023
DC power	eTOMENS	eTM-1560	--	15V 60A	Aug21,2023
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug21,2023
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug21,2023

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.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug21,2023
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug21,2023
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug21,2023
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug21,2023
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug21,2023
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-26.5GHz	Aug21,2023
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug21,2023
High NOISE AMPLIFIER	ZHINAN	ZN3380C	15002	10KHz-18GHz	Aug21,2023
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug21,2023
Spectrum Analyzer	Rohde&Schwarz	FSVR40	101003	10Hz-40GHz	Aug21,2023
Horn Antenna	SCHWARZBECK	BBHA9170	01066	15GHZ-40GHZ	Aug21,2023
Preamplifier	SCHWARZBECK	BBV-9721	81	18GHZ-40GHZ	Aug21,2023



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Test S/W	Tonscend	JS32-RE/4.0.0.0
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Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug21,2023
Artificial Mains Network	Rohde&Schwarz	BS ENV216	102453	9KHz-300MHz	Aug21,2023
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	9KHz-300MHz	Aug21,2023
Test S/W	Tonscend	JS32-CE/4.0.0.3			



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%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±2.54dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	



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4.3 Description of Support Units

Equipment	Model No.	Series No.

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

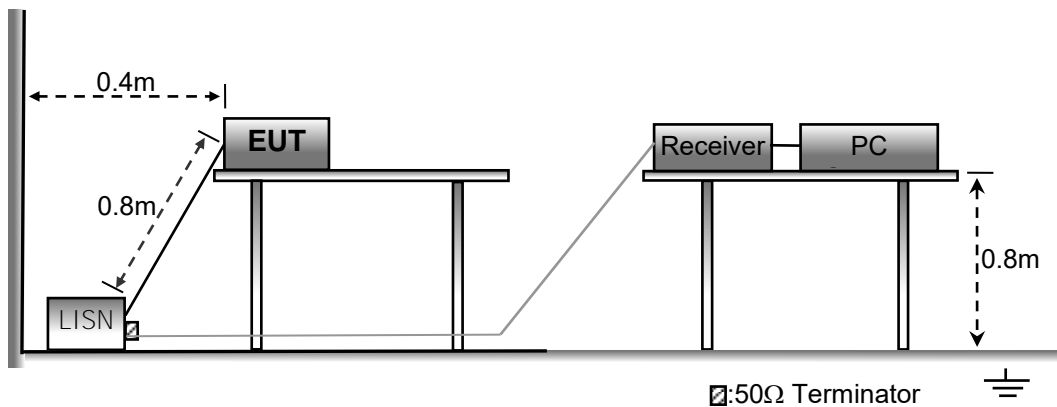
5.1 E.U.T. Operation

Operating Environment :

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

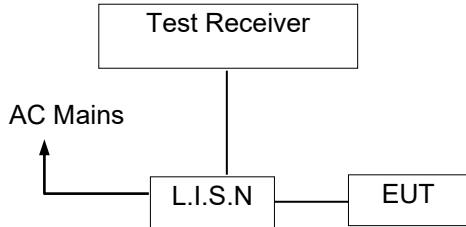
5.2 EUT Setup

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 0.8m 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 with AC 120V 60Hz and AC 240V 50Hz, the worst case is AC 120V 60Hz. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

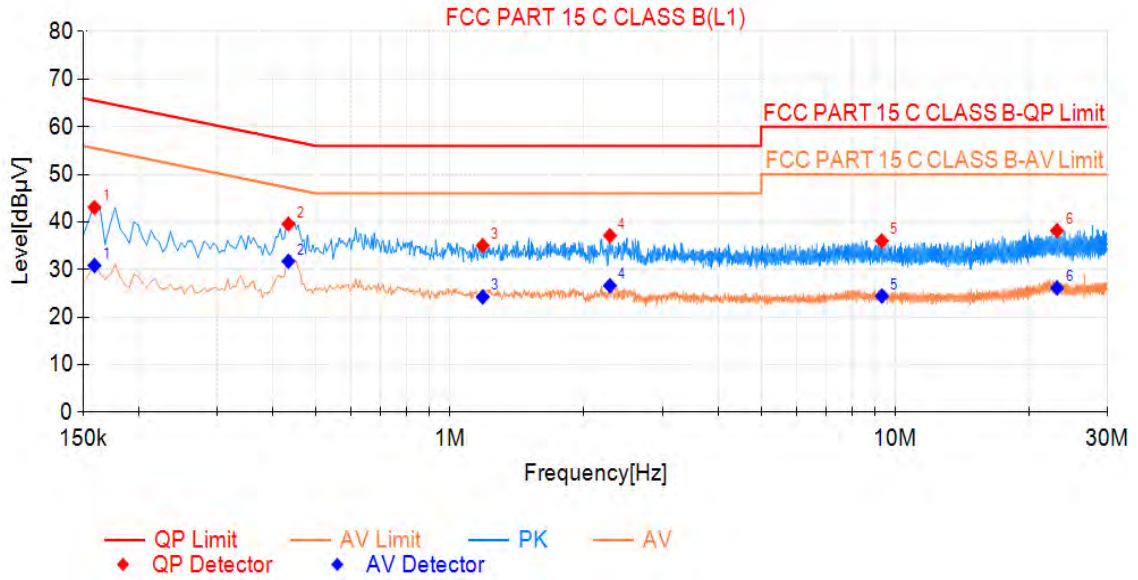
Pass.

The adapters and all modulation modes of have been tested. The data of the worst mode (TX 802.11b low channel) is recorded on the following page, and other modulation methods have not exceeded the limit.

Please refer to the following pages.



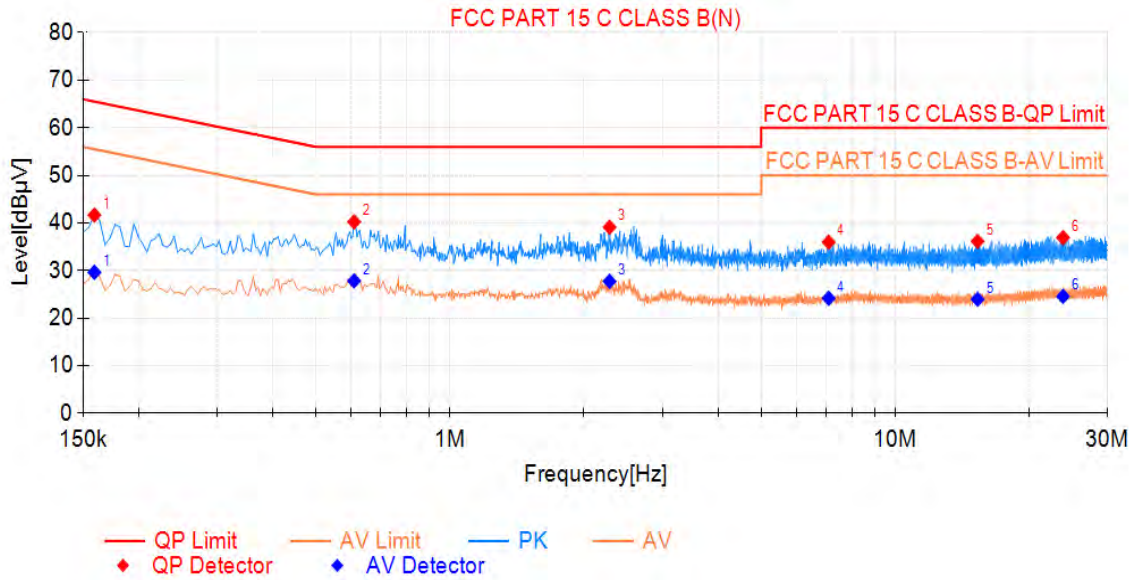
Line- AC 120V/60Hz



Final Data List								
NO.	Freq. [MHz]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Verdict
1	0.159	43.06	65.52	22.46	30.86	55.52	24.66	PASS
2	0.434	39.57	57.19	17.62	31.75	47.19	15.44	PASS
3	1.185	35.06	56.00	20.94	24.25	46.00	21.75	PASS
4	2.288	37.13	56.00	18.87	26.62	46.00	19.38	PASS
5	9.335	36.02	60.00	23.98	24.44	50.00	25.56	PASS
6	23.096	38.19	60.00	21.81	26.13	50.00	23.87	PASS



Neutral-AC 120V/60Hz



Final Data List								
NO.	Freq. [MHz]	QP	QP	QP	AV	AV	AV	Verdict
		Value	Limit	Margin	Value	Limit	Margin	
1	0.159	41.66	65.52	23.86	29.65	55.52	25.87	PASS
2	0.609	40.25	56.00	15.75	27.83	46.00	18.17	PASS
3	2.283	39.11	56.00	16.89	27.76	46.00	18.24	PASS
4	7.089	35.97	60.00	24.03	24.19	50.00	25.81	PASS
5	15.315	36.15	60.00	23.85	23.97	50.00	26.03	PASS
6	23.825	36.92	60.00	23.08	24.57	50.00	25.43	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	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
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

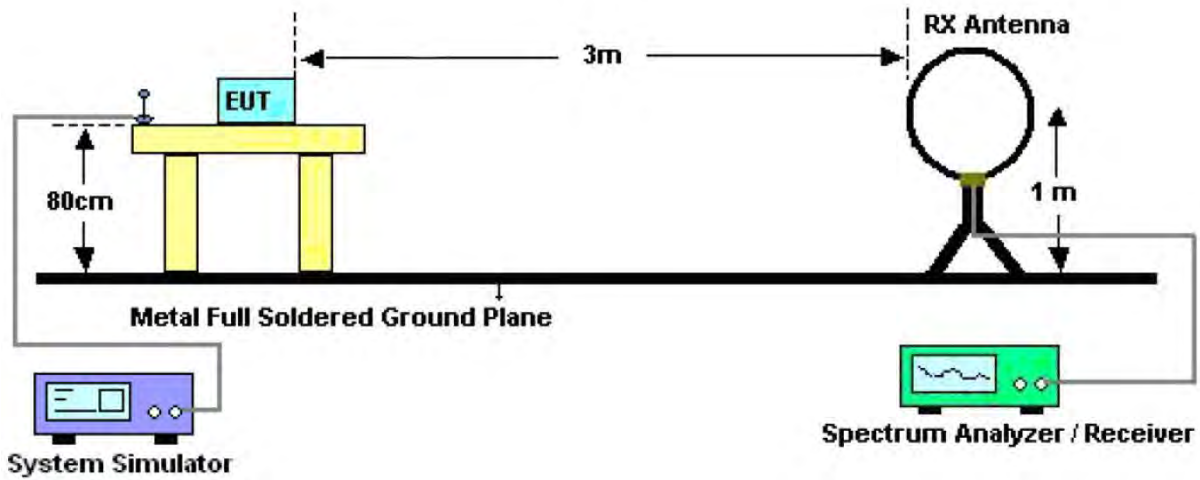
Operating Environment :

Temperature: : 24.5 °C
 Humidity: : 52 % RH
 Atmospheric Pressure: : 101.3kPa
 Test Voltage : AC 120V 60Hz

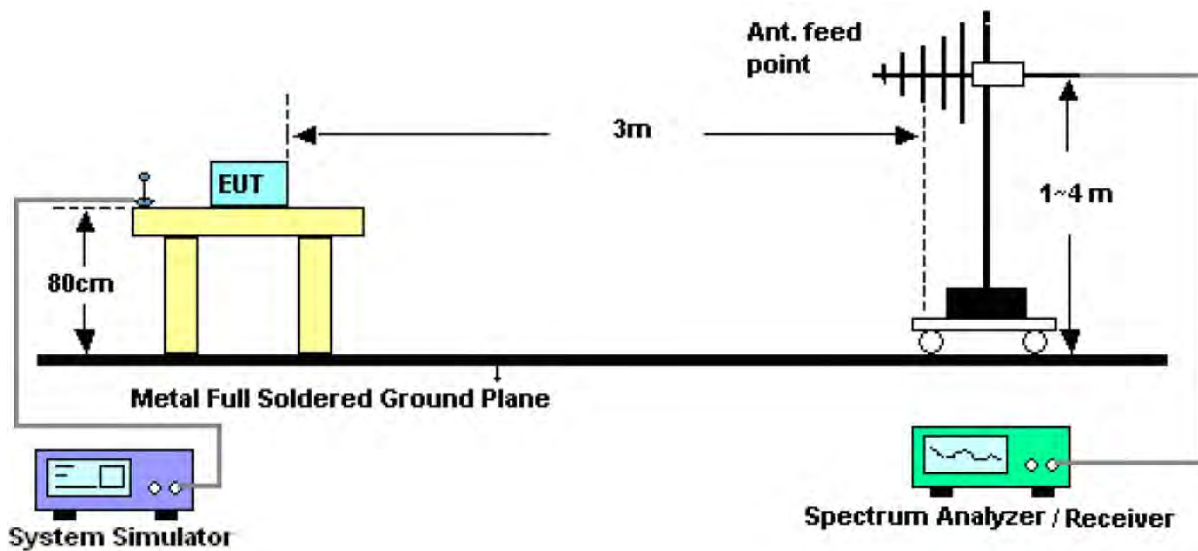
6.2 Test Setup

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

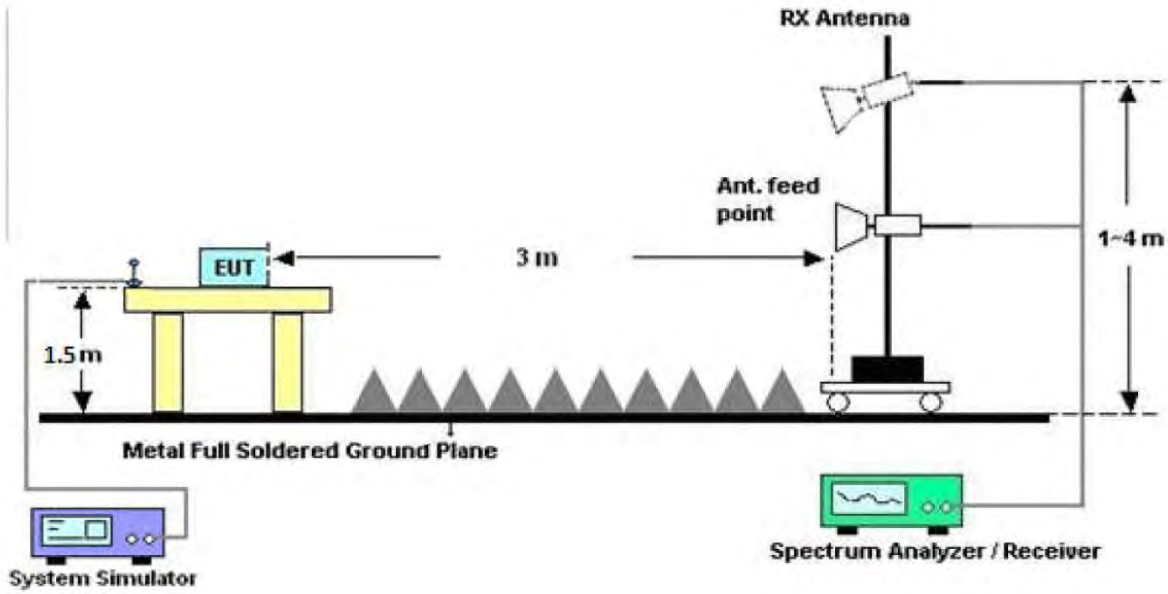
The test setup for emission measurement below 30MHz



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 0.8m 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)
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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 = $40\log(\text{Specific distance/ test distance})$ (dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

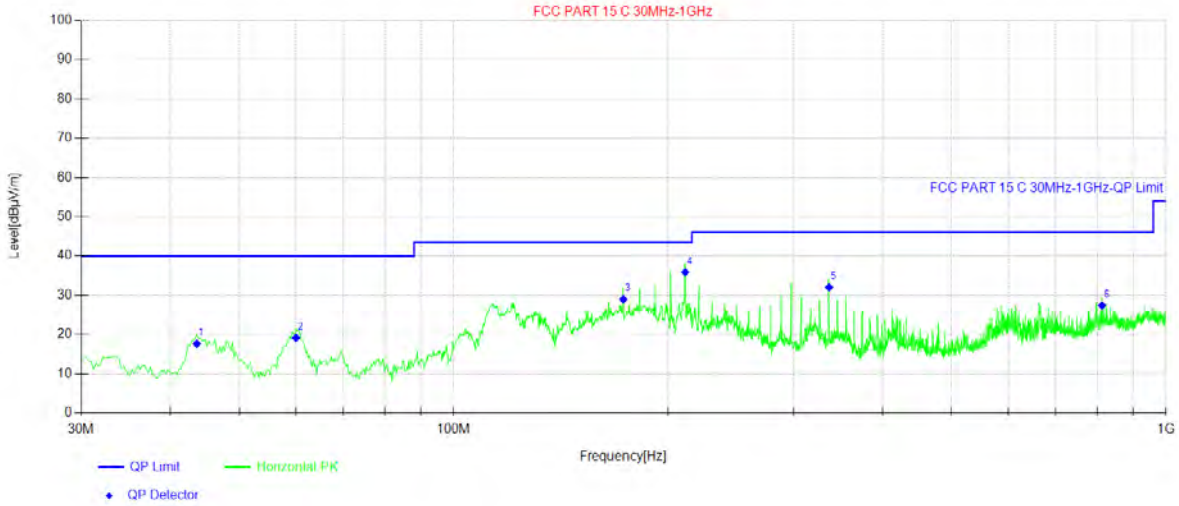
Test Frequency: 30MHz ~ 1GHz

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

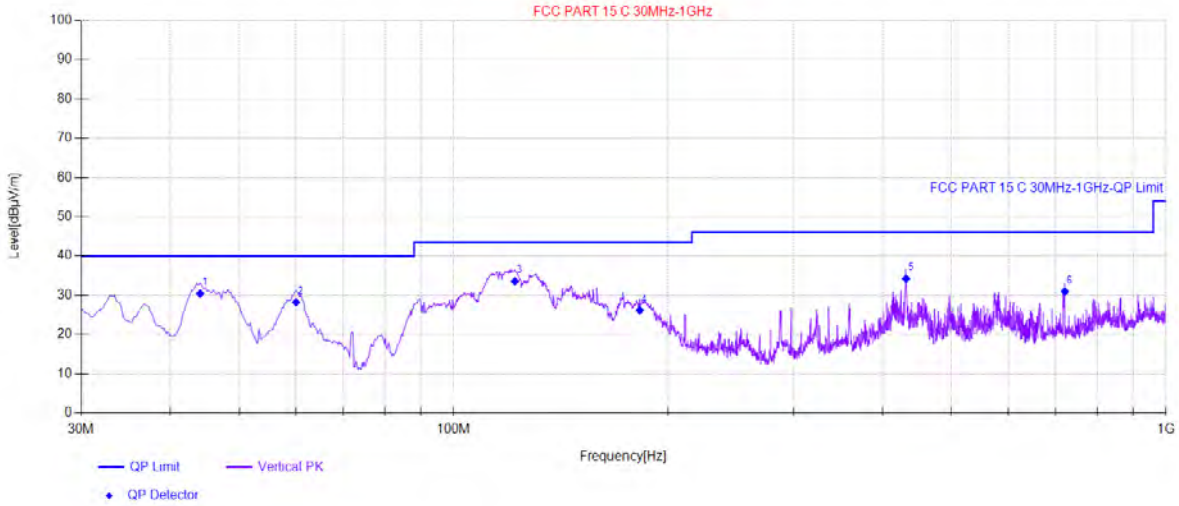


Final Data List[QP]							
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity
1	43.58	35.2	-17.55	17.65	40.00	22.35	Horizontal
2	60.07	36.96	-17.81	19.15	40.00	20.85	Horizontal
3	173.08	45.51	-16.53	28.98	43.50	14.52	Horizontal
4	211.39	54.41	-18.55	35.86	43.50	7.64	Horizontal
5	336.52	46.54	-14.51	32.03	46.00	13.97	Horizontal
6	813.28	31.61	-4.24	27.37	46.00	18.63	Horizontal

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



Antenna Polarization: Vertical



Final Data List[QP]							
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity
1	44.07	47.93	-17.53	30.40	40.00	9.60	Vertical
2	60.07	46.04	-17.81	28.23	40.00	11.77	Vertical
3	121.91	51.54	-17.96	33.58	43.50	9.92	Vertical
4	182.53	43.59	-17.44	26.15	43.50	17.35	Vertical
5	431.58	46.59	-12.38	34.21	46.00	11.79	Vertical
6	721.37	37.11	-6.18	30.93	46.00	15.07	Vertical

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



Test Frequency: From 1GHz to 25GHz

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.
4824.00	40.73	32.29	4.10	28.45	48.67	74.00	-25.33	V
7236.00	34.50	35.99	6.22	27.83	48.88	74.00	-25.12	V
9648.00	32.91	38.11	7.83	25.10	53.75	74.00	-20.25	V
4824.00	39.33	32.29	4.10	28.45	47.27	74.00	-26.73	H
7236.00	34.21	35.99	6.22	27.83	48.59	74.00	-25.41	H
9648.00	32.48	38.11	7.83	25.10	53.32	74.00	-20.68	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.
4824.00	29.78	32.29	4.10	28.45	37.72	54.00	-16.28	V
7236.00	23.35	35.99	6.22	27.83	37.73	54.00	-16.27	V
9648.00	23.25	38.11	7.83	25.10	44.09	54.00	-9.91	V
4824.00	28.85	32.29	4.10	28.45	36.79	54.00	-17.21	H
7236.00	22.79	35.99	6.22	27.83	37.17	54.00	-16.83	H
9648.00	22.22	38.11	7.83	25.10	43.06	54.00	-10.94	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.
4874.00	39.71	32.35	4.12	28.44	47.74	74.00	-26.26	V
7311.00	34.52	36.08	6.30	27.74	49.16	74.00	-24.84	V
9748.00	33.90	38.25	7.91	24.65	55.41	74.00	-18.59	V
4874.00	40.14	32.35	4.12	28.44	48.17	74.00	-25.83	H
7311.00	33.13	36.08	6.30	27.74	47.77	74.00	-26.23	H
9748.00	33.77	38.25	7.91	24.65	55.28	74.00	-18.72	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.
4874.00	30.54	32.35	4.12	28.44	38.57	54.00	-15.43	V
7311.00	22.83	36.08	6.30	27.74	37.47	54.00	-16.53	V
9748.00	23.14	38.25	7.91	24.65	44.65	54.00	-9.35	V
4874.00	30.23	32.35	4.12	28.44	38.26	54.00	-15.74	H
7311.00	22.21	36.08	6.30	27.74	36.85	54.00	-17.15	H
9748.00	23.48	38.25	7.91	24.65	44.99	54.00	-9.01	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.
4924.00	45.51	32.41	4.14	28.42	53.64	74.00	-20.36	V
7386.00	35.36	36.15	6.36	27.68	50.19	74.00	-23.81	V
9848.00	37.31	38.35	7.97	24.33	59.30	74.00	-14.70	V
4924.00	44.72	32.41	4.14	28.42	52.85	74.00	-21.15	H
7386.00	34.21	36.15	6.36	27.68	49.04	74.00	-24.96	H
9848.00	33.46	38.35	7.97	24.33	55.45	74.00	-18.55	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.
4924.00	36.37	32.41	4.14	28.42	44.50	54.00	-9.50	V
7386.00	25.26	36.15	6.36	27.68	40.09	54.00	-13.91	V
9848.00	25.80	38.35	7.97	24.33	47.79	54.00	-6.21	V
4924.00	35.05	32.41	4.14	28.42	43.18	54.00	-10.82	H
7386.00	23.59	36.15	6.36	27.68	38.42	54.00	-15.58	H
9848.00	22.71	38.35	7.97	24.33	44.70	54.00	-9.30	H

Note:

1. The testing has been conformed to $10 \times 2462 \text{MHz} = 24620 \text{MHz}$.
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.

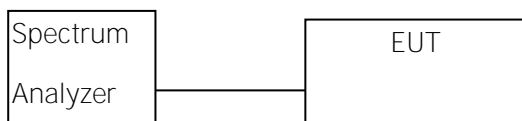


7 Conducted Spurious Emission

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
3. Set up:



7.2 Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	11.42	-56.46	≤-8.58	PASS
11B	Ant1	2412	1000~26500	11.42	-41.31	≤-8.58	PASS
11B	Ant2	2412	30~1000	10.84	-56.38	≤-9.16	PASS
11B	Ant2	2412	1000~26500	10.84	-42	≤-9.16	PASS
11B	Ant1	2437	30~1000	11.27	-56.39	≤-8.73	PASS
11B	Ant1	2437	1000~26500	11.27	-40.67	≤-8.73	PASS
11B	Ant2	2437	30~1000	10.49	-57.41	≤-9.51	PASS
11B	Ant2	2437	1000~26500	10.49	-41.81	≤-9.51	PASS
11B	Ant1	2462	30~1000	10.60	-56.54	≤-9.4	PASS

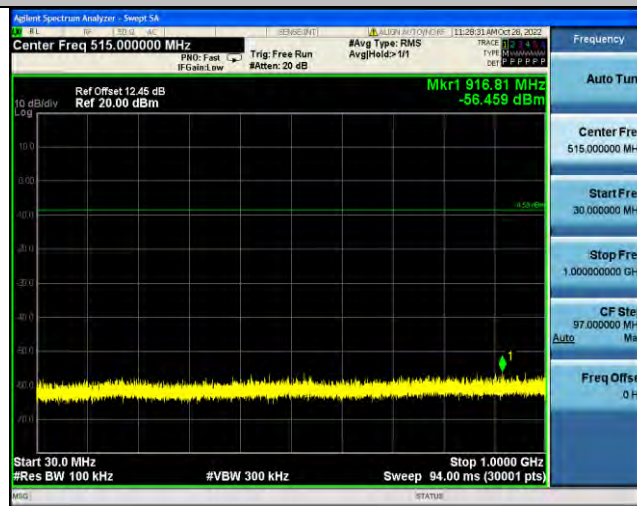


11B	Ant1	2462	1000~26500	10.60	-41.78	≤-9.4	PASS
11B	Ant2	2462	30~1000	9.70	-57.11	≤-10.3	PASS
11B	Ant2	2462	1000~26500	9.70	-41.8	≤-10.3	PASS
11G	Ant1	2412	30~1000	6.98	-56.45	≤-13.02	PASS
11G	Ant1	2412	1000~26500	6.98	-41.73	≤-13.02	PASS
11G	Ant2	2412	30~1000	6.48	-56.16	≤-13.52	PASS
11G	Ant2	2412	1000~26500	6.48	-39.4	≤-13.52	PASS
11G	Ant1	2437	30~1000	6.91	-56.55	≤-13.09	PASS
11G	Ant1	2437	1000~26500	6.91	-41.14	≤-13.09	PASS
11G	Ant2	2437	30~1000	6.14	-57.91	≤-13.86	PASS
11G	Ant2	2437	1000~26500	6.14	-40.97	≤-13.86	PASS
11G	Ant1	2462	30~1000	6.33	-56.58	≤-13.67	PASS
11G	Ant1	2462	1000~26500	6.33	-41.17	≤-13.67	PASS
11G	Ant2	2462	30~1000	5.42	-57.56	≤-14.58	PASS
11G	Ant2	2462	1000~26500	5.42	-41.6	≤-14.58	PASS
11N20SISO	Ant1	2412	30~1000	6.38	-57.22	≤-13.62	PASS
11N20SISO	Ant1	2412	1000~26500	6.38	-41.29	≤-13.62	PASS
11N20SISO	Ant2	2412	30~1000	6.26	-49.87	≤-13.74	PASS
11N20SISO	Ant2	2412	1000~26500	6.26	-40.96	≤-13.74	PASS
11N20SISO	Ant1	2437	30~1000	5.92	-56.69	≤-14.08	PASS
11N20SISO	Ant1	2437	1000~26500	5.92	-41.7	≤-14.08	PASS
11N20SISO	Ant2	2437	30~1000	5.55	-57	≤-14.45	PASS
11N20SISO	Ant2	2437	1000~26500	5.55	-41.57	≤-14.45	PASS
11N20SISO	Ant1	2462	30~1000	6.09	-56.68	≤-13.91	PASS
11N20SISO	Ant1	2462	1000~26500	6.09	-41.94	≤-13.91	PASS
11N20SISO	Ant2	2462	30~1000	5.03	-55.78	≤-14.97	PASS
11N20SISO	Ant2	2462	1000~26500	5.03	-40.82	≤-14.97	PASS
11N40SISO	Ant1	2422	0-Reference	-5.65	-5.65	---	PASS
11N40SISO	Ant1	2422	30~1000	-5.65	-56.45	≤-25.65	PASS

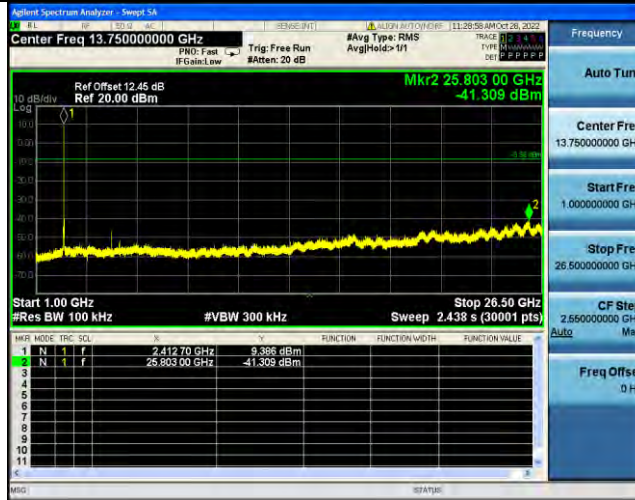


11N40SISO	Ant1	2422	1000~26500	-5.65	-40.34	≤-25.65	PASS
11N40SISO	Ant2	2422	0~Reference	-6.90	-6.90	---	PASS
11N40SISO	Ant2	2422	30~1000	-6.90	-57.44	≤-26.9	PASS
11N40SISO	Ant2	2422	1000~26500	-6.90	-41	≤-26.9	PASS
11N40SISO	Ant1	2437	0~Reference	-5.72	-5.72	---	PASS
11N40SISO	Ant1	2437	30~1000	-5.72	-55.94	≤-25.72	PASS
11N40SISO	Ant1	2437	1000~26500	-5.72	-41.79	≤-25.72	PASS
11N40SISO	Ant2	2437	0~Reference	-6.99	-6.99	---	PASS
11N40SISO	Ant2	2437	30~1000	-6.99	-58.25	≤-26.99	PASS
11N40SISO	Ant2	2437	1000~26500	-6.99	-40.98	≤-26.99	PASS
11N40SISO	Ant1	2452	0~Reference	-4.91	-4.91	---	PASS
11N40SISO	Ant1	2452	30~1000	-4.91	-56.68	≤-24.91	PASS
11N40SISO	Ant1	2452	1000~26500	-4.91	-41.26	≤-24.91	PASS
11N40SISO	Ant2	2452	0~Reference	-6.29	-6.29	---	PASS
11N40SISO	Ant2	2452	30~1000	-6.29	-57.81	≤-26.29	PASS
11N40SISO	Ant2	2452	1000~26500	-6.29	-41.22	≤-26.29	PASS

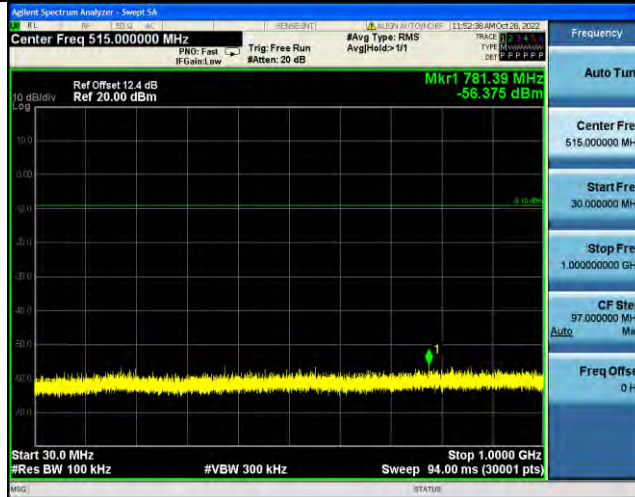
11B-Ant1-2412-30~1000-11.42



11B-Ant1-2412-1000~26500-11.42



11B-Ant2-2412-30~1000-10.84



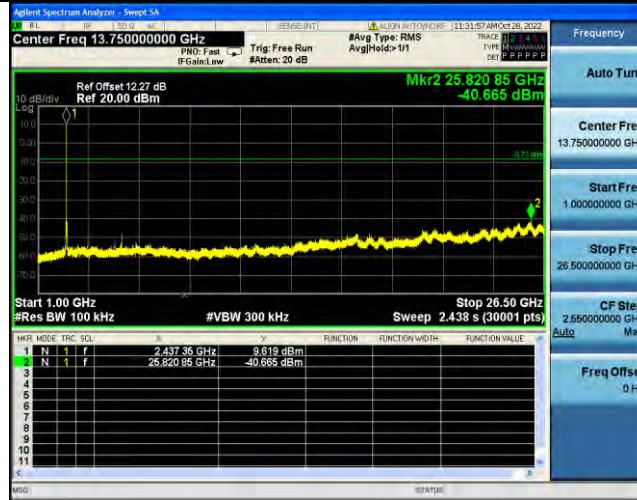
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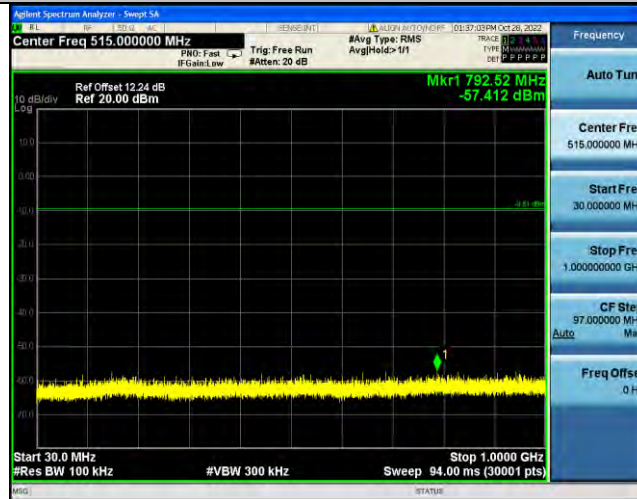
11B-Ant1-2437-30~1000-11.27



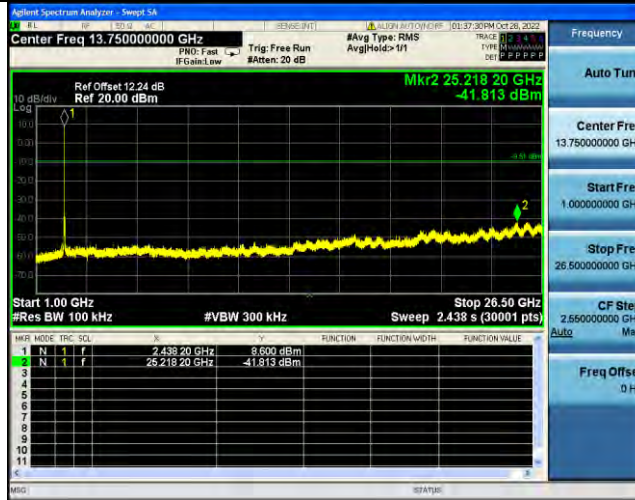
11B-Ant1-2437-1000~26500-11.27



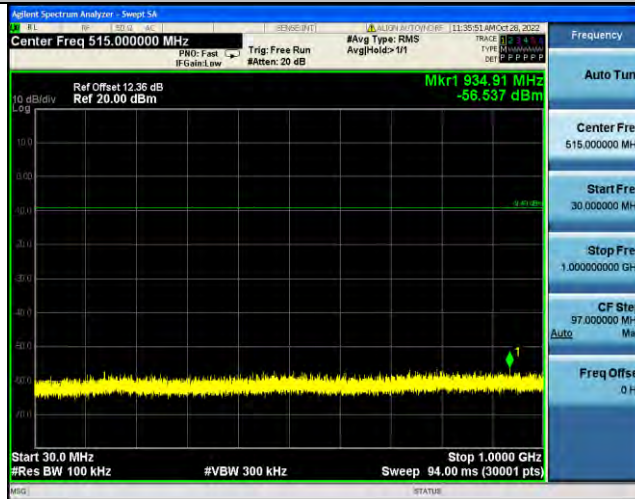
11B-Ant2-2437-30~1000-10.49



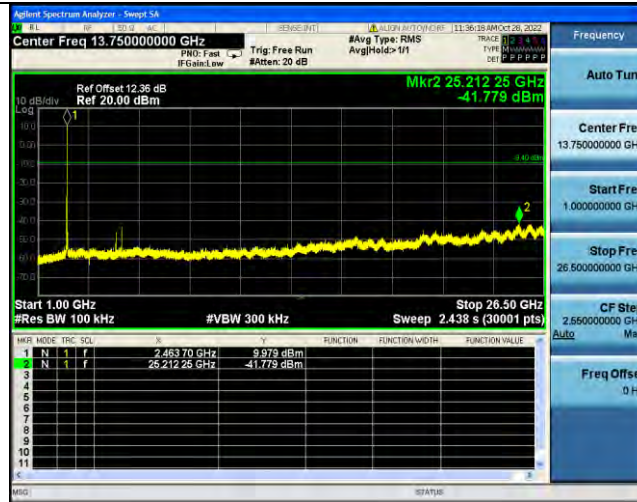
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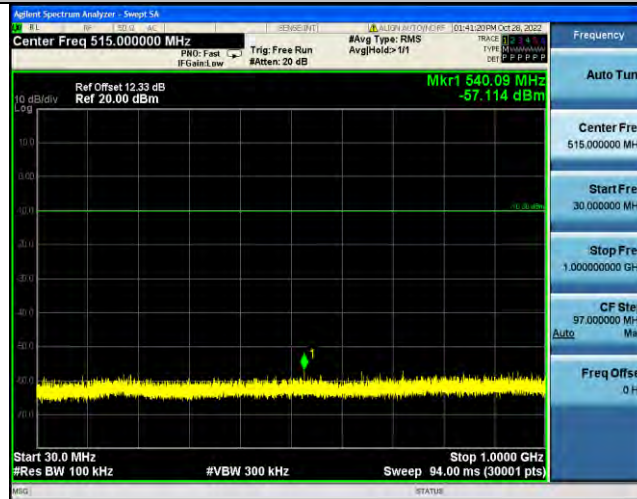
11B-Ant1-2462-30~1000-10.60



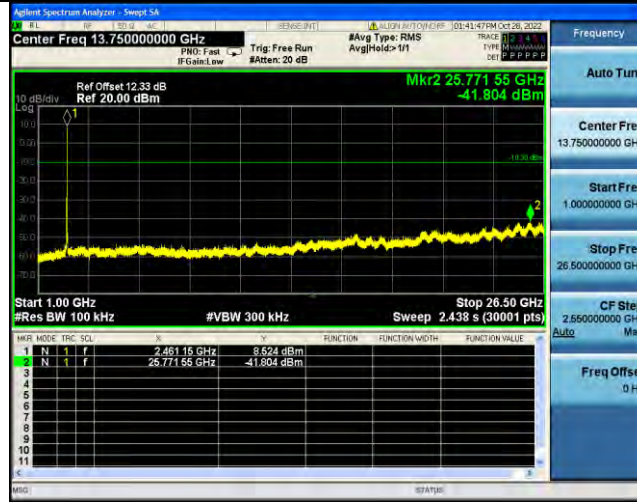
11B-Ant1-2462-1000~26500-10.60



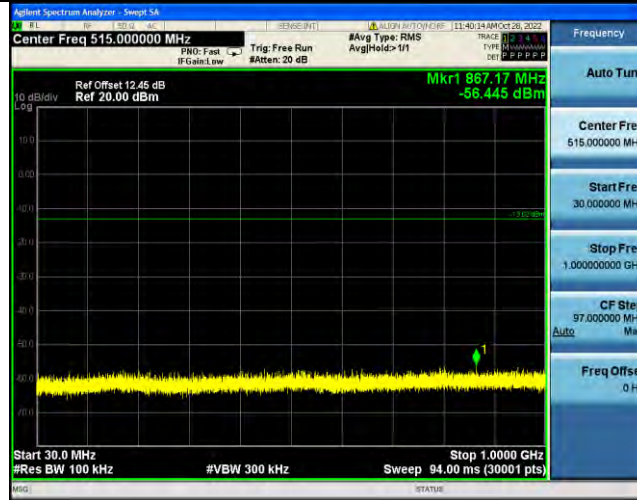
11B-Ant2-2462-30~1000-9.70



11B-Ant2-2462-1000~26500-9.70



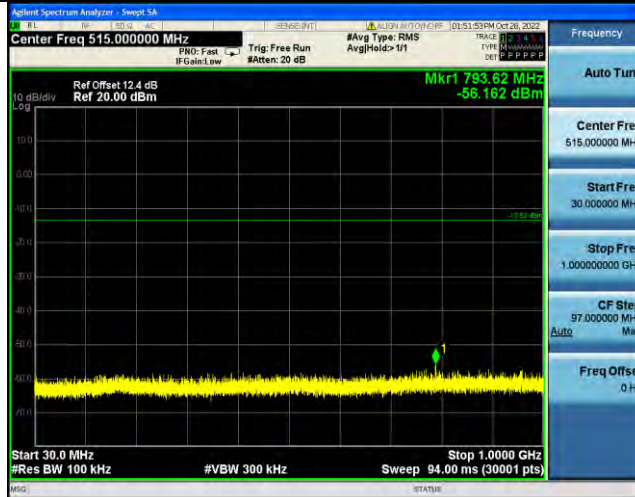
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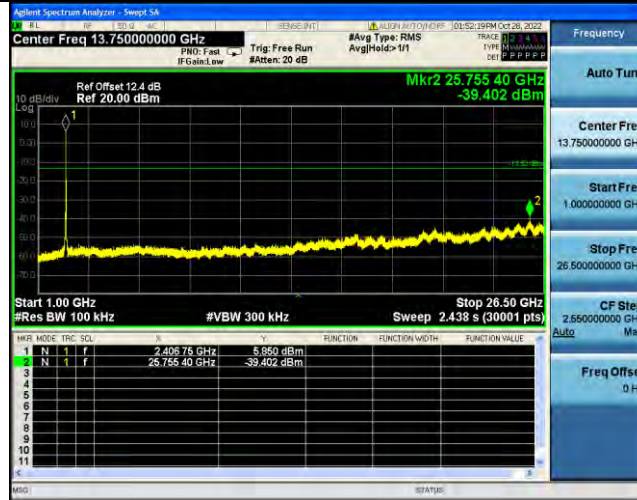
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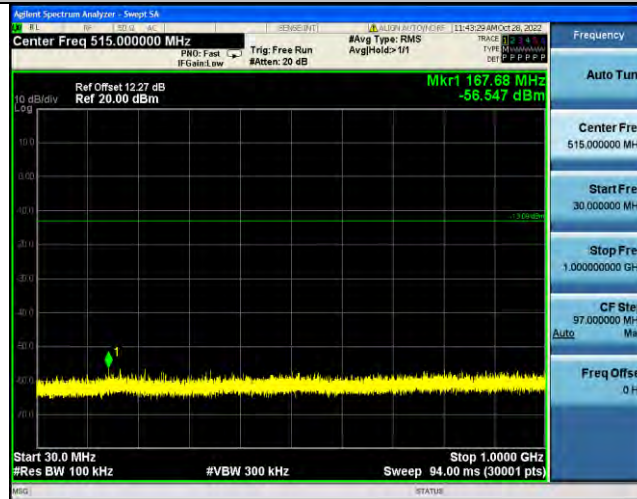
11G-Ant2-2412-30~1000-6.48



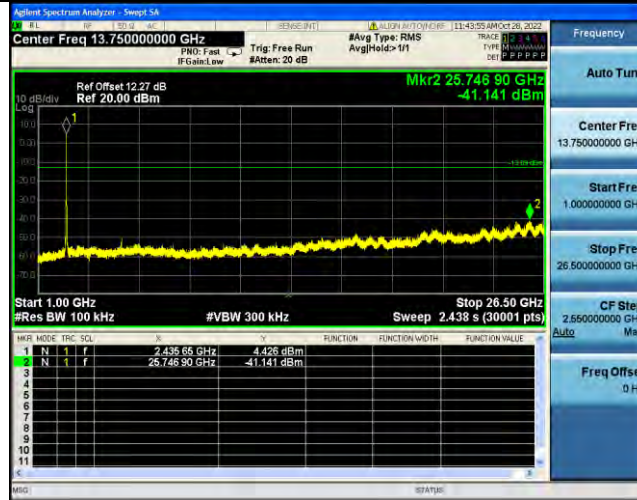
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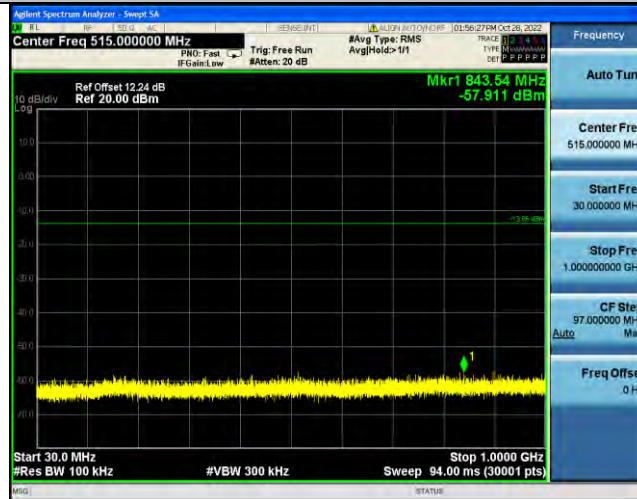
11G-Ant1-2437-30~1000-6.91



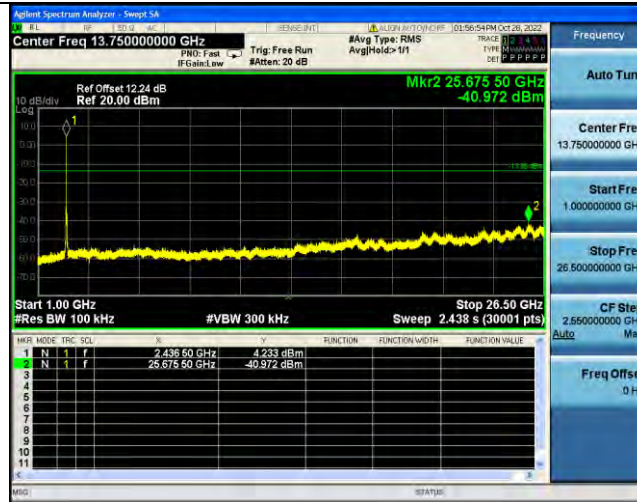
11G-Ant1-2437-1000~26500-6.91



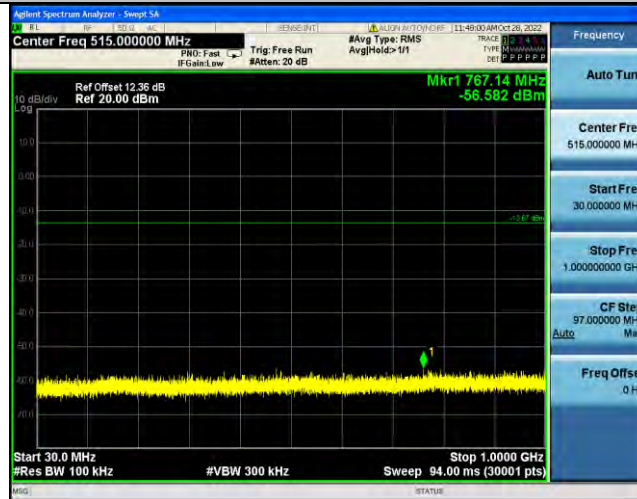
11G-Ant2-2437-30~1000-6.14



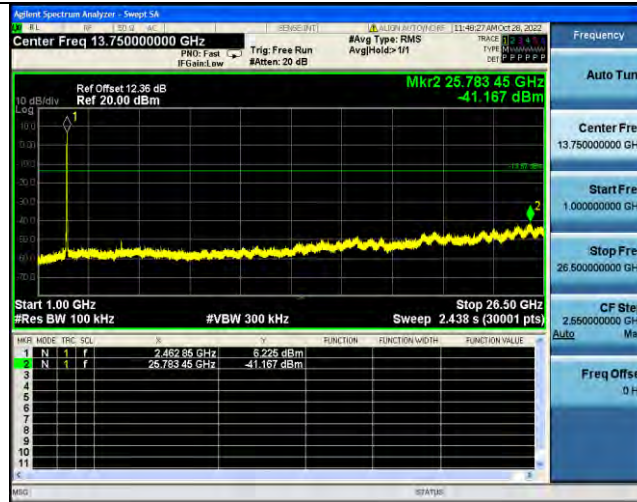
11G-Ant2-2437-1000~26500-6.14



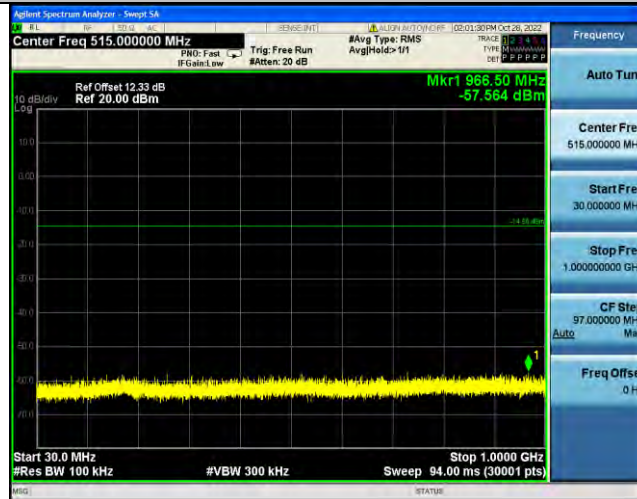
11G-Ant1-2462-30~1000-6.33



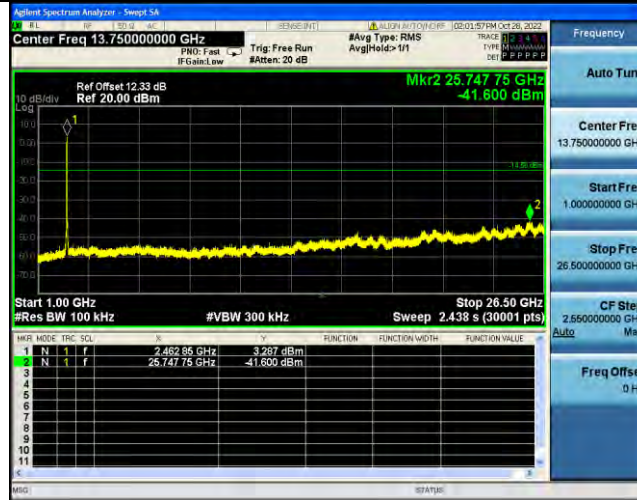
11G-Ant1-2462-1000~26500-6.33



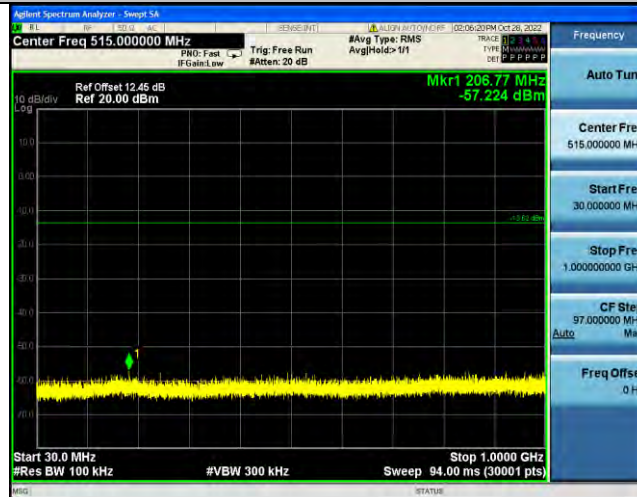
11G-Ant2-2462-30~1000-5.42



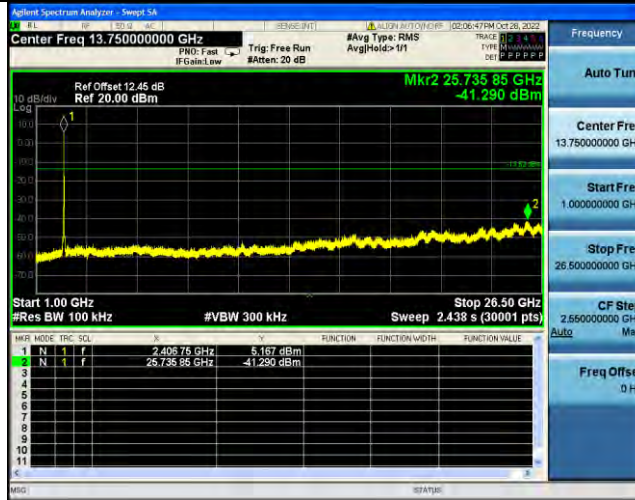
11G-Ant2-2462-1000~26500-5.42



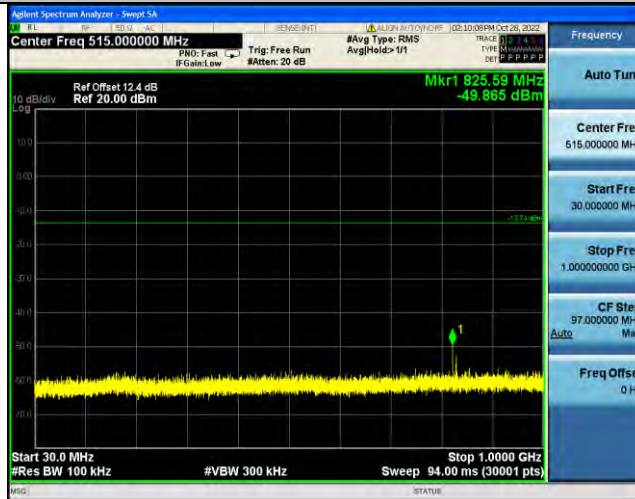
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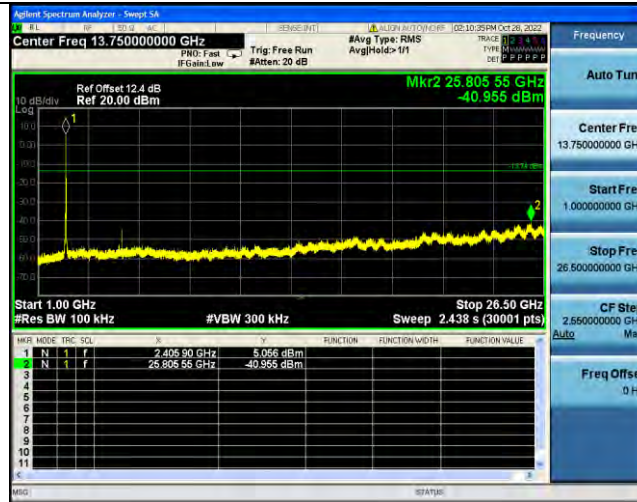
11N20SISO-Ant1-2412-1000~26500-6.38



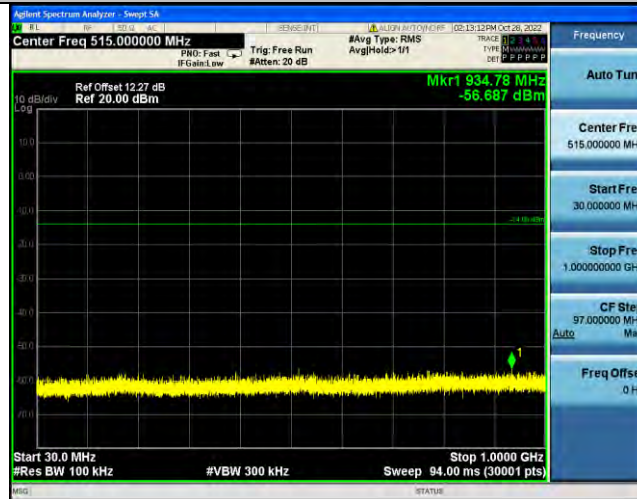
11N20SISO-Ant2-2412-30~1000-6.26



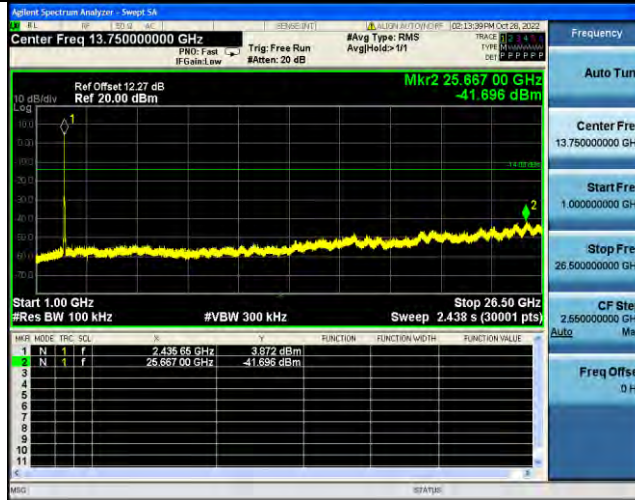
11N20SISO-Ant2-2412-1000~26500-6.26



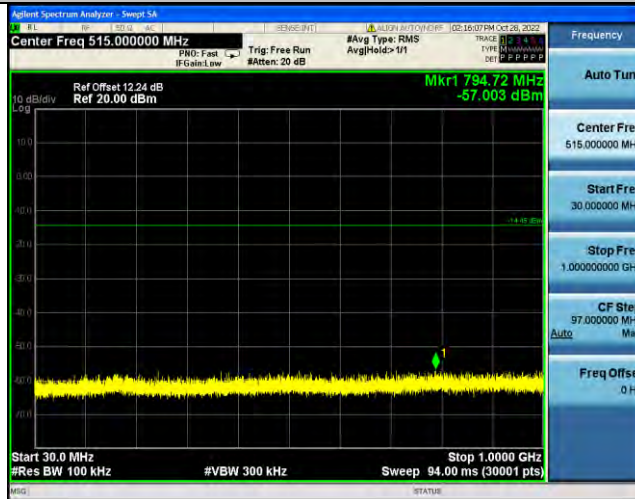
11N20SISO-Ant1-2437-30~1000-5.92



11N20SISO-Ant1-2437-1000~26500-5.92



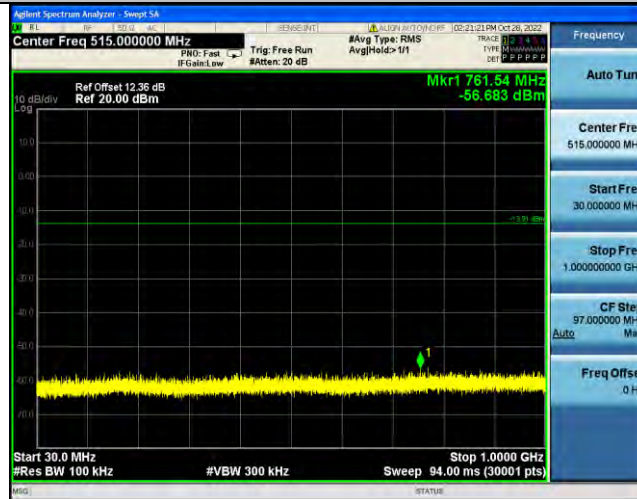
11N20SISO-Ant2-2437-30~1000-5.55



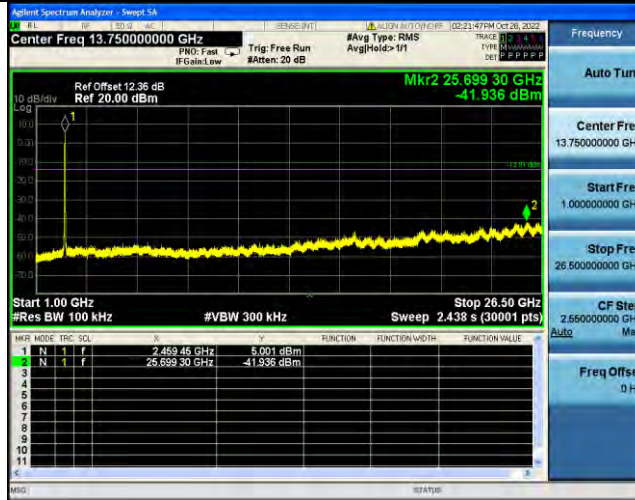
11N20SISO-Ant2-2437-1000~26500-5.55



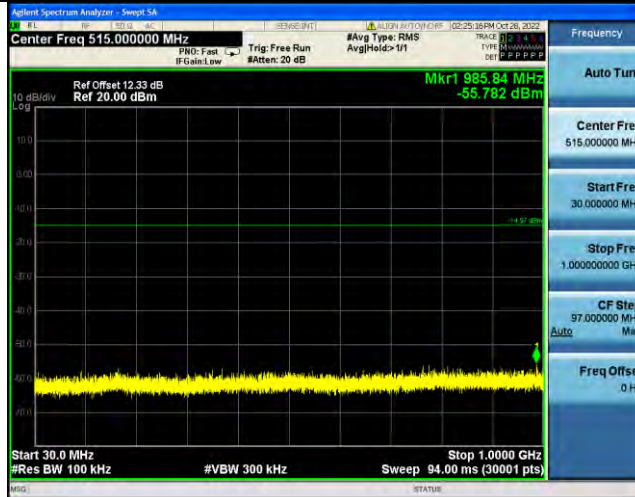
11N20SISO-Ant1-2462-30~1000-6.09



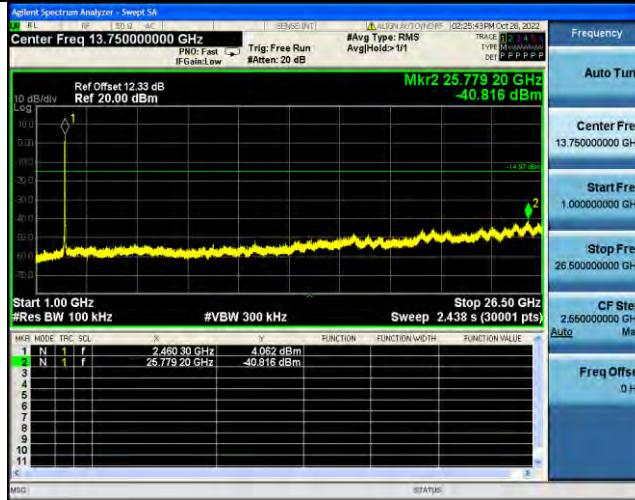
11N20SISO-Ant1-2462-1000~26500-6.09



11N20SISO-Ant2-2462-30~1000-5.03



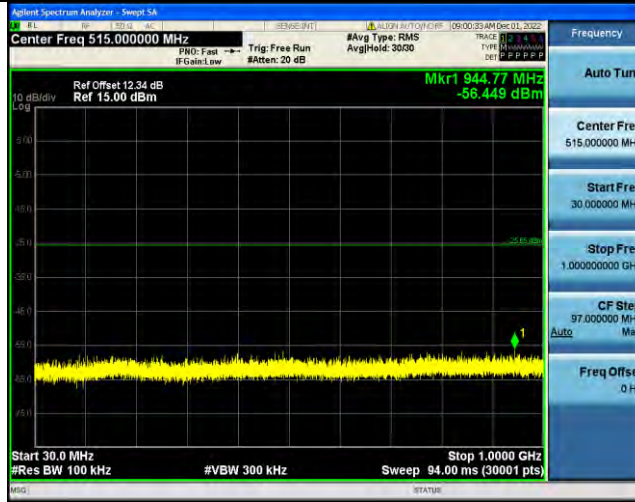
11N20SISO-Ant2-2462-1000~26500-5.03



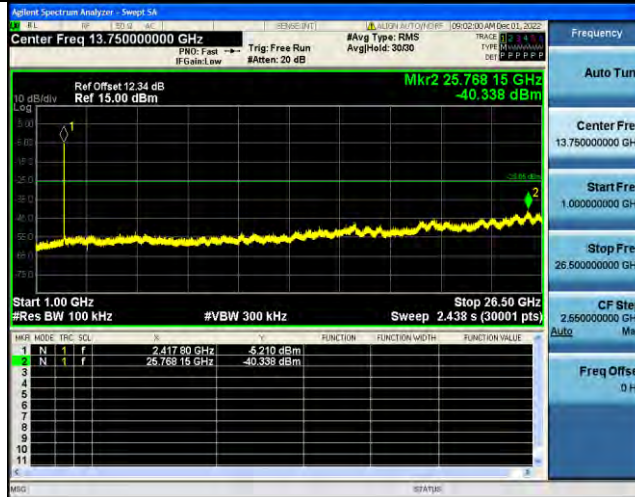
11N40SISO-Ant1-2422-0~Reference--5.65



11N40SISO-Ant1-2422-30~1000--5.65



11N40SISO-Ant1-2422-1000~26500~-5.65



11N40SISO-Ant2-2422-0~Reference~-6.90



11N40SISO-Ant2-2422-30~1000--6.90



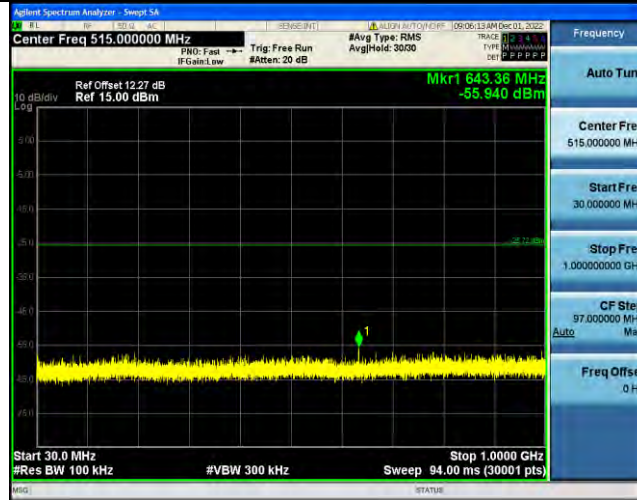
11N40SISO-Ant2-2422-1000~26500--6.90



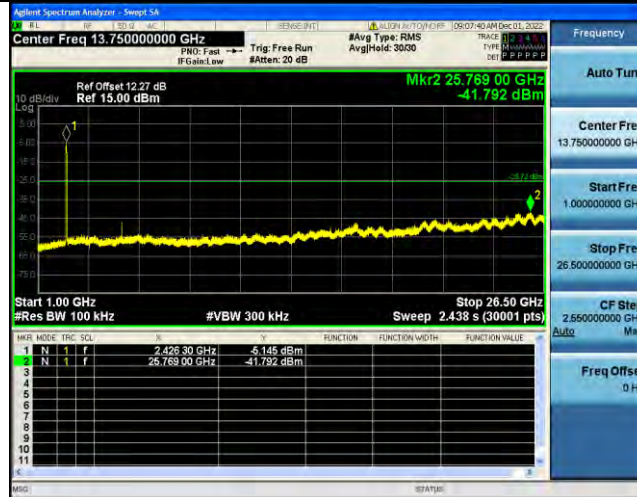
11N40SISO-Ant1-2437-0~Reference--5.72



11N40SISO-Ant1-2437-30~1000--5.72



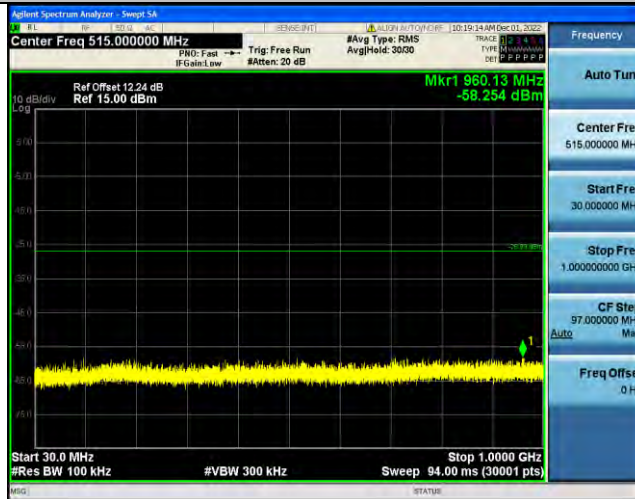
11N40SISO-Ant1-2437-1000~26500~-5.72



11N40SISO-Ant2-2437-0~Reference~-6.99



11N40SISO-Ant2-2437-30~1000~6.99



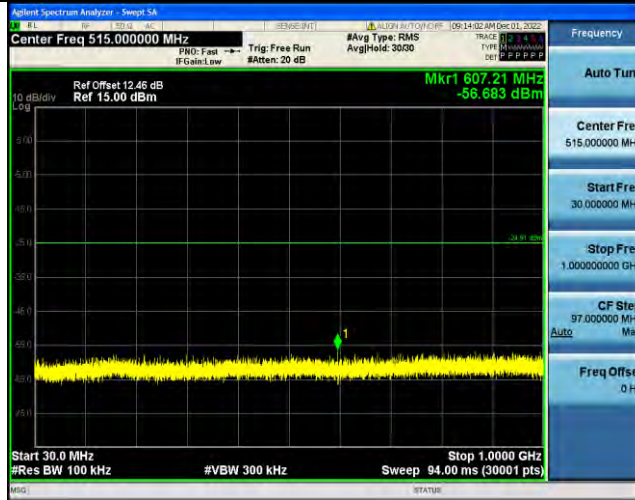
11N40SISO-Ant2-2437-1000~26500~6.99



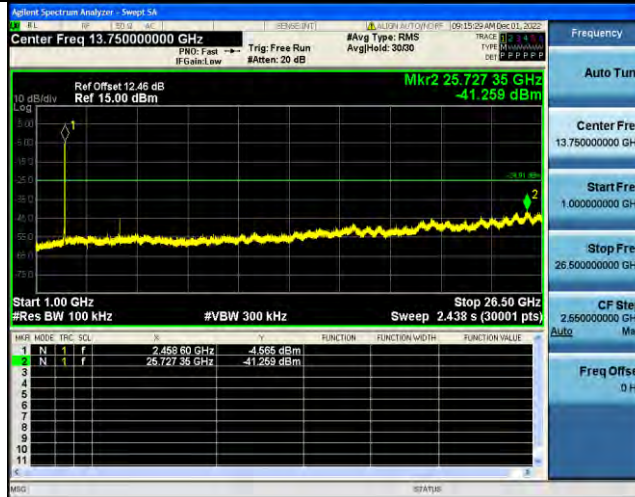
11N40SISO-Ant1-2452-0~Reference--4.91



11N40SISO-Ant1-2452-30~1000--4.91



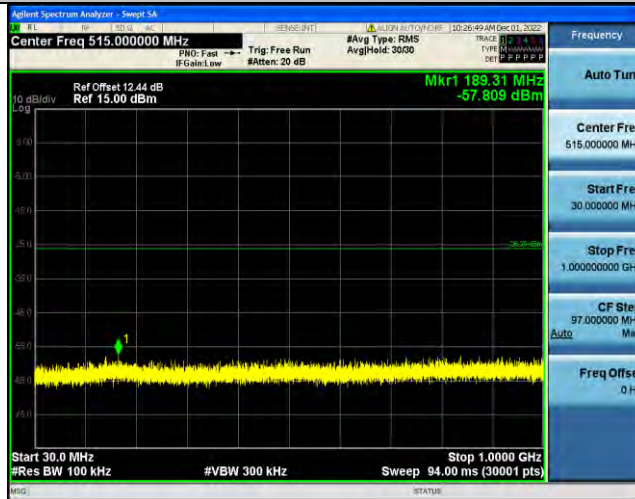
11N40SISO-Ant1-2452-1000~26500--4.91



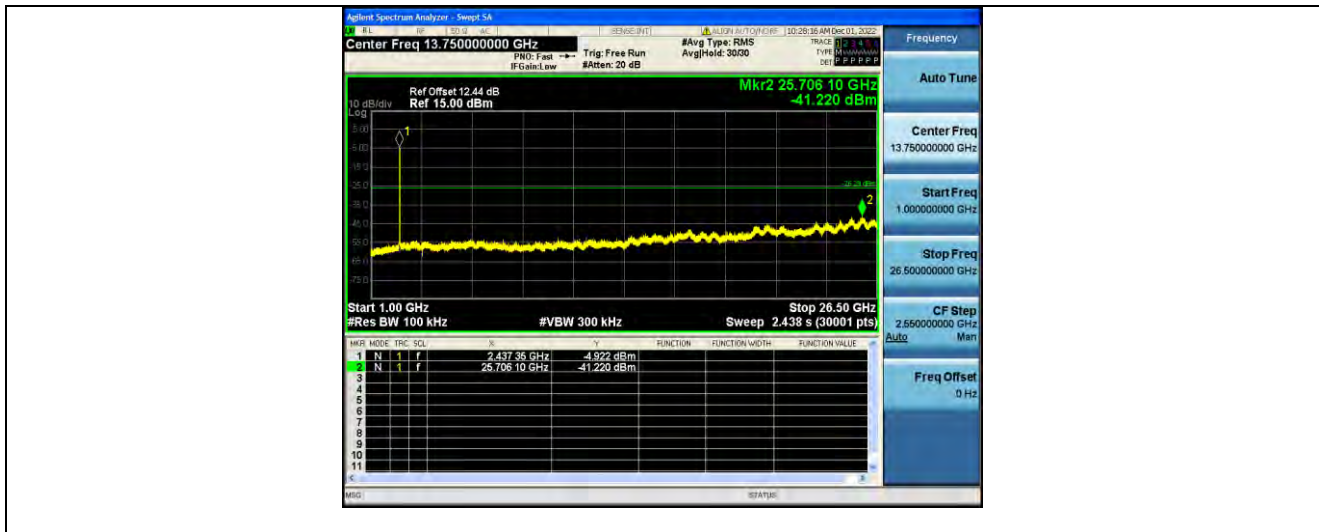
11N40SISO-Ant2-2452-0-Reference--6.29



11N40SISO-Ant2-2452-30~1000--6.29



11N40SISO-Ant2-2452-1000~26500--6.29



Emissions in Restricted Bands

TestMode	Antenna	Channel	Frequency [MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBUV/m]	Limit [dBUV/m]	Verdict
11B	Ant1	Low	2412	Peak	2390.000	-44.9	≤-21.20	50.30	≤74	PASS
11B	Ant1	Low	2412	Peak	2310.000	-44.44	≤-21.20	50.76	≤74	PASS
11G	Ant1	High	2462	Peak	2483.500	-41.12	≤-21.20	54.08	≤74	PASS
11G	Ant1	High	2462	AV	2483.500	-42.44	≤-41.20	52.76	≤54	PASS
11G	Ant1	High	2462	AV	2500.000	-43.79	≤-41.20	51.41	≤54	PASS
11G	Ant1	High	2462	AV	2483.670	-42.43	≤-41.20	52.77	≤54	PASS
11B	Ant2	Low	2412	Peak	2390.000	-39.69	≤-21.20	55.51	≤74	PASS
11B	Ant2	Low	2412	Peak	2310.000	-38.78	≤-21.20	56.42	≤74	PASS
11B	Ant2	Low	2412	AV	2390.000	-44.32	≤-41.20	50.88	≤54	PASS
11B	Ant2	Low	2412	AV	2310.000	-45.15	≤-41.20	50.05	≤54	PASS
11B	Ant2	Low	2412	AV	2385.540	-42.55	≤-41.20	52.65	≤54	PASS
11B	Ant2	High	2462	Peak	2483.500	-40.97	≤-21.20	54.23	≤74	PASS
11B	Ant2	High	2462	Peak	2500.000	-36.21	≤-21.20	58.99	≤74	PASS
11B	Ant2	High	2462	Peak	2499.950	-36.21	≤-21.20	58.99	≤74	PASS
11B	Ant2	High	2462	AV	2483.500	-44.16	≤-41.20	51.04	≤54	PASS
11B	Ant2	High	2462	AV	2500.000	-44.58	≤-41.20	50.62	≤54	PASS
11B	Ant2	High	2462	AV	2486.640	-43.36	≤-41.20	51.84	≤54	PASS
11G	Ant2	Low	2412	Peak	2390.000	-44.04	≤-21.20	51.16	≤74	PASS
11G	Ant2	Low	2412	Peak	2310.000	-47.04	≤-21.20	48.16	≤74	PASS
11G	Ant2	Low	2412	Peak	2385.150	-32.4	≤-21.20	62.80	≤74	PASS
11B	Ant1	Low	2412	Peak	2386.580	-36.09	≤-21.20	59.11	≤74	PASS
11B	Ant1	Low	2412	AV	2390.000	-43.92	≤-41.20	51.28	≤54	PASS
11B	Ant1	Low	2412	AV	2310.000	-45.06	≤-41.20	50.14	≤54	PASS
11N20SISO	Ant2	Low	2412	AV	2390.000	-42.32	≤-41.20	52.88	≤54	PASS
11N20SISO	Ant2	Low	2412	AV	2310.000	-44.63	≤-41.20	50.57	≤54	PASS
11N20SISO	Ant2	Low	2412	AV	2389.700	-42.1	≤-41.20	53.10	≤54	PASS
11N20SISO	Ant2	High	2462	Peak	2483.500	-39.17	≤-21.20	56.03	≤74	PASS
11N20SISO	Ant2	High	2462	Peak	2500.000	-44.56	≤-21.20	50.64	≤74	PASS



O										
11N20SIS O	Ant2	High	2462	Peak	2487.850	-35.2	≤-21.20	60.00	≤74	PASS
11N20SIS O	Ant2	High	2462	AV	2483.500	-42.95	≤-41.20	52.25	≤54	PASS
11N20SIS O	Ant2	High	2462	AV	2500.000	-43.88	≤-41.20	51.32	≤54	PASS
11N20SIS O	Ant2	High	2462	AV	2484.660	-42.7	≤-41.20	52.50	≤54	PASS
11N20SIS O	Ant1	High	2462	Peak	2483.500	-41.2	≤-21.20	54.00	≤74	PASS
11N20SIS O	Ant1	High	2462	Peak	2500.000	-38.39	≤-21.20	56.81	≤74	PASS
11N20SIS O	Ant1	High	2462	Peak	2485.210	-35.78	≤-21.20	59.42	≤74	PASS
11N20SIS O	Ant1	High	2462	AV	2483.500	-42.93	≤-41.20	52.27	≤54	PASS
11N20SIS O	Ant1	High	2462	AV	2500.000	-43.97	≤-41.20	51.23	≤54	PASS
11N20SIS O	Ant1	High	2462	AV	2484.000	-42.49	≤-41.20	52.71	≤54	PASS
11B	Ant1	Low	2412	AV	2385.540	-41.36	≤-41.20	53.84	≤54	PASS
11B	Ant1	High	2462	Peak	2483.500	-41.59	≤-21.20	53.61	≤74	PASS
11B	Ant1	High	2462	Peak	2500.000	-38.2	≤-21.20	57.00	≤74	PASS
11B	Ant1	High	2462	Peak	2488.070	-36.02	≤-21.20	59.18	≤74	PASS
11B	Ant1	High	2462	AV	2483.500	-43.73	≤-41.20	51.47	≤54	PASS
11B	Ant1	High	2462	AV	2500.000	-44.41	≤-41.20	50.79	≤54	PASS
11B	Ant1	High	2462	AV	2488.400	-42.39	≤-41.20	52.81	≤54	PASS
11G	Ant1	Low	2412	Peak	2390.000	-34.64	≤-21.20	60.56	≤74	PASS
11G	Ant1	Low	2412	Peak	2310.000	-45.6	≤-21.20	49.60	≤74	PASS
11G	Ant1	Low	2412	Peak	2389.960	-34.64	≤-21.20	60.56	≤74	PASS
11G	Ant1	Low	2412	AV	2390.000	-41.88	≤-41.20	53.32	≤54	PASS
11G	Ant1	Low	2412	AV	2310.000	-44.64	≤-41.20	50.56	≤54	PASS
11G	Ant1	Low	2412	AV	2389.960	-41.88	≤-41.20	53.32	≤54	PASS
11G	Ant1	High	2462	Peak	2500.000	-44.45	≤-21.20	50.75	≤74	PASS
11G	Ant1	High	2462	Peak	2489.280	-31.53	≤-21.20	63.67	≤74	PASS
11B	Ant2	Low	2412	Peak	2383.200	-35.86	≤-21.20	59.34	≤74	PASS
11G	Ant2	Low	2412	AV	2390.000	-41.64	≤-41.20	53.56	≤54	PASS
11G	Ant2	Low	2412	AV	2310.000	-44.65	≤-41.20	50.55	≤54	PASS
11G	Ant2	Low	2412	AV	2389.960	-41.64	≤-41.20	53.56	≤54	PASS
11G	Ant2	High	2462	Peak	2483.500	-40.44	≤-21.20	54.76	≤74	PASS
11G	Ant2	High	2462	Peak	2500.000	-45.44	≤-21.20	49.76	≤74	PASS
11G	Ant2	High	2462	Peak	2488.730	-33.96	≤-21.20	61.24	≤74	PASS
11G	Ant2	High	2462	AV	2483.500	-42.28	≤-41.20	52.92	≤54	PASS
11G	Ant2	High	2462	AV	2500.000	-43.79	≤-41.20	51.41	≤54	PASS
11G	Ant2	High	2462	AV	2483.670	-42.38	≤-41.20	52.82	≤54	PASS
11N20SIS O	Ant1	Low	2412	Peak	2390.000	-41.45	≤-21.20	53.75	≤74	PASS
11N20SIS O	Ant1	Low	2412	Peak	2310.000	-43.89	≤-21.20	51.31	≤74	PASS
11N20SIS O	Ant1	Low	2412	Peak	2372.670	-35.39	≤-21.20	59.81	≤74	PASS
11N20SIS O	Ant1	Low	2412	AV	2390.000	-42.16	≤-41.20	53.04	≤54	PASS
11N20SIS O	Ant1	Low	2412	AV	2310.000	-44.63	≤-41.20	50.57	≤54	PASS
11N20SIS O	Ant1	Low	2412	AV	2389.700	-41.97	≤-41.20	53.23	≤54	PASS



11N20SIS O	Ant2	Low	2412	Peak	2390.000	-40.74	≤-21.20	54.46	≤74	PASS
11N20SIS O	Ant2	Low	2412	Peak	2310.000	-40.9	≤-21.20	54.30	≤74	PASS
11N20SIS O	Ant2	Low	2412	Peak	2389.570	-35.05	≤-21.20	60.15	≤74	PASS
11N40SIS O	Ant1	Low	2422	Peak	2390.000	-39.68	≤-21.20	55.52	≤74	PASS
11N40SIS O	Ant1	Low	2422	Peak	2310.000	-41.84	≤-21.20	53.36	≤74	PASS
11N40SIS O	Ant1	Low	2422	Peak	2320.930	-35.18	≤-21.20	60.02	≤74	PASS
11N40SIS O	Ant1	Low	2422	AV	2390.000	-44.96	≤-41.20	50.24	≤54	PASS
11N40SIS O	Ant1	Low	2422	AV	2310.000	-45.53	≤-41.20	49.67	≤54	PASS
11N40SIS O	Ant1	Low	2422	AV	2389.960	-44.96	≤-41.20	50.24	≤54	PASS
11N40SIS O	Ant1	High	2452	Peak	2483.500	-35.93	≤-21.20	59.27	≤74	PASS
11N40SIS O	Ant1	High	2452	Peak	2500.000	-38.54	≤-21.20	56.66	≤74	PASS
11N40SIS O	Ant1	High	2452	Peak	2488.180	-35.66	≤-21.20	59.54	≤74	PASS
11N40SIS O	Ant1	High	2452	AV	2483.500	-44.72	≤-41.20	50.48	≤54	PASS
11N40SIS O	Ant1	High	2452	AV	2500.000	-44.86	≤-41.20	50.34	≤54	PASS
11N40SIS O	Ant1	High	2452	AV	2483.670	-44.71	≤-41.20	50.49	≤54	PASS
11N40SIS O	Ant2	Low	2422	Peak	2390.000	-37.49	≤-21.20	57.71	≤74	PASS
11N40SIS O	Ant2	Low	2422	Peak	2310.000	-39.45	≤-21.20	55.75	≤74	PASS
11N40SIS O	Ant2	Low	2422	Peak	2320.540	-35.36	≤-21.20	59.84	≤74	PASS
11N40SIS O	Ant2	Low	2422	AV	2390.000	-45.12	≤-41.20	50.08	≤54	PASS
11N40SIS O	Ant2	Low	2422	AV	2310.000	-45.51	≤-41.20	49.69	≤54	PASS
11N40SIS O	Ant2	Low	2422	AV	2389.830	-45.12	≤-41.20	50.08	≤54	PASS
11N40SIS O	Ant2	High	2452	Peak	2483.500	-40.27	≤-21.20	54.93	≤74	PASS
11N40SIS O	Ant2	High	2452	Peak	2500.000	-40.88	≤-21.20	54.32	≤74	PASS
11N40SIS O	Ant2	High	2452	Peak	2484.110	-36.29	≤-21.20	58.91	≤74	PASS
11N40SIS O	Ant2	High	2452	AV	2483.500	-44.63	≤-41.20	50.57	≤54	PASS
11N40SIS O	Ant2	High	2452	AV	2500.000	-44.87	≤-41.20	50.33	≤54	PASS
11N40SIS O	Ant2	High	2452	AV	2483.560	-44.63	≤-41.20	50.57	≤54	PASS

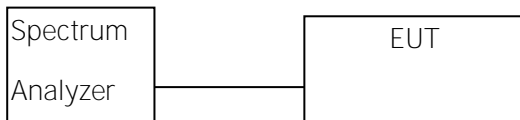


8 Band Edge Measurement

- 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
- 3.Set up:





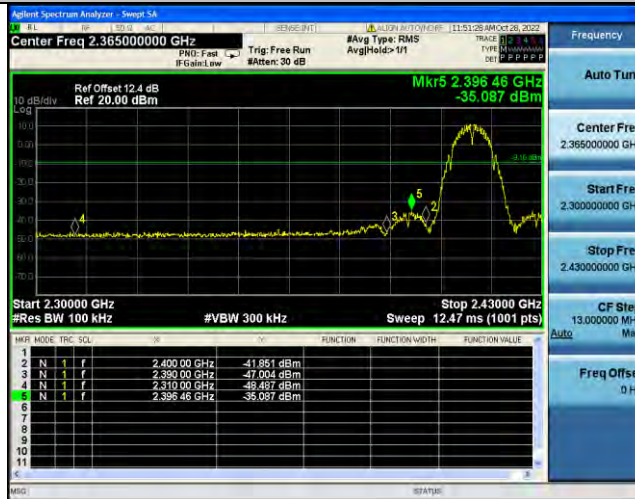
8.2 Test Result

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	11.42	-37.65	≤-8.58	PASS
11B	Ant2	Low	2412	10.84	-35.46	≤-9.16	PASS
11B	Ant1	High	2462	10.60	-41.45	≤-9.4	PASS
11B	Ant2	High	2462	9.70	-41.75	≤-10.3	PASS
11G	Ant1	Low	2412	6.98	-26.56	≤-13.02	PASS
11G	Ant2	Low	2412	6.48	-28.06	≤-13.52	PASS
11G	Ant1	High	2462	6.33	-34.13	≤-13.67	PASS
11G	Ant2	High	2462	5.42	-38.78	≤-14.58	PASS
11N20SISO	Ant1	Low	2412	6.38	-22.97	≤-13.62	PASS
11N20SISO	Ant2	Low	2412	6.26	-27.19	≤-13.74	PASS
11N20SISO	Ant1	High	2462	6.09	-31.92	≤-13.91	PASS
11N20SISO	Ant2	High	2462	5.03	-36.2	≤-14.97	PASS
11N40SISO	Ant1	Low	2422	-4.81	-44.33	≤-24.81	PASS
11N40SISO	Ant2	Low	2422	-4.57	-46.39	≤-24.57	PASS
11N40SISO	Ant1	High	2452	-4.16	-45.47	≤-24.16	PASS
11N40SISO	Ant2	High	2452	-3.76	-46.16	≤-23.76	PASS

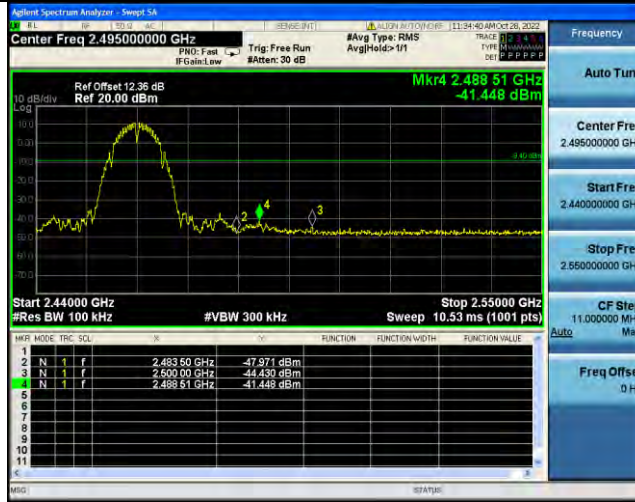
11B-Ant1-Low-2412-11.42



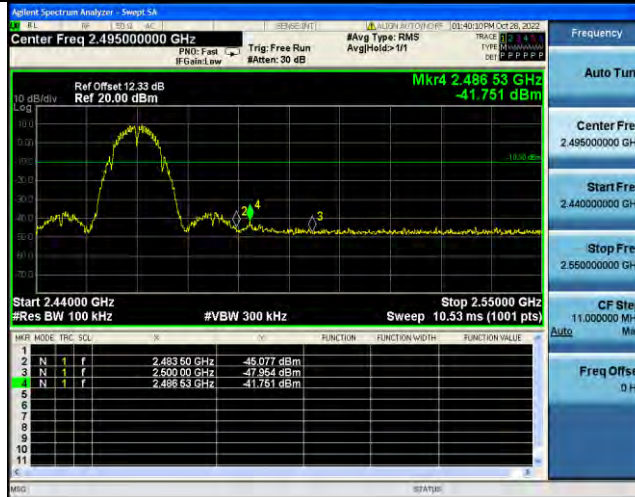
11B-Ant2-Low-2412-10.84



11B-Ant1-High-2462-10.60



11B-Ant2-High-2462-9.70



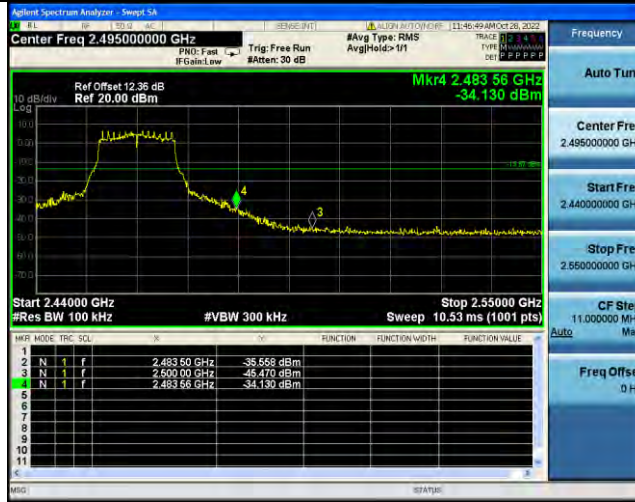
11G-Ant1-Low-2412-6.98



11G-Ant2-Low-2412-6.48



11G-Ant1-High-2462-6.33



11G-Ant2-High-2462-5.42



11N20SISO-Ant1-Low-2412-6.38



11N20SISO-Ant2-Low-2412-6.26



11N20SISO-Ant1-High-2462-6.09



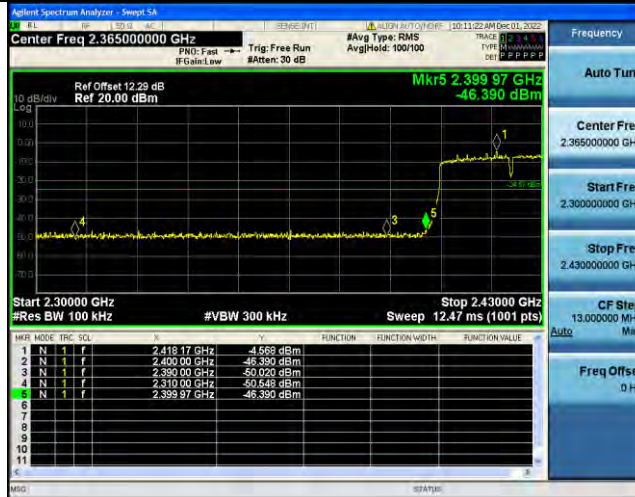
11N20SISO-Ant2-High-2462-5.03



11N40SISO-Ant1-Low-2422-4.81



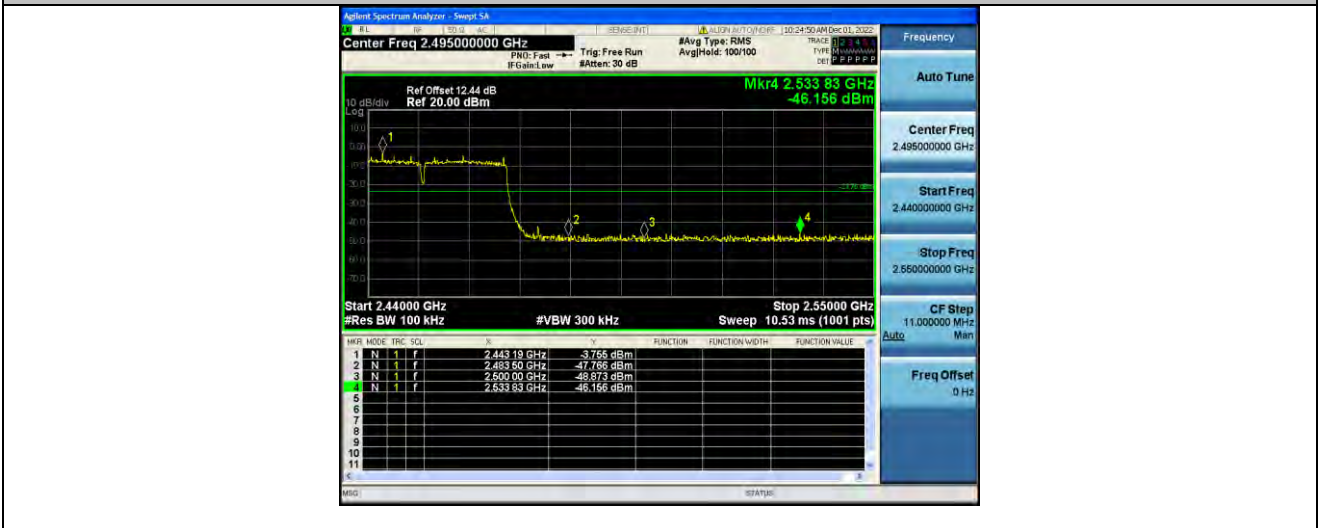
11N40SISO-Ant2-Low-2422--4.57



11N40SISO-Ant1-High-2452--4.16



11N40SISO-Ant2-High-2452--3.76





9 6dB Bandwidth Measurement

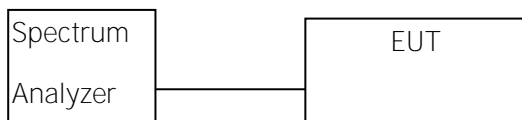
Test Requirement : FCC CFR47 Part 15 Section 15.247

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 6 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
3. Set up:

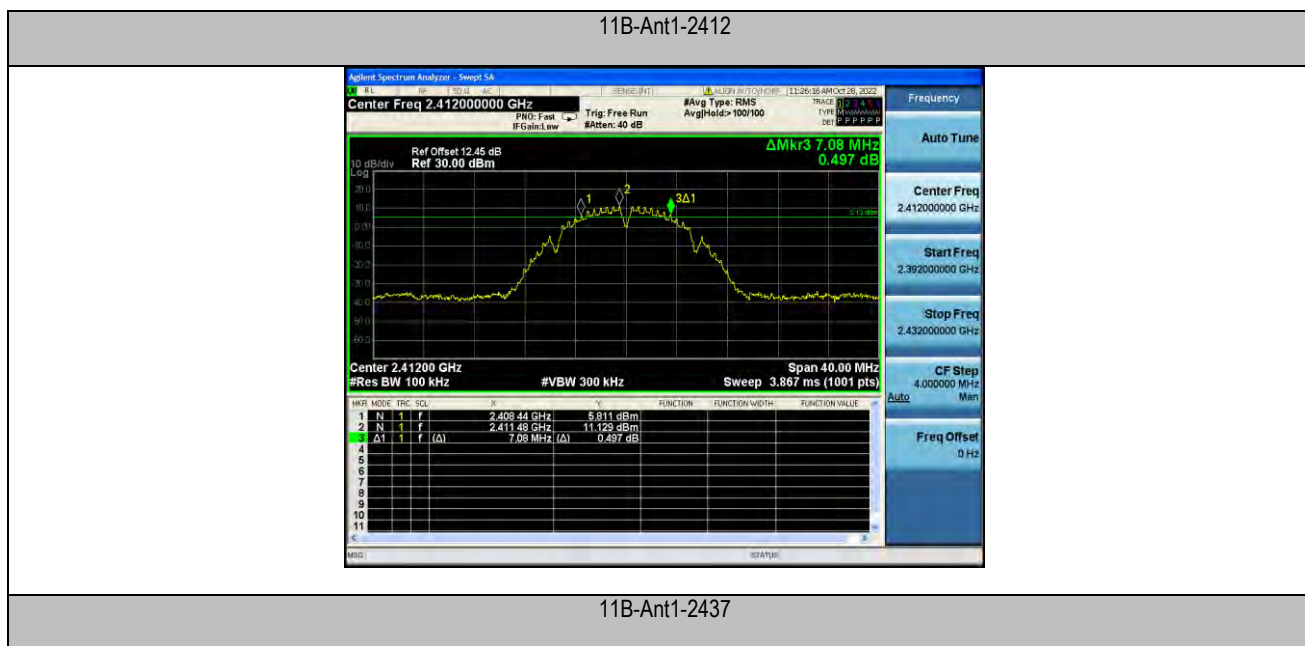


9.2 Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	7.080	2408.440	2415.520	0.5	PASS
11B	Ant1	2437	7.040	2433.480	2440.520	0.5	PASS
11B	Ant1	2462	7.080	2458.440	2465.520	0.5	PASS
11G	Ant1	2412	16.280	2403.840	2420.120	0.5	PASS
11G	Ant1	2437	16.320	2428.840	2445.160	0.5	PASS
11G	Ant1	2462	16.320	2453.840	2470.160	0.5	PASS
11B	Ant2	2412	7.080	2408.440	2415.520	0.5	PASS
11B	Ant2	2437	7.080	2433.440	2440.520	0.5	PASS
11B	Ant2	2462	7.040	2458.480	2465.520	0.5	PASS
11G	Ant2	2412	16.280	2403.840	2420.120	0.5	PASS
11G	Ant2	2437	16.320	2428.840	2445.160	0.5	PASS
11G	Ant2	2462	16.320	2453.840	2470.160	0.5	PASS
11N20SISO	Ant1	2412	17.160	2403.240	2420.400	0.5	PASS
11N20SISO	Ant2	2412	17.560	2403.200	2420.760	0.5	PASS



11N20SISO	Ant1	2437	17.320	2428.440	2445.760	0.5	PASS
11N20SISO	Ant2	2437	17.560	2428.200	2445.760	0.5	PASS
11N20SISO	Ant1	2462	17.560	2453.200	2470.760	0.5	PASS
11N20SISO	Ant2	2462	17.600	2453.200	2470.800	0.5	PASS
11N40SISO	Ant1	2422	35.360	2404.400	2439.760	0.5	PASS
11N40SISO	Ant1	2437	34.000	2418.760	2452.760	0.5	PASS
11N40SISO	Ant1	2452	36.160	2433.760	2469.920	0.5	PASS
11N40SISO	Ant2	2422	35.440	2404.480	2439.920	0.5	PASS
11N40SISO	Ant2	2437	30.800	2418.920	2449.720	0.5	PASS
11N40SISO	Ant2	2452	36.000	2433.760	2469.760	0.5	PASS





11B-Ant1-2462



11G-Ant1-2412



11G-Ant1-2437



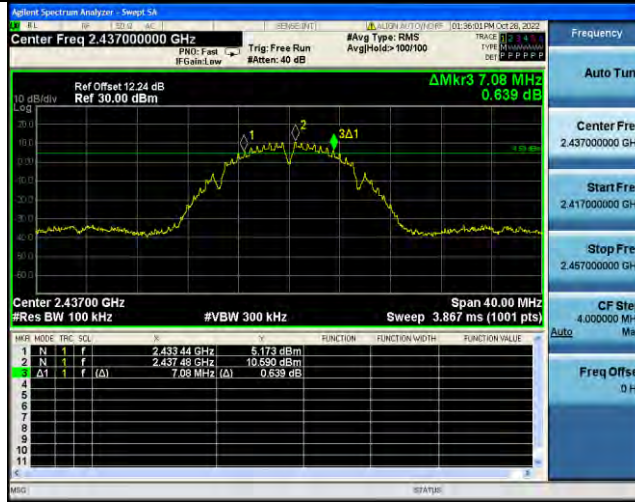
11G-Ant1-2462



11B-Ant2-2412



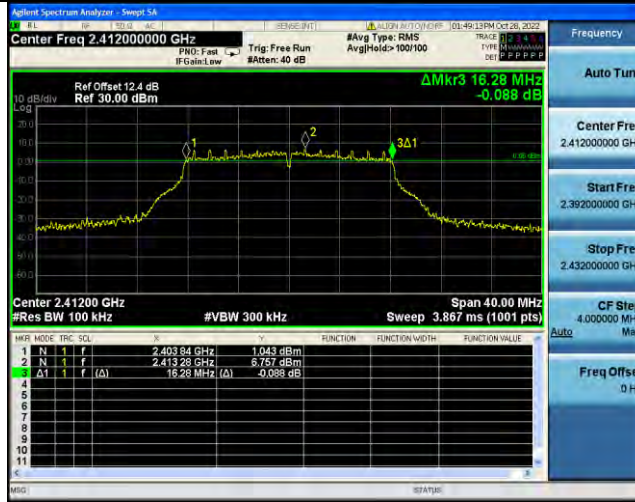
11B-Ant2-2437



11B-Ant2-2462



11G-Ant2-2412



11G-Ant2-2437



11G-Ant2-2462



11N20SISO-Ant1-2412



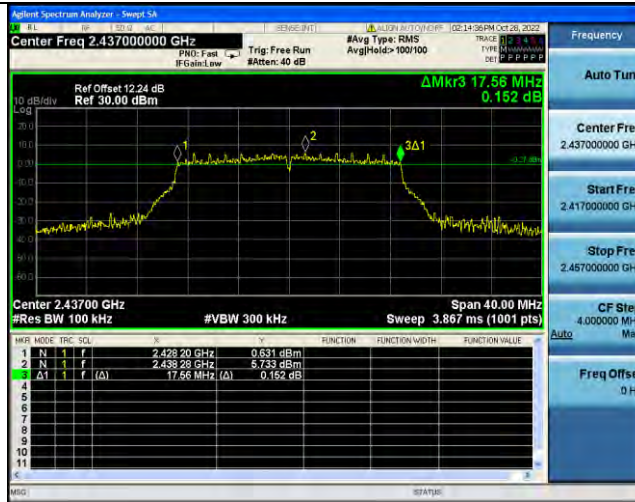
11N20SISO-Ant2-2412



11N20SISO-Ant1-2437



11N20SISO-Ant2-2437



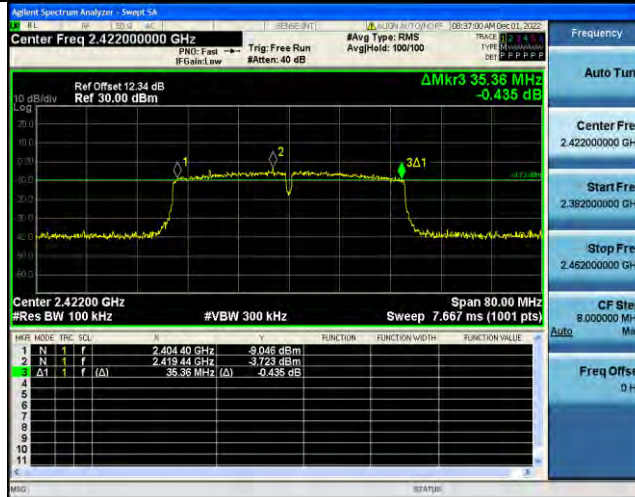
11N20SISO-Ant1-2462



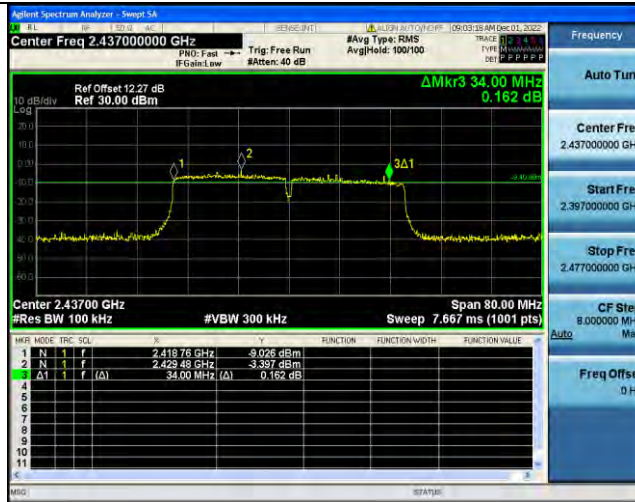
11N20SISO-Ant2-2462



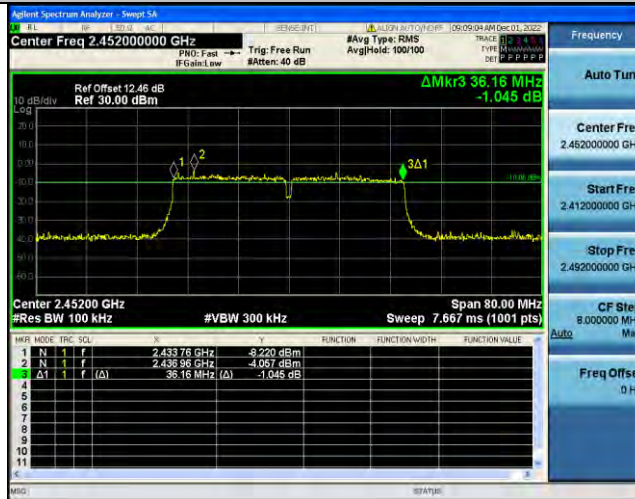
11N40SISO-Ant1-2422



11N40SISO-Ant1-2437



11N40SISO-Ant1-2452



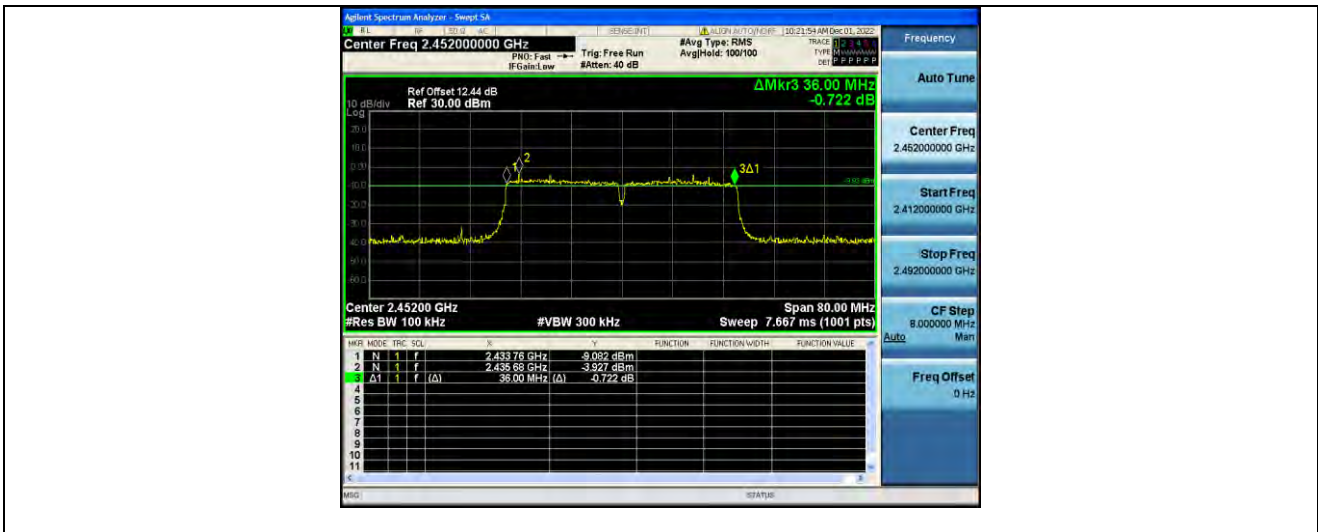
11N40SISO-Ant2-2422



11N40SISO-Ant2-2437



11N40SISO-Ant2-2452



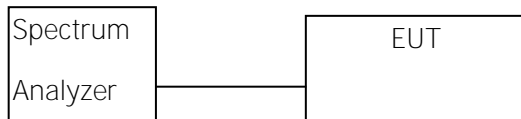


10 Maximum Peak Output Power

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 spectrum by RF cable . 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.
- 5.Set up:

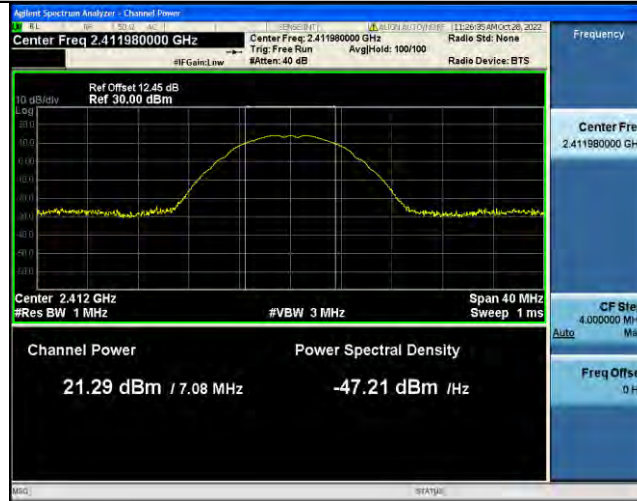


10.2 Test Result

TestMode	Antenna	Frequency[MHz]	Set Power	Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	---	21.29	≤30.00	22.90	≤36.00	PASS
11B	Ant1	2437	---	21.47	≤30.00	23.08	≤36.00	PASS
11B	Ant1	2462	---	20.94	≤30.00	22.55	≤36.00	PASS
11G	Ant1	2412	---	25.42	≤30.00	27.03	≤36.00	PASS
11G	Ant1	2437	---	25.38	≤30.00	26.99	≤36.00	PASS
11G	Ant1	2462	---	25.14	≤30.00	26.75	≤36.00	PASS
11B	Ant2	2412	---	20.85	≤30.00	22.46	≤36.00	PASS
11B	Ant2	2437	---	20.44	≤30.00	22.05	≤36.00	PASS
11B	Ant2	2462	---	19.57	≤30.00	21.18	≤36.00	PASS
11G	Ant2	2412	---	25.17	≤30.00	26.78	≤36.00	PASS
11G	Ant2	2437	---	24.90	≤30.00	26.51	≤36.00	PASS
11G	Ant2	2462	---	24.25	≤30.00	25.86	≤36.00	PASS
11N20SISO	Ant1	2412	---	24.85	≤30.00	26.46	≤36.00	PASS
11N20SISO	Ant2	2412	---	25.21	≤30.00	26.82	≤36.00	PASS
11N20SISO	Ant1	2437	---	24.66	≤30.00	26.27	≤36.00	PASS
11N20SISO	Ant2	2437	---	24.56	≤30.00	26.17	≤36.00	PASS
11N20SISO	Ant1	2462	---	24.41	≤30.00	26.02	≤36.00	PASS
11N20SISO	Ant2	2462	---	23.90	≤30.00	25.51	≤36.00	PASS
11N40SISO	Ant1	2422	---	18.60	≤30.00	20.21	≤36.00	PASS
11N40SISO	Ant1	2437	---	17.89	≤30.00	19.50	≤36.00	PASS
11N40SISO	Ant1	2452	---	17.89	≤30.00	19.50	≤36.00	PASS
11N40SISO	Ant2	2422	---	17.27	≤30.00	18.88	≤36.00	PASS
11N40SISO	Ant2	2437	---	16.73	≤30.00	18.34	≤36.00	PASS
11N40SISO	Ant2	2452	---	17.73	≤30.00	19.34	≤36.00	PASS



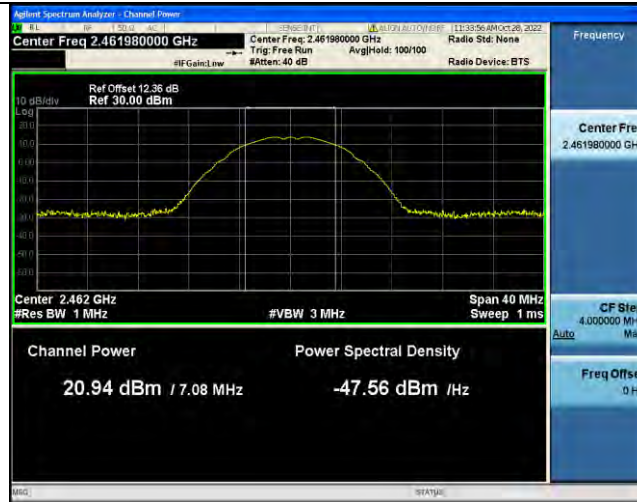
11B-Ant1-2412-----21.29-0-0



11B-Ant1-2437-----21.47-0-0



11B-Ant1-2462-----20.94-0-0



11G-Ant1-2412-----25.42-0-0



11G-Ant1-2437-----25.38-0-0



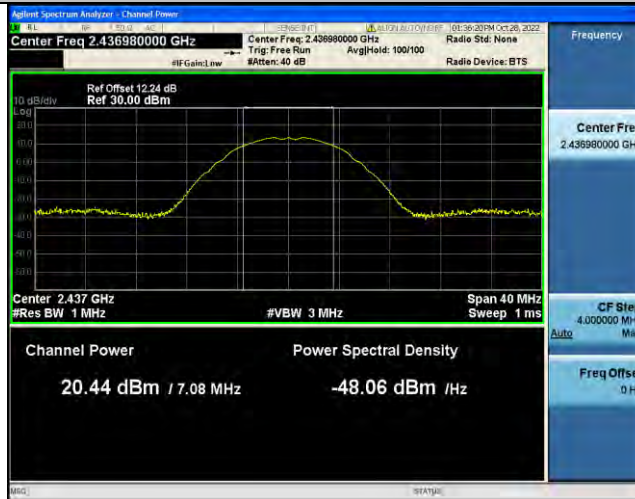
11G-Ant1-2462-----25.14-0-0



11B-Ant2-2412-----20.85-0-0



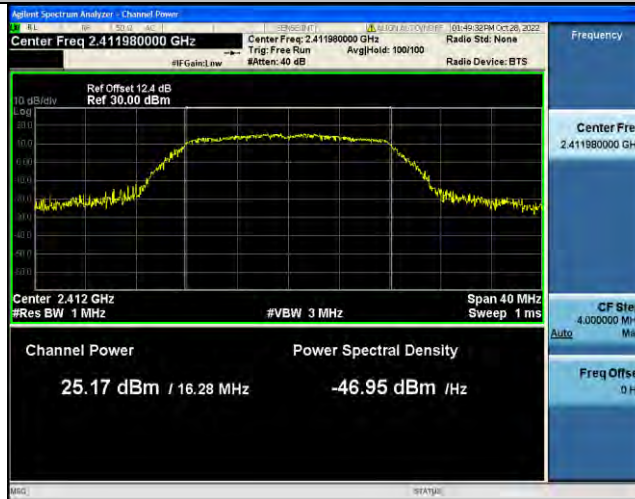
11B-Ant2-2437-----20.44-0-0



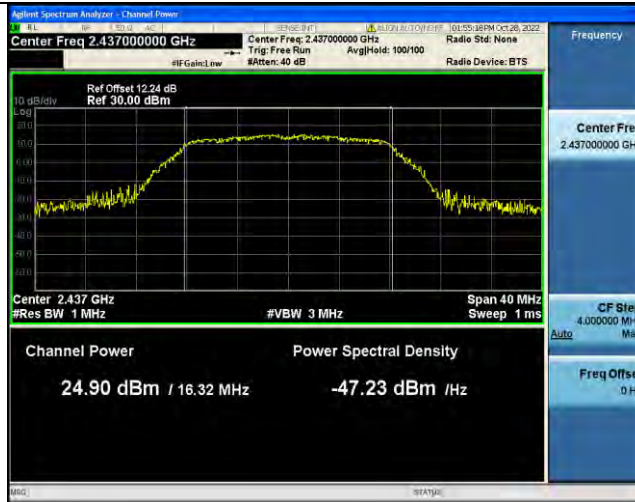
11B-Ant2-2462-----19.57-0-0



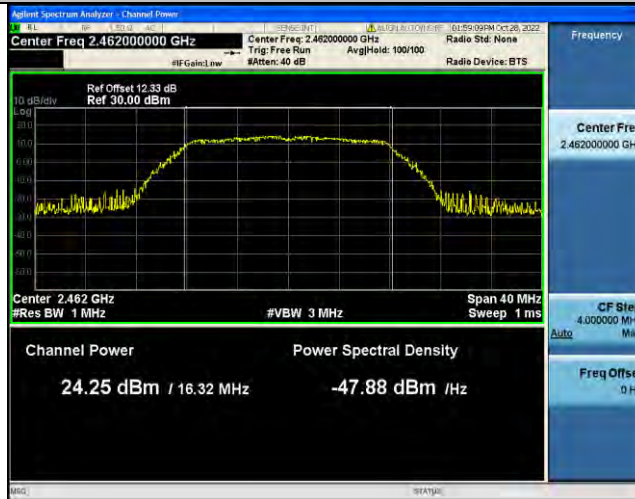
11G-Ant2-2412-----25.17-0-0



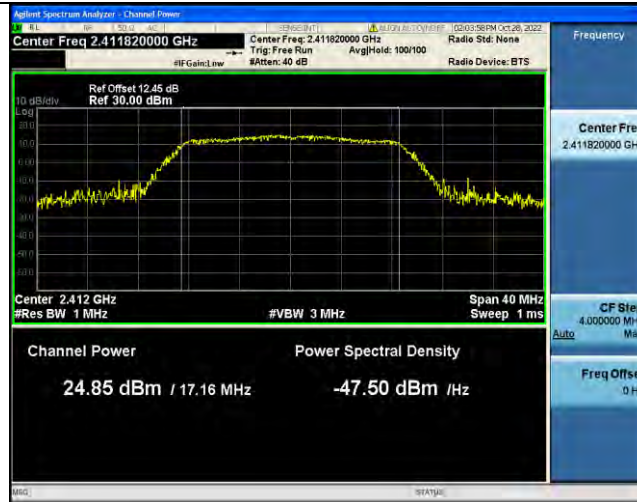
11G-Ant2-2437-----24.90-0-0



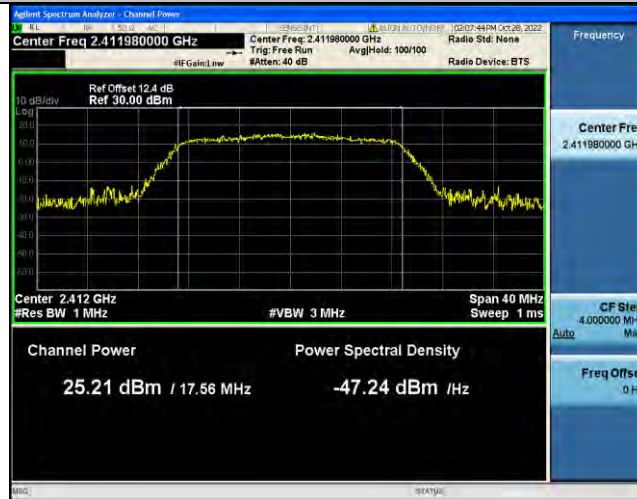
11G-Ant2-2462-----24.25-0-0



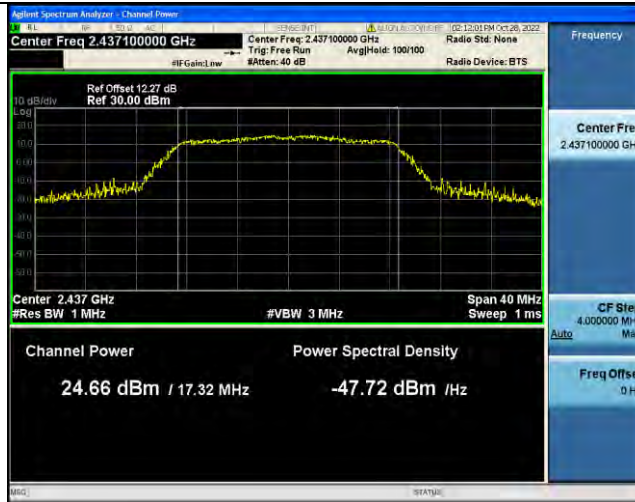
11N20SISO-Ant1-2412-----24.85-0-0



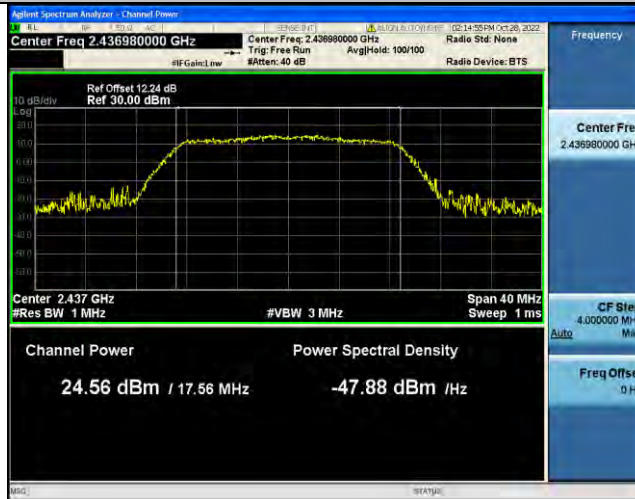
11N20SISO-Ant2-2412-----25.21-0-0



11N20SISO-Ant1-2437-----24.66-0-0



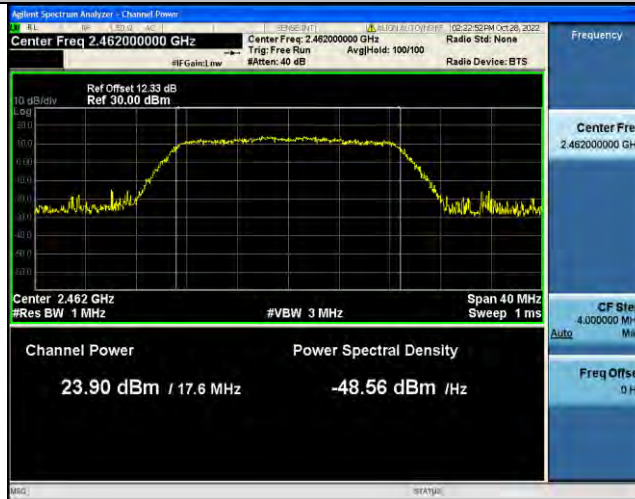
11N20SISO-Ant2-2437-----24.56-0-0



11N20SISO-Ant1-2462-----24.41-0-0



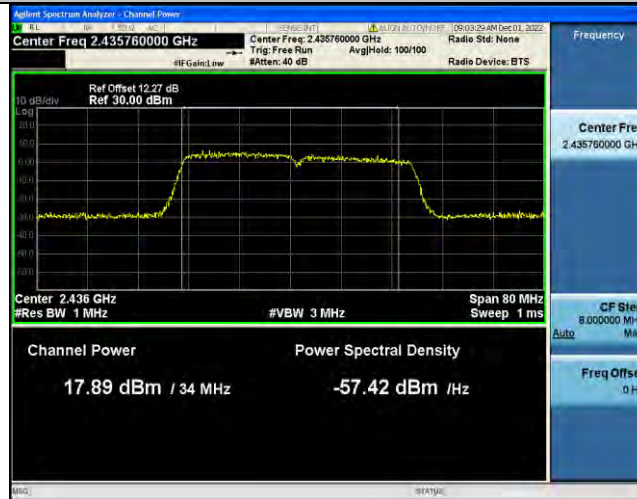
11N20SISO-Ant2-2462-----23.90-0-0



11N40SISO-Ant1-2422-----18.60-0-0



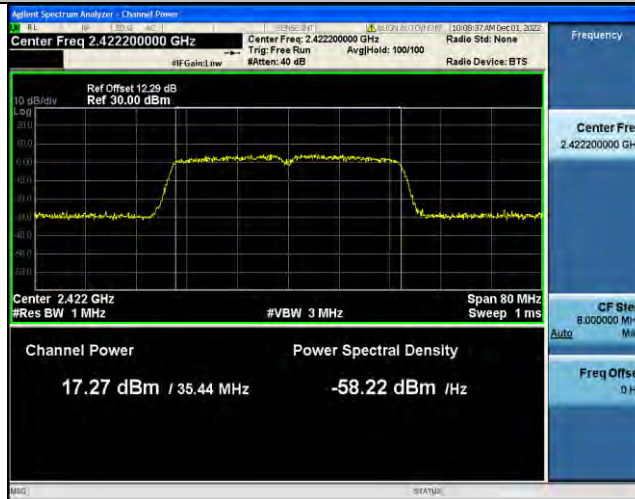
11N40SISO-Ant1-2437-----17.89-0-0



11N40SISO-Ant1-2452-----17.89-0-0



11N40SISO-Ant2-2422-----17.27-0-0



11N40SISO-Ant2-2437-----16.73-0-0



11N40SISO-Ant2-2452-----17.73-0-0



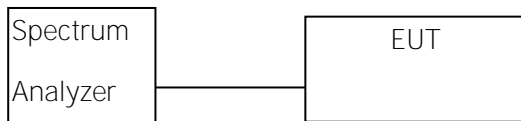


11 Power Spectral density

- 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 = 3KHz, VBW = 10KHz
 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.
- 6.Set up:

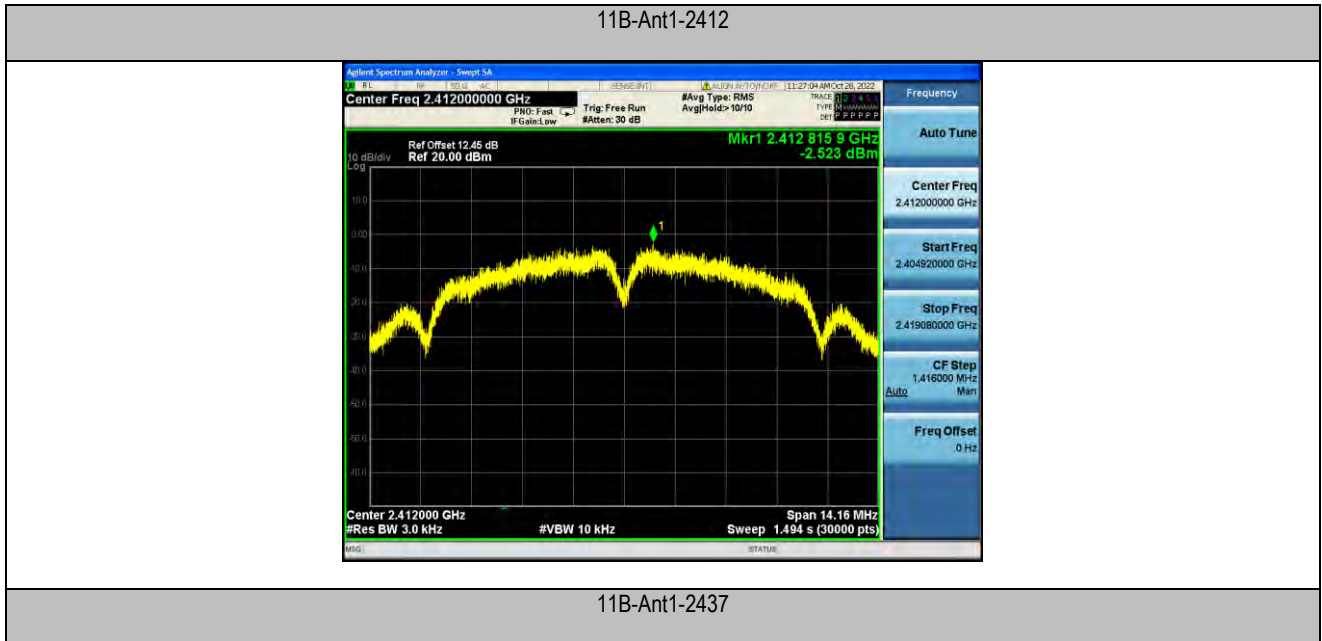


11.2 Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-2.52	≤8.00	PASS
11B	Ant1	2437	-1.81	≤8.00	PASS
11B	Ant1	2462	-2.95	≤8.00	PASS
11G	Ant1	2412	-5.81	≤8.00	PASS
11G	Ant1	2437	-5.91	≤8.00	PASS
11G	Ant1	2462	-6.14	≤8.00	PASS
11B	Ant2	2412	-2.32	≤8.00	PASS
11B	Ant2	2437	-3.61	≤8.00	PASS
11B	Ant2	2462	-4.93	≤8.00	PASS



11G	Ant2	2412	-6.01	≤8.00	PASS
11G	Ant2	2437	-6.45	≤8.00	PASS
11G	Ant2	2462	-7.68	≤8.00	PASS
11N20SISO	Ant1	2412	-6.56	≤8.00	PASS
11N20SISO	Ant2	2412	-6.25	≤8.00	PASS
11N20SISO	Ant1	2437	-6.09	≤8.00	PASS
11N20SISO	Ant2	2437	-7.74	≤8.00	PASS
11N20SISO	Ant1	2462	-7.2	≤8.00	PASS
11N20SISO	Ant2	2462	-7.48	≤8.00	PASS
11N40SISO	Ant1	2422	-16.83	≤8.00	PASS
11N40SISO	Ant1	2437	-17.05	≤8.00	PASS
11N40SISO	Ant1	2452	-17.6	≤8.00	PASS
11N40SISO	Ant2	2422	-18.2	≤8.00	PASS
11N40SISO	Ant2	2437	-18.13	≤8.00	PASS
11N40SISO	Ant2	2452	-16.85	≤8.00	PASS

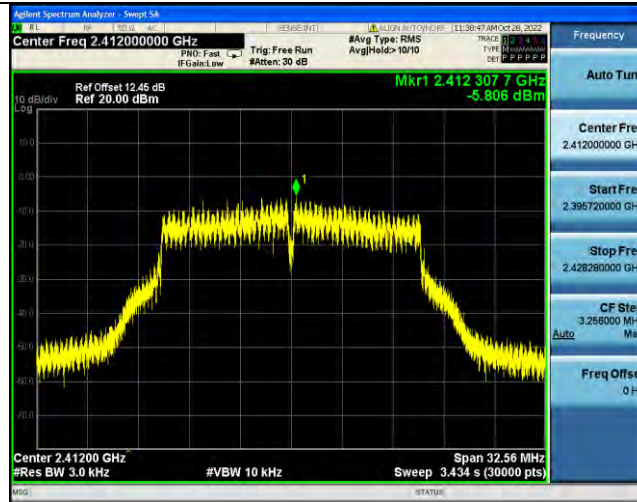




11B-Ant1-2462



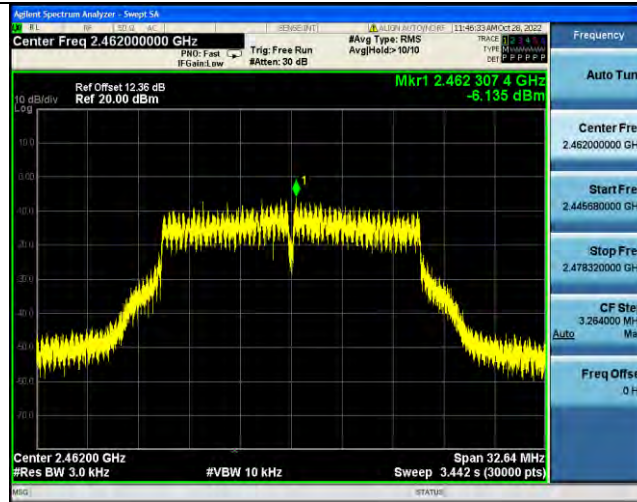
11G-Ant1-2412



11G-Ant1-2437



11G-Ant1-2462



11B-Ant2-2412



11B-Ant2-2437



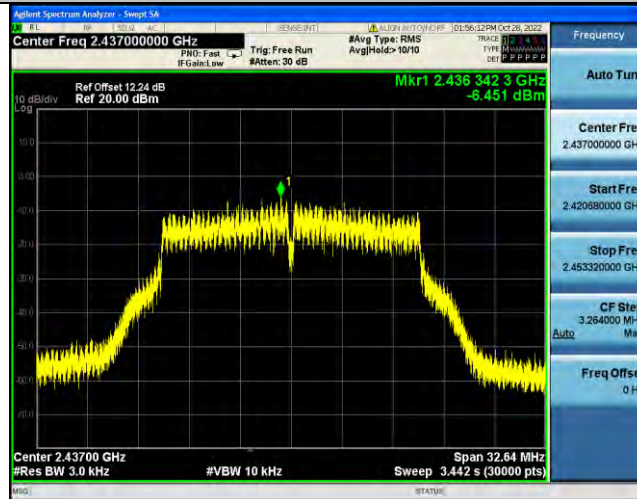
11B-Ant2-2462



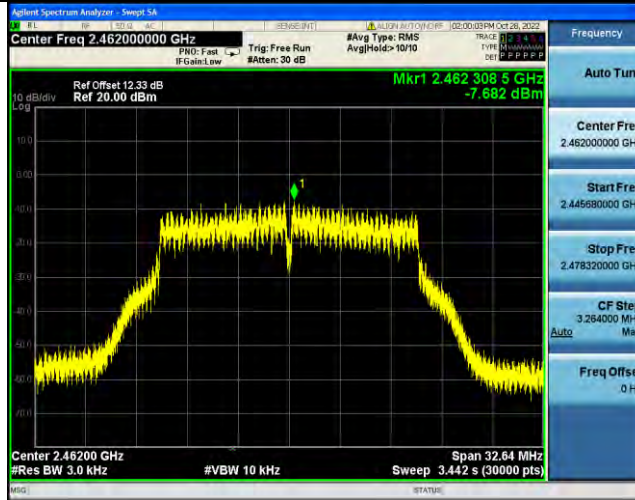
11G-Ant2-2412



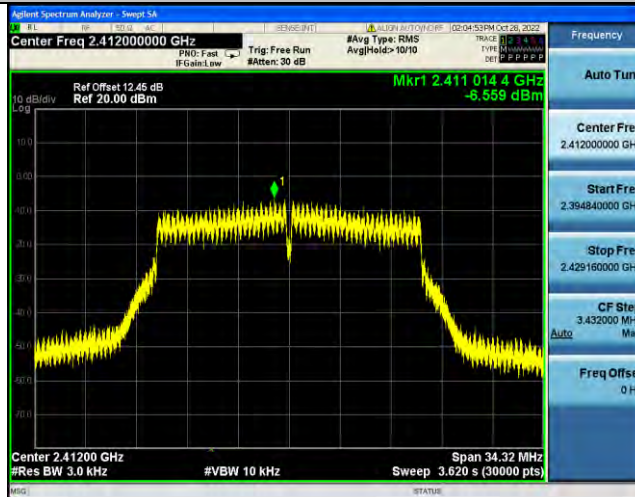
11G-Ant2-2437



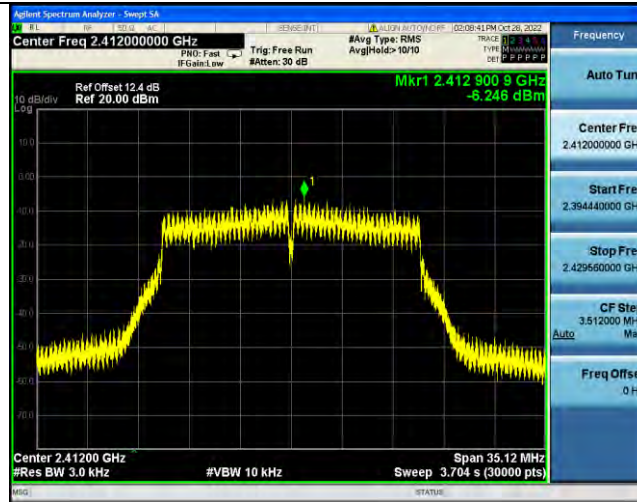
11G-Ant2-2462



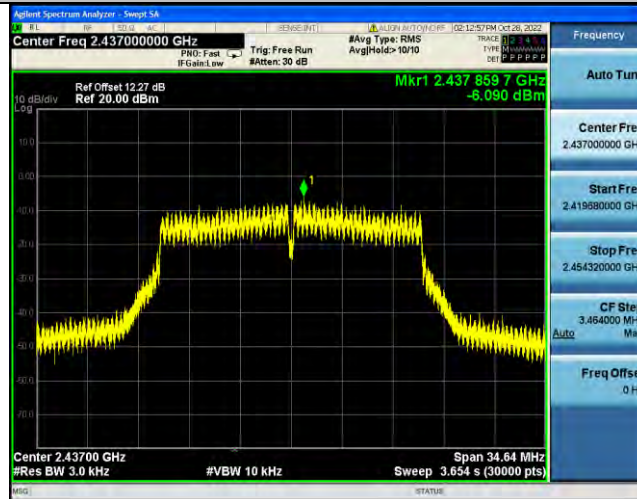
11N20SISO-Ant1-2412



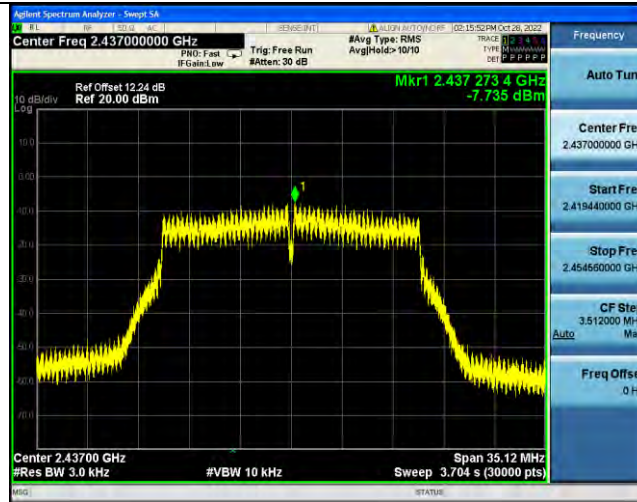
11N20SISO-Ant2-2412



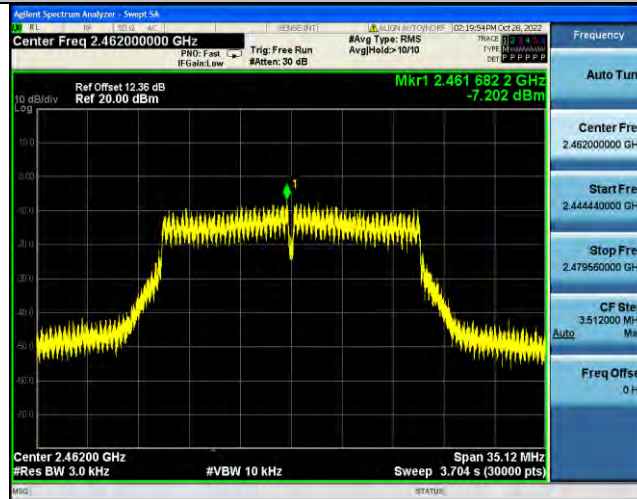
11N20SISO-Ant1-2437



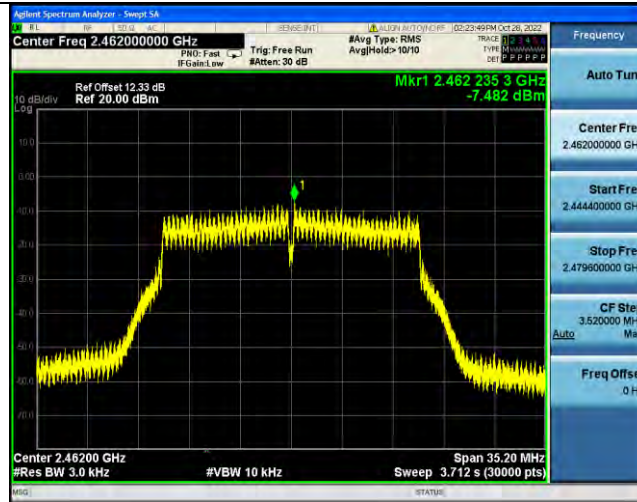
11N20SISO-Ant2-2437



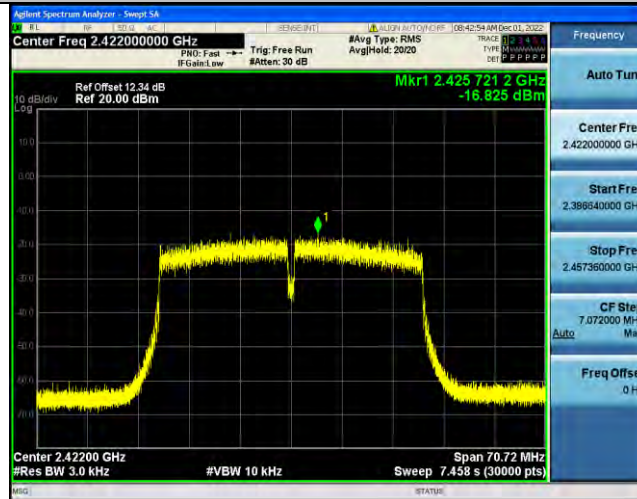
11N20SISO-Ant1-2462



11N20SISO-Ant2-2462



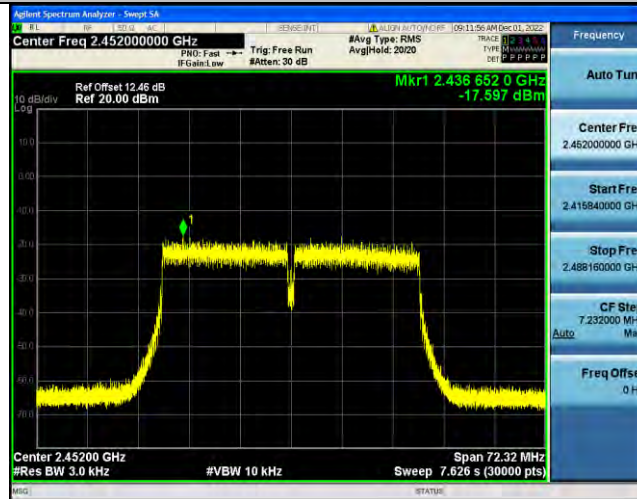
11N40SISO-Ant1-2422



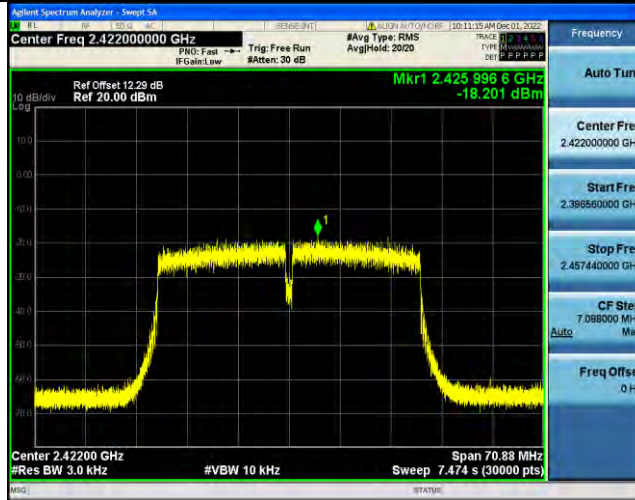
11N40SISO-Ant1-2437



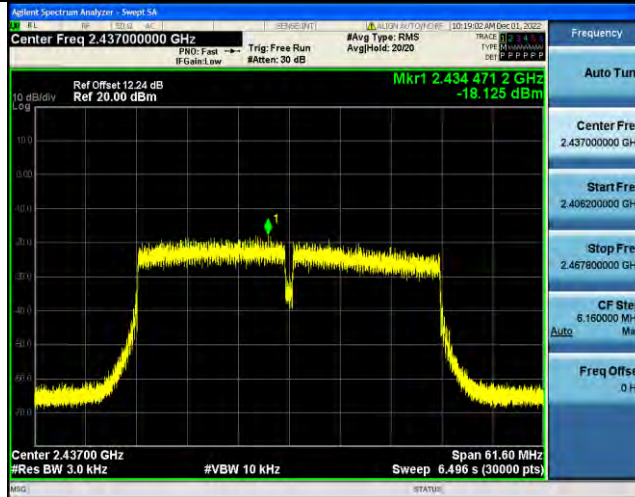
11N40SISO-Ant1-2452



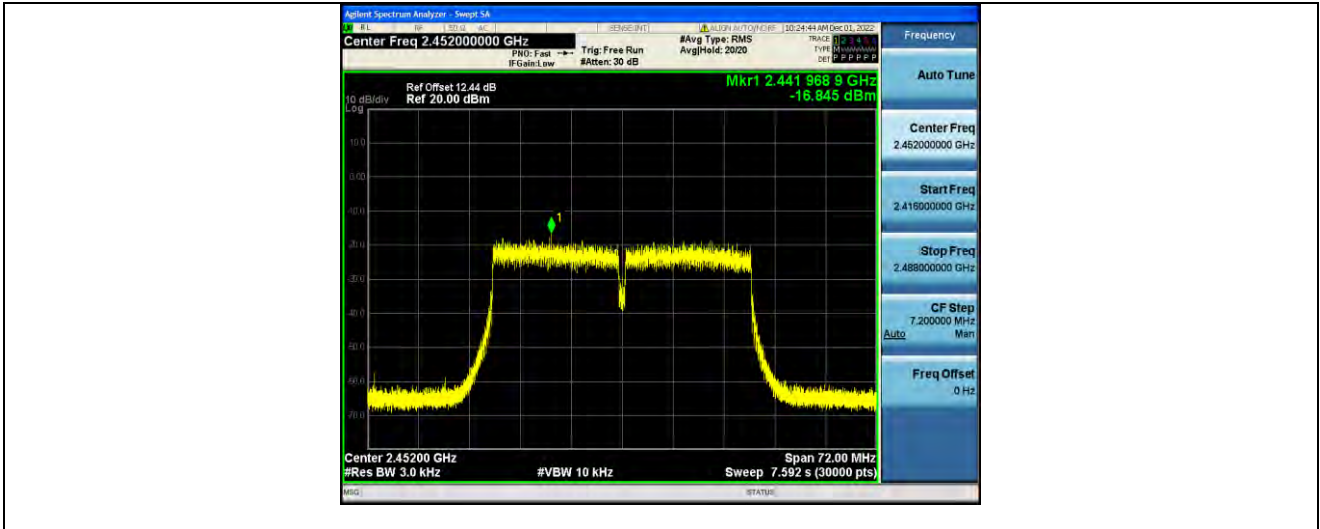
11N40SISO-Ant2-2422



11N40SISO-Ant2-2437



11N40SISO-Ant2-2452





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 5.25dB that the directional gain of the antenna exceeds 6dBi.

12.2 Result

The EUT'S antenna, permanent attached antenna, is Rod Antenna. The antenna's gain is 5.25dBi and meets the requirement.

13 Test Setup

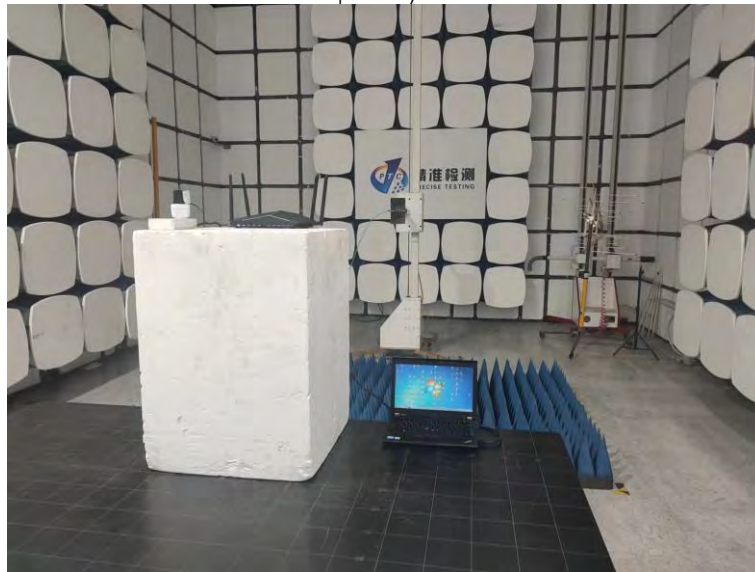
Conduction Emissions



Radiated Spurious Emissions Test Frequency From 30MHz-1000MHz



Test Frequency above 1G





14 EUT PHOTOS

Reference file External Photo and Internal Photo.

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