



FCC TEST REPORT

FCC ID: 2A56R-T200

Product	:	DASH CAMERA
Model Name	:	T200; S200; T200; M200; IM200; P200; S200 PRO; T200 PRO; M200 PRO; IM200 PRO; P200 PRO; S300; T300; M300; IM300; P300; S400; T400; M400PRO; IM400; P400; S400 PRO; T400 PRO; IM400 PRO; P400 PRO; S500; T500; M500; IM500; P500; S800; T800; M800; IM800; P800; S800 PRO; T800 PRO; M800 PRO; IM800 PRO; P800PRO; K200; F200; C200; IC200; Q200; K200 PRO; F200 PRO; C200 PRO; IC200 PRO; Q200 PRO; K300; F300; C300; IC300; Q300; K400; F400; C400; IC400; Q400; K400 PRO; F400 PRO; C400 PRO; IC400 PRO; Q400 PRO; K500; F500; C500; IC500; Q500; K800; F800; C800; IC800; Q800; K800 PRO; F800 PRO; C800 PRO; IC800 PRO; Q800PRO; M400
Brand	:	IMOU
Report No.	:	PTC22031600604E-FC01
Sample ID	:	PTC22031600604E-FC01#

Prepared for

Hangzhou Huacheng Network Technology Co., Ltd

No. 2930, NanHuan Road, Binjiang District, Hangzhou City, Zhejiang Province, China

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 : Hangzhou Huacheng Network Technology Co., Ltd

Address : No. 2930, NanHuan Road, Binjiang District, Hangzhou City, Zhejiang Province, China

Manufacturer's name : Hangzhou Huacheng Network Technology Co., Ltd

Address : No. 2930, NanHuan Road, Binjiang District, Hangzhou City, Zhejiang Province, China

Product name : DASH CAMERA

Model name : T200; S200; T200; M200; IM200; P200; S200 PRO; T200 PRO; M200 PRO; IM200 PRO; P200 PRO; S300; T300; M300; IM300; P300; S400; T400; M400PRO; IM400; P400; S400 PRO; T400 PRO; IM400 PRO; P400 PRO; S500; T500; M500; IM500; P500; S800; T800; M800; IM800; P800; S800 PRO; T800 PRO; M800 PRO; IM800 PRO; P800PRO; K200; F200; C200; IC200; Q200; K200 PRO; F200 PRO; C200 PRO; IC200 PRO; Q200 PRO; K300; F300; C300; IC300; Q300; K400; F400; C400; IC400; Q400; K400 PRO; F400 PRO; C400 PRO; IC400 PRO; Q400 PRO; K500; F500; C500; IC500; Q500; K800; F800; C800; IC800; Q800; K800 PRO; F800 PRO; C800 PRO; IC800 PRO; Q800PRO; M400

Standards : FCC CFR47 Part 15 Section 15.247

Test procedure : ANSI C63.10:2013

Test Date : June 01, 2022 to June 08, 2022

Date of Issue : June 09, 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.



Report No.: PTC22031600604E-FC01

Test Engineer:

A handwritten signature in black ink that appears to read "Leo Yang".

Leo Yang / Engineer

Technical Manager:

A handwritten signature in black ink that appears to read "Ronnie Liu".

Ronnie Liu / Manager



Contents

	Page
1 TEST RESULT CERTIFICATION	2
2 TEST SUMMARY	6
3 GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF E.U.T	7
3.2 CHANNEL LIST	8
3.3 TEST SITE	16
4 EQUIPMENT DURING TEST	17
4.1 EQUIPMENTS LIST	17
4.2 MEASUREMENT UNCERTAINTY	19
4.3 DESCRIPTION OF SUPPORT UNITS	20
5 CONDUCTED EMISSION	21
5.1 E.U.T. OPERATION	21
5.2 EUT SETUP	21
5.3 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	22
5.4 MEASUREMENT PROCEDURE	22
5.5 CONDUCTED EMISSION LIMIT	22
5.6 MEASUREMENT DESCRIPTION	22
5.7 CONDUCTED EMISSION TEST RESULT	22
6 RADIATED SPURIOUS EMISSIONS	23
6.1 EUT OPERATION	23
6.2 TEST SETUP	24
6.3 SPECTRUM ANALYZER SETUP	25
6.4 TEST PROCEDURE	26
6.5 SUMMARY OF TEST RESULTS	27
7 CONDUCTED SPURIOUS EMISSION	34
7.1 TEST PROCEDURE	34
7.2 TEST RESULT	34
8 BAND EDGE MEASUREMENT	48
8.1 TEST PROCEDURE	48



8.2	TEST RESULT.....	49
9	6DB BANDWIDTH MEASUREMENT.....	54
9.1	TEST PROCEDURE.....	54
9.2	TEST RESULT.....	54
10	MAXIMUM PEAK OUTPUT POWER.....	61
10.1	TEST PROCEDURE.....	61
10.2	TEST RESULT.....	61
11	POWER SPECTRAL DENSITY.....	62
11.1	TEST PROCEDURE.....	62
11.2	TEST RESULT.....	62
12	ANTENNA APPLICATION.....	69
12.1	ANTENNA REQUIREMENT.....	69
12.2	RESULT.....	69
13	TEST SETUP.....	70
14	EUT PHOTOS.....	71



2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	N/A
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		
This production is power by DC12V battery.		



3 General Information

3.1 General Description of E.U.T.

Product Name	:	DASH CAMERA
Model Name	:	T200; S200; T200; M200; IM200; P200; S200 PRO; T200 PRO; M200 PRO; IM200 PRO; P200 PRO; S300; T300; M300; IM300; P300; S400; T400; M400PRO; IM400; P400; S400 PRO; T400 PRO; IM400 PRO; P400 PRO; S500; T500; M500; IM500; P500; S800; T800; M800; IM800; P800; S800 PRO; T800 PRO; M800 PRO; IM800 PRO; P800PRO; K200; F200; C200; IC200; Q200; K200 PRO; F200 PRO; C200 PRO; IC200 PRO; Q200 PRO; K300; F300; C300; IC300; Q300; K400; F400; C400; IC400; Q400; K400 PRO; F400 PRO; C400 PRO; IC400 PRO; Q400 PRO; K500; F500; C500; IC500; Q500; K800; F800; C800; IC800; Q800; K800 PRO; F800 PRO; C800 PRO; IC800 PRO; Q800PRO; M400
Additional model	:	Note : The appearance and color of the product are different, and the electrical principle is the same. The main test model is T200
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	:	ceramic antenna
Antenna Gain	:	3 dBi
Power supply	:	DC 12V via battery
Hardware Version	:	ON-N3S-MAIN-V0.3
Software Version	:	N3S-20220114



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):

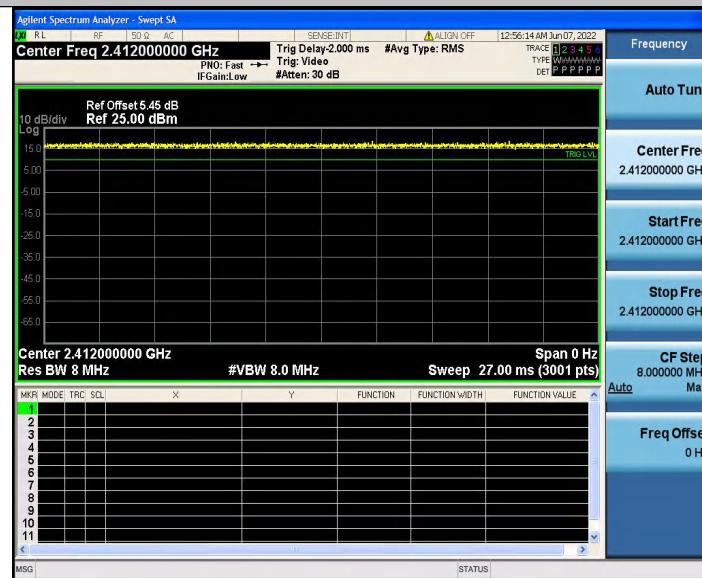
Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
3	2422	6	2437	9	2452



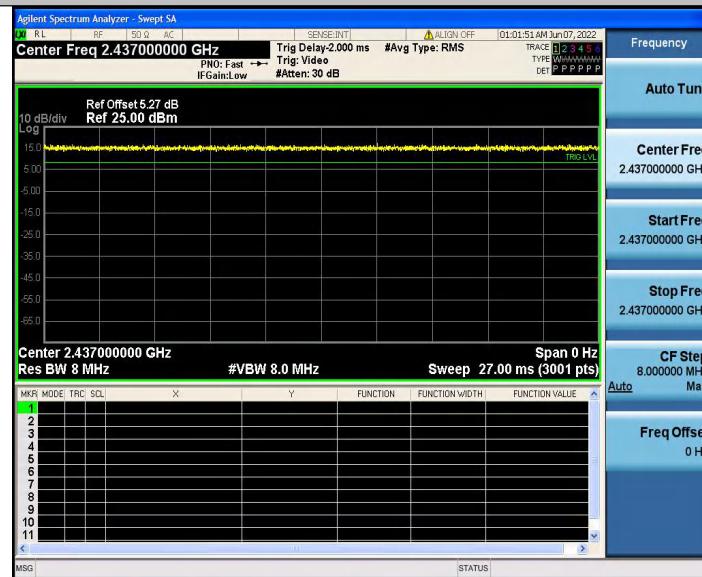
The maximum duty cycle as following table:

TestMode	Antenna	Channel	Transmissi on Duration [ms]	Transmissio n Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	27.00	27.00	100.00	---	---
		2437	27.00	27.00	100.00	---	---
		2462	27.00	27.00	100.00	---	---
11G	Ant1	2412	27.00	27.00	100.00	---	---
		2437	27.00	27.00	100.00	---	---
		2462	27.00	27.00	100.00	---	---
11N20SISO	Ant1	2412	27.00	27.00	100.00	---	---
		2437	27.00	27.00	100.00	---	---
		2462	27.00	27.00	100.00	---	---
11N40SISO	Ant1	2422	27.00	27.00	100.00	---	---
		2437	27.00	27.00	100.00	---	---
		2452	27.00	27.00	100.00	---	---

11B_Ant1_2412



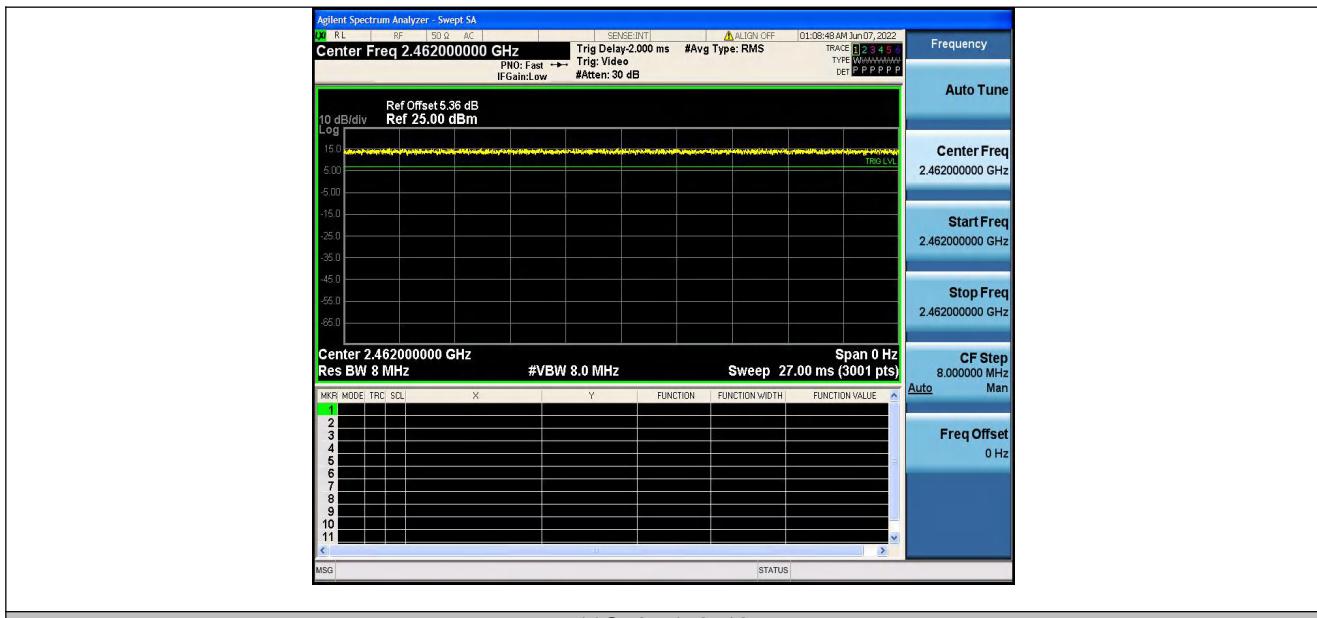
11B_Ant1_2437



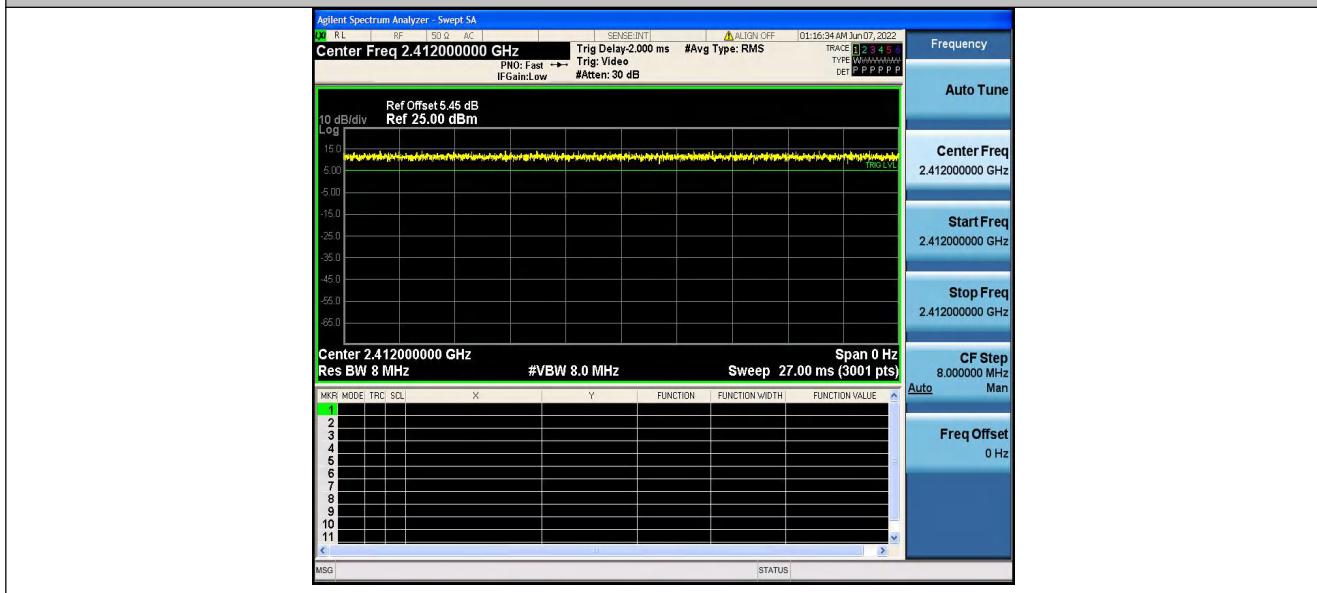
11B_Ant1_2462



Report No.: PTC22031600604E-FC01



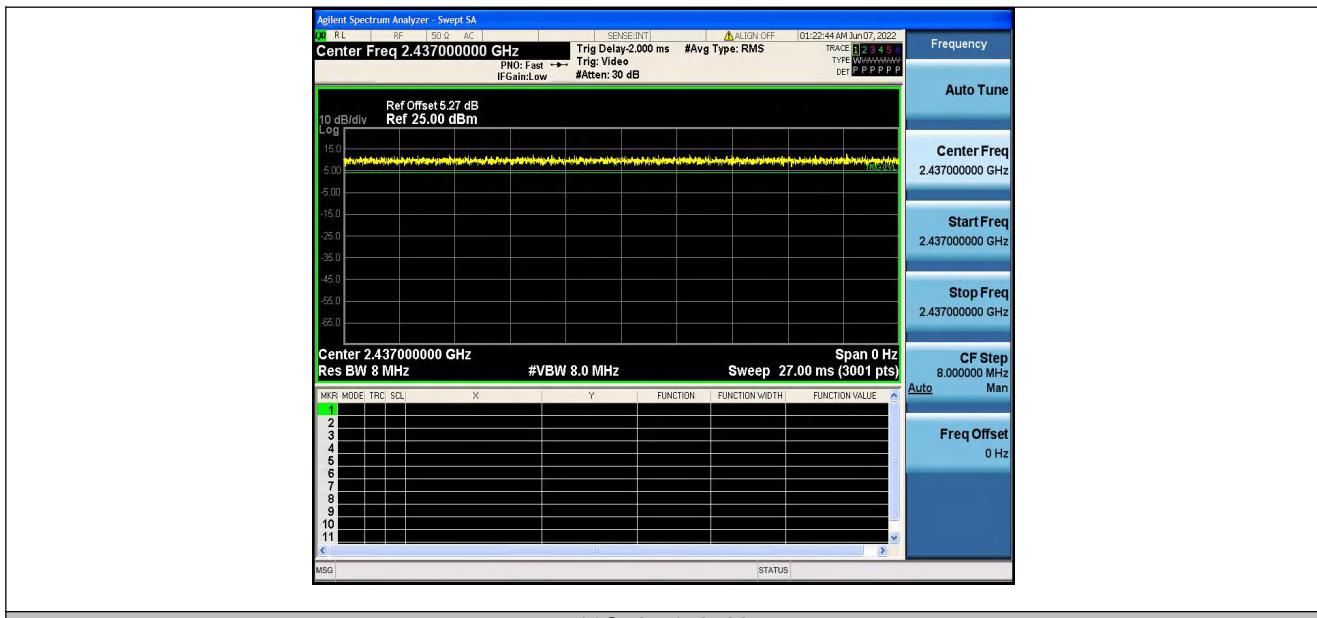
11G_Ant1_2412



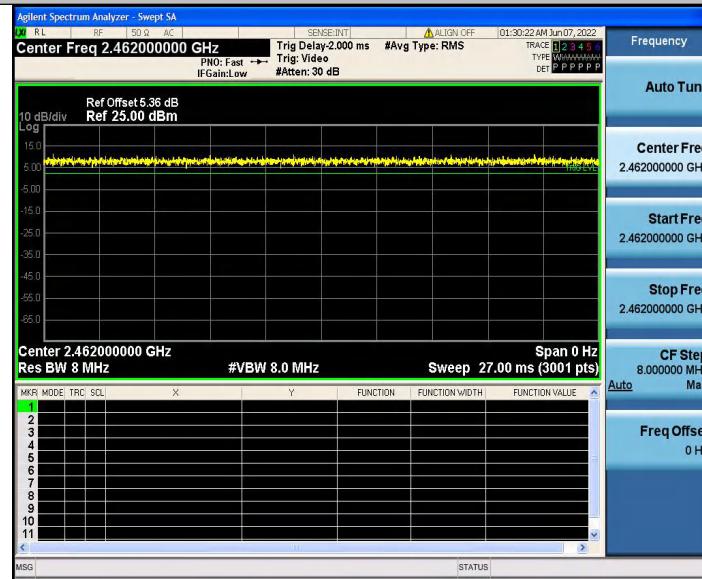
11G_Ant1_2437



Report No.: PTC22031600604E-FC01



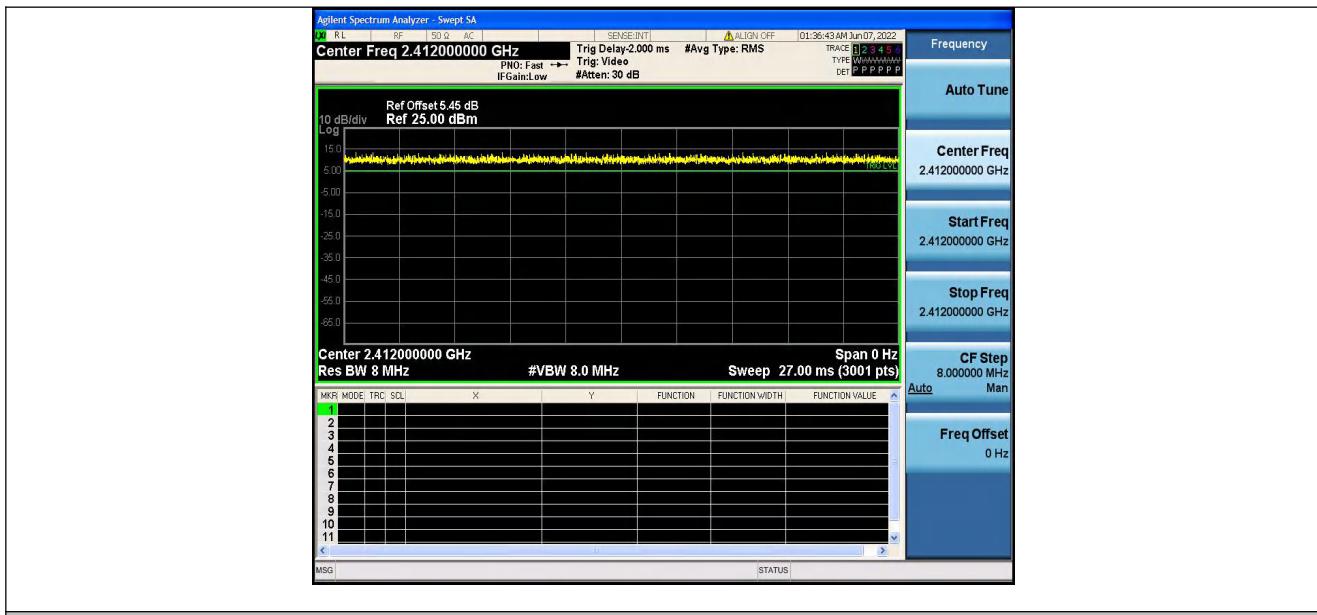
11G_Ant1_2462



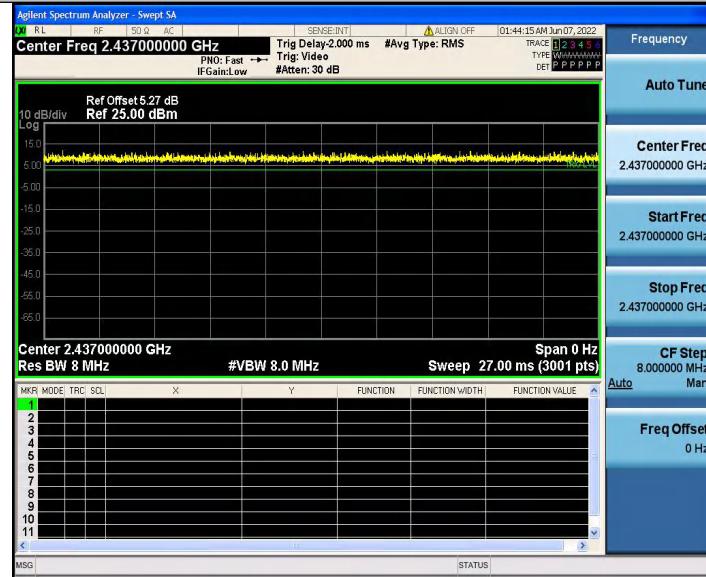
11N20SISO_Ant1_2412



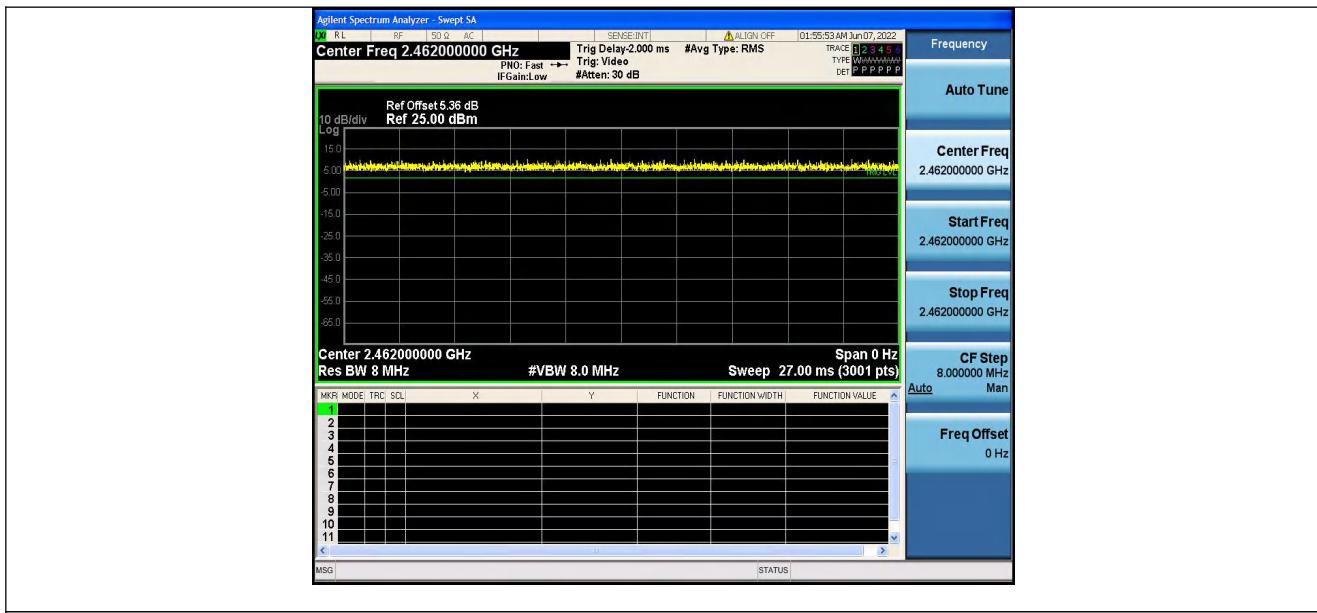
Report No.: PTC22031600604E-FC01



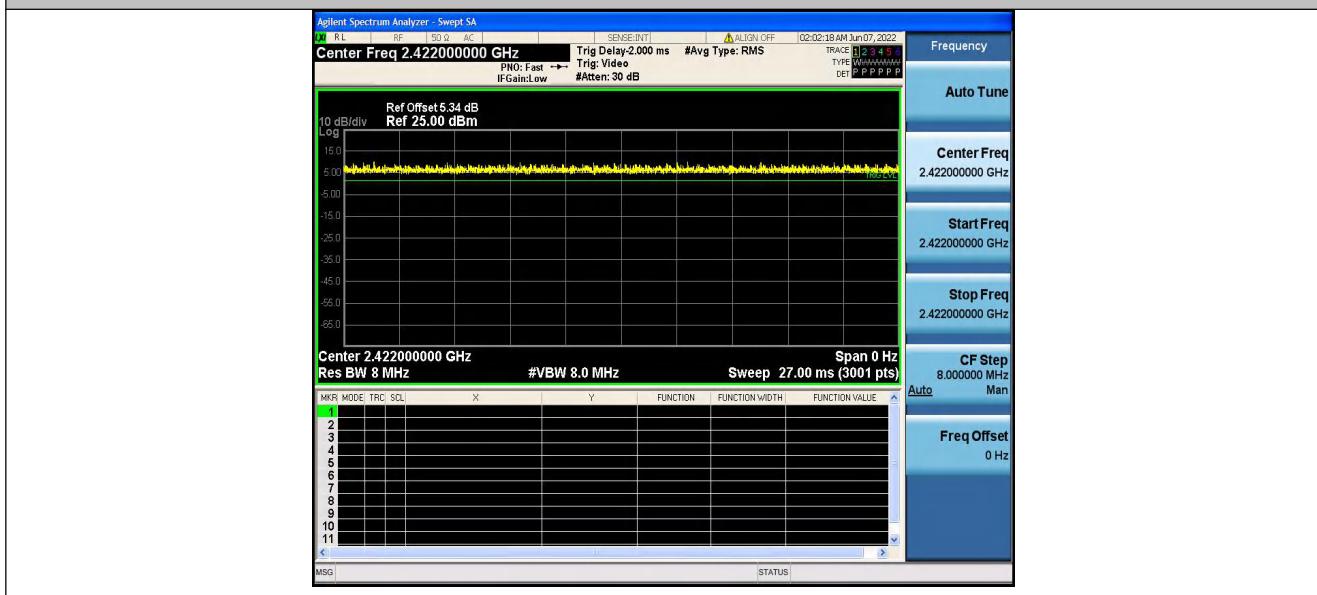
11N20SISO_Ant1_2437



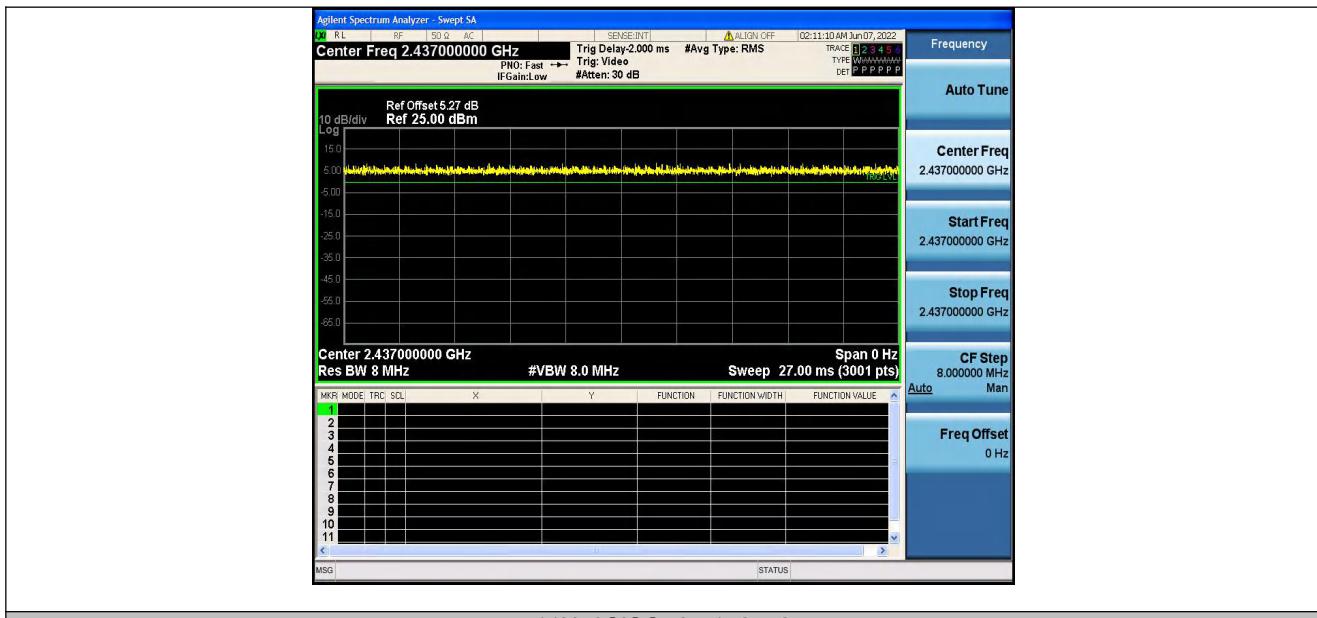
11N20SISO_Ant1_2462



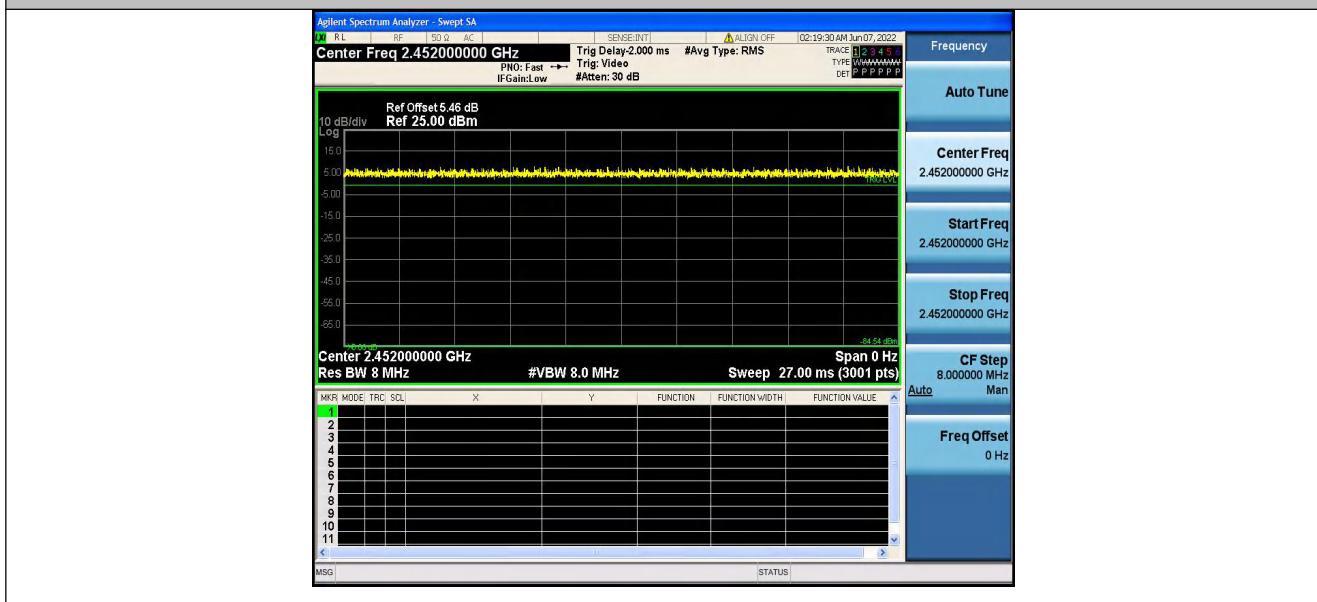
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452





Report No.: PTC22031600604E-FC01

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

FCC Designation Number: CN1219



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. 20, 2022
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 20, 2022
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 20, 2022
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 20, 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.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 20, 2022
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug. 20, 2022
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 20, 2022
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 20, 2022
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 20, 2022
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Aug. 20, 2022
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 20, 2022
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 20, 2022
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Aug. 20, 2022
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 20, 2022
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 20, 2022



RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 20, 2022
----------	-----	------	------	------------	---------------

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 20, 2022
Artificial Mains Network	Rohde&Schwarz	ENV216	102453	9KHz-300MHz	Aug. 20, 2022
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Aug. 20, 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%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB



Report No.: PTC22031600604E-FC01

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	: N /A
Frequency Range	: 150kHz to 30MHz
Class/Severity	: Class B

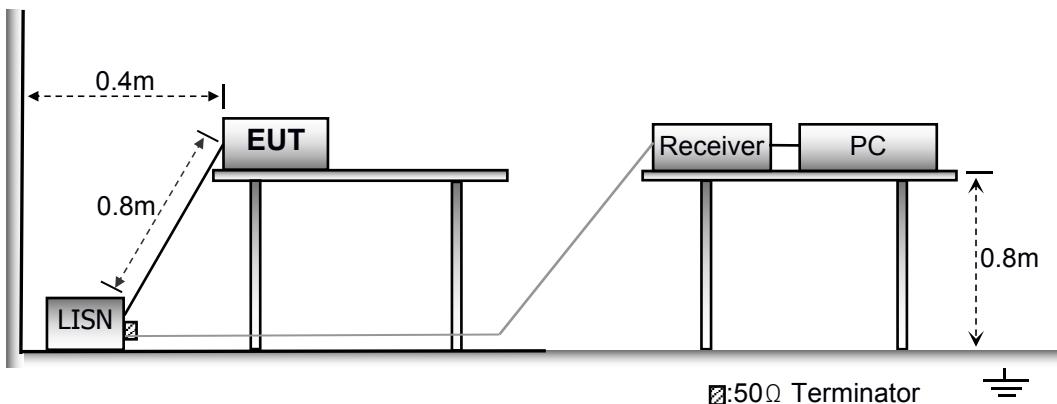
5.1 E.U.T. Operation

Operating Environment :

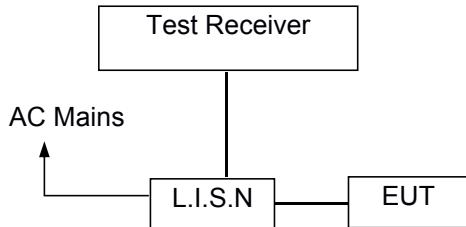
Temperature	: 23.9 °C
Humidity	: 51.4 % RH
Atmospheric Pressure	: 101.21kPa

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. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

Not Applicable

This production is power by DC12V battery.



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

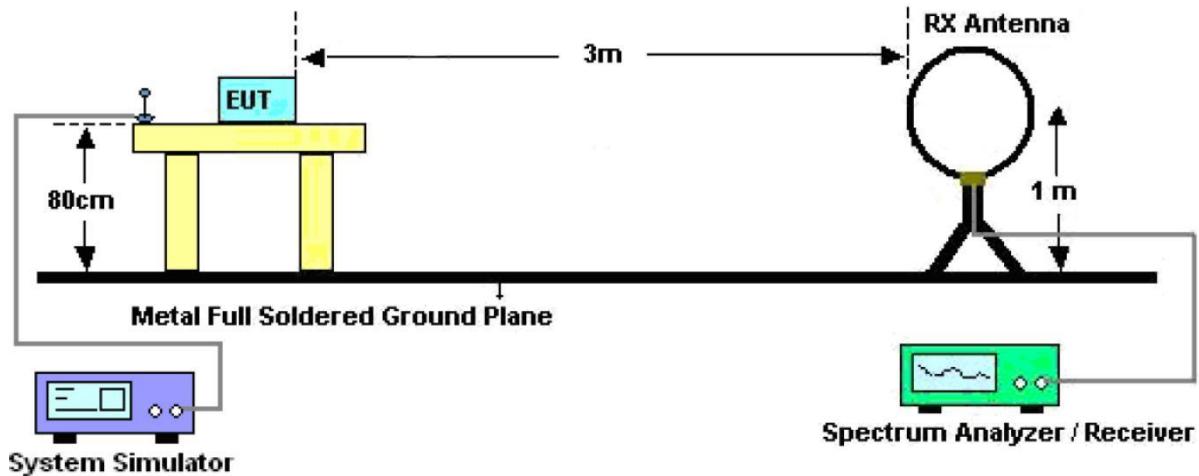
Atmospheric Pressure: : 101.3kPa

Test Voltage : DC 12V battery

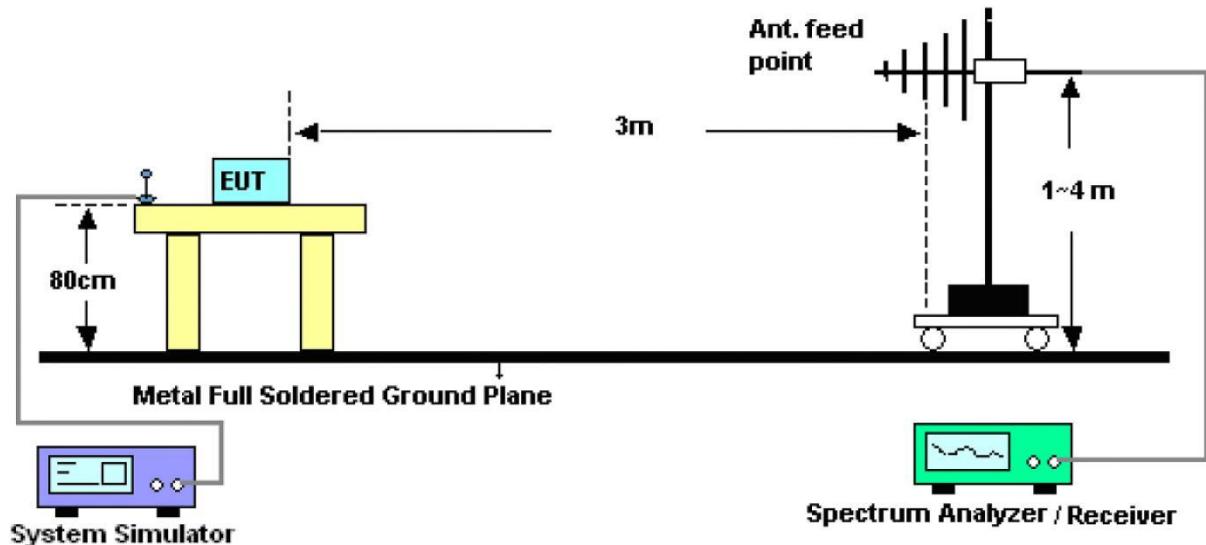
6.2 Test Setup

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

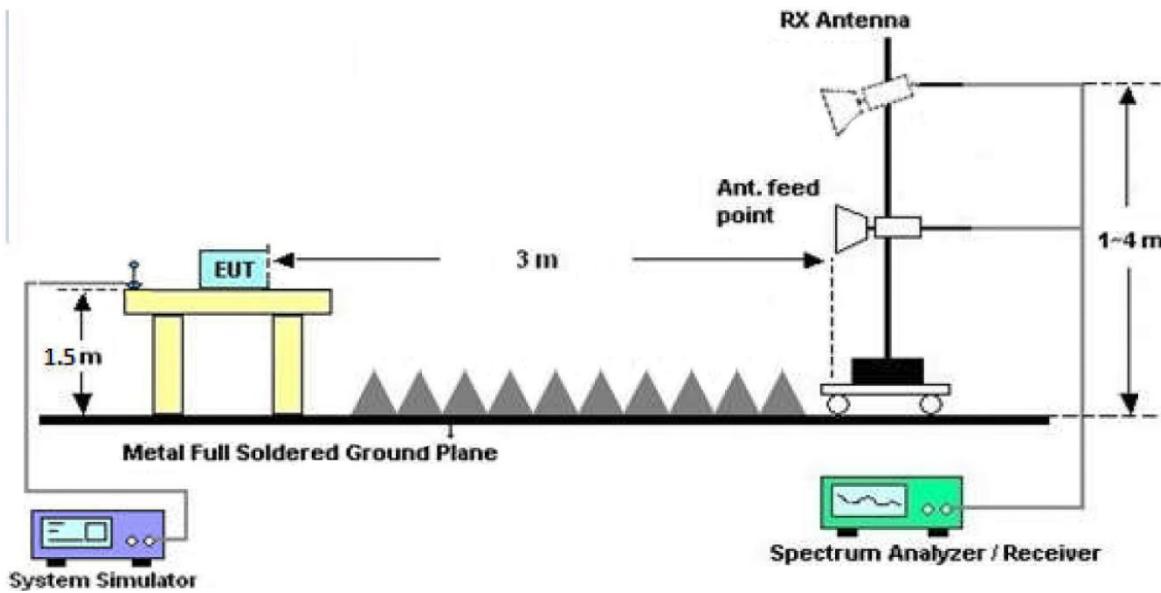
The test setup for emission measurement below 30MHz



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

Receiver Setup	Frequency	Detector	RBW	VBW	Remark
	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)
--	--	--	--	>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 = $40\log(\text{Specific distance/ test distance})$ (dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

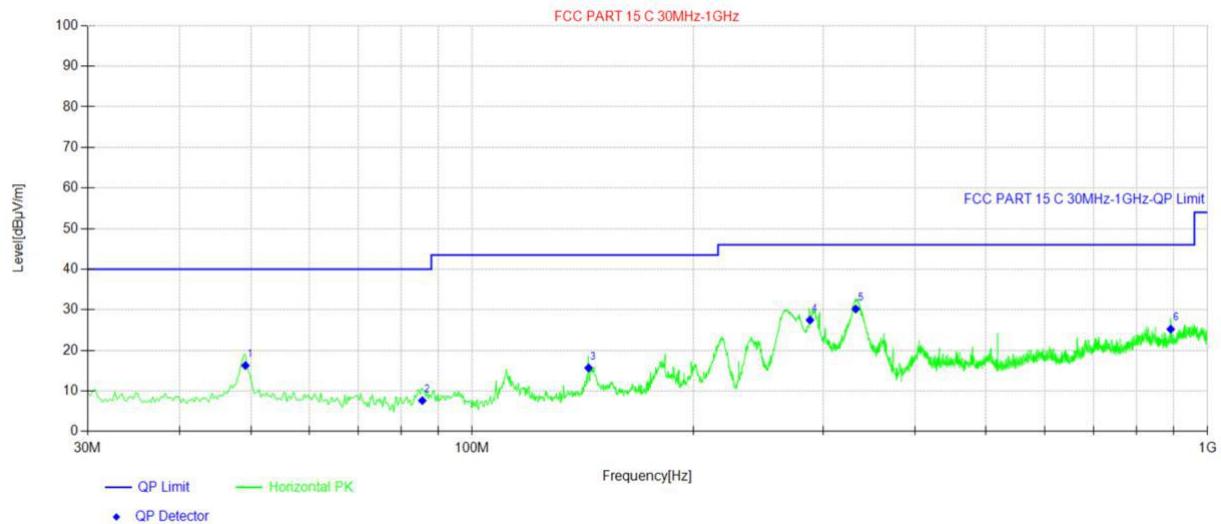
All the modulation modes were tested the data of the worst mode (TX 802.11b Low Channel) are recorded in the following pages and the others modulation methods do not exceed the limits.

Please refer to the following test plots:



Report No.: PTC22031600604E-FC01

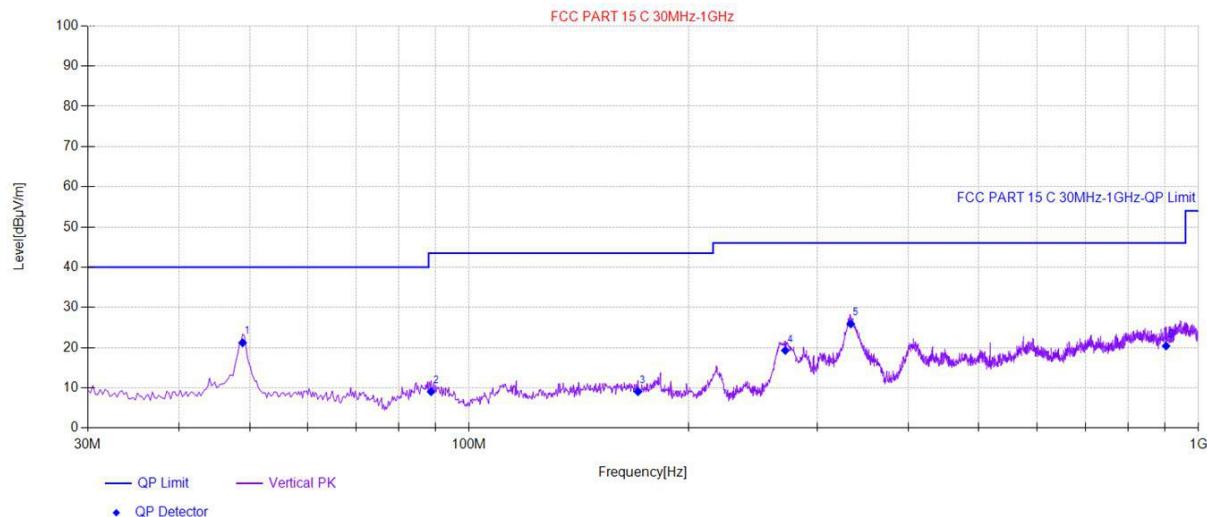
Antenna Polarization: Horizontal



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	49.16	-17.75	16.27	40.00	23.73	100	180	Horizontal
2	85.53	-20.96	7.63	40.00	32.37	100	234	Horizontal
3	143.98	-16.46	15.68	43.50	27.82	100	348	Horizontal
4	288.02	-15.88	27.47	46.00	18.53	100	229	Horizontal
5	332.40	-14.55	30.19	46.00	15.81	100	50	Horizontal
6	891.12	-3.15	25.23	46.00	20.77	100	331	Horizontal

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

Antenna Polarization: Vertical



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.92	-17.74	21.21	40.00	18.79	100	106	Vertical
2	88.69	-20.74	9.05	43.50	34.45	100	29	Vertical
3	170.41	-16.33	9.06	43.50	34.44	100	46	Vertical
4	271.29	-16.31	19.30	46.00	26.70	100	134	Vertical
5	333.61	-14.53	25.89	46.00	20.11	100	131	Vertical
6	902.76	-2.96	20.42	46.00	25.58	100	68	Vertical

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.
4824.00	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.



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

2.4G WiFi (802.11b/g/n20) mode have been tested, and the worst result(802.11g) was report as below

Test Mode: 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
2390.00	52.74	27.39	2.77	34.01	48.89	74.00	-25.11	H	Peak
2400.00	62.12	27.42	2.78	34.01	58.31	74.00	-15.69	H	
2390.00	54.50	27.39	2.77	34.01	50.65	74.00	-23.35	V	
2400.00	64.22	27.42	2.78	34.01	60.41	74.00	-13.59	V	
2390.00	39.19	27.39	2.77	34.01	35.34	54.00	-18.66	H	
2400.00	47.60	27.42	2.78	34.01	43.79	54.00	-10.21	H	Average
2390.00	41.10	27.39	2.77	34.01	37.25	54.00	-16.75	V	
2400.00	48.81	27.42	2.78	34.01	45.00	54.00	-9.00	V	

Test Mode: 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
2483.50	53.87	27.70	2.84	34.03	50.38	74.00	-23.62	H	Peak
2500.00	49.35	27.75	2.86	34.03	45.93	74.00	-28.07	H	
2483.50	56.35	27.70	2.84	34.03	52.86	74.00	-21.14	V	
2500.00	52.06	27.75	2.86	34.03	48.64	74.00	-25.36	V	
2483.50	39.72	27.70	2.84	34.03	36.23	54.00	-17.77	H	
2500.00	35.61	27.75	2.86	34.03	32.19	54.00	-21.81	H	Average
2483.50	41.77	27.70	2.84	34.03	38.28	54.00	-15.72	V	
2500.00	37.54	27.75	2.86	34.03	34.12	54.00	-19.88	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	3.56	-56.48	≤-16.44	PASS
			1000~26500	3.56	-45.27	≤-16.44	PASS
		2437	30~1000	1.86	-56.15	≤-18.14	PASS
			1000~26500	1.86	-44.82	≤-18.14	PASS
		2462	30~1000	0.75	-56.59	≤-19.25	PASS
			1000~26500	0.75	-42.3	≤-19.25	PASS
	11G	2412	30~1000	-4.61	-60.23	≤-24.61	PASS
			1000~26500	-4.61	-44.53	≤-24.61	PASS
		2437	30~1000	-6.37	-60.22	≤-26.37	PASS
			1000~26500	-6.37	-44.1	≤-26.37	PASS
		2462	30~1000	-7.78	-61.22	≤-27.78	PASS
			1000~26500	-7.78	-41.82	≤-27.78	PASS



11N20SISO	Ant1	2412	30~1000	-6.37	-60.81	≤-26.37	PASS
			1000~26500	-6.37	-44.74	≤-26.37	PASS
		2437	30~1000	-8.01	-61.29	≤-28.01	PASS
			1000~26500	-8.01	-44.4	≤-28.01	PASS
		2462	30~1000	-9.25	-60.93	≤-29.25	PASS
			1000~26500	-9.25	-41.73	≤-29.25	PASS
		2422	30~1000	-9.60	-62.49	≤-29.6	PASS
			1000~26500	-9.60	-44.33	≤-29.6	PASS
11N40SISO	Ant1	2437	30~1000	-11.11	-62.79	≤-31.11	PASS
			1000~26500	-11.11	-44.47	≤-31.11	PASS
		2452	30~1000	-11.56	-62.14	≤-31.56	PASS
			1000~26500	-11.56	-41.92	≤-31.56	PASS

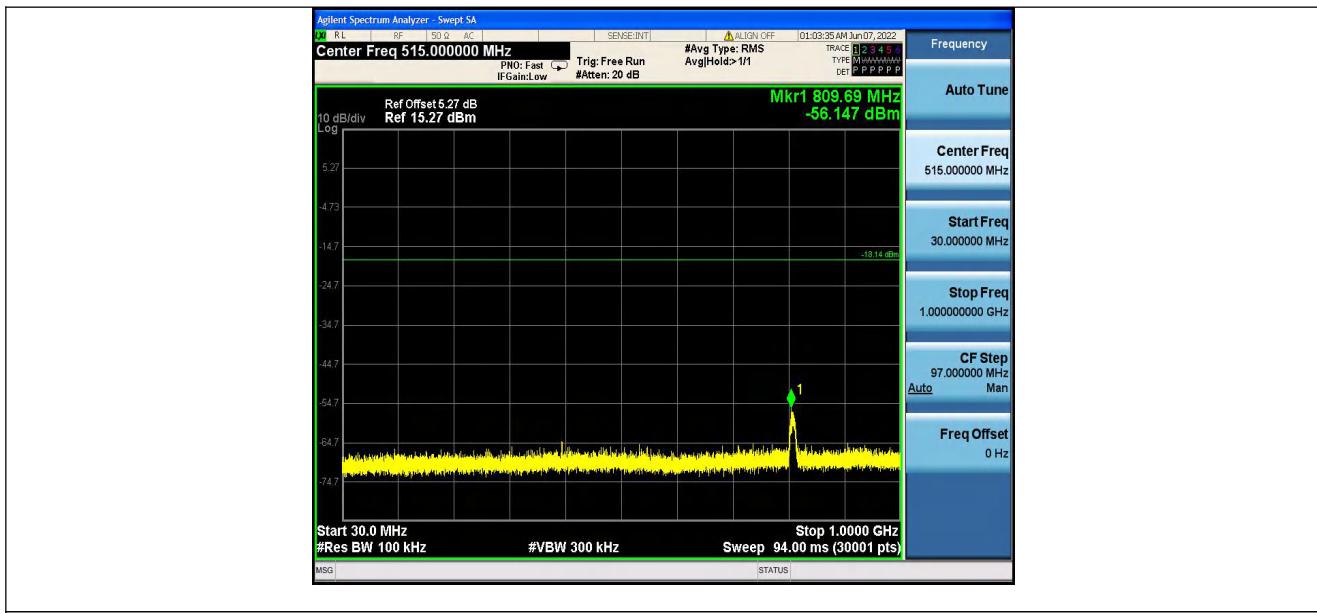
11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500



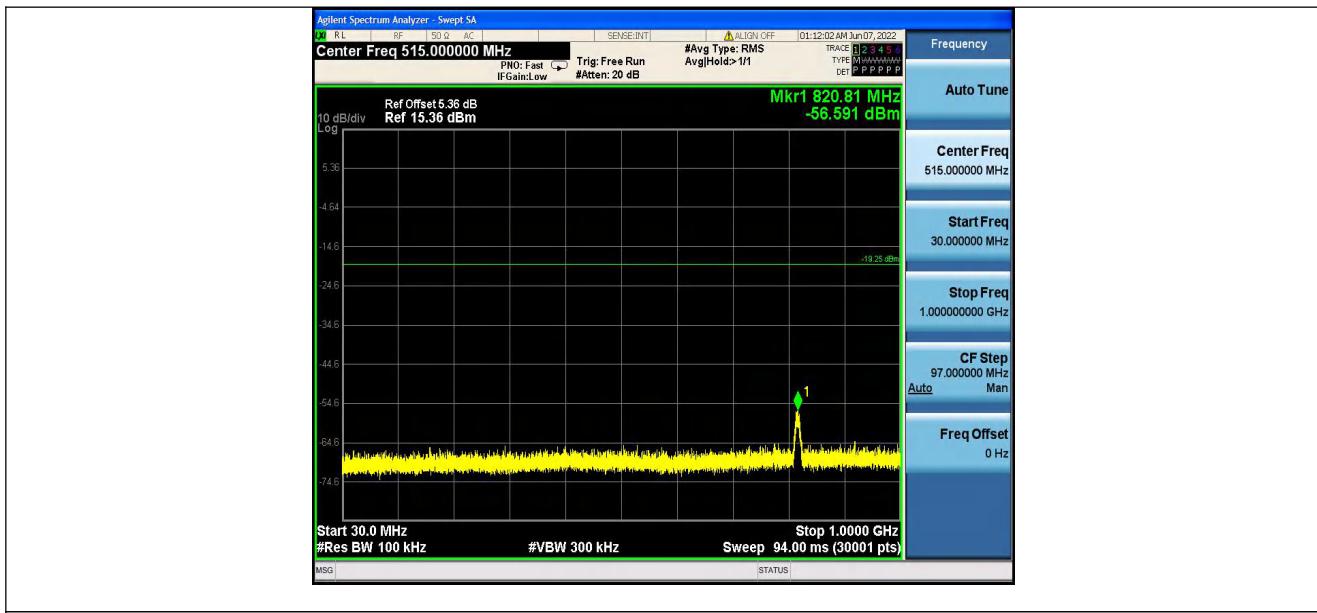
11B_Ant1_2437_30~1000



11B_Ant1_2437_1000~26500



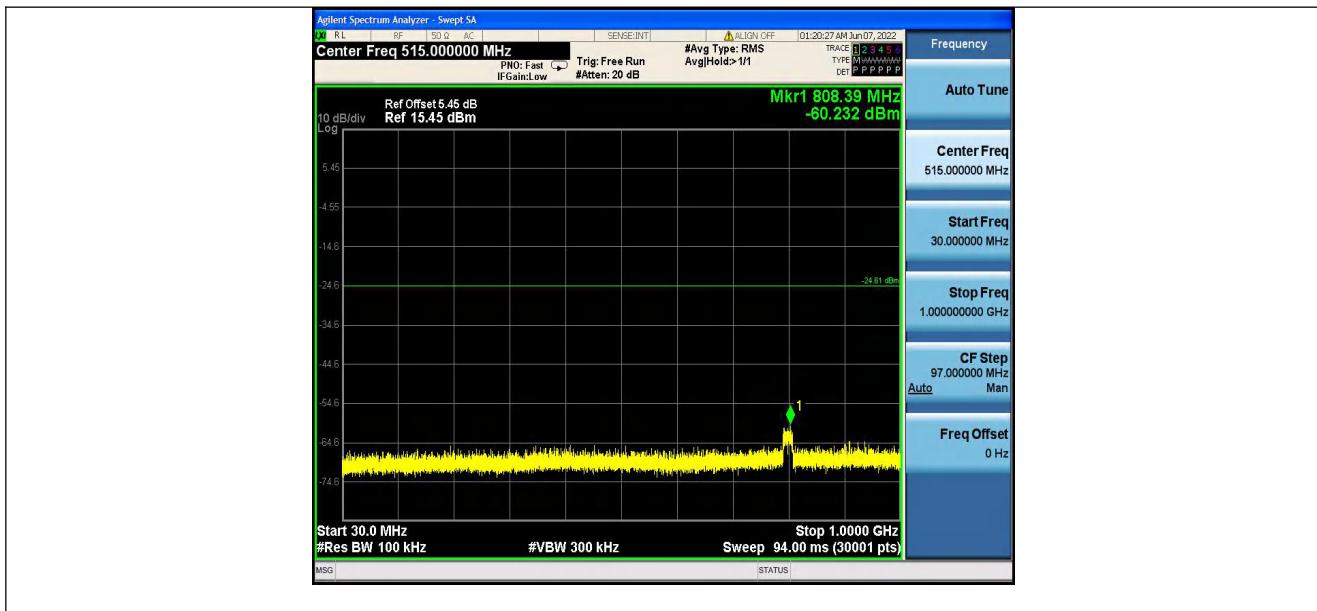
11B_Ant1_2462_30~1000



11B_Ant1_2462_1000~26500



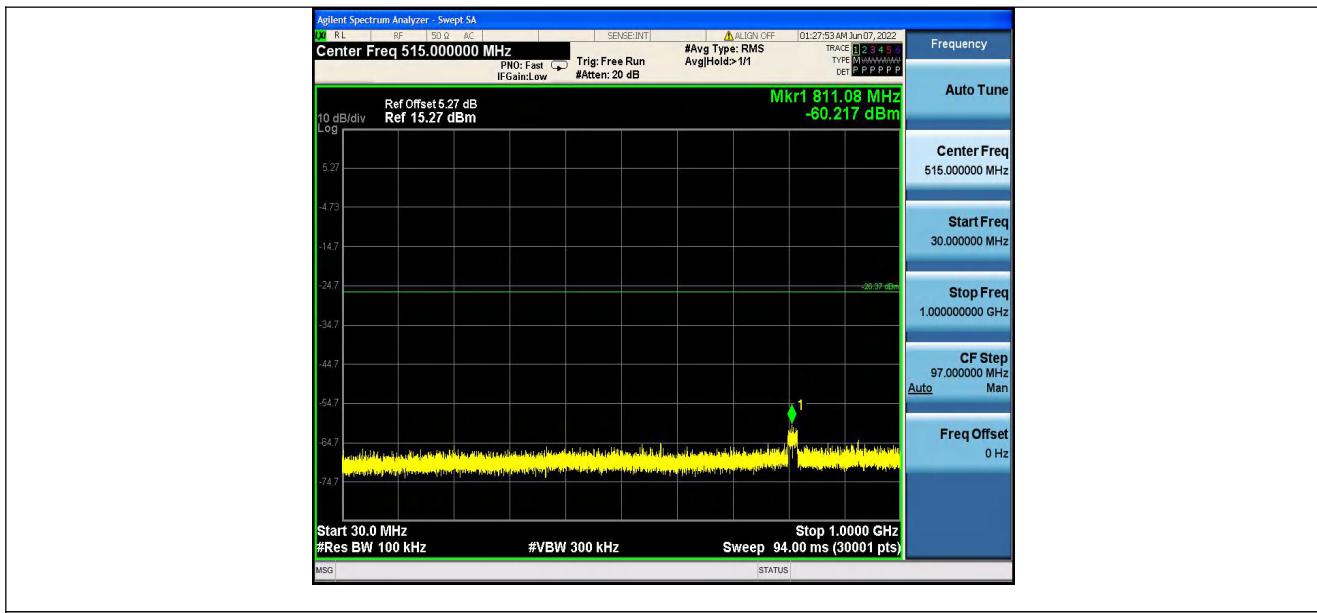
11G_Ant1_2412_30~1000



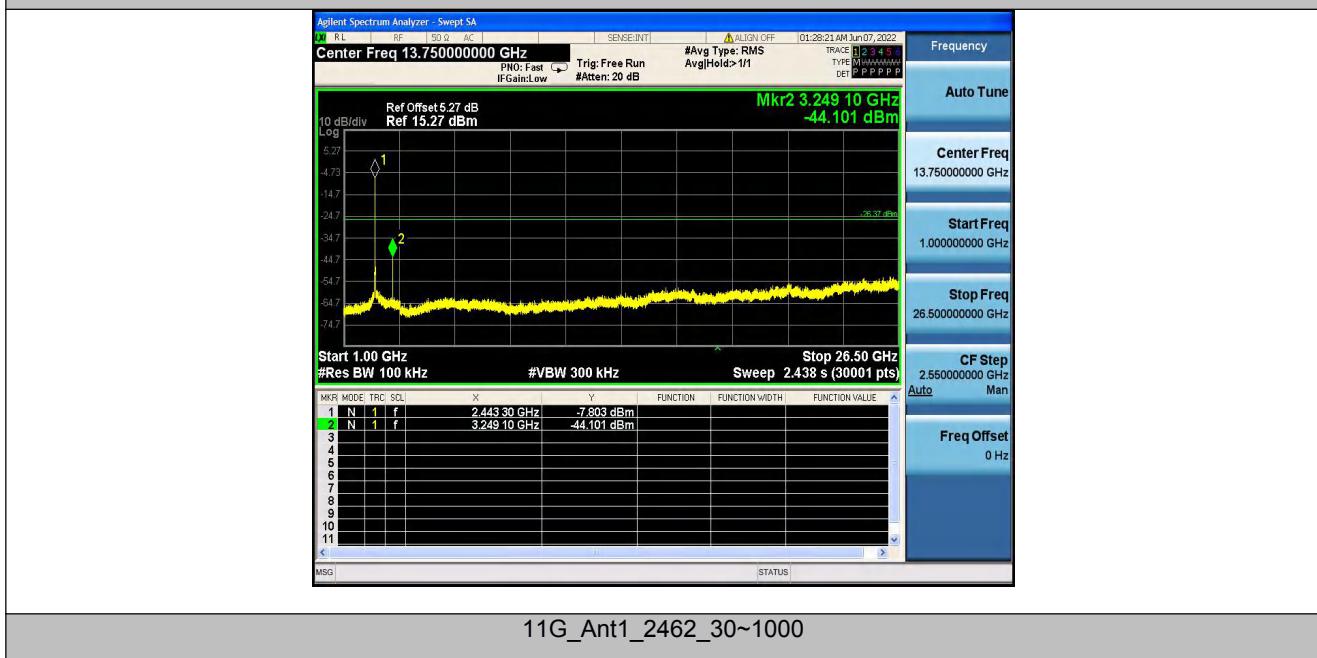
11G_Ant1_2412_1000~26500



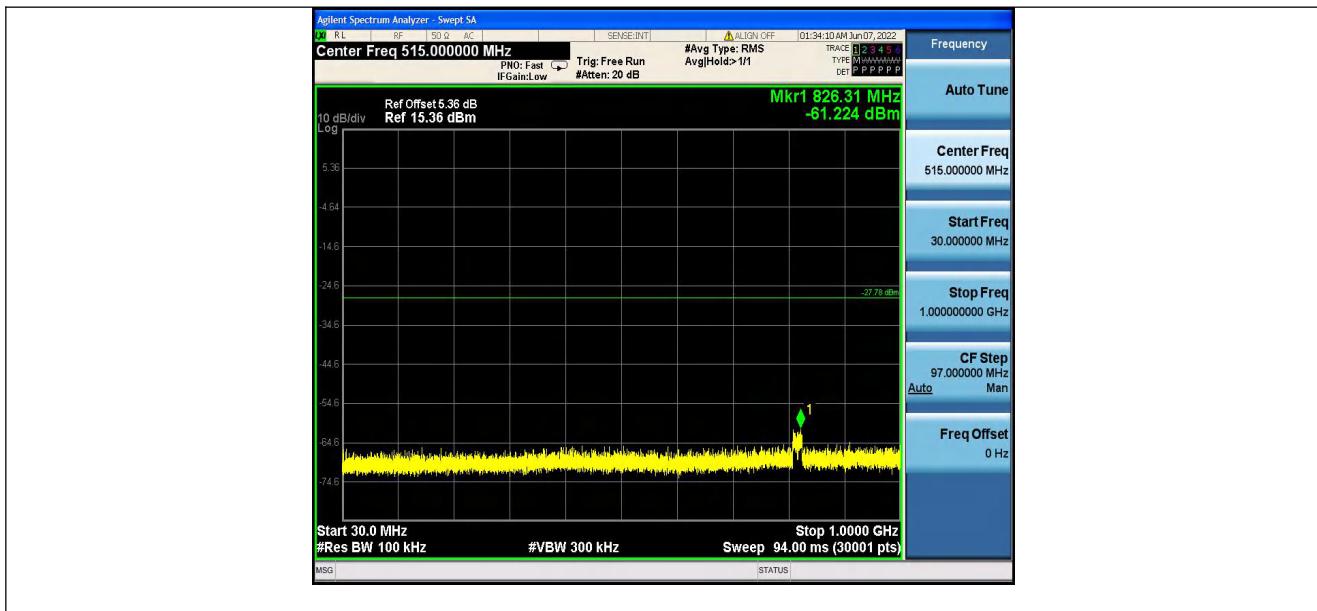
11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500



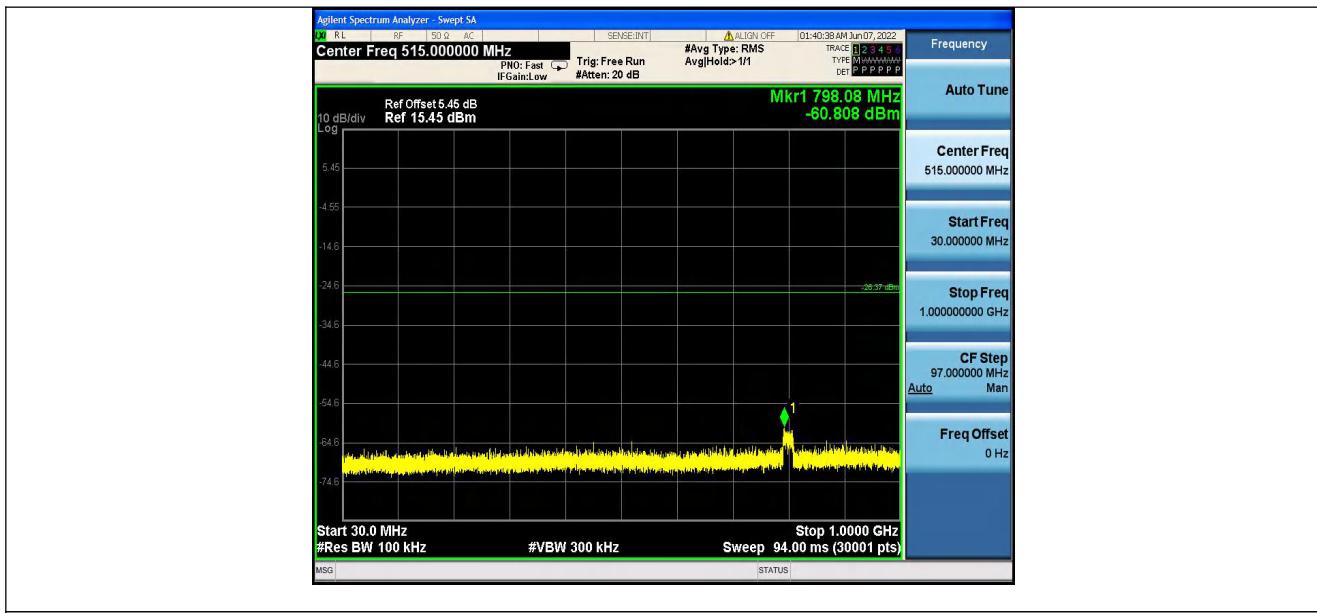
11G_Ant1_2462_30~1000



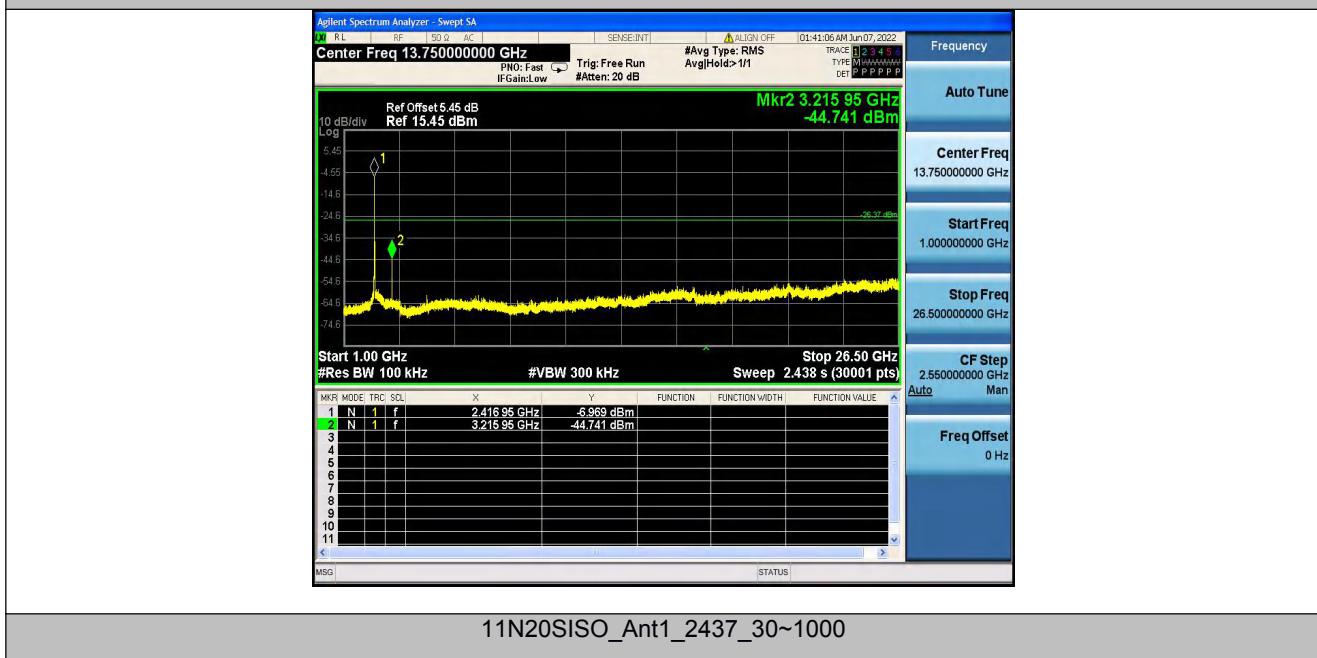
11G_Ant1_2462_1000~26500



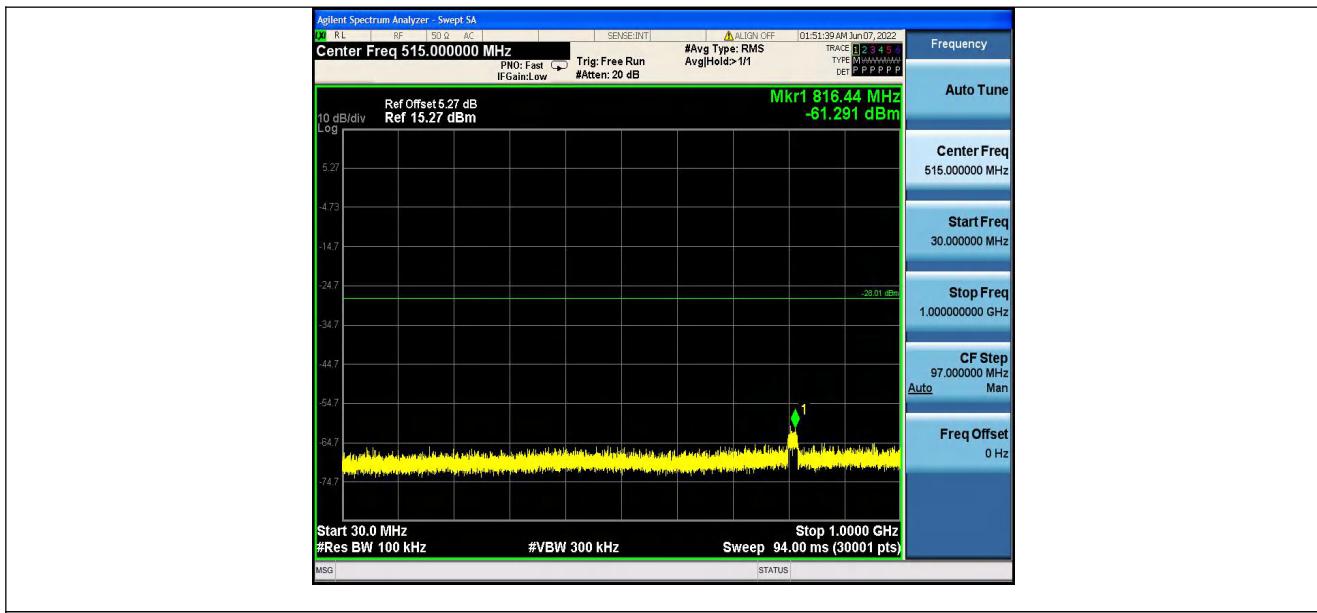
11N20SISO_Ant1_2412_30~1000



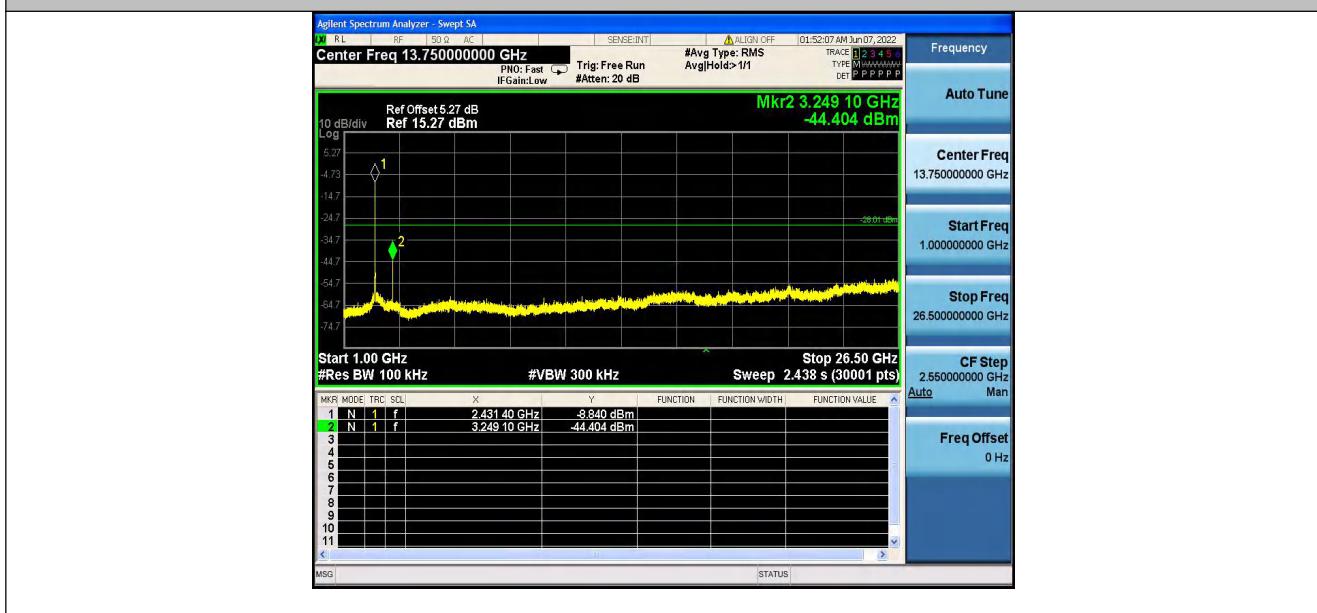
11N20SISO_Ant1_2412_1000~26500



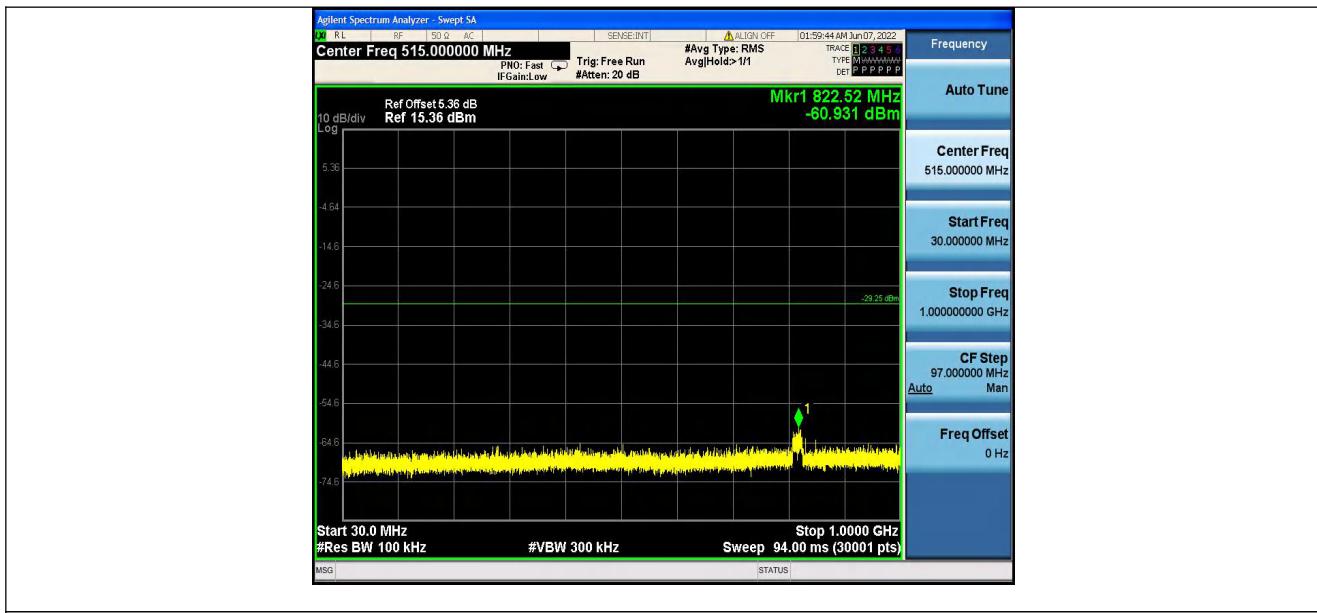
11N20SISO_Ant1_2437_30~1000



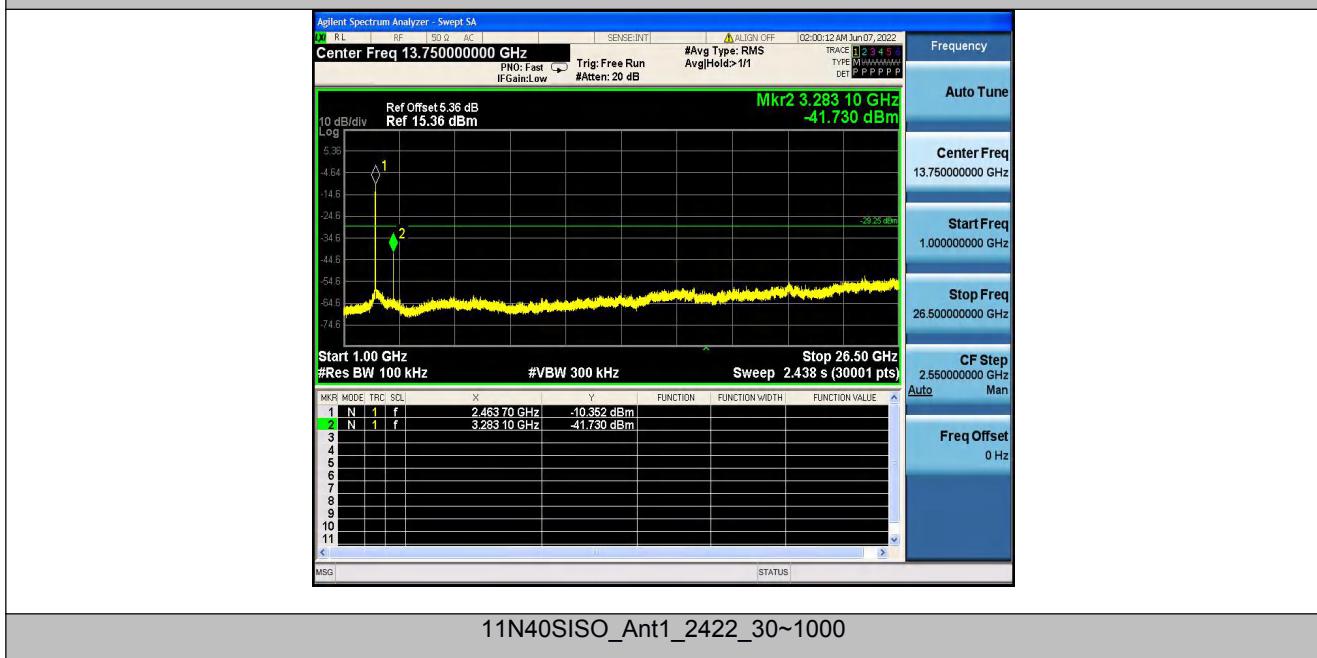
11N20SISO_Ant1_2437_1000~26500



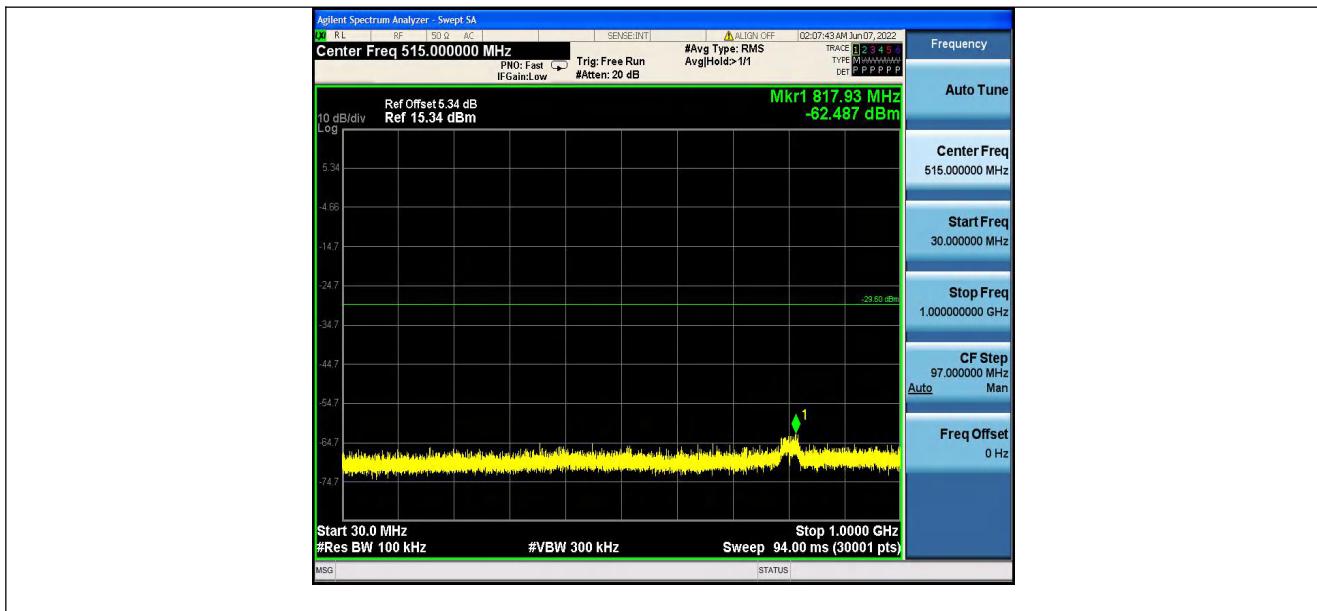
11N20SISO_Ant1_2462_30~1000



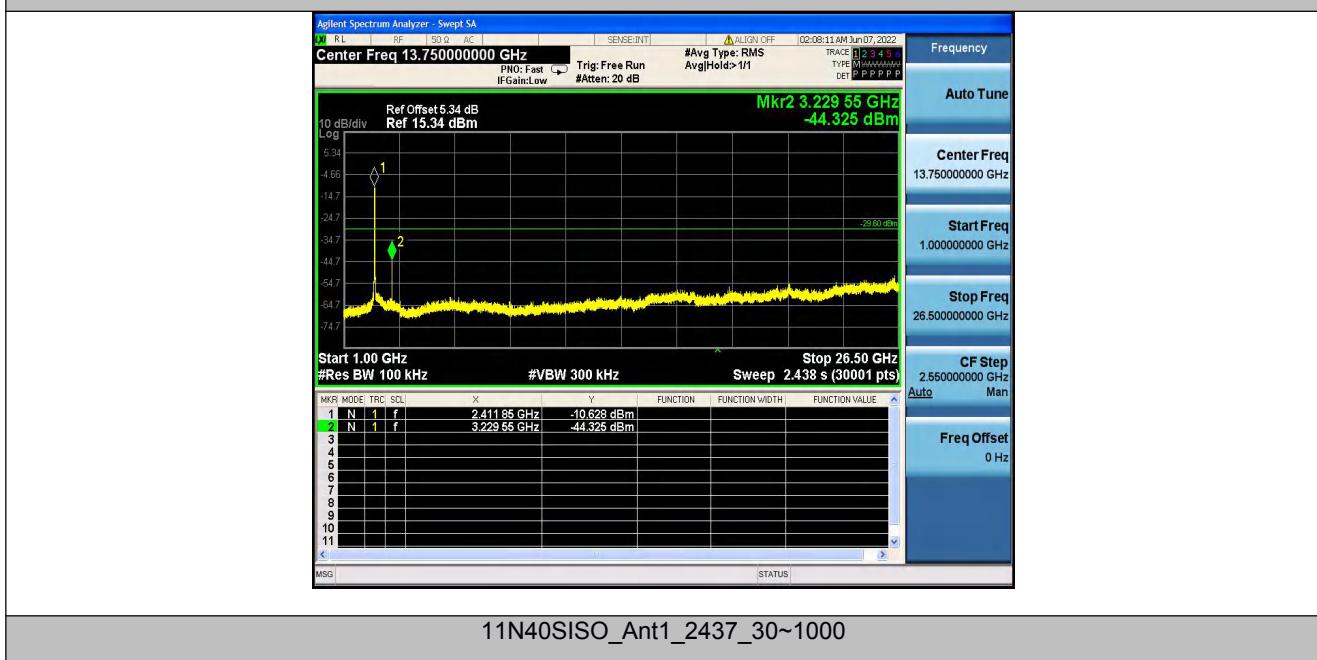
11N20SISO_Ant1_2462_1000~26500



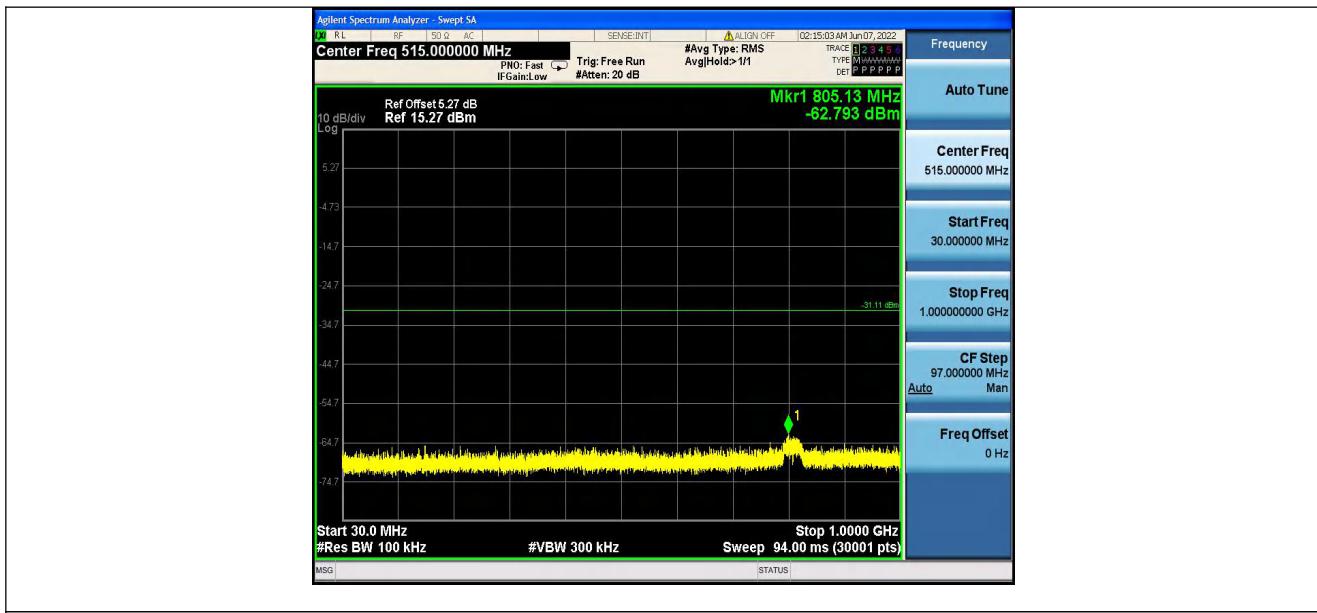
11N40SISO_Ant1_2422_30~1000



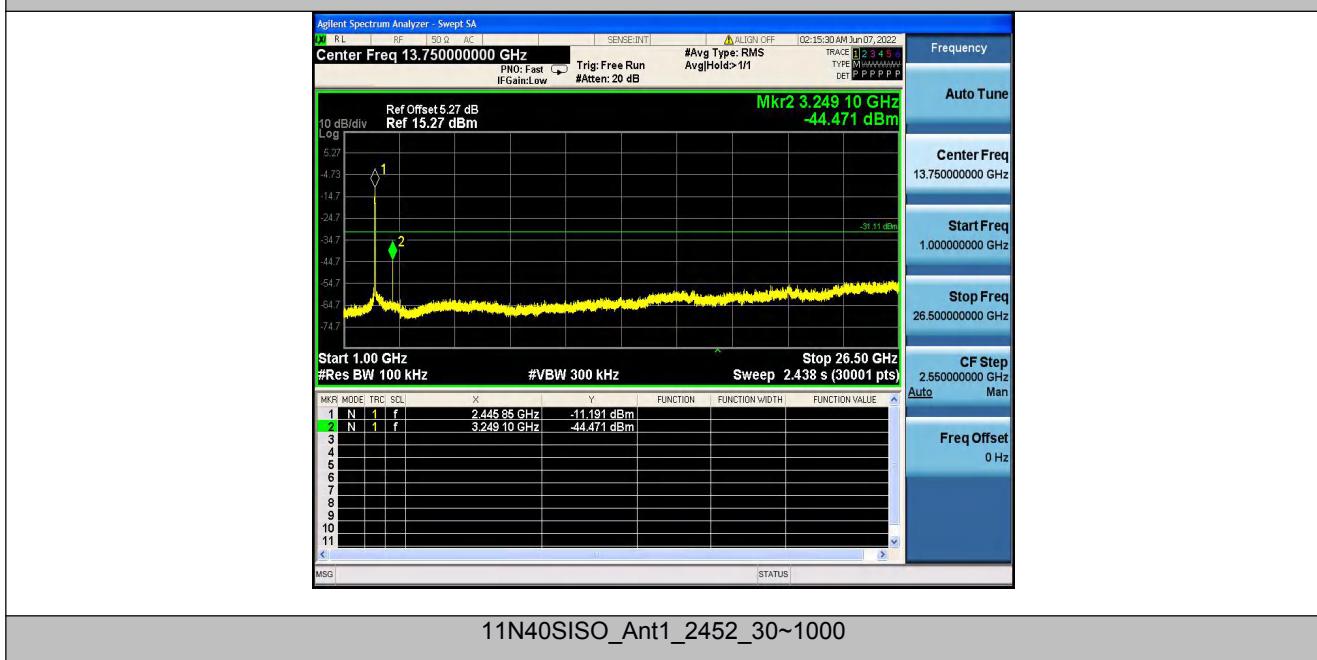
11N40SISO_Ant1_2422_1000~26500



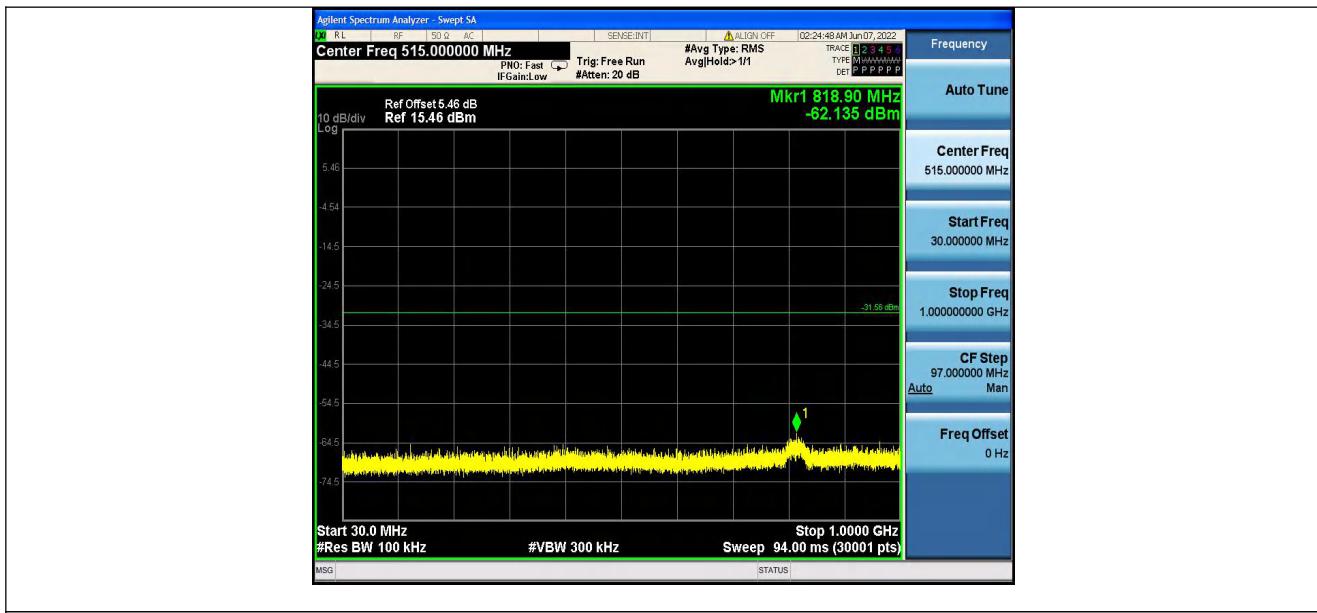
11N40SISO_Ant1_2437_30~1000



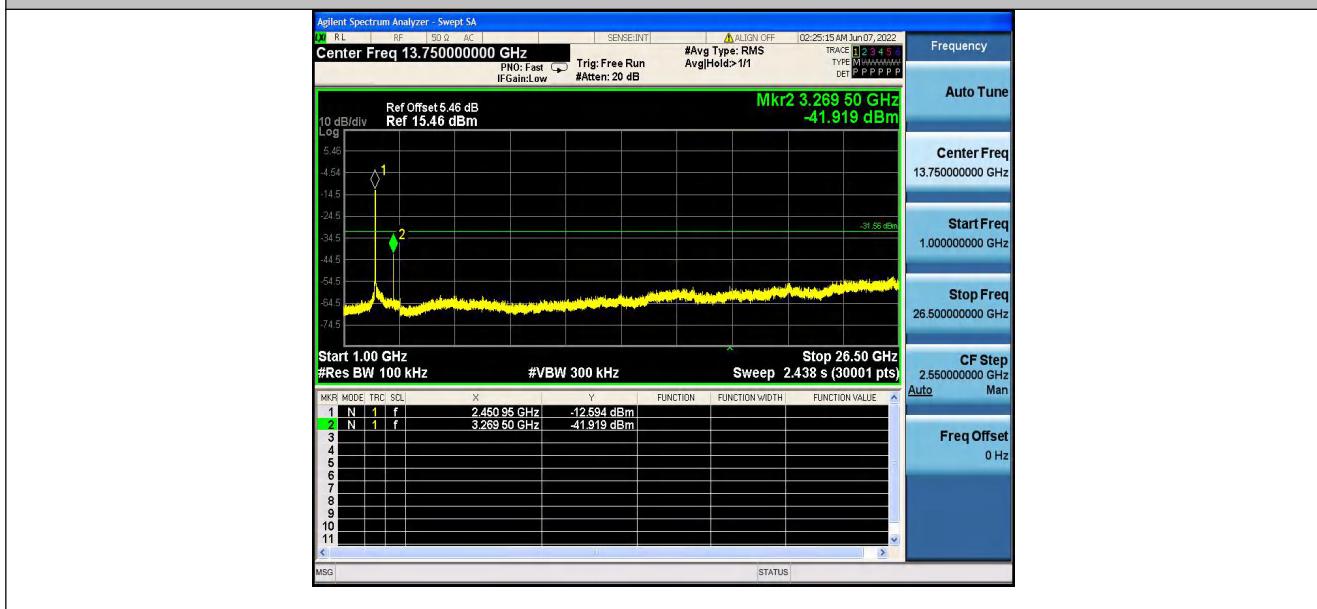
11N40SISO_Ant1_2437_1000~26500



11N40SISO_Ant1_2452_30~1000



11N40SISO_Ant1_2452_1000~26500



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)).

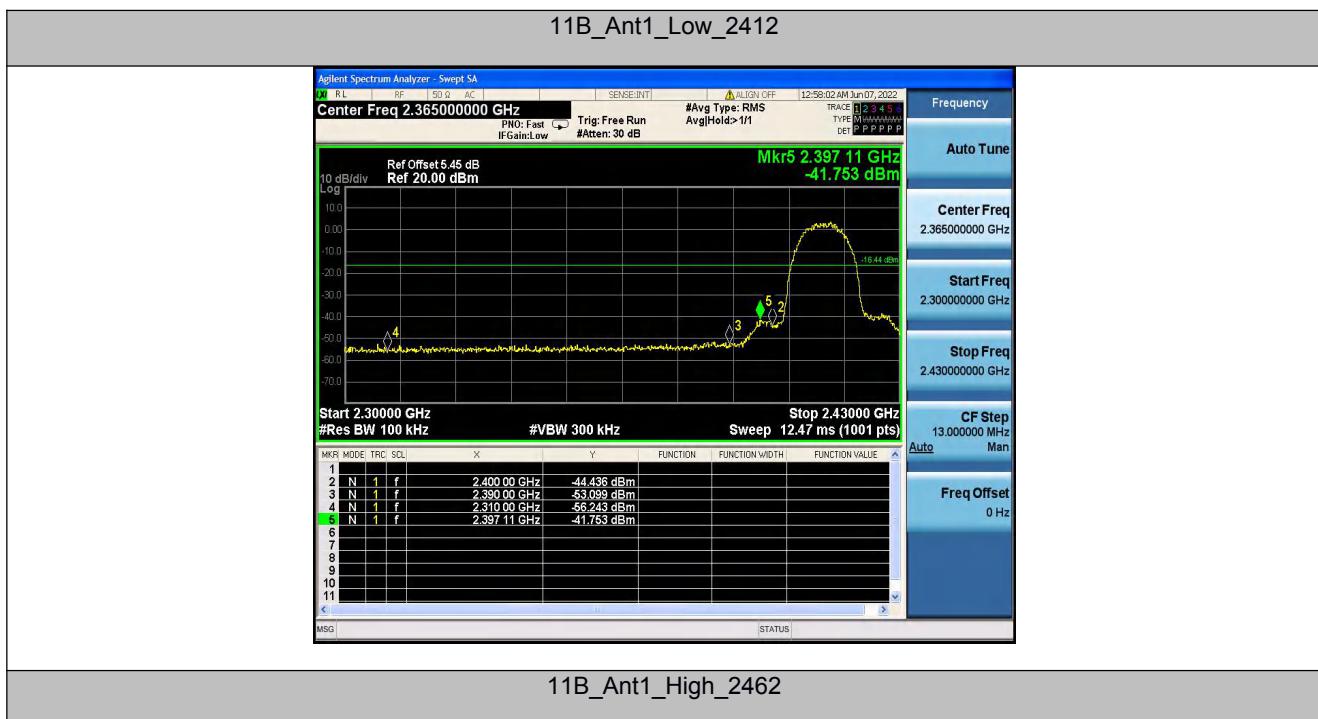
8.1 Test Procedure

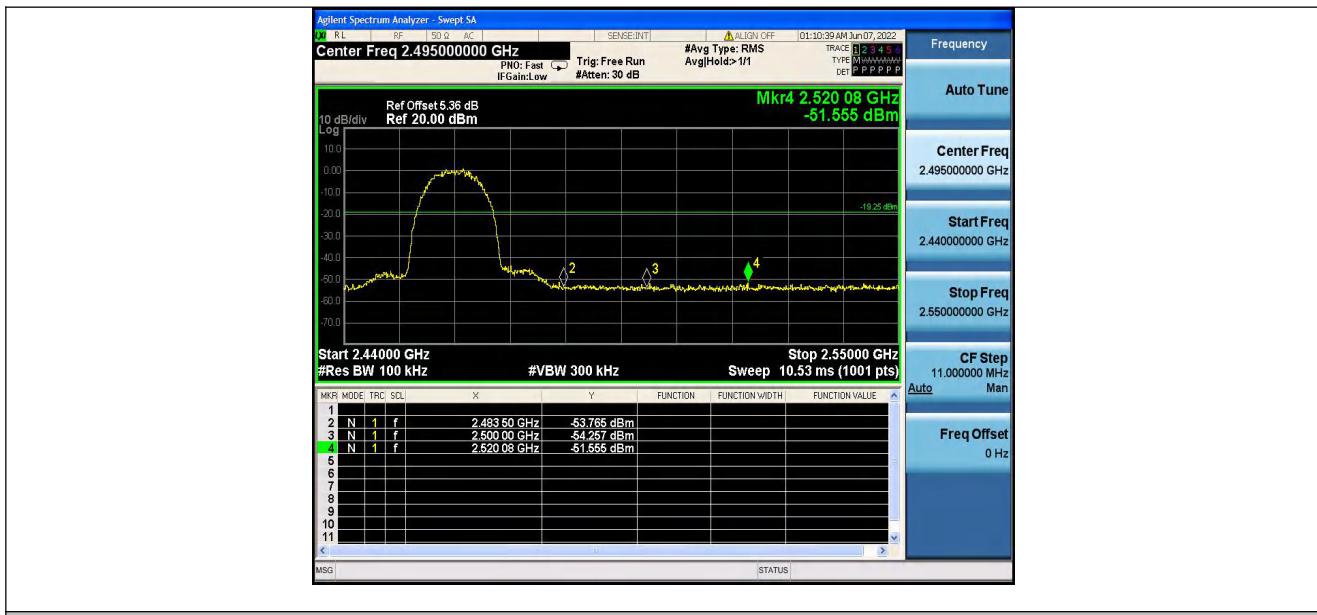
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold
3. set up



8.2 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	3.56	-41.75	≤-16.44	PASS
		High	2462	0.75	-51.56	≤-19.25	PASS
11G	Ant1	Low	2412	-4.61	-42.81	≤-24.61	PASS
		High	2462	-7.78	-51.68	≤-27.78	PASS
11N20SISO	Ant1	Low	2412	-6.37	-45.25	≤-26.37	PASS
		High	2462	-9.25	-51.37	≤-29.25	PASS
11N40SISO	Ant1	Low	2422	-9.60	-47.92	≤-29.6	PASS
		High	2452	-11.56	-50.5	≤-31.56	PASS

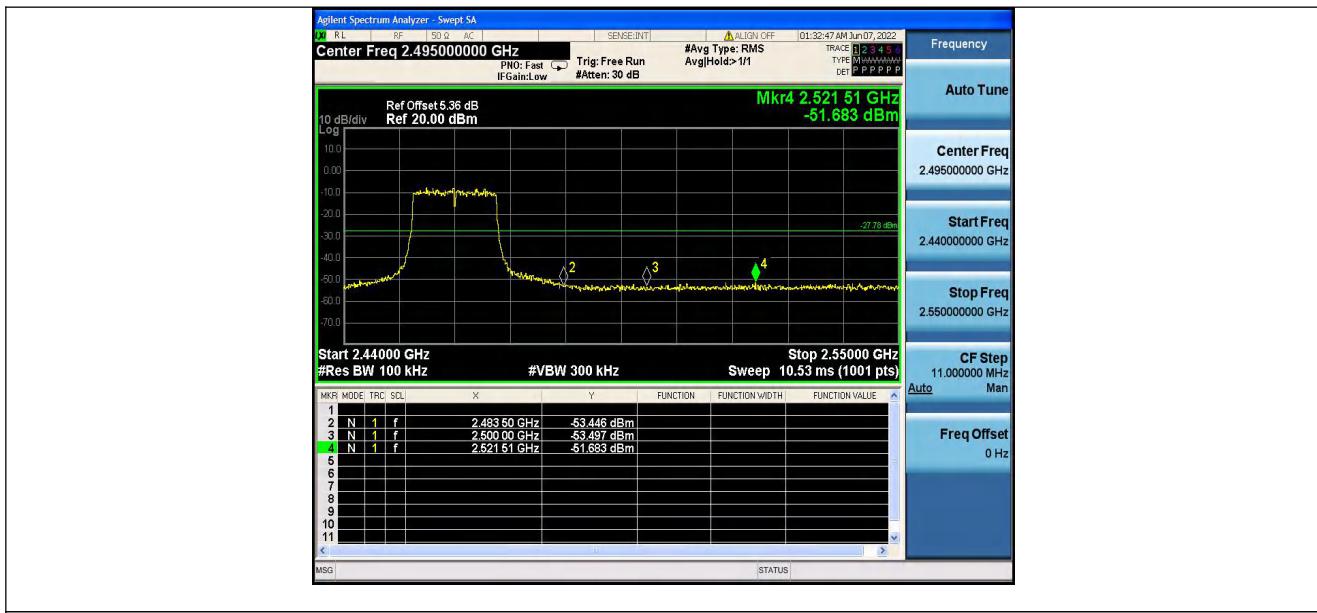




11G_Ant1_Low_2412



11G_Ant1_High_2462



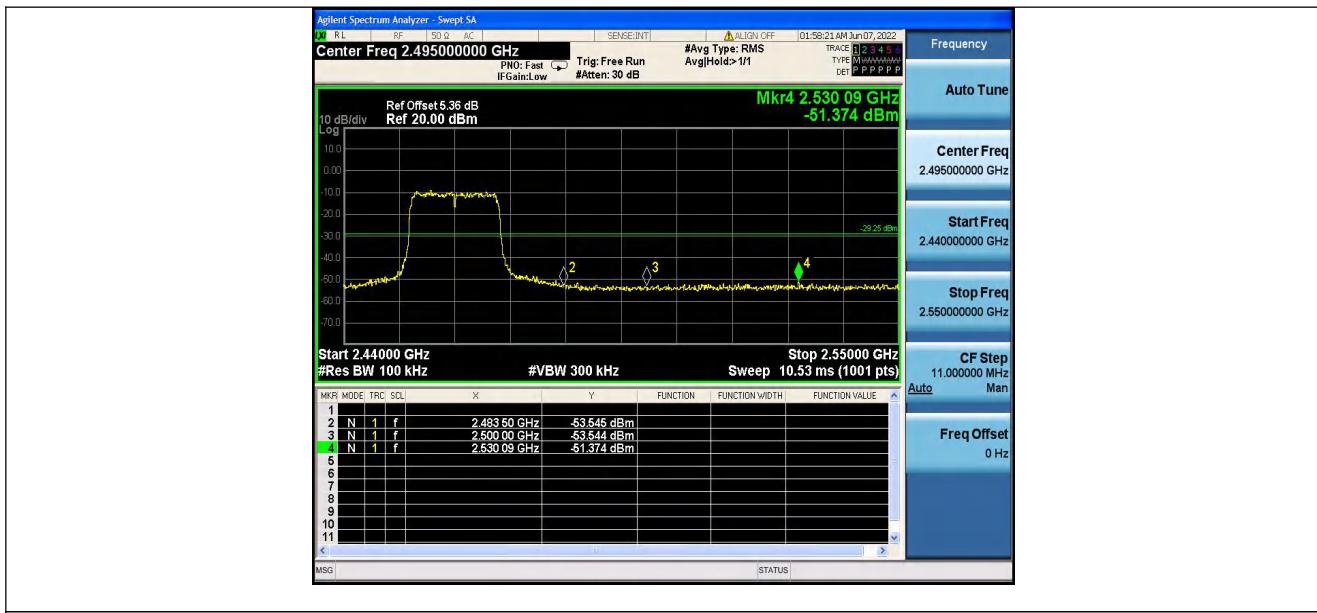
11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



Report No.: PTC22031600604E-FC01



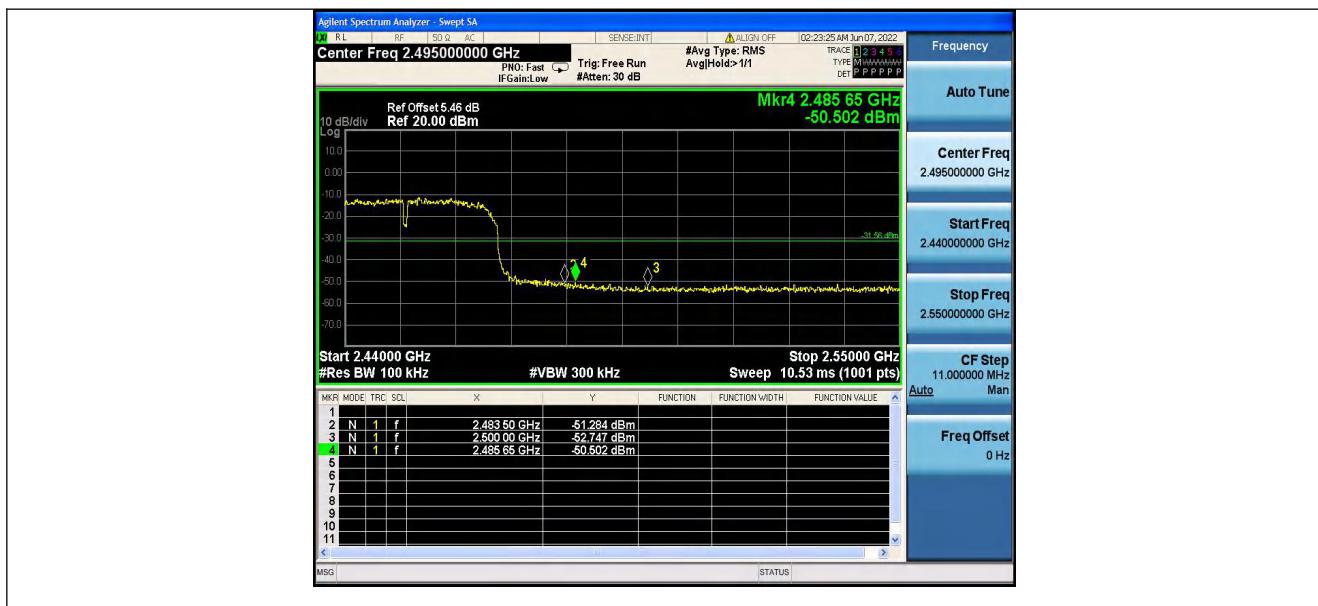
11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452



Report No.: PTC22031600604E-FC01





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	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.400	2407.360	2416.760	0.5	PASS
		2437	9.360	2432.360	2441.720	0.5	PASS
		2462	10.160	2456.880	2467.040	0.5	PASS
11G	Ant1	2412	16.480	2403.800	2420.280	0.5	PASS
		2437	16.480	2428.800	2445.280	0.5	PASS
		2462	16.480	2453.800	2470.280	0.5	PASS
11N20SISO	Ant1	2412	17.000	2403.560	2420.560	0.5	PASS
		2437	17.000	2428.560	2445.560	0.5	PASS
		2462	16.960	2453.560	2470.520	0.5	PASS
11N40SISO	Ant1	2422	32.720	2405.680	2438.400	0.5	PASS
		2437	32.640	2420.680	2453.320	0.5	PASS
		2452	32.720	2435.680	2468.400	0.5	PASS