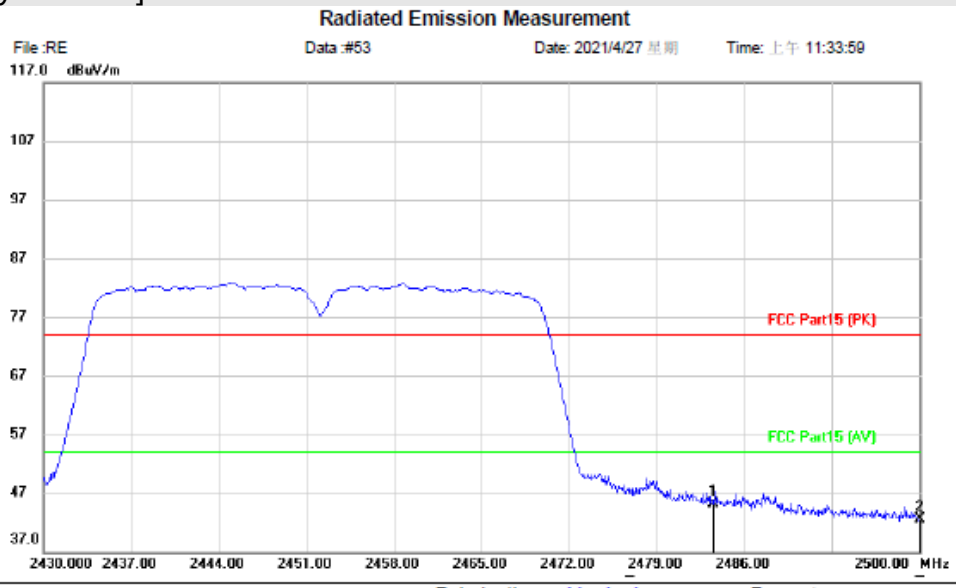
[Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Laptop Computer
M/N: N14
Mode: TX-N40-H
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	48.99	-3.84	45.15	74.00	-28.85	peak			
2		2500.000	46.31	-3.78	42.53	74.00	-31.47	peak			

Test Result: Pass

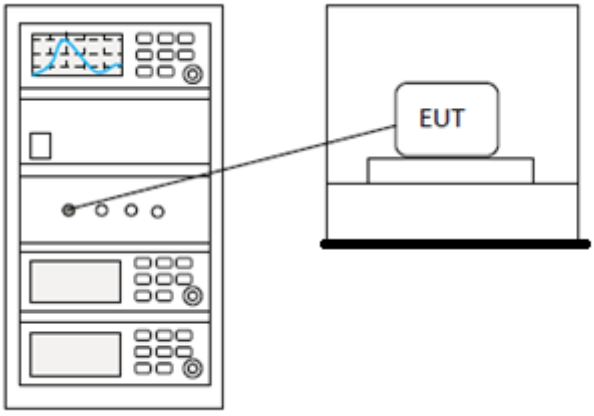
3 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	22℃
Humidity	50%

3.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

3.2 BLOCK DIAGRAM OF TEST SETUP



3.3 TEST DATA

Pass: Please Refer To Appendix: For Details

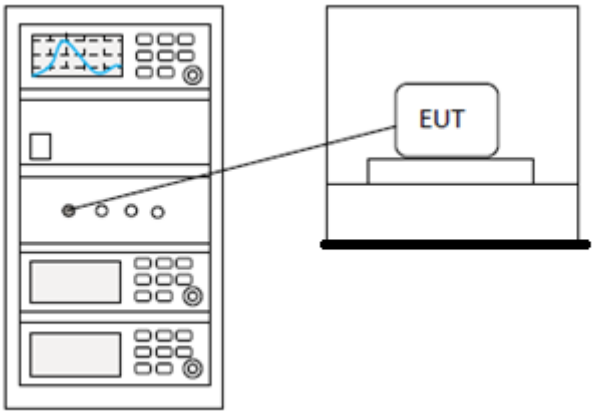
4 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	22℃
Humidity	50%

4.1 LIMITS

Limit:	≥500 kHz

4.2 BLOCK DIAGRAM OF TEST SETUP



4.3 TEST DATA

Pass: Please Refer To Appendix: For Details

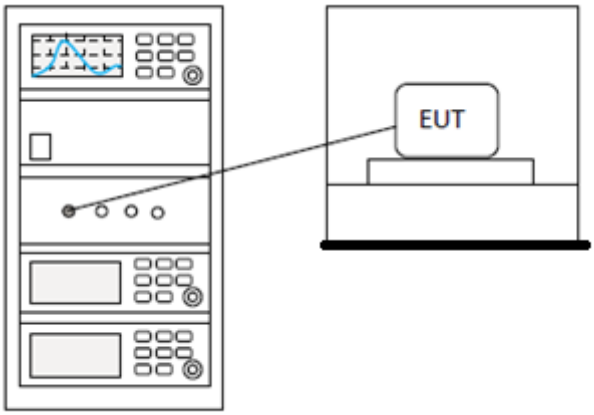
5 CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	22℃
Humidity	50%

5.1 LIMITS

Limit:	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)).

5.2 BLOCK DIAGRAM OF TEST SETUP



5.3 TEST DATA

Pass: Please Refer To Appendix: For Details

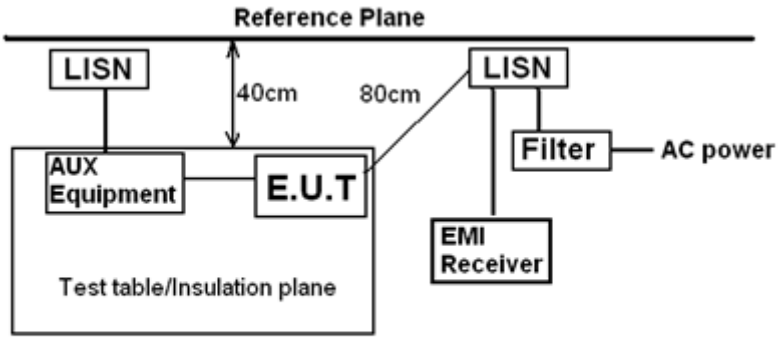
6 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	22℃
Humidity	50%

6.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

6.2 BLOCK DIAGRAM OF TEST SETUP



Remark
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

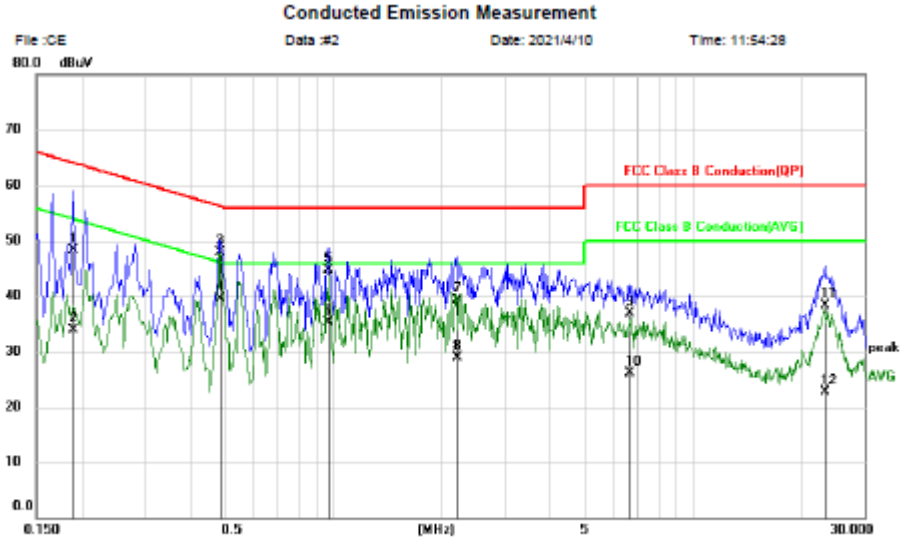
6.3 PROCEDURE

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50?H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

6.4 TEST DATA

[Line: Line][Power：AC120V/60Hz]

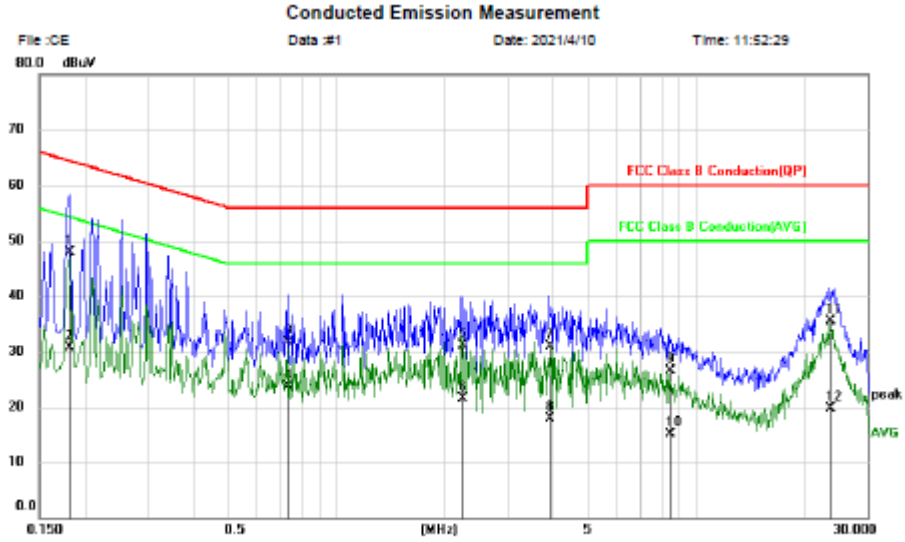


Site Phase: L1 Temperature:
Limit: FCC Class B Conduction(QP) Power: Humidity: %
EUT: Laptop Computer
M/N: N14
Mode: WIFI mode
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	38.41	9.83	48.24	64.04	-15.80	QP	
2		0.1900	24.14	9.83	33.97	54.04	-20.07	AVG	
3		0.4860	38.13	9.87	48.00	56.24	-8.24	QP	
4	*	0.4860	29.62	9.87	39.49	46.24	-6.75	AVG	
5		0.9700	34.85	9.92	44.77	56.00	-11.23	QP	
6		0.9700	25.45	9.92	35.37	46.00	-10.63	AVG	
7		2.2020	29.27	9.94	39.21	56.00	-16.79	QP	
8		2.2020	18.97	9.94	28.91	46.00	-17.09	AVG	
9		6.6580	26.76	10.08	36.84	60.00	-23.16	QP	
10		6.6580	16.00	10.08	26.08	50.00	-23.92	AVG	
11		23.3740	27.82	10.47	38.29	60.00	-21.71	QP	
12		23.3740	12.32	10.47	22.79	50.00	-27.21	AVG	

Test Result: Pass

[Line: Nutral] [Power：AC120V/60Hz]



Site Phase: N Temperature:
Limit: FCC Class B Conduction(QP) Power: Humidity: %
EUT: Laptop Computer
M/N: N14
Mode: WIFI mode
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1819	38.17	9.74	47.91	64.40	-16.49	QP	
2		0.1819	20.88	9.74	30.62	54.40	-23.78	AVG	
3		0.7380	21.96	9.82	31.78	56.00	-24.22	QP	
4		0.7380	13.87	9.82	23.69	46.00	-22.31	AVG	
5		2.2380	21.26	9.87	31.13	56.00	-24.87	QP	
6		2.2380	11.55	9.87	21.42	46.00	-24.58	AVG	
7		3.9060	21.03	9.91	30.94	56.00	-25.06	QP	
8		3.9060	8.08	9.91	17.99	46.00	-28.01	AVG	
9		8.4740	16.45	10.07	26.52	60.00	-33.48	QP	
10		8.4740	5.00	10.07	15.07	50.00	-34.93	AVG	
11		23.5820	25.06	10.47	35.53	60.00	-24.47	QP	
12		23.5820	9.26	10.47	19.73	50.00	-30.27	AVG	

Test Result: Pass

7 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

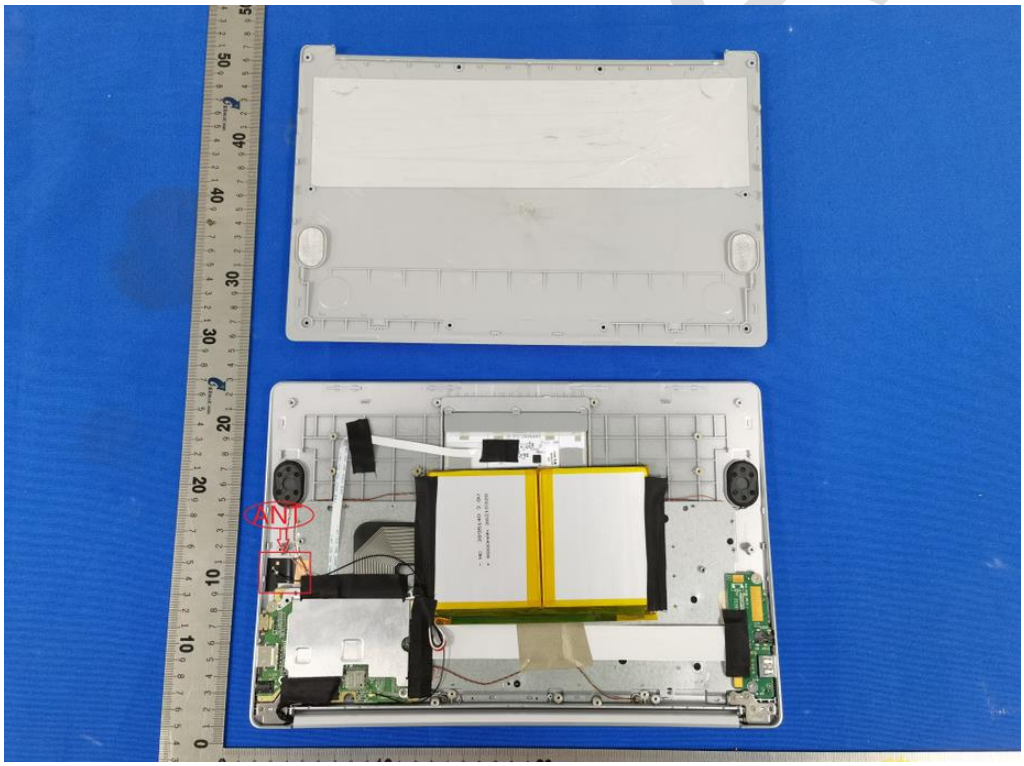
7.1 CONCLUSION

Standard Requirement:

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. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.8dBi.



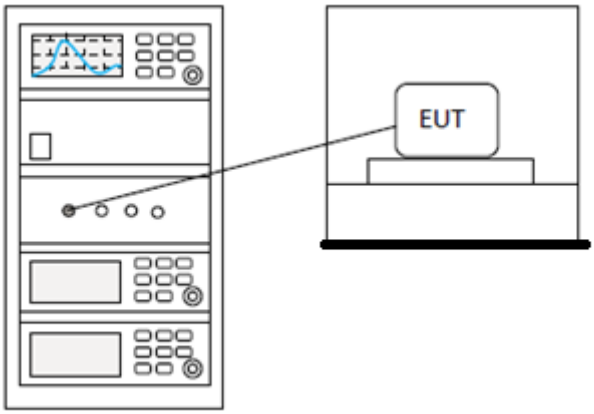
8 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	22℃
Humidity	50%

8.1 LIMITS

Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 TEST DATA

Pass: Please Refer To Appendix: For Details

10 APPENDIX

10.1 APPENDIX A: DTS BANDWIDTH

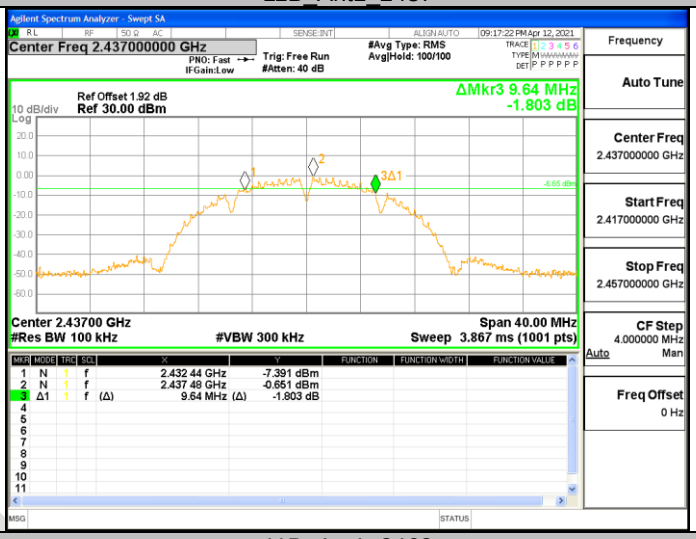
Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.120	2407.440	2416.560	>=0.5	PASS
		2437	9.640	2432.440	2442.080	>=0.5	PASS
		2462	9.680	2456.920	2466.600	>=0.5	PASS
11G	Ant1	2412	16.400	2403.800	2420.200	>=0.5	PASS
		2437	16.440	2428.760	2445.200	>=0.5	PASS
		2462	16.400	2453.800	2470.200	>=0.5	PASS
11N20SISO	Ant1	2412	17.120	2403.440	2420.560	>=0.5	PASS
		2437	17.280	2428.160	2445.440	>=0.5	PASS
		2462	17.280	2453.160	2470.440	>=0.5	PASS
11N40SISO	Ant1	2422	35.440	2404.400	2439.840	>=0.5	PASS
		2437	35.440	2419.400	2454.840	>=0.5	PASS
		2452	35.680	2434.160	2469.840	>=0.5	PASS

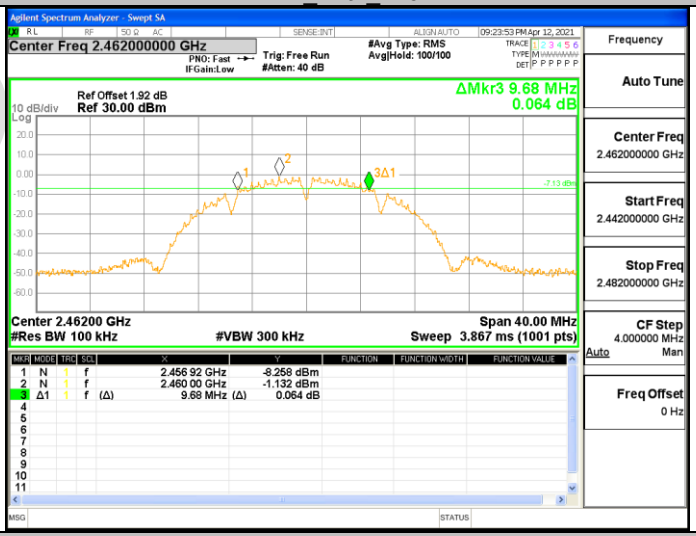
Test Graphs

11B_Ant1_2412

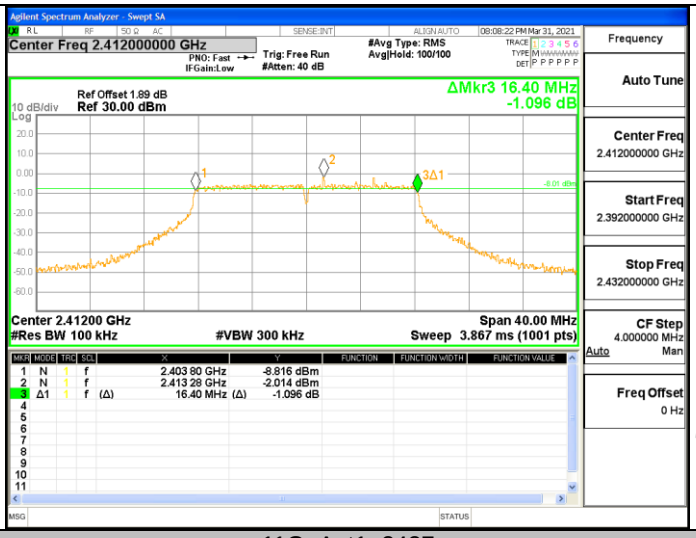
11B_Ant1_2437



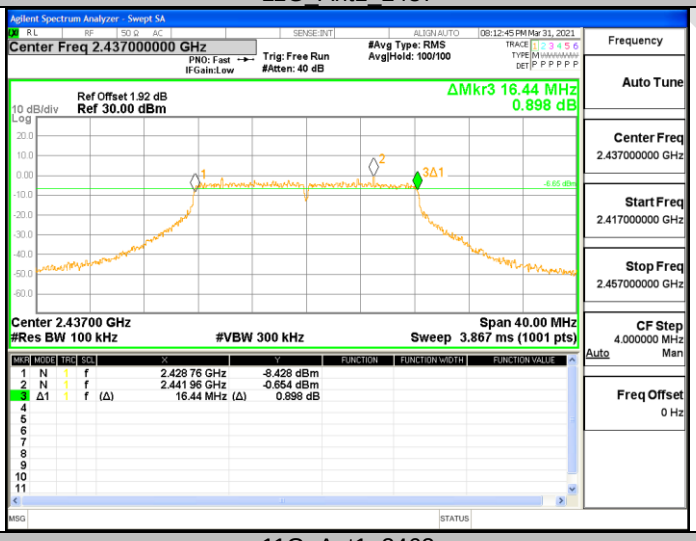
11B_Ant1_2462



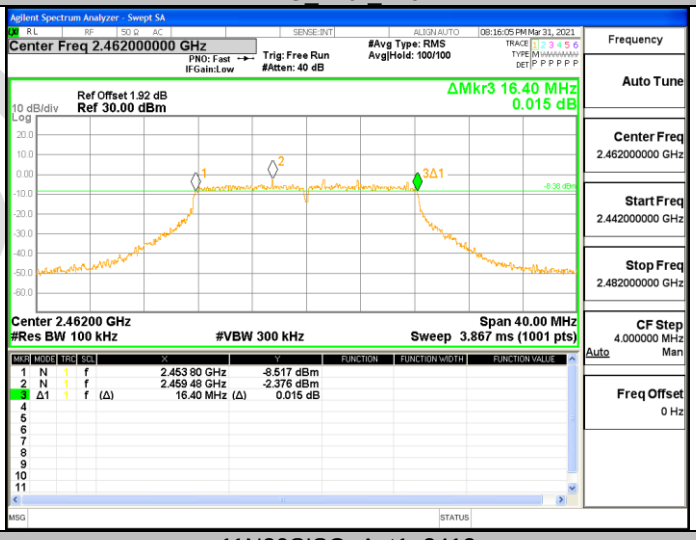
11G_Ant1_2412



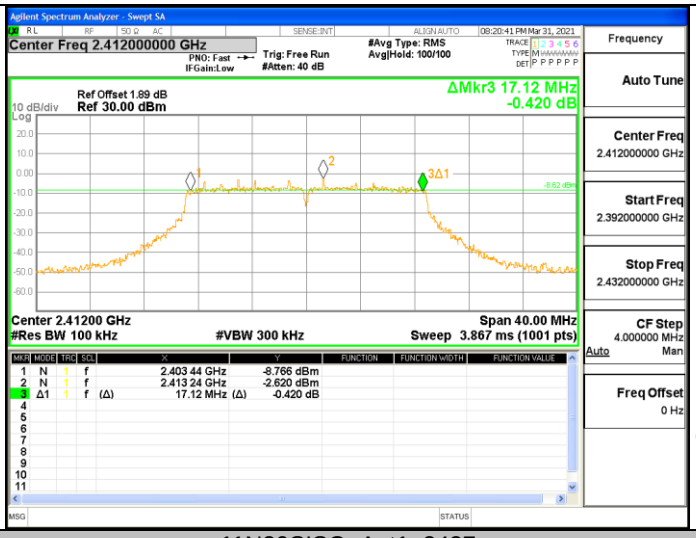
11G_Ant1_2437



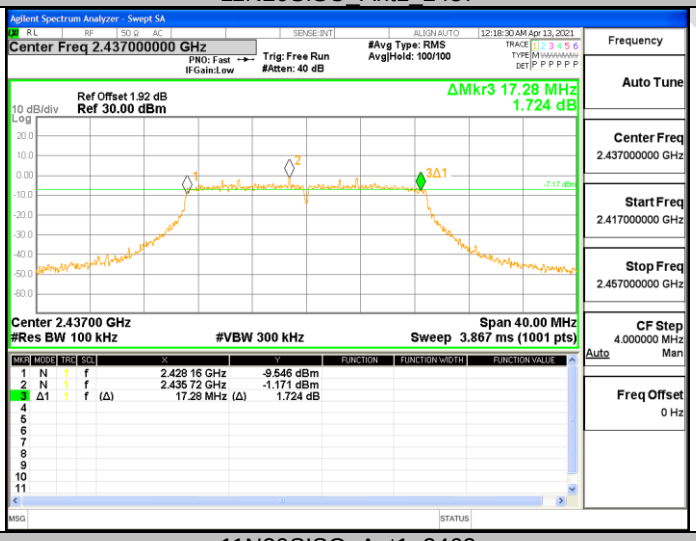
11G_Ant1_2462



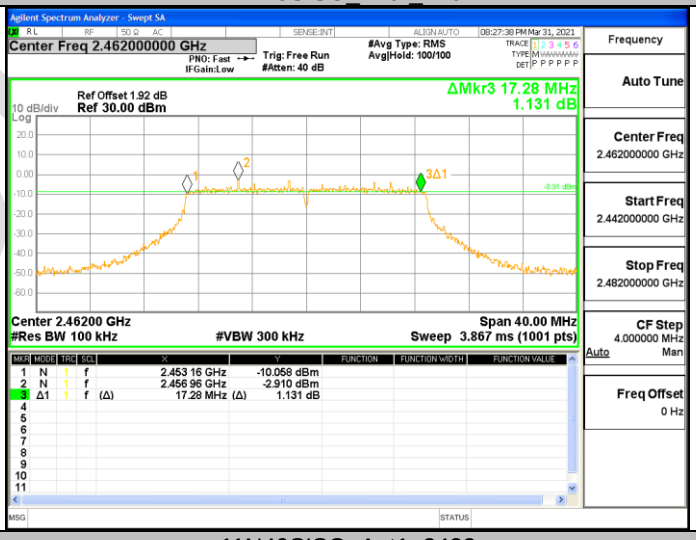
11N20SISO_Ant1_2412



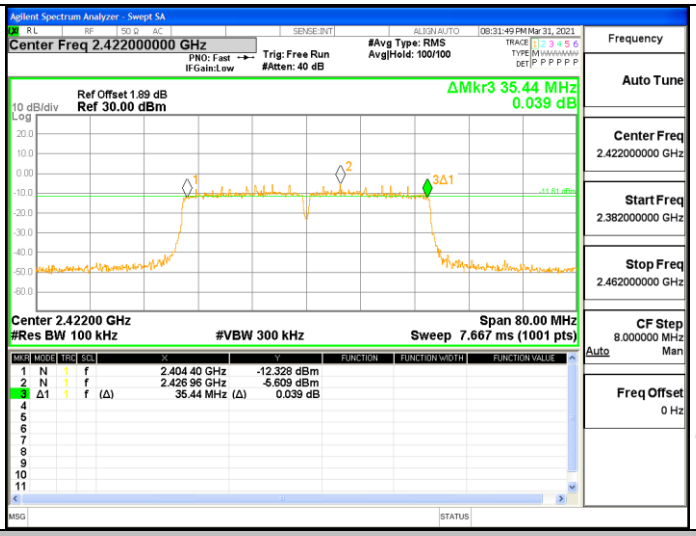
11N20SISO_Ant1_2437



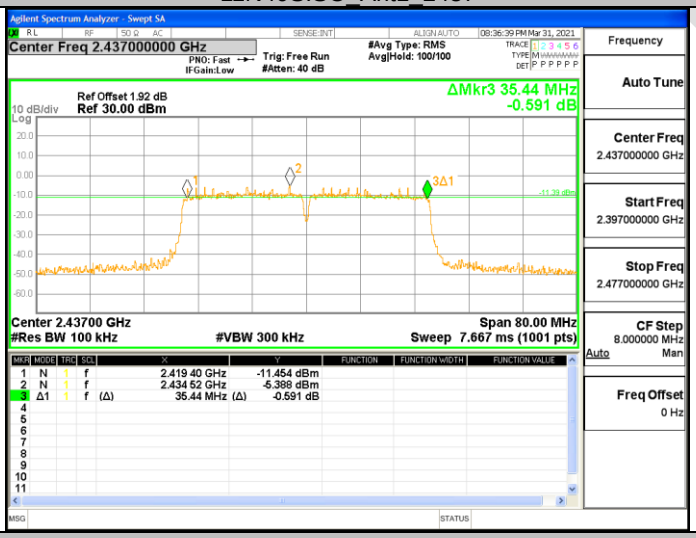
11N20SISO_Ant1_2462



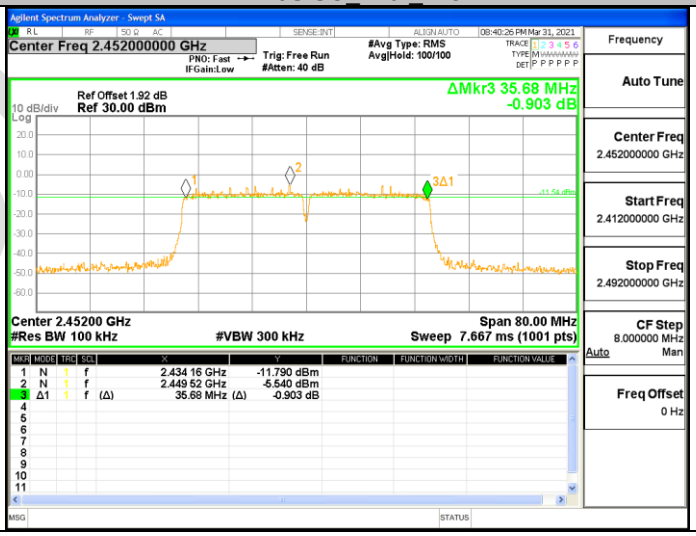
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



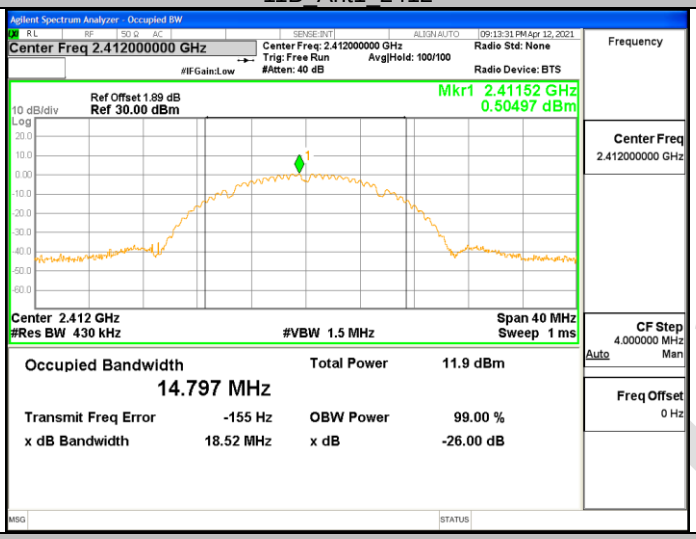
10.2 APPENDIX B: OCCUPIED CHANNEL BANDWIDTH

Test Result

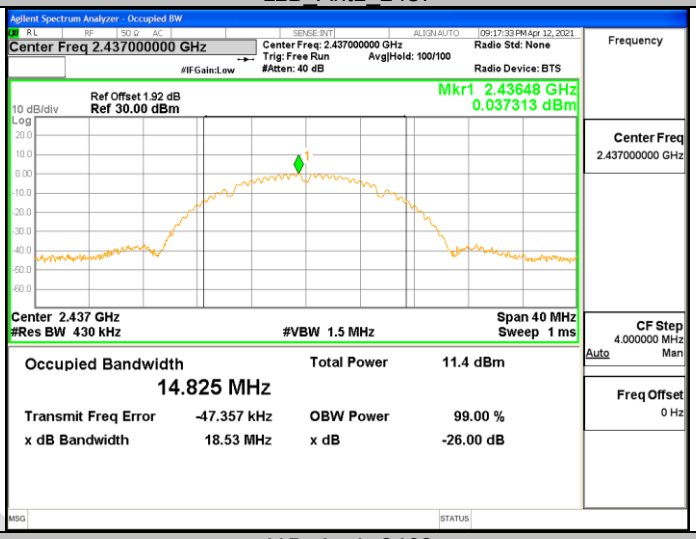
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.797	2404.601	2419.398	---	PASS
		2437	14.825	2429.540	2444.365	---	PASS
		2462	14.759	2454.615	2469.374	---	PASS
11G	Ant1	2412	17.143	2403.422	2420.565	---	PASS
		2437	17.183	2428.348	2445.531	---	PASS
		2462	17.180	2453.435	2470.615	---	PASS
11N20SISO	Ant1	2412	18.230	2402.869	2421.099	---	PASS
		2437	18.059	2427.961	2446.020	---	PASS
		2462	18.229	2452.897	2471.126	---	PASS
11N40SISO	Ant1	2422	35.964	2404.026	2439.990	---	PASS
		2437	36.002	2418.995	2454.997	---	PASS
		2452	36.016	2433.989	2470.005	---	PASS

Test Graphs

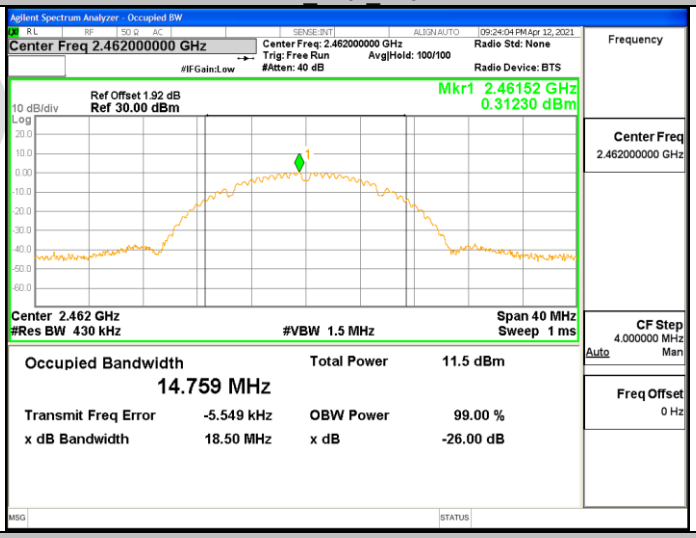
11B_Ant1_2412



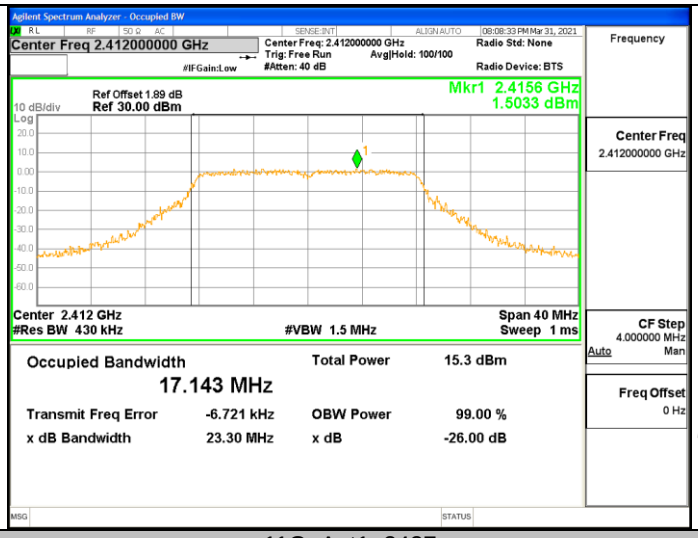
11B_Ant1_2437



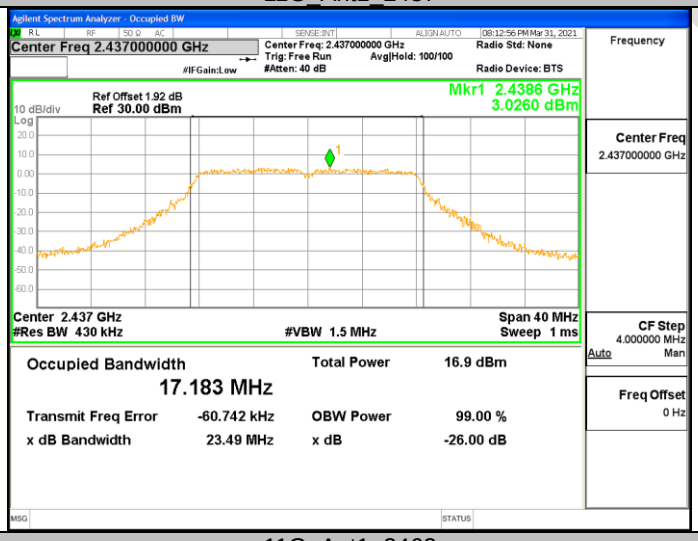
11B_Ant1_2462



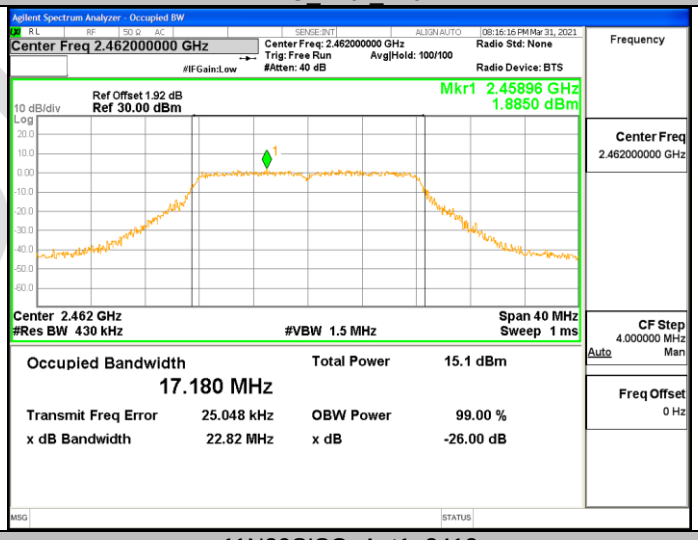
11G_Ant1_2412



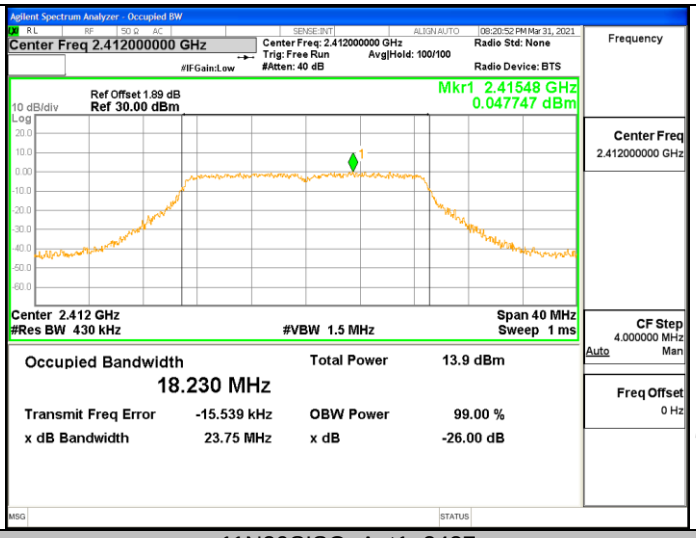
11G_Ant1_2437



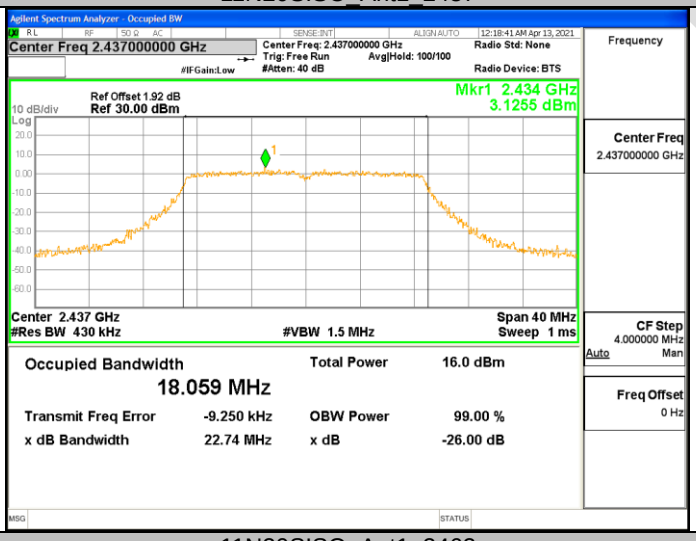
11G_Ant1_2462



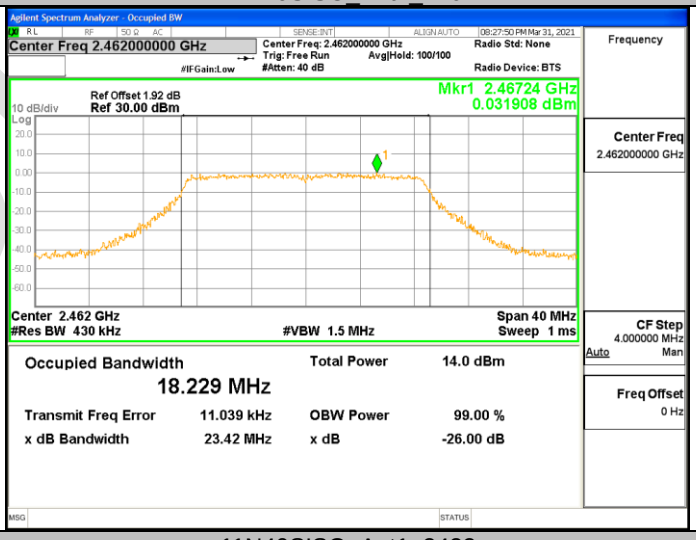
11N20SISO_Ant1_2412



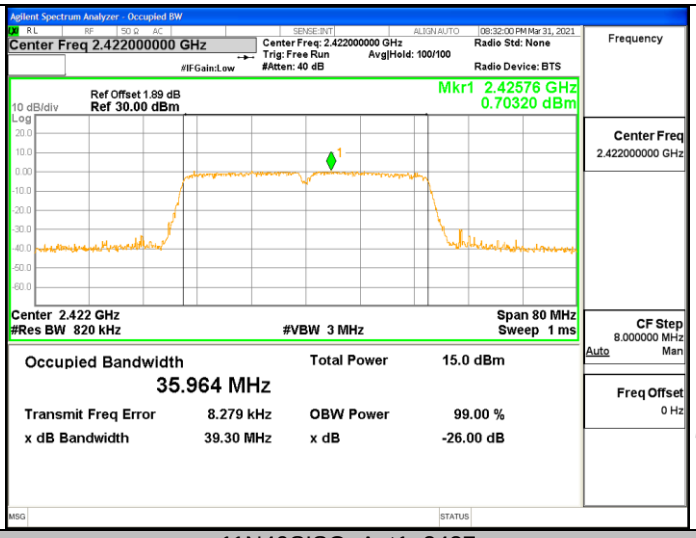
11N20SISO_Ant1_2437



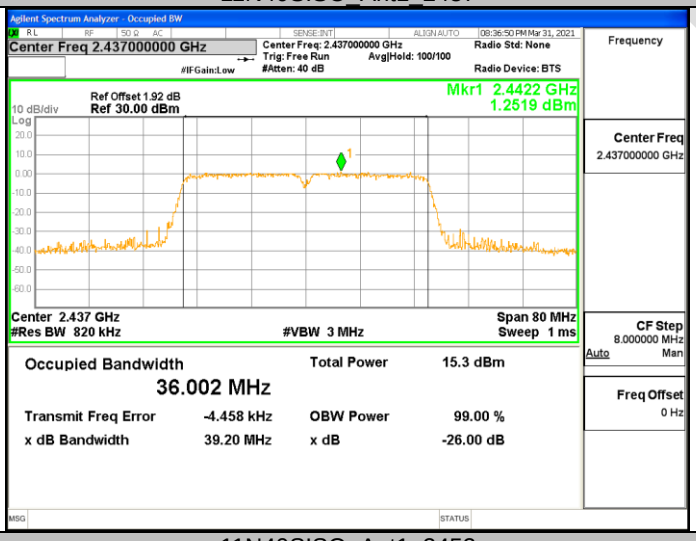
11N20SISO_Ant1_2462



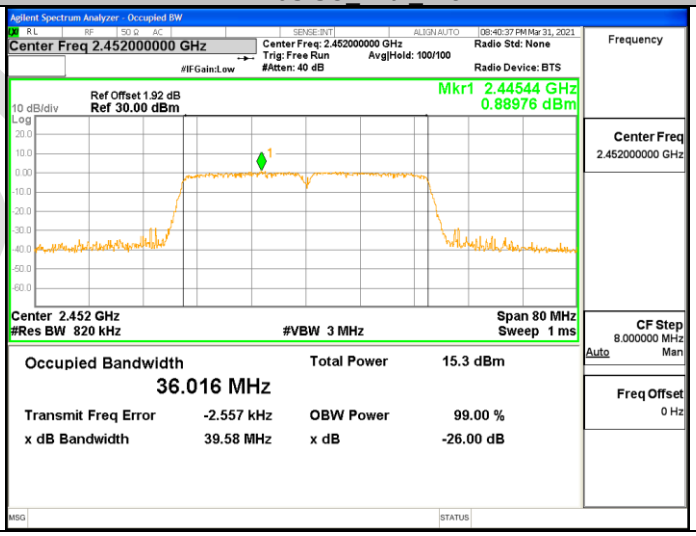
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



10.3 APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER

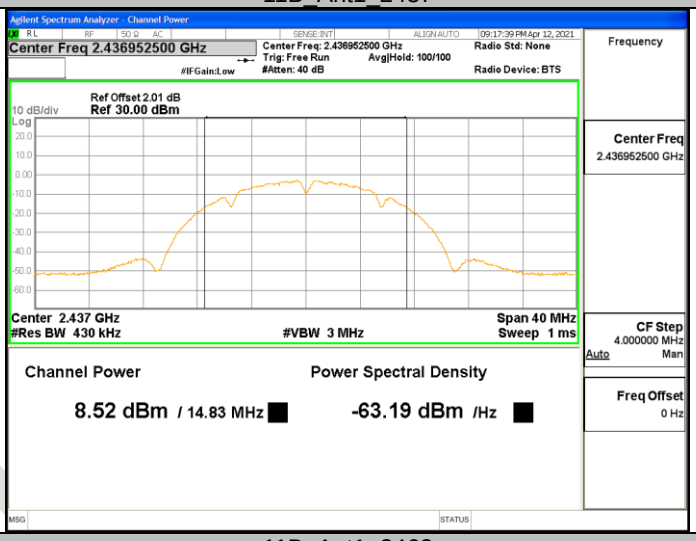
Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	8.80	<=30	PASS
		2437	8.52	<=30	PASS
		2462	9.28	<=30	PASS
11G	Ant1	2412	9.27	<=30	PASS
		2437	9.69	<=30	PASS
		2462	9.11	<=30	PASS
11N20SISO	Ant1	2412	9.04	<=30	PASS
		2437	9.78	<=30	PASS
		2462	7.17	<=30	PASS
11N40SISO	Ant1	2422	7.76	<=30	PASS
		2437	9.03	<=30	PASS
		2452	7.86	<=30	PASS

Test Graphs

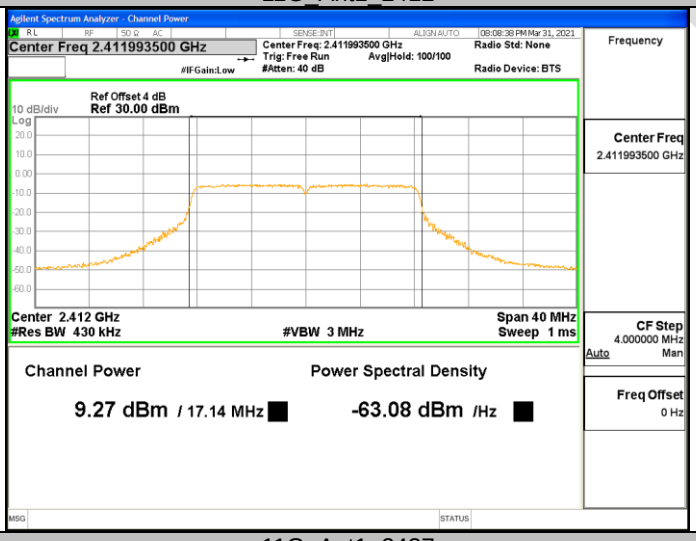
11B_Ant1_2412

11B_Ant1_2437

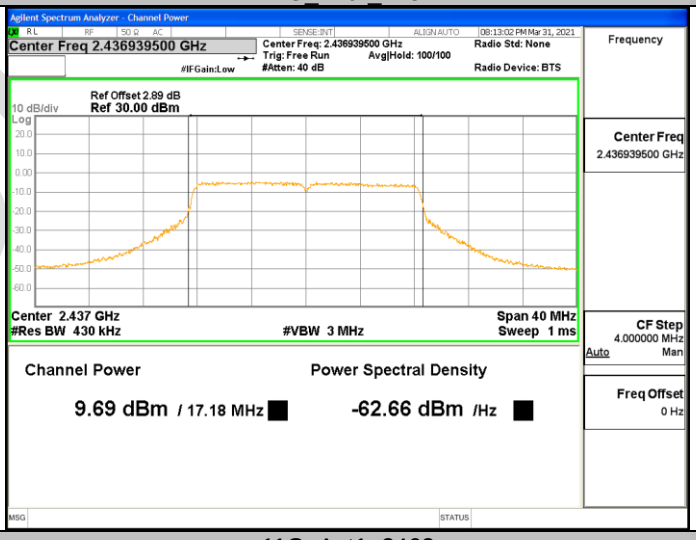


11B_Ant1_2462

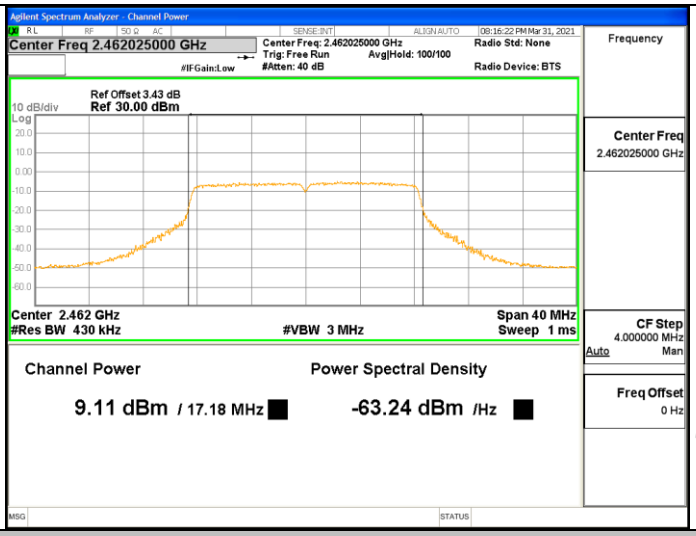
11G_Ant1_2412



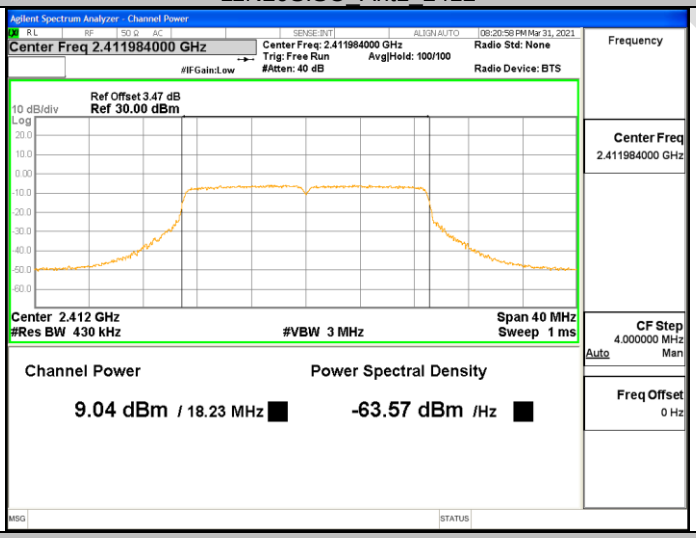
11G_Ant1_2437



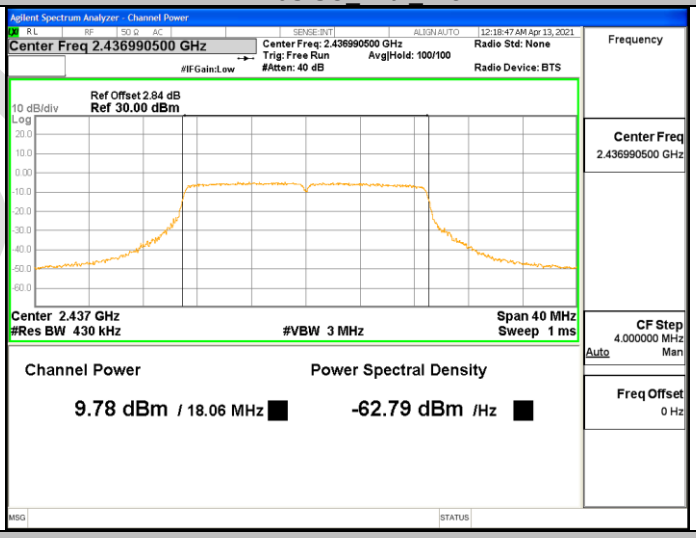
11G_Ant1_2462



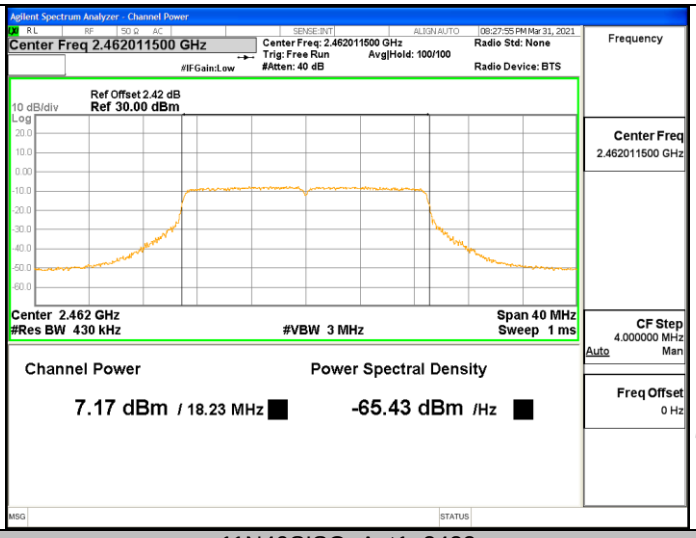
11N20SISO_Ant1_2412



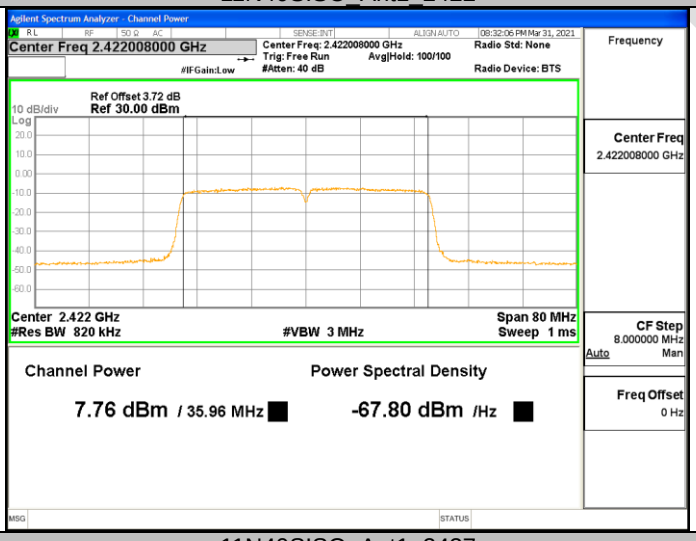
11N20SISO_Ant1_2437



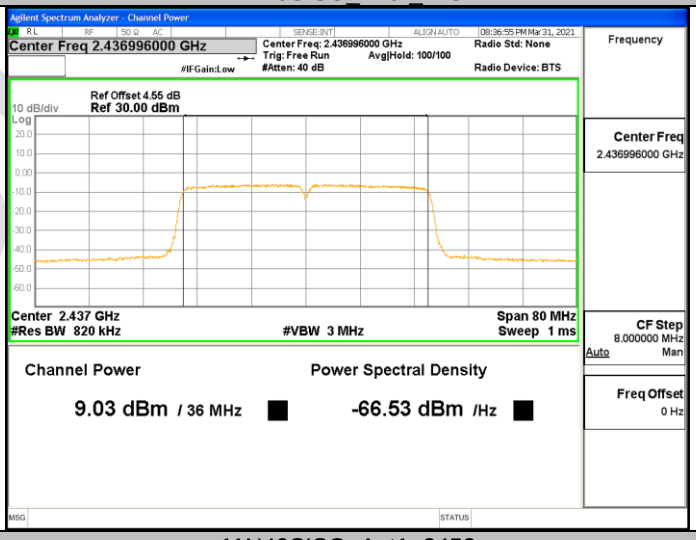
11N20SISO_Ant1_2462



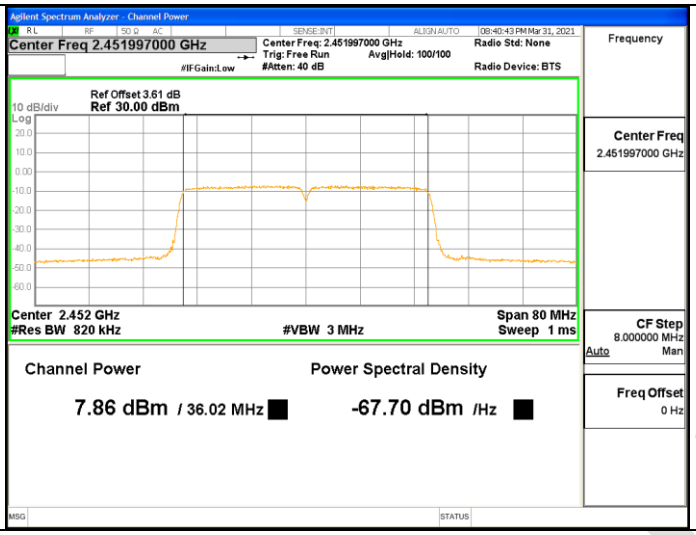
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452


Agilent Spectrum Analyzer - Channel Power
Center Freq 2.451997000 GHz
Center Freq: 2.451997000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
08:40:43 PM Mar 31, 2021
Frequency
Ref Offset 3.61 dB
10 dB/div
Ref 30.00 dBm
Log
Center Freq
2.451997000 GHz
Center 2.452 GHz
#Res BW 820 kHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
CF Step
8.000000 MHz
Auto
Man
Channel Power
7.86 dBm / 36.02 MHz
Power Spectral Density
-67.70 dBm /Hz
Freq Offset
0 Hz
MSG
STATUS

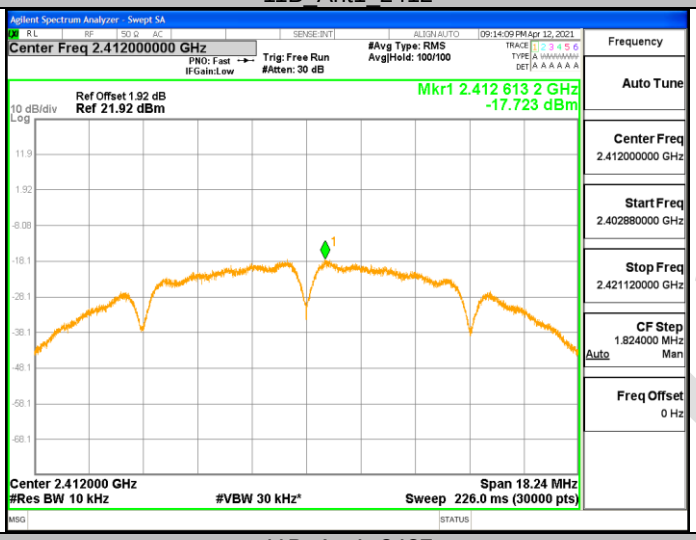
10.4 APPENDIX D: MAXIMUM POWER SPECTRAL DENSITY

Test Result

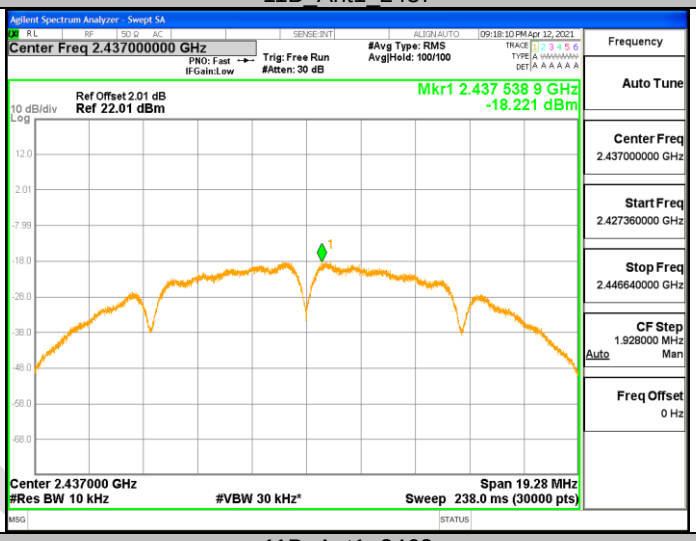
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-17.72	<=8	PASS
		2437	-18.22	<=8	PASS
		2462	-17.65	<=8	PASS
11G	Ant1	2412	-18.34	<=8	PASS
		2437	-17.26	<=8	PASS
		2462	-18.85	<=8	PASS
11N20SISO	Ant1	2412	-20.25	<=8	PASS
		2437	-18.97	<=8	PASS
		2462	-20.93	<=8	PASS
11N40SISO	Ant1	2422	-23.03	<=8	PASS
		2437	-21.31	<=8	PASS
		2452	-23.17	<=8	PASS

Test Graphs

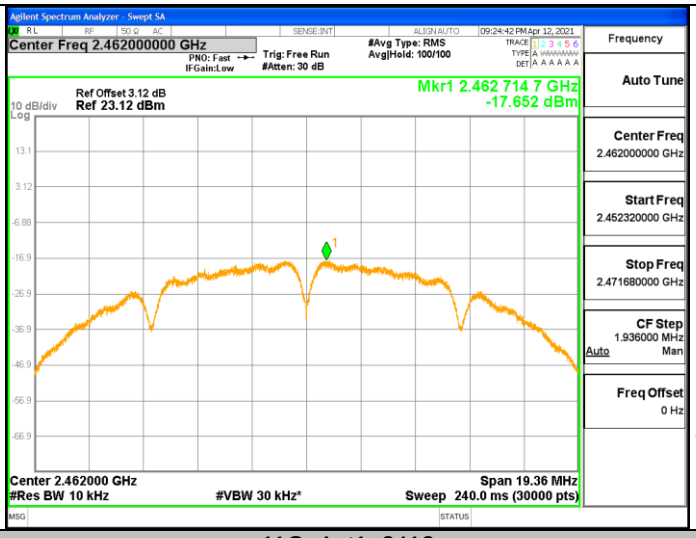
11B_Ant1_2412



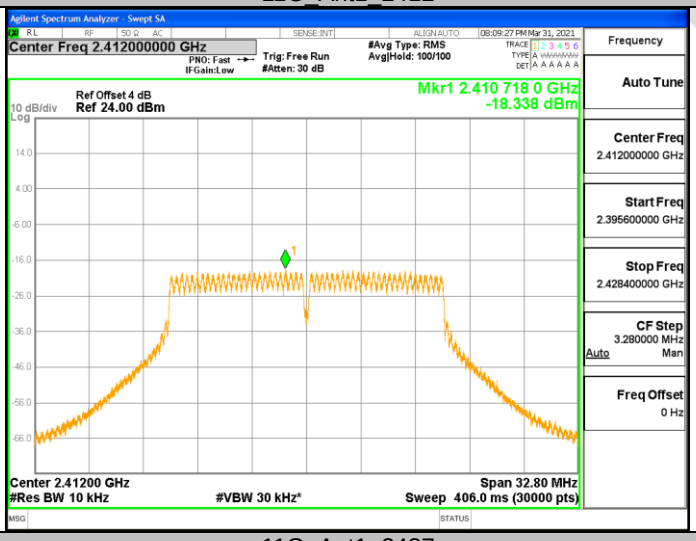
11B_Ant1_2437



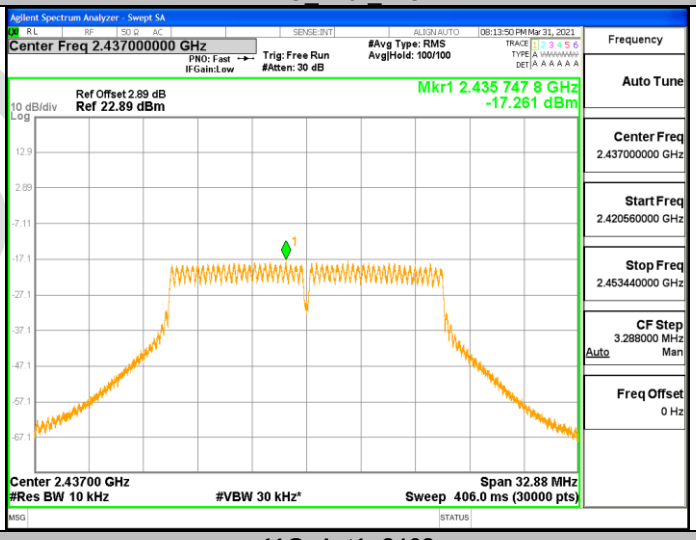
11B_Ant1_2462



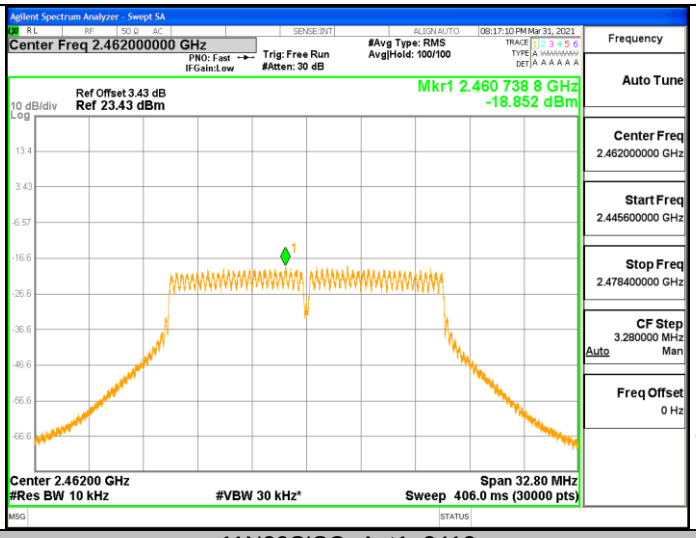
11G_Ant1_2412



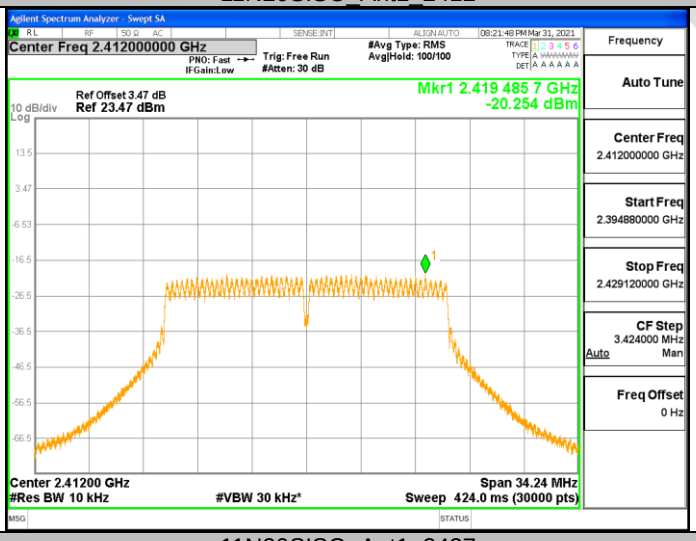
11G_Ant1_2437



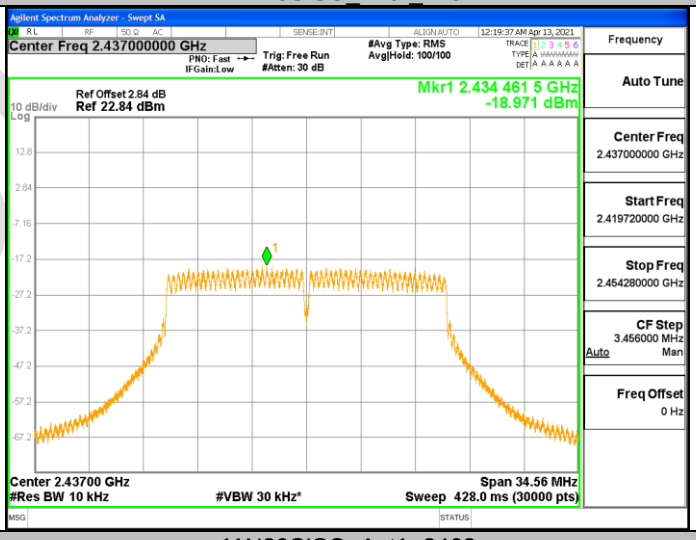
11G_Ant1_2462



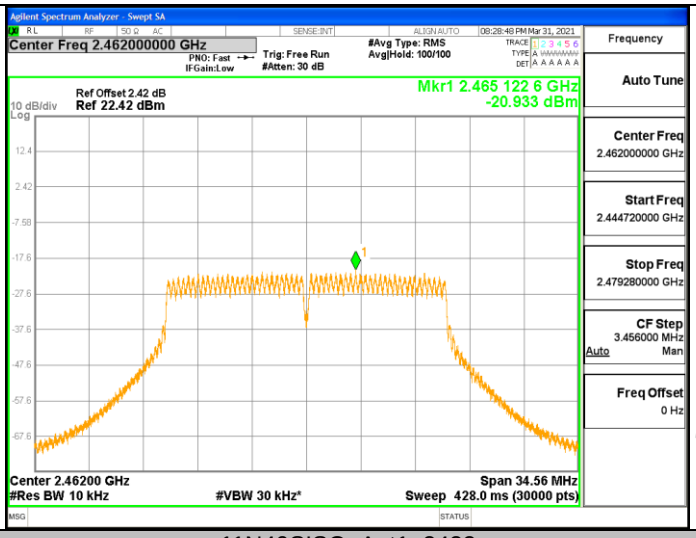
11N20SISO_Ant1_2412



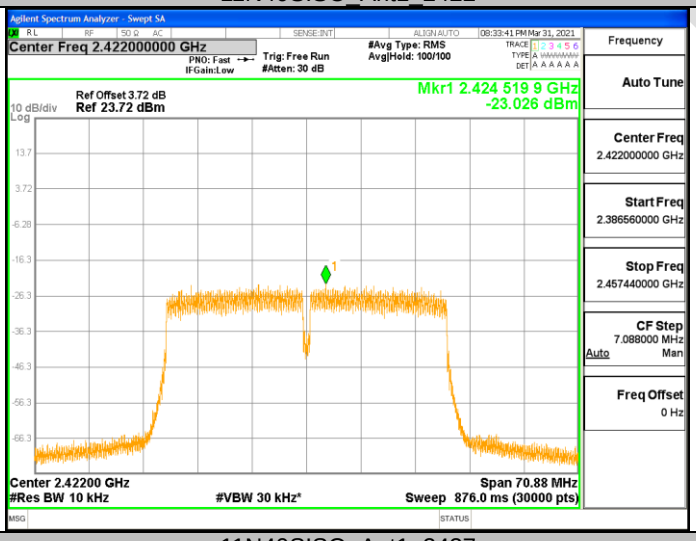
11N20SISO_Ant1_2437



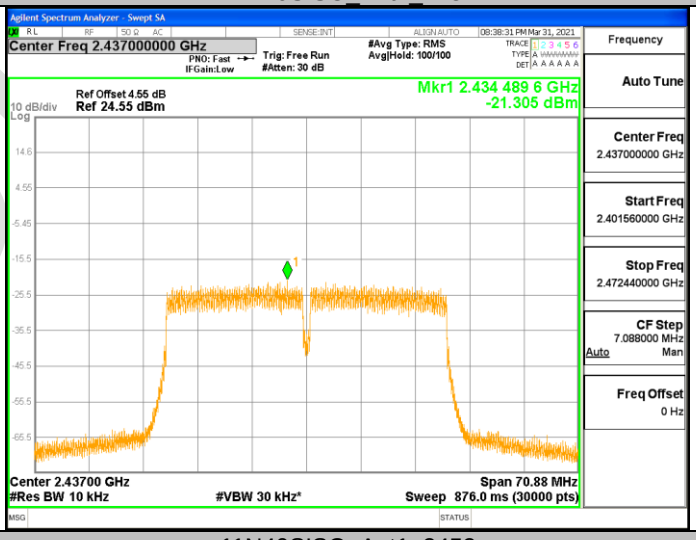
11N20SISO_Ant1_2462



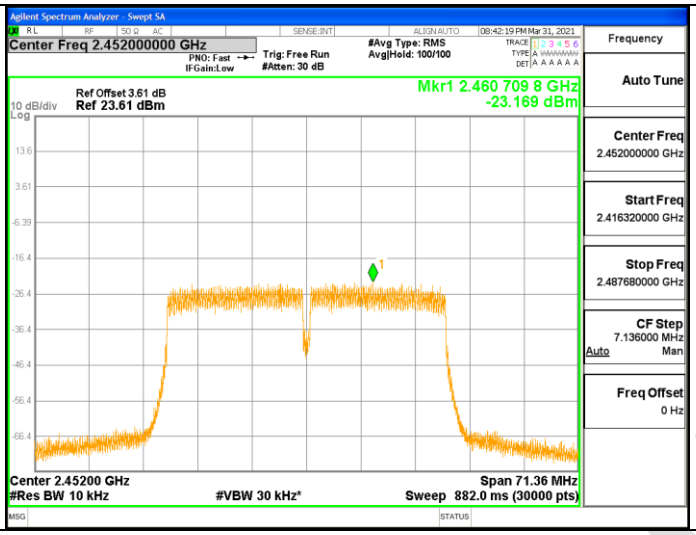
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.452000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
08:42:19 PM Mar 31, 2021
Frequency
Mkr1 2.460 709 8 GHz
-23.169 dBm
Ref Offset 3.61 dB
10 dB/div
Log
Ref 23.61 dBm
13.6
3.61
-6.39
-16.4
-26.4
-36.4
-46.4
-56.4
-66.4
Center 2.45200 GHz
#Res BW 10 kHz
#VBW 30 kHz*
Span 71.36 MHz
Sweep 882.0 ms (30000 pts)
Auto Tune
Center Freq
2.452000000 GHz
Start Freq
2.416320000 GHz
Stop Freq
2.487680000 GHz
CF Step
7.136000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

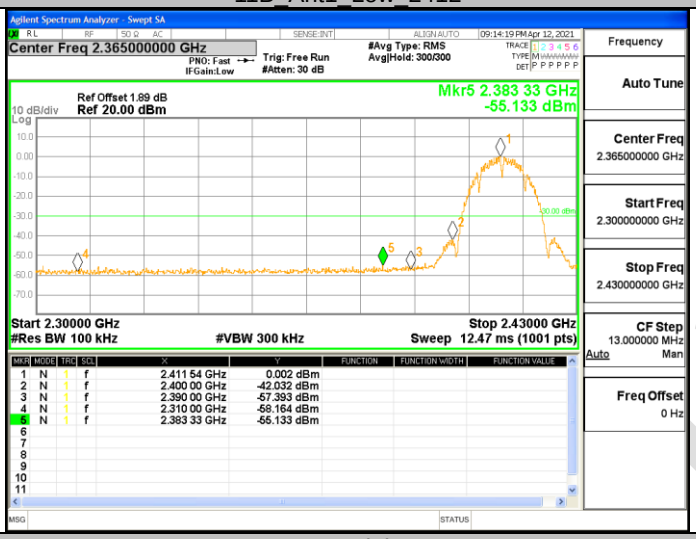
10.5 APPENDIX E: BAND EDGE MEASUREMENTS

Test Result

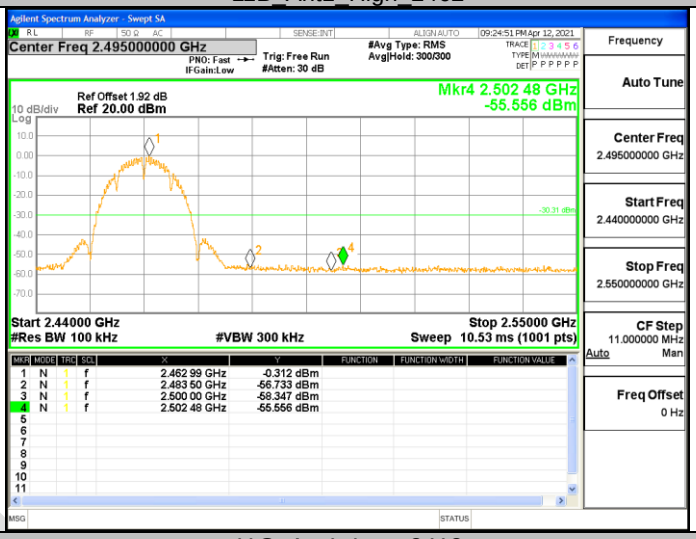
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	0.00	-55.13	<=-30	PASS
		High	2462	-0.31	-55.56	<=-30.31	PASS
11G	Ant1	Low	2412	-2.10	-48.85	<=-32.1	PASS
		High	2462	-1.86	-54.2	<=-31.86	PASS
11N20SISO	Ant1	Low	2412	-3.59	-53.81	<=-33.59	PASS
		High	2462	-3.24	-54.73	<=-33.24	PASS
11N40SISO	Ant1	Low	2422	-5.21	-47.69	<=-35.21	PASS
		High	2452	-5.51	-55.12	<=-35.51	PASS

Test Graphs

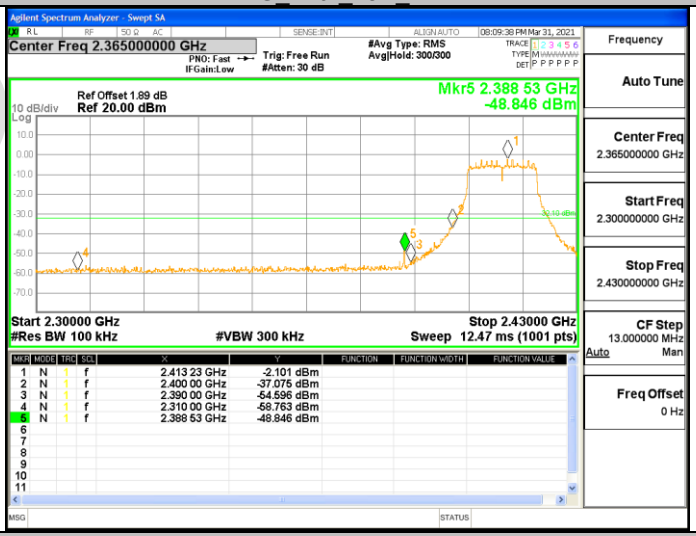
11B_Ant1_Low_2412



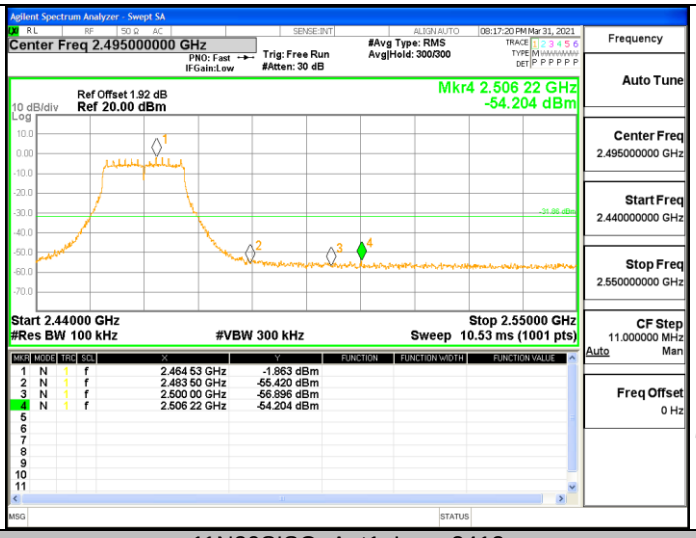
11B_Ant1_High_2462



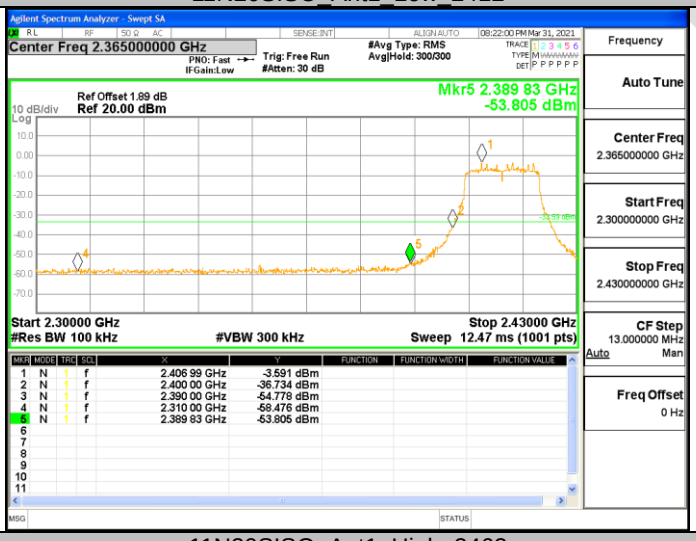
11G_Ant1_Low_2412



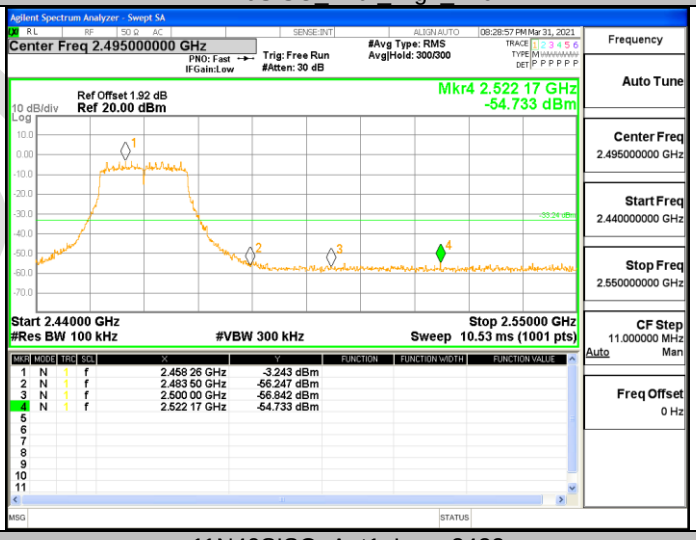
11G_Ant1_High_2462



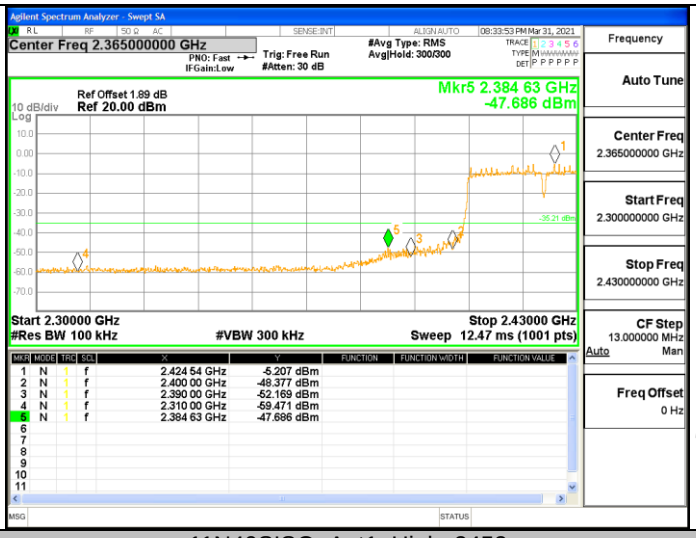
11N20SISO_Ant1_Low_2412



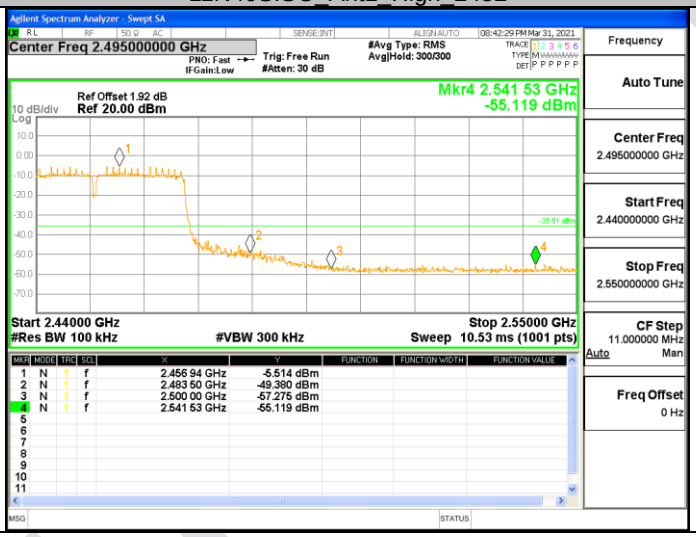
11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452

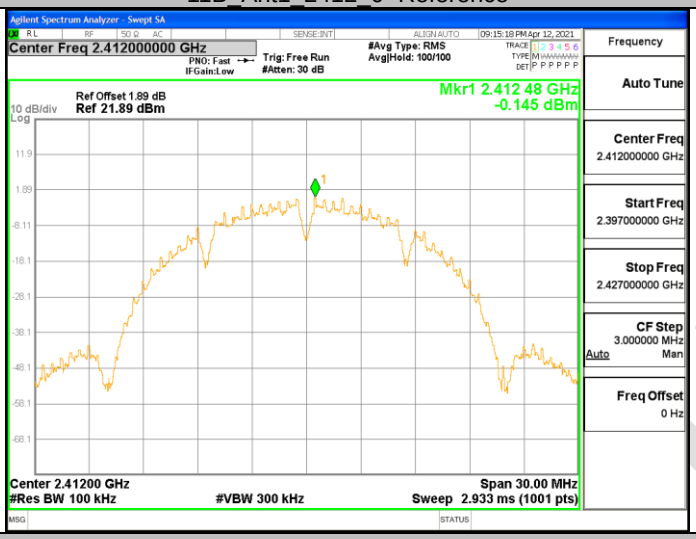
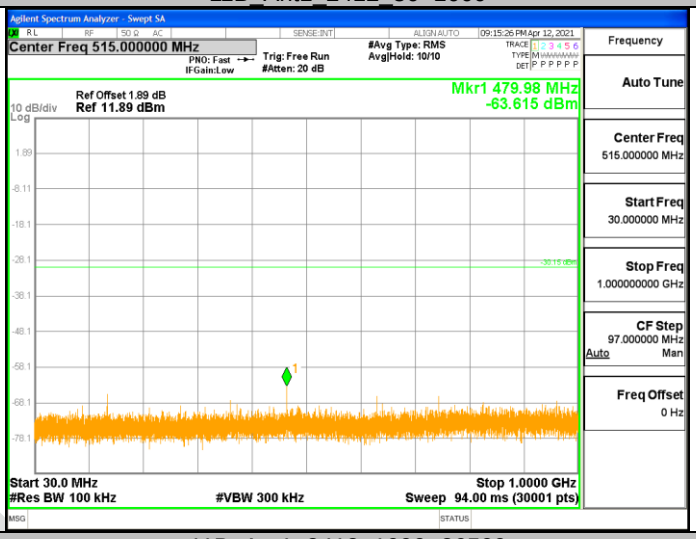
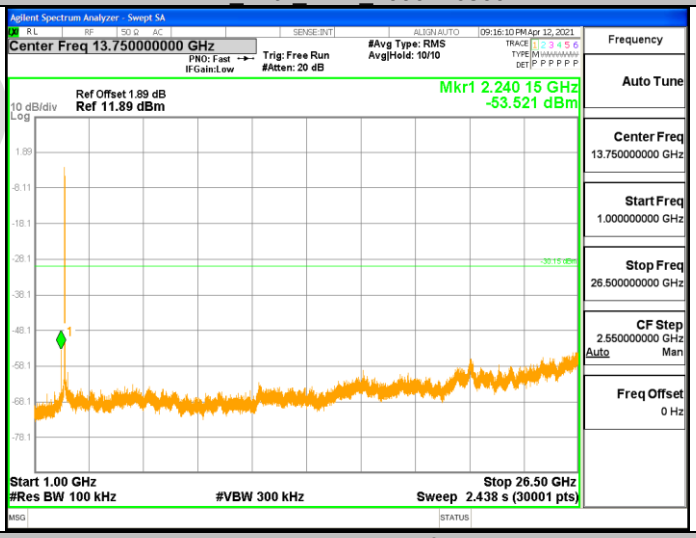


10.6 APPENDIX F: CONDUCTED SPURIOUS EMISSION

Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	-0.14	-0.14	---	PASS
			30~1000	30~1000	-63.615	<=-30.145	PASS
			1000~26500	1000~26500	-53.521	<=-30.145	PASS
		2437	Reference	-0.50	-0.50	---	PASS
			30~1000	30~1000	-67.59	<=-30.498	PASS
			1000~26500	1000~26500	-53.334	<=-30.498	PASS
		2462	Reference	-0.68	-0.68	---	PASS
			30~1000	30~1000	-65.078	<=-30.68	PASS
			1000~26500	1000~26500	-54.024	<=-30.68	PASS
11G	Ant1	2412	Reference	-2.53	-2.53	---	PASS
			30~1000	30~1000	-64.217	<=-32.527	PASS
			1000~26500	1000~26500	-54.111	<=-32.527	PASS
		2437	Reference	-0.50	-0.50	---	PASS
			30~1000	30~1000	-65.475	<=-30.496	PASS
			1000~26500	1000~26500	-51.44	<=-30.496	PASS
		2462	Reference	-2.38	-2.38	---	PASS
			30~1000	30~1000	-64.508	<=-32.381	PASS
			1000~26500	1000~26500	-50.881	<=-32.381	PASS
11N20SISO	Ant1	2412	Reference	-3.78	-3.78	---	PASS
			30~1000	30~1000	-66.063	<=-33.776	PASS
			1000~26500	1000~26500	-53.322	<=-33.776	PASS
		2437	Reference	-1.39	-1.39	---	PASS
			30~1000	30~1000	-63.019	<=-31.389	PASS
			1000~26500	1000~26500	-53.543	<=-31.389	PASS
		2462	Reference	-2.81	-2.81	---	PASS
			30~1000	30~1000	-64.383	<=-32.814	PASS
			1000~26500	1000~26500	-53.055	<=-32.814	PASS
11N40SISO	Ant1	2422	Reference	-5.60	-5.60	---	PASS
			30~1000	30~1000	-64.411	<=-35.599	PASS
			1000~26500	1000~26500	-53.577	<=-35.599	PASS
		2437	Reference	-5.50	-5.50	---	PASS
			30~1000	30~1000	-63.875	<=-35.5	PASS
			1000~26500	1000~26500	-53.359	<=-35.5	PASS
		2452	Reference	-5.62	-5.62	---	PASS
			30~1000	30~1000	-63.406	<=-35.618	PASS
			1000~26500	1000~26500	-54.093	<=-35.618	PASS

Test Graphs

11B_Ant1_2412_0~Reference

11B_Ant1_2412_30~1000

11B_Ant1_2412_1000~26500

11B_Ant1_2437_0~Reference