TEST REPORT

Product	:	PowerEgg X 8K
Trade mark	:	PowerEgg™
Model/Type reference	:	PEX20
Serial Model	:	N/A
Report Number	:	EED39N80209401
FCC ID	:	2AKBMPEX20
Date of Issue	:	August 6, 2021

Test Standards	Results
☒ 47 CFR Part 15 Subpart C	PASS

Prepared for:

Powervision Tech Inc.

Zone E,Ocean Venture Valley, No.40, Yangguang Rd, Nanhai new District, Weihai, Shandong,China. 264200

Prepared by:

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检验检测专用章
Inspection & Testing Services

Compiled by: Jenny. Yu Reviewed by: Lily. Wang

Approved by: Jeff Fang Date: August 6, 2021

Check No.: 7824090421

Modification Record

No.	Last Report No.	Modification Description
1	EED39N80209401	First report

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1. Test Summary

Test item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	N/A
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Duty cycle	47 CFR Part 15 Subpart C Section 15.35(c)	ANSI C63.10-2013	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

2. Test Requirement

2.1. Test Environment

Operating Environment:	
Temperature:	22.3 °C
Humidity:	48.7 % RH
Atmospheric Pressure:	1010mbar

2.2. Test Condition

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
TX mode:	The EUT transmitted the continuous signal at the specific channel(s).			

Note: Through Pre-scan, 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20).

3. General Information

3.1. Client Information

Applicant:	Powervision Tech Inc.
Address of Applicant:	Zone E,Ocean Venture Valley, No.40, Yangguang Rd, Nanhai new District, Weihai, Shandong,China. 264200
Manufacturer:	Powervision Tech Inc.
Address of Manufacturer:	Zone E,Ocean Venture Valley, No.40, Yangguang Rd, Nanhai new District, Weihai, Shandong,China. 264200
Factory:	Powervision (Suzhou) Technology Co.,Ltd.
Address of Factory:	Building 3,No.15, Zhujing Road,Changshu High-tech Industrial Development Zone,Suzhou,China

3.2. General Description of EUT

Product Name:	PowerEgg X 8K	
Model No.(EUT):	PEX20	
Serial Model:	/	
Trade Mark:	PowerEgg™	
EUT Supports Radios application:	2.4G WIFI: IEEE802.11b/g/n(20MHz), 2412MHz-2462MHz 5G WIFI: IEEE802.11a/an(HT20)5725-5850MHz. 2.4G: 2406MHz~2466MHz 5G:5740MHz~5830MHz	
Power Supply :	Adapter:	Model:PAD20 INPUT:100-240V 1.4A 50-60Hz OUTPUT:DC 13.3V 3.76A DC 5V 2A
	Battery:	Model: PEMIB10 Rated voltage:11.4V Rated capacity:3800mAh
Sample Received Date:	2021.05.14	
Sample tested Date:	2021.5.18 to 2021.08.05	

3.3. Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	11
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b:DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g:OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20): OFDM (64QAM, 16QAM,QPSK,BPSK)
Test Software of EUT:	artgui (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain①:	ANT1 Gain :3dBi ANT2 Gain :3dBi
Test Voltage:	DC 11.4V

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	6	2437MHz	11	2462MHz

Note: 1 The antenna gain is provided by the client and we Centre Testing International (Suzhou) CO., LTD. test lab is not responsible for the accuracy of the antenna gain information.

3.4. Description of Support Units

The EUT has been tested with associated equipment below.

1）support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
NB	ThinkPad	E490	FCC ID and DOC	CTI

3.5. Test Location

All test facilities used to collect the test data are located at Building 18, Zhihui New Town Ecological Industrial Park, No. 1206, Jinyang East Road, Lujia Town, Kunshan, Jiangsu, China.

3.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No. 5734.01

Centre Testing International (Suzhou) CO., LTD. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration. Laboratories and any additional program requirements in the identified field of testing.

FCC-Designation No.:CN1290

Centre Testing International Group Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The American association for Centre Testing International Group Co., Ltd. EMC laboratory accreditation Designation No.:CN1290

3.7. Deviation from Standards

None.

3.8. Abnormalities from Standard Conditions

None.

3.9. Other Information Requested by the Customer

None.

3.10. Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Occupied Bandwidth	0.56%
2	RF Power conducted	0.59 dB
3	Power Spectral Density, conducted	2.37 dB
4	Unwanted Emission, conducted	2.68 dB
5	All Emission, radiated	4.41 dB(30MHz-1GHz)
		4.99 dB(1GHz-18GHz)
		5.307 dB(18GHz-40GHz)
6	Temperature test	0.54°C
7	Humidity test	1.62%
8	DC and low frequency voltages test	1.14%

4. Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
Signal Generator	R&S	SMB100A	182002	2020-10-23	2021-10-22
Communication test set test set	R&S	CMW500	107929	2021-04-29	2022-04-28
Spectrum Analyzer	R&S	FSV40	101588	2020-10-23	2021-10-22
Vector signal generator	R&S	SMBV100B	101985	2020-10-23	2021-10-22
Temperature/ Humidity Indicator	testo	608-H1	1945222628	2020-11-09	2021-11-08
Switch Automatic control	R&S	OSP-B157W8	101111	2020-10-23	2021-10-22
High-low temperature chamber	GIANT FORCE	GTH-800-40-CP	MAA1908-003	2020-12-08	2021-12-07
Automatic test software	Shenzhen JS TONSCEND	/	V2.6.77.0518	/	/

966 Semi-anechoic Chamber					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
Receiver	R&S	ESU8	100537	2020-12-10	2021-12-09
Spectrum analyzer	R&S	FSV40	101185	2020-12-10	2021-12-09
Preamplifier (30MHz~1GHz)	SONOMA	317	393347	2020-12-04	2021-12-03
Preamplifier (1GHz~18GHz)	R&S	SCU-18D	1987397	2020-12-10	2021-12-09
Preamplifier (18GHz~40GHz)	/	MTLNA1804003 0235	12009007	2020-10-23	2021-10-22
Loop Antenna (9kHz~30MHz)	TESEQ	HLA6121	54575	2021-02-27	2022-02-26
Antenna (30MHz~1GHz)	SCHWARZBEC K	VULB9163	9163-965	2020-10-16	2021-10-15
Antenna (1GHz~18GHz)	R&S	HF907	102524	2020-12-15	2021-12-14
Antenna (18GHz~40GHz)	R&S	BBHA9170	1032	2020-10-23	2021-10-22
Band rejection filter	Xi’an xingbo	XBLBQ-DZA81	200827-1-02	/	/

5. Radio Technical Requirements Specification

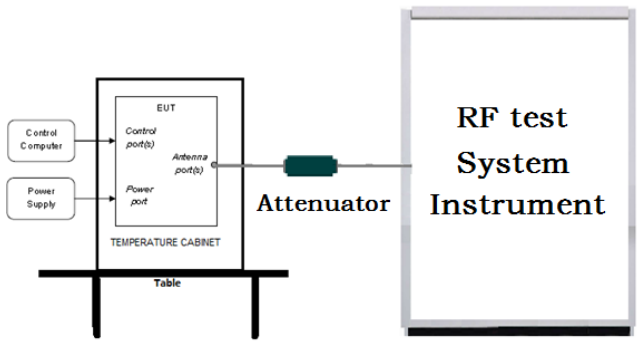
5.1. Reference Documents for Testing

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices

5.2. Test Results List

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI 63.10 (L,M,H CH)	Maximum conducted output power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI 63.10 (L,M,H CH)	DTS Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI 63.10 (L, H CH)	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI 63.10(L,M,H CH)	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI 63.10 (L,M,H CH)	Maximum Power Spectral Density	PASS	Appendix E)
Part15C Section 15.35 (c)	ANSI 63.10 (L or M or H CH)	Duty cycle	PASS	Appendix F)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix G)
Part15C Section 15.207	ANSI 63.10Transmitter mode	AC Power Line Conducted Emission	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI 63.10 (L,M, H CH)	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix I)
Part15C Section 15.205/15.209	ANSI 63.10 (L,M,H CH)	Radiated Spurious Emissions	PASS	Appendix J)

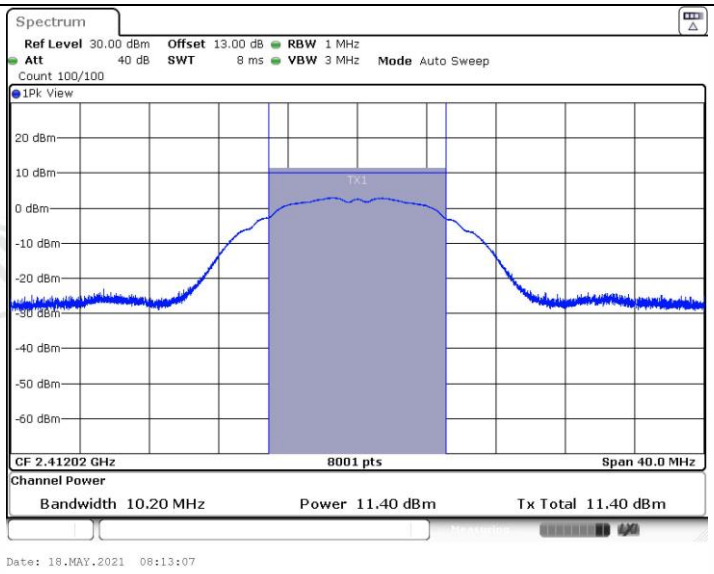
Appendix A): Maximum conducted output power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 2013
Test Setup:	
Test Procedure:	1. PKPM1 Peak power meter measurement The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector. 2. Method AVGPM-G Average power measurement Method AVGPM-G is a measurement using a gated RF average power meter. Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
Limit:	30dBm
Test Mode:	Refer to clause 2.2
Test Results:	Pass

Result Table:

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	11.40	<=30	PASS
	Ant2	2412	11.74	<=30	PASS
	Ant1	2437	11.60	<=30	PASS
	Ant2	2437	11.95	<=30	PASS
	Ant1	2462	11.32	<=30	PASS
	Ant2	2462	11.55	<=30	PASS
	Total	2412	14.58	<=30	PASS
		2437	14.82	<=30	PASS
		2462	14.45	<=30	PASS
11G	Ant1	2412	15.28	<=30	PASS
	Ant2	2412	15.56	<=30	PASS
	Ant1	2437	15.43	<=30	PASS
	Ant2	2437	15.76	<=30	PASS
	Ant1	2462	15.15	<=30	PASS
	Ant2	2462	15.41	<=30	PASS
	Total	2412	18.43	<=30	PASS
		2437	18.61	<=30	PASS
		2462	18.29	<=30	PASS
11N20	Ant1	2412	14.41	<=30	PASS
	Ant2	2412	14.61	<=30	PASS
	Ant1	2437	14.62	<=30	PASS
	Ant2	2437	14.75	<=30	PASS
	Ant1	2462	14.33	<=30	PASS
	Ant2	2462	14.42	<=30	PASS
	Total	2412	17.52	<=30	PASS
		2437	17.70	<=30	PASS
		2462	17.39	<=30	PASS

Test Graph:



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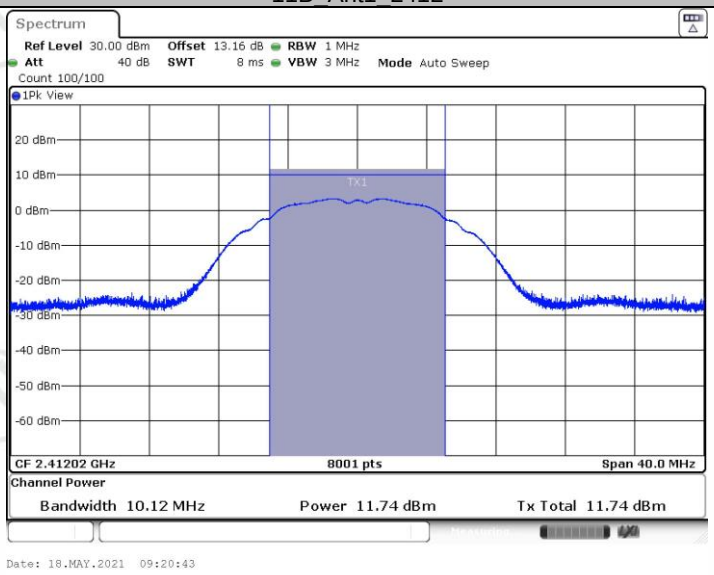
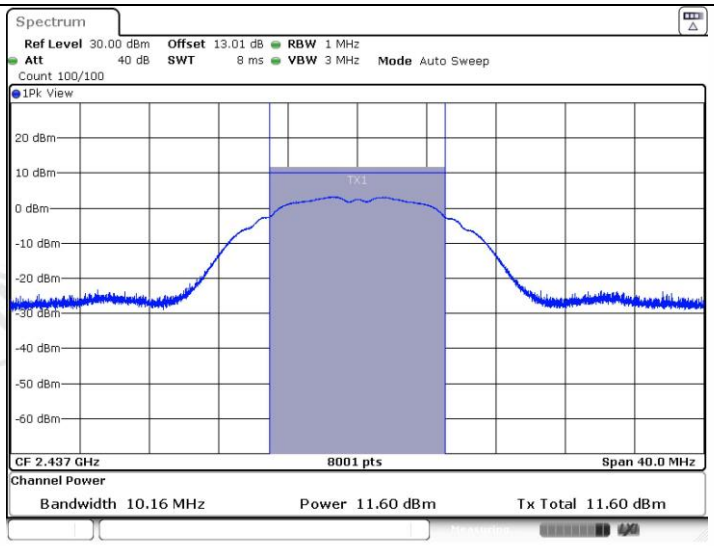
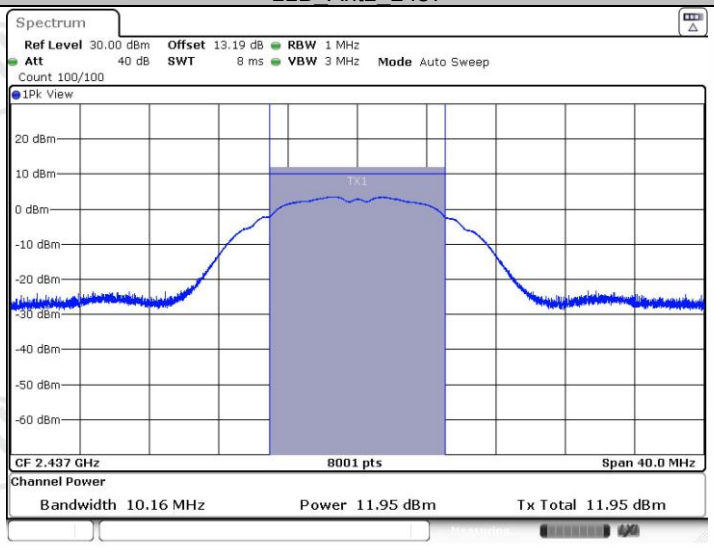


11B_Ant2_2412



11B_Ant1_2437



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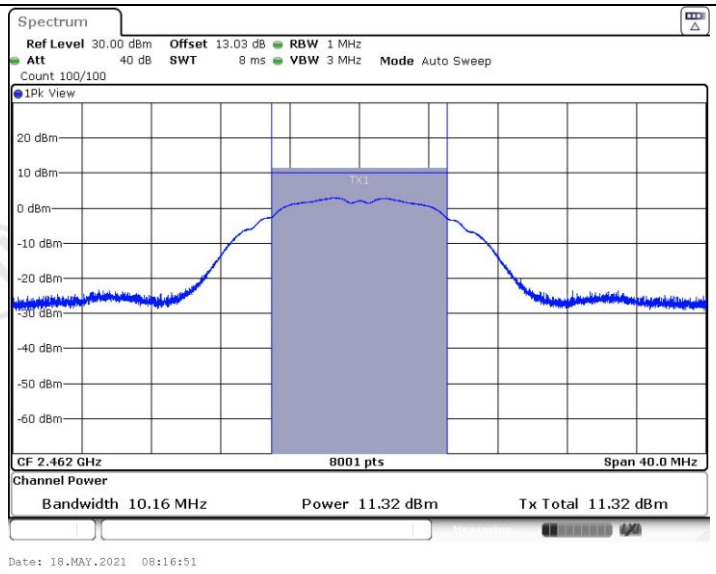
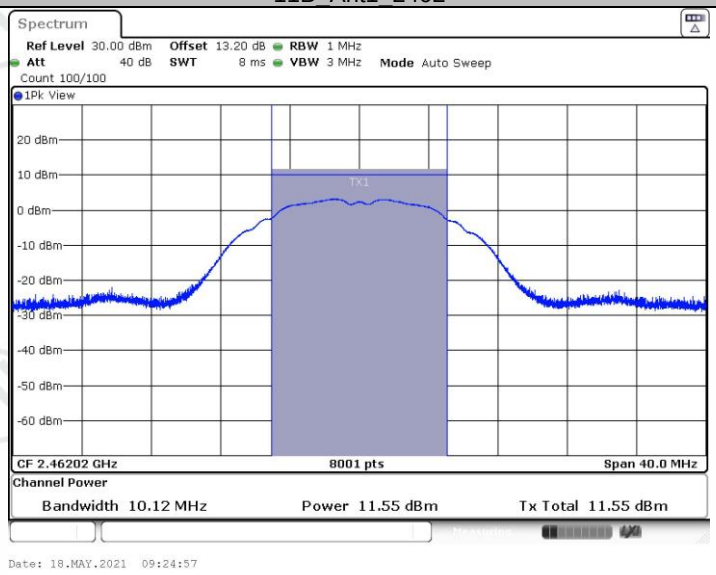


11B_Ant1_2462



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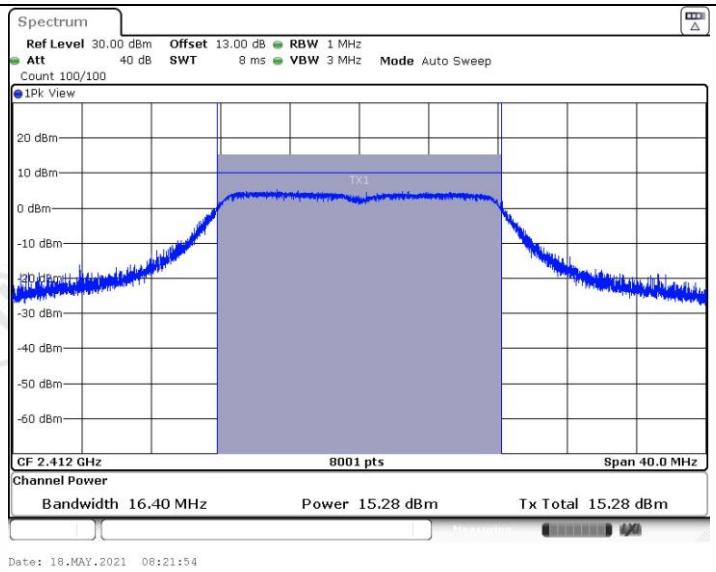
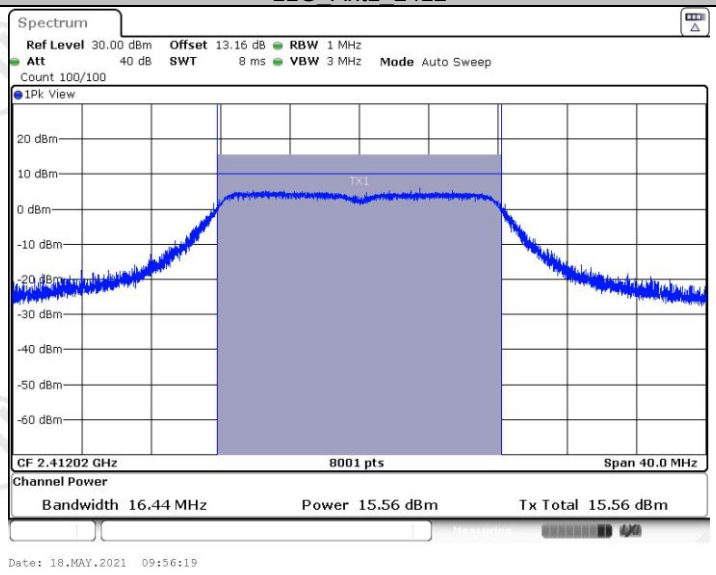


11G_Ant1_2412



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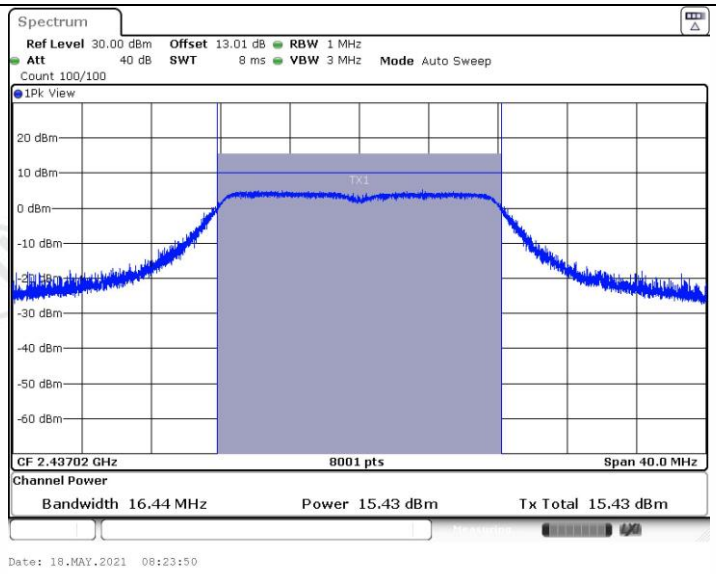

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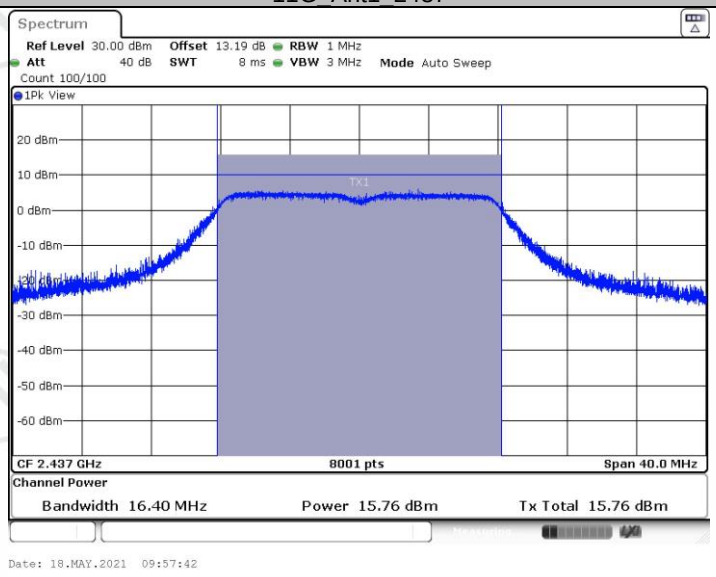

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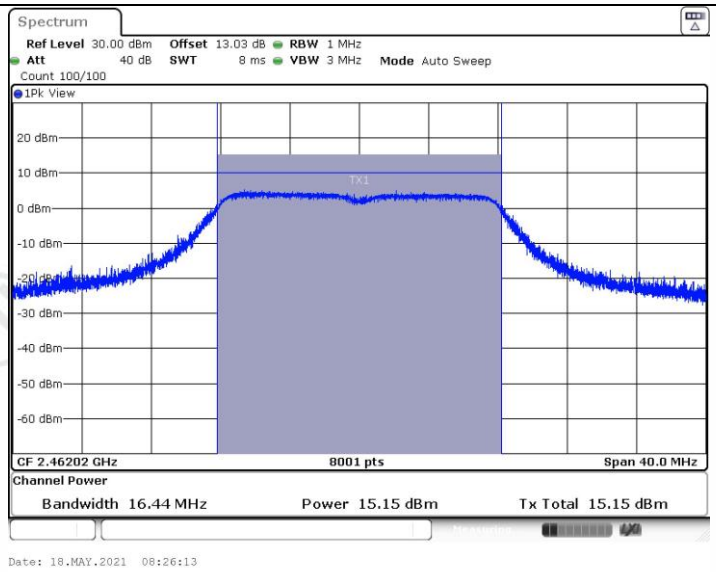

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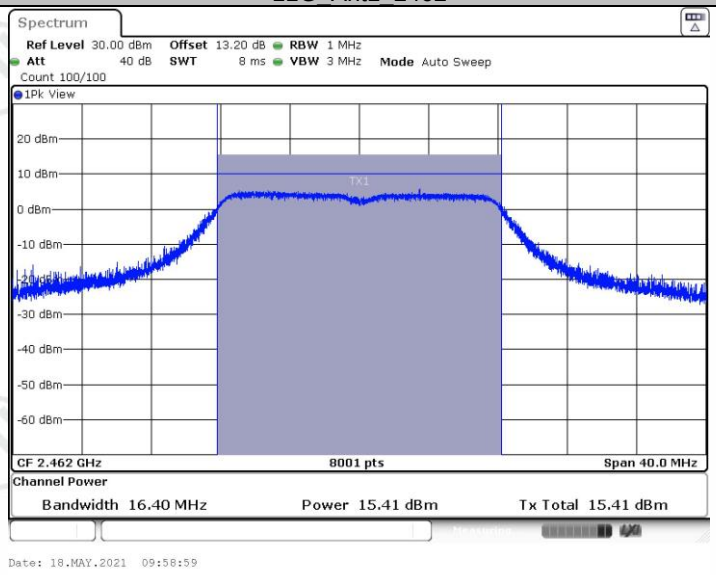

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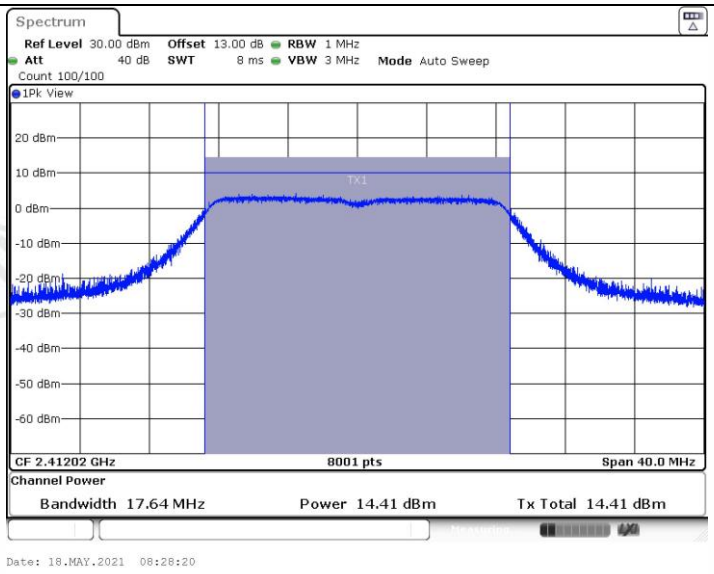
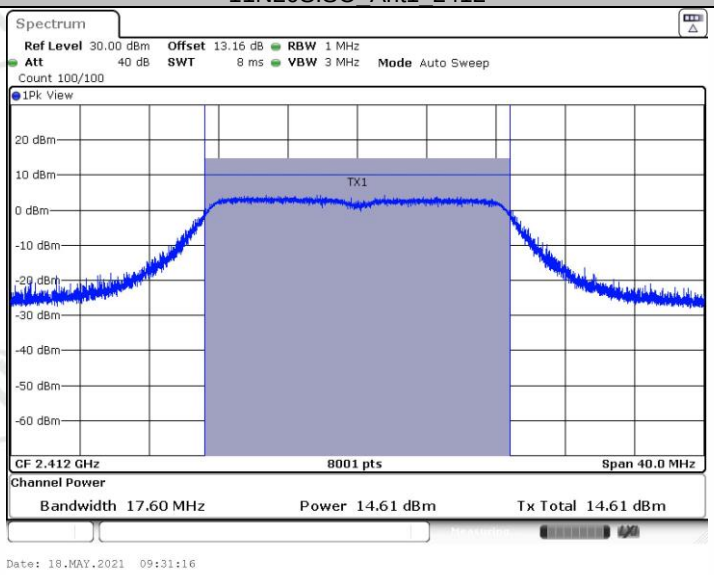


11N20SISO_Ant1_2412



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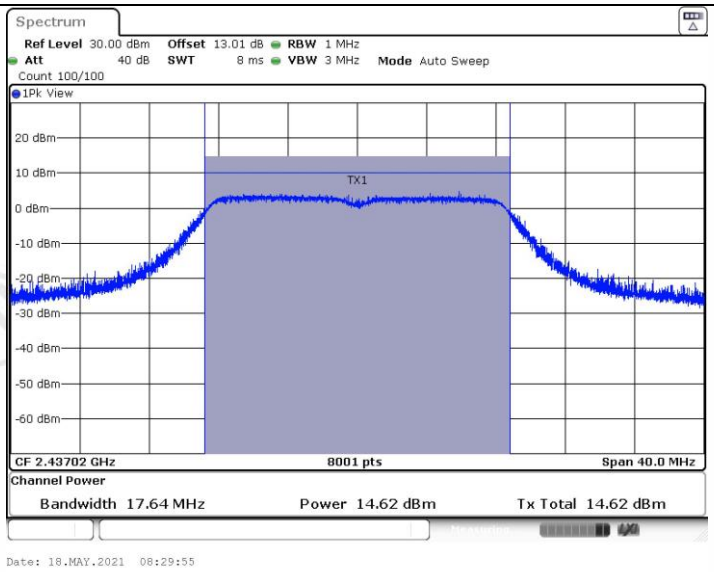

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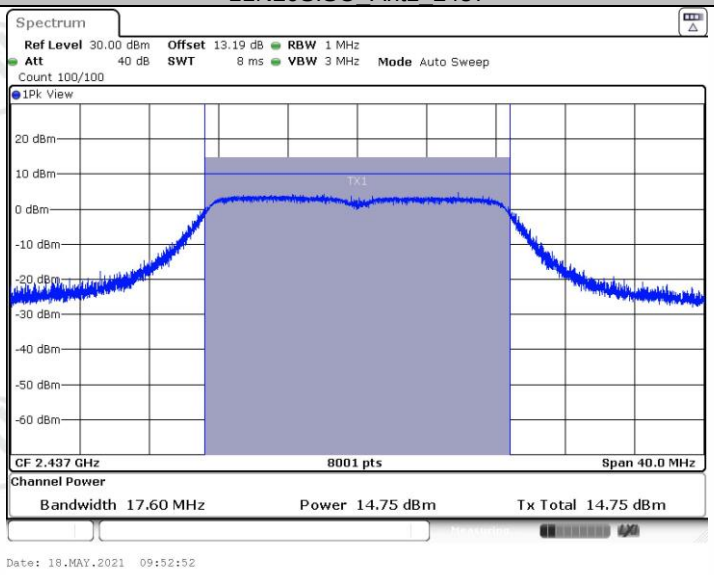

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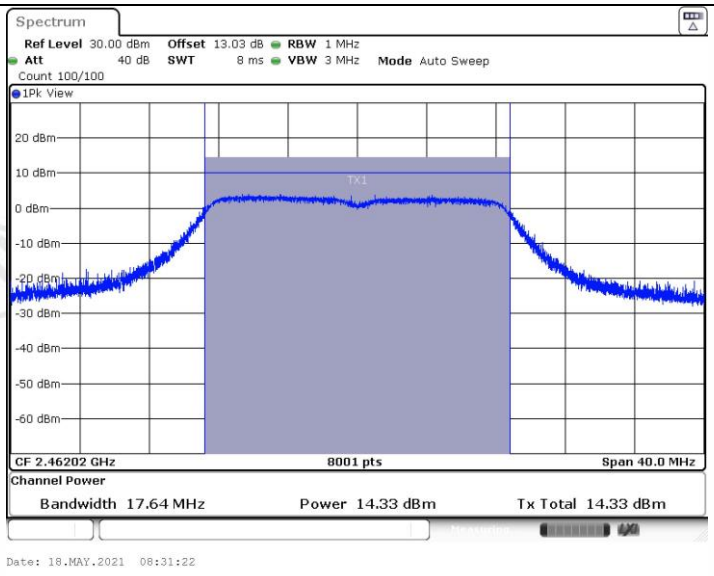

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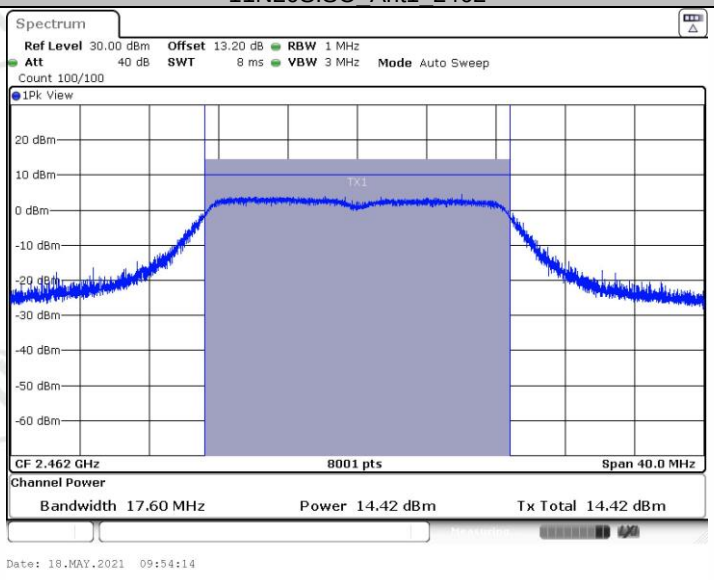
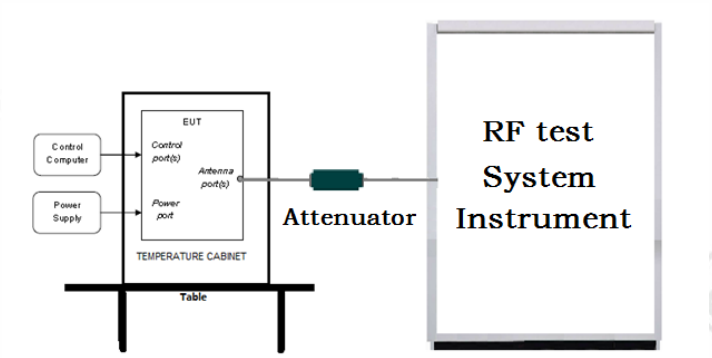


11N20SISO_Ant2_2462

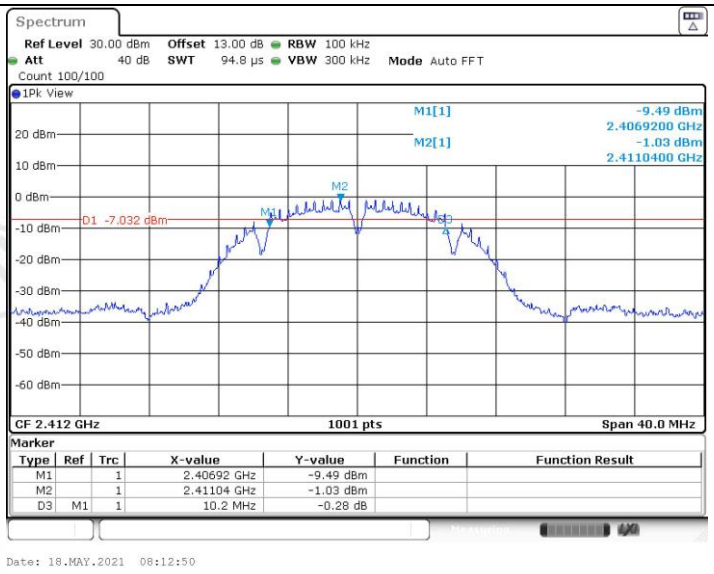
Appendix B): DTS Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set RBW = 100 kHz. b) Set the VBW ≥[3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Limit:	≥ 500 kHz
Test Mode:	Refer to clause 2.2
Test Results:	Pass

Result Table:

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	10.200	2406.920	2417.120	0.5	PASS
	Ant2	2412	10.120	2406.960	2417.080	0.5	PASS
	Ant1	2437	10.160	2431.920	2442.080	0.5	PASS
	Ant2	2437	10.160	2431.920	2442.080	0.5	PASS
	Ant1	2462	10.160	2456.920	2467.080	0.5	PASS
	Ant2	2462	10.120	2456.960	2467.080	0.5	PASS
11G	Ant1	2412	16.400	2403.800	2420.200	0.5	PASS
	Ant2	2412	16.440	2403.800	2420.240	0.5	PASS
	Ant1	2437	16.440	2428.800	2445.240	0.5	PASS
	Ant2	2437	16.400	2428.800	2445.200	0.5	PASS
	Ant1	2462	16.440	2453.800	2470.240	0.5	PASS
	Ant2	2462	16.400	2453.800	2470.200	0.5	PASS
11N20SISO	Ant1	2412	17.640	2403.200	2420.840	0.5	PASS
	Ant2	2412	17.600	2403.200	2420.800	0.5	PASS
	Ant1	2437	17.640	2428.200	2445.840	0.5	PASS
	Ant2	2437	17.600	2428.200	2445.800	0.5	PASS
	Ant1	2462	17.640	2453.200	2470.840	0.5	PASS
	Ant2	2462	17.600	2453.200	2470.800	0.5	PASS

Test Graph:



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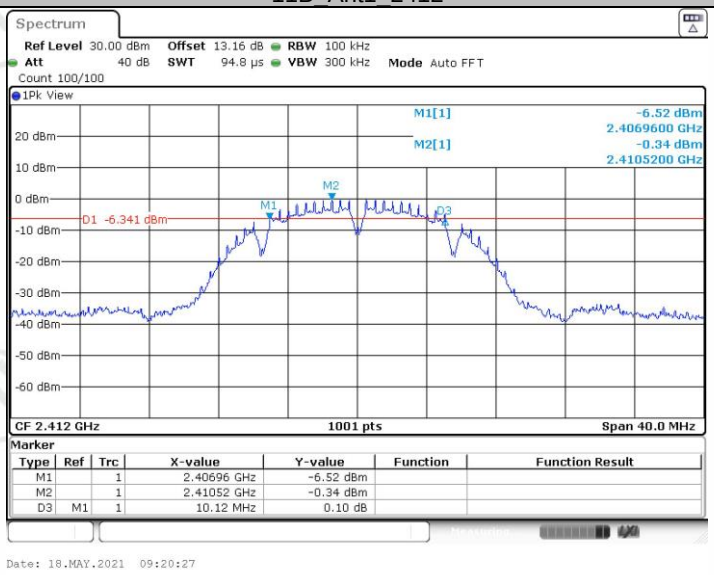

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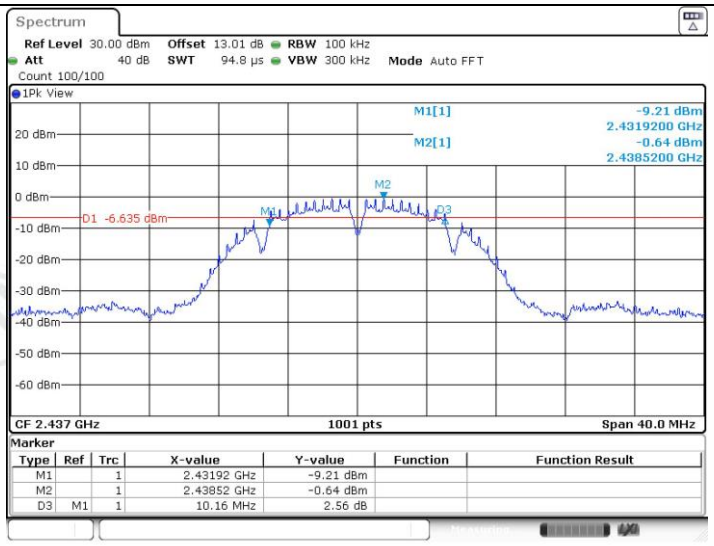
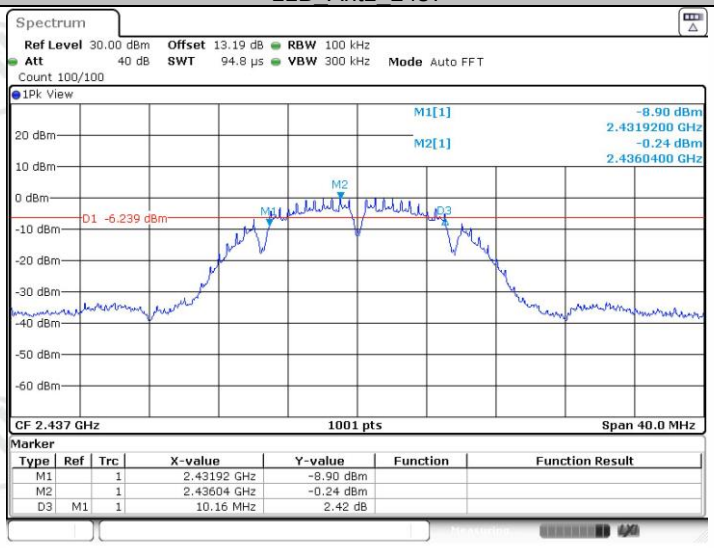


11B_Ant1_2437



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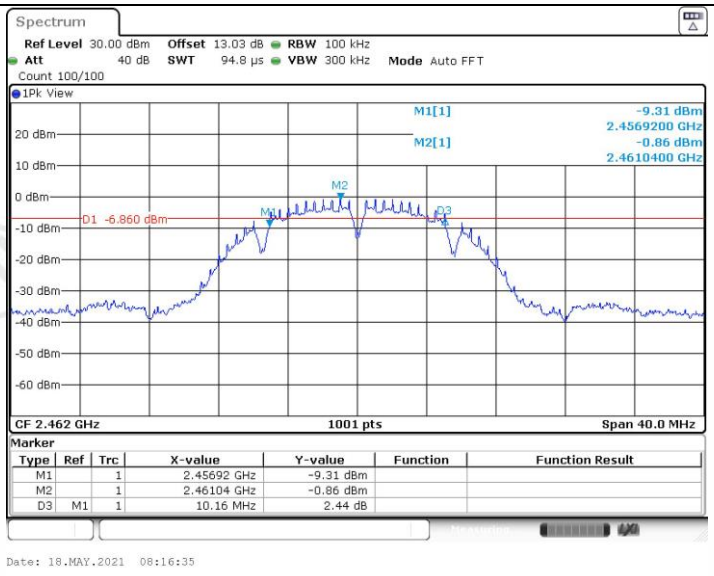
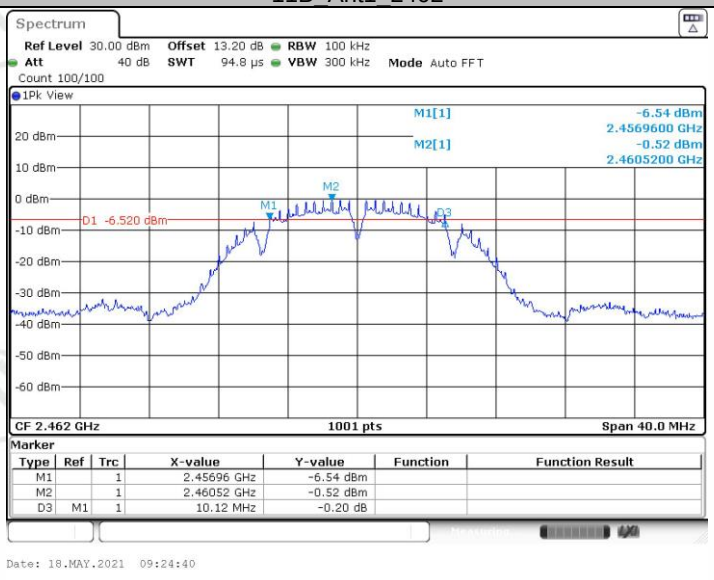


11B_Ant1_2462



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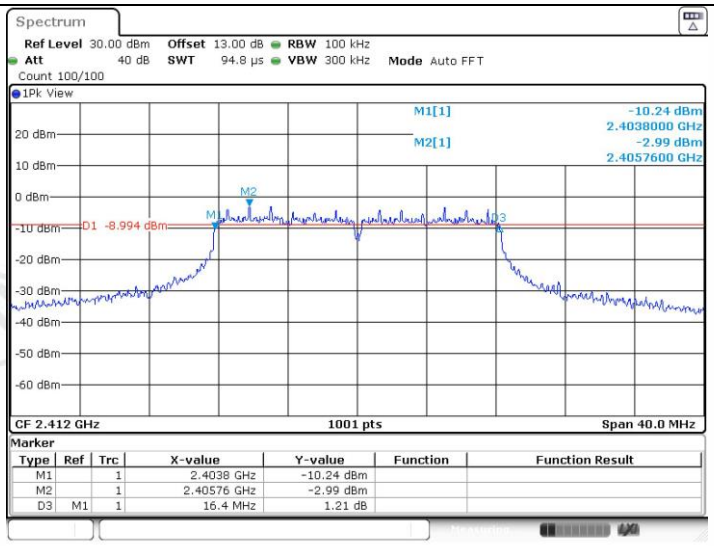

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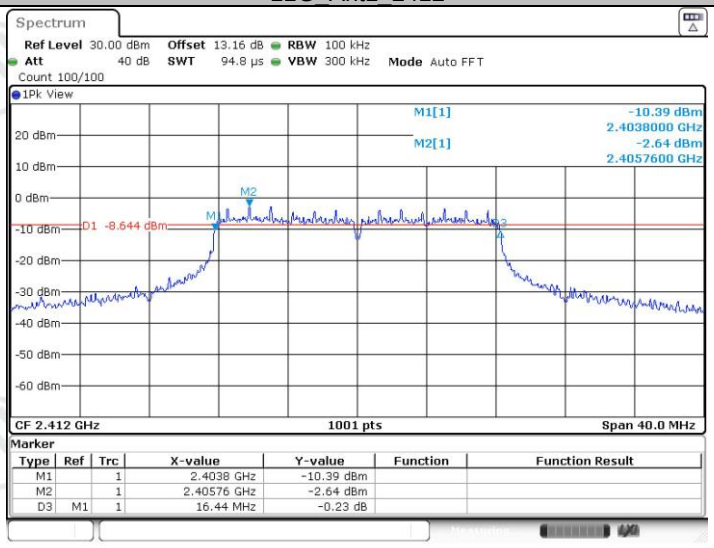

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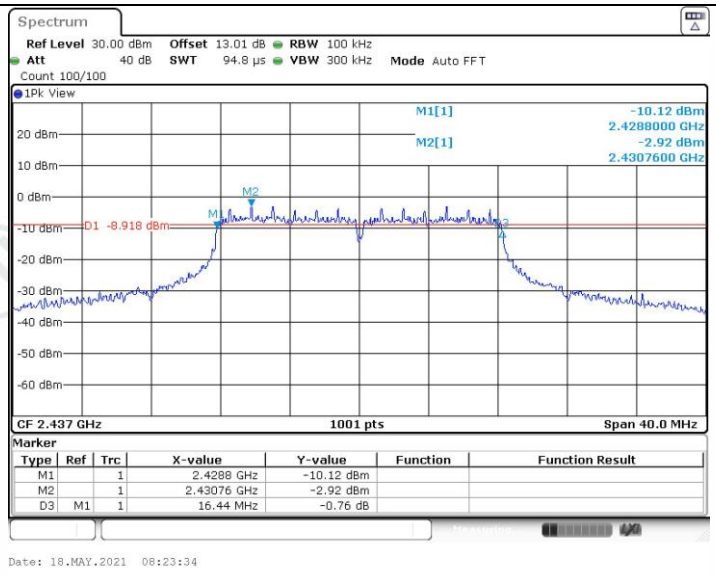

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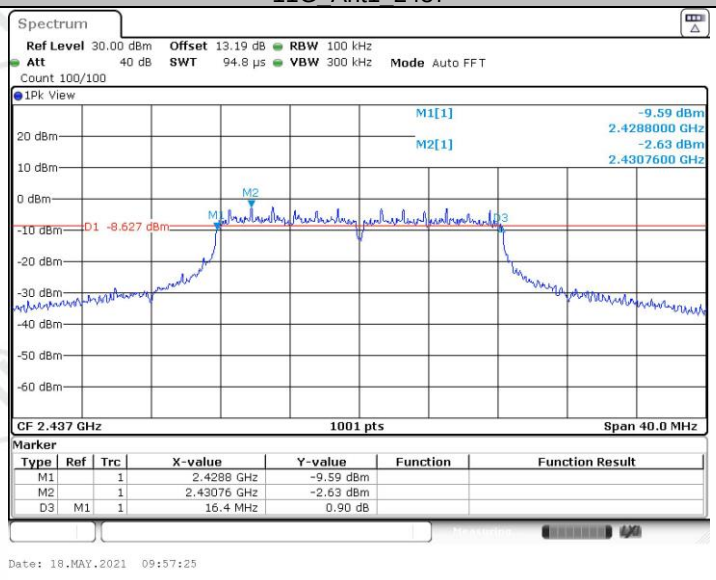

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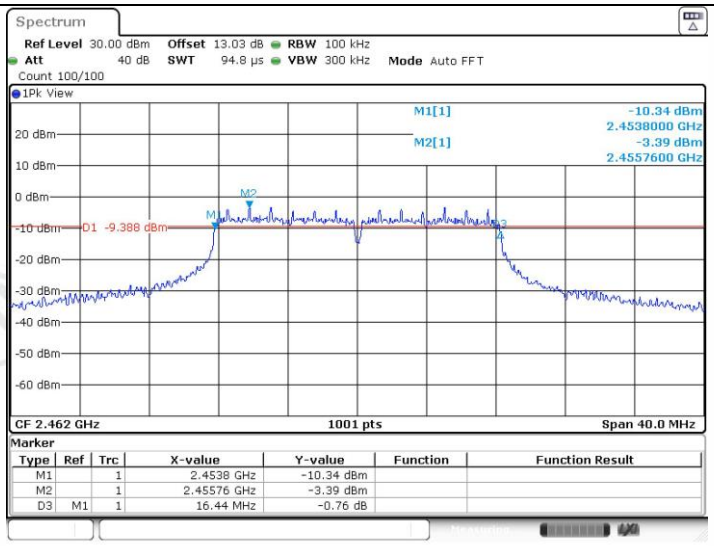

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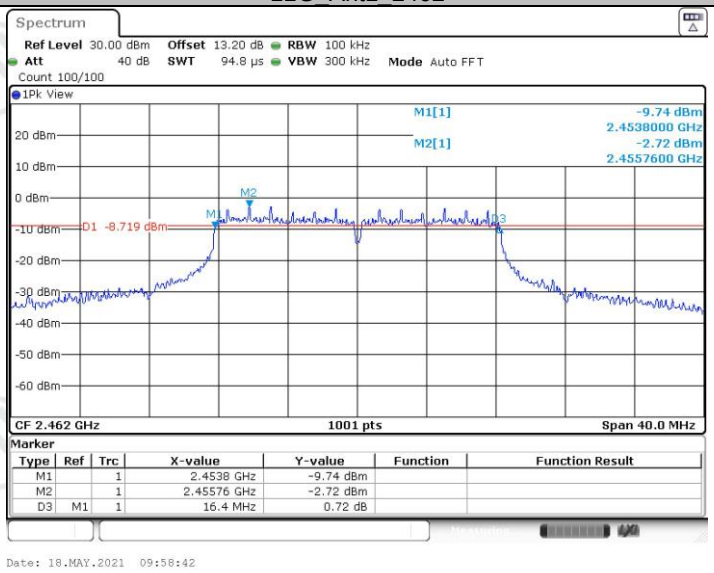
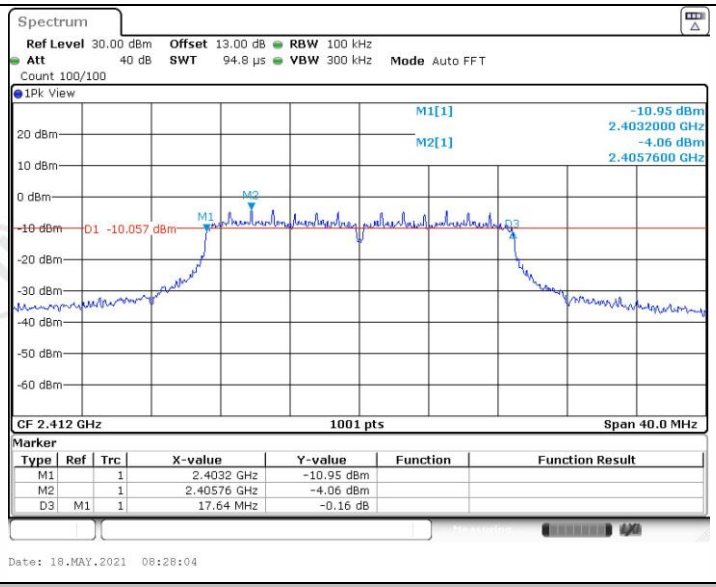
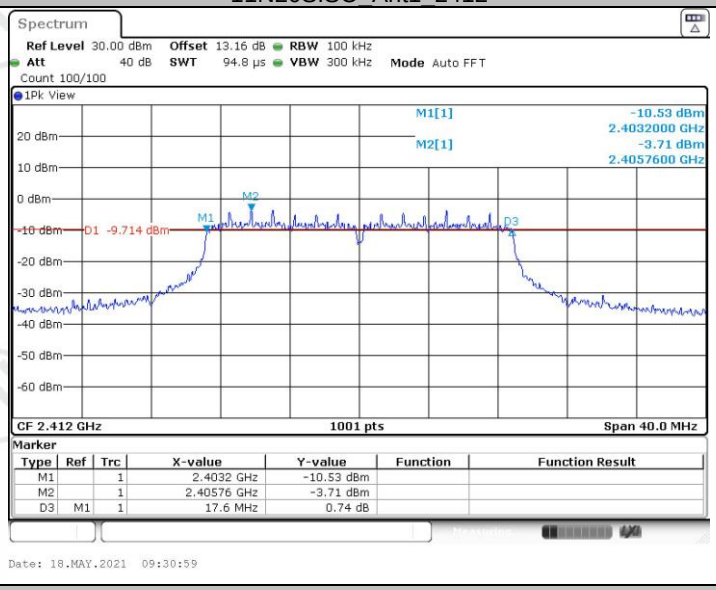


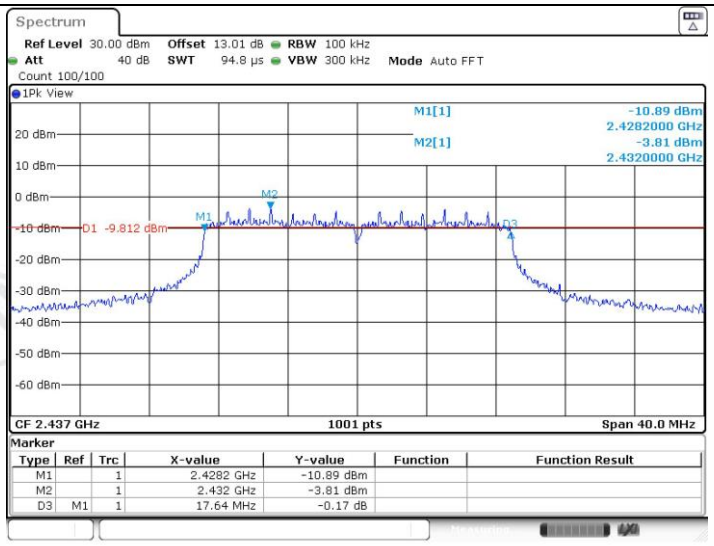
11G_Ant2_2462



11N20SISO_Ant1_2412



11N20SISO_Ant2_2412



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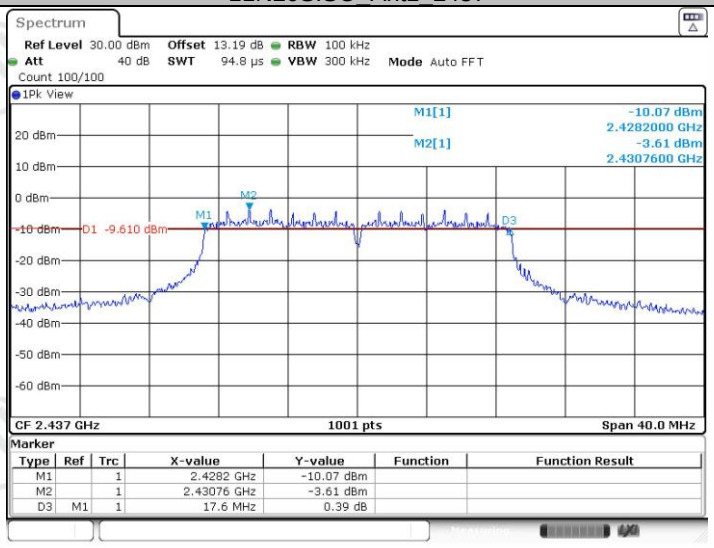

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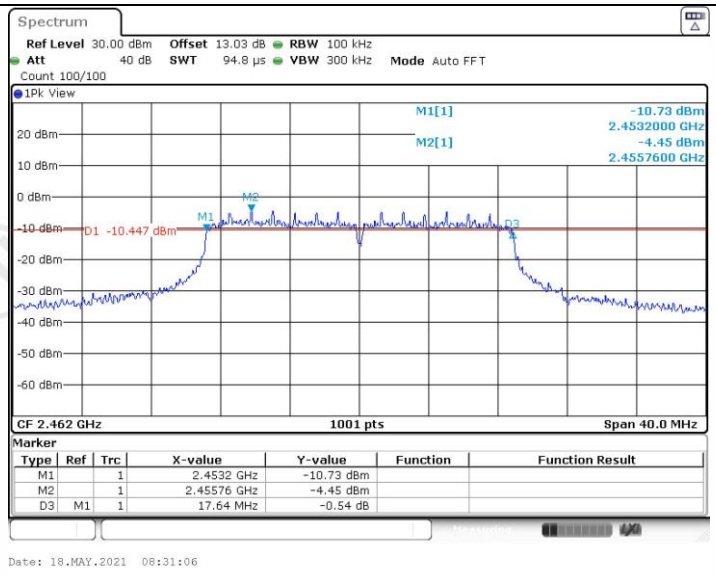
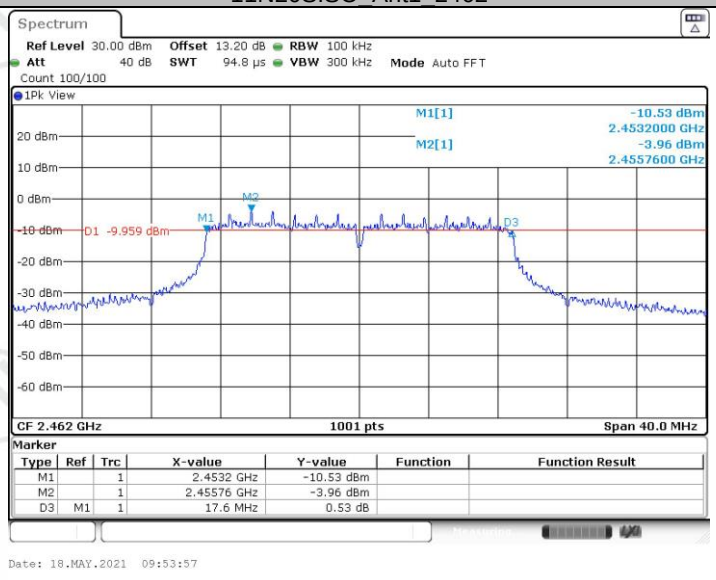
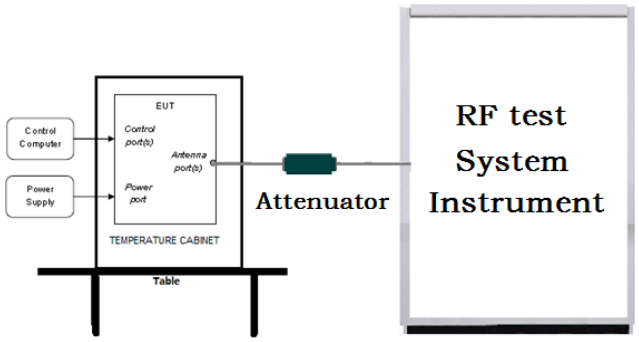


11N20SISO_Ant1_2462



11N20SISO_Ant2_2462

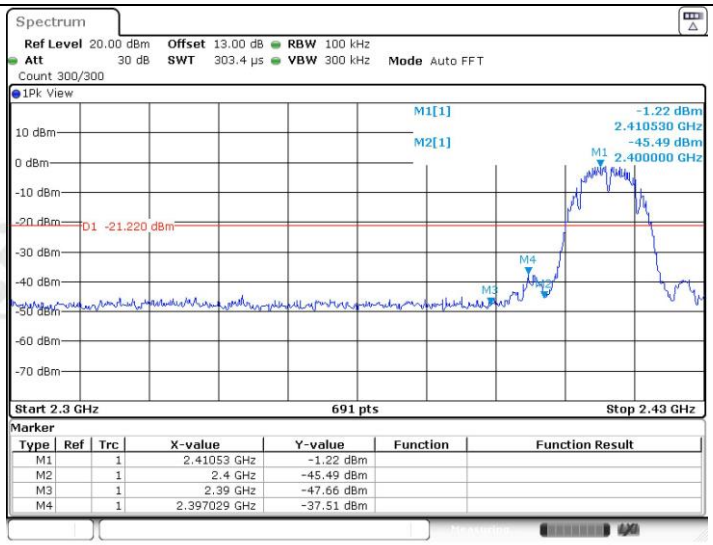
Appendix C): Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set RBW = 100KHz. b) Set VBW = 300KHz. c) Sweep time = auto couple. d) Detector = peak. e) Trace mode = max hold. f) Allow trace to fully stabilize. g) Use peak marker function to determine the peak amplitude level.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test Mode:	Refer to clause 2.2
Test Results:	Pass

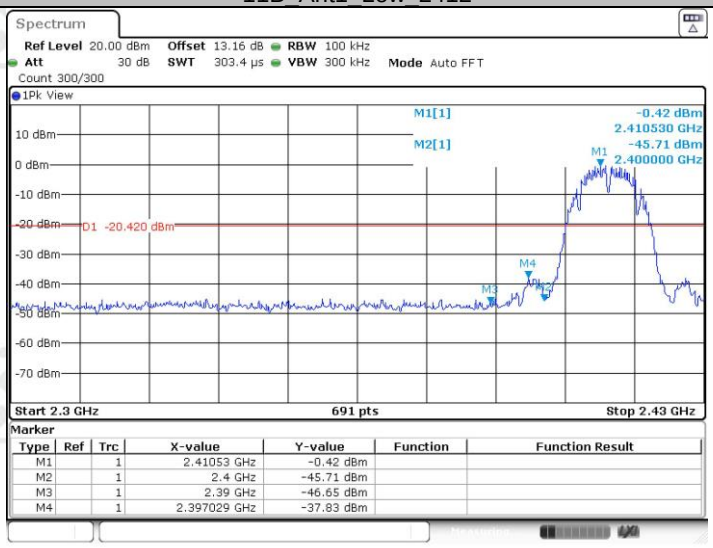
Result Table:

Test Mode	Antenna	Ch Name	Channel	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	-1.22	-37.51	<=-21.22	PASS
	Ant2	Low	2412	-0.42	-37.83	<=-20.42	PASS
	Ant1	High	2462	-1.00	-44.22	<=-21	PASS
	Ant2	High	2462	-0.61	-44.69	<=-20.61	PASS
	Total	Low	2412	2.49	-36.96	<=-17.51	PASS
		High	2462	1.28	-47.26	<=-18.72	PASS
11G	Ant1	Low	2412	-3.32	-31.48	<=-23.32	PASS
	Ant2	Low	2412	-4.26	-30.82	<=-24.26	PASS
	Ant1	High	2462	-3.98	-40.99	<=-23.98	PASS
	Ant2	High	2462	-2.63	-41.96	<=-22.63	PASS
	Total	Low	2412	0.97	-24.72	<=-19.03	PASS
		High	2462	0.69	-36.17	<=-19.31	PASS
11N20	Ant1	Low	2412	-5.18	-32.16	<=-25.18	PASS
	Ant2	Low	2412	-4.05	-32.49	<=-24.05	PASS
	Ant1	High	2462	-4.67	-42.65	<=-24.67	PASS
	Ant2	High	2462	-4.13	-41.9	<=-24.13	PASS
	Total	Low	2412	0.63	-28.87	<=-19.37	PASS
		High	2462	1.41	-36.88	<=-18.59	PASS

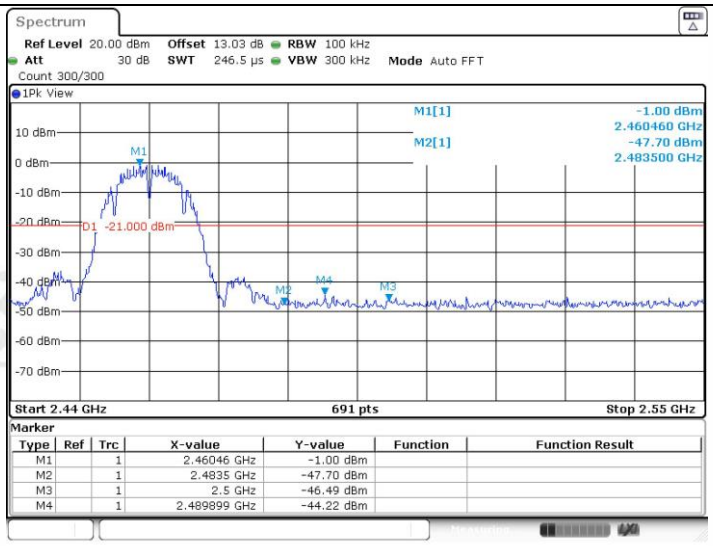
Test Graph:



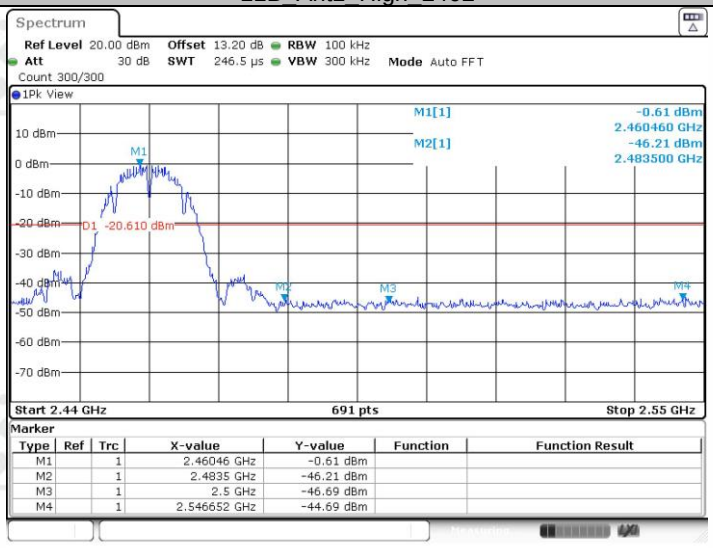
11B_Ant1_Low_2412



11B_Ant2_Low_2412



11B_Ant1_High_2462



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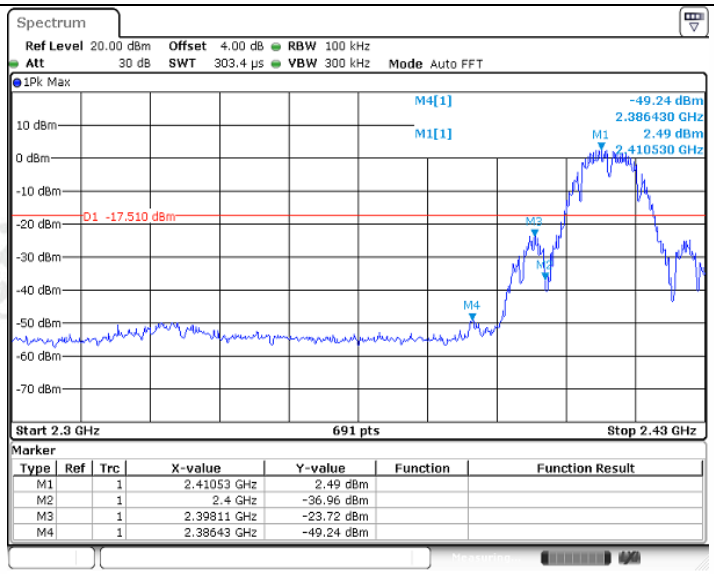
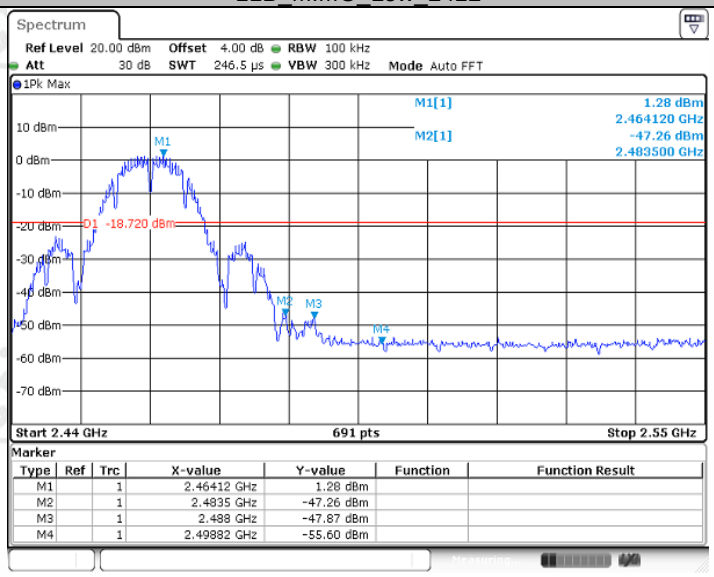
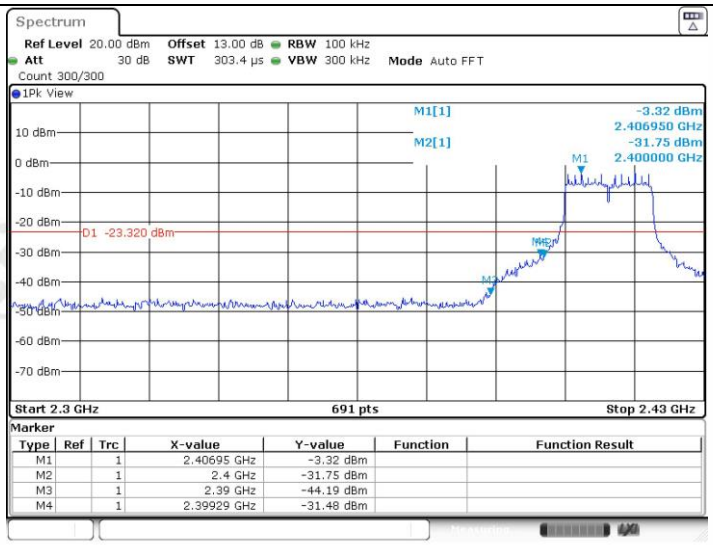


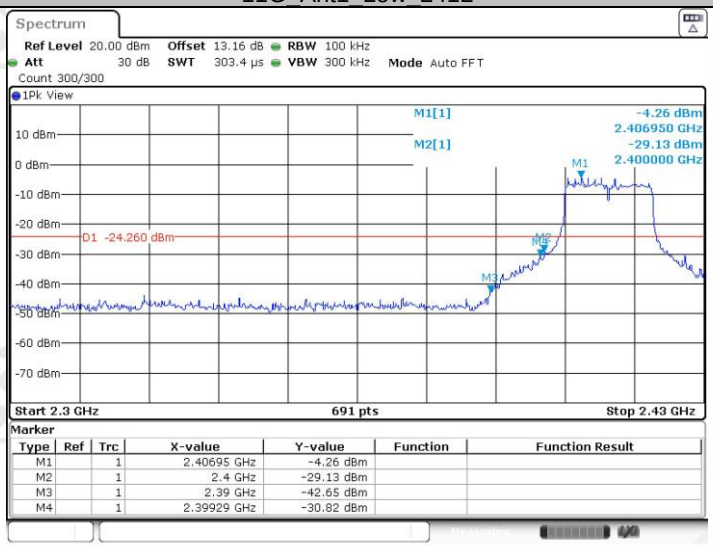
11B_MIMO_Low_2412



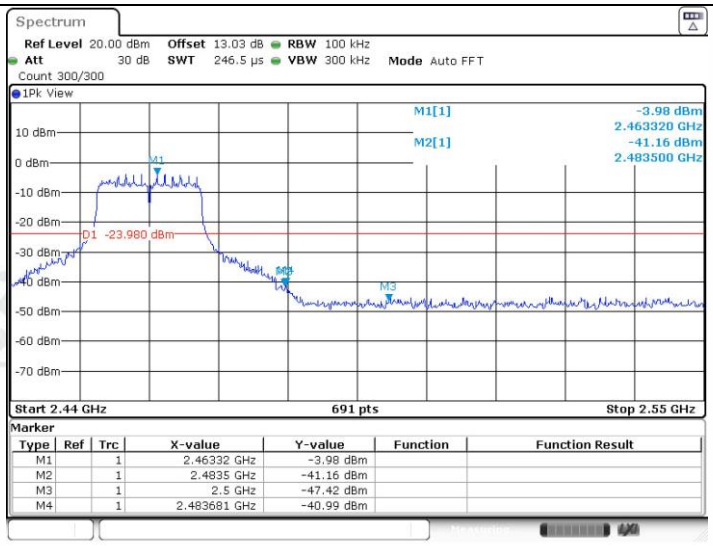
11B_MIMO_High_2462



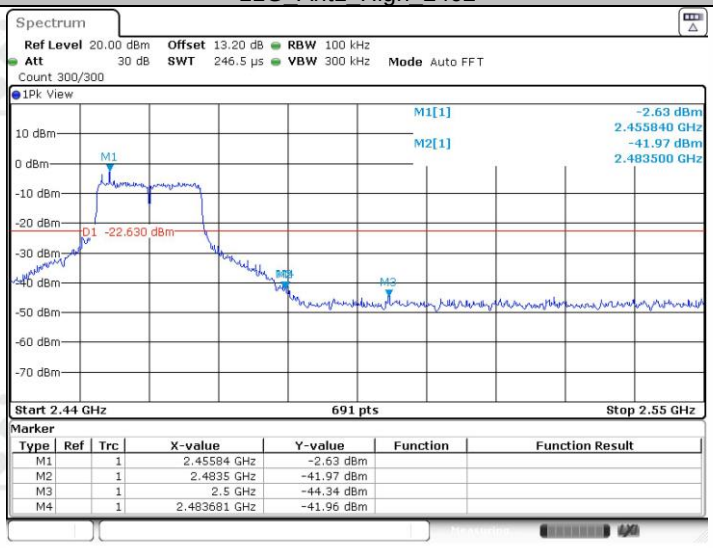
11G_Ant1_Low_2412



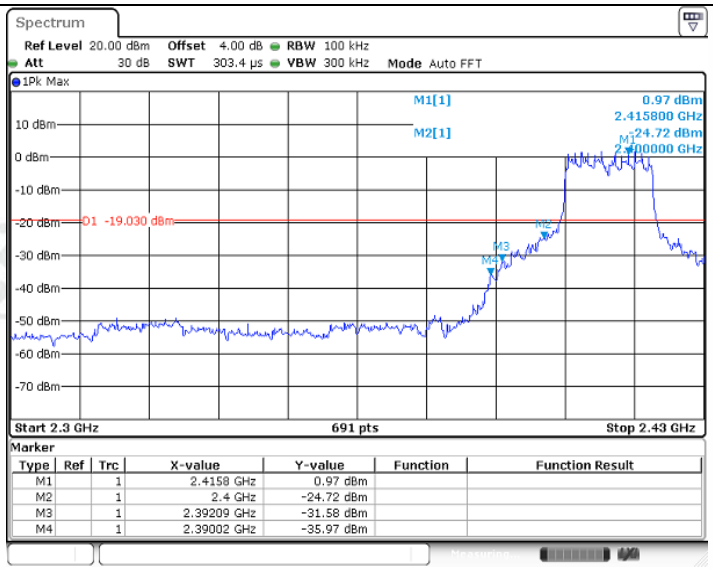
11G_Ant2_Low_2412



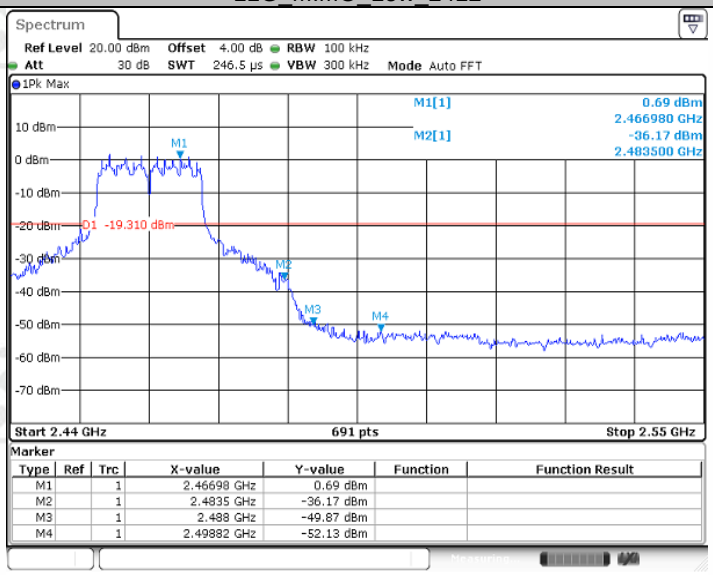
11G_Ant1_High_2462



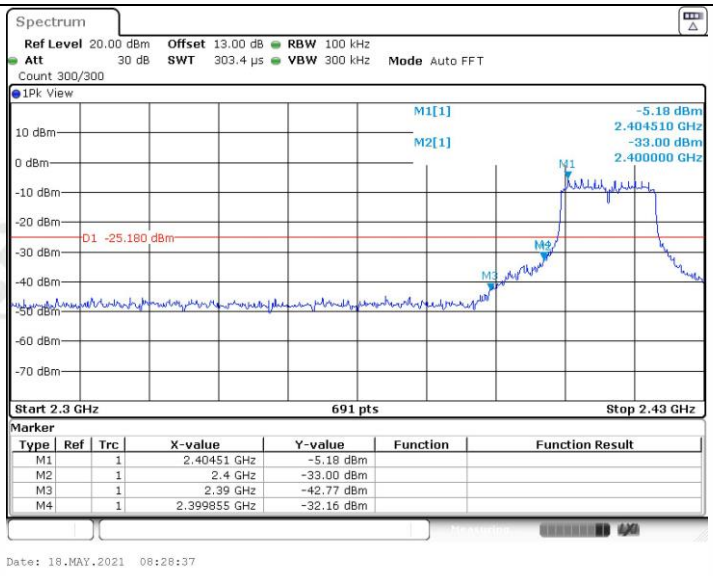
11G_Ant2_High_2462



11G_MIMO_Low_2412



11G_MIMO_High_2462



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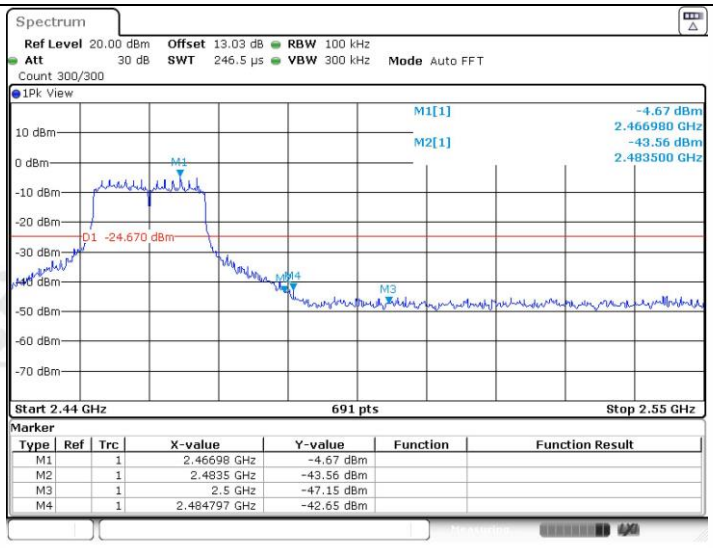
11N20SISO_Ant2_Low_2412



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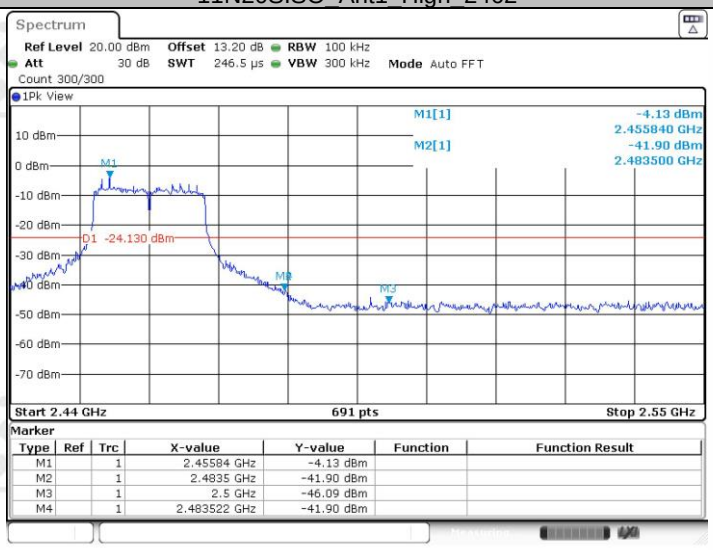

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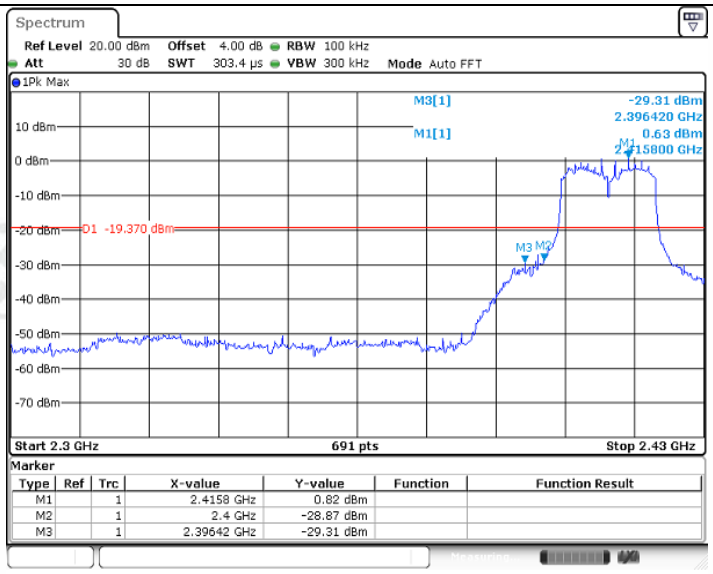

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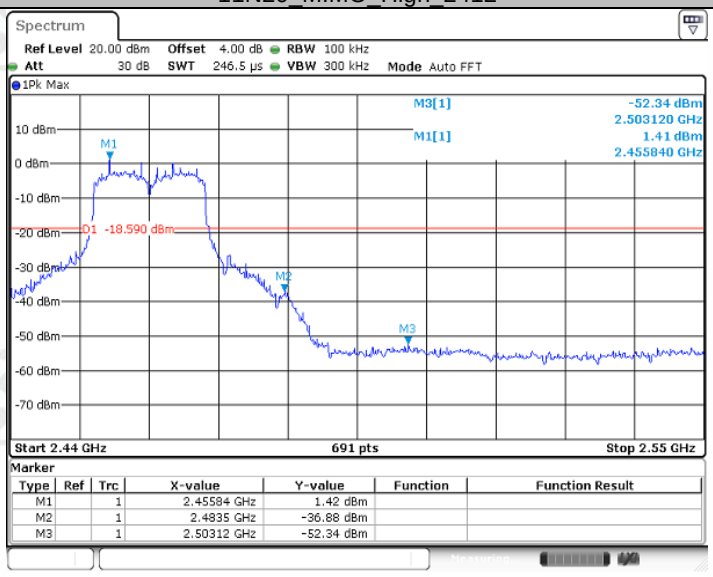

11N20_MIMO_High_2462