

Test Report

Report No.: MTi240820007-07E4

Date of issue: 2024-12-22

Applicant: IC Nexus Co., Ltd

Product name: SBC_VPC_

Model(s): VPC450, L800, L850, CB-8P

FCC ID: 2ACLCECNSDSBCVPC450

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.cn>

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Test Result Certification	
Applicant:	IC Nexus Co., Ltd
Address:	6F-1, No.3-2 Park Street, Nankang Software Park(NKSP), Taipei 115, Taiwan ROC
Manufacturer:	IC Nexus Co., Ltd
Address:	6F-1, No.3-2 Park Street, Nankang Software Park(NKSP), Taipei 115, Taiwan ROC
Factory:	IC Nexus Co., Ltd
Address:	6F-1, No.3-2 Park Street, Nankang Software Park(NKSP), Taipei 115, Taiwan ROC
Product description	
Product name:	SBC_VPC_
Trademark:	ICNexus
Model name:	VPC450
Series Model(s):	L800, L850, CB-8P
Standards:	47 CFR Part 15E
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 ANSI C63.10-2013
Date of Test	
Date of test:	2024-11-24 to 2024-12-20
Test result:	Pass

Test Engineer	:	 (James Qin)
Reviewed By	:	 (David Lee)
Approved By	:	 (Leon Chen)

1 General Description

1.1 Description of the EUT

Product name:	SBC_VPC_
Model name:	VPC450
Series Model(s):	L800, L850, CB-8P
Model difference:	All the models are the same circuit and module, except the model name.
Electrical rating:	Input: DC 12V
Accessories:	N/A
Hardware version:	PCB0L800 + PCB0L850
Software version:	android & Linux
Test sample(s) number:	MTi240820007-07S1007

RF specification

Operating frequency range:	802.11a/n(HT20)/ac(HT20): U-NII Band 1: 5180MHz to 5240MHz; U-NII Band 3: 5745MHz to 5825MHz; 802.11n(HT40)/ac(HT40): U-NII Band 1: 5190MHz to 5230MHz; U-NII Band 3: 5755MHz to 5795MHz; 802.11ac(HT80): U-NII Band 1: 5210MHz; U-NII Band 3: 5775MHz
Channel number:	802.11a/n(HT20)/ac(HT20): U-NII Band 1: 4; U-NII Band 3: 5; 802.11n(HT40)/ac(HT40): U-NII Band 1: 2; U-NII Band 3: 2; 802.11ac(HT80): U-NII Band 1: 1; U-NII Band 3: 1;
Modulation type:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM);
Antenna(s) type:	dipole
Antenna(s) gain:	3dBi



1.2 Description of test modes

No.	Emission test modes
Mode1	802.11a mode
Mode2	802.11n20 mode
Mode3	802.11n40 mode
Mode4	802.11ac20 mode
Mode5	802.11ac40 mode
Mode6	802.11ac80 mode

1.2.1 Operation channel list

U-NII Band 1

Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	/	/
44	5220	/	/	/	/
48	5240	/	/	/	/

U-NII Band 3

Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795	/	/
157	5785	/	/	/	/
161	5805	/	/	/	/
165	5825	/	/	/	/

Test Channel List

Operation Band: 5150-5250 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5180	5200	5240
40	5190	/	5230
80	5210	/	/

Operation Band: 5725-5850 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5745	5785	5825
40	5755	/	5795
80	5775	/	/

Note: The test software provided by manufacturer is used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

Test Software: ComTool

For power setting, refer to below table.

Mode	LCH	MCH	HCH
802.11a	16	16	16
802.11n(HT20)	16	16	16
802.11n(HT40)	16	16	16
802.11ac(VHT20)	16	16	16
802.11ac(VHT40)	16	16	16
802.11ac(VHT80)	16	16	16

Mode	LCH	MCH	HCH
802.11a	16	16	16
802.11n(HT20)	16	16	16
802.11n(HT40)	16	16	16
802.11ac(VHT20)	16	16	16
802.11ac(VHT40)	16	16	16
802.11ac(VHT80)	16	16	16

1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C ~ 35°C
Humidity:	20% RH ~ 75% RH
Atmospheric pressure:	98 kPa ~ 101 kPa

1.4 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
Adaptor	WDS050120	/	Wearnes GLOBAL CO., LTD.
Laptop	e485	/	Lenovo
Support cable list			
Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Time	±1 %
Occupied channel bandwidth	±3 %
RF output power, conducted	±1 dB
Power Spectral Density, conducted	±1 dB
Radiated spurious emissions (above 1GHz)	±5.3dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



2 Summary of Test Result

No.	Item	Standard	Requirement	Result
1	Antenna requirement	47 CFR Part 15E	Part 15.203	Pass
2	Conducted Emission at AC power line	47 CFR Part 15E	47 CFR Part 15.207(a)	Pass
3	Duty Cycle	47 CFR Part 15E		Pass
4	Emission bandwidth and occupied bandwidth	47 CFR Part 15E	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. 47 CFR Part 15.407(e)	Pass
5	Maximum conducted output power	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
6	Power spectral density	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
7	Band edge emissions (Radiated)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
8	Undesirable emission limits (below 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(9)	Pass
9	Undesirable emission limits (above 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass

3 Test Facilities and accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573
IC Registration No.:	21760
CABID:	CN0093



4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Conducted Emission at AC power line						
1	EMI Test Receiver	Rohde&schwarz	ESCI3	101368	2024-03-20	2025-03-19
2	Artificial mains network	Schwarzbeck	NSLK 8127	183	2024-03-21	2025-03-20
3	Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100263	2024-03-20	2025-03-19
Duty Cycle						
Emission bandwidth and occupied bandwidth						
Maximum conducted output power						
Power spectral density						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2024-03-20	2025-03-19
2	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2024-03-21	2025-03-20
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2024-03-21	2025-03-20
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2024-03-21	2025-03-20
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2024-03-21	2025-03-20
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2024-03-21	2025-03-20
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2024-03-20	2025-03-19
9	DC Power Supply	Agilent	E3632A	MY40027695	2024-03-21	2025-03-20
Band edge emissions (Radiated)						
Undesirable emission limits (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	2278	2023-06-17	2025-06-16
3	Amplifier	Agilent	8449B	3008A01120	2024-03-20	2025-03-19
4	MXA signal analyzer	Agilent	N9020A	MY54440859	2024-03-21	2025-03-20
5	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
6	Horn antenna	Schwarzbeck	BBHA 9170	00987	2023-06-17	2025-06-16
7	Pre-amplifier	Space-Dtronics	EWLAN1840 G	210405001	2024-03-21	2025-03-20
Undesirable emission limits (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2024-03-23	2025-03-22
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2024-03-20	2025-03-19

5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
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6 Radio Spectrum Matter Test Results (RF)

6.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)		Conducted limit (dB μ V)
	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50

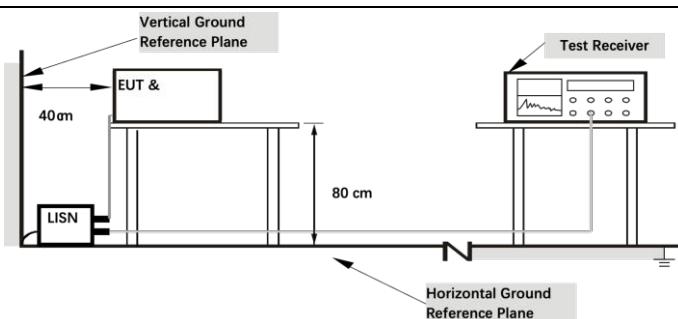
*Decreases with the logarithm of the frequency.

| Test Method: | ANSI C63.10-2013 section 6.2 | | |
| Procedure: | Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices | | |

6.1.1 E.U.T. Operation:

Operating Environment:			
Temperature:	25 °C	Humidity:	58 %
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report		

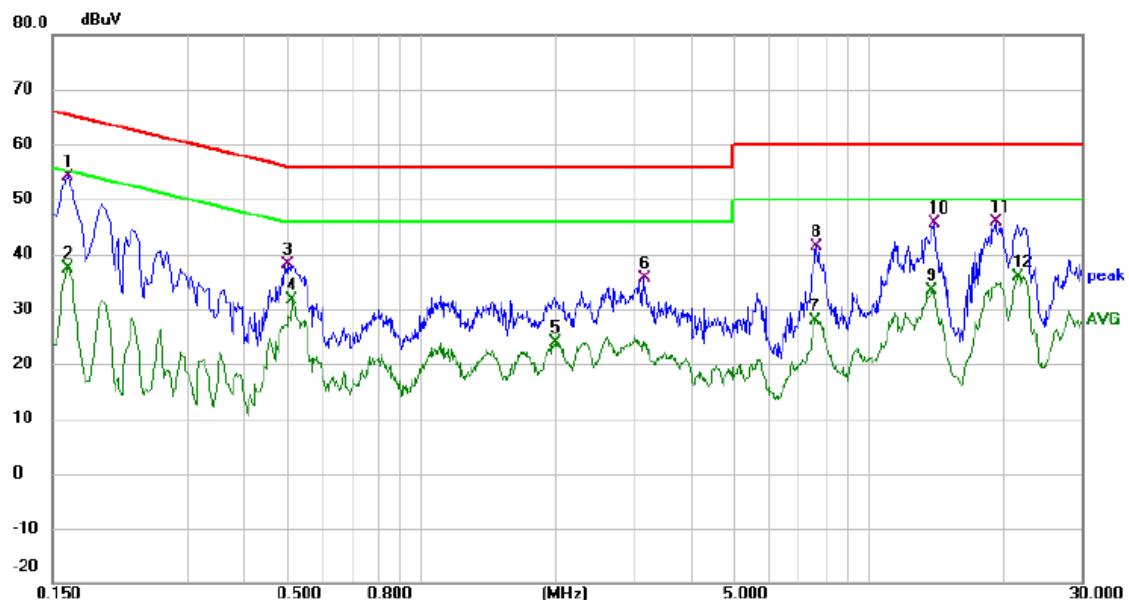
6.1.2 Test Setup Diagram:





6.1.3 Test Data:

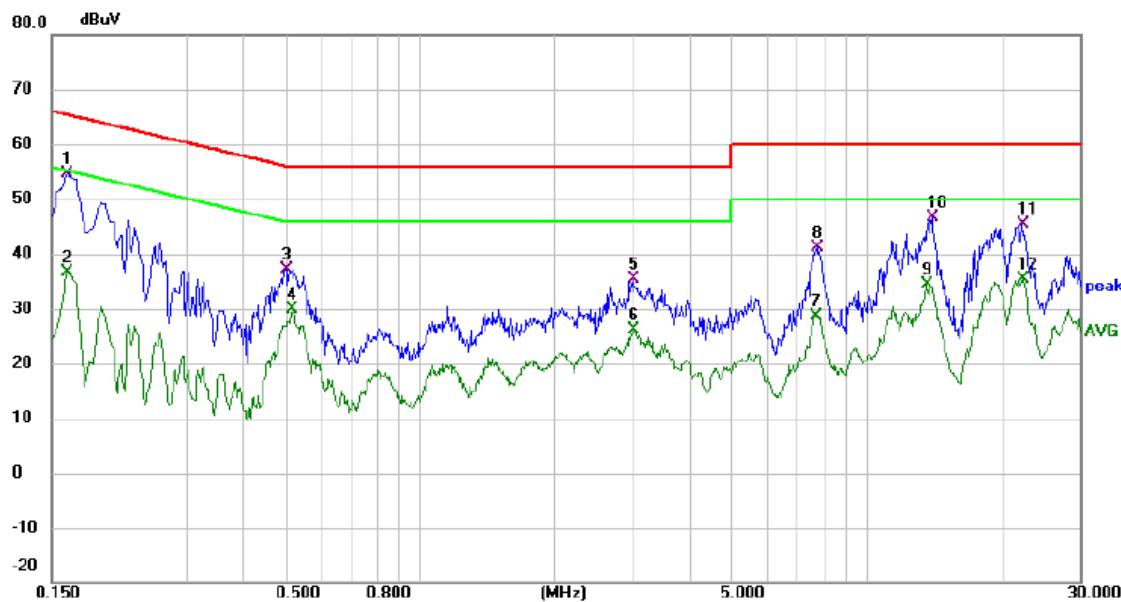
Mode1 / Line: Line / CH: L



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.1620	43.72	10.30	54.02	65.36	-11.34	QP	
2		0.1620	27.20	10.30	37.50	55.36	-17.86	AVG	
3		0.5060	27.79	10.43	38.22	56.00	-17.78	QP	
4		0.5140	21.18	10.43	31.61	46.00	-14.39	AVG	
5		1.9940	13.21	10.55	23.76	46.00	-22.24	AVG	
6		3.1540	25.05	10.56	35.61	56.00	-20.39	QP	
7		7.5860	17.35	10.63	27.98	50.00	-22.02	AVG	
8		7.6500	30.83	10.64	41.47	60.00	-18.53	QP	
9		13.7820	22.58	10.90	33.48	50.00	-16.52	AVG	
10		13.9900	34.61	10.91	45.52	60.00	-14.48	QP	
11		19.2420	34.84	11.10	45.94	60.00	-14.06	QP	
12		21.5580	24.91	11.08	35.99	50.00	-14.01	AVG	



Mode1 / Line: Neutral / CH: L



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1	*	0.1620	44.29	10.30	54.59	65.36	-10.77	QP	
2		0.1620	26.42	10.30	36.72	55.36	-18.64	AVG	
3		0.5020	26.80	10.43	37.23	56.00	-18.77	QP	
4		0.5180	19.37	10.43	29.80	46.00	-16.20	AVG	
5		3.0020	24.82	10.56	35.38	56.00	-20.62	QP	
6		3.0020	15.47	10.56	26.03	46.00	-19.97	AVG	
7		7.7019	18.10	10.64	28.74	50.00	-21.26	AVG	
8		7.7339	30.47	10.64	41.11	60.00	-18.89	QP	
9		13.5619	23.51	10.88	34.39	50.00	-15.61	AVG	
10		14.0459	35.61	10.92	46.53	60.00	-13.47	QP	
11		22.2139	34.34	11.06	45.40	60.00	-14.60	QP	
12		22.4500	24.24	11.05	35.29	50.00	-14.71	AVG	

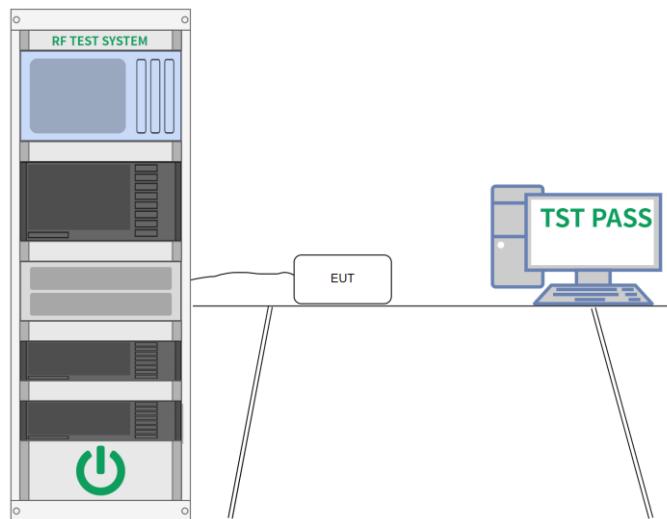
6.2 Duty Cycle

Test Requirement:	All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.
Test Limit:	No limits, only for report use.
Test Method:	ANSI C63.10-2013 section 12.2 (b)
Procedure:	i) Set the center frequency of the instrument to the center frequency of the transmission. ii) Set RBW \geq EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW \geq RBW. iv) Set detector = peak. v) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.

6.2.1 E.U.T. Operation:

Operating Environment:			
Temperature:	25 °C	Humidity:	58 %
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		
Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		

6.2.2 Test Setup Diagram:



6.2.3 Test Data:

Please Refer to Appendix for Details.



6.3 Emission bandwidth and occupied bandwidth

Test Requirement:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: 47 CFR Part 15.407(e)
Test Limit:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 6.9 & 12.4 KDB 789033 D02, Clause C.2
Procedure:	<p>Emission bandwidth:</p> <ul style="list-style-type: none">a) Set RBW = approximately 1% of the emission bandwidth.b) Set the VBW > RBW.c) Detector = peak.d) Trace mode = max hold.e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. <p>Occupied bandwidth:</p> <ul style="list-style-type: none">a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.d) Step a) through step c) might require iteration to adjust within the specified range.e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the



total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6 dB emission bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \geq RBW$.
- 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.

6.3.1 E.U.T. Operation:

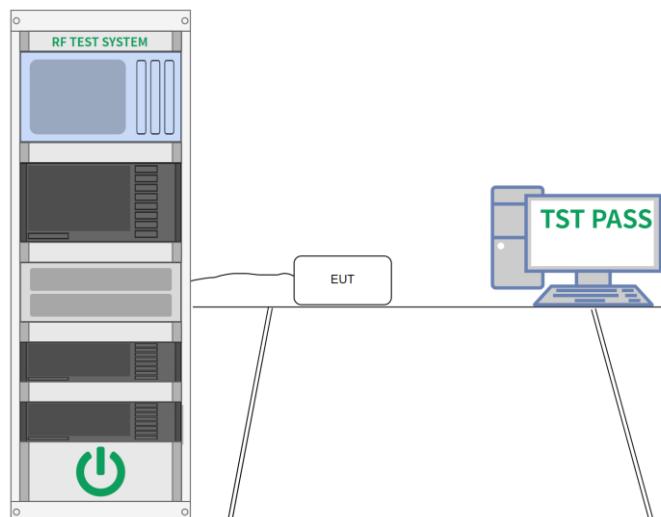
Operating Environment:

Temperature: 25 °C	Humidity: 58 %	Atmospheric Pressure: 101 kPa
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Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6
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Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6
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6.3.2 Test Setup Diagram:



6.3.3 Test Data:

Please Refer to Appendix for Details.



6.4 Maximum conducted output power

Test Requirement:	<p>47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)</p>
Test Limit:	<p>For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).</p> <p>For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.</p> <p>Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power.</p> <p>For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi.</p> <p>Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p> <p>For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems</p>

	employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
Test Method:	ANSI C63.10-2013, section 12.3
Procedure:	Refer to ANSI C63.10-2013 section 12.3

6.4.1 E.U.T. Operation:

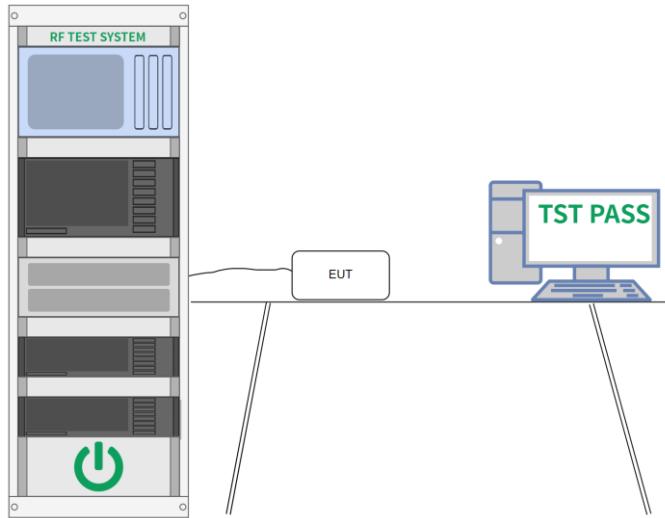
Operating Environment:

Temperature: 25 °C Humidity: 58 % Atmospheric Pressure: 101 kPa

Pre test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

Final test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

6.4.2 Test Setup Diagram:



6.4.3 Test Data:

Please Refer to Appendix for Details.



6.5 Power spectral density

Test Requirement:	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Limit:	<p>For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.</p> <p>Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p> <p>For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.</p> <p>Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p>
Test Method:	ANSI C63.10-2013, section 12.5

Procedure:	Refer to ANSI C63.10-2013, section 12.5
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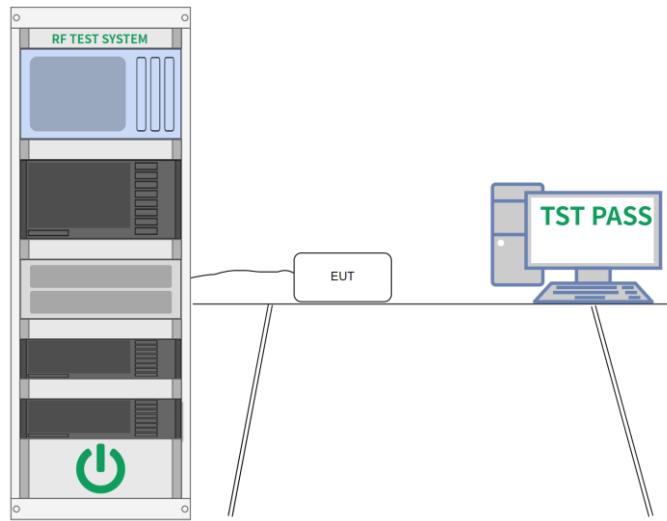
6.5.1 E.U.T. Operation:

Operating Environment:

Temperature: 25 °C Humidity: 58 % Atmospheric Pressure: 101 kPa

Pre test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

Final test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

6.5.2 Test Setup Diagram:**6.5.3 Test Data:**

Please Refer to Appendix for Details.



6.6 Band edge emissions (Radiated)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)																																																																										
Test Limit:	<p>For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.</p> <p>For transmitters operating solely in the 5.725-5.850 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p>																																																																										
<table border="1"> <thead> <tr> <th>MHz</th><th>MHz</th><th>MHz</th><th>GHz</th></tr> </thead> <tbody> <tr><td>0.090-0.110</td><td>16.42-16.423</td><td>399.9-410</td><td>4.5-5.15</td></tr> <tr><td>¹0.495-0.505</td><td>16.69475-16.69525</td><td>608-614</td><td>5.35-5.46</td></tr> <tr><td>2.1735-2.1905</td><td>16.80425-16.80475</td><td>960-1240</td><td>7.25-7.75</td></tr> <tr><td>4.125-4.128</td><td>25.5-25.67</td><td>1300-1427</td><td>8.025-8.5</td></tr> <tr><td>4.17725-4.17775</td><td>37.5-38.25</td><td>1435-1626.5</td><td>9.0-9.2</td></tr> <tr><td>4.20725-4.20775</td><td>73-74.6</td><td>1645.5-1646.5</td><td>9.3-9.5</td></tr> <tr><td>6.215-6.218</td><td>74.8-75.2</td><td>1660-1710</td><td>10.6-12.7</td></tr> <tr><td>6.26775-6.26825</td><td>108-121.94</td><td>1718.8-1722.2</td><td>13.25-13.4</td></tr> <tr><td>6.31175-6.31225</td><td>123-138</td><td>2200-2300</td><td>14.47-14.5</td></tr> <tr><td>8.291-8.294</td><td>149.9-150.05</td><td>2310-2390</td><td>15.35-16.2</td></tr> <tr><td>8.362-8.366</td><td>156.52475-156.52525</td><td>2483.5-2500</td><td>17.7-21.4</td></tr> <tr><td>8.37625-8.38675</td><td>156.7-156.9</td><td>2690-2900</td><td>22.01-23.12</td></tr> <tr><td>8.41425-8.41475</td><td>162.0125-167.17</td><td>3260-3267</td><td>23.6-24.0</td></tr> <tr><td>12.29-12.293</td><td>167.72-173.2</td><td>3332-3339</td><td>31.2-31.8</td></tr> <tr><td>12.51975-12.52025</td><td>240-285</td><td>3345.8-3358</td><td>36.43-36.5</td></tr> <tr><td>12.57675-12.57725</td><td>322-335.4</td><td>3600-4400</td><td>(²)</td></tr> <tr><td>13.36-13.41</td><td></td><td></td><td></td></tr> </tbody> </table>				MHz	MHz	MHz	GHz	0.090-0.110	16.42-16.423	399.9-410	4.5-5.15	¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46	2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75	4.125-4.128	25.5-25.67	1300-1427	8.025-8.5	4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2	4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5	6.215-6.218	74.8-75.2	1660-1710	10.6-12.7	6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4	6.31175-6.31225	123-138	2200-2300	14.47-14.5	8.291-8.294	149.9-150.05	2310-2390	15.35-16.2	8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4	8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12	8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0	12.29-12.293	167.72-173.2	3332-3339	31.2-31.8	12.51975-12.52025	240-285	3345.8-3358	36.43-36.5	12.57675-12.57725	322-335.4	3600-4400	(²)	13.36-13.41			
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<p>¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.</p> <p>² Above 38.6</p> <p>The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p>																																																																											



Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2013, section 12.7.4, 12.7.6, 12.7.7
Procedure:	<p>Above 1GHz:</p> <p>a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>Remark:</p> <ol style="list-style-type: none"> 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength



limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6.6.1 E.U.T. Operation:

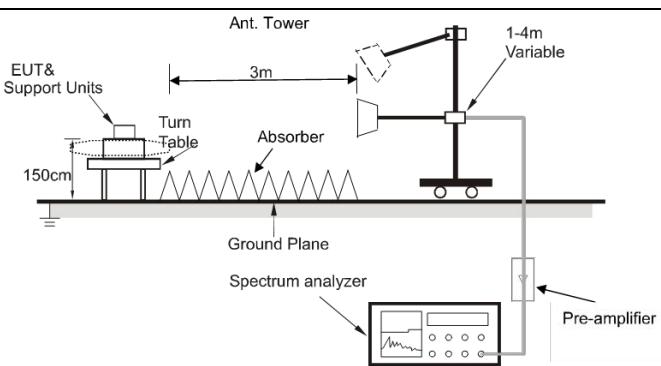
Operating Environment:

Temperature: 25 °C Humidity: 58 % Atmospheric Pressure: 101 kPa

Pre test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

Final test mode: Mode1, Mode2, Mode3, Mode4, Mode5, Mode6

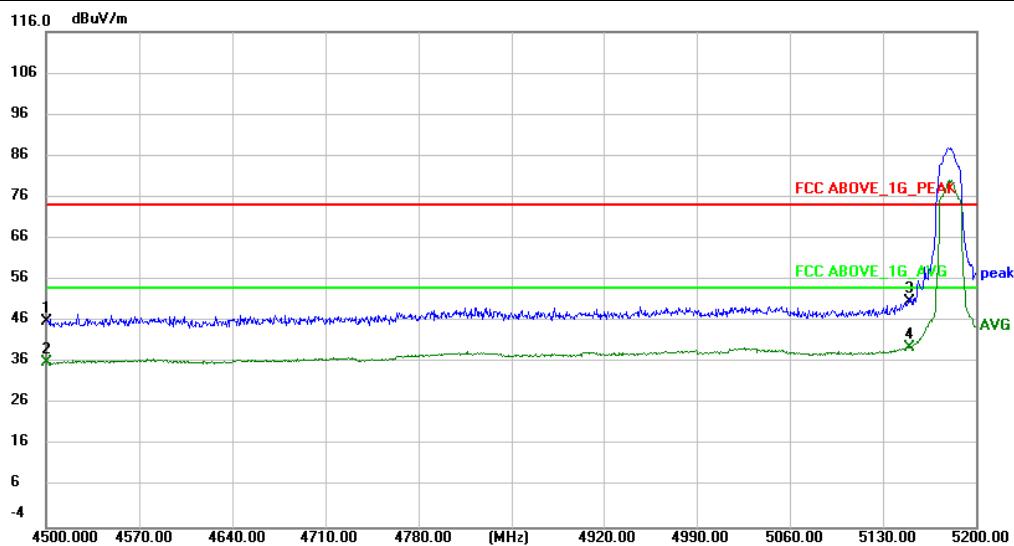
6.6.2 Test Setup Diagram:





6.6.3 Test Data:

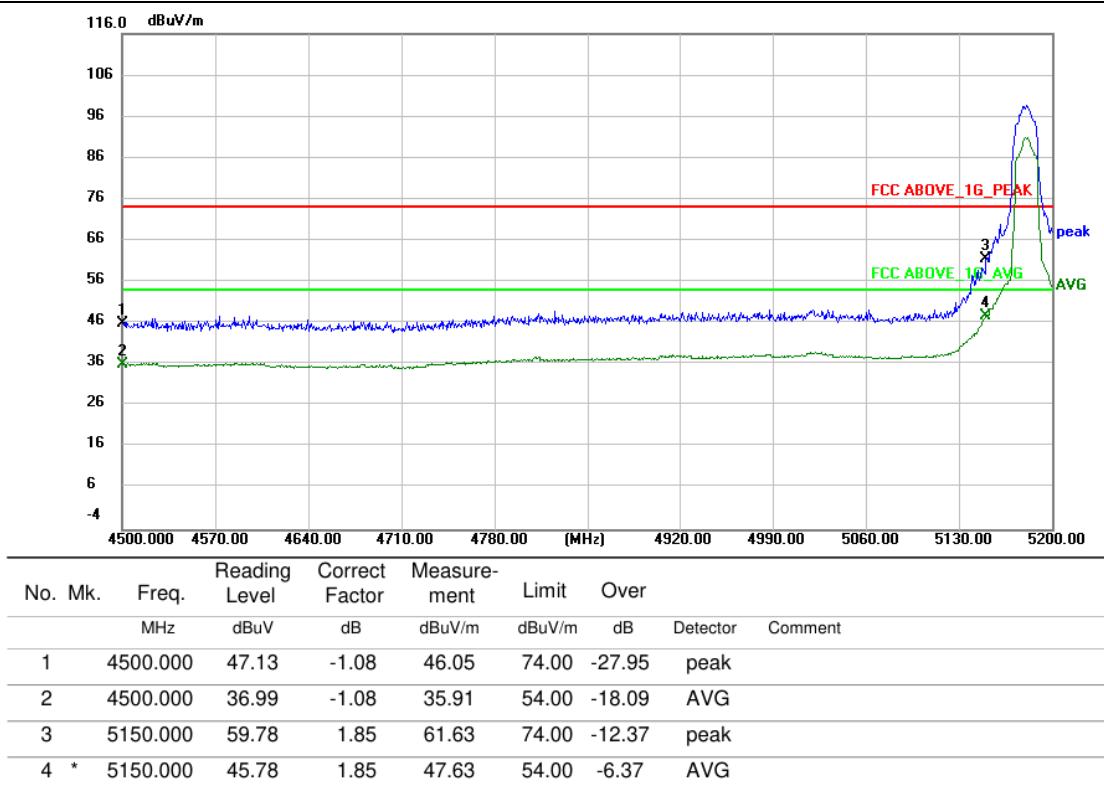
Mode1 / Polarization: Horizontal / U-NII Band 1 / 5180



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		4500.000	47.11	-1.08	46.03	74.00	-27.97	peak
2		4500.000	37.17	-1.08	36.09	54.00	-17.91	AVG
3		5150.000	49.03	1.85	50.88	74.00	-23.12	peak
4	*	5150.000	37.85	1.85	39.70	54.00	-14.30	AVG

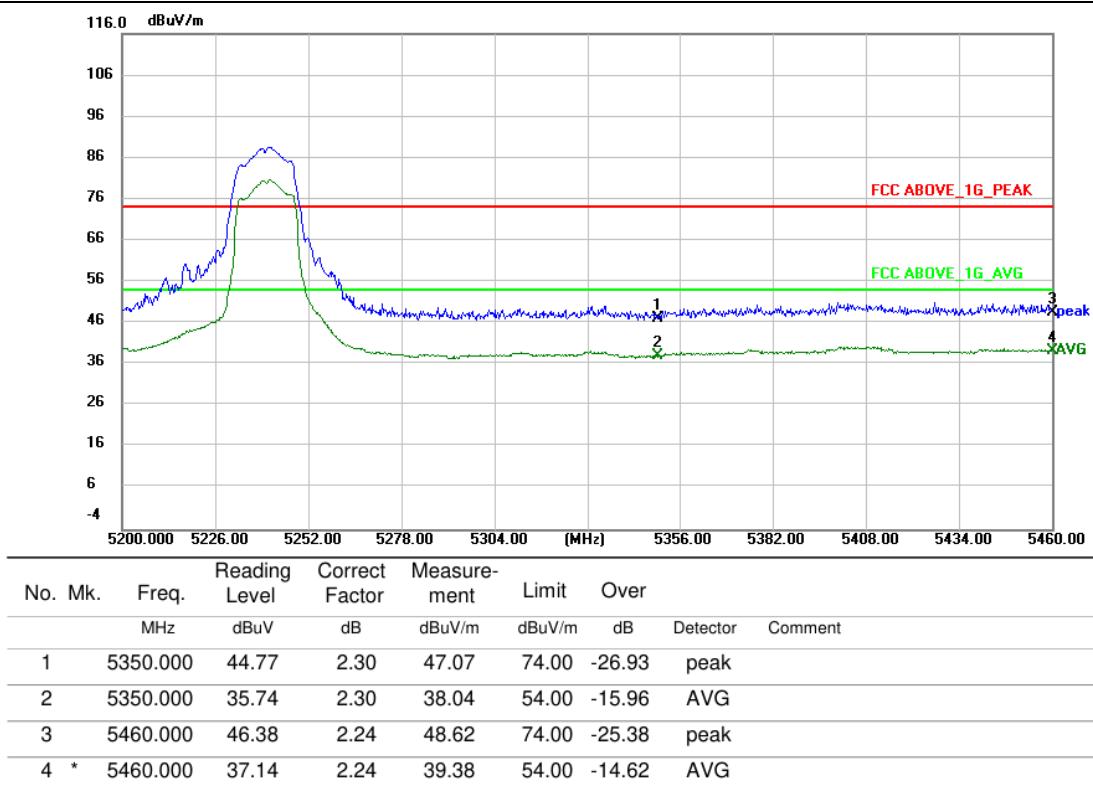


Mode1 / Polarization: Vertical / U-NII Band 1 / 5180



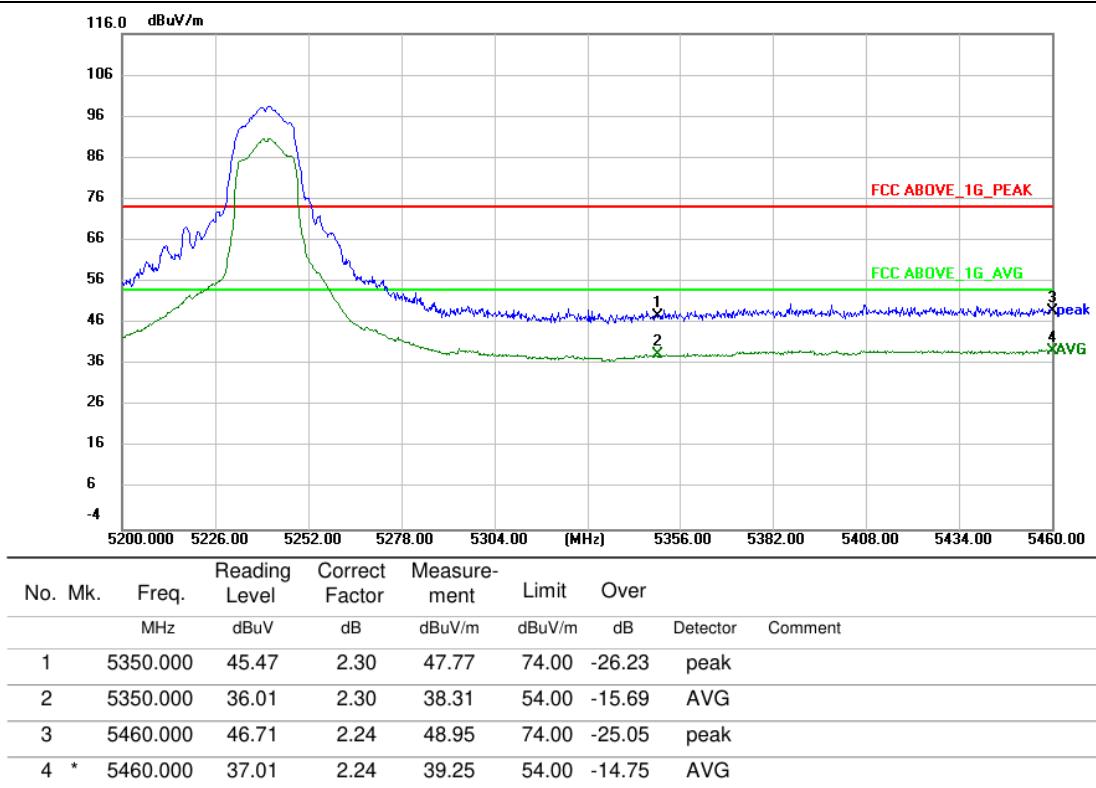


Mode1 / Polarization: Horizontal / U-NII Band 1 / 5240



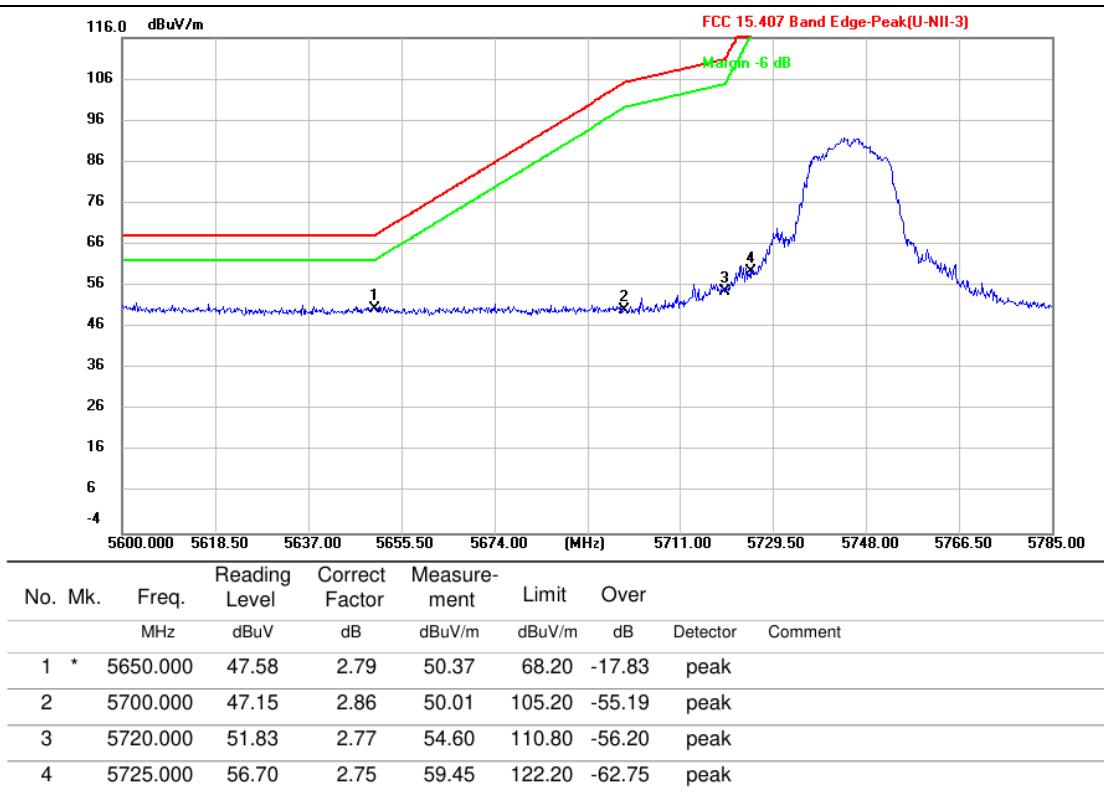


Mode1 / Polarization: Vertical / U-NII Band 1 / 5240



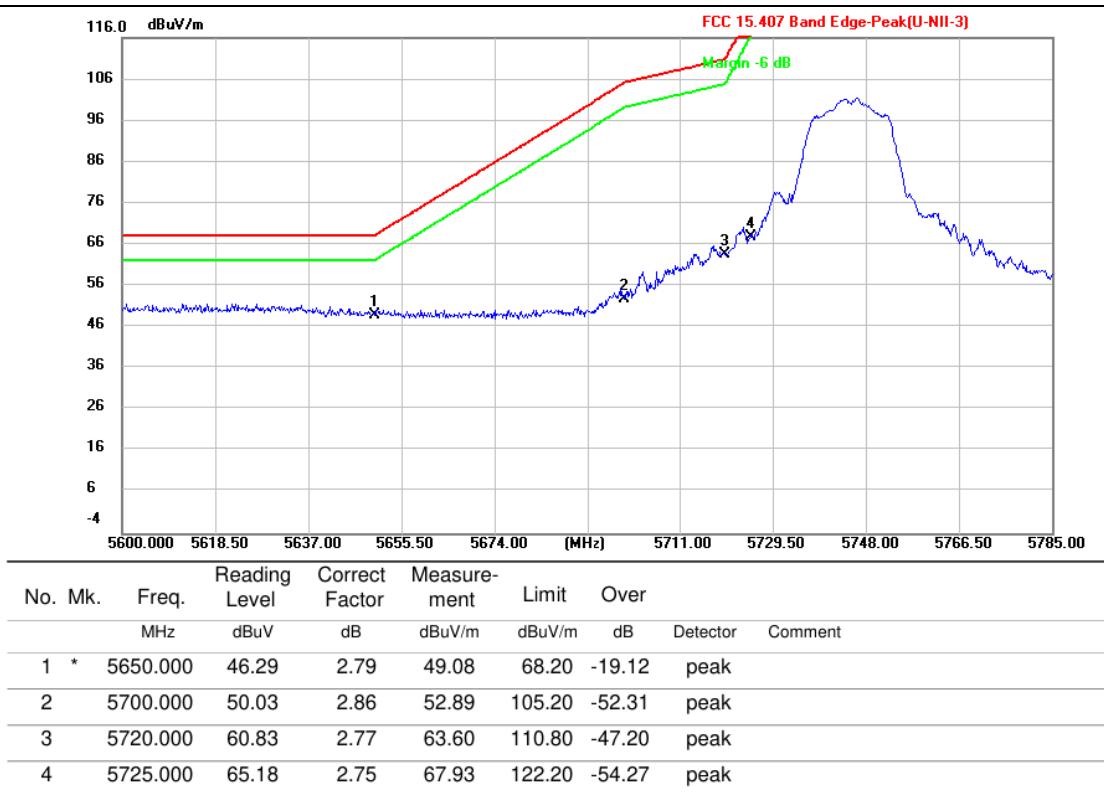


Mode1 / Polarization: Horizontal / U-NII Band 3 / 5745



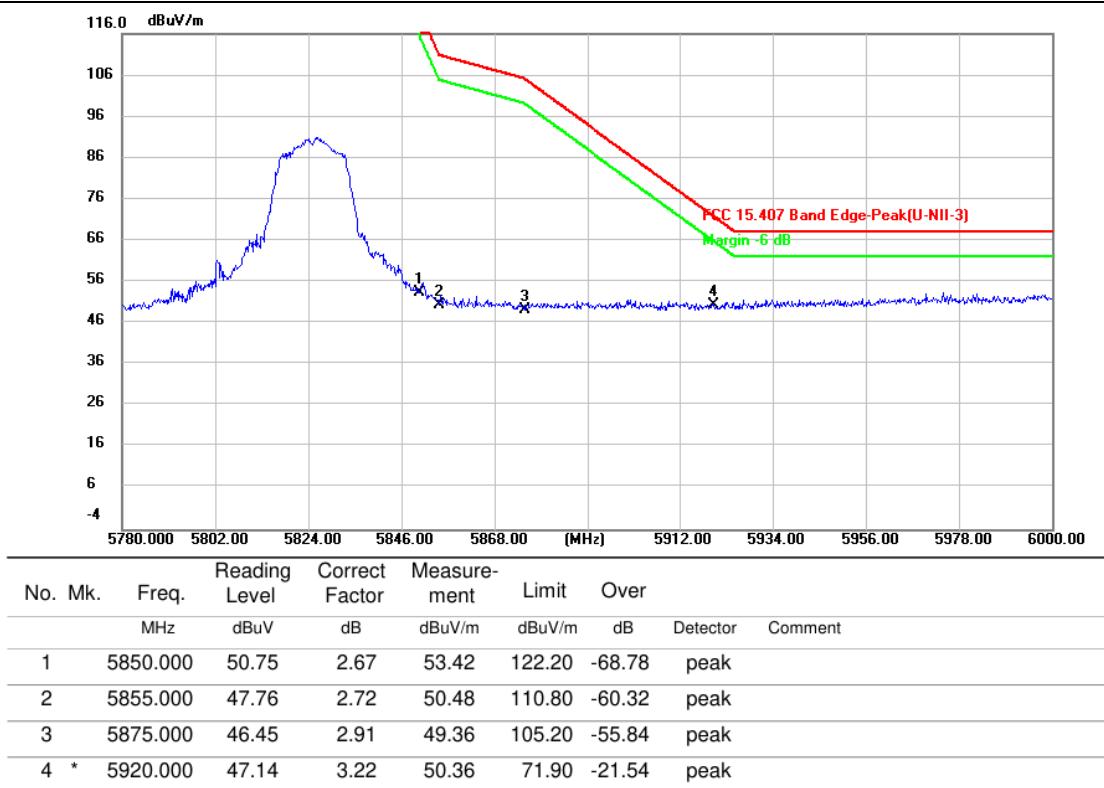


Mode1 / Polarization: Vertical / U-NII Band 3 / 5745



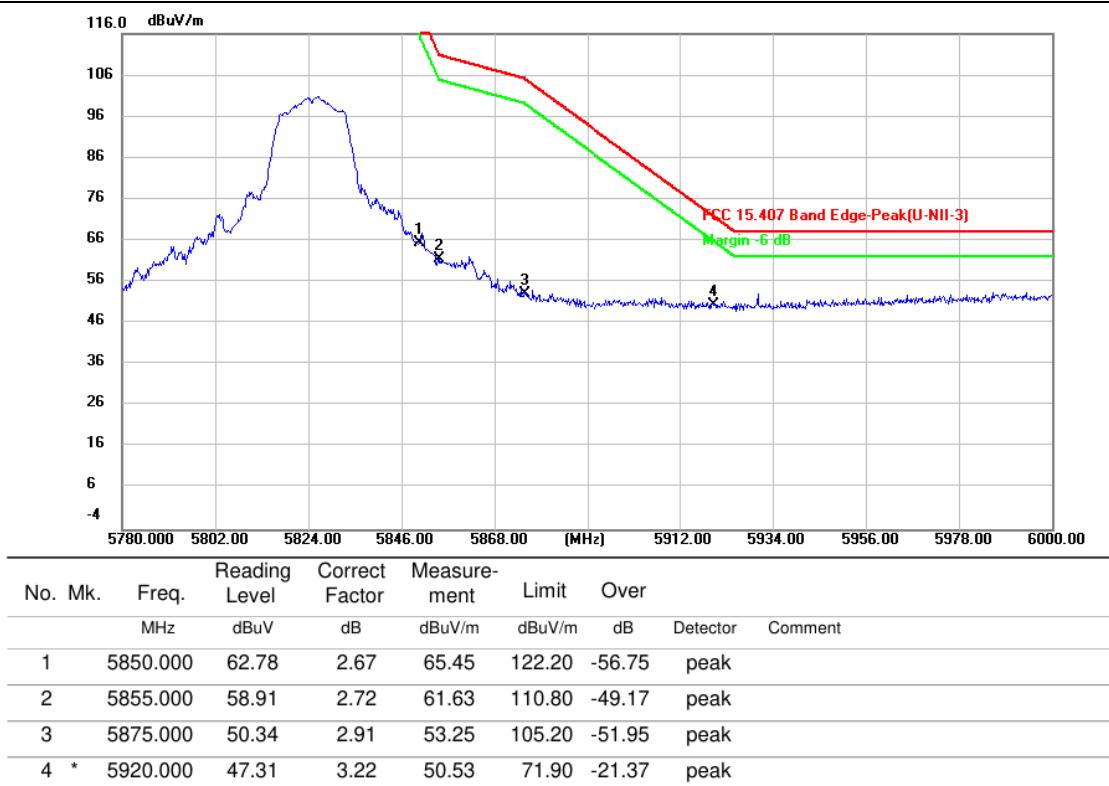


Mode1 / Polarization: Horizontal / U-NII Band 3 / 5825



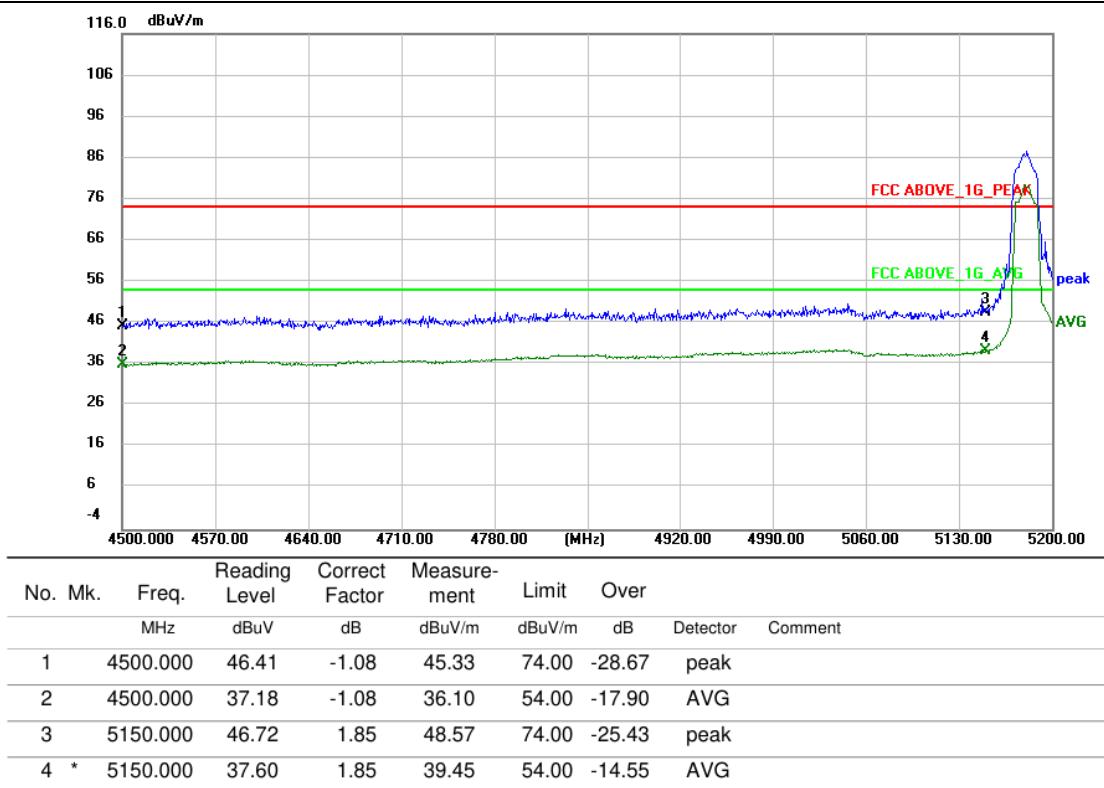


Mode1 / Polarization: Vertical / U-NII Band 3 / 5825



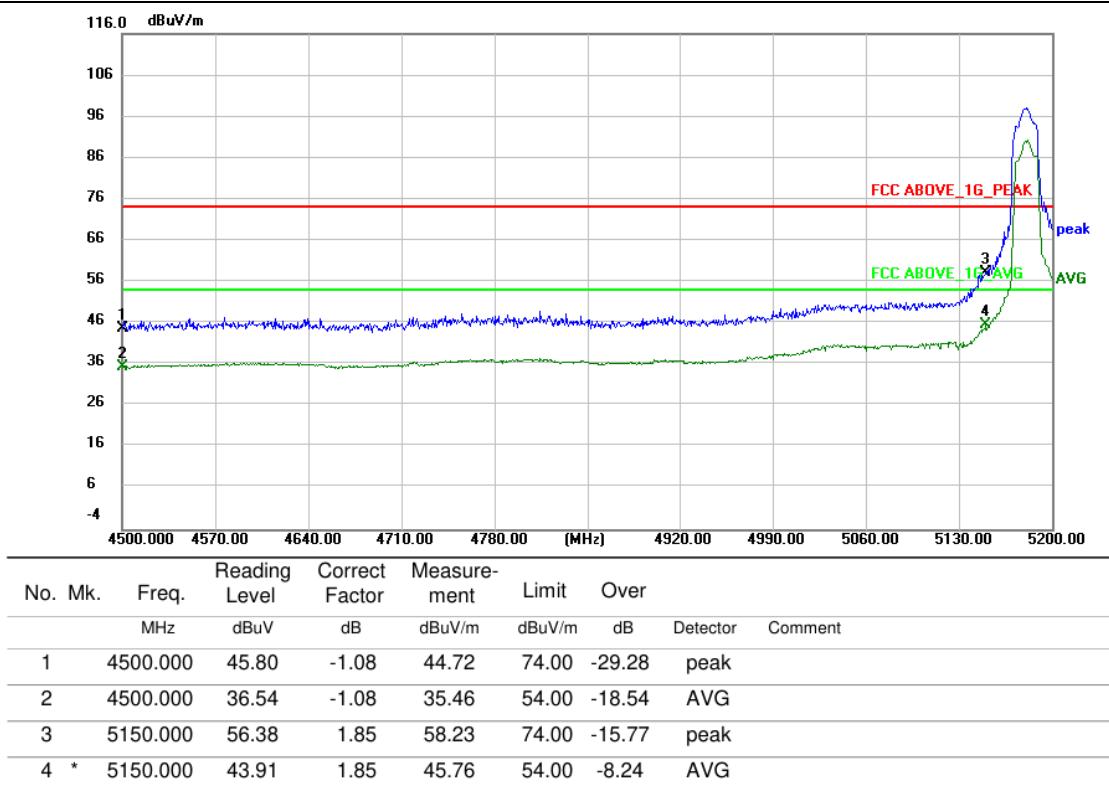


Mode2 / Polarization: Horizontal / U-NII Band 1 / 5190



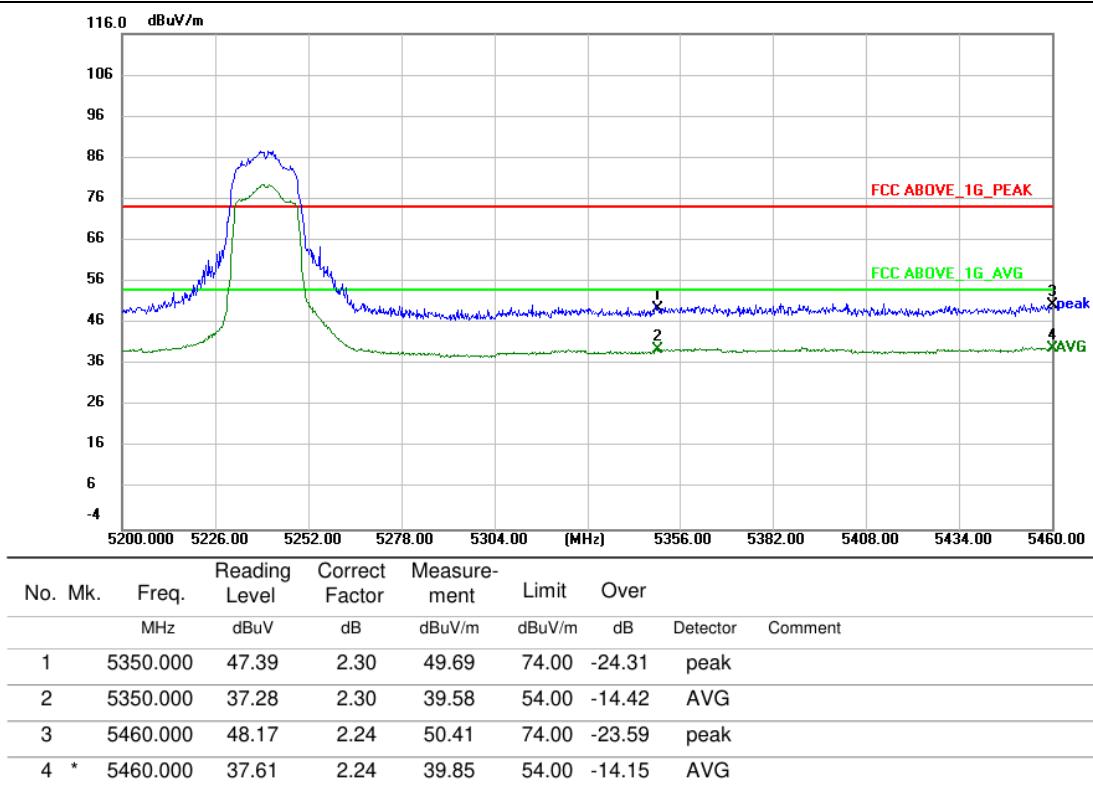


Mode2 / Polarization: Vertical / U-NII Band 1 / 5190



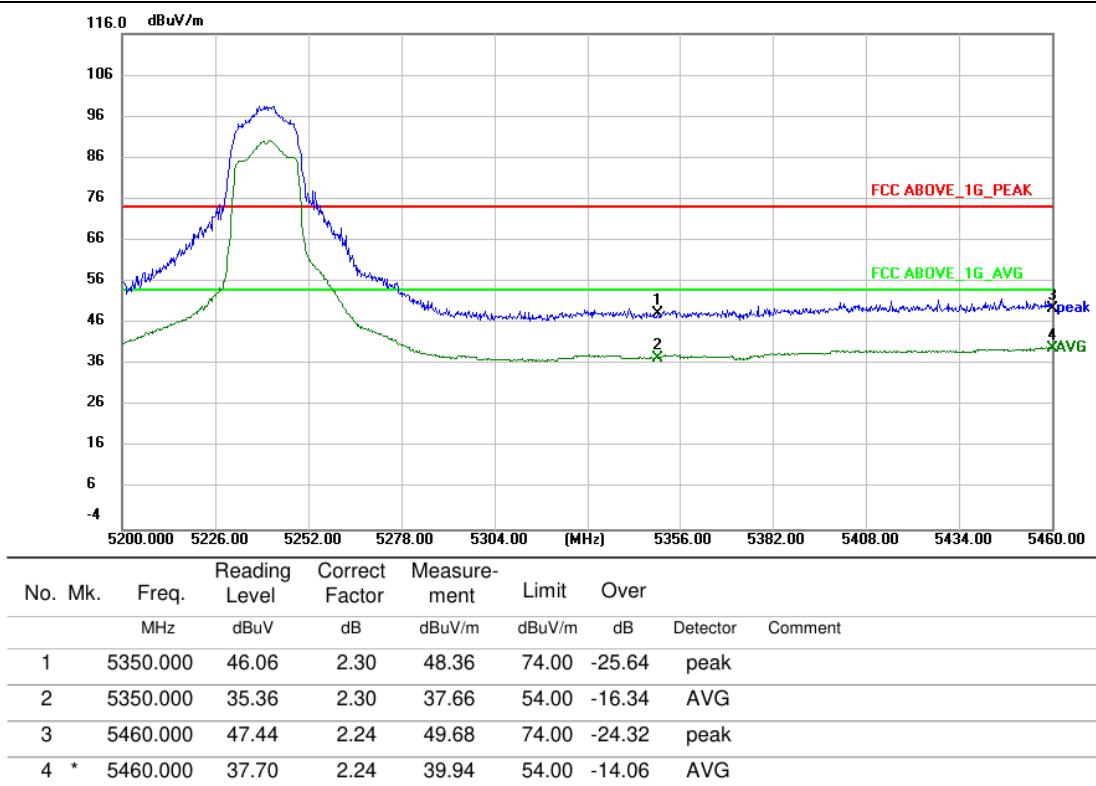


Mode2 / Polarization: Horizontal / U-NII Band 1 / 5240



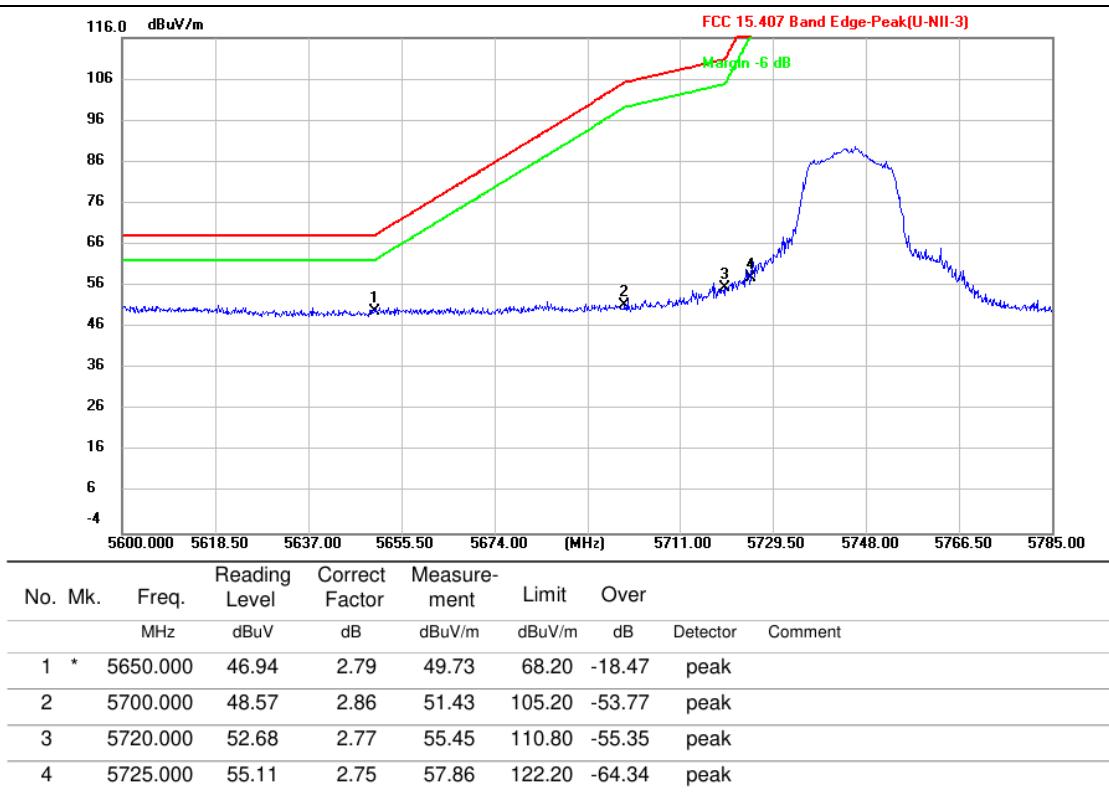


Mode2 / Polarization: Vertical / U-NII Band 1 / 5240



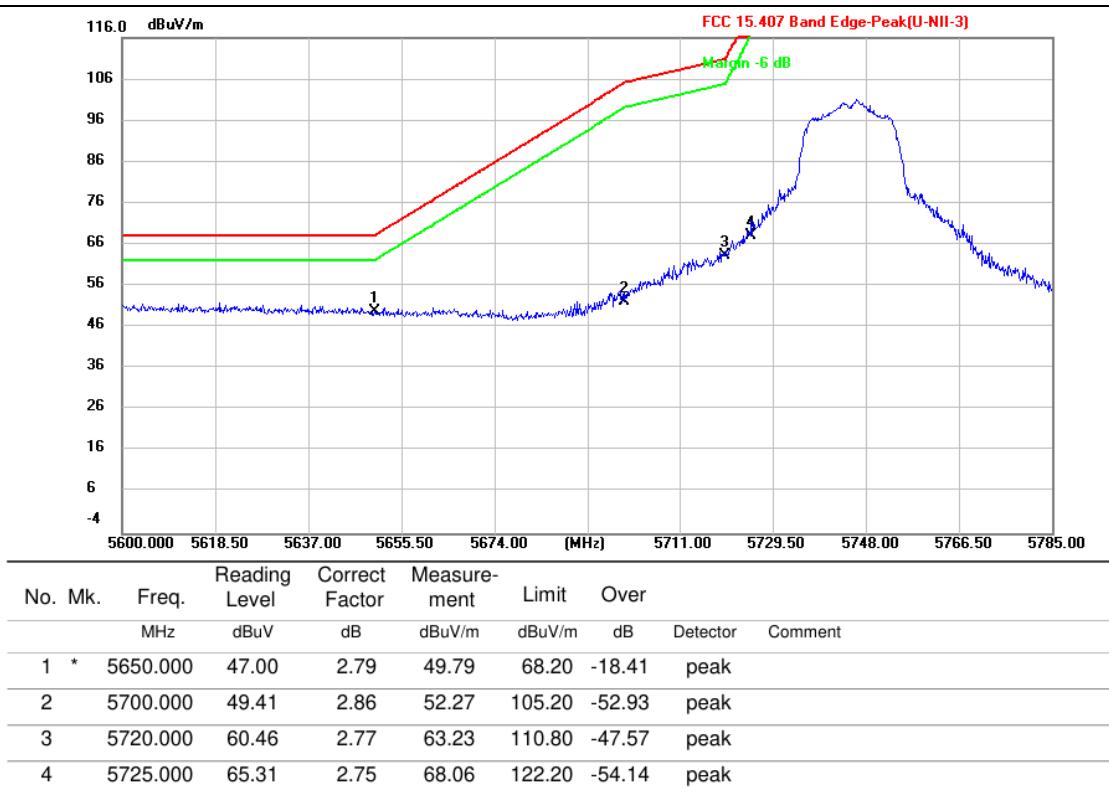


Mode2 / Polarization: Horizontal / U-NII Band 3 / 5745



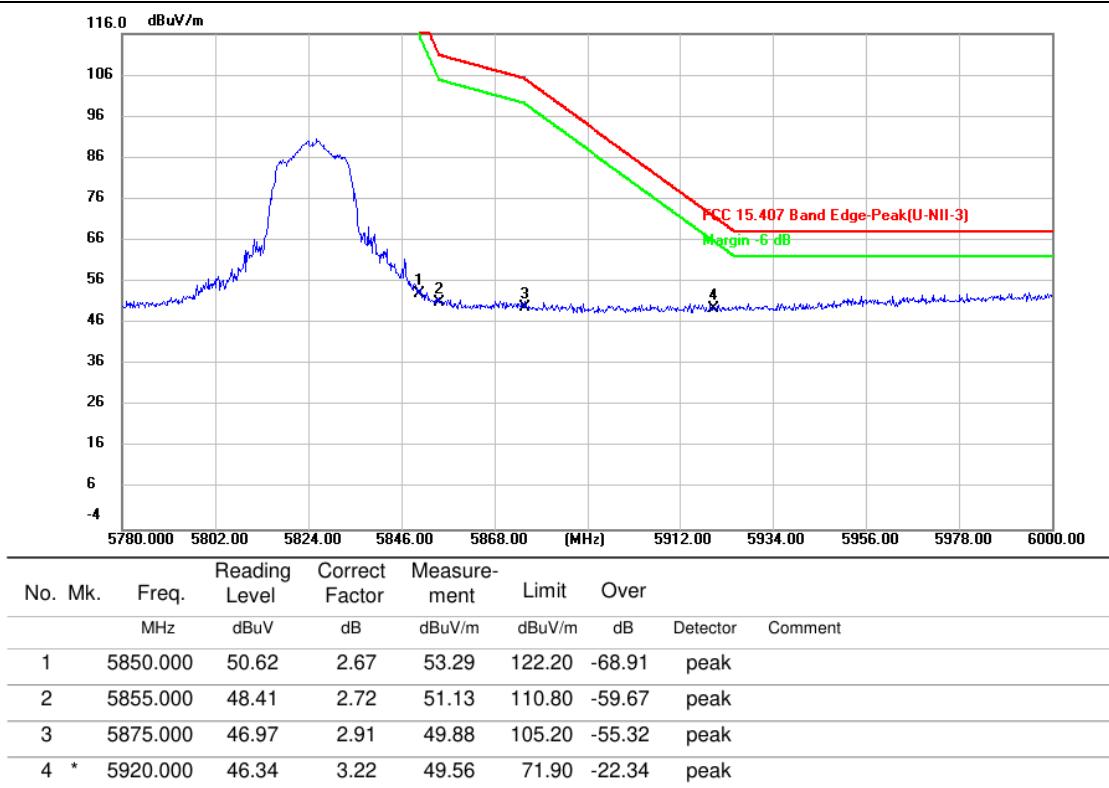


Mode2 / Polarization: Vertical / U-NII Band 3 / 5745



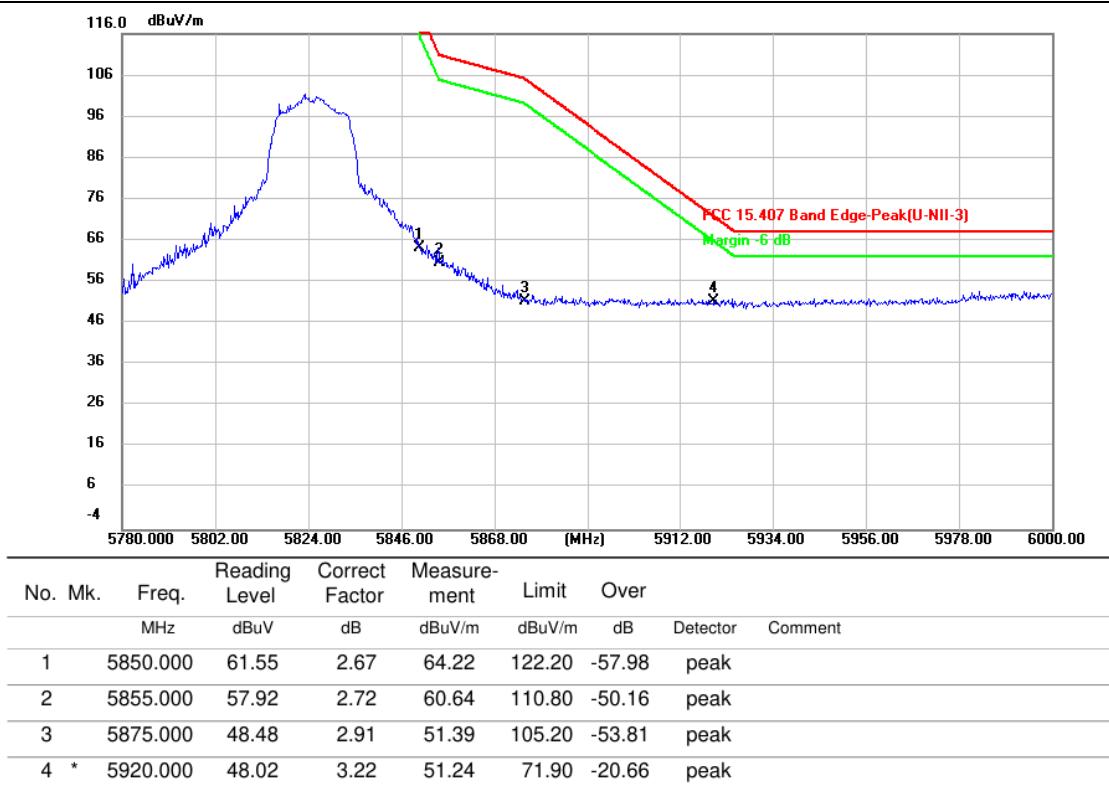


Mode2 / Polarization: Horizontal / U-NII Band 3 / 5825



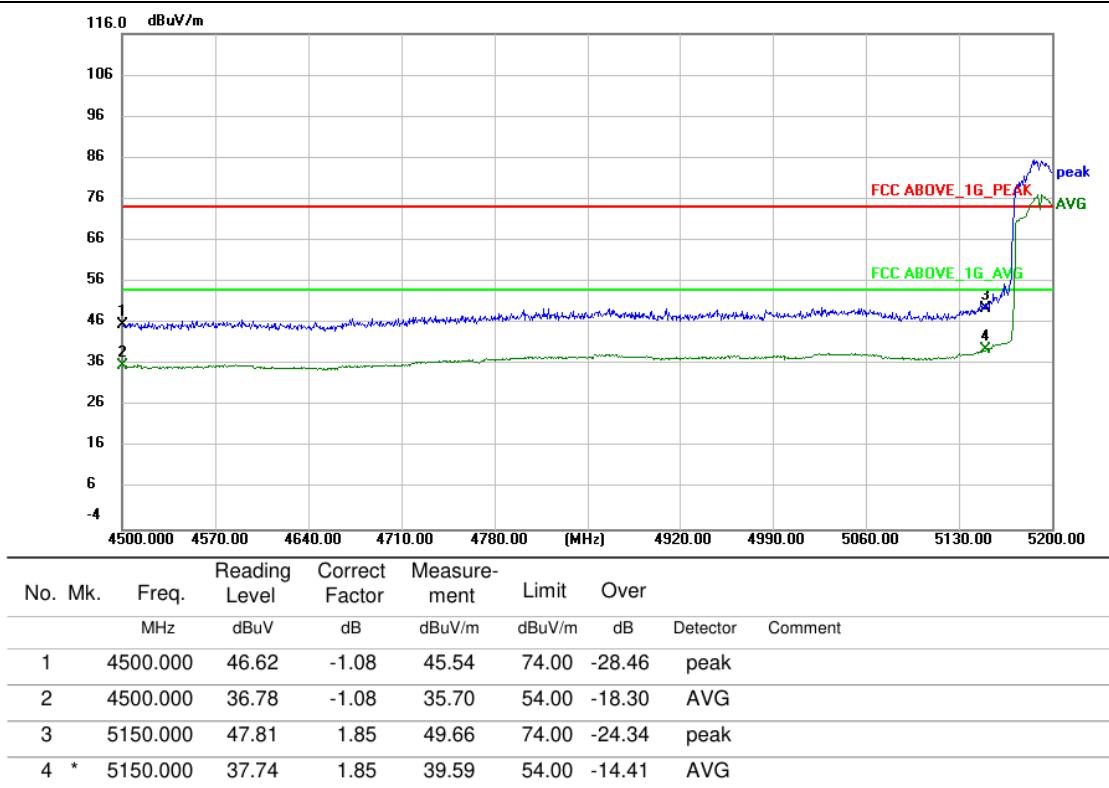


Mode2 / Polarization: Vertical / U-NII Band 3 / 5825



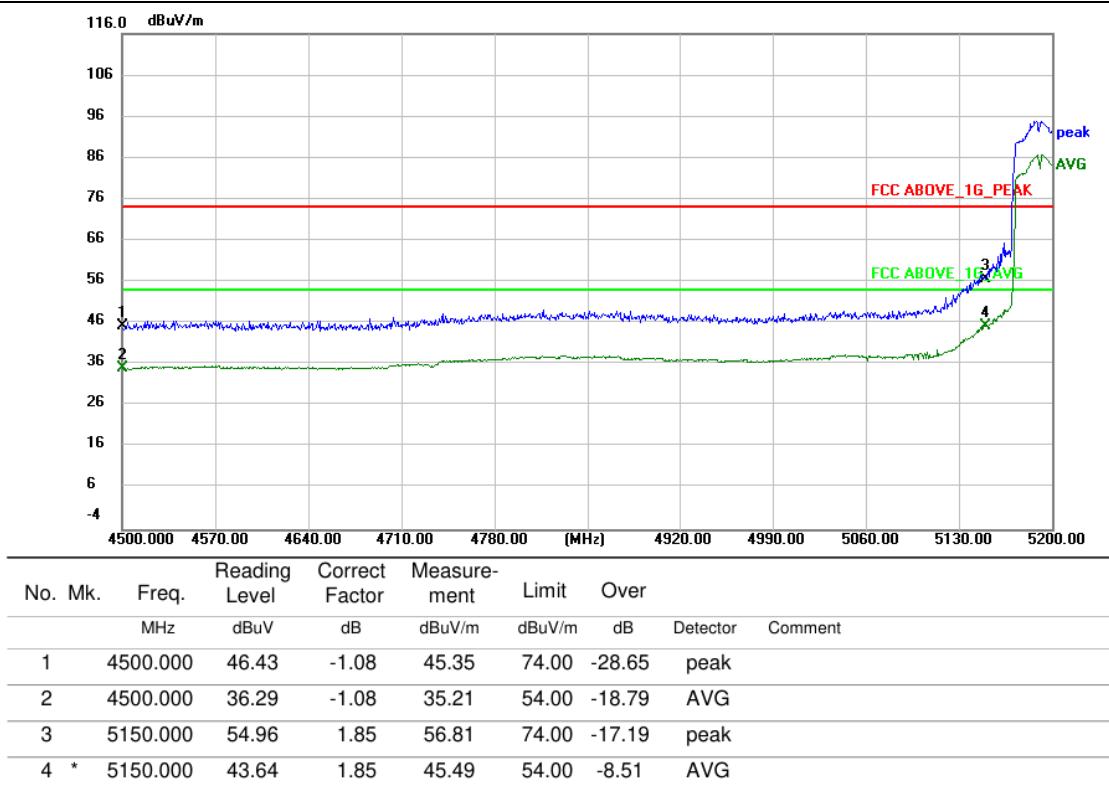


Mode3 / Polarization: Horizontal / U-NII Band 1 / 5190



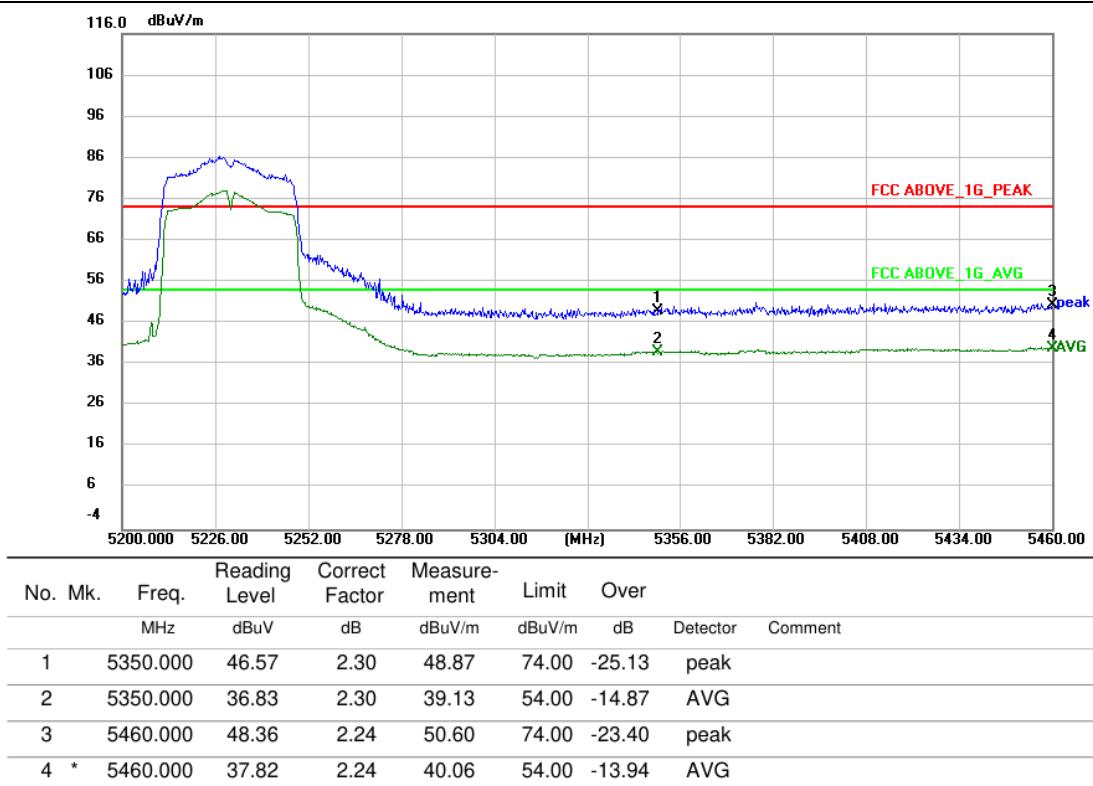


Mode3 / Polarization: Vertical / U-NII Band 1 / 5190



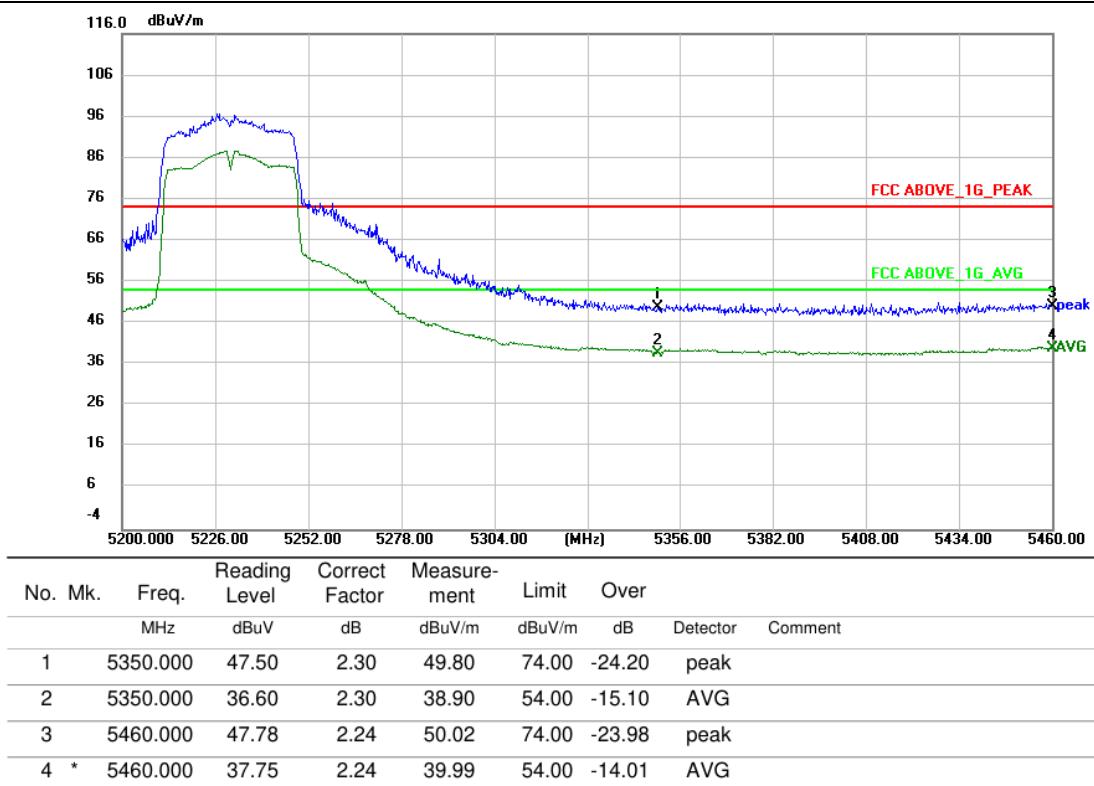


Mode3 / Polarization: Horizontal / U-NII Band 1 / 5230



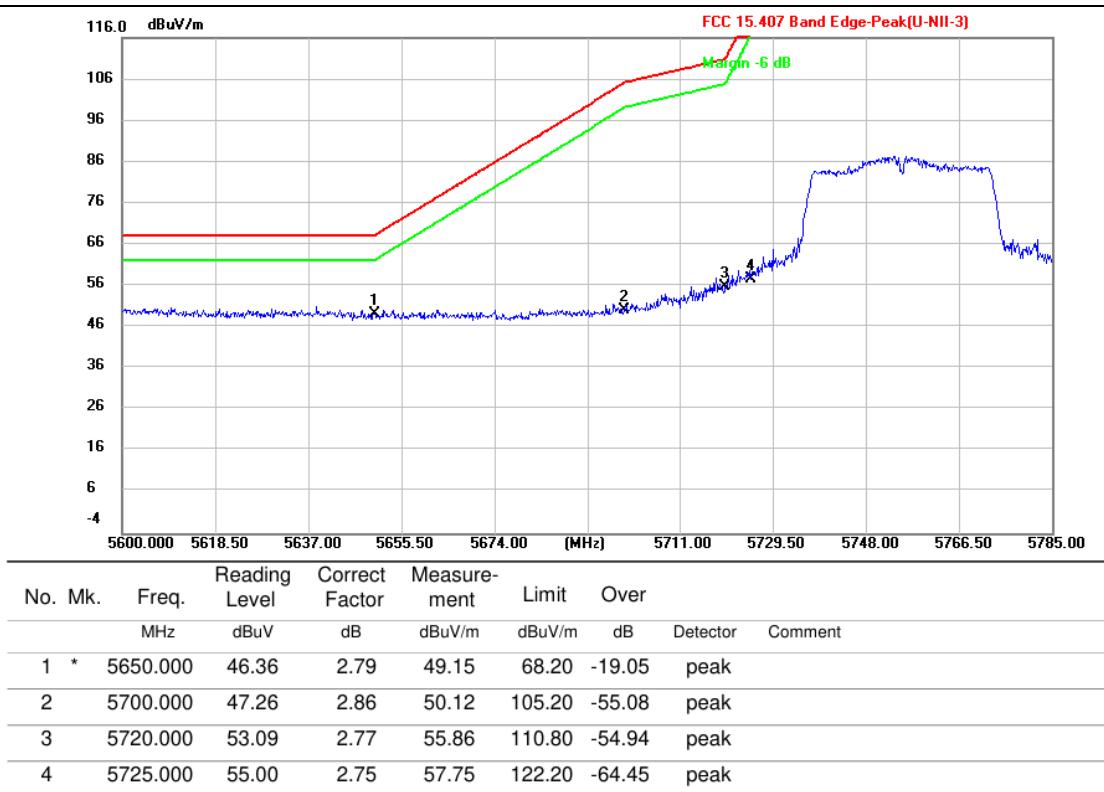


Mode3 / Polarization: Vertical / U-NII Band 1 / 5230



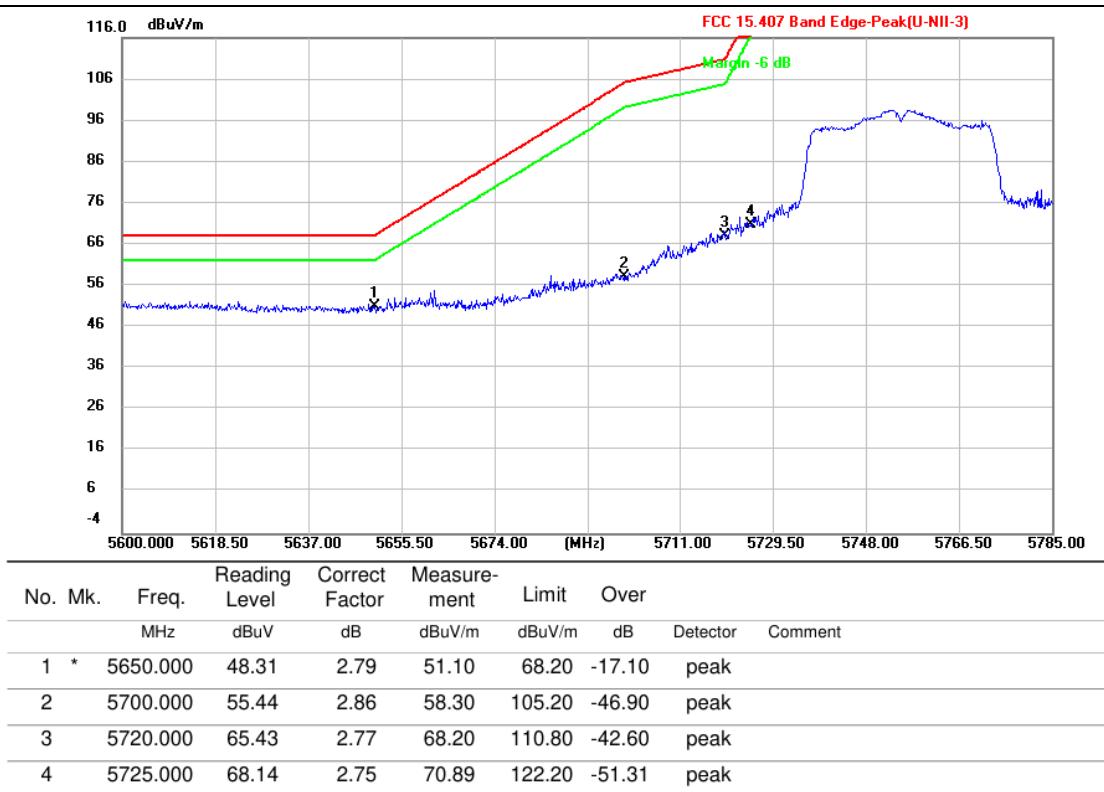


Mode3 / Polarization: Horizontal / U-NII Band 3 / 5755



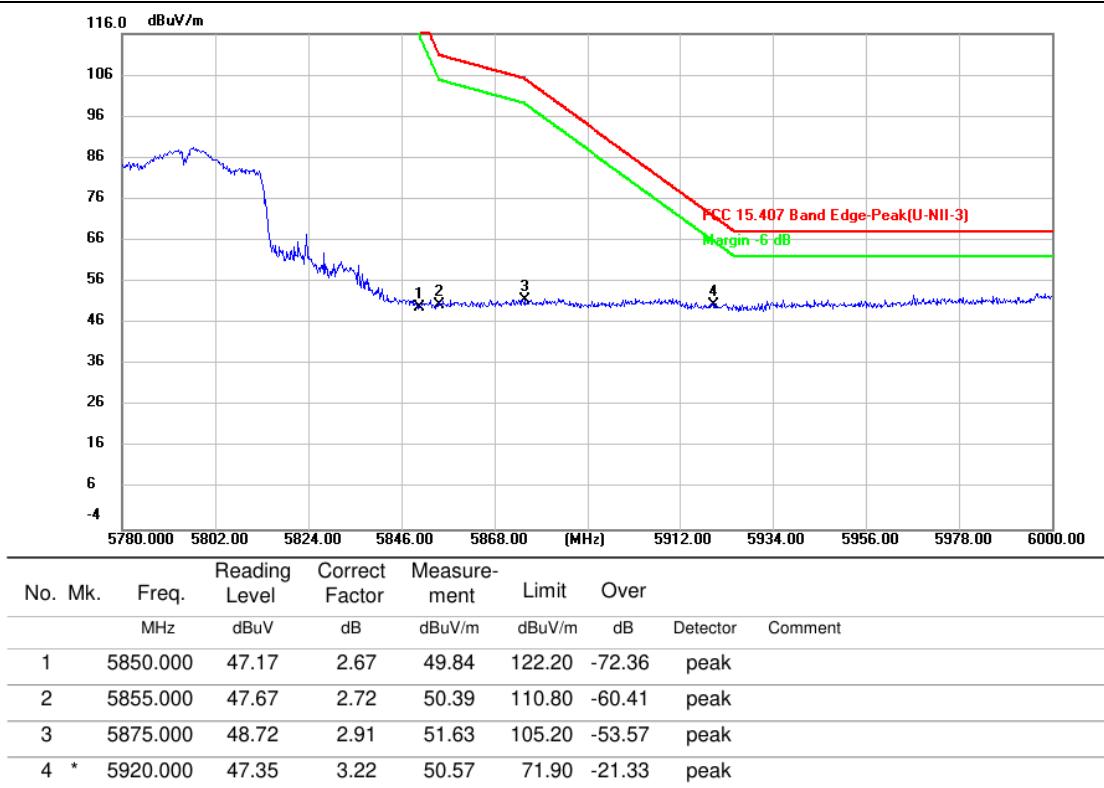


Mode3 / Polarization: Vertical / U-NII Band 3 / 5755



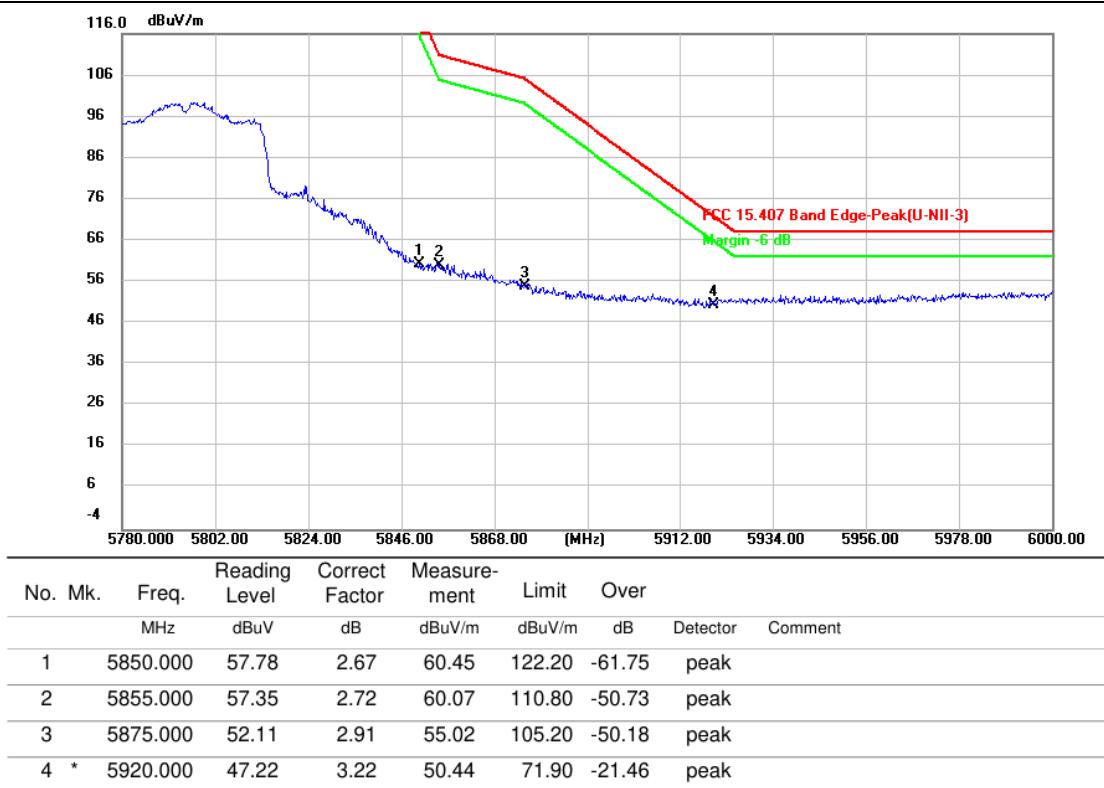


Mode3 / Polarization: Horizontal / U-NII Band 3 / 5795



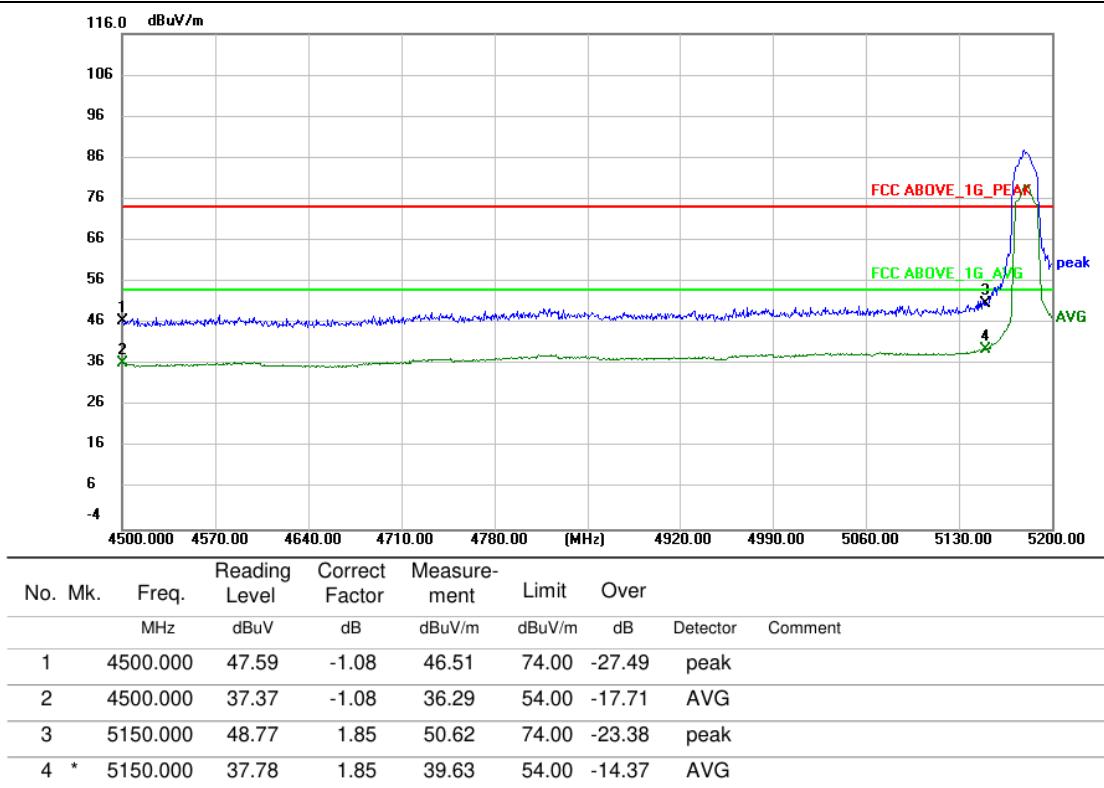


Mode3 / Polarization: Vertical / U-NII Band 3 / 5795



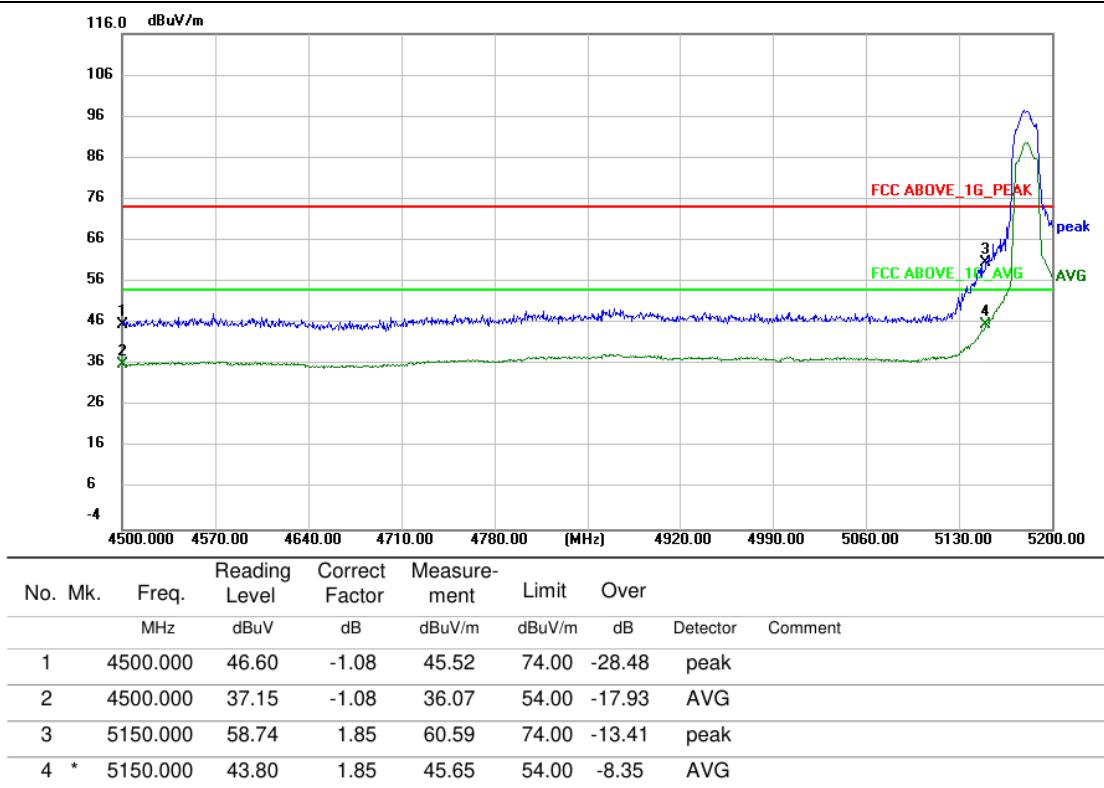


Mode4 / Polarization: Horizontal / U-NII Band 1 / 5180



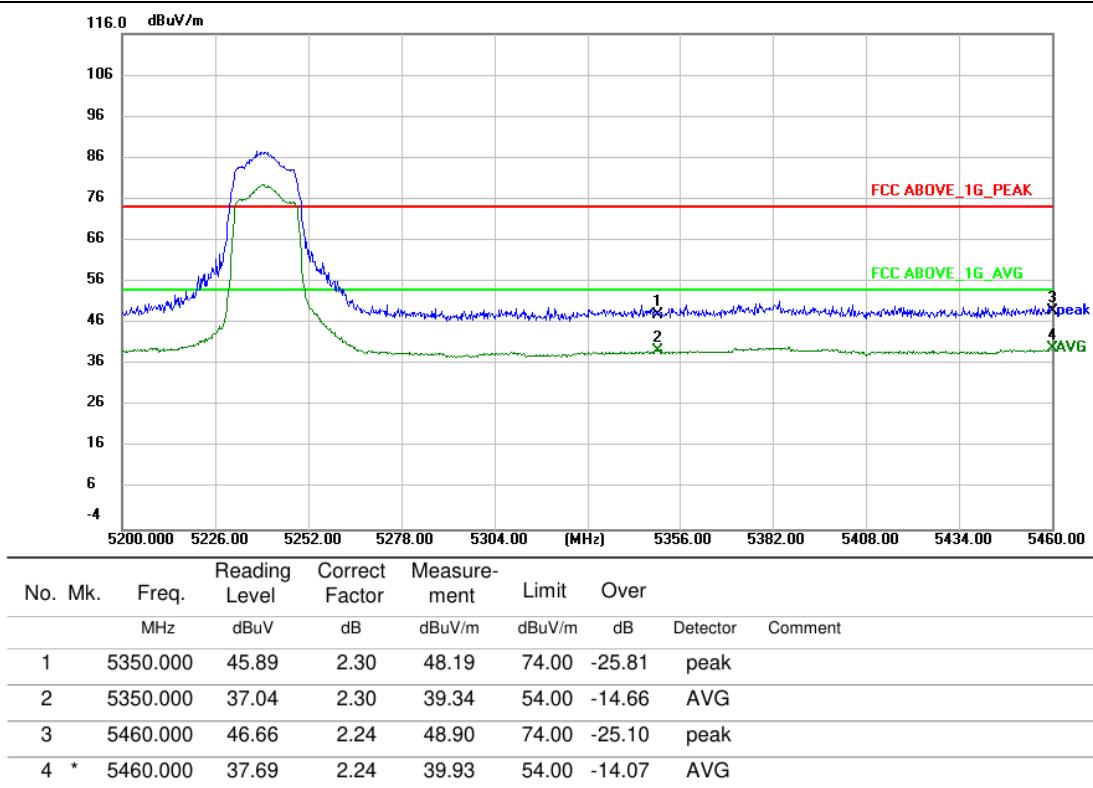


Mode4 / Polarization: Vertical / U-NII Band 1 / 5180



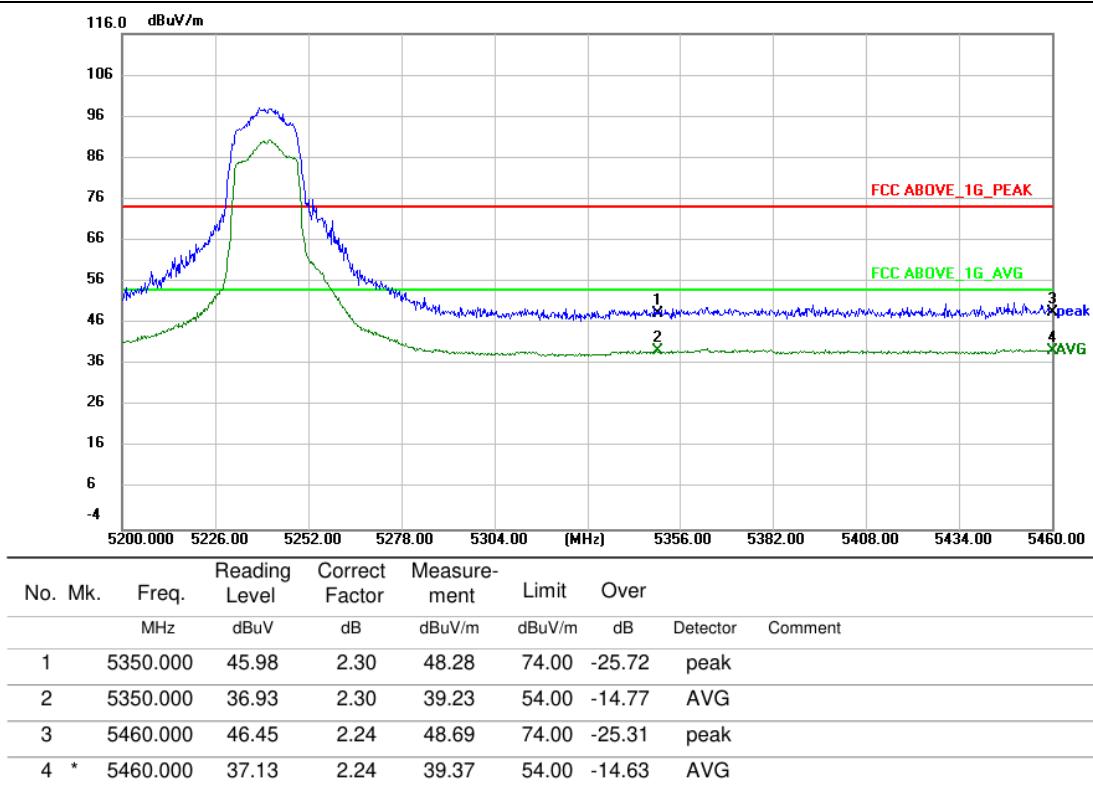


Mode4 / Polarization: Horizontal / U-NII Band 1 / 5240



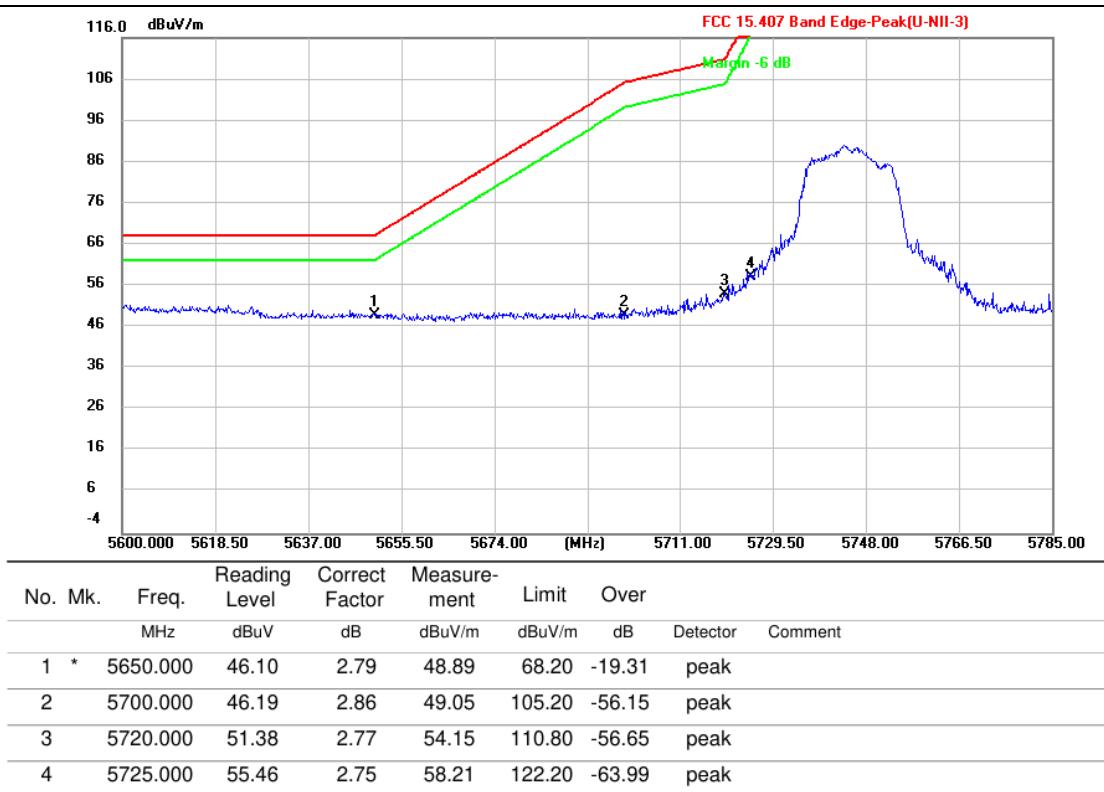


Mode4 / Polarization: Vertical / U-NII Band 1 / 5240



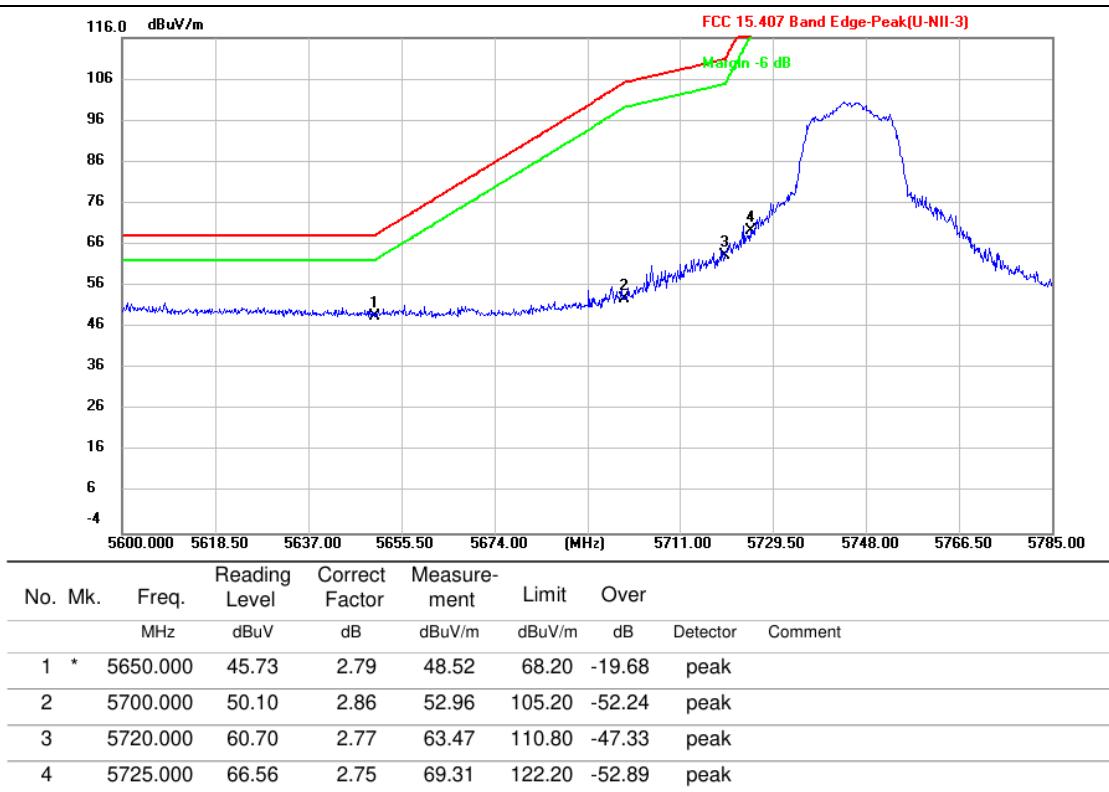


Mode4 / Polarization: Horizontal / U-NII Band 3 / 5745



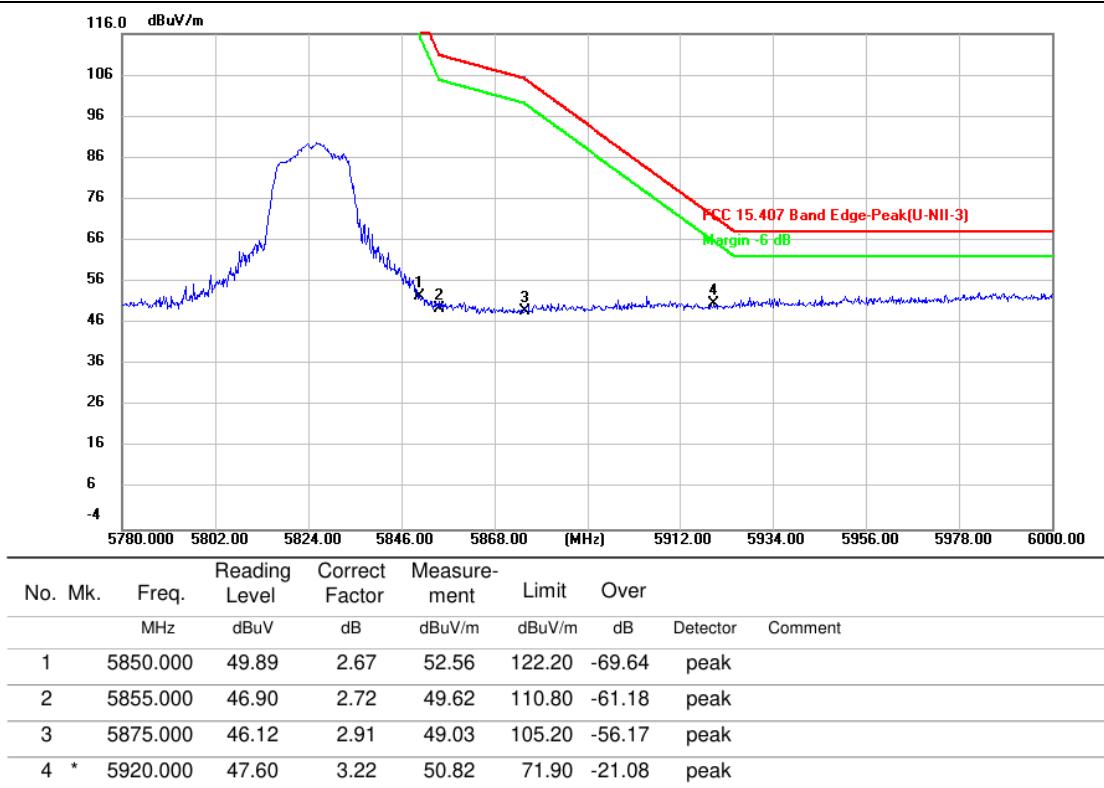


Mode4 / Polarization: Vertical / U-NII Band 3 / 5745



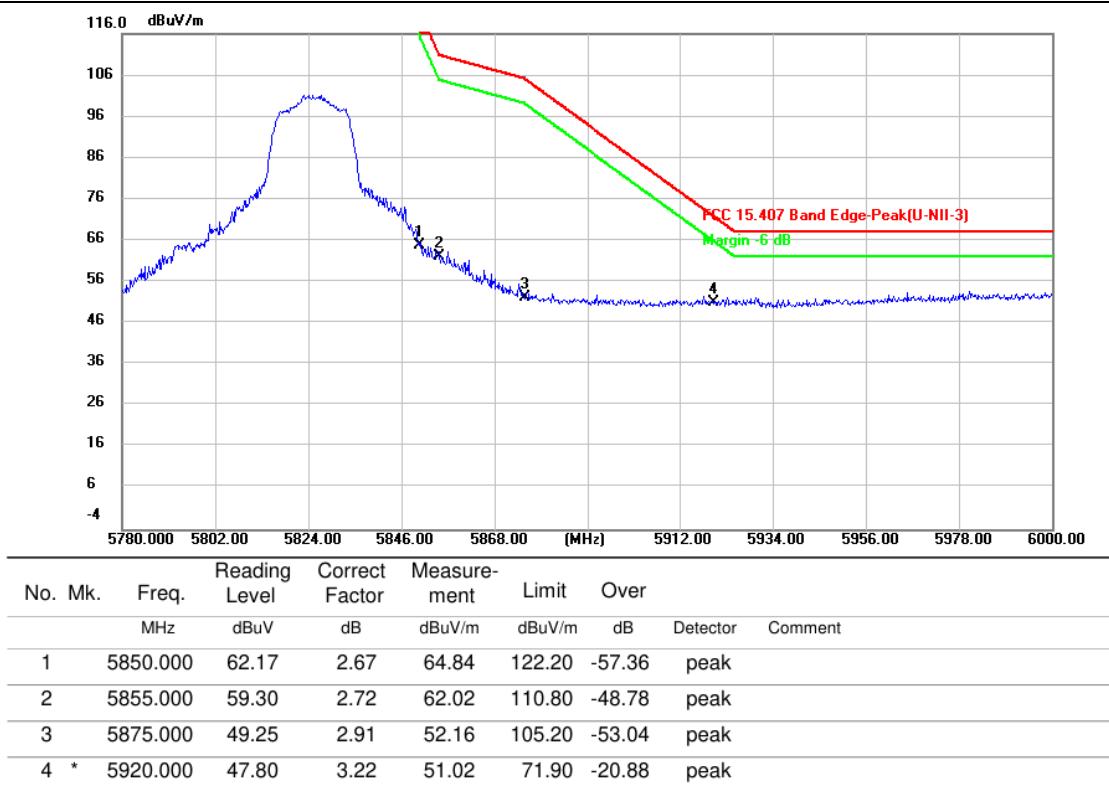


Mode4 / Polarization: Horizontal / U-NII Band 3 / 5825



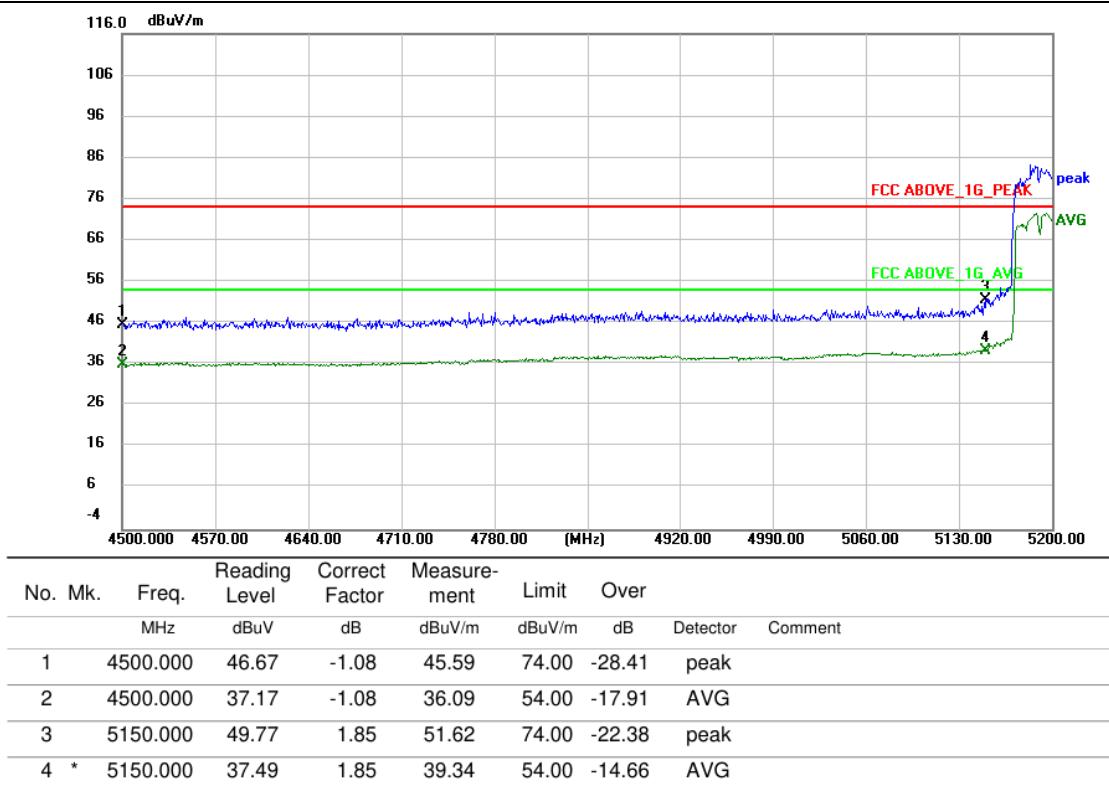


Mode4 / Polarization: Vertical / U-NII Band 3 / 5825



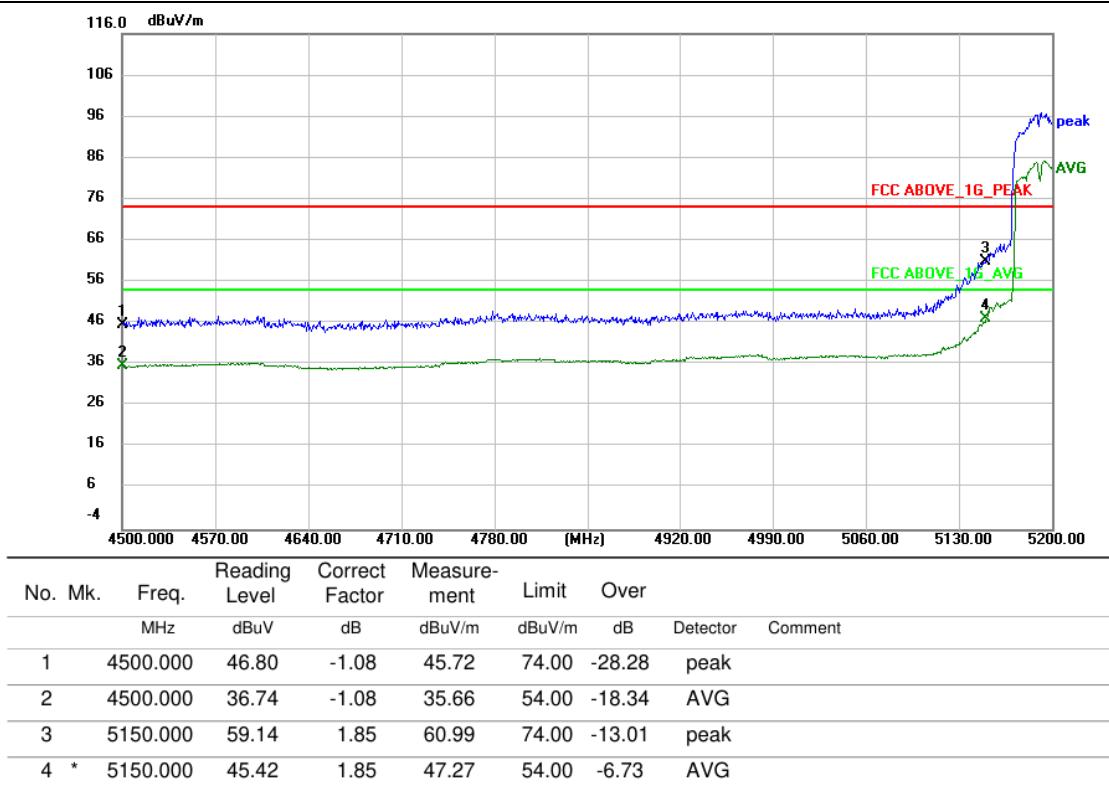


Mode5 / Polarization: Horizontal / U-NII Band 1 / 5190



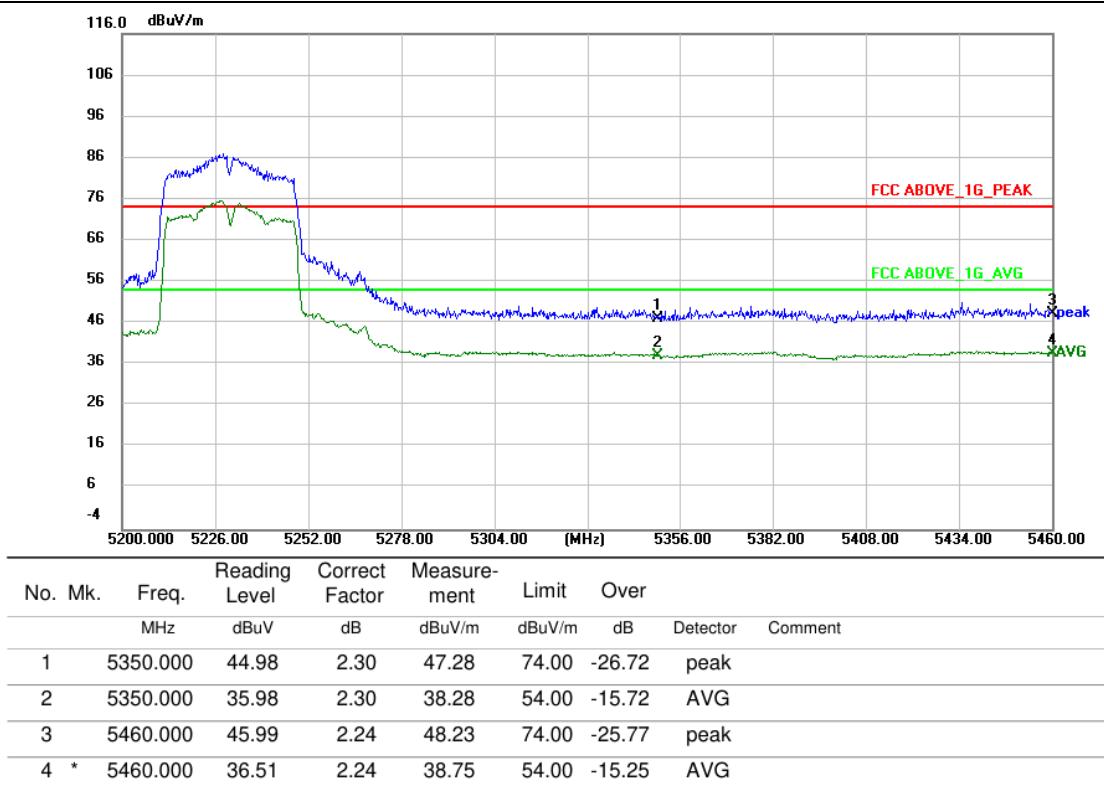


Mode5 / Polarization: Vertical / U-NII Band 1 / 5190



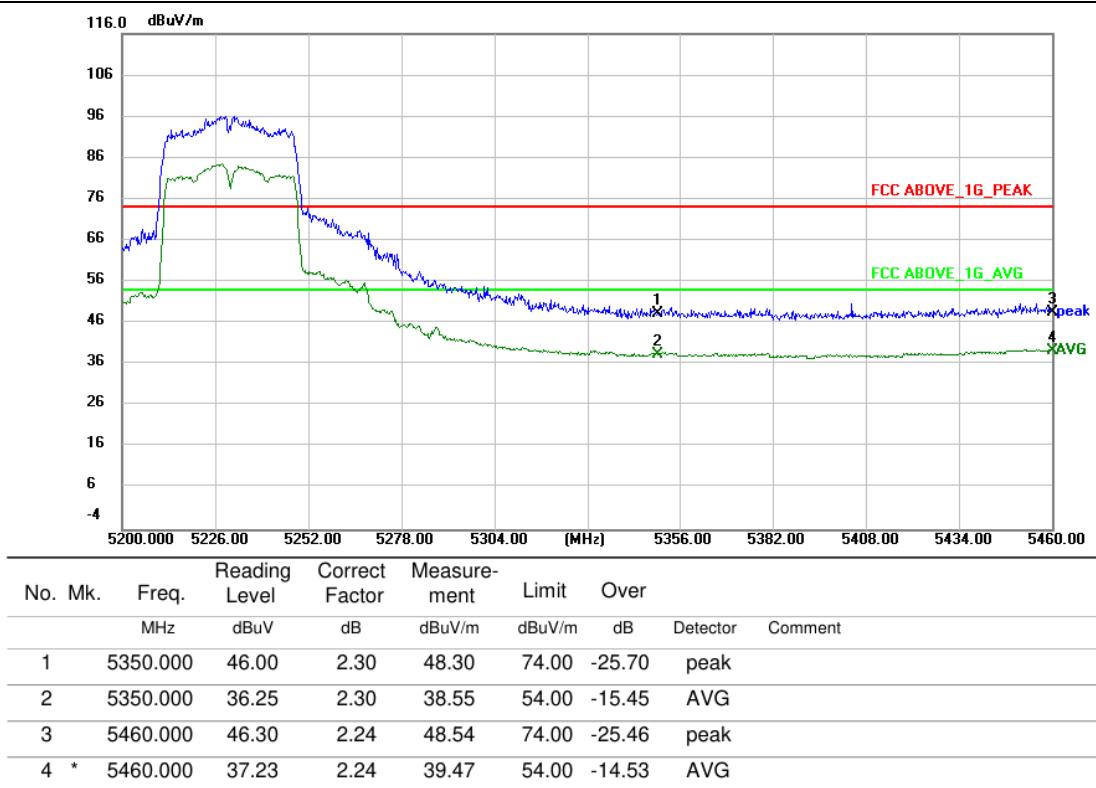


Mode5 / Polarization: Horizontal / U-NII Band 1 / 5230



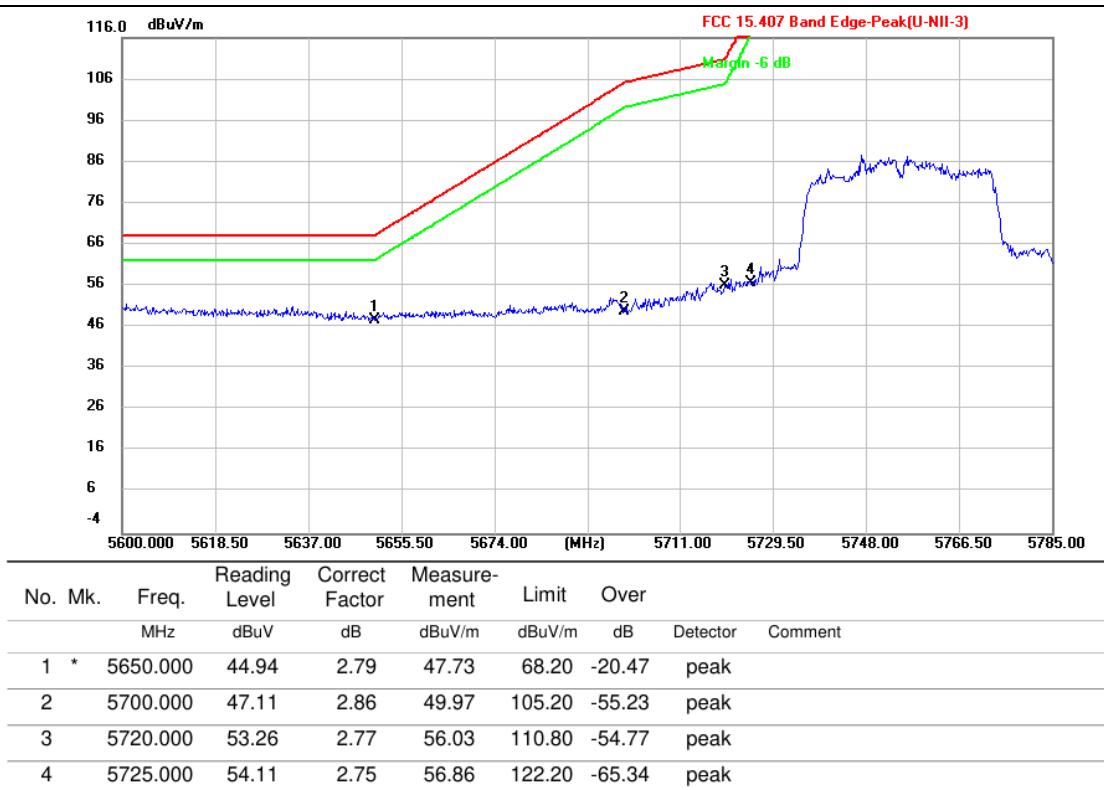


Mode5 / Polarization: Vertical / U-NII Band 1 / 5230



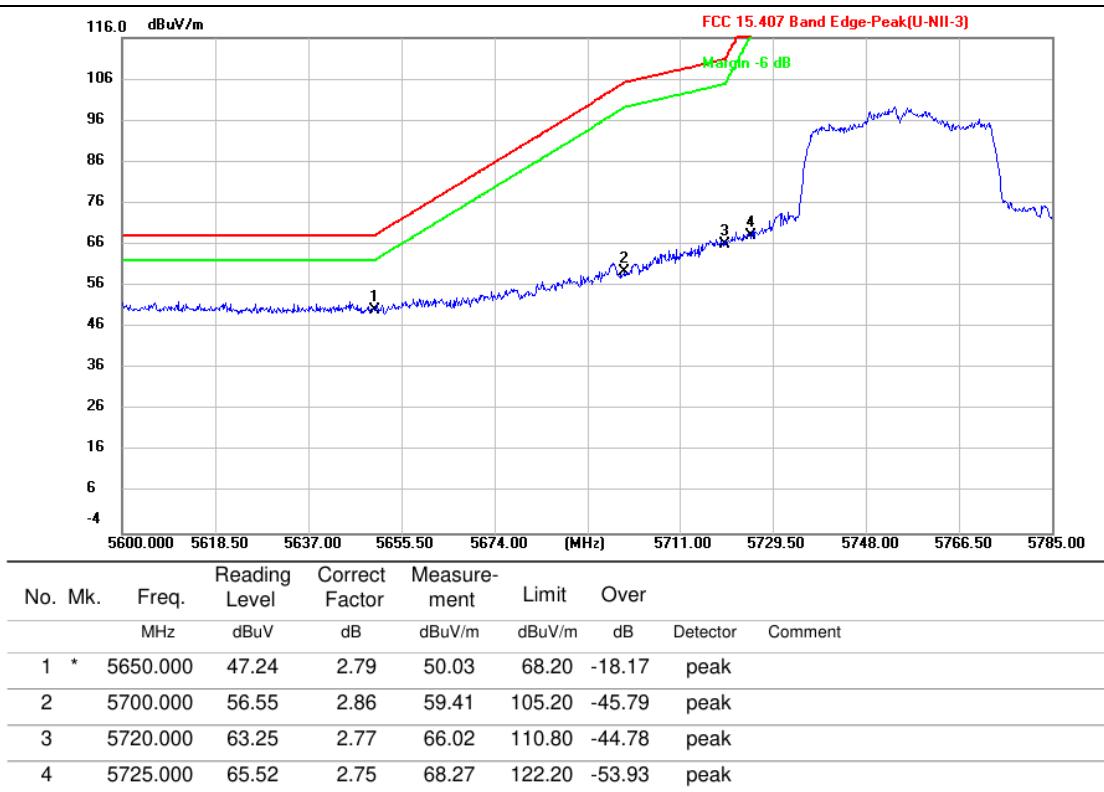


Mode5 / Polarization: Horizontal / U-NII Band 3 / 5755



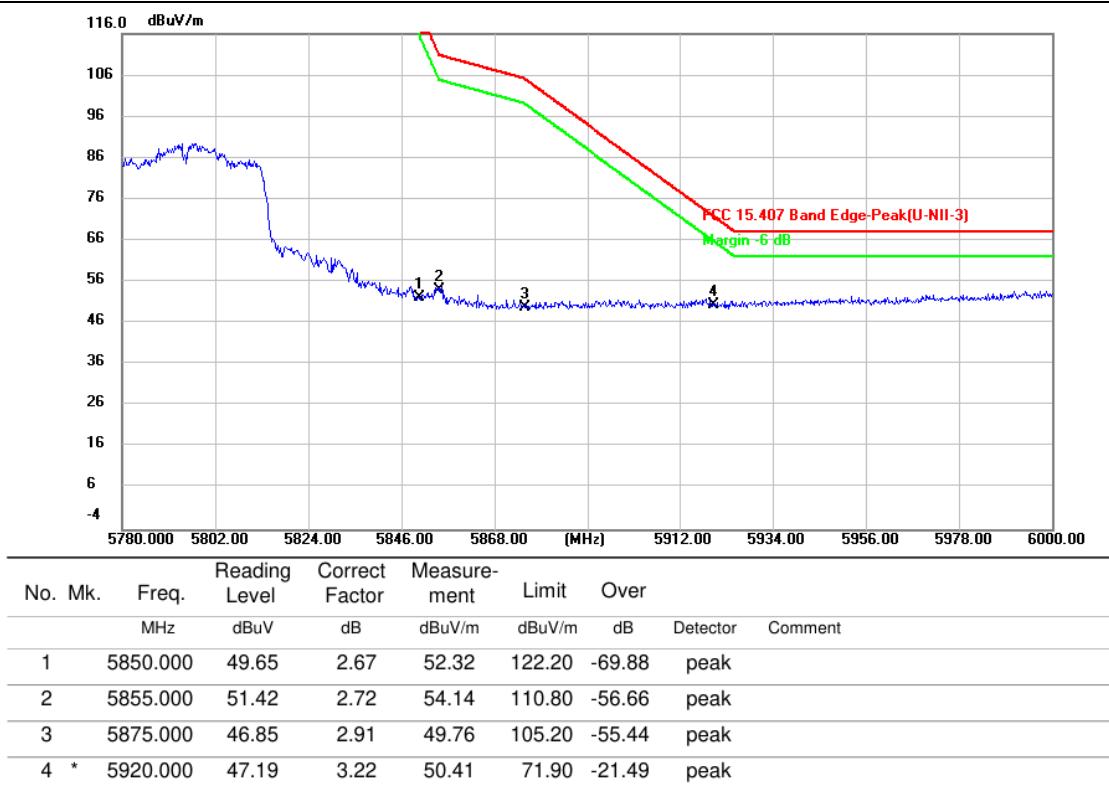


Mode5 / Polarization: Vertical / U-NII Band 3 / 5755



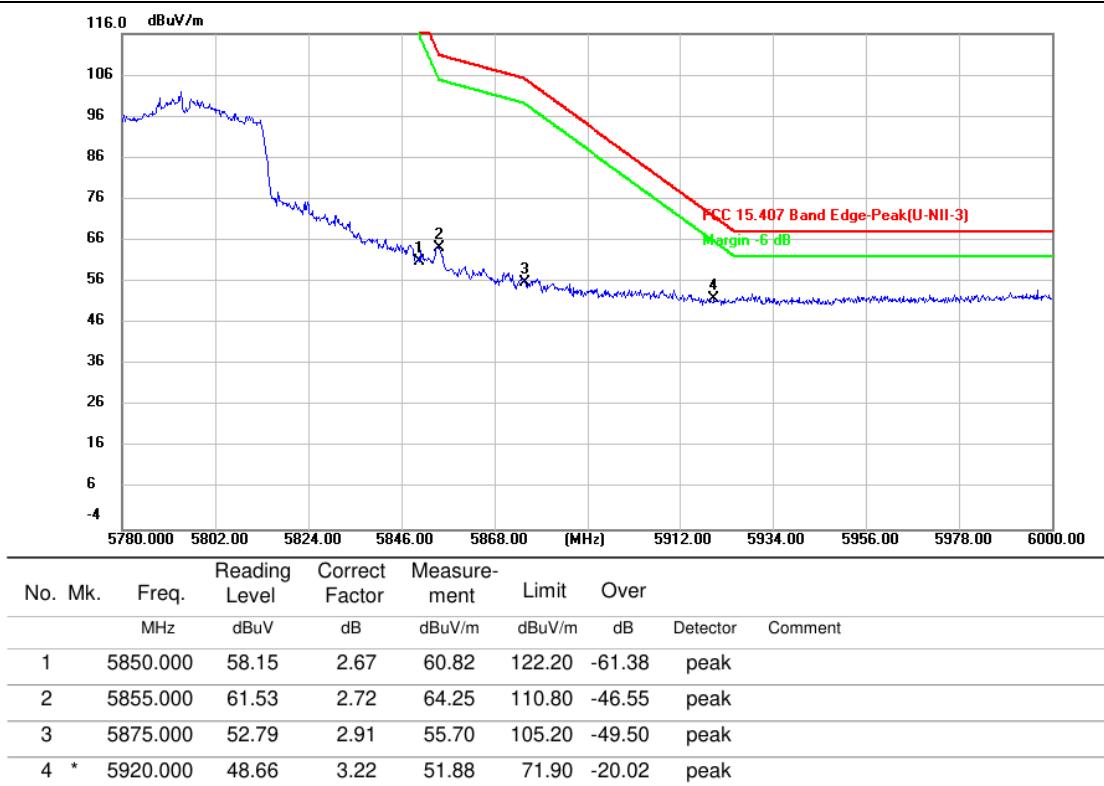


Mode5 / Polarization: Horizontal / U-NII Band 3 / 5795



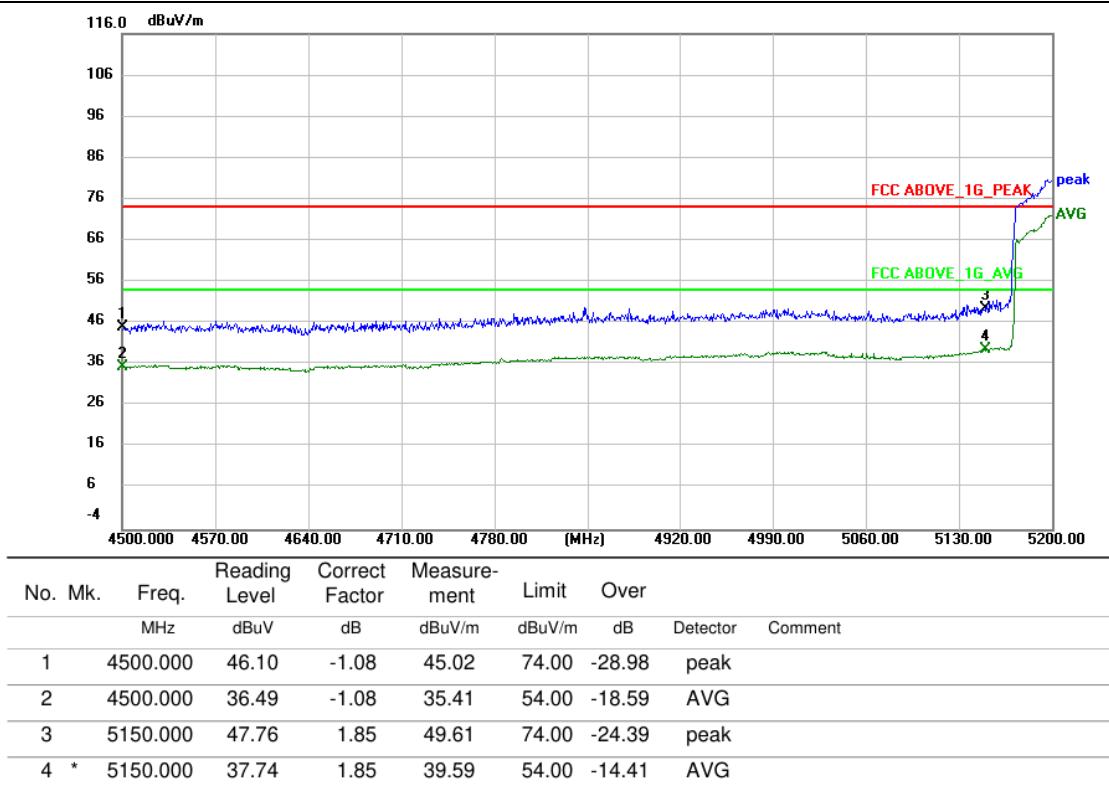


Mode5 / Polarization: Vertical / U-NII Band 3 / 5795



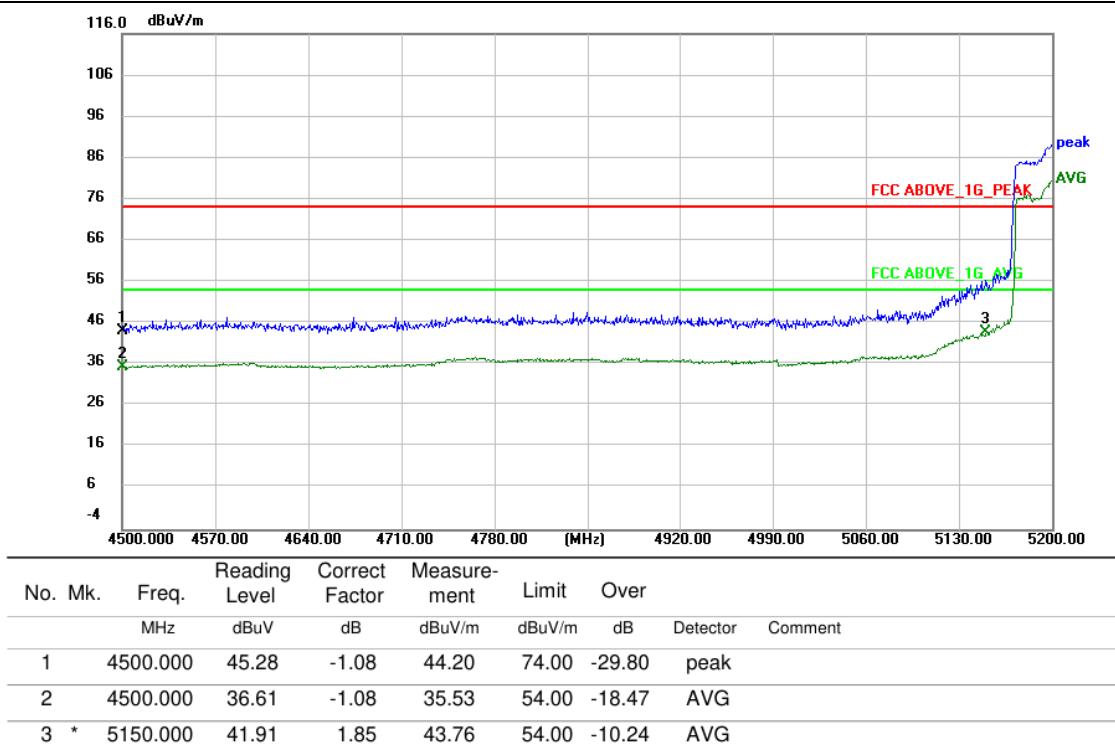


Mode6 / Polarization: Horizontal / U-NII Band 1 / 5210



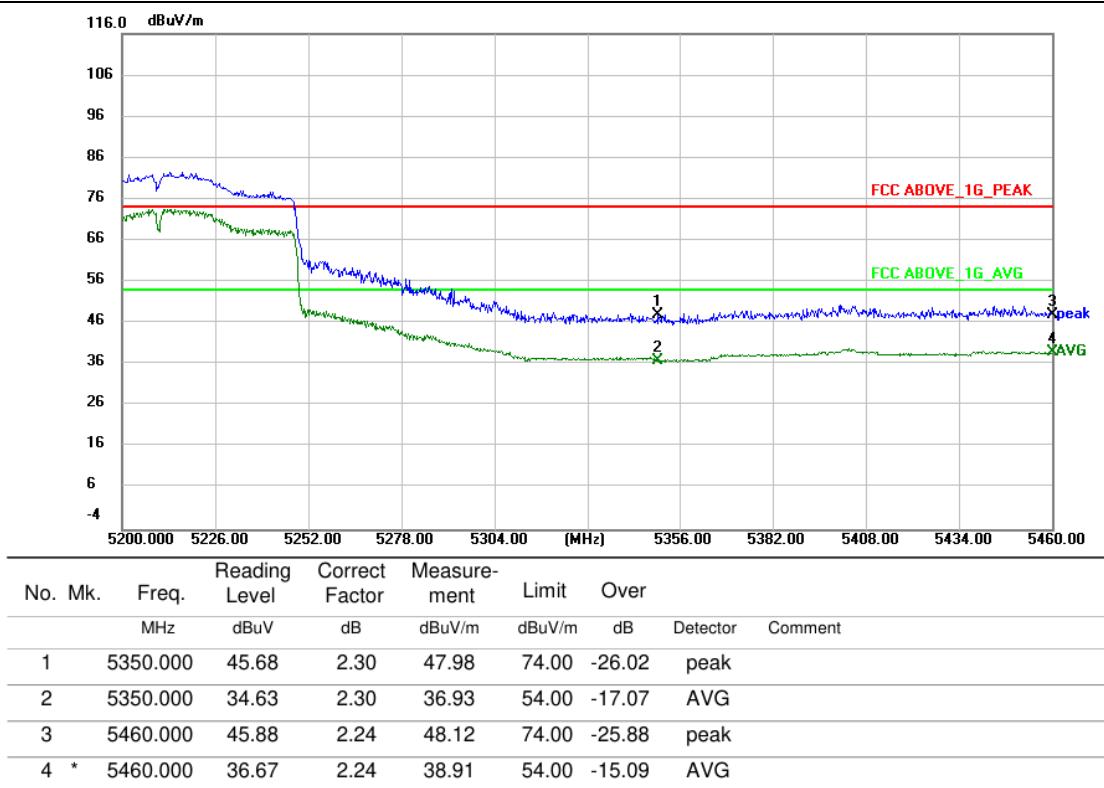


Mode6 / Polarization: Vertical / U-NII Band 1 / 5210



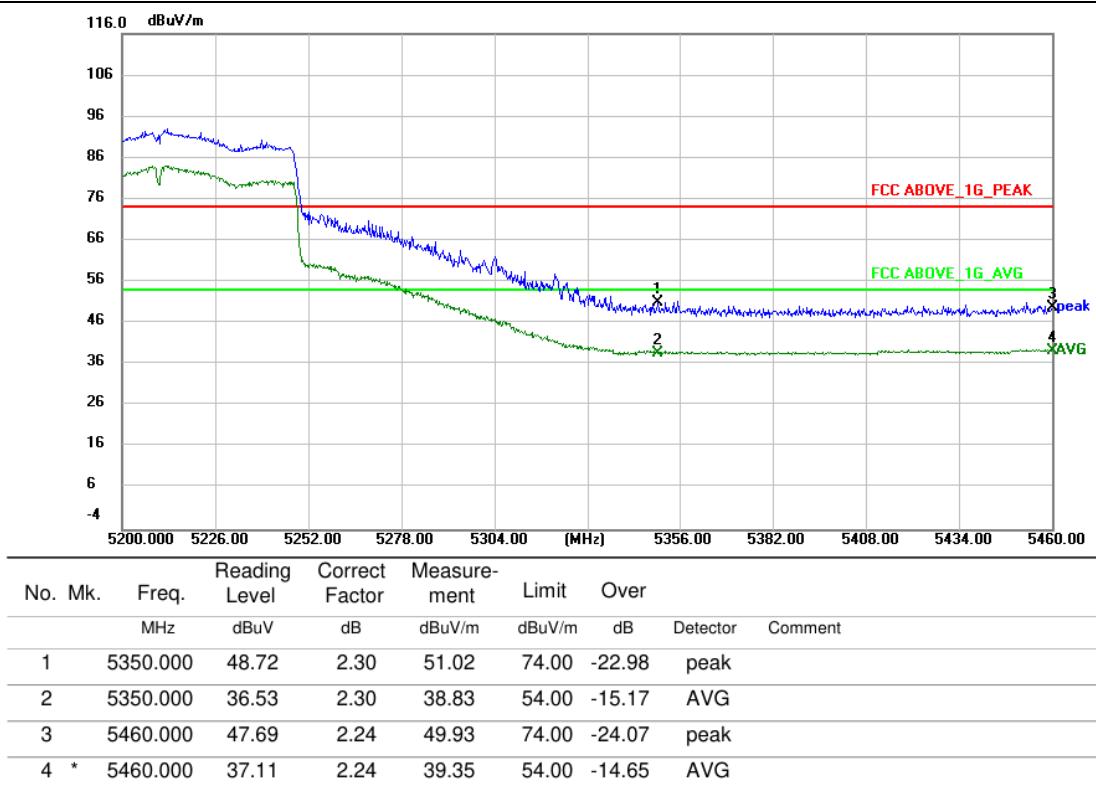


Mode6 / Polarization: Horizontal / U-NII Band 1 / 5210



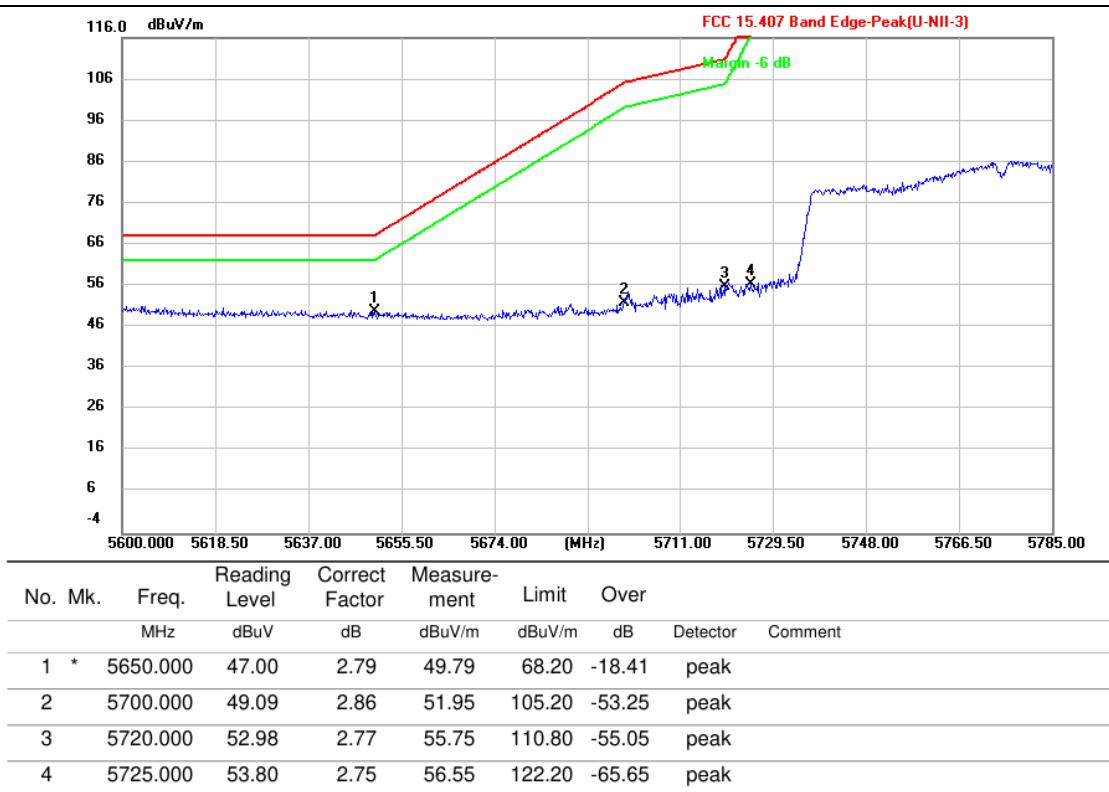


Mode6 / Polarization: Vertical / U-NII Band 1 / 5210



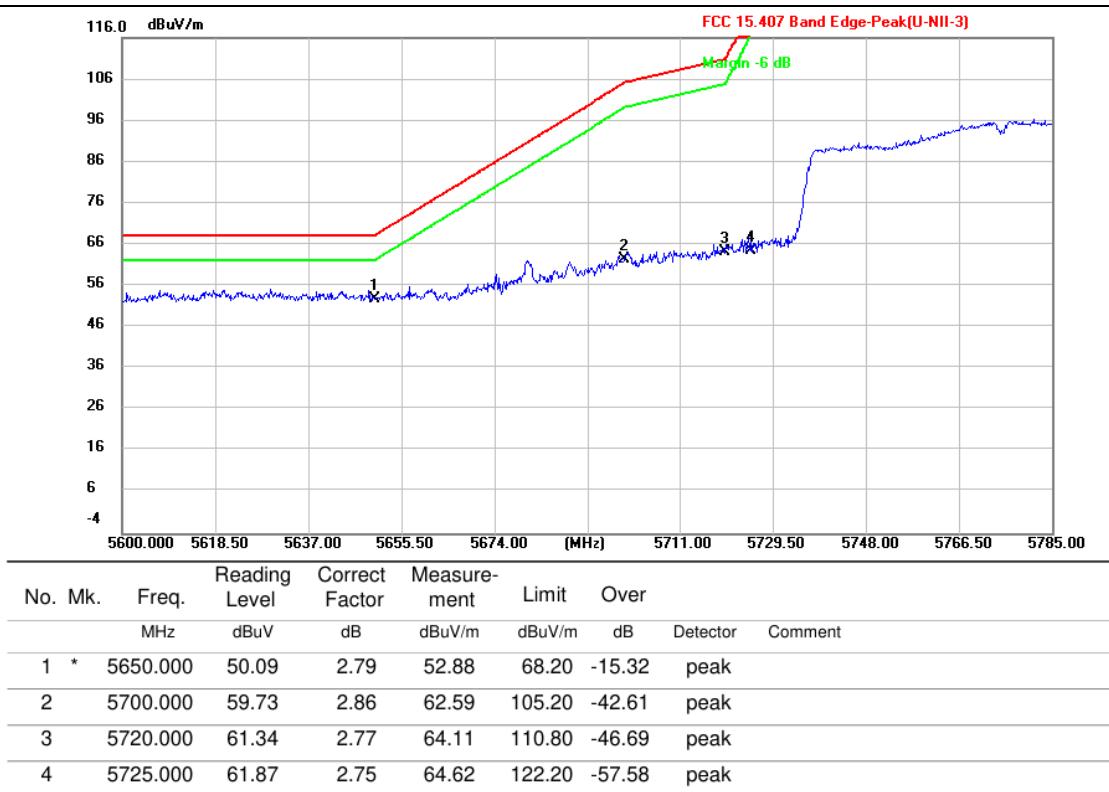


Mode6 / Polarization: Horizontal / U-NII Band 3 / 5775



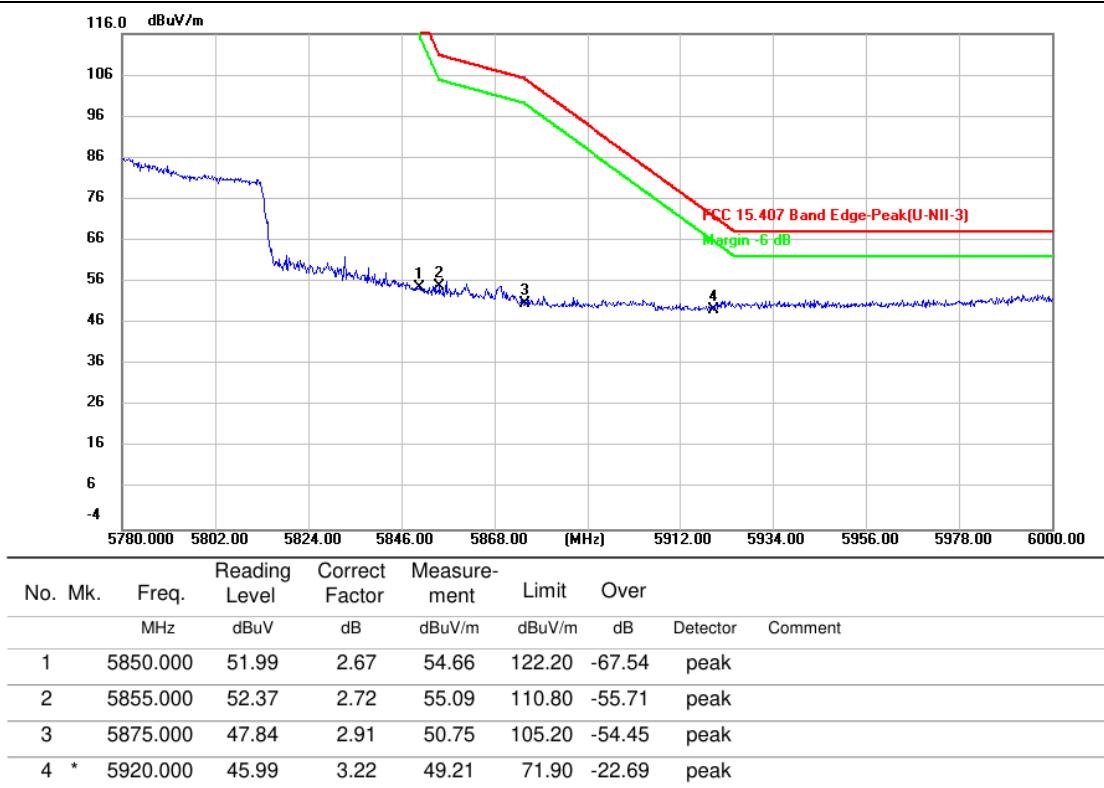


Mode6 / Polarization: Vertical / U-NII Band 3 / 5775



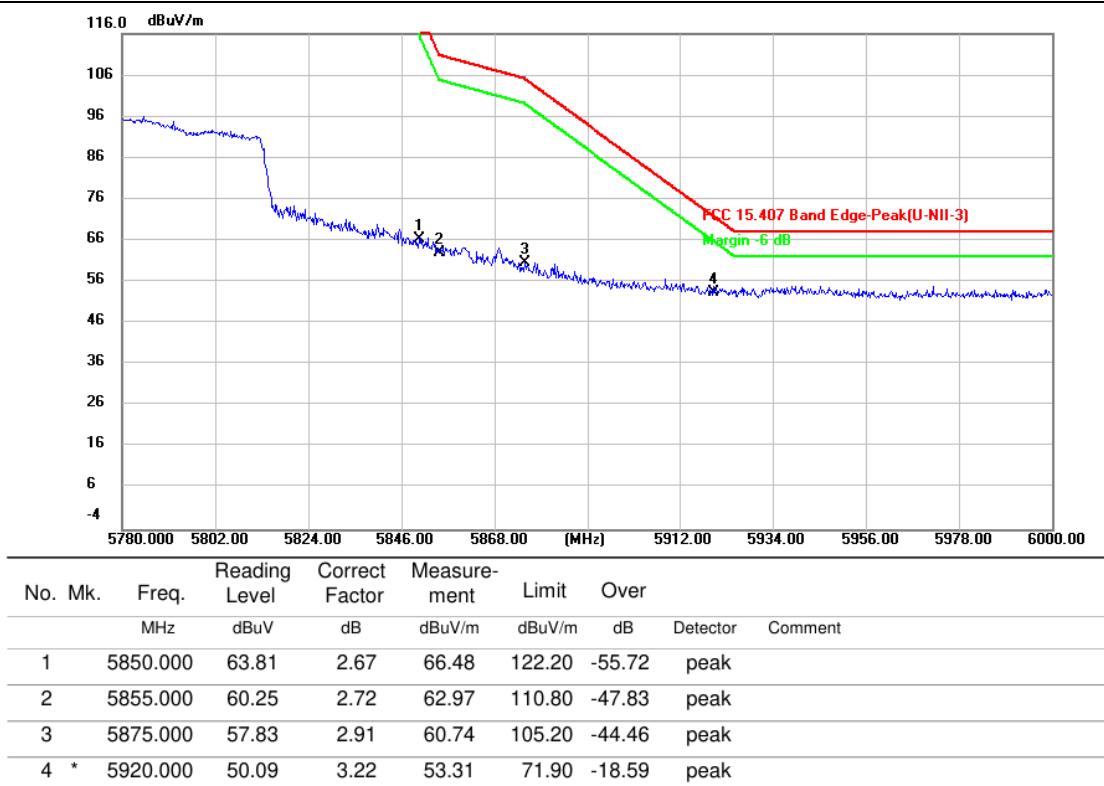


Mode6 / Polarization: Horizontal / U-NII Band 3 / 5775





Mode6 / Polarization: Vertical / U-NII Band 3 / 5775





6.7 Undesirable emission limits (below 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(9)																								
Test Limit:	<p>Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p> <table border="1"><thead><tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr></thead><tbody><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705-30.0</td><td>30</td><td>30</td></tr><tr><td>30-88</td><td>100 **</td><td>3</td></tr><tr><td>88-216</td><td>150 **</td><td>3</td></tr><tr><td>216-960</td><td>200 **</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>3</td></tr></tbody></table> <p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p>	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																							
0.009-0.490	2400/F(kHz)	300																							
0.490-1.705	24000/F(kHz)	30																							
1.705-30.0	30	30																							
30-88	100 **	3																							
88-216	150 **	3																							
216-960	200 **	3																							
Above 960	500	3																							
Test Method:	ANSI C63.10-2013, section 12.7.4, 12.7.5																								
Procedure:	<p>Below 1GHz:</p> <ol style="list-style-type: none">For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.Test the EUT in the lowest channel, the middle channel, the Highest channel.The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.Repeat above procedures until all frequencies measured was complete.																								



Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Above 1GHz:

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

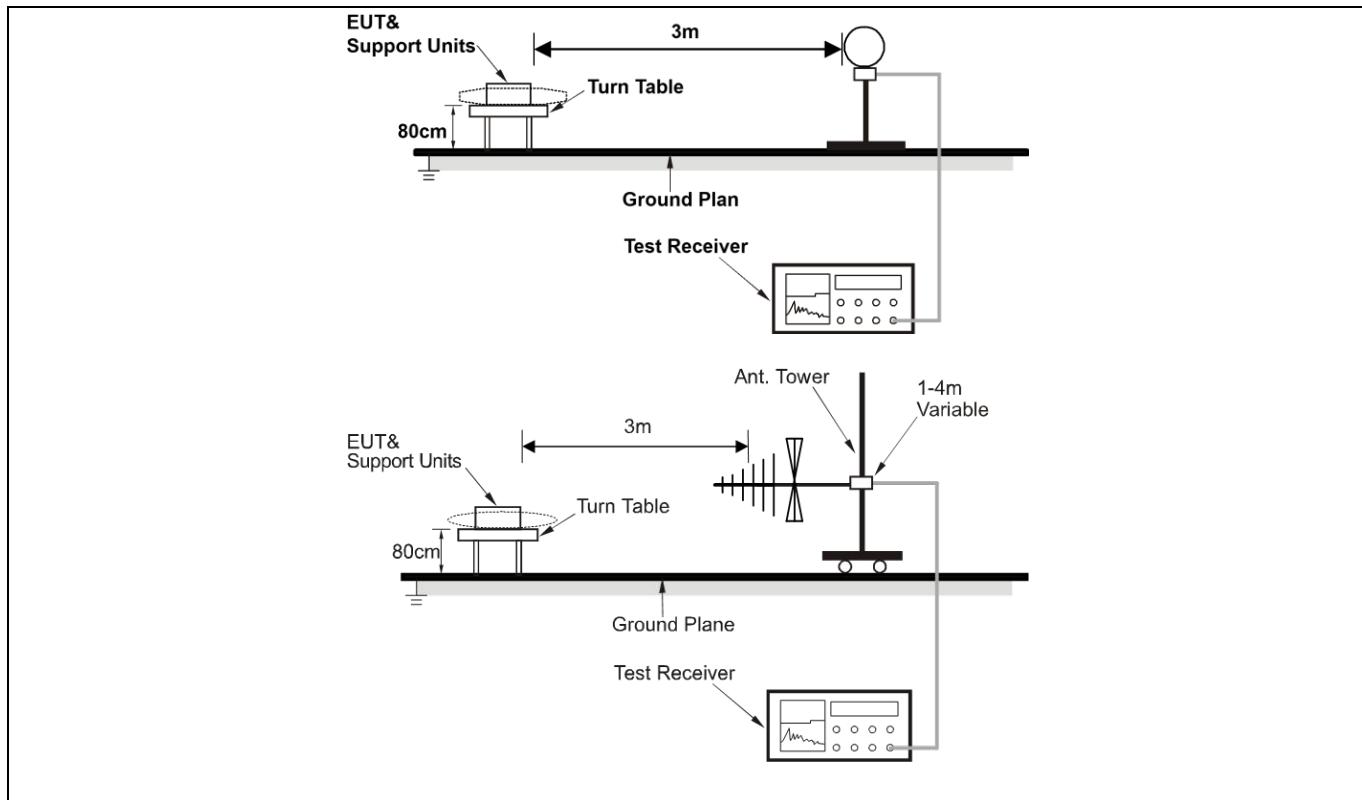
6.7.1 E.U.T. Operation:

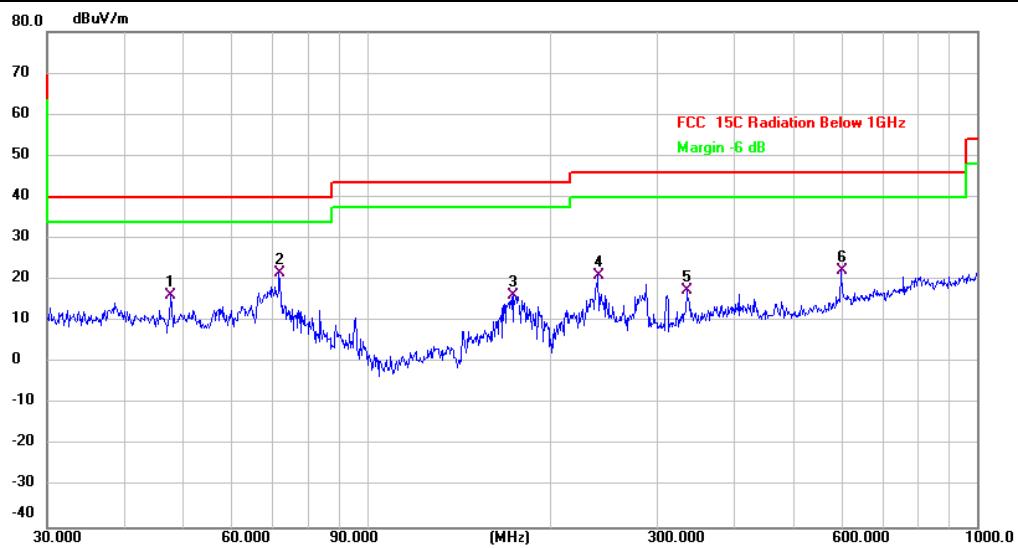
Operating Environment:



Temperature:	25 °C	Humidity:	58 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report				

6.7.2 Test Setup Diagram:

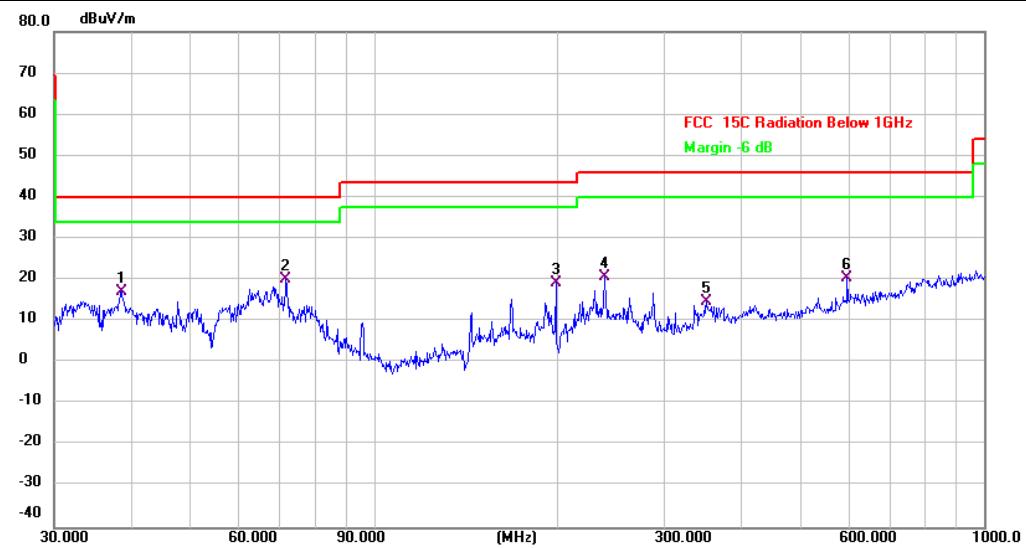


6.7.3 Test Data:
Mode1 U-NII Band 1 / Polarization: Horizontal / CH: H


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB			
1		47.8260	31.55	-15.28	16.27	40.00	-23.73	QP	
2	*	71.8320	43.43	-21.68	21.75	40.00	-18.25	QP	
3		173.8135	36.58	-20.35	16.23	43.50	-27.27	QP	
4		239.9874	36.10	-14.90	21.20	46.00	-24.80	QP	
5		334.8589	33.65	-16.29	17.36	46.00	-28.64	QP	
6		599.3212	32.81	-10.55	22.26	46.00	-23.74	QP	



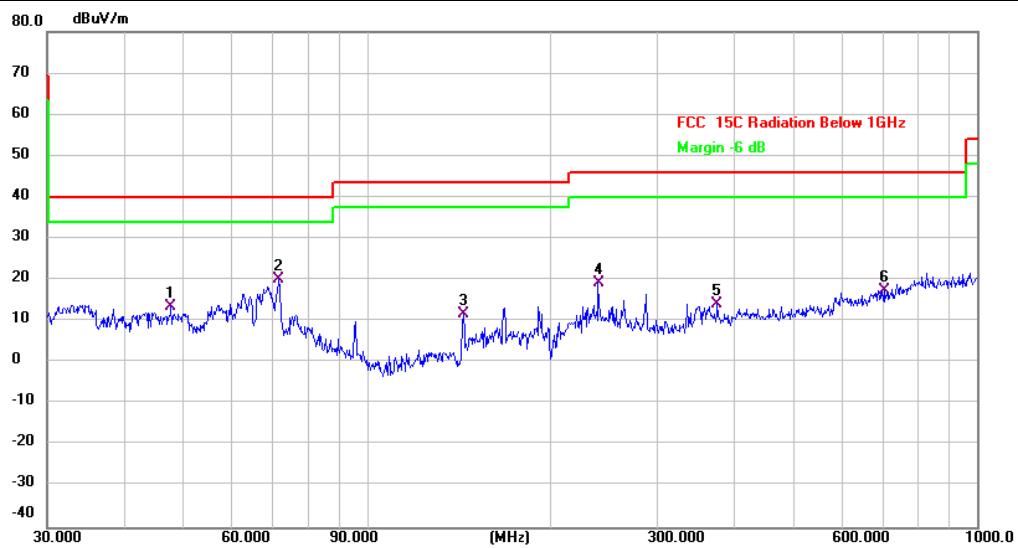
Mode1 U-NII Band 1 / Polarization: Vertical / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		38.6160	42.33	-25.08	17.25	40.00	-22.75	QP	
2	*	71.8320	38.99	-18.92	20.07	40.00	-19.93	QP	
3		199.2855	43.36	-24.03	19.33	43.50	-24.17	QP	
4		239.1473	40.01	-19.31	20.70	46.00	-25.30	QP	
5		351.7079	30.17	-15.28	14.89	46.00	-31.11	QP	
6		597.2234	31.02	-10.68	20.34	46.00	-25.66	QP	



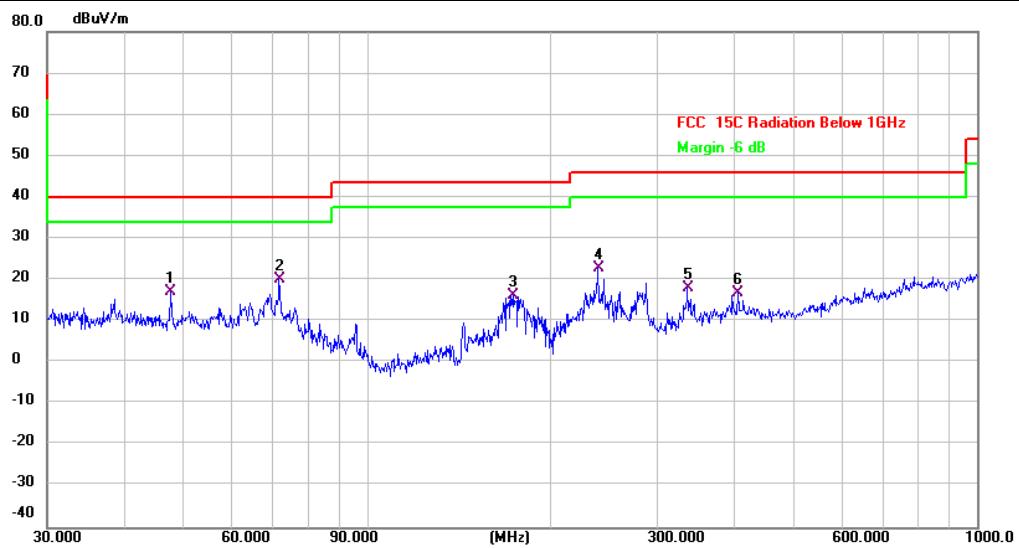
Mode1 U-NII Band 3 / Polarization: Horizontal / CH: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	dB	Detector	Over	Comment
1		47.8260	36.10	-22.69	13.41	40.00	-26.59	QP		
2	*	71.8320	38.96	-18.92	20.04	40.00	-19.96	QP		
3		143.8295	29.40	-17.62	11.78	43.50	-31.72	QP		
4		239.9874	38.44	-19.21	19.23	46.00	-26.77	QP		
5		375.9385	29.32	-15.17	14.15	46.00	-31.85	QP		
6		704.2261	27.04	-9.48	17.56	46.00	-28.44	QP		



Mode1 U-NII Band 3 / Polarization: Vertical / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		47.8260	32.31	-15.28	17.03	40.00	-22.97	QP	
2	*	71.8320	41.79	-21.68	20.11	40.00	-19.89	QP	
3		173.8135	36.67	-20.35	16.32	43.50	-27.18	QP	
4		239.9874	37.71	-14.90	22.81	46.00	-23.19	QP	
5		336.0352	34.37	-16.24	18.13	46.00	-27.87	QP	
6		406.0880	30.52	-13.54	16.98	46.00	-29.02	QP	



6.8 Undesirable emission limits (above 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)																																																																											
Test Limit:	<p>For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.</p> <p>For transmitters operating solely in the 5.725-5.850 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p>																																																																											
	<table border="1"> <thead> <tr> <th>MHz</th><th>MHz</th><th>MHz</th><th>GHz</th></tr> </thead> <tbody> <tr> <td>0.090-0.110</td><td>16.42-16.423</td><td>399.9-410</td><td>4.5-5.15</td></tr> <tr> <td>¹0.495-0.505</td><td>16.69475-16.69525</td><td>608-614</td><td>5.35-5.46</td></tr> <tr> <td>2.1735-2.1905</td><td>16.80425-16.80475</td><td>960-1240</td><td>7.25-7.75</td></tr> <tr> <td>4.125-4.128</td><td>25.5-25.67</td><td>1300-1427</td><td>8.025-8.5</td></tr> <tr> <td>4.17725-4.17775</td><td>37.5-38.25</td><td>1435-1626.5</td><td>9.0-9.2</td></tr> <tr> <td>4.20725-4.20775</td><td>73-74.6</td><td>1645.5-1646.5</td><td>9.3-9.5</td></tr> <tr> <td>6.215-6.218</td><td>74.8-75.2</td><td>1660-1710</td><td>10.6-12.7</td></tr> <tr> <td>6.26775-6.26825</td><td>108-121.94</td><td>1718.8-1722.2</td><td>13.25-13.4</td></tr> <tr> <td>6.31175-6.31225</td><td>123-138</td><td>2200-2300</td><td>14.47-14.5</td></tr> <tr> <td>8.291-8.294</td><td>149.9-150.05</td><td>2310-2390</td><td>15.35-16.2</td></tr> <tr> <td>8.362-8.366</td><td>156.52475-156.52525</td><td>2483.5-2500</td><td>17.7-21.4</td></tr> <tr> <td>8.37625-8.38675</td><td>156.7-156.9</td><td>2690-2900</td><td>22.01-23.12</td></tr> <tr> <td>8.41425-8.41475</td><td>162.0125-167.17</td><td>3260-3267</td><td>23.6-24.0</td></tr> <tr> <td>12.29-12.293</td><td>167.72-173.2</td><td>3332-3339</td><td>31.2-31.8</td></tr> <tr> <td>12.51975-12.52025</td><td>240-285</td><td>3345.8-3358</td><td>36.43-36.5</td></tr> <tr> <td>12.57675-12.57725</td><td>322-335.4</td><td>3600-4400</td><td>(²)</td></tr> <tr> <td>13.36-13.41</td><td></td><td></td><td></td></tr> </tbody> </table>				MHz	MHz	MHz	GHz	0.090-0.110	16.42-16.423	399.9-410	4.5-5.15	¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46	2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75	4.125-4.128	25.5-25.67	1300-1427	8.025-8.5	4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2	4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5	6.215-6.218	74.8-75.2	1660-1710	10.6-12.7	6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4	6.31175-6.31225	123-138	2200-2300	14.47-14.5	8.291-8.294	149.9-150.05	2310-2390	15.35-16.2	8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4	8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12	8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0	12.29-12.293	167.72-173.2	3332-3339	31.2-31.8	12.51975-12.52025	240-285	3345.8-3358	36.43-36.5	12.57675-12.57725	322-335.4	3600-4400	(²)	13.36-13.41			
MHz	MHz	MHz	GHz																																																																									
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15																																																																									
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46																																																																									
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75																																																																									
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5																																																																									
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2																																																																									
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5																																																																									
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7																																																																									
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4																																																																									
6.31175-6.31225	123-138	2200-2300	14.47-14.5																																																																									
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2																																																																									
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4																																																																									
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12																																																																									
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0																																																																									
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8																																																																									
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5																																																																									
12.57675-12.57725	322-335.4	3600-4400	(²)																																																																									
13.36-13.41																																																																												
	<p>¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.</p> <p>² Above 38.6</p> <p>The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p>																																																																											



	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300	
0.490-1.705	24000/F(kHz)	30	
1.705-30.0	30	30	
30-88	100 **	3	
88-216	150 **	3	
216-960	200 **	3	
Above 960	500	3	

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method: ANSI C63.10-2013, section 12.7.4, 12.7.6, 12.7.7

Procedure:

Above 1GHz:

- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength

limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6.8.1 E.U.T. Operation:

Operating Environment:				
Temperature:	26 °C	Humidity:	55 %	Atmospheric Pressure:
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6			
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report			



6.8.2 Test Data:

Mode1 / Polarization: Horizontal / U-NII Band 1 / 5180

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10360.000	42.93	10.75	53.68	74.00	-20.32	peak
2		10360.000	32.51	10.75	43.26	54.00	-10.74	AVG
3		15540.000	45.82	13.16	58.98	74.00	-15.02	peak
4	*	15540.000	35.51	13.16	48.67	54.00	-5.33	AVG

Mode1 / Polarization: Vertical / U-NII Band 1 / 5180

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10360.000	43.34	10.75	54.09	74.00	-19.91	peak
2		10360.000	33.37	10.75	44.12	54.00	-9.88	AVG
3		15540.000	43.84	13.16	57.00	74.00	-17.00	peak
4	*	15540.000	34.46	13.16	47.62	54.00	-6.38	AVG



Mode1 / Polarization: Horizontal / U-NII Band 1 / 5200

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10400.000	43.36	10.85	54.21	74.00	-19.79	peak
2		10400.000	33.51	10.85	44.36	54.00	-9.64	AVG
3		15600.000	45.63	12.71	58.34	74.00	-15.66	peak
4	*	15600.000	35.86	12.71	48.57	54.00	-5.43	AVG

Mode1 / Polarization: Vertical / U-NII Band 1 / 5200

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10400.000	42.73	10.85	53.58	74.00	-20.42	peak
2		10400.000	32.41	10.85	43.26	54.00	-10.74	AVG
3		15600.000	46.34	12.71	59.05	74.00	-14.95	peak
4	*	15600.000	36.97	12.71	49.68	54.00	-4.32	AVG



Mode1 / Polarization: Horizontal / U-NII Band 1 / 5240

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10480.000	43.77	10.65	54.42	74.00	-19.58	peak
2		10480.000	33.71	10.65	44.36	54.00	-9.64	AVG
3		15720.000	46.17	12.68	58.85	74.00	-15.15	peak
4	*	15720.000	35.89	12.68	48.57	54.00	-5.43	AVG

Mode1 / Polarization: Vertical / U-NII Band 1 / 5240

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10480.000	41.70	10.65	52.35	74.00	-21.65	peak
2		10480.000	31.71	10.65	42.36	54.00	-11.64	AVG
3		15720.000	45.01	12.68	57.69	74.00	-16.31	peak
4	*	15720.000	35.00	12.68	47.68	54.00	-6.32	AVG



Mode1 / Polarization: Horizontal / U-NII Band 3 / 5745

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11490.000	43.81	12.51	56.32	68.20	-11.88	peak
2		11490.000	34.08	12.51	46.59	54.00	-7.41	AVG
3		17235.000	47.02	14.54	61.56	68.20	-6.64	peak
4	*	17235.000	36.32	14.54	50.86	54.00	-3.14	AVG

Mode1 / Polarization: Vertical / U-NII Band 3 / 5745

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11490.000	43.09	12.51	55.60	68.20	-12.60	peak
2		11490.000	33.17	12.51	45.68	54.00	-8.32	AVG
3		17235.000	43.72	14.54	58.26	68.20	-9.94	peak
4	*	17235.000	33.93	14.54	48.47	54.00	-5.53	AVG



Mode1 / Polarization: Horizontal / U-NII Band 3 / 5785

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11570.000	43.83	12.37	56.20	68.20	-12.00	peak
2		11570.000	34.22	12.37	46.59	54.00	-7.41	AVG
3		17355.000	45.97	14.60	60.57	68.20	-7.63	peak
4	*	17355.000	35.87	14.60	50.47	54.00	-3.53	AVG

Mode1 / Polarization: Vertical / U-NII Band 3 / 5785

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11570.000	43.73	12.37	56.10	68.20	-12.10	peak
2		11570.000	34.21	12.37	46.58	54.00	-7.42	AVG
3		17355.000	45.99	14.60	60.59	68.20	-7.61	peak
4	*	17355.000	35.54	14.60	50.14	54.00	-3.86	AVG



Mode1 / Polarization: Horizontal / U-NII Band 3 / 5825

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11650.000	42.19	12.19	54.38	68.20	-13.82	peak
2		11650.000	32.17	12.19	44.36	54.00	-9.64	AVG
3		17475.000	45.13	14.88	60.01	68.20	-8.19	peak
4	*	17475.000	35.26	14.88	50.14	54.00	-3.86	AVG

Mode1 / Polarization: Vertical / U-NII Band 3 / 5825

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		11650.000	45.04	12.19	57.23	68.20	-10.97	peak
2		11650.000	34.96	12.19	47.15	54.00	-6.85	AVG
3		17475.000	44.64	14.88	59.52	68.20	-8.68	peak
4	*	17475.000	34.74	14.88	49.62	54.00	-4.38	AVG

Photographs of the test setup

Refer to Appendix - Test Setup Photos

Photographs of the EUT

Refer to Appendix - EUT Photos

Appendix

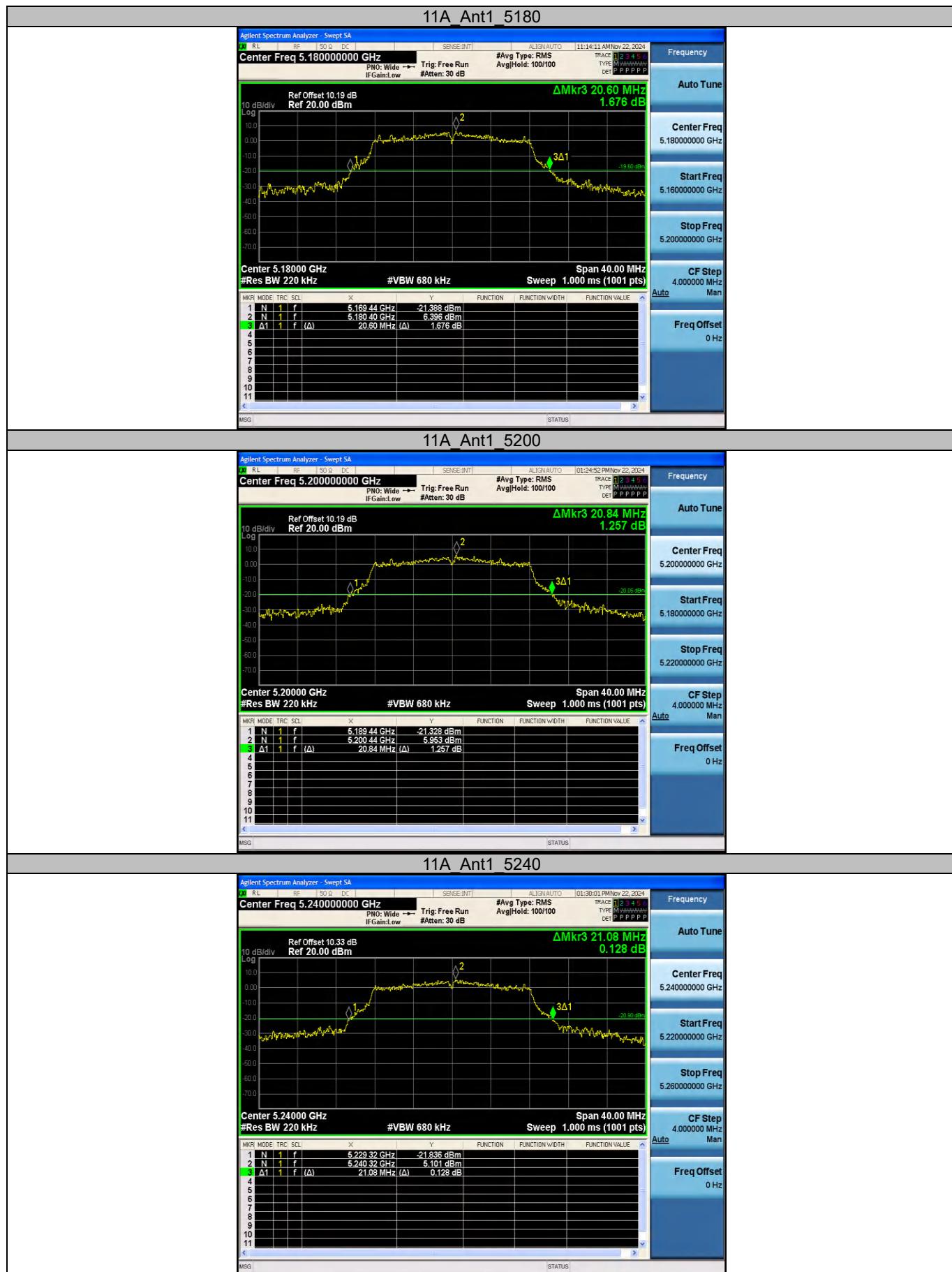
Appendix A1: Emission bandwidth (26dB bandwidth)

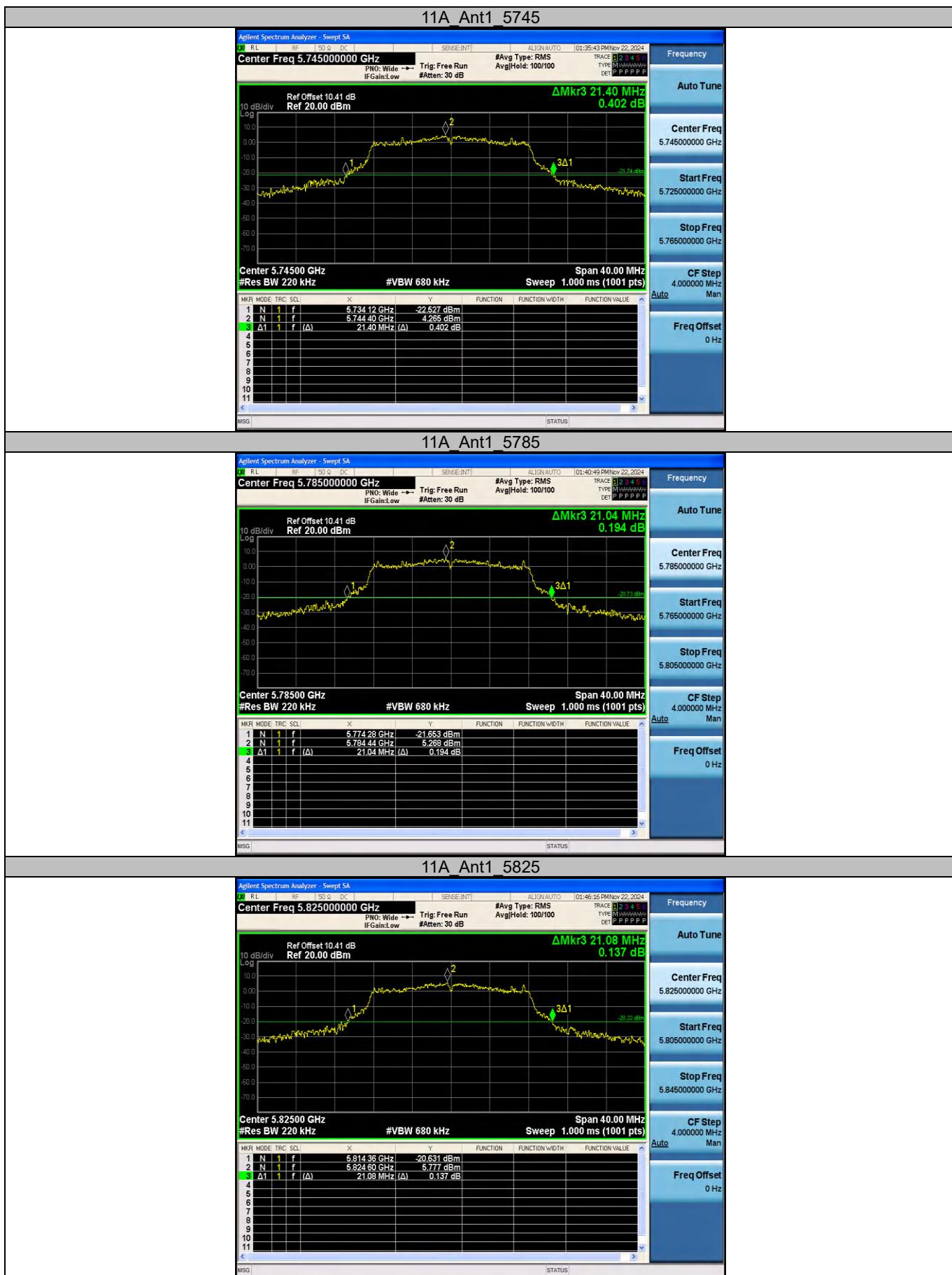
Test Result

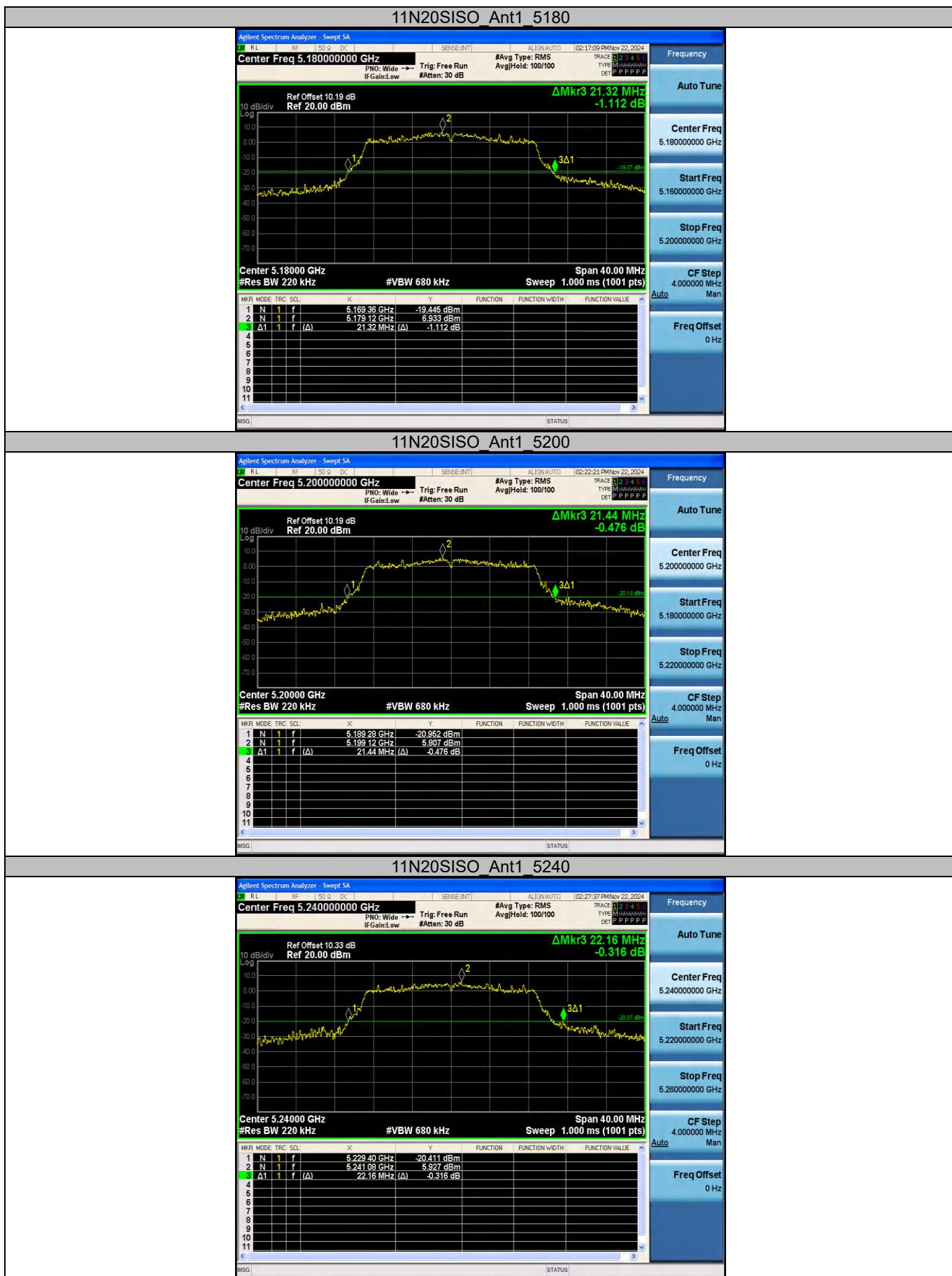
TestMode	Antenna	Freq(MHz)	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.600	5169.440	5190.040	---	---
		5200	20.840	5189.440	5210.280	---	---
		5240	21.080	5229.320	5250.400	---	---
		5745	21.400	5734.120	5755.520	---	---
		5785	21.040	5774.280	5795.320	---	---
		5825	21.080	5814.360	5835.440	---	---
11N20SISO	Ant1	5180	21.320	5169.360	5190.680	---	---
		5200	21.440	5189.280	5210.720	---	---
		5240	22.160	5229.400	5251.560	---	---
		5745	23.160	5734.200	5757.360	---	---
		5785	22.120	5774.240	5796.360	---	---
		5825	21.680	5814.200	5835.880	---	---
11N40SISO	Ant1	5190	51.440	5169.920	5221.360	---	---
		5230	44.800	5210.320	5255.120	---	---
		5755	50.240	5731.720	5781.960	---	---
		5795	44.720	5774.840	5819.560	---	---
11AC20SISO	Ant1	5180	21.680	5169.280	5190.960	---	---
		5200	21.600	5189.240	5210.840	---	---
		5240	21.240	5229.320	5250.560	---	---
		5745	21.680	5734.320	5756.000	---	---
		5785	21.800	5774.200	5796.000	---	---
		5825	22.800	5812.920	5835.720	---	---
11AC40SISO	Ant1	5190	48.720	5170.080	5218.800	---	---
		5230	39.680	5210.160	5249.840	---	---
		5755	39.520	5735.320	5774.840	---	---
		5795	48.960	5774.840	5823.800	---	---
11AC80SISO	Ant1	5210	86.720	5170.160	5256.880	---	---
		5775	81.120	5734.520	5815.640	---	---

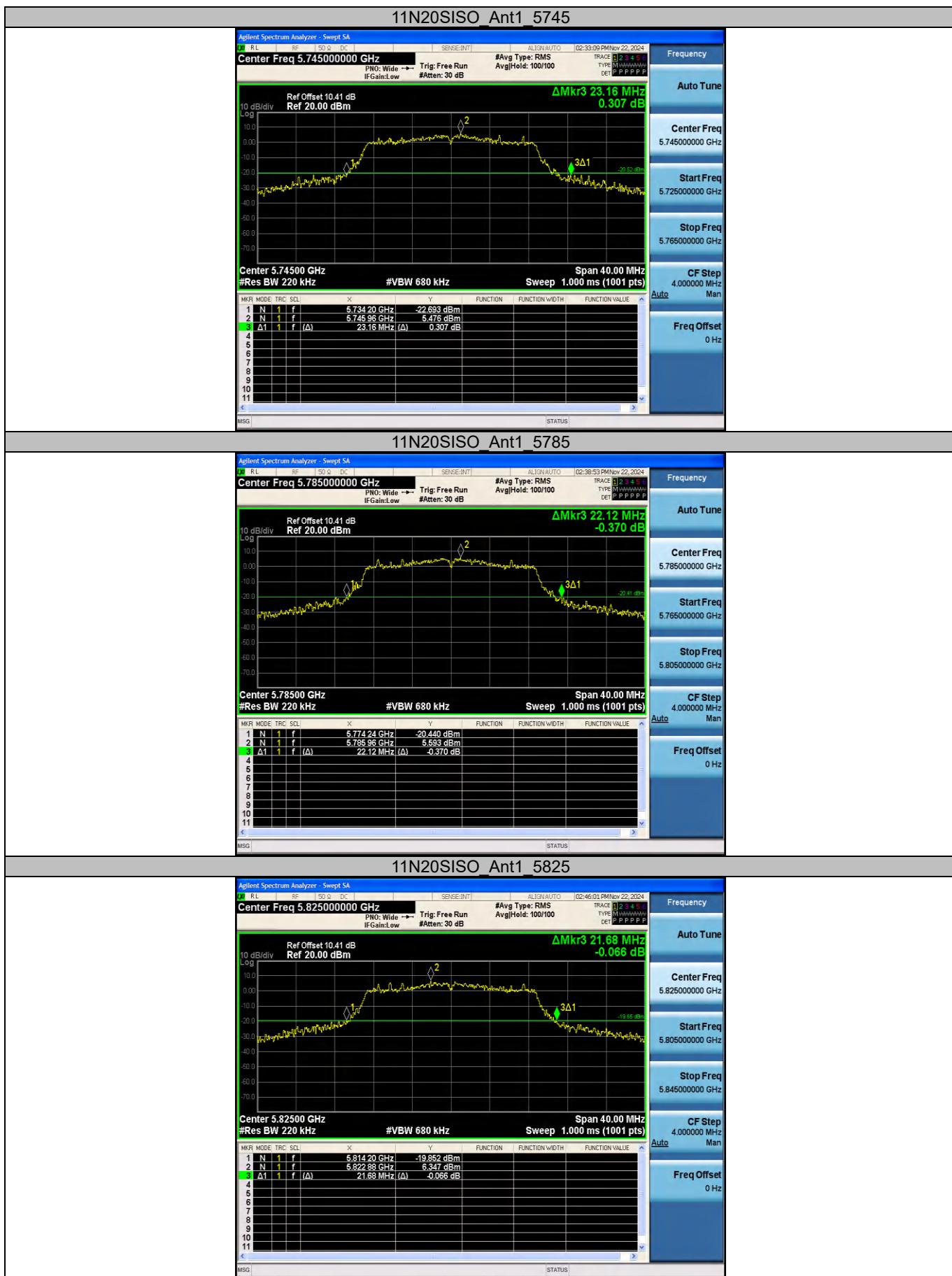


6.8.3 Test Graphs

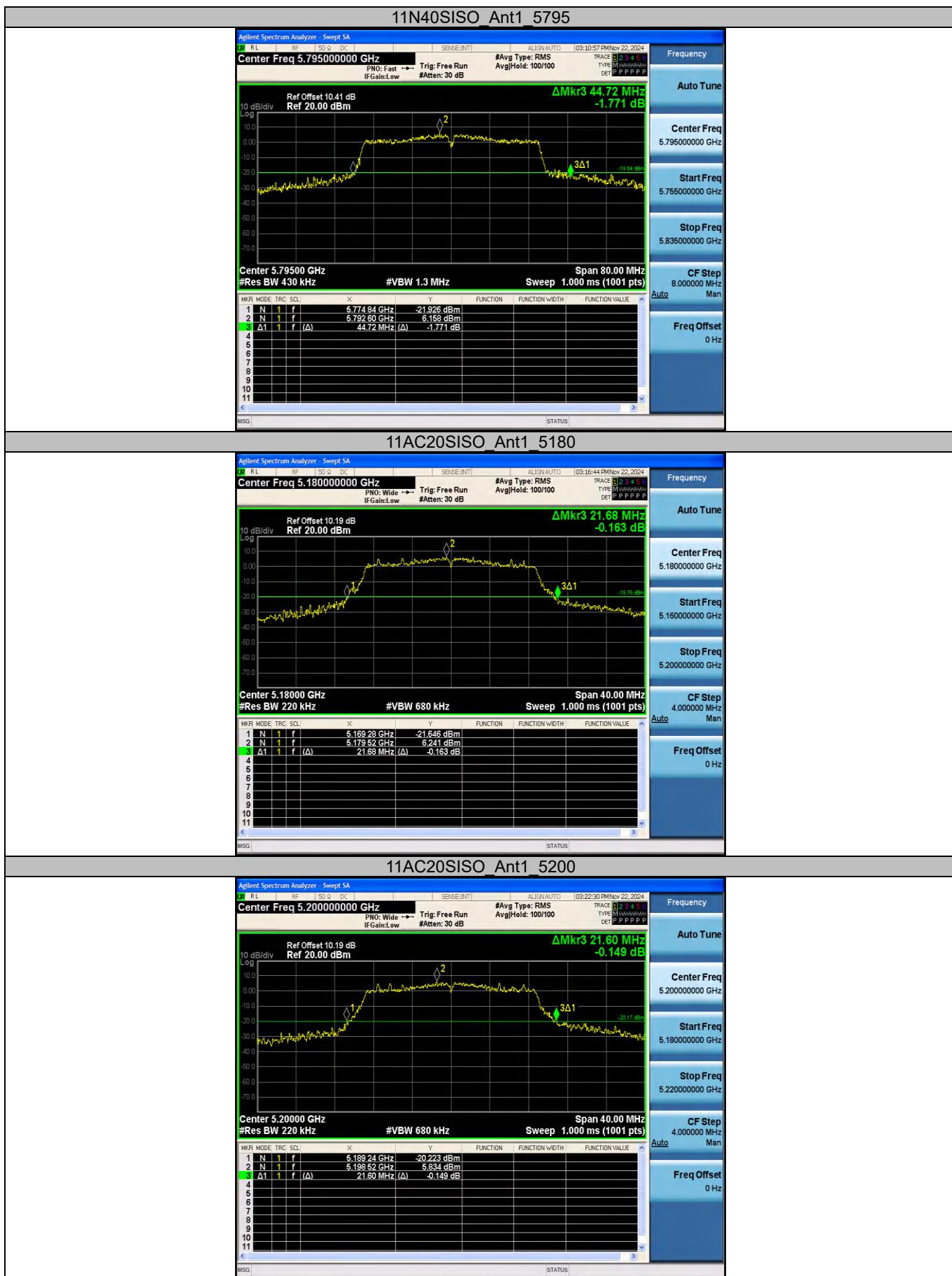


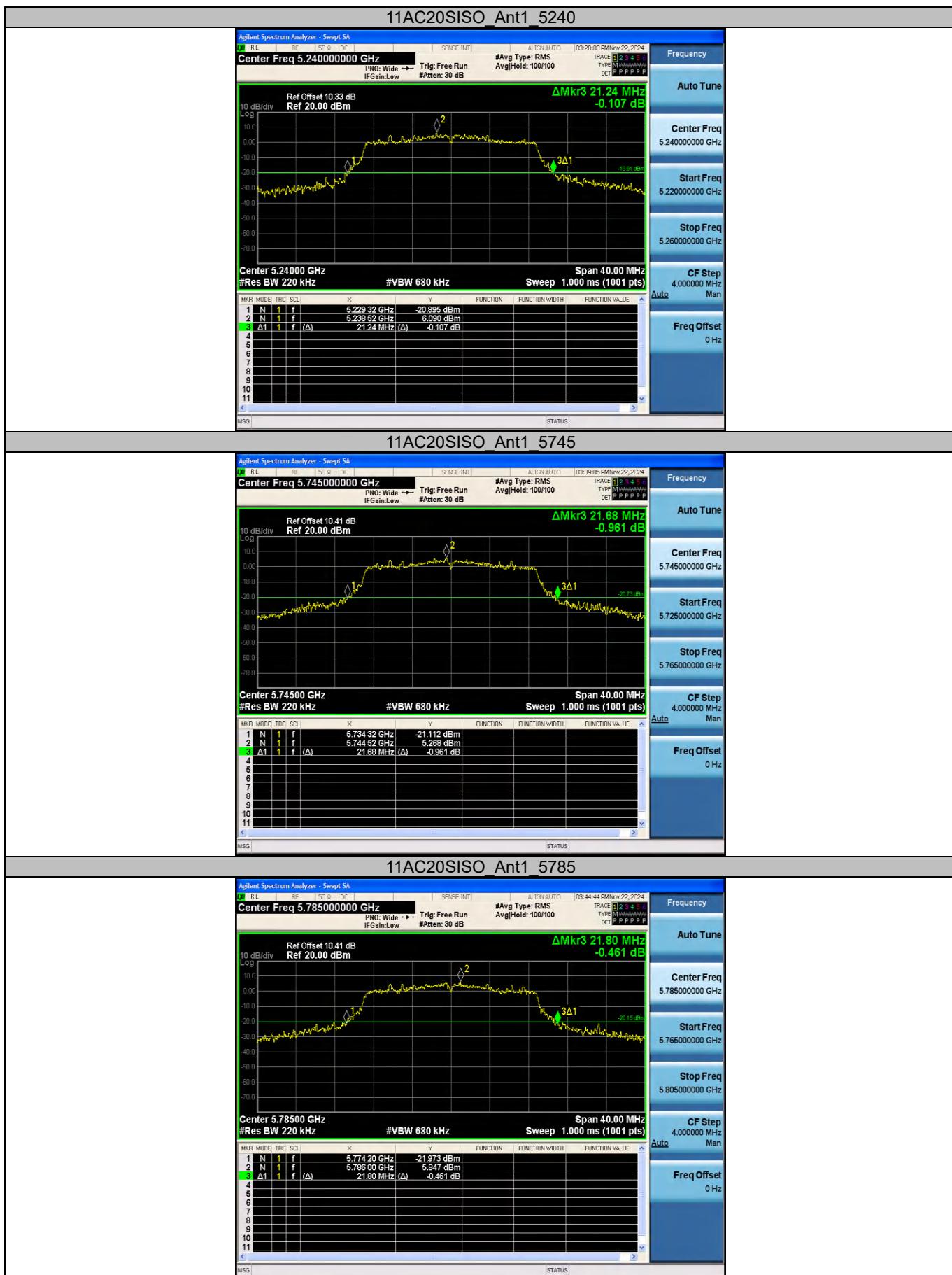


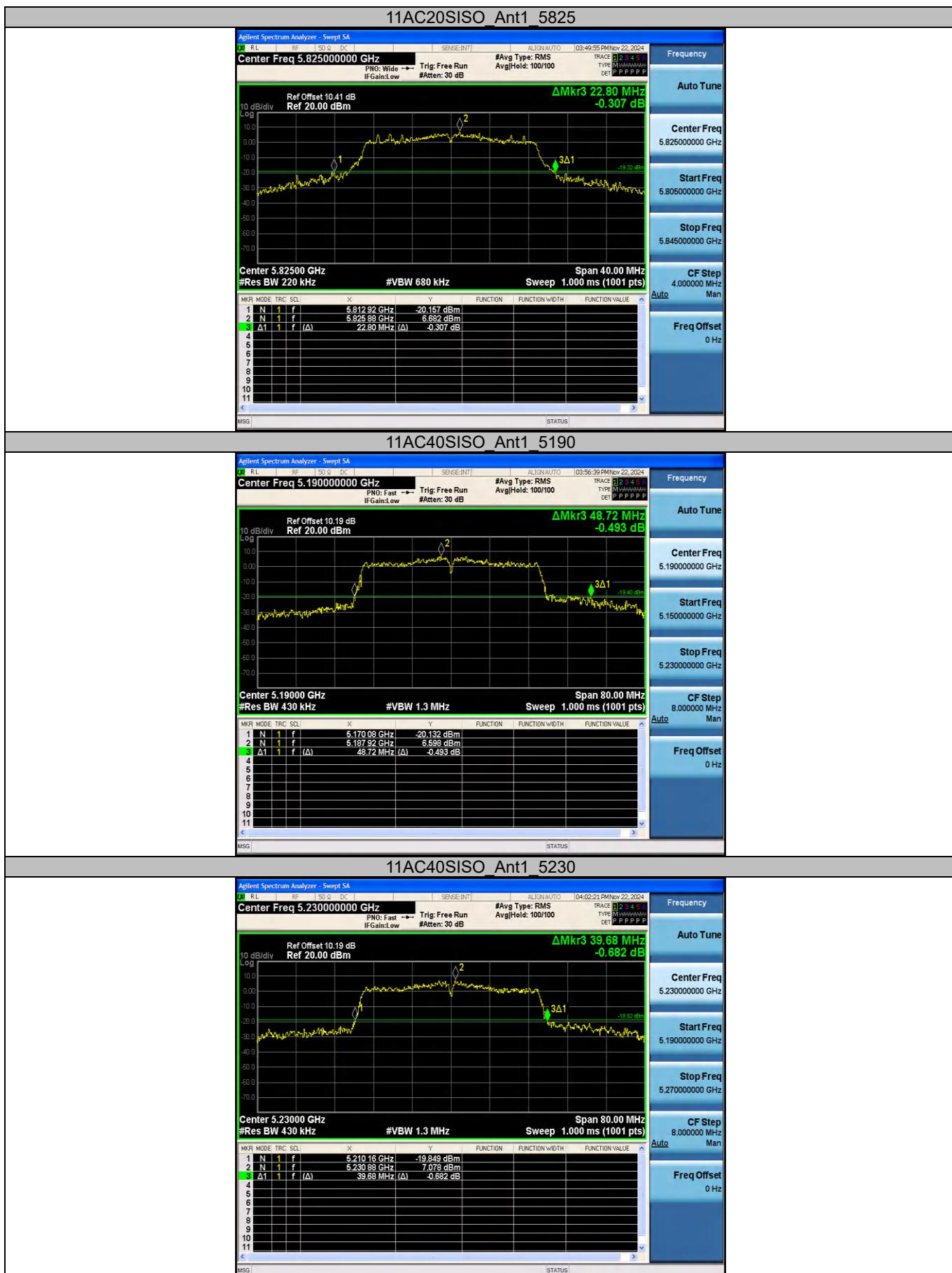


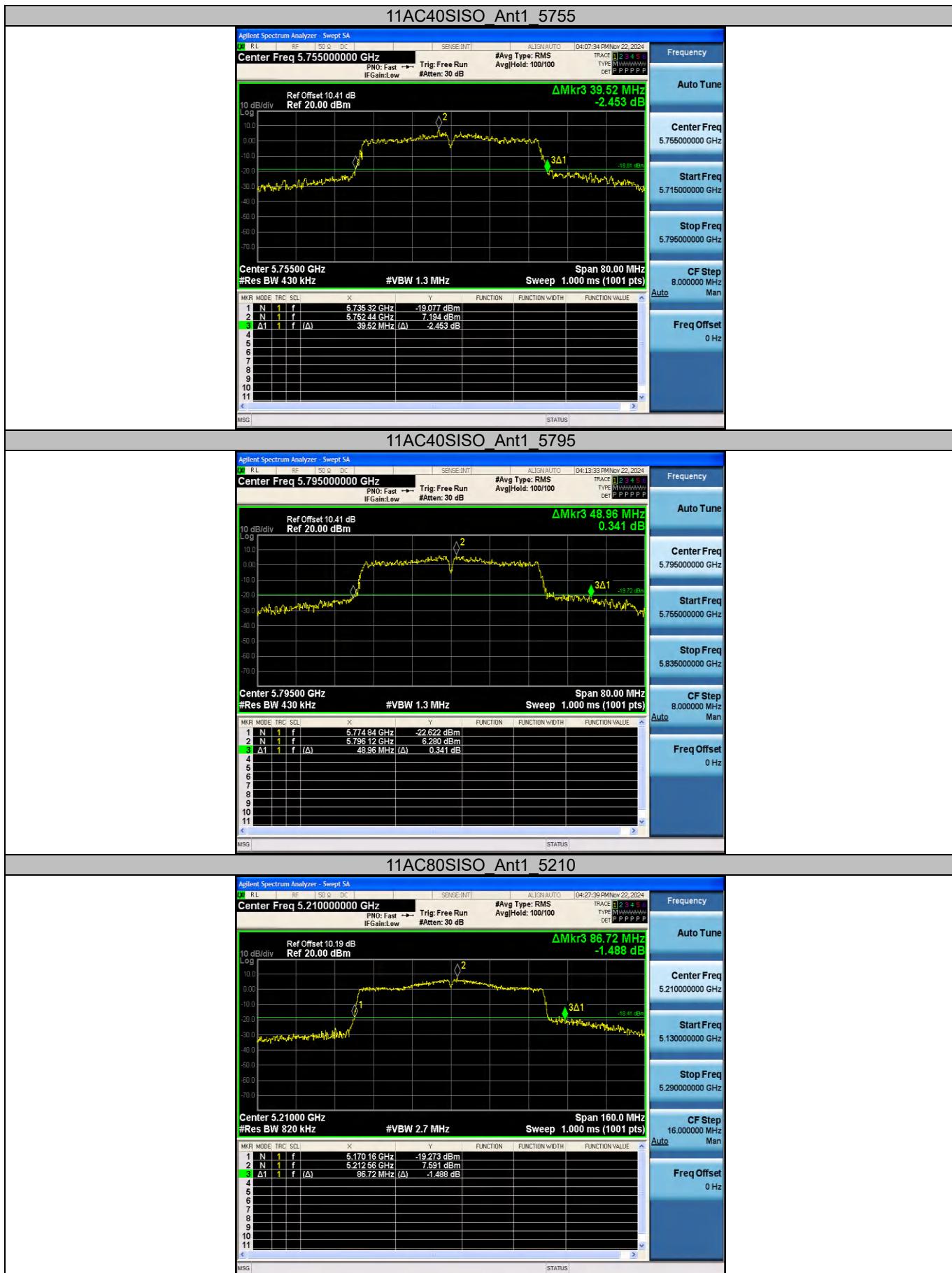














6.9 Appendix A2: Occupied channel bandwidth

6.9.1 Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.244	5171.2608	5188.5048	---	---
		5200	17.406	5191.2712	5208.6772	---	---
		5240	17.395	5231.1938	5248.5888	---	---
		5745	17.420	5736.1678	5753.5878	---	---
		5785	17.339	5776.2080	5793.5470	---	---
		5825	17.327	5816.2259	5833.5529	---	---
11N20SISO	Ant1	5180	18.247	5170.8737	5189.1207	---	---
		5200	18.387	5190.8326	5209.2196	---	---
		5240	18.393	5230.7891	5249.1821	---	---
		5745	18.491	5735.7134	5754.2044	---	---
		5785	18.424	5775.7480	5794.1720	---	---
		5825	18.473	5815.6738	5834.1468	---	---
11N40SISO	Ant1	5190	36.663	5171.7684	5208.4314	---	---
		5230	36.577	5211.7654	5248.3424	---	---
		5755	36.808	5736.6906	5773.4986	---	---
		5795	36.772	5776.7239	5813.4959	---	---
11AC20SISO	Ant1	5180	18.274	5170.8108	5189.0848	---	---
		5200	18.438	5190.8319	5209.2699	---	---
		5240	18.447	5230.7701	5249.2171	---	---
		5745	18.451	5735.7246	5754.1756	---	---
		5785	18.455	5775.7227	5794.1777	---	---
		5825	18.404	5815.7246	5834.1286	---	---
11AC40SISO	Ant1	5190	36.866	5171.6199	5208.4859	---	---
		5230	36.710	5211.5661	5248.2761	---	---
		5755	36.947	5736.4923	5773.4393	---	---
		5795	37.054	5776.4760	5813.5300	---	---
11AC80SISO	Ant1	5210	75.580	5172.3604	5247.9404	---	---
		5775	75.848	5737.2256	5813.0736	---	---



6.9.2 Test Graphs

