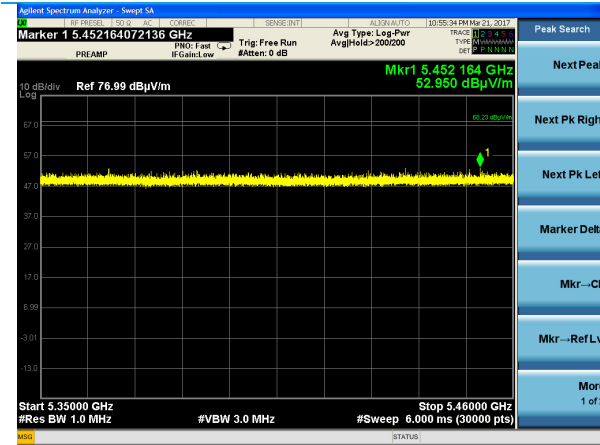
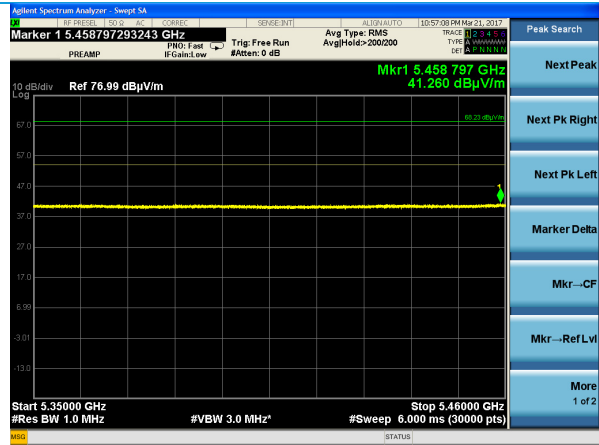


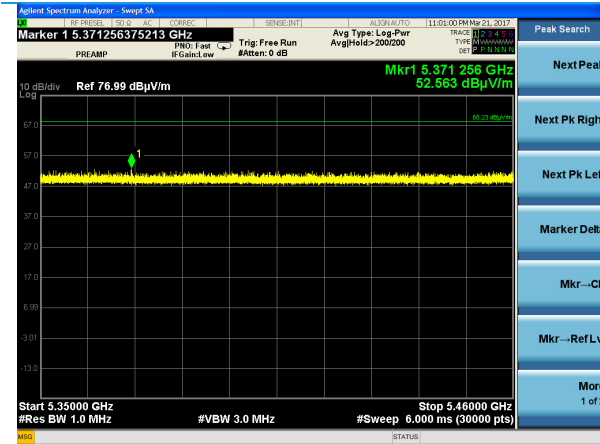
Plots – U-NII-2C Restricted-Band Lower Band-Edge, continued



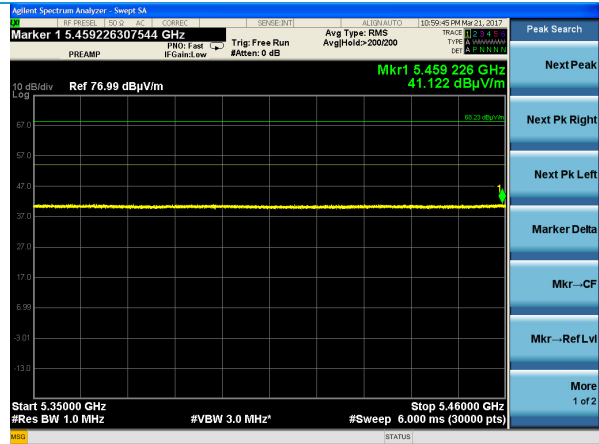
Low Channel – 802.11ac HT-80 – Peak



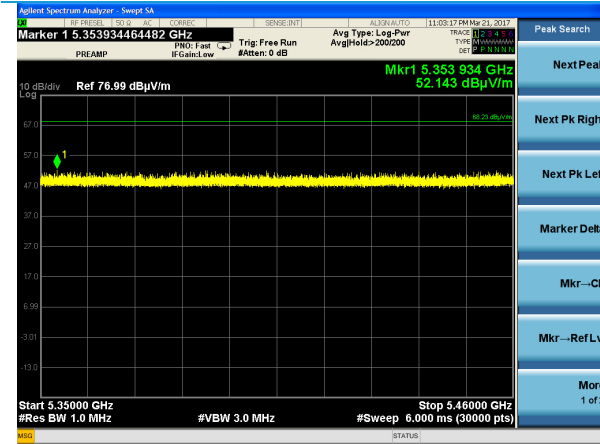
Low Channel – 802.11ac HT-80 - Average



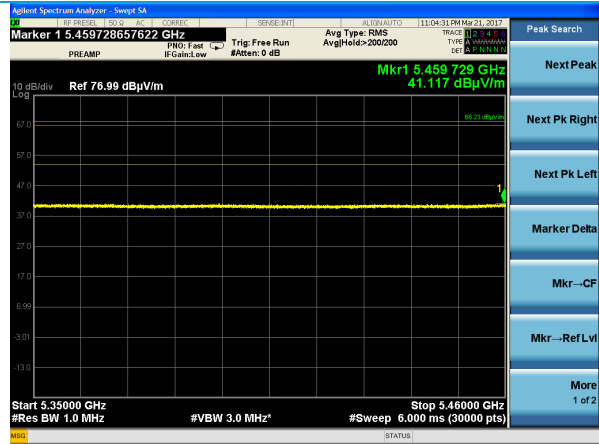
Low Channel – 802.11n HT-20 – Peak



Low Channel – 802.11n HT-20 - Average

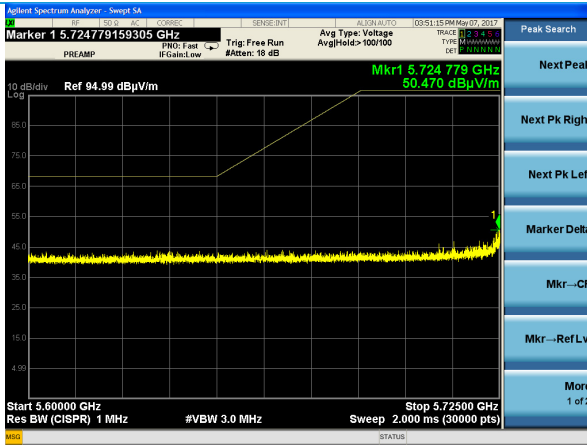


Low Channel – 802.11n HT-40 – Peak

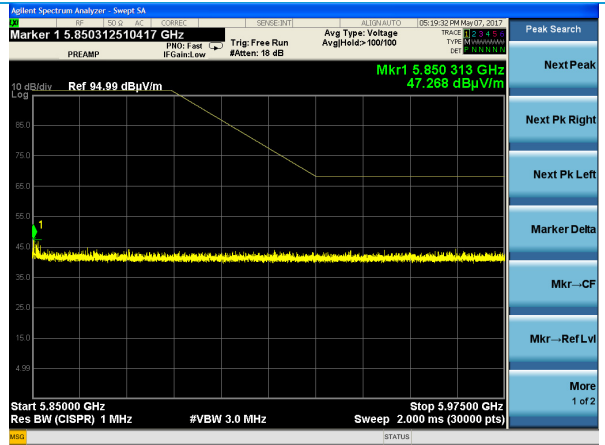


Low Channel – 802.11n HT-40 - Average

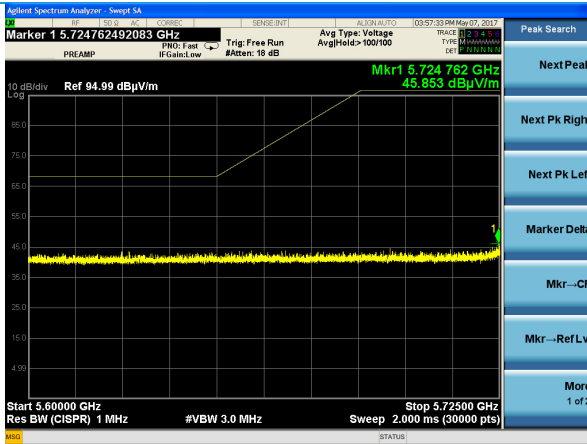
## Plots – U-NII-3 Band-Edge Mask



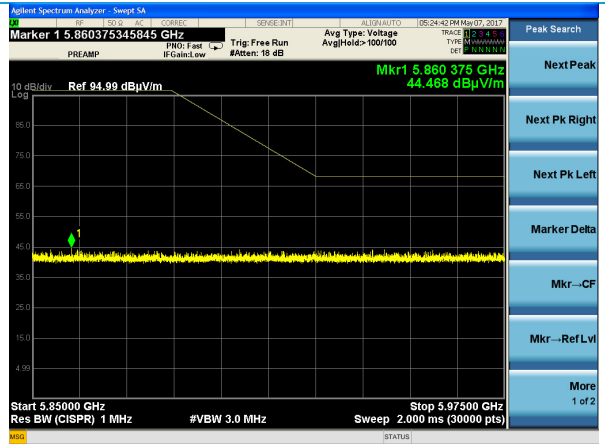
Low Channel – 802.11a HT-20



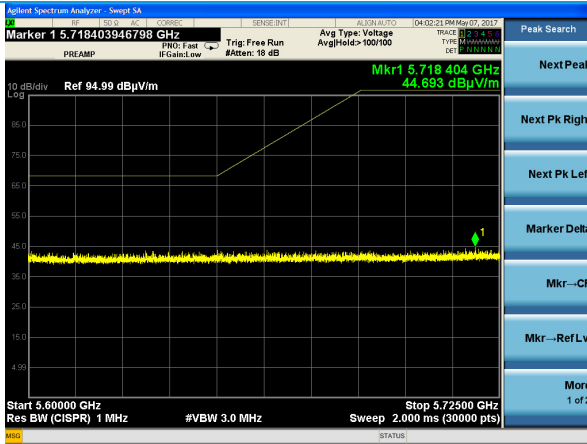
High Channel – 802.11a HT-20



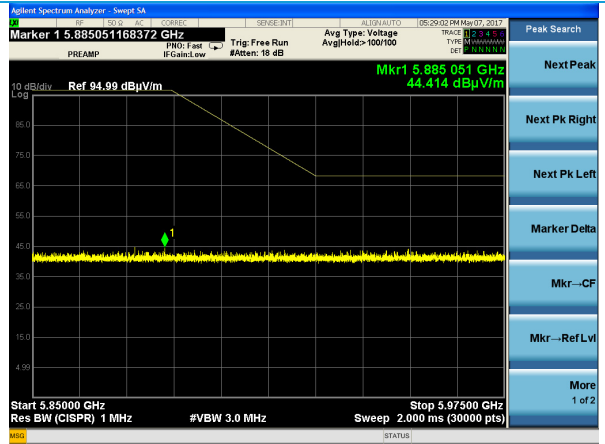
Low Channel – 802.11ac HT-20



High Channel – 802.11ac HT-20

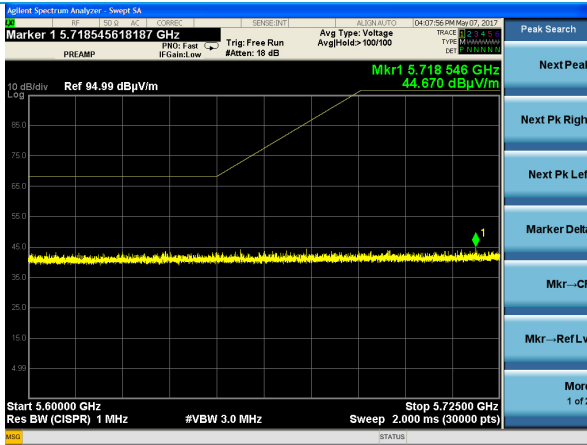


Low Channel – 802.11ac HT-40

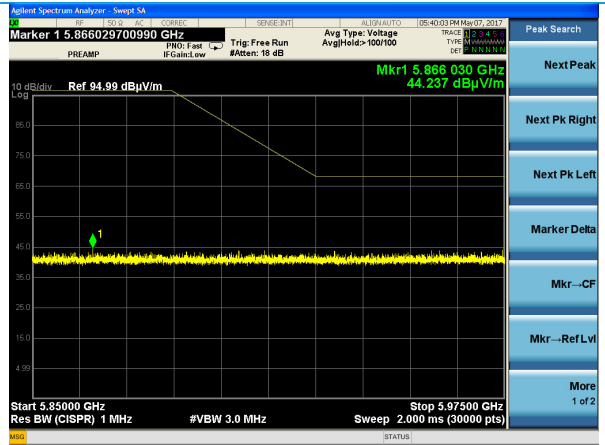


High Channel – 802.11ac HT-40

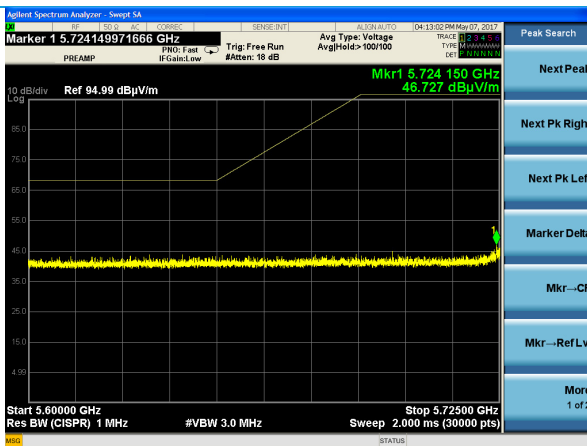
## Plots – U-NII-3 Band-Edge Mask, continued



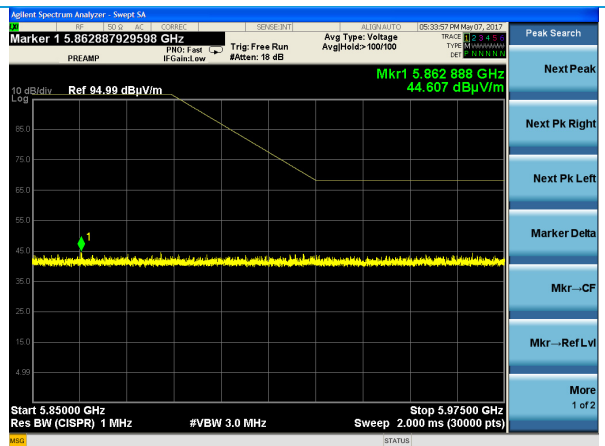
Only Channel – 802.11ac HT-80



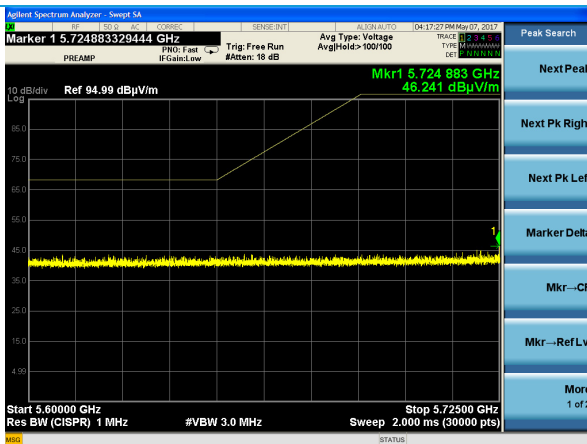
Only Channel – 802.11ac HT-80



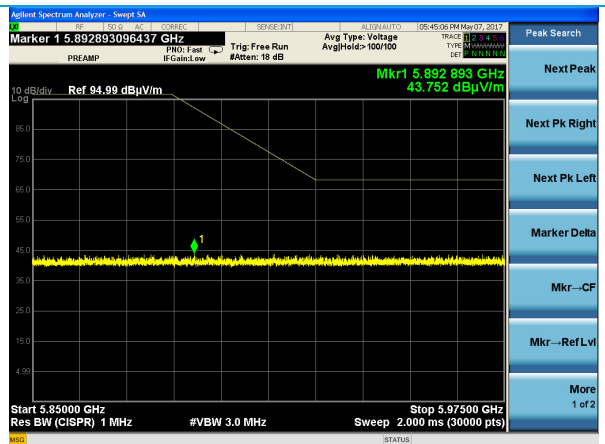
Low Channel – 802.11n HT-20



High Channel – 802.11n HT-20



Low Channel – 802.11n HT-40



High Channel – 802.11n HT-40

## 5.2.2 Radiated – Spurious & Harmonic Emissions

<b>Operator</b>	Kimberly Bay
<b>QA</b>	Shane Dock
<b>Test Date</b>	U-NII-1: March 20-21, 25, 2017; U-NII-2A: March 25, 2017 U-NII-2C: March 25, 2017; U-NII-3: March 7, 23-24, 2017
<b>Location</b>	3-meter Semi-Anechoic Chamber
<b>Temp. / R.H.</b>	21°C / 28%-34% RH
<b>Requirement</b>	FCC 15.407 (b)(1-8) RSS 247 Issue 2 Sections 6.2.1.2, 6.2.2.2, 6.2.3.2, 6.2.4.2
<b>Method</b>	KDB 789033 D02 v01r04 Section II.G.1,3,5 (max), 6 (average)

**Limits:**

U-NII Band	Frequency Range	FCC Limit (@ 3m)	ISED Limit (@ 3m)
All	30-88 MHz	Quasi-peak 40 dB $\mu$ V/m	Quasi-peak 40 dB $\mu$ V/m
All	88-216 MHz	Quasi-peak 43.5 dB $\mu$ V/m	Quasi-peak 43.5 dB $\mu$ V/m
All	216-960 MHz	Quasi-peak 46 dB $\mu$ V/m	Quasi-peak 46 dB $\mu$ V/m
All	960-1000 MHz	Peak 74 dB $\mu$ V/m Average 54 dB $\mu$ V/m	Peak 74 dB $\mu$ V/m Average 54 dB $\mu$ V/m
U-NII-1	1-40 GHz	Emissions outside of 5150-5350 MHz $\leq$ 68.23 dB $\mu$ V/m	Emissions outside of 5150-5350 MHz $\leq$ 68.23 dB $\mu$ V/m
U-NII-2A	1-40 GHz	Emissions outside of 5150-5350 MHz $\leq$ 68.23 dB $\mu$ V/m	1) Emissions outside of 5250-5350 MHz $\leq$ 68.23 dB $\mu$ V/m OR 2) Emissions outside of 5150-5350 MHz $\leq$ 68.23 dB $\mu$ V/m AND PSD must comply with ISED U-NII-1 PSD limit
U-NII-2C	1-40 GHz	Emissions outside of 5470-5725 MHz $\leq$ 68.23 dB $\mu$ V/m	1) Emissions outside of 5470-5600 MHz AND 5650-5725 MHz $\leq$ 68.23 dB $\mu$ V/m 2) Devices w/ BW overlapping the band edge of 5725 MHz can meet the emission limit of 68.23 dB $\mu$ V/m at 5850 MHz instead of 5725 MHz
U-NII-3	1-40 GHz	Unwanted emissions must comply with the following: 1) 122.23 dB $\mu$ V/m at frequencies from the band edges decreasing linearly to 110.83 dB $\mu$ V/m at 5 MHz above or below the band edges; 2) 110.83 dB $\mu$ V/m at 5 MHz above or below the band edges decreasing linearly to 105.23 dB $\mu$ V/m at 25 MHz above or below the band edges; 3) 105.23 dB $\mu$ V/m at 25 MHz above or below the band edges decreasing linearly to 68.23 dB $\mu$ V/m above or below the band edges; and 68.23 dB $\mu$ V/m at frequencies more than 75 MHz above or below the band edges.	

### Test Parameters

<b>Frequency</b>	30-40000 MHz
<b>Distance</b>	3 meters
<b>Test Chamber</b>	Above 1 GHz: Absorbers on floor and tilt gear added to antenna assembly to maintain cone of radiation.
<b>EUT</b>	<u>802.11ac HT-20:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5720 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
<b>EUT</b>	6 Mbps, maximum power setting
<b>Note</b>	Data rate of highest Pout was used for this test
<b>Note</b>	Measurements performed with EUT antenna port terminated
<b>Example Calculation</b>	Raw Data + Antenna Factor + Cable Factor = Reported Data 19.77 dBμV + 12.5 dB/m + 0.93 dB = 38.8 dBμV/m

### Instrumentation



Date: 8-Feb-2017

Type Test: Radiated Emissions - U-NII

Job #: C-2602

Prepared By: Kim

Customer: LSR

Quote #: 316356

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	EMI Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960158	Double Fridge Horn Antenna	ETS Lindgren	3117	109300	10/13/2016	10/13/2017	Active Calibration
3	EE 960159	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	40201429	10/13/2016	10/13/2017	Active Calibration
4	AA 960007	Double Fridge Horn Antenna	EMCO	3115	9311-4138	7/22/2016	7/22/2017	Active Calibration
5	EE 960180	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	977711030	7/22/2016	7/22/2017	Active Calibration
6	AA 960174	Small Horn Antenna	ETS Lindgren	3116C-PA	00206880	4/23/2016	4/23/2017	Active Calibration
7	AA 960161	Highpass Filter 5 GHz	K&L Microwave	11SH10-8000	2	2/17/2016	4/5/2017	Active Calibration

**Table – U-NII Spurious Emissions**

Frequency (MHz)	Peak Reading (dBµV/m)	Average Reading (dBµV/m)	FCC 15.407/ RSS 247 EIRP Limit (dBµV/m) @3m	FCC 15.407/ RSS 247 Margin (dB)	FCC 15.209 Average Limit (dBµV/m) @3m	FCC 15.209 Average Margin (dB)	Height (m)	Azimuth (degrees)	EUT Orientation	Antenna Polarization	Band/ Channel
3453	46.4	42.9	68.2	21.8	54	11.1	1.0	0	Side	H	U-NII-1/ 36
3829	44.6	39.6	68.2	23.6	54	14.4	1.1	304	Side	H	U-NII-3/ 149
3830	44.9	40.6	68.2	23.3	54	13.4	1.1	126	Side	V	U-NII-3/ 149

**Table – U-NII-1 Harmonic Emissions – FCC 15.407/RSS 247 Limits**

Fund. Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	FCC 15.407/ RSS 247 Limit (dBµV/m) @3m	FCC 15.407/ RSS 247 Margin (dB)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5180	3	15540	65.4	68.2	2.8	1.8	35	H	Side
5200	3	15600	64.1	68.2	4.1	1.8	23	H	Side
5220	3	15660	63.4	68.2	4.8	1.7	20	H	Side
5240	3	15720	62.6	68.2	5.6	1.9	14	H	Side

**Table – U-NII-1 Harmonic Emissions – FCC 15.209 Limits**

Fund. Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	Average Reading (dBµV/m)	FCC 15.209 Peak/Average Limit (dBµV/m)	Peak Margin (dBm)	Average Margin (dBm)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5180	3	15540	65.4	53.2	74/54	8.6	0.8	1.8	35	H	Side
5200	3	15600	64.1	51.8	74/54	9.9	2.2	1.8	23	H	Side
5220	3	15660	63.4	50.9	74/54	10.6	3.1	1.7	20	H	Side
5240	3	15720	62.6	50.1	74/54	11.4	3.9	1.9	14	H	Side

**Table – U-NII-2A Harmonic Emissions – FCC 15.407/RSS 247 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	FCC 15.407/RSS 247 Limit (dBµV/m) @3m	FCC 15.407/RSS 247 Margin (dB)	Average Margin (dBm)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5260	3	15780	61.0	68.2	7.2	5.2	1.0	11.5	H	Side
5300	3	15900	58.1	68.2	10.1	9.7	1.0	0.0	H	Side
5320	3	15960	55.2	68.2	13.0	11.2	2.2	8.0	H	Side

**Table – U-NII-2A Harmonic Emissions – FCC 15.209 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	Average Reading (dBµV/m)	FCC 15.209 Peak/Average Limit (dBµV/m)	Peak Margin (dBm)	Average Margin (dBm)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5260	3	15780	61.0	48.8	74/54	13	5.2	1.0	11.5	H	Side
5300	3	15900	58.1	44.3	74/54	15.9	9.7	1.0	0.0	H	Side
5320	3	15960	55.2	42.8	74/54	18.8	11.2	2.2	8.0	H	Side

**Table – U-NII-2C Harmonic Emissions – FCC 15.407/RSS 247 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	FCC 15.407/RSS 247 Limit (dBµV/m) @3m	FCC 15.407/RSS 247 Margin (dB)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5500	3	11000	52.8	68.2	15.4	1.2	8.5	H	Side
5580	3	11160	53.4	68.2	14.8	1.3	0.0	H	Side
5700	3	11400	54.3	68.2	13.9	1.1	0.0	H	Side

**Table – U-NII-2C Harmonic Emissions – FCC 15.209 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBµV/m)	Average Reading (dBµV/m)	FCC 15.209 Peak/Average Limit (dBµV/m)	Peak Margin (dBm)	Average Margin (dBm)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5500	3	11000	52.8	40.4	74/54	21.2	13.6	1.2	8.5	H	Side
5580	3	11160	53.4	42.0	74/54	20.6	12.0	1.3	0.0	H	Side
5700	3	11400	54.3	42.5	74/54	19.7	11.5	1.1	0.0	H	Side



**Table – U-NII-3 Harmonic Emissions – FCC 15.407/RSS 247 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBμV/m)	FCC 15.407/RSS 247 Limit (dBμV/m) @3m	FCC 15.407/RSS 247 Margin (dB)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5745	2	11490	54.8	68.2	13.4	1.0	0	H	Side
5785	2	11570	56.2	68.2	12.0	1.2	0	H	Side
5785	3	17355	58.6	68.2	9.6	1.0	37	H	Side
5825	2	11650	57.1	68.2	11.1	1.3	0	H	Side

**Table – U-NII-3 Harmonic Emissions – FCC 15.209 Limits**

Fundamental Frequency (MHz)	Harmonic	Harmonic Frequency (MHz)	Peak Reading (dBμV/m)	Average Reading (dBμV/m)	FCC 15.209 Peak/Average Limit (dBμV/m)	Peak Margin (dBm)	Average Margin (dBm)	Height (m)	Azimuth (degrees)	Antenna Polarization	EUT Orientation
5745	2	11490	54.8	43.4	74/54	19.2	10.6	1	0	H	Side
5785	2	11570	56.2	44.5	74/54	17.8	9.5	1.2	0	H	Side
5785	3	17355	58.6	45.6	74/54	15.4	8.4	1.03	37	H	Side
5825	2	11650	57.1	45.5	74/54	16.9	8.5	1.3	0	H	Side