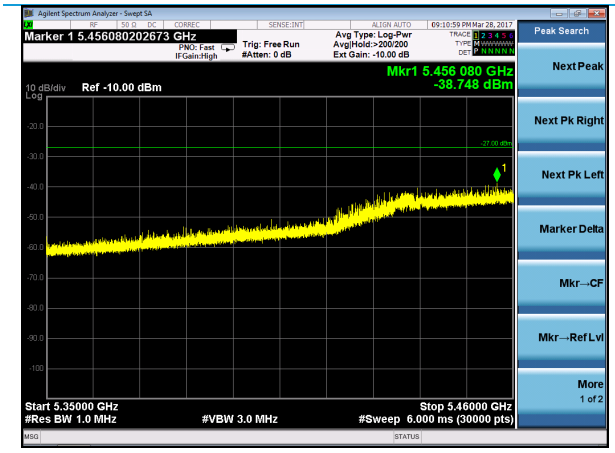
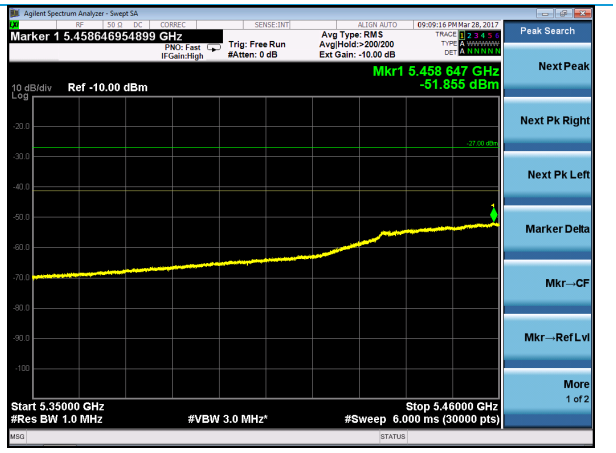
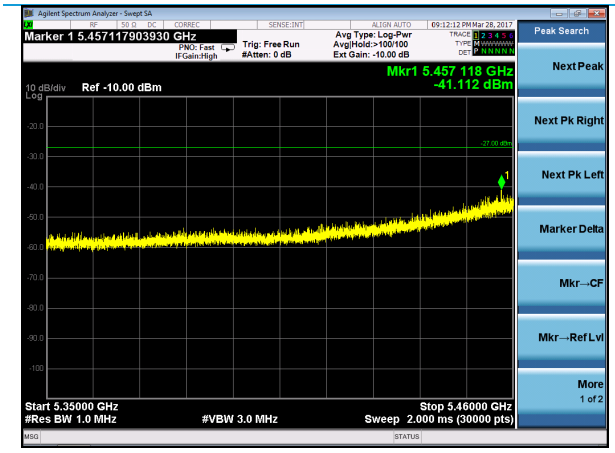
Plots – U-NII-2C Restricted-Band Lower Band-Edge, continued



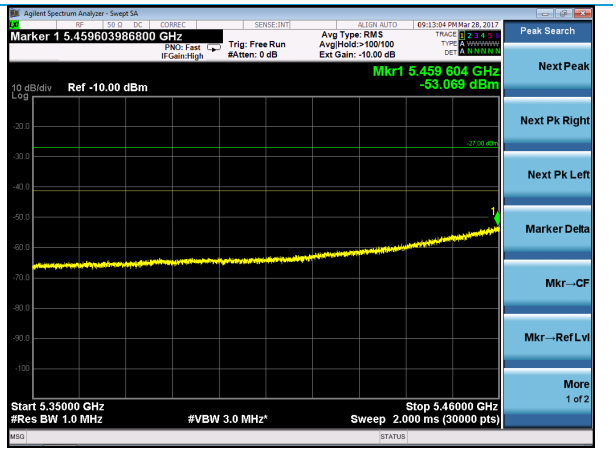
Low Channel – 802.11ac HT-80 – Peak



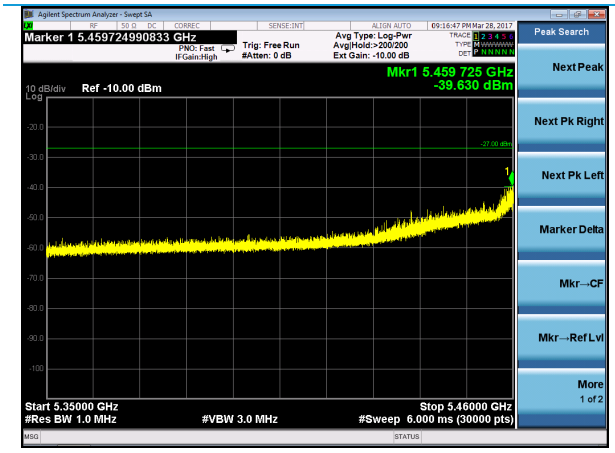
Low Channel – 802.11ac HT-80 - Average



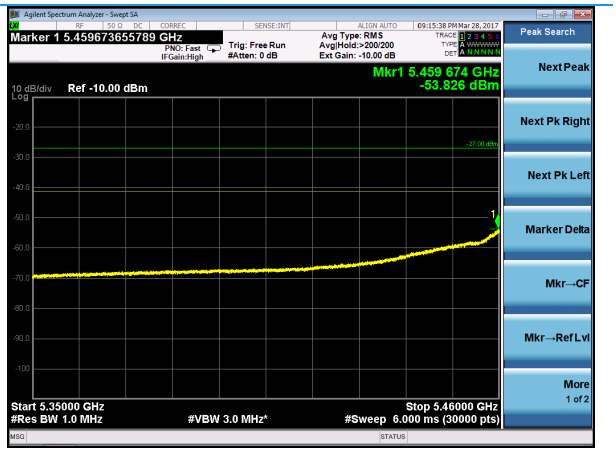
Low Channel – 802.11n HT-20 - Peak



Low Channel – 802.11n HT-20 - Average

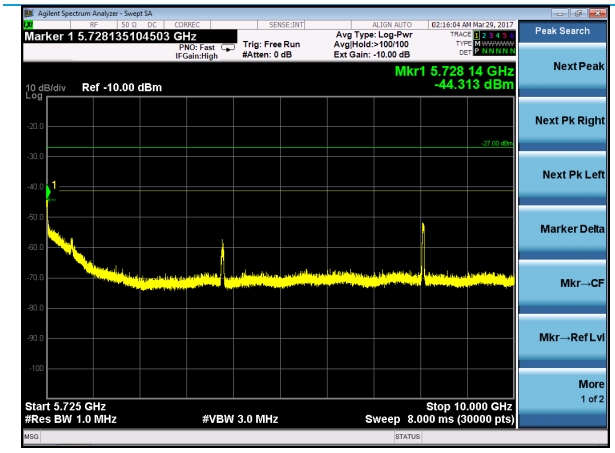


Low Channel – 802.11n HT-40 - Peak

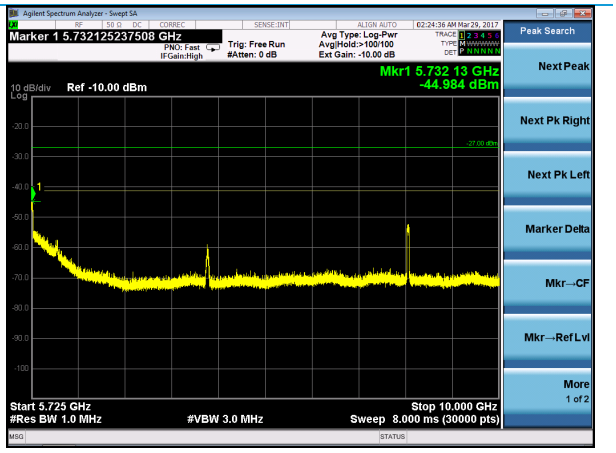


Low Channel – 802.11n HT-40 - Average

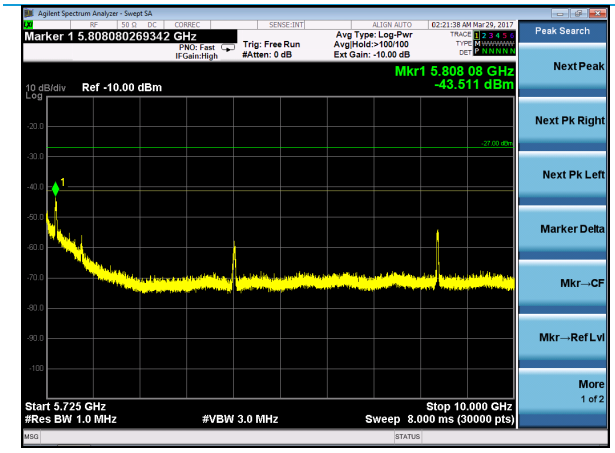
Plots – U-NII-2C: Upper Edge of U-NII-2C Band



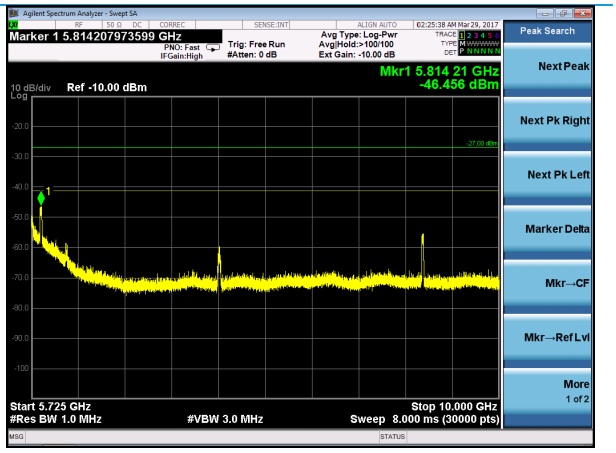
Low Channel – 802.11a HT-20



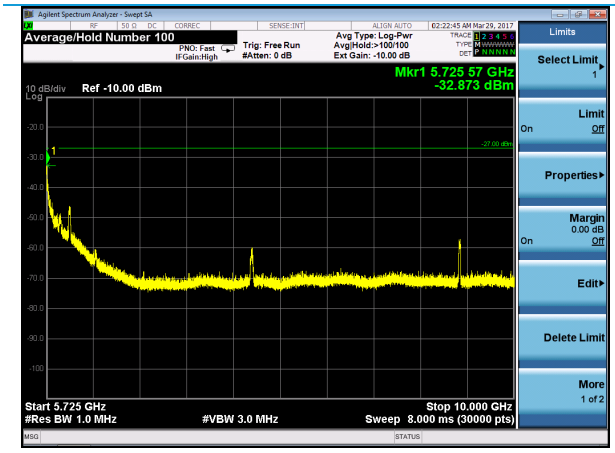
Low Channel – 802.11ac HT-20



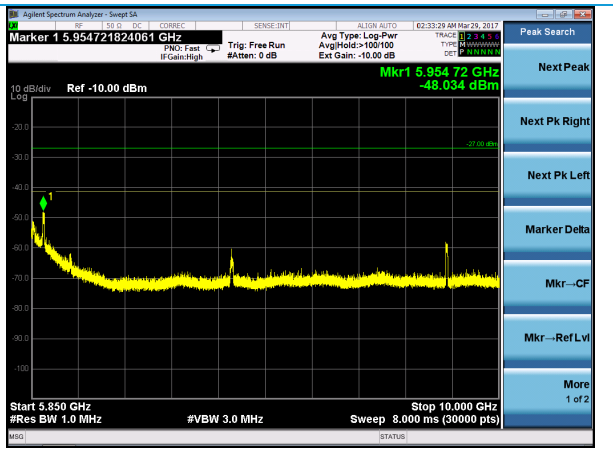
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20

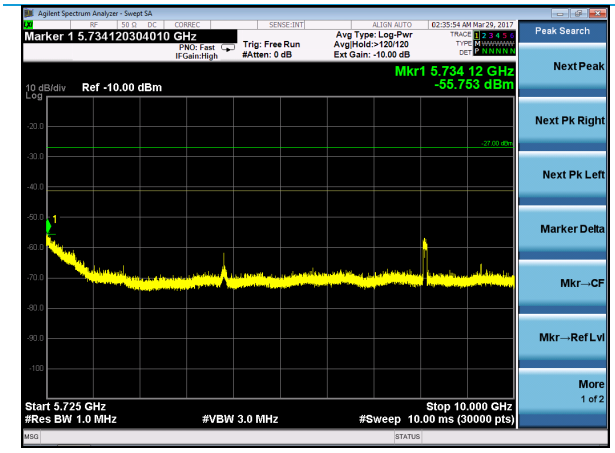


High Channel – 802.11a HT-20

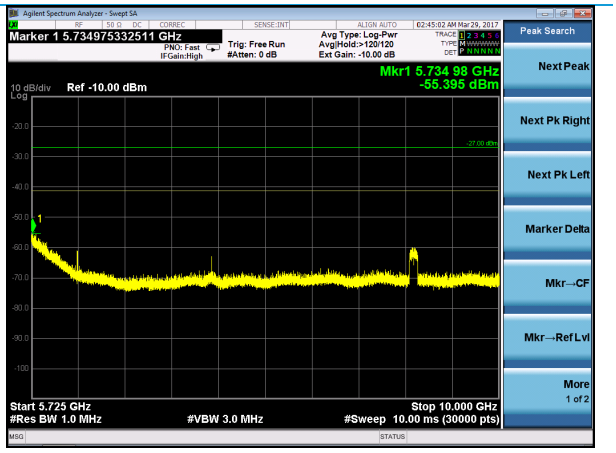


High Channel – 802.11ac HT-20

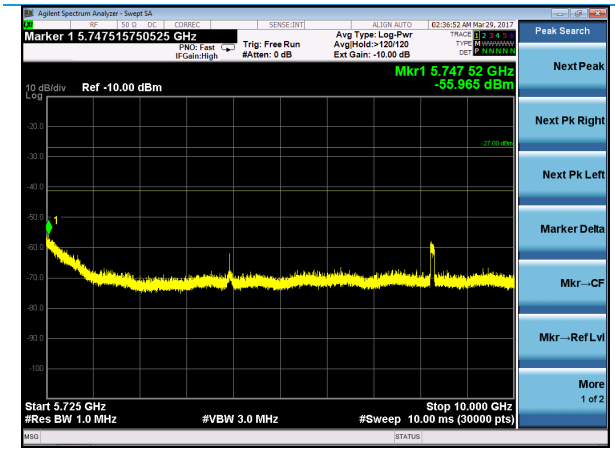
Plots – U-NII-2C: Upper Edge of U-NII-2C Band, continued



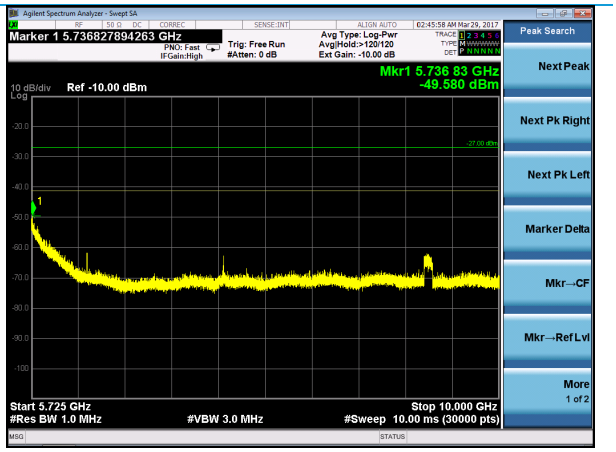
Low Channel – 802.11ac HT-40



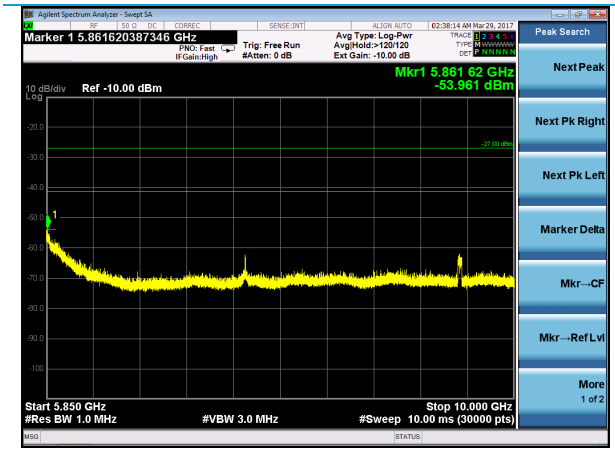
Low Channel – 802.11ac HT-80



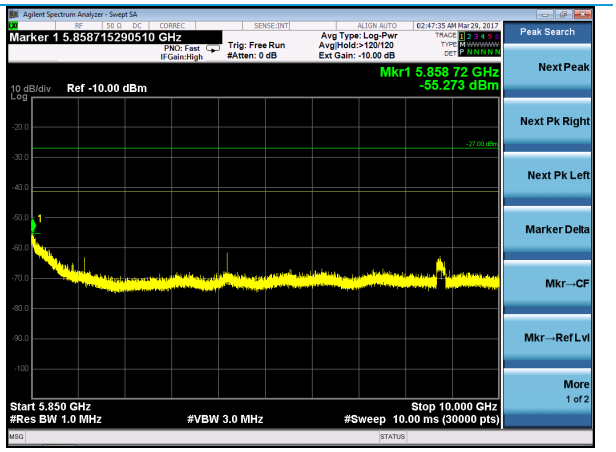
Mid Channel – 802.11ac HT-40



Mid Channel – 802.11ac HT-80

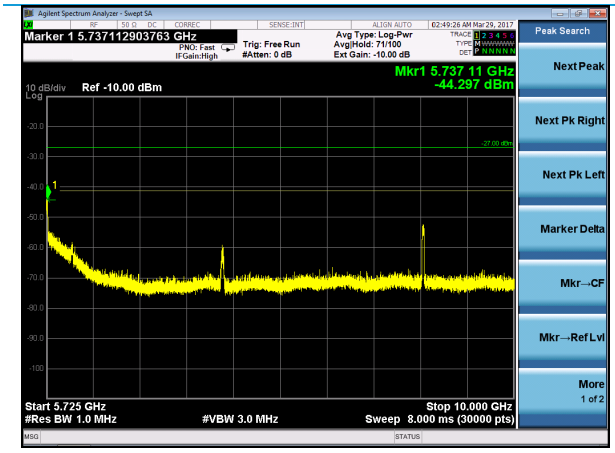


High Channel – 802.11ac HT-40

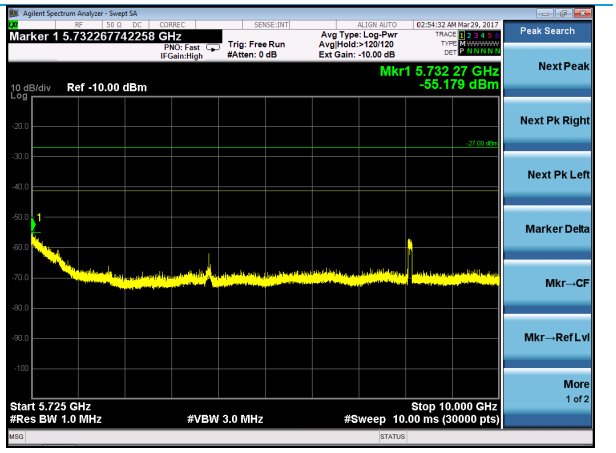


High Channel – 802.11ac HT-80

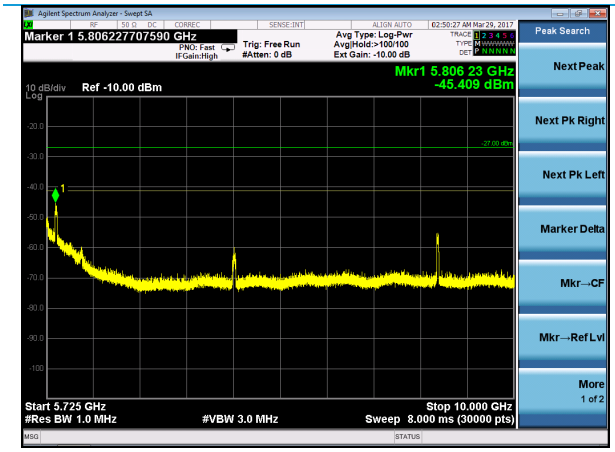
Plots – U-NII-2C: Upper Edge of U-NII-2C Band, continued



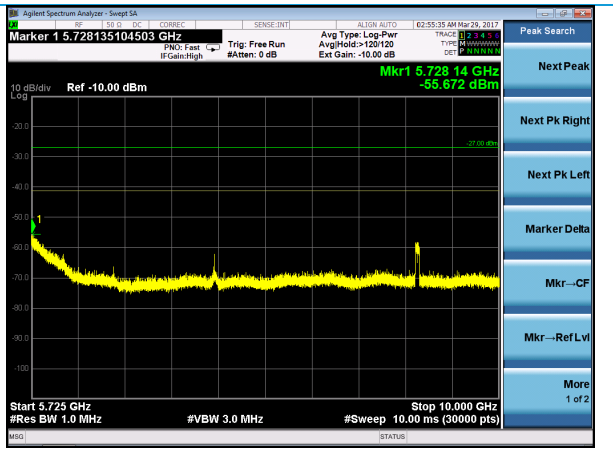
Low Channel – 802.11n HT-20



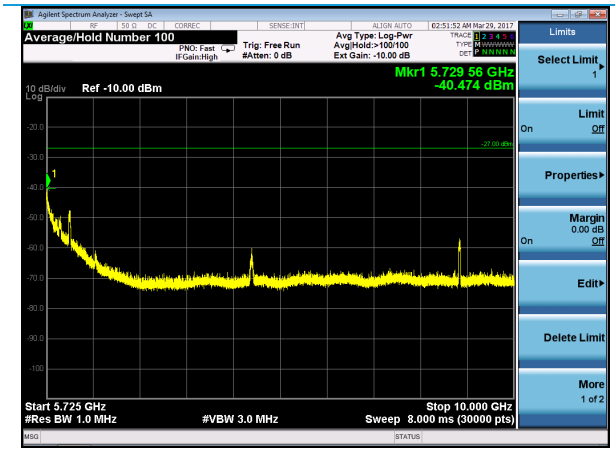
Low Channel – 802.11n HT-40



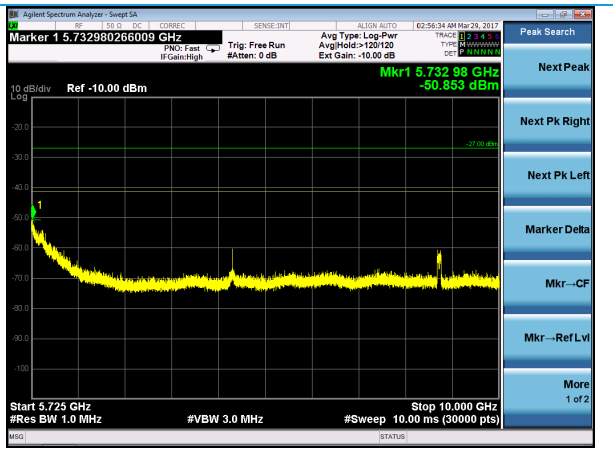
Mid Channel – 802.1n HT-20



Mid Channel – 802.11n HT-40

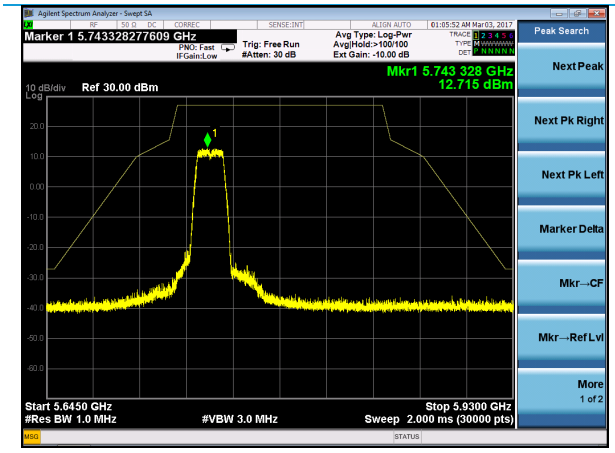


High Channel – 802.11n HT-20

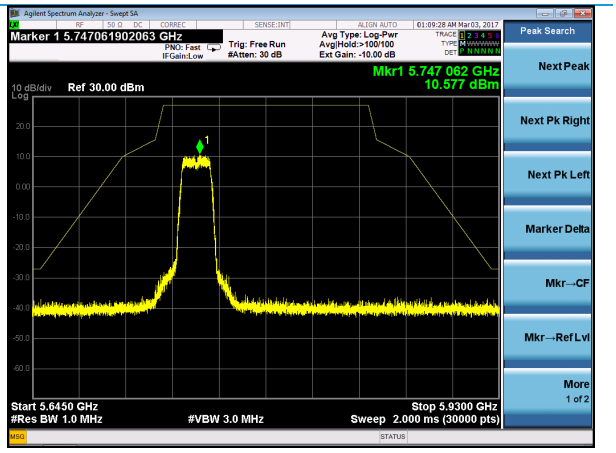


High Channel – 802.11n HT-40

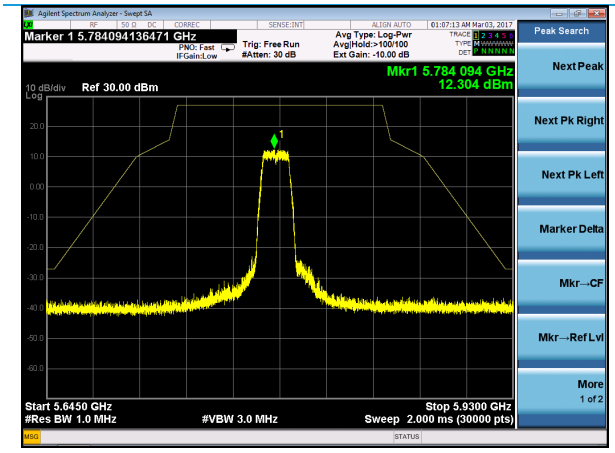
Plots – U-NII-3 Band Edge Mask



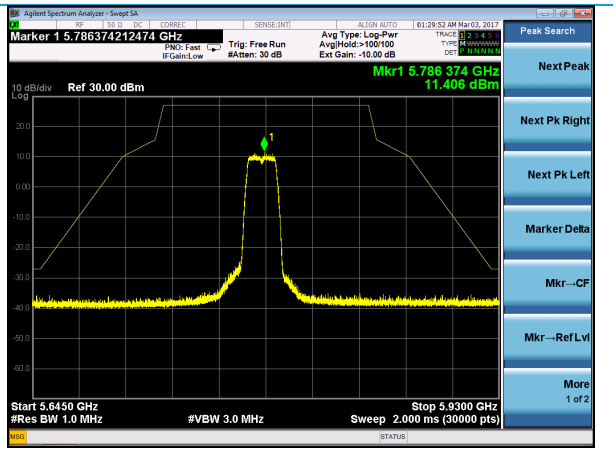
Low Channel – 802.11a HT-20



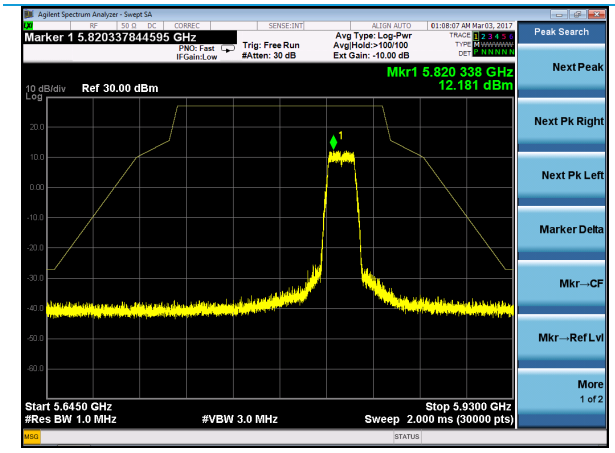
Low Channel – 802.11ac HT-20



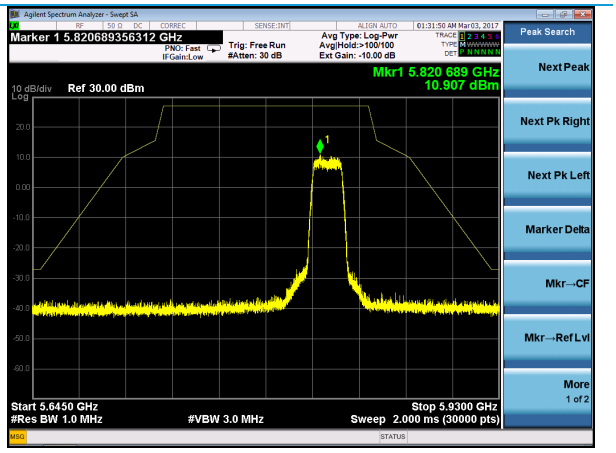
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20

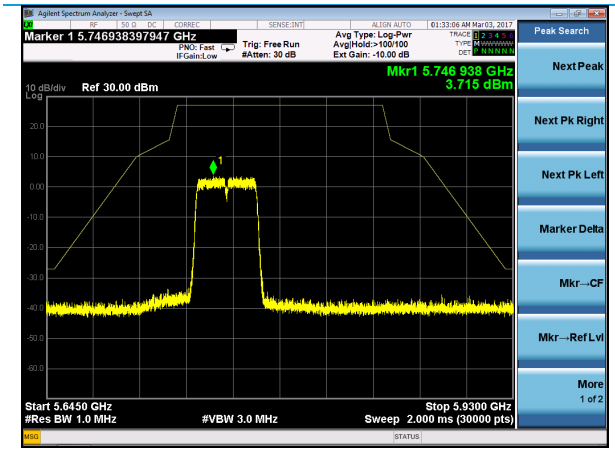


High Channel – 802.11a HT-20

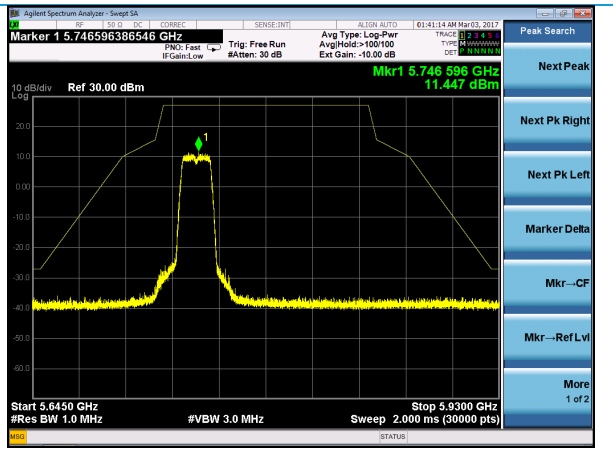


High Channel – 802.11ac HT-20

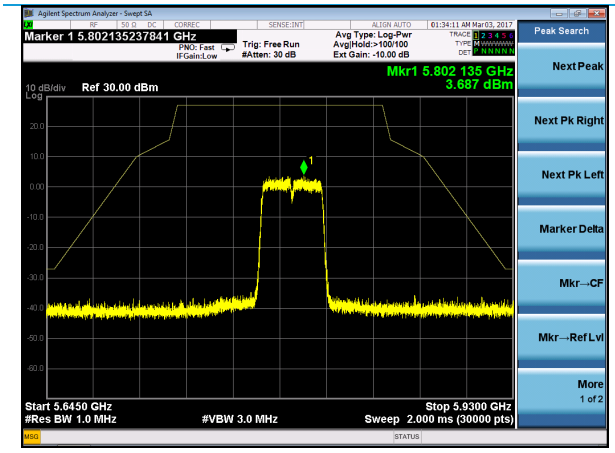
Plots – U-NII-3 Band Edge Mask, continued



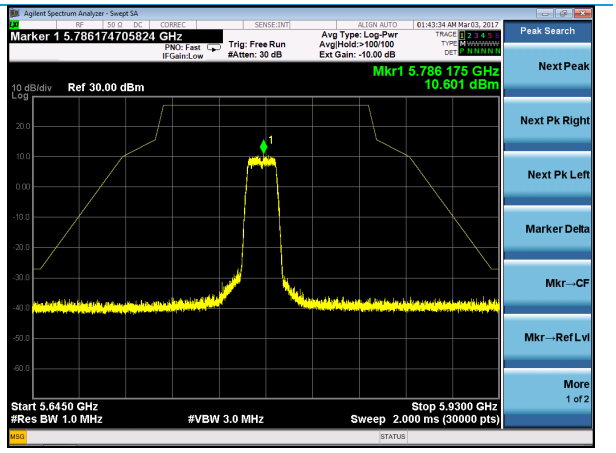
Low Channel – 802.11ac HT-40



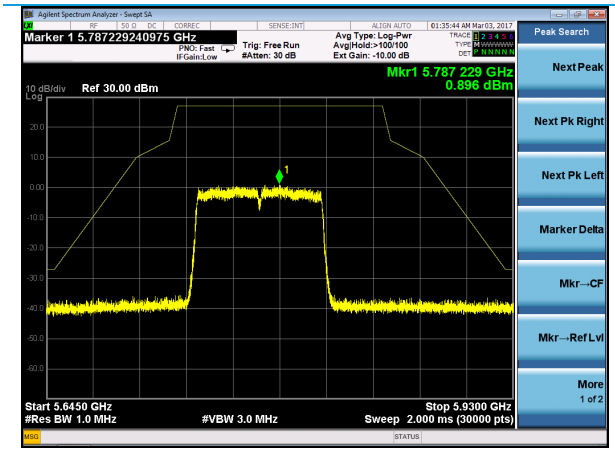
Low Channel – 802.11n HT-20



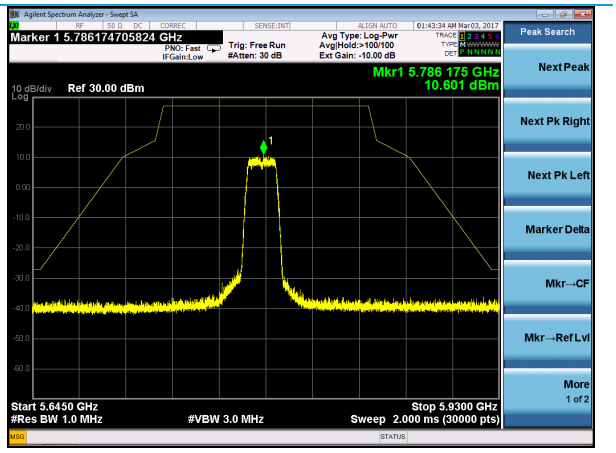
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

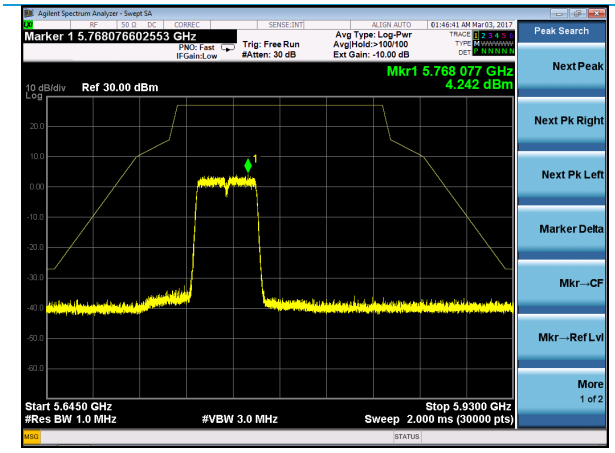


Only Channel – 802.11ac HT-80

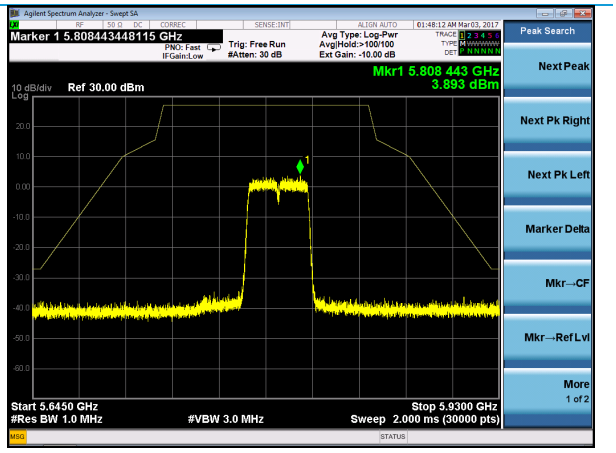


High Channel – 802.11n HT-20

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



Low Channel – 802.11n HT-40



High Channel – 802.11n HT-40

5.1.6 Antenna Port Conducted Emissions – Spurious & Harmonic Emissions

Operator	Kimberly Bay
QA	Aidi Zainal / Shane Dock
Test Date	U-NII-1: March 8, 10, 16 & 17, 2017; U-NII-2A: March 16, 2017 U-NII-2C: March 27-28, 2017; U-NII-3: February 28, 2017, March 20, 2017, April 10, 2017
Location	Conducted RF Test Bench
Temp. / R.H.	21°- 22°C / 25%-43% RH
Requirement	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
Method	KDB 789033 D02 v01r04 Section II.G.1,3,5 (max), 6 (average)

Limits:

U-NII Band	Frequency Range	FCC Limit	ISED Limit
All	30-88 MHz	Quasi-peak -55.23 dBm	Quasi-peak -55.23 dBm
All	88-216 MHz	Quasi-peak -51.23 dBm	Quasi-peak -51.23 dBm
All	216-960 MHz	Quasi-peak -49.23 dBm	Quasi-peak -49.23 dBm
All	960-1000 MHz	Peak -21.23 dBm Average -41.23 dBm	Peak -21.23 dBm Average -41.23 dBm
U-NII-1	1-40 GHz	Emissions outside of 5150-5350 MHz ≤ -27 dBm/MHz e.i.r.p	Emissions outside of 5150-5350 MHz ≤ -27 dBm/MHz e.i.r.p
U-NII-2A	1-40 GHz	Emissions outside of 5150-5350 MHz ≤ -27 dBm/MHz e.i.r.p	1) Emissions outside of 5250-5350 MHz ≤ -27 dBm/MHz e.i.r.p OR 2) Emissions outside of 5150-5350 MHz ≤ -27 dBm/MHz e.i.r.p. AND PSD must comply with ISED U-NII-1 PSD limit
U-NII-2C	1-40 GHz	Emissions outside of 5470-5725 MHz ≤ -27 dBm/MHz e.i.r.p	1) Emissions outside of 5470-5600 MHz AND 5650-5725 MHz ≤ -27 dBm/MHz e.i.r.p. 2) Devices w/ BW overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz
U-NII-3	1-40 GHz	E.I.R.P. of unwanted emissions must comply with the following: 1) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges; 2) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges; 3) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz above or below the band edges; and -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.	

Test Parameters

Frequency	30-40000 MHz
Settings	802.11a HT-20: 5180, 5200, 5220 (ISED only), 5240 (FCC only) MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	802.11ac HT-20: 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)
Settings	802.11ac HT-40: 5190, 5230 MHz (U-NII-1); 5270, 5310 MHz (U-NII-2A); 5510, 5550, 5710 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3)
Settings	802.11ac HT-80: 5210 MHz (U-NII-1); 5290 MHz (U-NII-2A); 5530, 5610 (FCC Only), 5690 MHz (U-NII-2C); 5775 MHz (U-NII-3)
Settings	802.11n HT-20: 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	802.11n HT-40: 5190, 5230 MHz, (U-NII-1); 5270, 5310 MHz(U-NII-2A); 5510, 5550, 5670 MHz(U-NII-2C); 5755, 5795 MHz (U-NII-3)
Note	Maximum antenna gain: 4 dBi
Note	U-NII-2A meets the second condition of the ISED limit as listed in the Limits table above.
Note	U-NII-1, U-NII-2A, and U-NII-3 each have only two HT-40 channels and one HT-80 channel.
Note	U-NII-2C 802.11ac HT-80 channel 5610 MHz tested here, but not used in Canada. U-NII-2C 802.11ac HT-80 has only two available ISED channels.
Example Calculation	Margin = Limit – (measurement + antenna gain) Ex: -27 dBm – (-38.6 dBm + 4 dBi) = 7.6 dB margin

Instrumentation

LSR a Laird Business

Date: 6-Feb-2017 Type Test: Conducted RF Emissions 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 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
2	AA 960143	Phaseflex	Gore	EKD01D01048.0	5546519	6/26/2015	6/25/2017	Active Calibration
3	AA 960172	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-1	387	5/16/2016	5/16/2017	Active Verification

Table – U-NII-1 Conducted Harmonics Emissions – FCC 15.407/RSS 247 Limits

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Peak Antenna Gain (dBi)	FCC 15.407/ RSS 247 EIRP Limit (dBm/ MHz)	FCC 15.407/ RSS 247 Margin (dB)
802.11a	6 Mbps	HT-20	5180	15540	-38.615	4	-27	7.615
802.11a	6 Mbps	HT-20	5200	15600	-38.523	4	-27	7.523
802.11a	6 Mbps	HT-20	5220 (ISED)	15660	-39.088	4	-27	8.088
802.11a	6 Mbps	HT-20	5240 (FCC)	15720	-40.234	4	-27	9.234
802.11ac	MCS0	HT-20	5180	15540	-44.247	4	-27	13.247
802.11ac	MCS0	HT-20	5200	15600	-44.317	4	-27	13.317
802.11ac	MCS0	HT-20	5220 (ISED)	15660	-44.454	4	-27	13.454
802.11ac	MCS0	HT-20	5240 (FCC)	15720	-46.171	4	-27	15.171
802.11n	MCS0	HT-20	5180	15540	-42.959	4	-27	11.959
802.11n	MCS0	HT-20	5200	15600	-44.232	4	-27	13.232
802.11n	MCS0	HT-20	5220 (ISED)	15660	-43.932	4	-27	12.932
802.11n	MCS0	HT-20	5240 (FCC)	15720	-45.105	4	-27	14.105

Table – U-NII-1 Conducted Harmonics Emissions – FCC 15.209 Limits

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Average Measured (dB)	Peak Antenna Gain (dBi)	FCC 15.209 Peak/Avg Limit (dBm)	FCC 15.209 Peak Margin (dB)	FCC 15.209 Average Margin (dB)
802.11a	6 Mbps	HT-20	5180	15540	-38.615	-47.373	4	-21.23/ -41.23	13.385	2.143
802.11a	6 Mbps	HT-20	5200	15600	-38.523	-46.132	4	-21.23/ -41.23	13.293	0.902
802.11a	6 Mbps	HT-20	5220 (ISED)	15660	-39.088	-46.449	4	-21.23/ -41.23	13.858	1.219
802.11a	6 Mbps	HT-20	5240 (FCC)	15720	-40.234	-47.759	4	-21.23/ -41.23	15.004	2.529
802.11ac	MCS0	HT-20	5180	15540	-44.247	-51.558	4	-21.23/ -41.23	19.017	6.328
802.11ac	MCS0	HT-20	5200	15600	-44.317	-50.685	4	-21.23/ -41.23	19.087	5.455
802.11ac	MCS0	HT-20	5220 (ISED)	15660	-44.454	-51.768	4	-21.23/ -41.23	19.224	6.538
802.11ac	MCS0	HT-20	5240 (FCC)	15720	-46.171	-53.371	4	-21.23/ -41.23	20.941	8.141
802.11n	MCS0	HT-20	5180	15540	-42.959	-49.883	4	-21.23/ -41.23	17.729	4.653
802.11n	MCS0	HT-20	5200	15600	-44.232	-50.81	4	-21.23/ -41.23	19.002	5.58
802.11n	MCS0	HT-20	5220 (ISED)	15660	-43.932	-51.103	4	-21.23/ -41.23	18.702	5.873
802.11n	MCS0	HT-20	5240 (FCC)	15720	-45.105	-52.706	4	-21.23/ -41.23	19.875	7.476

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

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Peak Antenna Gain (dBi)	FCC 15.407/ RSS 247 EIRP Limit (dBm/ MHz)	FCC 15.407/ RSS 247 Margin (dB)
802.11a	6 Mbps	HT-20	5260	15780	-38.21	4	-27	7.21
802.11a	6 Mbps	HT-20	5300	15900	-40.85	4	-27	9.85
802.11a	6 Mbps	HT-20	5320	15960	-43.84	4	-27	12.84
802.11ac	MCS0	HT-20	5260	15780	-42.45	4	-27	11.45
802.11ac	MCS0	HT-20	5300	15900	-44.67	4	-27	13.67
802.11ac	MCS0	HT-20	5320	15960	-46.82	4	-27	15.82
802.11n	MCS0	HT-20	5260	15780	-42.17	4	-27	11.17
802.11n	MCS0	HT-20	5300	15900	-44.196	4	-27	13.196
802.11n	MCS0	HT-20	5320	15960	-45.97	4	-27	14.97

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

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Average Measured (dB)	Peak Antenna Gain (dBi)	FCC 15.209 Peak/Avg Limit (dBm)	FCC 15.209 Peak Margin (dB)	FCC 15.209 Average Margin (dB)
802.11a	6 Mbps	HT-20	5260	15780	-38.21	-50.74	4	-21.23/ -41.23	12.98	5.51
802.11a	6 Mbps	HT-20	5300	15900	-40.85	-53.35	4	-21.23/ -41.23	15.62	8.12
802.11a	6 Mbps	HT-20	5320	15960	-43.84	-56.35	4	-21.23/ -41.23	18.61	11.12
802.11ac	MCS0	HT-20	5260	15780	-42.45	-54.4	4	-21.23/ -41.23	17.22	9.17
802.11ac	MCS0	HT-20	5300	15900	-44.67	-56.49	4	-21.23/ -41.23	19.44	11.26
802.11ac	MCS0	HT-20	5320	15960	-46.82	-57.98	4	-21.23/ -41.23	21.59	12.75
802.11n	MCS0	HT-20	5260	15780	-42.17	-54.25	4	-21.23/ -41.23	16.94	9.02
802.11n	MCS0	HT-20	5300	15900	-44.196	-56.61	4	-21.23/ -41.23	18.966	11.38
802.11n	MCS0	HT-20	5320	15960	-45.97	-58.21	4	-21.23/ -41.23	20.74	12.98

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

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Peak Antenna Gain (dBi)	FCC 15.407/ RSS 247 EIRP Limit (dBm/ MHz)	FCC 15.407/ RSS 247 Margin (dB)
802.11a	6 Mbps	HT-20	5500	11000	-52.059	4	-27	21.059
802.11a	6 Mbps	HT-20	5580	11160	-49.941	4	-27	18.941
802.11a	6 Mbps	HT-20	5700	11400	-47.772	4	-27	16.772
802.11ac	MCS0	HT-20	5500	11000	-54.846	4	-27	23.846
802.11ac	MCS0	HT-20	5580	11160	-52.478	4	-27	21.478
802.11ac	MCS0	HT-20	5720	11440	-52.407	4	-27	21.407
802.11n	MCS0	HT-20	5500	11000	-55.426	4	-27	24.426
802.11n	MCS0	HT-20	5580	11160	-52.128	4	-27	21.128
802.11n	MCS0	HT-20	5700	11400	-52.418	4	-27	21.418

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

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Average Measured (dB)	Peak Antenna Gain (dBi)	FCC 15.209 Peak/Avg Limit (dBm)	FCC 15.209 Peak Margin (dB)	FCC 15.209 Average Margin (dB)
802.11a	6 Mbps	HT-20	5500	11000	-52.059	-62.988	4	-21.23/ -41.23	26.829	17.758
802.11a	6 Mbps	HT-20	5580	11160	-49.941	-61.038	4	-21.23/ -41.23	24.711	15.808
802.11a	6 Mbps	HT-20	5700	11400	-47.772	-58.456	4	-21.23/ -41.23	22.542	13.226
802.11ac	MCS0	HT-20	5500	11000	-54.846	-65.109	4	-21.23/ -41.23	29.616	19.879
802.11ac	MCS0	HT-20	5580	11160	-52.478	-63.21	4	-21.23/ -41.23	27.248	17.98
802.11ac	MCS0	HT-20	5720	11440	-52.407	-62.617	4	-21.23/ -41.23	27.177	17.387
802.11n	MCS0	HT-20	5500	11000	-55.426	-65.561	4	-21.23/ -41.23	30.196	20.331
802.11n	MCS0	HT-20	5580	11160	-52.128	-63.168	4	-21.23/ -41.23	26.898	17.938
802.11n	MCS0	HT-20	5700	11400	-52.418	-62.17	4	-21.23/ -41.23	27.188	16.94

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

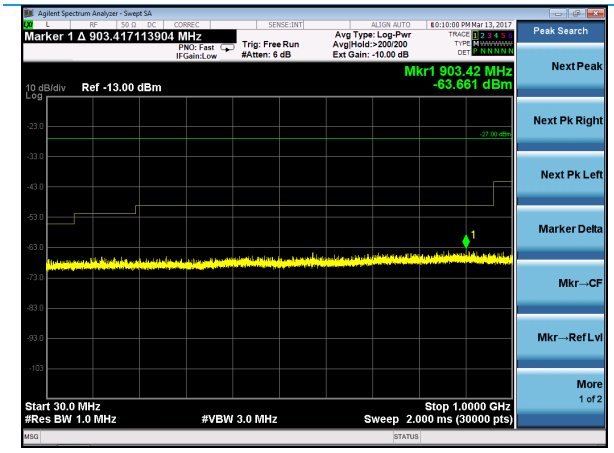
Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Peak Antenna Gain (dBi)	FCC 15.407/ RSS 247 EIRP Limit (dBm/ MHz)	FCC 15.407/ RSS 247 Margin (dB)
802.11a	6 Mbps	HT-20	5745	11490	-47.386	4	-27	16.386
802.11a	6 Mbps	HT-20	5785	11570	-46.747	4	-27	15.747
802.11a	6 Mbps	HT-20	5825	11650	-47.214	4	-27	16.214
802.11ac	MCS0	HT-20	5745	11490	-51.041	4	-27	20.041
802.11ac	MCS0	HT-20	5785	11570	-51.303	4	-27	20.303
802.11ac	MCS0	HT-20	5825	11650	-51.237	4	-27	20.237
802.11n	MCS0	HT-20	5745	11490	-51.348	4	-27	20.348
802.11n	MCS0	HT-20	5785	11570	-51.281	4	-27	20.281
802.11n	MCS0	HT-20	5825	11650	-51.973	4	-27	20.973

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

Mode	Data Rate	BW	Fundamental Frequency (MHz)	Frequency (MHz)	Peak Measured (dBm)	Average Measured (dB)	Peak Antenna Gain (dBi)	FCC 15.209 Peak/Avg Limit (dBm)	FCC 15.209 Peak Margin (dB)	FCC 15.209 Average Margin (dB)
802.11a	6 Mbps	HT-20	5745	11490	-47.386	-58.127	4	-21.23/ -41.23	22.156	12.897
802.11a	6 Mbps	HT-20	5785	11570	-46.747	-58.264	4	-21.23/ -41.23	21.517	13.034
802.11a	6 Mbps	HT-20	5825	11650	-47.214	-58.303	4	-21.23/ -41.23	21.984	13.073
802.11ac	MCS0	HT-20	5745	11490	-51.041	-63.303	4	-21.23/ -41.23	25.811	18.073
802.11ac	MCS0	HT-20	5785	11570	-51.303	-61.304	4	-21.23/ -41.23	26.073	16.074
802.11ac	MCS0	HT-20	5825	11650	-51.237	-62.388	4	-21.23/ -41.23	26.007	17.158
802.11n	MCS0	HT-20	5745	11490	-51.348	-61.863	4	-21.23/ -41.23	26.118	16.633
802.11n	MCS0	HT-20	5785	11570	-51.281	-62.986	4	-21.23/ -41.23	26.051	17.756
802.11n	MCS0	HT-20	5825	11650	-51.973	-62.107	4	-21.23/ -41.23	26.743	16.877

Plots – U-NII-1 Conducted Emissions

Plots show worst case (highest) emissions in the respective frequency range

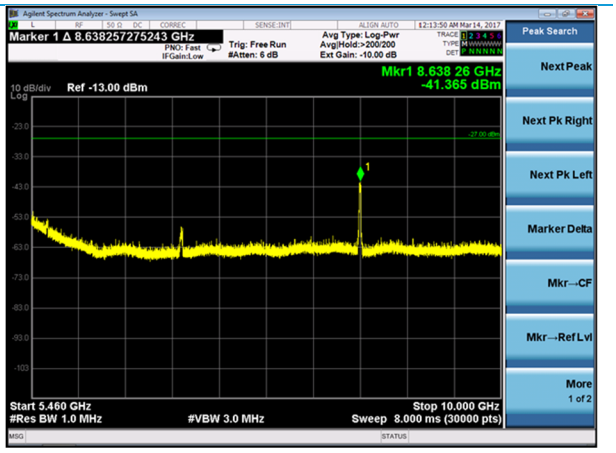


30-1000 MHz*

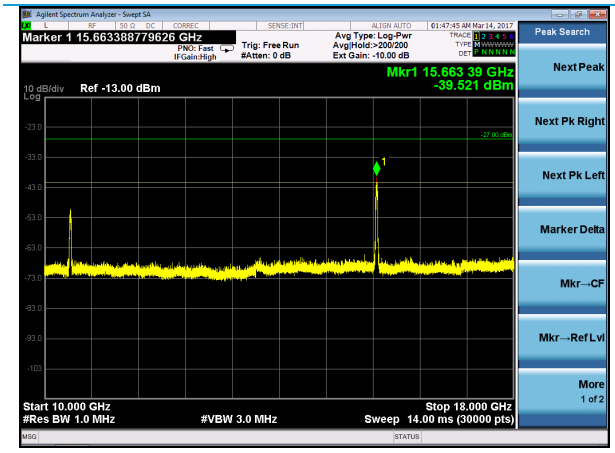
1-4.5 GHz

4.5-5.15 GHz
&
5.35-5.46 GHz

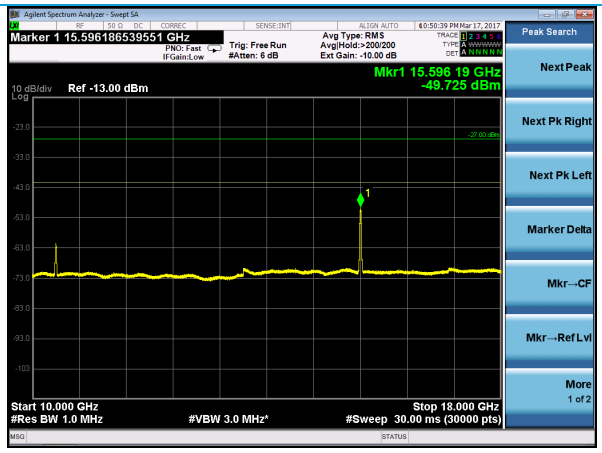
In section 5.1.4
Band Edges



5.46-10 GHz



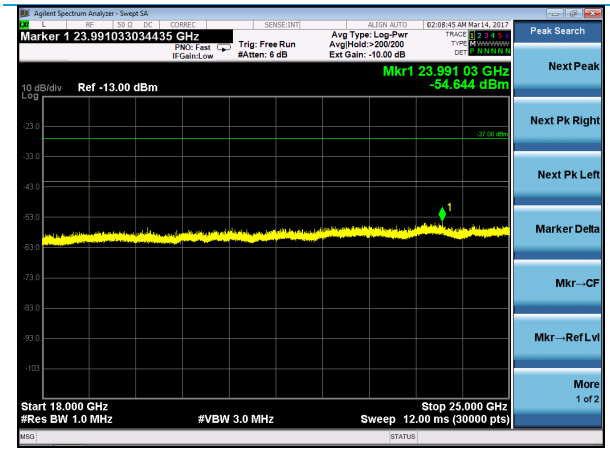
10-18 GHz – Peak Harmonic Emissions



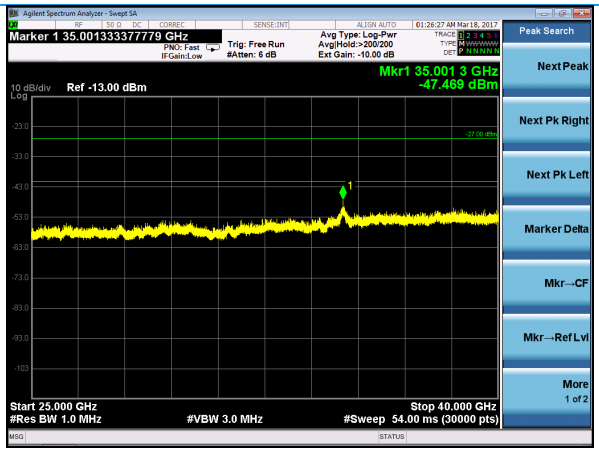
10-18 GHz – Average Harmonic Emissions

* No EUT emissions on any channel in this frequency range.

Plots – U-NII-1 Conducted Emissions, continued



18-25 GHz*

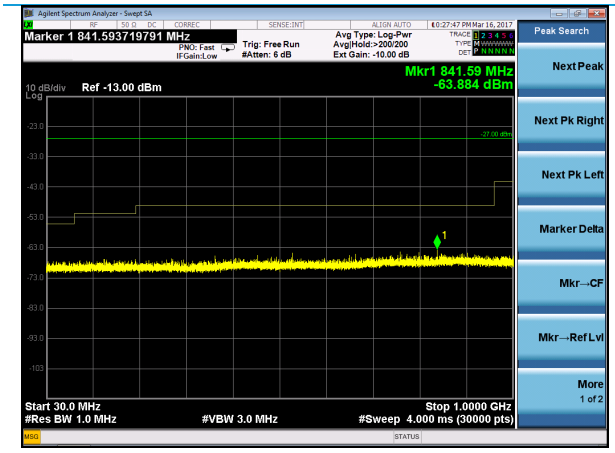


25-40 GHz*

* No EUT emissions on any channel in this frequency range.

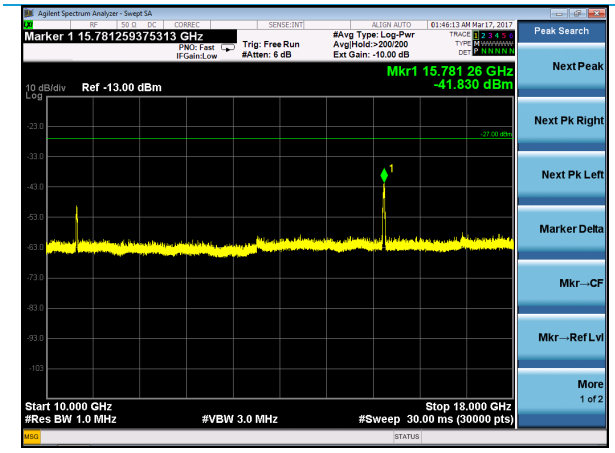
Plots – U-NII-2A Conducted Emissions

Plots show worst case (highest) emissions in the respective frequency range

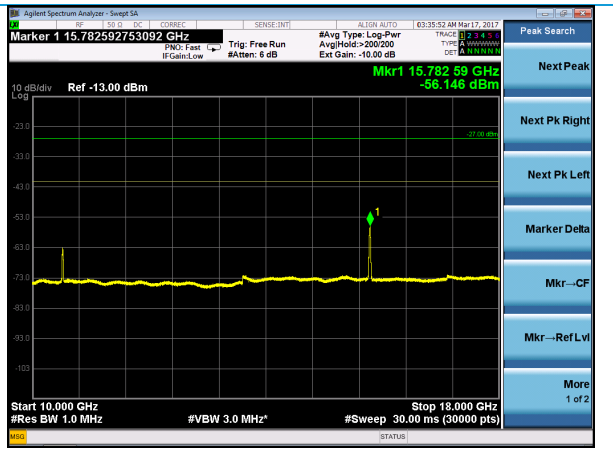


30-1000 MHz*

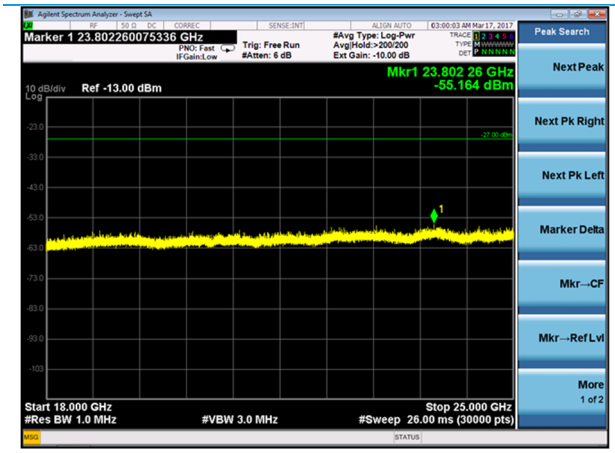
1-4.5 GHz



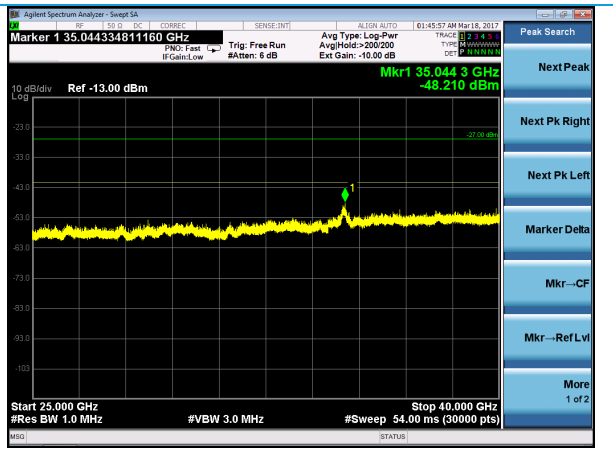
10-18 GHz – Peak Harmonic Emissions



10-18 GHz – Average Harmonic Emissions



18-25 GHz*

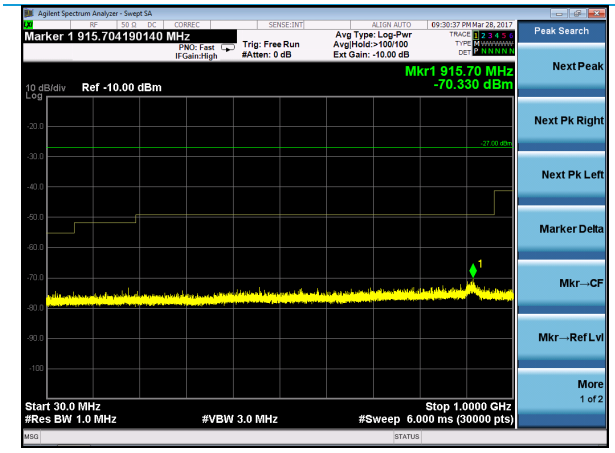


25-40 GHz*

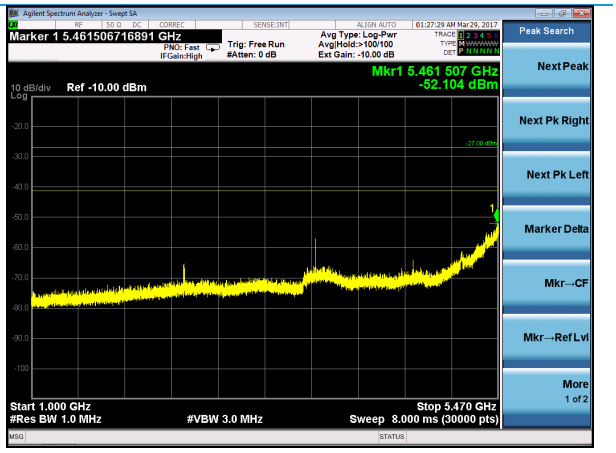
* No EUT emissions on any channel in this frequency range.

Plots – U-NII-2C Conducted Emissions

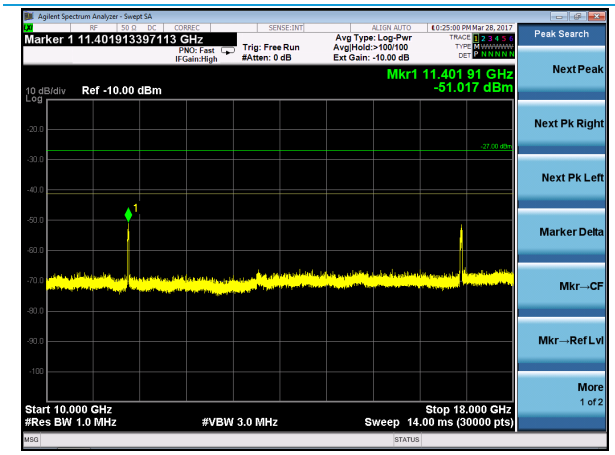
Plots show worst case (highest) emissions in the respective frequency range



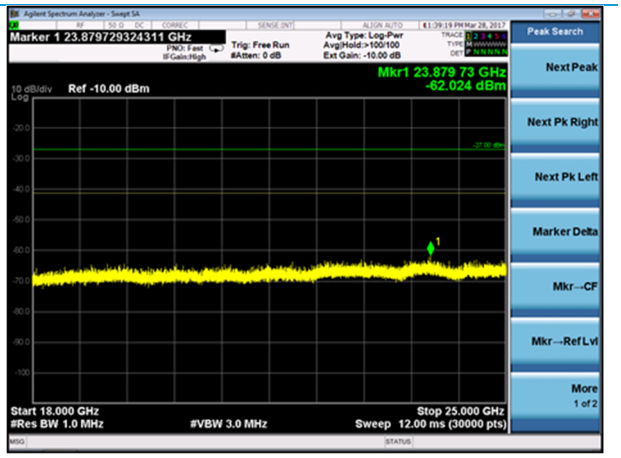
30-1000 MHz*



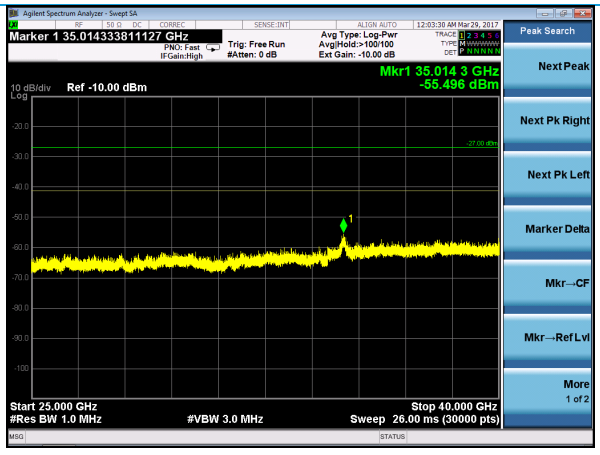
1-5.35 GHz



10-18 GHz – Peak Harmonic Emissions



18-25 GHz*

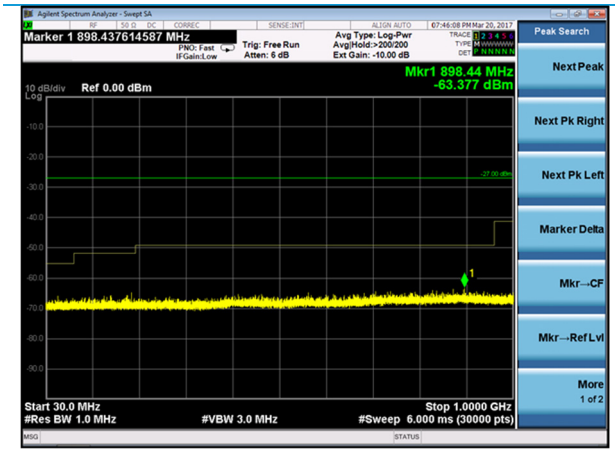


25-40 GHz*

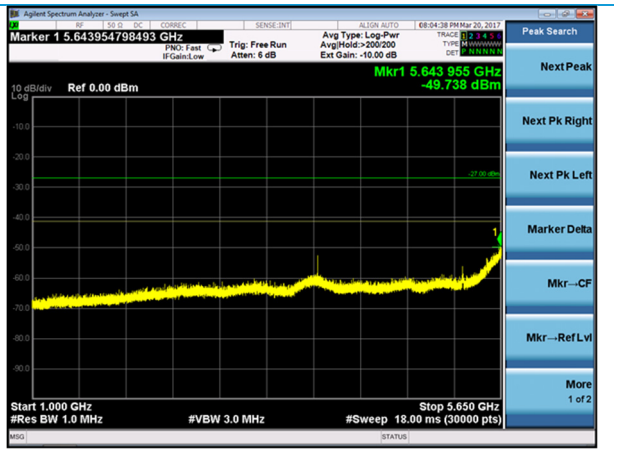
* No EUT emissions on any channel in this frequency range.

Plots – U-NII-3 Conducted Emissions

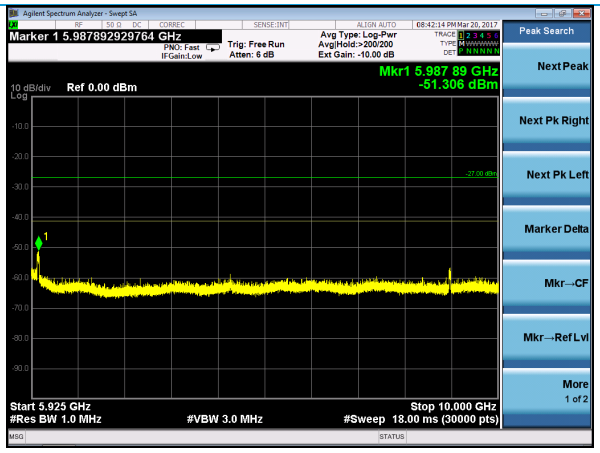
Plots show worst case (highest) emissions in the respective frequency range



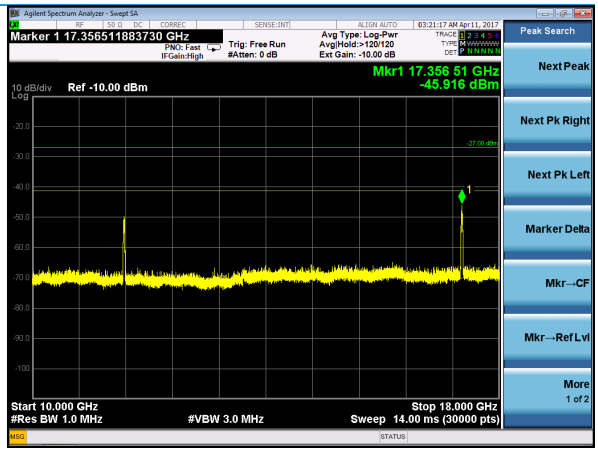
30-1000 MHz*



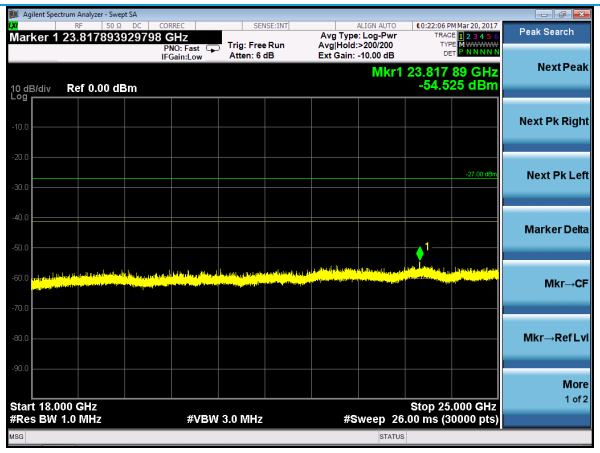
1-5.65 GHz



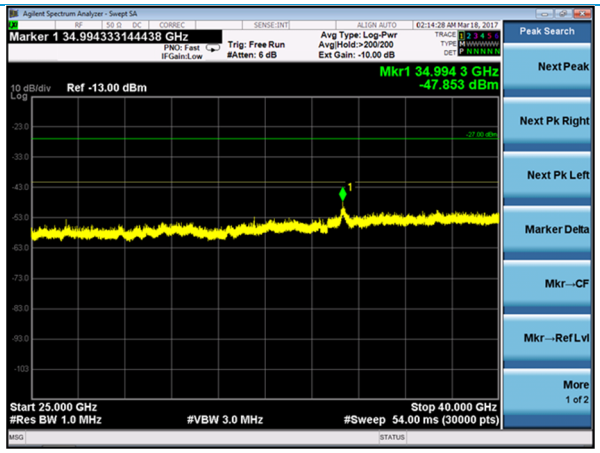
5.925-10 GHz



10-18 GHz – Peak Harmonic Emissions



18-25 GHz*



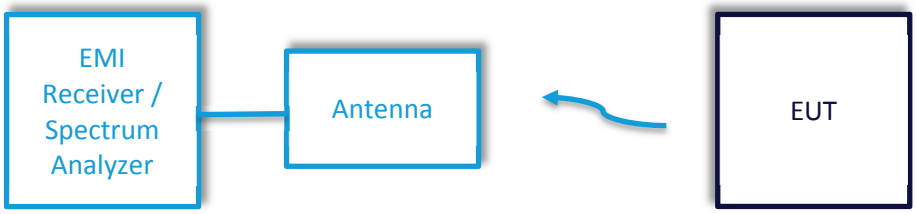
25-40 GHz*

* No EUT emissions on any channel in this frequency range.

5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBµV/m) Margin (dB) = Limit (dBµV/m) - Corrected Reading (dBµV/m) Example at 4000 MHz: Reading = 40 dBµV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBµV/m Average Limit = 20 log (500) = 54 dBµV/m Margin = 54 dBµV/m - 50.8 dBµV/m = 3.2 dB

Block Diagram



5.2.1 Radiated – Band Edges

Operator	Kimberly Bay
QA	Shane Dock
Test Date	U-NII-1: March 20-21, 2017; U-NII-2A: March 21, 2017 U-NII-2C: March 21, 2017; U-NII-3: May 7, 2017
Location	3-meter Semi-Anechoic Chamber
Temp. / R.H.	20°- 21°C / 25%-35% RH
Requirement	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
Method	U-NII-1: KDB 789033 D02 v01r04 Sections II.G.5 & 11.G.6 AD

Limits:

U-NII Band	Measured Range (MHz)	FCC 15.407 Limit RSS 247 Limit (@ 3m)	FCC 15.209 Limit (@ 3m)
U-NII-1	4500-5150	68.23 dBµV/m	Peak 74 dBµV/m Average 54 dBµV/m
U-NII-1	5350-5460	68.23 dBµV/m	Peak 74 dBµV/m Average 54 dBµV/m
U-NII-1	5250-5350 (ISED only)	68.23 dBµV/m	N/A
U-NII-2A	4500-5150	68.23 dBµV/m	Peak 74 dBµV/m Average 54 dBµV/m
U-NII-2A	5250-5460	68.23 dBµV/m	Peak 74 dBµV/m Average 54 dBµV/m
U-NII-2C	5250-5460	68.23 dBµV/m	Peak 74 dBµV/m Average 54 dBµV/m
U-NII-3	5600-5725	See table below	N/A
U-NII-3	5850-5975	See table below	N/A

Limits:

U-NII-3 Peak Emission Limits	Frequency Range (MHz)
1) 122.23 dBµV/m at frequencies from the band edges decreasing linearly to 110.83 dBµV/m at 5 MHz above or below the band edges	5720-5725 5850-5855
2) 110.83 dBµV/m at 5 MHz above or below the band edges decreasing linearly to 105.23 dBµV/m at 25 MHz above or below the band edges	5700-5720 5855-5875
3) 105.23 dBµV/m at 25 MHz above or below the band edges decreasing linearly to 68.23 dBµV/m above or below the band edges; and 68.23 dBµV/m at frequencies more than 75 MHz above or below the band edges.	5645 and down-5700 5875-5930 and up

Test Parameters

Frequency	4500-5150 MHz, 5350-5460 MHz, 5250-5350 MHz (ISED only), 5250-5460 MHz, 56502-5725 MHz, 5850-5925 MHz
Distance	3 meters
Settings	802.11a HT-20: 5180, 5220 (ISED only), 5240 (FCC only) MHz (U-NII-1) 5260, 5320 MHz (U-NII-2A) 5500 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	802.11ac HT-20: 5180, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5320 MHz (U-NII-2A) 5500 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Setting	802.11ac HT-40: 5190, 5230 MHz (U-NII-1); 5270, 5310 MHz (U-NII-2A); 5510 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3)
Settings	802.11ac HT-80: 5210 MHz (U-NII-1); 5290 MHz (U-NII-2A); 5530 (U-NII-2C); 5775 MHz (U-NII-3)
Settings	802.11n HT-20: 5180, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5320 MHz (U-NII-2A) 5500 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	802.11n HT-40: 5190, 5230 MHz, (U-NII-1); 5270, 5310 MHz(U-NII-2A); 5510 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3)
Note	Measurements performed with EUT antenna port terminated

Instrumentation

LSR a Laird Business

Date : 6-Feb-2017 Type Test : Radiated Band Edges - 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 Ridge Horn Antenna	ETS Lindgren	3117	109300	10/13/2016	10/13/2017	Active Calibration

Table – U-NII-1: Restricted-Band Lower Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Average Freq. (MHz)	Average Reading (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Margin (dB)	Average Margin (dB)
802.11a	HT-20	5129	51.2	5120	40.5	74	54	22.8	13.5
802.11ac	HT-20	5092	51.0	5076	40.8	74	54	23.0	13.2
802.11ac	HT-40	5066	51.5	5075	40.8	74	54	22.5	13.2
802.11ac	HT-80	5072	51.8	5133	40.6	74	54	22.2	13.4
802.11n	HT-20	4019	51.1	5073	40.5	74	54	22.9	13.5
802.11n	HT-40	5137	51.3	5114	40.6	74	54	22.7	13.4

Table – U-NII-1: Restricted-Band Upper Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Average Freq. (MHz)	Average Reading (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Margin (dB)	Average Margin (dB)
802.11a	HT-20	5440	51.6	5454	40.1	74	54	22.4	13.9
802.11ac	HT-20	5457	51.5	5455	40.1	74	54	22.5	13.9
802.11ac	HT-40	5455	50.6	5460	40.0	74	54	23.4	14.0
802.11ac	HT-80	5376	51.8	5456	40.0	74	54	22.2	14.0
802.11n	HT-20	5398	50.5	5457	40.0	74	54	23.5	14.0
802.11n	HT-40	5458	51.1	5447	40.0	74	54	22.9	14.0

Table – U-NII-1 ISED Upper Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
802.11a	HT-20	5325	57.0	68.23	11.2
802.11ac	HT-20	5282	58.1	68.23	10.1
802.11ac	HT-40	5330	60.3	68.23	7.9
802.11ac	HT-80	5250	64.6	68.23	3.6
802.11n	HT-20	5271	57.6	68.23	10.6
802.11n	HT-40	5290	60.9	68.23	7.3

Table – U-NII-2A Restricted-Band Lower Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Average Freq. (MHz)	Average Reading (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Margin (dB)	Average Margin (dB)
802.11a	HT-20	4583	52.5	4608	41.4	74	54	21.5	12.6
802.11ac	HT-20	4612	52.8	4609	41.4	74	54	21.2	12.6
802.11ac	HT-40	4623	52.8	4597	41.5	74	54	21.2	12.5
802.11ac	HT-80	5043	52.3	4608	41.5	74	54	21.7	12.5
802.11n	HT-20	4726	52.6	4630	41.7	74	54	21.4	12.3
802.11n	HT-40	4541	52.3	4592	41.4	74	54	21.7	12.6

Table – U-NII-2A Restricted-Band Upper Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Average Freq. (MHz)	Average Reading (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Margin (dB)	Average Margin (dB)
802.11a	HT-20	5455	52.5	5356	41.4	74	54	21.5	12.6
802.11ac	HT-20	5427	52.5	5361	41.3	74	54	21.5	12.7
802.11ac	HT-40	5375	52.5	5355	41.3	74	54	21.5	12.7
802.11ac	HT-80	5363	53.2	5360	41.3	74	54	20.8	12.7
802.11n	HT-20	5394	52.4	5351	41.2	74	54	21.6	12.8
802.11n	HT-40	5377	52.9	5354	41.2	74	54	21.1	12.8

Table – U-NII-2C Restricted-Band Lower Band-Edge

Mode	BW	Peak Freq. (MHz)	Peak Reading (dBµV/m)	Average Freq. (MHz)	Average Reading (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Margin (dB)	Average Margin (dB)
802.11a	HT-20	5458	52.4	5459	41.1	74	54	21.6	12.9
802.11ac	Ht-20	5368	52.3	5367	41.1	74	54	21.7	12.9
802.11ac	HT-40	5374	53.0	5362	41.2	74	54	21.0	12.8
802.11ac	HT-80	5452	53.0	5459	41.3	74	54	21.0	12.7
802.11n	HT-20	5371	52.6	5459	41.1	74	54	21.4	12.9
802.11n	HT-40	5354	52.1	5460	41.1	74	54	21.9	12.9

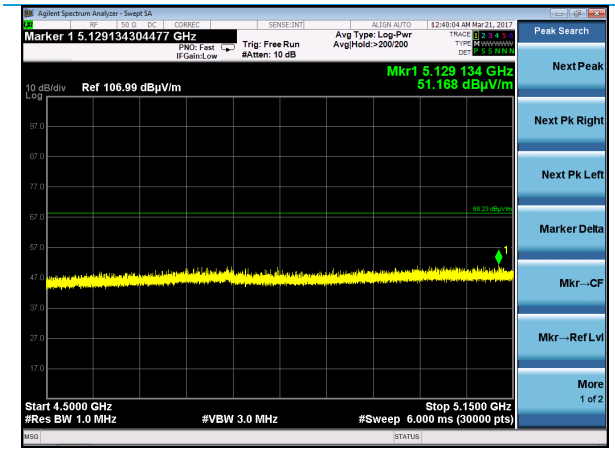
Table – U-NII-3 Lower Band-Edge Mask

No emissions within 15 dB of limit

Table – U-NII-3 Upper Band-Edge Mask

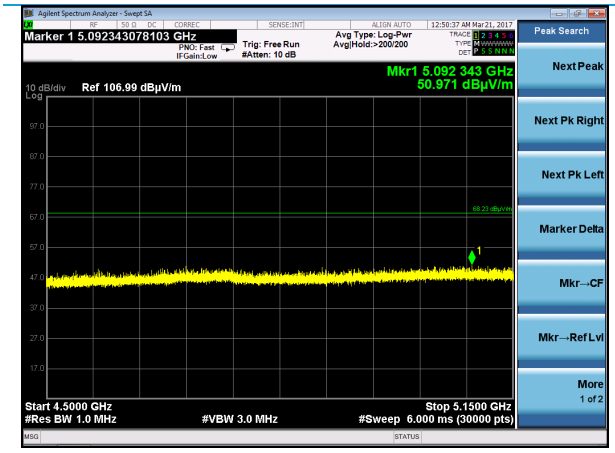
No emissions within 15 dB of limit

Plots – U-NII-1 Restricted-Band Lower Band-Edge



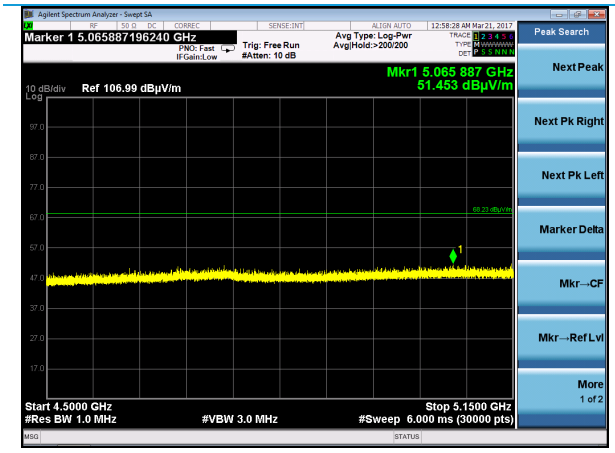
Low Channel – 802.11a HT-20 – Peak

Low Channel – 802.11a HT-20 – Average



Low Channel – 802.11ac HT-20 – Peak

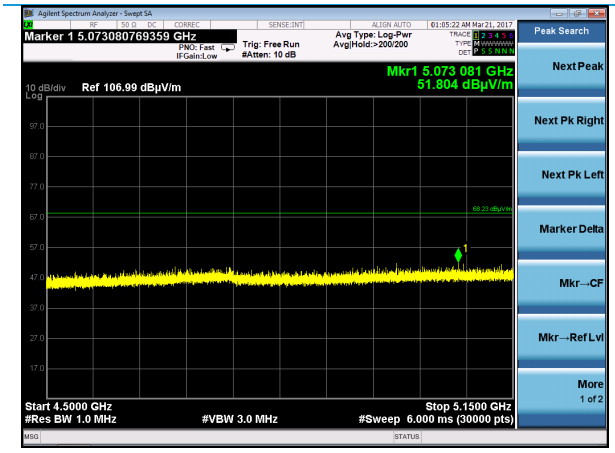
Low Channel – 802.11ac HT-20 – Average



Low Channel – 802.11ac HT-40 – Peak

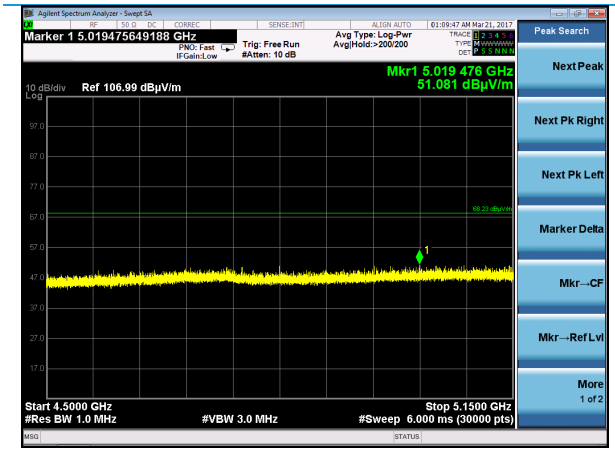
Low Channel – 802.11ac HT-40 – Average

Plots – U-NII-1 Restricted-Band Lower Band-Edge, continued



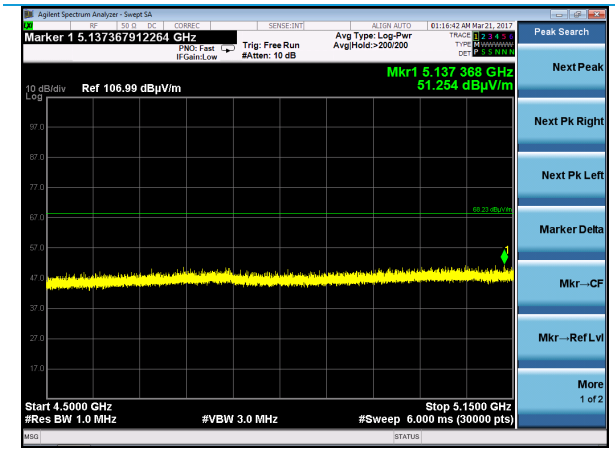
Low Channel – 802.11ac HT-80 – Peak

Low Channel – 802.11ac HT-80 Average



Low Channel – 802.11n HT-20 – Peak

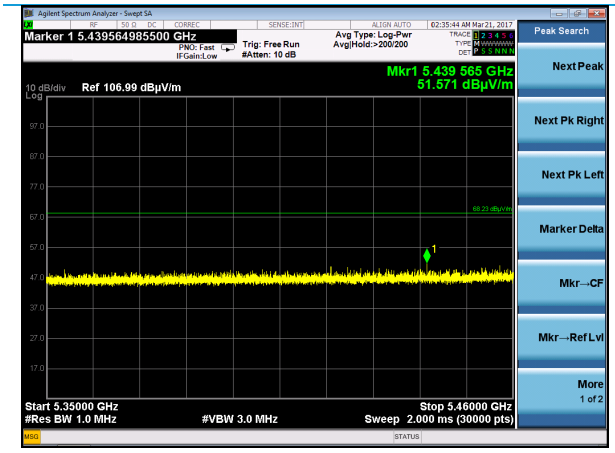
Low Channel – 802.11n HT-20 – Average



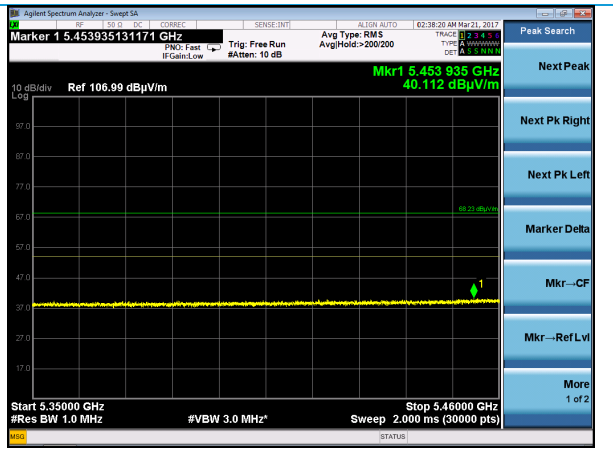
Low Channel – 802.11n HT-40 – Peak

Low Channel – 802.11n HT-40 – Average

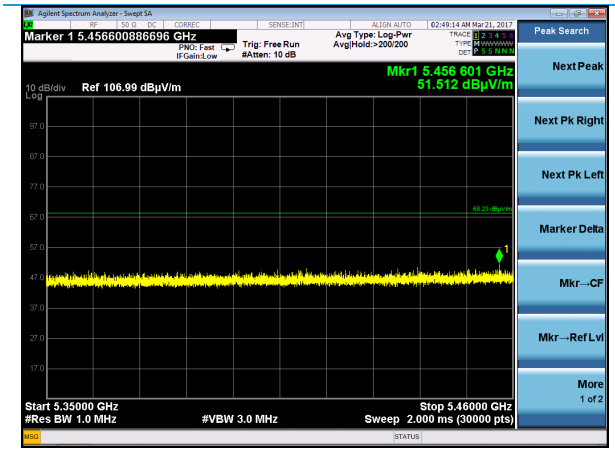
Plots – U-NII-1 Restricted-Band Upper Band-Edge



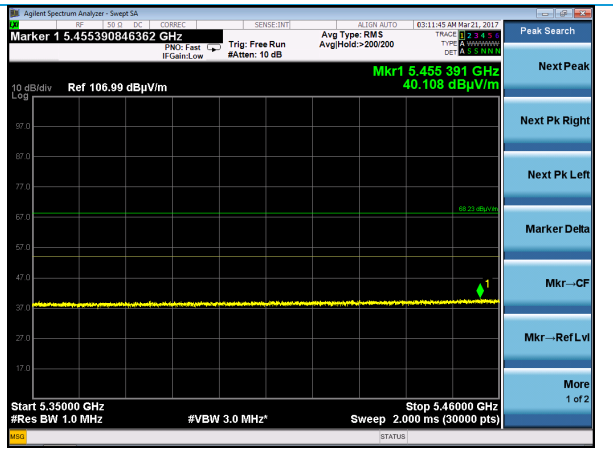
High Channel – 802.11a HT-20 – Peak



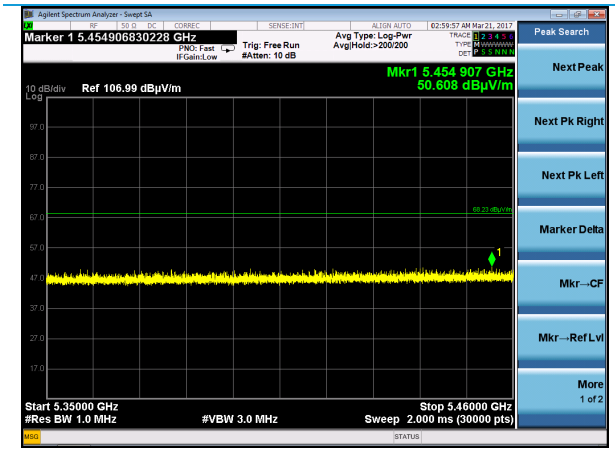
High Channel – 802.11a HT-20 – Average



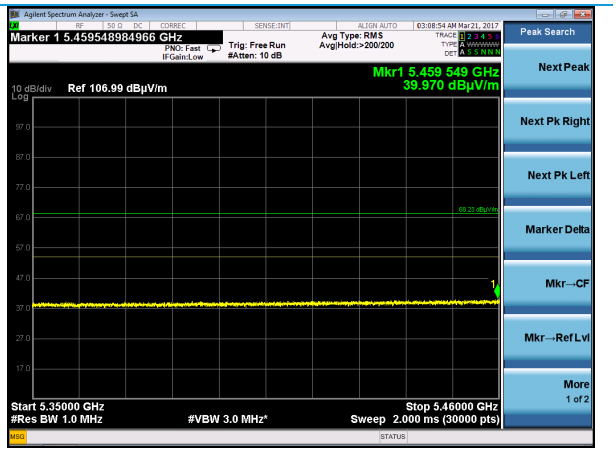
High Channel – 802.11ac HT-20 – Peak



High Channel – 802.11ac HT-20 – Average

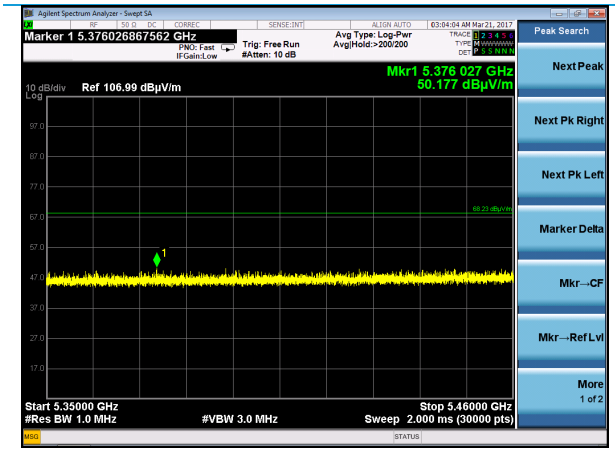


High Channel – 802.11ac HT-40 – Peak

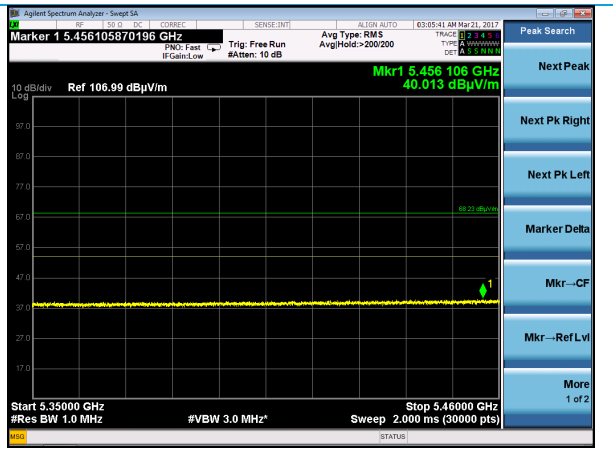


High Channel – 802.1ac HT-40 - Average

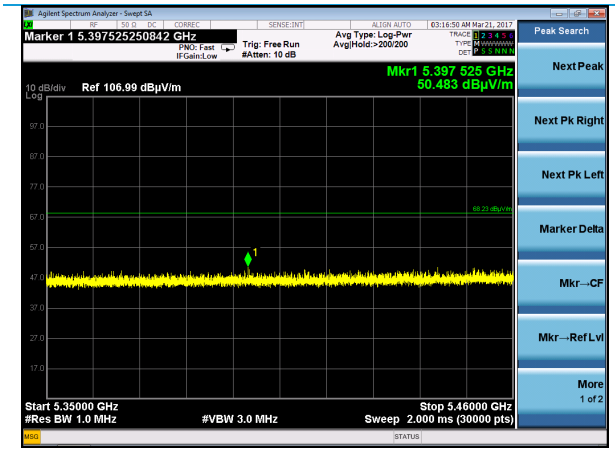
Plots – U-NII-1 Restricted-Band Upper Band-Edge, continued



High Channel – 802.11ac HT-80 – Peak

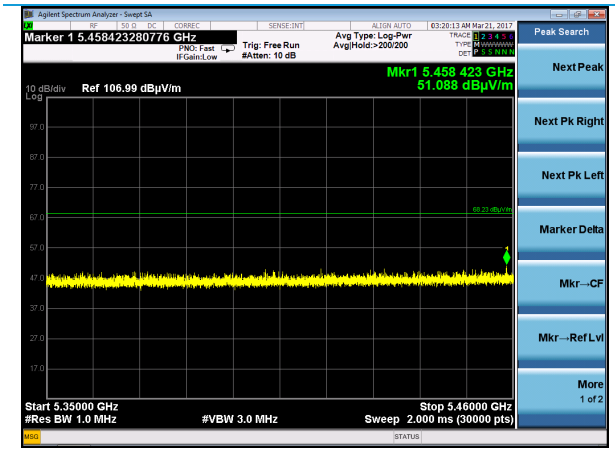


High Channel – 802.11ac HT-80 – Average



High Channel – 802.11n HT-20 – Peak

High Channel – 802.11n HT-20 – Average



High Channel – 802.11ac HT-40 – Peak

High Channel – 802.1n HT-40 - Average