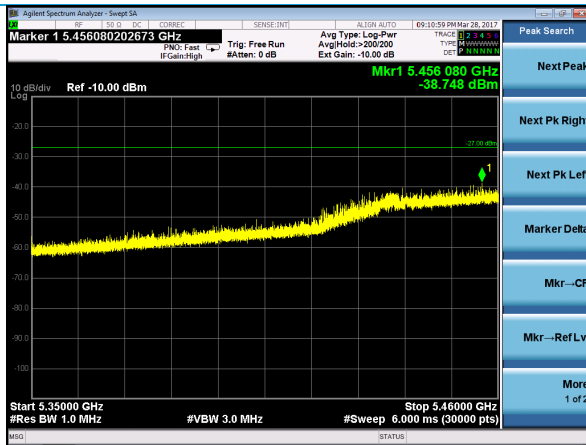
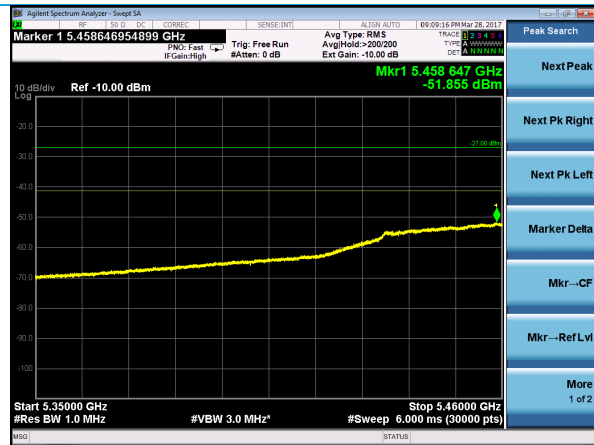


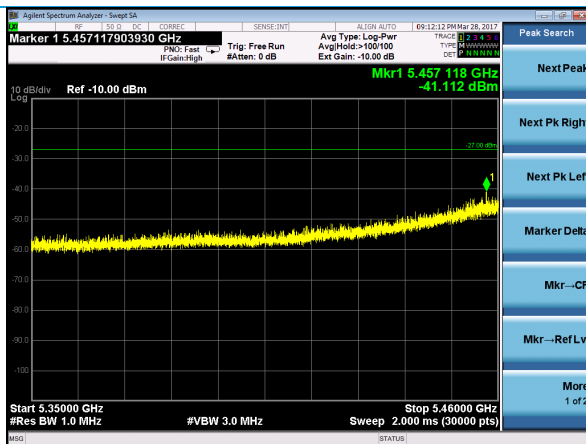
Plots – U-NII-2C Restricted-Band Lower Band-Edge, continued



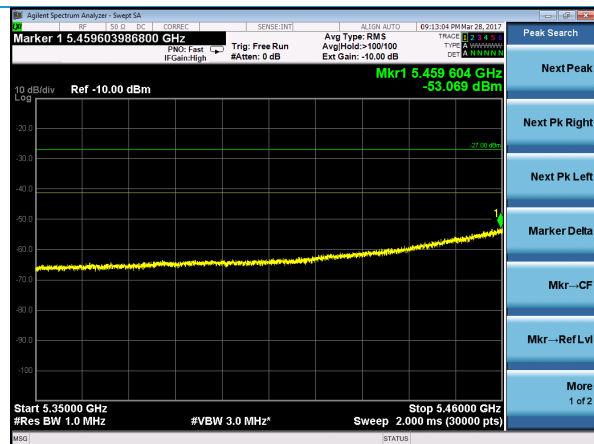
Low Channel – 802.11ac HT-80 – Peak



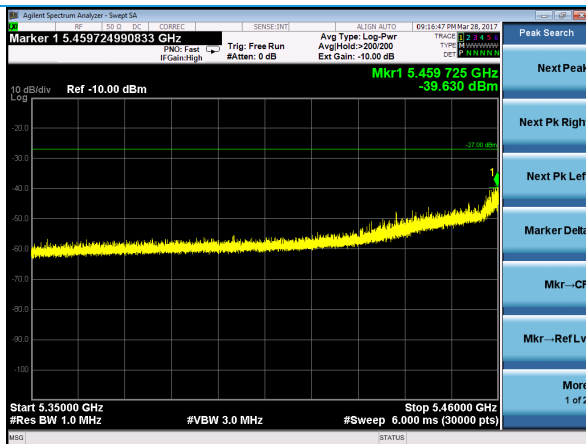
Low Channel – 802.11ac HT-80 - Average



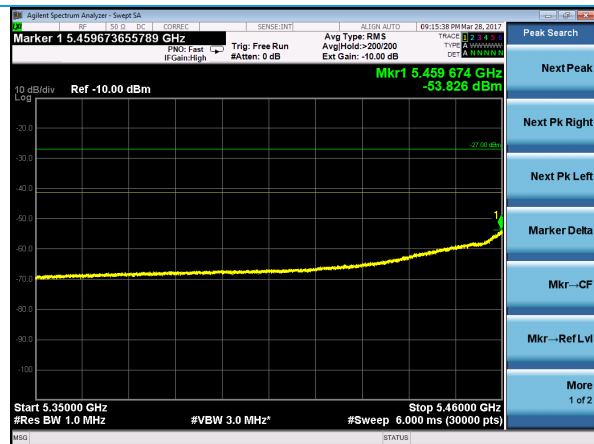
Low Channel – 802.11n HT-20 - Peak



Low Channel – 802.11n HT-20 - Average

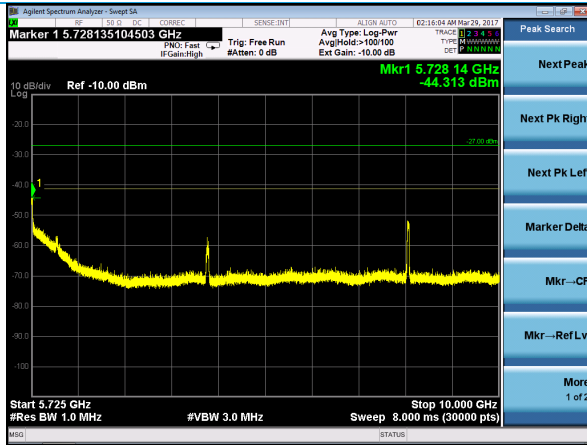


Low Channel – 802.11n HT-40 - Peak

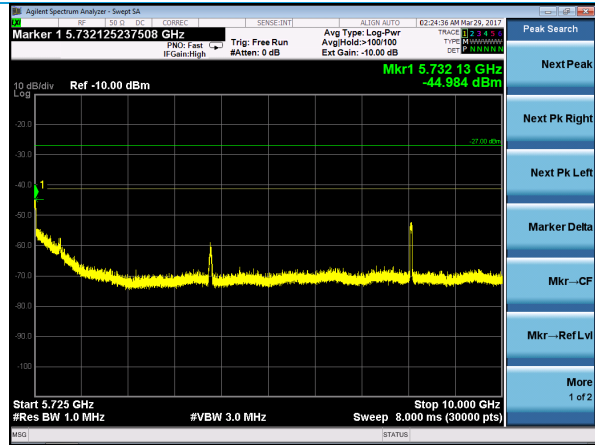


Low Channel – 802.11n HT-40 - Average

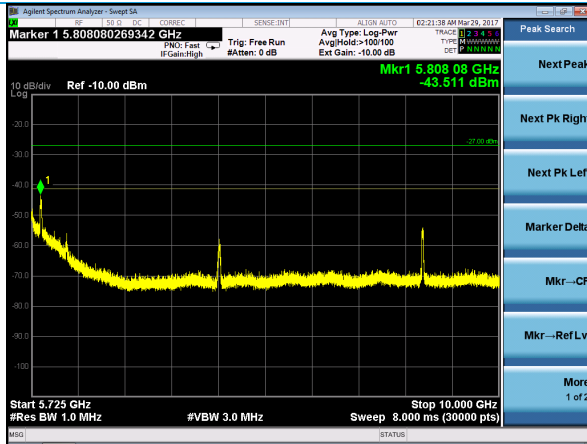
Plots – U-NII-2C: Upper Edge of U-NII-2C Band



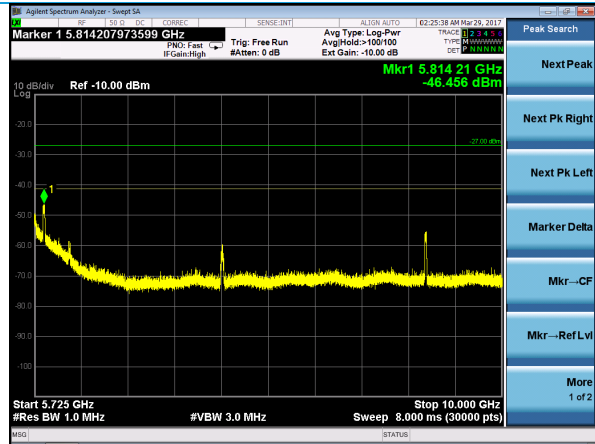
Low Channel – 802.11a HT-20



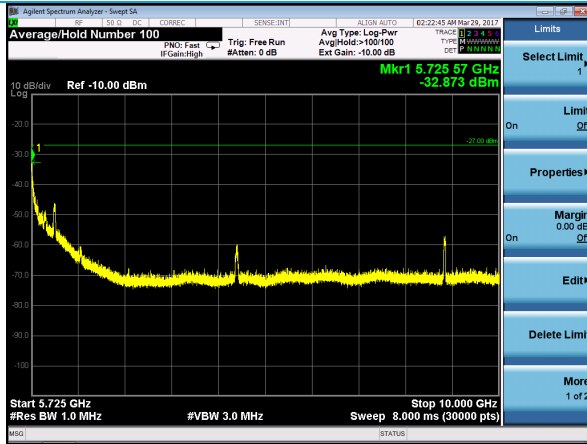
Low Channel – 802.11ac HT-20



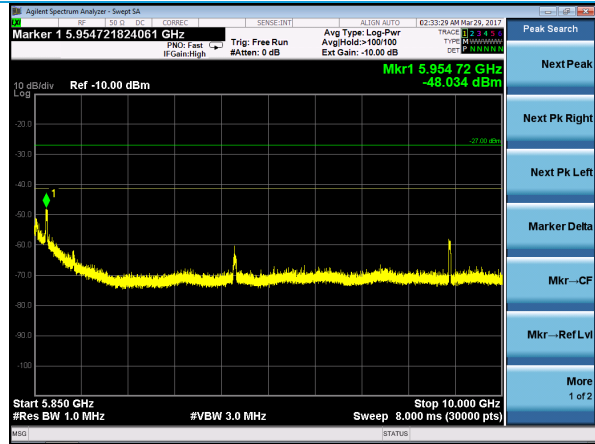
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20

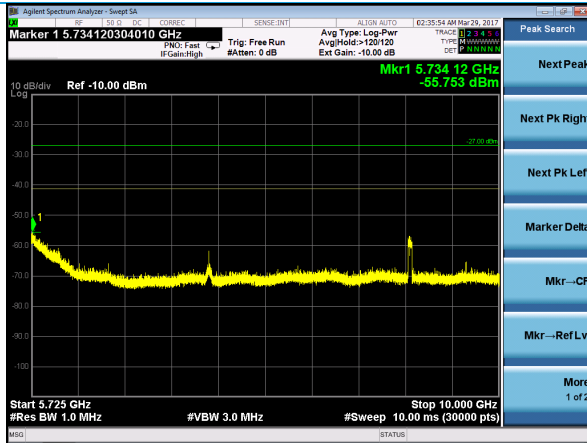


High Channel – 802.11a HT-20

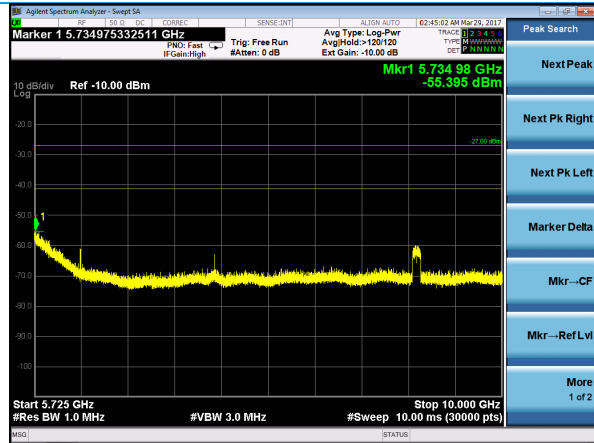


High Channel – 802.11ac HT-20

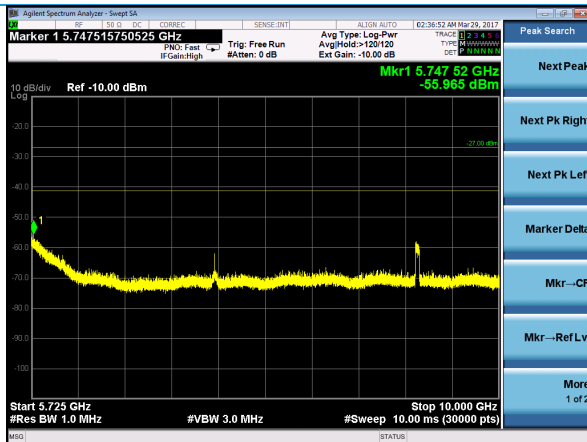
Plots – U-NII-2C: Upper Edge of U-NII-2C Band, continued



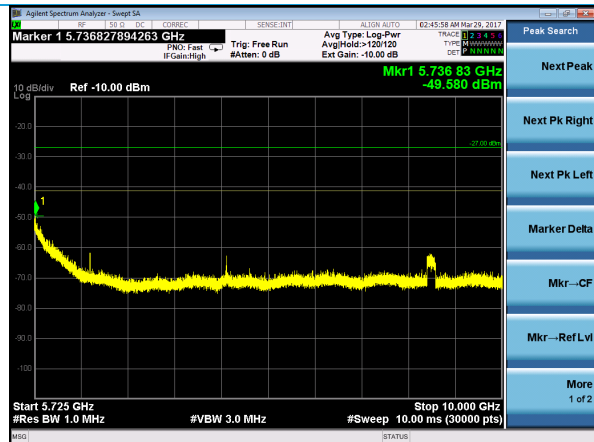
Low Channel – 802.11ac HT-40



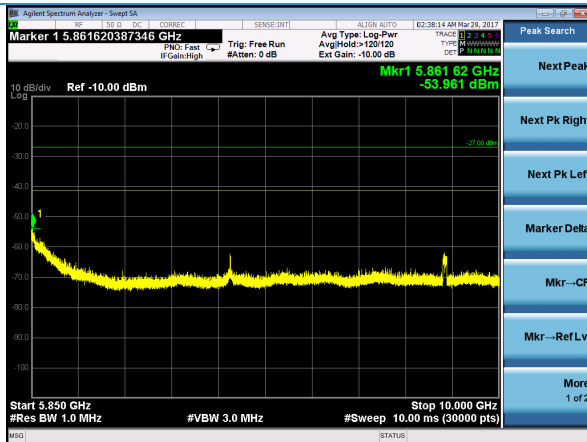
Low Channel – 802.11ac HT-80



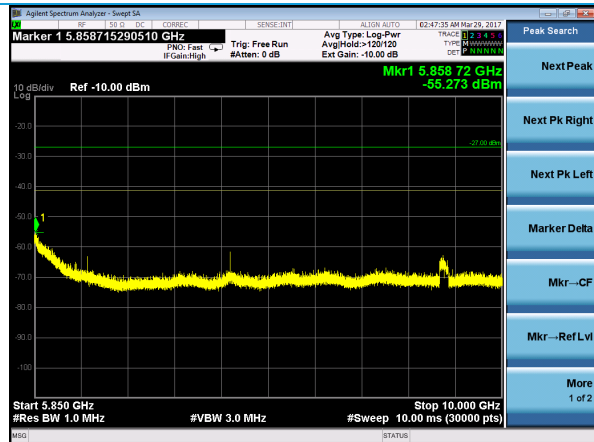
Mid Channel – 802.11ac HT-40



Mid Channel – 802.11ac HT-80



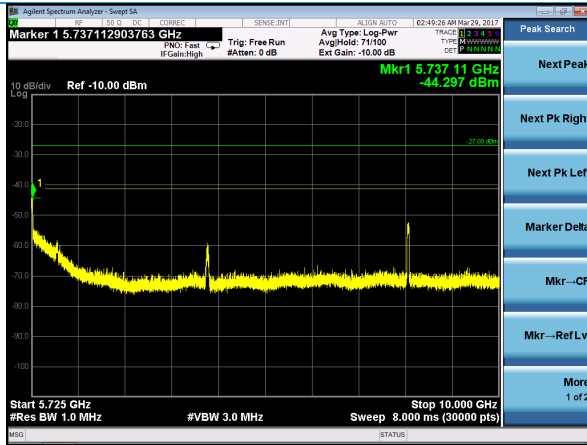
High Channel – 802.11ac HT-40



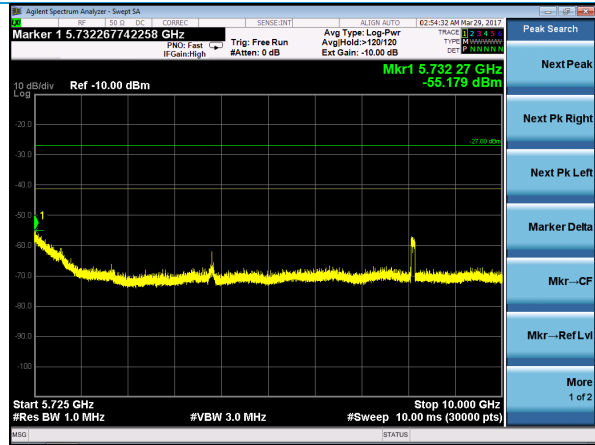
High Channel – 802.11ac HT-80

| | | |
|-------------------------------|----------------|----------------------|
| Company: LSR a Laird Business | Page 96 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

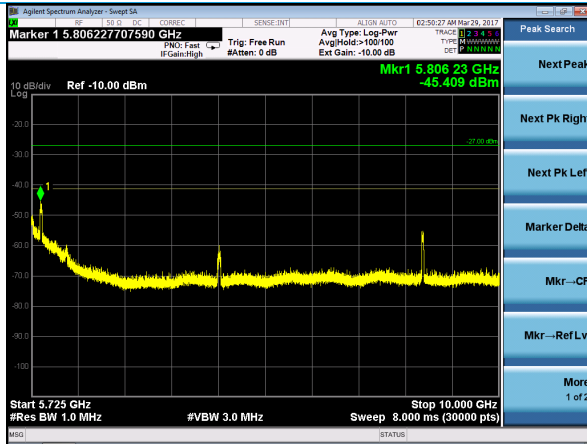
Plots – U-NII-2C: Upper Edge of U-NII-2C Band, continued



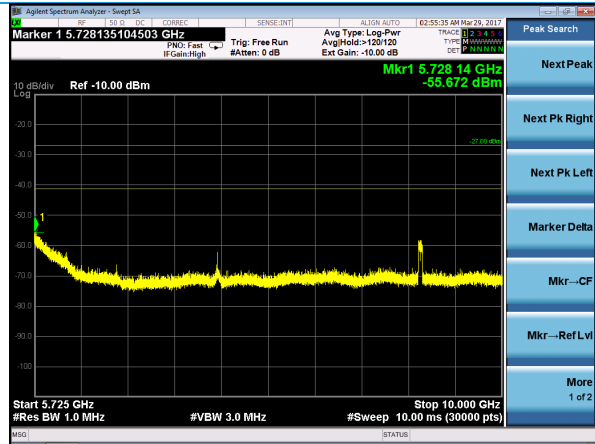
Low Channel – 802.11n HT-20



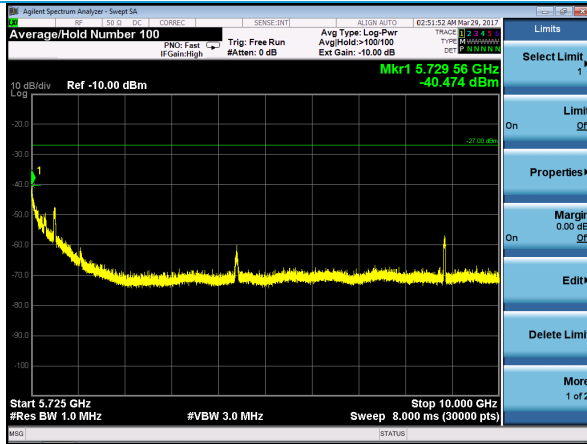
Low Channel – 802.11n HT-40



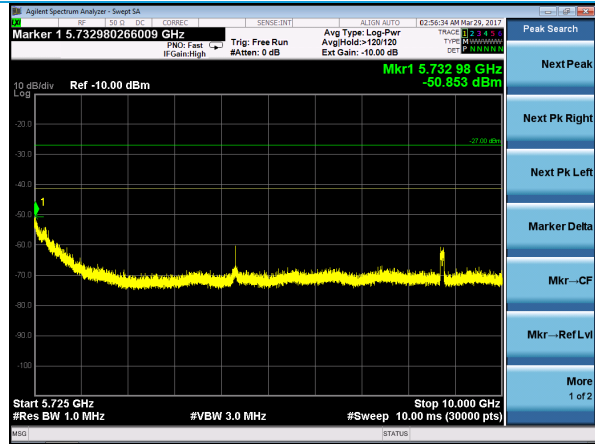
Mid Channel – 802.11n HT-20



Mid Channel – 802.11n HT-40

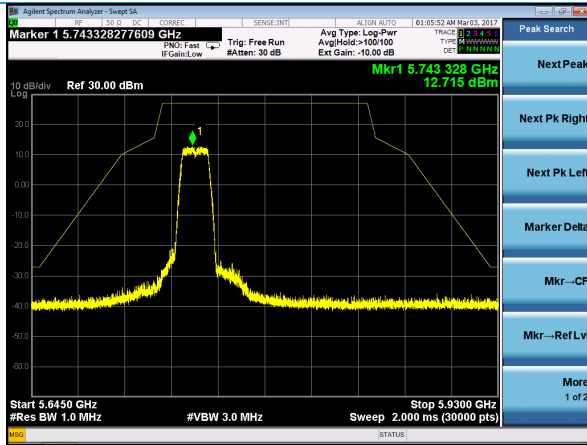


High Channel – 802.11n HT-20

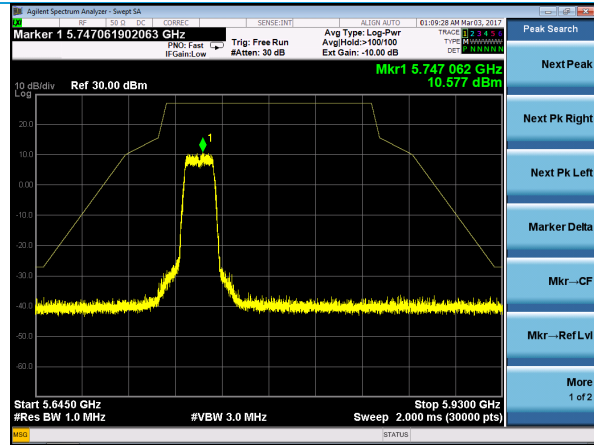


High Channel – 802.11n HT-40

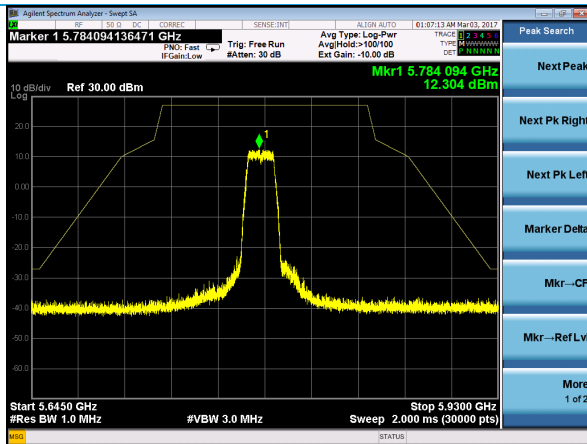
Plots – U-NII-3 Band Edge Mask



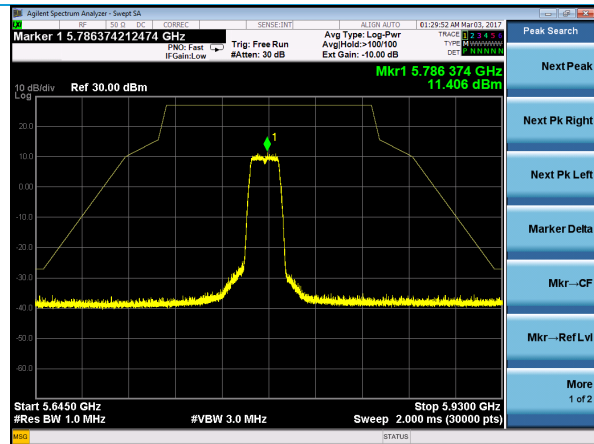
Low Channel – 802.11a HT-20



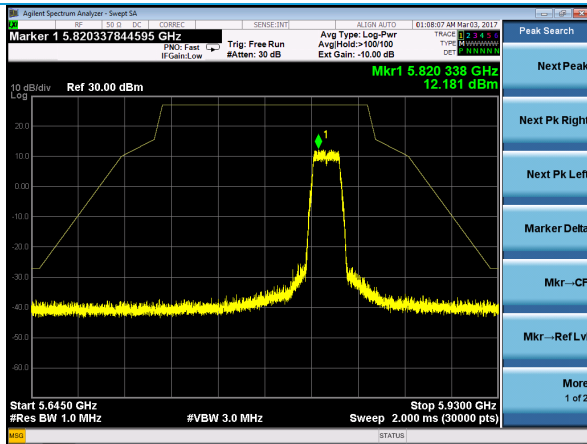
Low Channel – 802.11ac HT-20



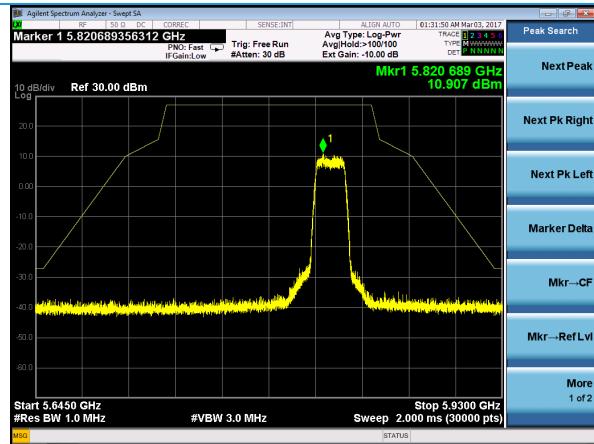
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20

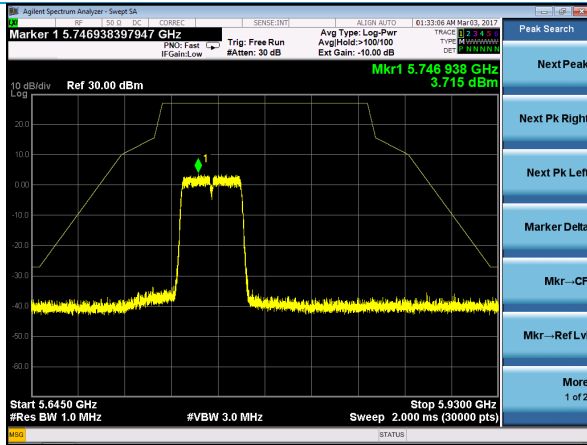


High Channel – 802.11a HT-20

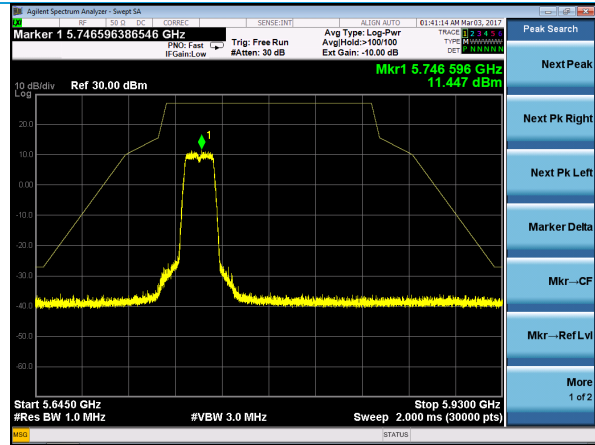


High Channel – 802.11ac HT-20

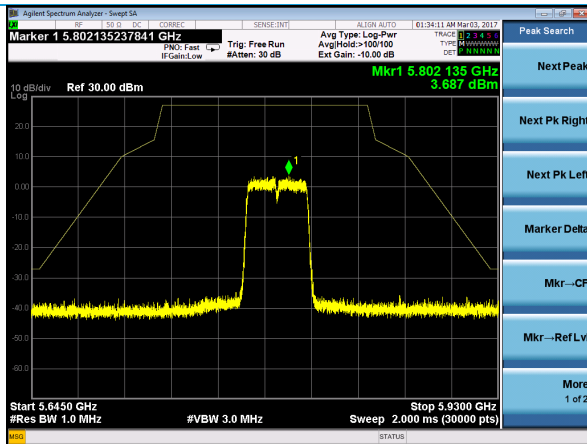
Plots – U-NII-3 Band Edge Mask, continued



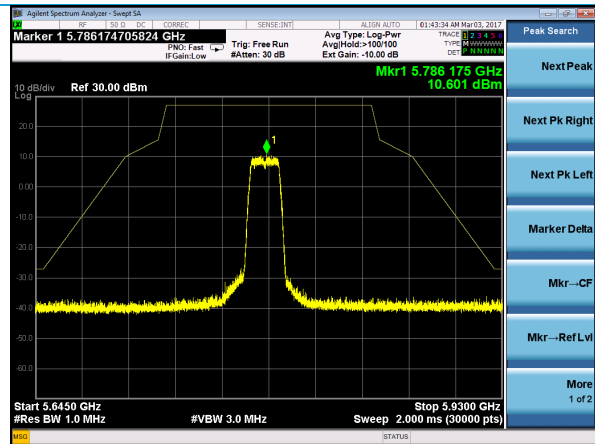
Low Channel – 802.11ac HT-40



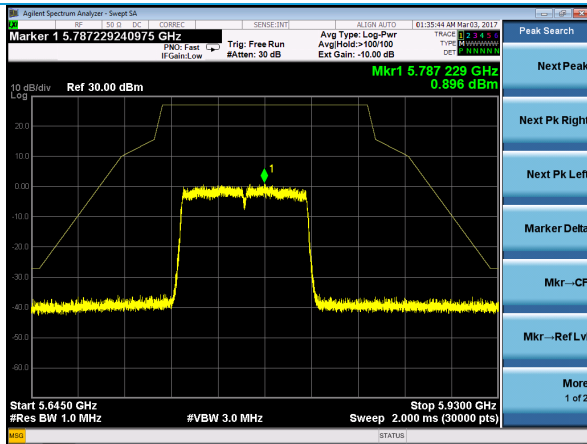
Low Channel – 802.11n HT-20



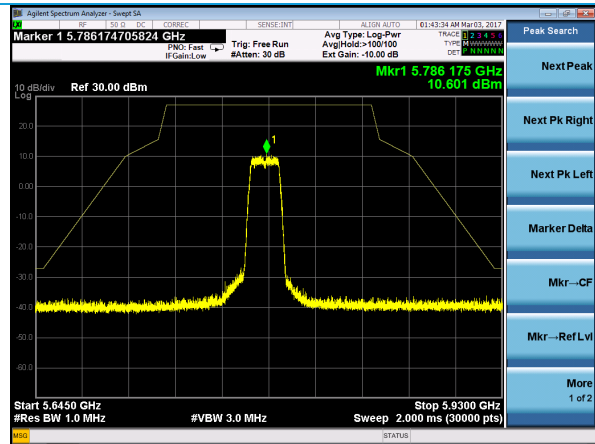
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

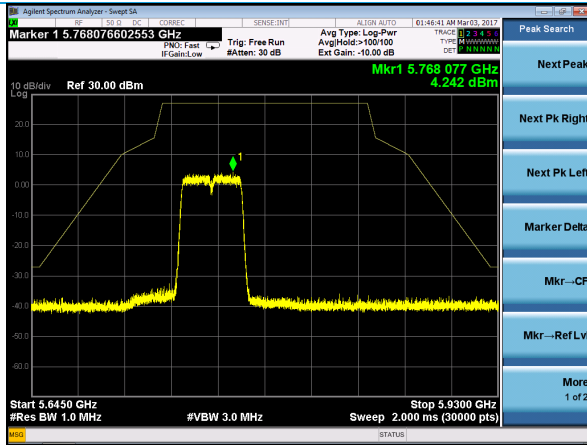


Only Channel – 802.11ac HT-80

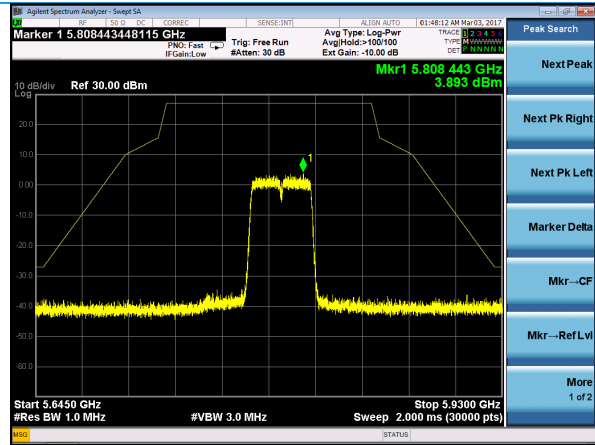


High Channel – 802.11n HT-20

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 \leq -27 dBm/MHz e.i.r.p | Emissions outside of 5150-5350 MHz \leq -27 dBm/MHz e.i.r.p |
| U-NII-2A | 1-40 GHz | Emissions outside of 5150-5350 MHz \leq -27 dBm/MHz e.i.r.p | 1) Emissions outside of 5250-5350 MHz \leq -27 dBm/MHz e.i.r.p OR 2) Emissions outside of 5150-5350 MHz \leq -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 \leq -27 dBm/MHz e.i.r.p | 1) Emissions outside of 5470-5600 MHz AND 5650-5725 MHz \leq -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 | <u>802.11a HT-20:</u> 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 | <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) |
| Settings | <u>802.11ac HT-40:</u> 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 | <u>802.11ac HT-80:</u> 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 | <u>802.11n HT-20:</u> 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 | <u>802.11n HT-40:</u> 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



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 |

| | | |
|-------------------------------|-----------------|----------------------|
| Company: LSR a Laird Business | Page 103 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

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

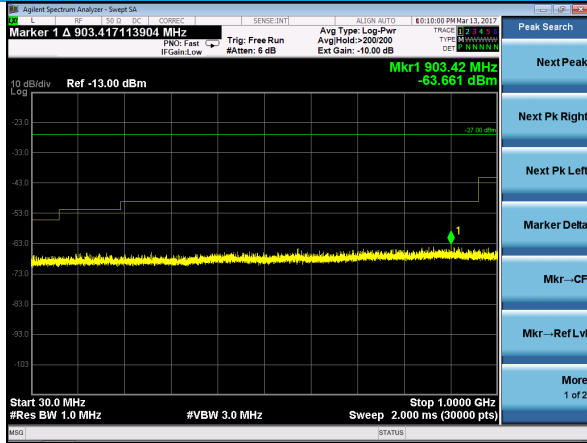
| Mode | Data Rate | BW | Fundamental Frequency (MHz) | Frequency (MHz) | Peak Measured (dBm) | Peak Antenna Gain (dBi) | FCC 15.407/RSS 247 EIRP Limit (dBm/MHz) | FCC 15.407/RSS 247 Margin (dB) |
|----------|-----------|-------|-----------------------------|-----------------|---------------------|-------------------------|---|--------------------------------|
| 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

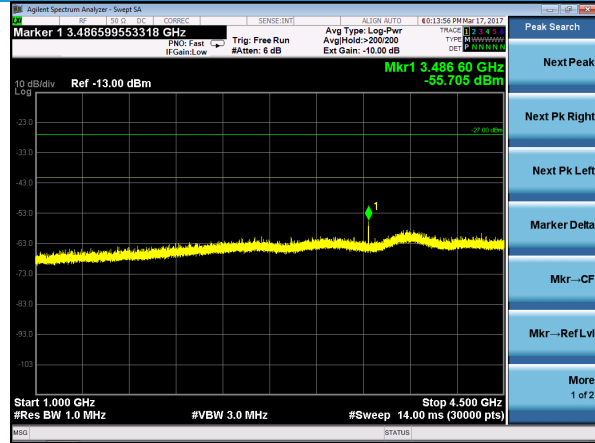
| Mode | Data Rate | BW | Fundamental Frequency (MHz) | Frequency (MHz) | Peak Measured (dBm) | Average Measured (dB) | Peak Antenna Gain (dBi) | FCC 15.209 Peak/Avg Limit (dBm) | FCC 15.209 Peak Margin (dB) | FCC 15.209 Average Margin (dB) |
|----------|-----------|-------|-----------------------------|-----------------|---------------------|-----------------------|-------------------------|---------------------------------|-----------------------------|--------------------------------|
| 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

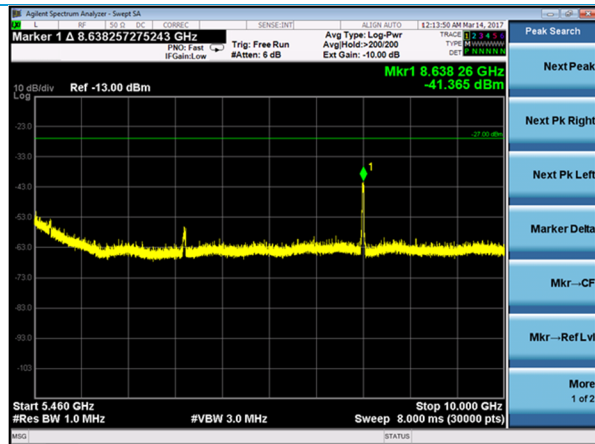


30-1000 MHz*

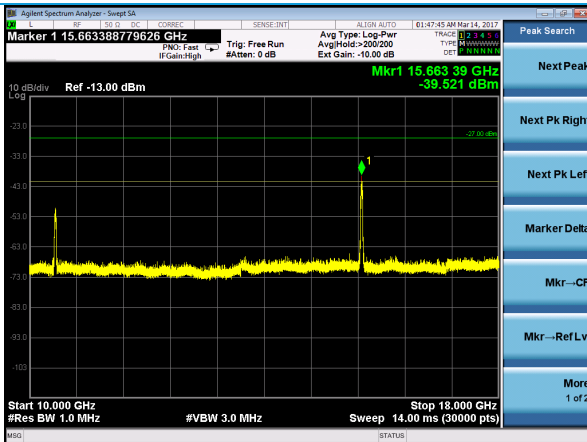


1-4.5 GHz

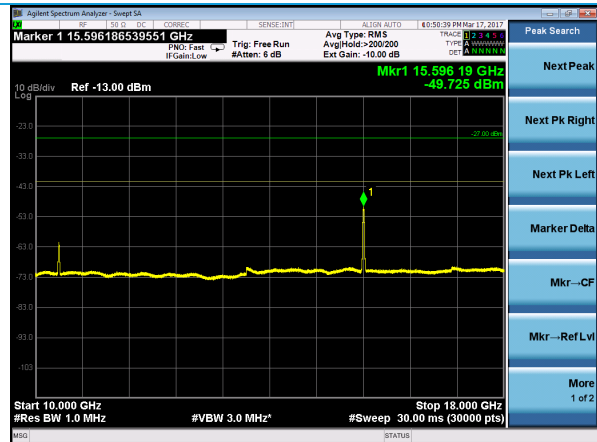
4.5-5.15 GHz
 &
 5.35-5.46 GHz
 In section 5.1.4
 Band Edges



5.46-10 GHz



10-18 GHz – Peak Harmonic Emissions

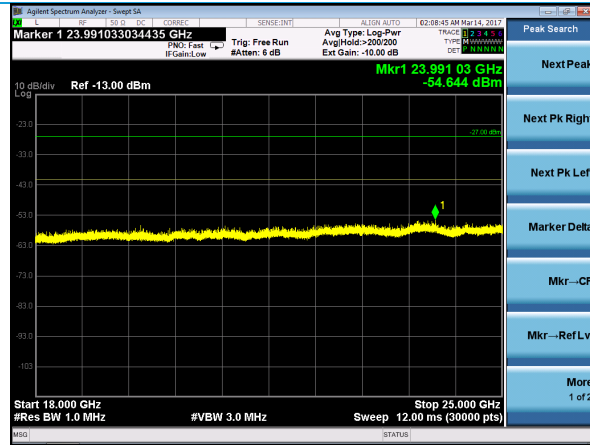


10-18 GHz – Average Harmonic Emissions

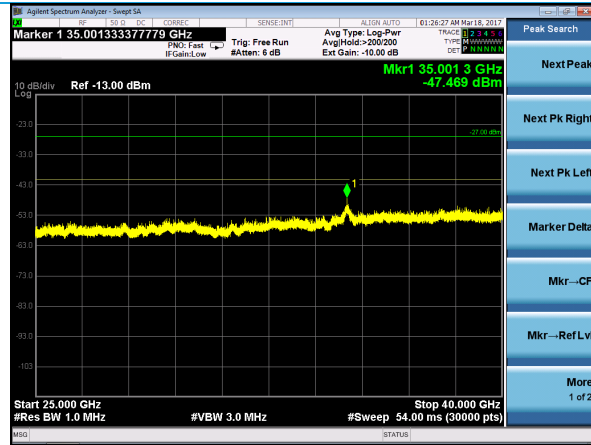
* No EUT emissions on any channel in this frequency range.

| | | |
|-------------------------------|-----------------|----------------------|
| Company: LSR a Laird Business | Page 109 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

Plots – U-NII-1 Conducted Emissions, continued



18-25 GHz*



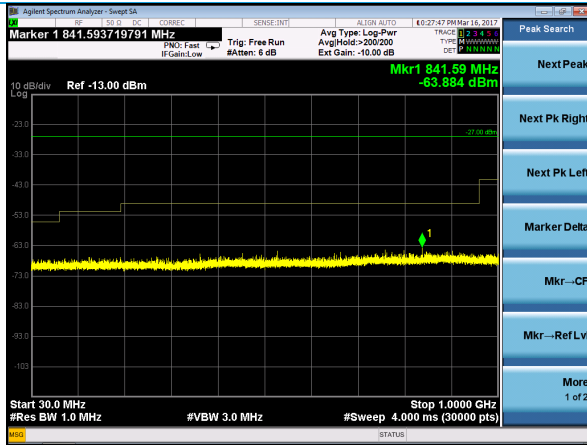
25-40 GHz*

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

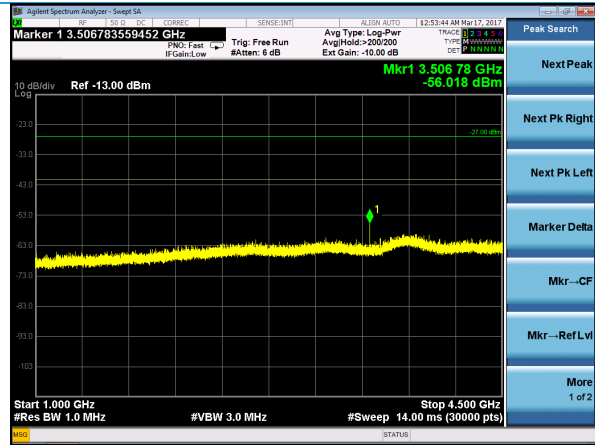
| | | |
|-------------------------------|-----------------|----------------------|
| Company: LSR a Laird Business | Page 110 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

Plots – U-NII-2A Conducted Emissions

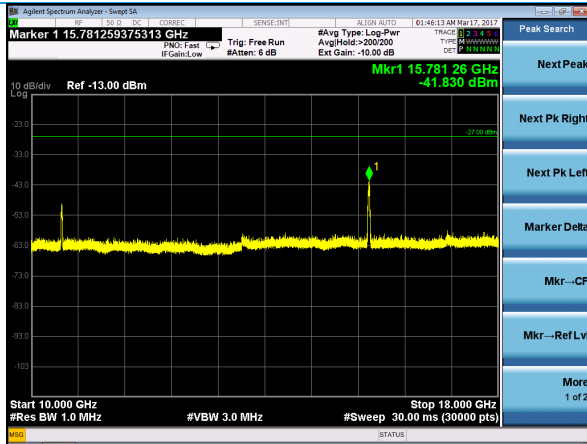
Plots show worst case (highest) emissions in the respective frequency range



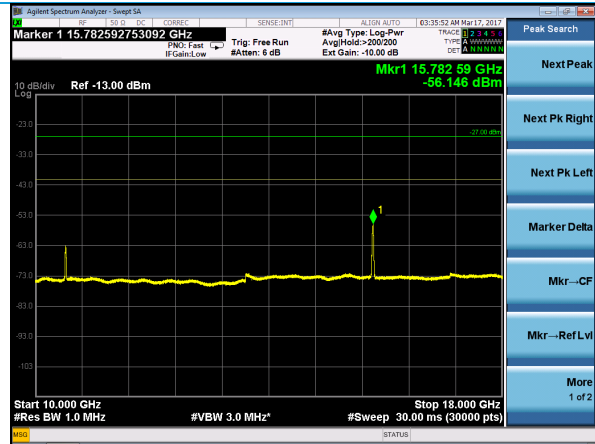
30-1000 MHz*



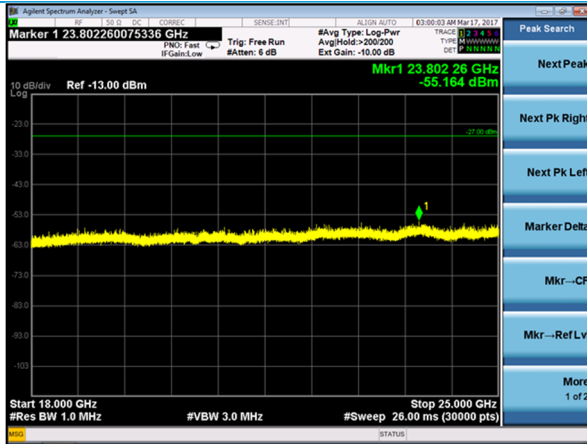
1-4.5 GHz



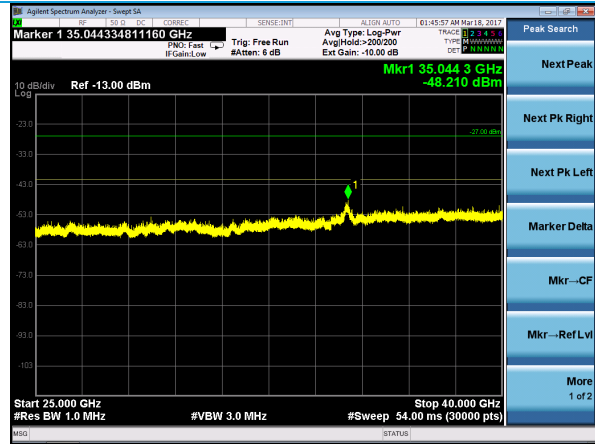
10-18 GHz – Peak Harmonic Emissions



10-18 GHz – Average Harmonic Emissions



18-25 GHz*

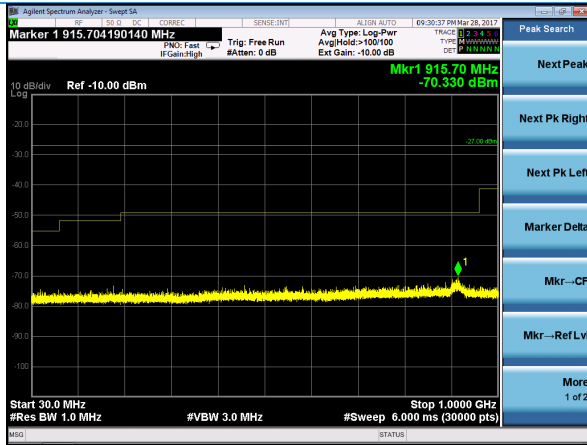


25-40 GHz*

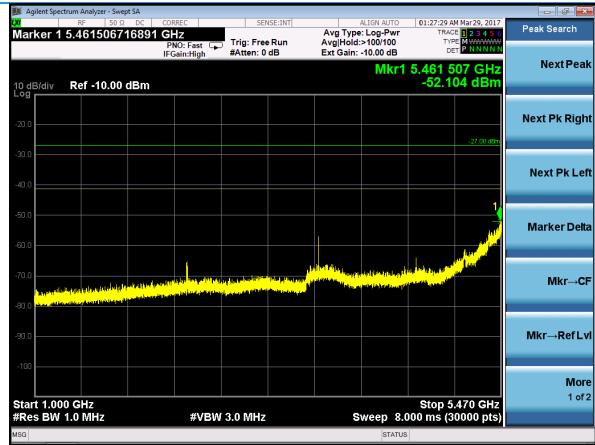
* No EUT emissions on any channel in this frequency range.

Plots – U-NII-2C Conducted Emissions

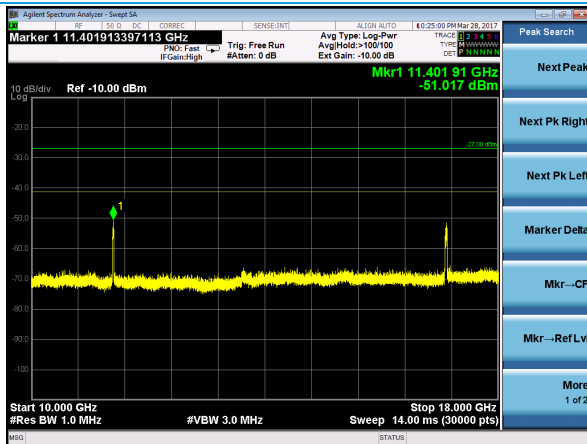
Plots show worst case (highest) emissions in the respective frequency range



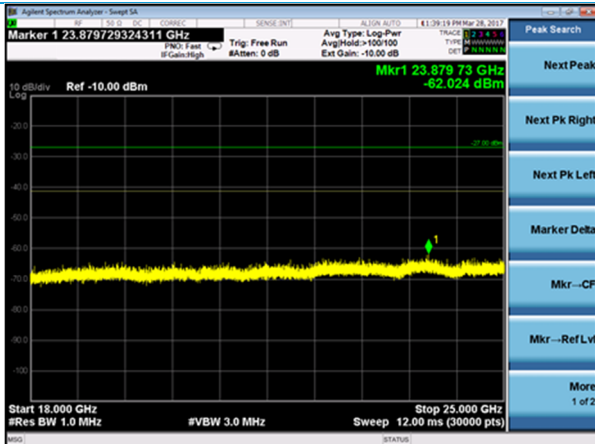
30-1000 MHz*



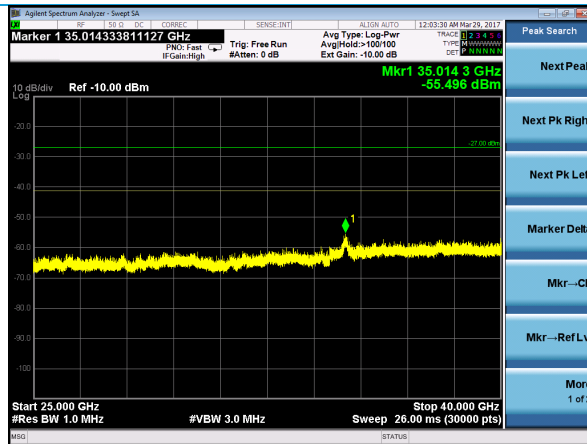
1-5.35 GHz



10-18 GHz – Peak Harmonic Emissions



18-25 GHz*



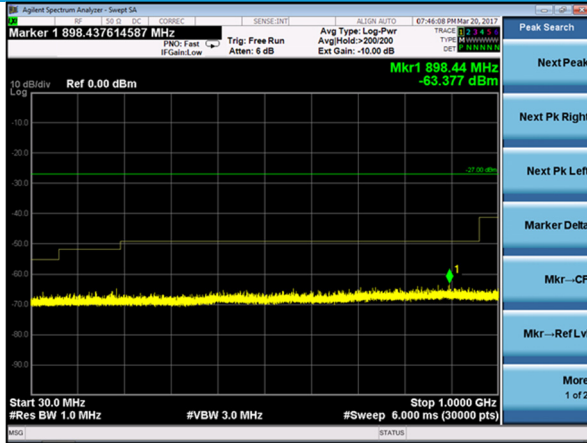
25-40 GHz*

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

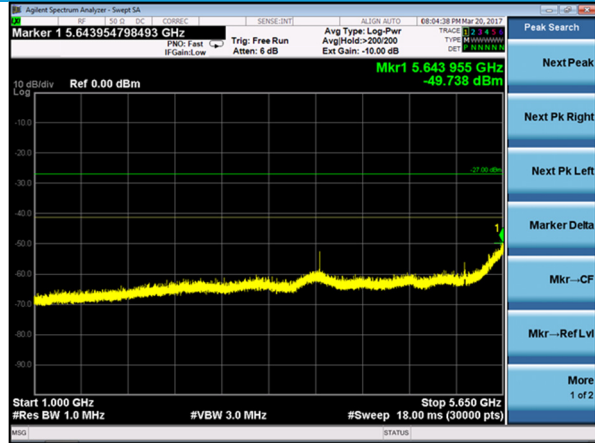
| | | |
|-------------------------------|-----------------|----------------------|
| Company: LSR a Laird Business | Page 112 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

Plots – U-NII-3 Conducted Emissions

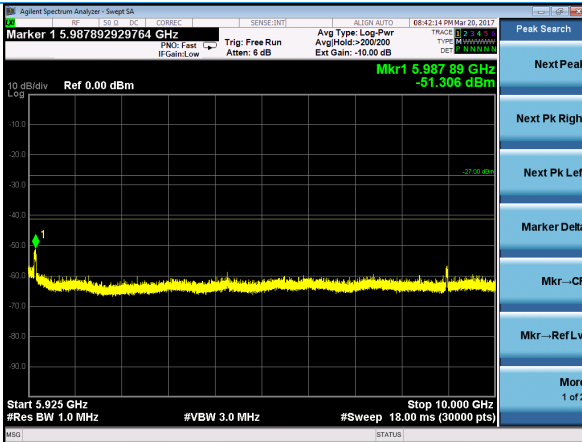
Plots show worst case (highest) emissions in the respective frequency range



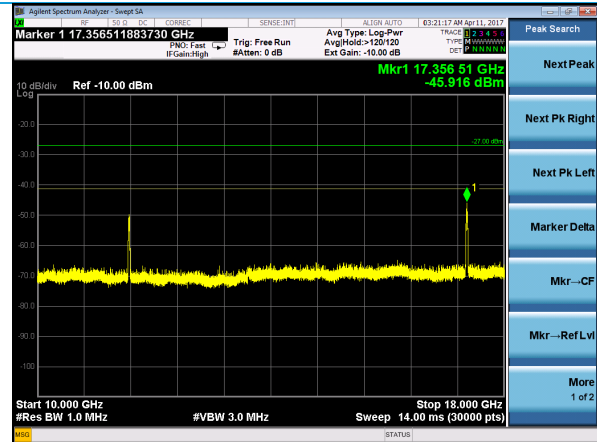
30-1000 MHz*



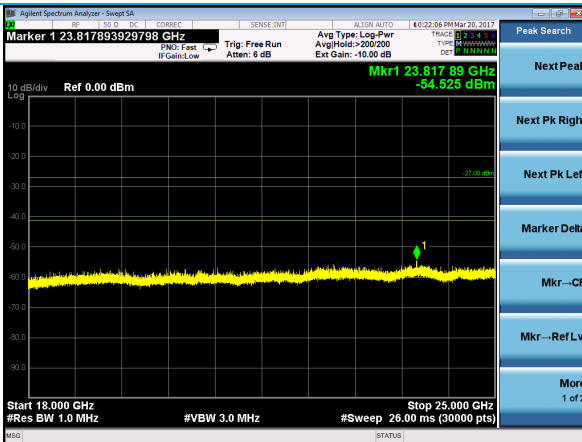
1-5.65 GHz



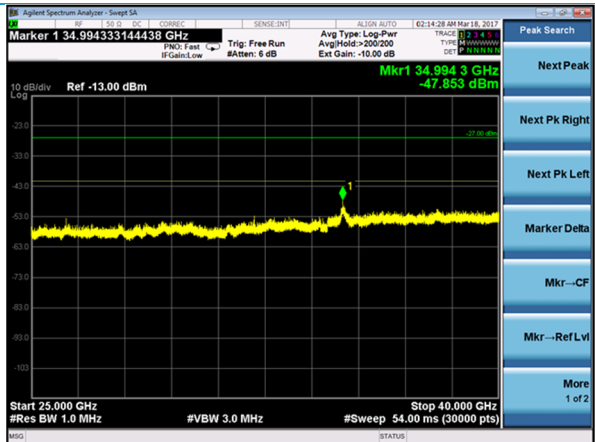
5.925-10 GHz



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

| | |
|--|---|
| <p>Description of Measurement</p> | <p>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.</p> <p>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.</p> <p>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.</p> |
| <p>Example Calculations</p> | <p>Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m)</p> <p>Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m)</p> <p>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</p> |

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 dB μ V/m | Peak 74 dB μ V/m Average 54 dB μ V/m |
| U-NII-1 | 5350-5460 | 68.23 dB μ V/m | Peak 74 dB μ V/m Average 54 dB μ V/m |
| U-NII-1 | 5250-5350 (ISED only) | 68.23 dB μ V/m | N/A |
| U-NII-2A | 4500-5150 | 68.23 dB μ V/m | Peak 74 dB μ V/m Average 54 dB μ V/m |
| U-NII-2A | 5250-5460 | 68.23 dB μ V/m | Peak 74 dB μ V/m Average 54 dB μ V/m |
| U-NII-2C | 5250-5460 | 68.23 dB μ V/m | Peak 74 dB μ V/m Average 54 dB μ V/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 dB μ V/m at frequencies from the band edges decreasing linearly to 110.83 dB μ V/m at 5 MHz above or below the band edges | 5720-5725 5850-5855 |
| 2) 110.83 dB μ V/m at 5 MHz above or below the band edges decreasing linearly to 105.23 dB μ V/m at 25 MHz above or below the band edges | 5700-5720 5855-5875 |
| 3) 105.23 dB μ V/m at 25 MHz above or below the band edges decreasing linearly to 68.23 dB μ V/m above or below the band edges; and 68.23 dB μ V/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 | <u>802.11a HT-20:</u> 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 | <u>802.11ac HT-20:</u> 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 | <u>802.11ac HT-40:</u> 5190, 5230 MHz (U-NII-1); 5270, 5310 MHz (U-NII-2A); 5510 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3) |
| Settings | <u>802.11ac HT-80:</u> 5210 MHz (U-NII-1); 5290 MHz (U-NII-2A); 5530 (U-NII-2C); 5775 MHz (U-NII-3) |
| Settings | <u>802.11n HT-20:</u> 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 | <u>802.11n HT-40:</u> 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



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

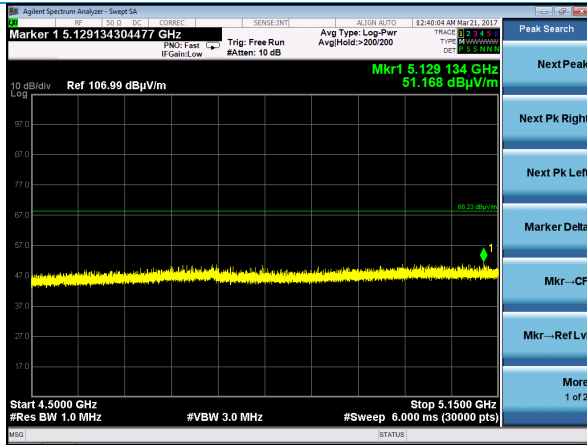
No emissions within 15 dB of limit

Table – U-NII-3 Upper Band-Edge Mask

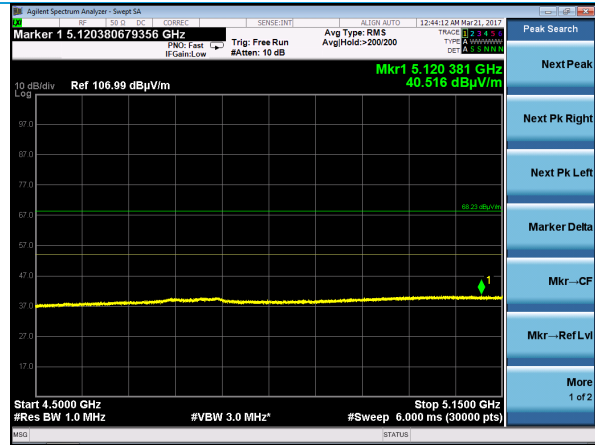
No emissions within 15 dB of limit

| | | |
|-------------------------------|-----------------|----------------------|
| Company: LSR a Laird Buisness | Page 120 of 149 | Name: Sterling-LWB5 |
| Report: TR 316356 C (U-NII) | | Model: Sterling-LWB5 |
| Job: C-2602 | | Serial: 00008, 00035 |

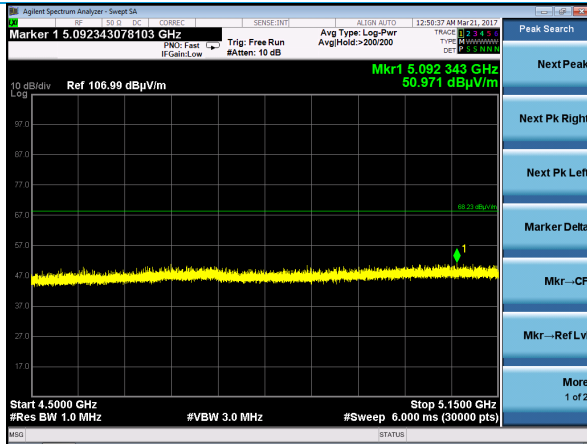
Plots – U-NII-1 Restricted-Band Lower Band-Edge



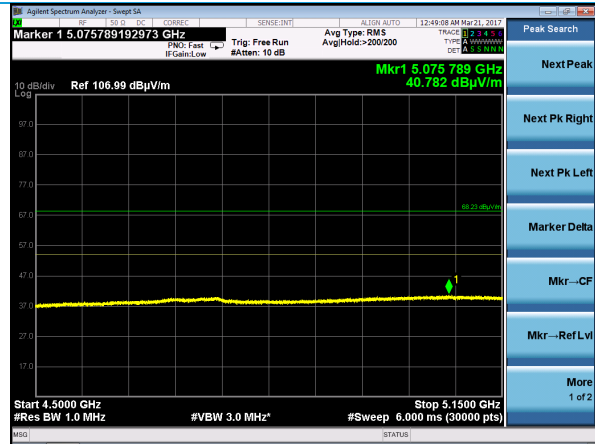
Low Channel – 802.11a HT-20 – Peak



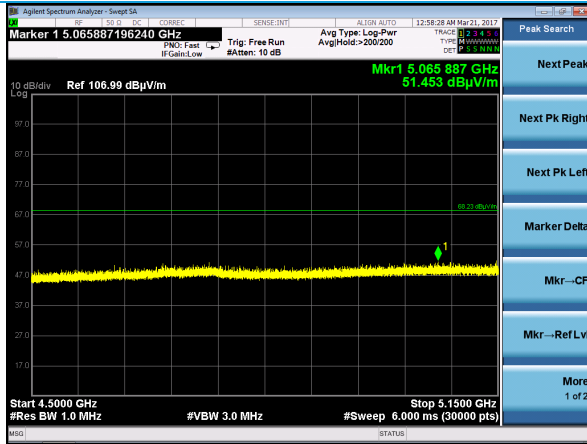
Low Channel – 802.11a HT-20 – Average



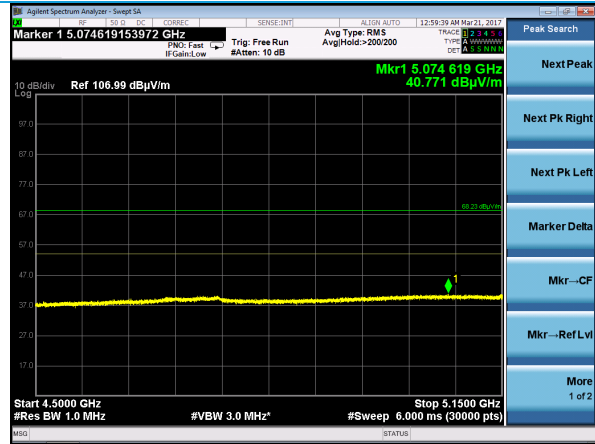
Low Channel – 802.11ac HT-20 – Peak



Low Channel – 802.11ac HT-20 – Average

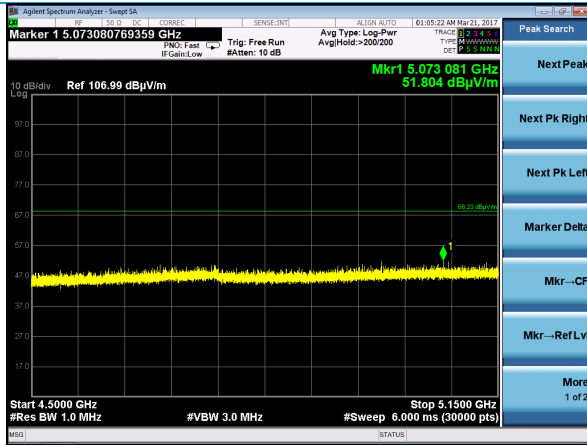


Low Channel – 802.11ac HT-40 – Peak

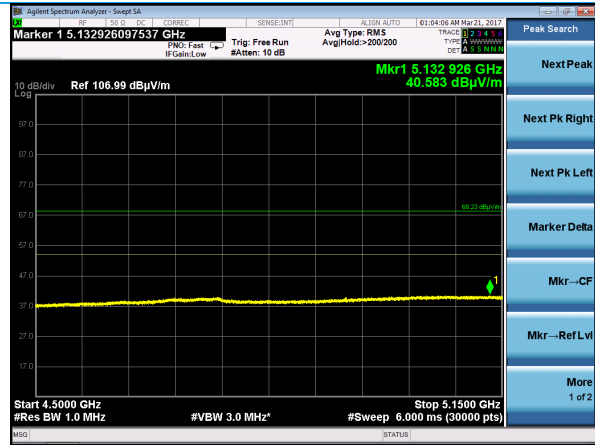


Low Channel – 802.11ac HT-40 – Average

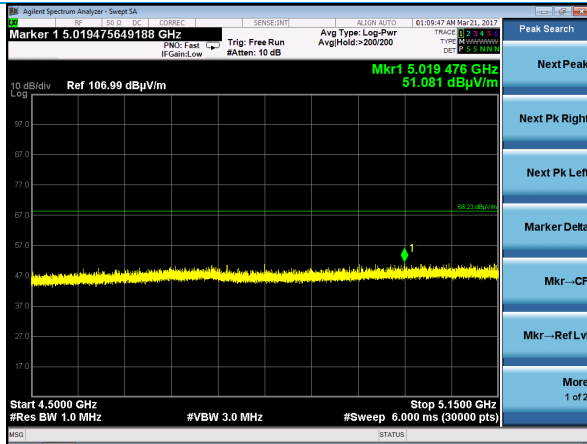
Plots – U-NII-1 Restricted-Band Lower Band-Edge, continued



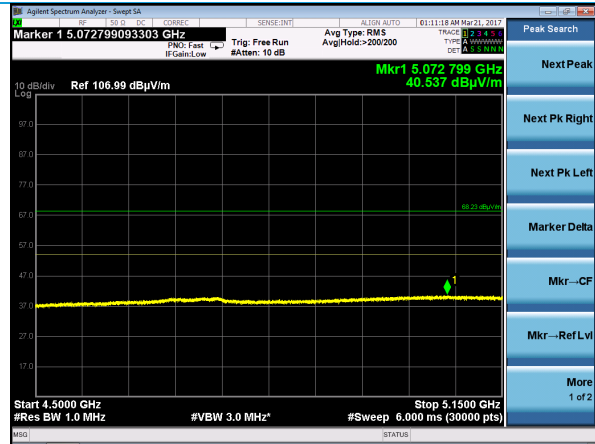
Low Channel – 802.11ac HT-80 – Peak



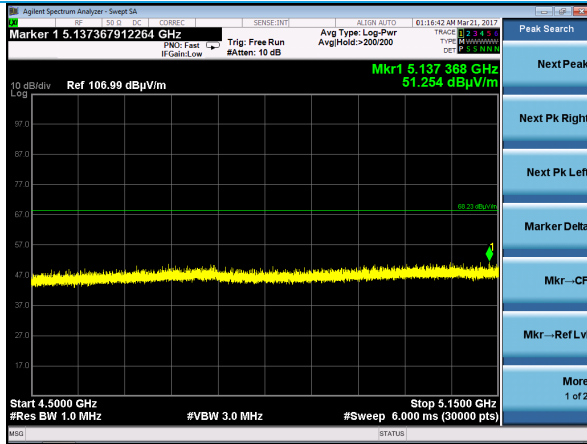
Low Channel – 802.11ac HT-80 Average



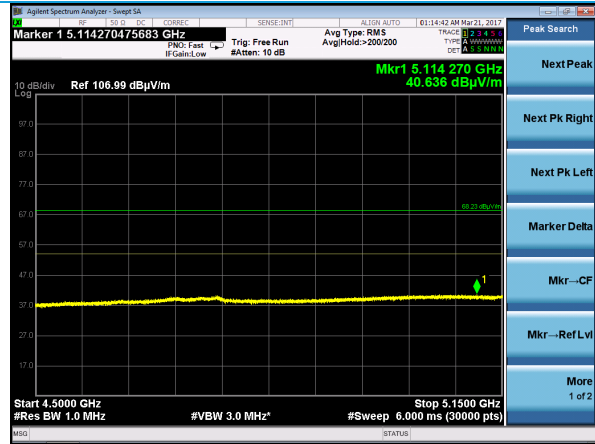
Low Channel – 802.11n HT-20 – Peak



Low Channel – 802.11n HT-20 – Average

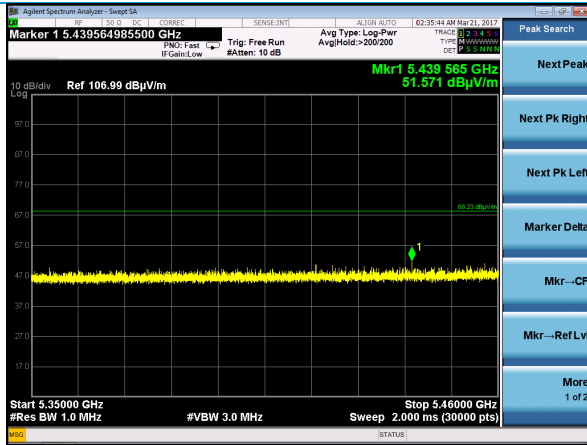


Low Channel – 802.11n HT-40 – Peak

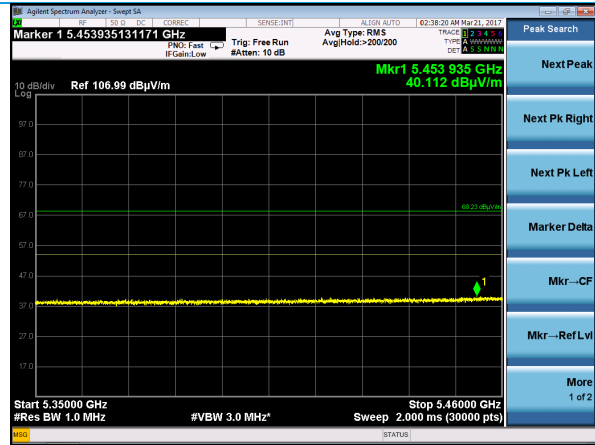


Low Channel – 802.11n HT-40 – Average

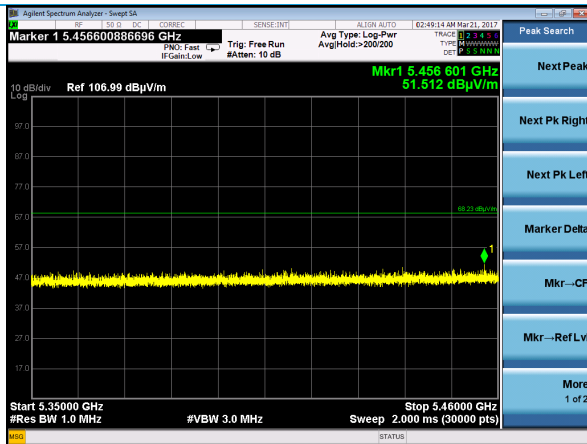
Plots – U-NII-1 Restricted-Band Upper Band-Edge



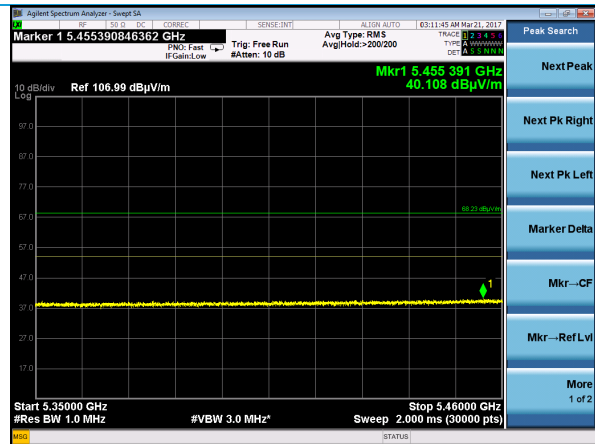
High Channel – 802.11a HT-20 – Peak



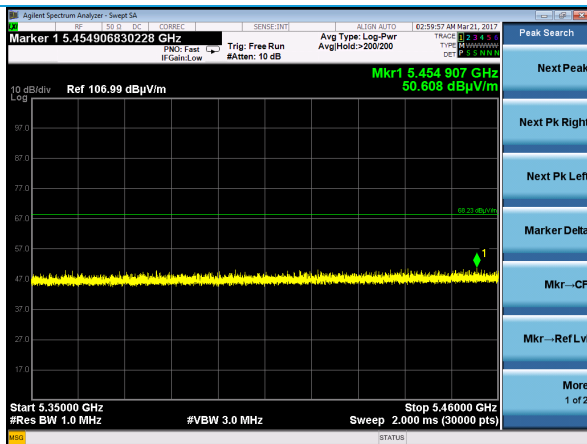
High Channel – 802.11a HT-20 – Average



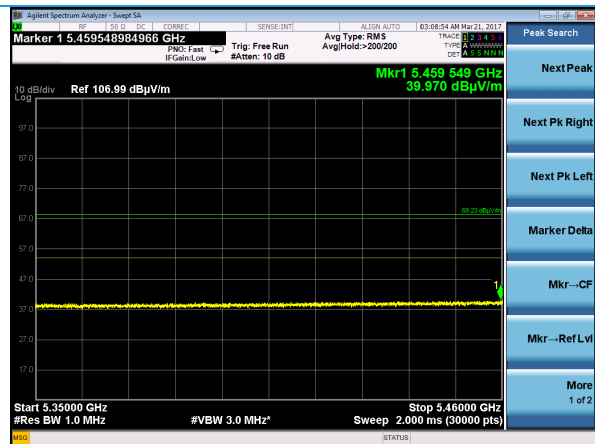
High Channel – 802.11ac HT-20 – Peak



High Channel – 802.11ac HT-20 – Average

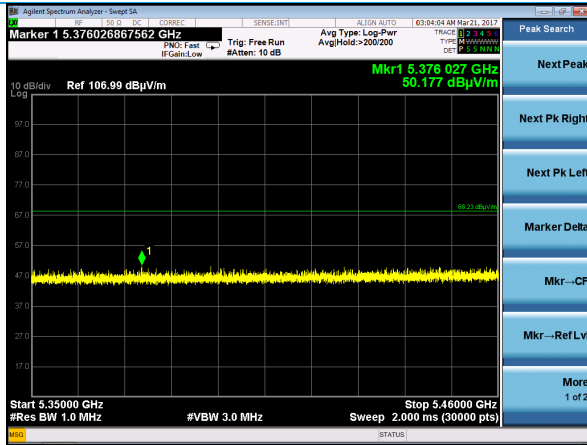


High Channel – 802.11ac HT-40 – Peak

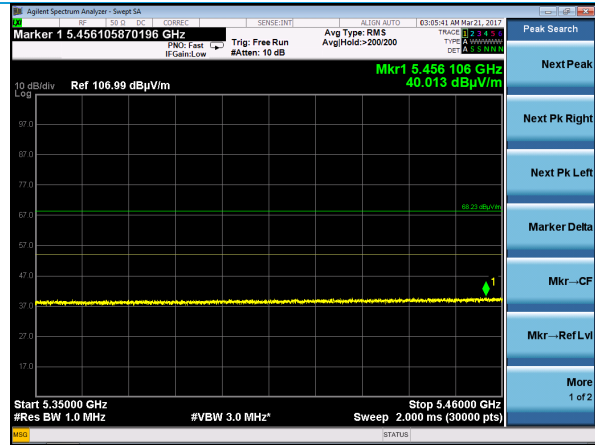


High Channel – 802.1ac HT-40 - Average

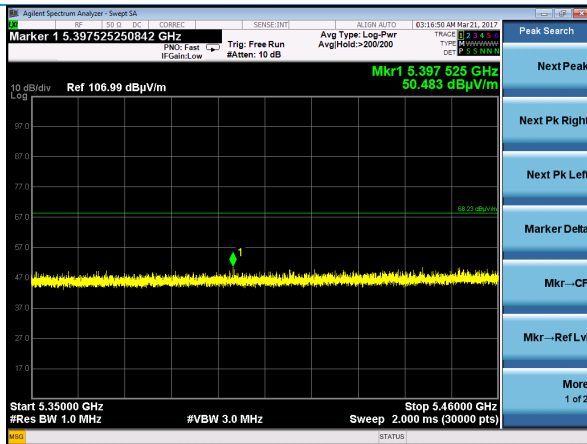
Plots – U-NII-1 Restricted-Band Upper Band-Edge, continued



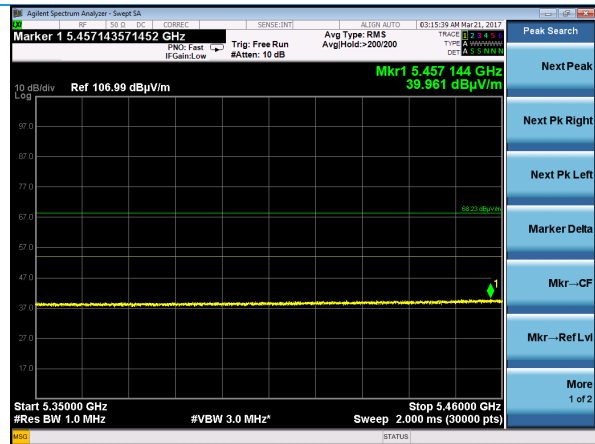
High Channel – 802.11ac HT-80 – Peak



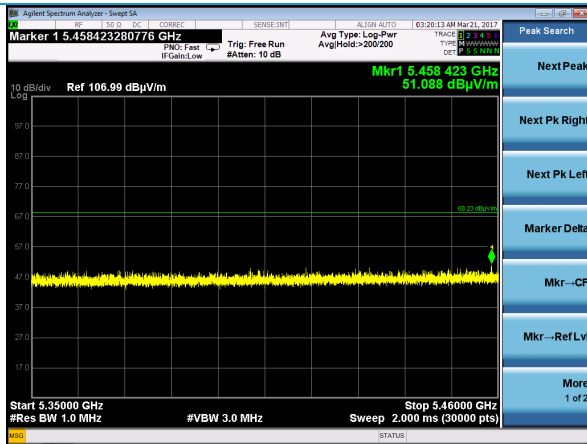
High Channel – 802.11ac HT-80 – Average



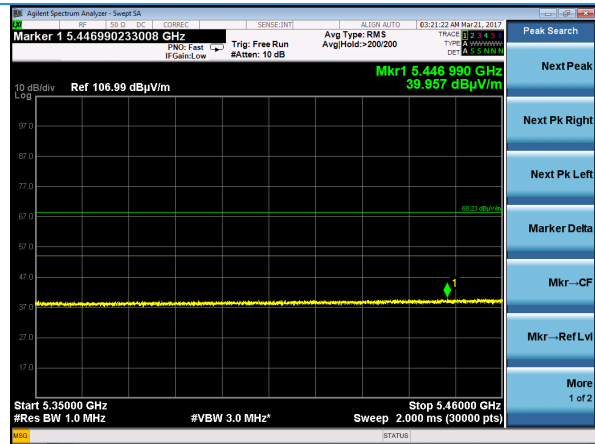
High Channel – 802.11n HT-20 – Peak



High Channel – 802.11n HT-20 – Average



High Channel – 802.11ac HT-40 – Peak



High Channel – 802.1n HT-40 - Average