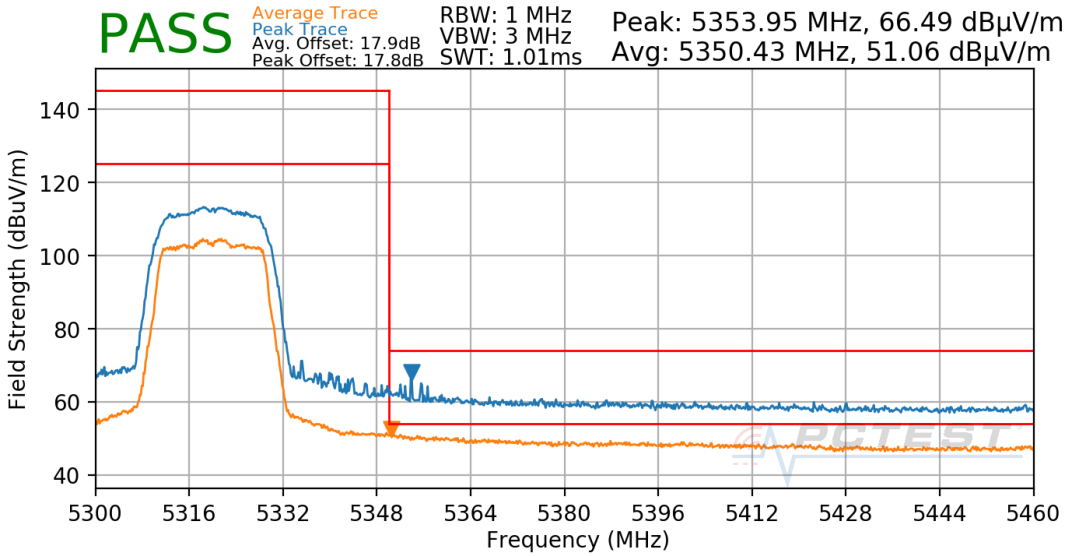
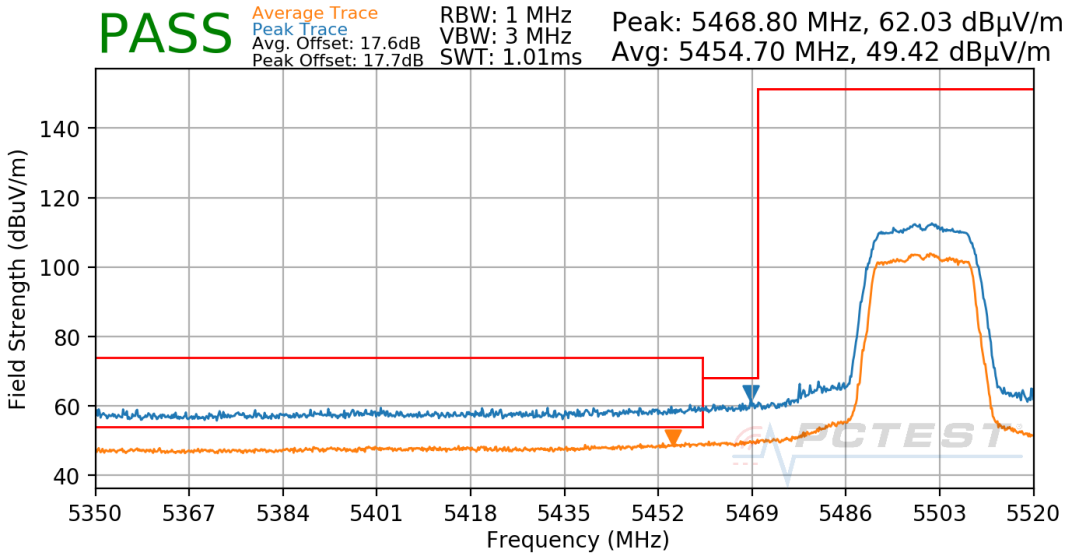
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5320MHz
Channel:	64



Plot 7-239. Radiated Upper Band Edge Plot SISO CORE 1 (UNII Band 2A)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5500MHz
Channel:	100



Plot 7-240. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 2C)

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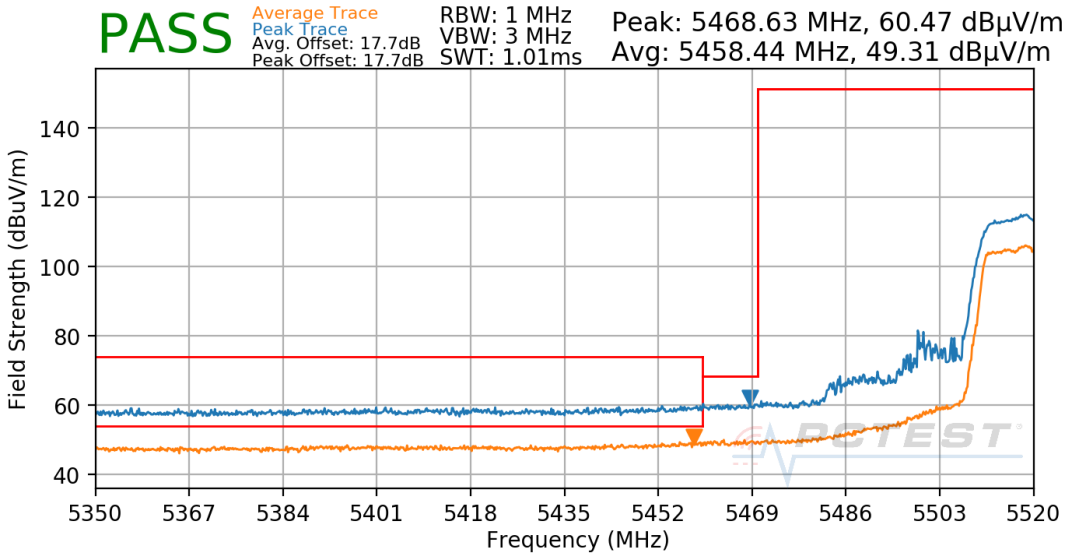
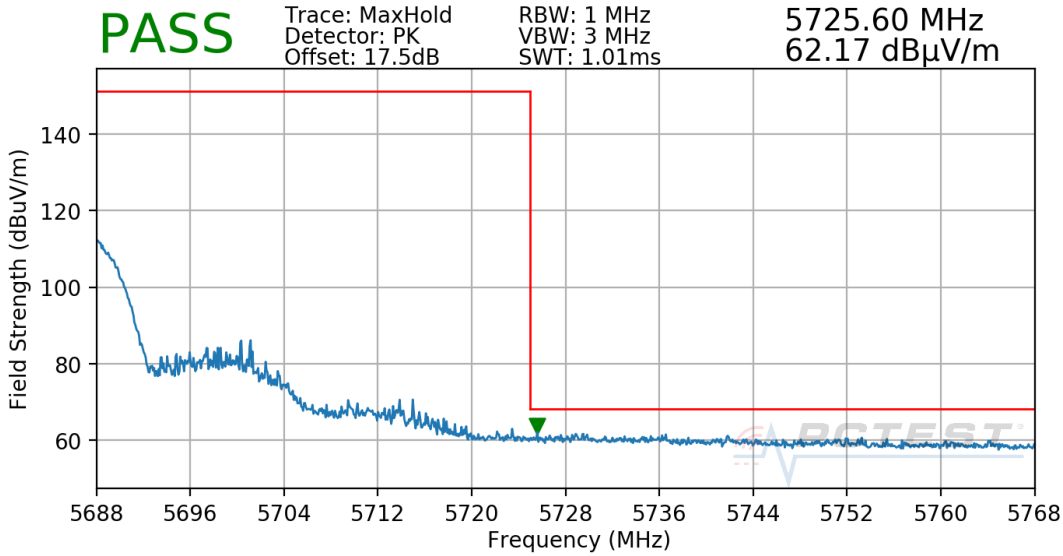
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5520MHz
Channel:	104



Plot 7-241. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5680MHz
Channel:	136



Plot 7-242. Radiated Upper Band Edge Plot SISO CORE 1 (Peak – UNII Band 2C)

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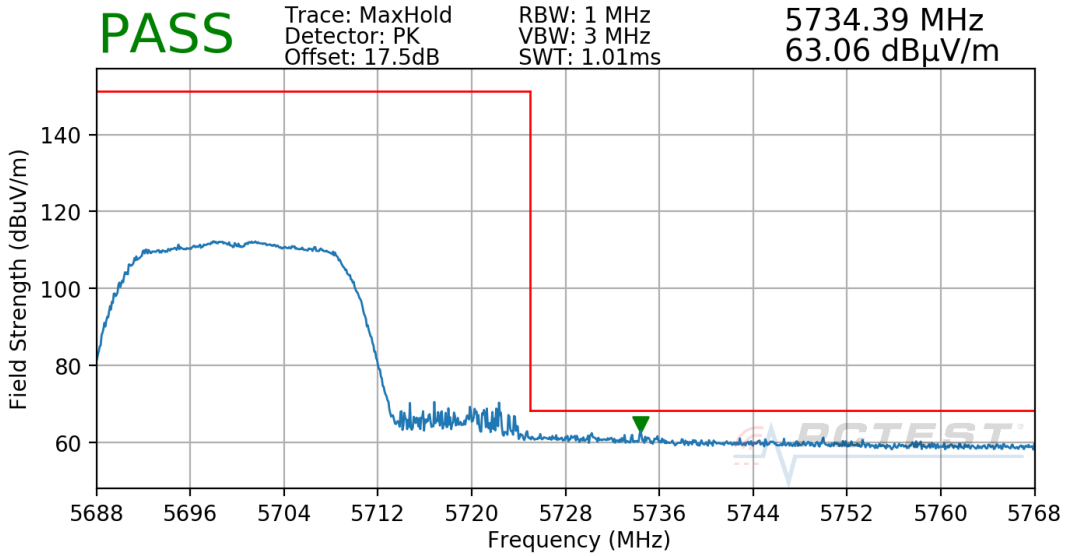
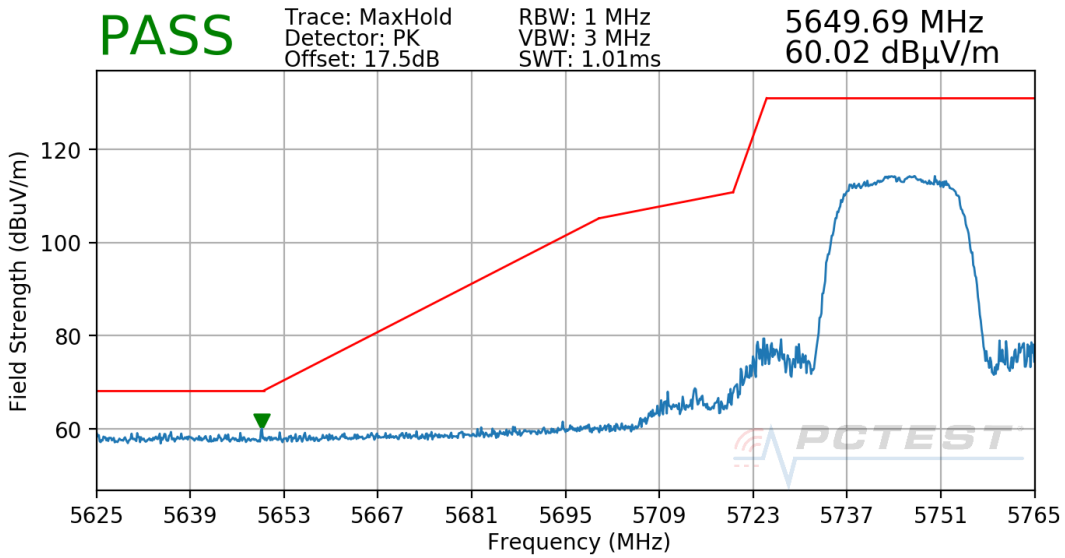
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5700MHz
Channel:	140



Plot 7-243. Radiated Upper Band Edge Plot SISO CORE 1 (Peak – UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5745MHz
Channel:	149



Plot 7-244. Radiated Lower Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

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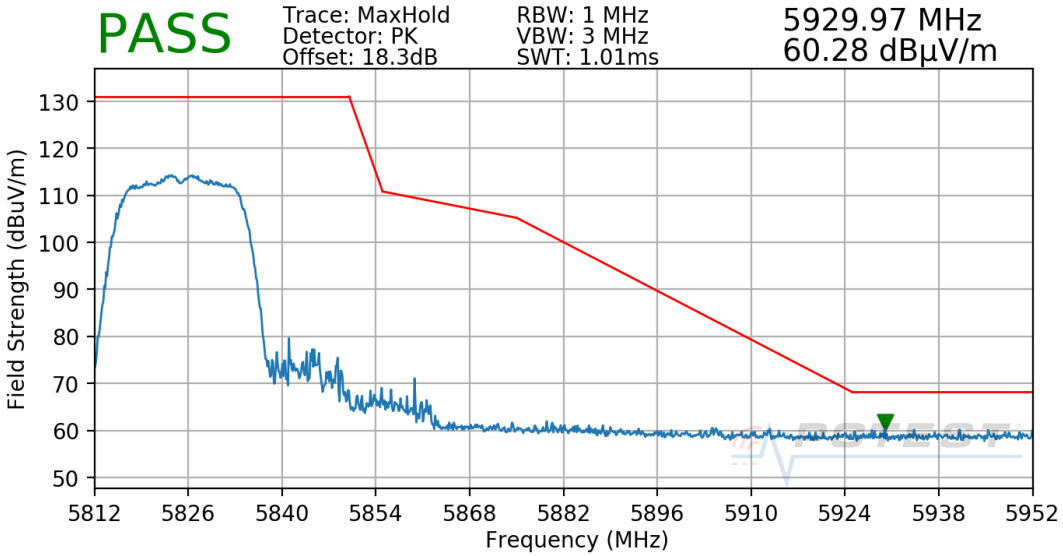
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5825MHz
Channel:	165



Plot 7-245. Radiated Upper Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

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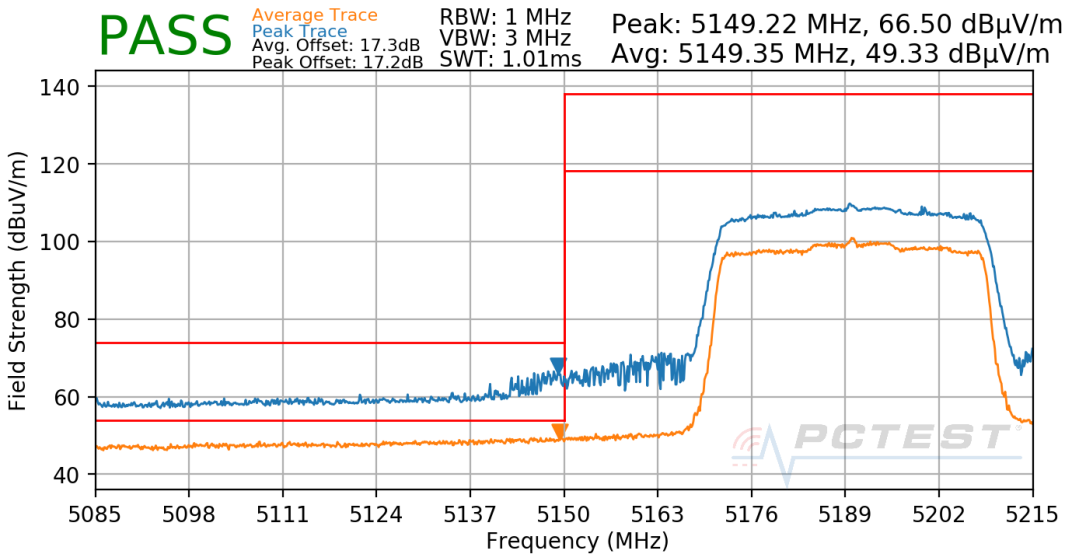
7.6.9 SISO Core-1 Radiated Band Edge Measurements (40MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5190MHz
Channel:	38



Plot 7-246. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 1)

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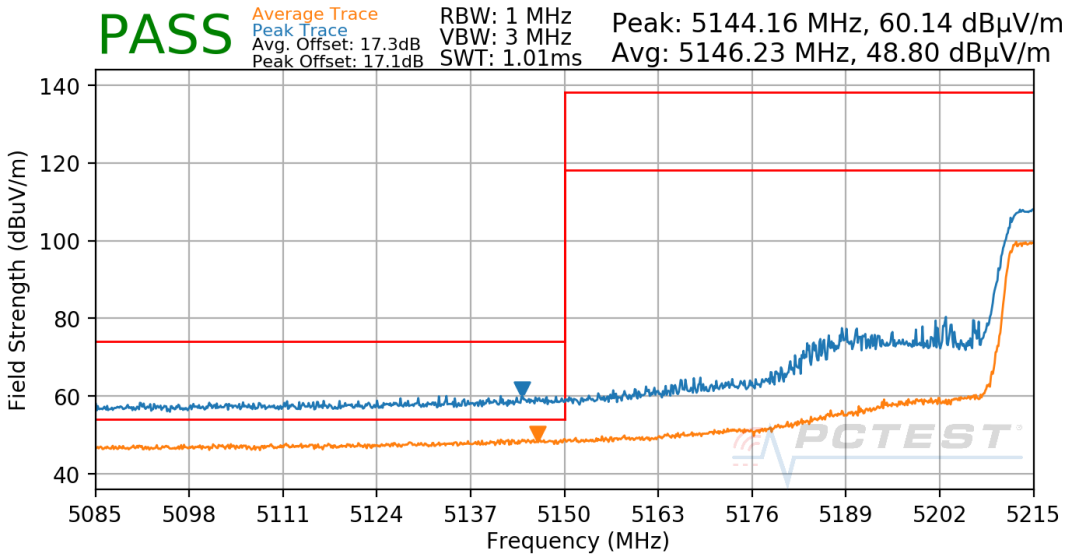
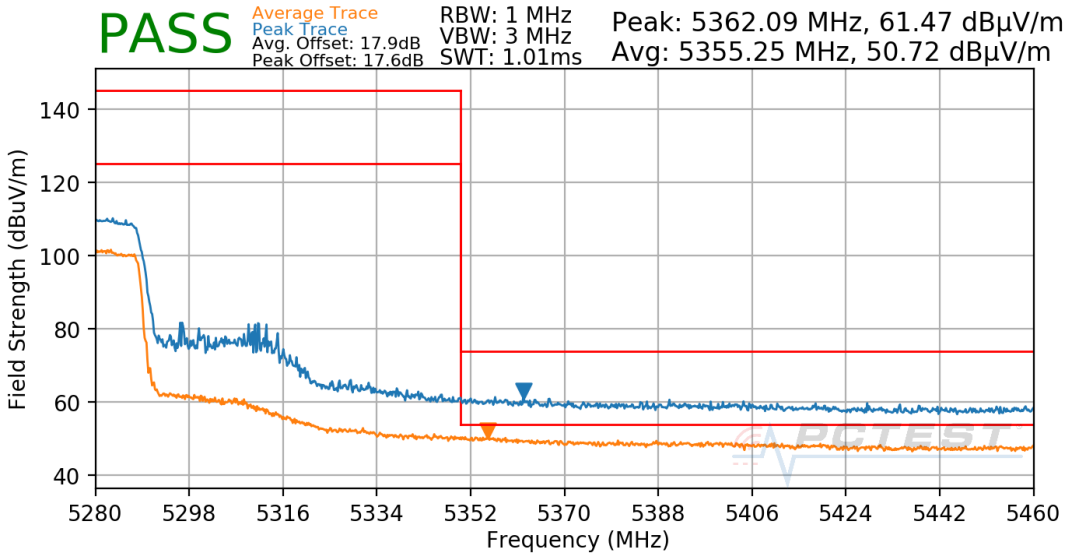
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5230MHz
Channel:	46



Plot 7-247. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 1)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5270MHz
Channel:	54



Plot 7-248. Radiated Upper Band Edge Plot SISO CORE 1 (UNII Band 2A)

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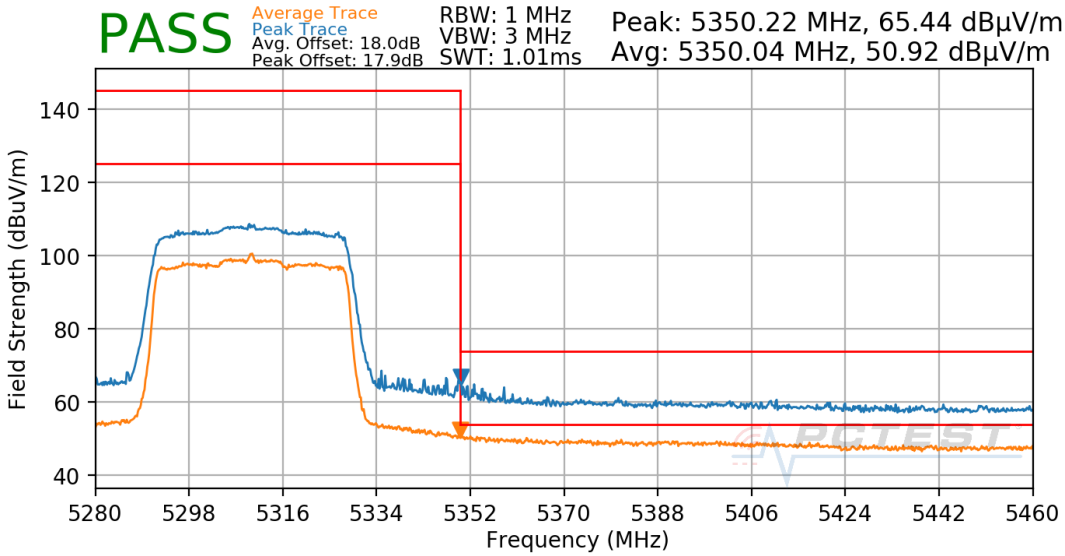
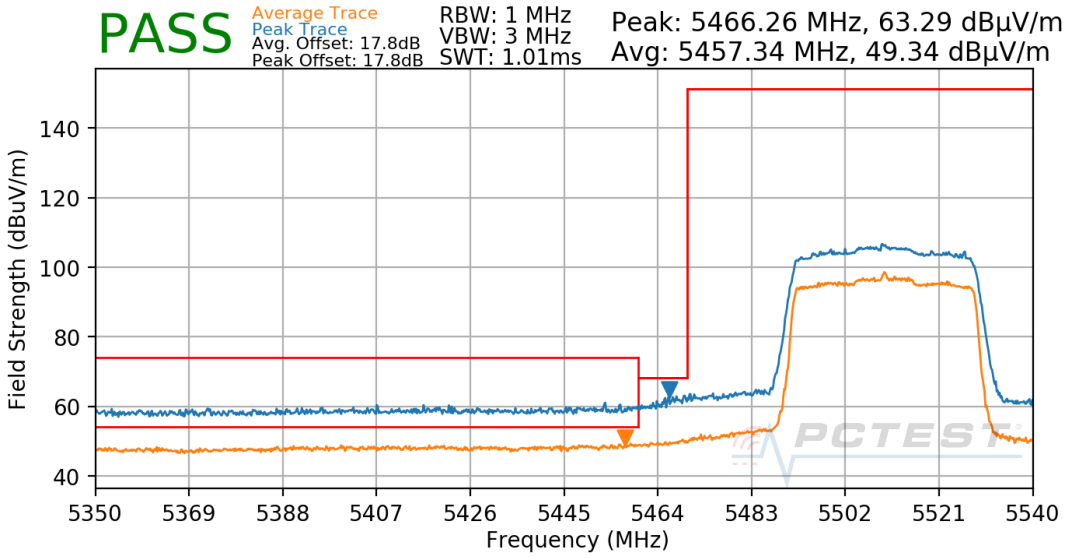
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5310MHz
Channel:	62



Plot 7-249. Radiated Upper Band Edge Plot SISO CORE 1 (UNII Band 2A)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5510MHz
Channel:	102



Plot 7-250. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 2C)

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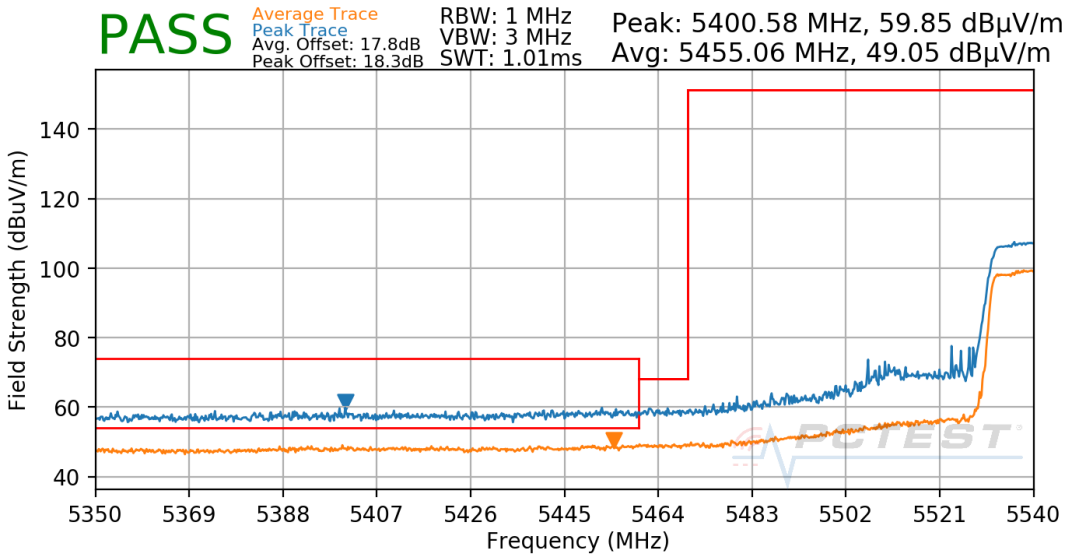
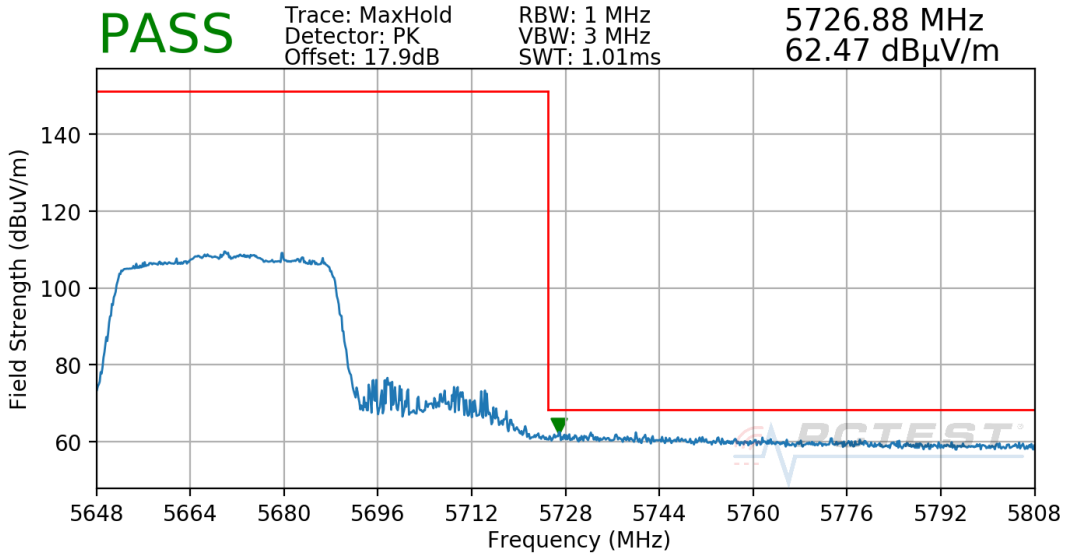
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5550MHz
Channel:	110



Plot 7-251. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5670MHz
Channel:	134



Plot 7-252. Radiated Upper Band Edge Plot SISO CORE 1 (Peak - UNII Band 2C)

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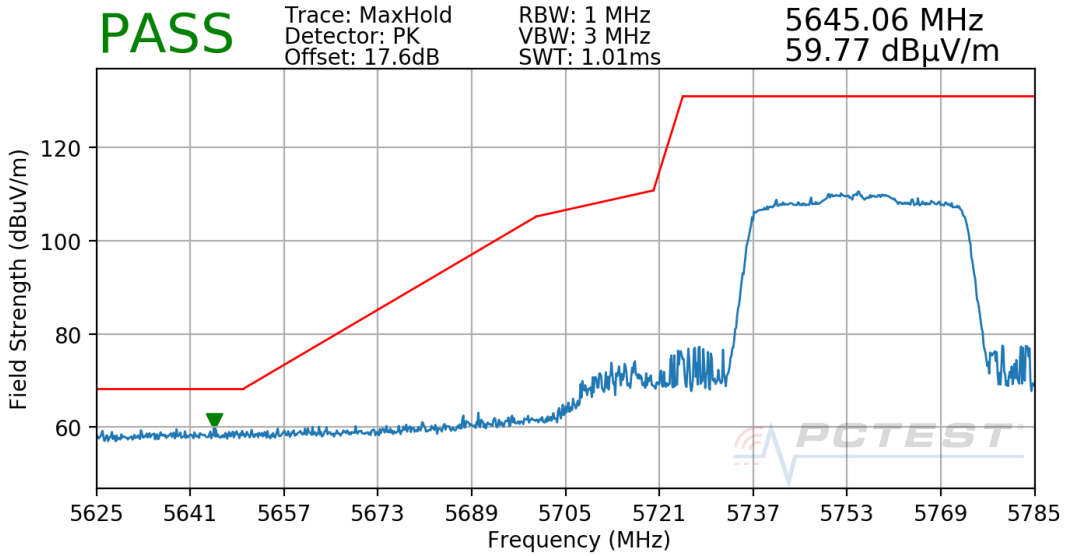
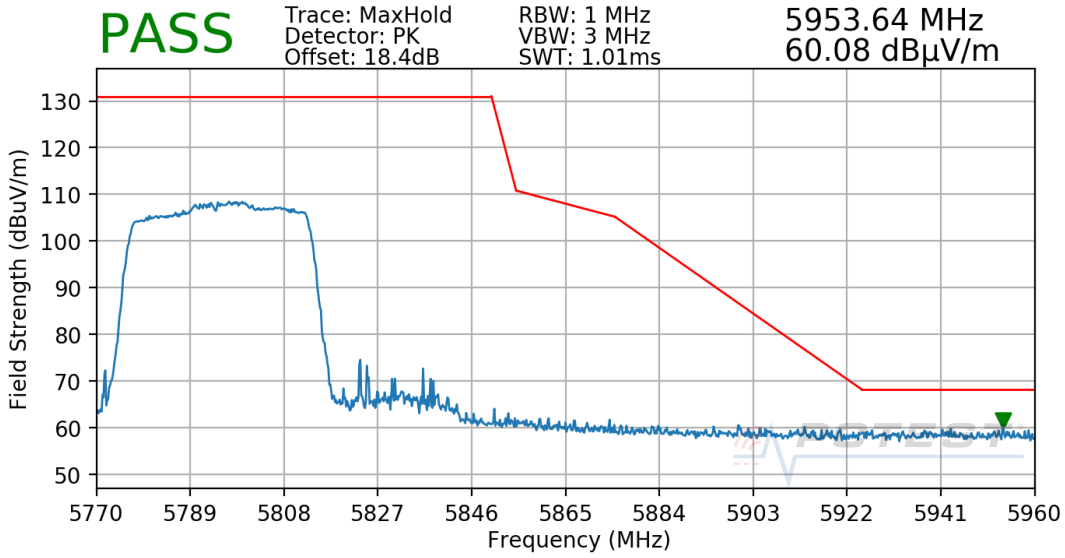
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5755MHz
Channel:	151



Plot 7-253. Radiated Lower Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5795MHz
Channel:	159



Plot 7-254. Radiated Upper Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

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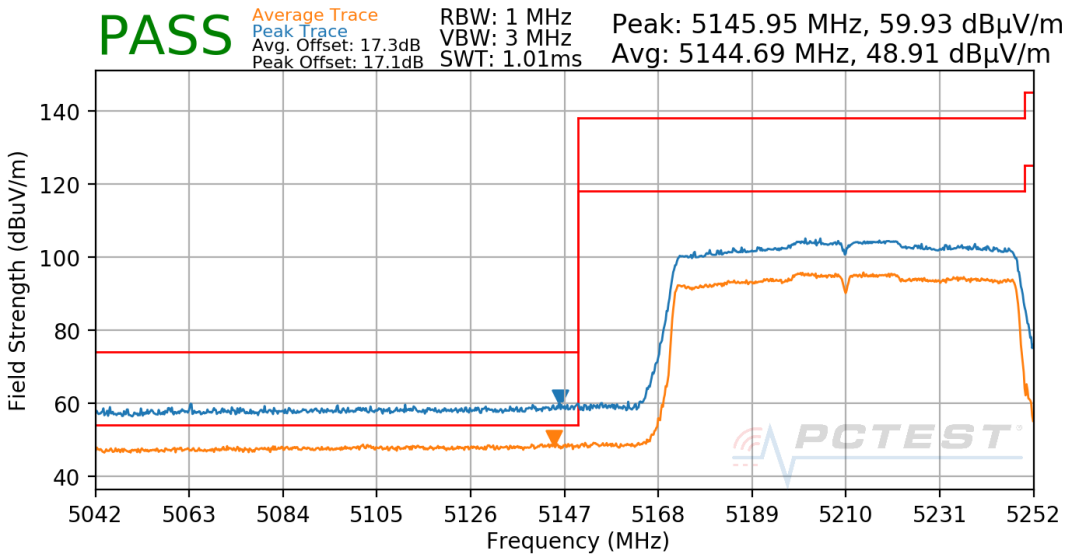
7.6.10 SISO Core-1 Radiated Band Edge Measurements (80MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5210MHz
Channel:	42



Plot 7-255. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 1)

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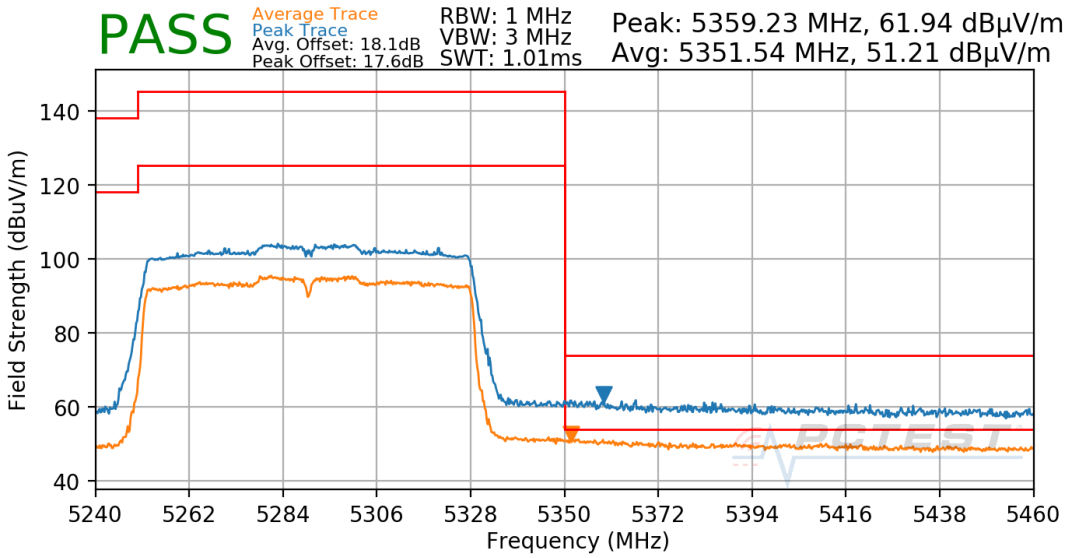
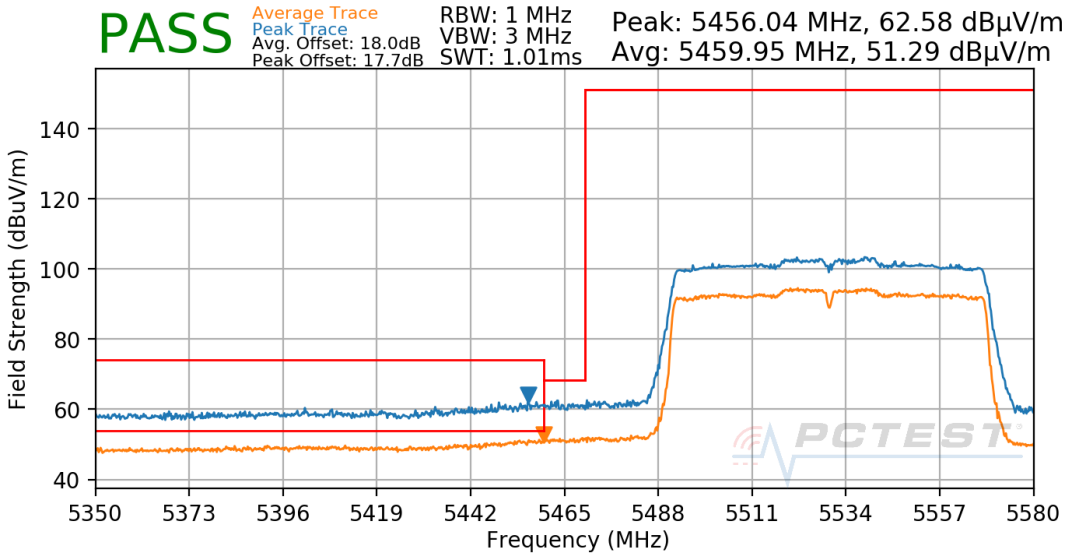
Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5290MHz
Channel:	58



Plot 7-256. Radiated Upper Band Edge Plot SISO CORE 1 (UNII Band 2A)

Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5530MHz
Channel:	106



Plot 7-257. Radiated Lower Band Edge Plot SISO CORE 1 (UNII Band 2C)

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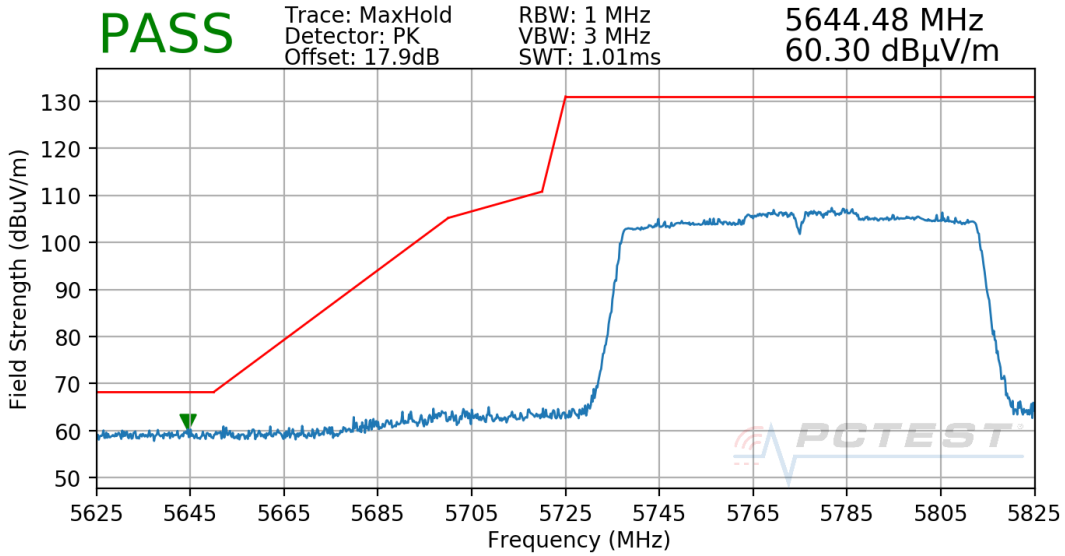
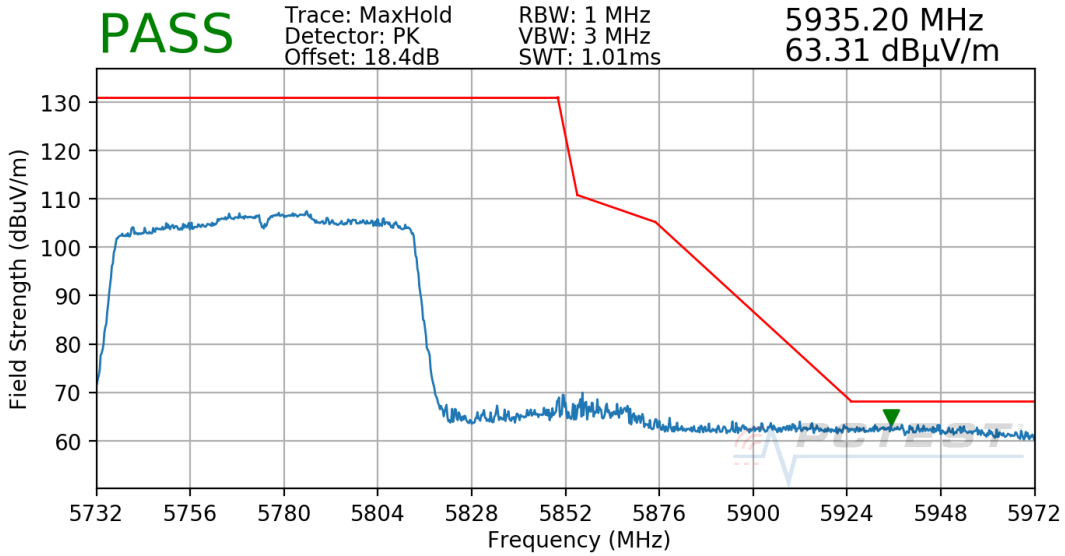
Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5775MHz
Channel:	155



Plot 7-258. Radiated Lower Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5775MHz
Channel:	155



Plot 7-259. Radiated Upper Band Edge Plot SISO CORE 1 (Peak – UNII Band 3)

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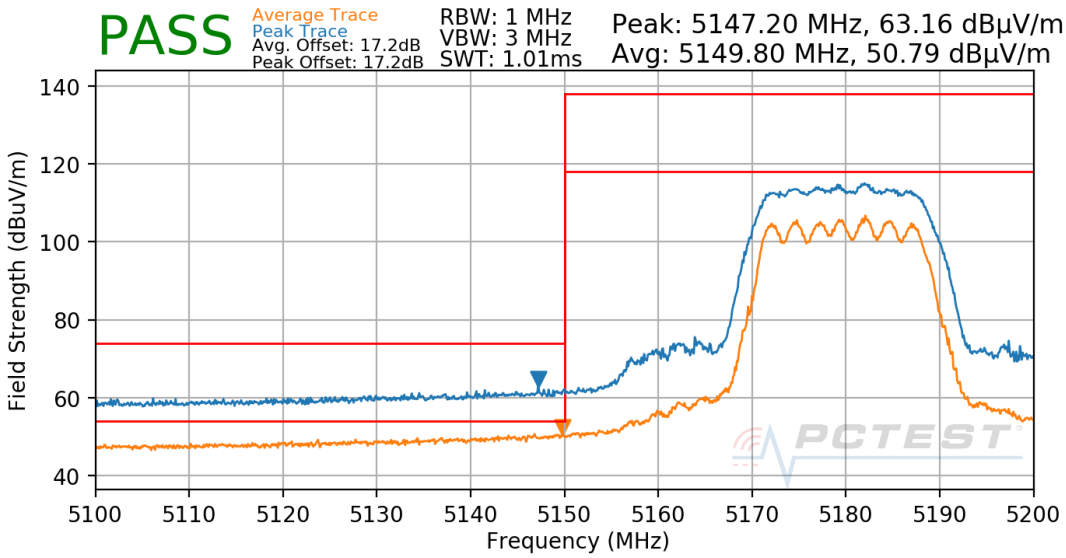
7.6.11 CDD/SDM Radiated Band Edge Measurements (20MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5180MHz
Channel:	36



Plot 7-260. Radiated Lower Band Edge Plot CDD (UNII Band 1)

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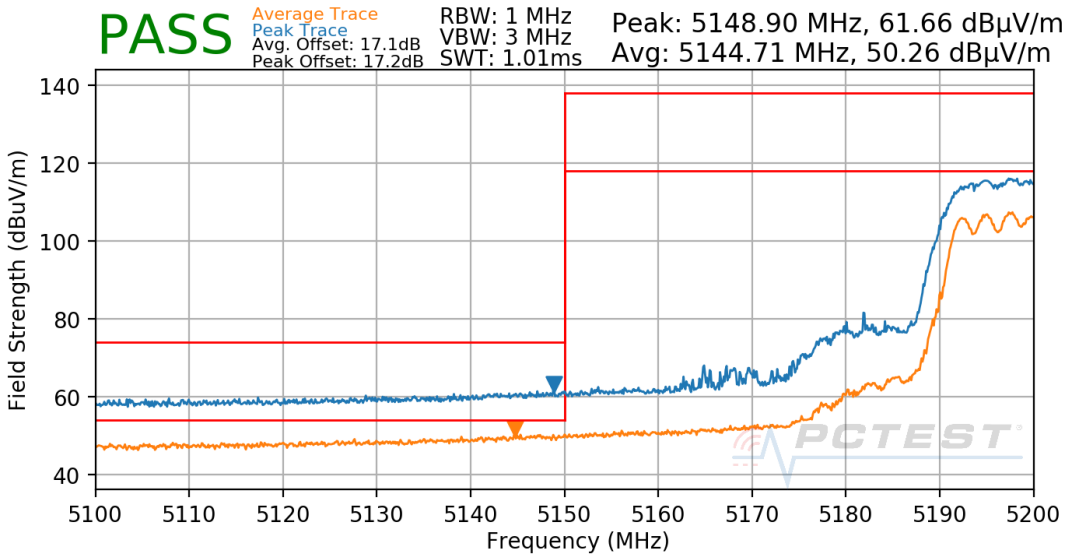
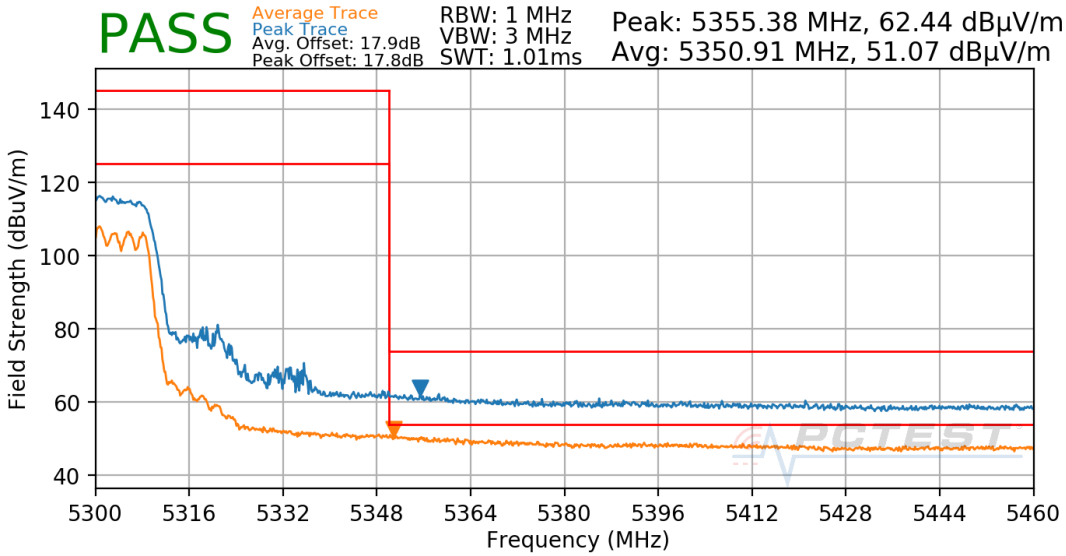
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5200MHz
Channel:	40



Plot 7-261. Radiated Lower Band Edge Plot CDD (UNII Band 1)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC8
Distance of Measurements:	3 Meters
Operating Frequency:	5300MHz
Channel:	60



Plot 7-262. Radiated Upper Band Edge Plot SDM (UNII Band 2A)

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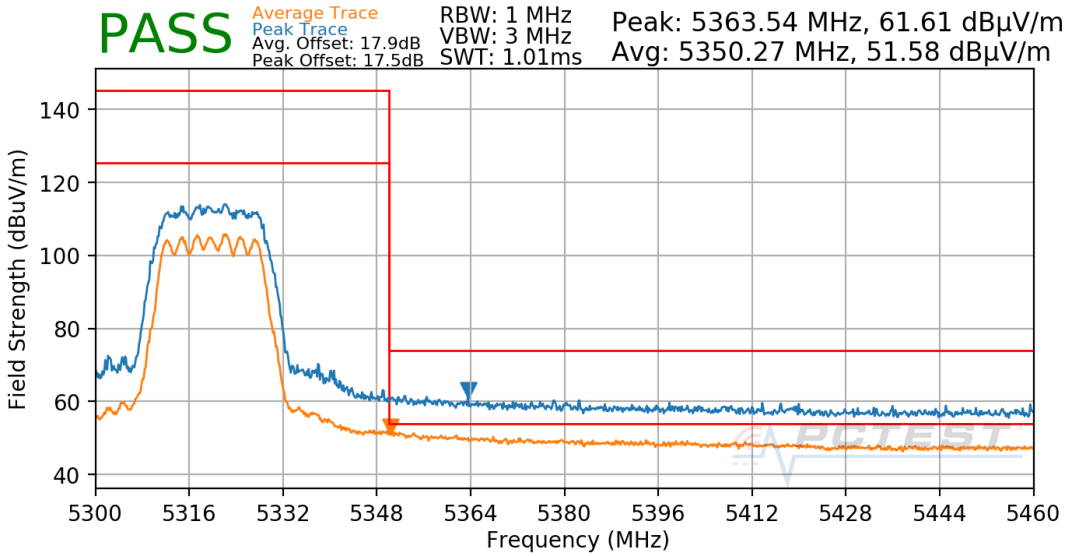
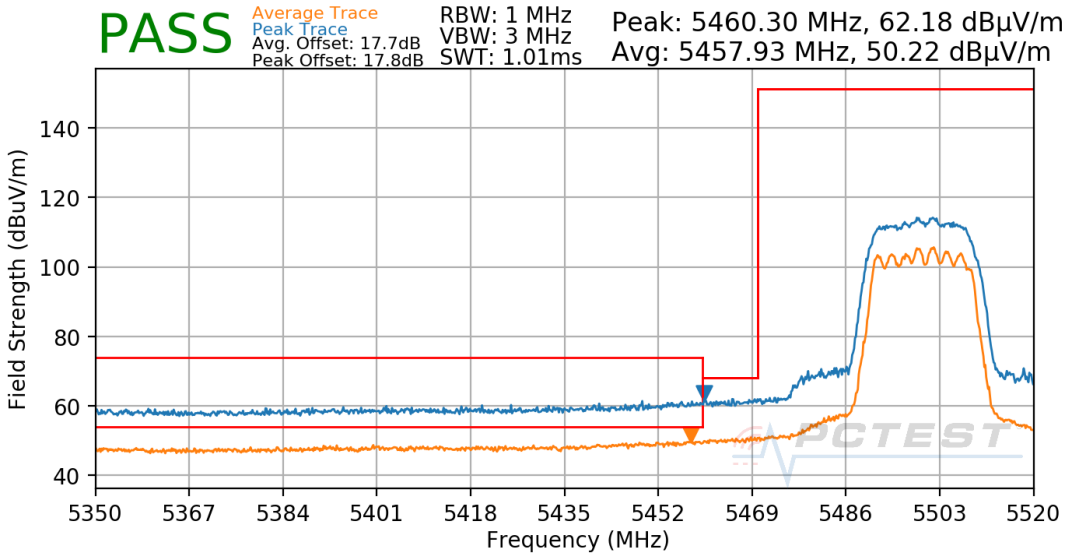
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5320MHz
Channel:	64



Plot 7-263. Radiated Upper Band Edge Plot CDD (UNII Band 2A)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5500MHz
Channel:	100



Plot 7-264. Radiated Lower Band Edge Plot CDD (UNII Band 2C)

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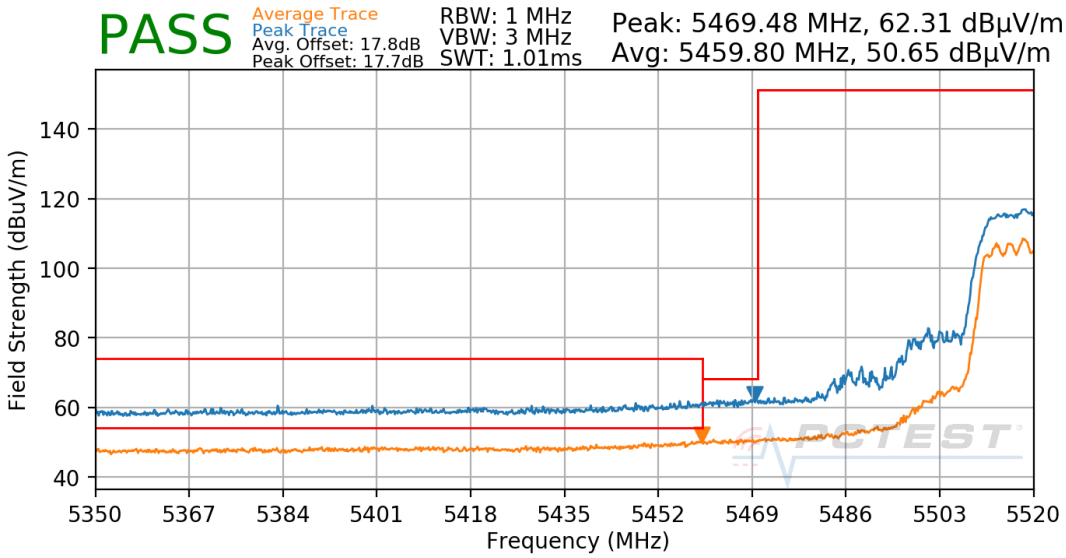
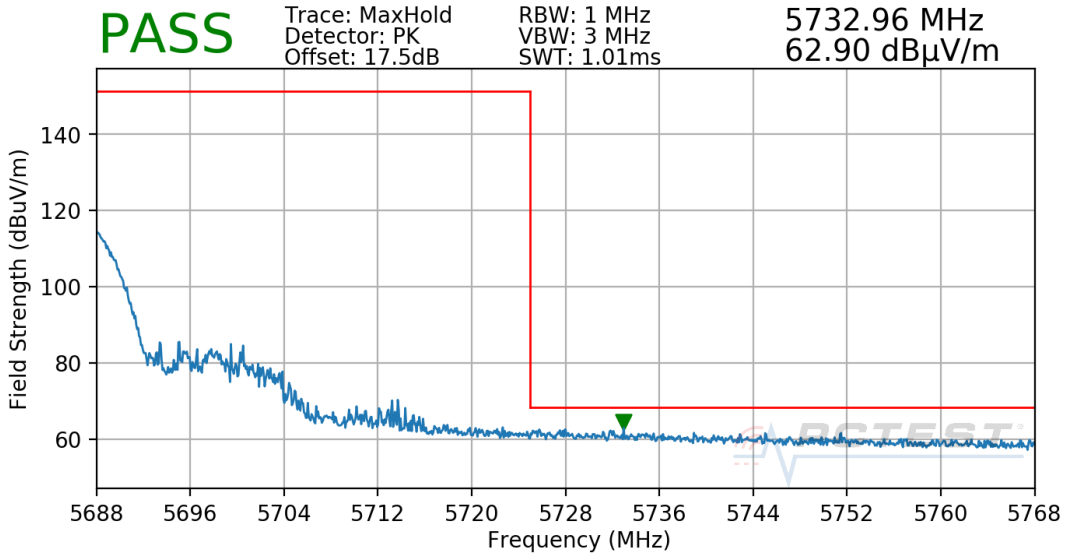
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC8
Distance of Measurements:	3 Meters
Operating Frequency:	5520MHz
Channel:	104



Plot 7-265. Radiated Lower Band Edge Plot SDM (UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5580MHz
Channel:	136



Plot 7-266. Radiated Upper Band Edge Plot SDM (Peak – UNII Band 2C)

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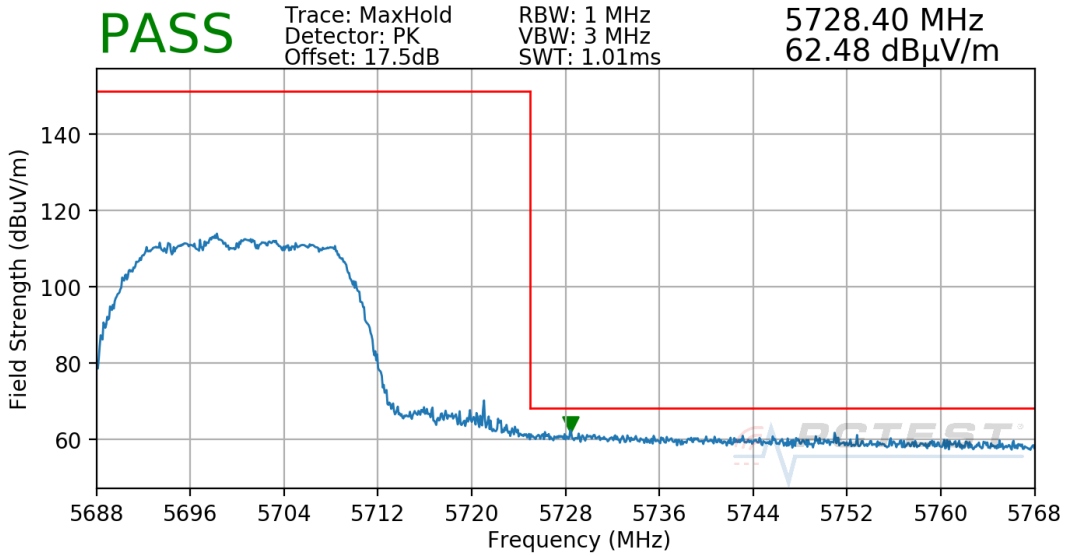
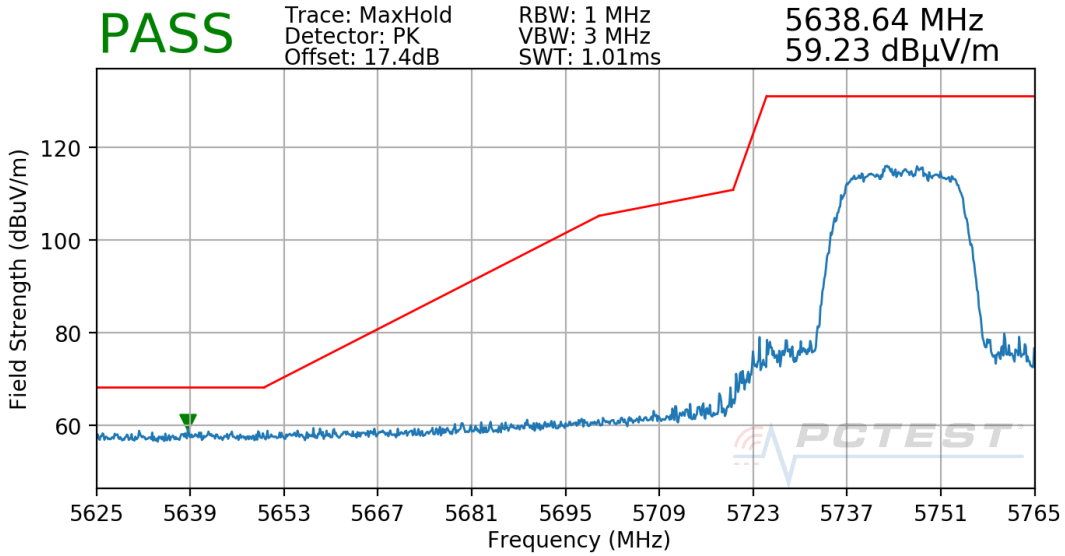
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5700MHz
Channel:	140



Plot 7-267. Radiated Upper Band Edge Plot CDD (Peak – UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5745MHz
Channel:	149



Plot 7-268. Radiated Lower Band Edge Plot CDD (Peak – UNII Band 3)

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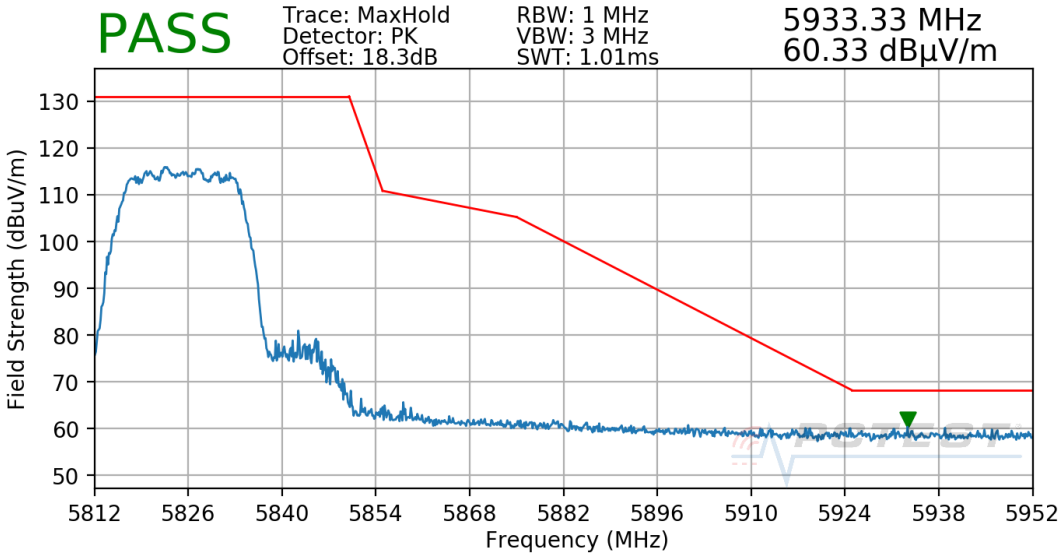
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5825MHz
Channel:	165



Plot 7-269. Radiated Upper Band Edge Plot CDD (Peak – UNII Band 3)

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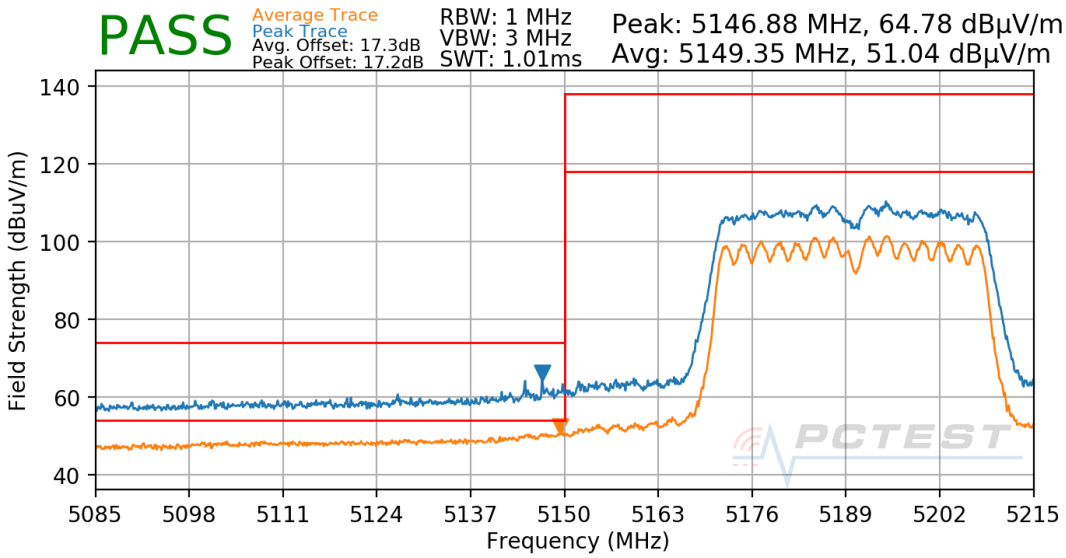
7.6.12 CDD/SDM Radiated Band Edge Measurements (40MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5190MHz
Channel:	38



Plot 7-270. Radiated Lower Band Edge Plot CDD (UNII Band 1)

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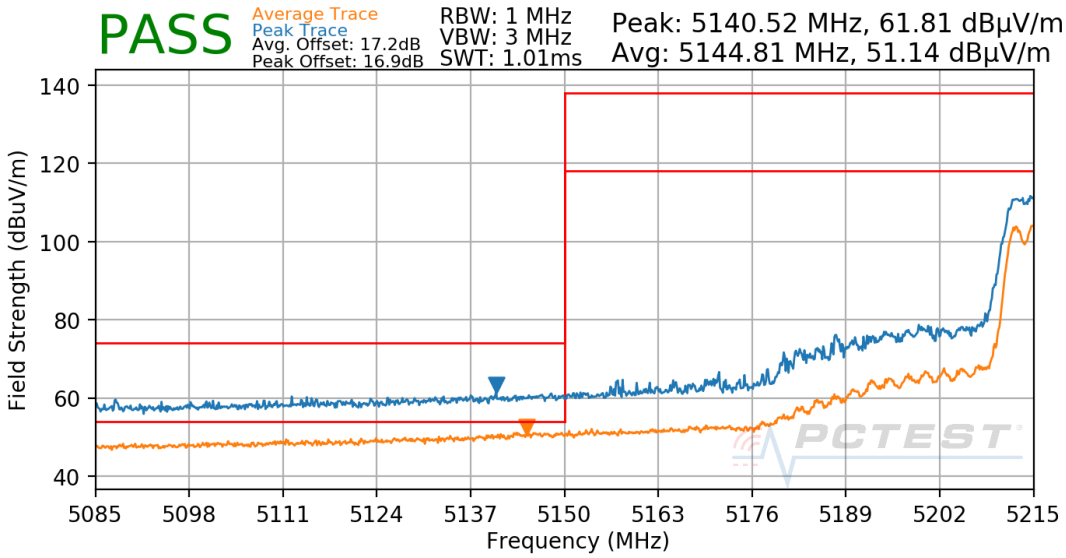
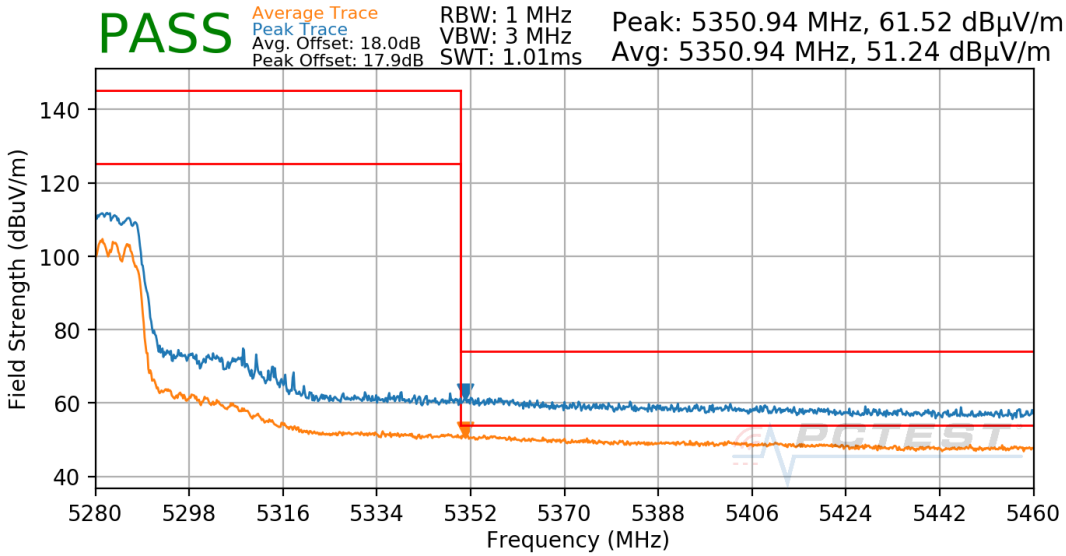
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5230MHz
Channel:	46



Plot 7-271. Radiated Lower Band Edge Plot CDD (UNII Band 1)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5270MHz
Channel:	54



Plot 7-272. Radiated Upper Band Edge Plot CDD (UNII Band 2A)

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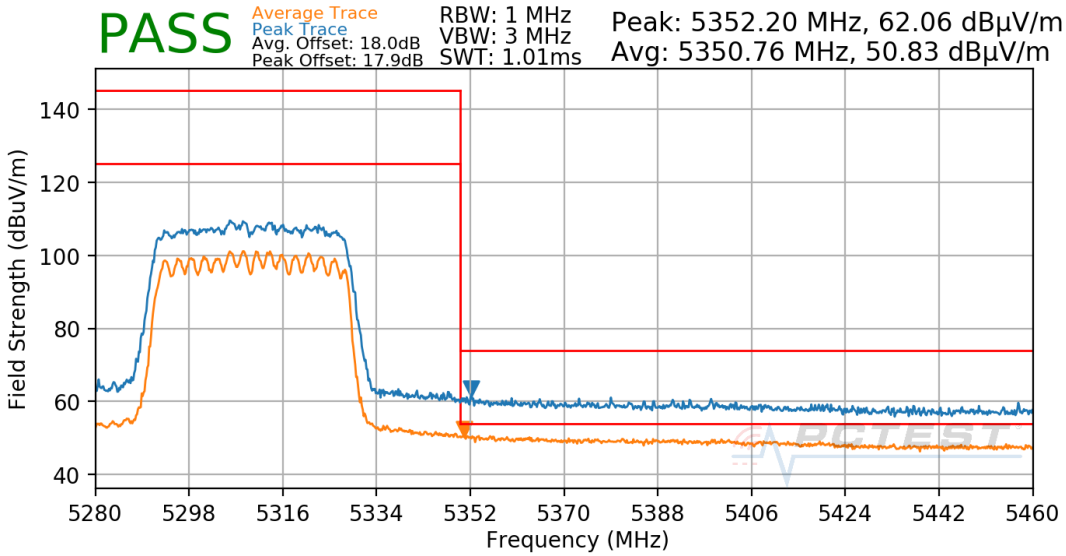
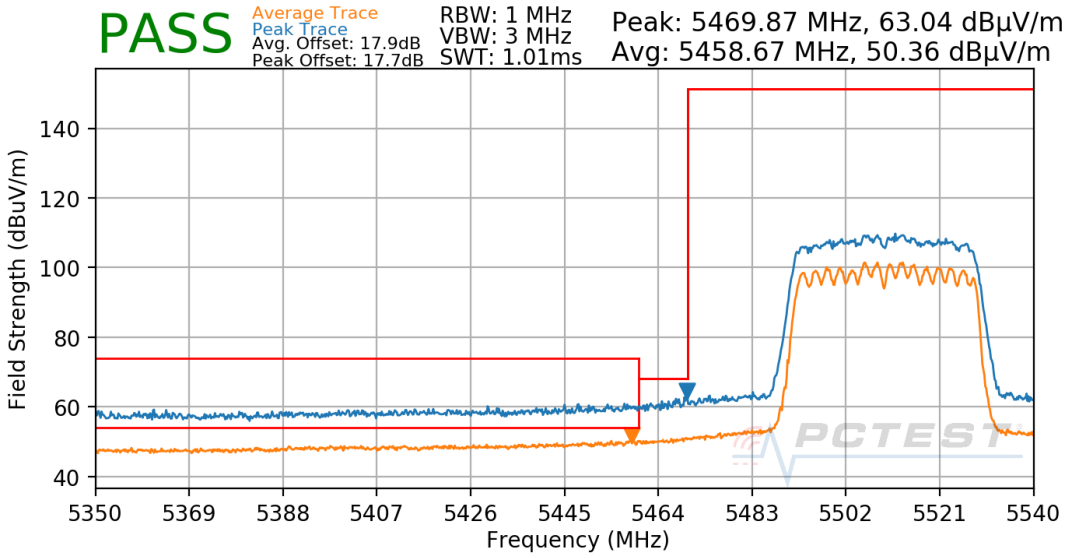
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5310MHz
Channel:	62



Plot 7-273. Radiated Upper Band Edge Plot CDD (UNII Band 2A)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5510MHz
Channel:	102



Plot 7-274. Radiated Lower Band Edge Plot CDD (UNII Band 2C)

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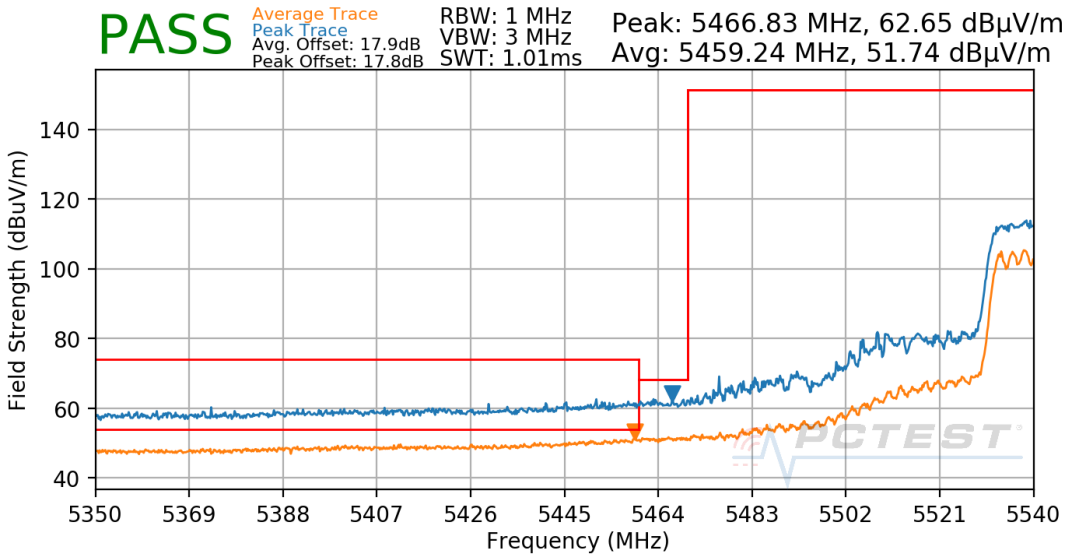
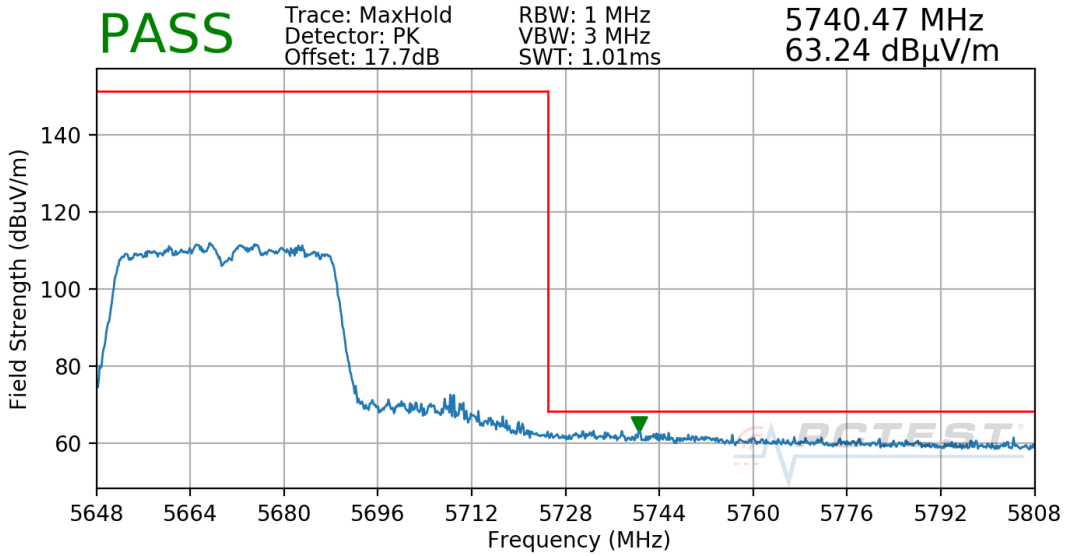
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5550MHz
Channel:	110



Plot 7-275. Radiated Lower Band Edge Plot CDD (UNII Band 2C)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5670MHz
Channel:	134



Plot 7-276. Radiated Upper Band Edge Plot CDD (Peak - UNII Band 2C)

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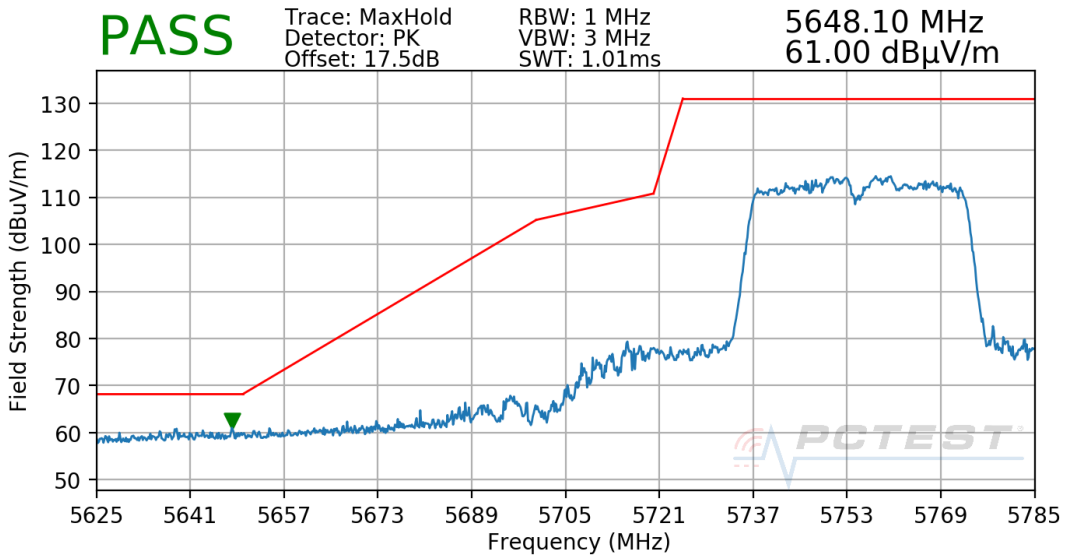
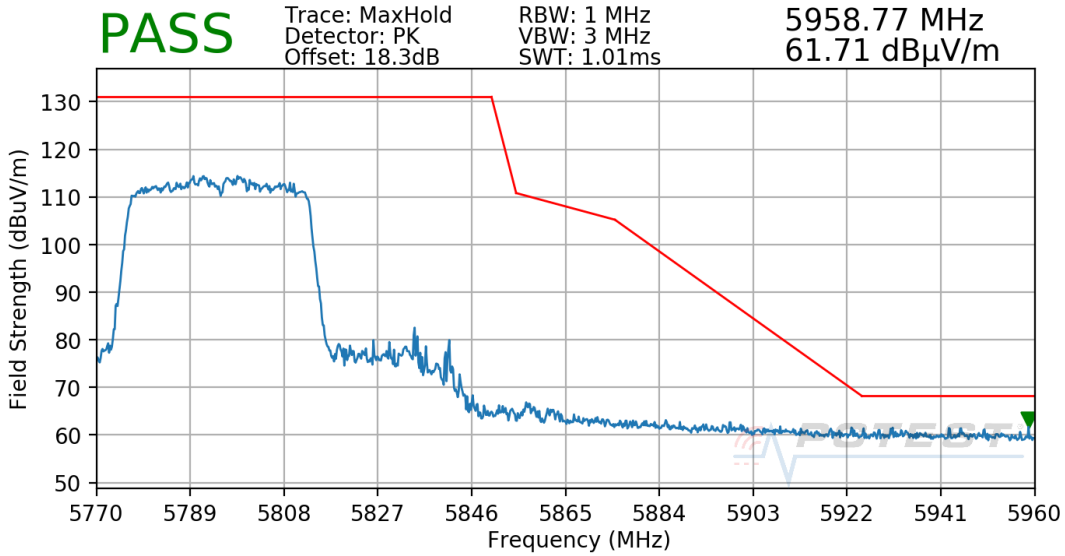
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5755MHz
Channel:	151



Plot 7-277. Radiated Lower Band Edge Plot CDD (Peak – UNII Band 3)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5795MHz
Channel:	159



Plot 7-278. Radiated Upper Band Edge Plot CDD (Peak – UNII Band 3)

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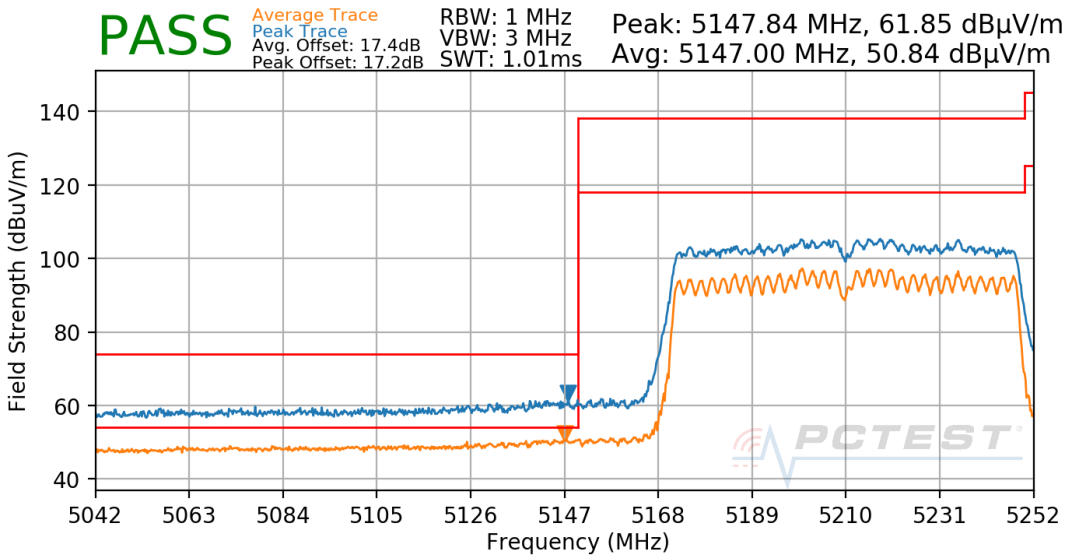
7.6.13 CDD/SDM Radiated Band Edge Measurements (80MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5210MHz
Channel:	42



Plot 7-279. Radiated Lower Band Edge Plot CDD (UNII Band 1)

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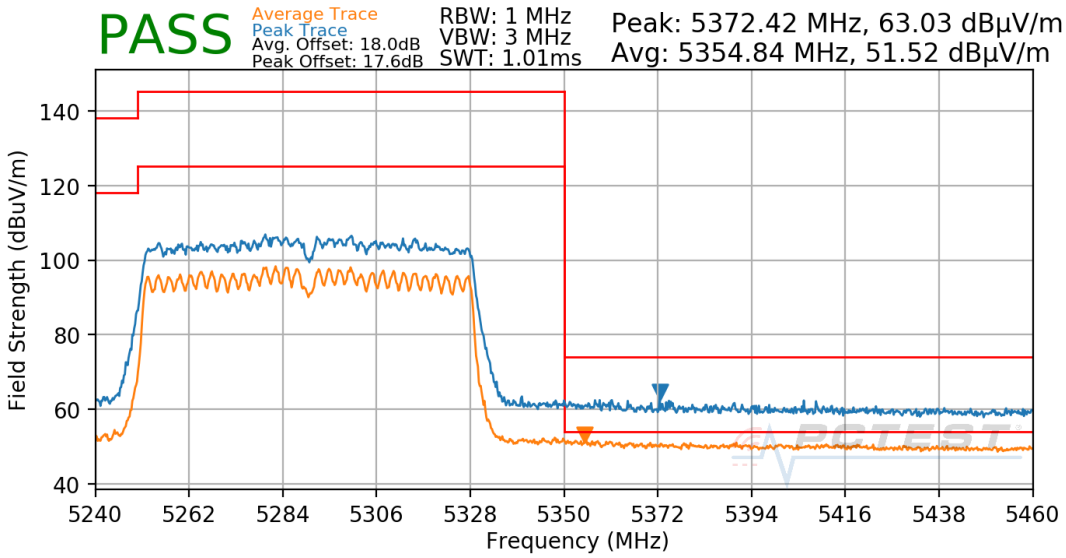
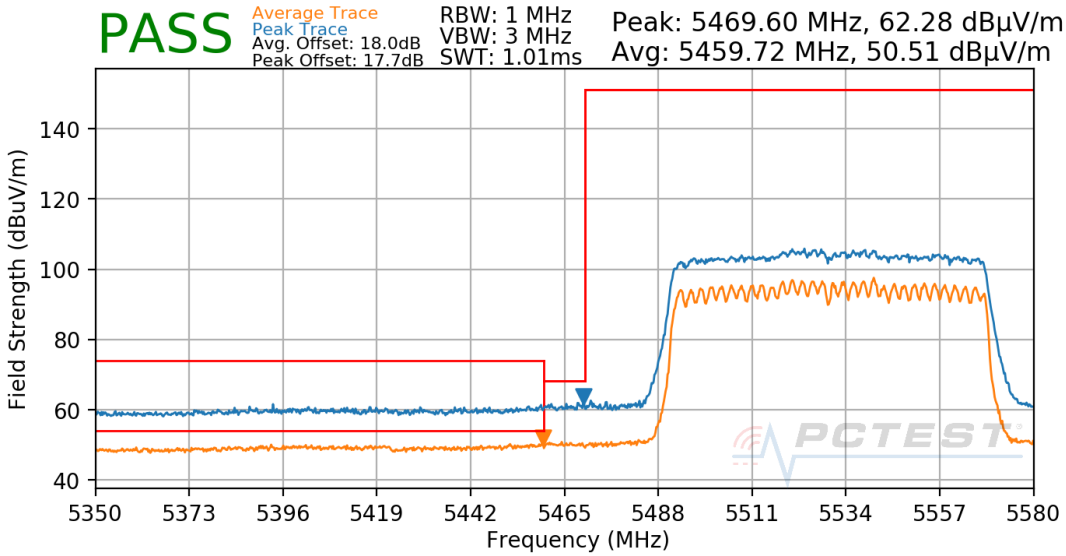
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5290MHz
Channel:	58



Plot 7-280. Radiated Upper Band Edge Plot CDD (UNII Band 2A)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5530MHz
Channel:	106



Plot 7-281. Radiated Lower Band Edge Plot CDD (UNII Band 2C)

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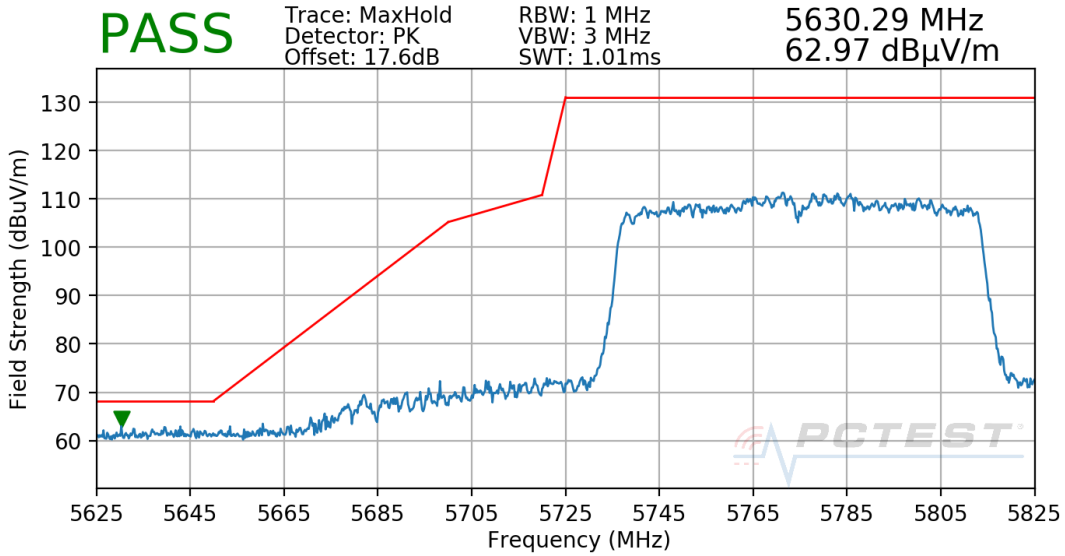
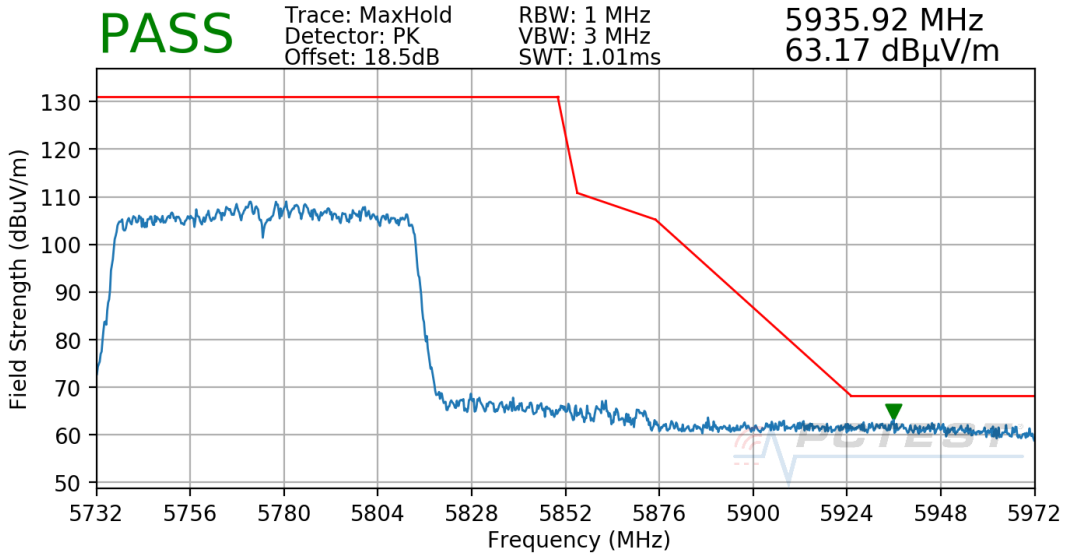
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5775MHz
Channel:	155



Plot 7-282. Radiated Lower Band Edge Plot CDD (Peak – UNII Band 3)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MSC0
Distance of Measurements:	3 Meters
Operating Frequency:	5775MHz
Channel:	155



Plot 7-283. Radiated Upper Band Edge Plot CDD (Peak – UNII Band 3)

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7.7 Radiated Spurious Emissions – Below 1GHz

§15.209; RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 7 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-74 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-74. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

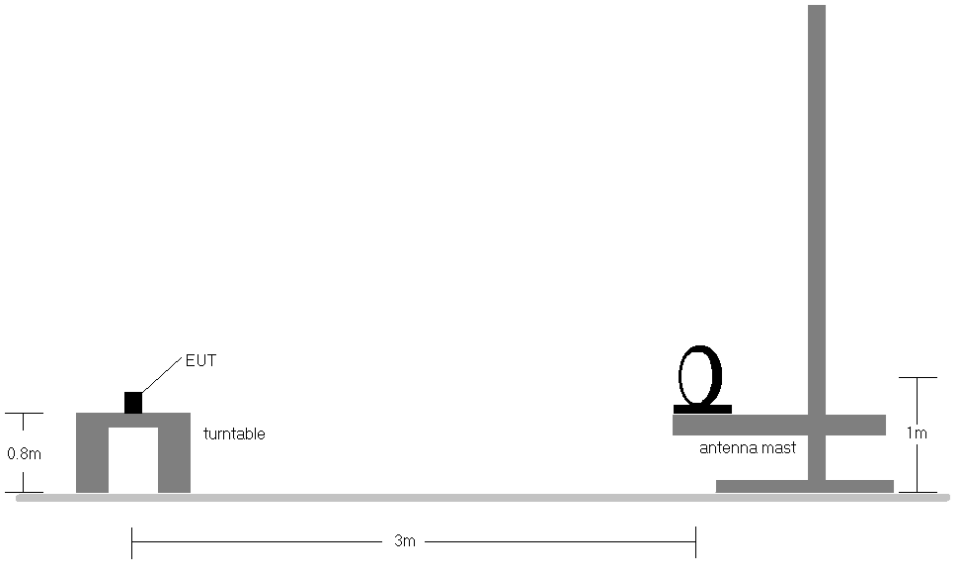

Figure 7-6. Radiated Test Setup < 30MHz

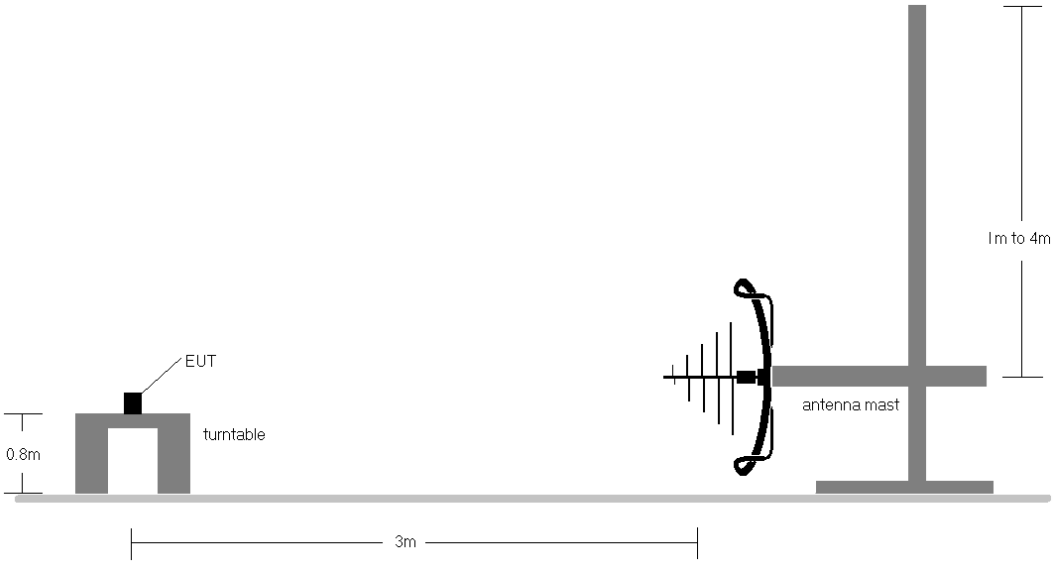

Figure 7-7. Radiated Test Setup < 1GHz

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Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-74.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector on emissions that were within 6dB of the limit. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
    b. EUT powered by host PC via USB-C cable with wire charger
9. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
10. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

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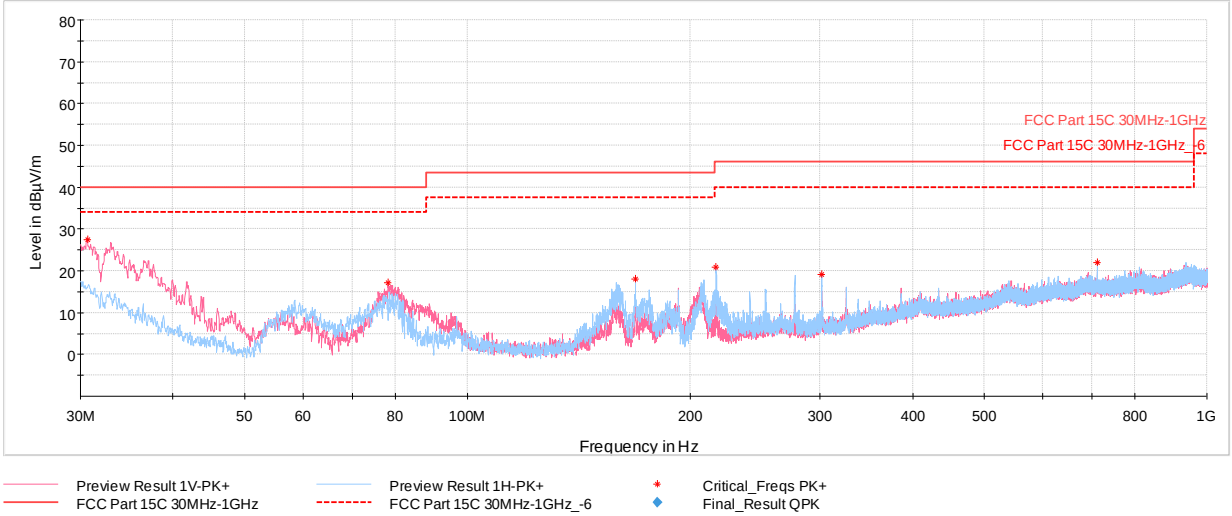
CDD/SDM Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]



Plot 7-284. Radiated Spurious Emissions below 1GHz CDD – Ch.36 with AC/DC Adapter

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
30.68	Max Peak	V	100	332	-61.77	-17.77	27.46	40.00	-12.54
78.11	Max Peak	V	100	172	-63.19	-26.70	17.11	40.00	-22.89
168.76	Max Peak	H	100	238	-65.70	-23.32	17.98	43.52	-25.54
217.02	Max Peak	H	100	256	-64.20	-21.84	20.96	46.02	-25.06
301.45	Max Peak	H	100	105	-69.04	-18.92	19.04	46.02	-26.98
711.38	Max Peak	H	100	224	-76.82	-8.25	21.93	46.02	-24.09

Table 7-75. Radiated Spurious Emissions below 1GHz CDD – Ch.36 with AC/DC Adapter

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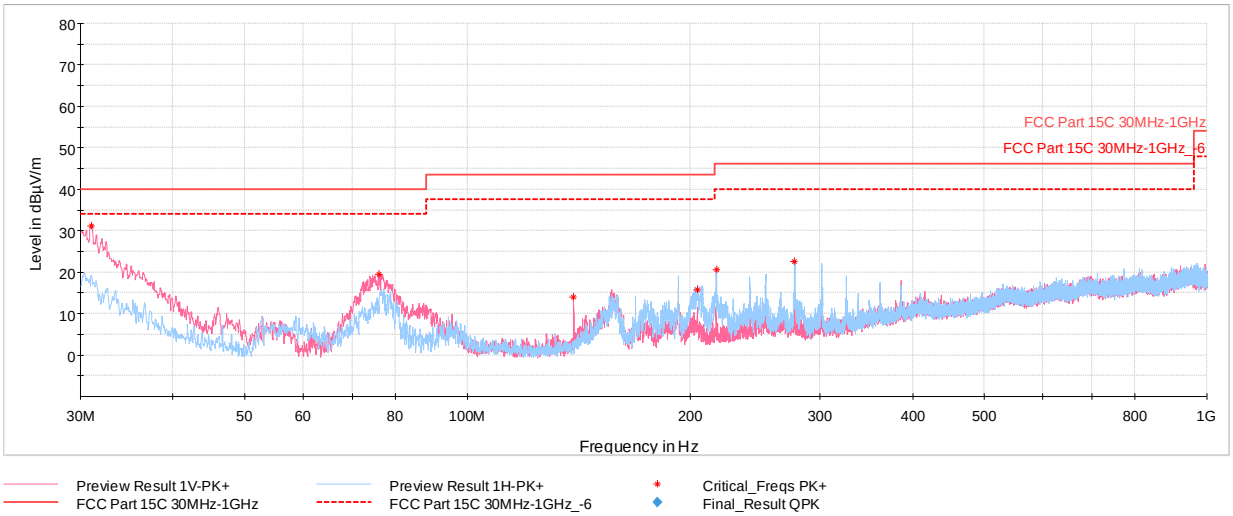
Simultaneous Tx Radiated Spurious Emissions Measurements (Below 1GHz)
§15.209; RSS-Gen [8.9]

Description	Bluetooth	802.11a/n/ac 5GHz
Antenna	A	A
Channel	78	36
Operating Frequency (MHz)	2480	5180
Data Rate (Mbps)	1.0	MCS0
Mode	GFSK/ePa	802.11n

Table 7-76. Worst Case Simultaneous Transmission Configuration



Plot 7-285. Radiated Spurious Emissions below 1GHz (2.4GHz Ch.78 – 5GHz Ch.36), with AC/DC adapter

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
31.07	Max Peak	V	100	295	-57.93	-18.00	31.07	40.00	-8.93
75.93	Max Peak	V	100	172	-61.00	-26.59	19.41	40.00	-20.59
139.13	Max Peak	V	100	277	-68.05	-25.01	13.94	43.52	-29.58
204.99	Max Peak	H	100	173	-69.27	-21.91	15.82	43.52	-27.70
217.11	Max Peak	H	100	246	-64.53	-21.83	20.64	46.02	-25.38
277.20	Max Peak	H	100	127	-65.05	-19.47	22.48	46.02	-23.54

Table 7-77. Radiated Spurious Emissions below 1GHz (2.4GHz Ch.78 – 5GHz Ch.36), with AC/DC adapter

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7.8 AC Line-Conducted Emissions Measurement

§15.407; RSS-Gen [8.8]

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for AC Line conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-78. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Section 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

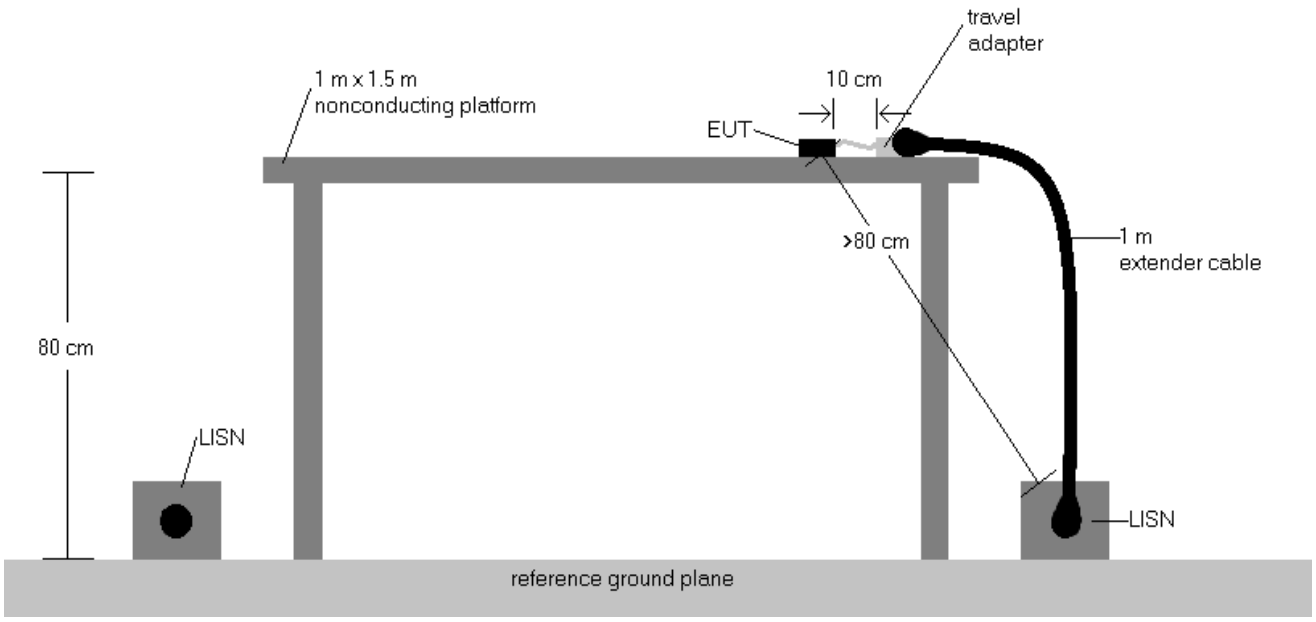

Figure 7-8. Test Instrument & Measurement Setup

Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
   a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
   b. EUT powered by host PC via USB-C cable with wire charger
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen(8.8).
4. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plot are made using quasi peak and average detectors.
8. Deviations to the Specifications: None.

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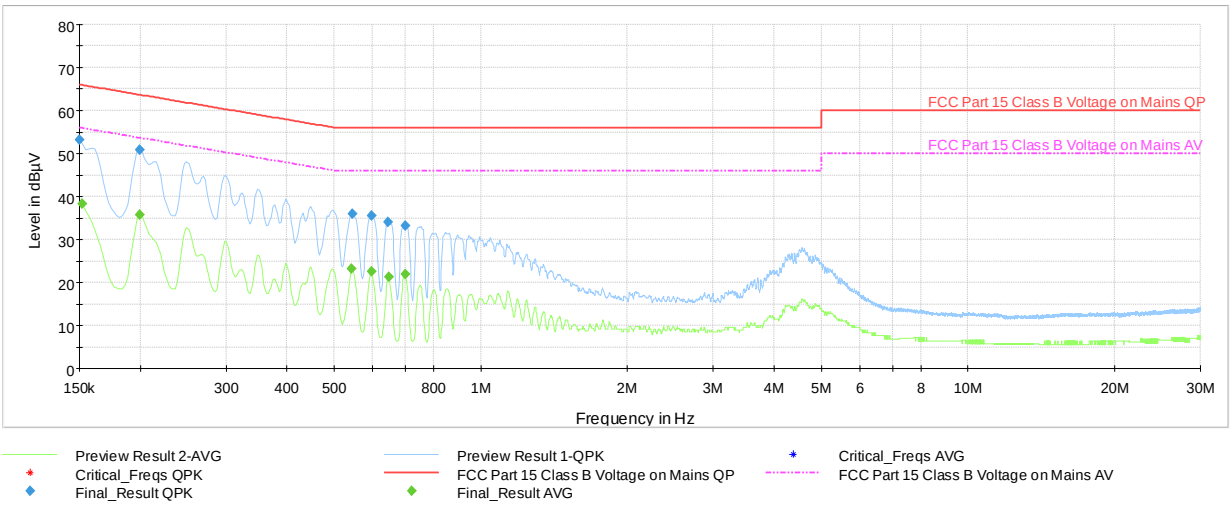

Plot 7-286. Line Conducted Plot with 802.11n UNII Band 1 – Ch.36 (L1), with AC/DC adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.150	FINAL	53.1	—	66.00	-12.88	L1	GND
0.152	FINAL	—	38.31	55.88	-17.56	L1	GND
0.200	FINAL	50.9	—	63.63	-12.70	L1	GND
0.200	FINAL	—	35.69	53.63	-17.94	L1	GND
0.544	FINAL	—	23.27	46.00	-22.73	L1	GND
0.546	FINAL	36.0	—	56.00	-20.03	L1	GND
0.596	FINAL	—	22.66	46.00	-23.34	L1	GND
0.596	FINAL	35.4	—	56.00	-20.56	L1	GND
0.645	FINAL	34.0	—	56.00	-22.00	L1	GND
0.647	FINAL	—	21.19	46.00	-24.81	L1	GND
0.699	FINAL	33.3	—	56.00	-22.73	L1	GND
0.699	FINAL	—	22.01	46.00	-23.99	L1	GND

Table 7-79. Line Conducted Data with 802.1n UNII Band 1 – Ch.36 (L1) with AC/DC adapter

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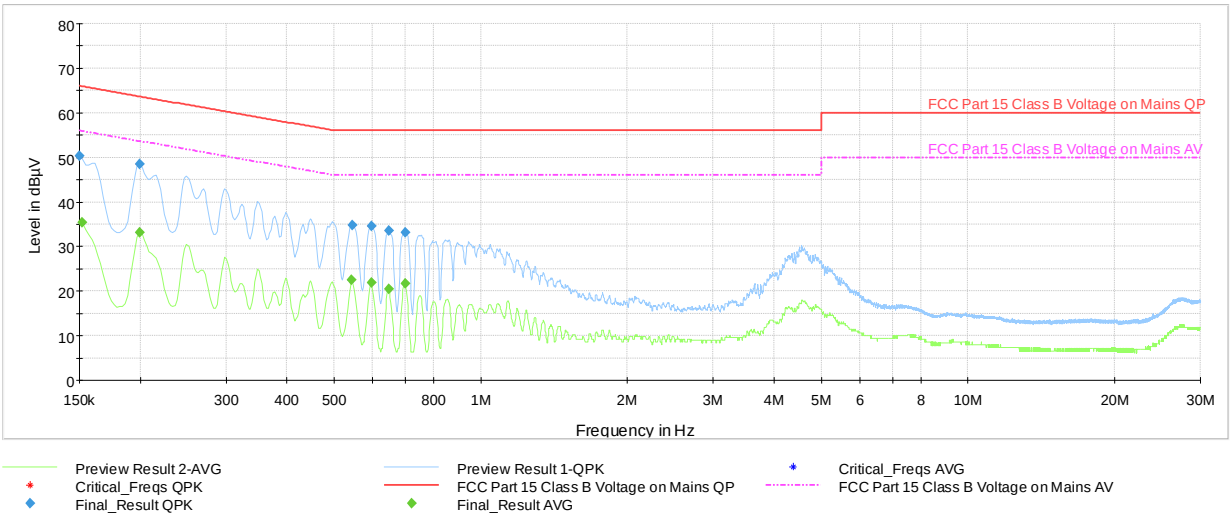

Plot 7-287. Line Conducted Plot with 802.11n UNII Band 1 – Ch.36 (N), with AC/DC adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.150	FINAL	50.4	—	66.00	-15.62	N	GND
0.152	FINAL	—	35.49	55.88	-20.38	N	GND
0.200	FINAL	48.5	—	63.63	-15.13	N	GND
0.200	FINAL	—	33.13	53.63	-20.51	N	GND
0.544	FINAL	—	22.44	46.00	-23.56	N	GND
0.546	FINAL	34.9	—	56.00	-21.14	N	GND
0.596	FINAL	—	21.90	46.00	-24.10	N	GND
0.596	FINAL	34.6	—	56.00	-21.42	N	GND
0.647	FINAL	—	20.43	46.00	-25.57	N	GND
0.647	FINAL	33.5	—	56.00	-22.50	N	GND
0.699	FINAL	33.2	—	56.00	-22.82	N	GND
0.699	FINAL	—	21.73	46.00	-24.27	N	GND

Table 7-80. Line Conducted Data with 802.11n UNII Band 1 – Ch.36 (N), with AC/DC adapter

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8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2429** is in compliance with Part 15 Subpart E (15.407) of the FCC Rules and RSS-247 of the Innovation, Science and Economic Development Canada Rules.

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