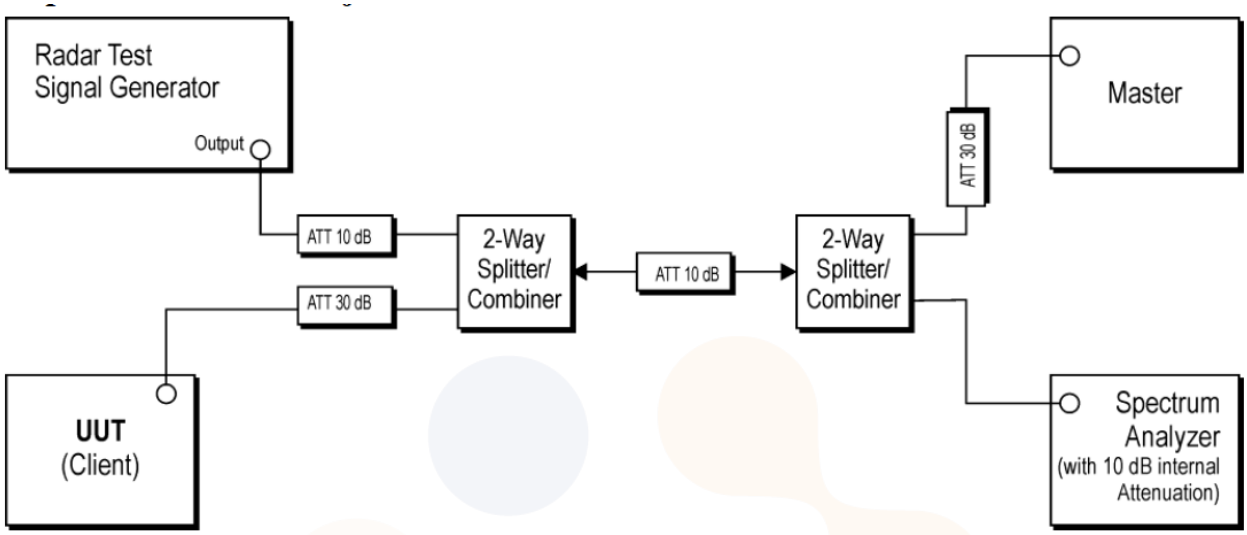
Test setup

- Setup for Client with injection at the Master



- Spectrum analyzer setting parameter

This setting parameter is shown below and it according to the 905462 D02 UNII DFS Compliance Procedures New Rules.

1) RBW/VBW ≥ 3 ㎒
2) Detector = peak
3) Span = zero span

- Conducted test procedure

1) One frequency will be chosen from the Operating Channels of the UUT within the 5 250-5 350 ㎒ or 5 470-5 725 ㎒ bands.
2) The Client Device (EUT) is set up the above diagram and communications between the Master device and the Client is established.
3) Stream the channel loading test file from the Master Device to the Client Device on the test Channel for the entire period of the test.
4) An additional 1 ㏈ is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
5) Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 12 seconds for Radar Type 0 to ensure detection occurs.
6) After the initial radar burst the channel is monitored for 30 minutes to ensure no transmissions or beacons occur. A second monitoring setup is used to verify that the Master and Client have both moved to different channels.

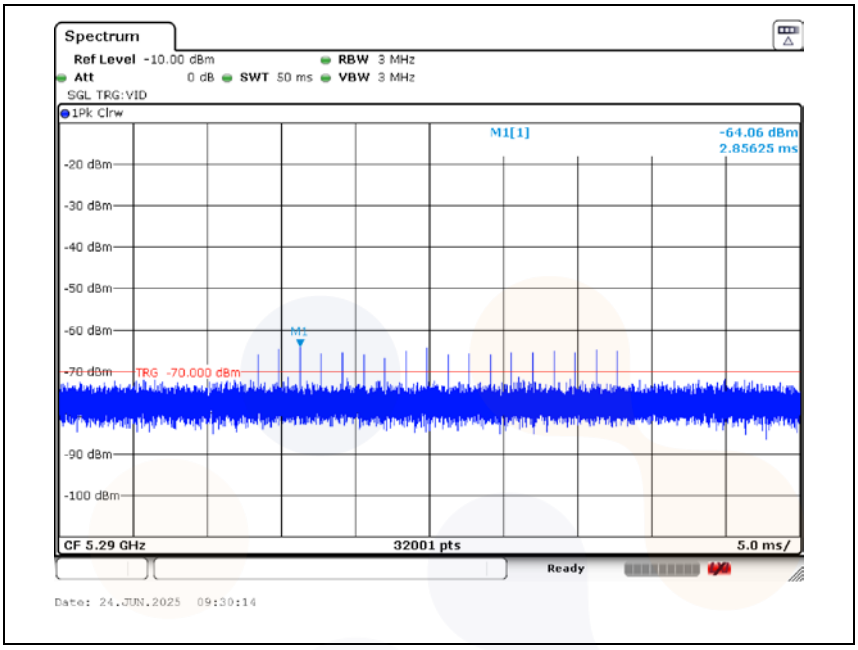
- Master device information

Equipment Name	Manufacturer	Model No.	Serial No.	FCC ID
Access Point	ASUSTeK Computer Inc	RT-BE96U	R9IG6G200115M3F	MSQ-RTBE6G00

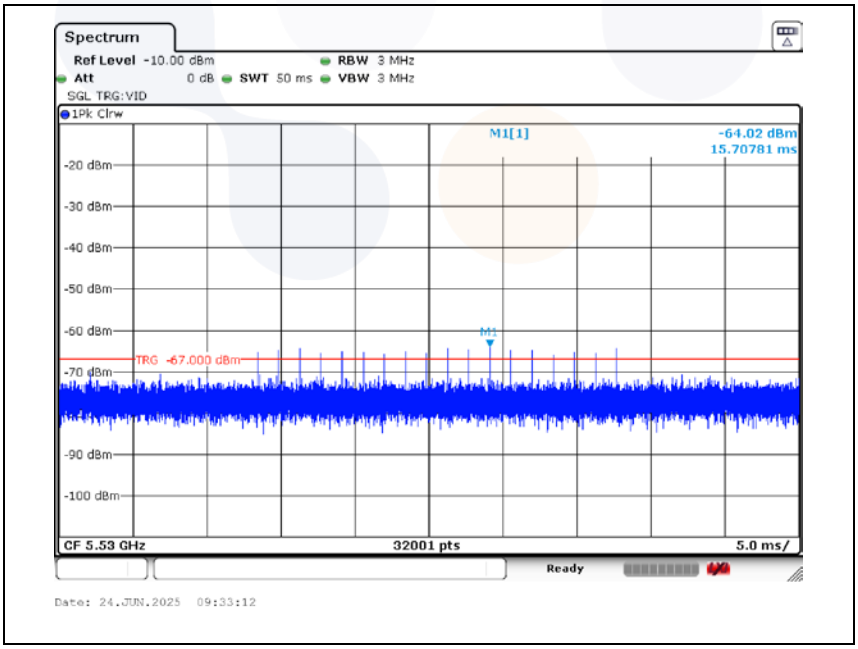
Test result

Plot of radar waveform

5 290 ㎒

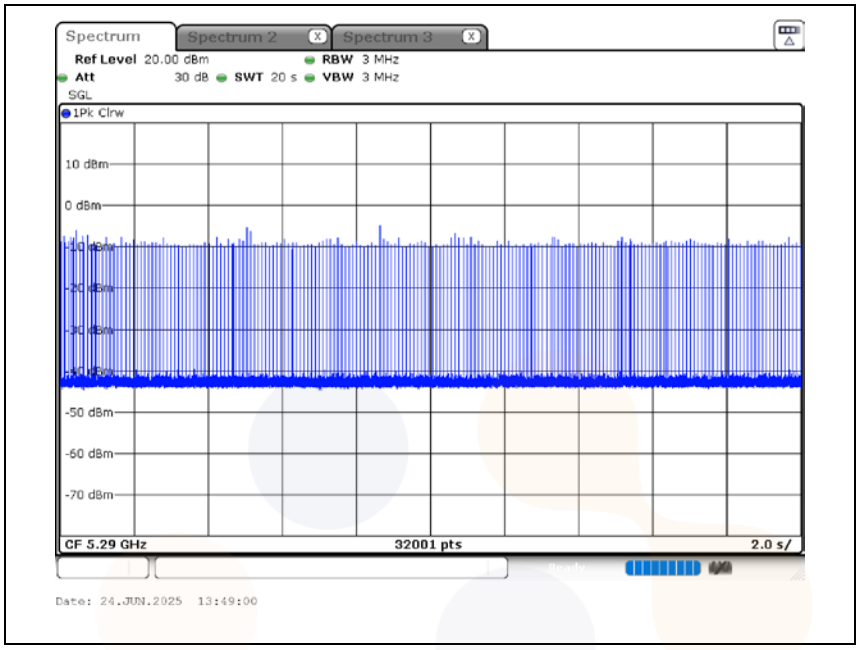


5 530 ㎒

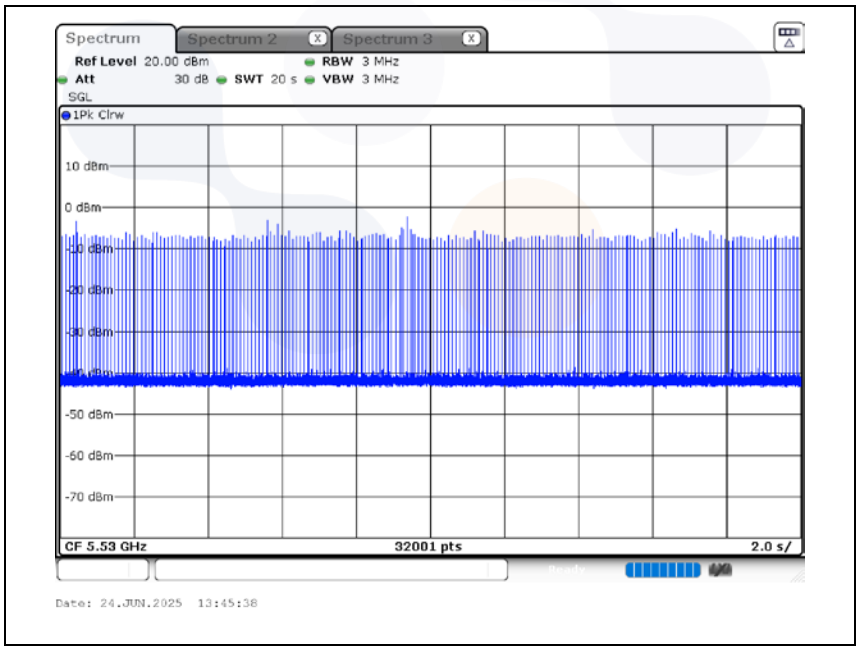


Plot of LAN traffic

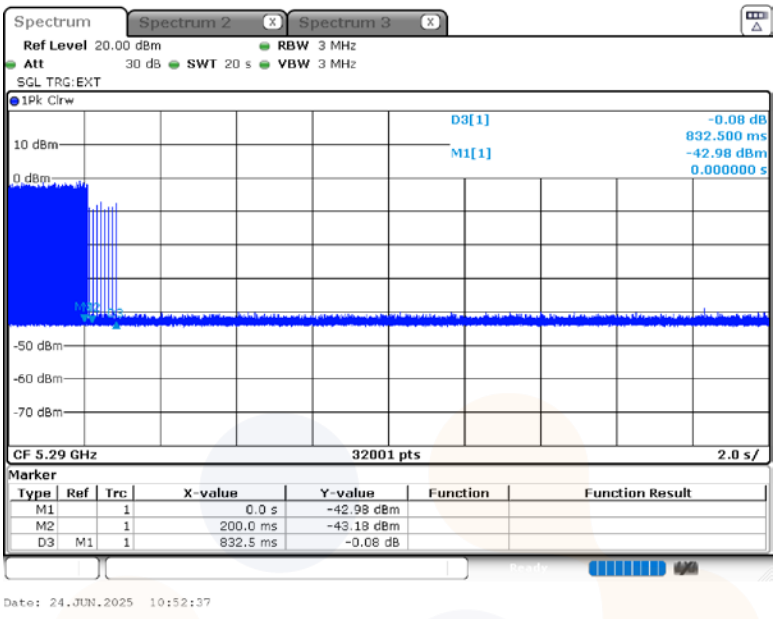
5 290 ㎒



5 530 ㎒

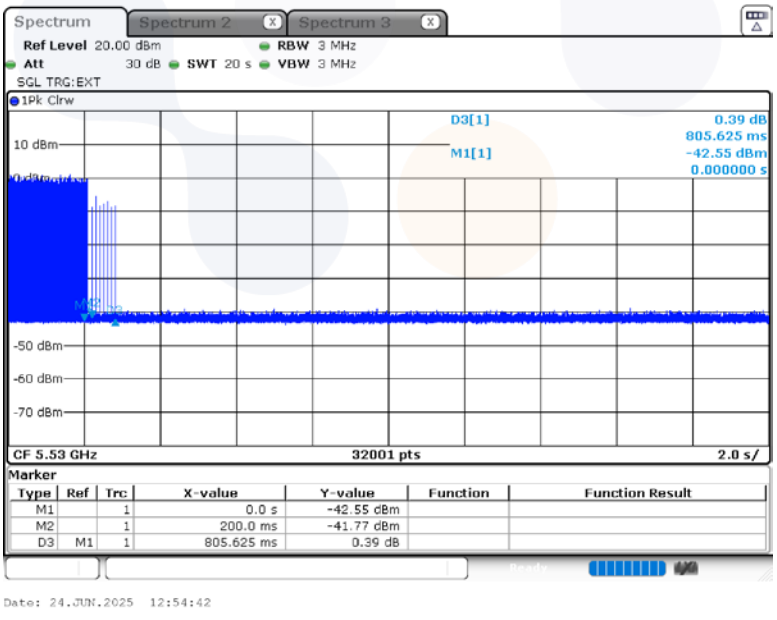


Plot of channel move time and aggregate time



Channel move time = 0.832 500 s
Closing time = 0.000 625 s x 30 = 0.018 750 s
(Closing time : Burst unit time(20 s / 32 001 points) * Number of burst(between 3 markers))

UNII 2A: 802.11ac VHT80, 5 290 ㎒

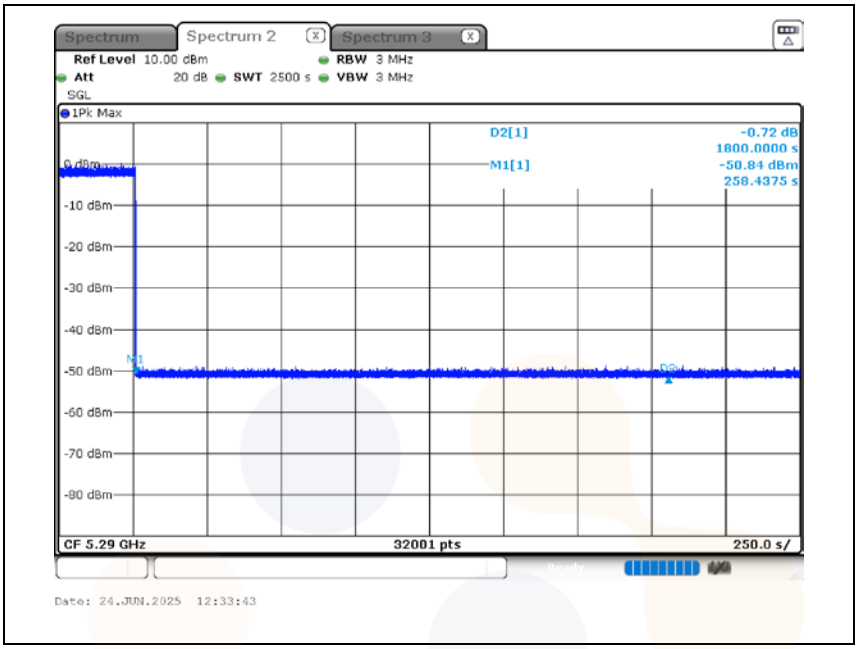


Channel move time = 0.805 625 s
Closing time = 0.000 625 s x 29 = 0.018 125 s
(Closing time : Burst unit time(20 s / 32 001 points) * Number of burst(between 3 markers))

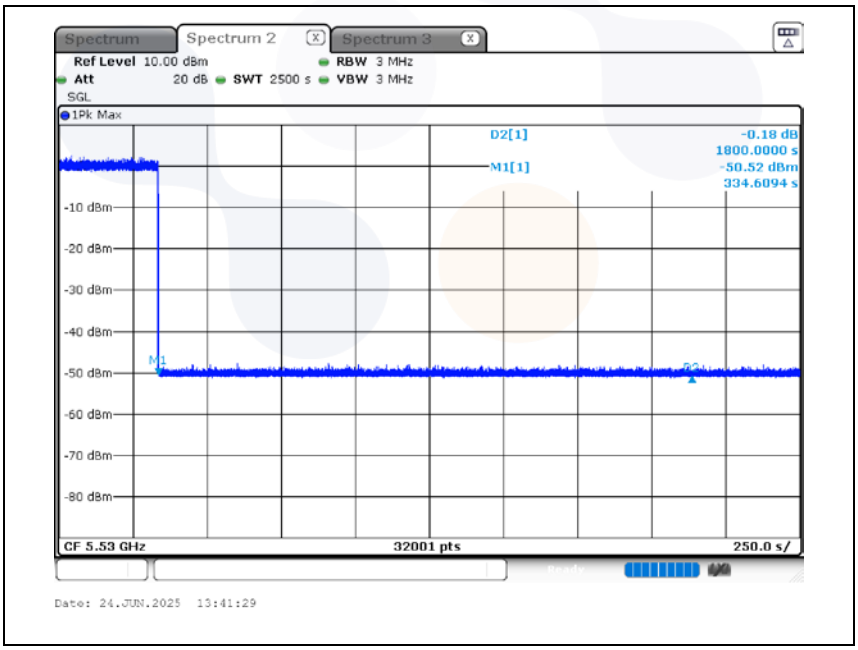
UNII 2C: 802.11ac VHT80, 5 530 ㎒

Plot of Non-occupancy period

5 290 ㎒



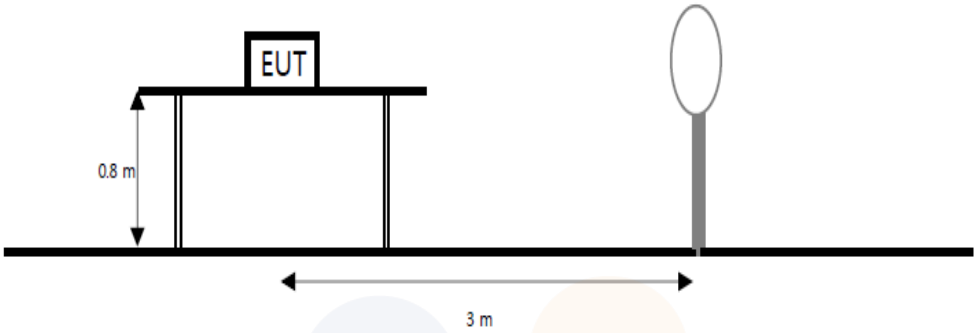
5 530 ㎒



7.7. Spurious Emission, Band Edge and Restricted bands

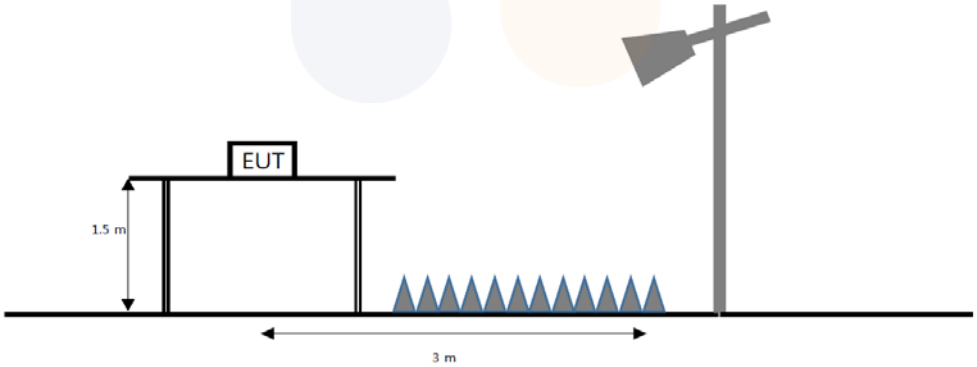
Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.

The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



Limit

According to section 15.209(a),

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (㎒)	Field strength (㎶/m)	Measurement distance (m)
0.009 - 0.490	2 400/F(㎑)	300
0.490 - 1.705	24 000/F(㎑)	30
1.705 - 30	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 ㎒, 76–88 ㎒, 174–216 ㎒ or 470–806 ㎒. However, operation within these frequency bands is permitted under other sections of this part, e.g., Section15.231 and 15.241.

According to section 15.205(a) and (b),

Only spurious emissions are permitted in any of the frequency bands listed below:

㎒	㎒	㎒	㎓
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 – 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 – 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 – 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 – 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 – 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 – 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 – 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 – 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525 25	2 483.5 – 2 500	17.7 - 21.4
8.376 25 - 8.386 75	156.7 - 156.9	2 690 – 2 900	22.01 - 23.12
8.414 25 - 8.414 75	162.012 5 - 167.17	3 260 – 3 267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3 332 – 3 339	31.2 - 31.8
12.519 75 - 12.520 25	240 - 285	3 345.8 – 3 358	36.43 - 36.5
12.576 75 - 12.577 25	322 - 335.4	3 600 – 4 400	Above 38.6
13.36 - 13.41			

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 ㎒, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

According to section 15.407(b), Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

For transmitters operating in the 5.15-5.25 ㎓ band: All emissions outside of the 5.15-5.35 ㎓ band shall not exceed an e.i.r.p. of −27 ㏈m/㎒
For transmitters operating in the 5.25-5.35 ㎓ band: All emissions outside of the 5.15-5.35 ㎓ band shall not exceed an e.i.r.p. of −27 ㏈m/㎒.

For transmitters operating in the 5.725-5.85 ㎓ band: All emissions shall be limited to a level of -27 ㏈m/㎒ at 75 ㎒ or more above or below the band edge increasing linearly to 10 ㏈m/㎒ at 25 ㎒ above or below the band edge, and form 25 ㎒ above or below the band edge increasing linearly to a level of 15.6 ㏈m/㎒ at 5 ㎒ above or below the band edge, and from 5 ㎒ above or below the band edge increasing linearly to a level of 27 ㏈m/㎒ at the band edge.

Test procedure

ANSI C63.10-2013 Section 12.7.7.2, 12.7.5, 12.7.6
KDB 789033 D02 v02r01 – Section G

Test settings

Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ (3×RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency

Frequency	RBW
9 ㎑ to 150 ㎑	200 ㎐ to 300 ㎐
0.15 ㎒ to 30 ㎒	9 ㎑ to 10 ㎑
30 ㎒ to 1 000 ㎒	100 ㎑ to 120 ㎑
> 1 000 ㎒	1 ㎒

Average field strength measurements

Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously (D ≥ 98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 ㎒ (unless otherwise specified).
2. VBW ≥ (3×RBW).
3. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
   2) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (D ≥ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less than ±2%), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 ㎒ (unless otherwise specified).
4. VBW ≥ [3 × RBW].
5. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this

condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

6. Averaging type = power (i.e., rms):
   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
   2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
   1) If power averaging (rms) mode was used in step f), then the applicable correction factor is [10 log (1 / D)], where D is the duty cycle.
   2) If linear voltage averaging mode was used in step f), then the applicable correction factor is [20 log (1 / D)], where D is the duty cycle.
   3) If a specific emission is demonstrated to be continuous (D ≥ 98%) rather than turning ON and OFF with with the transmit cycle, then no duty cycle correction is required for that emission.

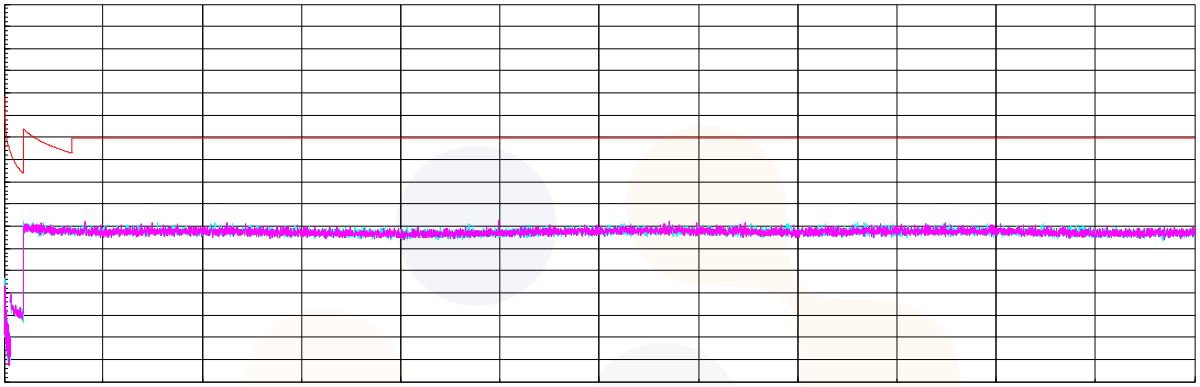
Notes:

1. *f* <30 ㎒, extrapolation factor of 40 dB/decade of distance. $F_d = 40\log(D_m/D_s)$
   f ≥30 ㎒, extrapolation factor of 20 dB/decade of distance. $F_d = 20\log(D_m/D_s)$
   Where:
   F_d= Distance factor in dB
   D_m= Measurement distance in meters
   D_s= Specification distance in meters
2. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d(dB)
3. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
4. Average test would be performed if the peak result were greater than the average limit.
5. 1) means restricted band.
6. Below 30 ㎒ frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 dB of the limit, then the following statement shall be made: “No spurious emissions were detected within 20 dB of the limit.”
7. Above 1 ㎓ the worst results between two antenna polarizations (H and V) were documented in the test report.
8. For above 1 ㎓ pre-scan to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 ㎒; the video bandwidth is set to 30 ㎑ for peak measurements.

Test results (Below 30 ㎒) – Worst case: 802.11n HT40 / UNII 3_5 795 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
No spurious emissions were detected within 20 ㏈ of the limit.								

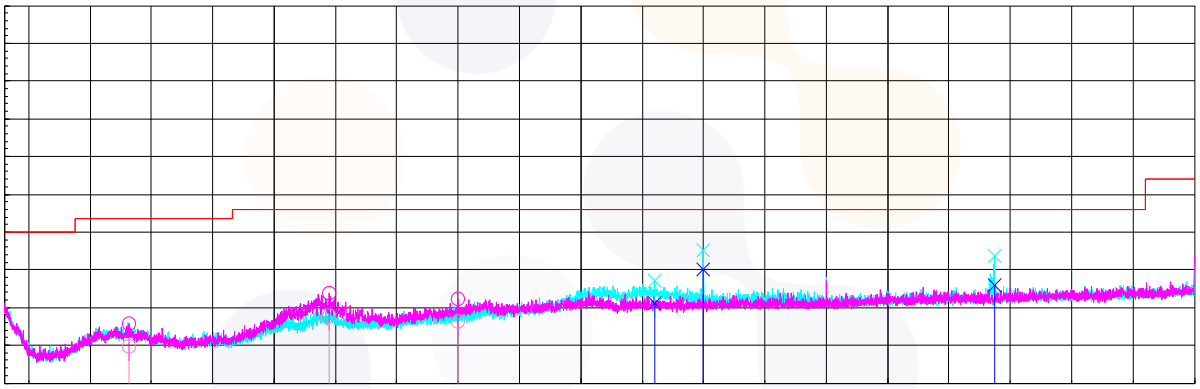
Horizontal/Vertical



Test results (Below 1 000 ㎒) – Worst case: 802.11n HT40 / UNII 3_5 795 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
132.09[1)]	H	23.50	17.89	-31.57	-	9.82	43.50	33.68
294.93	H	30.00	19.00	-31.22	-	17.78	46.00	28.22
399.93[1)]	H	26.00	21.50	-31.06	-	16.44	46.00	29.56
559.86	V	27.30	24.61	-30.85	-	21.06	46.00	24.94
600.00	V	36.40	24.50	-30.92	-	29.98	46.00	16.02
837.40	V	29.70	25.90	-29.83	-	25.77	46.00	20.23

Horizontal/Vertical



Test results (Above 1 000 ㎒)

UNII 1 SISO

802.11a_Lowest Channel (5 180 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 089.23[1)]	H	43.00	33.82	-24.20	-	52.62	74.00	21.38
10 366.30	H	60.66	37.19	-48.75	-	49.10	68.20	19.10
15 538.23[1)]	H	59.27	39.59	-47.46	-	51.40	74.00	22.60
Average Data								
5 089.23[1)]	H	32.76	33.82	-24.20	-	42.38	54.00	11.62
15 538.23[1)]	H	49.54	39.59	-47.46	-	41.67	54.00	12.33

802.11a_Middle Channel (5 200 ㎒)

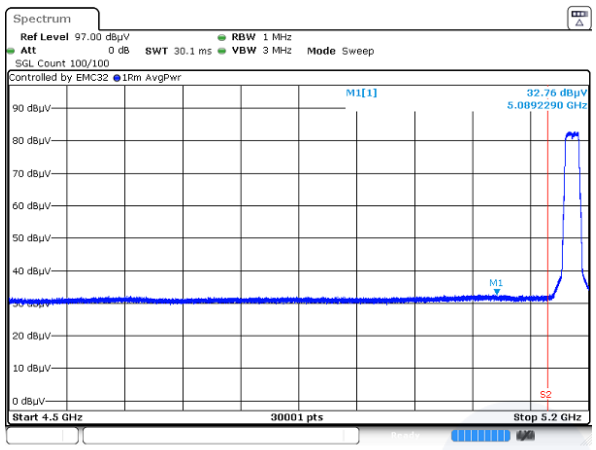
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 403.10	V	59.92	37.22	-48.75	-	48.39	68.20	19.81
15 624.70[1)]	H	59.16	39.58	-47.27	-	51.47	74.00	22.53
Average Data								
15 624.70[1)]	H	49.13	39.58	-47.27	-	41.44	54.00	12.56

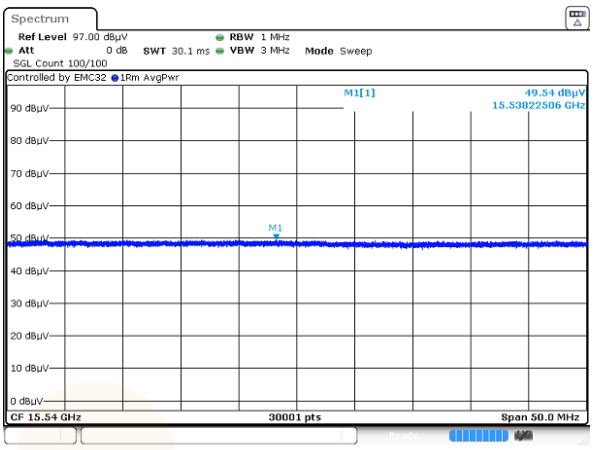
802.11a_Highest Channel (5 240 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 459.83	H	59.88	37.27	-48.76	-	48.39	68.20	19.81
15 697.62[1)]	H	59.73	39.56	-47.10	-	52.19	74.00	21.81
Average Data								
15 697.62[1)]	H	49.12	39.56	-47.10	-	41.58	54.00	12.42

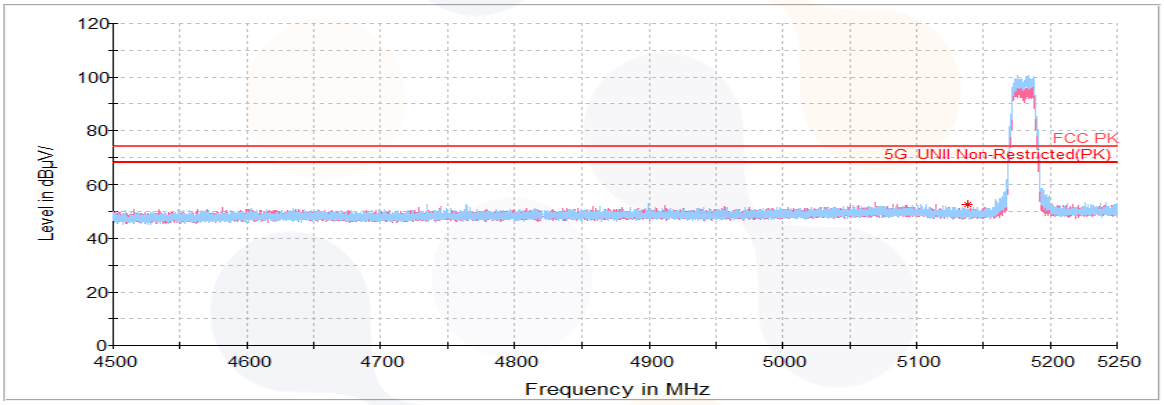
802.11a_Lowest Channel (5 180 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 180 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 070.77[1)]	H	44.35	33.80	-24.26	-	53.89	74.00	20.11
10 363.23	H	60.19	37.19	-48.74	-	48.64	68.20	19.56
15 526.99[1)]	H	59.56	39.59	-47.49	-	51.66	74.00	22.34
Average Data								
5 070.77[1)]	H	32.89	33.80	-24.26	-	42.43	54.00	11.57
15 526.99[1)]	H	49.23	39.59	-47.49	-	41.33	54.00	12.67

802.11n_HT20_Middle Channel (5 200 ㎒)

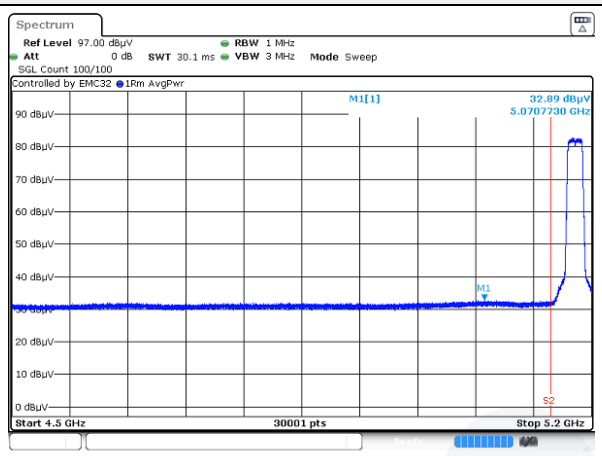
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 400.80	H	59.13	37.22	-48.75	-	47.60	68.20	20.60
15 612.90[1)]	H	59.25	39.58	-47.29	-	51.54	74.00	22.46
Average Data								
15 612.90[1)]	H	49.13	39.58	-47.29	-	41.42	54.00	12.58

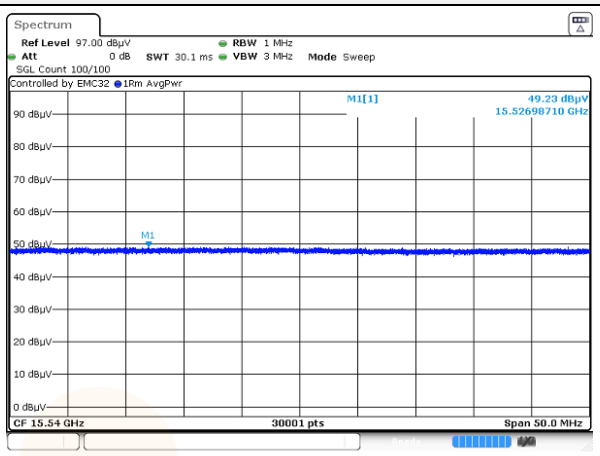
802.11n_HT20_Highest Channel (5 240 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 461.37	H	59.99	37.27	-48.76	-	48.50	68.20	19.70
15 701.03[1)]	H	58.89	39.56	-47.10	-	51.35	74.00	22.65
Average Data								
15 701.03[1)]	H	49.06	39.56	-47.10	-	41.52	54.00	12.48

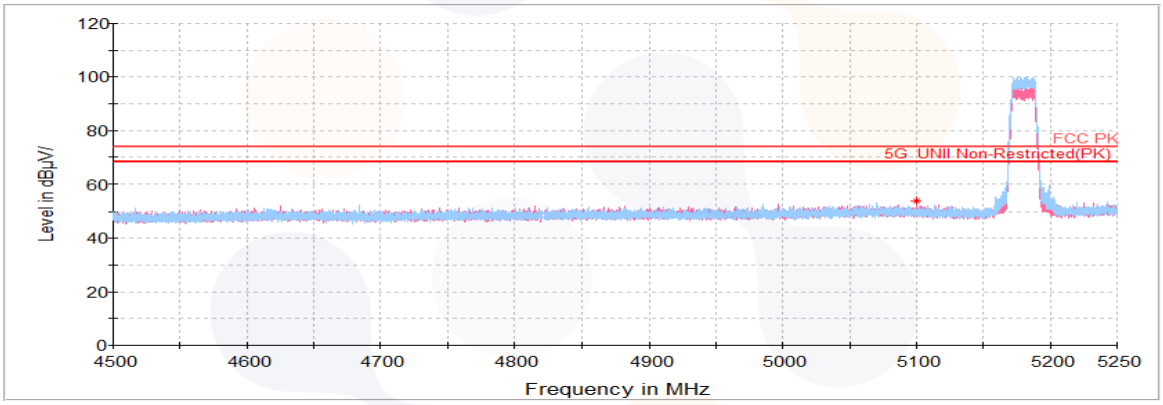
802.11n_HT20_Lowest Channel (5 180 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11n_HT40_Lowest Channel (5 190 ㎒)

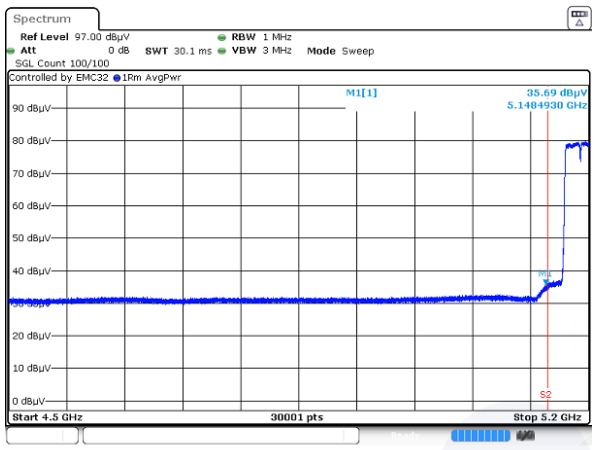
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 148.49[1)]	H	44.54	33.91	-24.23	-	54.22	74.00	19.78
10 358.25	H	59.29	37.19	-48.74	-	47.74	68.20	20.46
15 560.51[1)]	H	59.35	39.59	-47.41	-	51.53	74.00	22.47
Average Data								
5 148.49[1)]	H	35.69	33.91	-24.23	0.14	45.51	54.00	8.49
15 560.51[1)]	H	48.73	39.59	-47.41	0.14	41.05	54.00	12.95

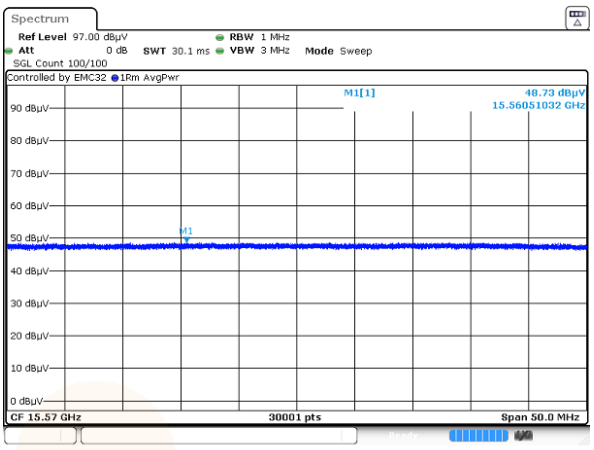
802.11n_HT40_Highest Channel (5 230 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 477.47	H	59.99	37.28	-48.77	-	48.50	68.20	19.70
15 680.75[1)]	H	59.87	39.56	-47.14	-	52.29	74.00	21.71
Average Data								
15 680.75[1)]	H	49.50	39.56	-47.14	0.14	42.06	54.00	11.94

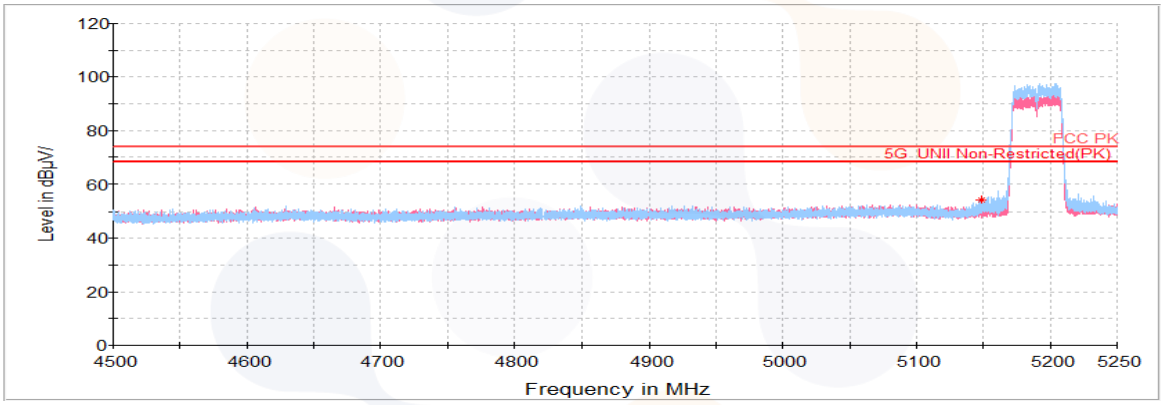
802.11n_HT40_Lowest Channel (5 190 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11ac_VHT20_Lowest Channel (5 180 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 073.29[1)]	H	43.24	33.80	-24.25	-	52.79	74.00	21.21
10 394.67	H	59.44	37.22	-48.75	-	47.91	68.20	20.29
15 538.53[1)]	H	58.86	39.59	-47.46	-	50.99	74.00	23.01
Average Data								
5 073.29[1)]	H	32.74	33.80	-24.25	-	42.29	54.00	11.71
15 538.53[1)]	H	49.69	39.59	-47.46	-	41.82	54.00	12.18

802.11ac_VHT20_Middle Channel (5 200 ㎒)

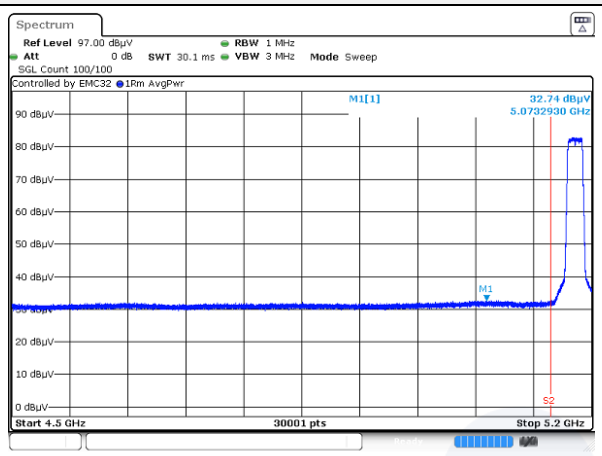
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 407.70	H	59.77	37.23	-48.75	-	48.25	68.20	19.95
15 615.23[1)]	H	59.16	39.58	-47.29	-	51.45	74.00	22.55
Average Data								
15 615.23[1)]	H	49.28	39.58	-47.29	-	41.57	54.00	12.43

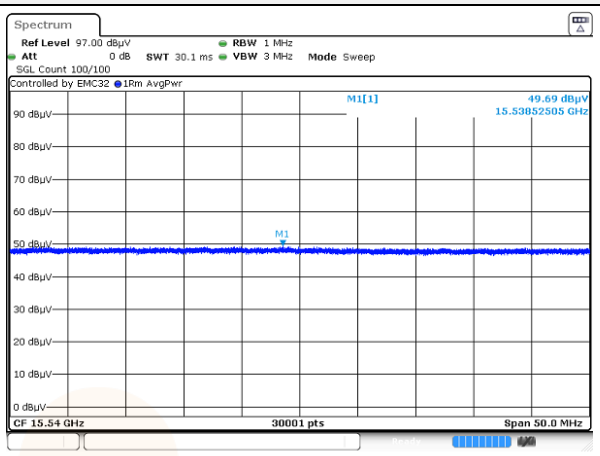
802.11ac_VHT20_Highest Channel (5 240 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 450.63	V	60.30	37.26	-48.76	-	48.80	68.20	19.40
15 726.83[1)]	H	58.74	39.55	-47.04	-	51.25	74.00	22.75
Average Data								
15 726.83[1)]	H	49.10	39.56	-47.09	-	41.57	54.00	12.43

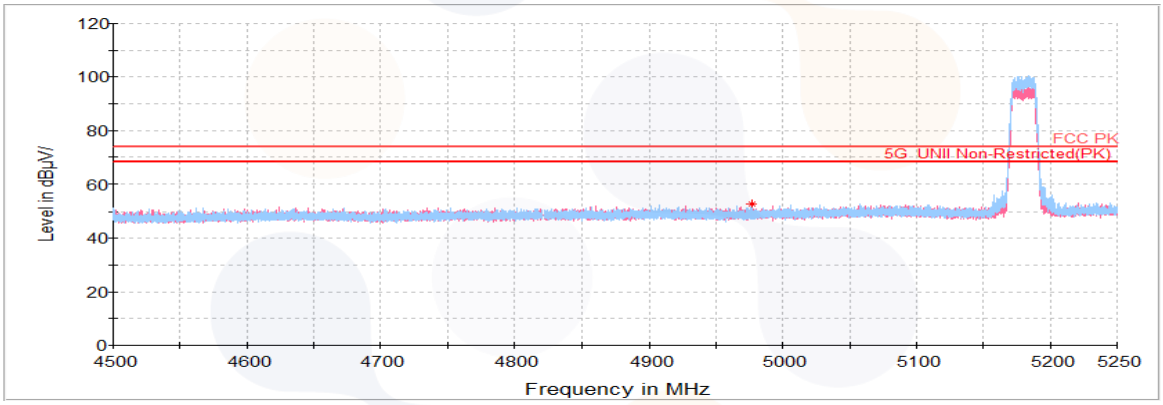
802.11ac_VHT20_Lowest Channel (5 180 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11ac_VHT40_Lowest Channel (5 190 ㎒)

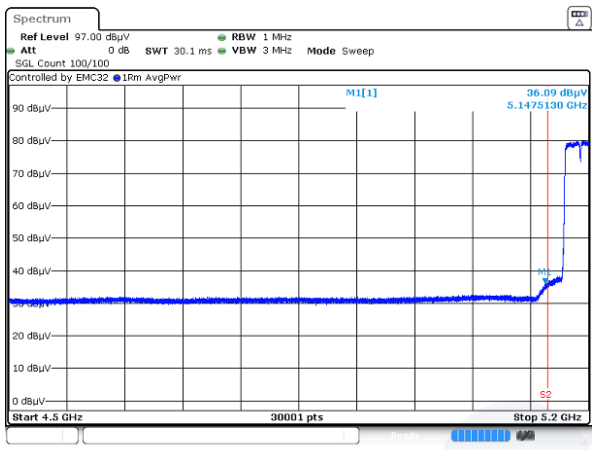
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 147.51[1)]	H	44.40	33.91	-24.23	-	54.08	74.00	19.92
10 322.60	V	60.30	37.16	-48.74	-	48.72	68.20	19.48
15 561.73[1)]	H	58.87	39.59	-47.41	-	51.05	74.00	22.95
Average Data								
5 147.51[1)]	H	36.09	33.91	-24.23	0.13	45.90	54.00	8.10
15 561.73[1)]	H	48.90	39.59	-47.41	0.13	41.21	54.00	12.79

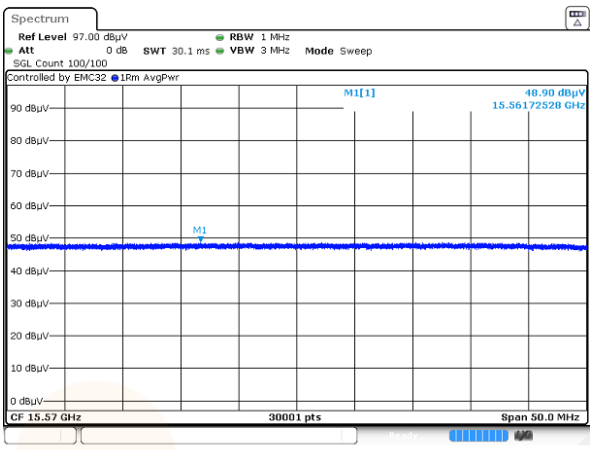
802.11ac_VHT40_Highest Channel (5 230 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 430.70	H	59.27	37.24	-48.76	-	47.75	68.20	20.45
15 676.67[1)]	H	59.51	39.56	-47.15	-	51.92	74.00	22.08
Average Data								
15 676.67[1)]	H	49.37	39.56	-47.15	0.13	41.91	54.00	12.09

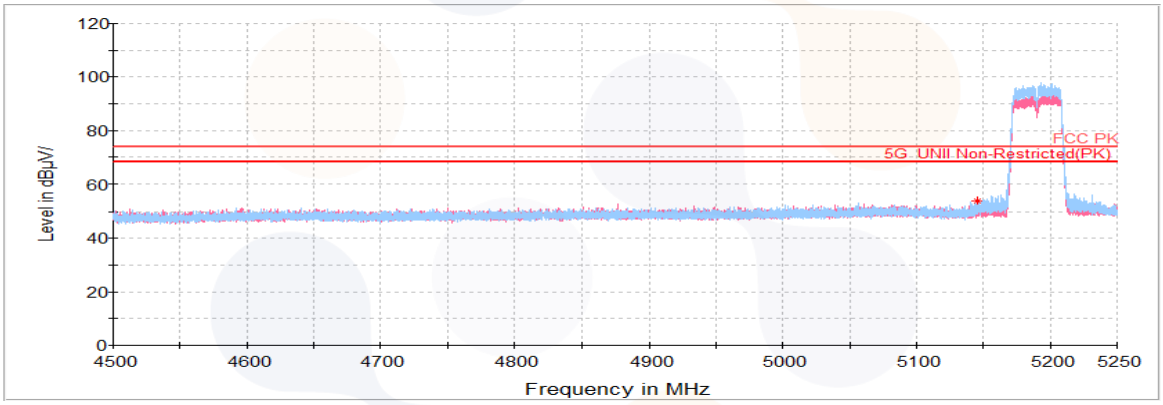
802.11ac_VHT40_Lowest Channel (5 190 ㎒)

Average data





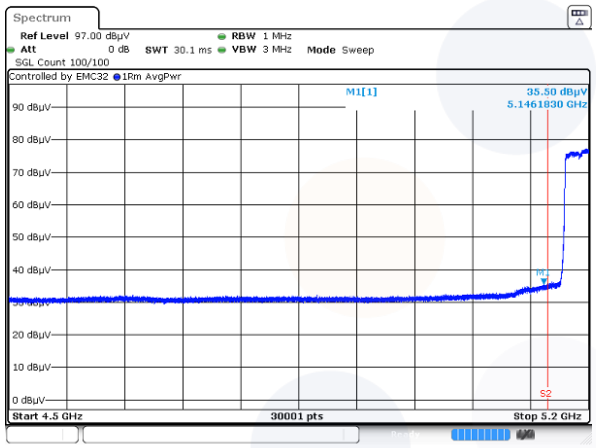
Horizontal/Vertical for Band-edge



802.11ac_VHT80_Middle Channel (5 210 ㎒)

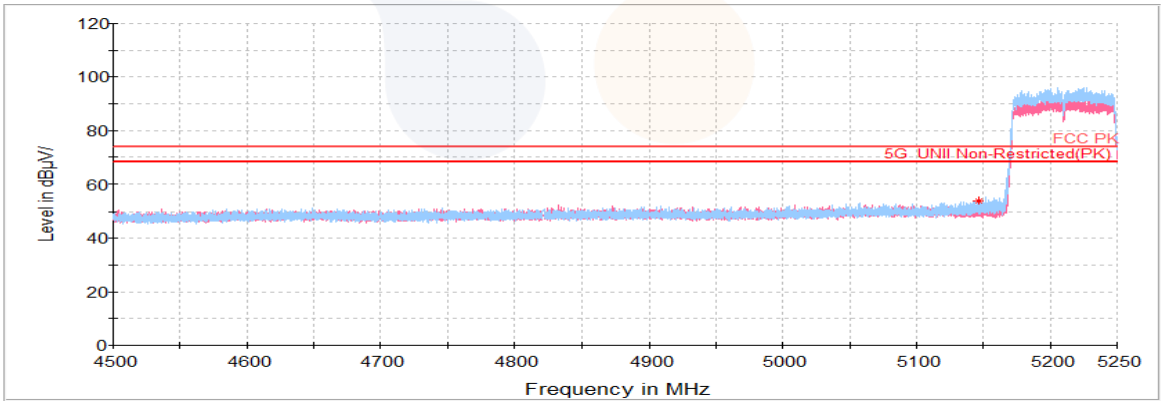
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 146.18[1)]	H	44.41	33.90	-24.23	-	54.08	74.00	19.92
10 452.93	H	59.42	37.26	-48.76	-	47.92	68.20	20.28
15 675.83[1)]	H	58.57	39.56	-47.15	-	50.98	74.00	23.02
Average Data								
5 146.18[1)]	H	35.50	33.90	-24.23	0.27	45.44	54.00	8.56

Average data



Blank

Horizontal/Vertical for Band-edge

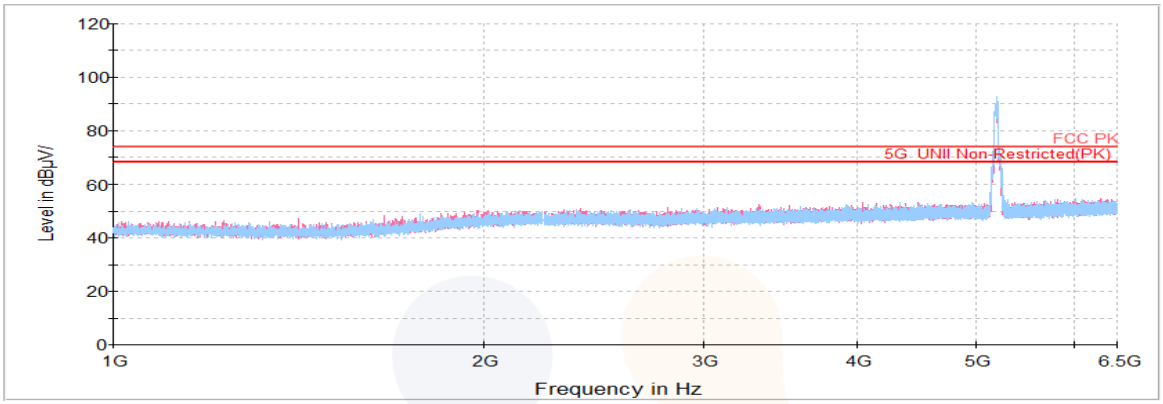


Plot of Harmonics and Spurious Emissions

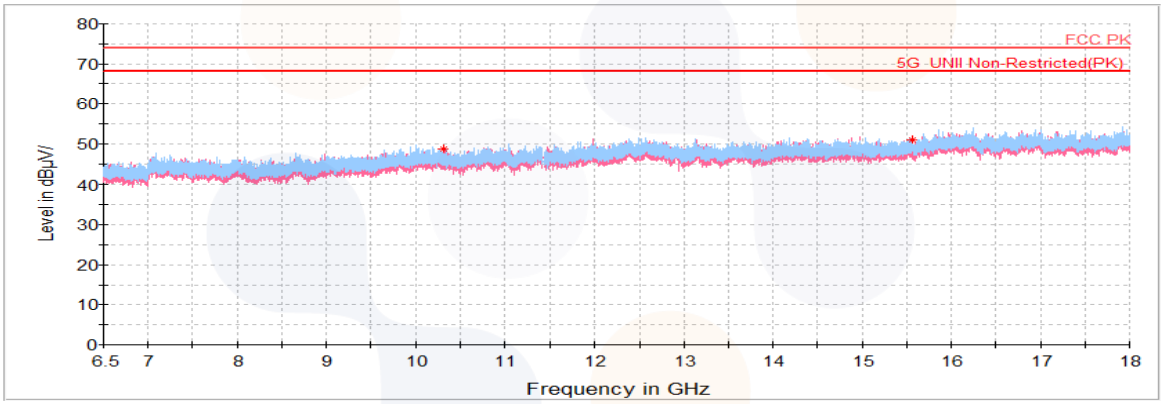
In order to simplify the report, attached plots were only the lowest margin condition

802.11ac_VHT40_UNII 1_Lowest Channel (5 190 ㎒)

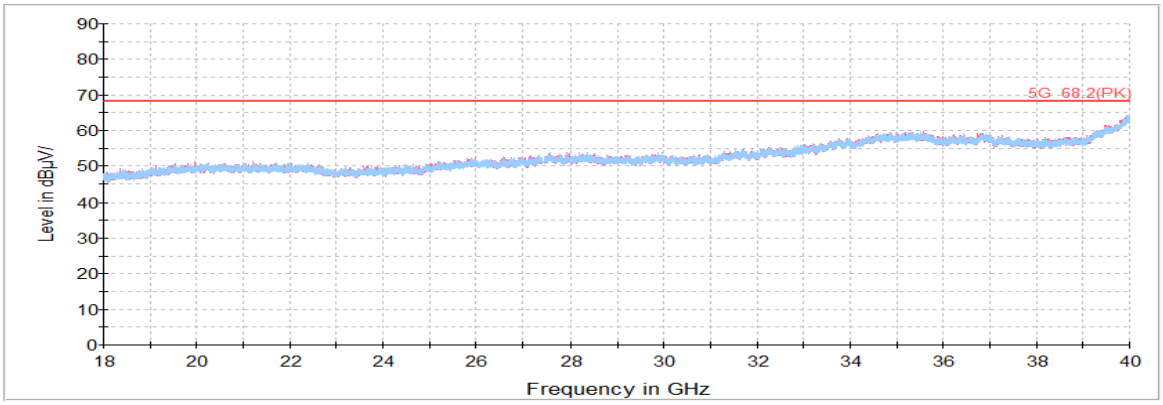
Horizontal/Vertical for 1 ㎓ ~ 6.5 ㎓



Horizontal/Vertical for 6.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 40 ㎓



UNII 2A SISO

802.11a_Lowest Channel (5 260 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 543.02	H	59.38	37.34	-48.75	-	47.97	68.20	20.23
15 801.09[1)]	H	59.24	39.54	-46.87	-	51.91	74.00	22.09
Average Data								
15 801.09[1)]	H	48.40	39.54	-46.87	-	41.07	54.00	12.93

802.11a_Middle Channel (5 280 ㎒)

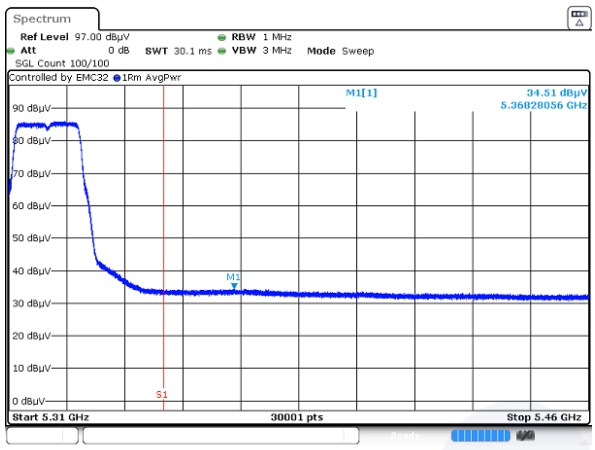
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 584.80	V	59.55	37.38	-48.73	-	48.20	68.20	20.00
15 854.06[1)]	H	59.90	39.53	-46.75	-	52.68	74.00	21.32
Average Data								
15 854.06[1)]	H	48.73	39.53	-46.75	-	41.51	54.00	12.49

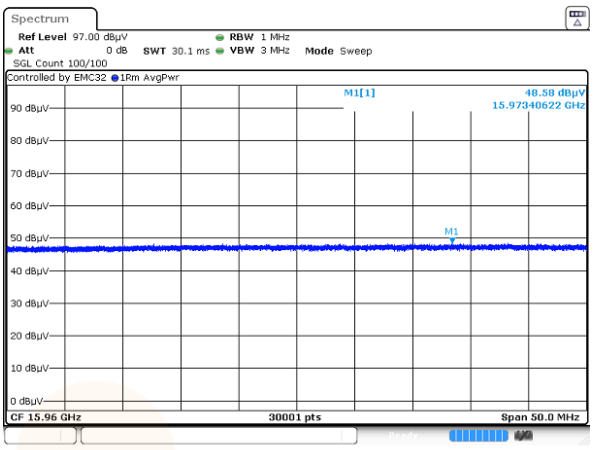
802.11a_Highest Channel (5 320 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 368.28[1)]	H	44.02	34.22	-24.15	-	54.09	74.00	19.91
10 644.60[1)]	V	60.85	37.44	-48.71	-	49.58	74.00	24.42
15 973.41[1)]	H	59.16	39.51	-46.49	-	52.18	74.00	21.82
Average Data								
5 368.28[1)]	H	34.51	34.22	-24.15	-	44.58	54.00	9.42
15 973.41[1)]	H	48.58	39.51	-46.49	-	41.60	54.00	12.40

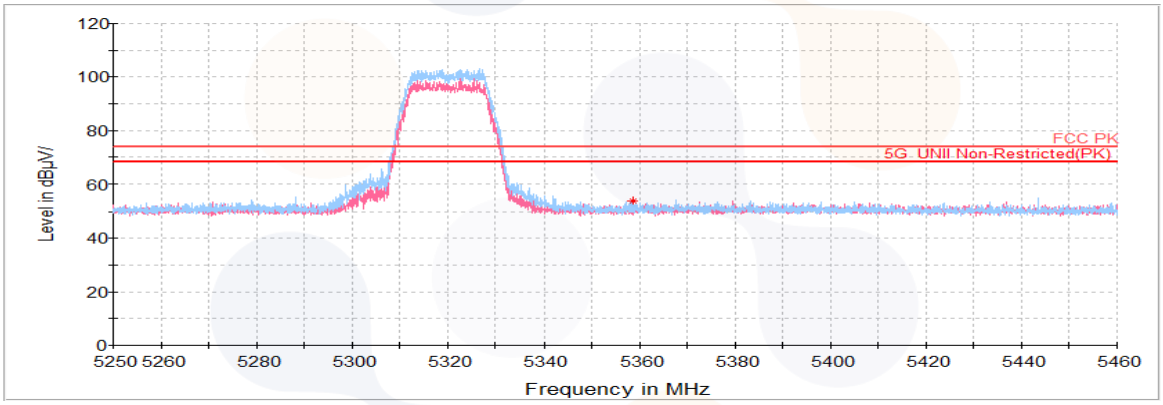
802.11a_Highest Channel (5 320 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 260 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 540.33	H	59.03	37.34	-48.75	-	47.62	68.20	20.58
15 773.03[1)]	H	59.97	39.55	-46.94	-	52.58	74.00	21.42
Average Data								
15 773.03[1)]	H	48.22	39.55	-46.94	-	40.83	54.00	13.17

802.11n_HT20_Middle Channel (5 280 ㎒)

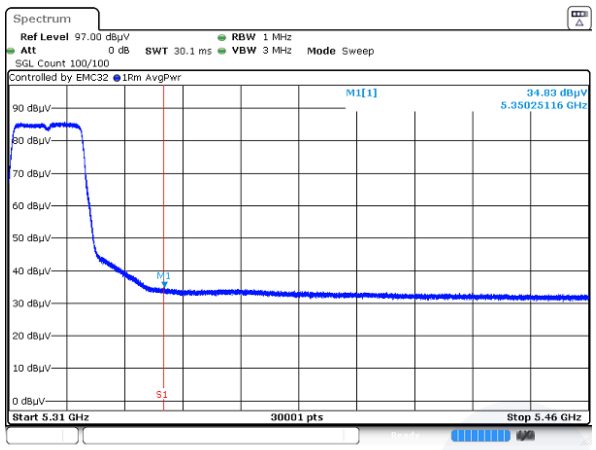
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 555.67	H	59.46	37.36	-48.75	-	48.07	68.20	20.13
15 860.65[1)]	H	60.26	39.53	-46.74	-	53.05	74.00	20.95
Average Data								
15 860.65[1)]	H	48.85	39.53	-46.74	-	41.64	54.00	12.36

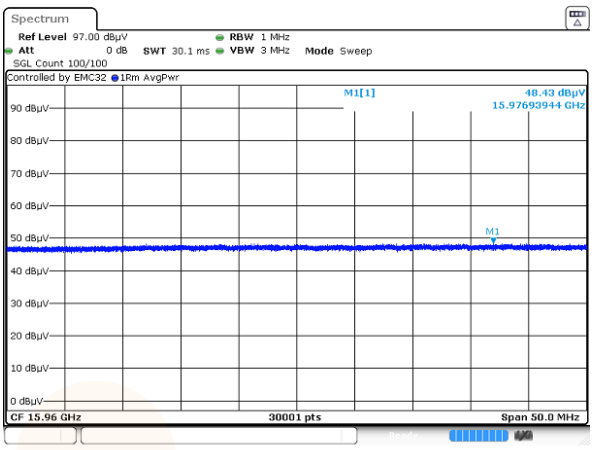
802.11n_HT20_Highest Channel (5 320 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 350.25[1)]	H	44.08	34.19	-24.20	-	54.07	74.00	19.93
10 619.30[1)]	H	60.50	37.42	-48.72	-	49.20	74.00	24.80
15 976.94[1)]	H	59.20	39.50	-46.48	-	52.22	74.00	21.78
Average Data								
5 350.25[1)]	H	34.83	34.19	-24.20	-	44.82	54.00	9.18
15 976.94[1)]	H	48.43	39.50	-46.48	-	41.45	54.00	12.55

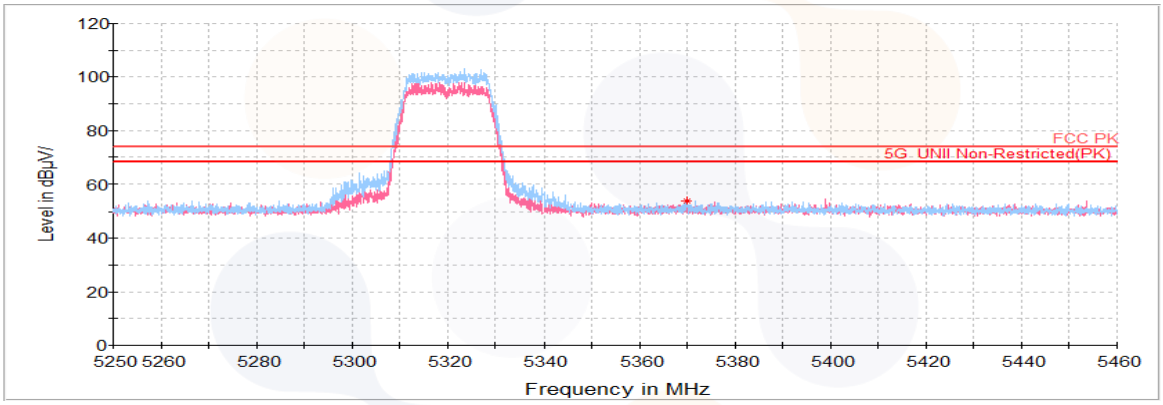
802.11n_HT20_Highest Channel (5 320 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11n_HT40_Lowest Channel (5 270 ㎒)

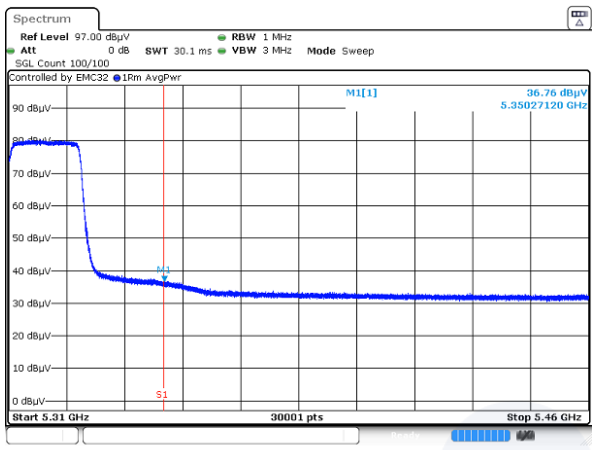
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 554.90	H	59.05	37.35	-48.75	-	47.65	68.20	20.55
15 823.66[1)]	H	58.78	39.54	-46.82	-	51.50	74.00	22.50
Average Data								
15 823.66[1)]	H	48.46	39.54	-46.82	0.14	41.32	54.00	12.68

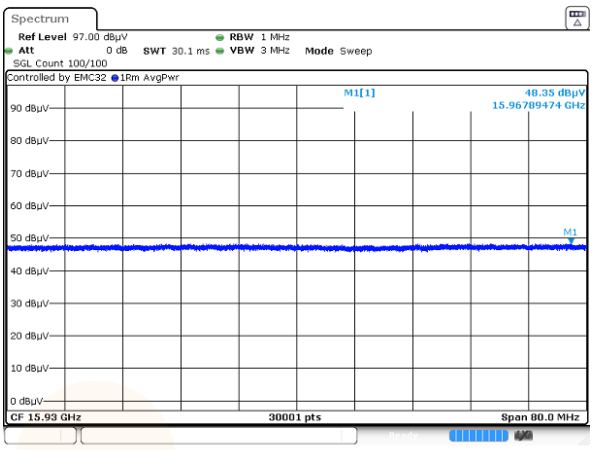
802.11n_HT40_Highest Channel (5 310 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 350.27[1)]	H	45.33	34.19	-24.20	-	55.32	74.00	18.68
10 594.77	H	60.29	37.39	-48.73	-	48.95	68.20	19.25
15 967.89[1)]	H	59.09	39.51	-46.50	-	52.10	74.00	21.90
Average Data								
5 350.27[1)]	H	36.76	34.19	-24.20	0.14	46.89	54.00	7.11
15 967.89[1)]	H	48.35	39.51	-46.50	0.14	41.50	54.00	12.50

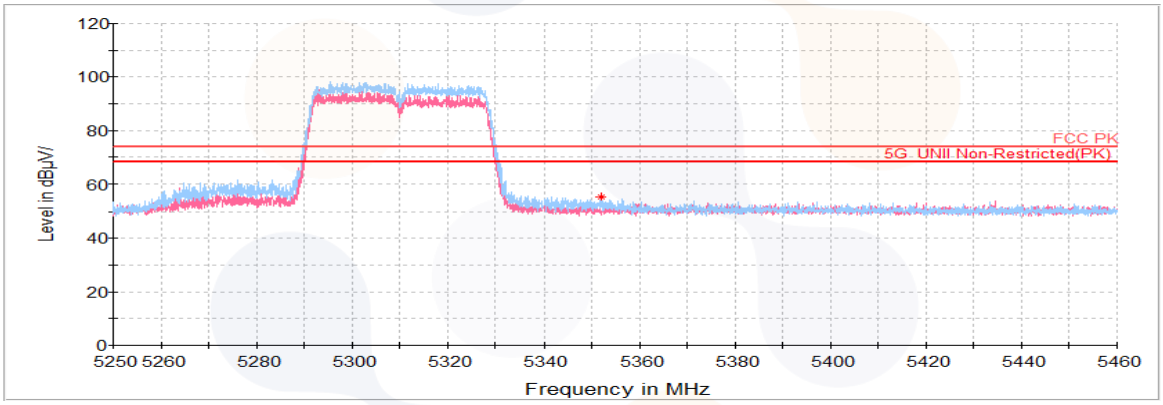
802.11n_HT40_Highest Channel (5 310 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11ac VHT20_Lowest Channel (5 260 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 496.25	V	60.14	37.30	-48.77	-	48.67	68.20	19.53
15 761.86[1)]	H	60.20	39.55	-46.96	-	52.79	74.00	21.21
Average Data								
15 761.86[1)]	H	48.30	39.55	-46.96	-	40.89	54.00	13.11

802.11ac VHT20_Middle Channel (5 280 ㎒)

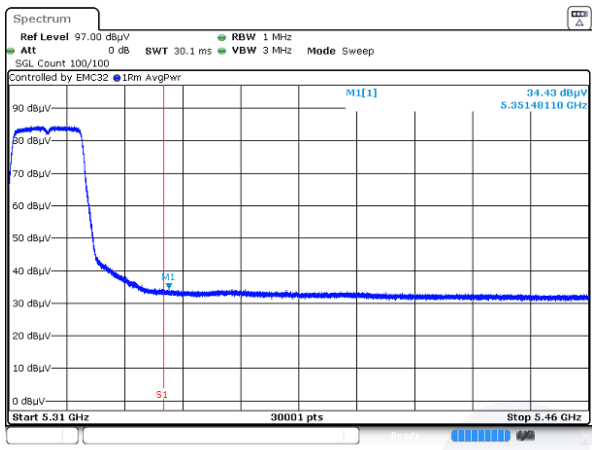
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 568.32	H	61.57	37.37	-48.74	-	50.20	68.20	18.00
15 859.14[1)]	H	59.78	39.53	-46.74	-	52.57	74.00	21.43
Average Data								
15 859.14[1)]	H	48.72	39.53	-46.74	-	41.51	54.00	12.49

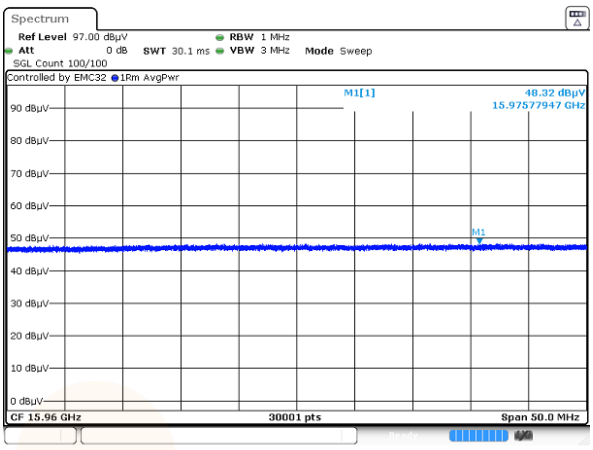
802.11ac VHT20_Highest Channel (5 320 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 351.48[1)]	H	42.90	34.19	-24.20	-	52.89	74.00	21.11
10 656.48[1)]	H	60.51	37.46	-48.70	-	49.27	74.00	24.73
15 975.78[1)]	H	58.51	39.50	-46.48	-	51.53	74.00	22.47
Average Data								
5 351.48[1)]	H	34.43	34.19	-24.20	-	44.42	54.00	9.58
15 975.78[1)]	H	48.32	39.50	-46.48	-	41.34	54.00	12.66

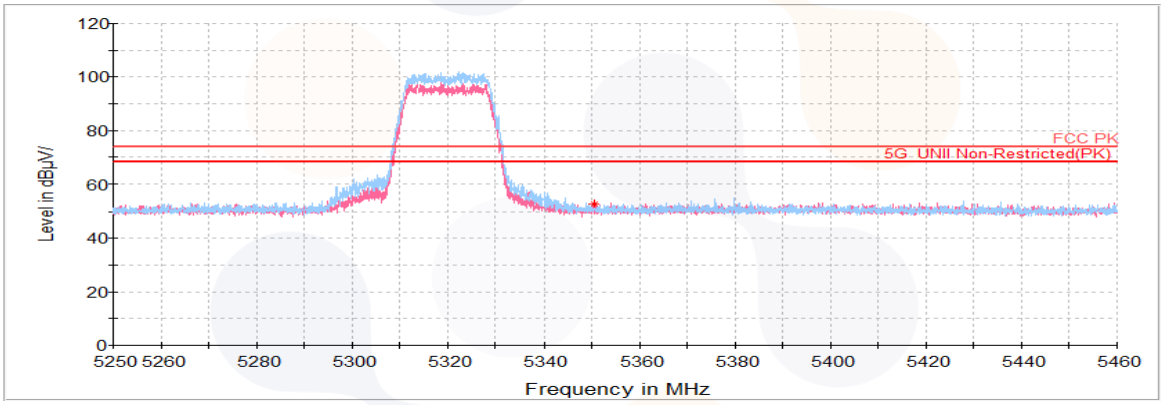
802.11ac VHT20_Highest Channel (5 320 ㎒)

Average data





Horizontal/Vertical for Band-edge



802.11ac VHT40_Lowest Channel (5 270 ㎒)

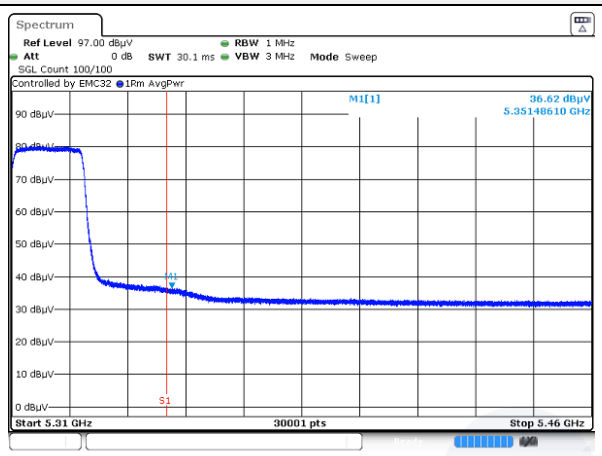
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 587.48	H	58.81	37.39	-48.73	-	47.47	68.20	20.73
15 849.97[1)]	H	59.25	39.53	-46.76	-	52.02	74.00	21.98
Average Data								
15 849.97[1)]	H	48.60	39.53	-46.76	0.13	41.50	54.00	12.50

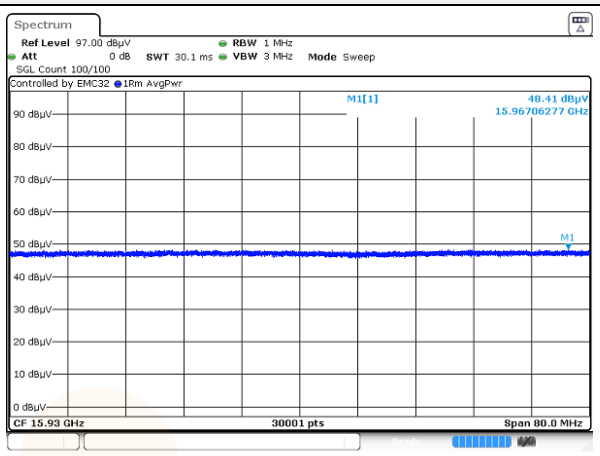
802.11ac VHT40_Highest Channel (5 310 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 351.49[1)]	H	45.93	34.19	-24.20	-	55.92	74.00	18.08
10 608.95[1)]	H	60.50	37.41	-48.72	-	49.19	74.00	24.81
15 967.06[1)]	H	59.91	39.51	-46.50	-	52.92	74.00	21.08
Average Data								
5 351.49[1)]	H	36.62	34.19	-24.20	0.13	46.74	54.00	7.26
15 967.06[1)]	H	48.41	39.51	-46.50	0.13	41.55	54.00	12.45

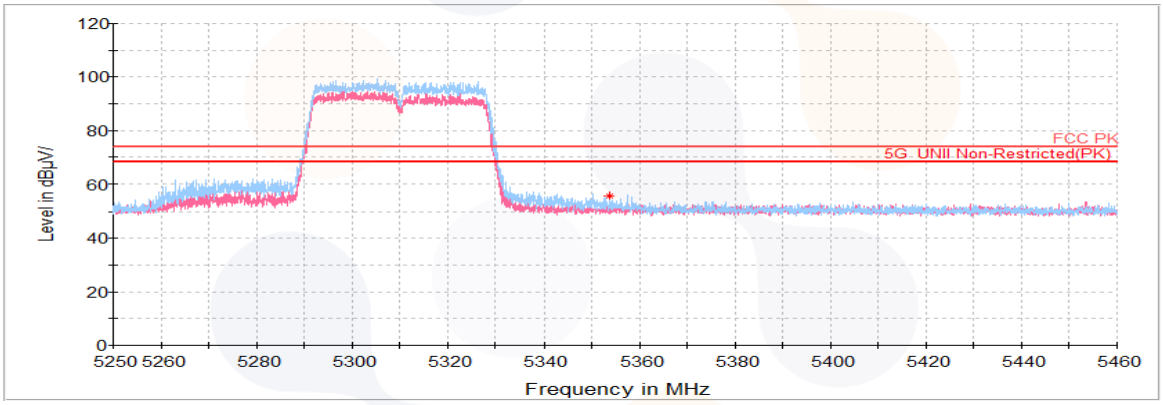
802.11ac VHT40_Highest Channel (5 310 ㎒)

Average data





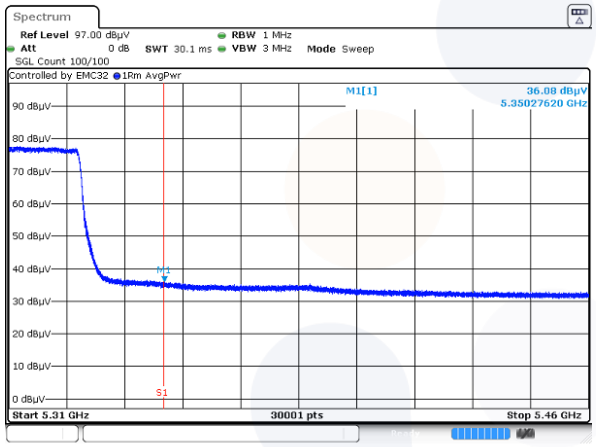
Horizontal/Vertical for Band-edge

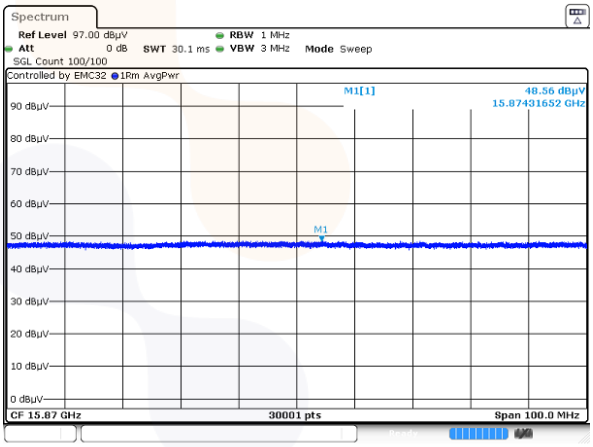


802.11ac VHT80_Middle Channel (5 290 ㎒)

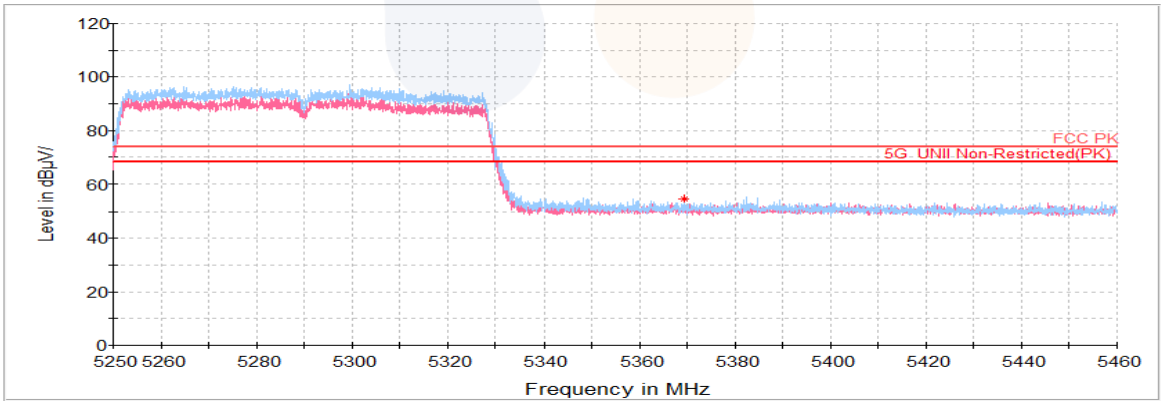
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 350.28[1)]	H	44.82	34.19	-24.20	-	54.81	74.00	19.19
10 589.40	V	59.58	37.39	-48.73	-	48.24	68.20	19.96
15 874.32[1)]	H	59.18	39.53	-46.71	-	52.00	74.00	22.00
Average Data								
5 350.28[1)]	H	36.08	34.19	-24.20	0.27	46.34	54.00	7.66
15 874.32[1)]	H	48.56	39.53	-46.71	0.27	41.65	54.00	12.35

Average data





Horizontal/Vertical for Band-edge

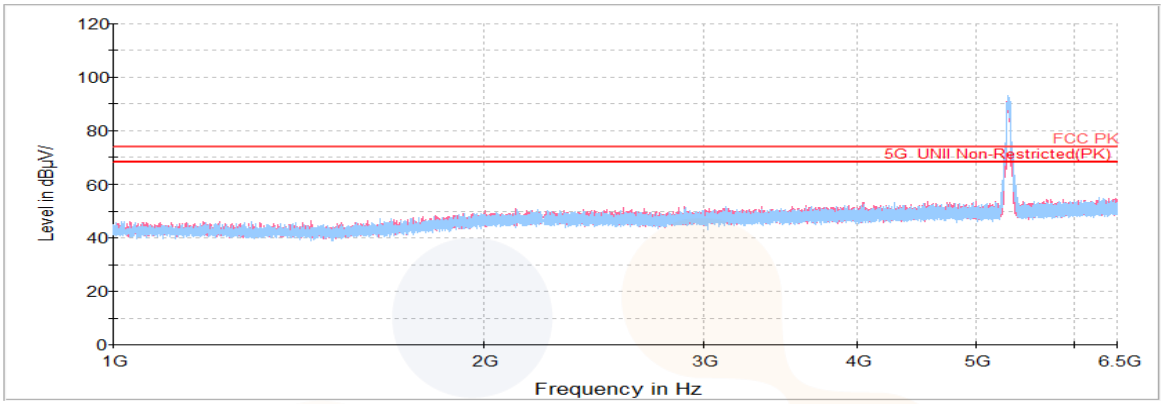


Plot of Harmonics and Spurious Emissions

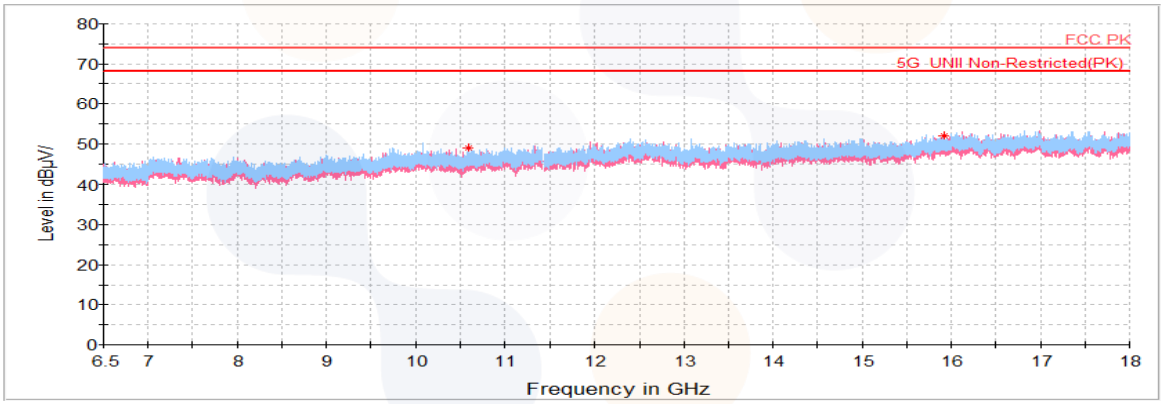
In order to simplify the report, attached plots were only the lowest margin condition
802.11ac VHT80_Middle Channel (5 290 ㎒)

802.11n HT40_UNII 2A_Highest Channel (5 310 ㎒)

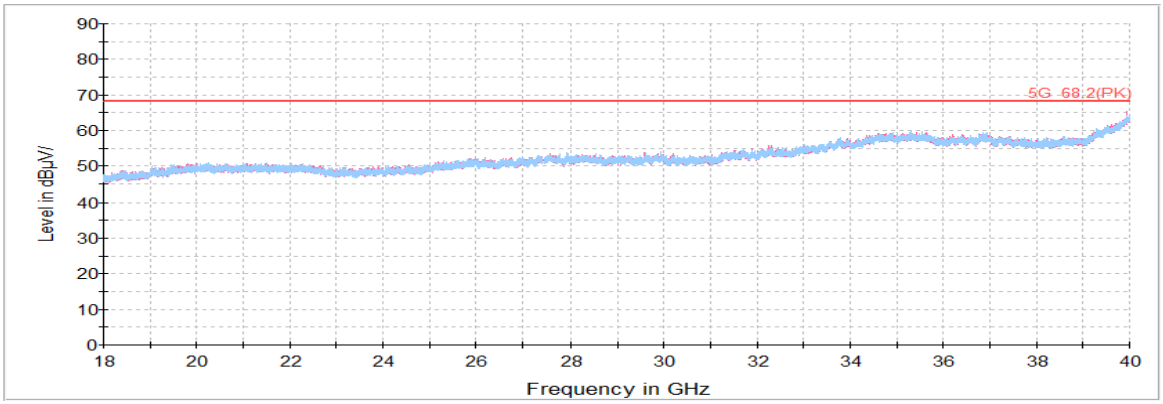
Horizontal/Vertical for 1 ㎓ ~ 6.5 ㎓



Horizontal/Vertical for 6.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 40 ㎓



UNII 2C SISO

802.11a_Lowest Channel (5 500 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 459.49[1)]	H	43.24	34.34	-23.90	-	53.68	74.00	20.32
10 992.67[1)]	H	59.94	37.79	-48.56	-	49.17	74.00	24.83
16 555.22	H	57.57	40.96	-46.42	-	52.11	68.20	16.09
Average Data								
5 459.49[1)]	H	33.95	34.34	-23.90	-	44.39	54.00	9.61

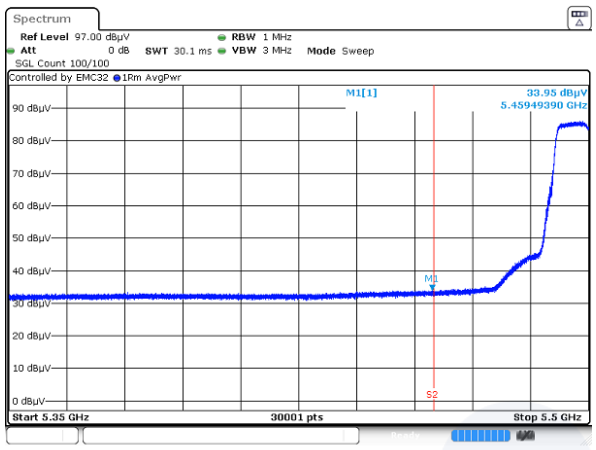
802.11a_Middle Channel (5 600 ㎒)

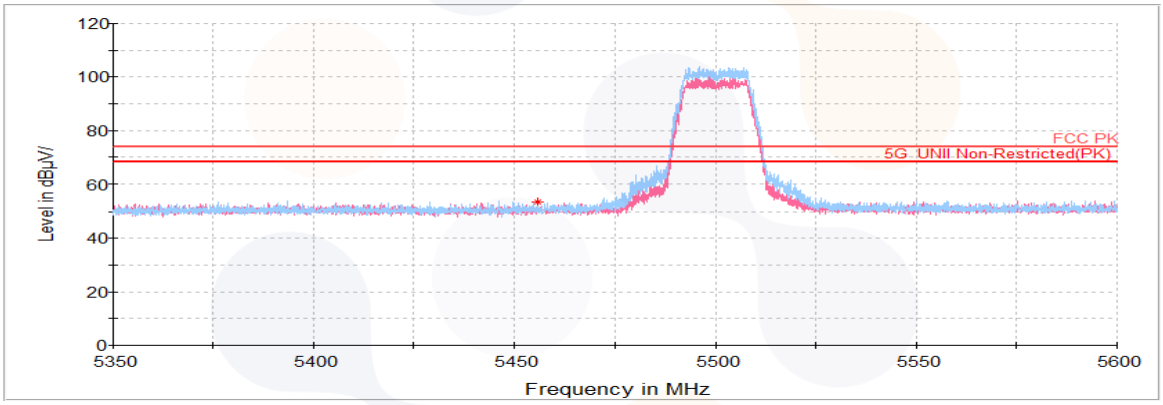
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 247.97[1)]	H	59.35	38.00	-48.68	-	48.67	74.00	25.33
16 839.65	V	57.53	41.24	-46.15	-	52.62	68.20	15.58
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11a_Highest Channel (5 640 ㎒)

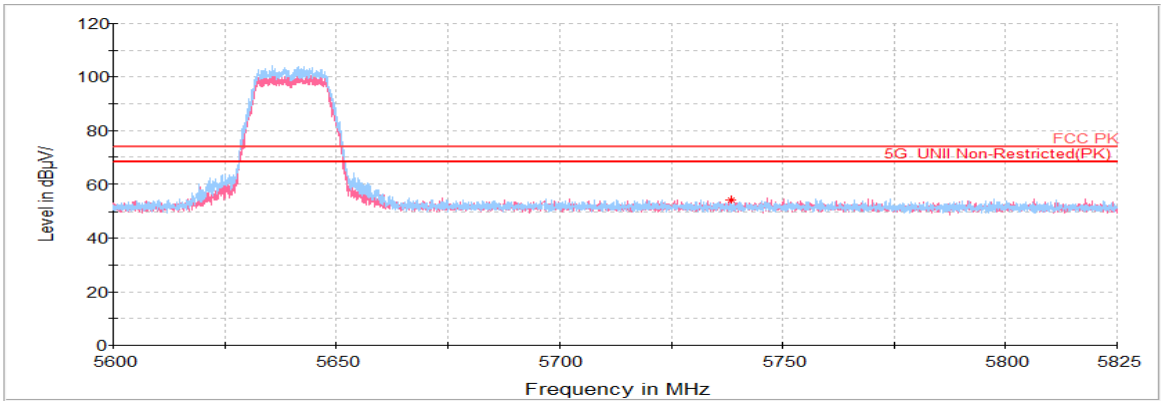
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 738.45	H	42.92	34.69	-23.21	-	54.40	68.20	13.80
11 267.13[1)]	H	59.18	38.01	-48.69	-	48.50	74.00	25.50
16 950.05	H	56.96	41.35	-46.05	-	52.26	68.20	15.94
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11a_Lowest Channel (5 500 ㎒)

Average data	
	Blank

Horizontal/Vertical for Band-edge


Highest Channel (5 640 ㎒)

Horizontal/Vertical for Band-edge


802.11n HT20_Lowest Channel (5 500 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 453.76[1)]	H	44.17	34.34	-23.92	-	54.59	74.00	19.41
10 998.80[1)]	V	60.07	37.80	-48.56	-	49.31	74.00	24.69
16 513.82	V	57.11	40.91	-46.45	-	51.57	68.20	16.63
Average Data								
5 453.76[1)]	H	33.88	34.34	-23.92	-	44.30	54.00	9.70

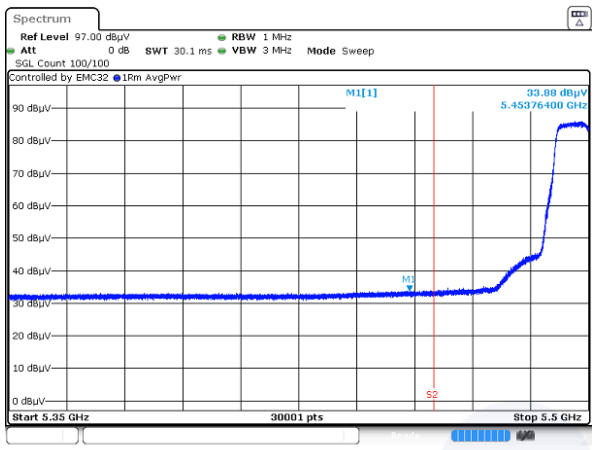
802.11n HT20_Middle Channel (5 600 ㎒)

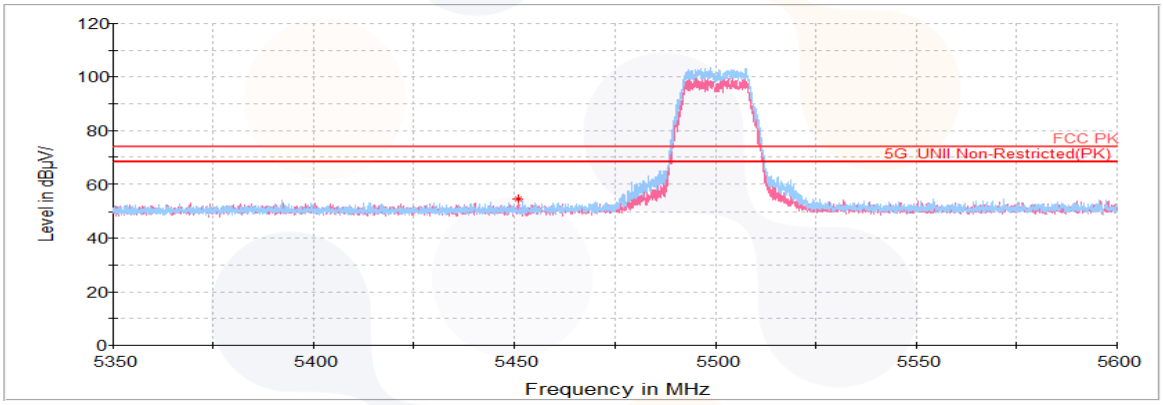
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 255.63[1)]	H	60.35	38.00	-48.69	-	49.66	74.00	24.34
16 788.28	H	57.61	41.19	-46.20	-	52.60	68.20	15.60
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n HT20_Highest Channel (5 640 ㎒)

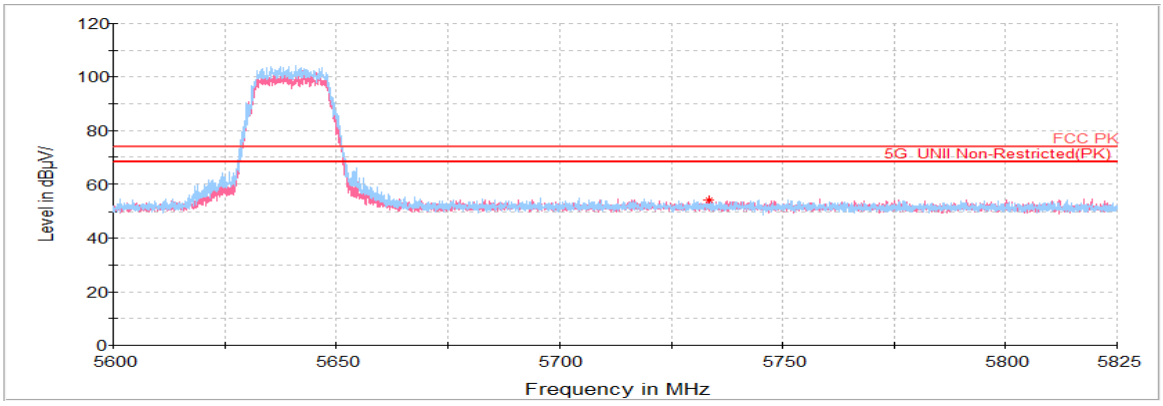
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 733.56	H	42.91	34.68	-23.22	-	54.37	68.20	13.83
11 295.12[1)]	V	59.12	38.04	-48.71	-	48.45	74.00	25.55
16 925.52	H	58.02	41.33	-46.07	-	53.28	68.20	14.92
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n HT20_Lowest Channel (5 500 ㎒)

Average data	
	Blank

Horizontal/Vertical for Band-edge


Highest Channel (5 640 ㎒)

Horizontal/Vertical for Band-edge


802.11n HT40_Lowest Channel (5 510 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 459.89[1)]	H	45.36	34.34	-23.90	-	55.80	74.00	18.20
11 049.78[1)]	H	59.50	37.84	-48.59	-	48.75	74.00	25.25
16 512.28	H	56.64	40.91	-46.46	-	51.09	68.20	17.11
Average Data								
5 459.89[1)]	H	35.89	34.34	-23.90	0.14	46.47	54.00	7.53

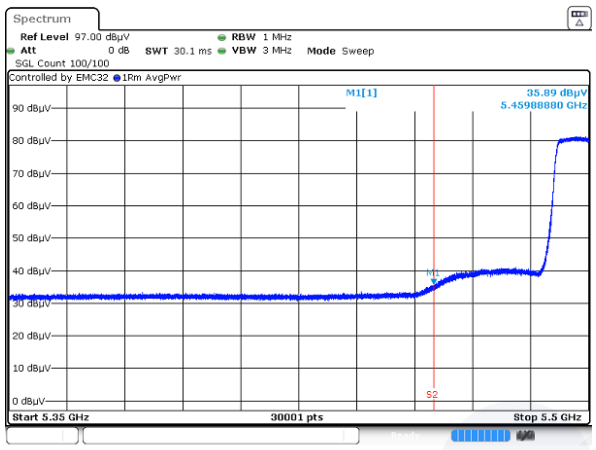
802.11n HT40_Middle Channel (5 590 ㎒)

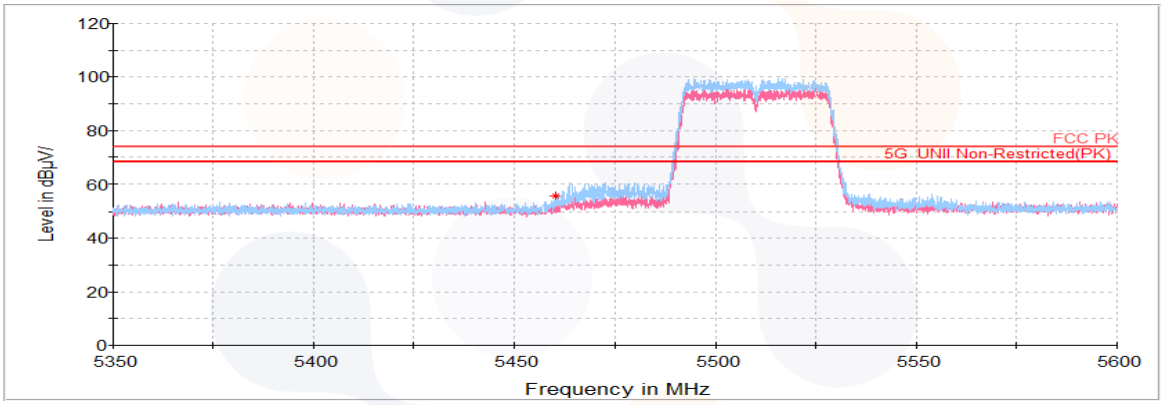
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 191.23[1)]	H	59.86	37.95	-48.66	-	49.15	74.00	24.85
16 750.72	H	57.72	41.15	-46.23	-	52.64	68.20	15.56
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n HT40_Highest Channel (5 670 ㎒)

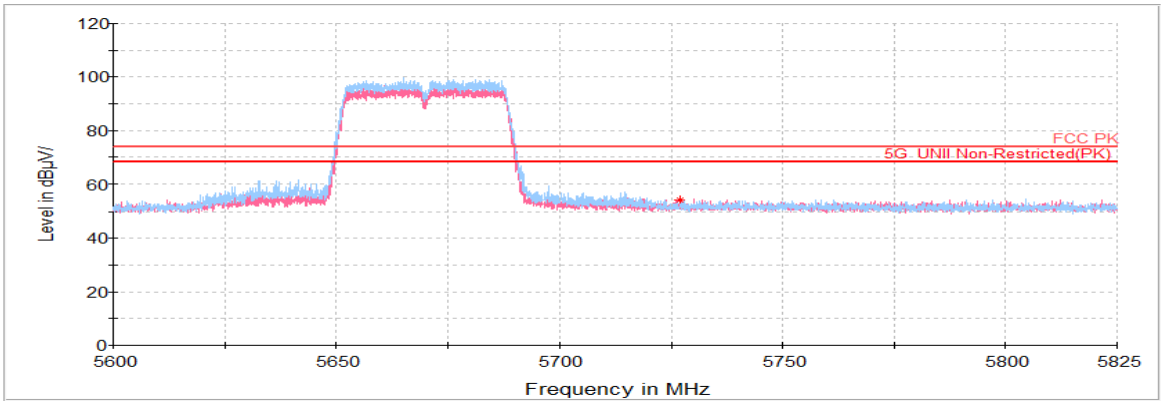
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 727.04	H	43.03	34.67	-23.23	-	54.47	68.20	13.73
11 350.32[1)]	H	60.26	38.08	-48.73	-	49.61	74.00	24.39
17 017.13	V	57.58	41.00	-46.02	-	52.56	68.20	15.64
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n HT40_Lowest Channel (5 510 ㎒)

Average data	
	Blank

Horizontal/Vertical for Band-edge


Highest Channel (5 670 ㎒)

Horizontal/Vertical for Band-edge


802.11ac VHT20_Lowest Channel (5 500 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 458.87[1)]	H	43.21	34.34	-23.90	-	53.65	74.00	20.35
10 979.63[1)]	H	59.92	37.78	-48.57	-	49.13	74.00	24.87
16 511.90	H	57.79	40.91	-46.46	-	52.24	68.20	15.96
Average Data								
5 458.87[1)]	H	33.99	34.34	-23.90	-	44.43	54.00	9.57

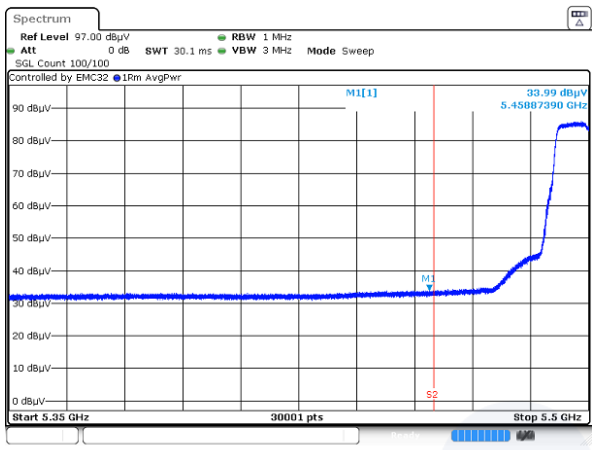
802.11ac VHT20_Middle Channel (5 600 ㎒)

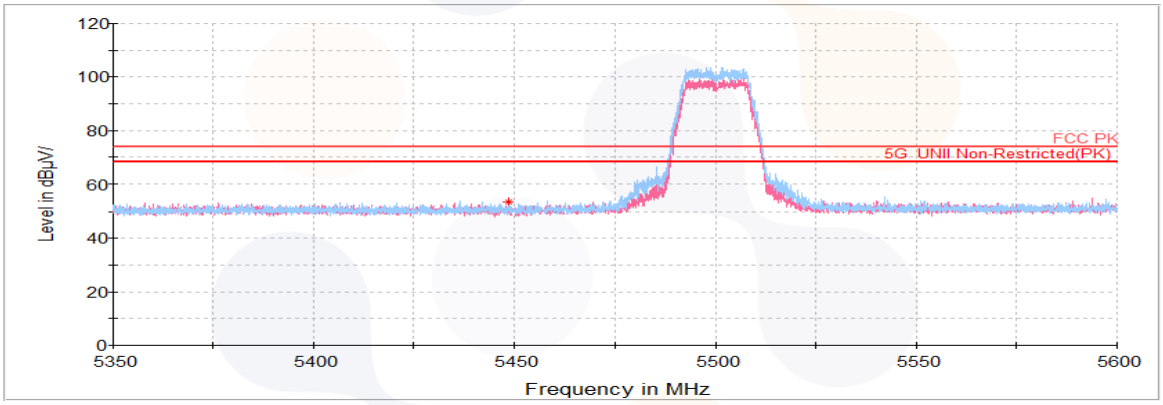
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 179.35[1)]	H	60.56	37.94	-48.65	-	49.85	74.00	24.15
16 838.88	V	58.07	41.24	-46.15	-	53.16	68.20	15.04
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11ac VHT20_Highest Channel (5 640 ㎒)

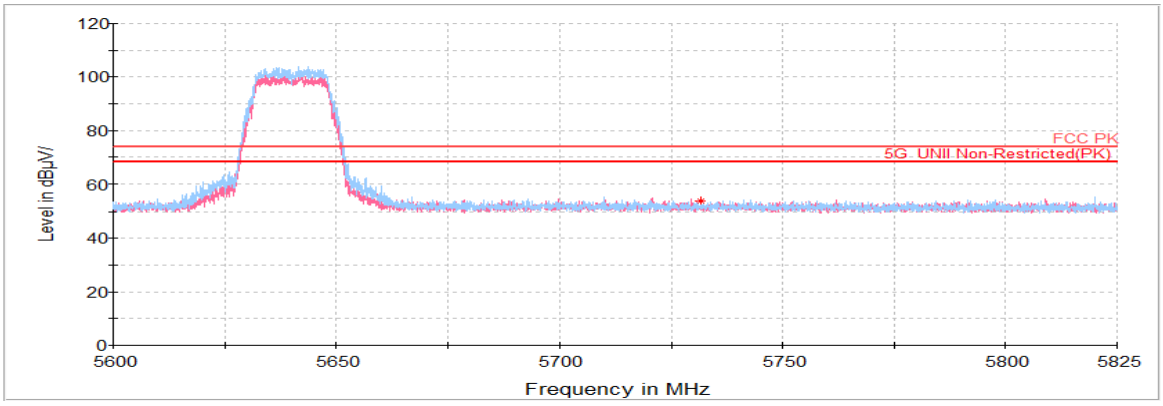
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 731.58	H	42.64	34.68	-23.23	-	54.09	68.20	14.11
11 249.12[1)]	H	59.76	38.00	-48.68	-	49.08	74.00	24.92
16 943.53	H	57.78	41.34	-46.06	-	53.06	68.20	15.14
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11ac VHT20_Lowest Channel (5 500 ㎒)

Average data	
	Blank

Horizontal/Vertical for Band-edge


Highest Channel (5 640 ㎒)

Horizontal/Vertical for Band-edge


802.11ac VHT40_Lowest Channel (5 510 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 459.92[1)]	H	44.61	34.34	-23.90	-	55.05	74.00	18.95
11 062.43[1)]	V	59.21	37.85	-48.59	-	48.47	74.00	25.53
16 508.45	H	57.77	40.91	-46.46	-	52.22	68.20	15.98
Average Data								
5 459.92[1)]	H	35.92	34.34	-23.90	0.13	46.49	54.00	7.51

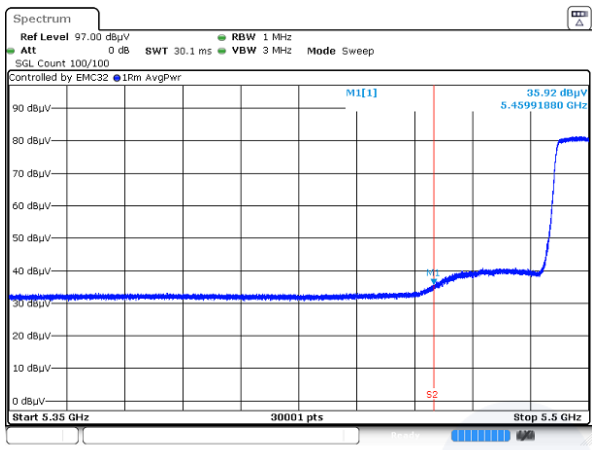
802.11ac VHT40_Middle Channel (5 590 ㎒)

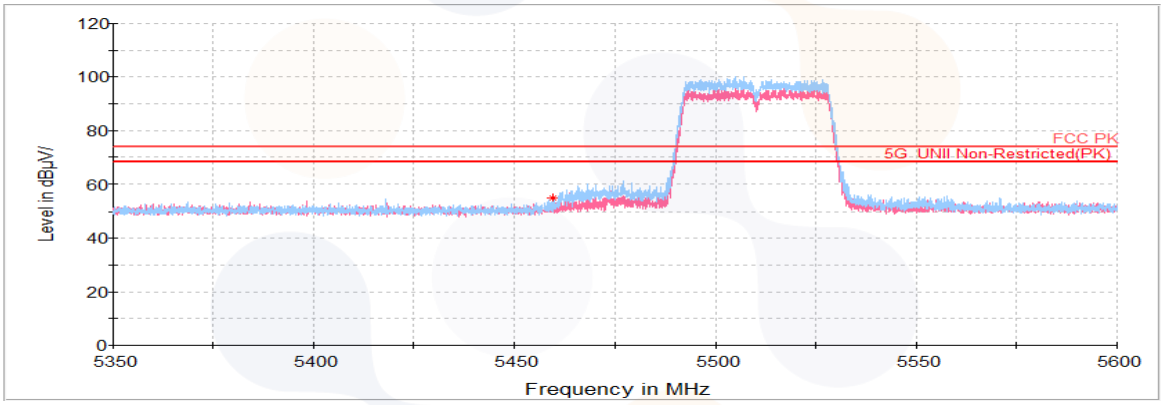
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 192.00[1)]	H	59.82	37.95	-48.66	-	49.11	74.00	24.89
16 774.48	H	57.27	41.17	-46.21	-	52.23	68.20	15.97
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11ac VHT40_Highest Channel (5 670 ㎒)

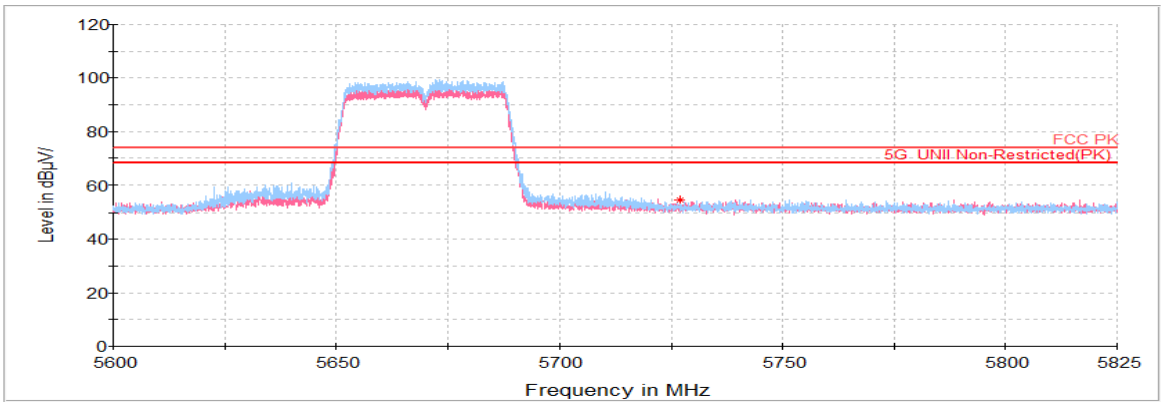
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 726.94	H	43.21	34.67	-23.23	-	54.65	68.20	13.55
11 365.27[1)]	H	60.28	38.09	-48.74	-	49.63	74.00	24.37
17 045.50	H	58.41	41.01	-46.04	-	53.38	68.20	14.82
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11ac VHT40_Lowest Channel (5 510 ㎒)

Average data	
	Blank

Horizontal/Vertical for Band-edge


Highest Channel (5 670 ㎒)

Horizontal/Vertical for Band-edge


802.11ac VHT80_Lowest Channel (5 530 ㎒)

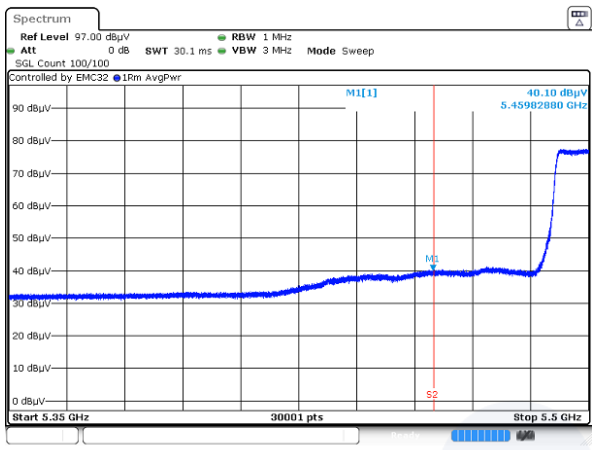
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 459.83[1)]	H	51.00	34.34	-23.90	-	61.44	74.00	12.56
11 035.60[1)]	H	59.67	37.83	-48.58	-	48.92	74.00	25.08
16 556.75	V	58.28	40.96	-46.41	-	52.83	68.20	15.37
Average Data								
5 459.83[1)]	H	40.10	34.34	-23.90	0.27	50.81	54.00	3.19

802.11ac VHT80_Highest Channel (5 610 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 727.81	V	43.32	34.67	-23.23	-	54.76	68.20	13.44
11 228.42[1)]	H	60.01	37.98	-48.67	-	49.32	74.00	24.68
16 818.18	V	58.06	41.22	-46.17	-	53.11	68.20	15.09
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

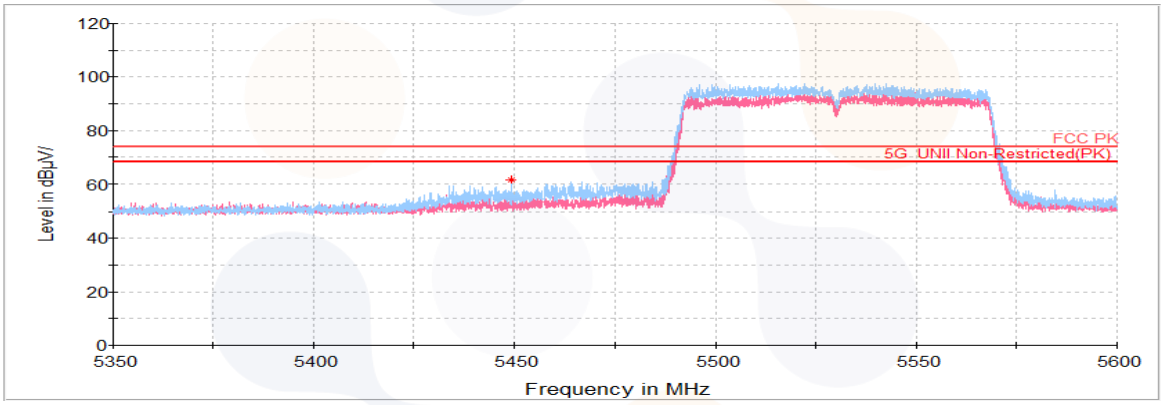
802.11ac VHT80_Lowest Channel (5 530 ㎒)

Average data



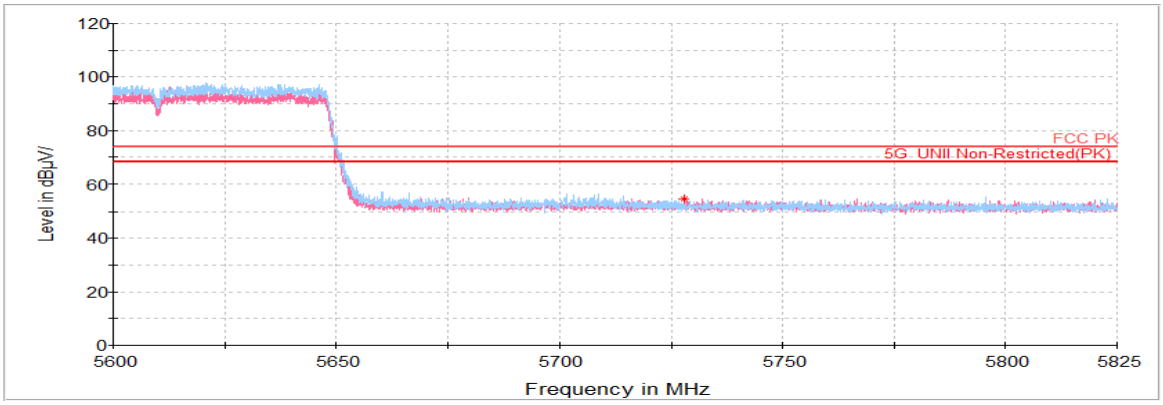
Blank

Horizontal/Vertical for Band-edge



Highest Channel (5 610㎒)

Horizontal/Vertical for Band-edge

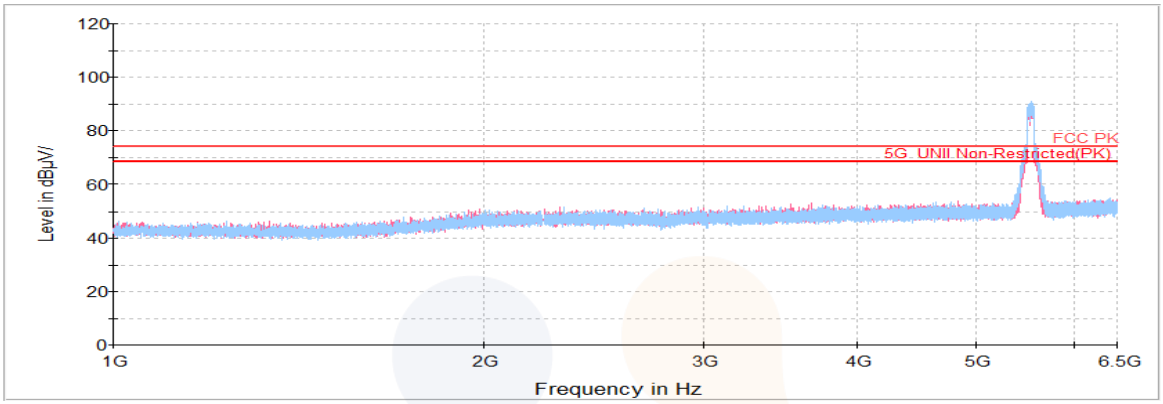


Plot of Harmonics and Spurious Emissions

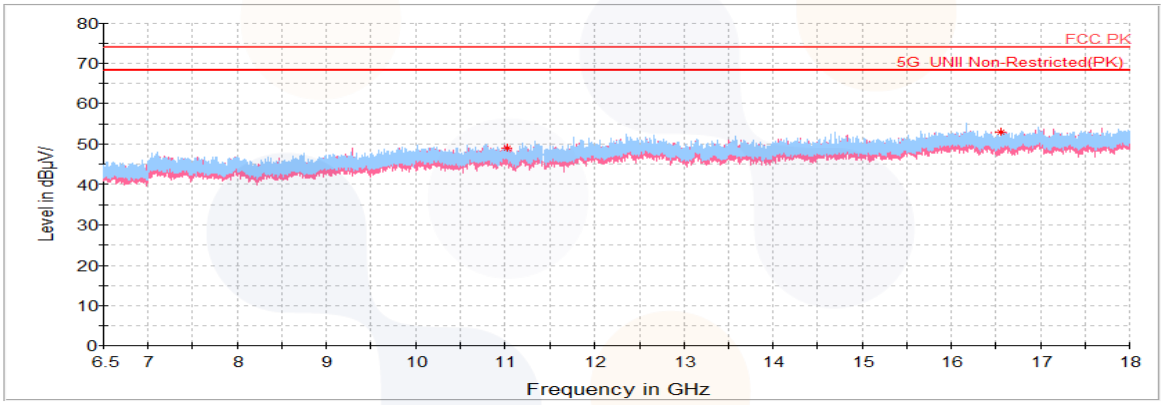
In order to simplify the report, attached plots were only the lowest margin condition

802.11ac VHT80_UNII 2C_Highest Channel (5 530 ㎒)

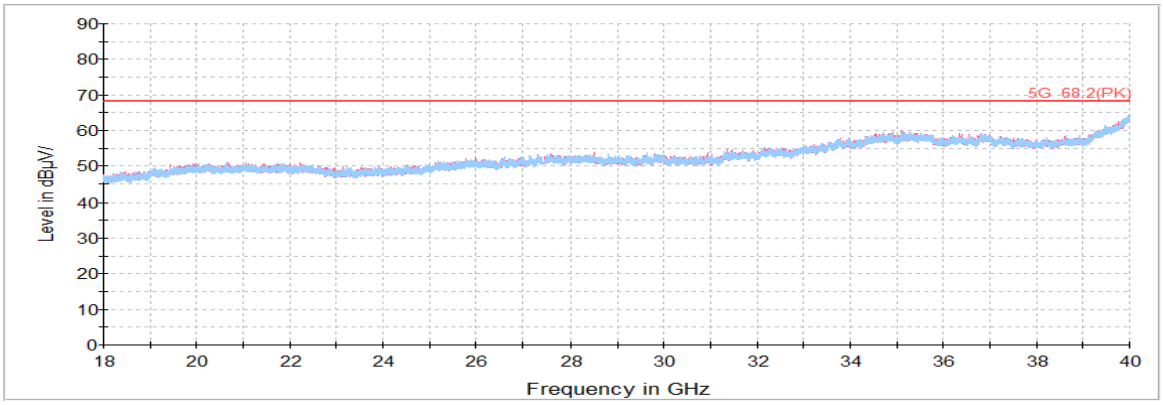
Horizontal/Vertical for 1 ㎓ ~ 6.5 ㎓



Horizontal/Vertical for 6.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 40 ㎓



Straddle Channel

802.11a (5 720 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 502.50[1)]	H	60.16	38.20	-48.81	-	49.55	74.00	24.45
17 180.05	H	57.33	41.04	-46.13	-	52.24	68.20	15.96
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT20 (5 720 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 411.65[1)]	V	59.79	38.13	-48.77	-	49.15	74.00	24.85
17 184.27	H	57.20	41.04	-46.13	-	52.11	68.20	16.09
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT40 (5 710 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 420.85[1)]	H	60.32	38.14	-48.77	-	49.69	74.00	24.31
17 172.00	V	57.63	41.03	-46.12	-	52.54	68.20	15.66
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT20 (5 720 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 372.17[1)]	V	61.01	38.10	-48.75	-	50.36	74.00	23.64
17 140.95	H	57.56	41.03	-46.10	-	52.49	68.20	15.71
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT40 (5 710 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 419.70[1)]	V	60.76	38.14	-48.77	-	50.13	74.00	23.87
17 110.28	V	57.84	41.02	-46.08	-	52.78	68.20	15.42
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11ac VHT80 (5 690 ㎒)

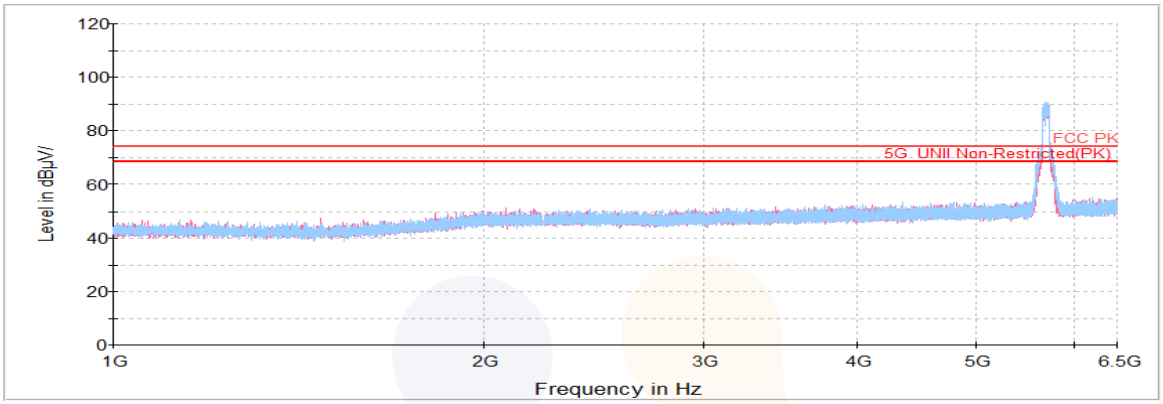
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 376.38[1)]	H	61.26	38.10	-48.75	-	50.61	74.00	23.39
17 094.57	H	58.03	41.02	-46.07	-	52.98	68.20	15.22
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Plot of Harmonics and Spurious Emissions

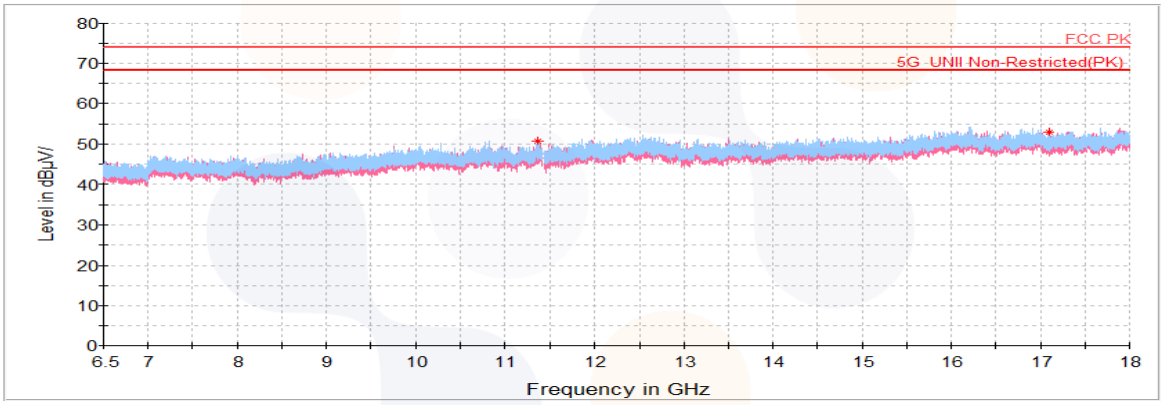
In order to simplify the report, attached plots were only the lowest margin condition

802.11ac VHT80_Straddle Channel (5 690 ㎒)

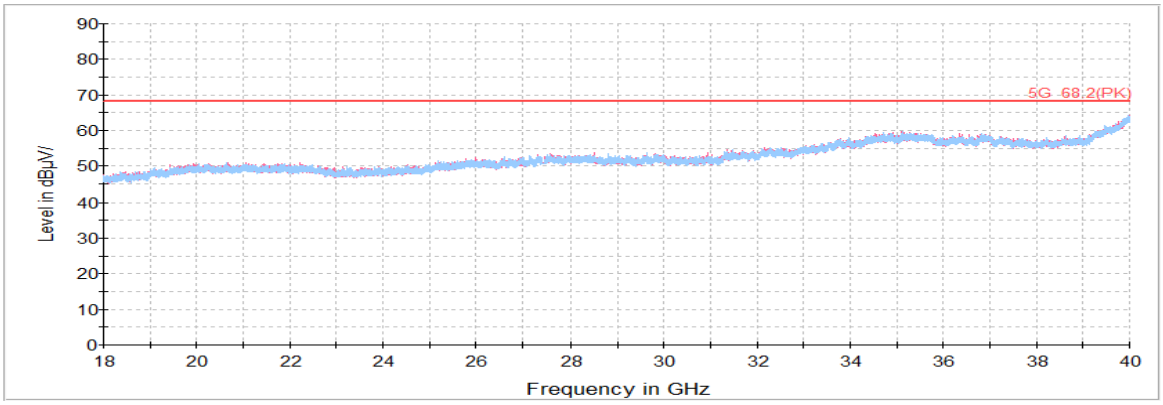
Horizontal/Vertical for 1 ㎓ ~ 6.5 ㎓



Horizontal/Vertical for 6.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 40 ㎓



UNII 3 SISO

802.11a_Lowest Channel (5 745 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 724.15	H	45.20	34.67	-23.24	-	56.63	120.25	63.62
11 473.37[1)]	H	59.74	38.18	-48.80	-	49.12	74.00	24.88
17 170.85	H	58.32	41.03	-46.12	-	53.23	68.20	14.97
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

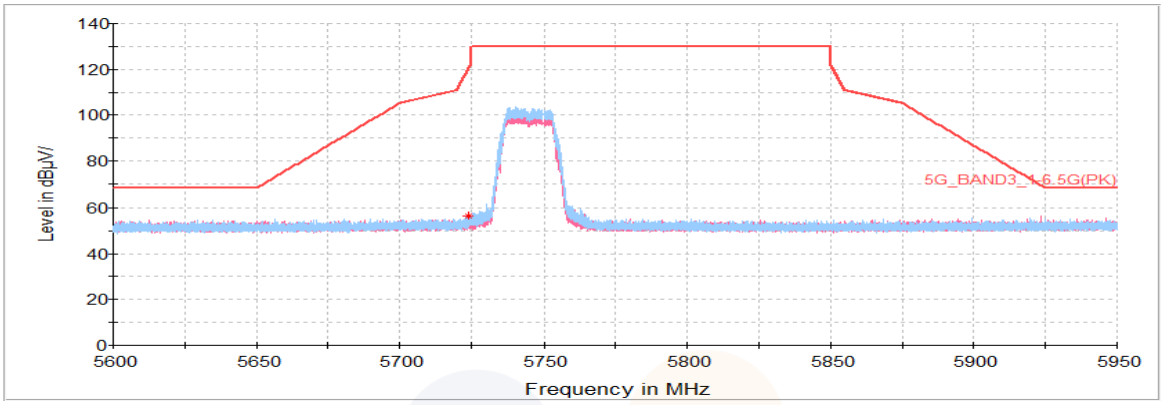
802.11a_Middle Channel (5 785 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 528.95[1)]	H	59.55	38.23	-48.82	-	48.96	74.00	25.04
17 370.57	V	58.15	41.07	-46.26	-	52.96	68.20	15.24
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

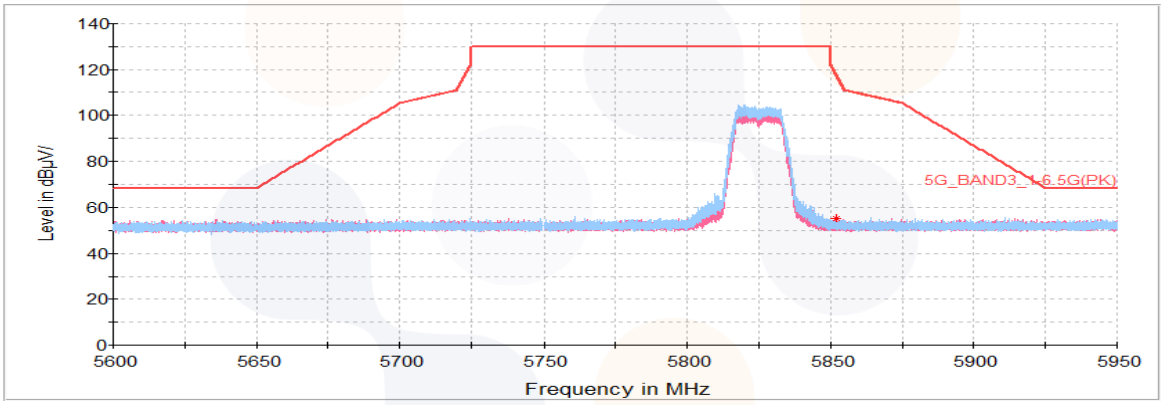
802.11a_Highest Channel (5 825 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 852.19	V	43.97	34.82	-23.30	-	55.49	117.21	61.72
11 668.48[1)]	V	59.90	38.37	-48.85	-	49.42	74.00	24.58
17 423.85	H	57.99	41.08	-46.30	-	52.77	68.20	15.43
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11a_Lowest Channel (5 745 ㎒)

Horizontal/Vertical for Band-edge


802.11a_Highest Channel (5 825 ㎒)

Horizontal/Vertical for Band-edge


802.11n_HT20_Lowest Channel (5 745 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 724.72	H	45.49	34.67	-23.24	-	56.92	121.55	64.63
11 492.92[1)]	H	60.31	38.19	-48.81	-	49.69	74.00	24.31
17 276.65	H	58.11	41.06	-46.20	-	52.97	68.20	15.23
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

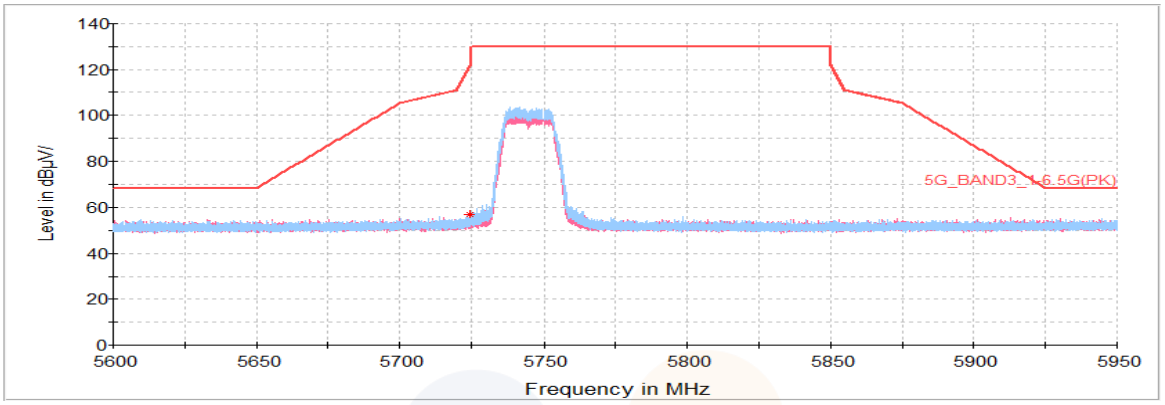
802.11n_HT20_Middle Channel (5 785 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 604.47[1)]	H	59.50	38.30	-48.83	-	48.97	74.00	25.03
17 369.42	V	58.07	41.07	-46.26	-	52.88	68.20	15.32
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

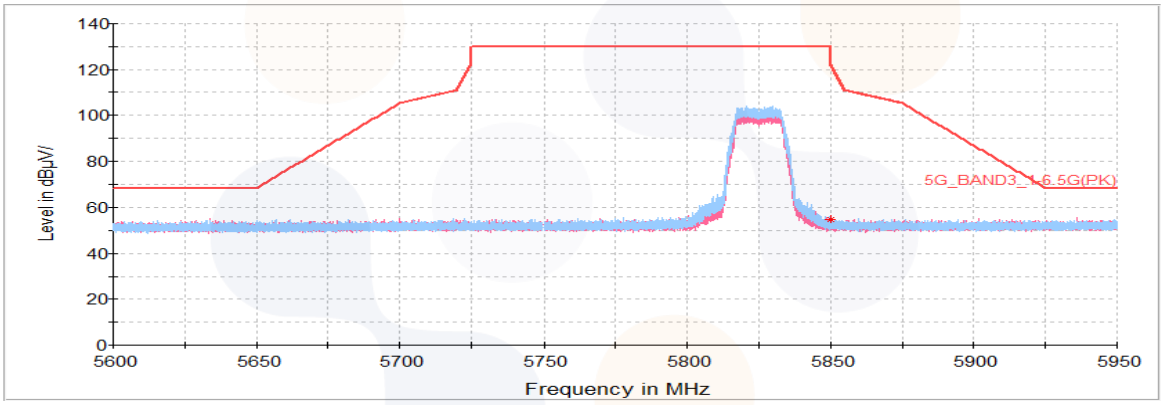
802.11n_HT20_Highest Channel (5 825 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 850.24	H	43.47	34.82	-23.29	-	55.00	121.66	66.65
11 631.68[1)]	H	59.55	38.33	-48.84	-	49.04	74.00	24.96
17 463.33	H	58.18	41.09	-46.33	-	52.94	68.20	15.26
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n_HT20_Lowest Channel (5 745 ㎒)

Horizontal/Vertical for Band-edge


802.11n_HT20_Highest Channel (5 825 ㎒)

Hoizontal/Vertical for Band-edge


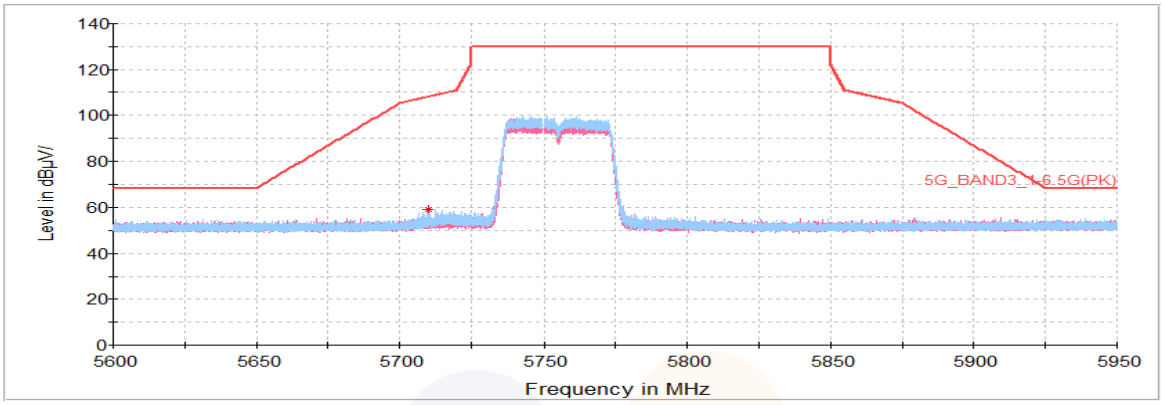
802.11n_HT40_Lowest Channel (5 755 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 710.27	H	47.93	34.65	-23.27	-	59.31	108.08	48.76
11 549.27[1)]	V	60.23	38.25	-48.82	-	49.66	74.00	24.34
17 265.15	V	57.52	41.05	-46.19	-	52.38	68.20	15.82
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

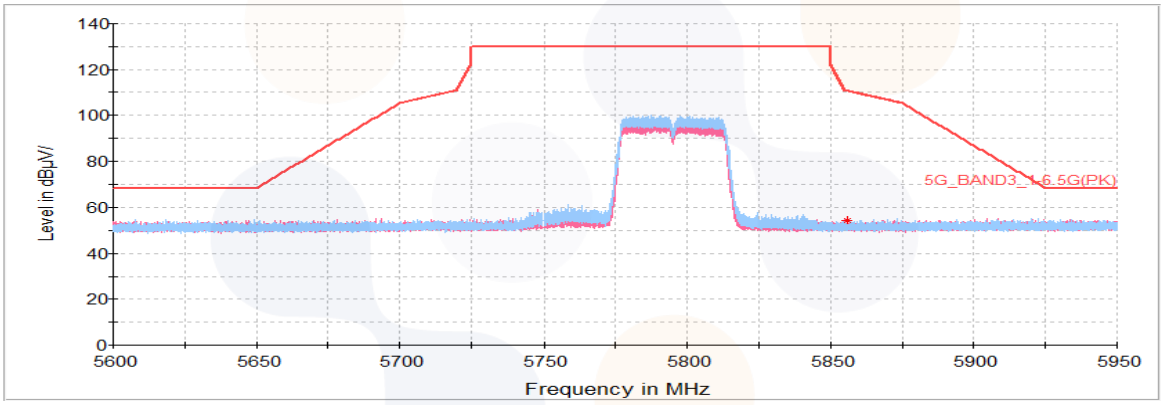
802.11n_HT40_Highest Channel (5 795 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 855.79	H	43.10	34.83	-23.31	-	54.62	110.58	55.96
11 596.42[1)]	H	60.23	38.30	-48.83	-	49.70	74.00	24.30
17 332.23	H	59.05	41.07	-46.24	-	53.88	68.20	14.32
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n_HT40_Lowest Channel (5 755 ㎒)

Horizontal/Vertical for Band-edge


802.11n_HT40_Highest Channel (5 795 ㎒)

Horizontal/Vertical for Band-edge


802.11ac_VHT20_Lowest Channel (5 745 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 723.49	H	45.98	34.67	-23.24	-	57.41	118.76	61.35
11 410.12[1)]	V	60.42	38.13	-48.76	-	49.79	74.00	24.21
17 242.92	H	57.25	41.05	-46.17	-	52.13	68.20	16.07
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

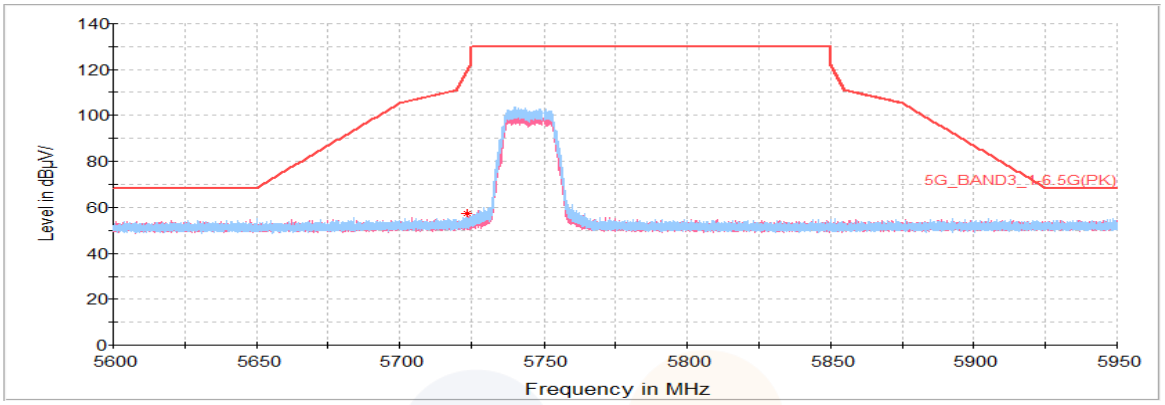
802.11ac_VHT20_Middle Channel (5 785 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
11 555.02[1)]	V	60.74	38.26	-48.82	-	50.18	74.00	23.82
17 318.82	H	58.46	41.06	-46.23	-	53.29	68.20	14.91
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

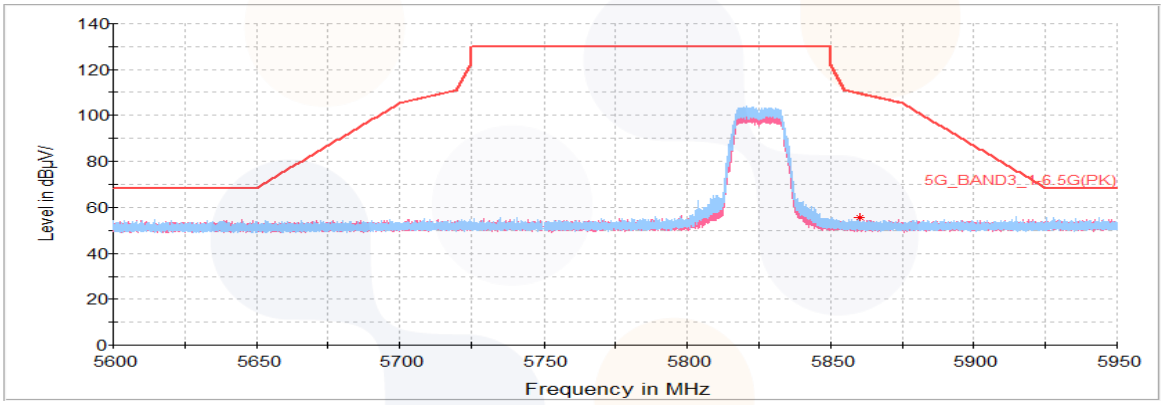
802.11ac_VHT20_Highest Channel (5 825 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 860.30	H	44.28	34.83	-23.33	-	55.78	109.32	53.54
11 631.30[1)]	H	59.92	38.33	-48.84	-	49.41	74.00	24.59
17 491.70	H	57.89	41.10	-46.35	-	52.64	68.20	15.56
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac_VHT20_Lowest Channel (5 745 ㎒)

Horizontal/Vertical for Band-edge


802.11ac_VHT20_Highest Channel (5 825 ㎒)

Horizontal/Vertical for Band-edge


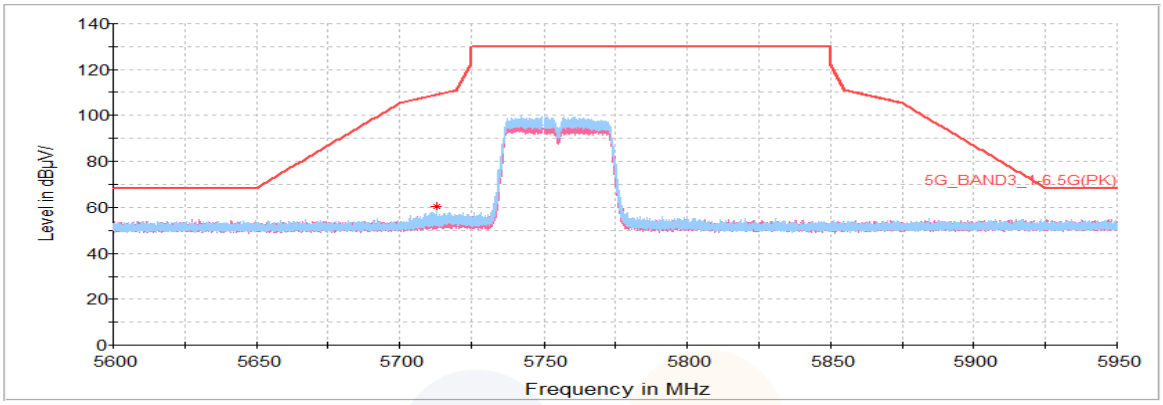
802.11ac_VHT40_Lowest Channel (5 755 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 713.07	H	49.29	34.66	-23.26	-	60.69	108.86	48.17
11 522.43[1)]	H	60.96	38.22	-48.81	-	50.37	74.00	23.63
17 271.28	V	57.93	41.05	-46.19	-	52.79	68.20	15.41
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

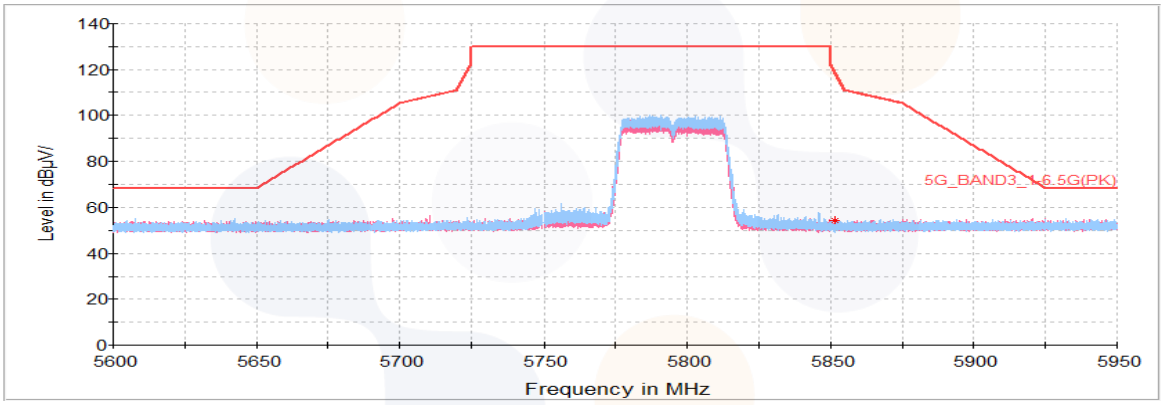
802.11ac_VHT40_Highest Channel (5 795 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 851.62	H	43.06	34.82	-23.30	-	54.58	118.52	63.94
11 594.88[1)]	V	59.97	38.29	-48.83	-	49.43	74.00	24.57
17 312.68	H	58.70	41.06	-46.22	-	53.54	68.20	14.66
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac_VHT40_Lowest Channel (5 755 ㎒)

Horizontal/Vertical for Band-edge


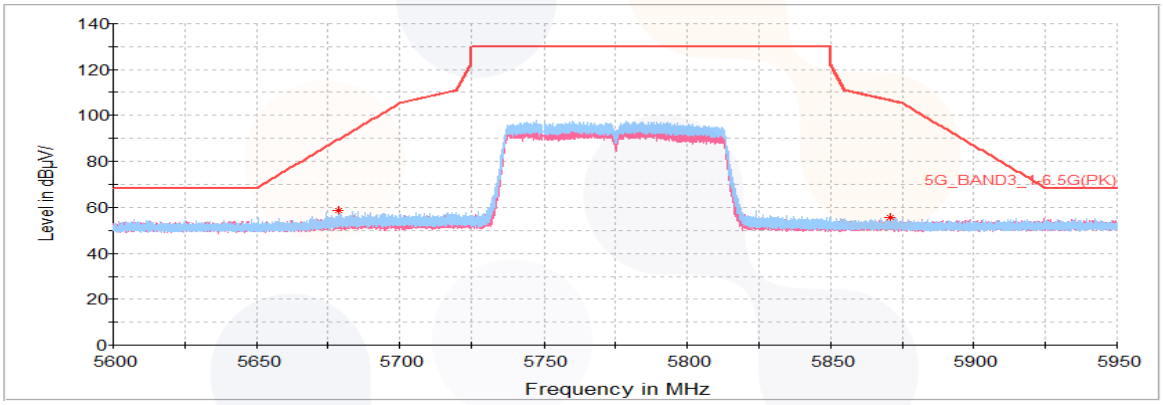
802.11ac_VHT40_Highest Channel (5 795 ㎒)

Horizontal/Vertical for Band-edge


802.11ac_VHT80_Middle Channel (5 775 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 678.54	H	47.43	34.61	-23.34	-	58.70	89.32	30.62
5 870.78	H	44.45	34.84	-23.38	-	55.91	106.38	50.48
11 566.90[1)]	H	60.27	38.27	-48.82	-	49.72	74.00	24.28
17 338.75	H	58.38	41.07	-46.24	-	53.21	68.20	14.99
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for Band-edge

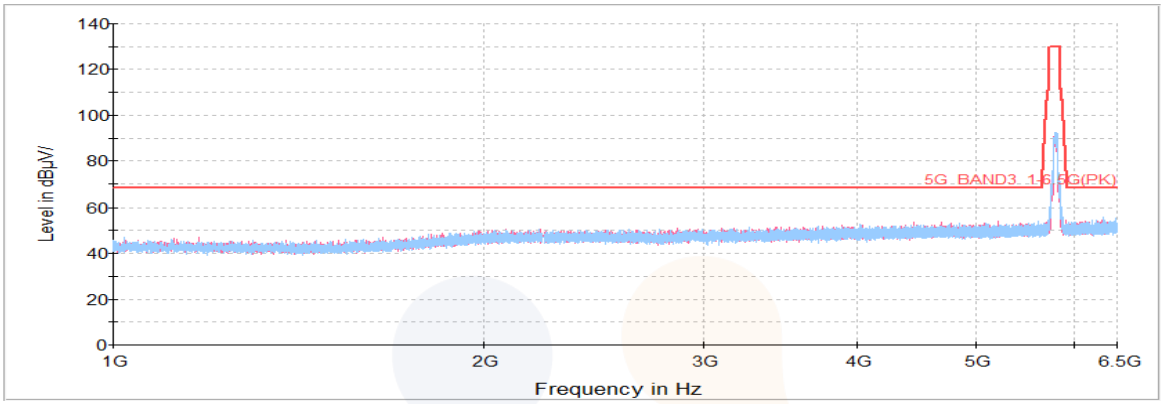


Plot of Harmonics and Spurious Emissions

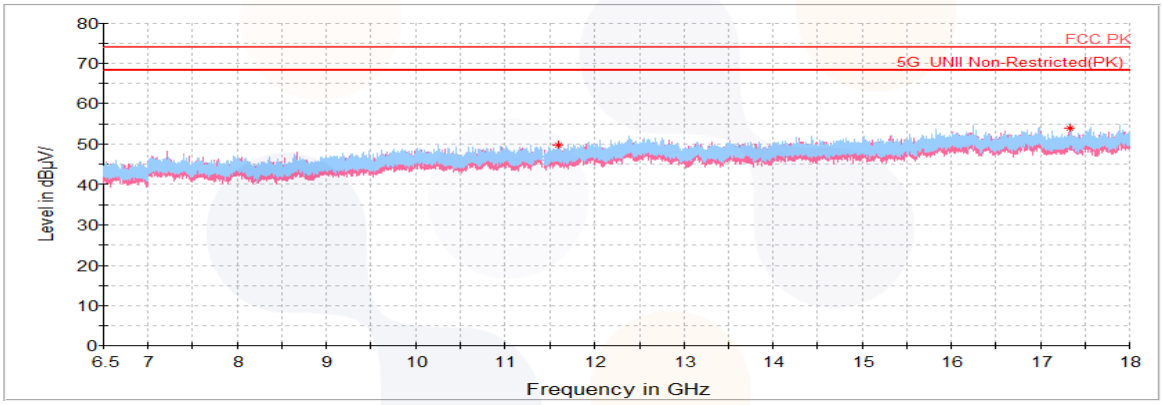
In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT40_UNII 3_Highest Channel (5 795 ㎒)

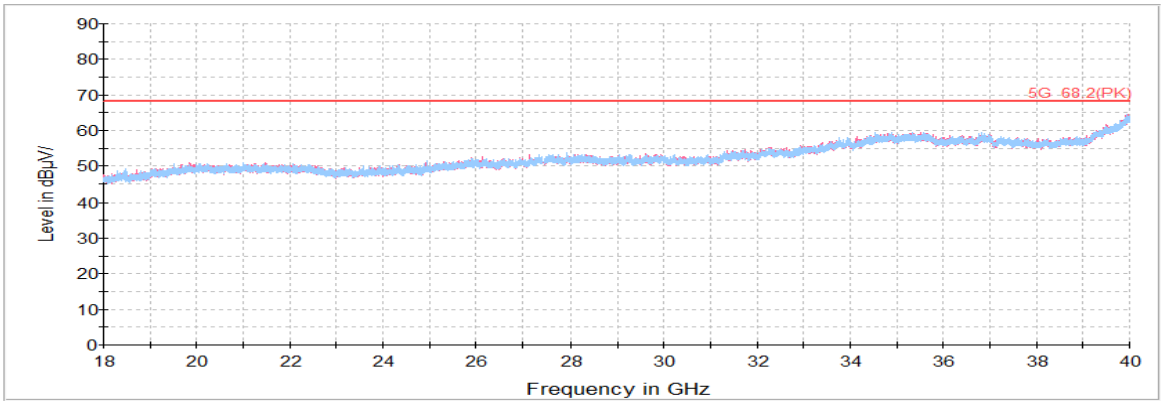
Horizontal/Vertical for 1 ㎓ ~ 6.5 ㎓



Horizontal/Vertical for 6.5 ㎓ ~ 18 ㎓

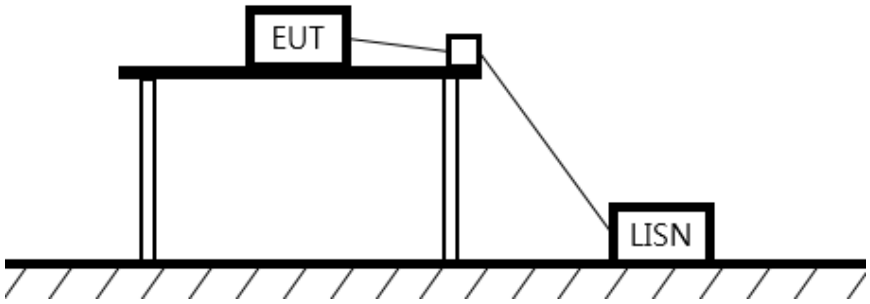


Horizontal/Vertical for 18 ㎓ ~ 40 ㎓



7.8. AC Conducted emission

Test setup



Limit

According to 15.207(a),

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

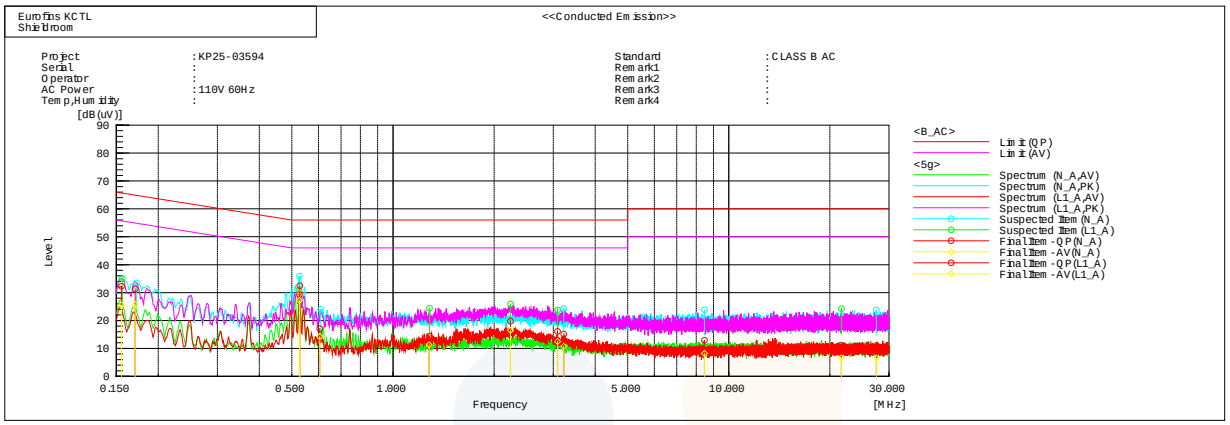
Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 ㎒ to 30 ㎒.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 ㎑ or to quasi-peak and average within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

Test results

Worst case: 802.11n HT40 / UNII 3_5 795 ㎒

.



Final Result

--- N_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.17057	21.1	15.5	10.2	31.3	25.7	64.9	54.9	33.6	29.2
2	0.52791	22.5	19.5	10.0	32.5	29.5	56.0	46.0	23.5	16.5
3	0.6052	7.0	4.3	10.0	17.0	14.3	56.0	46.0	39.0	31.7
4	3.22615	5.1	0.6	10.1	15.2	10.7	56.0	46.0	40.8	35.3
5	8.46126	2.6	-2.1	10.3	12.9	8.2	60.0	50.0	47.1	41.8
6	27.52345	-0.1	-4.6	11.1	11.0	6.5	60.0	50.0	49.0	43.5

--- L1_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.1554	22.3	15.5	10.0	32.3	25.5	65.7	55.7	33.4	30.2
2	0.52659	19.3	17.2	10.0	29.3	27.2	56.0	46.0	26.7	18.8
3	1.28158	4.5	1.3	9.9	14.4	11.2	56.0	46.0	41.6	34.8
4	2.23722	9.8	6.5	10.0	19.8	16.5	56.0	46.0	36.2	29.5
5	3.09114	6.0	2.4	10.1	16.1	12.5	56.0	46.0	39.9	33.5
6	21.65748	0.3	-4.3	10.9	11.2	6.6	60.0	50.0	48.8	43.4

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	101574	26.03.12
Spectrum Analyzer	R&S	FSV3044	101428	26.06.04
Vector Signal Generator	R&S	SMBV100A	257566	26.07.01*
Signal Generator	R&S	SMB100A	176206	26.01.17
Attenuator	API Inmet	40AH2W-10	11	26.04.28
Attenuator	API Inmet	40AH2W-10	13	26.04.28
Power Divider	AGILENT	11636B	54456	25.10.14
Power Divider	Aeroflex/ Weinschel,Inc	1580-1	NX380	26.04.28
Spectrum Analyzer	R&S	FSV40	100988	26.04.24
Spectrum Analyzer	R&S	FSV40	100989	25.10.10
PSA Spectrum Analyzer	Agilent	E4440A	MY44303500	26.08.04*
Amplifier	SONOMA INSTRUMENT	310N	421910	25.10.11
Bilog Antenna	Teseq GmbH	CBL 6112D	61521	26.12.11
TWO-LINE V - NETWORK	R&S	ENV216	101358	25.10.31
EMI TEST RECEIVER	R&S	ESCI3	100001	25.08.12
Horn antenna	ETS.lindgren	3117	00251528	26.01.21
Horn antenna	ETS.lindgren	3116	00086635	26.01.21
AMPLIFIER	B&Z Technologies	BZRT-00504000-481055-382525	26299-27735	26.04.30
AMPLIFIER	B&Z Technologies	BZR-0050400-551028-252525	27736	26.04.30
Attenuator	HUBER+SUHNER	6610_SK-50-1/199_NE	ATT09	26.03.17
High pass Filter	WT	WT-A1698-HS	WT160411001	26.04.23
High pass Filter	WT	WT-A1699-HS	WT160411002	26.04.23
Antenna Mast	Innco Systems	MA4640-XP-ET	MA4000/396/30810213/L	-
Controller	Innco Systems	CO3000	1175/45850319/P	-

* Tests related to this equipment were progressed before the calibration was completed

End of test report