

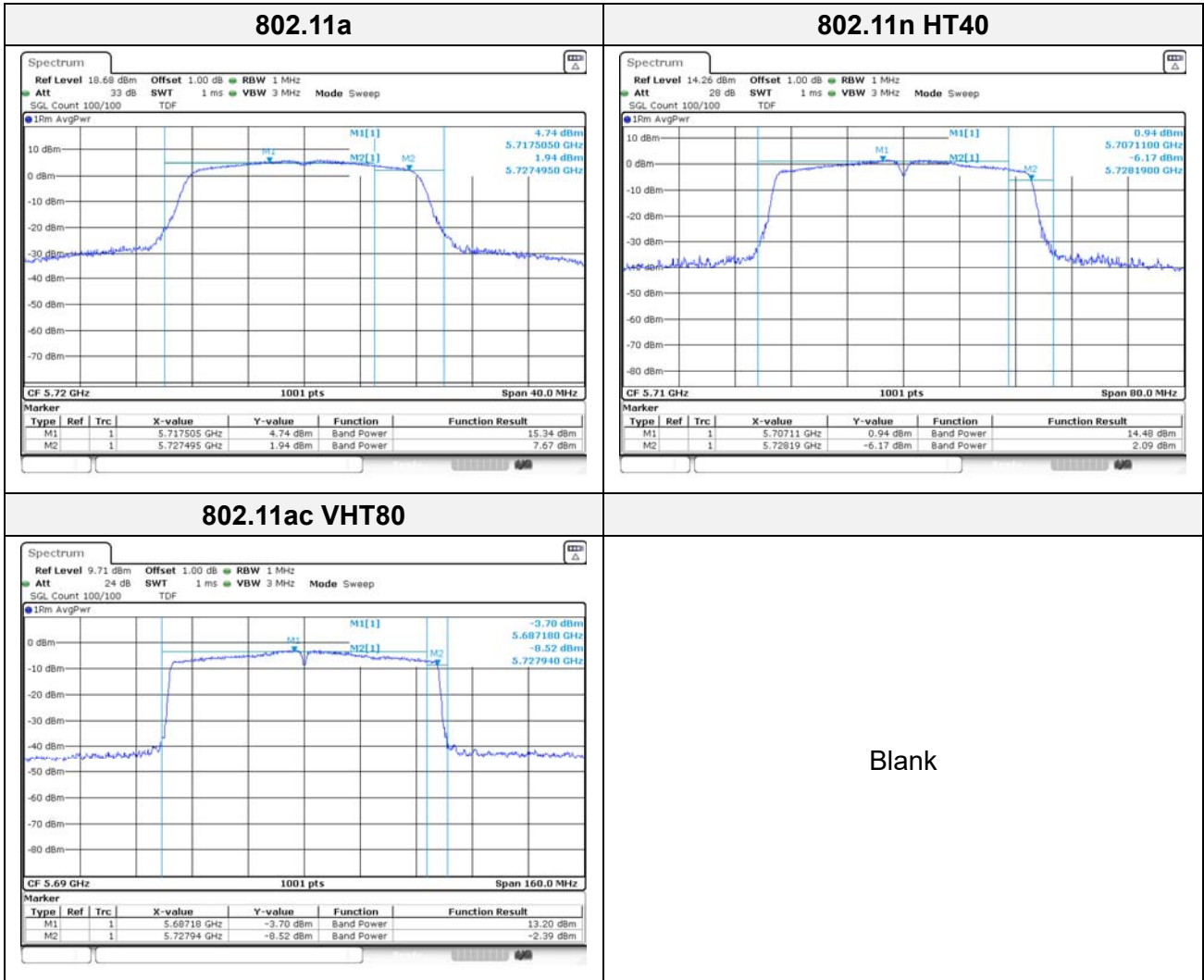
KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (47) of (109)



In order to simplify the report, attached plots were only the Worst Case per bandwidth.



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (48) of (109)

**Power Spectral Density**

Test mode	Band	Frequency (MHz)	Measured PSD (dBm/MHz)	DCF (dB)	Maximum PSD (dB m/MHz)	Limit (dBm/MHz)
802.11a	UNII-2C	5 720	5.92	0.14	6.06	11.00
802.11n HT20			5.59	0.15	5.74	
802.11ac VHT20			4.79	0.15	4.94	
802.11n HT40	UNII-2C	5 710	1.38	0.29	1.67	
802.11ac VHT40			1.40	0.29	1.69	
802.11ac VHT80	UNII-2C	5 690	-2.75	0.56	-2.19	

Test mode	Band	Frequency (MHz)	Measured PSD (dBm/ 500 kHz)	DCF (dB)	Maximum PSD (dBm/ 500 kHz)	Limit (dBm /500 kHz)
802.11a	UNII-3	5 720	1.20	0.14	1.34	30.00
802.11n HT20			0.66	0.15	0.81	
802.11ac VHT20			-0.09	0.15	0.06	
802.11n HT40		5 710	-5.10	0.29	-4.81	
802.11ac VHT40			-4.90	0.29	-4.61	
802.11ac VHT80		5 690	-9.40	0.56	-8.84	

Notes:

- Maximum PSD calculation
- Maximum PSD = Measured PSD + D.C.F

KCTL Inc.

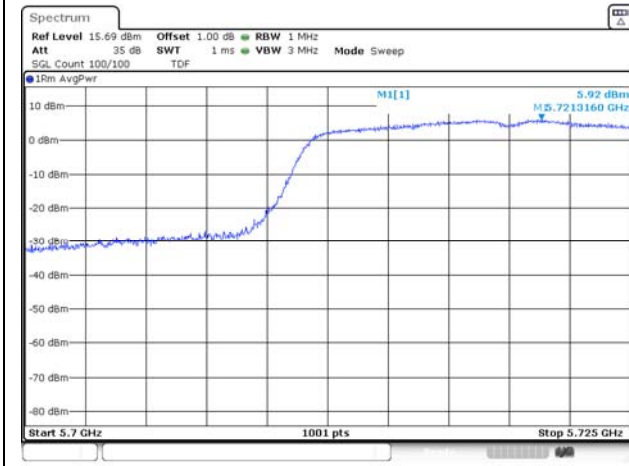
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (49) of (109)

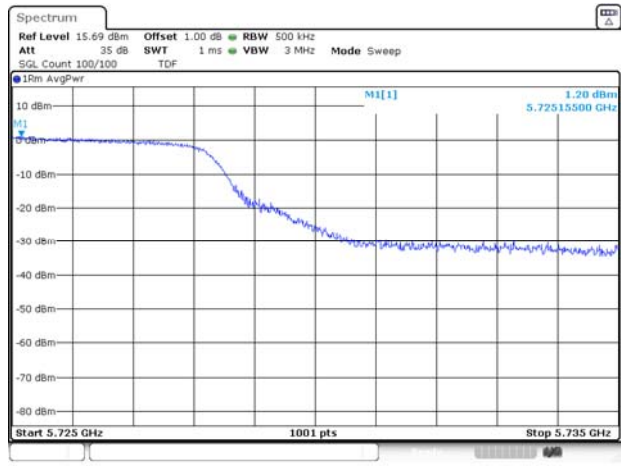


In order to simplify the report, attached plots were only the Worst Case per bandwidth.

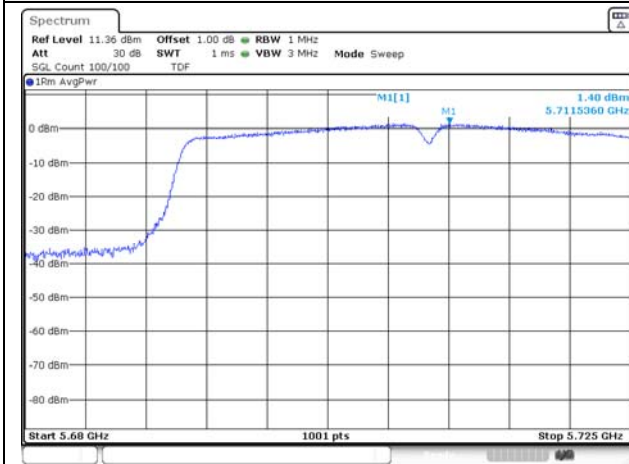
UNII-2C / 802.11a



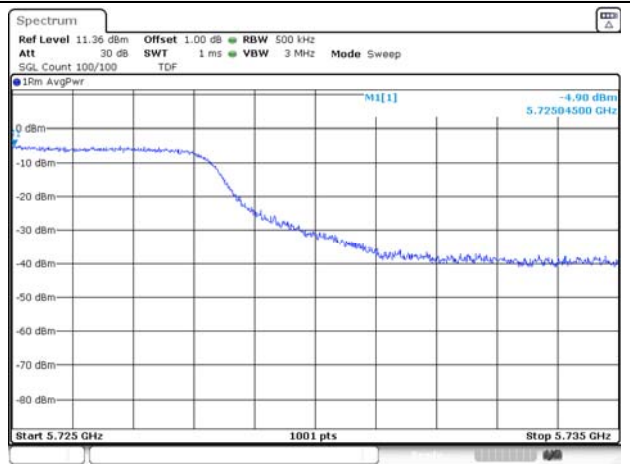
UNII-3 / 802.11a



UNII-2C / 802.11ac VHT40



UNII-3 / 802.11ac VHT40



UNII-2C / 802.11ac VHT80



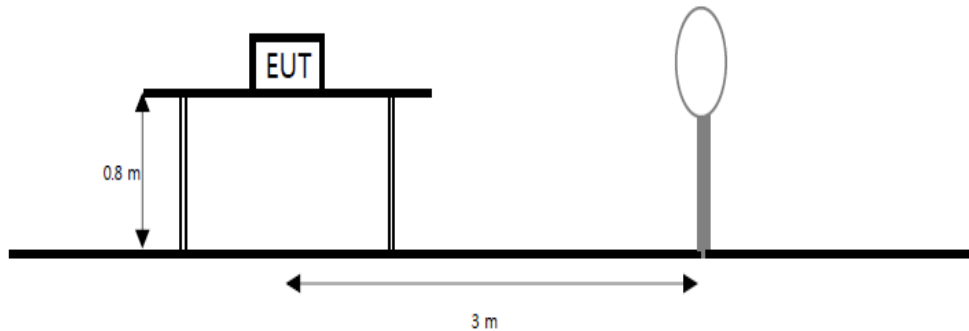
UNII-3 / 802.11ac VHT80



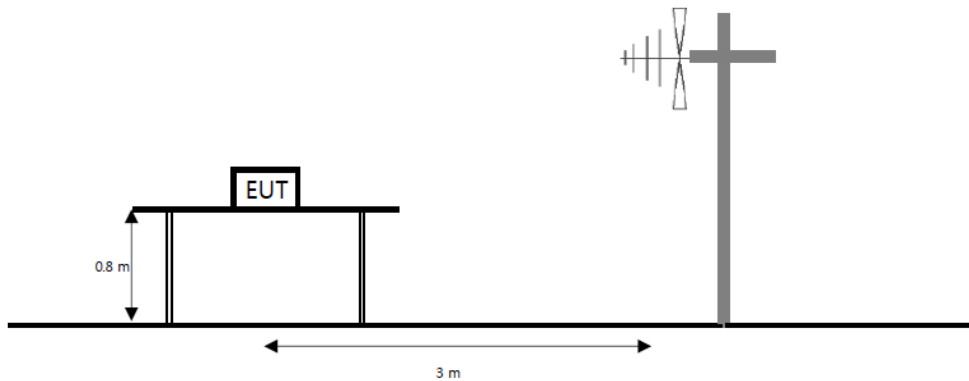
8.6. Spurious Emission, Band Edge and Restricted bands

Test setup

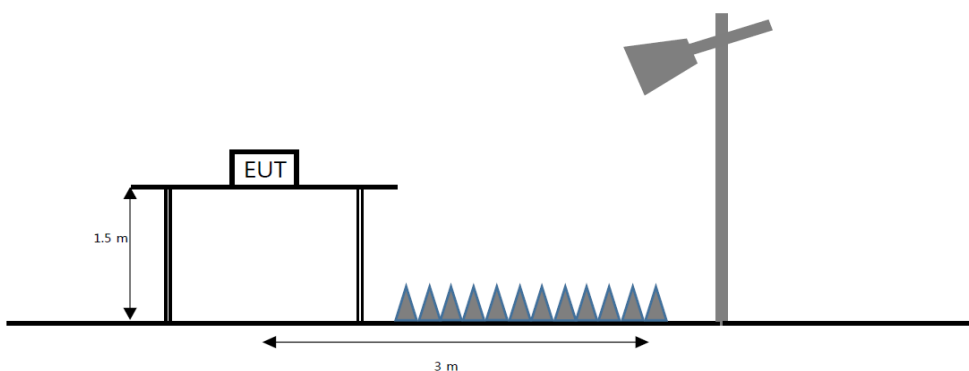
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



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



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



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (51) of (109)

**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 (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Measurement distance (m)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	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 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., Section 15.231 and 15.241.

According to section 15.205(a) and (b) only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
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	2 483.5 - 2 500	17.7 - 21.4
8.376 25 - 8.386 75	25	2 690 - 2 900	22.01 - 23.12
8.414 25 - 8.414 75	156.7 - 156.9	3 260 - 3 267	23.6 - 24.0
12.29 - 12.293	162.012 5 - 167.17	3 332 - 3 339	31.2 - 31.8
12.519 75 - 12.520 25	167.72 - 173.2	3 345.8 - 3 358	36.43 - 36.5
12.576 75 - 12.577 25	240 - 285	3 600 - 4 400	Above 38.6
13.36 - 13.41	322 - 335.4		

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 MHz, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, 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.

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (52) of (109)



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 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz

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

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

Test procedureANSI 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 \geq (3 \times 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 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

Average field strength measurements**Trace averaging with continuous EUT transmission at full power**

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

1. RBW = 1 MHz (unless otherwise specified).
2. VBW \geq (3 \times RBW).
3. Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. 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 dB 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 ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), 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 MHz (unless otherwise specified).
4. VBW \geq [3 \times RBW].
5. Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. 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 ($D \geq 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Notes:

1. $f < 30$ MHz, extrapolation factor of 40 dB/decade of distance. $F_d = 40 \log(D_m/D_s)$
 $f \geq 30$ MHz, 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. According to part 15.31(f)(2), an extrapolation factor of 40 dB/decade is applied because measured distance of radiated emission is 3 m.
7. Below 30 MHz 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."
8. For above 1 GHz pre-scan to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (55) of (109)

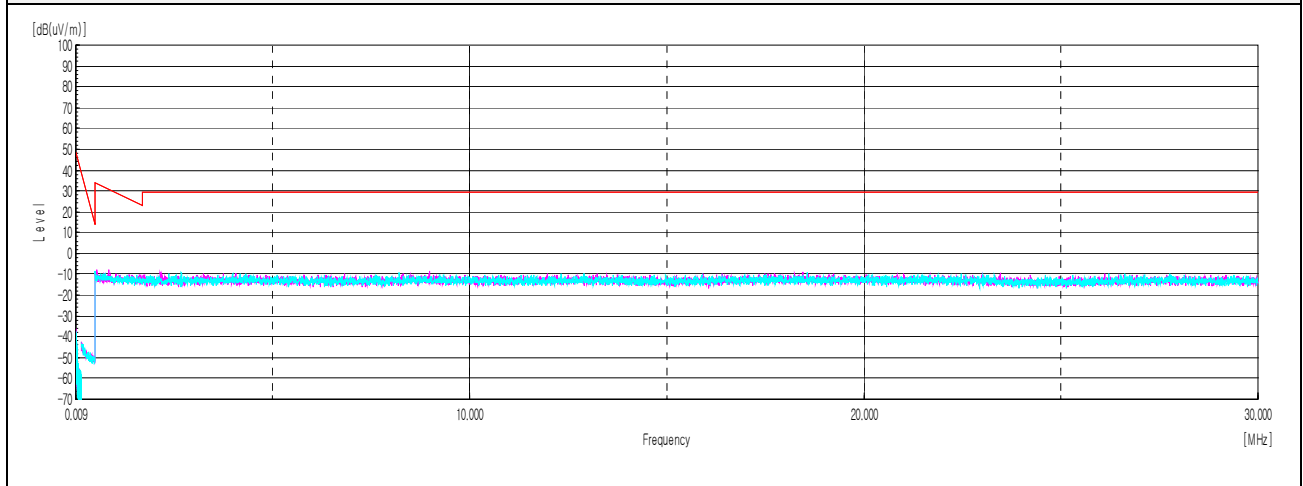


Test results (Below 30 MHz) – Worst case: 802.11a / UNII-2A 5 280 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. +Cable	Distance Factor	DCF	Result	Limit	Margin
[MHz]	[V/H]	[dB(μV)]	[dB]	[dB]	[dB]	[dB]	[dB(μV/m)]	[dB(μV/m)]	[dB]

No spurious emissions were detected within 20 dB of the limit.

Horizontal/Vertical



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

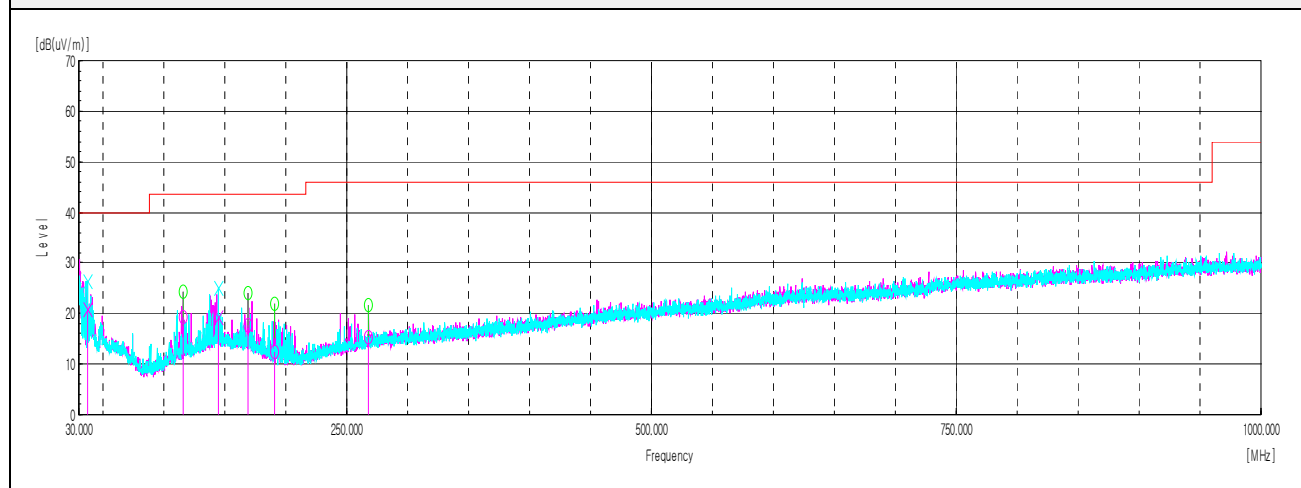
Report No.:
KR21-SRF0071-B
Page (56) of (109)



Test results (Below 1 000 MHz) – Worst case: 802.11a / UNII-2A 5 280 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Quasi peak data								
37.40	V	33.20	17.88	-30.32	-	20.76	40.00	19.24
115.36 ¹⁾	H	31.30	16.84	-28.84	-	19.30	43.50	24.20
144.58	V	28.70	19.00	-28.42	-	19.28	43.50	24.22
168.83 ¹⁾	H	27.50	18.42	-28.14	-	17.78	43.50	25.72
190.78	H	24.20	16.02	-27.83	-	12.39	43.50	31.11
267.89 ¹⁾	H	23.80	18.47	-26.93	-	15.34	46.00	30.66

Horizontal/Vertical



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (57) of (109)

**Test results (Above 1 000 MHz)****802.11a UNII-1****Lowest Channel (5 180 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 134.97 ¹⁾	H	40.74	34.14	-26.43	-	48.45	74.00	25.55
10 323.75	H	57.37	37.52	-49.94	-	44.95	68.20	23.25
16 650.19	V	57.69	41.12	-47.82	-	50.99	68.20	17.21
Average Data								
No spurious emissions were detected within 20 dB of the limit								

Middle Channel (5 200 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 463.55	H	58.89	37.66	-50.06	-	46.49	68.20	21.71
15 780.50 ¹⁾	V	57.19	39.89	-46.10	-	50.98	74.00	23.02
Average Data								
No spurious emissions were detected within 20 dB of the limit								

Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 486.19	H	57.82	37.69	-50.08	-	45.43	68.20	22.77
16 177.25 ¹⁾	V	56.72	40.81	-46.70	-	50.83	74.00	23.17
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

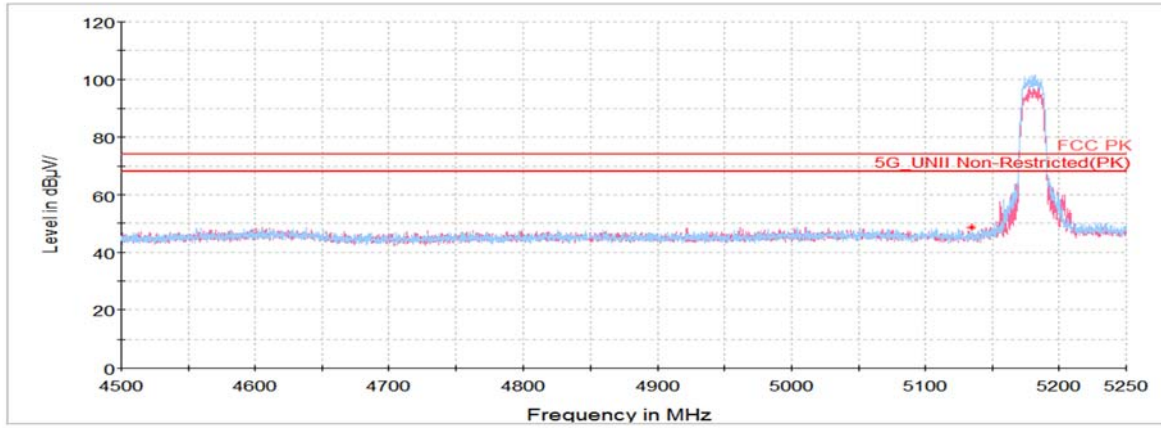
Report No.:
KR21-SRF0071-B
Page (58) of (109)



802.11a UNII-1

Lowest Channel (5 180 MHz)

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (59) of (109)

**802.11n HT20 UNII-1****Lowest Channel (5 180 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 148.74 ¹⁾	H	44.73	34.17	-26.28	-	52.62	74.00	21.38
10 273.44	V	58.79	37.47	-49.90	-	46.36	68.20	21.84
15 935.03 ¹⁾	H	56.54	39.83	-46.06	-	50.31	74.00	23.69
Average Data								
5 148.74 ¹⁾	H	34.93	34.17	-26.28	0.15	42.97	54.00	11.03

Middle Channel (5 200 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 513.14	V	58.64	37.71	-50.05	-	46.30	68.20	21.90
16 189.83 ¹⁾	H	56.76	40.83	-46.75	-	50.84	74.00	23.16
Average Data								
No spurious emissions were detected within 20 dB of the limit								

Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 592.56	H	58.20	37.79	-49.82	-	46.17	68.20	22.03
16 988.72	H	57.54	41.39	-47.64	-	51.29	68.20	16.91
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

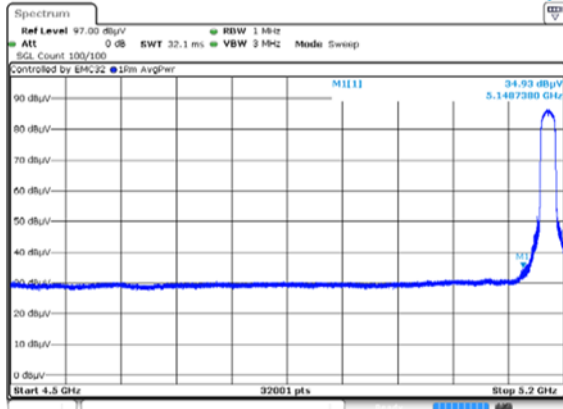
Report No.:
KR21-SRF0071-B
Page (60) of (109)



802.11n HT20 UNII-1

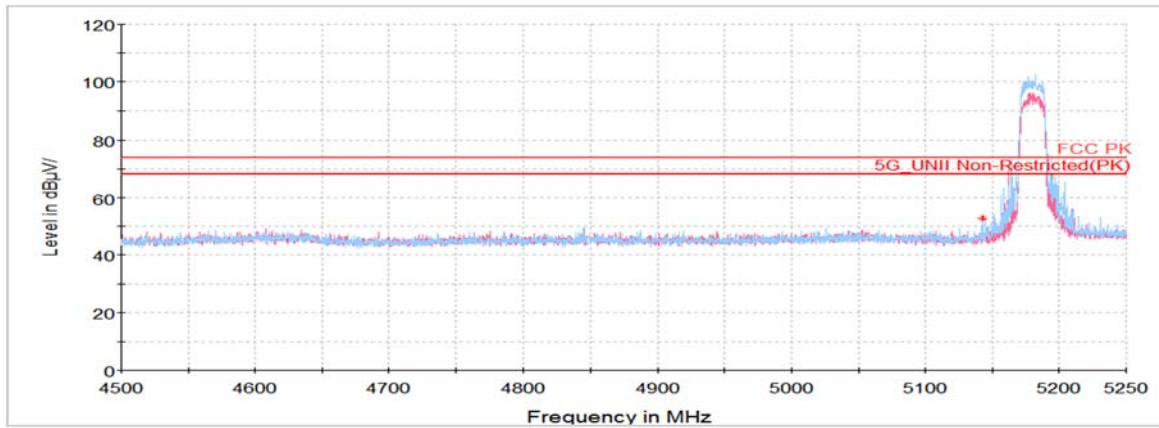
Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (61) of (109)

**802.11n HT40 UNII-1****Lowest Channel (5 190 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 149.94 ¹⁾	H	47.71	34.17	-26.27	-	55.61	74.00	18.39
10 275.95	V	58.06	37.48	-49.90	-	45.64	68.20	22.56
16 850.36	V	57.00	41.28	-47.71	-	50.57	68.20	17.63
Average Data								
5 149.94 ¹⁾	H	35.68	34.17	-26.27	0.29	43.87	54.00	10.13

Highest Channel (5 230 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 467.14	H	57.95	37.67	-50.06	-	45.56	68.20	22.64
15 922.45 ¹⁾	H	55.89	39.83	-46.07	-	49.65	74.00	24.35
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

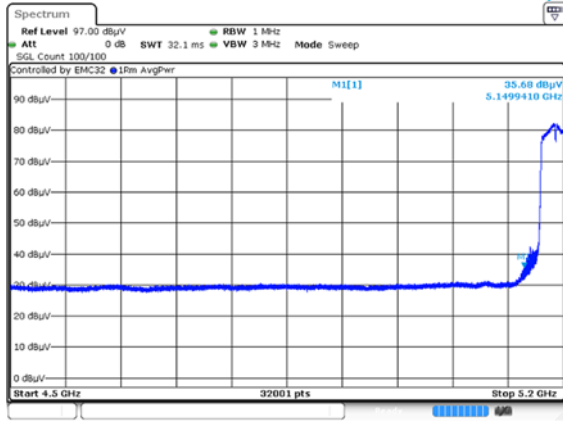
Report No.:
KR21-SRF0071-B
Page (62) of (109)



802.11n HT40 UNII-1

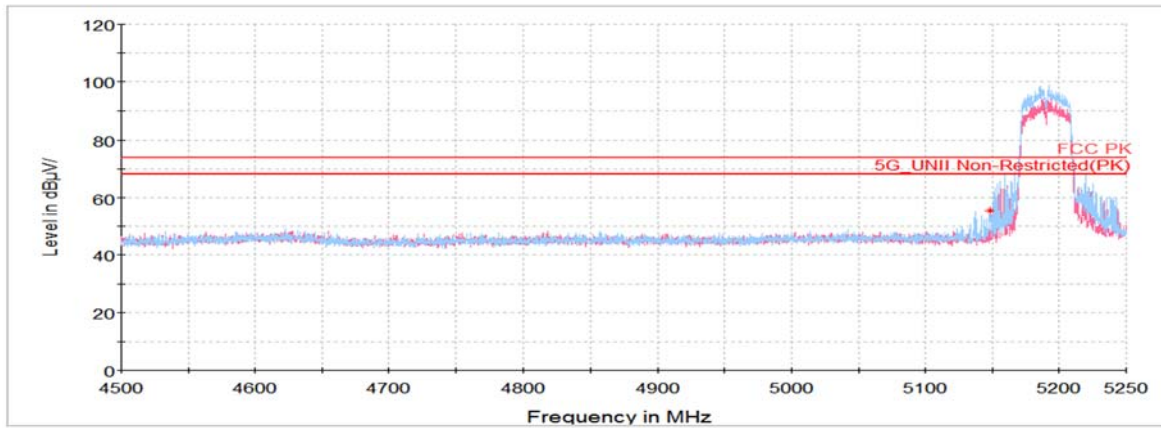
Lowest Channel (5 190 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (63) of (109)

**802.11ac VHT20 UNII-1****Lowest Channel (5 180 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 149.94 ¹⁾	H	44.09	34.17	-26.27	-	51.99	74.00	22.01
10 266.61	H	58.32	37.47	-49.89	-	45.90	68.20	22.30
15 247.19	H	56.03	40.15	-45.61	-	50.57	68.20	17.63
Average Data								
5 149.94 ¹⁾	H	35.27	34.17	-26.27	0.15	43.32	54.00	10.68

Middle Channel (5 200 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 462.83	V	57.78	37.66	-50.06	-	45.38	68.20	22.82
16 077.34 ¹⁾	H	56.61	40.69	-46.34	-	50.96	74.00	23.04
Average Data								
No spurious emissions were detected within 20 dB of the limit								

Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 555.19	H	57.81	37.76	-49.93	-	45.64	68.20	22.56
16 180.84 ¹⁾	V	56.13	40.82	-46.72	-	50.23	74.00	23.77
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

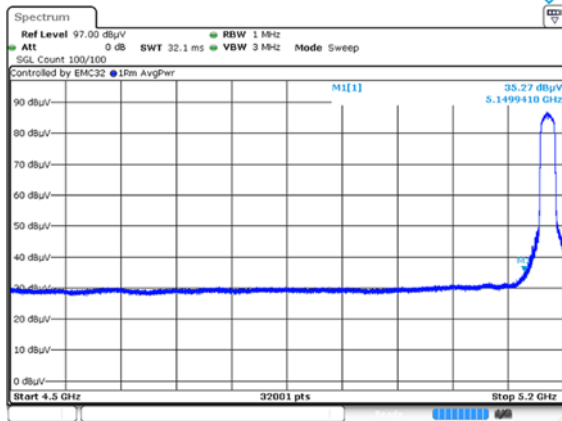
Report No.:
KR21-SRF0071-B
Page (64) of (109)



802.11ac VHT20 UNII-1

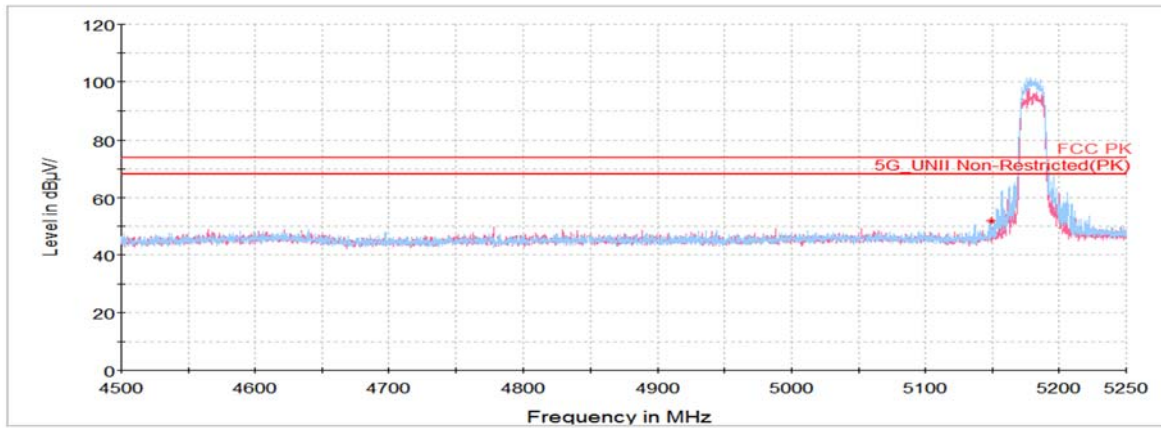
Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (65) of (109)

**802.11ac VHT40 UNII-1****Lowest Channel (5 190 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 149.42 ¹⁾	H	43.90	34.17	-26.27	-	51.80	74.00	22.20
10 491.22	H	57.72	37.69	-50.08	-	45.33	68.20	22.87
16 831.67	H	57.26	41.27	-47.72	-	50.81	68.20	17.39
Average Data								
5 149.42 ¹⁾	H	34.05	34.17	-26.27	0.29	42.24	54.00	11.76

Highest Channel (5 230 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 550.16	H	58.03	37.75	-49.95	-	45.83	68.20	22.37
15 927.84 ¹⁾	V	57.01	39.83	-46.07	-	50.77	74.00	23.23
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

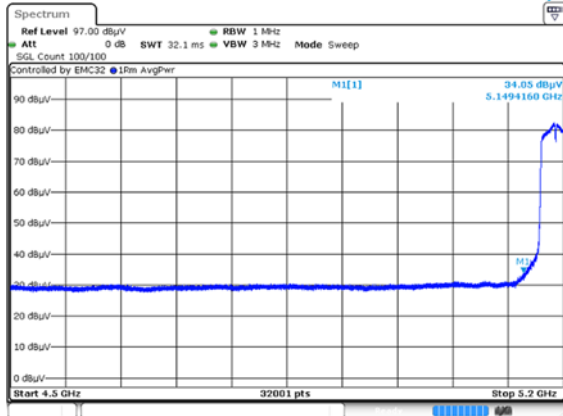
Report No.:
KR21-SRF0071-B
Page (66) of (109)



802.11ac VHT40 UNII-1

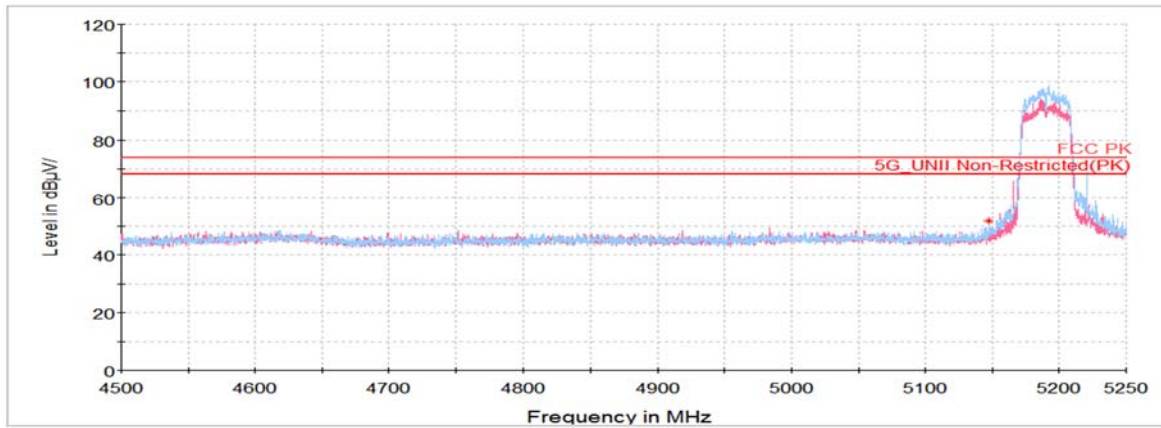
Lowest Channel (5 190 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (67) of (109)

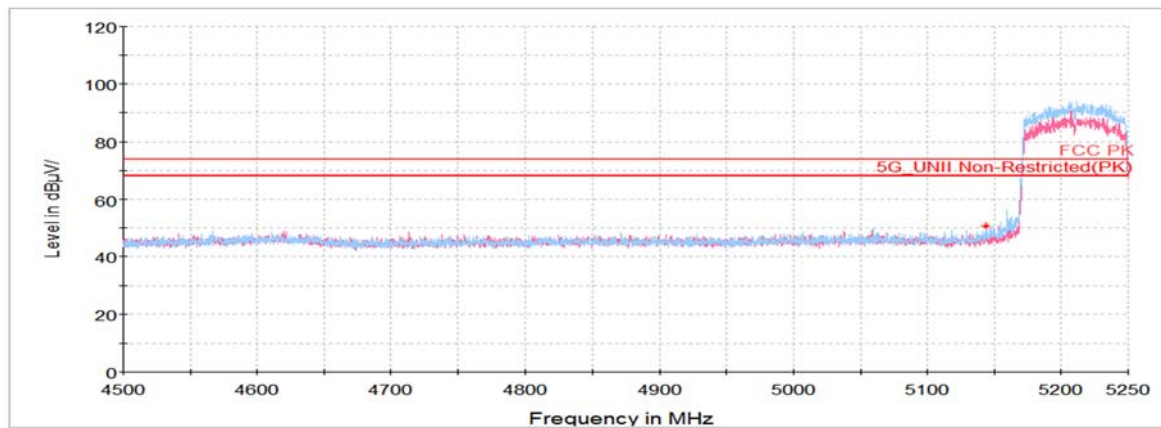


802.11ac VHT80 UNII-1

Lowest Channel (5 210 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μ V))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μ V/m))	Limit (dB(μ V/m))	Margin (dB)
Peak data								
5 143.73 ¹⁾	H	42.72	34.16	-26.34	-	50.54	74.00	23.46
10 485.47	H	57.72	37.69	-50.08	-	45.33	68.20	22.87
16 296.92	H	56.55	40.96	-47.14	-	50.37	68.20	17.83
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for Band-edge

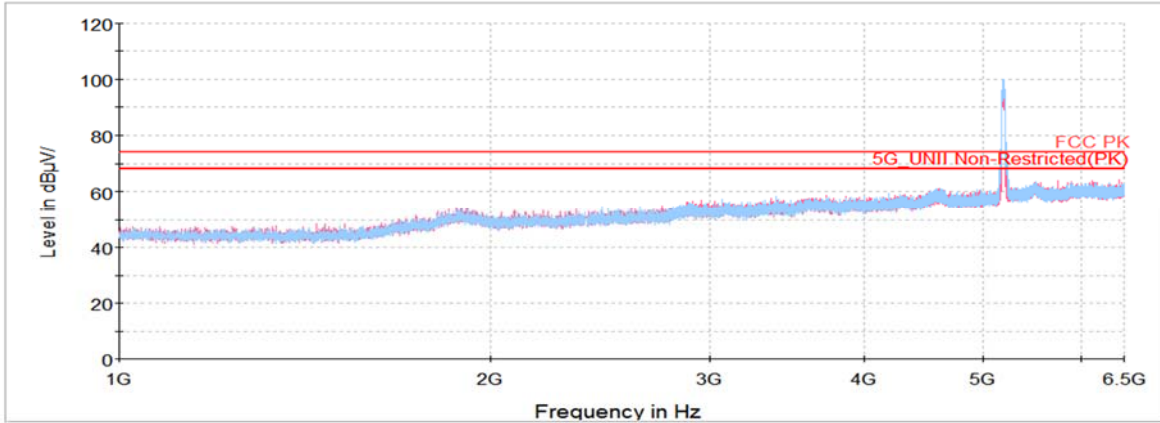


Plot of Harmonics and Spurious Emissions

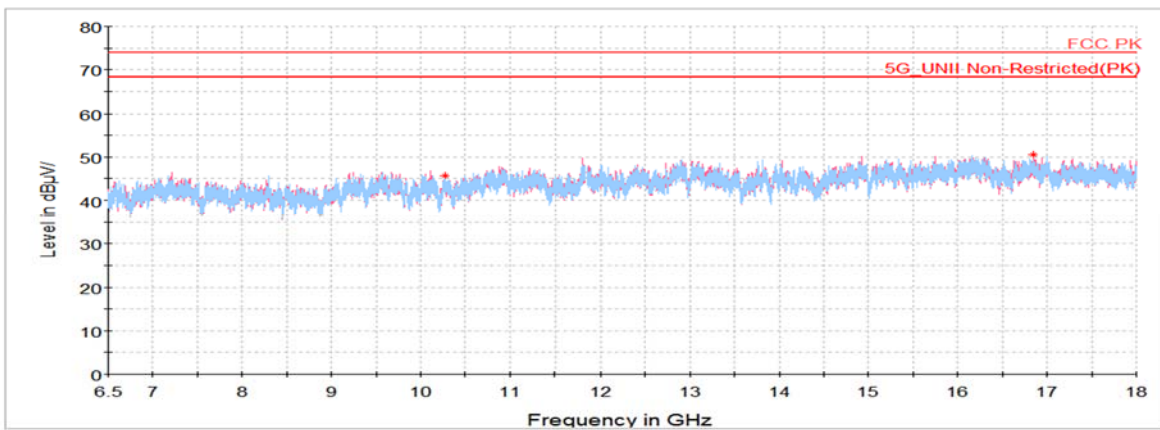
In order to simplify the report, attached plots were only the lowest margin condition

802.11n HT40_UNII-1_Lowest Channel (5 190 MHz)

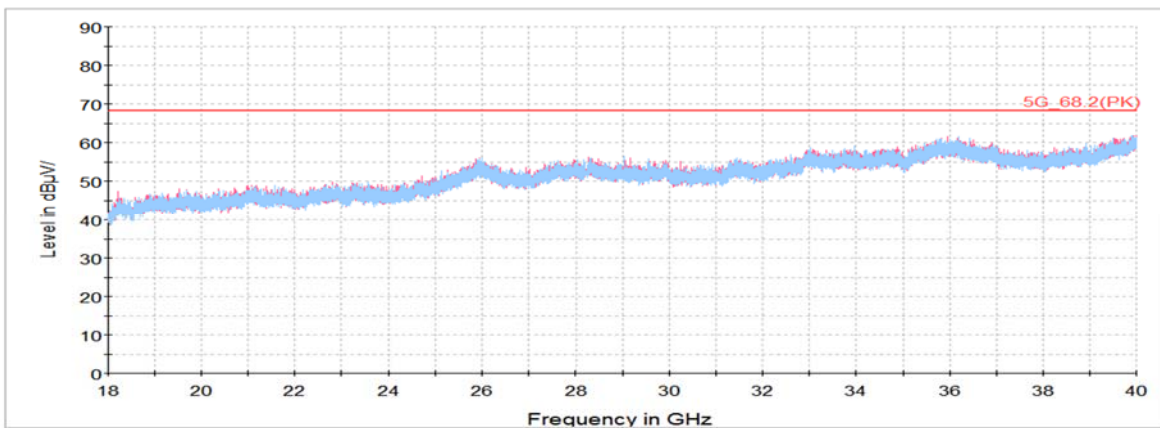
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (69) of (109)

**802.11a UNII-2A****Lowest Channel (5 260 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 549.80	H	58.31	37.75	-49.95	-	46.11	68.20	22.09
16 848.92	V	58.22	41.28	-47.71	-	51.79	68.20	16.41
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 280 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 264.81	V	59.93	37.46	-49.89	-	47.50	68.20	20.70
16 828.44	H	57.61	41.26	-47.72	-	51.15	68.20	17.05
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.06 ¹⁾	H	44.92	34.53	-26.11	-	53.34	74.00	20.66
10 604.06 ¹⁾	V	58.42	37.80	-49.79	-	46.43	74.00	27.57
16 845.33	H	57.82	41.28	-47.71	-	51.39	68.20	16.81
Average Data								
5 350.06 ¹⁾	H	34.87	34.53	-26.11	0.14	43.43	54.00	10.57

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

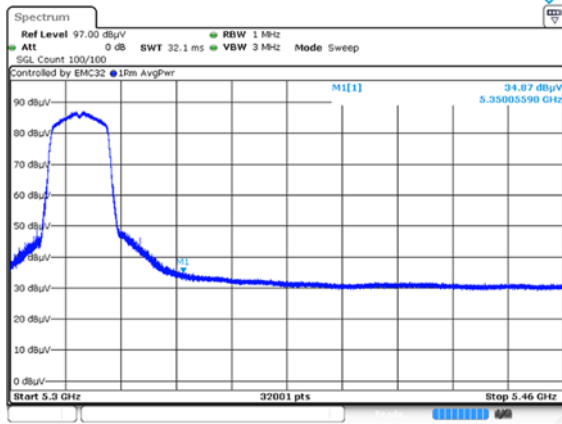
Report No.:
KR21-SRF0071-B
Page (70) of (109)



802.11a UNII-2A

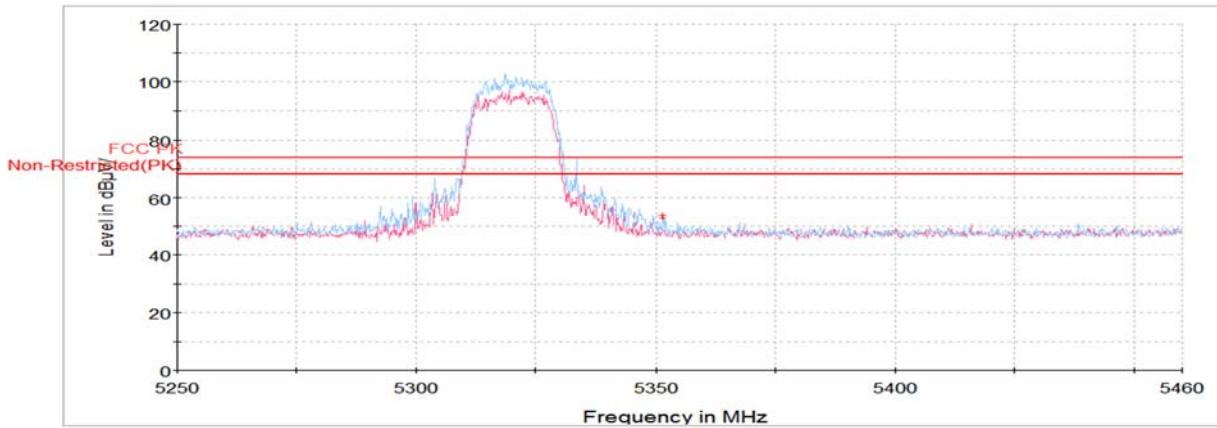
Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n HT20 UNII-2A

Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 466.42	V	58.11	37.67	-50.06	-	45.72	68.20	22.48
16 873.00	V	57.15	41.30	-47.70	-	50.75	68.20	17.45
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 280 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 517.45	V	58.80	37.72	-50.04	-	46.48	68.20	21.72
16 179.77 ¹⁾	V	56.35	40.82	-46.71	-	50.46	74.00	23.54
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 350.12 ¹⁾	H	49.16	34.53	-26.11	-	57.58	74.00	16.42
10 737.75 ¹⁾	H	59.26	37.94	-49.41	-	47.79	74.00	26.21
16 299.08	H	56.27	40.96	-47.15	-	50.08	68.20	18.12
Average Data								
5 350.12 ¹⁾	H	34.89	34.53	-26.11	0.15	43.46	54.00	10.54

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

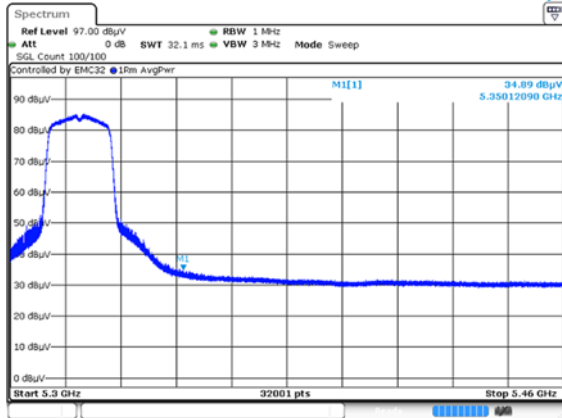
Report No.:
KR21-SRF0071-B
Page (72) of (109)



802.11n HT20 UNII-2A

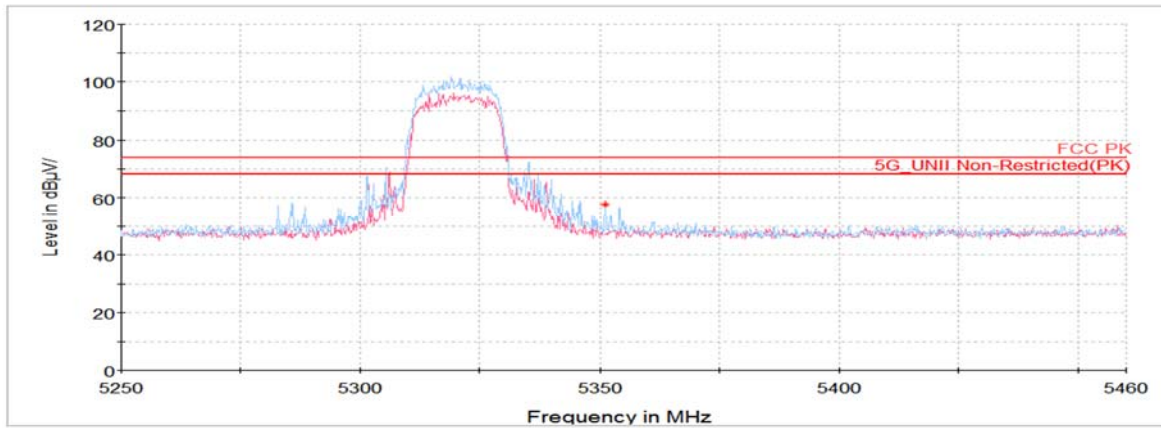
Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (73) of (109)

**802.11n HT40 UNII-2A****Lowest Channel (5 270 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 464.63	V	59.53	37.66	-50.06	-	47.13	68.20	21.07
16 807.95	H	57.01	41.25	-47.73	-	50.53	68.20	17.67
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 310 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.19 ¹⁾	H	50.36	34.53	-26.11	-	58.78	74.00	15.22
10 795.97	H	59.52	38.00	-49.24	-	48.28	74.00	25.72
16 230.08	H	57.65	40.88	-46.90	-	51.63	68.20	16.57
Average Data								
5 350.19 ¹⁾	H	39.35	34.53	-26.11	0.29	48.06	54.00	5.94

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

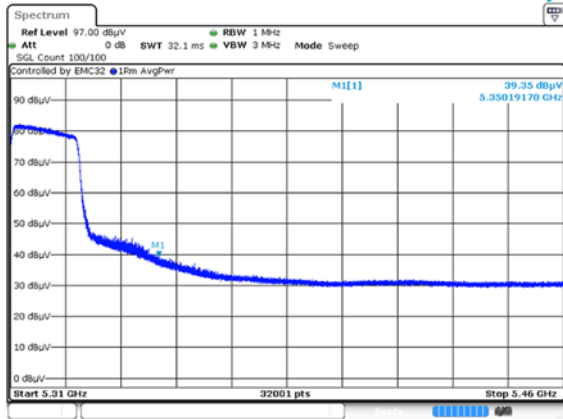
Report No.:
KR21-SRF0071-B
Page (74) of (109)



802.11n HT40 UNII-2A

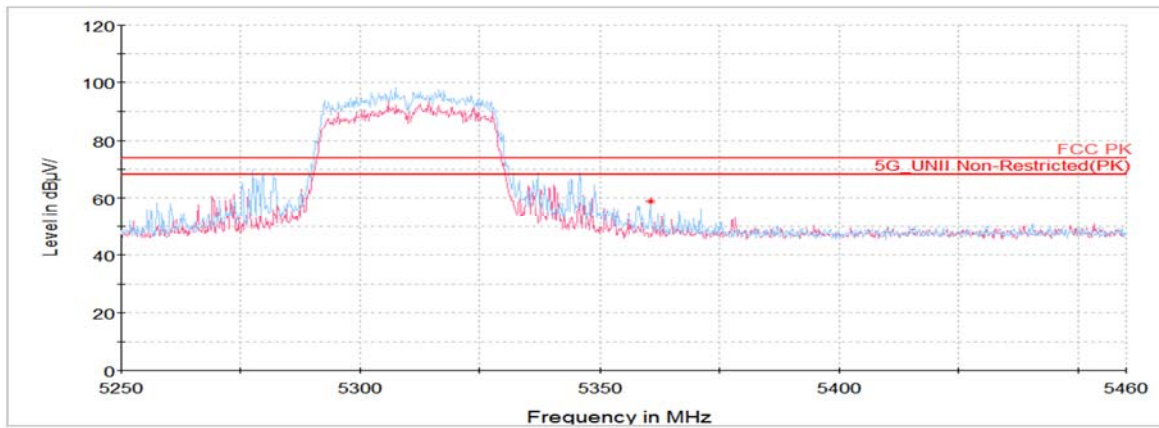
Highest Channel (5 310 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (75) of (109)

**802.11ac VHT20 UNII-2A****Lowest Channel (5 260 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 641.80 ¹⁾	H	58.57	37.84	-49.68	-	46.73	74.00	27.27
16 150.66 ¹⁾	V	56.46	40.78	-46.61	-	50.63	74.00	23.37
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 280 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 587.53	H	58.40	37.79	-49.84	-	46.35	68.20	21.85
16 277.88	V	57.39	40.93	-47.07	-	51.25	68.20	16.95
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 351.12 ¹⁾	H	44.42	34.53	-26.10	-	52.85	74.00	21.15
10 766.86 ¹⁾	H	58.58	37.97	-49.33	-	47.22	74.00	26.78
17 275.50	V	58.08	40.53	-47.81	-	50.80	68.20	17.40
Average Data								
5 351.12 ¹⁾	H	34.33	34.53	-26.10	0.15	42.91	54.00	11.09

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

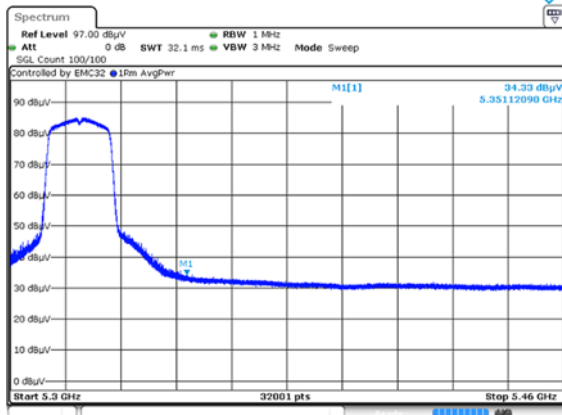
Report No.:
KR21-SRF0071-B
Page (76) of (109)



802.11ac VHT20 UNII-2A

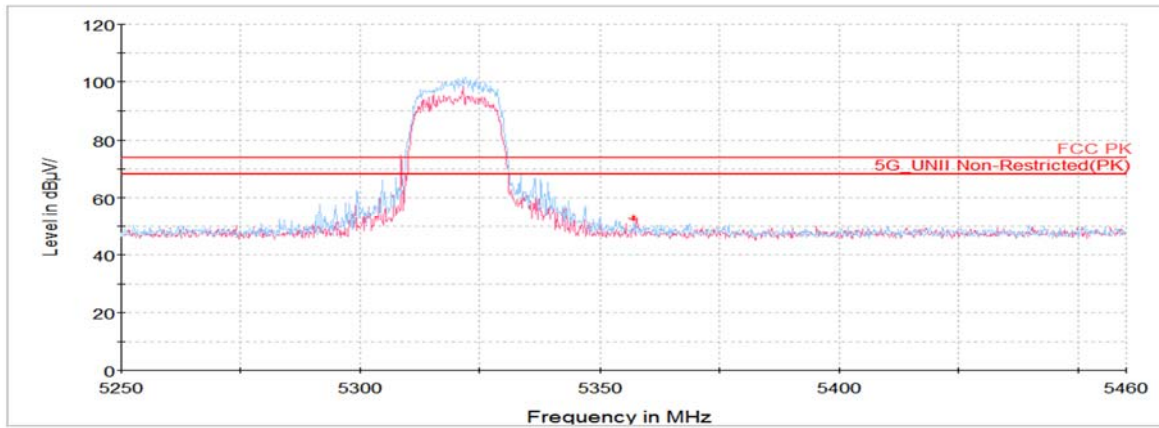
Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (77) of (109)

**802.11ac VHT40 UNII-2A****Lowest Channel (5 270 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 504.88	H	58.37	37.70	-50.07	-	46.00	68.20	22.20
16 295.13	V	57.28	40.95	-47.14	-	51.09	68.20	17.11
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 310 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.79 ¹⁾	H	46.58	34.53	-26.10	-	55.01	74.00	18.99
10 734.16 ¹⁾	H	60.13	37.93	-49.42	-	48.64	74.00	25.36
16 085.97 ¹⁾	V	56.26	40.70	-46.37	-	50.59	74.00	23.41
Average Data								
5 350.79 ¹⁾	H	38.47	34.53	-26.10	0.29	47.19	54.00	6.81

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

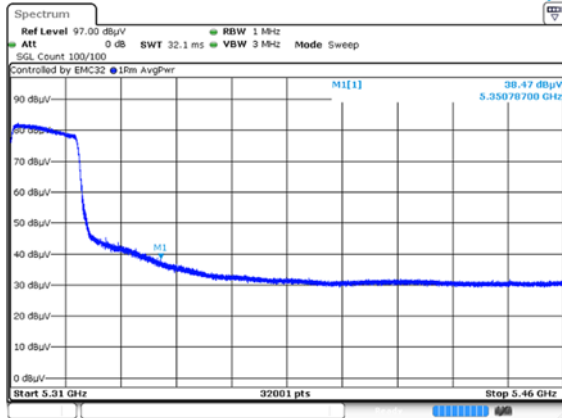
Report No.:
KR21-SRF0071-B
Page (78) of (109)



802.11ac VHT40 UNII-2A

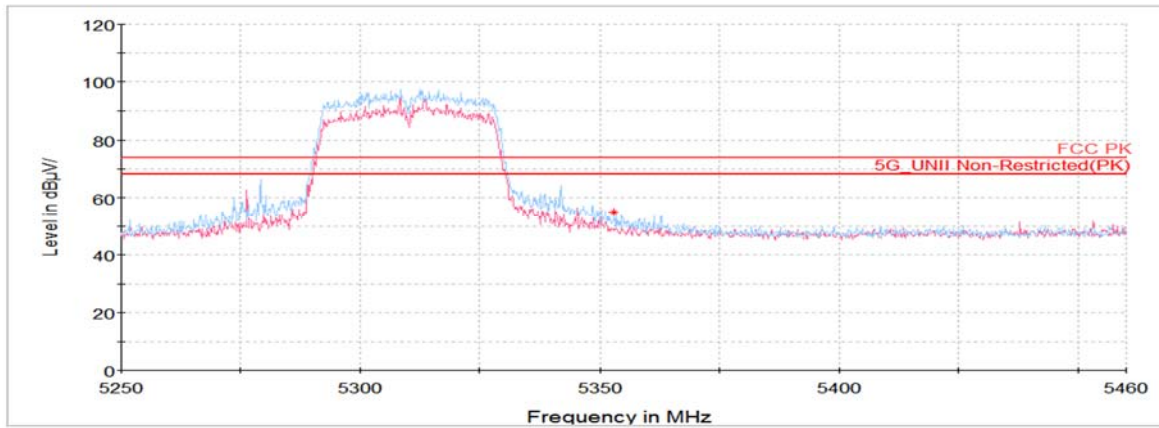
Highest Channel (5 310 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (79) of (109)

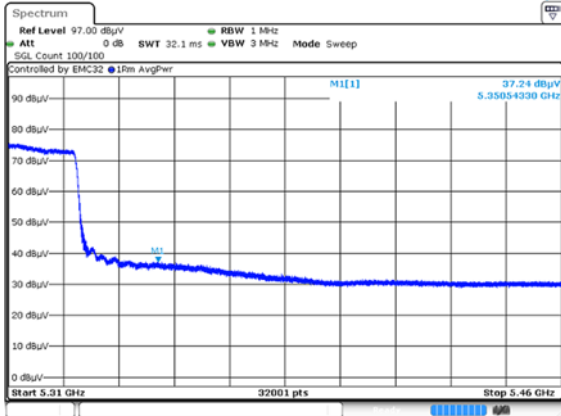


802.11ac VHT80 UNII-2A

Lowest Channel (5 290 MHz)

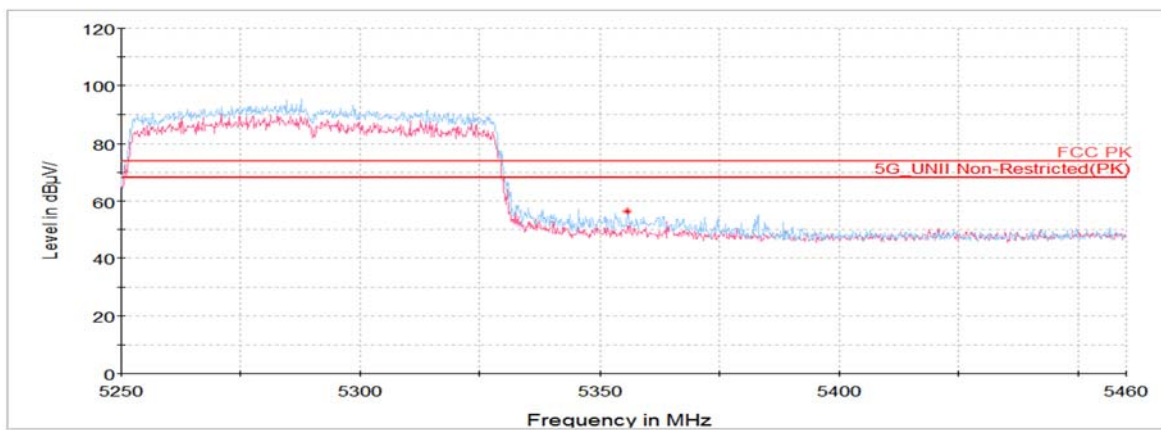
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.54 ¹⁾	H	47.84	34.53	-26.11	-	56.26	74.00	17.74
10 616.64 ¹⁾	H	58.79	37.82	-49.76	-	46.85	74.00	27.15
16 084.17 ¹⁾	V	56.09	40.70	-46.36	-	50.43	74.00	23.57
Average Data								
5 350.54 ¹⁾	H	37.24	34.53	-26.11	0.56	46.22	54.00	7.78

Average data



Blank

Horizontal/Vertical for Band-edge

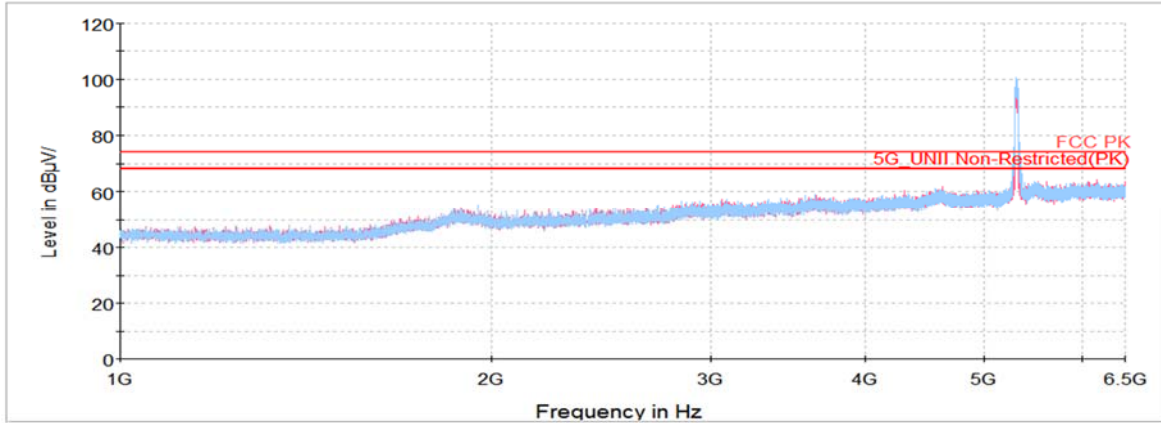


Plot of Harmonics and Spurious Emissions

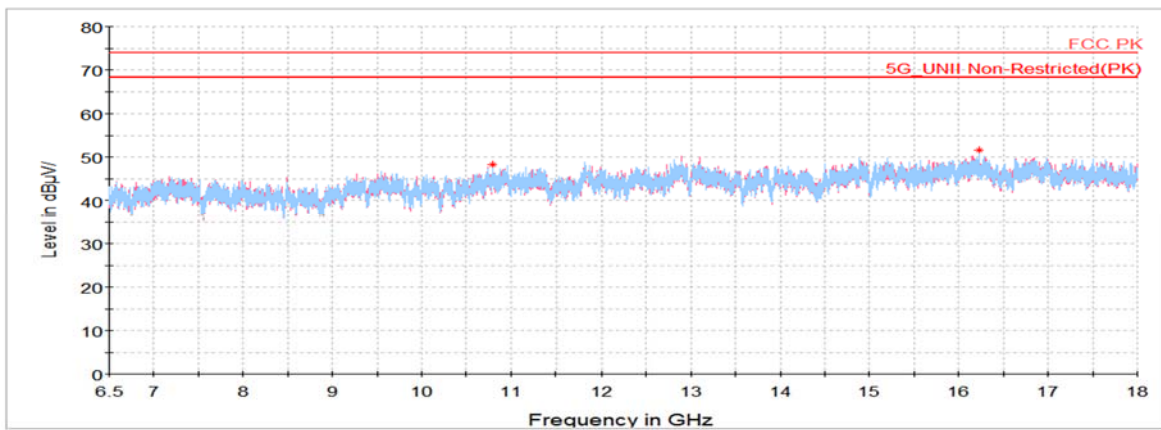
In order to simplify the report, attached plots were only the lowest margin condition

802.11n HT40_UNII-2A_Highest Channel (5 310 MHz)

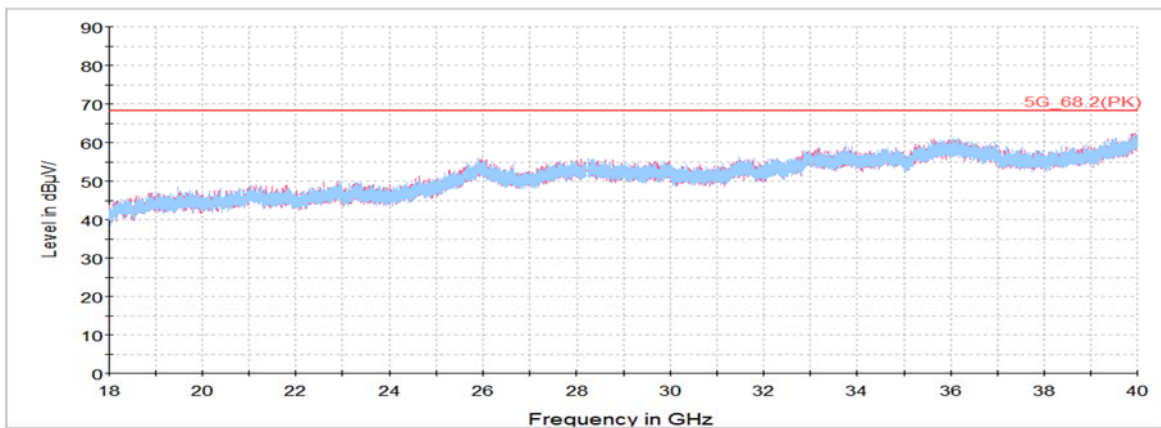
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (81) of (109)

**802.11a UNII-2C****Lowest Channel (5 500 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 454.66 ¹⁾	H	41.04	34.72	-25.14	-	50.62	74.00	23.38
10 934.33 ¹⁾	V	58.16	38.13	-48.85	-	47.44	74.00	26.56
16 177.61 ¹⁾	H	56.66	40.81	-46.70	-	50.77	74.00	23.23
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 600 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 204.58 ¹⁾	H	59.71	38.24	-49.39	-	48.56	74.00	25.44
16 643.00	H	57.31	41.11	-47.82	-	50.60	68.20	17.60
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 700 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 726.39	H	49.09	35.03	-26.42	-	57.70	68.20	10.50
11 370.25 ¹⁾	H	59.43	38.27	-49.98	-	47.72	74.00	26.28
16 038.17 ¹⁾	H	56.28	40.65	-46.19	-	50.74	74.00	23.26
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

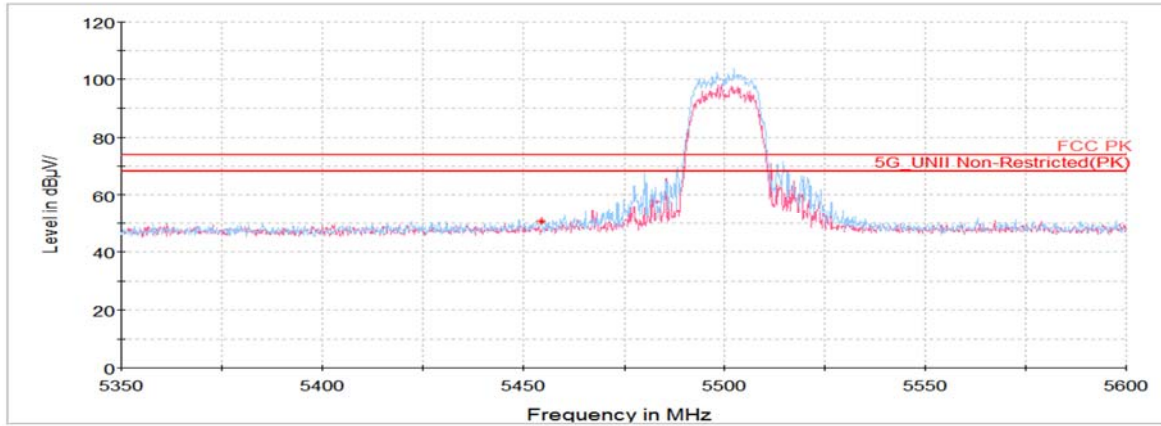
Report No.:
KR21-SRF0071-B
Page (82) of (109)



802.11a UNII-2C

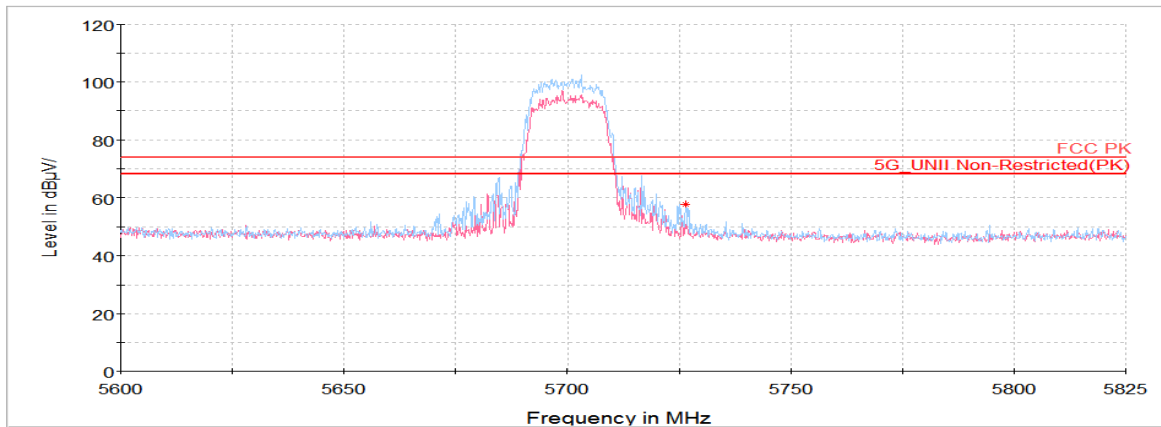
Lowest Channel (5 500 MHz)

Horizontal/Vertical for Band-edge (5 500 MHz)



Highest Channel (5 700 MHz)

Horizontal/Vertical for Band-edge (5 700 MHz)



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (83) of (109)

**802.11n HT20 UNII-2C****Lowest Channel (5 500 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 449.33 ¹⁾	H	41.18	34.71	-25.19	-	50.70	74.00	23.30
11 028.48 ¹⁾	V	58.27	38.21	-48.76	-	47.72	74.00	26.28
15 935.39 ¹⁾	V	56.46	39.83	-46.06	-	50.23	74.00	23.77
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 600 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 149.23 ¹⁾	V	58.27	38.23	-49.19	-	47.31	74.00	26.69
16 818.38	V	56.89	41.25	-47.73	-	50.41	68.20	17.79
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 700 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 728.45	H	51.29	35.03	-26.41	-	59.91	68.20	8.29
11 322.45 ¹⁾	V	58.30	38.26	-49.81	-	46.75	74.00	27.25
16 997.34	V	56.83	41.40	-47.64	-	50.59	68.20	17.61
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

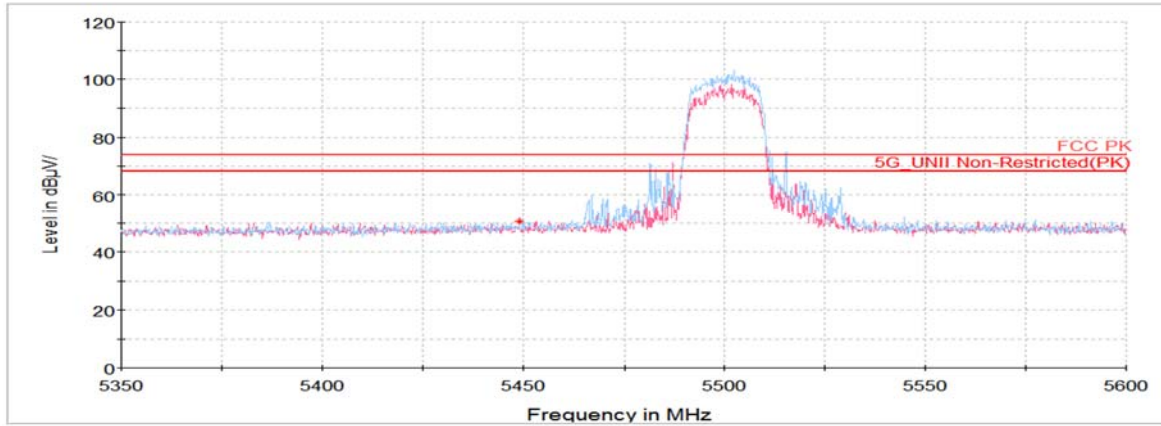
Report No.:
KR21-SRF0071-B
Page (84) of (109)



802.11n HT20 UNII-2C

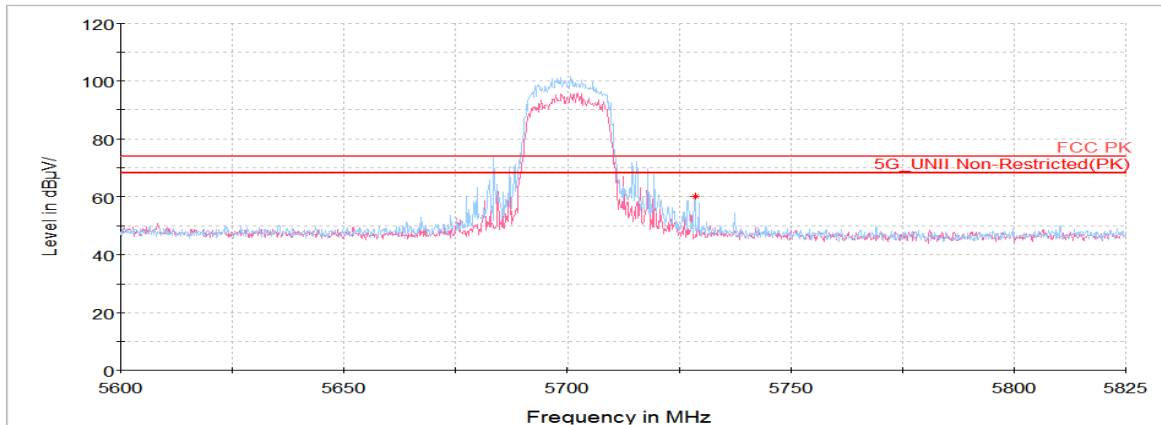
Lowest Channel (5 500 MHz)

Horizontal/Vertical for Band-edge



Highest Channel (5 700 MHz)

Horizontal/Vertical for Band-edge (5 700 MHz)



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (85) of (109)

**802.11n HT40 UNII-2C****Lowest Channel (5 510 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 457.65 ¹⁾	H	44.17	34.72	-25.11	-	53.78	74.00	20.22
10 925.70 ¹⁾	V	59.57	38.13	-48.87	-	48.83	74.00	25.17
16 299.44	V	56.90	40.96	-47.15	-	50.71	68.20	17.49
Average Data								
5 457.65 ¹⁾	H	33.07	34.72	-25.11	0.29	42.97	54.00	11.03

Middle Channel (5 590 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 215.00 ¹⁾	V	58.71	38.24	-49.43	-	47.52	74.00	26.48
16 828.08	V	57.27	41.26	-47.72	-	50.81	68.20	17.39
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

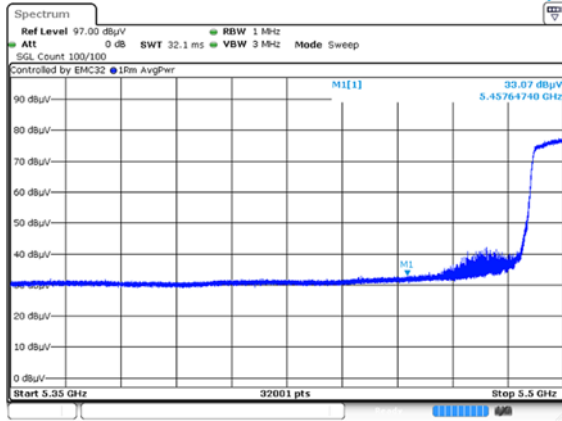
Highest Channel (5 670 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 725.19	H	45.78	35.03	-26.42	-	54.39	68.20	13.81
11 281.13 ¹⁾	V	59.03	38.26	-49.66	-	47.63	74.00	26.37
16 172.58 ¹⁾	V	56.66	40.81	-46.69	-	50.78	74.00	23.22
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT40 UNII-2C

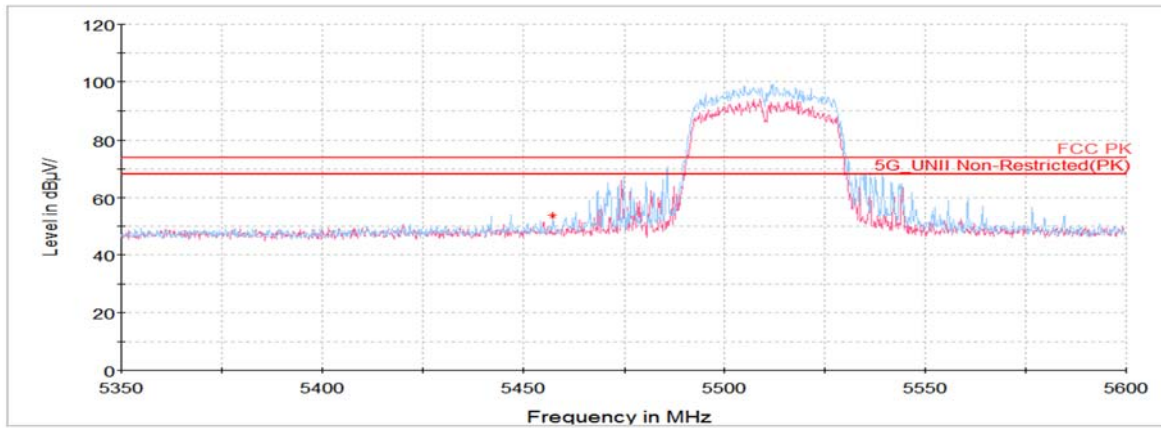
Lowest Channel (5 510 MHz)

Average data



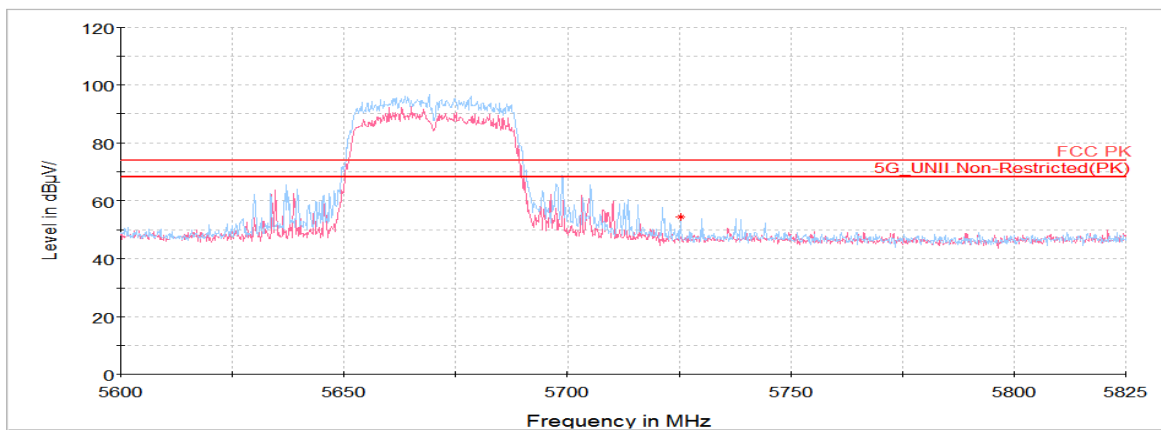
Blank

Horizontal/Vertical for Band-edge



Highest Channel (5 670 MHz)

Horizontal/Vertical for Band-edge (5 670 MHz)



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (87) of (109)

**802.11ac VHT20 UNII-2C****Lowest Channel (5 500 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 456.55 ¹⁾	H	41.30	34.72	-25.12	-	50.90	74.00	23.10
11 020.94 ¹⁾	H	58.01	38.20	-48.73	-	47.48	74.00	26.52
16 839.22	H	57.43	41.27	-47.72	-	50.98	68.20	17.22
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 600 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 277.89 ¹⁾	H	59.33	38.26	-49.65	-	47.94	74.00	26.06
16 176.89 ¹⁾	H	56.48	40.81	-46.70	-	50.59	74.00	23.41
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

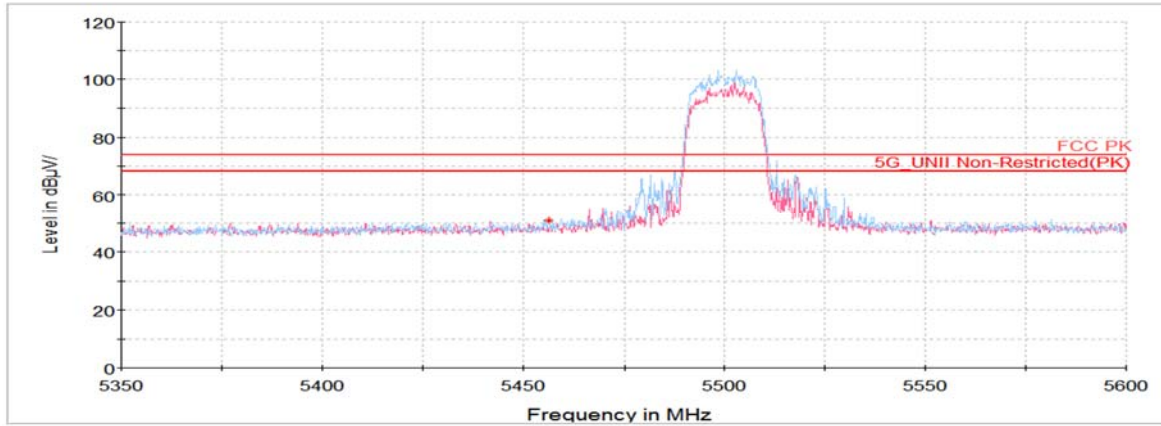
Highest Channel (5 700 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 725.36	H	50.59	35.03	-26.42	-	59.20	68.20	9.00
11 395.77 ¹⁾	V	57.88	38.28	-50.07	-	46.09	74.00	27.91
16 273.56	H	56.46	40.93	-47.06	-	50.33	68.20	17.87
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT20 UNII-2C

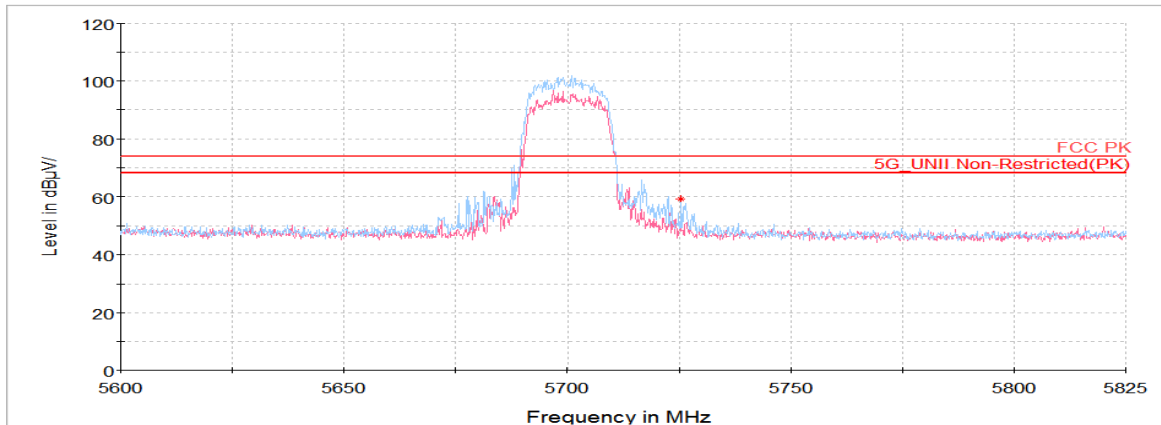
Lowest Channel (5 500 MHz)

Horizontal/Vertical for Band-edge (5 500 MHz)



Highest Channel (5 700 MHz)

Horizontal/Vertical for Band-edge (5 700 MHz)



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (89) of (109)

**802.11ac VHT40 UNII-2C****Lowest Channel (5 510 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 459.82 ¹⁾	H	42.67	34.73	-25.08	-	52.32	74.00	21.68
10 933.61 ¹⁾	H	58.90	38.13	-48.85	-	48.18	74.00	25.82
16 189.47 ¹⁾	H	56.38	40.83	-46.75	-	50.46	74.00	23.54
Average Data								
5 459.82 ¹⁾	H	32.82	34.73	-25.08	0.29	42.76	54.00	11.24

Middle Channel (5 590 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
11 264.59 ¹⁾	V	58.63	38.25	-49.60	-	47.28	74.00	26.72
16 815.86	H	57.50	41.25	-47.73	-	51.02	68.20	17.18
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

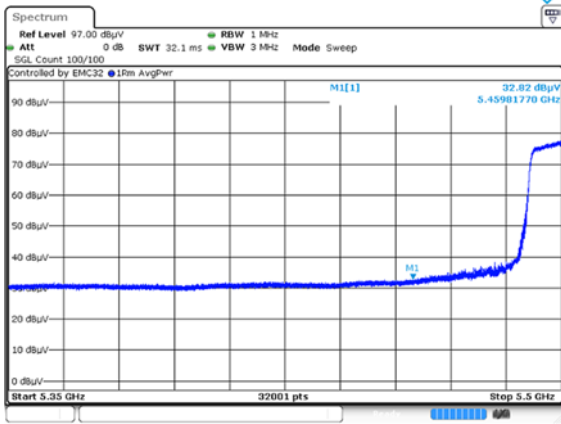
Highest Channel (5 670 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 727.08	H	42.17	35.03	-26.42	-	50.78	68.20	17.42
11 294.42 ¹⁾	H	58.50	38.26	-49.71	-	47.05	74.00	26.95
16 846.41	V	56.97	41.28	-47.71	-	50.54	68.20	17.66
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT40 UNII-2C

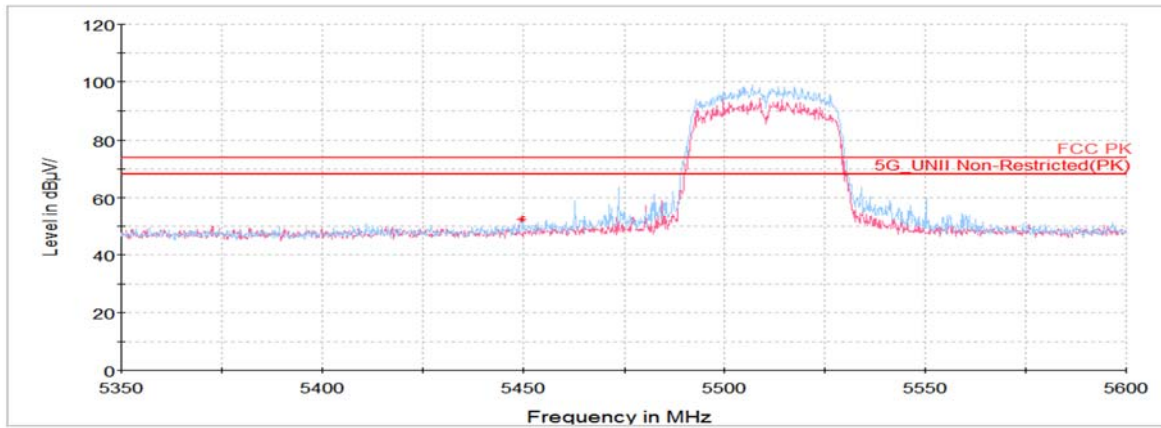
Lowest Channel (5 510 MHz)

Average data



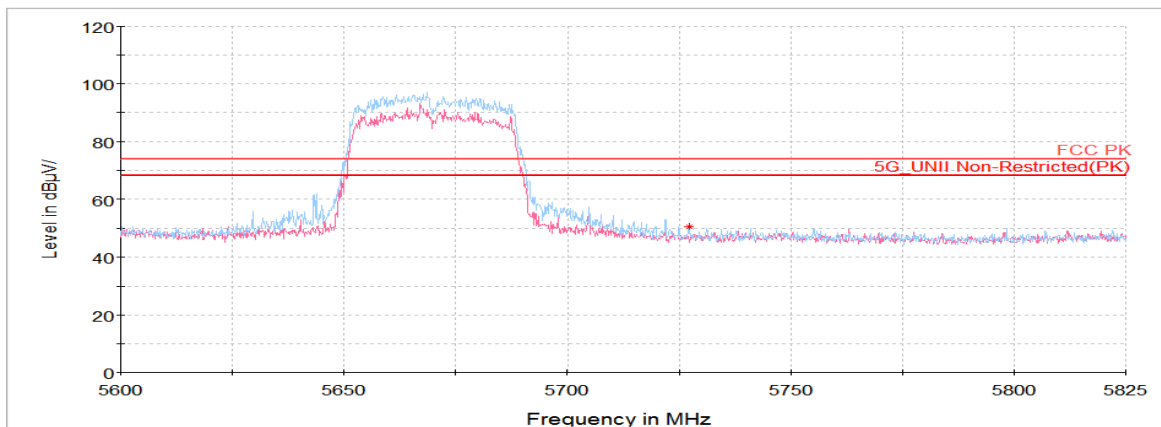
Blank

Horizontal/Vertical for Band-edge



Highest Channel (5 670 MHz)

Horizontal/Vertical for Band-edge (5 670 MHz)



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (91) of (109)

**802.11ac VHT80 UNII-2C****Lowest Channel (5 530 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 458.44 ¹⁾	H	45.27	34.73	-25.10	-	54.90	74.00	19.10
10 955.53 ¹⁾	V	58.83	38.16	-48.79	-	48.20	74.00	25.80
16 180.84 ¹⁾	H	56.47	40.82	-46.72	-	50.57	74.00	23.43
Average Data								
5 458.44 ¹⁾	H	34.34	34.73	-25.10	0.56	44.53	54.00	9.47

Highest Channel (5 610 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 727.42	V	40.54	35.03	-26.42	-	49.15	68.20	19.05
11 287.59 ¹⁾	V	59.47	38.26	-49.69	-	48.04	74.00	25.96
16 866.17	H	57.57	41.29	-47.70	-	51.16	68.20	17.04
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

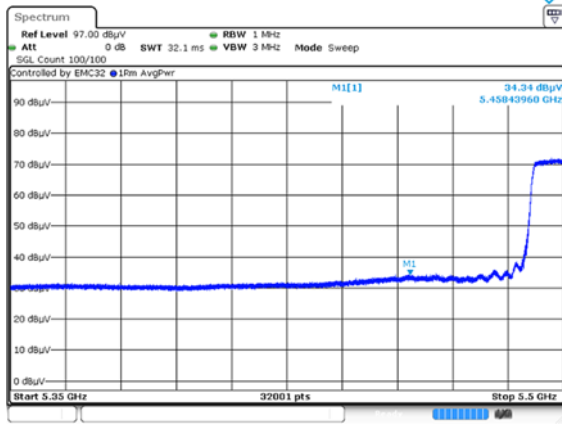
Report No.:
KR21-SRF0071-B
Page (92) of (109)



802.11ac VHT80 UNII-2C

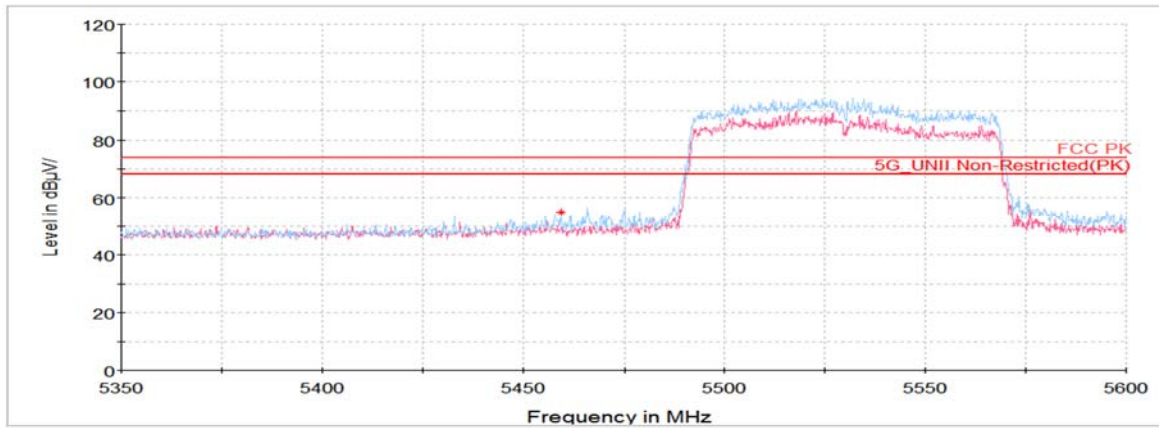
Lowest Channel (5 530 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge

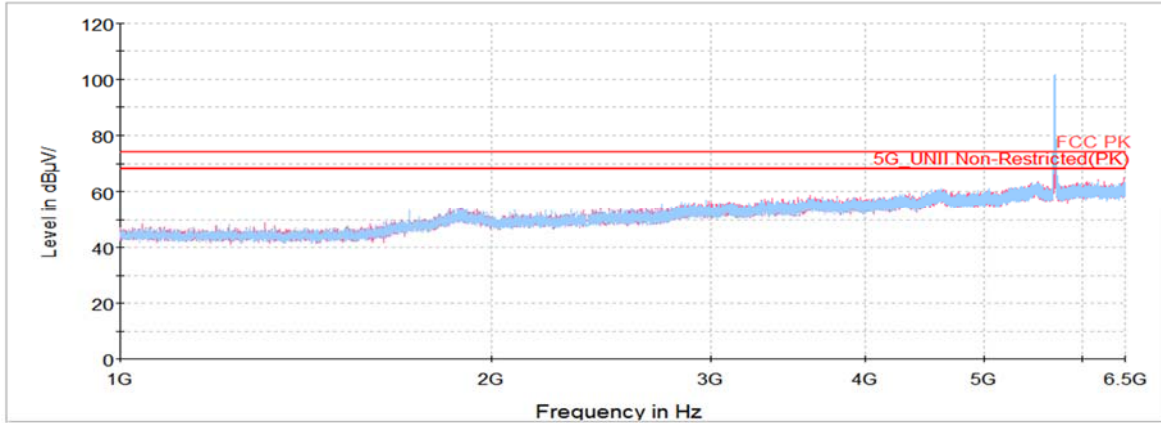


Plot of Harmonics and Spurious Emissions

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

802.11n HT20_UNII-2C_Highest Channel (5 700 MHz)

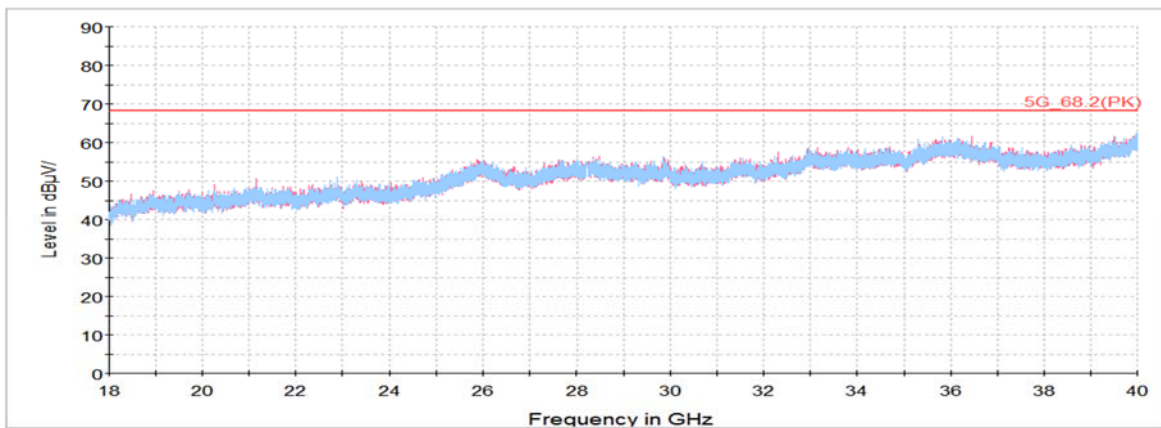
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (94) of (109)

**Straddle Channel****802.11a (5 720 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 229.73 ¹⁾	V	60.10	38.25	-49.48	-	48.87	74.00	25.13
16 175.45 ¹⁾	H	56.86	40.81	-46.70	-	50.97	74.00	23.03
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT20 (5 720 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 222.19 ¹⁾	V	60.28	38.24	-49.45	-	49.07	74.00	24.93
16 998.78	V	57.73	41.40	-47.63	-	51.50	68.20	16.70
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT40 (5 710 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 319.22 ¹⁾	H	59.65	38.26	-49.80	-	48.11	74.00	25.89
16 847.48	H	57.82	41.28	-47.71	-	51.39	68.20	16.81
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT20 (5 720 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 255.61 ¹⁾	H	59.74	38.25	-49.57	-	48.42	74.00	25.58
16 986.56	V	59.03	41.39	-47.64	-	52.78	68.20	15.42
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (95) of (109)

**802.11ac VHT40 (5 710 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
11 333.23 ¹⁾	V	60.10	38.27	-49.85	-	48.52	74.00	25.48
16 830.59	V	57.33	41.26	-47.72	-	50.87	68.20	17.33
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT80 (5 690 MHz)

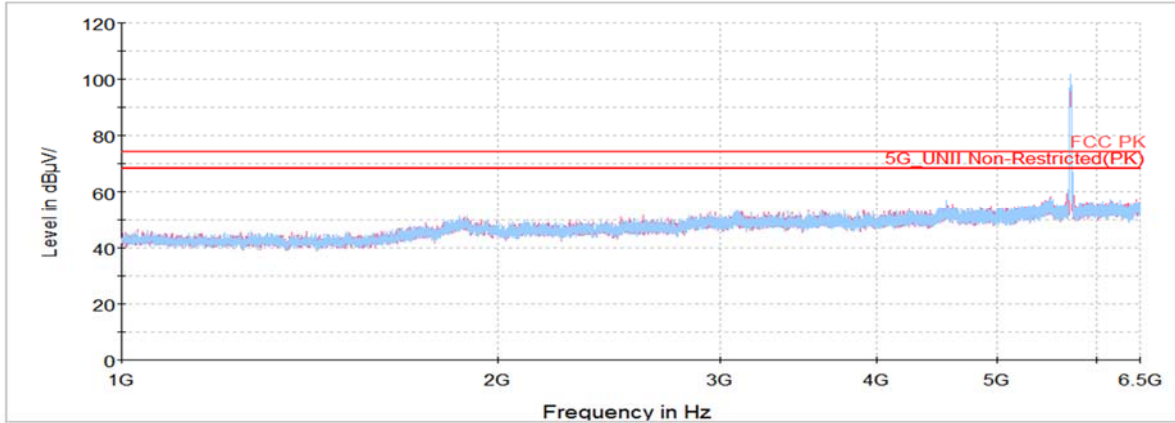
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
11 396.84 ¹⁾	V	60.47	38.28	-50.07	-	48.68	74.00	25.32
14 899.67	H	56.21	41.02	-45.59	-	51.64	68.20	16.56
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Plot of Harmonics and Spurious Emissions

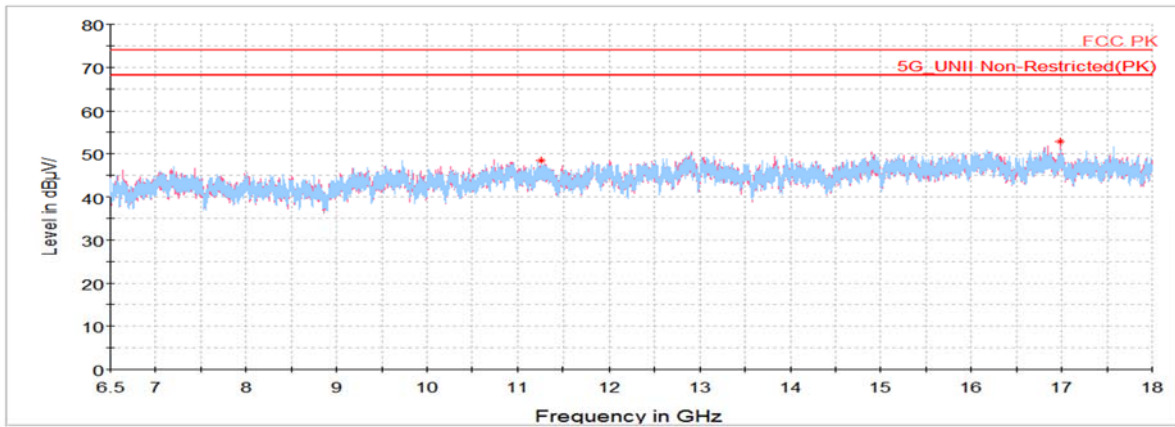
In order to simplify the report, attached plots were only the lowest margin condition

802.11ac VHT20_ Straddle Channel (5 720 MHz)

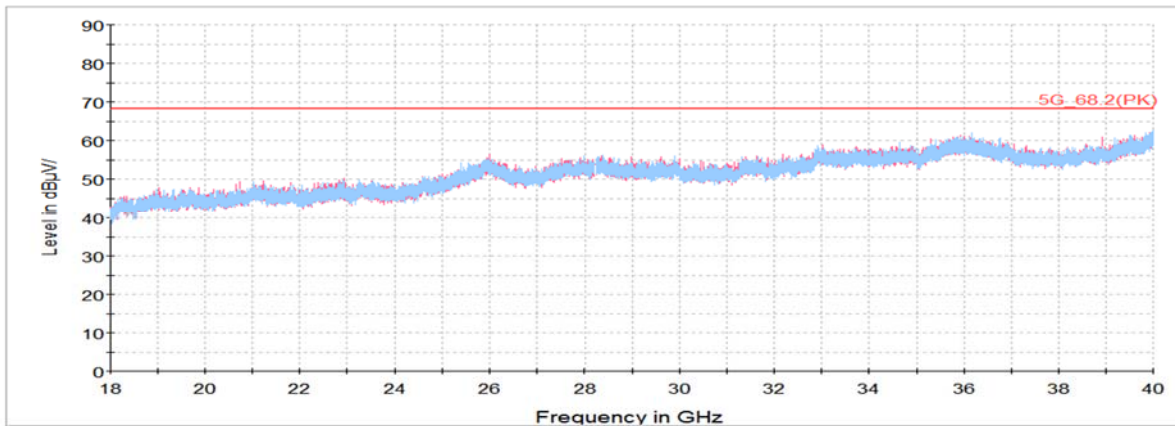
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (97) of (109)

**802.11a UNII-3****Lowest Channel (5 745 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 718.31	H	45.29	35.02	-26.45	-	53.86	110.33	56.47
11 494.23 ¹⁾	V	58.19	38.30	-50.42	-	46.07	74.00	27.93
15 184.30	V	56.09	40.16	-45.48	-	50.77	68.20	17.43
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 785 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 572.22 ¹⁾	H	57.91	38.36	-50.20	-	46.07	74.00	27.93
16 844.25	H	57.62	41.28	-47.71	-	51.19	68.20	17.01
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 825 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 886.41	H	41.67	35.19	-24.87	-	51.99	96.76	44.77
11 830.25 ¹⁾	H	59.28	38.56	-49.35	-	48.49	74.00	25.51
16 836.34	H	57.00	41.27	-47.72	-	50.55	68.20	17.65
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (98) of (109)

**802.11n HT20 UNII-3****Lowest Channel (5 745 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 722.09	H	53.17	35.02	-26.44	-	61.75	115.57	53.82
11 554.61 ¹⁾	V	57.41	38.34	-50.26	-	45.49	74.00	28.51
16 820.53	H	56.98	41.26	-47.73	-	50.51	68.20	17.69
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 785 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 651.28 ¹⁾	V	57.73	38.42	-49.94	-	46.21	74.00	27.79
16 199.53 ¹⁾	H	56.47	40.84	-46.79	-	50.52	74.00	23.48
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 825 MHz)

Frequency	Pol.	Reading	Amp. + Cable	Antenna Factor	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 865.09	H	44.59	35.17	-25.19	-	54.57	107.97	53.40
11 655.23 ¹⁾	H	58.16	38.42	-49.93	-	46.65	74.00	27.35
16 825.92	H	57.38	41.26	-47.72	-	50.92	68.20	17.28
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (99) of (109)

**802.11n HT40 UNII-3****Lowest Channel (5 755 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 721.06	H	45.98	35.02	-26.44	-	54.56	113.22	58.66
11 648.05 ¹⁾	V	58.48	38.42	-49.95	-	46.95	74.00	27.05
16 285.06	V	57.63	40.94	-47.10	-	51.47	68.20	16.73
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 795 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 865.78	H	44.77	35.17	-25.18	-	54.76	107.78	53.02
11 654.16 ¹⁾	V	58.26	38.42	-49.93	-	46.75	74.00	27.25
16 855.75	V	57.46	41.28	-47.71	-	51.03	68.20	17.17
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (100) of (109)

**802.11ac VHT20 UNII-3****Lowest Channel (5 745 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 723.47	H	50.55	35.02	-26.43	-	59.14	118.71	59.57
11 498.91 ¹⁾	V	58.30	38.30	-50.44	-	46.16	74.00	27.84
16 818.73	V	57.92	41.25	-47.73	-	51.44	68.20	16.76
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Middle Channel (5 785 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 578.69 ¹⁾	H	57.60	38.36	-50.18	-	45.78	74.00	28.22
16 803.64	H	57.67	41.24	-47.74	-	51.17	68.20	17.03
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 825 MHz)

Frequency	Pol.	Reading	Amp. + Cable	Antenna Factor	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 892.59	H	40.97	35.19	-24.78	-	51.38	92.18	40.80
11 815.16 ¹⁾	H	58.12	38.55	-49.40	-	47.27	74.00	26.73
16 881.63	H	57.12	41.31	-47.70	-	50.73	68.20	17.47
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (101) of (109)

**802.11ac VHT40 UNII-3****Lowest Channel (5 755 MHz)**

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 715.22	H	49.28	35.02	-26.46	-	57.84	109.46	51.62
11 568.27 ¹⁾	H	58.23	38.35	-50.22	-	46.36	74.00	27.64
16 823.05	H	57.86	41.26	-47.73	-	51.39	68.20	16.81
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Highest Channel (5 795 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 863.72	H	46.63	35.16	-25.21	-	56.58	108.36	51.78
11 638.34 ¹⁾	V	59.65	38.41	-49.98	-	48.08	74.00	25.92
16 208.16	H	57.04	40.85	-46.82	-	51.07	68.20	17.13
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac VHT80 UNII-3**Lowest Channel (5 775 MHz)**

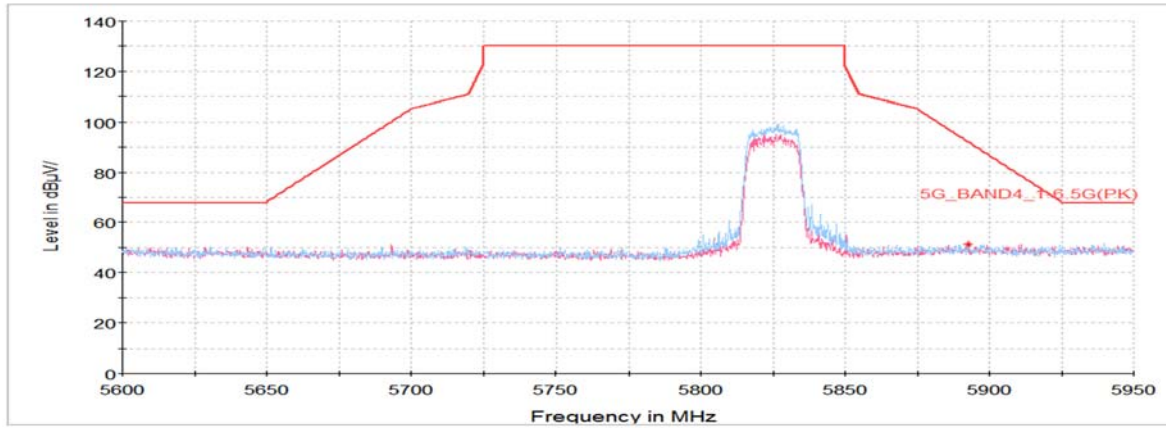
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 720.89	H	45.96	35.02	-26.44	-	54.54	112.83	58.29
5 870.25	H	46.43	35.17	-25.11	-	56.49	106.53	50.04
11 531.25 ¹⁾	H	58.97	38.33	-50.34	-	46.96	74.00	27.04
16 144.19 ¹⁾	H	56.58	40.77	-46.58	-	50.77	74.00	23.23
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Plot of Band-edge, Harmonics and Spurious Emissions

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

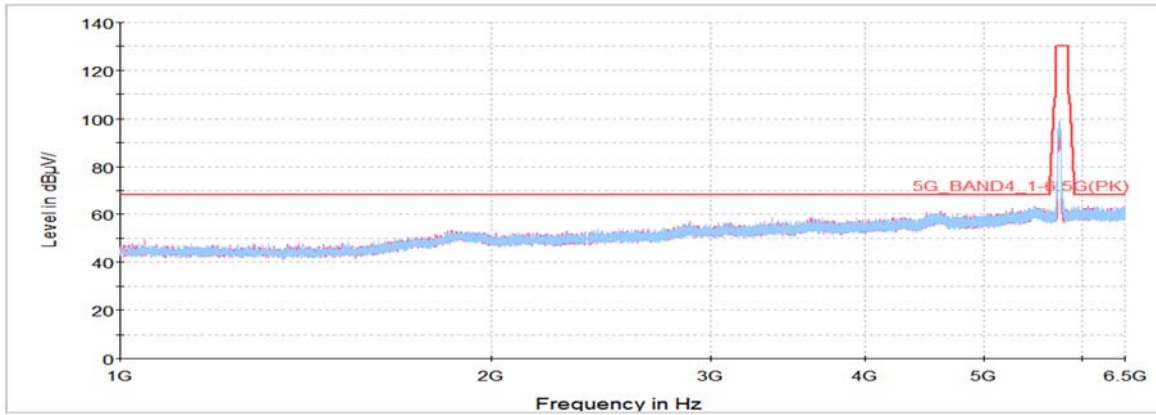
802.11ac VHT 20_UNII-3_Highest Channel (5 825 MHz)

Horizontal/Vertical for Band-edge

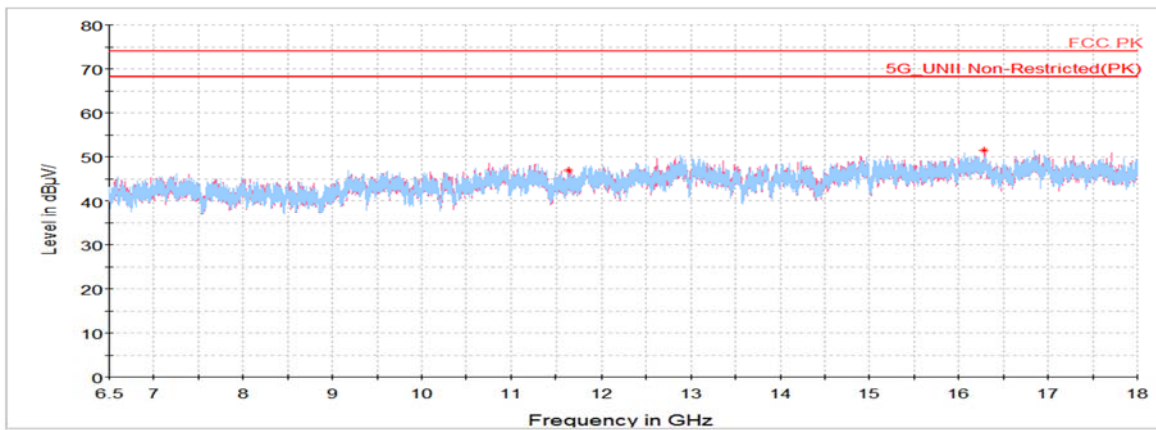


802.11n HT 40_UNII-3_Lowest Channel (5 755 MHz)

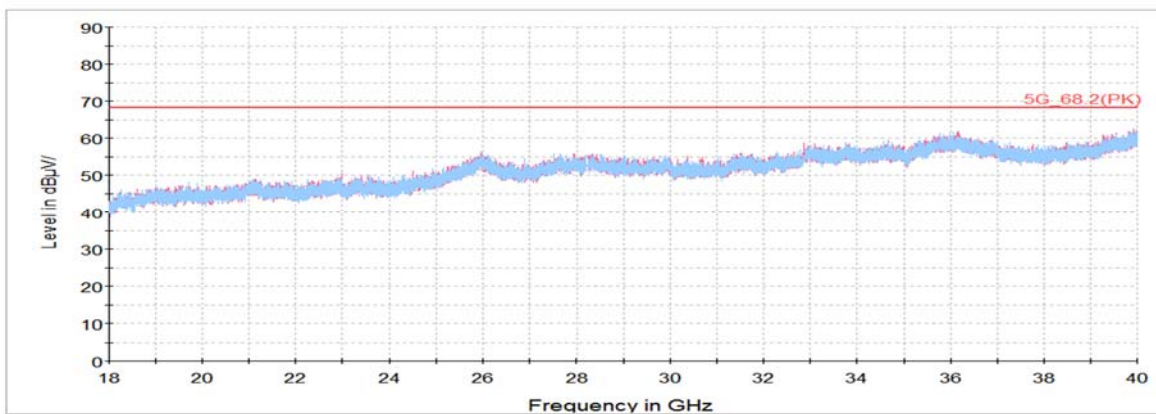
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (104) of (109)

**Spurious Emission for Simultaneous Tx Condition**

Case	WLAN 5 GHz	Bluetooth
Mode	802.11n HT40	BDR
Channel	62	0
Frequency	5 310	2 402
Data Rate	MCS0	DH1

Notes.

The lowest margin condition among the channels and modes were selected for test.

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
2 911.48	H	75.95	32.61	-45.60	-	62.96	74.00	11.04
4 803.64 ¹⁾	V	65.75	33.78	-53.26	-	46.27	74.00	27.73
7 205.81	H	64.53	35.30	-50.54	-	49.29	68.20	18.91
10 634.61 ¹⁾	H	58.81	37.83	-49.70	-	46.94	74.00	27.06
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

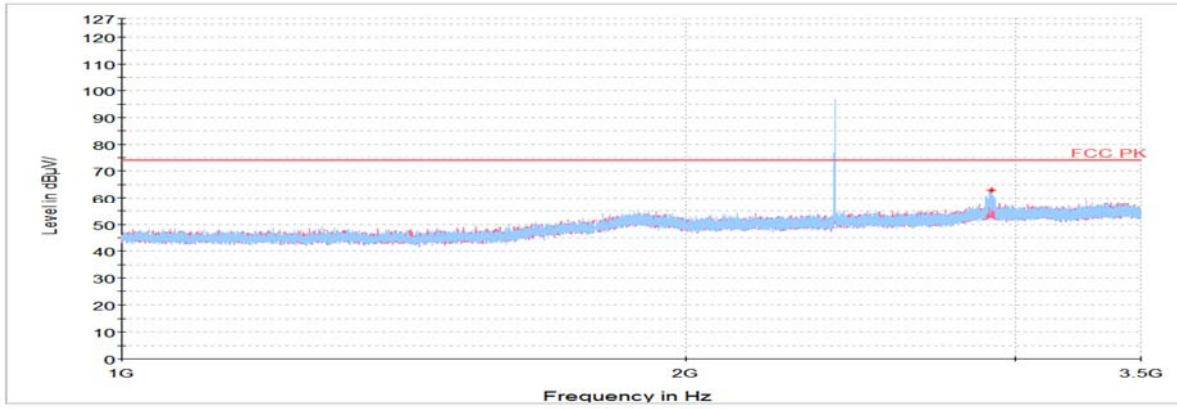
KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

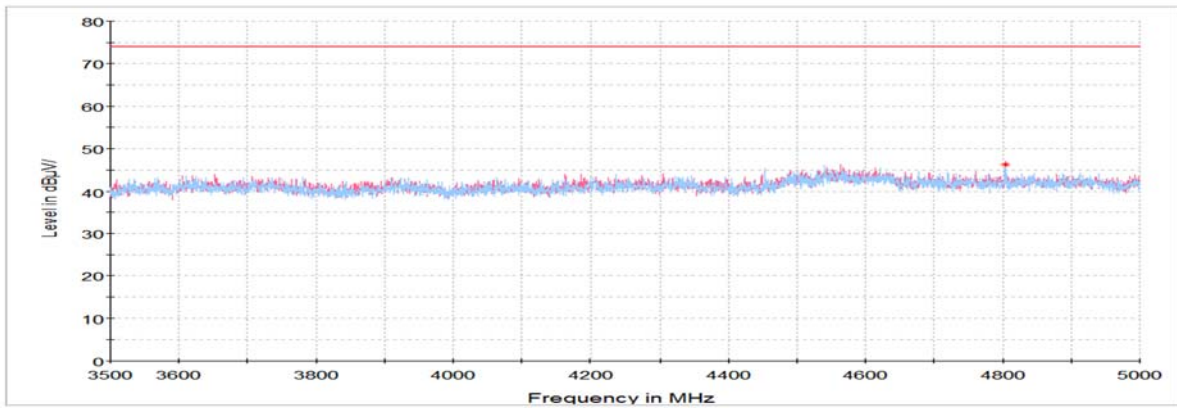
Report No.:
KR21-SRF0071-B
Page (105) of (109)



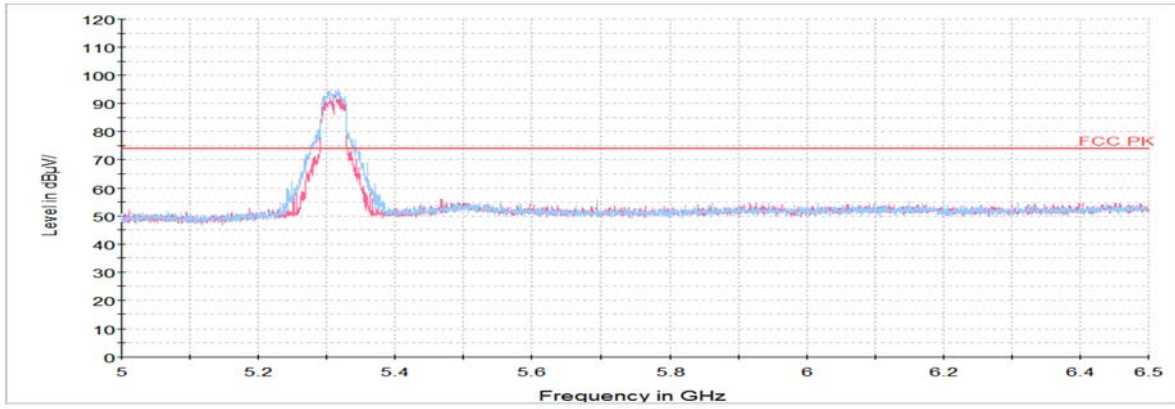
Horizontal/Vertical for 1 GHz ~ 3.5 GHz



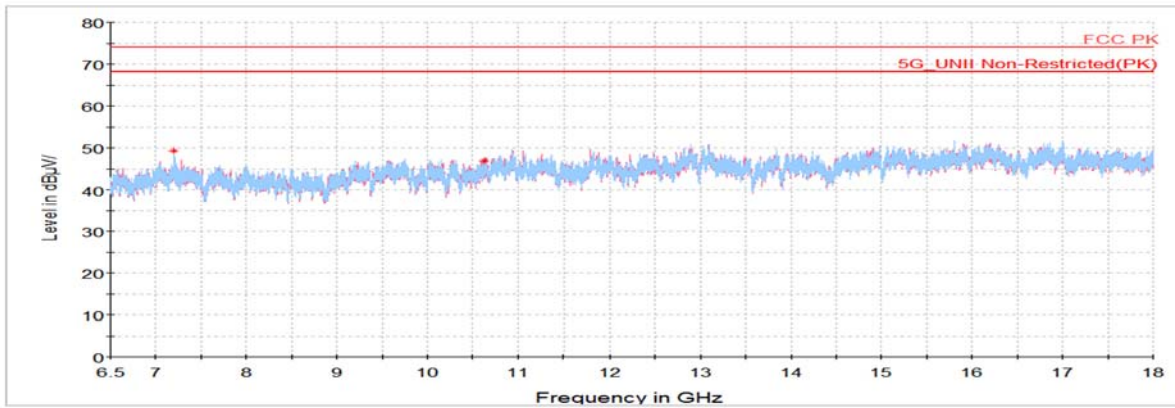
Horizontal/Vertical for 3.5 GHz ~ 5 GHz



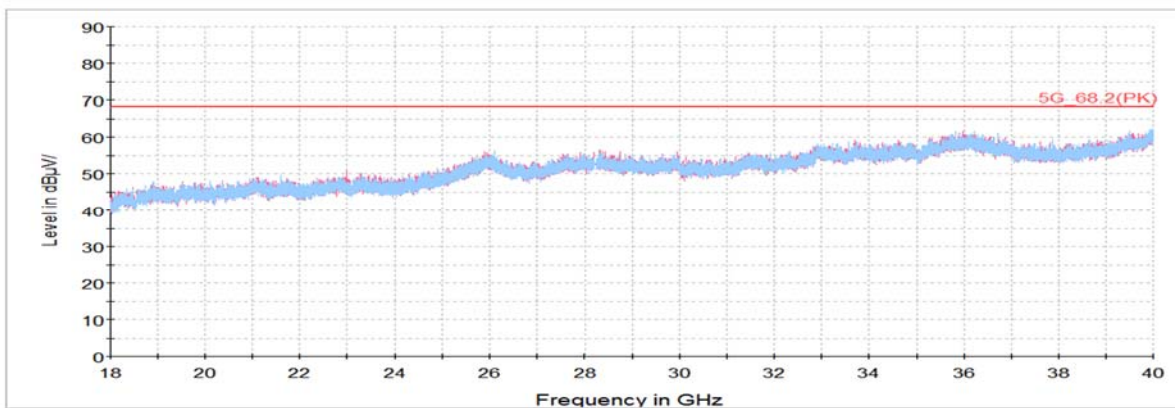
Horizontal/Vertical for 5 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz

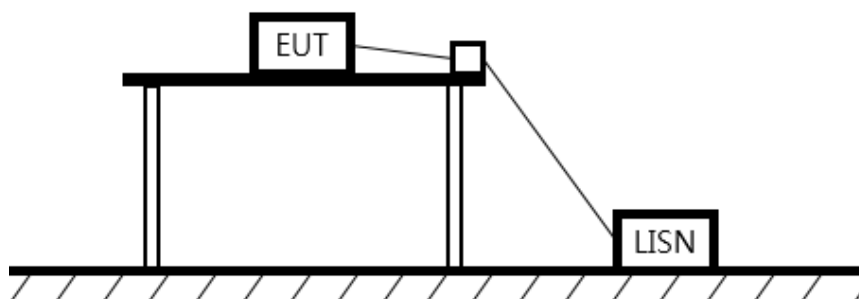


Horizontal/Vertical for 18 GHz ~ 40 GHz



8.7. AC Conducted emission

Test setup



Limit

§15.407

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 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V/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 cm in which is located 40 cm 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 50 Ω /50 μ H 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 MHz to 30 MHz.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 kHz or to quasi-peak and average within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

KCTL Inc.

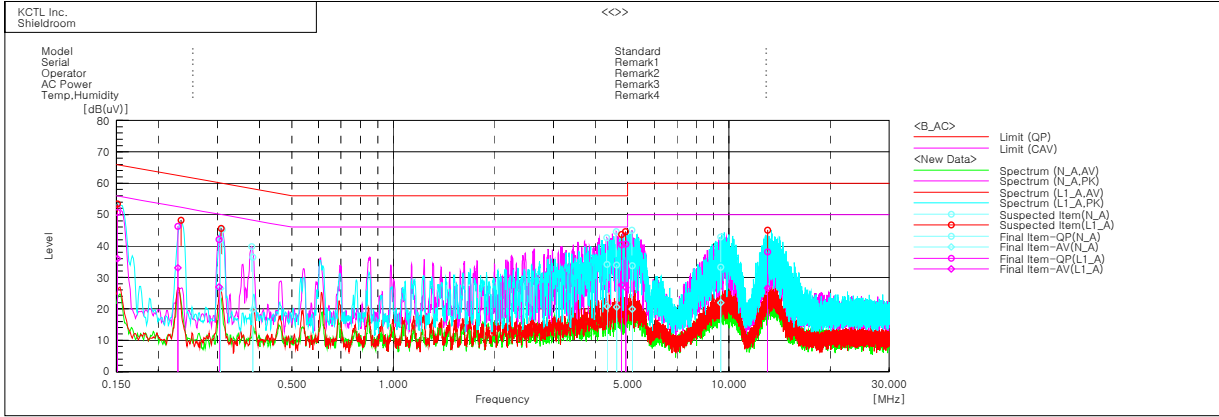
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (108) of (109)



Test results

Worst case: 802.11a / UNII-2A 5 280 MHz



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	0.30655	32.2	16.7	9.8	42.0	26.5	60.1	50.1	18.1	23.6
2	0.38182	26.5	9.8	9.9	36.4	19.7	58.2	48.2	21.8	28.5
3	4.33489	24.3	10.9	9.9	34.2	20.8	56.0	46.0	21.8	25.2
4	4.62742	23.9	10.6	10.0	33.9	20.6	56.0	46.0	22.1	25.4
5	5.14964	23.7	10.0	10.0	33.7	20.0	60.0	50.0	26.3	30.0
6	9.45828	23.2	11.8	10.1	33.3	21.9	60.0	50.0	26.7	28.1

--- 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	0.15105	40.8	26.1	9.9	50.7	36.0	65.9	55.9	15.2	19.9
2	0.22881	36.5	23.3	9.8	46.3	33.1	62.5	52.5	16.2	19.4
3	0.30333	32.3	17.1	9.8	42.1	26.9	60.2	50.2	18.1	23.3
4	4.79035	30.4	17.6	10.0	40.4	27.6	56.0	46.0	15.6	18.4
5	4.92801	30.6	16.8	10.0	40.6	26.8	56.0	46.0	15.4	19.2
6	13.04043	27.8	16.2	10.4	38.2	26.6	60.0	50.0	21.8	23.4

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR21-SRF0071-B
Page (109) of (109)



9. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100807	21.07.29
Attenuator	Weinschel ENGINEERING	56-10	51395	22.01.22
Signal Generator	R&S	SMB100A	176206	22.01.20
Vector Signal Generator	R&S	SMBV100A	257566	21.07.13
DC Power Supply	AGILENT	E3632A	MY40001543	21.05.11
Spectrum Analyzer	R&S	FSV40	100989	21.12.31
EMI TEST RECEIVER	R&S	ESCI3	101408	21.08.20
Bi-Log Antenna	SCHWARZBECK	VULB9168	583	22.04.23
Amplifier	SONOMA INSTRUMENT	310N	284608	21.08.20
COAXIAL FIXED ATTENUATOR	Agilent	8491B-003	2708A18758	22.04.23*
Horn antenna	ETS.lindgren	3117	00155787	21.10.28
Horn antenna	ETS.lindgren	3116	00086632	22.01.29
Attenuator	API Inmet	40AH2W-10	12	21.05.12
Broadband PreAmplifier	SCHWARZBECK	BBV9718	216	21.07.28
AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-01001800 -22-10P	2003683	21.08.28
AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000996	22.01.21
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	DT2000	79	-
Antenna Mast	Innco Systems	MA4000-EP	303	-
Turn Table	Innco Systems	DT2000	79	-
High pass Filter	WT	WT-A1699-HS	WT160411002	21.05.11
TWO-LINE V - NETWORK	R&S	ENV216	101358	21.09.29
EMI TEST RECEIVER	R&S	ESCI	100001	21.08.20

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

End of test report