






TEST REPORT

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.: KR19-SRF0029-B Page (1) of (197)	
1. Client		
<ul style="list-style-type: none"> ◦ Name : Samsung Electronics Co., Ltd. ◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea ◦ Date of Receipt : 2019-01-02 		
2. Use of Report : -		
3. Name of Product and Model : Wi-Fi Kit 2.0 / MIM-H04UN		
4. Manufacturer and Country of Origin : Samsung Electronics Co., Ltd. / Korea		
5. FCC ID : A3LMIMH04UN		
6. IC : 649E-MIMH04UN		
7. Date of Test : 2019-02-18 to 2019-03-03		
8. Test Standards : FCC Part 15 Subpart C, 15.407 RSS-247 Issue 2 February 2017 RSS GEN Issue 5 April 2018		
9. Test Results : Refer to the test result in the test report		
Affirmation	Tested by  Name : Euijung Kim (Signature)	Technical Manager  Name : Seungyong Kim (Signature)
	2019-05-08	
KCTL Inc.		
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**Report revision history**

Date	Revision	Page No
2019-03-11	Initial report	-
2019-04-29	added 802.11g for Modulation technique updated measurement uncertainty added note 8.	4, 14, 18
2019-05-08	Updated note and 30 MHz plots	13, 19

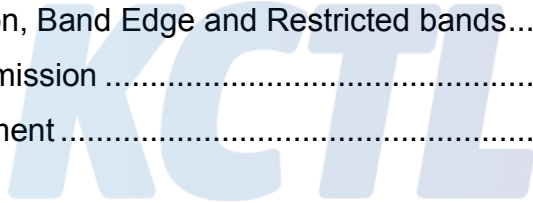
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1. General information

Client : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Laboratory : KCTL Inc.
Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132
VCCI Registration No. : R-3327, G-198, C-3706, T-1849
Industry Canada Registration No. : 8035A-2
KOLAS No.: KT231

2. Device information

Equipment under test : Wi-Fi Kit 2.0
Model : MIM-H04UN
Derivative model : MIM-H04U
Frequency range : 2 412 MHz ~ 2 462 MHz (802.11b/g/n HT20)
5 180 MHz ~ 5 240 MHz (802.11a/n HT20)
5 190 MHz ~ 5 230 MHz (802.11n HT40)
5 260 MHz ~ 5 320 MHz (802.11a/n HT20)
5 270 MHz ~ 5 310 MHz (802.11n HT40)
5 500 MHz ~ 5 700 MHz (802.11a/n HT20)
5 510 MHz ~ 5 670 MHz (802.11n HT40)
5 745 MHz ~ 5 825 MHz (802.11a/n HT20)
5 755 MHz ~ 5 795 MHz (802.11n HT40)
Modulation technique : DSSS (802.11b), OFDM (802.11a/g/n HT20/ HT40)
Number of channels : 11 ch (802.11b/g/n HT20)_2.4 GHz Band
4 ch (802.11a/n HT20), 2 ch (802.11n HT40)_U-NII-1
4 ch (802.11a/n HT20), 2 ch (802.11n HT40)_U-NII-2A
11 ch (802.11a/n HT20), 5 ch (802.11n HT40)_U-NII-2C
5 ch (802.11a/n HT20), 2 ch (802.11n HT40)_U-NII-3
Power source : DC 12 V
Antenna specification : PIFA antenna
5 GHz_U-NII-1 : 4.70 dBi (ANT 0), 5.20 dBi (ANT 1)
5 GHz_U-NII-2A : 5.30 dBi (ANT 0), 5.70 dBi (ANT 1)
5 GHz_U-NII-2C : 4.90 dBi (ANT 0), 4.80 dBi (ANT 1)
5 GHz_U-NII-3 : 4.80 dBi (ANT 0), 4.10 dBi (ANT 1)
Software version : 1.0

Hardware version : 1.4
 Test device serial No. : N/A

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
N/A	-	-	-	-

2.2. Information about derivative model

The basic and derivative model are electrically identical.
 The derivative model (MIM-H04U) has additional timing control function.

2.3. Frequency/channel operations

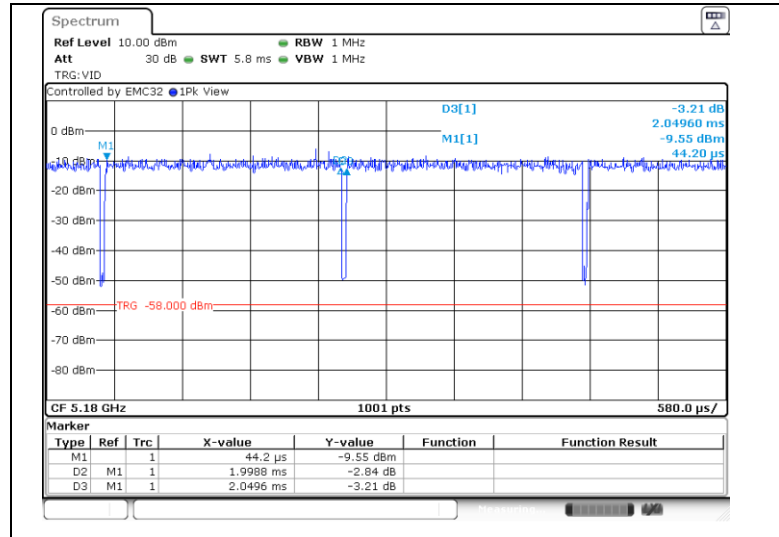
This device contains the following capabilities:
 WLAN 802.11a/b/g/n(HT20/40)

U-NII-1 (5 150 MHz – 5 250 MHz)			
Mode	Lowest frequency	Middle frequency	Highest frequency
802.11a/n_HT20	5 180 MHz	5 200 MHz	5 240 MHz
802.11n_HT40	5 190 MHz	-	5 230 MHz
U-NII-2A (5 250 MHz – 5 350 MHz)			
802.11a/n_HT20	5 260 MHz	5 280 MHz	5 320 MHz
802.11n_HT40	5 270 MHz	-	5 310 MHz
U-NII-2C (5 470 MHz – 5 725 MHz)			
802.11a/n_HT20	5 500 MHz	5 580 MHz	5 700 MHz
802.11n_HT40	5 510 MHz	5 590 MHz	5 670 MHz
U-NII-3 (5 725 MHz – 5 850 MHz)			
802.11a/n_HT20	5 745 MHz	5 785 MHz	5 825 MHz
802.11n_HT40	5 755 MHz	-	5 795 MHz

Table 2.3.1. 802.11a/n(HT20/40) mode

2.4. Duty Cycle Correction Factor

- 802.11a

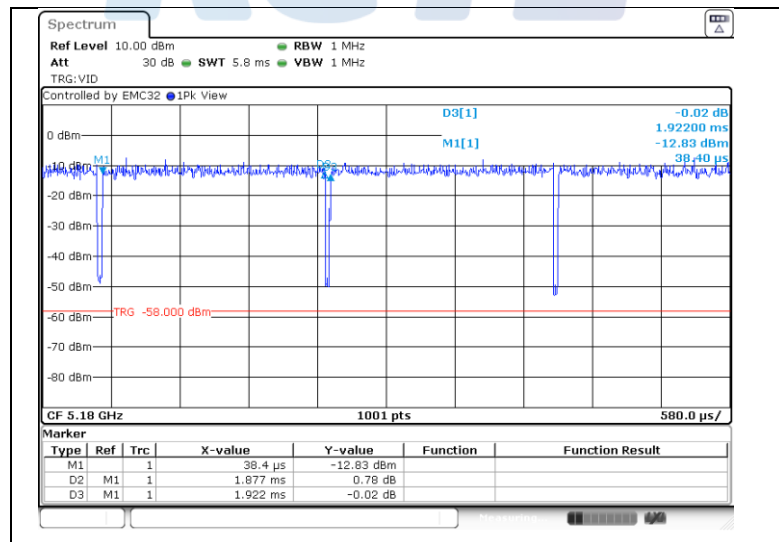


Note₁) : period : 2.05 ms, On time : 2.00 ms

Note₂) : DCCF = $10 \log(1 / x) = 10 \log(1/0.975) = 0.109$ dB, $x = 2.00/2.05 = 0.975$

Note₃) : 802.11a is a non-continuous transmission (duty cycle < 98 %)

- 802.11n HT20

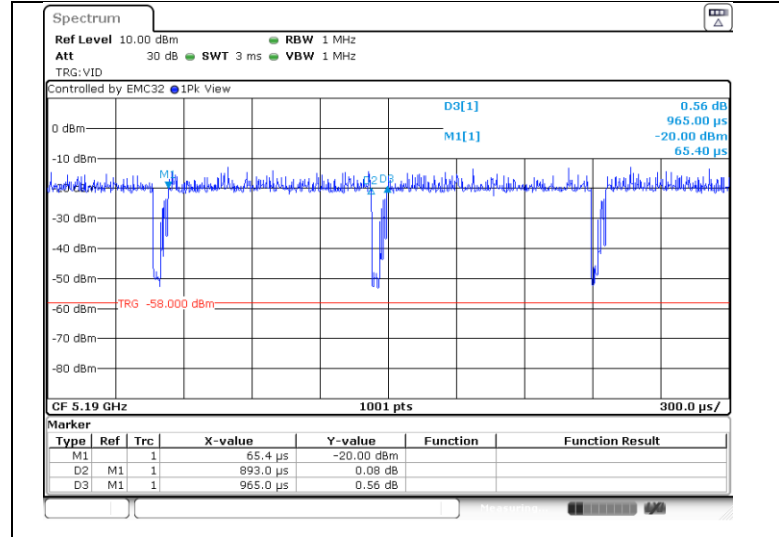


Note₁) : period : 1.92 ms, On time : 1.88 ms

Note₂) : DCCF = $10 \log(1 / x) = 10 \log(1/0.977) = 0.103$ dB, $x = 1.88/1.92 = 0.977$

Note₃) : 802.11n HT20 is a non-continuous transmission (duty cycle < 98 %)

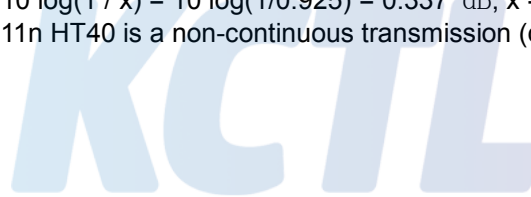
- 802.11n HT40



Note₁) : period : 0.97 ms, On time : 0.89 ms

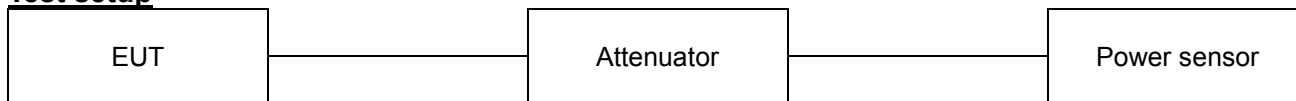
Note₂) : DCCF = $10 \log(1 / x) = 10 \log(1/0.925) = 0.337$ dB, $x = 0.89/0.97 = 0.925$

Note₃) : 802.11n HT40 is a non-continuous transmission (duty cycle < 98 %)



2.5. Maximum conducted output power

Test setup



Test procedure

789033 D02 General U-NII Test Procedures - Section E.3

Test settings

Method AVGP (Measurement using an RF average-reading power meter)

- a) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
 - 1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
 - 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as described in Section II.B.
- c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- d) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25%).

Test results**ANT 0**

Test mode	Frequency (MHz)	output power (dB m)	DCCF (dB)	Total output power (dB m)	Limit (dB m)
				Average	
802.11a / ANT 0 / U-NII-1	5 180	11.17	0.11	11.28	17
	5 200	11.49	0.11	11.60	
	5 240	11.63	0.11	11.74	
802.11a / ANT 0 / U-NII-2A	5 260	14.01	0.11	14.12	24
	5 280	13.69	0.11	13.80	
	5 320	13.58	0.11	13.69	
802.11a / ANT 0 / U-NII-2C	5 500	13.41	0.11	13.52	24
	5 580	14.84	0.11	14.95	
	5 700	15.16	0.11	15.27	
802.11a / ANT 0 / U-NII-3	5 745	21.29	0.11	21.40	30
	5 785	21.83	0.11	21.94	
	5 825	21.30	0.11	21.41	
802.11n20 / ANT 0 / U-NII-1	5 180	9.62	0.10	9.72	17
	5 200	10.17	0.10	10.27	
	5 240	10.11	0.10	10.21	
802.11n20 / ANT 0 / U-NII-2A	5 260	11.68	0.10	11.78	24
	5 280	11.61	0.10	11.71	
	5 320	10.93	0.10	11.03	
802.11n20 / ANT 0 / U-NII-2C	5 500	11.92	0.10	12.02	24
	5 580	13.05	0.10	13.15	
	5 700	12.92	0.10	13.02	
802.11n20 / ANT 0 / U-NII-3	5 745	19.17	0.10	19.27	30
	5 785	20.83	0.10	20.93	
	5 825	20.69	0.10	20.79	
802.11n40 / ANT 0 / U-NII-1	5 190	9.71	0.34	10.05	17
	5 230	9.78	0.34	10.12	
802.11n40 / ANT 0 / U-NII-2A	5 270	11.08	0.34	11.42	24
	5 310	10.13	0.34	10.47	
802.11n40 / ANT 0 / U-NII-2C	5 510	8.37	0.34	8.71	24
	5 590	9.44	0.34	9.78	
	5 670	9.46	0.34	9.80	
802.11n40 / ANT 0 / U-NII-3	5 755	17.04	0.34	17.38	30
	5 795	17.27	0.34	17.61	

ANT 1

Test mode	Frequency (MHz)	output power (dB m)	DCCF (dB)	Total output power (dB m)	Limit (dB m)
				Average	
802.11a / ANT 1 / U-NII-1	5 180	12.72	0.11	12.83	17
	5 200	12.01	0.11	12.12	
	5 240	12.20	0.11	12.31	
802.11a / ANT 1 / U-NII-2A	5 260	14.75	0.11	14.86	24
	5 280	14.57	0.11	14.68	
	5 320	13.71	0.11	13.82	
802.11a / ANT 1 / U-NII-2C	5 500	13.95	0.11	14.06	24
	5 580	15.09	0.11	15.20	
	5 700	14.80	0.11	14.91	
802.11a / ANT 1 / U-NII-3	5 745	21.79	0.11	21.90	30
	5 785	21.80	0.11	21.91	
	5 825	21.25	0.11	21.36	
802.11n20 / ANT 1 / U-NII-1	5 180	9.74	0.10	9.84	17
	5 200	9.43	0.10	9.53	
	5 240	9.80	0.10	9.90	
802.11n20 / ANT 1 / U-NII-2A	5 260	11.86	0.10	11.96	24
	5 280	11.04	0.10	11.14	
	5 320	11.01	0.10	11.11	
802.11n20 / ANT 1 / U-NII-2C	5 500	11.96	0.10	12.06	24
	5 580	12.17	0.10	12.27	
	5 700	11.74	0.10	11.84	
802.11n20 / ANT 1 / U-NII-3	5 745	20.03	0.10	20.13	30
	5 785	19.74	0.10	19.84	
	5 825	20.34	0.10	20.44	
802.11n40 / ANT 1 / U-NII-1	5 190	10.05	0.34	10.39	17
	5 230	9.90	0.34	10.24	
802.11n40 / ANT 1 / U-NII-2A	5 270	10.50	0.34	10.84	24
	5 310	10.34	0.34	10.68	
802.11n40 / ANT 1 / U-NII-2C	5 510	7.76	0.34	8.10	24
	5 590	9.46	0.34	9.80	
	5 670	9.56	0.34	9.90	
802.11n40 / ANT 1 / U-NII-3	5 755	16.88	0.34	17.22	30
	5 795	16.86	0.34	17.20	

MIMO

Test mode	Frequency (MHz)	output power (dB m)		DCCF (dB)	Total output power (dB m)	Limit (dB m)
		ANT 0	ANT 1		Average	
802.11n20 / MIMO / U-NII-1	5 180	10.57	8.94	0.10	12.94	17
	5 200	10.67	9.28	0.10	13.14	
	5 240	10.56	8.58	0.10	12.80	
802.11n20 / MIMO / U-NII-2A	5 260	12.76	10.32	0.10	14.82	24
	5 280	12.28	10.12	0.10	14.45	
	5 320	12.18	9.57	0.10	14.18	
802.11n20 / MIMO / U-NII-2C	5 500	12.6	11.48	0.10	15.19	24
	5 580	14.07	11.32	0.10	16.02	
	5 700	13.45	12.55	0.10	16.14	
802.11n20 / MIMO / U-NII-3	5 745	19.71	19.19	0.10	22.57	30
	5 785	20.57	20.25	0.10	23.53	
	5 825	20.65	20.13	0.10	23.51	
802.11n40 / MIMO / U-NII-1	5 190	10.49	8.68	0.34	13.03	17
	5 230	9.61	9.47	0.34	12.89	
802.11n40 / MIMO / U-NII-2A	5 270	11.79	10.53	0.34	14.55	24
	5 310	11.16	8.52	0.34	13.38	
802.11n40 / MIMO / U-NII-2C	5 510	8.05	7.62	0.34	11.19	24
	5 590	9.32	8.53	0.34	12.29	
	5 670	9.61	8.59	0.34	12.48	
802.11n40 / MIMO / U-NII-3	5 755	16.66	16.72	0.34	20.04	30
	5 795	16.97	17.47	0.34	20.57	

Note₁) : The above average output power were retested results.

Note₂) : The worst-case data rates were:

802.11 a mode: 6 Mbps

802.11 n/ac_HT20 mode: MCS0

802.11 n/ac_HT40 mode: MCS0

3. Antenna requirement

Requirement of FCC part section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The transmitter has permanently attached PIFA Antenna (internal antenna) on board.

Requirement of RSS-GEN Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

4. Summary of tests

FCC Part section(s)	IC Rule Referene	Parameter	Test results
15.407(a)	RSS-247 Issue 2, 6.2	Maximum conducted output power	N/T ^(Note1)
15.407(a)	RSS-247 Issue 2, 6.2	Maximum power spectral density	N/T ^(Note1)
15.407(a)	RSS-247 Issue 2, 6.2	26 dB Channel Bandwidth	N/T ^(Note1)
15.407(e)	RSS-247 Issue 2, 6.2.4	6 dB Channel Bandwidth	N/T ^(Note1)
-	RSS-GEN Issue 4, 6.7	Occupied Bandwidth	N/T ^(Note1)
15.407(g)	RSS-GEN Issue 4, 8.11	Frequency stability	N/T ^(Note1)
15.407(b), 15.205(a), 15.209(a)	RSS-247 Issue 2, 6.2, RSS-GEN Issue 4, 8.9, 8.10	Spurious emission	Pass
		Band-edge, restricted band	Pass
15.207(a)	RSS-GEN Issue 4, 8.8	Conducted Emissions	Pass

Notes:

1. Test was performed by modular transmitter (Model Name: WIDT30Q, FCC ID: A3LWIDT30Q, IC: 649E-WIDT30Q, Test Report No. NK-12-R-235-1 issued on 07, January, 2013 by Nemko Korea Co., Ltd.
2. Original module was issued against RSS-210 and with review on the change between RSS-210 and RSS-247, we confirmed that original module test report remains valid for RSS-247 filing.
3. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
4. According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
5. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that X orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in X orientation
6. The test procedure(s) in this report were performed in accordance as following.
 - ◆ ANSI C63.10-2013

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty	
Radiated spurious emissions	9 kHz ~ 30 MHz:	2.28 dB
	30 MHz ~ 300 MHz	4.98 dB
	300 MHz ~ 1 000 MHz	5.14 dB
	1 GHz ~ 6 GHz	6.34 dB
	Above 6 GHz	6.68 dB
Conducted emissions	9 kHz ~ 150 kHz	3.66 dB
	150 kHz ~ 30 MHz	3.26 dB

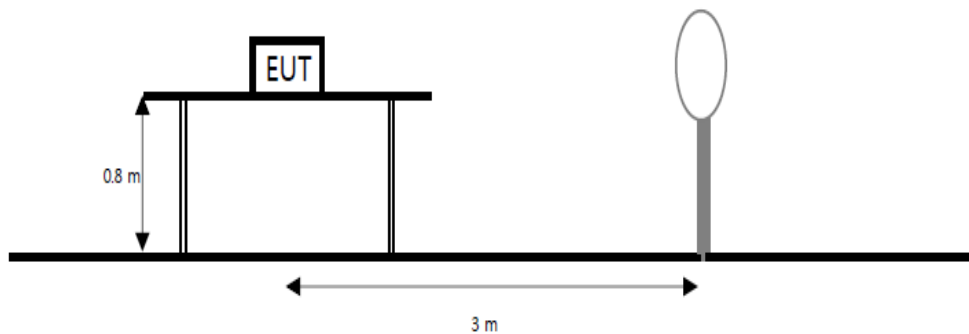
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6. Test results

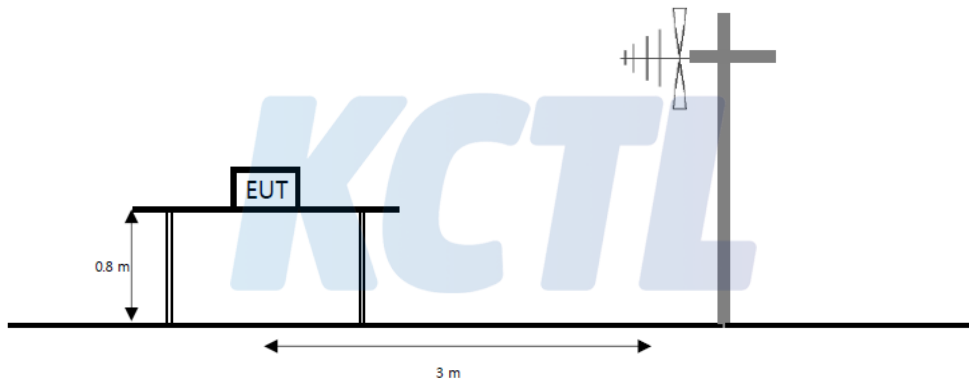
6.1. Spurious Emission, Band Edge and Restricted bands

Test setup

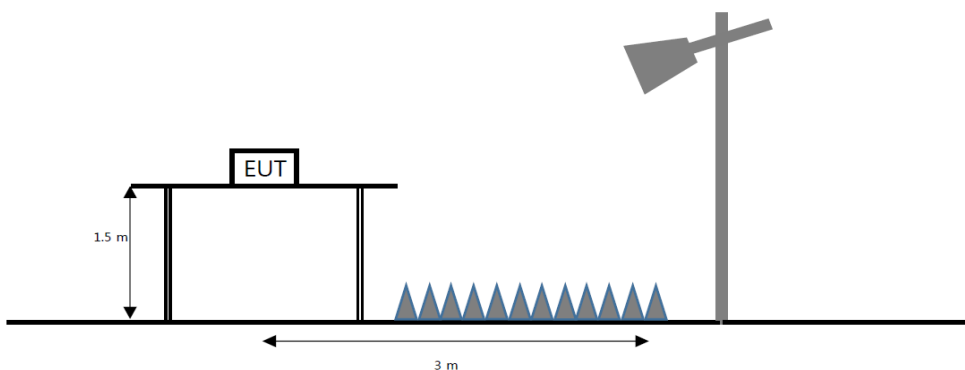
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



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.



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**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.

Test procedure

ANSI C63.10-2013

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 [span / (# of points in sweep)] \leq (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 [span / (# of points in sweep)] \leq (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 with the transmit cycle, then no duty cycle correction is required for that emission.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz ($\geq 1/T$) for Average detection (AV) at frequency above 1 GHz. (where T = pulse width)
2. $f < 30$ 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
3. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d (dB)
4. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
5. Average test would be performed if the peak result were greater than the average limit.
6. ¹⁾ means restricted band.
7. 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.
8. 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."

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KR19-SRF0029-B

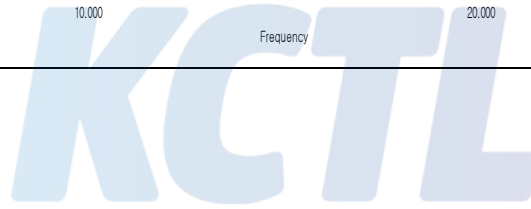
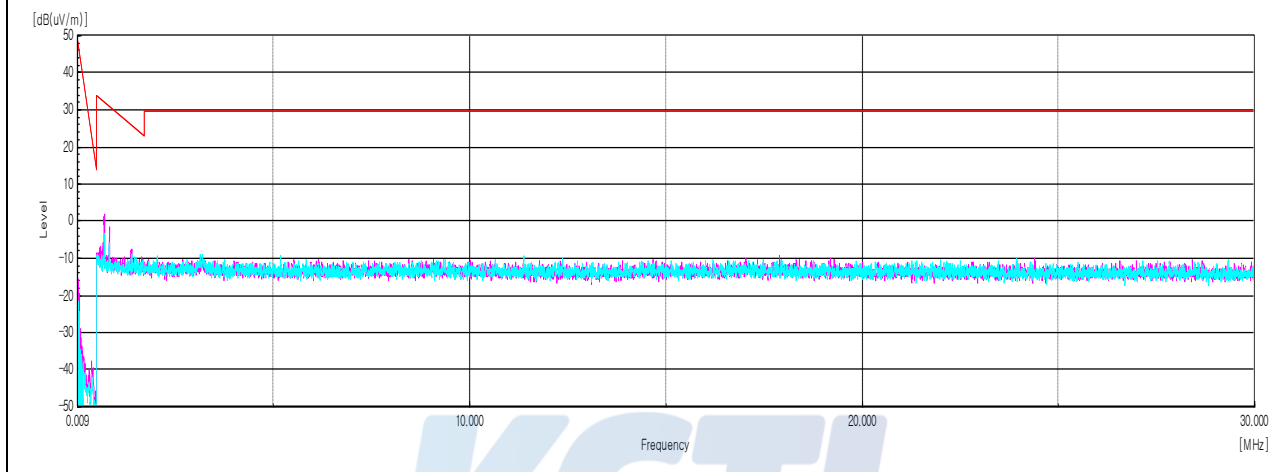
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Test results (Below 30 MHz) – Worst case: 802.11n20 / MIMO / U-NII-3 Middle frequency

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
No spurious emissions were detected within 20 dB of the limit.									

Horizontal/Vertical



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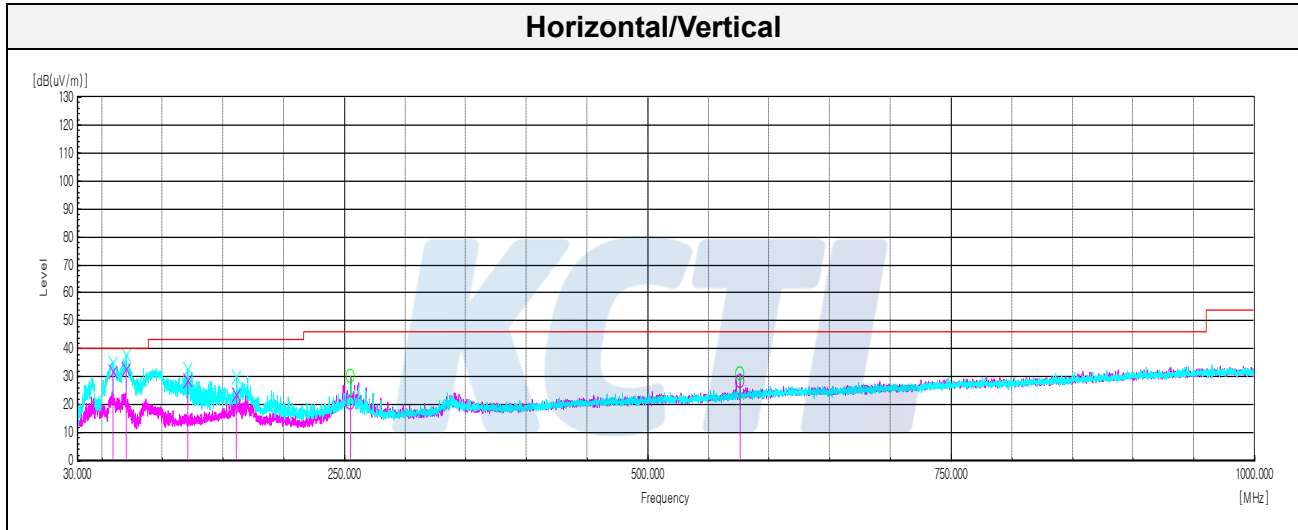
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Test results (Below 1 000 MHz) – Worst case: 802.11n20 / MIMO / U-NII-3 Middle frequency

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Quasi peak data									
58.98	V	44.50	1.59	-26.46	12.47	-	32.10	40.00	7.90
70.01	V	46.70	1.75	-28.15	12.50	-	32.80	40.00	7.20
120.57	V	41.20	2.36	-33.13	18.27	-	28.70	43.50	14.80
161.07	V	34.30	2.78	-29.23	16.05	-	23.90	43.50	19.60
255.16	H	31.20	3.55	-32.65	18.30	-	20.40	46.00	25.60
575.87	H	29.70	5.58	-31.37	24.29	-	28.20	46.00	17.80

Horizontal/Vertical



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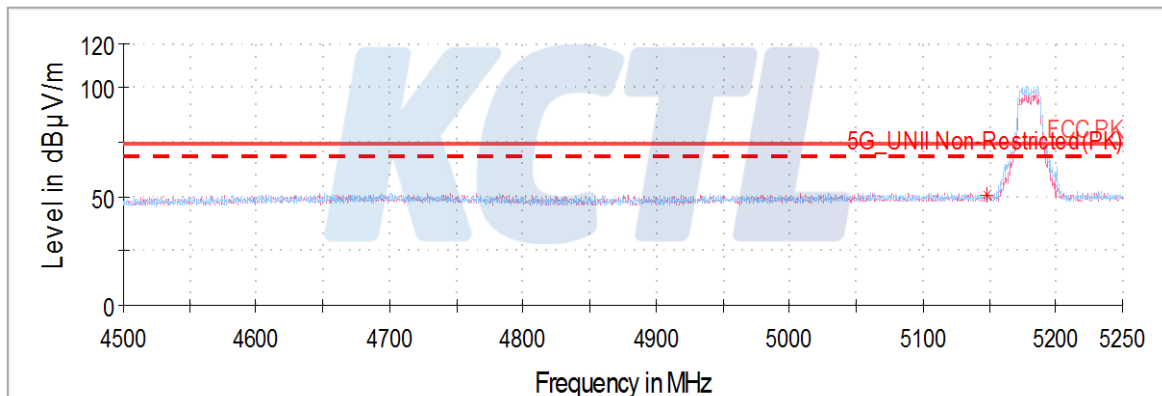


Test results (Above 1 000 MHz) U-NII-1
802.11a - ANT 0

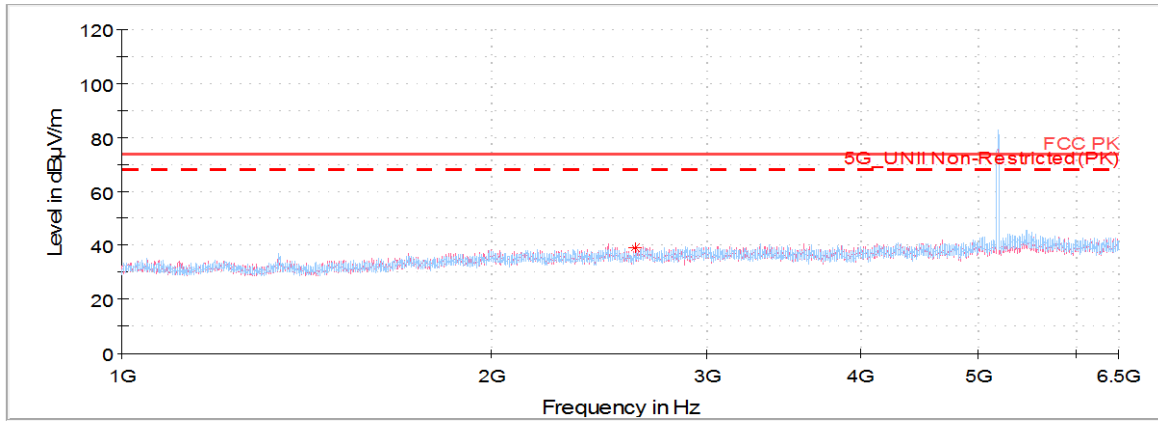
Lowest Channel (5 180 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data									
2 624.91	H	42.44	3.87	-36.29	28.99	-	39.01	68.20	29.19
5 148.55 ¹⁾	V	44.79	5.57	-32.73	33.12	-	50.75	74.00	23.25
10 361.48	H	57.63	8.09	-61.29	38.01	-	42.44	68.20	25.76
15 545.83 ¹⁾	V	55.63	9.96	-57.48	38.77	-	46.88	74.00	27.12
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

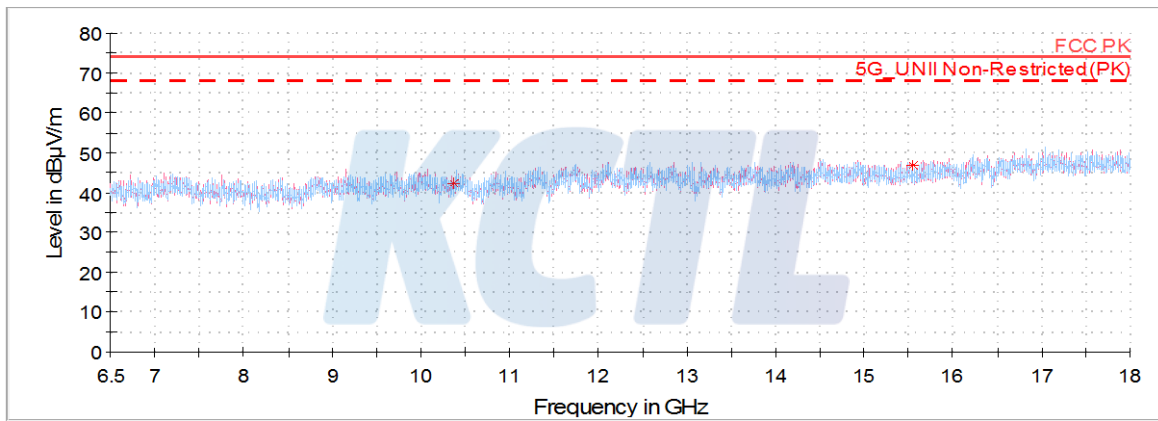
Bandedge



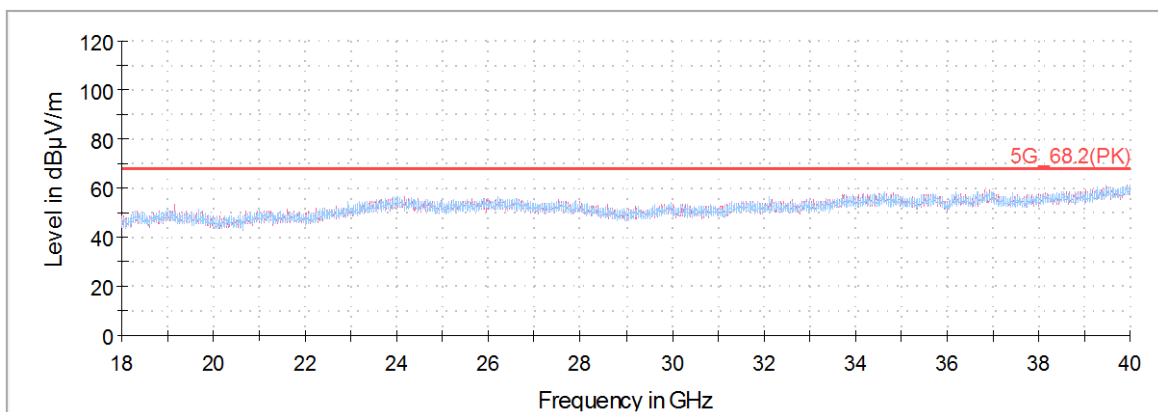
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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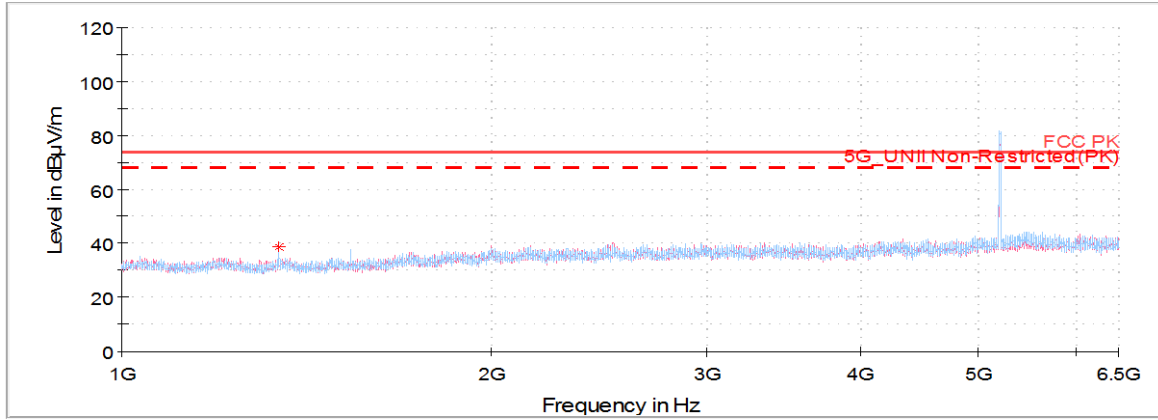
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**Middle Channel (5 200 MHz)**

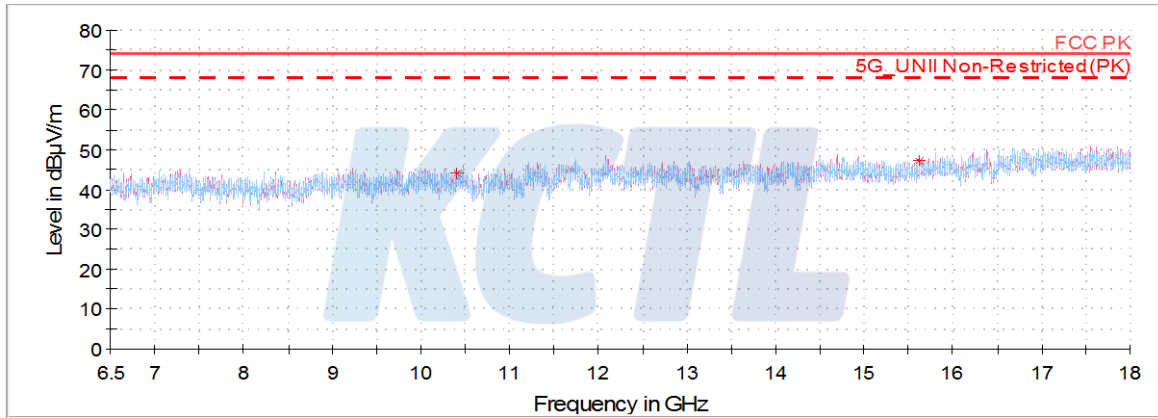
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 344.27 ¹⁾	H	47.43	2.80	-36.72	25.18	-	38.69	74.00	35.31
10 399.58	V	59.41	8.11	-61.35	38.02	-	44.18	68.20	24.02
15 623.09 ¹⁾	H	55.88	9.99	-57.31	38.56	-	47.12	74.00	26.88
Average Data									
No spurious emissions were detected within 20 dB of the limit.									



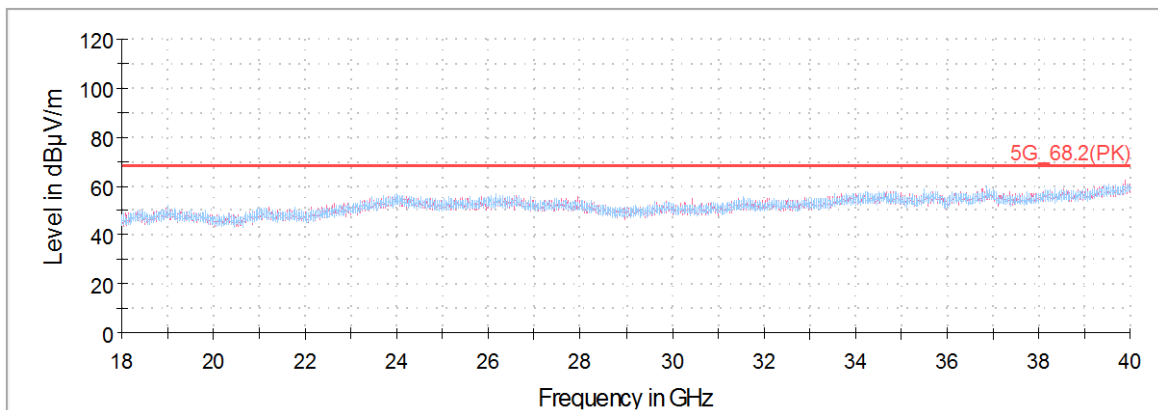
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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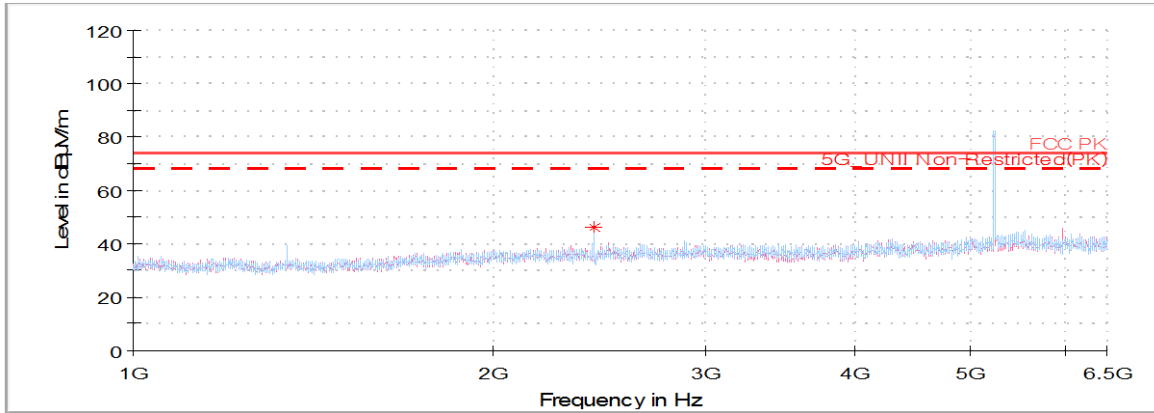
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**Highest Channel (5 240 MHz)**

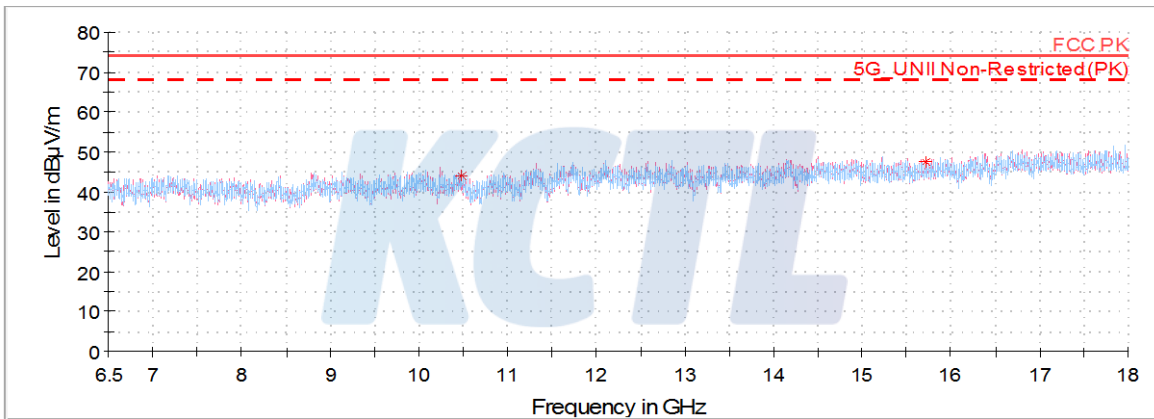
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
2 421.92	H	49.79	3.73	-36.12	28.60	-	46.00	68.20	22.20
10 482.59	V	59.48	8.16	-61.50	38.04	-	44.18	68.20	24.02
15 722.28 ¹⁾	H	56.33	10.02	-57.07	38.28	-	47.56	74.00	26.44
Average Data									
No spurious emissions were detected within 20 dB of the limit.									



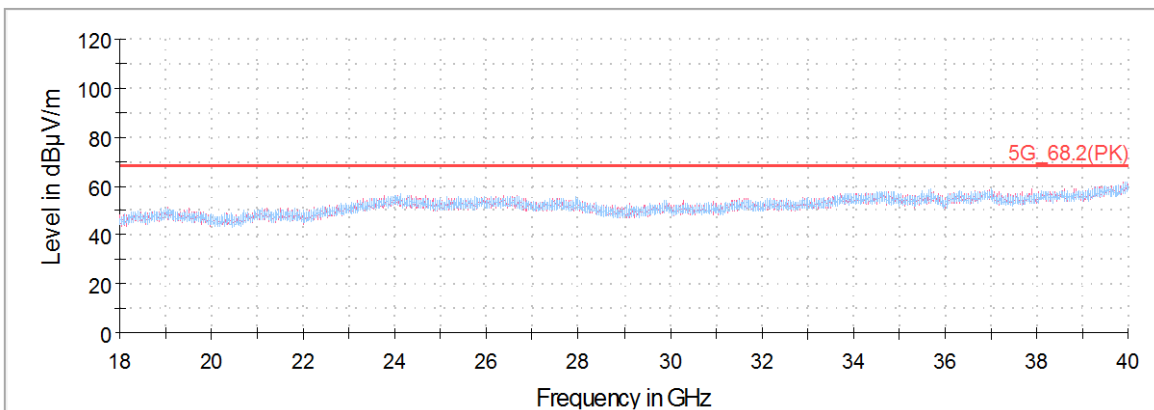
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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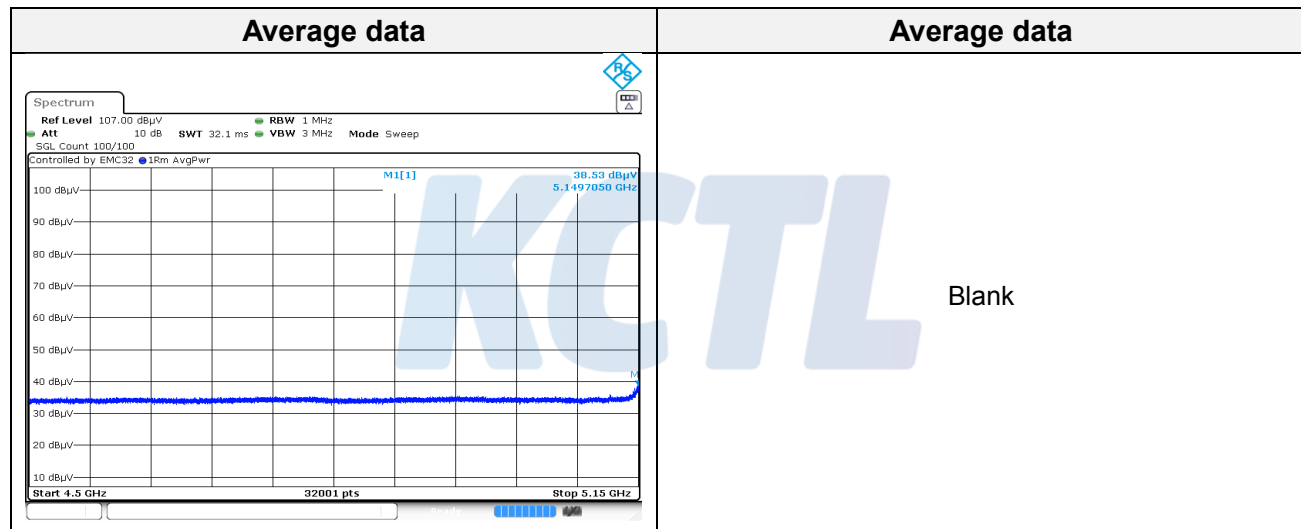
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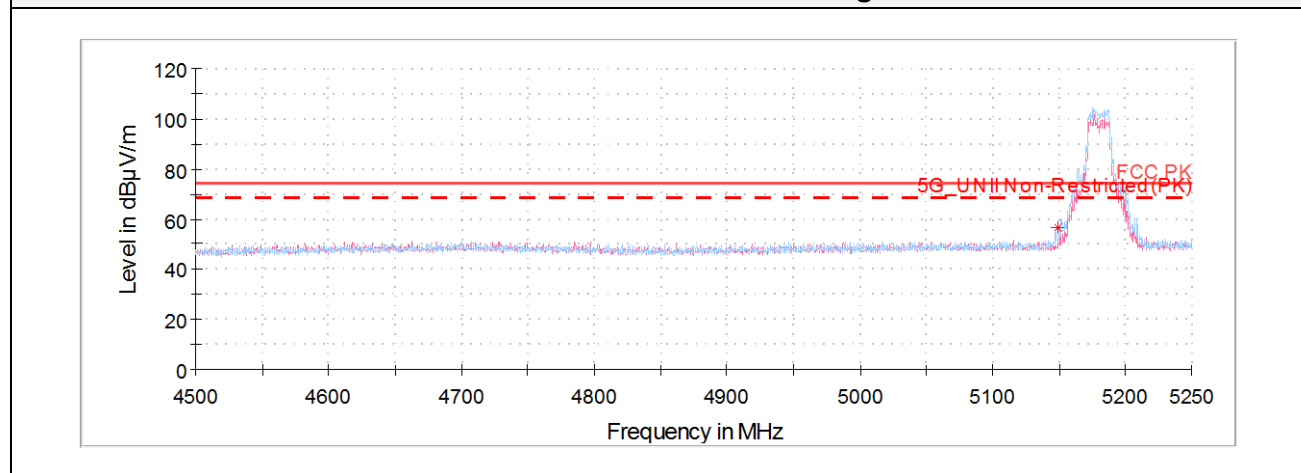
802.11a - ANT 1

Lowest Channel (5 180 MHz)

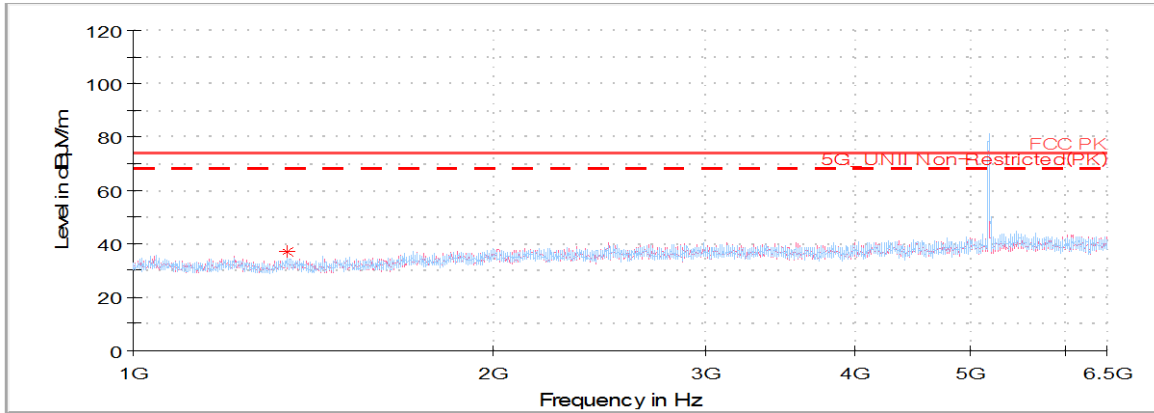
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 343.92 ¹⁾	H	45.97	2.80	-36.72	25.18	-	37.23	74.00	36.77
5 149.06 ¹⁾	H	50.61	5.57	-32.74	33.12	-	56.56	74.00	17.44
10 361.13	H	56.88	8.09	-61.29	38.01	-	41.69	68.20	26.51
15 539.00 ¹⁾	H	54.82	9.96	-57.50	38.79	-	46.07	74.00	27.93
Average Data									
5 149.06 ¹⁾	H	38.53	5.57	-32.74	33.12	0.11	44.59	54.00	9.41



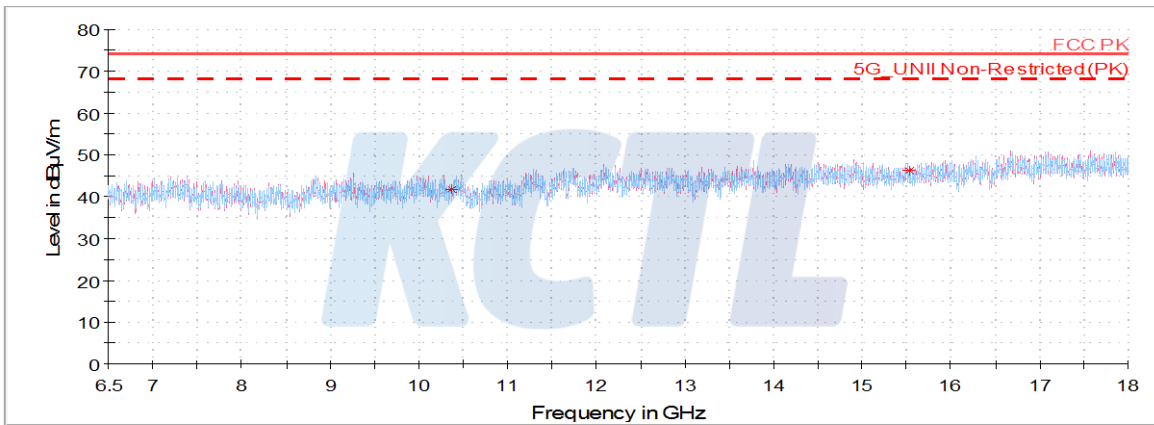
Horizontal/Vertical for Band-edge



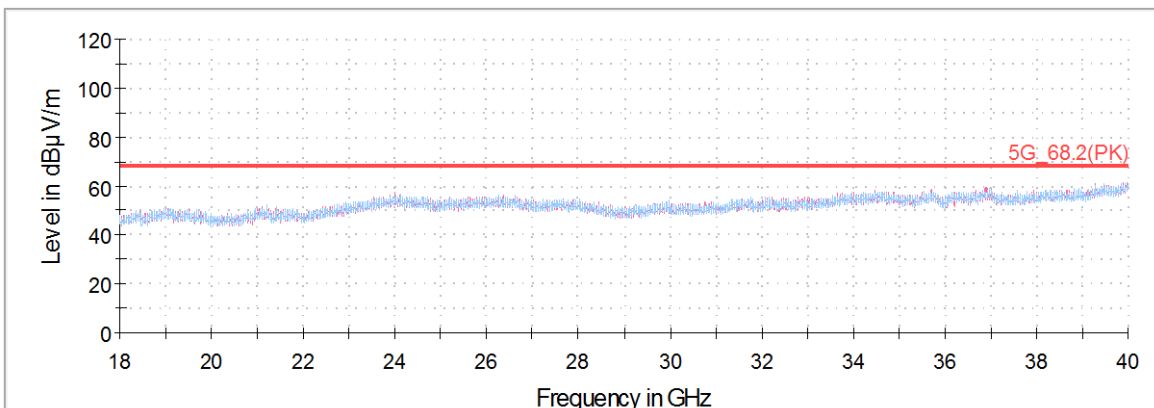
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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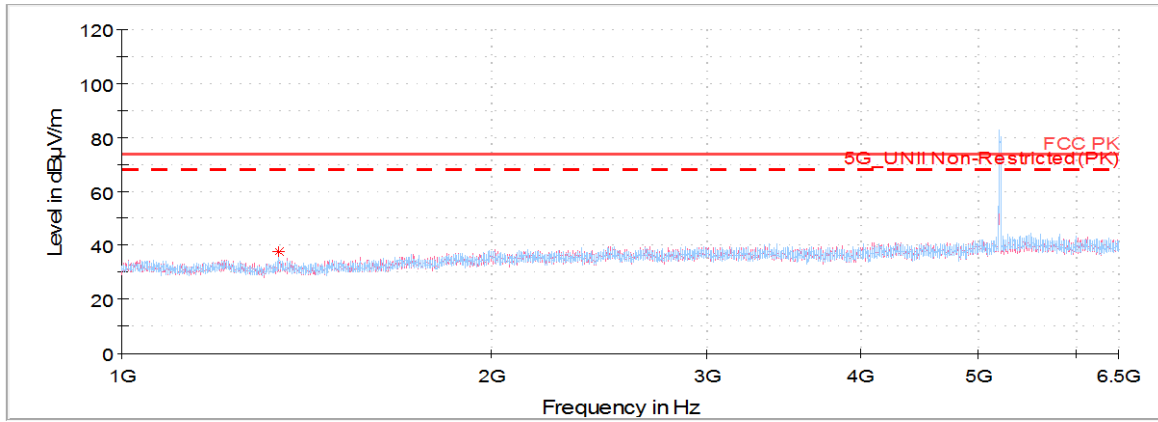
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KCTL**Middle Channel (5 200 MHz)**

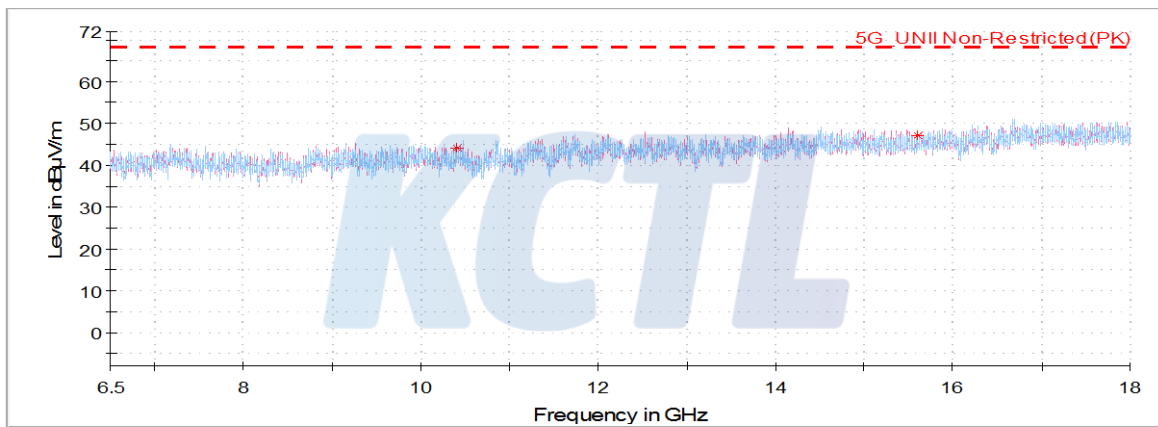
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 344.09 ¹⁾	H	46.50	2.80	-36.72	25.18	-	37.76	74.00	36.24
10 403.53	H	59.28	8.12	-61.37	38.02	-	44.05	68.20	24.15
15 602.25 ¹⁾	V	55.89	9.98	-57.35	38.61	-	47.13	74.00	26.87
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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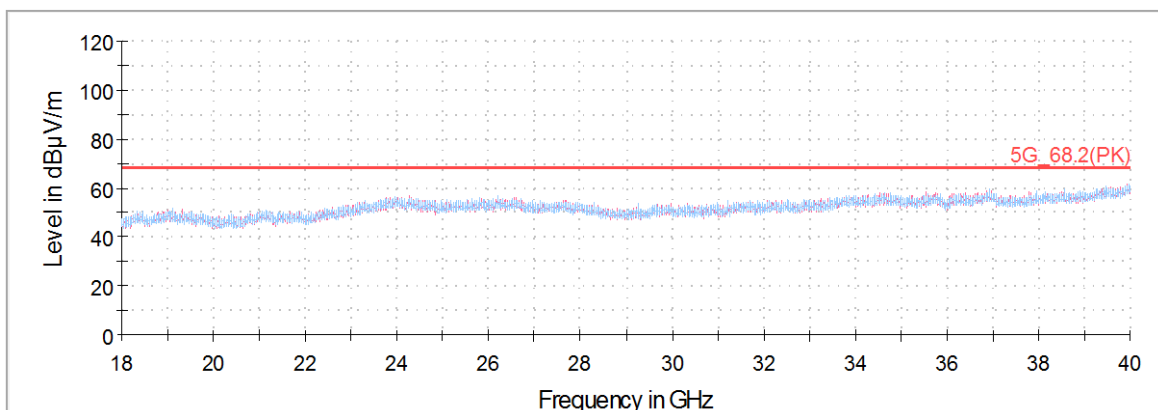
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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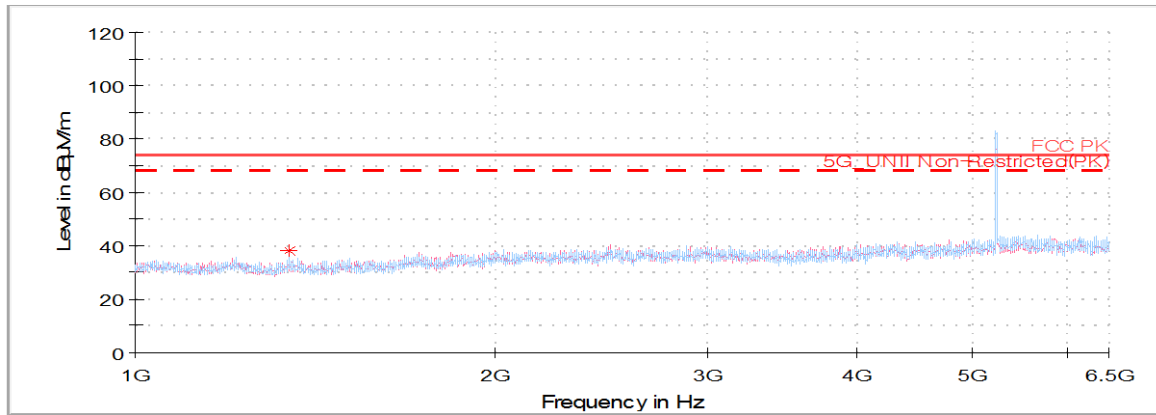
Page (31) of (197)

KCTL**Highest Channel (5 240 MHz)**

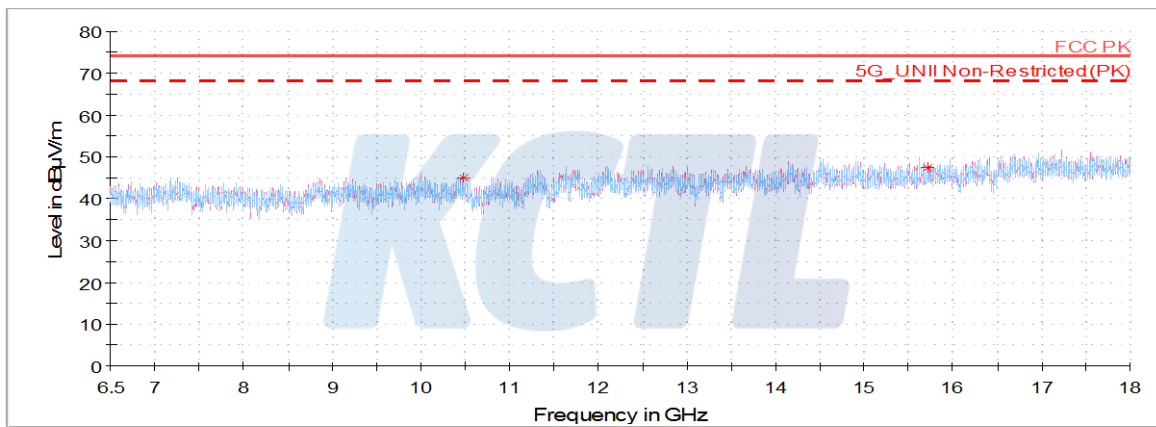
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 343.75 ¹⁾	H	46.58	2.80	-36.72	25.18	-	37.84	74.00	36.16
10 479.00	H	60.42	8.15	-61.49	38.04	-	45.12	68.20	23.08
15 720.84 ¹⁾	V	56.20	10.02	-57.07	38.28	-	47.43	74.00	26.57
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

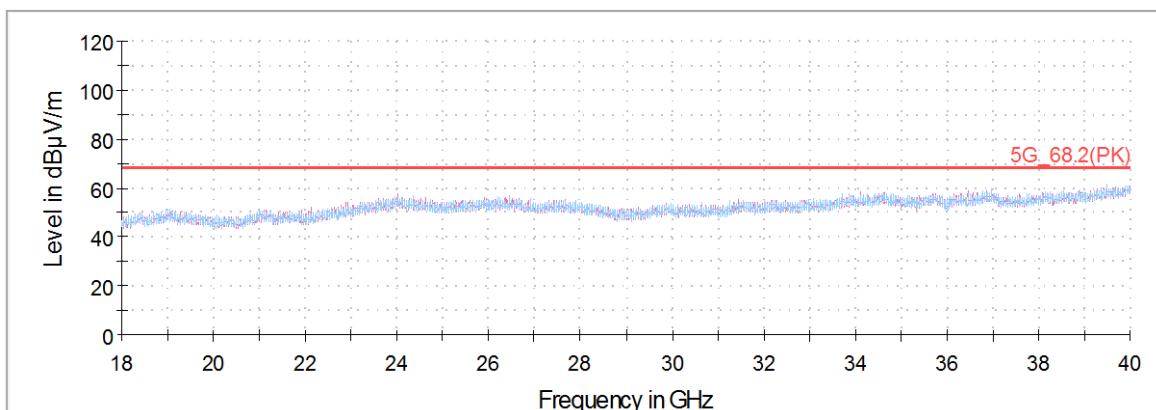
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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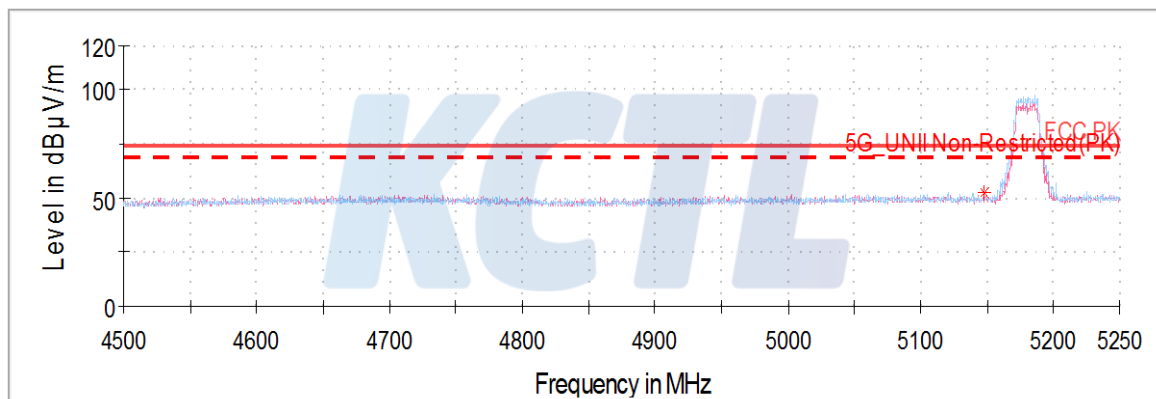
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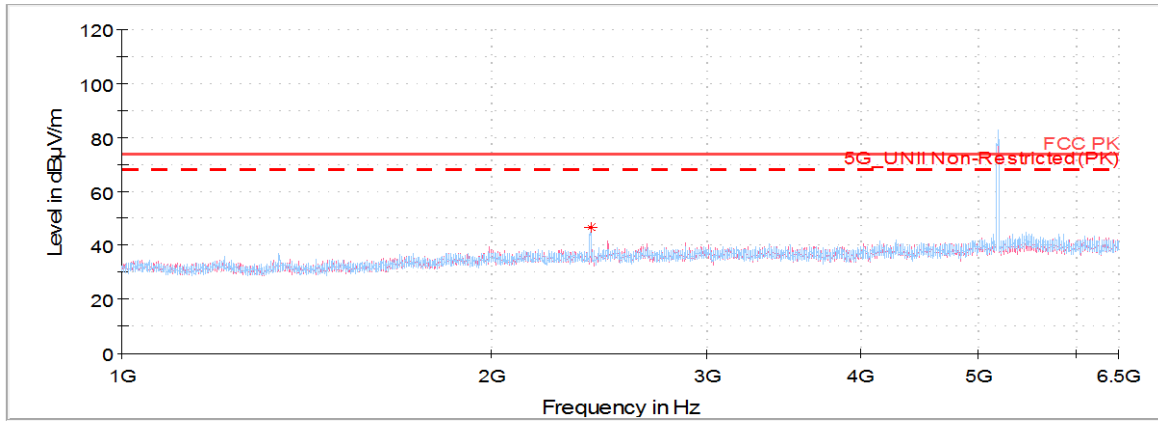
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KCTL**802.11n20 - ANT 0****Lowest Channel (5 180 MHz)**

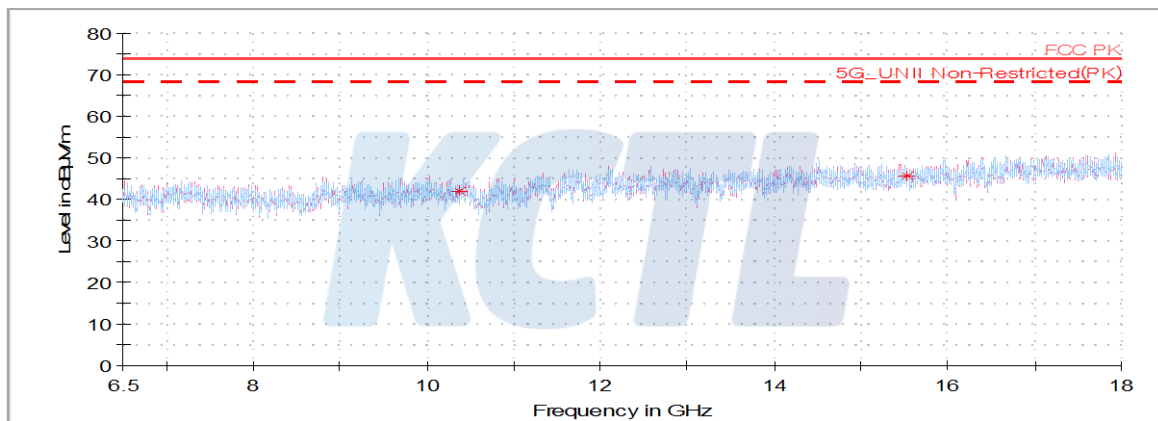
Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB($\mu V/m$))	Limit (dB($\mu V/m$))	Margin (dB)
Peak data									
2 411.09	H	50.60	3.72	-36.16	28.58	-	46.74	68.20	21.46
5 148.20 ¹⁾	H	46.21	5.57	-32.73	33.12	-	52.17	74.00	21.83
10 361.84	V	57.18	8.09	-61.29	38.01	-	41.99	68.20	26.21
15 540.44 ¹⁾	H	54.34	9.96	-57.50	38.79	-	45.59	74.00	28.41
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

Horizontal/Vertical for Band-edge

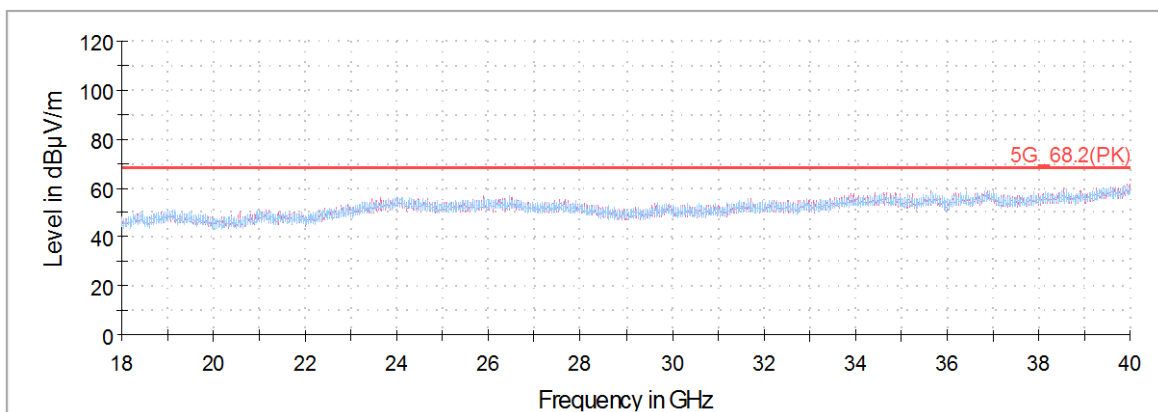
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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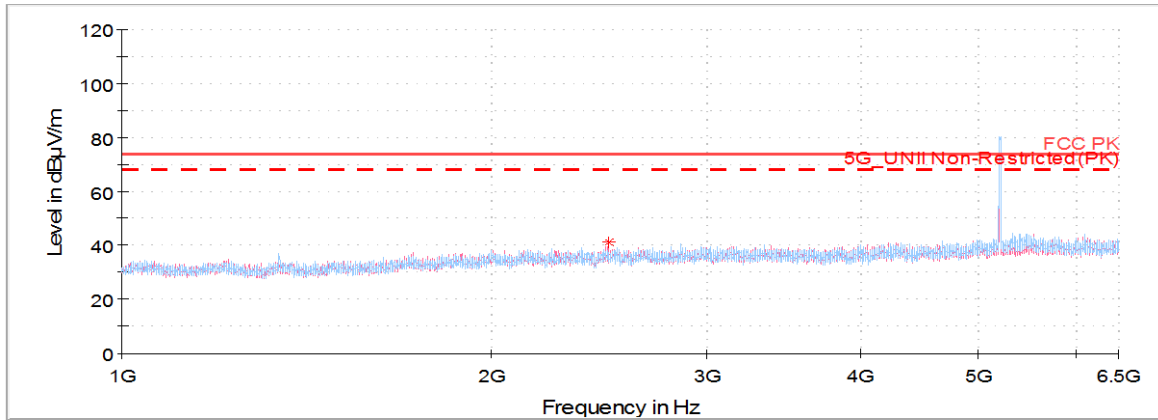
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KCTL**Middle Channel (5 200 MHz)**

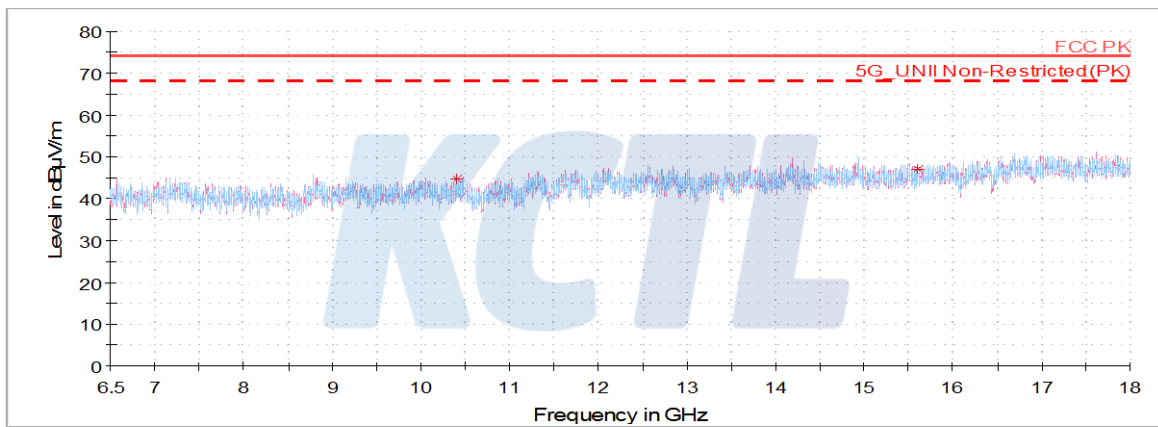
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
2 495.14 ¹⁾	V	44.40	3.78	-35.89	28.74	-	41.03	74.00	32.97
10 410.72	V	60.01	8.12	-61.37	38.02	-	44.78	68.20	23.42
15 602.25 ¹⁾	V	55.88	9.98	-57.35	38.61	-	47.12	74.00	26.88
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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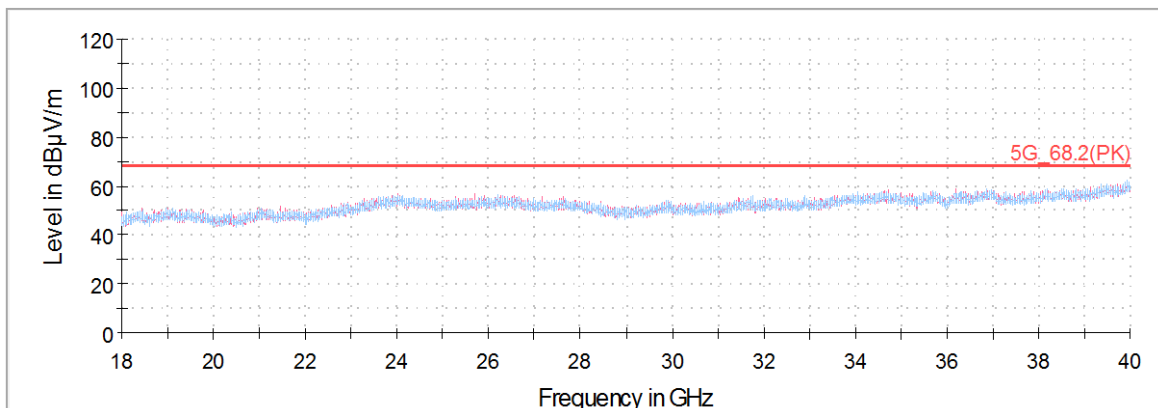
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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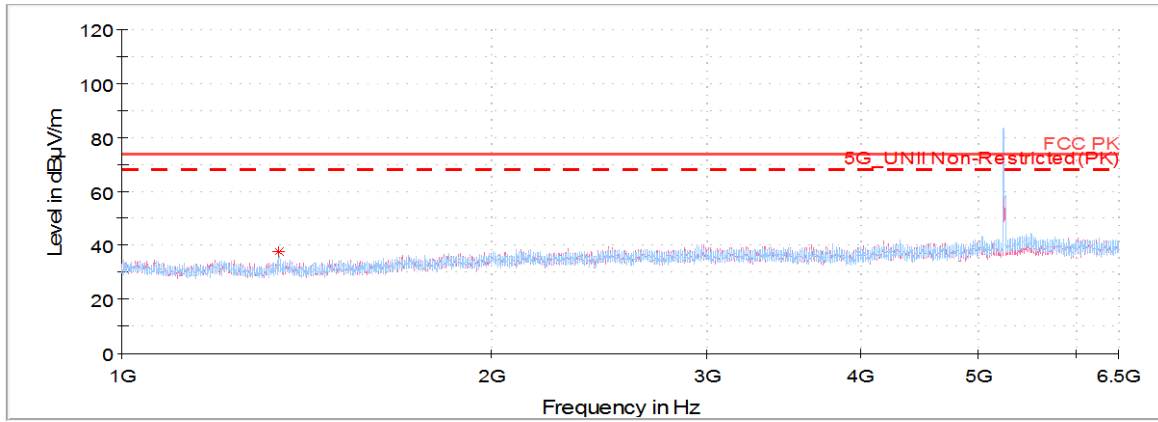
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**Highest Channel (5 240 MHz)**

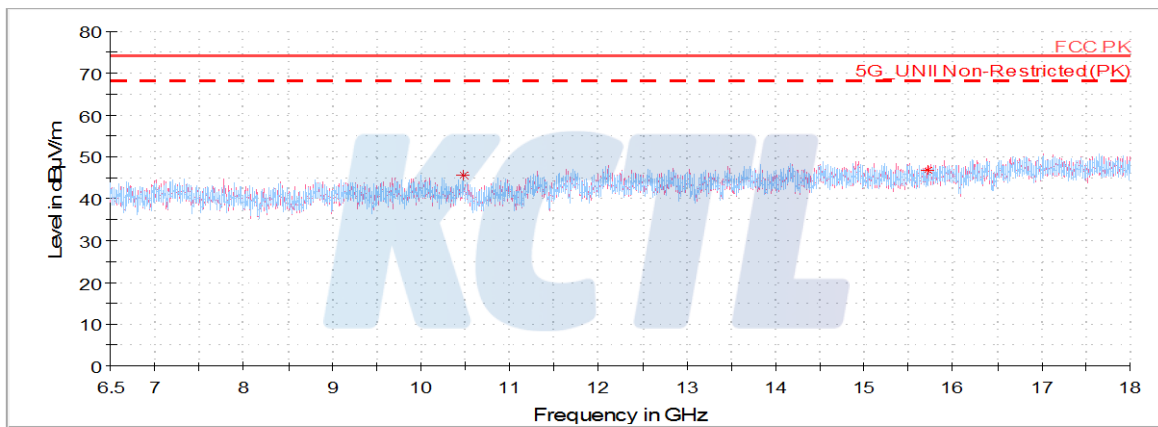
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 344.27 ¹⁾	H	46.24	2.80	-36.72	25.18	-	37.50	74.00	36.50
10 482.59	V	60.91	8.16	-61.50	38.04	-	45.61	68.20	22.59
15 718.33 ¹⁾	H	55.67	10.02	-57.08	38.29	-	46.90	74.00	27.10
Average Data									
No spurious emissions were detected within 20 dB of the limit.									



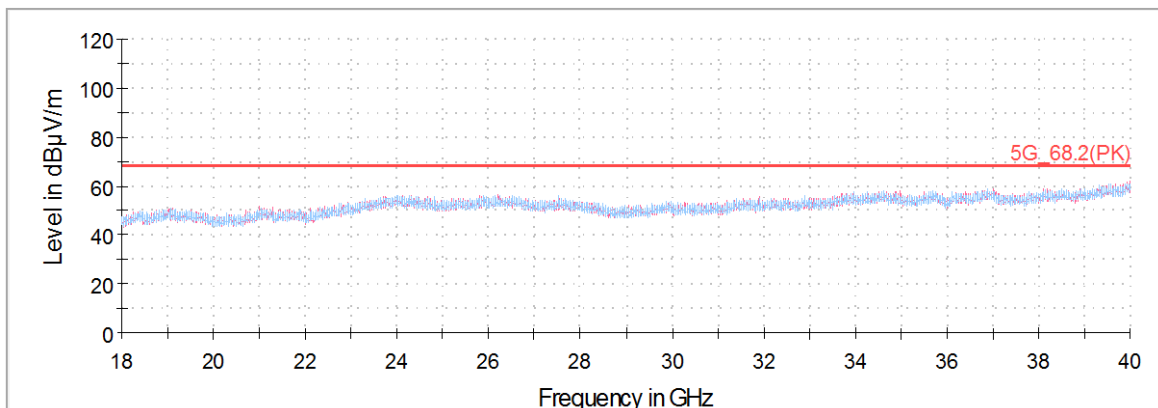
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

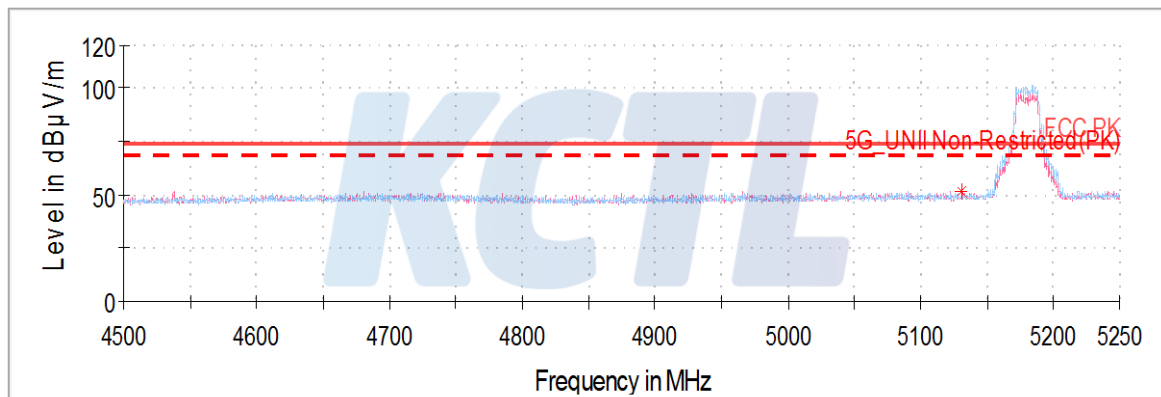
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Suwon-si, Gyeonggi-do, 16677, Korea
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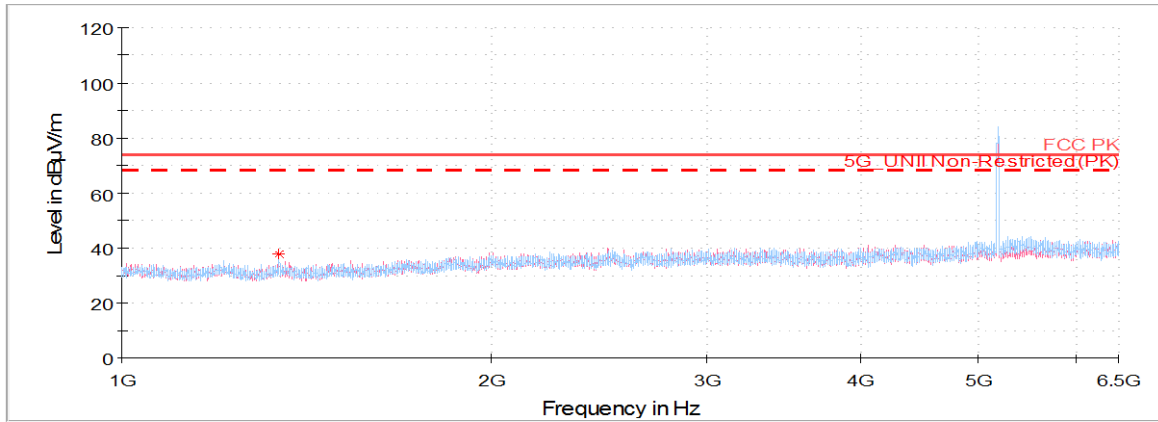
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**802.11n20 - ANT 1****Lowest Channel (5 180 MHz)**

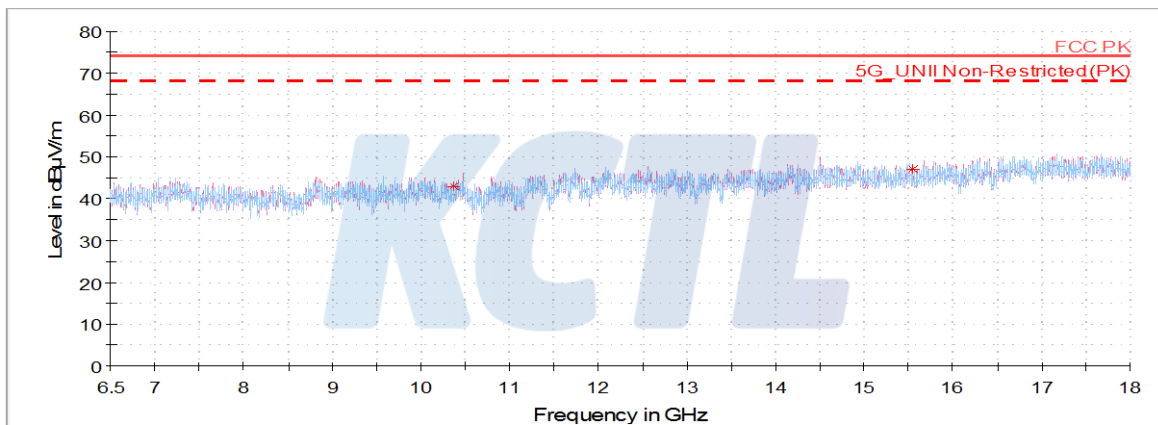
Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB($\mu V/m$))	Limit (dB($\mu V/m$))	Margin (dB)
Peak data									
1 343.75 ¹⁾	H	46.54	2.80	-36.72	25.18	-	37.80	74.00	36.20
5 131.02 ¹⁾	H	45.11	5.55	-32.49	33.10	-	51.27	74.00	22.73
10 361.84	H	58.19	8.09	-61.29	38.01	-	43.00	68.20	25.20
15 540.44 ¹⁾	H	55.75	9.96	-57.50	38.79	-	47.00	74.00	27.00
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

Horizontal/Vertical for Band-edge

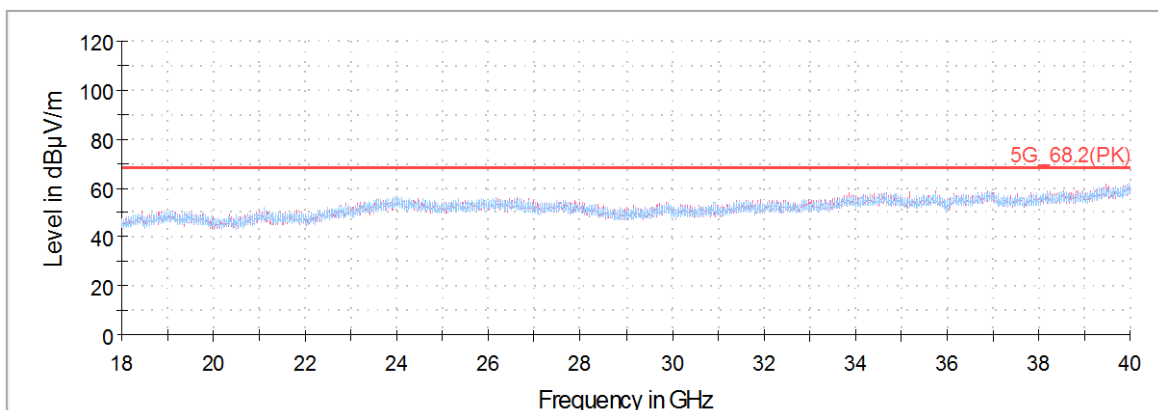
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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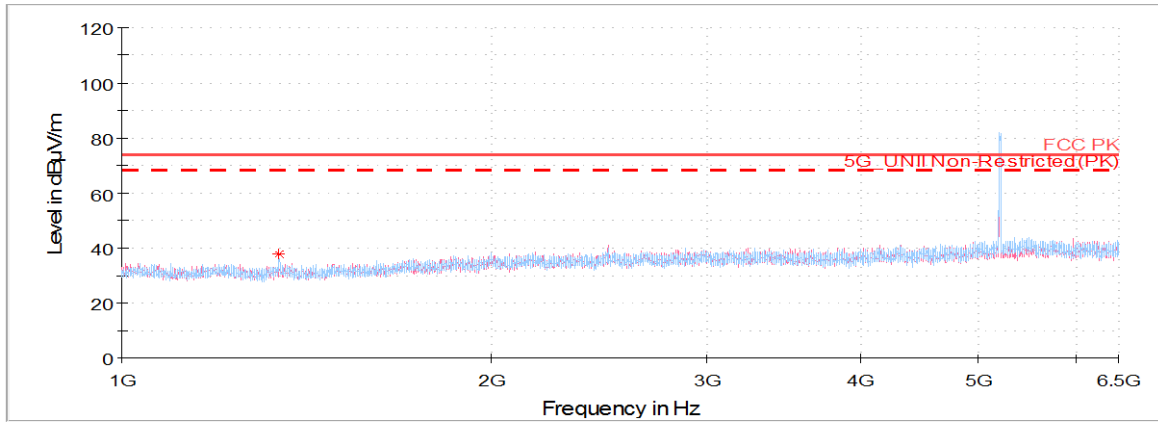
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KCTL**Middle Channel (5 200 MHz)**

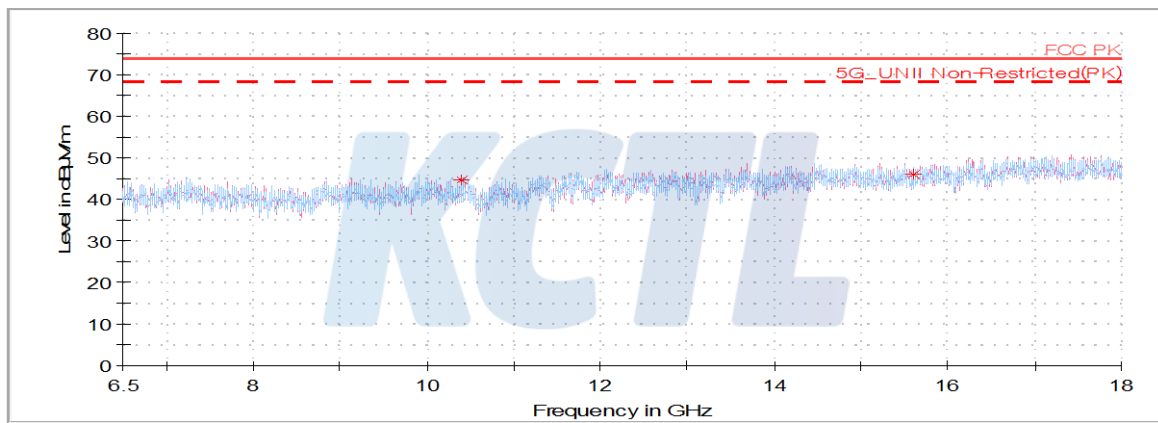
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 344.27 ¹⁾	H	46.37	2.80	-36.72	25.18	-	37.63	74.00	36.37
10 399.58	V	59.81	8.11	-61.35	38.02	-	44.59	68.20	23.61
15 600.45 ¹⁾	V	54.92	9.98	-57.36	38.62	-	46.16	74.00	27.84
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

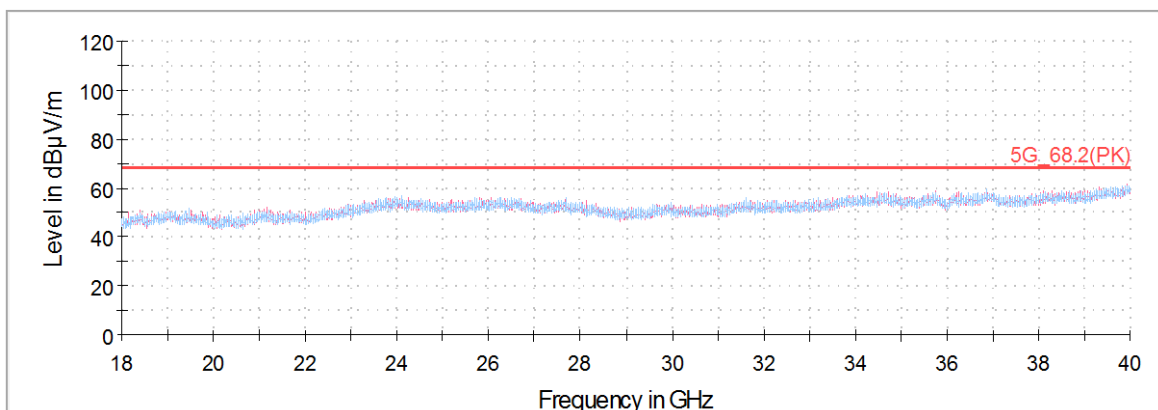
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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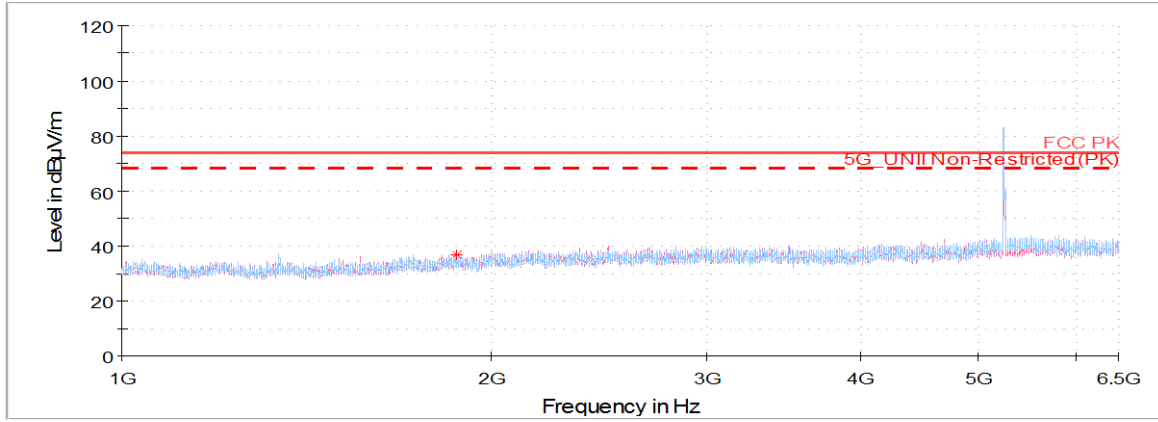
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KCTL**Highest Channel (5 240 MHz)**

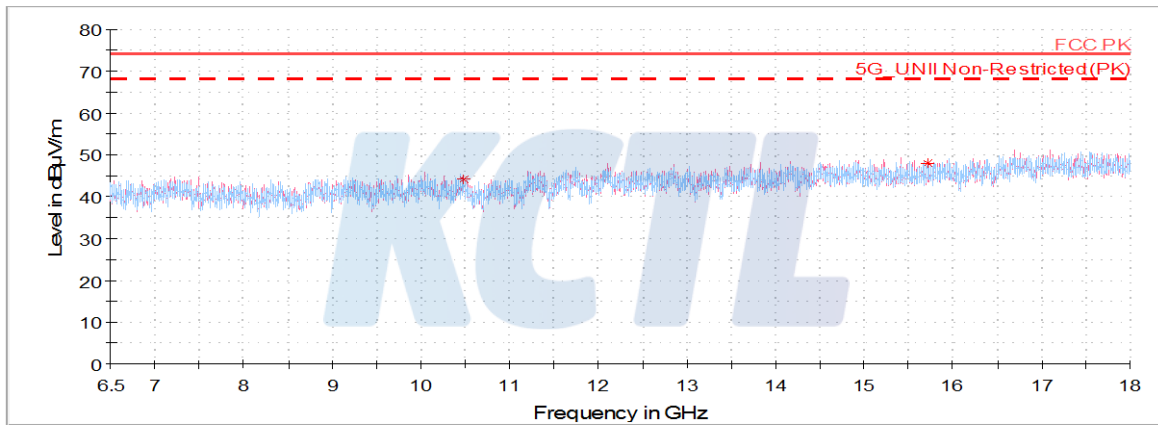
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 876.56	V	42.50	3.31	-36.30	27.31	-	36.82	68.20	31.38
10 480.08	H	59.57	8.15	-61.49	38.04	-	44.27	68.20	23.93
15 721.20 ¹⁾	V	56.65	10.02	-57.07	38.28	-	47.88	74.00	26.12
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

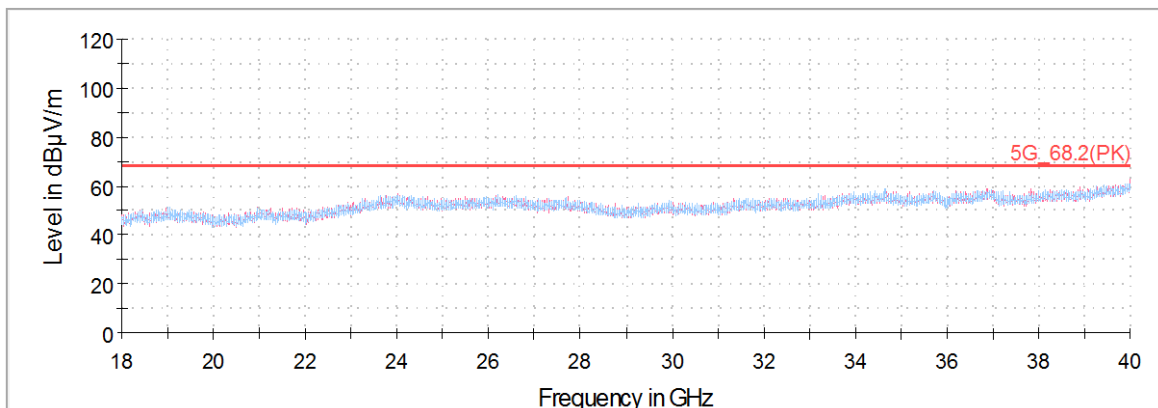
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

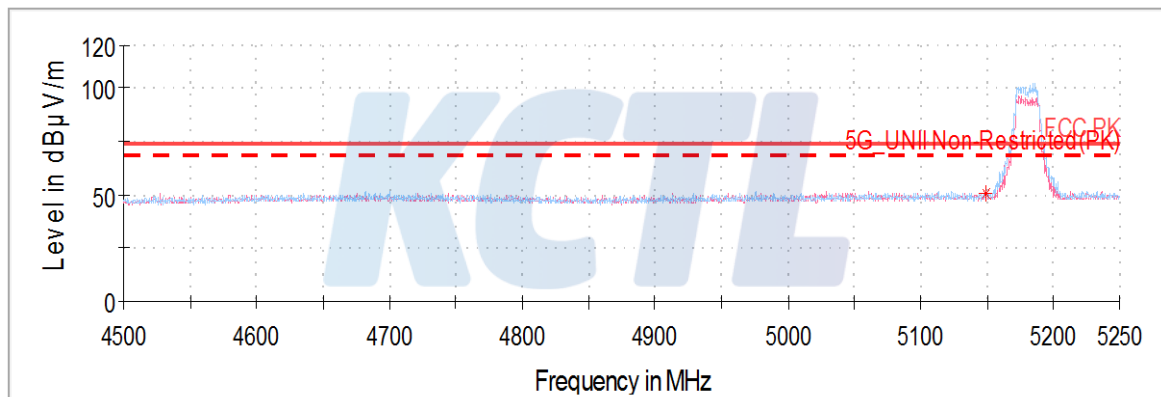
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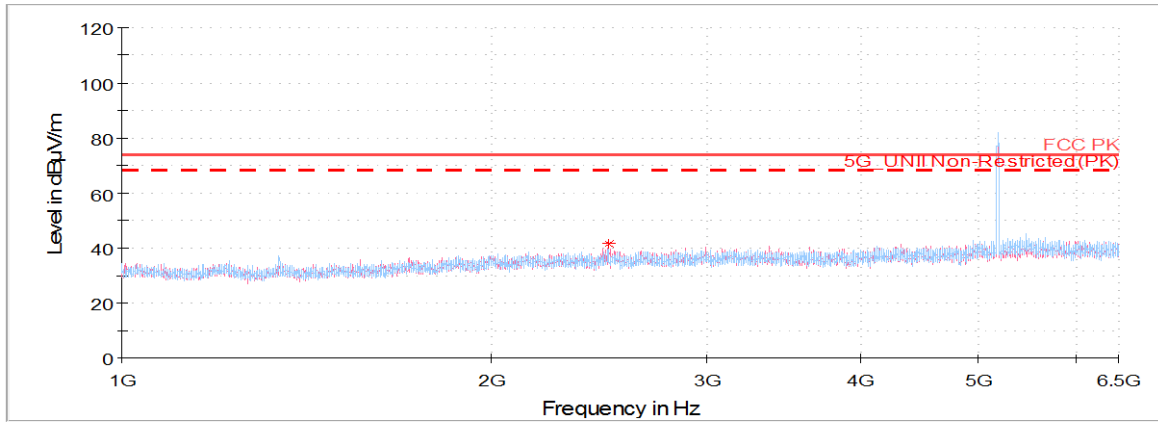
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**802.11n20 - MIMO****Lowest Channel (5 180 MHz)**

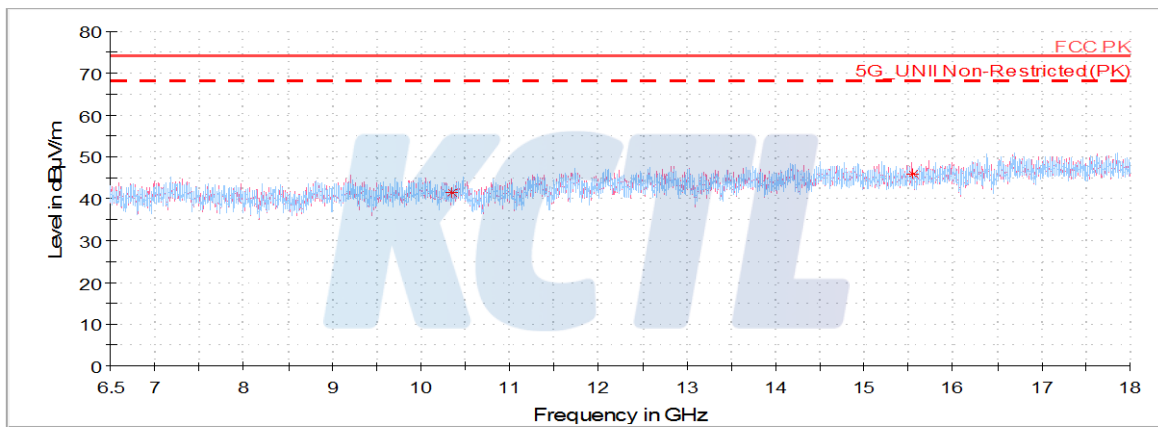
Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB($\mu V/m$))	Limit (dB($\mu V/m$))	Margin (dB)
Peak data									
2 494.97 ¹⁾	V	44.69	3.78	-35.89	28.74	-	41.32	74.00	32.68
5 149.58 ¹⁾	V	44.25	5.57	-32.74	33.12	-	50.20	74.00	23.80
10 359.69	V	56.54	8.09	-61.28	38.01	-	41.36	68.20	26.84
15 540.44 ¹⁾	V	54.63	9.96	-57.50	38.79	-	45.88	74.00	28.12
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

Horizontal/Vertical for Band-edge

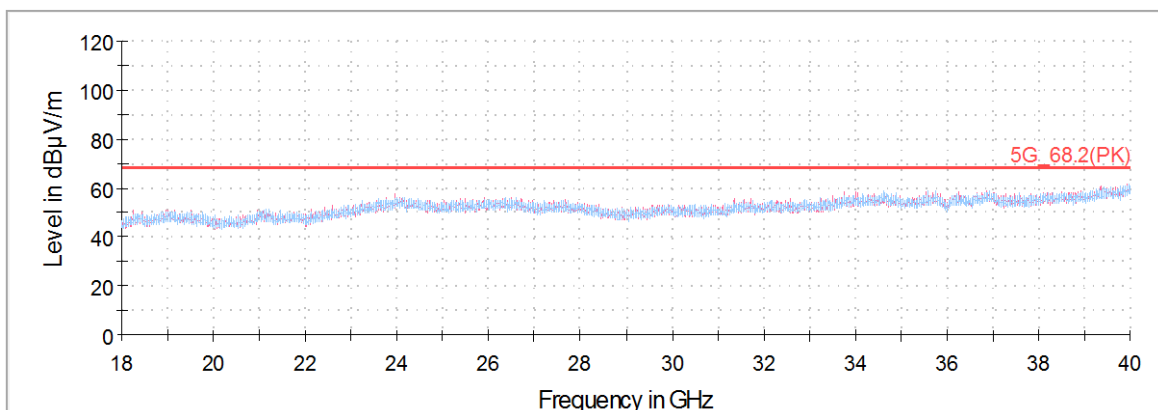
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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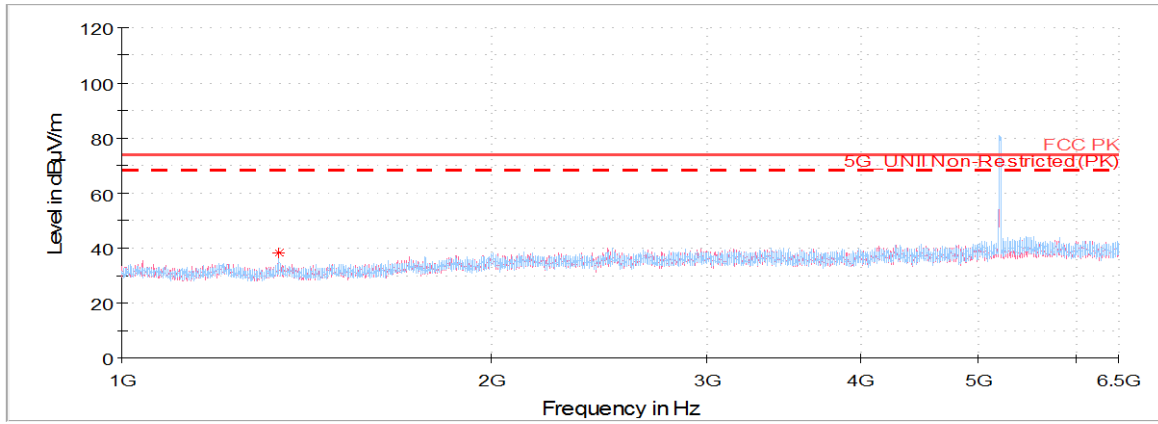
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KCTL**Middle Channel (5 200 MHz)**

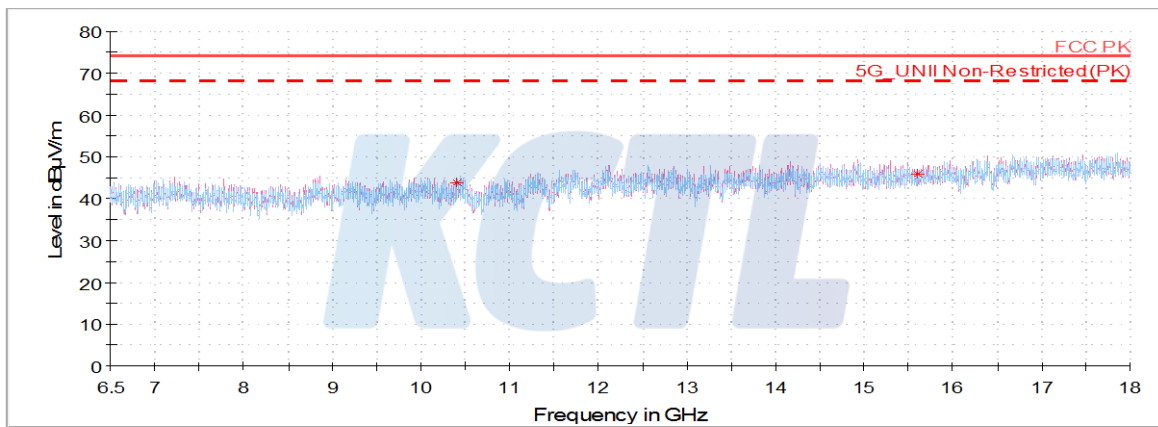
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 343.75 ¹⁾	H	46.84	2.80	-36.72	25.18	-	38.10	74.00	35.90
10 404.25	H	59.01	8.12	-61.37	38.02	v	43.78	68.20	24.42
15 603.69 ¹⁾	V	54.74	9.98	-57.35	38.61	v	45.98	74.00	28.02
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

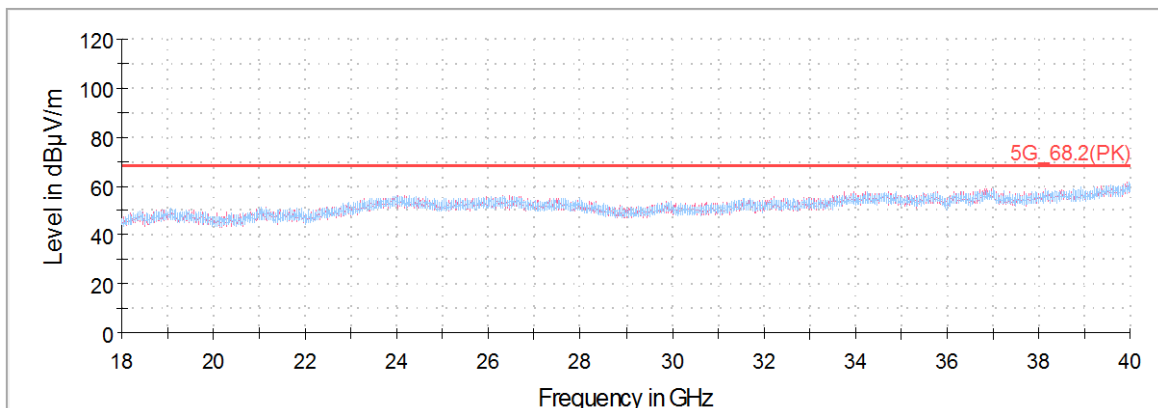
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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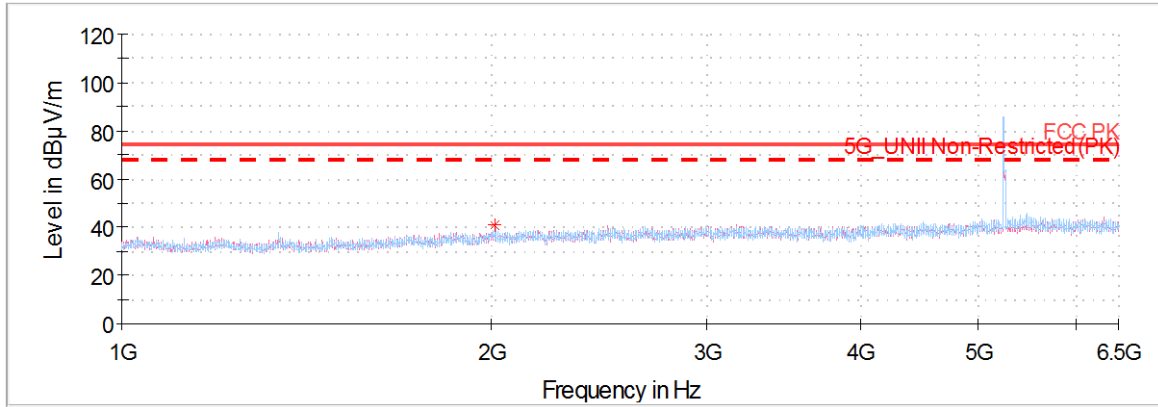
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KCTL**Highest Channel (5 240 MHz)**

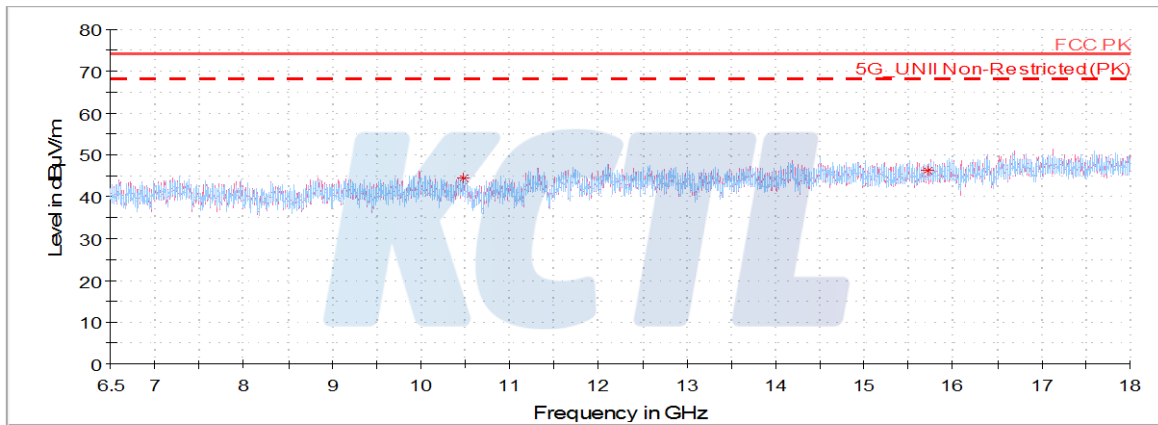
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
2 015.95	H	45.83	3.44	-36.18	27.83	-	40.92	68.20	27.28
10 480.80	V	59.61	8.15	-61.49	38.04	-	44.31	68.20	23.89
15 720.84 ¹⁾	V	54.87	10.02	-57.07	38.28	-	46.10	74.00	27.90
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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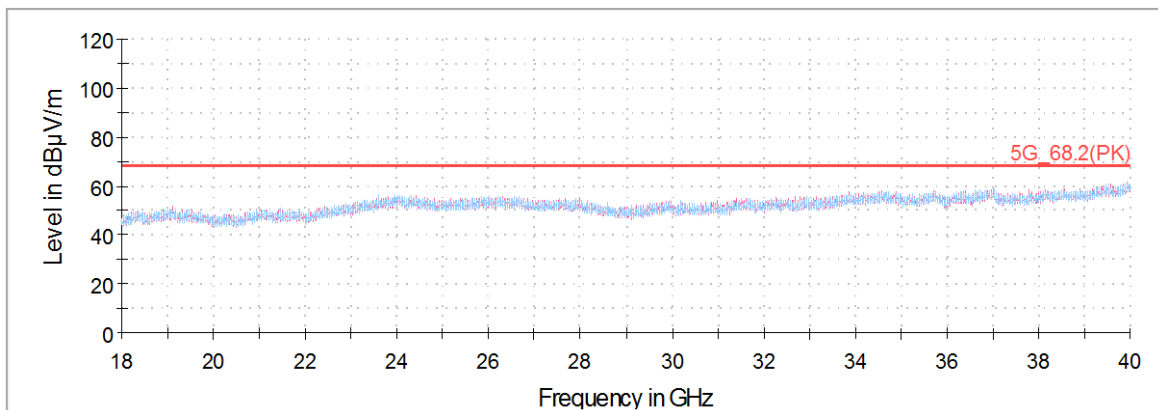
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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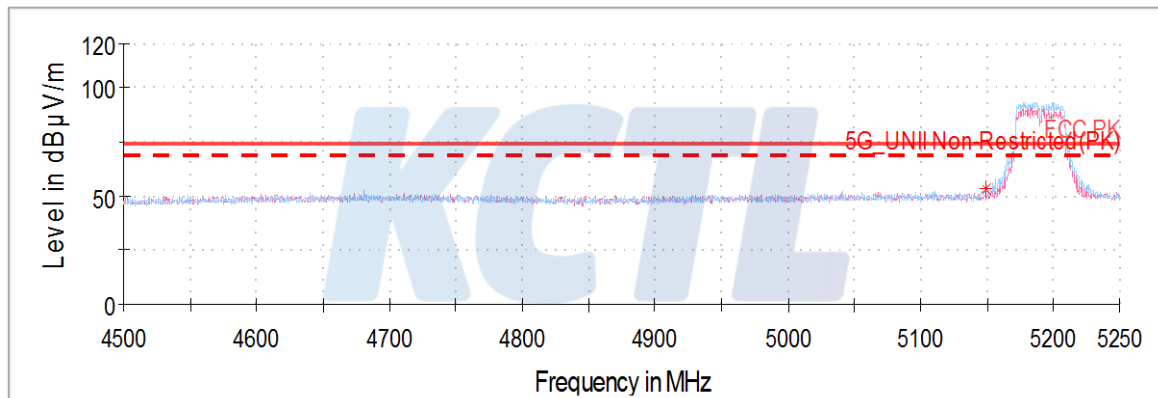
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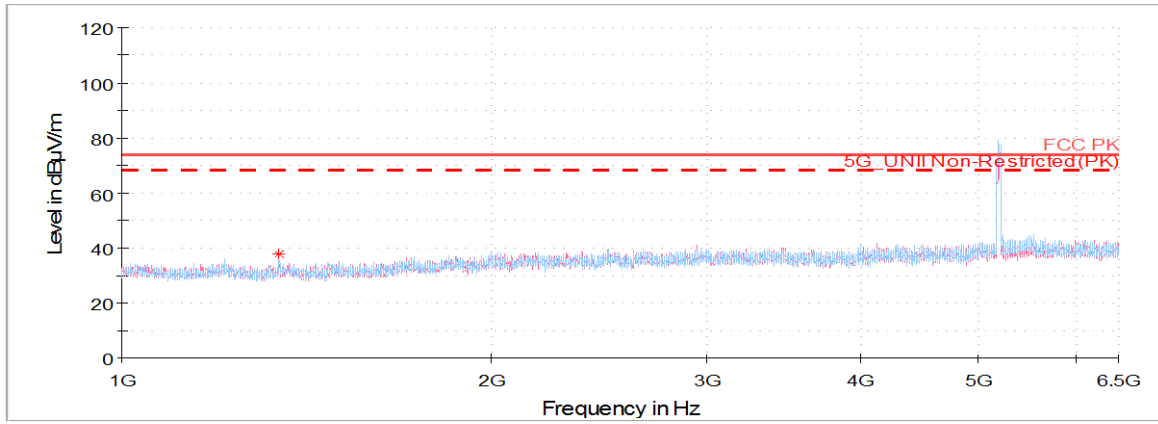
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**802.11n40 – ANT 0****Lowest Channel (5 190 MHz)**

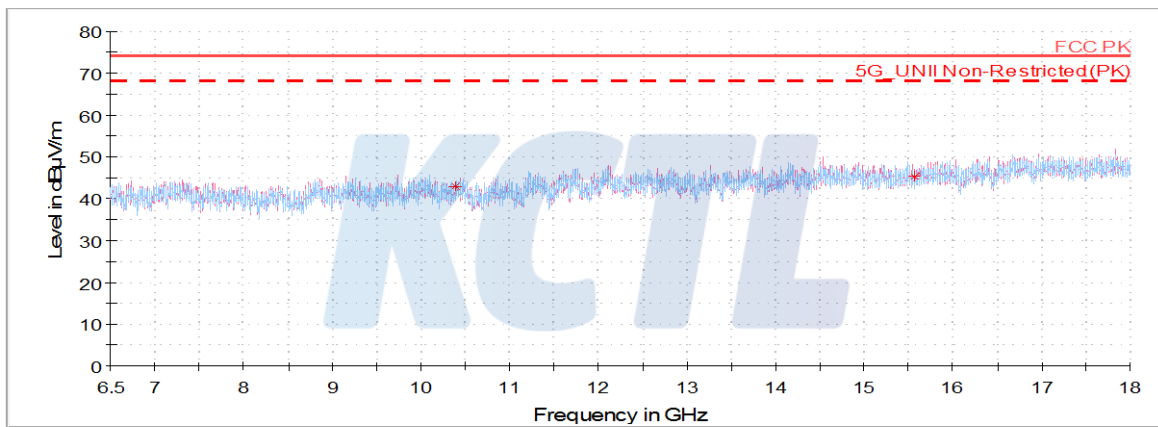
Frequency (MHz)	Pol. (V/H)	Reading (dB(μ V))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB(μ V/m))	Limit (dB(μ V/m))	Margin (dB)
Peak data									
1 344.09 ¹⁾	H	46.33	2.80	-36.72	25.18	-	37.59	74.00	36.41
5 149.23 ¹⁾	H	47.61	5.57	-32.74	33.12	-	53.56	74.00	20.44
10 379.81	V	58.29	8.10	-61.31	38.01	-	43.09	68.20	25.11
15 569.91 ¹⁾	H	54.11	9.97	-57.42	38.70	-	45.36	74.00	28.64
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

Horizontal/Vertical for Band-edge

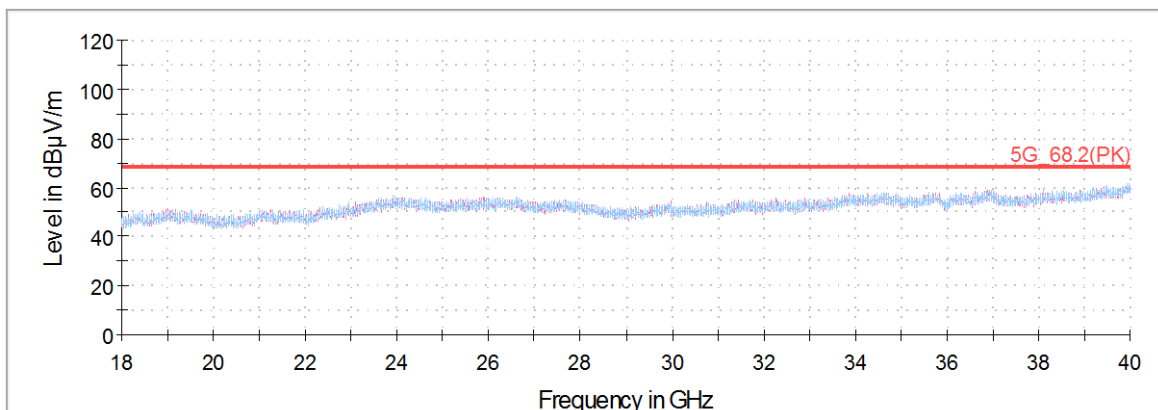
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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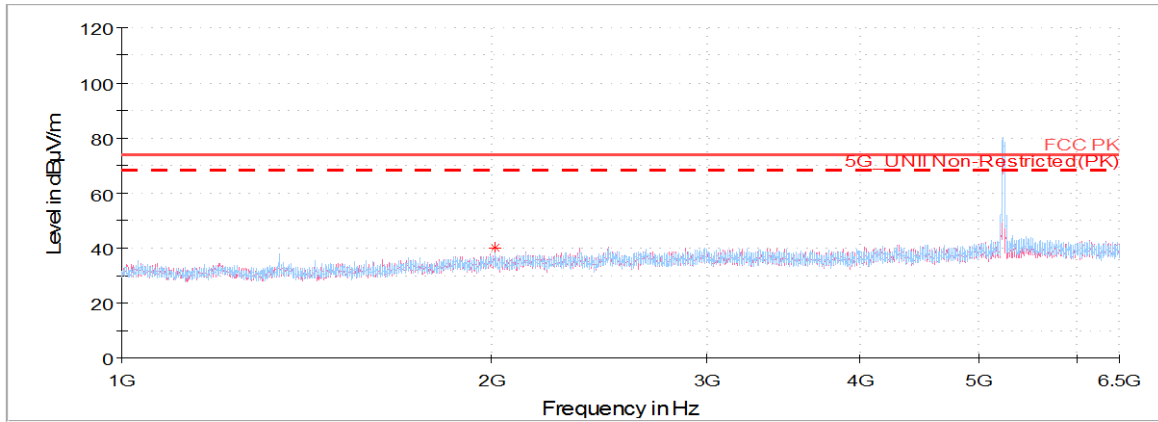
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KCTL**Highest Channel (5 230 MHz)**

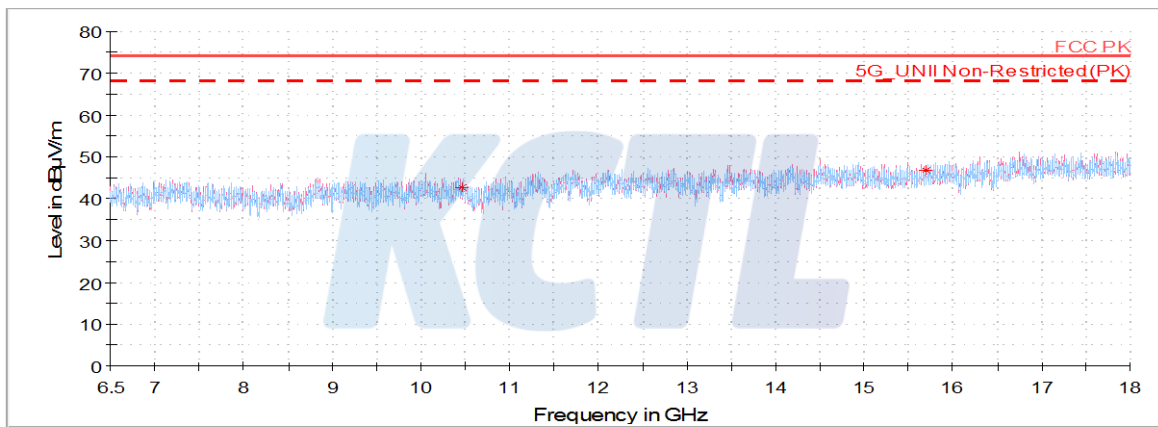
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
2 015.95	H	45.23	3.44	-36.18	27.83	-	40.32	68.20	27.88
10 460.67	V	57.81	8.14	-61.46	38.04	-	42.53	68.20	25.67
15 691.02 ¹⁾	H	55.44	10.01	-57.15	38.37	-	46.67	74.00	27.33
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

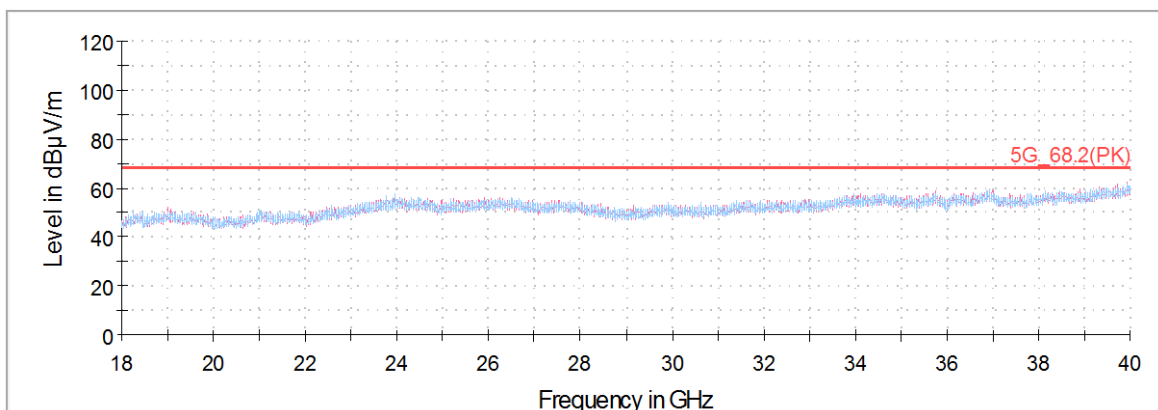
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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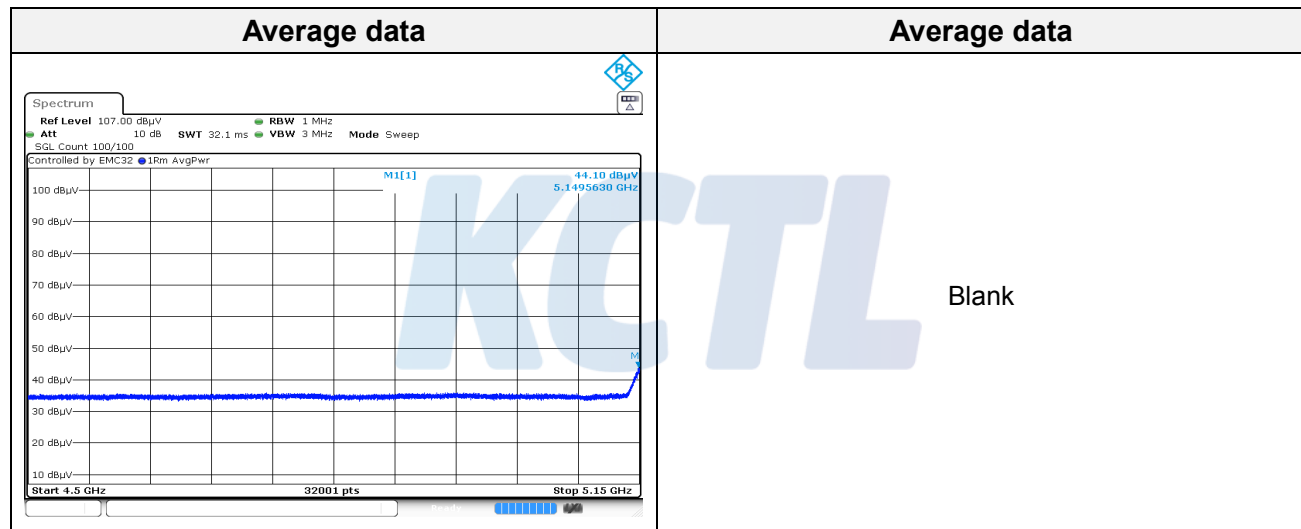
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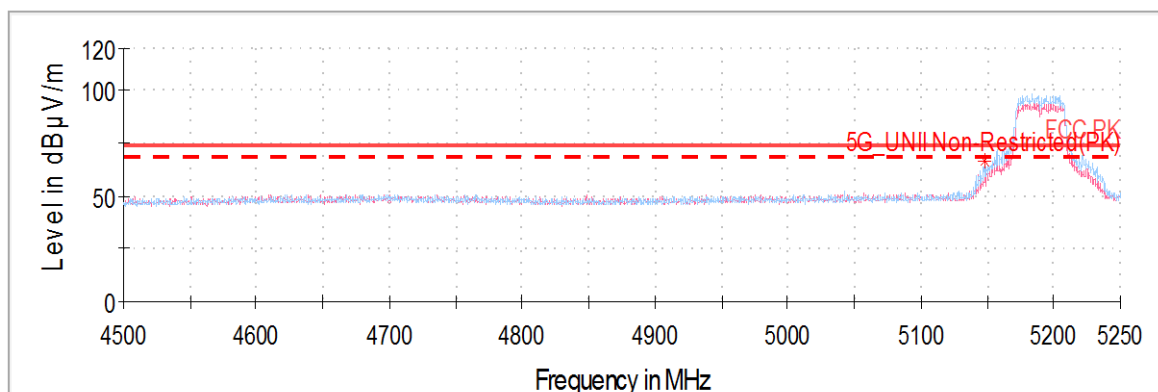
802.11n40 – ANT 1

Lowest Channel (5 190 MHz)

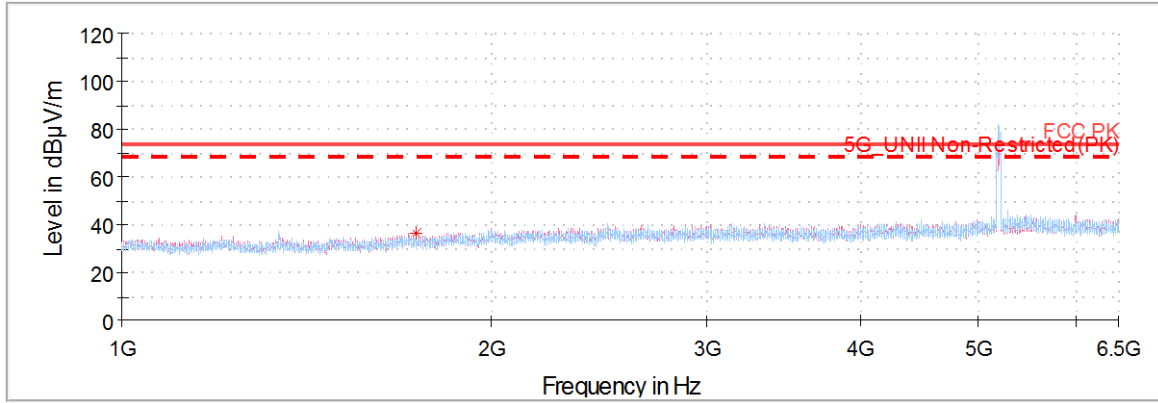
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 735.80	H	42.88	3.17	-36.50	26.74	-	36.29	68.20	31.91
5 147.69 ¹⁾	H	60.72	5.57	-32.72	33.12	-	66.69	74.00	7.31
10 381.25	H	57.48	8.10	-61.32	38.01	-	42.27	68.20	25.93
15 570.27 ¹⁾	H	54.93	9.97	-57.42	38.70	-	46.18	74.00	27.82
Average Data									
5 147.69 ¹⁾	H	44.10	5.57	-32.72	33.12	0.34	50.41	54.00	3.59



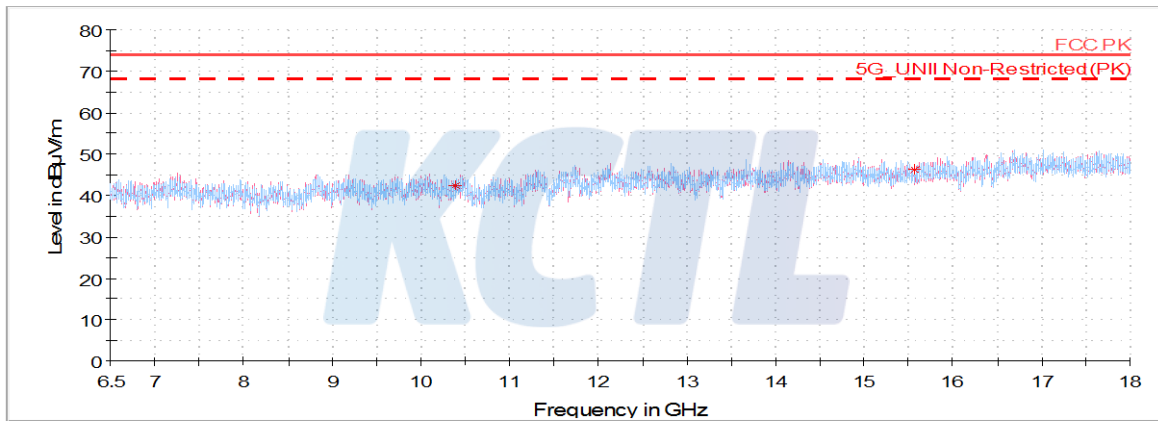
Horizontal/Vertical for Band-edge



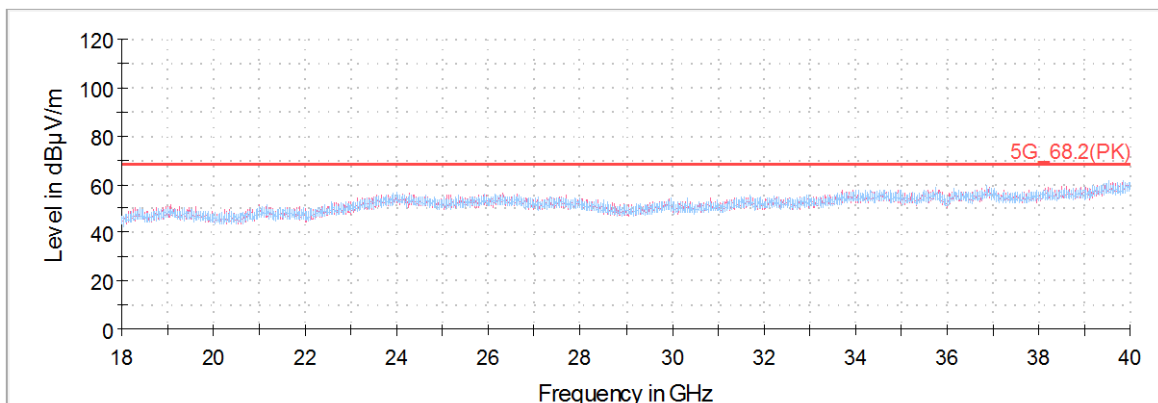
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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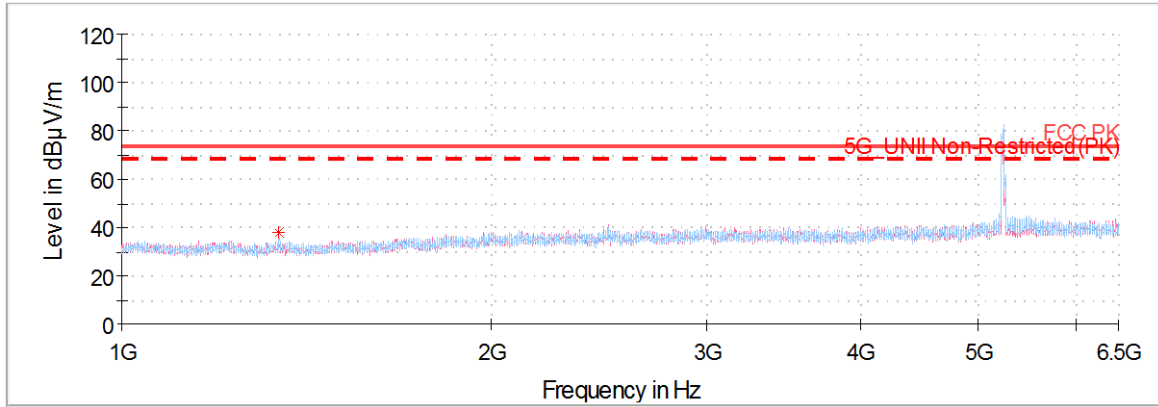
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**Highest Channel (5 230 MHz)**

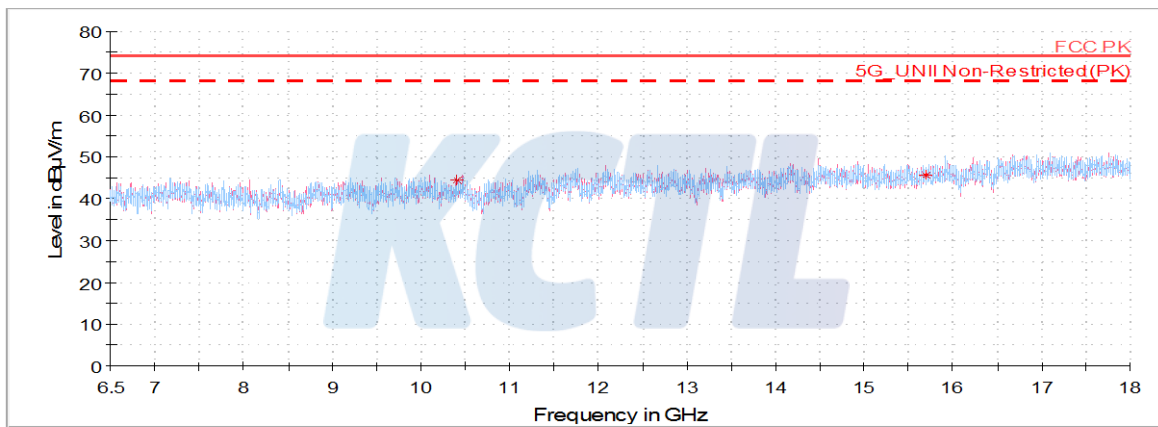
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 343.92 ¹⁾	H	46.50	2.80	-36.72	25.18	-	37.76	74.00	36.24
10 406.77	V	59.57	8.12	-61.37	38.02	-	44.34	68.20	23.86
15 690.66 ¹⁾	V	54.26	10.01	-57.15	38.37	-	45.49	74.00	28.51
Average Data									
No spurious emissions were detected within 20 dB of the limit.									



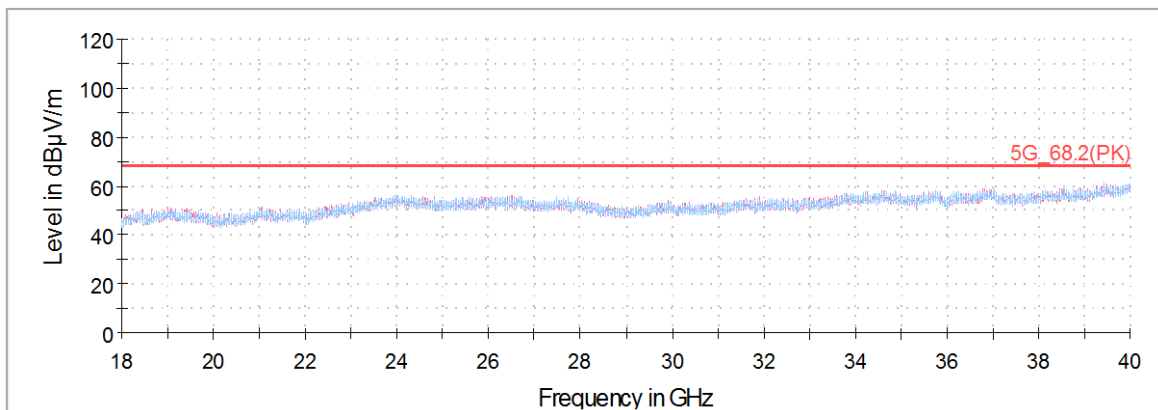
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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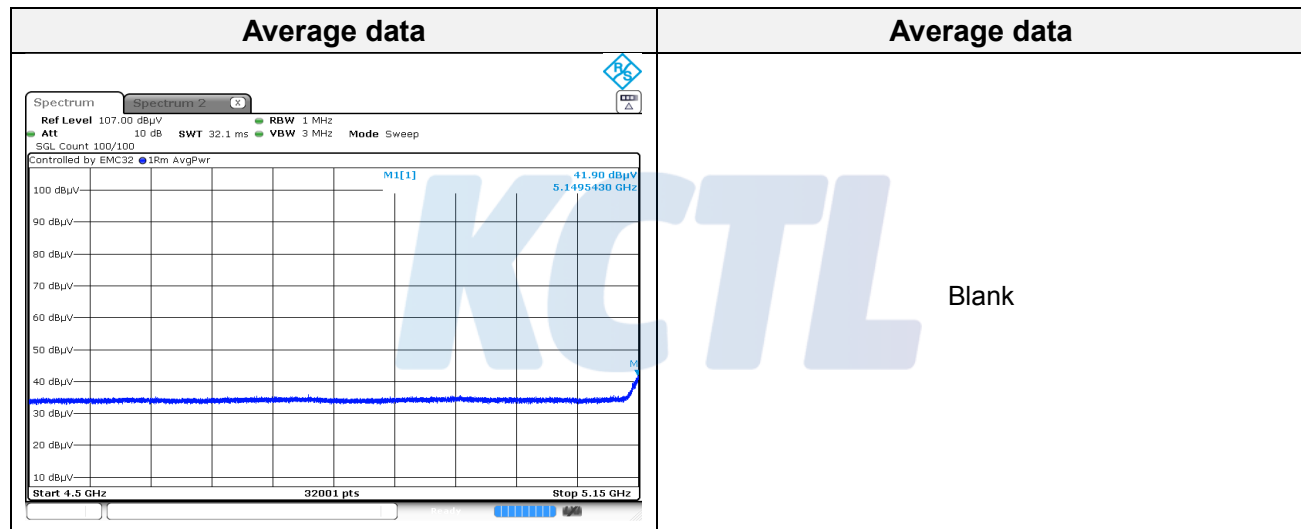
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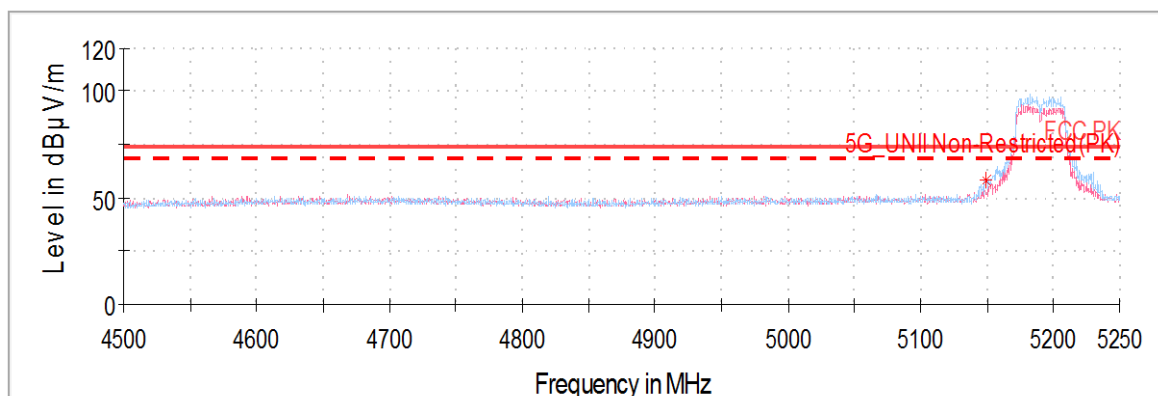
802.11n40 – MIMO

Lowest Channel (5 190 MHz)

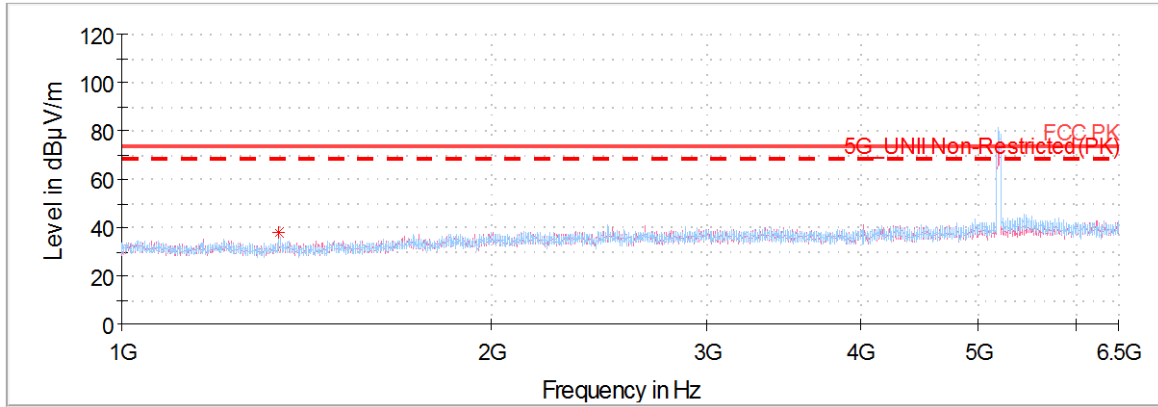
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
1 344.27 ¹⁾	H	46.46	2.80	-36.72	25.18	-	37.72	74.00	36.28
5 149.23 ¹⁾	H	52.50	5.57	-32.74	33.12	-	58.45	74.00	15.55
10 380.89	V	57.27	8.10	-61.31	38.01	-	42.07	68.20	26.13
15 571.70 ¹⁾	H	55.89	9.97	-57.42	38.70	-	47.14	74.00	26.86
Average Data									
5 149.23 ¹⁾	H	41.90	5.57	-32.74	33.12	0.34	48.19	54.00	5.81



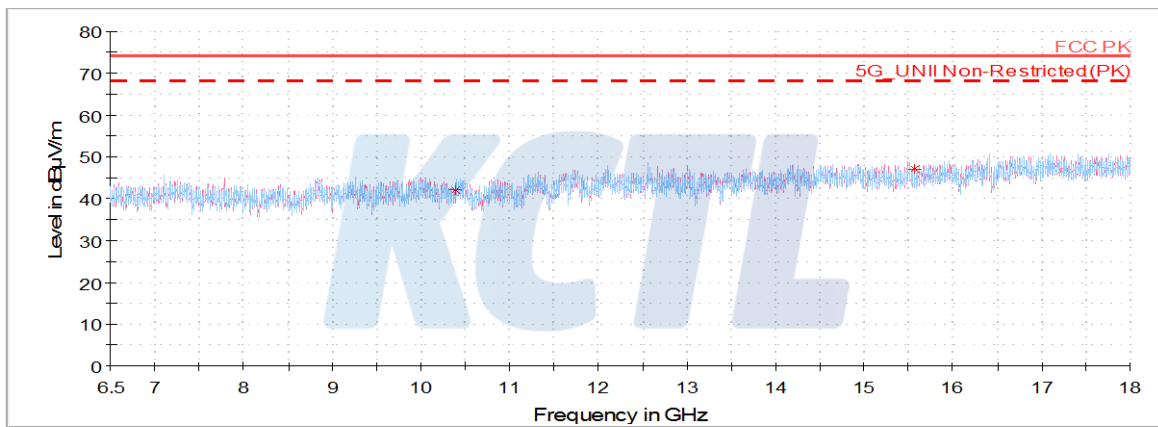
Horizontal/Vertical for Band-edge



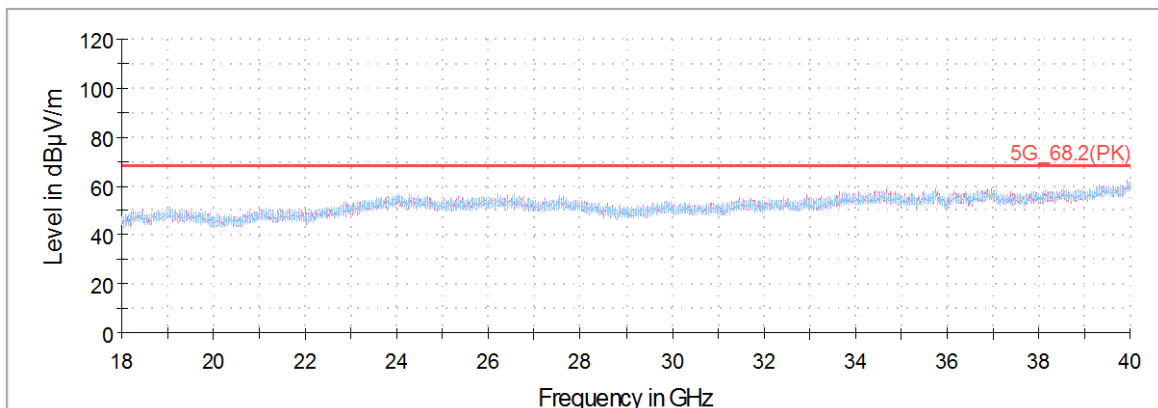
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
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www.kctl.co.kr

Report No.:
KR19-SRF0029-B

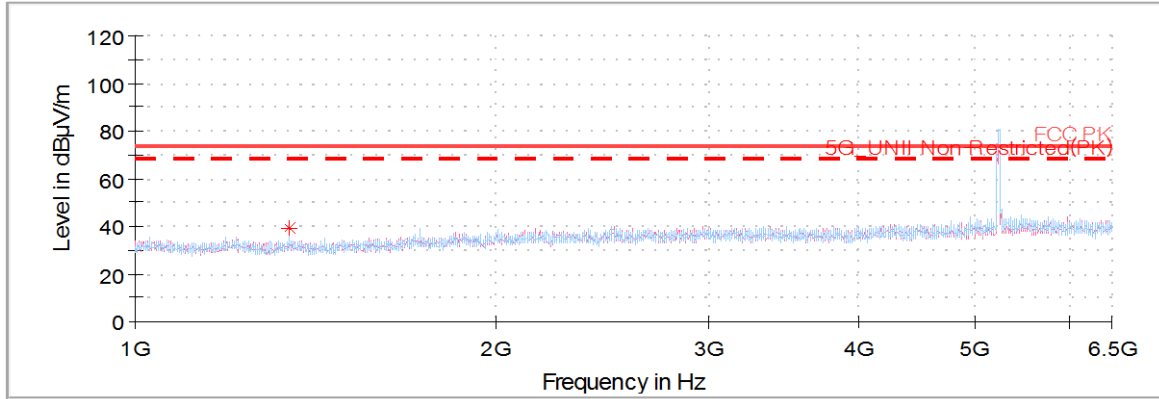
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**Highest Channel (5 230 MHz)**

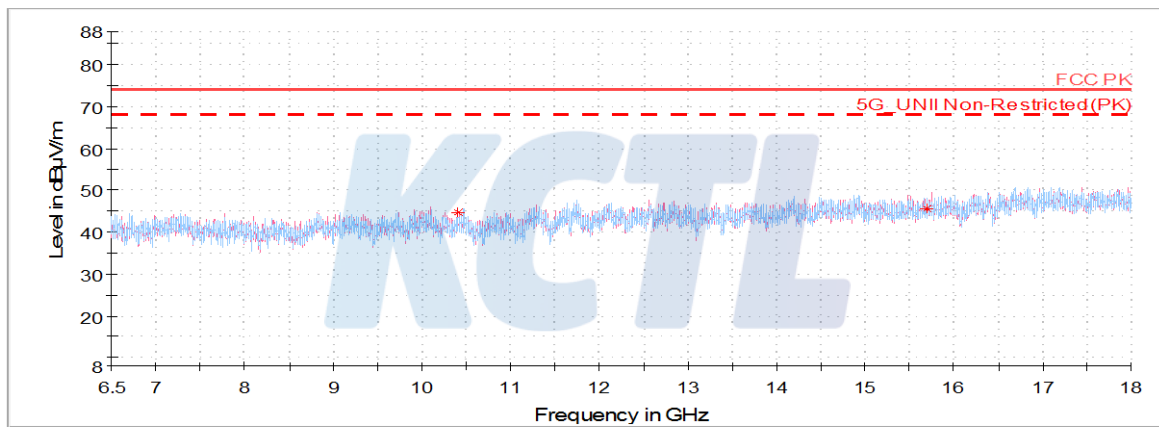
Frequency (MHz)	Pol. (V/H)	Reading (dB(μ V))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB(μ V/m))	Limit (dB(μ V/m))	Margin (dB)
Peak data									
1 344.09 ¹⁾	H	47.63	2.80	-36.72	25.18	-	38.89	74.00	35.11
10 407.13	H	60.01	8.12	-61.37	38.02	-	44.78	68.20	23.42
15 691.38 ¹⁾	V	54.38	10.01	-57.14	38.36	-	45.61	74.00	28.39
Average Data									
No spurious emissions were detected within 20 dB of the limit.									



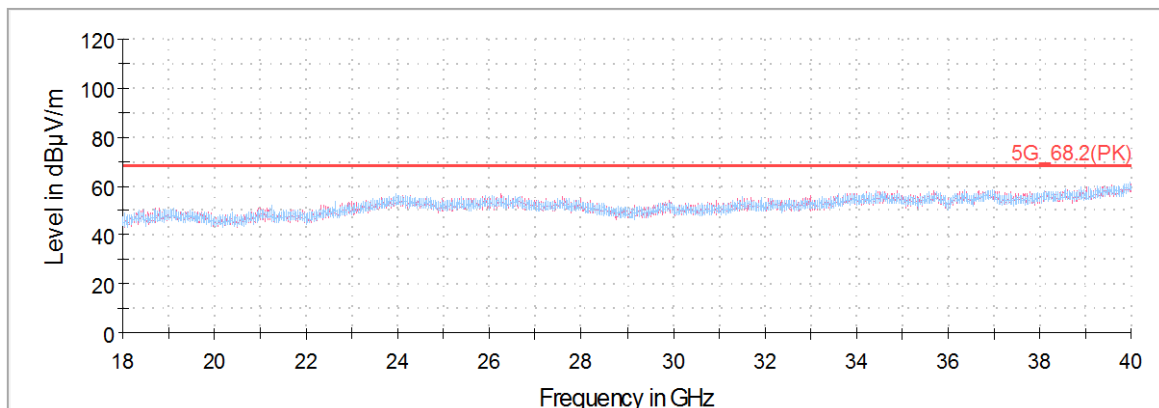
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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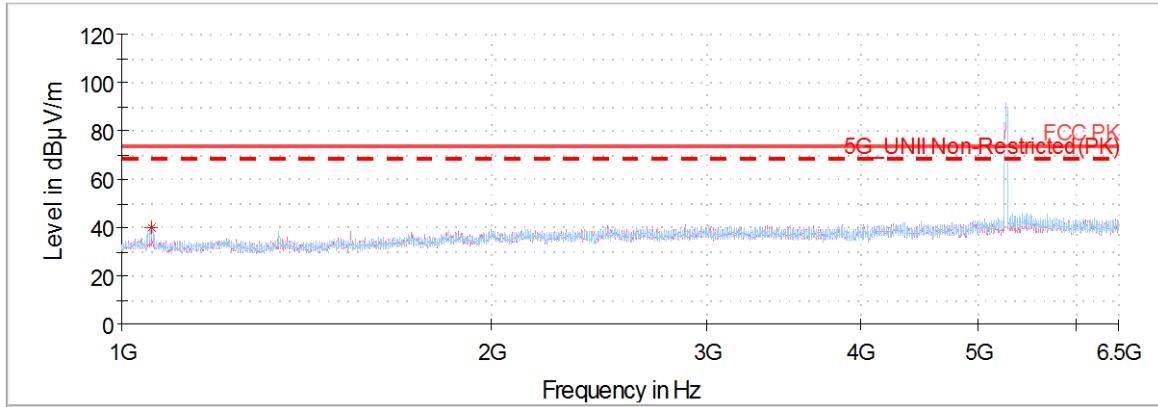
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KCTL**Test results (Above 1 000 MHz) U-NII-2A****802.11a – ANT 0****Lowest Channel (5 260 MHz)**

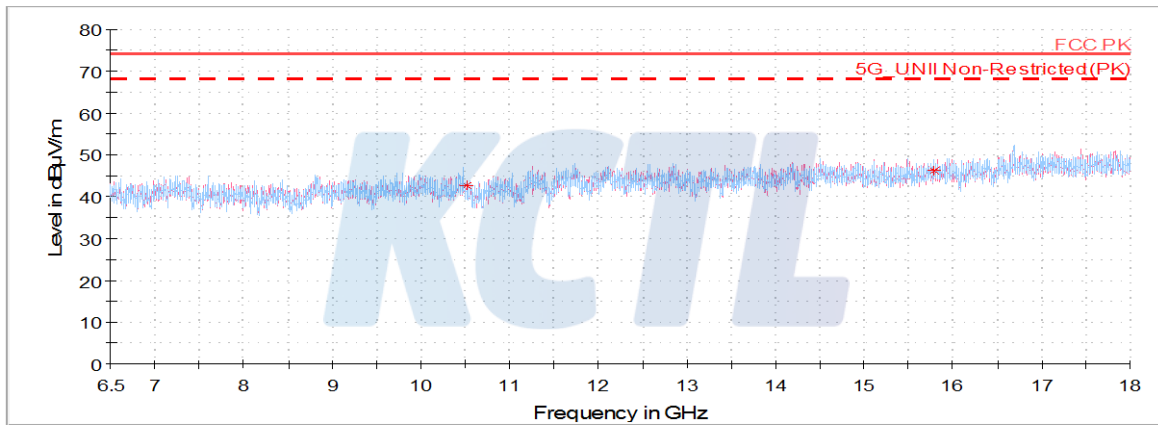
Frequency (MHz)	Pol. (V/H)	Reading (dB(μ V))	Cable Loss (dB)	Amp Gain (dB)	Antenna Factor (dB)	DCCF (dB)	Result (dB(μ V/m))	Limit (dB(μ V/m))	Margin (dB)
Peak data									
1 055.17 ¹⁾	H	48.99	2.52	-35.77	24.02	-	39.76	74.00	34.24
10 520.69	H	57.97	8.18	-61.56	38.06		42.65	68.20	25.55
15 779.42 ¹⁾	V	55.05	10.05	-56.95	38.12		46.27	74.00	27.73
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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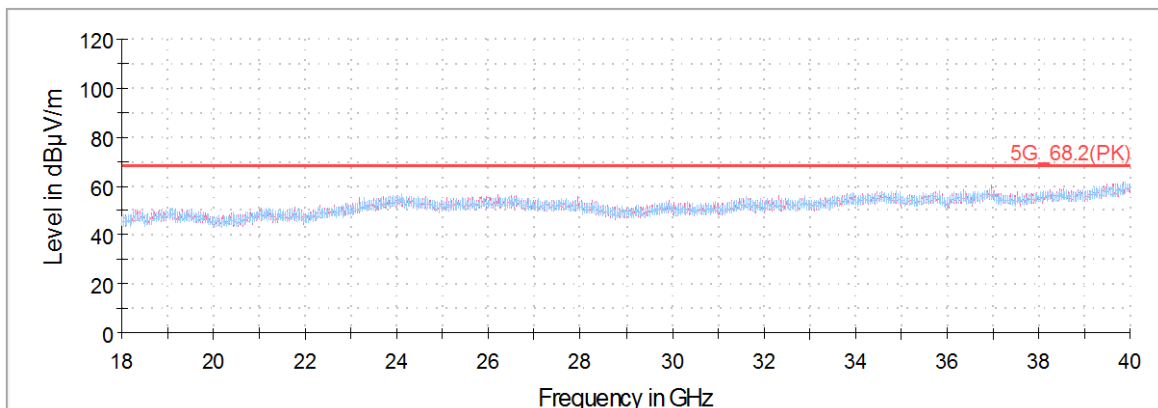
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



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KCTL**Middle Channel (5 280 MHz)**

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data									
2 459.73	H	48.32	3.75	-35.99	28.67	-	44.74	68.20	23.46
10 560.58	H	57.53	8.20	-61.58	38.07	-	42.22	68.20	25.98
15 839.08 ¹⁾	H	54.89	10.07	-56.81	37.95	-	46.10	74.00	27.90
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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