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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

KCTL

1. Client

- Name : CITECH CO.,LTD.
- Address : 11F, 932, Yangjae-daero, Songpa-gu, Seoul, Republic of Korea
- Date of Receipt : 2019-02-19

2. Use of Report : -

3. Name of Product and Model : All-in-One Player / RS201

4. Manufacturer and Country of Origin : CITECH CO.,LTD. / Korea

5. FCC ID : 2ANYL-RS201

6. Date of Test : 2019-04-22 to 2019-04-26

7. Test Standards : FCC Part 15 Subpart C, 15.247

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Myeonghwa Jang (Signature)	Technical Manager Name :Seungyong Kim (Signature)

2019-05-10

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

Report revision history

Date	Revision	Page No
2019-05-02	Initial report	-
2019-05-10	Updated antenna information	4, 5

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1. General information

Client	:	CITECH CO.,LTD.
Address	:	11F, 932, Yangjae-daero, Songpa-gu, Seoul, Republic of Korea
Manufacturer	:	CITECH CO.,LTD.
Address	:	11F, 932, Yangjae-daero, Songpa-gu, Seoul, Republic 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	:	All-in-One Player
Model	:	RS201
Derivative model	:	RS201A, RS201B, RS201C, RS201D, RS201E, RS201F, RS201G, RS201H, RS201I, RS201J, RS201K, RS201L, RS201N, RS201M, RS201O, RS201P, RS201Q, RS201R, RS201S, RS201T, RS201U, RS201V, RS201W, RS201X, RS201Y, RS201Z
Frequency range	:	Bluetooth(BDR/EDR/BLE)_2 402 ㎒ ~ 2 480 ㎒ WIFI(802.11b/g/n HT20)_2 412 ㎒ ~ 2 462 ㎒ WIFI(802.11n HT40)_2 422 ㎒ ~ 2 452 ㎒ WIFI(802.11a/n20)_5 180 ㎒ ~ 5 240 ㎒ (UNII-1) 5 745 ㎒ ~ 5 825 ㎒ (UNII-3) WIFI(802.11n HT40)_5 190 ㎒ ~ 5 230 ㎒ (UNII-1) 5 755 ㎒ ~ 5 795 ㎒ (UNII-3)
Modulation technique	:	Bluetooth(BDR/EDR)_GFSK, π/4DQPSK, 8DPSK Bluetooth(BLE)_GFSK WIFI(802.11a/b/g/n(HT20/40))_DSSS, OFDM
Number of channels	:	Bluetooth(BDR/EDR)_79ch Bluetooth(BLE)_40 ch 2.4 ㎓: 11 ch (802.11b/g/n HT20), 7 ch (802.11n HT40) 5.2 ㎓ (UNII 1): 4 ch (802.11a/n HT20), 2 ch (802.11n HT40) 5.8 ㎓ (UNII 3): 5 ch (802.11a/n HT20), 2 ch (802.11n HT40)
Power source	:	DC 24 V
Antenna specification	:	PCB Pattern Antenna
Antenna gain	:	4.07 ㏈i (Bluetooth, WIFI 2.4 ㎓), 4.57 ㏈i (WIFI 5 ㎓)
Software version	:	1.1.09
Hardware version	:	Rev 1.0
Test device serial No.	:	N/A
Operation temperature	:	0 ℃ ~ 40 ℃

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
Adaptor	ChungKwangTech Inc.	ADS-120QL-19-3 240120E	-	100-240V, 50/60Hz, 1.6A

2.2. Information about derivative model

The basic and derivative model are electrically identical.
The derivative models is only for the simplified derivation based on buyer's model name.

2.3. Frequency/channel operations

This device contains the following capabilities:
802.11a/b/g/n(HT20/40), Bluetooth(BDR, EDR), Bluetooth Low Energy

Ch.	Frequency (㎒)
01	2 412
. .	. .
07	2 437
. .	. .
11	2 462

Table 2.3.1. 802.11b/g/n HT20 mode

Ch.	Frequency (㎒)
03	2 422
. .	. .
07	2 437
. .	. .
09	2 452

Table 2.3.2. 802.11n HT40 mode

2.4. Simultaneously transmission condition

Technology	Modulation	Test mode	Tested Channel
WLAN 2.4 GHz	DSSS	802.11b	11
Bluetooth	GFSK	BDR	0

Note1) : The emission of the simultaneous operation (WiFi & Bluetooth) have been evaluated and no non-compliance found.

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 UFL type PCB Pattern Antenna.

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4. Summary of tests

FCC Part section(s)	Parameter	Test results
15.247(b)(3)	Maximum peak output power	NT(Note[1])
15.247(e)	Peak power spectral density	NT(Note[1])
15.247(a)(2)	6 ㏈ channel bandwidth	NT(Note1)
15.247(d), 15.205(a), 15.209(a)	Spurious emission	Pass
	Band-edge, restricted band	Pass
15.207(a)	Conducted emissions	Pass

Notes:

1. Test was performed by modular transmitter (Model Name: RTL8821AE, FCC ID: TX2-RTL8821AE, Test Report No. FR342603AA issued on 02, July, 2013 by SPORTON International Inc.)
2. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
3. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. 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.
4. 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
5. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
   - KDB 558074 D01 V05r01

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 indicated a 95 % level of confidence. The measurement data shown herein meets of 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 ㎑ ~ 30 ㎒:	2.28 ㏈
	30 ㎒ ~ 300 ㎒	4.98 ㏈
	300 ㎒ ~ 1 000 ㎒	5.14 ㏈
	1 ㎓ ~ 6 ㎓	6.70 ㏈
	Above 6 ㎓	6.60 ㏈
Conducted emissions	9 ㎑ ~ 150 ㎑	3.66 ㏈
	150 ㎑ ~ 30 ㎒	3.26 ㏈

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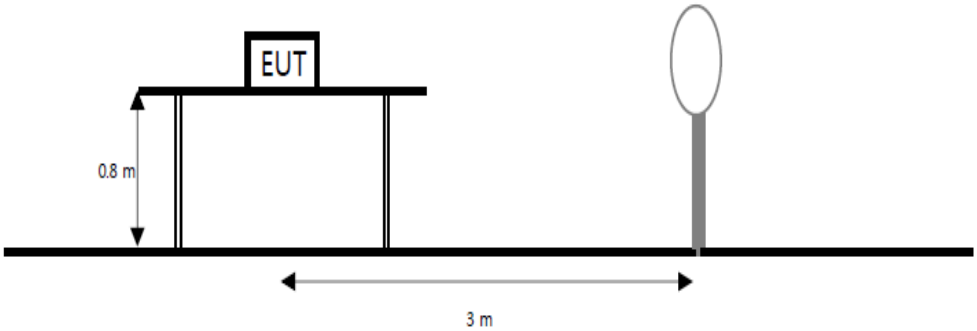
6. Test results

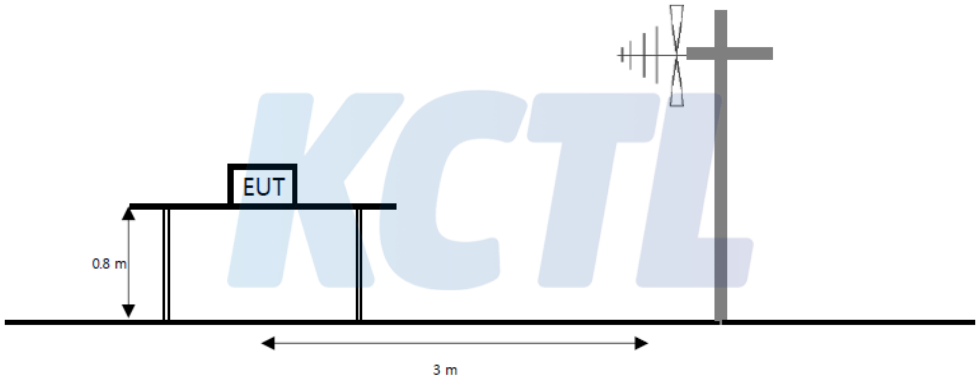
6.1. Spurious Emission, Band Edge and Restricted bands

Test setup

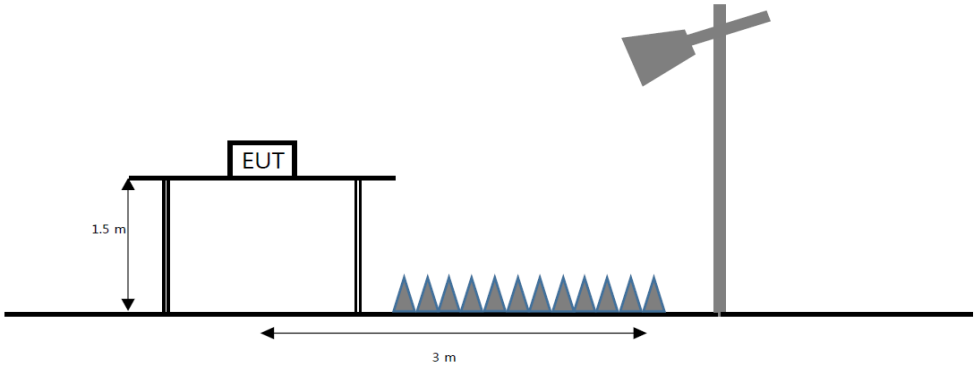
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



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



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



Limit

According to section 15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

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

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

㎒	㎒	㎒	㎓
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 – 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 – 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 – 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 – 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 – 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 – 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 – 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 – 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525 25	2 483.5 – 2 500	17.7 - 21.4
8.376 25 - 8.386 75		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 ㎒, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

Test procedure
ANSI C63.10-2013
KDB 558074 D01 V05r01

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

Table. RBW as a function of frequency

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

Average field strength measurements

Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously (D ≥ 98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):
1. RBW = 1 ㎒ (unless otherwise specified).
2. VBW ≥ (3×RBW).
3. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
   2) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

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

If continuous transmission of the EUT (D ≥ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less than ±2%), then the following procedure shall be used:
1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 ㎒ (unless otherwise specified).
4. VBW ≥ [3 × RBW].
5. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this

condition cannot be satisfied, then the detector mode shall be set to peak.

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

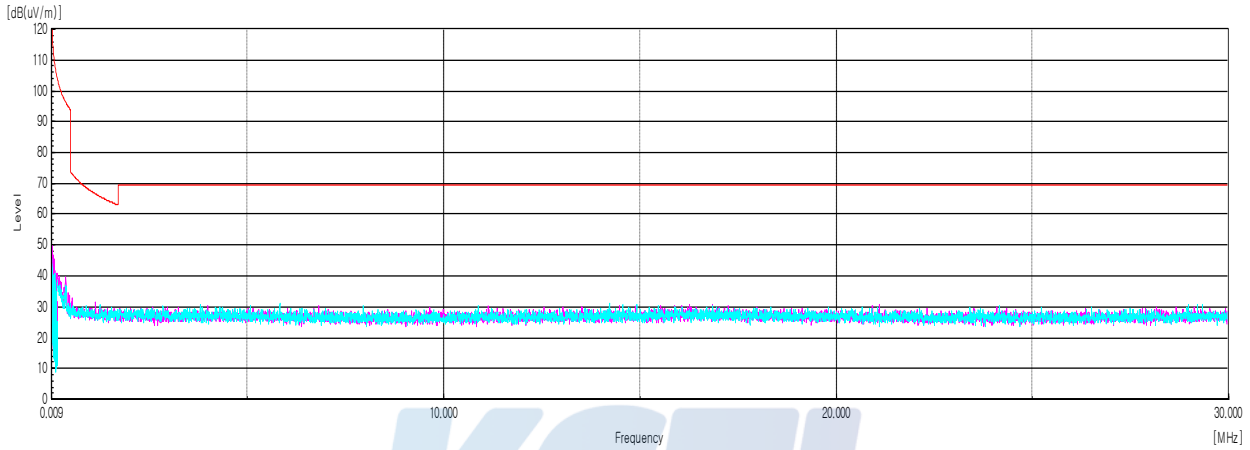
Notes:

1. 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(≥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 = 40log(D_m/Ds)
   f ≥30 MHz, extrapolation factor of 20 dB/decade of distance. F_d = 20log(D_m/Ds)
   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)] mean is 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.

Test results (Below 30 ㎒) – Worst case: 802.11b Lowest frequency

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

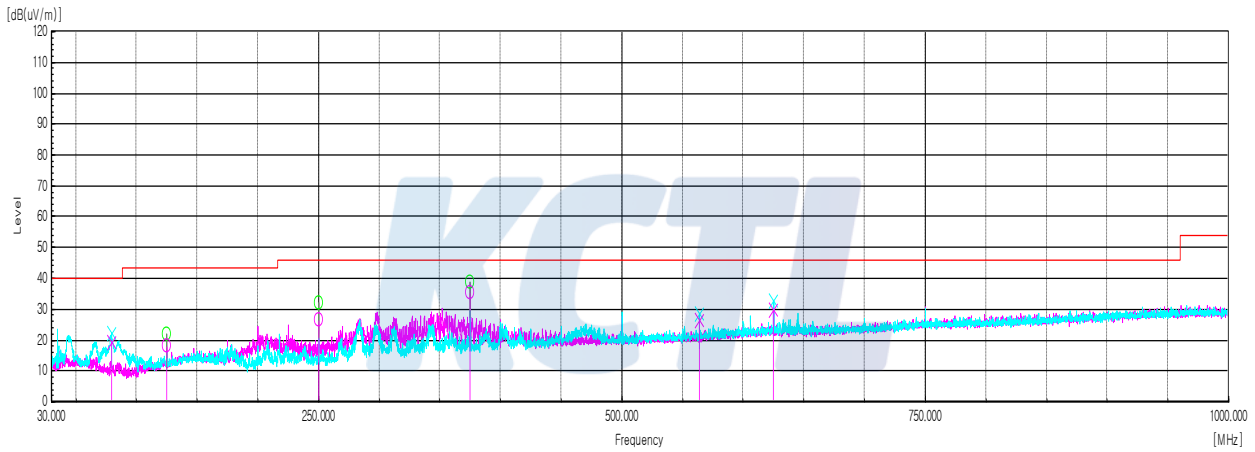
Horizontal/Vertical



Test results (Below 1 000 ㎒) – Worst case: 802.11 b Lowest frequency

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data									
79.47	V	35.00	1.88	-30.65	13.07	-	19.30	40.00	20.70
124.94	H	30.50	2.41	-32.66	18.05	-	18.30	43.50	25.20
249.95	H	37.50	3.51	-32.71	18.20	-	26.50	46.00	19.50
374.96	H	41.80	4.39	-32.06	21.07	-	35.20	46.00	10.80
563.99	V	28.50	5.51	-31.74	24.13	-	26.40	46.00	19.60
624.97	V	30.20	5.84	-30.74	24.70	-	30.00	46.00	16.00

Horizontal/Vertical

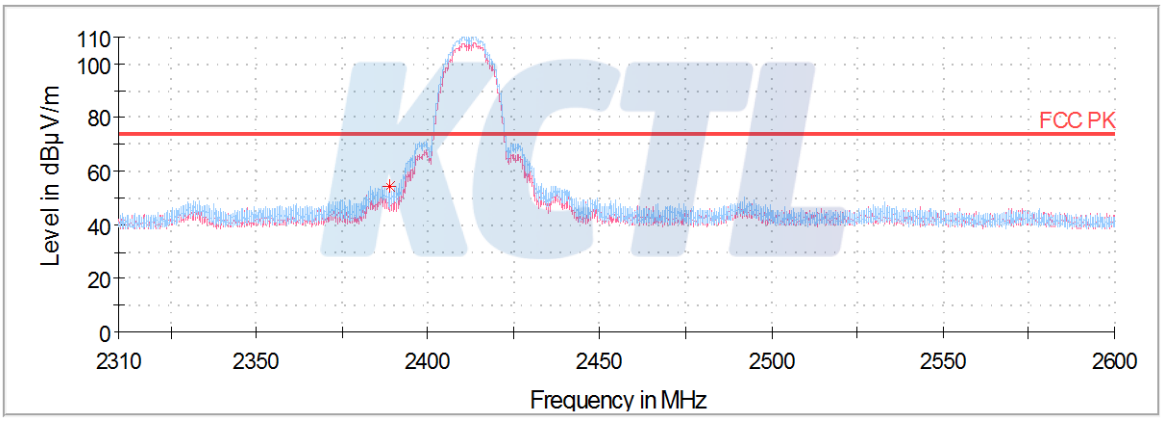


Test results (Above 1 000 ㎒)
802.11b

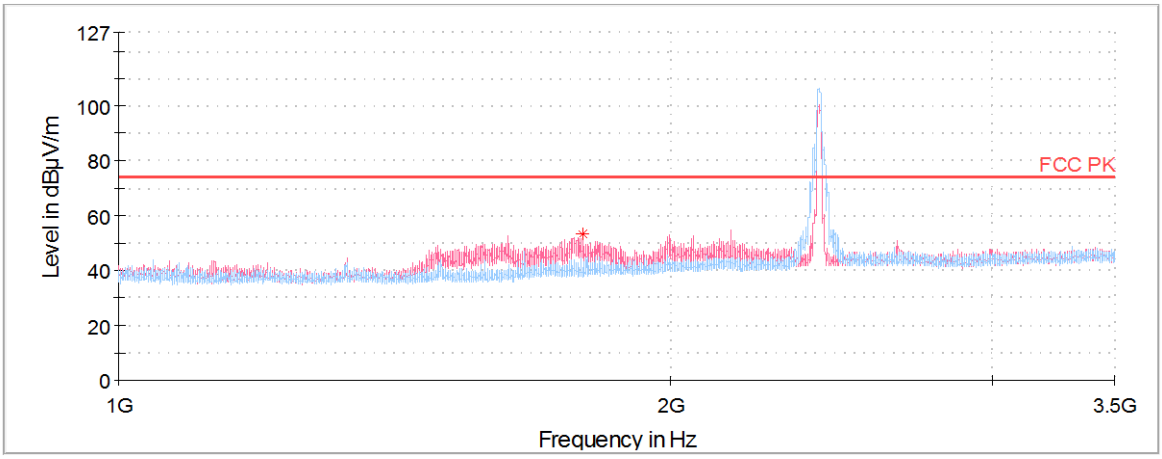
Lowest Channel

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data									
1 790.16	V	59.80	3.22	-36.66	26.96	-	53.32	74.00	20.68
2 389.00[1)]	H	51.60	3.70	-30.02	28.54	-	53.82	74.00	20.18
3 986.66[1)]	V	70.17	4.77	-61.17	32.36	-	46.13	74.00	27.87
6 658.73	V	70.46	6.44	-61.10	35.26	-	51.06	74.00	22.94
Average Data									
No spurious emissions were detected within 20 ㏈ of the limit.									

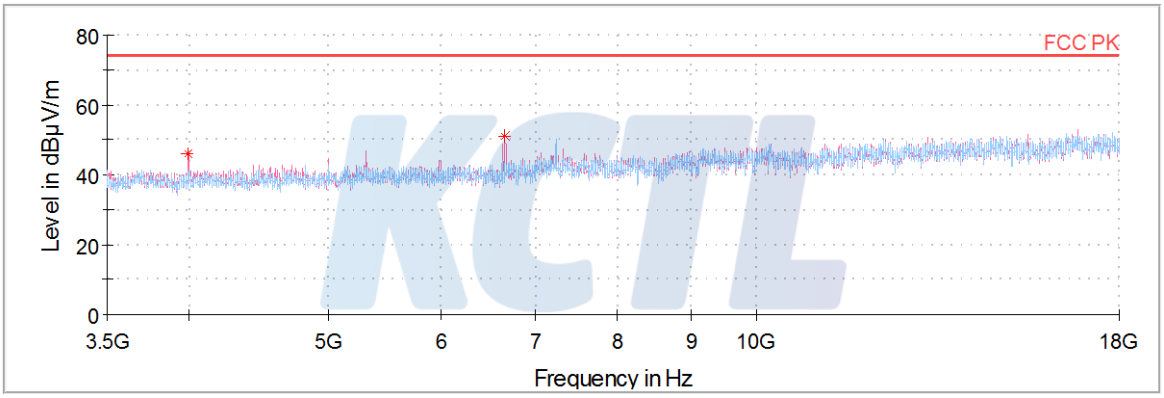
Horizontal/Vertical for Band-edge



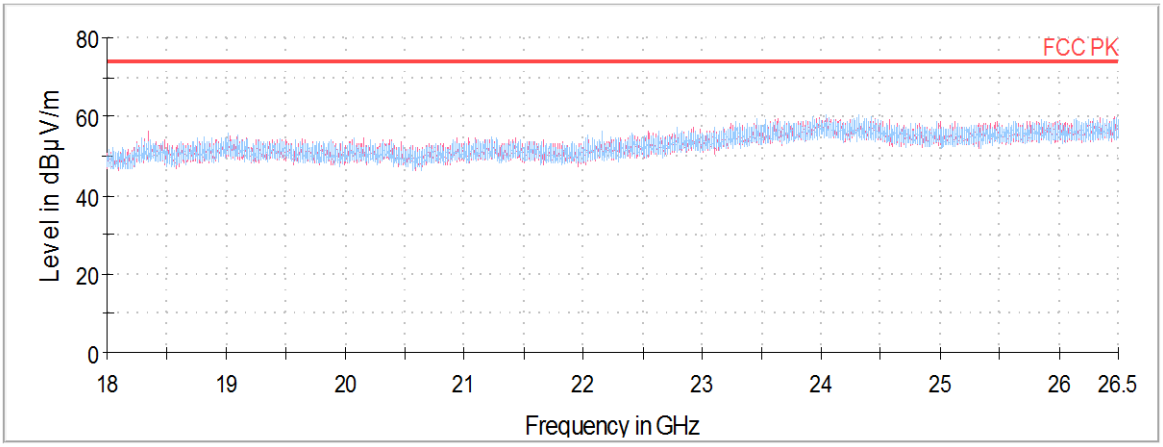
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



Middle Channel

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									
1 997.89	V	56.59	3.42	-36.19	27.79	-	51.61	74.00	22.39
5 000.30[1)]	V	68.03	5.47	-60.45	32.90	-	45.95	74.00	28.05
6 651.03	V	68.32	6.44	-61.11	35.25	-	48.90	74.00	25.10
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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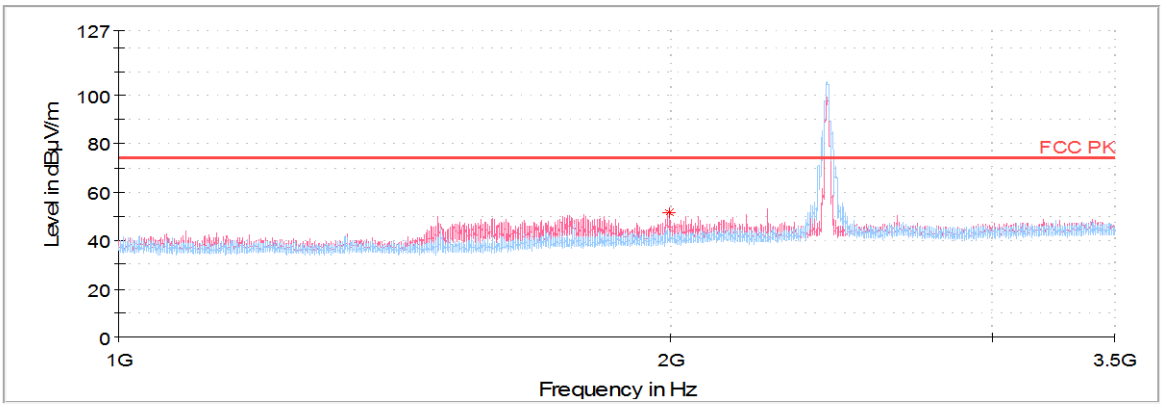
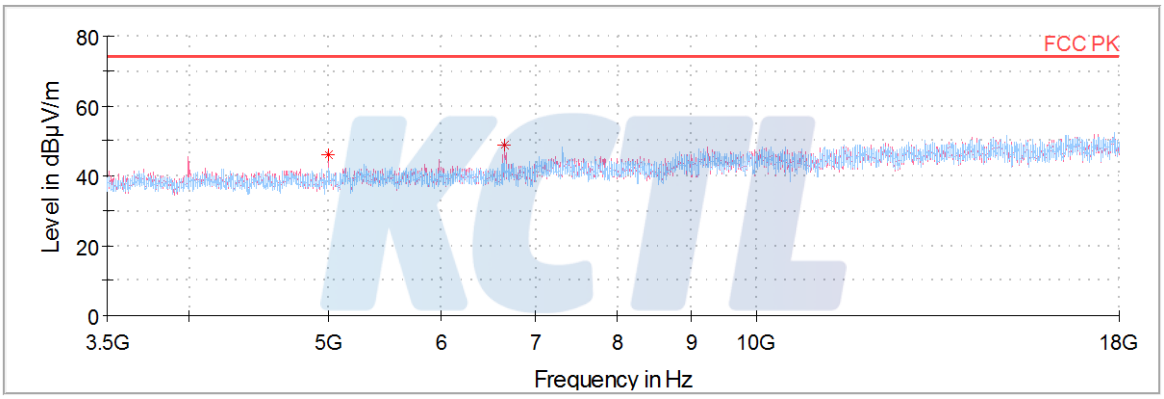
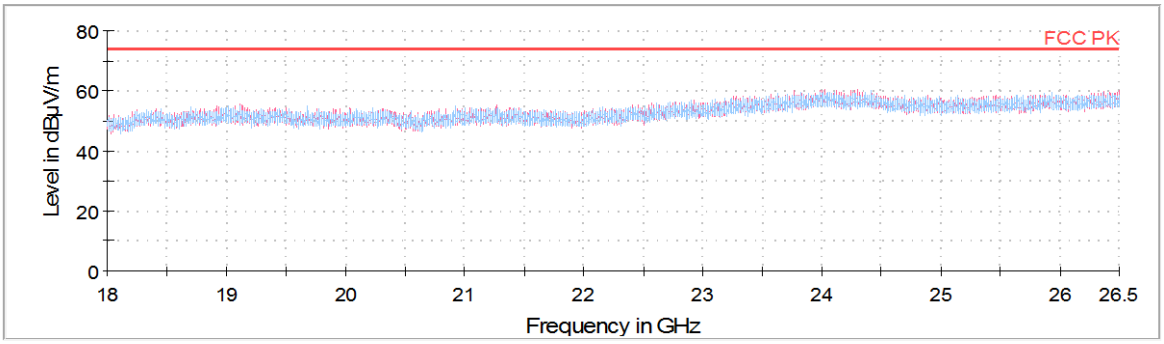
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

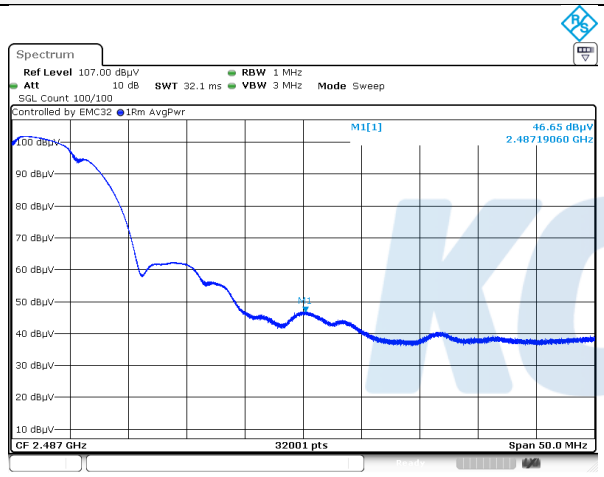


Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

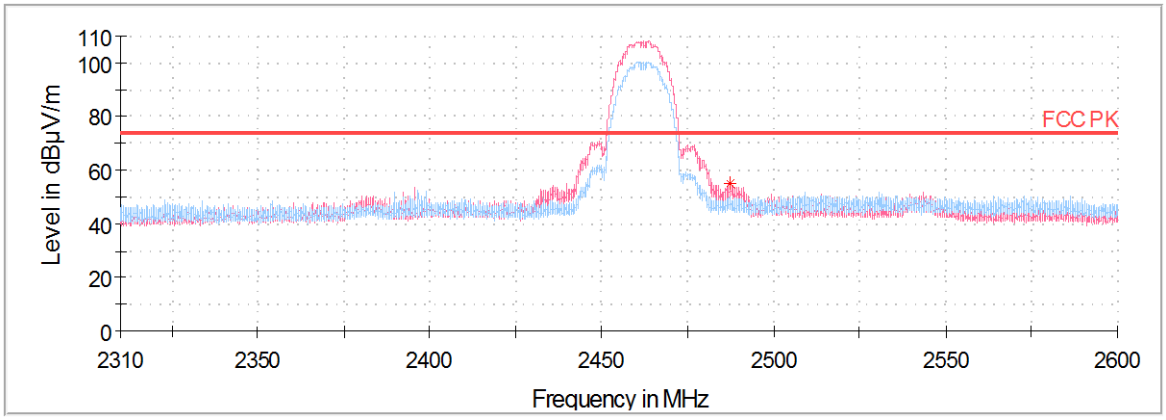


Highest Channel

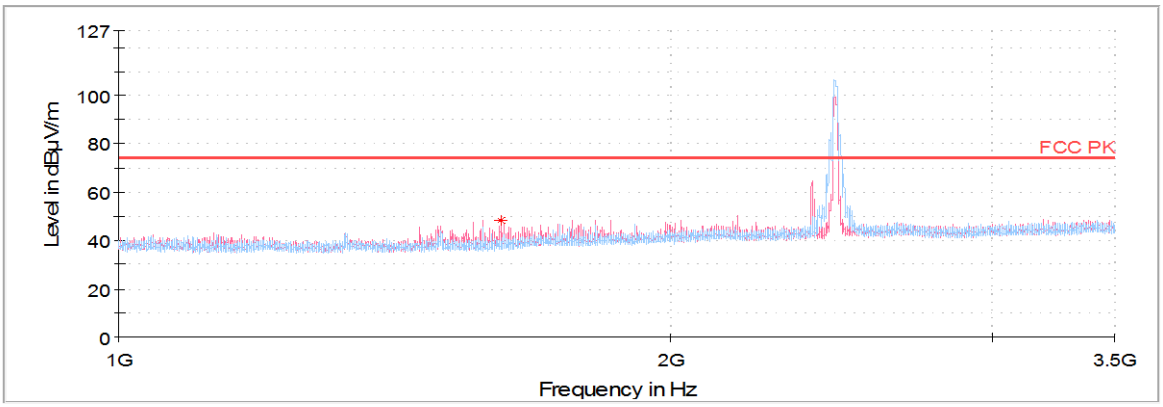
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 617.19[1)]	V	56.46	3.06	-37.25	26.27	-	48.54	74.00	25.46
2 487.19[1)]	V	52.54	3.77	-30.30	28.73	-	54.74	74.00	19.26
6 665.98	V	69.05	6.44	-61.10	35.27	-	49.66	74.00	24.34
7 384.64[1)]	H	67.89	6.79	-61.70	36.08	-	49.07	74.00	24.93
Average Data									
2 487.19[1)]	V	46.65	3.77	-30.30	28.73	-	48.85	54.00	5.15

Average data	Average data
	Blank

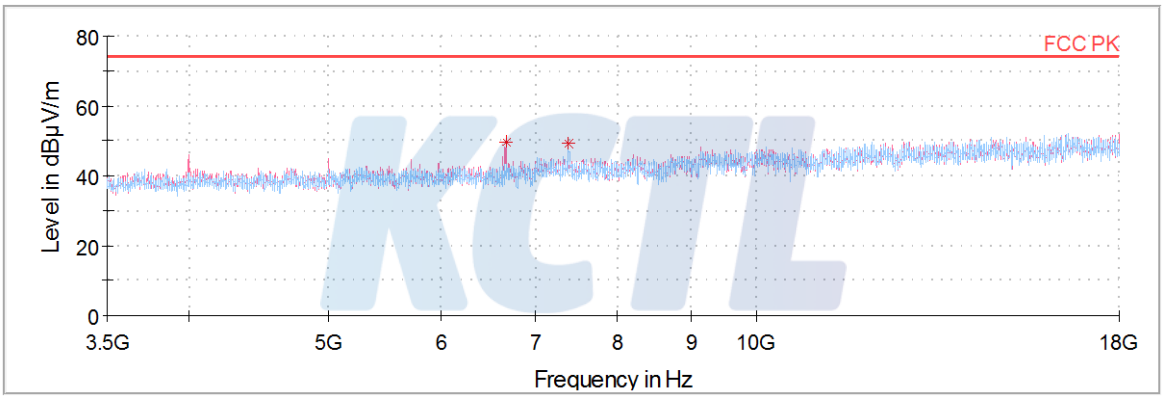
Horizontal/Vertical for Band-edge



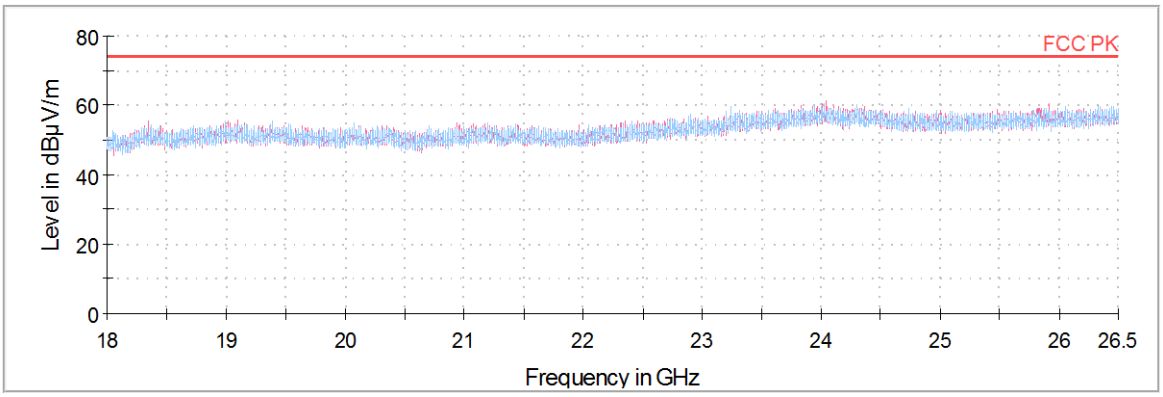
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



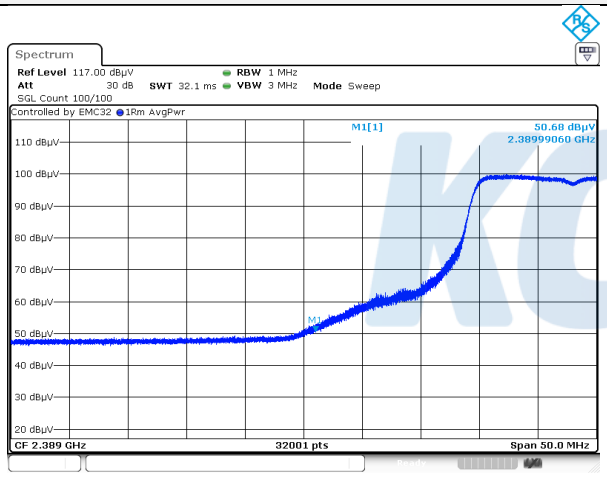
Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



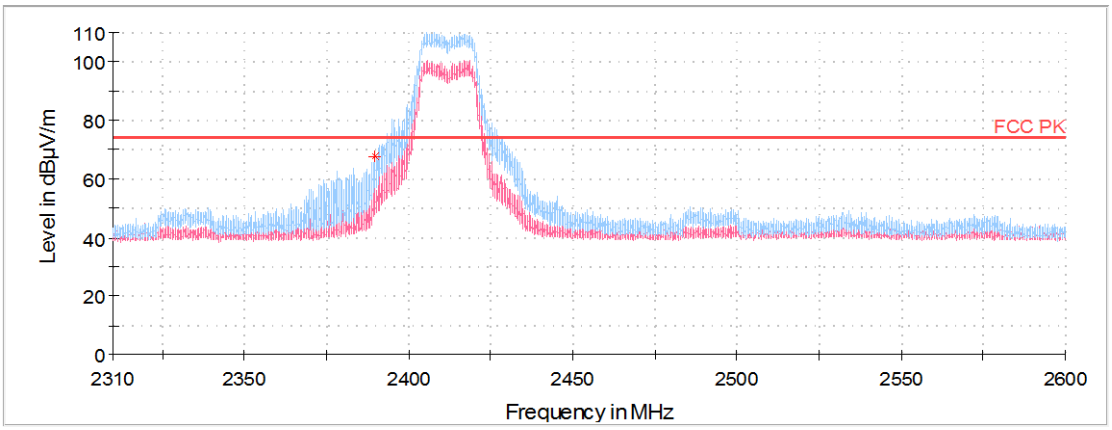
802.11g

Lowest Channel

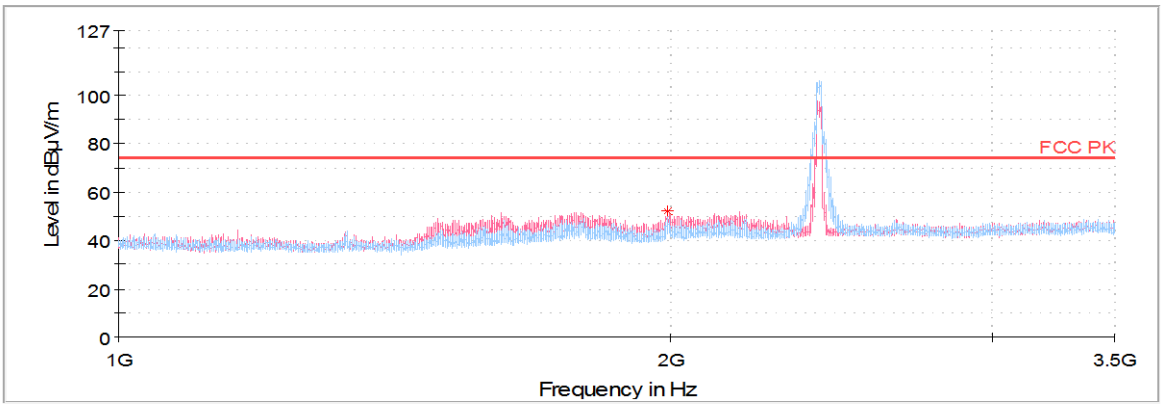
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 994.92	V	56.99	3.42	-36.19	27.78	-	52.00	74.00	22.00
2 389.99[1)]	H	65.55	3.70	-30.01	28.54	-	67.78	74.00	6.22
4 999.84[1)]	V	66.83	5.47	-60.45	32.90	-	44.75	74.00	29.25
6 641.97	V	68.16	6.43	-61.10	35.23	-	48.73	74.00	25.27
Average Data									
2 389.99[1)]	H	50.68	3.70	-30.01	28.54	-	52.91	54.00	1.09

Average data	Average data
	Blank

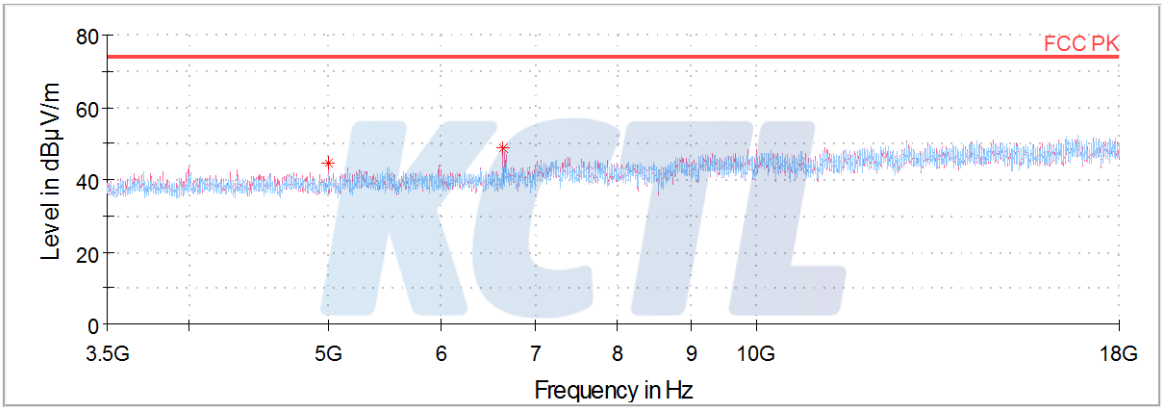
Horizontal/Vertical for Band-edge



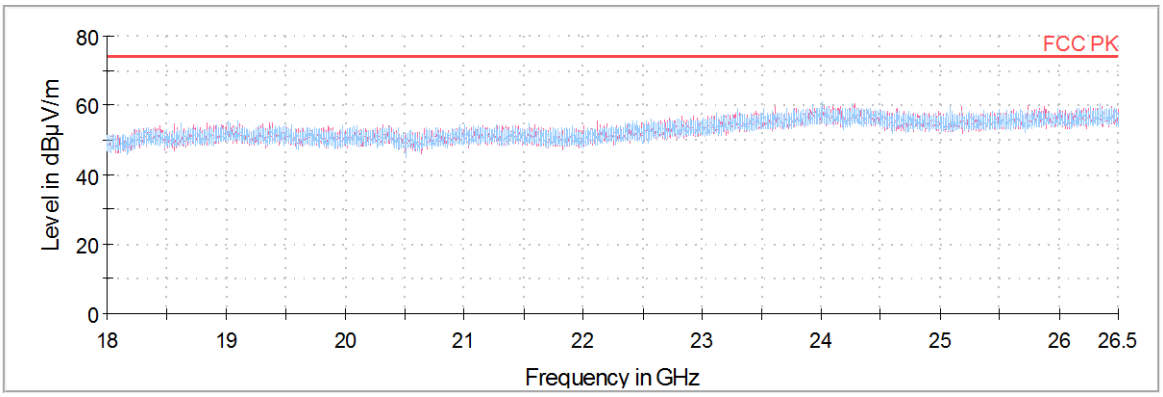
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



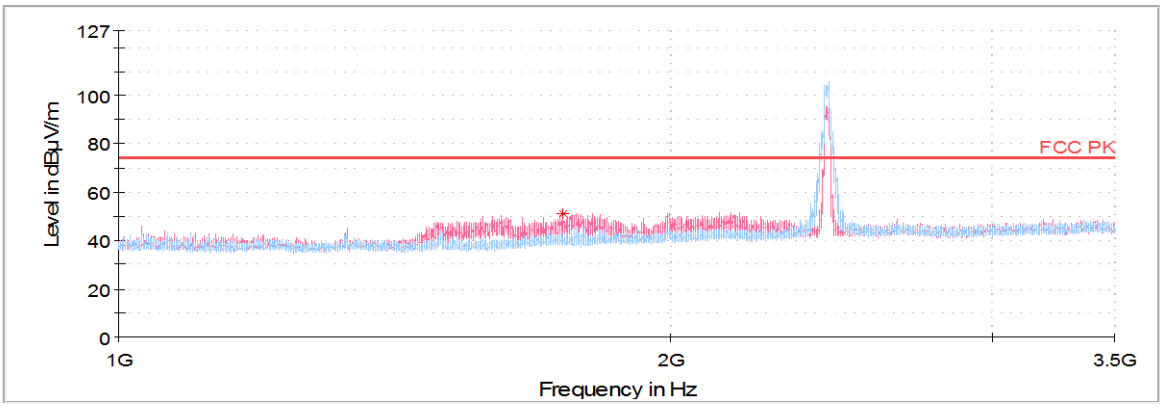
Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



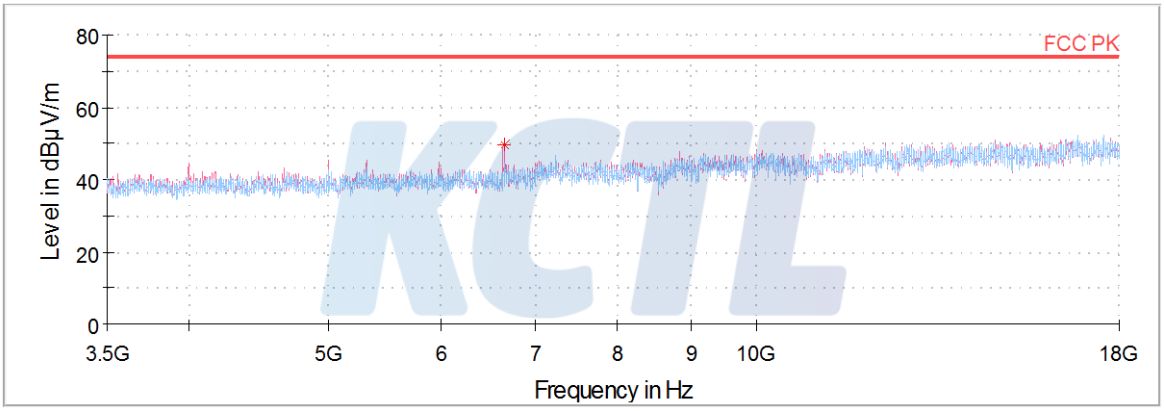
Middle Channel

Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data									
1 747.73	V	57.46	3.18	-36.54	26.79	-	50.89	74.00	23.11
6 662.81	V	69.10	6.44	-61.09	35.26	-	49.71	74.00	24.29
Average Data									
No spurious emissions were detected within 20 ㏈ of the limit.									

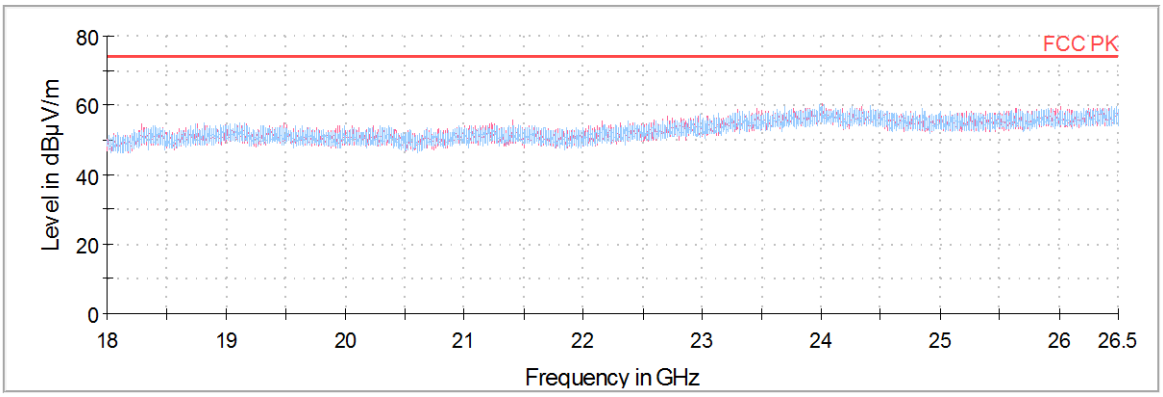
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



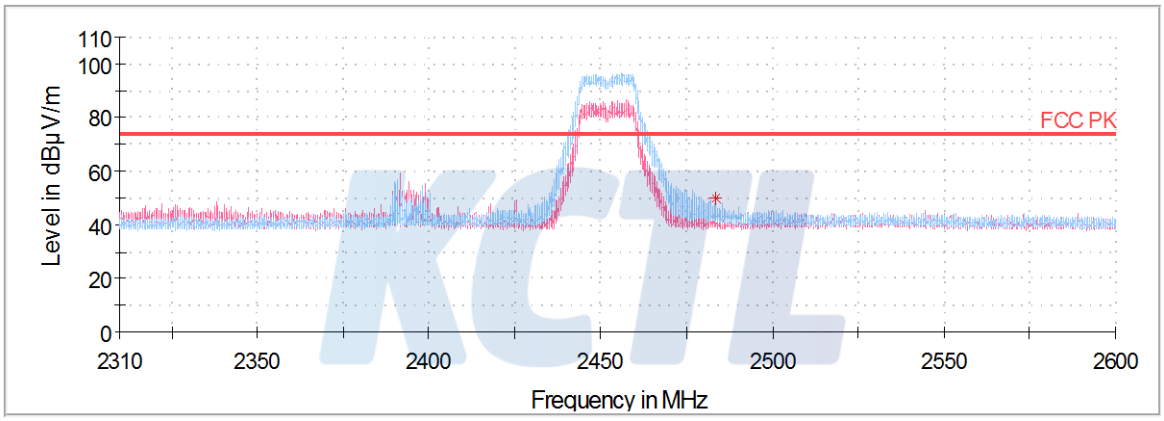
Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



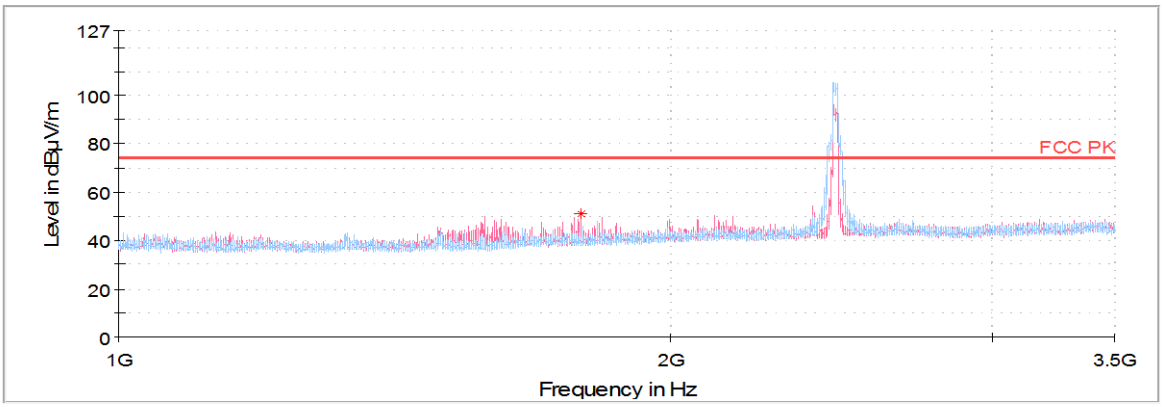
Highest Channel

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									
1 786.56	V	57.56	3.22	-36.65	26.95	-	51.08	74.00	22.92
2 483.56[1)]	H	47.90	3.77	-30.29	28.72	-	50.10	74.00	23.90
5 978.59	V	68.33	6.09	-61.66	34.37	-	47.13	74.00	26.87
6 665.98	V	70.58	6.44	-61.10	35.27	-	51.19	74.00	22.81
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

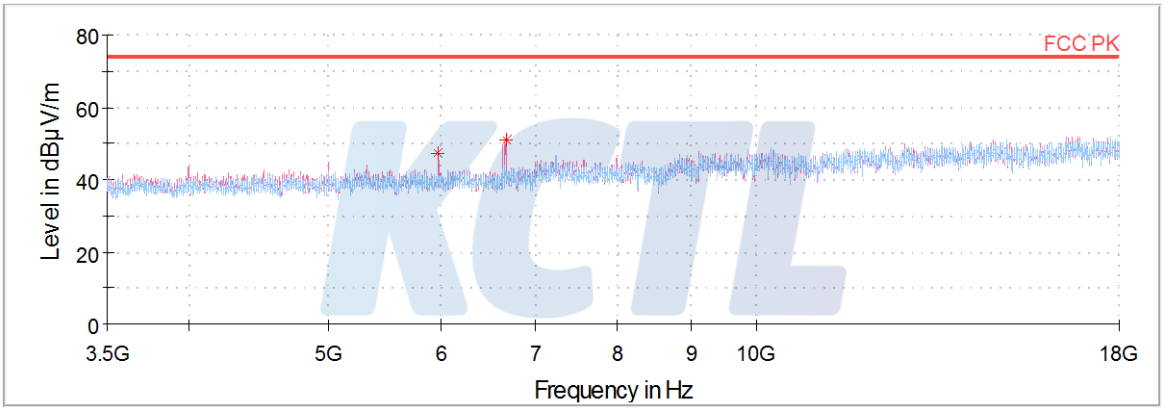
Horizontal/Vertical for Band-edge



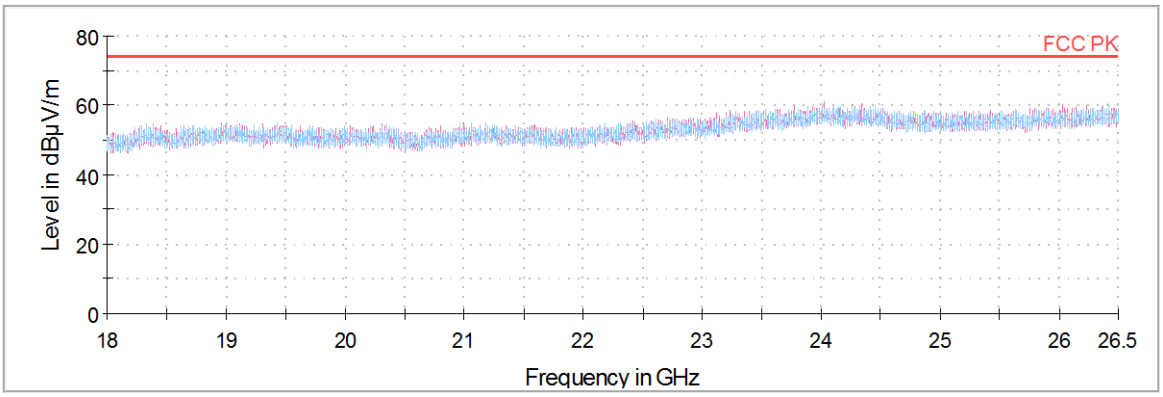
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



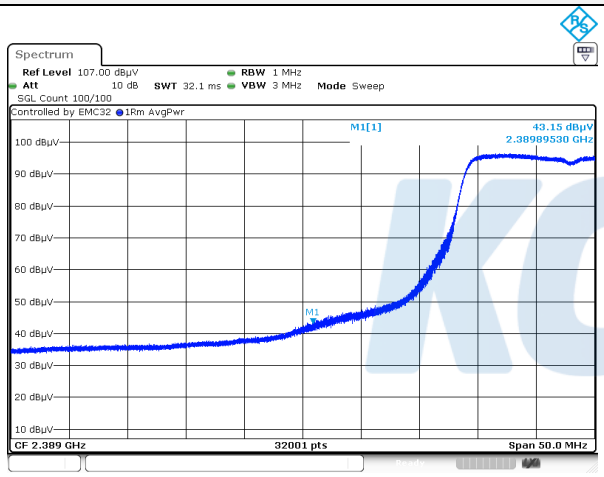
Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



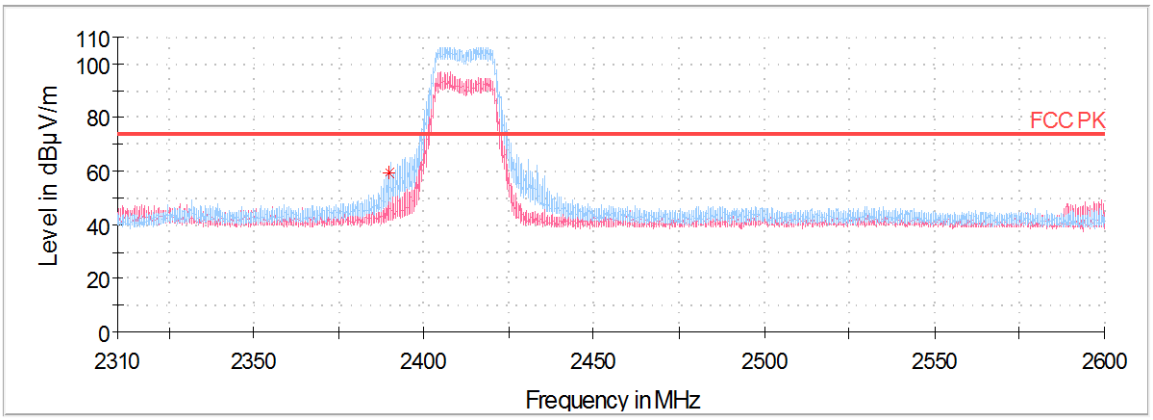
802.11n HT20

Lowest Channel

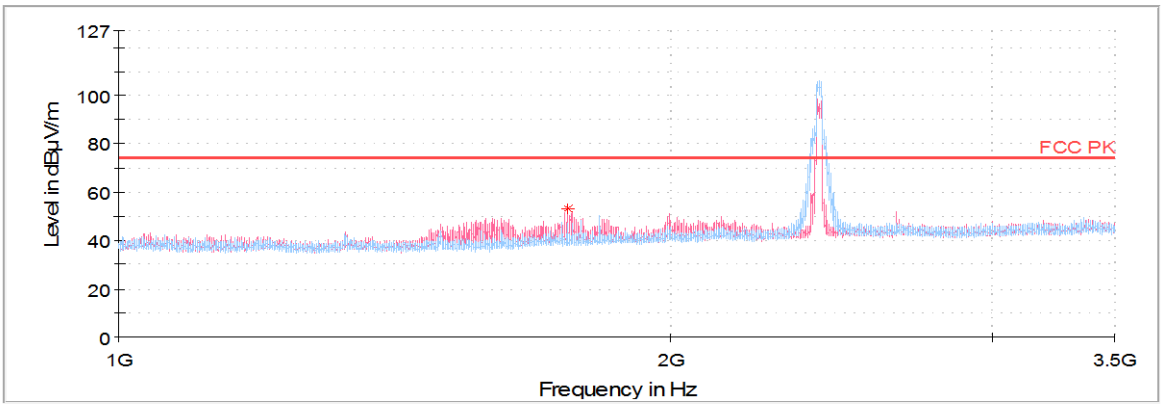
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 760.63	V	59.83	3.20	-36.58	26.84	-	53.29	74.00	20.71
2 389.90[1)]	H	57.44	3.70	-30.01	28.54	-	59.67	74.00	14.33
6 664.17	V	68.70	6.44	-61.09	35.26	-	49.31	74.00	24.69
Average Data									
2 389.90[1)]	H	43.15	3.70	-30.01	28.54	-	45.38	54.00	8.62

Average data	Average data
	Blank

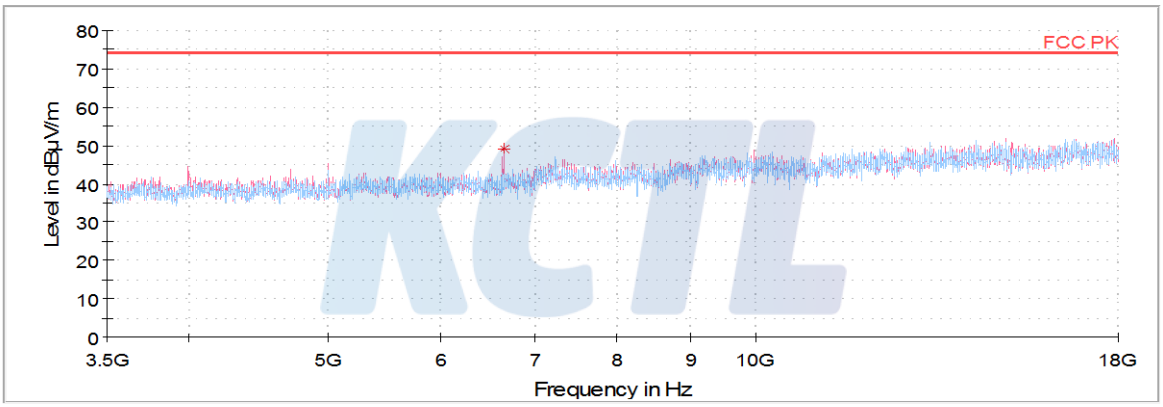
Horizontal/Vertical for Band-edge



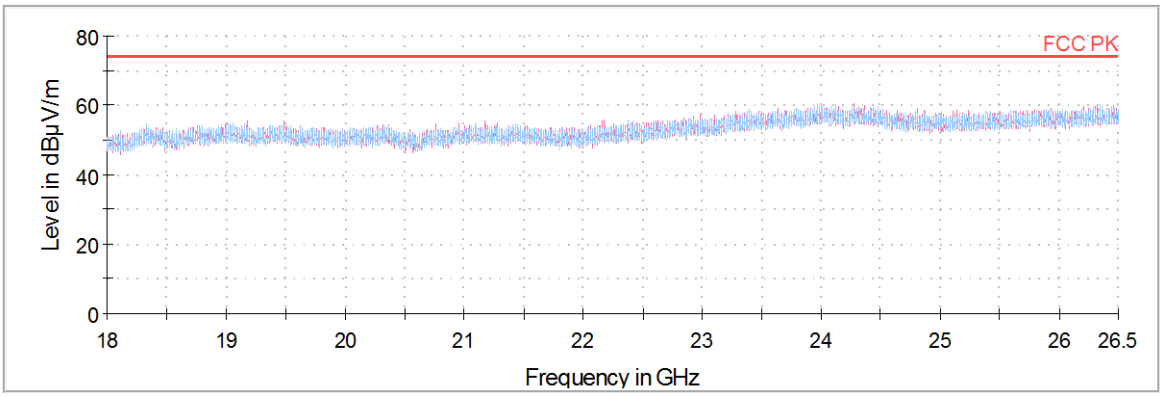
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



Middle Channel

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									
1 759.06	V	56.96	3.20	-36.58	26.84	-	50.42	74.00	23.58
5 321.56	V	69.33	5.67	-60.57	33.38	-	47.81	74.00	26.19
6 664.17	V	71.39	6.44	-61.09	35.26	-	52.00	74.00	22.00
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

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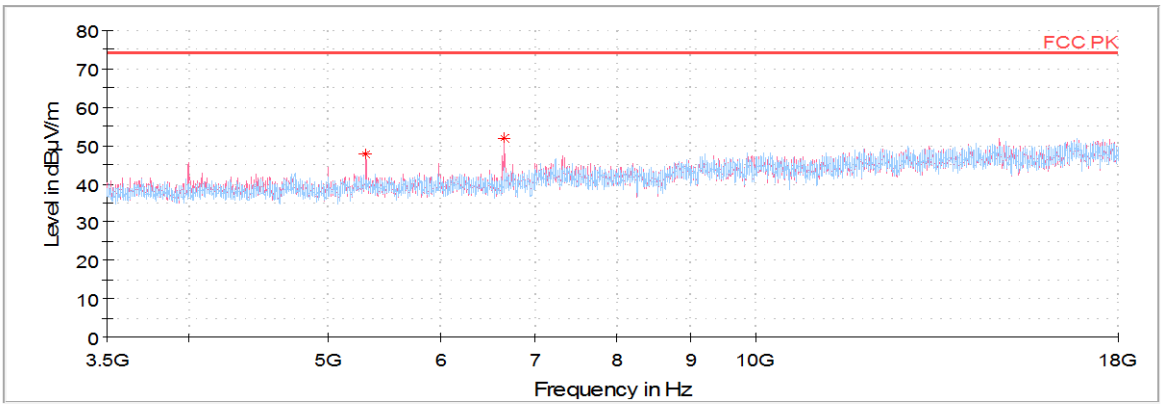
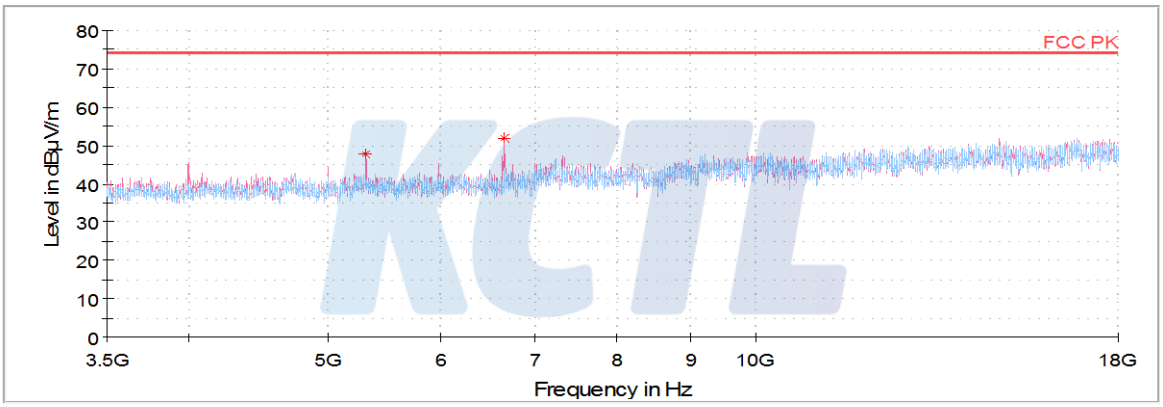
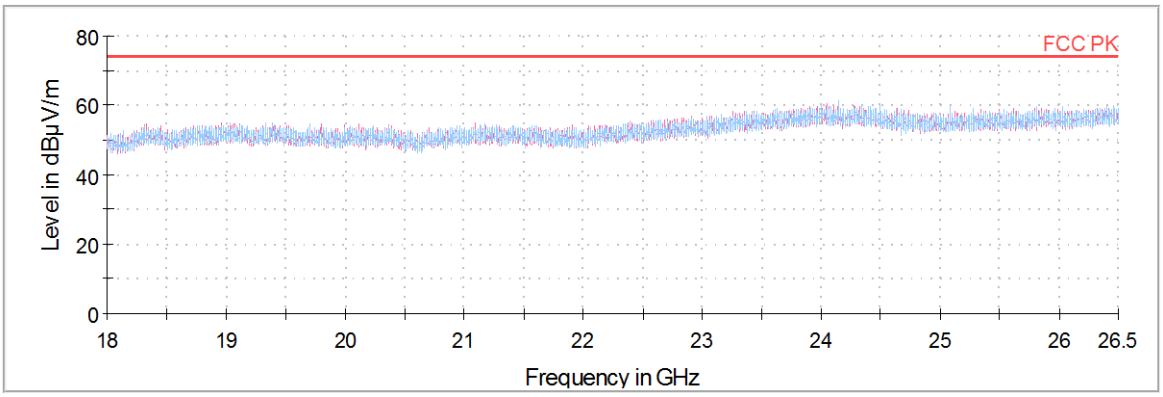
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

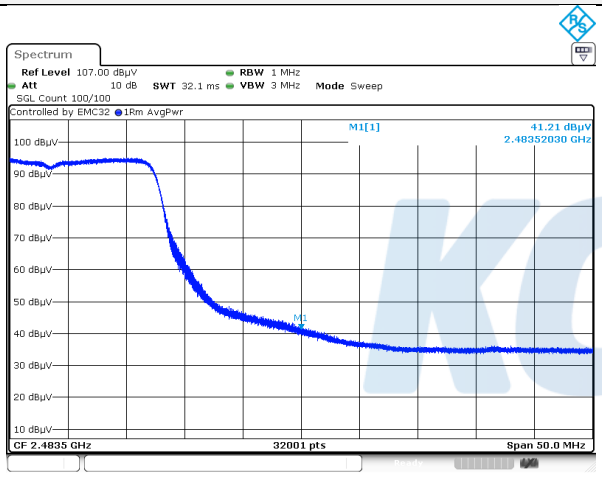


Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

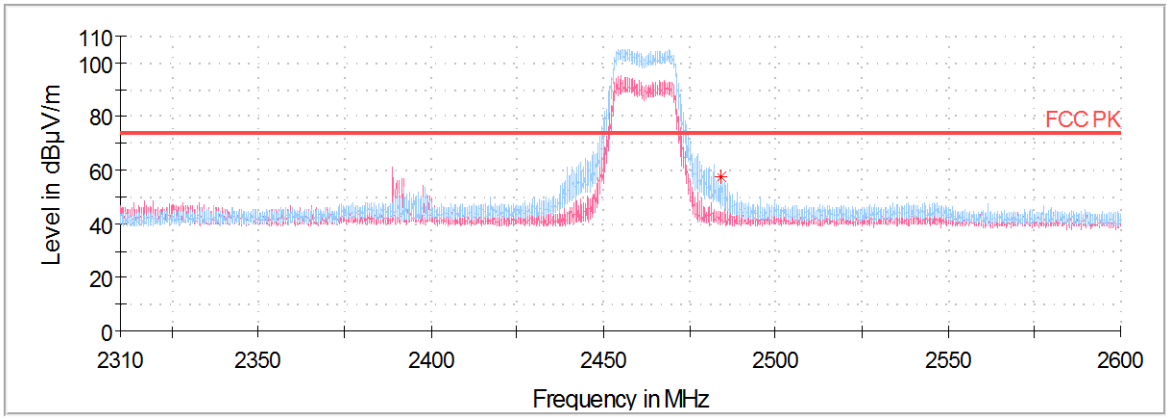


Highest Channel

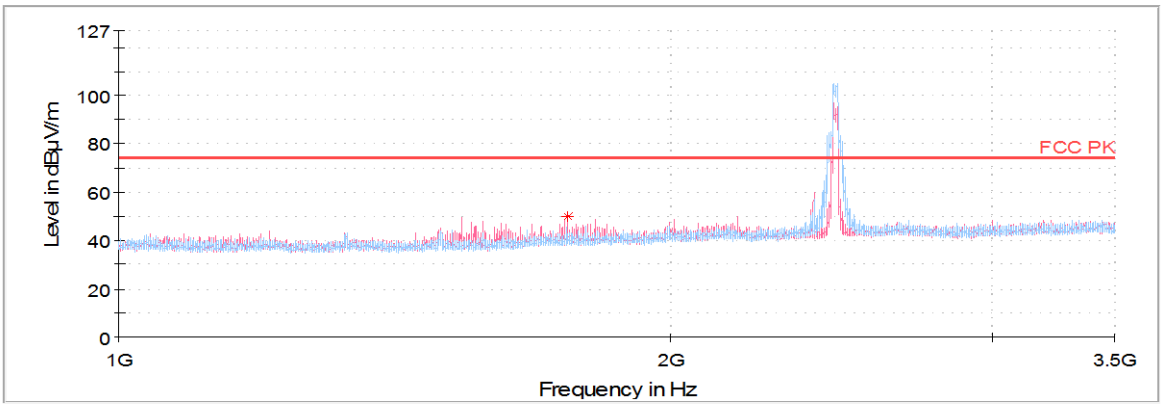
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 758.20	V	56.31	3.19	-36.56	26.83	-	49.77	74.00	24.23
2 483.52[1)]	H	55.20	3.77	-30.29	28.72	-	57.40	74.00	16.60
6 658.28	V	69.49	6.44	-61.10	35.26	-	50.09	74.00	23.91
7 233.75	H	66.80	6.72	-61.41	35.93	-	48.04	74.00	25.96
Average Data									
2 483.52[1)]	H	41.21	3.77	-30.29	28.72	-	43.41	54.00	10.59

Average data	Average data
	Blank

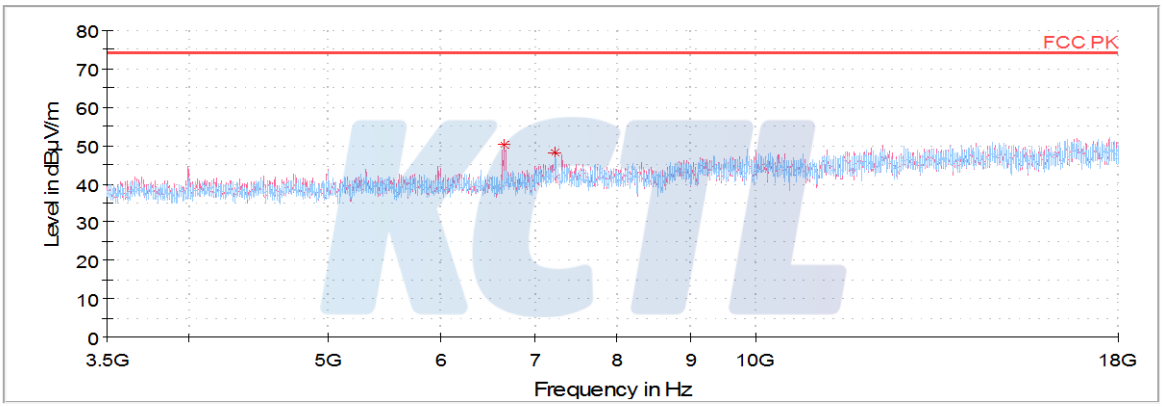
Horizontal/Vertical for Band-edge



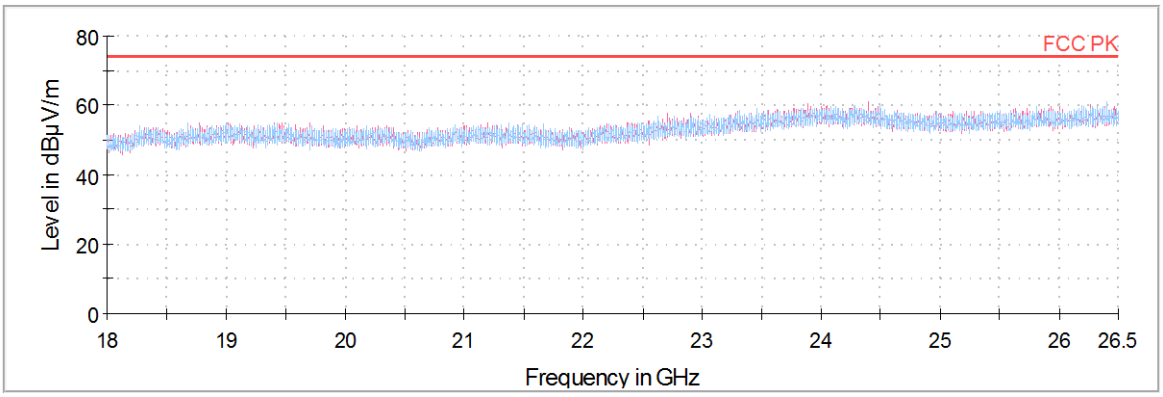
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

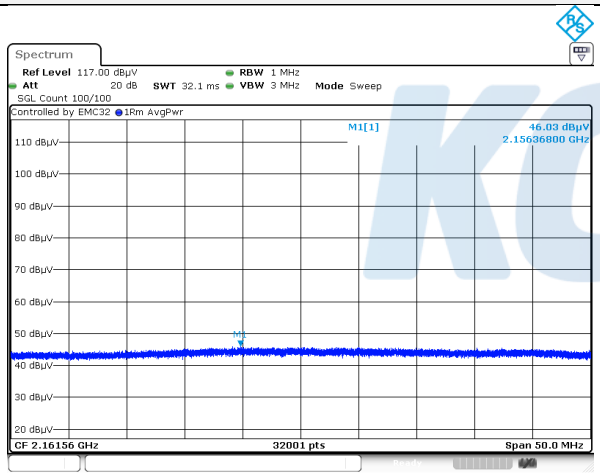


802.11n HT40

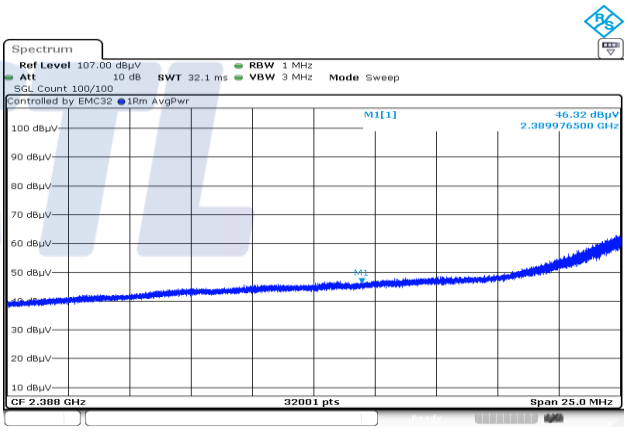
Lowest Channel

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									
2 156.37	V	58.90	3.54	-36.29	28.10	-	54.25	74.00	19.75
2 389.98[1)]	H	59.02	3.70	-30.02	28.54	-	61.24	74.00	12.76
6 656.02	V	69.42	6.44	-61.10	35.25	-	50.02	74.00	23.98
7 317.13[1)]	V	66.47	6.76	-61.58	36.02	-	47.67	74.00	26.33
Average Data									
2 156.37	V	46.03	3.54	-36.29	28.10	-	41.38	54.00	12.62
2 389.98	H	46.32	3.70	-30.02	28.54	-	48.54	54.00	5.46

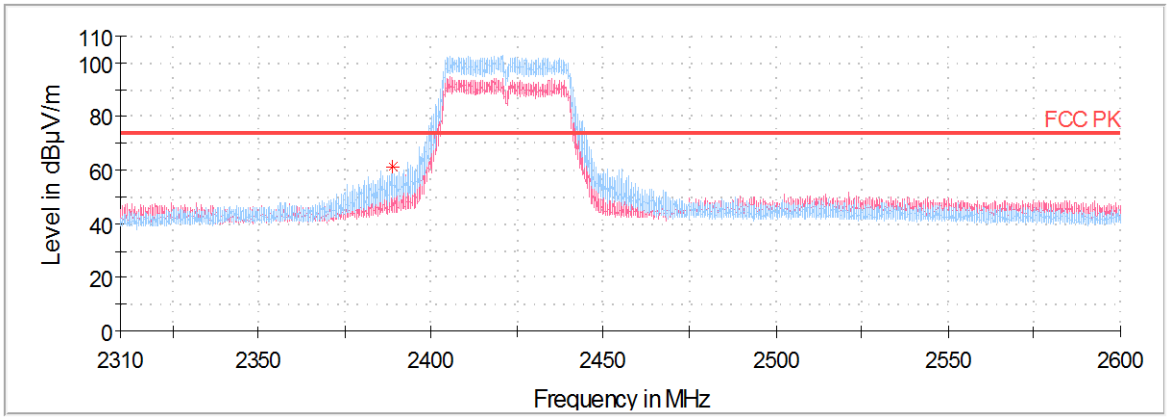
Average data



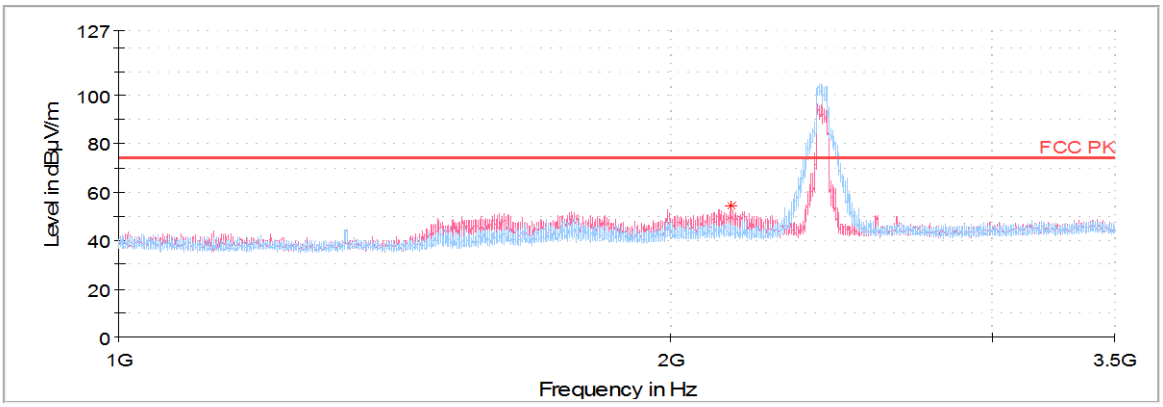
Average data



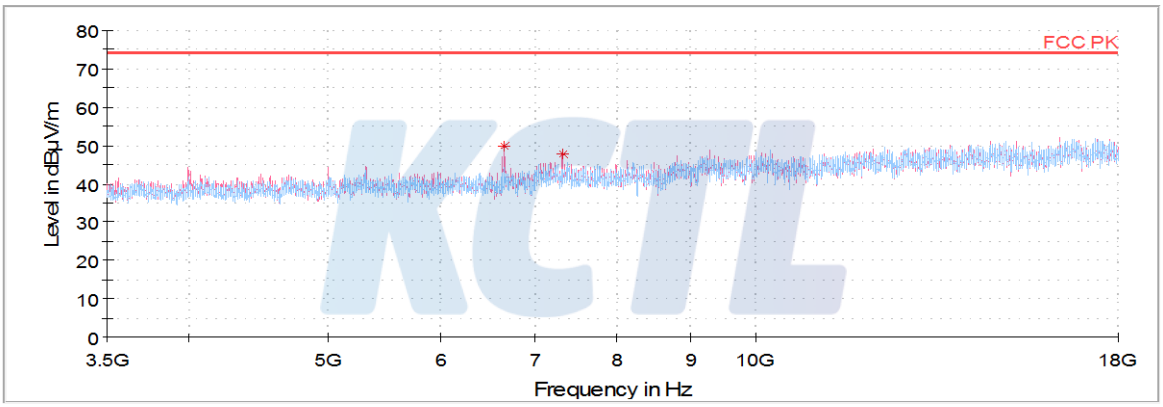
Horizontal/Vertical for Band-edge



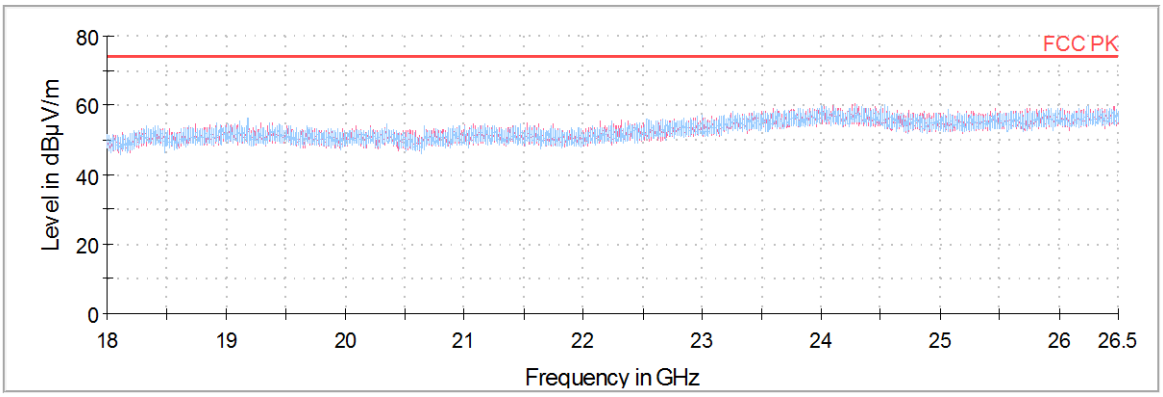
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

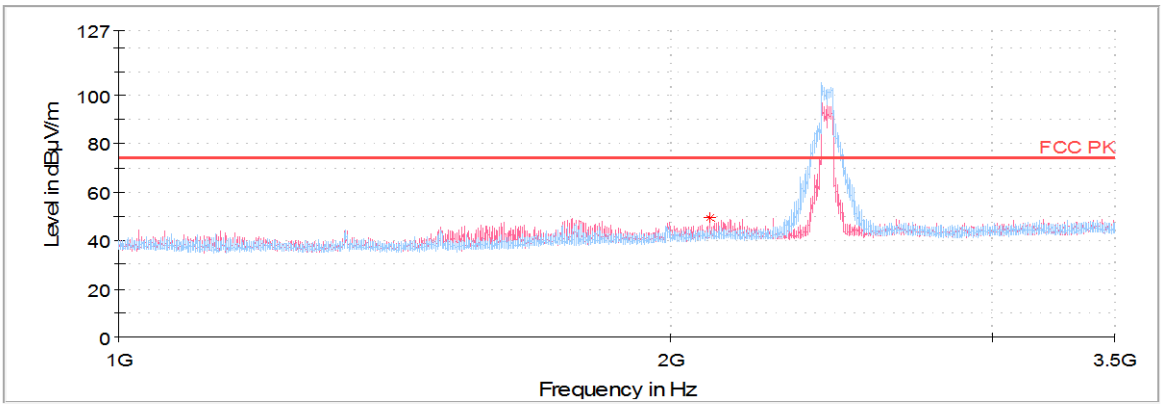


Middle Channel

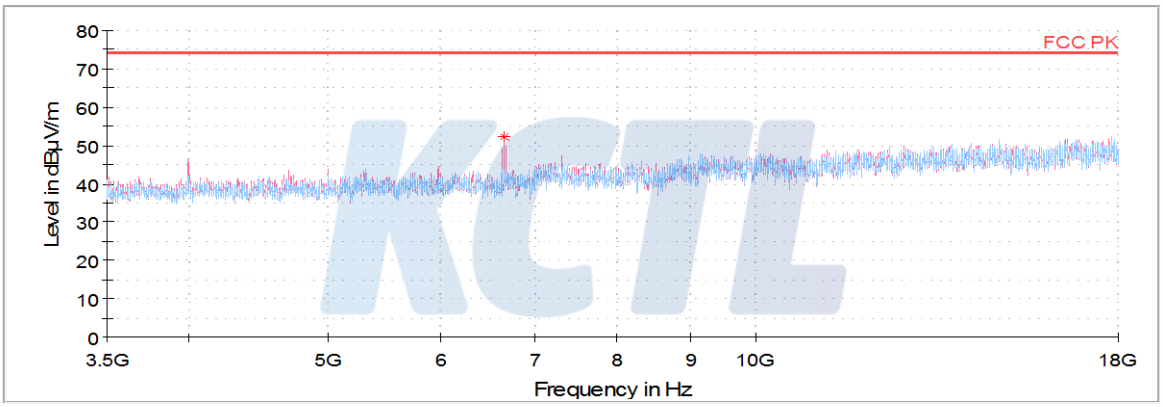
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
2 105.08	V	54.10	3.50	-36.11	28.00	-	49.49	74.00	24.51
6 659.64	V	71.63	6.44	-61.10	35.26	-	52.23	74.00	21.77
Average Data									
No spurious emissions were detected within 20 dB of the limit.									

KCTL

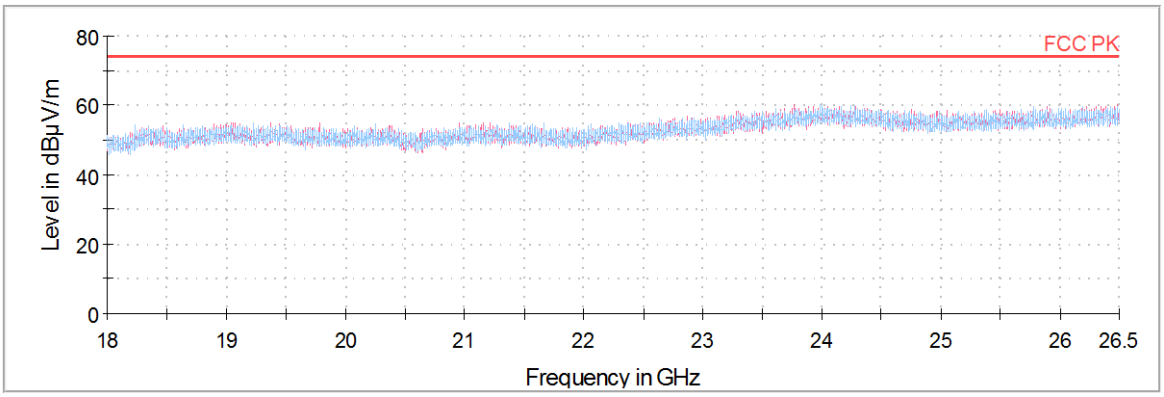
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

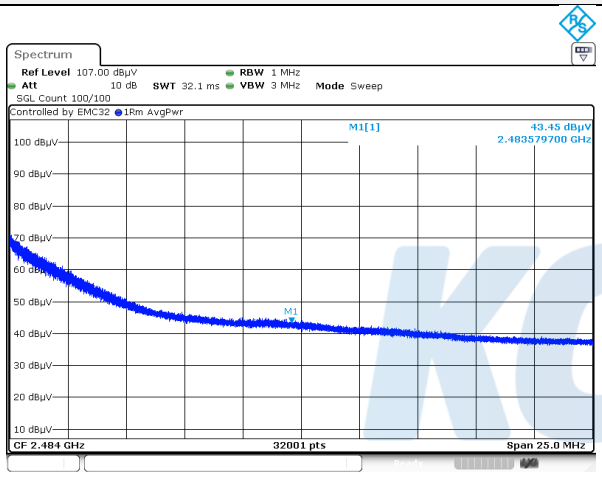


Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

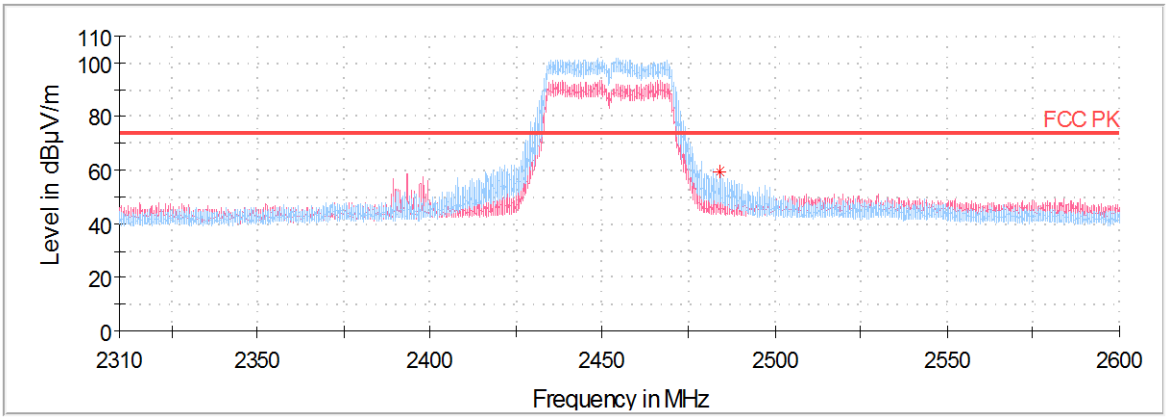


Highest Channel

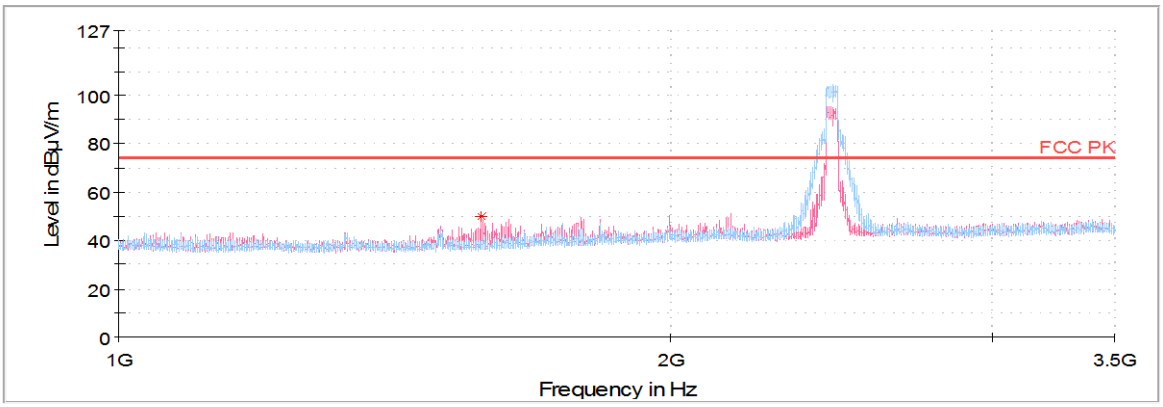
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data									
1 576.09[1)]	V	58.28	3.02	-37.40	26.10	-	50.00	74.00	24.00
2 483.58[1)]	H	57.37	3.77	-30.29	28.72	-	59.57	74.00	14.43
6 655.56	V	69.56	6.44	-61.10	35.25	-	50.15	74.00	23.85
Average Data									
2 483.58[1)]	H	43.45	3.77	-30.29	28.72	-	45.65	54.00	8.35

Average data	Average data
	Blank

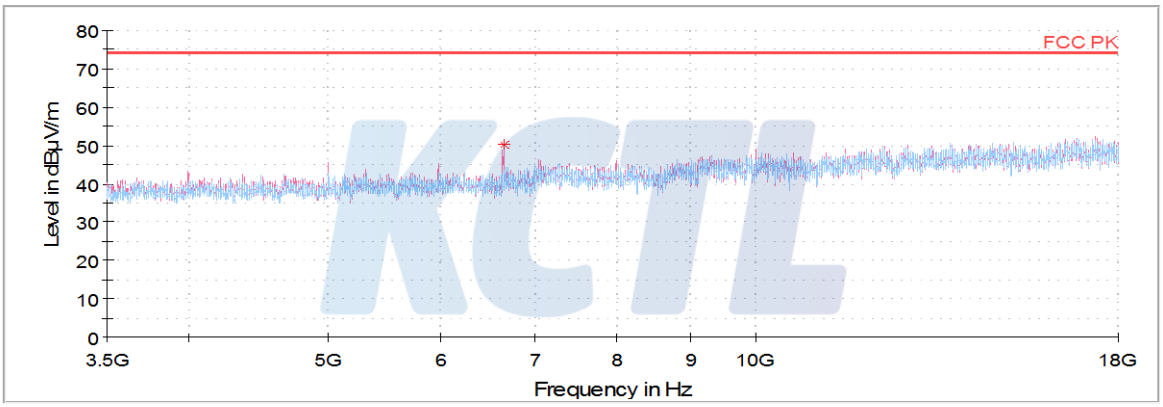
Horizontal/Vertical for Band-edge



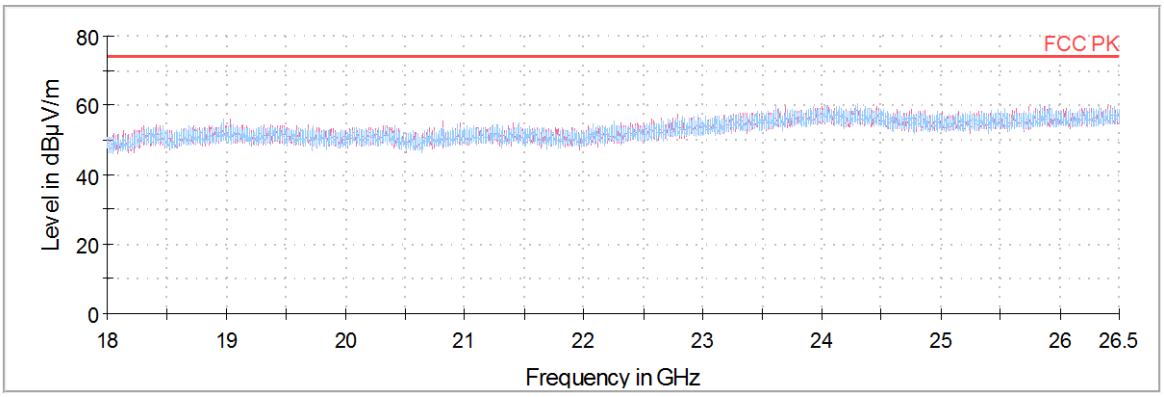
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓

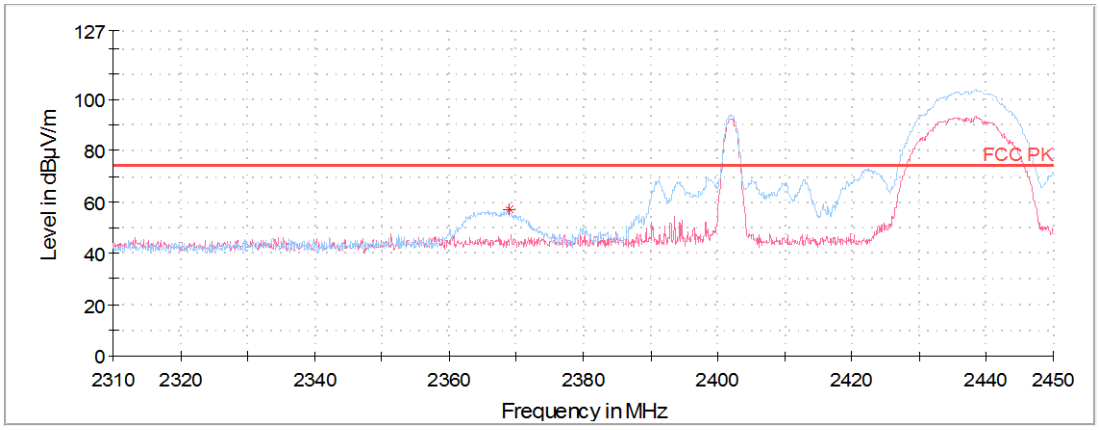


802.11b (2 462 ㎒) + BT, BDR (2 402 ㎒)

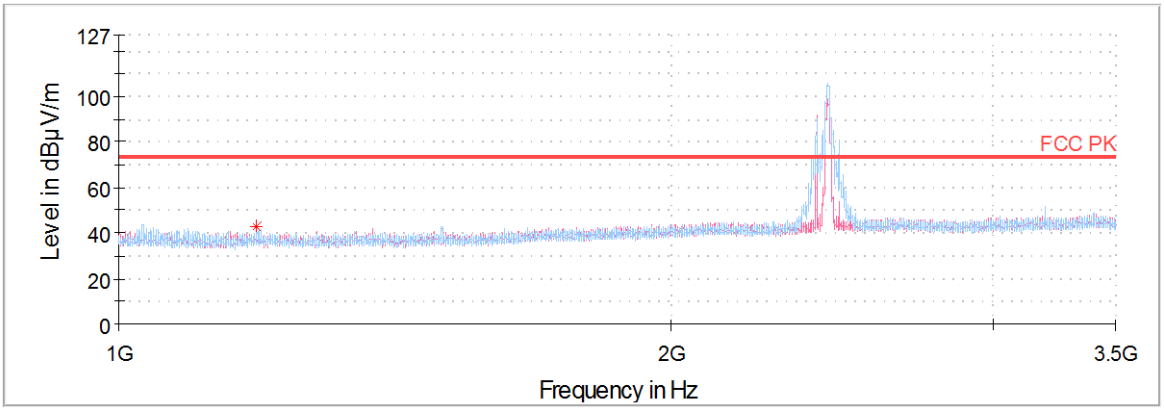
Frequency	Pol.	Reading	Cable Loss	Amp Gain	Antenna Factor	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data									
1 188.59[1)]	H	52.11	2.65	-36.04	24.55	-	43.27	74.00	30.73
2 365.92[1)]	H	69.97	3.69	-36.17	28.50	-	65.99	74.00	8.01
4 999.84[1)]	V	68.37	5.47	-60.45	32.90	-	46.29	74.00	27.71
Average Data									
2 365.92[1)]	H	51.76	3.69	-36.17	28.50	-	47.78	54.00	6.22

Average data	Average data
	Blank

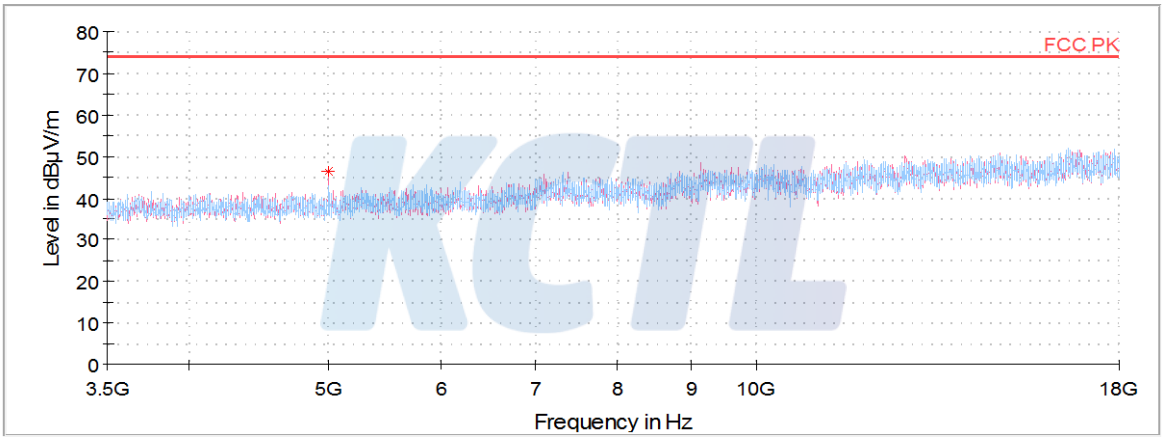
Horizontal/Vertical for Band-edge



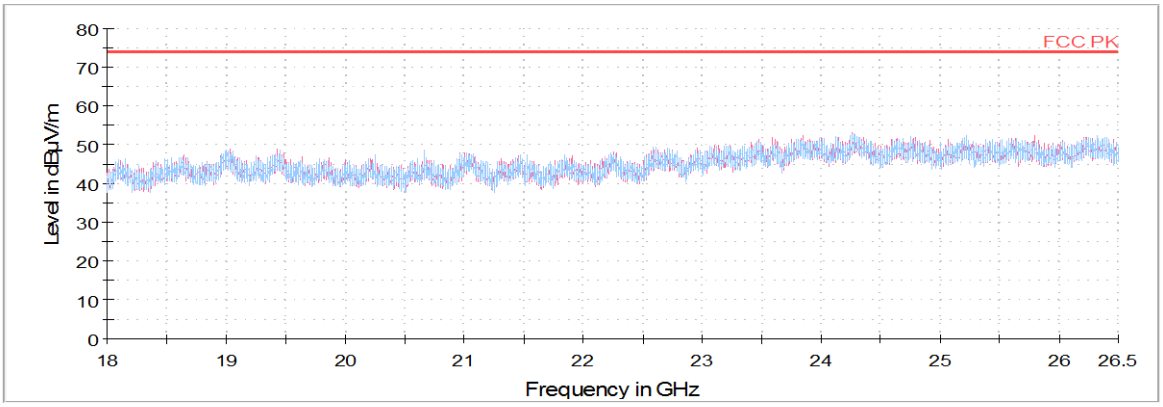
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

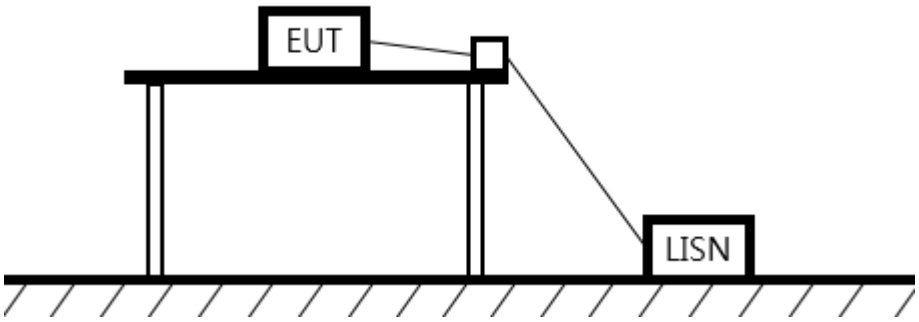


Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



6.2. AC Conducted emission

Test setup



Limit

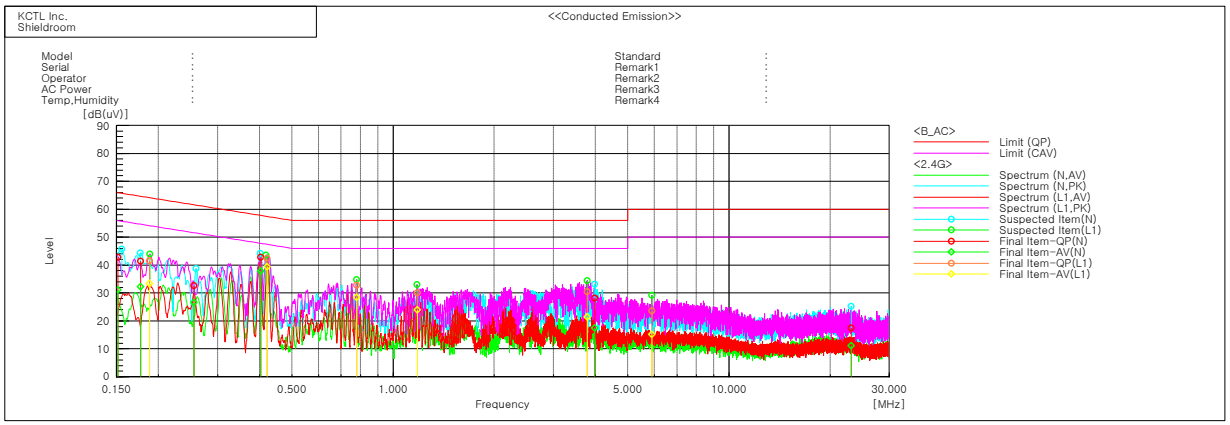
According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/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 (㎒)	Conducted limit (dBμV/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

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

Test results



Final Result

--- N 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	0.1516	33.0	21.3	9.8	42.8	31.1	65.9	55.9	23.1	24.8
2	0.17723	31.5	22.3	9.9	41.4	32.2	64.6	54.6	23.2	22.4
3	0.25508	23.0	16.9	9.6	32.6	26.5	61.6	51.6	29.0	25.1
4	0.40347	32.9	28.0	9.8	42.7	37.8	57.8	47.8	15.1	10.0
5	3.98232	18.3	7.6	9.8	28.1	17.4	56.0	46.0	27.9	28.6
6	23.09449	7.4	1.1	10.0	17.4	11.1	60.0	50.0	42.6	38.9

--- L1 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	0.18809	31.5	23.3	10.0	41.5	33.3	64.1	54.1	22.6	20.8
2	0.42144	32.6	29.5	9.8	42.4	39.3	57.4	47.4	15.0	8.1
3	0.77925	22.9	18.6	9.8	32.7	28.4	56.0	46.0	23.3	17.6
4	1.18049	20.3	14.1	9.8	30.1	23.9	56.0	46.0	25.9	22.1
5	3.78318	20.6	11.5	9.8	30.4	21.3	56.0	46.0	25.6	24.7
6	5.88815	13.6	5.2	9.9	23.5	15.1	60.0	50.0	36.5	34.9

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7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R & S	FSV40	100988	20.01.04
Pulse Power Meter	ANRITSU	ML2495A	1608009	19.08.02
Pulse Power Sensor	ANRITSU	MA2411B	1726174	19.08.02
ATTENUATOR	R & S	DNF Dämpfungsglied 10 dB in N-50 Ohm	31212	19.05.14
EMI TEST RECEIVER	R & S	ESCI	100732	19.08.23
Bi-Log Antenna	SCHWARZBECK	VULB 9168	583	20.05.04
Amplifier	SONOMA INSTRUMENT	310N	284608	19.08.23
COAXIAL FIXED ATTENUATOR	Agilent	8491B-003	2708A18758	20.05.04
Horn antenna	ETS.lindgren	3116	00086635	19.05.10
Horn antenna	ETS.lindgren	3117	161225	19.05.18
AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-01001800 -22-10P	2003683	19.05.15
AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33 -8P	2000997	19.08.02
LOOP Antenna	R & S	HFH2-Z2	100355	20.08.24
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	-
TWO-LINE V - NETWORK	R&S	ENV216	101584	19.04.05
EMI TEST RECEIVER	R & S	ESCI	101408	19.08.23
Highpass Filter	WT	WT-A1698-HS	WT160411001	19.05.14
Vector Signal Generator	R & S	SMBV100A	257566	20.01.04
Signal Generator	R & S	SMR40	100007	19.05.15
Cable Assembly	RadiAll	2301761768000PJ	1724.659	-
Cable Assembly	gigalane	RG-400	-	-

End of test report

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