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시점확인 진본 2023-10-23 13:23:08 KST 정부시점확인센터

TEST REPORT

FCC Part 15.247

Equipment under test	Flat Panel X-ray Detector for NDT, Security & EOD
Model name	PIXX1826N
FCC ID	2AWVMPIXX1826N
Applicant	PIXXGEN Corporation
Manufacturer	PIXXGEN Corporation
Date of test(s)	2023.08.31 ~ 2023.09.15
Date of issue	2023.10.06

Issued to
PIXXGEN Corporation
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Test and report completed by :	**Report approval by :**
Do-won, Ahn Test engineer	Young-Jin Lee Technical manager

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Revision history

Revision	Date of issue	Test report No.	Description
-	2023.10.06	KES-RF-23T0123	Initial

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1. General information

Applicant:	PIXXGEN Corporation
Applicant address:	5F, SMART BAY, 123, Beolmal-ro, Dongan-gu- Anyang-si, Gyeonggi-do, 14056, Republic of Korea
Test site:	KES Co., Ltd.
Test site address:	☐ 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea ☒ 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Test Facility	FCC Accreditation Designation No.: KR0100, Registration No.: 444148 ISED Registration No.: 23298
FCC rule part(s):	15.247
FCC ID:	2AWVMPIXX1826N
Test device serial No.:	☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test	Flat Panel X-ray Detector for NDT, Security & EOD
Frequency range	2 412 ㎒ ~ 2 462 ㎒ (802.11n_HT20)
Model	PIXX1826N
Modulation technique	OFDM
Antenna specification	PCB // Peak gain: 2.27 ㏈i
Power source	DC 7.4 V (Battery)
Number of channels	2 412 ㎒ ~ 2 462 ㎒ (Ch:11)
H/W Version	1.0
S/W Version	1.0

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1.2. Test configuration

The **PIXXGEN Corporation // Flat Panel X-ray Detector for NDT, Security & EOD // PIXX1826N // FCC ID: 2AWVMPIXX1826N**
was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents.

FCC Part 15.247
KDB 558074 D01 v05 r02
ANSI C63.10-2013

1.3. Derivative Model Information

N/A

1.4. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

1.5. Sample calculation

Where relevant, the following sample calculation is provided

For all conducted test items :

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 0.43+ 10 = 10.43(dB)

For Radiation test :
Field strength level (dBμV/m) = Measured level (dBμV) + Antenna factor (dB) + Cable loss (dB) – Amplifier gain (dB)

1.6. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.22 dB
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1㎓	4.04 dB
	Above 1㎓	5.32 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

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1.7. Frequency/channel operations

Ch.	Frequency (MHz)	Mode
01	**2 412**	802.11n_HT20
. .	. .	. .
06	**2 437**	802.11n_HT20
. .	. .	. .
11	**2 462**	802.11n_HT20

2. Summary of tests

Section in FCC Part 15	Parameter	Test results
15.247(a)(2)	6 dB bandwidth	N/A
15.247(b)(3)	Output power	Pass
15.247(e)	Power spectral density	N/A
15.205 15.209	Radiated restricted band and emission	Pass
15.247(d)	Conducted spurious emission and band edge	N/A
15.207(a)	AC Conducted emissions	Pass
15.203	Antenna requirement	Pass

Note:

1. This product is equipped with an approved module, please refer to Module Report Report No. : KES-RF1-20T0137 for details.
2. By the request of the applicant, test was performed with condition below:
   Program setting power: 39

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3. Test results

3.1. Output power

Test procedure

ANSI C63.10-2013 - Section 11.9.1.3 and 11.9.2.3.2

Test setup

EUT	—	Attenuator	—	Power meter, Power sensor

ANSI C63.10-2013 - Section 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS ba ndwidth and shall use a fast-responding diode detector.

ANSI C63.10-2013 - Section 11.9.2.3.2

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

Limit

According to §15.247(b)(3), For systems using digital modulation in the 902~928 ㎒, 2 400~2 483.5 ㎒, and 5 725~5 850 ㎒ bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted out-put power. Maximum Conducted Out-put Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to §15.247(b)(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 ㏈i. Except as shown in paragraph (c) of this section, if transmit-ting antennas of directional gain greater than 6 ㏈i are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 ㏈i.

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Test results

Measured output power (dBm)						
Mode	2 412 ㎒		2 437 ㎒		2 462 ㎒	
	Average	Peak	Average	Peak	Average	Peak
802.11n_HT20	8.04	16.34	8.48	16.37	8.27	16.59

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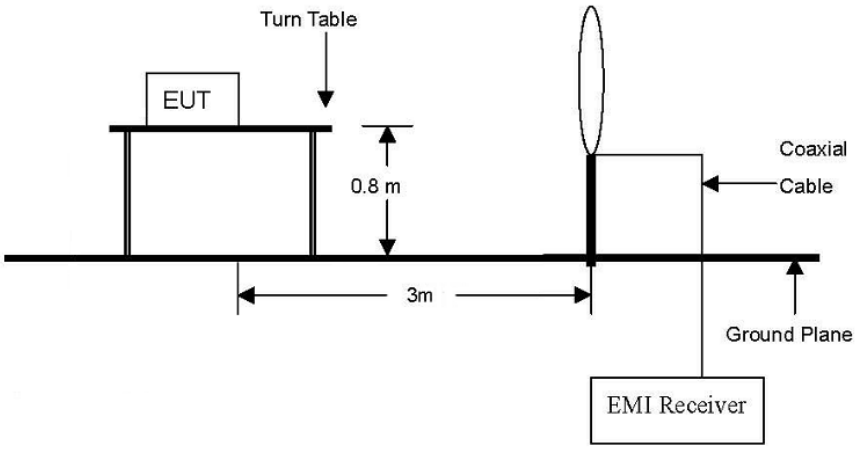
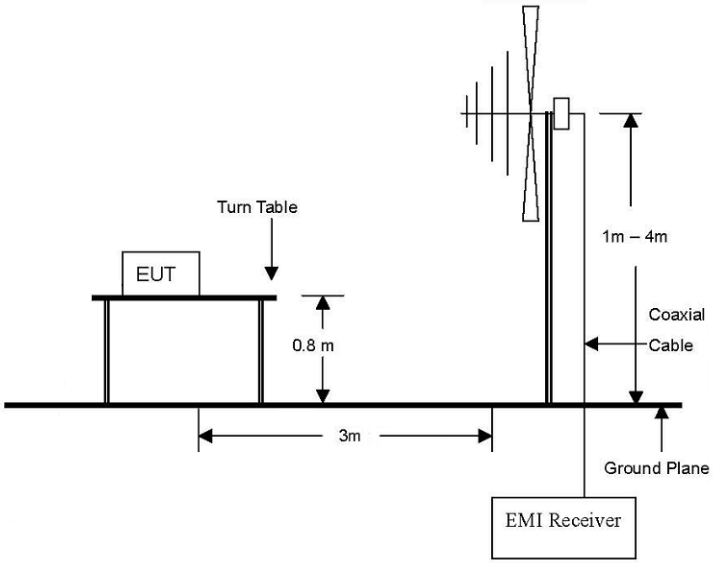
3.2. Radiated restricted band and emissions

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.



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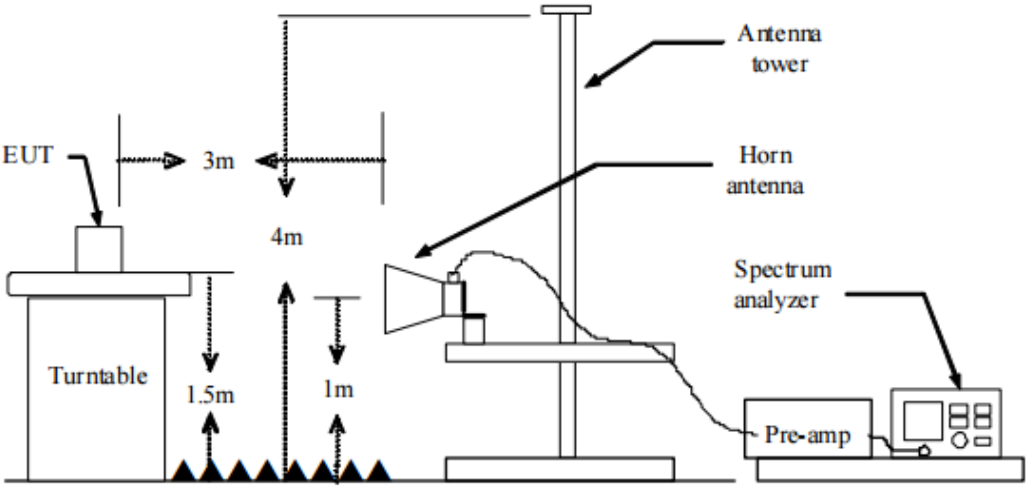
The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



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Test procedure

Radiated emissions from the EUT were measured according to the dictates in section 11.11 & 11.12 of ANSI C63.10-2013.

Test procedure below 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel, ground parallel and perpendicular of the antenna are set to make the measurement. It was determined that **parallel** was worst-case orientation; therefore, all final radiated testing was performed with the EUT in **parallel.**
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum hold mode.

Test procedure above 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters(30-1000MHz) / 1.5 meters(above 1GHz)above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The antenna is a bi-log antenna, a horn antenna ,and its height are varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5. Spectrum analyzer settings for f < 1 ㎓:
   ① Span = wide enough to fully capture the emission being measured
   ② RBW = 100 ㎑
   ③ VBW ≥ RBW
   ④ Detector = quasi peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
6. Spectrum analyzer settings for f ≥1 ㎓: Peak
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   ③ VBW ≥ 3 ㎒
   ④ Detector = peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
   ⑦ Trace was allowed to stabilize

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7. Spectrum analyzer settings for f ≥1 ㎓: Average
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   ③ VBW ≥ 3 × RBW
   ④ Detector = RMS, 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.
   ⑤ 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 in order to use linear voltage averaging. Log or ㏈ averaging shall not be used.
   ⑥ Sweep = auto
   ⑦ Trace = max hold
   ⑧ Perform a trace average of at least 100 traces.
   ⑨ A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
      1) If power averaging (RMS) mode was used in step ⑤, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
      2) If linear voltage averaging mode was used in step ⑤, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
      3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

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Note.

1. f<30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   f ≥30 ㎒, extrapolation factor of 20 ㏈/decade of distance. $F_d = 20\log(D_m/Ds)$
   Where:
   F_d = Distance factor in ㏈
   D_m = Measurement distance in meters
   D_s = Specification distance in meters
2. Field strength(㏈㎶/m) = Level(㏈㎶) + CF (㏈) + or DCF(㏈)
3. Margin(㏈) = Limit(㏈㎶/m) - Field strength(㏈㎶/m)
4. Emissions below 18 ㎓ were measured at a 3 meter test distance while emissions above 18 ㎓ were measured at a 1 meter test distance with the application of a distance correction factor.
7. 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.**
8. The worst-case emissions are reported however emissions whose levels were not within 20 ㏈ of respective limits were not reported.
9. 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.

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Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (㎒)	Distance (Meters)	Radiated (㎶/m)
0.009 ~ 0.490	300	2400/F(㎑)
0.490 ~ 1.705	30	24000/F(㎑)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

**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., Sections 15.231 and 15.241.

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Duty cycle

Regarding to KDB 558074 D01_v04, 6.0, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.

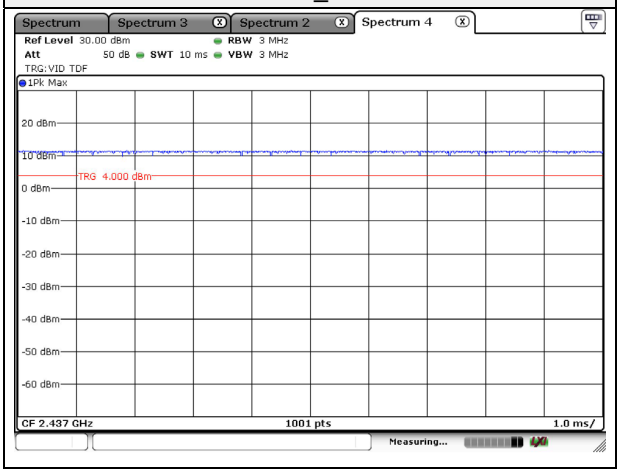
Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100.

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (㏈)
802.11n_HT20	1.00	1.00	1.00	100	0.00

Duty cycle (Linear) = T_{on} time/Period

DCF(Duty cycle correction factor (㏈)) = 10log(1/duty cycle)

802.11n_HT20



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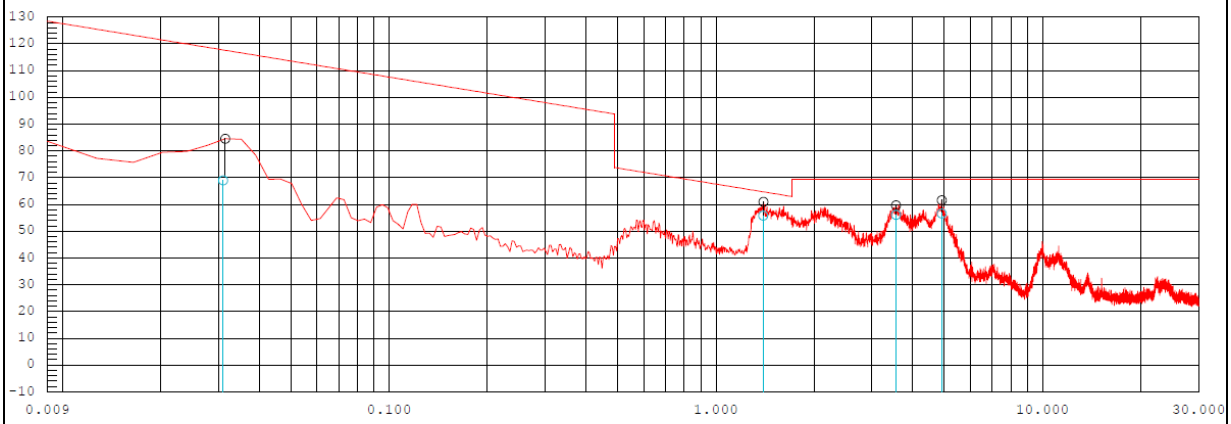
Test results (Below 30 ㎒)

Mode: 802.11n_HT20

Channel 06 (Worst case)

Distance of measurement: 3 meter

Parallel



Final Result

No.	Frequency [MHz]	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Angle [deg]	Remark
1	0.031	50.0	19.0	69.0	117.8	48.8	352.5	
2	1.396	36.6	19.2	55.8	64.7	8.9	23.6	
3	3.559	36.7	19.4	56.1	69.5	13.4	133.9	
4	4.909	37.1	19.5	56.6	69.5	12.9	352.5	

Note.
1. The peak result value was low enough not to affect the test result, and the quasi-peak value was not tested.

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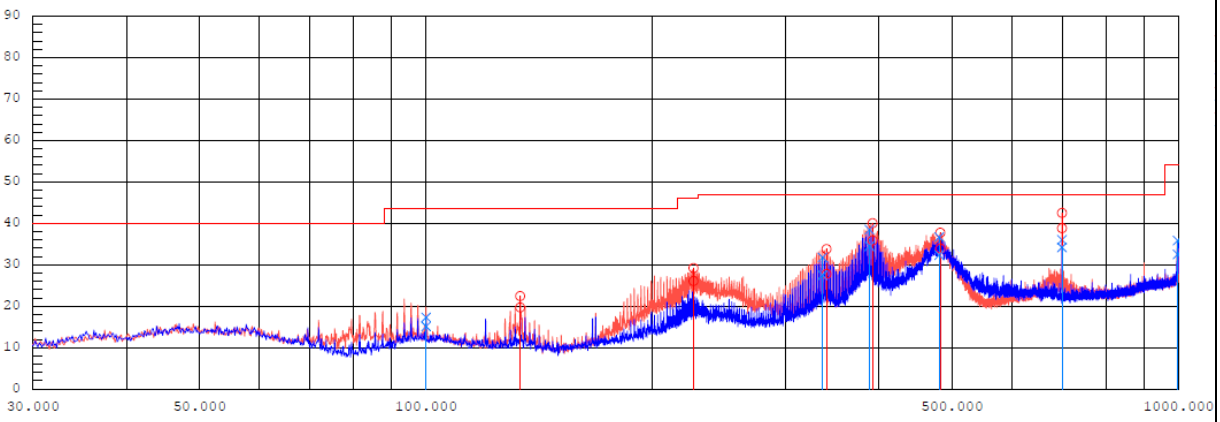
Test results (Below 1 000 ㎒)

Mode: 802.11n_HT20

Channel 06 (Worst case)

Distance of measurement: 3 meter

Horizontal // Vertical



Final Result

No.	Frequency [MHz]	Pol	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	99.961	V	28.4	-13.3	15.1	43.5	28.4	99.9	109.5	
2	133.305	H	35.4	-15.7	19.7	43.5	23.8	199.8	45.8	
3	226.668	H	37.6	-11.5	26.1	46.0	19.9	99.9	6.6	
4	336.399	V	35.8	-8.3	27.5	47.0	19.5	150.1	229.5	
5	340.400	H	35.9	-8.1	27.8	47.0	19.2	99.9	225.7	
6	388.173	V	41.8	-7.3	34.5	47.0	12.5	150.1	143.2	
7	392.174	H	43.2	-7.3	35.9	47.0	11.1	199.8	22.7	
8	480.808	V	37.9	-5.6	32.3	47.0	14.7	150.1	120.4	
9	482.263	H	39.5	-5.6	33.9	47.0	13.1	199.8	27.7	
10	700.028	H	42.2	-3.4	38.8	47.0	8.2	99.9	337.3	
11	700.028	V	37.6	-3.4	34.2	47.0	12.8	150.1	35.0	
12	996.848	V	30.0	2.5	32.5	54.0	21.5	99.9	351.0	

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Test results (Above 1 000 ㎒)

Mode: 802.11n_HT20

Channel 01

Distance of measurement: 3 meter

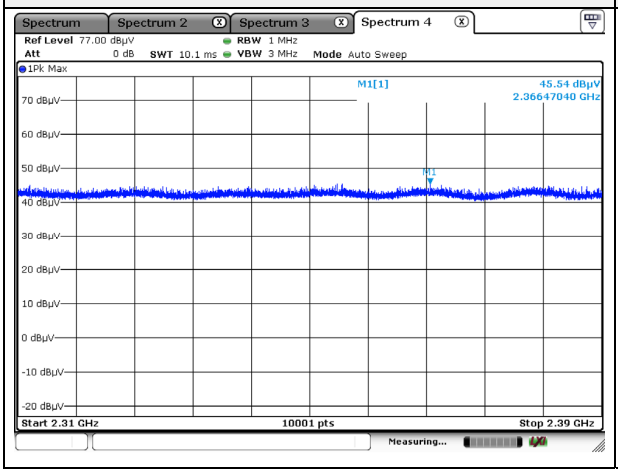
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 005.70	47.07	Peak	V	-9.56	-	37.51	74.00	36.49
1 044.10	47.35	Peak	H	-9.29	-	38.06	74.00	35.94
1 731.83	46.28	Peak	H	-3.98	-	42.30	74.00	31.70
2 139.59	47.24	Peak	V	-1.22	-	46.02	74.00	27.98
3 744.70	45.60	Peak	H	2.47	-	48.07	74.00	25.93
8 754.20	33.80	Average	V	14.28	-	48.08	54.00	5.92
8 781.20	44.32	Peak	V	14.21	-	58.53	74.00	15.47

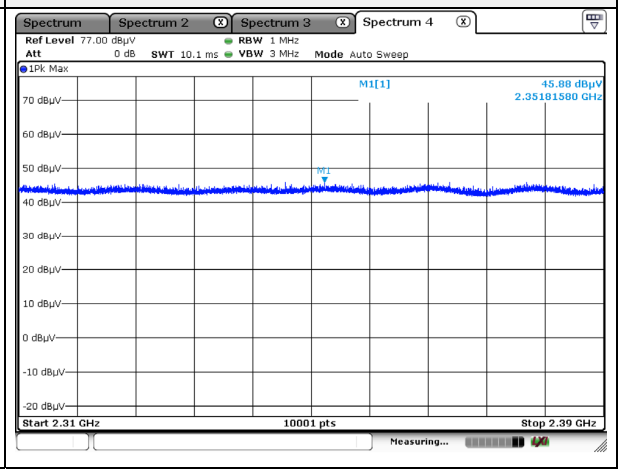
- **Band edge**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 351.82	45.88	Peak	V	-0.80	-	45.08	74.00	28.92
2 366.47	45.54	Peak	H	-0.77	-	44.77	74.00	29.23

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



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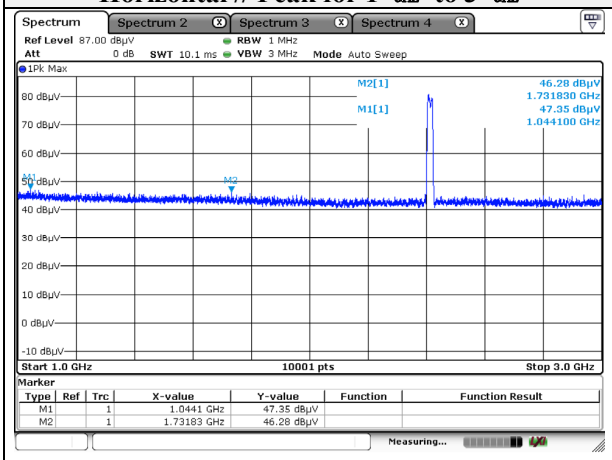
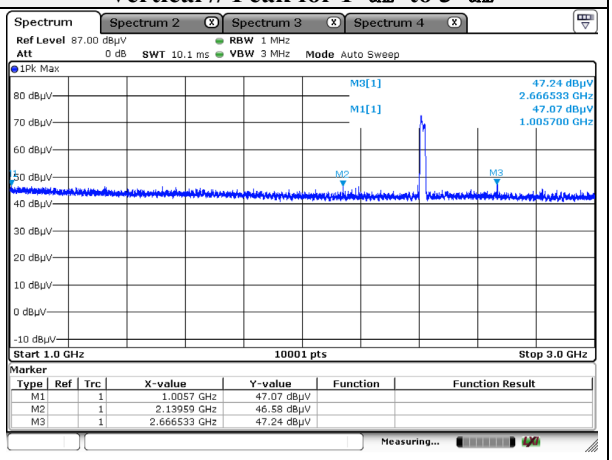
G4B(www.g4b.go.kr)진위확인코드 : YI9U+Z/MMmE=

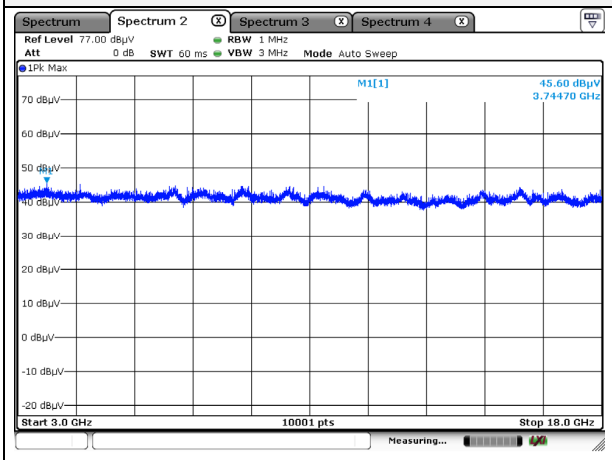
Horizontal // Peak for 1 ㎓ to 3 ㎓



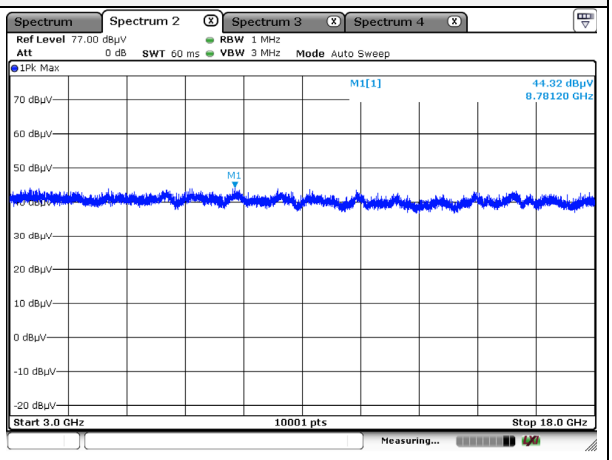
Vertical // Peak for 1 ㎓ to 3 ㎓



Horizontal // Peak for 3 ㎓ to 18 ㎓



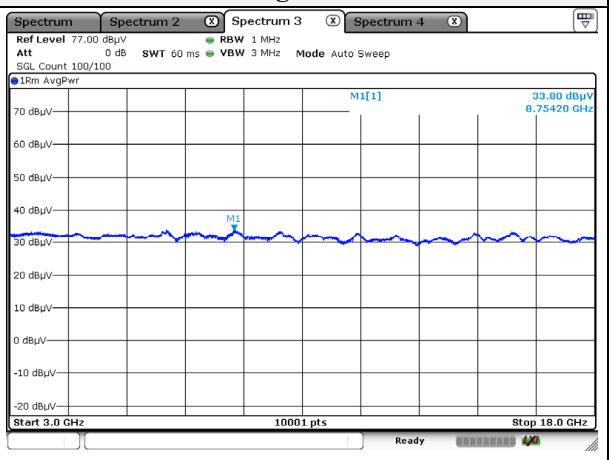
Vertical // Peak for 3 ㎓ to 18 ㎓



Horizontal // Average for 3 ㎓ to 18 ㎓

N/A

Vertical // Average for 3 ㎓ to 18 ㎓



Note.
1. Average test would be performed if the peak result were greater than the average limit.

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G4B(www.g4b.go.kr)진위확인코드 : YI9U+Z/MMmE=

Mode: 802.11n_HT20

Channel 06

Distance of measurement: 3 meter

- **Spurious**

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 000.30	50.26	Peak	H	-9.60	-	40.66	74.00	33.34
1 050.09	50.03	Peak	V	-9.25	-	40.78	74.00	33.22
1 829.02	47.81	Peak	V	-3.06	-	44.75	74.00	29.25
1 877.01	45.75	Peak	H	-2.62	-	43.13	74.00	30.87
2 658.93	47.92	Peak	V	0.17	-	48.09	74.00	25.91
2 828.92	47.92	Peak	V	0.89	-	48.81	74.00	25.19
4 787.10	45.36	Peak	V	6.40	-	51.76	74.00	22.24
7 802.30	45.16	Peak	H	13.95	-	59.11	74.00	14.89
7 012.80	34.22	Average	H	11.68	-	45.90	54.00	8.10

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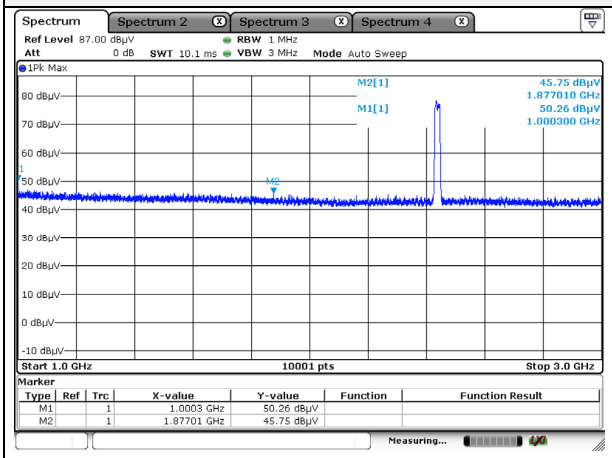
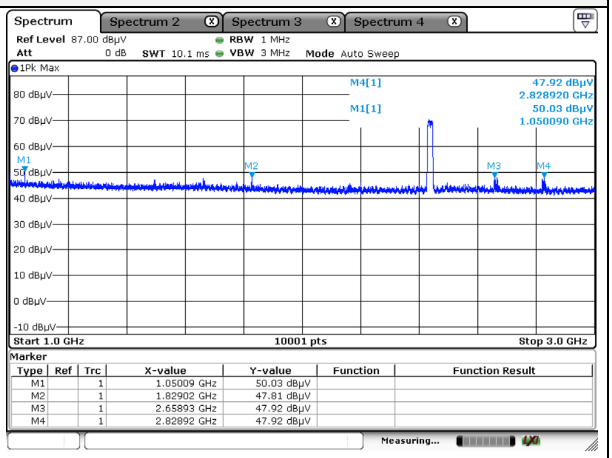
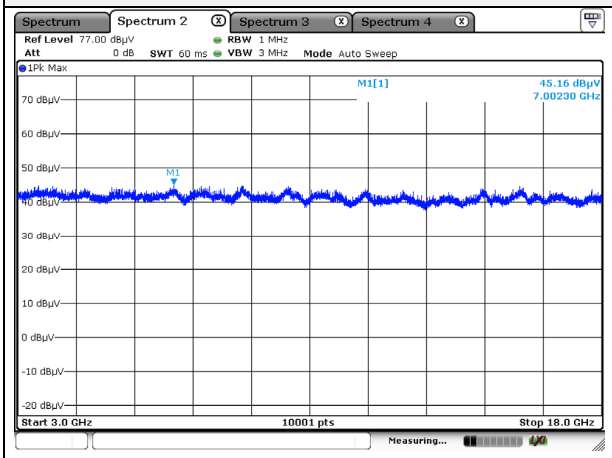
Horizontal // Peak for 1 GHz to 3 GHz



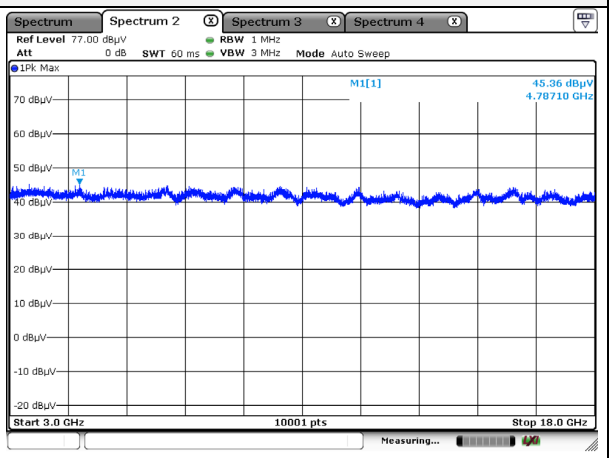
Vertical // Peak for 1 GHz to 3 GHz



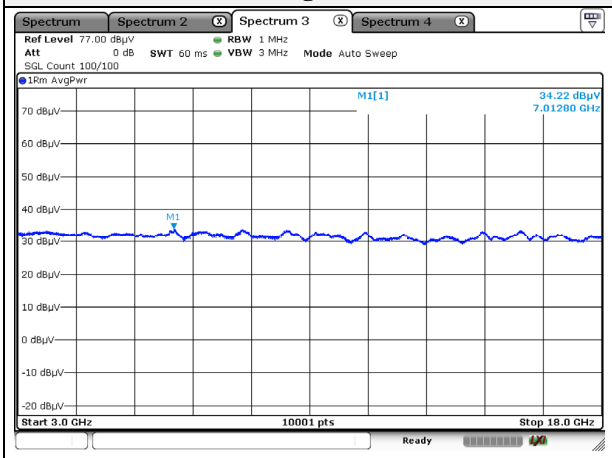
Horizontal // Peak for 3 GHz to 18 GHz



Vertical // Peak for 3 GHz to 18 GHz



Horizontal // Average for 3 GHz to 18 GHz



Vertical // Average for 3 GHz to 18 GHz

N/A

Note.
1. Average test would be performed if the peak result were greater than the average limit.

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G4B(www.g4b.go.kr)진위확인코드 : YI9U+Z/MMmE=

Mode: 802.11n_HT20
Channel 11
Distance of measurement: 3 meter

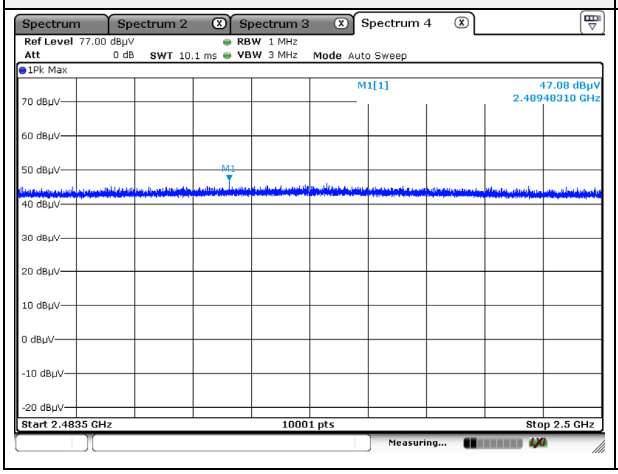
- **Spurious**

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 000.30	48.53	Peak	H	-9.60	-	38.93	74.00	35.07
1 050.29	48.68	Peak	V	-9.25	-	39.43	74.00	34.57
1 467.85	46.55	Peak	H	-6.41	-	40.14	74.00	33.86
1 661.83	48.60	Peak	V	-4.64	-	43.96	74.00	30.04
2 655.93	48.81	Peak	V	0.16	-	48.97	74.00	25.03
2 827.32	48.87	Peak	V	0.88	-	49.75	74.00	24.25
8 719.70	45.87	Peak	V	14.37	-	60.24	74.00	13.76
8 721.12	45.41	Peak	H	14.37	-	59.78	74.00	14.22
8 775.20	34.12	Average	V	14.23	-	48.35	54.00	5.65
8 794.70	33.65	Average	H	14.17	-	47.82	54.00	6.18

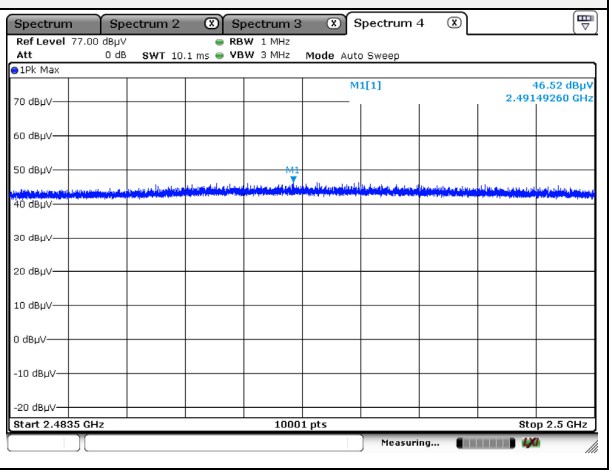
- **Band edge**

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 489.48	47.08	Peak	H	-0.56	-	46.52	74.00	27.48
2 491.49	46.52	Peak	V	-0.56	-	45.96	74.00	28.04

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



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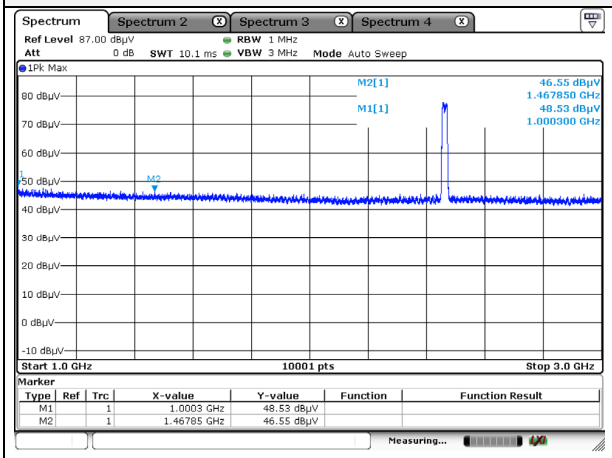
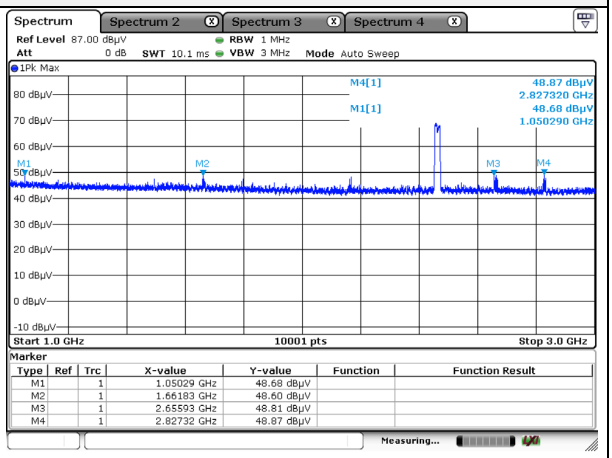
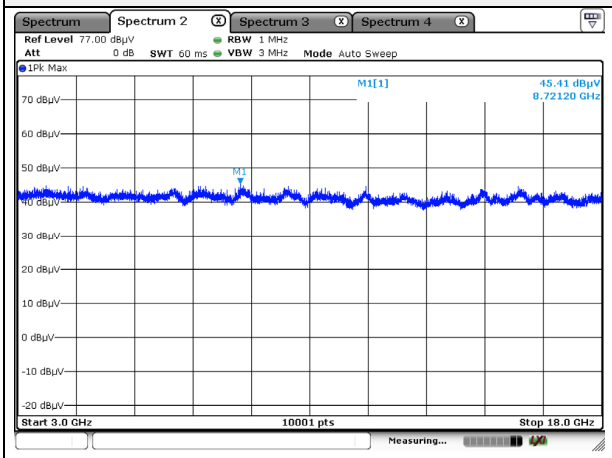
Horizontal // Peak for 1 GHz to 3 GHz



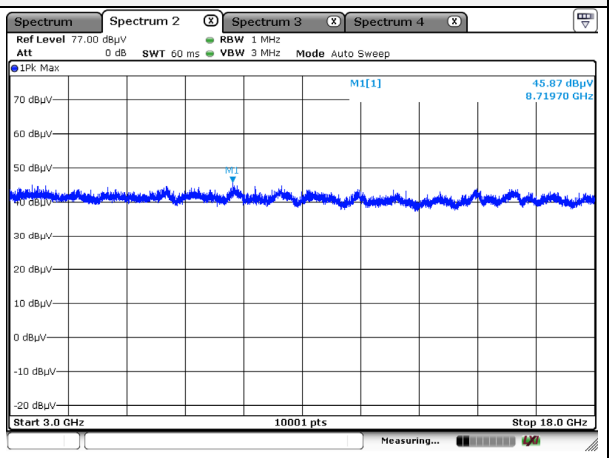
Vertical // Peak for 1 GHz to 3 GHz



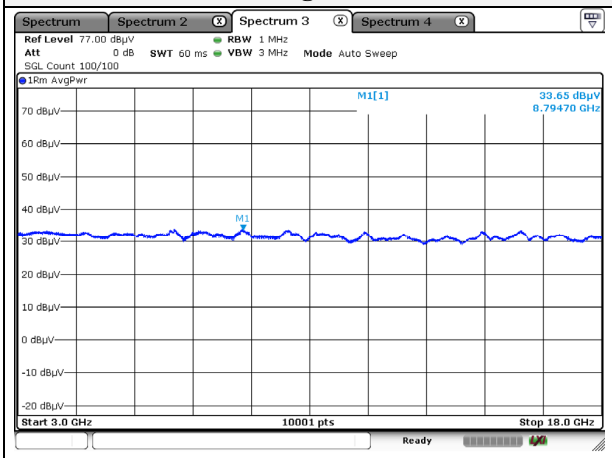
Horizontal // Peak for 3 GHz to 18 GHz



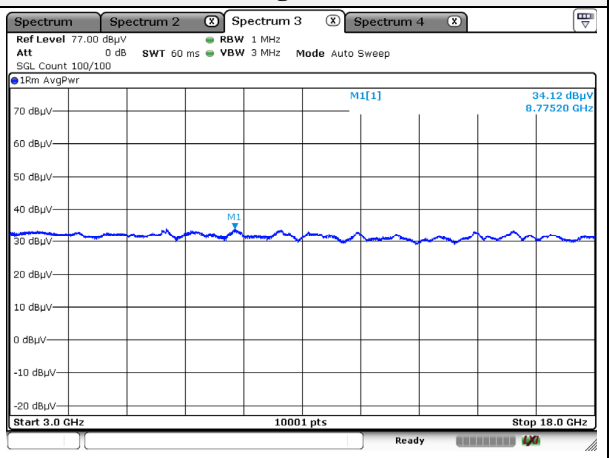
Vrtical // Peak for 3 GHz to 18 GHz



Horizontal // Average for 3 GHz to 18 GHz



Vertical // Average for 3 GHz to 18 GHz



Note.
1. Average test would be performed if the peak result were greater than the average limit.

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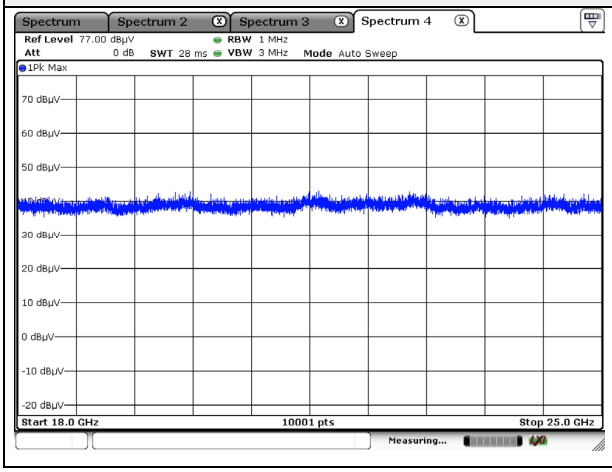
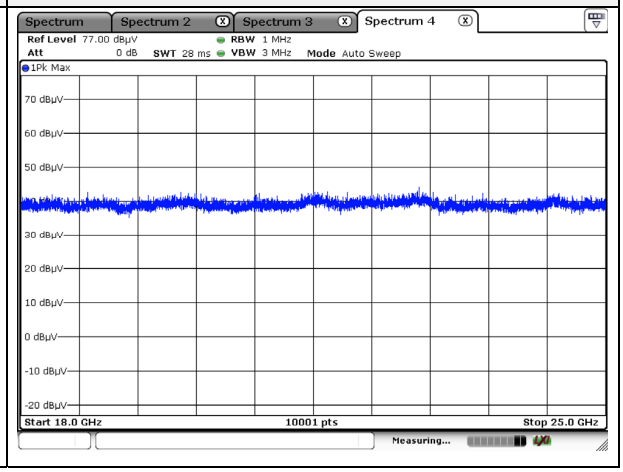
G4B(www.g4b.go.kr)진위확인코드 : YI9U+Z/MMmE=

Test results (18 ㎓ to 25 ㎓)

Mode: 802.11n_HT20

Channel: 06 (Worst case)

Distance of easurement : 3 meter

Horizontal Peak	Vertical Peak
	

Note.
No spurious emission were detected above 18 ㎓.

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3.3. AC conducted emissions

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

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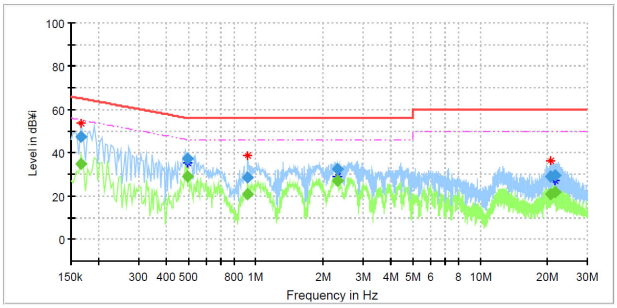
Test results

Mode: 802.11n_HT20

Channel 06 (Worst case)

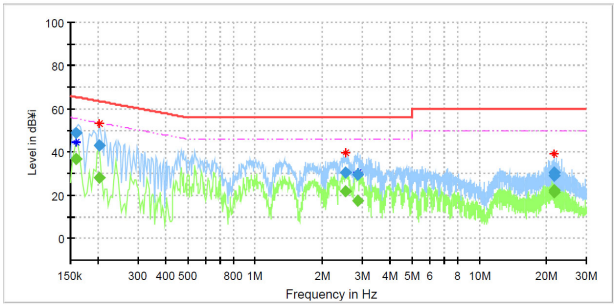
Hot Line



Final_Result

Frequency (MHz)	QuasiPeak (dB¥µ V)	CAverage (dB¥µ V)	Limit (dB¥µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.166000	---	34.89	55.16	20.27	1000.0	9.000	L1	19.4
0.166000	47.30	---	65.16	17.86	1000.0	9.000	L1	19.4
0.494000	---	29.10	46.10	17.00	1000.0	9.000	L1	19.4
0.494000	37.47	---	56.10	18.63	1000.0	9.000	L1	19.4
0.922000	---	20.80	46.00	25.20	1000.0	9.000	L1	19.5
0.922000	28.43	---	56.00	27.57	1000.0	9.000	L1	19.5
2.306000	---	27.31	46.00	18.69	1000.0	9.000	L1	19.5
2.306000	32.44	---	56.00	23.56	1000.0	9.000	L1	19.5
20.582000	---	20.69	50.00	29.31	1000.0	9.000	L1	20.2
20.582000	28.95	---	60.00	31.05	1000.0	9.000	L1	20.2
21.642000	---	21.66	50.00	28.34	1000.0	9.000	L1	20.2
21.642000	29.36	---	60.00	30.64	1000.0	9.000	L1	20.2

Neutral Line



Final_Result

Frequency (MHz)	QuasiPeak (dB¥µ V)	CAverage (dB¥µ V)	Limit (dB¥µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158000	---	36.70	55.57	18.87	1000.0	9.000	N	19.4
0.158000	48.66	---	65.57	16.91	1000.0	9.000	N	19.4
0.202000	---	28.05	53.53	25.48	1000.0	9.000	N	19.4
0.202000	42.87	---	63.53	20.66	1000.0	9.000	N	19.4
2.522000	---	21.64	46.00	24.36	1000.0	9.000	N	19.6
2.522000	30.56	---	56.00	25.44	1000.0	9.000	N	19.6
2.882000	---	17.64	46.00	28.36	1000.0	9.000	N	19.6
2.882000	29.46	---	56.00	26.54	1000.0	9.000	N	19.6
21.542000	---	22.33	50.00	27.67	1000.0	9.000	N	20.2
21.542000	30.49	---	60.00	29.51	1000.0	9.000	N	20.2
21.554000	---	21.45	50.00	28.55	1000.0	9.000	N	20.2
21.554000	29.27	---	60.00	30.73	1000.0	9.000	N	20.2

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3.4. Antenna requirement

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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

The EUT has an internal PCB antenna and meets the requirements of this section.

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Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
EMI Test Receiver	R&S	ESU26	100552	1 year	2024.03.21
Spectrum Analyzer	R&S	FSV40	101002	1 year	2024.06.14
EMI Test Receiver	R&S	ESR3	101783	1 year	2023.11.11
ATTENUATOR	KEYSIGHT	8493C	82506	1 year	2024.01.17
Power Meter	Anritsu	ML2495A	1438001	1 year	2024.01.13
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2024.01.13
SIGNAL GENERATOR	KEYSIGHT	N5182B	MY59100115	1 year	2024.05.26
SIGNAL GENERATOR	Anritsu	68369B	002118	1 year	2024.05.12
BAND REJECT FILTER	MICRO-TRONICS	BRM50702	G272	1 year	2024.01.12
Attenuator	KEYSIGHT	-	-	1 year	2024.03.21
Loop Antenna	Schwarzbeck	FMZB1513	1513-257	2 years	2025.03.22
Horn Antenna	A.H	SAS-571	414	1 year	2024.01.16
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA 9170550	1 year	2024.01.16
TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	2 years	2024.04.19
Amplifier	SONOMA INSTRUMENT	310N	186549	1 year	2024.03.21
PREAMPLIFIER	HP	8449B	3008A00538	1 year	2024.05.31
BROADBAND AMPLIFIER	SCHWARZBECK	BBV9721	PS9721-003	1 year	2024.01.16
DC POWER SUPPLY	AGILENT	6632B	US36351824	1 year	2024.01.13
LISN	R&S	ENV216	101787	1 year	2023.11.10
PULSE LIMITER	R&S	ESH3-Z2	101915	1 year	2023.11.10

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook computer	LG Electronics Inc.,	15U480	901QCCV558723
Jig board	-	-	-

The end of test report.

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