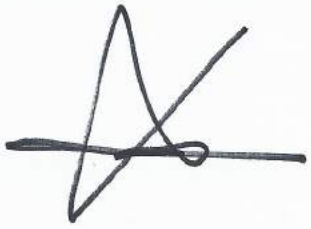
TEST REPORT

Part 15 Subpart E 15.407

Equipment under test	APM-PRO
Model name	APM-PRO
FCC ID	XYCAPMPRO
Applicant	Aram Huvis Co., LTD.
Manufacturer	Aram Huvis Co., LTD.
Date of test(s)	2017.11.09 ~ 2017.11.21 2018.01.15 ~ 2018.01.18
Date of issue	2018.01.22

Issued to
Aram Huvis Co., LTD.
Jung-Ja Dong-Rm401-402, Seoul National University Hospital's
Health Care Innovation Park, 172, Dolma-ro, Bundang-gu,
Seongnam-si, Gyeonggi-do, South Korea
Tel: +82-70-4687-1712 / Fax: +82-31-732-6330

Issued by
KES Co., Ltd.
3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,
Gyeonggi-do, 14057, Korea
473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450

Test and report completed by :	Report approval by :
	
Kwon-se Kim Test engineer	Hyeon-Su, Jang Technical manager

Revision history

Revision	Date of issue	Test report No.	Description
-	2018.01.03	KES-RF-18T0004	Initial
R1	2018.01.22	KES-RF-18T0004-R1	Added UNII-3 band test and Frequency stability test

TABLE OF CONTENTS

1. General information

Applicant:	Aram Huvis Co., LTD.
Applicant address:	Jung-Ja Dong-Rm401-402, Seoul National University Hospital's Health Care Innovation Park, 172, Dolma-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, South 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
FCC rule part(s):	15.407
FCC ID:	XYCAPMPRO
Test device serial No.:	☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test	APM-PRO
Frequency range	2 402 ㎒ ~ 2 480 ㎒ (BDR/EDR) 2 402 ㎒ ~ 2 480 ㎒ (LE) 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20) UNII-1 5 180 ㎒ ~ 5 240 ㎒ (11a/n_HT20) UNII-3 5 745 ㎒ ~ 5 825 ㎒ (11a/n_HT20)
Model:	APM-PRO
Modulation technique	WIFI : DSSS, OFDM BT : GFSK, π/4DQPSK, 8DPSK
Number of channels	2 402 ㎒ ~ 2 480 ㎒ (BDR/EDR) : 79 ch 2 402 ㎒ ~ 2 480 ㎒ (LE) : 40 ch 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20) : 11 ch 5 180 ㎒ ~ 5 240 ㎒ (11a/n_HT20) : 4 ch 5 745 ㎒ ~ 5 825 ㎒ (11a/n_HT20) : 5 ch
Antenna specification	2.4 ㎓ Antenna type : Chip antenna, Peak gain : 3.44 ㏈i 5 ㎓ Antenna type : Chip antenna, Peak gain(UNII-1) : -1.97 ㏈i Peak gain(UNII-3) : -1.95 ㏈i
Power source	DC 3.7 V (Internal Rechargeable Battery)

1.2. Test configuration

The **Aram Huvis Co., LTD. APM-PRO FCC ID: XYCAPMPRO** was tested per the guidance of KDB 789033 D02 v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

1.3. Device modifications

N/A

1.4. Frequency/channel operations

UNII-1

Ch.	Frequency (㎒)
36	5 180
44	5 220
48	5 240

UNII-3

Ch.	Frequency (㎒)
149	5 745
157	5 785
165	5 825

Table 1.4-1. 802.11a/n_HT20 mode

1.5. Maximum average output power

Refer to the average output power.

Note.

1. Radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
2. Worst-case data rates as provided by the client were:
   UNII-1 a : **54 Mbps** , n_HT 20 : **MCS 7**
   UNII-3 a : **54 Mbps** , n_HT 20 : **MCS 7**

1.6. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
Smart Cradle	Aram Huvis Co., LTD.	APM-PRO	APM-C-A-AGJE2500106	DC 5 V

1.7. Software and Firmware description

The software and firmware installed in the EUT is version 1.01-02.

1.8. Measurement results explanation example

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(㏈) = RF cable loss(㏈) + attenuator factor(㏈).

- UNII-1 : 1.15 + 10 = 11.15 (㏈)
- UNII-3 : 1.18 + 10 = 11.18 (㏈)

1.9 Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.62 dB
Uncertainty for Radiation emission test (include Fundamental emission)	9kHz - 30MHz	4.54 dB
	30MHz - 1GHz	4.36 dB
	Above 1GHz	5.00 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

2. Summary of tests

Reference	Parameter	Test results
15.407(a)	26 dB bandwidth	Pass
15.407(e)	6 dB bandwidth (UNII-3)	Pass
15.407(a)	Maximum conducted output power	Pass
15.407(a)	Power spectral density	Pass
15.407(g)	Frequency stability	Pass
15.205 15.209	Radiated restricted band and emission	Pass
15.407(d)	General field strength limit (Restricted bands and radiated emission limit)	Pass
15.207	AC power line conducted emissions	Pass

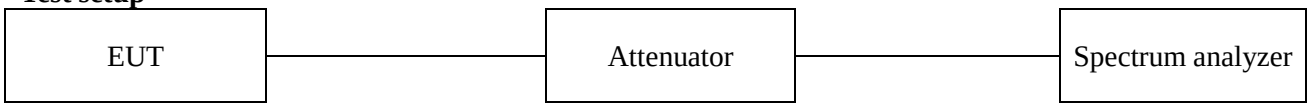
3. Test results

3.1. 26 dB bandwidth

Test procedure

KDB 789033 D02 v02r01– Section C.1

Test setup



Section C.1

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Limit

N/A

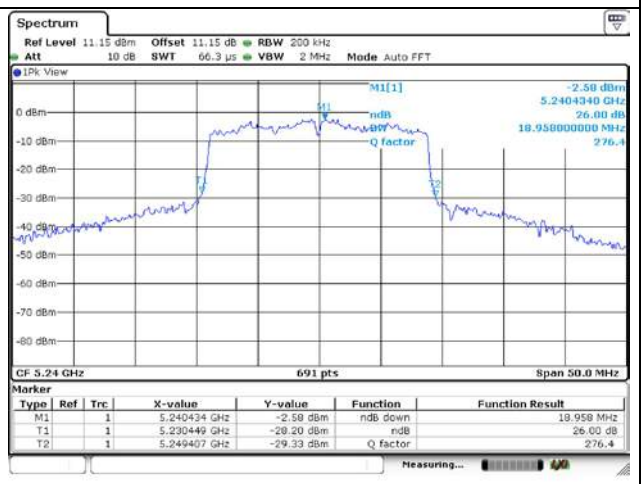
In the result,

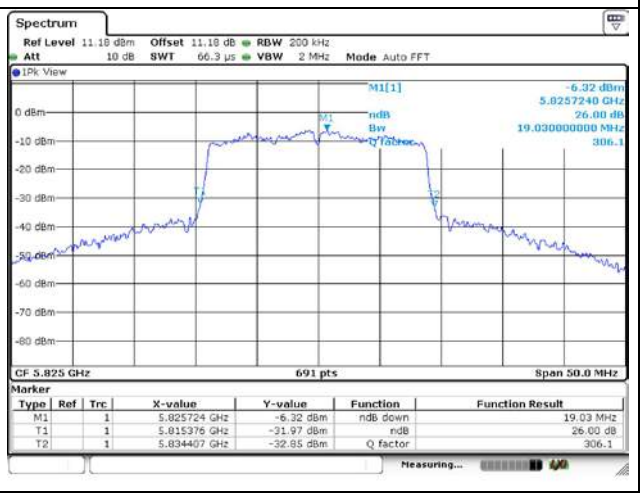
-DFS requirements are not applicable in the 5 150 ㎒ ~ 5 250 ㎒.

Test results

Band	Frequency(㎒)	Mode	26 dB bandwidth(㎒)
UNII-1	5 180	a	18.524
	5 220		18.524
	5 240		18.741
	5 180	HT20	18.958
	5 220		19.030
	5 240		18.958
UNII-3	5 745	a	18.741
	5 785		18.524
	5 825		18.596
	5 745	HT20	19.030
	5 785		18.958
	5 825		19.030

Test plots

UNII-1 // a	UNII-1 // n_HT20
	
	
	

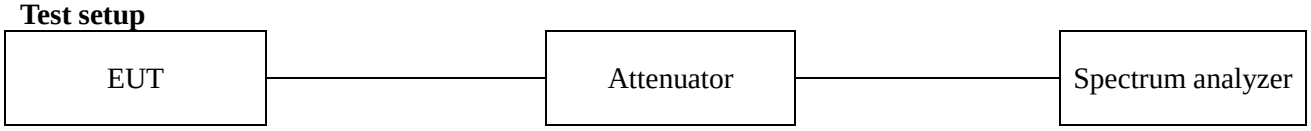
UNII-3 // a	UNII-3 // n_HT20
	
	
	

3.2. 6 dB bandwidth

Test procedure

KDB 789033 D02 v02r01– Section C.2

Test setup



Section C.2

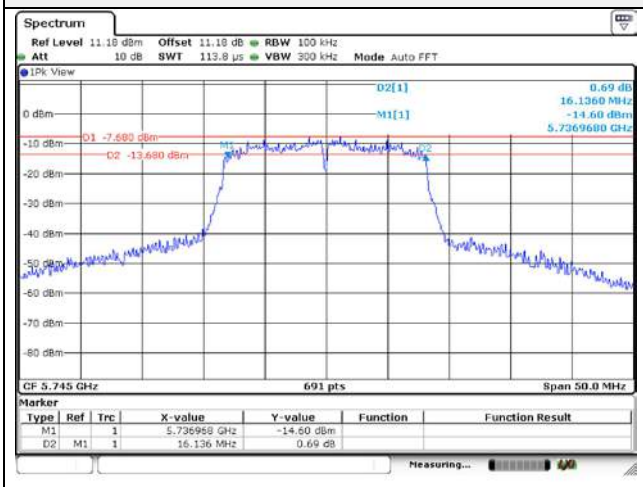
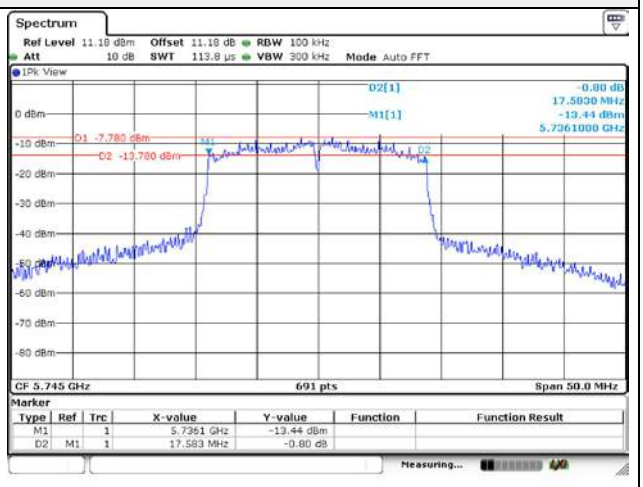
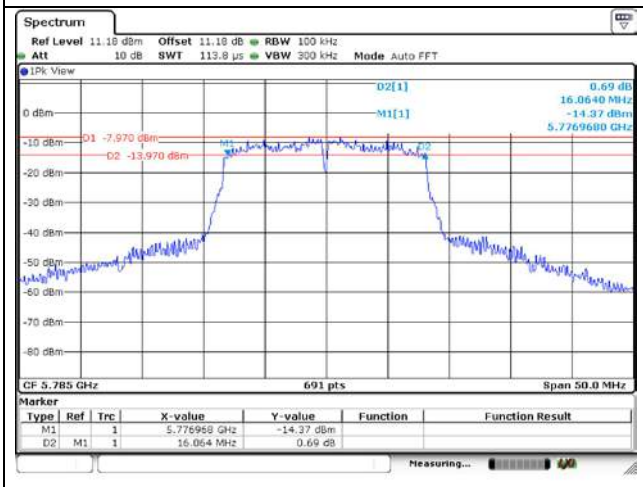
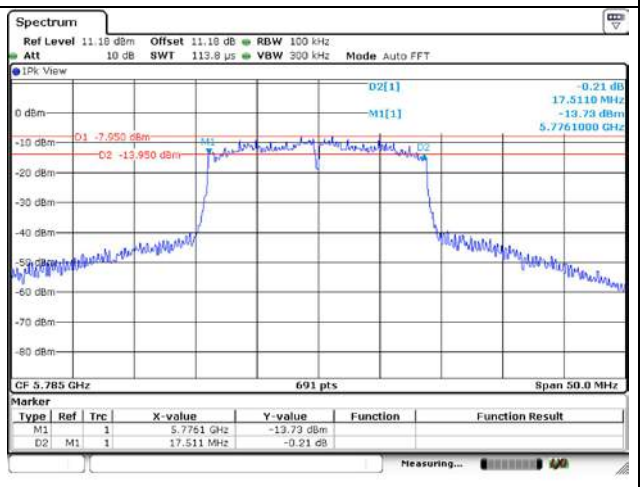
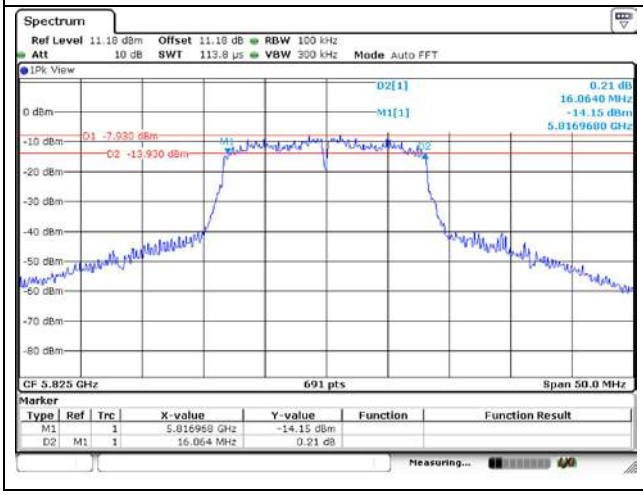
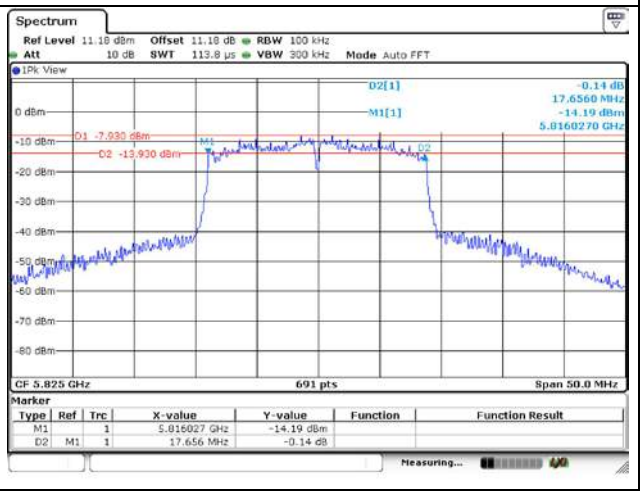
1. Set RBW = 100 ㎑
2. Set the video bandwidth (VBW) ≥ 3 × RBW.
3. Detector = peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission.

Limit

Within the 5.725-5.85 ㎓ band, the minimum 6 ㏈ bandwidth of U-NII devices shall be at least 500 ㎑.

Test results

Band	Frequency(㎒)	Mode	6 ㏈ bandwidth(㎒)
UNII-3	5 745	a	16.136
	5 785		16.064
	5 825		16.064
	5 745	HT20	17.583
	5 785		17.511
	5 825		17.656

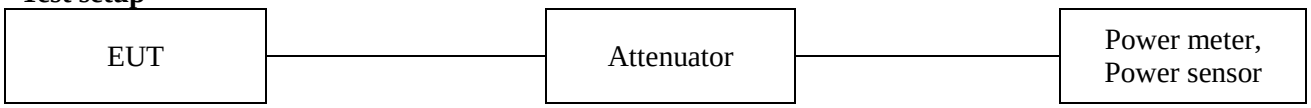
UNII-3_a	UNII-3_HT20
	
	
	

3.3. Maximum conducted output power

Test procedure

KDB 789033 D02 v02r01– Section E.3.a) or b)
Used test method is Section E.3.b)

Test setup



Section E.3.a)

Method PM (Measurement using an RF average power meter):

i. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

ii. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.

iii. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

iv. 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 %).

v. In case of band crossing channels 138, 142 and 144, the measurement is complied with section E.2.d of KDB 644545_D03 v01

Section E.3.b)

Method PM-G (Measurement using a gated RF average power meter):

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. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Limit

Band	EUT Category		Limit
UNII-1		Outdoor access point	1 W (30 dBm)
		Indoor access point	
		Fixed point-to-point access point	
	✓	Mobile and portable client device	250 mW(24 dBm)
UNII-2A			250 mW or 11 dBm + 10logB*
UNII-2C			250 mW or 11 dBm + 10logB*
UNII-3	✓		1 W (30 dBm)

Note.

1. B is the 26 dB emission bandwidth.

Test results

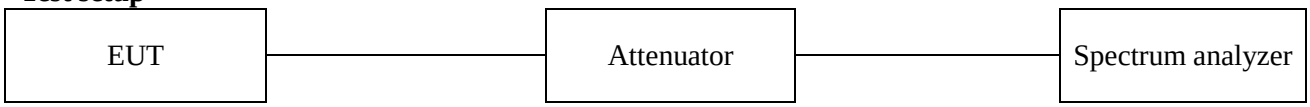
Band	mode	Frequency (㎒)	Detector mode	Output power(㏈m)	Limit (㏈m)
UNII-1	a	5 180	AV	4.58	24.00
		5 220		4.26	
		5 240		3.47	
	HT20	5 180		4.19	
		5 220		4.15	
		5 240		3.50	
UNII-3	a	5 745		1.78	30.00
		5 785		1.56	
		5 825		1.41	
	HT20	5 745		1.25	
		5 785		1.21	
		5 825		1.13	

3.4. Maximum Power spectral density

Test procedure

KDB 789033 D02 v02r01 – Section F

Test setup



Section F

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
   a) If Method SA-2 or SA-2 Alternative was used, add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 ㏈ to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 ㎒ reference bandwidth.
5. For devices operating in the bands 5.15-5.25 ㎓, 5.25-5.35 ㎓, and 5.47-5.725 ㎓, the preceding procedures make use of 1 ㎒ RBW to satisfy directly the 1 ㎒ reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 ㎓, the rules specify a measurement bandwidth of 500 ㎑. Many spectrum analyzers do not have 500 ㎑ RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 ㎒, or 500 ㎑, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 ㎒, or 500 ㎑). If measurements are performed using a reduced resolution bandwidth (< 1 ㎒, or < 500 ㎑) and integrated over 1 ㎒, or 500 ㎑ bandwidth, the following adjustments to the procedures apply:

   a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a)
   b) Set VBW ≥ 3 RBW.
   c) If measurement bandwidth of Maximum PSD is specified in 500 ㎑, add 10 log (500 ㎑/RBW) to the measured result, whereas RBW (< 500 ㎑) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   d) If measurement bandwidth of Maximum PSD is specified in 1 ㎒, add 10 log (1 ㎒/RBW) to the measured result, whereas RBW (< 1 ㎒) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note.

As a practical matter, it is recommended to use reduced RBW of 100 ㎑ for the II.F.5.c) and II.F.5.d), since RBW=100 ㎑ is available on nearly all spectrum analyzers.

Limit

Band	EUT Category		Limit
UNII-1		Outdoor access point	17 dBm/㎒
		Indoor access point	
		Fixed point-to-point access point	
	✓	Mobile and portable client device	11 dBm/㎒
UNII-2A			11 dBm/㎒
UNII-2C			11 dBm/㎒
UNII-3	✓		30 dBm/500 ㎑

Test results

Band	mode	Frequency (㎒)	DCF Note1	Measured PSD (dBm/㎒) Note2	Limit (dBm/㎒)
UNII-1	a	5 180	0.62	-2.63	11.00
		5 220		-3.46	
		5 240		-3.46	
	HT20	5 180	1.05	-2.52	
		5 220		-3.03	
		5 240		-3.34	

Band	mode	Frequency (㎒)	DCF Note1	Measured PSD (dBm/500㎑) Note2	Limit (dBm/500㎑)
UNII-3	a	5 745	1.08	-9.84	30.00
		5 785		-9.63	
		5 825		-9.83	
	HT20	5 745	1.17	-9.77	
		5 785		-9.90	
		5 825		-9.69	

Note.

1. Refer to the page 27 on this report.
2. DCF in measured value is included.

Test plots

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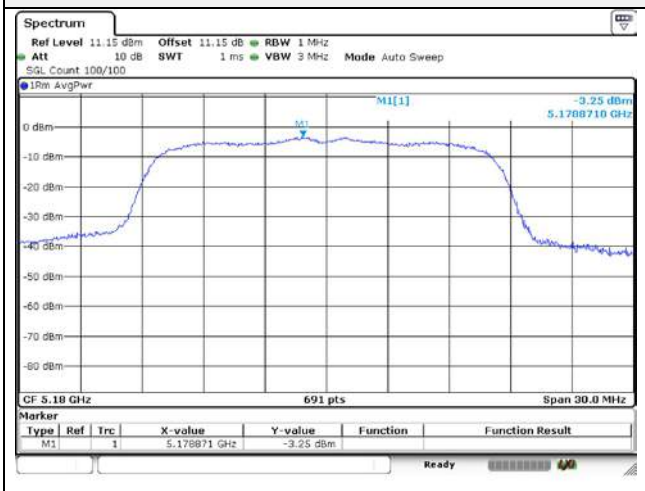	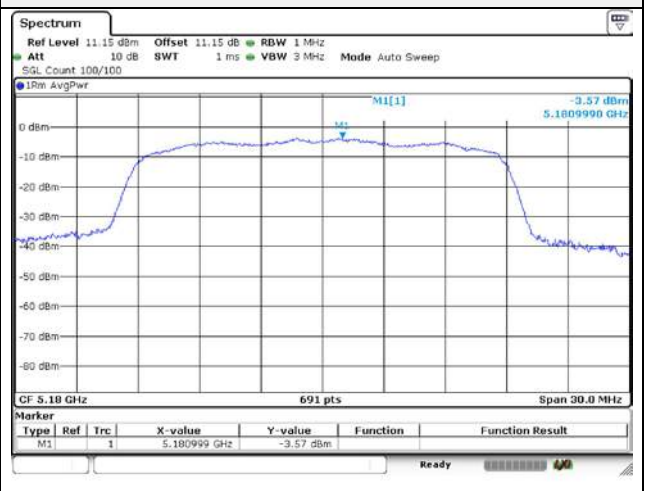
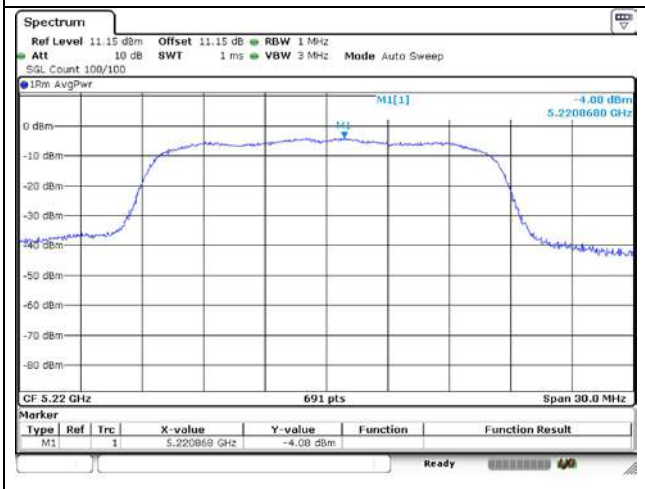	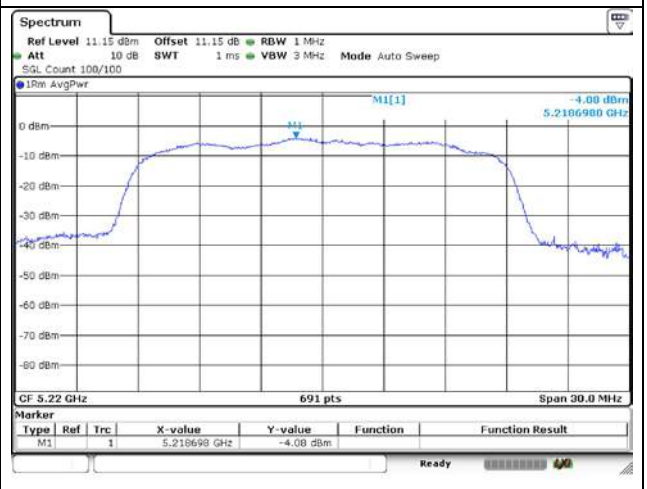
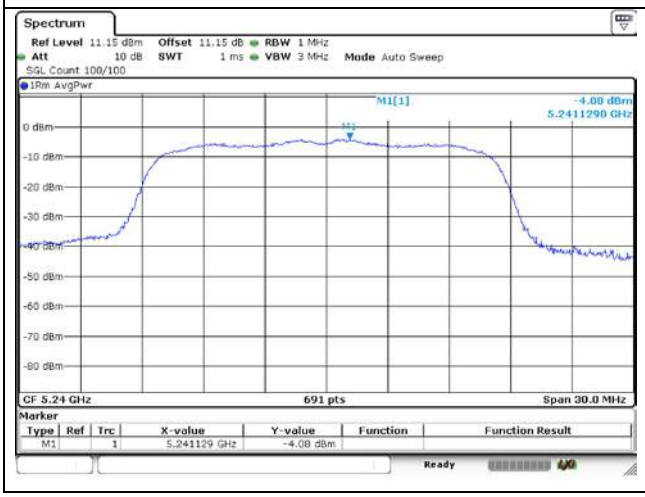	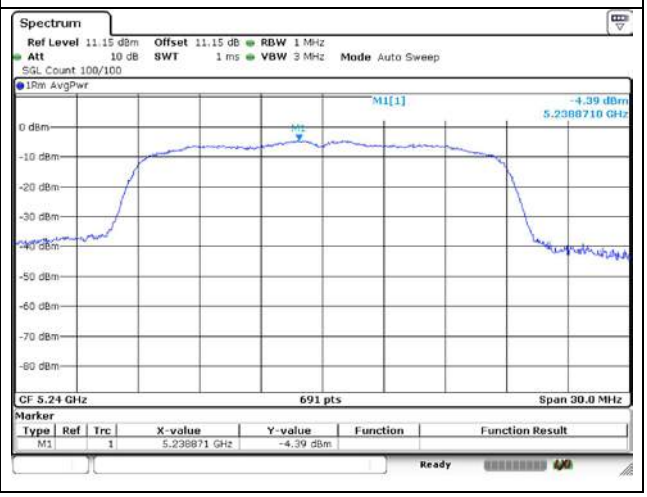

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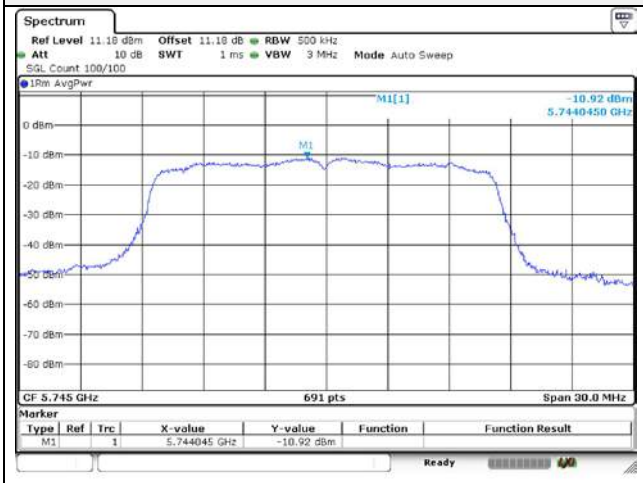
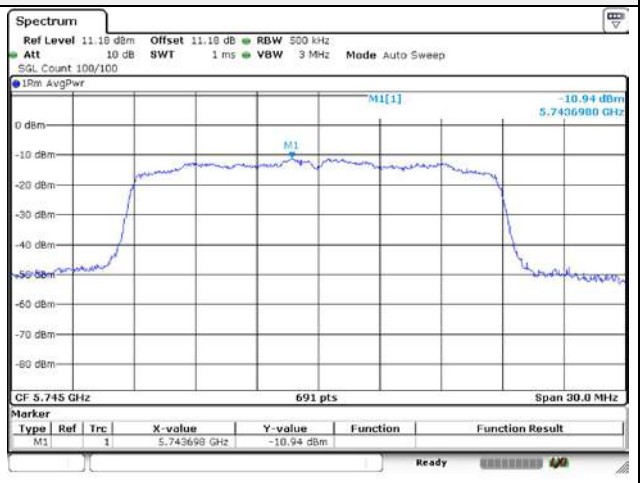
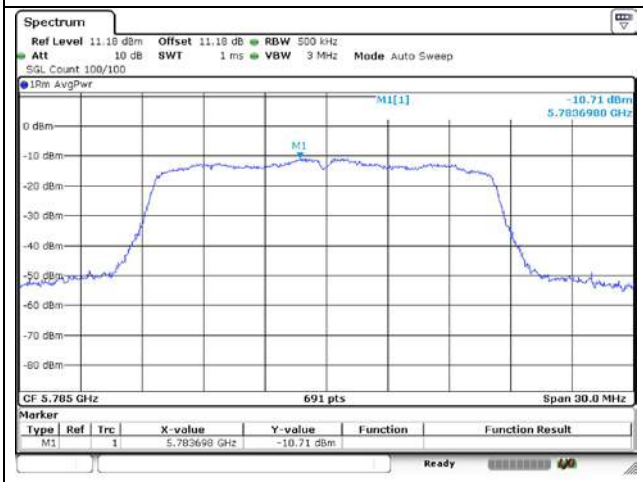
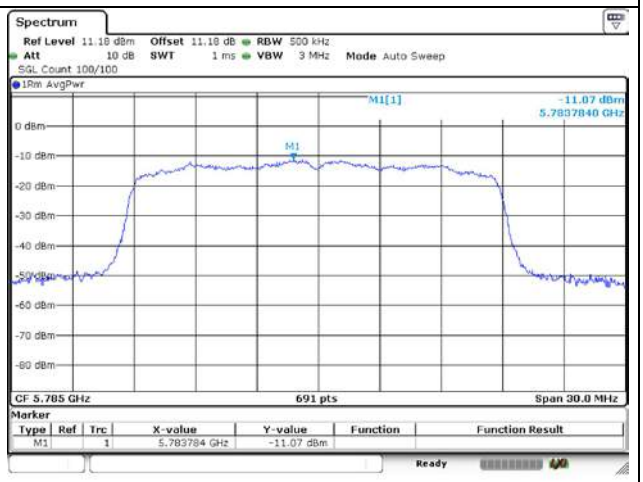
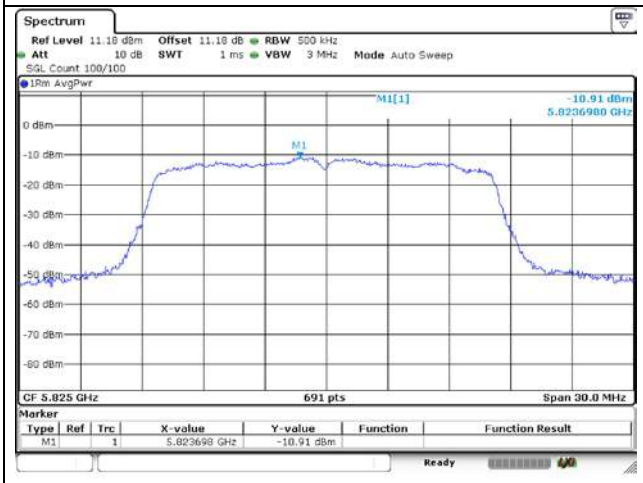
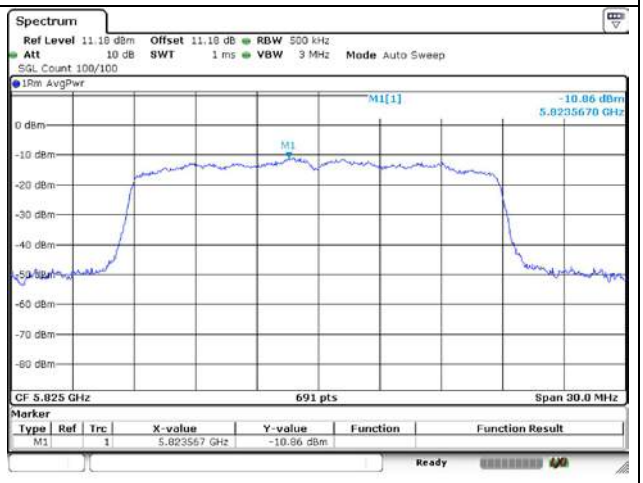
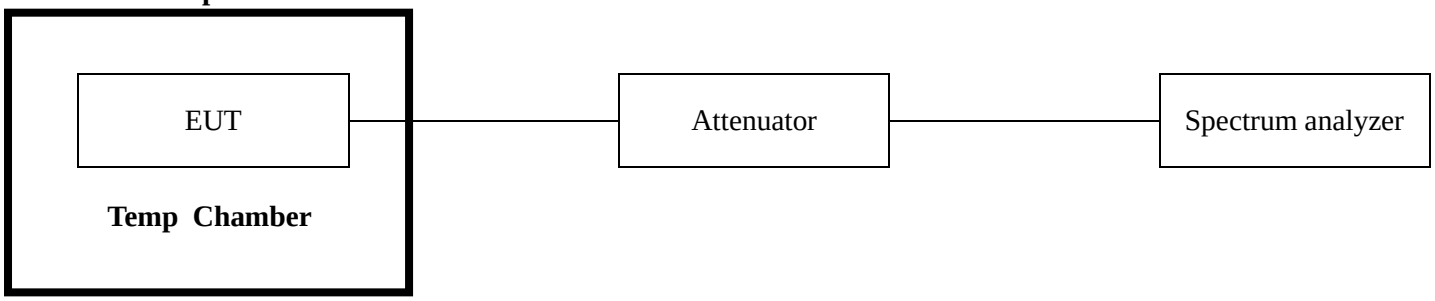
	
	
	

3.5. Frequency Stability

Test procedure
ANSI C63.10-2013, clause 6.8.1

Test setup



1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
7. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

Limit
N/A

Test results

Mode: UNII-1

Operating frequency: 5 180 ㎒

Test voltage (%)	Test voltage (V)	Temperature (℃)	Maintaining time	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (%)
100 %	DC 3.7	-10	Startup	5 179.893 825	-10 618	-0.002 050
			2 minutes	5 179.893 445	-10 656	-0.002 057
			5 minutes	5 179.893 297	-10 670	-0.002 060
			10 minutes	5 179.893 110	-10 689	-0.002 064
100 %		0	Startup	5 179.894 274	-10 573	-0.002 041
			2 minutes	5 179.895 039	-10 496	-0.002 026
			5 minutes	5 179.895 348	-10 465	-0.002 020
			10 minutes	5 179.895 498	-10 450	-0.002 017
100 %		10	Startup	5 179.896 036	-10 396	-0.002 007
			2 minutes	5 179.896 243	-10 376	-0.002 003
			5 minutes	5 179.896 372	-10 363	-0.002 001
			10 minutes	5 179.896 552	-10 345	-0.001 997
100 %		20	Startup	5 179.896 903	-10 310	-0.001 990
			2 minutes	5 179.896 947	-10 305	-0.001 989
			5 minutes	5 179.896 972	-10 303	-0.001 989
			10 minutes	5 179.896 665	-10 334	-0.001 995
100 %		21.8	Startup	5 179.897 463	-10 254	-0.001 980
			2 minutes	5 179.896 971	-10 303	-0.001 989
			5 minutes	5 179.896 333	-10 367	-0.002 001
			10 minutes	5 179.895 539	-10 446	-0.002 017
100 %		30	Startup	5 179.899 272	-10 073	-0.001 945
			2 minutes	5 179.899 503	-10 050	-0.001 940
			5 minutes	5 179.899 834	-10 017	-0.001 934
			10 minutes	5 179.902 304	-9 770	-0.001 886
100 %		40	Startup	5 179.923 375	-7 663	-0.001 479
			2 minutes	5 179.925 307	-7 470	-0.001 442
			5 minutes	5 179.925 847	-7 415	-0.001 432
			10 minutes	5 179.928 398	-7 160	-0.001 382
100 %		50	Startup	5 179.940 680	-5 932	-0.001 145
			2 minutes	5 179.943 394	-5 661	-0.001 093
			5 minutes	5 179.947 321	-5 268	-0.001 017
			10 minutes	5 179.950 011	-4 999	-0.000 965
85 %	DC 3.15	21.8	Startup	5 179.896 430	-10 357	-0.001 999
			2 minutes	5 179.896 273	-10 373	-0.002 002
			5 minutes	5 179.896 209	-10 380	-0.002 004
			10 minutes	5 179.895 873	-10 413	-0.002 010
115 %	DC 4.26	21.8	Startup	5 179.885 437	-11 456	-0.002 212
			2 minutes	5 179.885 395	-11 461	-0.002 213
			5 minutes	5 179.885 207	-11 480	-0.002 216
			10 minutes	5 179.883 750	-11 625	-0.002 244

Mode: UNII-3

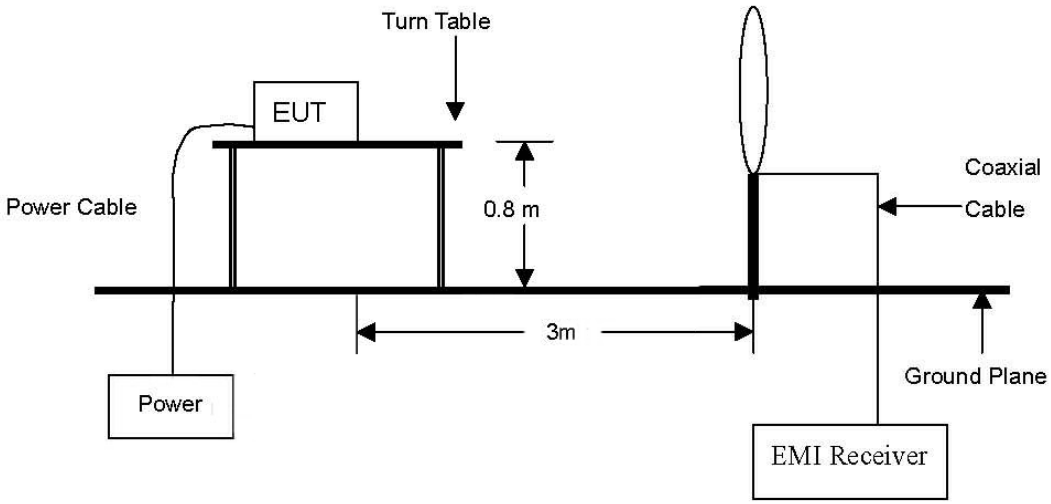
Operating frequency: 5 745 ㎒

Test voltage (%)	Test voltage (V)	Temperature (℃)	Maintaining time	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (%)
100 %	DC 3.7	-10	Startup	5 744.896 444	-10 356	-0.001 803
			2 minutes	5 744.896 786	-10 321	-0.001 797
			5 minutes	5 744.898 015	-10 200	-0.001 775
			10 minutes	5 744.898 224	-10 178	-0.001 772
100 %		0	Startup	5 744.899 055	-10 095	-0.001 757
			2 minutes	5 744.899 264	-10 074	-0.001 753
			5 minutes	5 744.899 598	-10 040	-0.001 748
			10 minutes	5 744.899 856	-10 014	-0.001 743
100 %		10	Startup	5 744.901 234	-9 877	-0.001 719
			2 minutes	5 744.901 864	-9 814	-0.001 708
			5 minutes	5 744.903 016	-9 700	-0.001 688
			10 minutes	5 744.903 353	-9 665	-0.001 682
100 %		20	Startup	5 744.905 151	-9 485	-0.001 651
			2 minutes	5 744.905 559	-9 444	-0.001 644
			5 minutes	5 744.905 890	-9 411	-0.001 638
			10 minutes	5 744.906 645	-9 336	-0.001 625
100 %		21.8	Startup	5 744.925 426	-7 457	-0.001 298
			2 minutes	5 744.925 776	-7 422	-0.001 292
			5 minutes	5 744.926 312	-7 369	-0.001 283
			10 minutes	5 744.926 678	-7 332	-0.001 276
100 %		30	Startup	5 744.928 426	-7 157	-0.001 246
			2 minutes	5 744.928 664	-7 134	-0.001 242
			5 minutes	5 744.929 131	-7 087	-0.001 234
			10 minutes	5 744.929 265	-7 734	-0.001 231
100 %		40	Startup	5 744.931 546	-6 845	-0.001 192
			2 minutes	5 744.931 668	-6 833	-0.001 189
			5 minutes	5 744.932 212	-6 779	-0.001 180
			10 minutes	5 744.932 249	-6 775	-0.001 179
100 %		50	Startup	5 744.933 335	-6 667	-0.001 160
			2 minutes	5 744.933 908	-6 609	-0.001 150
			5 minutes	5 744.934 504	-6 550	-0.001 140
			10 minutes	5 744.934 809	-6 519	-0.001 135
85 %	DC 3.15	21.8	Startup	5 744.924 568	-7 543	-0.001 313
			2 minutes	5 744.924 669	-7 533	-0.001 311
			5 minutes	5 744.924 981	-7 502	-0.001 306
			10 minutes	5 744.925 465	-7 454	-0.001 297
115 %	DC 4.26	21.8	Startup	5 744.925 165	-7 484	-0.001 303
			2 minutes	5 744.925 226	-7 478	-0.001 302
			5 minutes	5 744.925 598	-7 440	-0.001 295
			10 minutes	5 744.925 889	-7 411	-0.001 290

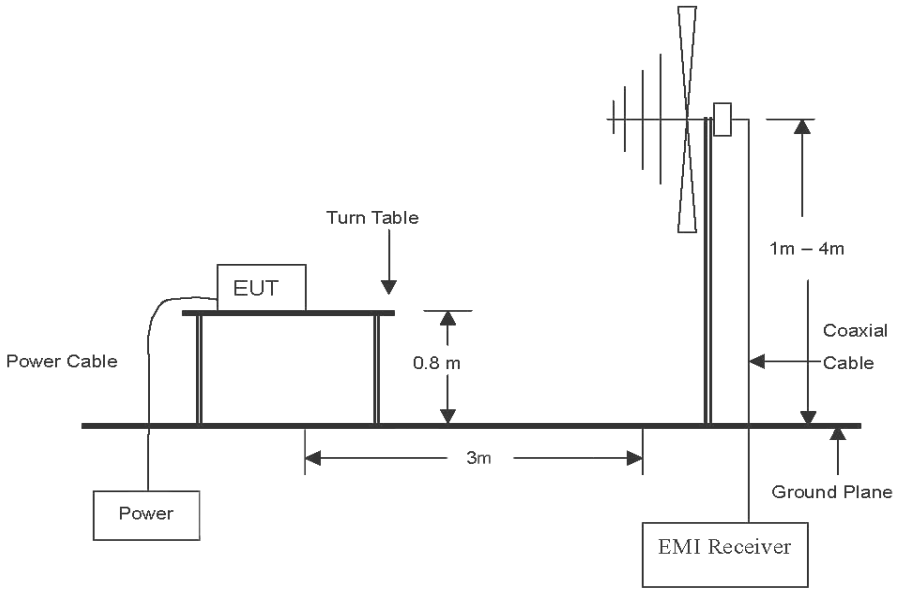
3.6. Radiated restricted band and emissions

Test setup

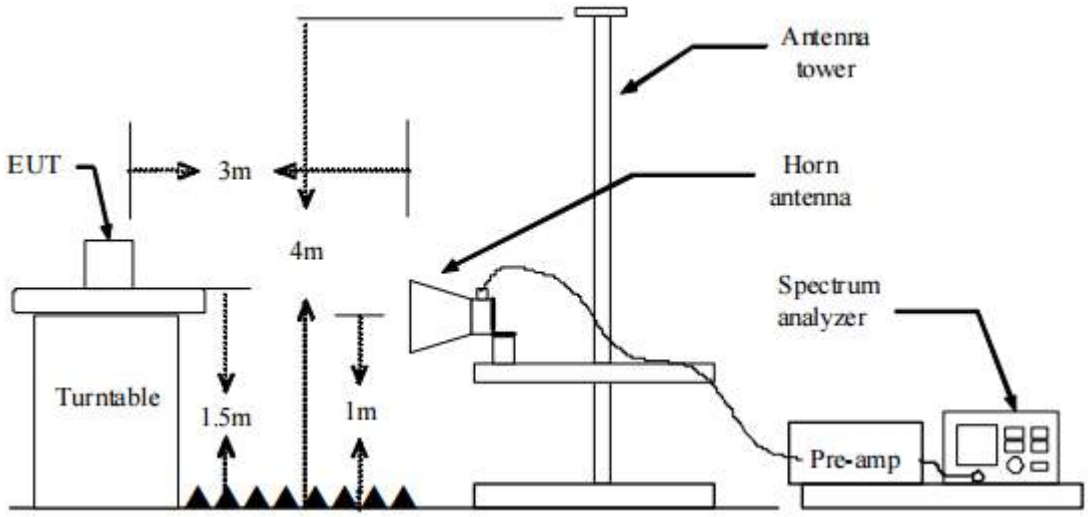
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.



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



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.



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 and perpendicular 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 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. Spectrum analyzer settings for f < 1 ㎓:
   ① Span = wide enough to fully capture the emission being measured
   ② RBW = 120 ㎑
   ③ VBW ≥ RBW
   ④ Detector = quasi peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
2. 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 ㎒ (≥ 3 x RBW)
   ④ Detector = peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
   ⑦ Trace was allowed to stabilize

3. Spectrum analyzer settings for $f \geq 1$ ㎓: 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.

Note.

1. f <30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   $f \geq 30$ ㎒, 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. CF(Correction factors(㏈)) = Antenna factor(㏈/m) + Cable loss(㏈) + or Amp. gain(㏈) + or F_d(㏈)
4. Field strength(㏈㎶/m) = Level(㏈㎶) + CF (㏈) + or DCF(㏈)
5. Margin(㏈) = Limit(㏈㎶/m) - Field strength(㏈㎶/m)
6. 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. All channels, modes (e.g. 802.11a/n(20 ㎒), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

10. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test 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.

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.

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

(1) For transmitters operating in the 5.15–5.25 ㎓ band: all emissions outside of the 5.15–5.35 ㎓ band shall not exceed an e.i.r.p of –27 ㏈m/㎒.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 ㎒.
A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 ㎒.
(6) Unwanted emissions below 1 ㎓ must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.
(7) The provisions of §15.205 apply to intentional radiators operating under this section.
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Duty cycle

Regarding to KDB 789033 D02 v02r01, B)2)b), 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, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100.

For the band 5.15-5.25 ㎓

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	0.188 4	0.217 4	0.866 6	86.66	0.62
802.11a_HT20	0.159 4	0.202 9	0.785 6	78.56	1.05

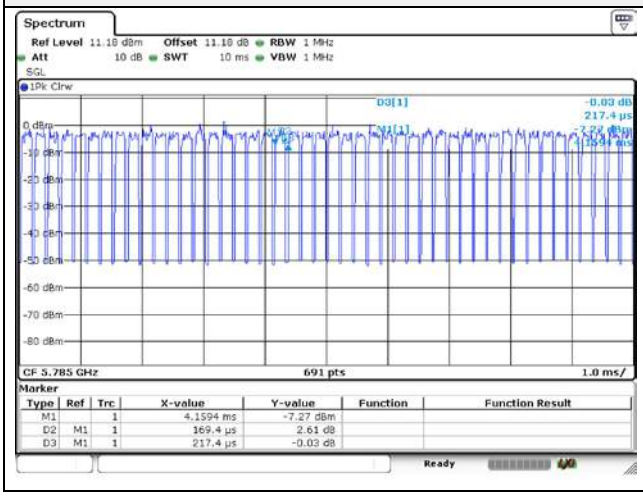
For the band 5.725-5.85 ㎓

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	0.169 4	0.217 4	0.779 2	77.92	1.08
802.11a_HT20	0.154 9	0.202 9	0.763 4	76.34	1.17

Note:

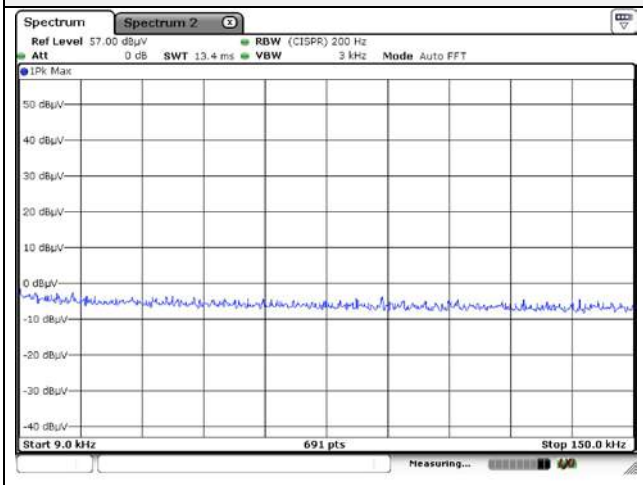
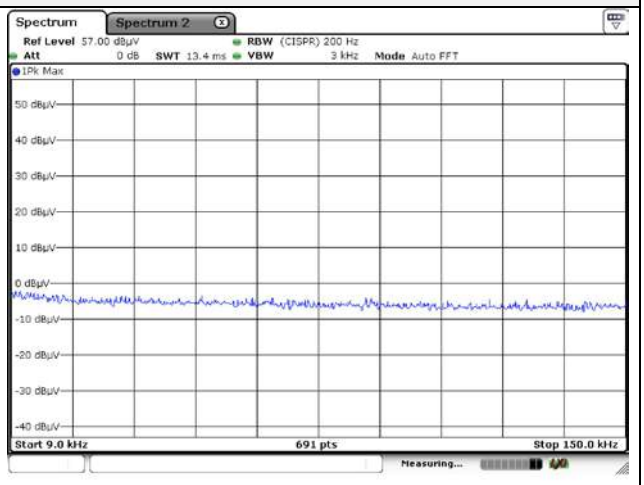
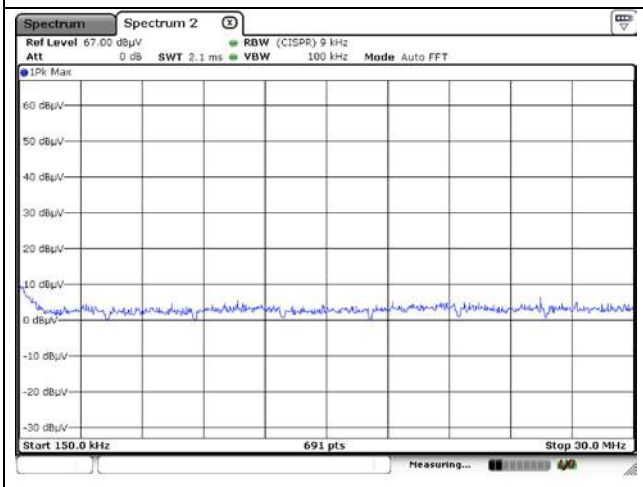
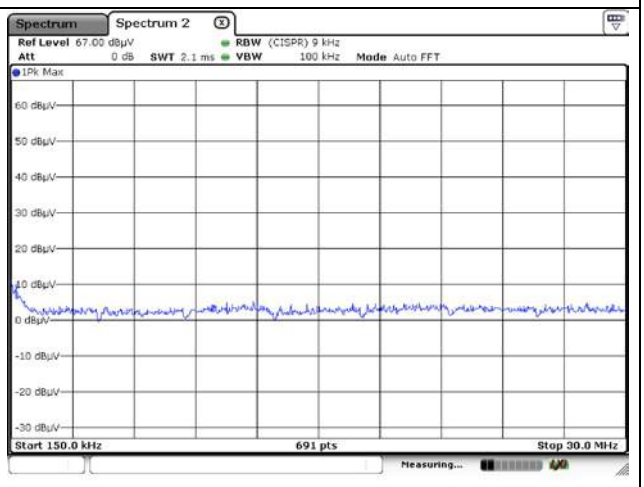
Duty cycle (Linear) = T_{on} time/Period

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

UNII-1 // a // middle channel	UNII-1 // n_HT20 // middle channel
	
UNII-3 // a // middle channel	**UNII-3 // n_HT20 // middle channel**
	

Test results (Below 30 ㎒) – Worst case

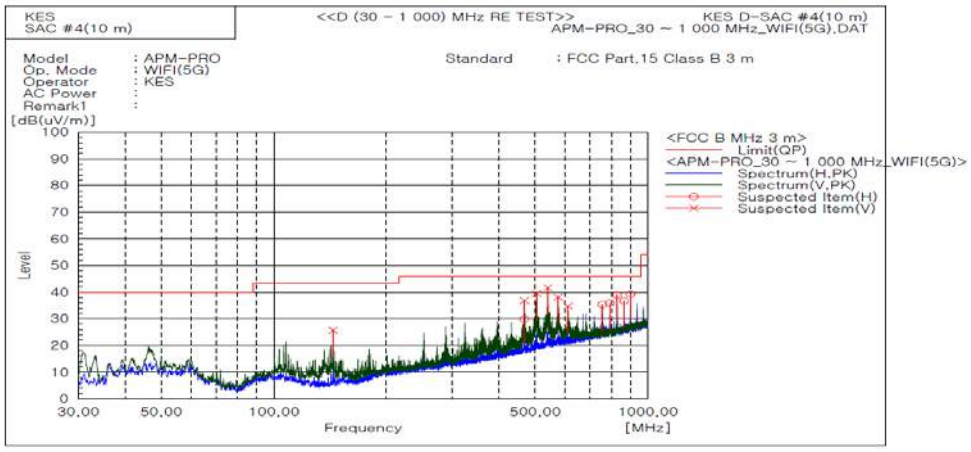
Mode:	UNII-1 HT20
Distance of measurement:	3 meter
Channel:	36 (Worst case)

Horizontal	Vertical
	
	

Test results (Below 1 000 ㎒) – Worst case

Mode:	UNII-1 HT20
Distance of measurement:	3 meter
Channel:	36 (Worst case)

Horizontal // Vertical



No.	Frequency	(P)	Reading	c.f	Result PK	Limit QP	Margin QP	Remark
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	
1	467.955	H	48.7	-18.8	29.9	46.0	16.1	
2	756.045	H	48.6	-13.3	35.3	46.0	10.7	
3	792.056	H	48.8	-12.9	35.9	46.0	10.1	
4	828.068	H	51.0	-12.1	38.9	46.0	7.1	
5	864.079	H	48.1	-11.3	36.8	46.0	9.2	
6	899.969	H	49.9	-10.6	39.3	46.0	6.7	
7	143.975	V	58.1	-32.4	25.7	43.5	17.8	
8	467.955	V	55.7	-18.8	36.9	46.0	9.1	
9	503.966	V	57.2	-17.7	39.5	46.0	6.5	
10	539.978	V	58.3	-16.7	41.6	46.0	4.4	
11	575.989	V	54.0	-15.8	38.2	46.0	7.8	
12	612.000	V	49.8	-15.0	34.8	46.0	11.2	

Test results (Above 1 000 ㎒)

Mode: UNII-1

Distance of measurement: 3 meter

Channel: 36

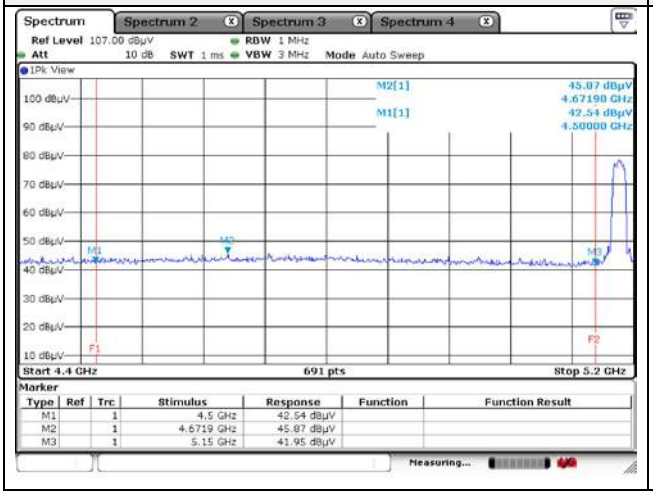
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 125.20	46.96	Peak	H	-0.72	-	46.24	74.00	27.76
2 414.60	50.50	Peak	H	-0.17	-	50.33	74.00	23.67
1 835.70	47.78	Peak	V	-2.70	-	45.08	74.00	28.92
2 161.40	48.32	Peak	V	-0.65	-	47.67	74.00	26.33
2 414.60	48.65	Peak	V	-0.17	-	48.48	74.00	25.52

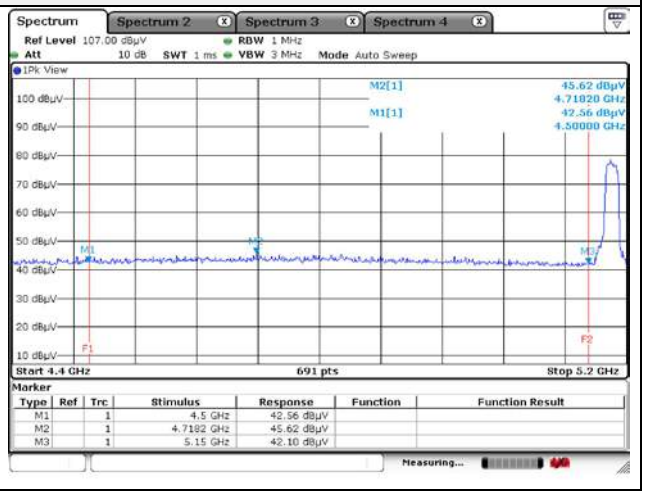
- **Band edge**

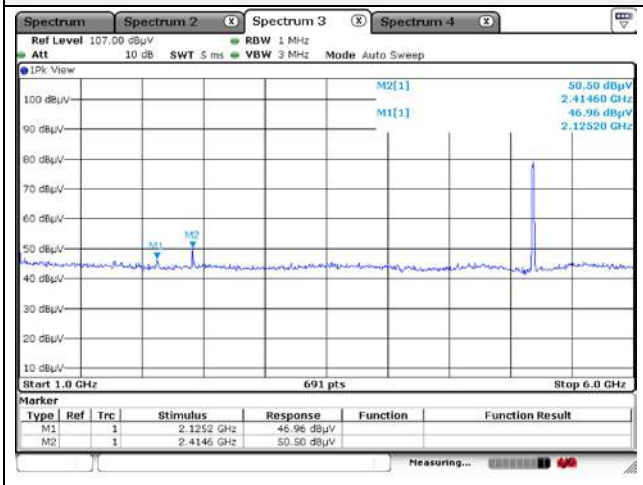
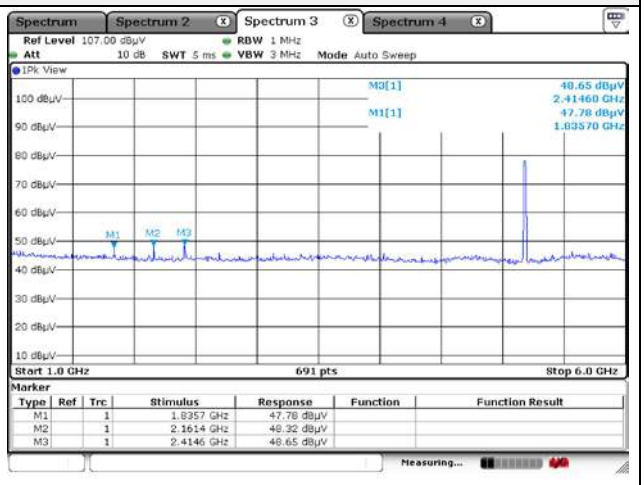
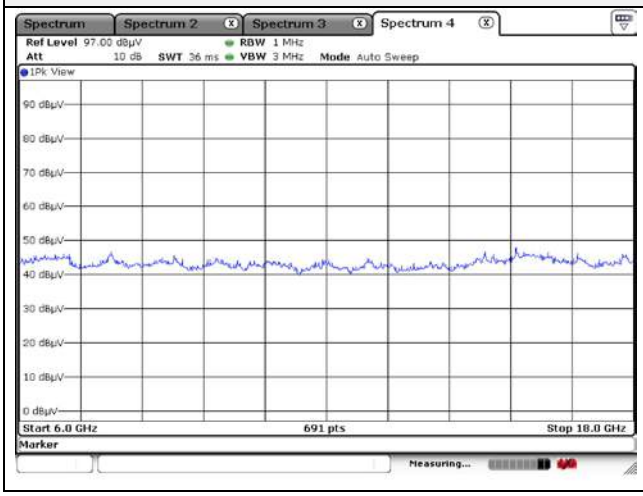
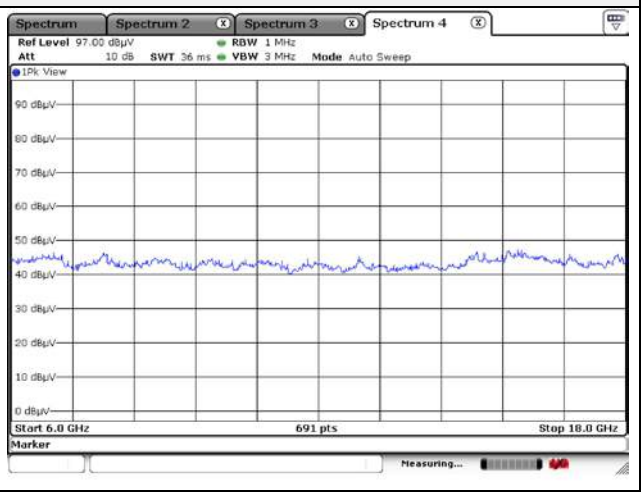
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
4 671.90	45.87	Peak	H	6.50	-	52.37	74.00	21.63
4 718.20	45.62	Peak	V	6.88	-	52.50	74.00	21.50

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



Horizontal // Peak for 1 ㎓ to 6 ㎓	Vertical // Peak for 1 ㎓ to 6 ㎓
	
Horizontal // Peak for 6 ㎓ to 18 ㎓	**Vertical // Peak for 6 ㎓ to 18 ㎓**
	

Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-1

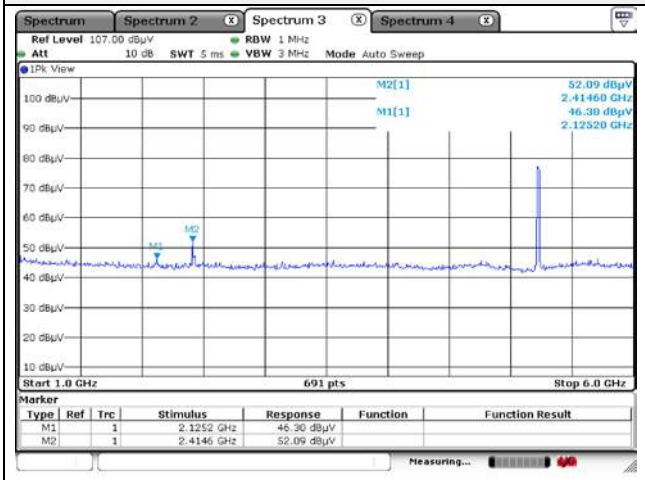
Distance of measurement: 3 meter

Channel: 44

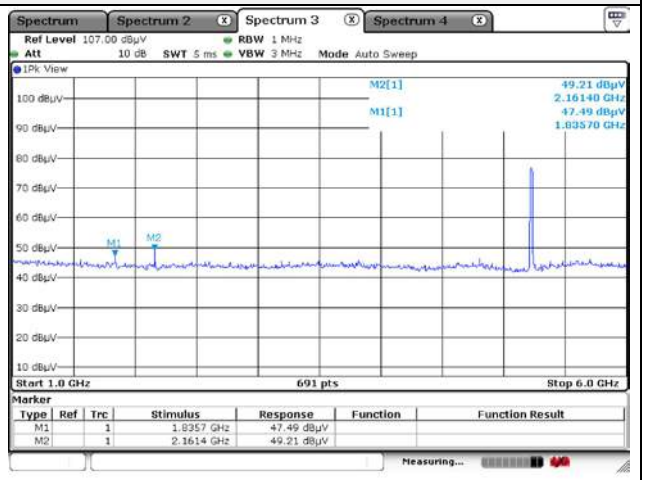
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 125.20	46.30	Peak	H	-0.72	-	45.58	74.00	28.42
2 414.60	52.09	Peak	H	-0.17	-	51.92	74.00	22.08
1 835.70	47.49	Peak	V	-2.70	-	44.79	74.00	29.21
2 161.40	49.21	Peak	V	-0.65	-	48.56	74.00	25.44

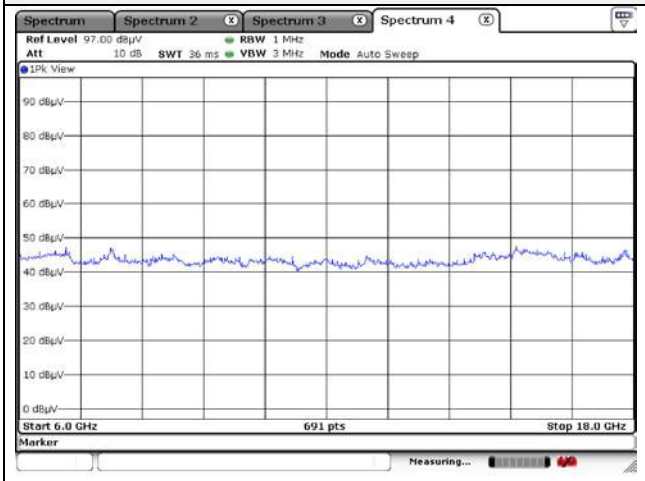
Horizontal // Peak for 1 ㎓ to 6 ㎓



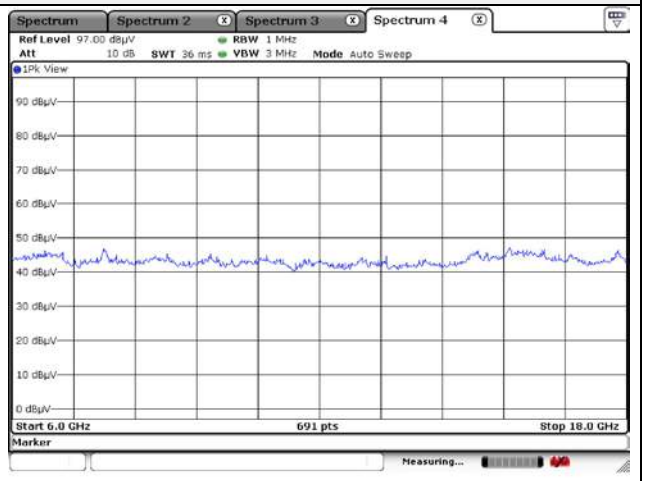
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-1

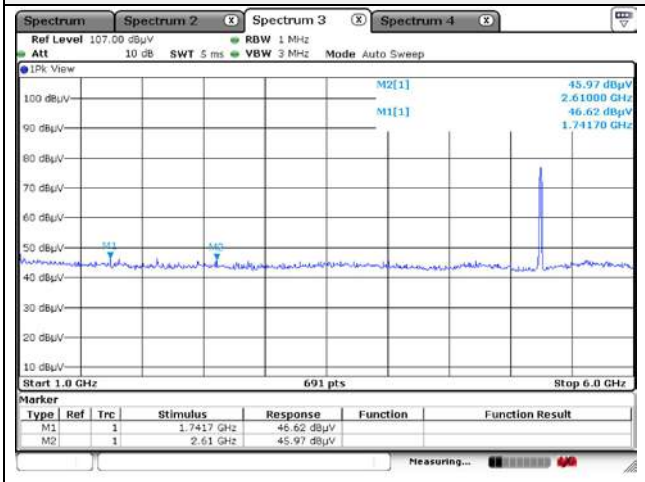
Distance of measurement: 3 meter

Channel: 48

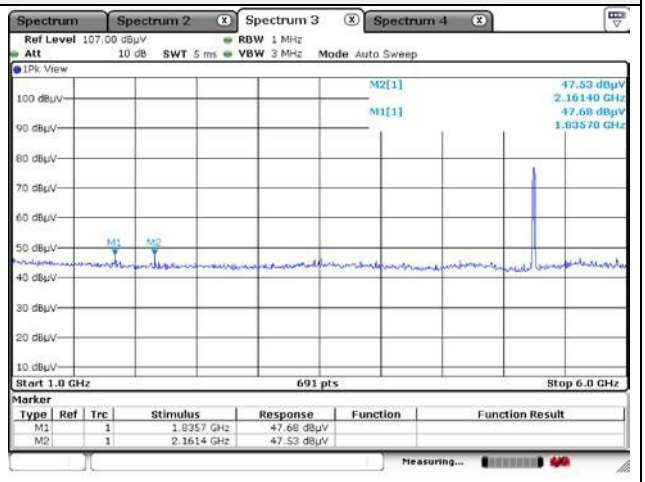
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 741.70	46.62	Peak	H	-3.63	-	42.99	74.00	31.01
2 610.00	45.97	Peak	H	0.38	-	46.35	74.00	27.65
1 835.70	47.68	Peak	V	-2.70	-	44.98	74.00	29.02
2 161.40	47.53	Peak	V	-0.65	-	46.88	74.00	27.12

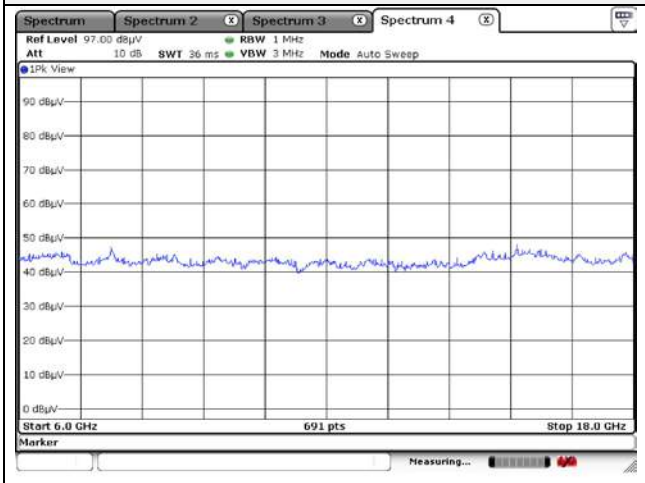
Horizontal // Peak for 1 ㎓ to 6 ㎓



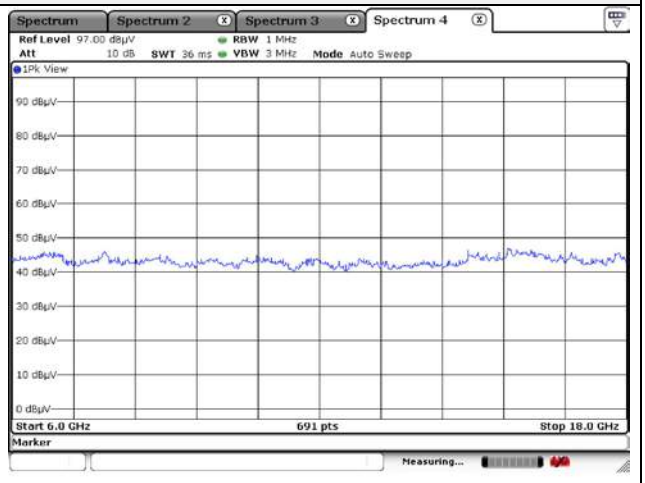
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3

Distance of measurement: 3 meter

Channel: 149

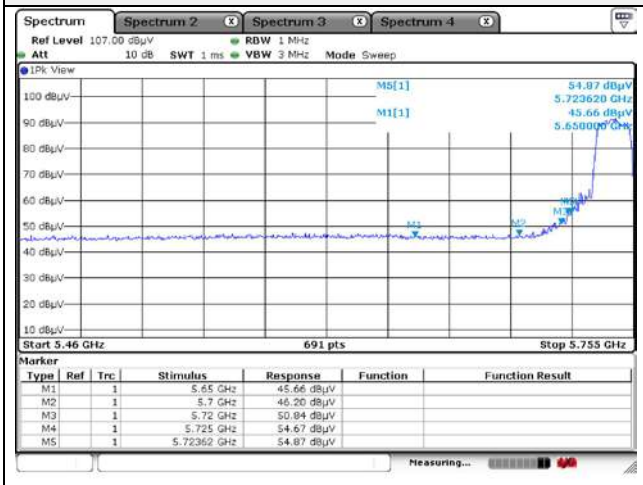
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 155.60	56.00	Peak	H	-8.14	-	47.86	74.00	26.14
2 342.30	48.84	Peak	H	-0.31	-	48.53	74.00	25.47
2 125.20	46.29	Peak	V	-0.72	-	45.57	74.00	28.43

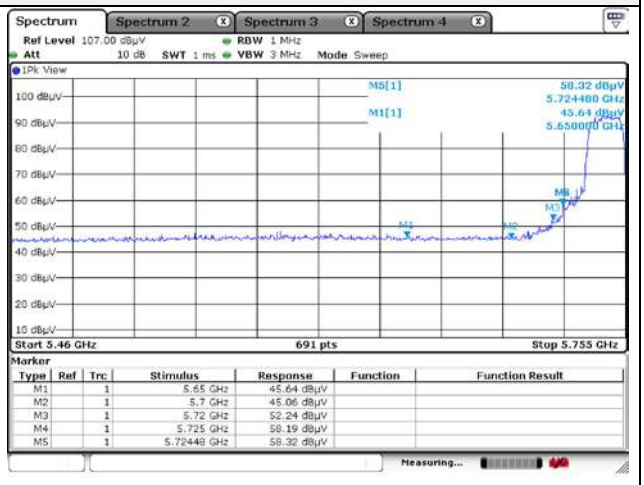
- **Band edge**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 725.00	54.67	Peak	H	10.87	-	65.54	122.20	56.66
5 723.62	54.87	Peak	H	10.86	-	65.73	119.05	53.32
5 725.00	58.19	Peak	V	10.87	-	69.06	122.20	53.14
5 724.48	58.32	Peak	V	10.87	-	69.19	121.01	51.82

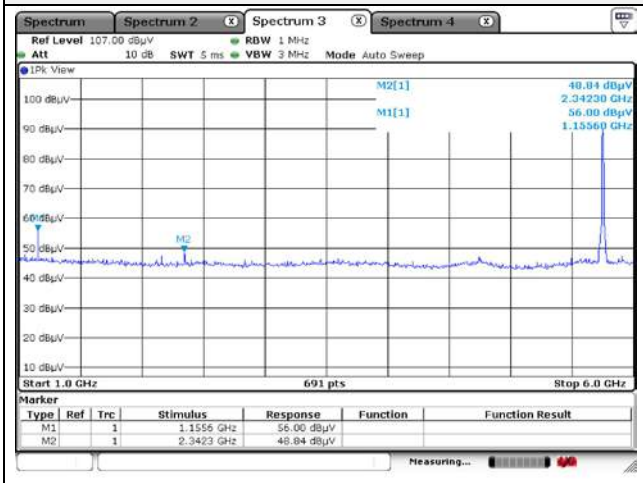
Restricted band // Horizontal // Peak



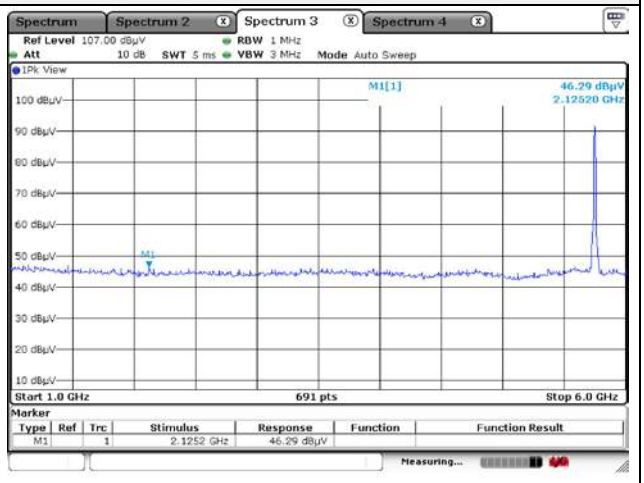
Restricted band // Vertical // Peak



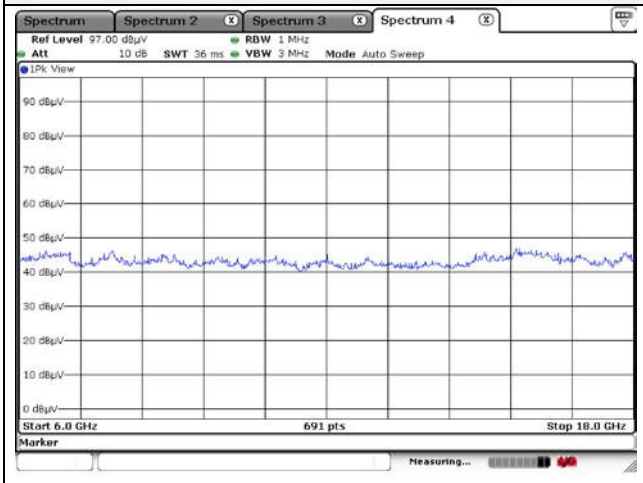
Horizontal // Peak for 1 ㎓ to 6 ㎓



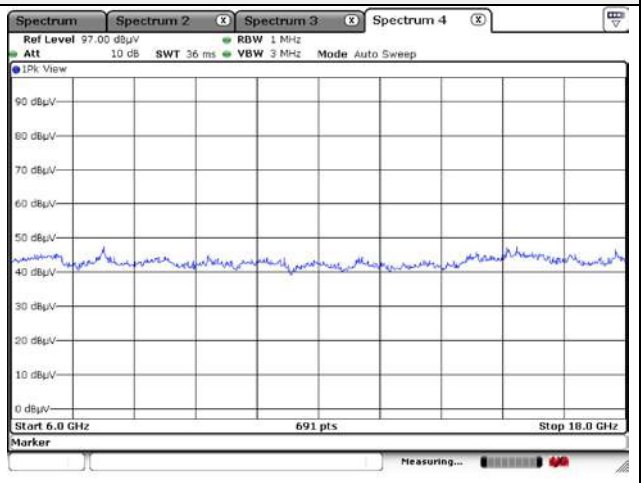
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.

1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3

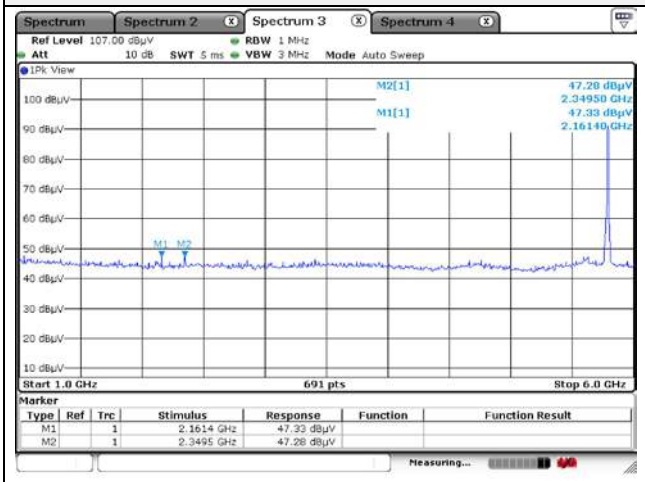
Distance of measurement: 3 meter

Channel: 157

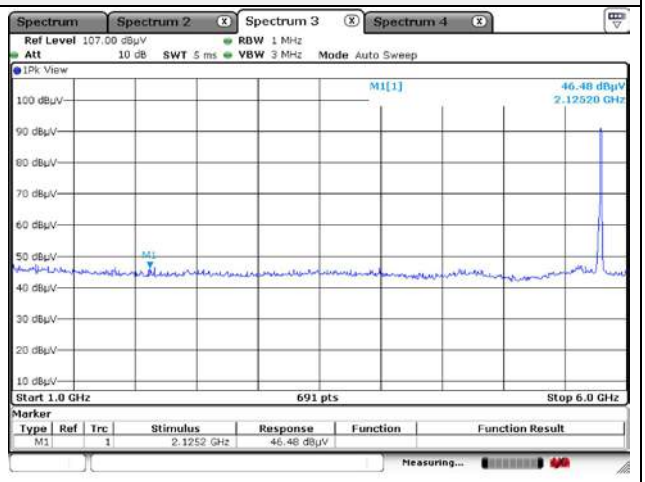
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 161.40	47.33	Peak	H	-0.65	-	46.68	74.00	27.32
2 349.50	47.28	Peak	H	-0.30	-	46.98	74.00	27.02
2 125.20	46.48	Peak	V	-0.72	-	45.76	74.00	28.24

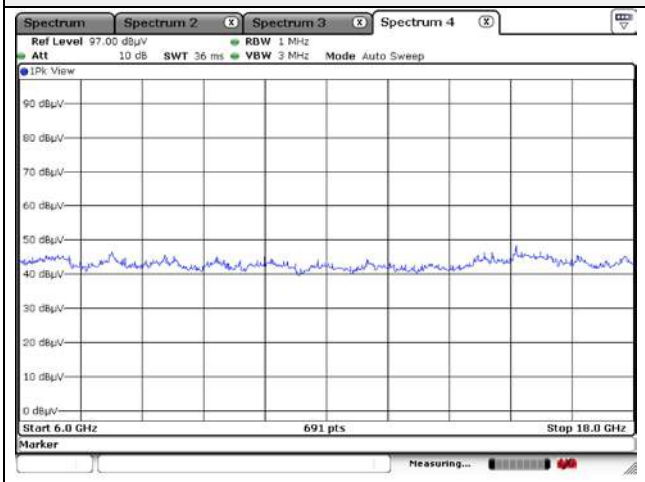
Horizontal // Peak for 1 ㎓ to 6 ㎓



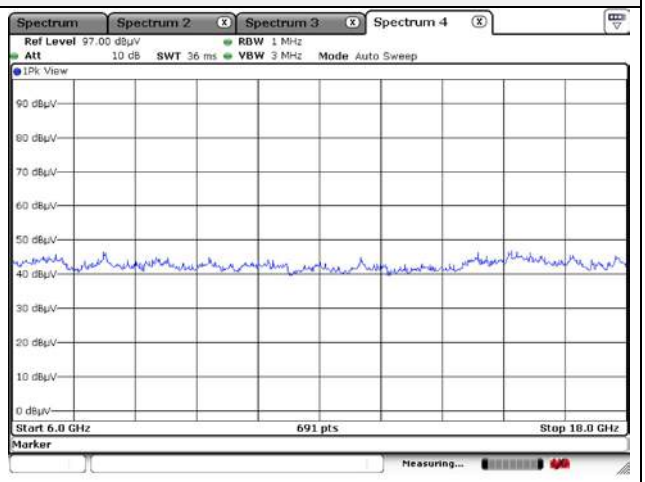
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3

Distance of measurement: 3 meter

Channel: 165

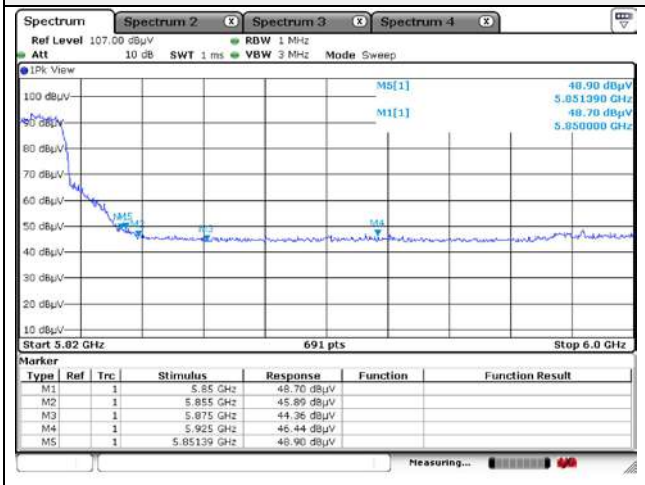
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 342.30	47.94	Peak	H	-0.31	-	47.63	74.00	26.37
1 727.30	55.95	Peak	V	-3.77	-	52.18	74.00	21.82

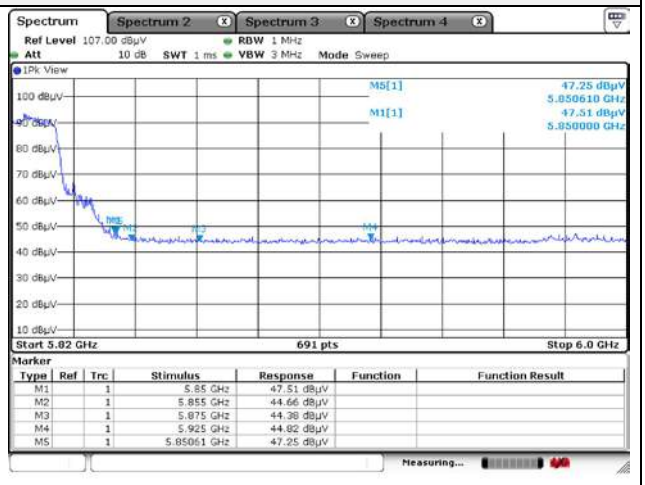
- **Band edge**

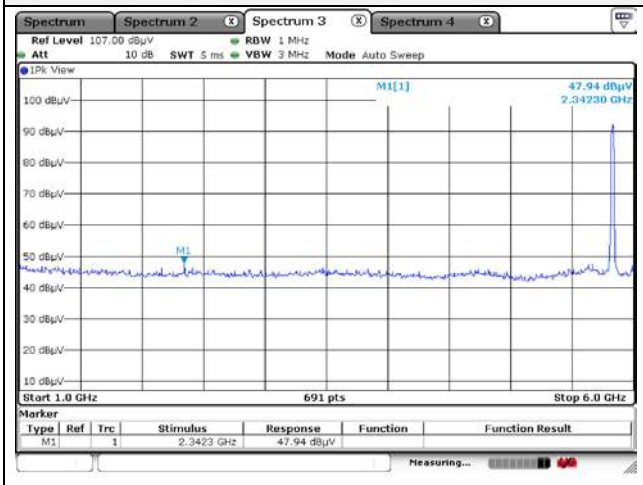
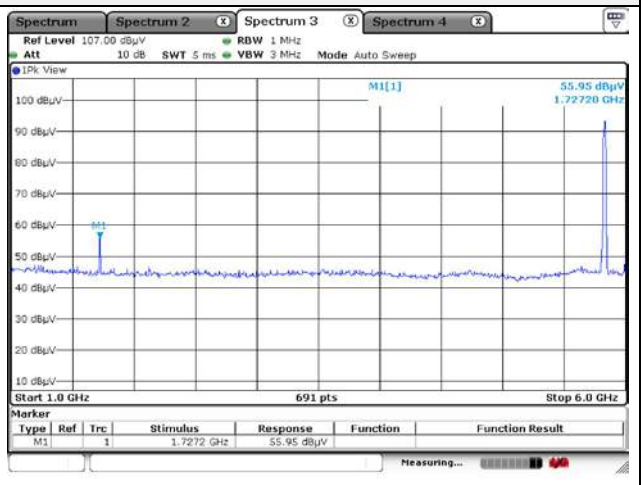
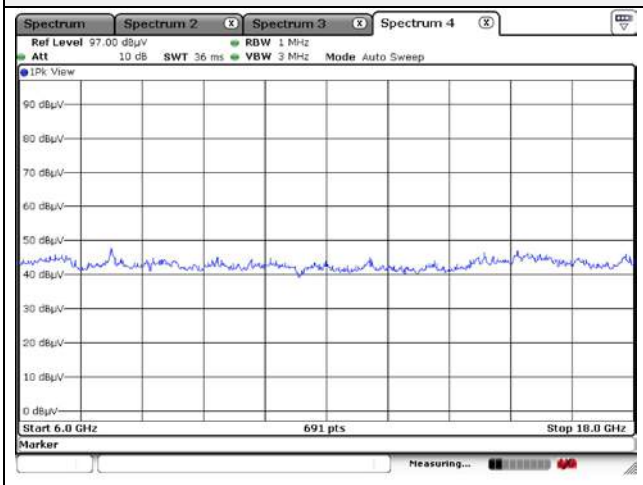
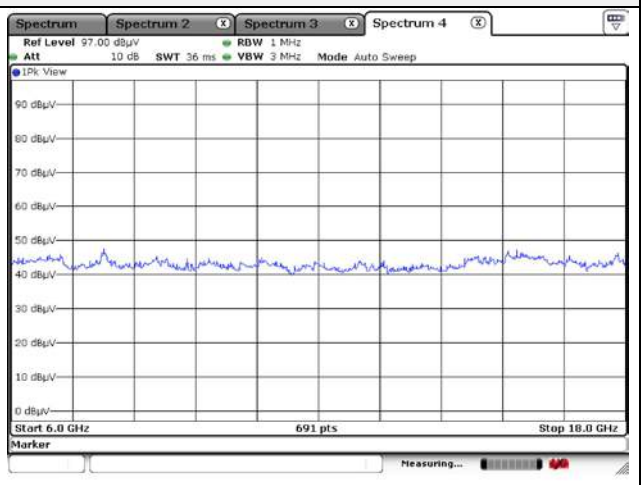
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 850.00	48.70	Peak	H	11.78	-	60.48	122.20	61.72
5 851.39	48.90	Peak	H	11.78	-	60.68	119.03	58.35
5 850.00	47.51	Peak	V	11.78	-	59.29	122.20	62.91
5 850.61	47.25	Peak	V	11.78	-	59.03	120.81	61.78

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



Horizontal // Peak for 1 ㎓ to 6 ㎓	Vertical // Peak for 1 ㎓ to 6 ㎓
	
Horizontal // Peak for 6 ㎓ to 18 ㎓	**Vertical // Peak for 6 ㎓ to 18 ㎓**
	

Note.

1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-1_n(HT20)

Distance of measurement: 3 meter

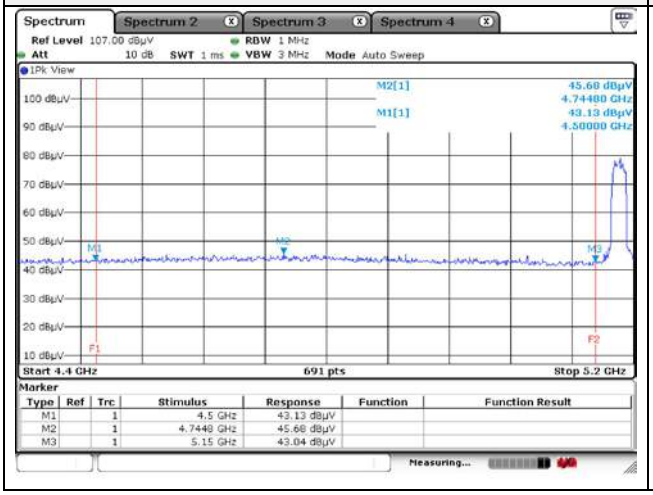
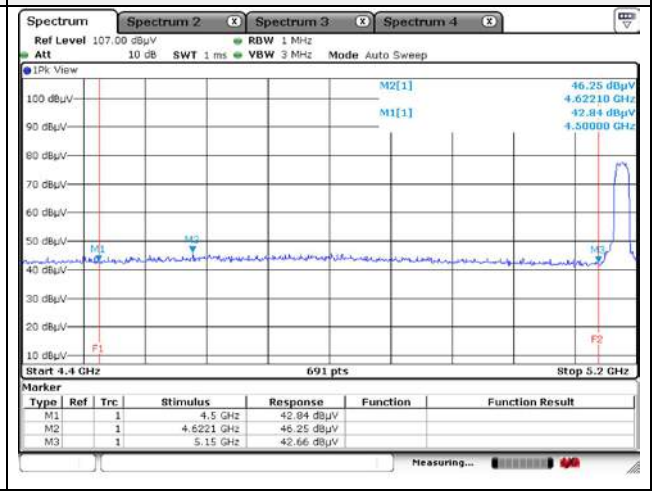
Channel: 36

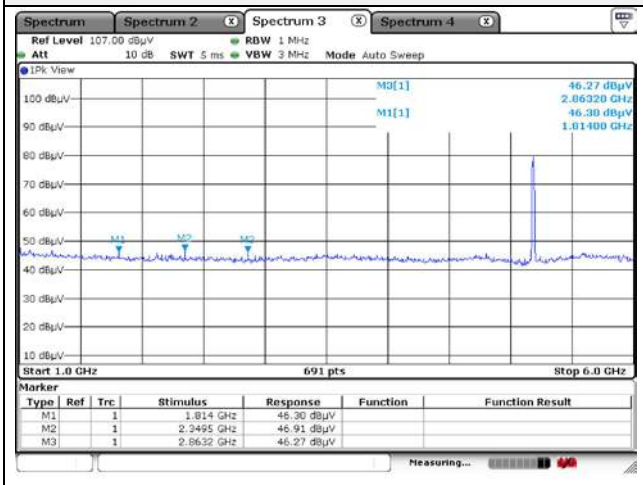
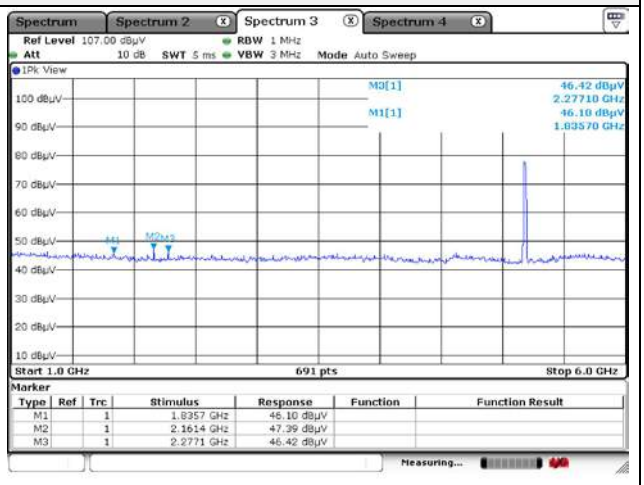
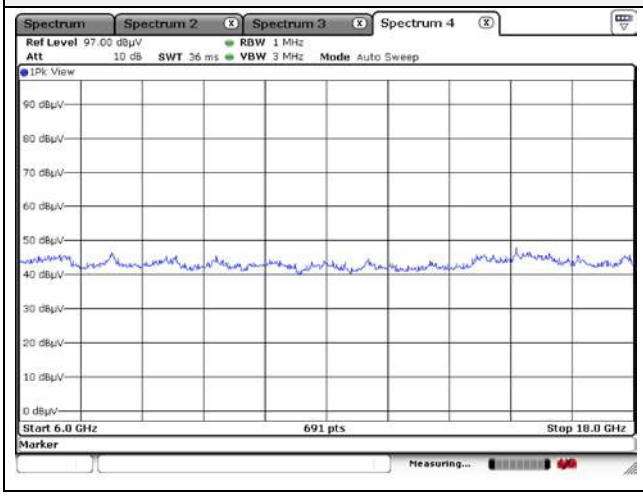
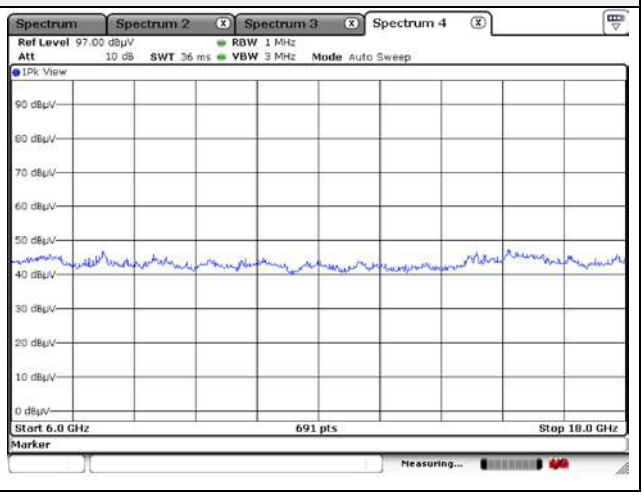
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 814.00	46.30	Peak	H	-2.93	-	43.37	74.00	30.63
2 349.50	46.91	Peak	H	-0.30	-	46.61	74.00	27.39
2 863.20	46.27	Peak	H	1.31	-	47.58	74.00	26.42
1 835.70	46.10	Peak	V	-2.70	-	43.40	74.00	30.60
2 161.40	47.39	Peak	V	-0.65	-	46.74	74.00	27.26
2 277.10	46.42	Peak	V	-0.43	-	45.99	74.00	28.01

- **Band edge**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
4 744.80	45.68	Peak	H	7.10	-	52.78	74.00	21.22
4 622.10	46.25	Peak	V	6.08	-	52.33	74.00	21.67

Restricted band // Horizontal // Peak	Restricted band // Vertical // Peak
	

Horizontal // Peak for 1 ㎓ to 6 ㎓	Vertical // Peak for 1 ㎓ to 6 ㎓
	
Horizontal // Peak for 6 ㎓ to 18 ㎓	**Vertical // Peak for 6 ㎓ to 18 ㎓**
	

Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-1_n(HT20)

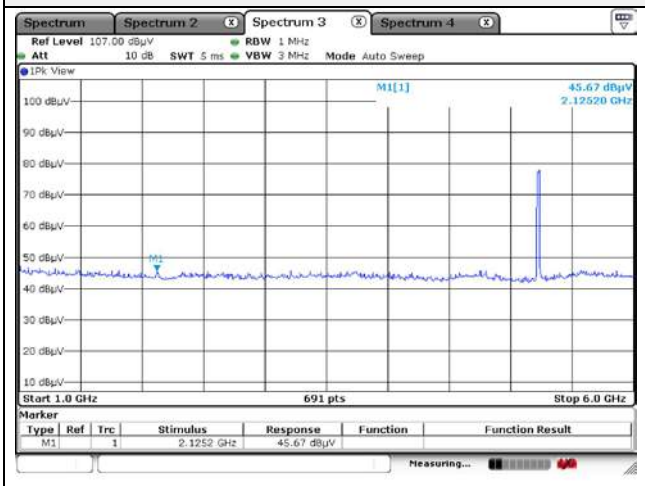
Distance of measurement: 3 meter

Channel: 44

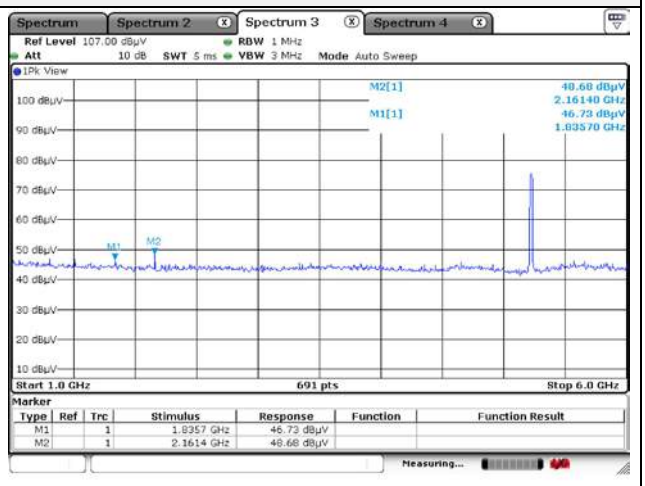
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 125.20	45.67	Peak	H	-0.72	-	44.95	74.00	29.05
1 835.70	46.73	Peak	V	-2.70	-	44.03	74.00	29.97
2 161.40	48.68	Peak	V	-0.65	-	48.03	74.00	25.97

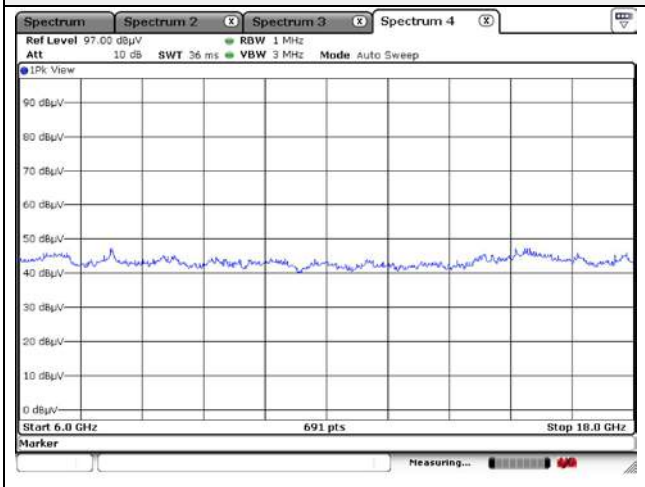
Horizontal // Peak for 1 ㎓ to 6 ㎓



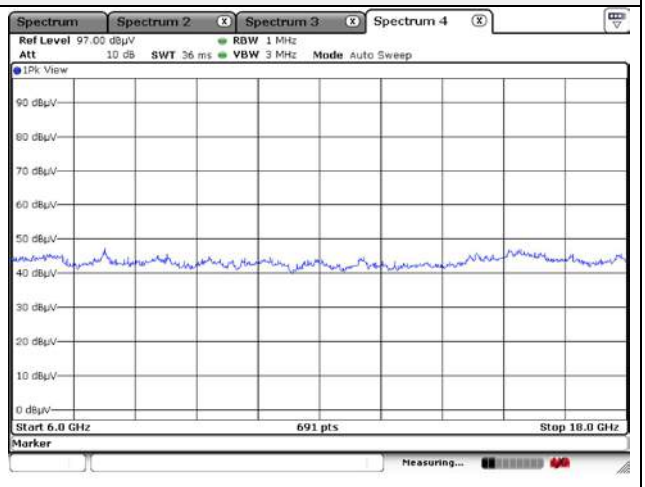
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-1_n(HT20)

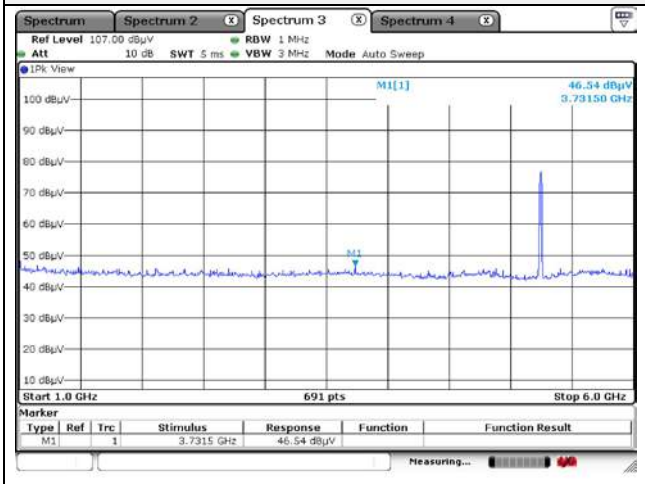
Distance of measurement: 3 meter

Channel: 48

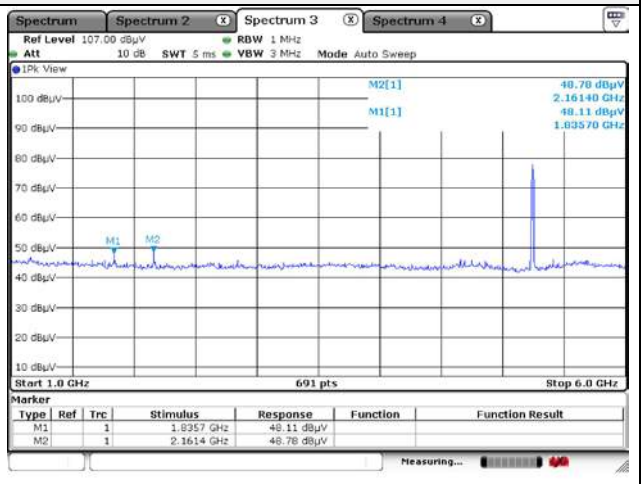
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
3 731.50	46.54	Peak	H	2.82	-	49.36	74.00	24.64
1 835.70	48.11	Peak	V	-2.70	-	45.41	74.00	28.59
2 161.40	48.78	Peak	V	-0.65	-	48.13	74.00	25.87

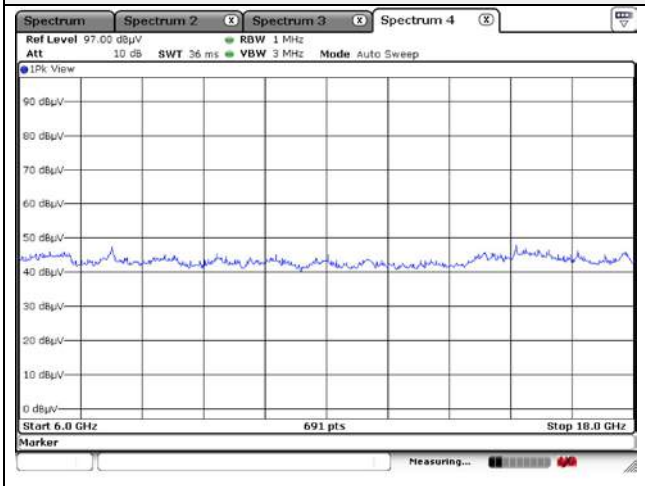
Horizontal // Peak for 1 ㎓ to 6 ㎓



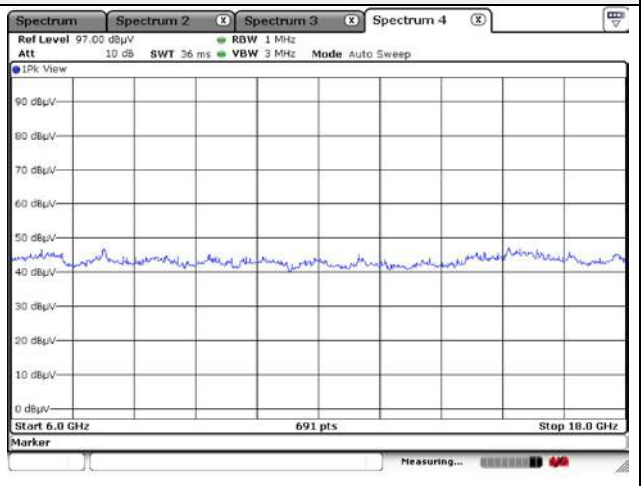
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3(HT20)

Distance of measurement: 3 meter

Channel: 149

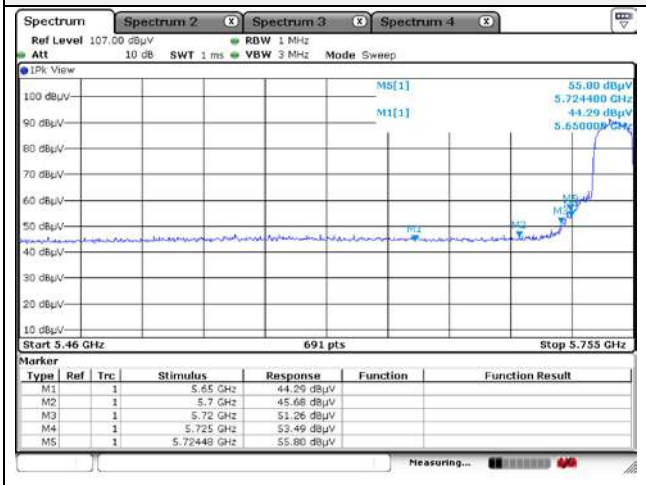
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 161.40	47.30	Peak	H	-0.65	-	46.65	74.00	27.35
2 342.30	46.93	Peak	V	-0.31	-	46.62	74.00	27.38

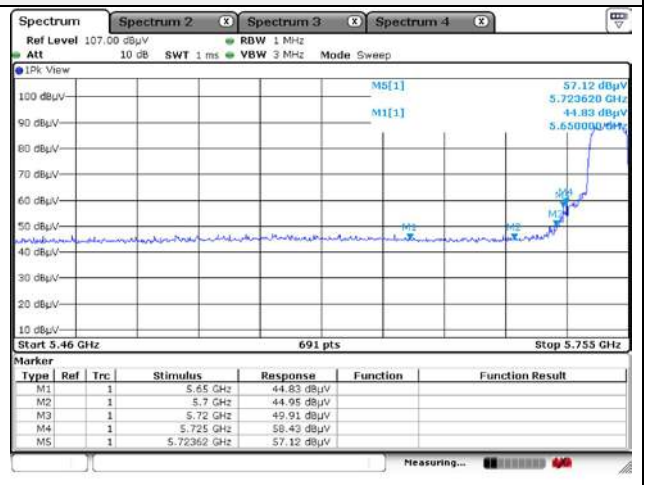
- **Band edge**

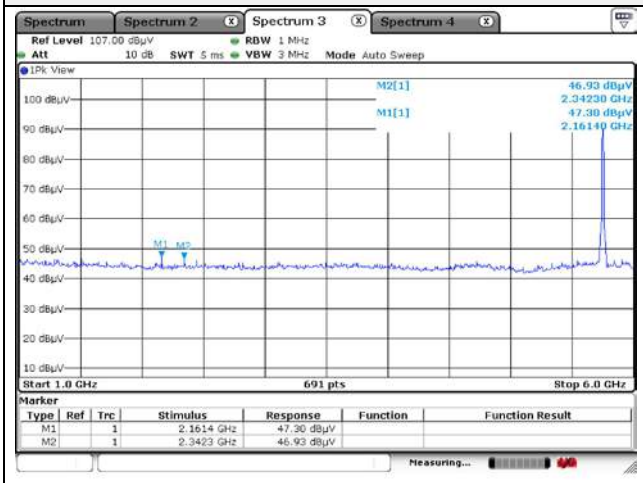
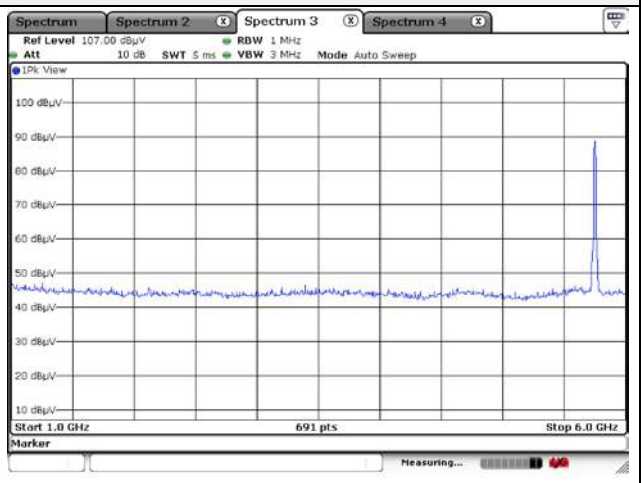
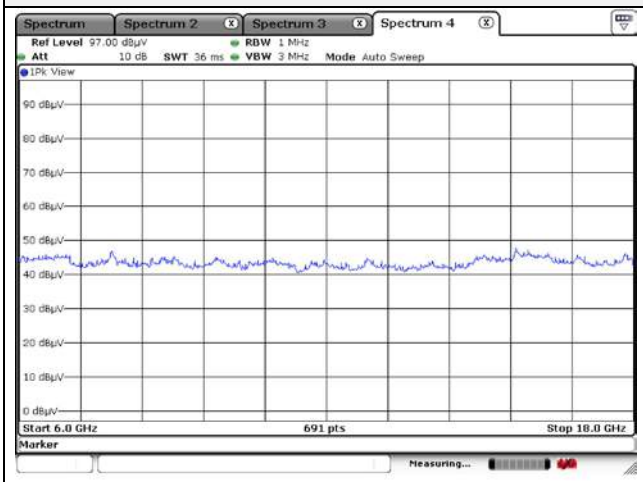
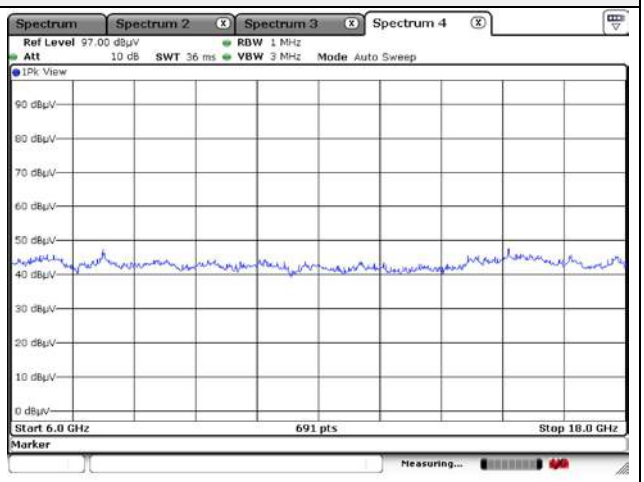
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 725.00	53.49	Peak	H	10.87	-	64.36	122.20	57.84
5 724.48	55.80	Peak	H	10.87	-	66.67	121.01	54.34
5 725.00	58.43	Peak	V	10.87	-	69.30	122.20	52.90
5 723.62	57.12	Peak	V	10.86	-	67.98	119.05	51.07

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



Horizontal // Peak for 1 ㎓ to 6 ㎓	Vertical // Peak for 1 ㎓ to 6 ㎓
	
Horizontal // Peak for 6 ㎓ to 18 ㎓	**Vertical // Peak for 6 ㎓ to 18 ㎓**
	

Note.

1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3(HT20)

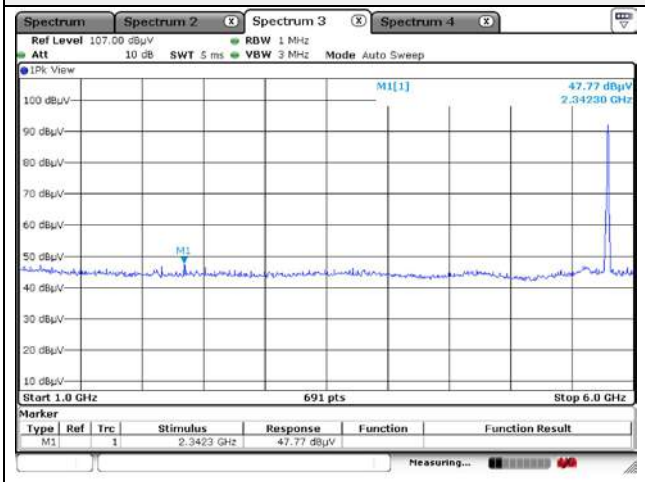
Distance of measurement: 3 meter

Channel: 157

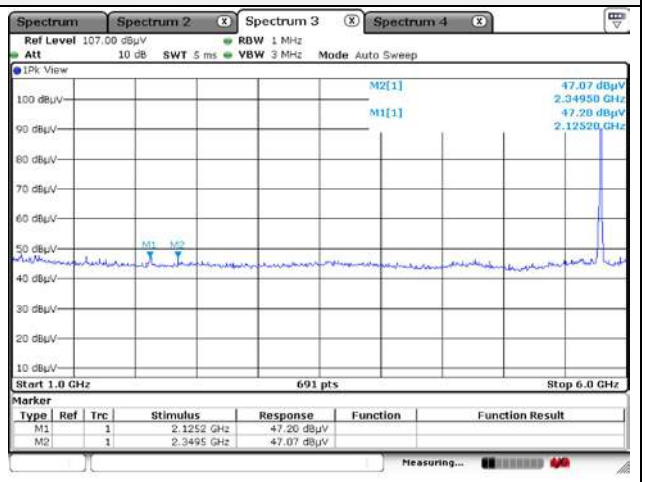
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
2 342.30	47.77	Peak	H	-0.31	-	47.46	74.00	26.54
2 125.20	47.20	Peak	V	-0.72	-	46.48	74.00	27.52
2 349.50	47.07	Peak	V	-0.30	-	46.77	74.00	27.23

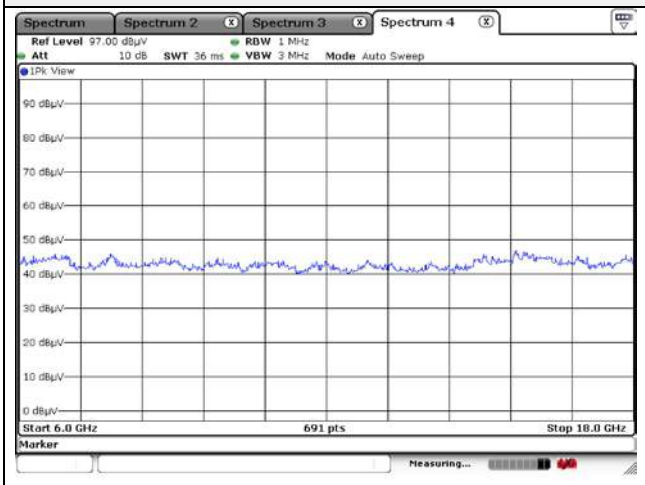
Horizontal // Peak for 1 ㎓ to 6 ㎓



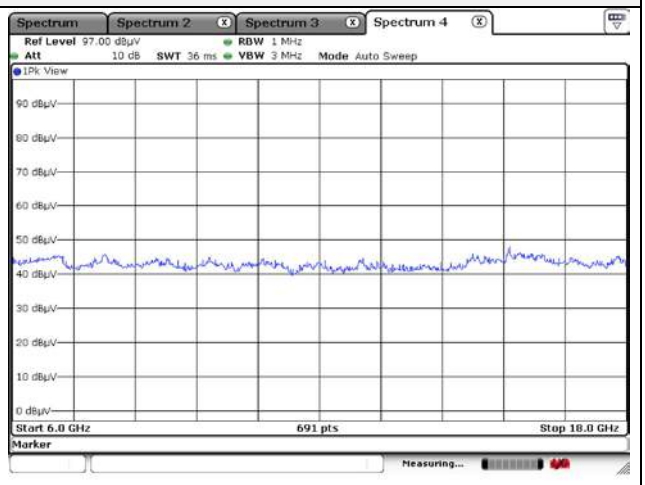
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.

1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: UNII-3(HT20)

Distance of measurement: 3 meter

Channel: 165

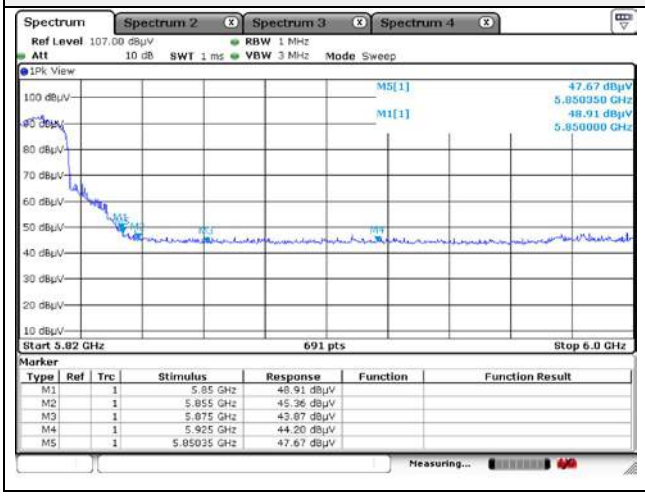
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 966.00	46.12	Peak	H	-1.33	-	44.79	74.00	29.21
2 161.40	47.10	Peak	H	-0.65	-	46.45	74.00	27.55
2 349.50	47.34	Peak	H	-0.30	-	47.04	74.00	26.96
1 727.20	56.83	Peak	V	-3.77	-	53.06	74.00	20.94

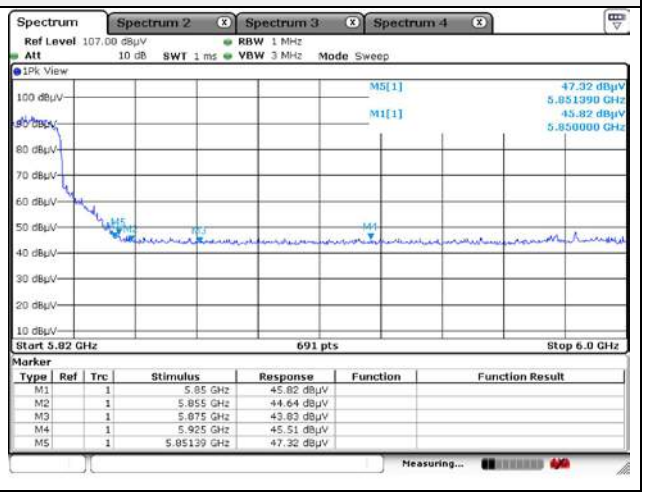
- **Band edge**

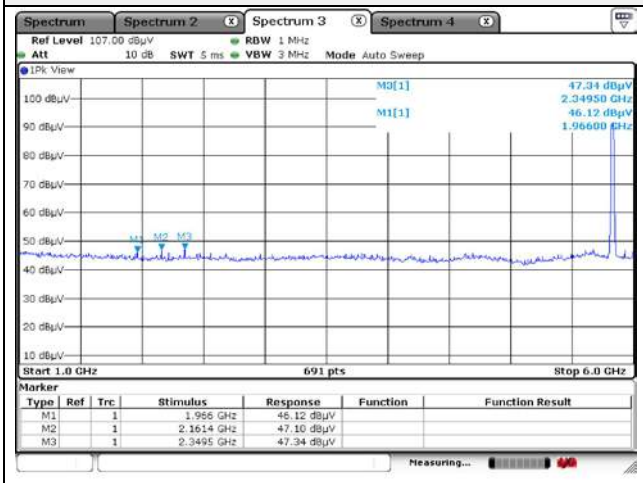
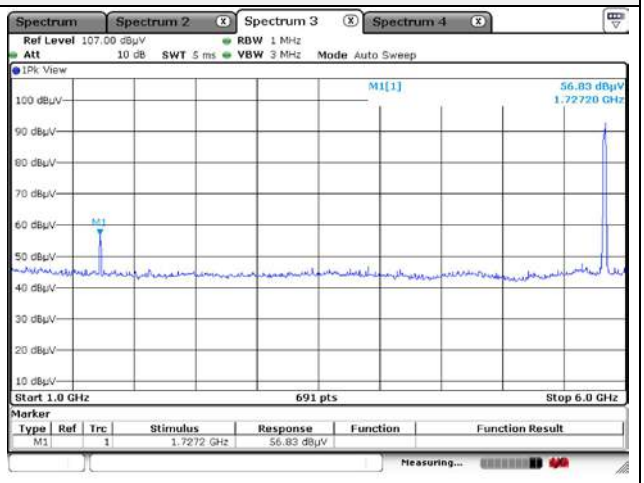
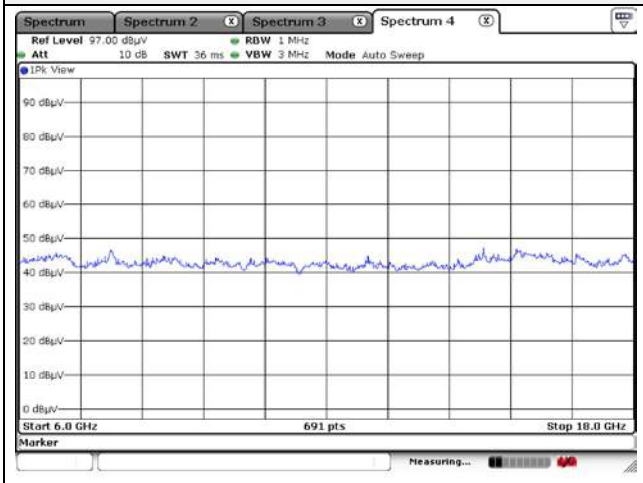
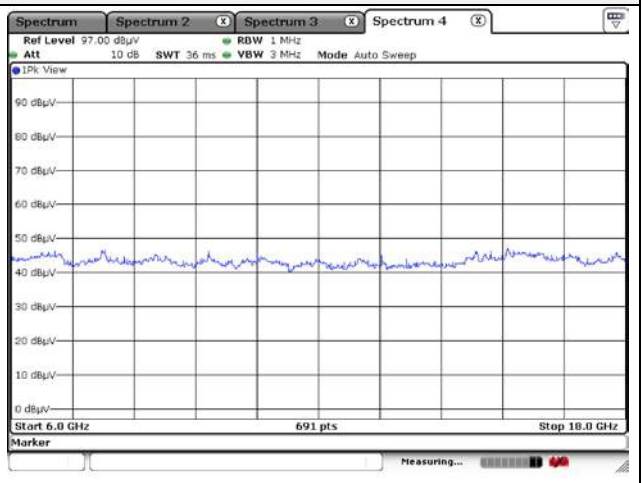
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 850.00	48.91	Peak	H	11.78	-	60.69	122.20	61.51
5 850.35	47.67	Peak	H	11.78	-	59.45	121.40	61.95
5 850.00	45.82	Peak	V	11.78	-	57.60	122.20	64.60
5 851.39	47.32	Peak	V	11.78	-	59.10	119.03	59.93

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak



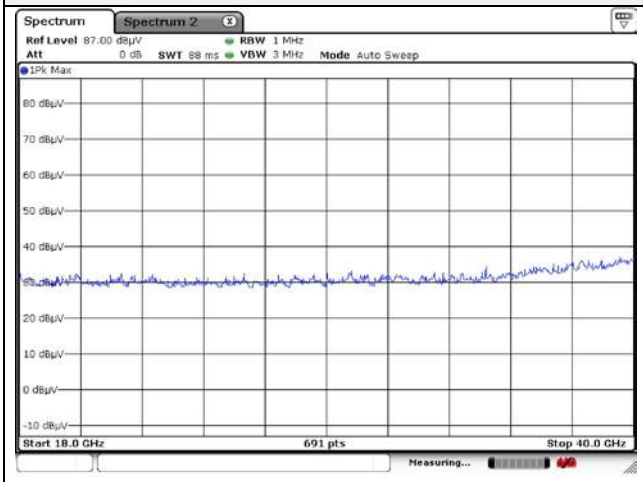
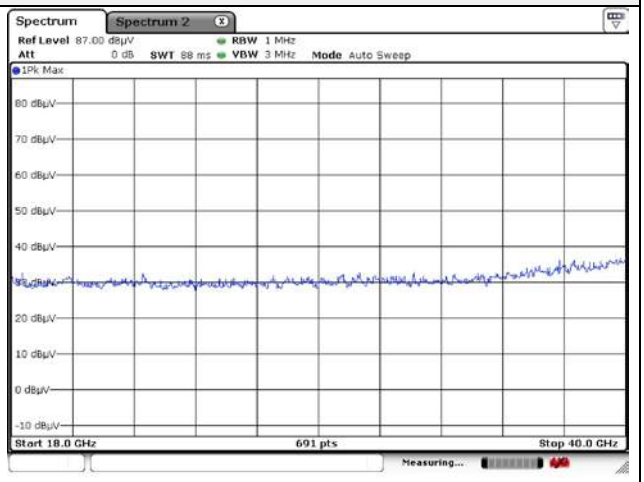
Horizontal // Peak for 1 ㎓ to 6 ㎓	Vertical // Peak for 1 ㎓ to 6 ㎓
	
Horizontal // Peak for 6 ㎓ to 18 ㎓	**Vertical // Peak for 6 ㎓ to 18 ㎓**
	

Note.

1. No spurious emission were detected above 6 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Test results (18 ㎓ to 40 ㎓) – Worst case

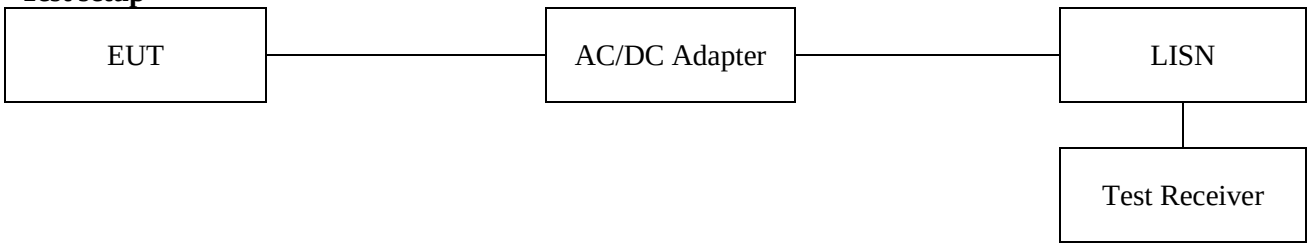
Mode:	UNII-1 HT20
Distance of measurement:	3 meter
Channel:	36 (Worst case)

Horizontal	Vertical
	

Note.
1. No spurious emission were detected above 18 ㎓.

3.7 AC conducted emissions

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.

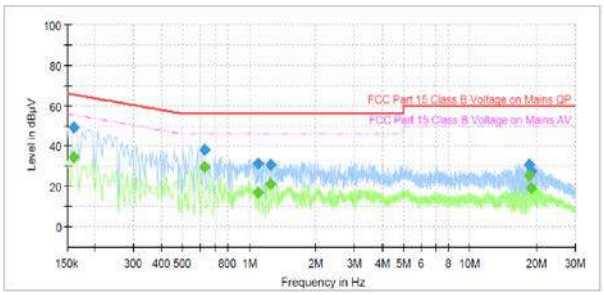
Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Note:

1. All AC line conducted spurious emission are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and the appropriate frequencies. All data rates and modes were investigated for conducted spurious emission. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.
2. Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).

Test results

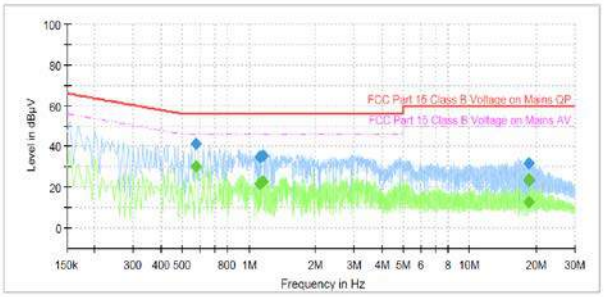
Hot Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	34.53	55.46	20.93	1000.0	9.000	N	19.4
0.160000	49.47	---	65.46	15.99	1000.0	9.000	N	19.4
0.625000	---	29.57	46.00	16.43	1000.0	9.000	N	19.6
0.625000	38.23	---	56.00	17.77	1000.0	9.000	N	19.6
1.095000	---	16.89	46.00	29.11	1000.0	9.000	N	19.8
1.095000	30.99	---	56.00	25.01	1000.0	9.000	N	19.8
1.250000	---	21.39	46.00	24.61	1000.0	9.000	N	19.9
1.250000	30.59	---	56.00	25.41	1000.0	9.000	N	19.9
18.550000	---	25.24	50.00	24.76	1000.0	9.000	N	20.1
18.550000	30.58	---	60.00	29.42	1000.0	9.000	N	20.1
18.905000	---	18.84	50.00	31.16	1000.0	9.000	N	20.1
18.905000	27.57	---	60.00	32.43	1000.0	9.000	N	20.1

Neutral Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.575000	---	30.26	46.00	15.74	1000.0	9.000	L1	19.6
0.575000	41.44	---	56.00	14.56	1000.0	9.000	L1	19.6
1.115000	---	21.91	46.00	24.09	1000.0	9.000	L1	19.8
1.115000	34.86	---	56.00	21.14	1000.0	9.000	L1	19.8
1.160000	---	22.72	46.00	23.28	1000.0	9.000	L1	19.8
1.160000	35.55	---	56.00	20.45	1000.0	9.000	L1	19.8
18.510000	---	12.91	50.00	37.09	1000.0	9.000	L1	20.2
18.510000	23.32	---	60.00	36.68	1000.0	9.000	L1	20.2
18.560000	---	23.60	50.00	26.40	1000.0	9.000	L1	20.2
18.560000	31.92	---	60.00	28.08	1000.0	9.000	L1	20.2

Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration date	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2017.01.23	2018.01.23
Spectrum Analyzer	R&S	FSV40	101002	1 year	2017.07.04	2018.07.04
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2017.01.23	2018.01.23
Signal Generator	Anritsu	68369B	992113	1 year	2017.02.20	2018.02.20
Power Meter	Anritsu	ML2495A	1438001	1 year	2017.01.23	2018.01.23
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2017.01.23	2018.01.23
Attenuator	Agilent	8493C	51401	1 year	2017.07.04	2018.07.04
Loop Antenna	Schwarzbeck	FMZB1513	225	2 years	2018.05.10	2019.05.10
Trilog-broadband antenna	SCHWARZBECK	VULB 9163	9168-714	2 years	2017.11.28	2018.11.28
Horn Antenna	A.H	SAS-571	414	2 years	2018.02.15	2019.02.15
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA 9170550	2 years	2018.02.15	2019.02.15
High Pass Filter	Wainwright Instrument Gmbh	WHJS3000-10TT	1	1 year	2017.07.03	2018.07.03
High Pass Filter	Wainwright Instrument Gmbh	WHNX6.0/ 26.5G-6SS	1	1 year	2017.07.04	2018.07.04
Low Pass Filter	Wainwright Instrument Gmbh	WLK1.0/ 18G-10TT	1	1 year	2017.07.03	2018.07.03
Preamplifier	R&S	SCU01	100603	1 year	2017.11.27	2018.11.27
Preamplifier	AGILENT	8449B	3008A01742	1 year	2018.01.11	2019.01.11
Broadband Amplifier	SCHWARZBECK	BBV-9721	PS9721-003	1 year	2017.01.23	2018.01.23
EMI Test Receiver	R&S	ESR3	101781	1 year	2017.04.27	2018.04.27
EMI Test Receiver	R&S	ESU26	100552	1 year	2017.04.19	2018.04.19
Pulse Limiter	R&S	ESH3-Z2	101915	1 year	2016.12.13	2017.12.13
					2017.11.27	2018.11.27
LISN	R&S	ENV216	101787	1 year	2017.01.11	2018.01.11
					2018.01.05	2019.01.15

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
-	-	-	-