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 ㎽(23.97 dBm)
UNII-2A			250 ㎽ or 11 dBm + 10logB*
UNII-2C			250 ㎽ or 11 dBm + 10logB*
UNII-3	✔		1 W (30 dBm)

Note.
1. Limit B is the 26 dB emission bandwidth.

Test results

Band	Frequency (㎒)	Mode	Detector mode	Ant Gain (dBi)	Output power (㏈m)	Limit (㏈m)
UNII-1	5 180	802.11a (6 Mbps)	AV	3.70	13.91	23.97
	5 220		AV		12.91	
	5 240		AV		11.41	
UNII-3	5 745		AV	3.49	15.46	30.00
	5 785		AV		15.80	
	5 825		AV		13.82	
UNII-1	5 180	802.11n _HT20 (MCS0)	AV	3.70	13.76	23.97
	5 220		AV		12.75	
	5 240		AV		12.27	
UNII-3	5 745		AV	3.49	15.24	30.00
	5 785		AV		15.60	
	5 825		AV		13.77	
UNII-1	5 180	802.11ac _VHT20 (MCS0)	AV	3.70	13.80	23.97
	5 220		AV		12.76	
	5 240		AV		12.24	
UNII-3	5 745		AV	3.49	15.26	30.00
	5 785		AV		15.70	
	5 825		AV		13.58	

Band	Frequency (㎒)	Mode	Detector mode	Ant Gain (dBi)	Output power (㏈m)	Limit (㏈m)
UNII-1	5 190	802.11n _HT40 (MCS0)	AV	3.70	14.18	23.97
	5 230		AV		13.26	
UNII-3	5 755		AV	3.49	15.05	30.00
	5 795		AV		15.10	
UNII-1	5 190	802.11ac _VHT40 (MCS0)	AV	3.70	13.51	23.97
	5 230		AV		12.81	
UNII-3	5 755		AV	3.49	14.13	30.00
	5 795		AV		14.08	

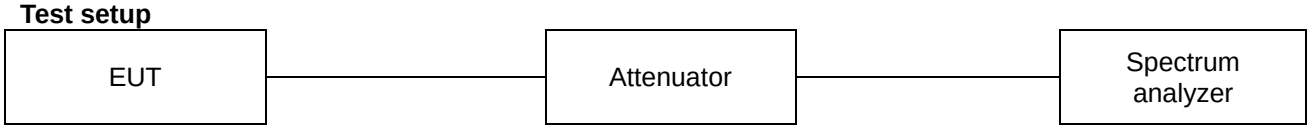
Band	Frequency (㎒)	Mode	Detector mode	Ant Gain (dBi)	Output power (㏈m)	Limit (㏈m)
UNII-1	5 190	802.11ac _VHT80 (MCS0)	AV	3.70	12.80	23.97
UNII-3	5 775		AV	3.49	14.88	30.00

3.4. 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 above 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 sections 5.c) and 5.d) above, 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 ㎑

Note.

1. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceed 6 dBi.

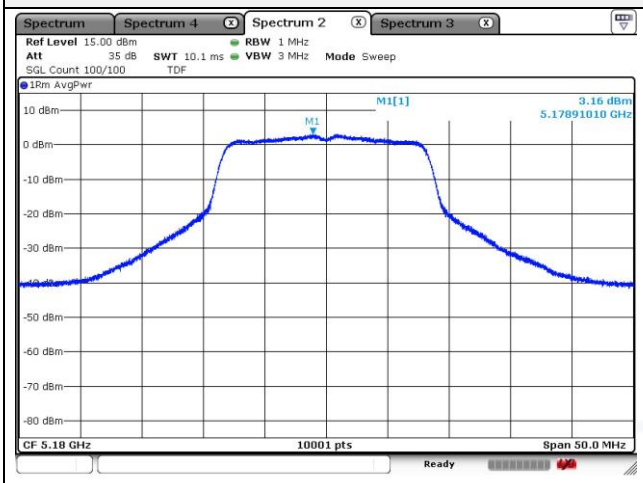
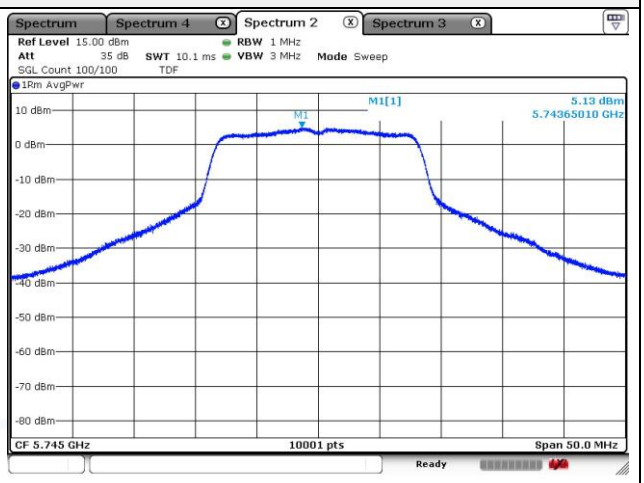
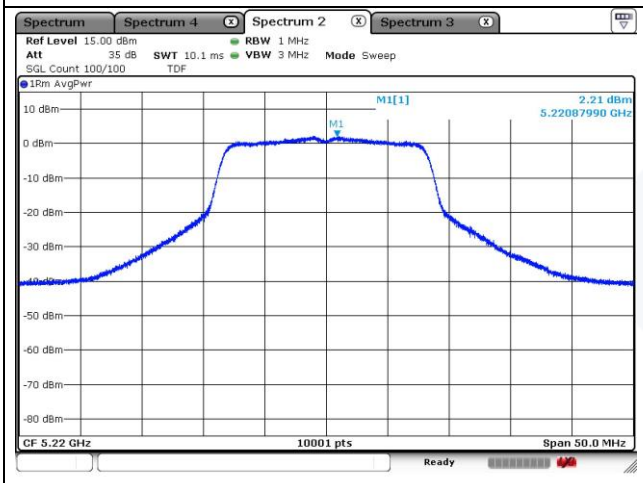
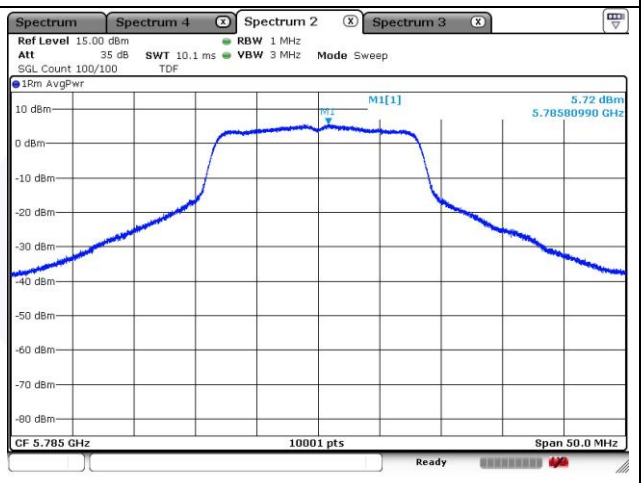
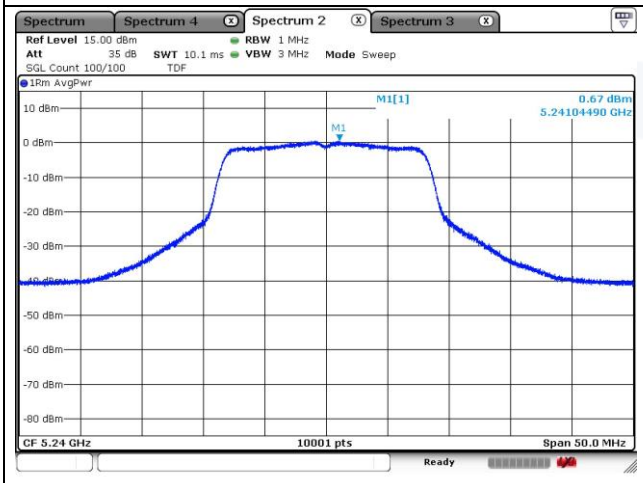
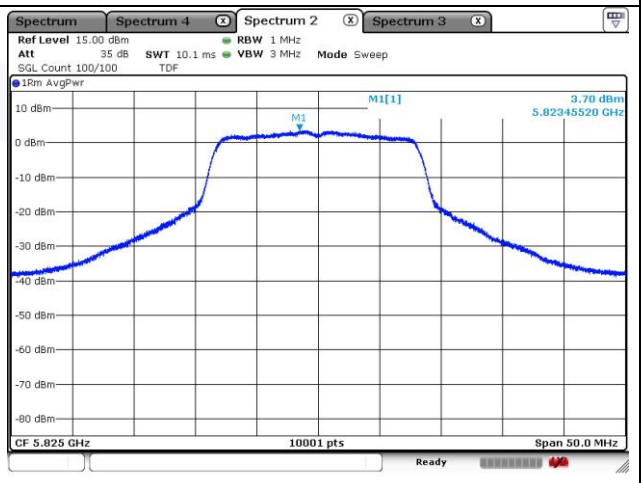
Test results

Mode	Frequency (㎒)	Band	PSD (dBm/㎒)	RBWF Note1	DCF Note2	Sum Note3	Limit
802.11a (6 Mbps)	5 180	UNII-1	3.16	-	-	3.16	11.00 (dB m/㎒)
	5 220		2.21			2.21	
	5 240		0.67			0.67	
	5 745	UNII-3	5.13	3.01	-	8.14	30.00 (dBm/500 ㎑)
	5 785		5.72			8.73	
	5 825		3.70			6.71	
802.11n_ HT20 (MCS0)	5 180	UNII-1	2.66	-	-	2.66	11.00 (dB m/㎒)
	5 220		1.62			1.62	
	5 240		1.21			1.21	
	5 745	UNII-3	4.84	3.01	-	7.85	30.00 (dBm/500 ㎑)
	5 785		5.06			8.07	
	5 825		3.20			6.21	
802.11ac_ VHT20 (MCS0)	5 180	UNII-1	2.71	-	-	2.71	11.00 (dB m/㎒)
	5 220		1.74			1.74	
	5 240		1.30			1.30	
	5 745	UNII-3	4.82	3.01	-	7.83	30.00 (dBm/500 ㎑)
	5 785		5.19			8.20	
	5 825		3.39			6.40	
802.11n_ HT40 (MCS0)	5 190	UNII-1	0.00	-	0.13	0.13	11.00 (dBm/㎒
	5 230		-1.05			-0.92	
	5 755	UNII-3	1.64	3.01	0.13	4.78	30.00 (dBm/500 ㎑)
	5 795		1.88			5.02	
802.11ac _VHT40 (MCS0)	5 190	UNII-1	-0.27	-	0.18	-0.09	11.00 (dBm/㎒
	5 230		-1.14			-0.96	
	5 755	UNII-3	1.30	3.01	0.13	4.44	30.00 (dBm/500 ㎑)
	5 795		1.53			4.67	
802.11ac _VHT80 (MCS0)	5 210	UNII-1	-4.14	-	0.27	-3.87	11.00 (dBm/㎒
	5 775	UNII-3	-0.65	3.01	0.27	2.63	30.00 (dBm/500 ㎑)

Note.

1. UNII-1 = 10log(1 ㎒/1 ㎒)
   UNII-3 = 10log(1 ㎒ /500 ㎑) = 3.01
2. Refer to the page 49 on this report.
3. Sum(dBm) = PSD(dBm) + RBWF + Duty correction factor (dB)

Test results

UNII-1_802.11a (6 Mbps)	UNII-3_802.11a (6 Mbps)
	
	
	

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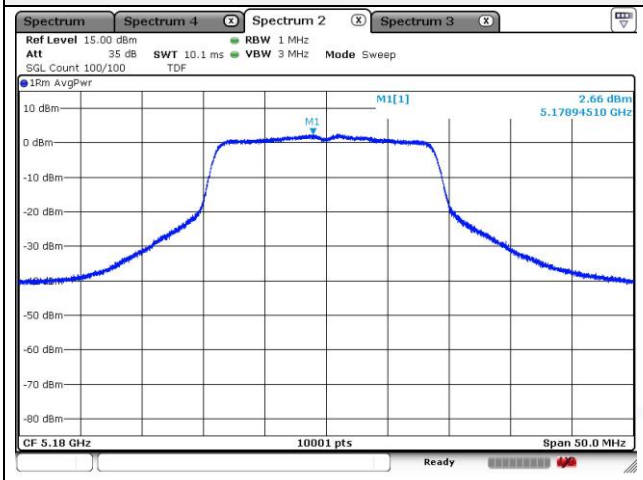	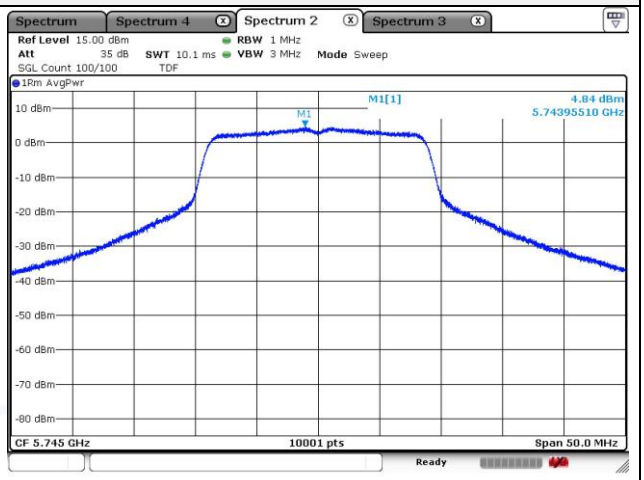
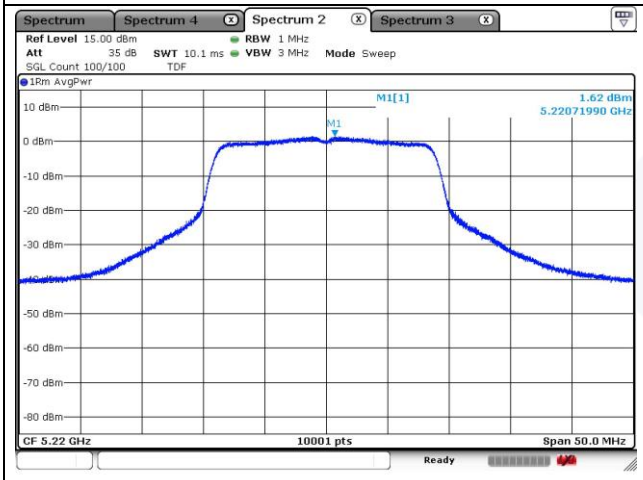	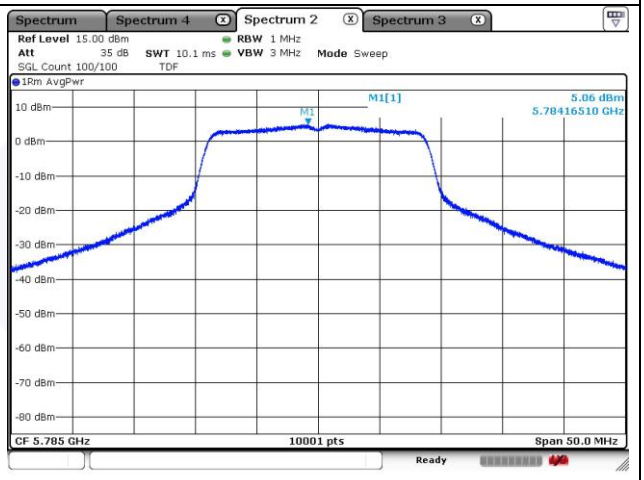
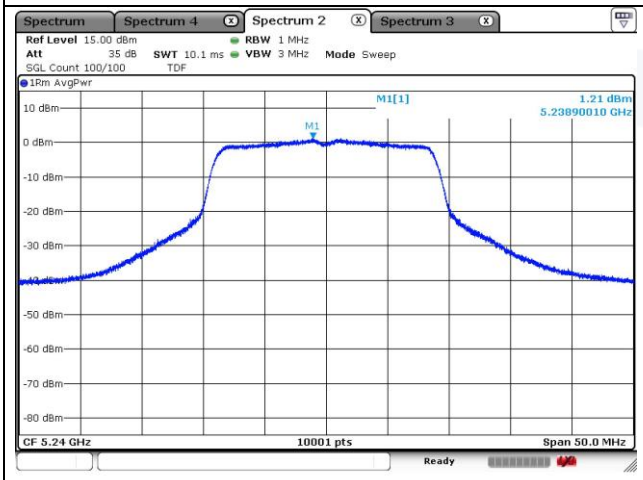	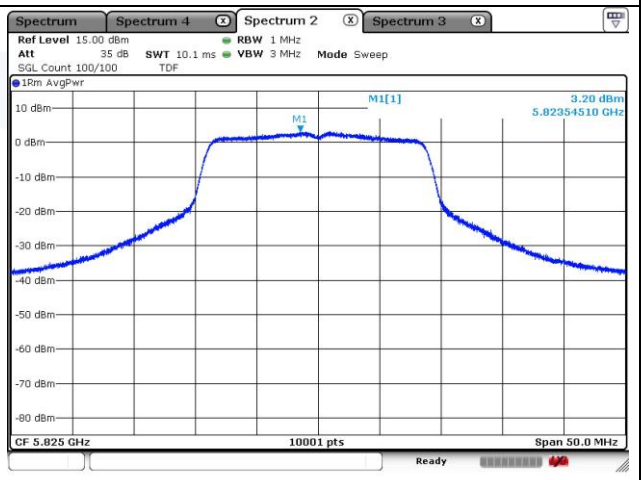

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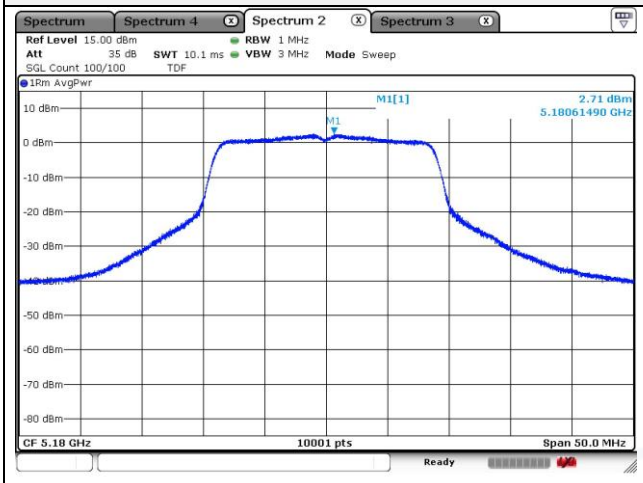	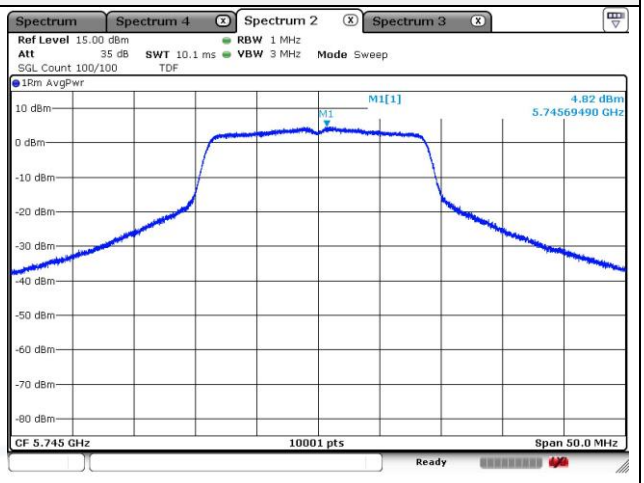
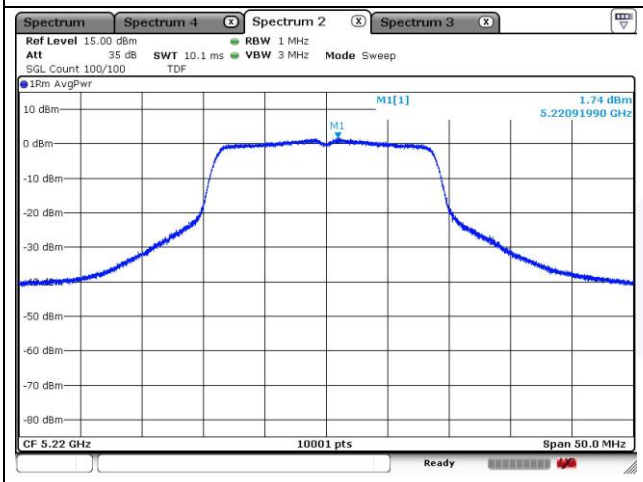	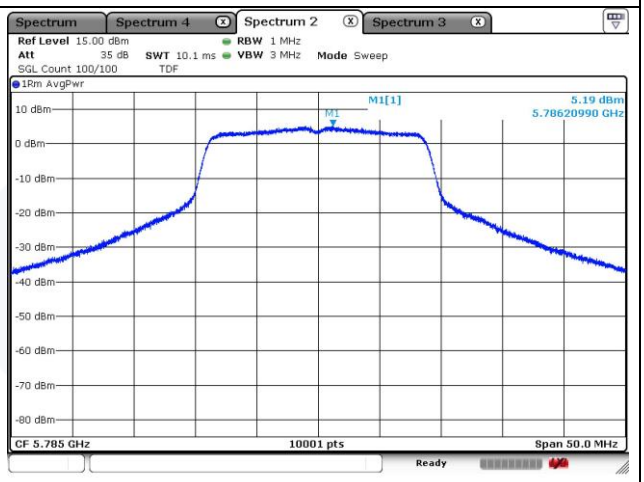
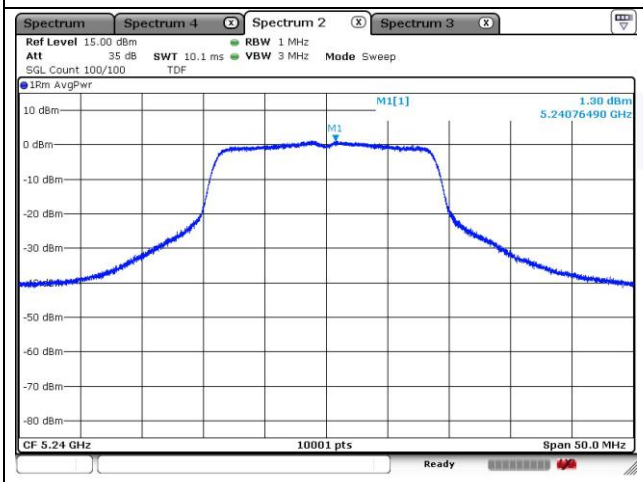	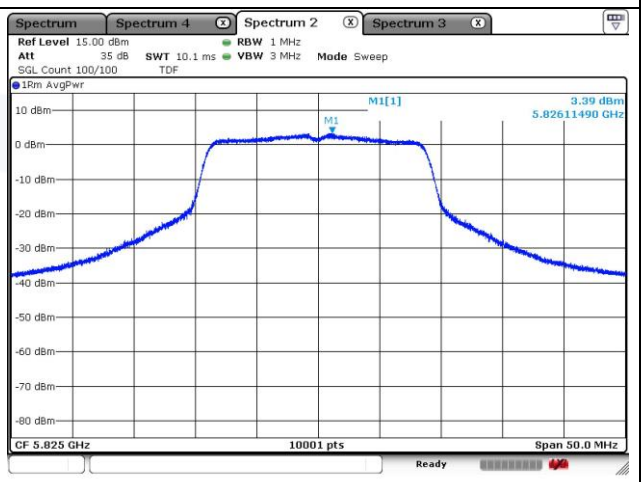

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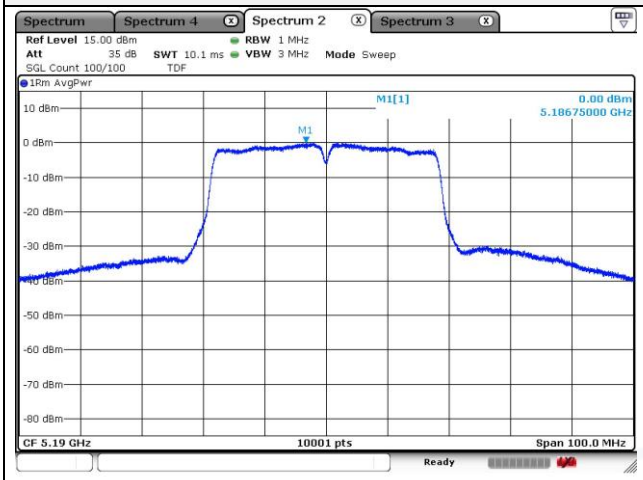
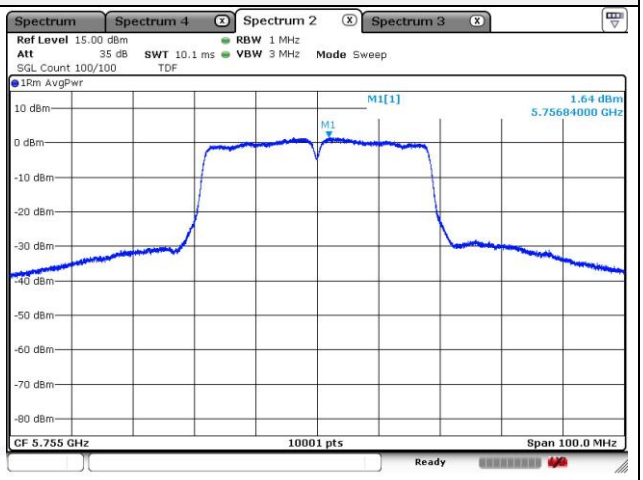
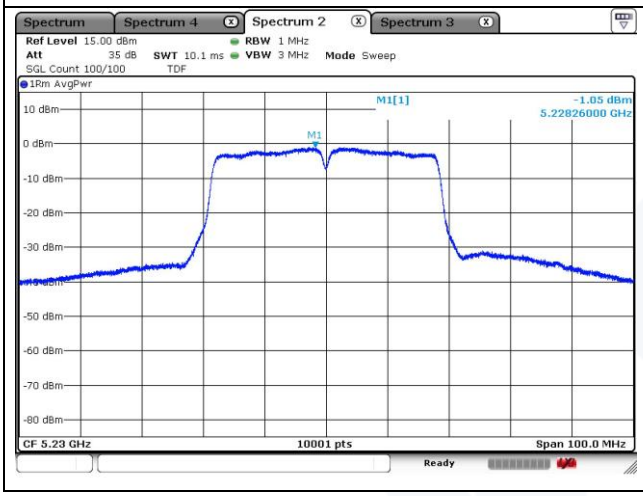
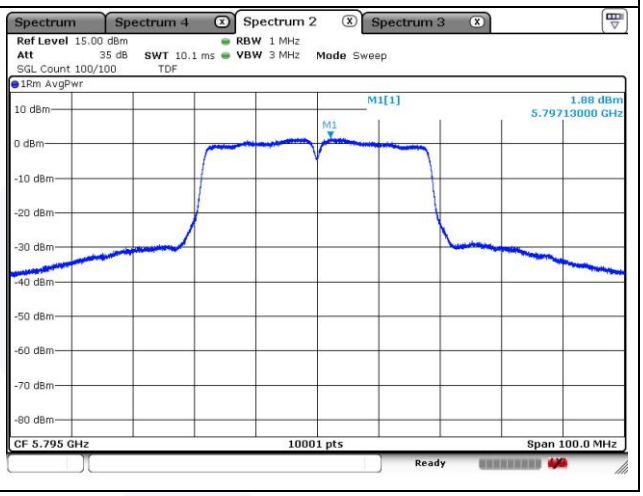
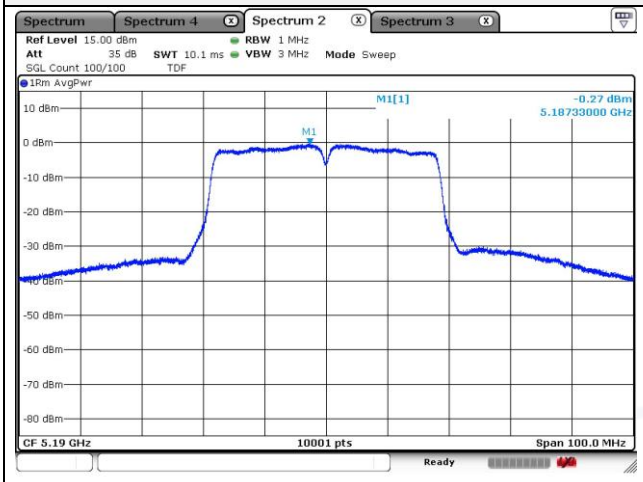
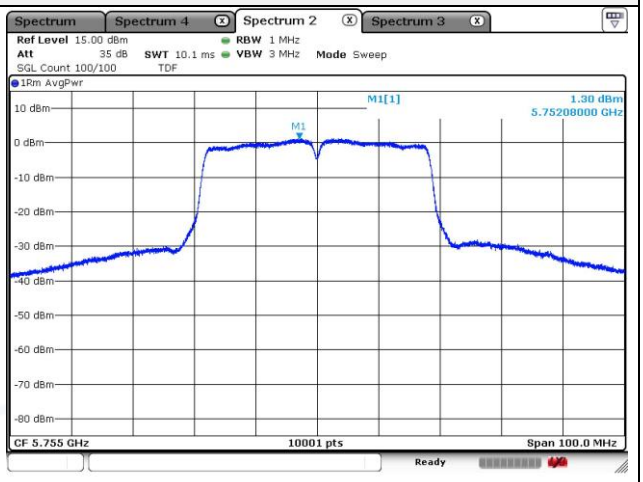
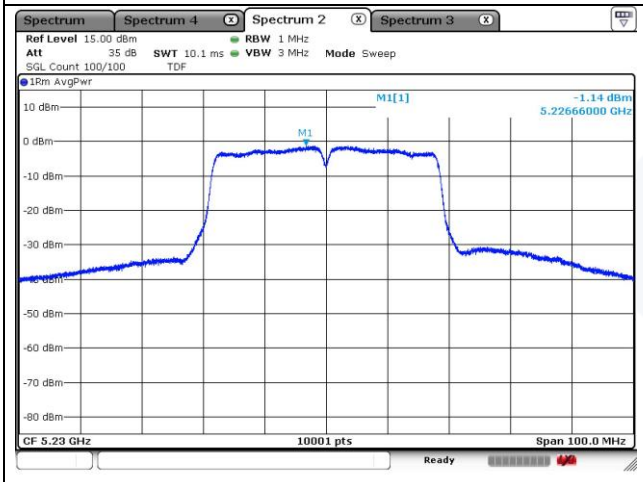
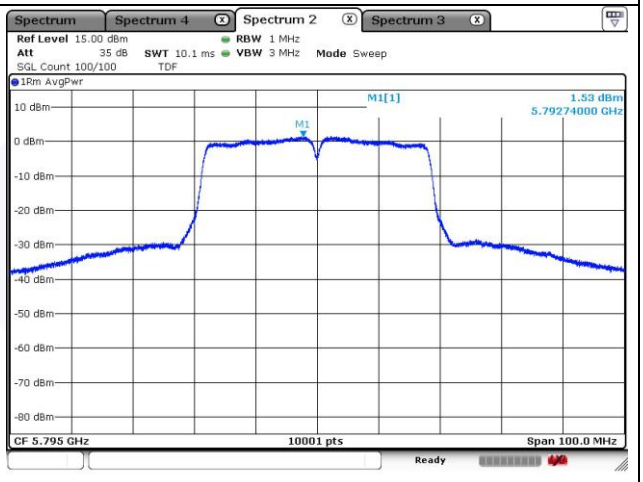
	
	

UNII-1_802.11ac_VHT40 (MCS0)	UNII-3_802.11ac_VHT40 (MCS0)
	
	

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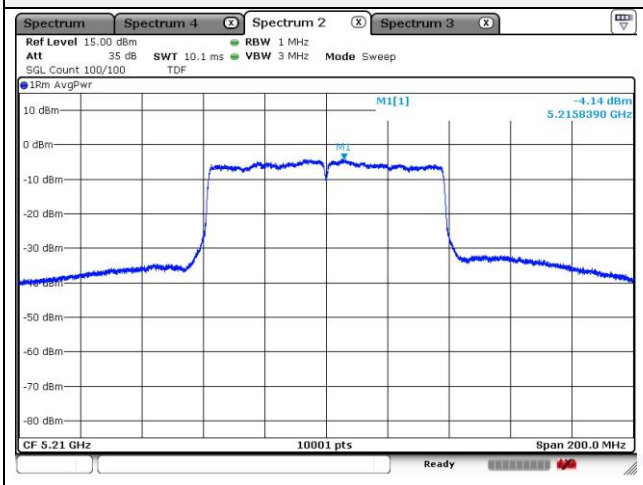
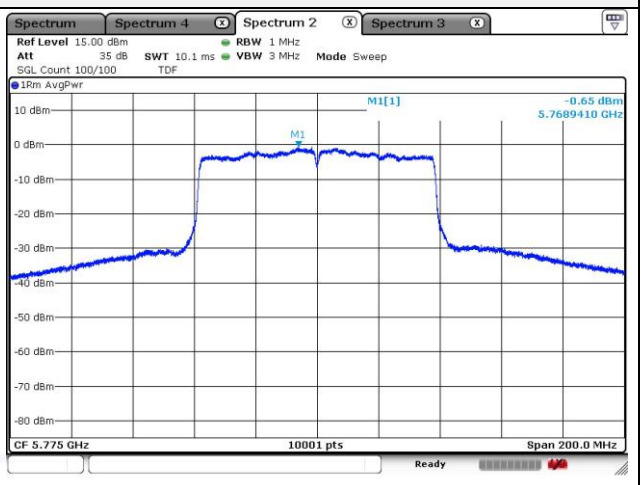
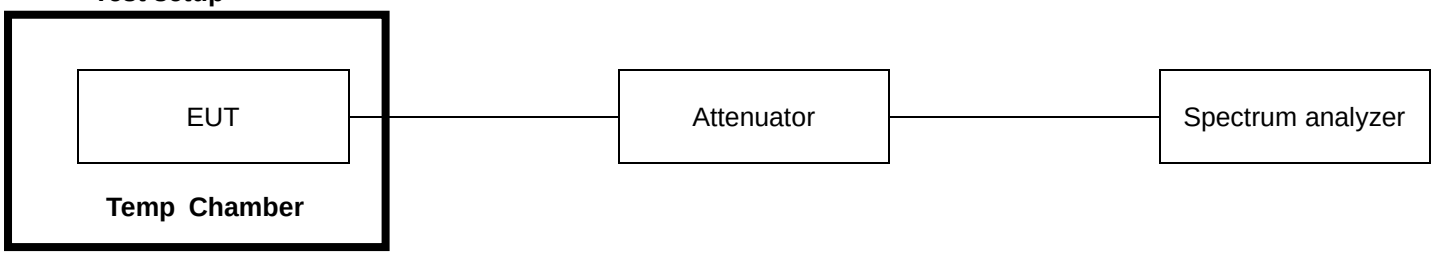
	

3.5. Frequency Stability

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 AC 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 3.85	-10.0	Startup	5 179.979 000	-21 000	-0.000 41
			2 minutes	5 179.982 500	-17 500	-0.000 34
			5 minutes	5 179.985 000	-15 000	-0.000 29
			10 minutes	5 179.982 000	-18 000	-0.000 35
100 %		0.0	Startup	5 179.978 000	-22 000	-0.000 42
			2 minutes	5 179.980 500	-19 500	-0.000 38
			5 minutes	5 179.979 000	-21 000	-0.000 41
			10 minutes	5 179.977 000	-23 000	-0.000 44
100 %		10.0	Startup	5 179.974 000	-26 000	-0.000 50
			2 minutes	5 179.951 000	-49 000	-0.000 95
			5 minutes	5 179.948 500	-51 500	-0.000 99
			10 minutes	5 179.944 500	-55 500	-0.001 07
100 %		20.0	Startup	5 179.915 000	-85 000	-0.001 64
			2 minutes	5 179.916 000	-84 000	-0.001 62
			5 minutes	5 179.916 500	-83 500	-0.001 61
			10 minutes	5 179.916 500	-83 500	-0.001 61
100 %		25.4	Startup	5 179.912 500	-87 500	-0.001 69
			2 minutes	5 179.913 500	-86 500	-0.001 67
			5 minutes	5 179.914 000	-86 000	-0.001 66
			10 minutes	5 179.911 500	-88 500	-0.001 71
100 %		30.0	Startup	5 179.932 500	-67 500	-0.001 30
			2 minutes	5 179.927 500	-72 500	-0.001 40
			5 minutes	5 179.924 500	-75 500	-0.001 46
			10 minutes	5 179.927 000	-73 000	-0.001 41
100 %		40.0	Startup	5 179.945 500	-54 500	-0.001 05
			2 minutes	5 179.949 000	-51 000	-0.000 98
			5 minutes	5 179.946 500	-53 500	-0.001 03
			10 minutes	5 179.941 000	-59 000	-0.001 14
100 %		50.0	Startup	5 179.937 000	-63 000	-0.001 22
			2 minutes	5 179.936 500	-63 500	-0.001 23
			5 minutes	5 179.938 500	-61 500	-0.001 19
			10 minutes	5 179.941 000	-59 000	-0.001 14
85 %	DC 3.272	25.4	Startup	5 179.918 500	-81 500	-0.001 57
			2 minutes	5 179.924 500	-75 500	-0.001 46
			5 minutes	5 179.916 500	-83 500	-0.001 61
			10 minutes	5 179.919 000	-81 000	-0.001 56
115 %	DC 4.423	25.4	Startup	5 179.922 500	-77 500	-0.001 50
			2 minutes	5 179.923 500	-76 500	-0.001 48
			5 minutes	5 179.916 500	-83 500	-0.001 61
			10 minutes	5 179.916 000	-84 000	-0.001 62

Mode: UNII-3

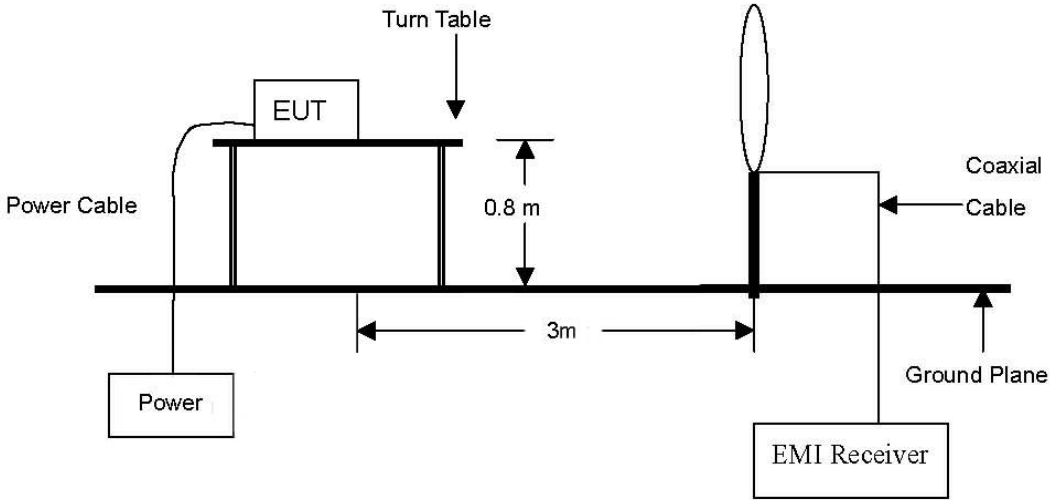
Operating frequency: 5 745 ㎒

Test voltage (%)	Test voltage (V)	Temperature (℃)	Maintaining time	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (%)
100 %	DC 3.85	-30.0	Startup	5 744.978 000	-22 000	-0.000 38
			2 minutes	5 744.975 500	-24 500	-0.000 43
			5 minutes	5 744.975 000	-25 000	-0.000 44
			10 minutes	5 744.972 000	-28 000	-0.000 49
100 %		-20.0	Startup	5 744.979 000	-21 000	-0.000 37
			2 minutes	5 744.986 500	-13 500	-0.000 23
			5 minutes	5 744.989 000	-11 000	-0.000 19
			10 minutes	5 744.992 500	-7 500	-0.000 13
100 %		-10.0	Startup	5 744.983 500	-16 500	-0.000 29
			2 minutes	5 744.986 000	-14 000	-0.000 24
			5 minutes	5 744.985 000	-15 000	-0.000 26
			10 minutes	5 744.990 500	-9 500	-0.000 17
100 %		0.0	Startup	5 744.992 000	-8 000	-0.000 14
			2 minutes	5 744.988 000	-12 000	-0.000 21
			5 minutes	5 744.982 500	-17 500	-0.000 30
			10 minutes	5 744.978 500	-21 500	-0.000 37
100 %		10.0	Startup	5 744.985 000	-15 000	-0.000 26
			2 minutes	5 744.990 500	-9 500	-0.000 17
			5 minutes	5 744.986 500	-13 500	-0.000 23
			10 minutes	5 744.988 000	-12 000	-0.000 21
100 %		20.0	Startup	5 744.976 000	-24 000	-0.000 42
			2 minutes	5 744.974 000	-26 000	-0.000 45
			5 minutes	5 744.974 500	-25 500	-0.000 44
			10 minutes	5 744.968 500	-31 500	-0.000 55
100 %		25.4	Startup	5 744.955 500	-44 500	-0.000 77
			2 minutes	5 744.959 000	-41 000	-0.000 71
			5 minutes	5 744.963 500	-36 500	-0.000 64
			10 minutes	5 744.964 500	-35 500	-0.000 62
100 %		30.0	Startup	5 744.955 000	-45 000	-0.000 78
			2 minutes	5 744.947 000	-53 000	-0.000 92
			5 minutes	5 744.949 000	-51 000	-0.000 89
			10 minutes	5 744.954 500	-45 500	-0.000 79
100 %		40.0	Startup	5 744.978 000	-22 000	-0.000 38
			2 minutes	5 744.975 500	-24 500	-0.000 43
			5 minutes	5 744.975 000	-25 000	-0.000 44
			10 minutes	5 744.972 000	-28 000	-0.000 49
100 %		50.0	Startup	5 744.979 000	-21 000	-0.000 37
			2 minutes	5 744.986 500	-13 500	-0.000 23
			5 minutes	5 744.989 000	-11 000	-0.000 19
			10 minutes	5 744.992 500	-7 500	-0.000 13
100 %		60.0	Startup	5 744.983 500	-16 500	-0.000 29
			2 minutes	5 744.986 000	-14 000	-0.000 24
			5 minutes	5 744.985 000	-15 000	-0.000 26
			10 minutes	5 744.990 500	-9 500	-0.000 17
85 %	DC 3.272	25.4	Startup	5 744.985 500	-14 500	-0.000 25
			2 minutes	5 744.978 500	-21 500	-0.000 37
			5 minutes	5 744.975 500	-24 500	-0.000 43
			10 minutes	5 744.974 000	-26 000	-0.000 45
115 %	DC 4.423	25.4	Startup	5 744.978 000	-22 000	-0.000 38
			2 minutes	5 744.978 500	-21 500	-0.000 37
			5 minutes	5 744.971 000	-29 000	-0.000 50
			10 minutes	5 744.978 500	-21 500	-0.000 37

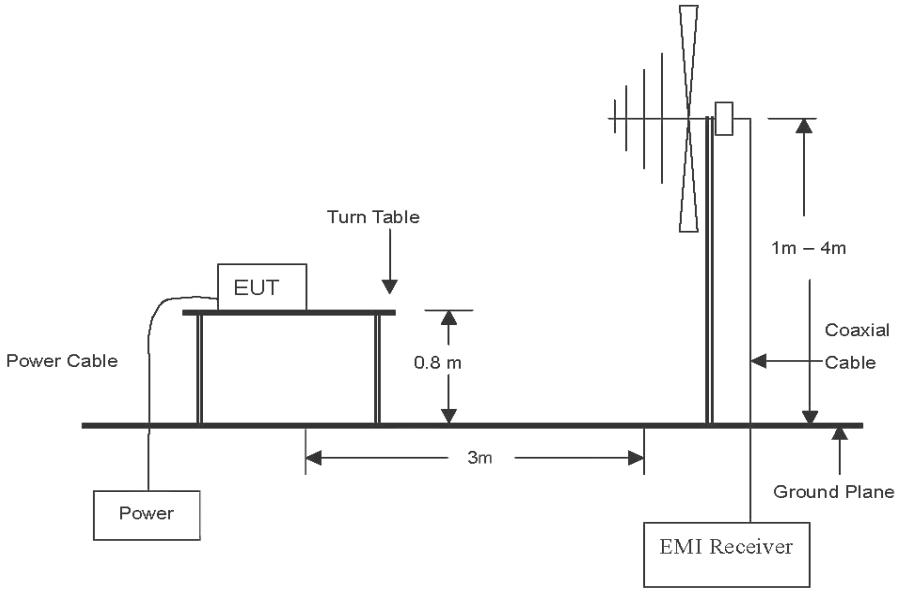
3.6. Radiated restricted band and emissions

Test setup

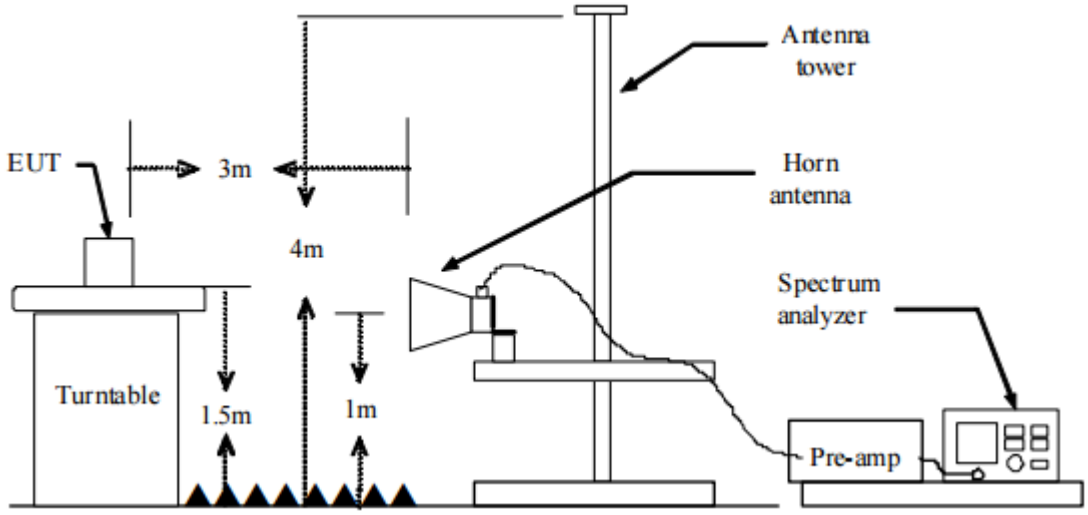
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.



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

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 above the ground for 30 ㎒-1 ㎓ and 1.5 meters for above 1 ㎓ 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 = 120 ㎑
   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

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.

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.
5. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that **X orientation** was worst-case orientation; therefore, all final radiated testing was performed with the EUT in **X orientation.**
6. The worst-case emissions are reported however emissions whose levels were not within 20 ㏈ of respective limits were not reported.
7. 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.

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 5.150-5.250 ㎓

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (㏈)
802.11a	2.07	2.10	0.99	98.57	-
802.11n_HT20	1.94	1.96	0.99	98.98	-
802.11ac_VHT20	1.94	1.97	0.98	98.48	-
802.11n_HT40	0.95	0.98	0.97	96.94	0.13
802.11ac_VHT40	0.95	0.99	0.96	95.96	0.18
802.11ac_VHT80	0.47	0.50	0.94	94.00	0.27

For the band 5.725-5.85 ㎓

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (㏈)
802.11a	2.07	2.10	0.99	98.57	-
802.11n_HT20	1.93	1.96	0.98	98.47	-
802.11ac_VHT20	1.94	1.97	0.98	98.48	-
802.11n_HT40	0.95	0.98	0.97	96.94	0.13
802.11ac_VHT40	0.96	0.99	0.97	96.97	0.13
802.11ac_VHT80	0.47	0.50	0.94	94.00	0.27

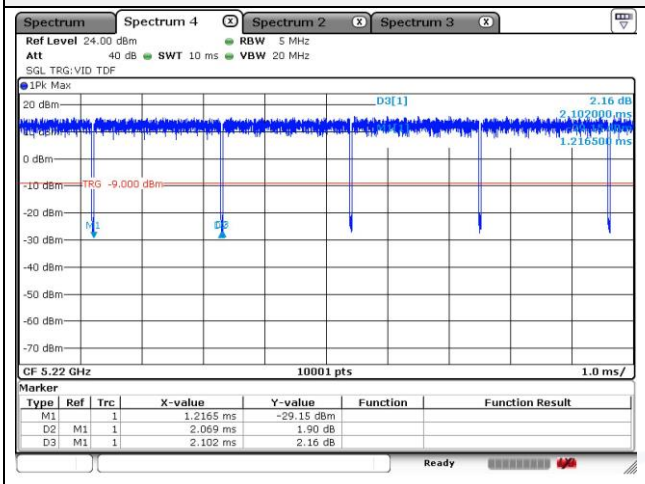
Note:

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

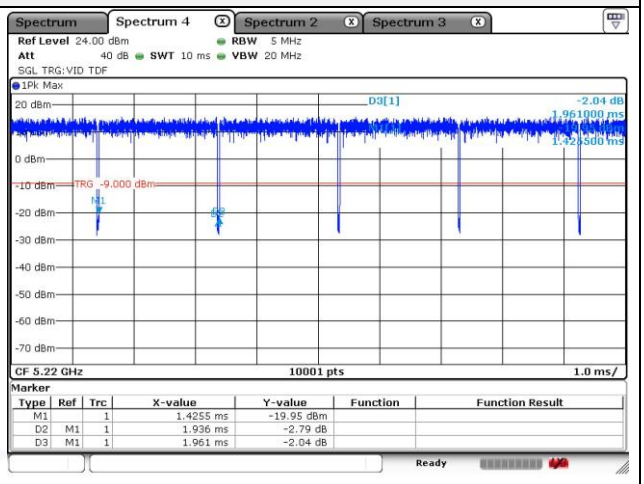
DCF(Duty cycle correction factor (㏈)) = 10log(1/duty cycle)

Mode:UNII-1

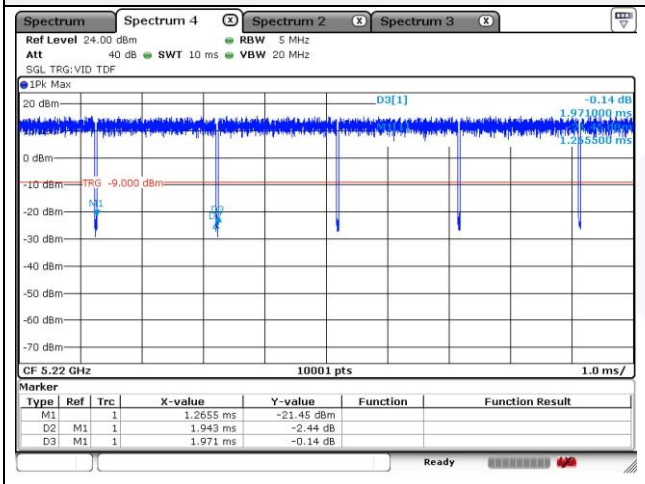
802.11a (6 Mbps)



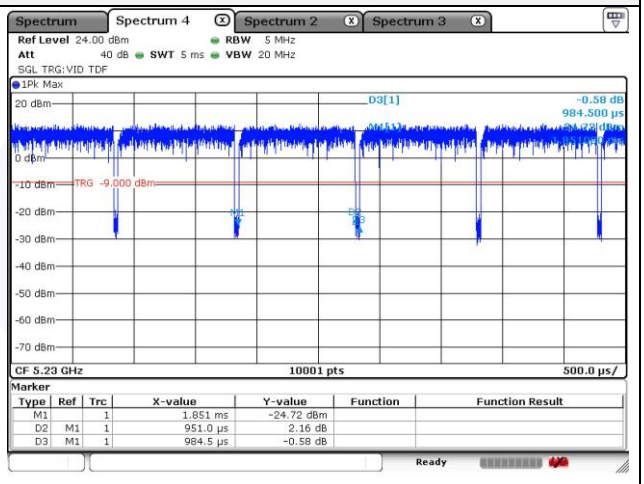
802.11n_HT20 (MCS0)



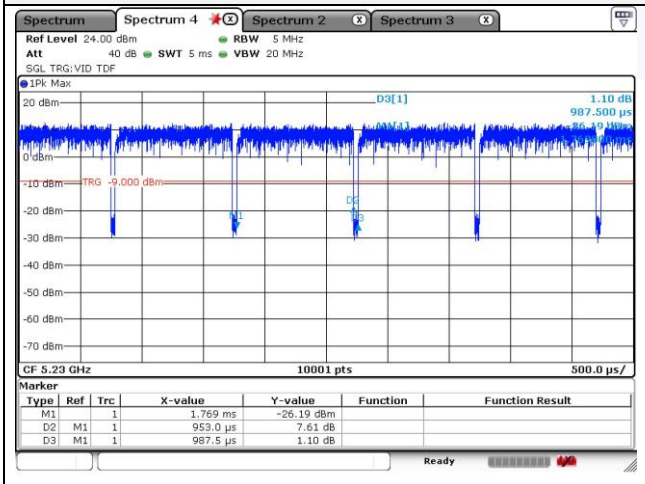
802.11ac_VHT20 (MCS0)



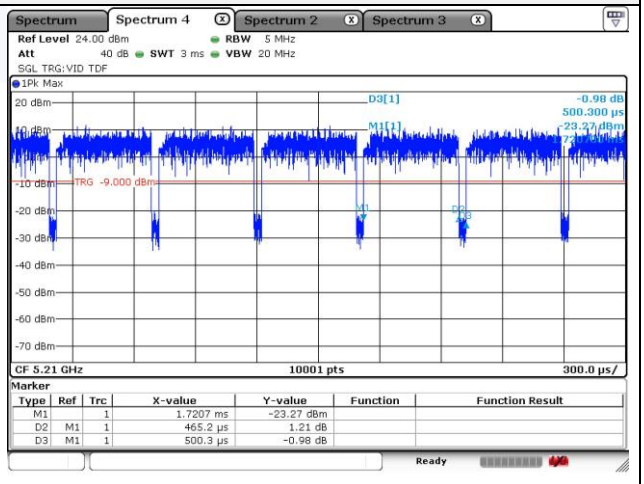
802.11n_HT40 (MCS0)



802.11ac_VHT40 (MCS0)



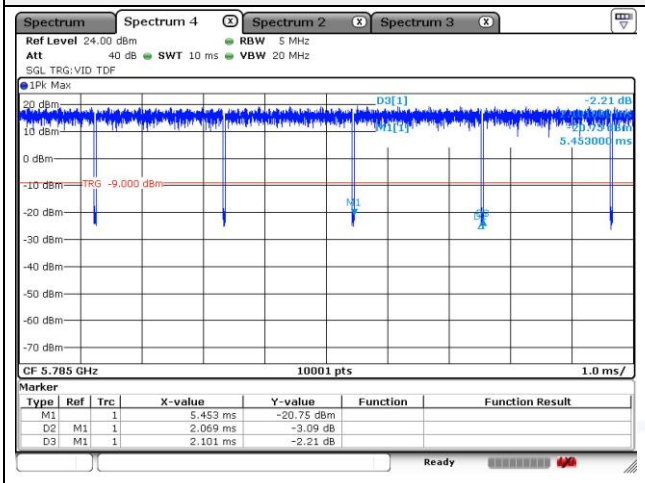
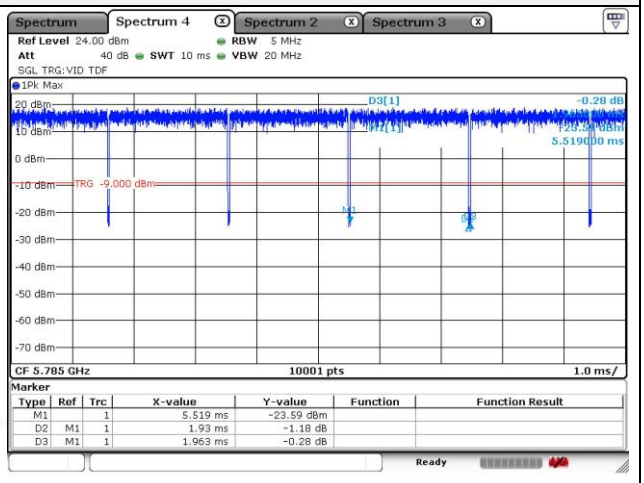
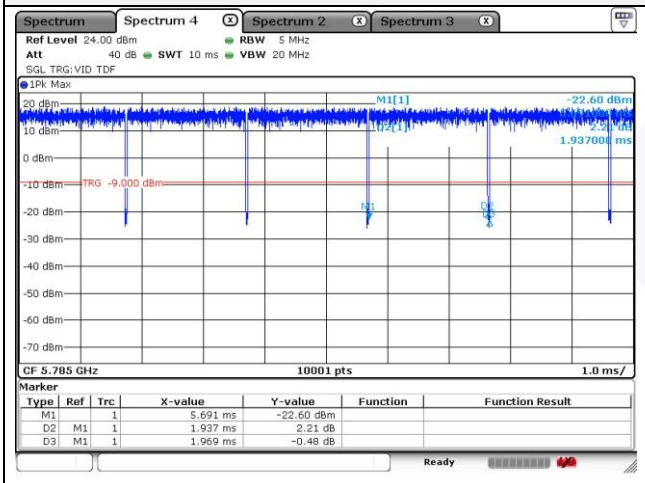
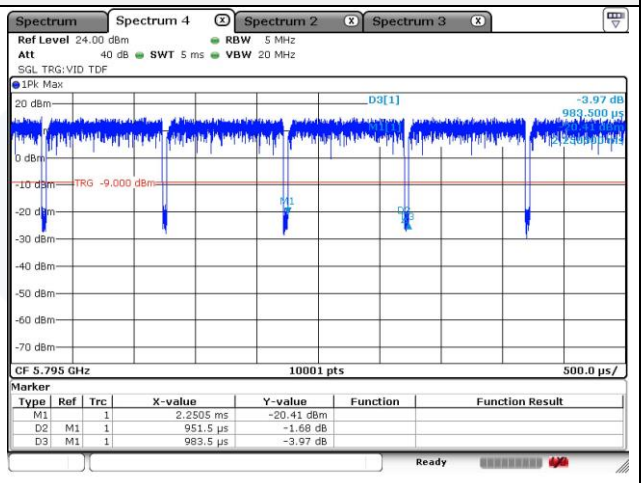
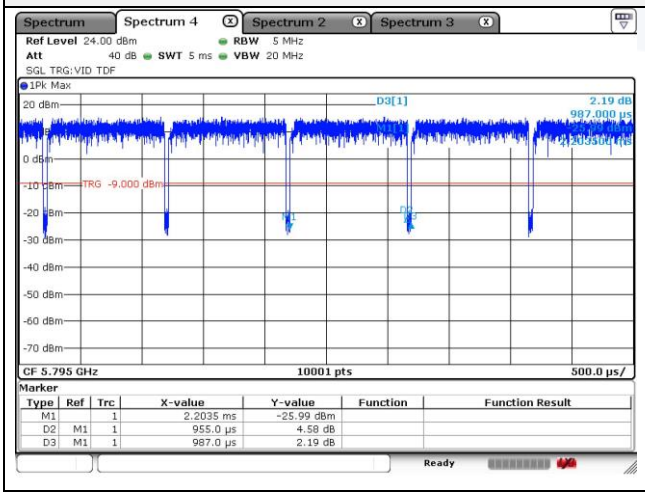
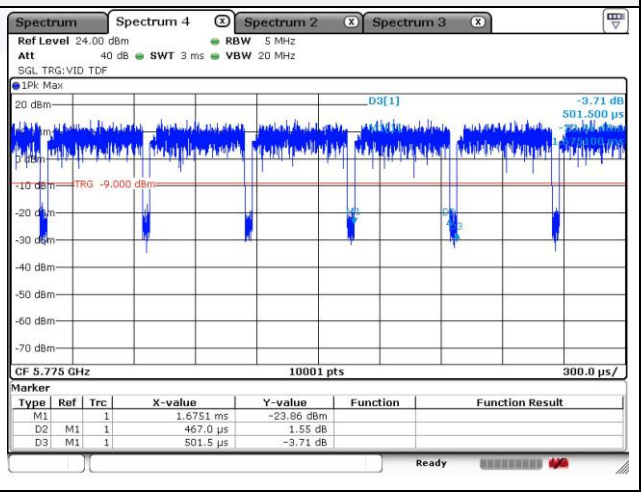
802.11ac_VHT80 (MCS0)



Note.

1. Tested with the maximum duty that can be set on the EUT.

Mode:UNII-3

802.11a (6 Mbps)	802.11n_HT20 (MCS0)
	
802.11ac_VHT20 (MCS0)	**802.11n_HT40 (MCS0)**
	
802.11ac_VHT40 (MCS0)	**802.11ac_VHT80 (MCS0)**
	

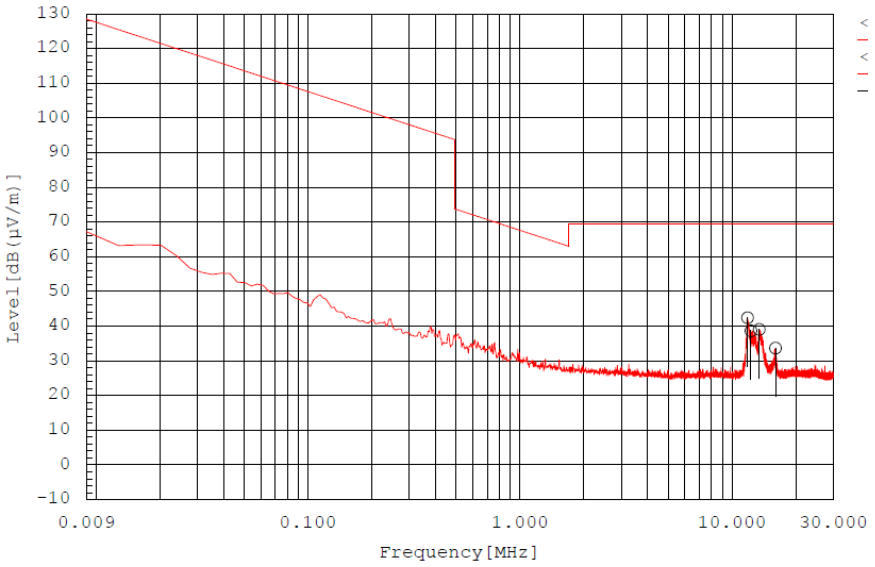
Note.

2. Tested with the maximum duty that can be set on the EUT.

Test results (Below 30 ㎒)

Band	UNII-1
Mode	802.11n_HT40(MCS0)
Distance of measurement:	3 meter
Channel	38 (Worst Case)

Parallel



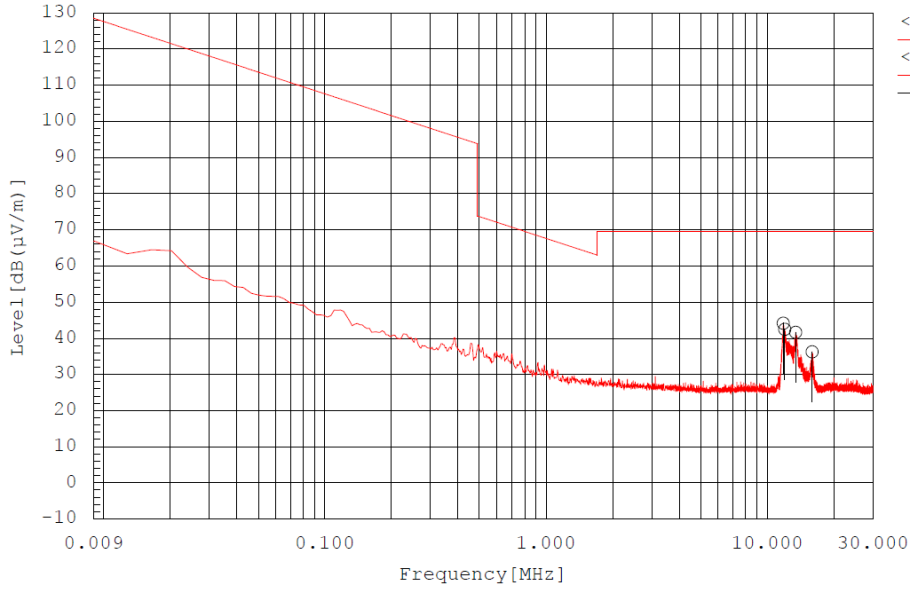
No.	Frequency [MHz]	Reading PK [dB(µV)]	c.f [dB(1/m)]	Result PK [dB(µV/m)]	Limit PK [dB(µV/m)]	Angle [deg]	Remark
1	11.852	22.8	19.6	42.4	----------	113.4	
2	12.294	19.0	19.6	38.6	----------	113.4	
3	13.426	19.4	19.7	39.1	----------	68.5	
4	16.017	14.0	19.7	33.7	----------	158.0	

Note.

1. No spurious emission were detected under 30 ㎒, Above data is peak result.

Band	UNII-3
Mode	802.11a (6 Mbps)
Distance of measurement:	3 meter
Channel	157 (Worst Case)

Parallel



No.	Frequency [MHz]	Reading PK [dB(µV)]	c.f [dB(1/m)]	Result PK [dB(µV/m)]	Limit PK [dB(µV/m)]	Angle [deg]	Remark
1	11.822	24.6	19.6	44.2	----------	93.7	
2	12.009	22.9	19.6	42.5	----------	93.7	
3	13.422	22.0	19.7	41.7	----------	93.7	
4	15.938	16.6	19.7	36.3	----------	49.9	

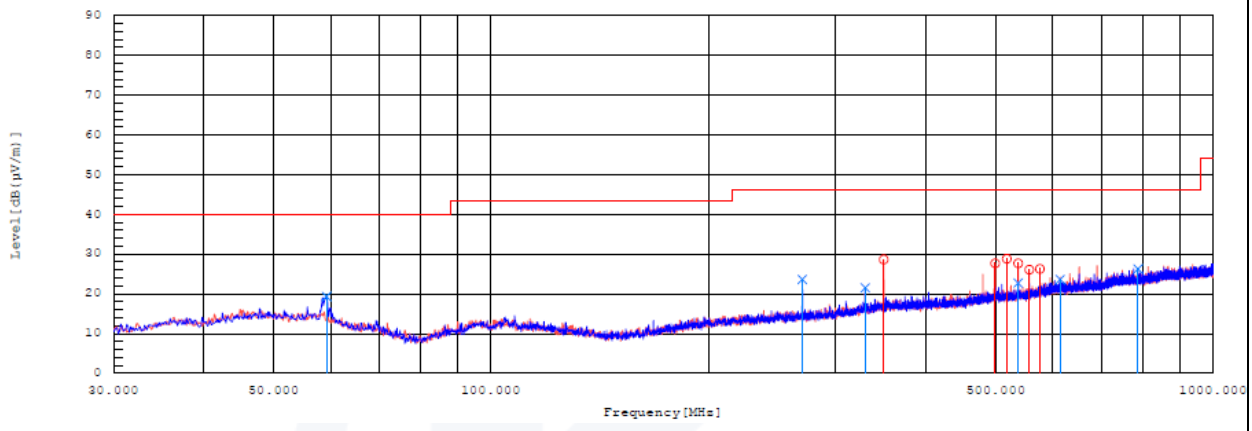
Note.

1. No spurious emission were detected under 30 ㎒, Above data is peak result.

Test results (Below 1 000 ㎒)

Band	UNII-1
Mode	802.11n_HT40(MCS0)
Distance of measurement:	3 meter
Channel	38 (Worst Case)

Horizontal // Vertical

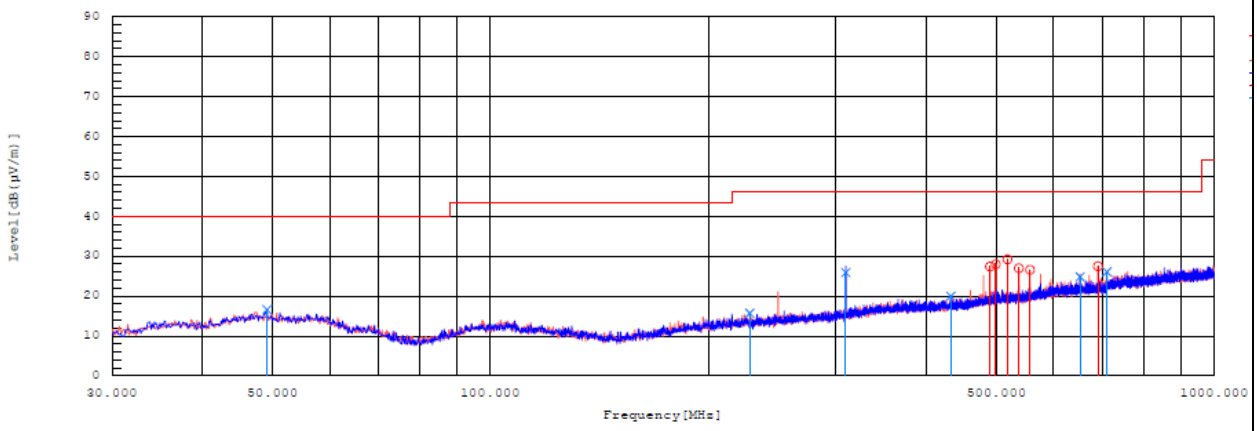


Final Result

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	59.221	V	32.4	-13.1	19.3	40.0	20.7	105.0	359.9	
2	269.954	V	35.0	-11.4	23.6	38.2	14.6	100.0	359.9	
3	329.973	V	31.1	-9.6	21.5	46.0	24.5	142.0	0.1	
4	349.979	H	37.4	-8.8	28.6	46.0	17.4	116.0	332.4	
5	499.238	H	34.0	-6.3	27.7	46.0	18.3	202.0	0.0	
6	518.395	H	34.9	-6.1	28.8	46.0	17.2	196.0	357.8	
7	537.553	V	28.6	-5.9	22.7	46.0	23.3	104.0	22.5	
8	537.553	H	33.6	-5.9	27.7	46.0	18.3	198.0	0.0	
9	556.831	H	31.6	-5.5	26.1	46.0	19.9	242.0	0.0	
10	575.989	H	31.2	-4.9	26.3	46.0	19.7	185.0	0.0	
11	614.425	V	27.7	-4.1	23.6	46.0	22.4	104.0	27.5	
12	787.570	V	27.7	-1.4	26.3	46.0	19.7	157.0	2.4	

Band	UNII-3
Mode	802.11a (6 Mbps)
Distance of measurement:	3 meter
Channel	157 (Worst Case)

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	49.158	V	28.6	-12.0	16.6	40.0	23.4	102.0	169.6	
2	228.365	V	28.2	-12.5	15.7	46.0	30.3	100.0	39.5	
3	309.966	V	36.3	-10.4	25.9	46.0	20.1	144.0	233.8	
4	432.793	V	28.0	-8.0	20.0	46.0	26.0	107.0	305.9	
5	490.023	H	34.0	-6.6	27.4	46.0	18.6	116.0	282.5	
6	499.238	H	34.3	-6.3	28.0	46.0	18.0	198.0	337.4	
7	518.395	H	35.3	-6.1	29.2	46.0	16.8	192.0	216.5	
8	537.553	H	32.9	-5.9	27.0	46.0	19.0	246.0	0.0	
9	556.831	H	32.1	-5.5	26.6	46.0	19.4	187.0	0.0	
10	652.861	V	28.5	-3.7	24.8	46.0	21.2	155.0	188.8	
11	691.176	H	30.8	-3.3	27.5	46.0	18.5	100.0	22.5	
12	711.546	V	28.9	-2.8	26.1	46.0	19.9	397.0	119.7	

Test results (Above 1 000 ㎒)

Mode:	802.11a (6 Mbps)
Distance of measurement:	3 meter
Channel:	36

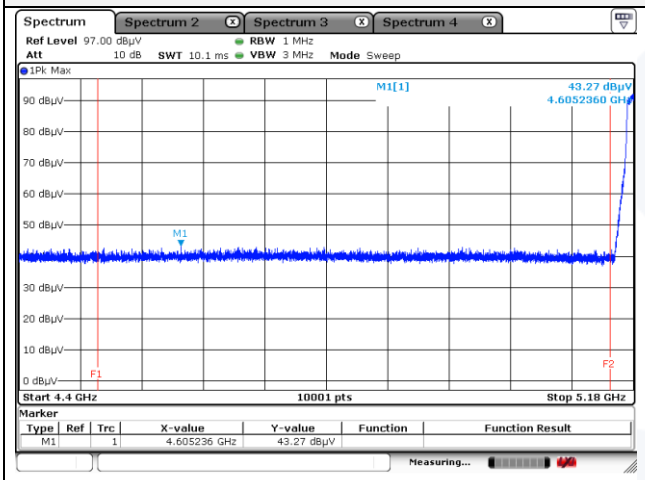
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 035.75	44.40	Peak	V	-9.48	-	34.92	74.00	39.08
1 040.75	44.39	Peak	H	-9.45	-	34.94	74.00	39.06

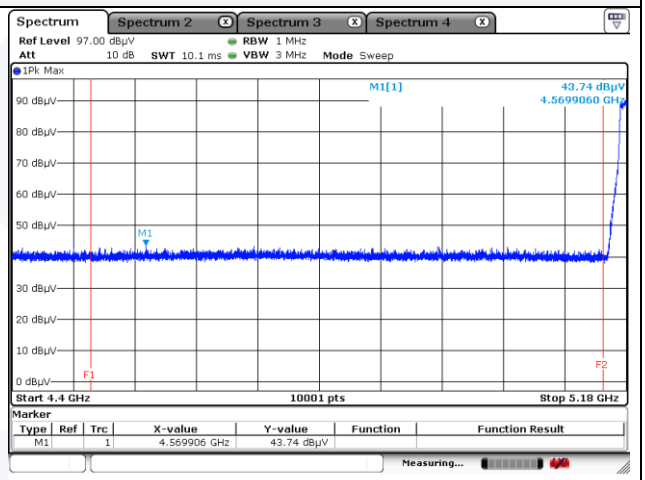
- **Band edge**

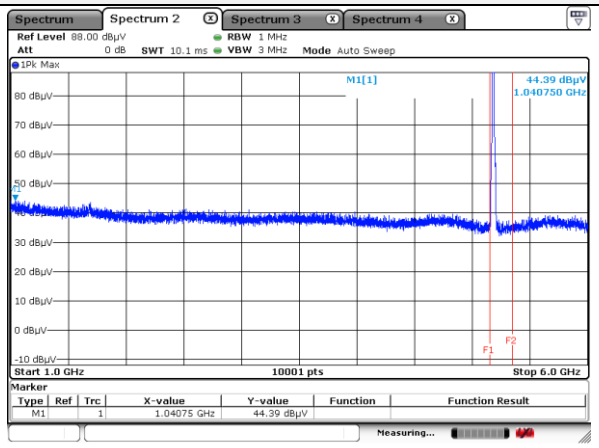
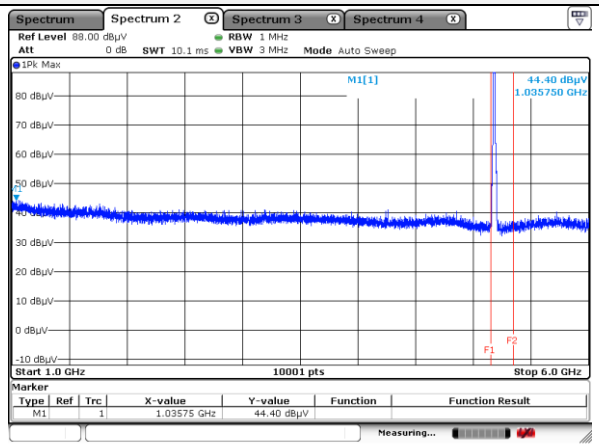
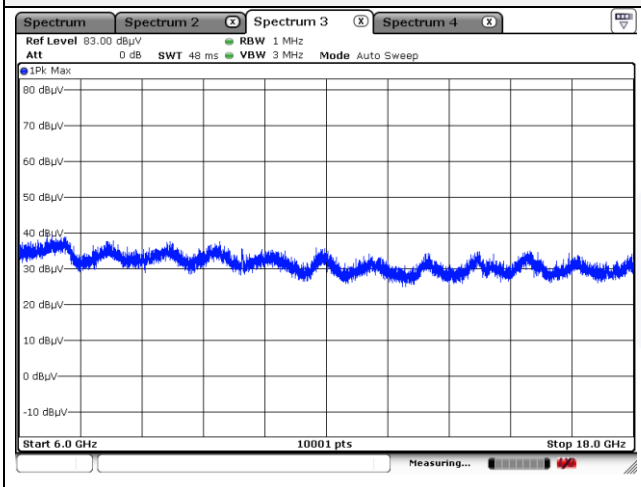
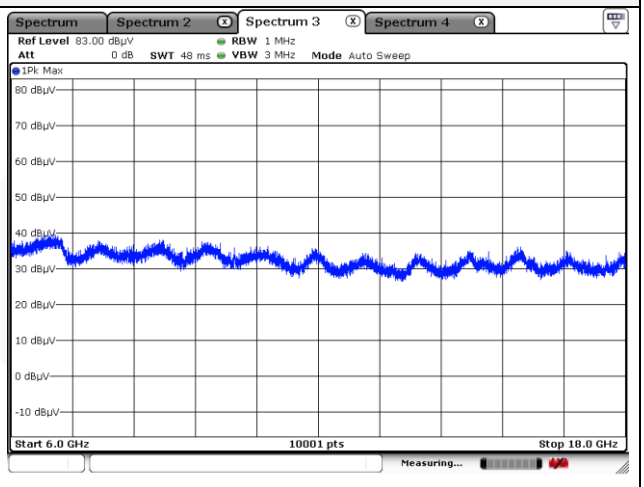
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
4 569.91	43.74	Peak	V	4.63	-	48.37	74.00	25.63
4 605.24	43.27	Peak	H	4.86	-	48.13	74.00	25.87

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.

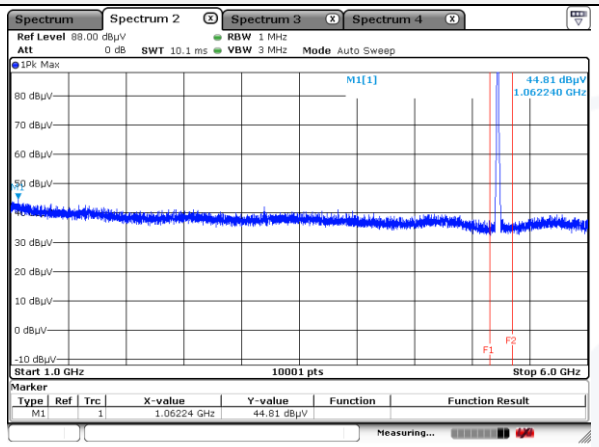
1. No spurious emission were detected above 3 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode:	802.11a (6 Mbps)
Distance of measurement:	3 meter
Channel:	44

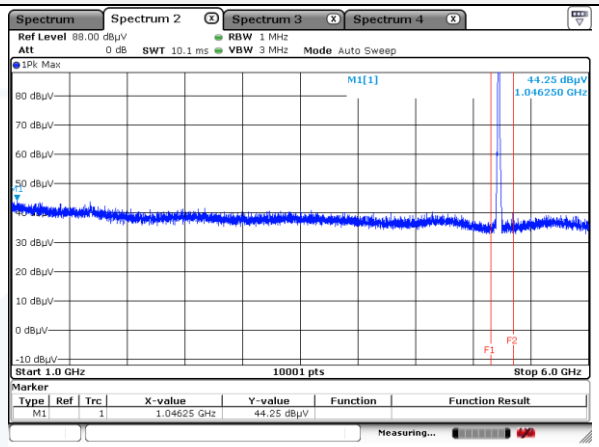
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 046.25	44.25	Peak	V	-9.41	-	34.84	74.00	39.16
1 062.24	44.81	Peak	H	-9.31	-	35.50	74.00	38.50

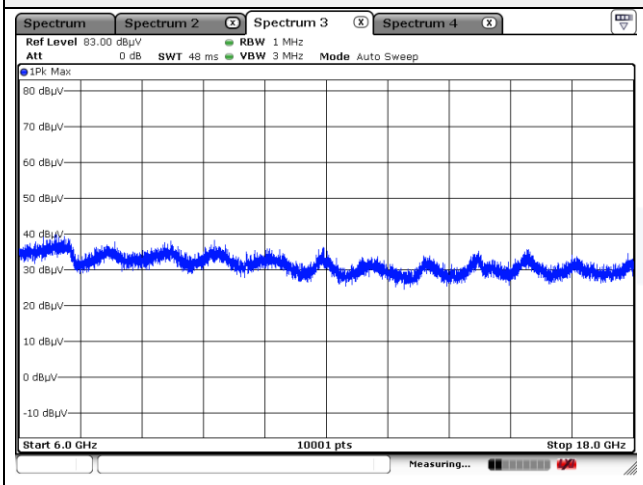
Horizontal // Peak for 1 ㎓ to 6 ㎓



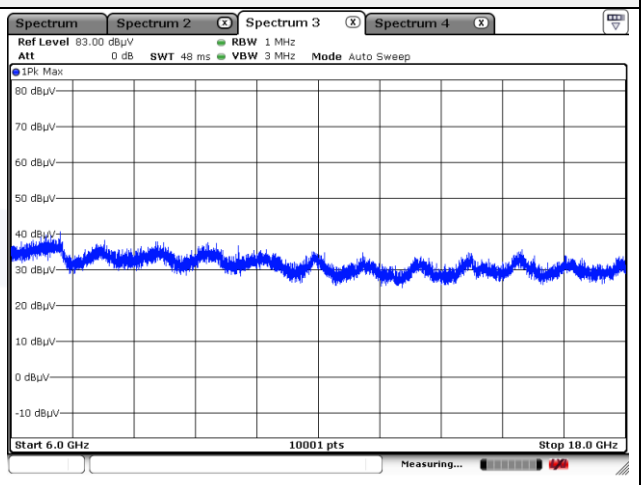
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 3 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode:	802.11a (6 Mbps)
Distance of measurement:	3 meter
Channel:	48

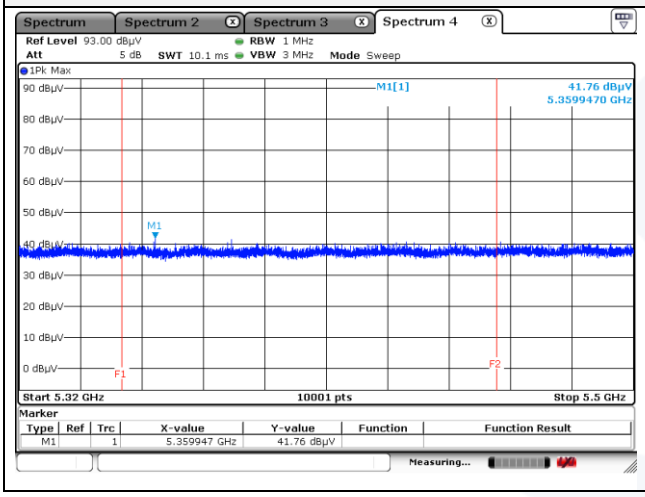
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 047.25	44.78	Peak	V	-9.41	-	35.37	74.00	38.63
1 678.18	43.86	Peak	H	-4.96	-	38.90	74.00	35.10

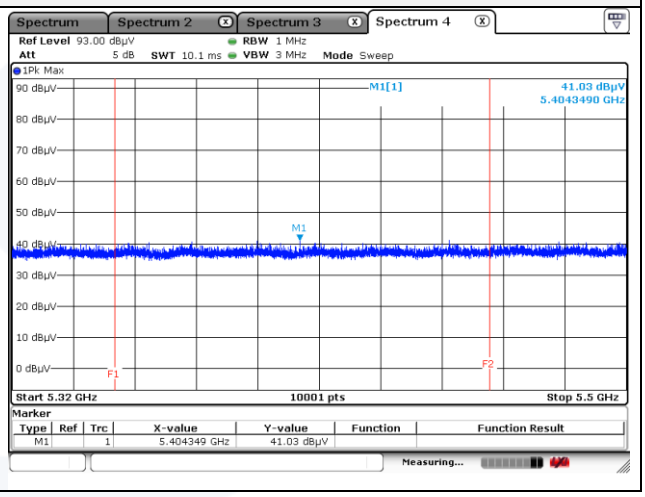
- **Band edge**

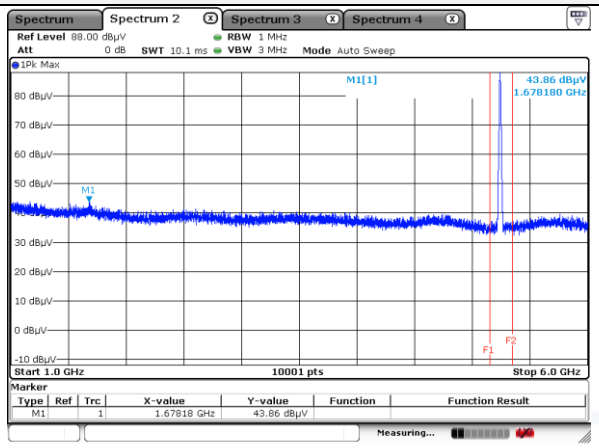
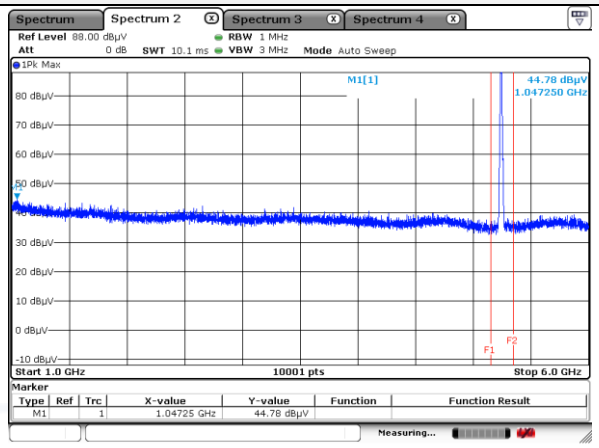
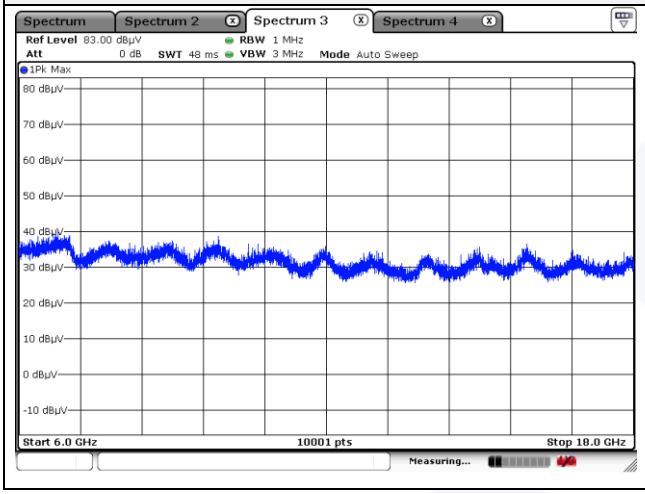
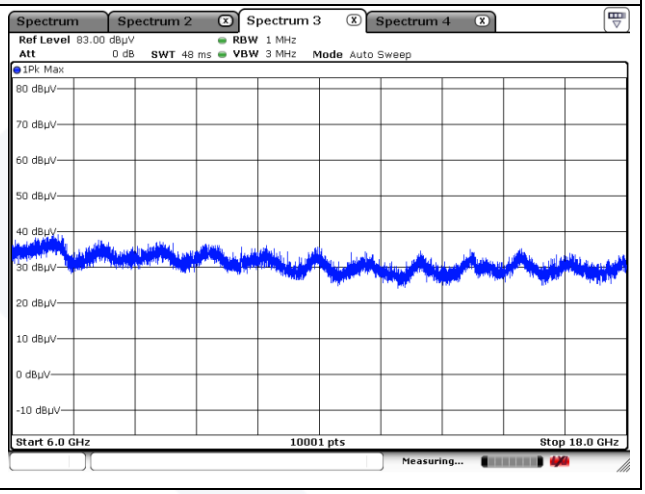
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 359.95	41.76	Peak	H	7.50	-	49.26	74.00	24.74
5 404.35	41.03	Peak	H	7.53	-	48.56	74.00	25.44

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 3 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: 802.11n_HT20 (MCS0)

Distance of measurement: 3 meter

Channel: 36

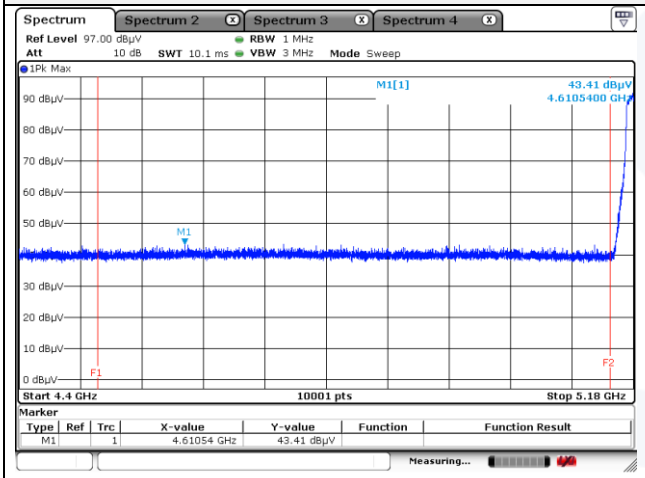
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 014.75	44.14	Peak	H	-9.61	-	34.53	74.00	39.47
1 677.18	43.77	Peak	V	-4.97	-	38.80	74.00	35.20

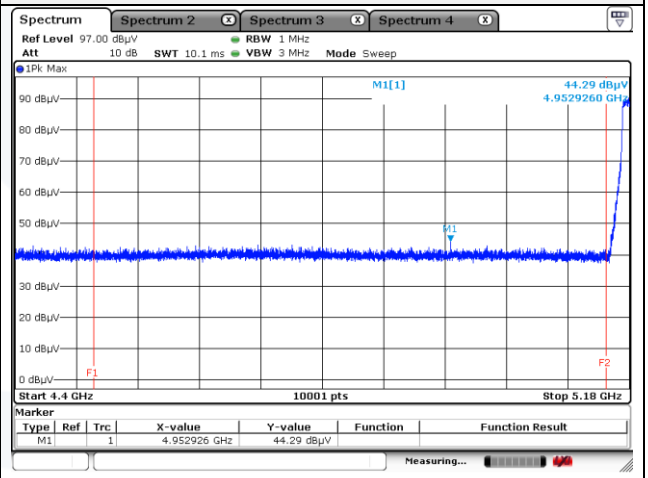
- **Band edge**

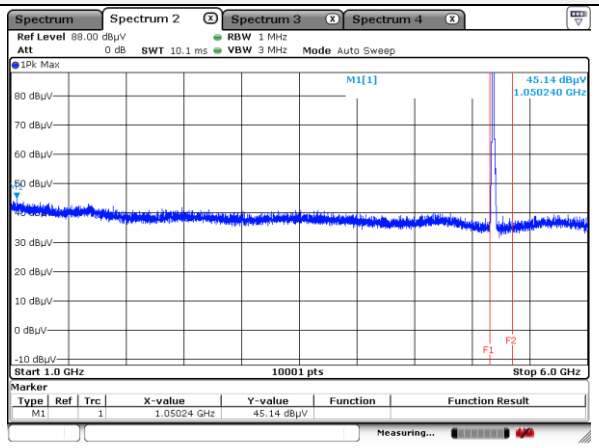
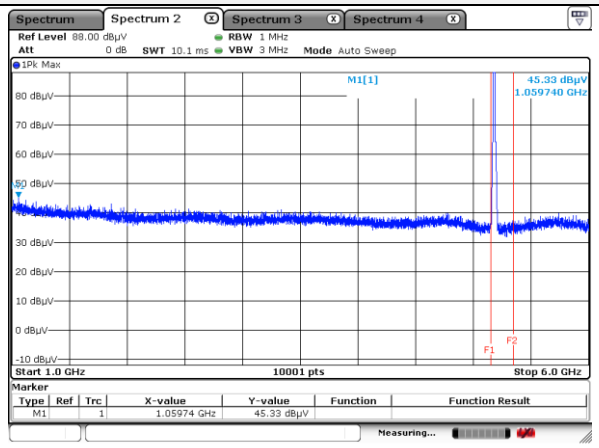
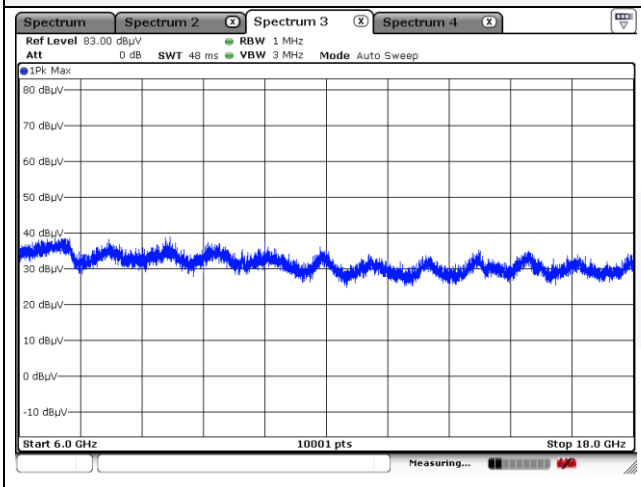
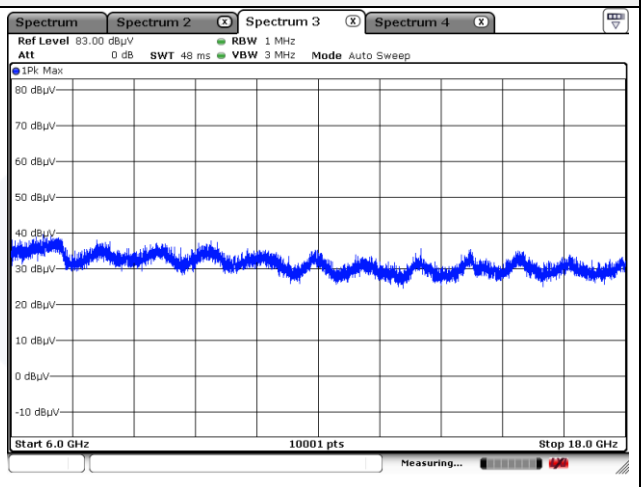
Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
4 725.03	43.10	Peak	V	5.62	-	48.72	74.00	25.28
4 759.27	43.87	Peak	H	5.84	-	49.71	74.00	24.29

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.

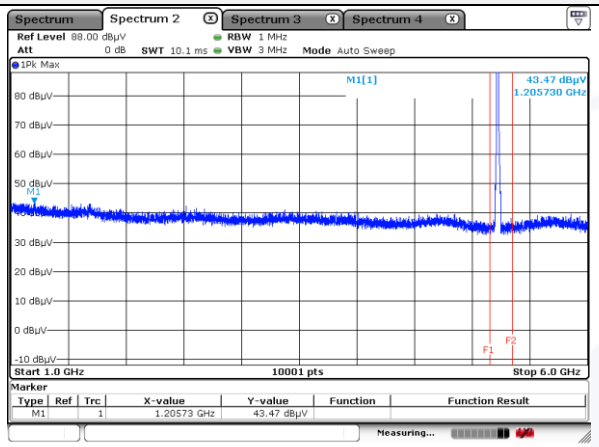
1. No spurious emission were detected above 3 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode:	802.11n_HT20 (MCS0)
Distance of measurement:	3 meter
Channel:	44

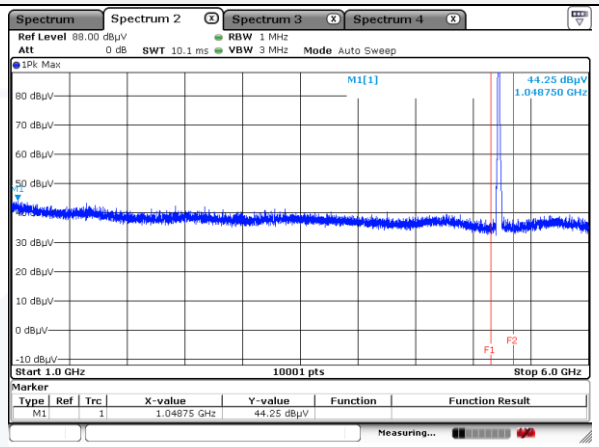
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 060.74	44.61	Peak	V	-9.32	-	35.29	74.00	38.71
1 684.68	44.78	Peak	H	-4.90	-	39.88	74.00	34.12

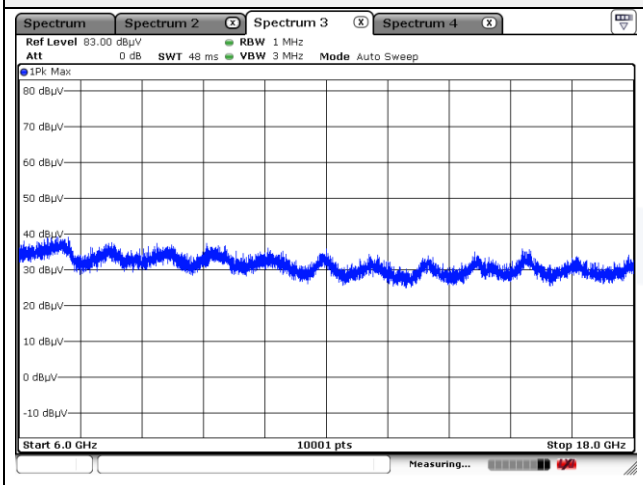
Horizontal // Peak for 1 ㎓ to 6 ㎓



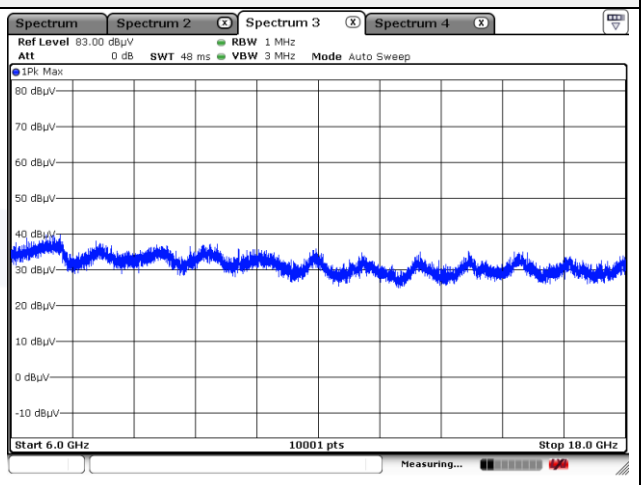
Vertical // Peak for 1 ㎓ to 6 ㎓



Horizontal // Peak for 6 ㎓ to 18 ㎓



Vertical // Peak for 6 ㎓ to 18 ㎓



Note.
1. No spurious emission were detected above 3 ㎓.
2. Average test would be performed if the peak result were greater than the average limit.

Mode:	802.11n_HT20 (MCS0)
Distance of measurement:	3 meter
Channel:	48

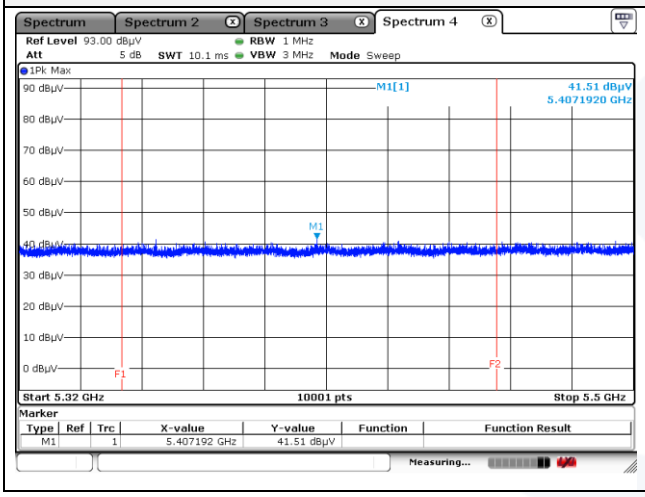
- **Spurious**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 069.74	44.15	Peak	H	-9.27	-	34.88	74.00	39.12
1 071.24	45.53	Peak	V	-9.26	-	36.27	74.00	37.73

- **Band edge**

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 359.52	40.74	Peak	V	7.50	-	48.24	74.00	25.76
5 359.70	41.05	Peak	H	7.50	-	48.55	74.00	25.45

Restricted band // Horizontal // Peak



Restricted band // Vertical // Peak