TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-4904-0113 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR25-SRF0221 Page (1) of (55)	eurofins | KCTL

1. Client

- Name : YURA CORPORATION
- Address : 308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2025-10-22

2. Use of Report : Certification

3. Name of Product / Model : Built-In CAM / BLTN_CAM2.0_ME1

4. Manufacturer / Country of Origin : YURA CORPORATION / Korea

5. FCC ID : 2A8FF-BLTNCAM20

6. IC Certificate No. : 28921-BLTNCAM20

7. Date of Test : 2025-11-12 to 2025-11-25

8. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

9. Test method used : FCC Part 15 Subpart E, 15.407
RSS-247 Issue 4 July 2025
RSS-Gen Issue 5 February 2021

10. Test Result : Refer to the test result in the test report

Affirmation	Tested by	Technical Manager
	Name : Seung Kim (Signature)	Name : Kwonse Kim (Signature)

2025-12-16

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2025-12-16	Originally issued	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	YURA CORPORATION
Address	:	308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Manufacturer	:	YURA CORPORATION
Address	:	308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Laboratory	:	Eurofins KCTL Co.,Ltd.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Built-In CAM			
Model	:	BLTN_CAM2.0_ME1			
Modulation technique	:	WIFI(802.11a/n)	:	OFDM	
Number of channels	:	UNII 1	:	4 ch (20 ㎒), 2 ch (40 ㎒)	
		UNII 3	:	5 ch (20 ㎒), 2 ch (40 ㎒)	
Power source	:	DC 12 V			
Antenna specification	:	PCB antenna			
Antenna gain	:	UNII 1	:	-0.87 ㏈i	
		UNII 3	:	-2.08 ㏈i	
Frequency range	:	UNII 1	:	5 180 ㎒ ~ 5 240 ㎒	(802.11a/n_HT20)
		UNII 1		5 190 ㎒ ~ 5 230 ㎒	(802.11n_HT40)
		UNII 3	:	5 745 ㎒ ~ 5 825 ㎒	(802.11a/n_HT20)
		UNII 3	:	5 755 ㎒ ~ 5 795 ㎒	(802.11n_HT40)
Software version	:	01.00.70.00			
Hardware version	:	1.00			
Test device serial No.	:	95720-GO100			
Operation temperature	:	-40 ℃ ~ 75 ℃			

2.1. Frequency/channel operations

This device contains the following capabilities:
WLAN 5 ㎓(802.11a/n_HT20/40)

UNII-1		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
36	5 180	149	5 745
40	5 200	157	5 785
48	5 240	165	5 825

Table 2.1.1. WLAN 5 ㎓(802.11a/n_HT20)

UNII-1		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
38	5 190	151	5 755
46	5 230	159	5 795

Table 2.1.2. WLAN 5 ㎓(802.11n_HT40)

2.2. RF power setting in TEST SW

Mode	Frequency [㎒]	RF Power setting value	Test Program
802.11a	5 180	17	CMD_adb shell
	5 200	17	
	5 240	17	
802.11n_HT20	5 180	16	
	5 200	16	
	5 240	16	
802.11n_HT40	5 190	14	
	5 230	16	
802.11a	5 745	16	
	5 785	17	
	5 825	18	
802.11n_HT20	5 745	16	
	5 785	16	
	5 825	16	
802.11n_HT40	5 755	16	
	5 795	16	

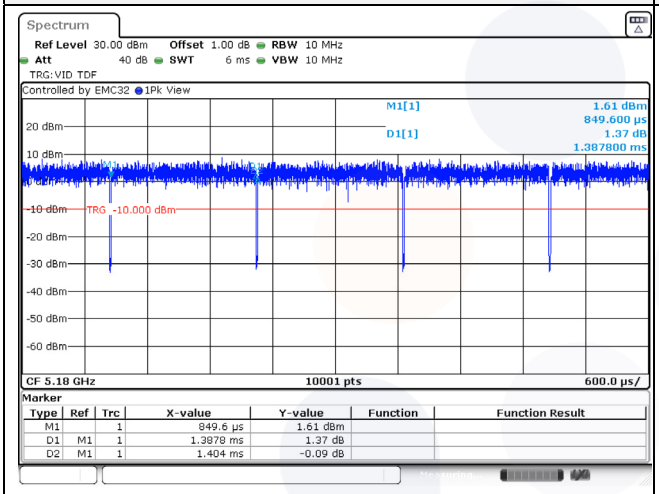
2.3. Duty Cycle Factor

Test mode	Period (ms)	T_{On} time (ms)	Duty cycle		Duty Cycle Factor (dB)
			(Linear)	(%)	
802.11a	1.404	1.388	0.988 6	98.86	0.05
802.11n_HT20	1.313	1.297	0.987 8	98.78	0.05
802.11n_HT40	0.664	0.648	0.975 9	97.59	0.11

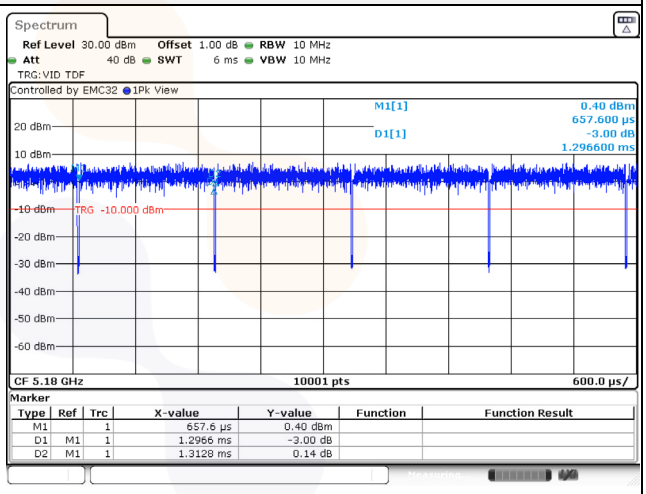
Notes:

1. Duty cycle (Linear) = T_{On} time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not compensated to average result if the duty cycle is more than 98%

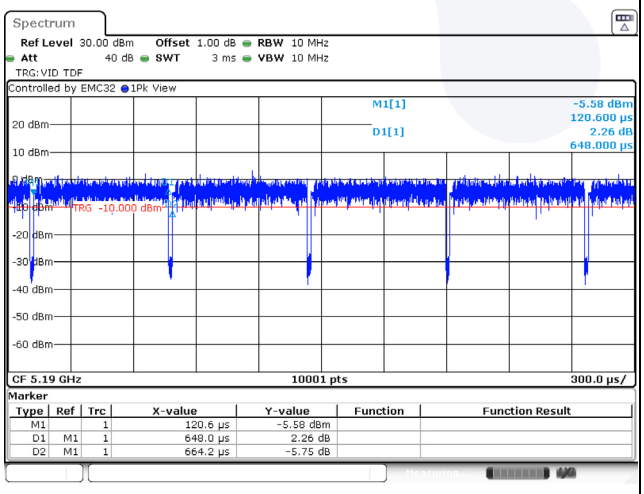
802.11a



802.11n_HT20



802.11n_HT40



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3. Antenna requirement

Requirement of FCC part section 15.203

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

Requirement of RSS-Gen Section 6.8:

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

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

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

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

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

- The transmitter has permanently attached Ceramic PCB antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.407.

4. Summary of tests

FCC Part section(s)	IC Rule Reference	Parameter	Test Condition	Test results
15.407(a)	RSS-247 (7.3)	Maximum conducted output power	Conducted	Pass
15.407(a)	RSS-247 (7.3)	Maximum power spectral density		Pass
15.407(a)	RSS-Gen (6.7)	26 dB Channel Bandwidth		Pass
15.407(e)	RSS-247 (7.3)	6 dB Channel Bandwidth		Pass
-	RSS-Gen (6.7)	Occupied Bandwidth		Pass
15.407(g)	RSS-Gen (6.11), (8.11)	Frequency Stability		Pass
15.207(a)	RSS-Gen (8.8)	AC Conducted Emissions		N/T[1)]
15.407(b), 15.205(a), 15.209(a)	RSS-Gen (8.9), (8.10) RSS-247 (7.3)	Spurious emission	Radiated	Pass
		Band-edge, restricted band		Pass

Notes: (N/T: Not Tested, N/A: Not Applicable)

1. The test was not conducted as the device is vehicle type.
2. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst-case emissions.
3. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
4. EUT was investigated in three orthogonal orientations X, Y and Z. it was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation.
5. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2020
   - ANSI C63.10-2020+Cor.1-2023
   - KDB 789033 D02 v02r01

7. Based on the baseline scan, the worst-case data rates were:
   802.11a mode : 6Mbps
   802.11n HT20 mode : MCS0
   802.11n HT40 mode : MCS0

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020, ANSI C63.10-2020+Cor.1-2023.

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

Parameter	Expanded uncertainty (±)	
Maximum Peak Output Power	0.9 dB	
Peak Power Spectral Density	1.0 dB	
6, 26 dB Channel Bandwidth	0.1 %	
Occupied Bandwidth	0.1 %	
Conducted spurious emission	2.0 dB	
Radiated spurious Emissions (Bandedge, restricted band)	Below 30 ㎒	2.3 dB
	30 ㎒ to 1 000 ㎒	2.6 dB
	1 000 ㎒ to 18 000 ㎒	4.8 dB
	Above 18 000 ㎒	4.8 dB
AC Conducted Emissions	150 ㎑ to 30 ㎒	2.9 dB

6. Measurement results explanation example

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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.

Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor (㏈)
30	9.40	9 000	10.78
50	9.64	10 000	11.46
100	9.72	11 000	11.93
200	9.69	12 000	12.90
300	9.90	13 000	12.57
400	10.28	14 000	12.55
500	10.35	15 000	12.17
600	10.41	16 000	12.96
700	10.48	17 000	12.61
800	10.54	18 000	12.71
900	10.44	19 000	12.47
1 000	10.09	20 000	12.94
2 000	10.77	21 000	12.88
3 000	11.05	22 000	12.39
4 000	11.19	23 000	13.37
5 000	11.46	24 000	12.75
6 000	11.54	25 000	12.90
7 000	10.91	26 000	13.74
8 000	10.81	26 500	13.57

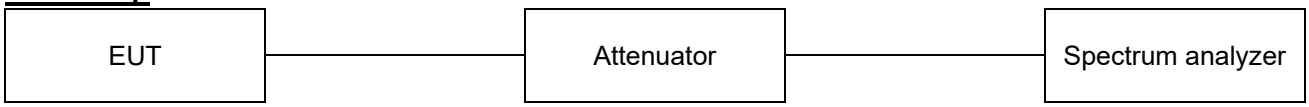
Notes:

Offset(㏈) = RF cable loss(㏈) + Attenuator(㏈)

7. Test results

7.1. Maximum conducted output power

Test setup



Limit

According to §15.407(a), RSS-247(6.2),

FCC

Band	EUT category		Conducted output power limit
UNII-1		Outdoor access point	1 W (30 dB m)
		Indoor access point	
		Fixed point-to-point access point	
	√	Client device	250 mW (23.98 dB m)
UNII-2A			250 mW or 11 dB m + 10logB[1)]
UNII-2C			250 mW or 11 dB m + 10logB[1)]
UNII-3		√	1 W (30 dB m)

IC

Band	Power limits	
	Maximum conducted output power	Maximum e.i.r.p
UNII 1	-	200 mW or 10 + 10 logB[1)], dB m
UNII 2A	250 mW or 11 dB m + 10logB[1)]	1 W or 17 dB m + 10logB[1)]
UNII 2C	250 mW or 11 dB m + 10logB[1)]	1 W or 17 dB m + 10logB[1)]
UNII 3	1 W (30 dB m)	-

Note:

1) Conducted output power limit B is the 26 dB emission bandwidth.
2) Maximum e.i.r.p. limit B is the 99% emission bandwidth.

Test procedure

ANSI C63.10-2020-Section 12.4.2.4
ANSI C63.10-2020+Cor.1-2023-Section 12.4.2.4
KDB 789033 D02 v02r01 - Section E.2.d)

Test settings

Used test method is Section E.2.d)

◆ **KDB 789033 D02 v02r01**

Section E.2.d)

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

(i) Measure the duty cycle, x, of the transmitter output signal as described in II.B..

(ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(iii) Set RBW = 1 ㎒

(iv) Set RBW ≥ 3 ㎒

(v) Number of points in sweep ≥ 2 x span/RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(vi) Sweep time = auto.

(vii) Detector = power averaging (rms), if available. Otherwise use sample detector mode.

(viii) Do not use sweep triggering. Allow the sweep to “free run.”

(ix) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.

(x) Compute power by integrating the spectrum across the 99% OBW of the signal using the instrument’s band-power measurement function with band limits set equal to the EBW or OBW band-edges. If the instrument does not have a band-power function, then sum the spectrum levels (in power units) at 1 ㎒ intervals extending across the 99% OBW of the spectrum.

(xi) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log(1/0,25) = 6 ㏈ if the duty cycle is 25%.

Test results

Conducted Output Power

Test mode	Band	Frequency (㎒)	Measured output power			Limit (dB m)
			Reading (dB m)	DCF (dB)	Result (dB m)	
802.11a	UNII 1	5 180	12.21	-	12.21	23.98
		5 200	12.35		12.35	
		5 240	12.44		12.44	
	UNII 3	5 745	10.08		10.08	30.00
		5 785	10.14		10.14	
		5 825	11.21		11.21	
802.11n HT20	UNII 1	5 180	11.46	-	11.46	23.98
		5 200	11.58		11.58	
		5 240	11.65		11.65	
	UNII 3	5 745	9.53		9.53	30.00
		5 785	9.30		9.30	
		5 825	9.39		9.39	
802.11n HT40	UNII 1	5 190	10.88	0.11	10.99	23.98
		5 230	11.68		11.79	
	UNII 3	5 755	9.40		9.51	30.00
		5 795	9.26		9.37	

Note:

1. Result (dBm) = Reading (dBm) + D.C.F (dB)

e.i.r.p.

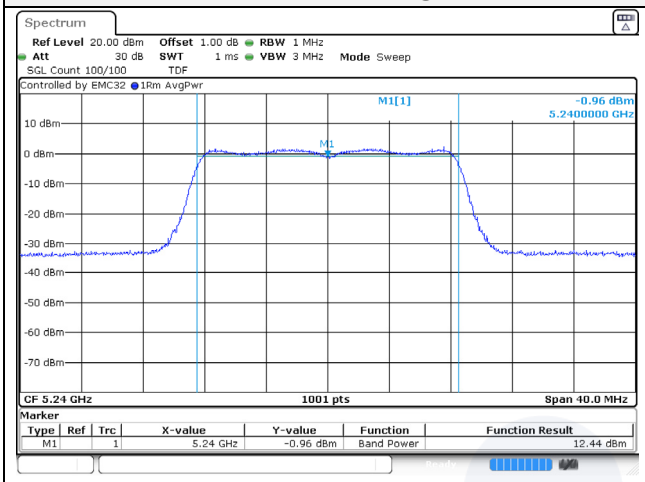
Test mode	Band	Frequency (㎒)	Measured output power			MAX e.i.r.p Limit (dB m)
			Conducted output Power (dB m)	ANT gain (dB i)	MAX e.i.r.p (dB m)	
802.11a	UNII 1	5 180	12.21	-0.87	11.34	22.29
		5 200	12.35		11.48	
		5 240	12.44		11.57	
802.11n HT20	UNII 1	5 180	11.46	-0.87	10.59	22.51
		5 200	11.58		10.71	
		5 240	11.65		10.78	
802.11n HT40	UNII 1	5 190	10.99	-0.87	10.12	23.01
		5 230	11.79		10.92	

Notes:

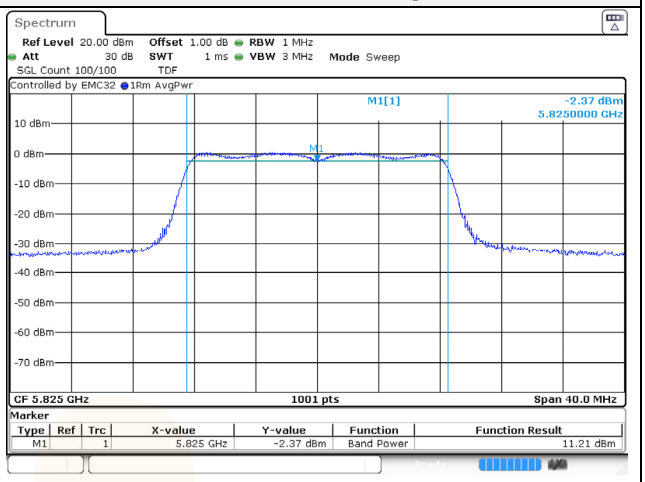
1. E.I.R.P. Calculation: E.I.R.P. (dB m) = Conducted output power (dB m) + Antenna gain (dB i)

In order to simplify the report, attached plots were the worst case per bandwidth

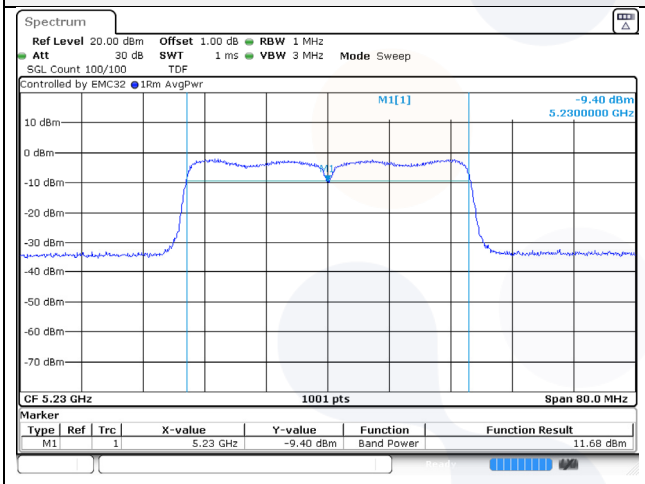
UNII 1 / 802.11a / High ch.



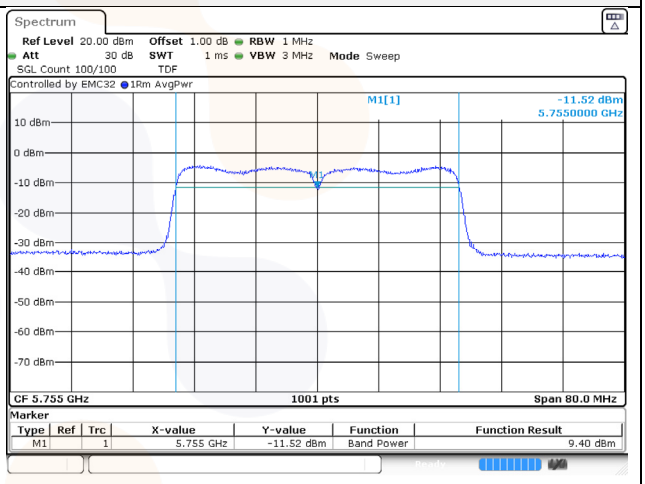
UNII 3 / 802.11a / High ch.



UNII 1 / 802.11n HT40 / High ch.

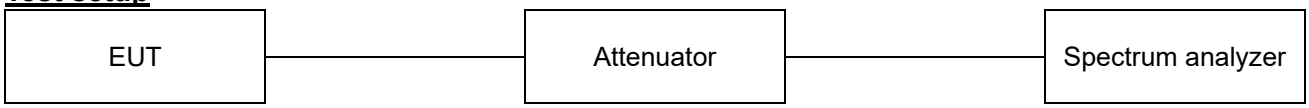


UNII 3 / 802.11n HT40 / Low ch.



7.2. Maximum Power Spectral Density

Test setup



Limit

According to §15.407(a),

Band	EUT category		Limit
UNII-1		Outdoor access point	17 dBm/MHz
		Indoor access point	
		Fixed point-to-point access point	
	√	Client device	11 dBm/MHz
UNII-2A			11 dBm/MHz
UNII-2C			11 dBm/MHz
UNII-3	√		30 dBm/500 kHz

According to RSS-247(7.3),

Band	e.i.r.p. spectral density	Limit
UNII 1	√	10 dBm/MHz

Band	Power spectral density	Limit
UNII 2A		11 dBm/MHz
UNII 2C		11 dBm/MHz
UNII 3	√	30 dBm/500 kHz

Notes:

When using transmitting antennas with a directional gain exceeding 6 dBi, the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceed 6 dBi

Test procedure

ANSI C63.10-2020 Section 12.6, 12.4.2.4
ANSI C63.10-2020+Cor.1-2023 Section 12.6, 12.4.2.4
KDB 789033 D02 v02r01 – Section E and F

Test settings (12.6)

Notwithstanding that some regulatory requirements refer to peak power spectral density (PPSD), in some cases the intent is to measure the maximum value of the time average of the power spectral density during a period of continuous transmission. The procedure for this method is as follows:

a) Create an average power spectrum for the EUT operating mode being tested by following the instructions in 12.4.2 for measuring maximum conducted output power using a spectrum analyzer or EMI receiver; that is, select the appropriate test method (SA-1, SA-2, SA-3, or their respective alternatives) 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 the power meter method PM.)
b) Use the peak search function on the instrument to find the peak of the spectrum.
c) Make the following corrections to the peak value of the spectrum, if applicable:
   1) If method SA-2 or SA-2A was used, then add [10 log (1 / D)], where D is the duty cycle, to the peak of the spectrum.
   2) If method SA-3A was used and the linear mode was used in step h) of 12.4.2.7, add 1 dB to

the final result to compensate for the difference between linear averaging and power averaging.

d) The result is the PPSD.

e) The procedure in item a) through item c) requires the use of 1 ㎒ resolution bandwidth to satisfy the 1 ㎒ measurement bandwidth specified by some regulatory authorities.85 This requirement also permits use of resolution bandwidths less than 1 ㎒ “provided that the measured power is integrated to show the total power over the measurement bandwidth” (i.e., 1 ㎒). If measurements are performed using a reduced resolution bandwidth and integrated over 1 ㎒ bandwidth, the following adjustments to the procedures apply:
   1) Set RBW ≥ 1 / T, where T is defined in 12.2 a).
   2) Set VBW ≥ [3 × RBW].
   3) Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Test settings (12.4.2.4)

Method SA-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction. The procedure for this method is as follows:

a) Measure the duty cycle D of the transmitter output signal as described in 12.2.
b) Set span to encompass the entire 99% OBW of the signal.
c) Set RBW = 1 ㎒.
d) ssSet VBW ≥ 3 ㎒.
e) Number of points in sweep ≥ [2×span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.
h) Do not use sweep triggering. Allow the sweep to “free run.”
i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
j) Compute power by integrating the spectrum across the 99% OBW of the signal using the instrument’s band-power measurement function with band limits set equal to the EBW or OBW band-edges. If the instrument does not have a band-power function, then sum the spectrum levels (in power units) at 1 ㎒ intervals extending across the 99% OBW of the spectrum.
k) Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1 / 0.25)] = 6 ㏈ if the duty cycle is 25%.

Test results

Power spectral density

Test mode	Band	Frequency (㎒)	Measured PSD (dB m/㎒)	DCF (dB)	Maximum PSD (dB m/㎒)	Limit (dB m/㎒)
802.11a	UNII 1	5 180	2.73	-	2.73	11.00
		5 200	2.95		2.95	
		5 240	2.93		2.93	
802.11n HT20		5 180	1.51	-	1.51	
		5 200	1.83		1.83	
		5 240	1.77		1.77	
802.11n HT40		5 190	-2.97	0.11	-2.86	
		5 230	-1.09		-0.98	

Notes:

1. Maximum PSD(dB m/㎒) = Measured PSD (dB m/㎒) + D.C.F(dB))

Test mode	Band	Frequency (㎒)	Measured PSD (dB m/500 ㎑)	DCF (dB)	Maximum PSD (dB m /500 ㎑)	Limit (dB m /500 ㎑)
802.11a	UNII 3	5 745	-1.94	-	-1.94	30.00
		5 785	-1.54		-1.54	
		5 825	-0.72		-0.72	
802.11n HT20		5 745	-1.89	-	-1.89	
		5 785	-2.31		-2.31	
		5 825	-2.74		-2.74	
802.11n HT40		5 755	-4.86	0.11	-4.75	
		5 795	-5.52		-5.41	

Notes:

1. Maximum PSD (dB m/500 ㎑) = Reading (dB m/500 ㎑) + D.C.F (dB)

e.i.r.p spectral density

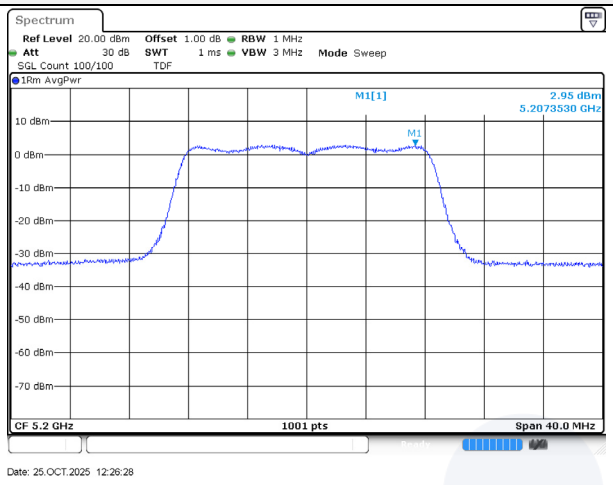
Test mode	Band	Frequency (㎒)	Measured PSD (dB m/㎒)	DCF (dB)	Maximum PSD (dB m/㎒)	ANT Gain (dB i)	E.I.R.P. PSD (dB m/㎒)	Limit (dB m/㎒)
802.11a	UNII 1	5 180	2.73	-	2.73	-0.87	1.86	10.00
		5 200	2.95		2.95		2.08	
		5 240	2.93		2.93		2.06	
802.11n HT20		5 180	1.51	-	1.51		0.64	
		5 200	1.83		1.83		0.96	
		5 240	1.77		1.77		0.90	
802.11n HT40		5 190	-2.97	0.11	-2.86		-3.73	
		5 230	-1.09		-0.98		-1.85	

Notes:

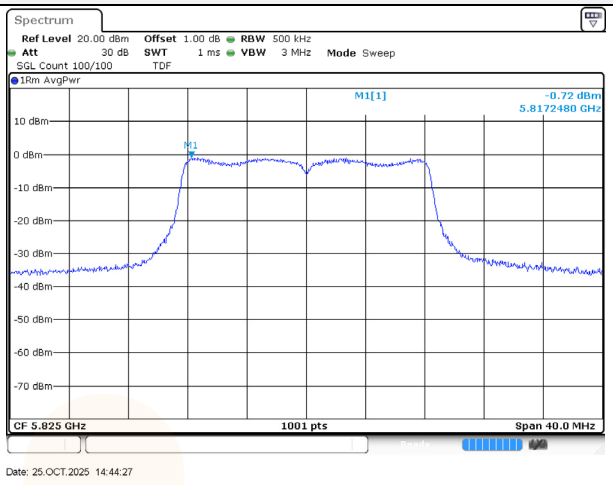
1. Maximum PSD (dB m/㎒) = Measured PSD (dB m/㎒) + DCF (dB)
2. E.I.R.P PSD (dB m/㎒) = Maximum PSD (dB m/㎒) + Antenna gain (dB i)

In order to simplify the report, attached plots were the worst case per bandwidth

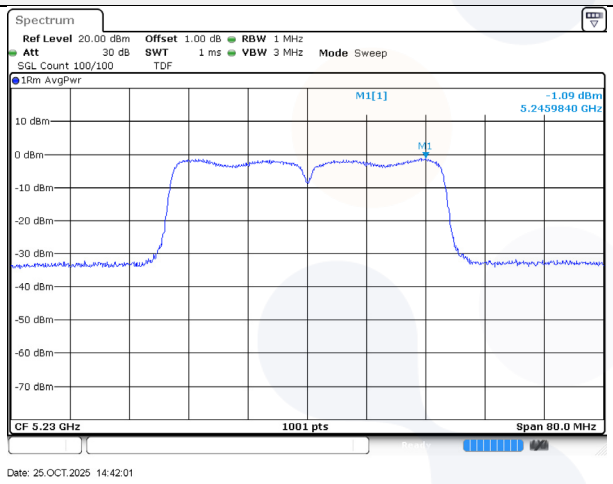
UNII 1 / 802.11a / Mid ch.



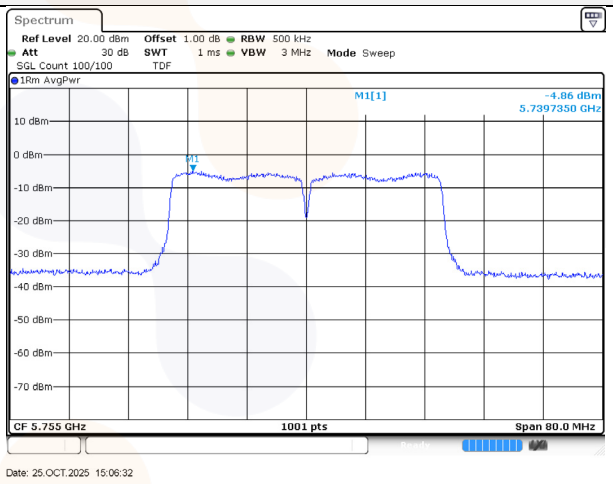
UNII 3 / 802.11a / High ch.



UNII 1 / 802.11n HT40 / High ch.

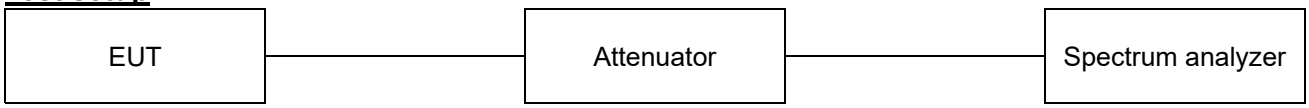


UNII 3 / 802.11n HT40 / Low ch.



7.3. 26 dB Bandwidth & 99% Bandwidth

Test setup



Limit

N/A

Test procedure

ANSI C63.10-2020 Section 12.5.2, 6.9.3
ANSI C63.10-2020+Cor.1-2023 Section 12.5.2, 6.9.3
KDB 789033 D02 v02r01 - Section C.1 (26 dB bandwidth), Section D (99% bandwidth)

Test settings

Emission bandwidth for all other bands (or 26 dB Bandwidth)

a) Set RBW = Shall be in the range of 1% to 5% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is in the range of 1% to 5%.

Occupied bandwidth (or 99% Occupied Bandwidth)

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
The following procedure shall be used for measuring 99% power bandwidth:

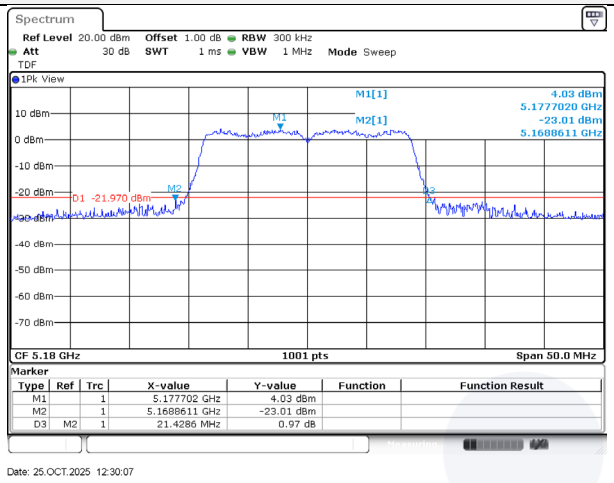
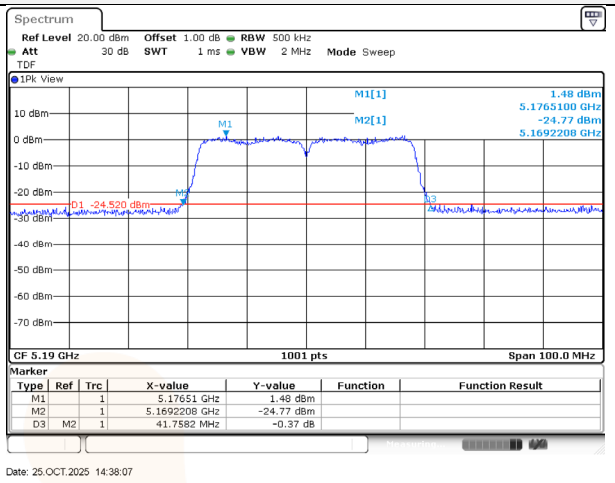
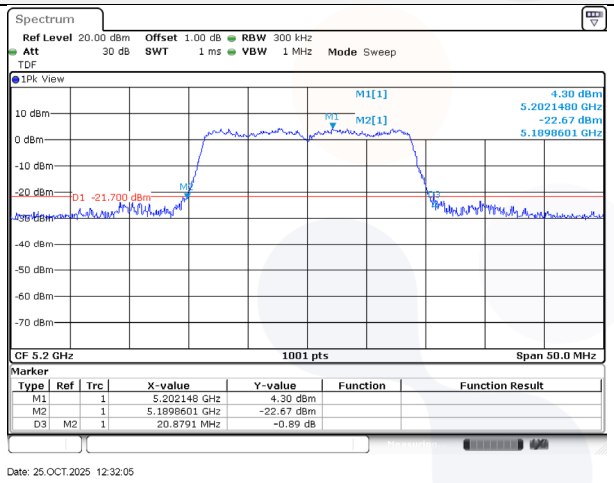
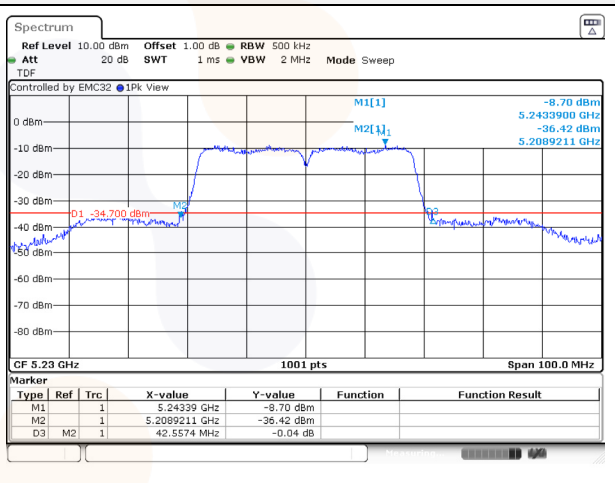
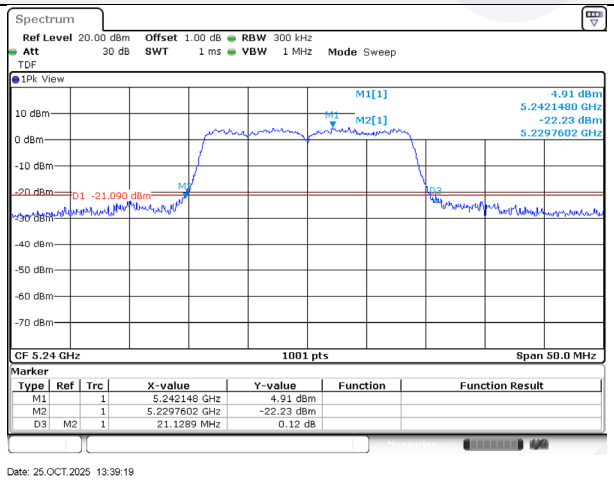
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Test results

Test mode	Band	Frequency(㎒)	26 ㏈ bandwidth (㎒)	99% bandwidth (㎒)
802.11a	UNII 1	5 180	20.579	16.933
		5 200	20.779	16.933
		5 240	20.729	16.933
802.11n HT20	UNII 1	5 180	21.429	17.832
		5 200	20.879	17.832
		5 240	21.129	17.882
802.11n HT40	UNII 1	5 190	41.758	36.663
		5 230	42.557	36.663

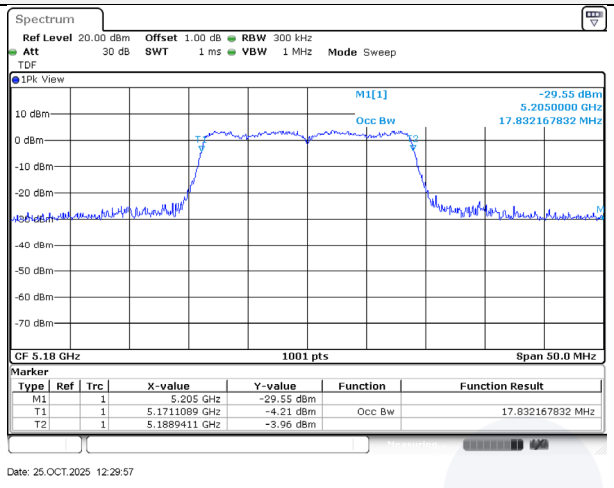
In order to simplify the report, attached plots were the worst case per bandwidth

26 dB bandwidth

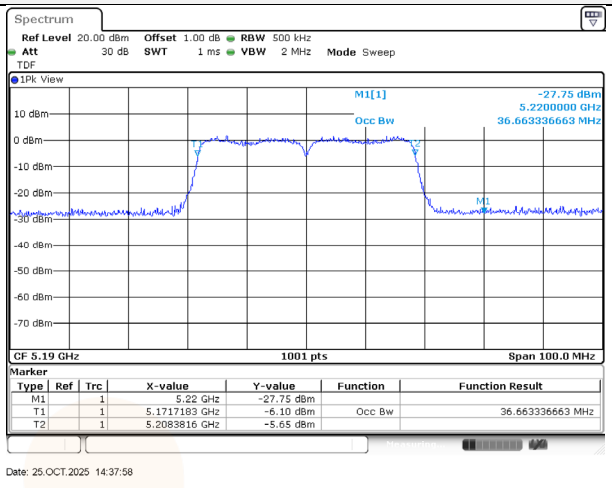
UNII 1 / 802.11n HT20 / Low ch.	UNII 1 / 802.11n HT40 / Low ch.
	
UNII 1 / 802.11n HT20 / Mid ch.	**UNII 1 / 802.11n HT40 / High ch.**
	
UNII 1 / 802.11n HT20 / High ch.	**-**
	Blank

99% bandwidth

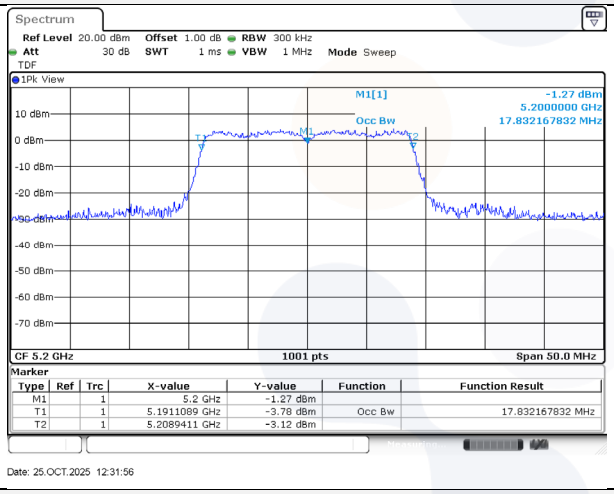
UNII 1 / 802.11n HT20 / Low ch.



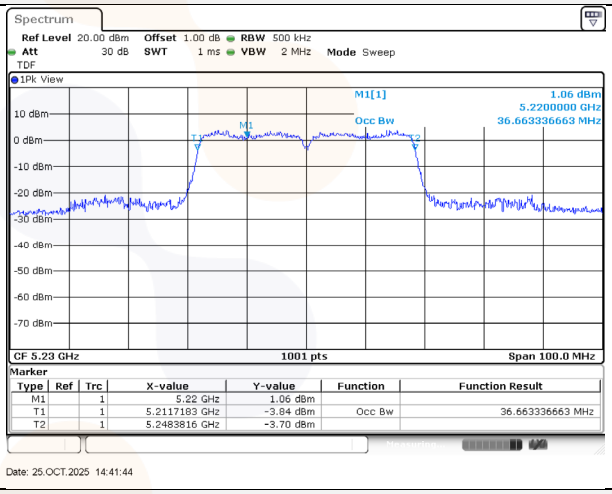
UNII 1 / 802.11n HT40 / Low ch.



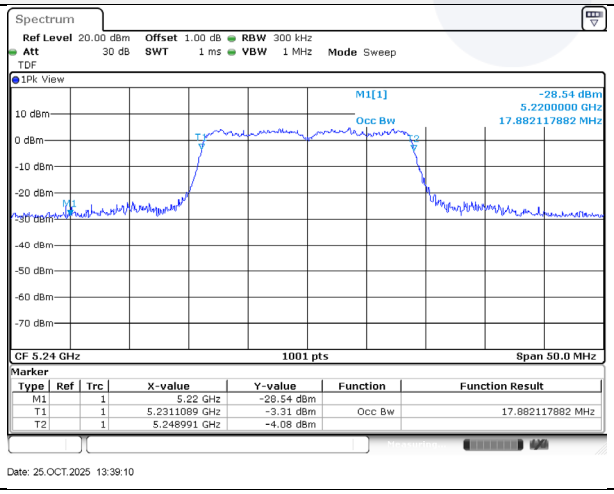
UNII 1 / 802.11n HT20 / Mid ch.



UNII 1 / 802.11n HT40 / High ch.



UNII 1 / 802.11n HT20 / High ch.



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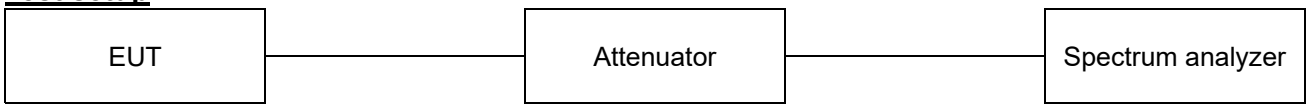
7.4. 6 dB Bandwidth & 99% Bandwidth

Test setup



Limit

According to §15.407(e), RSS-247(7.3.4.2) and (7.3.5.2),

For equipment operating in the band 5 725-5 850 ㎒ bands, the 6 ㏈ bandwidth shall be at least 500 ㎑

Test procedure

ANSI C63.10-2020 Section 12.5.1, 6.9.3
ANSI C63.10-2020+Cor.1-2023 Section 12.5.1, 6.9.3
KDB 789033 D02 v02r01 - Section C.2

Test settings

Emission Bandwidth for the band 5.725 to 5.85 ㎓ and 5.850-5.895 ㎓

1. Set RBW = 100 ㎑.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = No faster than coupled (auto) time.
6. Allow the trace to stabilize.
7. 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.

Occupied bandwidth (or 99% emission bandwidth)

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring 99% power bandwidth:

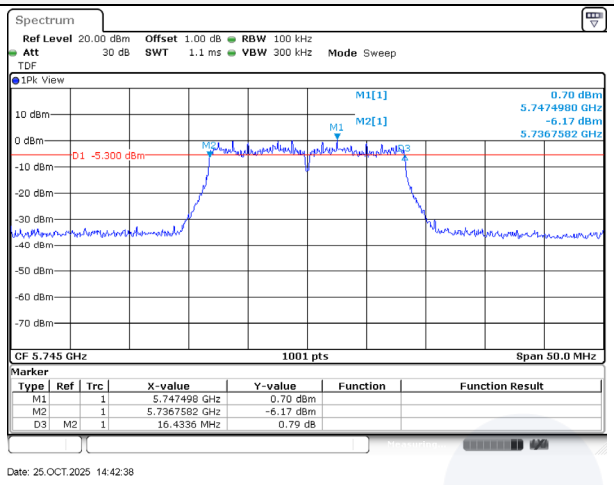
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 ㏈ RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Test results

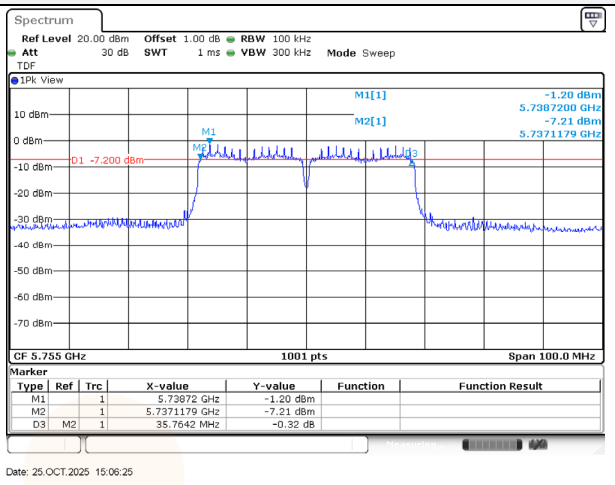
Test mode	Band	Frequency (㎒)	6 dB bandwidth (㎒)	Limit (㎒)	99% bandwidth (㎒)
802.11a	UNII 3	5 745	16.434	0.50	16.983
		5 785	16.384		16.983
		5 825	16.434		17.032
802.11n HT20	UNII 3	5 745	17.632		17.932
		5 785	17.632		17.882
		5 825	17.582		17.932
802.11n HT40	UNII 3	5 755	35.764		36.863
		5 795	35.564		36.863

In order to simplify the report, attached plots were the worst case per bandwidth

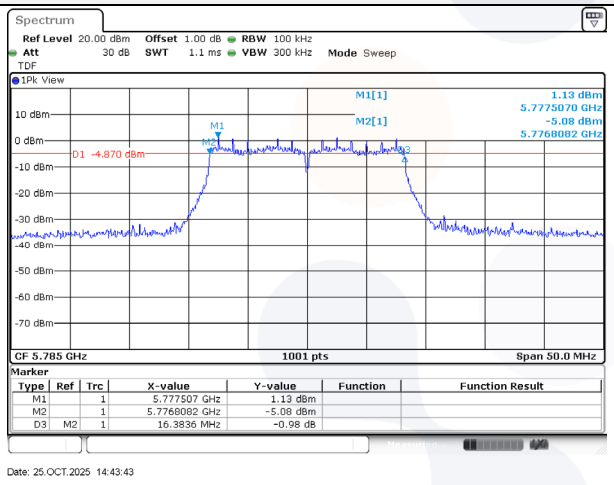
UNII 1 / 802.11a / Low ch.



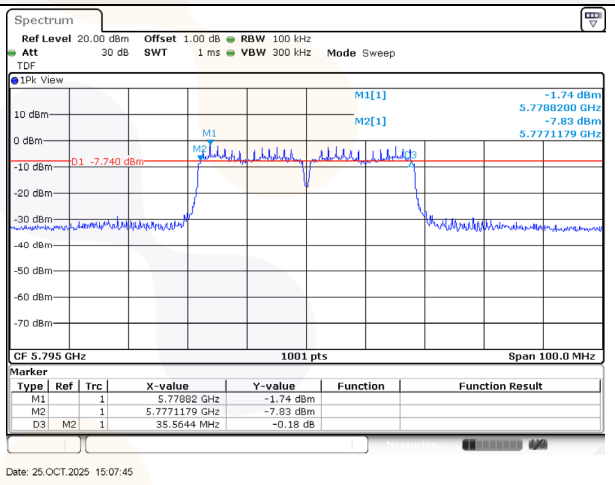
UNII 1 / 802.11n HT40 / Low ch.



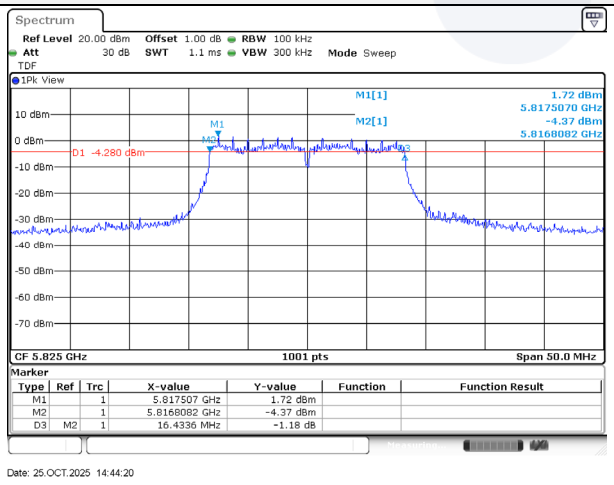
UNII 1 / 802.11a / Mid ch.



UNII 1 / 802.11n HT40 / High ch.



UNII 1 / 802.11a / High ch.



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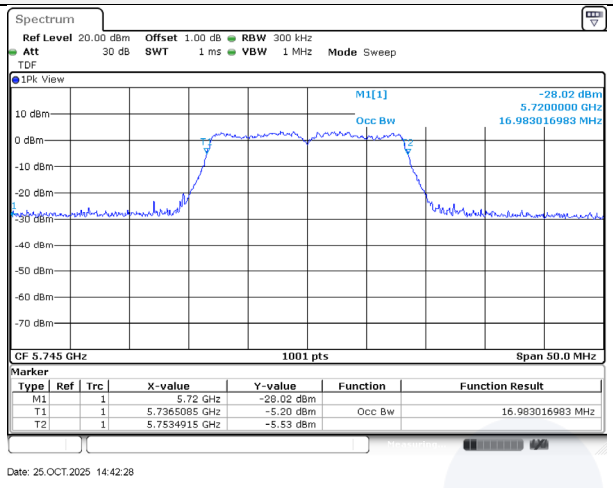
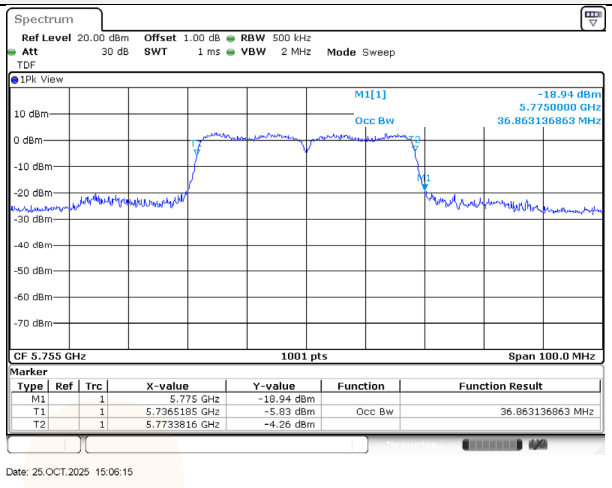
99% bandwidth

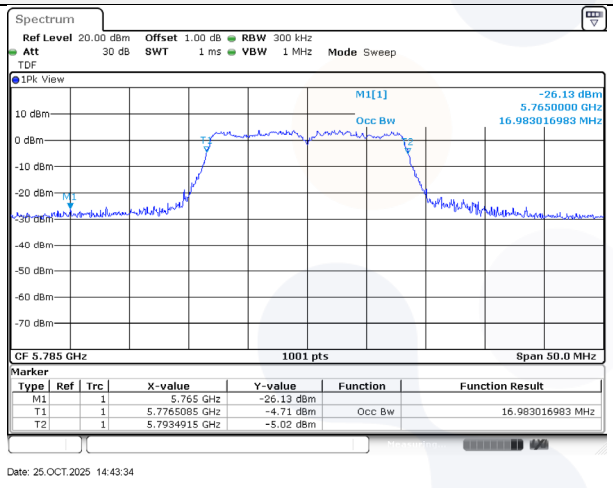
UNII 1 / 802.11a / Low ch.



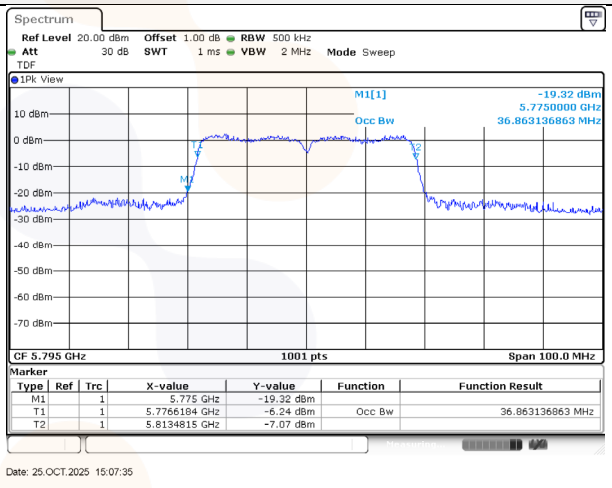
UNII 1 / 802.11n HT40 / Low ch.



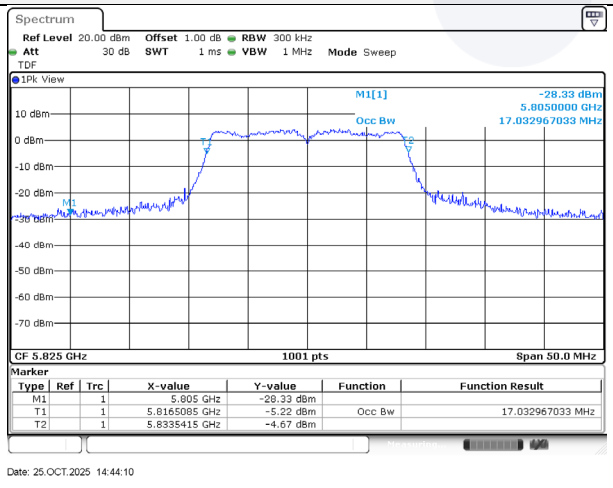
UNII 1 / 802.11a / Mid ch.



UNII 1 / 802.11n HT40 / High ch.



UNII 1 / 802.11a / High ch.



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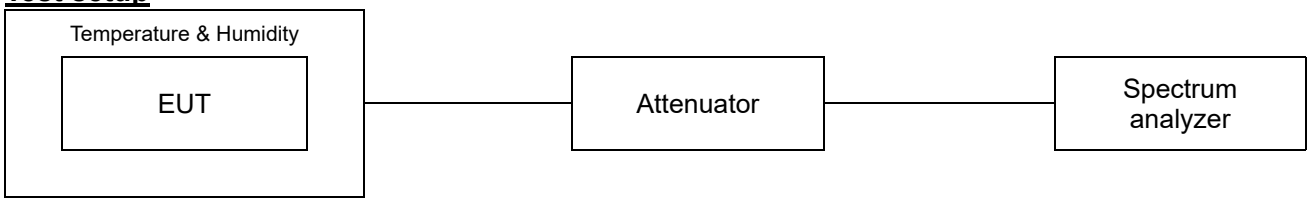
7.5. Frequency stability

Test setup



Limit

According to §15.407(g),

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

According to RSS-Gen(6.11),

For licence-exempt devices, the following conditions apply:

(a) at the temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

(b) at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage

If the frequency stability limits are only met within a temperature range that is smaller than the range specified in (a) for licensed or licence-exempt devices, the frequency stability requirement will be deemed to be met if the transmitter is automatically prevented from operating outside this smaller temperature range and if the published operating characteristics for the equipment are revised to reflect this restricted temperature range.

If the device contains both licence and licence-exempt transmitter modules, the device's frequency stability shall be measured under the most stringent condition specified in the applicable RSS of the transmitter module.

In addition, if an unmodulated carrier is not available, the method used to measure frequency stability shall be described in the test report.

According to RSS-Gen(8.11),

If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 ㎒, 76-88 ㎒, 174-216 ㎒, and 470-602 ㎒, unless otherwise indicated.

Test procedure

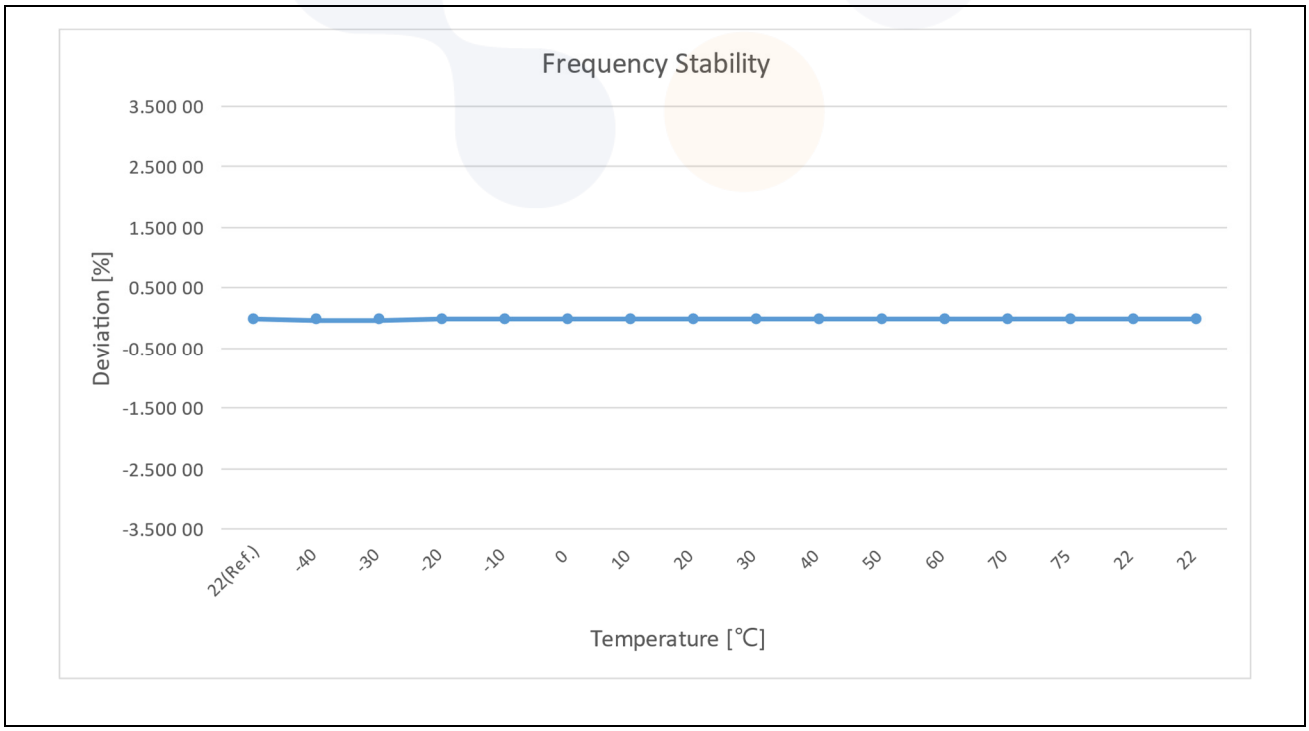
ANSI C63.10-2020 - Section 6.8
ANSI C63.10-2020+Cor.1-2023 - Section 6.8

Test results

Test band : UNII-1

Frequency (㎐) : 5 180 000 000

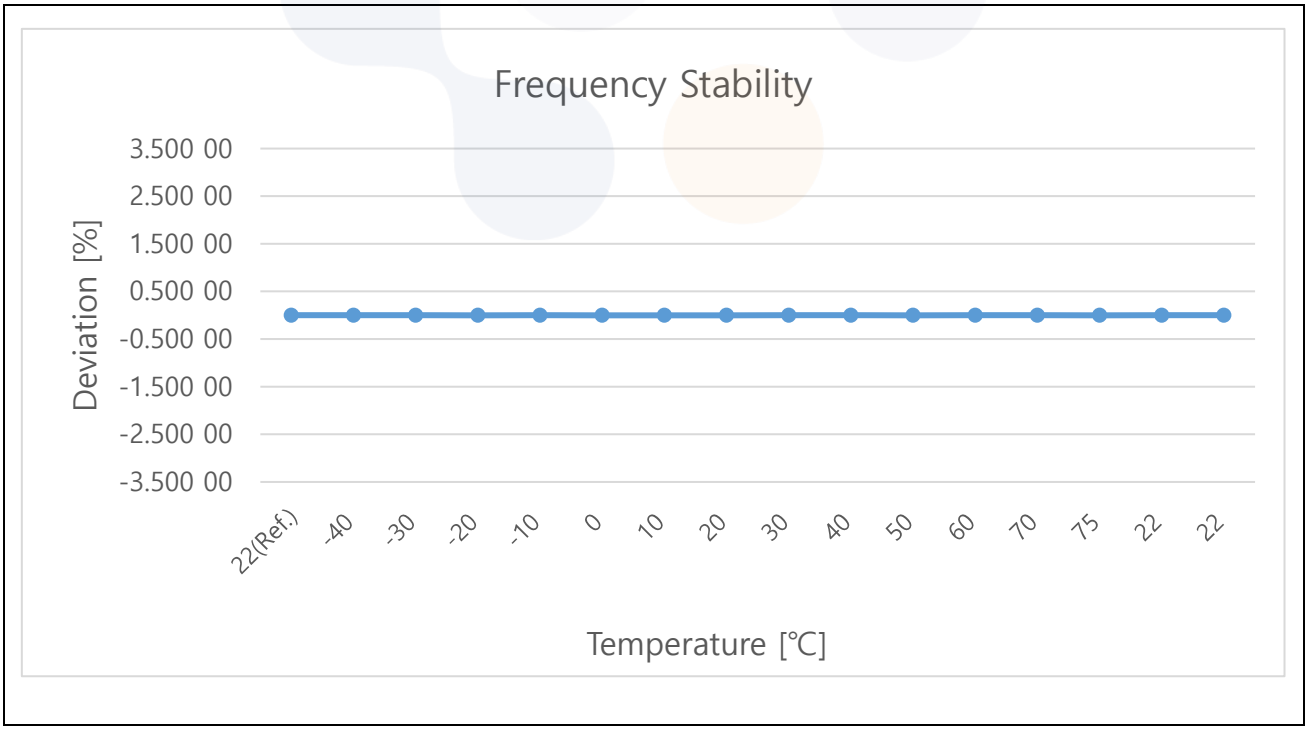
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100	12.00	22(Ref.)	5 179 998 000	-2000.000	-0.39	-0.000039
		-40	5 179 996 000	-4000.000	-0.77	-0.000077
		-30	5 179 996 000	-4000.000	-0.77	-0.000077
		-20	5 179 996 400	-3600.000	-0.69	-0.000069
		-10	5 179 998 100	-1900.000	-0.37	-0.000037
		0	5 179 997 500	-2500.000	-0.48	-0.000048
		10	5 179 998 100	-1900.000	-0.37	-0.000037
		20	5 179 998 100	-1900.000	-0.37	-0.000037
		30	5 179 998 100	-1900.000	-0.37	-0.000037
		40	5 179 997 000	-3000.000	-0.58	-0.000058
		50	5 179 997 500	-2500.000	-0.48	-0.000048
		60	5 179 996 500	-3500.000	-0.68	-0.000068
		70	5 179 996 600	-3400.000	-0.66	-0.000066
		75	5 179 996 600	-3400.000	-0.66	-0.000066
85	10.20	22	5 179 998 000	-2000.000	-0.39	-0.000039
115	13.80	22	5 179 998 000	-2000.000	-0.39	-0.000039



Test band : UNII-3

Frequency (㎐) : 5 745 000 000

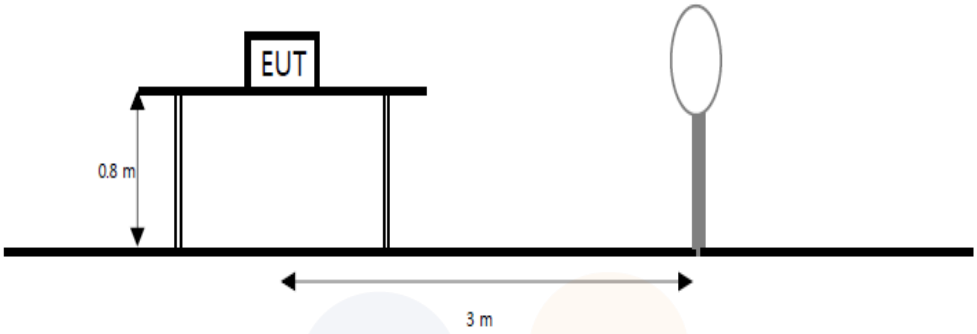
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100	12.00	22(Ref.)	5 744 998 000	-2000.000	-0.35	-0.000035
		-40	5 744 998 000	-2000.000	-0.35	-0.000035
		-30	5 744 997 800	-2200.000	-0.38	-0.000038
		-20	5 744 997 500	-2500.000	-0.44	-0.000044
		-10	5 744 997 700	-2300.000	-0.40	-0.000040
		0	5 744 998 500	-1500.000	-0.26	-0.000026
		10	5 744 998 500	-1500.000	-0.26	-0.000026
		20	5 744 998 500	-1500.000	-0.26	-0.000026
		30	5 744 998 200	-1800.000	-0.31	-0.000031
		40	5 744 998 100	-1900.000	-0.33	-0.000033
		50	5 744 998 500	-1500.000	-0.26	-0.000026
		60	5 744 997 700	-2300.000	-0.40	-0.000040
		70	5 744 997 700	-2300.000	-0.40	-0.000040
		75	5 744 997 500	-2500.000	-0.44	-0.000044
85	10.20	22	5 744 998 200	-1800.000	-0.31	-0.000031
115	13.80	22	5 744 998 200	-1800.000	-0.31	-0.000031



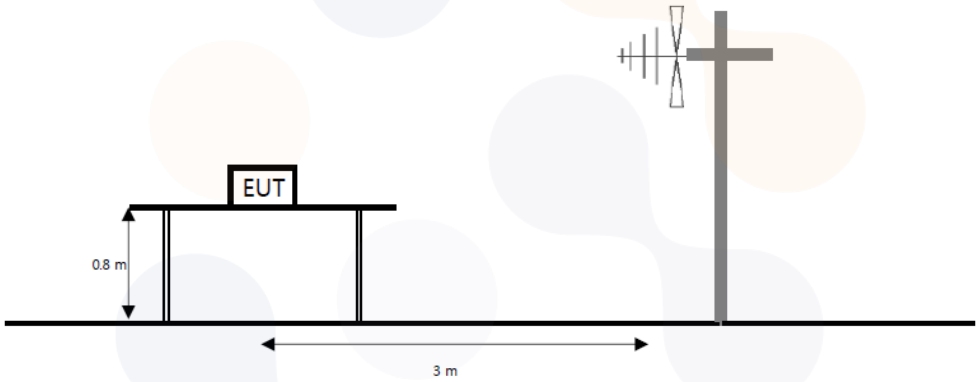
7.6. Spurious Emission, Band Edge and Restricted bands

Test setup

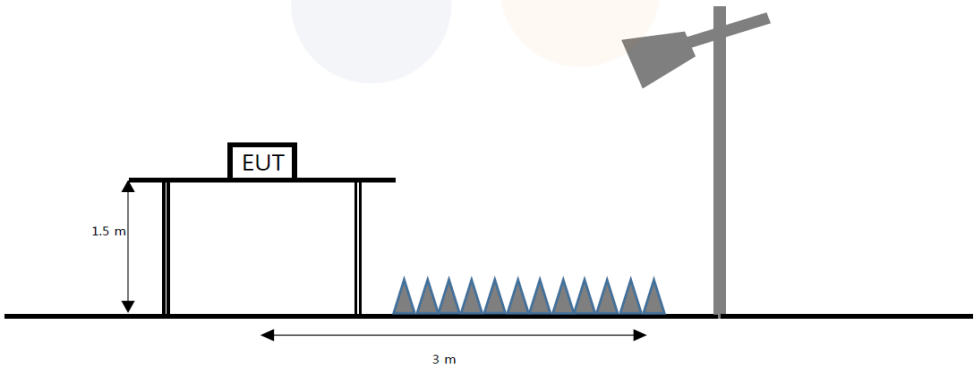
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



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



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



Limit

FCC

According to section 15.209(a),

except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

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

According to section 15.205(a) and (b),

Only spurious emissions are permitted in any of the frequency bands listed below:

㎒	㎒	㎒	㎓
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 – 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 – 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 – 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 – 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 – 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 – 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 – 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 – 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525 25	2 483.5 – 2 500	17.7 - 21.4
8.376 25 - 8.386 75	156.7 - 156.9	2 690 – 2 900	22.01 - 23.12
8.414 25 - 8.414 75	162.012 5 - 167.17	3 260 – 3 267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3 332 – 3 339	31.2 - 31.8
12.519 75 - 12.520 25	240 - 285	3 345.8 – 3 358	36.43 - 36.5
12.576 75 - 12.577 25	322 - 335.4	3 600 – 4 400	Above 38.6
13.36 - 13.41			

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 ㎒, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

According to section 15.407(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:

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/㎒
For transmitters operating in the 5.25-5.35 ㎓ band: All emissions outside of the 5.15-5.35 ㎓ band shall not exceed an e.i.r.p. of −27 ㏈m/㎒.

IC
According to RSS-247(6.6),
In any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum device, digitally modulated device, or hybrid system is operating, the RF power that is produced shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power – based on either an RF conducted or a radiated measurement provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 6.3.2, the attenuation required shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general field strength limits specified in RSS-Gen is not required.

According to RSS-Gen(8.9),
Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5- General field strength limits at frequencies above 30 ㎒

Frequency(㎒)	Field strength (μV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 6- General field strength limits at frequencies below 30 ㎒

Frequency	Magnetic field strength (H-Field) (㎂/m)	Measurement distance(m)
9 – 490 ㎑ 1)	6.37/F (F in ㎑)	300
490 – 1705 ㎑	63.7/F (F in ㎑)	30
1.705 - 30 ㎒	0.08	30

Note 1: The emission limits for the ranges 9-90 ㎑ and 110-490 ㎑ are based on measurements employing a linear average detector.

According to RSS-Gen(8.10),
Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and

some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
(b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
(c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7- Restricted frequency bands*

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

According to RSS-247(7.3),
For each band shall comply with the following e.i.r.p. spectral density limits:

For transmitters operating in the 5 150-5 250 ㎒,

a. All emissions outside the 5 150-5 350 ㎒ band shall not exceed −27 dBm/㎒ peak e.i.r.p. spectral density
b. any unwanted emissions that falls between the upper edge of the 26 dB bandwidth and 5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between1 and 5% of the occupied bandwidth.

For transmitters operating in the 5 250-5 350 ㎒,

a. All emissions outside the band 5 150-5 350 ㎒ shall not exceed −27 dBm/㎒ e.i.r.p. spectral density
b. All emissions inside the band 5 150-5 250 ㎒;
   i. not exceed −27 dBm/㎒ peak e.i.r.p. spectral density, or
   ii. comply with the power spectral density for operation in section 7.3.1.2.

For transmitters operating in the 5 470-5 725 ㎒,

a. All emissions outside of the 5 470-5 725 ㎒ shall not exceed −27 dBm/㎒ peak e.i.r.p. spectral density

For transmitters operating in the band 5 725-5 850 ㎒,

a. 27 dBm/㎒ at frequencies from the band edges decreasing linearly to 15.6 dBm/㎒ at 5 ㎒ above or below the band edges;
b. 15.6 dBm/㎒ at 5 ㎒ above or below the band edges decreasing linearly to 10 dBm/㎒ at 25 ㎒ above or below the band edges;
c. 10 dBm/㎒ at 25 ㎒ above or below the band edges decreasing linearly to -27 dBm/㎒ at 75 ㎒ above or below the band edges; and
d. -27 dBm/㎒ at frequencies more than 75 ㎒ above or below the band edges.

Test procedure
ANSI C63.10-2020 Section 6.10.6.2, 11.12.3.2, 12.7.5, 12.7.6, 12.7.7.2
ANSI C63.10-2020+Cor.1-2023 Section 6.10.6.2, 11.12.3.2, 12.7.5, 12.7.6, 12.7.7.2
KDB 789033 D02 v02r01 – Section G

Test settings
Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ [3×RBW]
4. Detector = peak
5. Sweep time = No faster than coupled (auto) time
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency

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

Average field strength measurements
Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously (D ≥ 98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

a) RBW = 1 ㎒ (unless otherwise specified).
b) VBW ≥ [3×RBW].
c) Detector = Power averaging (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 is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms):
e) As an alternative, the detector and averaging type may be set for linear voltage averaging.
f) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
g) Sweep time = auto.
h) Perform a trace average of at least 100 traces.

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

If continuous transmission of the EUT (D ≥ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less than ±2%), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.
b) Measure the duty cycle D of the transmitter output signal as described in 11.6.
c) RBW = 1 ㎒ (unless otherwise specified).
d) VBW ≥ [3×RBW].
e) Detector = Power averaging (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.
f) Averaging type = power (i.e., rms):
g) As an alternative, the detector and averaging type may be set for linear voltage averaging.
h) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
i) Sweep time = auto.
j) Perform a trace average of at least 100 traces.
k) A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
l) If power averaging (rms) mode was used in step e), then the applicable correction factor is [10 log (1 / D)], where D is the duty cycle.
m) If linear voltage averaging mode was used in step e), then the applicable correction factor is [20 log (1 / D)], where D is the duty cycle.

Band edge measurements

Integration Method

If continuous transmission of the EUT (D ≥ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less ±2%), then the following procedure may be used to measure the average power of unwanted emissions within 2 ㎒ of the authorized band-edge:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.
b) Measure the duty cycle D of the transmitter output signal as described in 11.6.
c) Set instrument center frequency to the frequency of the emission to be measured.
d) Set span to 2 ㎒.
e) RBW = 100 ㎑.
f) VBW ≥ 3 × RBW.
g) Detector = Power averaging (rms), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition might 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.
h) Averaging type = power (i.e., rms):
   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
   2) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
i) Sweep time = auto.
j) Perform a trace average of at least 100 traces.
k) Compute the power by integrating the spectrum over 1 ㎒ using the instrument's band-power measurement function with band limits set equal to the emission frequency (f emission) ± 0.5 ㎒. If the spectrum analyzer does not have a band-power function, then sum the amplitude levels (in power units) at 100 ㎑ intervals extending across the 1 ㎒ spectrum defined by f emission ± 0.5 ㎒.
l) A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
   1) If power averaging (rms) mode was used in step f), then the applicable correction factor is [10 log (1 / D)], where D is the duty cycle.
   2) If linear voltage averaging mode was used in step f), then the applicable correction factor is [20 log (1 / D)], where D is the duty cycle.
   3) If a specific emission is demonstrated to be continuous (D ≥ 98%) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission. Reduction of the measured emission amplitude levels to account for operational duty cycle is not permitted. Determining compliance is based on emission levels occurring during transmission it is not based on an average across ON and OFF times of the transmitter.

Marker-delta method

The following procedure shall be used for the marker-delta method:

a) Perform an in-band field strength measurement of the fundamental emission using the RBW and detector function required for the frequency being measured. For example, for a device operating in the 902 ㎒ to 928 ㎒ band, use a 120 ㎑ RBW with a CISPR QP detector (a peak detector with 100 ㎑ RBW alternatively may be used). For transmitters operating above 1 ㎓, use a 1 ㎒ RBW, a 3 ㎒ VBW, and a peak detector, as required.
Repeat the measurement with an average detector (or alternatively, a peak detector and reduced VBW). For pulsed emissions, other factors shall be included; see 4.1.5.2.7.

b) Choose an EMI receiver or spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the instrument RBW to 1% of the total span (but never less than 30 ㎑), with a VBW equal to or greater than three times the RBW. Record the peak levels of the fundamental emission and the relevant band-edge emission (i.e., run several sweeps in peak hold mode). Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band-edge relative to the highest fundamental emission level.

c) Subtract the delta measured in step b) from the field strengths measured in step a). The resulting field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band-edge emissions compliance, where required.

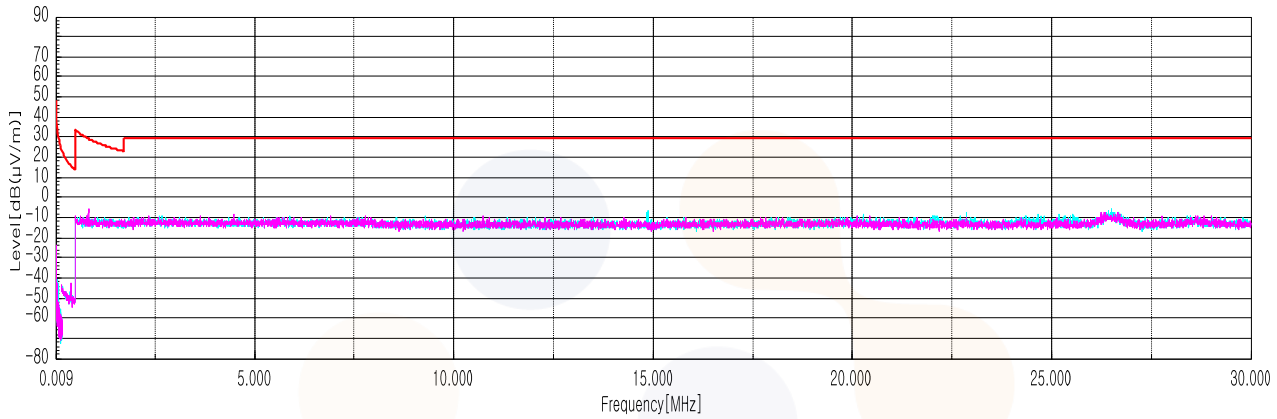
Notes:

1. *f* <30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/D_s)$
   f ≥30 ㎒, extrapolation factor of 20 ㏈/decade of distance. $F_d = 20\log(D_m/D_s)$
   Where:
   F_d= Distance factor in ㏈
   D_m= Measurement distance in meters
   D_s= Specification distance in meters
2. Factors(㏈) = Antenna factor(㏈/m) + Cable loss(㏈) + or Amp. gain(㏈) + or F_d(㏈)
3. The worst-case emissions are reported however emissions whose levels were not within 20 ㏈ of respective limits were not reported.
4. Average test would be performed if the peak result were greater than the average limit.
5. 1) means restricted band.
6. Below 30 ㎒ frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 ㏈ of the limit, then the following statement shall be made: “No spurious emissions were detected within 20 ㏈ of the limit.”
7. Above 1 ㎓ the worst results between two antenna polarizations (H and V) were documented in the test report.
8. For above 1 ㎓ pre-scan to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 ㎒; the video bandwidth is set to 30 ㎑ for peak measurements.
9. Since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X ㎑ resulted in a level of Y ㏈㎶/m, which is equivalent to Y - 51.5 = Z ㏈㎂/m, which has the same margin, W ㏈, to the corresponding RSS-GEN Table 6 limit.

Test results (Below 30 ㎒) – Worst case: 802.11a / UNII1_5 240 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
No spurious emissions were detected within 20 ㏈ of the limit.								

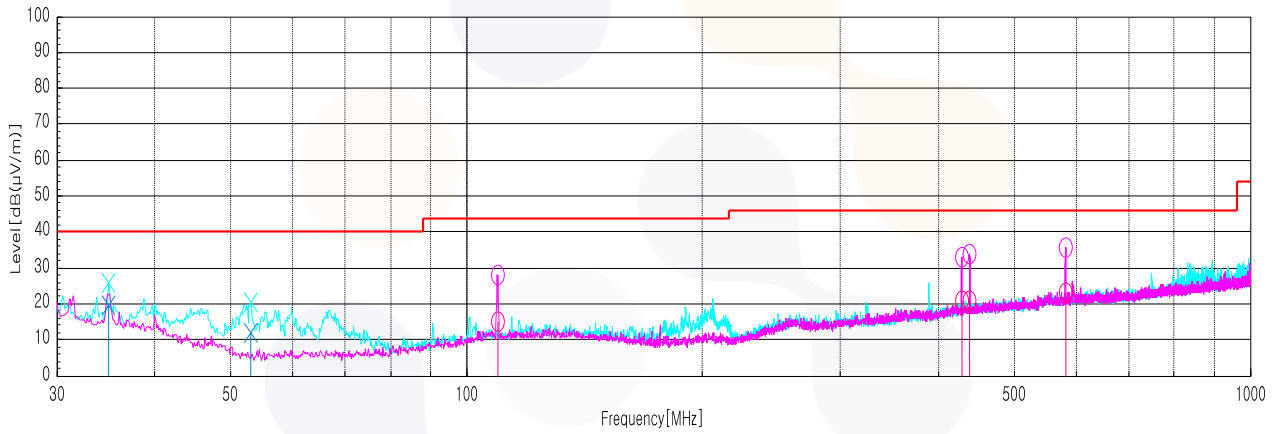
Horizontal/Vertical



Test results (Below 1 000 ㎒) – Worst case: 802.11a / UNII1_5 240 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
34.97	V	28.70	22.31	-31.36	-	19.65	40.00	20.35
53.04	V	29.50	12.99	-30.78	-	11.71	40.00	28.29
109.54[1)]	H	26.70	17.85	-29.60	-	14.95	43.50	28.55
428.31	H	24.10	22.48	-25.77	-	20.81	46.00	25.19
438.86	H	23.90	22.34	-25.56	-	20.68	46.00	25.32
580.84	H	23.10	24.50	-24.28	-	23.32	46.00	22.68

Horizontal/Vertical



Test results (Above 1 000 ㎒)

UNII 1

802.11a_Lowest Channel (5 180 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 149.68[1)]	V	45.61	33.91	-24.24	-	55.28	74.00	18.72
10 371.67	V	58.38	37.20	-48.75	-	46.83	68.20	21.37
15 515.23[1)]	H	57.95	39.60	-47.51	-	50.04	74.00	23.96
Average Data								
5 149.68[1)]	V	34.25	33.91	-24.24	-	43.92	54.00	10.08

802.11a_Middle Channel (5 200 ㎒)

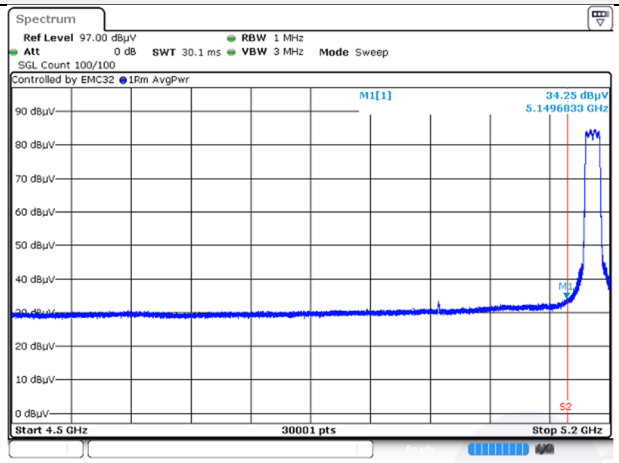
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 390.83	H	58.34	37.21	-48.75	-	46.80	68.20	21.40
15 632.53[1)]	H	57.88	39.57	-47.25	-	50.20	74.00	23.80
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11a_Highest Channel (5 240 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 521.17	H	58.46	37.32	-48.76	-	47.02	68.20	21.18
15 691.57[1)]	H	58.11	39.56	-47.12	-	50.55	74.00	23.45
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

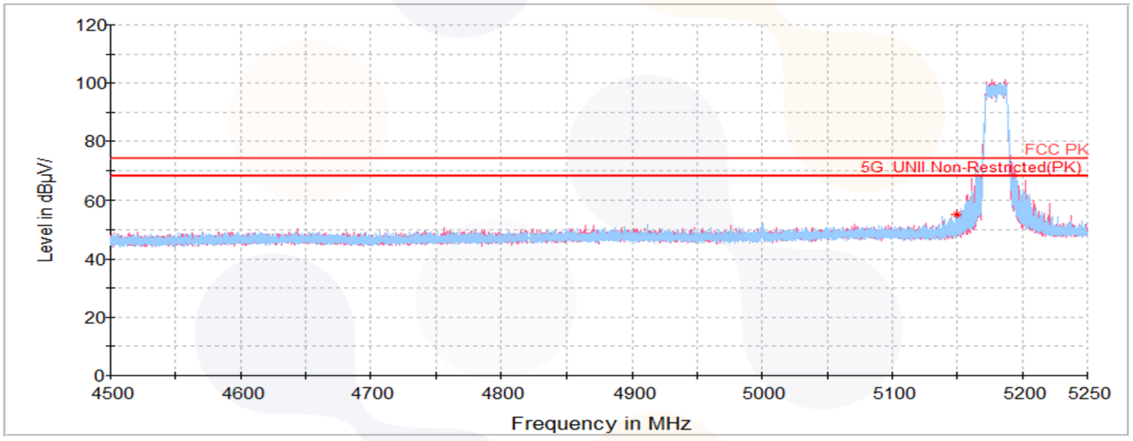
802.11a_Lowest Channel (5 180 ㎒)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 180 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
5 149.40[1)]	V	46.34	33.91	-24.24	-	56.01	74.00	17.99
10 339.47	H	58.97	37.17	-48.74	-	47.40	68.20	20.80
15 554.72[1)]	H	57.47	39.59	-47.42	-	49.64	74.00	24.36
Average Data								
5 149.40[1)]	V	33.77	33.91	-24.24	-	43.44	54.00	10.56

802.11n_HT20_Middle Channel (5 200 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 403.87	H	58.39	37.22	-48.75	-	46.86	68.20	21.34
15 629.08[1)]	H	57.80	39.57	-47.26	-	50.11	74.00	23.89
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

802.11n_HT20_Highest Channel (5 240 ㎒)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
10 479.00	H	58.21	37.28	-48.77	-	46.72	68.20	21.48
15 680.07[1)]	H	57.68	39.56	-47.14	-	50.10	74.00	23.90
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								