FCC Part 15 Subpart E §15.407
RSS-210 ISSUE No. :9

Test Report

Equipment Under Test	**Pico Projector**
Model Name	**PicoBit**
Variant Model Name	**PicoBit-S**
Applicant	**CELLUON, INC.**
FCC ID	**TCLPICOBIT**
IC Number	**10211A-PICOBIT**
Manufacturer	**CELLUON, INC.**
Date of Test(s)	**2017. 01.03 ~ 2017. 01. 31**
Date of Issue	**2017. 02. 10**

In the configuration tested, the EUT complied with the standards specified above.

Issue to	Issue by
CELLUON, INC. Ace High-End Tower 1101 235-2, Guro-Dong, Guro-Gu, Seoul, Korea, 152-740 Tel.: +82-2-6220-3886 Fax: +82-2-6220-3899	**MOVON CORPORATION** 498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 449-812 Tel.: +82-31-338-8837 Fax: +82-31-338-8847

Revision history

Revision	Date of issue	Description	Revised by
--	Jan 16, 2017	Initial	--
1	Jan 25, 2017	Add Test 6 dB bandwidth	Kin.son
2	Jan 31, 2017	Add to IC Limit	Kin.son
3	Feb 10, 2017	Add test data RF exposure evaluation	Kin.son

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1. General information

1.1. Details of applicant

Applicant : CELLUON, INC.
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1.2. Summary of test results

The EUT has been tested according to the following specifications;

Section in FCC part 15	Section in RSS-GEN, RSS-210	Description	Result
§15.205(a) §15.209(a)	2.2 2.6 A9.3(2)	Transmitter radiated spurious emissions,	C
§15.109(a)	RSS-Gen 6	Receiver radiated spurious emission	C
§15.207	7.2.2	Conducted power line test	C
§15.407(a)(1)	A9.2(2)	26 dB and 99% BANDWIDTH	C
§15.407(a)(1)	A9.2(2)	Output power	C
§15.407(a)(1)	A9.2(2)	Peak power spectral density	C
§15.407(a)(1)	-	Peak excursion	C
§15.407(g)	A2.1	frequency stability	C
§15.407(e)	-	6 dB bandwidth	C
§1.1307(b)(1)	RSS GEN 5.5 RSS-102	RF exposure evaluation	C

The sample was tested according to the following specification:
ANSI C63.10-2013, FCC Public Notice KDB789033 D02 v01r03.
TEST SITE REGISTRATION NUMBER: ***FCC(KR0151), IC(6432B-3), IC(21313-1)***

※ Abbreviation

C Complied
N/A Not applicable
F Fail

Approval Signatories

Test and Report Completed by :	Report Approval by :
Kin Son Test Engineer MOVON CORPORATION	Issac Jin Technical Manager MOVON CORPORATION

2. EUT Description

Kind of product	Pico projector
Model Name	PicoBit
Variant Model Name	PicoBit-S
FCC ID	TCLPICOBIT
IC Number	10211A-PICOBIT
Serial Number	N/A
Power supply	DC 3.8V
Frequency range	5 180 ㎒ ~ 5 240 ㎒ (U-NII-1, n_HT20) 5 745 ㎒ ~ 5 805 ㎒ (U-NII-3, n_HT20)
Modulation technique	OFDM
Number of channels	4 (U-NII-1, n_HT20) 4 (U-NII-3, n_HT20)
Antenna gain	1.9 ㏈i (Max.)
Test Site Registration Number	FCC(KR0151), IC(6432B-3), IC(21313-1)

2.1. Declarations by the manufacturer
None

2.2. Details of modification
None

2.3 Test Mode

Mode	Rate (Worst case)
U-NII-1	6M
U-NII-1 n_HT20	MCS0
U-NII-3	6M
U-NII-3, n_HT20	MCS0

3. Measurement equipment

Equipment	Manufacturer	Model	Serial number	Calibration Interval	Calibration due.
Test Receiver	R&S	ESVS30	829673/015	1 year	2017-12-09
Signal Generator	R&S	SMA100A	102188	1 year	2017-12-09
Spectrum Analyzer	R&S	FSV-40	100832	1 year	2017-11-09
Power Meter	Agilent	E4416A	GB41290645	1 year	2017-06-28
Power Sensor	Agilent	9327A	US40441490	1 year	2017-06-28
Horn Antenna	R&S	HF906	100236	2 year	2017-07-24
Horn Antenna	R&S	HF906	100235	2 year	2017-04-23
Horn Antenna	AH Systems	SAS-573	164	2 year	2018-05-03
TRILOG Supper Broadband test Antenna	SCHWARZBECK	SAS-521-7	9161-4159	2 year	2018-06-14
Power Amplifier	MITEQ	AM-1431	1497315	1 year	2017-06-28
Power Amplifier	MITEQ	AFS43-01002600	1374382	1 year	2017-11-03
High Pass Filter	Wainwright	WHK3.0/18G-10SS	508	1 year	2017-06-29
Controller	INNCO	CO2000	co200/064/6961003/L	N/A	N/A
Antenna Master	INNCO	MA4000	MA4000/038/6961003/L	N/A	N/A
Loop Antenna	ETS LINDGREN	6502	00118166	2 year	2018-02-23
TWO LINE-V-NETWORK	R&S	ESH3-Z5	100296	1 year	2017-12-09
Power Amplifier	MITEQ	AFS43-01002600	1374382	1 year	2016-11-03

※ Remark;
Support equipment

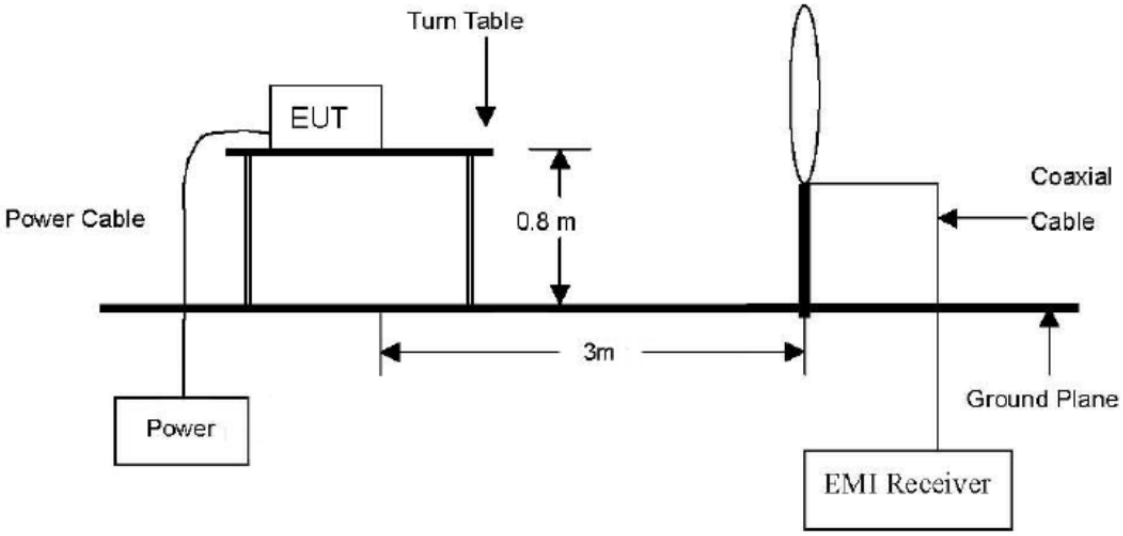
Description	Manufacturer	Model	Serial number
NOTEBOOK	DELL	Lattitude E5440	8HCMN12

4. Transmitter radiated spurious emissions and conducted spurious emissions

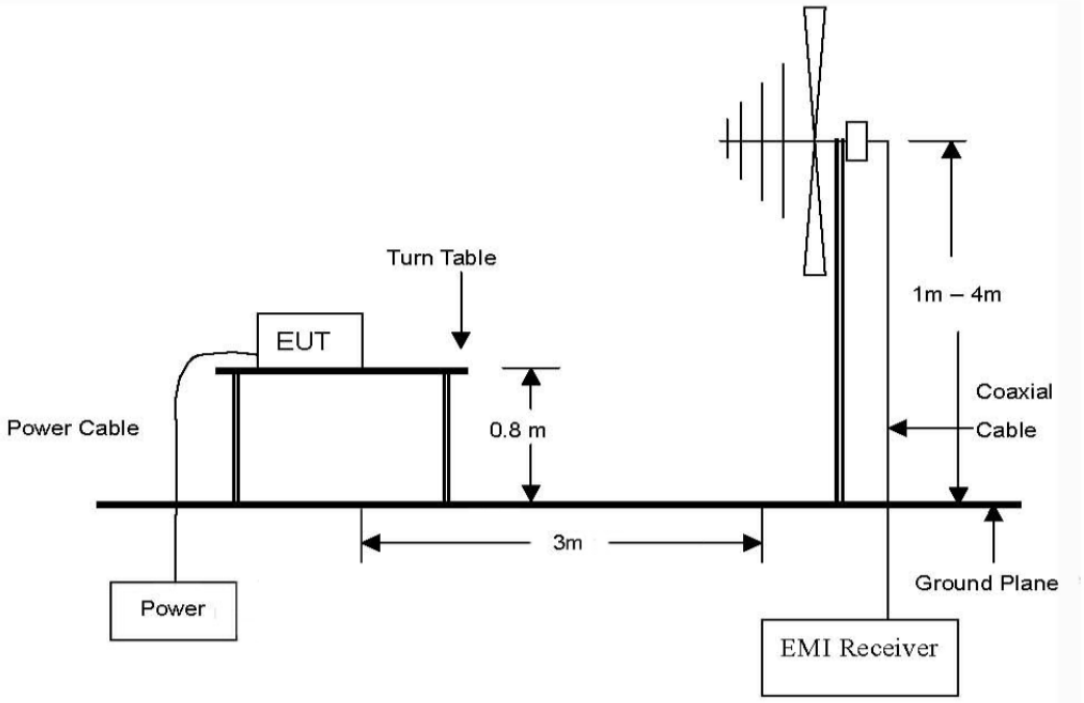
4.1. Test setup

4.1.1. Transmitter radiated spurious emissions

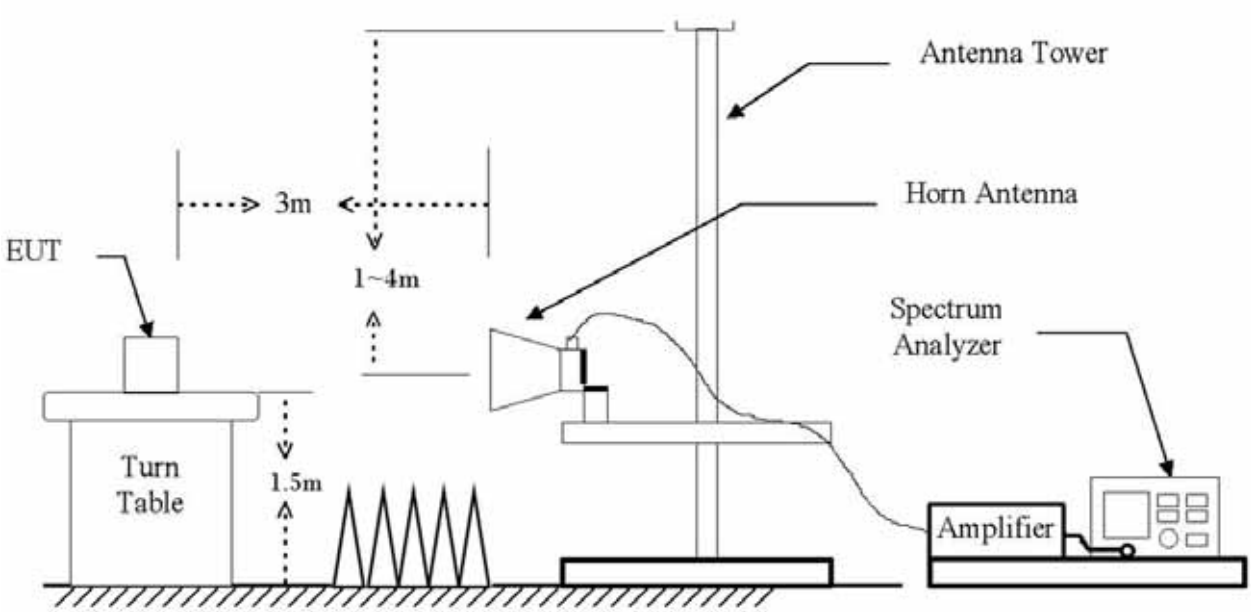
The diagram below shows the test setup that is utilized to make the measurements for emission from 9kHz to 30MHz Emissions.



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 40 ㎓ emissions.



4.2. 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	2 400 / F(㎑)
0.490 ~ 1.705	30	24 000 / 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.

4.3. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10:2013

In case of the air temperature of the test site is out of the range is 10 to 40°C before the testing proceeds the warm-up time of EUT maintain adequately

4.3.1. Test procedures for radiated spurious emissions

1. The EUT is placed on a turntable, which is 0.8 m (Below 1 ㎓.) **/** 1.5 m (Above 1 ㎓) above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

※ Remark;

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 ㎑ for Peak detection (PK) at frequency below 30 ㎒
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 ㎑ for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 ㎓.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 ㎒ for Peak detection and frequency above 1 ㎓.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 ㎒ z and the video bandwidth is 10 ㎐ for Average detection (AV) at frequency above 1 ㎓.

4.4. Test result

Ambient temperature: 20 ℃
Relative humidity: 45 % R.H.

4.4.1. Spurious radiated emission

The frequency spectrum from 9㎑ to 30 ㎒ was investigated. Emission levels are not reported much lower than the limits by over 20 ㏈. All reading values are peak values.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Operation mode: U-NII-1

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-1_(n HT20)

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3_(n HT20)

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

4.4.2. Spurious radiated emission

The frequency spectrum from 30 ㎒ to 1 000 ㎒ was investigated. Emission levels are not reported much lower than the limits by over 20 ㏈. All reading values are peak values.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Operation mode: U-NII-1
A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (㏈μV)	Detector mode	Pol.	Ant. factor (㏈/m)	CL (㏈)	Actual (㏈μV/m)	Limit (㏈μV/m)	Margin (㏈)
163.25	14.3	PK	V	19.5	2.7	36.4	43.5	7.1
239.54	19.3	PK	H	11.8	3.3	34.4	46.0	11.6
297.73	21.7	PK	H	13.3	3.7	38.6	46.0	7.4
396.63	18.5	PK	H	15.7	4.2	38.4	46.0	7.6
437.54	11.0	PK	V	16.6	4.5	32.1	46.0	13.9
564.42	15.2	PK	V	19.1	5.1	39.4	46.0	6.6
Above 900.00	Not detected	-	-	-	-	-	-	-

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (㏈μV)	Detector mode	Pol.	Ant. factor (㏈/m)	CL (㏈)	Actual (㏈μV/m)	Limit (㏈μV/m)	Margin (㏈)
163.28	14.3	PK	V	19.5	2.7	36.4	43.5	7.1
239.53	19.3	PK	H	11.8	3.3	34.4	46.0	11.6
290.70	21.7	PK	V	13.1	3.6	38.4	46.0	7.6
397.69	18.5	PK	H	15.7	4.3	38.5	46.0	7.5
Above 900.00	Not detected	-	-	-	-	-	-	-

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
168.44	14.9	PK	V	18.2	2.7	35.8	43.5	7.7
243.85	18.1	PK	H	11.8	3.3	33.2	46.0	12.8
284.08	19.33	PK	V	12.9	3.6	35.8	46.0	10.2
576.49	14.39	PK	H	19.3	5.2	38.9	46.0	7.2
Above 900.00	Not detected	-	-	-	-	-	-	-

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-1_(n HT20)

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
163.28	14.1	PK	V	19.5	2.7	36.2	43.5	7.3
437.56	10.3	PK	H	16.6	4.5	31.4	46.0	14.7
564.43	12.3	PK	V	19.1	5.1	36.5	46.0	9.5
Above 900.00	Not detected	-	-	-	-	-	-	-

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
175.55	14.3	PK	V	16.5	2.8	33.6	43.5	9.9
202.39	19.3	PK	H	11.9	3.0	34.2	46.0	11.8
244.43	21.7	PK	V	11.8	3.3	36.8	46.0	9.2
363.28	18.5	PK	V	14.9	4.1	37.4	46.0	8.6
456.48	11.0	PK	V	17.0	4.6	32.56	46.0	13.4
Above 900.00	Not detected	-	-	-	-	-	-	-

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
160.22	13.2	PK	V	20.2	2.7	36.1	43.5	7.5
248.39	18.6	PK	H	11.8	3.3	33.8	46.0	12.2
296.10	20.2	PK	V	13.2	3.6	37.1	46.0	8.9
Above 900.00	Not detected	-	-	-	-			

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
169.33	15.8	PK	V	18.0	2.7	36.5	43.5	7.0
246.86	17.9	PK	V	11.8	3.3	33.1	46.0	13.0
498.71	9.9	PK	V	17.9	4.8	32.6	46.0	13.4
559.50	13.7	PK	H	19.0	5.1	37.8	46.0	8.2
Above 900.00	Not detected	-	-	-	-	-	-	-

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
165.28	13.1	PK	V	19.0	2.7	34.8	43.5	8.7
242.54	15.6	PK	H	11.8	3.3	30.7	46.0	15.3
281.53	13.6	PK	V	12.8	3.6	29.9	46.0	16.1
388.81	15.1	PK	H	15.5	4.2	34.8	46.0	11.2
Above 900.00	Not detected	-	-	-	-	-	-	-

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
163.25	14.3	PK	V	19.5	2.7	36.5	43.5	7.0
239.54	19.3	PK	H	11.8	3.3	34.4	46.0	11.6
297.73	21.7	PK	H	13.3	3.7	38.7	46.0	7.3
396.63	18.5	PK	V	15.7	4.2	38.4	46.0	7.6
Above 900.00	Not detected	-	-	-	-	-	-	-

※ **Remark**

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3_(n HT20)

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
166.25	14.1	PK	V	18.7	2.7	35.5	43.5	8.0
239.48	17.6	PK	H	11.8	3.3	32.7	46.0	13.3
448.54	12.0	PK	H	16.8	4.5	33.4	46.0	12.7
569.48	13.8	PK	V	19.2	5.1	38.1	46.0	7.9
Above 900.00	Not detected	-	-	-	-	-	-	-

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
165.48	15.6	PK	V	18.9	2.7	37.2	43.5	6.3
242.26	20.1	PK	H	11.8	3.3	35.2	46.0	10.8
288.47	19.4	PK	V	13.0	3.6	36.0	46.0	10.0
405.58	17.4	PK	H	15.9	4.3	37.6	46.0	8.4
Above 900.00	Not detected	-	-	-	-	-	-	-

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
301.44	20.4	PK	H	13.4	3.7	37.5	46.0	8.5
388.41	17.3	PK	V	15.5	4.2	37.0	46.0	9.0
441.52	12.1	PK	H	16.7	4.5	33.3	46.0	12.7
569.43	14.4	PK	V	19.2	5.1	38.7	46.0	7.3
Above 900.00	Not detected	-	-	-	-	-	-	-

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

4.4.3. Spurious radiated emission

The frequency spectrum above 1 000 ㎒ was investigated. Emission levels are not reported much lower than the limits by over 20 ㏈.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Operation mode: U-NII-1

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-1_(n HT20)

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3_(n HT20)

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

4.4.4. Restricted Band

A. 4.5 – 5.15 ㎓ measurement

Operation mode: U-NII-1
*** Low channel (5 180 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 117.60	51.72	Peak	H	32.89	34.03	50.58	74.00	23.42
5 131.60	36.48	Average	H	32.89	34.03	35.34	54.00	18.66
5 138.60	49.73	Peak	V	32.89	34.03	48.59	74.00	25.41
5 128.60	36.48	Average	V	32.89	34.03	35.34	54.00	18.66

Operation mode: U-NII-1_nHT20
*** Low channel (5 180 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 127.60	50.87	Peak	H	32.89	34.03	49.73	74.00	24.27
5 100.60	38.00	Average	H	32.89	34.03	36.86	54.00	17.14
5 143.60	51.37	Peak	V	32.89	34.03	50.23	74.00	23.77
5 102.60	37.14	Average	V	32.89	34.03	36.00	54.00	18.00

Operation mode: U-NII-3

*** Low channel (5 745 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 689.65	49.94	Peak	H	33.86	33.33	50.47	74.00	23.53
5 653.90	36.24	Average	H	33.86	33.33	36.77	54.00	17.23
5 650.97	49.92	Peak	V	33.86	33.33	50.45	74.00	23.55
5 653.90	36.19	Average	V	33.86	33.33	36.72	54.00	17.28

*** High channel (5 805 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 908.99	51.03	Peak	H	34.53	33.33	52.23	74.00	21.77
5 861.30	36.05	Average	H	34.53	33.33	37.25	54.00	16.75
5 853.68	48.82	Peak	V	34.53	33.33	50.02	74.00	23.98
5 861.58	35.77	Average	V	34.53	33.33	36.97	54.00	17.03

※ Remark

Actual = Reading + Ant. Factor + Amp + CL (Cable loss)

Operation mode: U-NII-3_nHT20

*** Low channel (5 745 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 663.27	49.43	Peak	H	33.86	33.33	49.96	74.00	24.04
5 651.55	36.89	Average	H	33.86	33.33	37.42	54.00	16.58
5 661.52	50.69	Peak	V	33.86	33.33	51.22	74.00	22.78
5 650.97	37.00	Average	V	33.86	33.33	37.53	54.00	16.47

*** High channel (5 805 ㎒)**

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 908.43	50.69	Peak	H	34.53	33.33	51.89	74.00	22.11
5 861.30	36.97	Average	H	34.53	33.33	38.17	54.00	15.83
5 960.70	50.73	Peak	V	34.53	33.33	51.93	74.00	22.07
5 861.30	36.99	Average	V	34.53	33.33	38.19	54.00	15.81

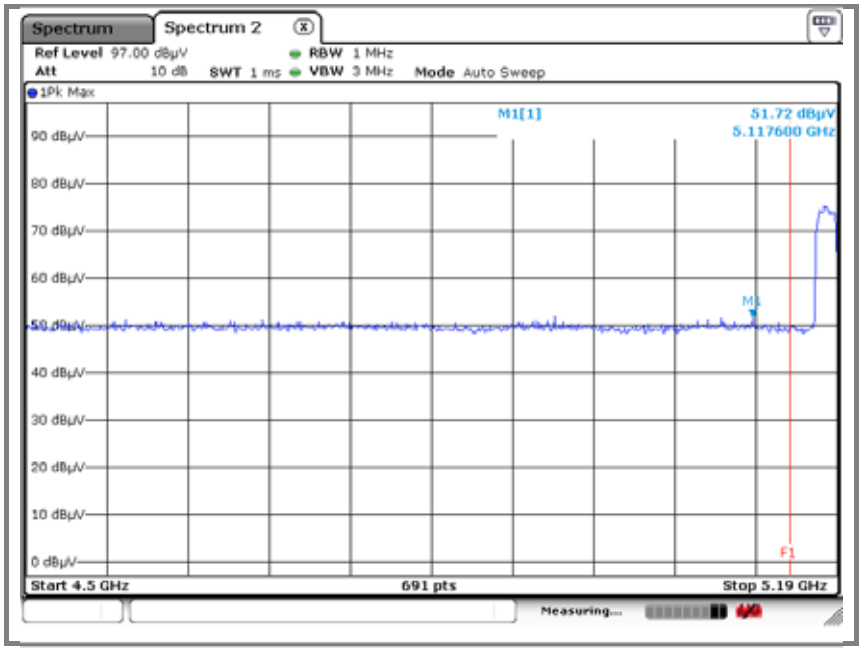
※ Remark

Actual = Reading + Ant. Factor + Amp + CL (Cable loss)

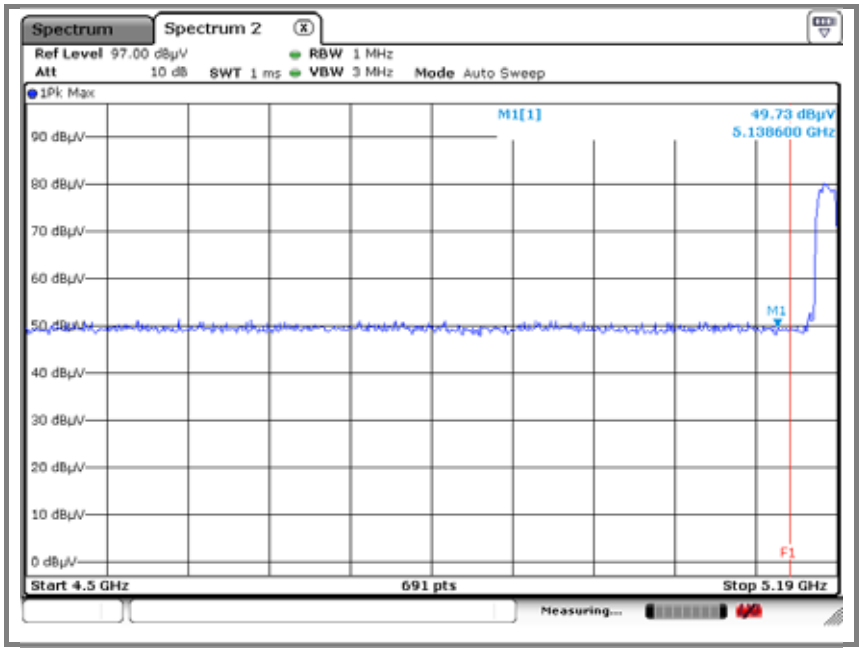
4.4.5. Spurious RF conducted emissions: Plot of spurious RF conducted emission

Band-edge data

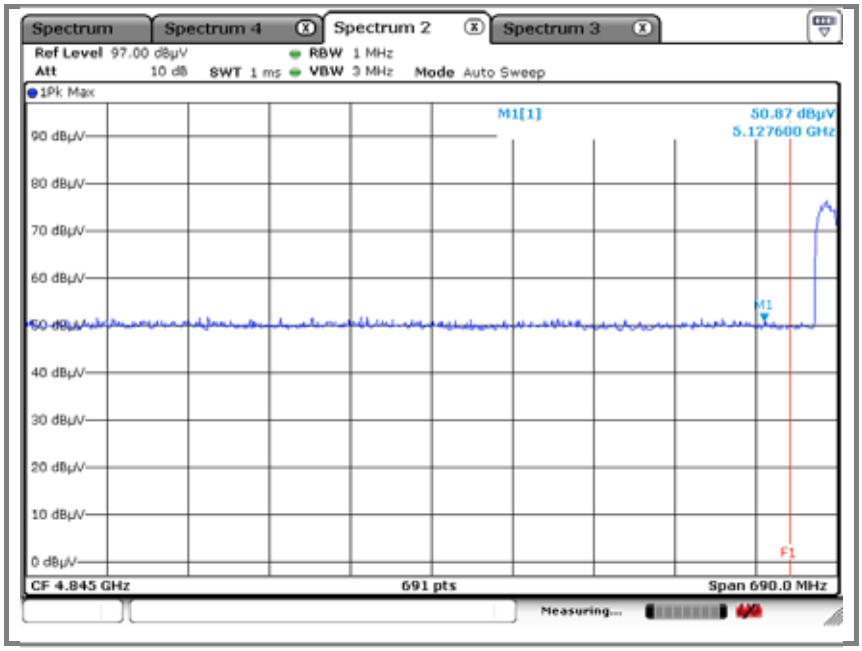
Operation mode:	U-NII-1	Frequency(㎒):	5 180	ANT:	H	Detector:	Peak



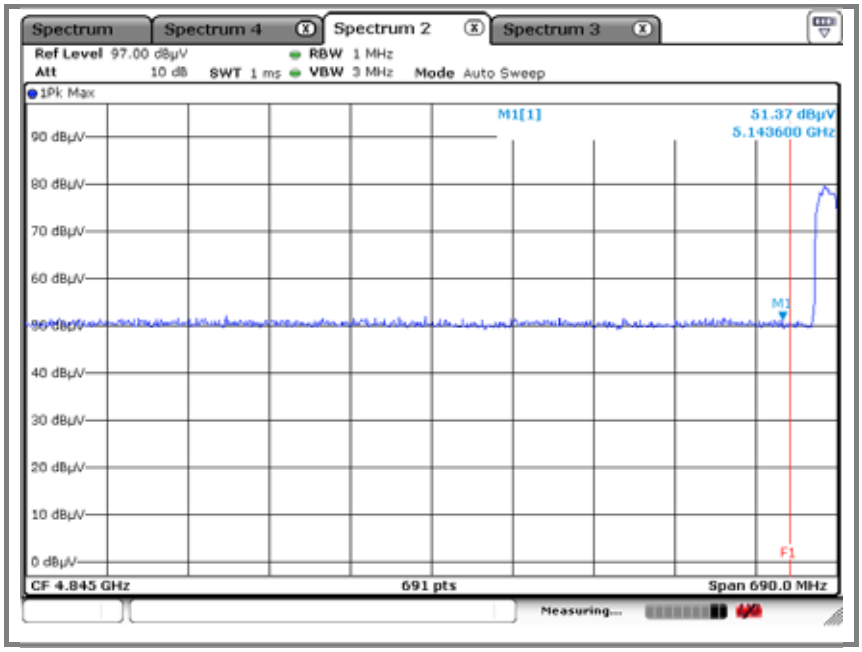
Operation mode:	U-NII-1	Frequency(㎒):	5 180	ANT:	V	Detector:	Peak



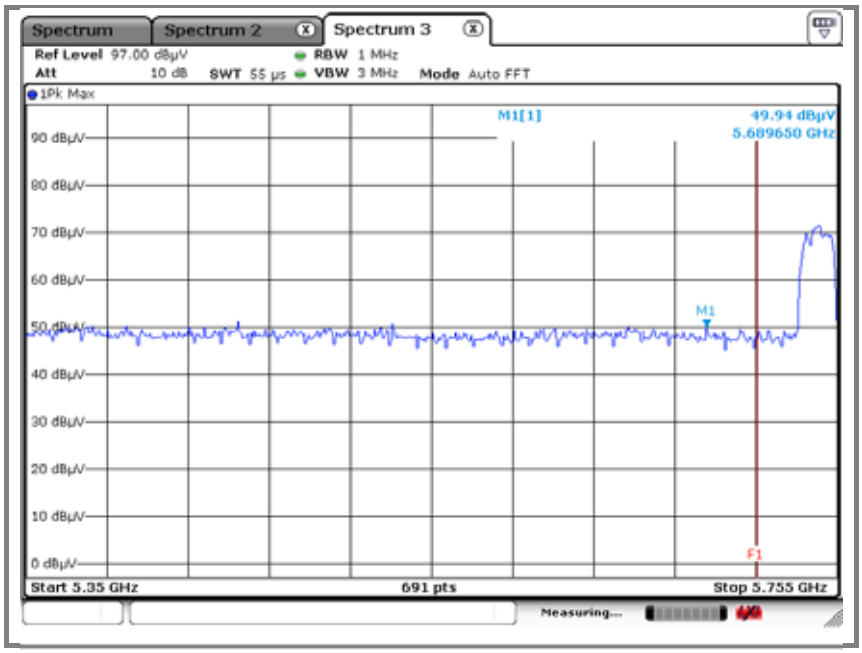
Operation mode:	U-NII-1_nHT20	Frequency(㎒):	5 180	ANT:	H	Detector:	Peak



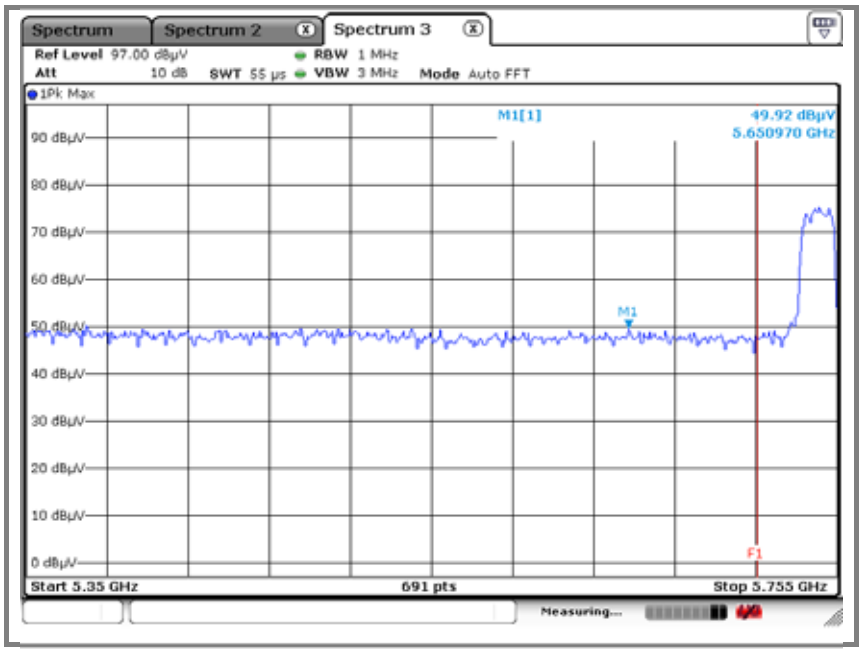
Operation mode:	U-NII-1_nHT20	Frequency(㎒):	5 180	ANT:	V	Detector:	Peak



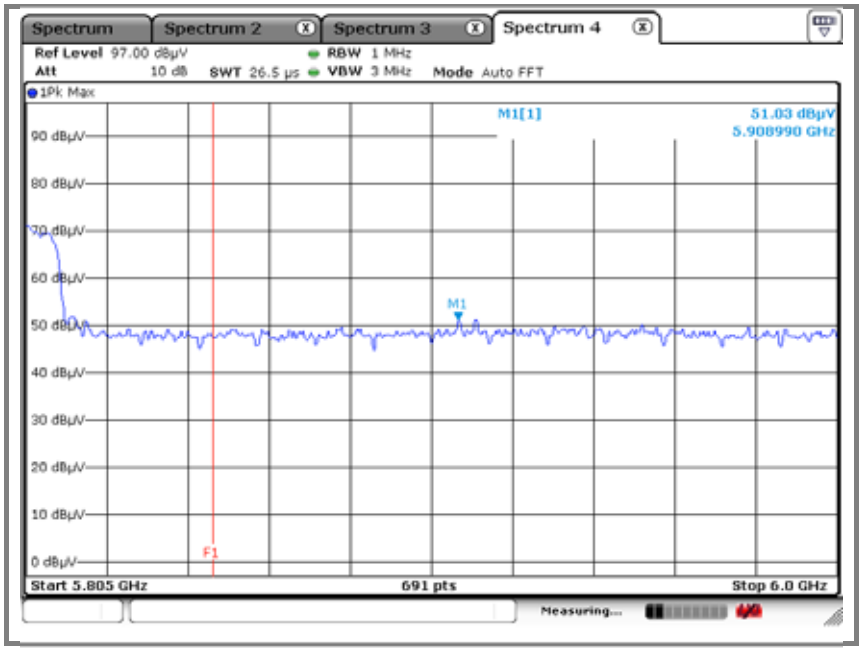
Operation mode:	U-NII-3	Frequency(㎒):	5 745	ANT:	H	Detector:	Peak



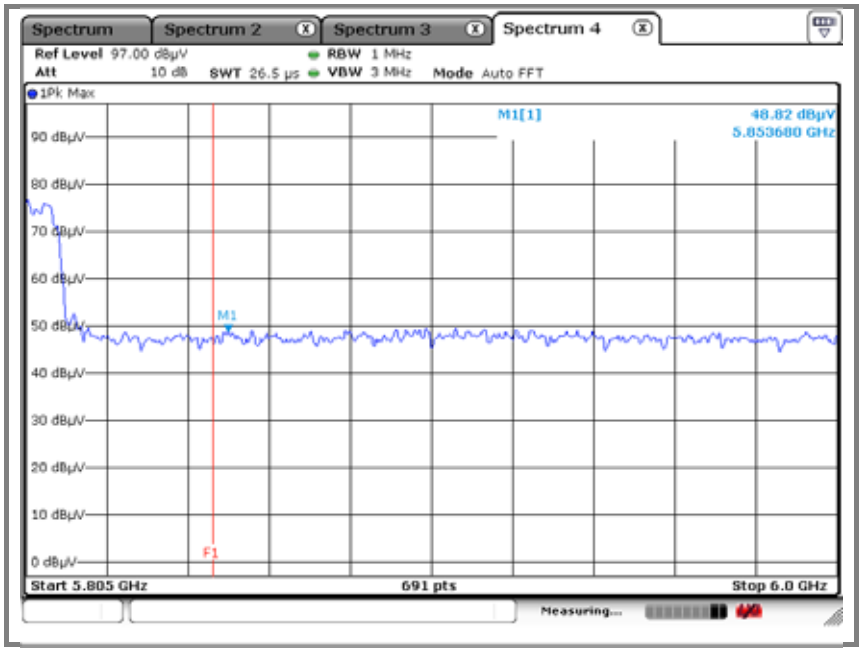
Operation mode:	U-NII-3	Frequency(㎒):	5 745	ANT:	V	Detector:	Peak



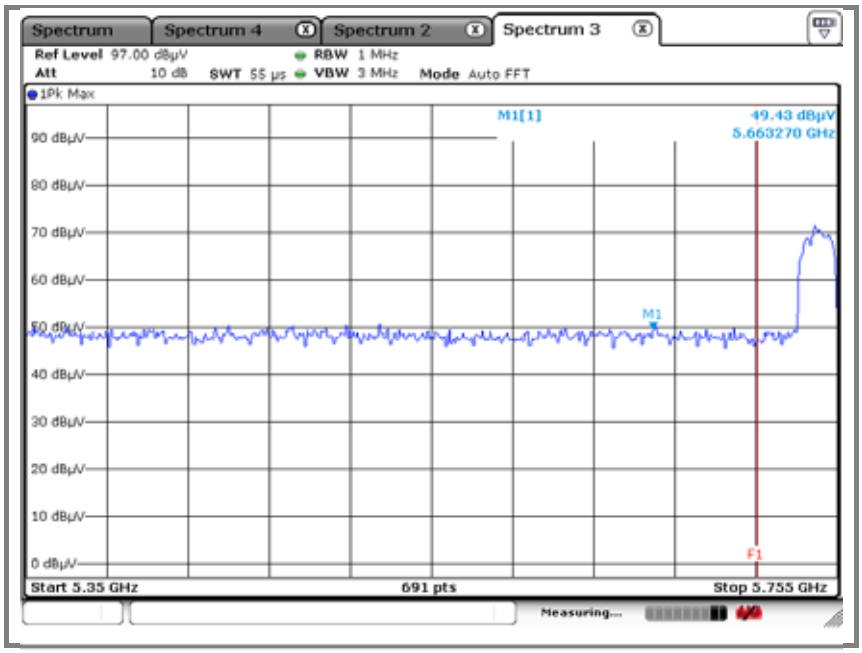
Operation mode:	U-NII-3	Frequency(㎒):	5 805	ANT:	H	Detector:	Peak



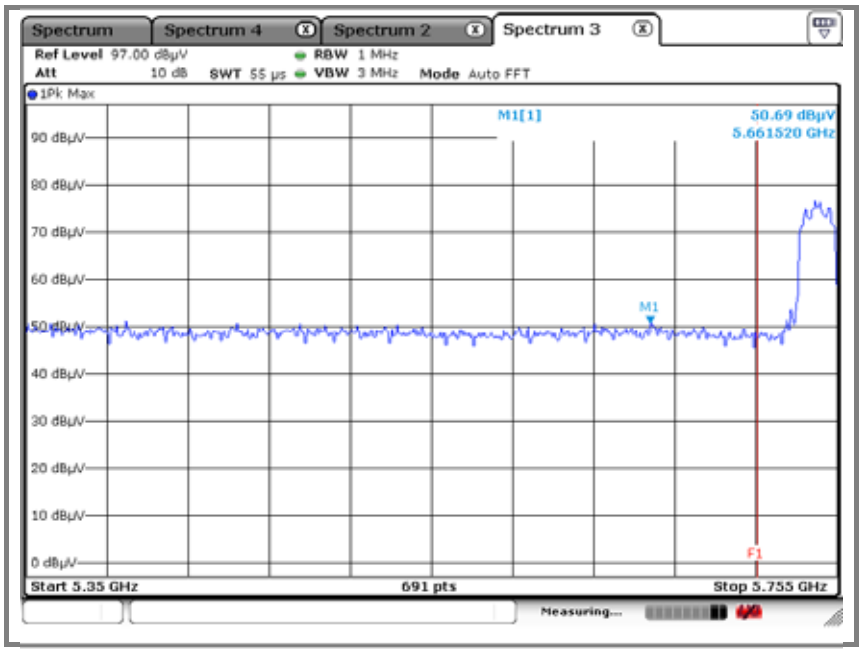
Operation mode:	U-NII-3	Frequency(㎒):	5 805	ANT:	V	Detector:	Peak



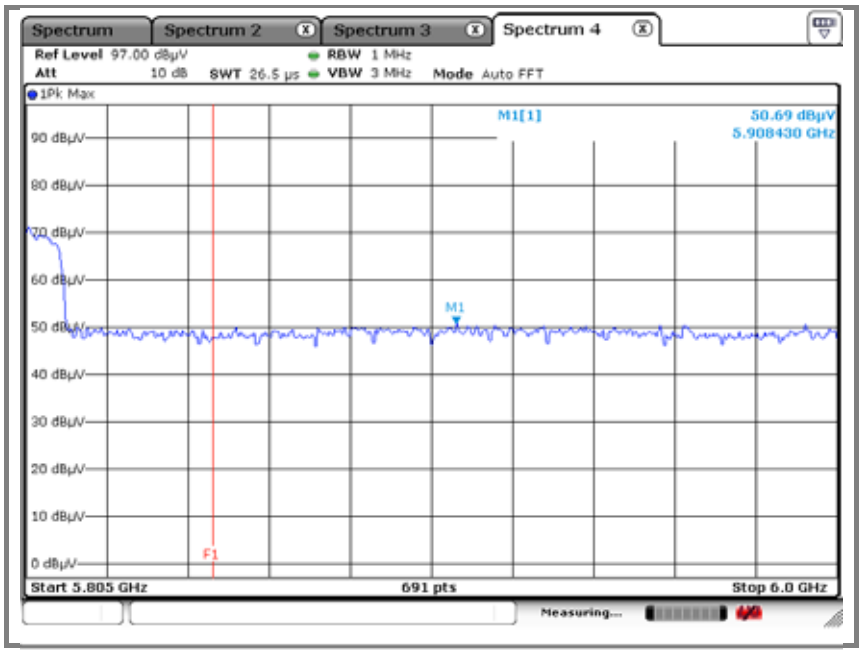
Operation mode:	U-NII-3_nHT20	Frequency(㎒):	5 745	ANT:	H	Detector:	Peak



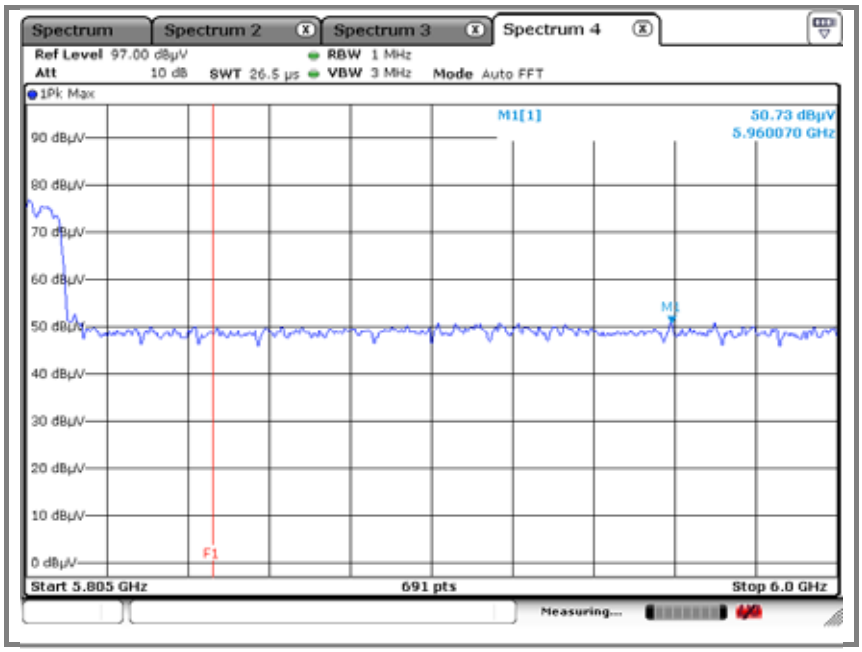
Operation mode:	U-NII-3HT20	Frequency(㎒):	5 745	ANT:	V	Detector:	Peak



Operation mode:	U-NII-3HT20	Frequency(㎒):	5 805	ANT:	H	Detector:	Peak



Operation mode:	U-NII-3HT20	Frequency(㎒):	5 805	ANT:	V	Detector:	Peak



5. *Receiver radiated spurious emissions*

5.1. Test setup
Same as clause 5.1.

5.1.1. Receiver radiated spurious emissions
Same as clause 5.1.1

5.2. Limit
According to §15.109(a), Except for Class A digital devices, the field strength of radiated emission from unintentional radiator at a distance of 3 m shall not exceed the following values:

Frequency (㎒)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009–0.490	300	See the remark	2400/F(㎑)
0.490–1.705	30		24000/F(㎑)
1.705–30.0	30		30
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

5.3. Test procedures
Same as clause 5.3.
Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003
In case of the air temperature of the test site is out of the range is 10 to 40°C before the testing proceeds the warm-up time of EUT maintain adequately

5.3.1. Test procedures for radiated spurious emissions
Same as Clause 5.3.1.

5.4. Test results

Ambient temperature: 20 ℃
Relative humidity: 45 % R.H.

5.4.1. Receiver radiated Spurious emission.

The frequency spectrum from 30 ㎒ to 26 ㎓ was investigated. Emission levels are not reported much lower than the limits by over 30 ㏈. All reading values are peak values.

Operation mode: U-NII-1

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (㏈μV)	Detector mode	Pol.	Ant. factor (㏈/m)	CL (㏈)	Actual (㏈μV/m)	Limit (㏈μV/m)	Margin (㏈)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (㏈μV)	Detector mode	Pol.	Ant. factor (㏈/m)	CL (㏈)	Actual (㏈μV/m)	Limit (㏈μV/m)	Margin (㏈)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (㏈μV)	Detector mode	Pol.	Ant. factor (㏈/m)	CL (㏈)	Actual (㏈μV/m)	Limit (㏈μV/m)	Margin (㏈)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-1_(n HT20)

A. Low channel (5 180 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 220 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 240 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

Operation mode: U-NII-3_(n HT20)

A. Low channel (5 745 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

B. Middle channel (5 785 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

C. High channel (5 805 ㎒)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (㎒)	Reading (dBμV)	Detector mode	Pol.	Ant. factor (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.								

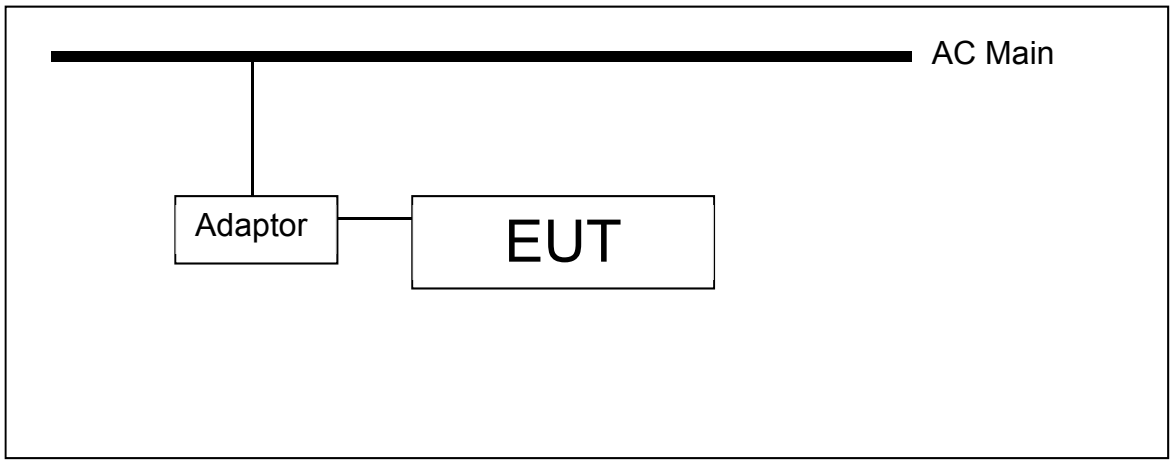
※ Remark

1. Actual = Reading + Ant. factor + CL (Cable loss)
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. 15.31 Measurement standards.

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

6. *Conducted power line test*

6.1 Test setup



6.2 Limit

According to §15.107(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 uH/ 50 ohm line impedance stabilization network (LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

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

※ Remark

Decreases with the logarithm of the frequency.

6.3 Test procedures

The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m(W) × 1.5 m(L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the

maximum emission.

6.4 Test results

Ambient temperature: 23 ℃
Relative humidity: 42 % R.H.

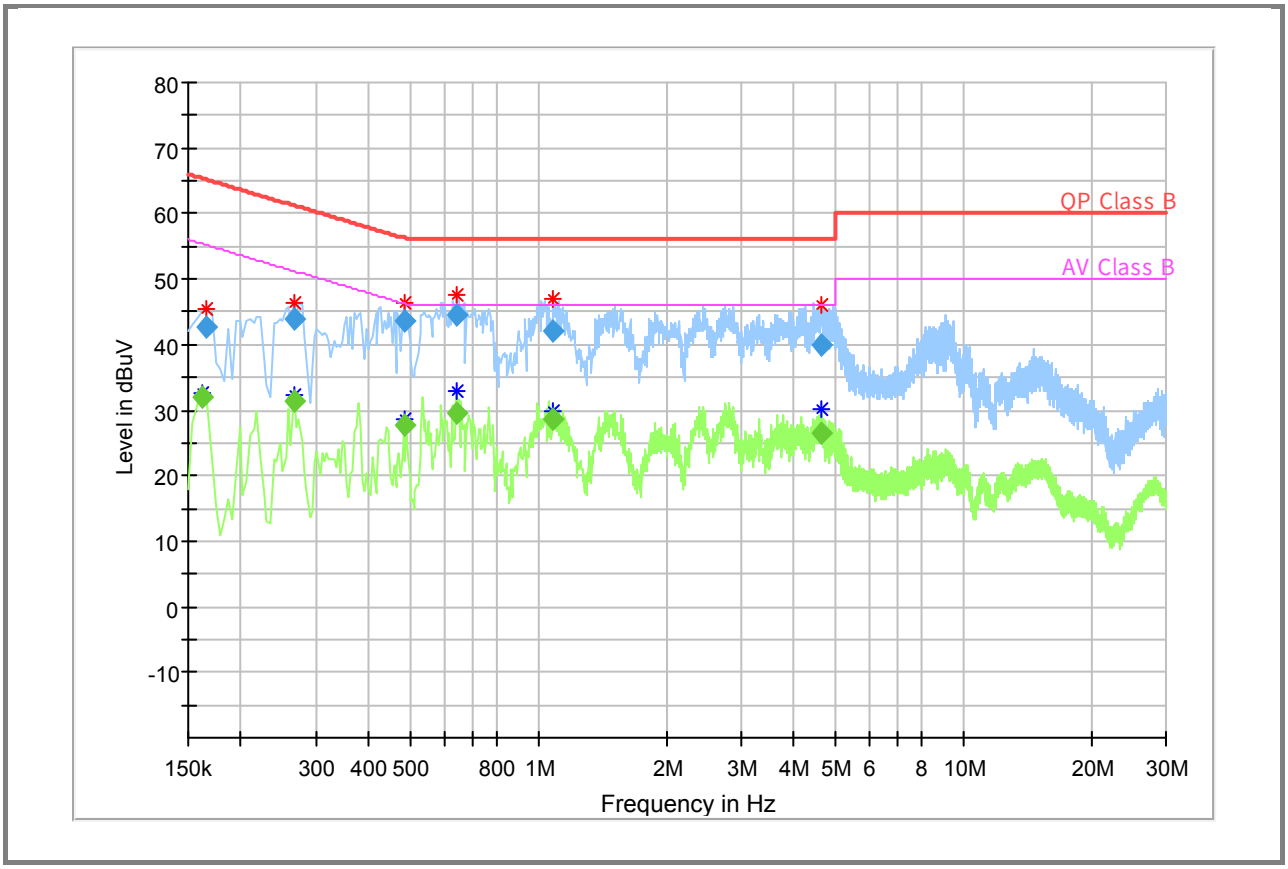
Frequency range: 0.15 ㎒ ~ 30 ㎒
Measured bandwidth: 9 ㎑

Freq. (㎒)	Line	Q-Peak		
		Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)
0.27	H	43.90	61.24	17.34
0.48	H	43.75	56.31	12.55
0.65	H	44.48	56.00	11.52
1.08	H	42.04	56.00	13.96
4.64	H	39.83	56.00	16.17

Freq. (㎒)	Line	Average		
		Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)
0.64	H	29.42	46.00	16.58
1.08	H	28.78	46.00	17.22
-	-	-	-	-
-	-	-	-	-

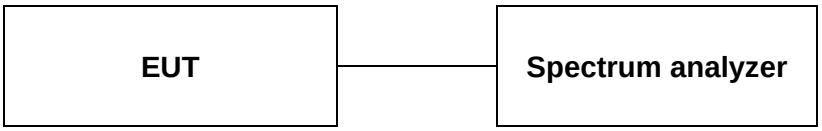
※ Remark
Line(H): Hot
Line(N): Neutral

Plot of conducted power line



7. 26 dB and 99% bandwidth

7.1. Test setup



7.2. Limit

Not applicable

7.3. Test procedure (KDB 789033)

1. The signal analyzer's automatic bandwidth measurement capability was used to per Form the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of Stimultaneously measuring the 99% occupied bandwidth. The bandwidth measurement Was not influenced by any intermediate power nulls in the fundamental emission.
2. Set the spectrum analyzer as,
   RBW = approximately 1% of the emission bandwidth
   VBW > RBW
   Detector = Peak
   Trace mode = max hold
3. Repeat until all the rest channels are investigated.

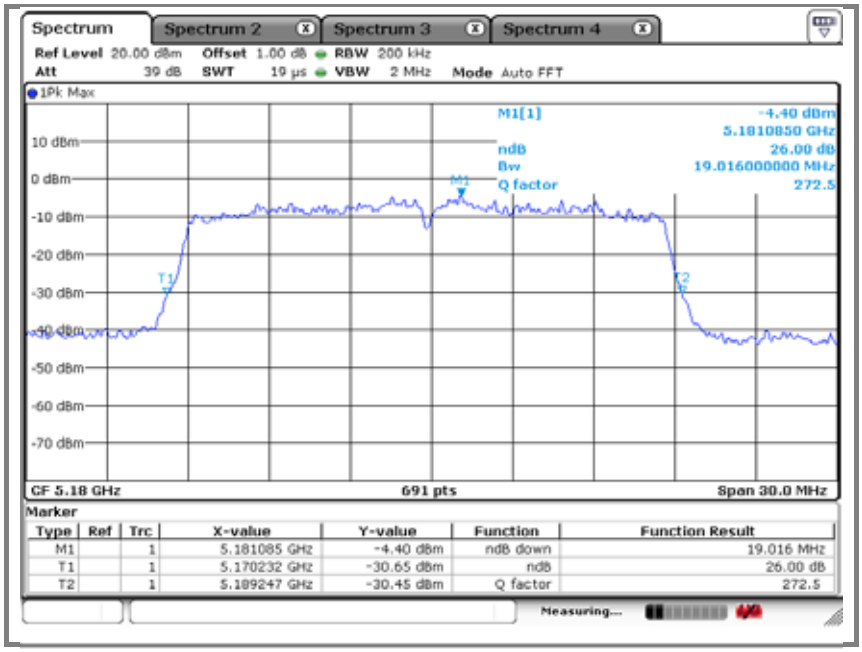
7.4. Test results

Ambient temperature: 22 ℃
Relative humidity: 45 % R.H.

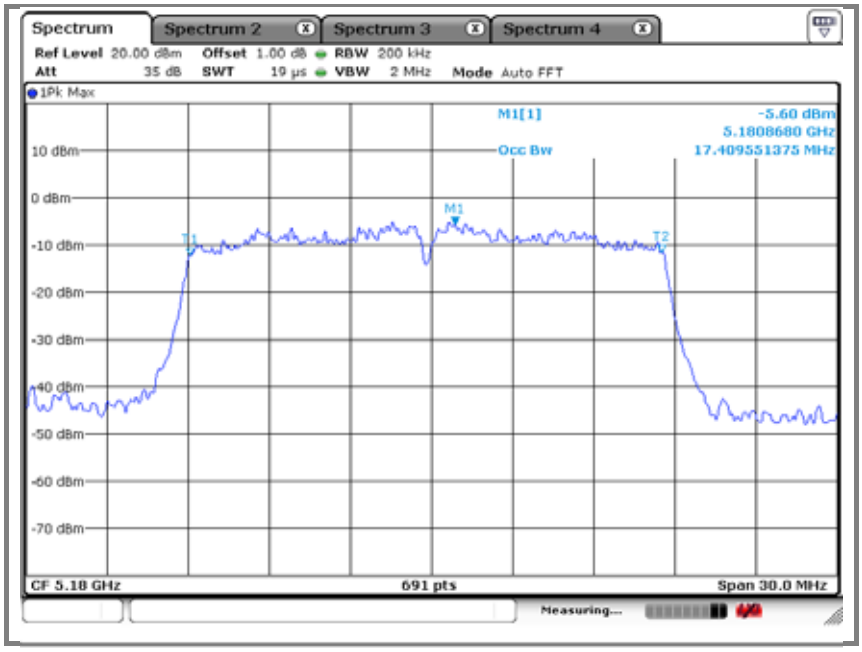
Mode	Frequency(㎒)	26 dB bandwidth(㎒)	99% bandwidth(㎒)
U-NII-1	5 180	19.02	17.41
	5 220	18.97	17.50
	5 240	18.97	17.50
U-NII-1(n_HT20)	5 180	18.58	16.32
	5 720	18.84	16.32
	5 240	18.67	16.37
U-NII-3	5 745	19.36	17.54
	5 785	20.84	17.54
	5 805	19.02	17.50
U-NII-3(n_HT20)	5 190	21.88	16.63
	5 230	22.06	16.71
	5 805	23.97	16.67

Operation mode: U-NII-1

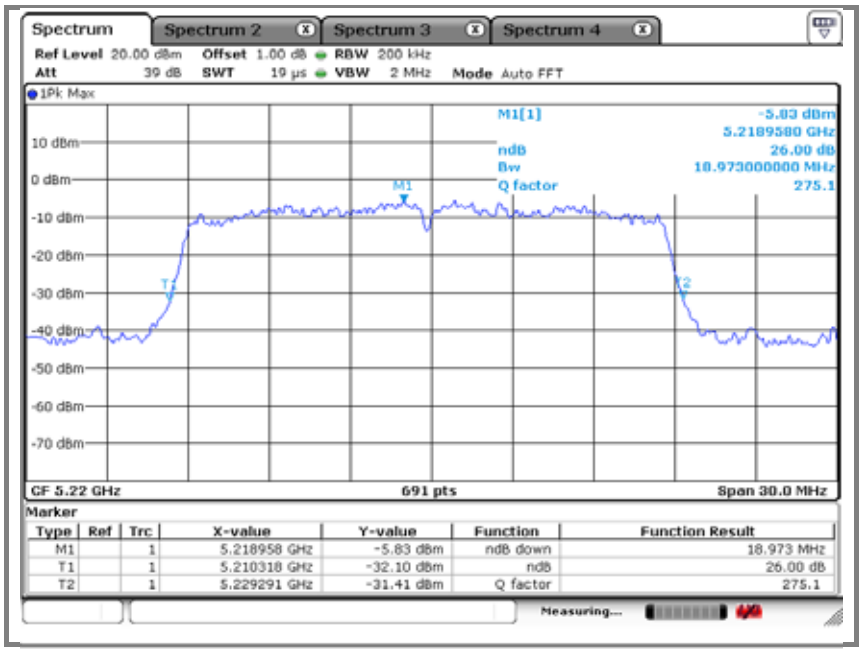
A. Low channel (5 180 ㎒) - 26 ㏈ bandwidth



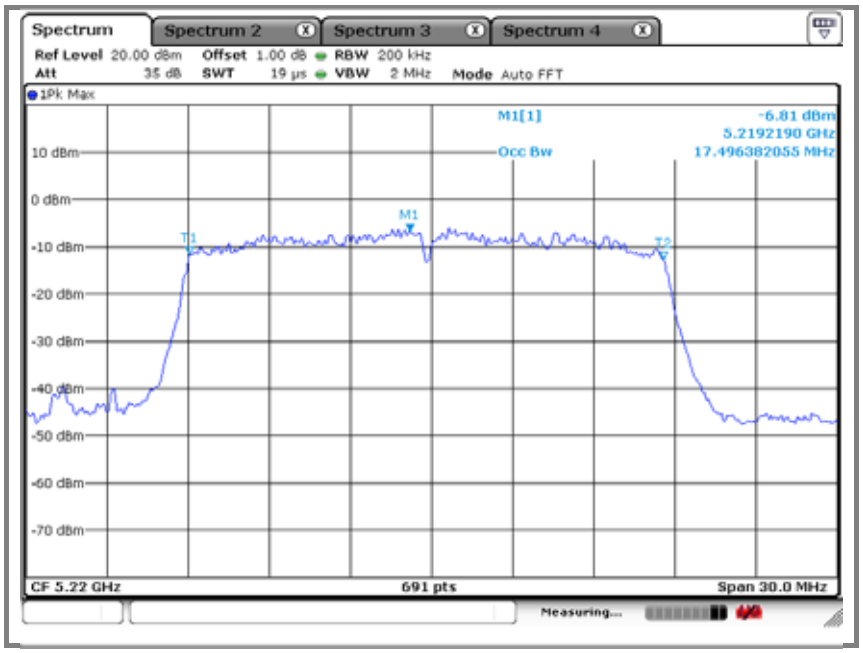
A. Low channel (5 180 ㎒) – 99% bandwidth



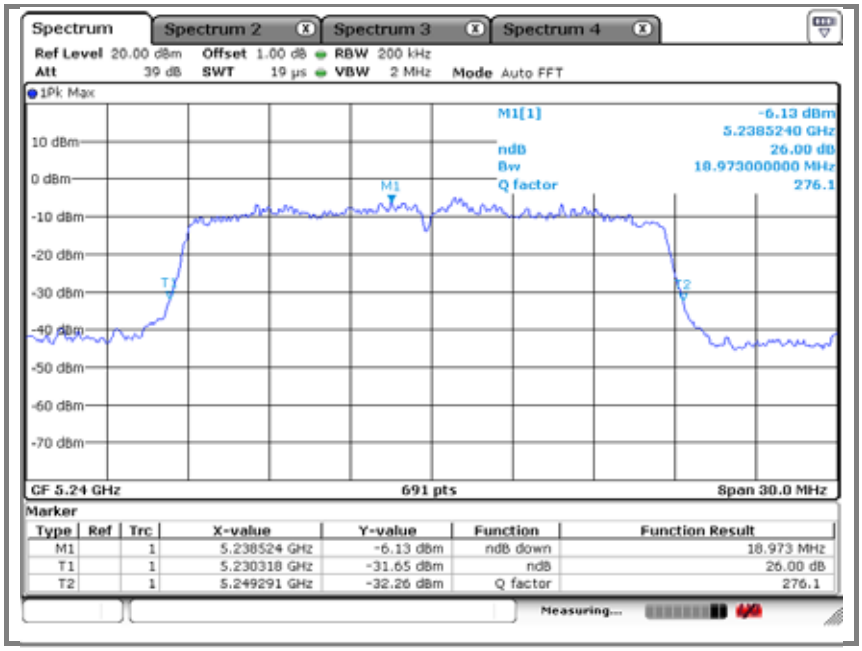
B. Middle channel (5 220 ㎒) - 26 ㏈ bandwidth



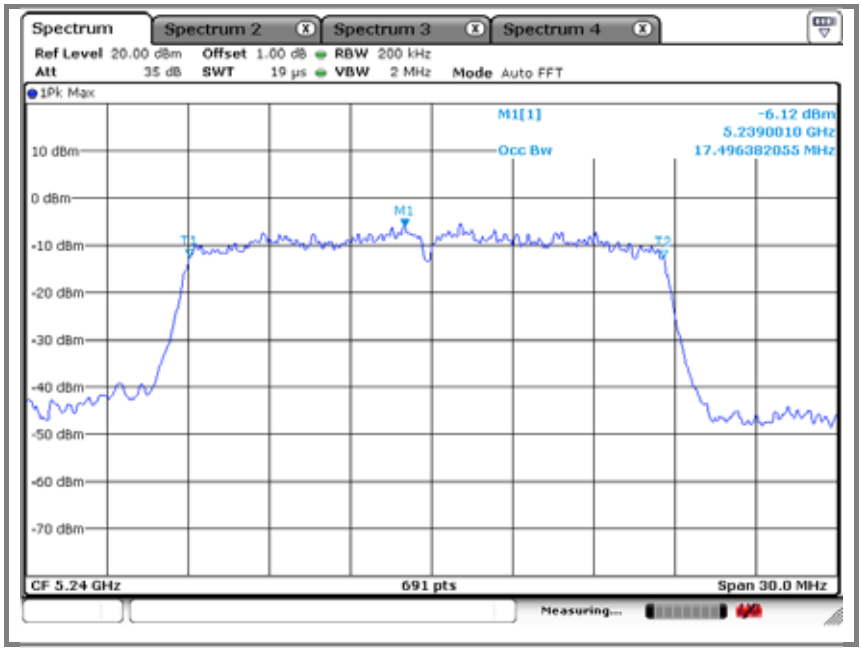
B. Middle channel (5 220 ㎒) – 99% bandwidth



C. High channel (5 240 ㎒) - 26 ㏈ bandwidth

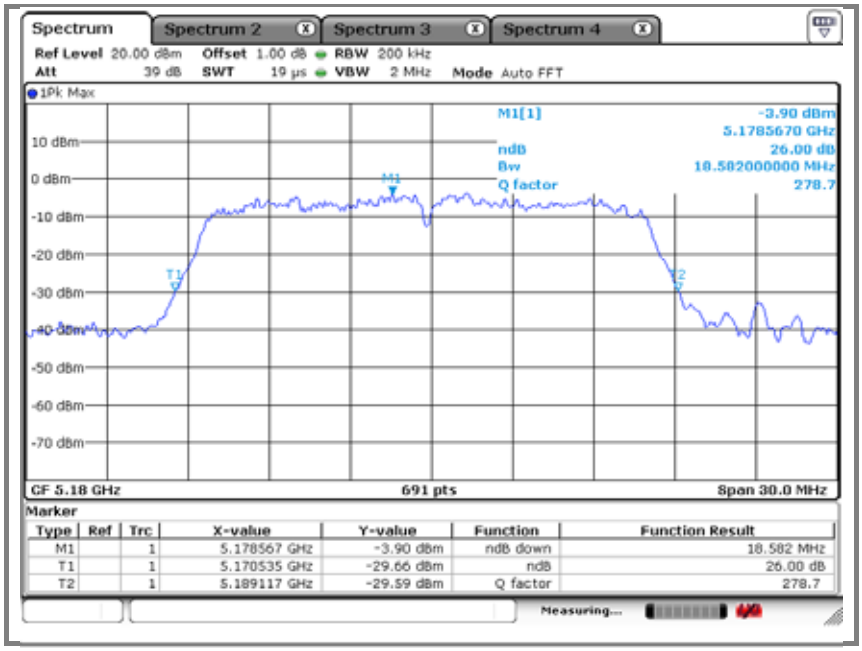


C. High channel (5 240 ㎒) – 99% bandwidth

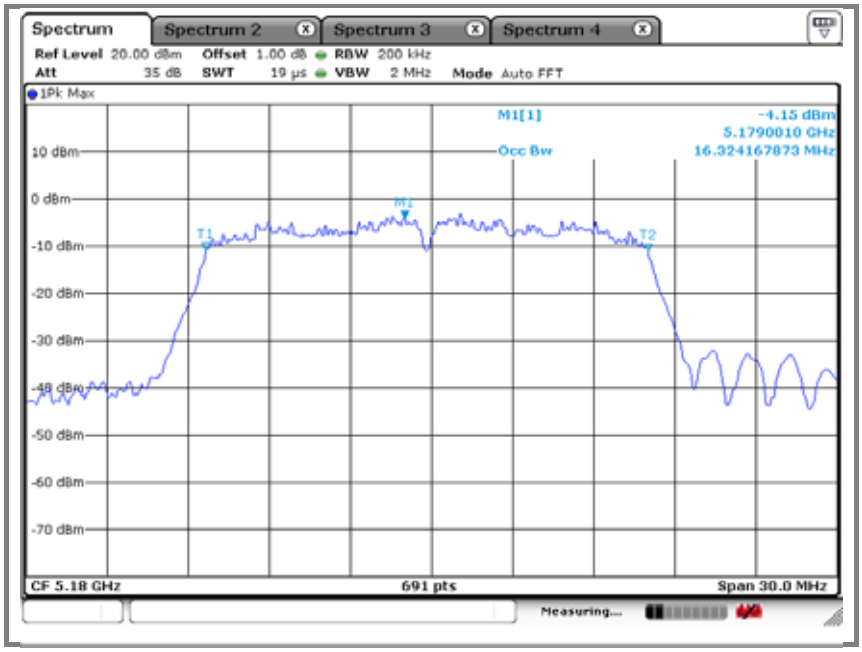


Operation mode: U-NII-1(n_HT20)

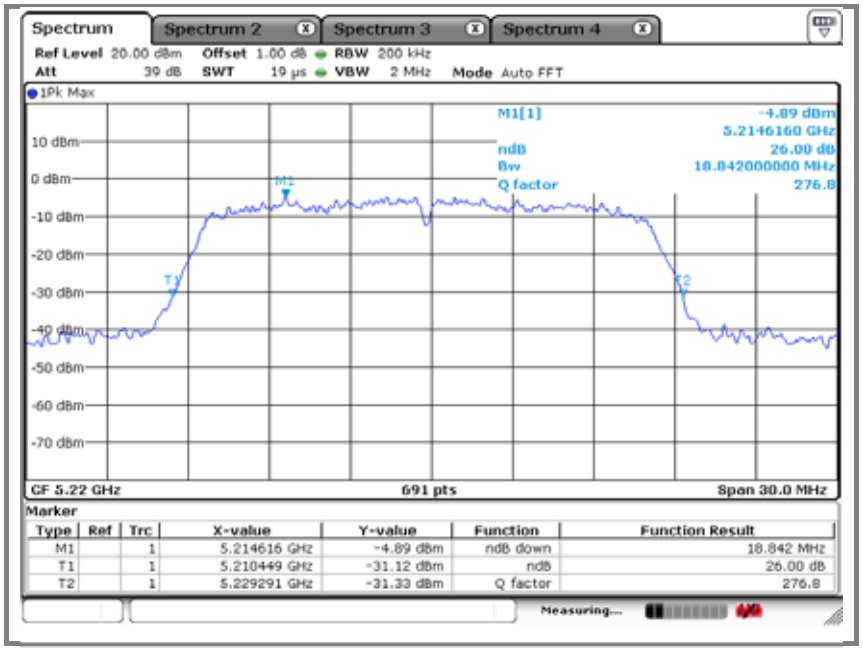
A. Low channel (5 180 ㎒) - 26 ㏈ bandwidth



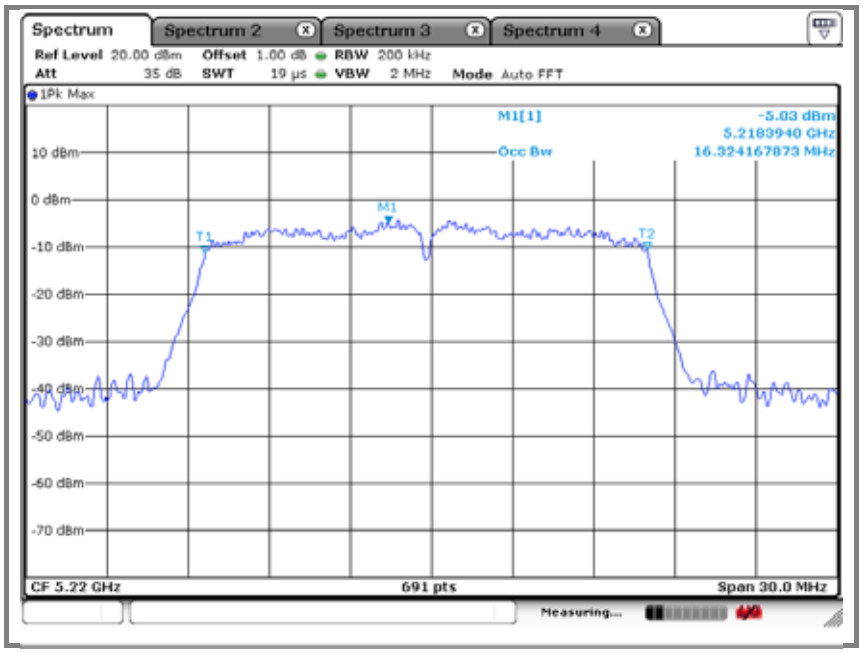
A. Low channel (5 180 ㎒) – 99% bandwidth



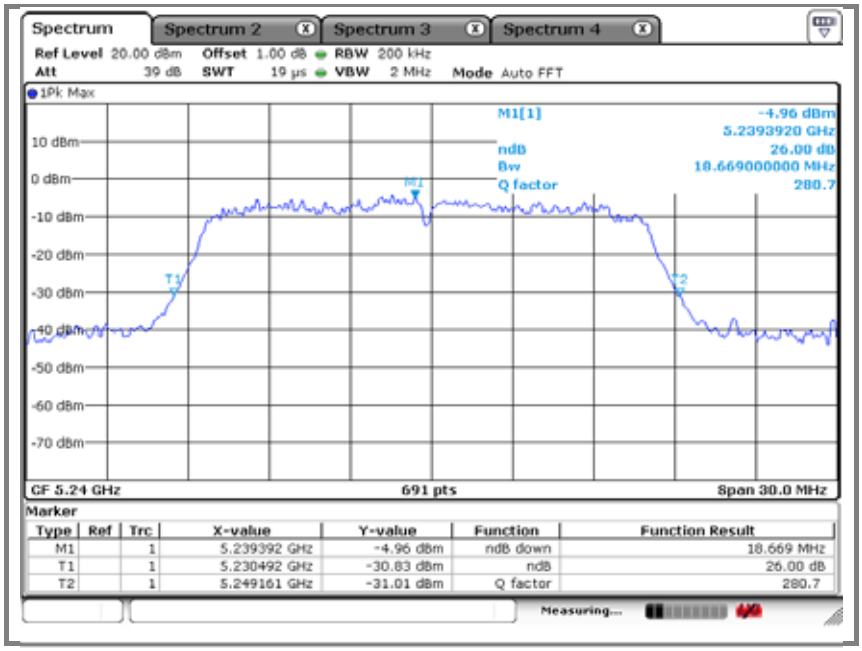
B. Middle channel (5 220 ㎒) - 26 ㏈ bandwidth



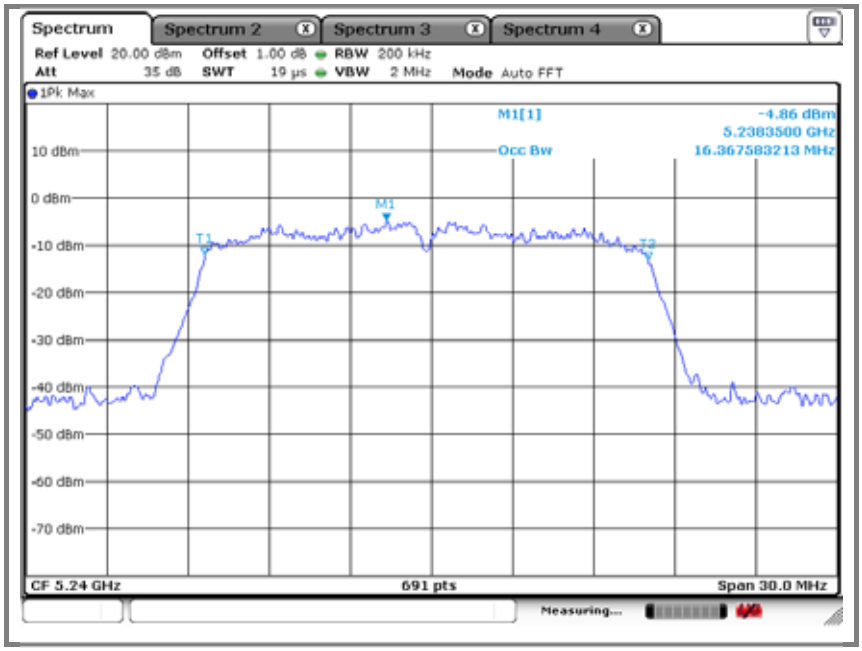
B. Middle channel (5 220 ㎒) – 99% bandwidth



C. High channel (5 240 ㎒) - 26 ㏈ bandwidth

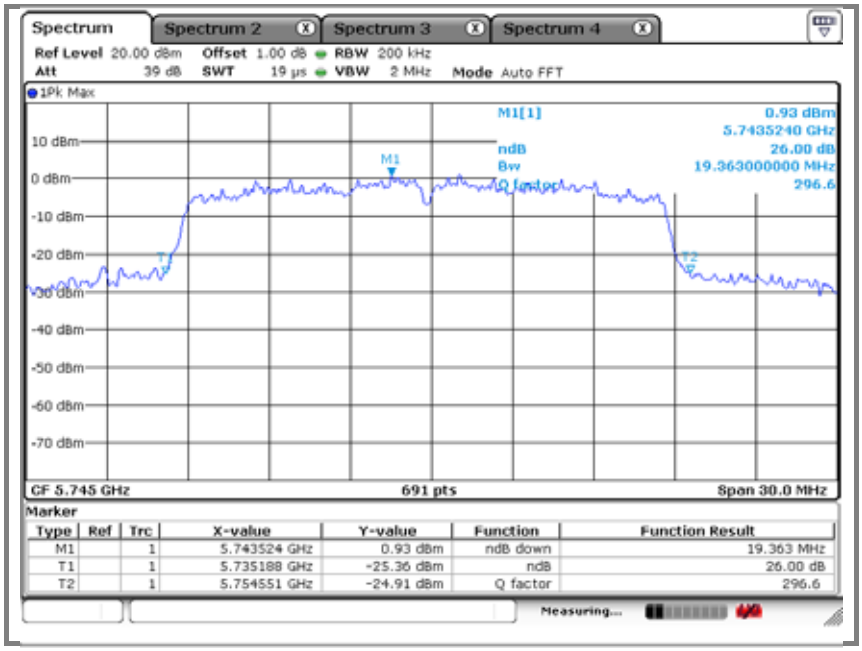


C. High channel (5 240 ㎒) – 99% bandwidth

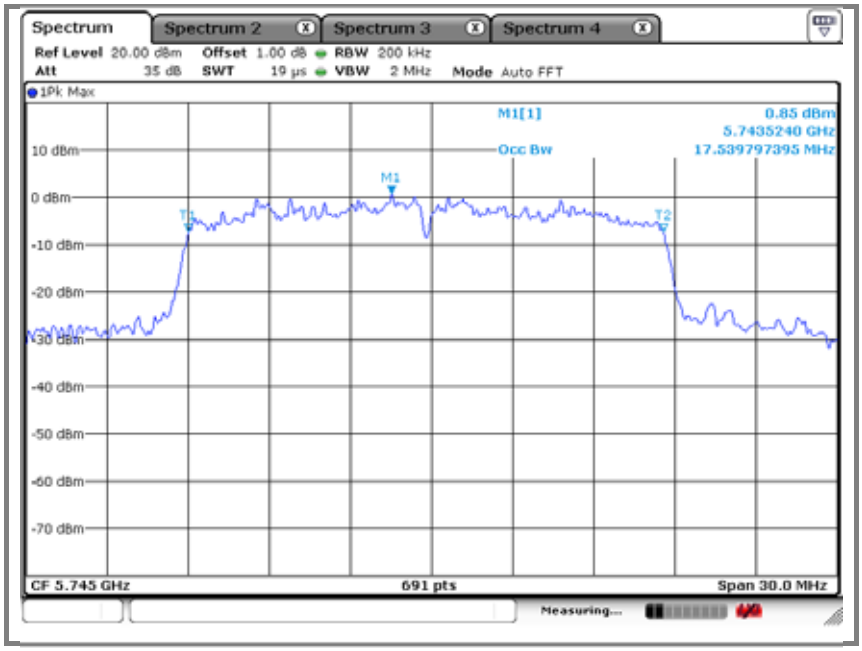


Operation mode: U-NII-3

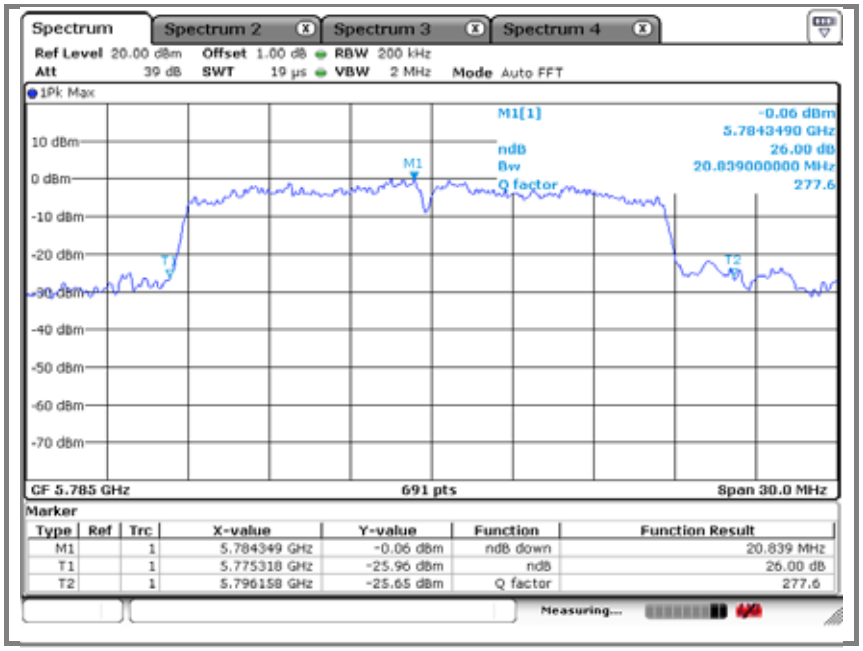
A. Low channel (5 745 ㎒) - 26 ㏈ bandwidth



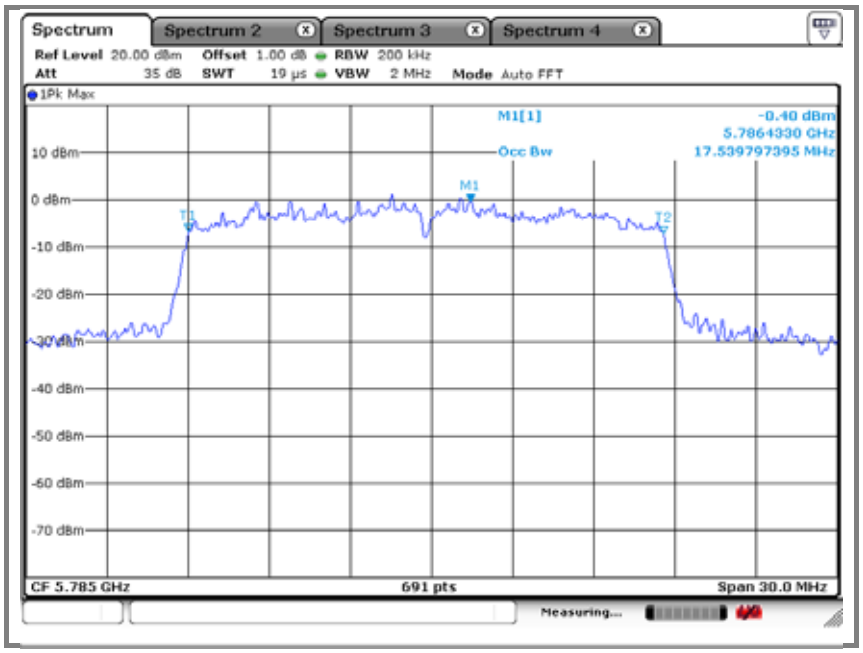
A. Low channel (5 745 ㎒) – 99% bandwidth



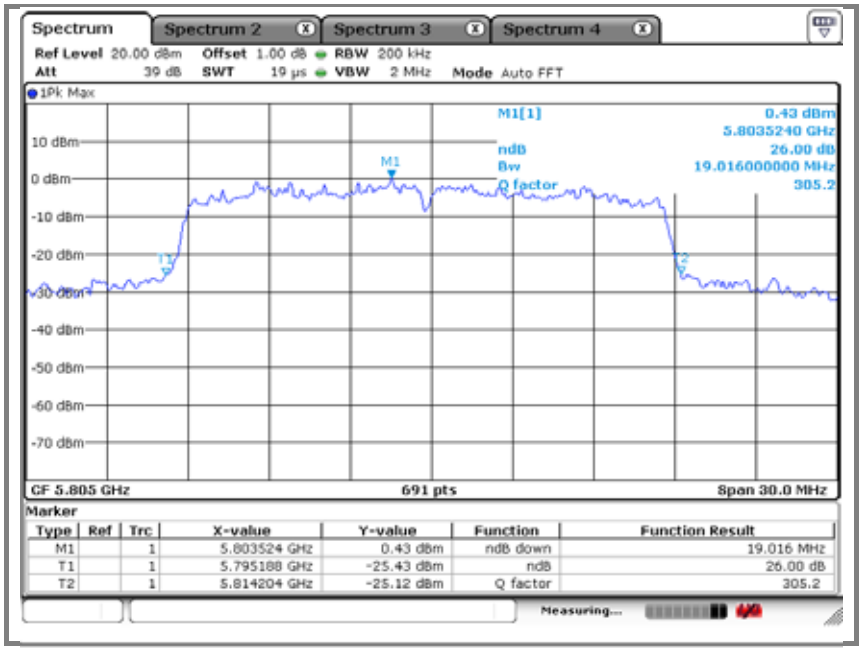
B. Middle channel (5 785 ㎒) - 26 ㏈ bandwidth



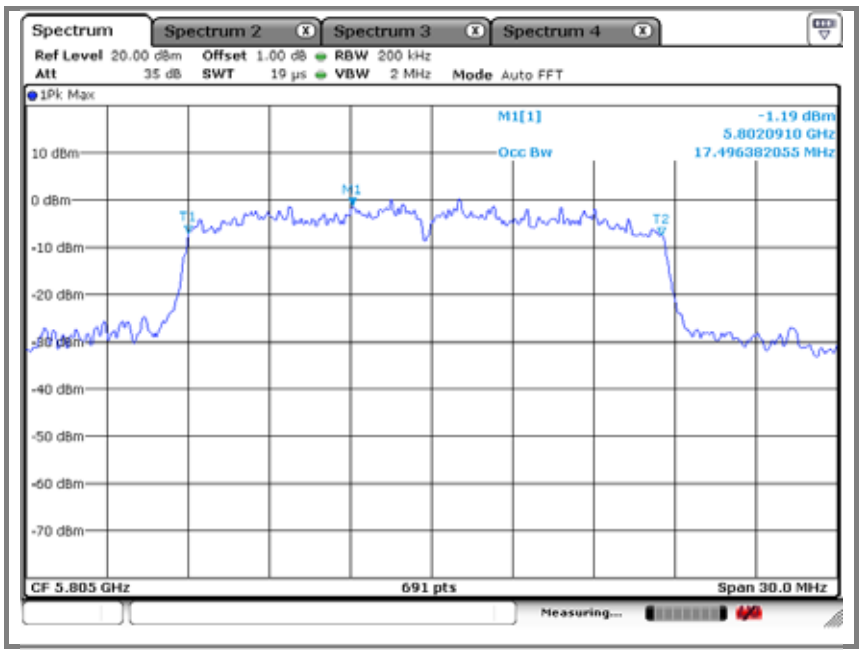
B. Middle channel (5 785 ㎒) – 99% bandwidth



C. High channel (5 805 ㎒) - 26 ㏈ bandwidth

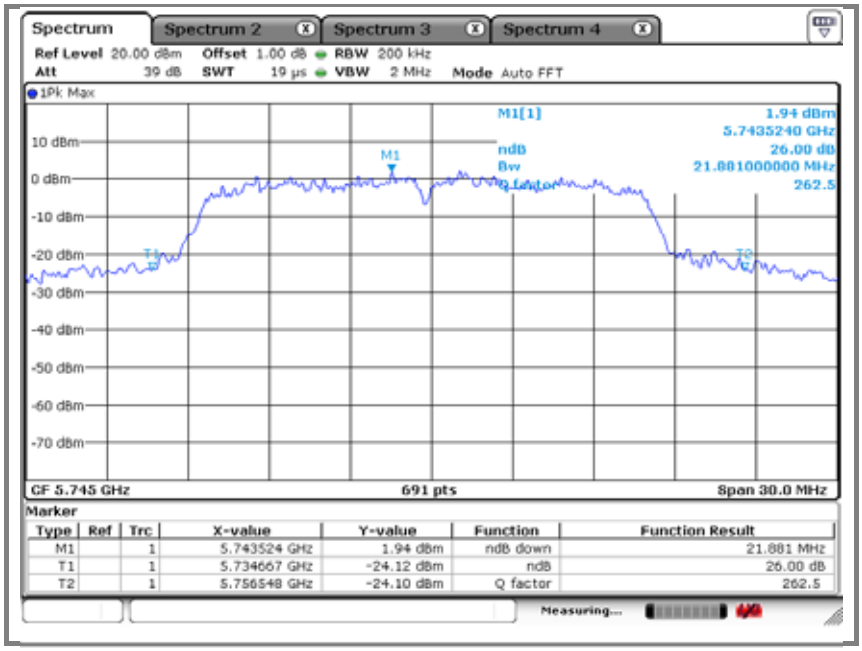


C. High channel (5 805 ㎒) – 99% bandwidth

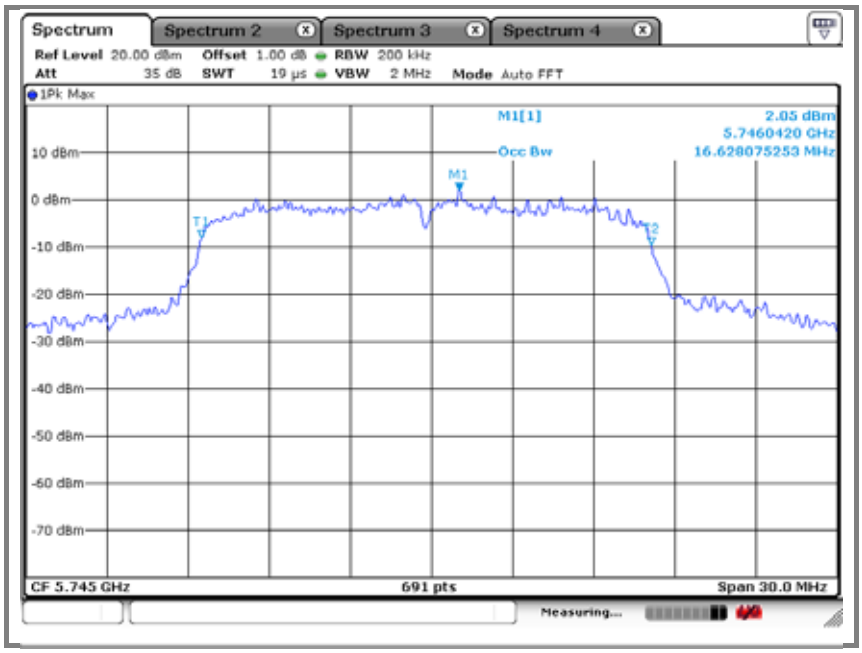


Operation mode: U-NII-3(n_HT20)

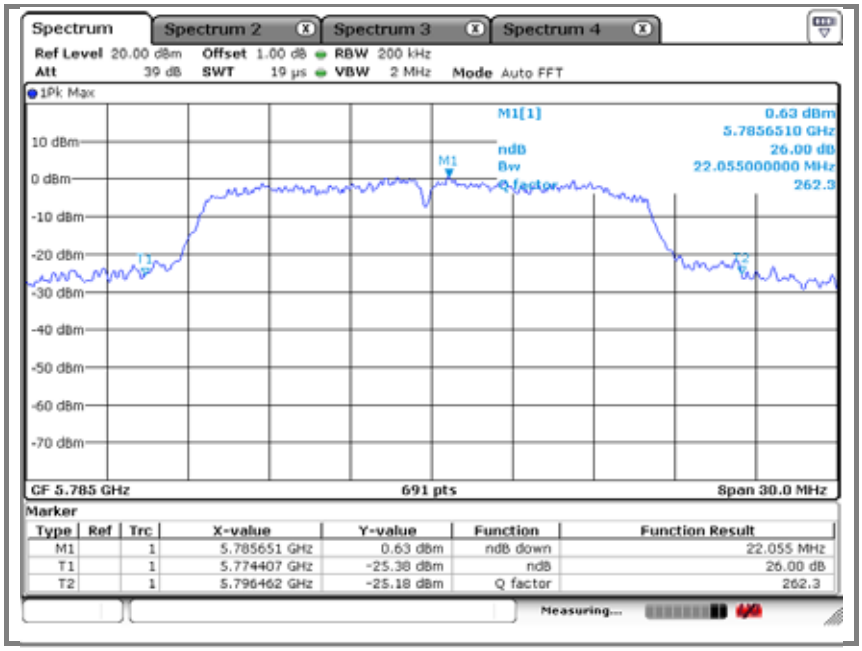
A. Low channel (5 745 ㎒) - 26 ㏈ bandwidth



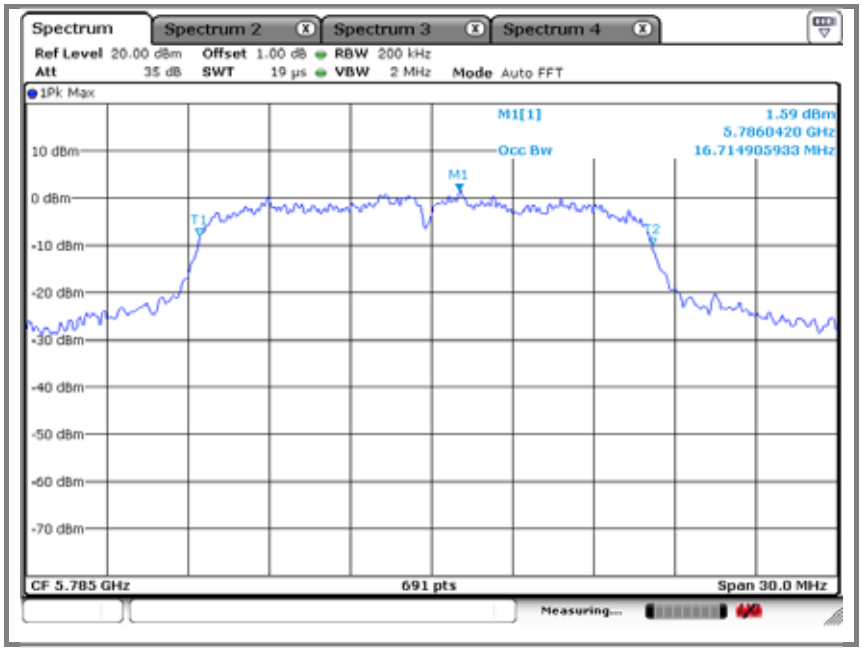
A. Low channel (5 745 ㎒) – 99% bandwidth



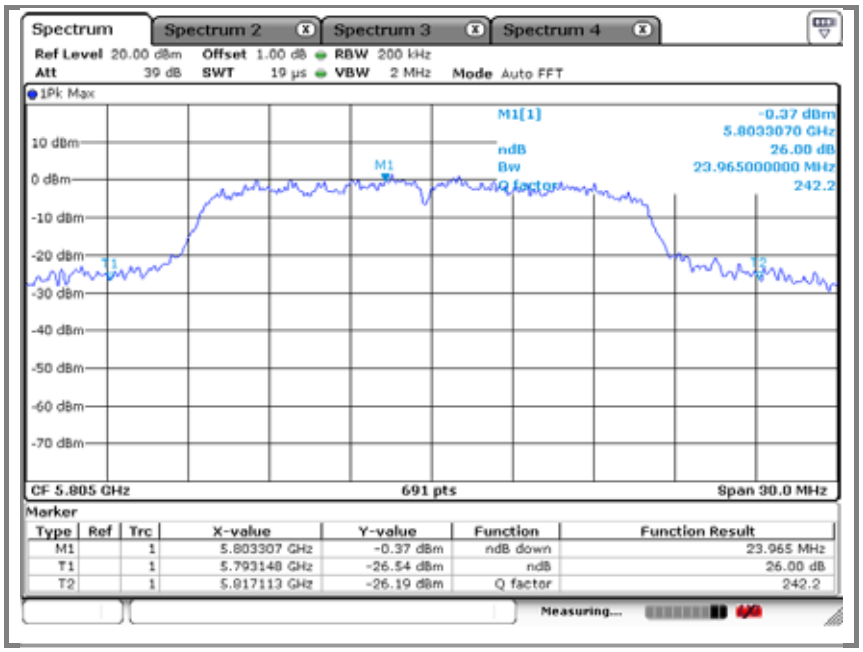
B. High channel (5 785 ㎒) - 26 ㏈ bandwidth



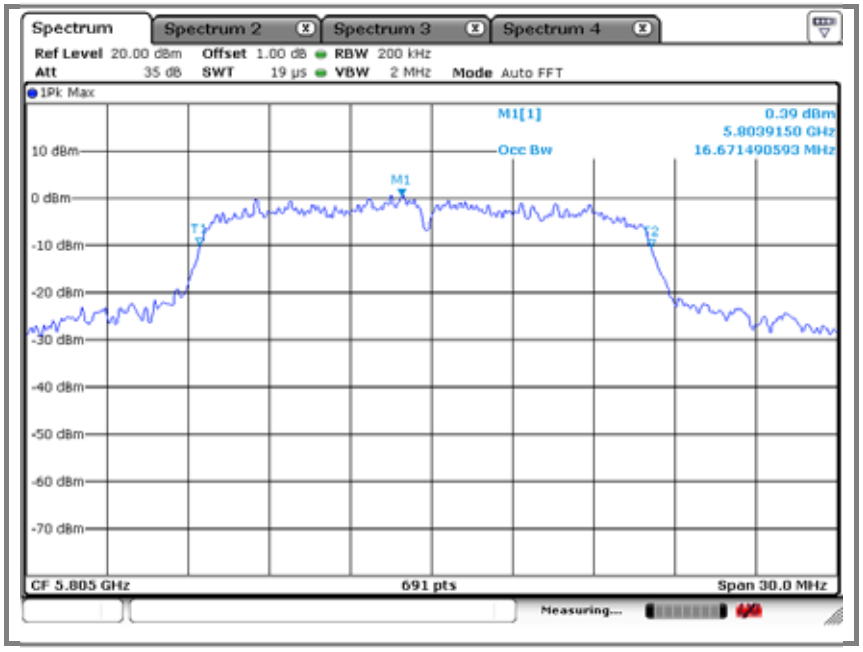
B. High channel (5 785 ㎒) – 99% bandwidth



C. High channel (5 805 ㎒) - 26 ㏈ bandwidth

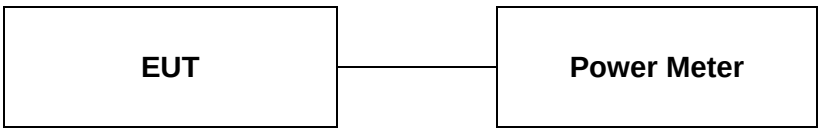


C. High channel (5 805 ㎒) – 99% bandwidth



8. Output power

8.1. Test setup.



8.2. Limit

Band 5.15-5.25GHz:
FCC: For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.
IC: The maximum e.i.r.p. shall not exceed 200 mW or 10 +10logB dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
Band 5.725-5.825GHz:
FCC: For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of
operation shall not exceed 1 W.
IC: The maximum conducted output power shall not exceed 1 W.

8.3. Test procedure

1. The maximum average conducted output power can be measured using Method
PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT
is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
a. The Transmitter output (antenna port) was connected to the power meter.
b. Turn on the EUT and power meter and then record the power value.
c. Repeat above procedures on all channels needed to be tested.

8.4. Test results

Ambient temperature: 22 ℃
Relative humidity: 45 % R.H.

Mode	Frequency (㎒)	Average Output power (㏈m)	E.I.R.P(㏈m)
U-NII-1	5 180	6.19	8.09
	5 220	5.30	7.20
	5 240	4.92	6.82
U-NII-1(n_HT20)	5 180	4.96	6.86
	5 220	3.80	5.70
	5 240	3.71	5.61
Antenna gain		1.9 ㏈i	

Mode	Frequency (㎒)	Average Output power (㏈m)
U-NII-1	5 180	6.19
	5 220	5.30
	5 240	4.92
U-NII-1(n_HT20)	5 180	4.96
	5 220	3.80
	5 240	3.71
U-NII-3	5 745	10.75
	5 785	10.08
	5 805	9.67
U-NII-3(n_HT20)	5 745	9.99
	5 785	9.26
	5 805	8.90

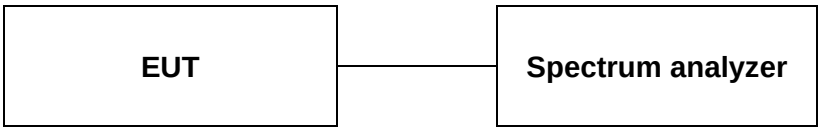
※ **Remark**

E.I.R.P= Output power+ Antenna gain

During the test the EUT is in 100% duty cycle transmitting.

9. Peak power spectral density

9.1. Test setup



9.2. Test Overview and Limit

Band 5.15-5.25GHz:
FCC: In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.
IC: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band..
Band 5.725-5.825GHz:
FCC: In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.
IC: The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas
of directional gain greater than 6 dBi are used.

9.3. Test procedure (KDB 789033)

Methods refer to FCC KDB 789033
1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”.
2) Use the peak search function on the instrument to find the peak of the spectrum.
3) The result is the PPSD.
4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz “provided that the measured power is integrated to show the total power over the measurement bandwidth” (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth

9.4. Test results

Ambient temperature: 22 ℃
Relative humidity: 45 % R.H.
FCC

Mode	Frequency (㎒)	Power Spectral Density (dB m /1 ㎒)	Limit (dB m /1 ㎒)
U-NII-1	5 180	2.11	11dBm
	5 220	2.02	
	5 240	1.47	
U-NII-1(n_HT20)	5 180	3.63	
	5 220	3.75	
	5 240	2.84	

Mode	Frequency (㎒)	Power Spectral Density (dB m /500kHz)	Limit (dB m /500kHz)
U-NII-3	5 745	3.17	30
	5 785	3.11	
	5 805	1.64	
U-NII-3(n_HT20)	5 745	2.94	
	5 785	1.71	
	5 805	1.03	

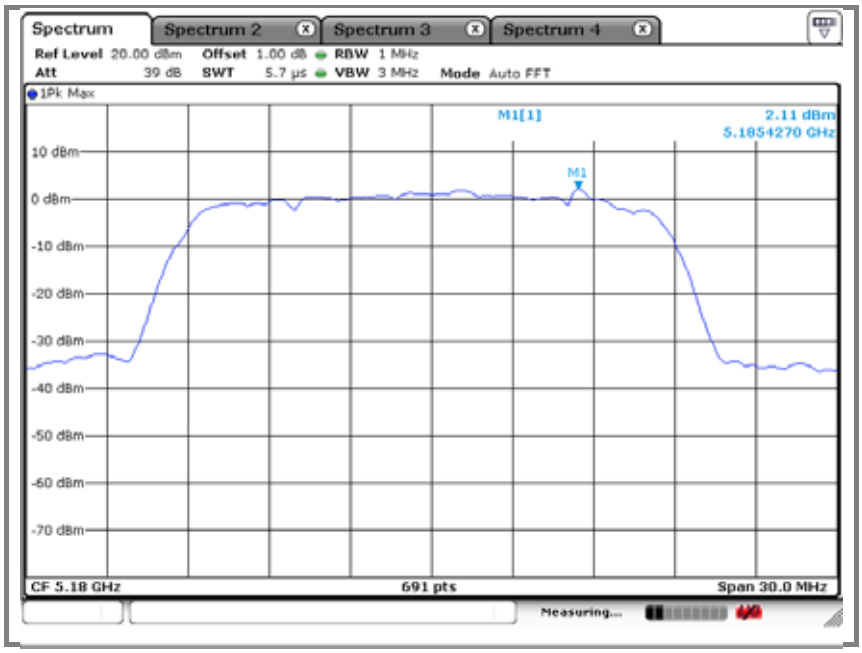
IC

Mode	Frequency (㎒)	Power Spectral Density (dB m /1 ㎒)	E.I.R.P Power Spectral Density (dB m /1 ㎒)	Limit (dB m /1 ㎒)
U-NII-1	5 180	2.11	4.01	10
	5 220	2.02	3.92	
	5 240	1.47	3.37	
U-NII-1(n_HT20)	5 180	3.63	5.53	
	5 220	3.75	5.65	
	5 240	2.84	4.74	
Antenna gain		1.9 dBi		

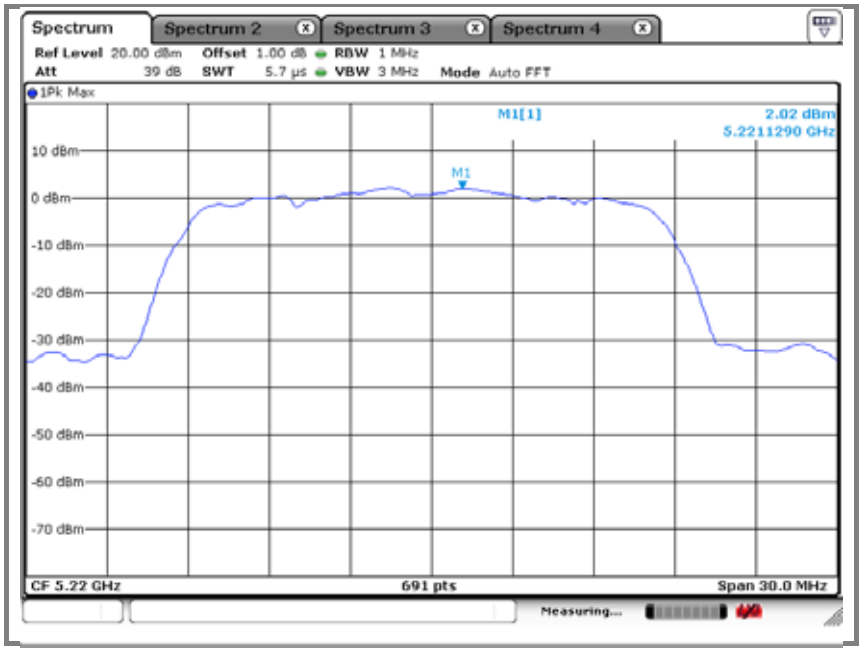
Mode	Frequency (㎒)	Power Spectral Density (dB m /500kHz)	E.I.R.P Power Spectral Density (dB m /500kHz)	Limit (dB m /500kHz)
U-NII-3	5 745	3.17	5.07	30
	5 785	3.11	5.01	
	5 805	1.64	3.54	
U-NII-3(n_HT20)	5 745	2.94	4.84	
	5 785	1.71	3.61	
	5 805	1.03	2.93	
Antenna gain		1.9 dBi		

Operation mode: U-NII-1

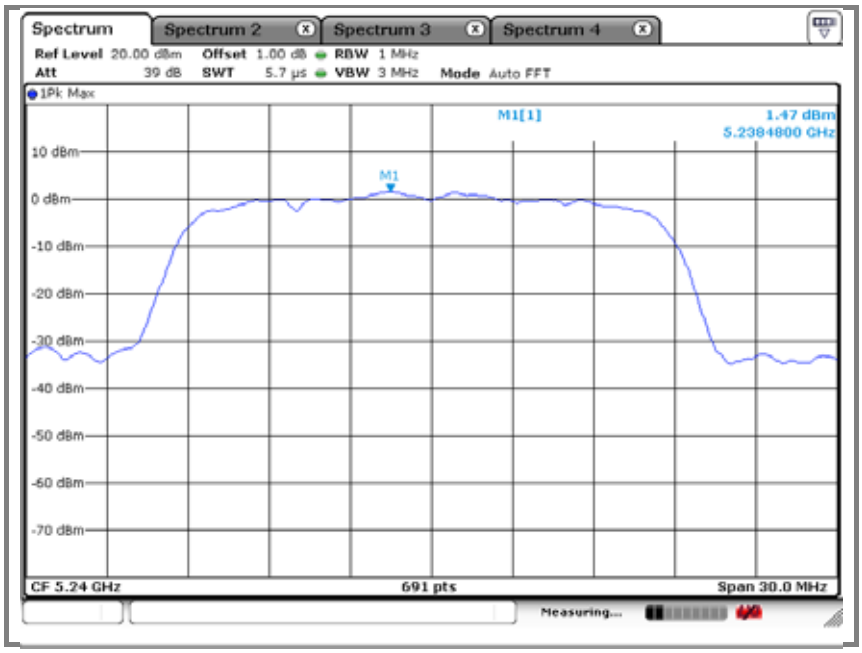
A. Low channel (5 180 ㎒)



B. Middle channel (5 220 ㎒)

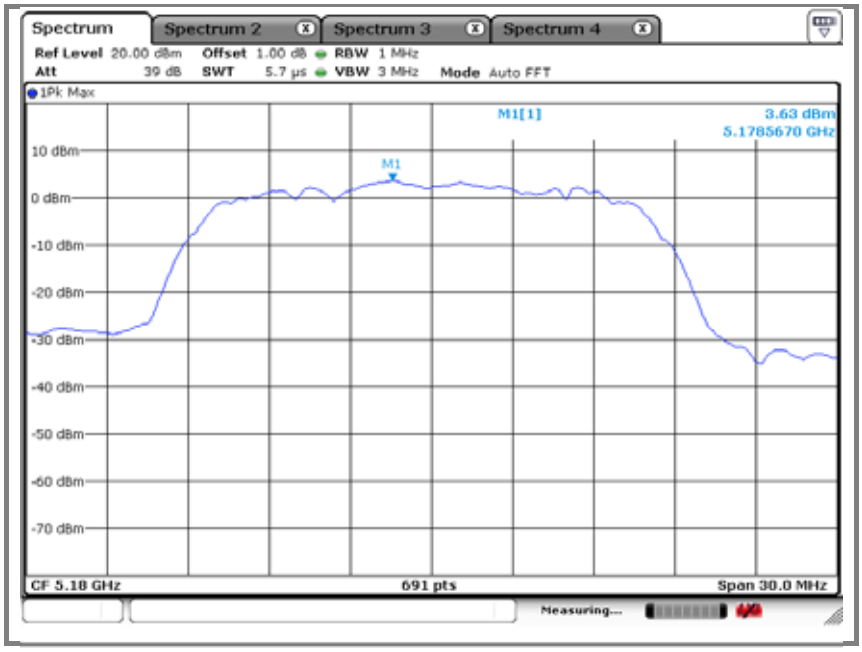


C. High channel (5 240 ㎒)

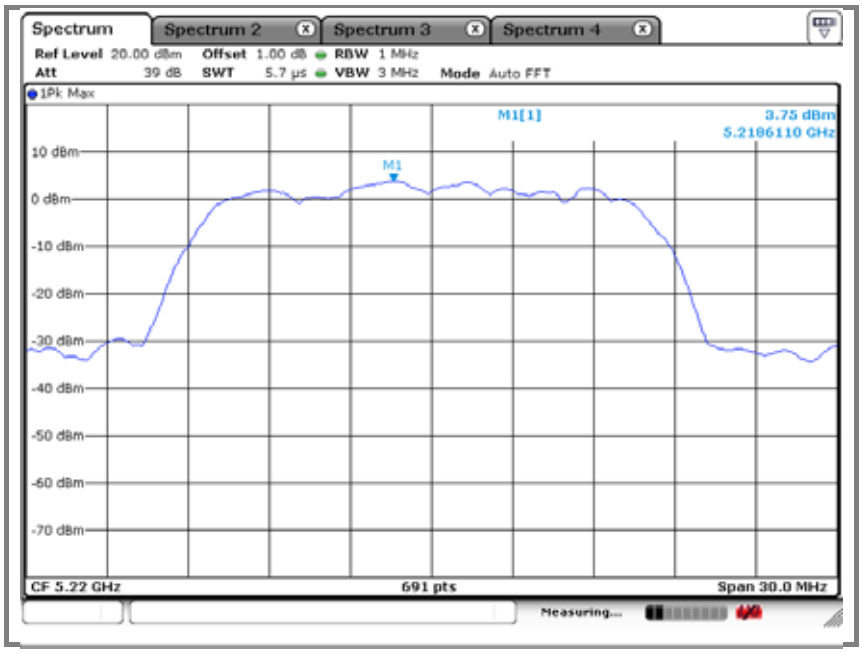


Operation mode: U-NII-1(n_HT20)

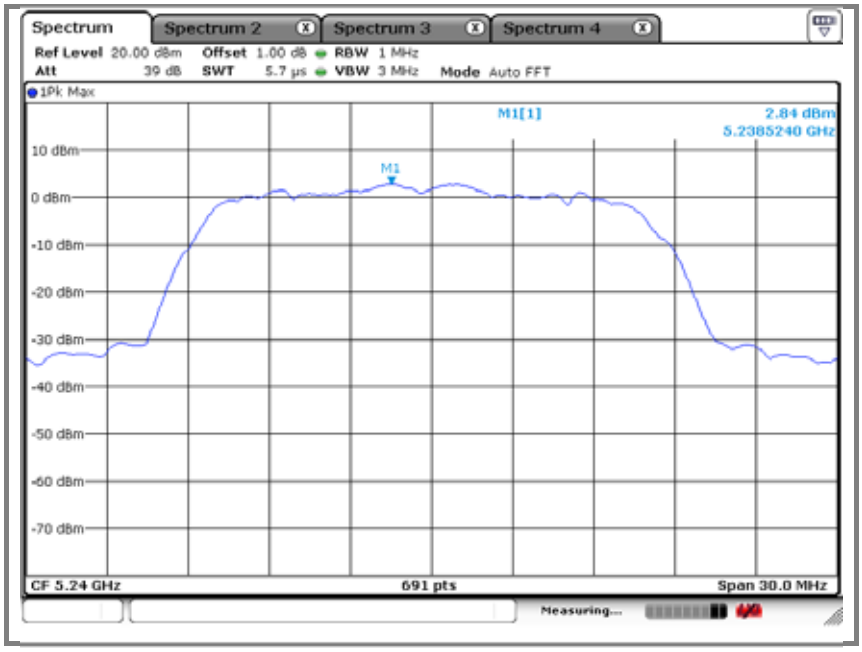
A. Low channel (5 180 ㎒)



B. Middle channel (5 220 ㎒)

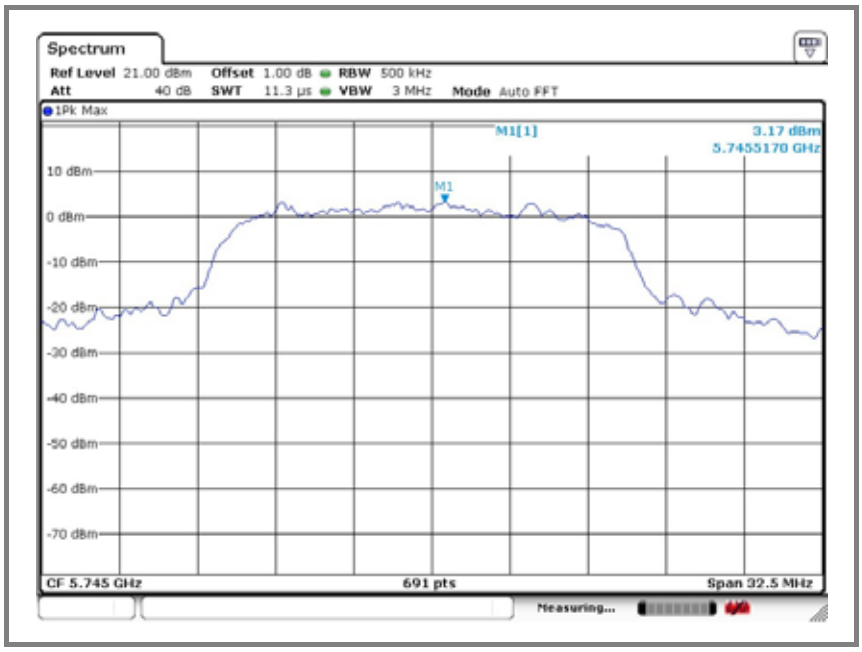


C. High channel (5 240 ㎒)

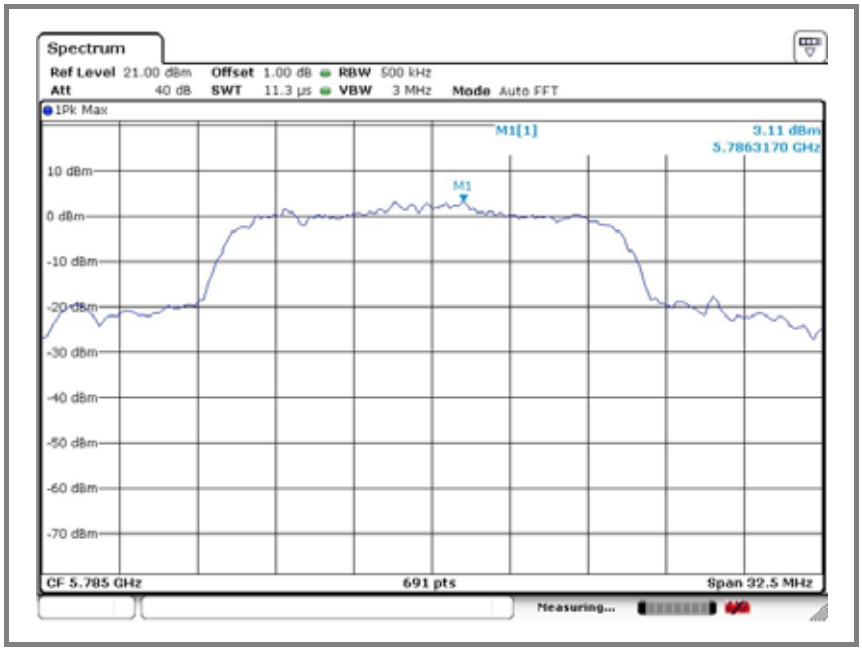


Operation mode: U-NII-3

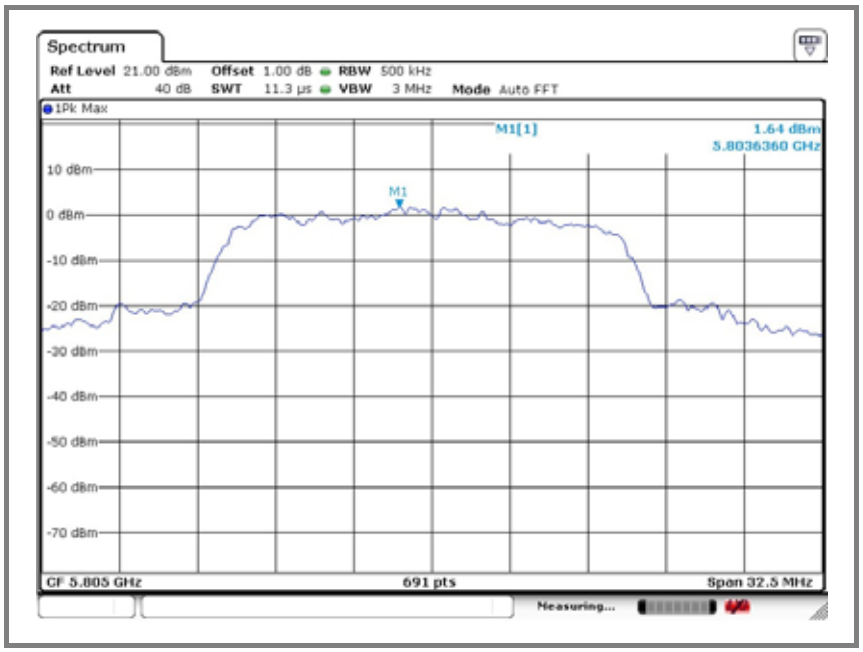
A. Low channel (5 745 ㎒)



B. Middle channel (5 785 ㎒)

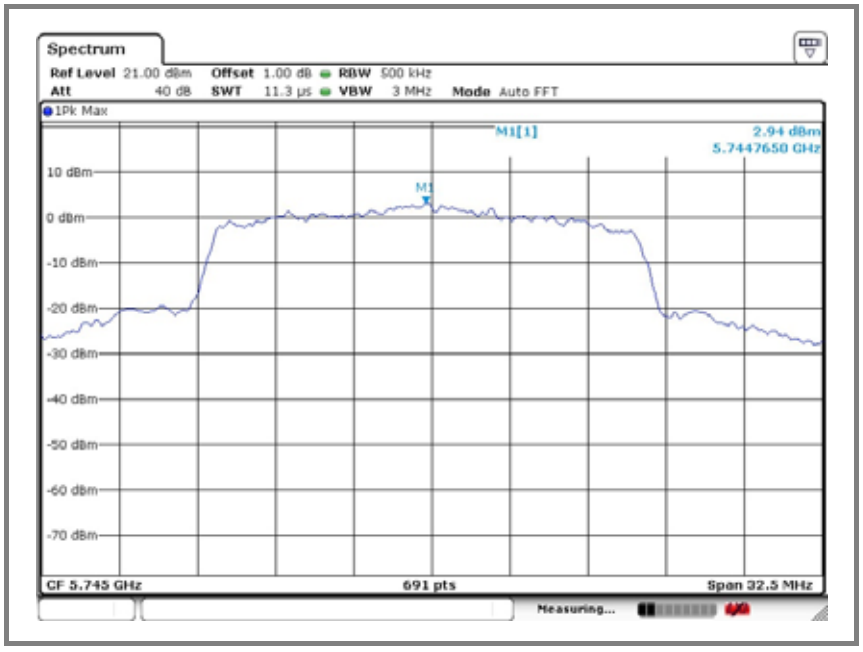


C. High channel (5 805 ㎒)

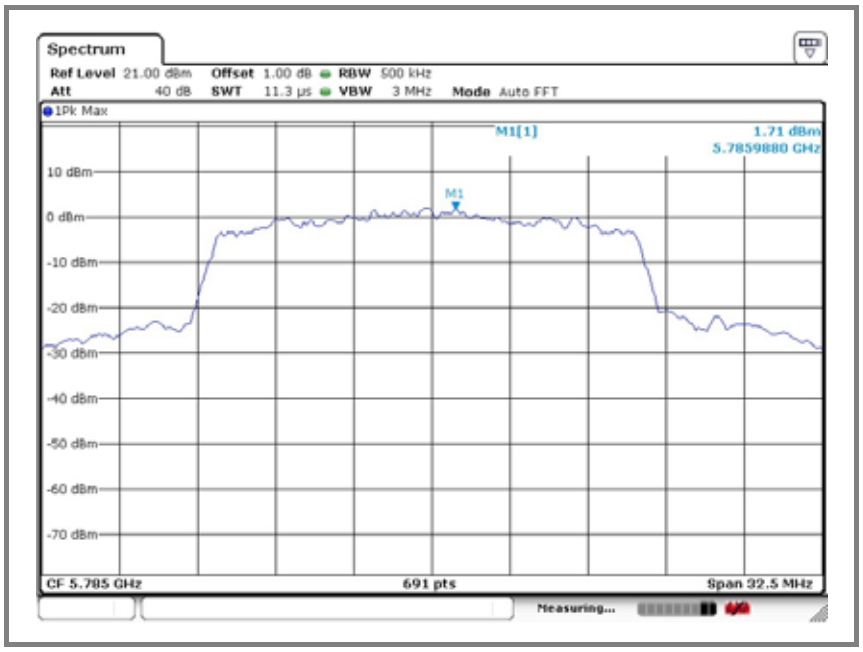


Operation mode: U-NII-3(n_HT20)

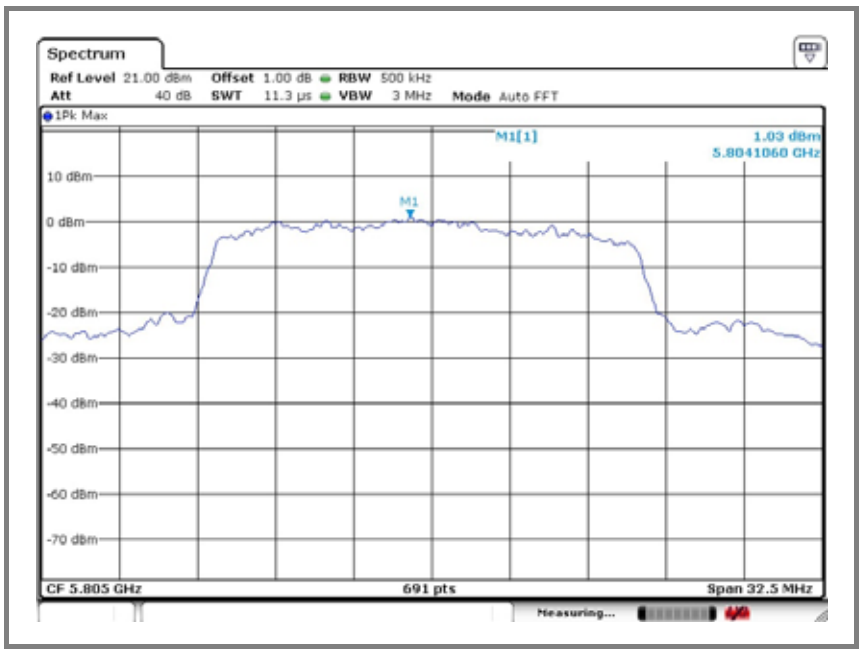
A. Low channel (5 745 ㎒)



B. Middle channel (5 785 ㎒)

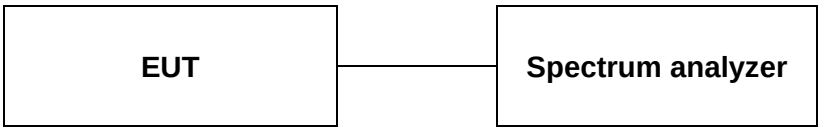


C. High channel (5 805 ㎒)



10. 6 dB Bandwidth

10.1. Test setup



10.2. Limit

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

10.3. Test procedure

Test procedure
KDB 789033 D02 v01r03– Section C.2, KDB 644545 D03 v01
1. Set RBW = 100 ㎑
2. Set the video bandwidth (VBW) ≥ 3 × RBW.
3. Detector = peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
7. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545_D03 v01.

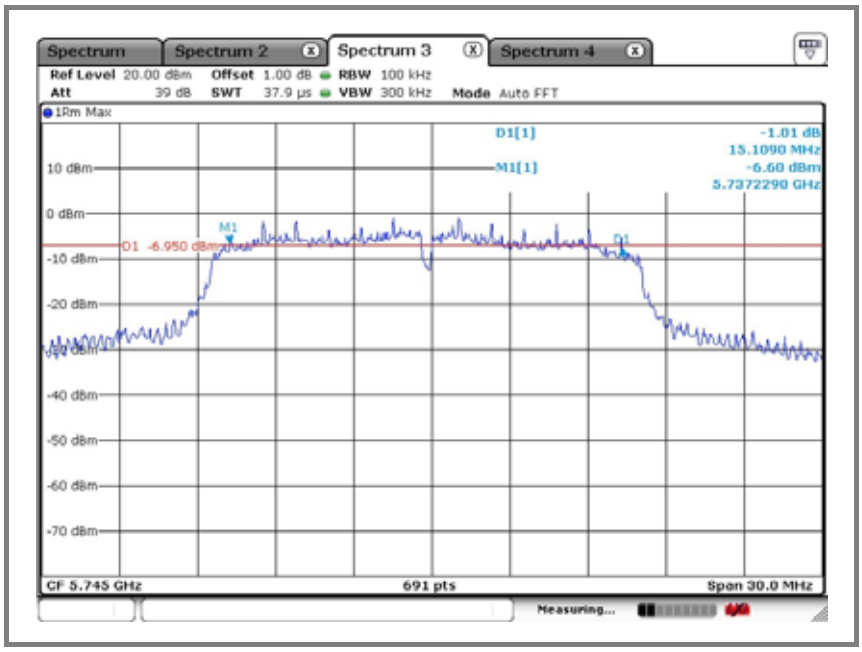
10.4. Test results

Ambient temperature: 22 ℃
Relative humidity: 45 % R.H.

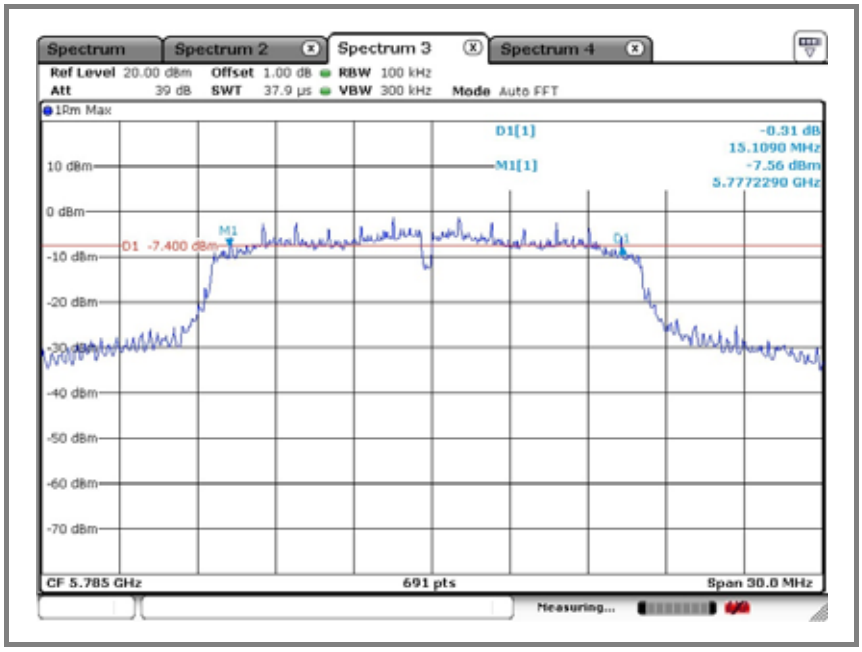
Mode	Frequency (㎒)	6 dB bandwidth (㎒)
U-NII-3	5 745	15.11
	5 785	15.11
	5 805	16.28
U-NII-3(n_HT20)	5 745	15.11
	5 785	15.11
	5 805	15.11

Operation mode: U-NII-3

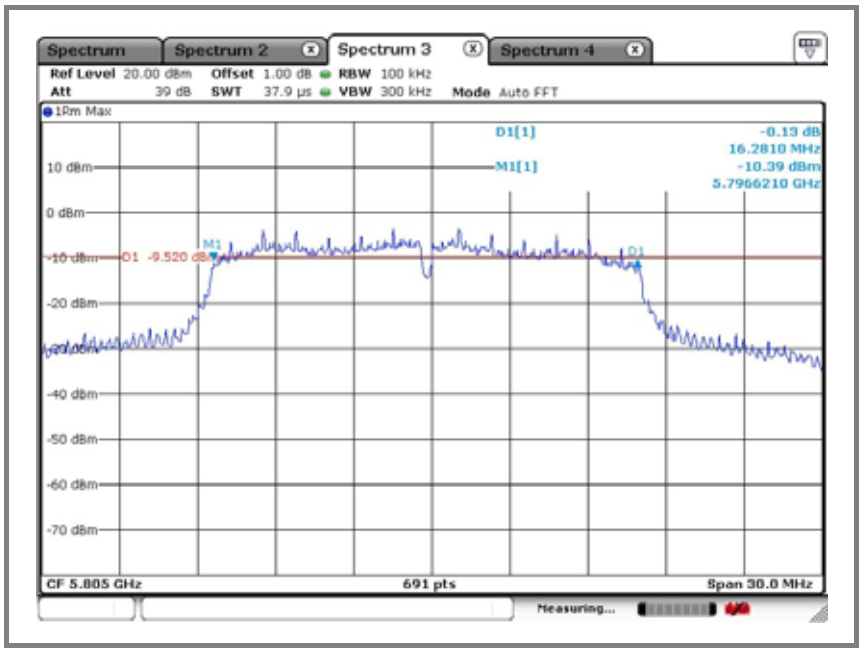
A. Low channel (5 745 ㎒)



B. Middle channel (5 785 ㎒)

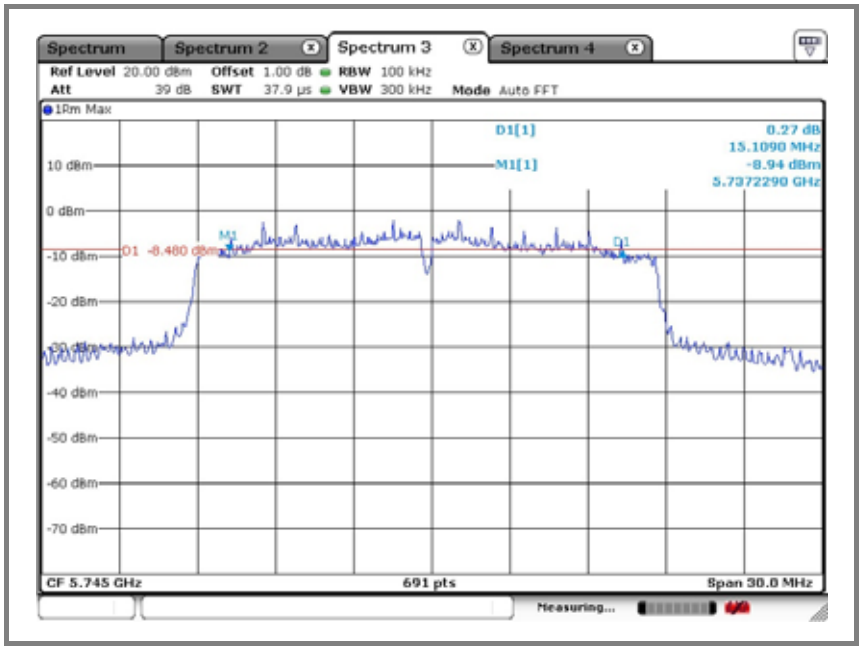


C. High channel (5 805 ㎒)

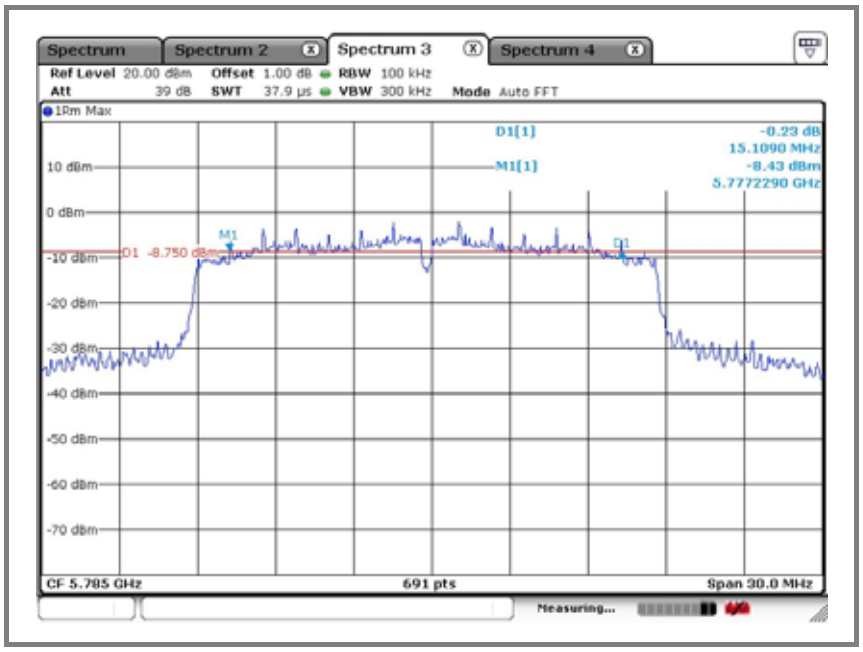


Operation mode: U-NII-3(n_HT20)

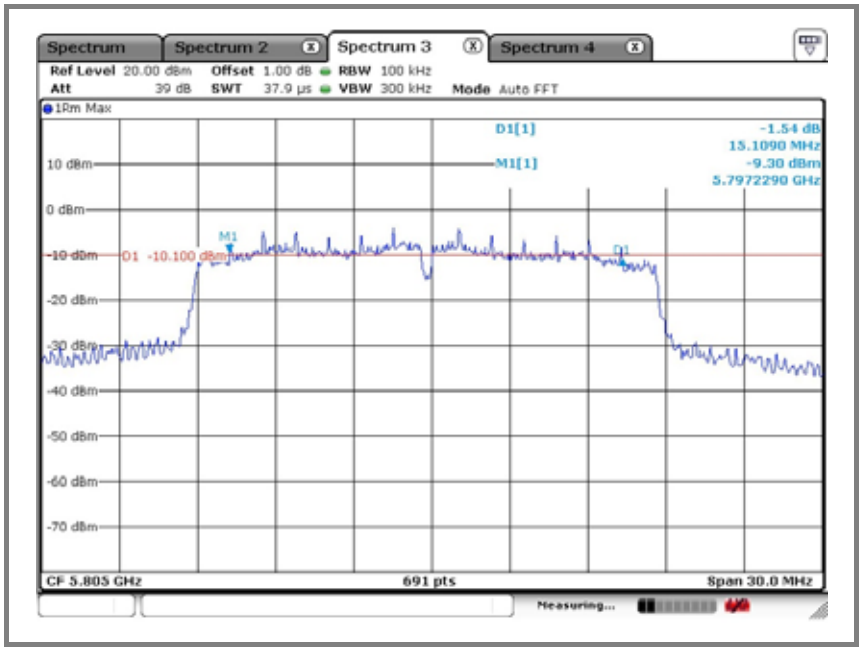
A. Low channel (5 745 ㎒)



B. Middle channel (5 785 ㎒)

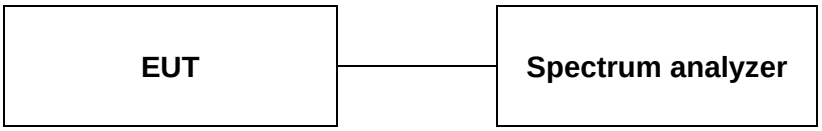


C. High channel (5 805 ㎒)



11. Frequency stability

11.1. Test setup



11.2. Limit

Not applicable

11.3. Test procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. 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.

11.4. Test results

Operation mode: Normal mode

Operation Frequency : 5 180 ㎒ (Worst case)

VOLTAGE (%)	**POWER** (VDC)	TEMP (dB)	**FREQ** (Hz)	**Deviation** (%)
100%	3.80	+20($_{Ref}$)	5180 020 760	0.000 401
100%		-20	5180 013 284	0.000 256
100%		-10	5180 015 368	0.000 297
100%		0	5180 016 669	0.000 322
100%		+10	5180 019 183	0.000 370
100%		+20	5180 016 333	0.000 315
100%		+25	5180 017 447	0.000 337
100%		+30	5180 013 285	0.000 256
100%		+40	5180 016 201	0.000 313
100%		+50	5180 020 336	0.000 393
100%		+60	5180 022 520	0.000 435
85%	3.23	+20	5180 015 106	0.000 292
115%	4.37	+20	5180 017 436	0.000 337

12. RF exposure evaluation

12.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. According to KDB 447498 (2)(a)(i)

Limits for maximum permissible exposure (MPE)

Frequency range (㎒)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (㎽/㎠)	Average time
(A) Limits for Occupational / Control exposures				
300 – 1 500	--	--	F/300	6
1 500 – 100 000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300 – 1 500	--	--	F/1 500	6
1 500 – 100 000	--	--	1	30

12.2. Friis transmission formula : Pd=(Pout*G)\(4*pi*R2)

Where
Pd= Power density in ㎽/㎠
Pout=output power to antenna in ㎽
G= Numeric gain of the antenna relative to isotropic antenna
Pi=3.1416
R= distance between observation point and center of the radiator in cm
Pd the limit of MPE, 1 ㎽/㎠. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

12.2. Test result of RF exposure evaluation

Test Item : RF Exposure evaluation data
Test Mode : Normal operation

12.3. Output power into antenna & RF exposure evaluation distance

Mode	Frequency (㎒)	Output Peak power to antenna (dBm)	Antenna gain (dBi)	Antenna Gain (dBi) Numeric	Power density at 20 ㎝ (㎽/㎠)	Power density Limits (㎽/㎠)
U-NII-1	5 180	6.19	1.90	1.55	0.001 3	1
	5 220	5.30			0.001 0	
	5 240	4.92			0.001 0	
U-NII-1(n_HT20)	5 180	4.96	1.90	1.55	0.001 0	
	5 220	3.80			0.000 7	
	5 240	3.71			0.000 7	
U-NII-3	5 745	10.75	1.90	1.55	0.003 7	
	5 785	10.08			0.003 1	
	5 805	9.67			0.002 9	
U-NII-3(n_HT20)	5 745	9.99	1.90	1.55	0.003 1	
	5 785	9.26			0.002 6	
	5 805	8.90			0.002 4	

※ Remark
The power density Pd (5th column) at a distance of 20 ㎝ calculated from the friis transmission formula is far below the limit of 1 ㎽/㎠ .