FCC EVALUATION REPORT FOR CERTIFICATION

Manufacturer: Ohsung Electronics Co., Ltd.

#181 Gongdan-dong, Gumi-si, Gyeongsangbuk-Do

South Korea

Attn: Mr. Hak Ki, Kim / General Manager

Date of Issue: Dec. 28, 2018

Order Number: GETEC-C1-18-469

Test Report Number: GETEC-E3-18-032

Test Site: GUMI UNIVERSITY EMC CENTER

(Test firm Registration Number: 269701)

FCC ID. : OZ5URCTDC9100

Applicant : Ohsung Electronics Co., Ltd.

Rule Part(s)	**: FCC Part 15 Subpart E-UNII Devices § 15.407**
Test Method	**: ANSI C63.10 (2013)**
Equipment Class	**: Unlicensed National Information Infrastructure(NII)**
EUT Type	**: Table top networking keypad**
Type of Authority	**: Certification**
Model Name	**: TDC-9100**

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10 (2013)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the vest of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,

Hyun Kim, Senior Engineer
GUMI UNIVERSITY EMC CENTER

Reviewed by,

Jae-Hoon Jeong, Technical Manager
GUMI UNIVERSITY EMC CENTER

This test report only contains the result of a specific sample supplied for the examination.
It is not allowed to copy this report even partly without the approval of EMC center

GUMI UNIVERSITY EMC CENTER

CONTENTS

Scope: *Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.*

1. General Information

Applicant: Ohsung Electronics Co., Ltd.

Applicant Address: #181 Gongdan-dong, Gumi-si, Gyeongsangbuk-Do, South Korea

Manufacturer: Ohsung Electronics Co., Ltd.

Manufacturer Address: #181 Gongdan-dong, Gumi-si, Gyeongsangbuk-Do, South Korea

Contact Person: Hak Ki, Kim / General Manager

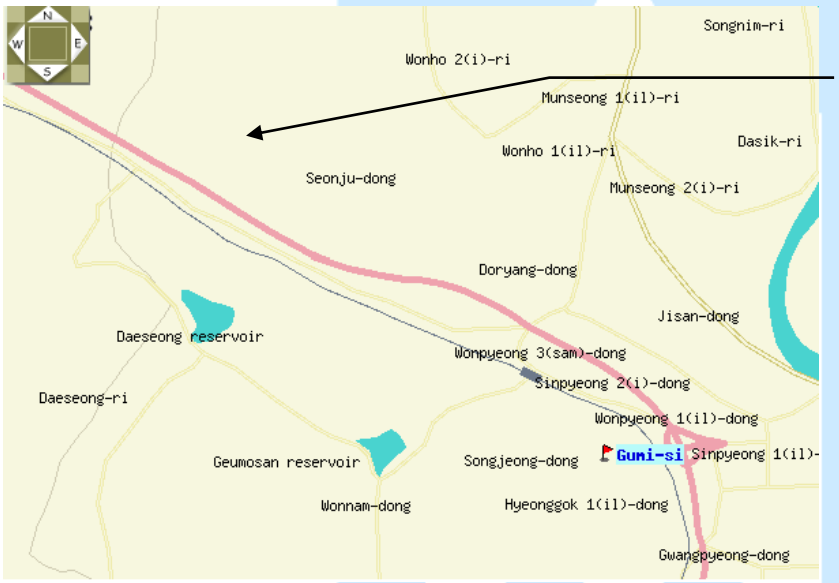
Telephone Number: +82-54-468-7281 Fax Number: +82-54-461-8368

- **FCC ID.** OZ5URCTDC9100
- **Equipment Class** Unlicensed National Information Infrastructure(NII)
- **EUT Type** Table top networking keypad
- **Model Name** TDC-9100
- **Rule Part(s)** FCC Part 15 Subpart E-UNII Devices § 15.407
- **Test Method** ANSI C63.10 (2013)
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.10 (2013), KDB789033 D02 General UNII Test Procedures New Rules v01r04(May 2,2017)
- **Dates of Test** Sep. 28, 2018 ~ Dec. 28, 2018
- **Place of Test** **GUMI UNIVERSITY EMC CENTER** (FCC Test firm Registration No.: 269701) 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea
- **Test Report Number** GETEC-E3-18-032
- **Dates of Issue** Dec. 28, 2018

2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2009) was used in determining radiated and conducted emissions emanating from **Ohsung Electronics Co., Ltd. Table top networking keypad (Model name: TDC-9100)**

These measurement tests were conducted at **GUMI UNIVERSITY EMC CENTER**.
The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea
This test site is one of the highest point of GUMI UNIVERSITY at about 200 kilometers away from Seoul city and 40 kilometers away from Daege city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.10 (2013)



GUMI UNIVERSITY EMC CENTER
37 Yaeun-ro, Gumi-si,
Gyeongsangbuk-do, 730-711,
Republic of Korea
Tel: +82-54-440-1195
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Fig 1. The map above shows the Gumi University in vicinity area.

3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **Ohsung Electronics Co., Ltd. Table top networking keypad (Model Name: TDC-9100) FCC ID.: OZ5URCTDC9100**

-. Equipment	: Table top networking keypad	
-. Model name	: TDC-9100	
-. Serial number	: Proto type	
-. Electrical Rating	: DC 3.65 V	
-. Manufacturer	: Ohsung Electronics Co., Ltd.	
-. Frequency Range (DTS band)	TX 20 MHz BW:	2412 MHz - 2462 MHz
	RX 20 MHz BW:	2412 MHz - 2462 MHz
-. Frequency Range (UNII band)	TX 20 MHz BW:	5180 MHz - 5240 MHz (UNII 1) / 5260 MHz - 5320 MHz (UNII 2A) 5500 MHz - 5720 MHz (UNII 2C) / 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1) / 5270 MHz - 5310 MHz (UNII 2A) 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	80 MHz BW:	5210 Mhz (UNII 1) / 5290 MHz (UNII 2A) / 5530 MHz - 5690 MHz (UNII 2C) / 5775 MHz (UNII 3)
	RX 20 MHz BW:	5180 MHz - 5240 MHz (UNII 1) / 5260 MHz - 5320 MHz (UNII 2A) 5500 MHz - 5720 MHz (UNII 2C) / 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1) / 5270 MHz - 5310 MHz (UNII 2A) 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	80 MHz BW:	5210 Mhz (UNII 1) / 5290 MHz (UNII 2A) / 5530 MHz - 5690 MHz (UNII 2C) / 5775 MHz (UNII 3)
-. Modulation	: BPSK, QPSK, QAM, CCK, OFDM	
-. Antenna Specification	: Manufacturer: Electronic Device Works Antenna type : PCB pattern antenna Gain : 4.20 dBi (DTS) / 4.42 dBi (UNII 1) / 4.42 dBi (UNII 2A) / 4.74 dBi (UNII 2C) / 4.29 dBi (UNII 3)	
-. Type (DFS)	: Client (without radar detection)	

3.2 Definition of models

-None.

3.3 Support Equipment / Cables used

3.3.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
Notebook Computer 1)	SAMSUNG	NT500R3W	S/N: 0Q2V91JJ100096T FCC ID.: N/A

Note)
1) The Support Equipment use only setting to the test mode.

3.3.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
-	-	-	-

3.3.3 Used Cable(s)

Cable Name	Condition	Description
-	-	-

3.4 Modification Item(s)

-. None

4. Antenna Requirement - §15.203

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

4.1 Description of Antenna

The **Ohsung Electronics Co., Ltd. Table top networking keypad.** comply with the requirement of §15.203 with a PCB pattern antenna permanently attached to the transmitter.

5. Description of tests

5.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used.

The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

- Test Voltage / Frequency: 3.65 V / DC

- Operating condition during the test(s) :
  -. Continuous RF transmitting mode with nominal maximum RF output power.
  -. Operating channel frequency and modulation technology

Mode		Available channel	Frequency	Modulation Technology
NII	802.11a	36 ~ 165	5180 ~ 5825 MHz	OFDM
	802.11n	36 ~ 165	5180 ~ 5825 MHz	OFDM
	802.11ac	36 ~ 165	5180 ~ 5825 MHz	OFDM

-. EUT set condition (Test Software)

Test Software	Tera Term Pro
Test Software version	2.3

6. References Standards

- FCC Part 15 (2009) Subpart E-UNII Devices §15.407
- ANSI C 63.10 (2013): American National Standard for Testing Unlicensed Wireless Devices
- KDB 789033 D02 General UNII Test Procedures New Rules v01r04 (May 2, 2017): Guidance for compliance testing of unlicensed national information infrastructure (UNII) devices (Part 15, Subpart E)

7. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Result
§15.407 (for Power Measurement)	26 dB Bandwidth	Pass
§15.407(e)	6 dB Bandwidth	Pass
§15.407(a)	Maximum Conducted Output Power	Pass
§15.407(h)1	Transmit Power Control (TPC)	N/A[1)]
§15.407(a)	Peak Power Spectral Density	Pass
§15.407(g)	Frequency Stability	Pass
§15.207	AC Conducted Emissions 150 kHz - 30 MHz	Pass
§15.407(b)	Undesirable Emissions	Pass
§15.205, § 15.407(b)(5),(6)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Pass

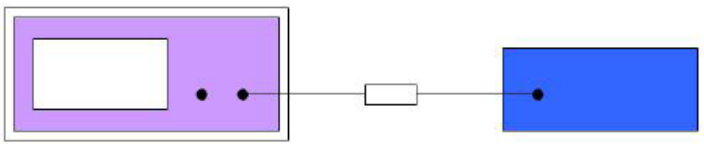
1) E.I.R.P of TDC-9100 is less than the 500 mW.
Therefore, TPC test is not required for systems with an e.i.r.p of less than 500 mW

8. 26 dB Bandwidth Measurement

8.1 Operating environment

Temperature : 20.1 °C
Relative Humidity : 61.5 % R.H.

8.2 Test Set-up (Layout)



8.3 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

8.4 Test Equipment used

	Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ -	FSV	Rohde & Schwarz	Spectrum Analyzer	101552	Apr. 16, 2019
■ -	10 dB Attenuator	Rohde & Schwarz	Attenuator 10 dB	SEP-10-14-046	Apr. 17. 2019
■ -	WMS 32	Rohde & Schwarz	Testing Software	VER10.20.01	N/A

8.5 Test Test Procedure

a) Set RBW = 200 kHz
b) Set the video bandwidth (VBW) ≥ 600 kHz
c) Detector = Max Peak
d) Trace mode = Max Hold
e) Sweep = Auto
f) Allow the trace to stabilize
g) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

8.6 Test result

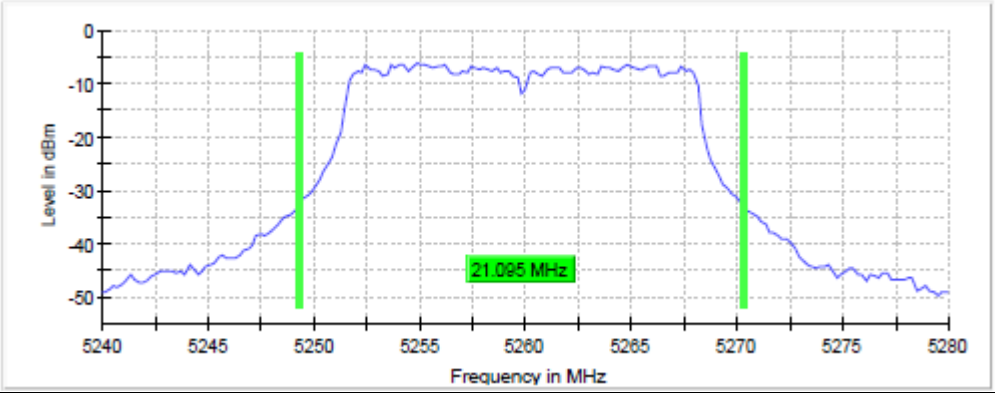
-. Test Date : Nov. 7, 2018 ~ Nov. 8, 2018
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(for power measurement)
-. Test Procedure(s) : ANSI C63.10 (2013), KDB 789033 D02 general UNII test procedures new rules v01r04 (May 2, 2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.65 V

802.11a

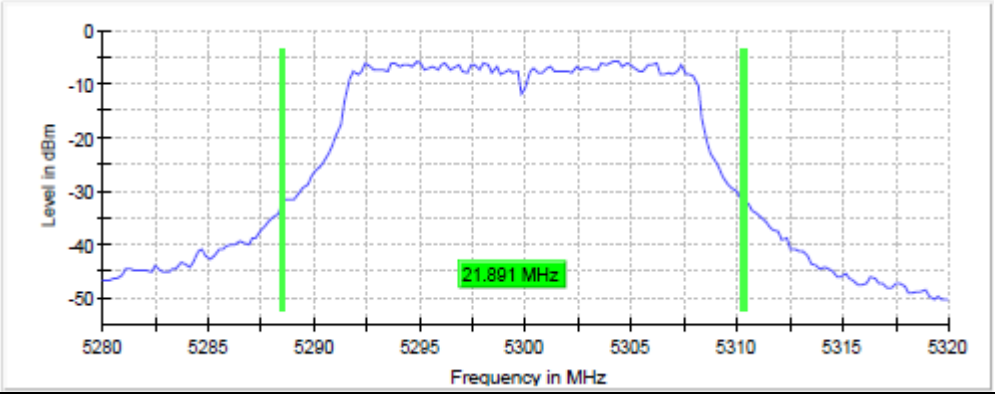
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5180	36	19.10	N/A	Complies
5200	40	19.30	N/A	Complies
5240	48	20.49	N/A	Complies
5260	52	21.09	N/A	Complies
5300	60	21.89	N/A	Complies
5320	64	20.89	N/A	Complies
5500	100	20.89	N/A	Complies
5580	116	19.30	N/A	Complies
5720	144	19.30	N/A	Complies
5745	149	19.30	N/A	Complies
5785	157	20.09	N/A	Complies
5825	165	19.30	N/A	Complies

Test Plot on Configuration : 802.11a

5260 MHz (52 ch)



5300 MHz (60 ch)



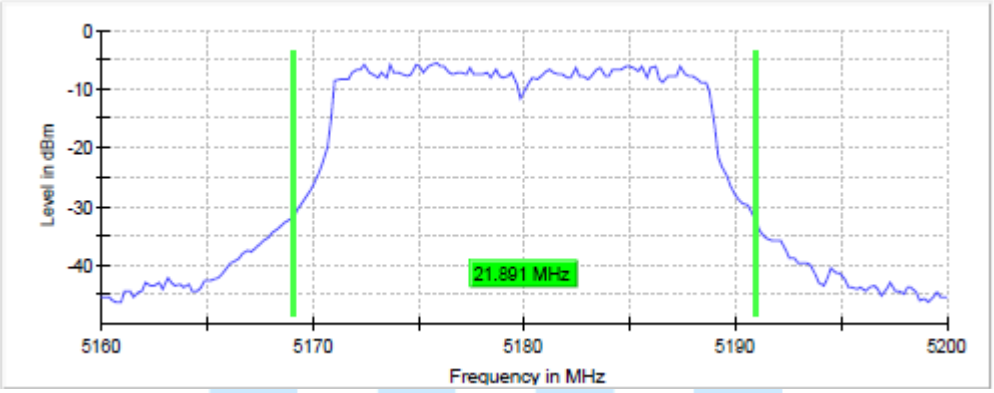
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n

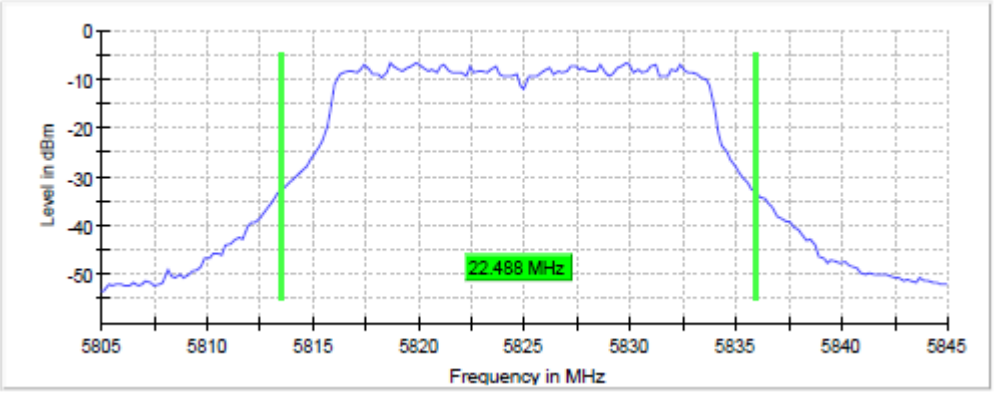
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5180	36	21.89	N/A	Complies
5200	40	21.89	N/A	Complies
5240	48	19.90	N/A	Complies
5260	52	21.89	N/A	Complies
5300	60	19.90	N/A	Complies
5320	64	21.89	N/A	Complies
5500	100	21.69	N/A	Complies
5580	116	21.89	N/A	Complies
5720	144	21.89	N/A	Complies
5745	149	21.89	N/A	Complies
5785	157	21.69	N/A	Complies
5825	165	22.48	N/A	Complies

Test Plot on Configuration : 802.11n

5180 MHz (36 ch)



5825 MHz (165 ch)



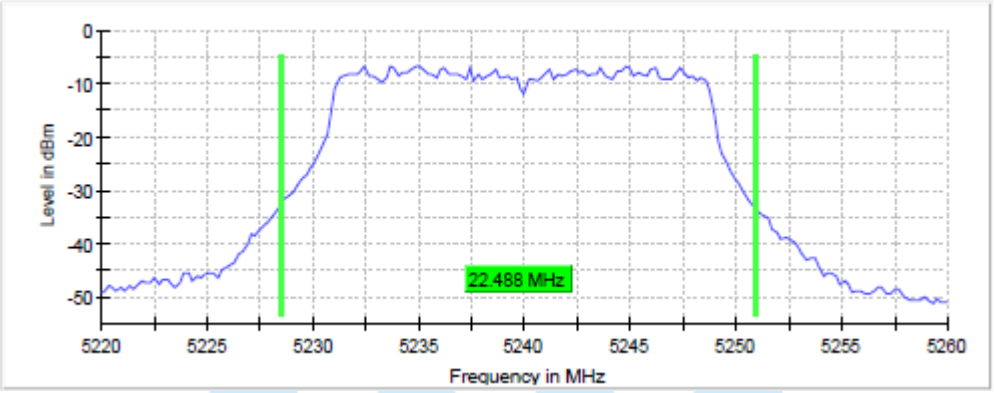
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac

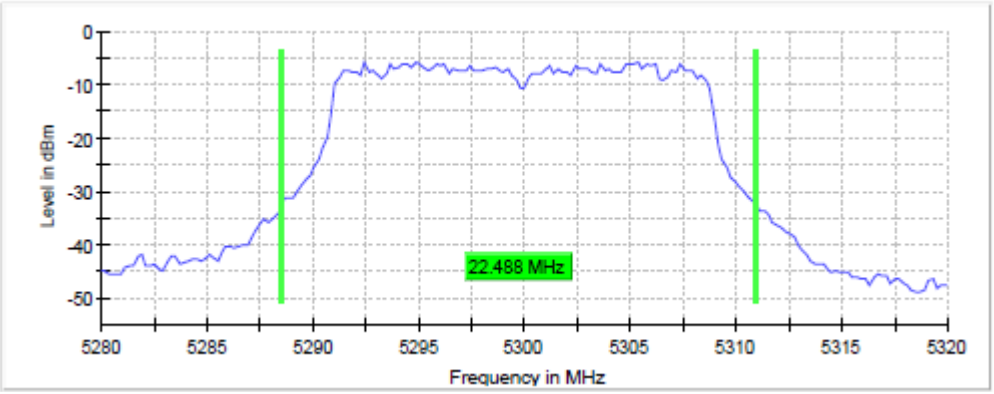
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5180	36	21.89	N/A	Complies
5200	40	21.89	N/A	Complies
5240	48	22.48	N/A	Complies
5260	52	22.28	N/A	Complies
5300	60	22.48	N/A	Complies
5320	64	21.69	N/A	Complies
5500	100	21.69	N/A	Complies
5580	116	21.89	N/A	Complies
5720	144	21.69	N/A	Complies
5745	149	21.89	N/A	Complies
5785	157	22.28	N/A	Complies
5825	165	21.89	N/A	Complies

Test Plot on Configuration : 802.11n

5240 MHz (48 ch)



5300 MHz (60 ch)



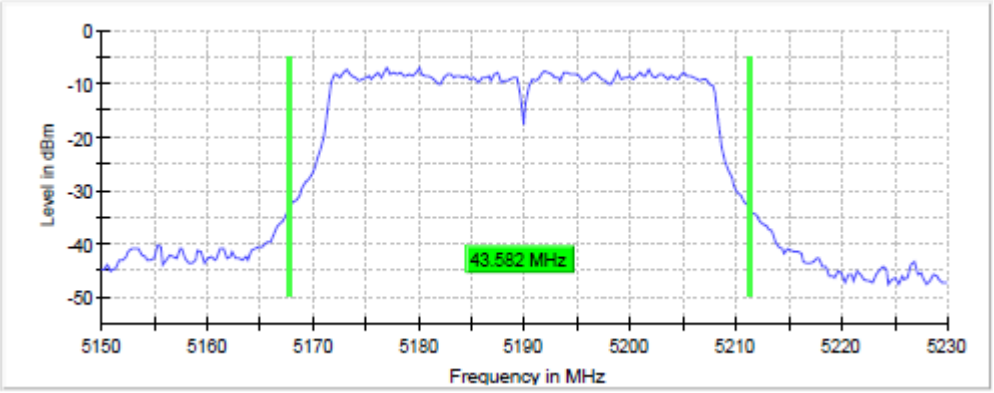
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40

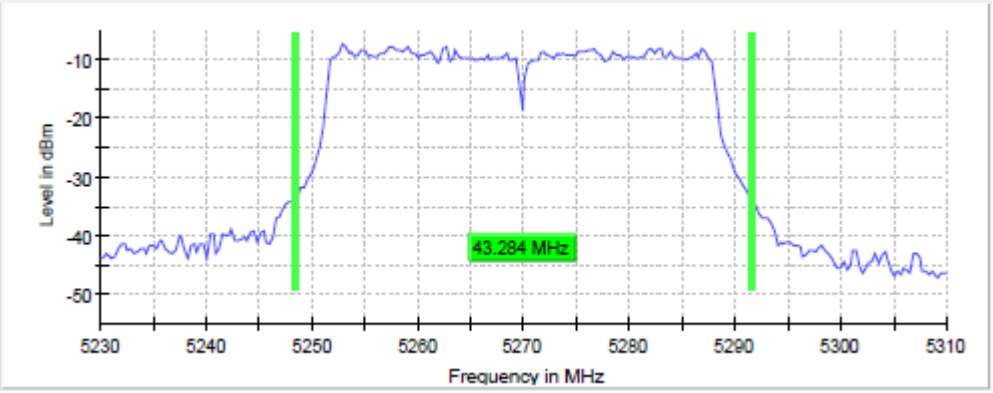
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5190	38	43.58	N/A	Complies
5230	46	42.38	N/A	Complies
5270	54	43.28	N/A	Complies
5310	62	43.28	N/A	Complies
5510	102	42.98	N/A	Complies
5550	110	42.38	N/A	Complies
5710	142	42.08	N/A	Complies
5755	151	43.28	N/A	Complies
5795	159	42.08	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5190 MHz (38 ch)



5270 MHz (54 ch)



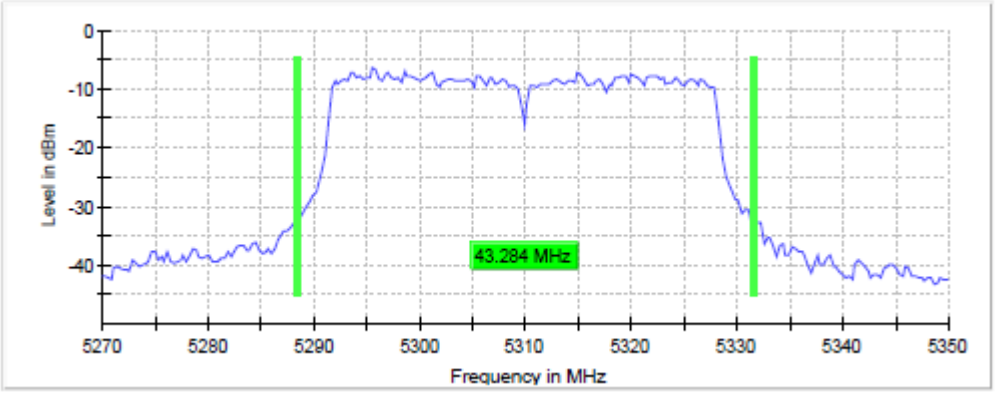
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40

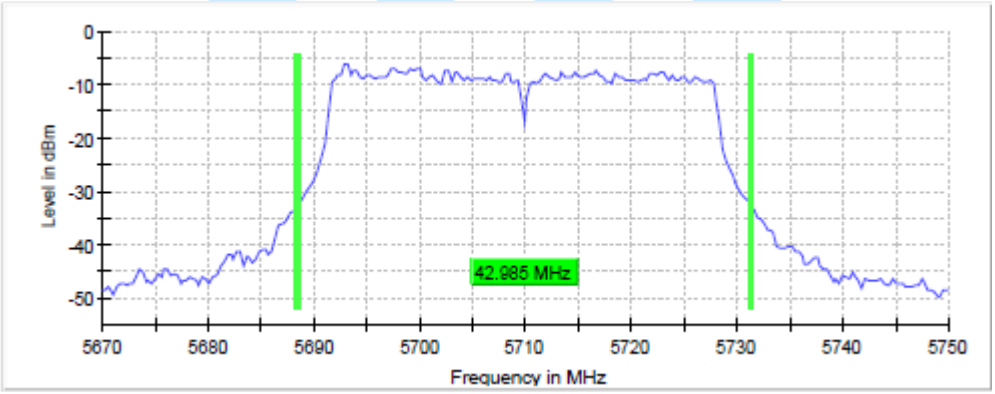
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5190	38	42.38	N/A	Complies
5230	46	42.38	N/A	Complies
5270	54	42.68	N/A	Complies
5310	62	43.28	N/A	Complies
5510	102	42.98	N/A	Complies
5550	110	42.08	N/A	Complies
5710	142	42.98	N/A	Complies
5755	151	42.68	N/A	Complies
5795	159	42.38	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5310 MHz (62 ch)



5710 MHz (142 ch)



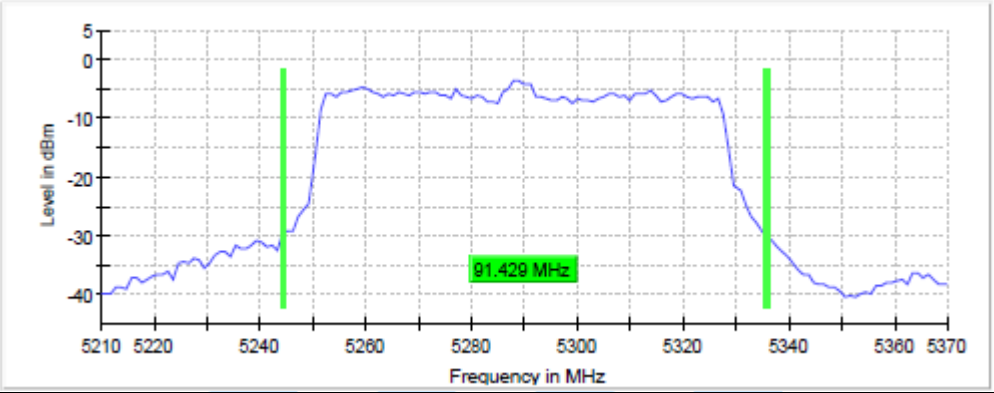
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT80

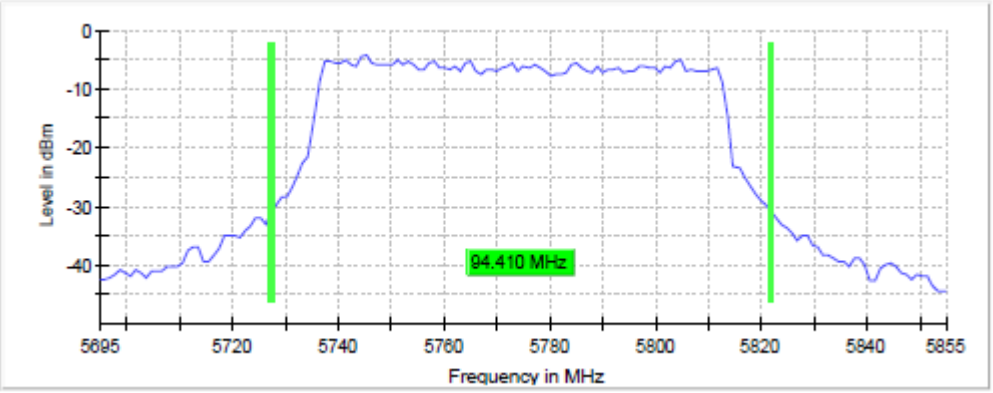
Frequency (MHz)	Channel No.	26 dB Bandwidth (MHz)	Min. Limit (MHz)	Result
5210	42	89.44	N/A	Complies
5290	58	91.42	N/A	Complies
5530	106	91.42	N/A	Complies
5690	138	90.43	N/A	Complies
5775	155	94.40	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5290 MHz (58 ch)



5775 MHz (155 ch)



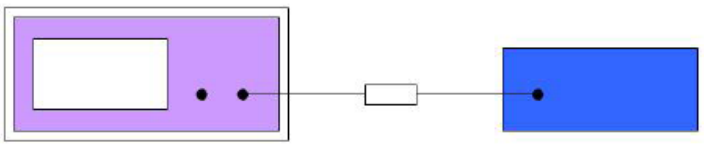
Note: In order to simplify the report, attached plots were only the most wide channel.

9. 6 dB Bandwidth Measurement

9.1 Operating environment

Temperature : 20.1 °C
Relative Humidity : 61.5 % R.H.

9.2 Test Set-up (Layout)



9.3 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

9.4 Test Equipment used

	Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ -	FSV	Rohde & Schwarz	Spectrum Analyzer	101552	Apr. 16, 2019
■ -	10 dB Attenuator	Rohde & Schwarz	Attenuator 10 dB	SEP-10-14-046	Apr. 17. 2019
■ -	WMS 32	Rohde & Schwarz	Testing Software	VER10.20.01	N/A

9.5 Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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.

9.6 Test result

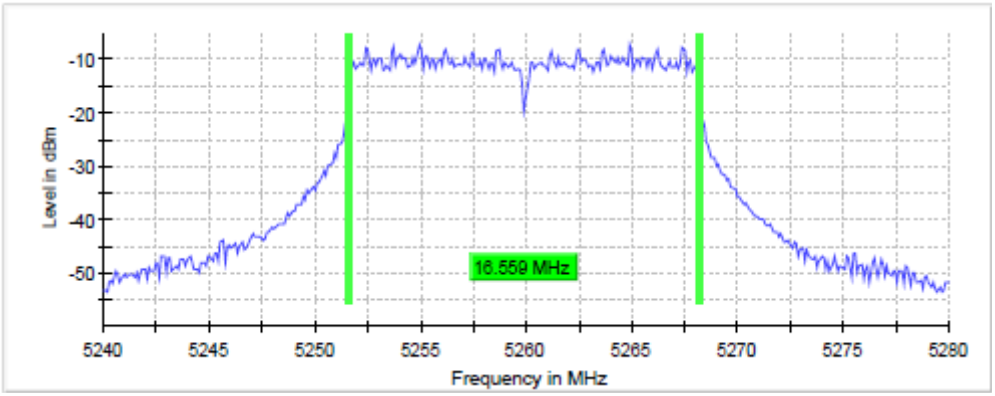
-. Test Date : Nov. 7, 2018 ~ Nov. 8, 2018
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(e)
-. Test Procedure(s) : ANSI C63.10 (2013), KDB 789033 D02 general UNII test procedures new rules v01r04 (May 2, 2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.65 V

802.11a

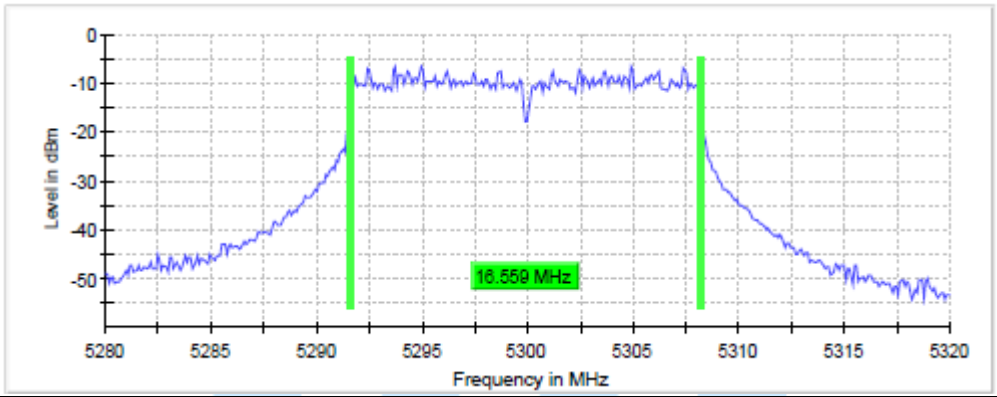
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5180	36	15.26	N/A	Complies
5200	40	15.26	N/A	Complies
5240	48	15.26	N/A	Complies
5260	52	16.55	N/A	Complies
5300	60	16.55	N/A	Complies
5320	64	16.55	N/A	Complies
5500	100	16.55	N/A	Complies
5580	116	15.26	N/A	Complies
5720	144	15.46	N/A	Complies
5745	149	15.26	N/A	Complies
5785	157	15.26	N/A	Complies
5825	165	15.26	N/A	Complies

Test Plot on Configuration : 802.11a

5260 MHz (52 ch)



5300 MHz (60 ch)



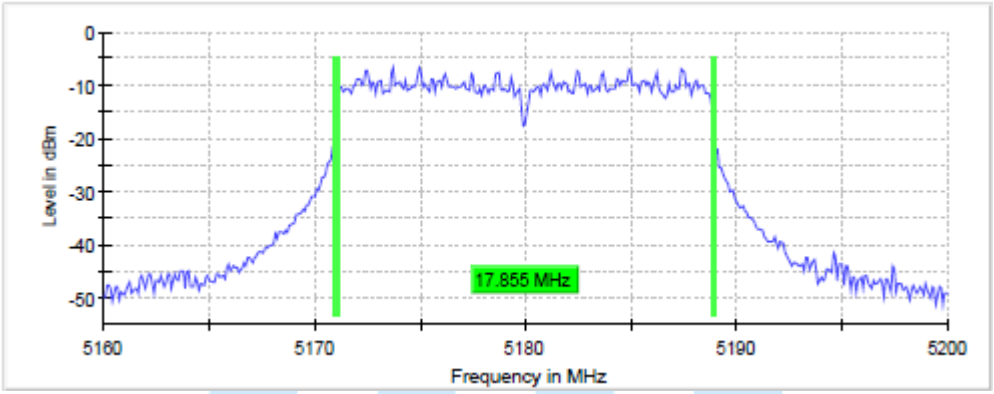
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n

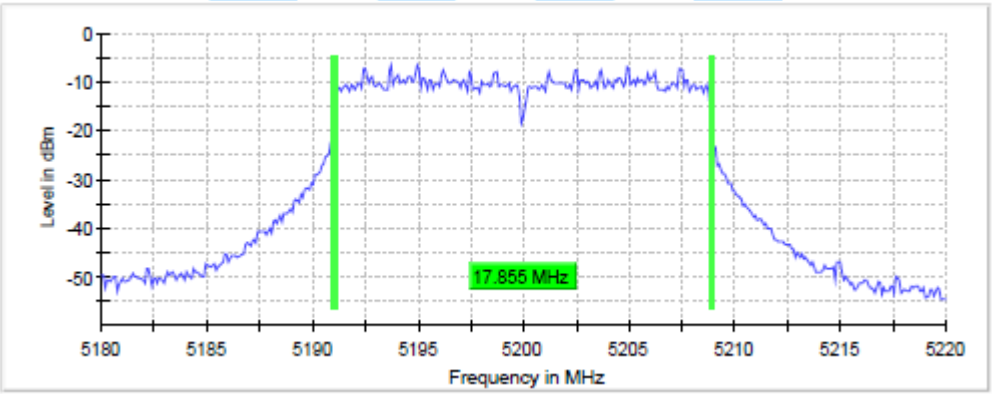
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5180	36	17.85	N/A	Complies
5200	40	17.85	N/A	Complies
5240	48	15.26	N/A	Complies
5260	52	17.85	N/A	Complies
5300	60	15.26	N/A	Complies
5320	64	17.75	N/A	Complies
5500	100	17.85	N/A	Complies
5580	116	17.85	N/A	Complies
5720	144	17.75	N/A	Complies
5745	149	17.85	N/A	Complies
5785	157	17.75	N/A	Complies
5825	165	17.85	N/A	Complies

Test Plot on Configuration : 802.11n

5180 MHz (36 ch)



5200 MHz (40 ch)



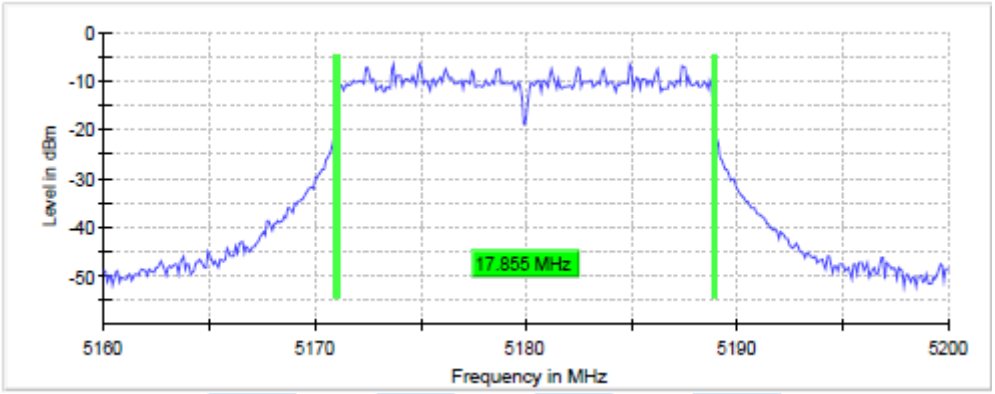
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac

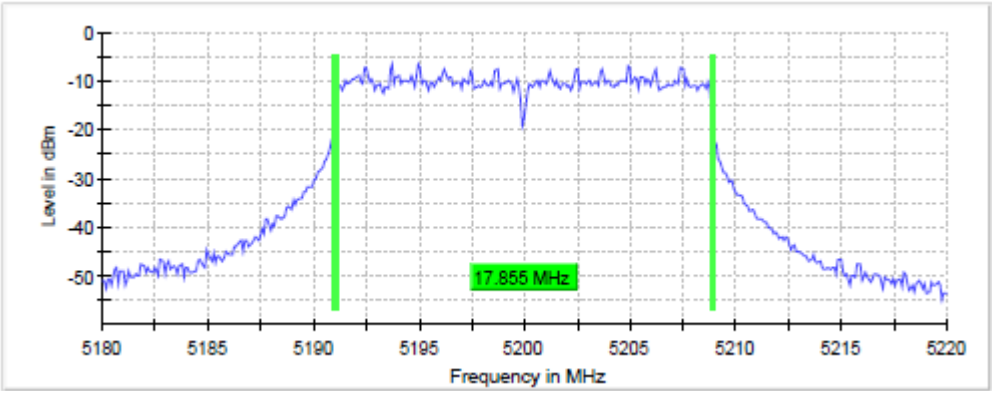
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5180	36	17.85	N/A	Complies
5200	40	17.85	N/A	Complies
5240	48	17.85	N/A	Complies
5260	52	17.85	N/A	Complies
5300	60	17.85	N/A	Complies
5320	64	17.85	N/A	Complies
5500	100	17.75	N/A	Complies
5580	116	17.85	N/A	Complies
5720	144	17.75	N/A	Complies
5745	149	17.75	N/A	Complies
5785	157	17.85	N/A	Complies
5825	165	17.85	N/A	Complies

Test Plot on Configuration : 802.11n

5180 MHz (36 ch)



5200 MHz (40 ch)



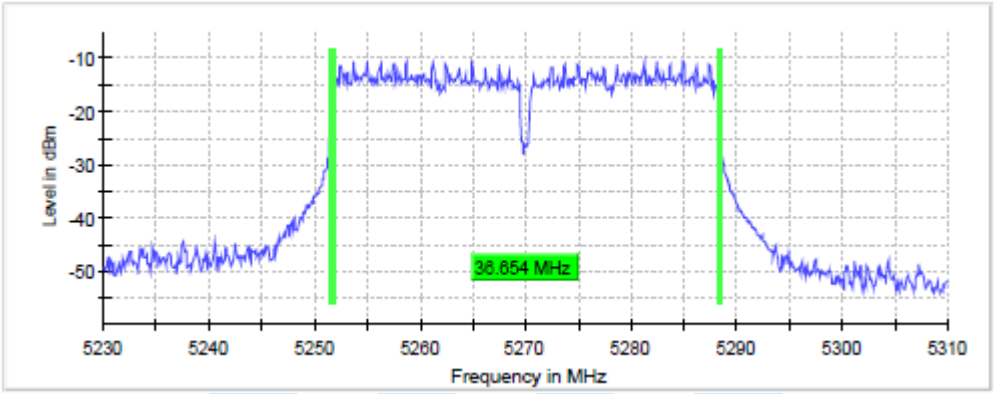
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40

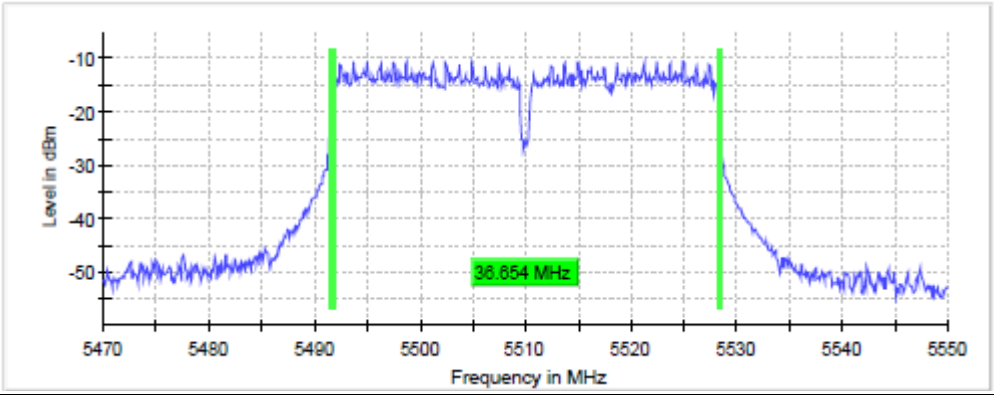
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5190	38	36.55	N/A	Complies
5230	46	36.55	N/A	Complies
5270	54	36.65	N/A	Complies
5310	62	36.55	N/A	Complies
5510	102	36.65	N/A	Complies
5550	110	36.65	N/A	Complies
5710	142	36.55	N/A	Complies
5755	151	36.55	N/A	Complies
5795	159	36.55	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5270 MHz (54 ch)



5510 MHz (102 ch)



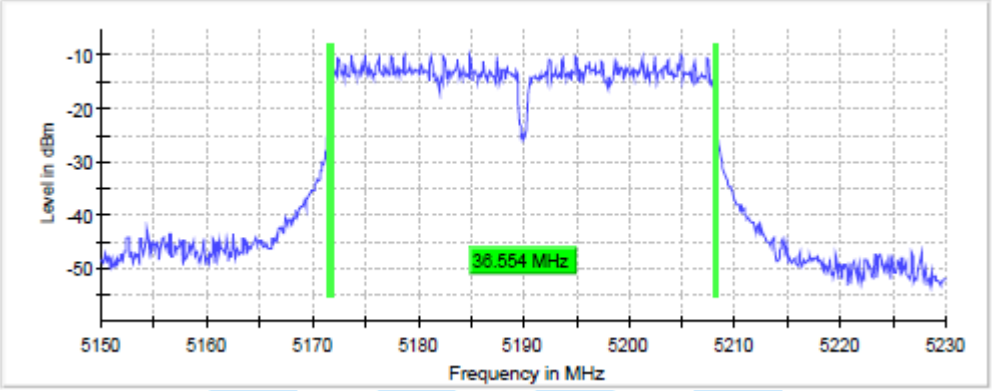
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40

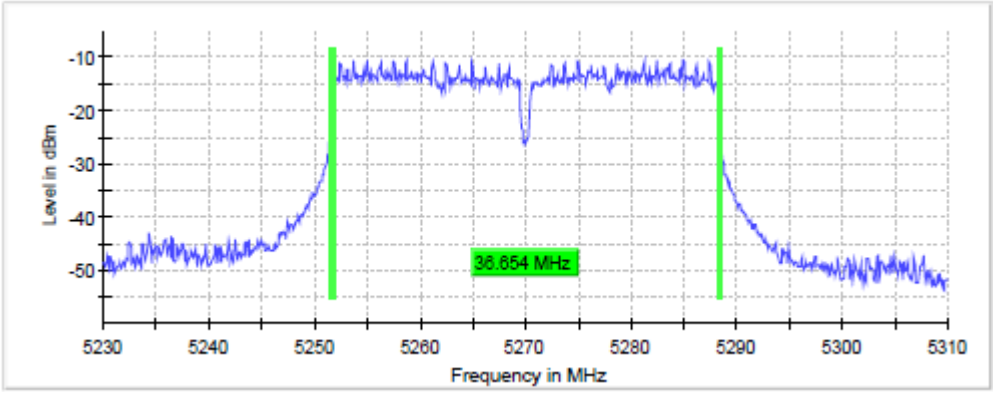
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5190	38	36.55	N/A	Complies
5230	46	36.55	N/A	Complies
5270	54	36.65	N/A	Complies
5310	62	36.55	N/A	Complies
5510	102	36.55	N/A	Complies
5550	110	36.55	N/A	Complies
5710	142	36.55	N/A	Complies
5755	151	36.55	N/A	Complies
5795	159	36.55	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5190 MHz (38 ch)



5270 MHz (54 ch)



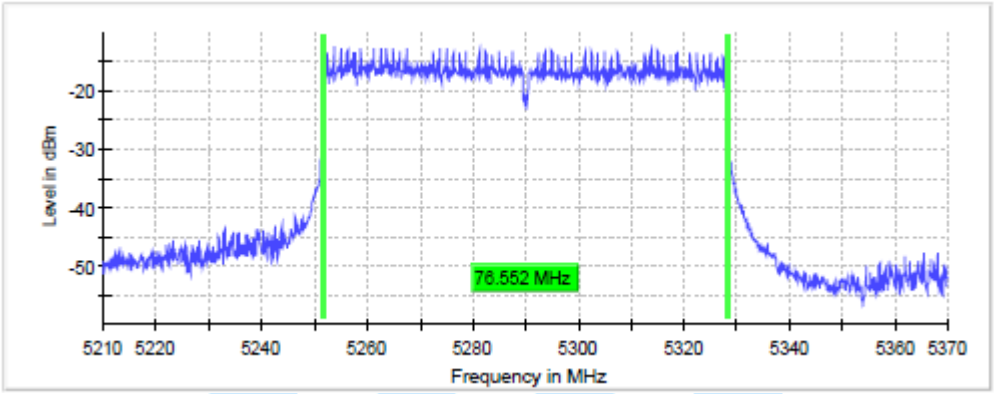
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT80

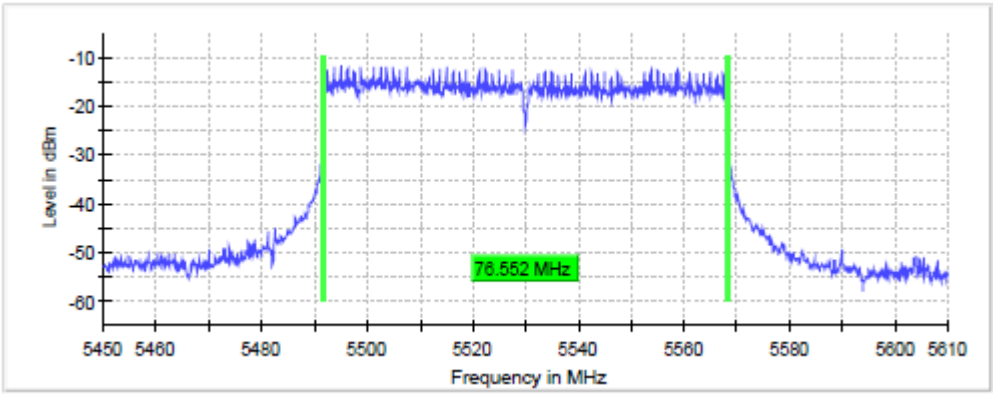
Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
5210	42	76.45	N/A	Complies
5290	58	76.55	N/A	Complies
5530	106	76.55	N/A	Complies
5690	138	76.55	N/A	Complies
5775	155	76.55	N/A	Complies

Test Plot on Configuration : 802.11n_HT40

5290 MHz (58 ch)



5530 MHz (155 ch)



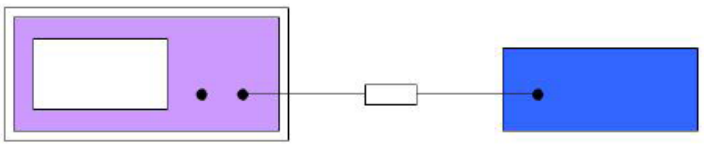
Note: In order to simplify the report, attached plots were only the most wide channel.

10. Maximum Conducted Output Power

10.1 Operating environment

Temperature : 20.1 °C
Relative Humidity : 61.5 % R.H.

10.2 Test Set-up (Layout)



10.3 Limit

For the 5.15-5.25 GHz band, 5.25-5.35 GHz and 5.47-5.725 GHz the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.
5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

10.4 Test Equipment used

	Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ -	NRV-Z32	Rohde & Schwarz	Peak Power sensor	100049	Apr. 17, 2019
■ -	NRVD	Rohde & Schwarz	Dual Channel Power Meter	101008	Apr. 17, 2019
■ -	NRP-Z51	Rohde & Schwarz	Power sensor	1138.0005.02	Apr. 17, 2019

10.5 Test Procedure

a) Measure the duty cycle.
b) Set span to encompass the 26 dB EBW of the signal.
c) RBW = 1 MHz.
d) VBW ≥ 3 MHz.
e) Number of points in sweep ≥ 2*span/RBW.
f) Sweep time = auto.
g) Detector = RMS.
h) Do not use sweep triggering. Allow the sweep to “free run”.
i) Trace average at least 100 traces in power averaging(RMS) mode
j) Integrated bandwidth = OBW
k) Add 10log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

10.6 Test Result

-. Test Date : Nov. 7, 2018 ~ Nov. 8, 2018
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(a)
-. Test Procedure(s) : ANSI C63.10 (2013), KDB 789033 D02 general UNII test procedures new rules v01r04 (May 2, 2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.65 V

802.11a

Frequency (MHz)	Channel No.	Rate (Mbps)	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	18	3.99	89.681	23.98	Complies
5200	40	18	4.68	89.626	23.98	Complies
5240	48	9	3.63	94.444	23.98	Complies
5260	52	24	3.88	86.783	23.98	Complies
5300	60	54	3.94	75.557	23.98	Complies
5320	64	48	3.70	77.566	23.98	Complies
5500	100	48	3.04	76.424	23.98	Complies
5580	116	18	4.81	88.673	23.98	Complies
5720	144	18	3.85	89.681	23.98	Complies
5745	149	18	4.05	89.683	30	Complies
5785	157	9	3.52	94.468	30	Complies
5825	165	18	3.39	89.683	30	Complies

802.11n_HT20

Frequency (MHz)	Channel No.	MCS Index	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	6	4.27	75.627	23.98	Complies
5200	40	5	3.95	77.269	23.98	Complies
5240	48	1	3.31	92.353	23.98	Complies
5260	52	6	3.87	75.635	23.98	Complies
5300	60	2	4.03	89.215	23.98	Complies
5320	64	7	4.12	74.158	23.98	Complies
5500	100	7	3.22	74.141	23.98	Complies
5580	116	6	4.61	74.494	23.98	Complies
5720	144	6	3.93	75.673	23.98	Complies
5745	149	7	4.14	74.062	30	Complies
5785	157	7	3.70	74.254	30	Complies
5825	165	4	3.29	81.544	30	Complies

802.11ac_VHT20

Frequency (MHz)	Channel No.	MCS Index	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	8	4.29	71.516	23.98	Complies
5200	40	8	4.06	71.544	23.98	Complies
5240	48	4	3.44	81.730	23.98	Complies
5260	52	8	3.83	71.551	23.98	Complies
5300	60	5	4.21	77.847	23.98	Complies
5320	64	7	4.29	74.427	23.98	Complies
5500	100	7	3.29	74.457	23.98	Complies
5580	116	6	4.65	74.736	23.98	Complies
5720	144	6	3.81	76.001	23.98	Complies
5745	149	6	4.05	75.896	30	Complies
5785	157	8	3.71	71.630	30	Complies
5825	165	6	3.30	75.965	30	Complies

802.11n_HT40

Frequency (MHz)	Channel No.	MCS Index	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5190	38	7	4.19	61.974	23.98	Complies
5230	46	6	3.68	64.149	23.98	Complies
5270	54	6	3.70	64.152	23.98	Complies
5310	62	7	4.15	62.000	23.98	Complies
5510	102	6	3.52	64.190	23.98	Complies
5550	110	6	4.56	64.142	23.98	Complies
5710	142	3	4.30	77.018	23.98	Complies
5755	151	7	3.86	62.119	30	Complies
5795	159	6	3.65	64.231	30	Complies

802.11ac_VHT40

Frequency (MHz)	Channel No.	MCS Index	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5190	38	6	4.17	64.643	23.98	Complies
5230	46	9	3.63	58.853	23.98	Complies
5270	54	6	3.82	64.560	23.98	Complies
5310	62	9	4.19	58.854	23.98	Complies
5510	102	9	3.57	58.898	23.98	Complies
5550	110	6	4.70	59.883	23.98	Complies
5710	142	6	4.20	64.709	23.98	Complies
5755	151	6	3.97	64.741	30	Complies
5795	159	4	3.68	70.940	30	Complies

802.11ac_VHT80

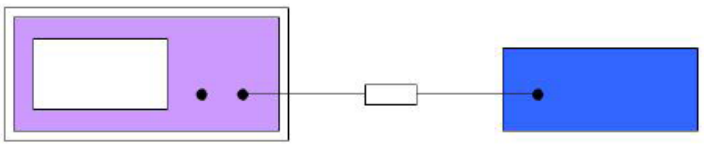
Frequency (MHz)	Channel No.	MCS Index	Measured Power (dBm)	DutyCycle (%)	Limit (dBm)	Result
5210	42	9	4.00	48.386	23.98	Complies
5290	58	7	4.18	52.250	23.98	Complies
5530	106	9	4.69	48.433	23.98	Complies
5690	138	7	4.63	52.243	23.98	Complies
5775	155	8	3.85	49.890	30	Complies

11. Power Spectral Density Measurement

11.1 Operating Environment

Temperature : 20.1 °C
Relative Humidity : 61.5 % R.H.

11.2 Test Set-up (Layout)



11.3 Limit

For the 5.15-5.25 GHz band, 5.25-5.35 GHz and 5.47-5.725 GHz the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.
5.725-5.85 GHz the maximum power spectral density shall not exceed 30 dBm in any 1 megahertz band.

11.4 Test Equipment used

	Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ -	FSV	Rohde & Schwarz	Spectrum Analyzer	101552	Apr. 16, 2019
■ -	10 dB Attenuator	Rohde & Schwarz	Attenuator 10 dB	SEP-10-14-046	Apr. 17. 2019
■ -	WMS 32	Rohde & Schwarz	Testing Software	VER10.20.01	N/A

11.5 Test Procedure

a) Set span to encompass the entire emission bandwidth(EBW) of the signal.
b) RBW = 1 MHz(510 kHz for UNII 3)
c) VBW ≥ 3 MHz
d) Number of points in sweep ≥ 2*span/RBW.
e) Sweep time = auto.
f) Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
g) Do not use sweep triggering. Allow the sweep to “free run”.
h) Trace average at least 100 traces in power averaging(RMS) mode
i) Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
j) If Method SA-2 was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

11.6 Test Result

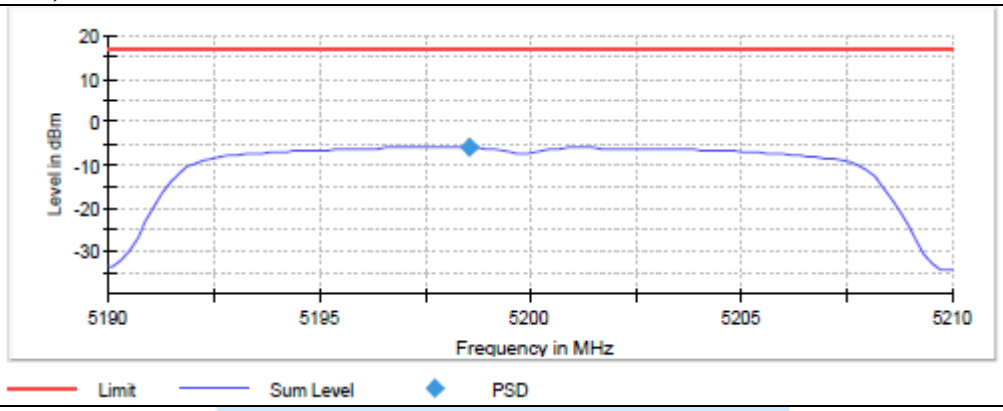
-. Test Date : Nov. 7, 2018 ~ Nov. 8, 2018
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(a)
-. Test Procedure(s) : ANSI C63.10 (2013), KDB 789033 D02 general UNII test procedures new rules v01r04 (May 2, 2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.65 V

802.11a

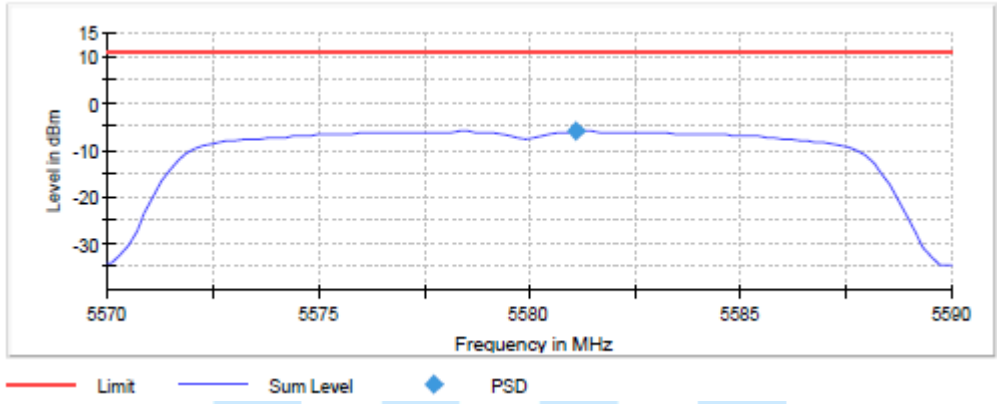
Frequency (MHz)	Channel No.	Rate (Mbps)	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	18	- 6.58	89.681	11	Complies
5200	40	18	- 5.29	89.626	11	Complies
5240	48	9	- 7.17	94.444	11	Complies
5260	52	24	- 7.40	86.783	11	Complies
5300	60	54	- 7.16	75.557	11	Complies
5320	64	48	- 7.51	77.566	11	Complies
5500	100	48	- 8.18	76.424	11	Complies
5580	116	18	- 6.09	88.673	11	Complies
5720	144	18	- 6.97	89.681	11	Complies
5745	149	18	- 9.69	89.683	30	Complies
5785	157	9	- 10.33	94.468	30	Complies
5825	165	18	- 10.32	89.683	30	Complies

Test Plot on Configuration : 802.11n_HT40

5200 MHz (40 ch)



5580 MHz (116 ch)



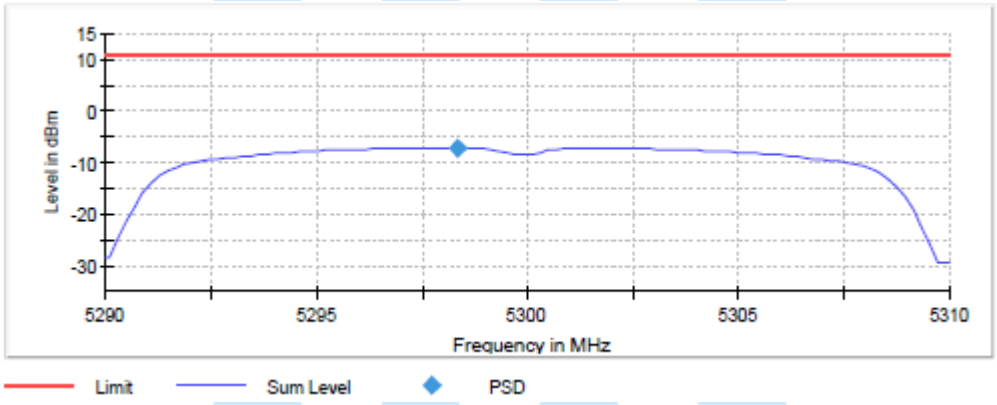
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20

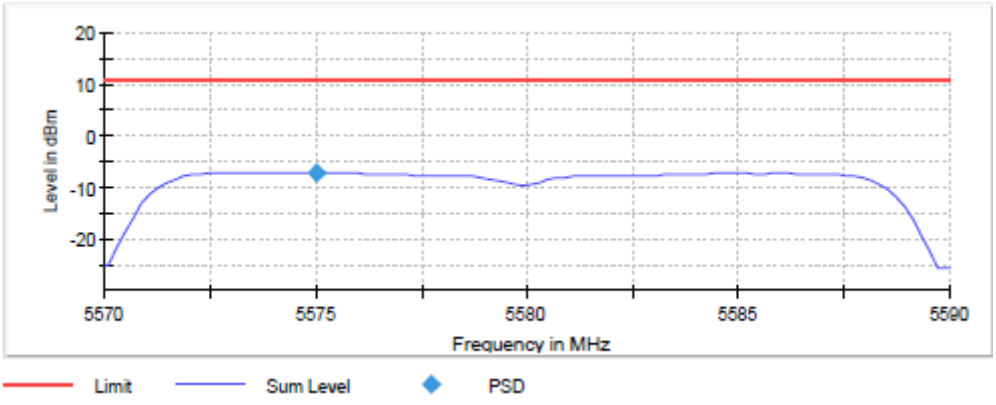
Frequency (MHz)	Channel No.	MCS Index	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	6	- 7.39	75.627	11	Complies
5200	40	5	- 7.44	77.269	11	Complies
5240	48	1	- 7.86	92.353	11	Complies
5260	52	6	- 7.95	75.635	11	Complies
5300	60	2	- 7.07	89.215	11	Complies
5320	64	7	- 7.48	74.158	11	Complies
5500	100	7	- 8.42	74.141	11	Complies
5580	116	6	- 7.15	74.494	11	Complies
5720	144	6	- 7.65	75.673	11	Complies
5745	149	7	- 10.25	74.062	30	Complies
5785	157	7	- 10.86	74.254	30	Complies
5825	165	4	- 11.17	81.544	30	Complies

Test Plot on Configuration : 802.11n_HT40

5300 MHz (60 ch)



5580 MHz (116 ch)



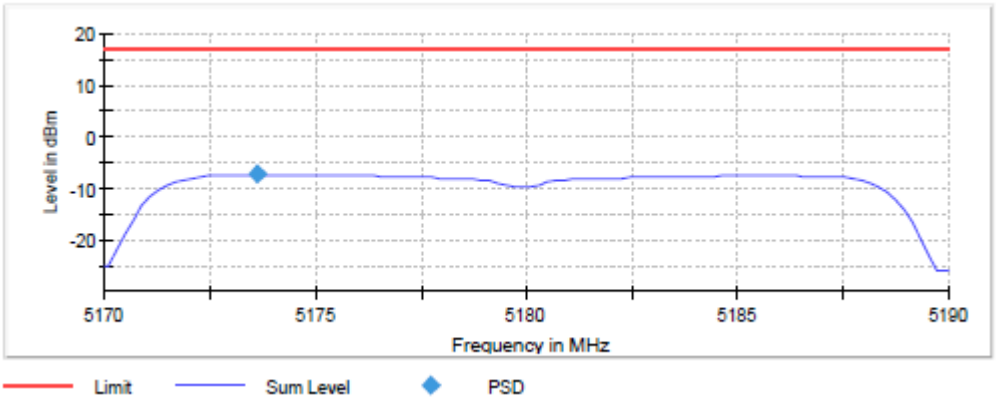
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20

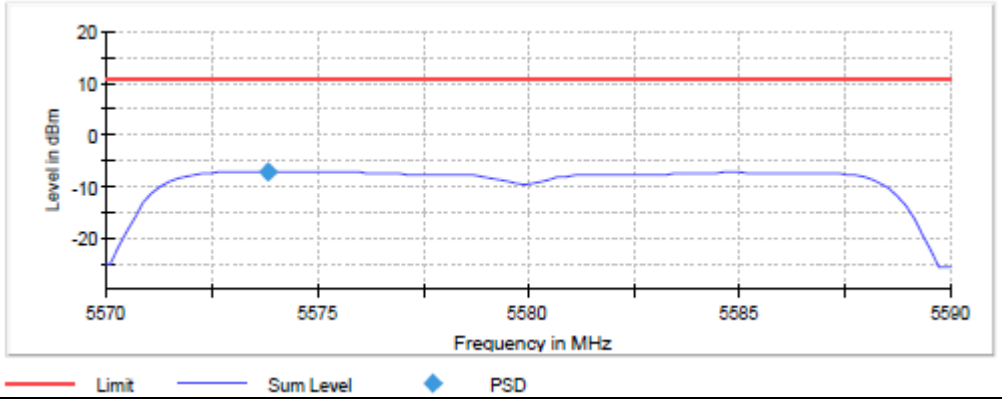
Frequency (MHz)	Channel No.	MCS Index	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5180	36	8	- 7.32	71.516	11	Complies
5200	40	8	- 7.52	71.544	11	Complies
5240	48	4	- 8.24	81.730	11	Complies
5260	52	8	- 7.95	71.551	11	Complies
5300	60	5	- 7.40	77.847	11	Complies
5320	64	7	- 7.41	74.427	11	Complies
5500	100	7	- 8.45	74.457	11	Complies
5580	116	6	- 7.15	74.736	11	Complies
5720	144	6	- 7.83	76.001	11	Complies
5745	149	6	- 10.35	75.896	30	Complies
5785	157	8	- 10.72	71.630	30	Complies
5825	165	6	- 11.31	75.965	30	Complies

Test Plot on Configuration : 802.11n_HT40

5180 MHz (36 ch)



5580 MHz (116 ch)



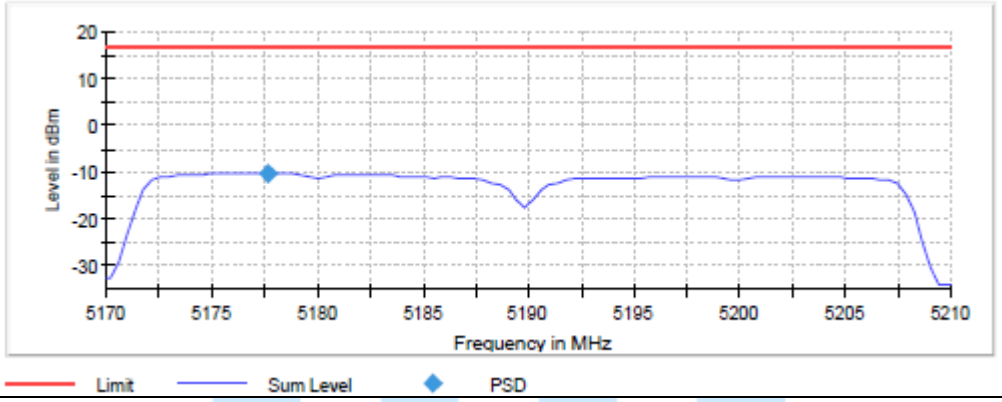
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40

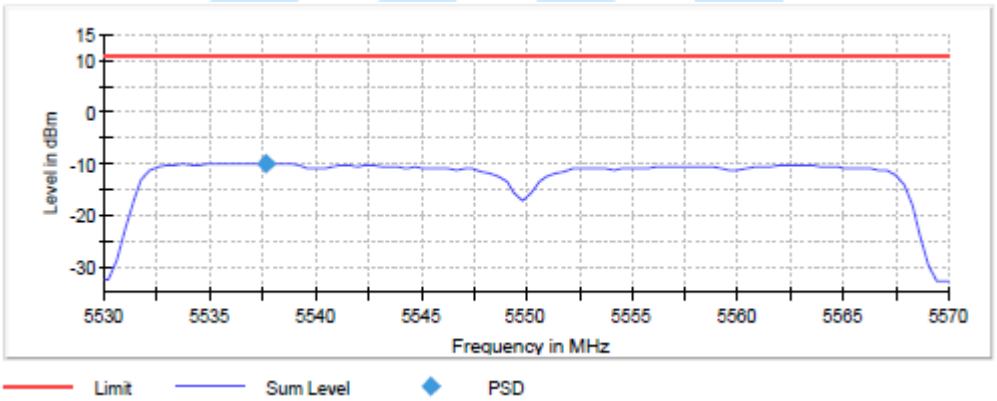
Frequency (MHz)	Channel No.	MCS Index	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5190	38	7	- 10.22	61.974	11	Complies
5230	46	6	- 10.78	64.149	11	Complies
5270	54	6	- 10.92	64.152	11	Complies
5310	62	7	- 10.38	62.000	11	Complies
5510	102	6	- 10.97	64.190	11	Complies
5550	110	6	- 9.91	64.142	11	Complies
5710	142	3	- 10.24	77.018	11	Complies
5755	151	7	- 13.35	62.119	30	Complies
5795	159	6	- 13.64	64.231	30	Complies

Test Plot on Configuration : 802.11n_HT40

5190 MHz (38 ch)



5550 MHz (110 ch)



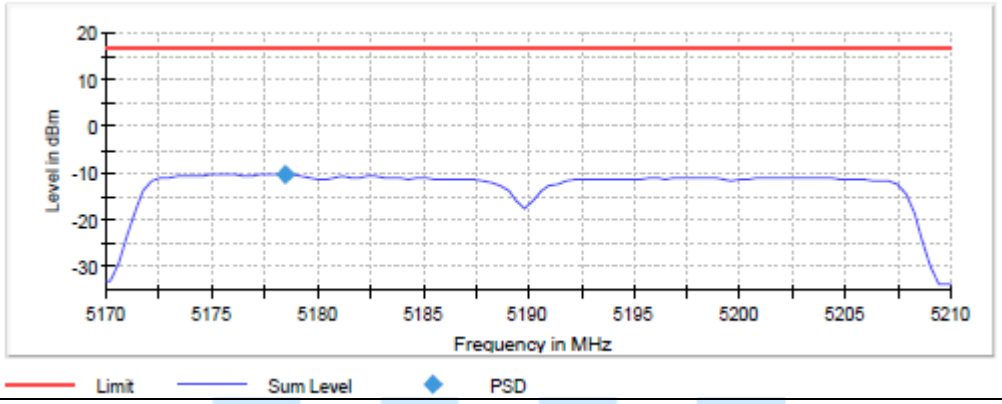
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40

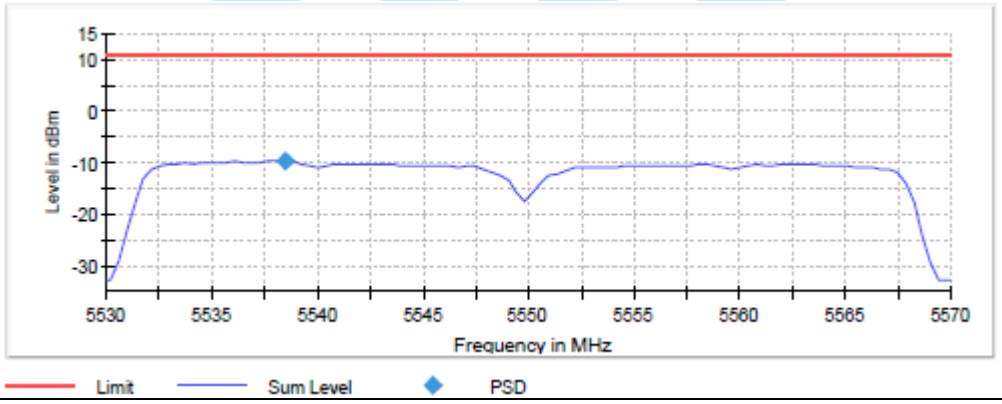
Frequency (MHz)	Channel No.	MCS Index	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5190	38	6	- 10.23	64.643	11	Complies
5230	46	9	- 10.82	58.853	11	Complies
5270	54	6	- 10.84	64.560	11	Complies
5310	62	9	- 10.31	58.854	11	Complies
5510	102	9	- 11.04	58.898	11	Complies
5550	110	6	- 9.60	59.883	11	Complies
5710	142	6	- 10.23	64.709	11	Complies
5755	151	6	- 13.20	64.741	30	Complies
5795	159	4	- 13.87	70.940	30	Complies

Test Plot on Configuration : 802.11n_HT40

5190 MHz (38 ch)



5550 MHz (110 ch)



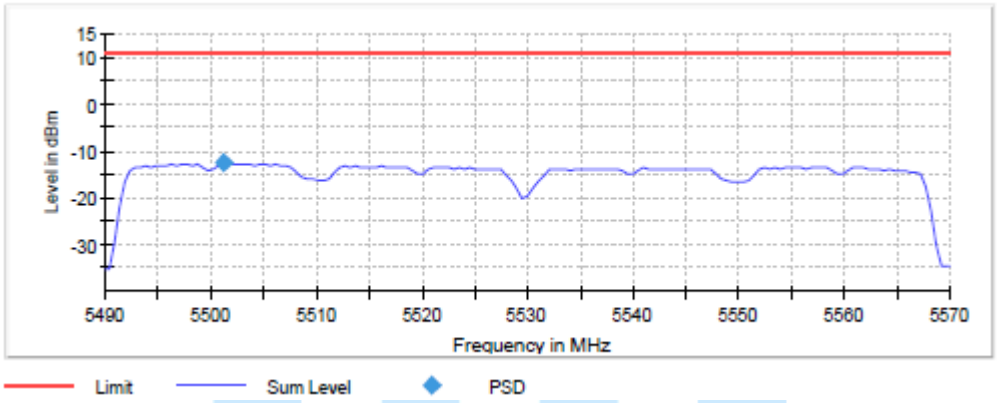
Note: In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT80

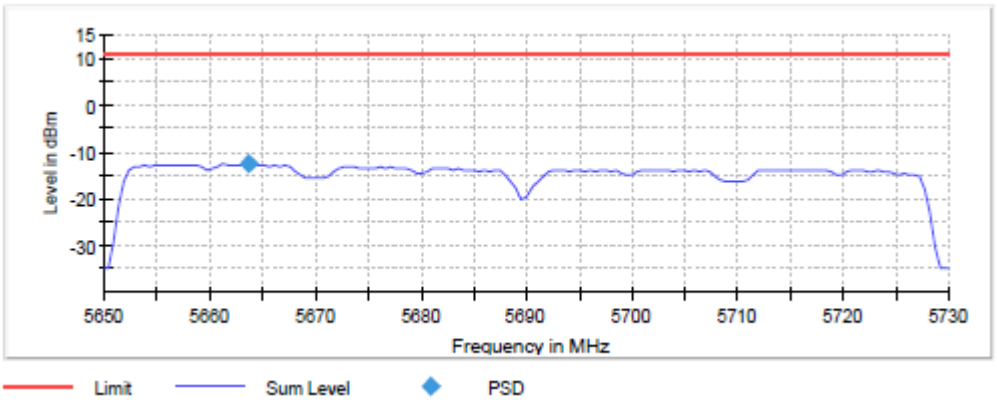
Frequency (MHz)	Channel No.	MCS Index	Measured Power Density (dBm)	DutyCycle (%)	Limit (dBm)	Result
5210	42	9	- 13.02	48.386	11	Complies
5290	58	7	- 13.35	52.250	11	Complies
5530	106	9	- 12.62	48.433	11	Complies
5690	138	7	- 12.58	52.243	11	Complies
5775	155	8	- 15.79	49.890	30	Complies

Test Plot on Configuration : 802.11n_HT40

5530 MHz (106 ch)



5690 MHz (138 ch)



Note: In order to simplify the report, attached plots were only the most wide channel.

12. Frequency Stability

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between 0 °C and 40 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

802.11ac (VHT 20)_Sartup (UNII 1 / 5 180 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 180 032 557	32 557
		10	5 180 033 114	33 114
		20	5 180 011 353	11 353
		30	5 179 999 569	- 431
		40	5 179 996 764	- 3 236
Min.	3.50	20	5 179 998 968	- 1 032
Max	4.20	20	5 179 998 988	- 1 012

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_2 minutes (UNII 1 / 5 180 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 180 033 461	33 461
		10	5 180 030 622	30 622
		20	5 180 010 616	10 616
		30	5 179 999 137	- 863
		40	5 179 996 688	- 3 312
Min.	3.50	20	5 179 998 814	- 1 186
Max	4.20	20	5 179 998 814	- 1 186

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_5 minutes (UNII 1 / 5 180 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 180 032 391	32 391
		10	5 180 031 655	31 655
		20	5 180 010 369	10 369
		30	5 179 999 077	-923
		40	5 179 996 509	- 3 491
Min.	3.50	20	5 179 998 685	- 1 315
Max	4.20	20	5 179 998 776	- 1 224

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_10 minutes (UNII 1 / 5 180 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 180 032 300	32 300
		10	5 180 030 717	30 717
		20	5 180 010 112	10 112
		30	5 179 999 209	- 791
		40	5 179 996 365	- 3 635
Min.	3.50	20	5 179 998 716	- 1 284
Max	4.20	20	5 179 999 587	- 413

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_Startup (UNII 2A / 5 260 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 260 033 018	33 018
		10	5 260 032 679	32 679
		20	5 260 011 371	11 371
		30	5 259 999 379	- 621
		40	5 259 996 406	- 3 594
Min.	3.50	20	5 259 998 757	- 1 243
Max	4.20	20	5 259 998 836	- 1 164

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_2 minutes (UNII 2A / 5 260 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 260 033 702	33 702
		10	5 260 031 144	31 144
		20	5 260 010 692	10 692
		30	5 259 999 085	- 915
		40	5 259 996 544	- 3 456
Min.	3.50	20	5 260 001 326	1 326
Max	4.20	20	5 259 998 806	- 1 194

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_5 minutes (UNII 2A / 5 260 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 260 032 812	32 812
		10	5 260 031 676	31 676
		20	5 260 010 255	10 255
		30	5 259 999 118	- 882
		40	5 259 996 624	- 3 376
Min.	3.50	20	5 259 998 727	- 1 273
Max	4.20	20	5 259 998 444	- 1 556

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_10 minutes (UNII 2A / 5 260 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 260 032 706	32 706
		10	5 260 030 529	30 529
		20	5 260 010 105	10 105
		30	5 259 999 025	- 975
		40	5 259 996 681	- 3 319
Min.	3.50	20	5 259 998 665	- 1 335
Max	4.20	20	5 259 999 415	- 585

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_Startup (UNII 2C / 5 500 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 500 034 379	34 379
		10	5 500 031 628	31 628
		20	5 500 011 709	11 709
		30	5 499 999 061	- 939
		40	5 499 996 203	- 3 797
Min.	3.50	20	5 499 998 758	- 1 242
Max	4.20	20	5 499 998 735	- 1 265

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_2 minutes (UNII 2C / 5 500 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 500 034 726	34 726
		10	5 500 030 375	30 375
		20	5 500 011 146	11 146
		30	5 499 999 055	- 945
		40	5 499 996 351	- 3 649
Min.	3.50	20	5 499 998 676	- 1 324
Max	4.20	20	5 499 998 679	- 1 321

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_5 minutes (UNII 2C / 5 500 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 500 034 152	34 152
		10	5 500 030 746	30 746
		20	5 500 010 428	10 428
		30	5 499 999 085	- 915
		40	5 499 996 398	- 3 602
Min.	3.50	20	5 499 998 667	- 1 333
Max	4.20	20	5 499 998 179	- 1 821

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_10 minutes (UNII 2C / 5 500 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 500 034 132	34 132
		10	5 500 030 697	30 697
		20	5 500 010 427	10 427
		30	5 499 999 014	- 986
		40	5 499 996 630	- 3 370
Min.	3.50	20	5 499 998 688	- 1 312
Max	4.20	20	5 499 999 238	- 762

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_Startup (UNII 3 / 5 745 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 745 035 823	35 823
		10	5 745 036 169	36 169
		20	5 745 012 224	12 224
		30	5 744 998 576	- 1 424
		40	5 744 995 289	- 4 711
Min.	3.50	20	5 744 997 966	- 2 034
Max	4.20	20	5 744 998 084	- 1 916

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_2 minutes (UNII 3 / 5 745 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 745 036 374	36 374
		10	5 745 035 379	35 379
		20	5 745 011 681	11 681
		30	5 744 998 588	- 1 412
		40	5 744 995 388	- 4 612
Min.	3.50	20	5 744 997 968	- 2 032
Max	4.20	20	5 744 998 143	- 1 857

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_5 minutes (UNII 3 / 5 745 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 745 035 834	35 834
		10	5 745 035 658	35 658
		20	5 745 010 998	10 998
		30	5 744 998 598	- 1 402
		40	5 744 995 329	- 4 671
Min.	3.50	20	5 744 998 101	- 1 899
Max	4.20	20	5 744 998 579	- 1 421

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 20)_10 minutes (UNII 3 / 5 745 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 745 035 776	35 776
		10	5 745 035 706	35 706
		20	5 745 010 957	10 957
		30	5 744 998 402	- 1 598
		40	5 744 995 369	- 4 631
Min.	3.50	20	5 744 998 243	- 1 757
Max	4.20	20	5 744 999 469	- 531

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_Startup (UNII 1 / 5 190 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 189 998 994	- 1 006
		10	5 189 998 947	- 1 053
		20	5 189 996 749	- 3 251
		30	5 189 999 603	- 397
		40	5 190 011 098	11 098
Min.	3.50	20	5 190 030 424	30 424
Max	4.20	20	5 190 032 357	32 357

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_2 minutes (UNII 1 / 5 190 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 189 998 857	- 1 143
		10	5 189 998 780	- 1 220
		20	5 189 996 898	- 3 102
		30	5 189 999 203	- 797
		40	5 190 010 586	10 586
Min.	3.50	20	5 190 029 794	29 794
Max	4.20	20	5 190 032 721	32 721

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_5 minutes (UNII 1 / 5 190 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 189 998 646	- 1 354
		10	5 189 998 888	- 1 112
		20	5 189 996 628	- 3 372
		30	5 189 999 187	- 813
		40	5 190 010 311	10 311
Min.	3.50	20	5 190 030 324	30 324
Max	4.20	20	5 190 032 297	32 297

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_10 minutes (UNII 1 / 5 190 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 189 999 573	- 427
		10	5 189 998 736	- 1 264
		20	5 189 996 788	- 3 212
		30	5 189 999 229	- 771
		40	5 190 010 096	10 096
Min.	3.50	20	5 190 030 013	30 013
Max	4.20	20	5 190 032 206	32 206

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_Startup (UNII 2A / 5 270 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 270 032 844	32 844
		10	5 270 030 884	30 884
		20	5 270 011 231	11 231
		30	5 269 999 377	- 623
		40	5 269 996 638	- 3 362
Min.	3.50	20	5 269 998 875	- 1 125
Max	4.20	20	5 269 998 915	- 1 085

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_2 minutes (UNII 2A / 5 270 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 270 033 299	33 299
		10	5 270 030 103	30 103
		20	5 270 010 640	10 640
		30	5 269 999 182	- 818
		40	5 269 996 702	- 3 298
Min.	3.50	20	5 269 998 773	- 1 227
Max	4.20	20	5 269 998 837	- 1 163

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_5 minutes (UNII 2A / 5 270 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 270 032 864	32 864
		10	5 270 030 498	30 498
		20	5 270 010 225	10 225
		30	5 269 999 192	- 808
		40	5 269 996 832	- 3 168
Min.	3.50	20	5 269 998 728	- 1 272
Max	4.20	20	5 269 998 416	- 1 584

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_10 minutes (UNII 2A / 5 270 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 270 032 762	32 762
		10	5 270 029 726	29 726
		20	5 270 010 125	10 125
		30	5 269 999 103	- 897
		40	5 269 996 994	- 3 006
Min.	3.50	20	5 269 998 697	- 1 303
Max	4.20	20	5 269 999 418	- 582

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_Startup (UNII 2C / 5 510 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 510 034 311	34 311
		10	5 510 031 205	31 205
		20	5 510 011 584	11 584
		30	5 509 999 119	- 881
		40	5 509 996 463	- 3 537
Min.	3.50	20	5 509 998 654	- 1 346
Max	4.20	20	5 509 998 778	- 1 222

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_2 minutes (UNII 2C / 5 510 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 510 034 498	34 498
		10	5 510 030 467	30 467
		20	5 510 011 181	11 181
		30	5 509 999 154	- 846
		40	5 509 996 563	- 3 437
Min.	3.50	20	5 509 998 716	- 1 284
Max	4.20	20	5 509 998 766	- 1 234

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_5 minutes (UNII 2C / 5 510 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 510 034 202	34 202
		10	5 510 030 543	30 543
		20	5 510 010 349	10 349
		30	5 509 999 182	- 818
		40	5 509 996 469	- 3 531
Min.	3.50	20	5 509 998 694	- 1 306
Max	4.20	20	5 509 998 229	- 1 771

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_10 minutes (UNII 2C / 5 510 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 510 034 138	34 138
		10	5 510 029 909	29 909
		20	5 510 010 529	10 529
		30	5 509 998 972	- 1 028
		40	5 509 996 560	- 3 440
Min.	3.50	20	5 509 998 722	- 1 278
Max	4.20	20	5 509 999 257	- 743

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_Startup (UNII 3 / 5 755 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 755 036 003	36 003
		10	5 755 035 793	35 793
		20	5 755 011 961	11 961
		30	5 754 998 695	- 1 305
		40	5 754 995 395	- 4 605
Min.	3.50	20	5 754 998 216	- 1 784
Max	4.20	20	5 754 998 283	- 1 717

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_2 minutes (UNII 3 / 5 755 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 755 036 131	36 131
		10	5 755 035 444	35 444
		20	5 755 011 487	11 487
		30	5 754 998 723	- 1 277
		40	5 754 995 402	- 4 598
Min.	3.50	20	5 754 998 125	- 1 875
Max	4.20	20	5 754 998 198	- 1 802

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_5 minutes (UNII 3 / 5 755 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 755 035 854	35 854
		10	5 755 035 244	35 244
		20	5 755 011 209	11 209
		30	5 754 998 714	- 1 286
		40	5 754 995 442	- 4 558
Min.	3.50	20	5 754 998 236	- 1 764
Max	4.20	20	5 754 999 071	- 929

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 40)_10 minutes (UNII 3 / 5 755 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 755 035 803	35 803
		10	5 755 035 518	35 518
		20	5 755 011 215	11 215
		30	5 754 998 600	- 1 400
		40	5 754 995 530	- 4 470
Min.	3.50	20	5 754 998 269	- 1 731
Max	4.20	20	5 755 000 042	42

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_Startup (UNII 1 / 5 210 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 210 032 476	32 476
		10	5 210 030 140	30 140
		20	5 210 010 825	10 825
		30	5 209 999 558	- 442
		40	5 209 996 730	- 3 270
Min.	3.50	20	5 209 998 959	- 1 041
Max	4.20	20	5 209 999 014	- 986

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_2 minutes (UNII 1 / 5 210 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 210 032 606	32 606
		10	5 210 029 337	29 337
		20	5 210 010 402	10 402
		30	5 209 999 230	- 770
		40	5 209 996 863	- 3 137
Min.	3.50	20	5 209 998 815	- 1 185
Max	4.20	20	5 209 998 952	- 1 048

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_5 minutes (UNII 1 / 5 210 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 210 032 354	32 354
		10	5 210 029 509	29 509
		20	5 210 010 323	10 323
		30	5 209 999 238	- 762
		40	5 209 996 988	- 3 012
Min.	3.50	20	5 209 998 913	- 1 087
Max	4.20	20	5 209 998 655	- 1 345

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_10 minutes (UNII 1 / 5 210 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 210 032 315	32 315
		10	5 210 029 519	29 519
		20	5 210 010 071	10 071
		30	5 209 999 269	- 731
		40	5 209 996 880	- 3 120
Min.	3.50	20	5 209 998 787	- 1 213
Max	4.20	20	5 209 999 568	- 432

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_Startup (UNII 2A / 5 290 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 290 034 014	34 014
		10	5 290 028 379	28 379
		20	5 290 010 777	10 777
		30	5 289 999 438	- 562
		40	5 289 996 723	- 3 277
Min.	3.50	20	5 289 999 072	- 928
Max	4.20	20	5 289 999 043	- 957

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_2 minutes (UNII 2A / 5 290 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 290 032 906	32 906
		10	5 290 028 139	28 139
		20	5 290 010 514	10 514
		30	5 289 999 348	- 652
		40	5 289 996 948	- 3 052
Min.	3.50	20	5 289 998 984	- 1 016
Max	4.20	20	5 289 998 979	- 1 021

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_5 minutes (UNII 2A / 5 290 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 290 032 752	32 752
		10	5 290 028 599	28 599
		20	5 290 010 174	10 174
		30	5 289 999 308	- 692
		40	5 289 997 060	- 2 940
Min.	3.50	20	5 289 998 983	- 1 017
Max	4.20	20	5 289 998 518	- 1 482

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_10 minutes (UNII 2A / 5 290 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 290 032 734	32 734
		10	5 290 028 310	28 310
		20	5 290 010 160	10 160
		30	5 289 999 290	- 710
		40	5 289 997 177	- 2 823
Min.	3.50	20	5 289 998 907	- 1 093
Max	4.20	20	5 289 999 587	- 413

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_Startup (UNII 2C / 5 530 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 530 035 756	35 756
		10	5 530 033 362	33 362
		20	5 530 011 129	11 129
		30	5 529 998 703	- 1 297
		40	5 529 995 814	- 4 186
Min.	3.50	20	5 529 998 175	- 1 825
Max	4.20	20	5 529 998 355	- 1 645

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_2 minutes (UNII 2C / 5 530 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 530 034 307	34 307
		10	5 530 032 213	32 213
		20	5 530 010 803	10 803
		30	5 529 998 858	- 1 142
		40	5 529 995 858	- 4 142
Min.	3.50	20	5 529 998 326	- 1 674
Max	4.20	20	5 529 998 376	- 1 624

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_5 minutes (UNII 2C / 5 530 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 530 034 267	34 267
		10	5 530 032 456	32 456
		20	5 530 010 513	10 513
		30	5 529 998 841	- 1 159
		40	5 529 995 922	- 4 078
Min.	3.50	20	5 529 998 356	- 1 644
Max	4.20	20	5 529 998 161	- 1 839

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_10 minutes (UNII 2C / 5 530 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 530 034 314	34 314
		10	5 530 032 194	32 194
		20	5 530 010 533	10 533
		30	5 529 998 713	- 1 287
		40	5 529 995 988	- 4 012
Min.	3.50	20	5 529 998 451	- 1 549
Max	4.20	20	5 529 998 946	- 1 054

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_Startup (UNII 3 / 5 775 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 775 037 506	37 506
		10	5 775 036 239	36 239
		20	5 775 011 674	11 674
		30	5 774 998 665	- 1 335
		40	5 774 995 410	- 4 590
Min.	3.50	20	5 774 998 140	- 1 860
Max	4.20	20	5 774 998 308	- 1 692

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_2 minutes (UNII 3 / 5 775 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 775 036 075	36 075
		10	5 775 035 955	35 955
		20	5 775 011 432	11 432
		30	5 774 998 651	- 1 349
		40	5 774 995 456	- 4 544
Min.	3.50	20	5 774 998 174	- 1 826
Max	4.20	20	5 774 998 172	- 1 828

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_5 minutes (UNII 3 / 5 775 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 775 036 001	36 001
		10	5 775 036 066	36 066
		20	5 775 011 306	11 306
		30	5 774 998 585	- 1 415
		40	5 774 995 357	- 4 643
Min.	3.50	20	5 774 998 183	- 1 817
Max	4.20	20	5774 999 196	- 804

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

802.11ac (VHT 80)_10 minutes (UNII 3 / 5 775 000 000 Hz)

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)
100	3.65	0	5 775 036 009	36 009
		10	5 775 035 877	35 877
		20	5 775 011 278	11 278
		30	5 774 998 485	- 1 515
		40	5 774 995 419	- 4 581
Min.	3.50	20	5 774 998 293	- 1 707
Max	4.20	20	5 775 000 139	139

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

13. AC Power line Conducted emission

-Test Description

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (Test firm Registration Number: 269701)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ENV216) and the support equipment is powered from the Rohde & Schwarz LISN (ENV216). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCI).

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

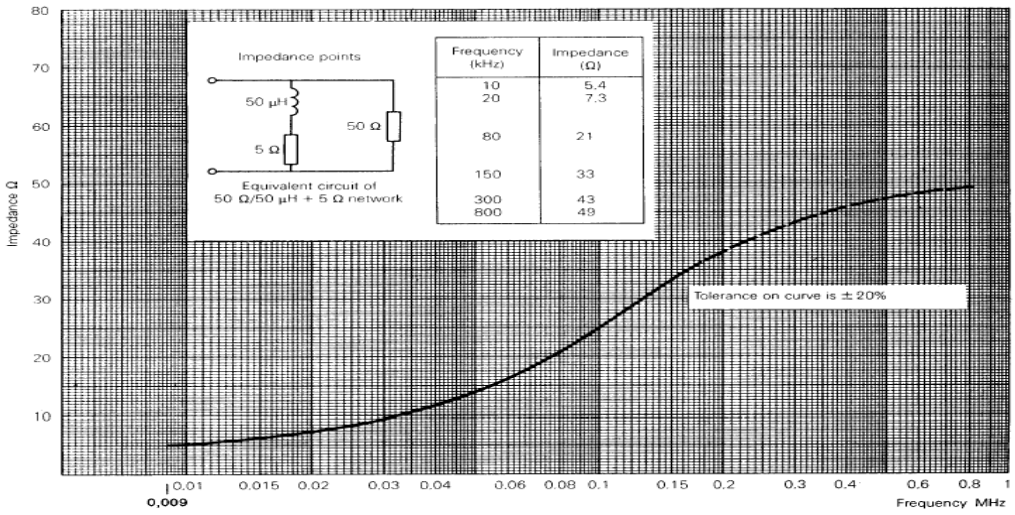


Fig 2. Impedance of LISN

13.1 Operating Environment

Temperature : 21.5 °C
Relative Humidity : 35.2 % R.H.

13.2 Test Set-up

The conducted emission measurements were performed in the shielded room.
The EUT was placed on wooden table, 0.8 m heights above the floor, 0.4 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.
AMN is bonded on horizontal reference ground plane.
The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

13.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."
The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	3.84 dB	Confidence level of approximately 95 % (k = 2)
Conducted emission (150 kHz ~ 30 MHz)	3.31 dB	Confidence level of approximately 95 % (k = 2)

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.
The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results

13.4 Limit

RFI Conducted	FCC Limit(dBµV/m) Class B	
Freq. Range	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
*Limits decreases linearly with the logarithm of frequency.		

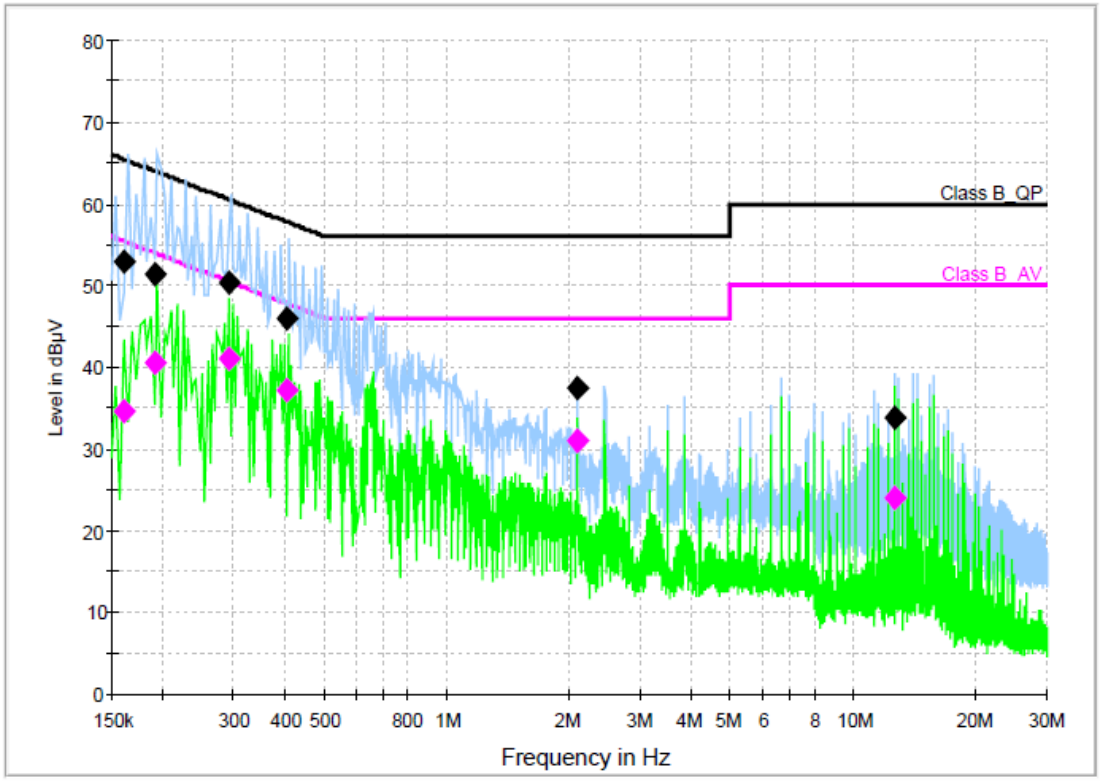
13.5 Test Equipment used

	Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■-	ESCI	Rohde & Schwarz	EMI test receiver	100237	Apr 16. 2019
■-	ENV216	Rohde & Schwarz	LISN	100172	Apr 12. 2019
□-	ENV216	Rohde & Schwarz	LISN	100173	Apr 12. 2019
□ -	ISN T8	TESEQ. GmbH	ISN	24568	May 02. 2019
■-	EMC 32	Rohde & Schwarz	Testing Software	VER8.53	N/A

13.6 Test data for Conducted Emission

-. Test Date : Oct. 29, 2018
-. Reference Standard : Part 15 Subpart C, Sec. 15.207
-. Test Procedure(s) : ANSI C63.10 (2013)
-. Operating Condition : Charging mode
-. Power Source : AC 120 V / 60 Hz
-. Frequency rage : 0.15 MHz to 30 MHz
-. Line : AC Power Line (Live and Neutral)
-. Comment :

AC Power line Conducted emission



Class B_QP
Class B_AV
Preview Result 1-PK+
Preview Result 2-AVG
Final Result 1-QPK
Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.161000	52.9	1000.0	9.000	Off	N	9.8	12.5	65.4	
0.191275	51.5	1000.0	9.000	Off	N	9.8	12.5	64.0	
0.292019	50.3	1000.0	9.000	Off	L1	9.8	10.1	60.5	
0.405688	45.9	1000.0	9.000	Off	N	9.8	11.8	57.7	
2.100213	37.4	1000.0	9.000	Off	N	9.9	18.6	56.0	
12.602413	33.9	1000.0	9.000	Off	L1	10.6	26.1	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.161000	34.5	1000.0	9.000	Off	N	9.8	20.9	55.4	
0.191275	40.4	1000.0	9.000	Off	N	9.8	13.5	54.0	
0.292019	41.0	1000.0	9.000	Off	L1	9.8	9.5	50.5	
0.405688	37.2	1000.0	9.000	Off	N	9.8	10.5	47.7	
2.100213	31.0	1000.0	9.000	Off	N	9.9	15.0	46.0	
12.602413	24.0	1000.0	9.000	Off	L1	10.6	26.0	50.0	

14. Radiated Spurious & Restricted Band Edge Emission

Exploratory Radiated measurements were conducted at the 3m semi anechoic chamber in order to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.
Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Final measurements of below 1GHz were made at 3m or 10 m Chamber that complies with CISPR 16/ANSI C63.10.
Above 1GHz final measurements were conducted at the 3m Chamber only.

For measurements above 1GHz, the bottom side of 3m chamber was installed with absorbers in order to meet SVSWR Limit.
Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode (Below 1GHz) and Peak & Average mode (Above 1GHz).

The measurements were performed by rotating the EUT 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

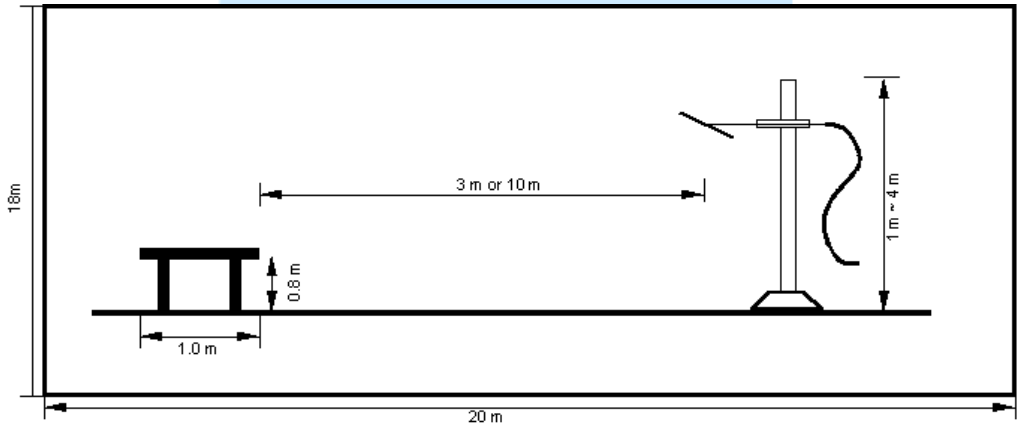


Fig 3. Dimensions of test site (Below 1GHz)

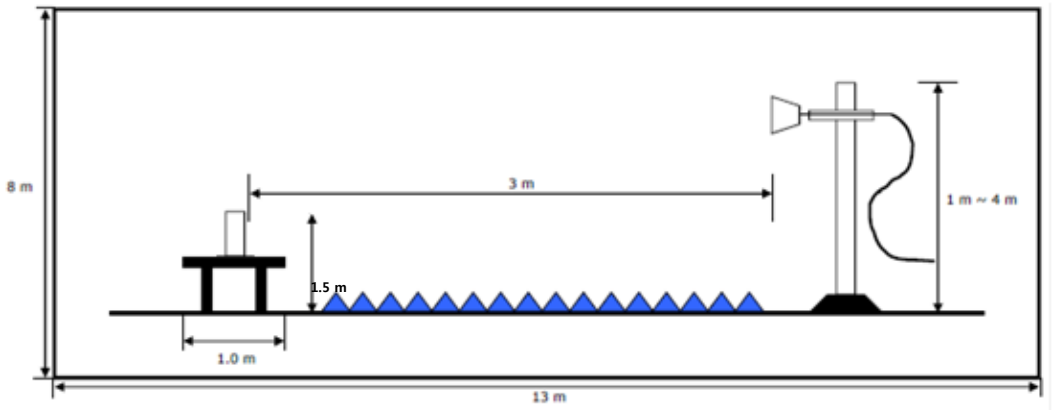


Fig 4. Dimensions of test site (Above 1GHz)

14.1 Operating environment

Temperature : 23.7 ℃
Relative humidity : 52.9 % R.H.

14.2 Test set-up

A preliminary and final measurement was at 3 m anechoic chamber.
The EUT was placed on a non-conducting table.
For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane.
For emission measurements above 1 GHz, the table height is 1.5 m above the reference ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.
This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

14.3 Measurement uncertainty

The measurement uncertainty was calculated in accordance with ISO “Guide to the expression of uncertainty in measurement”.
The measurement uncertainty was given with a confidence of 95 %.

Test items(Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	5.14 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	5.10 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	6.05 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	5.19 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m, V/H)	5.77 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (6 000 MHz ~ 18 000 MHz, 3 m, V/H)	5.77 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (18 000 MHz ~ 26 000 MHz, 3 m, V/H)	5.61 dB	Confidence level of approximately 95 % (k = 2)

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.
The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results

14.4 Limit

20 dB in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2 400/F (kHz)	300
0.490 ~ 1.705	2 400/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

14.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESU40	Rohde & Schwarz	EMI Test Receiver	100266	Apr. 17, 2019
■ - HFH2-Z2	Rohde & Schwarz	Loop Antenna	100041	Dec. 06, 2019
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3099	Sep. 29, 2019
■ - BBHA9120D	Schwarzbeck	Horn Antenna	207	Sep. 29, 2018
■ - 3160-09	Schwarzbeck	Horn Antenna	218457	Feb. 01, 2019
■ - MCU066	maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturo GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturo GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	Apr. 18, 2019
■ - SCU-F1826-G47-BZ42-CSS	BONN Elektronik	Preamplifier	10003	Apr. 18, 2019
■ - WHKX3.0/18G-10SS	WAINWRIGHT INSTRUMENTS	High pass filter	SN31	Apr. 12, 2019
■- EMC 32	Rohde & Schwarz	Testing Software	VER10.40	N/A

14.6 Test data for Radiated Spurious Emission

-. Test Date : Oct. 01 , 2018 ~ Nov. 21, 2018
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(b)
-. Measuring Distance : 3 m
-. Resolution Bandwidth : 200 Hz, 9 kHz(Below 30 MHz) / 120 kHz(30 MHz ~ 1GHz) / 1 MHz(Above 1GHz)
-. Detector mode : Quasi Peak detector mode / Peak detector mode / Average detector mode
-. Power Source : DC 3.65 V
-. Note : Through three orthogonal axes were investigated and the worst case is report

Radiated Spurious Emission (9 kHz to 30 MHz)

※ The emission level was not found.

The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

Radiated Spurious Emission (30 MHz to 1 000 MHz)

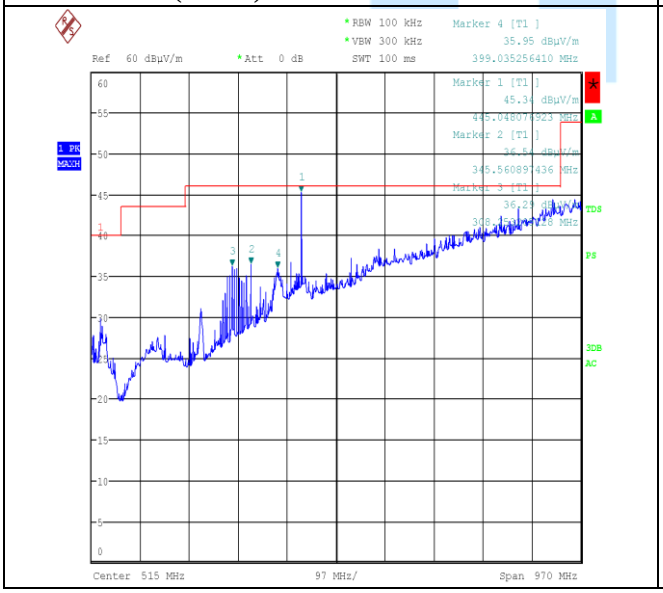
802.11a

Frequency (MHz)	Reading Value (dBμV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	ANT. Pol
445.048	22.63	16.95	4.76	44.34	46.00	1.66	H
544.535	21.03	18.49	5.18	44.70	46.00	1.30	V
841.442	14.15	22.90	6.47	43.52	46.00	2.48	H

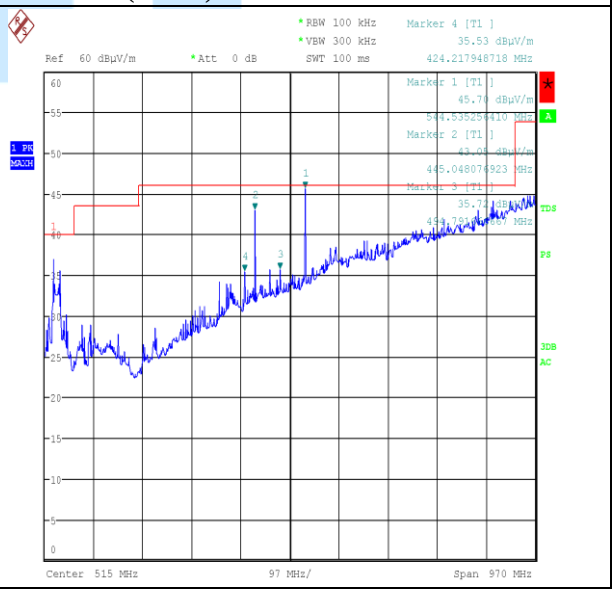
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11a

445.048 MHz (165 ch)



544.535 MHz (116 ch)



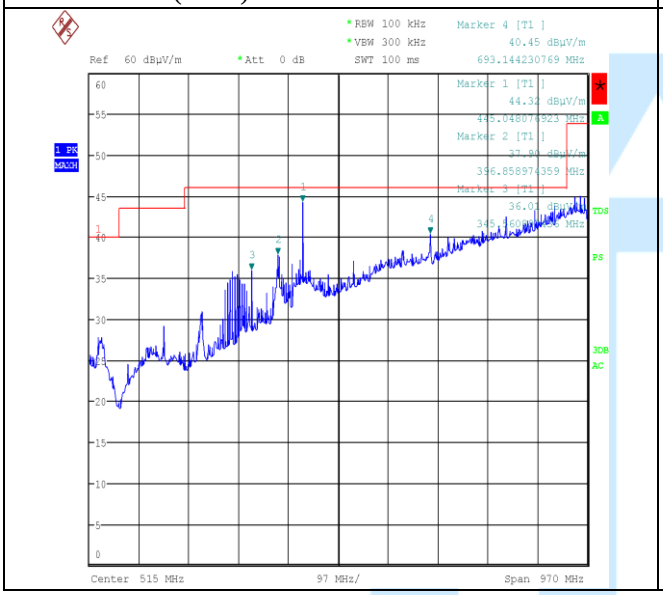
802.11n (HT 20)

Frequency (MHz)	Reading Value (dBµV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	ANT. Pol
445.048	22.61	16.95	4.76	44.32	46.00	1.68	H
544.535	21.14	18.49	5.18	44.81	46.00	1.19	V

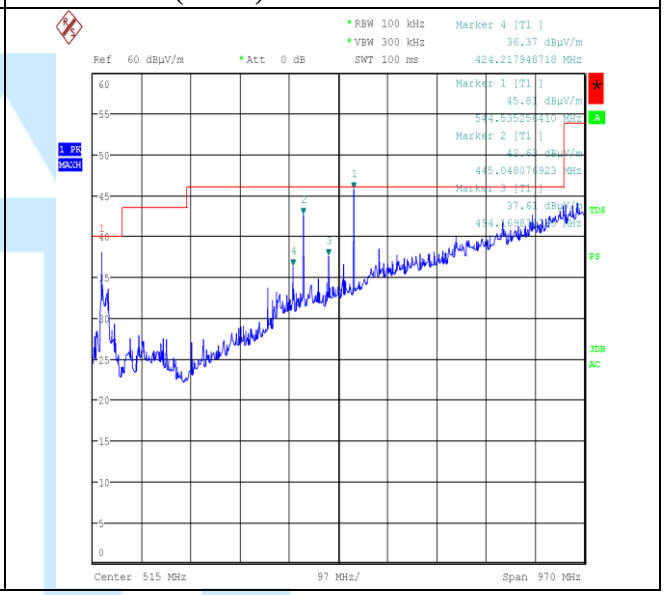
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11n (HT 20)

445.048 MHz (40 ch)



544.535 MHz (165 ch)



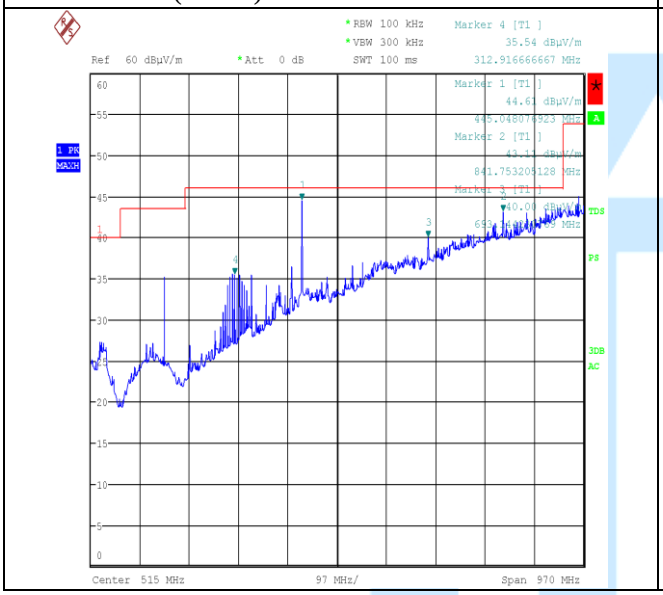
802.11ac (VHT 20)

Frequency (MHz)	Reading Value (dBµV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	ANT. Pol
445.048	21.90	16.95	4.76	43.61	46.00	2.39	H
544.535	21.07	18.49	5.18	44.74	46.00	1.26	V

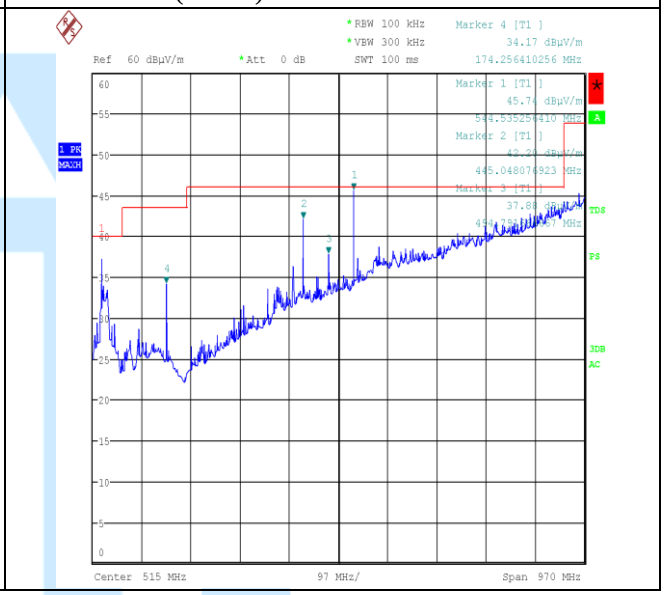
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11ac (VHT 20)

445.048 MHz (100 ch)



544.535 MHz (165 ch)



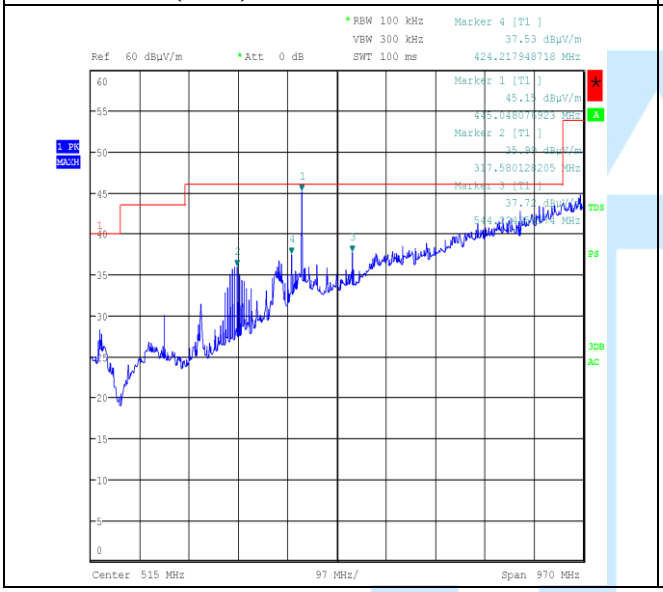
802.11n (HT 40)

Frequency (MHz)	Reading Value (dBµV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	ANT. Pol
445.048	22.44	16.95	4.76	44.15	46.00	1.85	H
544.535	21.16	18.49	5.18	44.83	46.00	1.17	V

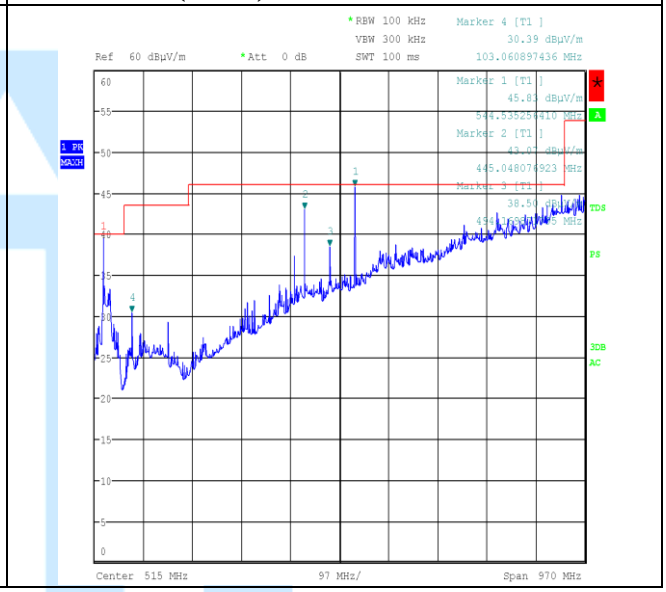
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11n (HT 40)

445.048 MHz (40 ch)



544.535 MHz (165 ch)



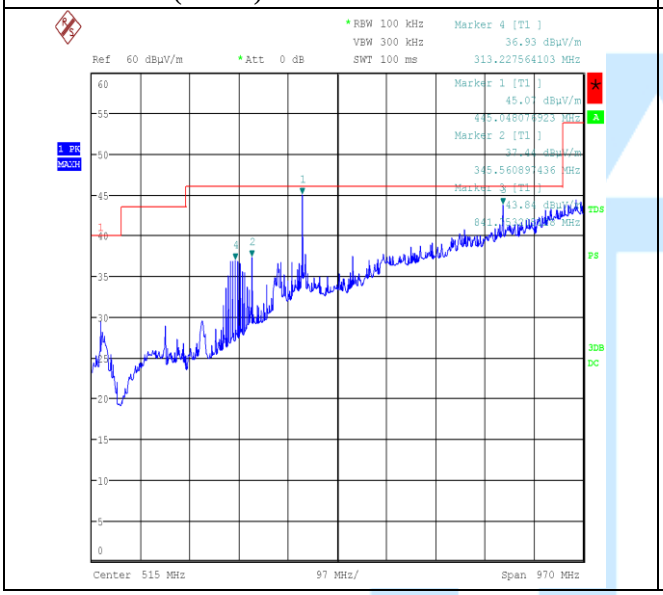
802.11ac (VHT 40)

Frequency (MHz)	Reading Value (dBµV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	ANT. Pol
445.048	22.36	16.95	4.76	44.07	46.00	1.93	H
544.535	21.16	18.49	5.18	44.83	46.00	1.17	V

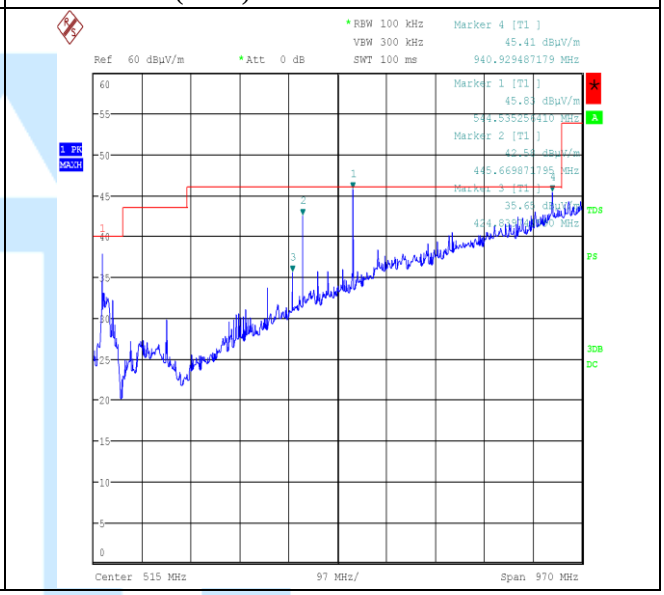
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11ac (VHT 40)

445.048 MHz (102 ch)



544.535 MHz (54 ch)



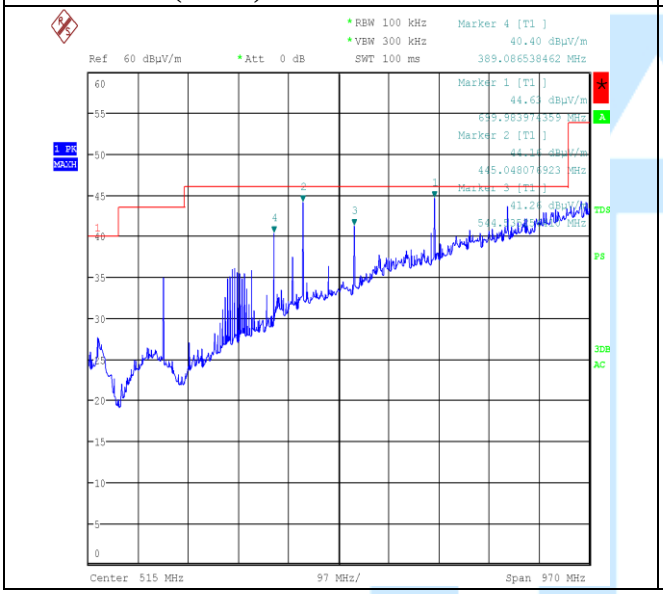
802.11ac (VHT 80)

Frequency (MHz)	Reading Value (dBµV/m)	ANT. Factor (dB/m)	Cable Loss (dB)	Test Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	ANT. Pol
445.048	21.92	16.95	4.76	43.63	46.00	2.37	H
544.535	20.98	18.49	5.18	44.65	46.00	1.35	V
699.983	16.83	20.90	5.90	43.63	46.00	2.37	H

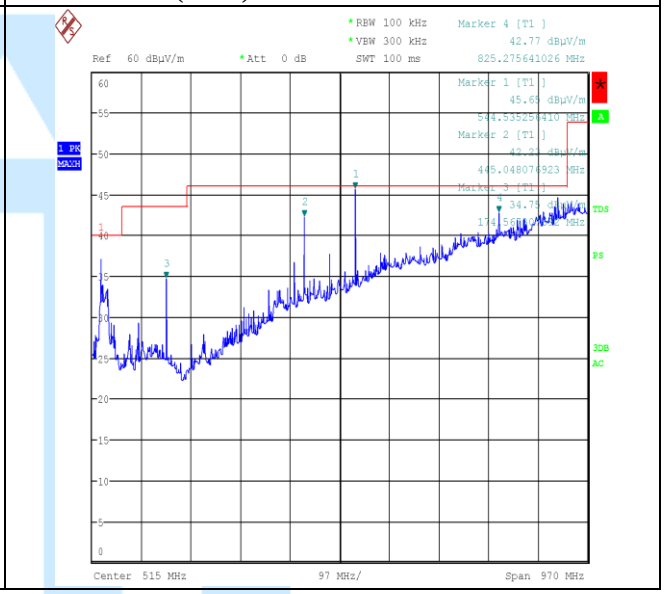
Note: In order to simplify the report, attached plots were only the most wide channel.

Test Plot on Configuration : 802.11ac (VHT 40)

445.048 MHz (106 ch)



544.535 MHz (58 ch)



Radiated Spurious Emission (1 GHz to 25 GHz)

※ The emission level was not found.

The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

14.7 Test data for Radiated Restricted Band Edge Emission

-. Test Date : Nov. 21, 2018
-. Reference Standard : Part 15 subpart E, Sec. 15.407(b)
-. Measuring Distance : 3 m
-. Resolution Bandwidth : 1 MHz
-. Detector mode : Peak detector mode / Average detector mode
-. Power Source : DC 3.65 V
-. Note : Through three orthogonal axes were investigated and the worst case is report

802.11a_5 180 GHz, 5 500 GHz

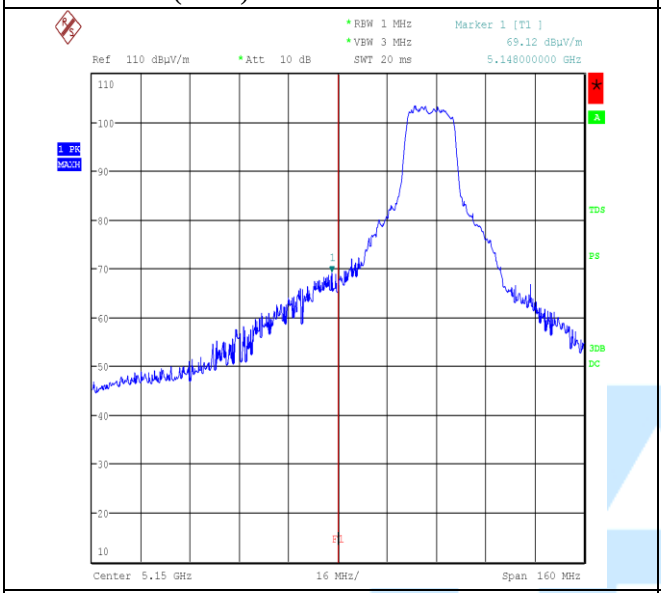
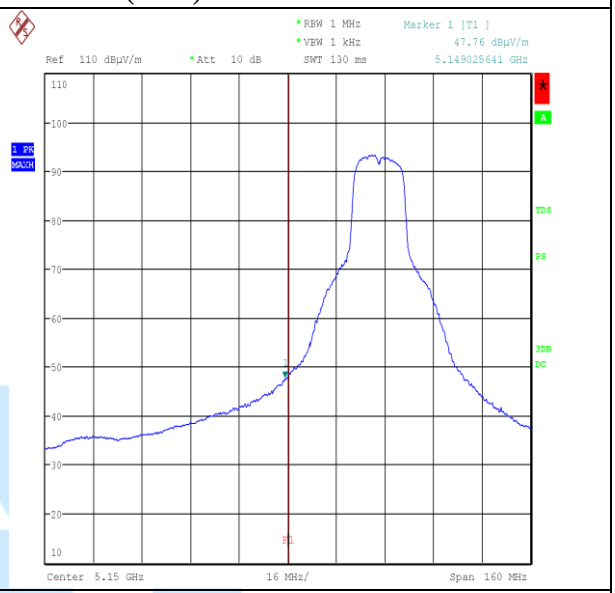
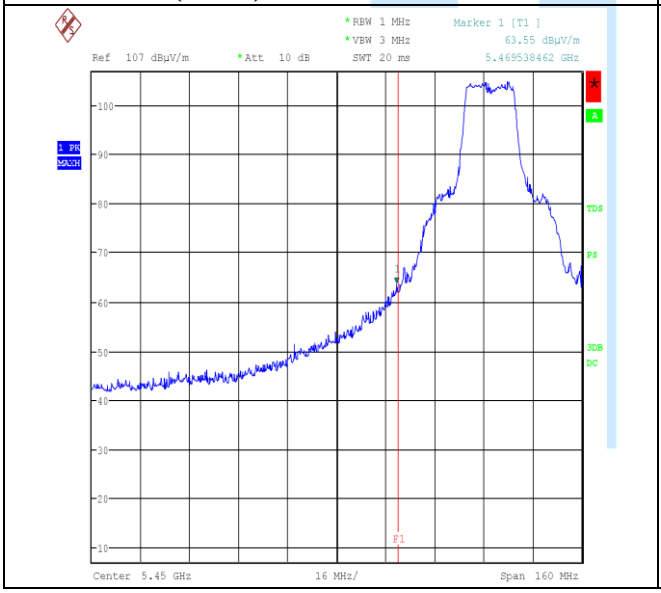
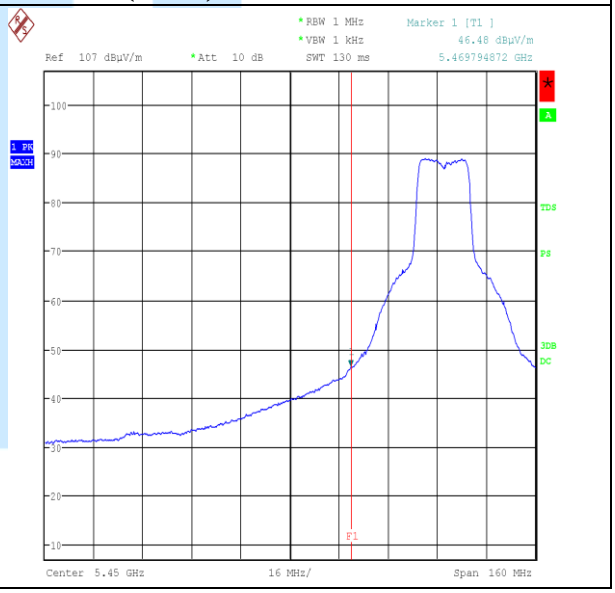
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5148.00	74.92	-	31.80	- 37.60	69.12	-	74.00	-	4.88	-	H
5149.03	-	53.56	31.80	- 37.60	-	47.76	-	54.00	-	6.24	H
5469.54	68.71	-	32.44	- 37.60	63.55	-	74.00	-	10.45	-	H
5469.79	-	51.64	32.44	- 37.60	-	46.48	-	54.00	-	7.52	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11a_5 180 GHz, 5 500 GHz

5148.00 MHz (36 ch)	5149.03 MHz (36 ch)
	
5469.54 MHz (100 ch)	**5469.79 MHz (100 ch)**
	

802.11n (HT 20)_5 180 GHz, 5 500 GHz

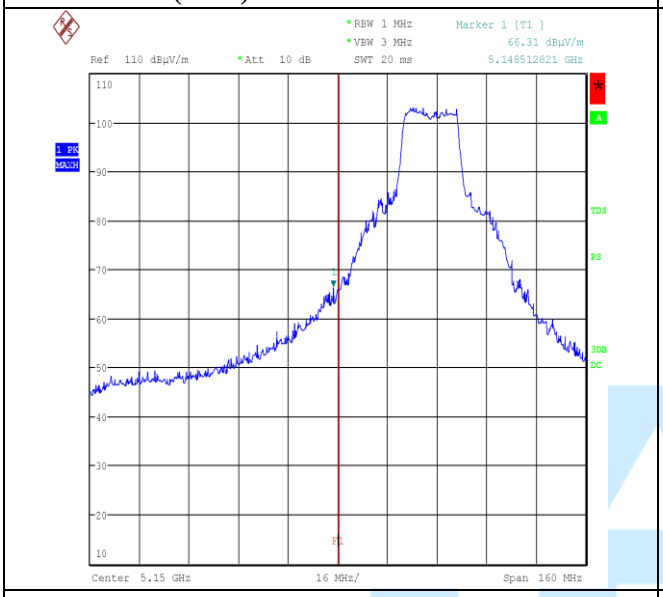
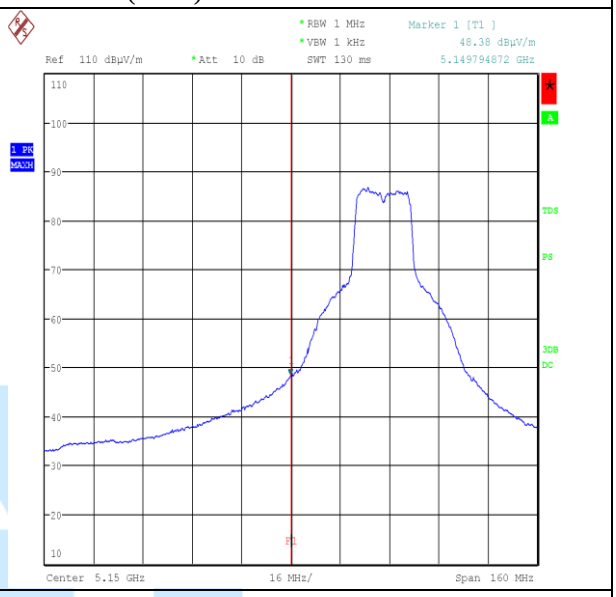
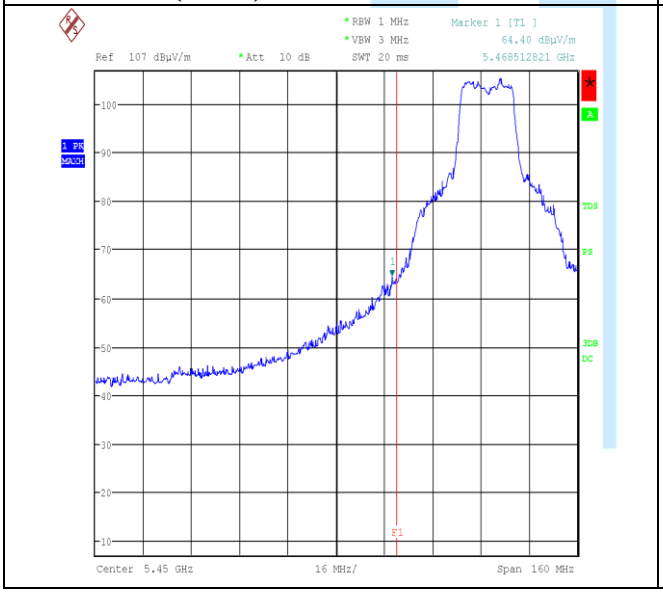
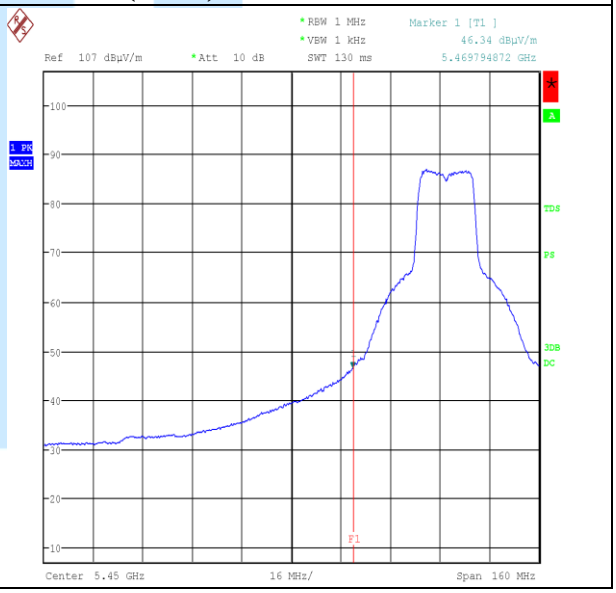
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5148.51	72.11	-	31.80	- 37.60	66.31	-	74.00	-	7.69	-	H
5149.79	-	54.18	31.80	- 37.60	-	48.38	-	54.00	-	5.62	H
5469.51	69.56	-	32.44	- 37.60	64.40	-	74.00	-	9.60	-	H
5469.79	-	51.50	32.44	- 37.60	-	46.34	-	54.00	-	7.66	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11n (HT 20)_5 180 GHz, 5 500 GHz

5148.51 MHz (36 ch)	5149.79 MHz (36 ch)
	
5469.51 MHz (100 ch)	**5469.79 MHz (100 ch)**
	

802.11ac (VHT 20)_5 180 GHz, 5 500 GHz

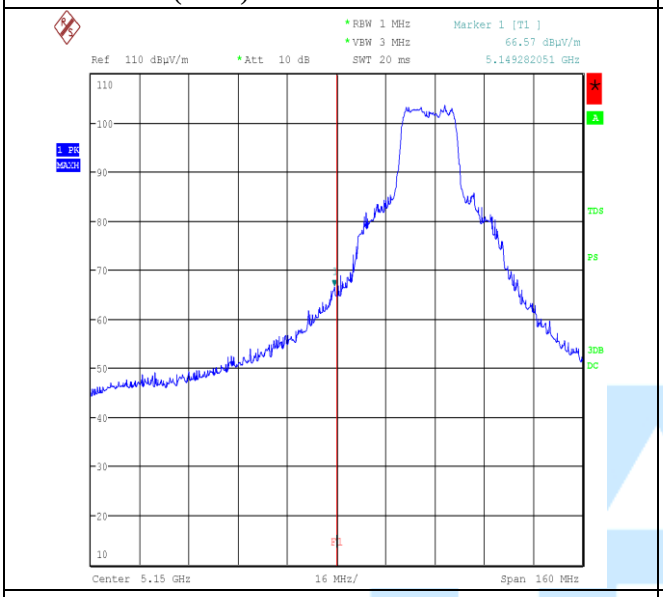
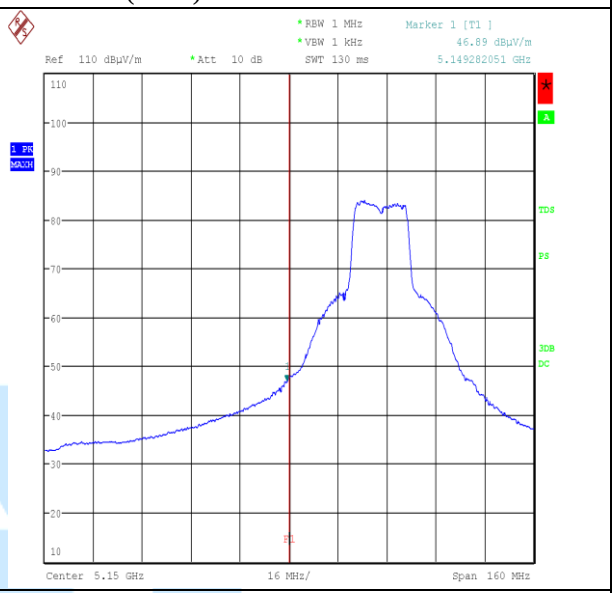
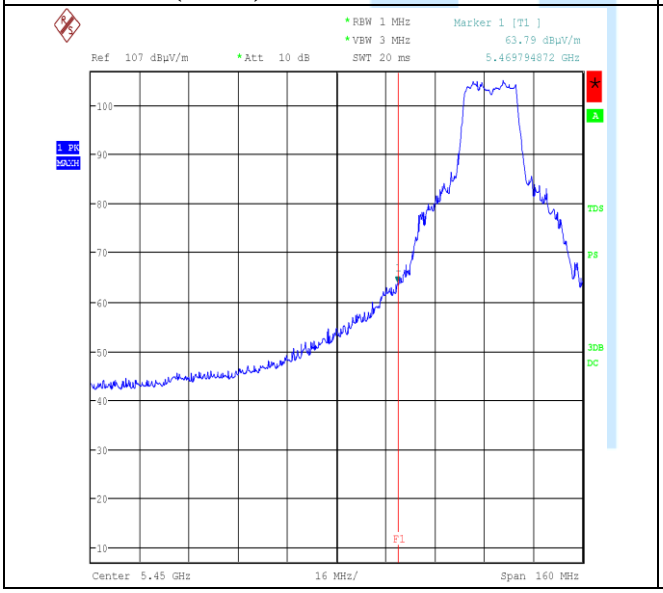
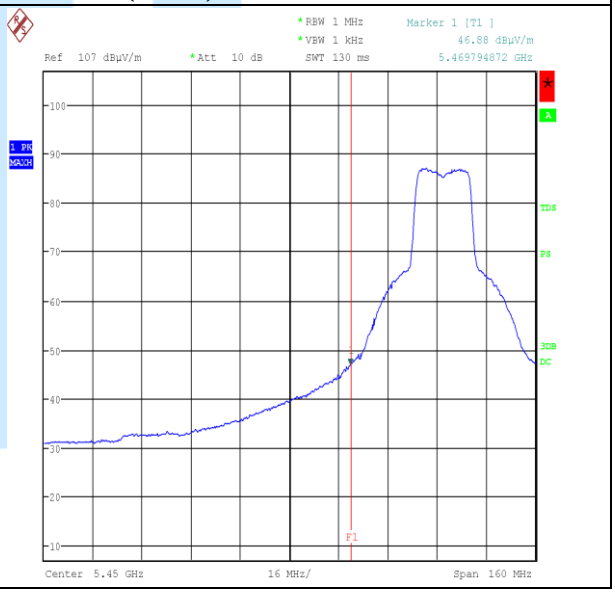
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5149.28	72.37	-	31.80	- 37.60	66.57	-	74.00	-	7.43	-	H
5149.28	-	52.69	31.80	- 37.60	-	46.89	-	54.00	-	7.11	H
5469.79	68.95	-	32.44	- 37.60	63.79	-	74.00	-	10.21	-	H
5469.79	-	52.04	32.44	- 37.60	-	46.88	-	54.00	-	7.12	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11ac (VHT 20)_5 180 GHz, 5 500 GHz

5149.28 MHz (36 ch)	5149.28 MHz (36 ch)
	
5469.79 MHz (100 ch)	5469.79 MHz (100 ch)
	

802.11n (HT 40)_5 190 GHz, 5 510 GHz

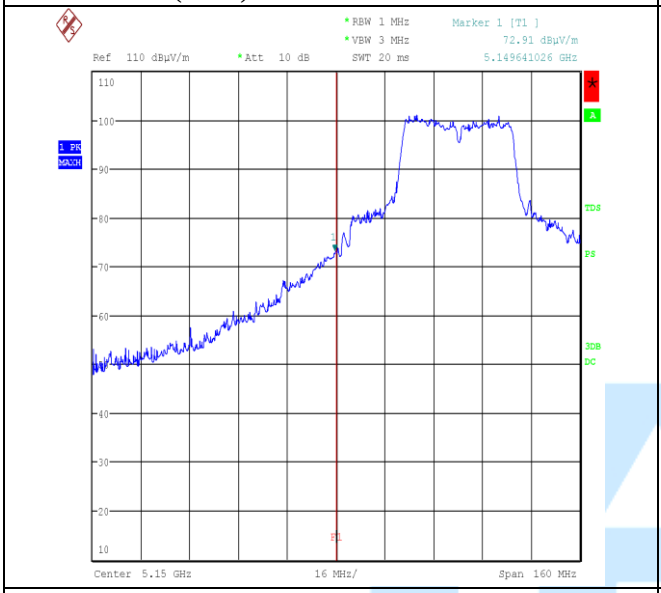
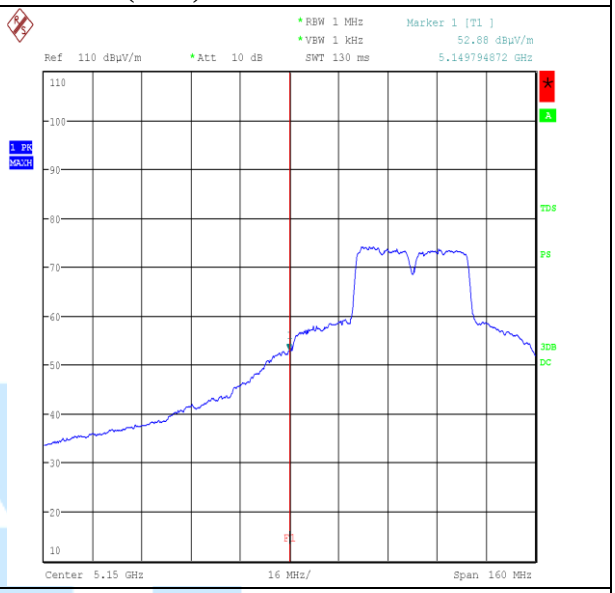
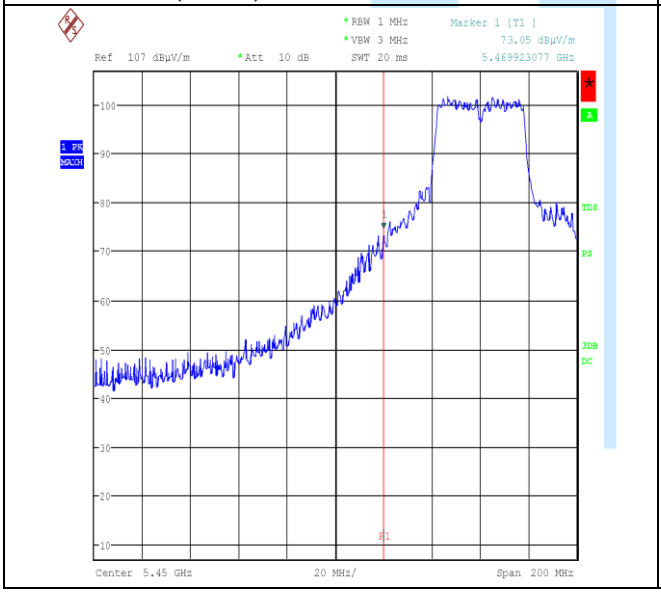
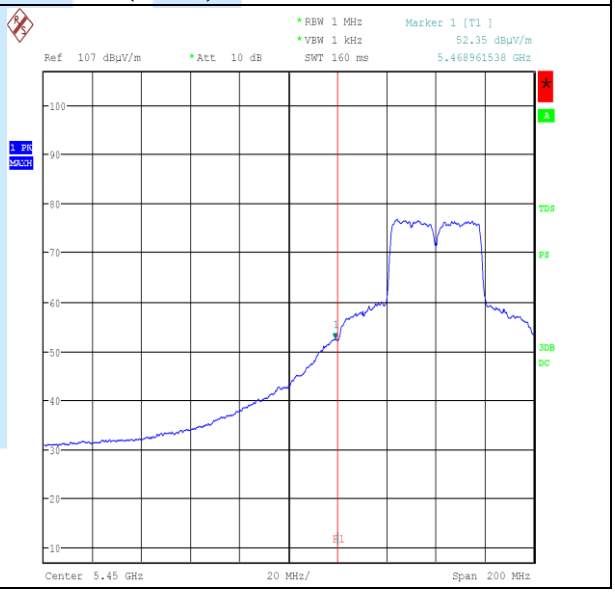
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5149.64	72.37	-	31.80	- 37.60	72.91	-	74.00	-	1.09	-	H
5149.79	-	52.69	31.80	- 37.60	-	52.88	-	54.00	-	1.12	H
5469.92	68.95	-	32.44	- 37.60	73.05	-	74.00	-	0.95	-	H
5469.94	-	52.04	32.44	- 37.60	-	52.35	-	54.00	-	1.65	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11n (HT 40)_5 190 GHz, 5 510 GHz

5149.64 MHz (38 ch)	5149.79 MHz (38 ch)
	
5469.92 MHz (102 ch)	5469.94 MHz (102 ch)
	

802.11ac (VHT 40)_5 190 GHz, 5 510 GHz

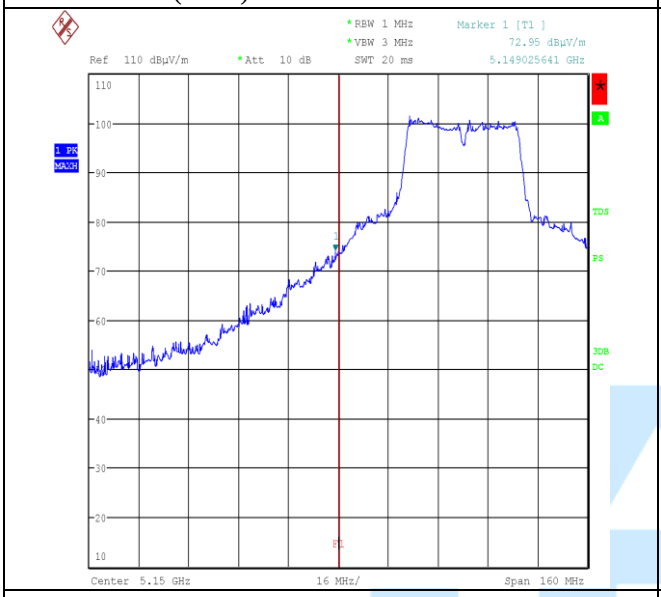
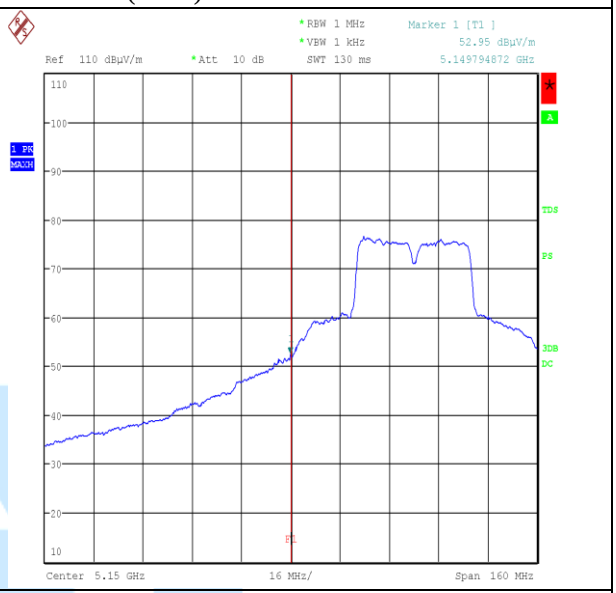
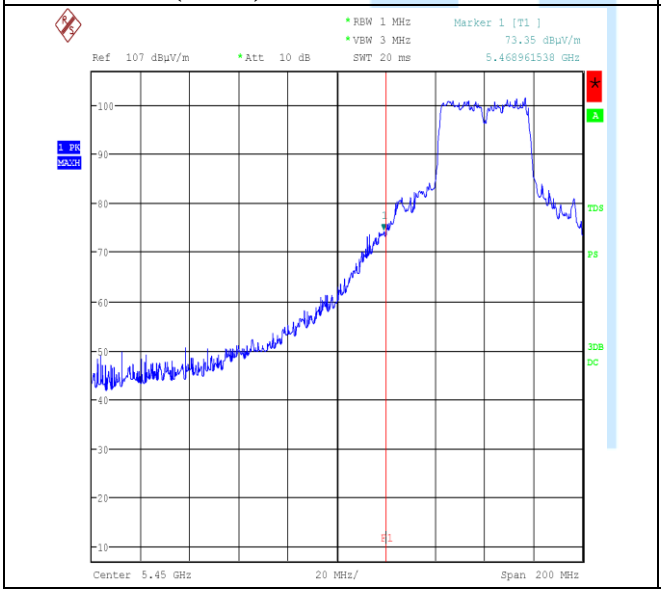
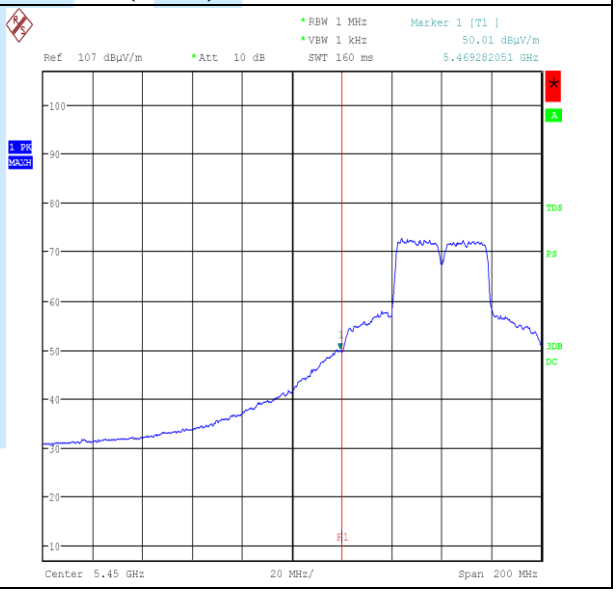
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5149.03	72.37	-	31.80	- 37.60	72.95	-	74.00	-	1.05	-	H
5149.79	-	52.69	31.80	- 37.60	-	52.95	-	54.00	-	1.05	H
5468.96	68.95	-	32.44	- 37.60	73.35	-	74.00	-	0.65	-	H
5469.82	-	52.04	32.44	- 37.60	-	50.01	-	54.00	-	3.99	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11ac (VHT 40)_5 190 GHz, 5 510 GHz

5149.03 MHz (38 ch)	5149.79 MHz (38 ch)
	
5468.96 MHz (102 ch)	**5469.82 MHz (102 ch)**
	

802.11ac (VHT 80)_5 210 GHz, 5 530 GHz

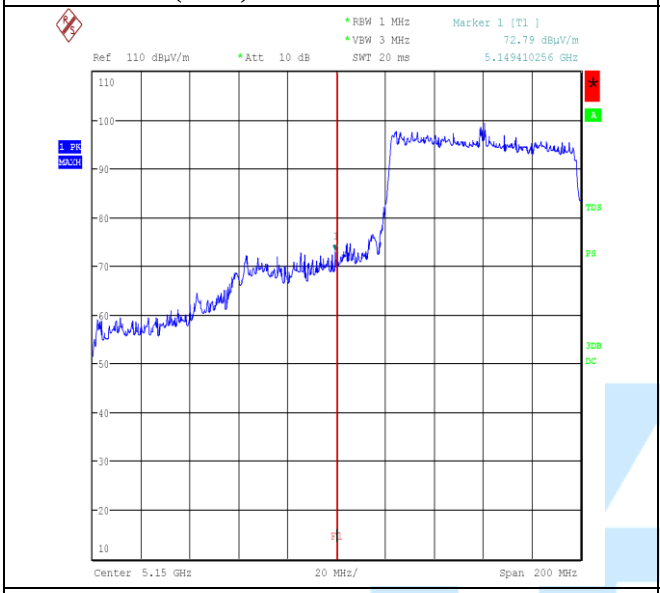
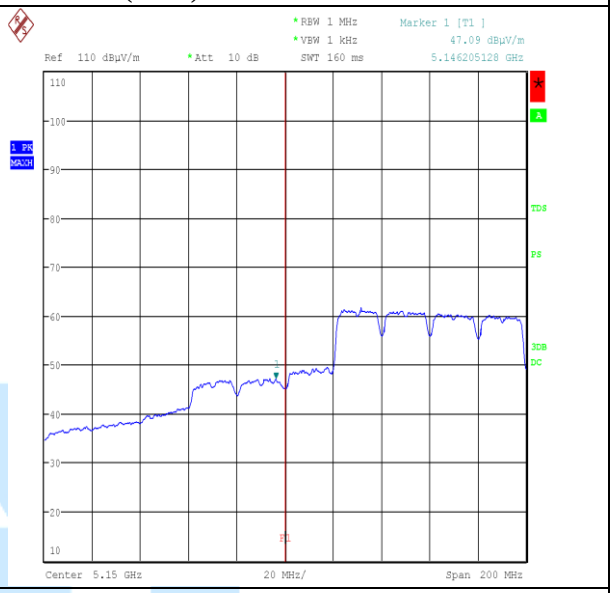
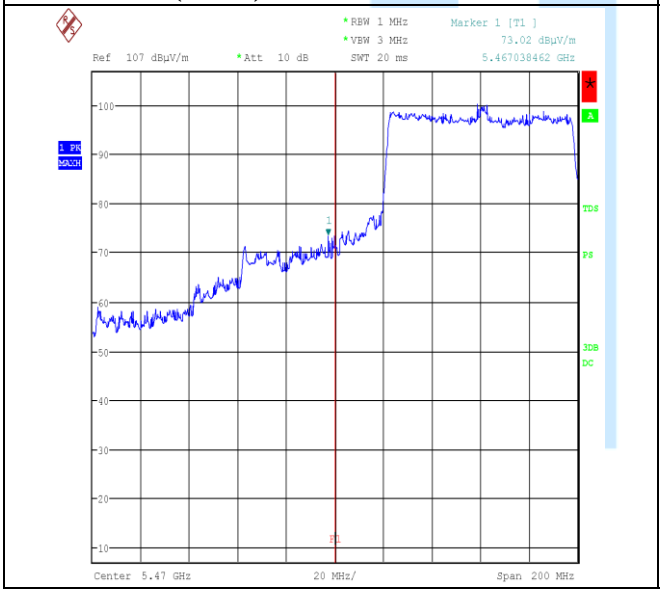
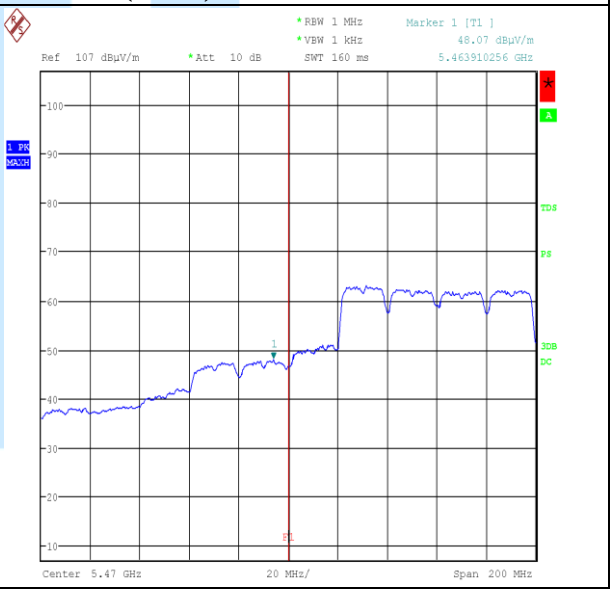
Frequency (MHz)	Reading Value (dBµV/m)		ACF (dB/m)	CL (dB)	Test Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)		ANT. Pol
	PK	AV			PK	AV	PK	AV	PK	AV	
5149.41	78.59	-	31.80	- 37.60	72.79	-	74.00	-	1.21	-	H
5146.21	-	52.89	31.80	- 37.60	-	47.09	-	54.00	-	6.91	H
5467.04	78.18	-	32.44	- 37.60	73.02	-	74.00	-	0.98	-	H
5463.91	-	53.24	32.44	- 37.60	-	48.07	-	54.00	-	5.93	H

Note: In order to simplify the report, attached plots were only the most wide channel.

※ Test result = Reading: + Transducer Factor.

Where, ACF : Antenna Collection Factor,
CL = Cable loss + Preamplifier gain
Pol.: H(Horizontal), V(Vertical)

Test Plot on Configuration : 802.11ac (VHT 80)_5 210 GHz, 5 530 GHz

5149.41 MHz (42 ch)	5146.21 MHz (42 ch)
	
5467.04 MHz (106 ch)	**5463.91 MHz (106 ch)**
	

15. Sample Calculations

$$dB\mu V = 20 \text{ Log } {}_{10}(\mu V/m)$$
$$dB\mu V = dBm + 107$$
$$\mu V = 10^{(dB\mu V/20)}$$

15.1 Example 1 :

■ **20.3 MHz**

Class B Limit = 250 µV = 48 dBµV

Reading = 39.2 dBµV

$10^{(39.2dB\mu V/20)}$ = 91.2 µV

Margin = 48 dBµV - 39.2 dBµV

= 8.8 dB

15.2 Example 2 :

■ **66.7 MHz**

Class B Limit = 100 µV/m = 40.0 dBµV/m

Reading = 31.0 dBµV

Antenna Factor + Cable Loss = 5.8 dB

Total = 36.8 dBµV/m

Margin = 40.0 dBµV/m – 36.8 dBµV/m

= 3.2 dB

16. Recommendation & Conclusion

The data collected shows that the **Ohsung Electronics Co., Ltd. Table top networking keypad (Model Name: TDC-9100)** was complies with §15.407 of the FCC Rules.

- The end -