

TEST REPORT

Application No.: KSCR2510002271AT
FCC ID: 2BFQD-JUEYINGX30
Applicant: Hangzhou Yunshenchu Technology Co., Ltd.
Address of Applicant: Building 3, Zijin Dream Plaza, No.36 Xinran Street, Sandun Town, Xihu District, Hangzhou, Zhejiang, China
Manufacturer: Hangzhou Yunshenchu Technology Co., Ltd.
Address of Manufacturer: Building 3, Zijin Dream Plaza, No.36 Xinran Street, Sandun Town,
Factory: Huzhou Yunshenchu Robotics Co., Ltd.
Address of Factory: 1-3/F, Building 17, District C, Geographical Information Town, Wuyang Street, Deqing, Huzhou, Zhejiang, China

Equipment Under Test (EUT):

EUT Name: Quadruped Robot

Model No.: Jueying X30 Pro, Jueying X30 ♣

♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Trade Mark: DEEPRobotics

Standard(s) : 47 CFR Part 15, Subpart E 15.407

Date of Receipt: 2025-10-15

Date of Test: 2025-11-28 to 2025-12-09

Date of Issue: 2025-12-09

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Revision Record			
Version	Description	Date	Remark
00	Original	2025-12-09	/

Authorized for issue by:			
Tested By		Damon Zhou	
		Damon_Zhou/Project Engineer	
Approved By		Terry Hou	
		Terry Hou /Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Transmission in the Absence of Data		N/A	47 CFR Part 15, Subpart E 15.407 (c)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)	Pass
Radiated Emissions (Below 1GHz)		ANSI C63.10 (2020) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Radiated Emissions (Above 1GHz)		ANSI C63.10 (2020) Section 6.6	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2020) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Duty Cycle		ANSI C63.10 (2020) Section 12.2	ANSI C63.10 (2020) Section 12.2	Pass
99% Bandwidth		ANSI C63.10 (2020) Section 12.5.3	ANSI C63.10 (2020) Section 12.4.2	Pass
26dB Emission bandwidth		ANSI C63.10 (2020) Section 12.5.2	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)		ANSI C63.10 (2020) Section 12.5.1	47 CFR Part 15, Subpart E 15.407 (e)	Pass
Maximum Conducted output power		ANSI C63.10 (2020) Section 12.4	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Peak Power spectrum density		ANSI C63.10 (2020) Section 12.6	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Frequency Stability		ANSI C63.10 (2020) Section 6.8	47 CFR Part 15, Subpart E 15.407 (g)	Pass

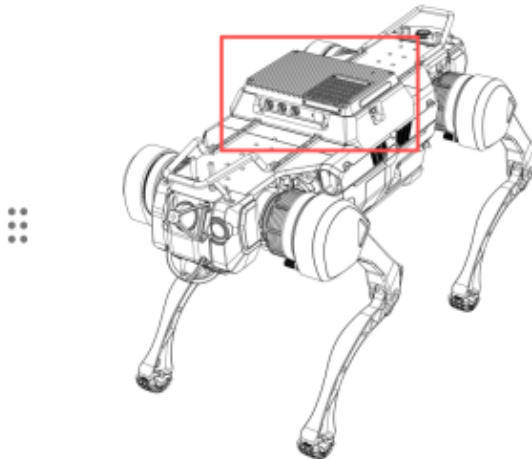
Note: There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model Jueying X30 Pro was tested since their differences are appearance and Jueying X30 without intelligent controller.

The differences in the intelligent controller do not affect the radio frequency performance. The specific differences are as follows.

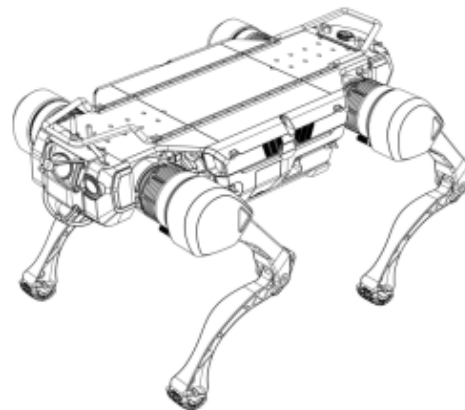
Attachment Description:

Jueying X30 Pro contains an intelligent controller, Jueying X30 without. An additional host inside Intelligent Controller is used for navigation and inspections.

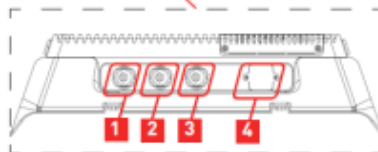
Jueying X30 Pro



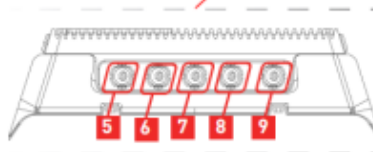
Jueying X30



intelligent controller



Interface
① LAN1+12V
② LAN2
③ 24V
④ USB3.0x2



⑤ USB2.0x2
⑥ LAN3+12V
⑦ LAN4+12V
⑧ LAN5+24V
⑨ LAN6+24V

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4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter model: XT80V840A080 INPUT: AC 100-240V,50/60Hz, 10.0A OUTPUT: DC 84V,8A Battery model: RD006-04-C Nominal Voltage: DC 72V Rated Capacity: 22.4Ah Nominal Energy: 1612.8Wh Limit Charge: DC 84V
Operation Frequency/Number of channels (20MHz):	U-NII-3: 5745-5825MHz (5 Channels)
Operation Frequency/Number of channels/(40MHz):	U-NII-3: 5755-5795MHz (2 Channels)
Operation Frequency/Number of channels (80MHz):	U-NII-3: 5775MHz (1 Channel)
Modulation Type:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	802.11a/n/ac20: 20MHz; 802.11n/ac40: 40MHz; 802.11ac 80: 80MHz
DFS Function:	Without DFS function
TPC Function:	Without TPC function
Antenna Type:	External omnidirectional antenna
Antenna Gain:	-2.14dBi (Provided by the manufacturer)

4.2 Power level setting using in test:

Channel	802.11a	802.11ac(VHT20)
	Ant 1	Ant 2
149	14	14
157	14	14
165	14	14
Channel	802.11ac(VHT40)	
	Ant 1	
151	15	
159	15	
Channel	802.11ac(VHT80)	
	Ant 1	
155	15	

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	Lenovo	/	/

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

- **VCCI**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESCI	KS301196	07/09/2025	07/08/2026
2	LISN	R&S	ENV216	KS301197	01/15/2025	01/14/2026
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/15/2025	01/14/2026
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	12/05/2024	12/04/2025
5	CE test Cable	Thermax	/	CZ301102	01/14/2025	01/13/2026
6	Test Software	Farad	EZ-EMC	/	N.C.R	N.C.R
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	07/09/2025	07/08/2026
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	07/09/2025	07/08/2026
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/15/2025	01/14/2026
4	Signal Generator	R&S	SMBV100B	KSEM032	02/19/2025	02/18/2026
5	Signal Generator	R&S	SMW200A	KSEM020-1	07/09/2025	07/08/2026
6	Signal Generator	Agilent	N5182A	KUS2001M001-1	07/08/2025	07/07/2026
7	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
8	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	07/09/2025	07/08/2026
9	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	02/19/2025	02/18/2026
10	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	07/08/2025	07/07/2026
11	Switcher	TST	FY562	KUS2001M001-4	01/15/2025	01/14/2026
12	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	01/14/2025	01/13/2026
13	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	07/15/2025	07/14/2026
14	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	02/26/2025	02/25/2026
15	Software	BST	TST-PASS	/	NCR	NCR
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	07/09/2025	07/08/2026
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	02/18/2025	02/17/2026
3	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
4	Loop Antenna (9KHz-30MHz)	COM-POWER	AL-130R	KUS1806E001	07/11/2025	07/10/2026
5	Bilog Antenna (30MHz-1GHz)	TESEQ	CBL 6112D	KUS1806E005	07/12/2025	07/11/2026
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	03/23/2024	03/22/2026
7	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/07/2024	01/06/2026
8	Amplifier(30MHz~1GHz)	TST	LNA009100G30	KSEM061	01/15/2025	01/14/2026
9	Amplifier(400MHz~8GHz)	TST	LNA004080G30	KSEM062	01/15/2025	01/14/2026
10	Amplifier(1GHz~18GHz)	TST	LNA010180G45	KSEM039	07/09/2025	07/08/2026
11	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	07/09/2025	07/08/2026
12	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	02/26/2025	02/25/2026
13	Software	Faratronic	EZ_EMV-3A1	/	NCR	NCR
14	Software	ESE	E3_V 6.111221a	/	NCR	NCR

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is External omnidirectional antenna and no consideration of replacement. The best case gain of the antenna is -2.14 dBi.

Antenna location: Refer to Internal photo.

6.2 Transmission in the Absence of Data

6.2.1 Test Requirement:

47 CFR Part 15, Subpart E 15.407 (c)

6.2.2 Conclusion

Standard Requirement:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

Applicants shall include in their application for equipment authorization a description of how this requirement is met.

EUT Details:

WIFI chip support automatically discontinue transmission in case of either absence of information to transmit or operational failure, if the chip detect absence of information to transmit or operational failure, it will be automatically shut off.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)

Test Method: ANSI C63.10 (2020) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.3 °C

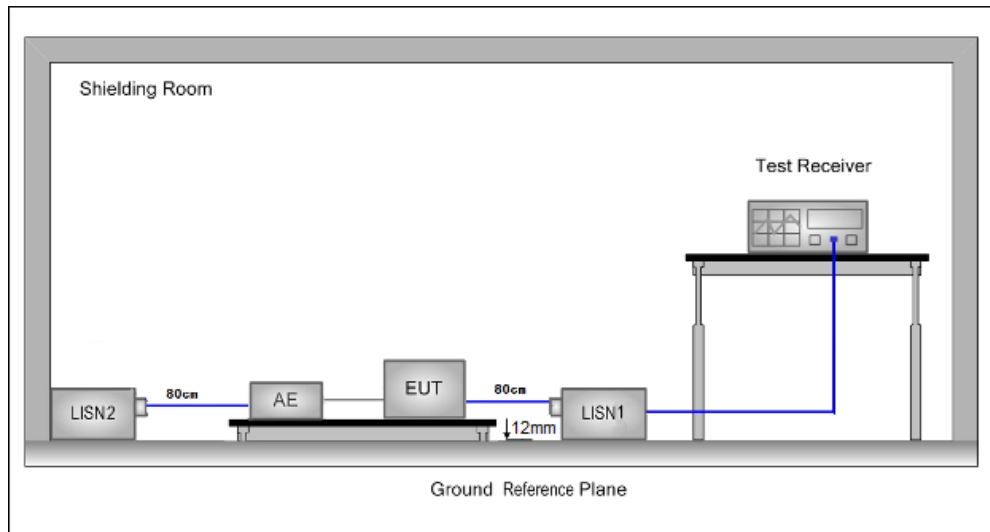
Humidity: 49.7 % RH

Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

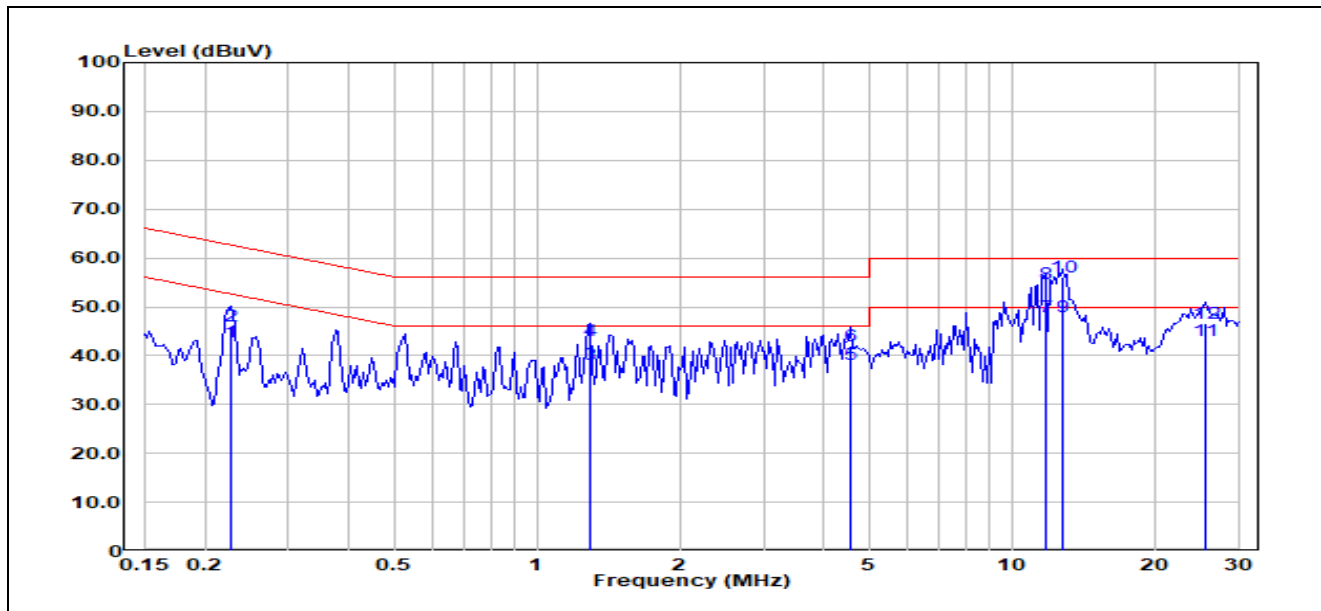
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark 1: Level=Read Level+ Cable Loss+ LISN Factor

Remark 2: Pre-test AC 120V/50-60Hz&AC 240V/50-60Hz then choose the AC 120/60Hz as worst case.

Test Mode: 01; Line: Live line

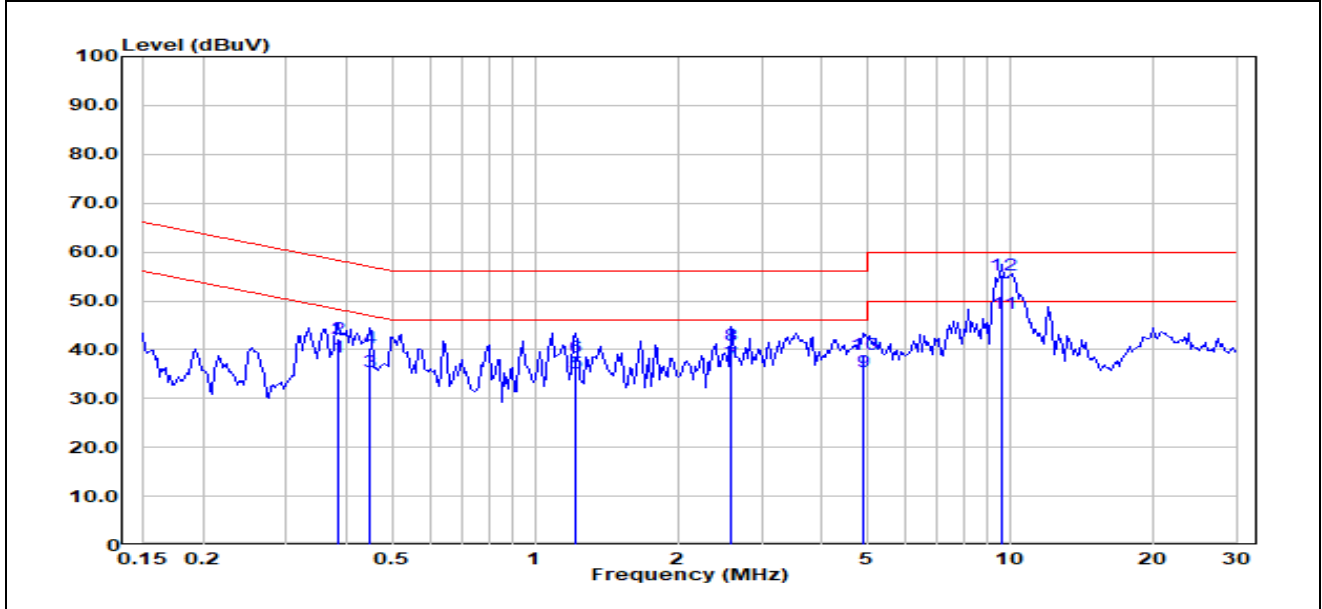
Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2268	23.05	19.76	42.81	52.57	-9.76	Average
2	0.2268	26.31	19.76	46.07	62.57	-16.50	QP
3	1.2890	18.37	19.91	38.28	46.00	-7.72	Average
4	1.2890	23.06	19.91	42.97	56.00	-13.03	QP
5	4.5980	18.32	19.86	38.18	46.00	-7.82	Average
6	4.5980	22.05	19.86	41.91	56.00	-14.09	QP
7	11.8070	28.11	19.78	47.89	50.00	-2.11	Average
8	11.8070	34.96	19.78	54.74	60.00	-5.26	QP
9	12.8520	28.14	19.86	48.00	50.00	-2.00	Average
10	12.8520	36.21	19.86	56.07	60.00	-3.93	QP
11	25.5910	22.61	20.37	42.98	50.00	-7.02	Average
12	25.5910	26.31	20.37	46.68	60.00	-13.32	QP

Test Mode: 01; Line: Neutral Line

Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3852	18.74	19.62	38.36	48.17	-9.81	Average
2	0.3852	22.61	19.62	42.23	58.17	-15.94	QP
3	0.4468	15.96	19.61	35.57	46.93	-11.36	Average
4	0.4468	20.81	19.61	40.42	56.93	-16.51	QP
5	1.2230	15.30	19.84	35.14	46.00	-10.86	Average
6	1.2230	18.63	19.84	38.47	56.00	-17.53	QP
7	2.5940	17.22	19.92	37.14	46.00	-8.86	Average
8	2.5940	21.04	19.92	40.96	56.00	-15.04	QP
9	4.9000	15.74	19.78	35.52	46.00	-10.48	Average
10	4.9000	19.32	19.78	39.10	56.00	-16.90	QP
11	9.6540	27.89	19.67	47.56	50.00	-2.44	Average
12	9.6540	35.51	19.67	55.18	60.00	-4.82	QP

7.2 Radiated Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)

Test Method: ANSI C63.10 (2020) Section 6.4,6.5

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C

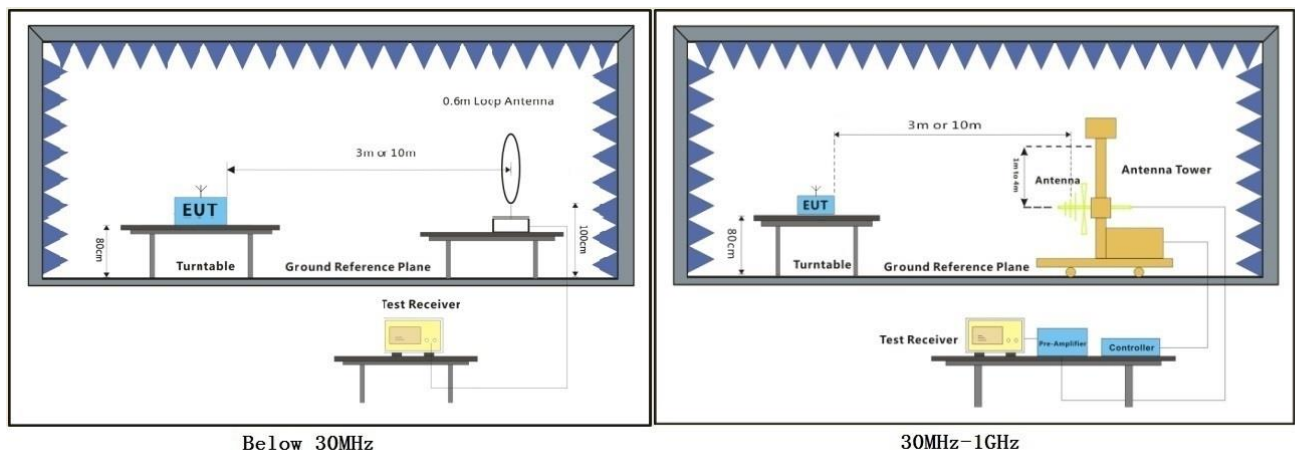
Humidity: 45.6 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

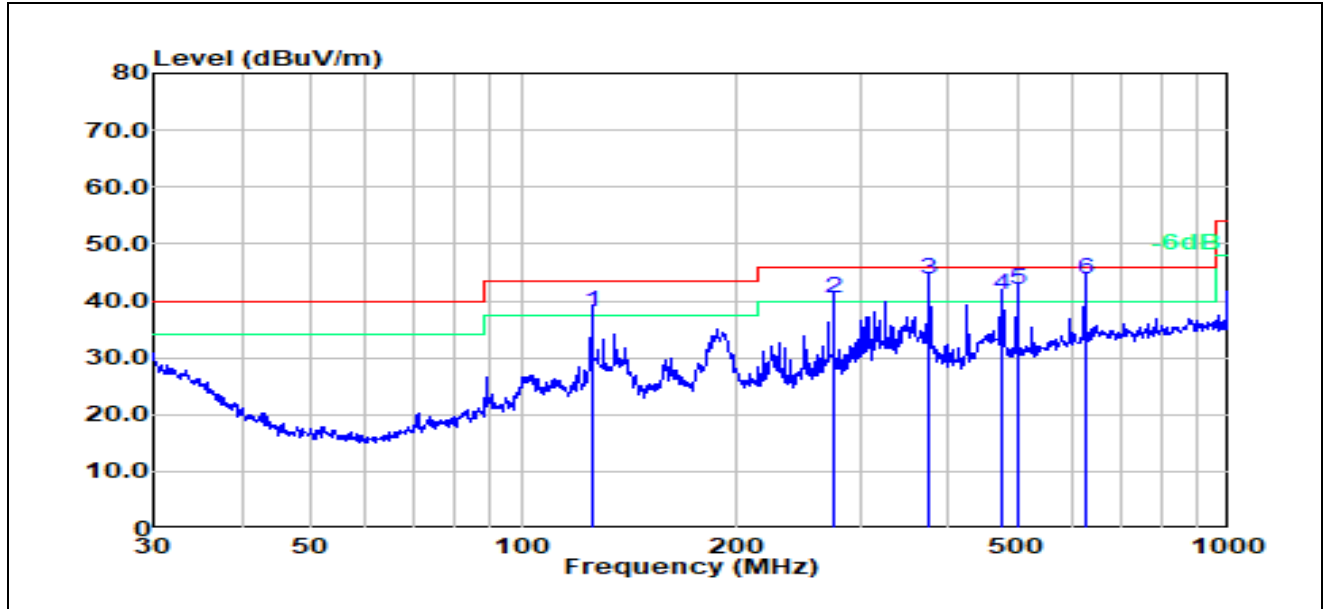
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$
2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.
3. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
4. The disturbance below 1GHz was very low and the below harmonics were the highest point could be found when testing, so only the below harmonics had been displayed.

Test Mode: 01; Polarity: Horizontal

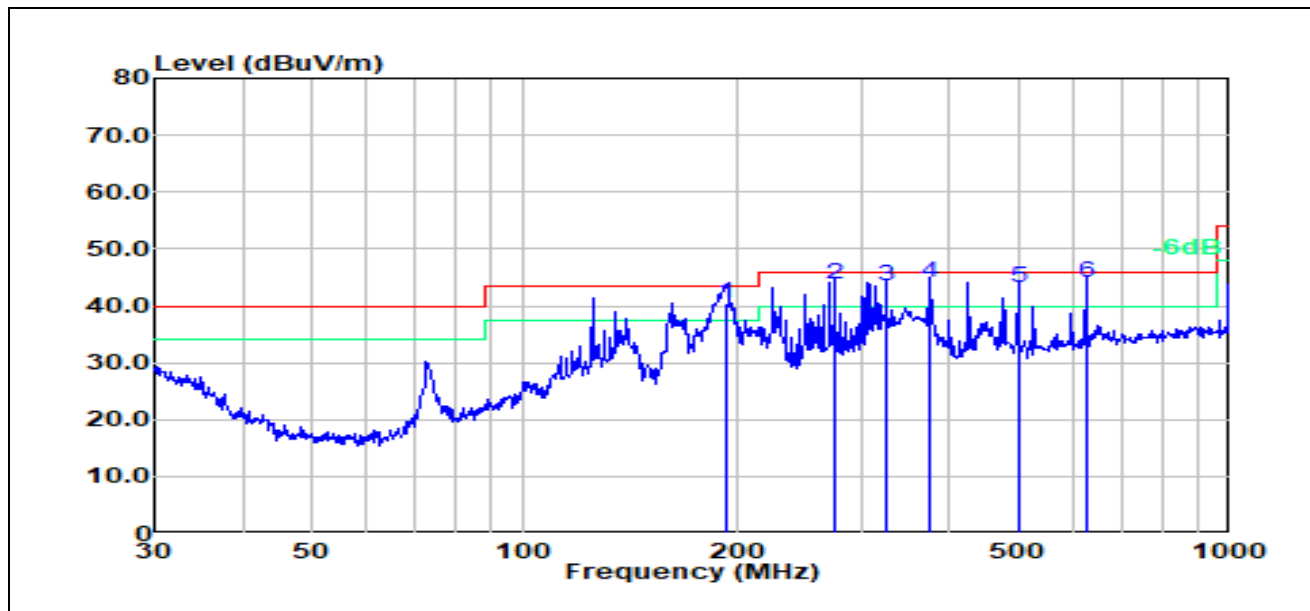
Test Data :



No.	Frequency (MHz)	Reading (dBUV)	Correct Factor(dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	125.01	17.65	20.40	38.05	43.50	-5.45	100	215	QP
2	275.16	19.55	20.92	40.47	46.00	-5.53	100	150	QP
3	375.94	21.07	22.69	43.76	46.00	-2.24	200	115	QP
4	475.50	15.25	25.77	41.02	46.00	-4.98	200	95	QP
5	501.18	15.33	26.71	42.04	46.00	-3.96	100	267	QP
6	625.08	14.98	28.71	43.69	46.00	-2.31	100	258	QP

Test Mode: 01; Polarity: Vertical

Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	193.10	23.05	17.36	40.41	43.50	-3.09	100	102	QP
2	275.16	22.83	20.92	43.75	46.00	-2.25	100	218	QP
3	325.60	21.53	21.92	43.45	46.00	-2.55	100	132	QP
4	375.94	21.32	22.69	44.01	46.00	-1.99	100	168	QP
5	501.18	16.32	26.71	43.03	46.00	-2.97	100	161	QP
6	625.08	15.45	28.71	44.16	46.00	-1.84	100	210	QP

7.3 Radiated Emissions (Above 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)

Test Method: ANSI C63.10 (2020) Section 6.6

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/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

*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

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

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

Humidity: 45.7 % RH

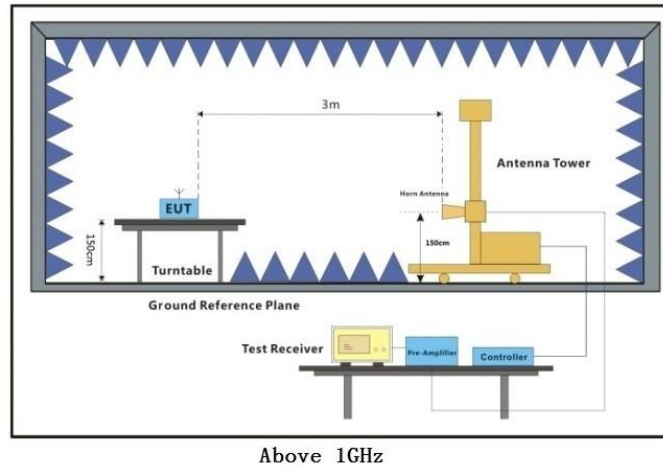
Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all

		modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.
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7.3.3 Test Setup Diagram



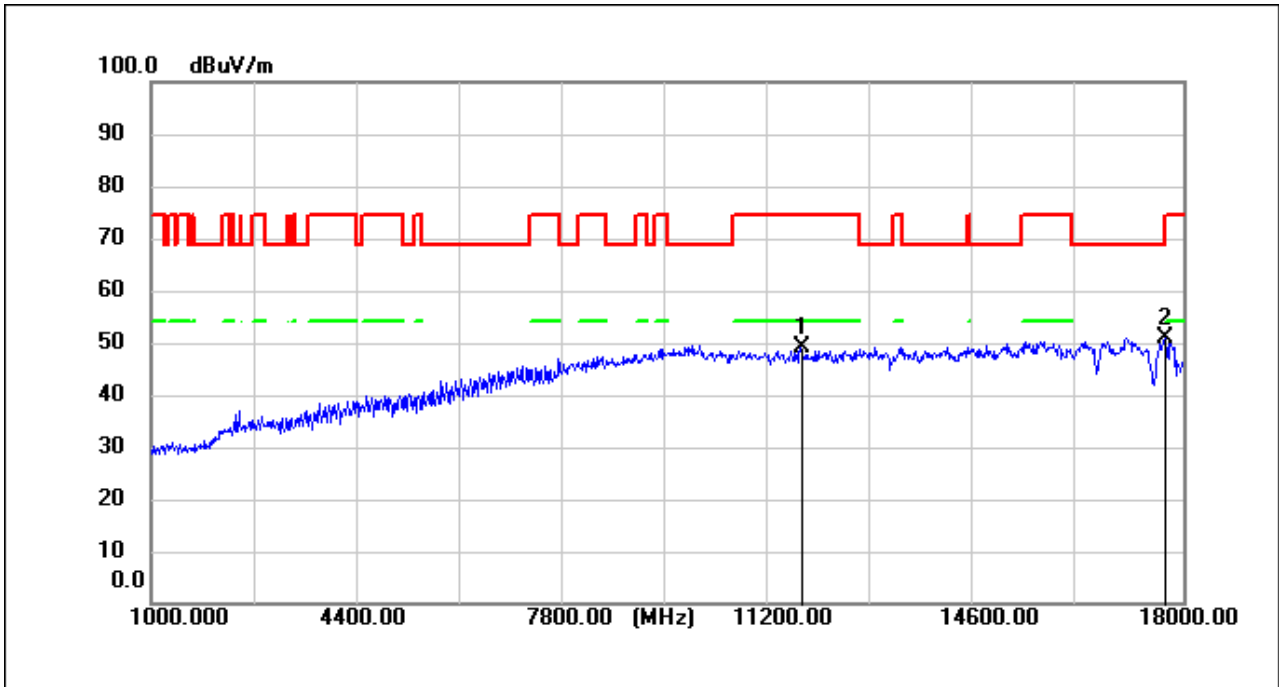
7.3.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

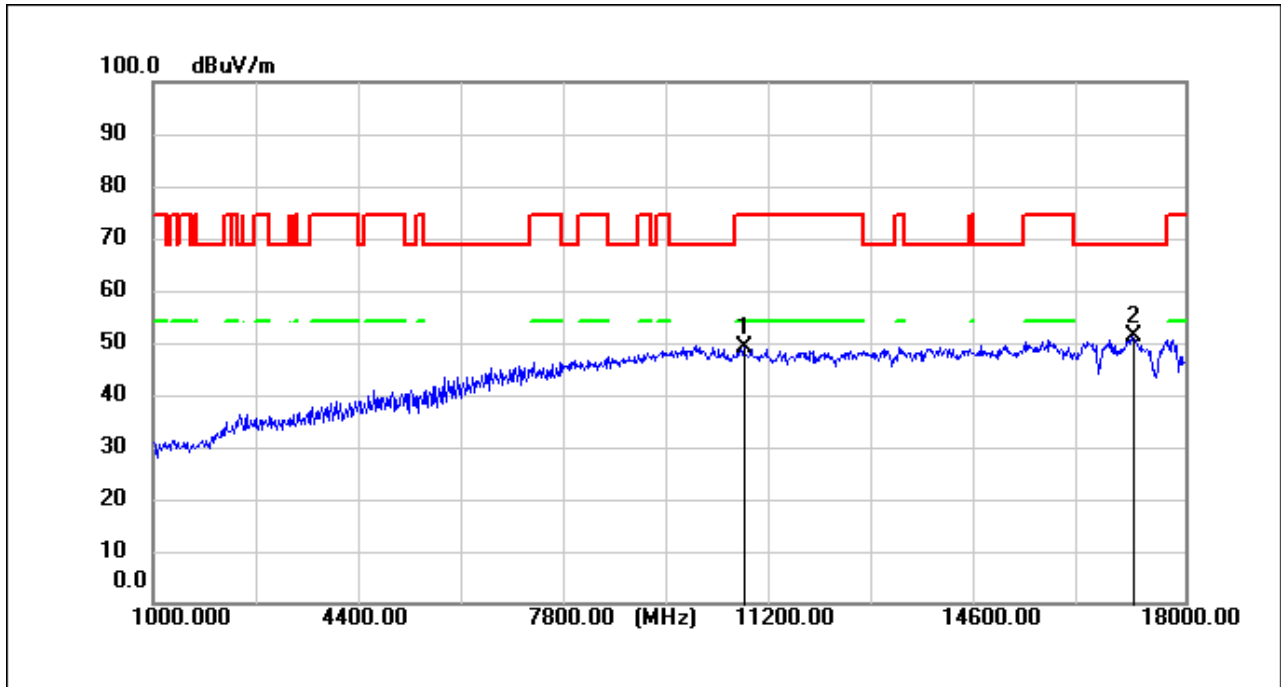
1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$
2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on below plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
4. The disturbance above 18GHz were very low and the below harmonics were the highest point could be found when testing, so only the below harmonics had been displayed.
5. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst case mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.
7. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

11a_TX_CH_149_Horizontal



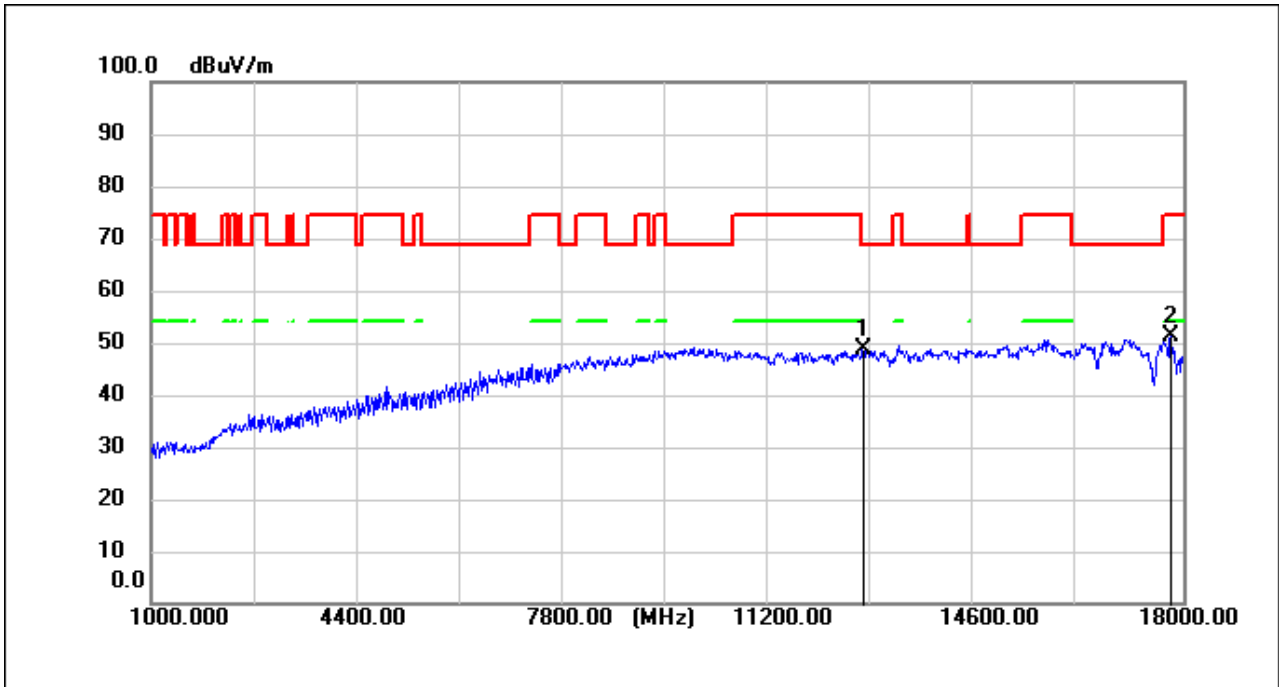
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	11698.100	55.41	-6.47	48.94	74.00	-25.06	peak
2	17698.250	52.36	-1.36	51.00	68.30	-17.30	peak

11a_TX_CH_149_Vertical



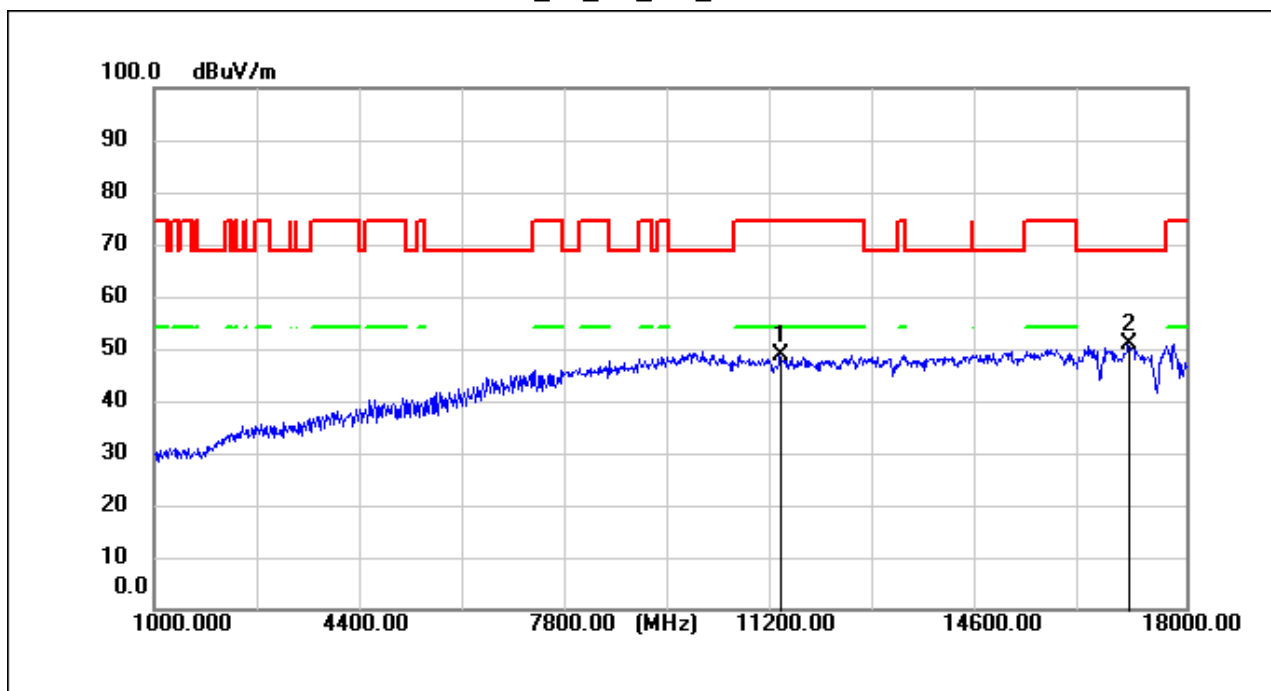
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10750.350	55.19	-6.20	48.99	74.00	-25.01	peak
2	17140.650	52.95	-1.67	51.28	68.30	-17.02	peak

11a_TX_CH_157_Horizontal



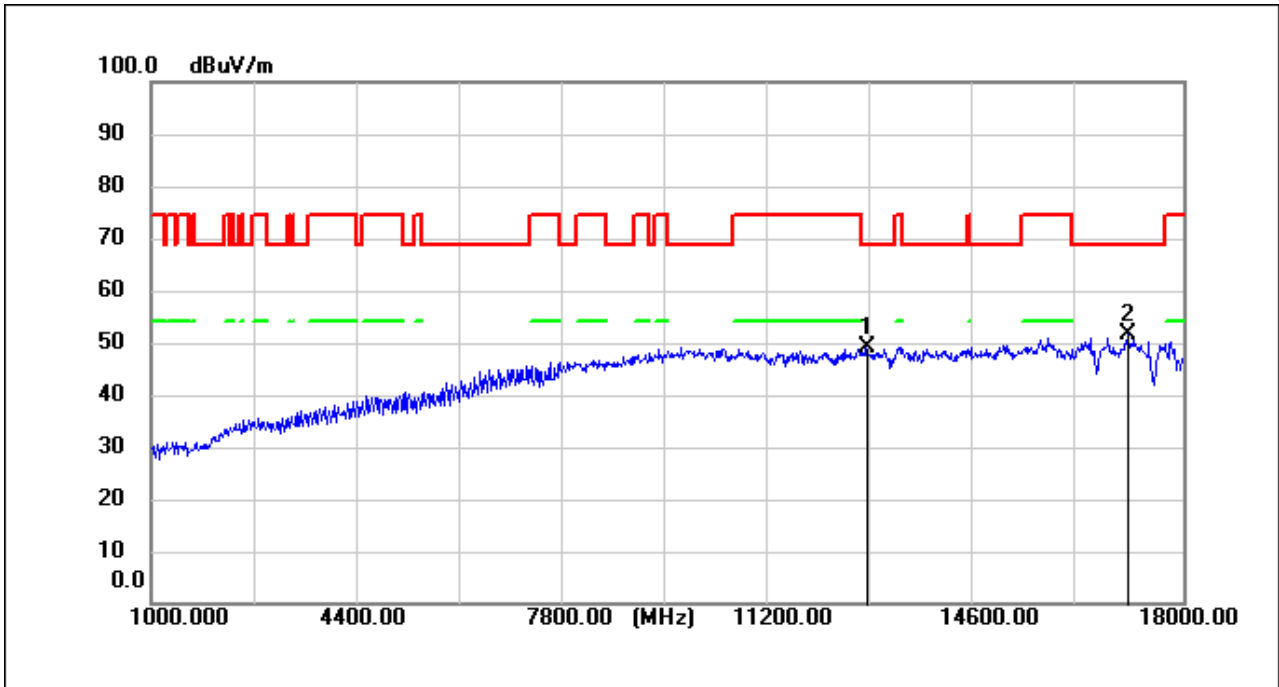
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12724.900	54.85	-6.04	48.81	68.30	-19.49	peak
2	17811.300	52.68	-1.34	51.34	74.00	-22.66	peak

11a_TX_CH_157_Vertical



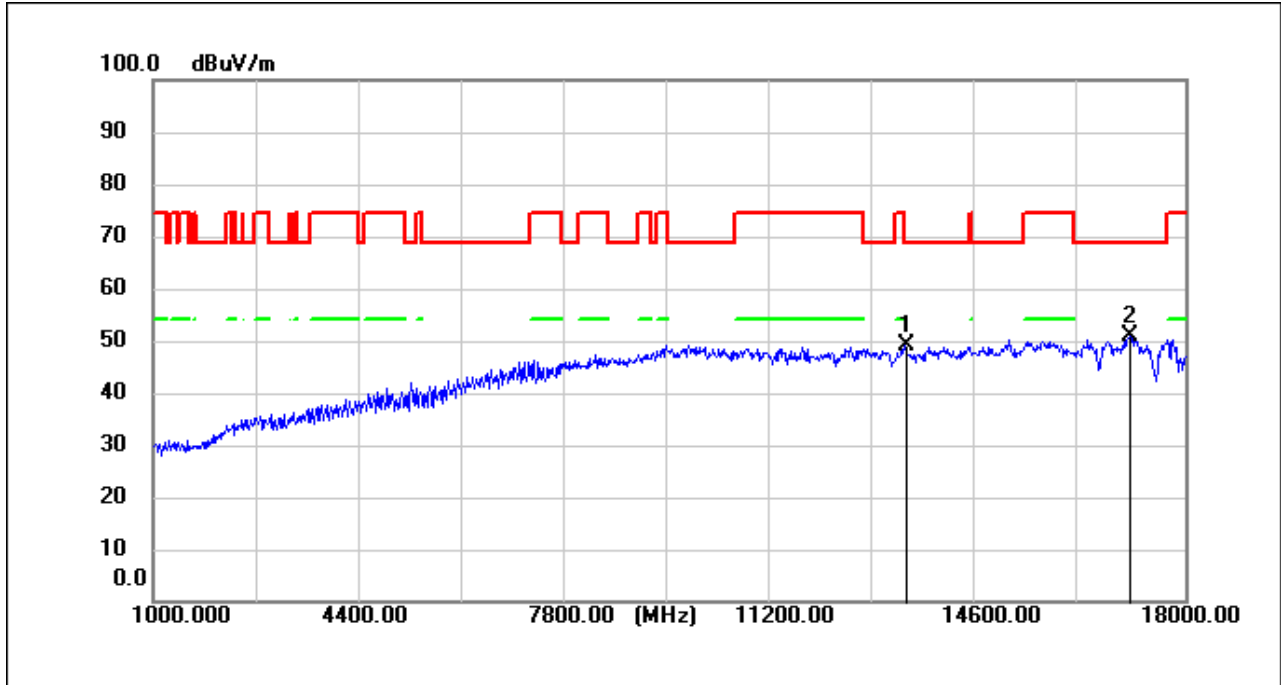
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	11308.800	55.27	-6.44	48.83	74.00	-25.17	peak
2	17056.500	52.73	-1.75	50.98	68.30	-17.32	peak

11a_TX_CH_165_Horizontal



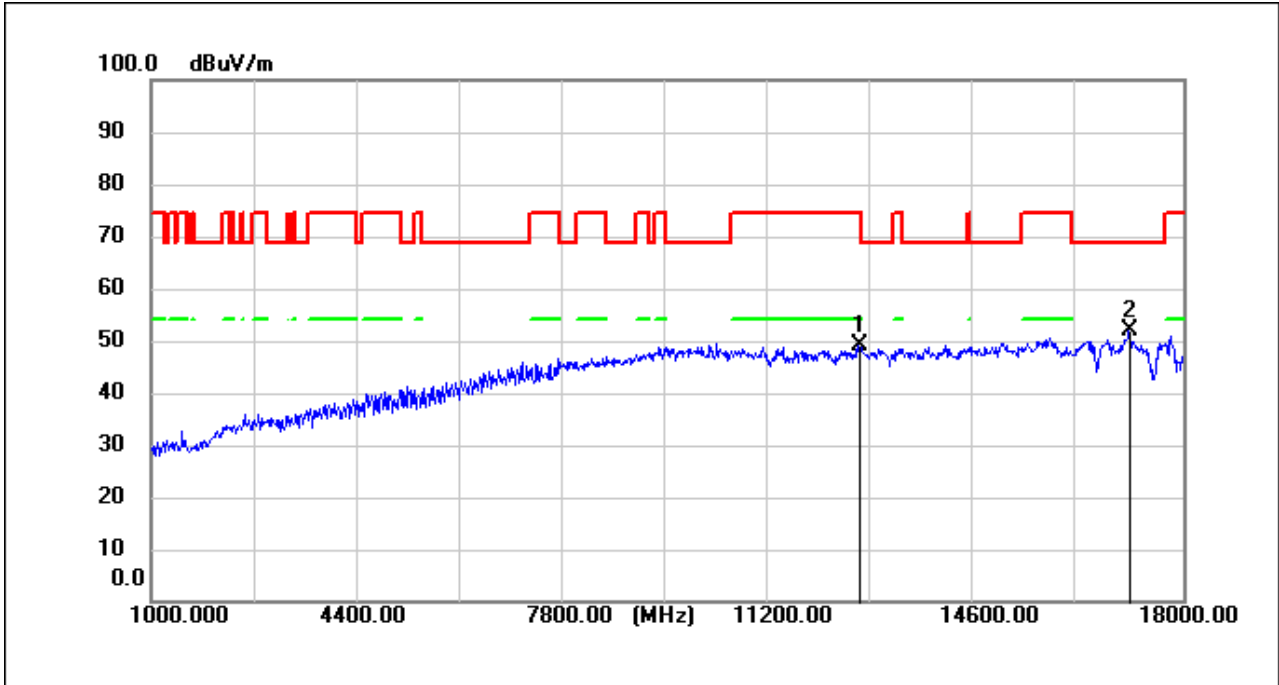
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12787.800	54.96	-6.00	48.96	68.30	-19.34	peak
2	17086.250	53.30	-1.72	51.58	68.30	-16.72	peak

11a_TX_CH_165_Vertical



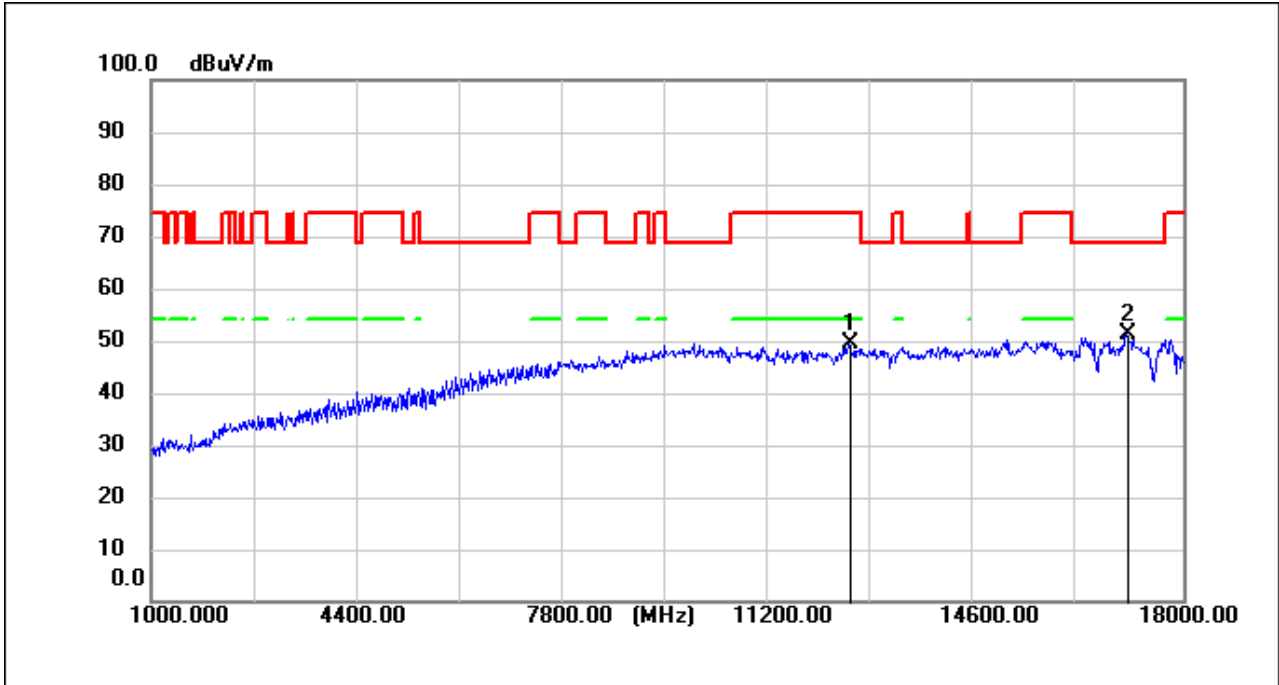
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13400.650	54.86	-5.59	49.27	68.30	-19.03	peak
2	17090.500	52.56	-1.72	50.84	68.30	-17.46	peak

11ac(VHT40)_TX_CH_151_Horizontal



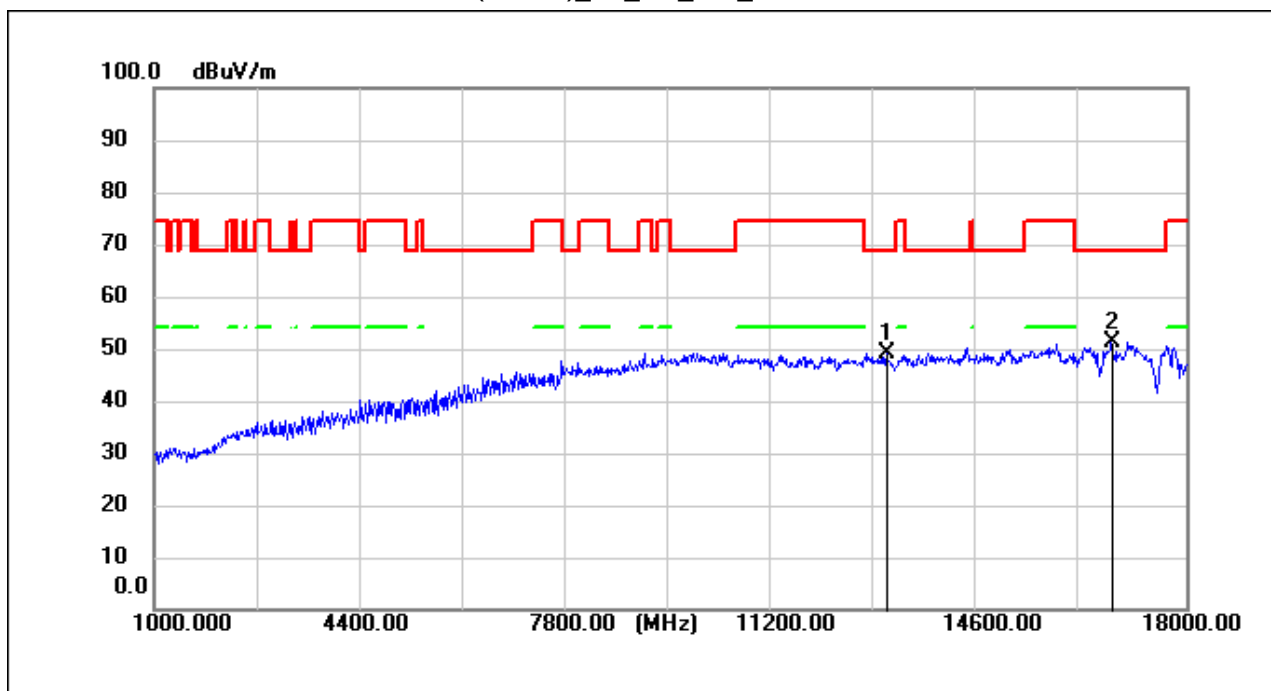
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12649.250	55.06	-6.08	48.98	74.00	-25.02	peak
2	17114.300	53.65	-1.70	51.95	68.30	-16.35	peak

11ac(VHT40)_TX_CH_151_Vertical



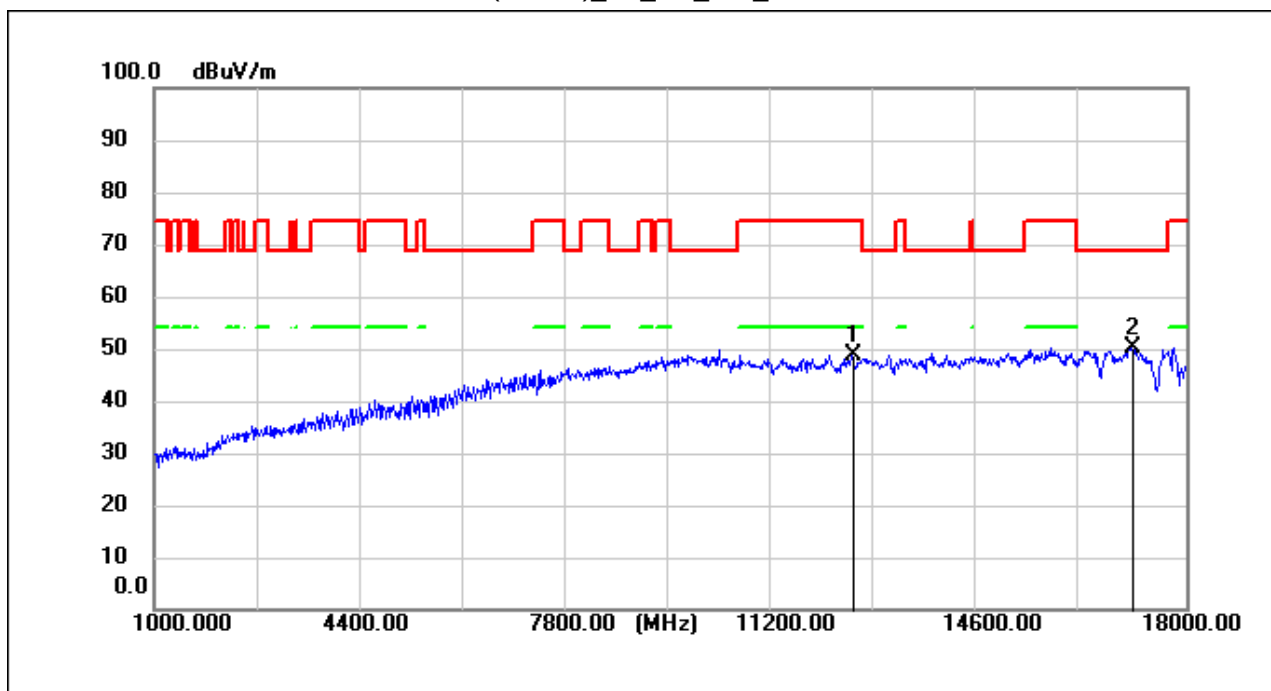
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12499.650	55.70	-6.15	49.55	74.00	-24.45	peak
2	17081.150	52.98	-1.73	51.25	68.30	-17.05	peak

11ac(VHT40)_TX_CH_159_Horizontal



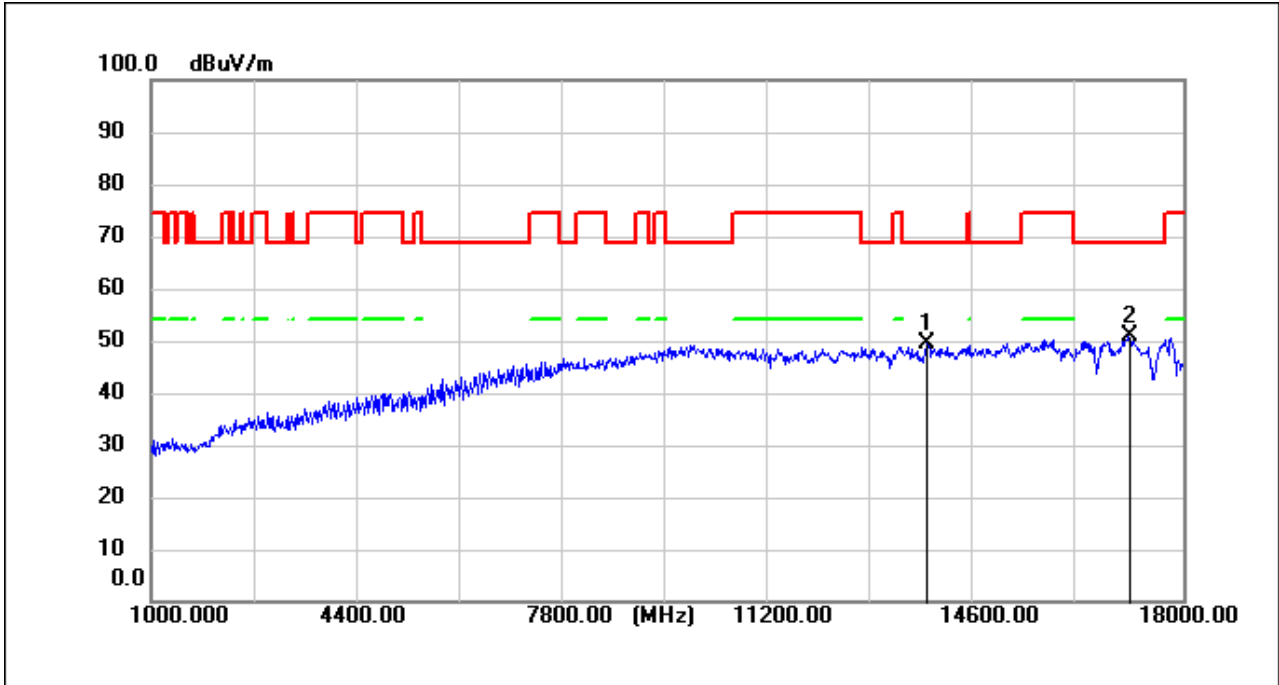
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13074.250	55.00	-5.79	49.21	68.30	-19.09	peak
2	16766.650	53.33	-2.09	51.24	68.30	-17.06	peak

11ac(VHT40)_TX_CH_159_Vertical



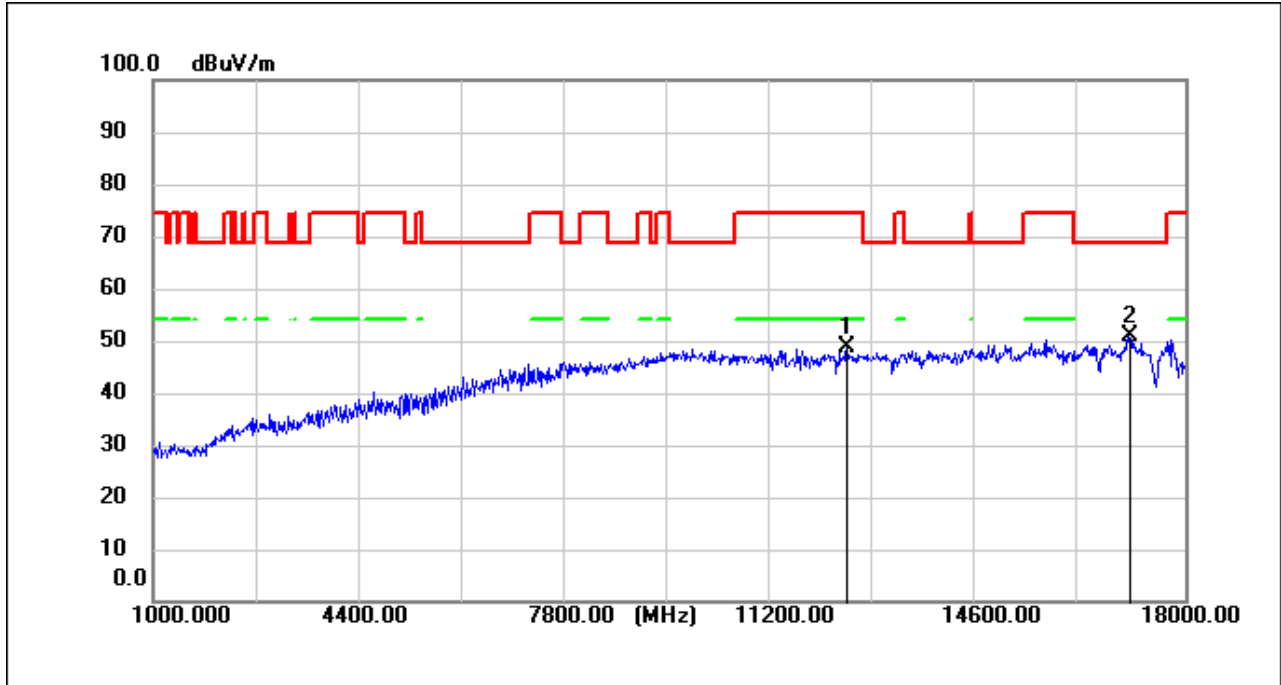
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12500.500	54.87	-6.15	48.72	74.00	-25.28	peak
2	17108.350	51.93	-1.70	50.23	68.30	-18.07	peak

11ac(VHT80)_TX_CH_155_Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13770.400	55.00	-5.41	49.59	68.30	-18.71	peak
2	17111.750	52.67	-1.70	50.97	68.30	-17.33	peak

11ac(VHT80)_TX_CH_155_Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	12427.400	54.94	-6.19	48.75	74.00	-25.25	peak
2	17081.150	52.47	-1.73	50.74	68.30	-17.56	peak

7.4 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)

Test Method: ANSI C63.10 (2020) Section 6.10.5

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/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

*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

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

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

Humidity: 45.6 % RH

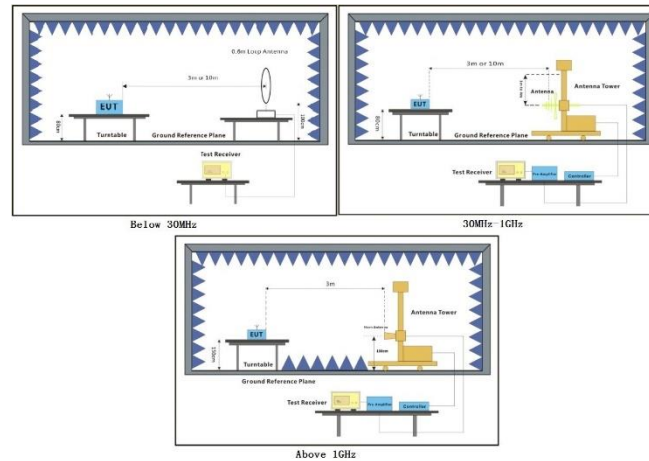
Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all

		modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.
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7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

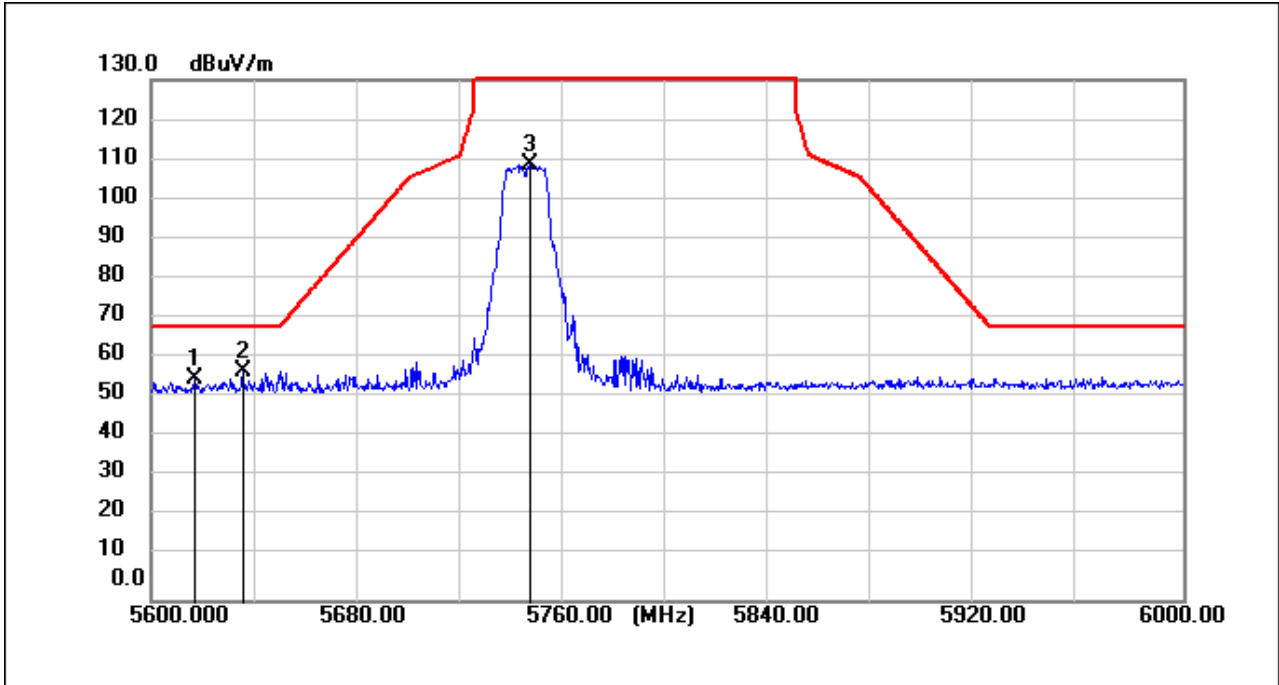
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

Remark 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

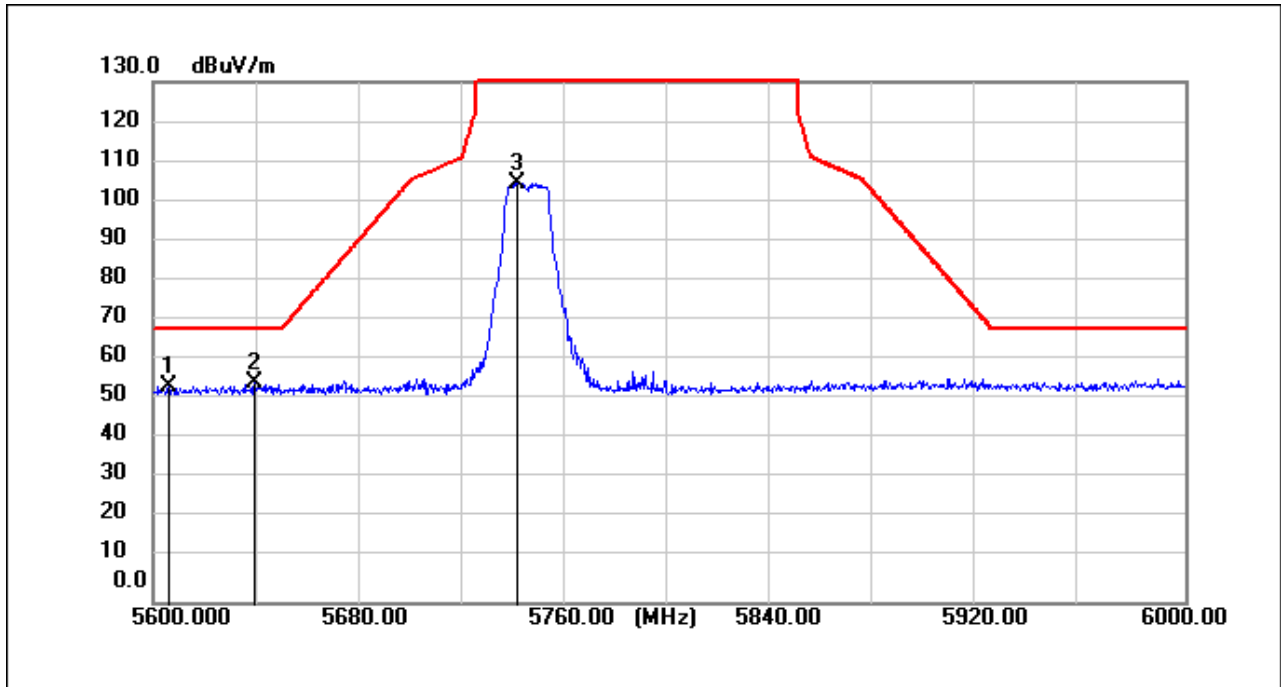
Remark 3: For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

11a_TX_CH_149_Horizontal_Peak



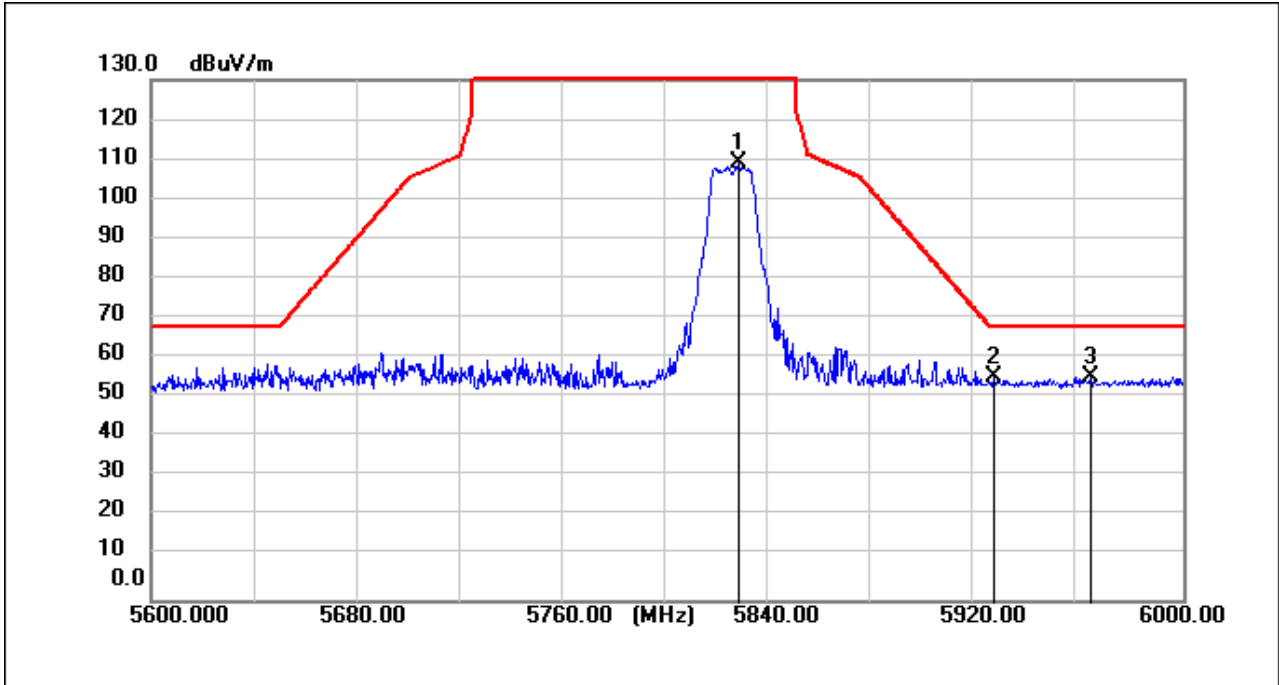
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5617.200	48.39	7.12	55.51	68.20	-12.69	peak
2	5635.600	50.20	7.16	57.36	68.20	-10.84	peak
3	5747.200	101.51	7.43	108.94	135.00	-26.06	peak

11a_TX_CH_149_Vertical_Peak



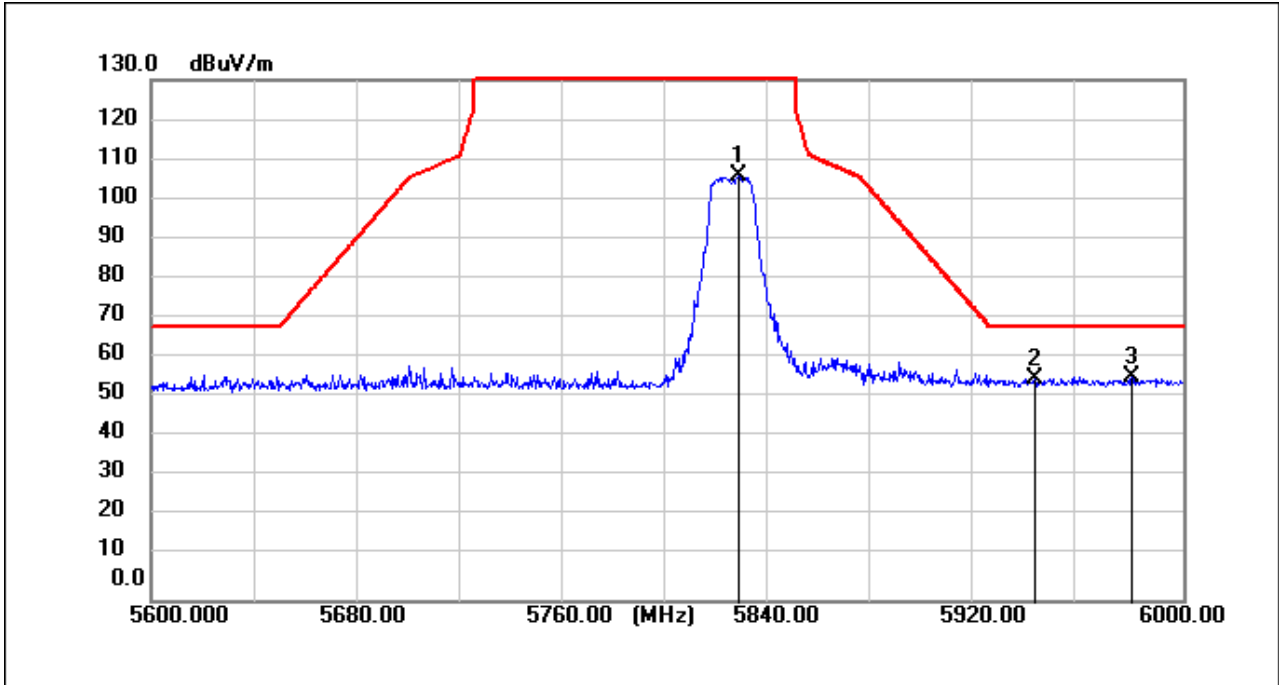
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5606.400	47.08	7.09	54.17	68.20	-14.03	peak
2	5639.200	48.06	7.17	55.23	68.20	-12.97	peak
3	5741.200	97.37	7.42	104.79	135.00	-30.21	peak

11a_TX_CH_165_Horizontal_Peak



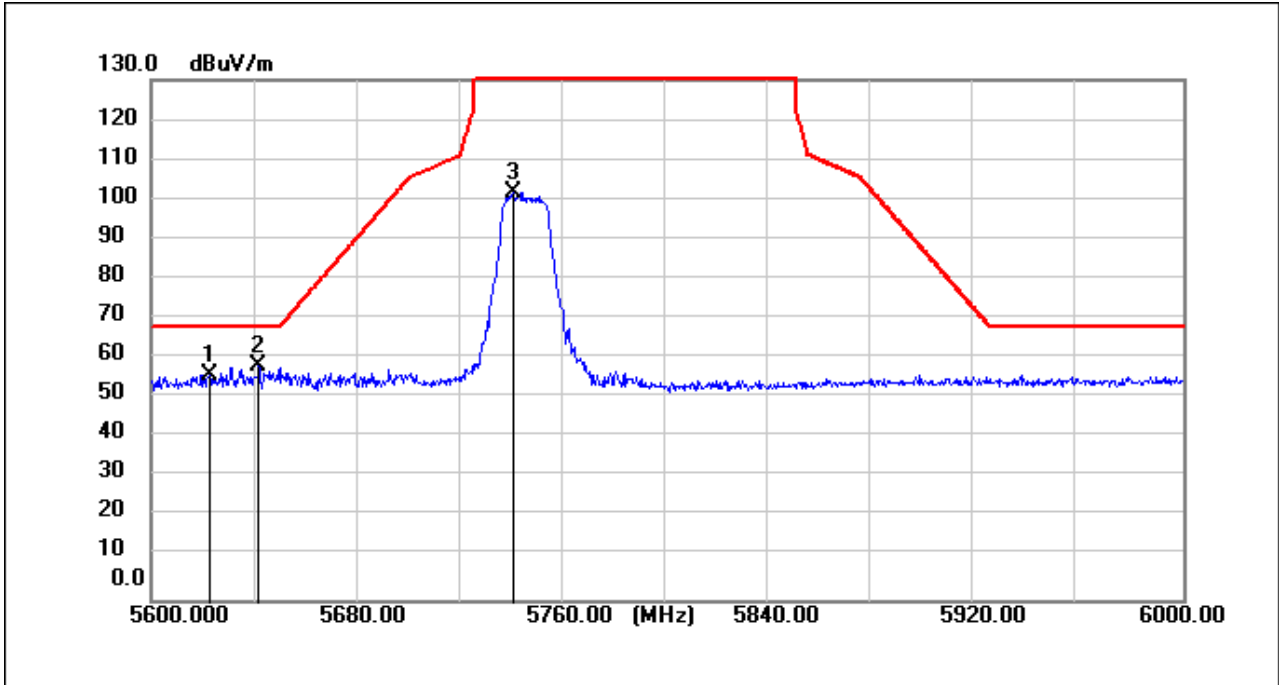
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5827.600	101.56	7.61	109.17	135.00	-25.83	peak
2	5926.400	48.06	7.85	55.91	68.20	-12.29	peak
3	5964.000	47.93	7.94	55.87	68.20	-12.33	peak

11a_TX_CH_165_Vertical_Peak



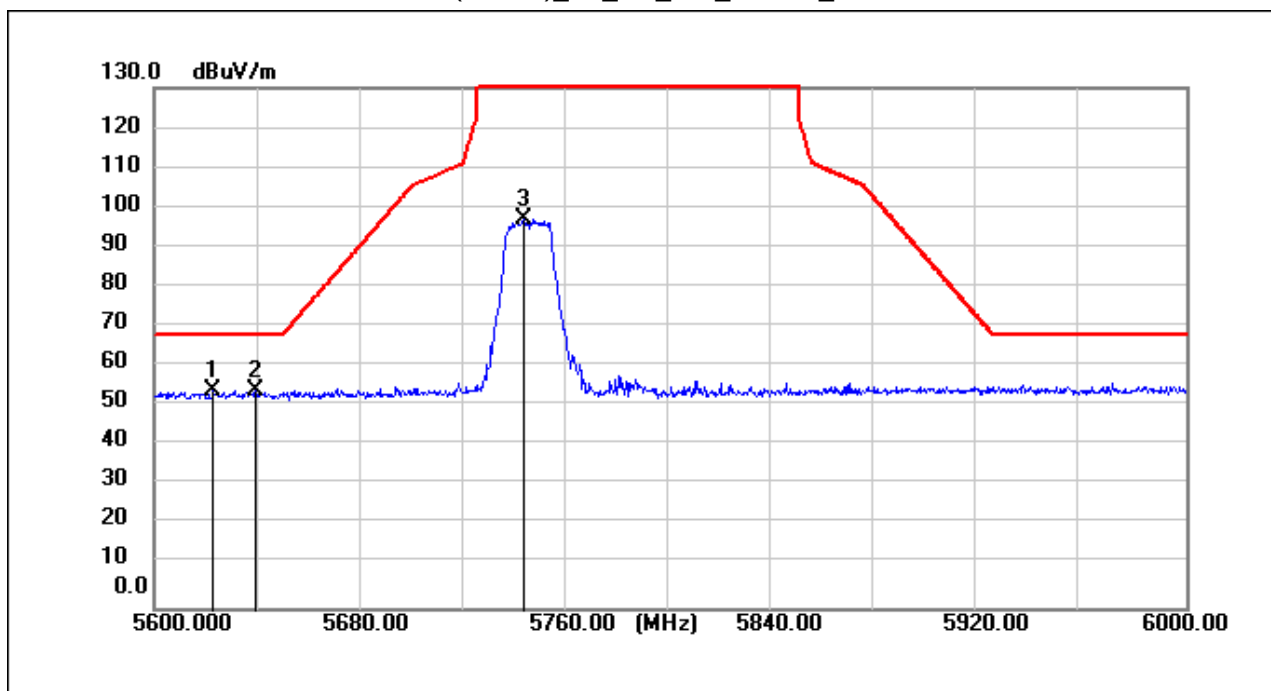
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5827.600	98.29	7.61	105.90	135.00	-29.10	peak
2	5942.400	47.64	7.88	55.52	68.20	-12.68	peak
3	5980.000	47.76	7.98	55.74	68.20	-12.46	peak

11ac(VHT20)_TX_CH_149_Horizontal_Peak



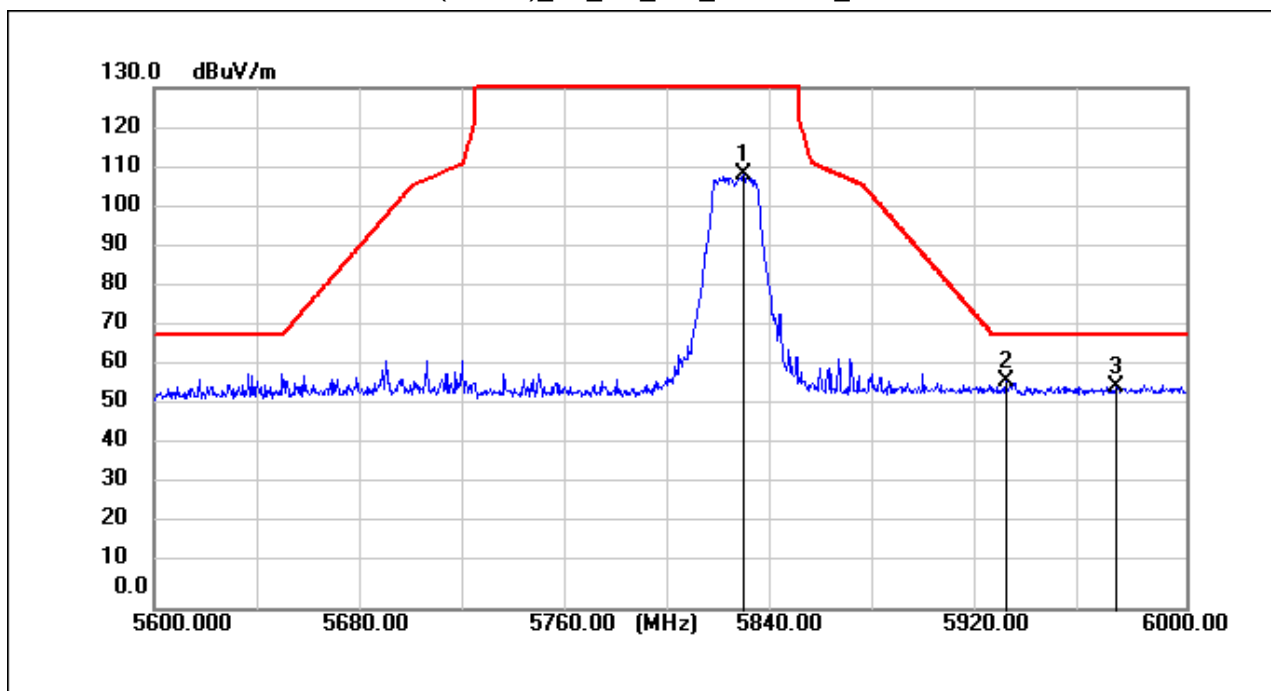
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5622.400	49.44	7.13	56.57	68.20	-11.63	peak
2	5641.600	51.69	7.18	58.87	68.20	-9.33	peak
3	5740.400	94.42	7.41	101.83	135.00	-33.17	peak

11ac(VHT20)_TX_CH_149_Vertical_Peak



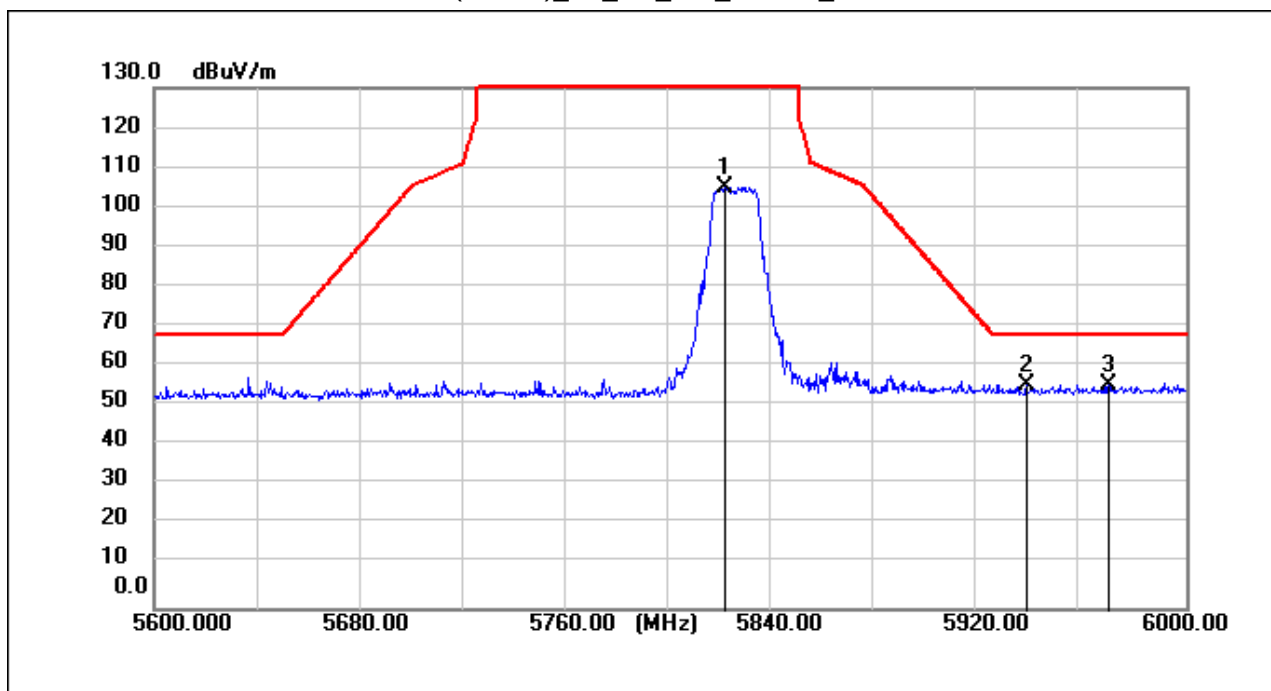
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5622.800	47.28	7.13	54.41	68.20	-13.79	peak
2	5639.600	47.34	7.17	54.51	68.20	-13.69	peak
3	5743.200	89.80	7.41	97.21	135.00	-37.79	peak

11ac(VHT20)_TX_CH_165_Horizontal_Peak



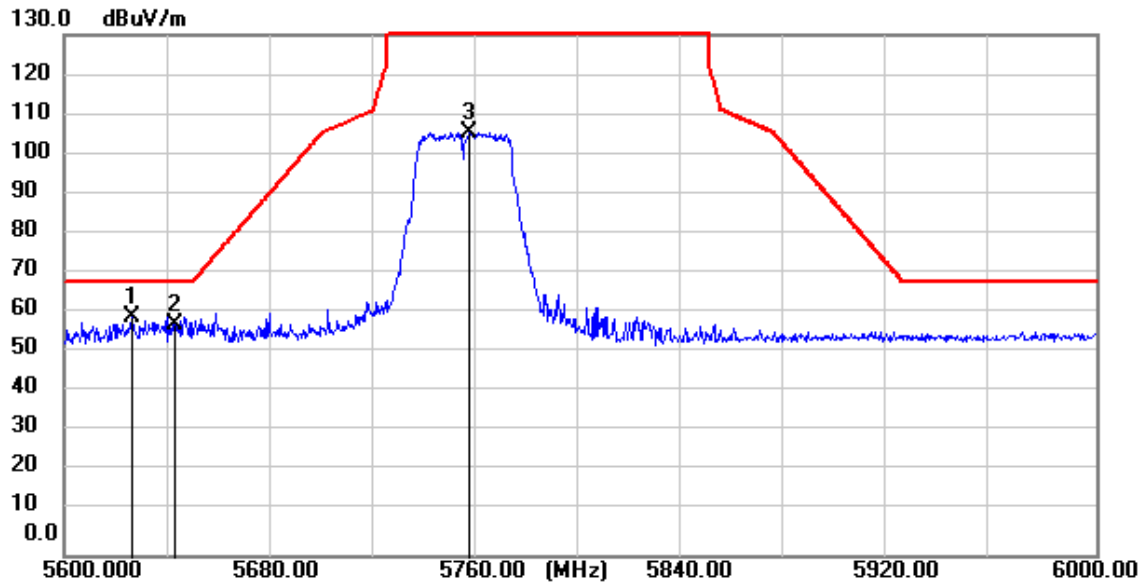
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5828.400	100.60	7.61	108.21	135.00	-26.79	peak
2	5930.000	48.90	7.85	56.75	68.20	-11.45	peak
3	5972.800	47.56	7.96	55.52	68.20	-12.68	peak

11ac(VHT20)_TX_CH_165_Vertical_Peak

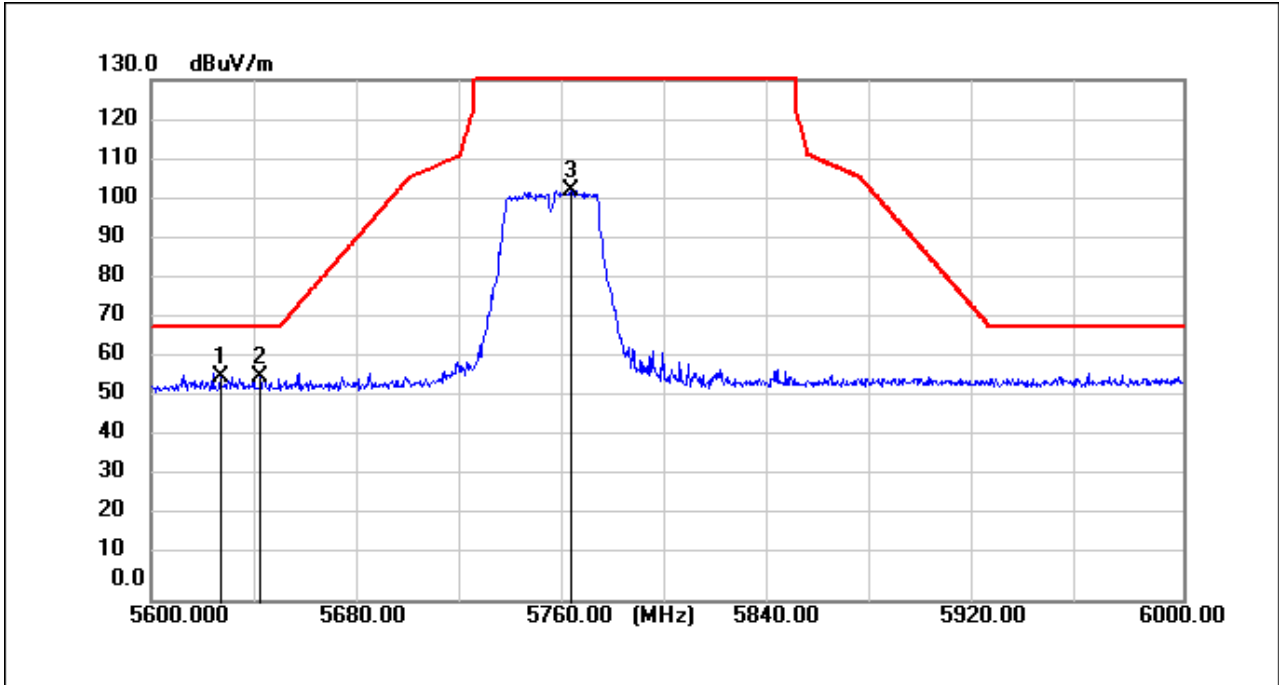


No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5821.600	97.76	7.60	105.36	135.00	-29.64	peak
2	5938.000	48.03	7.87	55.90	68.20	-12.30	peak
3	5970.000	48.15	7.95	56.10	68.20	-12.10	peak

11ac(VHT40)_TX_CH_151_Horizontal_Peak

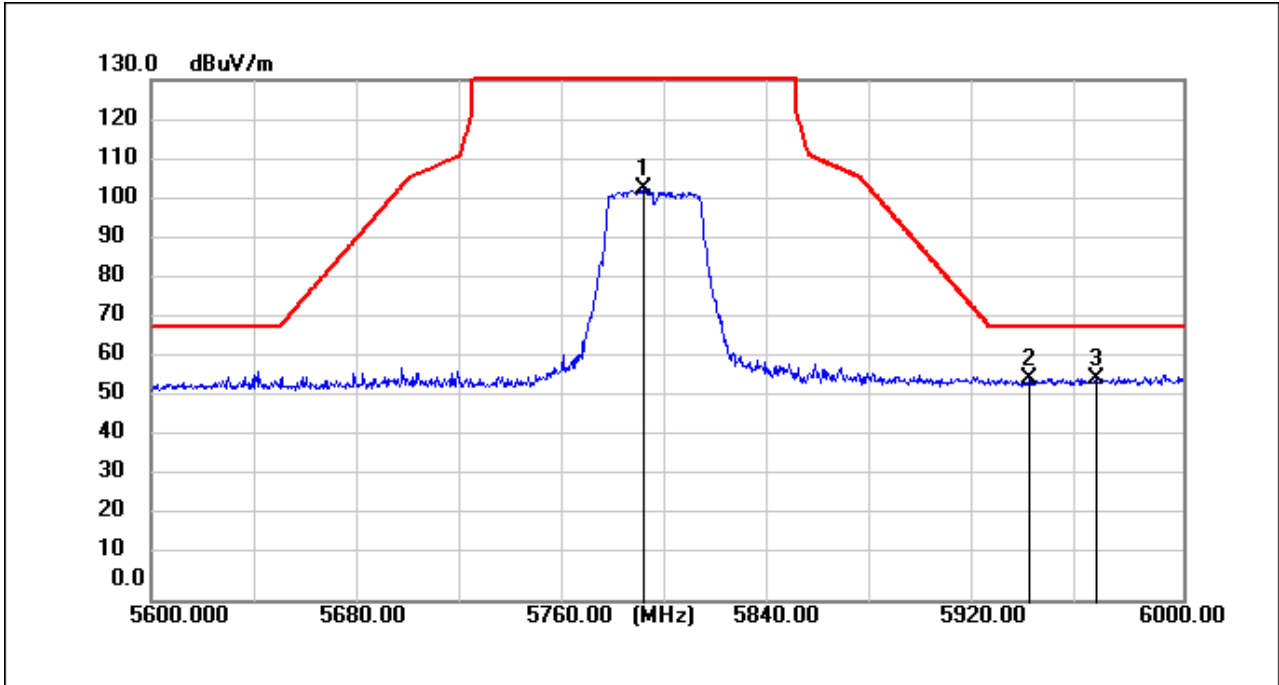


11ac(VHT40)_TX_CH_151_Vertical_Peak



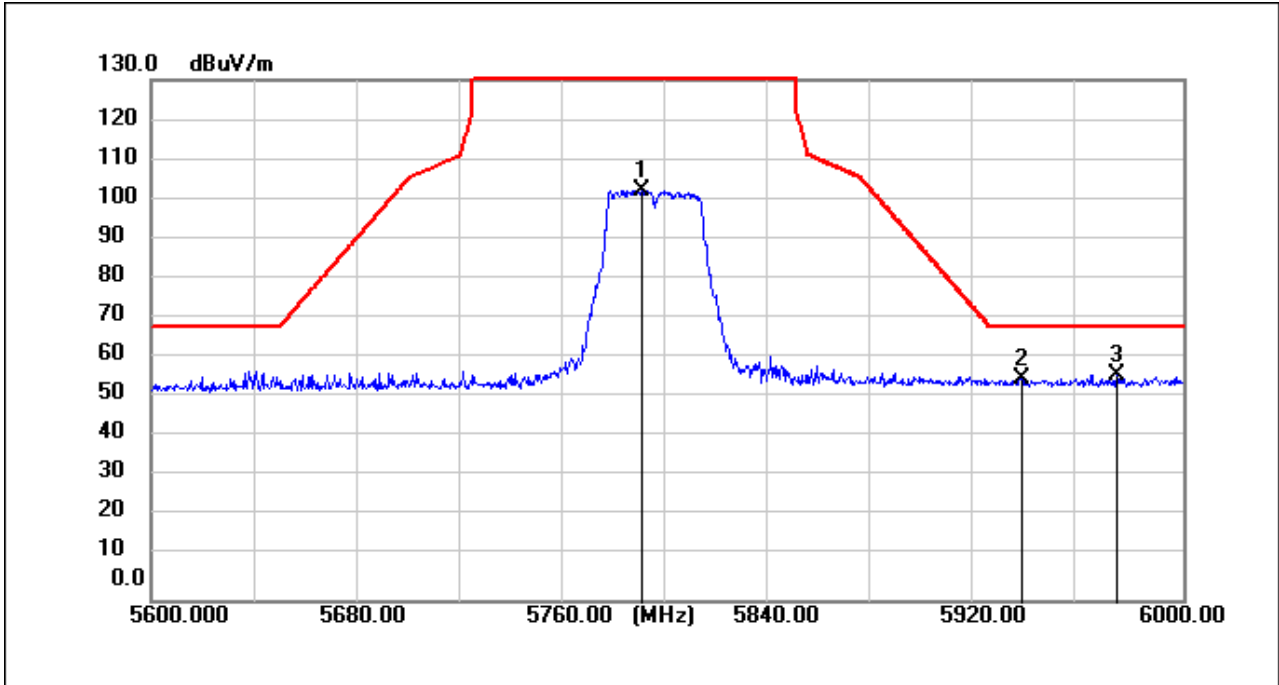
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5626.800	48.89	7.15	56.04	68.20	-12.16	peak
2	5642.400	48.74	7.17	55.91	68.20	-12.29	peak
3	5762.800	95.04	7.46	102.50	135.00	-32.50	peak

11ac(VHT40)_TX_CH_159_Horizontal_Peak



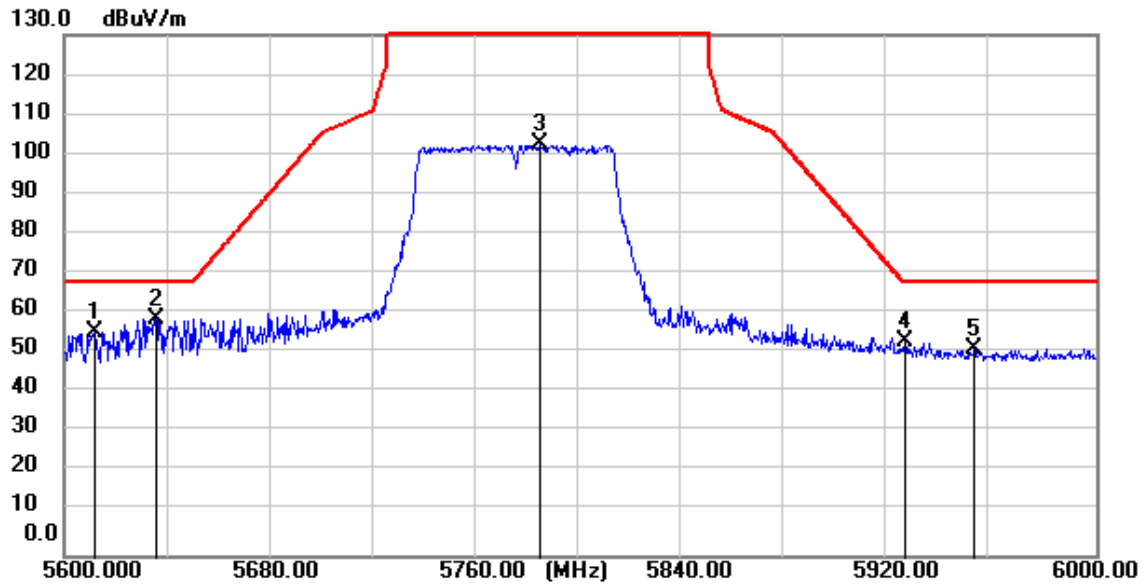
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5790.800	95.23	7.53	102.76	135.00	-32.24	peak
2	5940.400	47.66	7.88	55.54	68.20	-12.66	peak
3	5966.400	47.73	7.94	55.67	68.20	-12.53	peak

11ac(VHT40)_TX_CH_159_Vertical_Peak



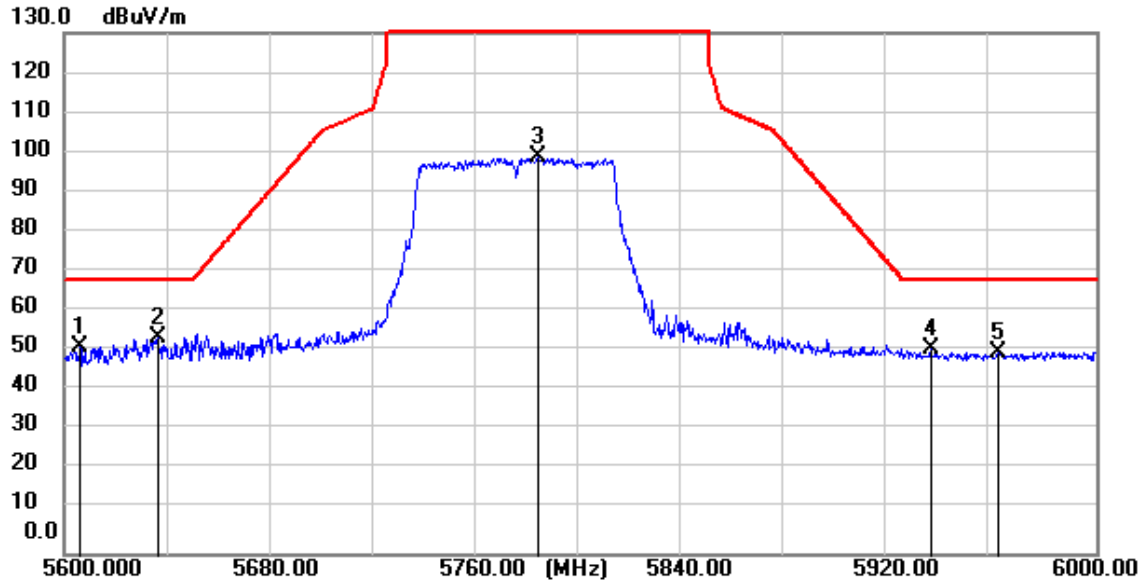
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5790.400	94.98	7.52	102.50	135.00	-32.50	peak
2	5937.200	47.76	7.87	55.63	68.20	-12.57	peak
3	5974.400	48.50	7.96	56.46	68.20	-11.74	peak

11ac(VHT80)_TX_CH_155_Horizontal_Peak



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5611.600	48.77	7.10	55.87	68.20	-12.33	peak
2	5636.000	52.26	7.16	59.42	68.20	-8.78	peak
3	5784.800	95.19	7.51	102.70	135.00	-32.30	peak
4	5926.000	45.65	7.85	53.50	68.20	-14.70	peak
5	5952.800	44.03	7.91	51.94	68.20	-16.26	peak

11ac(VHT80)_TX_CH_155_Vertical_Peak



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5606.400	44.84	7.09	51.93	68.20	-16.27	peak
2	5636.400	46.79	7.16	53.95	68.20	-14.25	peak
3	5783.600	91.49	7.51	99.00	135.00	-36.00	peak
4	5936.000	43.53	7.87	51.40	68.20	-16.80	peak
5	5962.000	42.54	7.93	50.47	68.20	-17.73	peak

7.5 Duty Cycle

Test Requirement ANSI C63.10 (2020) Section 12.2

Test Method: ANSI C63.10 (2020) Section 12.2

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

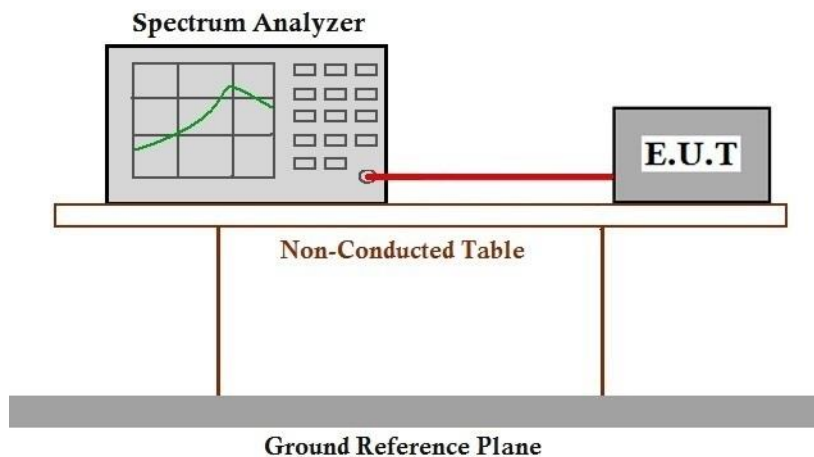
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 99% Bandwidth

Test Requirement ANSI C63.10 (2020) Section 12.4.2

Test Method: ANSI C63.10 (2020) Section 12.5.3

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

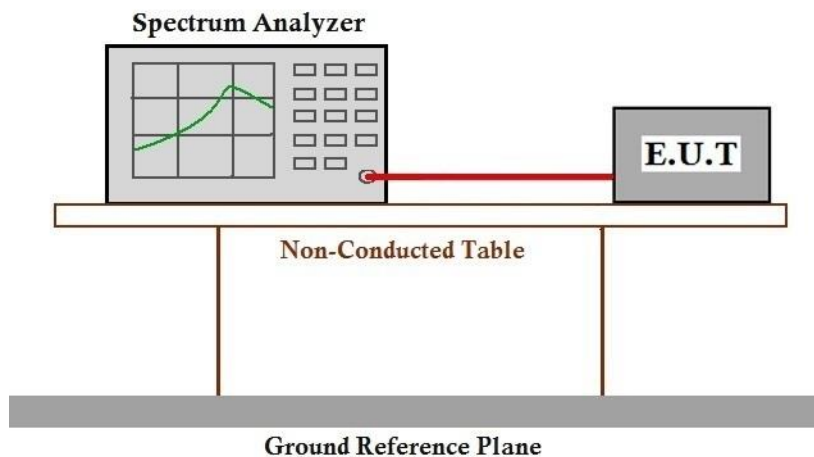
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 26dB Emission bandwidth

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)

Test Method: ANSI C63.10 (2020) Section 12.5.2

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

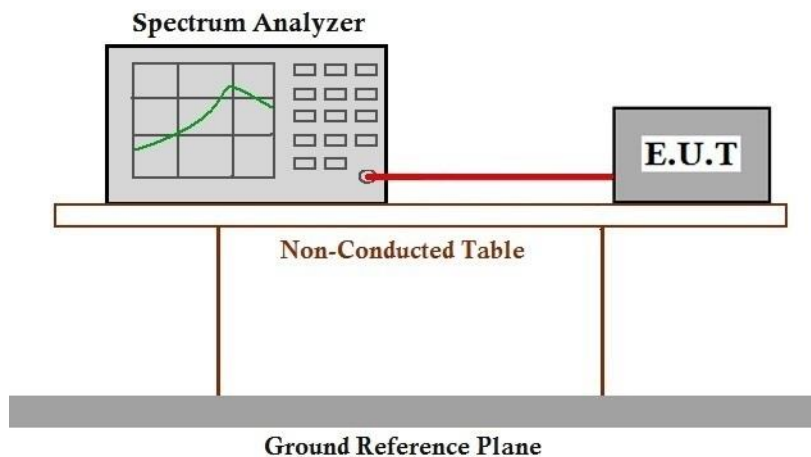
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

Test Requirement 47 CFR Part 15, Subpart E 15.407 (e)

Test Method: ANSI C63.10 (2020) Section 12.5.1

Limit:

Frequency band(MHz)	Limit
5725-5850	≥500 kHz

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

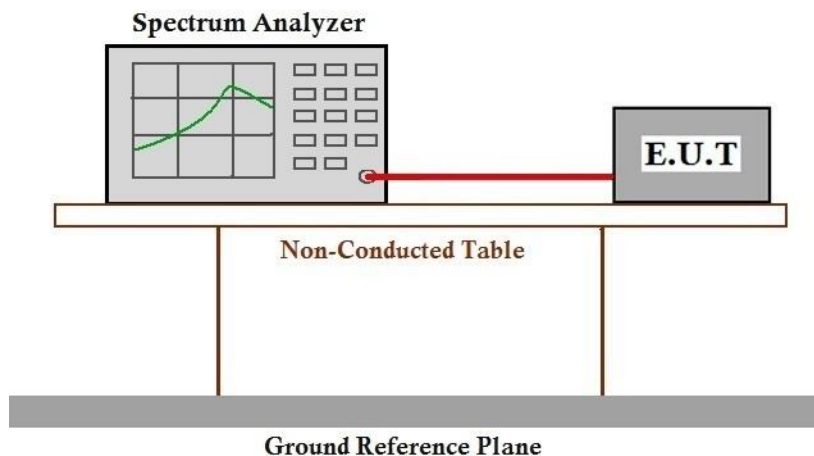
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.9 Maximum Conducted output power

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)

Test Method: ANSI C63.10 (2020) Section 12.4

Limit:

Frequency band(MHz)	Limit
5150-5250	≤1W(30dBm) for master device
	≤250mW(24dBm) for client device
5250-5350	≤250mW(24dBm) or 11dBm+10logB*
5470-5725	≤250mW(24dBm) or 11dBm+10logB*
5725-5850	≤1W(30dBm)
Remark:	* Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

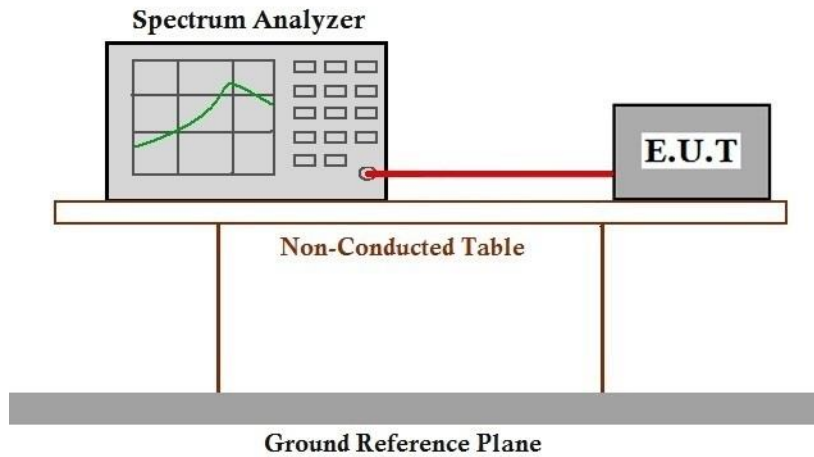
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

AV Output power Level = Reading level + Cable loss + DCCF

Please Refer to Appendix for Details

7.10 Peak Power spectrum density

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)

Test Method: ANSI C63.10 (2020) Section 12.6

Limit:

Frequency band(MHz)	Limit
5150-5250	≤17dBm in 1MHz for master device
	≤11dBm in 1MHz for client device
5250-5350	≤11dBm in 1MHz for client device
5470-5725	≤11dBm in 1MHz for client device
5725-5850	≤30dBm in 500 kHz
Remark:	The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.

7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

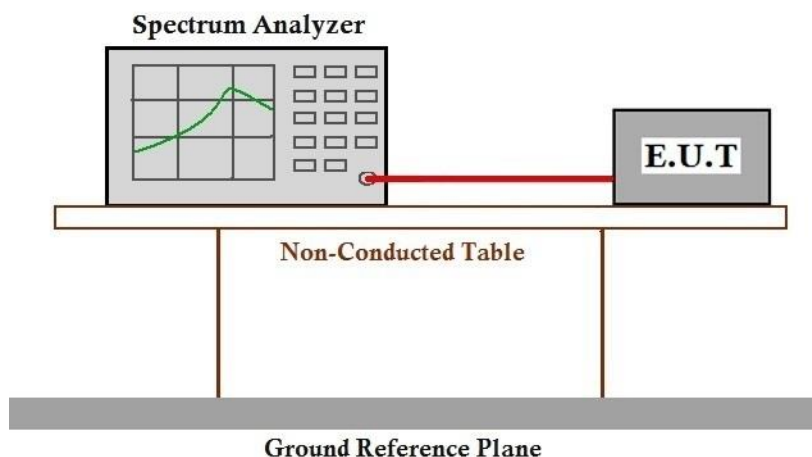
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram





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7.10.4 Measurement Procedure and Data

RBW conversion factor from 300kHz to 500kHz (2.22dB) for UNII Band 3 has been considered.

Please Refer to Appendix for Details

7.11 Frequency Stability

Test Requirement 47 CFR Part 15, Subpart E 15.407 (g)

Test Method: ANSI C63.10 (2020) Section 6.8

7.11.1 E.U.T. Operation

Operating Environment:

Temperature: 22.8 °C

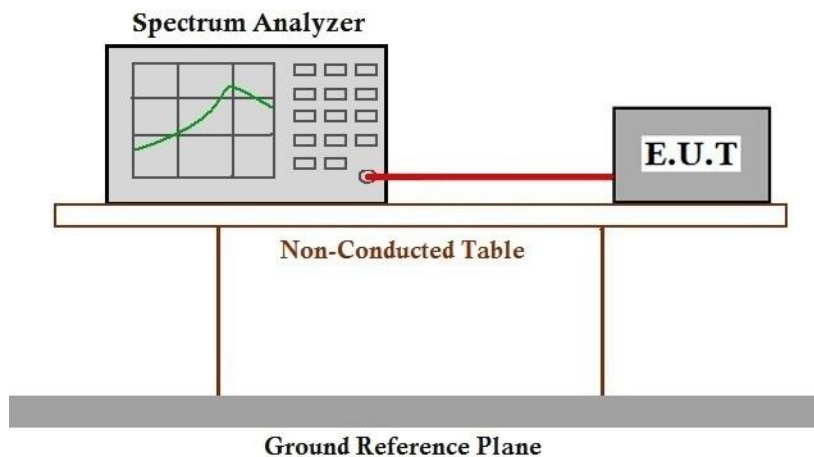
Humidity: 55.0 % RH

Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac20/40/80, Only the data of worst case is recorded in the report.

7.11.3 Test Setup Diagram



7.11.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2510002271AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix_Photographs of EUT Constructional Details for KSCR2510002271AT

10 Appendix

1. Duty Cycle

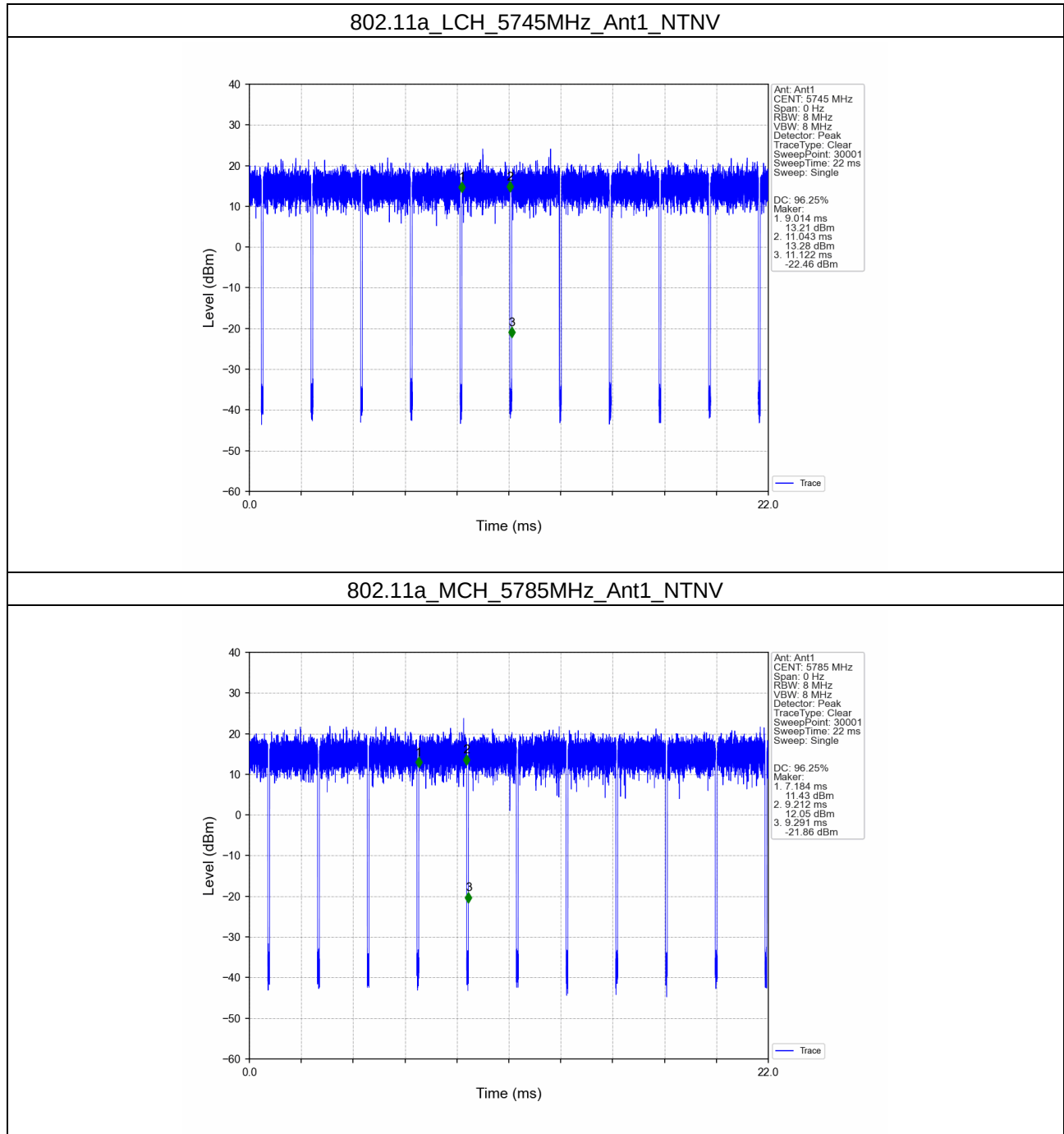
1.1 Test Result

1.1.1 Ant1

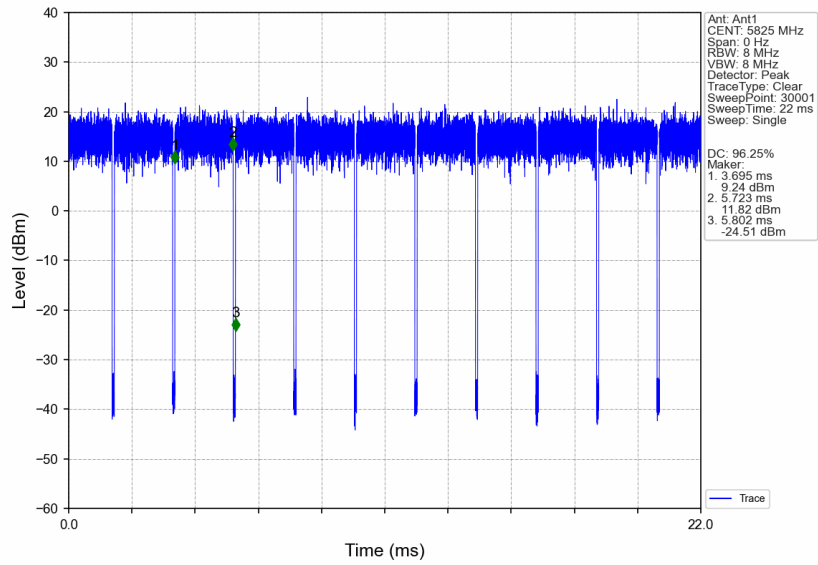
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11a	SISO	5745	2.029	2.108	96.25	0.17	0.14
		5785	2.028	2.107	96.25	0.17	0.07
		5825	2.028	2.107	96.25	0.17	0.07
802.11ac (VHT20)	SISO	5745	4.972	5.051	98.44	0.07	0.04
		5785	4.974	5.053	98.44	0.07	0.07
		5825	4.973	5.051	98.46	0.07	0.04
802.11ac (VHT40)	SISO	5755	2.417	2.498	96.76	0.14	0.07
		5795	2.417	2.498	96.76	0.14	0.14
802.11ac (VHT80)	SISO	5775	1.137	1.213	93.73	0.28	0.19

1.2 Test Graph

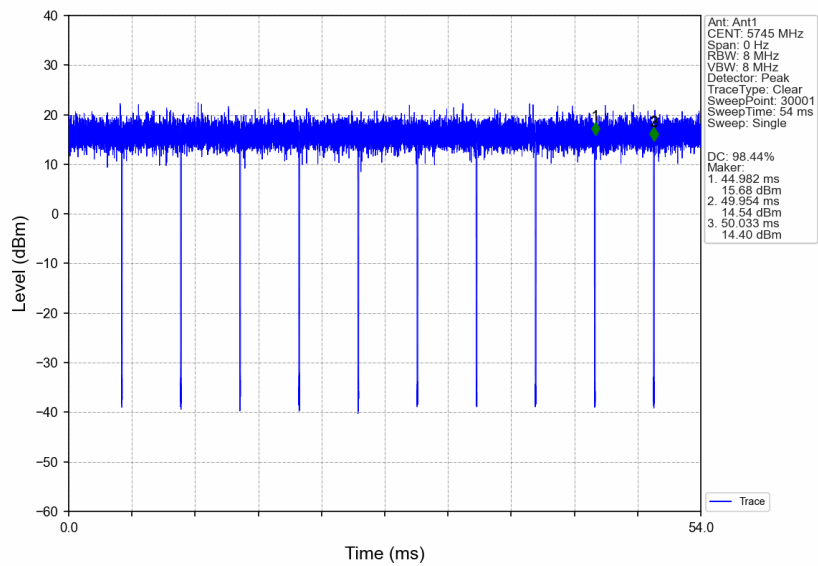
1.2.1 Ant1



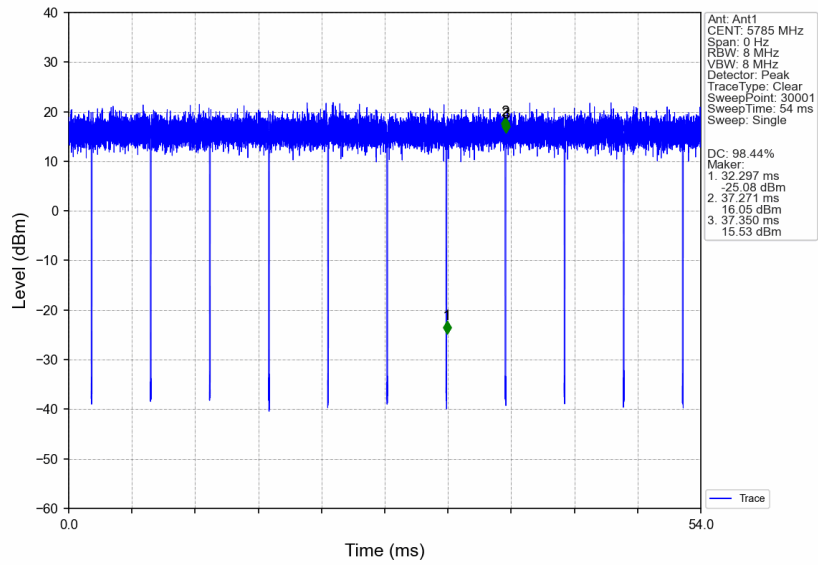
802.11a_HCH_5825MHz_Ant1_NTNV



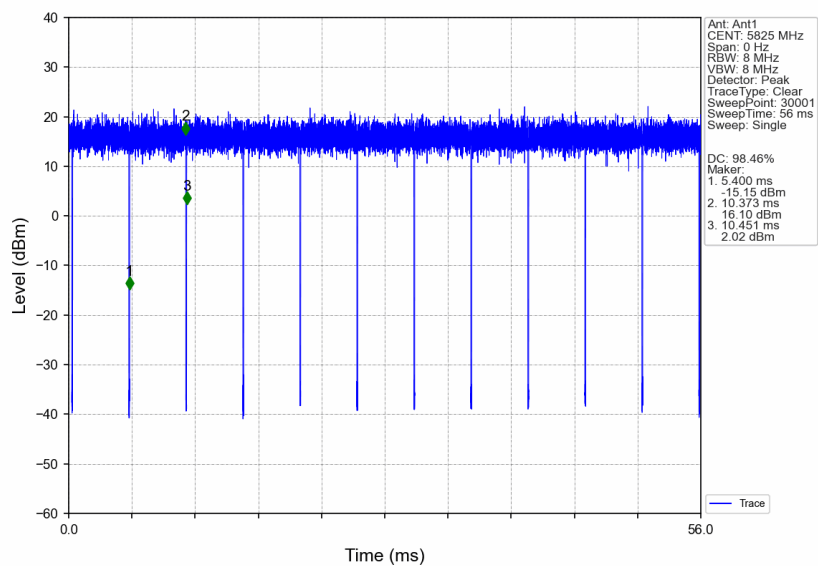
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



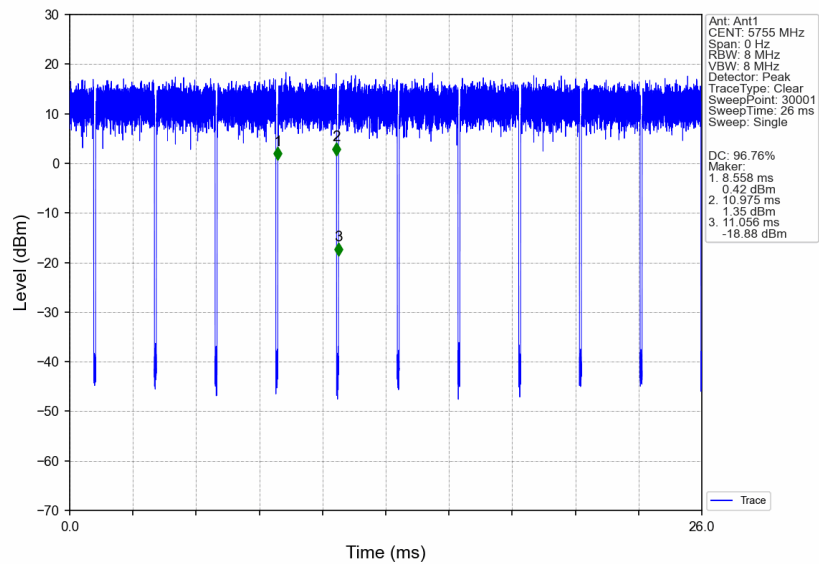
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



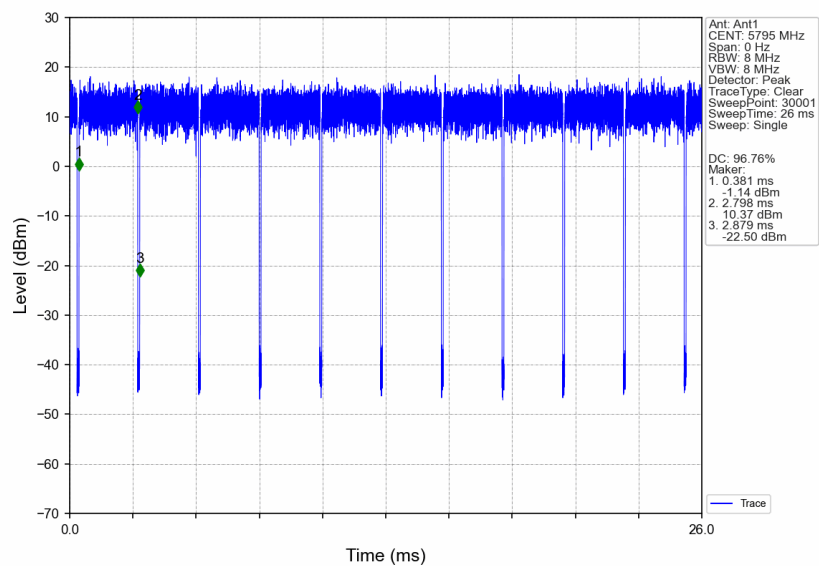
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



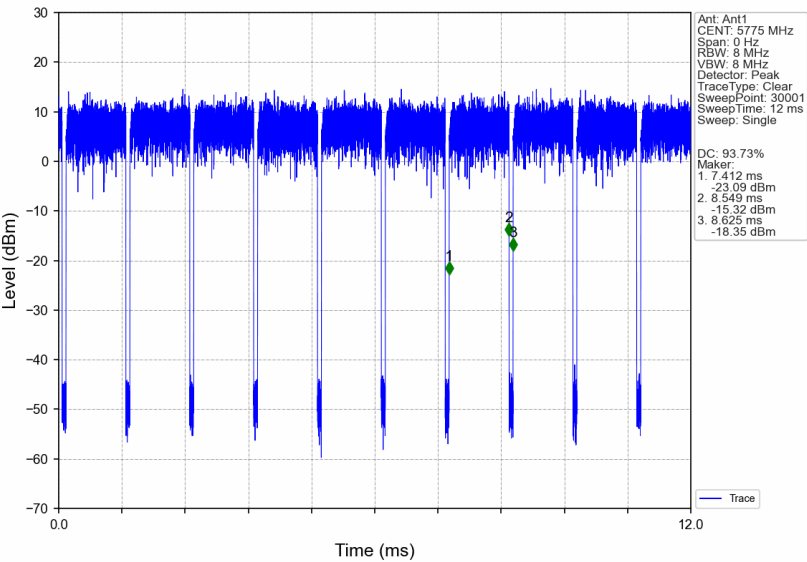
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

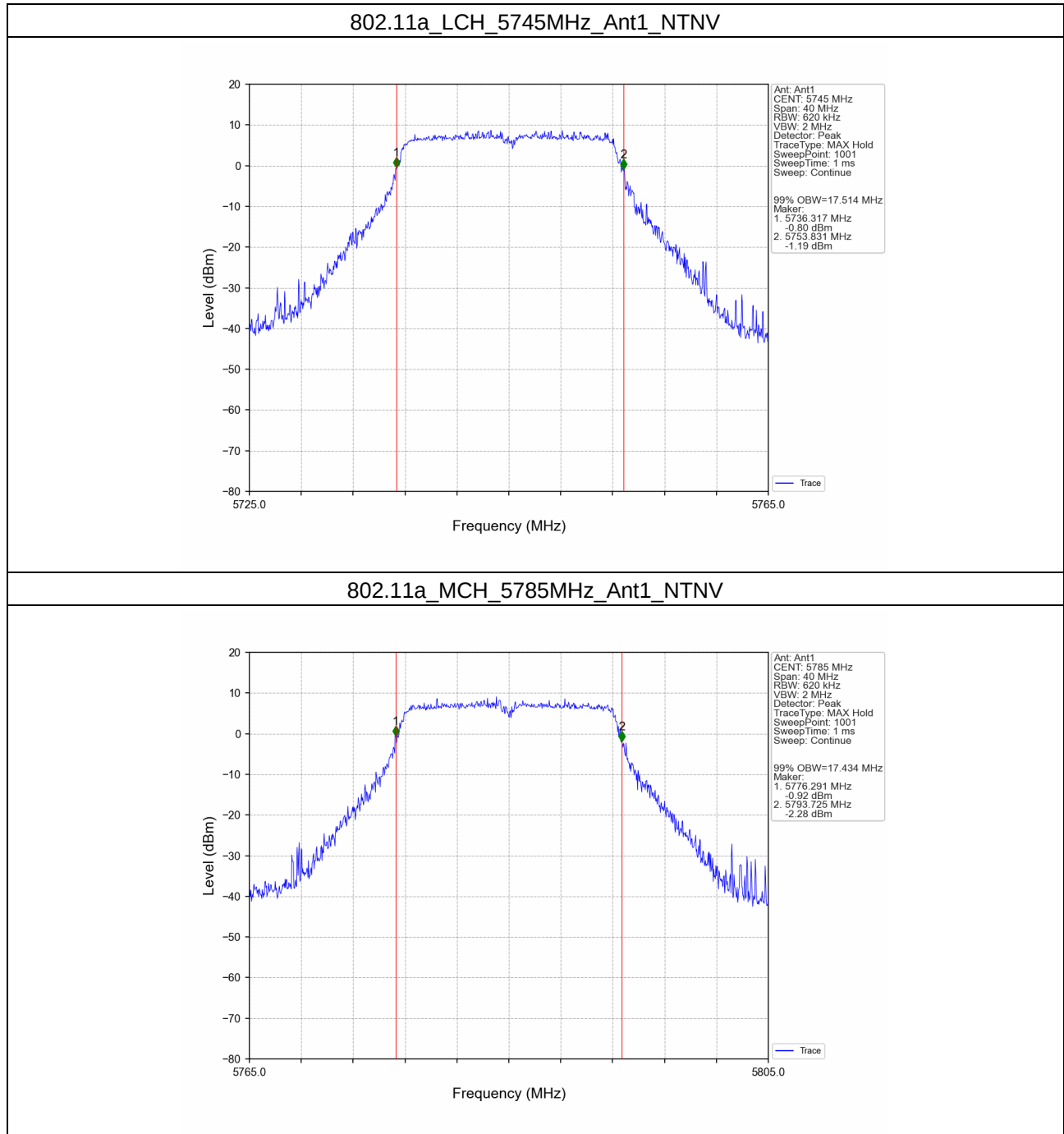
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5745	1	17.514	/	Pass
		5785	1	17.434	/	Pass
		5825	1	17.544	/	Pass
802.11ac (VHT20)	SISO	5745	1	18.584	/	Pass
		5785	1	18.515	/	Pass
		5825	1	18.630	/	Pass
802.11ac (VHT40)	SISO	5755	1	37.225	/	Pass
		5795	1	37.196	/	Pass
802.11ac (VHT80)	SISO	5775	1	77.631	/	Pass

2.1.2 6dB BW

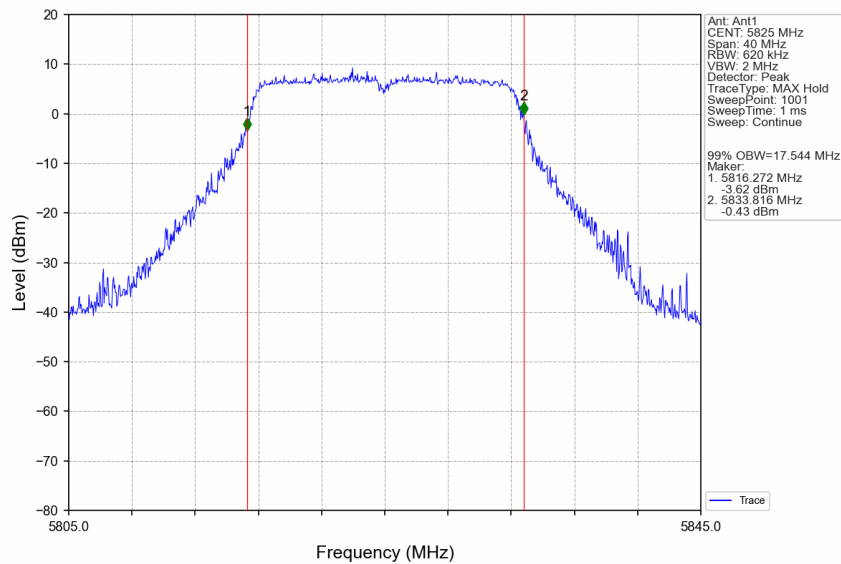
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5745	1	16.407	≥ 0.5	Pass
		5785	1	16.413	≥ 0.5	Pass
		5825	1	16.401	≥ 0.5	Pass
802.11ac (VHT20)	SISO	5745	1	17.731	≥ 0.5	Pass
		5785	1	17.671	≥ 0.5	Pass
		5825	1	17.602	≥ 0.5	Pass
802.11ac (VHT40)	SISO	5755	1	36.375	≥ 0.5	Pass
		5795	1	36.376	≥ 0.5	Pass
802.11ac (VHT80)	SISO	5775	1	76.391	≥ 0.5	Pass

2.2 Test Graph

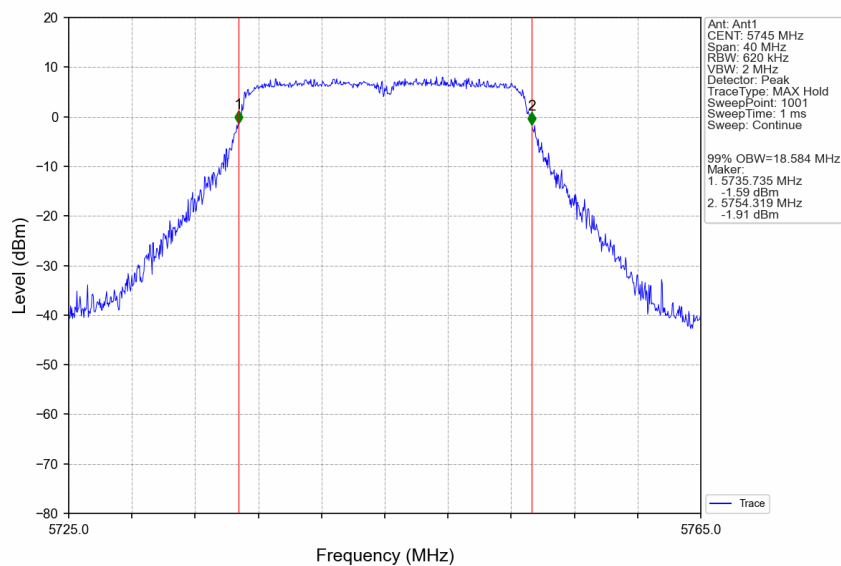
2.2.1 OBW



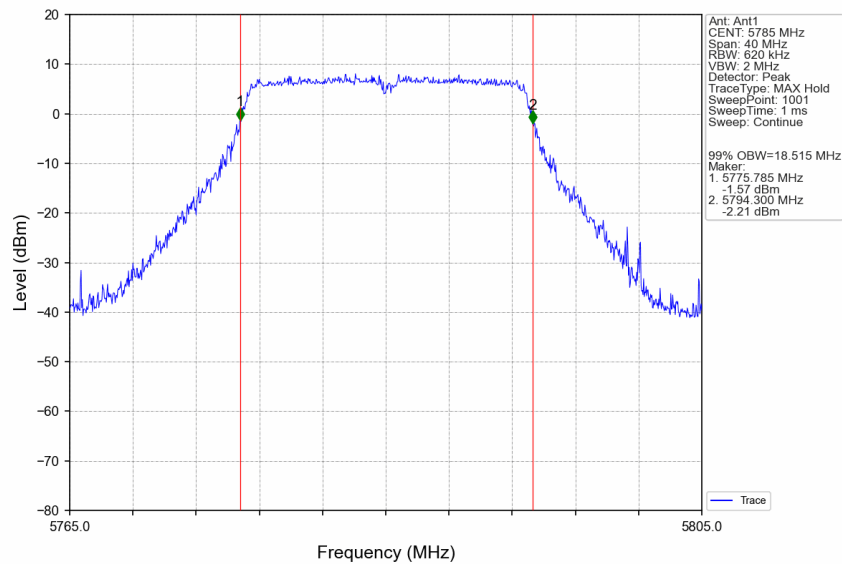
802.11a_HCH_5825MHz_Ant1_NTNV



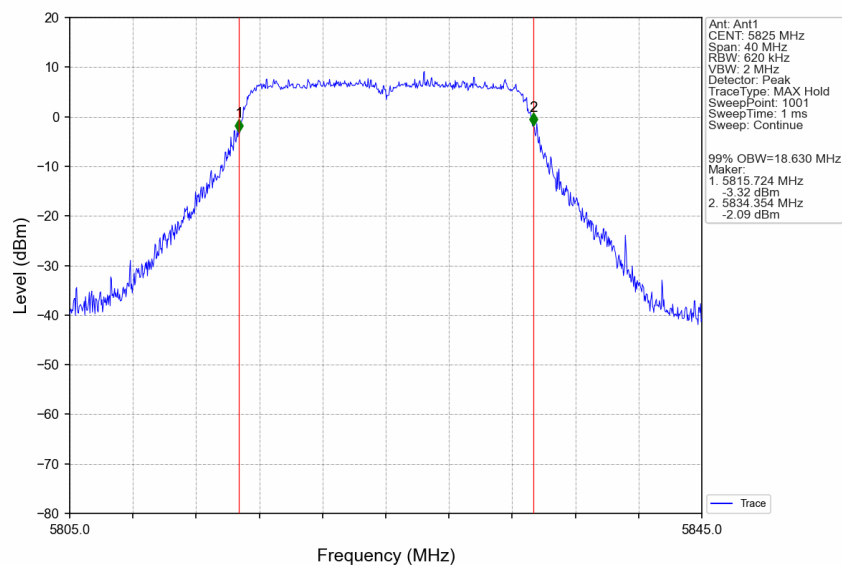
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



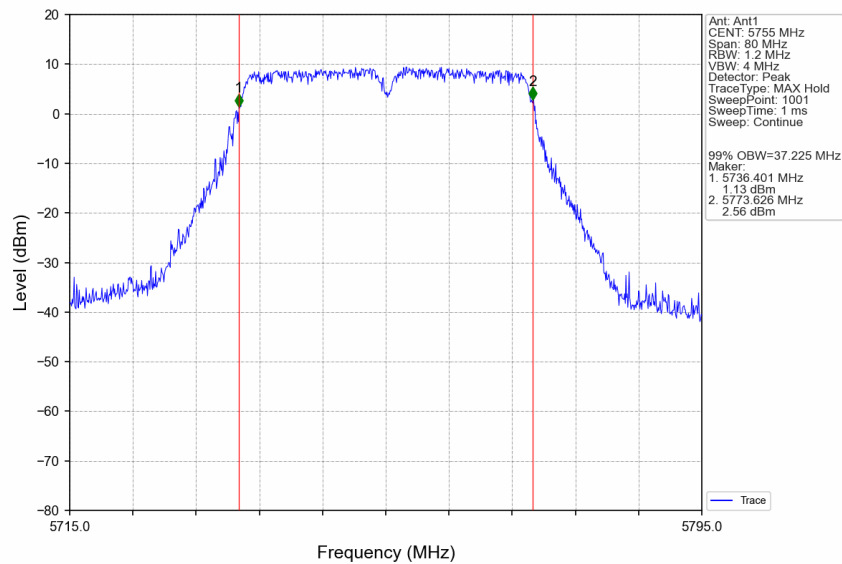
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



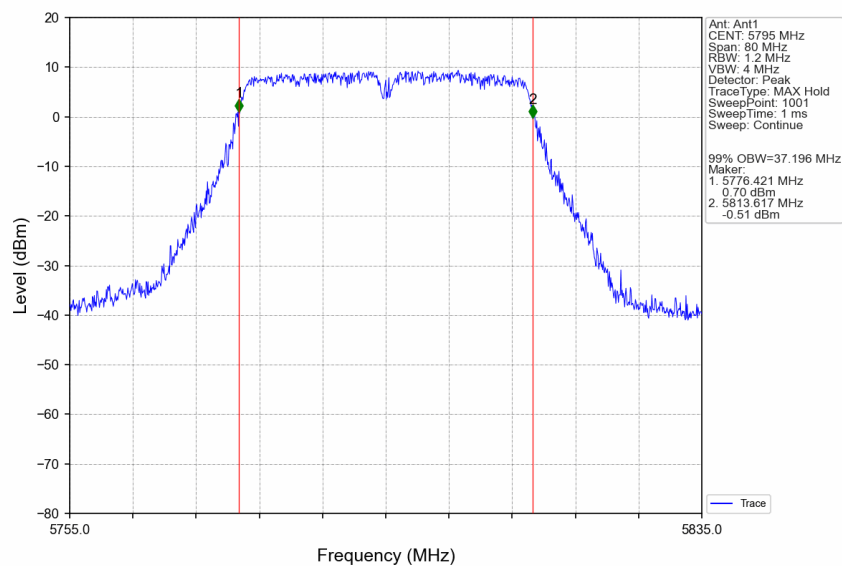
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



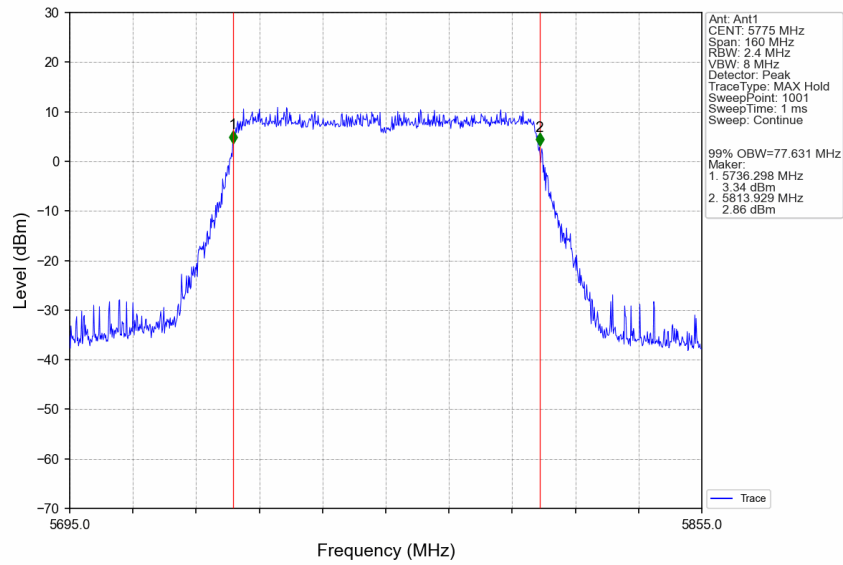
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV

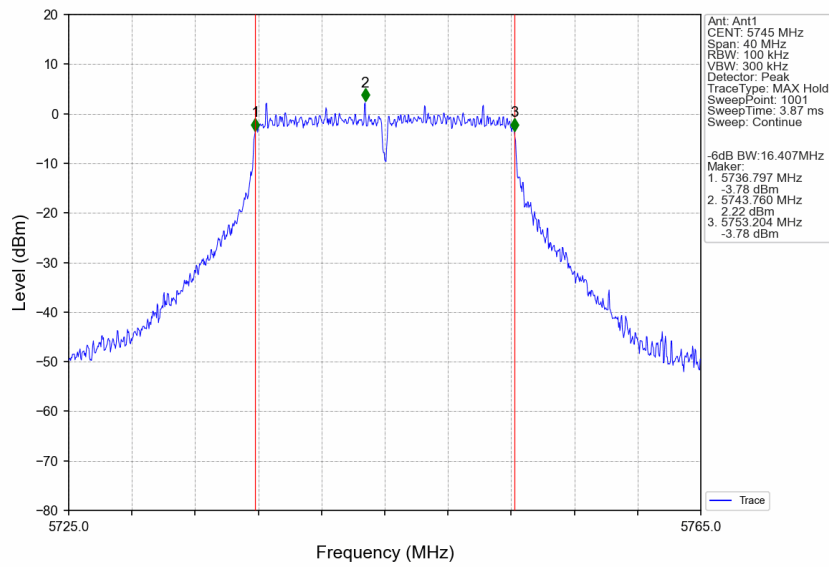


802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV

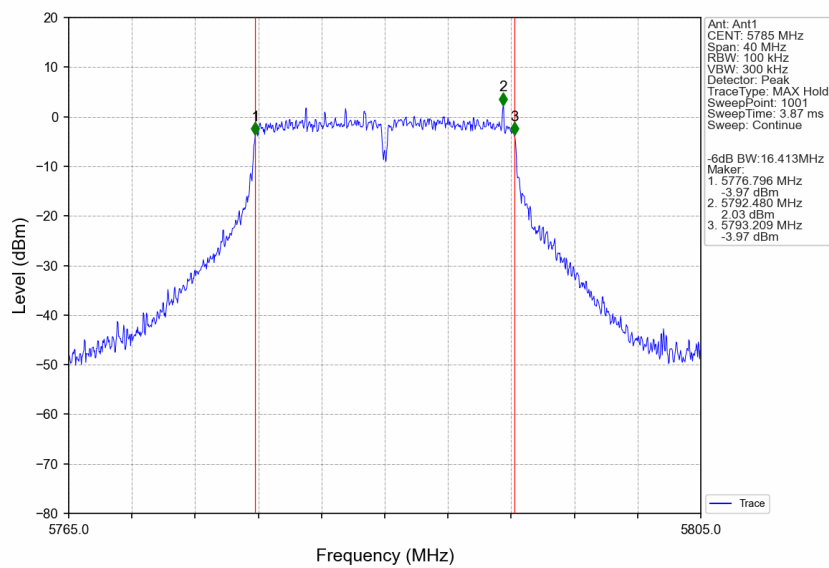


2.2.2 6dB BW

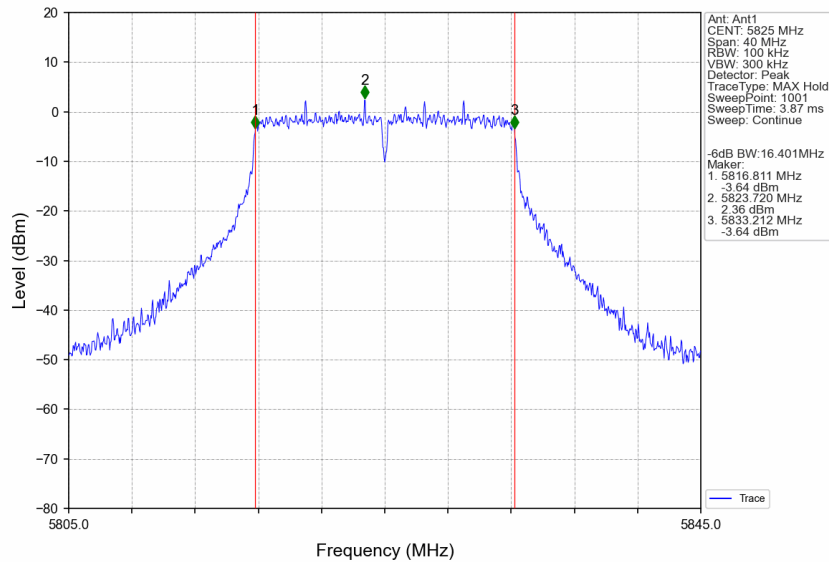
802.11a_LCH_5745MHz_Ant1_NTNV



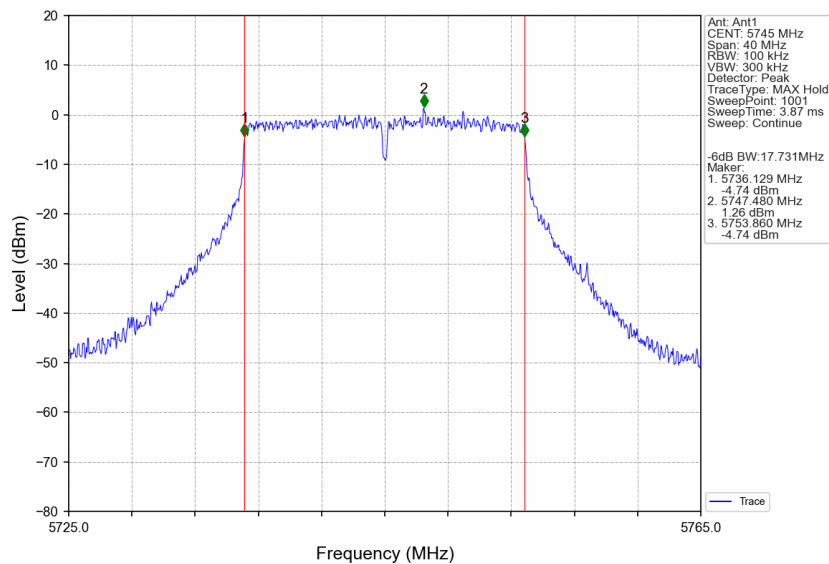
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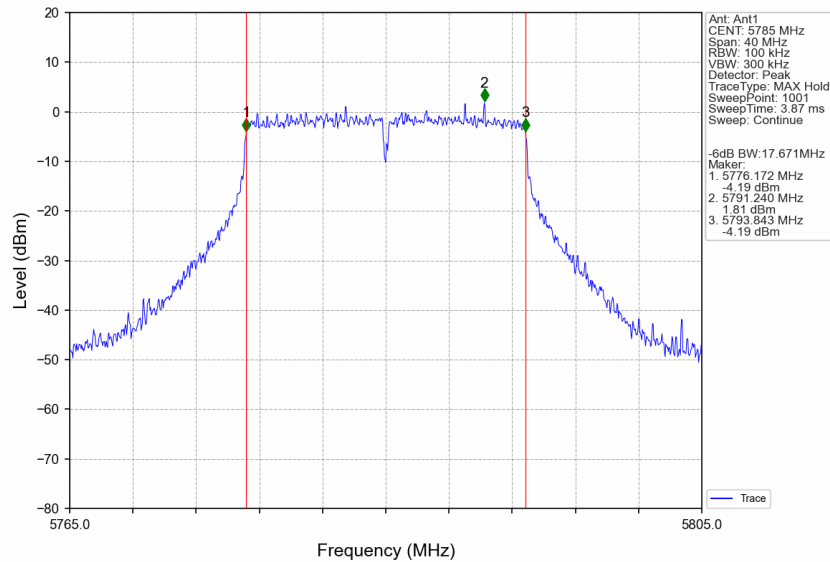
802.11a_HCH_5825MHz_Ant1_NTNV



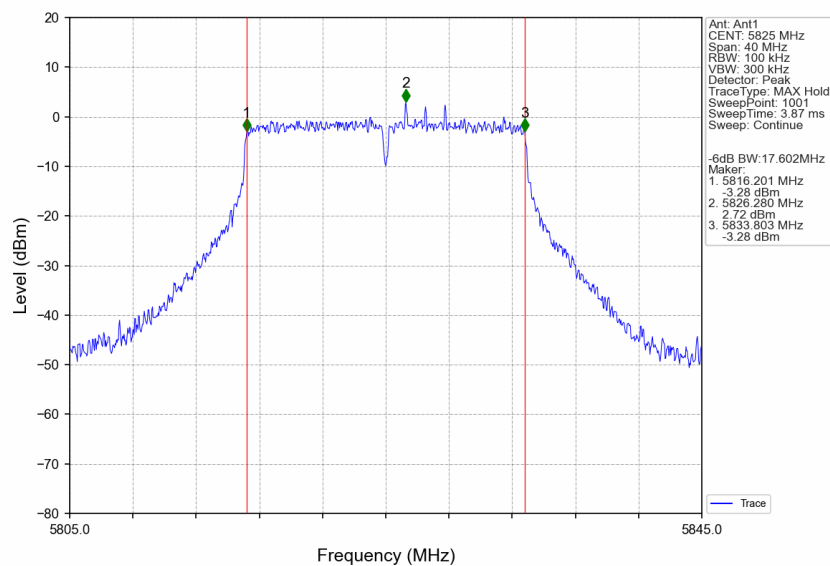
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



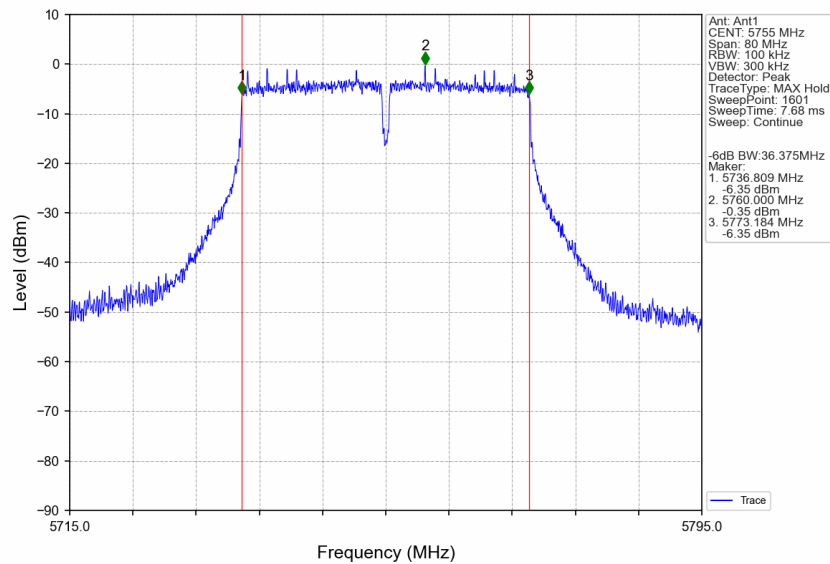
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



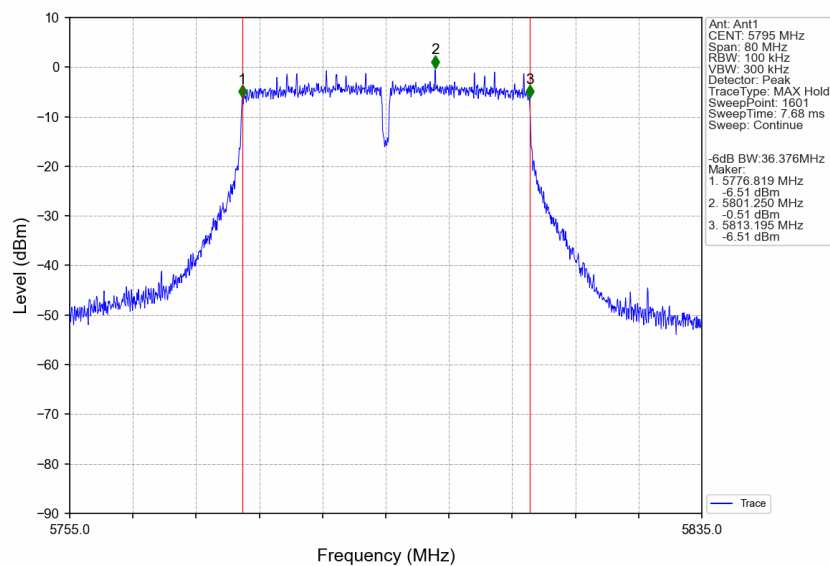
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



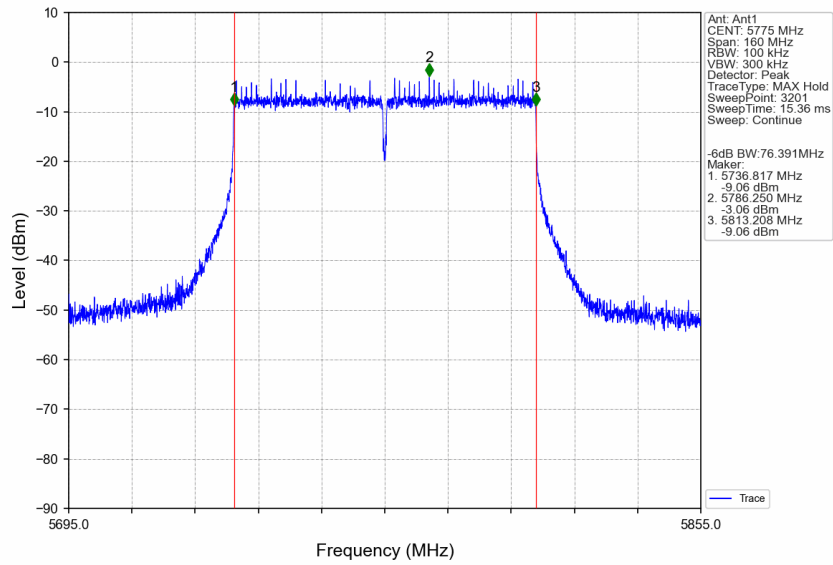
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV





3. Maximum Conducted Output Power

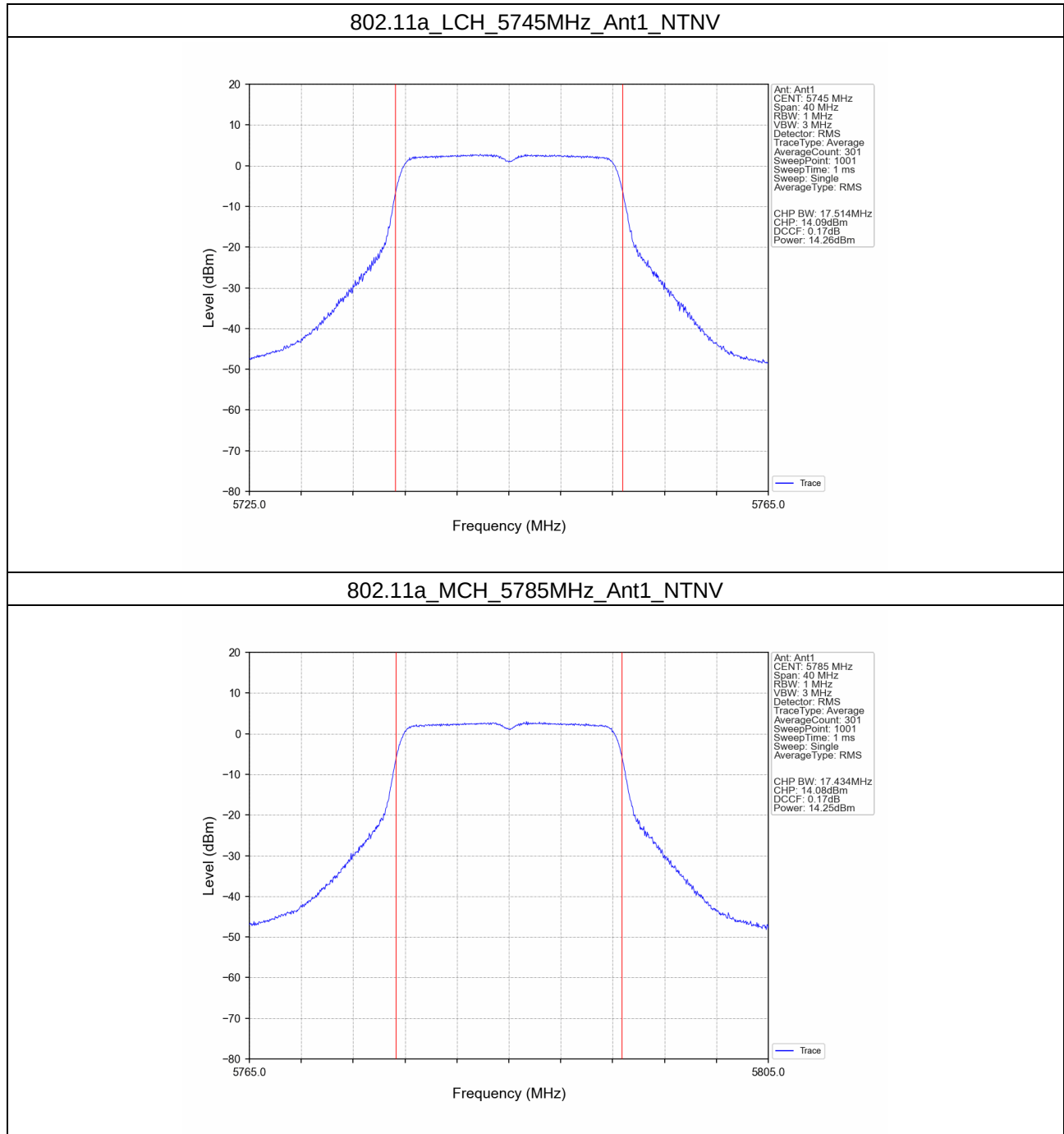
3.1 Test Result

3.1.1 Power

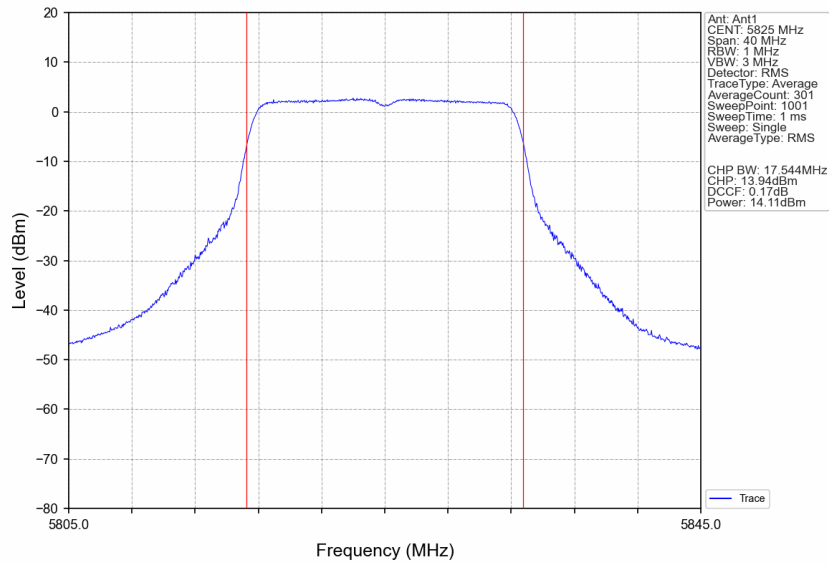
Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11a	SISO	5745	14.26	≤ 30	Pass
		5785	14.25	≤ 30	Pass
		5825	14.11	≤ 30	Pass
802.11ac (VHT20)	SISO	5745	14.18	≤ 30	Pass
		5785	14.13	≤ 30	Pass
		5825	14.04	≤ 30	Pass
802.11ac (VHT40)	SISO	5755	14.54	≤ 30	Pass
		5795	14.36	≤ 30	Pass
802.11ac (VHT80)	SISO	5775	14.39	≤ 30	Pass
Note1: Antenna Gain: Ant1: -2.14dBi;					

3.2 Test Graph

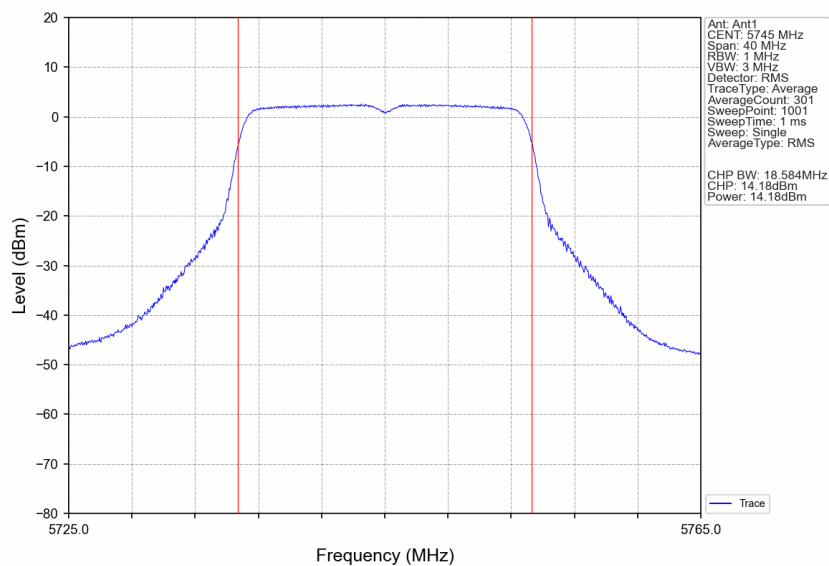
3.2.1 Power



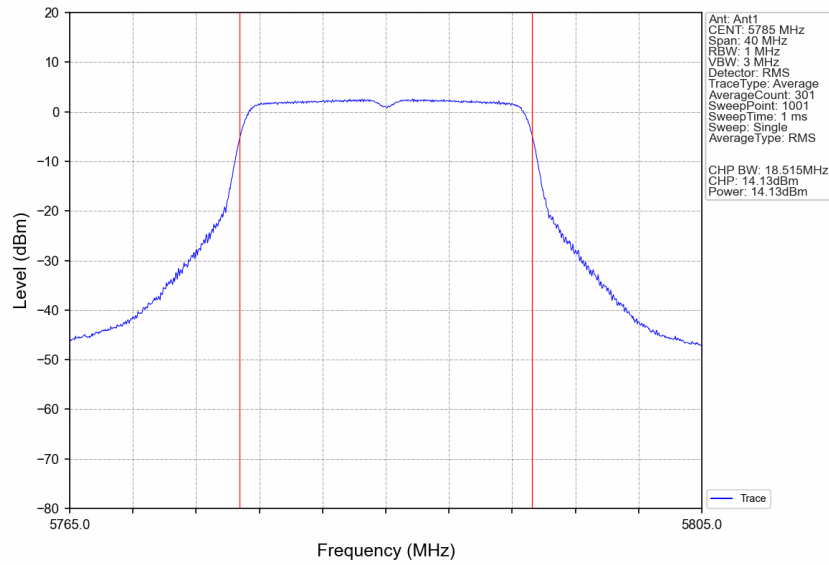
802.11a_HCH_5825MHz_Ant1_NTNV



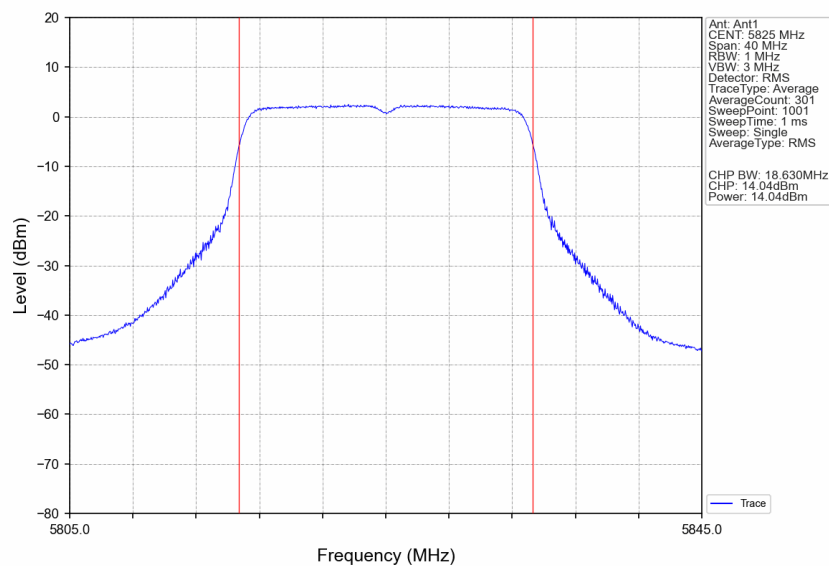
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



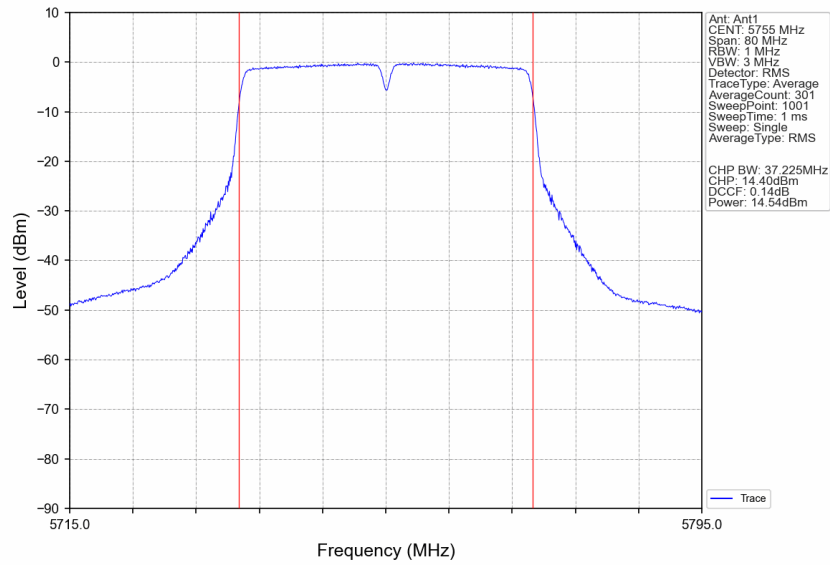
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



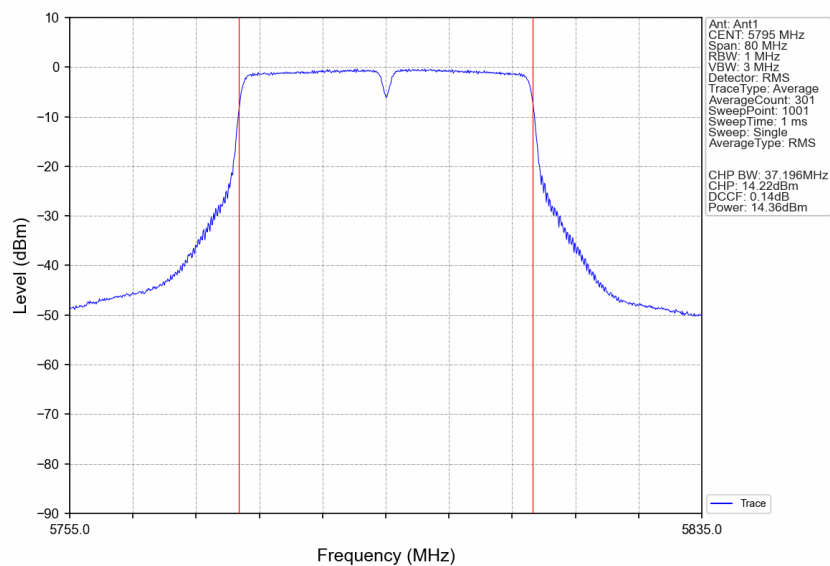
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV

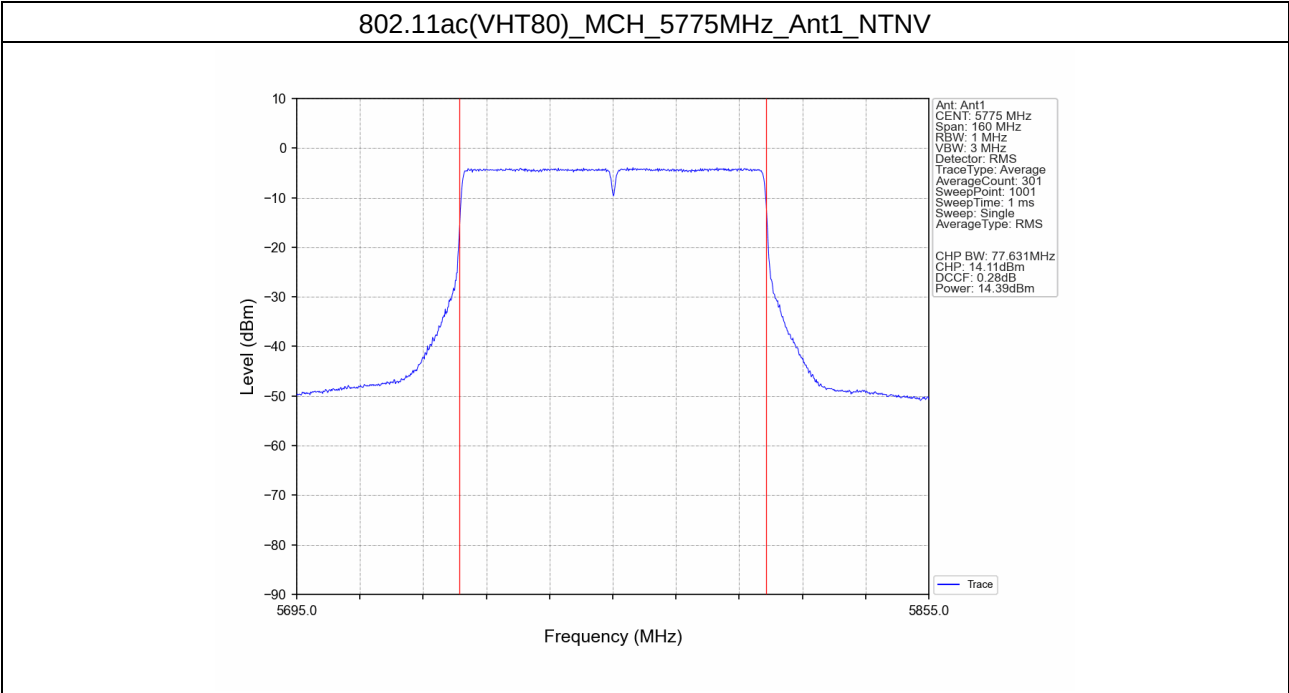


802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV







4. Maximum Power Spectral Density

4.1 Test Result

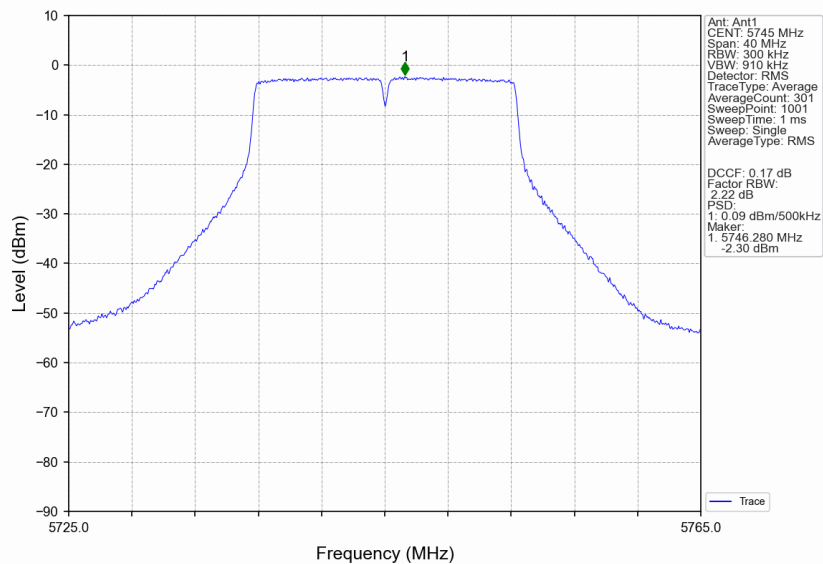
4.1.1 PSD-Band3

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/500kHz)		Verdict
			ANT1	Limit	
802.11a	SISO	5745	0.09	<=30	Pass
		5785	0.07	<=30	Pass
		5825	-0.10	<=30	Pass
802.11ac (VHT20)	SISO	5745	-0.30	<=30	Pass
		5785	-0.46	<=30	Pass
		5825	-0.49	<=30	Pass
802.11ac (VHT40)	SISO	5755	-3.02	<=30	Pass
		5795	-3.14	<=30	Pass
802.11ac (VHT80)	SISO	5775	-6.33	<=30	Pass
Note1: Antenna Gain: Ant1: -2.14dBi;					

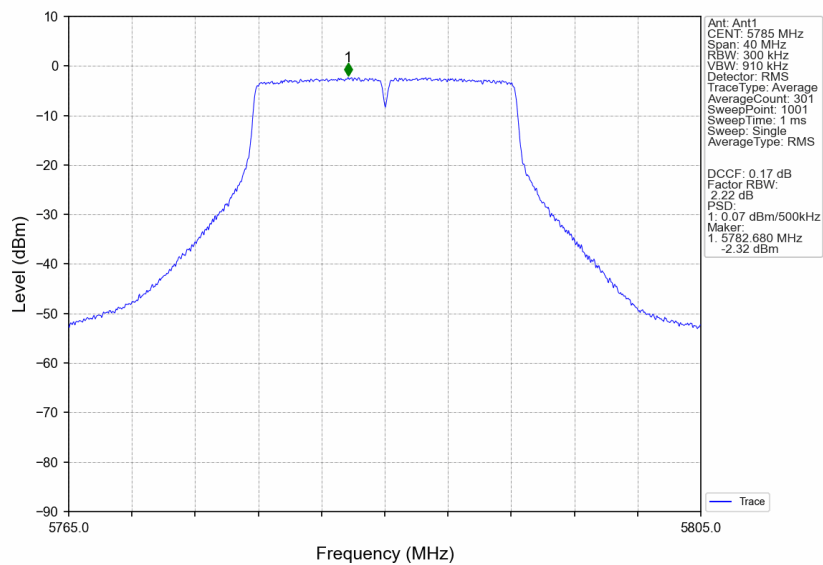
4.2 Test Graph

4.2.1 PSD-Band3

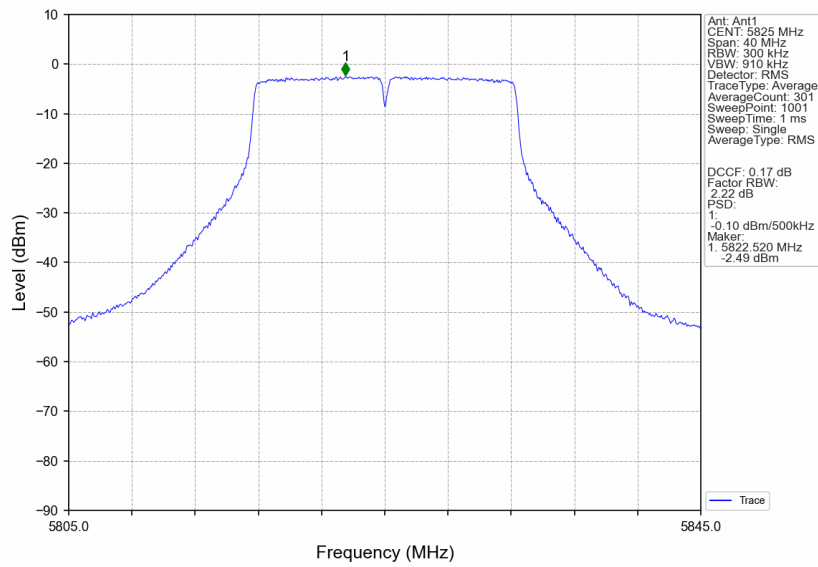
802.11a_LCH_5745MHz_Ant1_NTNV



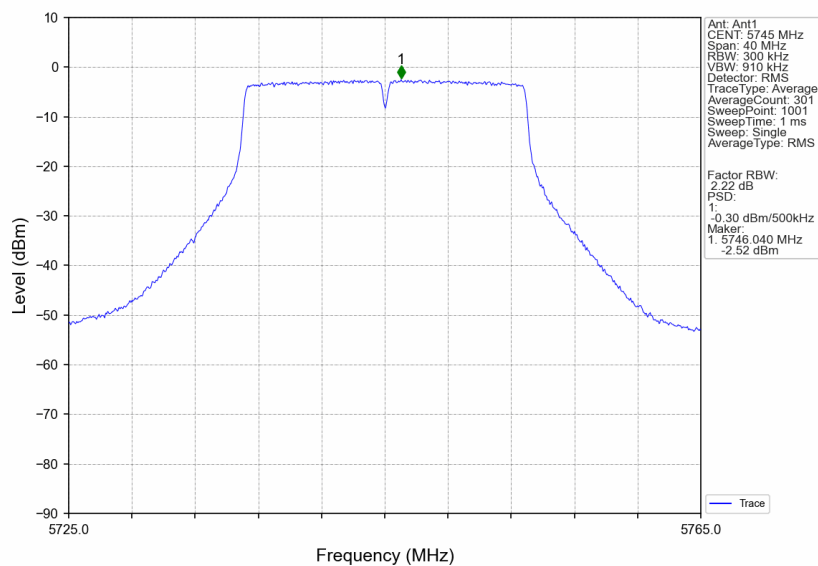
802.11a_MCH_5785MHz_Ant1_NTNV



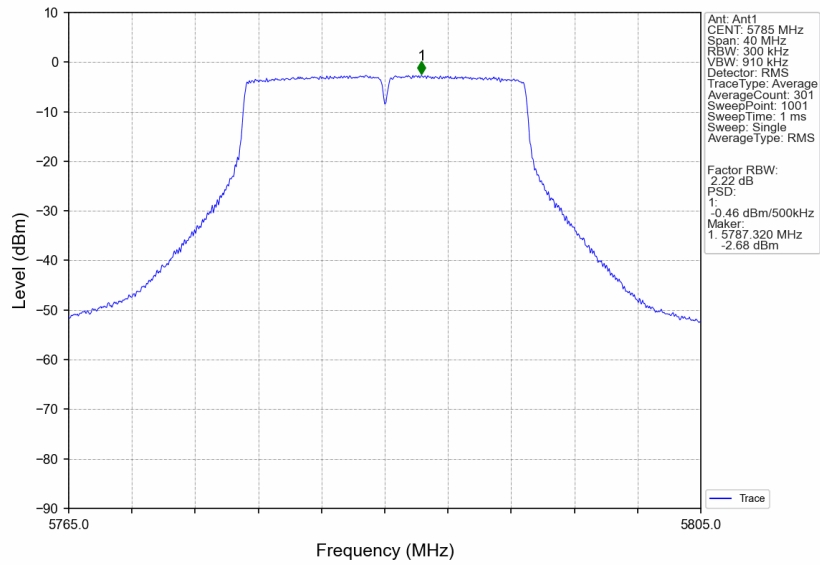
802.11a_HCH_5825MHz_Ant1_NTNV



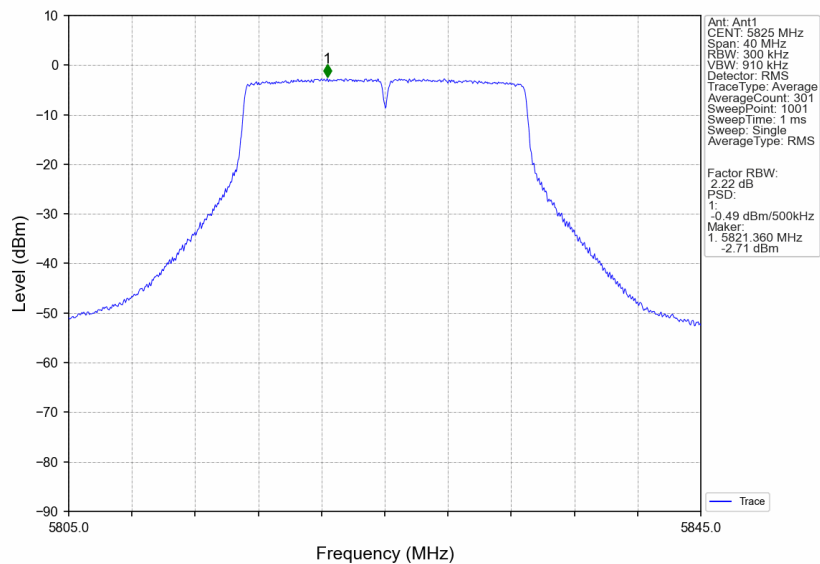
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



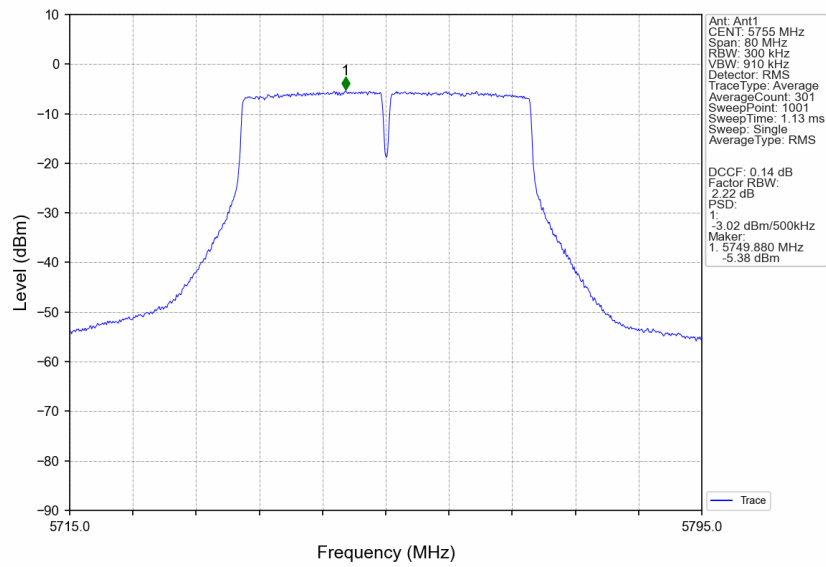
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



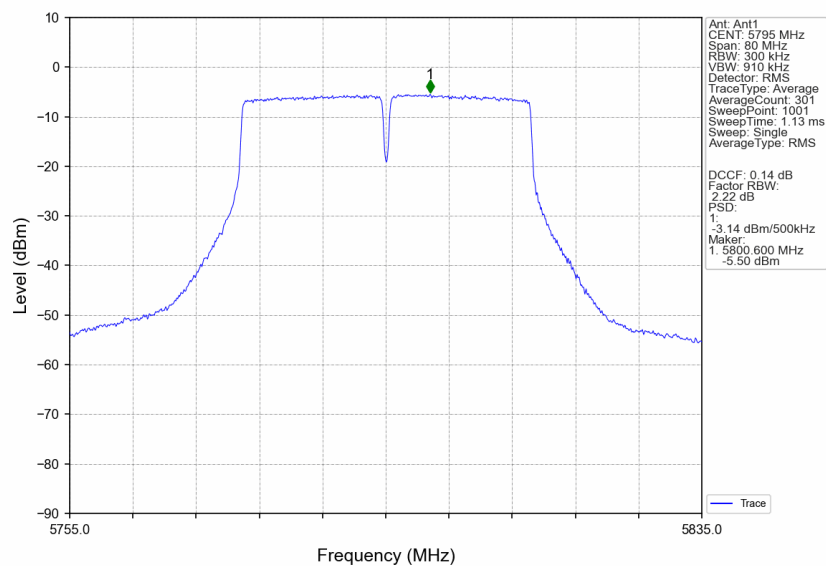
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



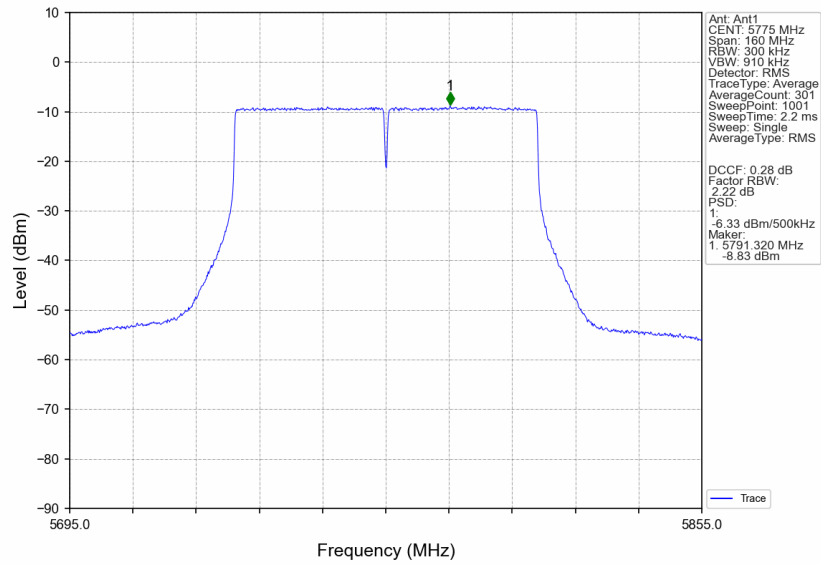
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



5. Frequency Stability

5.1 Test Result

5.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
802.11a	SISO	5745	20	70.2	5745.040	5725 to 5850	Pass
				72.0	5745.040	5725 to 5850	Pass
				82.8	5745.060	5725 to 5850	Pass
			-30	72.0	5745.020	5725 to 5850	Pass
			-20	72.0	5745.060	5725 to 5850	Pass
			-10	72.0	5745.020	5725 to 5850	Pass
			0	72.0	5745.040	5725 to 5850	Pass
			10	72.0	5745.080	5725 to 5850	Pass
			30	72.0	5745.040	5725 to 5850	Pass
			40	72.0	5745.040	5725 to 5850	Pass
			50	72.0	5745.100	5725 to 5850	Pass
		5785	20	70.2	5785.040	5725 to 5850	Pass
				72.0	5785.060	5725 to 5850	Pass
				82.8	5785.060	5725 to 5850	Pass
			-30	72.0	5785.060	5725 to 5850	Pass
			-20	72.0	5785.040	5725 to 5850	Pass
			-10	72.0	5785.040	5725 to 5850	Pass
			0	72.0	5785.040	5725 to 5850	Pass
			10	72.0	5785.020	5725 to 5850	Pass
			30	72.0	5785.040	5725 to 5850	Pass
			40	72.0	5785.040	5725 to 5850	Pass
			50	72.0	5785.060	5725 to 5850	Pass
		5825	20	70.2	5825.040	5725 to 5850	Pass
				72.0	5825.060	5725 to 5850	Pass
				82.8	5824.980	5725 to 5850	Pass
			-30	72.0	5825.020	5725 to 5850	Pass
			-20	72.0	5824.940	5725 to 5850	Pass
			-10	72.0	5825.040	5725 to 5850	Pass
			0	72.0	5825.000	5725 to 5850	Pass
			10	72.0	5825.060	5725 to 5850	Pass
			30	72.0	5825.060	5725 to 5850	Pass
			40	72.0	5825.020	5725 to 5850	Pass
			50	72.0	5825.060	5725 to 5850	Pass
802.11ac	SISO	5745	20	70.2	5745.040	5725 to 5850	Pass

(VHT20)				72.0	5745.020	5725 to 5850	Pass
				82.8	5745.020	5725 to 5850	Pass
			-30	72.0	5745.040	5725 to 5850	Pass
			-20	72.0	5745.040	5725 to 5850	Pass
			-10	72.0	5745.040	5725 to 5850	Pass
			0	72.0	5744.960	5725 to 5850	Pass
			10	72.0	5745.040	5725 to 5850	Pass
			30	72.0	5745.060	5725 to 5850	Pass
			40	72.0	5745.040	5725 to 5850	Pass
			50	72.0	5745.080	5725 to 5850	Pass
		5785	20	70.2	5785.040	5725 to 5850	Pass
				72.0	5785.020	5725 to 5850	Pass
				82.8	5785.080	5725 to 5850	Pass
			-30	72.0	5785.040	5725 to 5850	Pass
			-20	72.0	5785.040	5725 to 5850	Pass
			-10	72.0	5785.020	5725 to 5850	Pass
			0	72.0	5785.060	5725 to 5850	Pass
			10	72.0	5785.040	5725 to 5850	Pass
			30	72.0	5785.020	5725 to 5850	Pass
			40	72.0	5785.060	5725 to 5850	Pass
			50	72.0	5785.040	5725 to 5850	Pass
		5825	20	70.2	5825.060	5725 to 5850	Pass
				72.0	5825.020	5725 to 5850	Pass
				82.8	5825.020	5725 to 5850	Pass
			-30	72.0	5825.060	5725 to 5850	Pass
			-20	72.0	5825.020	5725 to 5850	Pass
			-10	72.0	5825.000	5725 to 5850	Pass
			0	72.0	5825.020	5725 to 5850	Pass
			10	72.0	5825.020	5725 to 5850	Pass
			30	72.0	5825.060	5725 to 5850	Pass
			40	72.0	5825.020	5725 to 5850	Pass
			50	72.0	5825.040	5725 to 5850	Pass
802.11ac (VHT40)	SISO	5755	20	70.2	5755.080	5725 to 5850	Pass
				72.0	5755.080	5725 to 5850	Pass
				82.8	5755.120	5725 to 5850	Pass
			-30	72.0	5755.120	5725 to 5850	Pass
			-20	72.0	5755.160	5725 to 5850	Pass
			-10	72.0	5755.080	5725 to 5850	Pass
			0	72.0	5755.120	5725 to 5850	Pass
			10	72.0	5755.080	5725 to 5850	Pass
			30	72.0	5755.040	5725 to 5850	Pass
			40	72.0	5755.120	5725 to 5850	Pass
			50	72.0	5755.080	5725 to 5850	Pass

		5795	20	70.2	5795.080	5725 to 5850	Pass
				72.0	5795.080	5725 to 5850	Pass
				82.8	5795.080	5725 to 5850	Pass
			-30	72.0	5795.040	5725 to 5850	Pass
			-20	72.0	5795.120	5725 to 5850	Pass
			-10	72.0	5795.080	5725 to 5850	Pass
			0	72.0	5795.040	5725 to 5850	Pass
			10	72.0	5795.040	5725 to 5850	Pass
			30	72.0	5795.080	5725 to 5850	Pass
			40	72.0	5795.000	5725 to 5850	Pass
			50	72.0	5795.120	5725 to 5850	Pass
802.11ac (VHT80)	SISO	5775	20	70.2	5775.075	5725 to 5850	Pass
				72.0	5775.075	5725 to 5850	Pass
				82.8	5775.150	5725 to 5850	Pass
			-30	72.0	5775.150	5725 to 5850	Pass
			-20	72.0	5775.075	5725 to 5850	Pass
			-10	72.0	5775.150	5725 to 5850	Pass
			0	72.0	5775.150	5725 to 5850	Pass
			10	72.0	5775.075	5725 to 5850	Pass
			30	72.0	5775.150	5725 to 5850	Pass
			40	72.0	5775.075	5725 to 5850	Pass
			50	72.0	5775.075	5725 to 5850	Pass

- End of the Report -