TEST REPORT

Report No.:	TW2309412-04E
Applicant:	Stellar Private Cable Inc.
Product:	eHub
Model No.:	2.0
Trademark:	Sentrics
FCC ID:	2BDDH-A3E6C
Test Standards:	FCC Part 15 Subpart E, Paragraph 15.407
Test Result:	It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15 Subpart E, Paragraph 15.407 for the evaluation of electromagnetic compatibility

Approved By

Terry Tang

Manager

Dated: Oct 20, 2023

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

Special Statement:

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

CAB identifier: CN0033

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Test Report Conclusion

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1.0 **General Details**

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688

Fax: (755) 83442996

Site Listed with Federal Communications commission (FCC)

Registration Number:744189

For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Stellar Private Cable Inc.

Address: 975 E. Tallmadge Ave., Akron OH 44310 USA

Telephone: --

Fax: --

1.3 Description of EUT

Product:	eHub
Manufacturer:	Stellar Private Cable Inc.
Address:	975 E. Tallmadge Ave., Akron OH 44310 USA
Trademark:	Sentrics
Additional Trademark:	N/A
Model Number:	2.0
Additional Model Number:	N/A
Hardware Version:	RKS230712_V1.0
Software Version:	V2.x
Serial No.:	N/A
Type of Modulation	IEEE 802.11a/n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK); IEEE 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Frequency	Band 1: 5180MHz-5240MHz; Band 4: 5745MHz-5825MHz
Air Data Rate	IEEE 802.11a: 54, 48,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n/HT20: mcs0-mcs15 IEEE 802.11n/HT40: mcs0-mcs15 IEEE 802.11ac: NSS1 mcs0-mcs9
Antenna:	5.2Gwifi：Dipole antenna: 2.66dBi, FPC antenna:3.48dBi 5.8Gwifi：Dipole antenna: 3.01dBi, FPC antenna: 3.37dBi.

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Test Mode:	During testing, EUT was set to 100% duty cycle. 6Mbps air data rate was the worst case for 802.11a mode; mcs0 air data rate was the worst case for 802.11n mode;
Frequency Selection	By software
Rating:	Input: DC12V, 1.5A
Power Supply:	Model: FJ-SW1201500N Input: AC100-240V~, 50/60Hz, 0.6A; Output: DC12.0V, 1.5A

Each Channel Operation Frequency

Band 1					
802.11a / 11n HT20 / 802.11ac VHT20		802.11n HT40 / 802.11acVHT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190 MHz	42	5210 MHz
40	5200 MHz	46	5230 MHz		
44	5220 MHz				
48	5240 MHz				
Band 4					
802.11a / 11n HT20 / 802.11ac VHT20		802.11n HT40 / 802.11acVHT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745 MHz	151	5755 MHz	155	5775 MHz
153	5765 MHz	159	5795 MHz		
157	5785 MHz				
165	5825 MHz				

The selected test channels as follows:

Band 1					
802.11a / 11n HT20		802.11n HT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190 MHz	42	5210 MHz
40	5200 MHz	46	5230 MHz		
48	5240 MHz				

Band 4					
802.11a / 11n HT20		802.11n HT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745 MHz	151	5755 MHz	155	5775 MHz
157	5785 MHz	159	5795 MHz		
165	5825 MHz				

Note: 802.11ac VHT20/VHT40 is similar with 802.11n HT20/HT40.

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1.4 Submitted Sample: 2 Samples

1.5 Test Duration
2023-09-29 to 2023-10-20

1.6 Test Uncertainty
Conducted Emissions Uncertainty =3.6dB
Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by _____

Print Name: Andy Xing

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100294	2023-07-17	2024-07-16
LISN	R&S	EZH3-Z5	100253	2023-07-17	2024-07-16
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2023-07-17	2024-07-16
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17
Spectrum	R&S	FSIQ26	100292	2023-07-14	2024-07-13
Spectrum	Keysight	N9020A	MY53300466	2023-03-05	2024-03-04
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2023-08-17	2024-07-16
Horn Antenna	R&S	BBHA 9120D	9120D-631	2023-08-17	2024-07-16
Power meter	Anritsu	ML2487A	6K00003613	2023-08-17	2024-07-16
Power sensor	Anritsu	MA2491A	32263	2023-08-17	2024-07-16
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2023-08-17	2024-07-16
9*6*6 Anechoic	--	--	N/A	2022-07-26	2025-07-25
EMI Test Receiver	RS	ESVB	826156/011	2023-07-14	2024-07-13
EMI Test Receiver	RS	ESCS 30	834115/006	2023-07-14	2024-07-13
Spectrum	HP/Agilent	E4407B	MY50441392	2023-07-14	2024-07-13
Spectrum	RS	FSP	1164.4391.38	2023-07-14	2024-07-13
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2023-07-14	2024-07-13
RF Cable	Zhengdi	7m	--	2023-07-14	2024-07-13
Pre-Amplifier	Schwarebeck	BBV9743	#218	2023-07-14	2024-07-13
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2023-07-14	2024-07-13
LISN	SCHAFFNER	NNB42	00012	2023-08-17	2024-07-16

2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107 & 15.407	Conducted Emission Test	Pass	Complies
FCC Part 15 Subpart E Paragraph 15.407 (b1/4), Part 15.205 and Part 15.209	Undesirable Emission and Restrict band	Pass	Complies
FCC Part 15, Paragraph 15.407 (a1/3)	Peak Transmit Power	Pass	Complies
FCC Part 15, Paragraph 15.407 (a)(1)	Peak Power Excursion	Pass	Complies
FCC Part 15, Paragraph 15.407 (a/1/3)	Peak Power Spectral Density	Pass	Complies
FCC Part 15, Paragraph 15.407(g)	Frequency Stability	Pass	Complies

3.2 Test Standards

FCC Part 15 Subpart E, Paragraph 15.407, ANSI C63.10 :2013, ANSI C63.4 :2014
KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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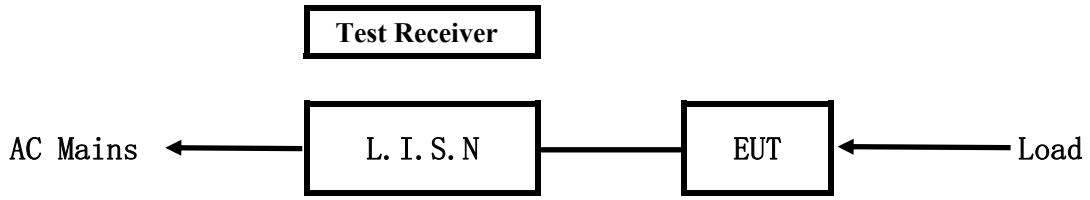
5. Power Line Conducted Emission Test

5.1 Schematics of the test



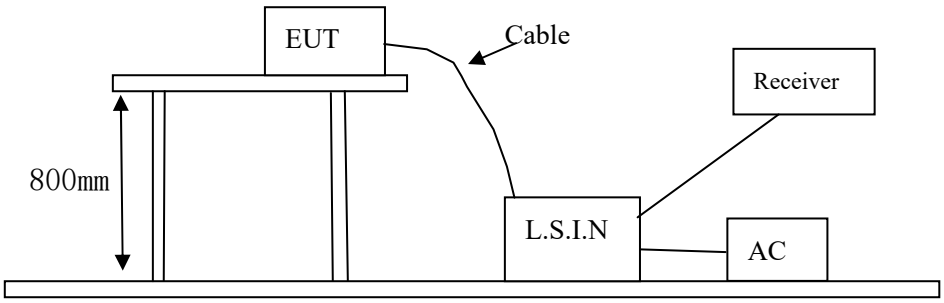
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013.The Frequency spectrum from 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10–2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
eHub	Stellar Private Cable Inc.	2.0	2BDDH-A3E6C

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B. Internal Device

Device	Manufacturer	Model	Rating
Adapter	SHENZHEN FUJIA APPLIANCE cO. LTD	FJ-SW1201500N	DOC

C. Peripherals

Device	Manufacturer	Model	Rating
Flat Panel Monitor	DELL	U2720QM	100-240V~, 50/60Hz, 2.5A

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2013.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ～ 0.50	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	56.0	46.0
5.00 ～ 30.00	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

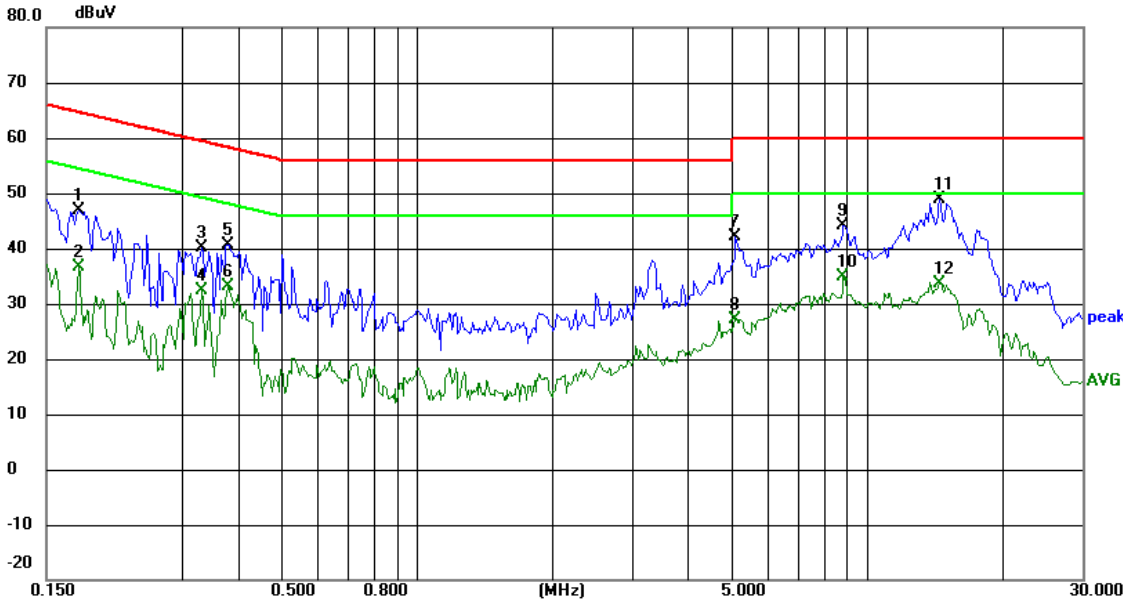
EUT Operating Environment

Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keeping WIFI Transmitting

Results: Pass **Test Power:AC120V/60Hz**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1773	37.04	9.77	46.81	64.61	-17.80	peak	P
2	0.1773	26.92	9.77	36.69	54.61	-17.92	AVG	P
3	0.3331	30.39	9.76	40.15	59.37	-19.22	peak	P
4	0.3331	22.50	9.76	32.26	49.37	-17.11	AVG	P
5	0.3800	30.93	9.76	40.69	58.28	-17.59	peak	P
6	0.3800	23.43	9.76	33.19	48.28	-15.09	AVG	P
7	5.0865	32.18	9.93	42.11	60.00	-17.89	peak	P
8	5.0865	17.23	9.93	27.16	50.00	-22.84	AVG	P
9	8.8617	25.08	18.96	44.04	60.00	-15.96	peak	P
10	8.8617	15.83	18.96	34.79	50.00	-15.21	AVG	P
11 *	14.4504	24.08	24.81	48.89	60.00	-11.11	peak	P
12	14.4504	8.85	24.81	33.66	50.00	-16.34	AVG	P

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

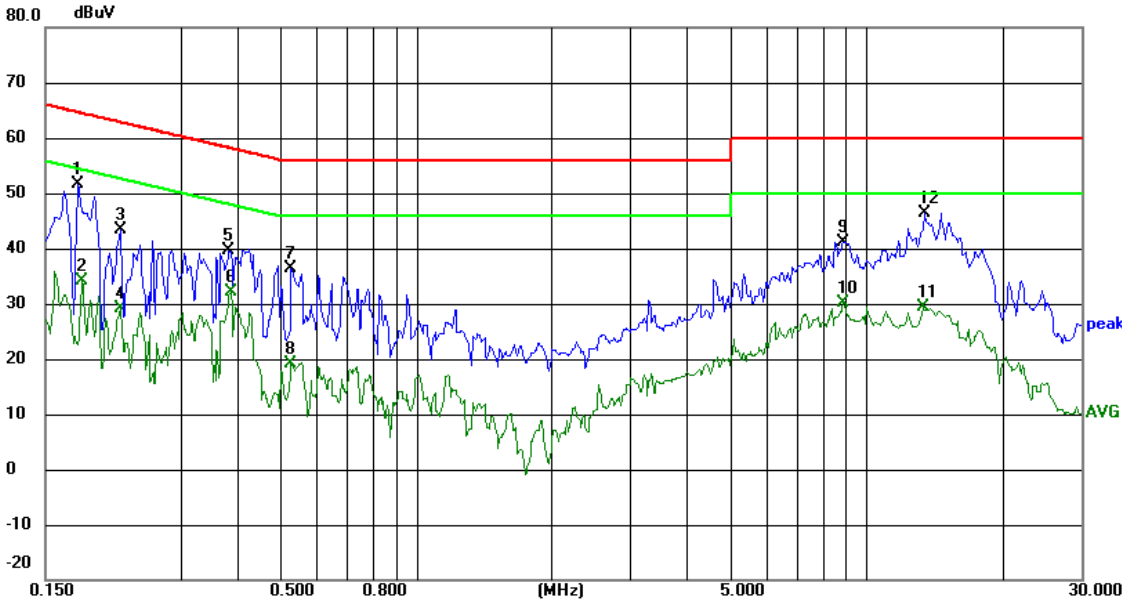
EUT Operating Environment

Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keeping WIFI Transmitting

Results: Pass **Test Power:AC120V/60Hz**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1773	41.74	9.77	51.51	64.61	-13.10	peak	P
2	0.1811	24.37	9.76	34.13	54.44	-20.31	AVG	P
3	0.2202	33.63	9.75	43.38	62.81	-19.43	peak	P
4	0.2202	19.49	9.75	29.24	52.81	-23.57	AVG	P
5	0.3840	29.76	9.76	39.52	58.19	-18.67	peak	P
6	0.3879	22.38	9.76	32.14	48.11	-15.97	AVG	P
7	0.5282	26.51	9.77	36.28	56.00	-19.72	peak	P
8	0.5282	9.33	9.77	19.10	46.00	-26.90	AVG	P
9	8.8695	22.19	18.97	41.16	60.00	-18.84	peak	P
10	8.8695	11.04	18.97	30.01	50.00	-19.99	AVG	P
11	13.3701	5.74	23.68	29.42	50.00	-20.58	AVG	P
12	13.4403	22.67	23.75	46.42	60.00	-13.58	peak	P

Note：Both 240V and 120V voltages are tested, the data of the worst-case is shown in the report.

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6 Undesirable Emission and Restrict band

6.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189

(2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.

(3) The frequency spectrum is set as follows:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

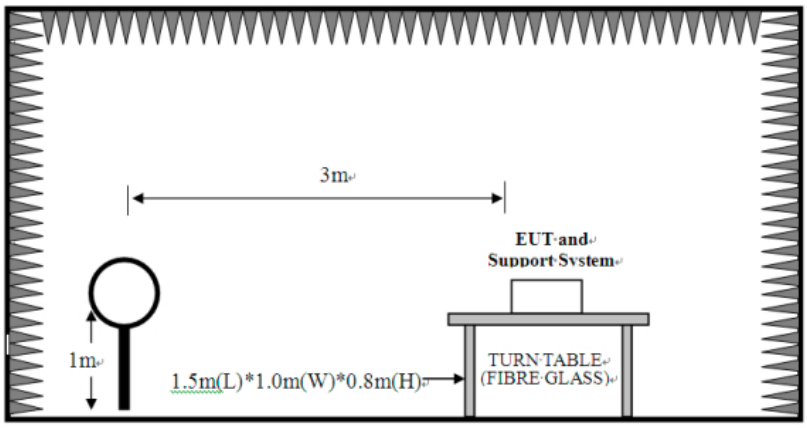
(4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

(5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.

(6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



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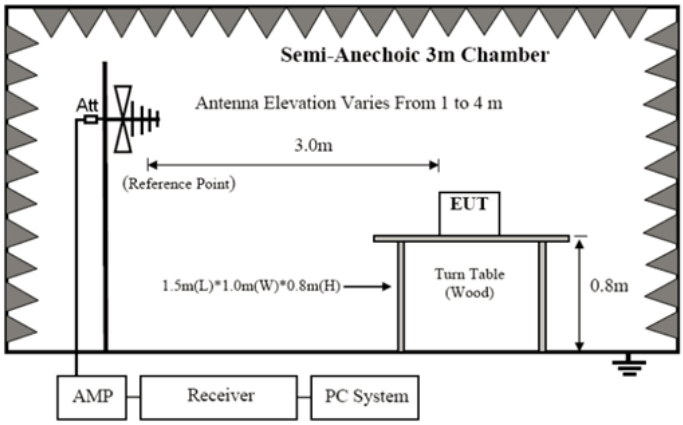
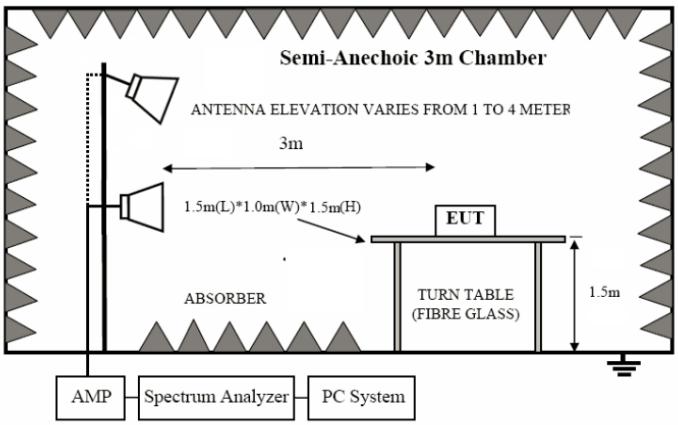
For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



6.2 Configuration of the EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

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Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.049	3	20log(2400/F(kHz)) +40log (300/3)
0.490-1.705	3	20log(24000/F(kHz)) +40log (30/3)
1.705-30	3	69.5
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

(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 EIRP of -27dBm/MHz

(2) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the higher limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (9kHz----30MHz)

EUT set Condition: **Keep Transmitting**

Results: **Pass**

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =20 log (specific distance/test distance) (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor

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Test result

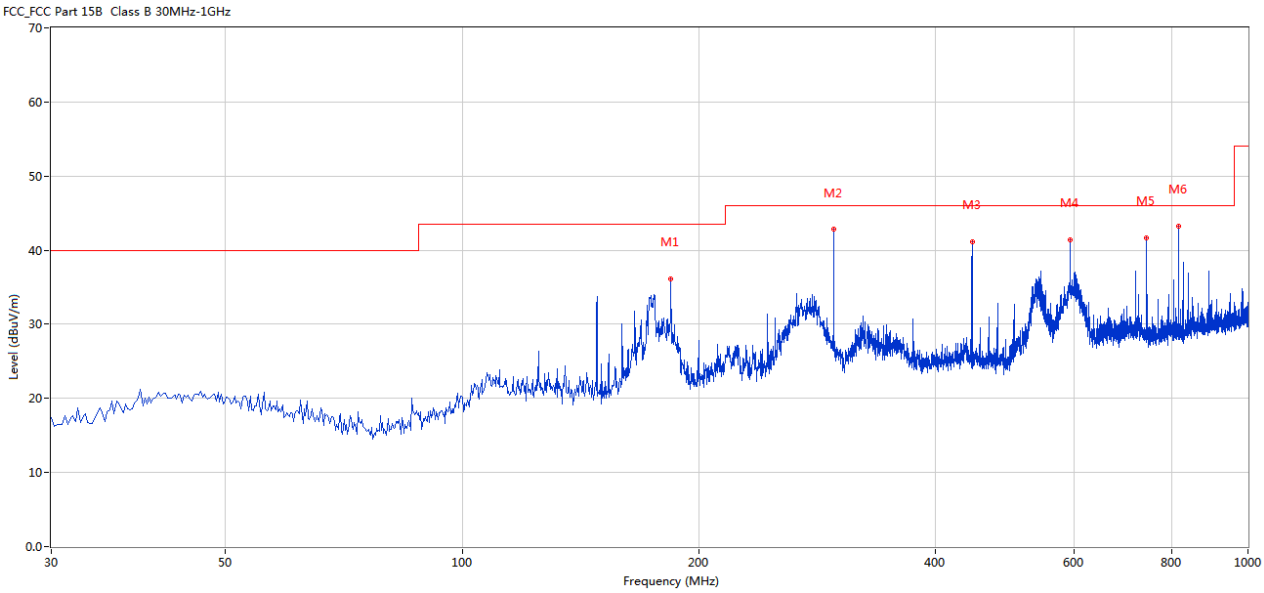
General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: **Keeping WIFI Transmitting**

Results: **Pass**

Test Figure



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	184.191	36.11	-14.98	43.5	7.39	Peak	262.00	100	Horizontal	Pass
2	296.926	42.78	-11.07	46.0	3.22	Peak	226.00	100	Horizontal	Pass
3	445.541	41.15	-8.02	46.0	4.85	Peak	344.00	100	Horizontal	Pass
4	594.156	41.37	-5.26	46.0	4.63	Peak	136.00	100	Horizontal	Pass
5	742.287	41.63	-3.44	46.0	4.37	Peak	86.00	100	Horizontal	Pass
6	815.989	43.30	-2.96	46.0	2.70	Peak	196.00	100	Horizontal	Pass

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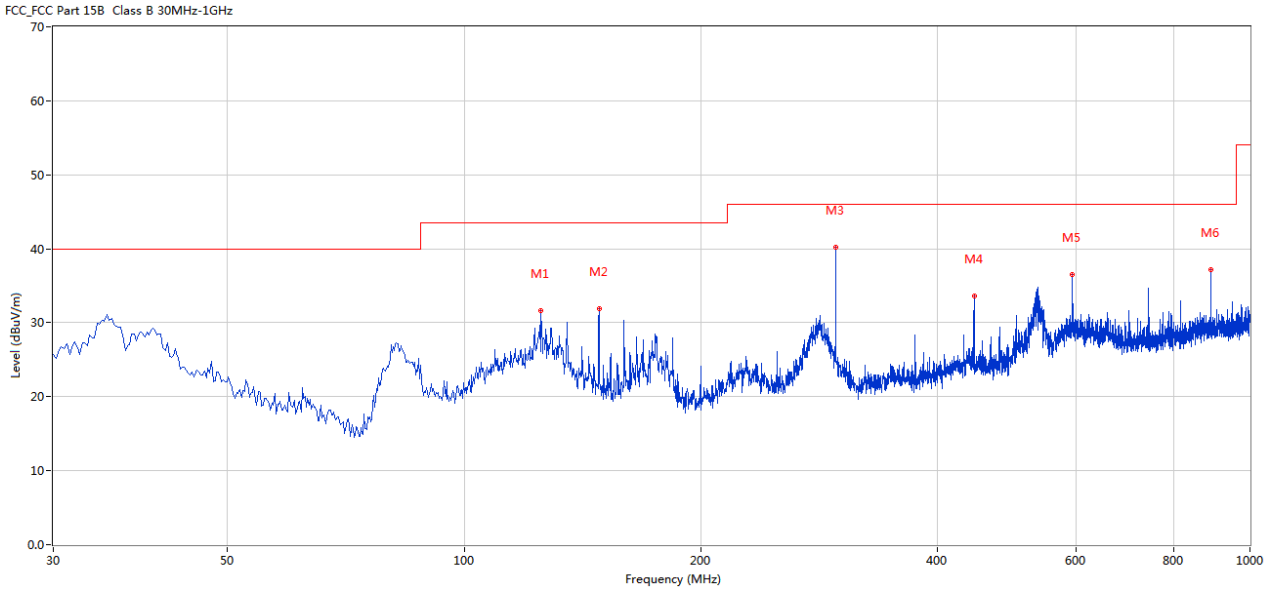
Test Figure



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	125.036	31.59	-16.32	43.5	11.91	Peak	1.00	100	Vertical	Pass
2	148.553	31.86	-17.15	43.5	11.64	Peak	133.00	100	Vertical	Pass
3	296.926	40.21	-11.07	46.0	5.79	Peak	47.00	100	Vertical	Pass
4	445.541	33.58	-8.02	46.0	12.42	Peak	137.00	100	Vertical	Pass
5	593.914	36.49	-5.25	46.0	9.51	Peak	108.00	100	Vertical	Pass
6	890.902	37.17	-1.91	46.0	8.83	Peak	14.00	100	Vertical	Pass

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Operation Mode: Keeping Transmitting under CH36 for 11a at 6Mbps- ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5180.00	101.64（PK）	V	Fundamental Frequency
5180.00	92.23（PK）	H	
10360	--	V	74(Peak)/ 54(AV)
10360	--	H	74(Peak)/ 54(AV)
15540	--	H/V	74(Peak)/ 54(AV)
20720	--	H/V	74(Peak)/ 54(AV)
25900	--	H/V	74(Peak)/ 54(AV)
31080	--	H/V	74(Peak)/ 54(AV)
36260	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Pre-amplifier
2. Remark "---" means that the emissions level is too low to be measured
The 802.11a SISO mode ANT 1 is the worst case.

Operation Mode: Keeping Transmitting under CH40 for 11a at 6Mbps - ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5200.00	102.85（PK）	V	Fundamental Frequency
5200.00	91.73（PK）	H	
10400	--	V	74(Peak)/ 54(AV)
10400	--	H	74(Peak)/ 54(AV)
15600	--	V	74(Peak)/ 54(AV)
20800	--	H/V	74(Peak)/ 54(AV)
26000	--	H/V	74(Peak)/ 54(AV)
31200	--	H/V	74(Peak)/ 54(AV)
36400	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Pre-amplifier
2. Remark "---" means that the emissions level is too low to be measured
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Operation Mode: Keeping Transmitting under CH48 for 11a at 6Mbps - ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5240.00	102.22（PK）	V	Fundamental Frequency
5240.00	90.74（PK）	H	
10480	--	V	74(Peak)/ 54(AV)
10480	--	H	74(Peak)/ 54(AV)
15720	--	H/V	74(Peak)/ 54(AV)
20960	--	H/V	74(Peak)/ 54(AV)
26200	--	H/V	74(Peak)/ 54(AV
31440	--	H/V	74(Peak)/ 54(AV)
36680	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable – Pre-amplifier
2. Remark "---" means that the emissions level is too low to be measured
The 802.11a SISO mode ANT 1 is the worst case.

Operation Mode: Keeping Transmitting under CH36 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5180.00	99.85（PK）	V	Fundamental Frequency
5180.00	90.72（PK）	H	
10360	45.52（PK）	V	74(Peak)/ 54(AV)
10360	41.75（PK）	H	74(Peak)/ 54(AV)
15540	--	H/V	74(Peak)/ 54(AV)
20720	--	H/V	74(Peak)/ 54(AV)
25900	--	H/V	74(Peak)/ 54(AV)
31080	--	H/V	74(Peak)/ 54(AV)
36260	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The MIMO mode 802.11n is the worst case.

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Operation Mode: Keeping Transmitting under CH40 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5200.00	101.07（PK）	V	Fundamental Frequency
5200.00	90.35（PK）	H	
10400	44.74（PK）	V	74(Peak)/ 54(AV)
10400	41.85（PK）	H	74(Peak)/ 54(AV)
15600	--	H/V	74(Peak)/ 54(AV)
20800	--	H/V	74(Peak)/ 54(AV)
26000	--	H/V	74(Peak)/ 54(AV)
31200	--	H/V	74(Peak)/ 54(AV)
36400	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The MIMO mode 802.11n is the worst case.

Operation Mode: Keeping Transmitting under CH48 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5240.00	100.45（PK）	V	Fundamental Frequency
5240.00	91.63（PK）	H	
10480	45.44（PK）	V	74(Peak)/ 54(AV)
10480	41.81（PK）	H	74(Peak)/ 54(AV)
15720	--	H/V	74(Peak)/ 54(AV)
20960	--	H/V	74(Peak)/ 54(AV)
26200	--	H/V	74(Peak)/ 54(AV)
31440	--	H/V	74(Peak)/ 54(AV)
36680	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The MIMO mode 802.11n is the worst case.

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Operation Mode: Keeping Transmitting under CH149 for 11a at 6Mbps-ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5745.00	101.13（PK）	V	Fundamental Frequency
5745.00	91.73（PK）	H	
11490	44.74（PK）	V	74(Peak)/ 54(AV)
11490	42.50（PK）	H	74(Peak)/ 54(AV)
17235	--	H/V	74(Peak)/ 54(AV)
22980	--	H/V	74(Peak)/ 54(AV)
28725	--	H/V	74(Peak)/ 54(AV)
34470	--	H/V	74(Peak)/ 54(AV)
40215	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The 802.11a SISO mode ANT 1 is the worst case.

Operation Mode: Keeping Transmitting under CH157 for 11a at 6Mbps-ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5785.00	100.74（PK）	V	Fundamental Frequency
5785.00	91.75 PK）	H	
11570	45.74（PK）	V	74(Peak)/ 54(AV)
11570	42.31（PK）	H	74(Peak)/ 54(AV)
17355	--	H/V	74(Peak)/ 54(AV)
23140	--	H/V	74(Peak)/ 54(AV)
28925	--	H/V	74(Peak)/ 54(AV)
34710	--	H/V	74(Peak)/ 54(AV)
40495	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The 802.11a SISO mode ANT 1 is the worst case.

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Operation Mode: Keeping Transmitting under CH165 for 11a at 6Mbps-ANT1

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5825.00	101.06（PK）	V	Fundamental Frequency
5825.00	90.73（PK）	H	
11650	46.75（PK）	V	74(Peak)/ 54(AV)
11650	42.34（PK）	H	74(Peak)/ 54(AV)
17475	--	H/V	74(Peak)/ 54(AV)
23300	--	H/V	74(Peak)/ 54(AV)
29125	--	H/V	74(Peak)/ 54(AV)
34950	--	H/V	74(Peak)/ 54(AV)
40775	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The 802.11a SISO mode ANT 1 is the worst case.

Operation Mode: Keeping Transmitting under CH149 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5745.00	102.07（PK）	V	Fundamental Frequency
5745.00	92.63（PK）	H	
11490	45.31（PK）	V	74(Peak)/ 54(AV)
11490	42.60（PK）	H	74(Peak)/ 54(AV)
17235	--	H/V	74(Peak)/ 54(AV)
22980	--	H/V	74(Peak)/ 54(AV)
28725	--	H/V	74(Peak)/ 54(AV)
34470	--	H/V	74(Peak)/ 54(AV)
40215	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The MIMO mode 802.11n is the worst case.

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Operation Mode: Keeping Transmitting under CH157 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5785.00	99.86（PK）	V	Fundamental Frequency
5785.00	91.21（PK）	H	
11570	45.37（PK）	V	74(Peak)/ 54(AV)
11570	44.63（PK）	H	74(Peak)/ 54(AV)
17355	--	H/V	74(Peak)/ 54(AV)
23140	--	H/V	74(Peak)/ 54(AV)
28925	--	H/V	74(Peak)/ 54(AV)
34710	--	H/V	74(Peak)/ 54(AV)
40495	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
The MIMO mode 802.11n is the worst case.

Operation Mode: Keeping Transmitting under CH165 for 11n20 at MCS0-MIMO

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5825.00	101.43（PK）	V	Fundamental Frequency
5825.00	91.52（PK）	H	
11650	44.74（PK）	V	74(Peak)/ 54(AV)
11650	43.16（PK）	H	74(Peak)/ 54(AV)
17475	--	H/V	74(Peak)/ 54(AV)
23300	--	H/V	74(Peak)/ 54(AV)
29125	--	H/V	74(Peak)/ 54(AV)
34950	--	H/V	74(Peak)/ 54(AV)
40775	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
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Restricted band Measurement

EUT：	eHub	Model Name ：	2.0
Temperature：	24℃	Relative Humidity：	51%
Pressure：	1010 hPa	**Test Voltage：**	DC 12V
Test Mode ：	802.11a-ANT1		
Note：	1. The transmitter was setup to transmit at the lowest channel (CH36). Then the field strength was measured at 4500-5150 MHz. 2. The transmitter was setup to transmit at the highest channel (CH48). Then the field strength was measured at 5190-5410 MHz. 3. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	36.81	4.78	41.59	68.20	CH36
5185.080	V	85.14	4.67	---	---	CH36
5150.000	H	37.11	4.78	41.89	68.20	CH36
5184.720	H	88.61	4.67	---	---	CH36
5244.130	V	85.59	4.52	---	---	CH48
5350.000	V	37.47	4.30	41.77	68.20	CH48
5237.765	H	88.23	4.53	---	---	CH48
5350.000	H	36.99	4.30	41.29	68.20	CH48

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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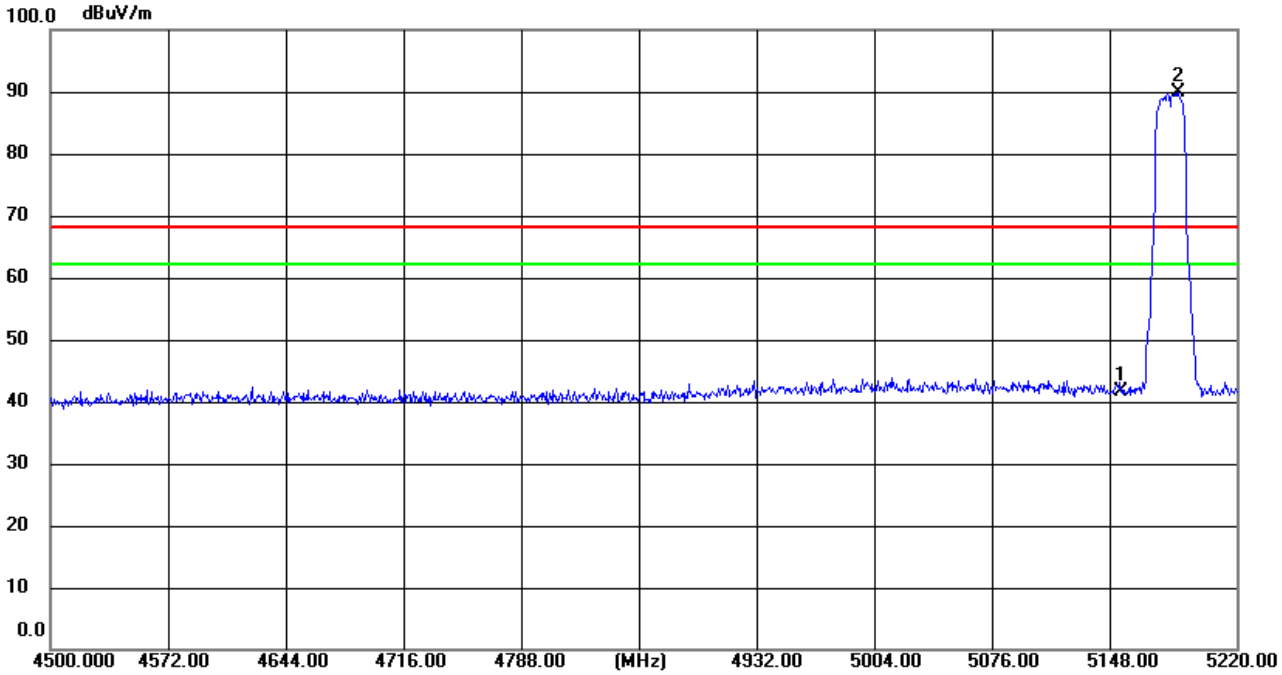
802.11a (5.15GHz-5.25GHz)

CH 36 (Lower) Data rate 6Mbps

Detector mode: Peak **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

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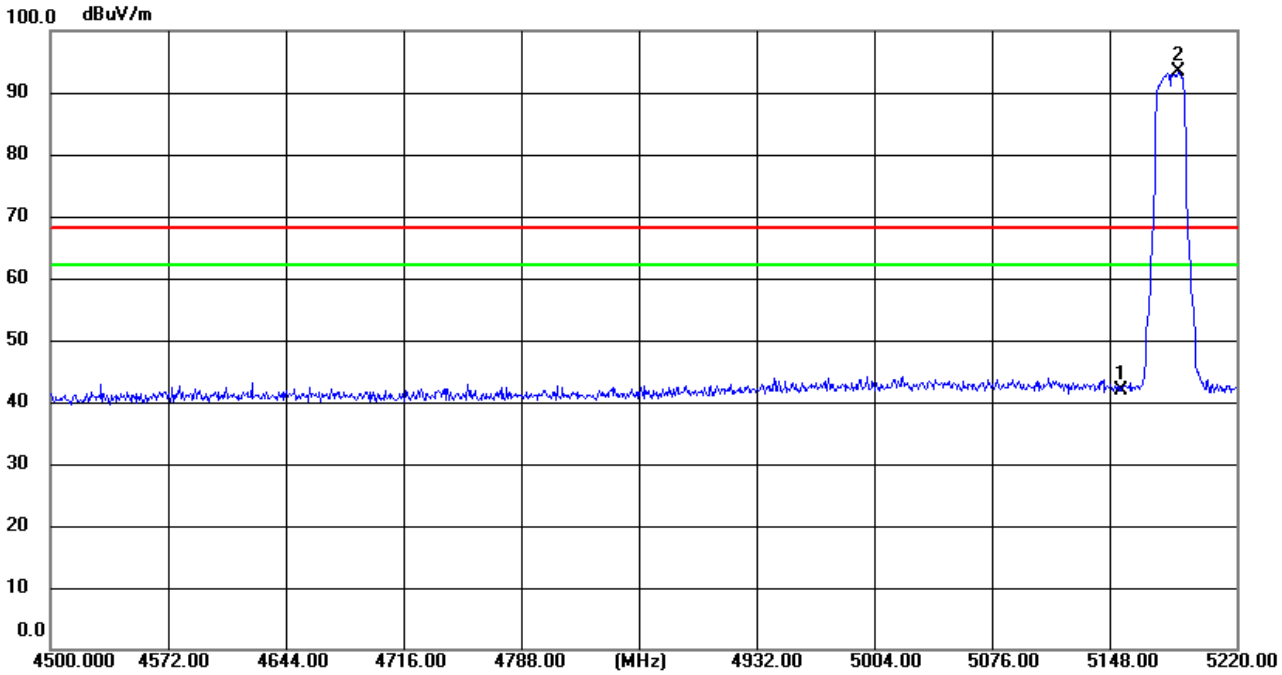
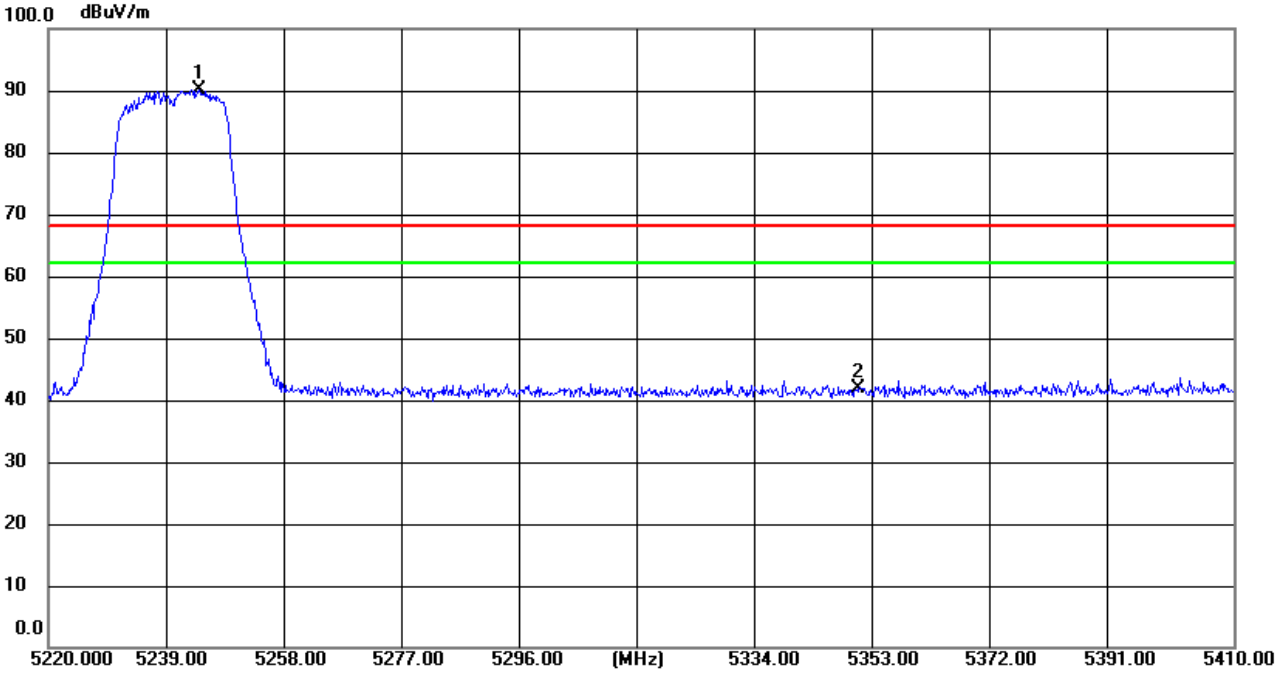


802.11a (5.15GHz-5.25GHz)

CH 48 (Upper) Data rate 6Mbps

Detector mode: Peak **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

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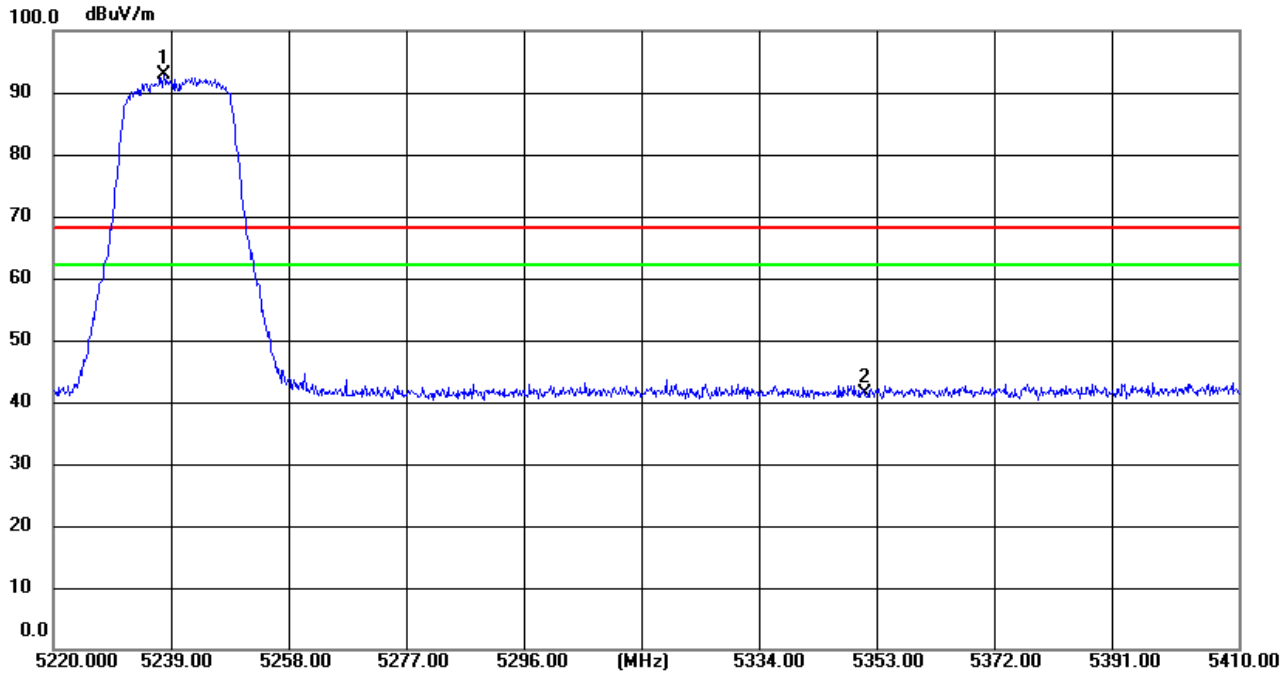

EUT:	eHub	Model Name :	2.0
Temperature:	24℃	Relative Humidity:	51%
Pressure:	1010 hPa	**Test Voltage:**	DC 12V
Test Mode :	802.11n BW20MHz-MIMO		
Note:	1. The transmitter was setup to transmit at the lowest channel (CH36). Then the field strength was measured at 4500-5150 MHz. 2. The transmitter was setup to transmit at the highest channel (CH48). Then the field strength was measured at 5190-5410 MHz. 3. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	36.9	4.78	41.68	68.20	CH36
5182.200	V	85.9	4.68	---	---	CH36
5150.000	H	37.66	4.78	42.44	68.20	CH36
5183.280	H	89.43	4.67	---	---	CH36

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5244.035	V	85.02	4.52	---	---	CH48
5350.000	V	36.45	4.30	40.75	68.20	CH48
5238.430	H	88.17	4.53	---	---	CH48
5350.000	H	36.11	4.30	40.41	68.20	CH48

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

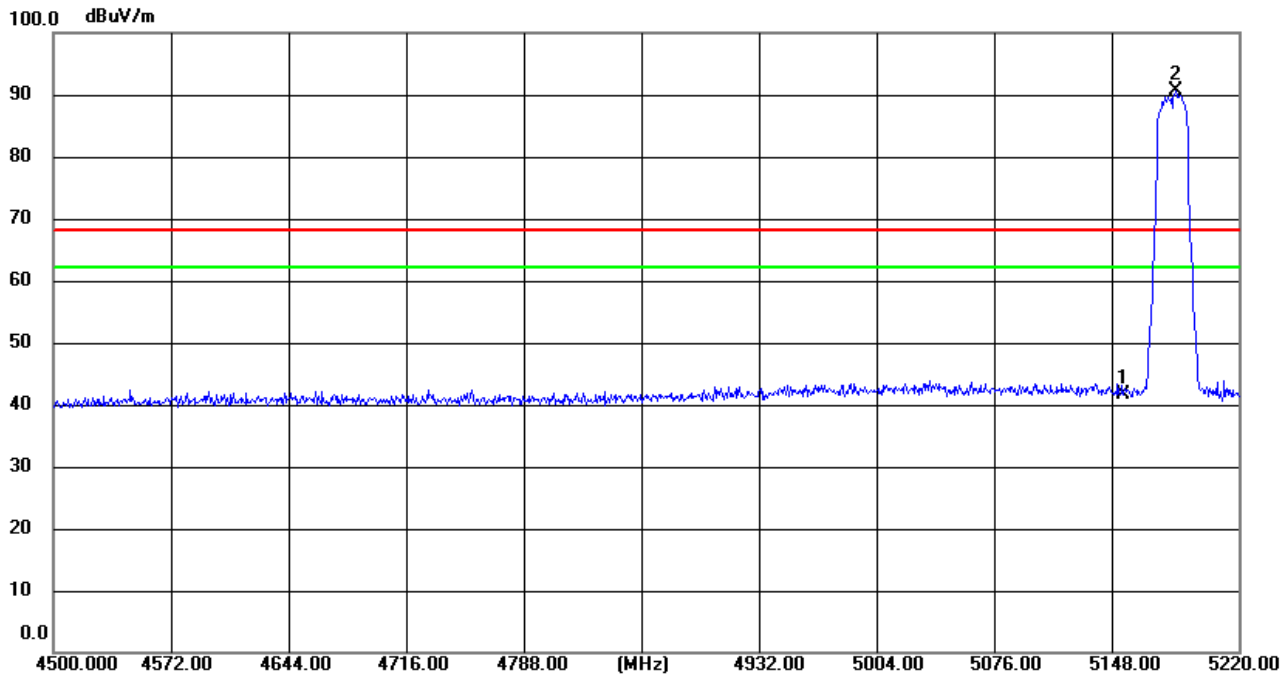
(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

802.11n(20M) (5.15GHz-5.25GHz)

CH 36 (Lower) Data rate 7.2Mbps

Detector mode: Peak **Polarity: Vertical**



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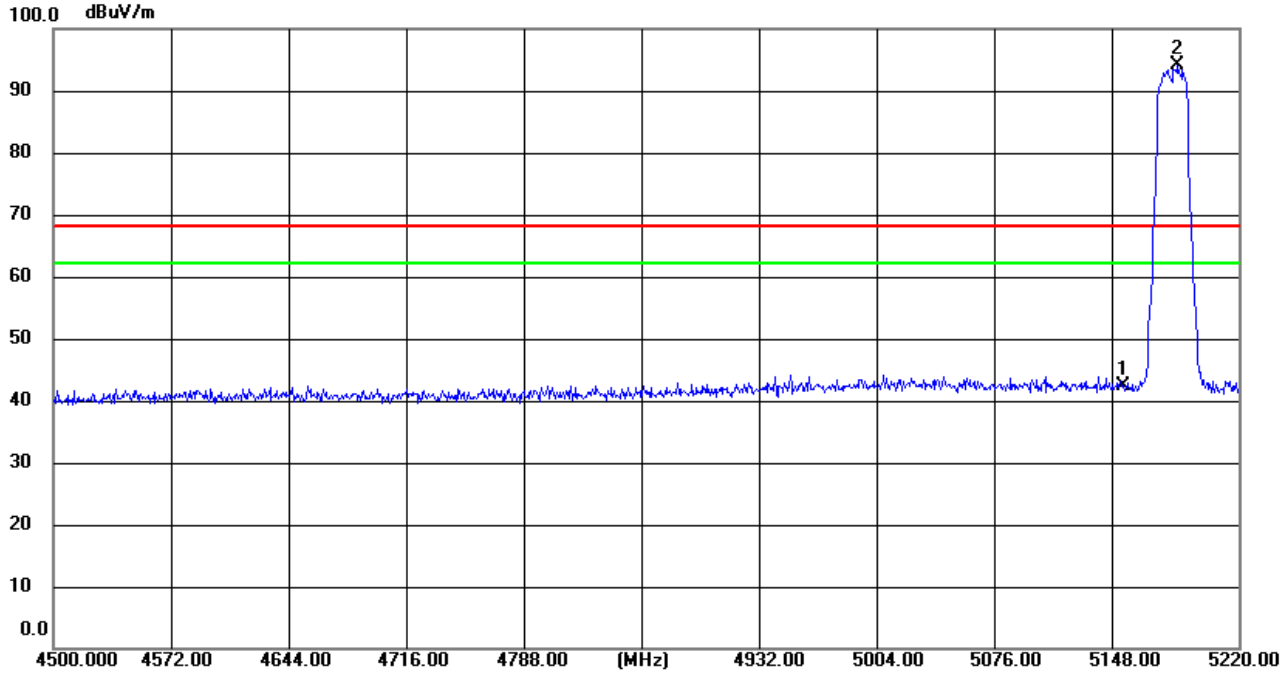
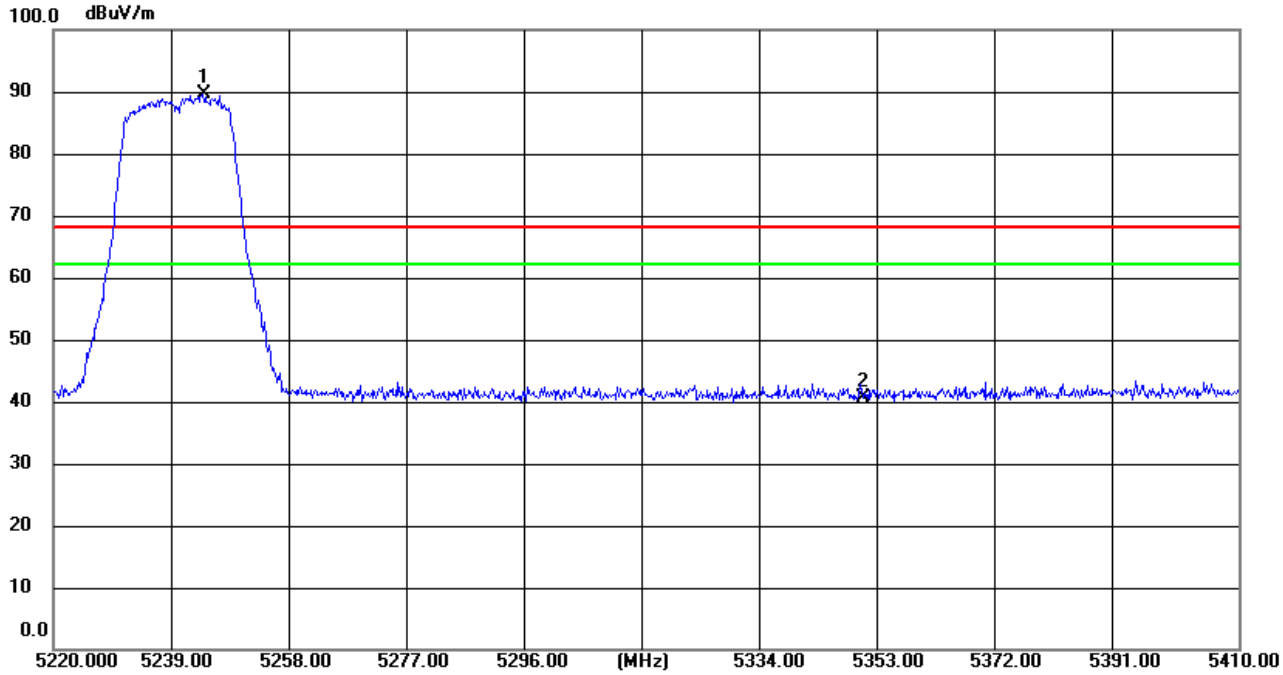
Detector mode: Peak **Polarity: Horizontal**



802.11n(20M) (5.15GHz-5.25GHz)

CH 48(Upper) Data rate 7.2Mbps

Detector mode: Peak **Polarity: Vertical**



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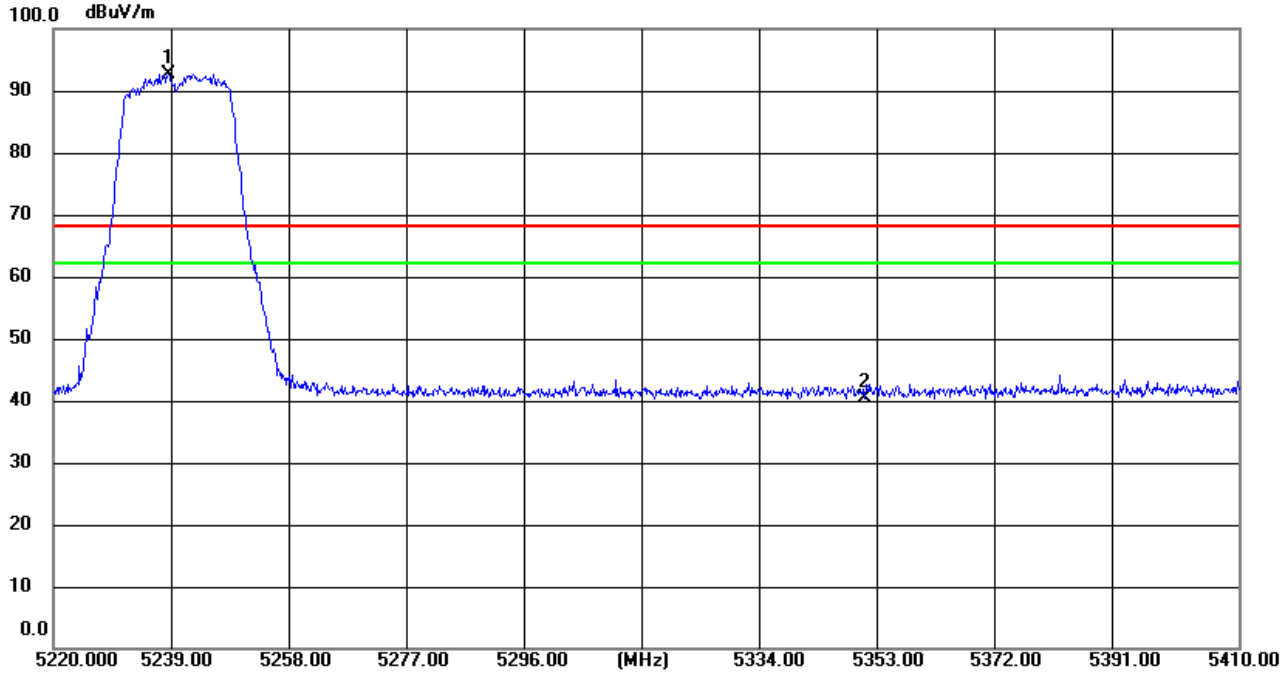
Detector mode: Peak **Polarity: Horizontal**



EUT:	eHub	Model Name :	2.0
Temperature:	24℃	Relative Humidity:	51%
Pressure:	1010 hPa	**Test Voltage:**	DC 12V
Test Mode :	802.11ac BW20MHz -MIMO		
Note:	1. The transmitter was setup to transmit at the lowest channel (CH36). Then the field strength was measured at 4500-5150 MHz. 2. The transmitter was setup to transmit at the highest channel (CH48). Then the field strength was measured at 5190-5410 MHz. 3. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	36.93	4.78	41.71	68.20	CH36
5184.720	V	84.98	4.67	---	---	CH36
5150.000	H	36.95	4.78	41.73	68.20	CH36
5181.840	H	89.03	4.68	---	---	CH36
5245.650	V	86.04	4.51	---	---	CH48

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5350.000	V	37.28	4.30	41.58	68.20	CH48
5241.470	H	88.46	4.53	---	---	CH48
5350.000	H	37.3	4.30	41.60	68.20	CH48

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

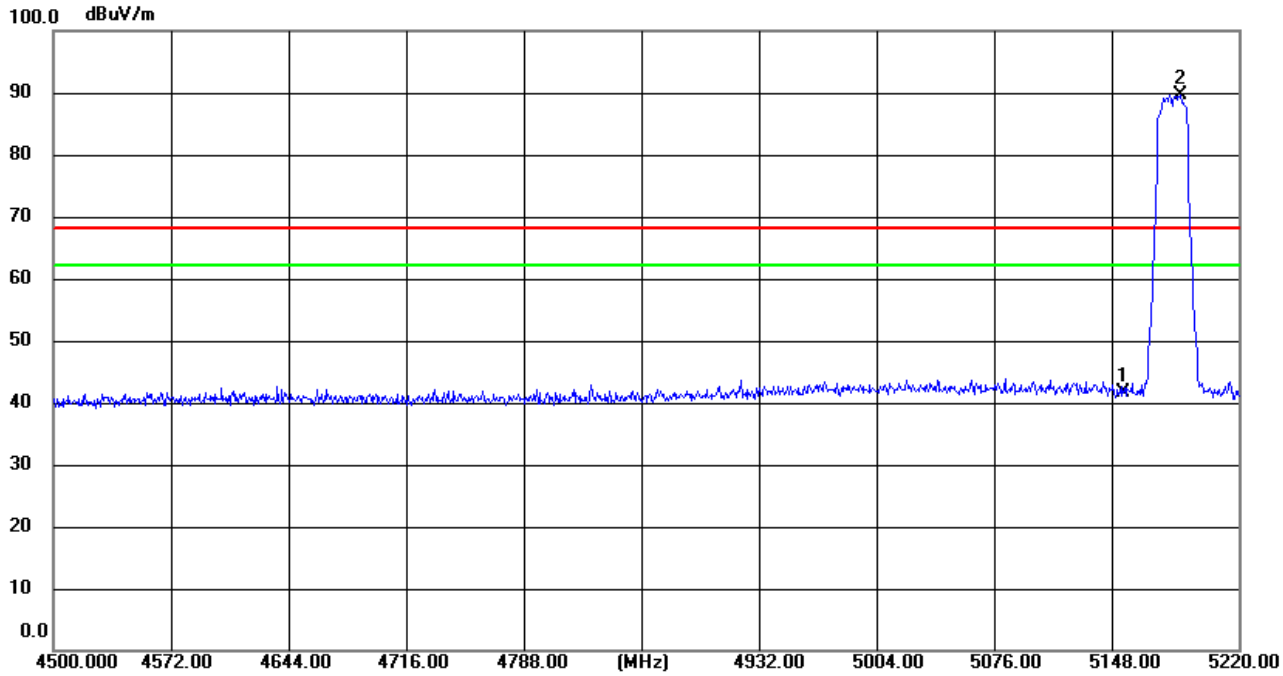
(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

802.11ac(20M) (5.15GHz-5.25GHz)

CH 36 (Lower) Data rate 7.2Mbps

Detector mode: Peak **Polarity: Vertical**



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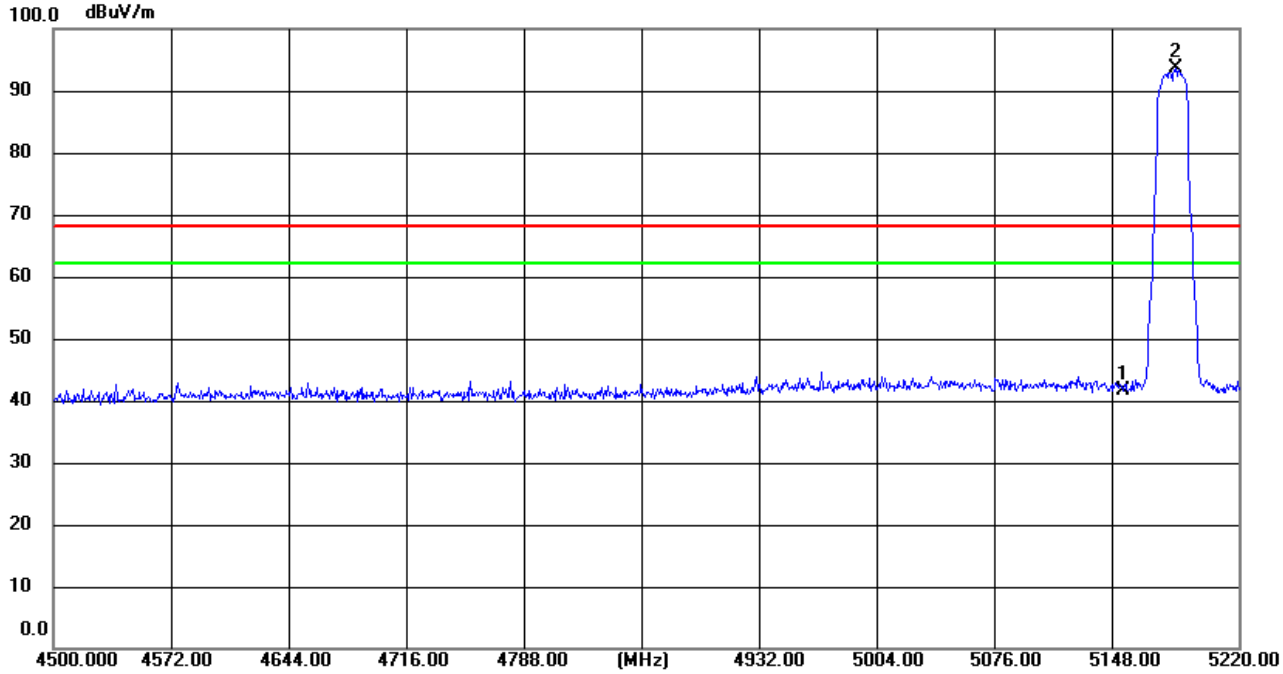
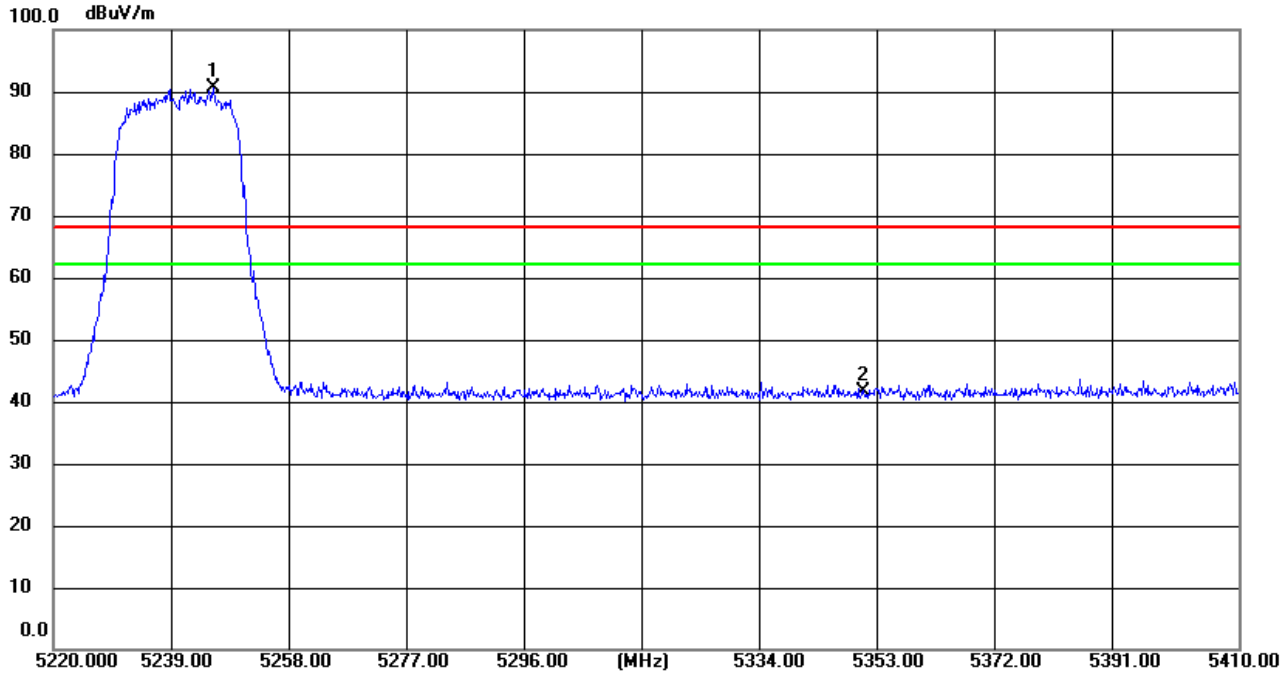
Detector mode: Peak **Polarity: Horizontal**



802.11 ac(20M) (5.15GHz-5.25GHz)

CH 48(Upper) Data rate 7.2Mbps

Detector mode: Peak Polarity: Vertical



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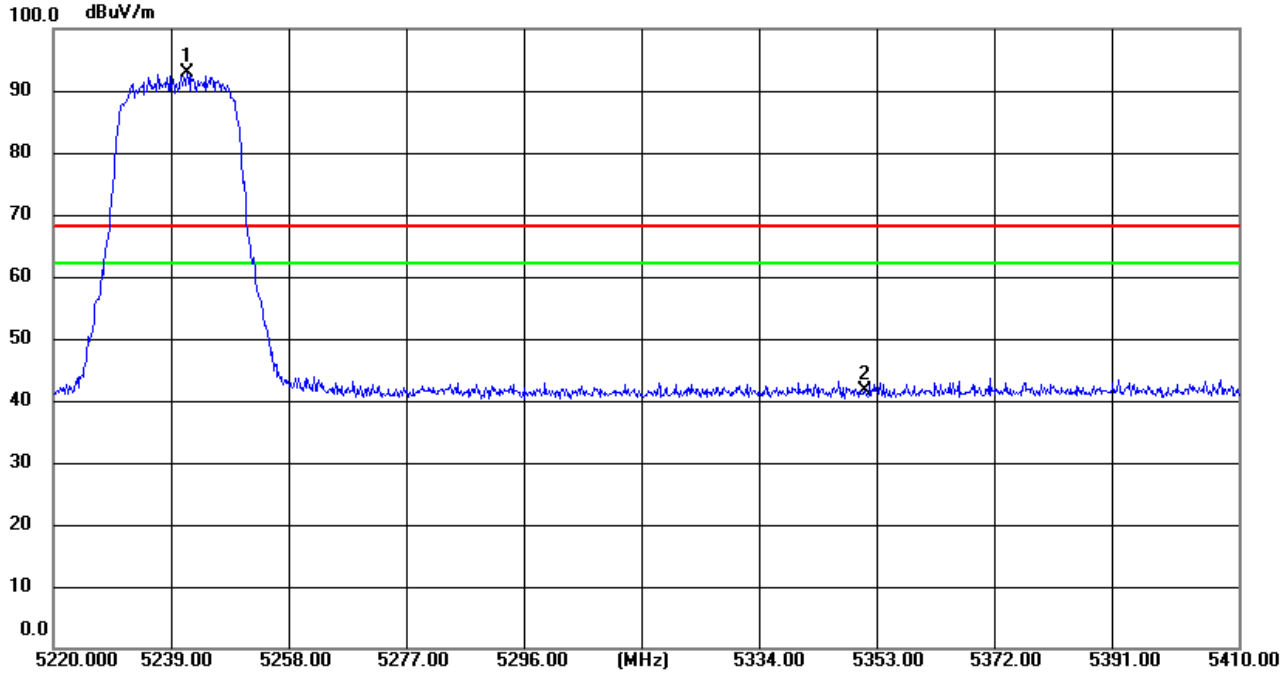
Detector mode: Peak

Polarity: Horizontal



EUT:	eHub	Model Name :	2.0
Temperature:	24℃	Relative Humidity:	51%
Pressure:	1010 hPa	**Test Voltage:**	DC 12V
Test Mode :	802.11n BW40MHz -MIMO		
Note:	1. The transmitter was setup to transmit at the lowest channel (CH38). Then the field strength was measured at 4500-5150 MHz. 2. The transmitter was setup to transmit at the highest channel (CH46). Then the field strength was measured at 5190-5410 MHz. 3. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	37.01	4.78	41.79	68.20	CH38
5200.200	V	82.89	4.61	---	---	CH38
5150.000	H	36.71	4.78	41.49	68.20	CH38
5199.480	H	85.46	4.61	---	---	CH38
5238.850	V	81.8	4.53	---	---	CH46

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5350.000	V	37.44	4.30	41.74	68.20	CH46
5227.930	H	85.95	4.56	---	---	CH46
5350.000	H	38.36	4.30	42.66	68.20	CH46

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

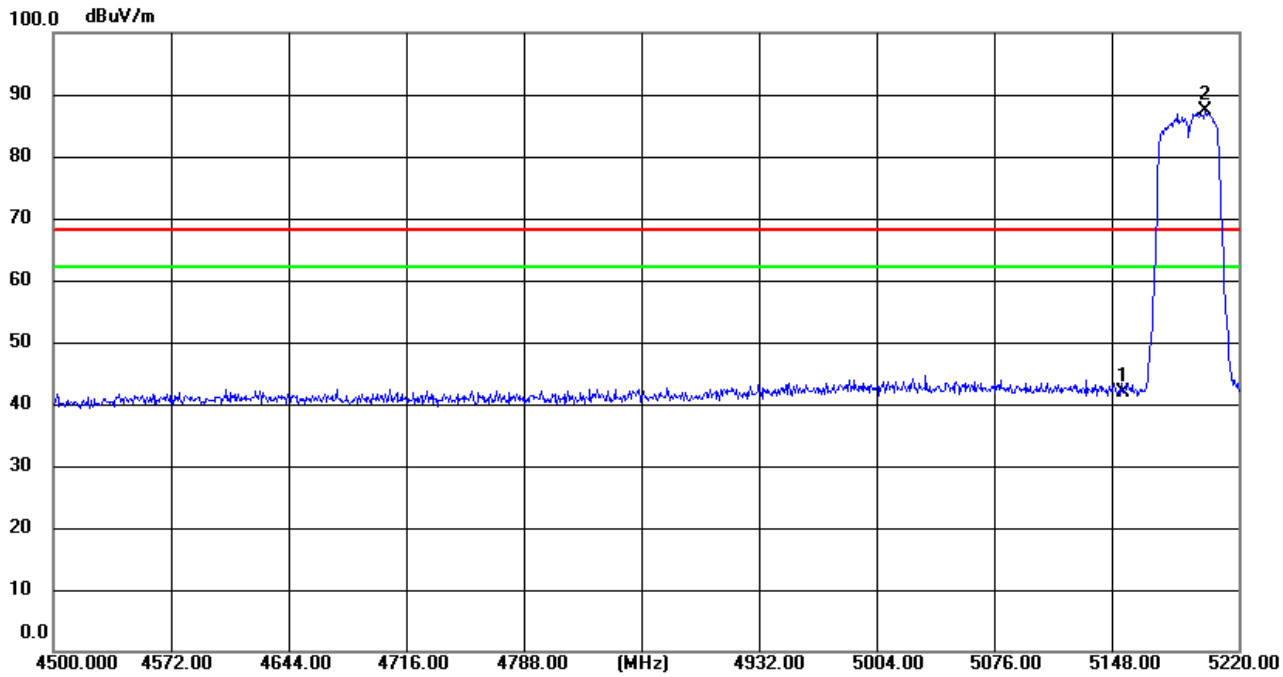
(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

802.11n(40M) (5.15GHz-5.25GHz)

CH 38 (Lower) Data rate 7.2Mbps

Detector mode: Peak **Polarity: Vertical**



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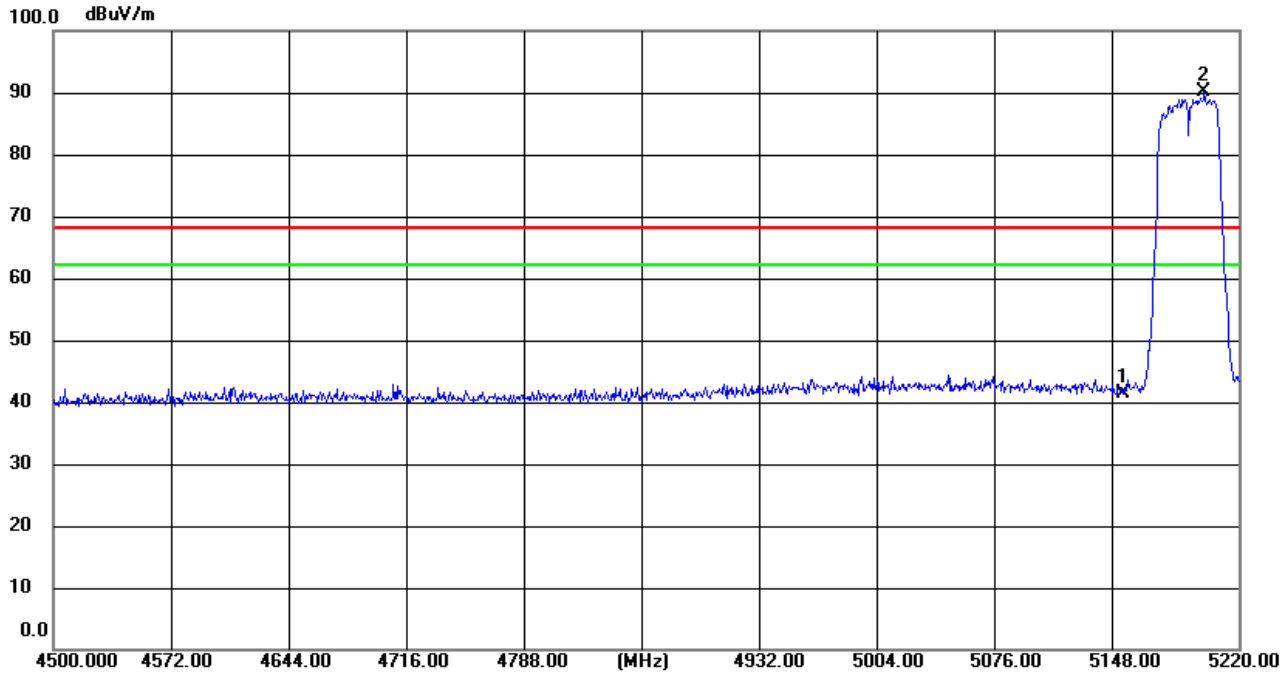
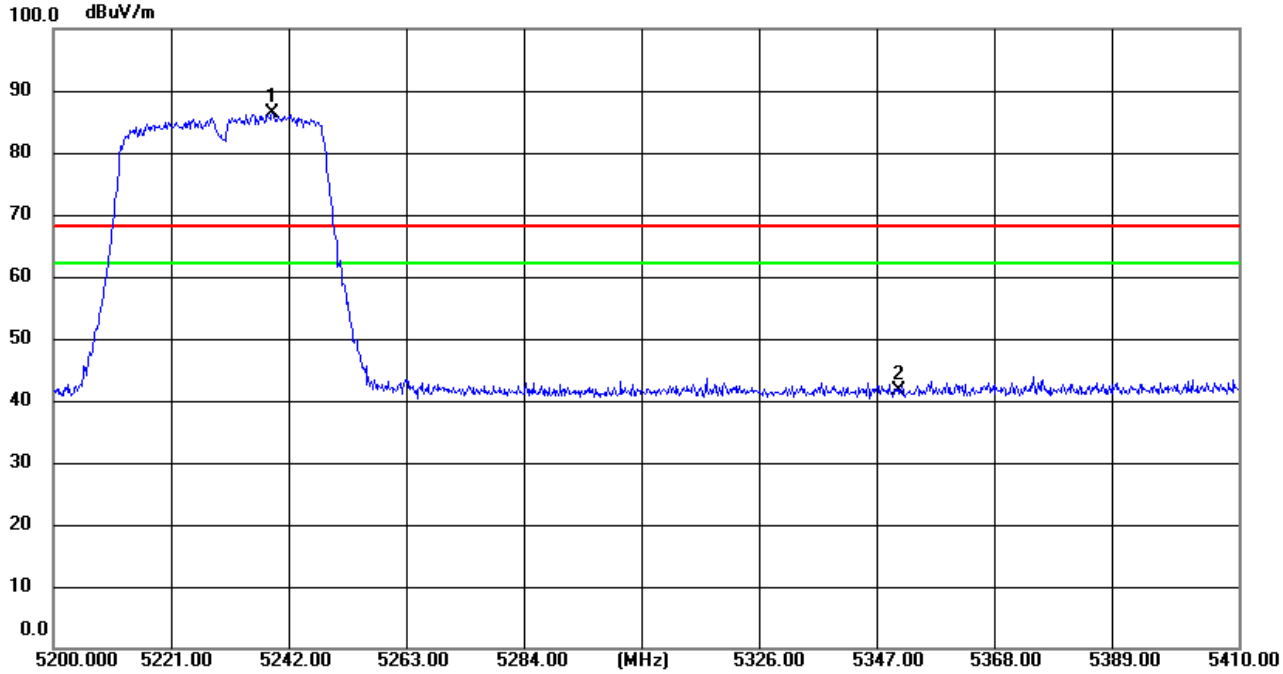
Detector mode: Peak **Polarity: Horizontal**



802.11n(40M) (5.15GHz-5.25GHz)

CH 46(Upper) Data rate 7.2Mbps

Detector mode: Peak Polarity: Vertical



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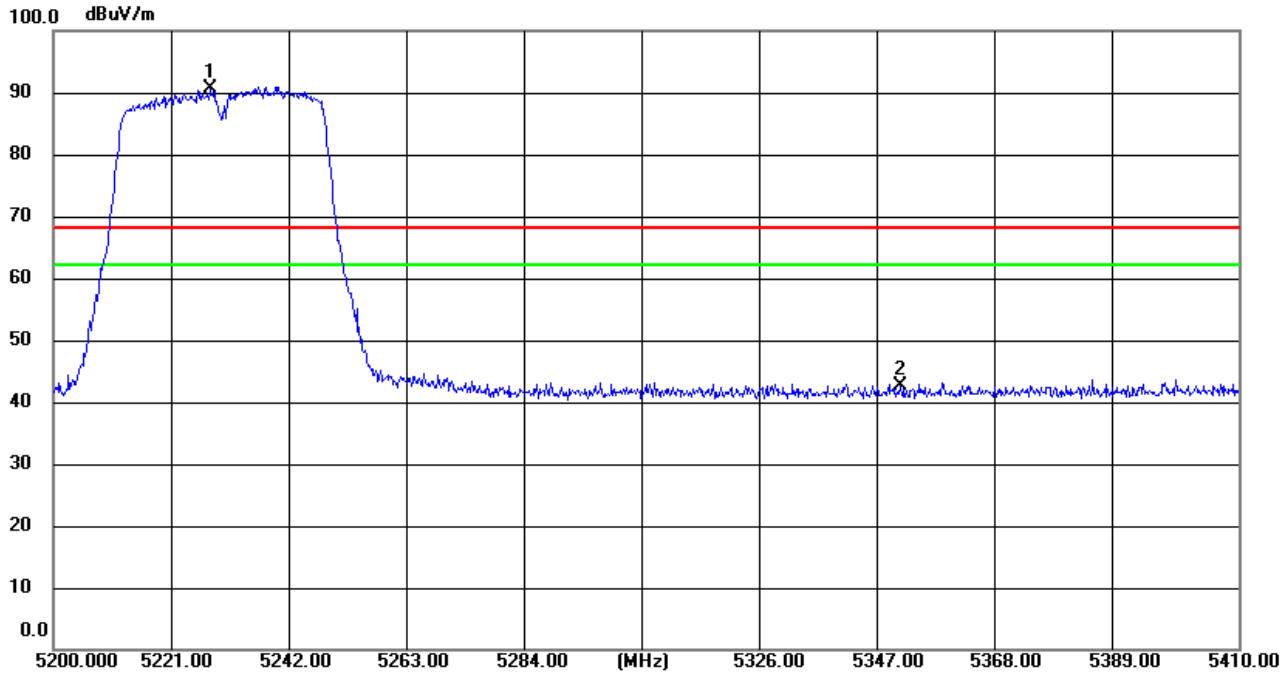
Detector mode: Peak

Polarity: Horizontal



EUT:	eHub	Model Name :	2.0
Temperature:	24℃	Relative Humidity:	51%
Pressure:	1010 hPa	**Test Voltage:**	DC 12V
Test Mode :	802.11ac BW40MHz -MIMO		
Note:	1. The transmitter was setup to transmit at the lowest channel (CH38). Then the field strength was measured at 4500-5150 MHz. 2. The transmitter was setup to transmit at the highest channel (CH46). Then the field strength was measured at 5190-5410 MHz. 3. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	36.99	4.78	41.77	68.20	CH38
5200.200	V	83.12	4.61	---	---	CH38
5150.000	H	36.99	4.78	41.77	68.20	CH38
5191.200	H	85.3	4.65	---	---	CH38

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5241.685	V	83.5	4.53	---	---	CH46
5350.000	V	38.22	4.30	42.52	68.20	CH46
5235.070	H	87.13	4.54	---	---	CH46
5350.000	H	38.87	4.30	43.17	68.20	CH46

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

802.11ac(40M) (5.15GHz-5.25GHz)

CH 38 (Lower) Data rate 7.2Mbps

Detector mode: Peak **Polarity: Vertical**

The report refers only to the sample tested and does not apply to the bulk.
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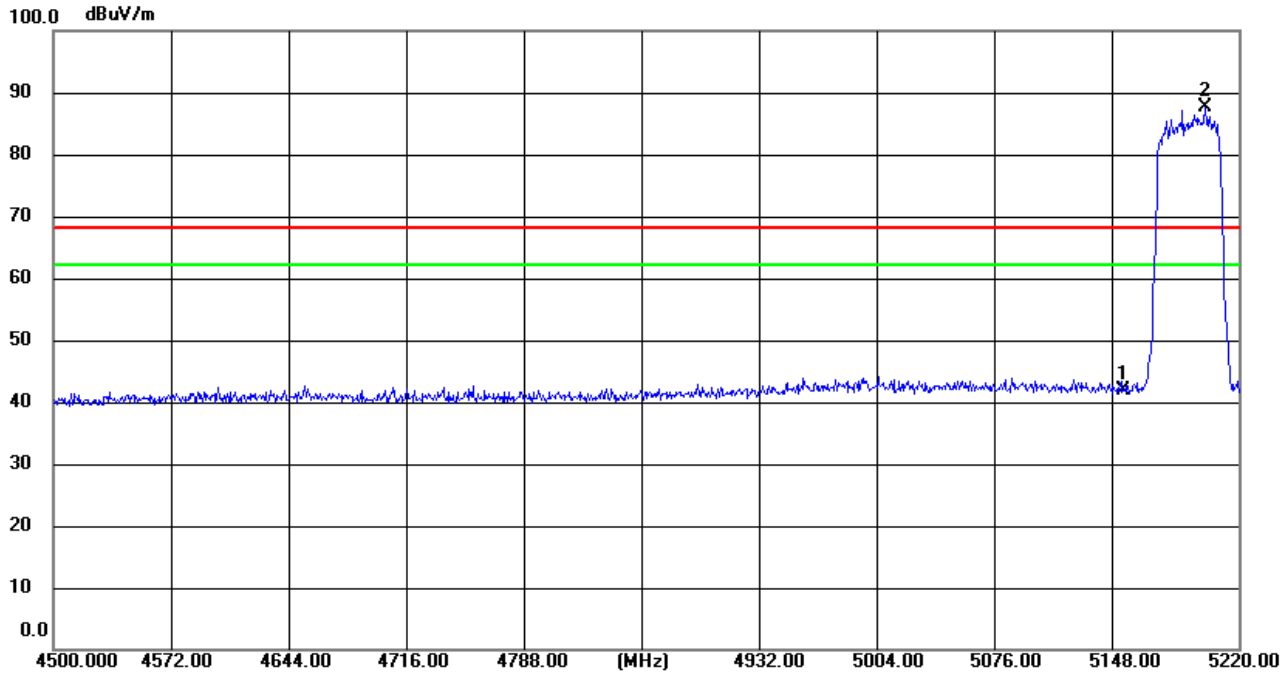
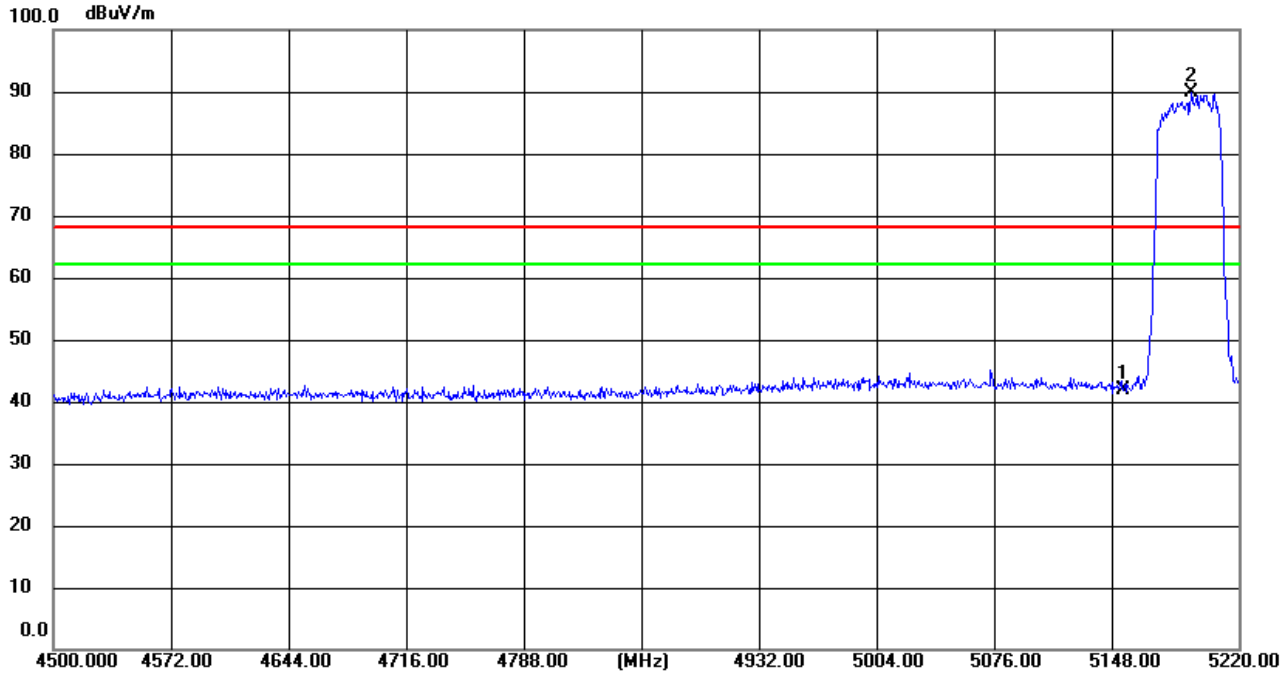


Detector mode: Peak **Polarity: Horizontal**



802.11ac(40M) (5.15GHz-5.25GHz)

CH 46(Upper) Data rate 7.2Mbps

Detector mode: Peak Polarity: Vertical

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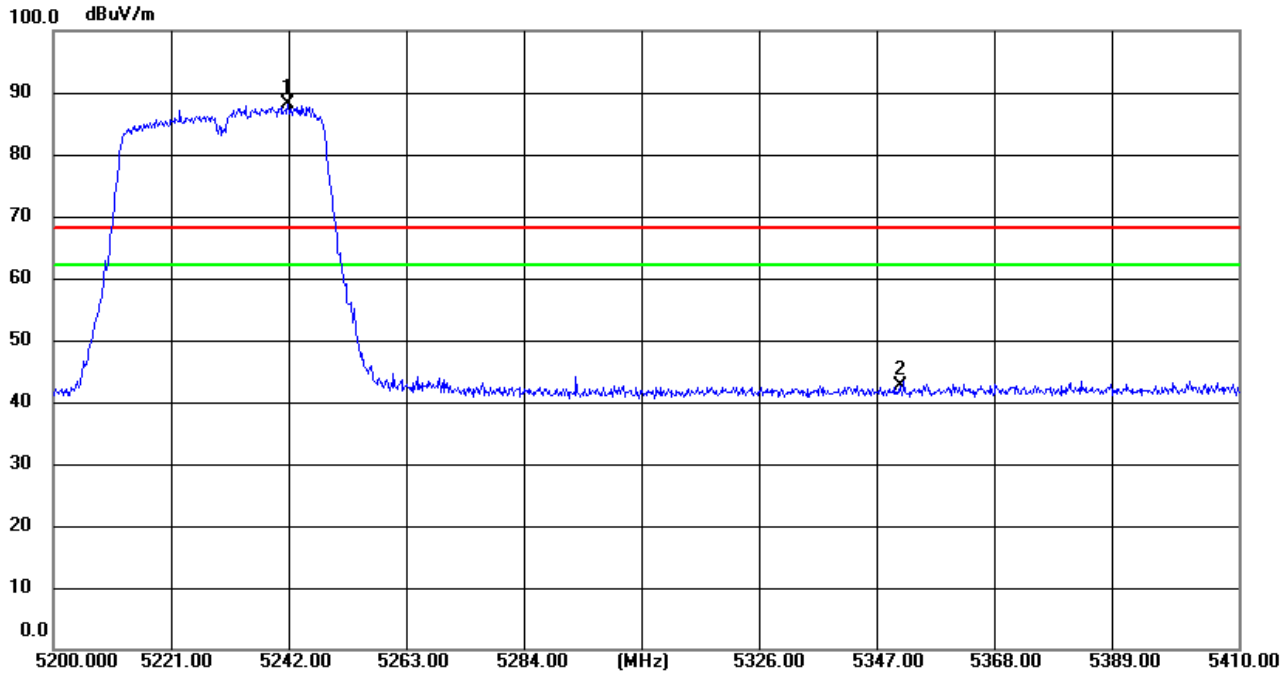
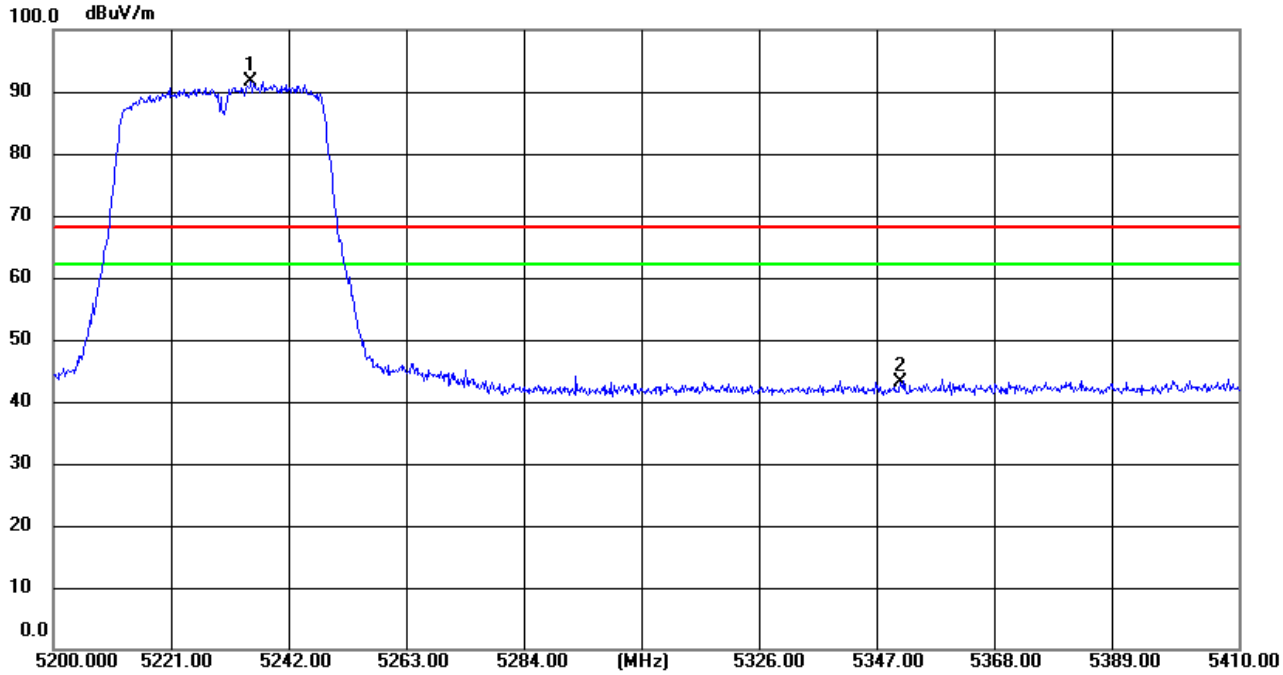


Detector mode: Peak

Polarity: Horizontal



EUT：	eHub	Model Name ：	2.0
Temperature：	24℃	Relative Humidity：	51%

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Pressure:	1010 hPa	**Test Voltage:**	DC 12V
Test Mode :	802.11ac BW80MHz -MIMO		
Note:	1. The transmitter was setup to transmit at the lowest channel (CH42). Then the field strength was measured at 4960-5460 MHz. 2. The data of 5150MHz and 5350MHz was the worst.		

Freq. (MHz) (Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak (dBuv)	Peak (dB)	Peak (dBuv/m)	Peak (dBuv/m)	
5150.000	V	36.34	4.78	41.12	68.20	CH42
5238.500	V	81.88	4.53	---	---	CH42
5350.000	V	37.46	4.30	41.76	68.20	CH42
5150.000	H	37.16	4.78	41.94	68.20	CH42
5203.000	H	85.87	4.60	---	---	CH42
5350.000	H	37.09	4.30	41.39	68.20	CH42

Remark:

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

(2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

802.11ac(80M) (5.15GHz-5.25GHz)

CH 42 Data rate 7.2Mbps

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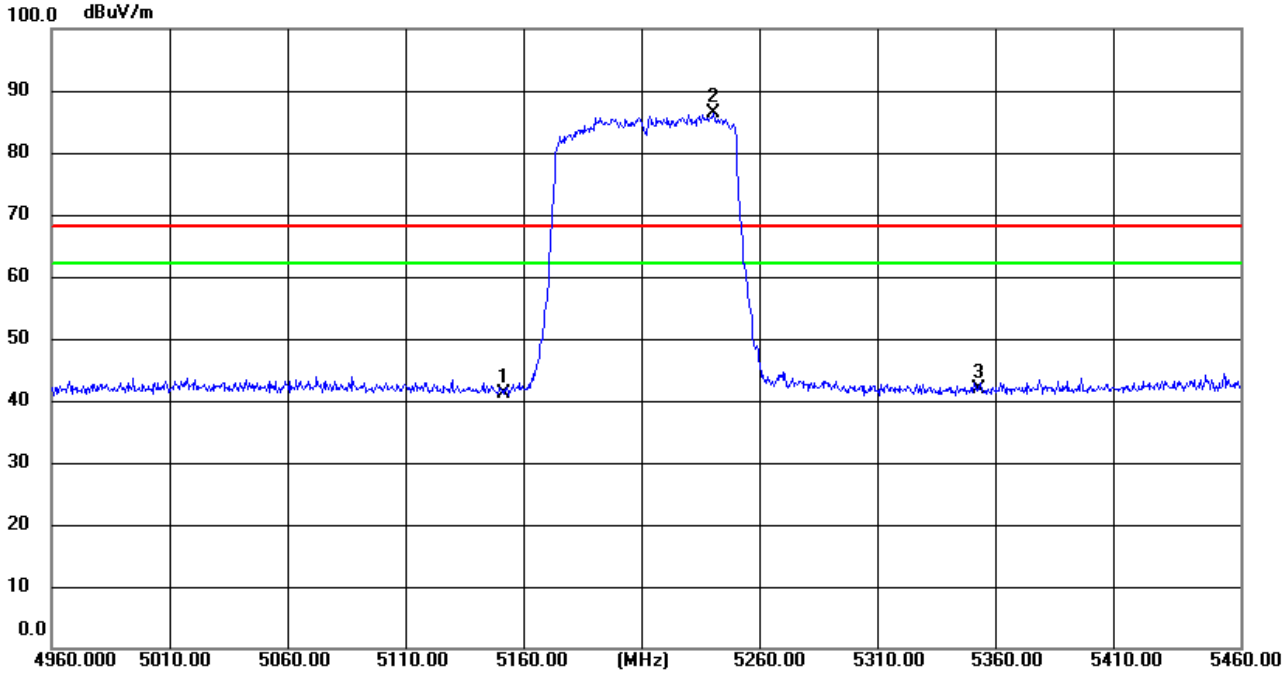
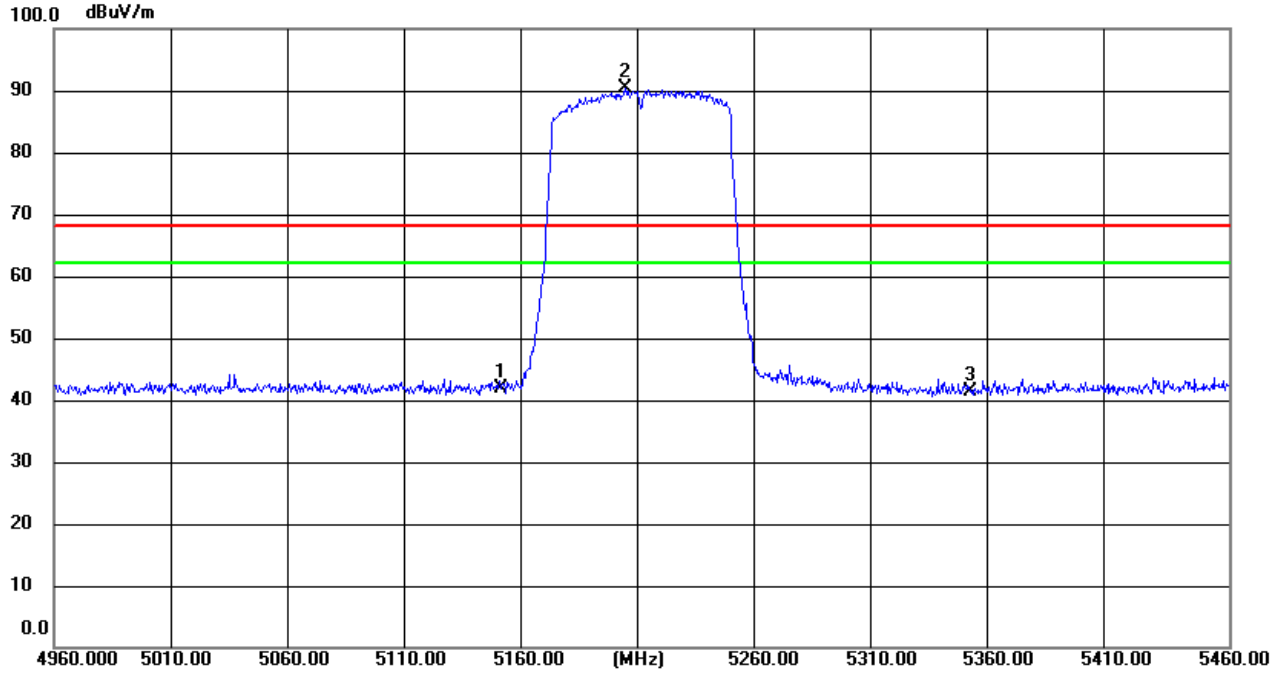
Detector mode: Peak **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11a CH 149-ANT1		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	32.19	3.95	36.14	122.20	CH 149
5850.000	V	31.88	3.96	35.84	122.20	CH 149
5725.000	H	30.51	3.95	34.46	122.20	CH 149
5850.000	H	31.93	3.96	35.89	122.20	CH 149

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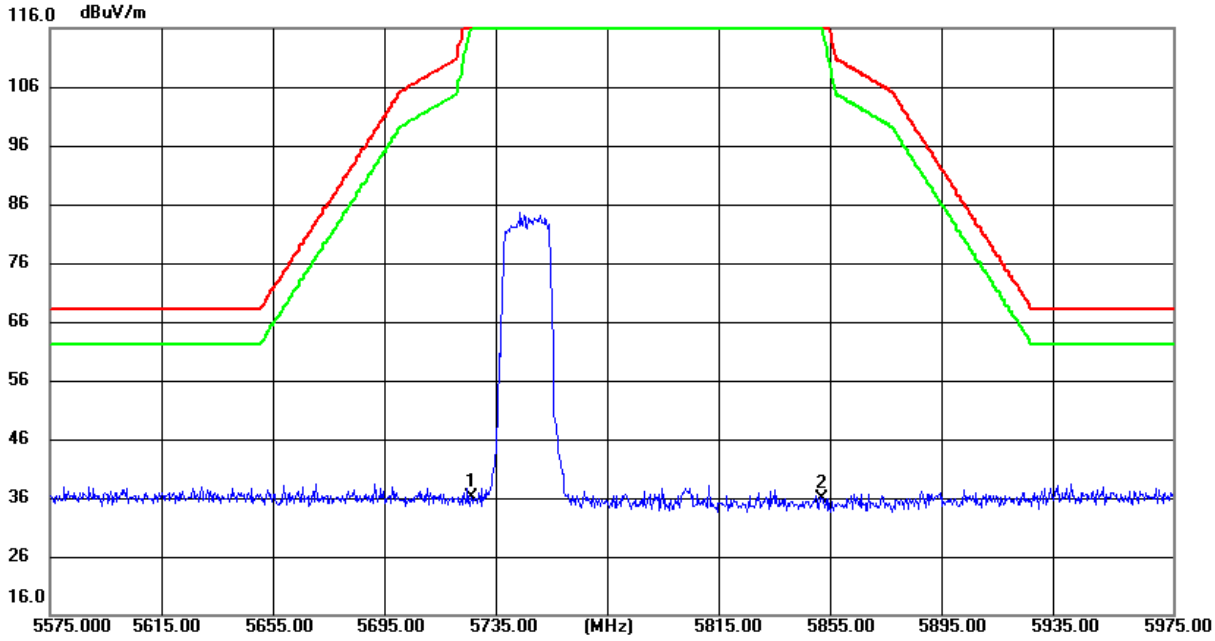
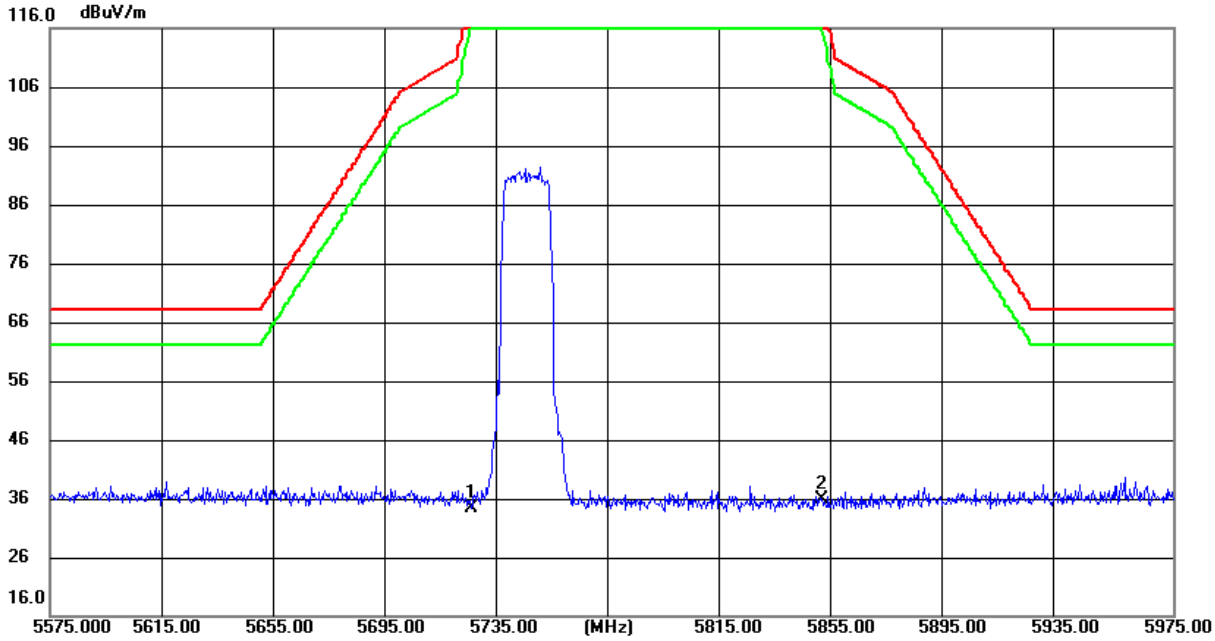
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11a CH 165-ANT1		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	31.83	3.95	35.78	122.20	CH 165
5850.000	V	31.58	3.96	35.54	122.20	CH 165
5725.000	H	32.24	3.95	36.19	122.20	CH 165
5850.000	H	31.62	3.96	35.58	122.20	CH 165

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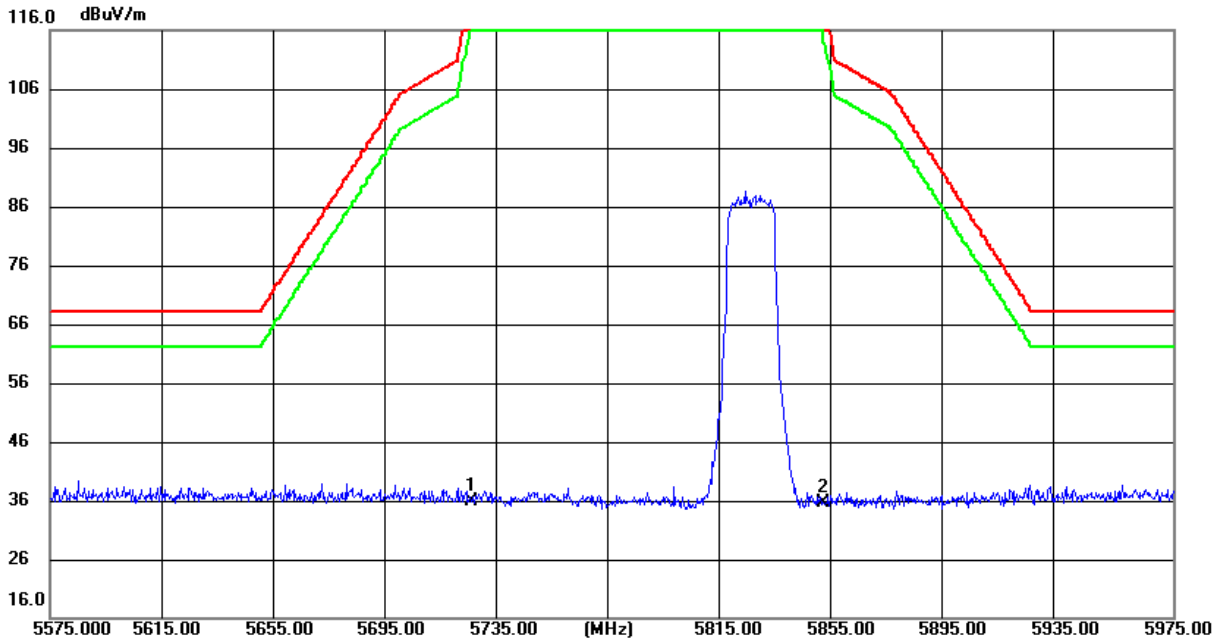
Detector mode: Peak

Polarity: Vertical



Detector mode: Peak

Polarity: Horizontal

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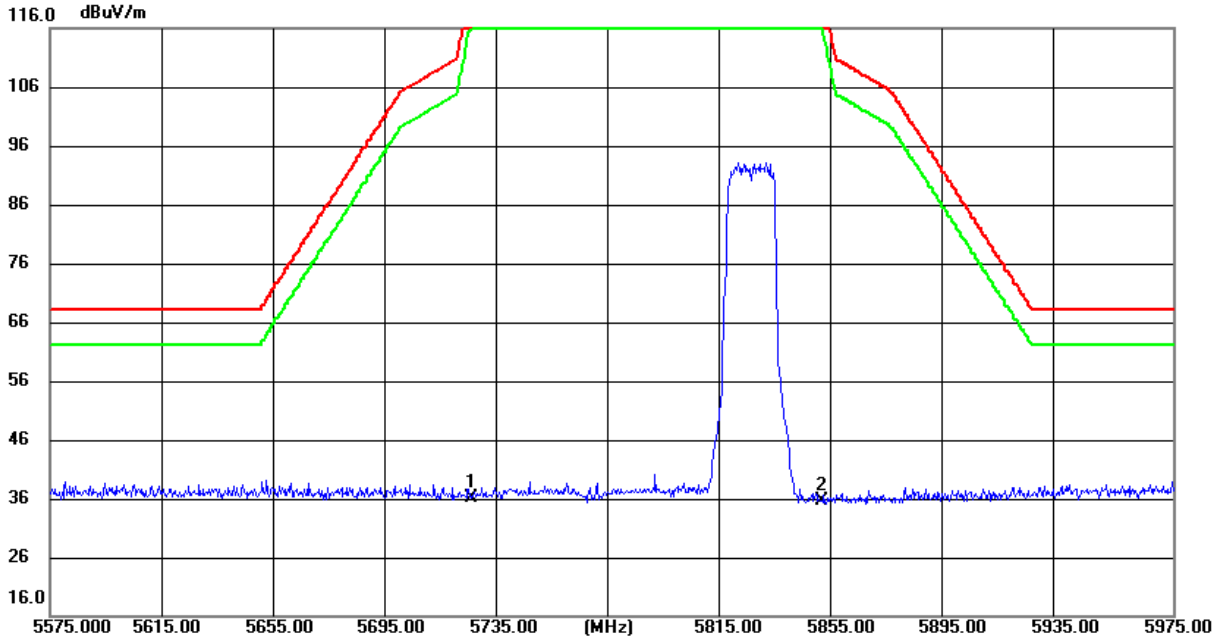

EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11n20(5G) CH 149-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	33.32	3.95	37.27	122.20	CH 149

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5850.000	V	31.11	3.96	35.07	122.20	CH 149
5725.000	H	32.37	3.95	36.32	122.20	CH 149
5850.000	H	32.22	3.96	36.18	122.20	CH 149

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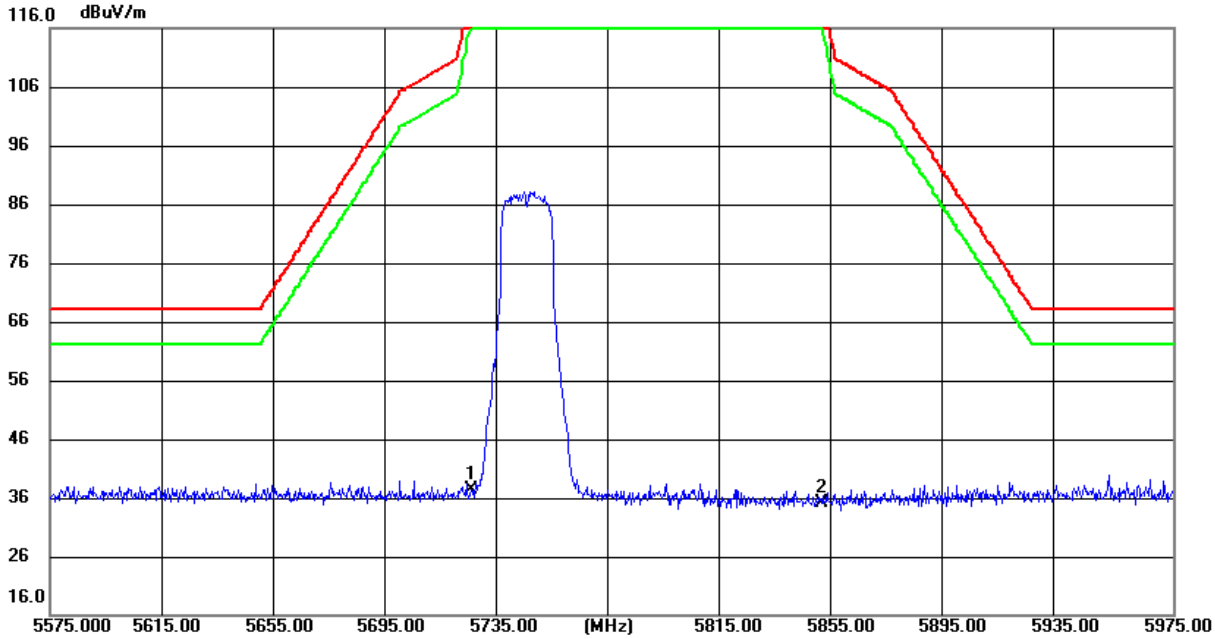
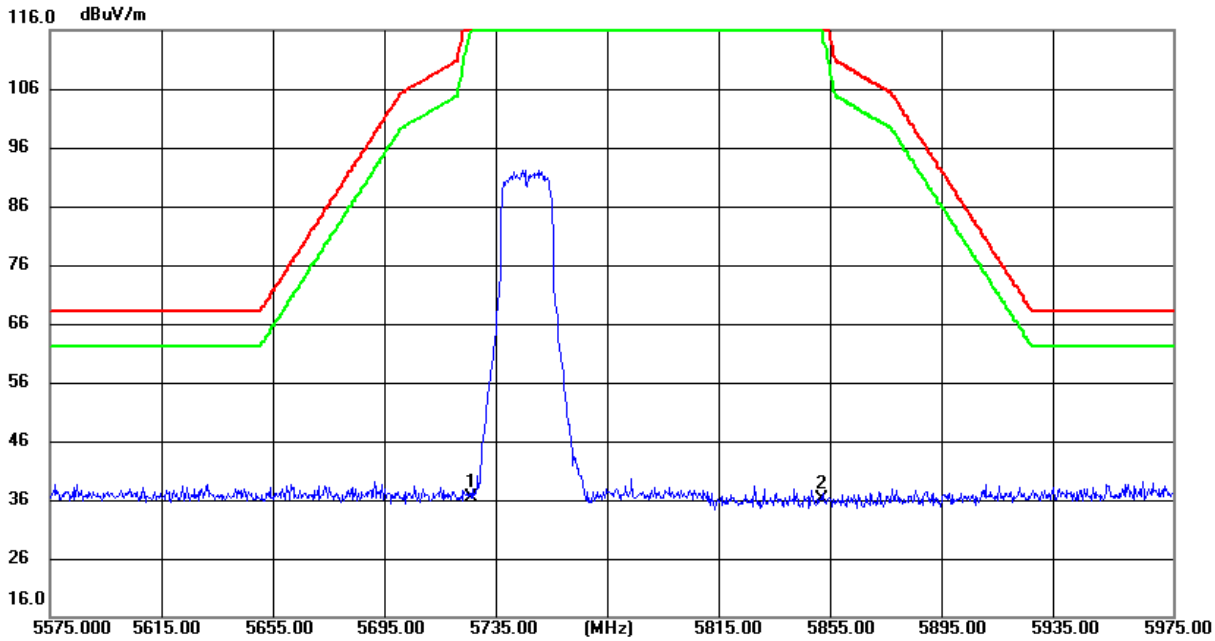
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11n20(5G) CH 165-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	33.64	3.95	37.59	122.20	CH 165
5850.000	V	34.02	3.96	37.98	122.20	CH 165
5725.000	H	32.42	3.95	36.37	122.20	CH 165
5850.000	H	32.56	3.96	36.52	122.20	CH 165

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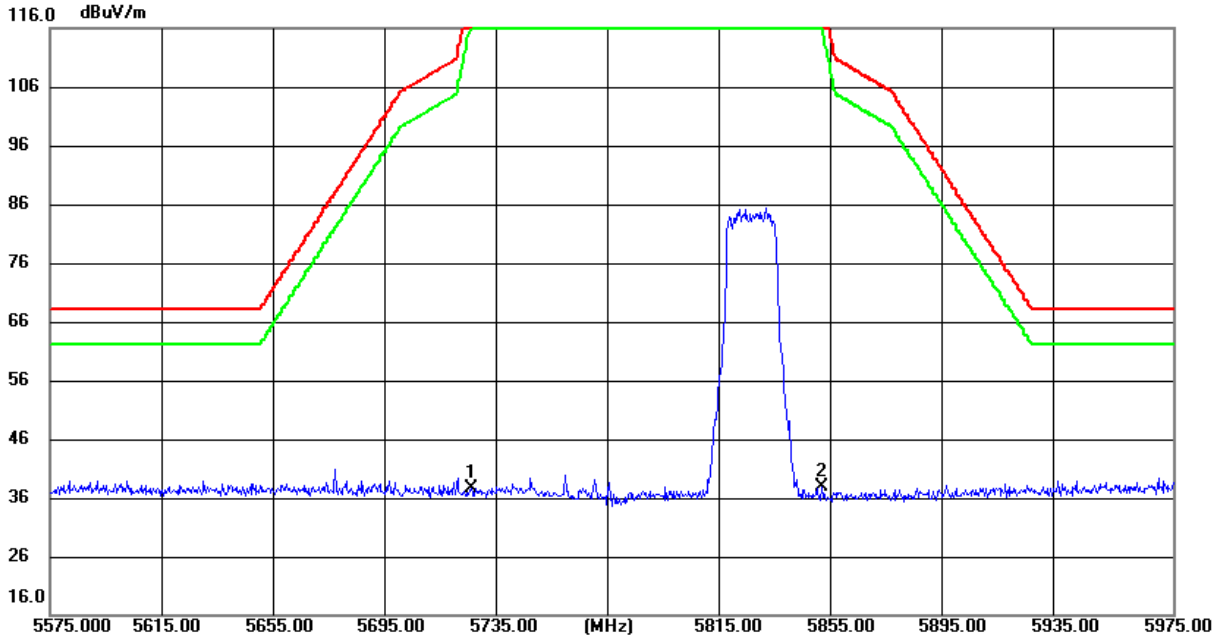
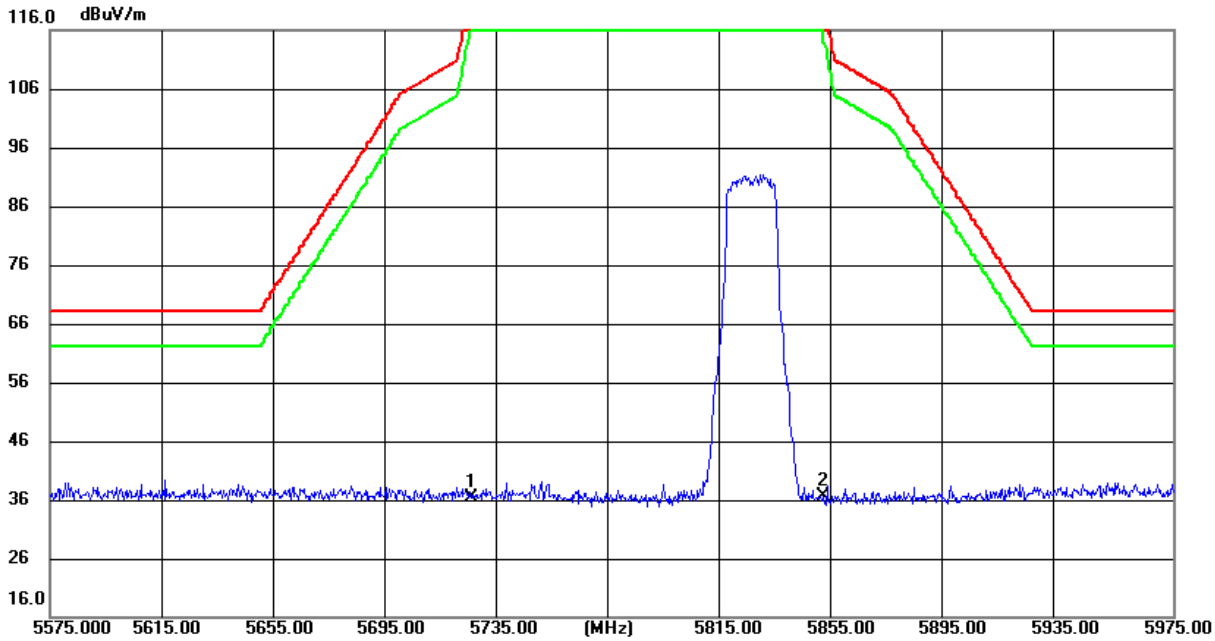
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11ac20(5G) CH 149-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	32.51	3.95	36.46	122.20	CH 149
5850.000	V	31.72	3.96	35.68	122.20	CH 149
5725.000	H	32.92	3.95	36.87	122.20	CH 149
5850.000	H	31.64	3.96	35.60	122.20	CH 149

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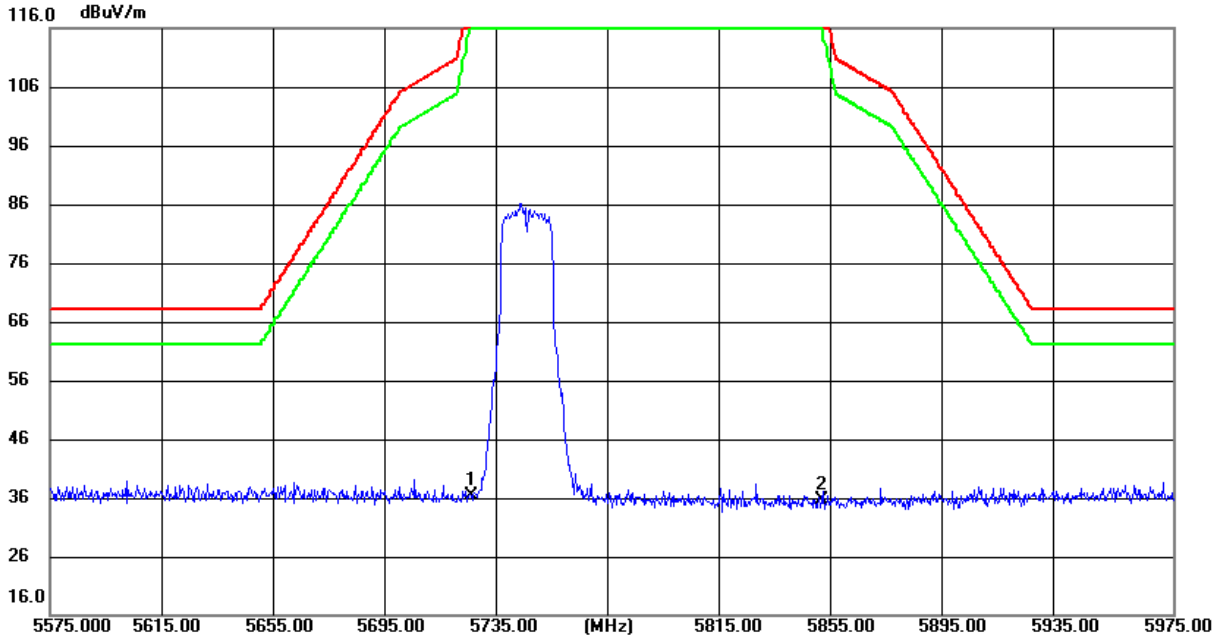
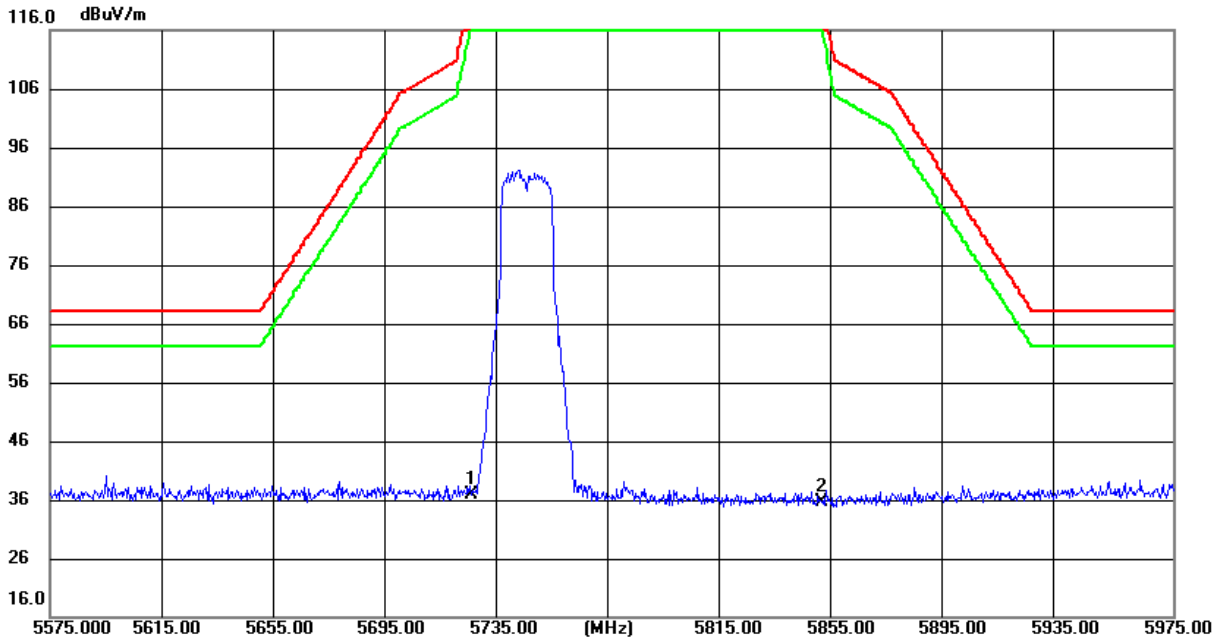
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11ac20(5G) CH 165-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	31.04	3.95	34.99	122.20	CH 165
5850.000	V	31.19	3.96	35.15	122.20	CH 165
5725.000	H	32.49	3.95	36.44	122.20	CH 165
5850.000	H	32.95	3.96	36.91	122.20	CH 165

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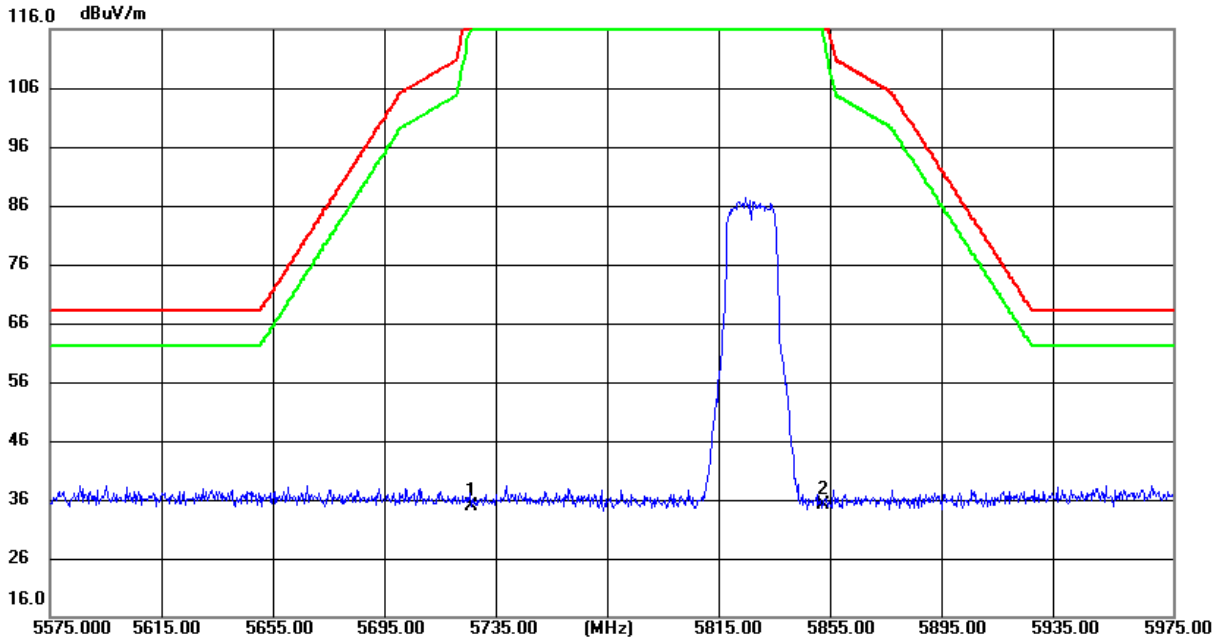
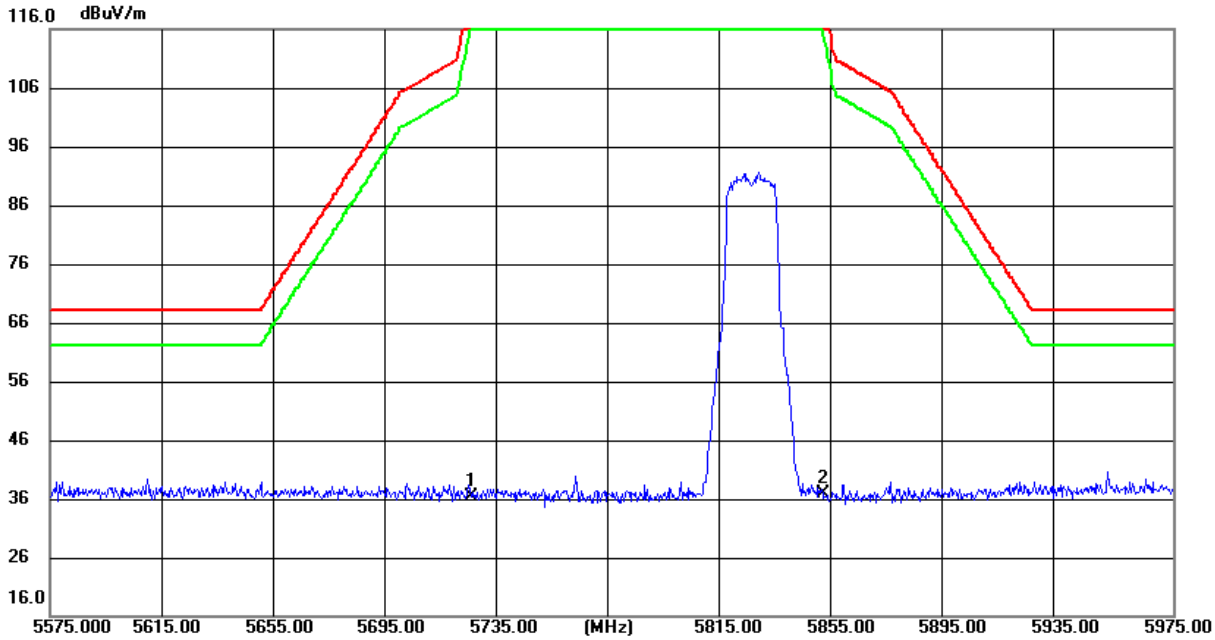
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11n40(5G) CH 151-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	32.74	3.95	36.69	122.20	CH 151
5850.000	V	31.88	3.96	35.84	122.20	CH 151
5725.000	H	33.09	3.95	37.04	122.20	CH 151
5850.000	H	32.36	3.96	36.32	122.20	CH 151

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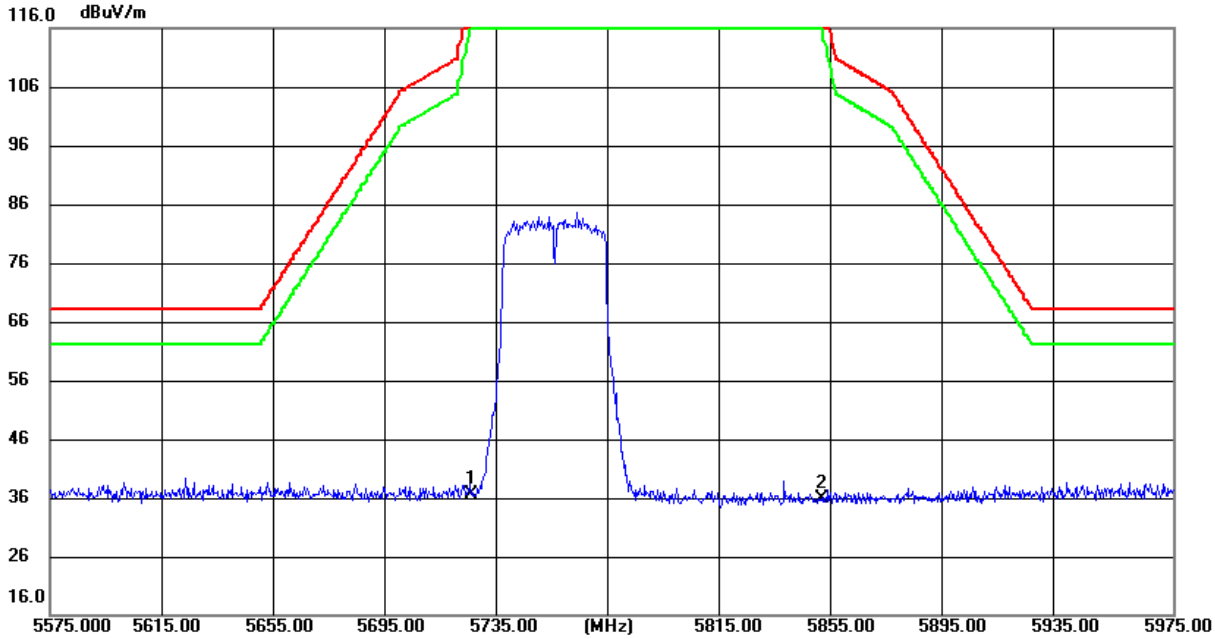
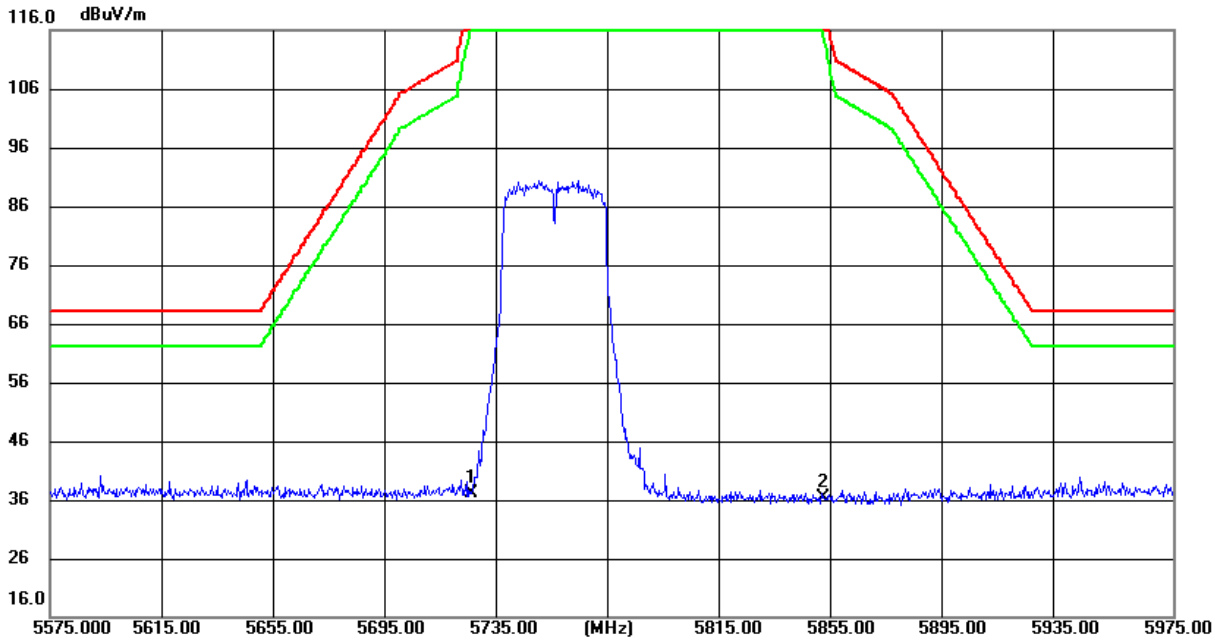


Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11n40(5G) CH 159-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	33.33	3.95	37.28	122.20	CH 159
5850.000	V	31.27	3.96	35.23	122.20	CH 159
5725.000	H	32.77	3.95	36.72	122.20	CH 159
5850.000	H	30.96	3.96	34.92	122.20	CH 159

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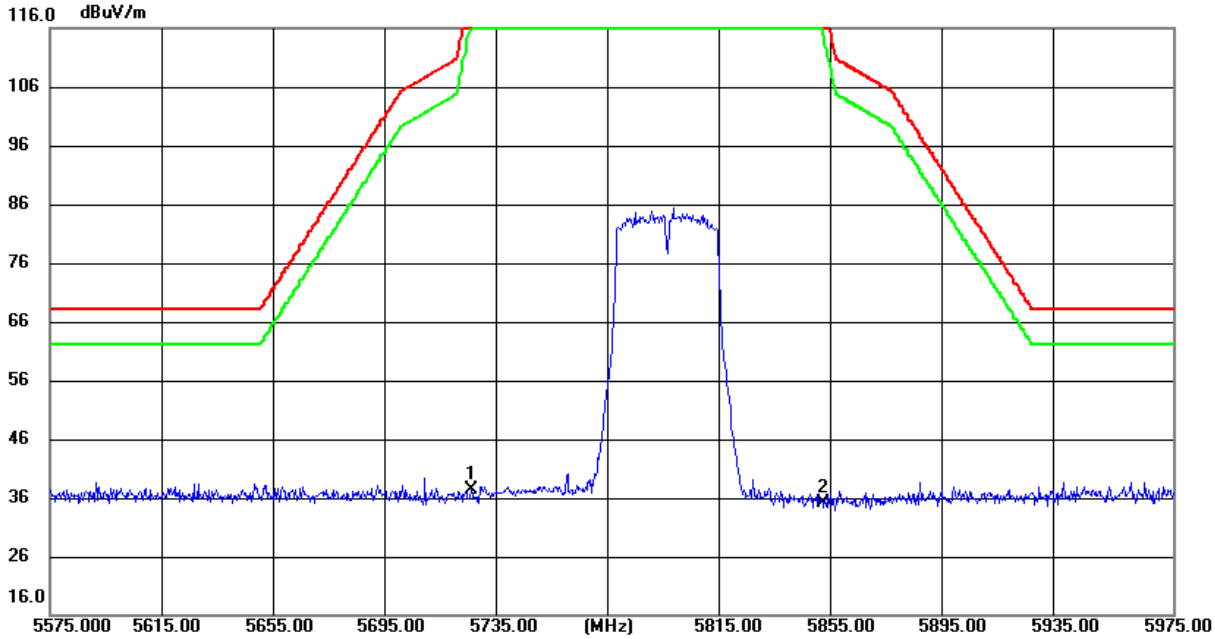
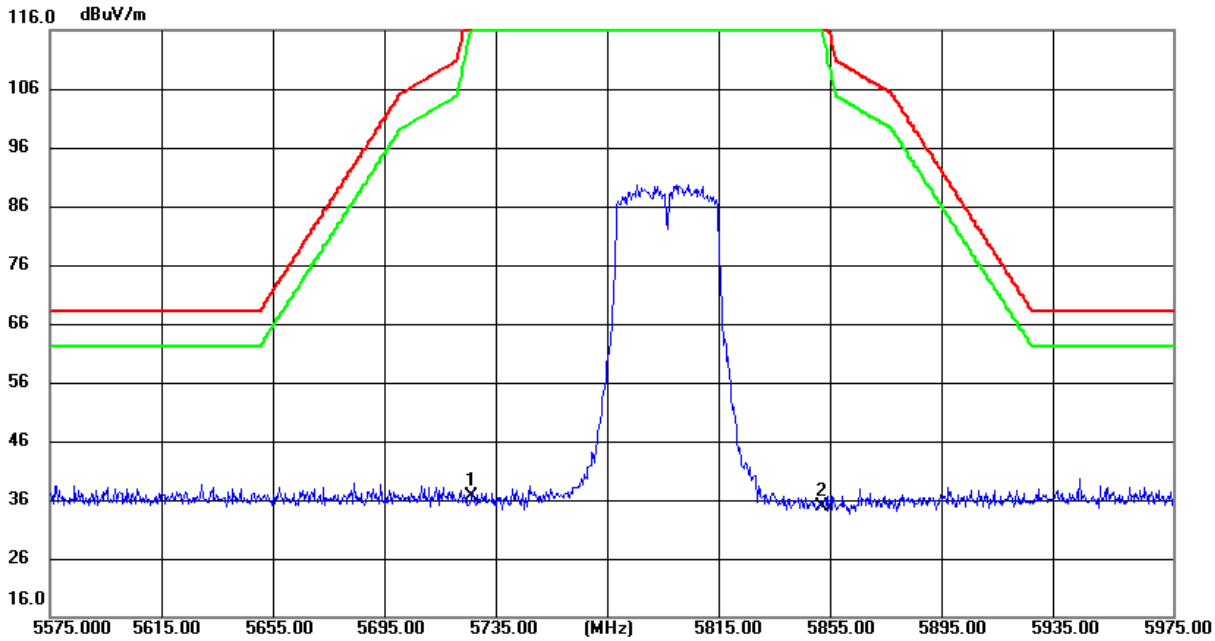
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11ac40(5G) CH 149-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	34.89	3.95	38.84	122.20	CH 149
5850.000	V	32.01	3.96	35.97	122.20	CH 149
5725.000	H	33.15	3.95	37.10	122.20	CH 149
5850.000	H	32.4	3.96	36.36	122.20	CH 149

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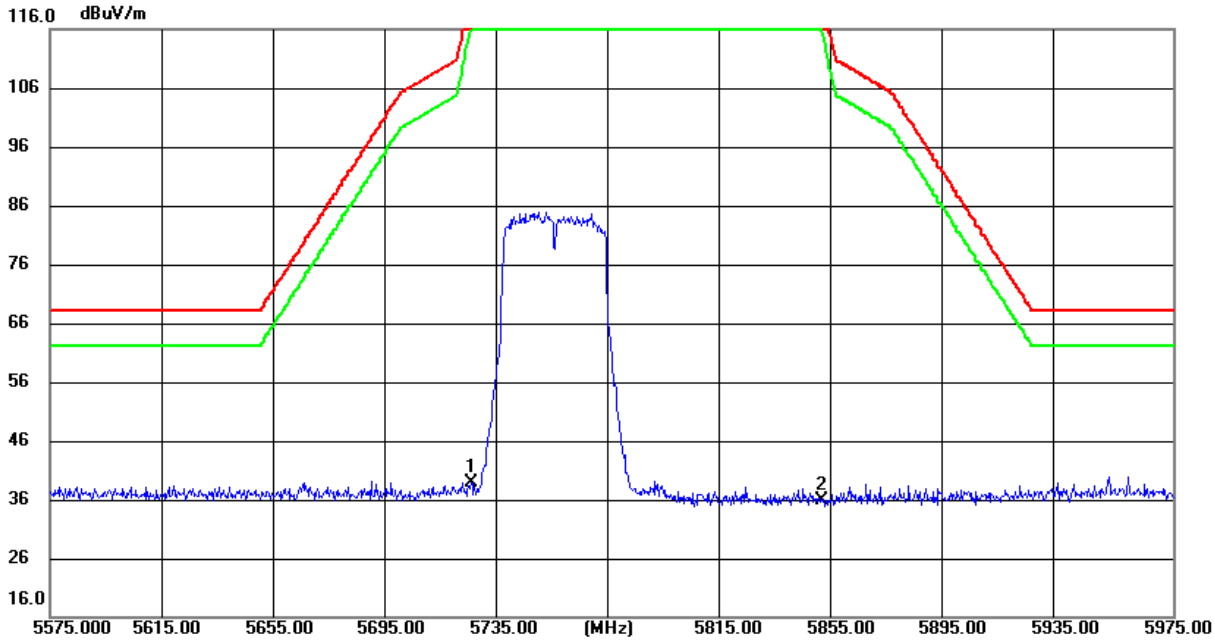
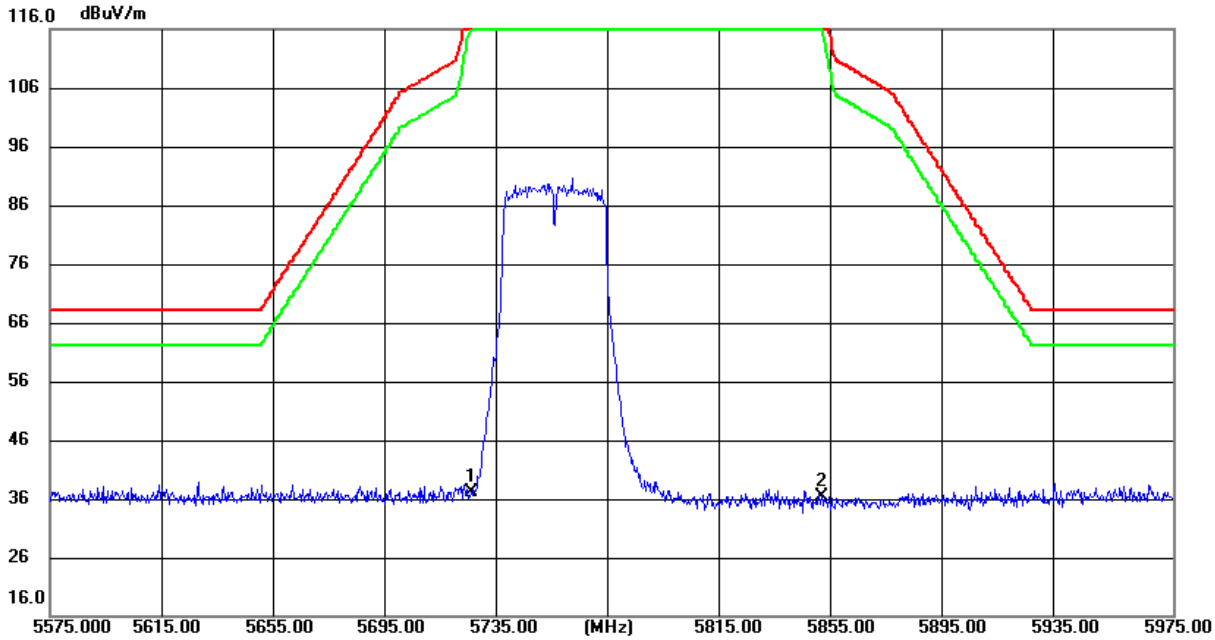
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11ac40(5G) CH 159-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	33.11	3.95	37.06	122.20	CH 159
5850.000	V	30.99	3.96	34.95	122.20	CH 159
5725.000	H	32.31	3.95	36.26	122.20	CH 159
5850.000	H	32.18	3.96	36.14	122.20	CH 159

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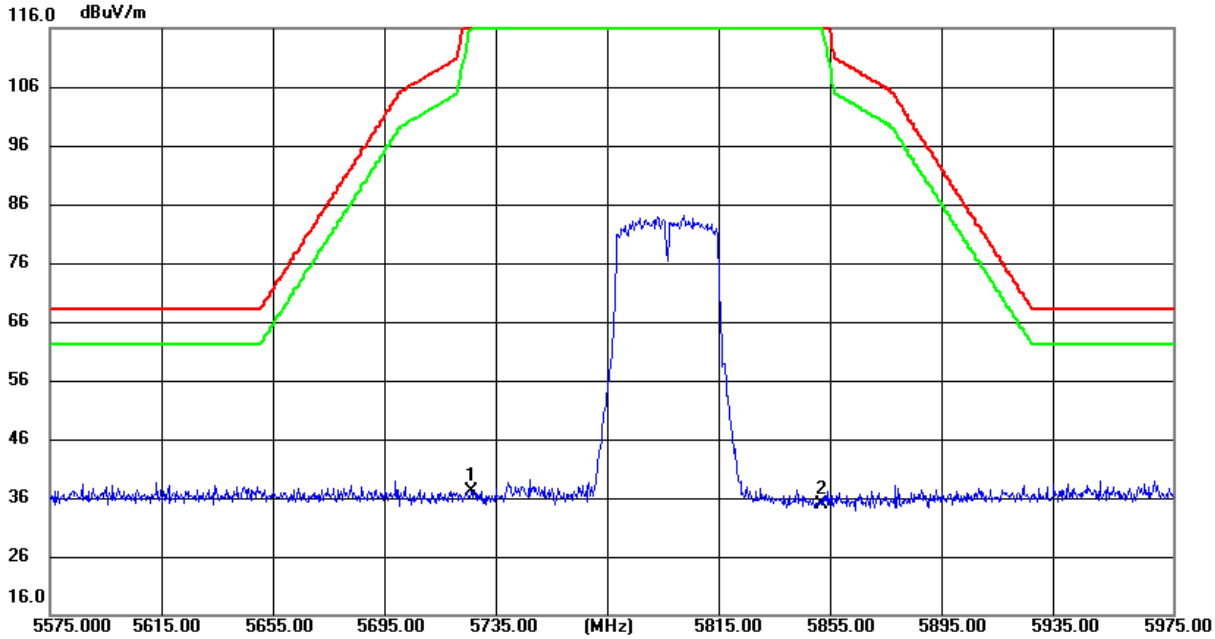
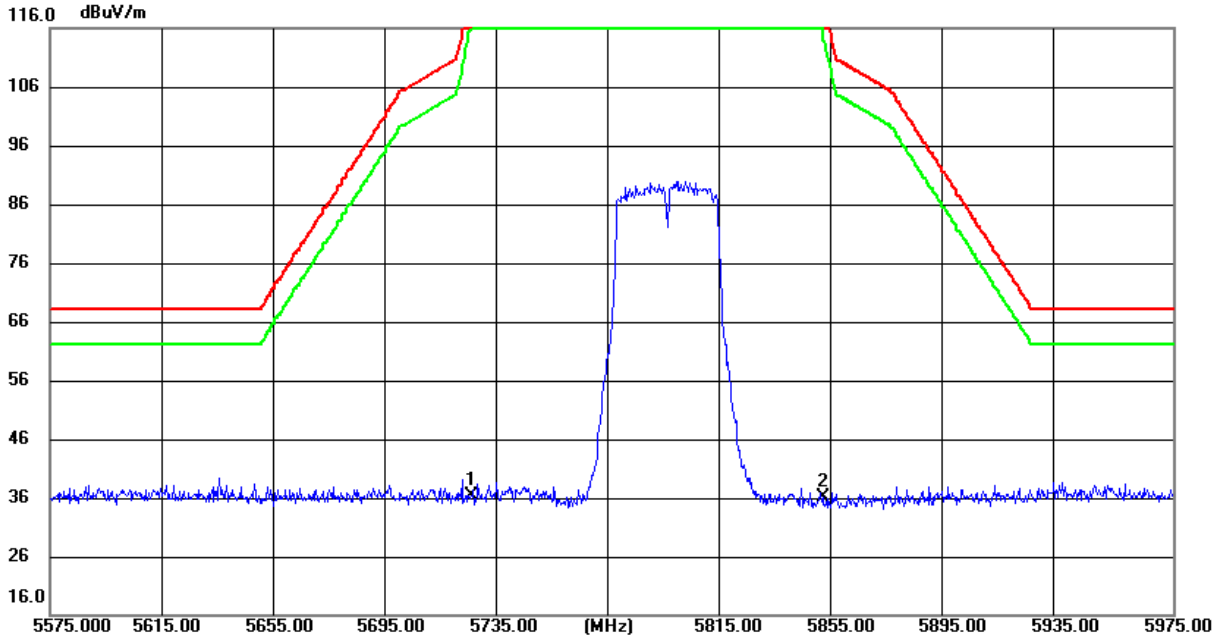
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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EUT：	eHub	Model Name ：	2.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Voltage：	DC 12V
Test Mode ：	802.11 AC80(5G) CH 155-MIMO		
Note：	In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.		

Freq. (MHz)	Ant.Pol. H/V	Reading (dBuv)	Ant/CF (dB)	Act (dBuv/m)	Limit (dBuv/m)	Note
5725.000	V	35.05	3.95	39.00	122.20	CH 155
5850.000	V	32.74	3.96	36.70	122.20	CH 155
5725.000	H	36.73	3.95	40.68	122.20	CH 155
5850.000	H	34.25	3.96	38.21	122.20	CH 155

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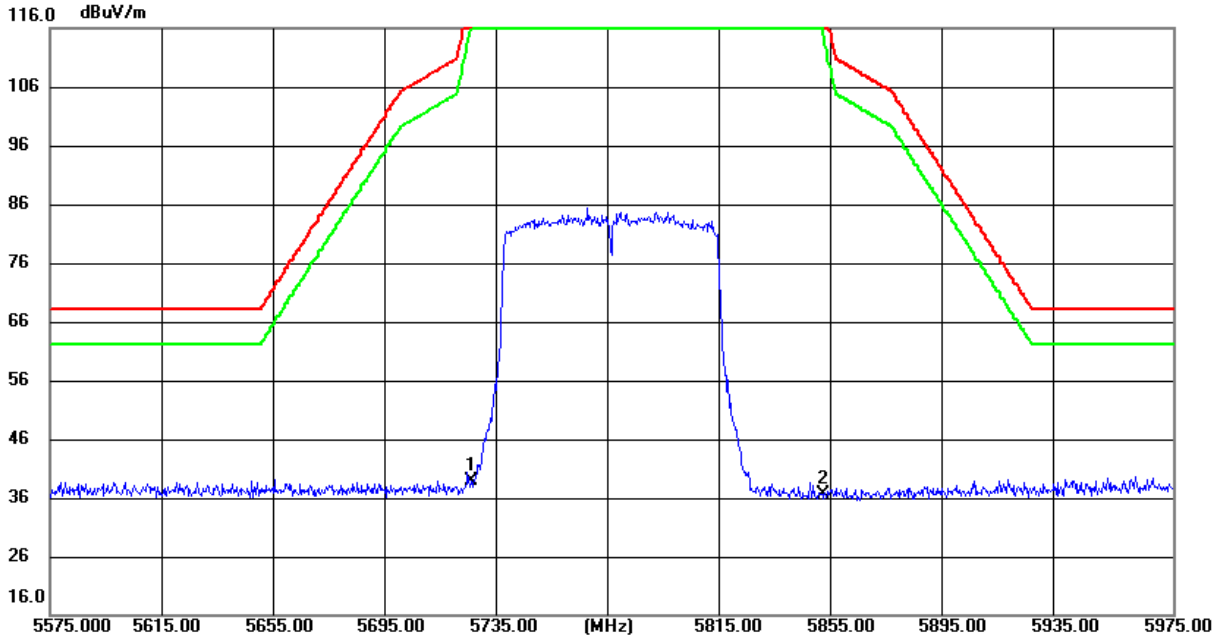
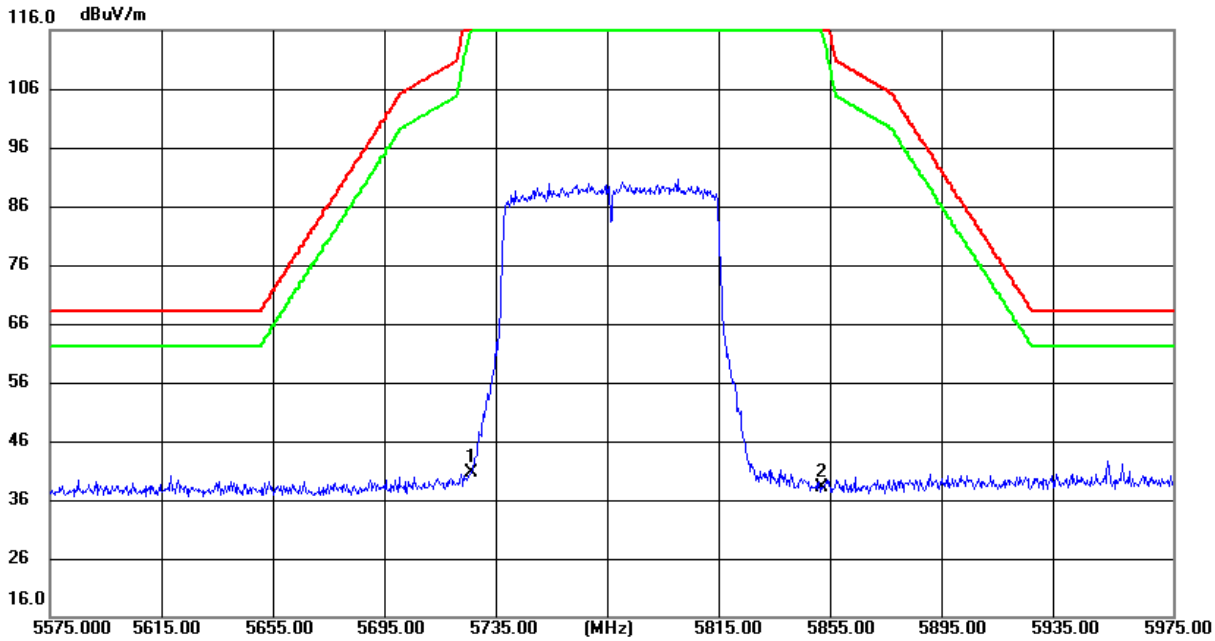
Detector mode: Peak Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



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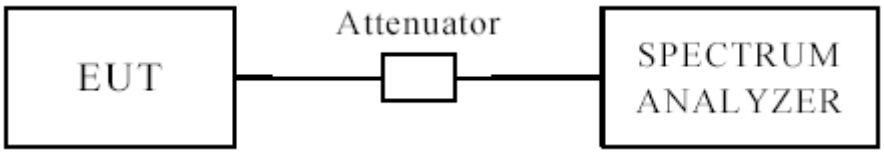
7.0 Emission Bandwidth

7.1 Test Setup



7.3 Test Procedure for Emission Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set VBW> RBW
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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%.

7.4 Test Procedure for Minimum Bandwidth for the Band 5725-5850MHz

1. Set RBW = 100 kHz.
2. Set VBW≥ 3 × RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.5 Test Procedure for 99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times OBW
3. Set RBW= 1% TO 5% of the OBW
4. Set VBW≥ 3 × RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Other, peak detection and max mode (until trace stabilizes) shall be used.
6. Use the 99% power bandwidth function of the instrument

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7.6 Test Result

Test Channel	Frequency	6dB Bandwidth (MHz) Antenna 1	6dB Bandwidth (MHz) Antenna 2	99 % Emission Bandwidth (MHz) ANT 1	99 % Emission Bandwidth (MHz) ANT 2	6dB Bandwidth Limit (kHz)	Result
802.11a							
CH 149	5745	16.38	16.25	17.089	17.043	≧500	Pass
CH 157	5785	16.38	16.25	17.095	17.062	≧500	Pass
CH 165	5825	16.38	16.24	17.104	17.101	≧500	Pass
802.11n(20M)							
CH 149	5745	17.63	17.36	18.160	18.143	≧500	Pass
CH 157	5785	17.65	17.37	18.119	18.105	≧500	Pass
CH 165	5825	17.59	17.42	18.164	18.142	≧500	Pass
802.11ac(20M)							
CH 149	5745	17.58	17.46	18.123	18.112	≧500	Pass
CH 157	5785	17.65	17.45	18.118	18.109	≧500	Pass
CH 165	5825	17.65	17.59	18.132	18.123	≧500	Pass
802.11n(40M)							
CH 151	5755	36.38	36.34	36.477	36.443	≧500	Pass
CH 159	5795	36.41	36.24	36.536	36.523	≧500	Pass
802.11ac(40M)							
CH 151	5755	36.37	36.26	36.574	36.426	≧500	Pass
CH 159	5795	36.39	36.31	36.461	36.434	≧500	Pass
802.11ac(80M)							
CH 155	5775	75.65	75.23	75.817	75.434	≧500	Pass

Note: ANT 1(2) Represent the value of antenna 1 and 2, The worst data is Antenna 1, only shown Antenna 1 Plot.

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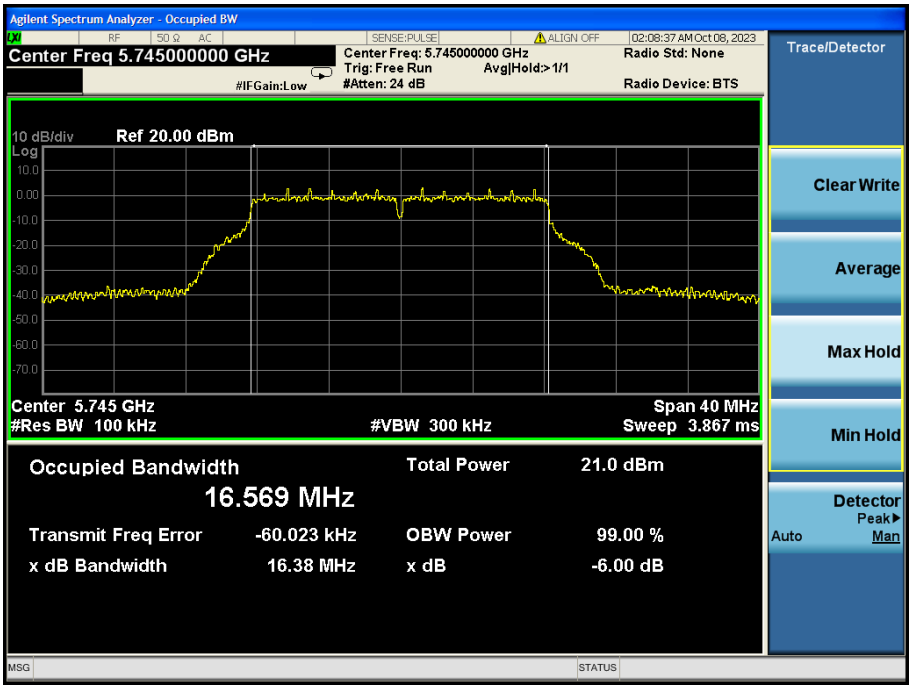
6dB bandwidth-802.11a

TX CH 149



TX CH 157

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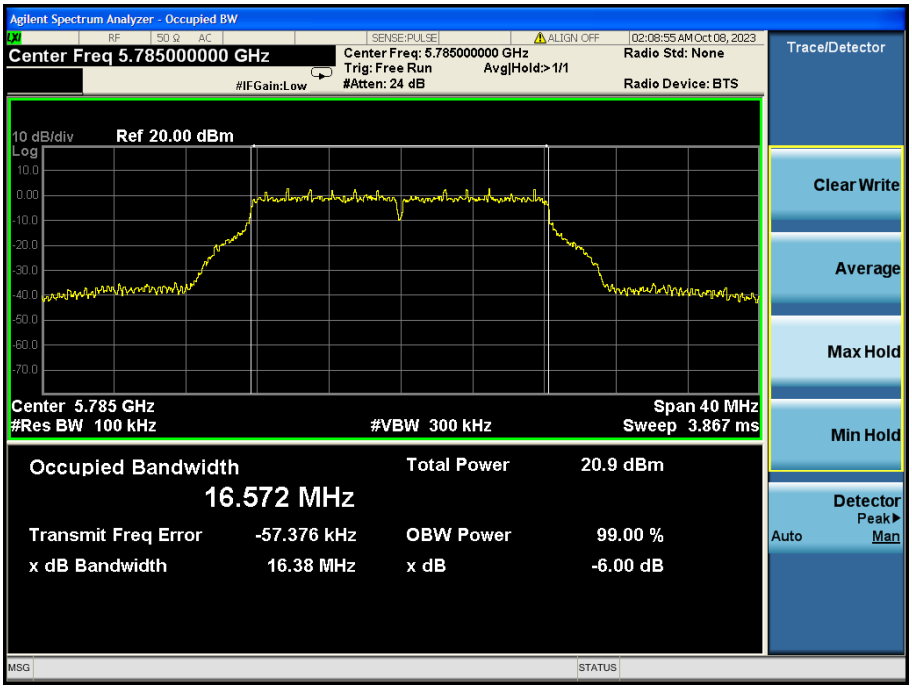
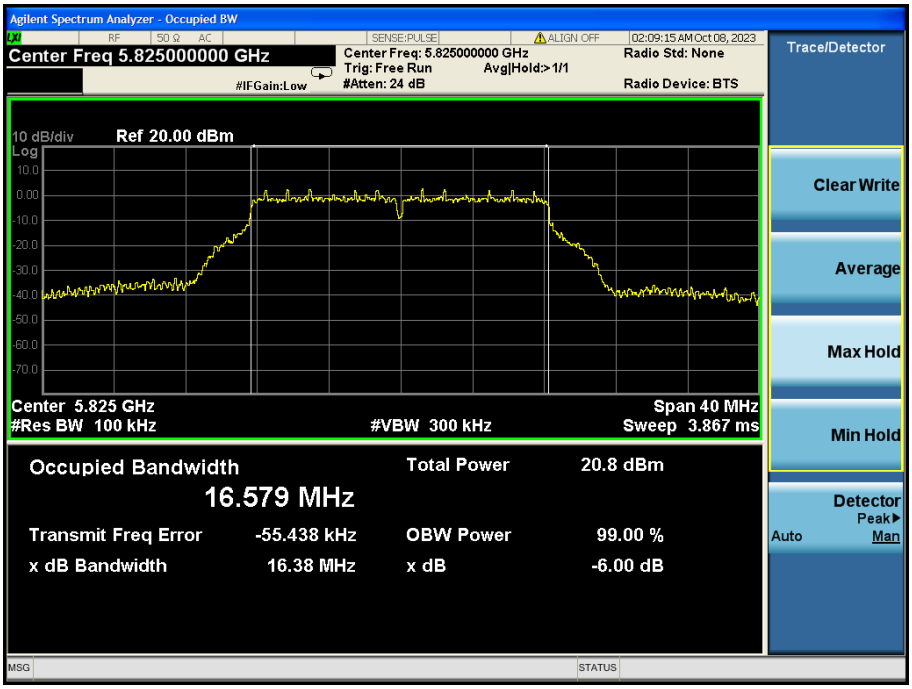


TX CH 165



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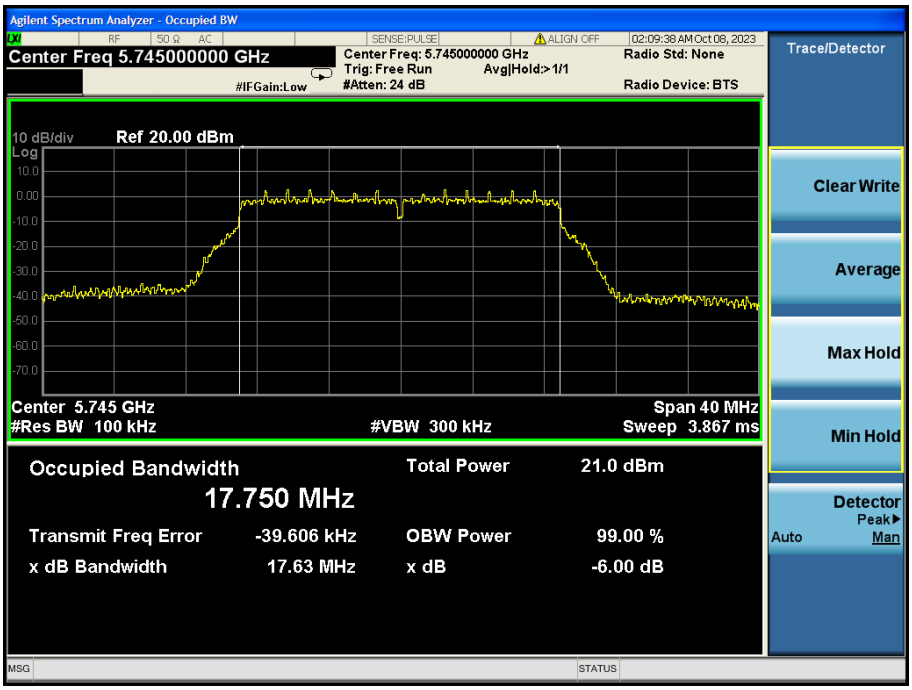
6dB bandwidth-802.11n20

TX CH 149



TX CH 157

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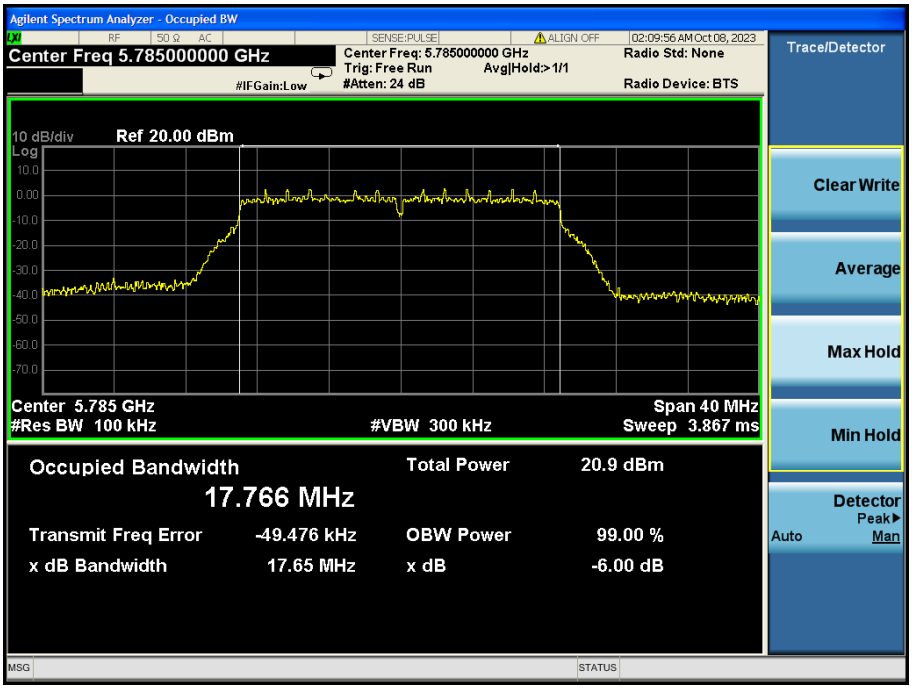
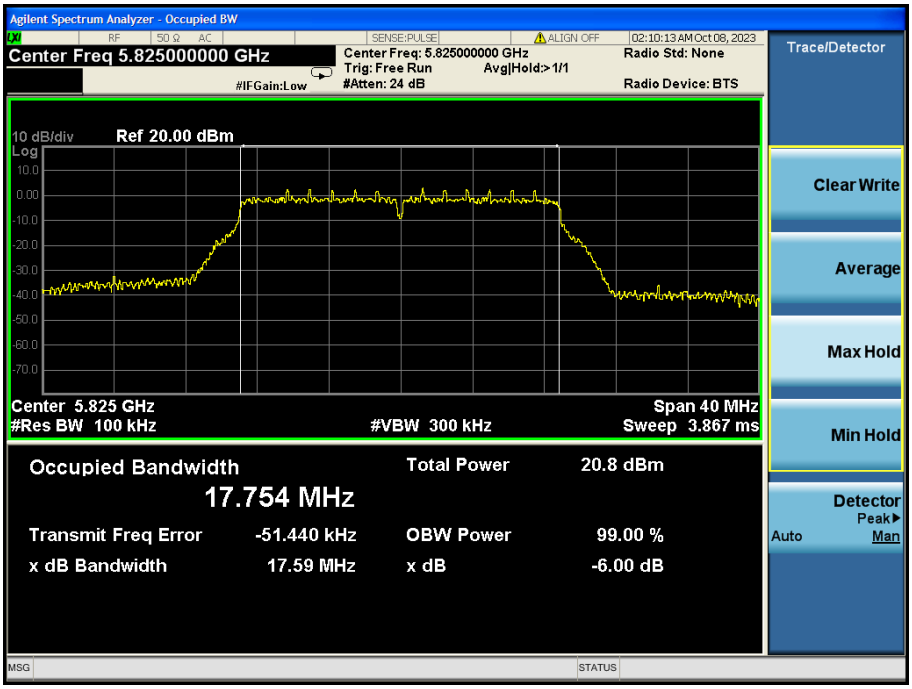


TX CH 165



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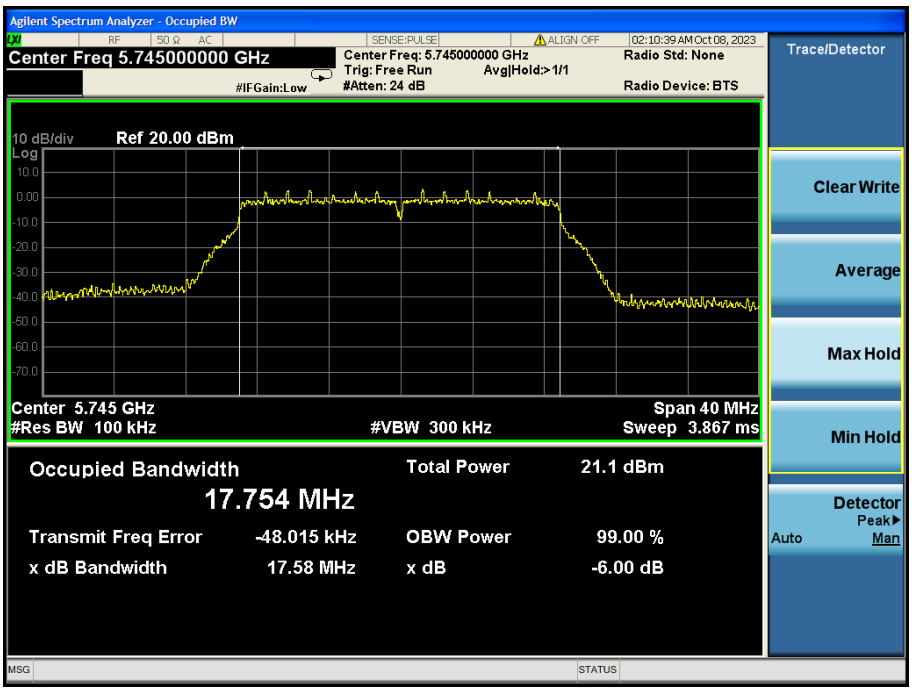
6dB bandwidth-802.11ac20

TX CH 149



TX CH 157

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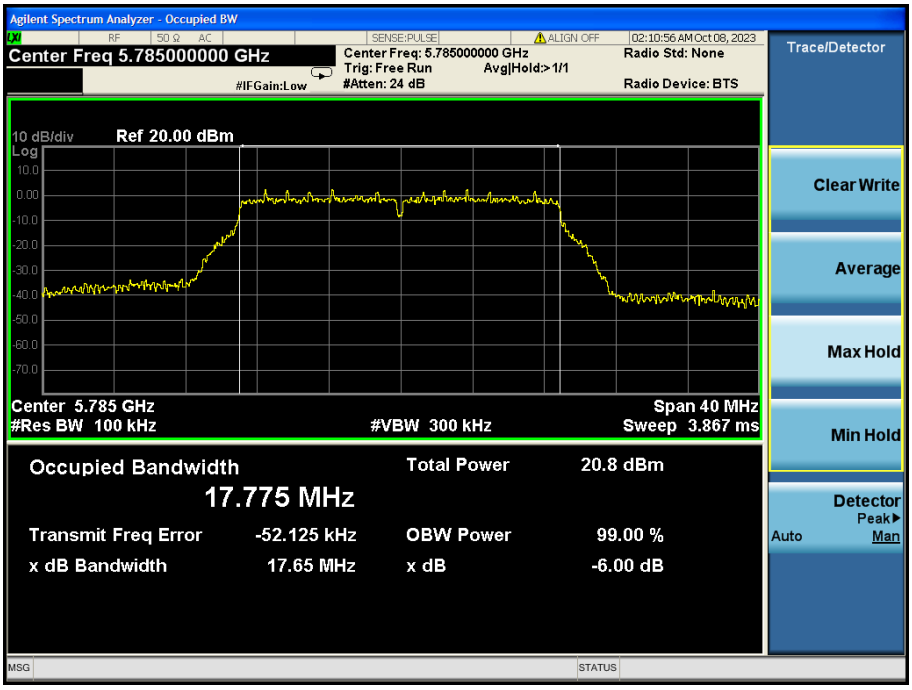
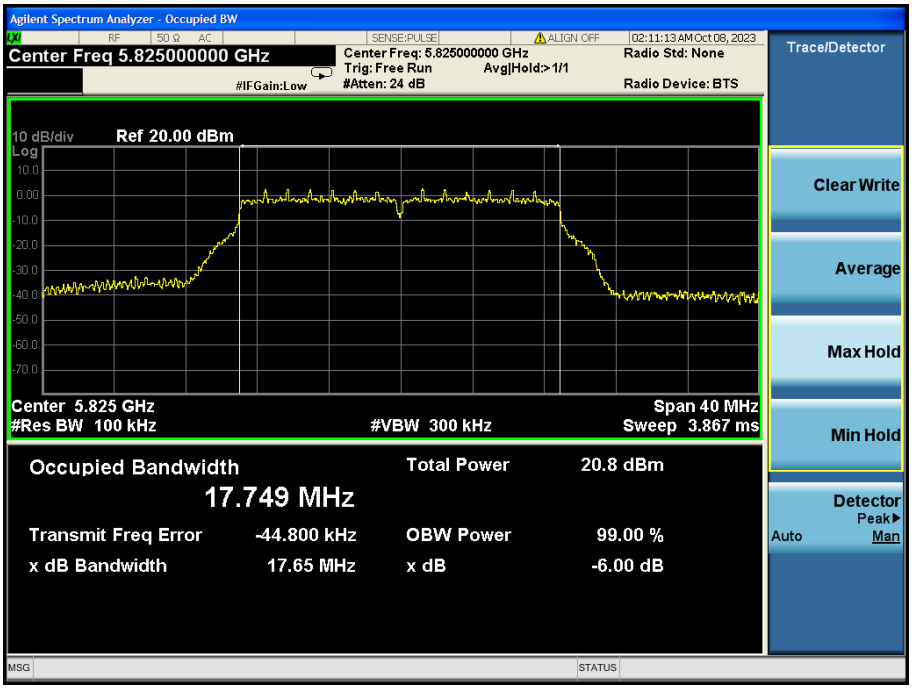


TX CH 165



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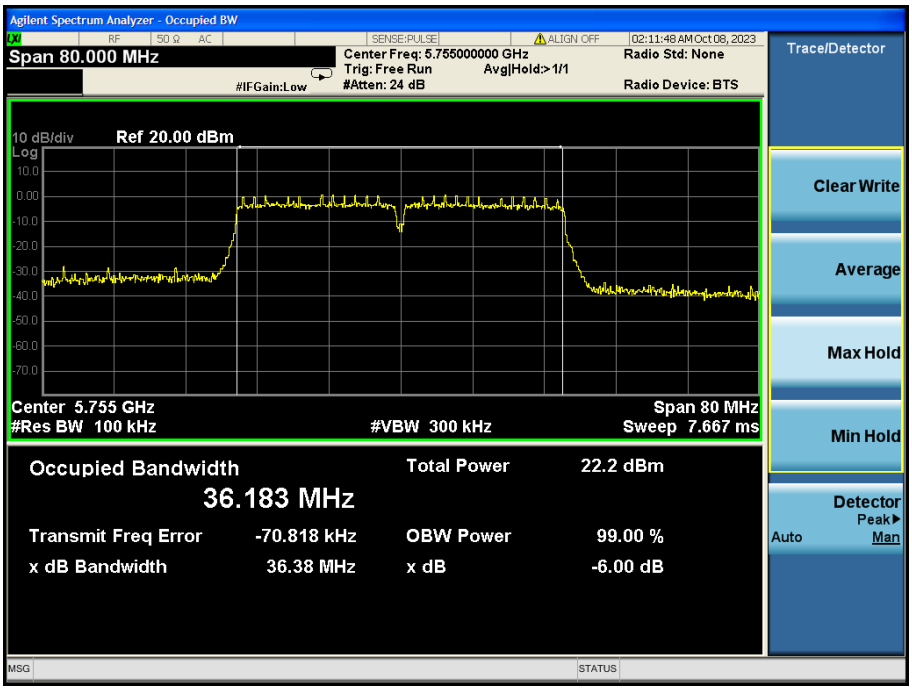
6dB bandwidth-802.11n40

TX CH 151



TX CH 159

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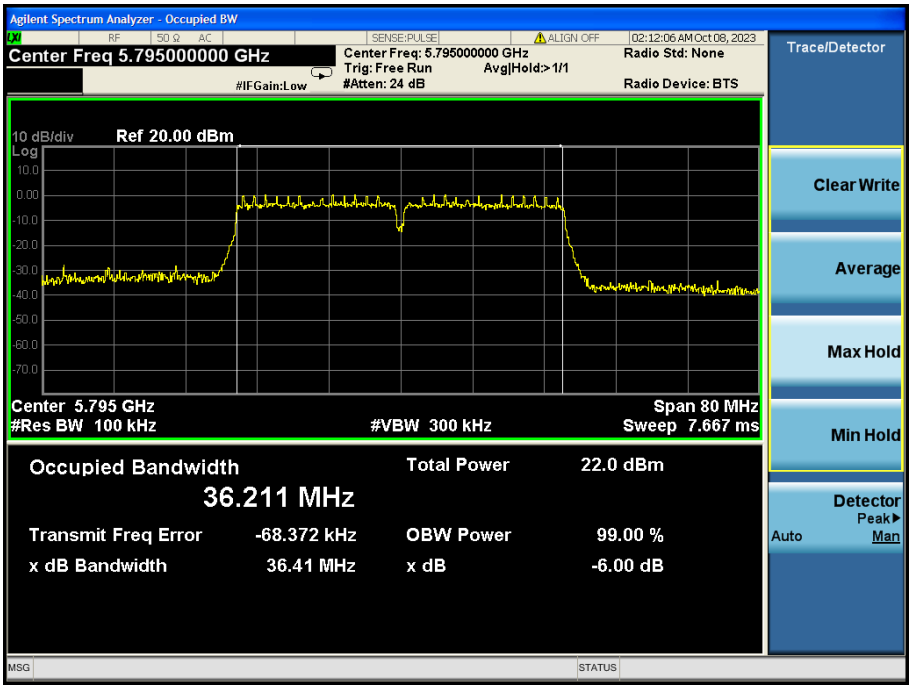
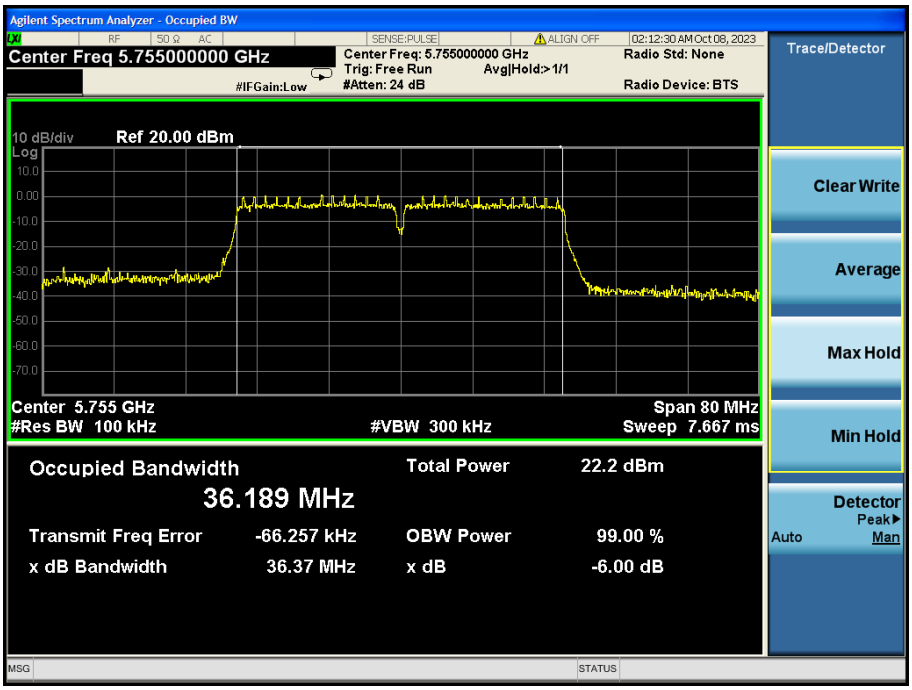


6dB bandwidth-802.11ac40

TX CH 151



TX CH 159

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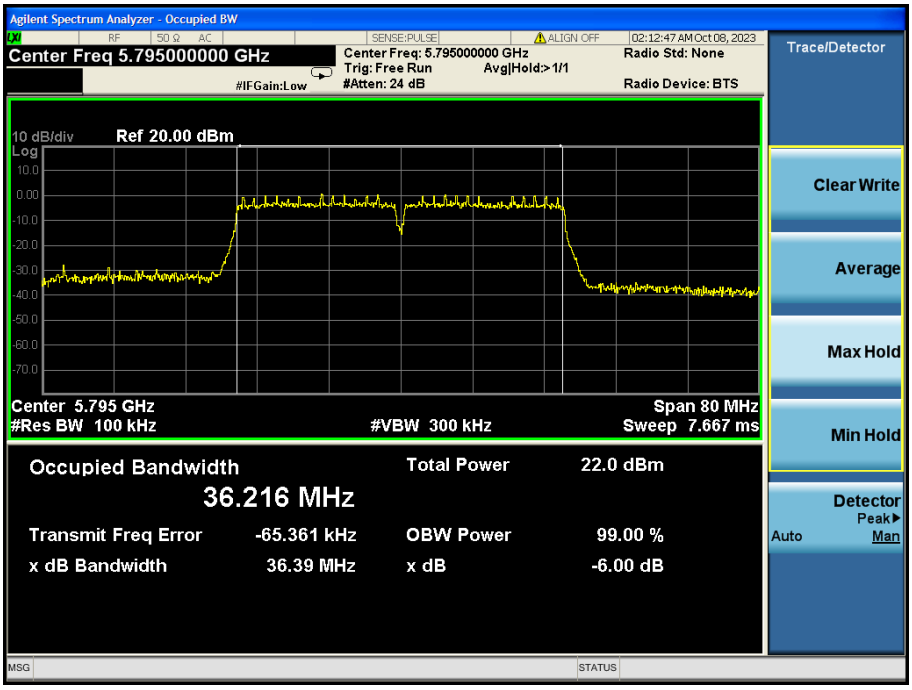
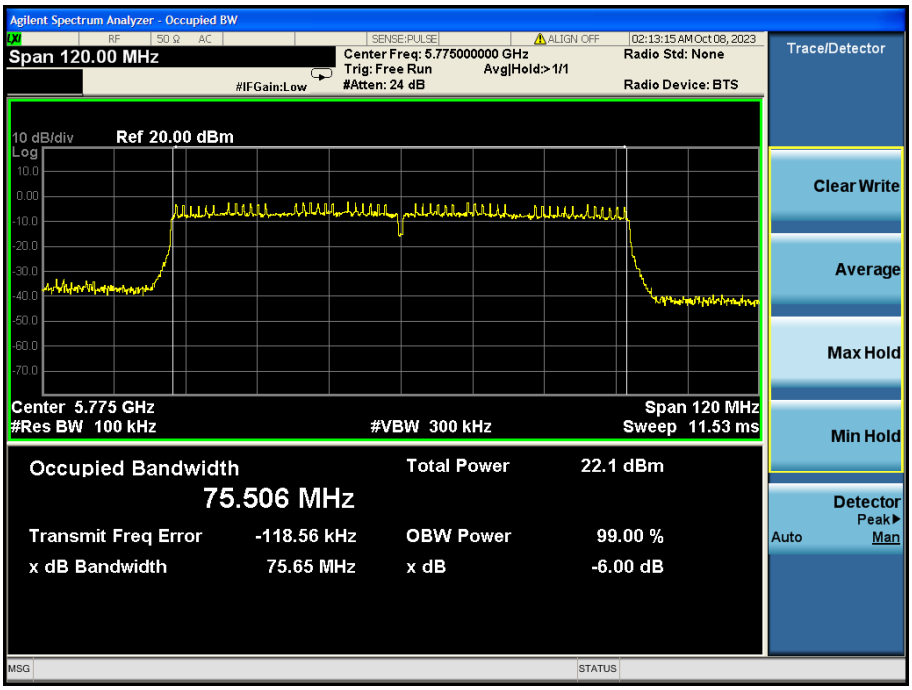


6dB bandwidth-802.11ac80

TX CH 155



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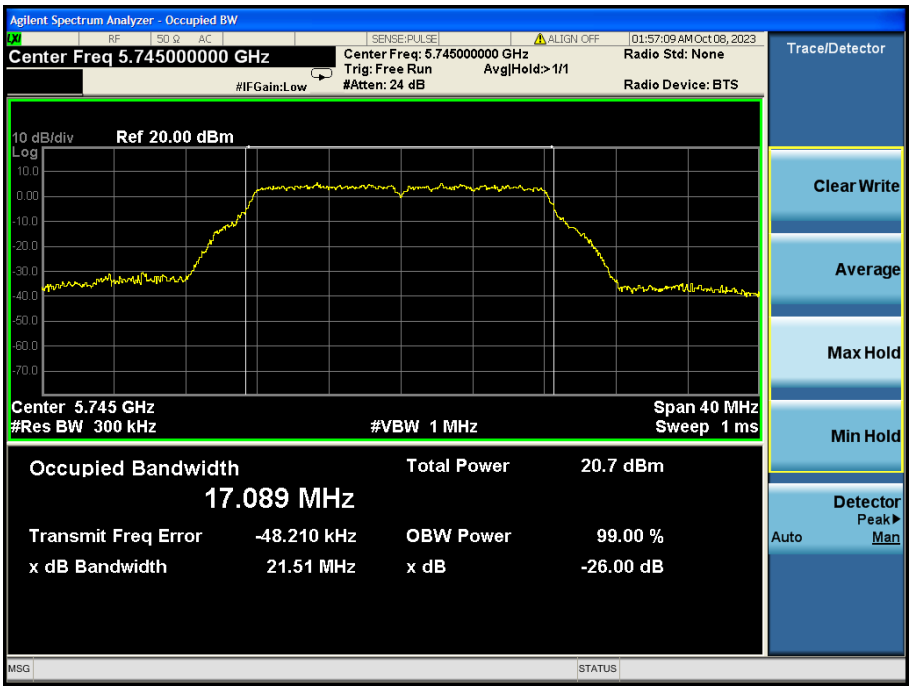
99% bandwidth-802.11a

TX CH 149



TX CH 157

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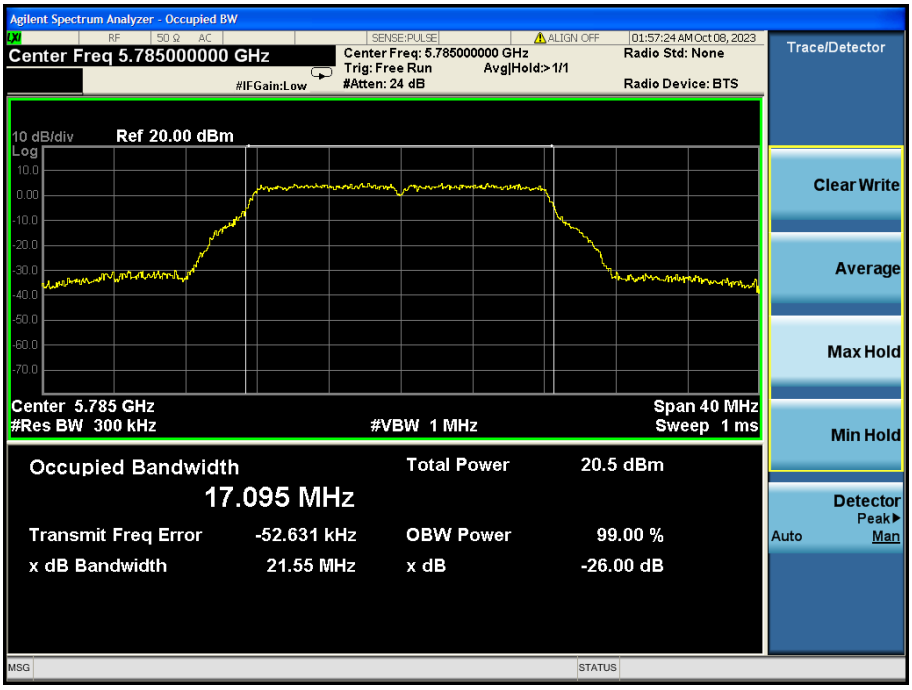
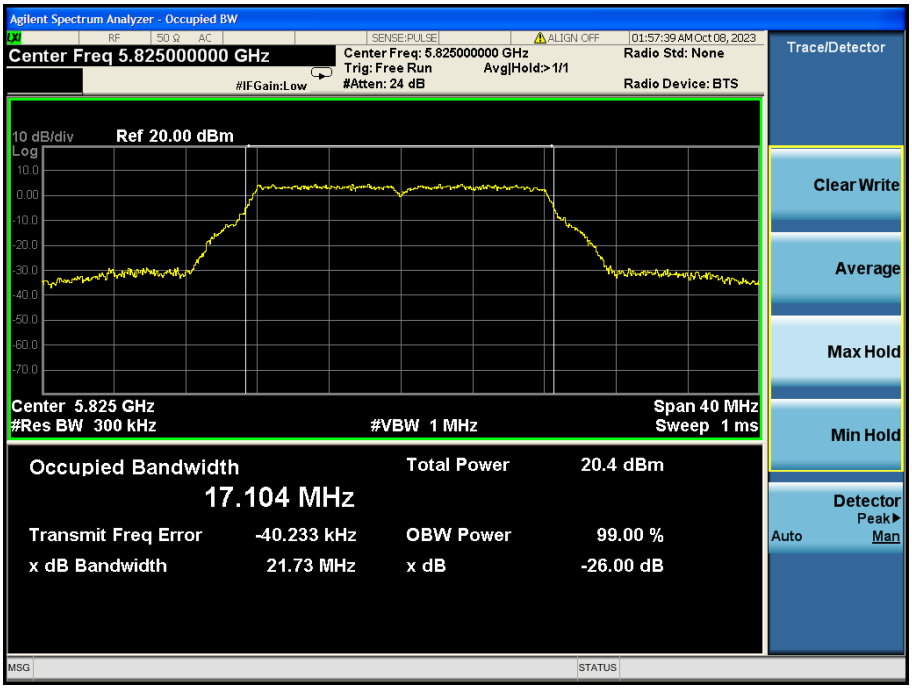


TX CH 165



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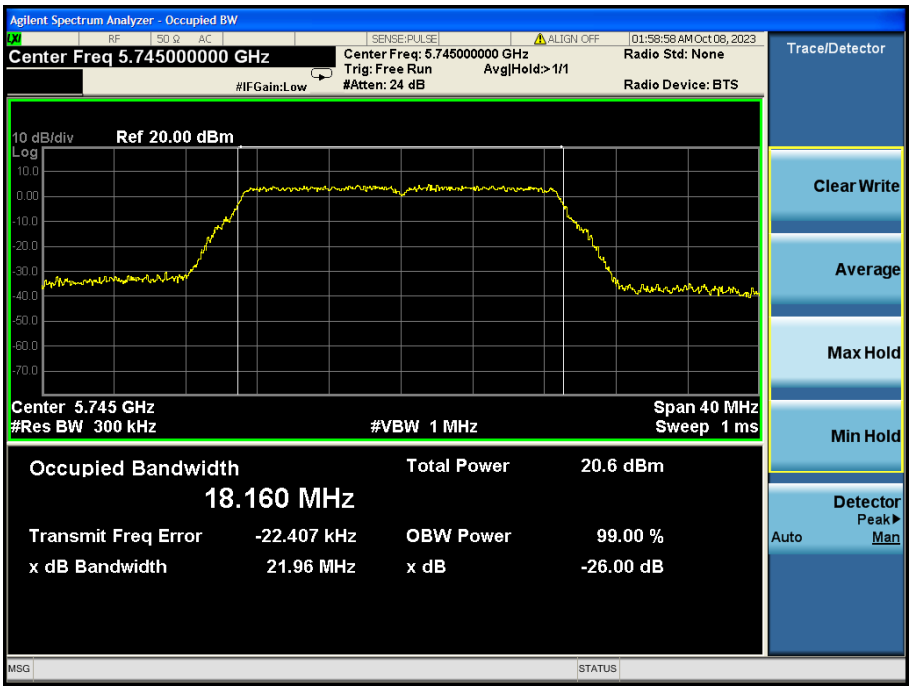
99% bandwidth-802.11n20

TX CH 149



TX CH 157

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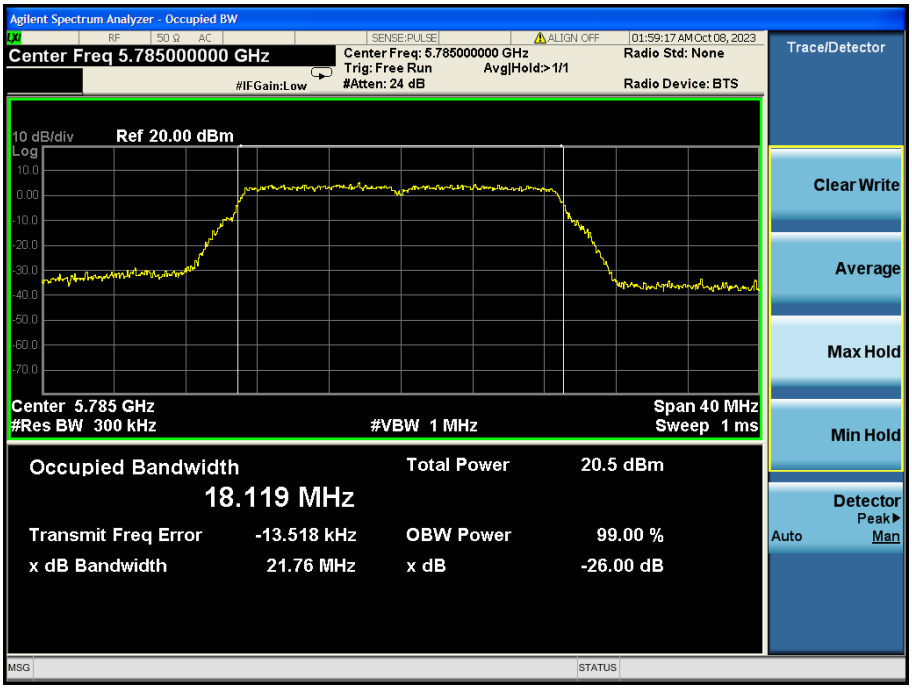
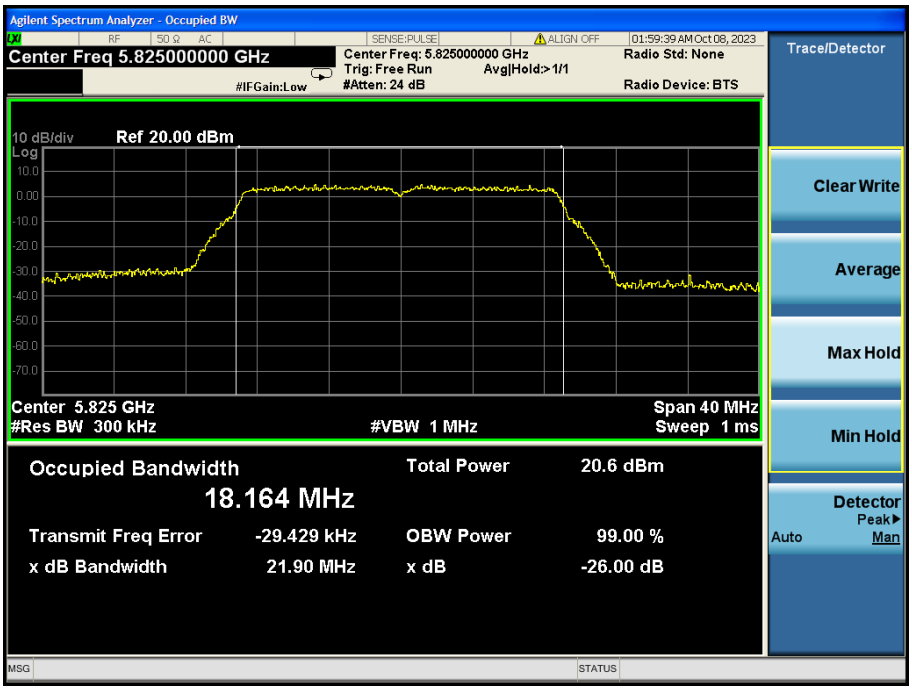


TX CH 165



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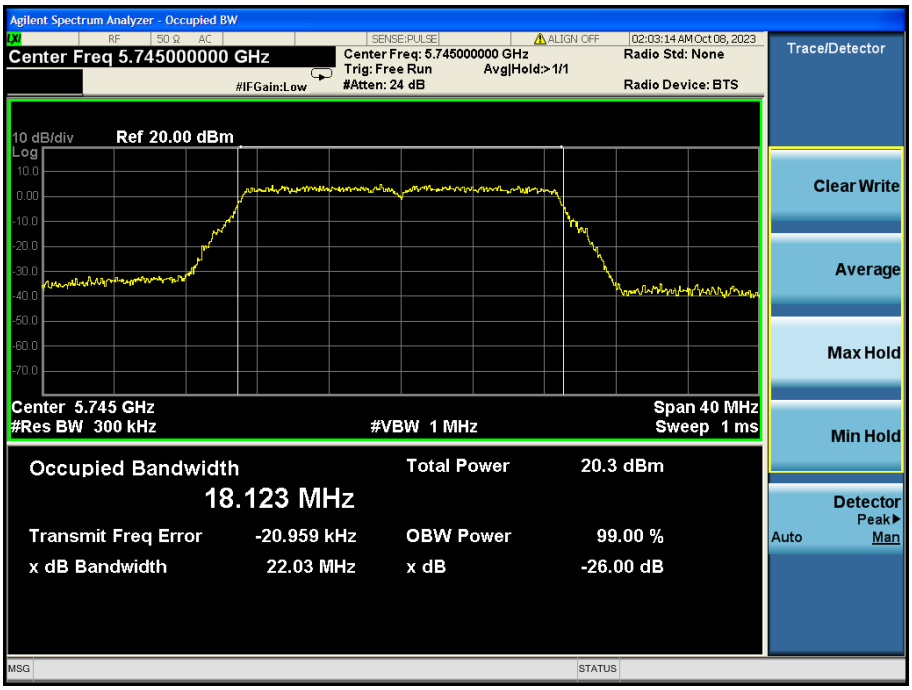
99% bandwidth-802.11ac20

TX CH 149



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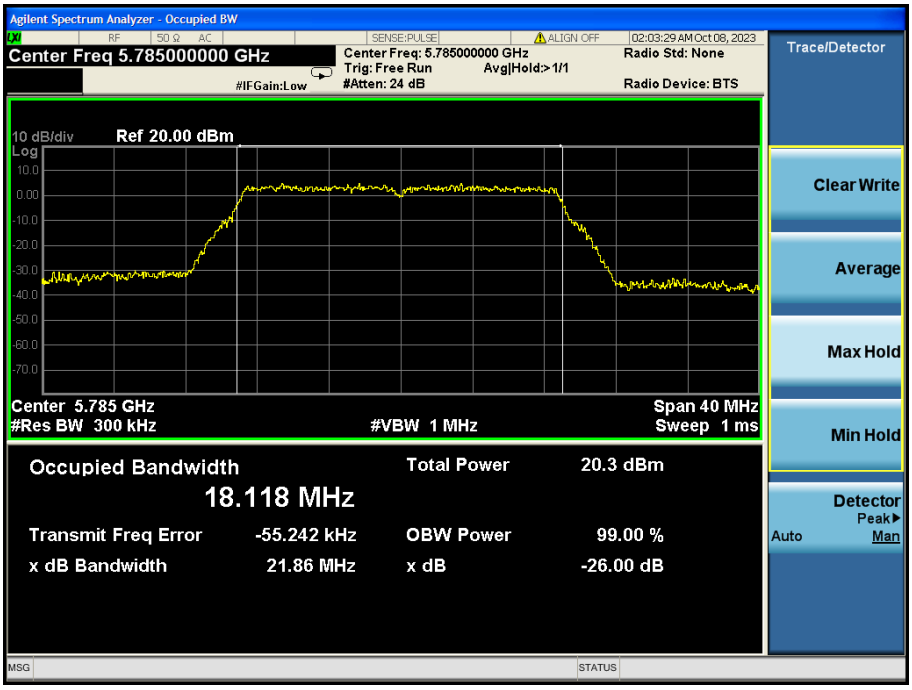
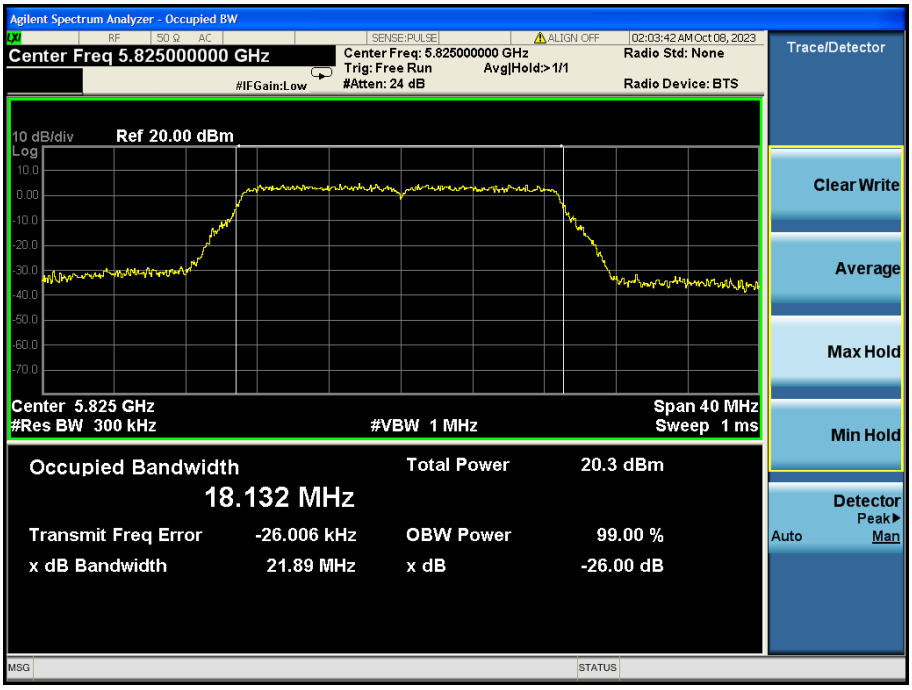


TX CH 165



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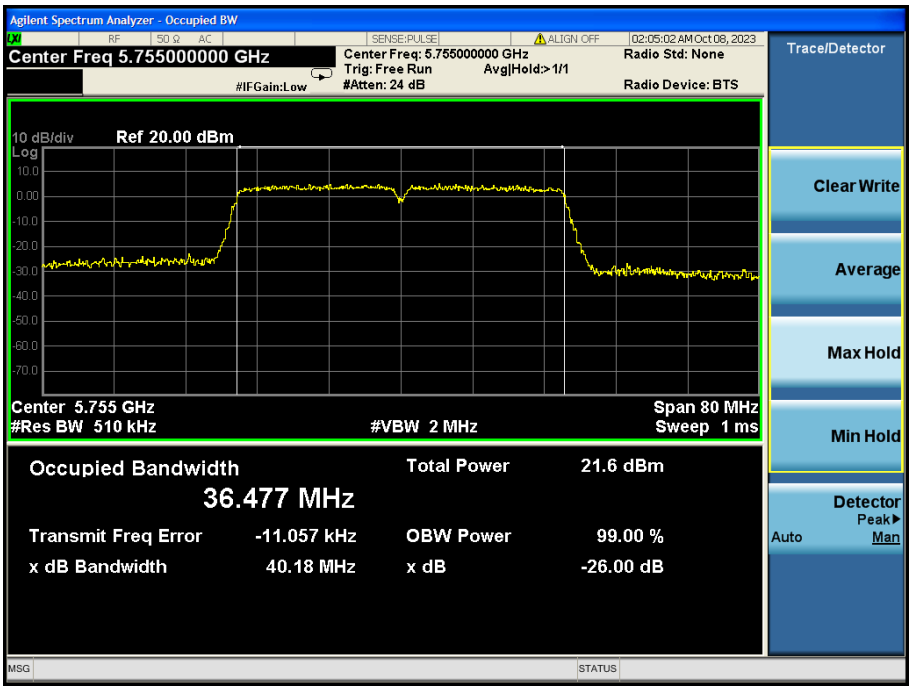
99% bandwidth-802.11n40

TX CH 151



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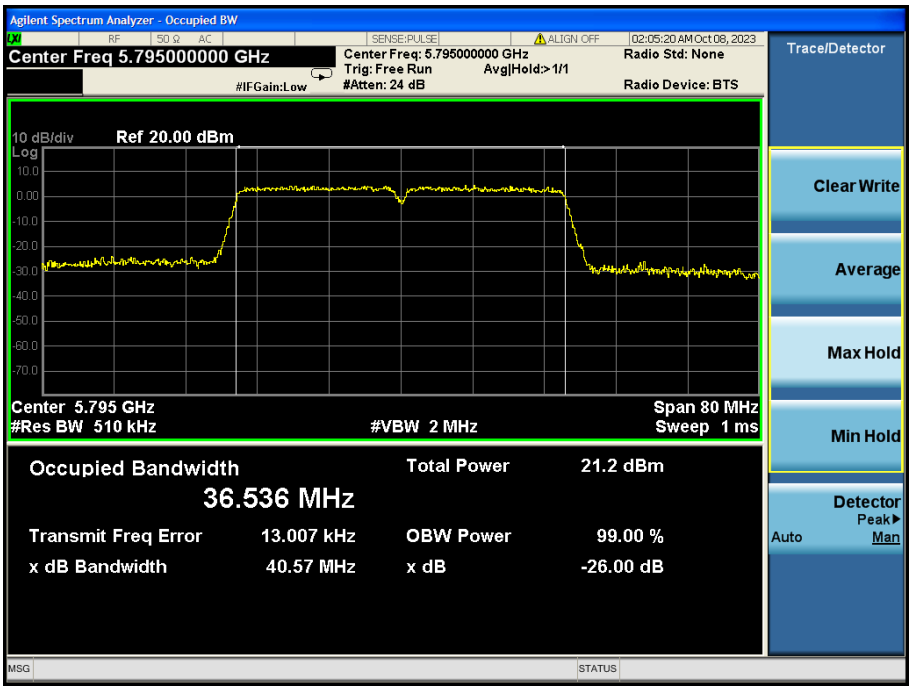
TX CH 159



99% bandwidth-802.11ac40

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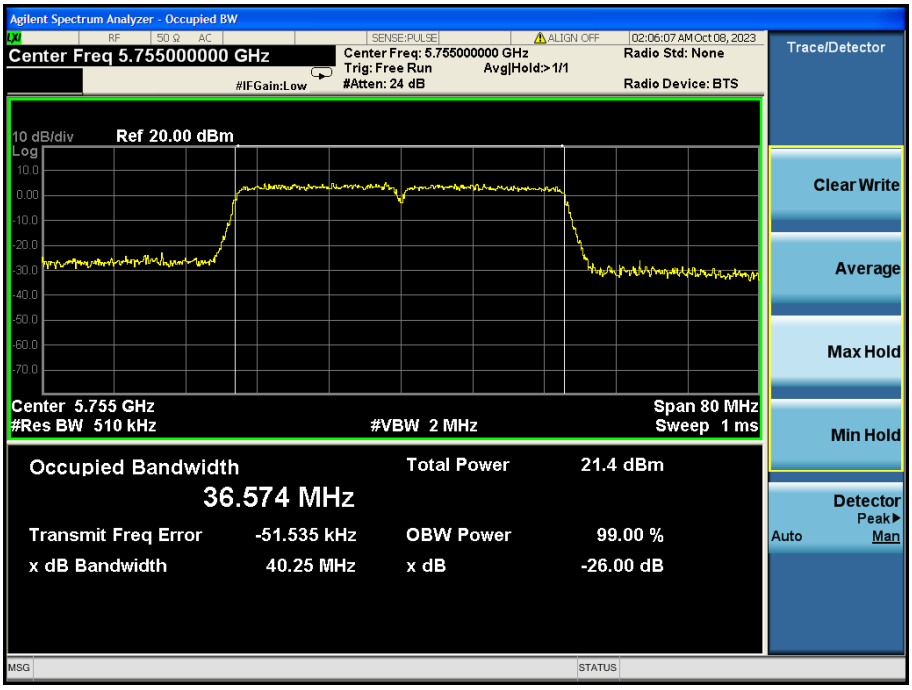
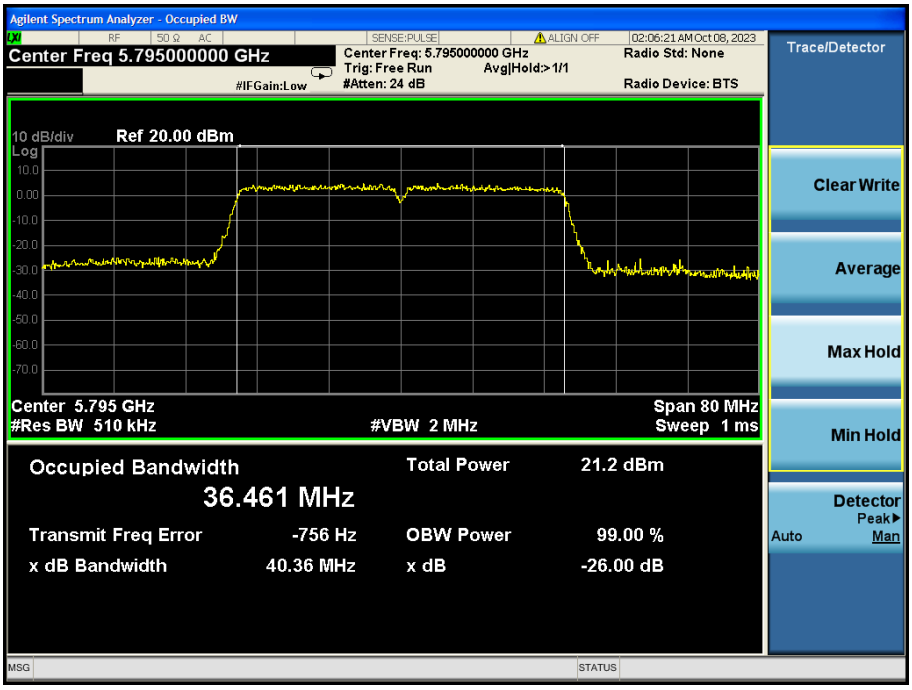


TX CH 159



99% bandwidth-802.11ac80

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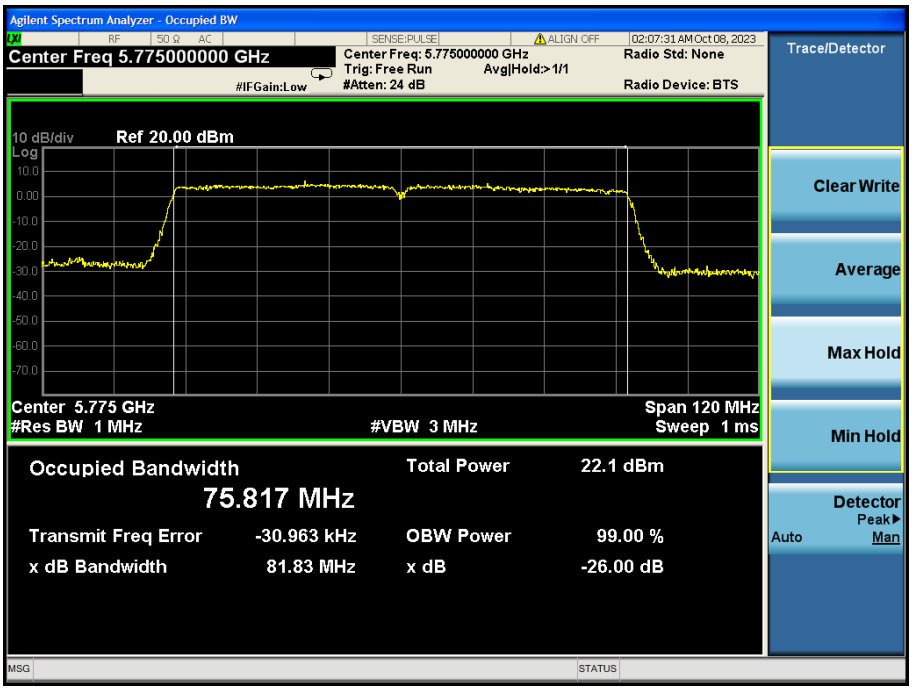
TX CH 155



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Test Mode	Test CH	Frequency (MHz)	26 dB Bandwidth (MHz)ANT 1	26 dB Bandwidth (MHz)ANT 2	99 % Emission Bandwidth (MHz) ANT 1	99 % Emission Bandwidth (MHz) ANT 2
802.11a	CH36	5180	21.63	21.45	17.107	17.104
	CH40	5200	21.54	21.35	17.077	17.045
	CH48	5240	21.77	21.47	17.099	17.073
802.11n(20M)	CH36	5180	21.73	21.63	18.176	18.163
	CH40	5200	21.90	21.73	18.091	18.062
	CH48	5240	21.95	21.57	18.173	18.145
802.11ac(20M)	CH36	5180	21.89	21.67	18.143	18.136
	CH40	5200	21.70	21.45	18.072	18.038
	CH48	5240	21.75	21.62	18.150	18.146
802.11n(40M)	CH38	5190	40.37	40.36	36.472	36.436
	CH46	5230	40.21	40.20	36.451	36.444
802.11ac(40M)	CH38	5190	40.23	40.12	36.409	36.405
	CH46	5230	40.16	40.11	35.374	35.353
802.11ac(80M)	CH42	5210	82.23	82.07	75.830	75.827

Note: ANT 1(2) Represent the value of antenna 1 and 2, The worst data is Antenna 1, only shown Antenna 1 Plot.

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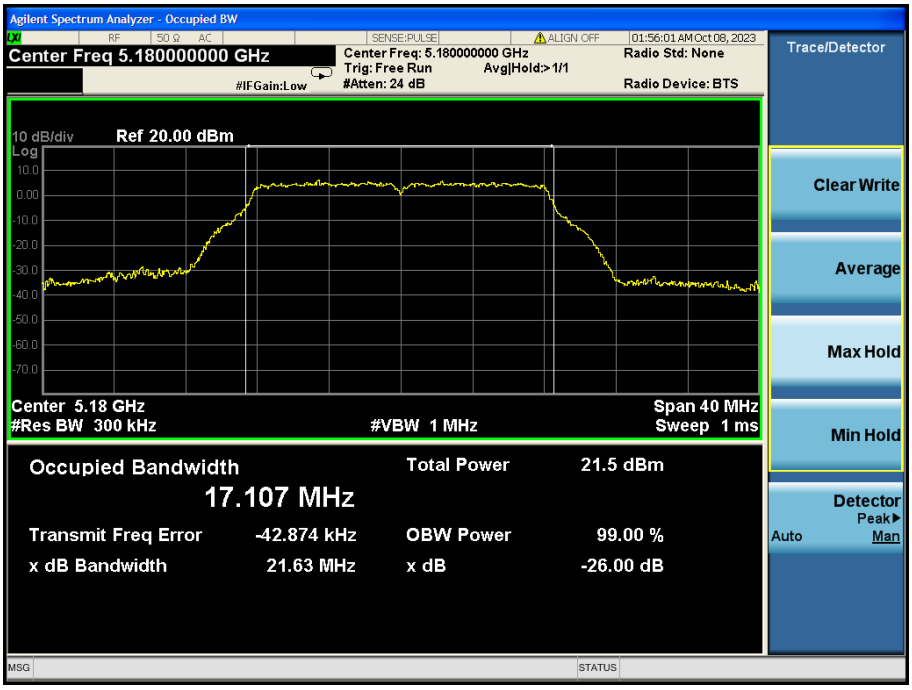
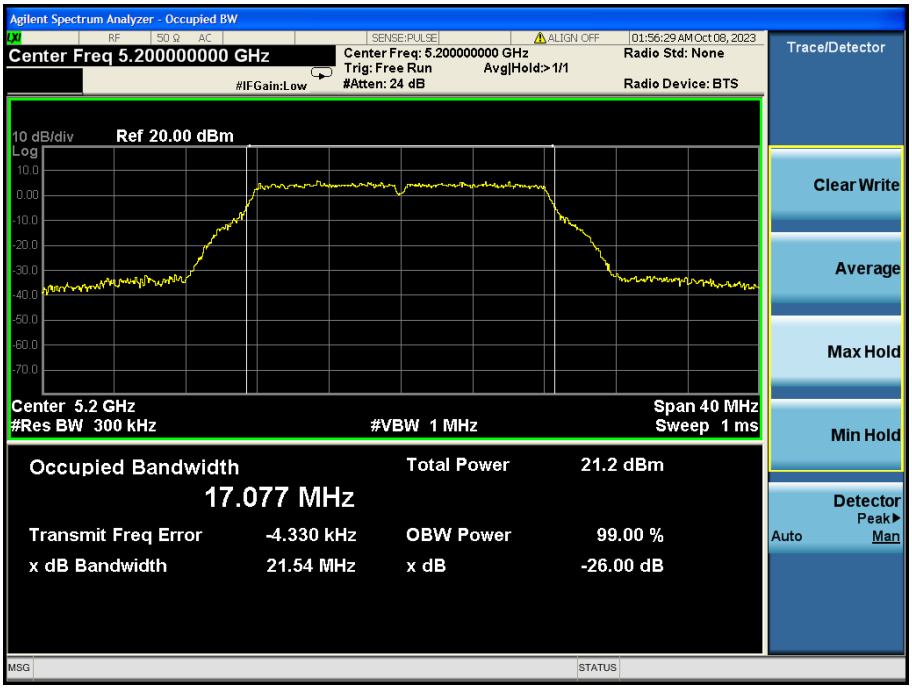
802.11a (5.15GHz-5.25GHz)

The Low Channel 36: 5180MHz



802.11a (5.15GHz-5.25GHz)

The Middle Channel 40: 5200MHz



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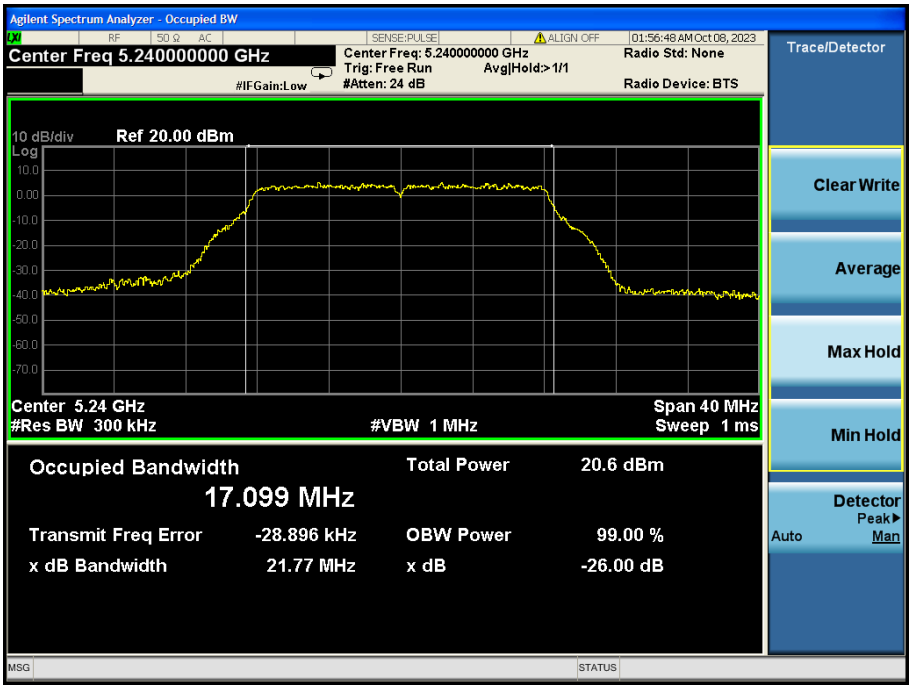
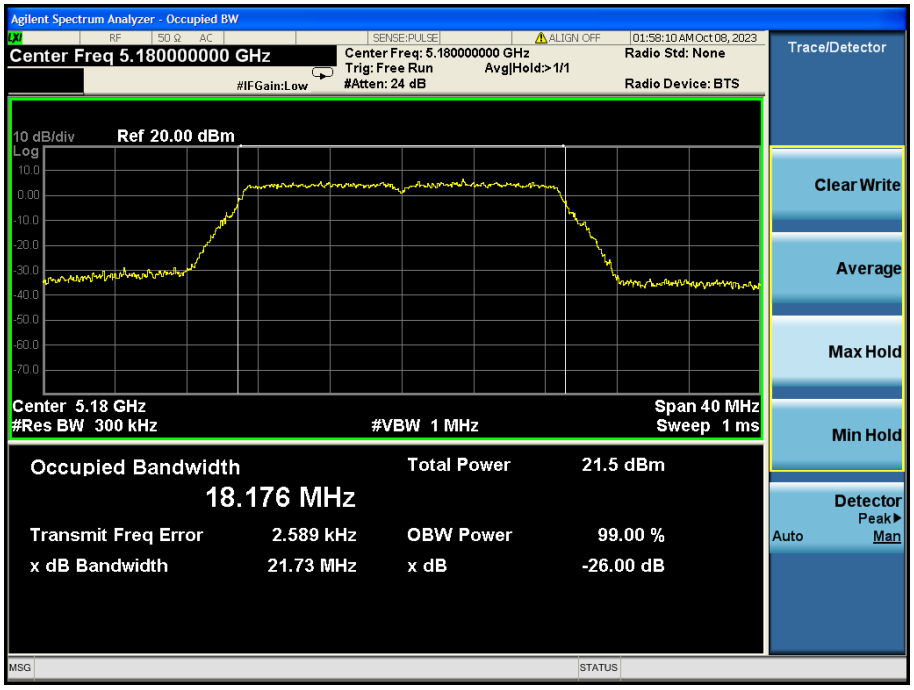
802.11a (5.15GHz-5.25GHz)

The High Channel 48: 5240MHz



802.11n(20M) (5.15GHz-5.25GHz)

The Lowest Channel 36: 5180MHz



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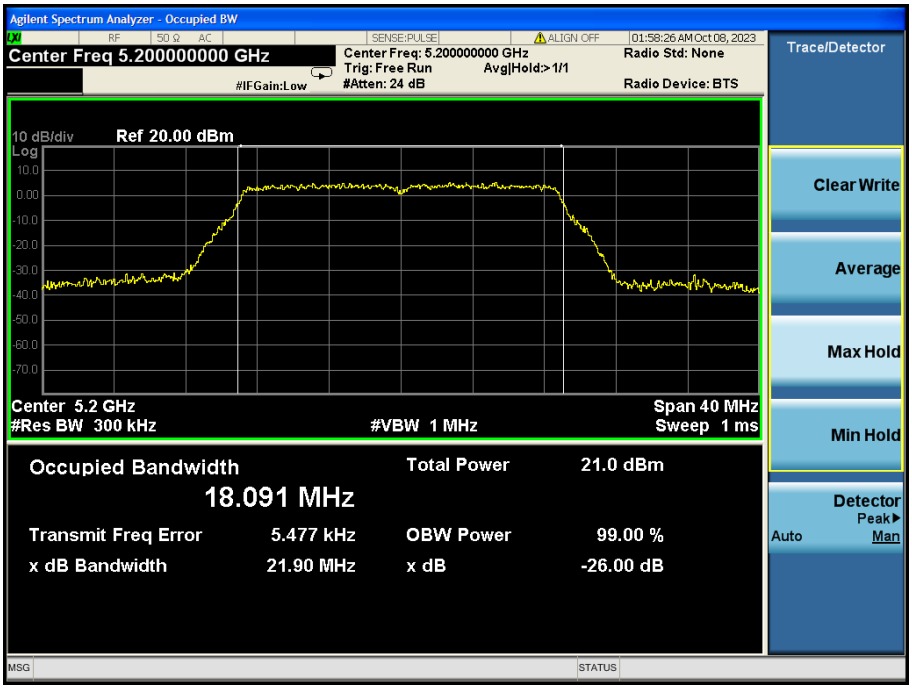
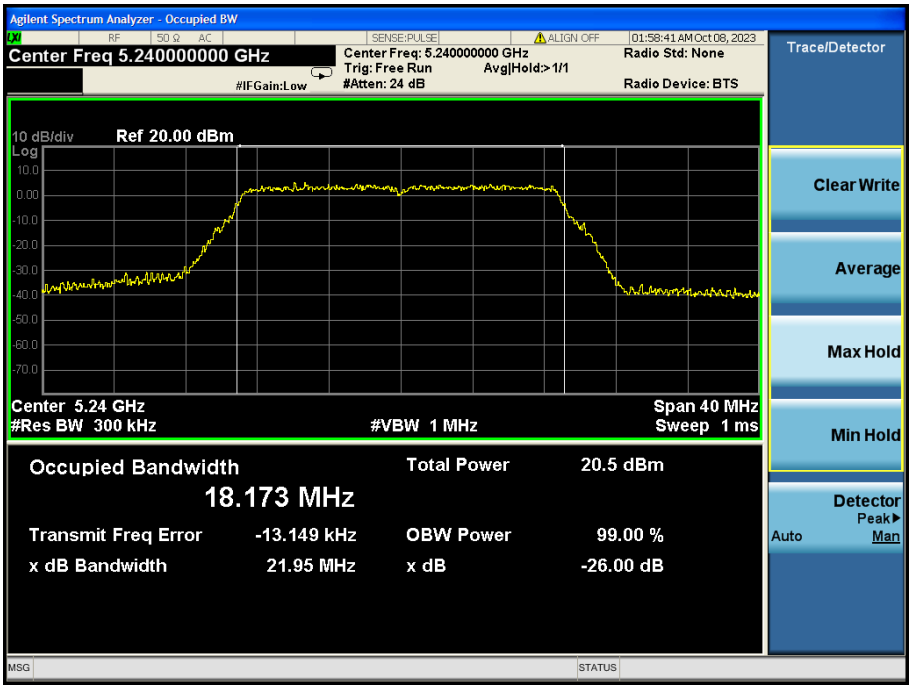
802.11n(20M) (5.15GHz-5.25GHz)

The Middle Channel 40: 5200MHz



802.11n(20M) (5.15GHz-5.25GHz)

The High Channel 48: 5240MHz



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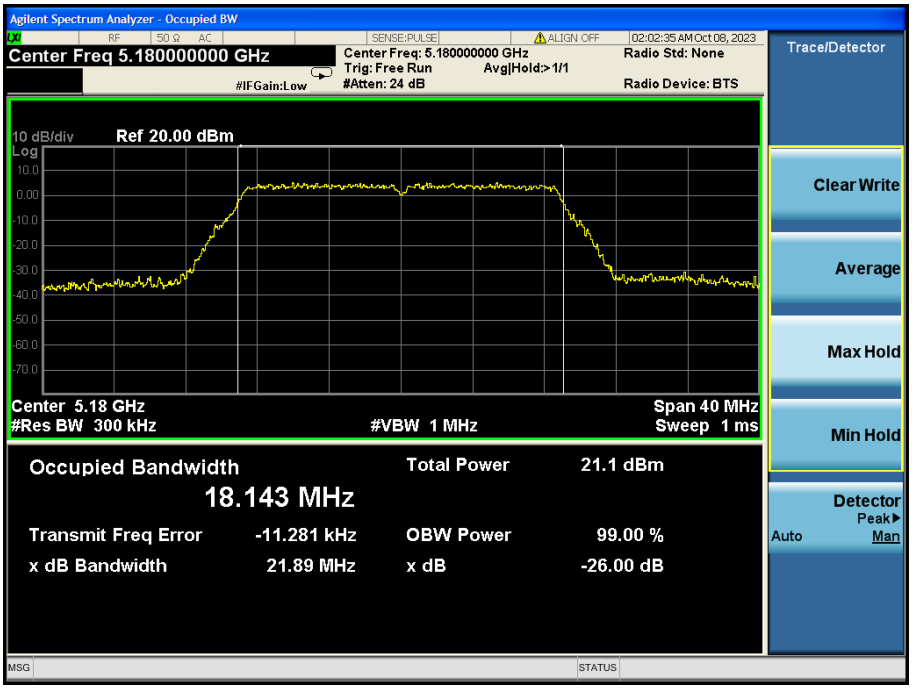
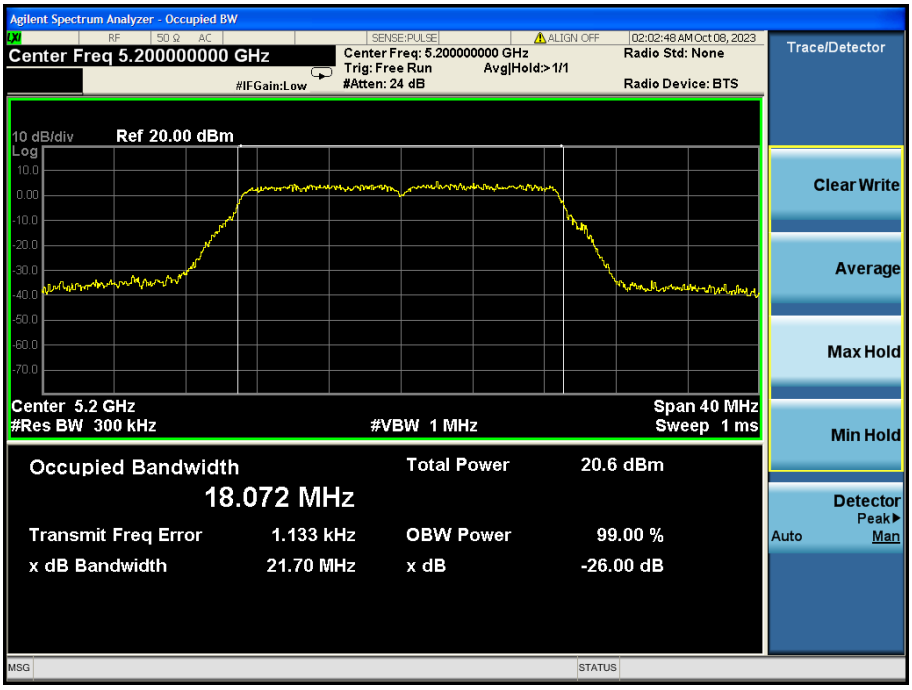
802.11ac(20M) (5.15GHz-5.25GHz)

The Middle Channel 36: 5180MHz



802.11n(20M) (5.15GHz-5.25GHz)

The High Channel 40: 5200MHz



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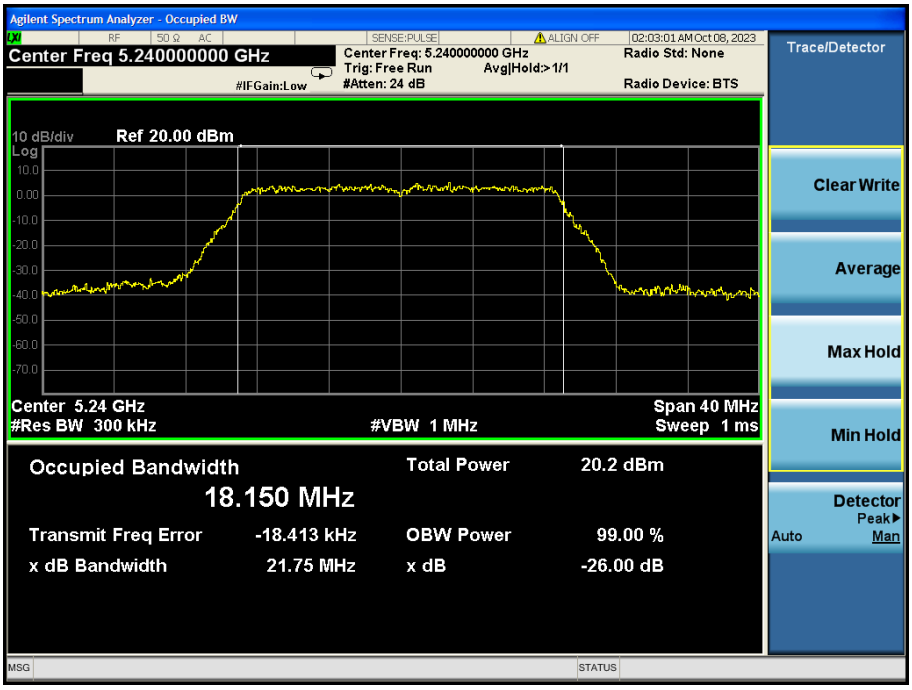
802.11ac(20M) (5.15GHz-5.25GHz)

The Middle Channel 48: 5240MHz



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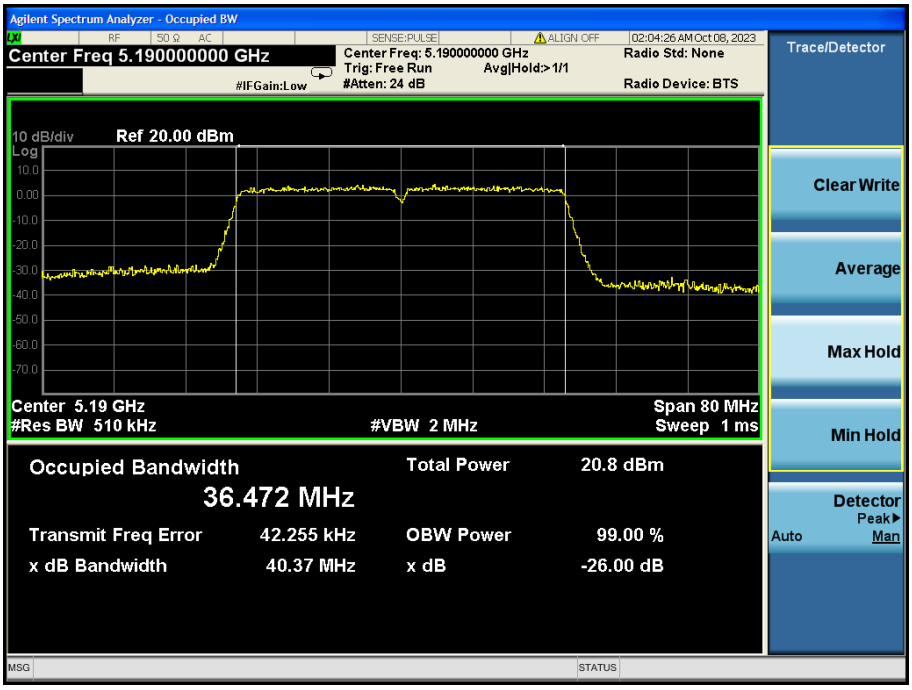
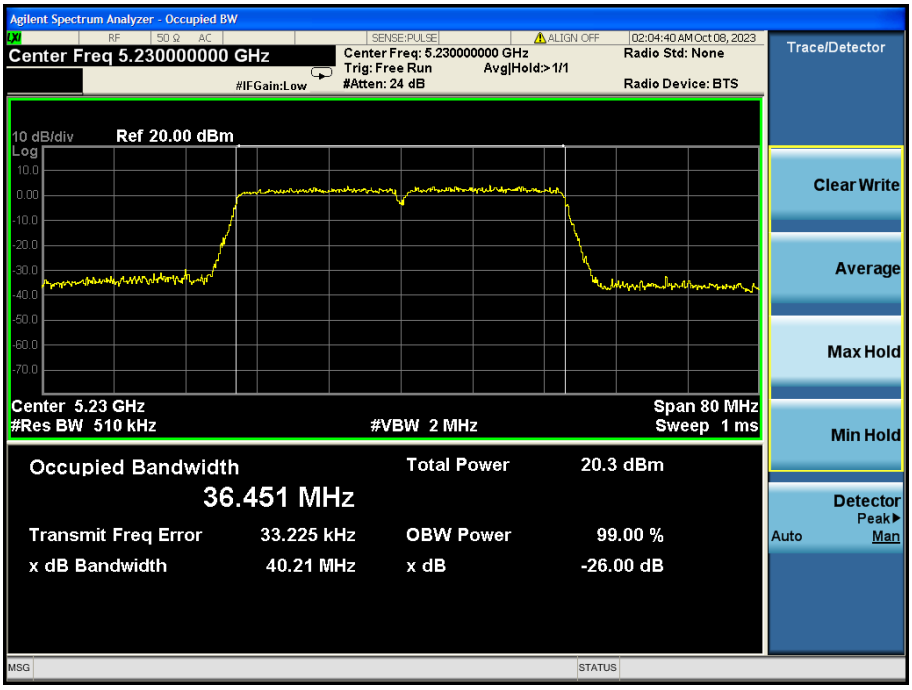
802.11n(40M) (5.15GHz-5.25GHz)

The Lowest Channel 38: 5190MHz



802.11n(40M) (5.15GHz-5.25GHz)

The High Channel 46: 5230MHz



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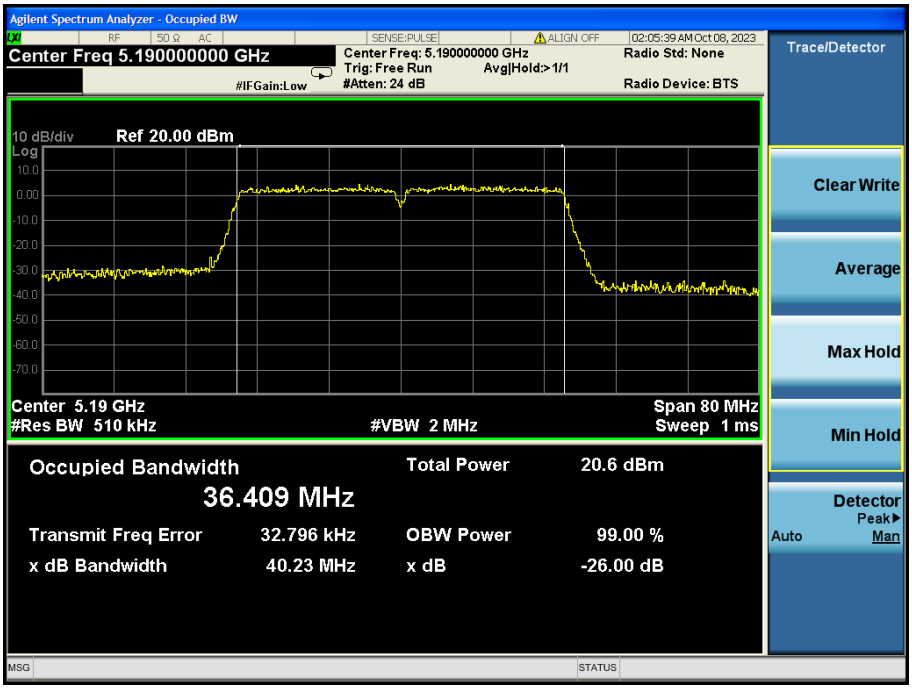
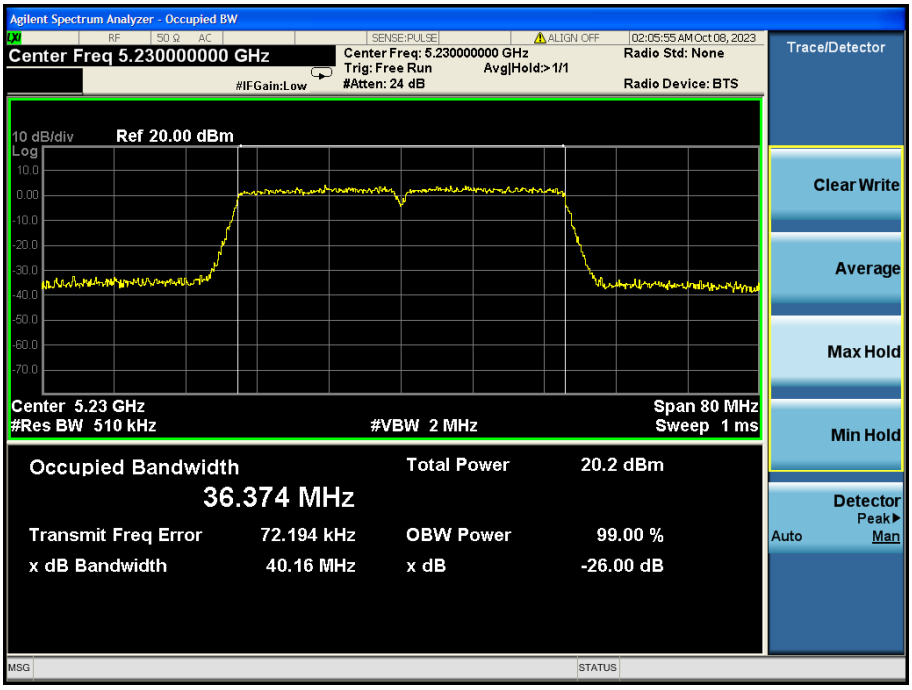
802.11ac(40M) (5.15GHz-5.25GHz)

The Lowest Channel 38: 5190MHz



802.11ac(40M) (5.15GHz-5.25GHz)

The High Channel 46: 5230MHz



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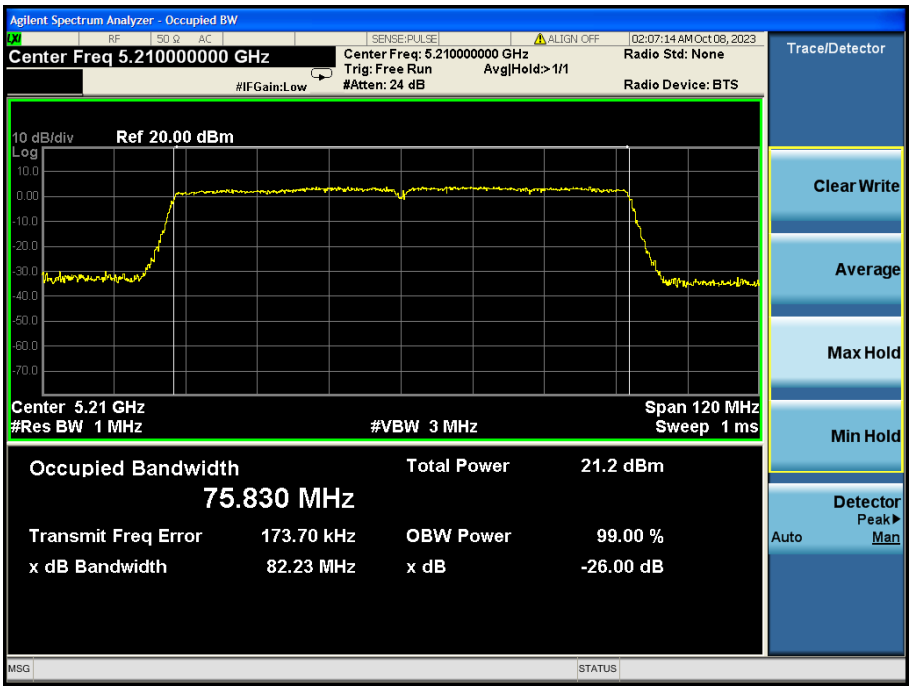
802.11ac(80M) (5.15GHz-5.25GHz)

The Lowest Channel 42: 5210MHz



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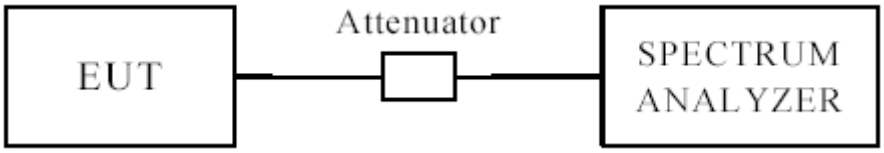
8.0 Peak Transmit Power Measurement

8.1 Test Setup



8.2 Limits of Peak Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) ≦(Max. e.i.r.p 125mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Client device	250mW (24 dBm)
U-NII-2A	--		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	--		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	--		1 Watt (30 dBm)

Note: Where B is the 26dB emission bandwidth in MHz.

8.3 Test Procedure

The average power output was measured with a Spectrum analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the average power was measured

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8.4Test Results

CH. No.	Frequency	Conducted Average Power(dBm)		total power (dBm)	Limit (dBm/MHz)	Result
		ANT 1	ANT 2			
TX 802.11a Mode						
CH36	5180	17.88	17.79	--	24	Pass
CH40	5200	18.77	18.13	--	24	Pass
CH48	5240	18.70	18.17	--	24	Pass
CH 149	5745	19.99	18.83	--	30	Pass
CH 157	5785	19.42	18.68	--	30	Pass
CH 165	5825	20.22	19.24	--	30	Pass
TX 802.11n20 Mode						
CH36	5180	16.84	15.46	19.21	23.51	Pass
CH40	5200	16.59	15.43	19.06	23.51	Pass
CH48	5240	16.23	15.75	19.01	23.51	Pass
CH 149	5745	17.24	16.49	19.89	29.62	Pass
CH 157	5785	17.85	16.10	20.07	29.62	Pass
CH 165	5825	17.65	16.46	20.11	29.62	Pass
TX 802.11n40 Mode						
CH38	5190	15.22	14.86	18.05	23.51	Pass
CH46	5230	15.59	14.59	18.13	23.51	Pass
CH151	5755	16.82	15.07	19.04	29.62	Pass
CH159	5795	16.44	15.18	18.87	29.62	Pass

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CH. No.	Frequency	Conducted Average Power(dBm)		total power (dBm)	Limit (dBm)	Result
		ANT 1	ANT 2			
TX 802.11 ac (VHT20) Mode						
CH 36	5180	16.57	15.44	19.05	23.51	Pass
CH 40	5200	16.53	15.73	19.16	23.51	Pass
CH 48	5240	16.70	15.34	19.08	23.51	Pass
CH 149	5745	18.35	17.56	20.98	29.62	Pass
CH 157	5785	18.52	17.37	20.99	29.62	Pass
CH 165	5825	18.17	17.36	20.79	29.62	Pass
TX 802.11 ac (VHT40) Mode						
CH38	5190	15.47	14.08	17.84	23.51	Pass
CH46	5230	15.02	14.51	17.78	23.51	Pass
CH 151	5755	15.15	14.46	17.83	29.62	Pass
CH 159	5795	15.14	14.16	17.69	29.62	Pass
TX 802.11 ac (VHT80) Mode						
CH42	5210	13.97	13.14	16.59	23.51	Pass
CH155	5775	14.38	13.24	16.86	29.62	Pass

Note: For MIMO mode:

5.2Gwifi：Directional gain = GANT MAX + 10 log(NANT/NSS) =6.49dBi, Limit =24-6.49+6=23.51 dBm.

5.8Gwifi：Directional gain = GANT MAX + 10 log(NANT/NSS) =6.38dBi, Limit =30-6.38+6=29.62 dBm.

（Nss=1）

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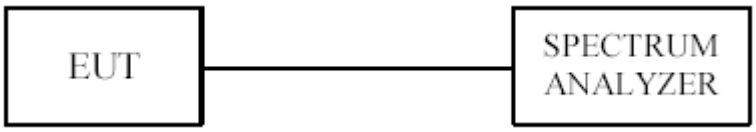
9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client device	11dBm/MHz
U-NII-2A	--		11dBm/MHz
U-NII-2C	--		11dBm/MHz
U-NII-3	--		30dBm/500kHz

9.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer
2. Set the RBW = 1MHz or 510kHz
3. Set the VBW =3MHz or 2MHz
4. Set the span to encompass the entire emissions bandwidth (EBW) of the signal
5. Detector = Peak/rms
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

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9.4Test Result

Test Mode	Test Channel	Frequency	Power Density (dBm/500kHz) ANT 1	Power Density (dBm/500kHz) ANT 2	Total Power Density (dBm/500 kHz)	Limit (dBm/500 kHz)	Result
802.11a (5.725GHz-5.85GHz) Data rate 6Mbps	CH 149	5745	5.839	5.573	/	30	Pass
	CH 157	5785	5.668	5.347	/	30	Pass
	CH 165	5825	5.393	5.026	/	30	Pass
802.11n(20M) (5.725GHz-5.85GHz) Data rate 13Mbps	CH 149	5745	5.961	5.223	8.62	29.62	Pass
	CH 157	5785	5.543	5.157	8.36	29.62	Pass
	CH 165	5825	5.153	4.862	8.02	29.62	Pass
802.11ac(20M) (5.725GHz-5.85GHz) Data rate 13Mbps	CH 149	5745	5.520	5.232	8.39	29.62	Pass
	CH 157	5785	5.288	5.072	8.19	29.62	Pass
	CH 165	5825	5.355	5.107	8.24	29.62	Pass
802.11n(40M) (5.725GHz-5.85GHz) Data rate 27Mbps	CH 151	5755	3.038	2.485	5.78	29.62	Pass
	CH 159	5795	2.167	1.854	5.02	29.62	Pass
802.11ac(40M) (5.725GHz-5.85GHz) Data rate 27Mbps	CH 151	5755	3.005	2.742	5.89	29.62	Pass
	CH 159	5795	2.253	2.074	5.17	29.62	Pass
802.11ac(80M) (5.725GHz-5.85GHz) Data rate 58.6Mbps	CH 155	5775	1.281	1.174	4.24	29.62	Pass

Note: For MIMO mode: Directional gain = GANT MAX + 10 log(NANT/NSS) =6.38dBi，（Nss=1）
Limit =30-6.38+6=29.62 dBm.

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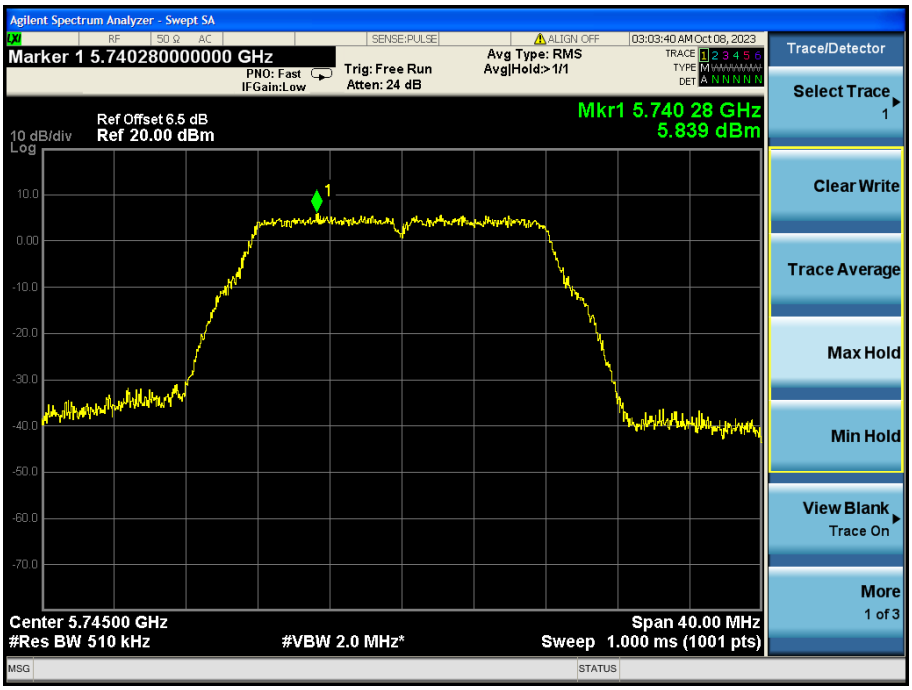
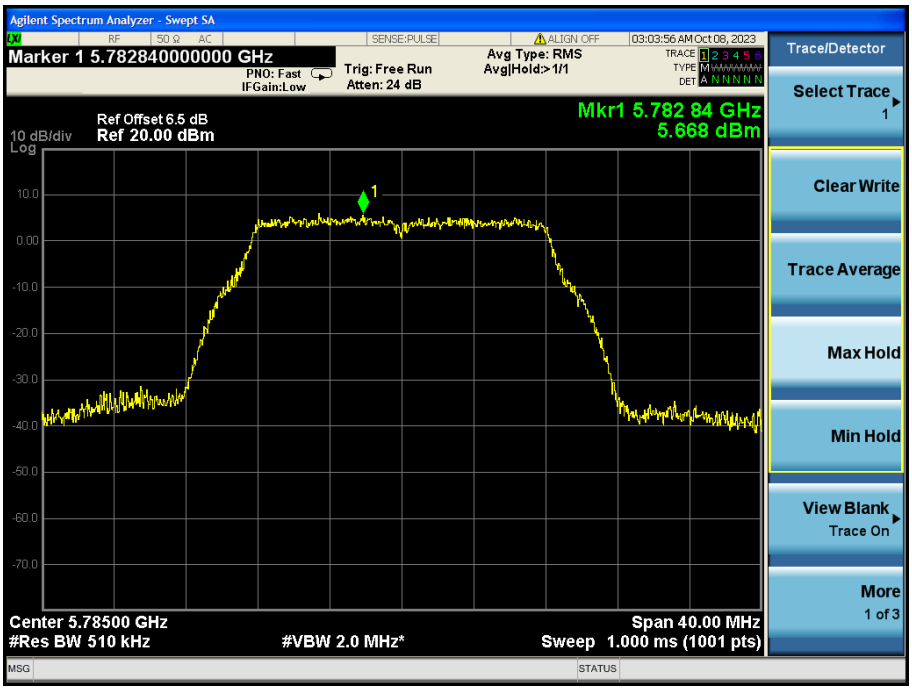
802.11a (5.725GHz-5.85GHz)
TX CH149



TX CH157



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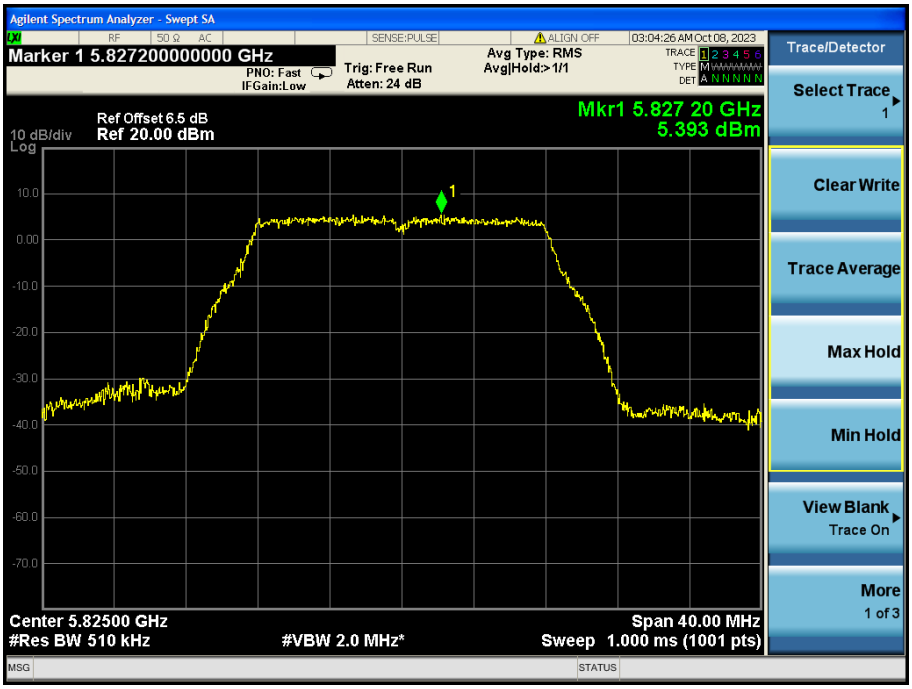
TX CH165



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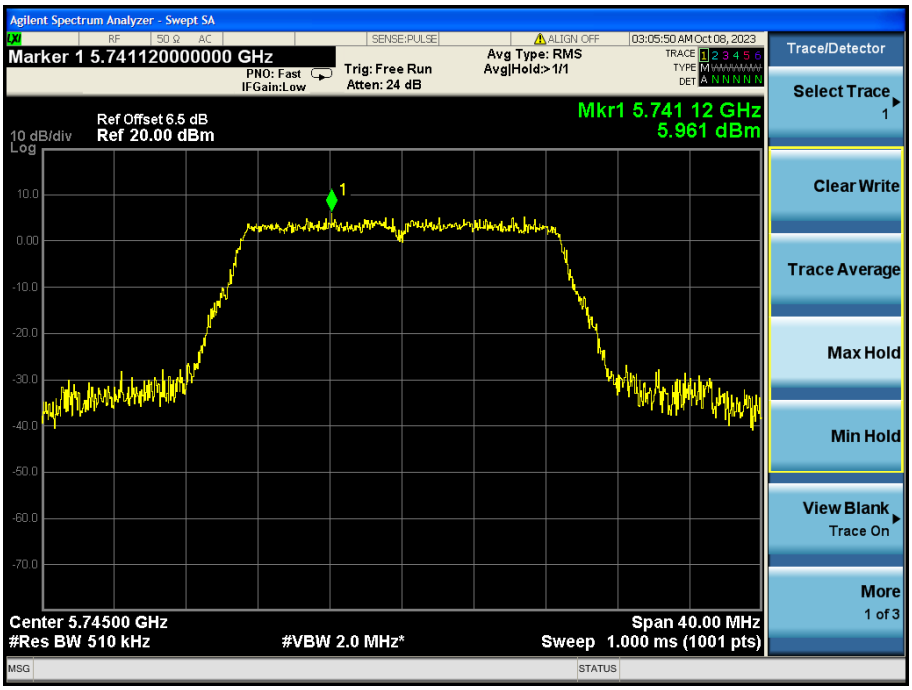
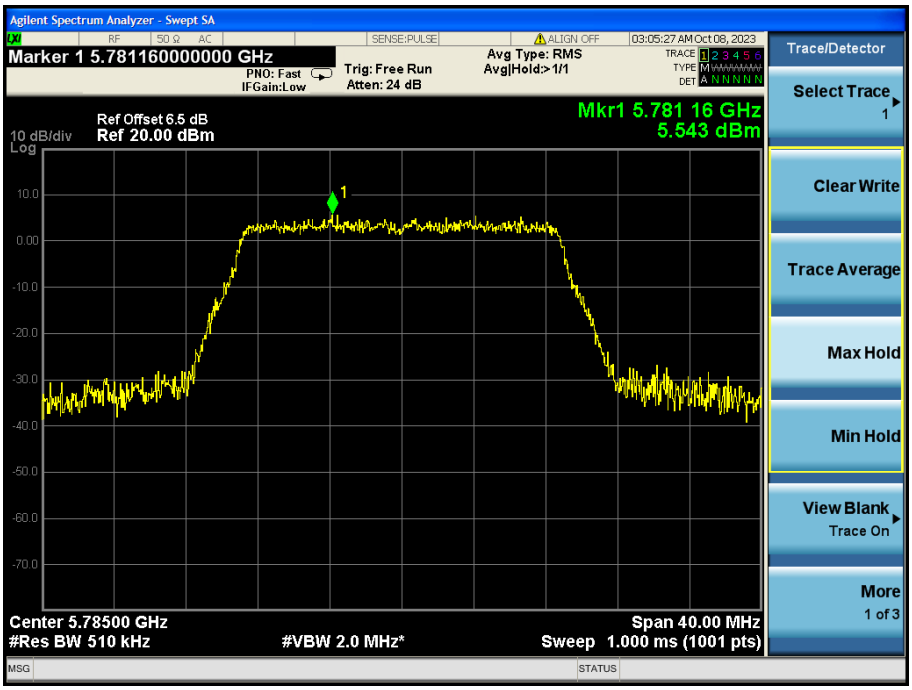
802.11n(20M) (5.725GHz-5.85GHz)
TX CH149



TX CH157



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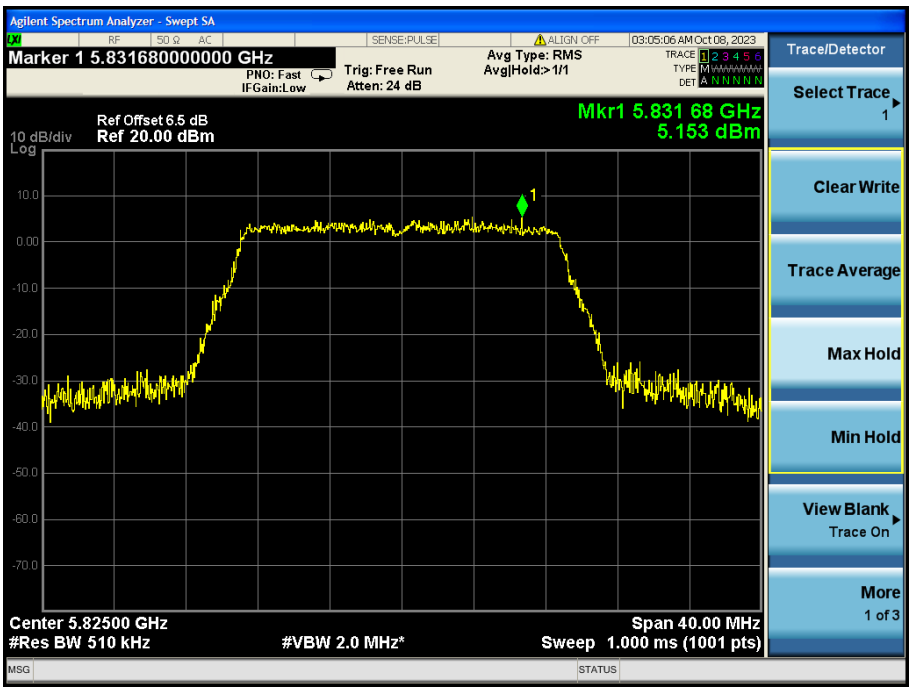
TX CH165



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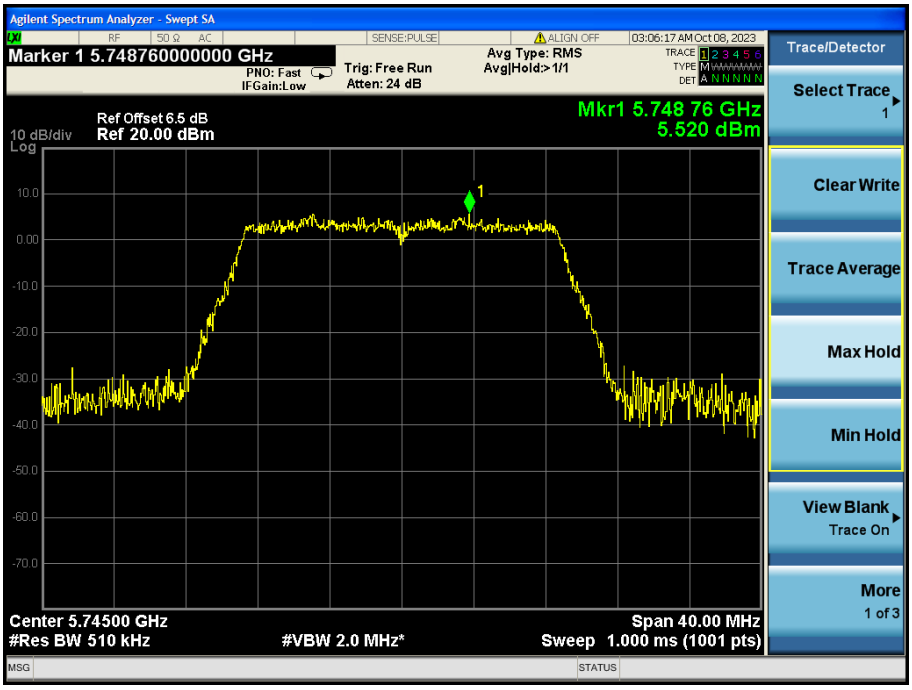
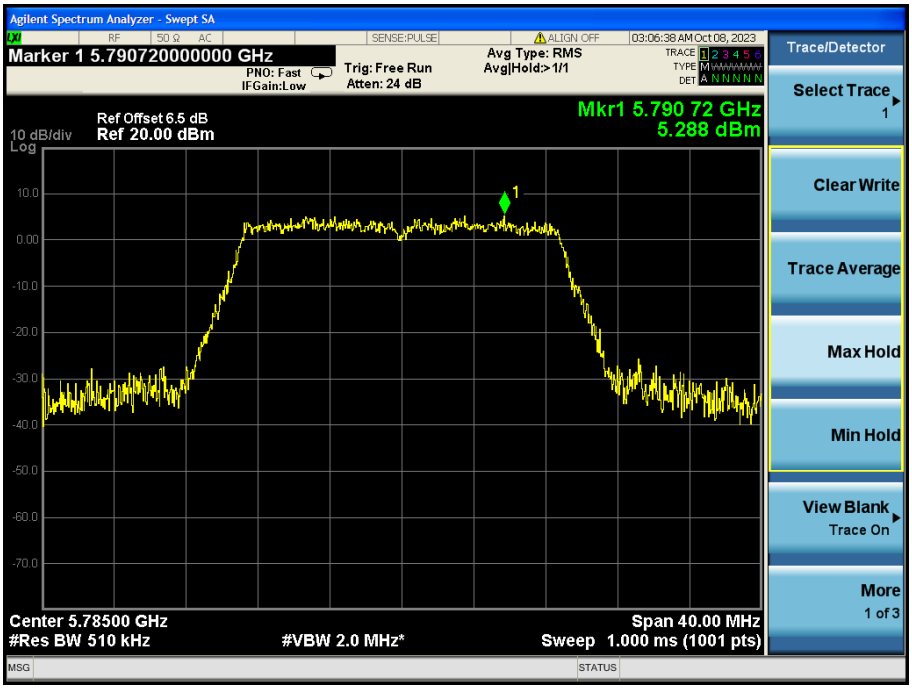
802.11ac(20M) (5.725GHz-5.85GHz)
TX CH149



TX CH157



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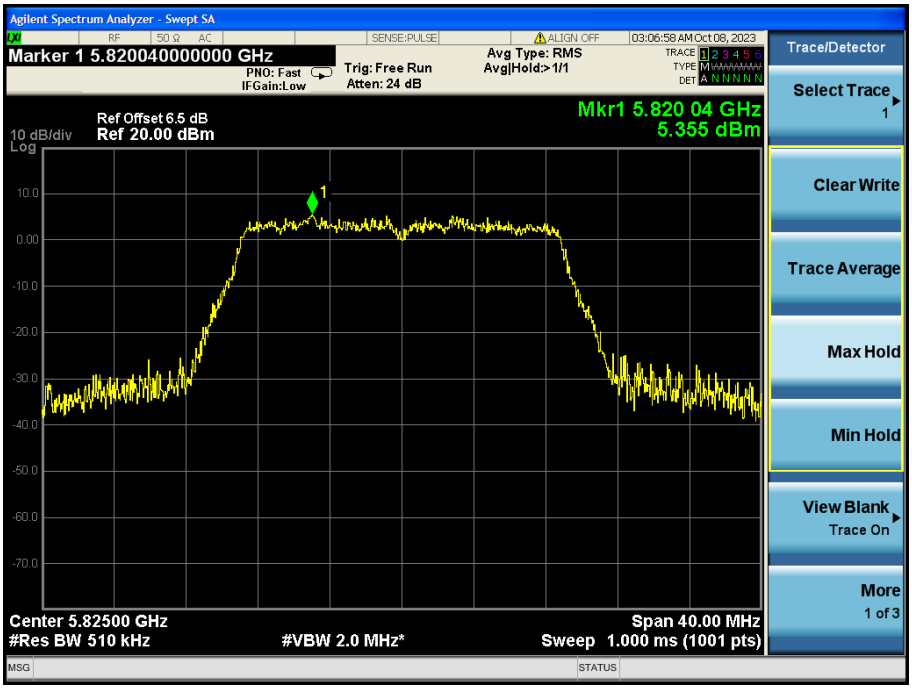

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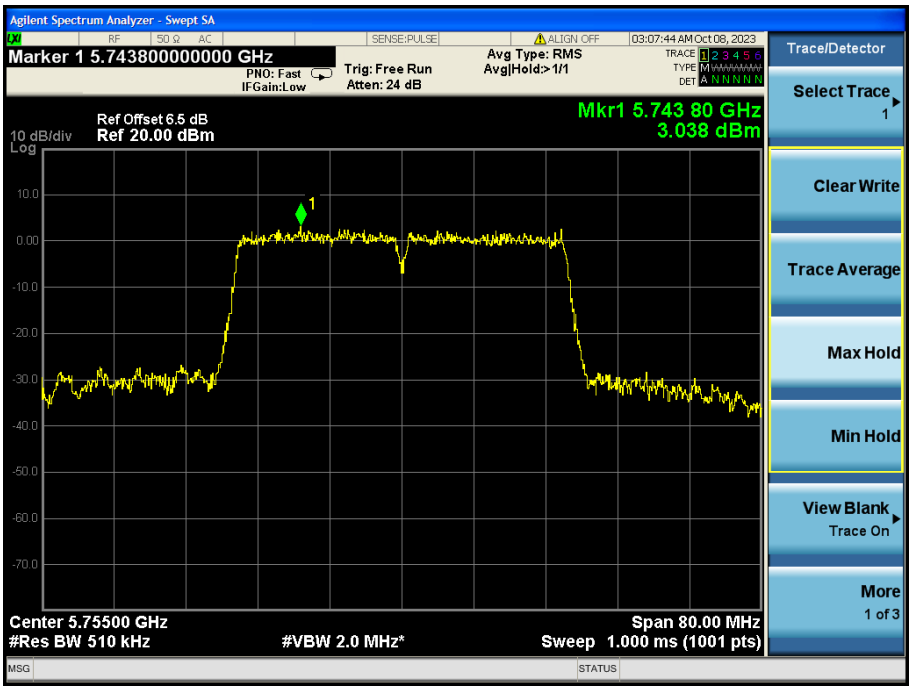
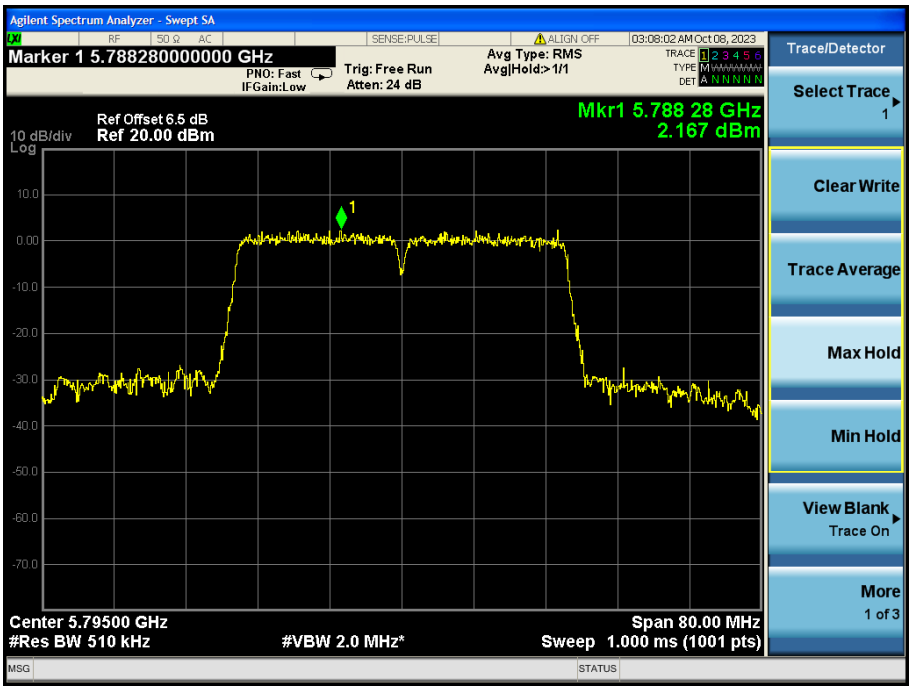
802.11n(40M) (5.725GHz-5.85GHz)
TX CH151



TX CH159



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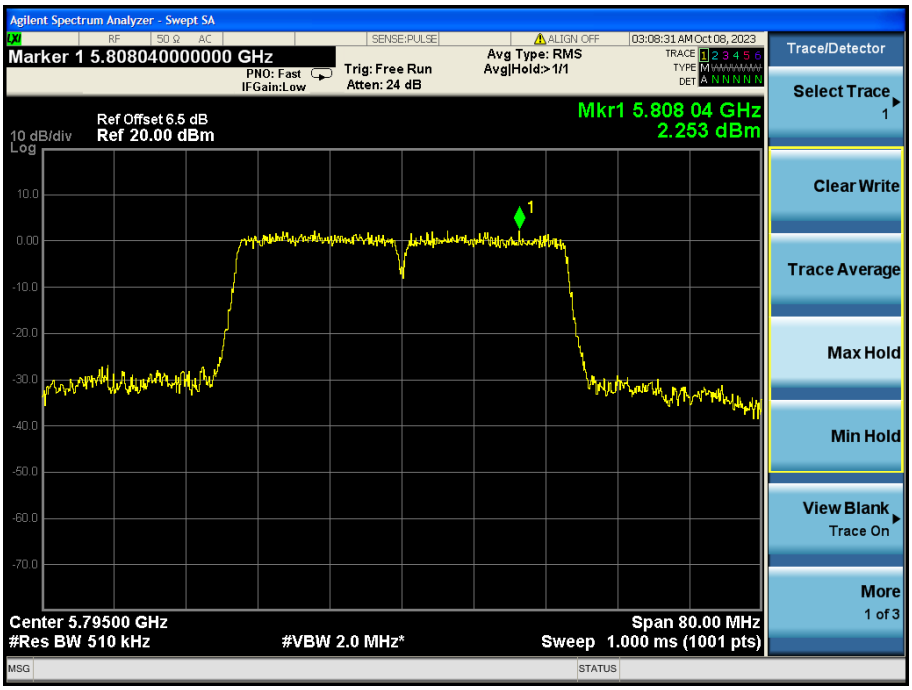
802.11ac(40M) (5.725GHz-5.85GHz)
TX CH151

TX CH159



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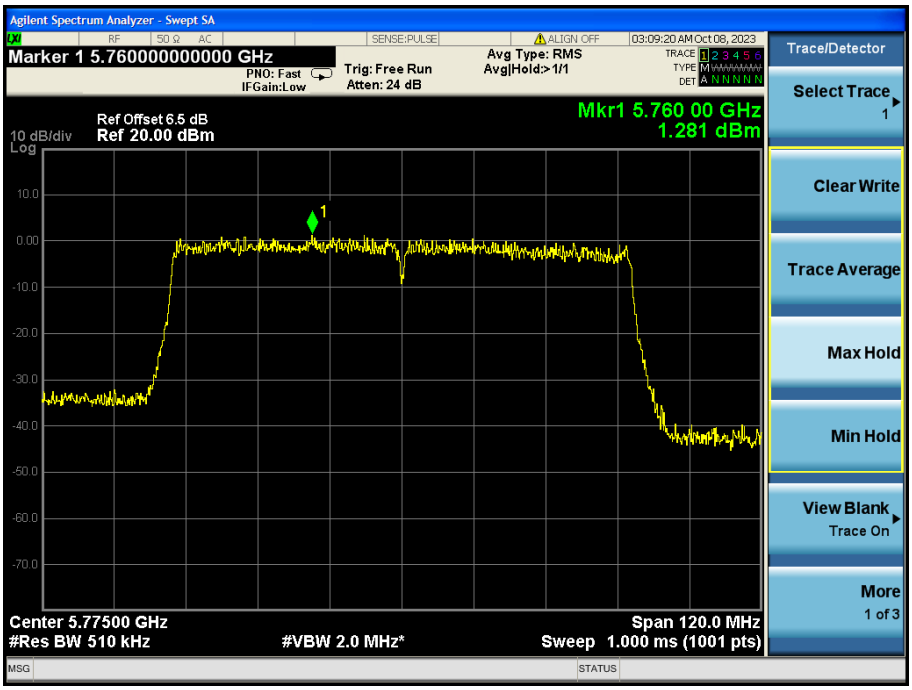
802.11ac(80M) (5.725GHz-5.85GHz)
TX CH155



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Test Mode	Channel	Channel Frequency (MHz)	Power Density (dBm/MH) ANT 1	Power Density (dBm/MHz) ANT 2	Total Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Low	5180	6.444	6.321	--	11	Pass
	Middle	5200	6.200	6.126	--	11	Pass
	Highest	5240	5.684	5.236	--	11	Pass
802.11n(20M)	Low	5180	2.969	2.347	5.68	10.51	Pass
	Middle	5200	4.133	3.635	6.90	10.51	Pass
	Highest	5240	3.708	3.352	6.54	10.51	Pass
802.11ac(20M)	Low	5180	1.572	1.265	4.43	10.51	Pass
	Middle	5200	1.130	1.059	4.10	10.51	Pass
	Highest	5240	1.138	1.006	4.08	10.51	Pass
802.11n(40M)	Low	5190	4.286	3.767	7.04	10.51	Pass
	Highest	5230	4.518	3.683	7.13	10.51	Pass
802.11ac(40M)	Low	5190	2.675	1.874	5.30	10.51	Pass
	Highest	5230	3.460	2.457	6.00	10.51	Pass
802.11ac(80M)	---	5210	1.463	1.163	4.33	10.51	Pass

Note: For MIMO mode: Directional gain = GANT MAX + 10 log(NANT/NSS) =6.49dBi，（Nss=1）
Limit =11-6.49+6=10.51 dBm.

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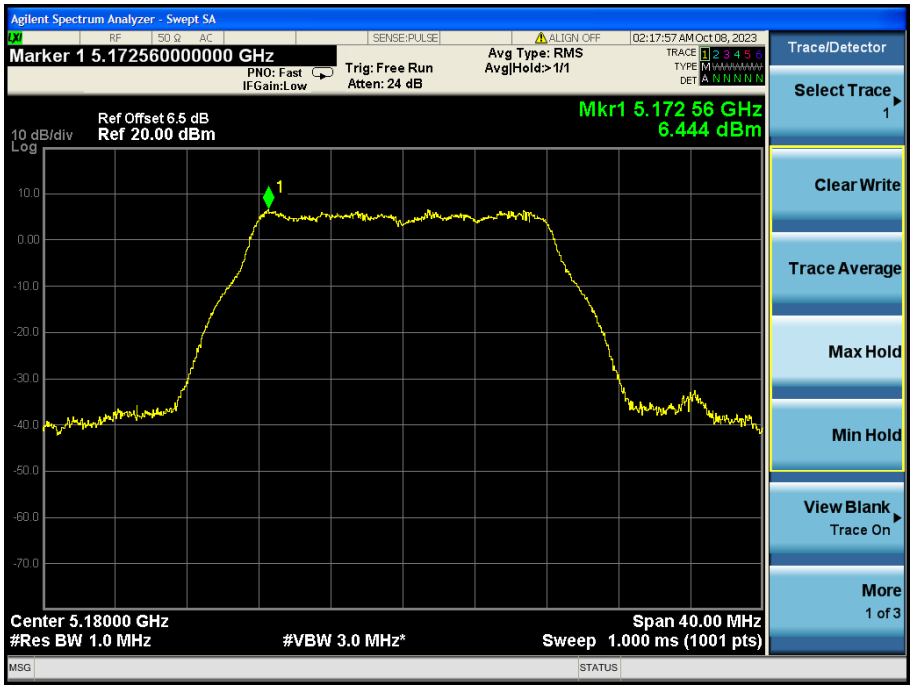
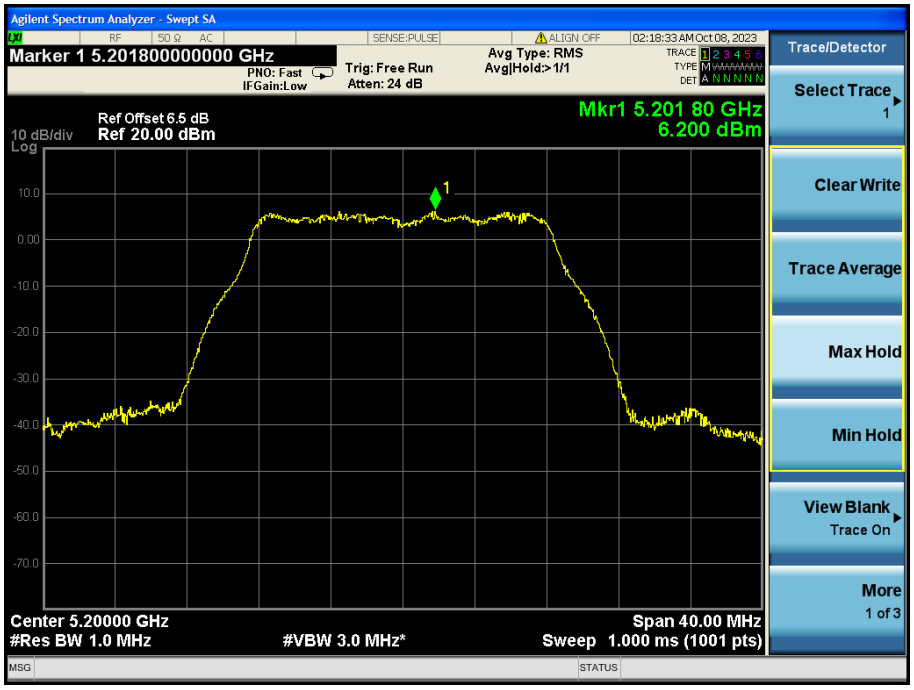
802.11a (5.15GHz-5.25GHz)

The Lowest Channel 36: 5180MHz



802.11a (5.15GHz-5.25GHz)

The Middle Channel 40: 5200MHz



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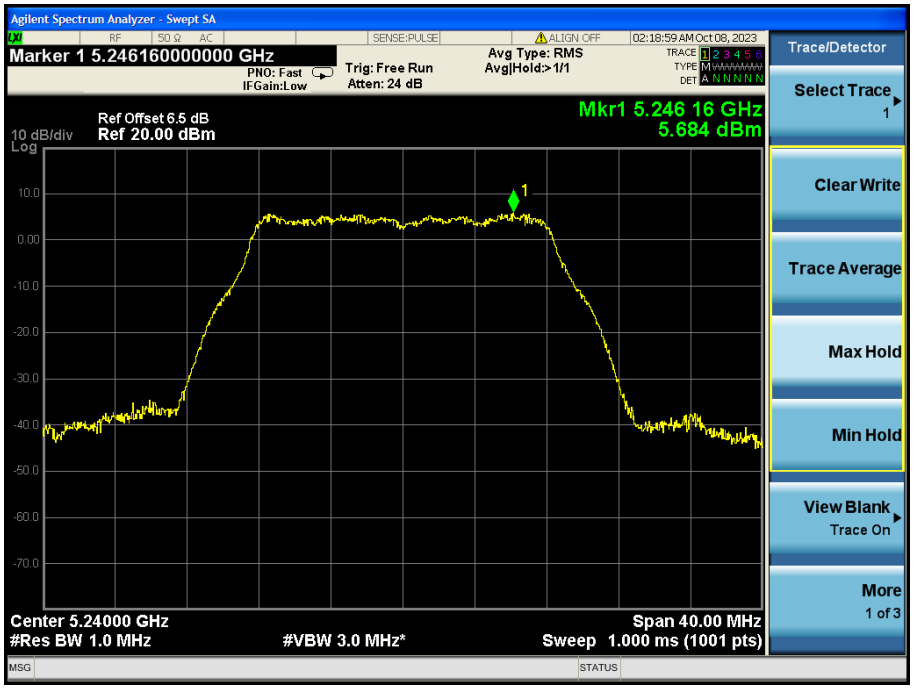
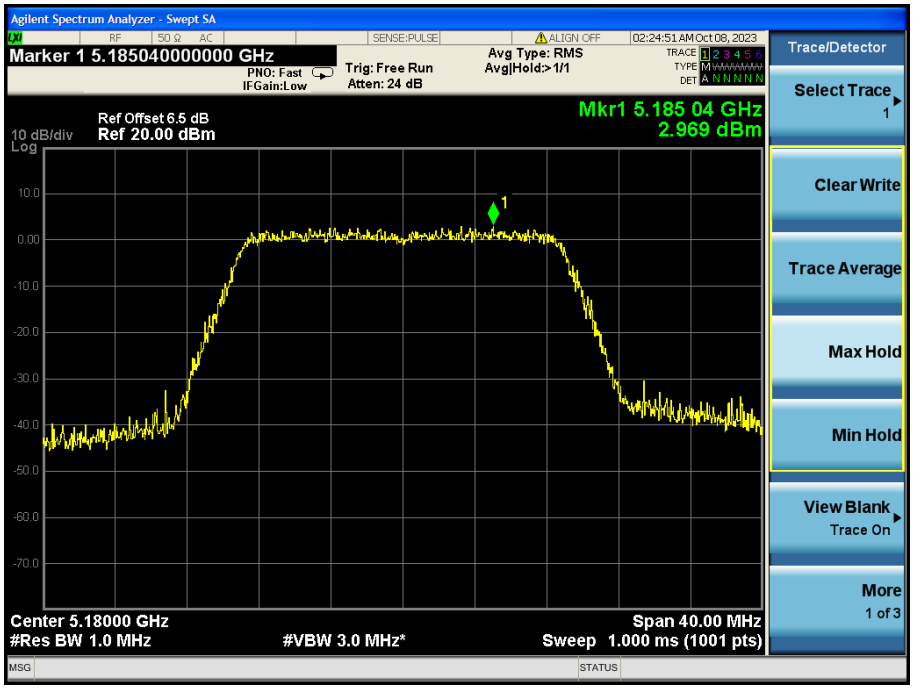
802.11a (5.15GHz-5.25GHz)

The Highest Channel 48: 5240MHz



802.11n(20M) (5.15GHz-5.25GHz)

The Lowest Channel 36: 5180MHz



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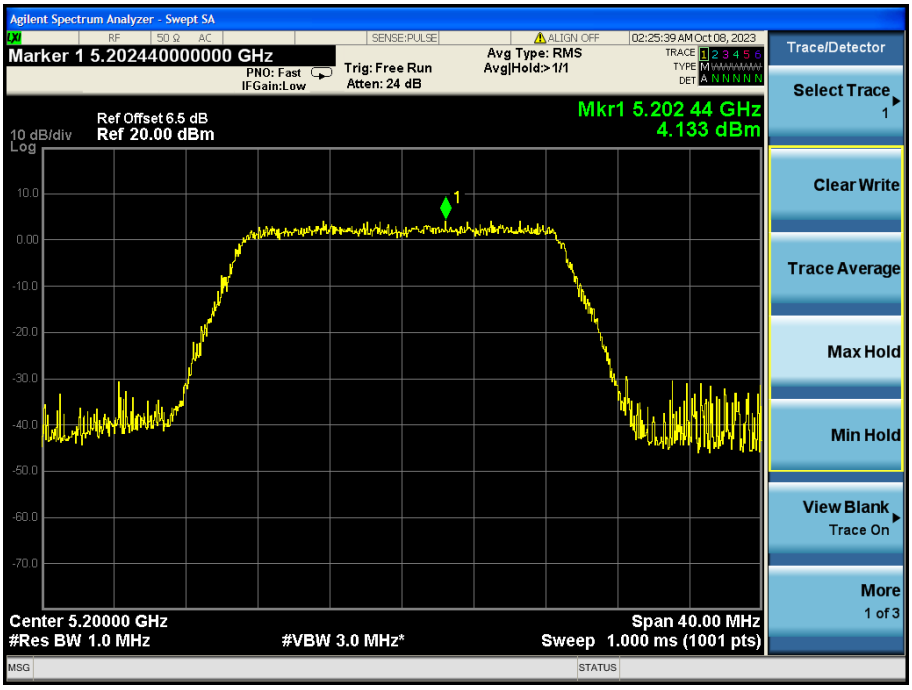
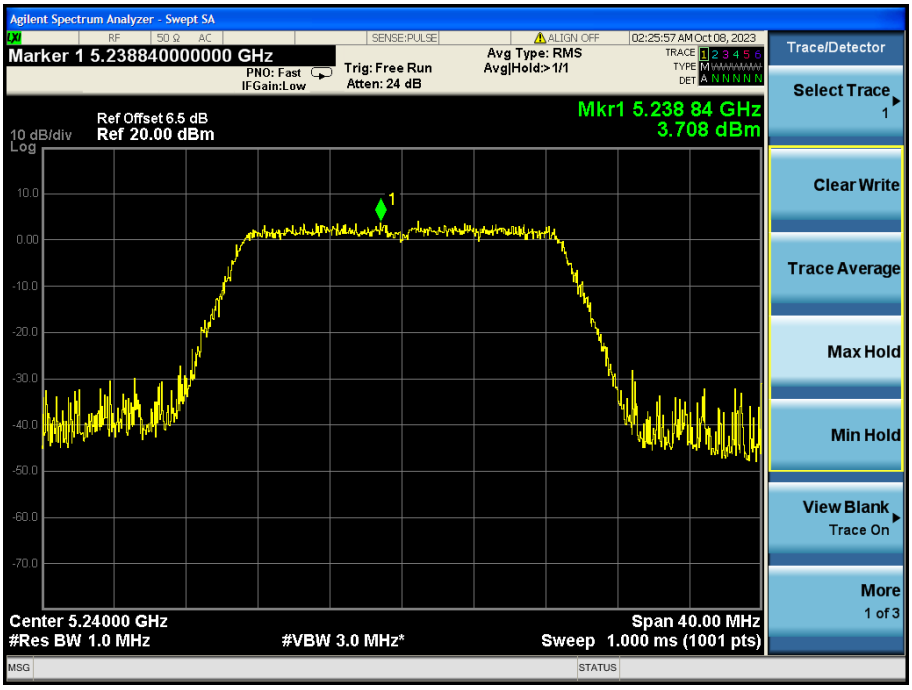
802.11n(20M) (5.15GHz-5.25GHz)

The Middle Channel 40: 5200MHz



802.11n(20M) (5.15GHz-5.25GHz)

The Highest Channel 48: 5240MHz



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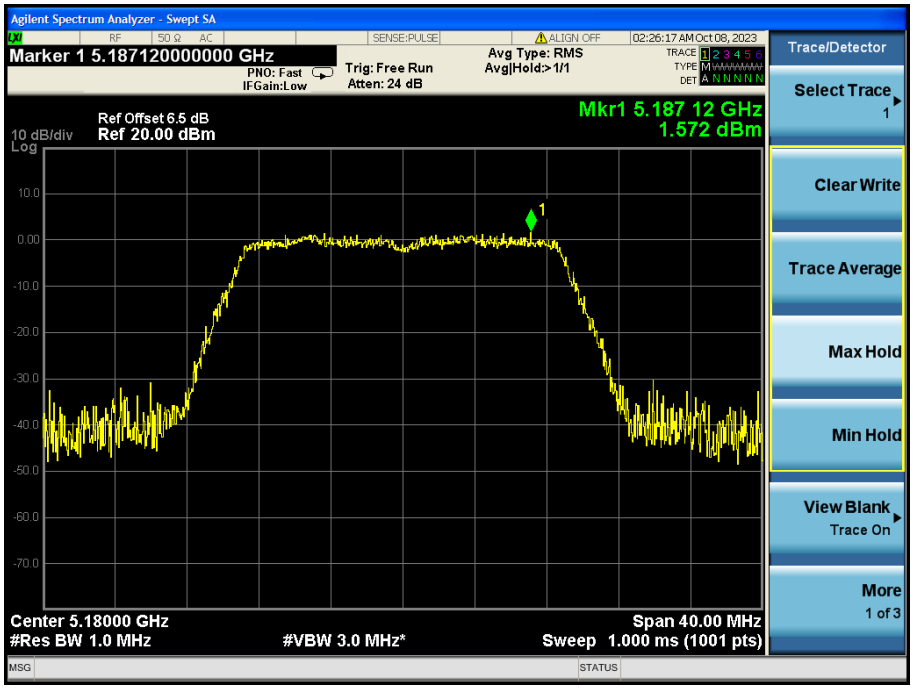
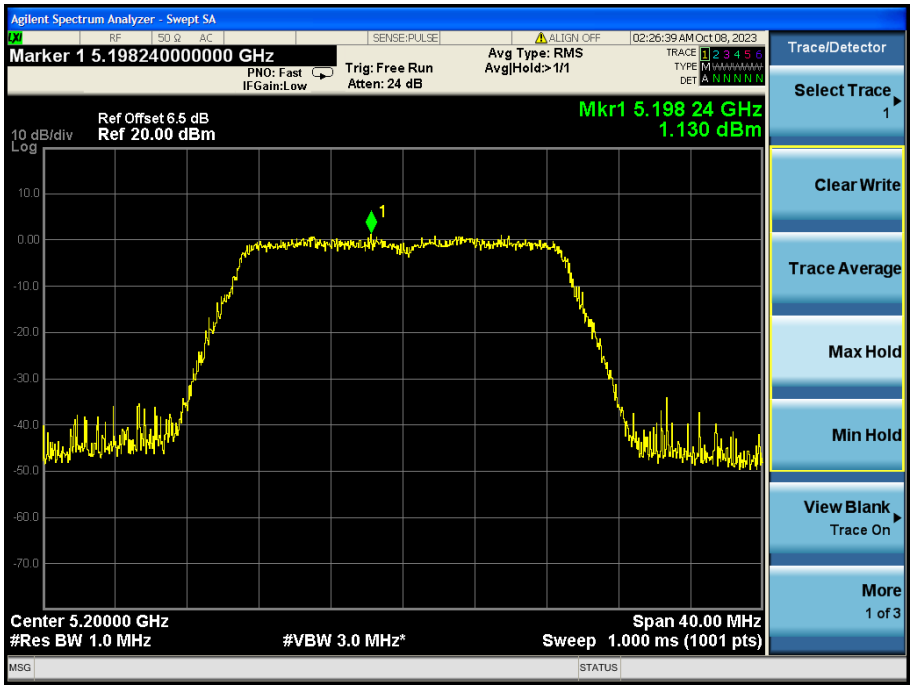
802.11ac (5.15GHz-5.25GHz)

The Lowest Channel 36: 5180MHz



802.11ac (5.15GHz-5.25GHz)

The Middle Channel 40: 5200MHz



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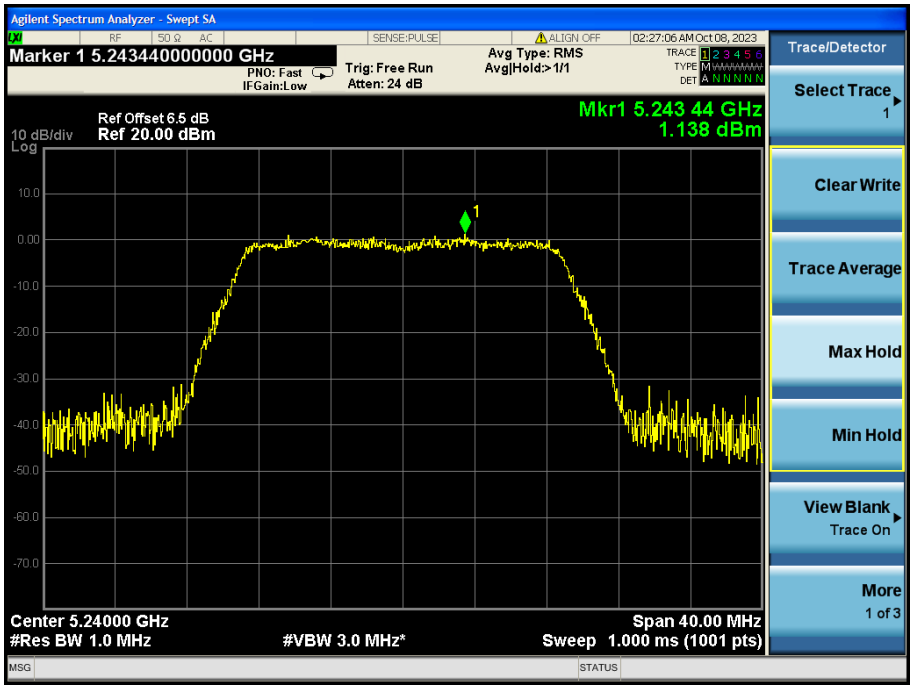
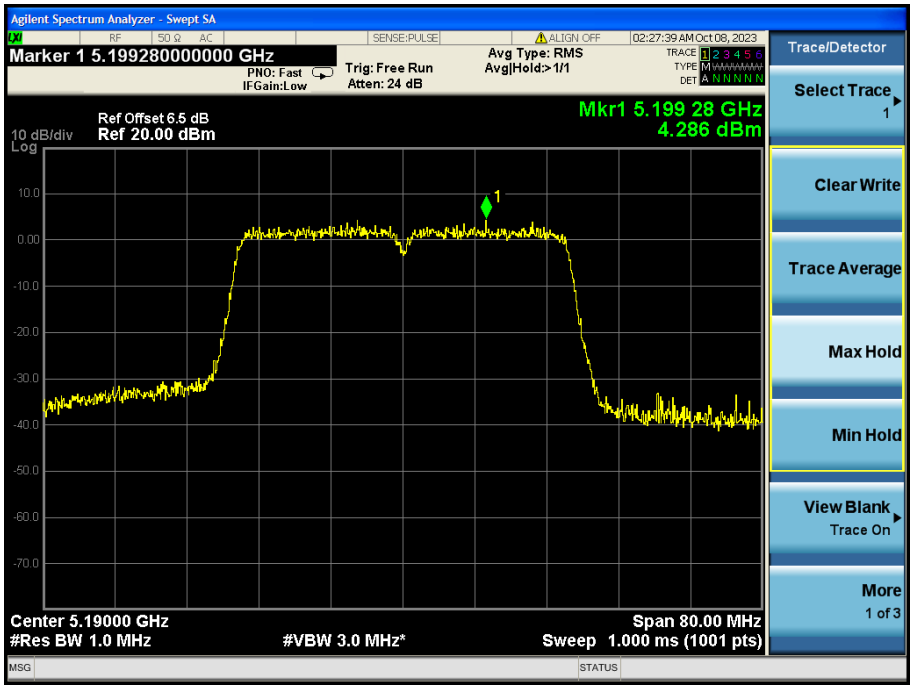
802.11ac (5.15GHz-5.25GHz)

The Highest Channel 48: 5240MHz



802.11n(40M) (5.15GHz-5.25GHz)

The Lowest Channel 38: 5190MHz



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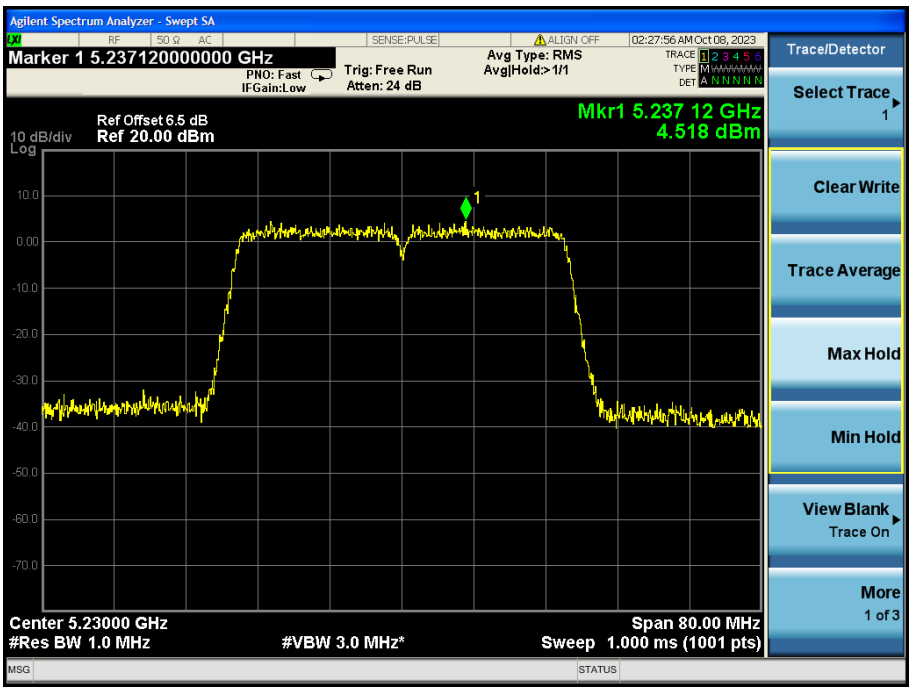
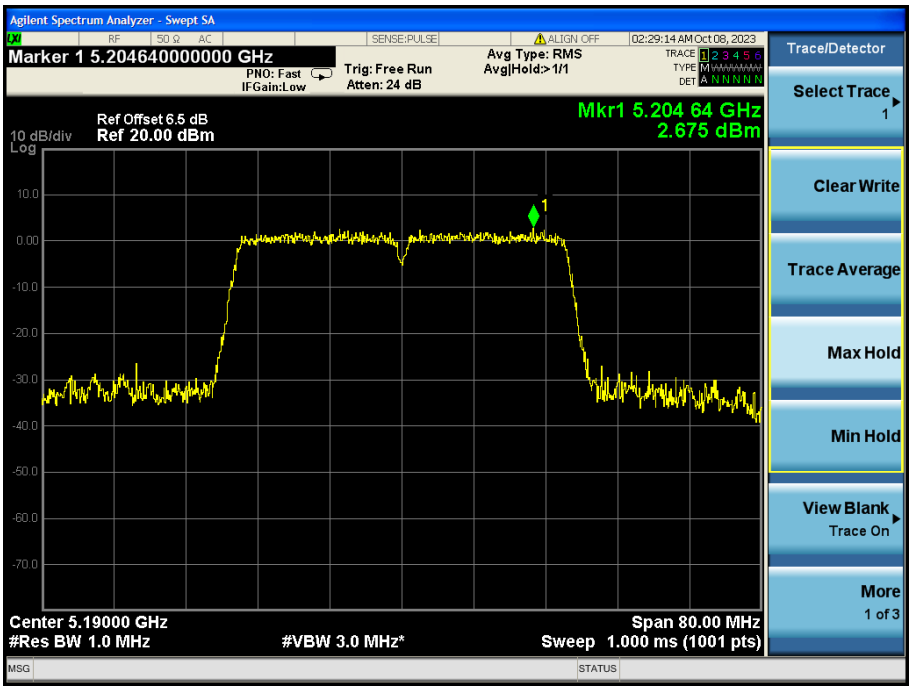
802.11n(40M) (5.15GHz-5.25GHz)

The Highest Channel 46: 5230MHz



802.11ac(40M) (5.15GHz-5.25GHz)

The Lowest Channel 38: 5190MHz



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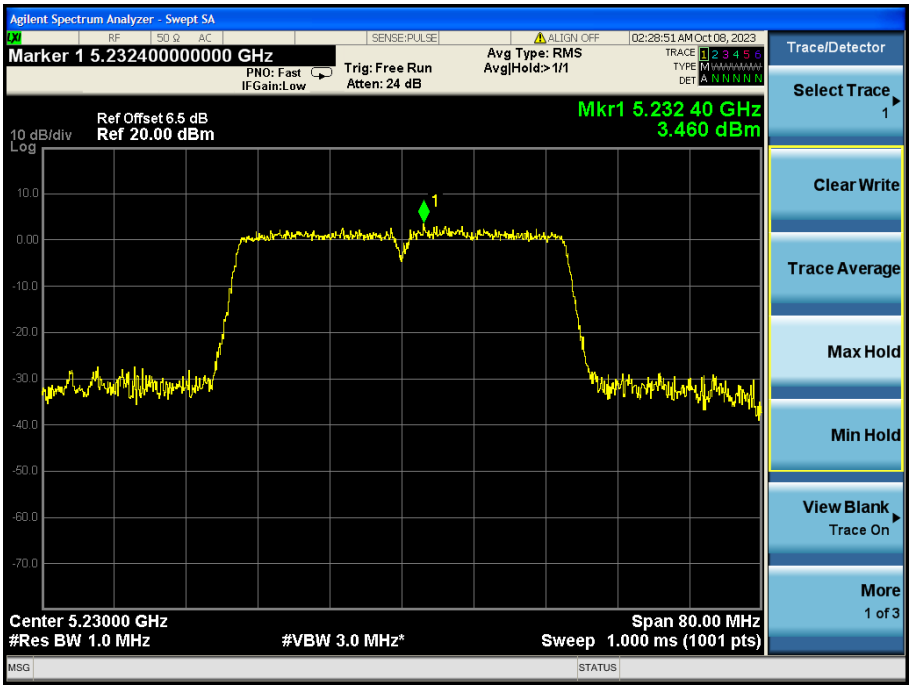
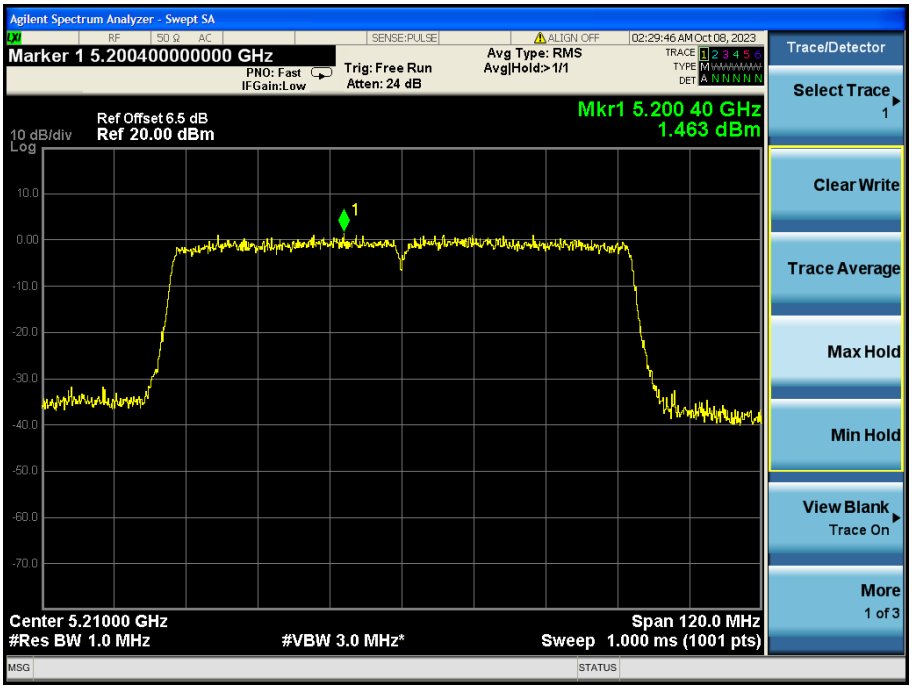
802.11ac(40M) (5.15GHz-5.25GHz)

The Highest Channel 46: 5230MHz



802.11ac(80M) (5.15GHz-5.25GHz)

The Lowest Channel 42: 5210MHz



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10.0 Frequency Stability

10.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees

10.2 Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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10.3 Test Result

Channel 36 (5180MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
120V~	5180.0463
108V~	5180.0456
132V~	5180.0442
Max. Deviation (MHz)	0.0463
Max. Deviation (ppm)	8.94

Rated working voltage: 120V~

Temperature vs. Frequency Stability

Temperature（℃）	Measurement Frequency (MHz)
-30	5180.0446
-20	5180.0436
-10	5180.0421
0	5180.0448
10	5180.0423
20	5180.0426
30	5180.0417
40	5180.0473
50	5180.0423
Max. Deviation (MHz)	0.0473
Max. Deviation (ppm)	9.13

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Channel 149 (5745MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
120V~	5745.0516
108V~	5745.0562
132V~	5745.0546
Max. Deviation (MHz)	0.0562
Max. Deviation (ppm)	9.78

Rated working voltage: 120V~

Temperature vs. Frequency Stability

Temperature（℃）	Measurement Frequency (MHz)
-30	5745.0534
-20	5745.0562
-10	5745.0545
0	5745.0552
10	5745.0513
20	5745.0542
30	5745.0532
40	5745.0514
50	5745.0523
Max. Deviation (MHz)	0.0562
Max. Deviation (ppm)	9.78

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11.0 Antenna Requirement

11.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407, if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

5.2Gwifi：Dipole antenna: 2.66dBi, FPC antenna:3.48dBi

5.8Gwifi：Dipole antenna: 3.01dBi, FPC antenna: 3.37dBi.

(Get from the antenna specification)

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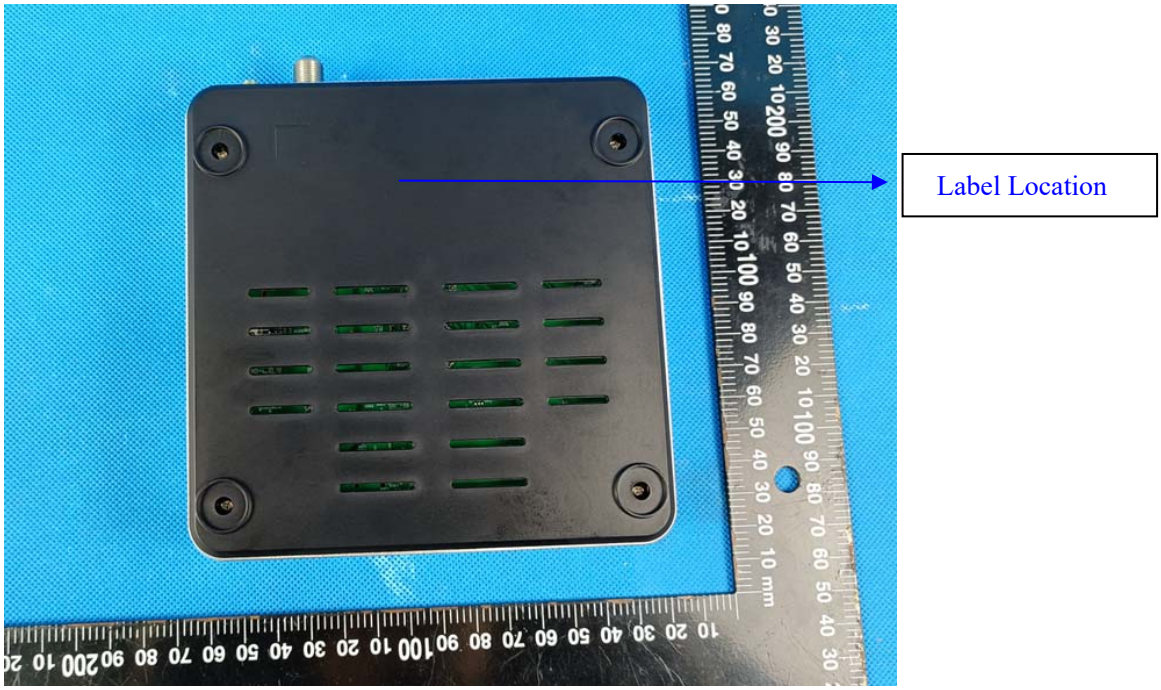
12.0 FCC Label

FCC ID: 2BDDH-A3E6C

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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13.0 Photo of testing

Conducted Emission Test Setup:

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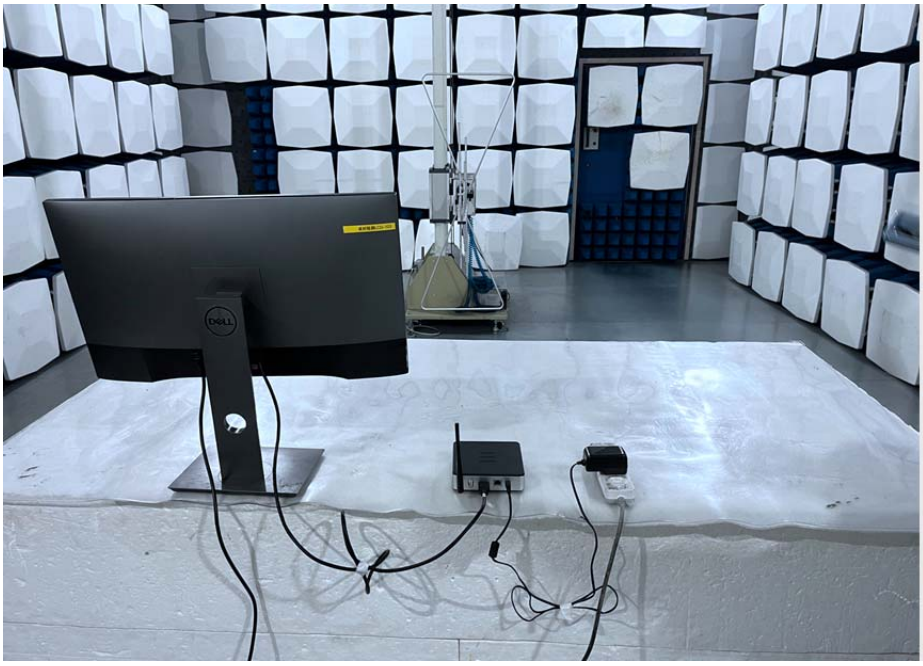
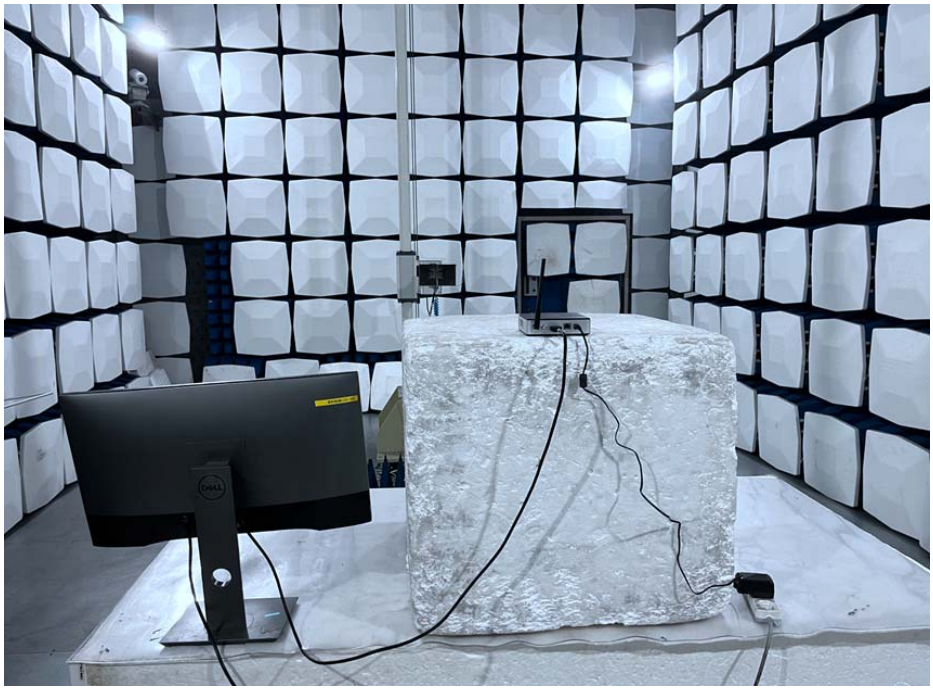
Radiated Emission Test Setup:





Photos of EUT

Please see test report TW2309412-01E

--End of the report--

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