TEST REPORT
ETSI EN 301 893 V2.1.1 (2017-05)

Report Reference No. ..... :	**HK2109063323-3ER**
Compiled by (position+printed name+signature)..:	Testing engineer Len Liao
Supervised by (position+printed name+signature)..:	Technique principal Sliver Wan
Approved by (position+printed name+signature)..:	Manager Jason Zhou
Date of issue ..... :	2021/09/18

Representative Laboratory Name .:	**Shenzhen HUAK Testing Technology Co., Ltd.**
Address ..... :	1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name ..... :	XonTel Technology Trd. Co. W.LL
Address ..... :	Kuwait City, Qibla, Aladel Tower, F21, state of Kuwait

Test specification ..... :	
Standard ..... :	**ETSI EN 301 893 V2.1.1 (2017-05)**
TRF Originator ..... :	Shenzhen HUAK Testing Technology Co., Ltd.
Master TRF ..... :	Dated 2014-12

Test item description..... :	Wireless Access Point
Trade Mark ..... :	N/A
Model/Type reference ..... :	XT-1800AX
List Model ..... :	N/A
Hardware version ..... :	V2.0
Software version ..... :	V2.0
Operation Frequency ..... :	From 5180MHz-5240MHz
Ratings ..... :	DC 48V From POE power or DC 12V From DC Power
Result ..... :	**PASS**

TEST REPORT

Test Report No. :	HK210906332-3ER	2021/09/18 Date of issue

Equipment under Test	:	Wireless Access Point
Model /Type	:	XT-1800AX
Listed Models	:	N/A
Applicant	:	XonTel Technology Trd. Co. W.LL
Address	:	Kuwait City, Qibla, Aladel Tower, F21, state of Kuwait
Manufacturer	:	XonTel Technology Trd. Co. W.LL
Address	:	Kuwait City, Qibla, Aladel Tower, F21, state of Kuwait

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2021/09/18	Jason Zhou

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 301 893 V2.1.1 (2017-05)–5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	2021/09/06
Testing commenced on	:	2021/09/06
Testing concluded on	:	2021/09/18

2.2. Product Description

Product Name:	Wireless Access Point
Model/Type reference:	XT-1800AX
List Model:	N/A
Difference descrption	N/A
Power supply:	DC 48V From POE power or DC 12V From DC Power
POE information:	N/A
Antenna Type	Internal Antenna
Antenna Gain	3.0dBi
WLAN	Supported 802.11a/ 802.11n HT20/ 802.11n HT40/ 802.11ac HT20/ 802.11ac HT40/ 802.11ac HT80/ 802.11ax HT20/ 802.11ax HT40/ 802.11ax HT80
Operation frequency	IEEE 802.11a:5180MHz-5240MHz IEEE 802.11n HT20/IEEE 802.11ac HT20/ IEEE 802.11ax HT20:5180MHz-5240MHz IEEE 802.11n HT40/IEEE 802.11ac HT40/IEEE 802.11ax HT40:5190MHz-5230MHz IEEE 802.11ac HT80/ IEEE 802.11ax HT80:5210MHz
Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac HT20: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac HT40: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac HT80: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ax HT20: OFDM(1024AAM, 256QAM,64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HT40: OFDM (1024AAM, 256QAM,64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ax HT80: OFDM (1024AAM, 256QAM,64QAM, 16QAM, QPSK,BPSK)
Remark: The products are identical in interior structure, electrical circuits and components, just model names are different.	

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 48V From POE power or DC 12V From DC Power

Channel list:

Channel	Frequency (MHz)
36	5180
38	2190
40	5200
42	5210
44	5220
46	5230
48	5240

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	/	M/N:	/
		Manufacturer:	/

2.5. Test summary

Test Item	Test Requirement ESTI EN301983	Verdict
Centre frequencies	Section 4.2.1	Pass
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Section 4.2.2	Pass
RF output power, Transmit Power Control (TPC) and power density	Section 4.2.3	Pass
Transmitter unwanted emissions	Section 4.2.4	Pass
Receiver spurious emissions	Section 4.2.5	Pass
Dynamic Frequency Selection (DFS)	Section 4.2.6	N/A
Adaptivity (Channel Access Mechanism) 4.8.1 Applicability	Section 4.2.7	Pass
Receiver Blocking	Section 4.2.8	Pass
User Access Restrictions	Section 4.2.9	Pass
Geo-location capability	Section 4.2.10	N/A
Note:N/A Stands for “Not applicable”		

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：
A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

3.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature: 25 °C
High Temperature: 40 °C
Low Temperature: 10 °C
Normal Voltage : DC 48.0V
High Voltage:DC 52.8V
Low Voltage:DC 43.2V
Relative Humidity: 55 %
Air Pressure: 989 hPa

3.3. Test Channels：

Test	Clause	Test channels		
		Lower sub-band (5 150 MHz to 5 350 MHz)		Higher sub-band 5 725 MHz to 5 850 MHz
		5 150 MHz to 5 250 MHz	5 250 MHz to 5 350 MHz	
Centre frequencies	5.3.2	C7 (see note 1)		C8 (see note 1)
Occupied Channel Bandwidth	5.3.3	C7		C8
Power, power density	5.3.4	C1	C2	C3, C4
Transmitter unwanted emissions outside the 5 GHz RLAN bands	5.3.5	C7 (see note 1)		C8 (see note 1)
Transmitter unwanted emissions within the 5 GHz RLAN bands	5.3.6	C1	C2	C3, C4
Receiver spurious emissions	5.3.7	C7 (see note 1)		C8 (see note 1)
Transmit Power Control (TPC)	5.3.4	n.a. (see note 2)	C2 (see note 1)	C3, C4 (see note 1)
Dynamic Frequency Selection (DFS)	5.3.8	n.a. (see note 2)	C5	C6 (see note 3)
Adaptivity	5.3.9	C7		C8

C1, C3: The lowest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.
C2, C4: The highest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.
C5, C6: One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth.
C7, C8: One channel out of the declared channels for this sub-band. For Occupied Channel Bandwidth, testing shall be repeated for every declared nominal channel bandwidth within this sub-band. For Adaptivity, testing shall be performed using the highest nominal channel bandwidth.

NOTE 1: In case of more than one channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans.
NOTE 2: Testing is not required for nominal channel bandwidths that fall completely within the frequency range 5 150 MHz to 5 250 MHz.
NOTE 3: Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5 600 MHz to 5 650 MHz band, the tests for the *Channel Availability Check* (and where implemented, for the *Off-Channel CAC)* shall be performed on one of these channels in addition to a channel within the band 5 470 MHz to 5 600 MHz or within the band 5 650 MHz to 5 725 MHz.

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HUAK laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency error	25 Hz	(1)
Transmitter power conducted	0.57dB	(1)
Transmitter power Radiated	2.20dB	(1)
Conducted spurious emission	1.60dB	(1)
Radiated spurious emission	2.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.5. Equipments Used during the Test

Centre frequencies & RF output power & Power density & OCB & TPC						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum analyzer	Agilent	N9020A	HKE-048	2020/12/10	2021/12/09
2	Signal generator	Agilent	N5182A	HKE-029	2020/12/10	2021/12/09
3	Signal generator	Agilent	83630A	HKE-028	2020/12/10	2021/12/09
4	RF automatic control unit	Tonscend	JS0806-2	HKE-060	2020/12/10	2021/12/09
5	Power Sensor	Agilent	E9300A	HKE-086	2020/12/10	2021/12/09
6	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2020/12/10	2021/12/09

Adaptively & Receiver Blocking						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum analyzer	R&S	FSP40	HKE-025	2020/12/10	2021/12/09
2	Wireless Communication Test Set	R&S	CMU200	HKE-026	2020/12/10	2021/12/09
3	Wireless Communication Test Set	R&S	CMW500	HKE-027	2020/12/10	2021/12/09
4	RF automatic control unit	Tonscend	JS0806-2	HKE-060	2020/12/10	2021/12/09

Transmitter spurious emissions & Receiver spurious emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2020/12/10	2021/12/09
2	Horn antenna	Schwarzbeck	9120D	HKE-013	2020/12/10	2021/12/09
3	Receiver	R&S	ESR-7	HKE-010	2020/12/10	2021/12/09
4	Position controller	Taiwan MF	MF7802	HKE-011	2020/12/10	2021/12/09
5	Preamplifier	EMCI	EMC051845SE	HKE-015	2020/12/10	2021/12/09
6	Preamplifier	Agilent	83051A	HKE-016	2020/12/10	2021/12/09
7	High pass filter unit	Tonscend	JS0806-F	HKE-055	2020/12/10	2021/12/09
8	Spectrum analyzer	Agilent	N9020A	HKE-048	2020/12/10	2021/12/09

The calibration interval is 1 year.

4. TEST CONDITIONS AND RESULTS

4.1. Centre frequencies

Limit

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range fc ± 20 ppm.

Test Procedure

1. For equipment can operating without modulation
   a Connected The UUT to the spectrum and operated in an unmodulated mode.
   b Set the centre frequency of spectrum to the frequency which UUT operated.
   c Max Hold and waiting the trace stabilized.
   d Search the peak value of the power envelope and noted.
2. For equipment operating with modulation
   a Connected The UUT to the spectrum.
   b Set the centre frequency of spectrum to the frequency which UUT operated.
   c Max Hold and waiting the trace stabilized.
   d Search the peak value of the power envelope and noted.
   e Move the marker in a positive frequency increment until the upper, (relative to the centre frequency), -10 dBc point is reached, note this point as f1.
   f Move the marker in a negative frequency increment until the lower, (relative to the centre frequency), -10 dBc point is reached, note this point as f2.
   g The centre frequency is calculated as (f1 + f2) / 2.
3. These measurements shall be performed under both normal and extreme test conditions.
4. One channel out of the declared channels for each sub-band shall be tested.

Test Results

Ant 1

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 a	CH36/ 5180MHz	5179.981457	3.58
52.8	-10			5179.981845	3.50
	+40			5179.943126	10.98
43.2	-10			5179.966901	6.39
	+40			5179.948531	9.94
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 n HT 20	CH36/ 5180MHz	5179.965366	6.69
52.8	-10			5179.952555	9.16
	+40			5179.947269	10.18
43.2	-10			5179.977083	4.42
	+40			5179.961274	7.48
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 n HT 40	CH38/ 5190MHz	5189.975002	4.82
52.8	-10			5189.952366	9.18
	+40			5189.955982	8.48
43.2	-10			5189.936239	12.29
	+40			5189.941123	11.34
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 20	CH36/ 5180MHz	5179.948826	9.88
52.8	-10			5179.961748	7.38
	+40			5179.961939	7.35
43.2	-10			5179.946420	10.34
	+40			5179.944867	10.64
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 40	CH38/ 5190MHz	5189.915737	16.24
52.8	-10			5189.961655	7.39
	+40			5189.967865	6.19
43.2	-10			5189.952108	9.23
	+40			5189.958087	8.08
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 80	CH42/ 5210MHz	5209.991489	1.63
52.8	-10			5209.947128	10.15
	+40			5209.960093	7.66
43.2	-10			5209.954916	8.65
	+40			5209.958820	7.90
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 20	CH36/ 5180MHz	5179.954665	8.75
52.8	-10			5179.955249	8.64
	+40			5179.947563	10.12
43.2	-10			5179.955467	8.60
	+40			5179.949642	9.72
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 40	CH38/ 5190MHz	5189.943105	10.96
52.8	-10			5189.957774	8.14
	+40			5189.951223	9.40
43.2	-10			5189.933952	12.73
	+40			5189.949580	9.71
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 80	CH42/ 5210MHz	5209.972285	5.32
52.8	-10			5209.959825	7.71
	+40			5209.944398	10.67
43.2	-10			5209.936362	12.21
	+40			5209.945086	10.54
Limit				20 ppm	
Result				PASS	

Ant 2

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 a	CH36/ 5180MHz	5179.939215	11.73
52.8	-10			5179.964803	6.79
	+40			5179.946761	10.28
43.2	-10			5179.965237	6.71
	+40			5179.945293	10.56
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 n HT 20	CH36/ 5180MHz	5179.972926	5.23
52.8	-10			5179.957695	8.17
	+40			5179.951041	9.45
43.2	-10			5179.959930	7.74
	+40			5179.948834	9.88
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 n HT 40	CH38/ 5190MHz	5189.970087	5.76
52.8	-10			5189.963060	7.12
	+40			5189.961411	7.44
43.2	-10			5189.946719	10.27
	+40			5189.943974	10.79
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 20	CH36/ 5180MHz	5179.948575	9.93
52.8	-10			5179.951816	9.30
	+40			5179.959537	7.81
43.2	-10			5179.940967	11.40
	+40			5179.948881	9.87
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 40	CH38/ 5190MHz	5189.913826	16.60
52.8	-10			5189.952963	9.06
	+40			5189.961381	7.44
43.2	-10			5189.940179	11.53
	+40			5189.951143	9.41
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ac HT 80	CH42/ 5210MHz	5209.988841	2.14
52.8	-10			5209.962153	7.26
	+40			5209.952097	9.19
43.2	-10			5209.953688	8.89
	+40			5209.949263	9.74
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 20	CH36/ 5180MHz	5179.950065	9.64
52.8	-10			5179.960876	7.55
	+40			5179.962279	7.28
43.2	-10			5179.940985	11.39
	+40			5179.945160	10.59
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 40	CH38/ 5190MHz	5189.932572	12.99
52.8	-10			5189.947977	10.02
	+40			5189.962185	7.29
43.2	-10			5189.933827	12.75
	+40			5189.939684	11.62
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
48.0	+25	802.11 ax HT 80	CH42/ 5210MHz	5209.984748	2.93
52.8	-10			5209.955616	8.52
	+40			5209.954753	8.68
43.2	-10			5209.947090	10.16
	+40			5209.959597	7.75
Limit				20 ppm	
Result				PASS	

4.2. Nominal Channel Bandwidth and Occupied Channel Bandwidth

LIMIT

The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz

Alternatively, equipment may implement a lower Nominal Channel Bandwidth with a minimum of 5 MHz, providing they still comply with the Nominal Centre Frequencies defined in clause 4.2.1 (20 MHz raster).

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.
The Occupied Channel Bandwidth might change with time/payload.

During a Channel Occupancy Time (COT), equipment may operate temporarily with an Occupied Channel Bandwidth of less than 80 % of its Nominal Channel Bandwidth with a minimum of 2 MHz

Test Procedure

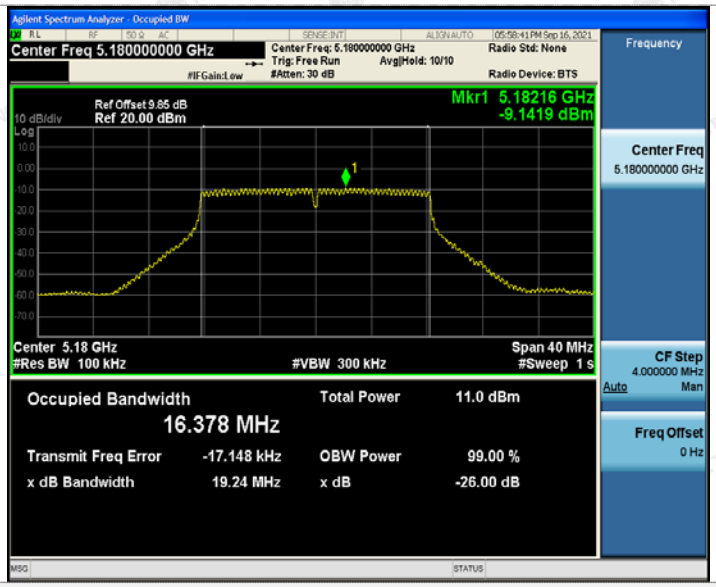
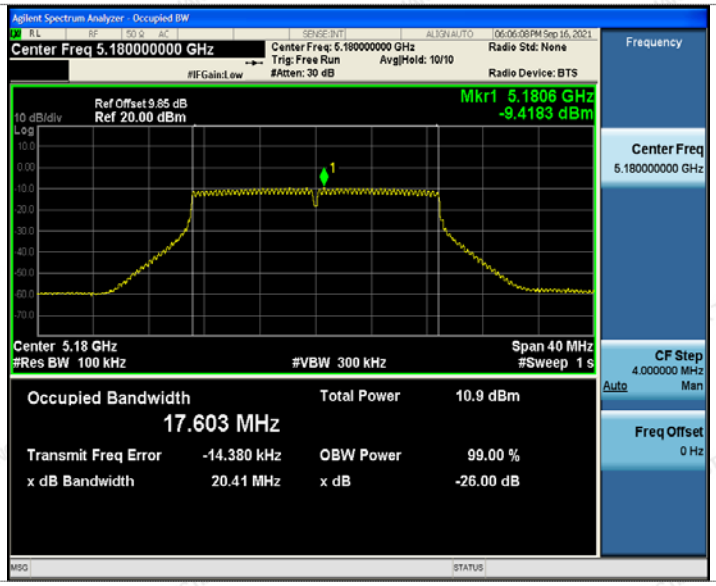
1. Connect the UUT to the spectrum analyser and use the following settings:

Centre Frequency:	The centre frequency of the channel under test
Resolution Bandwidth:	100 kHz
Video Bandwidth:	300 kHz
Frequency Span:	2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)
Detector Mode:	Peak
Trace Mode:	Max Hold

2. When the trace is complete, capture the trace.
3. Find the peak value of the trace and place the analyser marker on this peak.
4. Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.
5. Repeated steps 1 to 3 above in case of simultaneous transmissions in non-adjacent channels.
6. These measurements shall be performed only under normal operating conditions.
7. One channel out of the declared channels for each sub-band shall be tested.

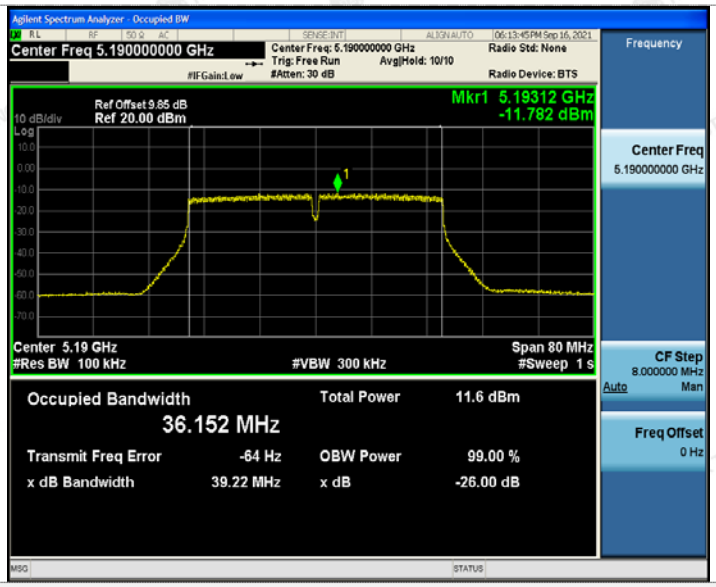
Ant 1

Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	Result
802.11 a	CH36	5180	16.378	Pass
802.11 n HT 20	CH36	5180	17.603	Pass
802.11 n HT 40	CH38	5190	36.152	Pass
802.11 ac HT 20	CH36	5180	17.601	Pass
802.11 ac HT 40	CH38	5190	36.134	Pass
802.11 ac HT 80	CH42	5210	75.485	Pass
802.11 ax HT 20	CH36	5180	18.911	Pass
802.11 ax HT 40	CH38	5190	37.718	Pass
802.11 ax HT 80	CH42	5210	77.034	Pass

802.11 a
CH36

802.11 n HT 20
CH36


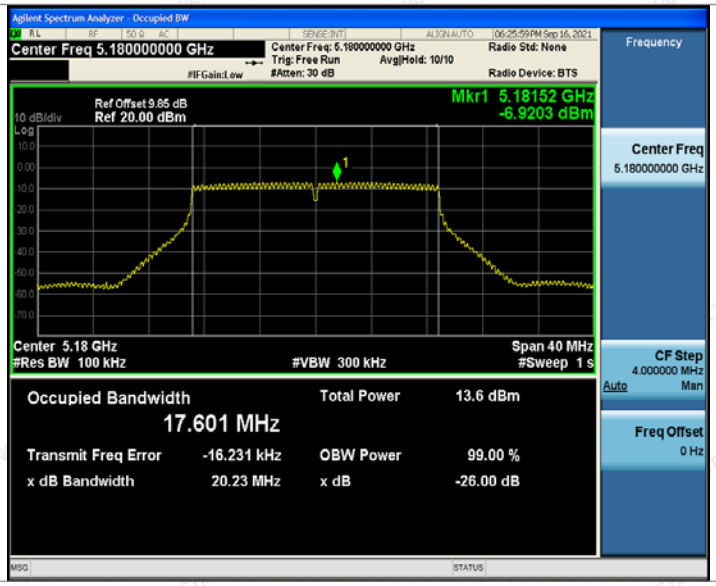
802.11 n HT 40

CH38



802.11 ac HT 20

CH36



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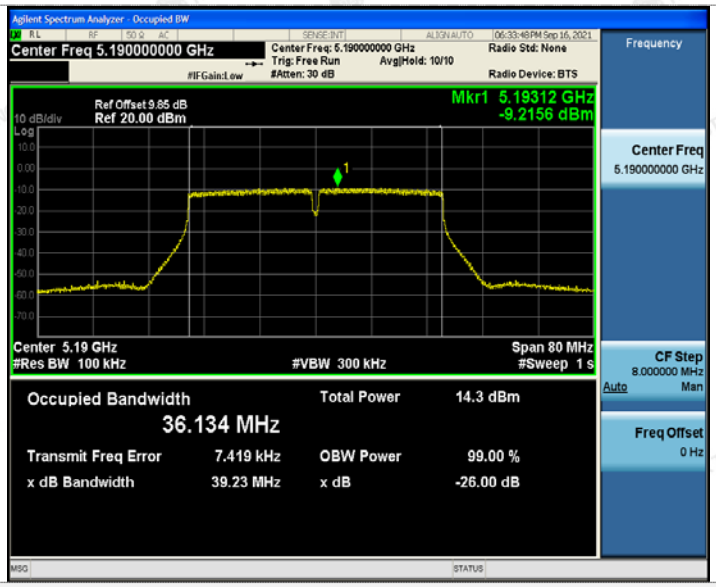
CH38

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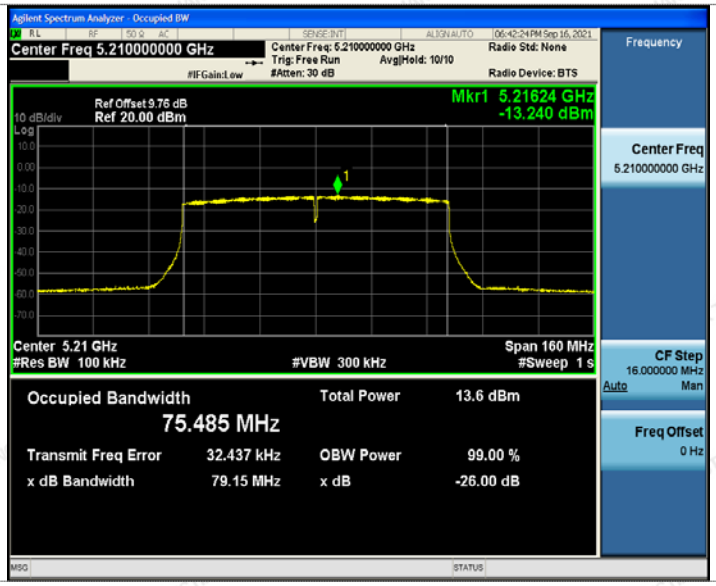

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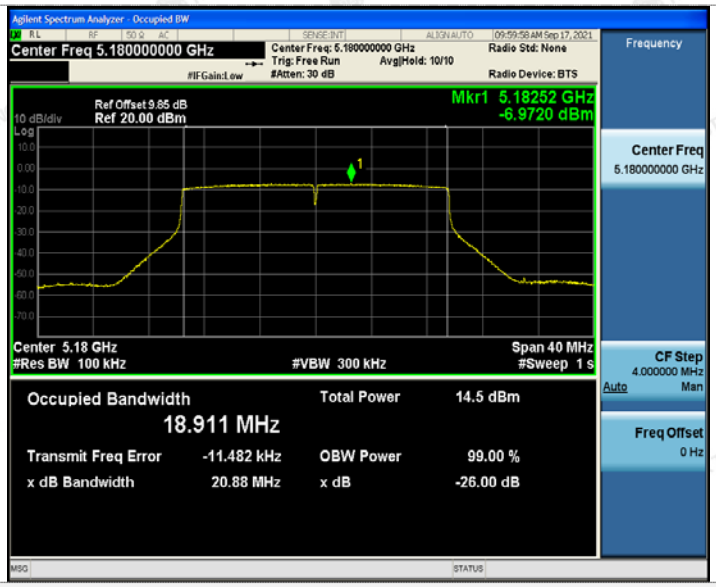
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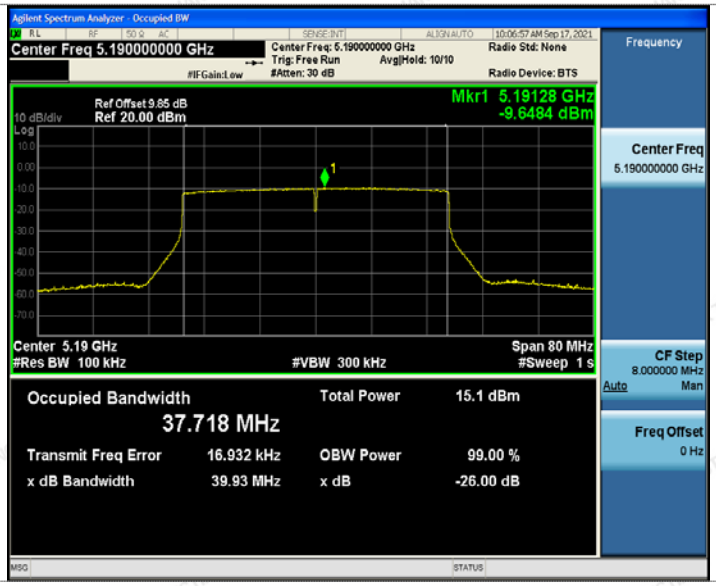

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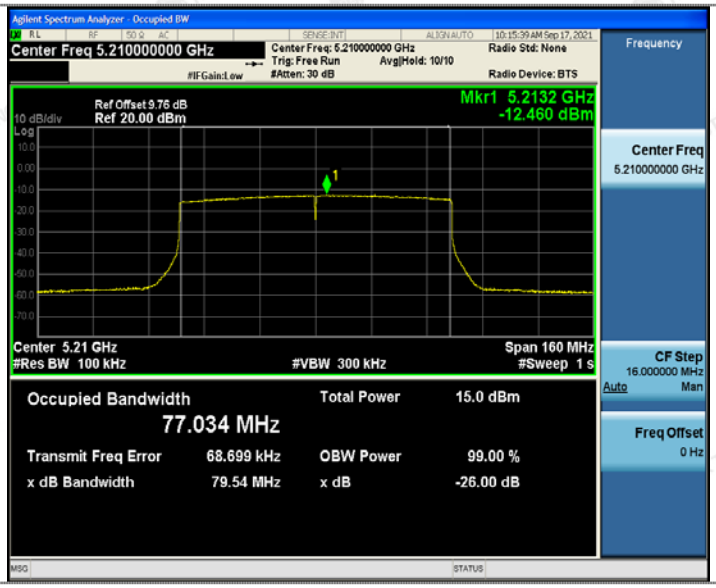
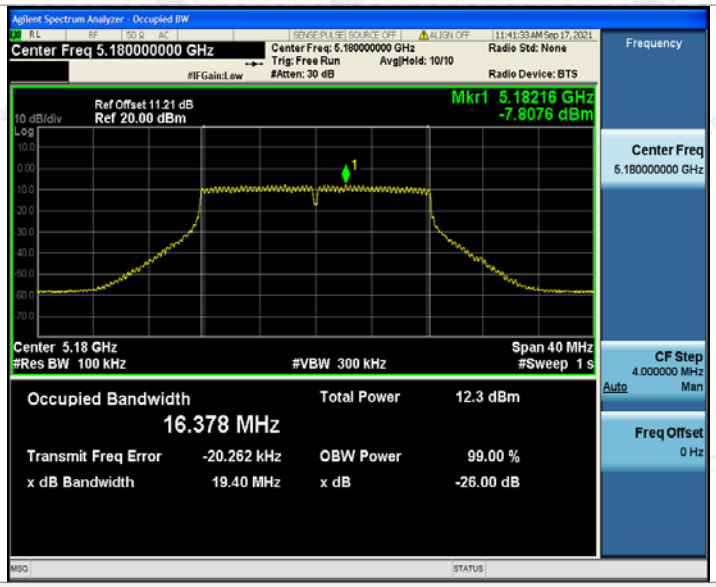


Note:Only the worst channel is reported for each modulation.

Ant 2

Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	Result
802.11 a	CH36	5180	16.378	Pass
802.11 n HT 20	CH36	5180	17.606	Pass
802.11 n HT 40	CH38	5190	36.154	Pass
802.11 ac HT 20	CH36	5180	17.604	Pass
802.11 ac HT 40	CH38	5190	36.156	Pass
802.11 ac HT 80	CH42	5210	75.464	Pass
802.11 ax HT 20	CH36	5180	18.916	Pass
802.11 ax HT 40	CH38	5190	37.711	Pass
802.11 ax HT 80	CH42	5210	77.066	Pass

-

802.11 a
CH36

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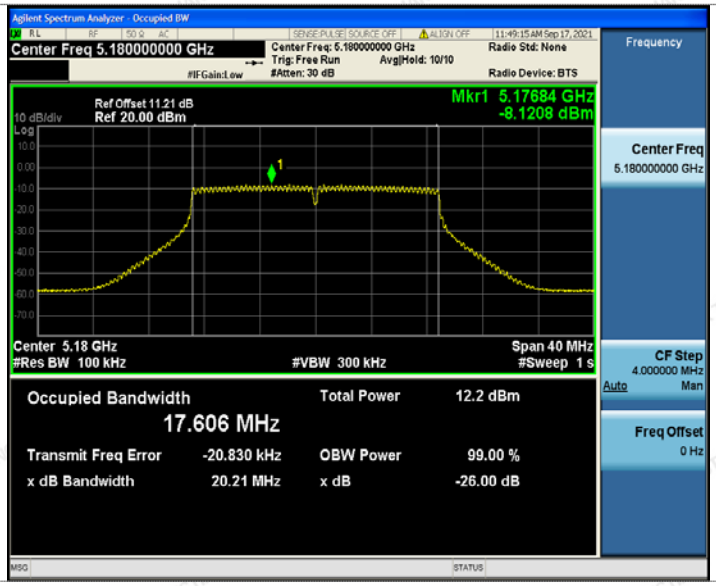

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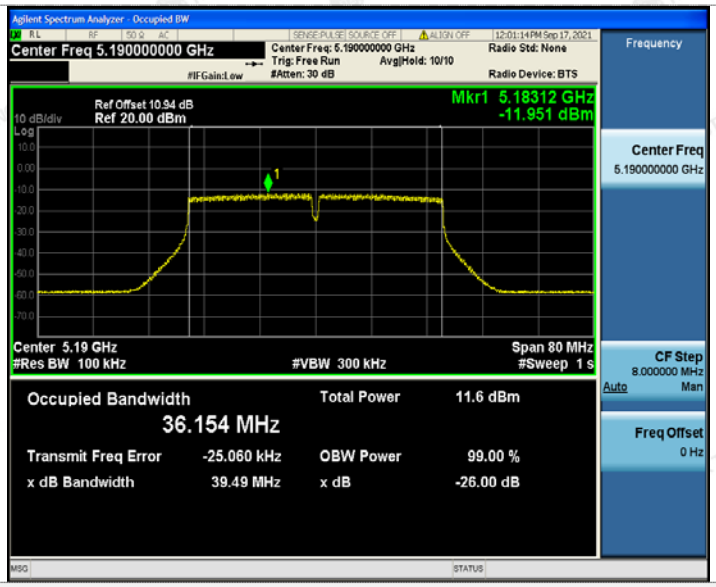
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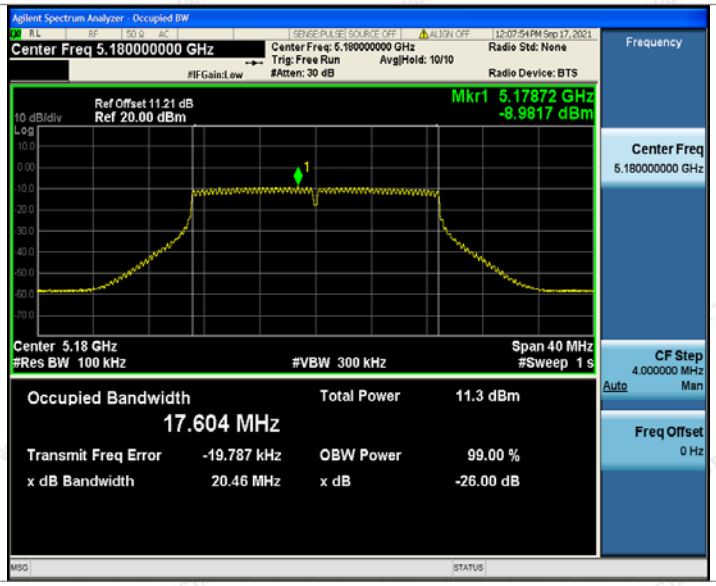

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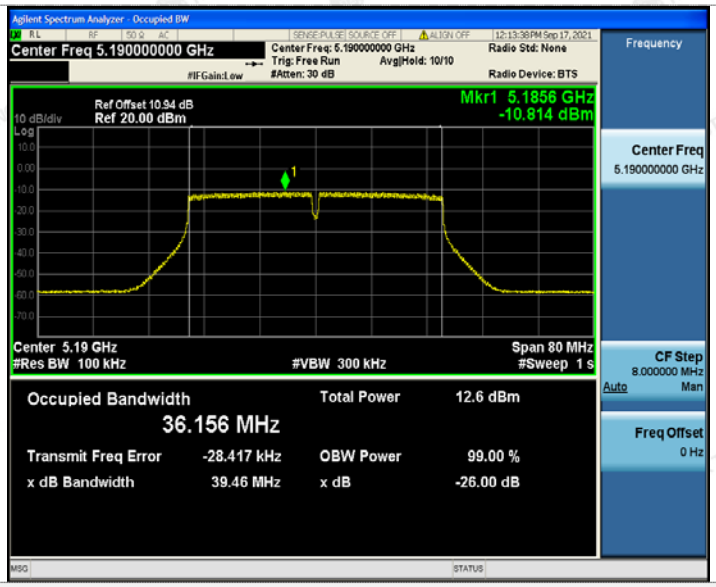
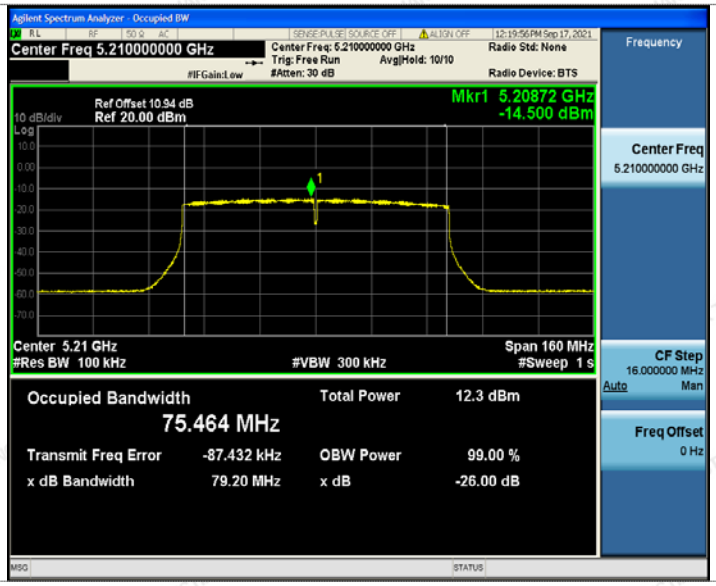

802.11 ac HT 80
CH42


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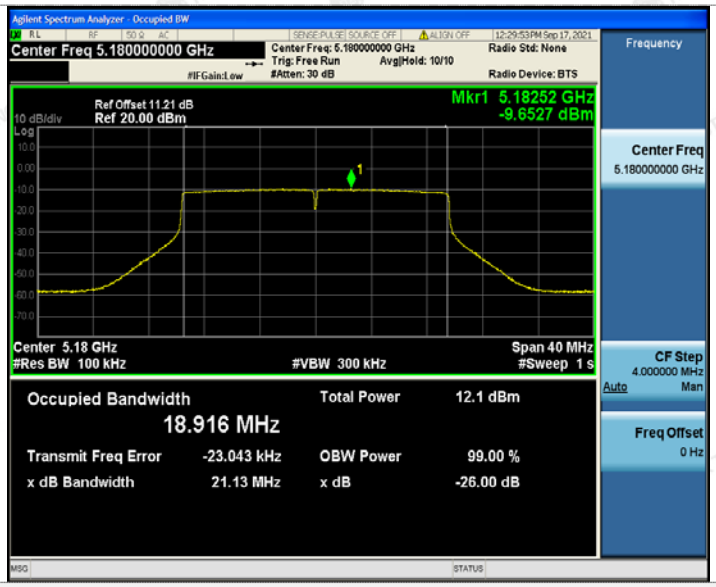
CH36


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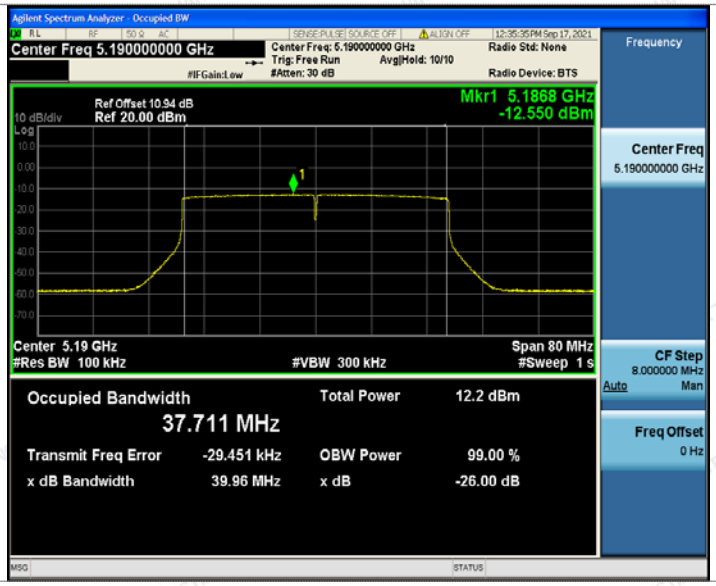
CH38


802.11 ax HT 80
CH42


Note:Only the worst channel is reported for each modulation.

4.3. RF output power, Transmit Power Control (TPC) and power density

LIMIT

The limits below are applicable to the system as a whole and in any possible configuration. Includes smart antenna systems (devices with multiple transmit chains).
In case of multiple (adjacent or non-adjacent) channels within the same sub-band, the total RF output power of all channels in that sub-band shall not exceed the limits defined below.
In case of multiple, non-adjacent channels operating in separate sub-bands, the total RF output power in each of the sub-bands shall not exceed the limits defined below.

TPC is not required for channels whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz.
For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in table 1.
Devices are allowed to operate without TPC. See table 1 for the applicable limits in this case.

Table 1: Mean e.i.r.p. limits for RF output power and power density at the highest power level

Frequency range [MHz]	Mean e.i.r.p. limit [dBm]		Mean e.i.r.p. density limit [dBm/MHz]	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.
NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.
NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in table 2.
For devices without TPC, the limits in table 2 do not apply.

Table 2: Mean e.i.r.p. limits for RF output power at the lowest power level of the TPC range

Frequency range	Mean e.i.r.p. [dBm]
5 250 MHz to 5 350 MHz	17
5 470 MHz to 5 725 MHz	24 (see note)

NOTE: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

4.3.1. RF output power at the highest power - PH

Test Procedure

1. The UUT shall be configured to operate at:
   - The highest stated transmitter output power level of the TPC range; or
   - The maximum transmitter output power level in case the equipment has no TPC feature.
2. For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle reference clause 5.4.4.2.1.1.2 ETSI EN 301 893 V2.1.1 (2017-05)
3. For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band reference clause 5.4.4.2.1.1.3 ETSI EN 301 893 V2.1.1 (2017-05)
4. For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands reference clause 5.4.4.2.1.1.4 ETSI EN 301 893 V2.1.1 (2017-05)
5. These measurements shall be performed under both normal and extreme test conditions.

Test Results

802.11a							
Test conditions		Channel/ Frequency	Ant 1	Ant 2	Mimo	Limit (dBm)	Result
Temperature (℃)	Voltage (V)		power (dBm)	power (dBm)	power (dBm)		
+25℃	48.0V	36/5180	10.35	10.29	/	23	Pass
-10℃	52.8V		10.53	10.95	/		Pass
	43.2V		10.20	10.65	/		Pass
+40℃	52.8V		11.32	10.91	/		Pass
	43.2V		11.28	10.25	/		Pass

802.11 n HT 20							
Test conditions		Channel/ Frequency	Ant 1	Ant 2	Mimo	Limit (dBm)	Result
Temperature (℃)	Voltage (V)		power (dBm)	power (dBm)	power (dBm)		
+25℃	48.0V	36/5180	9.44	10.05	12.77	23	Pass
-10℃	52.8V		9.18	8.74	11.98		Pass
	43.2V		9.71	9.05	12.40		Pass
+40℃	52.8V		8.59	8.66	11.64		Pass
	43.2V		8.14	10.11	12.25		Pass

802.11 n HT 40							
Test conditions		Channel/ Frequency	Ant 1	Ant 2	Mimo	Limit (dBm)	Result
Temperature (℃)	Voltage (V)		power (dBm)	power (dBm)	power (dBm)		
+25℃	48.0V	38/5190	6.93	7.84	10.42	23	Pass
-10℃	52.8V		7.66	7.30	10.49		Pass
	43.2V		7.25	7.06	10.17		Pass
+40℃	52.8V		6.69	6.32	9.52		Pass
	43.2V		7.30	7.34	10.33		Pass

802.11 ac HT 20							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	36/5180	6.91	6.46	9.70	23	Pass
-10℃	52.8V		6.52	7.04	9.80		Pass
	43.2V		5.98	6.27	9.14		Pass
+40℃	52.8V		7.07	6.93	10.01		Pass
	43.2V		6.95	6.41	9.70		Pass

802.11 ac HT 40							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	38/5190	6.17	5.65	8.93	23	Pass
-10℃	52.8V		7.52	6.41	10.01		Pass
	43.2V		5.76	5.74	8.76		Pass
+40℃	52.8V		5.69	4.82	8.29		Pass
	43.2V		6.78	6.94	9.87		Pass

802.11 ac HT 80							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	42/5210	5.71	6.47	9.12	23	Pass
-10℃	52.8V		6.77	6.56	9.68		Pass
	43.2V		5.58	5.73	8.67		Pass
+40℃	52.8V		5.84	5.30	8.59		Pass
	43.2V		6.71	6.02	9.39		Pass

802.11 ax HT 20							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	36/5180	7.00	6.54	9.79	23	Pass
-10℃	52.8V		6.15	7.13	9.68		Pass
	43.2V		6.18	6.38	9.29		Pass
+40℃	52.8V		7.20	7.03	10.13		Pass
	43.2V		6.92	6.25	9.61		Pass

802.11 ax HT 40							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	38/5190	5.91	5.80	8.87	23	Pass
-10℃	52.8V		7.01	6.28	9.67		Pass
	43.2V		5.39	5.83	8.63		Pass
+40℃	52.8V		5.66	4.53	8.14		Pass
	43.2V		6.90	6.42	9.68		Pass

802.11 ax HT 80							
Test conditions		**Channel/ Frequency**	**Ant 1**	**Ant 2**	**Mimo**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**		**power (dBm)**	**power (dBm)**	**power (dBm)**		
+25℃	48.0V	42/5210	5.93	6.48	9.22	23	Pass
-10℃	52.8V		6.54	6.64	9.60		Pass
	43.2V		5.92	6.02	8.98		Pass
+40℃	52.8V		5.70	5.08	8.41		Pass
	43.2V		6.40	5.81	9.13		Pass

4.3.2. RF output power at the lowest power level of the TPC range - PL

Test Procedure

1. The UUT shall be configured to operate at the lowest stated transmitter output power level of the TPC range.
2. For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment) reference clause 5.4.4.2.1.2.2 ETSI EN 301 893 V2.1.1 (2017-05)
3. For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band reference clause 5.4.4.2.1.2.3 ETSI EN 301 893 V2.1.1 (2017-05)
4. For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands reference clause 5.4.4.2.1.2.4 ETSI EN 301 893 V2.1.1 (2017-05)
5. These measurements shall be performed under both normal and extreme test conditions.
6. This test is only required for equipment with a TPC feature.

Test Results

This test item is not applicable for the EUT without TPC featur.

4.4. Power density

Test Procedure

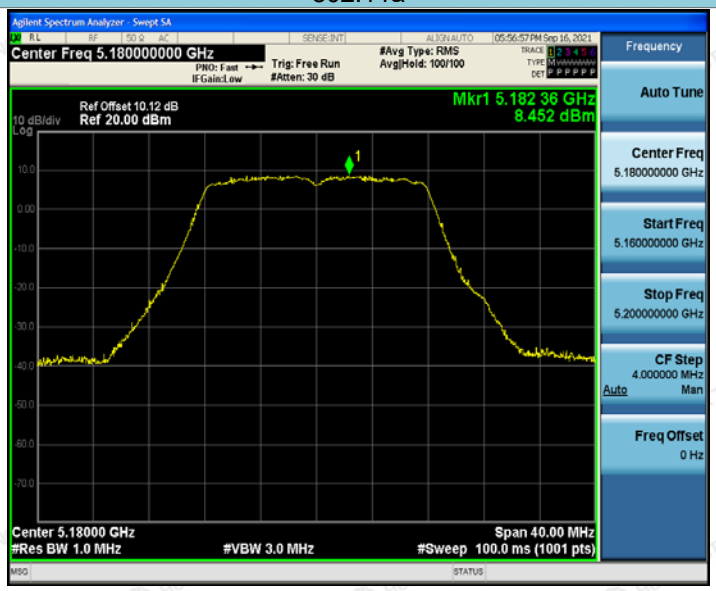
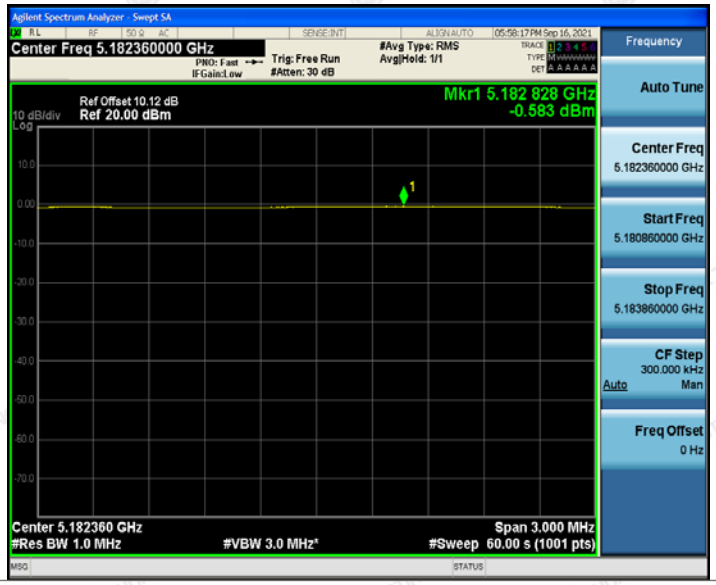
1. The UUT shall be configured to operate at:
   - The highest stated transmitter output power level of the TPC range; or
   - The maximum transmitter output power level in case the equipment has no TPC feature.
2. For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment) reference clause 5.4.4.2.1.3.2 ETSI EN 301 893 V2.1.1 (2017-05).
3. For equipment without continuous transmission capability and without the capability to transmit with a constant duty cycle reference clause 5.4.4.2.1.3.3 ETSI EN 301 893 V2.1.1 (2017-05).
4. These measurements shall only be performed at normal test conditions.

Test Results

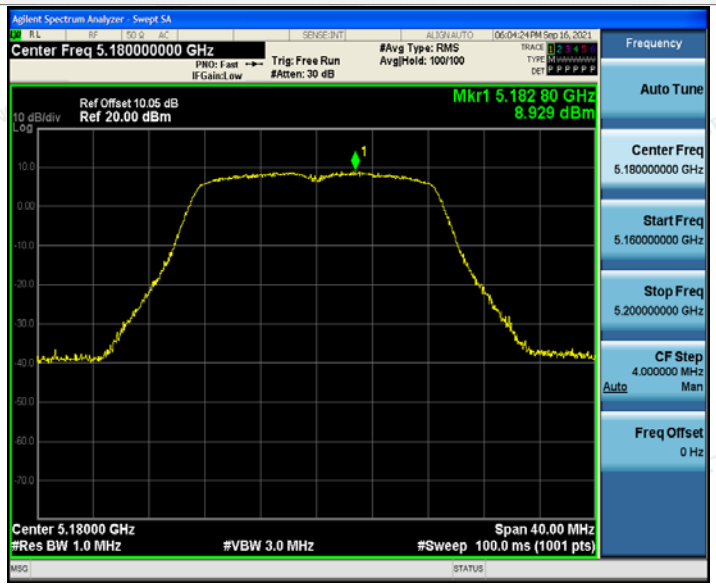
Mode	Channel/ Frequency (MHz)	Ant 1	Ant 2	Mimo	Limit (dBm/MHz)	Result
		PSD (dBm/MHz)	PSD (dBm/MHz)	PSD (dBm/MHz)		
802.11a	36/5180	-0.58	0.67	/	10	Pass
802.11n HT 20	36/5180	-1.37	0.08	2.43	10	Pass
802.11n HT 40	38/5190	-3.97	-3.70	-0.82	10	Pass
802.11ac HT 20	36/5180	2.06	-0.86	3.85	10	Pass
802.11ac HT 40	38/5190	-0.87	-2.55	1.38	10	Pass
802.11ac HT 80	42/5210	-4.64	-5.85	-2.19	10	Pass
802.11ax HT 20	36/5180	2.07	-0.22	4.08	10	Pass
802.11ax HT 40	38/5190	-0.21	-3.09	1.59	10	Pass
802.11ax HT 80	42/5210	-3.18	-5.88	-1.31	10	Pass

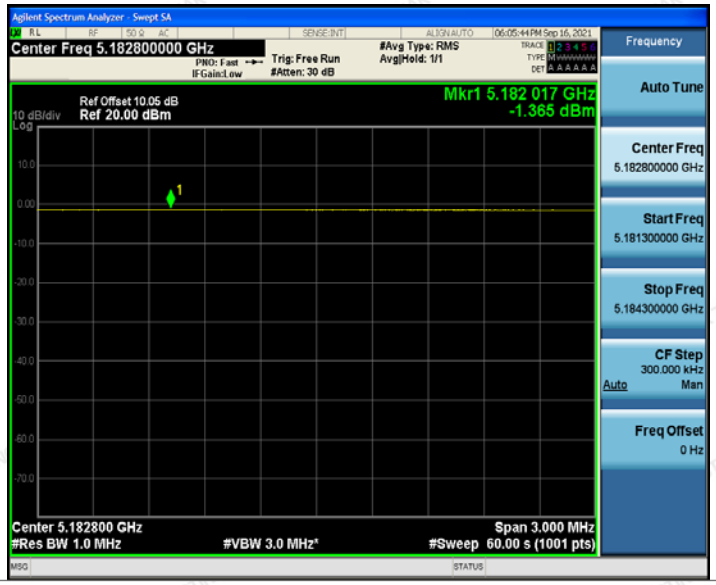
Note:Only the worst channel is reported for each modulation.

The test plots as follow:
Ant 1

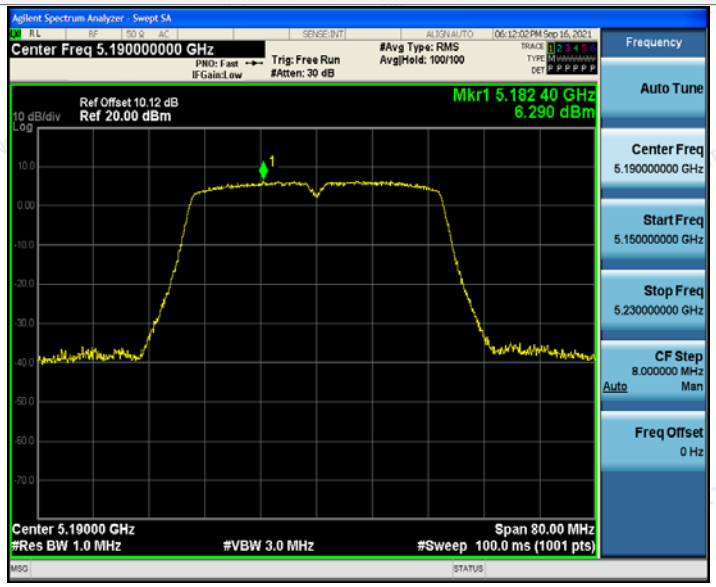
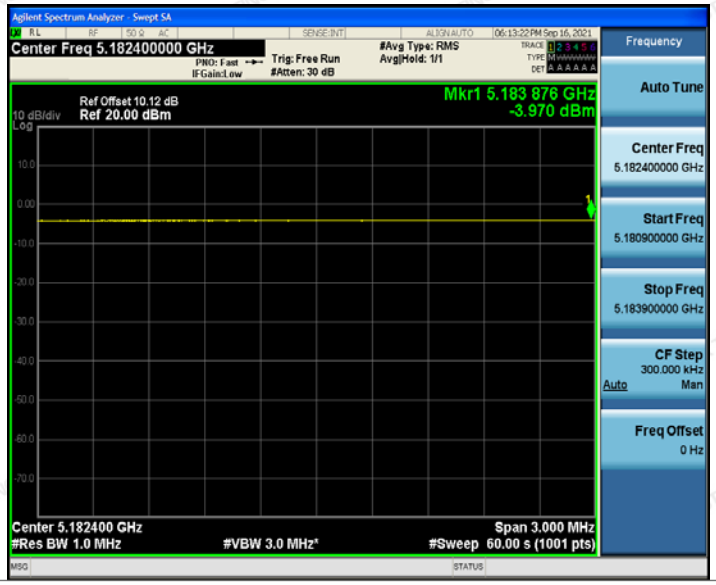
802.11a


CH36

802.11n HT 20

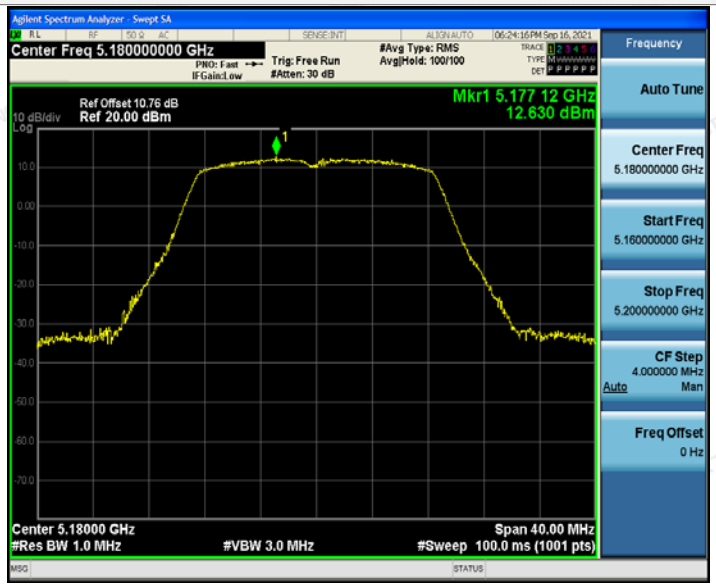


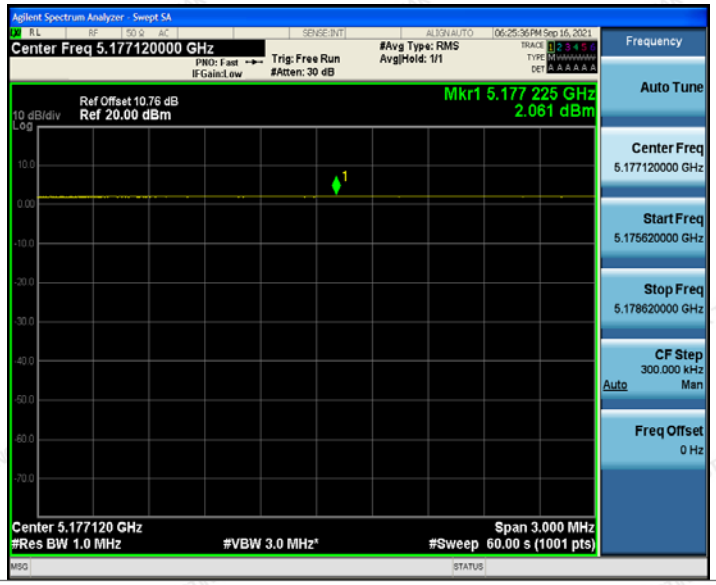


CH36

802.11n HT 40


CH38

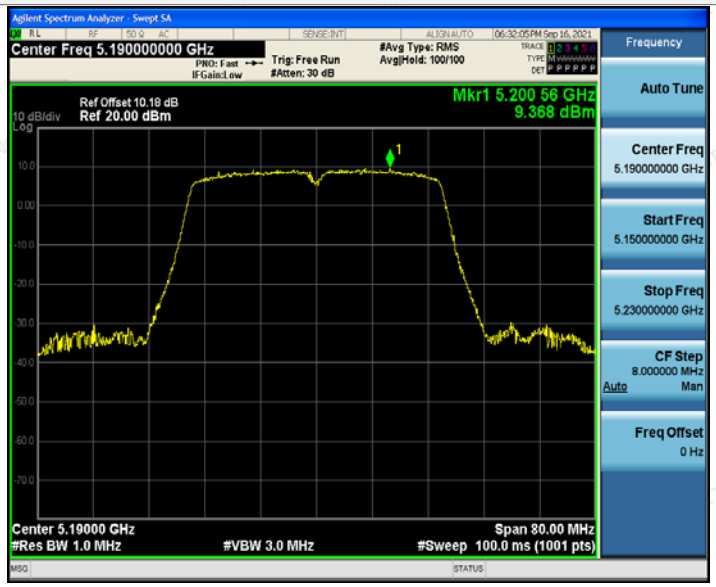
802.11ac HT 20

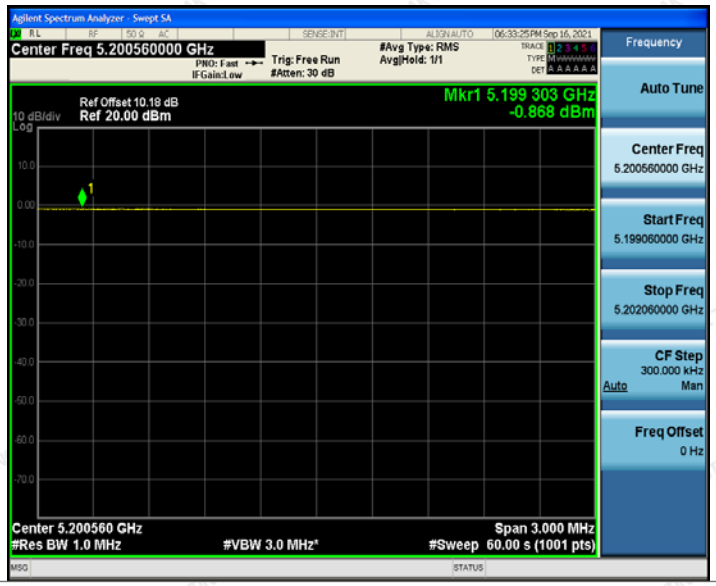




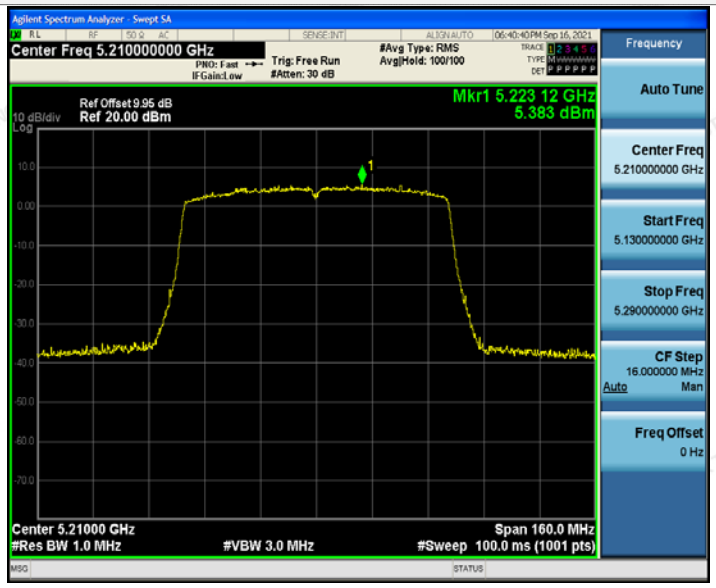
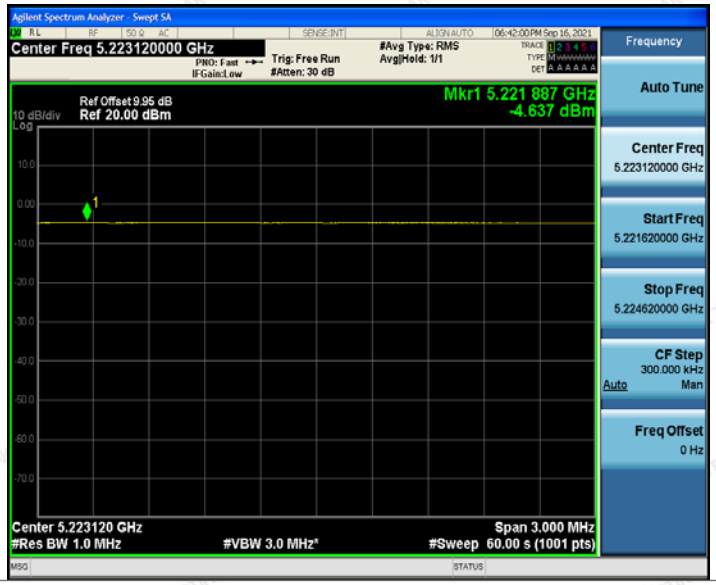
CH36

802.11ac HT 40

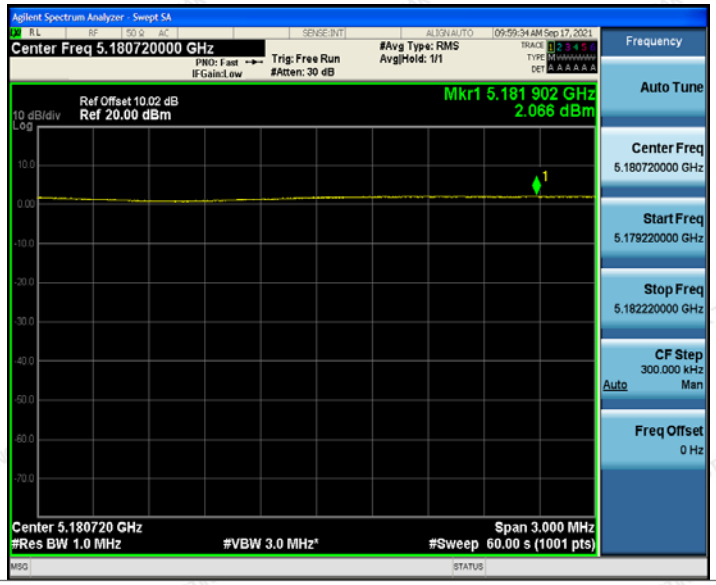




CH38

802.11ac HT 80


CH42

802.11ax HT 20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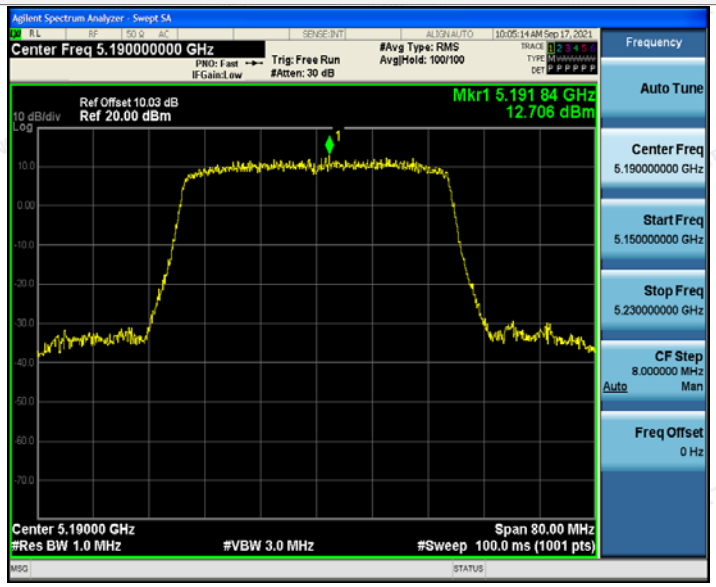
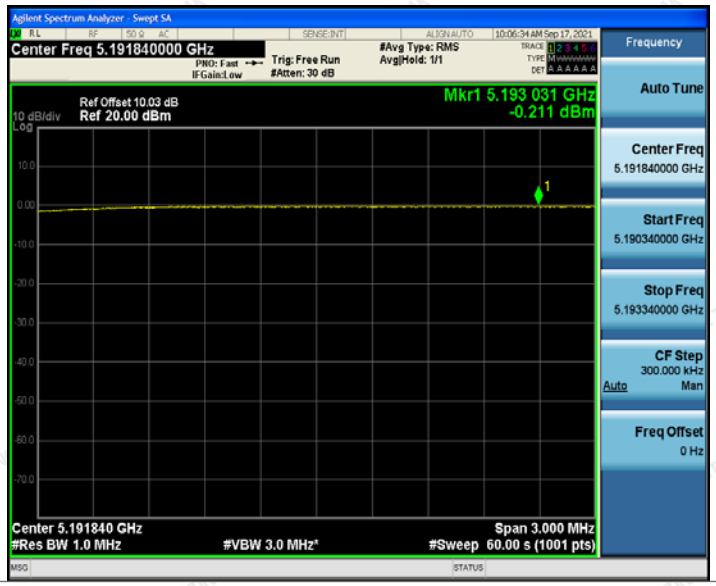
802.11ax HT 40





CH38

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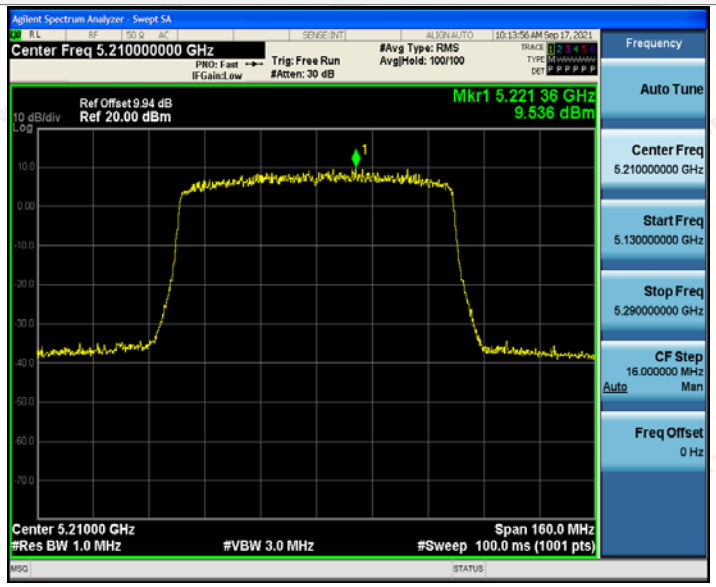
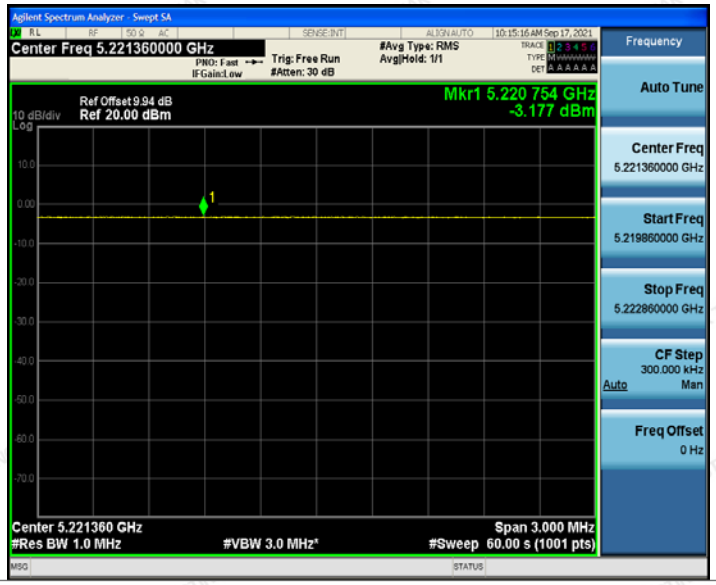
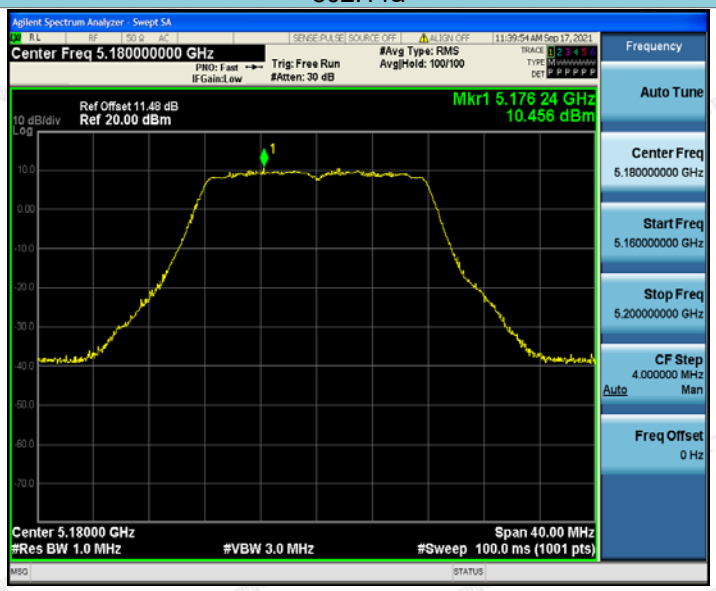
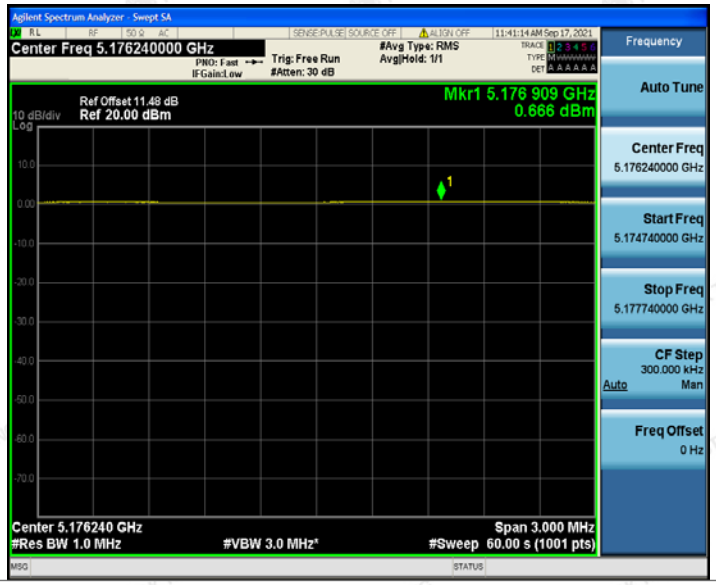
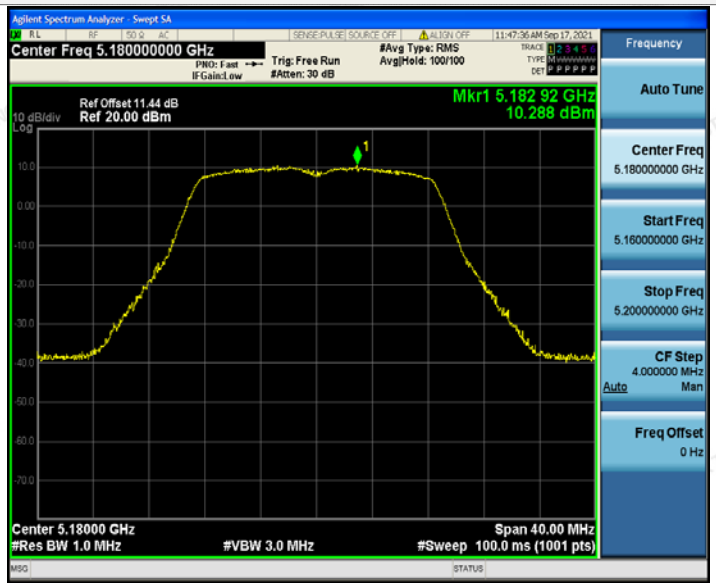
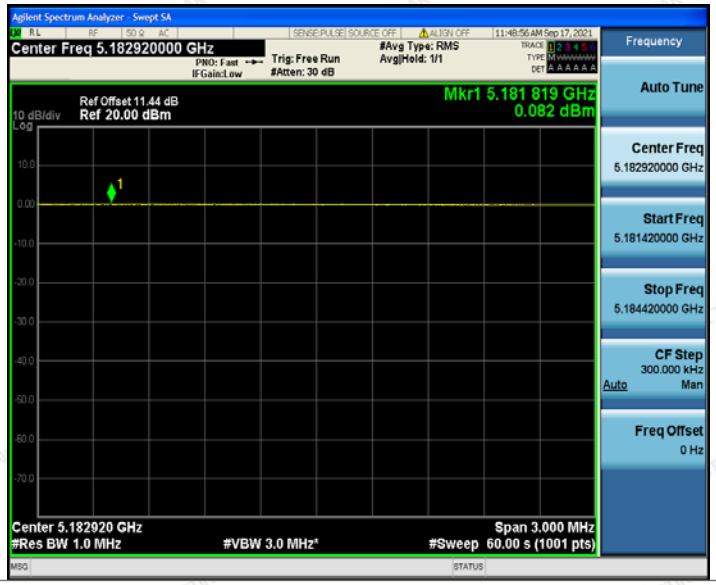


CH42

Ant 2

802.11a


CH36

802.11n HT 20





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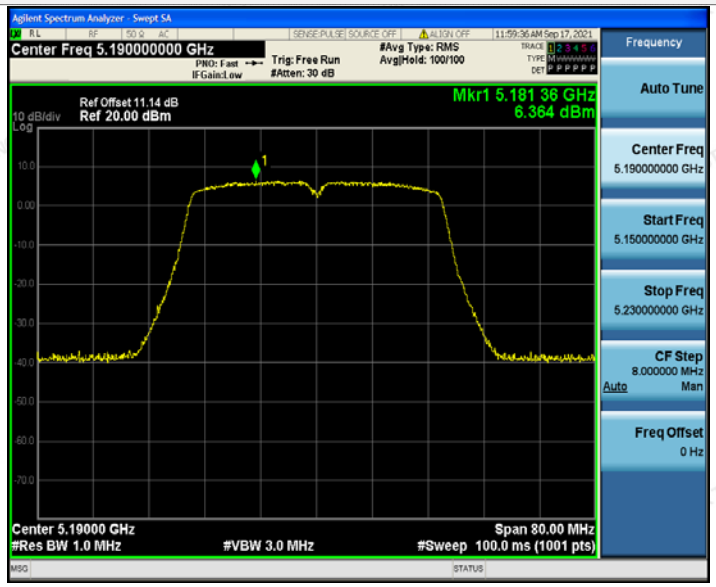
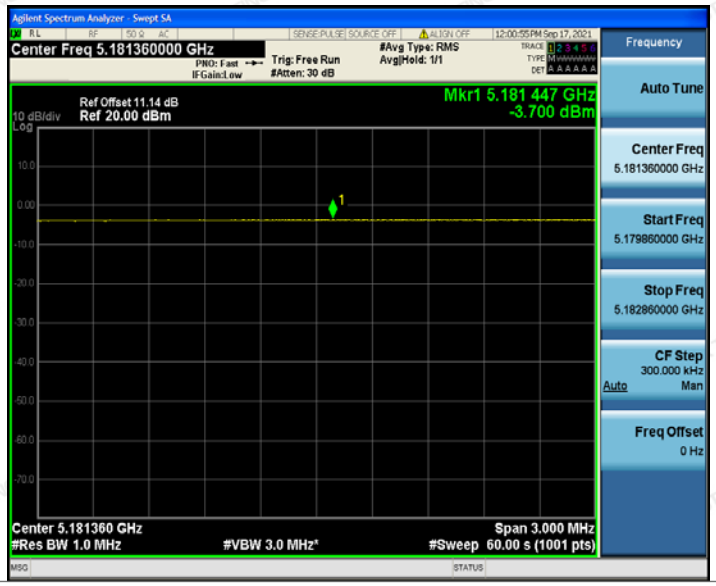
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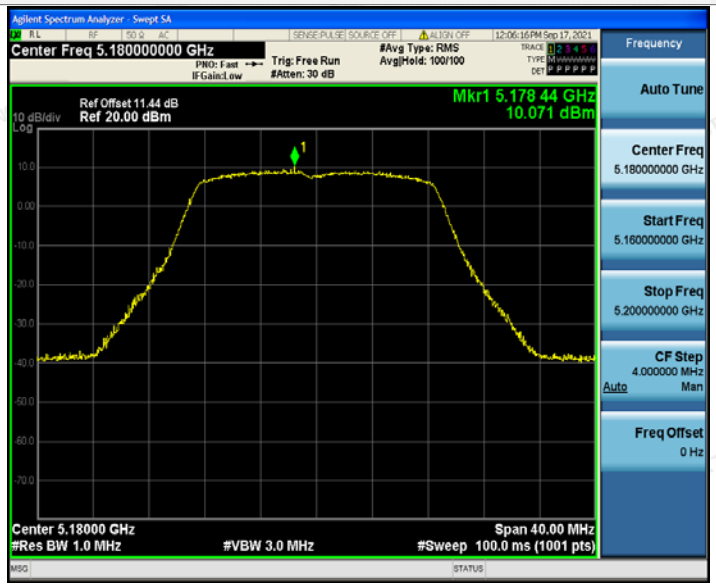

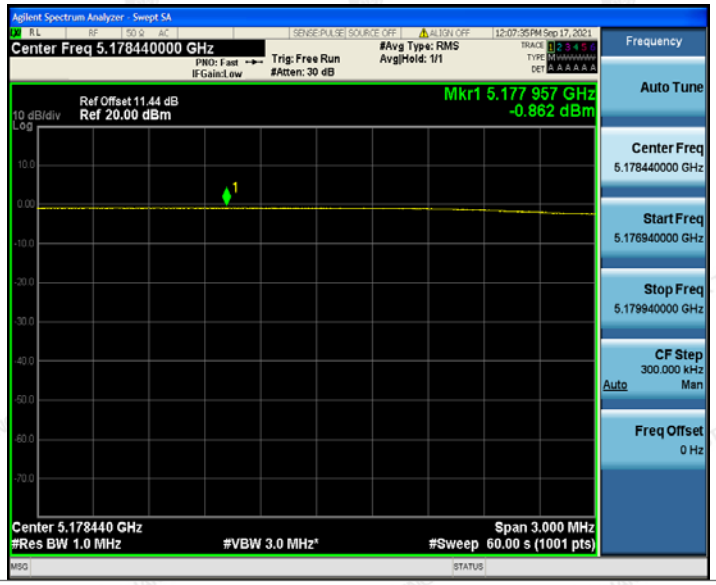

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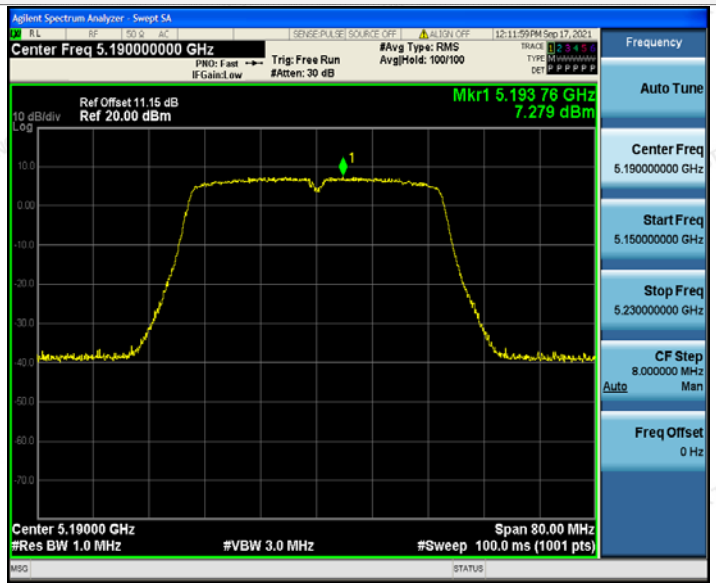
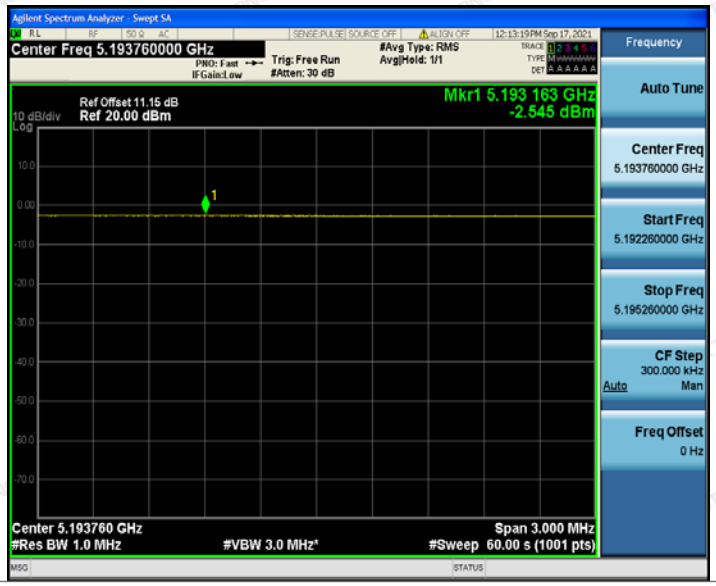
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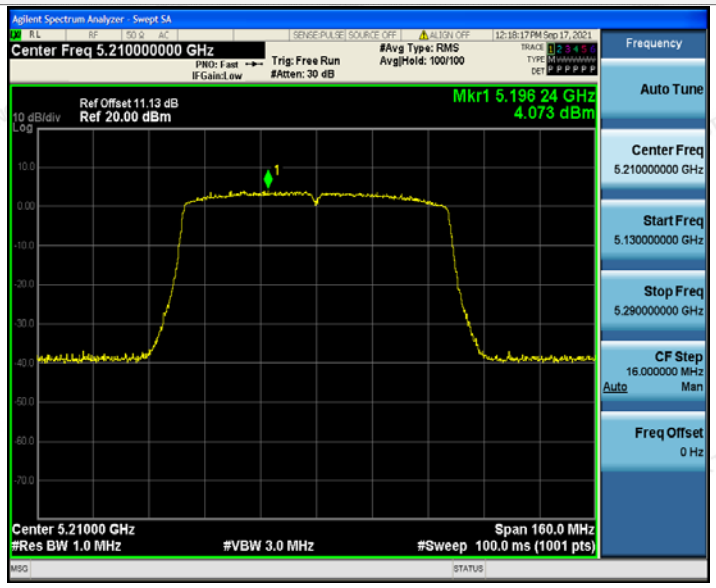
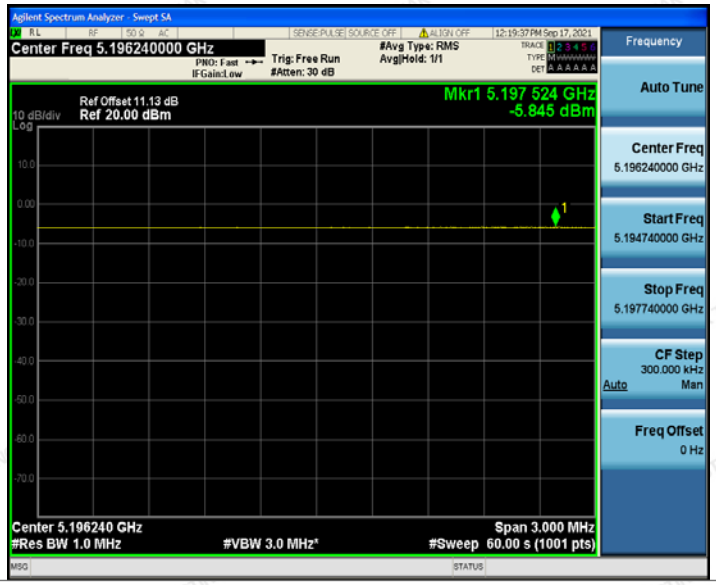
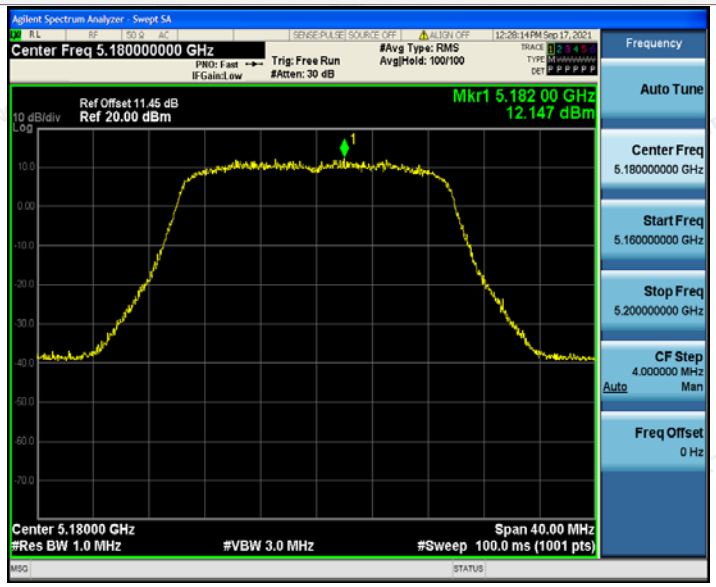
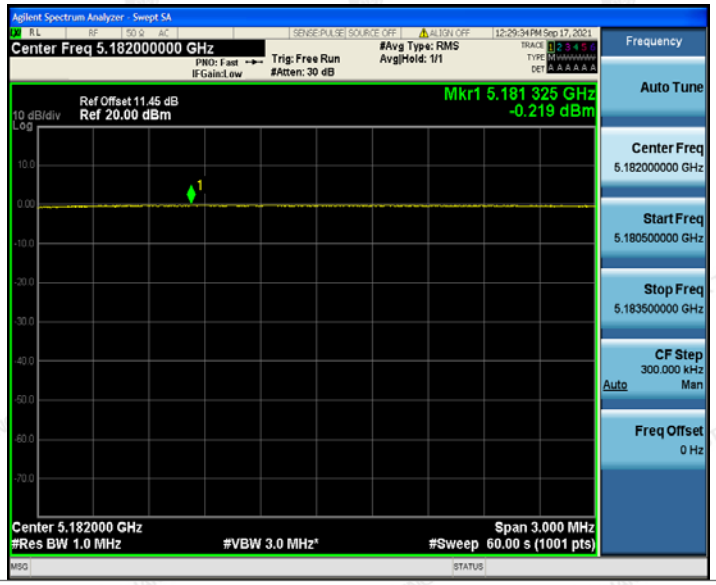


CH42

802.11ax HT 20





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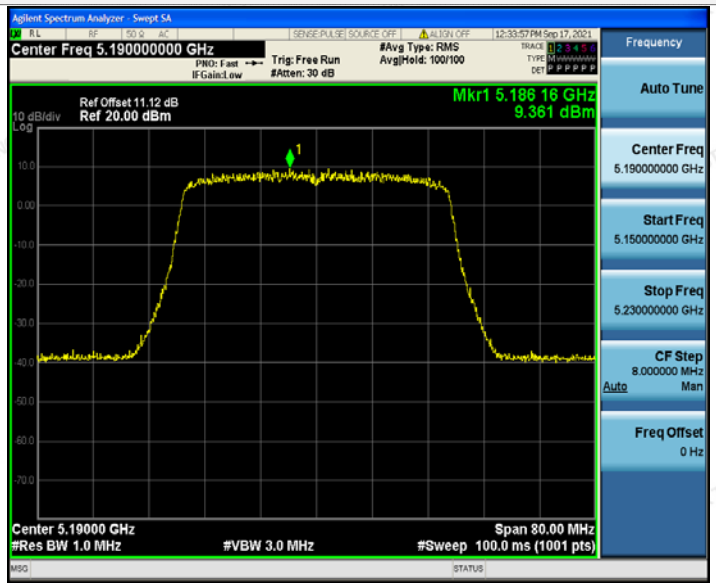
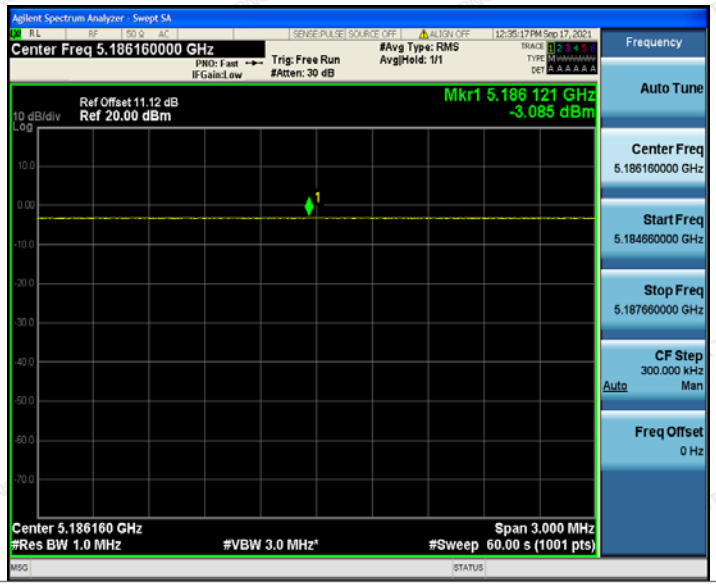
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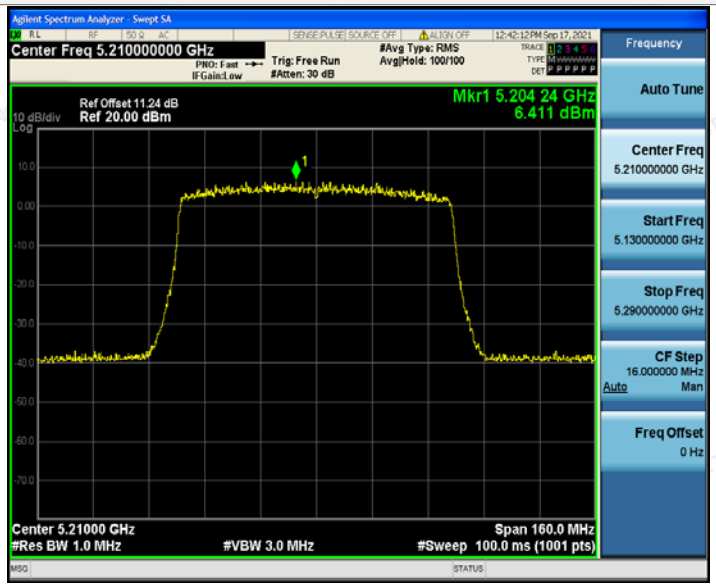
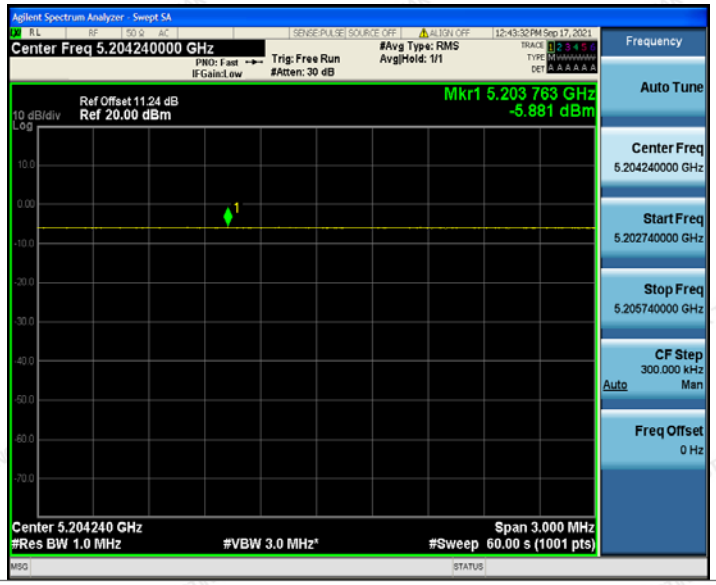
802.11ax HT 80





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4.5. Transmitter unwanted emissions

4.5.1. Transmitter unwanted emissions outside the 5 GHz RLAN bands

Limit

The level of unwanted emission shall not exceed the limits given in table 3.

Table 3: Transmitter unwanted emission limits outside the 5 GHz RLAN bands

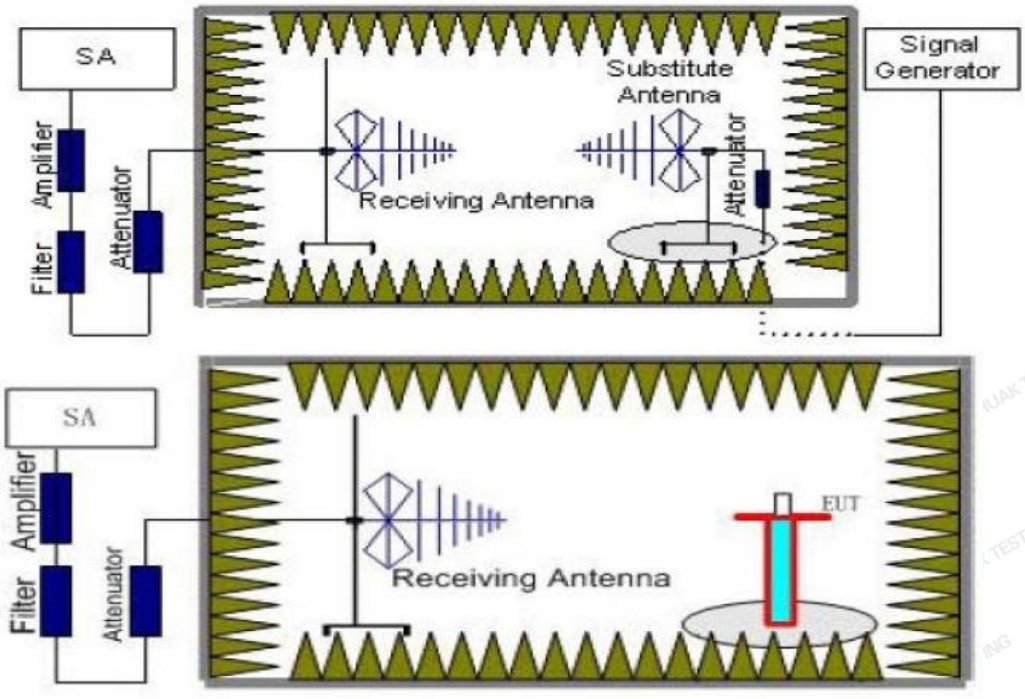
Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 5,15 GHz	-30 dBm	1 MHz
5,35 GHz to 5,47 GHz	-30 dBm	1 MHz
5,725 GHz to 26 GHz	-30 dBm	1 MHz

Test Procedure

1. The measurement procedure follows ETSI EN 301 893 (V2.1.1) Sub-clause 5.4.5.2.2
2. The measurement shall only be performed at normal test conditions.
   One channel out of the declared channels for each sub-band shall be tested.

Test Configuration

Effective Radiated Power measurement (30 MHz to 26 GHz)



TEST RESULTS

Remark: We tested at 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80/802.11ax HT20/802.11ax HT40/802.11ax HT80 mode at the antenna single transmitting mode and the Mimo mode, and recorded the worst case 802.11n HT 20 mode at the Mimo mode. 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

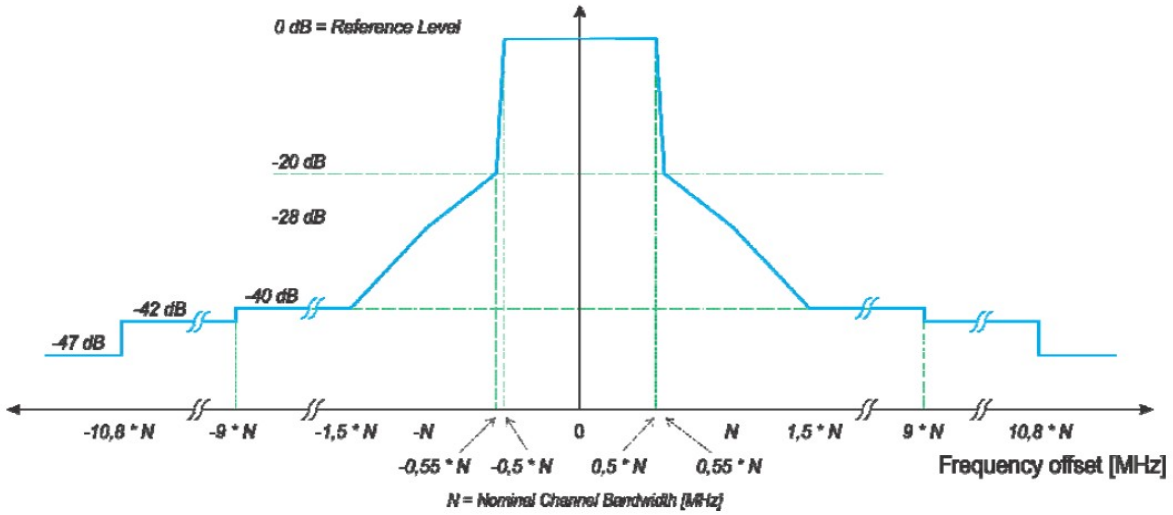
802.11n HT 20, CH 36, Horizontal/Vertical

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
220.57	V	-77.03	-54	-23.03	PASS
255.02	V	-77.91	-54	-23.91	PASS
341.12	V	-75.91	-36	-39.91	PASS
452.17	V	-78.94	-36	-42.94	PASS
545.85	V	-75.91	-54	-21.91	PASS
841.24	V	-80.66	-36	-44.66	PASS
206.33	H	-75.75	-54	-21.75	PASS
253.79	H	-77.79	-36	-41.79	PASS
327.75	H	-71.53	-36	-35.53	PASS
440.47	H	-74.12	-36	-38.12	PASS
626.92	H	-71.44	-54	-17.44	PASS
849.16	H	-77.87	-36	-41.87	PASS
Note: 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Above 1GHz:					
2019.32	V	-55.16	-30	-25.16	PASS
2617.69	V	-56.82	-30	-26.82	PASS
3649.50	V	-56.69	-30	-26.69	PASS
4372.59	V	-58.83	-30	-28.83	PASS
5607.75	V	-51.65	-30	-21.65	PASS
6038.41	V	-53.49	-30	-23.49	PASS
2232.02	H	-54.75	-30	-24.75	PASS
2371.80	H	-59.70	-30	-29.70	PASS
3075.38	H	-54.27	-30	-24.27	PASS
3862.23	H	-53.71	-30	-23.71	PASS
4791.15	H	-53.83	-30	-23.83	PASS
6751.77	H	-53.54	-30	-23.54	PASS
Note: 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

4.5.2. Transmitter unwanted emissions within the 5 GHz RLAN bands

LIMIT



NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

Figure 1: Transmit spectral power mask

Test Procedure

1. The measurement procedure follows ETSI EN 301 893 (V2.1.1) Sub-clause .4.6.2.1.
2. The measurement shall only be performed at normal test conditions.

Test Result

The test plots as follow:

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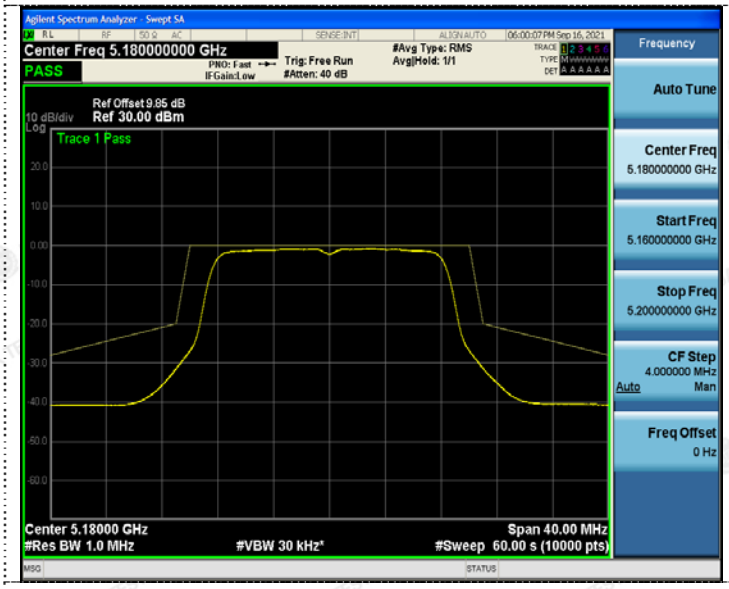

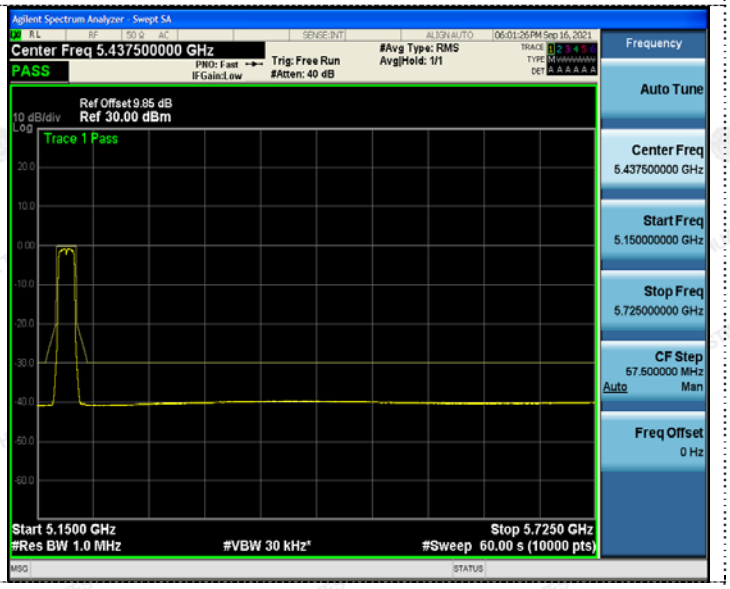

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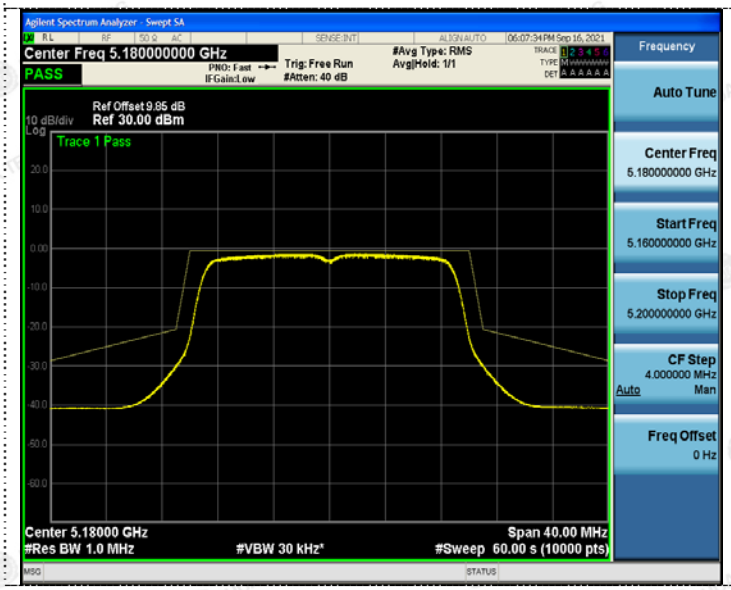

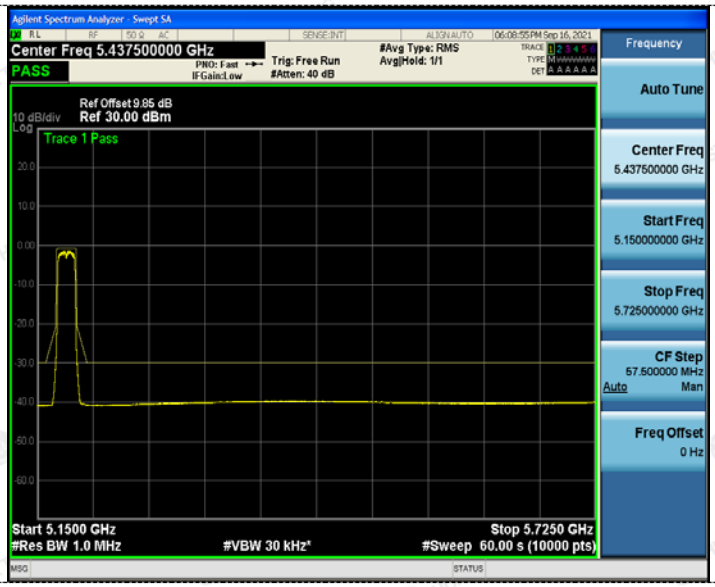

802.11n HT 40

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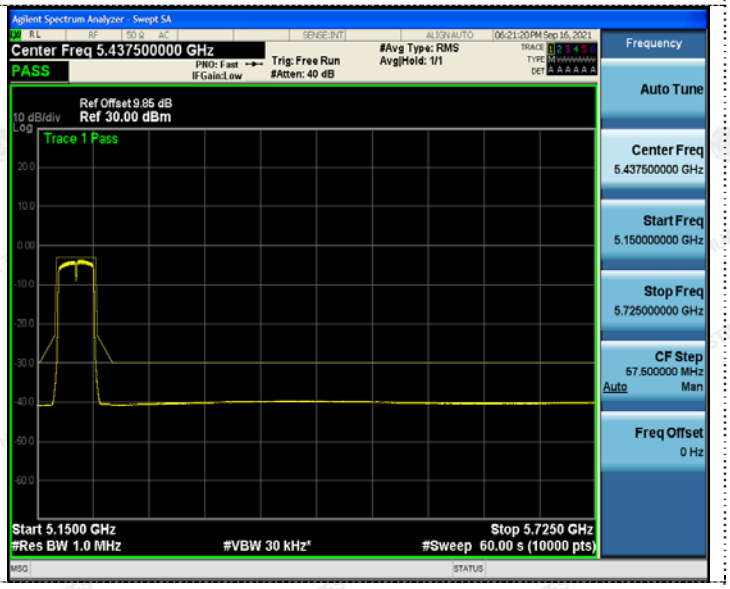
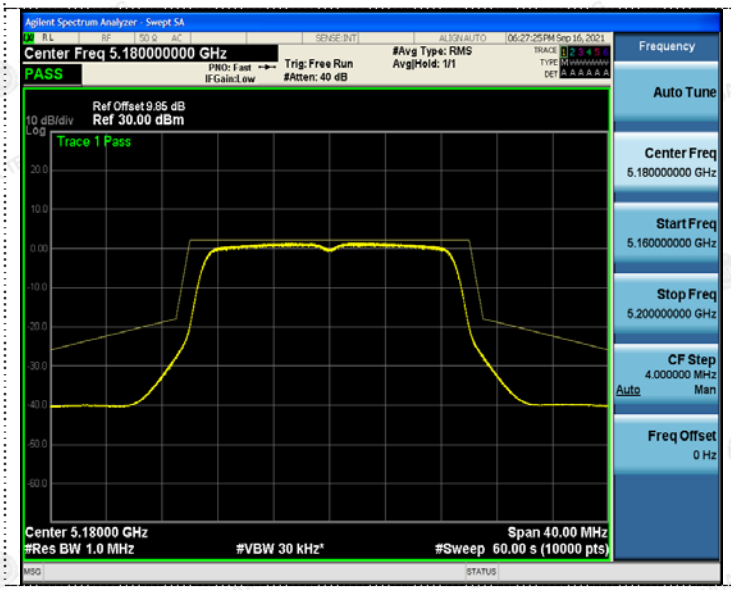
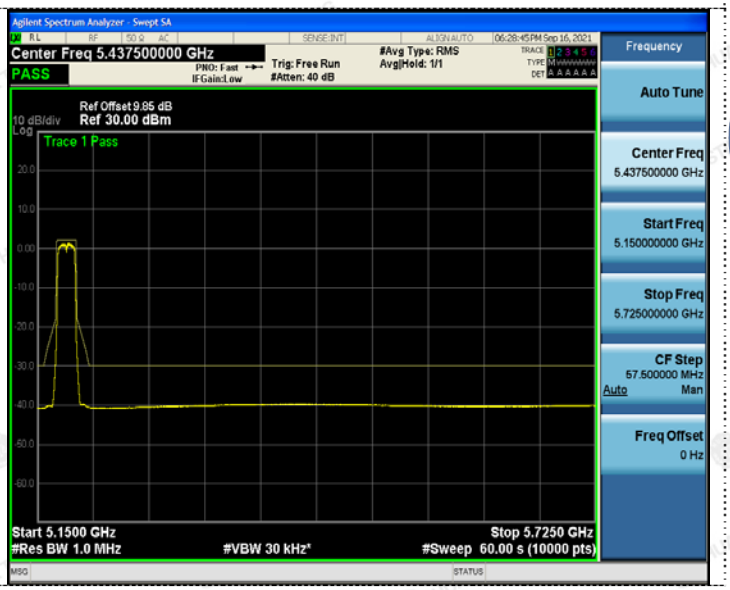


802.11ac HT 20

CH36





802.11ac HT 40

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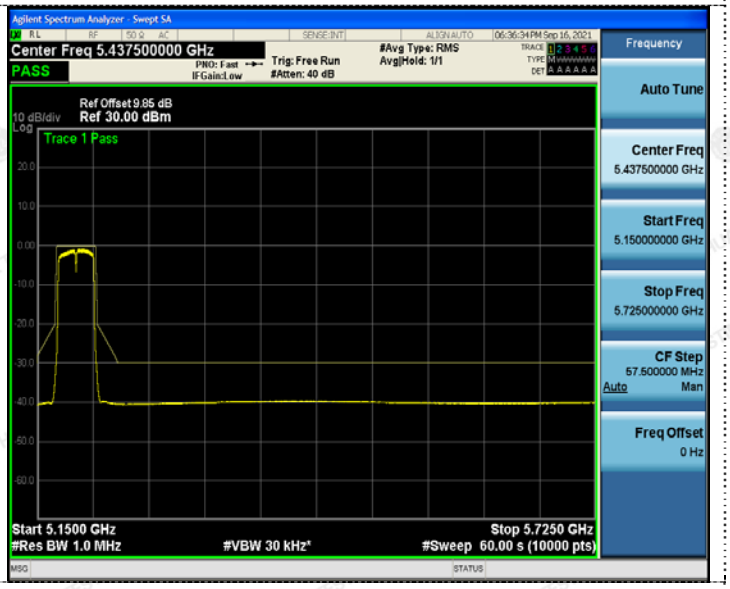

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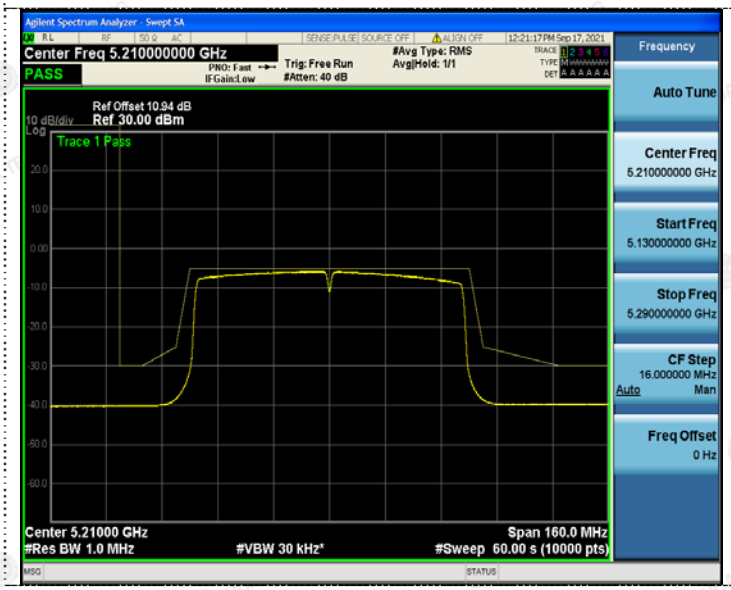

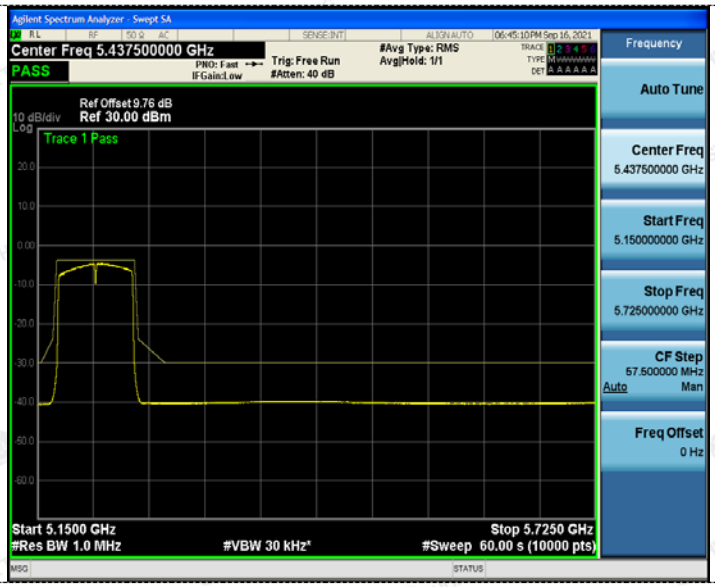

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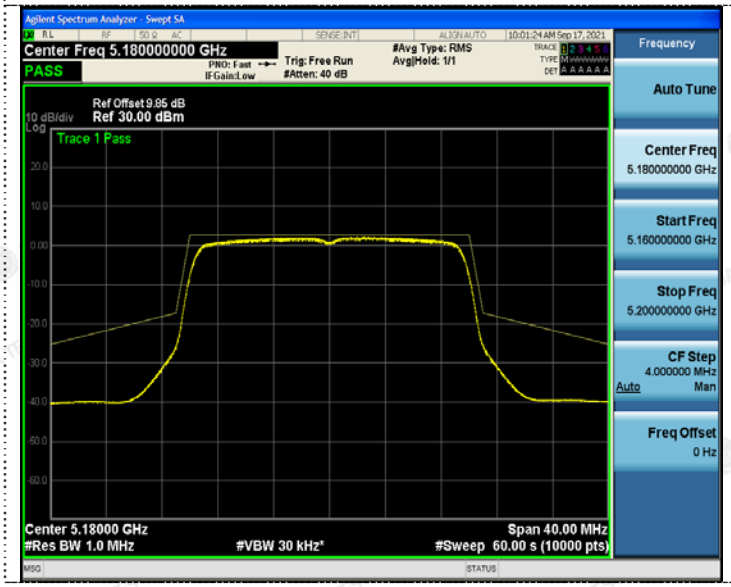	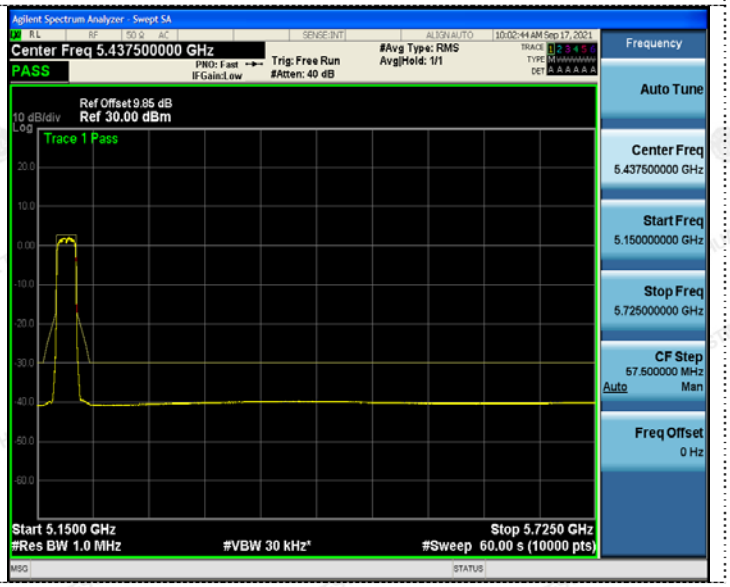

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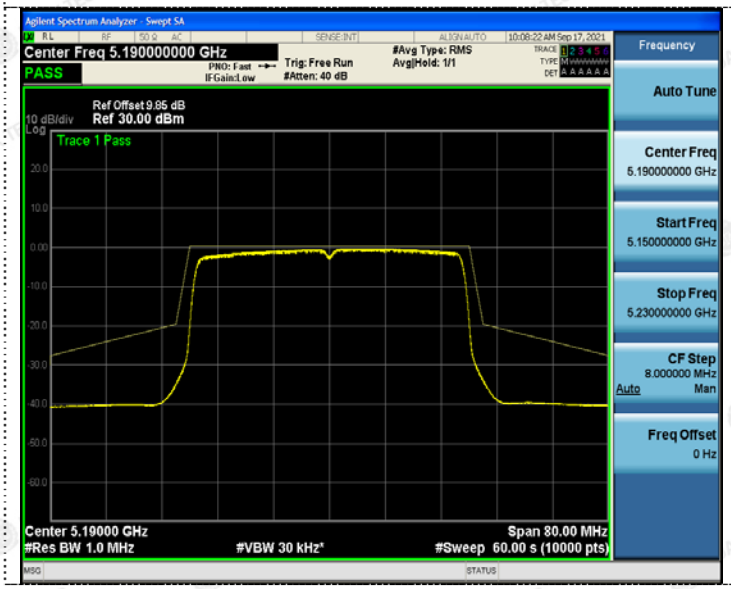	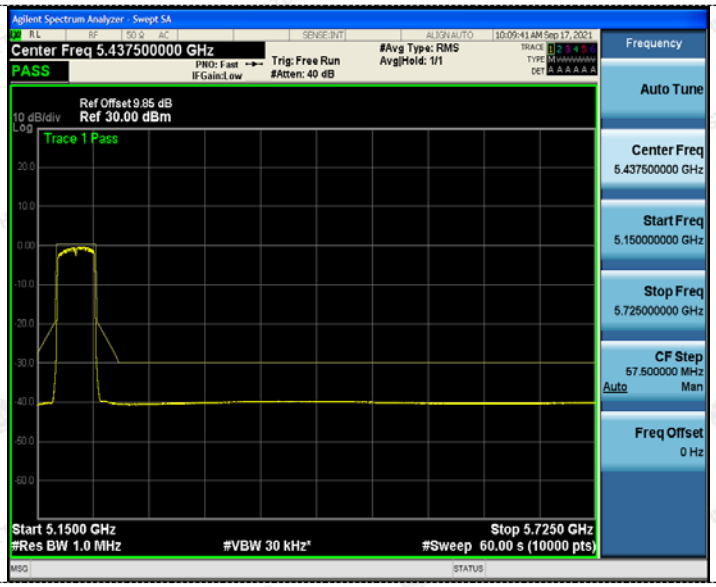

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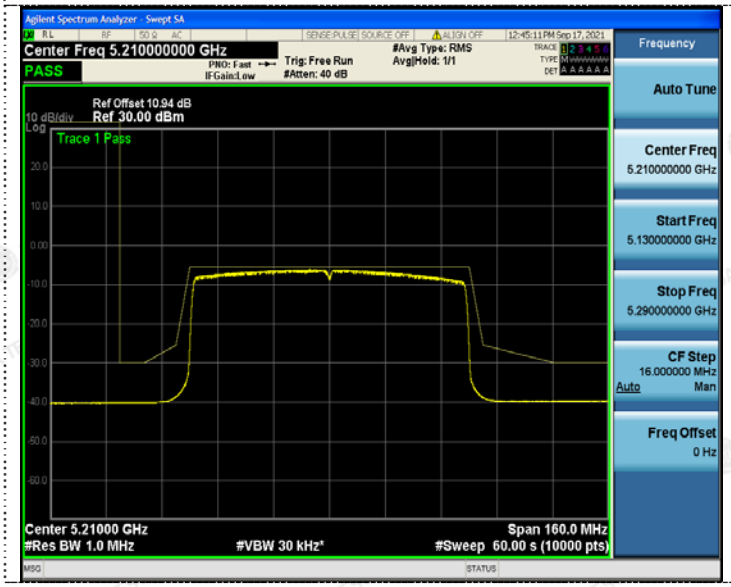

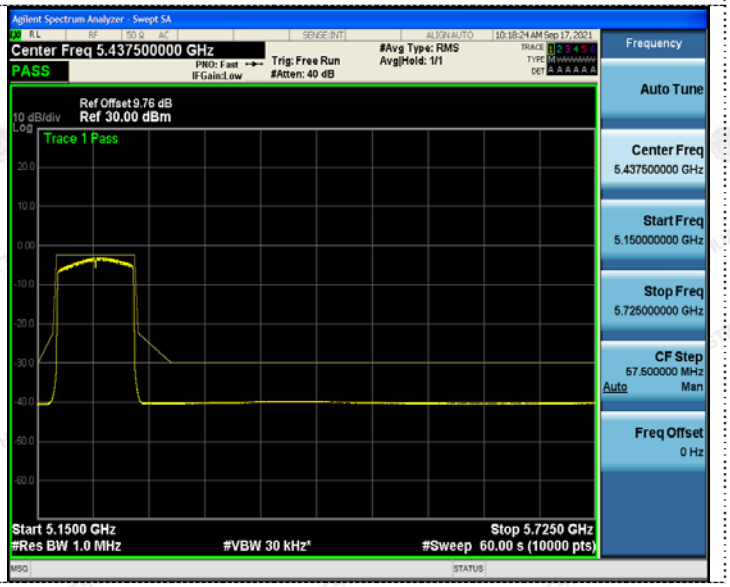

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	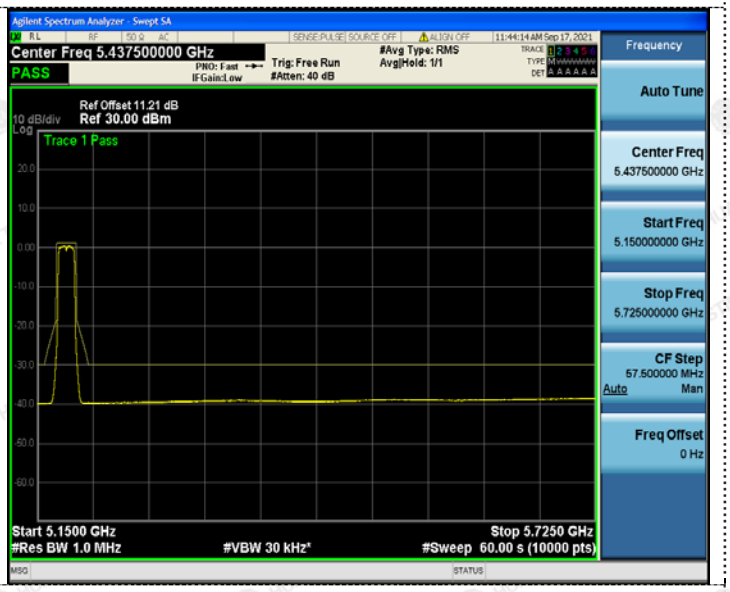
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	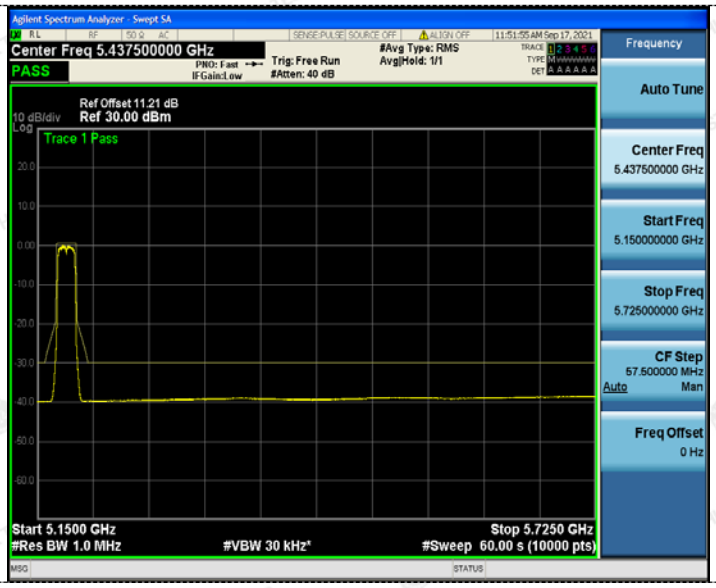

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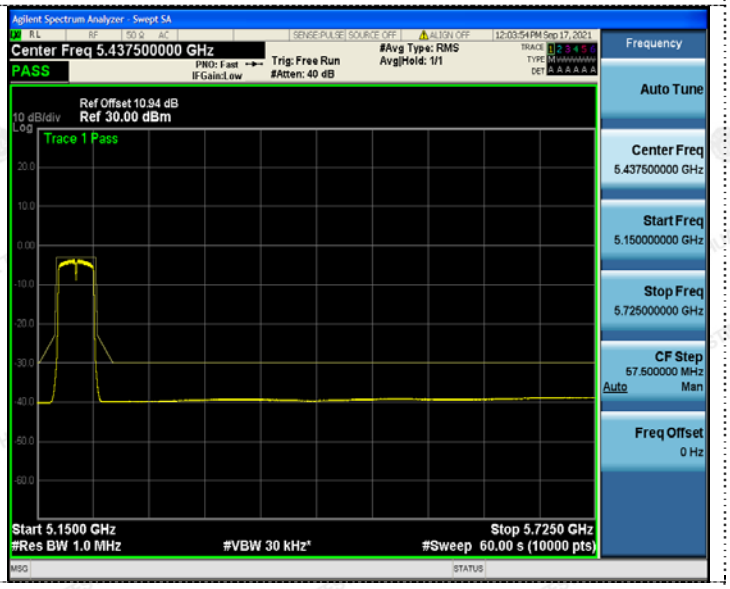
CH38



802.11ac HT 20

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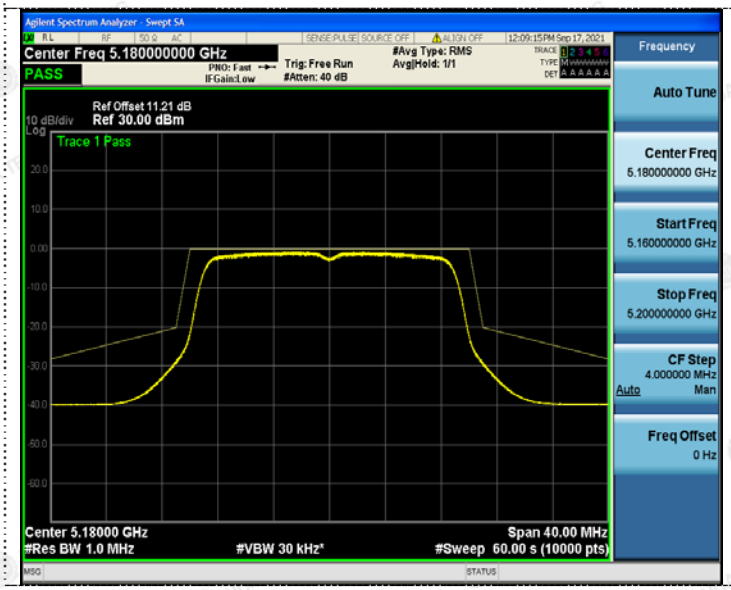

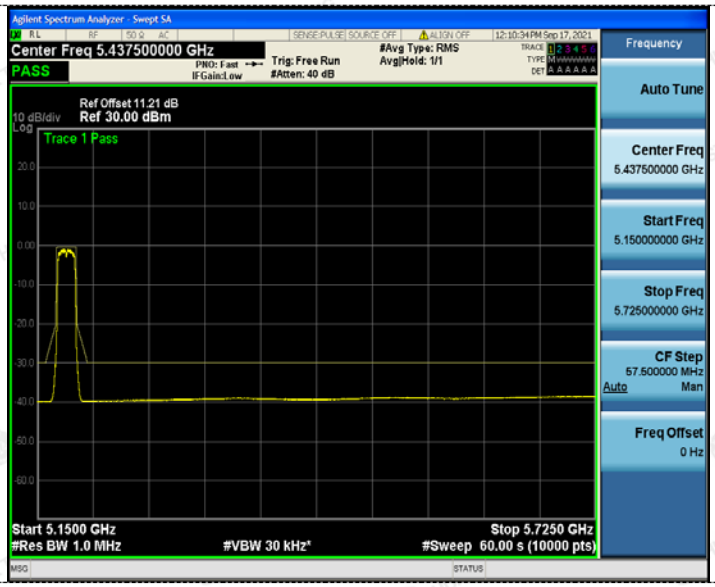

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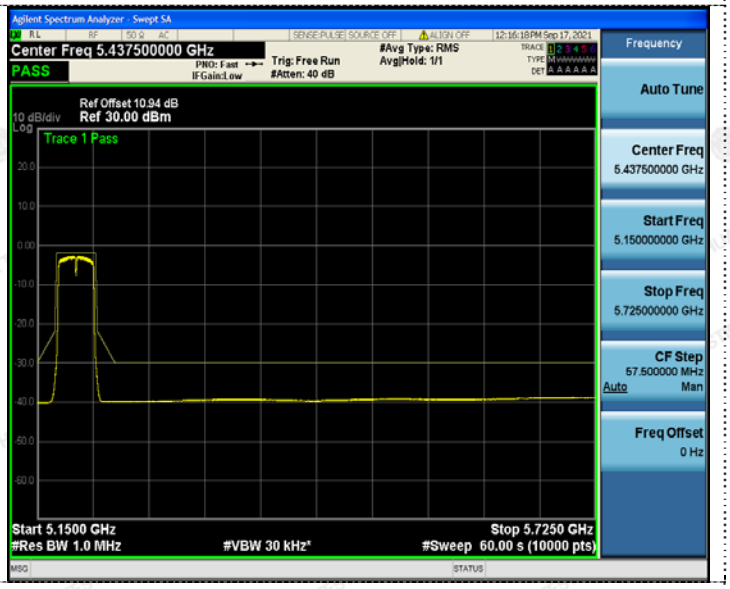

802.11ac HT 80

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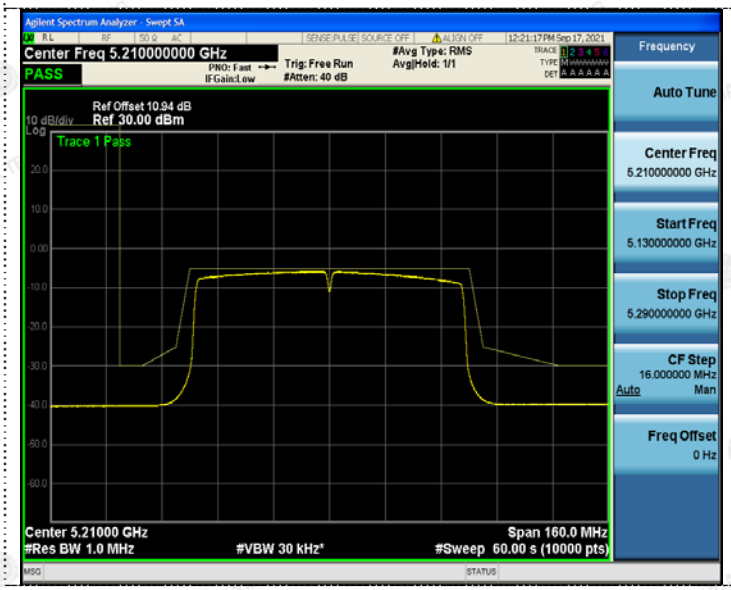

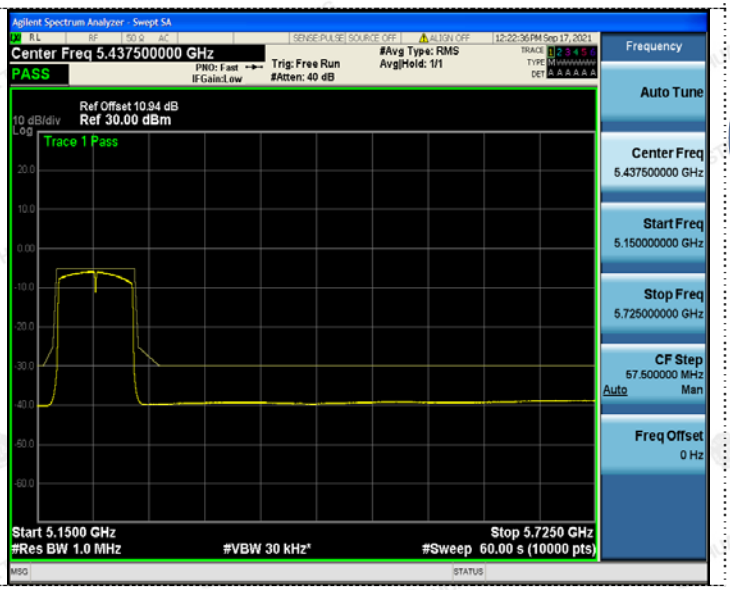

802.11ax HT 20

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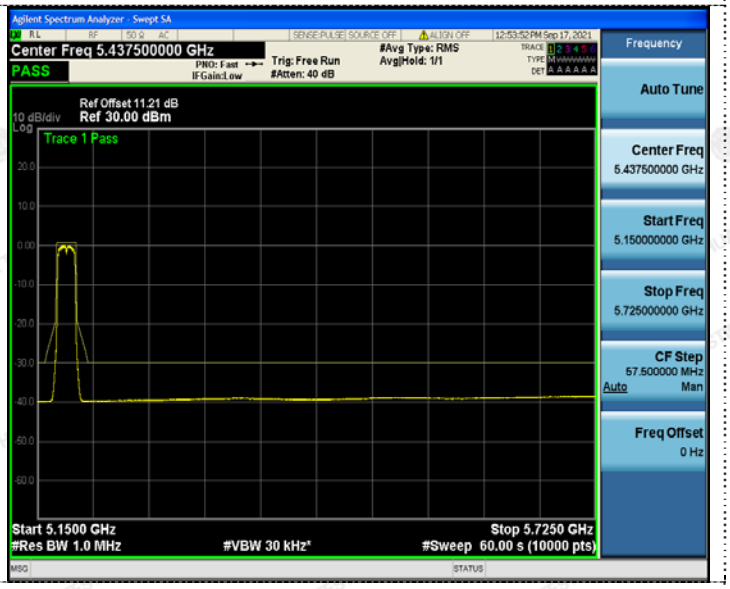

802.11ax HT 40

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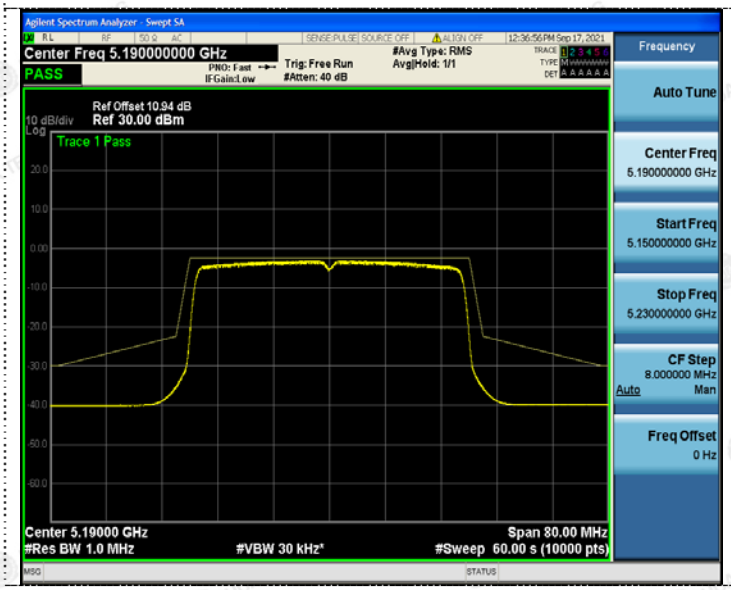

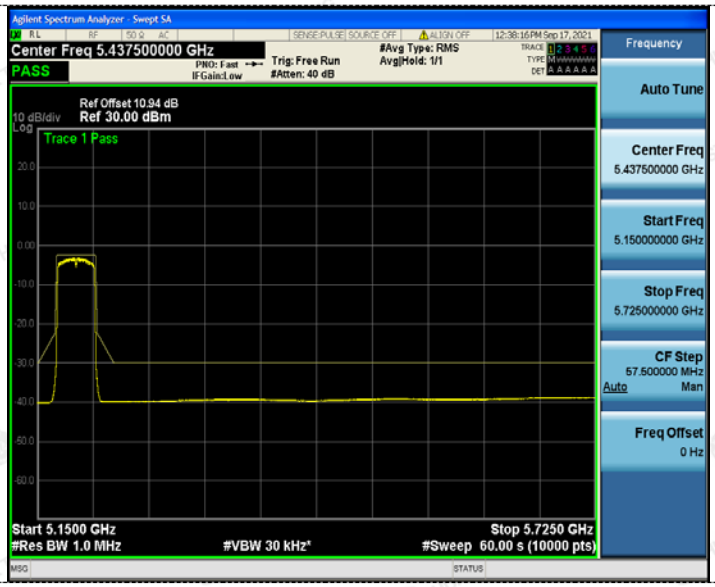

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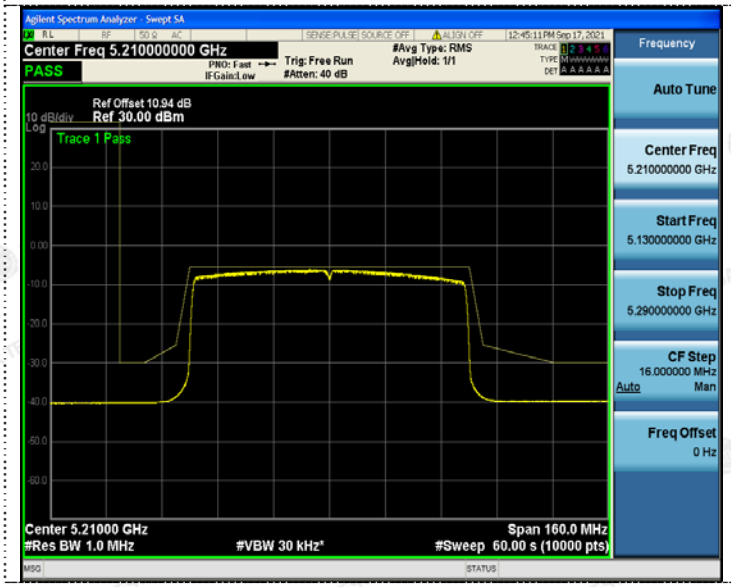
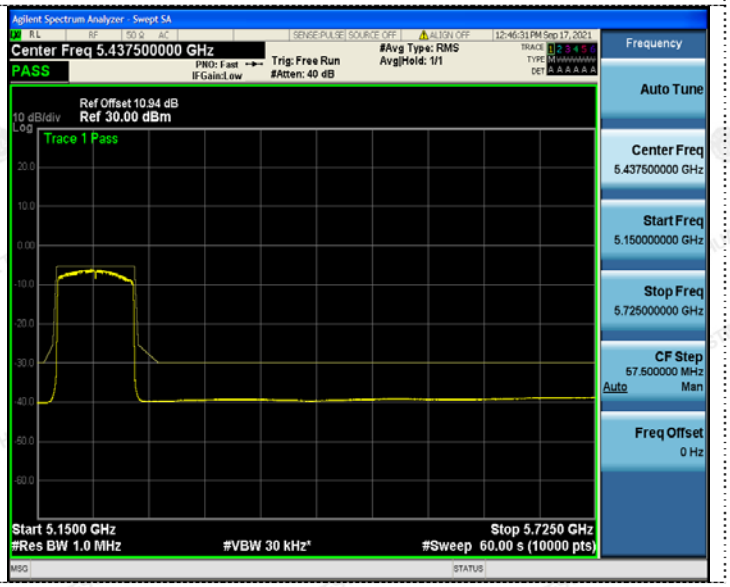




4.6. Receiver spurious emissions

The spurious emissions of the receiver shall not exceed the limits given in table 4.

Table 4: Spurious radiated emission limits

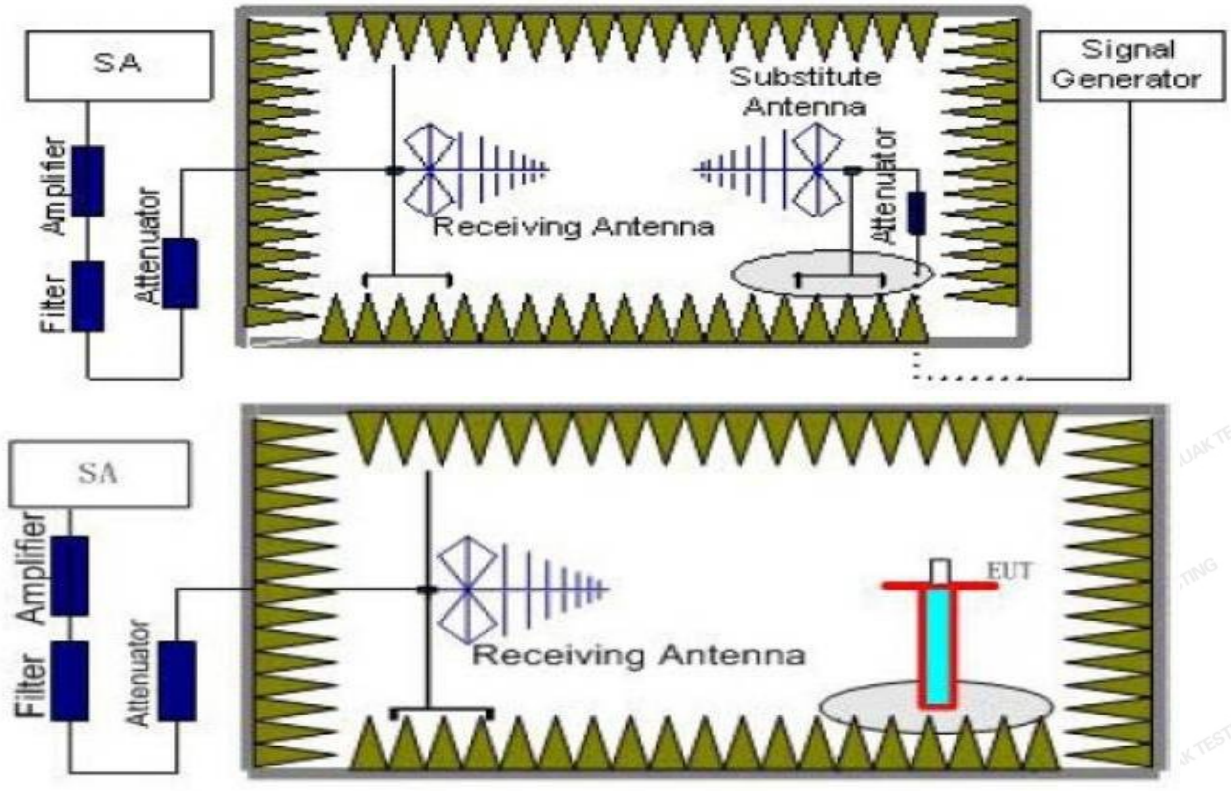
Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

Test Procedure

1. The measurement procedure follows ETSI EN 301 893 (V2.1.1) Sub-clause 5.4.7.2.2
2. The measurement shall only be performed at normal test conditions.
3. One channel out of the declared channels for each sub-band shall be tested.

Test Configuration

Effective Radiated Power measurement (30 MHz to 26 GHz)



TEST RESULTS

Note:We tested at 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80/802.11ax HT20/802.11ax HT40/802.11ax HT80 mode at the antenna single receiver mode and the Mimo mode, and recorded the worst case 802.11n HT 20 mode at the Mimo mode. 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

802.11n HT 20, CH 36, Horizontal/Vertical

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
209.72	V	-72.72	-57	-15.72	PASS
246.65	V	-73.79	-57	-16.79	PASS
345.60	V	-79.35	-57	-22.35	PASS
459.20	V	-73.01	-57	-16.01	PASS
555.34	V	-79.83	-57	-22.83	PASS
850.01	V	-82.66	-57	-25.66	PASS
261.00	H	-80.39	-57	-23.39	PASS
281.21	H	-76.98	-57	-19.98	PASS
328.20	H	-80.34	-57	-23.34	PASS
441.67	H	-79.77	-57	-22.77	PASS
625.54	H	-77.06	-57	-20.06	PASS
847.47	H	-71.82	-57	-14.82	PASS
Note: 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
2263.67	V	-73.74	-47	-26.74	PASS
2373.77	V	-75.60	-47	-28.60	PASS
3507.99	V	-71.25	-47	-24.25	PASS
4268.77	V	-76.41	-47	-29.41	PASS
5584.43	V	-73.89	-47	-26.89	PASS
5953.21	V	-75.98	-47	-28.98	PASS
2282.57	H	-72.16	-47	-25.16	PASS
2433.90	H	-76.33	-47	-29.33	PASS
3235.17	H	-75.30	-47	-28.30	PASS
3875.23	H	-75.24	-47	-28.24	PASS
4933.66	H	-74.96	-47	-27.96	PASS
6758.09	H	-80.59	-47	-33.59	PASS
Note: 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

4.7. Dynamic Frequency Selection (DFS)

DFS parameters

Table D.1: DFS requirement values

Parameter	Value
Channel Availability Check Time	60 s (see note 1)
Minimum Off-Channel CAC Time	6 minutes (see note 2)
Maximum Off-Channel CAC Time	4 hours (see note 2)
Channel Move Time	10 s
Channel Closing Transmission Time	1 s
Non-Occupancy Period	30 minutes
NOTE 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Channel Availability Check Time* shall be 10 minutes. NOTE 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Off-Channel CAC Time* shall be within the range 1 to 24 hours.	

Table D.2: Interference threshold values

e.i.r.p. Spectral Density dBm/MHz	Value (see notes 1 and 2)
10	-62 dBm
NOTE 1: This is the level at the input of the receiver of an RLAN device with a maximum e.i.r.p. density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different e.i.r.p. spectral density and/or a different receive antenna gain G (dBi) the DFS threshold level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - e.i.r.p. Spectral Density (dBm/MHz) + G (dBi), however the DFS threshold level shall not be lower than -64 dBm assuming a 0 dBi receive antenna gain. NOTE 2: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection.	

Table D.3: Parameters of the reference DFS test signal

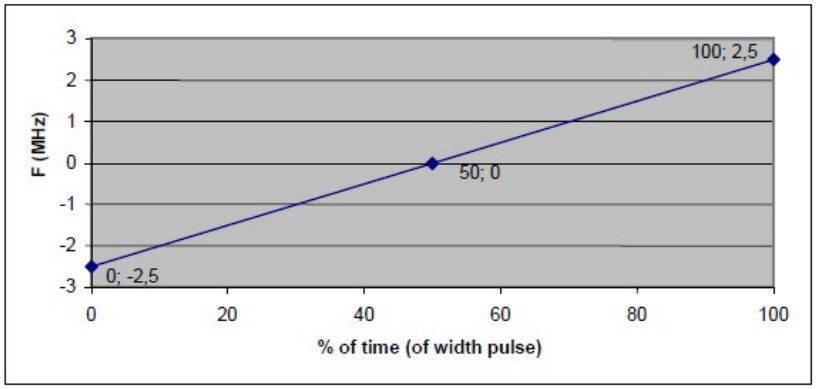
Pulse width W [µs]	Pulse repetition frequency PRF [PPS]	Pulses per burst [PPB]
1	700	18

Table D.4: Parameters of radar test signals

Radar test signal # (see notes 1 to 3)	Pulse width W [µs]		Pulse repetition frequency PRF (PPS)		Number of different PRFs	Pulses per burst for each PRF (PPB) (see note 5)
	Min	Max	Min	Max		
1	0,5	5	200	1 000	1	10 (see note 6)
2	0,5	15	200	1 600	1	15 (see note 6)
3	0,5	15	2 300	4 000	1	25
4	20	30	2 000	4 000	1	20
5	0,5	2	300	400	2/3	10 (see note 6)
6	0,5	2	400	1 200	2/3	15 (see note 6)

NOTE 1: Radar test signals 1 to 4 are constant PRF based signals. See figure D.1. These radar test signals are intended to simulate also radars using a packet based Staggered PRF. See figure D.2.

NOTE 2: Radar test signal 4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a ±2,5 MHz frequency deviation which is described below.



NOTE 3: Radar test signals 5 and 6 are single pulse based Staggered PRF radar test signals using 2 or 3 different PRF values. For radar test signal 5, the difference between the PRF values chosen shall be between 20 PPS and 50 PPS. For radar test signal 6, the difference between the PRF values chosen shall be between 80 PPS and 400 PPS. See figure D.3.

NOTE 4: Apart for the Off-Channel CAC testing, the radar test signals above shall only contain a single burst of pulses. See figures D.1, D.3 and D.4.
For the Off-Channel CAC testing, repetitive bursts shall be used for the total duration of the test. See figures D.2 and D.5. See also clauses 4.7.2.2, 5.3.8.2.1.3.1 and 5.3.8.2.1.3.2.

NOTE 5: The total number of pulses in a burst is equal to the number of pulses for a single PRF multiplied by the number of different PRFs used.

NOTE 6: For the CAC and Off-Channel CAC requirements, the minimum number of pulses (for each PRF) for any of the radar test signals to be detected in the band 5 600 MHz to 5 650 MHz shall be 18.

Table D.5: Detection probability

Parameter	Detection Probability (P_d)	
	Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, Off-Channel CAC	99,99 %	60 %
In-Service Monitoring	60 %	60 %

NOTE: P_d gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions. Therefore P_d does not represent the overall detection probability for any particular radar under real life conditions.

Test set-ups

Set-up A

Set-up A is a set-up whereby the UUT is an RLAN device operating in master mode. Radar test signals are injected into the UUT. This set-up also contains an RLAN device operating in slave mode which is associated with the UUT.

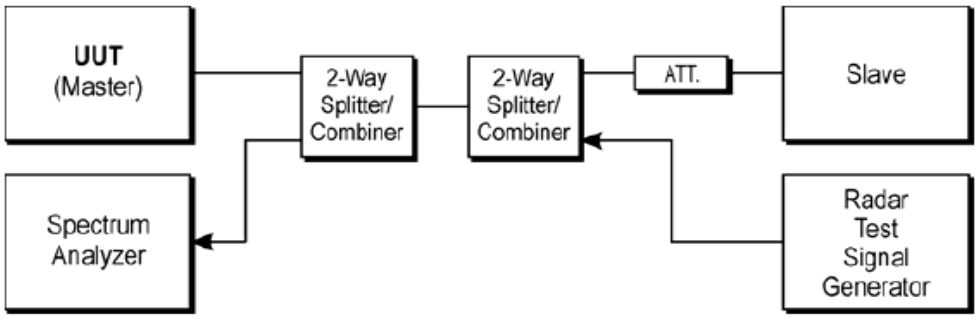


Figure 4: Set-up A

Set-up B

Set-up B is a set-up whereby the UUT is an RLAN device operating in slave mode, with or without Radar Interference Detection function. This set-up also contains an RLAN device operating in master mode. The radar test signals are injected into the master device. The UUT (slave device) is associated with the master device。

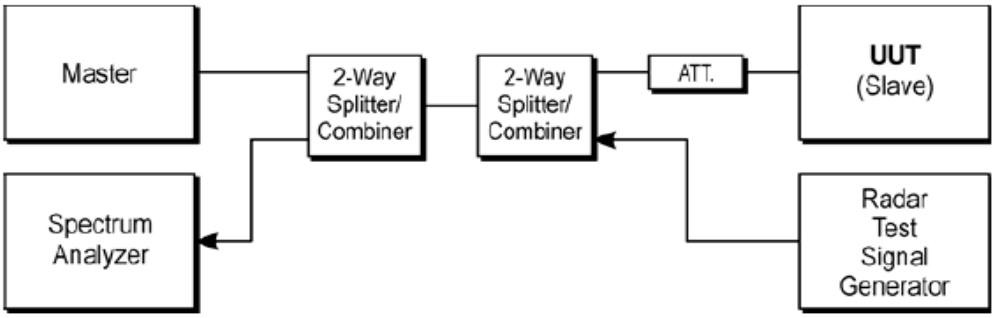


Figure 5: Set-up B

Set-up C

The UUT is an RLAN device operating in slave mode with Radar Interference Detection function. Radar test signals are injected into the slave device. This set-up also contains an RLAN device operating in master mode. The UUT (slave device) is associated with the master device.

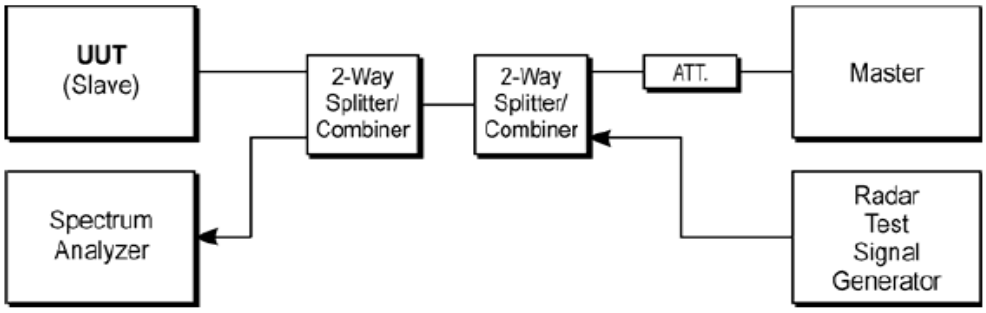


Figure 6: Set-up C

DFS technical requirements specifications

Follow table lists the DFS related technical requirements and their applicability for every operational mode. If the RLAN device is capable of operating in more than one operational mode then every operating mode shall be assessed separately.

Applicability of DFS requirements

Requirement	DFS Operational mode		
	Master	Slave without radar detection	Slave with radar detection (see table D.2, note 2)
Channel Availability Check	√	Not required	√ (see note 2)
Off-Channel CAC (see note 1)	√	Not required	√ (see note 2)
In-Service Monitoring	√	Not required	√
Channel Shutdown	√	√	√
Non-Occupancy Period	√	Not required	√
Uniform Spreading	√	Not required	Not required
NOTE 1: Where implemented by the manufacturer. NOTE 2: A slave with radar detection is not required to perform a CAC or Off-Channel CAC at initial use of the channel but only after the slave has detected a radar signal on the Operating Channel by In-Service Monitoring.			

TEST RESULTS

Testing is not required for nominal channel bandwidths that fall completely within the frequency range 5 150 MHz to 5 250 MHz. So this test item is not applicable for the EUT.

4.8. Adaptivity

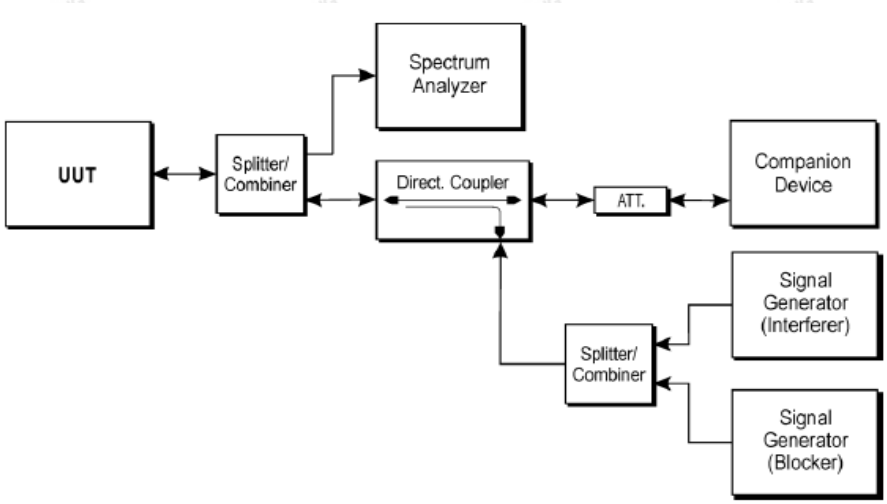
Requirements and limits

When interference signal detected by relevant channel access mechanism UUT used. The UUT should stops transmissions on the current operating channel, apart from Short Control Signaling Transmissions with a maximum duty cycle of 5 % within an observation period of 50 ms,

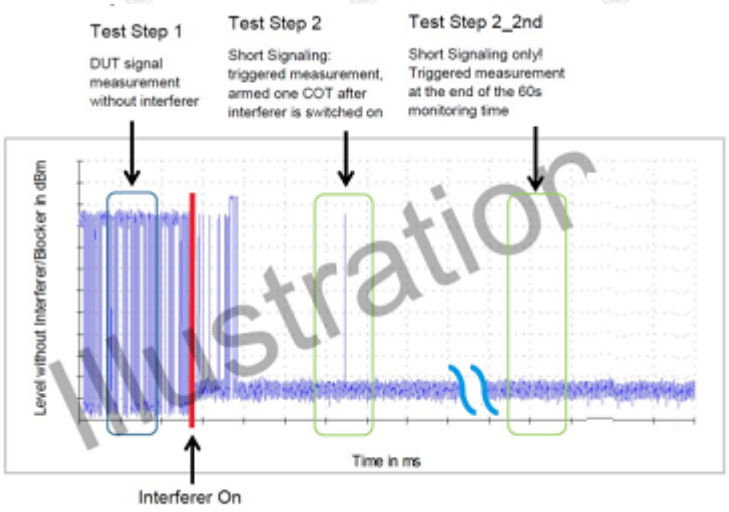
Test Procedure

1. The measurement procedure follows the clause 5.3.9.2.1 of the ETSI EN 301 893 V2.1.1 (2017-05).
2. The inference signal used shall be a band limited noise signal with a 100 % duty cycle.
3. Testing shall be performed at one channel out of the declared channels for each sub-band and the highest nominal channel bandwidth.

Test Configuration



Adaptivity Test schematic graphic



Test Step 2 :We add the Additive white Gaussian noise (AWGN) as interference Signal

Test step 3 and Test step 3_2nd **:** We Repeat Test Step 2 and Test Step 2_2nd ,but We add the OFDM test signal as interference Signal

Test step 4 and Test step 4_2nd **:** We Repeat Test Step 2 and Test Step 2_2nd ,but We add LTE test signal as interference Signal

TEST RESULTS

Ant 1
Adaptivity 1

Test Mode	Test Channel	Priority Class	COT Num[n]	Max.COT [ms]	Limit [ms]	Min. Idel Time [ms]	Limit [ms]
802.11a	5180	2	868	1.136	<=6	0.052	>0.027
802.11n HT 20	5180	2	932	0.258	<=6	0.044	>0.027
802.11n HT 40	5190	2	925	0.234	<=6	0.053	>0.027
802.11ac HT 20	5180	2	847	1.158	<=6	0.038	>0.027
802.11ac HT 40	5190	2	943	0.174	<=6	0.044	>0.027
802.11ac HT 80	5210	2	917	0.191	<=6	0.051	>0.027
802.11ax HT 20	5180	2	847	1.152	<=6	0.036	>0.027
802.11ax HT 40	5190	2	943	0.176	<=6	0.042	>0.027
802.11ax HT 80	5210	2	917	0.195	<=6	0.054	>0.027

Test Mode	Test Channel	Interference signal Type	Add interference signal Time[ms]	Interference signal Level [dBm/MHz]	Max.Short Control number[n]	Limit [n]	Max.Short Control Time [ms]	Limit [ms]
802.11a	5180	LTE	2000	-75	5	<=50	1.24	<2.5
802.11a	5180	OFDM	2000	-75	5	<=50	0.23	<2.5
802.11a	5180	AWGN	2000	-75	5	<=50	0.04	<2.5
802.11n HT 20	5180	LTE	2000	-75	5	<=50	0.67	<2.5
802.11n HT 20	5180	OFDM	2000	-75	5	<=50	0.16	<2.5
802.11n HT 20	5180	AWGN	2000	-75	5	<=50	0.29	<2.5
802.11n HT 40	5190	LTE	2000	-75	5	<=50	0.06	<2.5
802.11n HT 40	5190	OFDM	2000	-75	5	<=50	0.61	<2.5
802.11n HT 40	5190	AWGN	2000	-75	5	<=50	0.52	<2.5
802.11ac HT 20	5180	LTE	2000	-75	5	<=50	0.16	<2.5
802.11ac HT 20	5180	OFDM	2000	-75	5	<=50	0.61	<2.5
802.11ac HT 20	5180	AWGN	2000	-75	5	<=50	2.14	<2.5
802.11ac HT 40	5190	LTE	2000	-75	5	<=50	0.30	<2.5
802.11ac HT 40	5190	OFDM	2000	-75	5	<=50	0.40	<2.5
802.11ac HT 40	5190	AWGN	2000	-75	5	<=50	1.96	<2.5
802.11ac HT 80	5210	LTE	2000	-75	5	<=50	0.62	<2.5
802.11ac HT 80	5210	OFDM	2000	-75	5	<=50	0.65	<2.5
802.11ac HT 80	5210	AWGN	2000	-75	5	<=50	0.52	<2.5
802.11ax HT 20	5180	LTE	2000	-75	5	<=50	0.37	<2.5
802.11ax HT 20	5180	OFDM	2000	-75	5	<=50	0.25	<2.5
802.11ax HT 20	5180	AWGN	2000	-75	5	<=50	2.04	<2.5

802.11ax HT 40	5190	LTE	2000	-75	5	<=50	0.15	<2.5
802.11ax HT 40	5190	OFDM	2000	-75	5	<=50	0.48	<2.5
802.11ax HT 40	5190	AWGN	2000	-75	5	<=50	2.11	<2.5
802.11ax HT 80	5210	LTE	2000	-75	5	<=50	0.68	<2.5
802.11ax HT 80	5210	OFDM	2000	-75	5	<=50	0.62	<2.5
802.11ax HT 80	5210	AWGN	2000	-75	5	<=50	0.64	<2.5

Ant 2
Adaptivity 1

Test Mode	Test Channel	Priority Class	COT Num[n]	Max.COT [ms]	Limit [ms]	Min. Idel Time [ms]	Limit [ms]
802.11a	5180	2	868	1.145	<=6	0.041	>0.027
802.11n HT 20	5180	2	932	0.246	<=6	0.048	>0.027
802.11n HT 40	5190	2	925	0.231	<=6	0.044	>0.027
802.11ac HT 20	5180	2	847	1.155	<=6	0.036	>0.027
802.11ac HT 40	5190	2	943	0.176	<=6	0.043	>0.027
802.11ac HT 80	5210	2	917	0.192	<=6	0.050	>0.027
802.11ax HT 20	5180	2	847	1.153	<=6	0.036	>0.027
802.11ax HT 40	5190	2	943	0.176	<=6	0.043	>0.027
802.11ax HT 80	5210	2	917	0.195	<=6	0.051	>0.027

Test Mode	Test Channel	Interference signal Type	Add interference signal Time[ms]	Interference signal Level [dBm/MHz]	Max.Short Control number[n]	Limit [n]	Max.Short Control Time [ms]	Limit [ms]
802.11a	5180	LTE	2000	-75	5	<=50	0.64	<2.5
802.11a	5180	OFDM	2000	-75	5	<=50	0.27	<2.5
802.11a	5180	AWGN	2000	-75	5	<=50	0.58	<2.5
802.11n HT 20	5180	LTE	2000	-75	5	<=50	0.07	<2.5
802.11n HT 20	5180	OFDM	2000	-75	5	<=50	0.41	<2.5
802.11n HT 20	5180	AWGN	2000	-75	5	<=50	0.83	<2.5
802.11n HT 40	5190	LTE	2000	-75	5	<=50	0.06	<2.5
802.11n HT 40	5190	OFDM	2000	-75	5	<=50	0.25	<2.5
802.11n HT 40	5190	AWGN	2000	-75	5	<=50	0.82	<2.5
802.11ac HT 20	5180	LTE	2000	-75	5	<=50	0.15	<2.5
802.11ac HT 20	5180	OFDM	2000	-75	5	<=50	0.10	<2.5
802.11ac HT 20	5180	AWGN	2000	-75	5	<=50	1.82	<2.5
802.11ac HT 40	5190	LTE	2000	-75	5	<=50	0.13	<2.5
802.11ac HT 40	5190	OFDM	2000	-75	5	<=50	0.19	<2.5
802.11ac HT 40	5190	AWGN	2000	-75	5	<=50	1.86	<2.5
802.11ac HT 80	5210	LTE	2000	-75	5	<=50	0.59	<2.5
802.11ac HT 80	5210	OFDM	2000	-75	5	<=50	0.68	<2.5
802.11ac HT 80	5210	AWGN	2000	-75	5	<=50	0.30	<2.5
802.11ax HT 20	5180	LTE	2000	-75	5	<=50	0.37	<2.5
802.11ax HT 20	5180	OFDM	2000	-75	5	<=50	0.65	<2.5
802.11ax HT 20	5180	AWGN	2000	-75	5	<=50	1.95	<2.5

802.11ax HT 40	5190	LTE	2000	-75	5	<=50	0.19	<2.5
802.11ax HT 40	5190	OFDM	2000	-75	5	<=50	0.46	<2.5
802.11ax HT 40	5190	AWGN	2000	-75	5	<=50	1.80	<2.5
802.11ax HT 80	5210	LTE	2000	-75	5	<=50	0.41	<2.5
802.11ax HT 80	5210	OFDM	2000	-75	5	<=50	0.50	<2.5
802.11ax HT 80	5210	AWGN	2000	-75	5	<=50	0.91	<2.5

4.9. Receiver Blocking

Limits

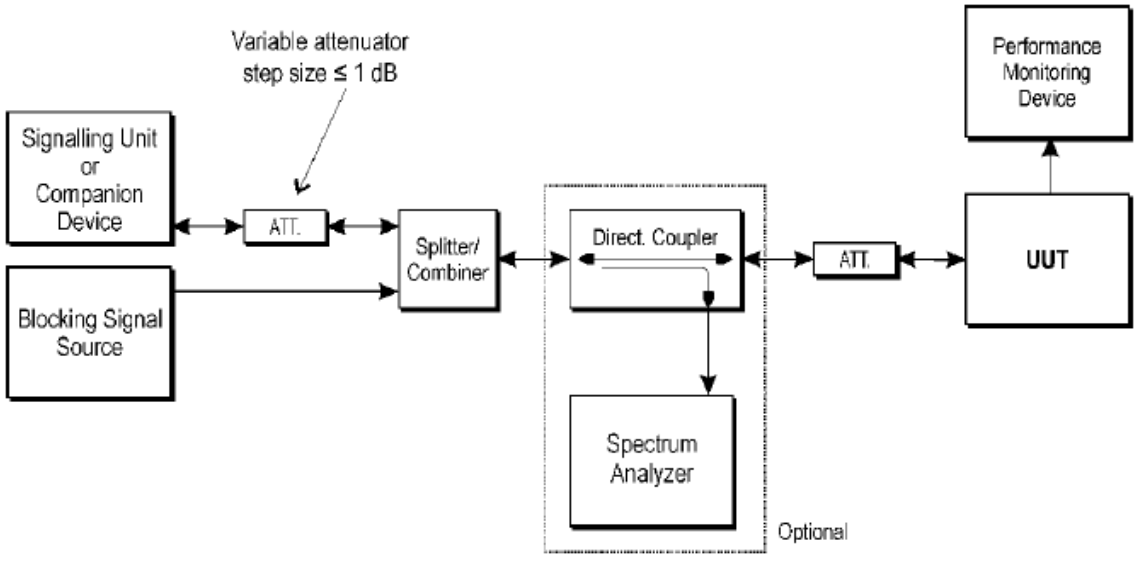
ETSI EN 301 893 Sub-4.2.8.4

While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 9.

Table 9: Receiver Blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
Pmin + 6 dB	5 100	-53	-59	Continuous Wave
Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.				

TEST CONFIGURATION:



TEST PROCEDURE

Please refer to ETSI EN 301 893 Sub-clause 4.2.8.2 for the measurement method..

TEST RESULTS

For ANT 1

For 11a

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	6%	PASS
	4900	-47	10%	4%	PASS
	5000	-47	10%	5%	PASS
	5975	-47	10%	4%	PASS

For 11n HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	4%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	6%	PASS

For 11n HT40

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	4%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	5%	PASS

For 11ac HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	6%	PASS

For 11ac HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	4%	PASS
	4900	-47	10%	4%	PASS
	5000	-47	10%	5%	PASS
	5975	-47	10%	4%	PASS

For 11ac HT80

5210MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	6%	PASS
	4900	-47	10%	4%	PASS
	5000	-47	10%	5%	PASS
	5975	-47	10%	4%	PASS

For 11ax HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	5%	PASS

For 11ax HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	5%	PASS
	5975	-47	10%	5%	PASS

For 11ax HT80

5210MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	4%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	5%	PASS

For ANT 2

For 11a

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	4%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	5%	PASS

For 11n HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	6%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	4%	PASS

For 11n HT40

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	6%	PASS

For 11ac HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	4%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	4%	PASS

For 11ac HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	4%	PASS

For 11ac HT80

5210MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	6%	PASS
	4900	-47	10%	4%	PASS
	5000	-47	10%	5%	PASS
	5975	-47	10%	5%	PASS

For 11ax HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	5%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	5%	PASS

For 11ax HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	6%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	4%	PASS
	5975	-47	10%	5%	PASS

For 11ax HT80

5210MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 6dB	5100	-53	10%	5%	PASS
	4900	-47	10%	6%	PASS
	5000	-47	10%	6%	PASS
	5975	-47	10%	5%	PASS

4.10. User Access Restrictions

Requirement

The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements in EN301893 (clause 4.7) The above requirement includes the prevention of indirect access to any setting that impacts DFS.

Result

The EUT do not use the DFS Band and The customers will not obtain the information to set hardware and/ software related to DFS, if the product is on sales.So The EUT meets this requirement.

4.11. Geo-location capability

Requirement

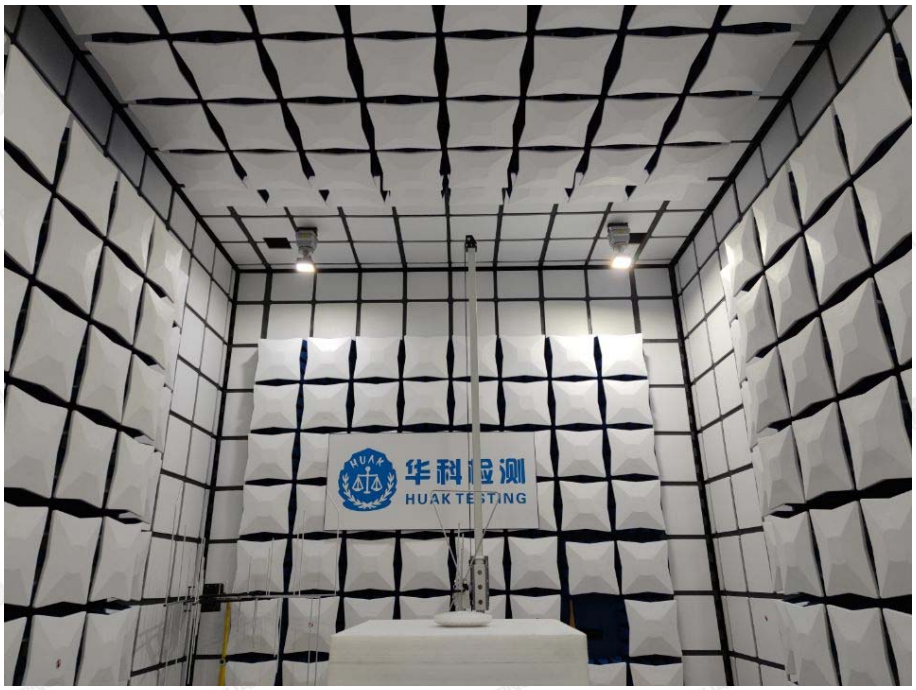
Geo-location capability is a feature of the RLAN device to determine its geographical location with the purpose to configure itself according to the regulatory requirements applicable at the geographical location where it operates. The geo-location capability may be present in the equipment or in an external device (temporary) associated with the equipment operating at the same geographical location during the initial power up of the equipment. The geographical location may also be available in equipment already installed and operating at the same geographical location.

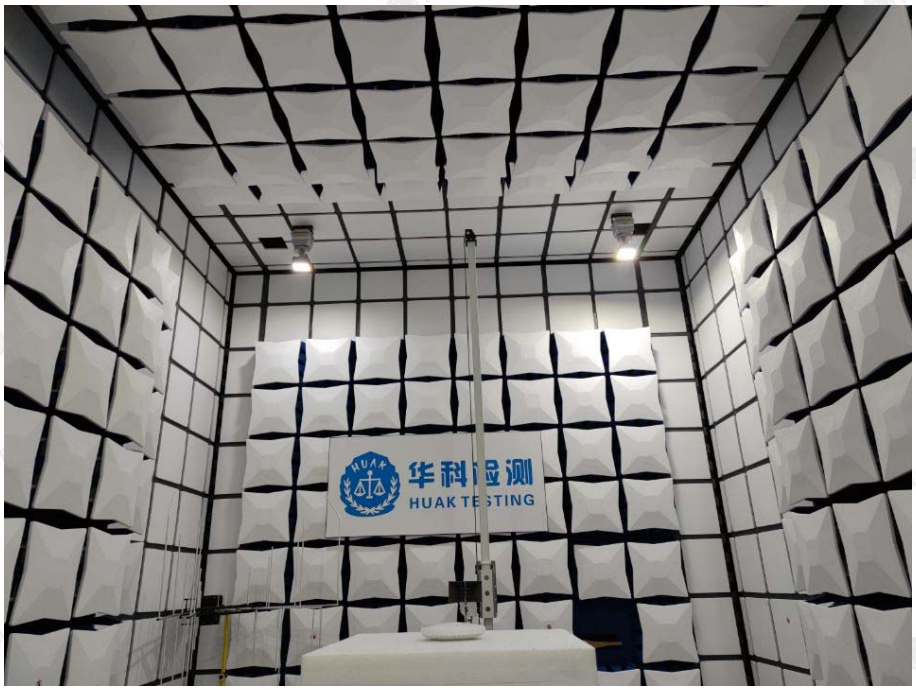
The geographical location determined by the equipment as defined in the above shall not be accessible to the user.

Result

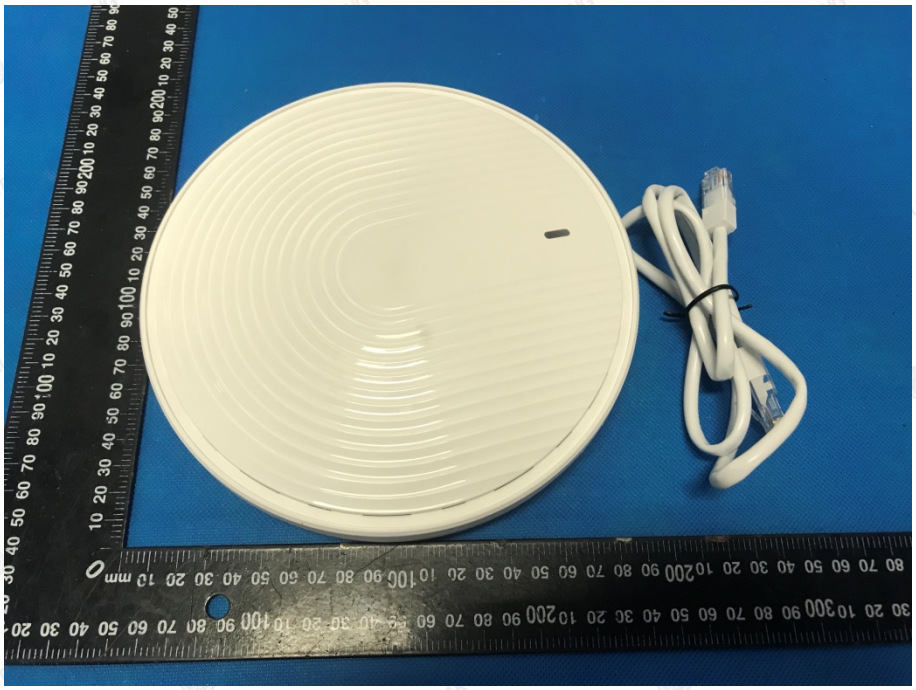
This requirement only applies to equipment with geo-location capability,and the EUT do not support this fuction.So this requirement is not applicable for the EUT.

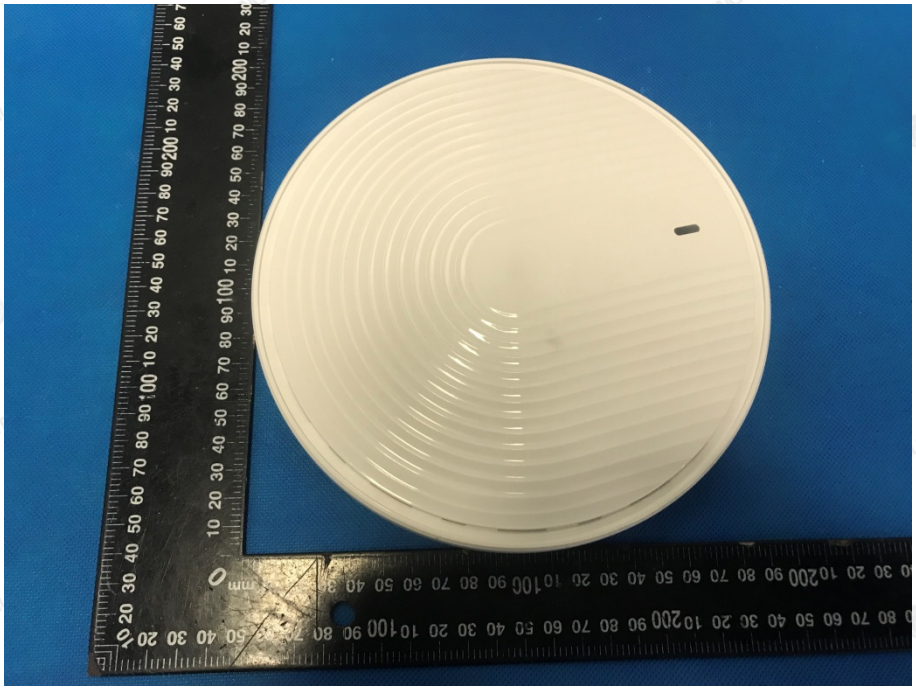
5. Test Setup Photos of the EUT

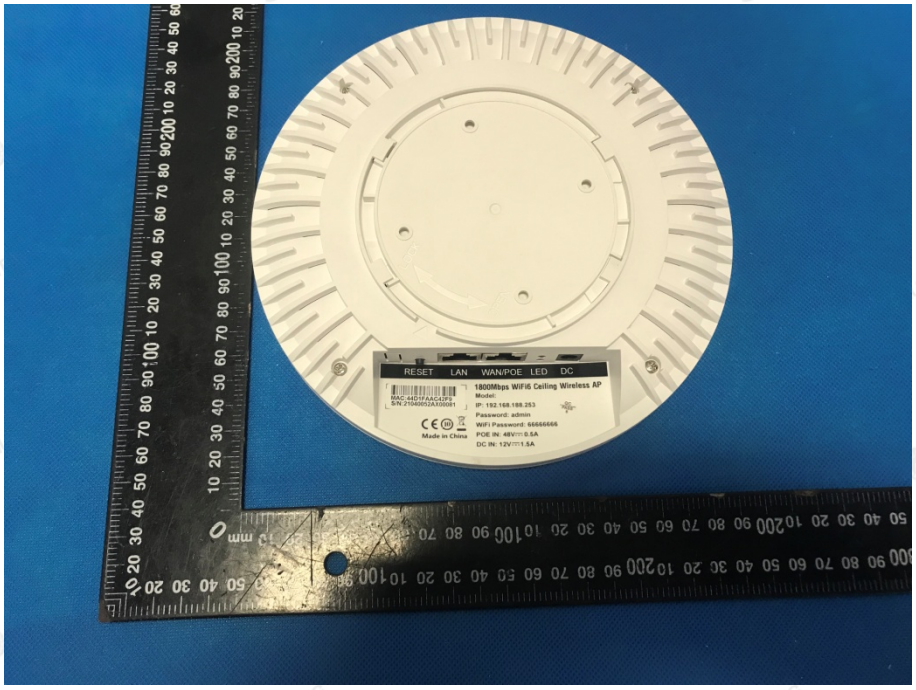


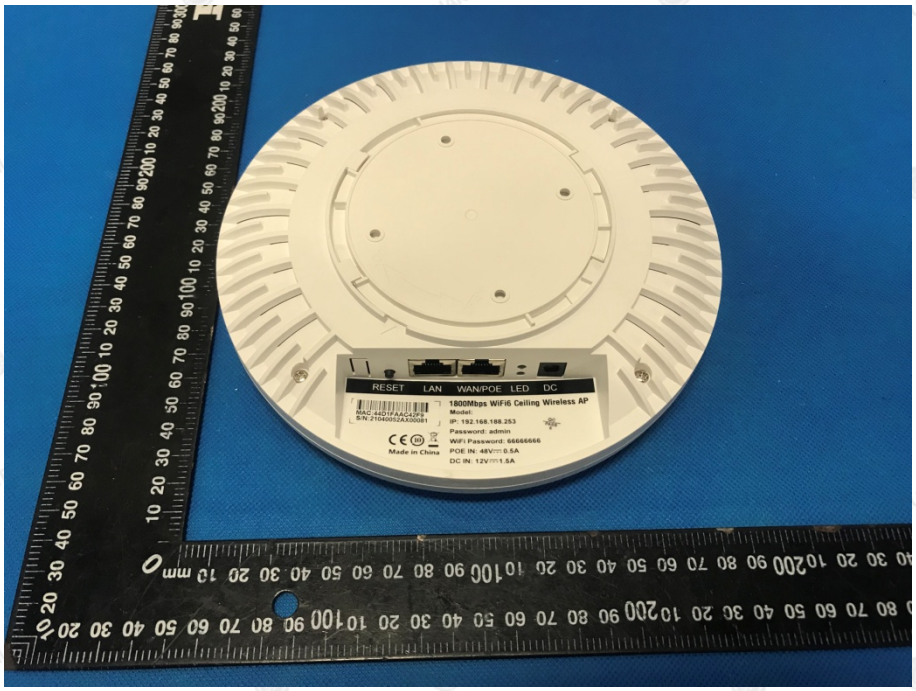


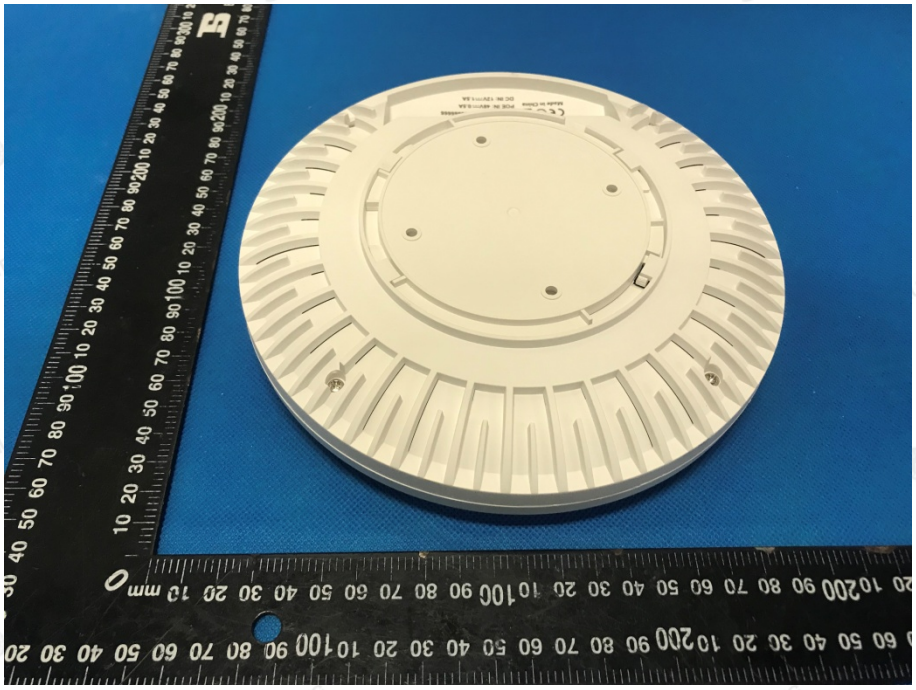
6. External and Internal Photos of the EUT

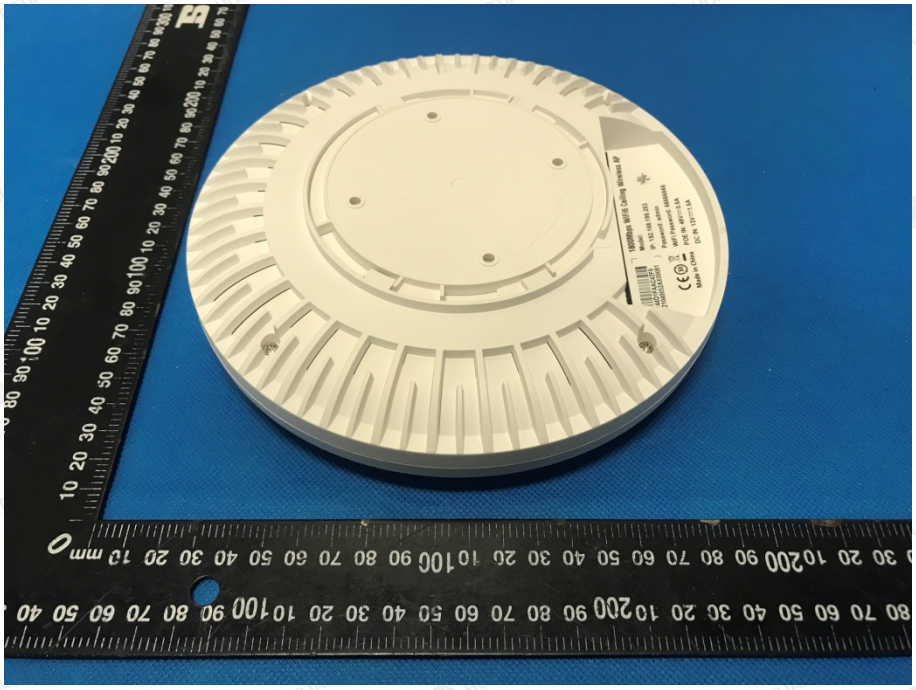


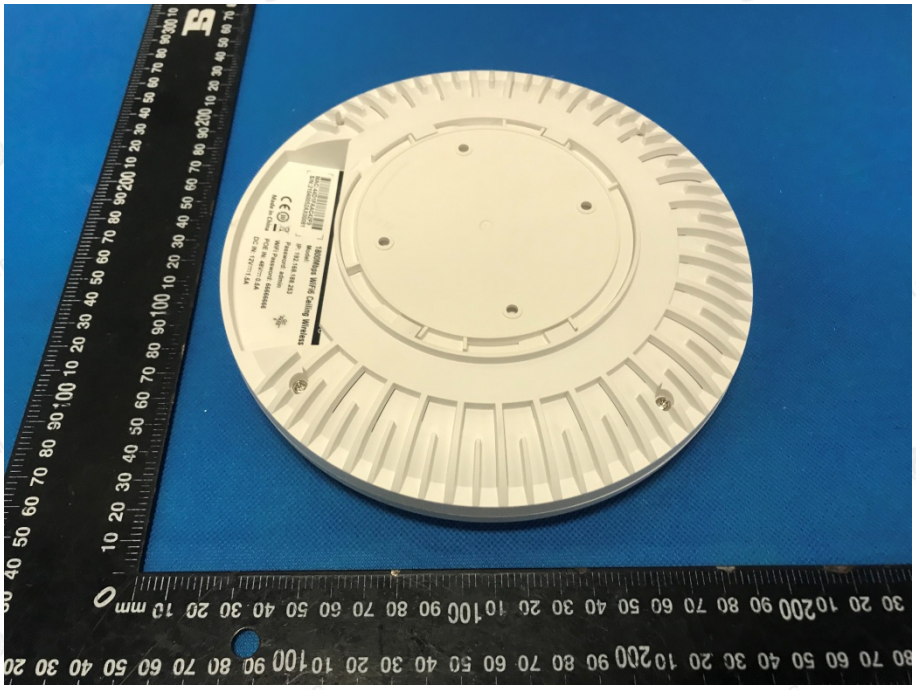


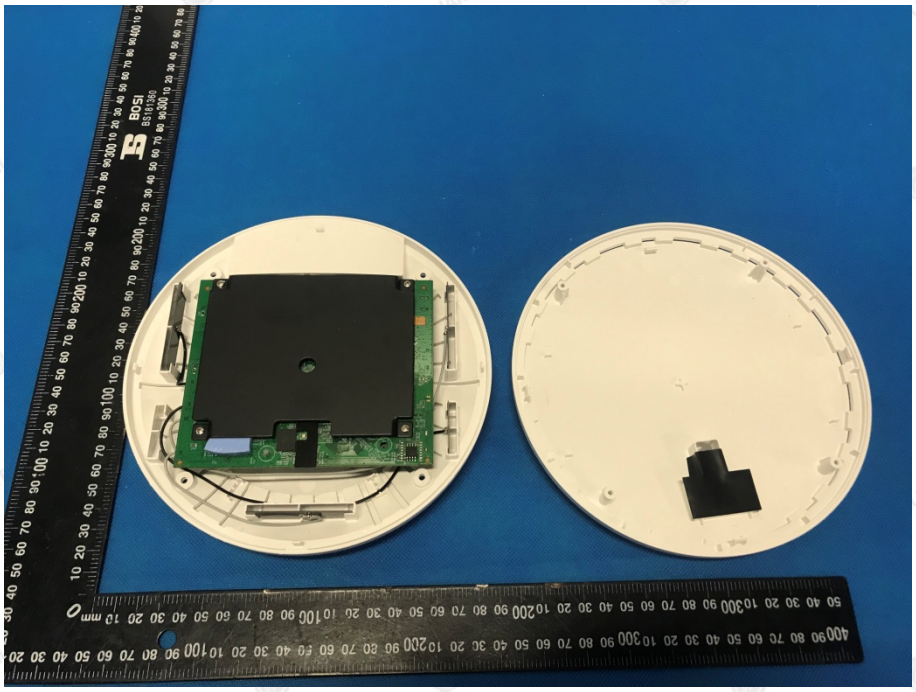


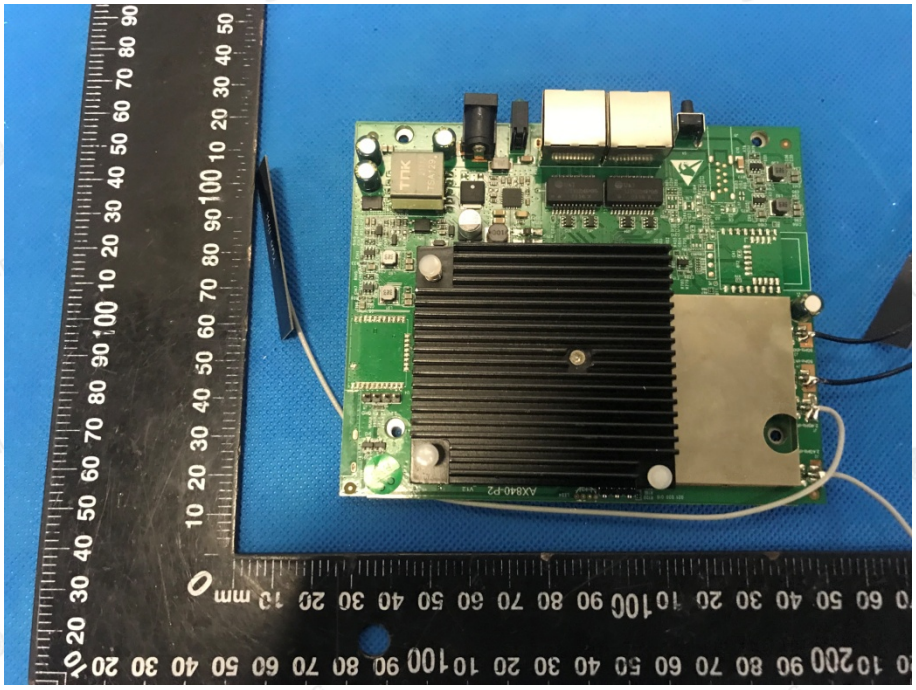


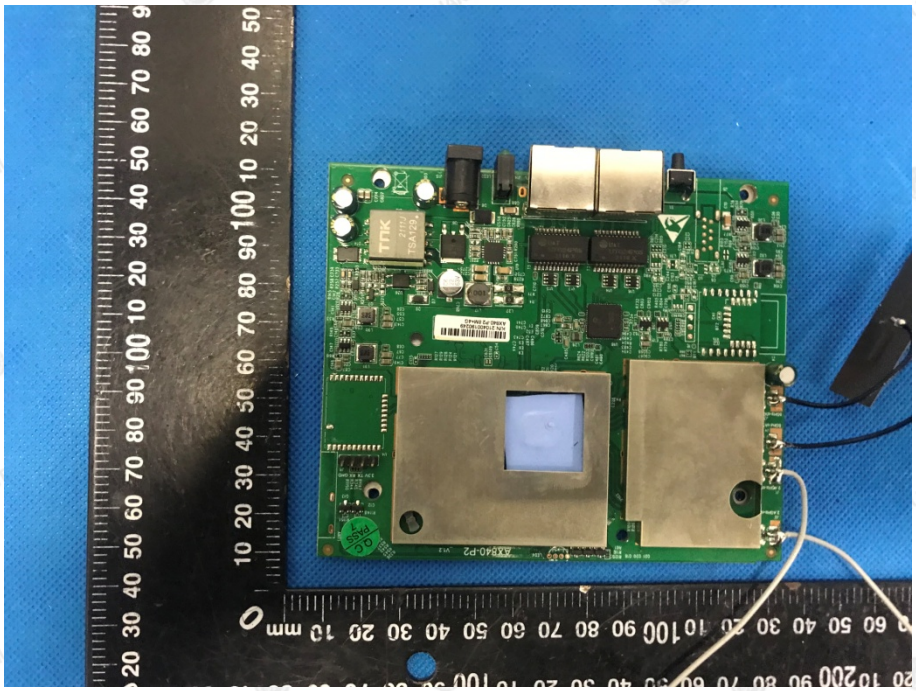












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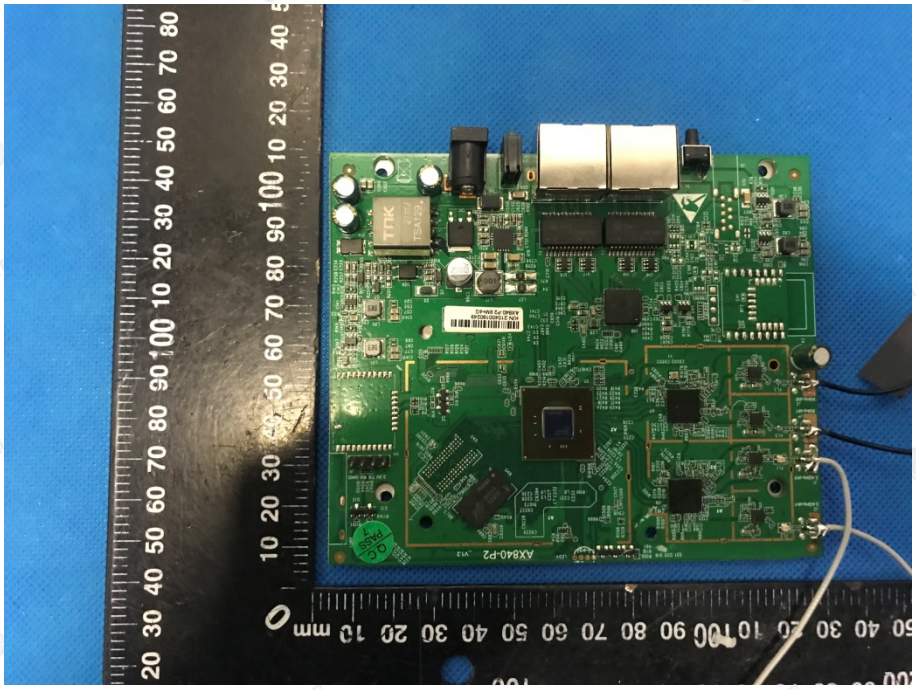

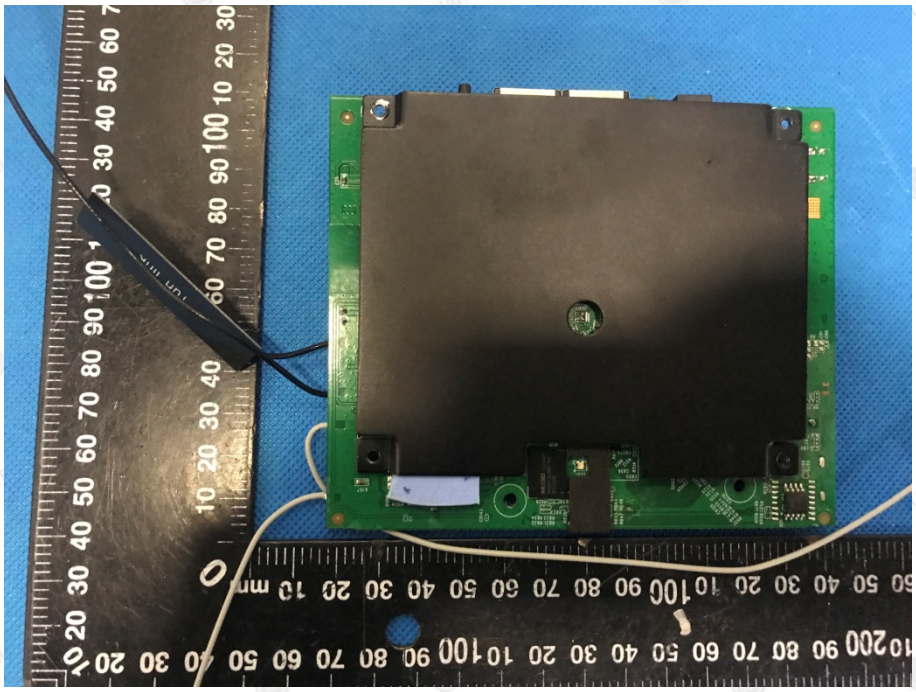

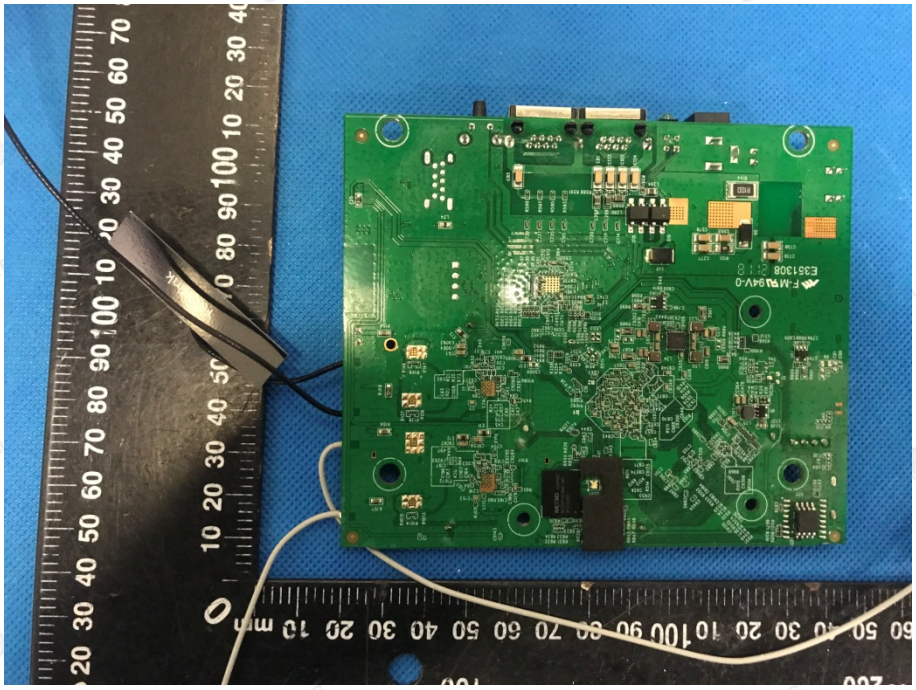

.....End of Report.....

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