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检测
TESTING
CNAS L3110

TEST REPORT

Reference No.	:	WTD25D10286744W004
Manufacturer*	:	Shenzhen Cudy Technology Co., Ltd.
Address	:	7/F, Lepu Tower (West), 66 Xingke Rd, Nanshan, Shenzhen, China
Factory.....	:	Shenzhen Cudy Technology Co., Ltd.
Address	:	7/F, Lepu Tower (West), 66 Xingke Rd, Nanshan, Shenzhen, China
Product	:	AX3000 Gigabit Wi-Fi 6 Router
Model(s).....	:	WR3000
Standards	:	ETSI EN 301 893 V2.1.1 (2017-05)
Date of Receipt Sample ...	:	2025-11-03
Date of Test.....	:	2025-11-05 to 2026-03-13
Date of Issue	:	2026-03-24
Test Result	:	**Pass**

Remarks:
1. The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.
2. "*" **manufacturer** means any natural or legal person who manufactures radio equipment or has radio equipment designed or manufactured, and markets that equipment under his name or trade mark.

Prepared By:
Waltek Testing Group Co., Ltd.
Address: No. 77, Houjie Section, Guantai Road, Houjie Town, Dongguan City, Guangdong, China
Tel: +86-769-2267 6998
Fax: +86-769-2267 6828

Compiled by:

Frank Yin

Frank Yin / Project Engineer

Approved by:

WALTEK TESTING GROUP CO.,LTD. WALTEK TEST REPORT

Deval Qin / Designated Reviewer

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3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD25D10286744W004	2025-11-03	2025-11-05 to 2026-03-13	2026-03-24	Original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	AX3000 Gigabit Wi-Fi 6 Router
Model(s):	WR3000
Model Description:	N/A
Wi-Fi Specification:	5G-802.11a/n(HT20/40)/ac(VHT20/40/80/160)/ax(HE20/40/80/160)
Hardware Version:	V2.0
Software Version:	2.4.14

4.2 Details of E.U.T.

Operation Frequency:	U-NII-1 802.11a/n(HT20)/ac (VHT20)/ax (HE20), 5180-5240MHz 4CH 802.11n(HT40)/ac (VHT40)/ax (HE40), 5190-5230MHz 2CH 802.11ac (VHT80)/ax (HE80), 5210MHz 1CH 802.11ac (VHT160)/ax (HE160), 5250MHz 1CH U-NII-2A 802.11a/n (HT20)/ac (VHT20)/ax (HE20), 5260-5320MHz 4CH 802.11n (HT40)/ac (VHT40)/ax (HE40), 5270-5310MHz 2CH 802.11ac (VHT80)/ax (HE80), 5290MHz 1CH U-NII-2C 802.11a/n (HT20)/ac (VHT20)/ax (HE20), 5500-5700MHz 11CH 802.11n (HT40)/ac (VHT40)/ax (HE40), 5510-5670MHz 5CH 802.11ac (VHT80)/ax (HE80), 5530MHz, 5610MHz 2CH 802.11ac (VHT160)/ax (HE160), 5570MHz 1CH
Max. RF output power:	ANT 1 U-NII-1: 20.86dBm EIRP , U-NII-2A: 17.62dBm EIRP, U-NII-2C: 22.49dBm EIRP ANT2 U-NII-1: 21.02dBm EIRP , U-NII-2A: 18.02dBm EIRP, U-NII-2C: 22.70dBm EIRP ANT 1+ANT 2 U-NII-1: 22.23dBm EIRP , U-NII-2A: 19.94dBm EIRP, U-NII-2C: 25.18dBm EIRP
Type of Modulation:	OFDM
Antenna installation:	Integrated antenna
Antenna Gain:	1.19dBi

Note:
#: The antenna gain is provided by the applicant, and the applicant should be responsible for its authenticity, WALTEK lab has not verified the authenticity of its information.

Ratings:	Input: DC 12V, 1A
Adapter:	Model: A938-120100W-EU1 Input: 100-240V~, 50/60Hz Output: DC 12V, 1A Manufacturer: Shenzhen Aoda Power Technology Co., Ltd.

4.3 Channel List

U-NII-1 (5.15-5.25GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	38	5190
40	5200	42	5210
44	5220	46	5230
48	5240	50	5250

U-NII-2A (5.25-5.35GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
52	5260	54	5270
56	5280	58	5290
60	5300	62	5310
64	5320		

U-NII-2C (5.47-5.725GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
100	5500	102	5510
104	5520	106	5530
108	5540	110	5550
112	5560	116	5580
118	5590	120	5600
122	5610	124	5620
126	5630	128	5640
132	5660	134	5670
136	5680	140	5700

5 Test Summary

RF PART		
Test Items	**Test Requirement**	**Result**
Centre frequencies	ETSI EN 301 893	PASS
Nominal Channel Bandwidth and Occupied Channel Bandwidth	ETSI EN 301 893	PASS
RF Output Power,	ETSI EN 301 893	PASS
Transmit Power Control (TPC)	ETSI EN 301 893	N/A
Power Density	ETSI EN 301 893	PASS
Transmitter unwanted emissions outside the 5GHz RLAN bands	ETSI EN 301 893	PASS
Transmitter unwanted emissions within the 5GHz RLAN bands	ETSI EN 301 893	PASS
Receiver spurious emissions	ETSI EN 301 893	PASS
Dynamic Frequency Selection (DFS)	ETSI EN 301 893	PASS
Adaptivity (Channel Access Mechanism)	ETSI EN 301 893	PASS
Receiver Blocking	ETSI EN 301 893	PASS
User Access Restrictions	ETSI EN 301 893	PASS
Geo-location capability	ETSI EN 301 893	N/A
Remark: N/A: Not Applicable RF: In this whole report RF means Radio Frequency.		

6 Equipment Used during Test

6.1 Equipments List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	Agilent	N9020A	MY49100060	2025-07-04	2026-07-03
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2025-07-04	2026-07-03
3.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2025-07-04	2026-07-03
4.	EXA Signal Analyzer	Malaysia Keysight	N9010A	MY50520207	2025-04-19	2026-04-18
5.	ESG VECTOR SIGNAL GENERATOR	Malaysia Keysight	E4438C	MY45092536	2025-04-19	2026-04-18
6.	EXG Analog Signal Generator	Malaysia Keysight	N5171B	MY53050845	2025-07-04	2026-07-03
7.	USB Wideband Power Sensor	Keysight	MW100-PSB	SG54400003	2025-04-19	2026-04-18
8.	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2025-07-20	2026-07-19
9.	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2025-04-19	2026-04-18
10.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1314	2025-08-09	2026-08-08
11.	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2025-07-04	2026-07-03
12.	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	NA	2025-04-19	2026-04-18
13.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2025-07-04	2026-07-03
14.	Universal Radio Communication Tester	R&S	CMU 200	121315	2025-04-19	2026-04-18
15.	Universal Radio Communication Tester	R&S	CMW500	127818	2025-04-19	2026-04-18

ETSI Test software

Software name	ETSI family
Software version	V2.2.2

6.2 Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.42dB
Power Spectral Density, conducted	±0.7dB
Unwanted Emissions, conducted	±2.76dB
Time	±5%
Duty Cycle	±5%
Temperature	±1°C
Humidity	±2%
DC and low frequency voltages	±0.1%
Conduction disturbance(150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±4.53dB
Radiated Emission(1GHz~30GHz)	±5.03dB

6.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

7 RF Requirements

1. Normal Test Conditions:

Ambient Condition: 12VDC, 22.3 °C, 52.5 %RH

2. Extreme Test Conditions:

Extreme Temperature: 0°C to +40°C;

For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	Normal	LT	HT
Temperature (℃)	22.3	0	40

Test mode	Low channel	Middle channel	High channel
Transmitting(802.11a HT20)	36/52/100	40/56/120	48/64/140
Transmitting(802.11n HT20)	36/52/100	40/56/120	48/64/140
Transmitting(802.11ax HE20)	36/52/100	40/56/120	48/64/140
Transmitting(802.11n HT40)	38/54/102	110	46/62/134
Transmitting(802.11ax HE40)	38/54/102	110	46/62/134
Transmitting(802.11ac VHT80)	106	42/58	122
Transmitting(802.11ax HE80)	106	42/58	122
Transmitting(802.11ac VHT160)	50	/	/
Transmitting(802.11ax HE160)	50	/	/
Receiving(802.11a HT20)	36/52/100	40/56/120	48/64/140
Receiving(802.11n HT20)	36/52/100	40/56/120	48/64/140
Receiving(802.11ax HE20)	36/52/100	40/56/120	48/64/140
Receiving (802.11n HT40)	38/54/102	110	46/62/134
Receiving (802.11ax HE40)	38/54/102	110	46/62/134
Receiving (802.11ac VHT80)	106	42/58	122
Receiving (802.11ax HE80)	106	42/58	122
Receiving (802.11ac VHT160)	114	/	/
Receiving (802.11ax HE160)	114	/	/

Note:

1. 802.11ac VHT20, VHT40 covered by 802.11n HT20, HT40

2. 802.11ax HE20/HE40/HE80 supports all RUs, only the worst case(full RUs) is recorded in the report.

3. Test Mode & channels

Test	Clause	Test channels		
		Lower sub-band 5 150 MHz to 5 350 MHz		Higher sub-band 5 470 MHz to 5 725 MHz
		5 150 MHz to 5 250 MHz	5 250 MHz to 5 350 MHz	
Centre frequencies	5.4.2	C7 (see note 1)		C8 (see note 1)
Occupied Channel Bandwidth	5.4.3	C7		C8
Power, power density	5.4.4	C1	C2	C3, C4
Transmitter unwanted emissions outside the 5 GHz RLAN bands	5.4.5	C7 (see note 1)		C8 (see note 1)
Transmitter unwanted emissions within the 5 GHz RLAN bands	54.6	C1	C2	C3, C4
Receiver spurious emissions	5.4.7	C7 (see note 1)		C8 (see note 1)
Transmit Power Control (TPC)	5.4.4	n.a. (see note 2)	C2 (see note 1)	C3, C4 (see note 1)
Dynamic Frequency Selection (DFS)	5.4.8	n.a. (see note 2)	C5	C6 (see note 3)
Adaptivity	5.4.9	C9		
Receiver Blocking	5.4.10	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.
C9:	One channel (in case of single-channel testing) or a group of channels (in case of multi-channel testing) out of the declared channels.
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.

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

8 Centre frequencies

8.1 Definition

The centre frequency is the centre of the channel declared by the manufacturer as part of the declared channel plan(s).

8.2 Limit

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

8.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal and extreme condition.

8.4 Test Procedure

Equipment operating without modulation

This test method requires that the UUT can be operated in an unmodulated test mode.

The UUT shall be connected to a suitable frequency measuring device (e.g. a frequency counter or a spectrum analyser) and operated in an unmodulated mode.

The result shall be recorded.

Equipment operating with modulation

This method is an alternative to the above method in case the UUT cannot be operated in an un-modulated mode.

The UUT shall be connected to spectrum analyser.

Max Hold shall be selected and the centre frequency adjusted to that of the UUT.

The peak value of the power envelope shall be measured and noted. The span shall be reduced and the marker moved in a positive frequency increment until the upper, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f1.

The marker shall then be moved in a negative frequency increment until the lower, (relative to the centre frequency),-10 dBc point is reached. This value shall be noted as f2.

The centre frequency is calculated as (f1 + f2) / 2.

8.5 Test Result

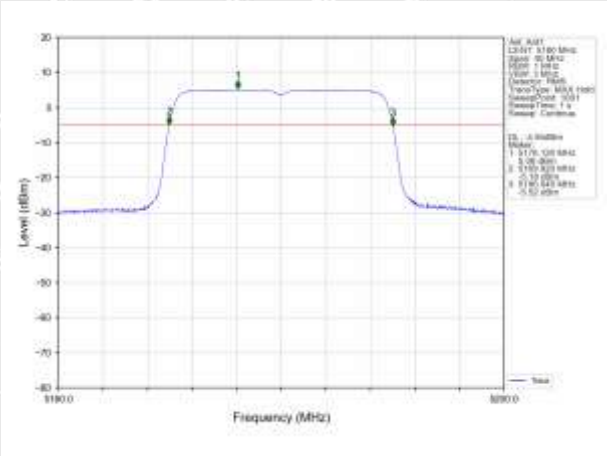
ANT 1

U-NII-1

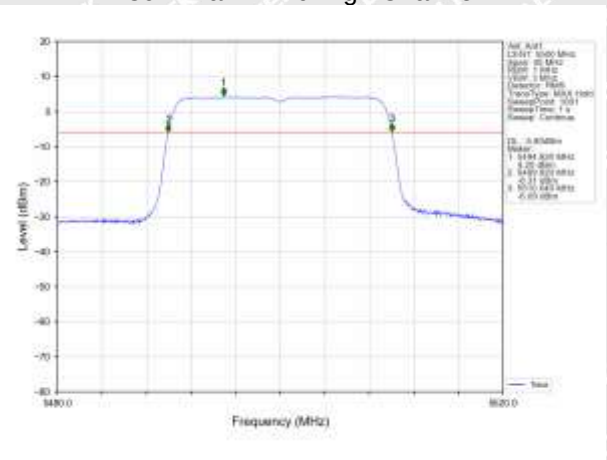
Modulation	Test conditions		Frequency Measured (MHz)		
			Low channel	Middle channel	High channel
			5180MHz	/	5500MHz
802.11ax HE20	Normal		5179.980	/	5499.980
	Extreme	LT	5179.980	/	5499.980
		HT	5179.980	/	5499.980
Max.Error(ppm)			-3.86	/	-3.64
Modulation	**Test conditions**		**Frequency Measured (MHz)**		
			Low channel	**Middle channel**	**High channel**
			5190MHz	**/**	**5510MHz**
802.11ax HE40	Normal		5190.000	/	5510.000
	Extreme	LT	5190.000	/	5510.000
		HT	5190.000	/	5510.000
Max.Error(ppm)			0.00	/	0.00
Modulation	**Test conditions**		**Frequency Measured (MHz)**		
			Low channel	**Middle channel**	**High channel**
			5210MHz	**/**	**5530MHz**
802.11ax HE80	Normal		5210.000	/	5530.000
	Extreme	LT	5210.000	/	5530.000
		HT	5210.080	/	5530.000
Max.Error(ppm)			0.00	/	0.00
Modulation	**Test conditions**		**Frequency Measured (MHz)**		
			Low channel	**Middle channel**	**High channel**
			5250MHz	**/**	**5570MHz**
802.11ax HE160	Normal		5250.000	/	5570.000
	Extreme	LT	5250.000	/	5570.000
		HT	5250.000	/	5570.000
Max.Error(ppm)			0.00	/	0.00

Test Plots-ANT 1
U-NII-1

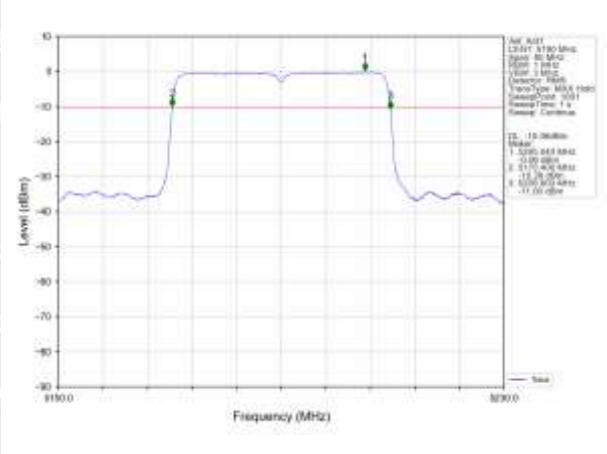
802.11ax HE20 Low Channel



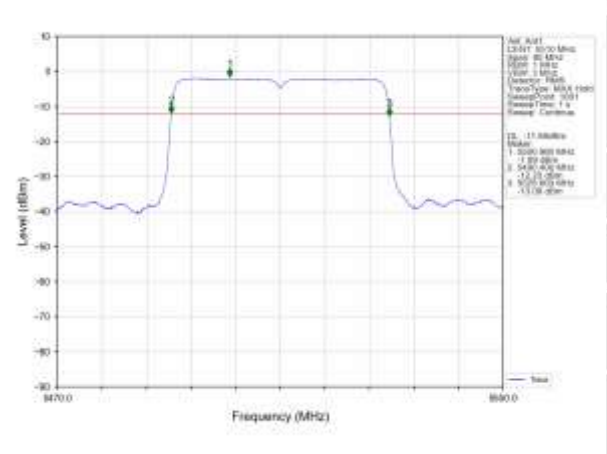
802.11ax HE20 High Channel



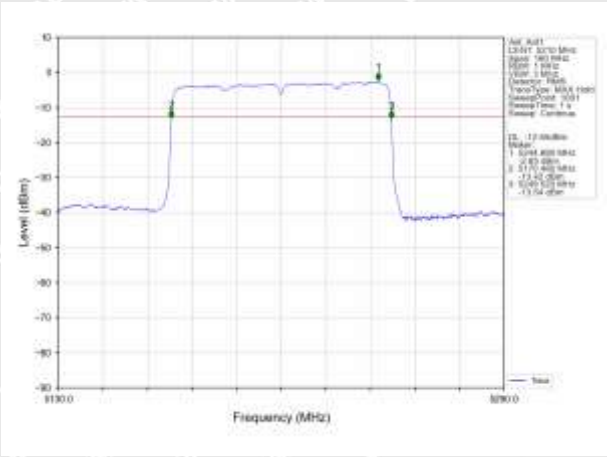
802.11ax HE40 Low Channel



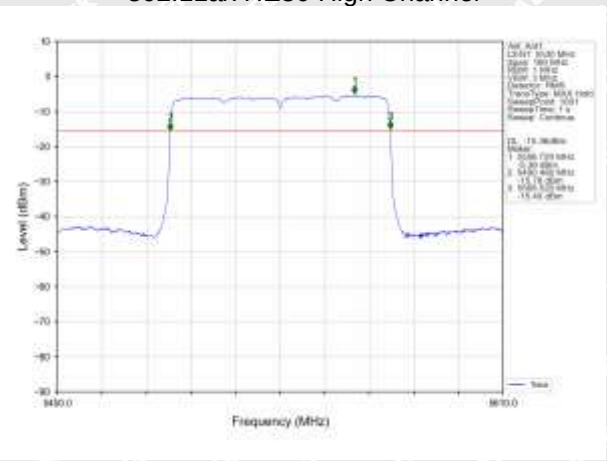
802.11ax HE40 High Channel



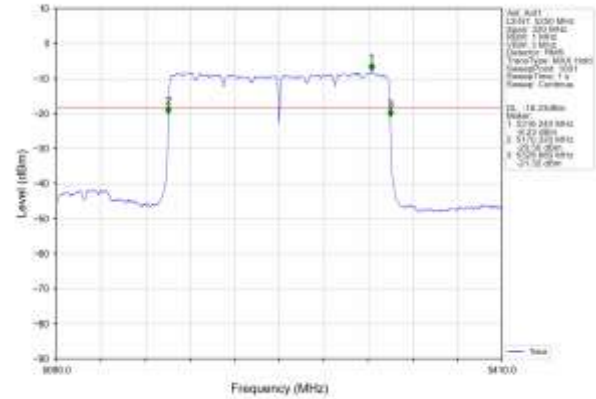
802.11ax HE80 Low Channel



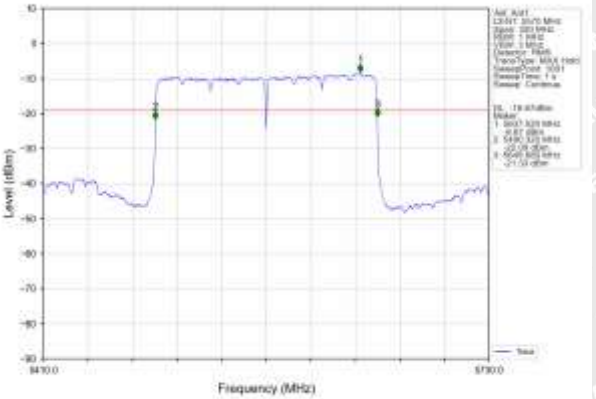
802.11ax HE80 High Channel



802.11ax HE160 Low Channel



802.11ax HE160 High Channel



9 Occupied Channel Bandwidth

9.1 Definition

The Nominal Channel Bandwidth is the widest band of frequencies, inclusive of guard bands, assigned to a single channel.

The Occupied Channel Bandwidth is the bandwidth containing 99 % of the power of the signal.

NOTE: A device is permitted to operate in one or more adjacent or non-adjacent channels simultaneously.

When equipment has simultaneous transmissions in adjacent channels, these transmissions may be considered as one signal with an actual Nominal Channel Bandwidth of "n" times the individual Nominal Channel Bandwidth where "n" is the number of adjacent channels. When equipment has simultaneous transmissions in non-adjacent channels, each power envelope shall be considered separately.

9.2 Limit

The Nominal Channel Bandwidth shall be at least 5 MHz at all times.

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth.

In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.

During an established communication in which a device operates with a Nominal Channel Bandwidth mode of 40 MHz or more, the device is allowed to operate temporarily with an Occupied Channel Bandwidth below 80 % of its Nominal Channel Bandwidth with a minimum of 16 MHz.

9.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

9.4 Test Procedure

Step 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)
- Sweep time: > 1 s; for larger Nominal Bandwidths, the sweep time may be increased until a value where the sweep time has no impact on the RMS value of the signal

- Detector Mode: RMS
- Trace Mode: Max Hold

Step 2:

• Wait for the trace to stabilize.

Step 3:

• Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

• Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

The measurement described in step 1 to step 3 above shall be repeated in case of simultaneous transmissions in non-adjacent channels.

9.5 Test Result

ANT 1

Modulation	Test conditions	Occupied Channel Bandwidth (MHz)		
		Low channel	Middle channel	High channel
		5180MHz	/	5500MHz
802.11ax HE20	Normal	18.916	/	18.918
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5190MHz	**/**	**5510MHz**
802.11ax HE40	Normal	37.740	/	37.725
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5210 MHz	**/**	**5530MHz**
802.11ax HE80	Normal	77.084	/	77.080
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5250 MHz	**/**	**5570MHz**
802.11ax HE160	Normal	156.206	/	156.158

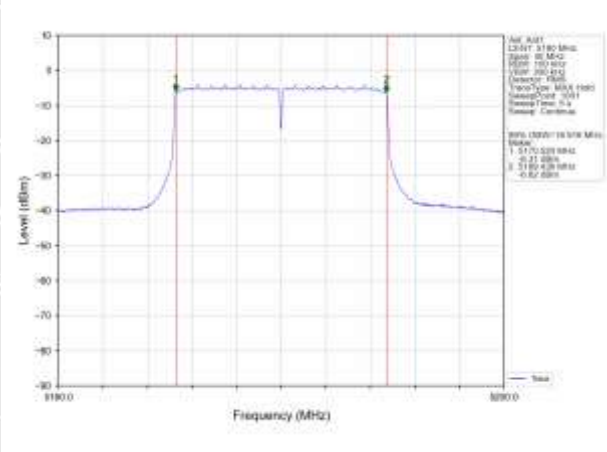
ANT 2

Modulation	Test conditions	Occupied Channel Bandwidth (MHz)		
		Low channel	Middle channel	High channel
		5180MHz	/	5500MHz
802.11ax HE20	Normal	18.904	/	18.902
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5190MHz	**/**	**5510MHz**
802.11ax HE40	Normal	37.718	/	37.722
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5210 MHz	**/**	**5530MHz**
802.11ax HE80	Normal	77.106	/	77.073
Modulation	**Test conditions**	**Occupied Channel Bandwidth (MHz)**		
		Low channel	**Middle channel**	**High channel**
		5250 MHz	**/**	**5570MHz**
802.11ax HE160	Normal	156.145	/	156.154

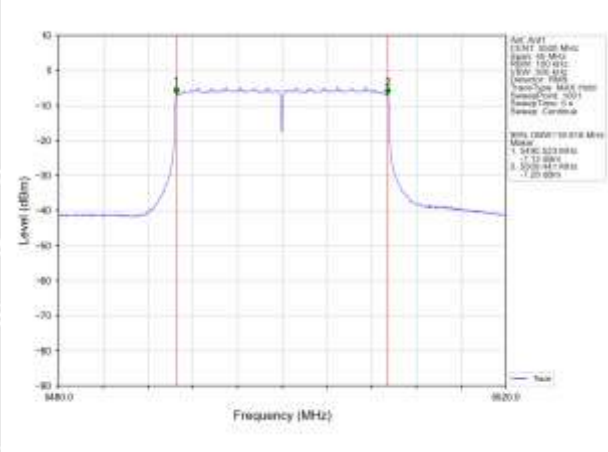
Test Plots-ANT 1

U-NII-1

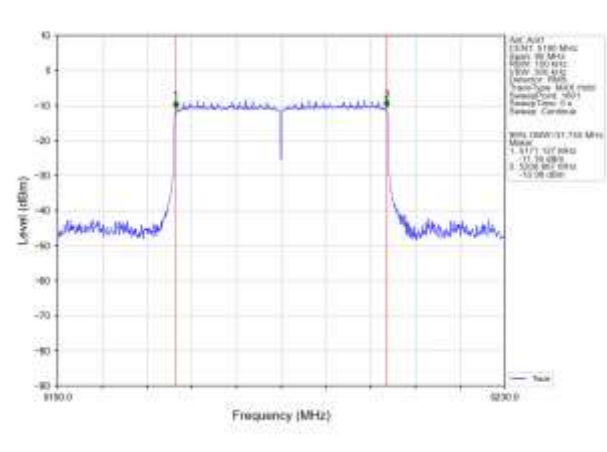
802.11ax HE20 Low Channel



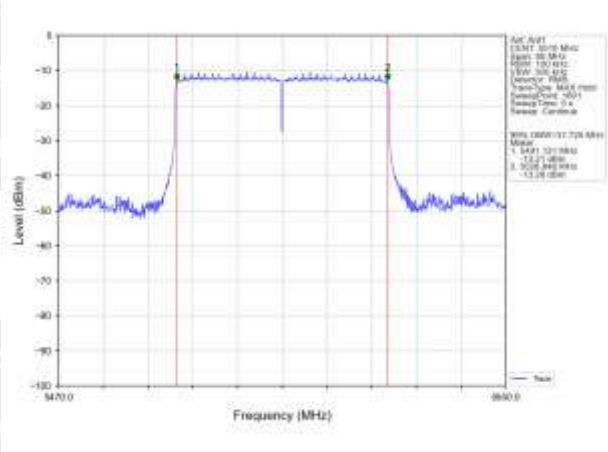
802.11ax HE20 High Channel



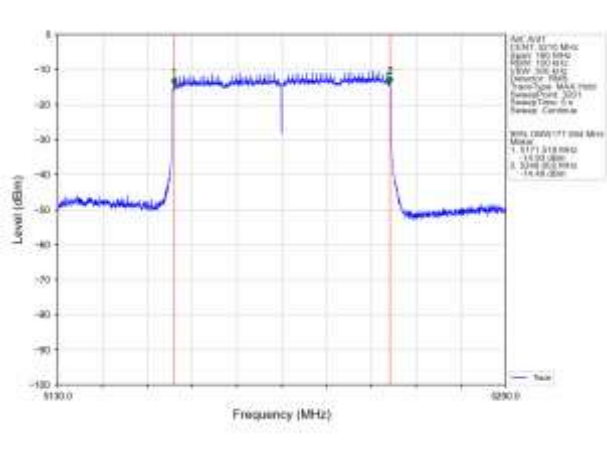
802.11ax HE40 Low Channel



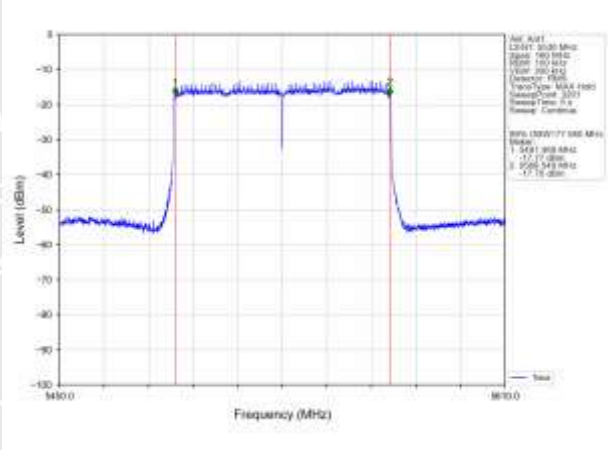
802.11ax HE40 High Channel



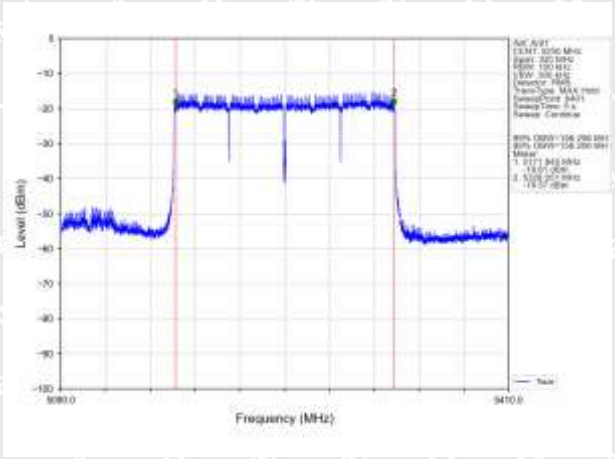
802.11ax HE80 Low Channel



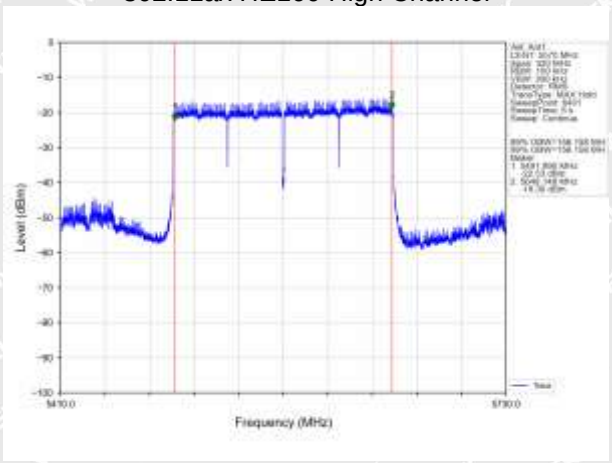
802.11ax HE80 High Channel



802.11ax HE160 Low Channel



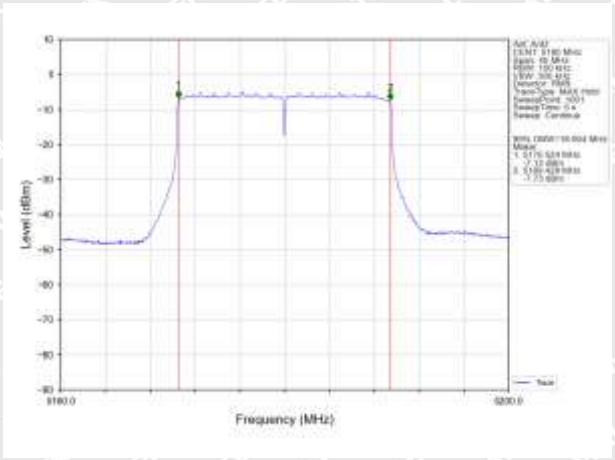
802.11ax HE160 High Channel



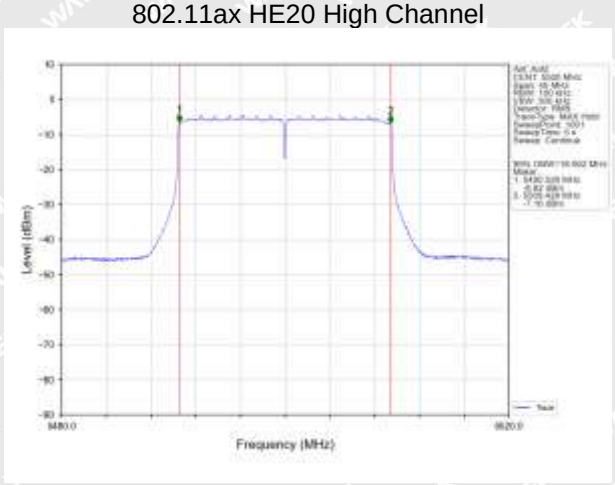
Test Plots-ANT 2

U-NII-1

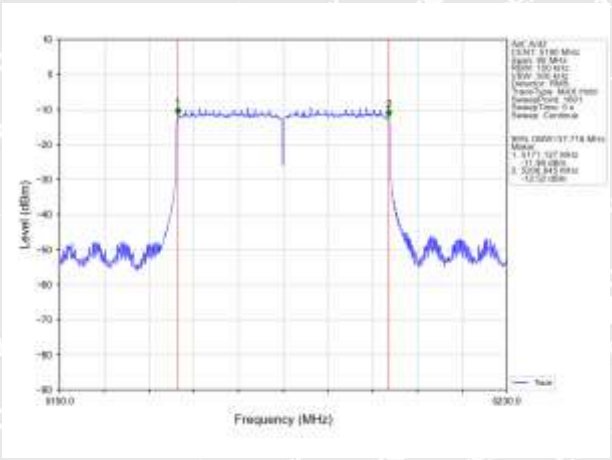
802.11ax HE20 Low Channel



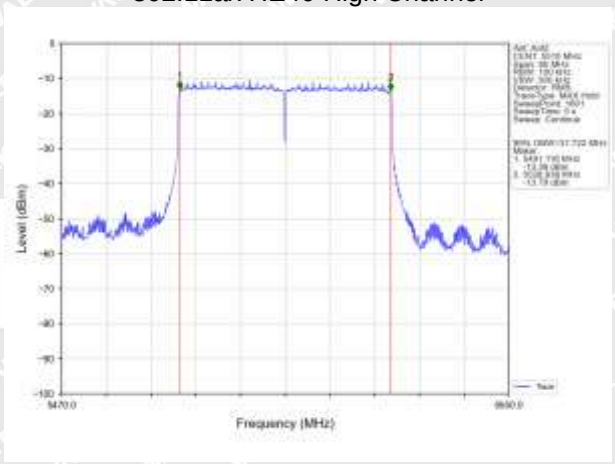
802.11ax HE20 High Channel



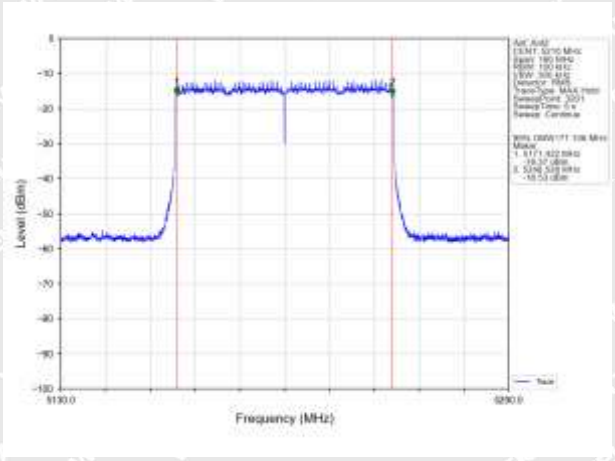
802.11ax HE40 Low Channel



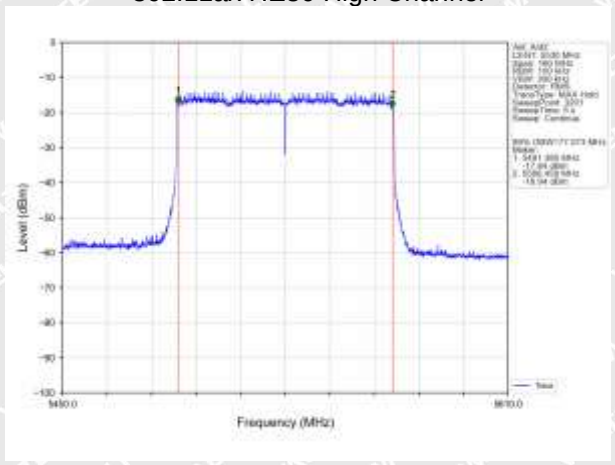
802.11ax HE40 High Channel



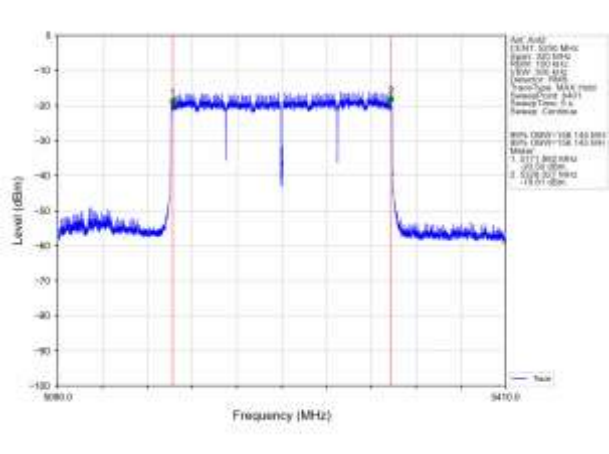
802.11ax HE80 Low Channel



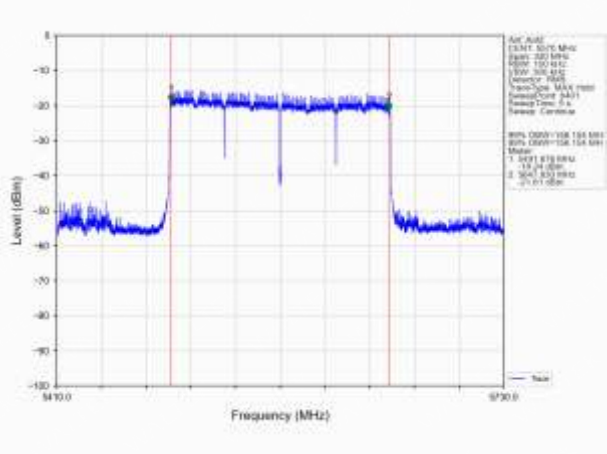
802.11ax HE80 High Channel



802.11ax HE160 Low Channel



802.11ax HE160 High Channel



10 RF Output Power

10.1 Definition

The RF Output Power is the mean equivalent isotropically radiated power (e.i.r.p.) during a transmission burst.

10.2 Limit

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.				

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.	

10.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal and extreme condition.

10.4 Test Procedure

Conducted measurement
RF output power at the highest power - PH
Additional test conditions
These measurements shall be performed under both normal and extreme test conditions (see clause 5.1.1).
The UUT shall be configured to operate at:
• the highest stated transmitter output power level of the TPC range; or
• the maximum stated transmitter output power level in case the equipment has no TPC feature.
Option 1: 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)
This option is for equipment that operates only in one sub-band or that is capable for operation in two sub-bands simultaneously but, for the purpose of the testing, the equipment can be configured to:
• operate in a continuous transmit mode or with a constant duty cycle (x), and
• operate only in one sub-band.
Step 1:
For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.
• The output power of the transmitter shall be coupled to a matched diode detector or equivalent thereof. The output of the diode detector shall be connected to the vertical channel of an oscilloscope.
• The combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the duty cycle of the transmitter output signal.
• The observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) shall be noted as x ($0 < x \leq 1$), and recorded in the test report.
Step 2:
• The RF output power shall be determined using a wideband RF power meter with a thermocouple detector or an equivalent thereof and with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be noted as A (in dBm).
• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value A in dBm) for the UUT.
Step 3:
• The RF output power at the highest power level PH (e.i.r.p.) shall be calculated from the above measured power output A (in dBm), the observed duty cycle x, the stated antenna gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report.
If more than one antenna assembly is intended for this power setting or TPC range, the gain of the antenna assembly with the highest gain shall be used.
$PH = A + G + Y + 10 \times \log (1 / x)$ (dBm).
• This value PH shall be compared to the applicable limit contained in table 1 of clause 4.4.2.

10.5 Test Result

ANT 1

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Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		20.85	/	/
	Extreme	LT	20.86	/	/
		HT	20.86	/	/
	Max. radiated Power		**20.86**		
802.11n HT20	Normal		18.92	/	/
	Extreme	LT	18.95	/	/
		HT	18.91	/	/
	Max. radiated Power		18.95		
802.11n HT40	Normal		19.06	/	/
	Extreme	LT	19.03	/	/
		HT	19.05	/	/
	Max. radiated Power		19.06		
802.11ax HE20	Normal		19.69	/	/
	Extreme	LT	19.69	/	/
		HT	19.70	/	/
	Max. radiated Power		19.70		

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Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		/	/	17.61
	Extreme	LT	/	/	17.62
		HT	/	/	17.61
	Max. radiated Power		**17.62**		
802.11n HT20	Normal		/	/	16.10
	Extreme	LT	/	/	16.03
		HT	/	/	16.06
	Max. radiated Power		16.10		
802.11n HT40	Normal		/	/	16.16
	Extreme	LT	/	/	16.14
		HT	/	/	16.15
	Max. radiated Power		16.16		
802.11ax HE20	Normal		/	/	15.69
	Extreme	LT	/	/	15.69
		HT	/	/	15.69
	Max. radiated Power		15.69		

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Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		22.49	/	22.24
	Extreme	LT	22.48	/	22.22
		HT	22.48	/	22.22
	Max. radiated Power		**22.49**		
802.11n HT20	Normal		22.02	/	22.00
	Extreme	LT	22.01	/	21.95
		HT	21.98	/	21.96
	Max. radiated Power		22.02		
802.11n HT40	Normal		20.79	/	20.85
	Extreme	LT	21.28	/	20.71
		HT	21.28	/	20.71
	Max. radiated Power		21.28		
802.11ax HE20	Normal		18.44	/	18.93
	Extreme	LT	18.42	/	18.92
		HT	18.42	/	18.92
	Max. radiated Power		18.93		

ANT 2
U-NII-1

Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		21.02	/	/
	Extreme	LT	21.00	/	/
		HT	21.02	/	/
	Max. radiated Power		**21.02**		
802.11n HT20	Normal		18.45	/	/
	Extreme	LT	18.46	/	/
		HT	18.43	/	/
	Max. radiated Power		18.46		
802.11n HT40	Normal		19.27	/	/
	Extreme	LT	19.23	/	/
		HT	19.25	/	/
	Max. radiated Power		19.27		
802.11ax HE20	Normal		18.68	/	/
	Extreme	LT	18.67	/	/
		HT	18.68	/	/
	Max. radiated Power		18.68		

U-NII-2A

Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		/	/	18.01
	Extreme	LT	/	/	18.02
		HT	/	/	18.00
	Max. radiated Power		**18.02**		
802.11n HT20	Normal		/	/	16.34
	Extreme	LT	/	/	16.26
		HT	/	/	16.30
	Max. radiated Power		16.34		
802.11n HT40	Normal		/	/	16.42
	Extreme	LT	/	/	16.40
		HT	/	/	16.40
	Max. radiated Power		16.42		
802.11ax HE20	Normal		/	/	15.23
	Extreme	LT	/	/	15.23
		HT	/	/	15.23
	Max. radiated Power		15.23		

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Modulation	Test conditions		EIRP (dBm)		
			Low Channel	Middle Channel	High Channel
802.11a HT20	Normal		21.22	/	22.69
	Extreme	LT	21.36	/	22.70
		HT	21.40	/	22.70
	Max. radiated Power		**22.70**		
802.11n HT20	Normal		20.94	/	22.34
	Extreme	LT	20.93	/	22.29
		HT	20.90	/	22.30
	Max. radiated Power		22.34		
802.11n HT40	Normal		20.25	/	21.32
	Extreme	LT	20.43	/	21.38
		HT	20.43	/	21.39
	Max. radiated Power		21.39		
802.11ax HE20	Normal		19.33	/	19.91
	Extreme	LT	19.32	/	19.90
		HT	19.32	/	19.90
	Max. radiated Power		19.91		

ANT 1+ANT 2
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Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	Low	21.72
802.11n HT40	Low	22.18
802.11ac VHT80	Low	22.19
802.11ac VHT160	Low	19.93
802.11ax HE20	Low	22.23
802.11ax HE40	Low	21.12
802.11ax HE80	Low	21.17
802.11ax HE160	Low	19.29
Max. e.i.r.p.		**22.23**
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

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Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	High	19.23
802.11n HT40	High	19.30
802.11ac VHT80	High	19.94
802.11ax HE20	High	18.48
802.11ax HE40	High	18.69
802.11ax HE80	High	18.77
Max. e.i.r.p.		**19.94**
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

U-NII-2C:

Table 1

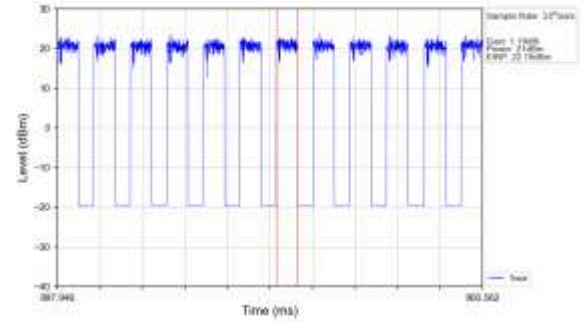
Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	Low	24.52
802.11n HT40	Low	23.89
802.11ac VHT80	Low	19.73
802.11ac VHT160	Low	21.53
802.11ax HE20	Low	21.92
802.11ax HE40	Low	19.58
802.11ax HE80	Low	19.54
802.11ax HE160	Low	19.46
Max. e.i.r.p.		24.52
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

Table 2

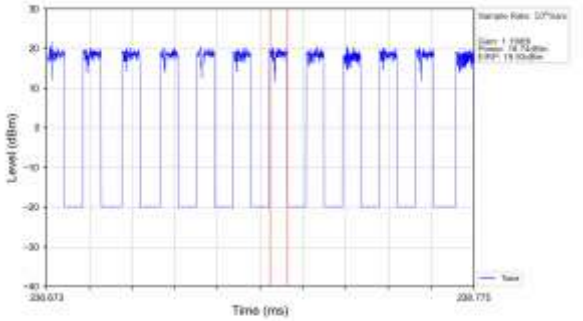
Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	High	25.18
802.11n HT40	High	24.10
802.11ac VHT80	High	23.38
802.11ax HE20	High	22.46
802.11ax HE40	High	20.14
802.11ax HE80	High	23.24
Max. e.i.r.p.		**25.18**
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

Test Plots
U-NII-1

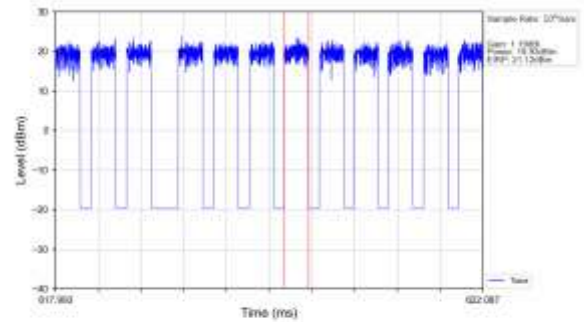
802.11ac VHT80 Low Channel



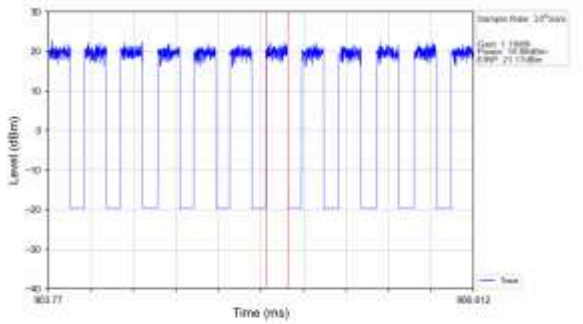
802.11ac VHT160 Low Channel



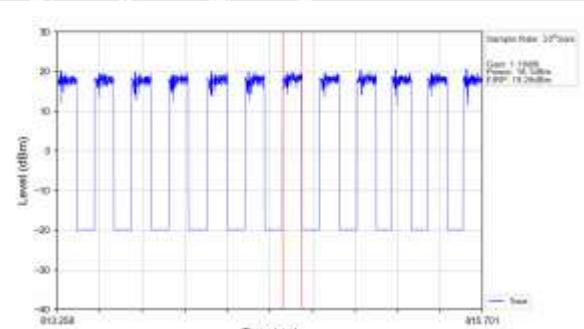
802.11ax HE40 Low Channel



802.11ax HE80 Low Channel

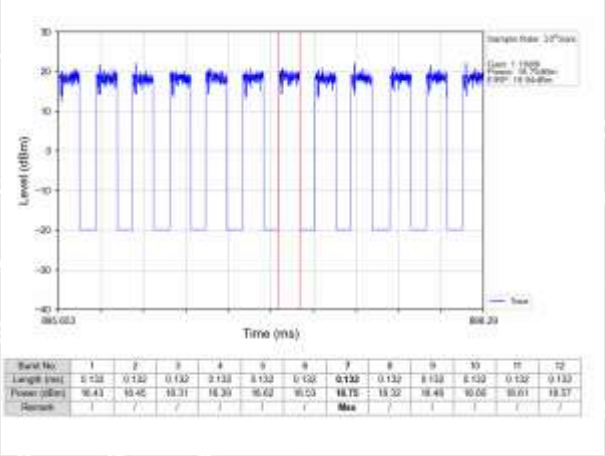


802.11ax HE160 Low Channel

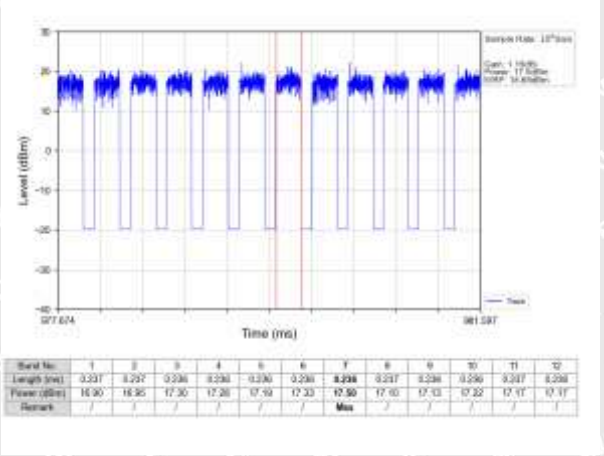


U-NII-2A

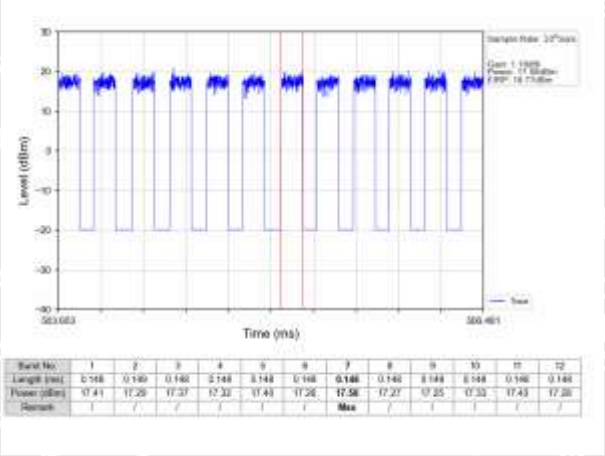
802.11ac VHT80 High Channel



802.11ax HE40 High Channel

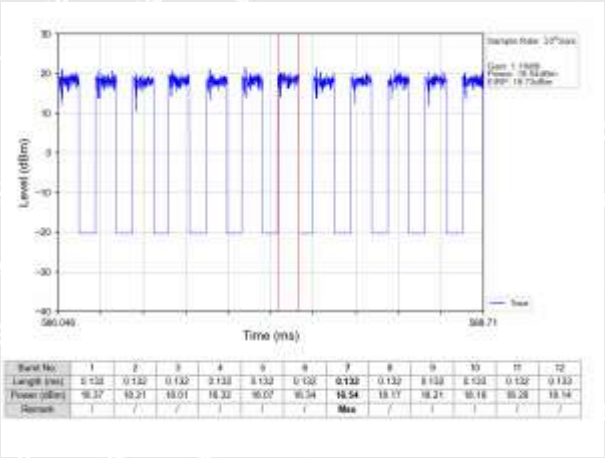


802.11ax HE80 High Channel

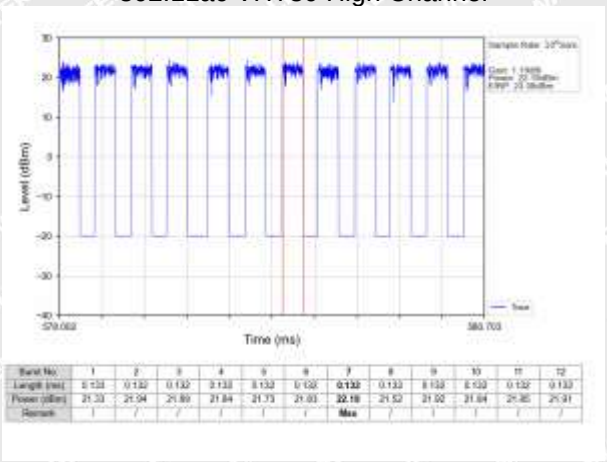


U-NII-2C

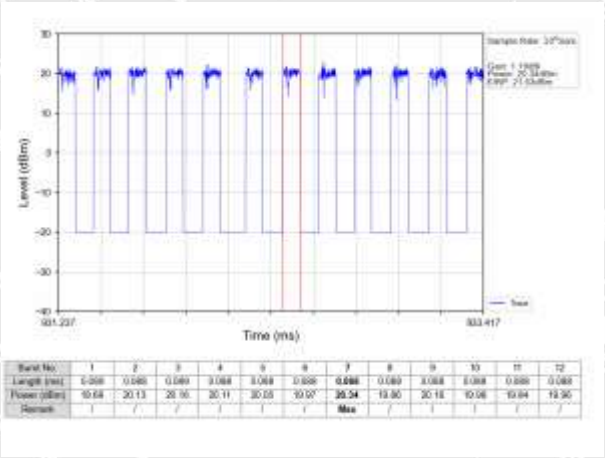
802.11ac VHT80 Low Channel



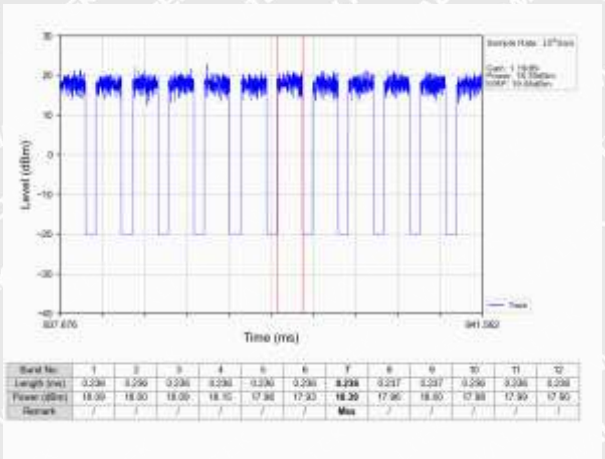
802.11ac VHT80 High Channel



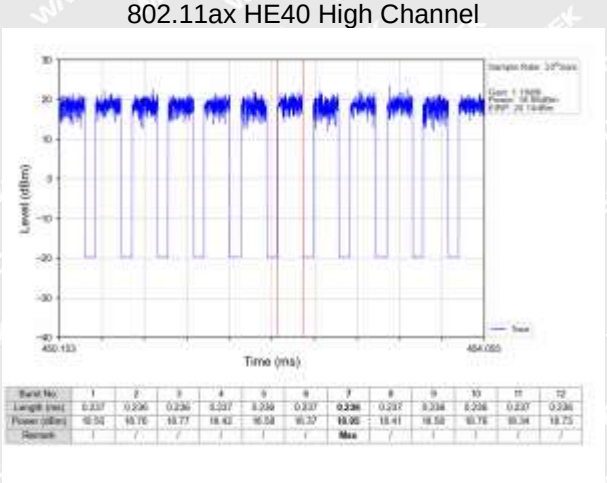
802.11ac VHT160 Low Channel



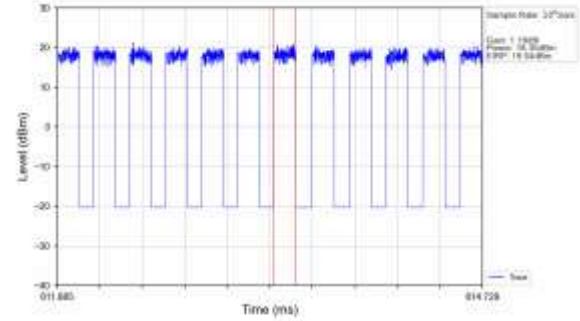
802.11ax HE40 Low Channel



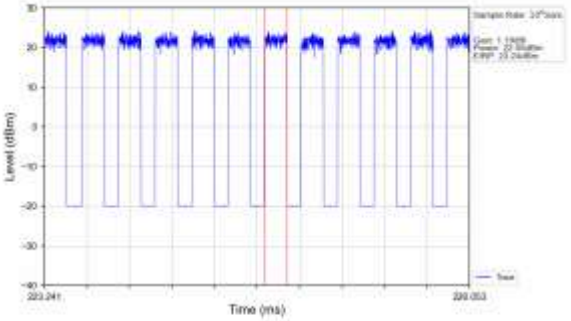
802.11ax HE40 High Channel



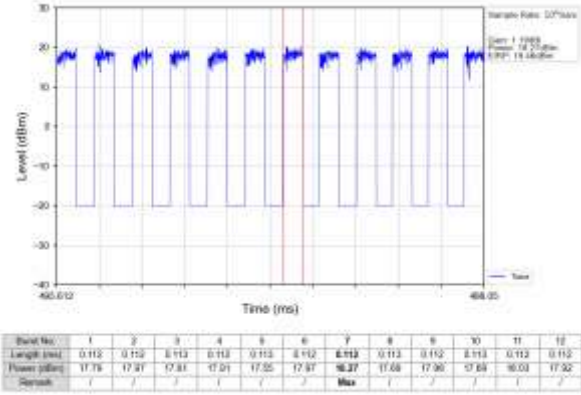
802.11ax HE80 Low Channel



802.11ax HE80 High Channel



802.11ax HE160 Low Channel



11 Power Density

11.1 Definition

The Power Density is the mean equivalent isotropically radiated power (e.i.r.p.) density during a transmission burst.

11.2 Limit

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.

11.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

11.4 Test Procedure

Additional test conditions

These measurements shall only be performed at normal test conditions (see clause 5.1.1).

The UUT shall be configured to operate at the lowest nominal Channel Bandwidth with:

• the highest stated transmitter output power level of its TPC range; or

• the maximum stated transmitter output power level in case the equipment has no TPC feature.

Option 1: 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)

This option is for equipment that can be configured to operate in a continuous transmit mode or with a constant duty cycle (x).

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- RBW: 1 MHz
- VBW: 3 MHz

- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)
- Detector Mode: Peak
- Trace Mode: Max Hold

Step 2:

• When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:

• Make the following changes to the settings of the spectrum analyser:

- Centre Frequency: Equal to the frequency recorded in step 2
- Frequency Span: 3 MHz
- RBW: 1 MHz
- VBW: 3 MHz
- Sweep Time: 1 minute
- Detector Mode: RMS
- Trace Mode: Max Hold

Step 4:

• When the trace is complete, the trace shall be captured using the "Hold" or "View" option on the spectrum analyser.

• Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as the highest mean power (power density) D in a 1 MHz band.

• Alternatively, where a spectrum analyser is equipped with a function to measure spectral power density, this function may be used to display the power density D in dBm / MHz.

In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the power density of each transmit chain shall be measured separately to calculate the total power density (value D in dBm / MHz) for the UUT.

Step 5:

• The maximum spectral power density e.i.r.p. is calculated from the above measured power density D, the observed duty cycle x (see clause 5.3.4.2.1.1.2, step 1), the applicable antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used.

PD = D + G + Y + 10 × log (1 / x) (dBm / MHz)

Option 2: For equipment without continuous transmission capability and without the capability to transmit with a constant duty cycle

This method can be used if the equipment has non-continuous transmissions and cannot be configured to transmit continuously or with a constant duty cycle.

For devices having simultaneous transmissions in both sub-bands, the Power Density in each of the sub-bands shall be measured separately and compared with the applicable limits contained in table 1 of clause 4.4.2.

The test procedure shall be as follows:

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:

- Start Frequency: lower band edge of applicable sub-band (e.g. 5 150 MHz or 5 470 MHz)
- Stop Frequency: upper band edge of applicable sub-band (e.g. 5 350 MHz or 5 725 MHz)
- RBW: 10 kHz
- VBW: 30 kHz
- Sweep Points: > 20 000 (for 5 150 MHz to 5 350 MHz)
> 25 500 (for 5 470 MHz to 5 725 MHz)
For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented.
- Detector: RMS
- Trace Mode: Max Hold
- Sweep time: 30 s

• For non-continuous signals, wait for the trace to be stabilized. Save the (trace) data set to a file.

Step 2:

• For conducted measurements on smart antenna systems using either operating mode 2 or operating mode 3 (see clause 5.1.4.2), repeat the measurement for each of the transmit ports. For each sampling point (frequency domain), add up the coincident power values (in mW) for the different transmit chains and use this as the new data set.

Step 3:

• Add up the values of power for all the samples in the file using the formula below.

$$P_{\text{Sum}} = \sum_{n=1}^{k} P_{\text{sample}}(n)$$

with 'k' being the total number of samples and 'n' the actual sample number

Step 4:

• Normalize the individual values for power (in dBm) so that the sum is equal to the RF Output Power (e.i.r.p.) (PH) measured in clause 5.3.4.2.1.1 for this sub-band. The following formulas can be used:

$$C_{\text{Corr}} = P_{\text{Sum}} - P_{H\text{e.i.r.p}}$$

$$P_{\text{Samplecorr}}(n) = P_{\text{Sample}}(n) - C_{\text{Corr}}$$

with 'n' being the actual sample number

Step 5:

• Starting from the first sample □Samplecorr in the file (lowest frequency), add up the power (in mW) of the

following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Density (e.i.r.p.) for the first 1 MHz segment which shall be saved.

Step 6:

• Shift the start point of the samples added up in step 5 by one sample and repeat the procedure in step 5

(i.e. sample #2 to sample #101).

Step 7:

• Repeat step 6 until the end of the data set and save the radiated power density values for each of the 1 MHz segments.

• From all the saved results, the highest value is the maximum Power Density (e.i.r.p.) for the UUT. This value, which shall comply with the limit contained in table 1 of clause 4.4.2, shall be recorded in the test report.

11.5 Test Result

ANT 1

U-NII-1

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		5180MHz	/	/
802.11a	Normal	9.78	/	/
802.11n HT20	Normal	6.99	/	/
802.11ax HE20	Normal	7.46	/	/
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		5210MHz	**/**	**/**
802.11ac VHT80	Normal	1.25	/	/
Remark: PD = D + G + Y + 10 × log (1 / x)				
Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

U-NII-2A

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		/	/	5320MHz
802.11a	Normal	/	/	5.71
802.11n HT20	Normal	/	/	3.76
802.11ax HE20	Normal	/	/	3.74
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		/	**/**	**5290MHz**
802.11ac VHT80	Normal	/	/	-0.74
Remark: PD = D + G + Y + 10 × log (1 / x)				
Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

U-NII-2C

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		5500MHz	/	5700MHz
802.11a	Normal	10.53	/	10.43
802.11n HT20	Normal	10.48	/	10.36
802.11ax HE20	Normal	6.26	/	7.17
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		5530MHz	**/**	**5610MHz**
802.11ac VHT80	Normal	-0.62	/	2.19
Remark: PD = D + G + Y + 10 × log (1 / x)				
Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

ANT 2

U-NII-1

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		5180MHz	/	/
802.11a	Normal	9.25	/	/
802.11n HT20	Normal	6.11	/	/
802.11ax HE20	Normal	6.02	/	/
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		5210MHz	**/**	**/**
802.11ac VHT80	Normal	0.96	/	/
Remark: PD = D + G + Y + 10 × log (1 / x)				
Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

U-NII-2A

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		/	/	5320MHz
802.11a	Normal	/	/	6.90
802.11n HT20	Normal	/	/	4.21
802.11ax HE20	Normal	/	/	3.69
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		/	**/**	**5290MHz**
802.11ac VHT80	Normal	/	/	-0.90
Remark: PD = D + G + Y + 10 × log (1 / x)				
Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

U-NII-2C

Modulation	Test conditions	Power Density (dBm/MHz)		
		Low channel	Middle channel	High channel
		5500MHz	/	5700MHz
802.11a	Normal	9.61	/	11.28
802.11n HT20	Normal	9.51	/	11.03
802.11ax HE20	Normal	6.45	/	8.35
Modulation	**Test conditions**	**Power Density (dBm/MHz)**		
		Low channel	**Middle channel**	**High channel**
		5530MHz	**/**	**5610MHz**
802.11ac VHT80	Normal	-0.93	/	2.59
Remark: PD = D + G + Y + 10 × log (1 / x) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%				

ANT 1+ANT 2:

U-NII-1

Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	Low	9.58
802.11ac VHT80	Low	4.24
802.11ax HE20	Low	9.81
Max. e.i.r.p.		9.81
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

U-NII-2A

Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	High	7.00
802.11ac VHT80	High	1.96
802.11ax HE20	High	6.73
Max. e.i.r.p.		7.00
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

U-NII-2C:

Table 1

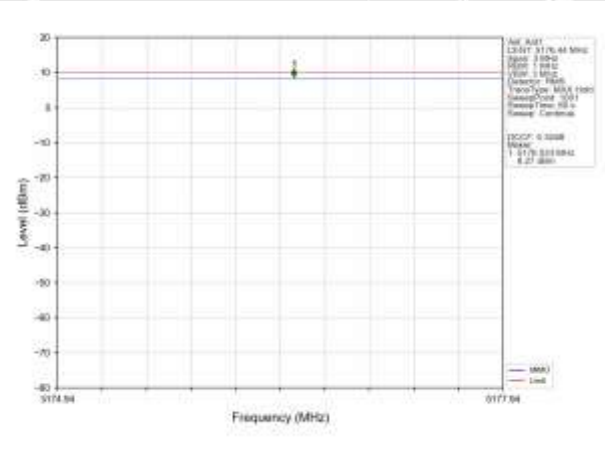
Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	Low	13.03
802.11ac VHT80	Low	1.79
802.11ax HE20	Low	9.37
Max. e.i.r.p.		13.03
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

Table 2

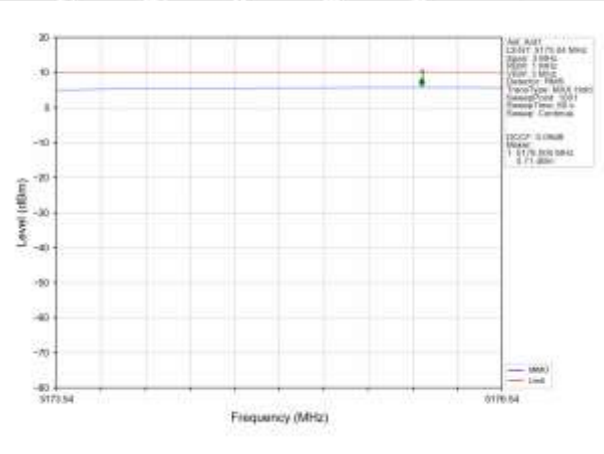
Modulation	CH	e.i.r.p. (dBm)
802.11n HT20	High	13.72
802.11ac VHT80	High	5.57
802.11ax HE20	High	10.81
Max. e.i.r.p.		13.72
Remark: PH = A + G + Y + 10 × log (1 / x) (dBm) Antenna Gain G=1.19dBi, beam forming gain Y= 0 dB, duty cycle X=100%		

Test Plots-ANT 1
U-NII-1

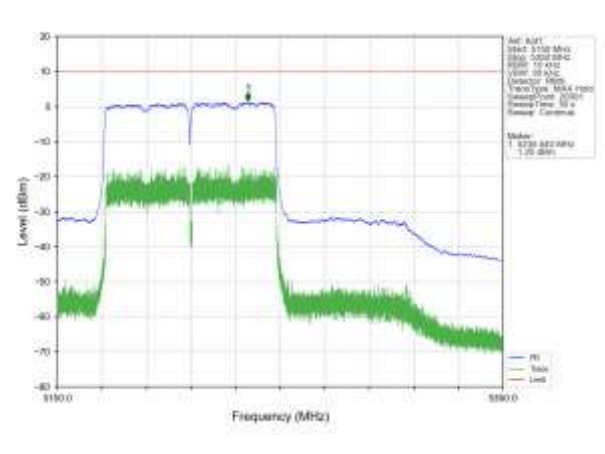
802.11a HT20 Low Channel



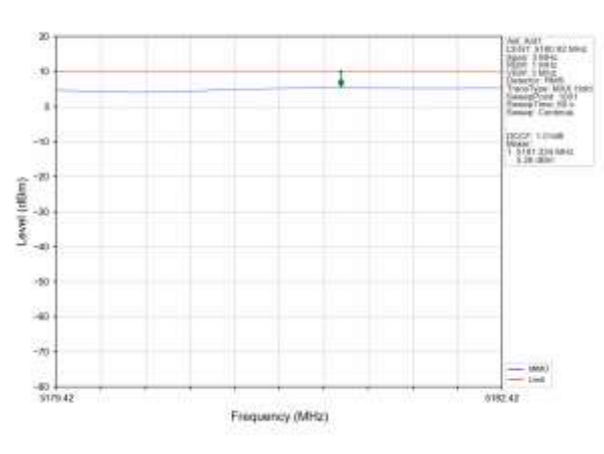
802.11n HT20 Low Channel



802.11ac VHT80 Low Channel

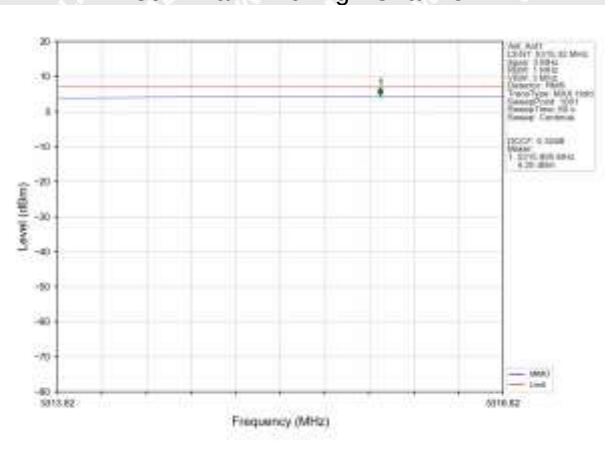


802.11ax HE20 Low Channel

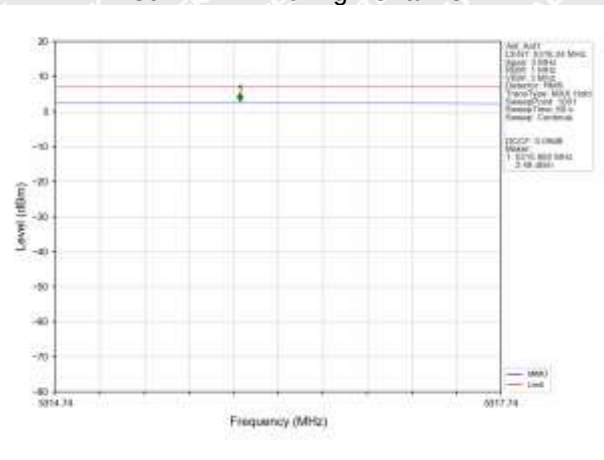


U-NII-2A

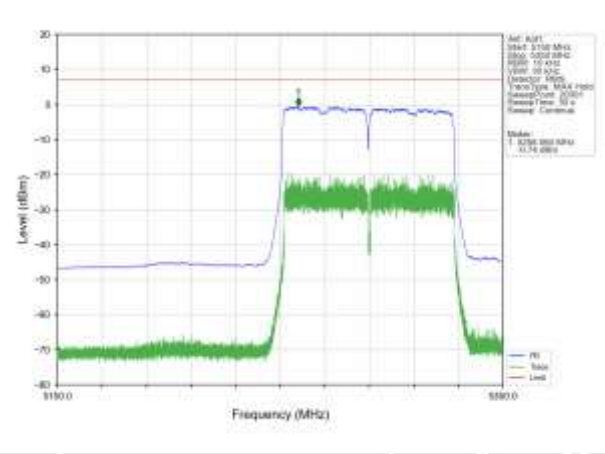
802.11a HT20 High Channel



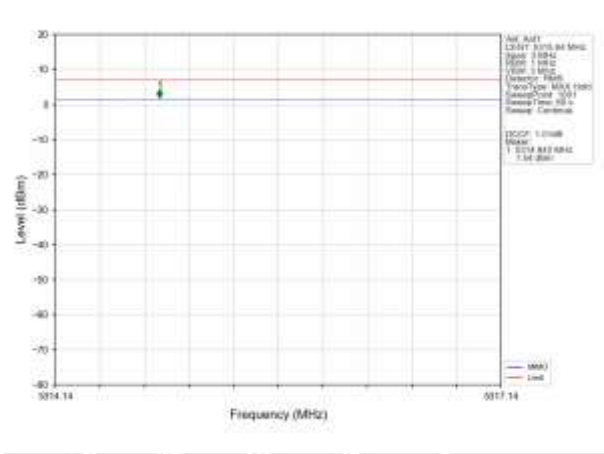
802.11n HT20 High Channel



802.11ac VHT80 High Channel

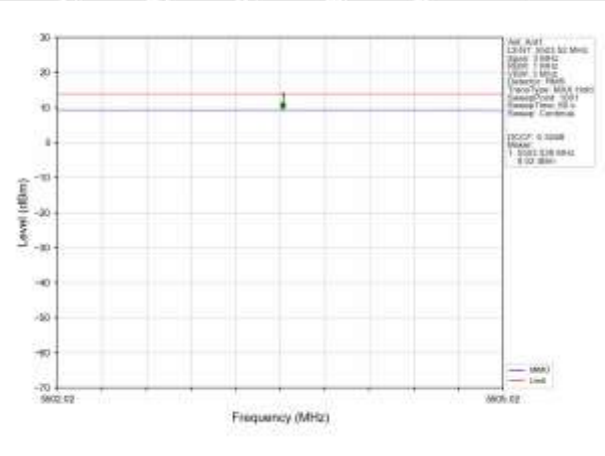


802.11ax HE20 High Channel

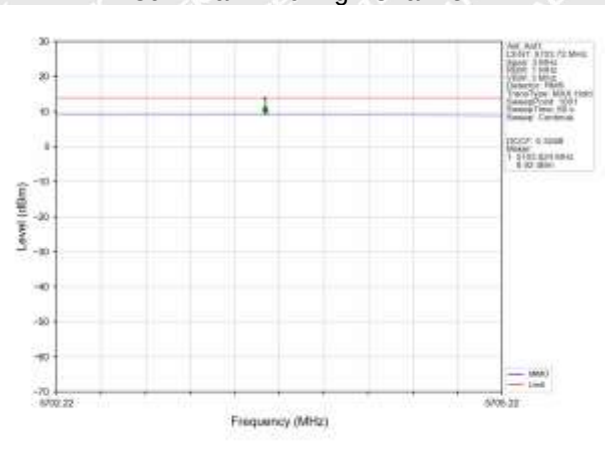


U-NII-2C

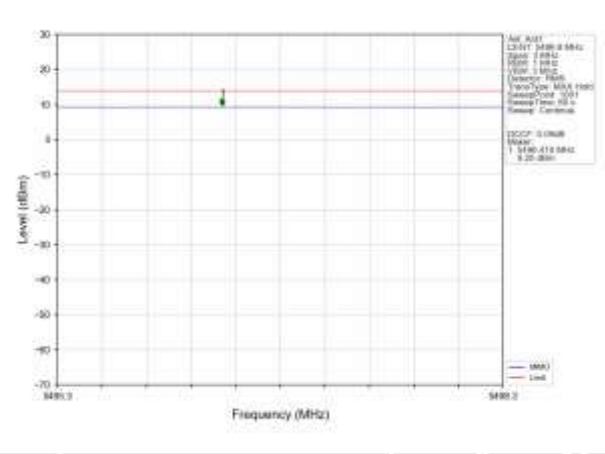
802.11a HT20 Low Channel



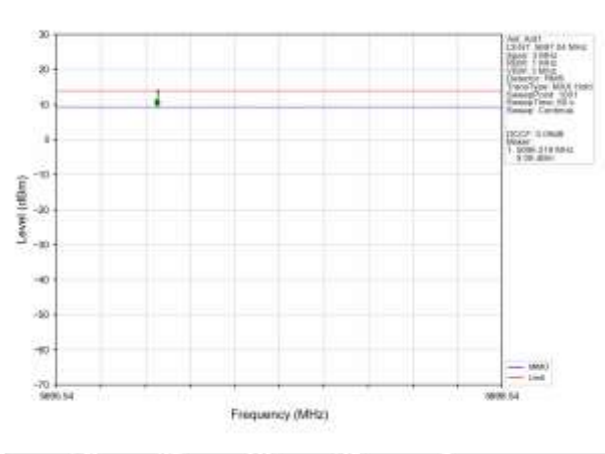
802.11a HT20 High Channel



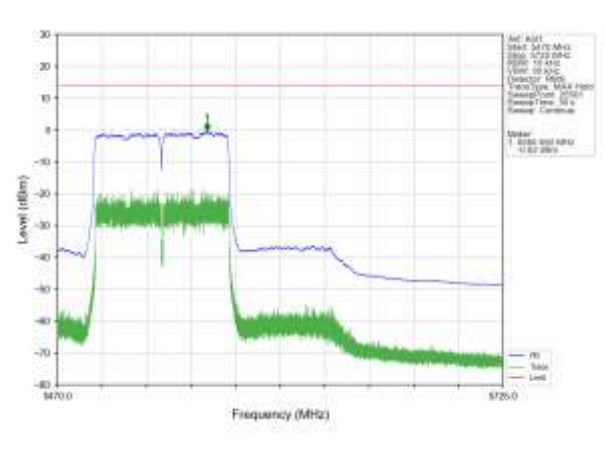
802.11n HT20 Low Channel



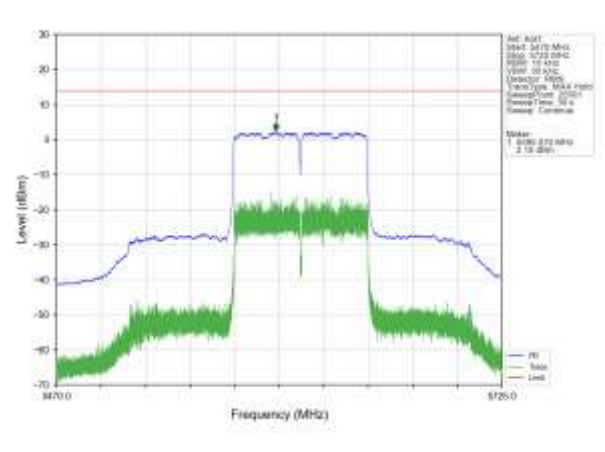
802.11n HT20 High Channel



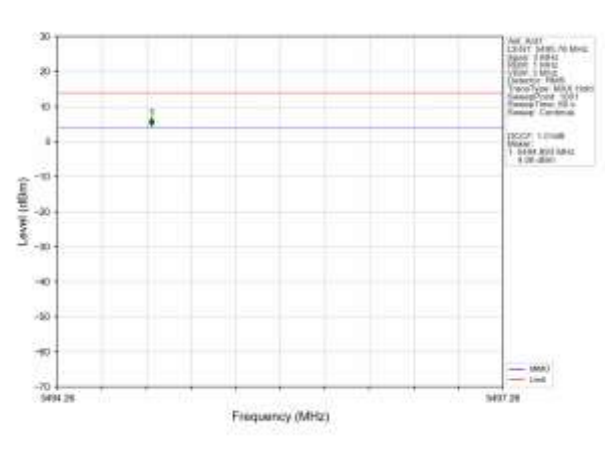
802.11ac VHT80 Low Channel



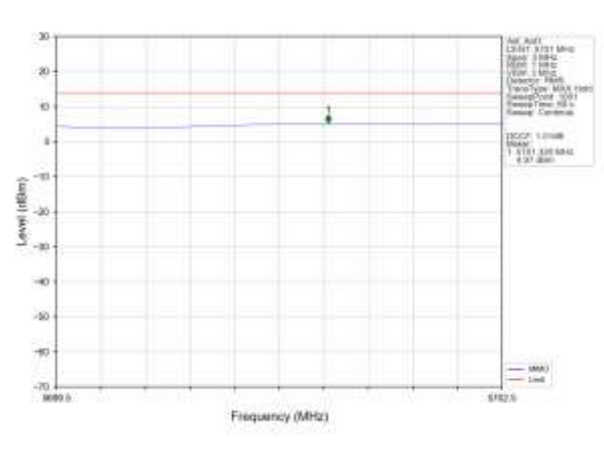
802.11ac VHT80 High Channel



802.11ax HE20 Low Channel

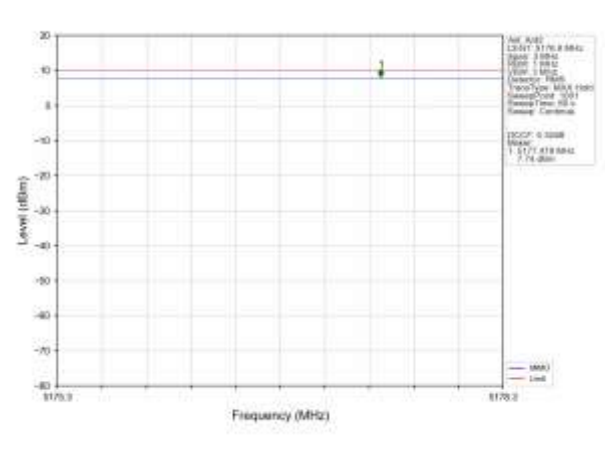


802.11ax HE20 High Channel

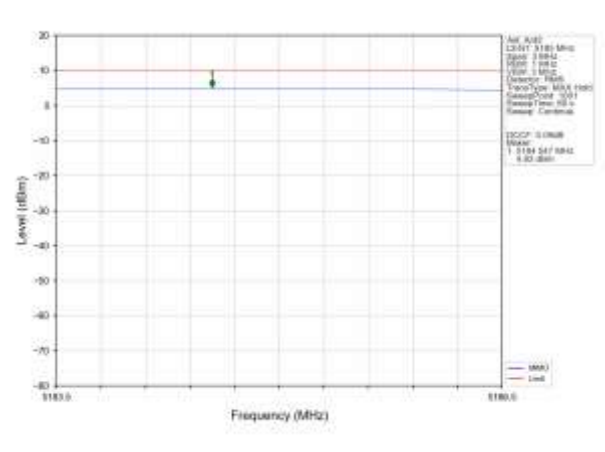


Test Plots-ANT 2
U-NII-1

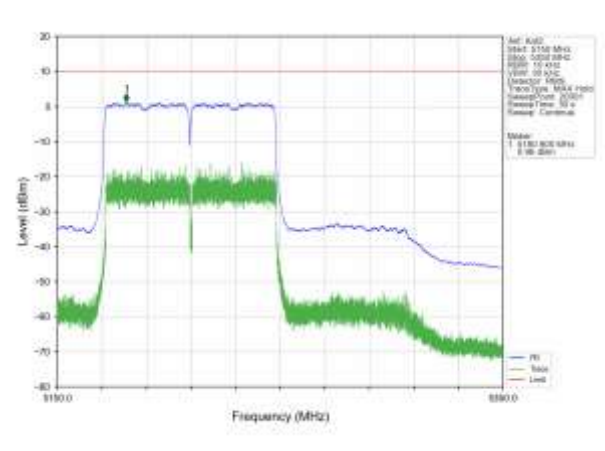
802.11a HT20 Low Channel



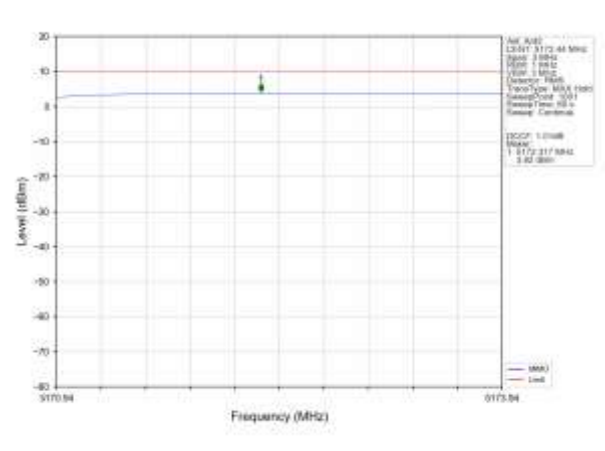
802.11n HT20 Low Channel



802.11ac VHT80 Low Channel

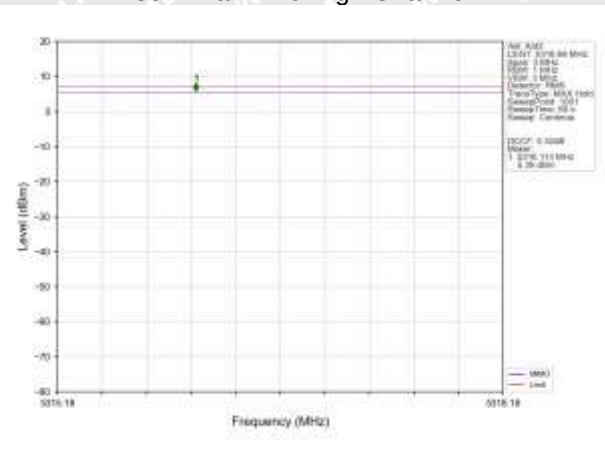


802.11ax HE20 Low Channel

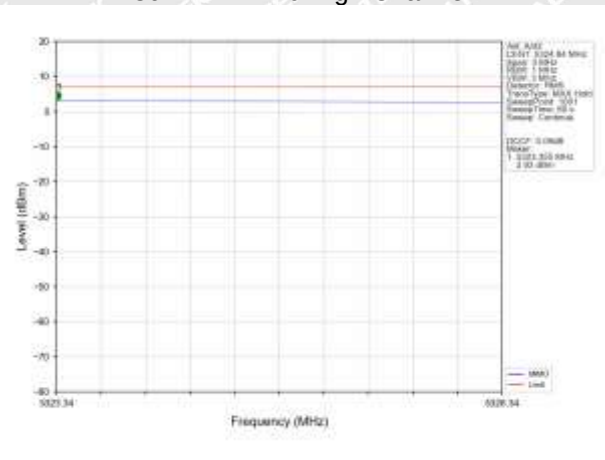


U-NII-2A

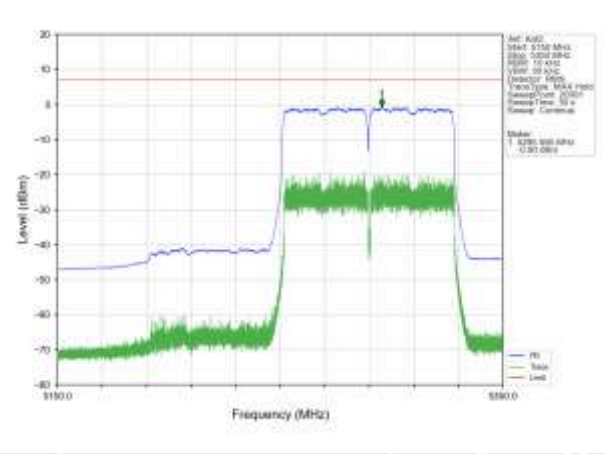
802.11a HT20 High Channel



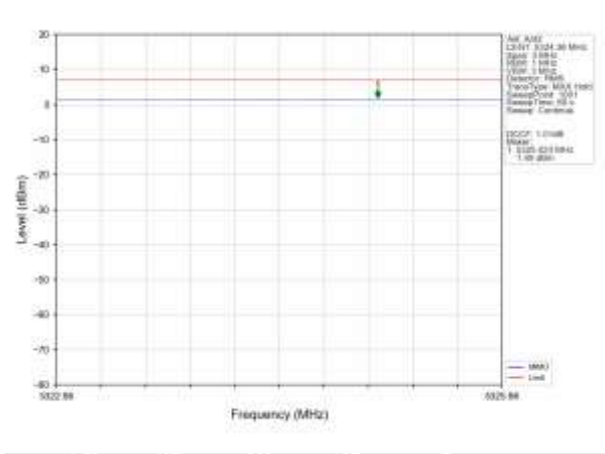
802.11n HT20 High Channel



802.11ac VHT80 High Channel

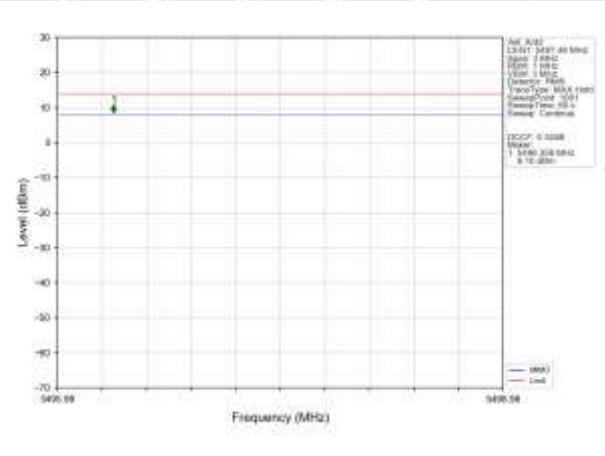


802.11ax HE20 High Channel

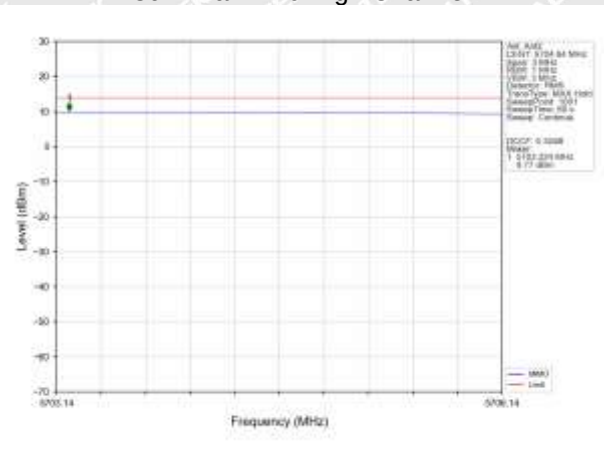


U-NII-2C

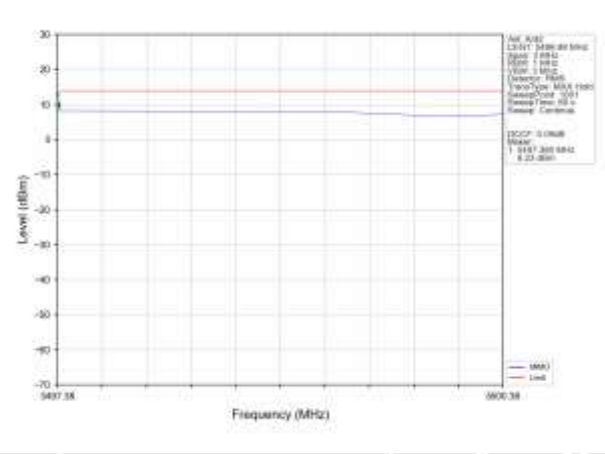
802.11a HT20 Low Channel



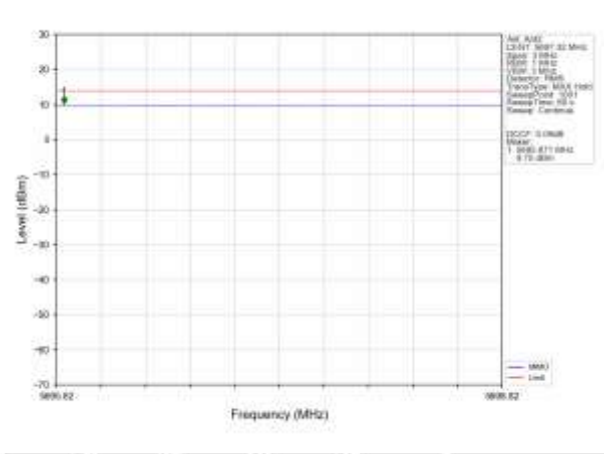
802.11a HT20 High Channel



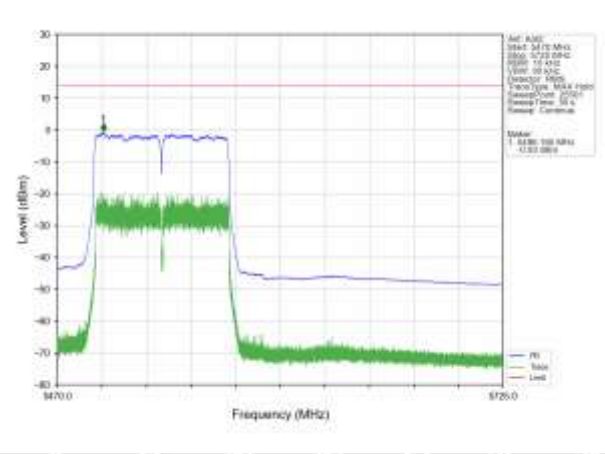
802.11n HT20 Low Channel



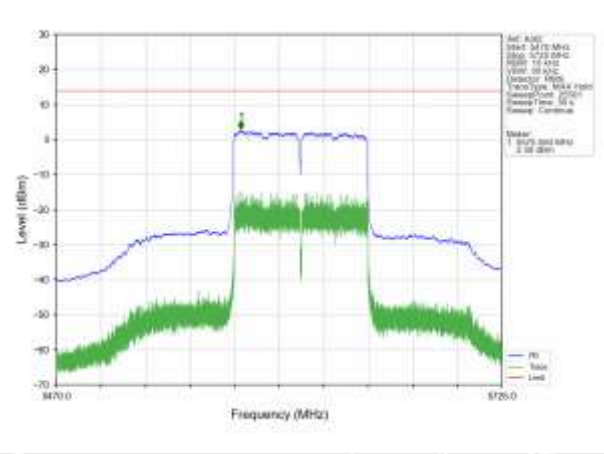
802.11n HT20 High Channel



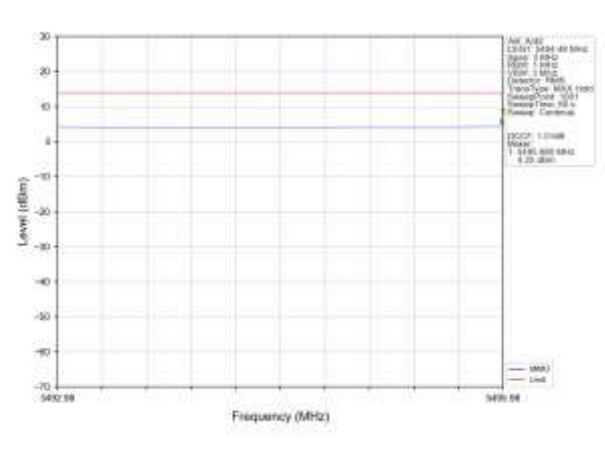
802.11ac VHT80 Low Channel



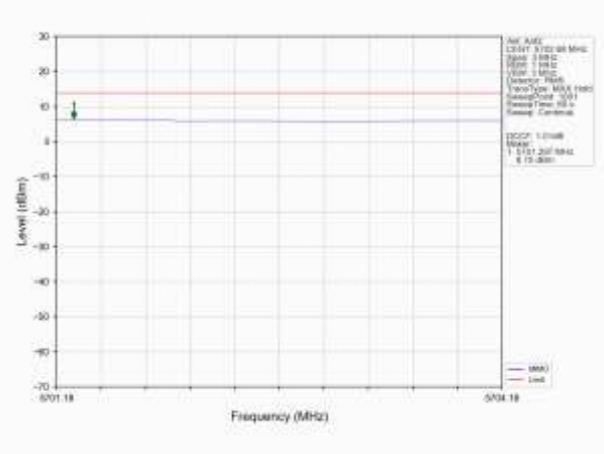
802.11ac VHT80 High Channel



802.11ax HE20 Low Channel



802.11ax HE20 High Channel



12 Transmit power control

12.1 Definition

Transmit Power Control (TPC) is a mechanism to be used by the RLAN device to ensure a mitigation factor of at least 3 dB on the aggregate power from a large number of devices. This requires the RLAN device to have a TPC range from which the lowest value is at least 6 dB below the values for mean e.i.r.p. given in table 1 for devices with TPC.

12.2 Limit

Limits for RF output power and power density at the highest power level:
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.

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.

Limit for RF output power at the lowest power level of the TPC range:
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

12.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

12.4 Test Procedure

Conducted measurement

Pre-scan

The UUT shall be connected to a spectrum analyser capable of RF power measurements.

This pre-scan test procedure shall be used to identify potential unwanted emissions of the UUT.

Step 1:

For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.

• The output power of the transmitter shall be coupled to a matched diode detector or equivalent thereof. The output of the diode detector shall be connected to the vertical channel of an oscilloscope.

• The combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the duty cycle of the transmitter output signal.

• The observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) shall be noted as x ($0 < x \leq 1$), and recorded in the test report.

Step 2:

• The RF output power shall be determined using a wideband RF power meter with a thermocouple detector or an equivalent thereof and with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be noted as A (in dBm).

• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value A in dBm) for the UUT.

Step 3:

• The RF output power at the highest/lowest power level PH (e.i.r.p.) shall be calculated from the above measured power output A (in dBm), the observed duty cycle x, the stated antenna gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting or TPC range, the gain of the antenna assembly with the highest gain shall be used.

$PH = A + G + Y + 10 \times \log (1 / x)$ (dBm).

• This value PH shall be compared to the applicable limit contained in table 1 of clause 4.4.2.

12.5 Test Result

Not Applicable

13 Transmitter unwanted emissions outside the 5 GHz RLAN bands

13.1 Definition

Transmitter unwanted emissions outside the 5 GHz RLAN bands are radio frequency emissions outside the 5 GHz RLAN bands defined in clause 3.1.

13.2 Limit

The level of transmitter unwanted emissions outside the 5 GHz RLAN bands shall not exceed the limits given in table 3.
In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted) and to the emissions radiated by the cabinet. In case of integral antenna equipment (without temporary antenna connectors), these limits apply to emissions radiated by the equipment.

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

13.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

13.4 Test Procedure

Conducted measurement

Pre-scan

The UUT shall be connected to a spectrum analyser capable of RF power measurements.

This pre-scan test procedure shall be used to identify potential unwanted emissions of the UUT.

Step 1:

• The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits

given in clause 4.5.1.2, table 3.

Step 2:

• The unwanted emissions over the range 30 MHz to 1 000 MHz shall be identified.

• Spectrum analyser settings:

- Resolution bandwidth: 100 kHz

- Video bandwidth: 300 kHz

- Detector mode: Peak

- Trace Mode: Max Hold

- Sweep Points: ≥ 9 700

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.3.5.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: For non-continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT.

EXAMPLE: For non-continuous transmissions, if the UUT is using a test sequence as described in clause 5.1.2.1 with a transmitter on + off time of 2 ms, then the sweep time has to be greater than 4 ms per 100 kHz.

• Allow the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the imits given in clause 4.5.1.2, table 3 shall be individually measured using the procedure in clause 5.3.5.2.1.2 and compared to the limits given in clause 4.5.1.2, table 3.

Step 3:

• The unwanted emissions over the range 1 GHz to 26 GHz shall be identified.

• Spectrum analyser settings:

- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep points: ≥ 25 000

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.3.5.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: For non-continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT.

EXAMPLE: For non-continuous transmissions, if the UUT is using a test sequence as described in clause 5.1.2.1 with a transmitter on + off time of 2 ms, then the sweep time has to be greater than 4 ms per 1 MHz.

Allow the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the

limits given in clause 4.5.1.2, table 3 shall be individually measured using the procedure in clause 5.3.5.2.1.2

and compared to the limits given in clause 4.5.1.2, table 3.

Measurement of the emissions identified during the pre-scan

The limits for transmitter unwanted emissions in clause 4.5.1 refer to average power levels.

The steps below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan

measurements above.

Continuous transmit signals:

For continuous transmit signals, a simple measurement using the RMS detector of the spectrum analyser is permitted.

The measured values shall be recorded and compared with the limits in clause 4.5.1.2, table 3.

Non-continuous transmit signals:

For non-continuous transmit signals, the measurement shall be made only over the "on" part of the burst.

Step 1:

• The level of the emissions shall be measured in the time domain, using the following spectrum analyser settings:

- Centre Frequency: Frequency of emission identified during the pre-scan
- RBW: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
- VBW: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
- Frequency Span: 0 Hz
- Sweep mode: Single Sweep
- Sweep Time: Suitable to capture one transmission burst. Additional measurements may be needed to identify the length of the transmission burst. In case of continuous

signals, the Sweep Time shall be set to 30 ms

- Sweep points: Sweeptime [µs] / 1 µs with a maximum of 30 000
- Trigger: Video (burst signals) or Manual (continuous signals)
- Detector: RMS
- Trace Mode: Clear/Write

• Adjust the centre frequency (fine tune) to capture the highest level of one burst of the emission to be measured.

This fine tuning can be omitted for spectrum analysers capable of supporting twice this number of sweep

points required in step 2 and step 3 from the pre-scan procedure in clause 5.3.5.2.1.1.

Step 2:

• Adjust the trigger level to select the transmissions with the highest power level.

• Set a window (start and stop lines) to match with the start and end of the burst and in which the RMS power

shall be measured using the Time Domain Power function. If the spurious emission to be measured is a

continuous signal, the measurement window shall be set to match the start and stop times of the sweep.

• Select RMS power to be measured within the selected window and note the result which is the RMS power of this particular spurious emission. Compare this value with the applicable limit provided by clause 4.5.1.2,

table 3.

Repeat this procedure for every emission identified during the pre-scan. The values and corresponding frequencies shall be recorded.

In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements shall be repeated for each of the active transmit chains. Comparison with the applicable limits shall be done using either of the options given below:

• Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and

compared with the limits provided by table 3 in clause 4.5.1.2.

• Option 2: the results for each of the transmit chains shall be individually compared with the limits provided by table 3 in clause 4.5.1.2 after these limits have been reduced by 10 × log10 (Tch) (number of active transmit chains).

Radiated measurement

The test set up as described in annex B shall be used with a spectrum analyser attached to the test antenna (see clause 5.2).

The test procedure is as described under clause 5.3.5.2.1.

13.5 Test Result

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	EN 301 893	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
ANT1 802.11a Channel 5180MHz										
96.49	28.39	255	1.9	H	-77.45	0.16	0.00	-77.61	-54.00	-23.61
96.49	30.73	41	1.1	V	-72.87	0.16	0.00	-73.03	-54.00	-19.03
1263.46	50.04	348	1.4	H	-59.42	2.68	12.70	-49.40	-30.00	-19.40
1263.46	52.48	147	1.2	V	-55.71	2.68	12.70	-45.69	-30.00	-15.69
10360.00	42.51	233	1.2	H	-58.14	7.19	11.00	-54.33	-30.00	-24.33
10360.00	43.29	289	1.7	V	-56.57	7.19	11.00	-52.76	-30.00	-22.76
ANT1+ANT2 802.11n20 Channel 5180MHz										
96.49	27.49	32	1.7	H	-78.35	0.16	0.00	-78.51	-54.00	-24.51
96.49	31.14	166	1.7	V	-72.46	0.16	0.00	-72.62	-54.00	-18.62
1263.46	50.34	143	1.5	H	-59.12	2.68	12.70	-49.10	-30.00	-19.10
1263.46	51.87	217	1.6	V	-56.32	2.68	12.70	-46.30	-30.00	-16.30
10360.00	42.82	110	1.4	H	-57.83	7.19	11.70	-53.32	-30.00	-23.32
10360.00	44.22	80	1.8	V	-55.64	7.19	11.70	-51.13	-30.00	-21.13
ANT1+ANT2 802.11n40 Channel 5190MHz										
96.49	26.91	103	1.1	H	-78.93	0.16	0.00	-79.09	-54.00	-25.09
96.49	30.51	242	1.9	V	-73.09	0.16	0.00	-73.25	-54.00	-19.25
1263.46	50.11	214	1.0	H	-58.92	2.68	12.70	-48.90	-30.00	-18.90
1263.46	51.64	82	1.4	V	-56.92	2.68	12.70	-46.90	-30.00	-16.90
10380.00	43.15	173	1.7	H	-57.50	7.19	11.90	-52.79	-30.00	-22.79
10380.00	44.74	37	1.4	V	-55.12	7.19	11.90	-50.41	-30.00	-20.41

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	EN 301 893	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
ANT1+ANT2 802.11ac80 Channel 5210MHz										
96.49	26.66	52	1.7	H	-79.18	0.16	0.00	-79.34	-54.00	-25.34
96.49	27.87	279	1.8	V	-75.73	0.16	0.00	-75.89	-54.00	-21.89
1263.46	48.30	33	1.3	H	-61.16	2.68	12.70	-51.14	-30.00	-21.14
1263.46	50.98	236	1.3	V	-57.21	2.68	12.70	-47.19	-30.00	-17.19
10420.00	45.30	94	1.5	H	-55.35	7.19	11.90	-50.64	-30.00	-20.64
10420.00	43.81	16	2.0	V	-56.05	7.19	11.90	-51.34	-30.00	-21.34
ANT1+ANT2 802.11ax20 Channel 5180MHz										
96.49	26.36	262	1.1	H	-79.48	0.16	0.00	-79.64	-54.00	-25.64
96.49	29.60	35	1.6	V	-74.00	0.16	0.00	-74.16	-54.00	-20.16
1263.46	49.23	249	1.8	H	-60.23	2.68	12.70	-50.21	-30.00	-20.21
1263.46	50.75	109	2.0	V	-57.44	2.68	12.70	-47.42	-30.00	-17.42
10360.00	43.80	327	1.3	H	-56.85	7.19	11.70	-52.34	-30.00	-22.34
10360.00	43.92	121	1.1	V	-55.94	7.19	11.70	-51.43	-30.00	-21.43
ANT1+ANT2 802.11ax40 Channel 5190MHz										
96.49	25.92	243	1.3	H	-79.92	0.16	0.00	-80.08	-54.00	-26.08
96.49	28.85	67	1.1	V	-74.75	0.16	0.00	-74.91	-54.00	-20.91
1263.46	48.29	166	2.0	H	-61.17	2.68	12.70	-51.15	-30.00	-21.15
1263.46	50.35	262	1.3	V	-57.84	2.68	12.70	-47.82	-30.00	-17.82
10380.00	44.50	321	1.5	H	-56.15	7.19	11.70	-51.64	-30.00	-21.64
10380.00	44.73	199	1.3	V	-55.13	7.19	11.70	-50.62	-30.00	-20.62

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	EN 301 893	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
ANT1+ANT2 802.11ax80 Channel 5210MHz										
96.49	28.41	193	1.1	H	-77.43	0.16	0.00	-77.59	-54.00	-23.59
96.49	29.40	244	1.3	V	-74.20	0.16	0.00	-74.36	-54.00	-20.36
1263.46	50.67	241	1.8	H	-58.79	2.68	12.70	-48.77	-30.00	-18.77
1263.46	52.51	196	1.6	V	-55.68	2.68	12.70	-45.66	-30.00	-15.66
10420.00	40.88	141	1.0	H	-59.77	7.19	11.90	-55.06	-30.00	-25.06
10420.00	44.04	144	1.8	V	-55.82	7.19	11.90	-51.11	-30.00	-21.11

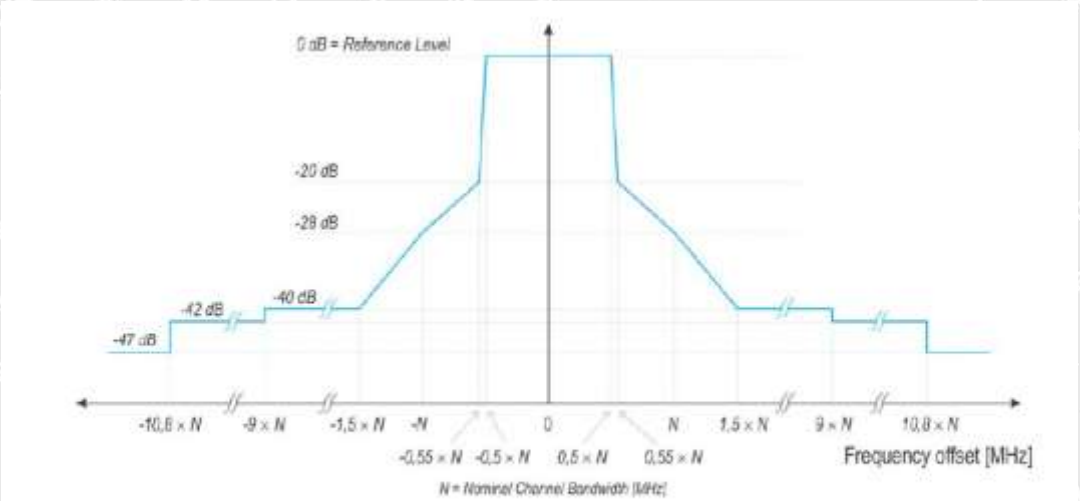
Note: All test modes were tested, only record the worst case.

14 Transmitter unwanted emissions within the 5 GHz RLAN bands

14.1 Definition

Transmitter unwanted emissions within the 5 GHz RLAN bands are radio frequency emissions within the 5 GHz RLAN bands defined in clause 3.1.

14.2 Limit



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

Figure 1: Transmit spectral power mask

14.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

14.4 Test Procedure

Option 1: For equipment with continuous transmission capability
The UUT shall be configured for continuous transmit mode (duty cycle equal to 100 %). If this is not possible, then option 2 shall be used.
Step 1: Determination of the reference average power level.

- Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 30 kHz
- Detector mode: Peak
- Trace mode: Video Average
- Sweep Time: Coupled
- Centre Frequency: Centre frequency of the channel being tested
- Span: 2 × Nominal Channel Bandwidth
- Use the marker to find the highest average power level of the power envelope of the UUT. This level shall be used as the reference level for the relative measurements.

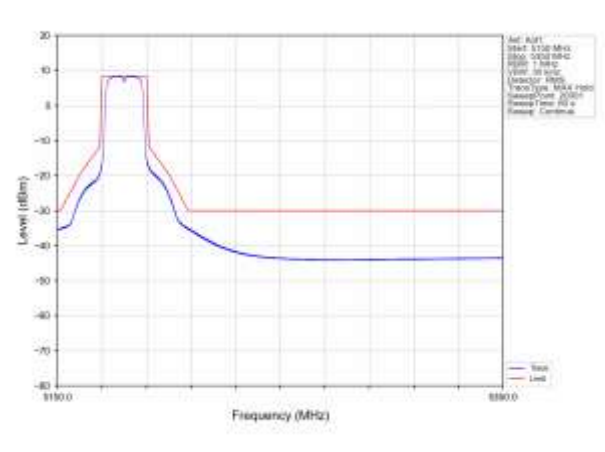
Step 2: Determination of the relative average power levels.

- Adjust the frequency range of the spectrum analyser to allow the measurement to be performed within the sub-bands 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. No other parameter of the spectrum analyser should be changed.
- Compare the relative power envelope of the UUT with the limits defined in clause 4.5.2.2.

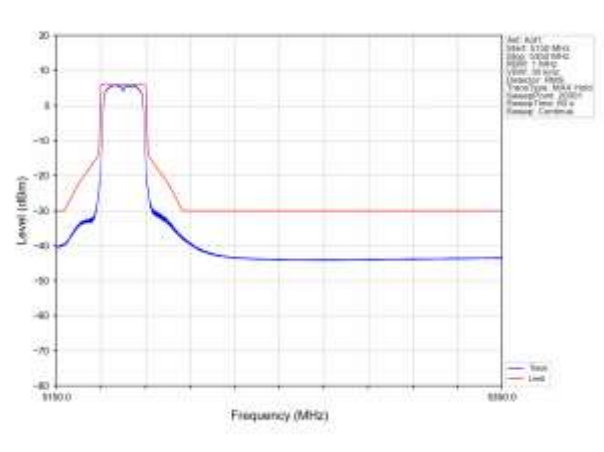
14.5 Test Result

Test plots-ANT 1
U-NII-1

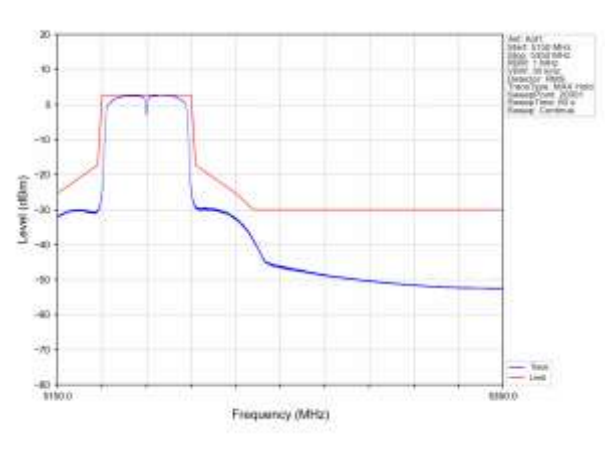
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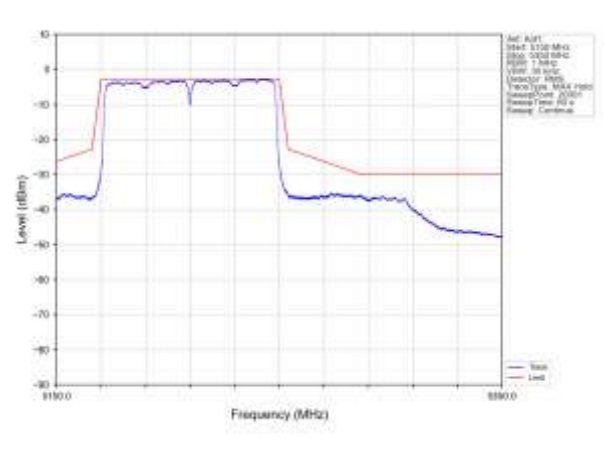
802.11n HT20 Low Channel



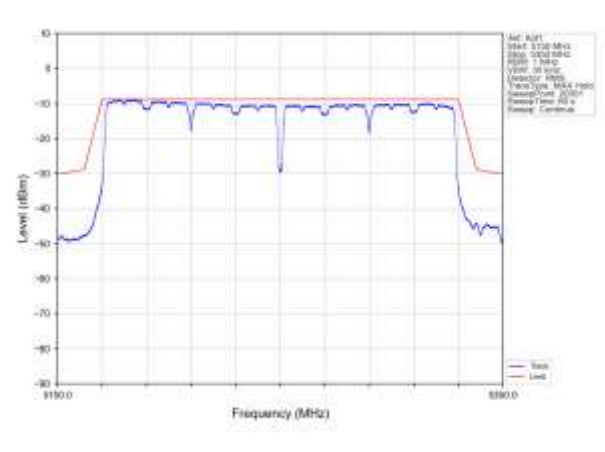
802.11n HT40 Low Channel



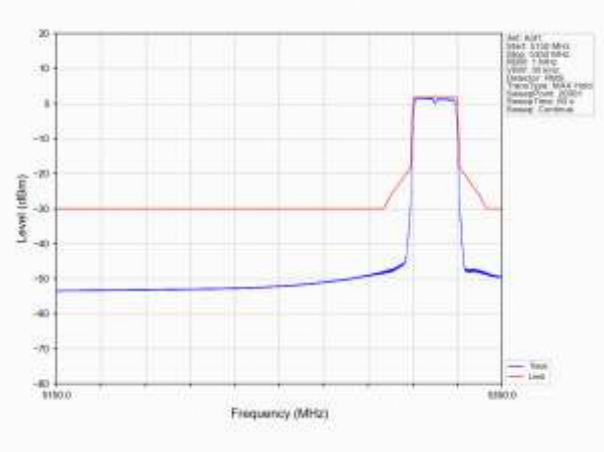
802.11ac VHT80 Low Channel



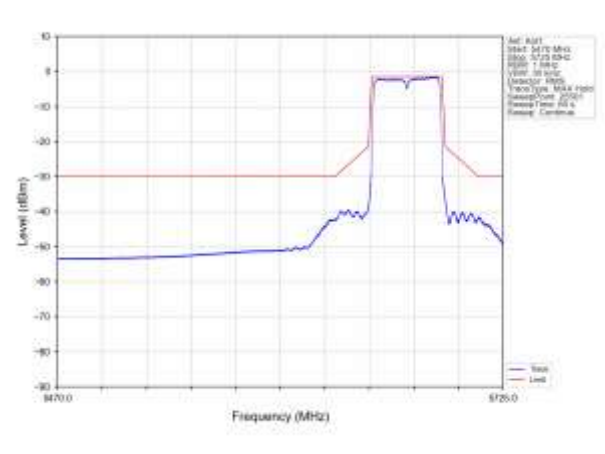
802.11ac VHT160 Low Channel



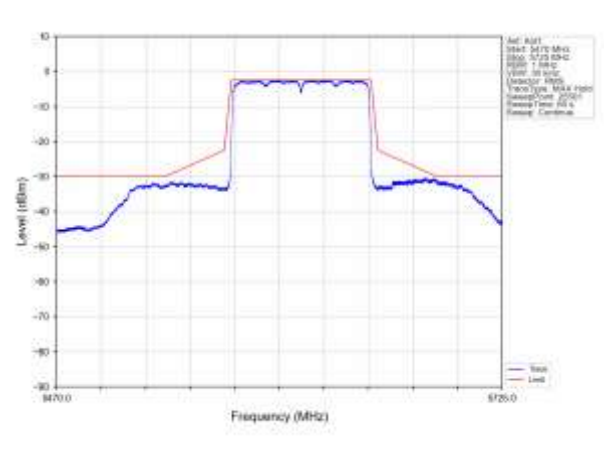
802.11ax HE20 Low Channel



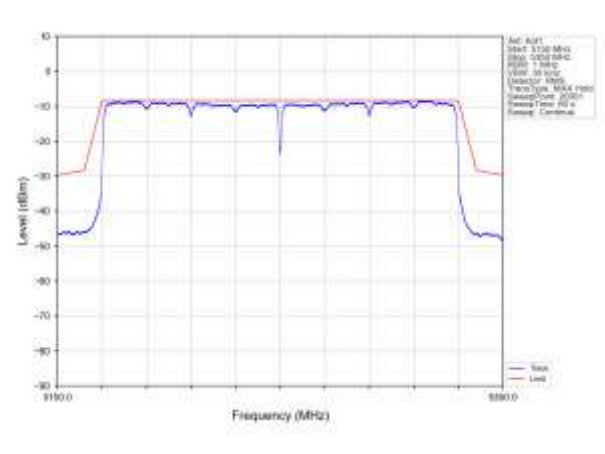
802.11ax HE40 Low Channel



802.11ax HE80 Low Channel

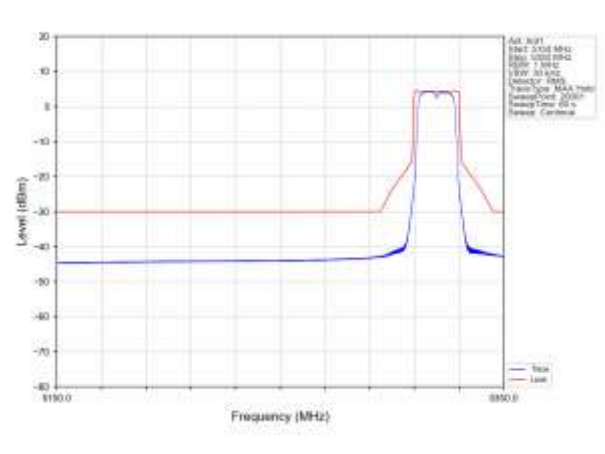


802.11ax HE160 Low Channel

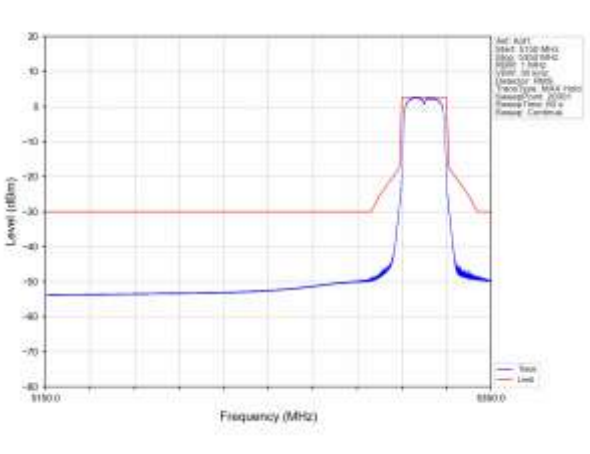


U-NII-2A

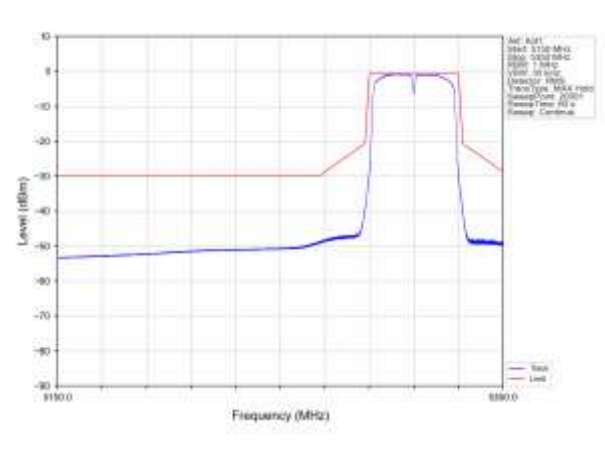
802.11a HT20 High Channel



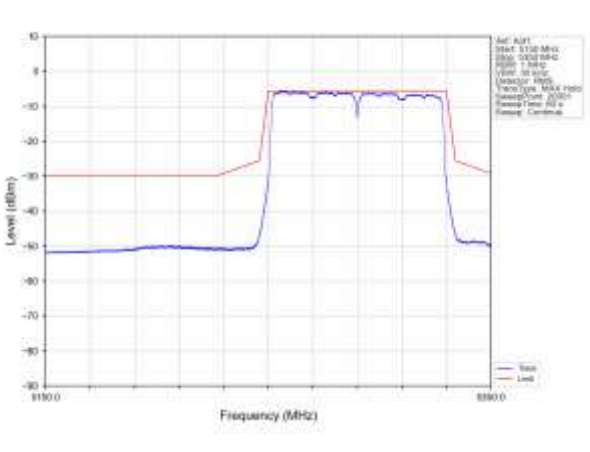
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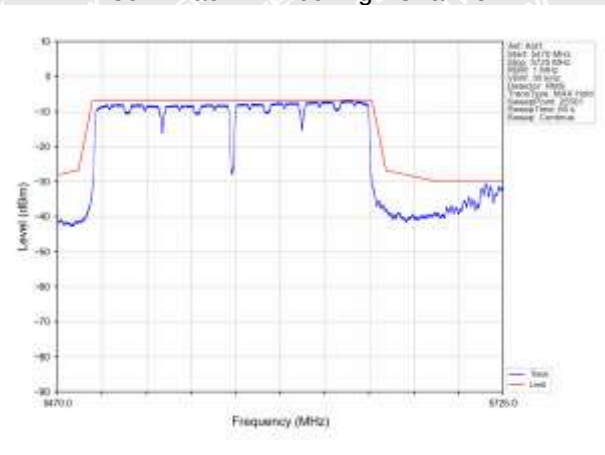
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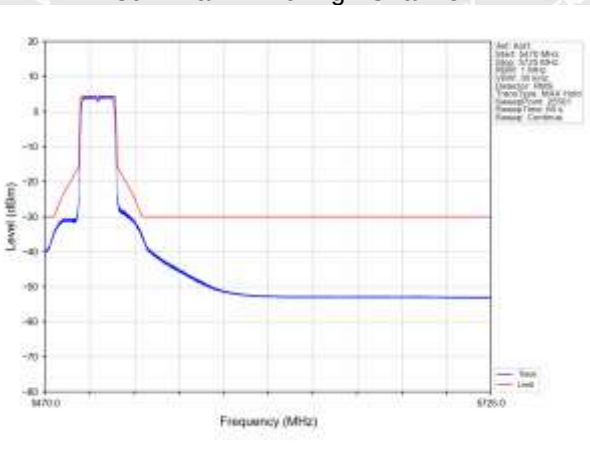
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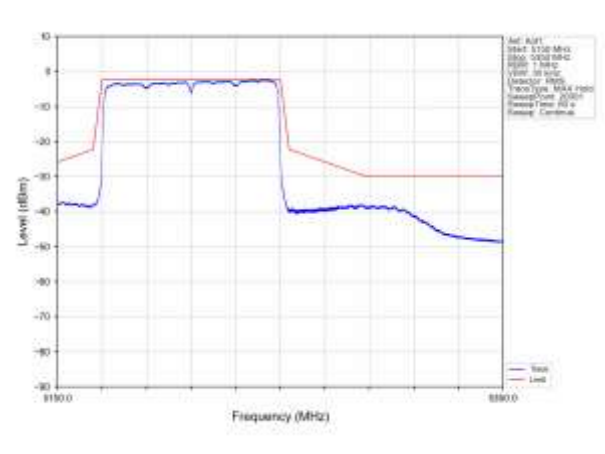
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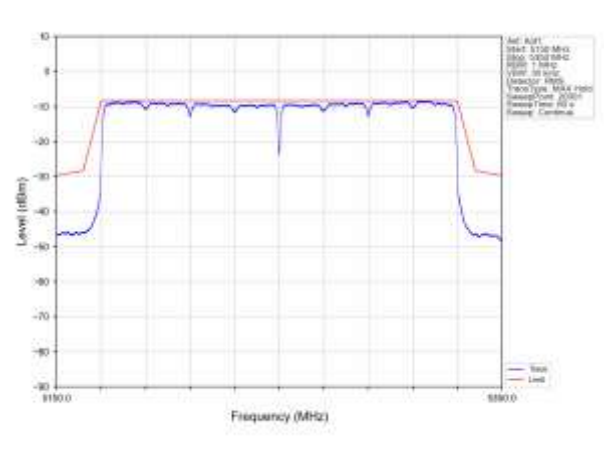
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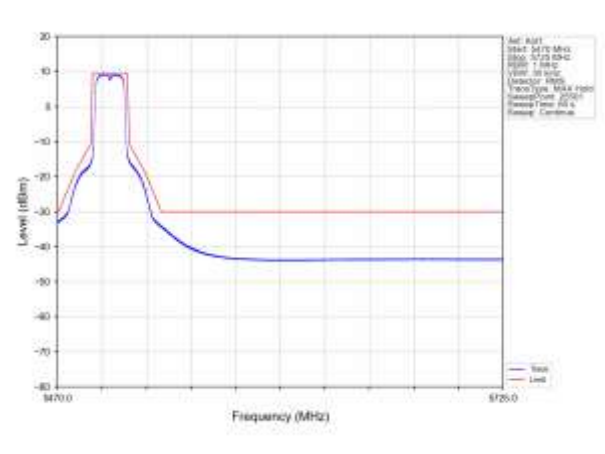


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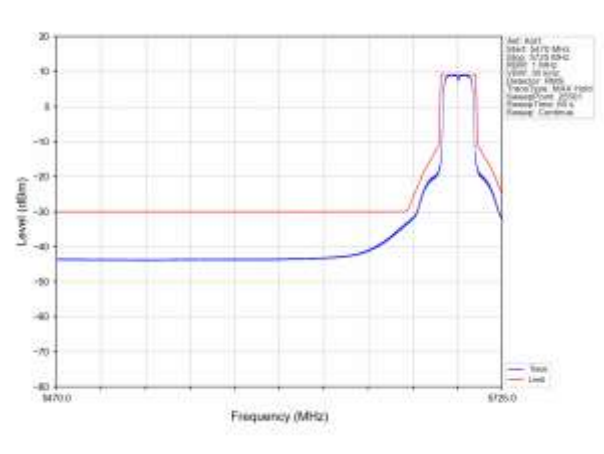


U-NII-2C

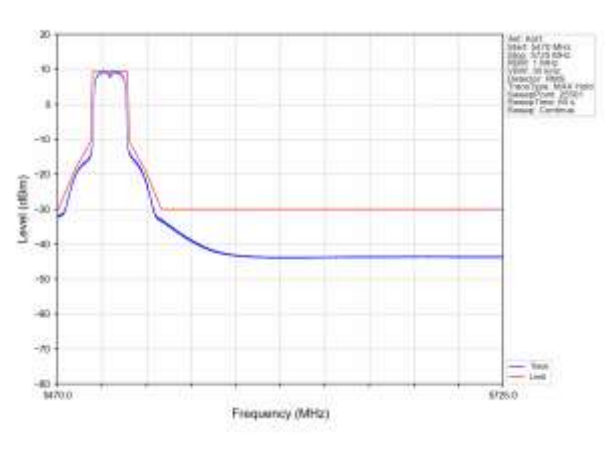
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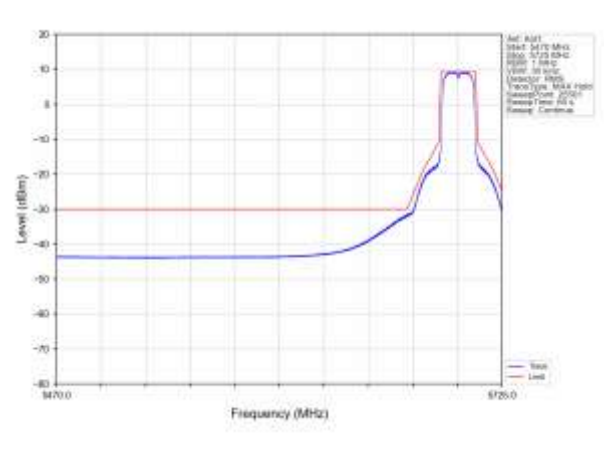
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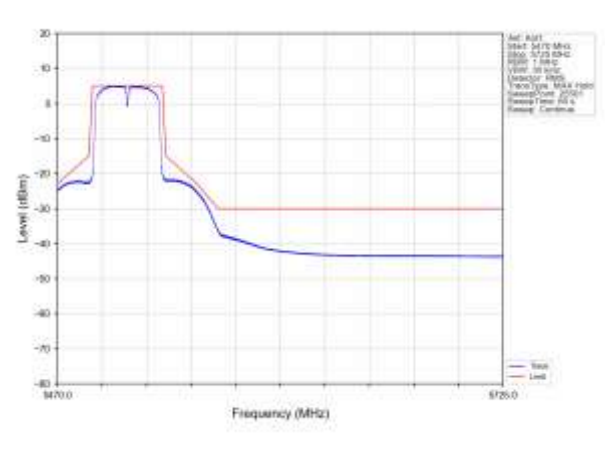
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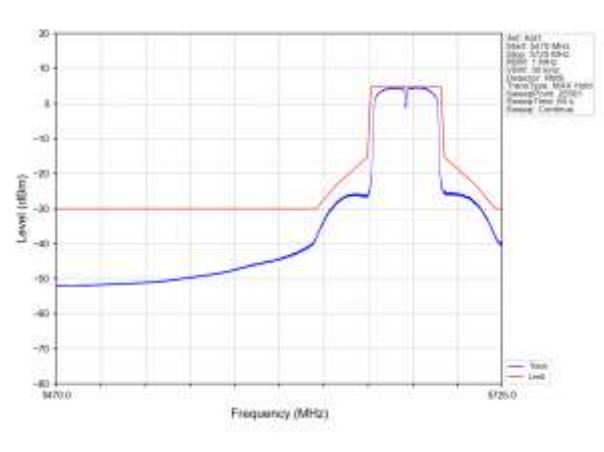
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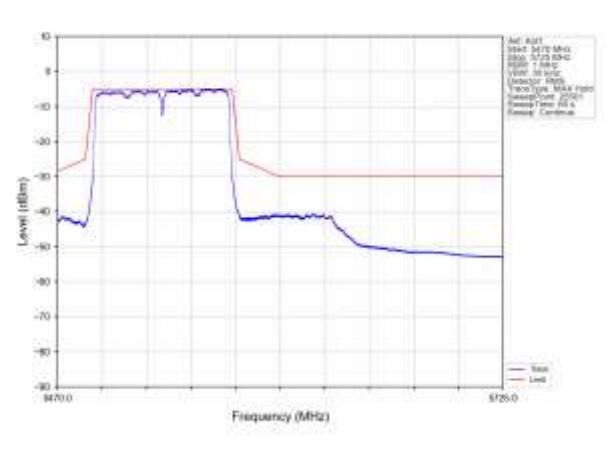
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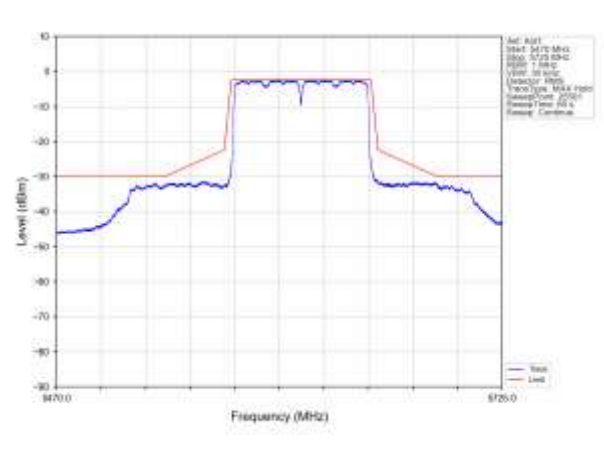
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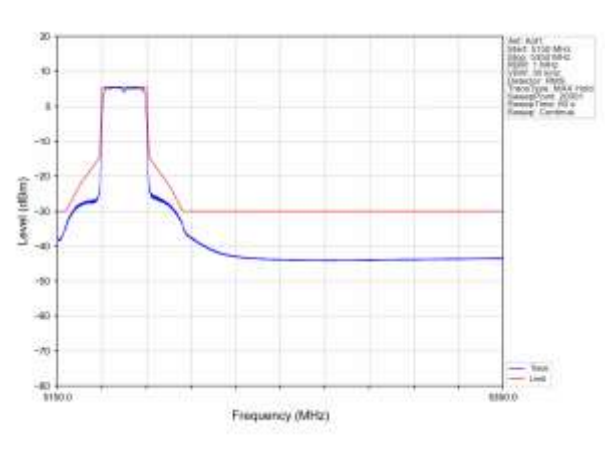
802.11ac VHT80 Low Channel



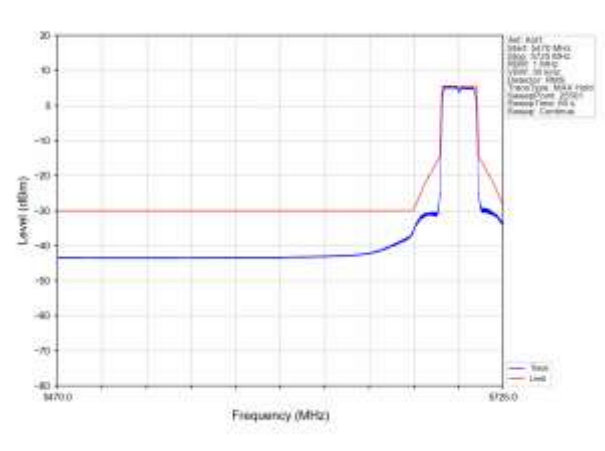
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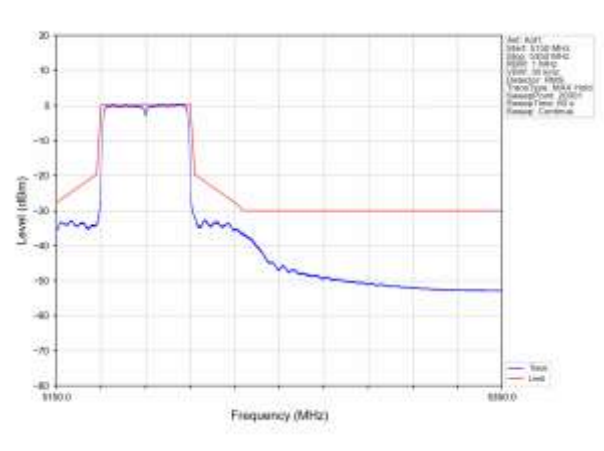
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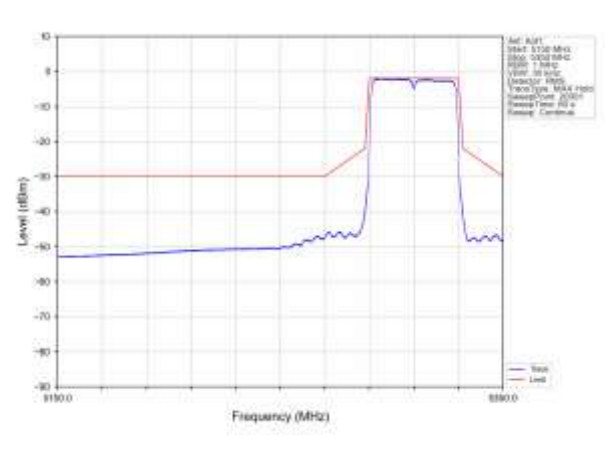
802.11ax HE20 Low Channel



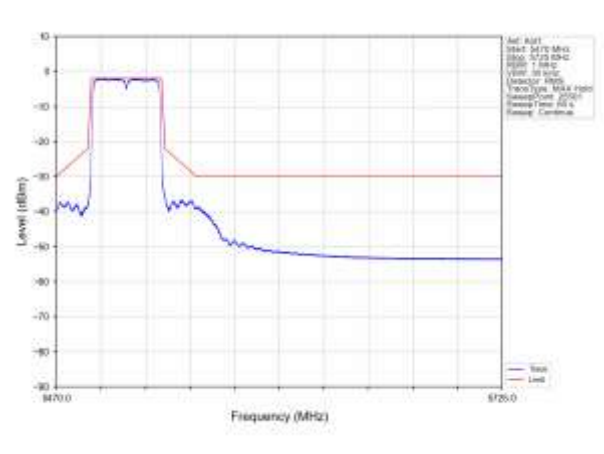
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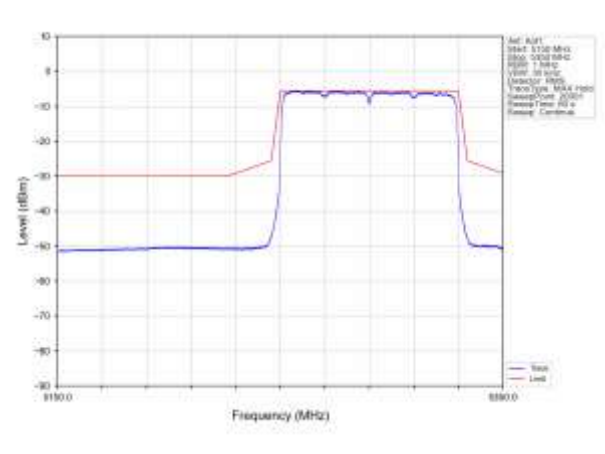
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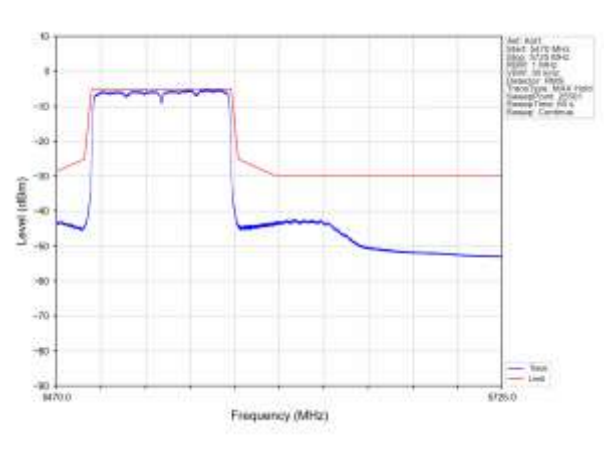
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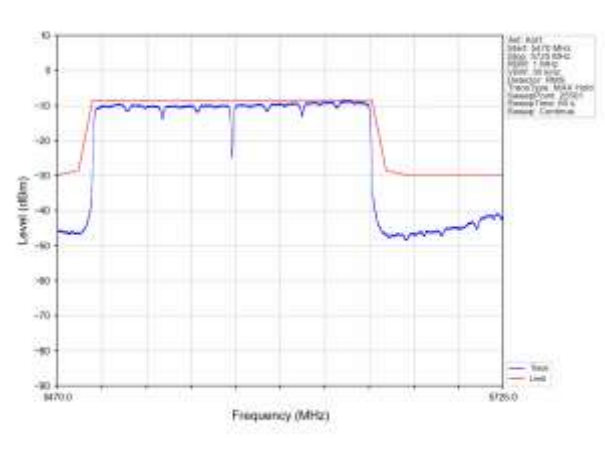
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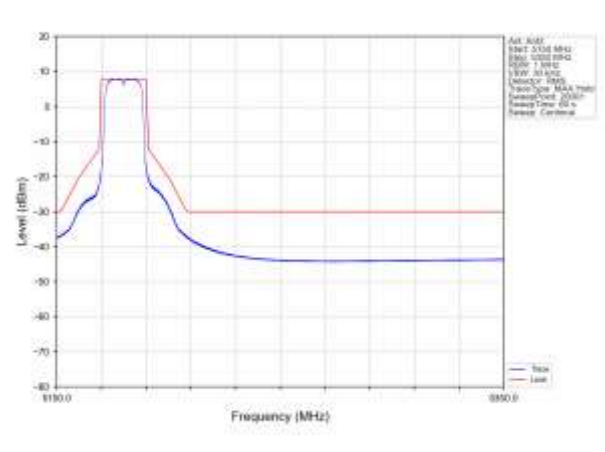


802.11ax HE160 Low Channel

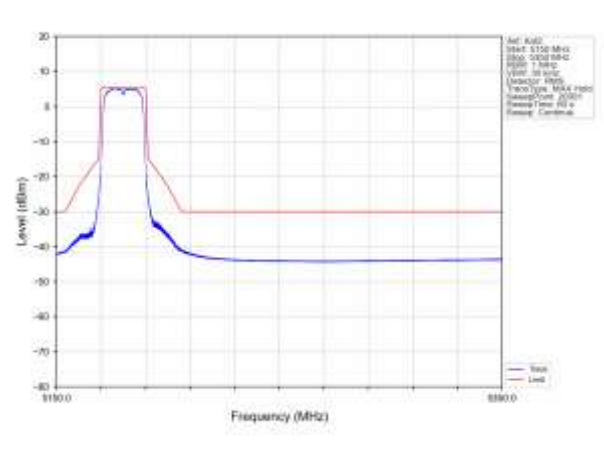


Test plots-ANT 2
U-NII-1

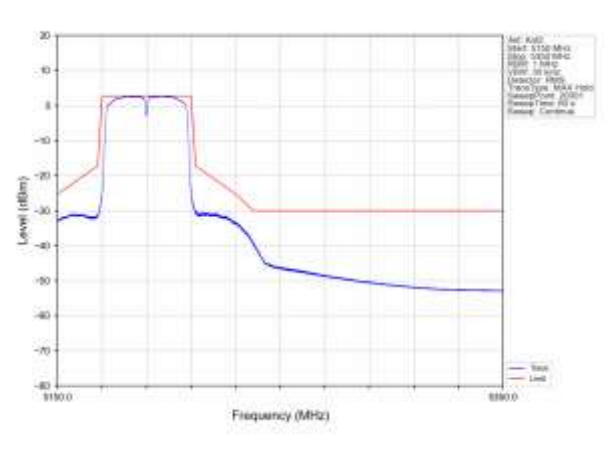
802.11a HT20 Low Channel



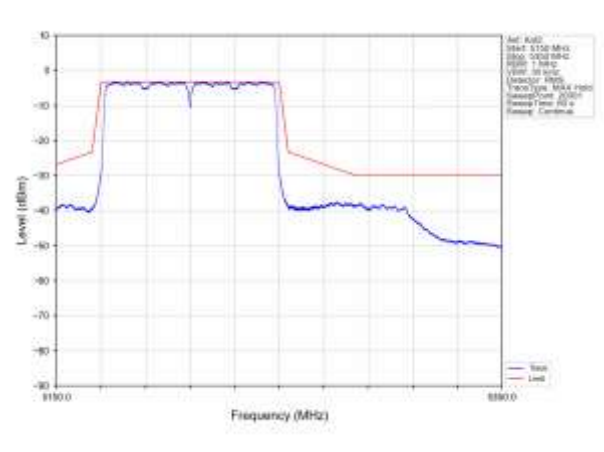
802.11n HT20 Low Channel



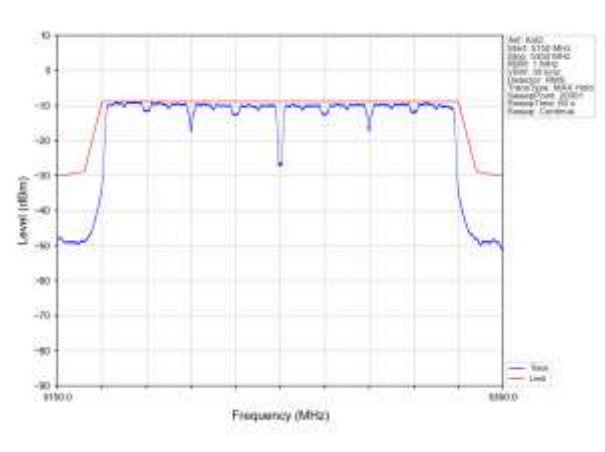
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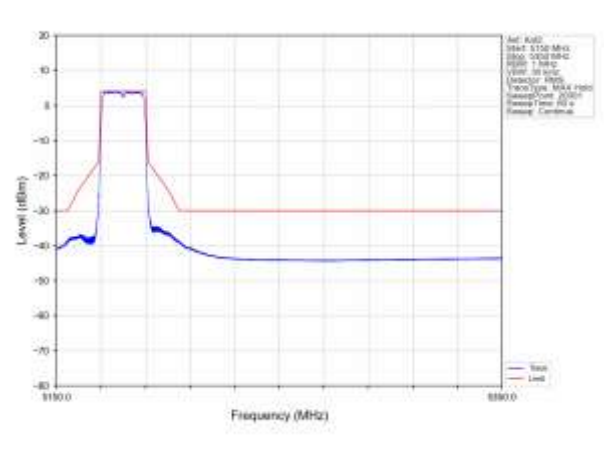
802.11ac VHT80 Low Channel



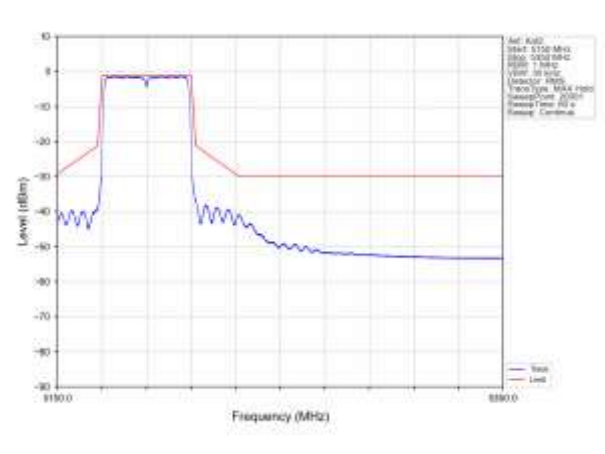
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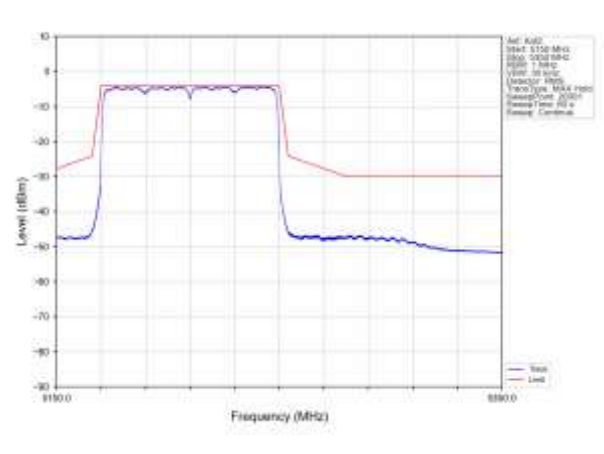
802.11ax HE20 Low Channel



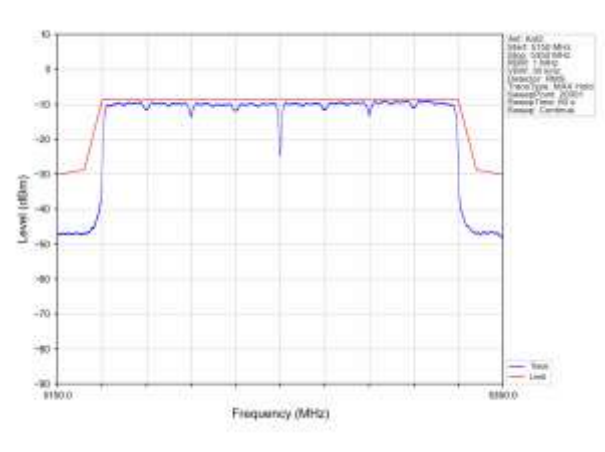
802.11ax HE40 Low Channel



802.11ax HE80 Low Channel

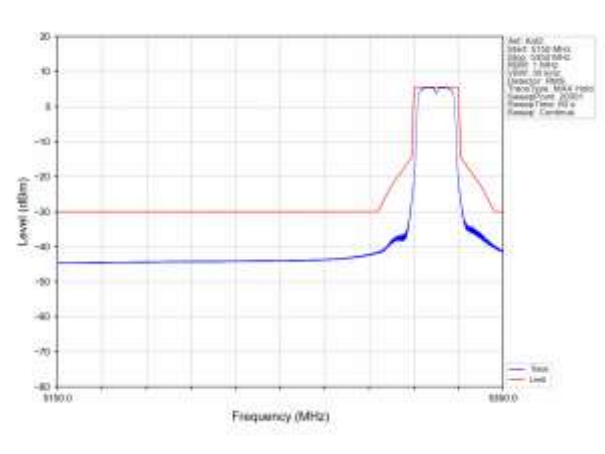


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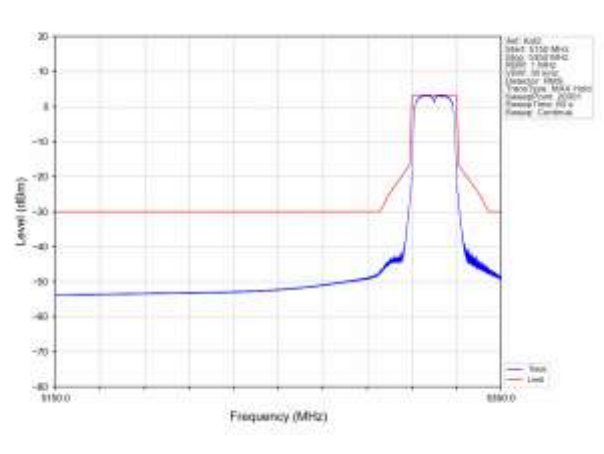


U-NII-2A

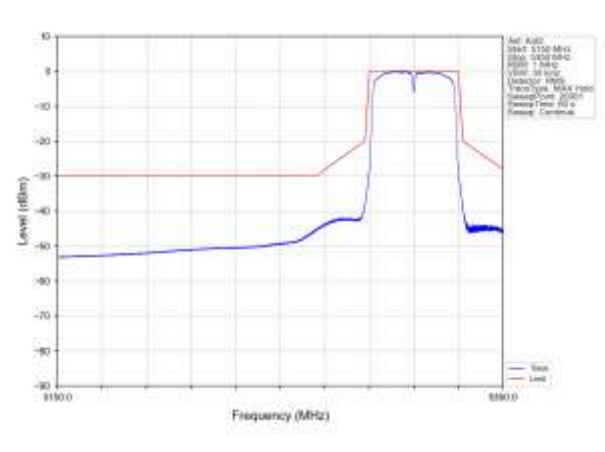
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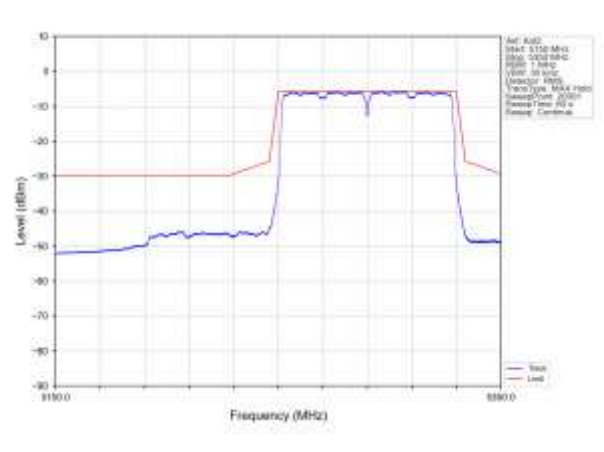
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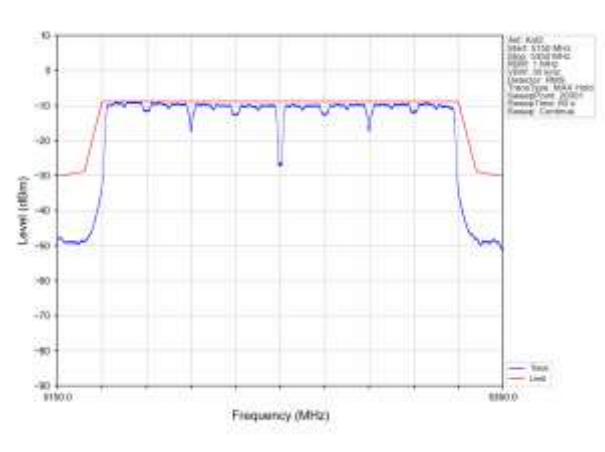
802.11n HT40 High Channel



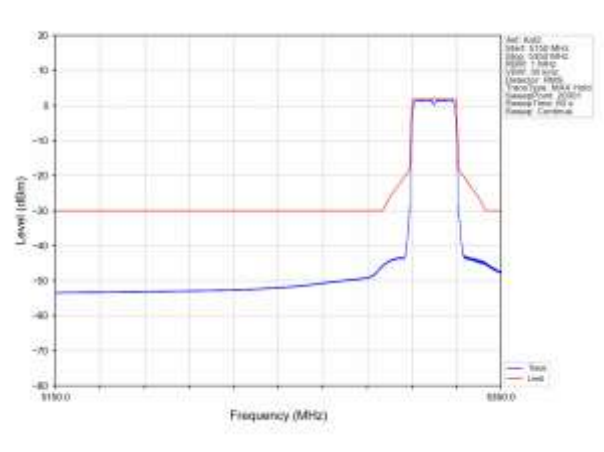
802.11ac VHT80 High Channel



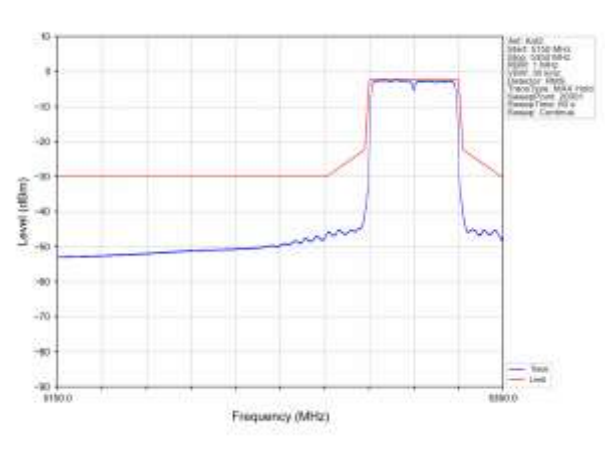
802.11ac VHT160 High Channel



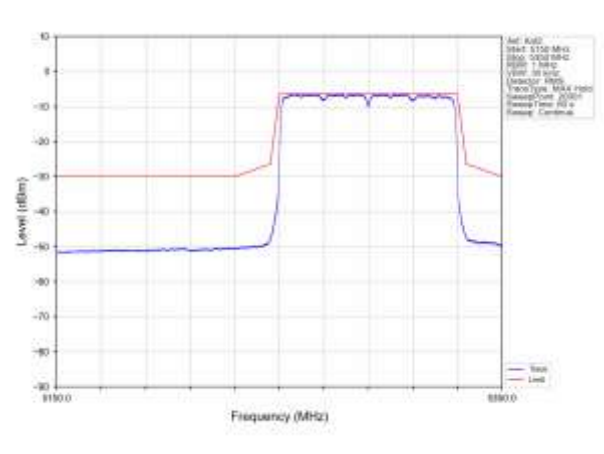
802.11ax HE20 High Channel



802.11ax HE40 High Channel

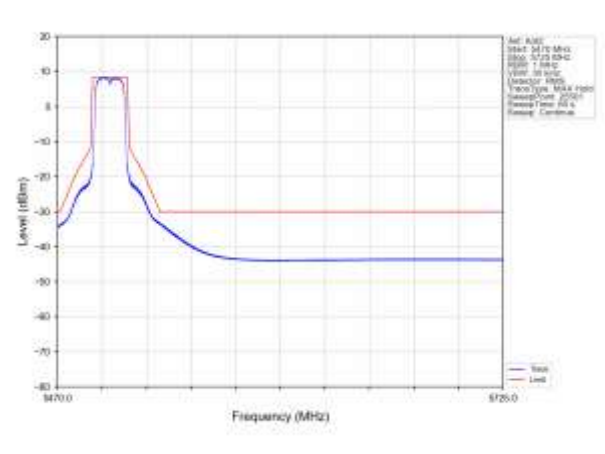


802.11ax HE80 High Channel

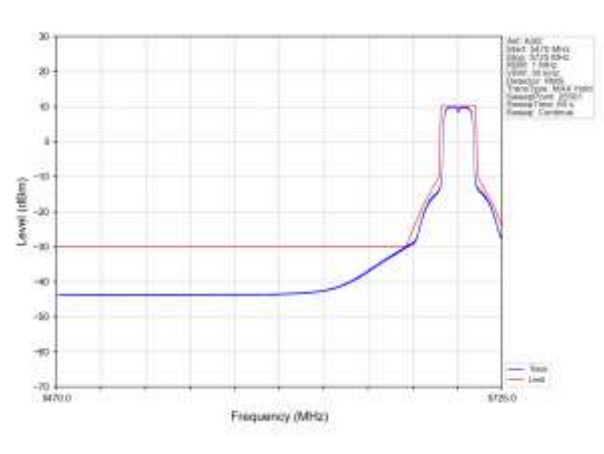


U-NII-2C

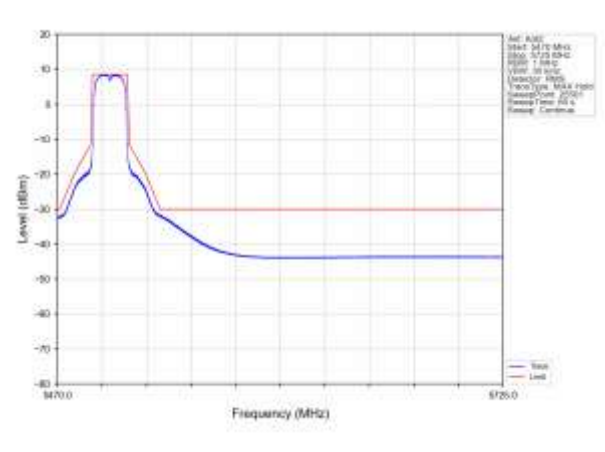
802.11a HT20 Low Channel



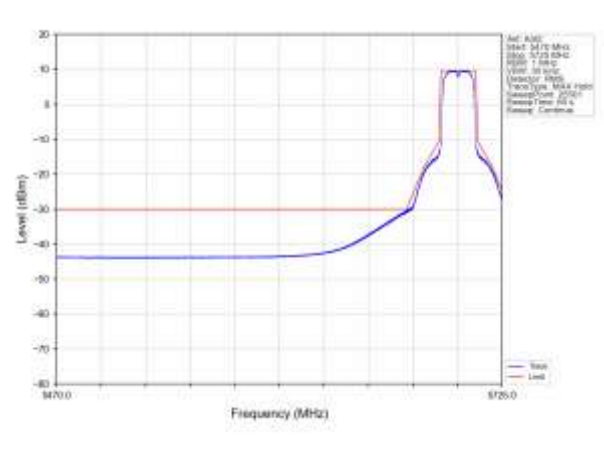
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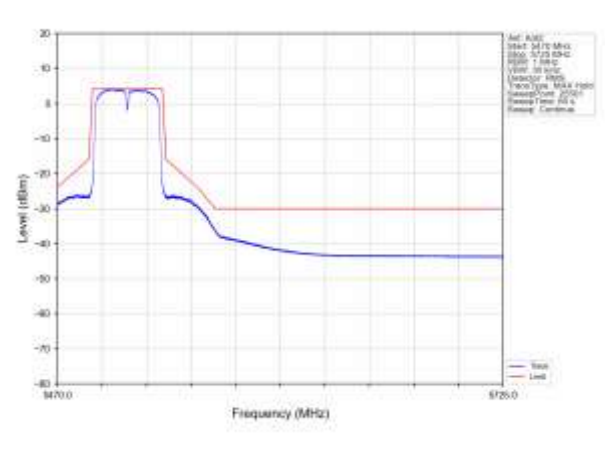
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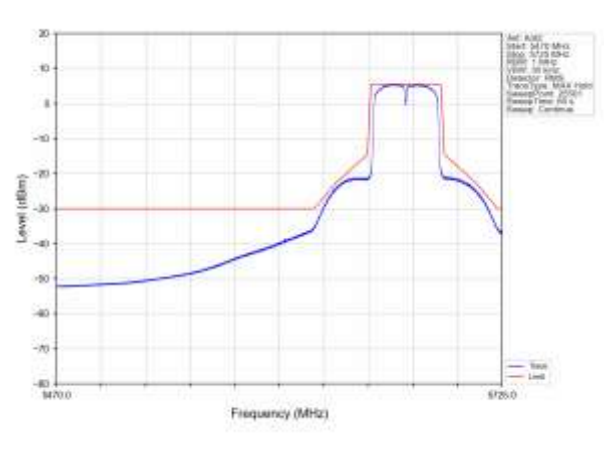
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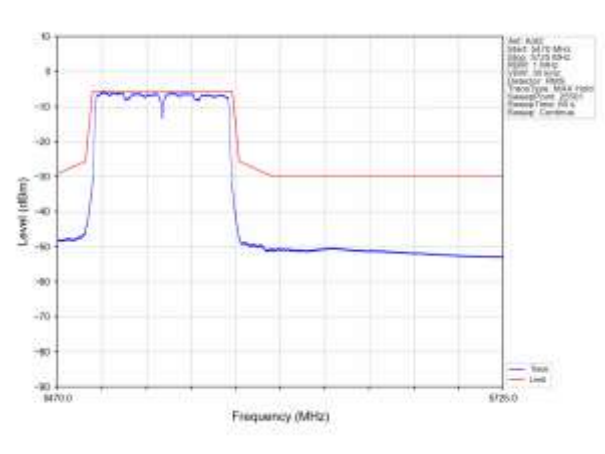
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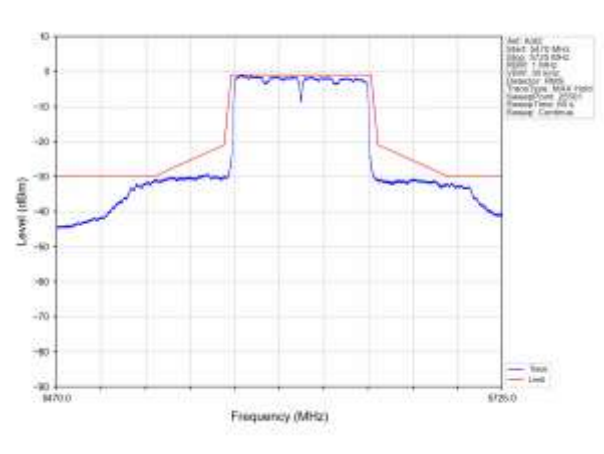
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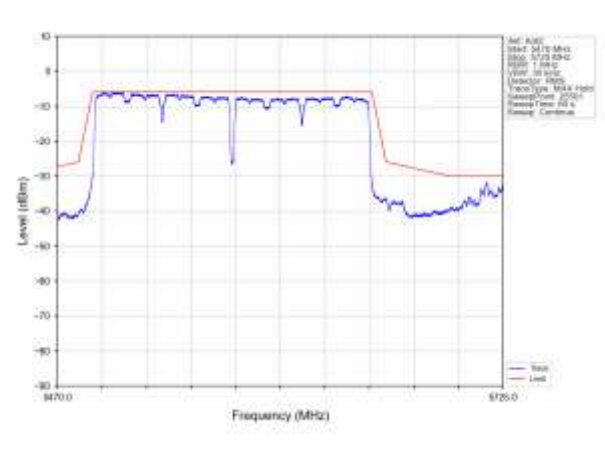
802.11ac VHT80 Low Channel



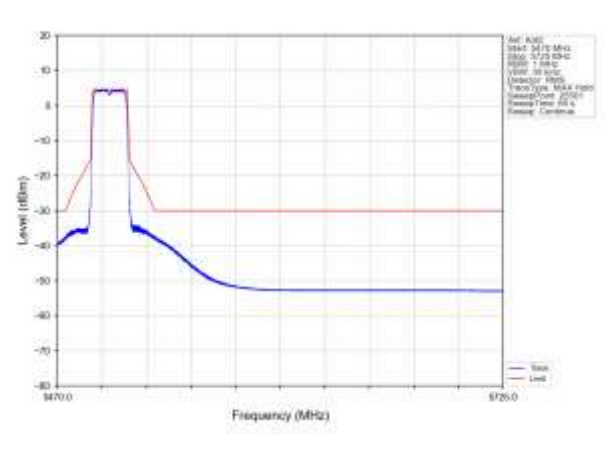
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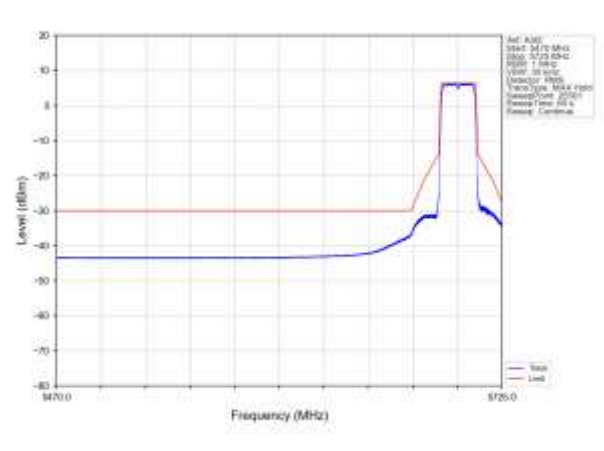
802.11ac VHT160 Low Channel



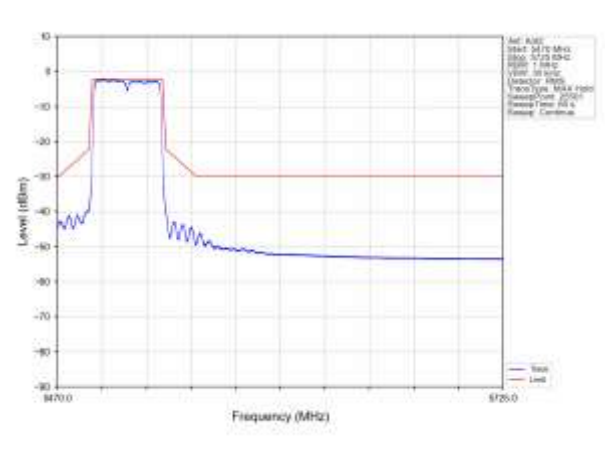
802.11ax HE20 Low Channel



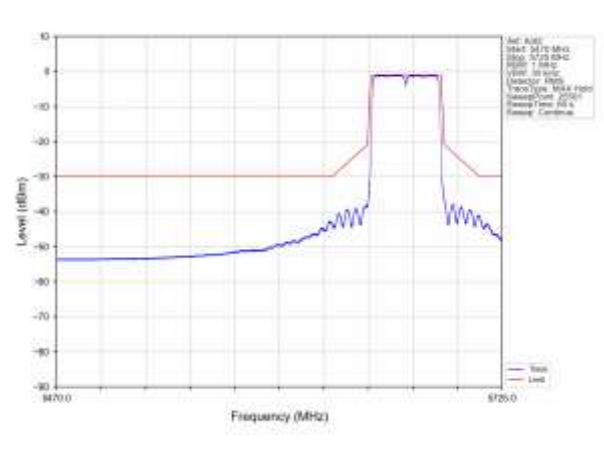
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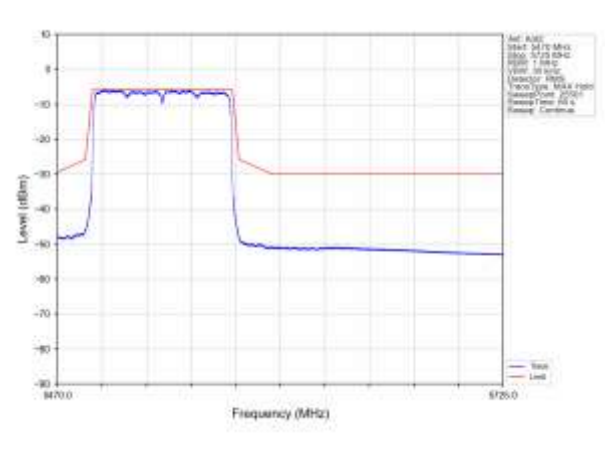
802.11ax HE40 Low Channel



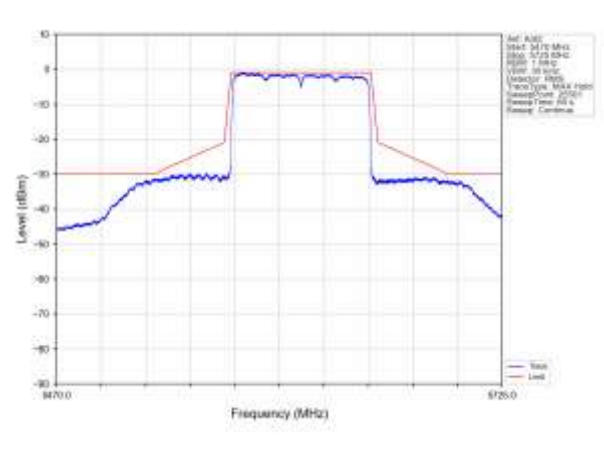
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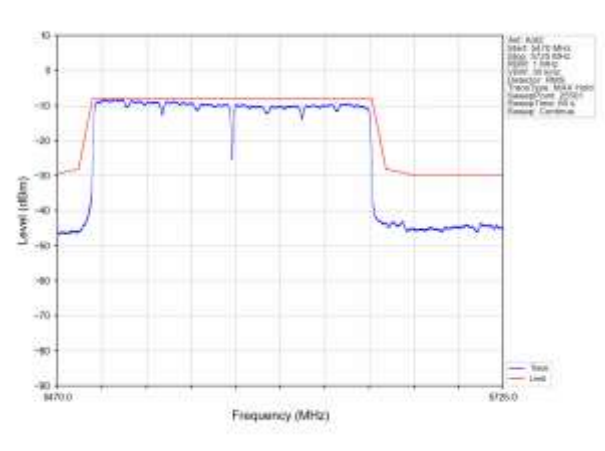
802.11ax HE80 Low Channel



802.11ax HE80 High Channel



802.11ax HE160 Low Channel



15 Receiver spurious emissions

15.1 Definition

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

15.2 Limit

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

15.3 EUT Operation Condition

The EUT was programmed to be in continuously receiving mode with normal condition.

15.4 Test Procedure

The test procedure below shall be used to identify potential receiver spurious emissions of the UUT.

Step 1:

- The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in clause 4.6.2, table 4.

Step 2:

- The emissions shall be measured over the range 30 MHz to 1 000 MHz.
- Spectrum analyser settings:
- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ≥ 9 700

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.3.7.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: Auto
- Wait for the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the limits given in clause 4.6.2, table 4, shall be individually measured using the procedure in clause 5.3.7.2.1.2 and compared to the limits given in clause 4.6.2, table 4.

Step 3:

- The emissions shall now be measured over the range 1 GHz to 26 GHz.
- Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Detector mode: Peak
- Trace mode: Max Hold
- Sweep Points: ≥ 25 000

For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.3.7.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: Auto
- Wait for the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the limits given in clause 4.6.2, table 4, shall be individually measured using the procedure in clause 5.3.7.2.1.2 and compared to the limits given in clause 4.6.2, table 4.

15.5 Test Result

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
ANT1 802.11a Channel 5180MHz										
216.46	35.94	189	1.4	H	-69.90	0.16	0.00	-70.06	-57.00	-13.06
216.46	34.03	160	1.0	V	-69.57	0.16	0.00	-69.73	-57.00	-12.73
1665.87	38.52	325	1.1	H	-70.94	2.68	12.70	-60.92	-47.00	-13.92
1665.87	38.87	324	1.3	V	-69.32	2.68	12.70	-59.30	-47.00	-12.30
ANT1+ANT2 802.11n20 Channel 5180MHz										
216.46	35.29	260	1.1	H	-70.55	0.16	0.00	-70.71	-57.00	-13.71
216.46	33.25	169	1.4	V	-70.35	0.16	0.00	-70.51	-57.00	-13.51
1665.87	38.11	221	1.5	H	-71.35	2.68	12.70	-61.33	-47.00	-14.33
1665.87	38.72	144	1.9	V	-69.47	2.68	12.70	-59.45	-47.00	-12.45
ANT1+ANT2 802.11n40 Channel 5190MHz										
216.46	34.77	241	1.5	H	-71.07	0.16	0.00	-71.23	-57.00	-14.23
216.46	33.81	38	1.1	V	-69.79	0.16	0.00	-69.95	-57.00	-12.95
1665.87	38.80	319	1.4	H	-70.23	2.68	12.70	-60.21	-47.00	-13.21
1665.87	39.47	81	1.5	V	-69.09	2.68	12.70	-59.07	-47.00	-12.07
ANT1+ANT2 802.11ac80 Channel 5210MHz										
216.46	34.10	99	1.7	H	-71.74	0.16	0.00	-71.90	-57.00	-14.90
216.46	33.34	75	1.2	V	-70.26	0.16	0.00	-70.42	-57.00	-13.42
1665.87	39.60	188	2.0	H	-69.86	2.68	12.70	-59.84	-47.00	-12.84
1665.87	39.36	54	1.1	V	-68.83	2.68	12.70	-58.81	-47.00	-11.81

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
ANT1+ANT2 802.11ax20 Channel 5180MHz										
216.46	34.29	48	1.0	H	-71.55	0.16	0.00	-71.71	-57.00	-14.71
216.46	33.63	211	1.8	V	-69.97	0.16	0.00	-70.13	-57.00	-13.13
1665.87	39.77	43	1.3	H	-69.69	2.68	12.70	-59.67	-47.00	-12.67
1665.87	38.67	305	1.7	V	-69.52	2.68	12.70	-59.50	-47.00	-12.50
ANT1+ANT2 802.11ax40 Channel 5190MHz										
216.46	34.22	145	1.4	H	-71.62	0.16	0.00	-71.78	-57.00	-14.78
216.46	33.39	276	1.8	V	-70.21	0.16	0.00	-70.37	-57.00	-13.37
1665.87	39.10	204	1.2	H	-70.36	2.68	12.70	-60.34	-47.00	-13.34
1665.87	38.53	259	1.2	V	-69.66	2.68	12.70	-59.64	-47.00	-12.64
ANT1+ANT2 802.11ax80 Channel 5210MHz										
216.46	34.84	170	1.9	H	-71.00	0.16	0.00	-71.16	-57.00	-14.16
216.46	36.36	170	1.2	V	-67.24	0.16	0.00	-67.40	-57.00	-10.40
1665.87	36.42	0	1.5	H	-73.04	2.68	12.70	-63.02	-47.00	-16.02
1665.87	40.83	6	1.8	V	-67.36	2.68	12.70	-57.34	-47.00	-10.34

Note: All test modes were tested, only record the worst case.

16 Adaptivity (Channel Access Mechanism)

16.1 Definition

Adaptivity is an automatic channel access mechanism by which a device avoids transmissions in a channel in the presence of transmissions from other RLAN devices in that channel.
NOTE: Adaptivity is not intended to be used as an alternative to DFS to detect radar transmissions, but to detect transmissions from other RLAN devices operating in the band. DFS requirements are covered by clause 4.7.

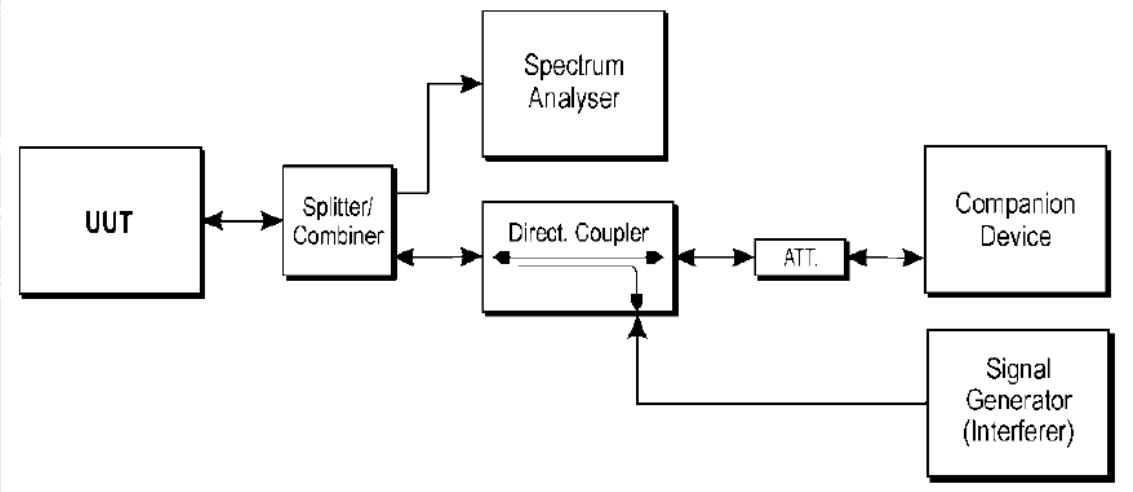
16.2 Limit

Refer to section 4.8.3 of EN 301 893 V1.8.1

16.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode with normal condition.

16.4 Test Procedure



16.5 Test Result

Mode	Frequency (MHz)	Antenna	Interfer Type	Interfer Level (dBm)	Short Control (ms)	Limit (ms)	Short Control (n)	Limit (n)	Verdict
802.11a	5180	ANT1	AWGN	-81.66	0.00	<=2.5	0	<=50	Pass
			LTE	-81.66	0.00	<=2.5	0	<=50	Pass
			OFDM	-81.66	0.00	<=2.5	0	<=50	Pass
802.11n HT20	5180	ANT 1	AWGN	-79.73	0.00	<=2.5	0	<=50	Pass
			LTE	-79.73	0.00	<=2.5	0	<=50	Pass
			OFDM	-79.73	0.00	<=2.5	0	<=50	Pass
802.11n HT40	5190	ANT 1	AWGN	-79.87	0.00	<=2.5	0	<=50	Pass
			LTE	-79.87	0.00	<=2.5	0	<=50	Pass
			OFDM	-79.87	0.00	<=2.5	0	<=50	Pass
802.11ax (HE20)	5180	ANT 1	AWGN	-80.50	0.00	<=2.5	0	<=50	Pass
			LTE	-80.50	0.00	<=2.5	0	<=50	Pass
			OFDM	-80.50	0.00	<=2.5	0	<=50	Pass
802.11ax (HE40)	5190	ANT1	AWGN	-81.93	0.00	<=2.5	0	<=50	Pass
			LTE	-81.93	0.00	<=2.5	0	<=50	Pass
			OFDM	-81.93	0.00	<=2.5	0	<=50	Pass

Mode	Frequency (MHz)	Antenna	Priority Class	Max COT (ms)	Limit COT (ms)	Verdict
802.11a	5180	Ant1	4	0.508	<=2	Pass
802.11n (HT20)	5180	Ant1	4	0.502	<=2	Pass
802.11n (HT40)	5190	Ant1	4	0.531	<=2	Pass
802.11ax (HE20)	5180	Ant1	4	0.559	<=2	Pass
802.11ax (HE40)	5190	Ant1	4	0.530	<=2	Pass

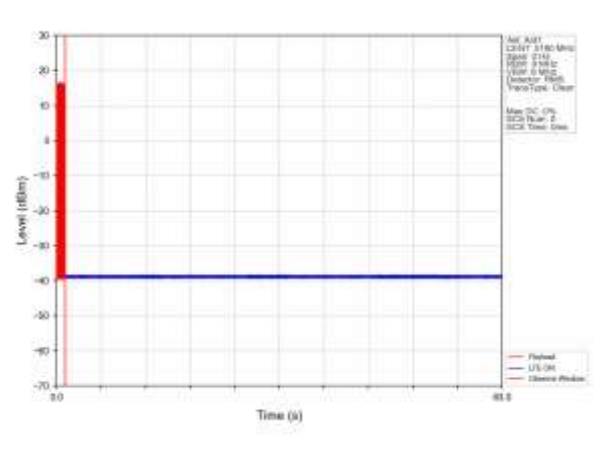
Mode	Frequency (MHz)	Antenna	Priority Class	Verdict
802.11a	5180	ANT 1	4	Pass
802.11n (HT20)	5180	ANT 1	4	Pass
802.11n (HT40)	5190	ANT 1	4	Pass
802.11ax (HE20)	5180	ANT 1	4	Pass
802.11ax (HE40)	5190	ANT 1	4	Pass

Remark: only the worst case ANT1(802.11a mode) was recorded.

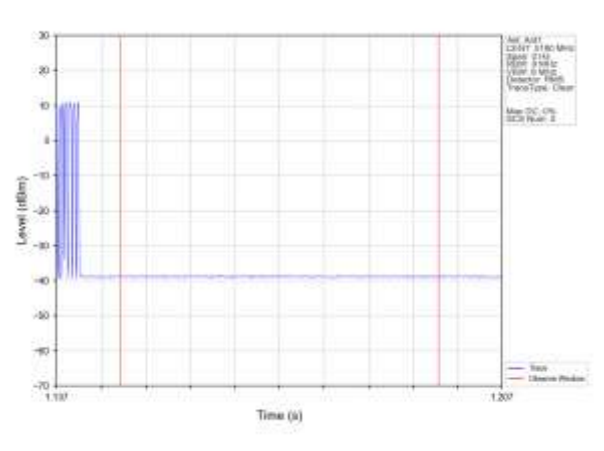
Test Plots-ANT 1

802.11a
AWGN

Adaptivity and Blocking

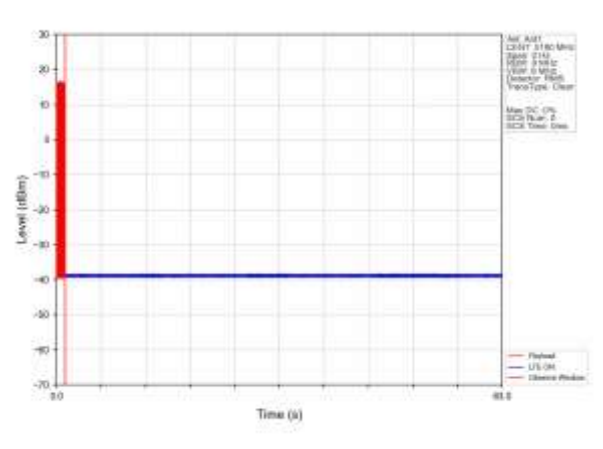


Short Control Signal

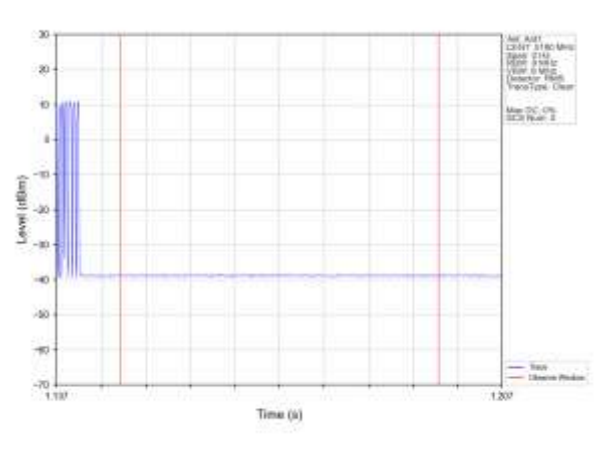


LTE

Adaptivity and Blocking

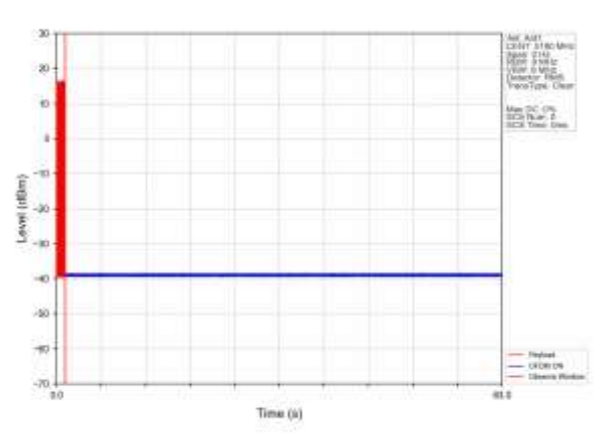


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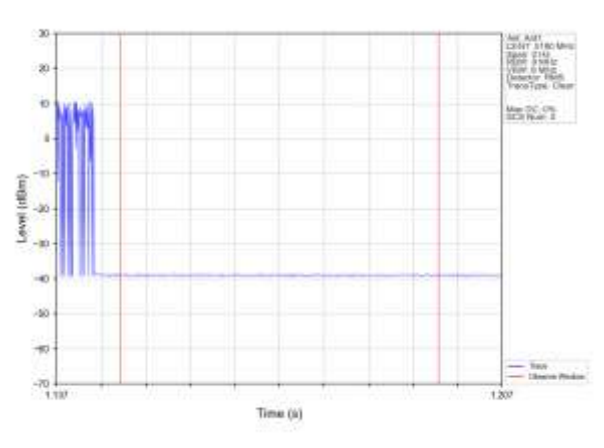


OFDM

Adaptivity and Blocking

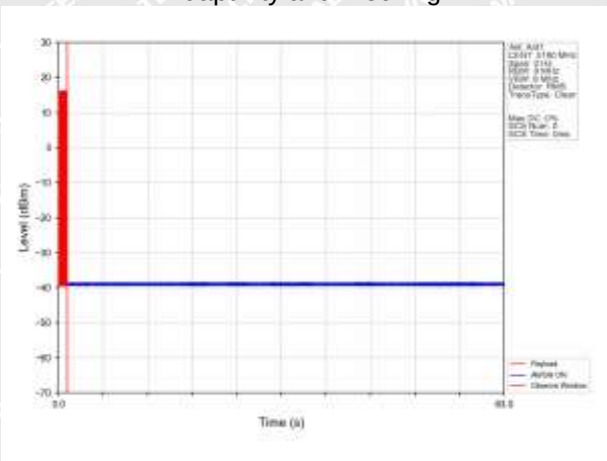


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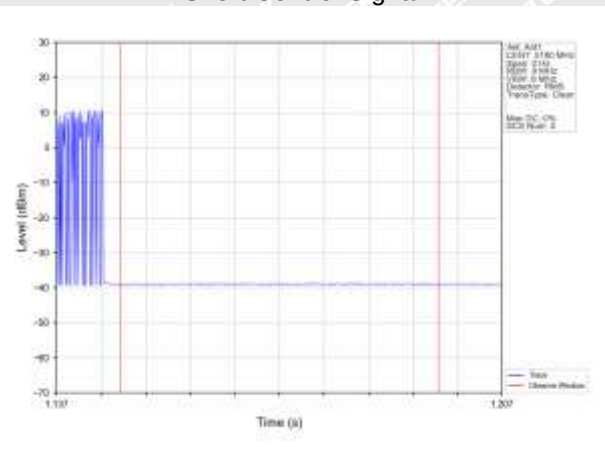


802.11n(HT20)
AWGN

Adaptivity and Blocking

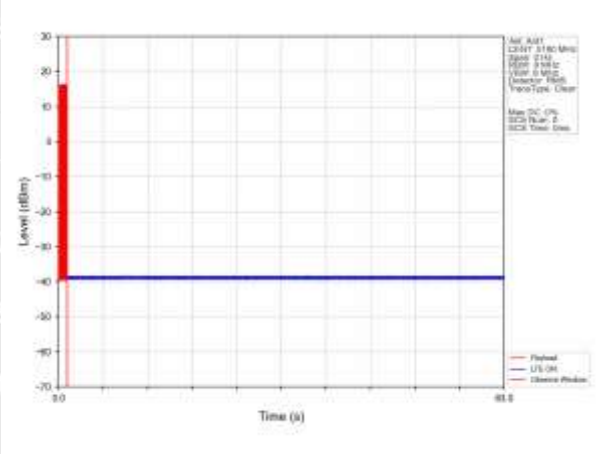


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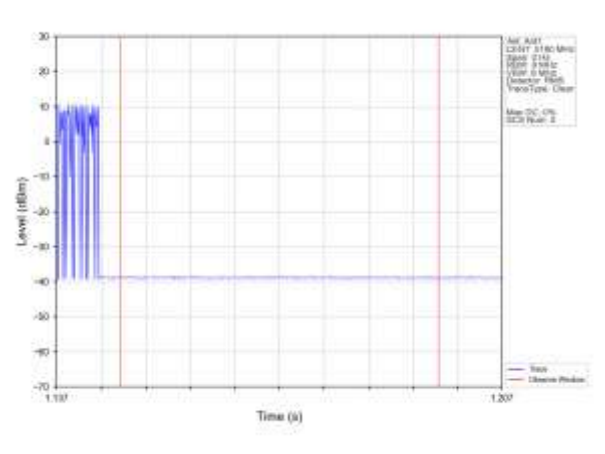


LTE

Adaptivity and Blocking

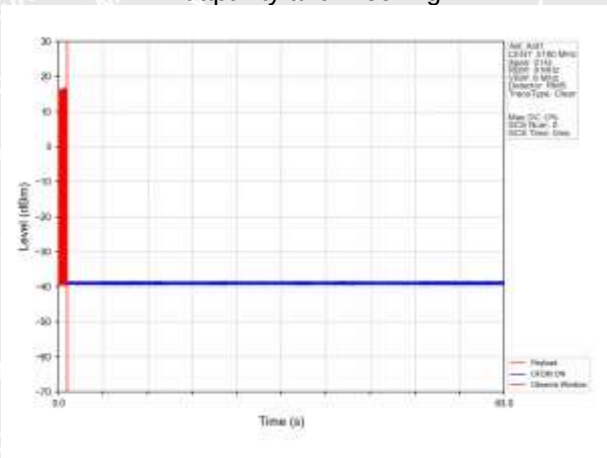


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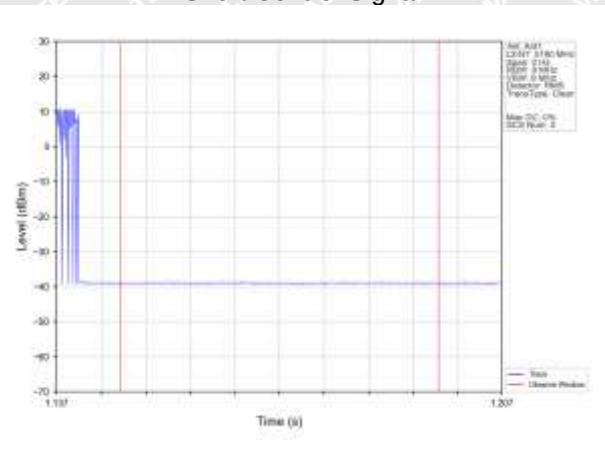


OFDM

Adaptivity and Blocking

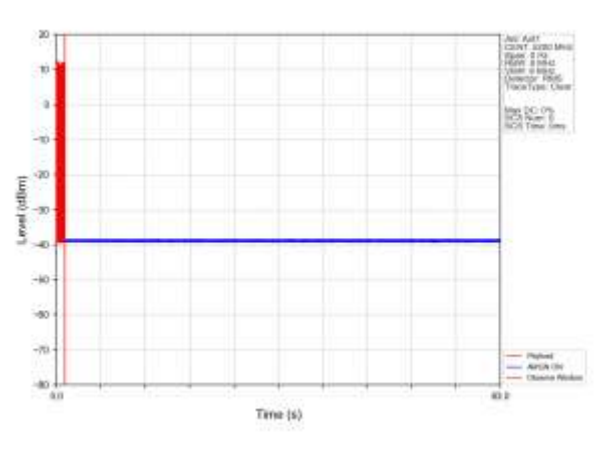


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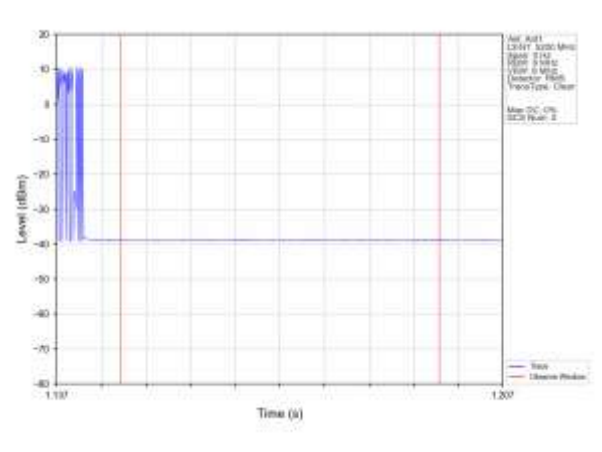


802.11n(HT40)
AWGN

Adaptivity and Blocking

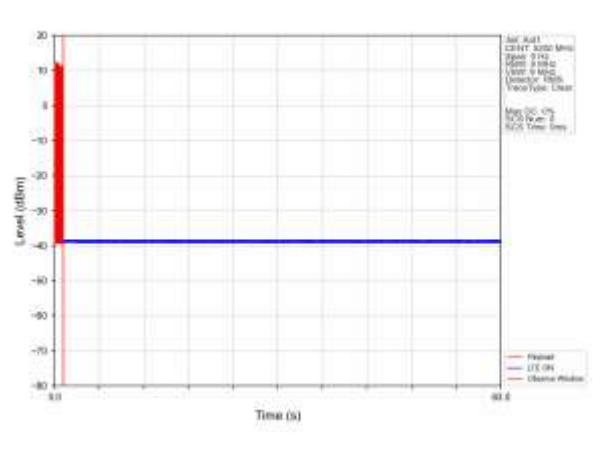


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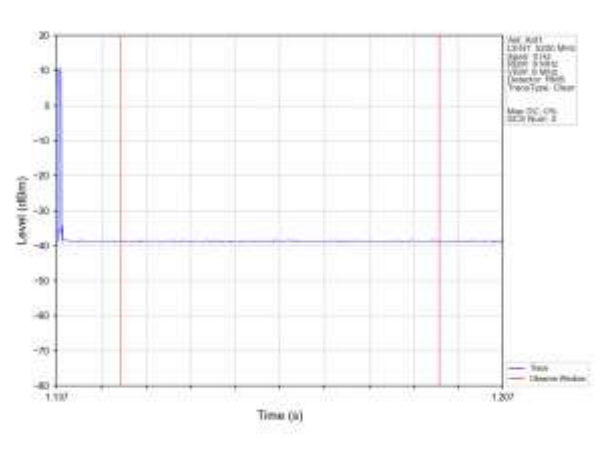


LTE

Adaptivity and Blocking

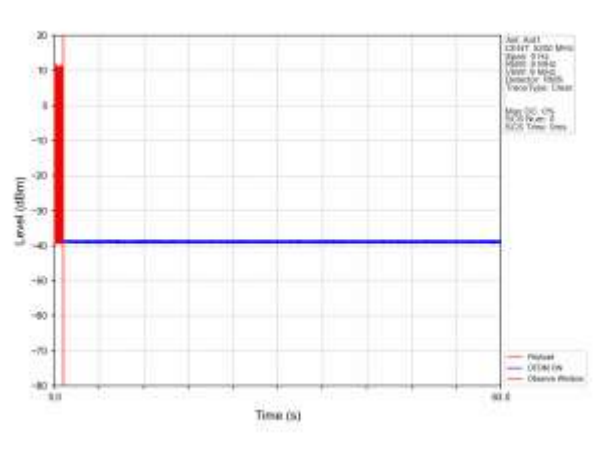


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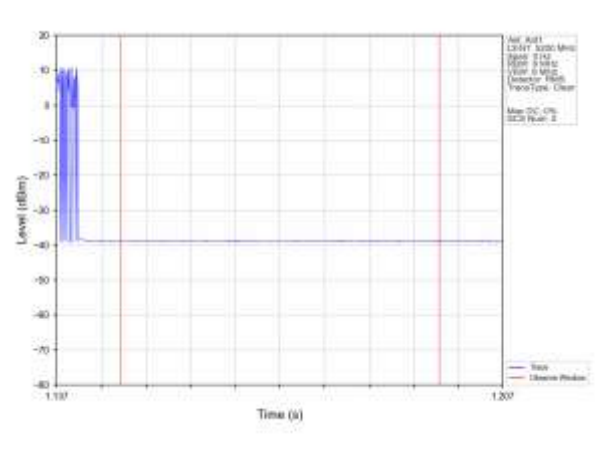


OFDM

Adaptivity and Blocking

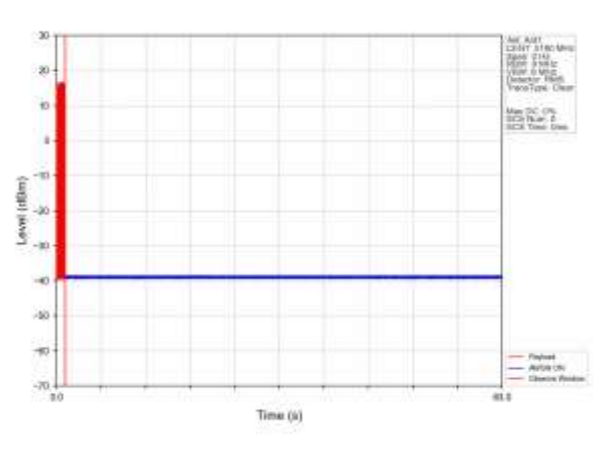


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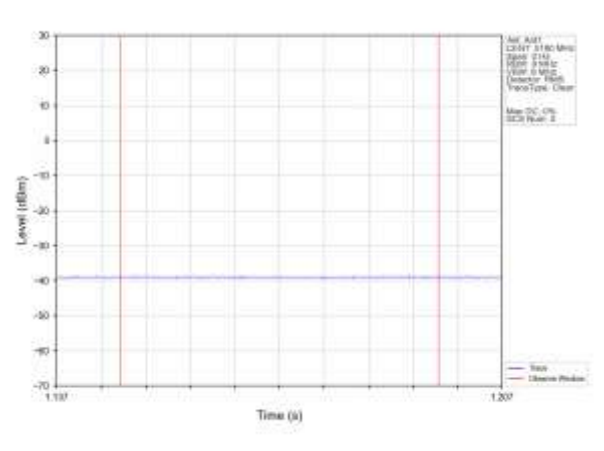


802.11ax(HT20)
AWGN

Adaptivity and Blocking

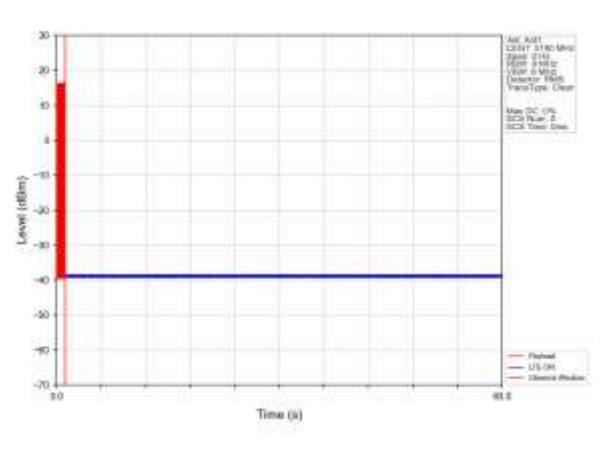


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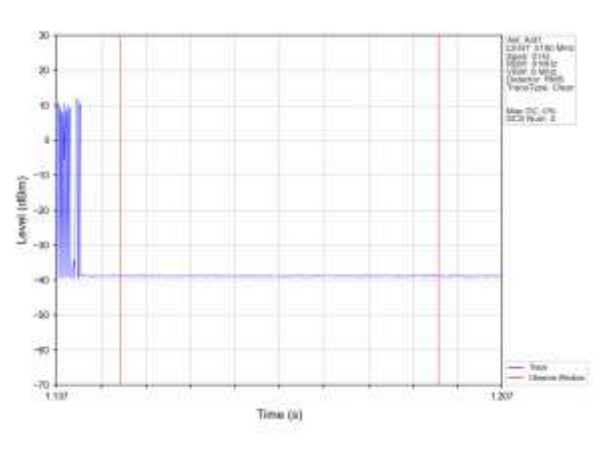


LTE

Adaptivity and Blocking

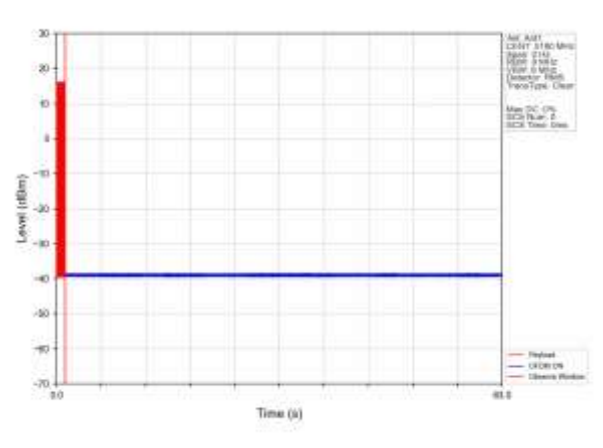


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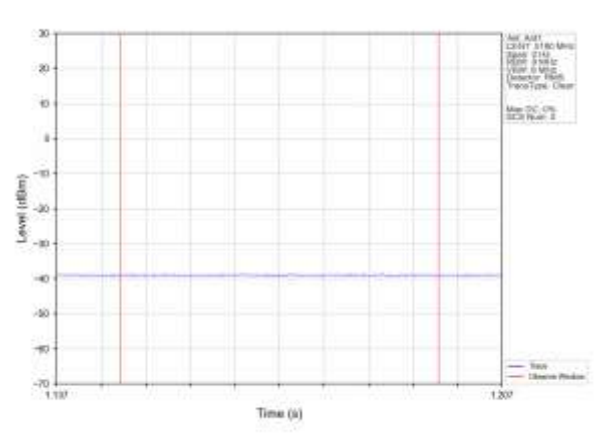


OFDM

Adaptivity and Blocking

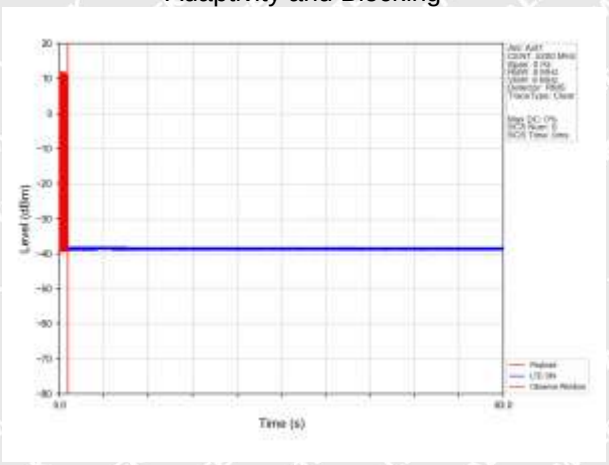


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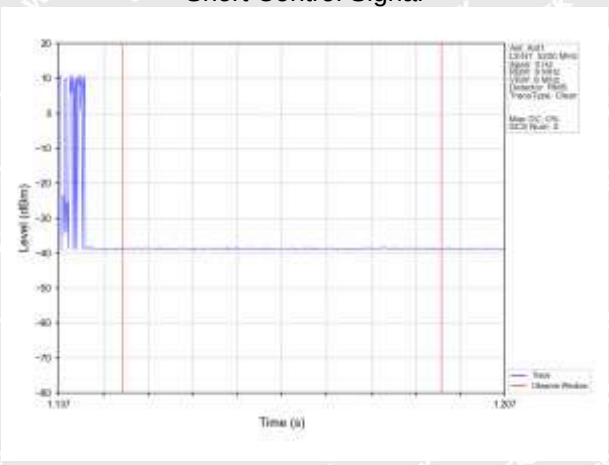


802.11ax(HT40)
AWGN

Adaptivity and Blocking

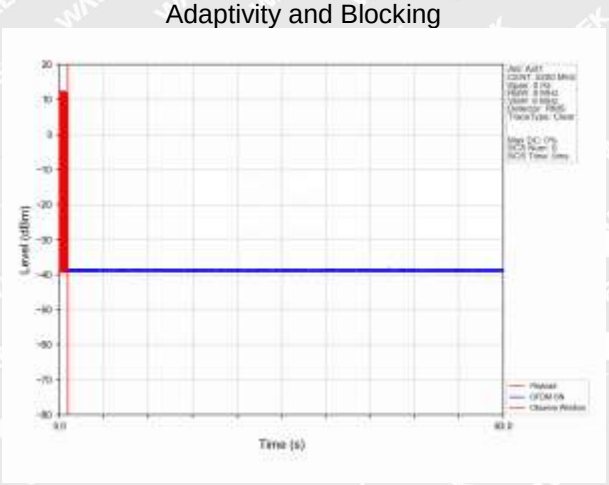


Short Control Signal

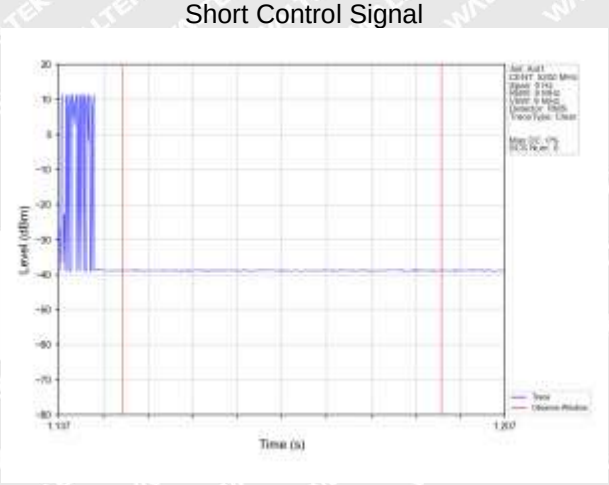


LTE

Adaptivity and Blocking

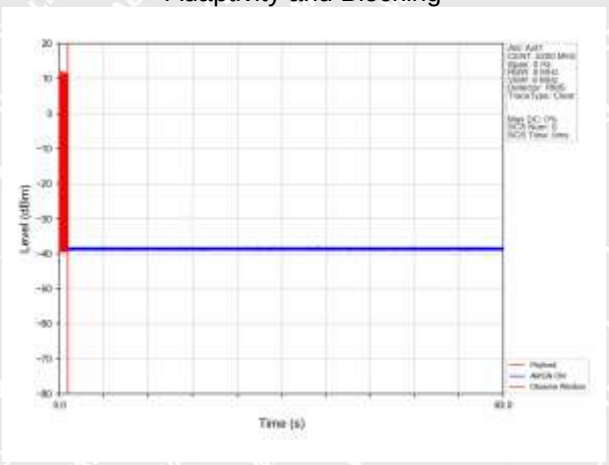


Short Control Signal

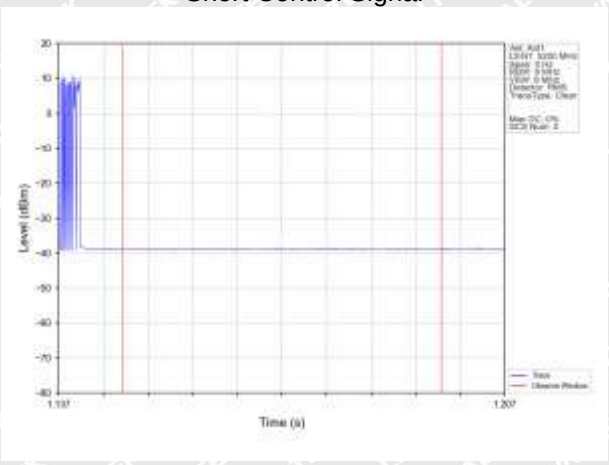


OFDM

Adaptivity and Blocking

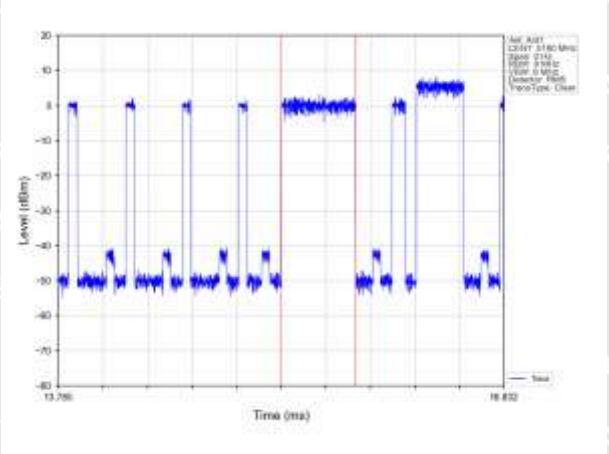


Short Control Signal

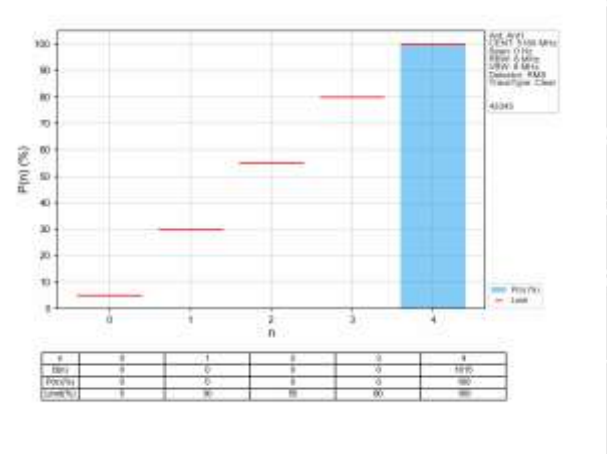


802.11a Centre Frequency
Channel Occupation Time

Cot

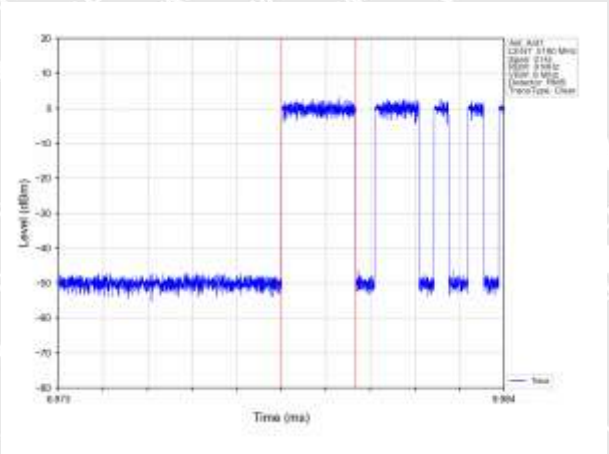


Idle Period Probability

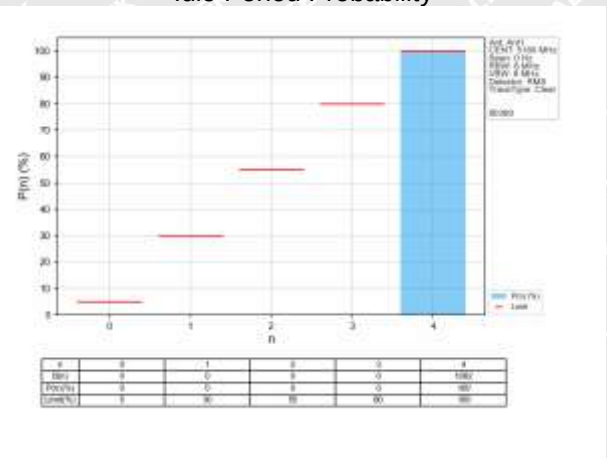


802.11n(HT20) Centre Frequency
Channel Occupation Time

Cot

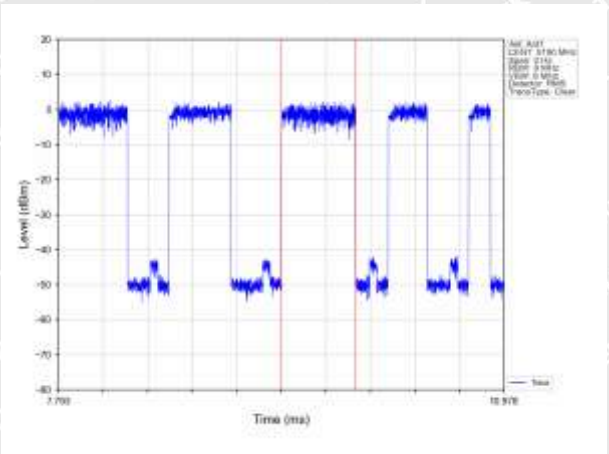


Idle Period Probability

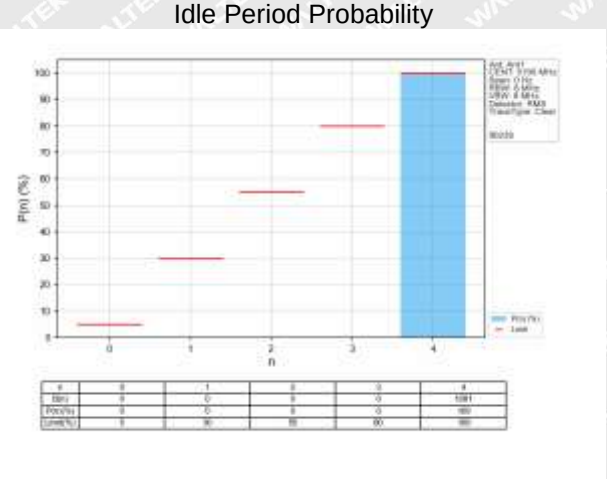


802.11n(HT40) Centre Frequency
Channel Occupation Time

Cot

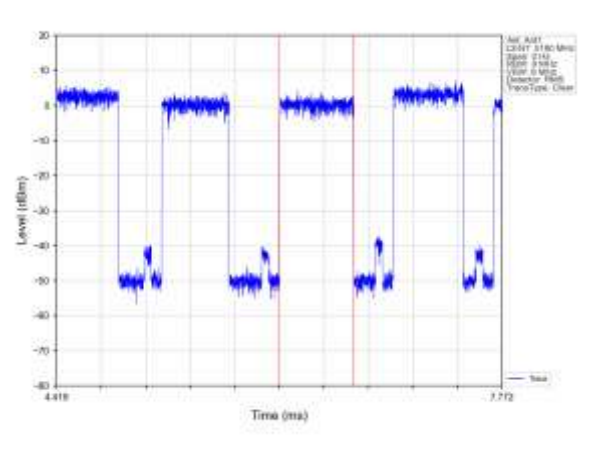


Idle Period Probability

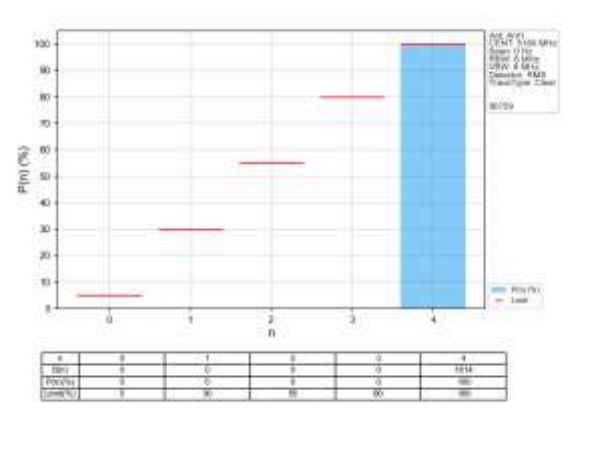


802.11ax(HT20) Centre Frequency
Channel Occupation Time

Cot

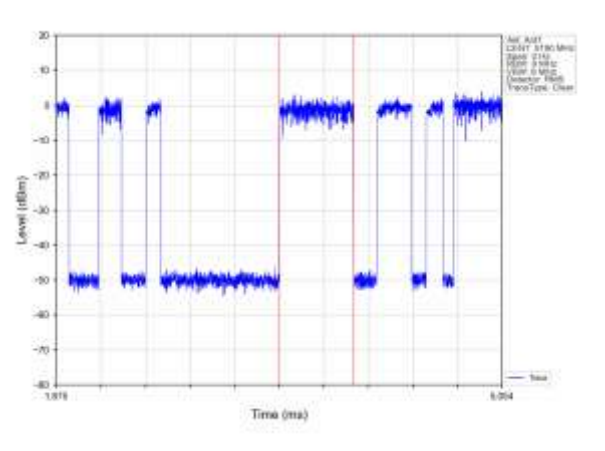


Idle Period Probability

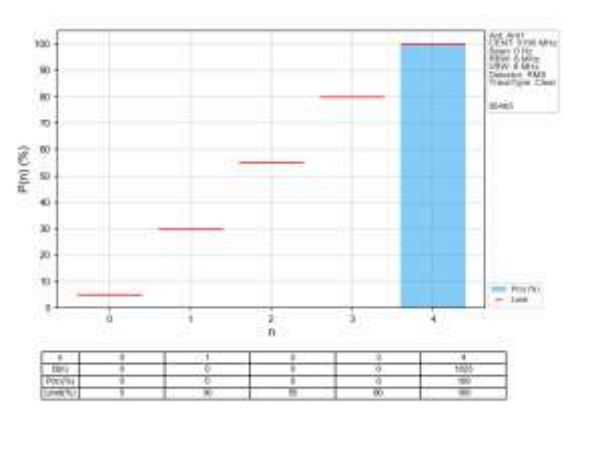


802.11ax(HT40) Centre Frequency
Channel Occupation Time

Cot



Idle Period Probability



17 Receiver Blocking

17.1 Definition

Receiver blocking is a measure of the capability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation due to the presence of an unwanted input signal (blocking signal) on frequencies other than those of the operating bands provided in table 1..

17.2 Limit

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.				

17.3 EUT Operation Condition

The EUT was programmed to be in loopback mode.

17.4 Test Procedure

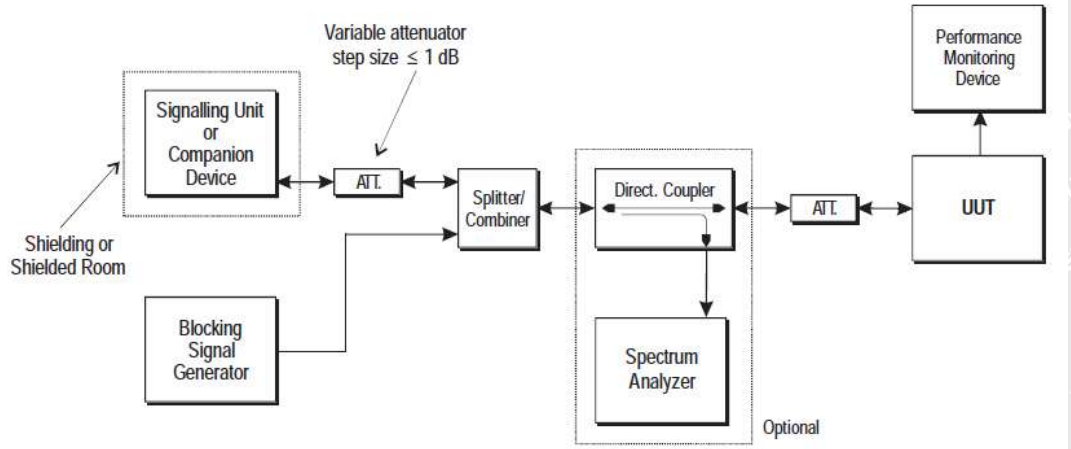


Figure 18: Test Set-up for receiver blocking

For systems using multiple receive chains only one chain need to be tested. All other receiver inputs shall be terminated.

Figure 18 shows the test set-up which can be used for performing the receiver blocking test. The companion device may require appropriate shielding or may need to be put in a shielded room to prevent it may have a negative impact on the measurement.

The steps below define the procedure to verify the receiver blocking requirement as described in clause 4.2.8.

Step 1:

• The UUT shall be set to the first operating frequency to be tested (see clause 5.3.2).

Step 2:

• The blocking signal generator is set to the first frequency as defined in table 9.

Step 3:

• With the blocking signal generator switched off a communication link is set up between the UUT and the associated companion device using the test setup shown in figure 18. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.2.8.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.

• This signal level (Pmin) is increased by 6 dB resulting in a new level (Pmin + 6 dB) of the wanted signal at the UUT receiver input.

Step 4:

• The level of the blocking signal at the UUT input is set to the level provided in table 9. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.2.8.3 are met.

• If the performance criteria as specified in clause 4.2.8.3 are met, the level of the blocking signal at the UUT may be further increased (e.g. in steps of 1 dB) until the level whereby the performance criteria as specified in clause 4.2.8.3 are no longer met. The highest level at which the performance criteria are met is recorded in the test report.

Step 5:

• Repeat step 4 for each remaining combination of frequency and level as specified in table 9.

Step 6:

• Repeat step 2 to step 5 with the UUT operating at the other operating frequencies at which the blocking test has to be performed. See clause 5.3.2.

17.5 Test Result

U-NII-1

Test Condition: 5G Wi-Fi Mode							
Modulation	**Mode**	**Blocking Frequency(MHz)**	**Blocking Power(dB)**	**Measured PER(%)**	**Pmin (dbm)**	**Limit (%)**	**Result**
802.11a	AP	5100	-53	1.2	-84	10	PASS
		4900	-47	1.5		10	PASS
		5000	-47	1.7		10	PASS
		5975	-47	1.9		10	PASS

Remark:

ANT 1 and ANT 2 have been tested, only records worst case(ANT 1)on this report.

18 User Access Restrictions

18.1 Definition

User Access Restrictions are constraints implemented in the RLAN device to restrict access of the user to any hardware and/or software settings of the equipment, including software replacement(s), which may impact (directly or indirectly) the compliance of the equipment with the requirements in the present document.

NOTE: The user should be understood as the end user, the operator or any person not responsible for the compliance of the equipment against the requirements in the present document..

18.2 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 clause 4.2.6.

18.3 Test Result

This device software and hardware cannot be changed by the user and meets the requirements.

19 Geo-location capability

19.1 Definition

Geo-location capability is a feature of the RLAN device to determine its location at installation, at reinstallation and at each power up of the equipment, with the purpose to configure itself according to the regulatory requirements applicable at the 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 geographic location during the initial power up of the equipment. The geographic location may also be available in equipment already installed and operating at the same geographic location.

19.2 Requirement

The geographic location determined by the equipment as defined in clause 4.2.10.2 shall not be accessible to the user.

If the equipment cannot determine the geographic location, it shall operate in a mode compliant with the requirements applicable in any of the geographic locations where the equipment is intended to operate.

19.3 Test Result

N/A

Remark: the EUT not has a Geo-location capability.

20 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-WR3000-Photos.

======End of Report======