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TEST REPORT

ETSI EN 301 893 V1.8.1 (2015-03)

Report Reference No.: CTL1703212051-WR

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Product Name: Khadas VIM

Model/Type reference: VIM

List Model(s): VIM, VIM Pro

Trade Mark: Khadas

Applicant's name: Shenzhen Wesion Technology Co., Ltd.

Address of applicant: C301, Mingyou Caigou Zhongxin, Baoyuan Road, Xixiang,
Bao'an, Shenzhen, China

Test Firm: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Test specification:

Standard: ETSI EN 301 893 V1.8.1 (2015-03)

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

Date of Receipt: Mar. 08, 2017

Date of Test Date: Mar. 09, 2017–Mar. 23, 2017

Data of Issue: Mar. 24, 2017

Result: Pass

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TEST REPORT

Test Report No. :	CTL1703212051-WR	Mar. 24, 2017
		Date of issue

Equipment under Test : Khadas VIM

Model /Type : VIM

Listed Models : VIM, VIM Pro

Applicant : **Shenzhen Wesion Technology Co., Ltd.**

Address : C301, Mingyou Caigou Zhongxin, Baoyuan Road,
Xixiang, Bao'an, Shenzhen, China

Manufacturer : **Shenzhen Wesion Technology Co., Ltd.**

Address : C301, Mingyou Caigou Zhongxin, Baoyuan Road,
Xixiang, Bao'an, Shenzhen, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**** Modified History ****

Revision	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2017-03-24	CTL1703212051-WR	Tracy Qi



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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

ETSI EN 301 893 V1.8.1 (2015-03)–Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.

1.2 Test Description

Technical requirements specifications for transmitter		
Test Item	EN 301 893 V1.8.1 Sub-Clause	Result
Carrier frequencies	Clause 4.2	Pass
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Clause 4.3	Pass
RF output power, Transmit Power Control (TPC) and power density	Clause 4.4	Pass
Transmitter unwanted emissions	Clause 4.5	Pass
Receiver spurious emissions	Clause 4.6	Pass
Dynamic Frequency Selection (DFS)	Clause 4.7	N/A
Adaptivity (Channel Access Mechanism)	Clause 4.8	Pass
User Access Restrictions	Clause 4.9	Pass
Geo-location capability	Clause 4.10	N/A

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Occupied Channel Bandwidth	±2%	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission	1.60 dB	(1)
Radiated spurious emission	2.20 dB	(1)
Temperature	±1 °C	(1)
Humidity	±3%	(1)
DC and low frequency voltages	±1.5%	(1)
Time	±2%	(1)
Duty cycle	±2%	(1)

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

2 GENERAL INFORMATION

2.1 Environmental conditions

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

Temperature	Normal Temperature:	25°C
	High Temperature:	55°C
	Low Temperature:	-20°C
Voltage	Normal Voltage	230V
	High Voltage	254V
	Low Voltage	207V
Other	Relative Humidity	55 %
	Air Pressure	101 kPa

2.2 General Description of EUT

Product Name:	Khadas VIM			
Model:	VIM, VIM Pro			
Power supply:	USB 5V from PC			
WIFI				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11ac	N/A
Operation frequency:	5180MHz-5240MHz	5190MHz-5230MHz	5210MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	4	2	1	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A

Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual or Annex F.2

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Mode	Description
802.11a	IEEE 802.11a with data rate of 6Mbps working in SISO mode
802.11n20SISO	IEEE 802.11n20 with data rate MSC0 and 20MHz bandwidth working in SISO mode
802.11n40SISO	IEEE 802.11n40 with data rate MSC0 and 40MHz bandwidth working in SISO mode
802.11ac20 SISO	IEEE 802.11ac20 with data rate MSC0 and 20MHz bandwidth working in SISO mode
802.11ac40 SISO	IEEE 802.11ac40 with data rate MSC0 and 40MHz bandwidth working in SISO mode
802.11ac80 SISO	IEEE 802.11ac80 with data rate MSC0 and 80MHz bandwidth working in SISO mode

Operation Frequency List WIFI on 5G Band:

Operating band	20MHz		40MHz		80MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
W52 (5150MHz-5250MHz)	36	5180	38	5190	42	5210
	40	5200				
	44	5220	46	5230		
	48	5240				

Note: "--"Means no channel(s) available any more.

Channel selected for test followed the table defined bellow; refer to ETSI EN 301 893 V1.8.1 clause 5.1.3

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	5.3.2	C7 (see note 1)		C8 (see note 1)
Occupied Channel Bandwidth	5.3.3	C7		C8
Power, power density	5.3.4	C1	C2	C3, C4
Transmitter unwanted emissions outside the 5 GHz RLAN bands	5.3.5	C7 (see note 1)		C8 (see note 1)
Transmitter unwanted emissions within the 5 GHz RLAN bands	5.3.6	C1	C2	C3, C4
Receiver spurious emissions	5.3.7	C7 (see note 1)		C8 (see note 1)
Transmit Power Control (TPC)	5.3.4	n.a. (see note 2)	C2 (see note 1)	C3, C4 (see note 1)
Dynamic Frequency Selection (DFS)	5.3.8	n.a. (see note 2)	C5	C6 (see note 3)
Adaptivity	5.3.9	C7		C8
C1, C3: The lowest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.				
C2, C4: The highest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.				
C5, C6: One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth.				
C7, C8: One channel out of the declared channels for this sub-band. For Occupied Channel Bandwidth, testing shall be repeated for every declared nominal channel bandwidth within this sub-band. For Adaptivity, testing shall be performed using the highest nominal channel bandwidth.				
NOTE 1: In case of more than one channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans.				
NOTE 2: Testing is not required for nominal channel bandwidths that fall completely within the frequency range 5 150 MHz to 5 250 MHz.				
NOTE 3: Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5 600 MHz to 5 650 MHz band, the tests for the <i>Channel Availability Check</i> (and where implemented, for the <i>Off-Channel CAC</i>) 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.				

2.4 Equipments Used during the Test

Centre frequencies & RF output power & Power density & OCB & TPC & DFS						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum Analyzer	Agilent	N9020	US46220290	2017/01/16	2018/01/17
2	Signal Generator	Agilent	N5182A	MY47420864	2016/05/21	2017/05/20
3	Signal Generator	Agilent	E4421B	US40051744	2016/05/21	2017/05/20
4	Power Sensor	Agilent	U2021XA	MY5365004	2016/05/21	2017/05/20
5	Power Meter	Agilent	U2531A	TW53323507	2016/05/21	2017/05/20
6	Climate Chamber	ESPEC	EL-10KA	A20120523	2016/05/20	2017/05/19

Transmitter spurious emissions & Receiver spurious emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	ULTRA-ROADBA ND ANTENNA	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2017/06/01
2	Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2017/05/18
3	EMI Test Receiver	R&S	ESCI	103710	2016/06/02	2017/06/01
4	Controller	EM Electronics	Controller EM 1000	N/A	2016/05/21	2017/05/20
5	Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
6	Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
7	Temperature/Hu midity Meter	Gangxing	CTH-608	02	2016/05/20	2017/05/19
8	High-Pass Filter	K&L	9SH10-27 00/X1275 0-O/O	N/A	2016/05/20	2017/05/19
9	High-Pass Filter	K&L	41H10-13 75/U1275 0-O/O	N/A	2016/05/20	2017/05/19
10	RF Cable	HUBER+SU HNER	RG214	N/A	2016/05/20	2017/05/19

The calibration interval is 1 year.

3 TEST ITEM AND RESULTS

3.1 Centre frequencies

Limit

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range $f_c \pm 20$ ppm.

Test Procedure

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

Test Results

Test conditions		Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (°C)			
230	25	CH36/ 5180MHz	5179.957845	8.14
207	-20		5179.956398	8.42
	+55		5179.958715	7.97
254	-20		5179.954417	8.80
	+55		5179.958965	7.92
Limit			20 ppm	
Result			PASS	

3.2 Nominal Channel Bandwidth and Occupied Channel Bandwidth

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.

NOTE: During an established communication, a device is allowed to operate temporarily in a mode where its Occupied Channel Bandwidth may be reduced to as low as 40 % of its Nominal Channel Bandwidth with a minimum of 4 MHz.

Test Procedure

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

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

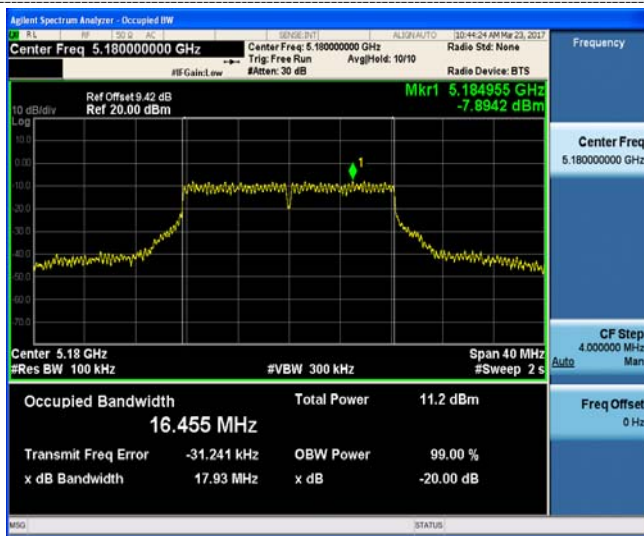
2. When the trace is complete, capture the trace.
3. Find the peak value of the trace and place the analyser marker on this peak.
4. Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.
5. Repeated steps 1 to 3 above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

Test Results

Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	Result
802.11a	CH36	5180	16.455	Pass
802.11n20MHz	CH36	5180	17.662	
802.11n40MHz	CH38	5190	36.247	
802.11ac20MHz	CH36	5180	17.671	
802.11ac40MHz	CH38	5190	36.240	
802.11ac80MHz	CH42	5210	75.565	

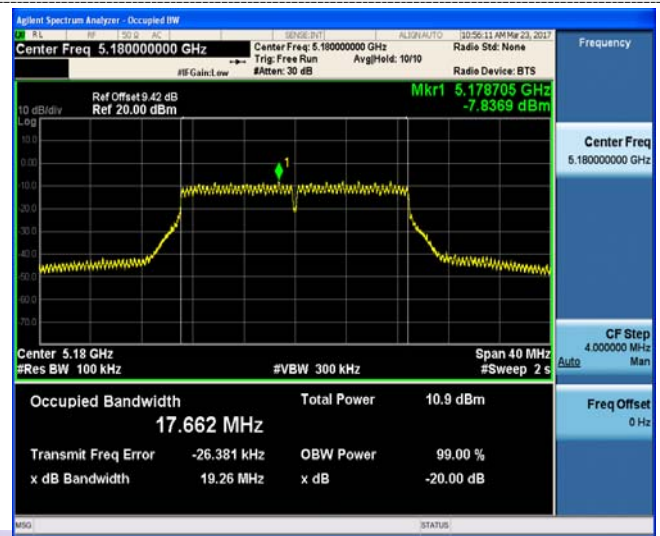
Test plot as follows:

802.11a



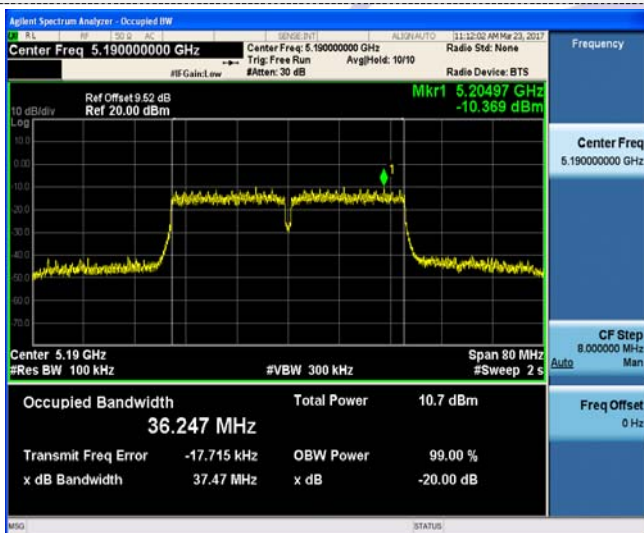
CH36

802.11n20MHz



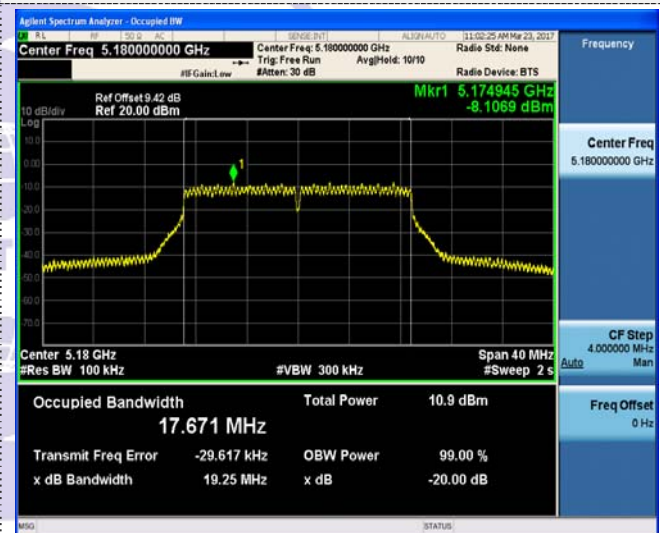
CH36

802.11n40MHz



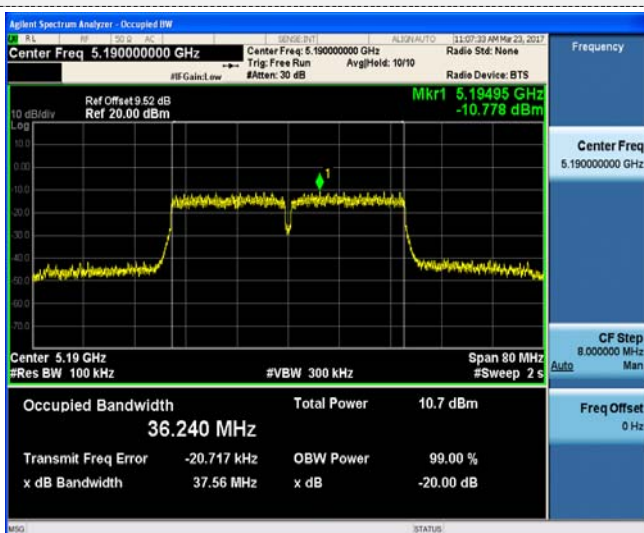
CH38

802.11ac20MHz



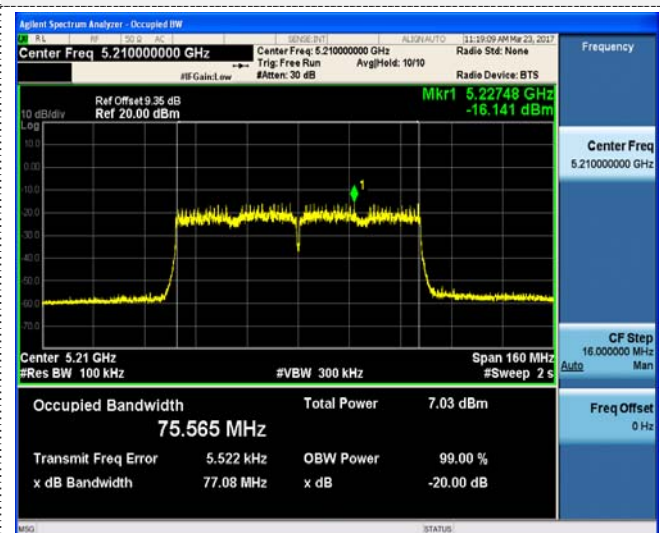
CH36

802.11ac40MHz



CH38

802.11ac80MHz



CH42

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

Limit

The limits below are applicable to the system as a whole and in any possible configuration. Includes smart antenna systems (devices with multiple transmit chains).

In case of multiple (adjacent or non-adjacent) channels within the same sub-band, the total RF output power of all channels in that sub-band shall not exceed the limits defined below.

In case of multiple, non-adjacent channels operating in separate sub-bands, the total RF output power in each of the sub-bands shall not exceed the limits defined below.

TPC is not required for channels whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz.

For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in table 1.

Devices are allowed to operate without TPC. See table 1 for the applicable limits in this case.

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

Frequency range [MHz]	Mean e.i.r.p. limit [dBm]		Mean e.i.r.p. density limit [dBm/MHz]	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)
NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.				
NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.				
NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.				

For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in table 2.

For devices without TPC, the limits in table 2 do not apply.

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

Frequency range	Mean e.i.r.p. [dBm]
5 250 MHz to 5 350 MHz	17
5 470 MHz to 5 725 MHz	24 (see note)
NOTE: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.	

3.3.1 RF output power at the highest power - PH

Test Procedure

- The UUT shall be configured to operate at:
 - The highest stated transmitter output power level of the TPC range; or
 - The maximum transmitter output power level in case the equipment has no TPC feature.
- For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle reference clause 5.3.4.2.1.1.1 ETSI EN 301 893 V1.8.1 (2015-03)
- For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band reference clause 5.3.4.2.1.1.2 ETSI EN 301 893 V1.8.1 (2015-03)
- For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands reference clause 5.3.4.2.1.1.3 ETSI EN 301 893 V1.8.1 (2015-03)
- These measurements shall be performed under both normal and extreme test conditions.
- The lowest declared channel for band 5 150 MHz to 5 250 MHz and 5 470 MHz to 5 725 MHz
the highest declared channel for band 5 250 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz shall be tested.

Test Results

802.11a							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	36/5180	10.76	0.00	10.76	23	PASS
T _{min} (-20°C)	207V		10.22	0.00	10.22		
	254V		10.59	0.00	10.59		
T _{Max} (+55°C)	207V		10.78	0.00	10.78		
	254V		10.54	0.00	10.54		

802.11n20MHz							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	36/5180	9.88	0.00	9.88	23	PASS
T _{min} (-20°C)	207V		9.91	0.00	9.91		
	254V		9.73	0.00	9.73		
T _{Max} (+55°C)	207V		9.25	0.00	9.25		
	254V		9.47	0.00	9.47		

802.11n40MHz							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	38/5190	9.68	0.00	9.68	23	PASS
T _{min} (-20°C)	207V		9.71	0.00	9.71		
	254V		9.67	0.00	9.67		
T _{Max} (+55°C)	207V		9.56	0.00	9.56		
	254V		9.69	0.00	9.69		

802.11ac20MHz							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	36/5180	9.93	0.00	9.93	23	PASS
T _{min} (-20°C)	207V		9.87	0.00	9.87		
	254V		9.91	0.00	9.91		
T _{Max} (+55°C)	207V		9.68	0.00	9.68		
	254V		9.74	0.00	9.74		

802.11ac40MHz							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	38/5190	9.66	0.00	9.66	23	PASS
T _{min} (-20°C)	207V		9.74	0.00	9.74		
	254V		9.69	0.00	9.69		
T _{Max} (+55°C)	207V		9.80	0.00	9.80		
	254V		9.78	0.00	9.78		

802.11ac80MHz							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
T _{Nor} (25°C)	230V	42/5210	6.11	0.00	6.11	23	PASS
T _{min} (-20°C)	207V		6.22	0.00	6.22		
	254V		6.35	0.00	6.35		
T _{Max} (+55°C)	207V		6.48	0.00	6.48		
	254V		6.57	0.00	6.57		

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

Test Procedure

1. The UUT shall be configured to operate at the lowest stated transmitter output power level of the TPC range.
2. For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment) reference clause 5.3.4.2.1.2.1 ETSI EN 301 893 V1.8.1 (2015-03)
3. For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band reference clause 5.3.4.2.1.2.2 ETSI EN 301 893 V1.8.1 (2015-03)
4. For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands reference clause 5.3.4.2.1.2.3 ETSI EN 301 893 V1.8.1 (2015-03)
5. These measurements shall be performed under both normal and extreme test conditions.
6. The lowest declared channel for band 5 150 MHz to 5 250 MHz and 5 470 MHz to 5 725 MHz
the highest declared channel for band 5 250 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz
shall be tested.
7. This test is only required for equipment with a TPC feature.

Test Results

Not applicable to this device which TPC feature not available.



3.4 Power density

Test Procedure

- The UUT shall be configured to operate at:
 - The highest stated transmitter output power level of the TPC range; or
 - The maximum transmitter output power level in case the equipment has no TPC feature.
- For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment) reference clause 5.3.4.2.1.3.1 ETSI EN 301 893 V1.8.1 (2015-03).
- For equipment without continuous transmission capability and without the capability to transmit with a constant duty cycle reference clause 5.3.4.2.1.3.2 ETSI EN 301 893 V1.8.1 (2015-03).
- These measurements shall only be performed at normal test conditions.
- The lowest declared channel for band 5 150 MHz to 5 250 MHz and 5 470 MHz to 5 725 MHz the highest declared channel for band 5 250 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz shall be tested.

Test Results

Mode	Channel/ Frequency (MHz)	Measured value (dBm/MHz)	Antenna Gain (dBi)	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	CH36/5180	9.751	0.00	9.751	10	Pass
802.11n20MHz	CH36/5180	8.633	0.00	8.633	10	Pass
802.11n40MHz	CH38/5190	6.688	0.00	6.688	10	Pass
802.11ac20MHz	CH36/5180	8.735	0.00	8.735	10	Pass
802.11ac40MHz	CH38/5190	5.414	0.00	5.414	10	Pass
802.11ac80MHz	CH42/5210	-0.143	0.00	-0.143	10	Pass

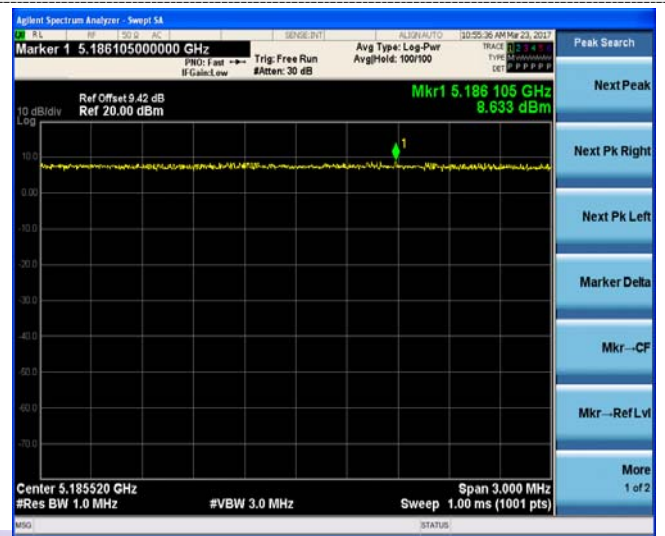
The test plots as follow:

802.11a



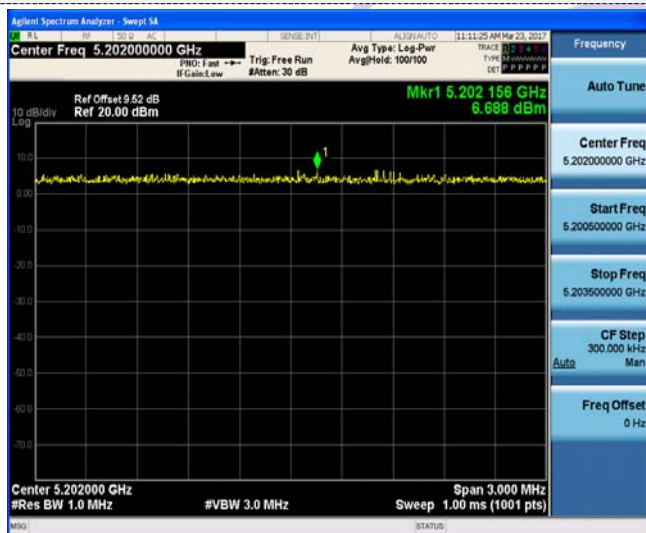
CH36

802.11n20MHz



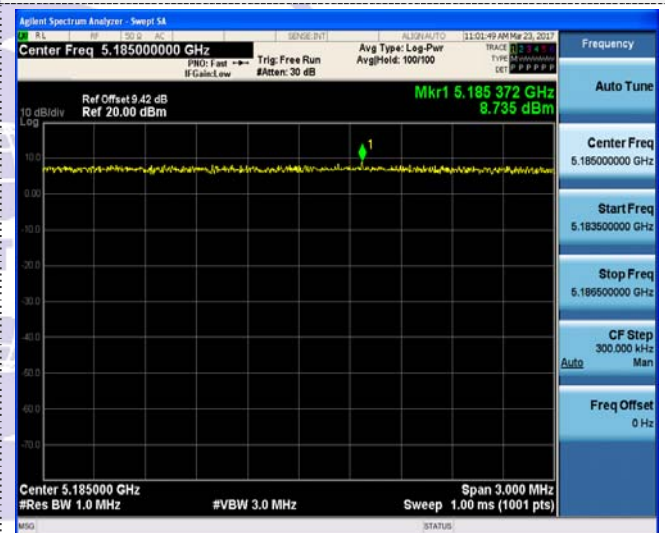
CH36

802.11n40MHz



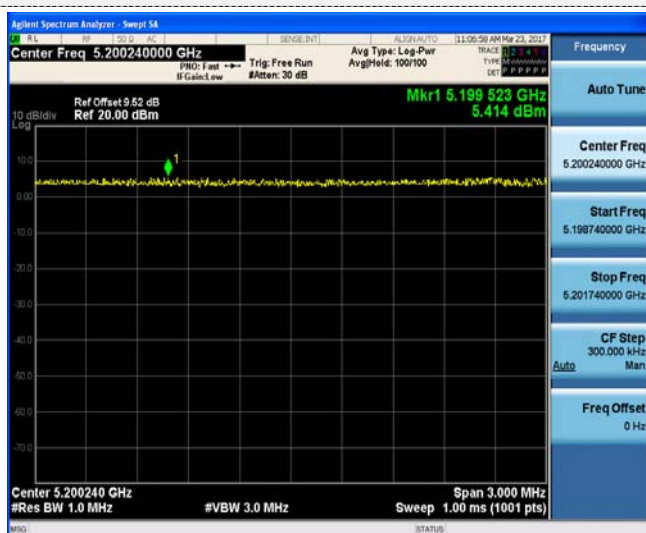
CH38

802.11ac20MHz



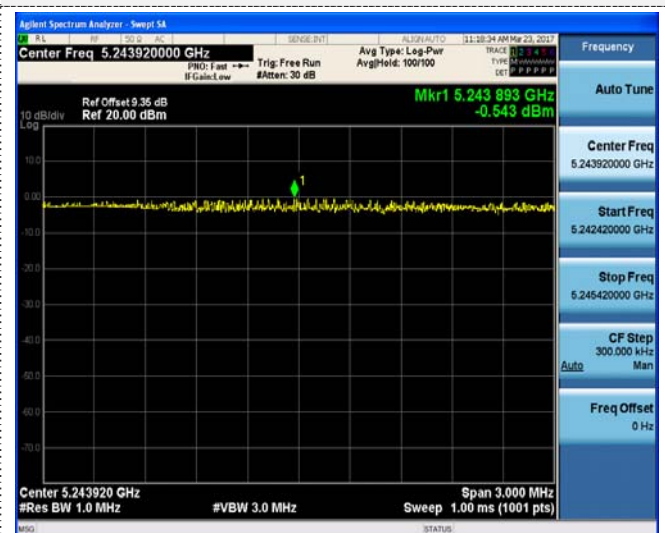
CH36

802.11ac40MHz



CH38

802.11ac80MHz



CH42

3.5 Transmitter unwanted emissions

3.5.1 Transmitter unwanted emissions outside the 5 GHz RLAN bands

Limit

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

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

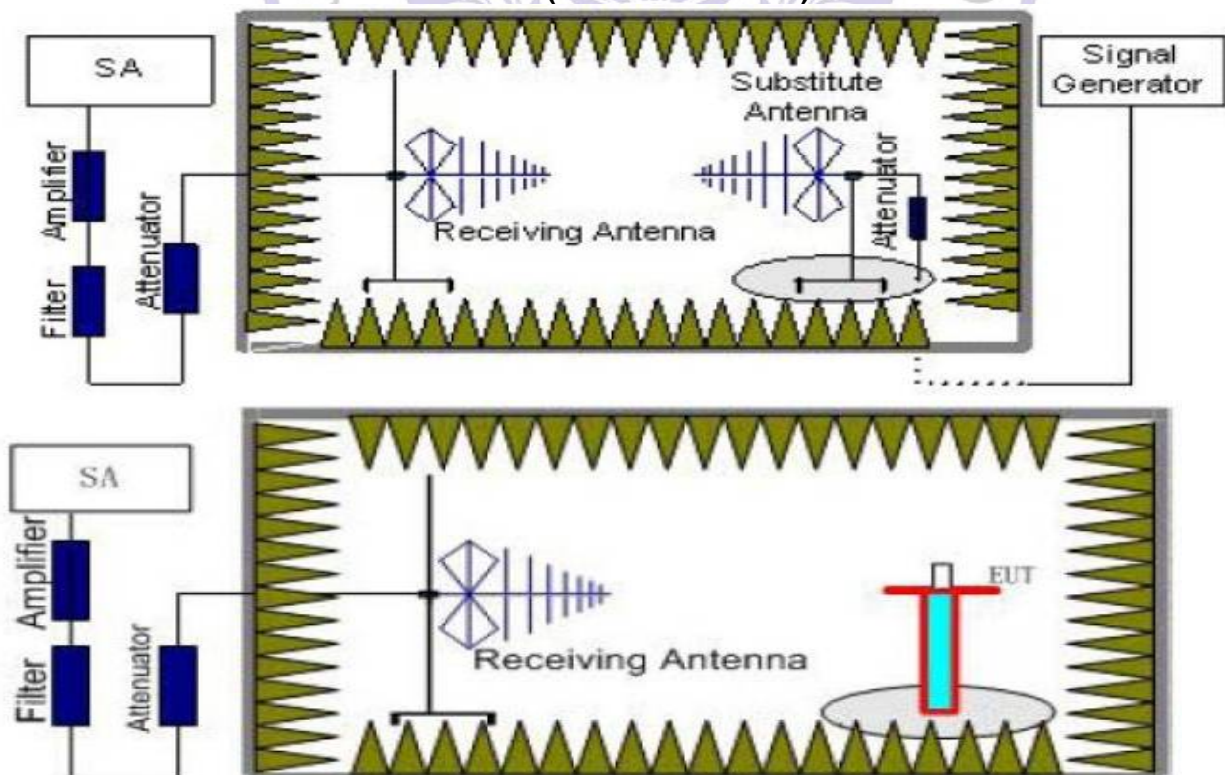
Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz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

Test Procedure

1. The measurement procedure follows ETSI EN 300 389 (V1.8.1) Sub-clause 5.3.5
2. The measurement shall only be performed at normal test conditions.
3. One channel out of the declared channels for each sub-band shall be tested.

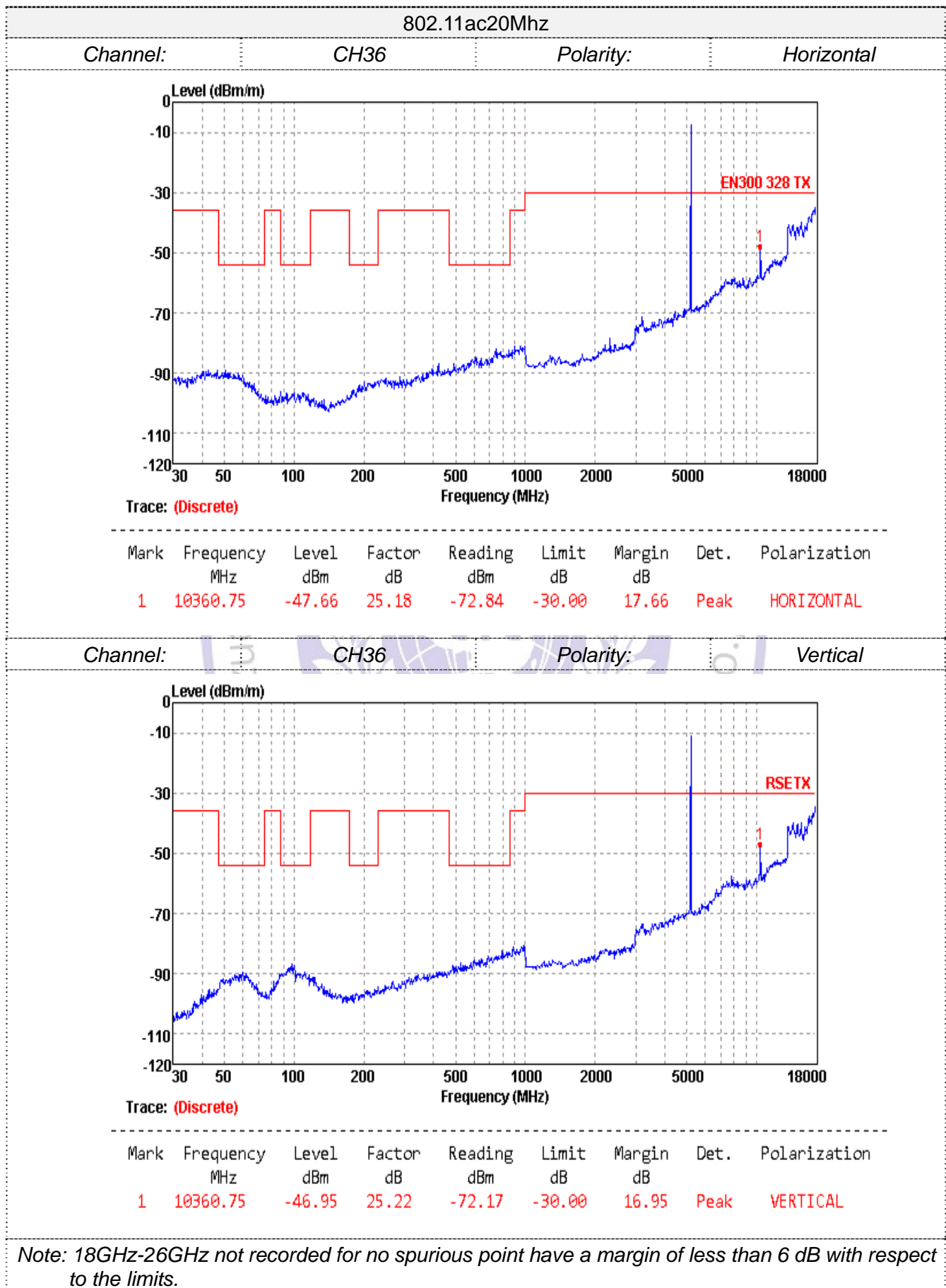
Test Configuration

Effective Radiated Power measurement (30 MHz to 26 GHz)



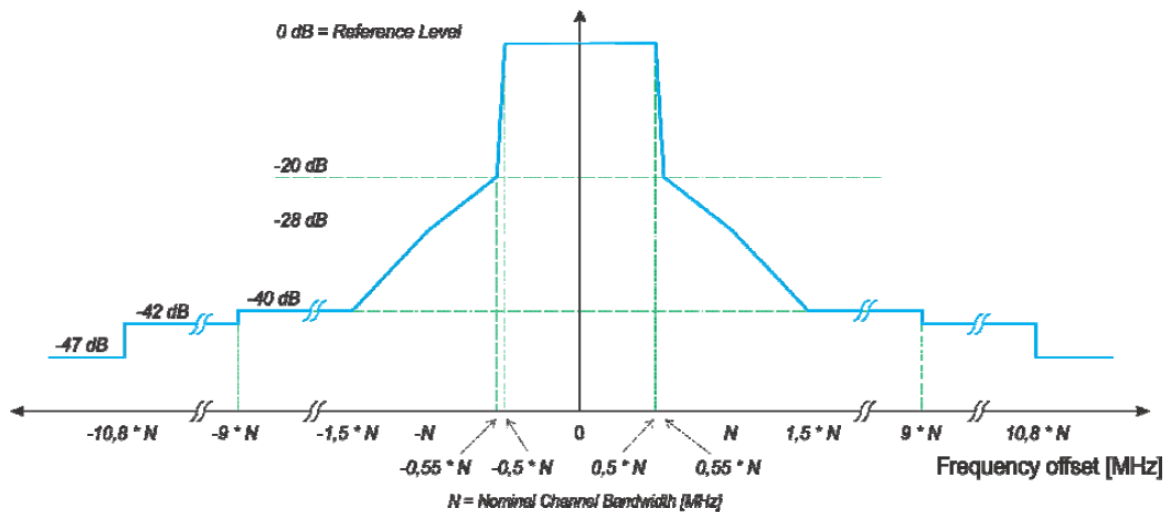
Test Result

Remark: We test all modulation type, and recorded the worst case at 802.11ac20Mhz mode.



3.6 Transmitter unwanted emissions within the 5 GHz RLAN bands

Limit



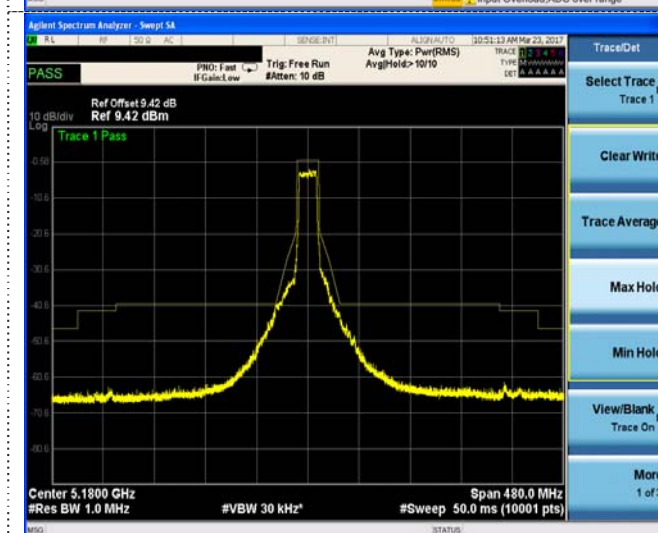
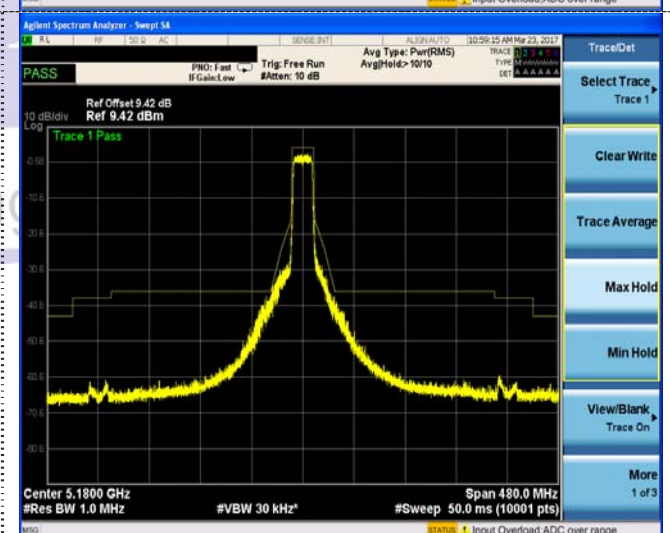
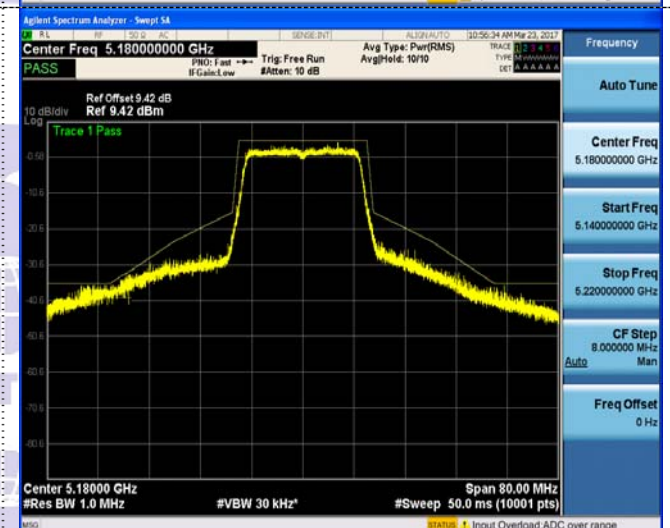
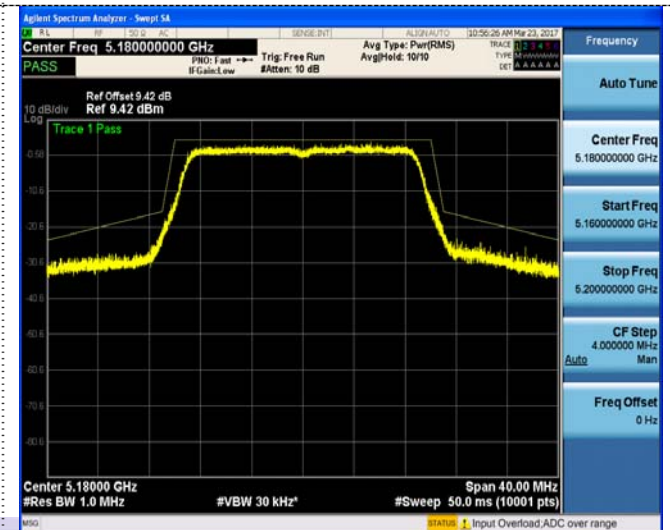
NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

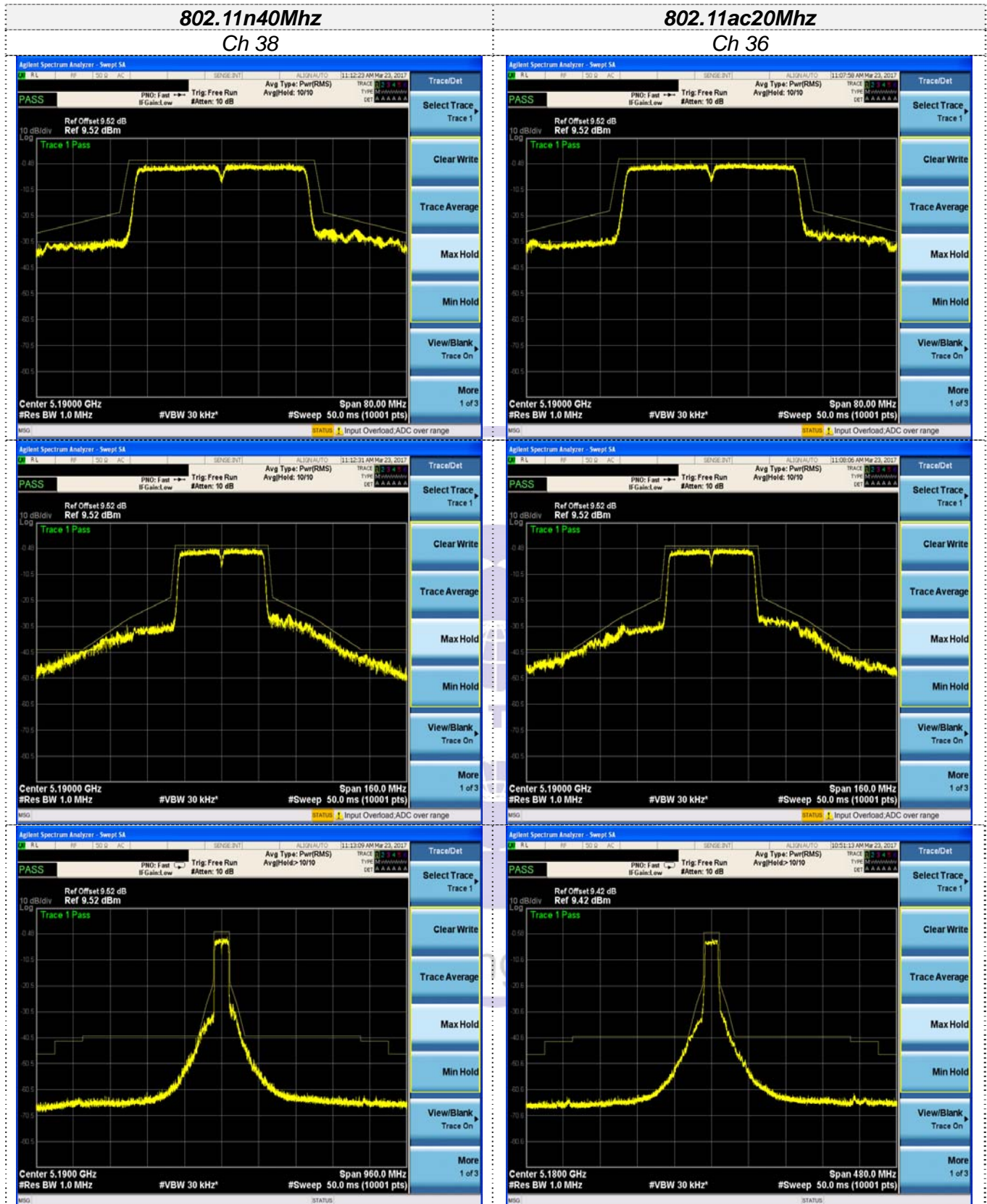
Figure 1: Transmit spectral power mask

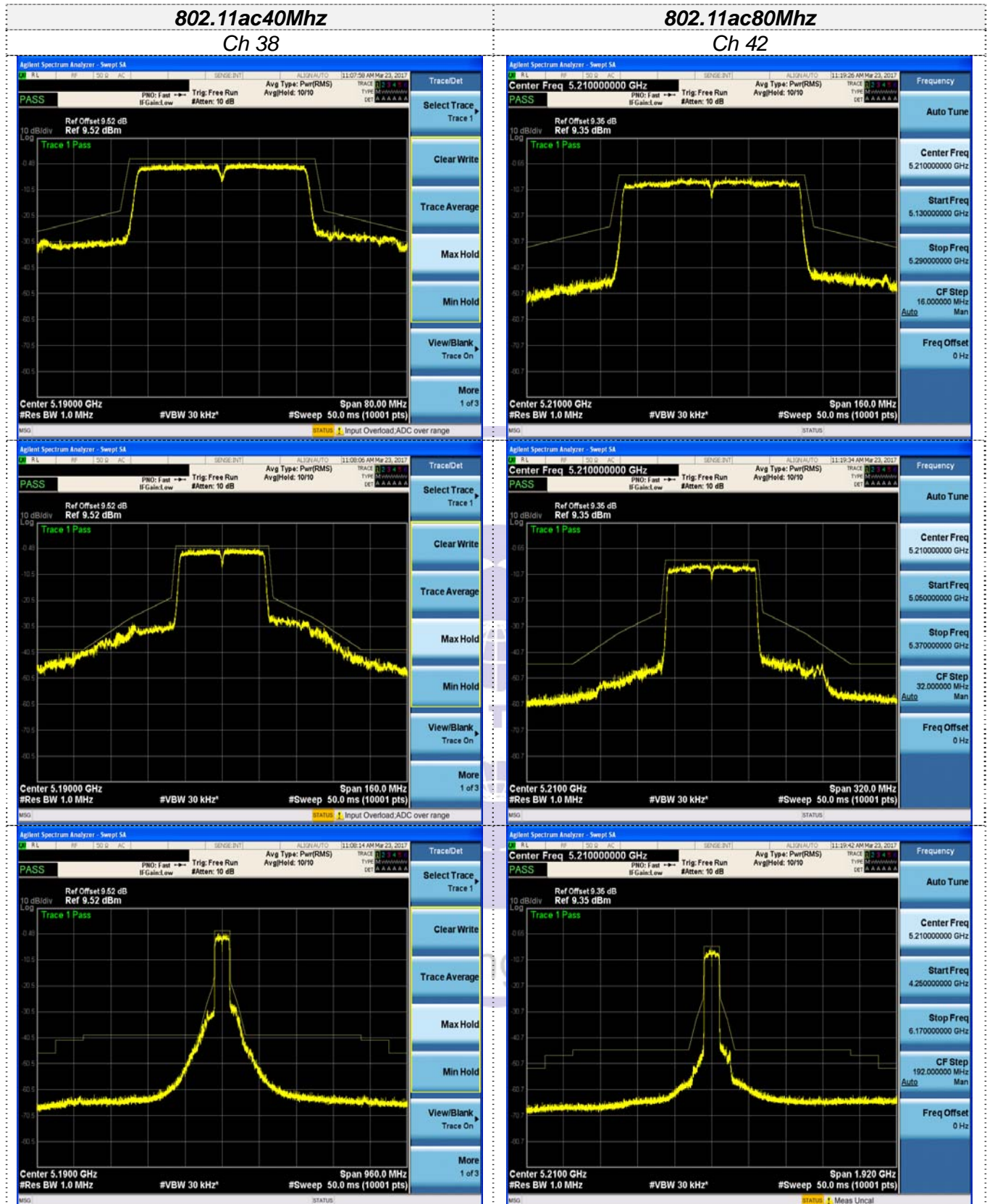
Test Procedure

1. The measurement procedure follows ETSI EN 300 389 (V1.8.1) Sub-clause 5.3.6
2. The measurement shall only be performed at normal test conditions.
3. The lowest declared channel for band 5 150 MHz to 5 250 MHz and 5 470 MHz to 5 725 MHz the highest declared channel for band 5 250 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz shall be tested.

Test Result

802.11a
Ch 36**802.11n20Mhz**
Ch 36





3.7 Receiver spurious emissions

LIMIT

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

Table 4: Spurious radiated emission limits

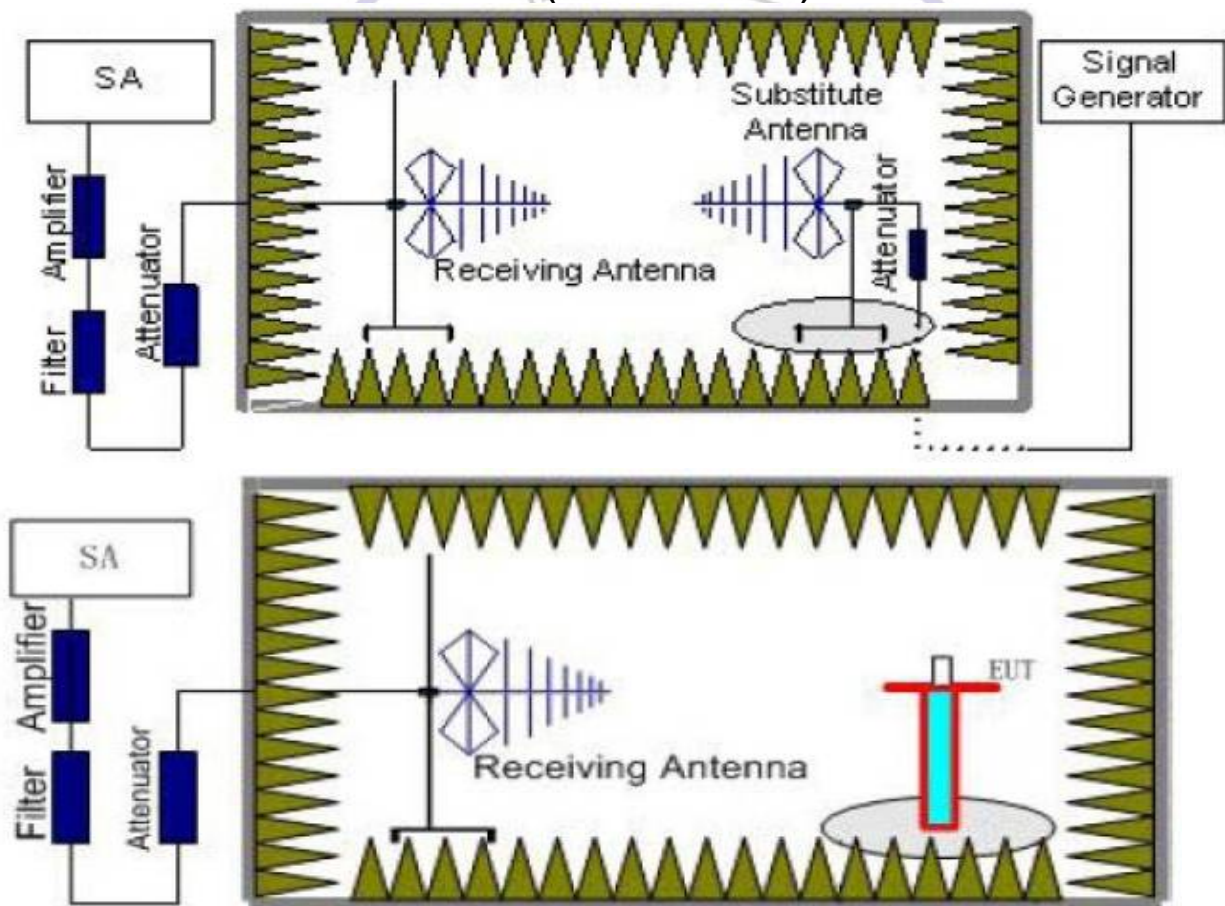
Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

Test Procedure

1. The measurement procedure follows ETSI EN 300 389 (V1.8.1) Sub-clause 5.3.7
2. The measurement shall only be performed at normal test conditions.
3. One channel out of the declared channels for each sub-band shall be tested.

Test Configuration

Effective Radiated Power measurement (30 MHz to 26 GHz)

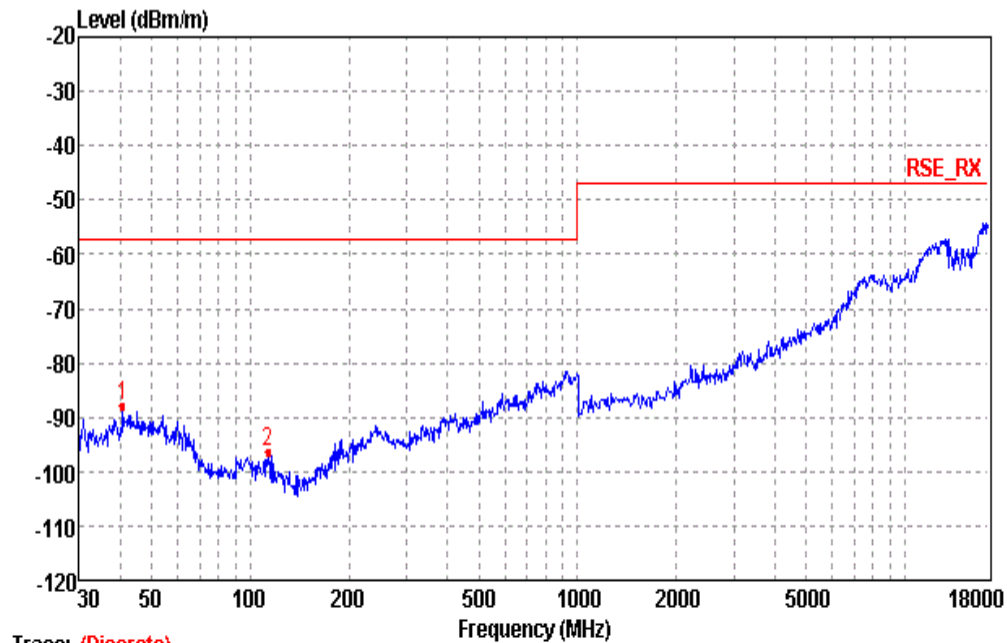


Test Result

Remark: We test all modulation type, and recorded the worst case at 802.11ac 20MHz mode.

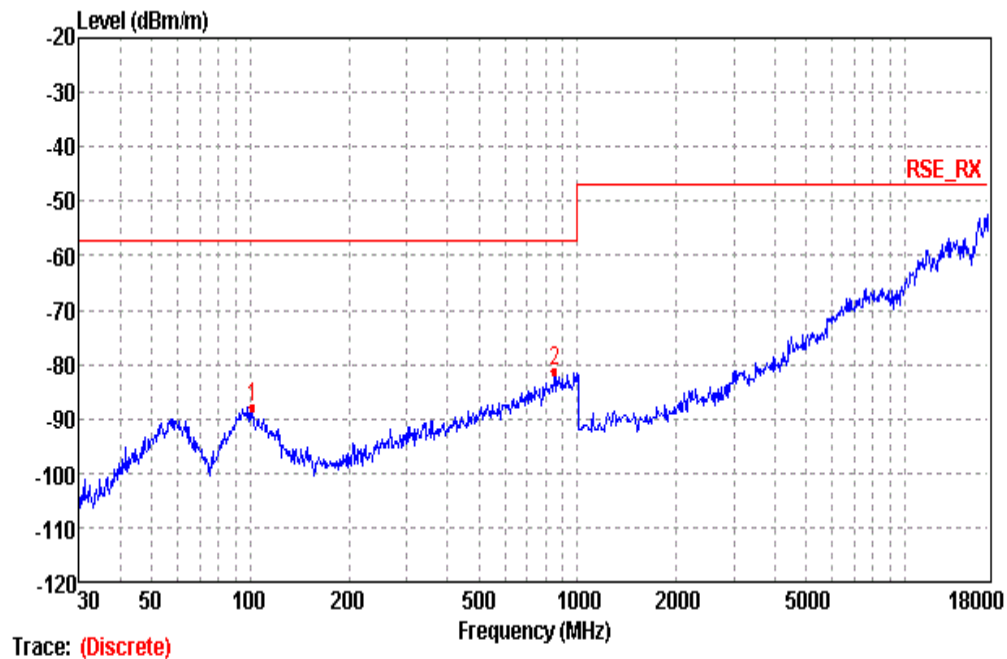
802.11ac20MHz

Channel: CH36 Polarity: Horizontal



Mark	Frequency MHz	Level dBm	Factor dB	Reading dBm	Limit dB	Margin dB	Det.	Polarization
1	40.72	-87.95	-0.20	-87.75	-57.09	30.86	Peak	HORIZONTAL
2	113.13	-96.27	-8.03	-88.24	-57.09	39.18	Peak	HORIZONTAL

Channel: CH36 Polarity: Vertical



Mark	Frequency MHz	Level dBm	Factor dB	Reading dBm	Limit dB	Margin dB	Det.	Polarization
1	101.46	-88.04	0.88	-88.92	-57.09	30.95	Peak	VERTICAL
2	849.11	-81.40	5.96	-87.36	-57.09	24.31	Peak	VERTICAL

Note: 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

3.8 Dynamic Frequency Selection (DFS)

DFS parameters

Table D.1: DFS requirement values

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

Table D.2: Interference threshold values

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

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

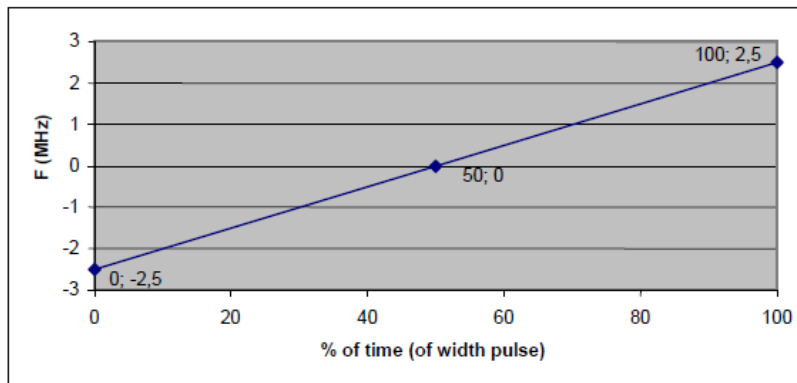
Pulse width W [μs]	Pulse repetition frequency PRF [PPS]	Pulses per burst [PPB]
1	700	18

Table D.4: Parameters of radar test signals

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

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

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



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

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

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

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

Table D.5: Detection probability

Parameter	Detection Probability (P_d)	
	Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, Off-Channel CAC	99,99 %	60 %
In-Service Monitoring	60 %	60 %
NOTE: P_d gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions. Therefore P_d does not represent the overall detection probability for any particular radar under real life conditions.		

Test set-ups

Set-up A

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

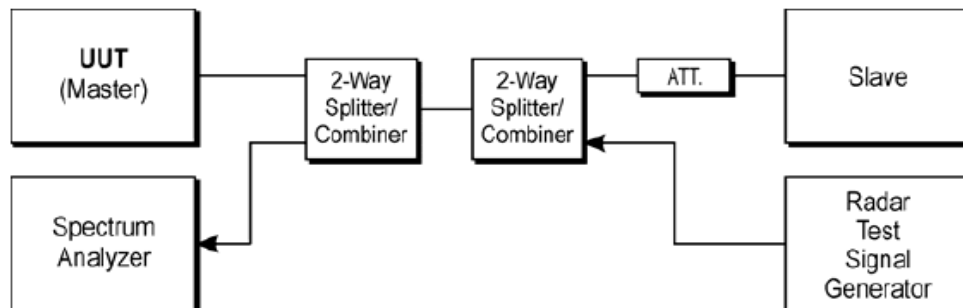


Figure 4: Set-up A

Set-up B

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

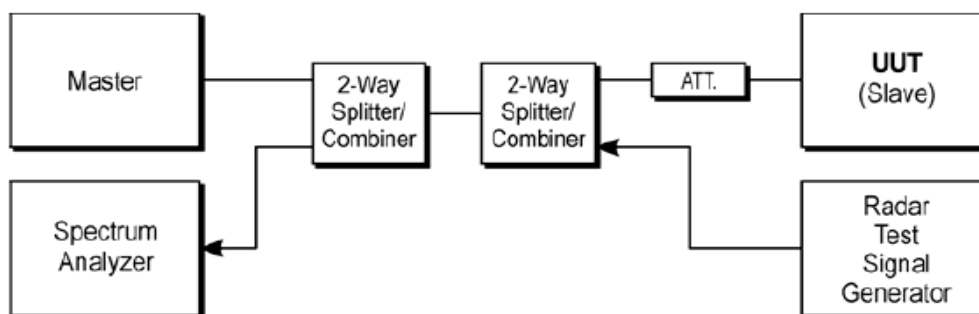


Figure 5: Set-up B

Set-up C

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

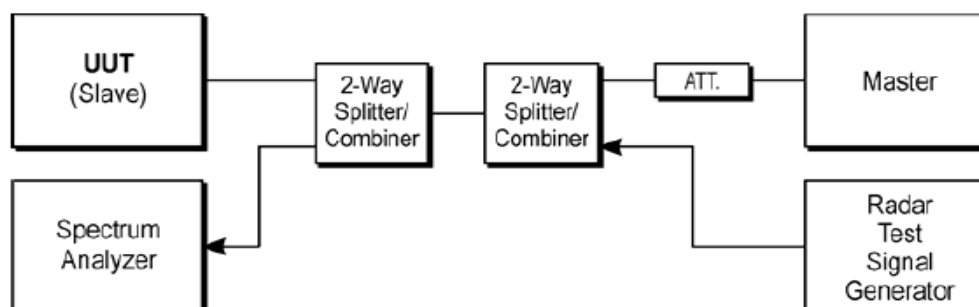


Figure 6: Set-up C

DFS technical requirements specifications

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

Applicability of DFS requirements

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

Test Results

Not applicable to this device.



3.9 Adaptivity

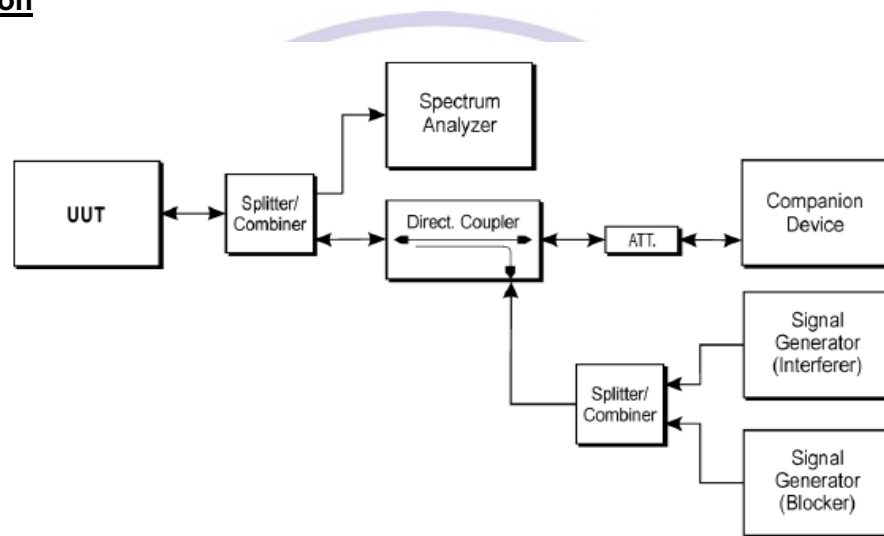
Requirements and limits

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

Test Procedure

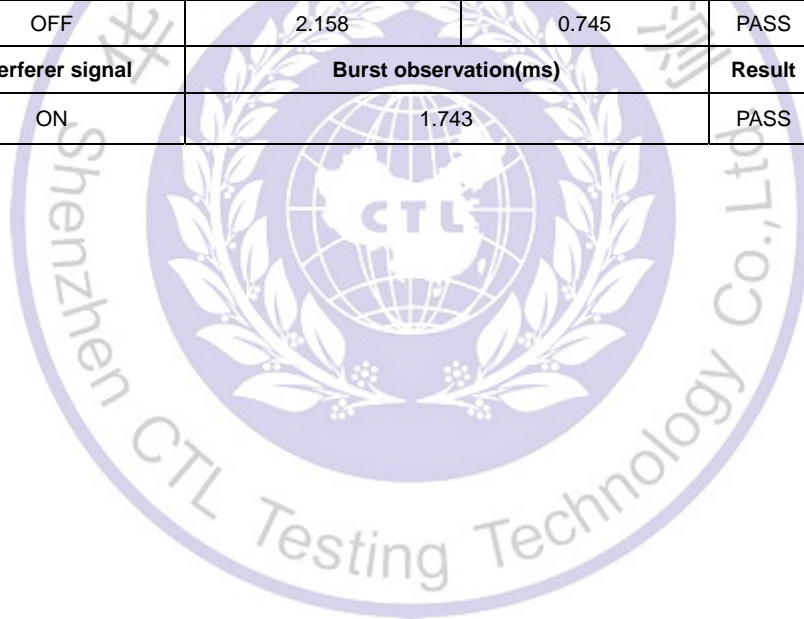
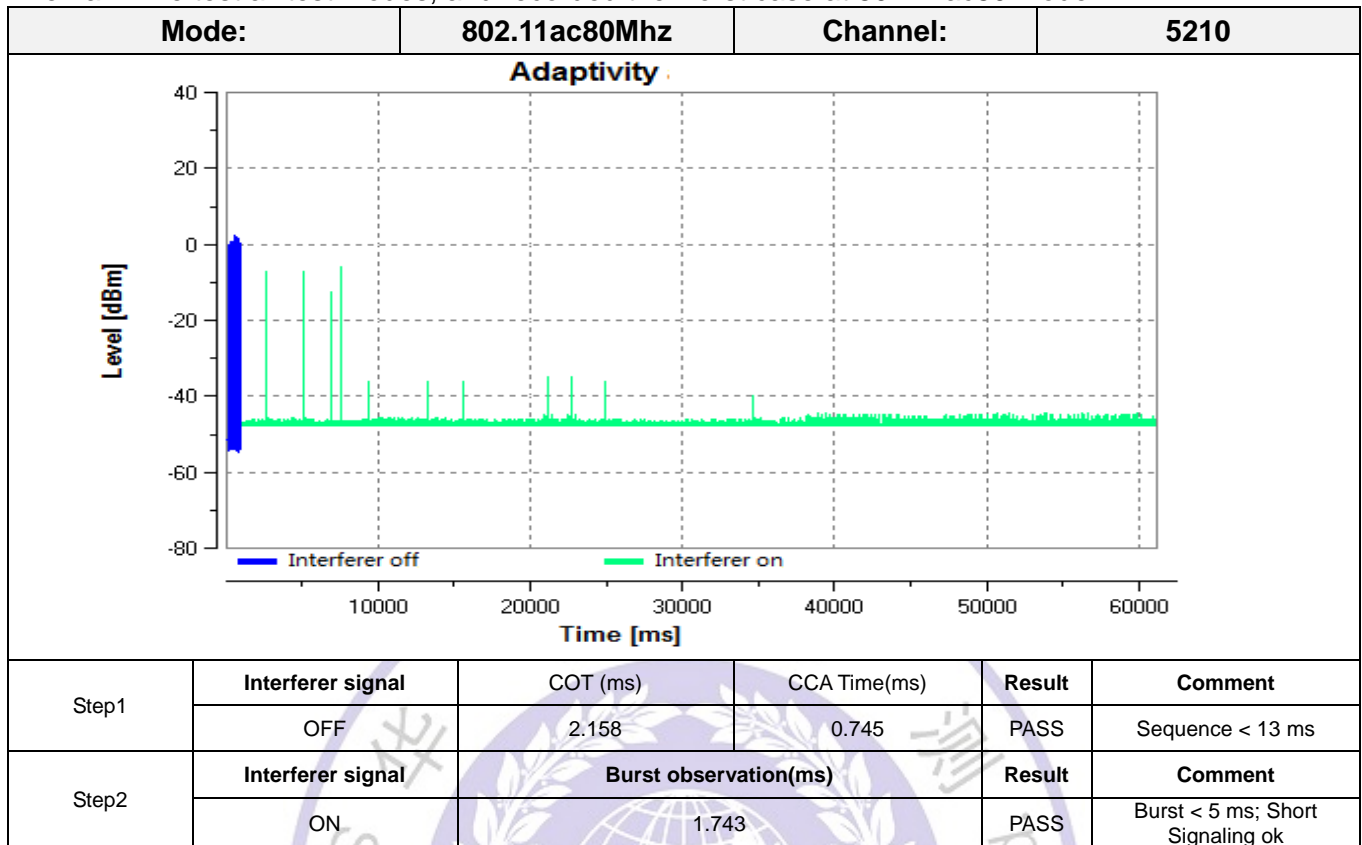
1. The measurement procedure follows the clause 5.3.9.2.1 of the ETSI EN 300 893 V1.8.1 (2015-03).
2. The inference signal used shall be a band limited noise signal with a 100 % duty cycle.
3. Testing shall be performed at one channel out of the declared channels for each sub-band and the highest nominal channel bandwidth.

Test Configuration



Test Results

Remark: We test all test modes, and recorded the worst case at 802.11ac80 mode.



4 EUT TEST PHOTOS



5 PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please reference to the test report No.: CTL1703042091-WE

*****THE END*****



6 Annex F.2

Information as required by ETSI EN 301 893 (V1.8.1), clause 5.3.1

In accordance with ETSI EN 301 893, clause 5.3.1, the following information is provided by the manufacturer.

a) The Nominal Channel Bandwidth(s):

Nominal Channel Bandwidth 1: 20 MHz

Nominal Channel Bandwidth 2: 40 MHz

Nominal Channel Bandwidth 3: 80 MHz

The associated centre frequencies:

For Nominal Channel Bandwidth 1:

for the band 5 150 MHz to 5 350 MHz: 5180MHz; 5200MHz; 5220MHz; 5240 MHz; MHz;
MHz; MHz; MHz;

for the band 5 470 MHz to 5 725 MHz: MHz; MHz; MHz; MHz; MHz; MHz;
MHz; MHz; MHz; MHz; MHz; MHz;

For Nominal Channel Bandwidth 2:

for the band 5 150 MHz to 5 350 MHz: 5190MHz; 5230 MHz; MHz; MHz;

for the band 5 470 MHz to 5 725 MHz: MHz; MHz; MHz; MHz; MHz;

For Nominal Channel Bandwidth 3:

for the band 5 150 MHz to 5 350 MHz: 5210MHz; MHz; MHz; MHz;

for the band 5 470 MHz to 5 725 MHz: MHz; MHz; MHz; MHz;

b) For equipment that support simultaneous transmissions in one or more channels:

The (maximum) number of channels used for these simultaneous transmissions:

These channels are adjacent channels: ☐Yes ☐No

In case of non-adjacent channels, whether or not these channels are in different sub-bands: ☐Yes ☐No

In case of simultaneous transmissions, further information defining the channels used for these simultaneous transmissions may be required.

c) The different transmit operating modes (see clause 5.1.4.2) (tick all that apply):

☒ Operating mode 1: Single Antenna Equipment

☒ a) Equipment with only 1 antenna

☐ b) Equipment with diversity antennas but only 1 antenna active at any moment in time

☐ c) Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used.

☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beamforming

☐ a) Single spatial stream/Standard throughput

☐ b) High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1

☐ c) High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beamforming

☐ a) Single spatial stream/Standard throughput

☐ b) High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1

☐ c) High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

d) In case of Smart Antenna Systems or multiple antenna systems:

● The number of Receive chains:

● The number of Transmit chains:

● Equal power distribution among the transmit chains: ☐Yes ☐No

● In case of beamforming, the maximum (additional) beamforming gain: dB

NOTE: Beamforming gain does not include the basic gain of a single antenna (assembly).

e) TPC feature available: ☐Yes ☒No

f) For equipment with TPC range:

The lowest and highest power level (or lowest and highest e.i.r.p. level in case of integrated antenna equipment), intended antenna assemblies and corresponding operating frequency range for the TPC range (or for each of the TPC ranges if more than one is implemented).

TPC range 1: Applicable Frequency Range:

☐ 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz (Indoor)

Simultaneous transmissions in both sub-bands: ☐ Yes ☐ No

☐ 5 470 MHz to 5 725 MHz only (Outdoor only)

Indicate whether the power levels specified are Transmitter Output Power levels or e.i.r.p. levels in case of integrated antenna equipment.

Power levels are specified for: ☐ Tx out ☐ e.i.r.p

If more than one transmit chain is present (e.g. in the case of smart antenna systems), the power levels below represent the power settings per active transmit chain (and per sub-band in case of simultaneous transmissions).

Table F.1: Power levels for TPC range 1

	Sub-band (MHz)	Operating Mode 1 (dBm)	Operating Mode 2 (dBm)	Operating Mode 3 (dBm)
Lowest setting (P_{low})	5 150 to 5 350			
	5 470 to 5 725			
Highest setting (P_{high})	5 150 to 5 350			
	5 470 to 5 725			

Beamforming possible: ☐ Yes ☐ No

Intended Antenna Assemblies:

Table F.2: Intended Antenna Assemblies for TPC range 1

Antenna Assembly name	Antenna Gain (dBi)	Operating Mode	Sub-band (MHz)	forming Beam gain (dB)	e.i.r.p. for P_{low} (dBm)	e.i.r.p. for P_{high} (dBm)
<Antenna 1>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 2>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 3>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			

DFS Threshold level: dBm ☐ at the antenna connector
☐ in front of the antenna

TPC range 2: Applicable Frequency Range:

☐ 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz (Indoor)
 Simultaneous transmissions in both sub-bands: ☐ Yes ☐ No

☐ 5 470 MHz to 5 725 MHz only (Outdoor only)

Indicate whether the power levels specified are Transmitter Output Power levels or e.i.r.p. levels in case of integrated antenna equipment.

Power levels are specified for: ☐ Tx out ☐ e.i.r.p

If more than one transmit chain is present (e.g. in the case of smart antenna systems), the power levels below represent the power settings per active transmit chain (and per sub-band in case of simultaneous transmissions).

Table F.3: Power levels for TPC range 2

	Sub-band (MHz)	Operating Mode 1 (dBm)	Operating Mode 2 (dBm)	Operating Mode 3 (dBm)
Lowest setting (P_{low})	5 150 to 5 350			
	5 470 to 5 725			
Highest setting (P_{high})	5 150 to 5 350			
	5 470 to 5 725			

Beamforming possible: ☐ Yes ☐ No

Intended Antenna Assemblies:

Table F.4: Intended Antenna Assemblies for TPC range 2

Antenna Assembly name	Antenna Gain (dBi)	Operating Mode	Sub-band (MHz)	forming Beam gain (dB)	e.i.r.p. for P_{low} (dBm)	e.i.r.p. for P_{high} (dBm)
<Antenna 1>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 2>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 3>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			

DFS Threshold level: dBm ☐ at the antenna connector
 ☐ in front of the antenna

g) For equipment without a TPC range:**Power Setting 1:** Applicable Frequency Range:

- ☐ 5150 MHz to 5350 MHz and 5470 MHz to 5725 MHz (Indoor)
 Simultaneous transmissions in both sub-bands: ☐ Yes ☐ No
- ☐ 5470 MHz to 5725 MHz only (Outdoor only)

Indicate whether the power levels specified are Transmitter Output Power levels or e.i.r.p. levels in case of integrated antenna equipment.

Power levels are specified for: ☐ Tx out ☐ e.i.r.p.

If more than one transmit chain is present (e.g. in the case of smart antenna systems), the power levels below represent the power settings per active transmit chain (and per sub-band in case of simultaneous transmissions).

Table F.5: Power levels for Power Setting 1

	Sub-band (MHz)	Operating Mode 1 (dBm)	Operating Mode 2 (dBm)	Operating Mode 3 (dBm)
Lowest setting (P_{low})	5150 to 5350			
	5470 to 5725			
Highest setting (P_{high})	5150 to 5350			
	5470 to 5725			

Beamforming possible: ☐ Yes ☐ No
 Intended Antenna Assemblies:

Table F.6: Intended Antenna Assemblies for Power Setting 1

Antenna Assembly name	Antenna Gain (dBi)	Operating Mode	Sub-band (MHz)	forming Beam gain (dB)	e.i.r.p. for P_{low} (dBm)	e.i.r.p. for P_{high} (dBm)
<Antenna 1>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 2>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 3>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			

DFS Threshold level: dBm ☐ at the antenna connector
 ☐ in front of the antenna

Power Setting 2: Applicable Frequency Range:

- ☐ 5150 MHz to 5350 MHz and 5470 MHz to 5725 MHz (Indoor)
 Simultaneous transmissions in both sub-bands: ☐ Yes ☐ No
- ☐ 5470 MHz to 5725 MHz only (Outdoor only)

Indicate whether the power levels specified are Transmitter Output Power levels or e.i.r.p. levels in case of integrated antenna equipment.

Power levels are specified for: ☐ Tx out ☐ e.i.r.p.

If more than one transmit chain is present (e.g. in the case of smart antenna systems), the power levels below represent the power settings per active transmit chain (and per sub-band in case of simultaneous transmissions).

Table F.5: Power levels for Power Setting 2

	Sub-band (MHz)	Operating Mode 1 (dBm)	Operating Mode 2 (dBm)	Operating Mode 3 (dBm)
Lowest setting (P_{low})	5150 to 5350			
	5470 to 5725			
Highest setting (P_{high})	5150 to 5350			
	5470 to 5725			

Beamforming possible: ☐ Yes ☐ No
 Intended Antenna Assemblies:

Table F.6: Intended Antenna Assemblies for Power Setting 2

Antenna Assembly name	Antenna Gain (dBi)	Operating Mode	Sub-band (MHz)	forming Beam gain (dB)	e.i.r.p. for P_{low} (dBm)	e.i.r.p. for P_{high} (dBm)
<Antenna 1>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 2>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			
<Antenna 3>		Mode 1	5150 to 5350			
			5470 to 5725			
		Mode 2	5150 to 5350			
			5470 to 5725			
		Mode 3	5150 to 5350			
			5470 to 5725			

DFS Threshold level: dBm ☐ at the antenna connector
 ☐ in front of the antenna

h) The DFS related operating mode(s) of the equipment:

- ☐ Master
- ☐ Slave with radar detection
- ☐ Slave without radar detection

If the equipment has more than one operating mode, tick all that apply.

i) User access restrictions (please check box below to confirm):

- ☒ The equipment is constructed to comply with the requirements contained in clause 4.10 in ETSI EN 301 893 V1.8.1.

j) For equipment with Off-Channel CAC functionality:

The equipment has an "Off-Channel CAC" function: ☐ Yes ☐ No

If yes, specify the "Off-Channel CAC Time"

- For channels outside the 5 600 MHz to 5 650 MHz range: hours
- If applicable, for channels (partially) within the 5 600 MHz to 5 650 MHz range: hours

k) The equipment can operate in ad-hoc mode:

- ☒ no ad-hoc operation
- ☐ ad-hoc operation in the frequency range 5 150 MHz to 5 250 MHz without DFS
- ☐ ad-hoc operation with DFS

If more than 1 is applicable, tick all that apply.

l) Operating Frequency Range(s):

Range 1: ☒ 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz

Range 2: ☐ 5 470 MHz to 5 725 MHz

Range 3: ☐ 5 150 MHz to 5 250 MHz (ad-hoc without DFS)

Range 4: ☐ other, please specify:

If the equipment has more than one Operating Frequency Range, tick all that apply.

m) The extreme operating temperature and supply voltage range that apply to the equipment:

- ☒ -20°C to +55°C (Outdoor & Indoor usage)
- ☐ 0°C to +35°C (Indoor usage only)
- ☐ Other:

The supply voltages of the stand-alone radio equipment or the supply voltages of the combined (host) equipment or test jig in case of plug-in devices:

- Details provided are for the: ☐ stand-alone equipment
- ☒ combined (or host) equipment
- ☐ test jig

Supply Voltage	<input checked="" type="checkbox"/> AC mains	State AC voltage:	Minimum: 207V	Nominal: 230V	Maximum: 254V
	<input type="checkbox"/> DC	State DC voltage	Minimum:	Nominal:	Maximum:

In case of DC, indicate the type of power source:

- ☐ Internal Power Supply
- ☐ External Power Supply or AC/DC adapter
- ☐ Battery
 - ☐ Nickel Cadmium
 - ☐ Alkaline
 - ☐ Nickel-Metal Hydride
 - ☐ Lithium-Ion
 - ☐ Lead acid (Vehicle regulated)
 - ☐ Other

n) The test sequence/test software used (see also ETSI EN 301 893 (V1.8.1), clause 5.1.2):

o) Type of Equipment:

- ☐ Stand-alone
- ☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of Equipment)
- ☒ Plug-in radio device (Equipment intended for a variety of host systems)
- ☐ Other .

p) Adaptivity (Channel Access Mechanism):

- ☐ Frame Based Equipment
- ☐ Load Based Equipment - Option A
- ☒ Load Based Equipment - Option B

Specify which protocol has been implemented: ☒ IEEE 802.11 ☐ Other:

q) The CCA time implemented by the equipment: 20 μ s

In case of Load Based Equipment implementing Option B (see clause 4.8.3.2) the value q: 32