TEST REPORT

Report Reference No.......................:	**HK2512116489-5ER**
Compiled by (position+printed name+signature)..:	Testing engineer Len Liao
Supervised by (position+printed name+signature)..:	Technique principal Sliver Wan
Approved by (position+printed name+signature)..:	Manager Jason Zhou
Date of issue.......................................:	2026/03/25
Representative Laboratory Name......:	Shenzhen HUAK Testing Technology Co., Ltd.
Address..:	1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name ....:	EDA Technology Shanghai Co.,Ltd
Address..:	Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road, Jiading District, Shanghai, PRC
Test specification .... :	
Standard ....:	**ETSI EN 301 893 V2.2.1 (2024-11)**
TRF Originator ....:	Shenzhen HUAK Testing Technology Co., Ltd.
Master TRF..:	Dated 2024-12

Product Name .... :	ED-HMI3010
Trade Mark ....:	EDATEC
Product Model....................................:	ED-HMI3010-215CA
Series Model.......................................:	ED-HMI3010-116C, ED-HMI3010-116CA, ED-HMI3010-133C, ED-HMI3010-133CA, ED-HMI3010-156C, ED-HMI3010-156CA, ED-HMI3010-185C, ED-HMI3010-185CA, ED-HMI3010-215C
Hardware version..............................:	V2.0
Software version ....:	V1.0
Operation Frequency.........................:	From 5180MHz-5240MHz
Ratings..:	DC 12V From Adapter
Result...:	**PASS**

HUAK TESTING

TEST REPORT

Test Report No. :	HK2512116489-5ER	2026/03/25 Date of issue

Product Name	:	ED-HMI3010
Product Model	:	ED-HMI3010-215CA
Series Model	:	ED-HMI3010-116C, ED-HMI3010-116CA, ED-HMI3010-133C, ED-HMI3010-133CA, ED-HMI3010-156C, ED-HMI3010-156CA, ED-HMI3010-185C, ED-HMI3010-185CA, ED-HMI3010-215C
Applicant	:	EDA Technology Shanghai Co.,Ltd
Address	:	Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road, Jiading District, Shanghai, PRC
Manufacturer	:	EDA Technology Shanghai Co.,Ltd
Address	:	Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road, Jiading District, Shanghai, PRC

Test Result:	**PASS**

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

** Issued history **

Revision	Description	Issued Date	Remark
Revision 1.0	Initial Test Report Release	2026/03/25	Jason Zhou

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 301 893 V2.2.1 (2024-11)
5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	2025/12/11
Testing commenced on	:	2025/12/11
Testing concluded on	:	2026/03/25

2.2. Product Description

Product Name:	ED-HMI3010
Model/Type reference:	ED-HMI3010-215CA
List Model:	ED-HMI3010-116C, ED-HMI3010-116CA, ED-HMI3010-133C, ED-HMI3010-133CA, ED-HMI3010-156C, ED-HMI3010-156CA, ED-HMI3010-185C, ED-HMI3010-185CA, ED-HMI3010-215C
Difference descrption	All model’s the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: ED-HMI3010-215CA.
Power supply:	DC 12V From Adapter
Adapter information:	Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 12V/4.0A, 48.0W Model: KSA-50W-120400D5
Antenna Type	External Antenna
Antenna Gain	1dBi
WLAN	Supported 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40 /802.11ac HT80
Operation frequency	IEEE 802.11a:5180MHz-5240MHz IEEE 802.11n HT20:5180MHz-5240MHz IEEE 802.11n HT40:5190MHz-5230MHz IEEE 802.11ac HT20:5180MHz-5240MHz IEEE 802.11ac HT40:5190MHz-5230MHz IEEE 802.11ac HT80:5210MHz
Modulation Type	IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac HT20: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac HT40: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac HT80: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Note: Antenna gain Refer to the antenna specifications. The cable loss data is obtained from the supplier. The test results in the report only apply to the tested sample.	

2.3. Equipment Under Test

Power supply system utilised

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

DC 12V From Adapter

Channel list:

Channel	Frequency (MHz)
36	5180
38	5190
40	5200
42	5210
44	5220
46	5230
48	5240

2.4. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

○	/	M/N:	/
		Manufacturer:	/

2.5. Test summary

Test Item	Test Requirement ESTI EN 301 893	Verdict
Nominal centre frequency	Section 4.2.1	Pass
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Section 4.2.2	Pass
RF output power, Transmit Power Control (TPC) and power density	Section 4.2.3	Pass
Transmitter unwanted emissions	Section 4.2.4	Pass
Receiver spurious emissions	Section 4.2.5	Pass
Dynamic Frequency Selection (DFS)	Section 4.2.6	N/A
Adaptivity (Channel Access Mechanism) 4.8.1 Applicability	Section 4.2.7	Pass
Receiver Blocking	Section 4.2.8	Pass
Adjacent channel selectivity	Section 4.2.9	Pass
User Access Restrictions	Section 4.2.10	Pass
Geo-location capability	B.2.2.11	N/A
Note:N./A Stands for “Not applicable”		

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Information of the Test Laboratory

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

3.2. Environmental conditions

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

Normal Temperature: 25 °C
High Temperature: 40 °C
Low Temperature: -10 °C
Normal Voltage: DC 12V
High Voltage: DC 13.2V
Low Voltage: DC 10.8V
Relative Humidity: 55 %
Air Pressure: 989 hPa

3.3. Test Channels:

Test	Clause	Test channel		
		Sub-band 1	Sub-band 2	Sub-band 3
Nominal centre frequency (see note 1)	5.4.2	$C_{1}1$	$C_{2}1$	$C_{3}1$
Occupied bandwidth	5.4.3	$C_{1}1$	$C_{2}1$	$C_{3}1$
RF output power, Power Spectral Density (PSD)	5.4.4	$C_{1}2$, $C_{1}3$	$C_{2}2$, $C_{2}3$	$C_{3}2$, $C_{3}3$
Transmit Power Control (TPC) (see note 1)	5.4.4	n.a.	$C_{2}2$, $C_{2}3$	$C_{3}2$, $C_{3}3$
Transmitter unwanted emissions outside the transmitter's operating bands (see note 1)	5.4.5	$C_{1}1$	$C_{2}1$	$C_{3}1$
Transmitter unwanted emissions within the transmitter's operating bands (for single-channel operation)	5.4.6	$C_{1}2$, $C_{1}3$	$C_{2}2$, $C_{2}3$	$C_{3}2$, $C_{3}3$

Test	Clause	Test channel		
		Sub-band 1	Sub-band 2	Sub-band 3
Transmitter unwanted emissions within the transmitter's operating bands (for multi-channel operation in adjacent channels) (see note 3 for multi-channel operation in non-adjacent channels)	5.4.6	$C_{gen}1$, $C_{gen}2$ (see note 4 for channels in the group of adjacent channels not used for transmission)		
Receiver spurious emissions (see note 1)	5.4.7	$C_{1}1$	$C_{2}1$	$C_{3}1$
Dynamic Frequency Selection (DFS)	5.4.8	n.a.	$C_{2}4$	$C_{3}4$ (see note 2)
Adaptivity (channel access mechanism)	5.4.9	$C_{gen}3$		
Receiver blocking	5.4.10	$C_{1}1$	$C_{2}1$	$C_{3}1$
Adjacent channel selectivity	5.4.11	$C_{1}1$	$C_{2}1$	$C_{3}1$

Test channel definitions:

$C_{1}1$, $C_{2}1$, $C_{3}1$: One channel from the channel plan for the sub-band. For occupied bandwidth, testing shall be repeated for every nominal channel bandwidth within the sub-band. For receiver blocking and adjacent channel selectivity, it is sufficient to only perform this test using the lowest nominal channel bandwidth.

$C_{1}2$, $C_{2}2$, $C_{3}2$: The lowest channel for every channel plan within this sub-band. For PSD testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth. For unwanted emissions testing, it is sufficient to only perform this test using a nominal channel bandwidth of 20 MHz.

$C_{1}3$, $C_{2}3$, $C_{3}3$: The highest channel for every channel plan within this sub-band. For PSD testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth. For unwanted emissions testing, it is sufficient to only perform this test using a nominal channel bandwidth of 20 MHz.

$C_{1}4$, $C_{2}4$, $C_{3}4$: One channel from the channel plan for this sub-band. If more than one nominal channel bandwidth is specified for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth.

$C_{gen}1$: The lowest channel in the group of adjacent channels for all supported total bandwidths (N).

$C_{gen}2$: The highest channel in the group of adjacent channels for all supported total bandwidths (N).

$C_{gen}3$: One channel (in case of single-channel testing) or a group of adjacent channels (in case of multi-channel testing) from the channel plan.

NOTE 1: In case of more than one channel plan, testing of these specific requirements needs only to be performed using one of the channel plans.

NOTE 2: Where the 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 (CAC) (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.

NOTE 3: For multi-channel operation in non-adjacent channels, each group of adjacent channels shall be tested individually with the specified test channels.

NOTE 4: If one or more of the channels in the group of adjacent channels might not be used for transmission, channel configurations suitable to verify each of the supported channel edge masks as shown in figure 2, figure 3 and figure 4 shall be tested in addition.

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen HUAK 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 Shenzhen HUAK Testing Technology Co., Ltd is reported:

No.	Item	Uncertainty
1	Occupied Channel Bandwidth	±3.68%
2	RF power, conducted	±0.37dB
3	Power Spectral Density, conducted	±0.78dB
4	Unwanted Emissions, conducted	±2.71dB
5	All emissions, radiated	±4.28dB
6	Temperature	±0.5°C
7	Humidity	±2%
8	DC and low frequency voltages	±1.5%
9	Time	±1.0%
10	Duty Cycle	±3.0%

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

Shenzhen HUAK Testing Technology Co., Ltd. Tel.: +86-0755-2302 9901 E-mail: info@huak.com Web.: www.huak.com

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.5. Equipments Used during the Test

Centre frequencies & RF output power & Power density & OCB & TPC & Adaptively & Receiver Blocking						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum analyzer	Agilent	N9020A	HKE-025	2026.02.06	2027.02.05
2	Signal generator	Agilent	N5182A	HKE-029	2026.02.04	2027.02.03
3	Signal generator	KEYSIGHT	N5182B	HKE-124	2026.02.04	2027.02.03
4	RF automatic control unit	Tonscend	JS0806-2	HKE-060	2026.02.06	2027.02.05
5	RF test software	Tonscend	V3.5.39	HKE-083	/	/

Transmitter spurious emissions & Receiver spurious emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2026.02.06	2028.02.05
2	Horn antenna	Schwarzbeck	9120D	HKE-013	2026.02.06	2028.02.05
3	Receiver	R&S	ESR-7	HKE -010	2026.02.06	2027.02.05
4	Preamplifier	Schwarzbeck	EMC051845SE	HKE-006	2026.02.06	2027.02.05
5	Preamplifier	Agilent	83051A	HKE-016	2026.02.04	2027.02.03
6	High pass filter unit	Tonscend	JS0806-F	HKE-055	2026.02.06	2027.02.05
7	Spectrum analyzer	Agilent	N9020A	HKE-025	2026.02.06	2027.02.05
8	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE -184	/	/

4. TEST CONDITIONS AND RESULTS

4.1. Centre frequencies

Limit

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

Test Procedure

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

Test Results

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 a	CH36/ 5180MHz	5179.945134	10.59
13.2	-10			5179.937740	12.02
	+40			5179.961577	7.42
10.8	-10			5179.949175	9.81
	+40			5179.974762	4.87
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 n HT 20	CH36/ 5180MHz	5179.963824	6.98
13.2	-10			5179.957369	8.23
	+40			5179.959243	7.87
10.8	-10			5179.971645	5.47
	+40			5179.947371	10.16
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 n HT 40	CH38/ 5190MHz	5189.989122	2.10
13.2	-10			5189.920646	15.29
	+40			5189.956273	8.43
10.8	-10			5189.963864	6.96
	+40			5189.978848	4.08
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 ac HT 20	CH36/ 5180MHz	5179.976549	4.53
13.2	-10			5179.938654	11.84
	+40			5179.939552	11.67
10.8	-10			5179.964704	6.81
	+40			5179.945590	10.50
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 ac HT 40	CH38/ 5190MHz	5189.952513	9.15
13.2	-10			5189.944269	10.74
	+40			5189.956122	8.45
10.8	-10			5189.945568	10.49
	+40			5189.943820	10.82
Limit				20 ppm	
Result				PASS	

Test conditions		Mode	Test Channel / Frequency	Measured Result (MHz)	Frequency Deviation (ppm)
Voltage (V)	Temperature (℃)				
12.0	+25	802.11 ac HT 80	CH42/ 5210MHz	5209.935243	12.43
13.2	-10			5209.940806	11.36
	+40			5209.941781	11.17
10.8	-10			5209.945120	10.53
	+40			5209.974476	4.90
Limit				20 ppm	
Result				PASS	

4.2. Nominal Channel Bandwidth and Occupied Channel Bandwidth

LIMIT

The nominal channel bandwidth for a single channel shall be 20 MHz.
Alternatively, equipment may implement a lower nominal channel bandwidth with a minimum of 5 MHz, providing it still conforms to the limits defined for nominal centre frequencies (20 MHz raster).
For channels whose nominal channel bandwidth falls partly or completely within sub-band 2 or sub-band 3, the occupied bandwidth shall not be less than 80 % of the nominal channel bandwidth. During a Channel Occupancy Time (COT), equipment may operate temporarily with an occupied bandwidth of less than 80 % of its nominal channel bandwidth. The occupied bandwidth shall not be less than 2 MHz.
For channels whose nominal channel bandwidth falls completely outside sub-band 2 and sub-band 3, the occupied bandwidth shall be equal or less than the nominal channel bandwidth.
In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet the requirements specified in this clause.
The occupied bandwidth might change with time/payload.

Test Procedure

Step 1:
• Connect the UUT to the spectrum analyser and use the following settings:
- Centre frequency: nominal centre frequency of the channel being investigated
- RBW: 100 kHz
- VBW: 300 kHz
- Frequency span: 2 × nominal channel bandwidth (e.g. 40 MHz for a nominal channel bandwidth of 20 MHz)
- Sweep time: > 1 s; in case of multi-channel operation, the sweep time may be increased to 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.

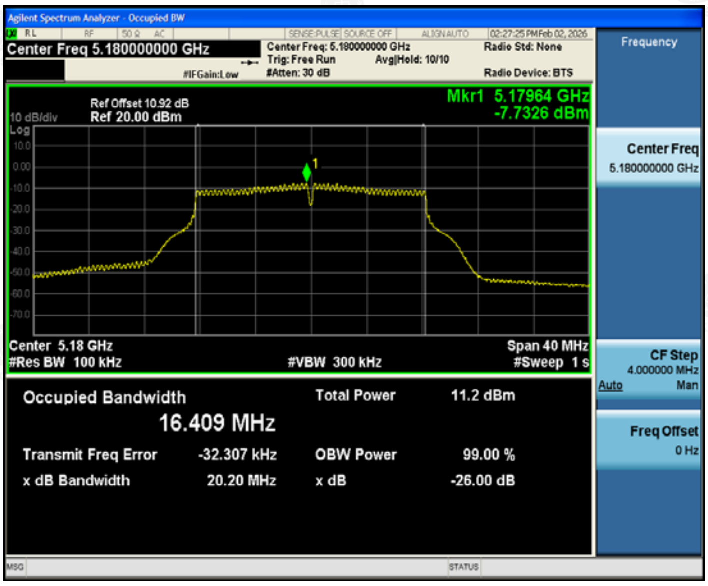
Step 3:
• Ensure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.
• Use the 99 % bandwidth function of the spectrum analyser to measure the occupied bandwidth of the UUT. This value shall be recorded.
The measurement described in step 1 to step 3 shall be repeated in case of simultaneous transmissions in non-adjacent channels.

TEST RESULTS

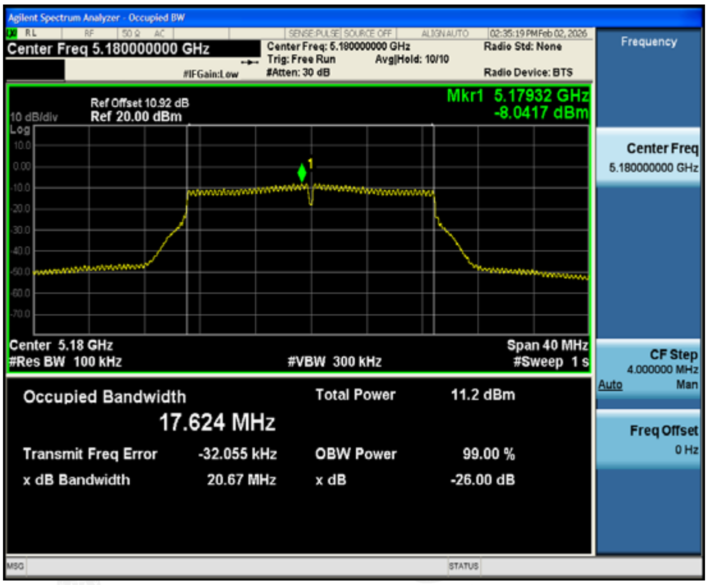
Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	Result
802.11 a	CH36	5180	16.409	Pass
802.11 n HT 20	CH36	5180	17.624	Pass
802.11 n HT 40	CH38	5190	36.163	Pass
802.11 ac HT 20	CH36	5180	17.625	Pass
802.11 ac HT 40	CH38	5190	36.161	Pass
802.11 ac HT 80	CH42	5210	75.518	Pass

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

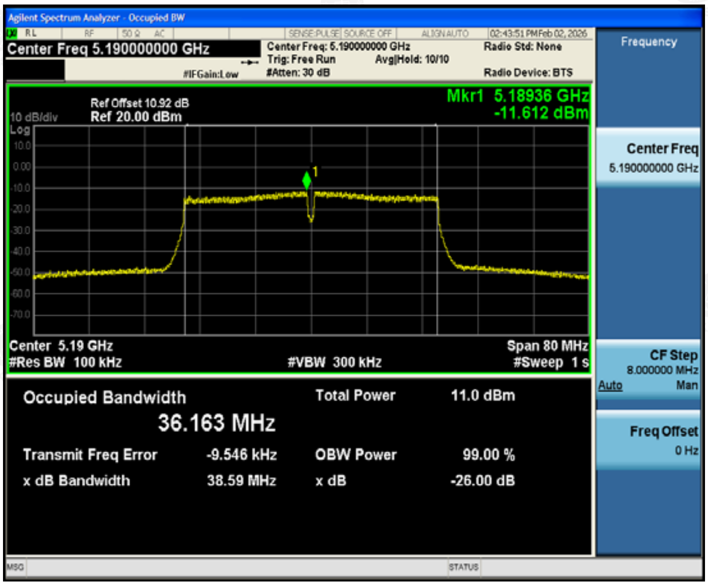
802.11a-5180MHz



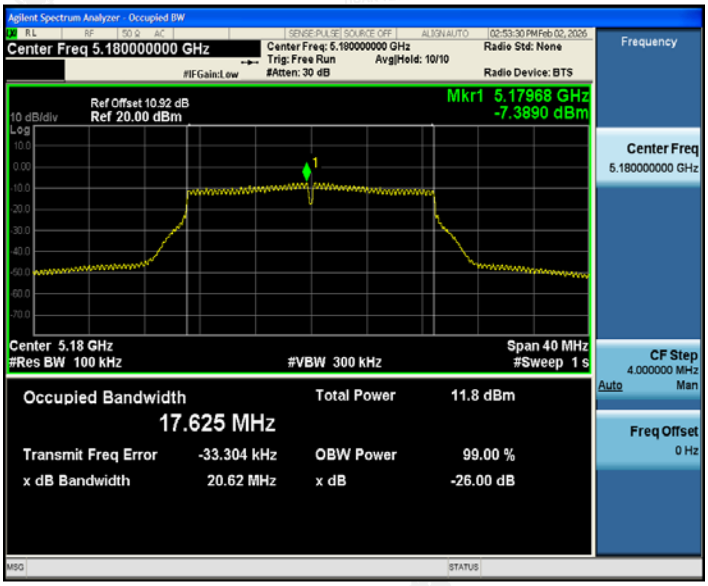
802.11n HT20-5180MHz



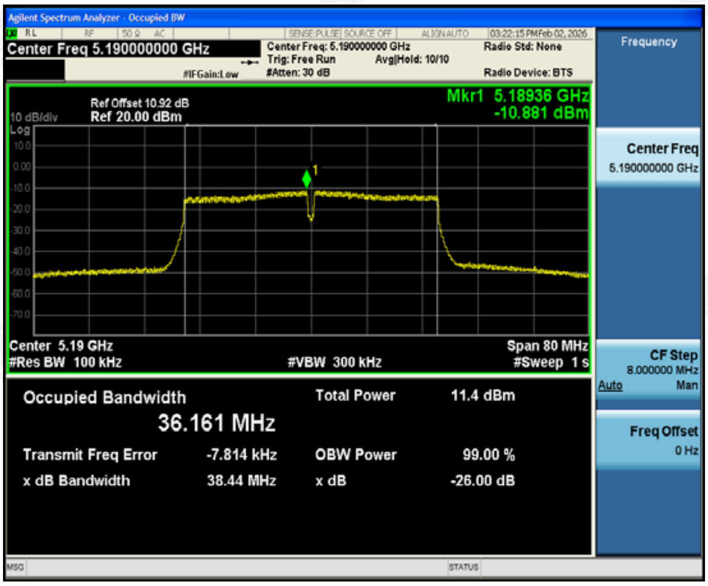
802.11n HT40-5190MHz



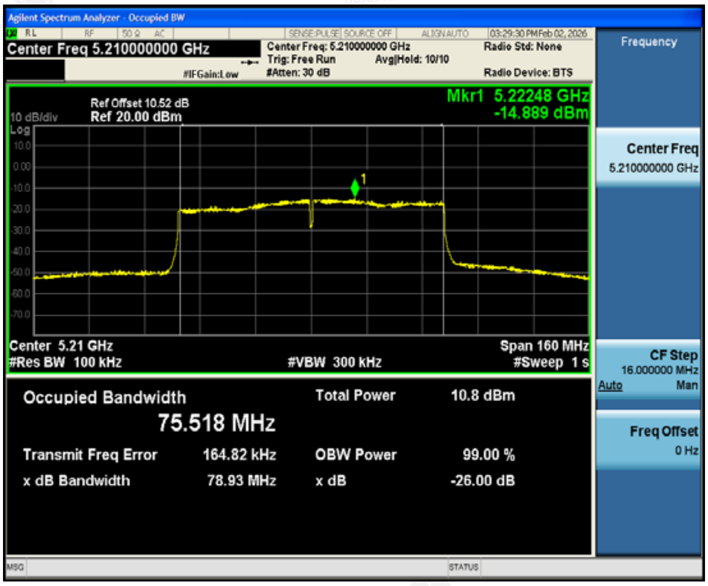
802.11ac HT20-5180MHz



802.11ac HT40-5190MHz



802.11ac HT80-5210MHz



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

LIMIT

Table 2: RF output power and PSD limits

Sub-band	RF output power limit (dBm)		PSD limit (dBm/MHz)	
	with TPC (see note 3)	without TPC	with TPC	without TPC
Sub-band 1	23	23	10	10
Sub-band 2	23	20	10	7
Sub-band 3 (see note 2)	30 (see note 1)	27 (see note 1)	17 (see note 1)	14 (see note 1)

NOTE 1: Secondary devices without radar detection operating in sub-band 3 shall conform to the limits for sub-band 2.
NOTE 2: National frequency usage conditions may allow devices to operate in sub-band 3 on a channel with a nominal channel bandwidth that extends into sub-band 4.
NOTE 3: If TPC is used, the RF output power in sub-band sb at the lowest power level of the TPC range in sub-band sb ($P_{L,sb}$) shall be at least 6 dB less than the applicable RF output power limit with TPC.

4.3.1. RF output power at the highest power - PH

Test Procedure

Additional test conditions

These measurements shall be performed under both normal and extreme test conditions (see clause 5.1.2 and clause 5.1.3).
The UUT shall be configured to operate at:
• the highest transmitter output power level of the TPC range; or
• the maximum transmitter output power level in case the equipment has no TPC feature.
Procedure 1 (see clause 5.4.4.2.1.1.2) shall be performed for equipment that operates only in one sub-band or which is capable of operating in multiple sub-bands simultaneously but, for the purpose of the testing, can be configured to:
• operate in a continuous transmit mode or with a constant duty cycle (x) (e.g. FBE); and
• operate only within one sub-band.
Procedure 2 (see clause 5.4.4.2.1.1.3) shall be performed for equipment that is either:
• capable of operating in more than one sub-band but not simultaneously; or
• capable of operating in multiple sub-bands simultaneously but which, for the purpose of the testing, can be configured to transmit only in one sub-band.
Procedure 3 (see clause 5.4.4.2.1.1.4) shall be performed for equipment capable of operating in multiple sub-bands simultaneously but which cannot be configured to transmit only in one sub-band.

Procedure 1
The test procedure shall be as follows and shall be performed for each of the supported sub-bands:
Step 1:
• For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.
• Couple the output power of the transmitter to a matched diode detector or equivalent thereof. Connect the output of the diode detector 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.

• Note the observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) as x (0 < x ≤ 1) and record it in the test report.

Step 2:

• Determine the RF output power 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. Note the observed value as A (in dBm).

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

Step 3:

• Calculate the RF output power at the highest power level PH,sb from the RF output power A (in dBm) measured in step 2, the observed duty cycle x, the antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to equation (4). If more than one antenna assembly is intended for this power setting or TPC range, use the gain of the antenna assembly with the highest gain.

$$P_{H,sb} = A + G + Y + 10 \times \log10\ (1 / x)\ (dBm)\ (4)$$

• Compare the value $P_{H,sb}$ to the applicable limit and record it in the test report.

Procedure 2

The test procedure shall be as follows and shall be performed for each of the supported sub-bands:

Step 1:

• Sample the transmit signal from the UUT using a fast power sensor suitable for 6 GHz. Save the raw samples, representing the RMS power of the signal. Use the following settings:

- Sample speed: ⩾ 106 samples/s
- Measurement duration: sufficient to capture a minimum of 10 transmitter bursts (see clause 5.3.1.1)

Step 2:

• For conducted measurements on devices with one transmit chain:

- Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.

• For conducted measurements on devices with multiple transmit chains:

- Connect a power sensor to each transmit port for a synchronous measurement on all transmit ports.
- Trigger the power sensors so that they start sampling at the same time. Ensure that the time difference between the samples of all sensors is less than 500 ns.
- For each individual sampling point (time domain), sum the coincident power samples of all ports and store them. Use these summed samples in the following steps.

Step 3:

• Find the start and stop times of each burst in the stored measurement samples.

The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples from step 2. In case of insufficient dynamic range, the value of 30 dB may need to be reduced appropriately.

Step 4:

• Between the start and stop times of each individual burst, calculate the RMS (mean) power over the burst (Pburst) using equation (5):

$$P_{burst} = \frac{1}{k} \sum_{n=1}^{k} P_{sample}(n)$$

with k the total number of samples and n the actual sample number.

• Note the highest of all Pburst values as the value A in dBm.

Step 5:

• Calculate the RF output power at the highest power level PH,sb from the RF output power A (in dBm) determined in step 4, the antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to equation (6). If more than one antenna assembly is intended for this power setting or TPC range, use the gain of the antenna assembly with the highest gain.

PH,sb = A + G + Y (dBm) (6)

• Compare the value PH,sb to the applicable limit and record it in the test report.

Procedure 3

This procedure first measures the peak power in each sub-band separately, then measures the peak-to-mean power ratio for the overall transmission and uses this to calculate the RF output power in each sub-band separately using the measured values for peak power.

The test procedure shall be as follows:

Step 1: Measuring the total peak power within sub-band 1

• Connect the UUT to the spectrum analyser and use the following settings:
- Start frequency: 5 100 MHz
- Stop frequency: 5 300 MHz
- RBW: 1 MHz
- VBW: 3 MHz
- Detector mode: Peak
- Trace mode: Max Hold
- Sweep time: Auto

• Ensure that the noise floor of the spectrum analyser is at least 30 dB below the peak of the power envelope. If this is not possible (e.g. radiated measurements), reduce the bandwidth of the channel power measurement function to avoid the noise floor influencing the measurement result.

When the trace is complete, use the channel power measurement function to measure the total peak power of the transmissions within sub-band 1.

Step 2: Measuring the total peak power within sub-band 2

• Change the start frequency to 5 200 MHz and the stop frequency to 5 400 MHz.

• Ensure that the noise floor of the spectrum analyser is at least 30 dB below the peak of the power envelope. If this is not possible (e.g. radiated measurements), reduce the bandwidth of the channel power measurement function to avoid the noise floor influencing the measurement result.

• When the trace is complete, use the channel power measurement function to measure the total peak power of the transmissions within sub-band 2.

• For conducted measurements on devices with multiple transmit chains, repeat the procedure in step 2 for each of the active transmit chains. Sum the results to provide the total peak power of the transmissions within subband 2.

Step 3: Measuring the total peak power within sub-band 3 (if applicable including transmissions between 5 725 MHz and 5 730 MHz)

• Change the start frequency to 5 420 MHz and the stop frequency to 5 775 MHz.

If the channel plan includes a channel with a nominal centre frequency within sub-band 3 whose nominal channel bandwidth extends into sub-band 4, adjust the stop frequency accordingly.

• Ensure that the noise floor of the spectrum analyser is at least 30 dB below the peak of the power envelope. If this is not possible (e.g. radiated measurements), reduce the bandwidth of the channel power measurement function to avoid the noise floor influencing the measurement result.

• When the trace is complete, use the channel power measurement function to measure the total peak power of all transmissions within sub-band 3.

• For conducted measurements on devices with multiple transmit chains, repeat the procedure in step 3 for each of the active transmit chains. Sum the results to calculate the total peak power of the transmissions within subband 3.

NOTE: If the channel plan includes a channel with a nominal centre frequency within sub-band 3 whose nominal channel bandwidth extends into sub-band 4, the total peak power may include transmissions within the band 5 725 MHz to 5 730 MHz.

Step 4: Calculating the total peak power

• Calculate the total peak power by summing the measured values in step 1, step 2 and step 3.

Modern spectrum analysers may be able to measure the peak power in all sub-bands in one measurement in which case

step 1, step 2 and step 3 can be combined.

Step 5: Measuring the total mean output power

• Sample the transmit signal from the device using a fast power sensor suitable for 6 GHz. Save the raw samples, representing the RMS power of the signal. Use the following settings:
- Sample speed: ⩾ 106 samples/s
- Measurement duration: sufficient to capture a minimum of 10 transmitter bursts (see clause 5.3.1.1)

• For conducted measurements on devices with one transmit chain:
- Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.
• For conducted measurements on devices with multiple transmit chains:
- Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports.
- Trigger the power sensors so that they start sampling at the same time. Ensure that the time difference between the samples of all sensors is less than 500 ns.
- For each individual sampling point (time domain), sum the coincident power samples of all ports and store them. Use these summed samples in all following steps.
• Find the start and stop times of each burst in the stored measurement samples.
The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples. In case of insufficient dynamic range, the value of 30 dB may need to be reduced appropriately.
• Between the start and stop times of each individual burst, calculate the RMS (mean) power over the burst (Pburst) using equation (7):

$$P_{burst} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with k the total number of samples and n the actual sample number.
• The highest of all Pburst values is the total mean output power, and this value will be used for further calculations.
Step 6: Calculating the peak-to-mean power ratio
• Using the value for total peak power calculated in step 4 and the highest value for total mean output power measured in step 5, calculate the peak-to-mean power ratio in dB.
Step 7: Calculating the RF output power at the highest power level PH,sb for sub-band 1, sub-band 2 and sub-band 3
• Calculate the RF output power at the highest power level PH,sb for each of the sub-bands defined in table 1 from the peak-to-mean power ratio obtained in step 6 and the measured values for peak power in each of the sub-bands (see step 1, step 2 and step 3). These values (values A in dBm) will be used for RF output power calculations:
- Add the antenna assembly gain G in dBi of the individual antenna element.
- If applicable, add the additional beamforming gain Y in dB.
- If more than one antenna assembly is intended for this power setting or TPC range, use the maximum overall antenna gain (G or G + Y).
• For each sub-band, calculate $P_{H,sb}$ using equation (8):

$$P_{H,sb} = A + G + Y \text{ (dBm) (8)}$$

• Compare the values for $P_{H,sb}$ to the applicable limits and record them in the test report.

Test Results

802.11a								
Test conditions		**Channel/ Frequency**	**Measur power (dBm)**	**Antenna Gain (dBi)**	**e.i.r.p (dBm)**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**						
+25℃	12.0V	36/5180	11.65	1.0	12.65	23	PASS
-10℃	13.2V		11.96	1.0	12.96		
	10.8V		11.24	1.0	12.24		
+40℃	13.2V		11.11	1.0	12.11		
	10.8V		9.27	1.0	10.27		

802.11 n HT 20							
Test conditions		**Channel/ Frequency**	**Measur power (dBm)**	**Antenna Gain (dBi)**	**e.i.r.p (dBm)**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**						
+25℃	12.0V	36/5180	11.65	1.0	12.65	23	PASS
-10℃	13.2V		11.07	1.0	12.07		
	10.8V		10.24	1.0	11.24		
+40℃	13.2V		10.11	1.0	11.11		
	10.8V		9.27	1.0	10.27		

802.11 n HT 40							
Test conditions		**Channel/ Frequency**	**Measur power (dBm)**	**Antenna Gain (dBi)**	**e.i.r.p (dBm)**	**Limit (dBm)**	**Result**
Temperature (℃)	**Voltage (V)**						
+25℃	12.0V	38/5190	11.18	1.0	12.18	23	PASS
-10℃	13.2V		10.32	1.0	11.32		
	10.8V		10.64	1.0	11.64		
+40℃	13.2V		9.95	1.0	10.95		
	10.8V		10.66	1.0	11.66		

802.11 ac HT 20								
Test conditions		Channel/ Frequency	Measur power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (℃)	Voltage (V)						
+25℃	12.0V	36/5180	10.99	1.0	11.99	23	PASS
-10℃	13.2V		10.64	1.0	11.64		
	10.8V		10.46	1.0	11.46		
+40℃	13.2V		10.48	1.0	11.48		
	10.8V		10.67	1.0	11.67		

802.11 ac HT 40							
Test conditions		Channel/ Frequency	Measur power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (℃)	Voltage (V)						
+25℃	12.0V	38/5190	9.46	1.0	10.46	23	PASS
-10℃	13.2V		10.13	1.0	11.13		
	10.8V		9.91	1.0	10.91		
+40℃	13.2V		10.89	1.0	11.89		
	10.8V		10.94	1.0	11.94		

802.11 ac HT 80							
Test conditions		Channel/ Frequency	Measur power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (℃)	Voltage (V)						
+25℃	12.0V	42/5210	10.63	1.0	11.63	23	PASS
-10℃	13.2V		10.16	1.0	11.16		
	10.8V		9.60	1.0	10.60		
+40℃	13.2V		8.37	1.0	9.37		
	10.8V		8.06	1.0	9.06		

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

Test Procedure

Additional test conditions
This test is only required for equipment with a TPC feature.
These measurements shall be performed under both normal and extreme test conditions (see clause 5.1.2 and clause 5.1.3).
The UUT shall be configured to operate at the lowest transmitter output power level of the TPC range.
Procedure 1 (see clause 5.4.4.2.1.2.2) shall be performed for equipment that operates only in one sub-band or which is capable of operating in multiple sub-bands simultaneously but, for the purpose of the testing, can be configured to:
• operate in a continuous transmit mode or with a constant duty cycle (x) (e.g. FBE); and
• operate only within one sub-band.
Procedure 2 (see clause 5.4.4.2.1.2.3) shall be performed for equipment that is either:
• capable of operating in more than one sub-band but not simultaneously; or
• capable of operating in multiple sub-bands simultaneously but which, for the purpose of the testing, can be configured to transmit only in one sub-band.
Procedure 3 (see clause 5.4.4.2.1.2.4) shall be performed for equipment capable of operating in multiple sub-bands simultaneously but which cannot be configured to transmit only in one sub-band.

5.4.4.2.1.2.2 Procedure 1

The test procedure shall be as follows and shall be performed for each of the supported sub-bands:
Step 1:
• See step 1 in clause 5.4.4.2.1.1.2.
The duty cycle measurement may not need to be repeated.
Step 2:
• See step 2 in clause 5.4.4.2.1.1.2.
Step 3:
• Calculate the RF output power at the lowest power level of the TPC range PL,sb from the RF output power A (in dBm) measured in step 2, the observed duty cycle x, the antenna assembly gain G in dBi and, if applicable, the beamforming gain Y in dB according to equation (9). If more than one antenna assembly is intended for this TPC range, use the gain of the antenna assembly with the highest gain.

$$P_{L,sb} = A + G + Y + 10 \times \log10 (1 / x) \text{ (dBm)}$$

• Compare the value $P_{L,sb}$ to the applicable limit and record it in the test report.
5.4.4.2.1.2.3 Procedure 2
The test procedure shall be as follows:
Step 1 to step 4:
• See step 1 to step 4 in clause 5.4.4.2.1.1.3.
Step 5:
• Calculate the RF output power at the lowest power level of the TPC range PL,sb from the RF output power A (in dBm) determined in step 4, the antenna assembly gain G in dBi and, if applicable, the beamforming gain Y in dB according to equation (10). If more than one antenna assembly is intended for this TPC range, use the gain of the antenna assembly with the highest gain.

$$P_{L,sb} = A + G + Y \text{ (dBm) (10)}$$

• Compare the value $P_{L,sb}$ to the applicable limit and record it in the test report.
5.4.4.2.1.2.4 Procedure 3
This procedure first measures the peak power in each sub-band separately, then measures the peak-to-mean power ratio for the overall transmission and uses this to calculate the RF output power in each sub-band separately using the measured values for peak power.
The test procedure shall be as follows:
Step 1 to step 6:
• See step 1 to step 6 in clause 5.4.4.2.1.1.4.
Step 7: Calculating the RF output power at the lowest power level of the TPC range PL,sb for sub-band 1, sub-band 2 and sub-band 3

• Calculate the RF output power at the lowest power level of the TPC range PL,sb for each of the sub-bands defined in table 1 from the peak-to-mean power ratio obtained in step 6 and the measured values for peak power in each of the sub-bands (see step 1, step 2 and step 3). These values (values A in dBm) will be used for RF output power calculations:

- Add the antenna assembly gain G in dBi of the individual antenna element.
- If applicable, add the additional beamforming gain Y in dB.
- If more than one antenna assembly is intended for this TPC range, use the maximum overall antenna gain (G or G + Y).

• For each sub-band, calculate $P_{L,sb}$ using equation (11):

$P_{L,sb}$ = A + G + Y (dBm)

• Compare the values for $P_{L,sb}$ to the applicable limit and record them in the test report.

Test Results

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

4.4. Power density

Test Procedure

Additional test conditions

These measurements shall only be performed at normal test conditions (see clause 5.1.2).
The UUT shall be configured to operate at the lowest nominal channel bandwidth with:
• the highest transmitter output power level of its TPC range; or
• the maximum transmitter output power level in case the equipment has no TPC feature.
Procedure 1 (see clause 5.4.4.2.1.3.2) shall be performed for equipment that can be configured to operate in a continuous transmit mode or with a constant duty cycle (x) (e.g. FBE).
Procedure 2 (see clause 5.4.4.2.1.3.3) shall be performed for equipment that has non-continuous transmissions and cannot be configured to transmit continuously or with a constant duty cycle.

5.4.4.2.1.3.2 Procedure 1
The test procedure shall be as follows:
Step 1:
• Connect the UUT to the spectrum analyser and use the following settings:
- Centre frequency: nominal centre frequency of the channel being investigated
- RBW: 1 MHz
- VBW: 3 MHz
- Frequency span: 2 × nominal channel bandwidth (e.g. 40 MHz for a nominal channel bandwidth of 20 MHz)
- 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: 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, capture the trace using the Hold or View mode on the spectrum analyser.
Find the peak value of the trace and place the analyser marker on this peak. This level is the highest measured PSD in a 1 MHz band. Record it as D.
Where a spectrum analyser is equipped with a function to measure PSD, this function may be used to determine the peak PSD value D in dBm/MHz.
• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, measure the PSD of each transmit chain separately to calculate the total peak PSD value D in dBm/MHz for the UUT.
Step 5:
• Calculate the maximum PSD from the peak PSD value D measured in step 4, the observed duty cycle x (see clause 5.4.4.2.1.1.2, step 1), the applicable antenna assembly gain G in dBi and, if applicable, the beamforming gain Y in dB according to equation (12). If more than one antenna assembly is intended for this power setting or TPC range, use the gain of the antenna assembly with the highest gain.

$$PSD_{total} = D + G + Y + 10 \times \log10 (1 / x) \text{ (dBm/MHz)}$$

• Compare the value of PSDtotal obtained in step 5 with the applicable limit and record it in the test report.

5.4.4.2.1.3.3 Procedure 2

For devices capable of operating in multiple sub-bands simultaneously, the PSD in each of the sub-bands shall be measured separately and compared with the applicable limits.

The test procedure for measuring the PSD in a given sub-band 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 (i.e. 5 150 MHz, 5 250 MHz or 5 470 MHz)
- Stop frequency: upper band edge of applicable sub-band (i.e. 5 250 MHz, 5 350 MHz or 5 725 MHz)
- RBW: 10 kHz
- VBW: 30 kHz
- Sweep points: > 10 000 (for sub-band 1)

> 10 000 (for sub-band 2)
> 25 500 (for sub-band 3)

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented.

- Detector mode: 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 5.3.3.2), 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 equation (13):

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

with k 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 at the highest power level PH,sb measured in clause 5.4.4.2.1.1 for this sub-band. Equations (14) and (15) may be used:

$$C_{corr} = P_{sum} - P_{H,sb} \quad (14)$$

$$P_{samplecorr}(n) = P_{sample}(n) - C_{corr} \quad (15)$$

with n the actual sample number.

Step 5:

• Starting from the first sample Psamplecorr(n) 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 PSD for the first 1 MHz segment. Save this value.

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 PSD values for each of the 1 MHz segments. From all the saved results, the highest value is the maximum PSD for the UUT.

Step 8:

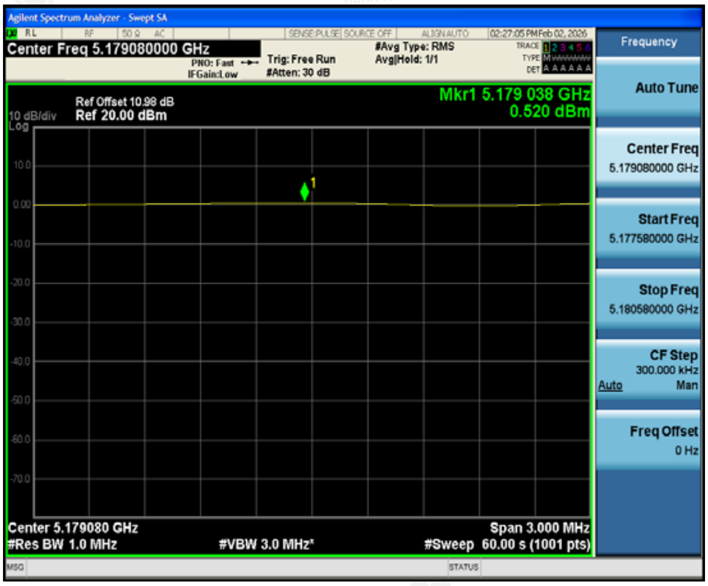
• Compare the values for the maximum PSD obtained in step 7 with the applicable limits and record them in the test report.

Test Results

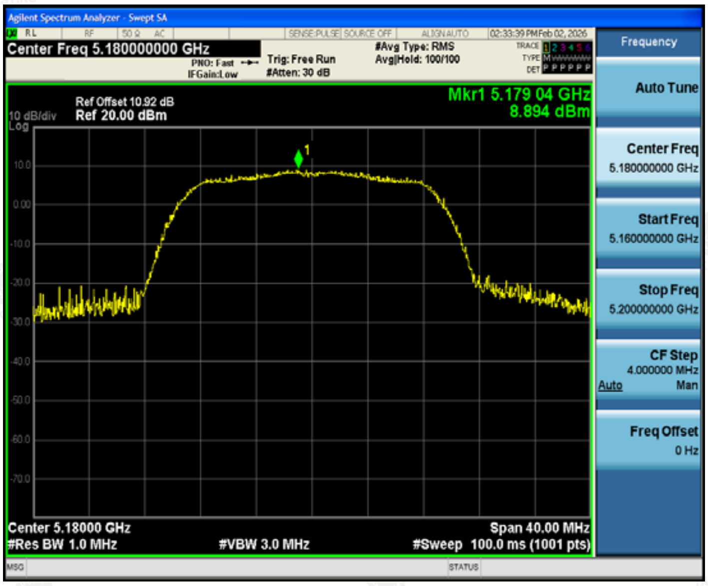
Mode	Channel/ Frequency （MHz）	Measured value (dBm/MHz)	Antenna Gain (dBi)	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	36/5180	-0.48	1.0	0.52	10	Pass
802.11n HT 20	36/5180	-0.91	1.0	0.09	10	Pass
802.11n HT 40	38/5190	-4.10	1.0	-3.10	10	Pass
802.11ac HT 20	36/5180	-0.31	1.0	0.69	10	Pass
802.11ac HT 40	38/5190	-3.88	1.0	-2.88	10	Pass
802.11ac HT 80	42/5210	-7.30	1.0	-6.30	10	Pass

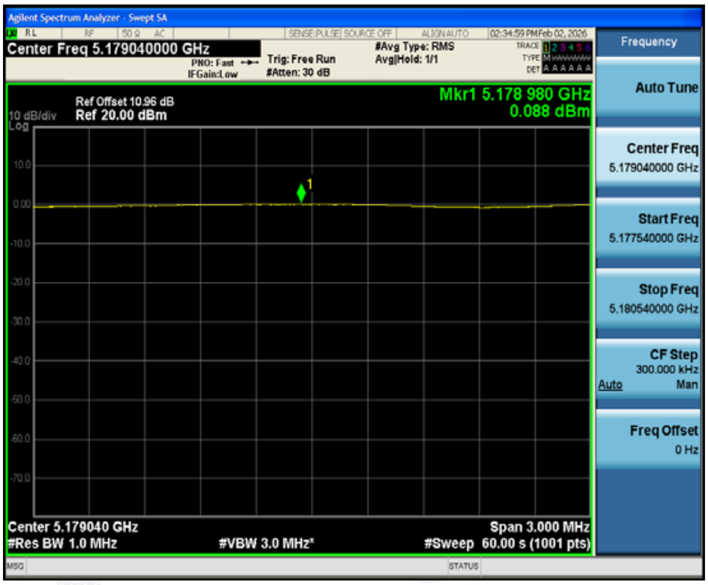
Note:Only the worst channel is reported for each modulation.

802.11a-5180MHz

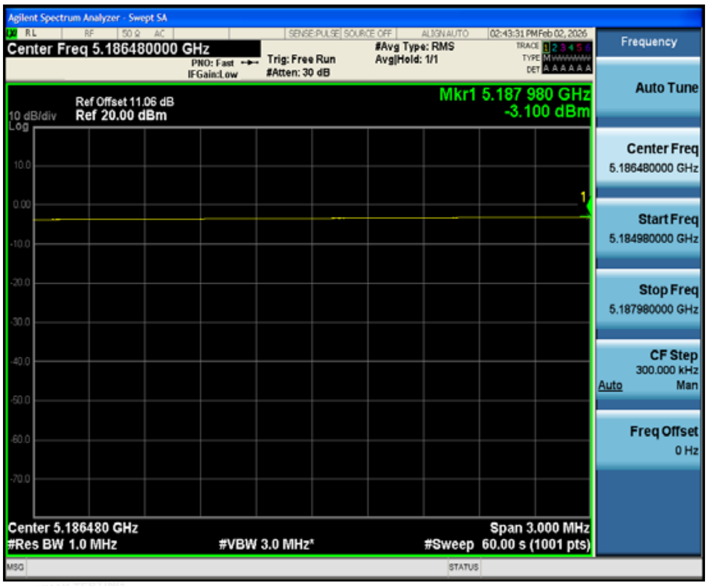


802.11n HT20-5180MHz

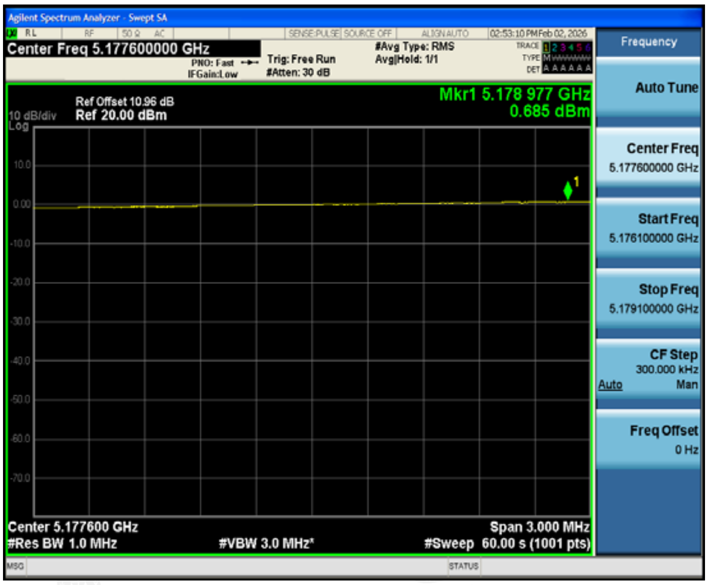




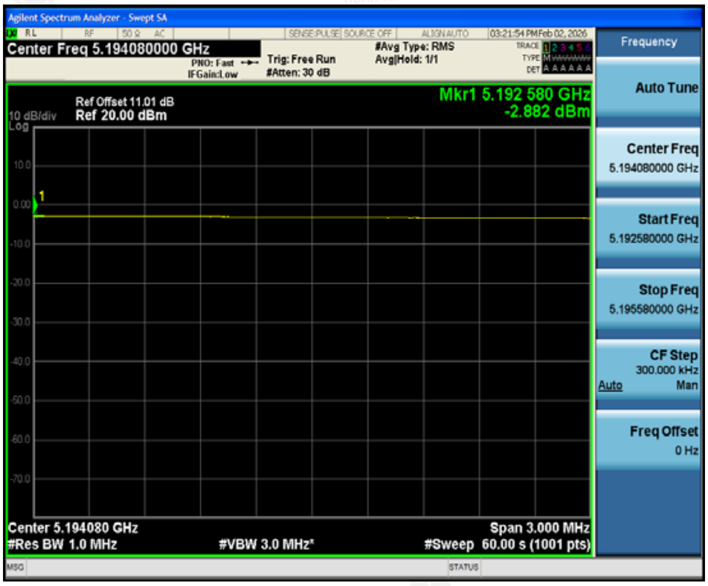
802.11n HT40-5190MHz



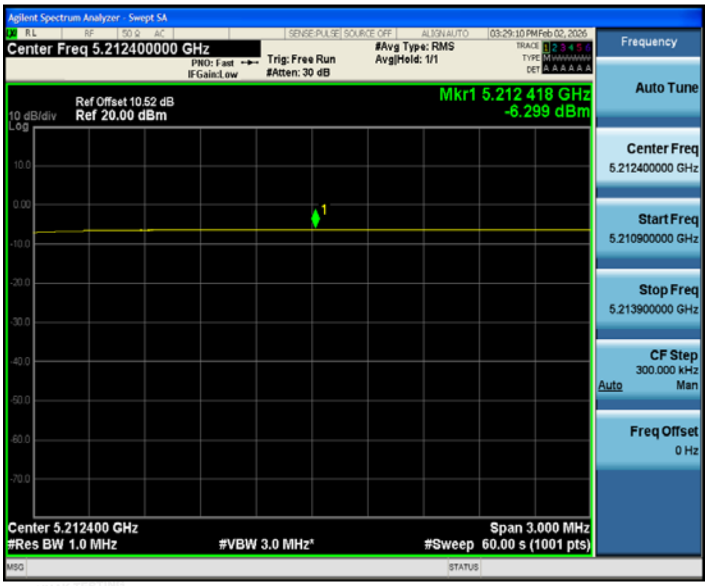
802.11ac HT20-5180MHz



802.11ac HT40-5190MHz



802.11ac HT80-5210MHz



4.5. Transmitter unwanted emissions

4.5.1. Transmitter unwanted emissions outside the 5 GHz RLAN bands

Limit

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

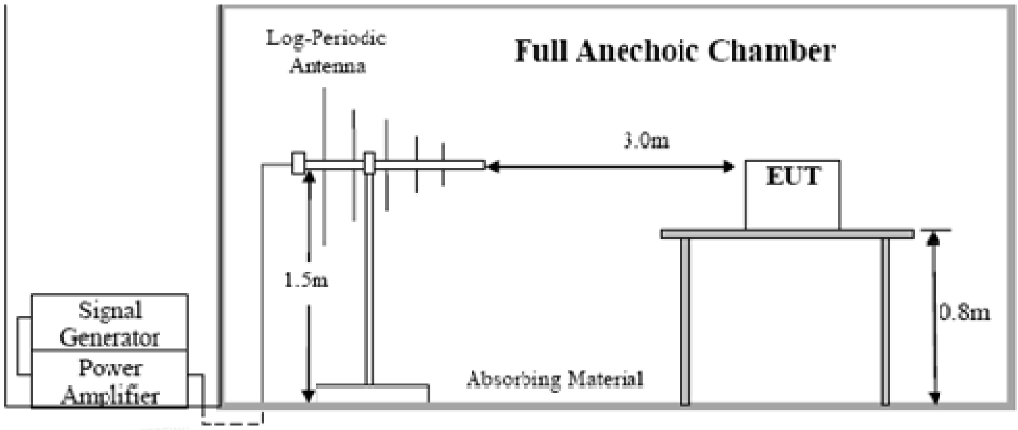
Table 3: Transmitter unwanted emission limits outside the transmitter's operating bands

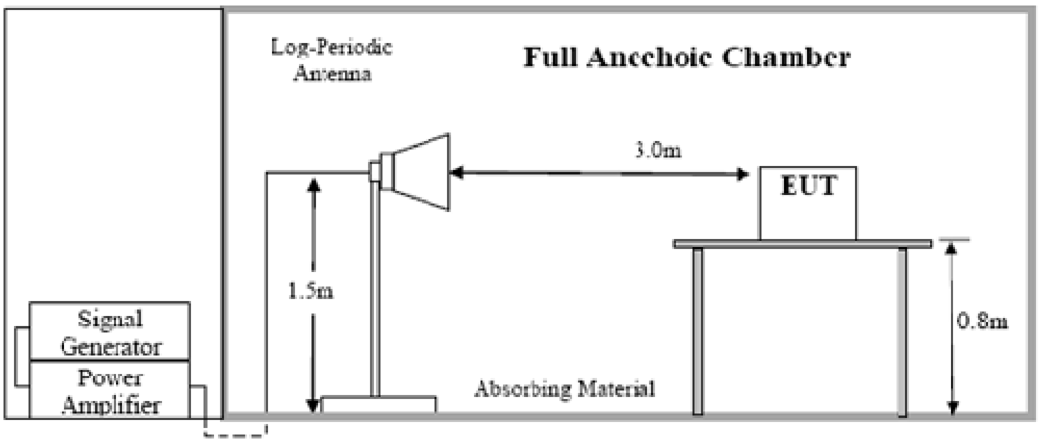
Frequency range	Maximum power	Measurement bandwidth
30 MHz ≤ f < 87,5 MHz	-36 dBm	100 kHz
87,5 MHz ≤ f ≤ 118 MHz	-54 dBm	100 kHz
118 MHz < f < 174 MHz	-36 dBm	100 kHz
174 MHz ≤ f ≤ 230 MHz	-54 dBm	100 kHz
230 MHz < f < 470 MHz	-36 dBm	100 kHz
470 MHz ≤ f ≤ 694 MHz	-54 dBm	100 kHz
694 MHz < f ≤ 1 GHz	-36 dBm	100 kHz
1 GHz < f ≤ 26 GHz	-30 dBm	1 MHz
NOTE: Information in this table is based on ERC Recommendation 74-01 [i.13], Annex 2, Table 6.		

Test Procedure

1. The measurement procedure follows ETSI EN 301 893 V2.2.1 Sub-clause 5.4.5.2.2
2. The measurement shall only be performed at normal test conditions.
   One channel out of the declared channels for each sub-band shall be tested.

Test Configuration



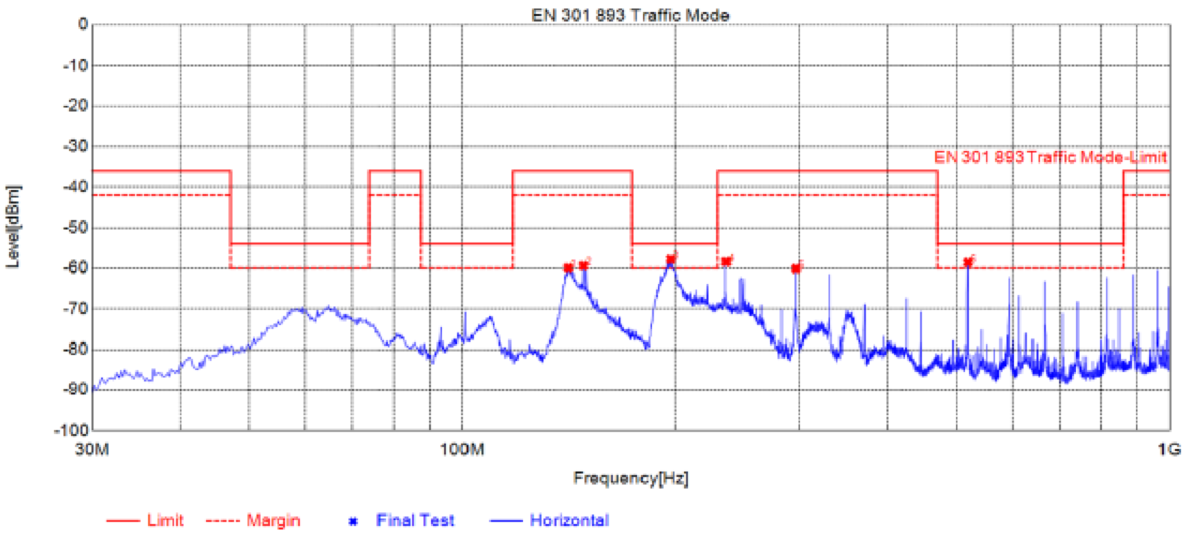


TEST RESULTS

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

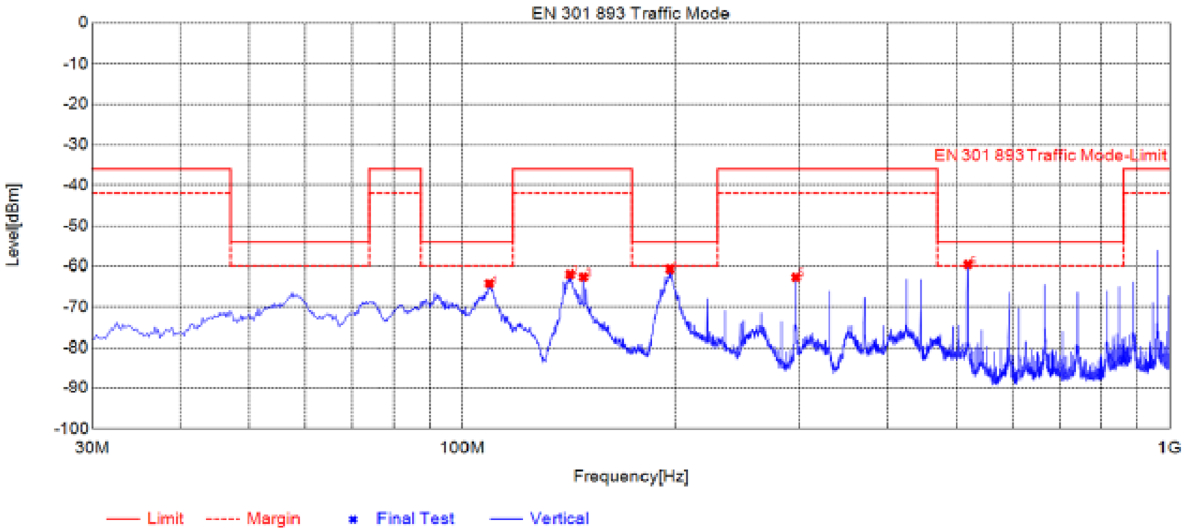
802.11n HT 20, CH 36, Horizontal/Vertical

Below 1GHz:



Suspected List

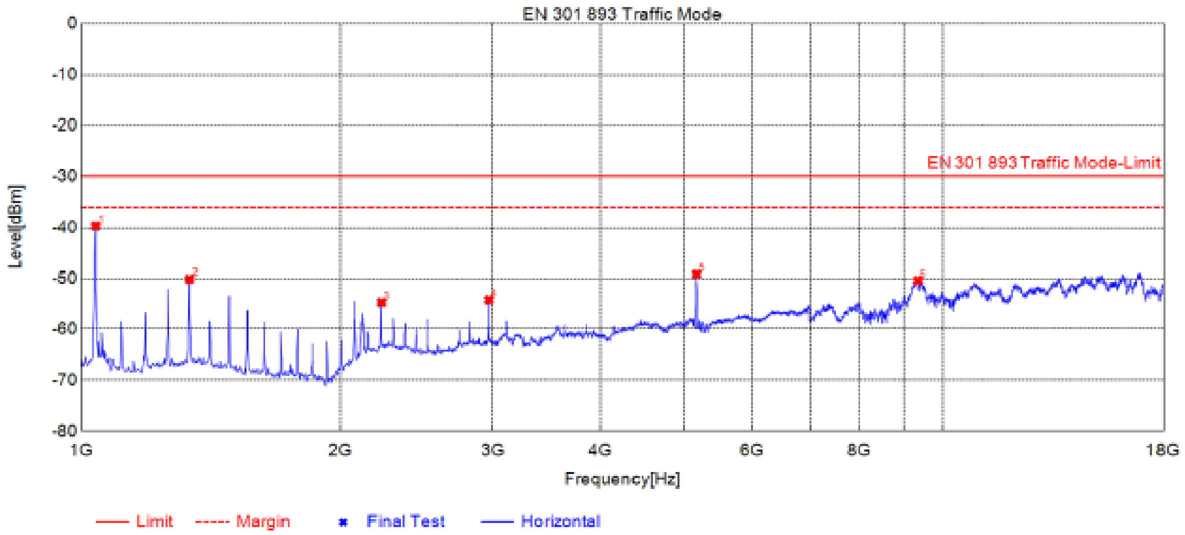
Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	141.184	-60.30	-59.91	-36.00	23.91	0.39	Horizontal
2	148.363	-61.52	-59.40	-36.00	23.40	2.12	Horizontal
3	197.261	-58.31	-57.79	-54.00	3.79	0.52	Horizontal
4	236.263	-62.22	-58.44	-36.00	22.44	3.78	Horizontal
5	296.997	-62.70	-60.10	-36.00	24.10	2.60	Horizontal
6	519.754	-62.53	-58.59	-54.00	4.59	3.94	Horizontal



Suspected List

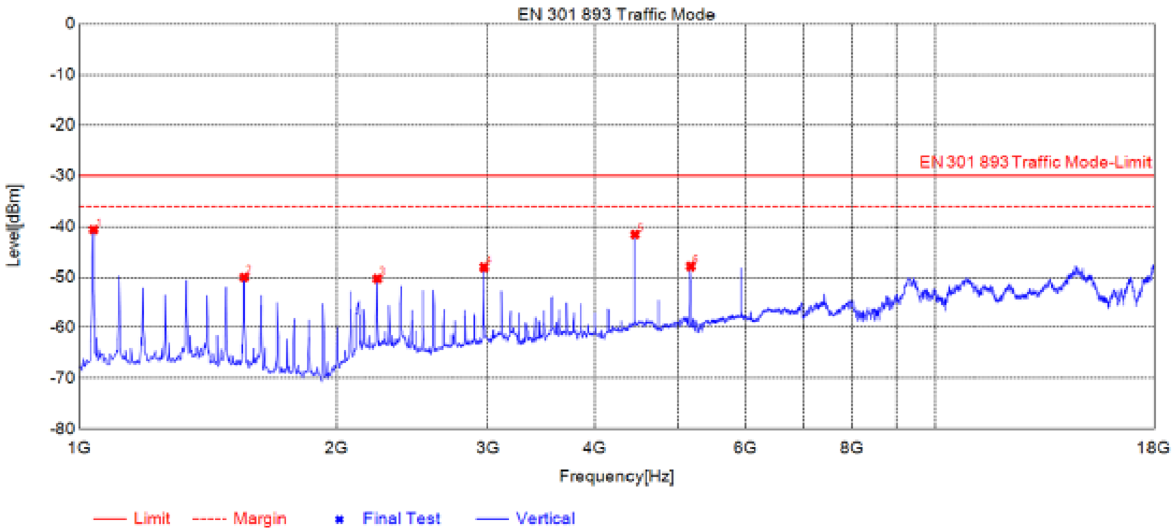
Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	109.167	-76.29	-64.17	-54.00	10.17	12.12	Vertical
2	141.960	-61.17	-61.89	-36.00	25.89	-0.72	Vertical
3	148.363	-61.56	-62.56	-36.00	26.56	-1.00	Vertical
4	196.679	-59.41	-60.67	-54.00	6.67	-1.26	Vertical
5	296.997	-63.17	-62.63	-36.00	26.63	0.54	Vertical
6	519.754	-62.86	-59.58	-54.00	5.58	3.28	Vertical

Above 1GHz:



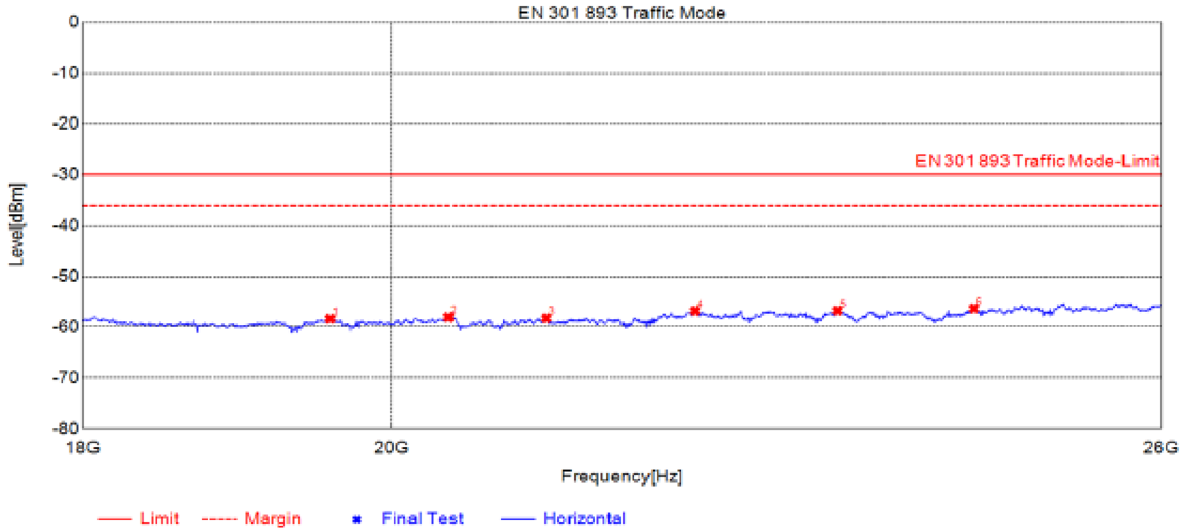
Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1040.01	-33.56	-39.68	-30.00	9.68	-6.12	Horizontal
2	1336.11	-46.42	-50.15	-30.00	20.15	-3.73	Horizontal
3	2228.40	-54.79	-54.73	-30.00	24.73	0.06	Horizontal
4	2970.65	-55.29	-54.25	-30.00	24.25	1.04	Horizontal
5	5179.39	-56.22	-49.17	-30.00	19.17	7.05	Horizontal
6	9340.11	-65.20	-50.40	-30.00	20.40	14.80	Horizontal



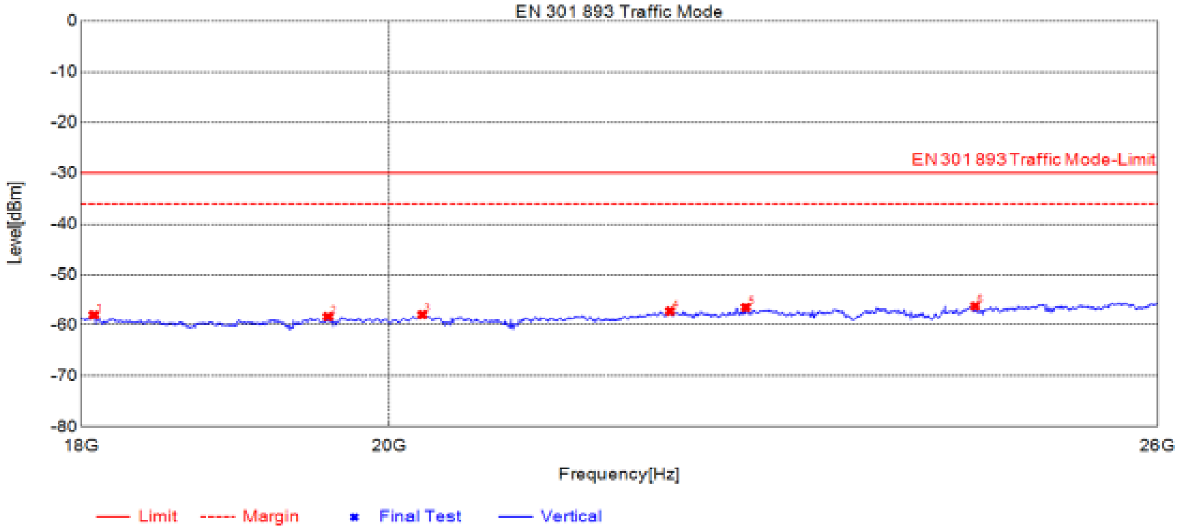
Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1040.01	-34.16	-40.61	-30.00	10.61	-6.45	Vertical
2	1558.18	-44.86	-50.02	-30.00	20.02	-5.16	Vertical
3	2228.40	-50.24	-50.27	-30.00	20.27	-0.03	Vertical
4	2970.65	-49.09	-48.09	-30.00	18.09	1.00	Vertical
5	4455.15	-46.69	-41.60	-30.00	11.60	5.09	Vertical
6	5181.39	-54.98	-47.91	-30.00	17.91	7.07	Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	19584.5	-64.48	-58.38	-30.00	28.38	6.10	Horizontal
2	20390.1	-64.11	-58.10	-30.00	28.10	6.01	Horizontal
3	21081.0	-63.60	-58.28	-30.00	28.28	5.32	Horizontal
4	22174.7	-62.59	-56.85	-30.00	26.85	5.74	Horizontal
5	23281.7	-62.47	-56.80	-30.00	26.80	5.67	Horizontal
6	24386.1	-62.02	-56.41	-30.00	26.41	5.61	Horizontal

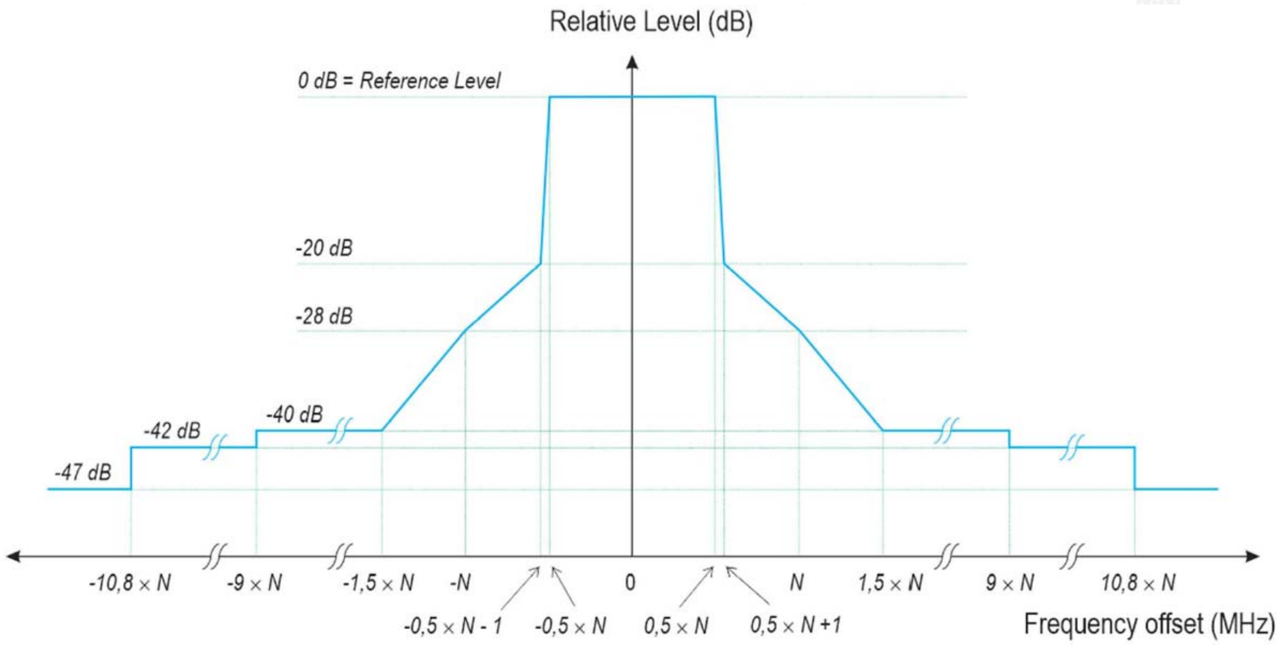


Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	18080.0	-64.12	-58.02	-30.00	28.02	6.10	Vertical
2	19584.5	-64.44	-58.34	-30.00	28.34	6.10	Vertical
3	20224.7	-64.02	-57.96	-30.00	27.96	6.06	Vertical
4	22012.0	-62.99	-57.25	-30.00	27.25	5.74	Vertical
5	22588.1	-62.12	-56.52	-30.00	26.52	5.60	Vertical
6	24426.1	-61.88	-56.23	-30.00	26.23	5.65	Vertical

4.5.2. Transmitter unwanted emissions within the 5 GHz RLAN bands

LIMIT



The mean PSD of the transmitter unwanted emissions within the transmitter's operating bands shall not exceed the limits of the mask provided in figure 1 or an absolute level of -30 dBm/MHz, whichever is greater. The limits in figure 1 are relative to the maximum PSD transmitted by the RLAN device when measured with a reference bandwidth of 1 MHz.
The mask is only applicable within the band(s) of operation. Beyond the band edges, the requirements for transmitter unwanted emissions outside the transmitter's operating bands (see clause 4.2.4.1) apply.
In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet the limits for transmitter unwanted emissions within the transmitter's operating bands.
In case of multi-channel operation in adjacent or non-adjacent channels, clause 4.2.4.2.2.2 and clause 4.2.4.2.2.3 describe how the overall transmit spectral power mask to be applied shall be constructed. The transmitter unwanted emissions within the transmitter's operating bands shall not exceed the limits of this overall transmit spectral power mask or an absolute level of -30 dBm/MHz based on ERC Recommendation 74-01 [i.13], whichever is greater.
The channel edge masks for multi-channel operation in adjacent and/or non-adjacent channels which are supported by the equipment shall be noted in the test report (see clause 5.4.1).

Channel edge mask for multi-channel operation in adjacent channels
For equipment configured for multi-channel operation (see clause 4.2.7.3.1.3 or clause 4.2.7.3.2.3) on a group of adjacent channels where all these adjacent channels are used for transmissions, these transmissions may be considered as one signal with a total bandwidth (N) of n times the nominal channel bandwidth of an individual channel where n is the number of adjacent channels used simultaneously. This signal shall be subject to the limits provided by the mask in figure 1.
In case of a multi-channel configuration on a group of adjacent channels where not all the adjacent channels are used for transmissions, the overall transmit spectral power mask is constructed from the mask provided in figure 1 together with additional restrictions for the channels in the group of adjacent channels that are not used for transmission as described in the following:
• When the lowest channel(s) and/or the highest channel(s) of a group of adjacent channels is/are not used for transmission, an additional channel edge mask as in figure 2 shall be applied at the lower edge of the lowest channel used for transmission and at the higher edge of the highest channel used for transmission. M is the separation in MHz between these edges.

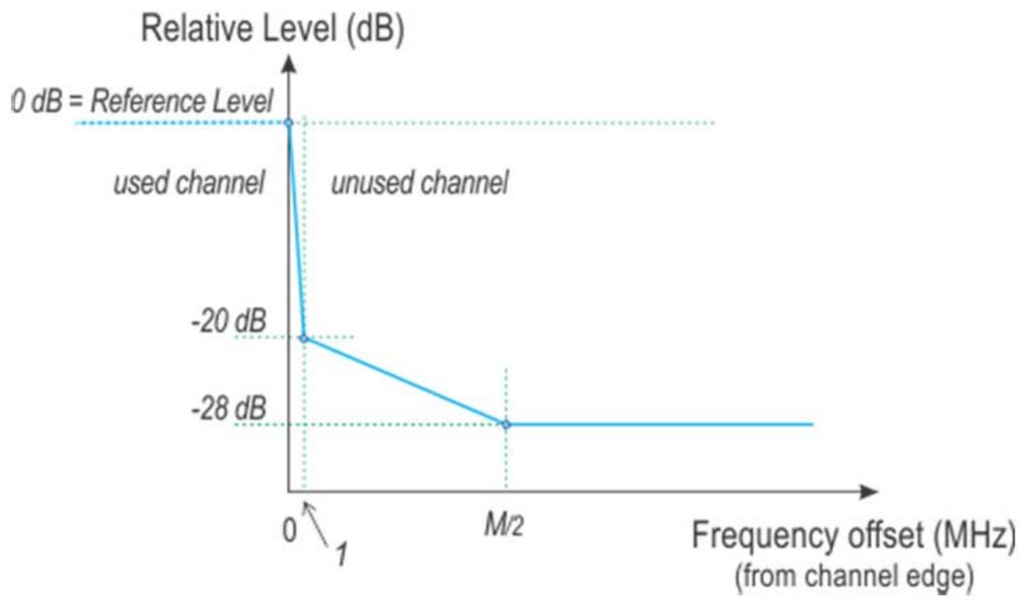


Figure 2: Channel edge mask - case 1

When there are two or more channels not used for transmission in between channels used for transmission (all belonging to the same group of adjacent channels configured for multi-channel operation) and these channels not used for transmission are adjacent to each other, an additional channel edge mask as in figure 3 shall be applied at the higher edge of the channel adjacent to the lowest channel of the group of adjacent channels not used for transmission and at the lower edge of the channel adjacent to the highest channel of the group of adjacent channels not used for transmission. U is the total bandwidth of channels used for transmission adjacent to the channels not used for transmission.

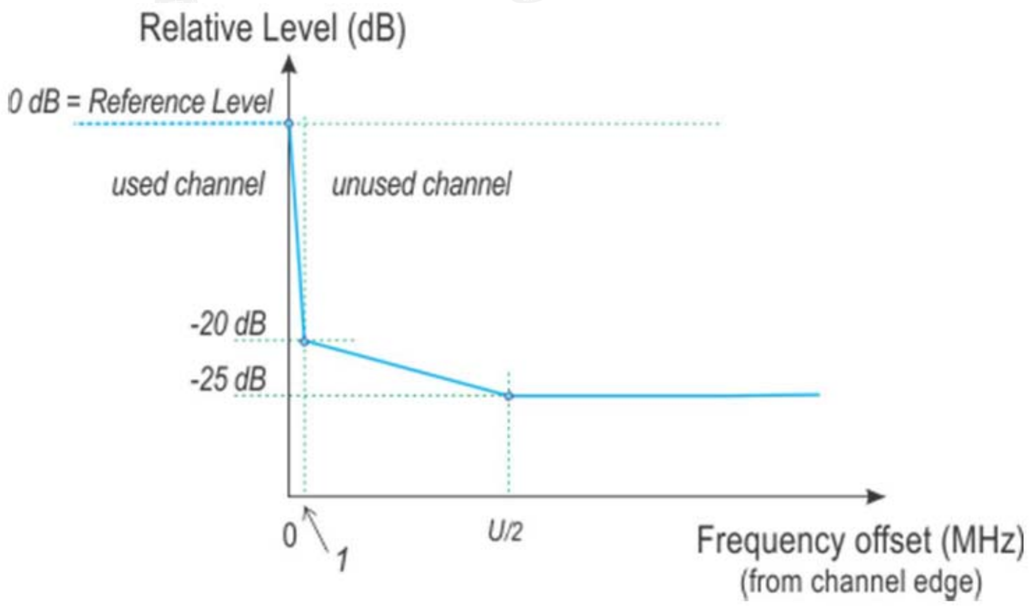


Figure 3: Channel edge mask - case 2

When there is only one channel not used for transmission in between channels used for transmission (all belonging to the group of adjacent channels configured for multi-channel operation), an additional channel edge mask as in figure 4 shall be applied at the higher edge of the channel below the channel not used for transmission and at the lower edge of the channel above the channel not used for transmission

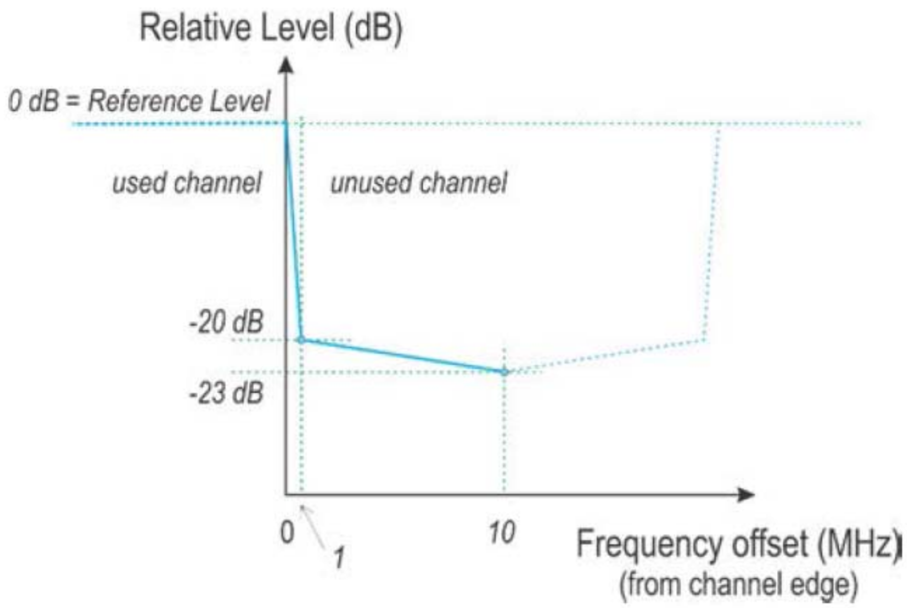


Figure 4: Channel edge mask - case 3

Any Local Oscillator (LO) power in a 2 MHz band may exceed the limits provided by the overall transmit spectral power mask (constructed from the masks in figure 1 to figure 4) but shall be less than -28 dBc (relative to the RF output
power), or less than -20 dBm/MHz, whichever is greater. A 2 MHz band per LO can be located anywhere within the group of adjacent channels configured for multi-channel operation. The LO exceedance shall occur not more than once
per 20 MHz of the total bandwidth (N) of the group of adjacent channels. For the specific case of a 40 MHz band configured for multi-channel operation and only one channel is being used for transmission, the LO exceedance shall be
not more than 0 dBr if occurring.
Annex I contains a number of examples of how the overall transmit spectral power mask is constructed.

Channel edge mask for multi-channel operation in non-adjacent channels
For simultaneous transmissions in multiple non-adjacent channels (or non-adjacent groups of adjacent channels), the overall transmit spectral power mask is constructed in the following manner. First, the procedure as described in clause 4.2.4.2.2.2 shall be applied to each of the channels (or to each group of adjacent channels). Then, for each frequency point, the greatest value from the applicable transmit spectral power masks for each of the channels or the group of adjacent channels assessed shall be taken as the overall spectral power mask requirement at that frequency.

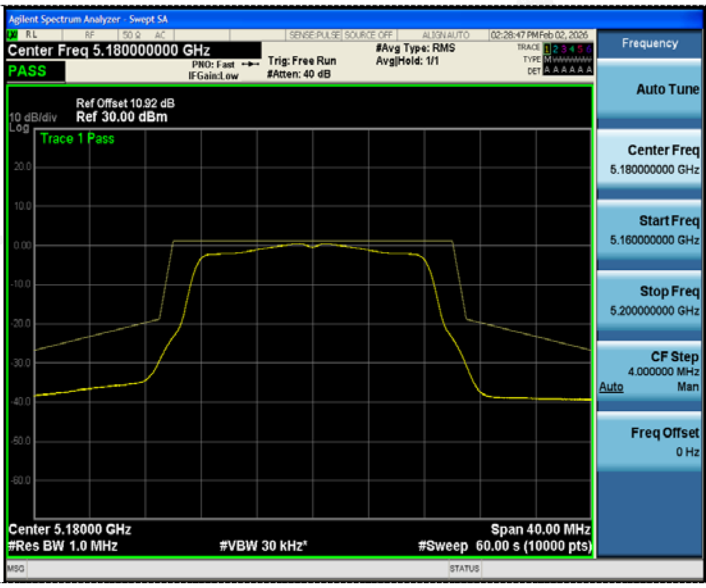
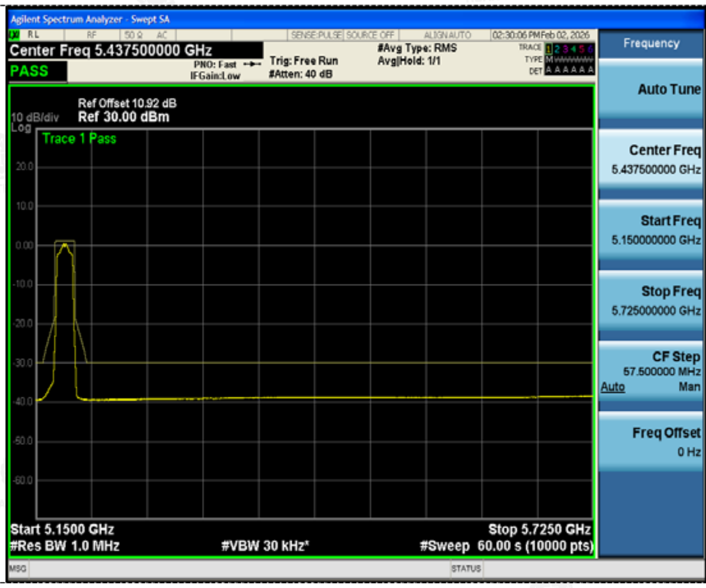
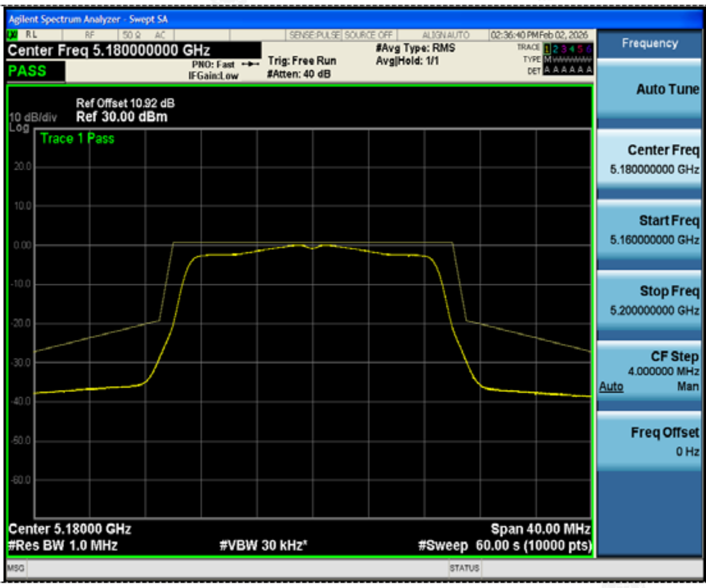
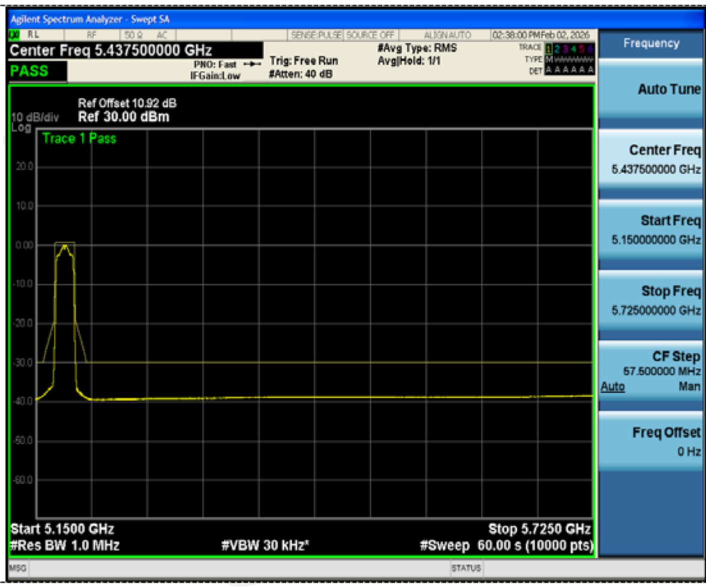
Test Procedure

For equipment with continuous transmission capability (duty cycle equal to 100 %), the procedure specified in clause 5.4.6.2.1.1 shall be used.
For equipment without continuous transmission capability (duty cycle less than 100 %), the procedure specified in clause 5.4.6.2.1.2 shall be used.
If the relative power envelope of the UUT (from measurements using either the procedure specified in clause 5.4.6.2.1.1 or the procedure specified in clause 5.4.6.2.1.2) does not meet the limit defined for a 1 MHz measurement bandwidth:
i) in the 0 dB (i.e. reference level of the mask) to -20 dB slope of the applied mask; or
ii) within 500 kHz of the -20 dB point(s) of the applied mask; or
iii) for LO exceedance defined in clause 4.2.4.2.2.2, the procedure specified in clause 5.4.6.2.1.3 may be used in addition. This procedure may be applied to determine conformance in regions i), ii) and iii) when applying the transmit spectral power mask in figure 1 and any overall transmit spectral power mask constructed from figure 2, figure 3 and figure 4. This procedure may also be applied for multi-channel operation in non-adjacent channels as defined in clause 4.2.4.2.2.3.

5.4.6.2.1.1 Equipment with continuous transmission capability
The UUT shall be configured for continuous transmit mode (duty cycle equal to 100 %).
The test procedure shall be as follows:
Step 1: Determination of the reference average power level
• Adjust the spectrum analyser to the following settings:
- RBW: 1 MHz
- VBW: 30 kHz
- Detector mode: RMS
- Trace mode: Video Average
- Sweep time: coupled
- Centre frequency: nominal centre frequency of the channel being investigated
- Frequency span: 2 × nominal channel bandwidth
• Use the marker to find the highest average power level of the power envelope of the UUT. Use this level 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-band of operation. No other parameter of the spectrum analyser should be changed.
• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.
Step 3: Allowance for a 100 kHz RBW measurement procedure
• As applicable, run additional measurements per clause 5.4.6.2.1.3.
5.4.6.2.1.2 Equipment without continuous transmission capability
The test procedure shall be as follows:
Step 1: Determination of the reference average power level
• Adjust the spectrum analyser to the following settings:
- RBW: 1 MHz
- VBW: 30 kHz
- Detector mode: RMS
- Trace mode: Max Hold
- Sweep time: ≥ 1 min
- Centre frequency: nominal centre frequency of the channel being investigated
- Frequency span: 2 × nominal channel bandwidth
• Use the marker to find the highest average power level of the power envelope of the UUT. Use this level 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-band of operation. No other parameter of the spectrum analyser should be changed.
• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.
Step 3: Allowance for a 100 kHz RBW measurement procedure
• As applicable, run additional measurements per clause 5.4.6.2.1.3.
5.4.6.2.1.3 Additional measurements using a 100 kHz RBW
The test procedure shall be as follows:
Step 1: Determination of the reference average power level
• Adjust the spectrum analyser to the following settings:
- RBW: 100 kHz
- VBW: 300 kHz
Otherwise, use the relevant settings from either clause 5.4.6.2.1.1 or clause 5.4.6.2.1.2.
• Use the marker to find the highest average power level of the power envelope of the UUT. Use this level 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 subband of operation. No other parameter of the spectrum analyser should be changed.
• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.

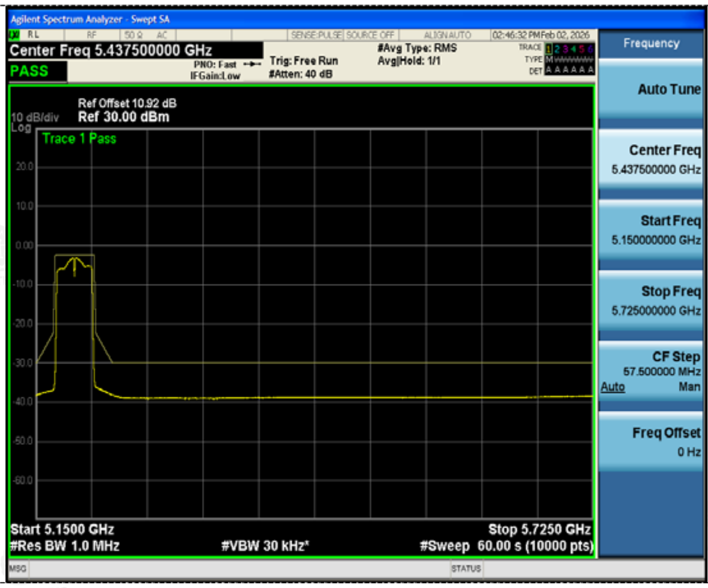
Test Result

The test plots as follow:

802.11a	
CH36	
	
802.11n HT 20	
CH36	
	

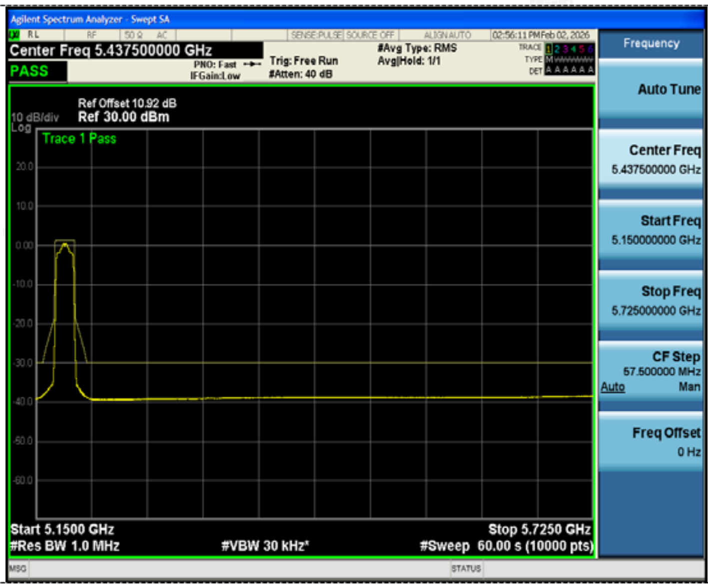
802.11n HT40

CH38



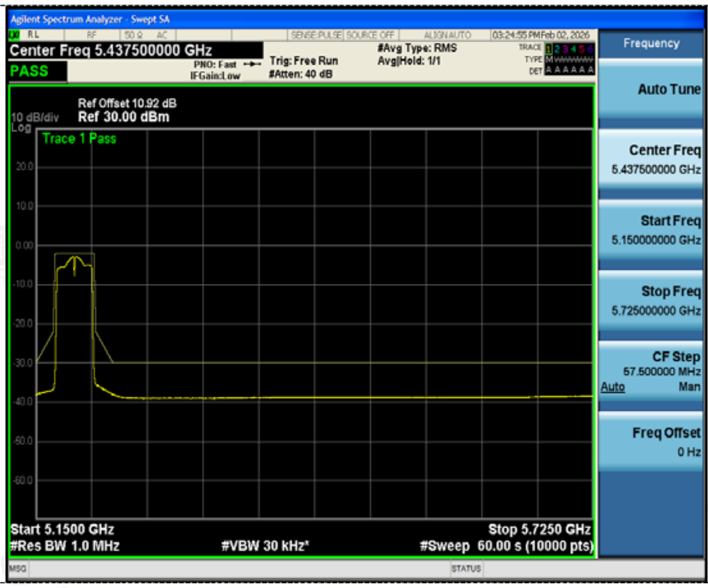
802.11ac HT 20

CH36



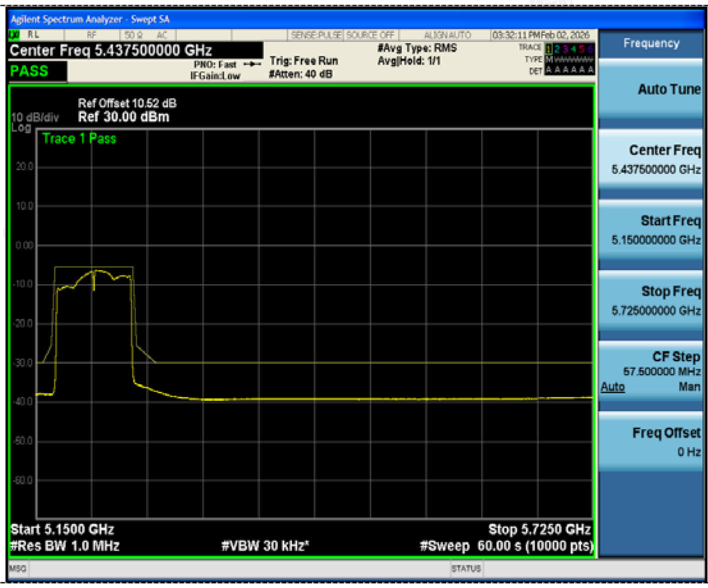
802.11ac HT40

CH38



802.11ac HT80

CH42



4.6. Receiver spurious emissions

Limits

The receiver spurious emissions shall not exceed the limits given in table 4.
In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are ERP for emissions up to 1 GHz and EIRP for emissions above 1 GHz.

Table 4: Spurious radiated emission limits

Frequency range	Maximum power	Measurement bandwidth
30 MHz ≤ f ≤ 1 GHz	-57 dBm	100 kHz
1 GHz < f ≤ 26 GHz	-47 dBm	1 MHz
NOTE: Information in this table is based on ERC Recommendation 74-01 [i.13], Annex 2, Table 6.		

Test Procedure

Step 1:
• Measure the emissions over the range 30 MHz to 1 000 MHz using the following spectrum analyser settings:
- RBW: 100 kHz
- VBW: 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 5.4.7.2.1.2, step 1, last bullet may be omitted.
- Sweep time: Auto
• Wait for the trace to stabilize. Measure any emissions identified that have a margin of less than 6 dB with respect to the applicable limit individually using the procedure in clause 5.4.7.2.1.2 and compare it to the applicable limit.
Step 2:
• Measure the emissions over the range 1 GHz to 26 GHz using the following spectrum analyser settings:
- RBW: 1 MHz
- VBW: 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 5.4.7.2.1.2, step 1, last bullet may be omitted.
- Sweep time: Auto
• Wait for the trace to stabilize. Measure any emissions identified that have a margin of less than 6 dB with respect to the applicable limit given in clause 4.2.5.2, table 4 individually using the procedure in clause 5.4.7.2.1.2 and compare it to the applicable limit.

Measurement of the emissions identified during the pre-scan

The steps in the present clause shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements in clause 5.4.7.2.1.1. This method assumes the spectrum analyser has a Time Domain Power function.
The test procedure shall be as follows:

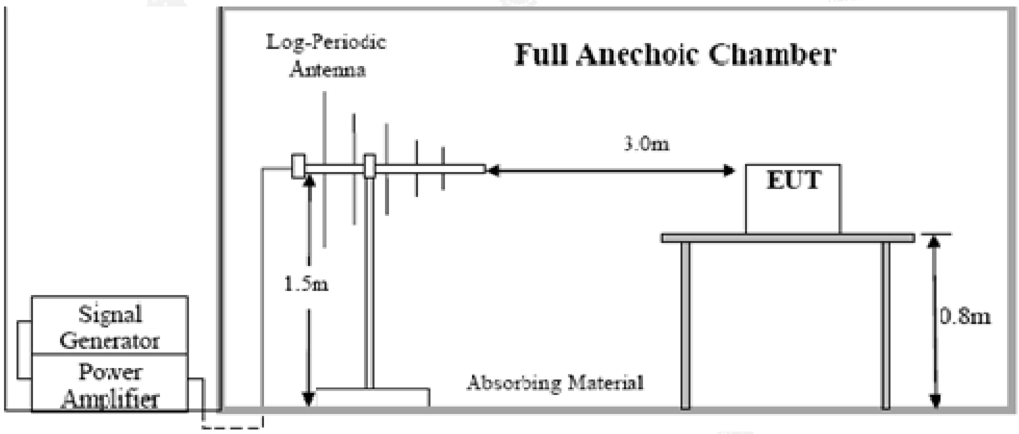
Step 1:
• Measure the level of the emissions using the following spectrum analyser settings:
- Measurement mode: Time Domain Power
- Centre frequency: frequency of the emission identified during the pre-scan
- RBW: 100 kHz (emissions ≤ 1 GHz) / 1 MHz (emissions > 1 GHz)
- VBW: 300 kHz (emissions ≤ 1 GHz) / 3 MHz (emissions > 1 GHz)
- Frequency span: 0 Hz
- Sweep mode: Single Sweep
- Sweep time: 30 ms
- Sweep points: ≥ 30 000
- Trigger mode: Video (for burst signals) or Manual (for continuous signals)
- Detector mode: RMS
• Adjust the centre frequency (fine tune) to capture the highest level of one burst of the emission to be measured. This fine tuning may be omitted for spectrum analysers capable of supporting twice the number of sweep points required in step 2 and step 3 from the pre-scan procedure in clause 5.4.7.2.1.1.

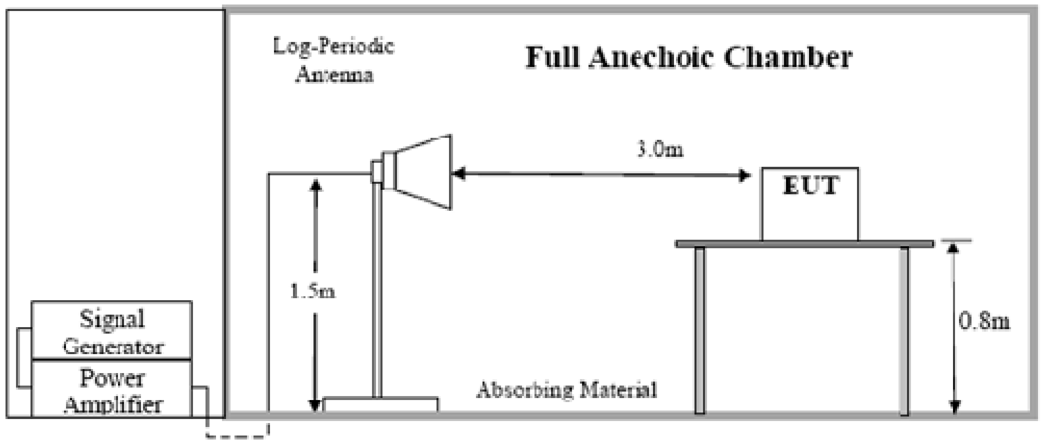
Step 2:
• Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the value of the power measured within this window.
• If the spurious emission to be measured is a continuous transmission, set the measurement window to the start and stop times of the sweep.

Step 3:
• In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), repeat step 2 for each of the active receive chains.
• Sum the measured power (within the observed window) for each of the active receive chains.

Step 4:
• Compare the value obtained in step 3 to the applicable limit.

Test Configuration



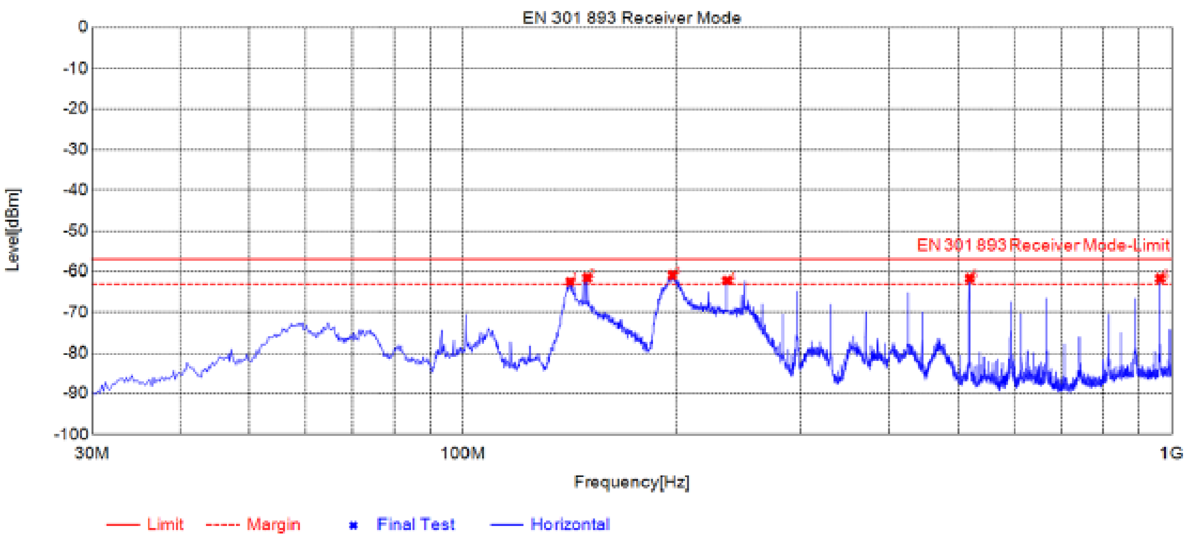


TEST RESULTS

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

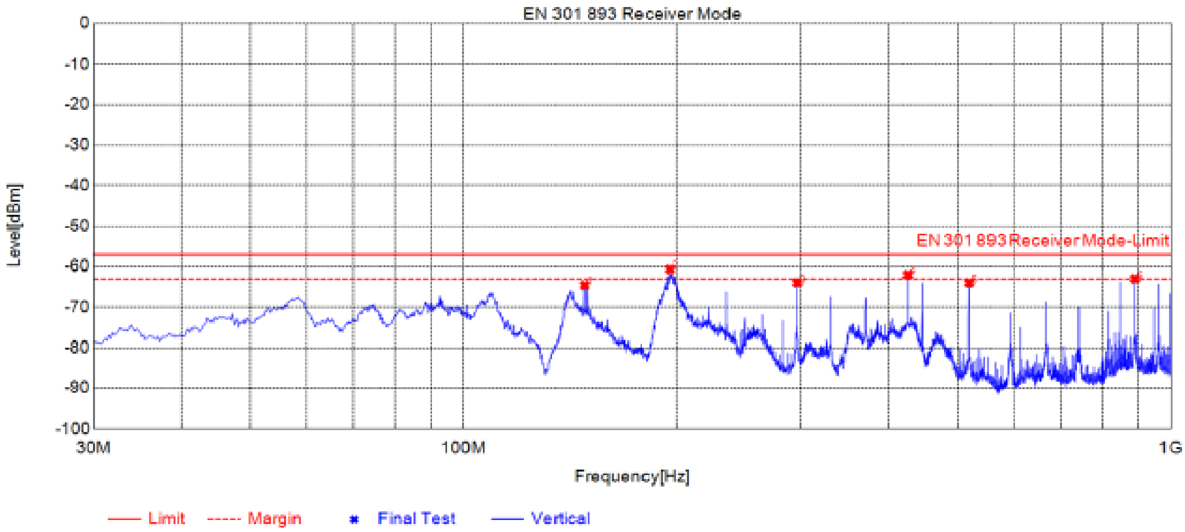
802.11n HT 20, CH 36, Horizontal/Vertical

Below 1GHz:



Suspected List

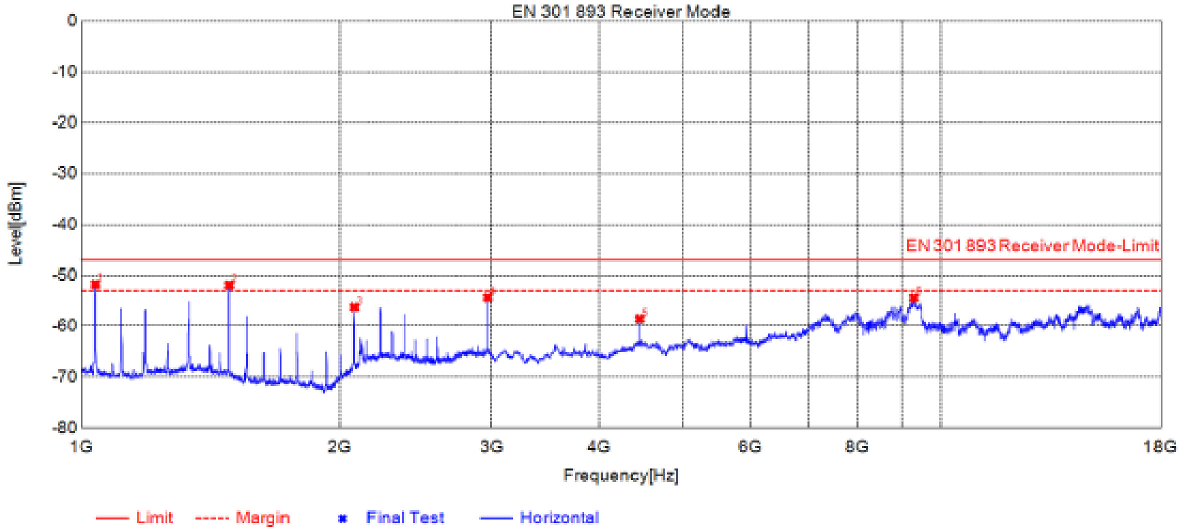
Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	141.766	-62.94	-62.41	-57.00	5.41	0.53	Horizontal
2	149.916	-63.97	-61.48	-57.00	4.48	2.49	Horizontal
3	197.649	-61.48	-60.86	-57.00	3.86	0.62	Horizontal
4	236.263	-65.85	-62.07	-57.00	5.07	3.78	Horizontal
5	519.754	-65.54	-61.60	-57.00	4.60	3.94	Horizontal
6	965.267	-71.69	-61.63	-57.00	4.63	10.06	Horizontal



Suspected List

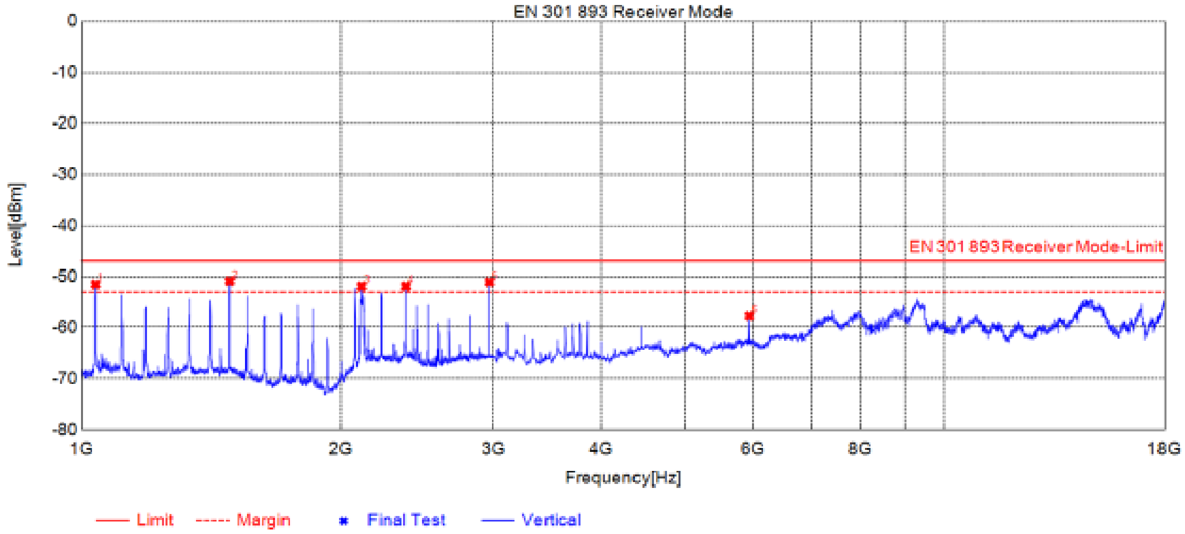
Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	148.363	-63.58	-64.58	-57.00	7.58	-1.00	Vertical
2	195.903	-59.34	-60.68	-57.00	3.68	-1.34	Vertical
3	296.997	-64.48	-63.94	-57.00	6.94	0.54	Vertical
4	425.257	-64.61	-61.99	-57.00	4.99	2.62	Vertical
5	519.754	-67.26	-63.98	-57.00	6.98	3.28	Vertical
6	890.950	-72.25	-62.98	-57.00	5.98	9.27	Vertical

Above 1GHz:



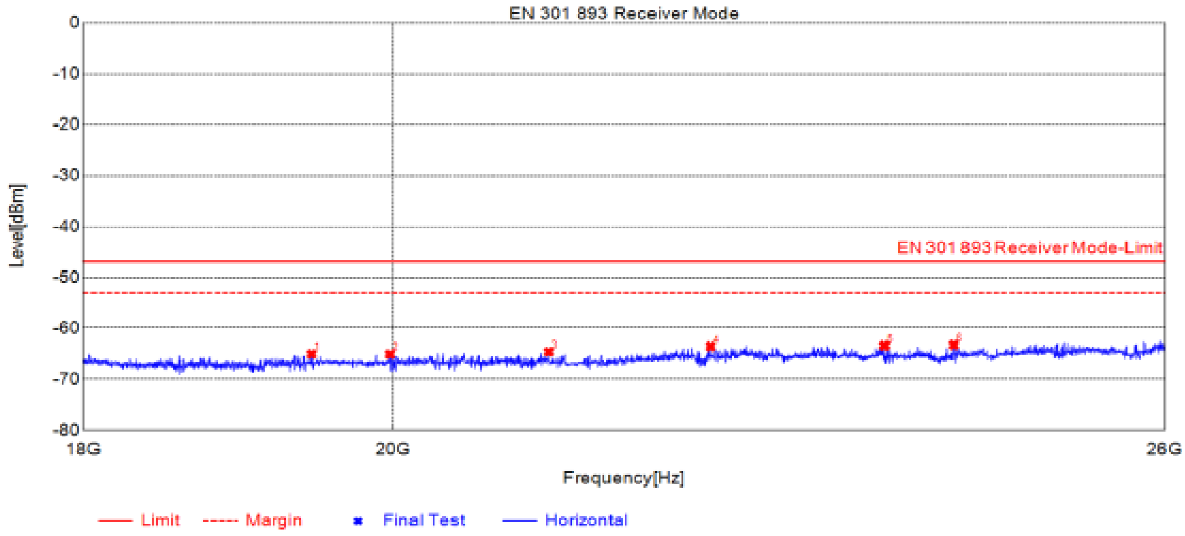
Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1039.60	-47.37	-51.73	-47.00	4.73	-4.36	Horizontal
2	1484.89	-47.64	-51.89	-47.00	4.89	-4.25	Horizontal
3	2079.01	-54.35	-56.26	-47.00	9.26	-1.91	Horizontal
4	2969.99	-54.92	-54.36	-47.00	7.36	0.56	Horizontal
5	4455.29	-61.86	-58.66	-47.00	11.66	3.20	Horizontal
6	9292.25	-68.79	-54.42	-47.00	7.42	14.37	Horizontal



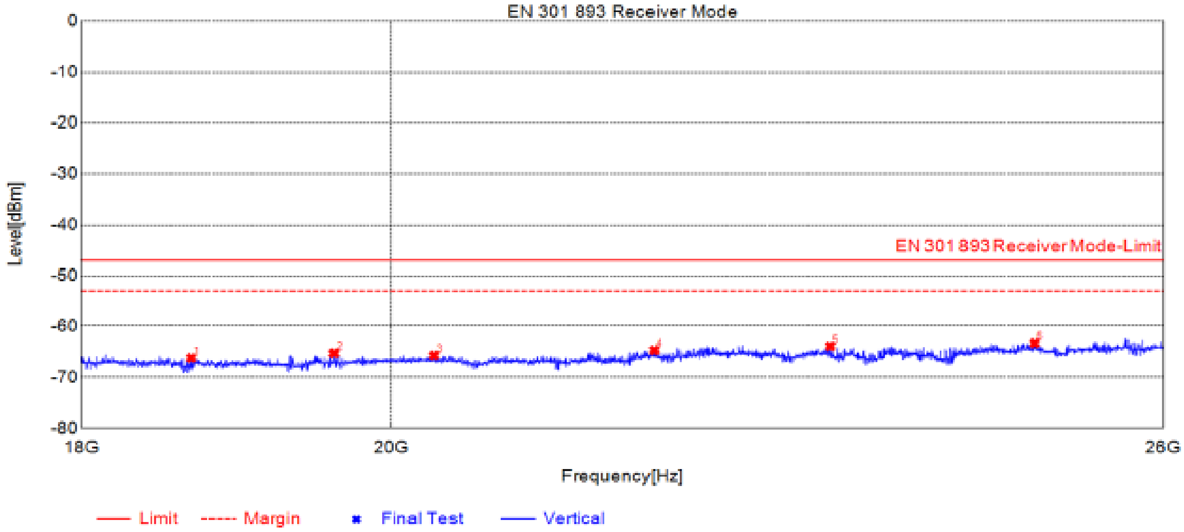
Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1039.20	-46.80	-51.49	-47.00	4.49	-4.69	Vertical
2	1484.89	-46.18	-50.90	-47.00	3.90	-4.72	Vertical
3	2113.42	-50.46	-51.86	-47.00	4.86	-1.40	Vertical
4	2375.87	-51.45	-51.85	-47.00	4.85	-0.40	Vertical
5	2969.99	-51.58	-51.06	-47.00	4.06	0.52	Vertical
6	5940.58	-62.67	-57.74	-47.00	10.74	4.93	Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	19453.0	-71.07	-64.99	-47.00	17.99	6.08	Horizontal
2	19977.9	-71.23	-65.03	-47.00	18.03	6.20	Horizontal
3	21085.4	-69.91	-64.59	-47.00	17.59	5.32	Horizontal
4	22279.2	-69.28	-63.55	-47.00	16.55	5.73	Horizontal
5	23634.7	-69.00	-63.41	-47.00	16.41	5.59	Horizontal
6	24201.2	-68.72	-63.27	-47.00	16.27	5.45	Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	18684.9	-71.60	-66.15	-47.00	19.15	5.45	Vertical
2	19613.1	-71.31	-65.22	-47.00	18.22	6.09	Vertical
3	20291.6	-71.70	-65.66	-47.00	18.66	6.04	Vertical
4	21866.3	-70.25	-64.63	-47.00	17.63	5.62	Vertical
5	23215.4	-69.51	-63.86	-47.00	16.86	5.65	Vertical
6	24887.7	-69.54	-63.27	-47.00	16.27	6.27	Vertical

4.7. Dynamic Frequency Selection (DFS)

DFS technical requirements specifications

Table 5 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.

Table 5: Applicability of DFS requirements

Requirement	DFS operational mode		
	Primary device	**Secondary device without radar detection (see table D.2, note 2)**	**Secondary device with radar detection (see table D.2, note 2)**
CAC	Required	Not required	Required (see note 2)
Off-channel CAC (see note 1)	Required	Not required	Required (see note 2)
In-service monitoring	Required	Not required	Required
Channel shutdown	Required	Required	Required
Non-occupancy period	Required	Not required	Required
Uniform spreading	Required	Not required	Not required
NOTE 1: If implemented.			
NOTE 2: A secondary device with radar detection is not required to perform a CAC or off-channel CAC at initial use of a channel but only before returning to the use of a channel where it has detected a radar signal by in-service monitoring. Where the secondary device with radar detection is under the control of its primary device and does not start transmissions on the channel until connected to that primary device, then the secondary device with radar detection does not have to perform a CAC or off-channel CAC and may rely on the CAC performed by the primary device to enable in-service monitoring.			

Test set-ups

Set-up A

Setup A is a setup in which the UUT is an RLAN device operating as primary device. Radar test signals are injected into the UUT. This setup also contains an RLAN device operating as secondary device without radar detection and which is associated with the UUT.

Figure 8 shows an example for setup A. The setup used shall be documented in the test report..

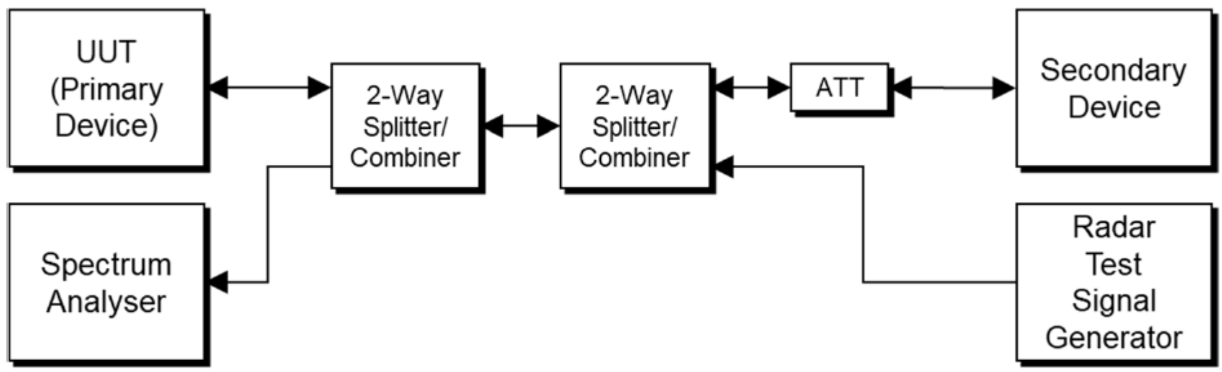


Figure 8: Setup A

Set-up B
Setup B is a setup in which the UUT is an RLAN device operating as secondary device with or without radar detection.
This setup also contains an RLAN device operating as primary device. The radar test signals are injected into the primary device. The UUT (secondary device) is associated with the primary device.
Figure 9 shows an example for setup B. When the UUT is a secondary device with radar detection, the value of the attenuator shall be sufficient to prevent radar detection by the secondary device. The setup used shall be documented in the test report.

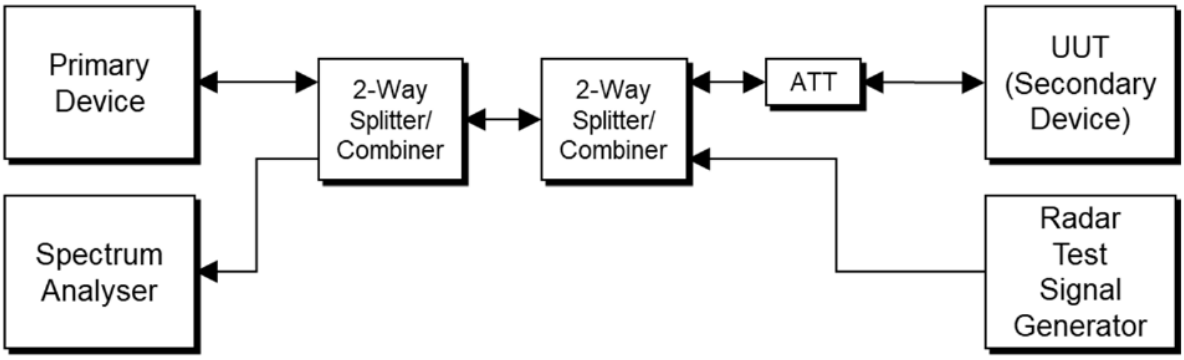


Figure 9: Setup B

Set-up C
The UUT is an RLAN device operating as secondary device with radar detection. Radar test signals are injected into the secondary device. This setup also contains an RLAN device operating as primary device. The UUT (secondary device) is associated with the primary device.
Figure 10 shows an example for setup C. The value of the attenuator shall be sufficient to prevent radar detection by the primary device. The setup used shall be documented in the test report.

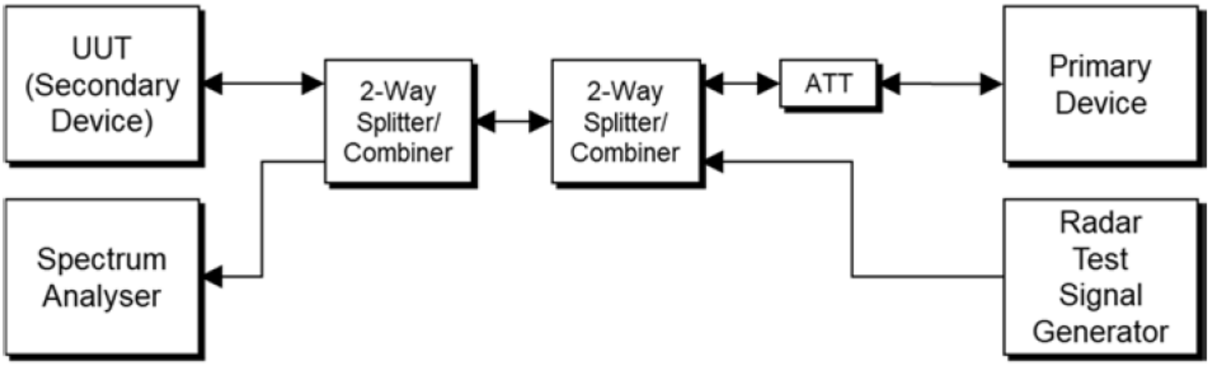


Figure 10: Setup C

<u>TEST RESULTS</u>

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

4.8. Adaptivity(channel access mechanism)

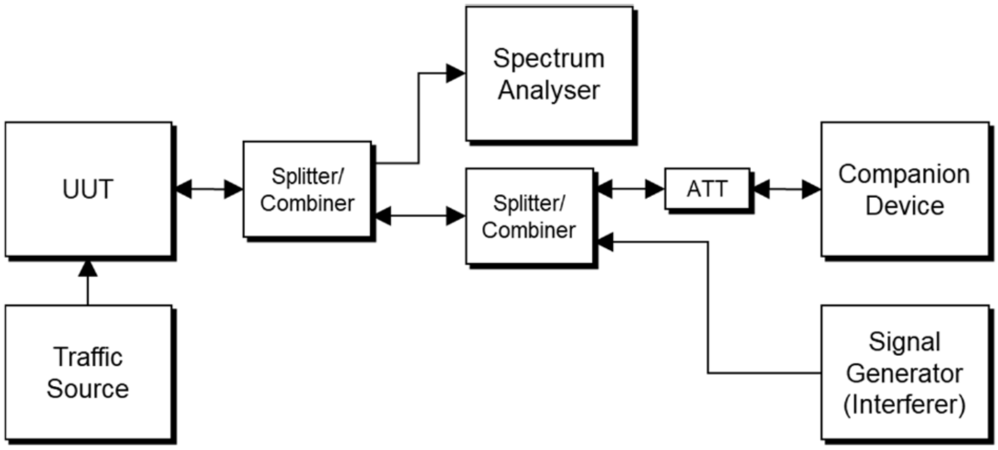
Requirements and limits

The use of SCS transmissions is constrained as follows:
• within an observation period of 50 ms, the number of SCS transmissions by the equipment shall be equal to or less than 50; and
• the total duration of the equipment's SCS transmissions shall be less than 2 500 μs within said observation period.

Test Procedure

All measurements shall have temporal resolution of less than or equal to 1 μs.
The measurement equipment shall be able to observe the UUT behaviour for a duration of at least 250 ms at the aforementioned temporal resolution. This data may be recorded in segments. In that case, the FFPs shall be extracted from each data segment. The combined set of all FFPs shall be analysed as described in clause 5.4.9.2.2.4.
Step 1:
• The UUT shall connect to a companion device during the test. The signal generator, the spectrum analyser, the UUT, the traffic source and the companion device shall be connected using a setup equivalent to the example given by figure 17 although the interference source shall be switched off at this point in time. The spectrum analyser is used to monitor the transmissions of the UUT in response to the interference signal. The traffic source might be part of the UUT itself.
• The received signal level (wanted signal from the companion device) at the UUT shall be sufficient to maintain a reliable link for the duration of the test. A typical value for the received signal level which can be used in most cases is -50 dBm/MHz.
• The spectrum analyser shall be set as follows:
- RBW: ⩾ occupied bandwidth (if the analyser does not support this setting, the highest available setting shall be used)
- VBW: 3 × RBW (if the analyser does not support this setting, the closest higher available setting shall be used)
- Detector mode: RMS
- Centre frequency: nominal centre frequency of the channel being investigated
- Frequency span: 0 Hz
- Sweep time: > 2 × Channel Occupancy Time (COT)
- Trace mode: Clear/Write
- Trigger mode: Video or RF/IF Power
Step 2:
• The traffic source shall be configured so that it exceeds the UUT's theoretical radio performance. The traffic source shall fill the UUT's buffers to a level causing the UUT to always have transmissions queued (full buffer condition) towards the companion device. Where this is not possible, the UUT shall be configured to occupy the COT of the FFP to the highest extent possible.
• To avoid adverse effects on the measurement results, a unidirectional traffic source should be used. An example of such a unidirectional traffic source not triggering reverse traffic on higher layer protocols is UDP.

Test Configuration



TEST RESULTS

Adaptivity 1

Test Mode	Test Channel	Priority Class	COT Num[n]	Max.COT [ms]	Limit [ms]	Min. Idel Time [ms]	Limit [ms]
802.11a	5180	2	868	1.951	<=6	0.099	>0.027
802.11n HT 20	5180	2	932	1.962	<=6	0.096	>0.027
802.11n HT 40	5190	2	925	1.915	<=6	0.104	>0.027
802.11ac HT 20	5180	2	847	1.048	<=6	0.093	>0.027
802.11ac HT 40	5190	2	943	1.045	<=6	0.104	>0.027
802.11ac HT 80	5190	2	986	1.945	<=6	0.047	>0.027

Test Mode	Test Channel	Interference signal Type	Add interference signal Time[ms]	Interference signal Level [dBm/MHz]	Max.Short Control number[n]	Limit [n]	Max.Short Control Time [ms]	Limit [ms]
802.11a	5180	LTE	2000	-75	5	<=50	1.18	<2.5
802.11a	5180	OFDM	2000	-75	5	<=50	0.04	<2.5
802.11a	5180	AWGN	2000	-75	5	<=50	0.51	<2.5
802.11n HT 20	5180	LTE	2000	-75	5	<=50	1.58	<2.5
802.11n HT 20	5180	OFDM	2000	-75	5	<=50	0.65	<2.5
802.11n HT 20	5180	AWGN	2000	-75	5	<=50	0.34	<2.5
802.11n HT 40	5190	LTE	2000	-75	5	<=50	1.22	<2.5
802.11n HT 40	5190	OFDM	2000	-75	5	<=50	1.95	<2.5
802.11n HT 40	5190	AWGN	2000	-75	5	<=50	0.04	<2.5
802.11ac HT 20	5180	LTE	2000	-75	5	<=50	1.97	<2.5
802.11ac HT 20	5180	OFDM	2000	-75	5	<=50	1.65	<2.5
802.11ac HT 20	5180	AWGN	2000	-75	5	<=50	0.44	<2.5
802.11ac HT 40	5190	LTE	2000	-75	5	<=50	0.74	<2.5
802.11ac HT 40	5190	OFDM	2000	-75	5	<=50	1.18	<2.5
802.11ac HT 40	5190	AWGN	2000	-75	5	<=50	0.09	<2.5
802.11ac HT 80	5210	LTE	2000	-75	5	<=50	0.11	<2.5
802.11ac HT 80	5210	OFDM	2000	-75	5	<=50	0.15	<2.5
802.11ac HT 80	5210	AWGN	2000	-75	5	<=50	0.13	<2.5

4.9. Receiver Blocking

Performance criteria

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.
For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

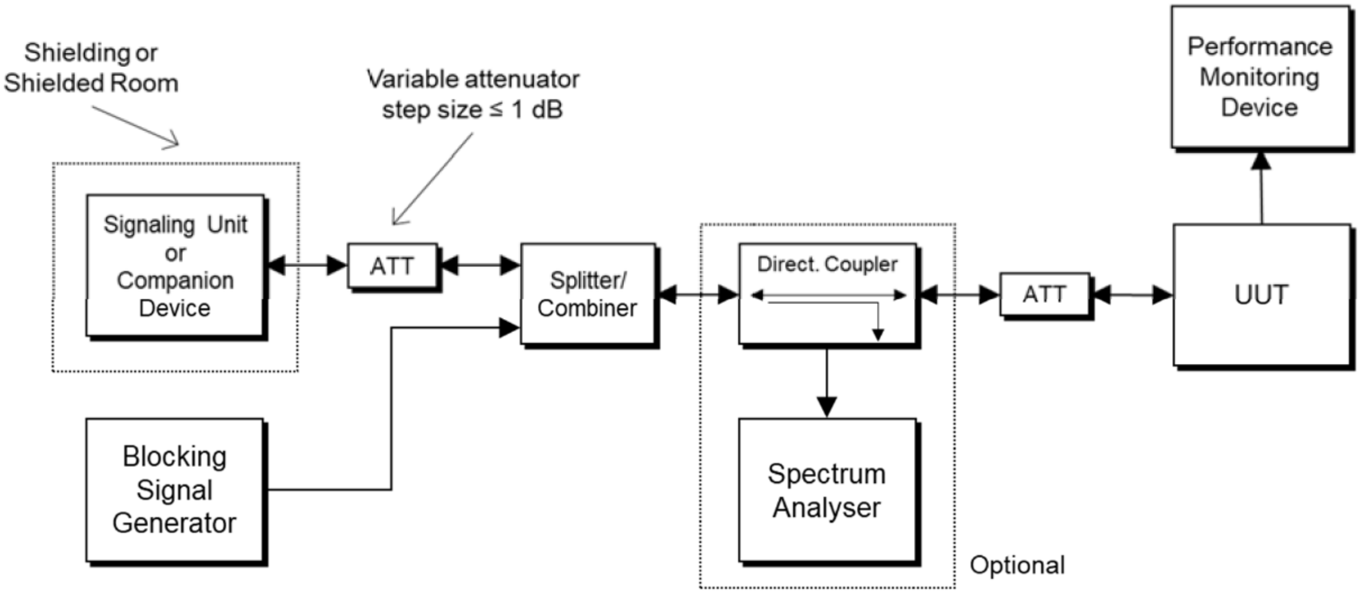
Limits
While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits given in table 8.

Table 8: Receiver blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power		Type of blocking signal
		Primary device or secondary device with radar detection (see note 2 in table D.2) (dBm)	Secondary device without radar detection (see note 2 in table D.2) (dBm)	
P_{min} + 6 dB	5 100	-53	-59	Continuous wave
P_{min} + 6 dB	4 900 5 000 5 975	-47	-53	Continuous wave
NOTE: 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.				

TEST PROCEDURE
The steps in the present clause 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 channel to be tested.
Step 2:
• The blocking signal generator shall be set to the first frequency as defined in table 8.
Step 3:
• With the blocking signal generator switched off, a communication link shall be set up between the UUT and the associated companion device using the test setup shown in figure 21. 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 measured at the interface between the UUT and its antenna assembly is Pmin.
• This signal level (Pmin) shall be 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 measured at the interface between the UUT and its antenna assembly shall be set to the level provided in table 8. 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 shall be recorded in the test report.
Step 5:
• Step 4 shall be repeated for each remaining combination of frequency and level as specified in table 8.
Step 6:
• If applicable, step 2 to step 5 shall be repeated with the UUT operating at the other channels at which the blocking test has to be performed.

TEST CONFIGURATION:



TEST RESULTS

For 11a

5180MHz

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

For 11n HT20

5180MHz

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

For 11n HT40

5180MHz

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

For 11ac HT20

5180MHz

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

For 11ac HT40

5190MHz

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

For 11ac HT80

5210MHz

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

4.10. Adjacent channel selectivity

Performance criteria

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.
For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment

Limits

The limits defined in this clause apply when the equipment receives the wanted signal on a single channel and the occupied bandwidth of the interfering signal falls completely within a channel adjacent to this channel. Both channels have a nominal channel bandwidth as defined in clause 4.2.2.

Table 9: Adjacent channel selectivity parameters

Wanted signal mean power from companion device (dBm)	Interferer signal frequency offset range (MHz)	Interferer signal power (dBm) (see note 2)	Type of interferer signal
P_{min} + 10 dB	20 ± 0,2	P_{min} + 26 dB	Same as the wanted signal with an equivalent occupied bandwidth
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.9.3 in the absence of any interfering signal.			
NOTE 2: The level specified for the interferer signal applies at the lowest data rate.			

TEST PROCEDURE

The steps in the present clause define the procedure to verify the adjacent channel selectivity requirement as described in clause 4.2.9.

Step 1:

• The UUT shall be set to the first channel to be tested.

Step 2:

• The interference source shall be set to operate in the upper adjacent channel using the frequency offset as defined in table 9.

Step 3:

• With the interference source switched off, a communication link shall be set up between the UUT and the associated companion device using the test setup shown in figure 22. 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 4.2.9.3 is still met. The resulting level for the wanted signal measured at the interface between the UUT and its antenna assembly is Pmin.

• This signal level (Pmin) shall be increased by 10 dB resulting in a new level (Pmin + 10 dB) of the wanted signal at the UUT receiver input.

Step 4:

• The interference signal source shall be switched on. It shall transmit continuously unsynchronized with a duty cycle of at least 50 %. The level of the interference source measured at the interface of the UUT and its antenna assembly shall be 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 4.2.9.3 are met.

• If the performance criteria as specified in clause 4.2.9.3 are met, the level of the interference source 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 4.2.9.3 are no longer met. The highest level at which the performance criteria are met shall be recorded in the test report.

Step 5:

• Step 4 shall be repeated after the interference source is set to operate in the lower adjacent channel using the frequency offset as defined in table 9.

Step 6:

• If applicable, step 2 to step 5 shall be repeated with the UUT operating at the other channels at which the receiver adjacent channel selectivity test has to be performed.

TEST CONFIGURATION:

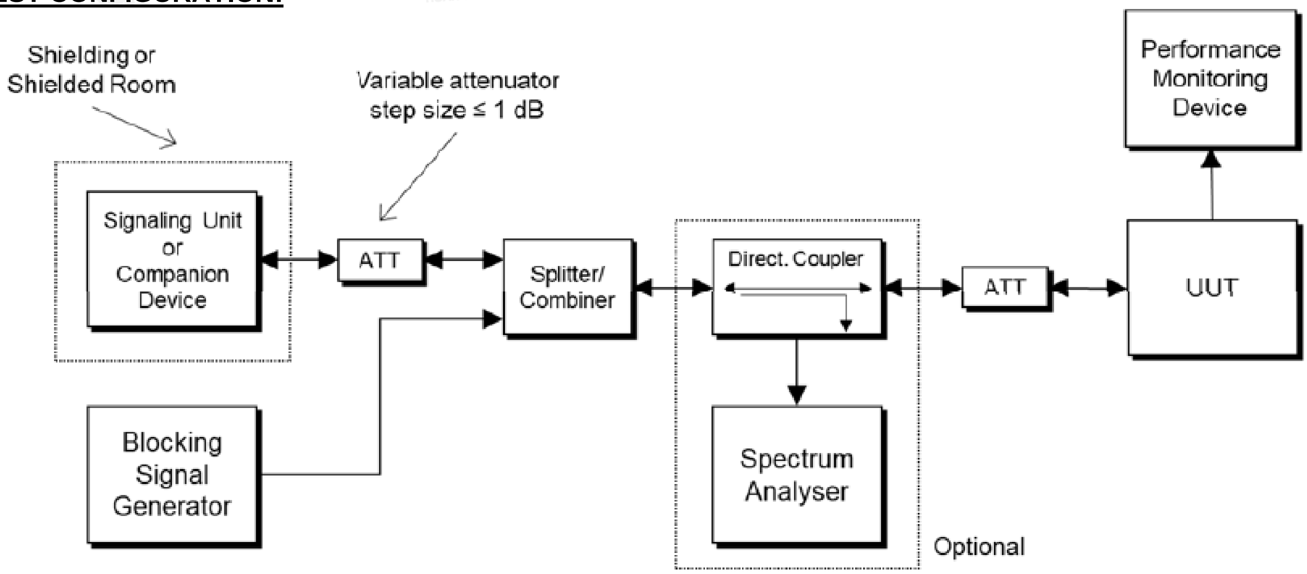


Figure 22: Test setup for receiver adjacent channel selectivity

TEST RESULTS

For 11a

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5159.8	Pmin + 26dB	10%	5%	PASS
	5160.2		10%	6%	PASS
	5199.8		10%	5%	PASS
	5200.2		10%	6%	PASS

For 11n HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5159.8	Pmin + 26dB	10%	6%	PASS
	5160.2		10%	5%	PASS
	5199.8		10%	5%	PASS
	5200.2		10%	4%	PASS

For 11n HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5169.8	Pmin + 26dB	10%	4%	PASS
	5170.2		10%	5%	PASS
	5209.8		10%	5%	PASS
	5210.2		10%	6%	PASS

For 11ac HT20

5180MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5159.8	Pmin + 26dB	10%	4%	PASS
	5160.2		10%	5%	PASS
	5199.8		10%	6%	PASS
	5200.2		10%	4%	PASS

For 11ac HT40

5190MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5169.8	Pmin + 26dB	10%	5%	PASS
	5170.2		10%	5%	PASS
	5209.8		10%	4%	PASS
	5210.2		10%	4%	PASS

For 11ac HT80

5210MHz

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Interferer signal power (dBm)	Limit(PER)	test value(PER)	Result
Pmin + 10dB	5189.8	Pmin + 26dB	10%	5%	PASS
	5190.2		10%	6%	PASS
	5229.8		10%	4%	PASS
	5230.2		10%	6%	PASS

4.11. User Access Restrictions

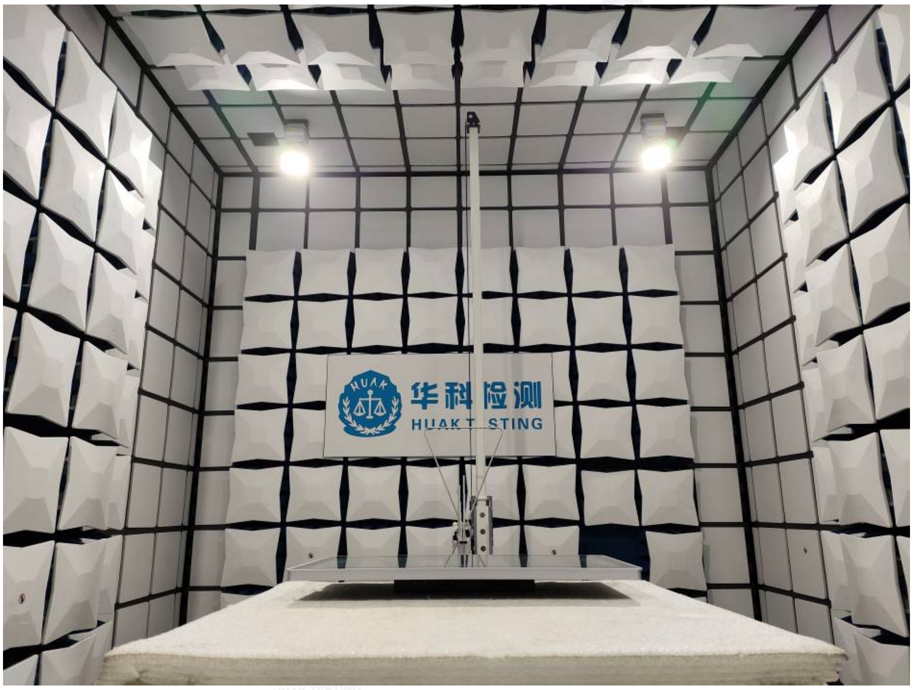
Requirement

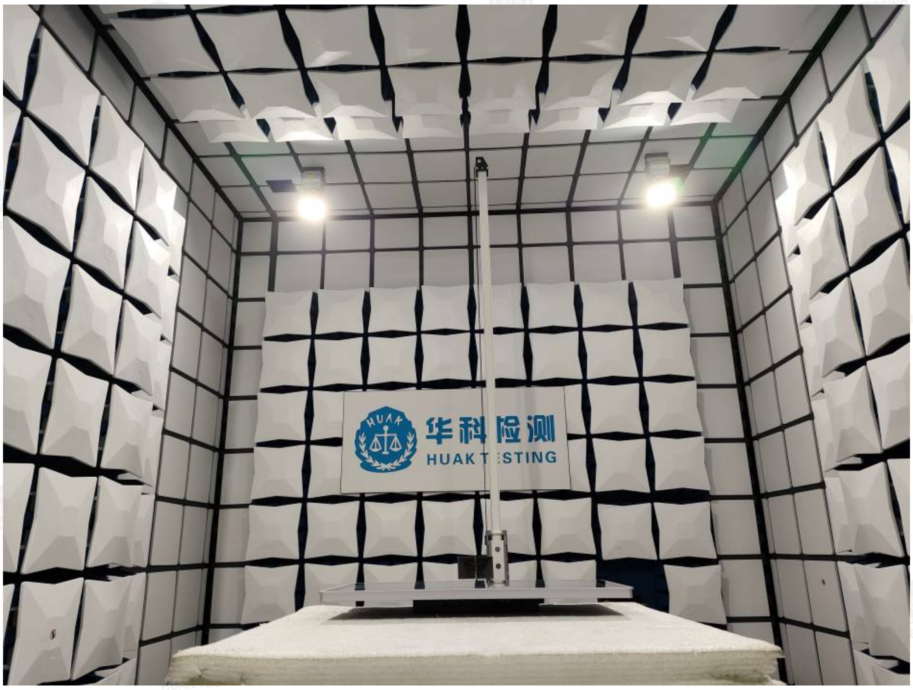
The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements in EN301893 (clause 4.7) The above requirement includes the prevention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

Result

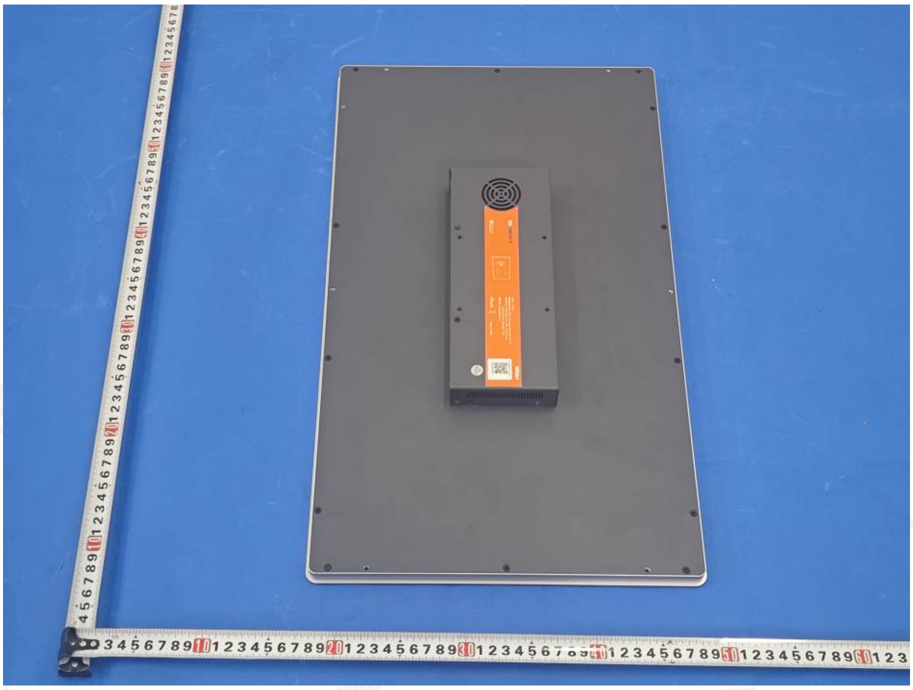
The EUT do not use the DFS Band and The customers will not obtain the information to set hardware and/ software related to DFS, if the product is on sales. So The EUT meets this requirement.

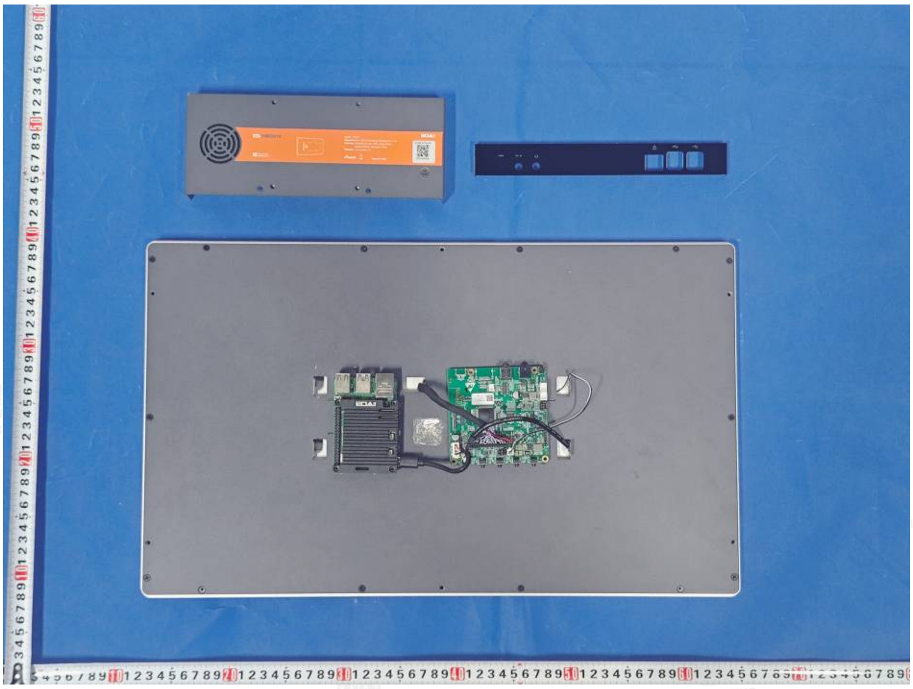
5. Test Setup Photos of the EUT

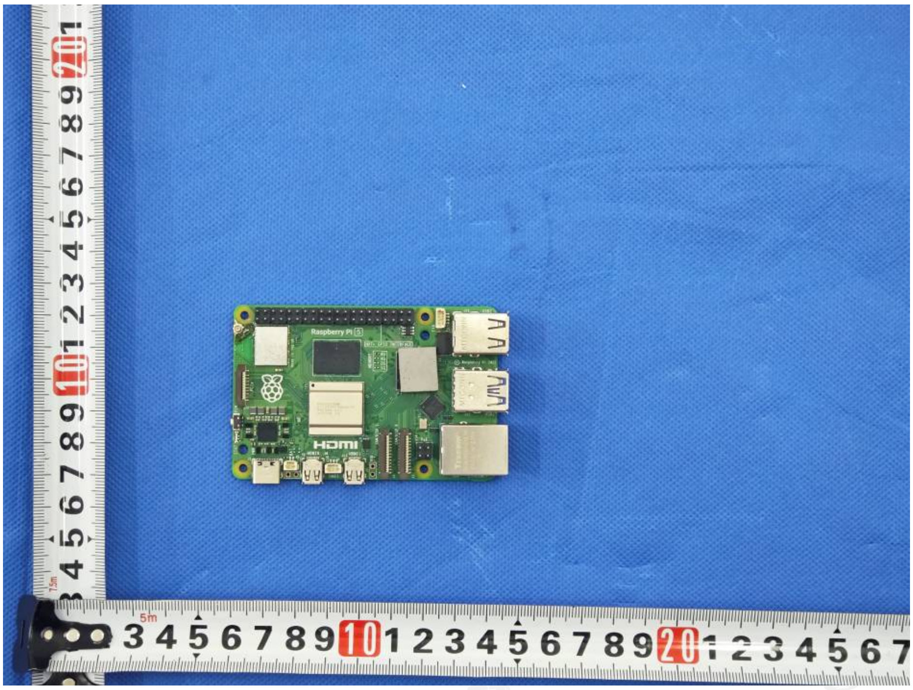


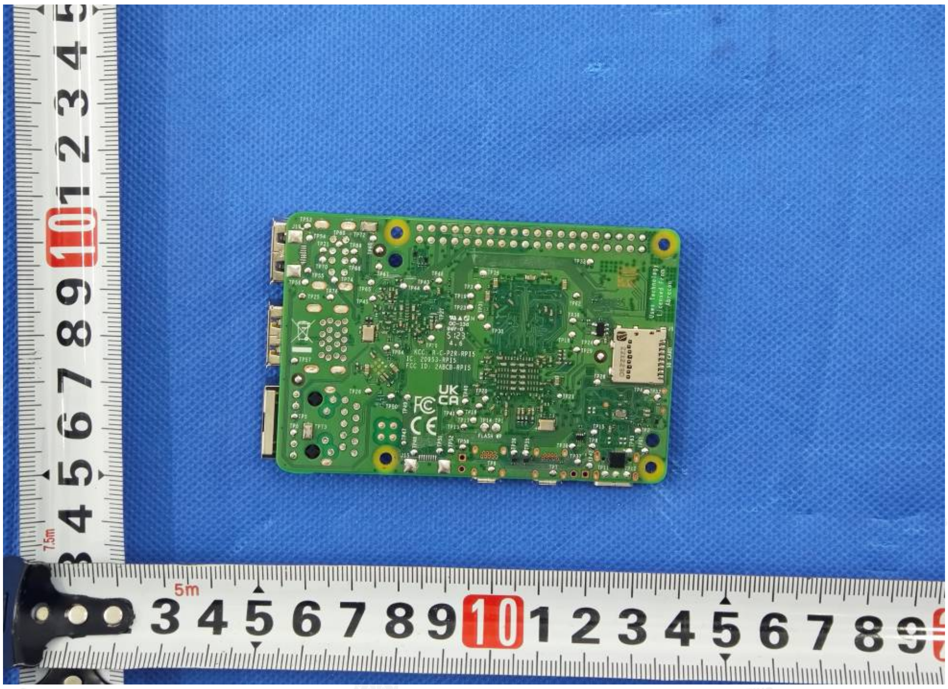


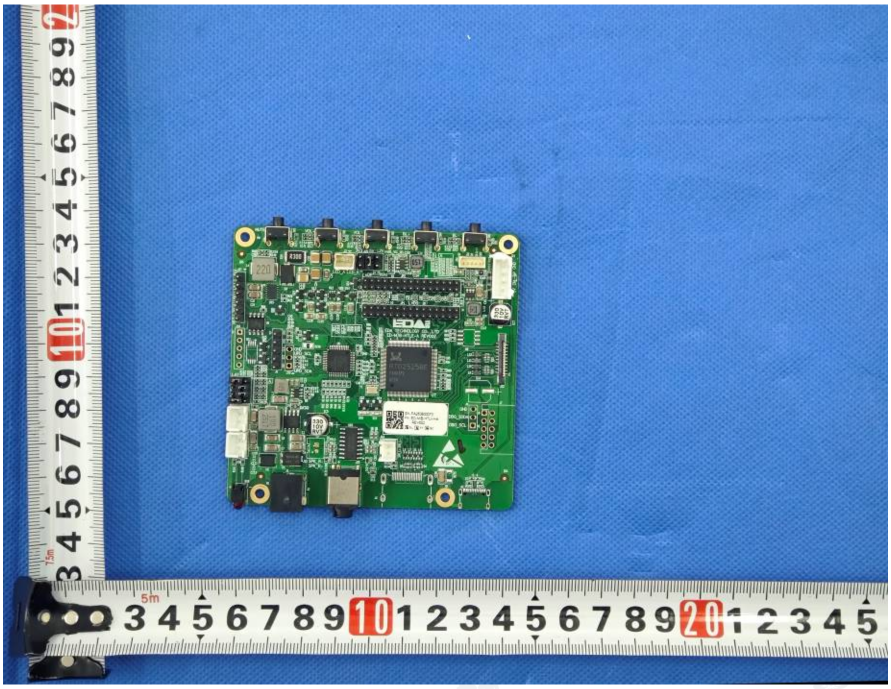
6. External and Internal Photos of the EUT

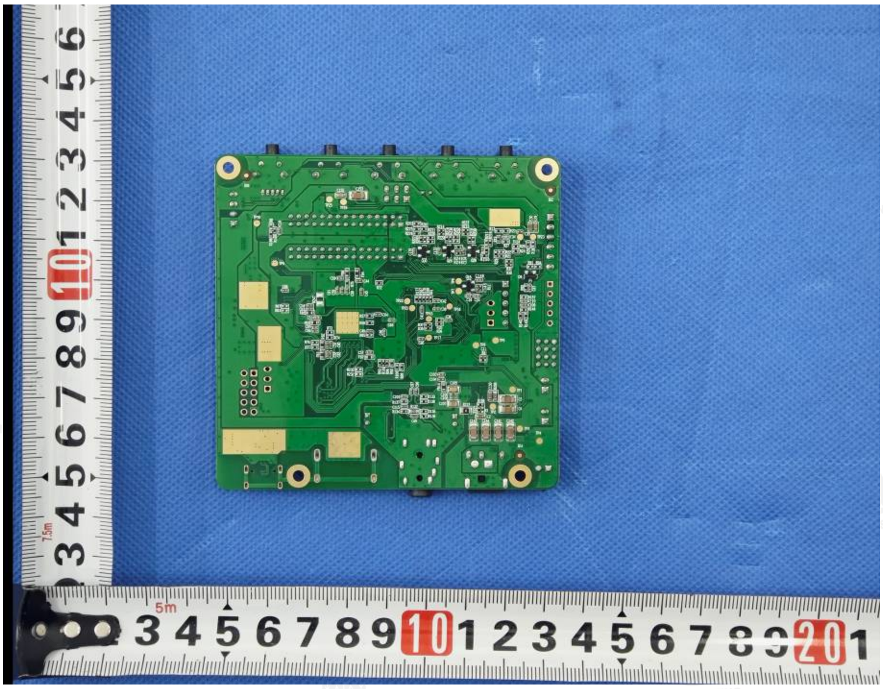












......................End of Report......................