

# Radio Test Report-5G WIFI

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

### Client Information:

Applicant: DOKE COMMUNICATION (HK) LIMITED  
Applicant add.: RM 1902 EASEY COMM BLDG 253-261 HENNESSY ROAD WANCHAI HK  
CHINA

### Product Information:

Product Name: Tablet  
Model No.: Tab 11 WIFI  
Serial Model: N/A  
Brand Name: Blackview  
Report No.: AIT23042604-1

### Prepared By:

**Dongguan Yaxu (AiT) Technology Limited**

No.22, Jinqianling Third Street, Jitigang, Huangjiang, Dongguan,  
Guangdong, China  
Tel.: +86-769-8202 0499 Fax.: +86-769-8202 0495

Date of Receipt: 2023.04.26

Date of Test: 2023.04.27~2023.05.23

Date of Issue: 2023.05.23

Test Result: Pass

This device has been tested and found to comply with the stated standard(s), which is (are) required by the council directive of 2014/53/EU and indicated in the test report and are applicable only to the tested sample identified in the report.

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Reviewed by:



Simba huang

Approved by:



Seal.chen



**REPORT REVISE RECORD**

<b>Report Version</b>	<b>Revise Time</b>	<b>Issued Date</b>	<b>Valid Version</b>	<b>Notes</b>
V1.0	/	2023.05.23	Valid	Initial release

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## 2 Test Summary

### 2.1 Compliance with EN 301 893 (2017-05) V2.1.1

<b>Radio Spectrum Matter (RSM) Part</b>				
<b>Transmitter Parameters</b>				
<b>Test Item</b>	<b>Test Requirement</b>	<b>Test Method</b>	<b>Limit</b>	<b>Result</b>
<b>Centre frequencies</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.1	EN 301 893 (2017-05) V2.1.1 Clause 5.4.2	Refer clause 4.2.1.3	PASS
<b>Nominal Channel Bandwidth and Occupied Channel Bandwidth</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.2	EN 301 893 (2017-05) V2.1.1 Clause 5.4.3	Refer clause 4.2.2.2	PASS
<b>RF output power</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.3	EN 301 893 (2017-05) V2.1.1 Clause 5.4.4	Refer clause 4.2.3.2	PASS
<b>Transmit Power Control (TPC)</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.3	EN 301 893 (2017-05) V2.1.1 Clause 5.4.4	Refer clause 4.2.3.2	N/A
<b>Power Density</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.3	EN 301 893 (2017-05) V2.1.1 Clause 5.4.4	Refer clause 4.2.3.2	PASS
<b>Transmitter unwanted emissions outside the 5 GHz RLAN bands</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.4	EN 301 893 (2017-05) V2.1.1 Clause 5.4.5	Refer clause 4.2.4.1.2	PASS
<b>Transmitter unwanted emissions within the 5 GHz RLAN bands</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.4	EN 301 893 (2017-05) V2.1.1 Clause 5.4.6	Refer clause 4.2.4.2.2	PASS
<b>DFS: Dynamic Frequency Selection</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.6	EN 301 893 (2017-05) V2.1.1 Clause 5.4.8	Refer clause 4.2.6	PASS (Remark)
<b>Adaptivity (Channel Access Mechanism)</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.2.7	EN 301 893 (2017-05) V2.1.1 Clause 5.4.9	Refer clause 4.2.7.3	PASS
<b>Geo-location capability</b>	EN 301 893 (2017-05) V2.1.1 Clause 4.10	NA	NA	This test is not required since the device does not support this function

Receiver Parameters				
Receiver spurious emissions	EN 301 893 (2017-05) V2.1.1 Clause 4.6	EN 301 893 (2017-05) V2.1.1 Clause 5.4.7	Refer clause 4.2.5.2	PASS
Receiver Blocking	EN 301 893 (2017-05) V2.1.1 Clause 4.2.8	EN 301 893 (2017-05) V2.1.1 Clause 5.4.10	Refer clause 4.2.8.4	PASS

**Remark:**

**The EUT in this report is a slave without radar detection.**

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application

This device “Dynamic Frequency Selection” was record in other test report.

## 2.2 Measurement Uncertainty

No.	Item	Uncertainty
1	Conducted Emission Test	1.20dB
2	Radiated Emission Test	3.30dB
3	RF power,conducted	0.16dB
4	RF power density,conducted	0.24dB
5	Spurious emissions,conducted	0.21dB
6	All emissions,radiated(<1G)	4.68dB
7	All emissions,radiated(>1G)	4.89dB

### 3 Test Facility

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

**.CNAS- Registration No: L6177**

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on April 17, 2022

**FCC-Registration No.: 703111 Designation Number: CN1313**

Dongguan Yaxu (AiT) technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

**IC —Registration No.: 6819A CAB identifier: CN0122**

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

**A2LA-Lab Cert. No.: 6317.01**

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### 3.1 Deviation from standard

None

#### 3.2 Abnormalities from standard conditions

None

## 4 General Information

### 4.1 EUT DESCRIPTION

Manufacturer:	Shenzhen DOKE Electronic Co., Ltd
Manufacturer Address:	801, Building3, 7th Industrial Zone, Yulv Community, Yutang Road, Guangming District, Shenzhen, China
EUT Name:	Tablet
Model No	Tab 11 WIFI
Serial Model:	N/A
Brand Name:	Blackview
Operating Frequency	WLAN: 802.11a/ n -20: 5180-5250MHz 802.11n -40: 5190-5240MHz 802.11ac -80: 5210MHz
Type of Modulation:	WLAN: 802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Number of Channels	Please see Channel List.
Duty Cycle:	Continuous operation possible for testing purposes
Antenna Type	FPC Antenna
Antenna gain:	2.0dBi
H/W No.:	WT_DK047_8183_BED_UMCP_MB_V2.0
S/W No.:	Tab11WiFi_NEU_MT8183_V1.0
Adapter:	Model:QZ-01800EA00 Input:100-240V 50/60Hz 0.35A Output: 9V 2A or 12V 1.5A
Battery:	DC 3.8V 8380mAh for Battery

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

## 4.2 DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	High channel TX
3	Low channel RX
4	High channel RX
5	Normal Operation

**Note:**

1. All the transmit mode would tested with each modulation.
2. All modes have been tested and the worst mode test data recording in the test report, if no any other data.

## 4.3 EUT Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Remark
1	N/A	N/A	N/A	N/A	N/A	N/A

## 4.4 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A



### 4.5 POWER SETTING WITHOUT TPC

Power setting 1

		5150-5250	5250- 5350	5470-5725
Frequency range [MHz]		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Single Antenna Equipment	Power [dBm]	23dBm		
Multiple Antennas no beamforming	Power [dBm]			
Multiple Antennas with beamforming	Power [dBm]			

Beam forming possible  Yes  No

### 4.6 DFS RELATED OPERATING MODE

<input type="checkbox"/>	Master	<input type="checkbox"/>	Slave with radar detection	<input checked="" type="checkbox"/>	Slave without radar detection
<input type="checkbox"/>	DFS controls (hardware or software) related to radar detection are NOT accessible to the user				

The equipment has Off-channel CAC function:  Yes  No

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

For channels outside the 5 600 MHz to 5 650 MHz range :	-----	hours
If applicable, for channels (partially) within the 5 600 MHz to 5 650 MHz range(Ch 120 - 132):	-----	hours

Ad hoc mode option (device establish connetion without customer supervision )					
<input checked="" type="checkbox"/>	No ad-hoc operation	<input type="checkbox"/>	ad-hoc operation in the range 5150 5250 MHz	<input type="checkbox"/>	ad-hoc operation with DFS

Frequency band	5150-5250	5250- 5350	5470-5725
Device active	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DFS Active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TPC Active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 4.7 TYPE OF ADAPTIVITY USED

<input type="checkbox"/> Non-adaptive	<input checked="" type="checkbox"/> Adaptive	<input checked="" type="checkbox"/> LBT	<input type="checkbox"/> Non LBT
	<input type="checkbox"/> The system can operate in more than one adaptive mode	<input type="checkbox"/> System can operate both adaptive & non adaptive mode	
	<input type="checkbox"/> Frame Based Equipment	<input checked="" type="checkbox"/> Load Based Equipment	
		CCA time implemented [uS]	>25
		q	5

**Channel Lists:**

802.11 a20/802.11 n20/802.11 ac20

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

802.11 n40/802.11 ac40

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

802.11 ac80

Channel	Frequency
42	5210 MHz

## 5 Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2022.09.02	2023.09.01
2	EMI Measuring Receiver	R&S	ESR	101160	2022.09.02	2023.09.01
3	Low Noise Pre Amplifier	HP	HP8447E	AiT-F01319	2022.09.02	2023.09.01
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2022.09.02	2023.09.01
5	Passive Loop	ETS	6512	00165355	2020.09.05	2022.09.04
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2022.09.02	2023.09.01
10	LISN	Kyoritsu	KNW-242	8-837-4	2022.09.02	2023.09.01
11	LISN	R&S	ESH3-Z2	0357.8810.54 - 101161-S2	2022.09.02	2023.09.01
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2022.09.02	2023.09.01
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
14	Signal Generator	Agilent	N5182A	MY50143009	2022.09.02	2023.09.01
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2022.09.02	2023.09.01
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
17	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A

## 6 Radio Technical Requirements in EN 301 893 V2.1.1

### 6.1 Test conditions

#### 6.1.1 Normal conditions

Ambient:	Temperature:	+15°C to +35°C
	Relative humidity:	20% to 75%
	Press:	1010 mbar
Power supply:	DC:	3.85 for Battery

#### 6.1.2 Extreme conditions

Ambient:	Temperature:	-20 °C to +40 °C (Which declared by manufacture )
Power supply:	DC:	3.49V ~4.25V

## 7 Radio Technical Specification in EN 301 893 V2.1.1

### 7.1 Transmitter Requirements

The EUT is intended for general use only and with a temporary antenna.

#### 7.1.1 Centre frequencies

**Test Requirement:** EN 301 893 Clause 4.2.1

**Test Method:** EN 301 893 Clause 5.4.2

**EUT Operation:**

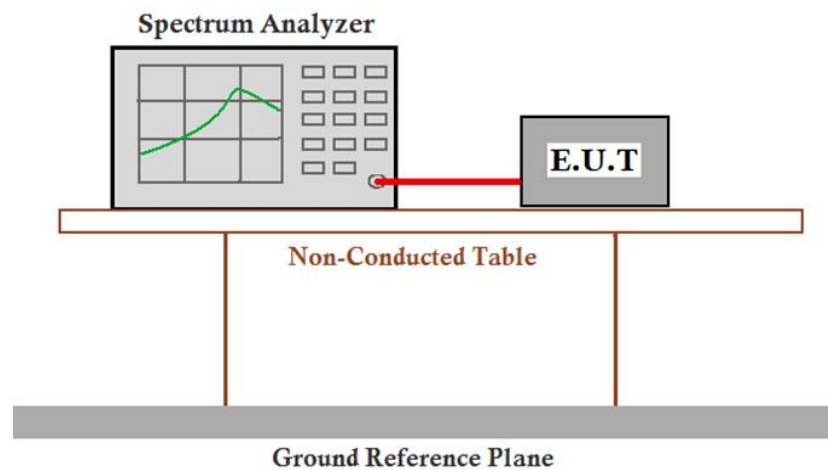
**Ambient:** Temp.: 25.0 °C                      Humid.: 56 %                      Press.: 1013 mbar

**Test Status:**

- 1) Enter test mode (802.11a, 802.11n and 802.11ac) for the product, and report the worst data of **802.11a**, **802.11n20** **802.11n40** and **802.11ac80**.
- 2) These measurements shall be performed under both normal and extreme test conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup:**



**Limit:** -20 ppm <math>f\_c</math> <math>20</math> ppm

**Test Data:**

Note:

1. In case of conducted measurements on smart antenna systems (devices with multiple transmit chains) the measurements shall be performed on only one of the active transmit chains.
2. The channels to be used for testing shall be as given according to ETSI EN 301 893 (V2.1.1) table 11.
3. The UUT operated in an unmodulated test mode.

Test Conditions	Frequency Measurement ( MHz )	
	5180	5240
Temp (25)°C	5179.9736	5239.9729
Temp (-10)°C	5179.9748	5239.9738
Temp (40)°C	5179.9752	5239.9745
Max. Deviation Frequency	0.0264	0.0271
Max. Frequency Error (ppm)	5.10	5.17
Wide Band Limit (ppm)	±20.00	

### 7.1.2 Nominal Channel Bandwidth and Occupied Channel Bandwidth

**Test Requirement:** EN 301 893 Clause 4.2.2

**Test Method:** EN 301 893 Clause 5.4.3

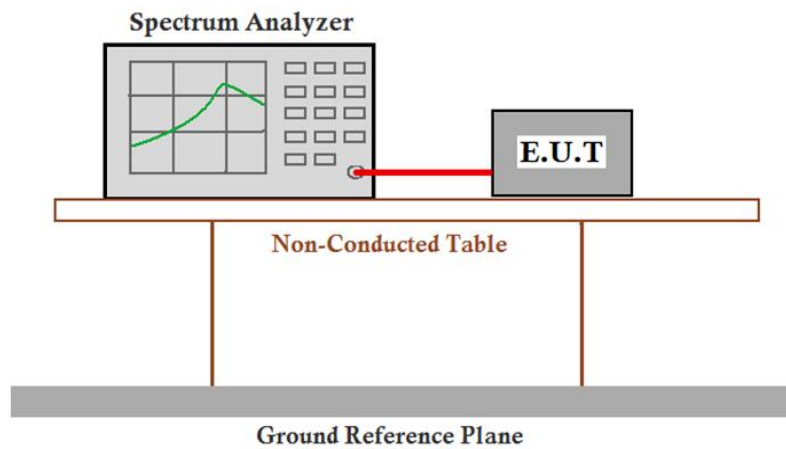
**EUT Operation:**

Ambient: Temp.: 25.0 °C                      Humid.: 56 %                      Press.: 1013 mbar

- Test Status:
- 1) Enter test mode (802.11a, 802.11n and 802.11ac) for the product, and report the datas of 802.11a, 802.11n20, 802.11n40, 802.11ac80.
  - 2) These measurements shall be verified only under normal operating conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup:**



**Limit:** Nominal Channel Bandwidth  $\geq$  5 MHz  
 80% < Occupied Channel Bandwidth / Nominal Channel Bandwidth < 100%

**Test Data:**

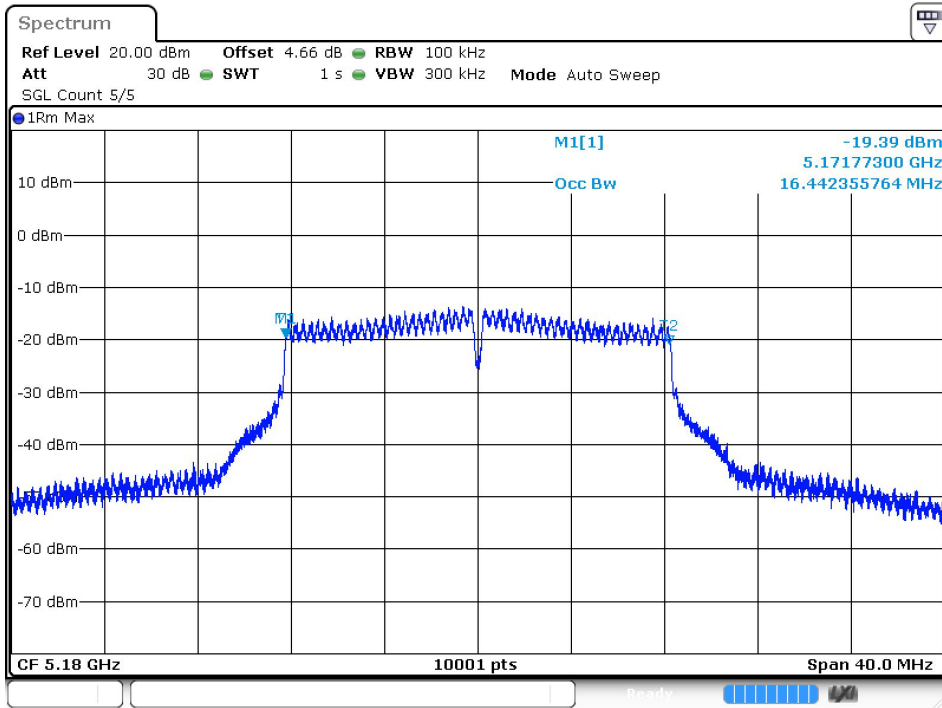
<b>Modulation Mode</b>	<b>Frequency (MHz)</b>	<b>Occupied Channel Bandwidth (MHz)</b>	<b>Occupied Channel Bandwidth Limit (MHz) (80-100% of Nominal channel)</b>
802.11a	5180	16.442	16-20
802.11n HT 20	5180	17.654	16-20
802.11n HT 40	5190	36.164	32-40
802.11ac VHT 80	5210	75.576	64-80

**Remark:**

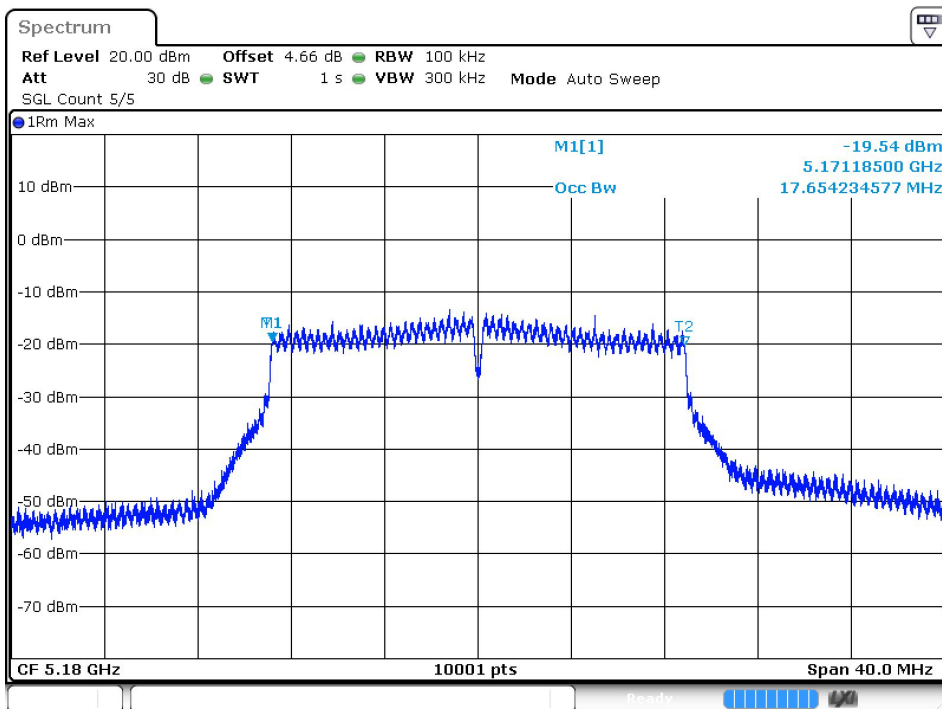
Percentage Proportion Calculation = Occupied Channel Bandwidth / Nominal Channel Bandwidth



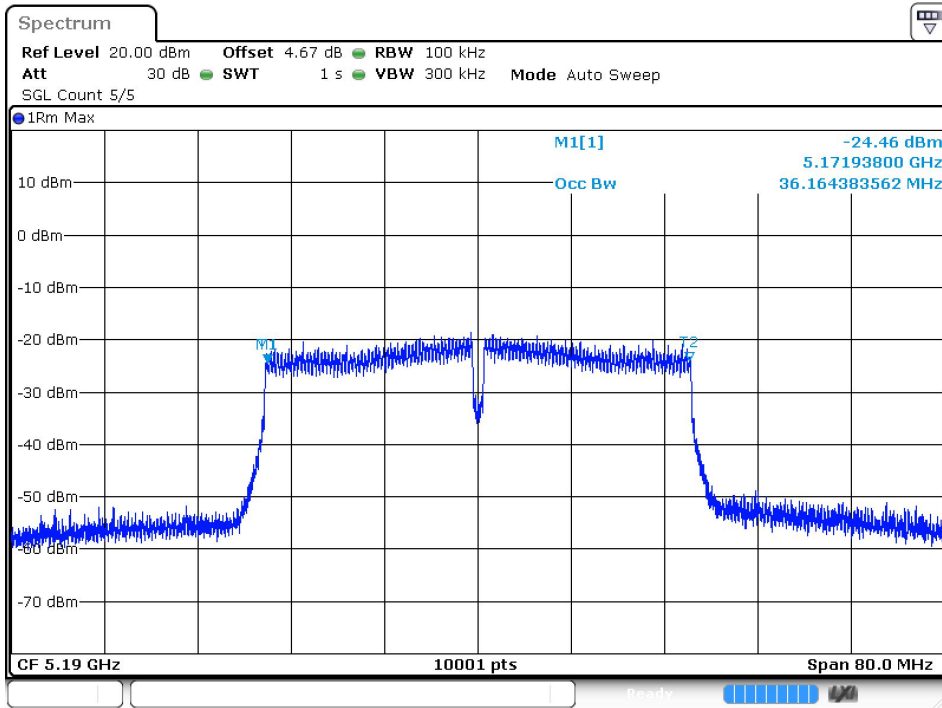
### 802.11a



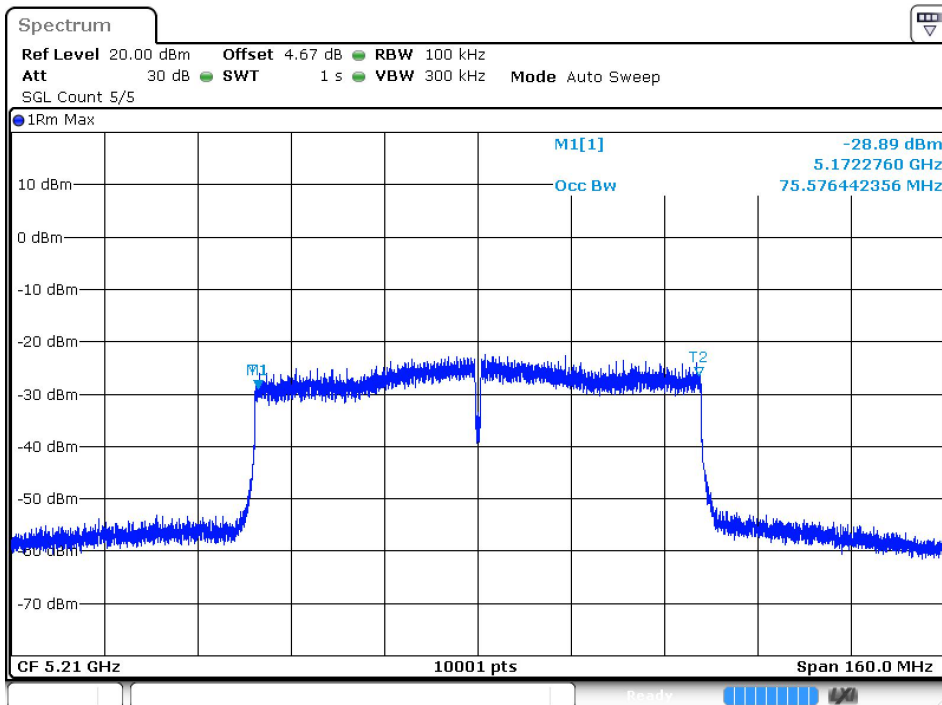
### 802.11n20



### 802.11n40



### 802.11ac80



### 7.1.3 RF output power, Transmit Power Control (TPC) and Power Density

**Test Requirement:** EN 301 893 Clause 4.2.3

**Test Method:** EN 301 893 Clause 5.4.4

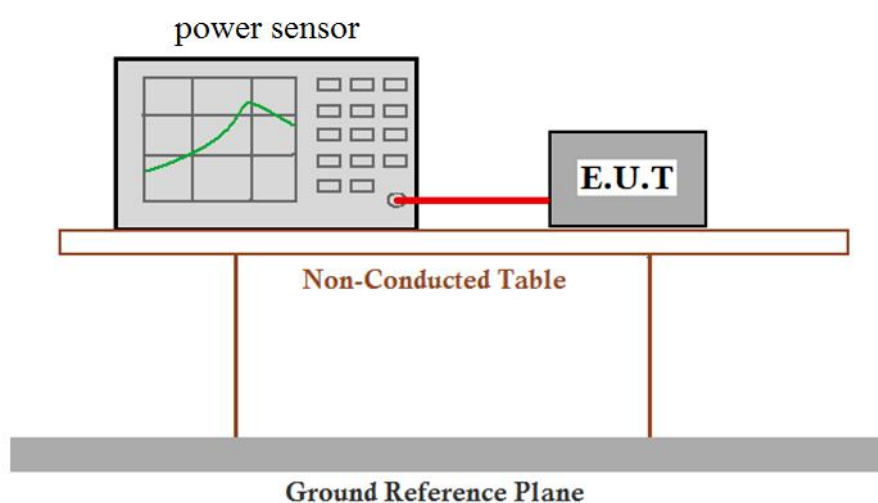
**EUT Operation:**

Ambient: Temp.: 25.0 °C Humid.: 56 % Press.: 1013 mbar

- Test Status:
- 1) Enter test mode (802.11a, 802.11n and 802.11ac) for the product, and report the datas of 802.11a, 802.11n20, 802.11n40, 802.11ac80.
  - 2) These measurements shall be performed under both normal and extreme test conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup :**



**Limit:**

**E.I.R.P limits for RF output power and power density at the highest power level**

Frequency range (MHz)	Mean e.i.r.p. limit [dBm]		Mean e.i.r.p. density limit [dBm/MHz]	
	With TPC	Without TPC	With TPC	Without TPC
5150 to 5350	23	20 / 23 (see note 1)	10	7 / 10 (see note 2)
5470 to 5725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

Note 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 23 dBm.

Note 2: The applicable limit is 7 dBm/MHz except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 10 dBm/MHz.

Note 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

**E.I.R.P limits for RF output power at the lowest power level**

Frequency range (MHz)	Mean e.i.r.p. [dBm]
5250 to 5350	17
5470 to 5725	24 (see note)

Note: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

**Test Date**

IEEE 802.11a-20MHz Test Conditions	Average EIRP Power ( dBm )	
	5180MHz	5240MHz
Temp (25)°C	11.94	10.59
Temp (0)°C	11.90	10.54
Temp (40)°C	11.85	10.49
Limits	23	23

IEEE 802.11n-20MHz Test Conditions	Average EIRP Power ( dBm )	
	5180MHz	5240MHz
Temp (25)°C	11.70	8.72
Temp (0)°C	11.65	8.68
Temp (40)°C	11.61	8.64
Limits	23	23

IEEE 802.11n-40MHz Test Conditions	Average EIRP Power ( dBm )	
	5190MHz	5230MHz
Temp (25)°C	10.70	11.37
Temp (0)°C	10.66	11.32
Temp (40)°C	10.62	11.28
Limits	23	23

IEEE 802.11ac-20MHz Test Conditions	Average EIRP Power ( dBm )	
	5180MHz	5240MHz
Temp (25)°C	11.49	9.46
Temp (0)°C	11.45	9.41
Temp (40)°C	11.41	9.37
Limits	23	23

IEEE 802.11ac-40MHz Test Conditions	Average EIRP Power ( dBm )	
	5190MHz	5230MHz
Temp (25)°C	10.30	11.06
Temp (0)°C	10.26	11.02
Temp (40)°C	10.22	10.98
Limits	23	23

IEEE 802.11ac-80MHz Test Conditions	Average EIRP Power ( dBm )	
	5210MHz	--
Temp (25)°C	10.20	--
Temp (0)°C	10.06	5210MHz
Temp (40)°C	10.12	5210MHz
Limits	23	5210MHz

**Remark:** e.i.r.p= read level(dBm) +cable loss+ Product antenna gain  
 Antenna Gain=2dBi, this factors have been set in test software

**Power Density Test Data**

IEEE 802.11a-20MHz Test Conditions	Average EIRP Power (dBm/MHz)	
	5180MHz	5240MHz
Temp (25)°C	-0.13	-1.54
Limits	10	10

IEEE 802.11n-20MHz Test Conditions	Average EIRP Power (dBm/MHz)	
	5180MHz	5240MHz
Temp (25)°C	-0.60	-3.63
Limits	10	10

IEEE 802.11n-40MHz Test Conditions	Average EIRP Power (dBm/MHz )	
	5190MHz	5230MHz
Temp (25)°C	-4.84	-4.12
Limits	10	10

IEEE 802.11ac-20MHz Test Conditions	Average EIRP Power (dBm/MHz )	
	5180MHz	5240MHz
Temp (25)°C	-0.74	-2.81
Limits	10	10

IEEE 802.11ac-40MHz Test Conditions	Average EIRP Power (dBm/MHz)	
	5190MHz	5230MHz
Temp (25)°C	-4.69	-5.70
Limits	10	10

IEEE 802.11ac-80MHz Test Conditions	Average EIRP Power ( dBm )
	5210MHz
Temp (25)°C	-7.68
Limits	10

Note: 1. Corrected Antenna(dBm/MHz)= Result(dBm/MHz) + Antenna gain(dBi)

2. Antenna Gain factors have been set in test software.

## 7.1.4 Transmitter unwanted emissions outside the 5 GHz RLAN bands

**Test Requirement:** EN 301 893 Clause 4.2.4

**Test Method:** EN 301 893 Clause 5.4.5

**EUT Operation:**

Ambient: Temp.: 26.0 °C Humid.: 56 % Press.: 1012 mbar

- Test Status:
- 1) Enter test mode(802.11a, 802.11n and 802.11ac) for the product, and report the datas of 802.11a.
  - 2) These measurements shall be verified only under normal operating conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup**

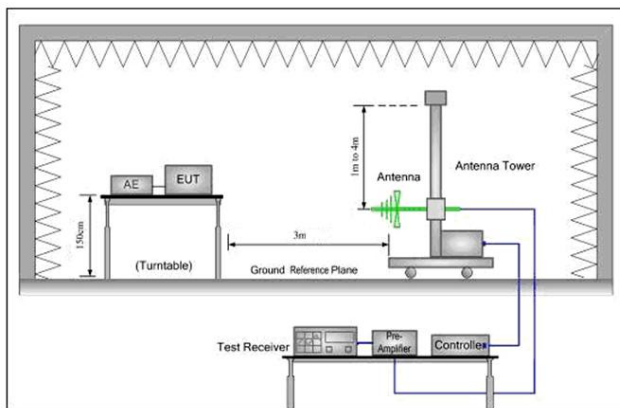


Figure 1. 30MHz to 1GHz

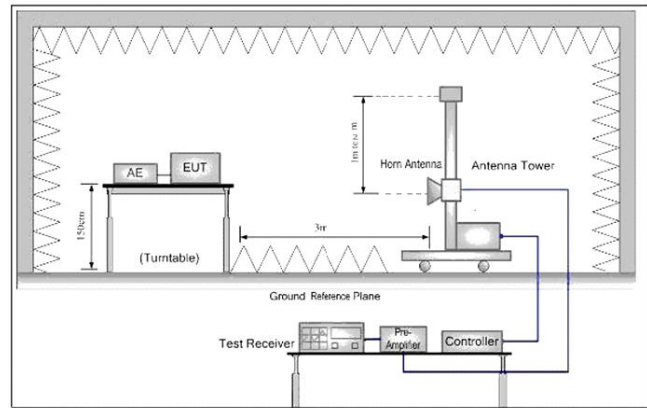


Figure 2. Above 1GHz

**Test Procedure:**

1. Scan from 30MHz to 26 GHz, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Below 1GHz test procedure as below:

- 1) The EUT was powered ON and placed on a 1.5m high table in the chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a



non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.

- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas polarized.
- 8) Calculate power in dBm by the following formula:

$$ERP(dBm) = P_g(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

where:

$P_g$  is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and receiving antenna is moved from 1m to 2m.
- 2) Calculate power in dBm by the following formula:

$$EIRP(dBm) = P_g(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$EIRP = ERP + 2.15dB$$

where:

$P_g$  is the generator output power into the substitution antenna.

Standby mode test procedure as below:

- 1) Below 1GHz test procedure Steps 1) to 8) and Above 1GHz test procedure 1) to 2) shall be repeated with the transmitter in the standby condition if this option is available.

Limit:

**Table 1: Transmitter limits for spurious emissions**

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

**Test Data:**

Transmitting with modulation Mode at 5180MHz for 802.11a				
Frequency (MHz)	Spurious Emission Level		Limit dBm	Over limit (dB)
	Polaxis	(dBm)		
44.4475	Vertical	-60.44	-36.00	-24.44
50.1388	Vertical	-62.02	-54.00	-8.02
70.8303	Vertical	-65.88	-54.00	-11.88
98.7753	Vertical	-65.92	-54.00	-11.92
129.3298	Vertical	-63.94	-36.00	-27.94
241.3251	Vertical	-63.28	-36.00	-27.28
43.7550	Horizontal	-69.74	-36.00	-33.74
74.2292	Horizontal	-70.29	-36.00	-34.29
118.8540	Horizontal	-63.03	-36.00	-27.03
190.2917	Horizontal	-68.34	-54.00	-14.34
240.5586	Horizontal	-61.59	-36.00	-25.59
703.0987	Horizontal	-62.21	-54.00	-8.21

Transmitting with modulation Mode at 5240MHz for 802.11a				
Frequency (MHz)	Spurious Emission Level		Limit dBm	Over limit (dB)
	Polaxis	(dBm)		
37.4796	Vertical	-61.14	-36.00	-25.14
48.9712	Vertical	-62.13	-54.00	-8.13
75.8603	Vertical	-65.38	-36.00	-29.38
96.9521	Vertical	-66.10	-54.00	-12.10
127.6156	Vertical	-64.11	-36.00	-28.11
243.1720	Vertical	-63.09	-36.00	-27.09
36.7871	Horizontal	-70.44	-36.00	-34.44
73.0616	Horizontal	-70.40	-54.00	-16.40
123.8840	Horizontal	-62.53	-36.00	-26.53
188.4685	Horizontal	-68.52	-54.00	-14.52
238.8444	Horizontal	-61.76	-36.00	-25.76
704.9456	Horizontal	-62.02	-54.00	-8.02

Transmitting with modulation Mode at 5180MHz for 802.11a				
Frequency	Spurious Emission Level		Limit	Over limit
(MHz)	Polaxis	(dBm)	dBm	(dB)
10360	V	-44.98	-30.00	-14.98
10360	H	-44.05	-30.00	-14.05

Transmitting with modulation Mode at 5240MHz for 802.11a				
Frequency	Spurious Emission Level		Limit	Over limit
(MHz)	Polaxis	(dBm)	dBm	(dB)
11000	V	-44.81	-30.00	-14.81
11000	H	-44.66	-30.00	-14.66

**Remark:**

1. The disturbance below 1GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
2. The disturbance other emissions were very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

### 7.1.5 Transmitter unwanted emissions within the 5 GHz RLAN bands

**Test Requirement:** EN 301 893 Clause 4.2.4.2

**Test Method:** EN 301 893 Clause 5.4.6

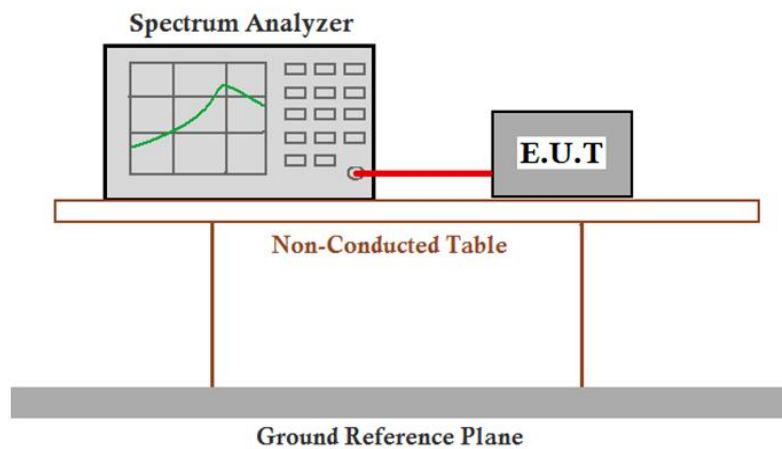
**EUT Operation:**

Ambient: Temp.: 25.0 °C Humid.: 52 % Press.: 1012 mbar

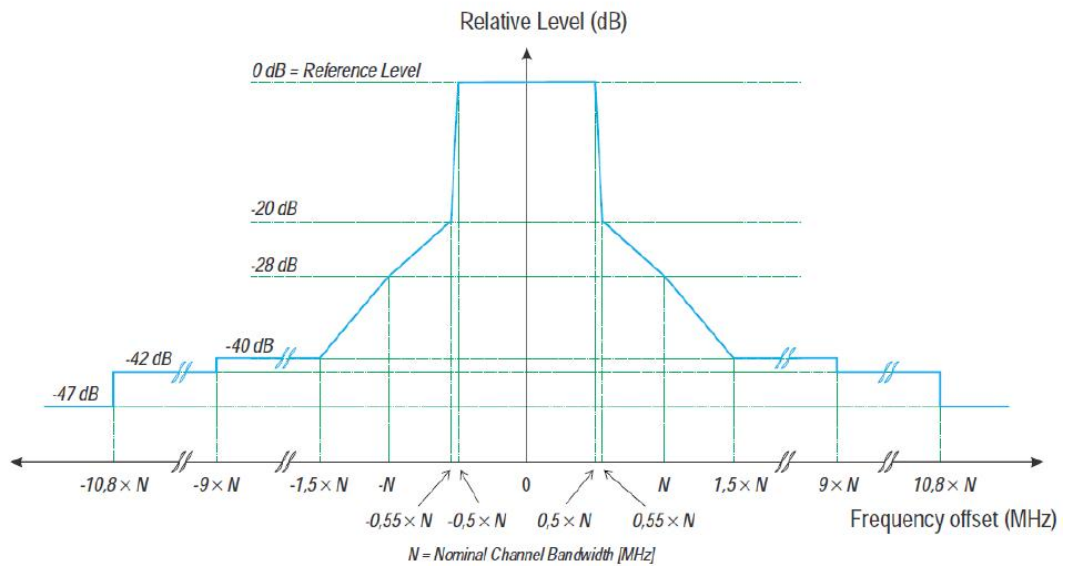
- Test Status:
- 1) Enter test mode(802.11a, 802.11n and 802.11ac) for the product. And report the worst case mode.
  - 2) These measurements shall be verified only under normal operating conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup**



**Limit:**



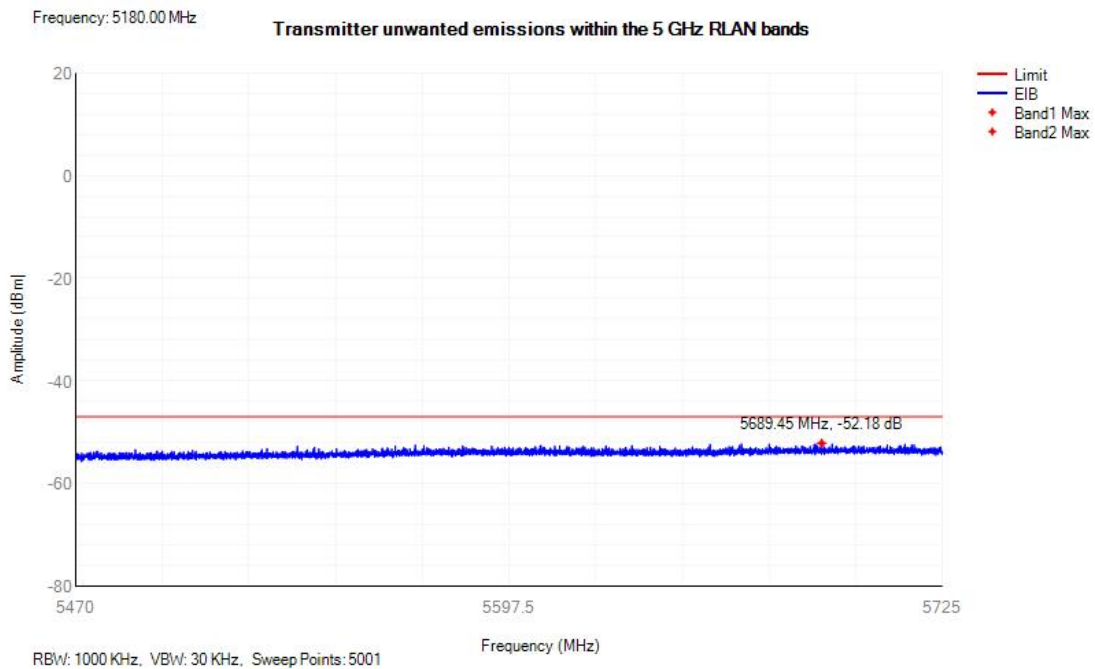
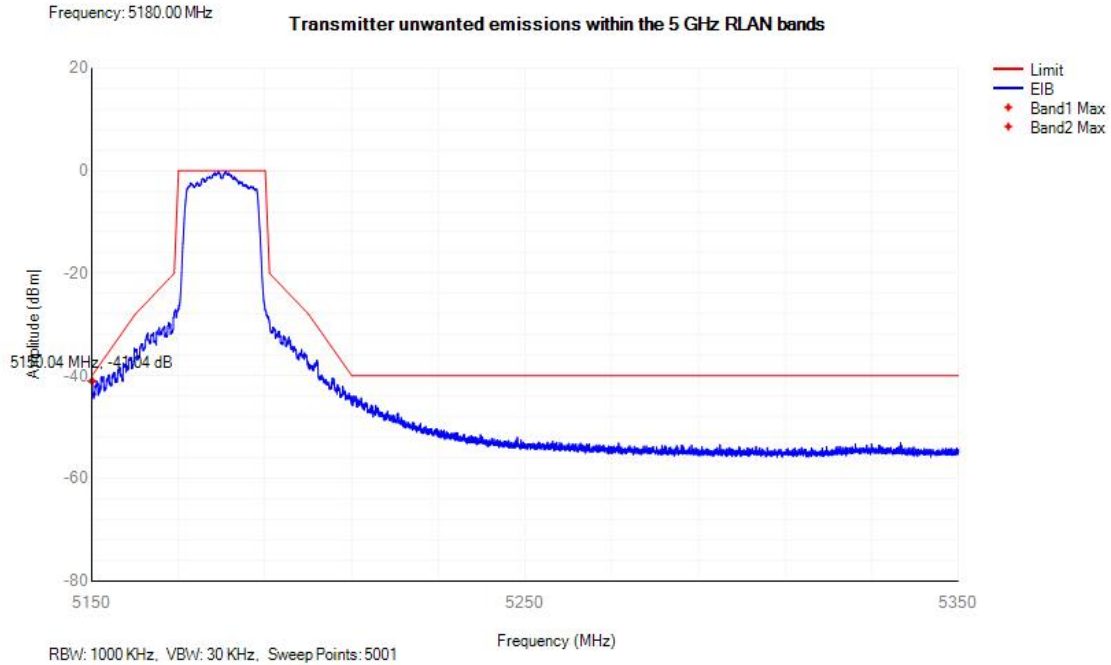
**Figure 1: Transmit spectral power mask**

**Test Data:**

**Test Result of Transmitter Unwanted Emissions within the 5 GHz RLAN bands.(list the worst case of each mode)**

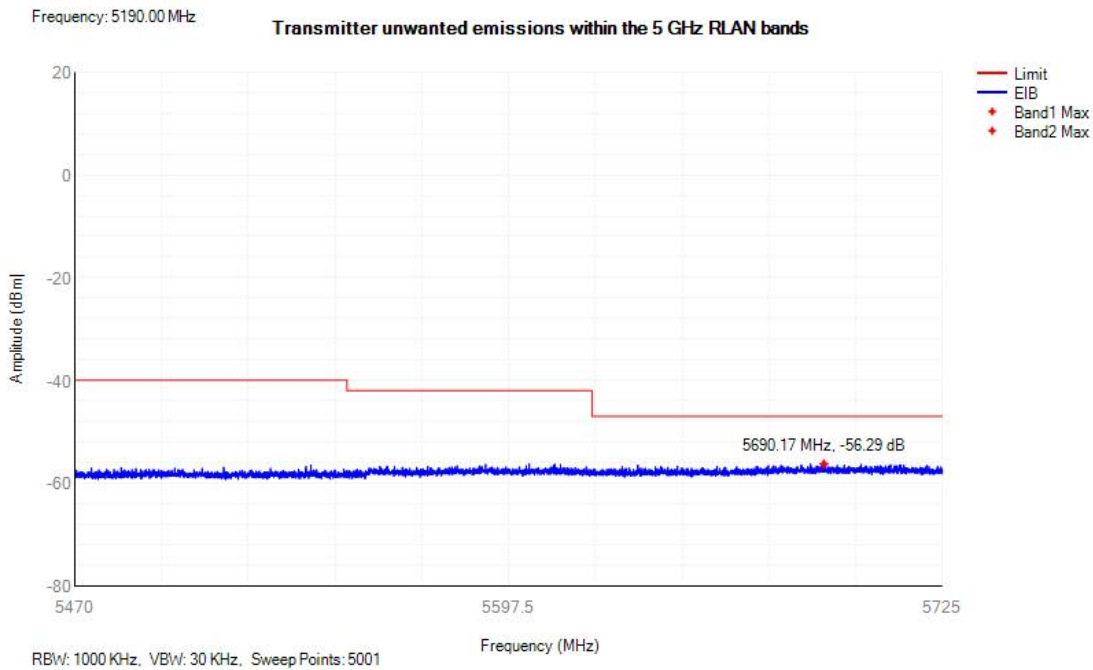
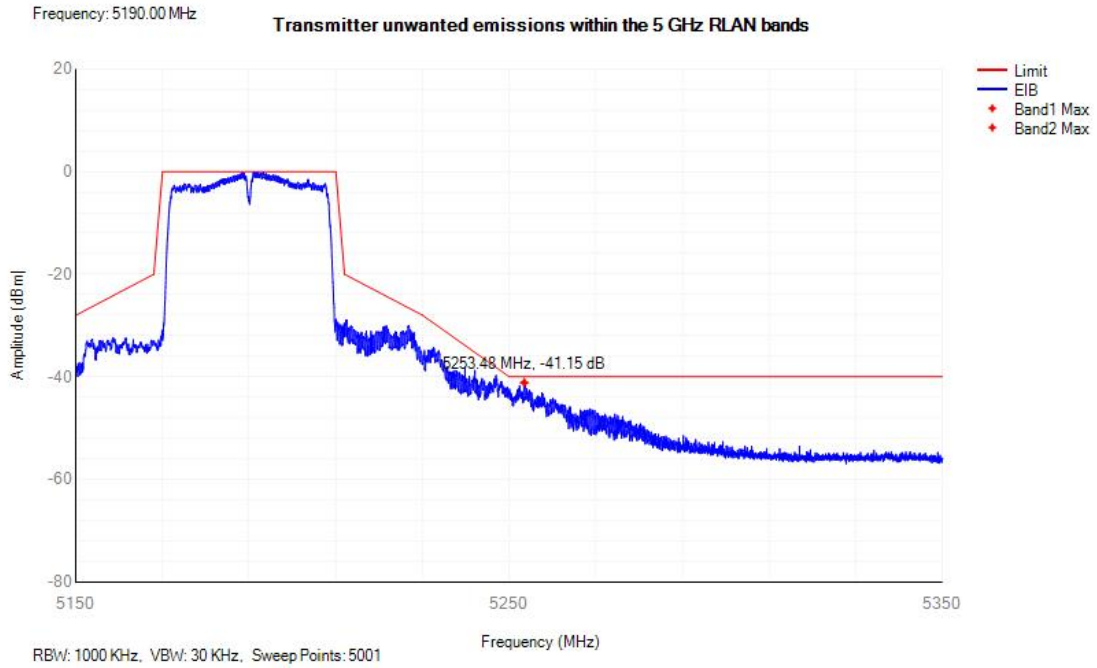
For 802.11a

**5180MHz**



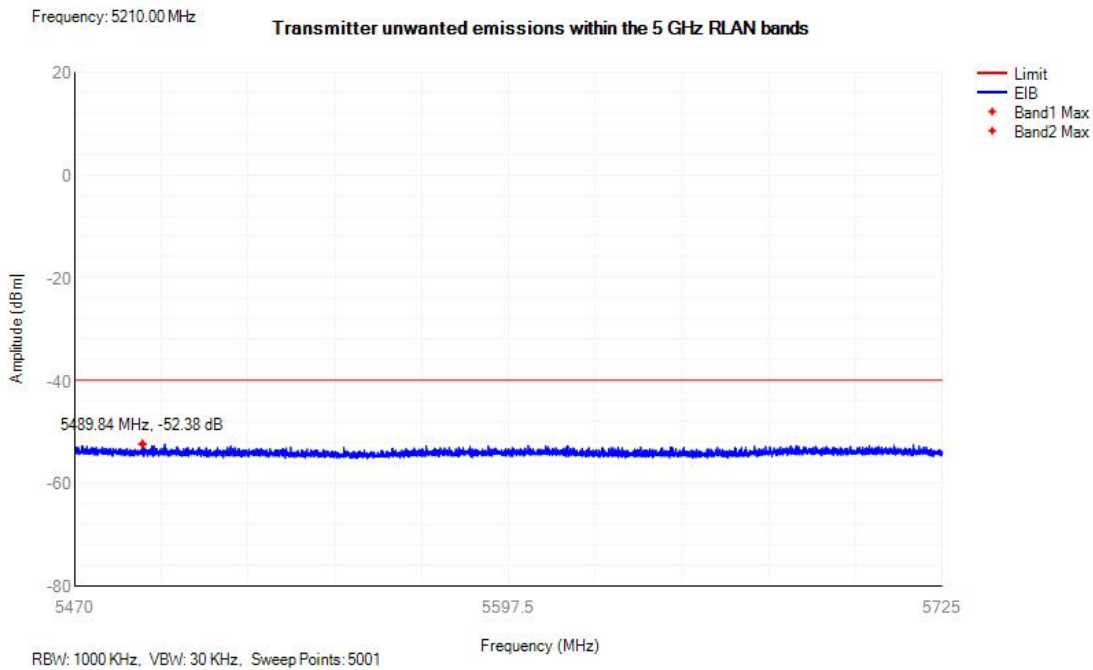
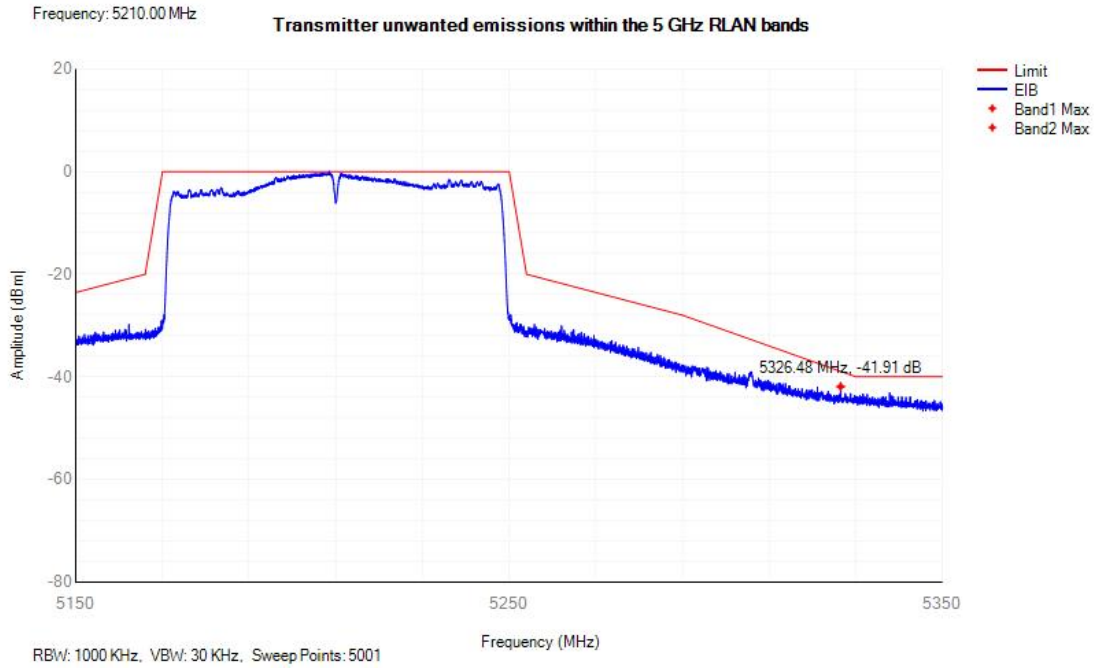
For 802.11n-HT40

5190MHz



For 802.11ac-VHT80

5210MHz



## 7.1.6 Receiver spurious emissions

**Test Requirement:** EN 300 893 Clause 4.2.5

**Test Method:** EN 300 893 Clause 5.4.7

**EUT Operation:**

Ambient: Temp.: 26.0 °C Humid.: 52 % Press.: 1010 mbar

- Test Status:
- 1) Enter test mode (802.11a, 802.11n20, 802.11n40 and 802.11ac) for the product. Find the worst case in 802.11a mode.
  - 2) Testing shall be performed when the equipment is in a receive-only mode.
  - 3) Test EUT in normal conditions.

**Equipment Used:** Refer to section 5 for details.

**Test Setup:**

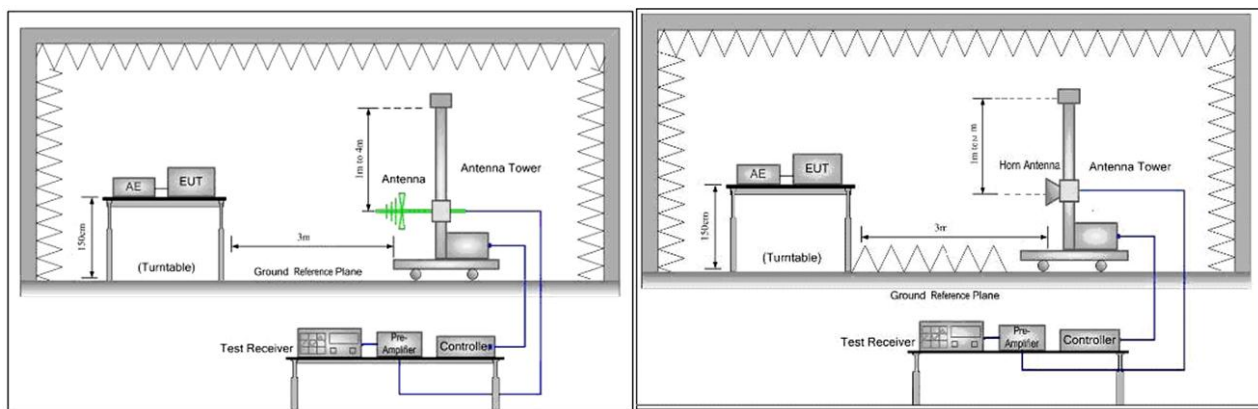


Figure 1. 30MHz to 1GHz

Figure

### 2. Above 1GHz

- Test Procedure:**
1. Scan from 30MHz to 26GHz, find the maximum radiation frequency to measure.
  2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

**Below 1GHz test procedure as below:**

- 1) The EUT was powered ON and placed on a 1.5m high table in the chamber. The antenna of the transmitter was extended to its maximum length. Receiver mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.



- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas polarized.
- 8) Calculate power in dBm by the following formula:

$$ERP(dBm) = Pg(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

where:

Pg is the generator output power into the substitution antenna.

**Above 1GHz test procedure as below :**

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and receiving antenna is moved from 1m to 2m.
- 2) Calculate power in dBm by the following formula:

$$EIRP(dBm) = Pg(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$EIRP=ERP+2.15dB$$

where:

Pg is the generator output power into the substitution antenna.

Limit:

**Table 2: Spurious emission limits for receivers**

Frequency range	Maximum power	bandwidth
	e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1MHz

**Test Data (worst case):**

Receiving mode at 802.11a 5180MHz				
Frequency (MHz)	Spurious Emission Level		Limit	Over limit
	Polaxis	(dBm)	dBm	(dB)
46.5864	Vertical	-71.66	-57.00	-14.66
52.8001	Vertical	-71.02	-57.00	-14.02
66.8859	Vertical	-63.93	-57.00	-6.93
106.7115	Vertical	-70.88	-57.00	-13.88
135.3952	Vertical	-69.25	-57.00	-12.25
239.0115	Vertical	-67.90	-57.00	-10.90
42.1634	Horizontal	-74.06	-57.00	-17.06
72.4783	Horizontal	-69.38	-57.00	-12.38
116.4298	Horizontal	-65.70	-57.00	-8.70
190.4702	Horizontal	-69.99	-57.00	-12.99
246.1249	Horizontal	-67.03	-57.00	-10.03
705.0824	Horizontal	-66.74	-57.00	-9.74

Receiving mode at 802.11a 5240MHz				
Frequency (MHz)	Spurious Emission Level		Limit	Over limit
	Polaxis	(dBm)	dBm	(dB)
46.9337	Vertical	-70.58	-57.00	-13.58
49.3922	Vertical	-69.01	-57.00	-12.01
66.6674	Vertical	-65.50	-57.00	-8.50
95.3147	Vertical	-70.84	-57.00	-13.84
127.3793	Vertical	-68.85	-57.00	-11.85
233.5049	Vertical	-67.74	-57.00	-10.74
43.5382	Horizontal	-73.13	-57.00	-16.13
72.6407	Horizontal	-70.77	-57.00	-13.77
121.5358	Horizontal	-65.85	-57.00	-8.85
190.0444	Horizontal	-71.64	-57.00	-14.64
239.6448	Horizontal	-67.88	-57.00	-10.88
693.5418	Horizontal	-65.42	-57.00	-8.42

Receiving mode at 802.11a 5180MHz				
Frequency (MHz)	Spurious Emission Level		Limit dBm	Over limit (dB)
	Polaxis	(dBm)		
1615.581	Vertical	-57.84	-47.00	-10.84
2680.386	Vertical	-59.12	-47.00	-12.12
5032.275	Vertical	-55.27	-47.00	-8.27
2011.461	Horizontal	-54.86	-47.00	-7.86
3257.050	Horizontal	-53.35	-47.00	-6.35
5075.275	Horizontal	-54.41	-47.00	-7.41

Receiving mode at 802.11a 5240MHz				
Frequency (MHz)	Spurious Emission Level		Limit dBm	Over limit (dB)
	Polaxis	(dBm)		
2814.065	Vertical	-51.85	-47.00	-4.85
2973.522	Vertical	-56.18	-47.00	-9.18
5290.542	Vertical	-50.11	-47.00	-3.11
1358.831	Horizontal	-58.13	-47.00	-11.13
2670.656	Horizontal	-59.21	-47.00	-12.21
5110.081	Horizontal	-53.72	-47.00	-6.72

**Remark:**  
 1.The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

### 7.1.7 Adaptivity (Channel Access Mechanism)

**Test Requirement:** EN 300 893 Clause 4.2.7

**Test Method:** EN 300 893 Clause 5.4.9

**Limit:**

This requirement applies to all equipment within the scope of the present document.

The present document defines 2 types of Adaptive equipment: Frame Based Equipment and Load Based Equipment.

Whilst the mechanisms described in this clause define conditions under which the equipment may transmit, transmissions are only allowed providing they are not prohibited by any of the DFS requirements in clause 4.7.

LBT based Detect and Avoid(Load Based Equipment) Option B

The CCA observation time shall be not less than 20 us;

The CCA time used by the equipment shall be declared by the supplier;

The Maximum Channel Occupancy Time which shall be less than  $(13 / 32) \times q$  ms

The value of q is selected by the manufacturer in the range 4 to 32. This selected value shall be declared by the manufacturer.

For transmit power levels of 23 dBm e.i.r.p. or above:

the CCA threshold level (TL), at the input to the receiver, shall be a minimum of -73 dBm/MHz assuming a 0 dBi receive antenna.

For transmit power levels below 23 dBm e.i.r.p.:

the CCA threshold level (TL), at the input of the receiver, shall be proportional to the maximum transmit power (PH) according to the formula which assumes a 0 dBi receive antenna and PH to be specified in dBm e.i.r.p.  $TL = -73 \text{ dBm} / \text{MHz} + (23 \text{ dBm} - PH) / (1 \text{ MHz})$

Short Control Signalling Transmissions:

Short Control Signalling Transmissions of Adaptive equipment shall have a maximum duty cycle of 5 % within an observation period of 50 ms.

**EUT Operation:**

Ambient: Temp.: 25.0 °C

Humid.: 56 %

Press.: 1013 mbar

**Test configuration:**

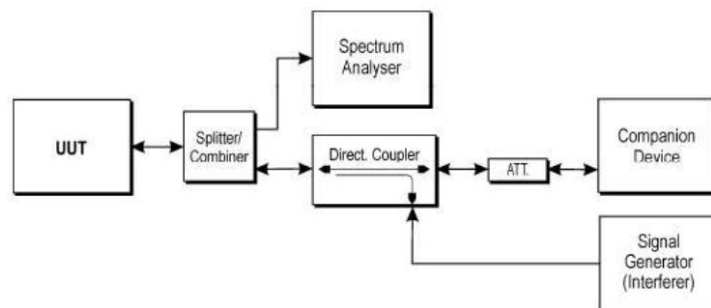
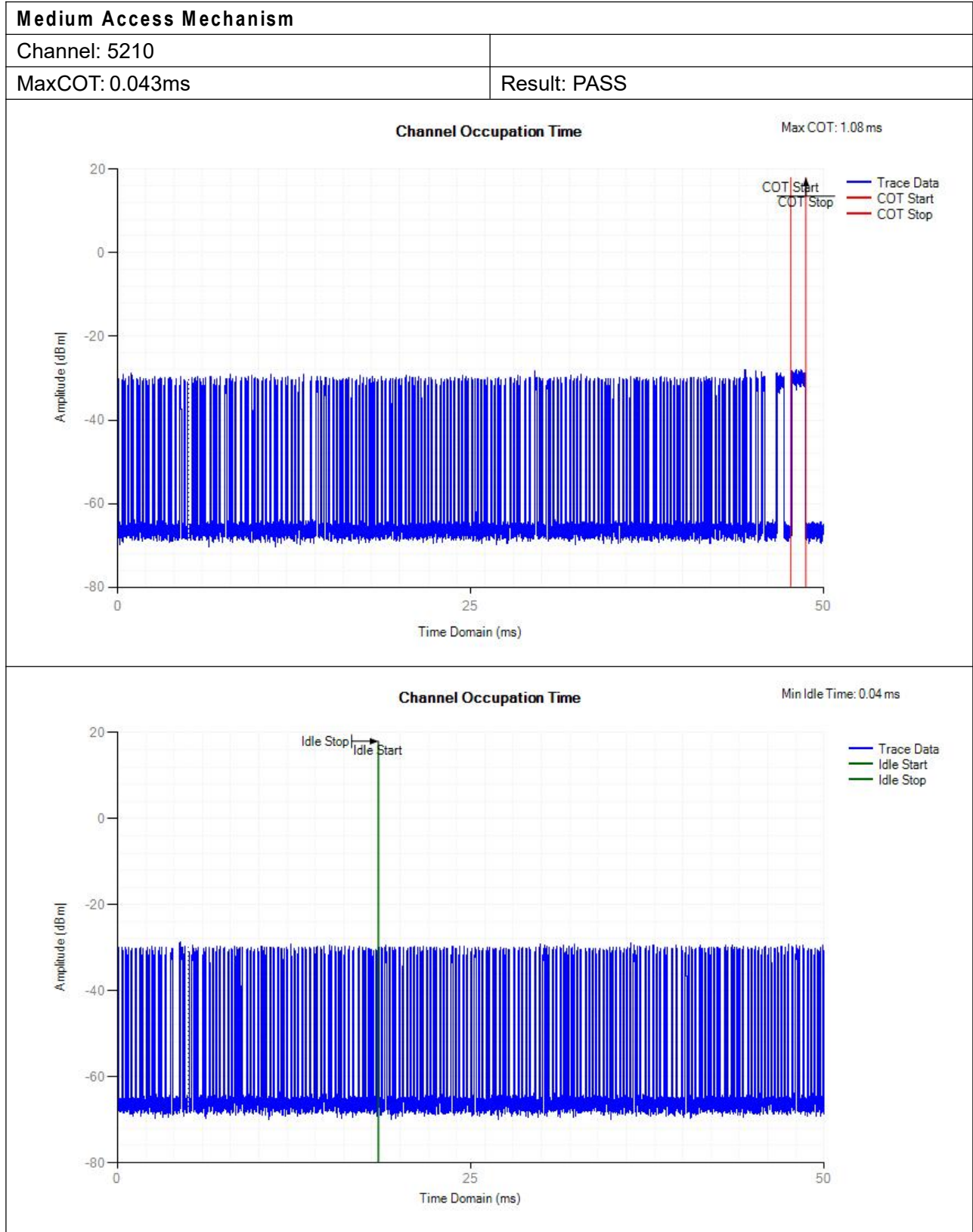
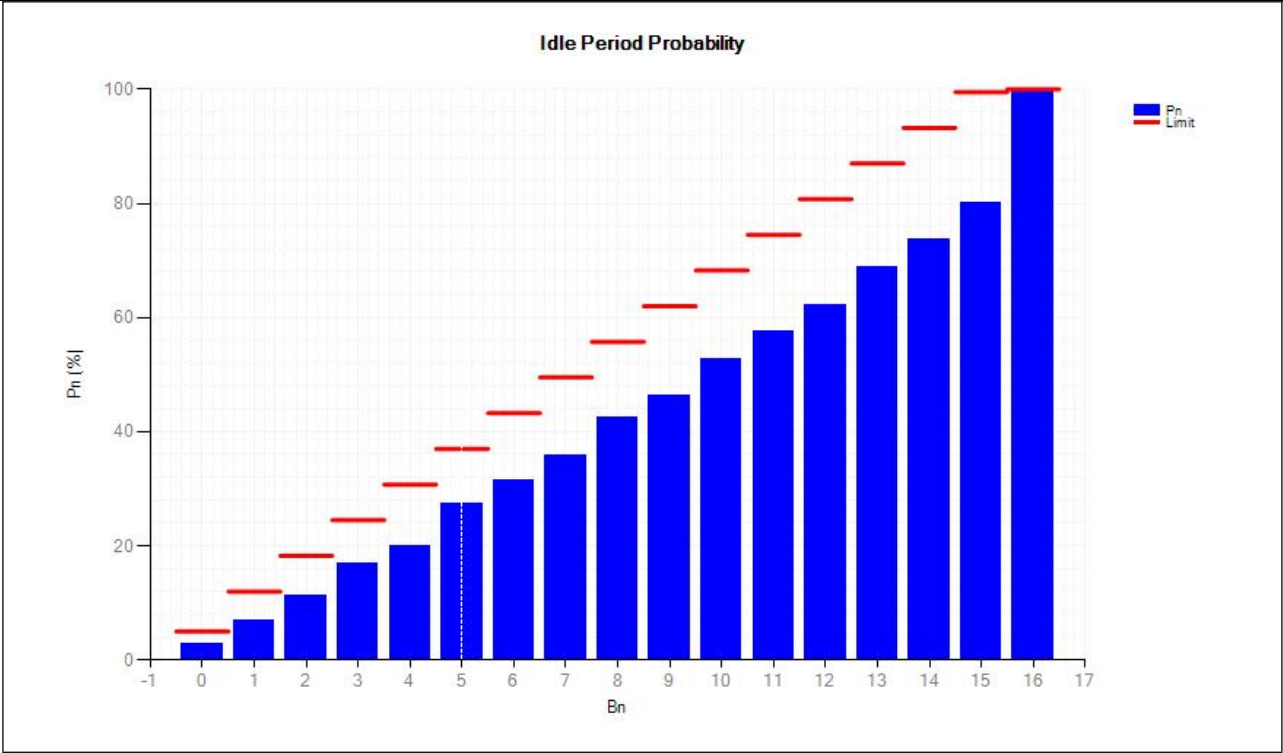
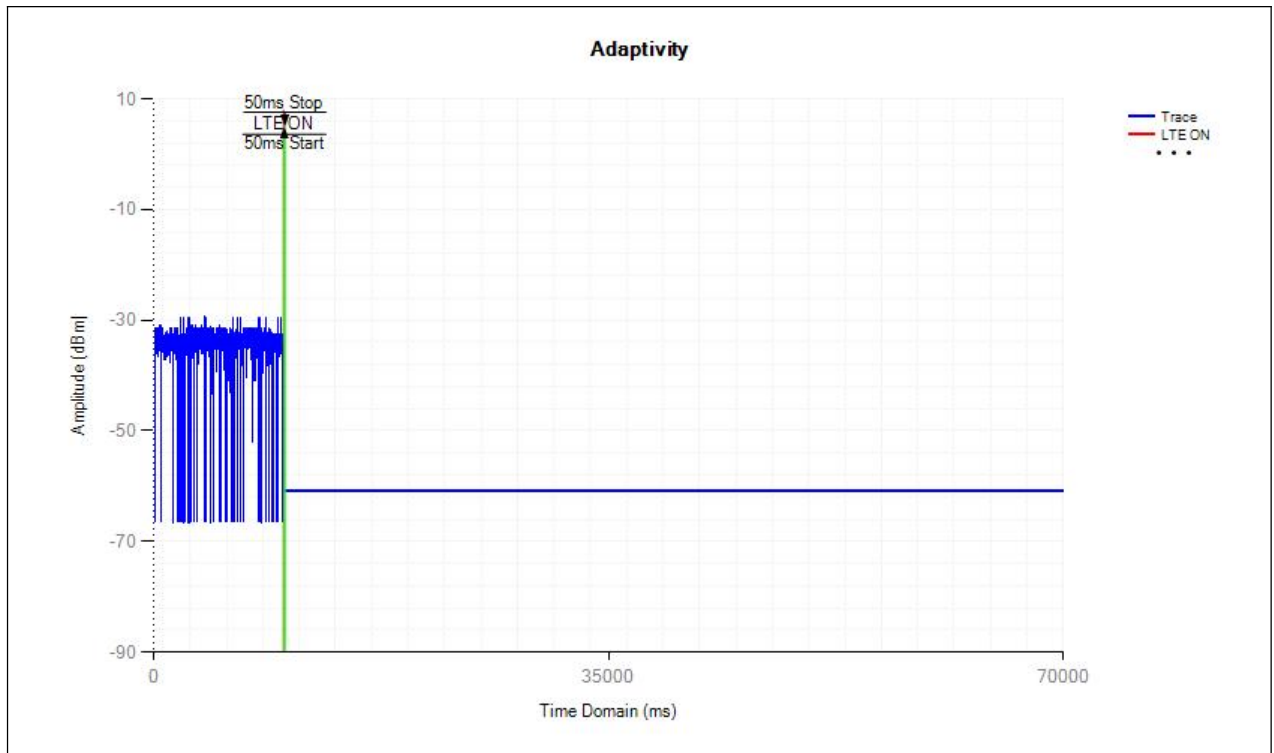
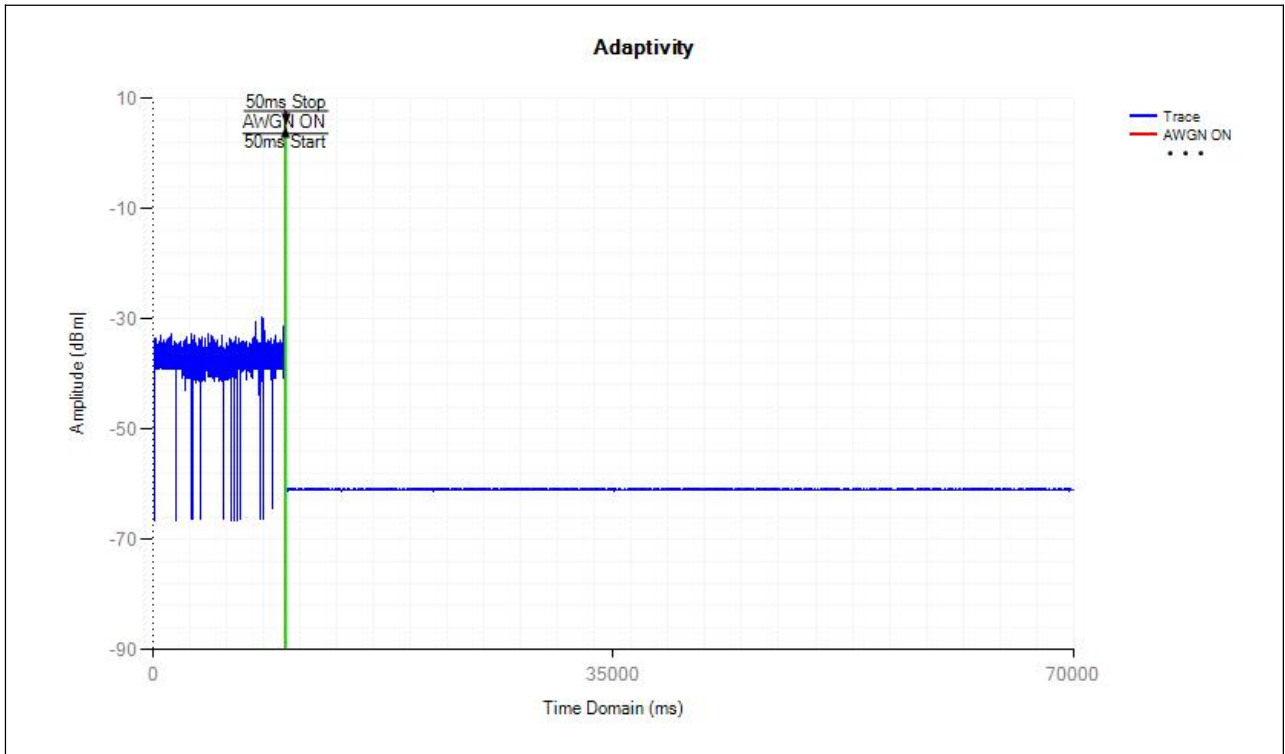


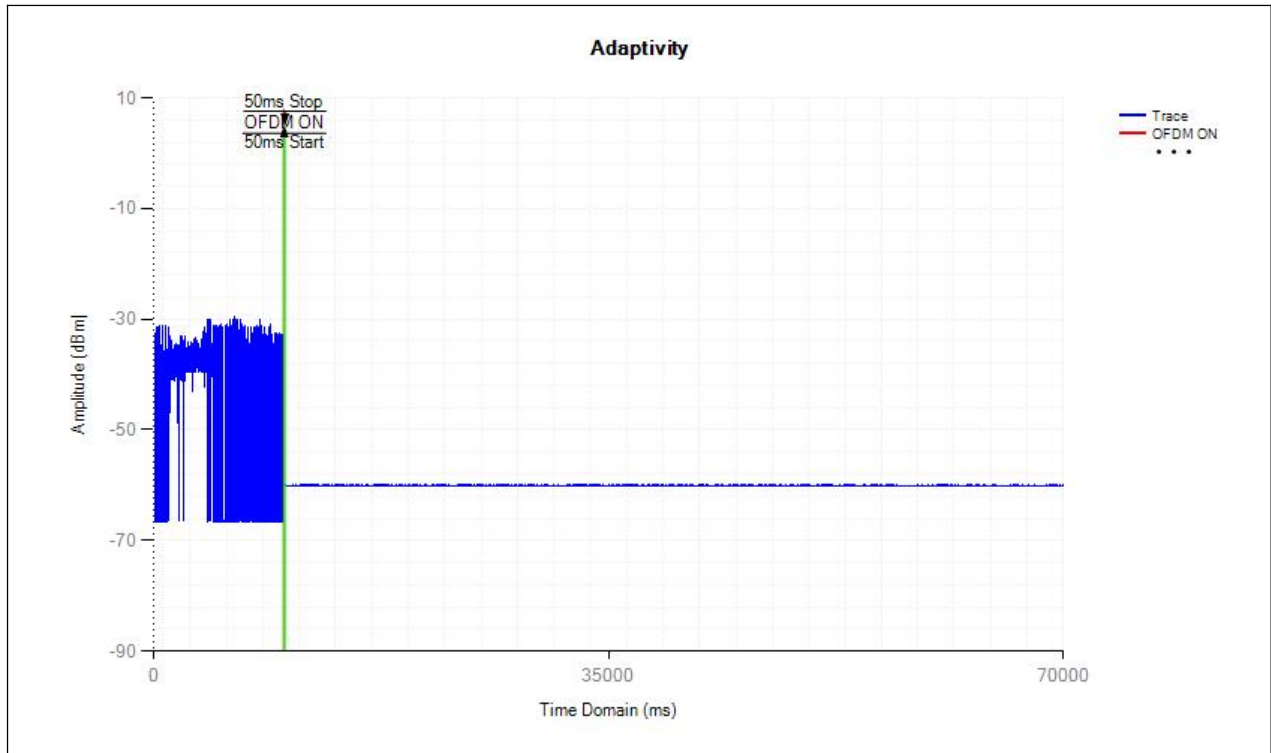
Figure 13: Example Test Set-up for verifying the adaptivity of an equipment





802.11 ac VHT80 Mode	Shot time after interfacing signal(s)		
	AWGN	OFDM	LTE
5210MHz	PASS	PASS	PASS

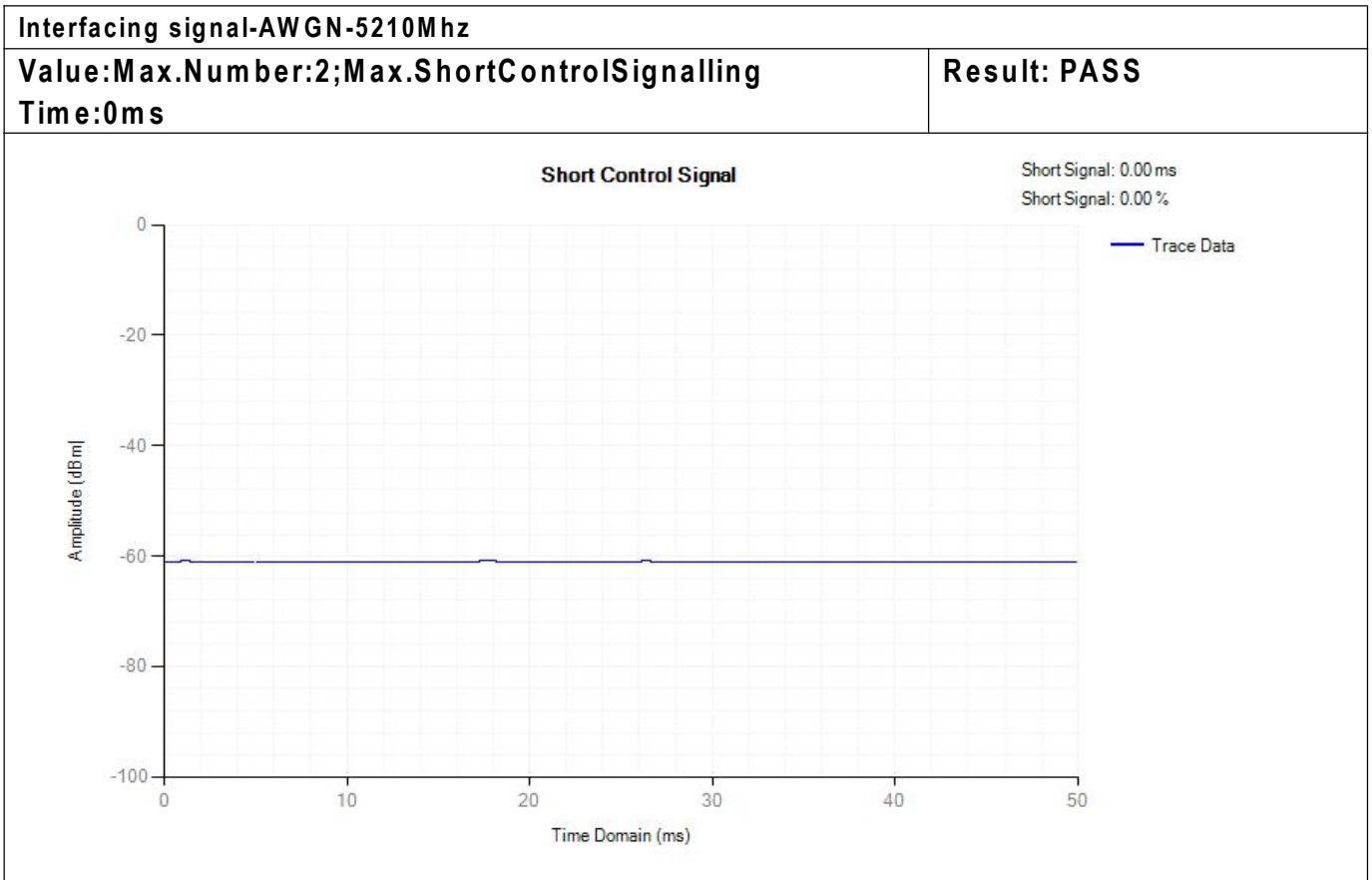


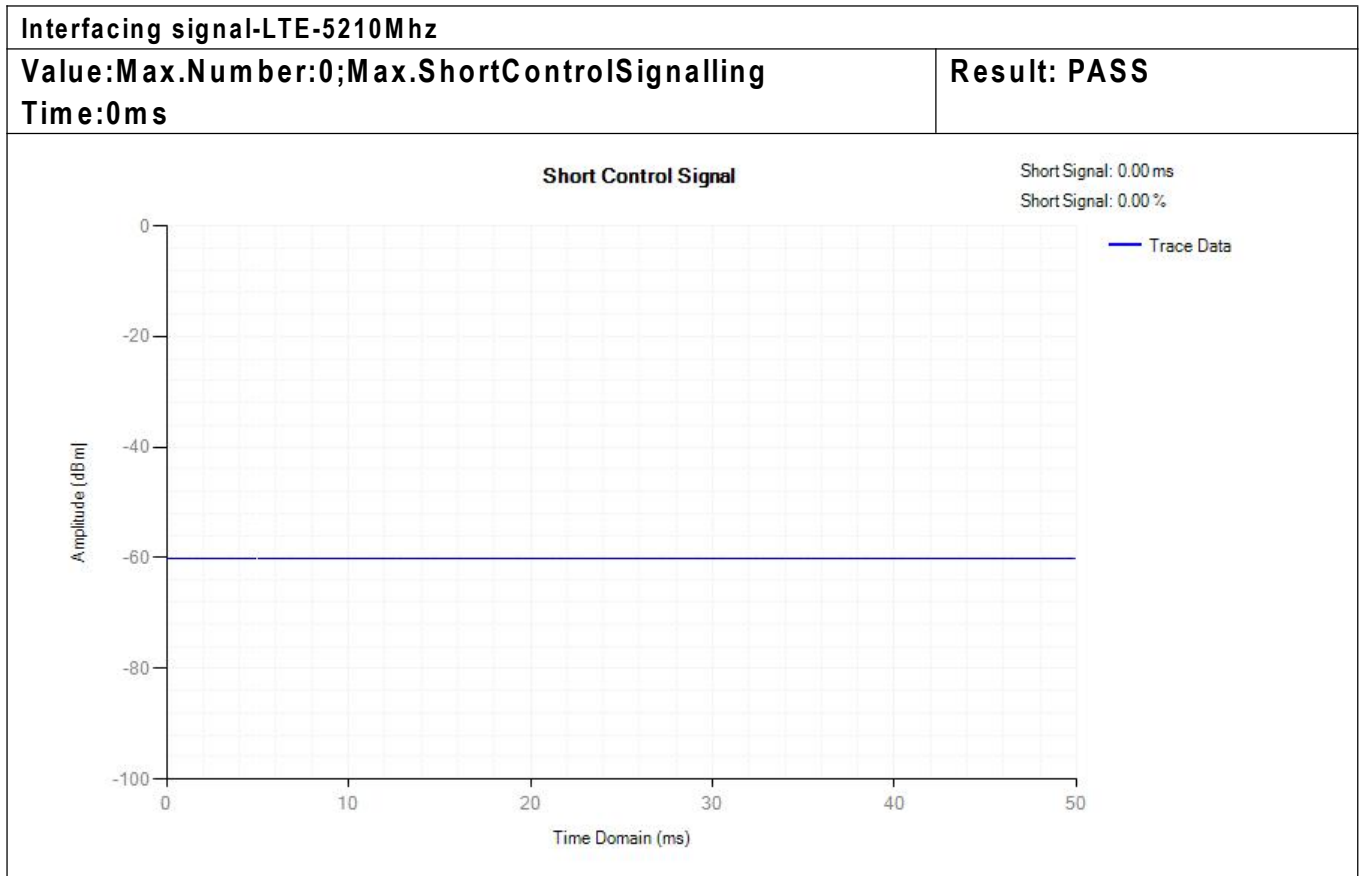
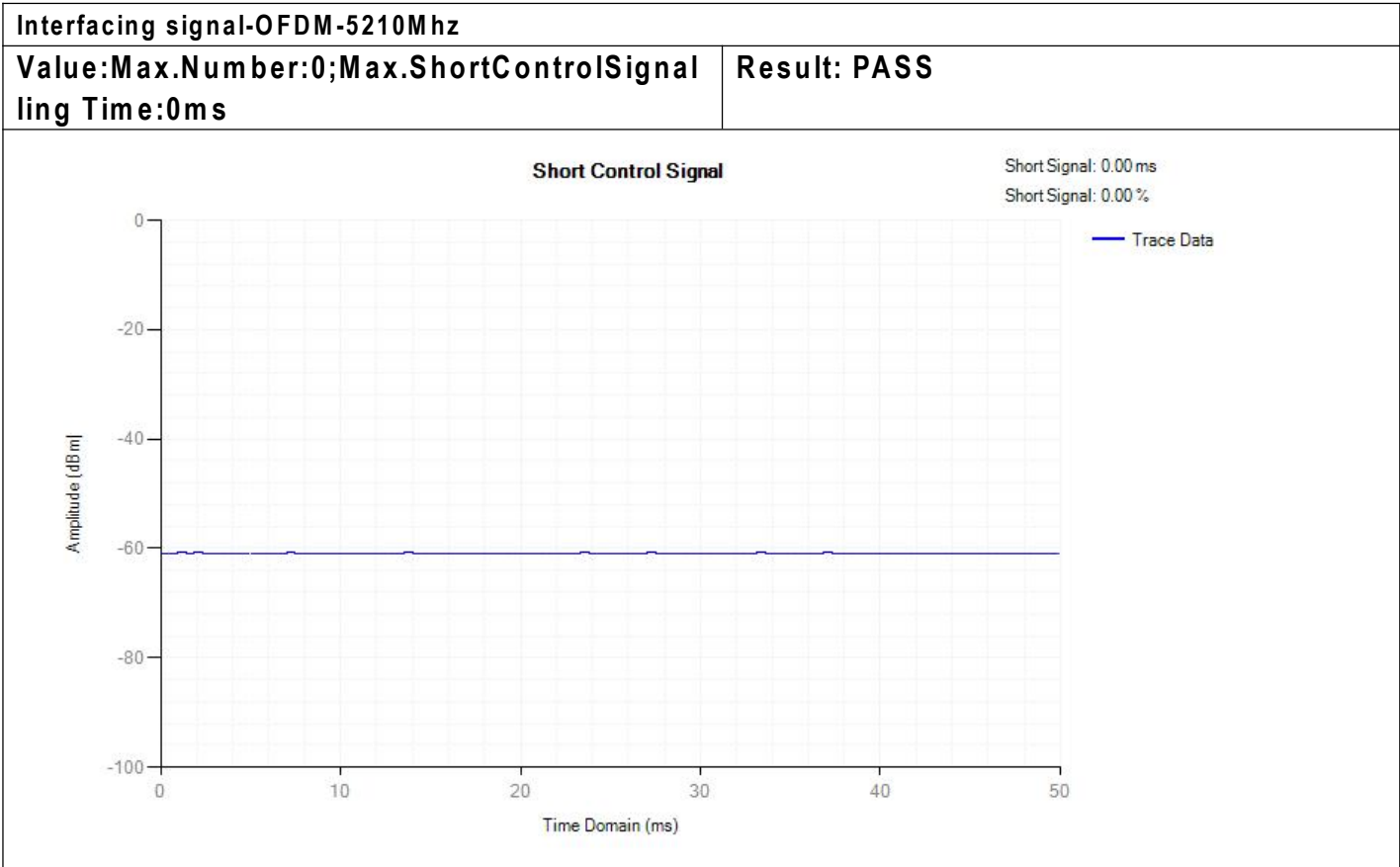




Mode Limit		Maximum duty cycle(ms)	Pulse number	Limit(ms)	Limit
		5210MHz			
802.11 ac VHT80 Mode Mode	AWGN	0	0	2.5	50
	OFDM	0	0	2.5	50
	LTE	0	0	2.5	50

Remark: within an observation period of 50 ms, the number of Shot Control signaling Transmissions by threequipment shall be equal to or less than 50; and the total duration of the equipment’s Short Control Signaling Transmissions shall be less than 2500us within said observation period.





## 7.1.8 Receiver Blocking

**Test Requirement:** EN 300 893 Clause 4.2.8

**Test Method:** EN 300 893 Clause 5.4.10

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

**Table 9: Receiver Blocking parameters**

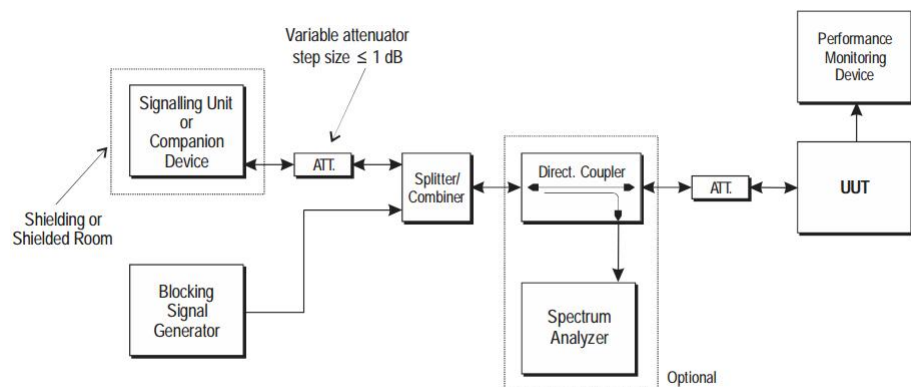
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
P <sub>min</sub> + 6 dB	5 100	-53	-59	Continuous Wave
P <sub>min</sub> + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave

NOTE 1: P<sub>min</sub> is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal.  
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.

**EUT Operation:**

Ambient: Temp.: 25.0 °C      Humid.: 56 %      Press.: 1013 mbar

**Test configuration:** According to the section 5.4.10.2.1, the test block diagram shall be used.



**Figure 18: Test Set-up for receiver blocking**

All test procedure is carried to the section 5.4.10.2.1  
RBW/VBW=8MHz/28MHz

**Test Result: Compliant**

**802.11a 5180MHz (Worst case)**

Wanted Signal Power (MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Test Result ( PER)	Limit ( PER)	Result
P <sub>min</sub> +6dB	5100	-59	1.12%	10%	Pass
P <sub>min</sub> +6dB	4900	-53	0.79%	10%	Pass
P <sub>min</sub> +6dB	5000	-53	2.97%	10%	Pass
P <sub>min</sub> +6dB	5975	-53	1.67%	10%	Pass

**802.11a 5240MHz (Worst case)**

Wanted Signal Power (MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Test Result ( PER)	Limit ( PER)	Result
P <sub>min</sub> +6dB	5100	-59	1.47%	10%	Pass
P <sub>min</sub> +6dB	4900	-53	0.89%	10%	Pass
P <sub>min</sub> +6dB	5000	-53	2.75%	10%	Pass
P <sub>min</sub> +6dB	5975	-53	1.66%	10%	Pass

## 8 Photographs

### 8.1 Spurious Emission Test Setup (below 1GHz)



### 8.2 Spurious Emission Test Setup (above 1GHz)



**\*\* End of Report \*\***