

# TEST REPORT

**Applicant:** 8devices  
**Address of Applicant:** Gedimino 47, Kaunas, LT-44242, Lithuania  
**Equipment Under Test (EUT)**  
Product Name: Broadband Digital Transmission System  
Model No.: Rambutan, Rambutan-I  
**Standards:** ETSI EN 301 893 V2.1.1 (2017-05)  
**Date of Receipt:** 11 Oct., 2017  
**Date of Test:** 12 Oct., to 17 Oct., 2017  
**Date of Issue:** 18 Oct., 2017  
**Test Result :** PASS \*

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.



Bruce Zhang

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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## 2 Version

Version No.	Date	Description
00	18 Oct., 2017	Original

**Tested by:**

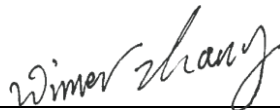


**Date:**

18 Oct., 2017

\_\_\_\_\_  
**Test Engineer**

**Reviewed by:**



**Date:**

18 Oct., 2017

\_\_\_\_\_  
**Project Engineer**

## 3 Test Summary

### Test standard

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

Test Items	Test Requirement	Test Method	Limit / Severity	Result
Centre frequencies	Clause 4.2.1	Clause 5.4.2	±20 ppm	PASS
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Clause 4.2.2	Clause 5.4.3	>5MHz and 80%~100% Nominal Bandwidth	PASS
RF Output Power,EIRP	clause 4.2.3	Clause 5.4.4	Table 2	PASS
Power Spectrum Density	clause 4.2.3	Clause 5.4.4	Table 2	PASS
Transmitter unwanted emissions outside the 5 GHz RLAN bands	clause 4.2.4.1	clause 5.4.5	Table 4	PASS
Transmitter unwanted emissions within the 5 GHz RLAN bands	clause 4.2.4.2	clause 5.4.6	Figure 1	PASS
Receiver spurious emissions	clause 4.2.5	clause 5.4.7	Table 5	PASS
Dynamic Frequency Selection (DFS)	clause 4.2.6	clause 5.4.8.2.1.6	clause 4.2.6.2.5.2	PASS
Adaptivity (Channel AccessMechanism)	clause 4.2.7	clause 5.4.9	clause 4.2.7.3.3.3	PASS
Receiver Blocking	clause 4.2.8	clause 5.4.10	clause 4.2.8.4	PASS
User Access Restrictions	clause 4.2.9	clause 4.2.9	clause 4.2.9.2	PASS

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## 5 General Information

### 5.1 Client Information

Applicant:	8devices
Address of Applicant:	Gedimino 47, Kaunas, LT-44242, Lithuania
Manufacturer/ Factory:	8devices
Address of Manufacturer/ Factory:	Gedimino 47, Kaunas, LT-44242, Lithuania

### 5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	Rambutan, Rambutan-I
Hardware version:	8dev1401_0004
Software version:	8Devices OpenWrt release v2.8
EUT Power Supply:	DC 5V
Operating Temperature:	-40°C to +60°C
Operating Humidity:	up to 95%
Technical Parameter:	
Operating Frequency:	5180MHz~5240MHz
Nominal Bandwidth	802.11a: 20MHz, 802.11n20: 20MHz, 802.11n40: 40MHz,
Channel Spacing:	10MHz
Modulation:	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	Ceramic Antenna
Antenna Gain	5dBi

## 5.3 Description of test

The available channel of EUT:

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210		

According to EN 301893 clause 5.1.3, for 802.11a and 802.11n-HT20 mode, we selected channel No.36,40 and 48 to perform the test, for 802.11n-HT40 mode, we selected channel No. 38 and 46 to perform the test. For 802.11n mode, the EUT support 2x2 MIMO, for 802.11a mode, the EUT just support SISO.For conducted method test, the detail test plan as below:

Test Items	Test conditions	Ant.port	Test channel
Center Frequencies	Normal and extreme	Ant. Port 1	Middle
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Normal	Ant. Port 1 & 2	Low & High
RF Output Power,EIRP	Normal and extreme	Ant. Port 1 & 2	Low & High
Power Spectrum Density	Normal	Ant. Port 1 & 2	Low & High
Transmitter Unwanted emission Outside 5GHz R-LAN Bands	Normal	Ant. Port 1 & 2	Low & High
Transmitter Unwanted emission within 5GHz R-LAN Bands	Normal	Ant. Port 1 & 2	Low & High
Receiver Spurious Emissions	Normal	Enclosure	Middle
Adaptivity (channel access mechanism)	Normal	/	Low & High
Receiver Blocking	Normal	Ant. Port 1	Low & High

Note: For Receiver Spurious Emissions test item, the test was performed under 802.11n-HT40 mode.

## 5.4 Test Modes

Test mode	Keep the EUT in continuous transmitting mode (100% duty cycle)
Remark:Pre-scan all data mode, MCS0 mode was the worst case mode, so all tests were performed in this mode.	

## 5.5 Description of Support Units

The EUT has been tested independently.

## 5.6 Laboratory Facility

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

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

## 5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.  
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,  
Bao'an District, Shenzhen, Guangdong, China  
Tel: 0755-23118282  
Fax: 0755-23116366  
Email: info@ccis-cb.com



## 5.8 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	07-22-2017	07-21-2020
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2017	02-24-2018
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2017	02-24-2018
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2017	02-24-2018
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2017	02-24-2018
6	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	02-25-2017	02-24-2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	02-25-2017	02-24-2018
8	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2017	02-24-2018
9	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2017	02-24-2018
10	Loop antenna	SCHWARZBECK	FMZB1519	CCIS0188	02-25-2017	02-24-2018
11	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

Conducted method:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date(mm-dd-yy)
1	Spectrum Analyzer	Agilent	N9020A	MY50510123	10-29-2016	10-28- 2017
2	Vector Signal Generator	Agilent	N5182A	MY49060014	10-28-2016	10-27- 2017
3	Signal Generator	R&S	SMR20	1008100050	02-25-2017	02-24- 2018
4	Power Sensor	D.A.R.E	RPR3006W	15I00041SNO5 4	10-29-2016	10-28- 2017
5	Power Sensor	D.A.R.E	RPR3006W	15I00041SNO1 2	10-29-2016	10-28- 2017
6	DC Power Supply	Shenzhen XinNuoEr Technologies Co., Ltd.	WYK-10020K	CCIS0201	10-31-2016	10-30-2017
7	Temperature Humidity Chamber	Fo Shan HengPu Electronics Co., Ltd.	HPGDS-500	CCIS0240	09-24-2016	09-23-2017
8	RF Switch Unit	Ascentest	AT890-RFB	N/A	C.B.T	
9	Wideband radio communication tester	Rhode & Schwarz	CMW500	CCIS0194	02-25-2017	02-24-2018

C.B.T means Calibration Before Test.

## 6 Essential Radio Test Suites Specification in EN 301893.

### 6.1 Test Conditions

Please refer to **EN 301 893 Clause 5.1**

**Normal Test Condition:**

Temperature: +15 °C to +30 °C;

The normal test voltage is 230Vac

**Extreme Test Conditions:**

(1). Temperatures: -40°C to +60°C.

(2). Voltages: 217 Vac to 253 Vac;

## 6.2 Centre frequencies

**Test Method:** EN 301 893: clause 5.4.2.

**EUT Operations:** Refer to section 5.4 of this report

**Ambient:** Temp.: 25 °C, Humid.: 52% Press.: 1010 mBar

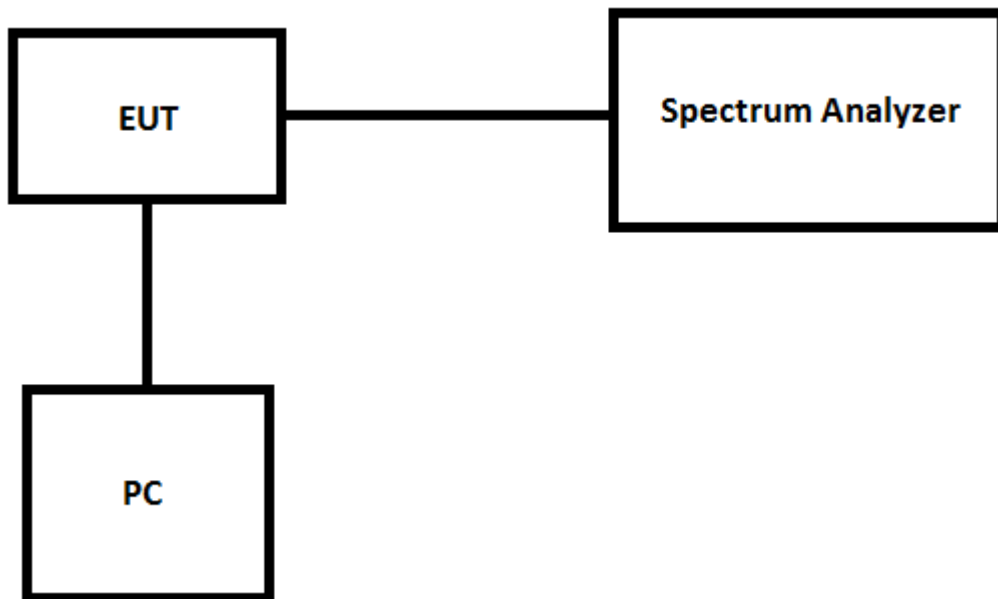
**Equipment Used:** Refer section 5.8 of this report.

### 6.2.1 Test Limit

EN 301 893: clause 4.2.1.3

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

### 6.2.2 Test Setup



6.2.3 Measurement Record:

Test Data

Frequency (MHz)	Measured Frequency For Operating Conditions					Maximum Frequency Error (ppm)	Test Result
	Normal	Extreme					
	25 °C 230 Vac	-40°C 217 Vac	-40°C 253 Vac	60°C 217 Vac	60°C 253 Vac		
<b>TX0-802.11a mode</b>							
5200	5199.94	5199.95	5199.90	5199.92	5199.93	-19.23	Pass
<b>TX1-802.11a mode</b>							
5200	5199.99	5199.98	5199.96	5199.97	5199.95	-9.62	Pass
<b>TX0-802.11n-HT20</b>							
5200	5199.96	5199.93	5199.97	5199.98	5199.94	-13.46	Pass
<b>TX1-802.11n-HT20</b>							
5200	5199.99	5199.95	5199.98	5199.97	5199.96	-9.62	Pass
<b>TX0-802.11n-HT40</b>							
5230	5229.95	5229.97	5229.94	5229.98	5229.93	-13.38	Pass
<b>TX1-802.11n-HT40</b>							
5230	5229.98	5229.95	5229.97	5229.96	5229.99	-9.56	Pass

## 6.3 Nominal Channel Bandwidth and Occupied Channel Bandwidth

**Test Method:** EN 301 893 : clause 5.4.3.

**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 25 °C Humid.: 52% Press.: 1010 mBar

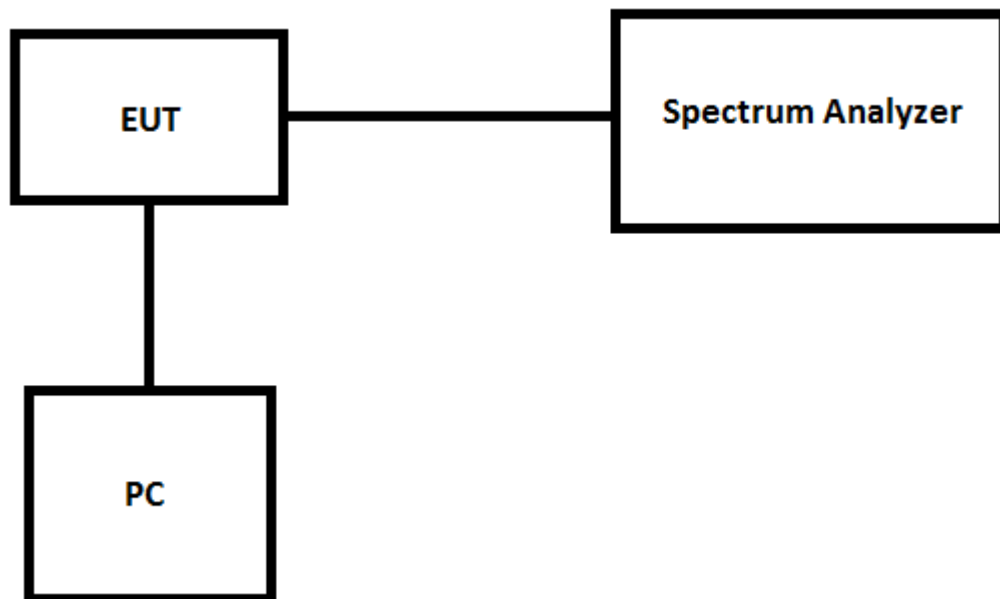
**Equipment Used:** Refer to section 5.8 of this report.

### 6.3.1 Test Limit

Refer EN 301 893: clause 4.2.2.2

The Nominal Channel Bandwidth shall be at least 5 MHz at all times. The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth.

### 6.3.2 Test Setup



### 6.3.3 Measurement Record

Test data

TX0:

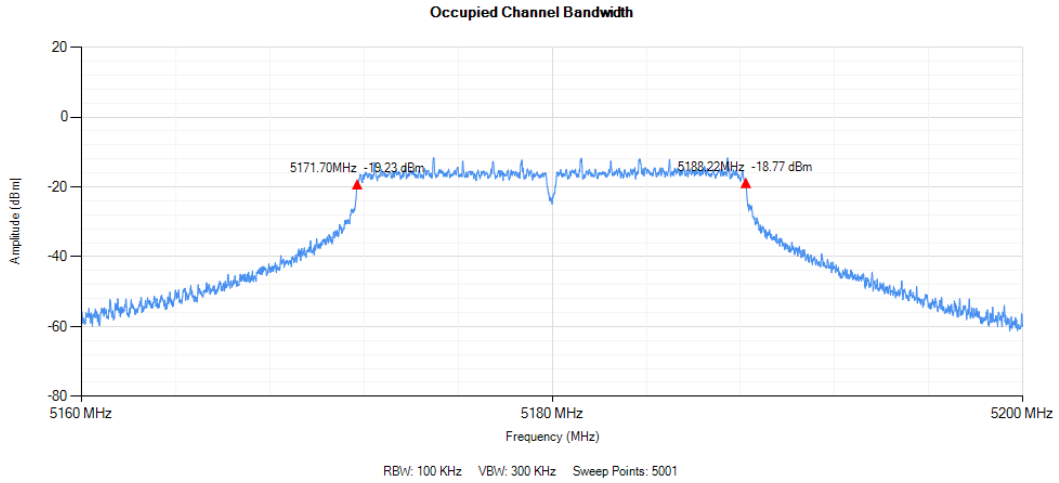
Test mode	Test channel	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
802.11a	Lowest	20	16.52	20	Pass
	Highest		16.52		
802.11n-HT20	Lowest	20	17.71	20	Pass
	Highest		17.69		
802.11n-HT40	Lowest	40	36.15	40	Pass
	Highest		36.17		

TX1:

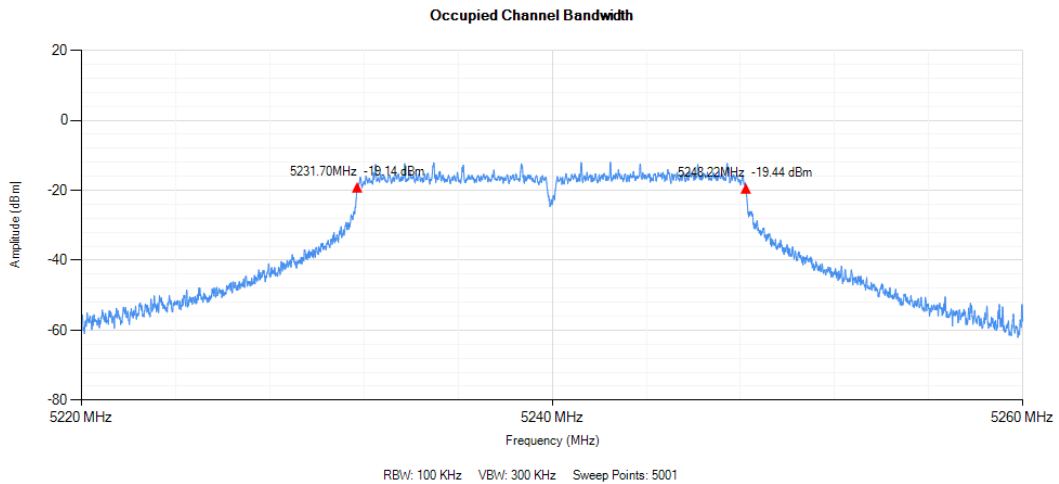
Test mode	Test channel	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
802.11a	Lowest	20	16.50	20	Pass
	Highest		16.48		
802.11n-HT20	Lowest	20	17.69	20	Pass
	Highest		17.69		
802.11n-HT40	Lowest	40	36.18	40	Pass
	Highest		36.17		

Test Plots as below:

TX0  
802.11a



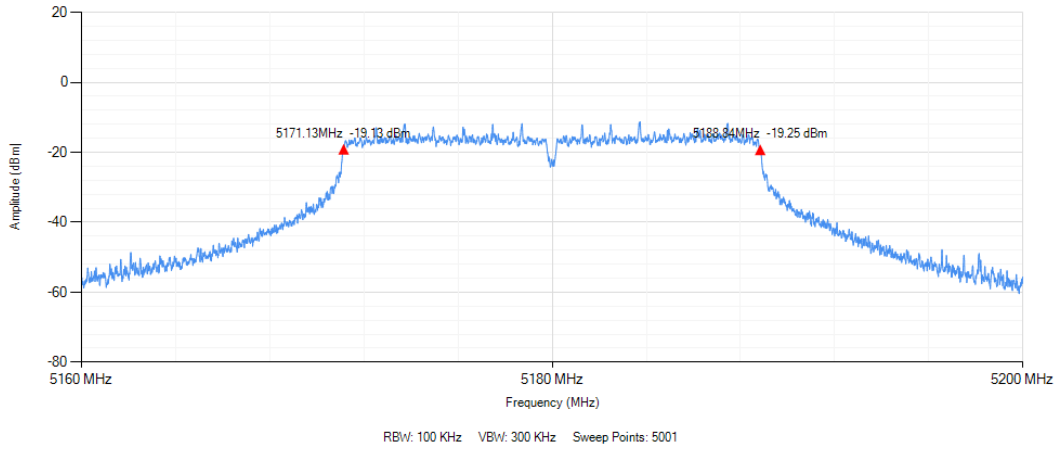
Lowest channel



Highest channel

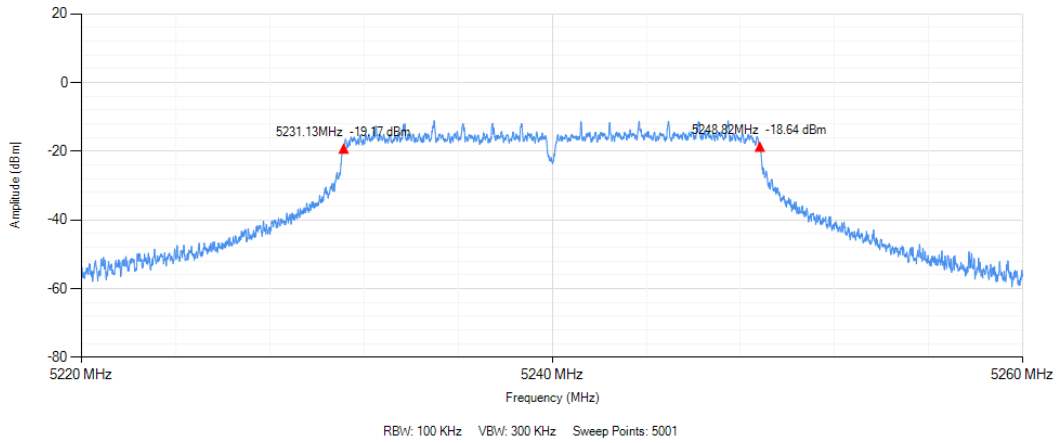
## 802.11n-HT20

Occupied Channel Bandwidth



Lowest channel

Occupied Channel Bandwidth

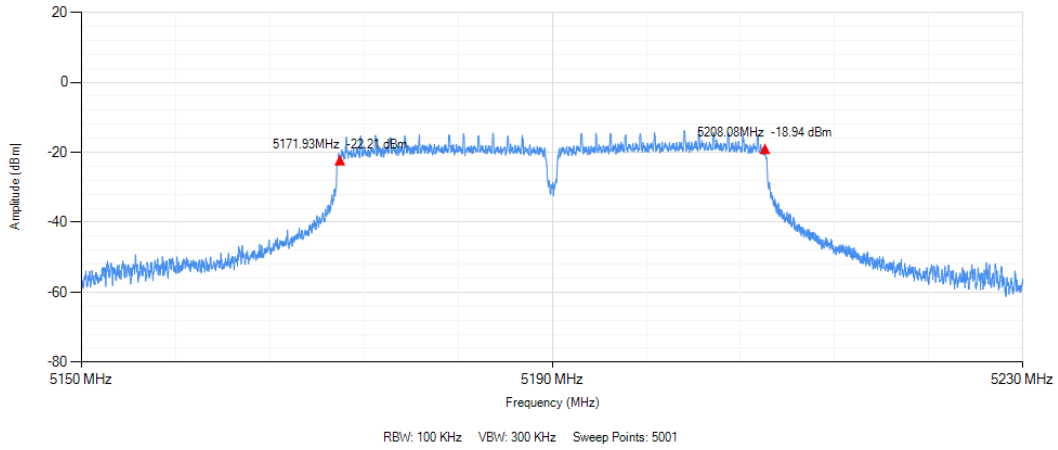


Highest channel



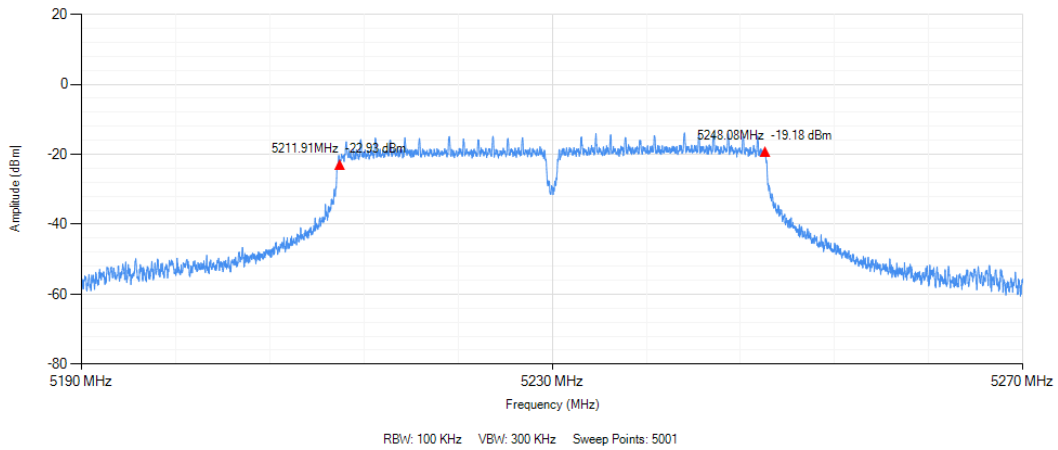
## 802.11n-HT40

Occupied Channel Bandwidth



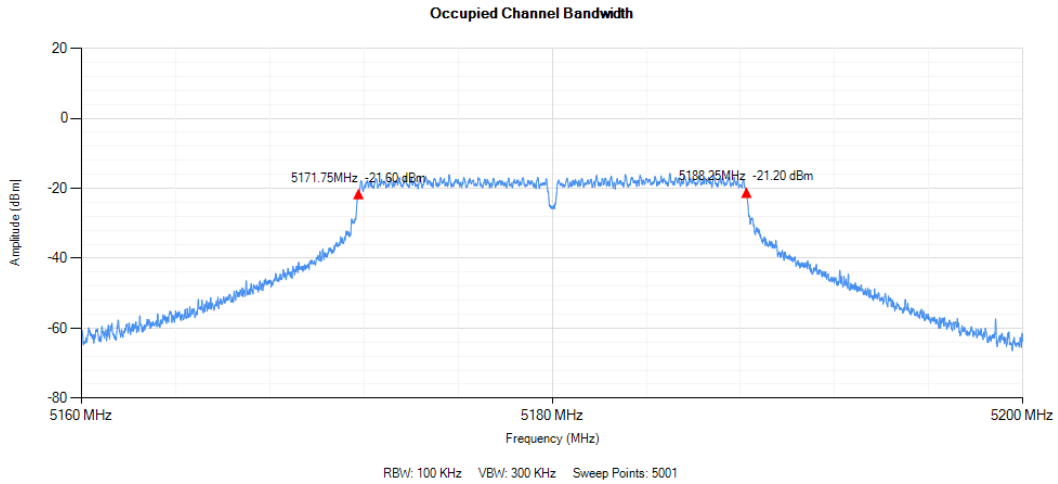
## Lowest channel

Occupied Channel Bandwidth

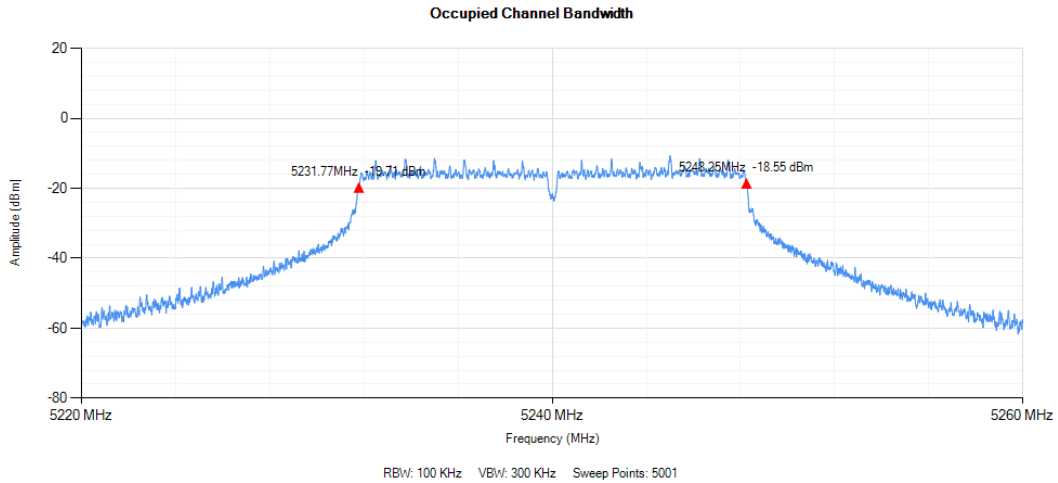


## Highest channel

TX1  
802.11a



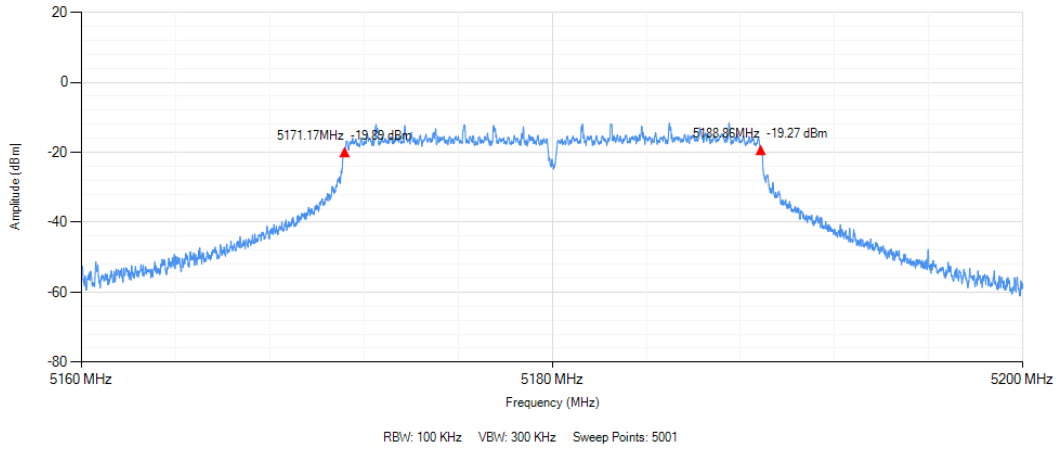
Lowest channel



Highest channel

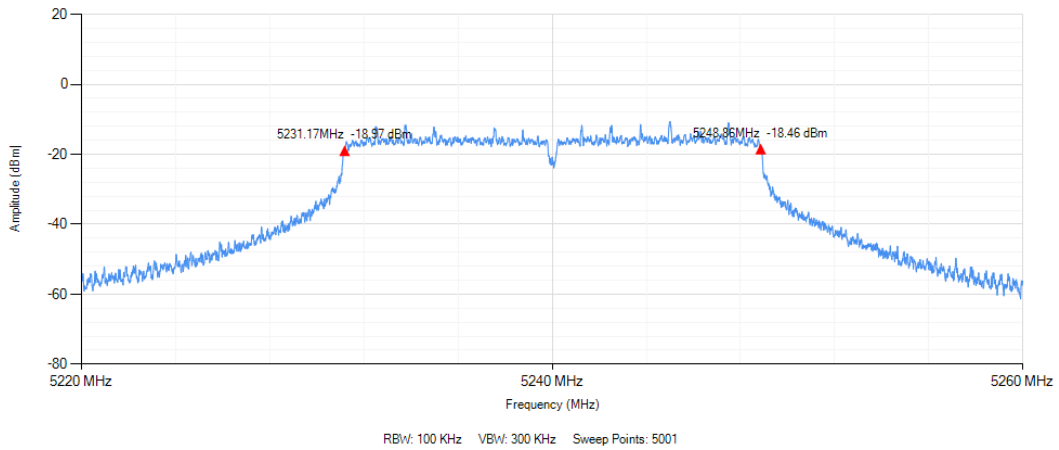
## 802.11n-HT20

Occupied Channel Bandwidth



## Lowest channel

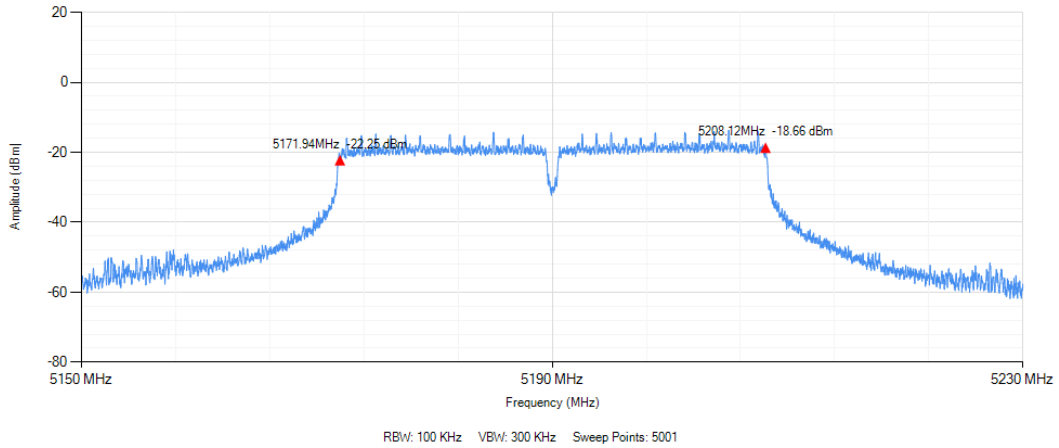
Occupied Channel Bandwidth



## Highest channel

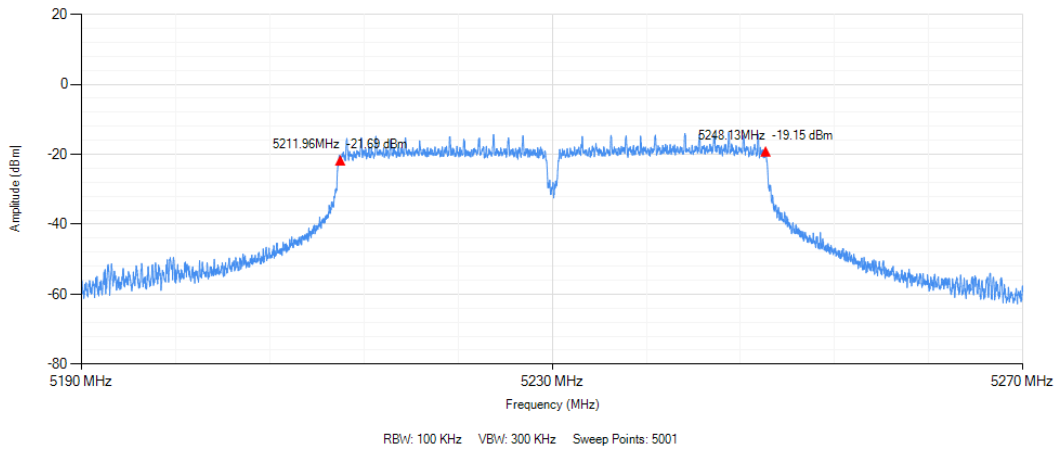
## 802.11n-HT40

### Occupied Channel Bandwidth



### Lowest channel

### Occupied Channel Bandwidth



### Highest channel

## 6.4 RF Output Power, EIRP

**Test Method:** EN 301 893: clause 5.4.4.

**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 25 °C Humid.: 52% Press.: 1010 mBar

**Equipment Used:** Refer section 5.8 of this report.

### 6.4.1 Test Limit

Refer EN 301 893: clause 4.2.3.2

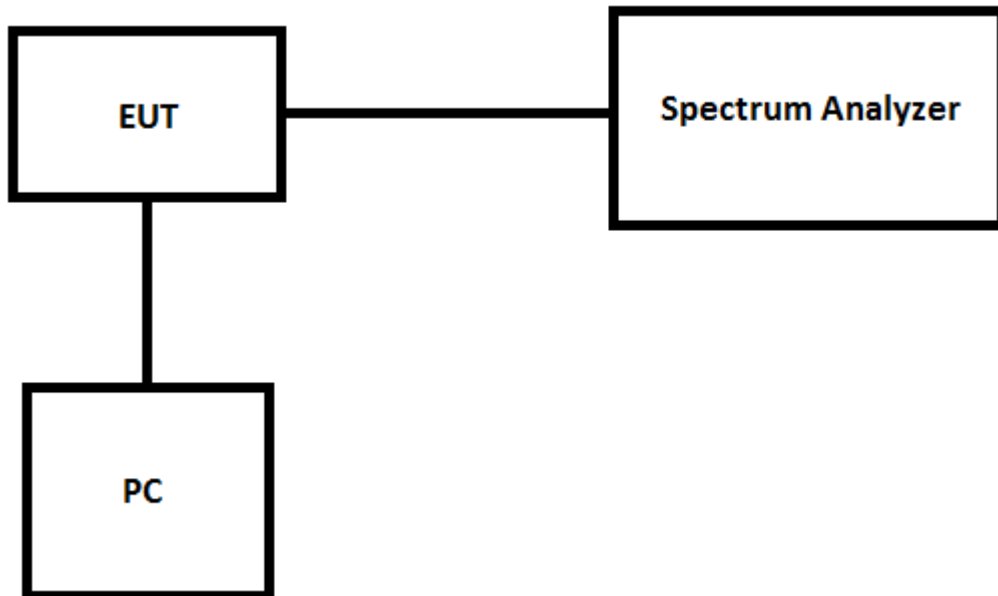
Frequency range [MHz]	Mean e.i.r.p. limit [dBm]		Mean e.i.r.p. density limit [dBm/MHz]	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.

NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.

NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

### 6.4.2 Test Setup



### 6.4.3 Measurement Record

#### Test Data

Measured Conditions		Antenna Port	Total Power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm)	Limit (dBm)
<b>802.11a mode-Low channel</b>						
+25°C	230Vac	TX0	14.67	5	19.67	23
		TX1				
-40°C	217Vac	TX0	14.60	5	19.60	23
		TX1				
-40°C	253Vac	TX0	14.65	5	19.65	23
		TX1				
+60°C	217Vac	TX0	14.63	5	19.63	23
		TX1				
+60°C	253Vac	TX0	14.56	5	19.56	23
		TX1				
<b>802.11a mode-High channel</b>						
+25°C	230Vac	TX0	14.65	5	19.65	23
		TX1				
-40°C	217Vac	TX0	14.60	5	19.60	23
		TX1				
-40°C	253Vac	TX0	14.57	5	19.57	23
		TX1				
+60°C	217Vac	TX0	14.55	5	19.55	23
		TX1				
+60°C	253Vac	TX0	14.62	5	19.62	23
		TX1				
<b>802.11n-HT20-Low channel</b>						
+25°C	230Vac	TX0	14.66	5	19.66	23
		TX1				
-40°C	217Vac	TX0	14.60	5	19.60	23
		TX1				
-40°C	253Vac	TX0	14.56	5	19.56	23
		TX1				
+60°C	217Vac	TX0	14.50	5	19.50	23
		TX1				
+60°C,	253Vac	TX0	14.63	5	19.63	23
		TX1				

802.11n-HT20-High channel						
+25°C	230Vac	TX0	14.81	5	19.81	23
		TX1				
-40°C	217Vac	TX0	14.75	5	19.75	23
		TX1				
-40°C	253Vac	TX0	14.70	5	19.70	23
		TX1				
+60°C	217Vac	TX0	14.63	5	19.63	23
		TX1				
+60°C,	253Vac	TX0	14.66	5	19.66	23
		TX1				
802.11n-HT40-Low channel						
+25°C	230Vac	TX0	14.70	5	19.70	23
		TX1				
-40°C	217Vac	TX0	14.65	5	19.65	23
		TX1				
-40°C	253Vac	TX0	14.60	5	19.60	23
		TX1				
+60°C	217Vac	TX0	14.63	5	19.63	23
		TX1				
+60°C,	253Vac	TX0	14.59	5	19.59	23
		TX1				
802.11n-HT40-High channel						
+25°C	230Vac	TX0	14.75	5	19.75	23
		TX1				
-40°C	217Vac	TX0	14.63	5	19.63	23
		TX1				
-40°C	253Vac	TX0	14.70	5	19.70	23
		TX1				
+60°C	217Vac	TX0	14.68	5	19.68	23
		TX1				
+60°C,	253Vac	TX0	14.71	5	19.71	23
		TX1				

## 6.5 Power Spectrum Density

**Test Method:** EN 301 893: clause 5.4.4.

**EUT Operations:** Refer to section 5.4 of this report.

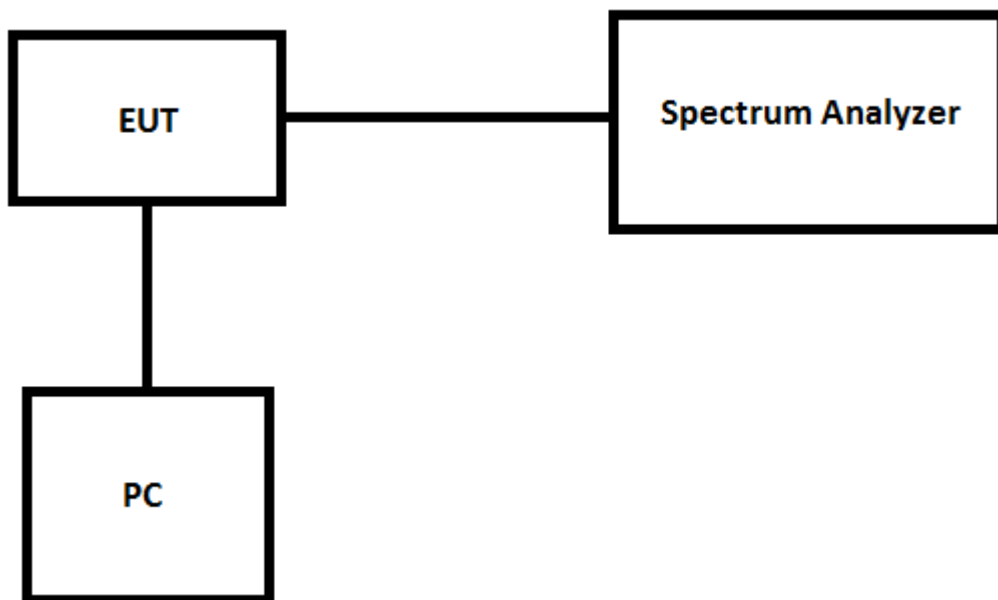
**Ambient:** Temp.: 22 °C Humid.: 52% Press.: 1010 mBar

**Equipment Used:** Refer to section 5.8 of this report.

### 6.5.1 Test Limit

Refer EN 301 893: clause 4.2.3.2

### 6.5.2 Test Setup





### 6.5.3 Measurement Record

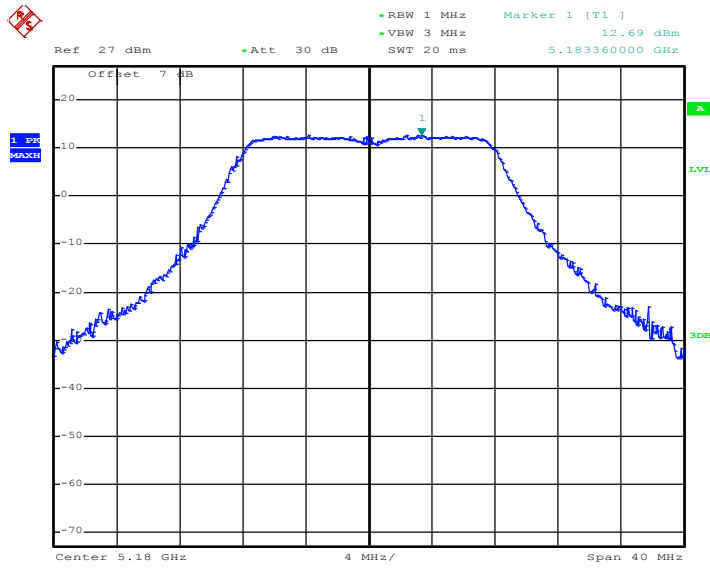
**Test Data:**

Measured Conditions		Antenna Port	PSD (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)
<b>802.11a mode-Low channel</b>					
+25°C,	230Vac	TX0	3.27	6.53	10
		TX1	3.75		
<b>802.11a mode-High channel</b>					
+25°C,	230Vac	TX0	3.22	6.17	10
		TX1	3.10		
<b>802.11n-HT20-Low channel</b>					
+25°C,	230Vac	TX0	2.95	6.27	10
		TX1	3.54		
<b>802.11n-HT20-High channel</b>					
+25°C,	230Vac	TX0	2.87	5.94	10
		TX1	2.99		
<b>802.11n-HT40-Low channel</b>					
+25°C,	230Vac	TX0	0.54	3.90	10
		TX1	1.21		
<b>802.11n-HT40-High channel</b>					
+25°C,	230Vac	TX0	0.47	3.71	10
		TX1	0.92		

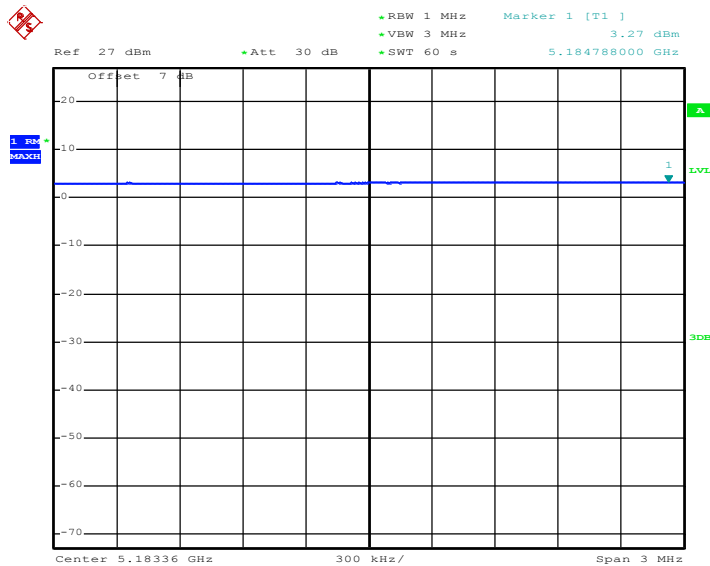
**Test Result:Pass**

Test plots as below:

802.11a mode  
TX0 - Low channel

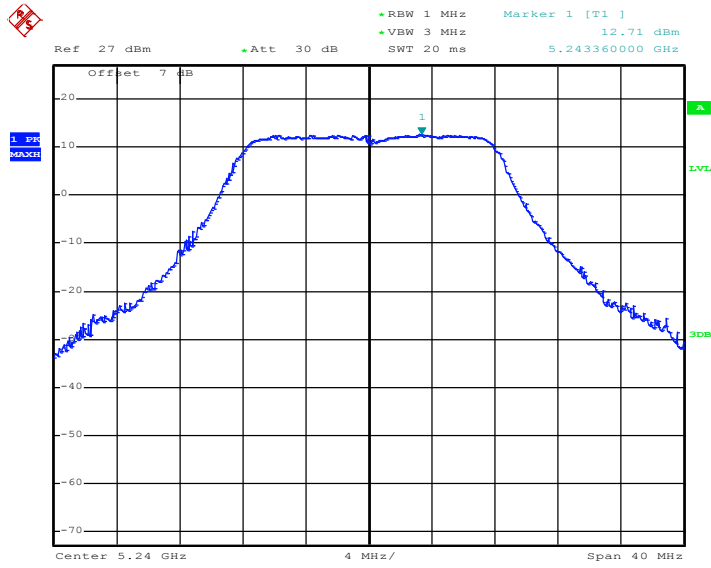


Date: 15.JUN.2016 18:58:27

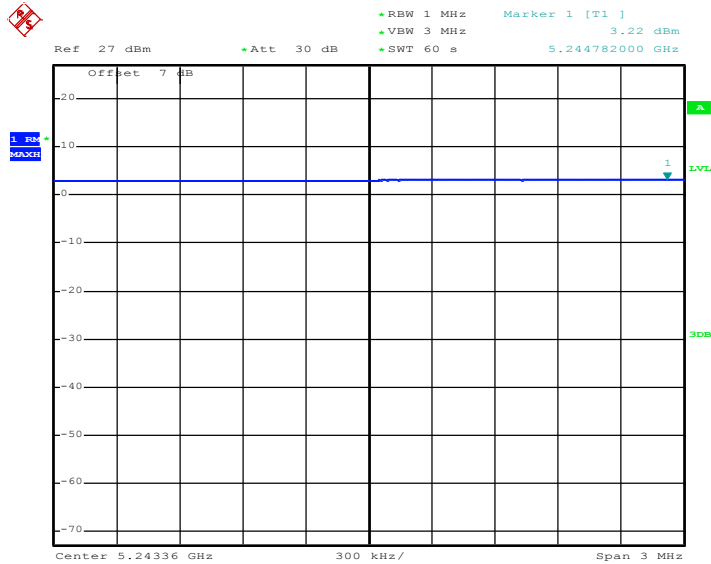


Date: 15.JUN.2016 18:59:48

## High Channel

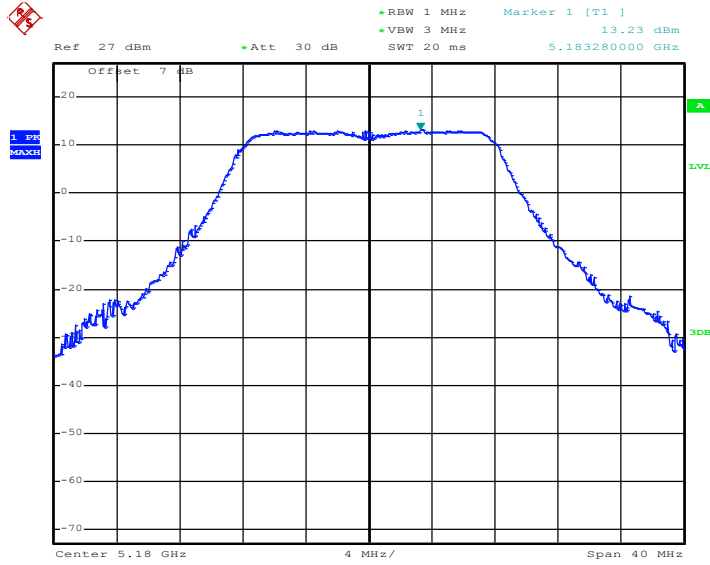


Date: 15.JUN.2016 19:01:58

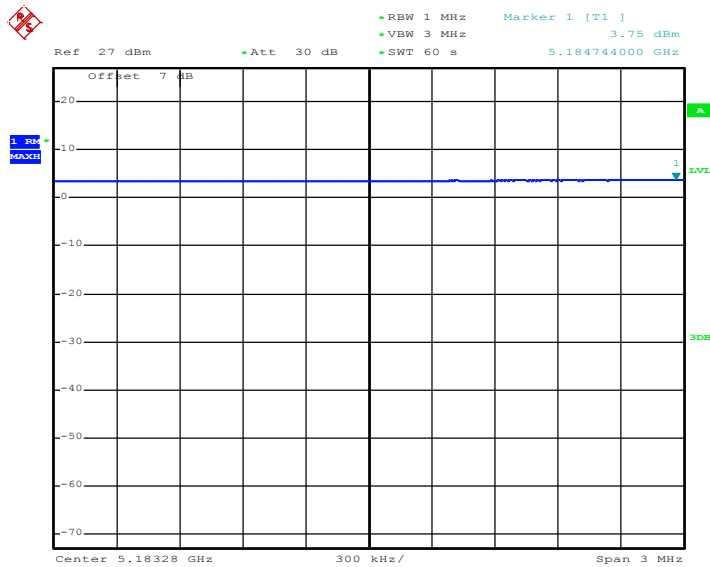


Date: 15.JUN.2016 19:03:13

802.11a mode  
TX1 - Low channel

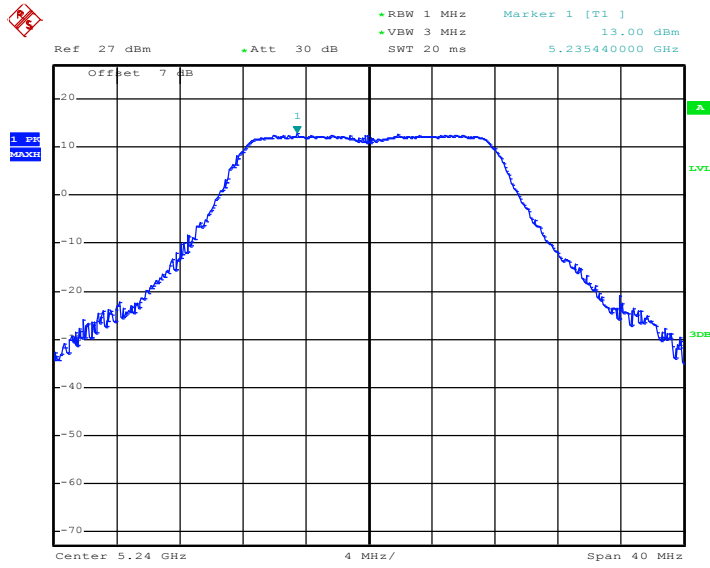


Date: 15.JUN.2016 19:27:17

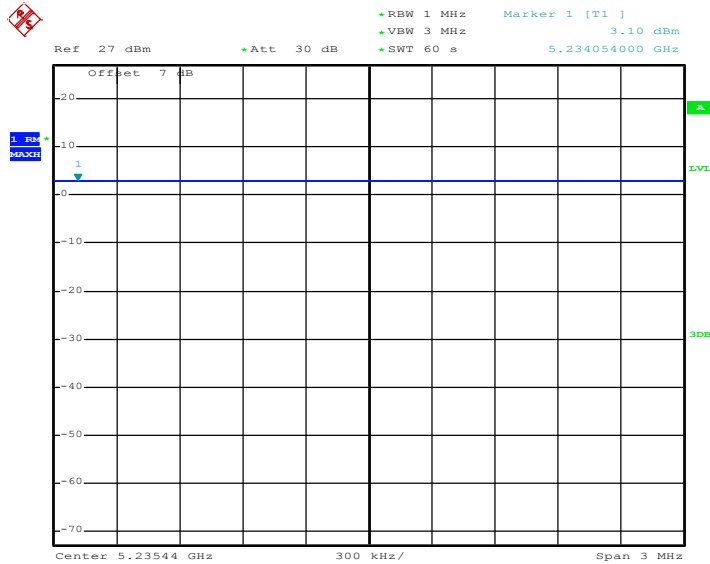


Date: 15.JUN.2016 19:28:32

## High Channel

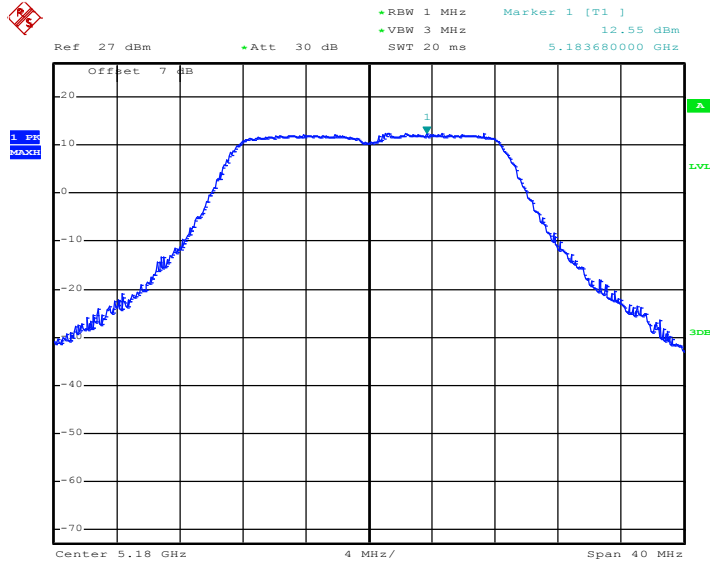


Date: 15.JUN.2016 19:29:28

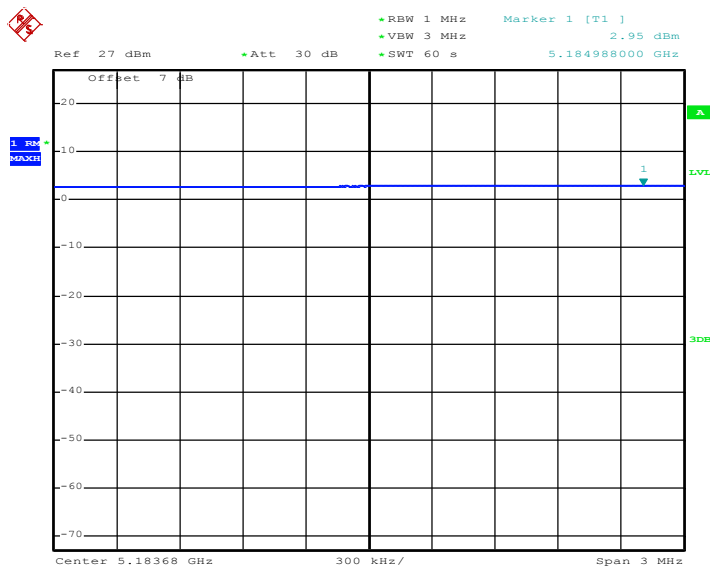


Date: 15.JUN.2016 19:30:45

## 802.11n-HT20 TX0 – Low Channel

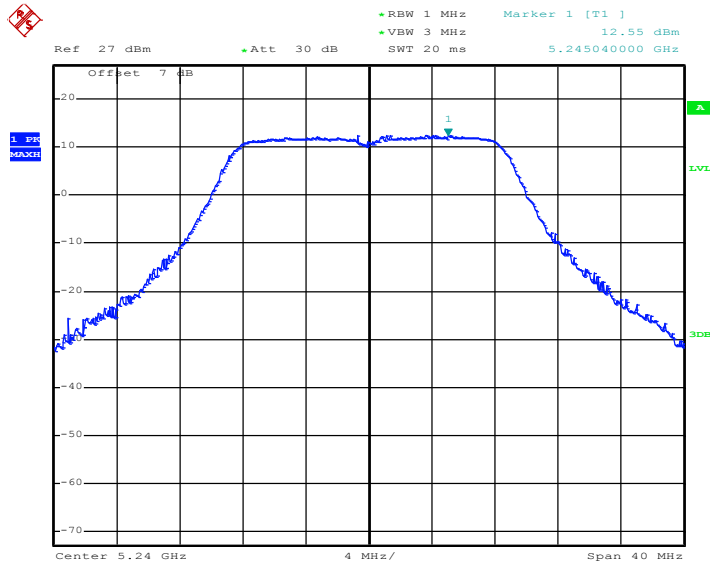


Date: 15.JUN.2016 19:07:39

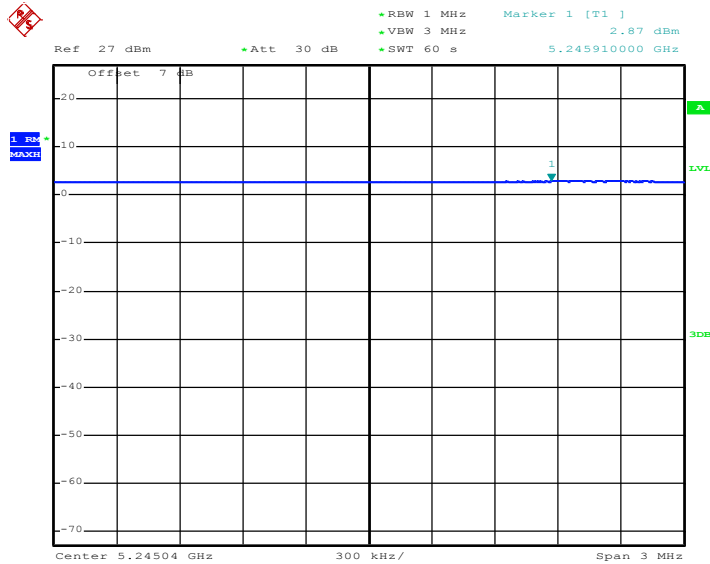


Date: 15.JUN.2016 19:09:35

## High Channel

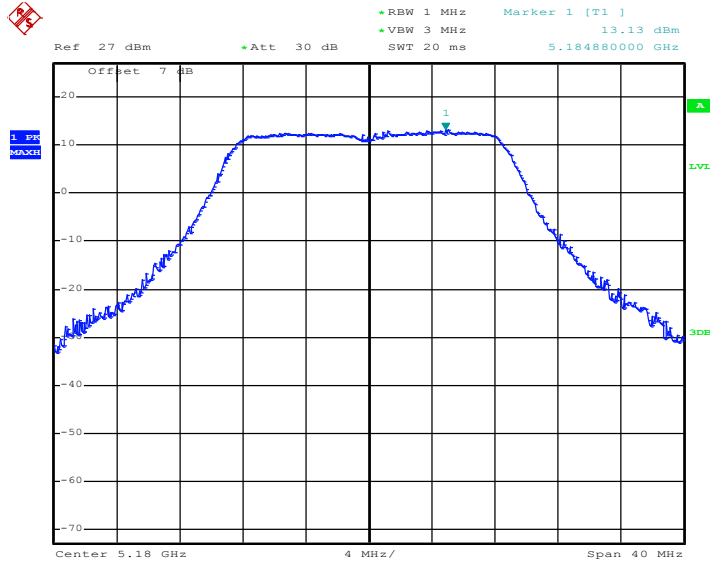


Date: 15.JUN.2016 19:05:06

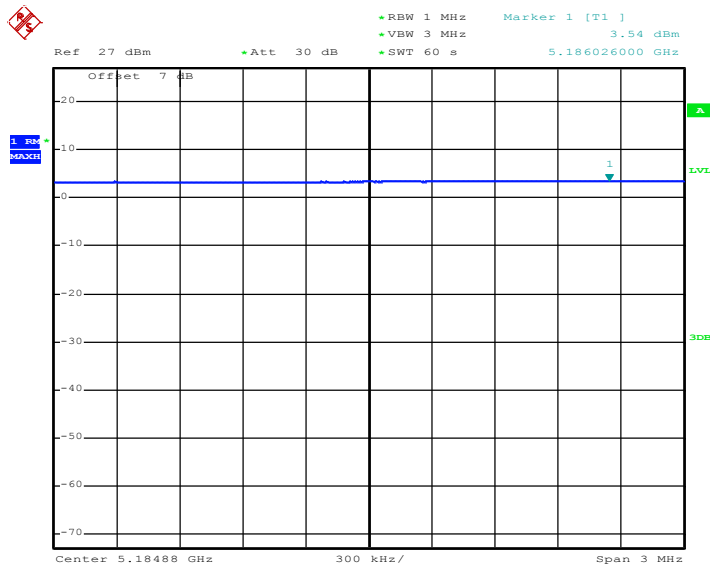


Date: 15.JUN.2016 19:06:44

## 802.11n-HT20 TX1 – Low Channel



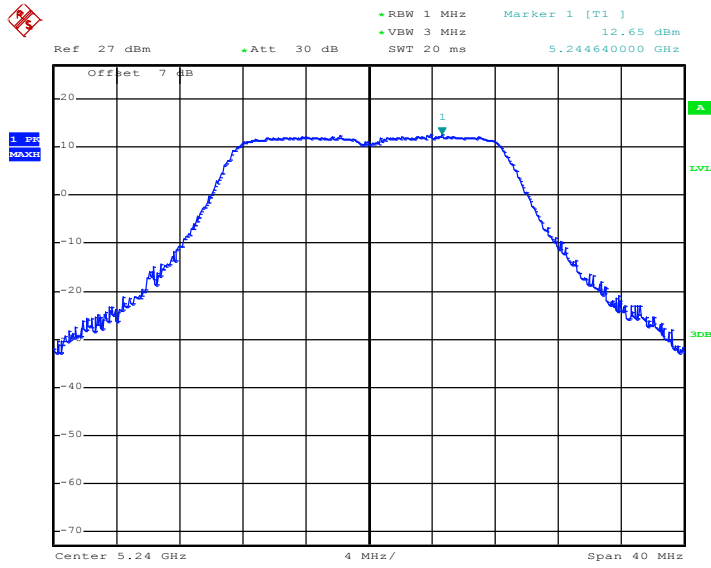
Date: 15.JUN.2016 19:34:29



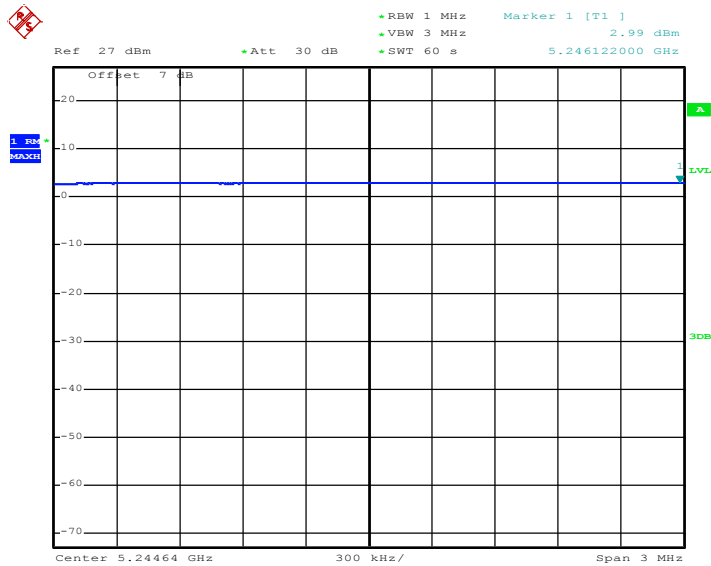
Date: 15.JUN.2016 19:35:46



## High Channel

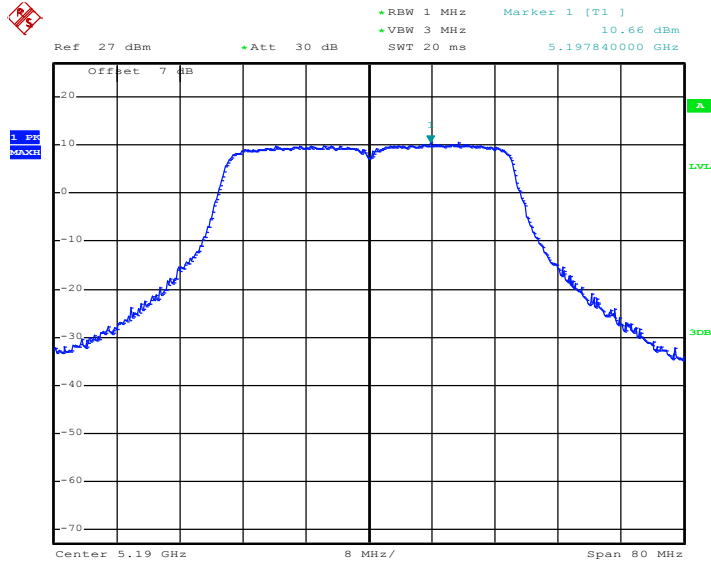


Date: 15.JUN.2016 19:31:39

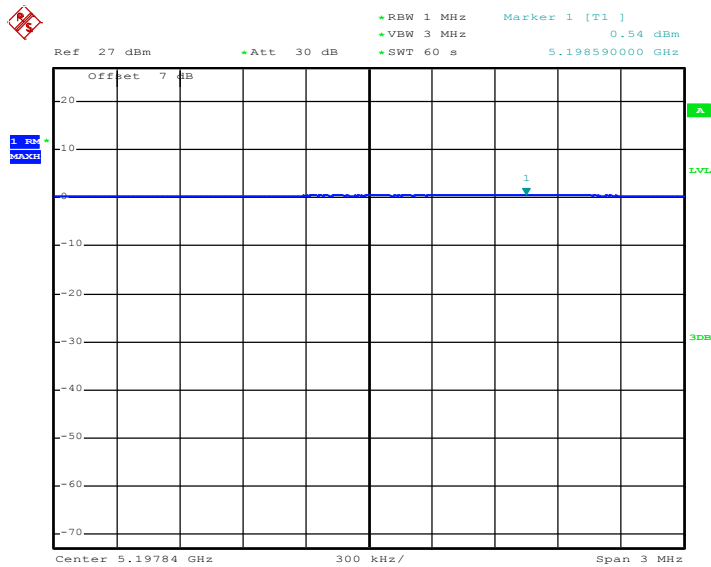


Date: 15.JUN.2016 19:33:30

## 802.11n-HT40 TX0 – Low Channel

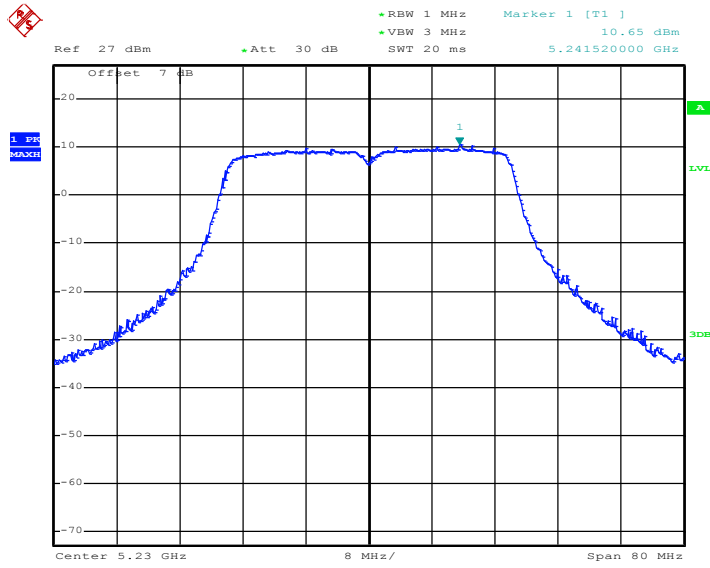


Date: 15.JUN.2016 19:13:46

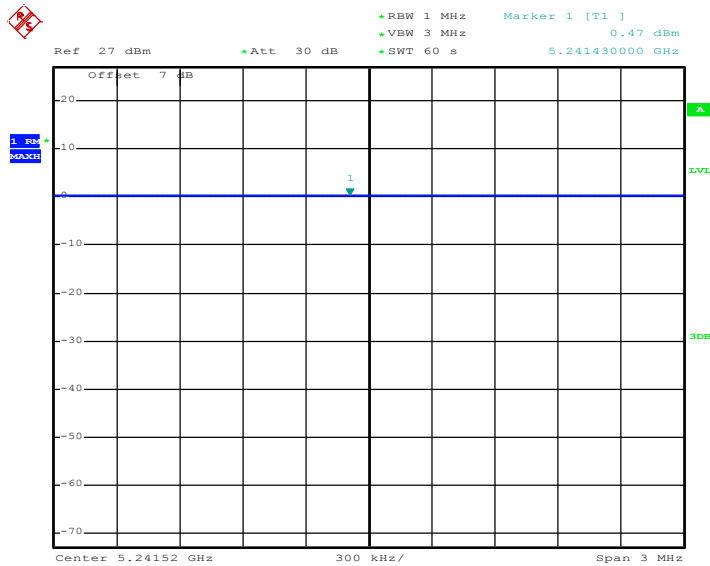


Date: 15.JUN.2016 19:15:01

## High Channel

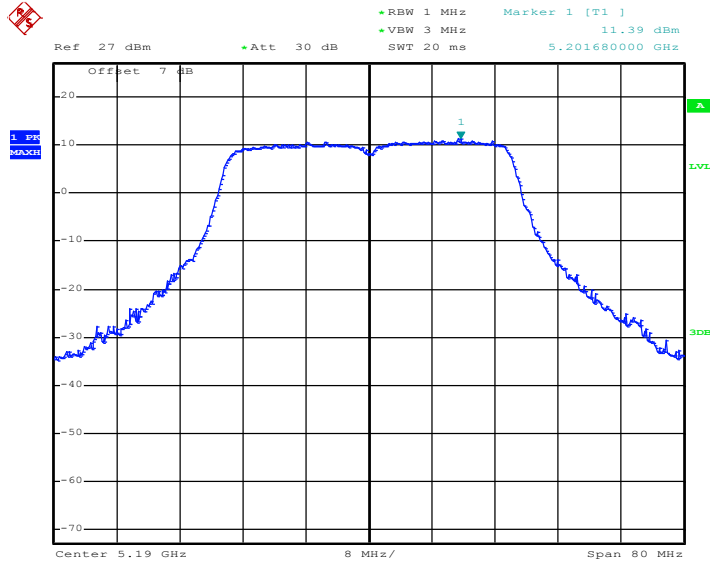


Date: 15.JUN.2016 19:15:56

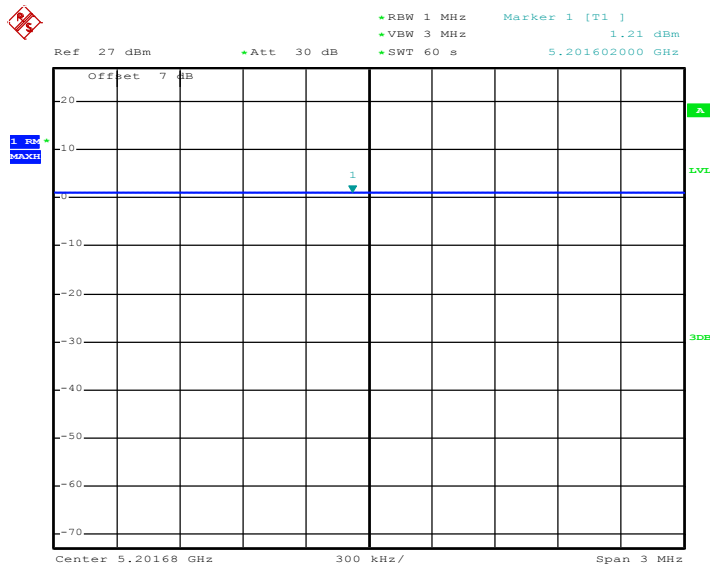


Date: 15.JUN.2016 19:17:33

## 802.11n-HT40 TX1 – Low Channel

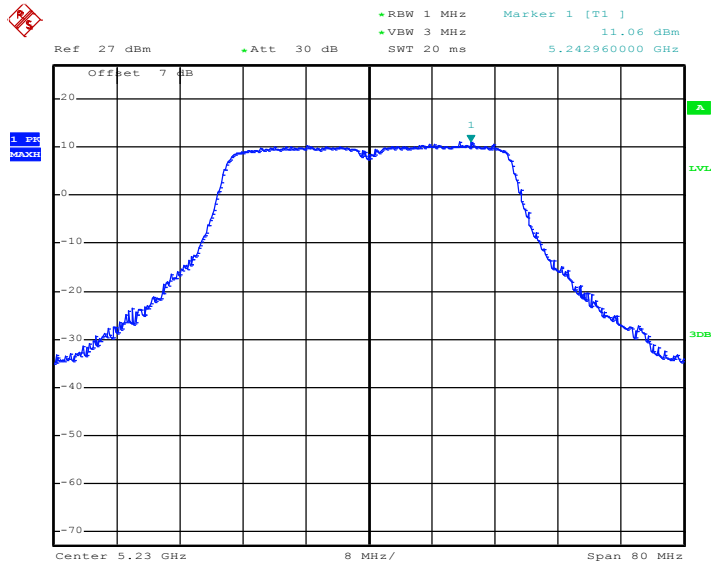


Date: 15.JUN.2016 19:24:37

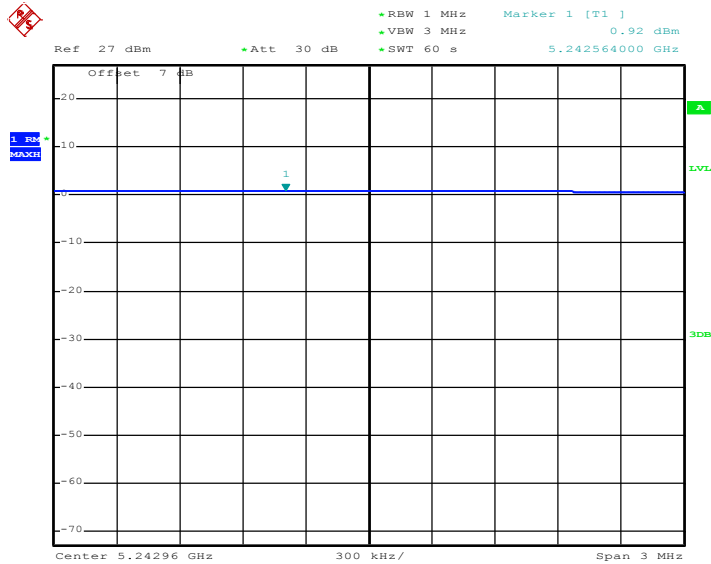


Date: 15.JUN.2016 19:26:04

## High Channel



Date: 15.JUN.2016 19:19:03



Date: 15.JUN.2016 19:23:09

## 6.6 Transmitter Unwanted emission Outside 5GHz R-LAN Bands

**Test Method:** EN 301 893: clause 5.4.5.

**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 22 °C Humid.: 52% Press.: 1010 mBar

**Equipment Used:** Refer section 5.8 of this report

### 6.6.1 Test Limit

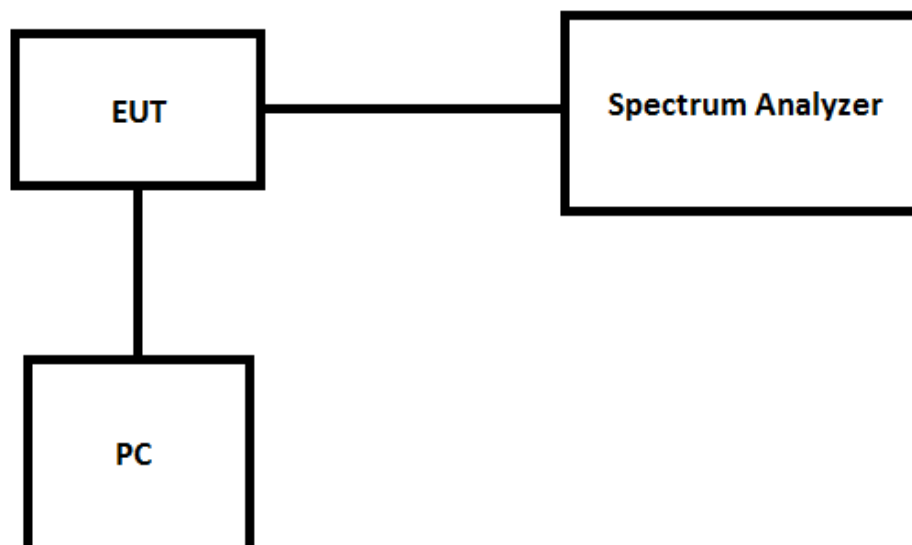
Refer EN 301 893 : clause 4.2.4.1.2

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

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

### 6.6.2 Test Setup

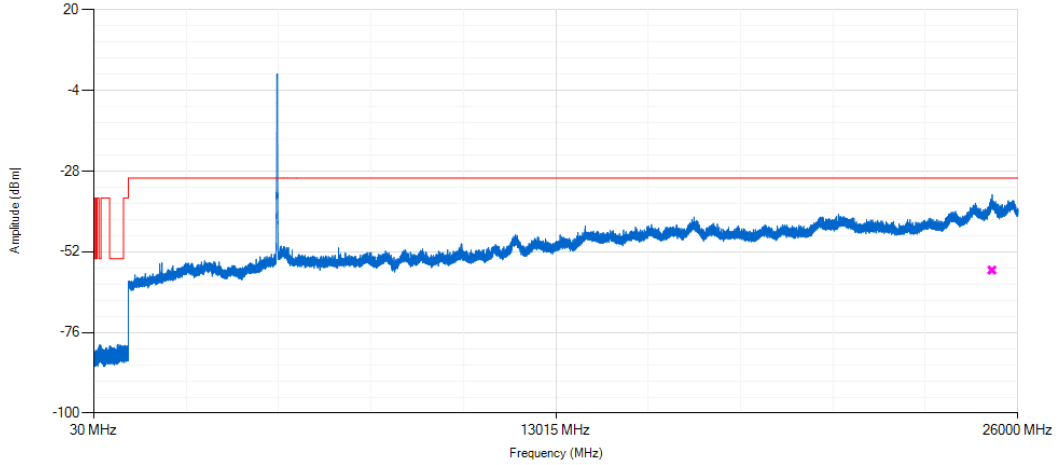
For Conducted method



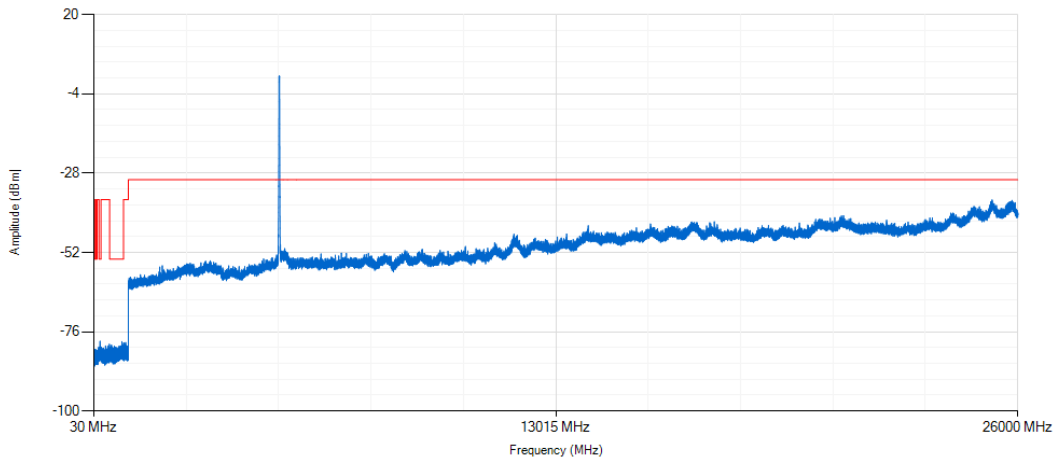
### 6.6.3 Measurement Record:

For Conducted method:

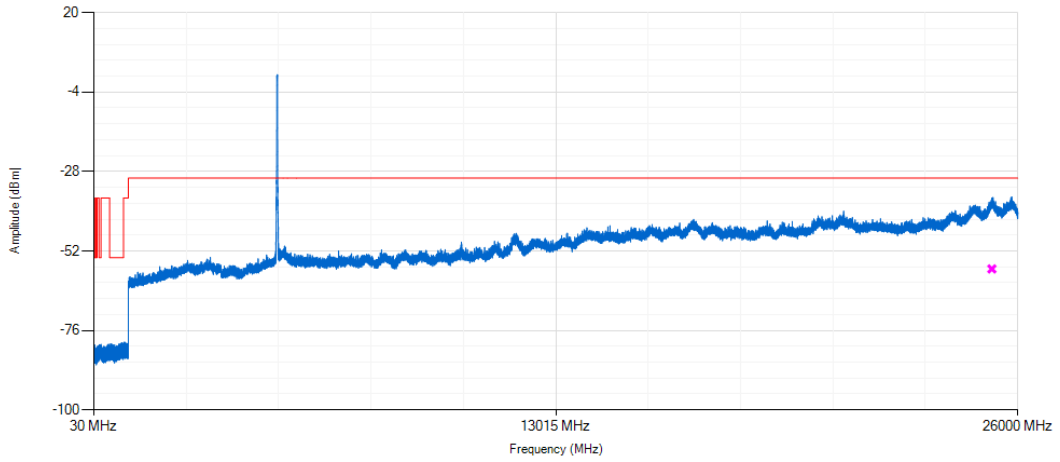
TX0-802.11a mode  
Lowest channel



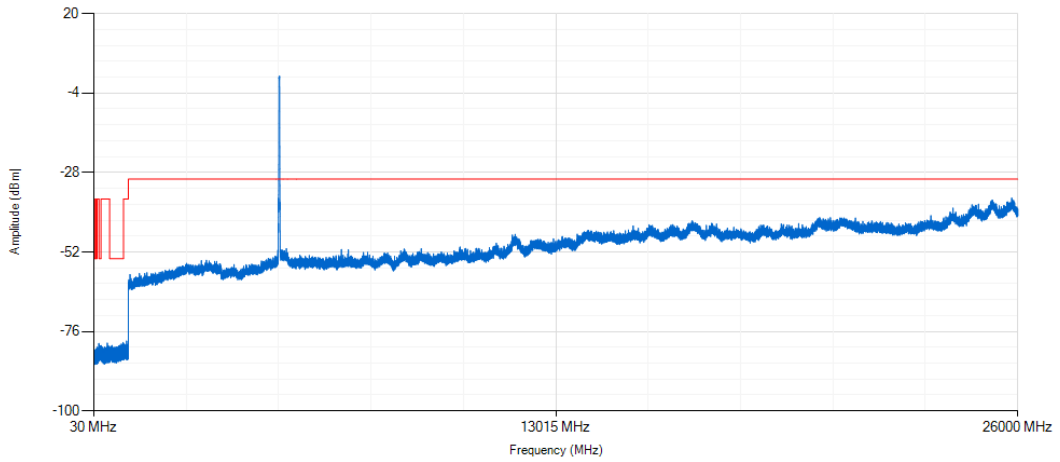
Highest channel



TX0-802.11n-HT20 mode  
Lowest channel



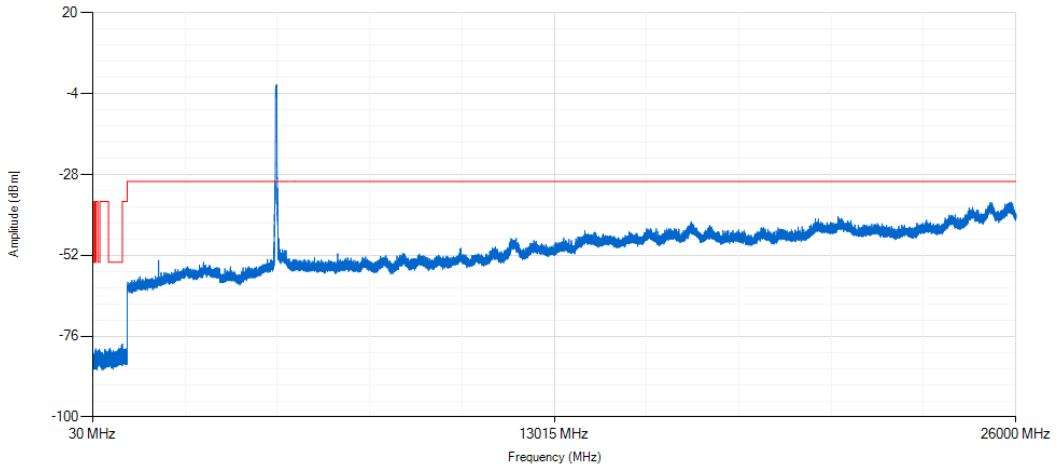
Highest channel



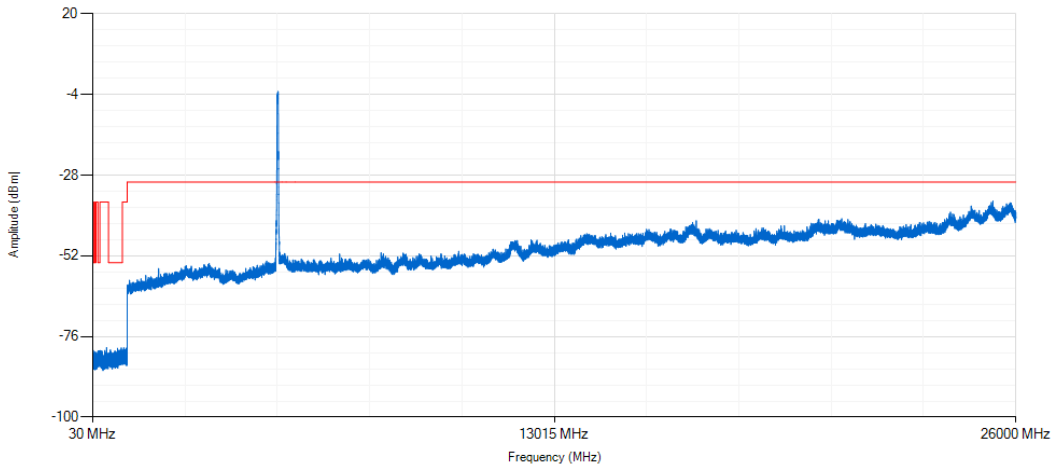


### TX0-802.11n-HT40

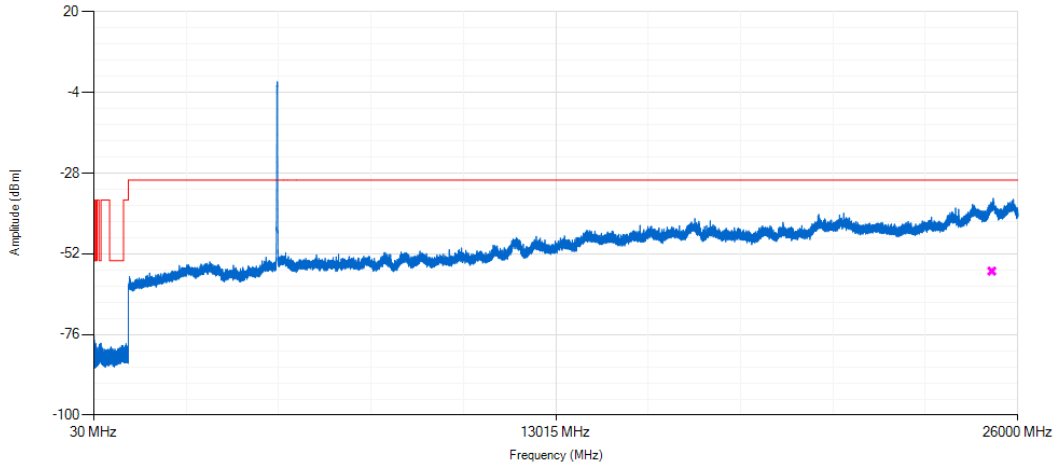
#### Lowest channel



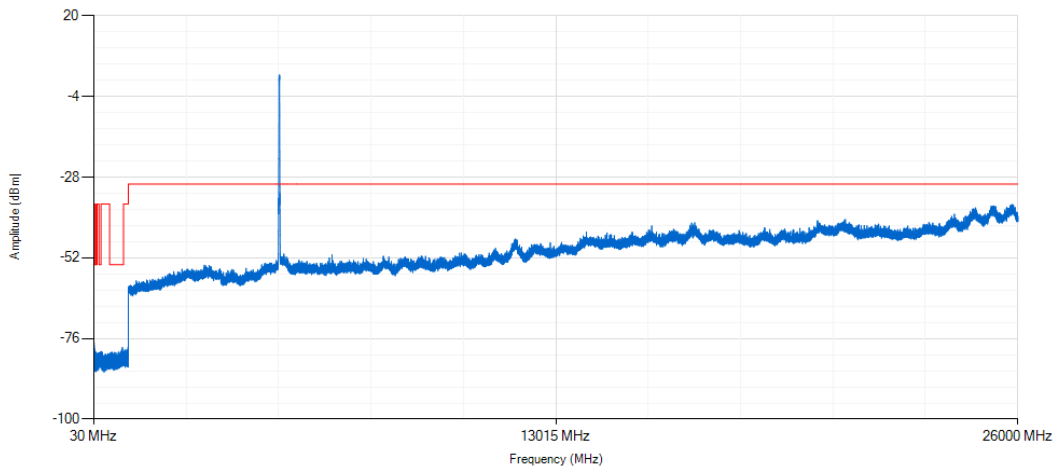
#### Highest channel



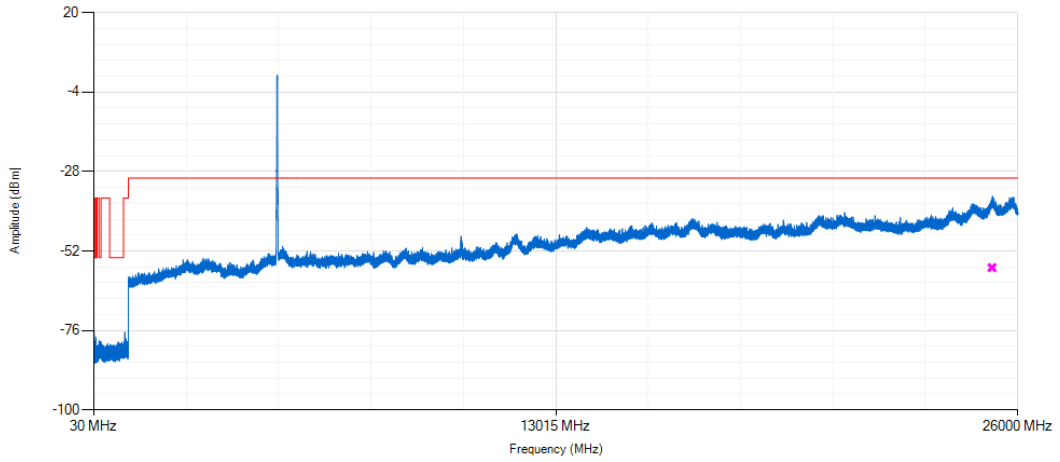
TX1-802.11a mode  
Lowest channel



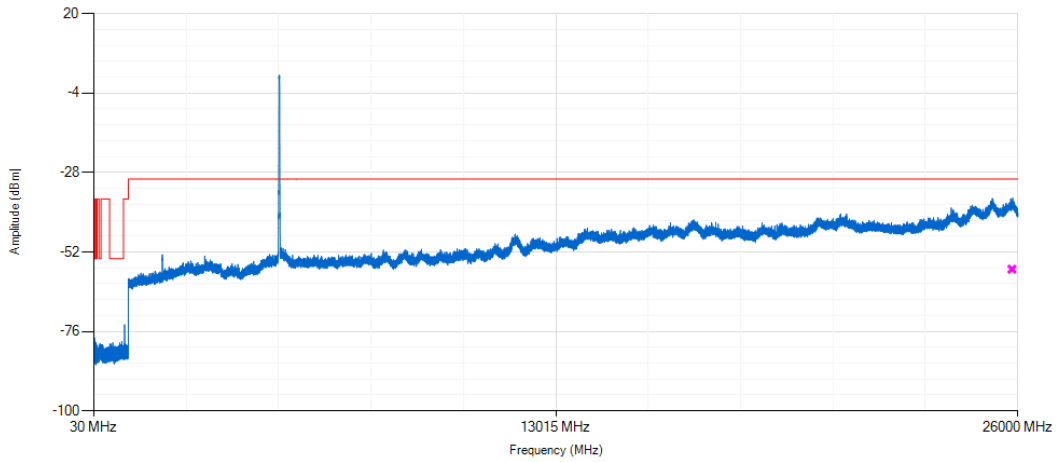
Highest channel



TX1-802.11n-HT20 mode  
Lowest channel

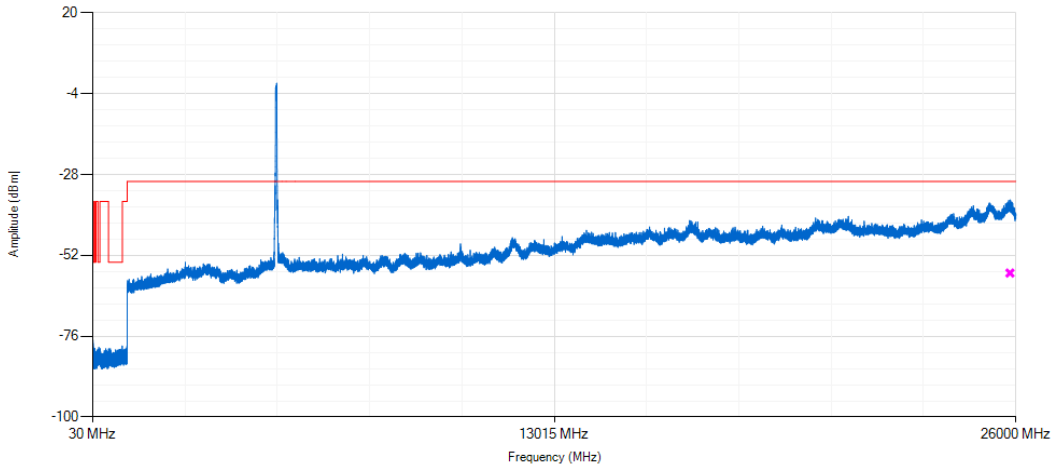


Highest channel

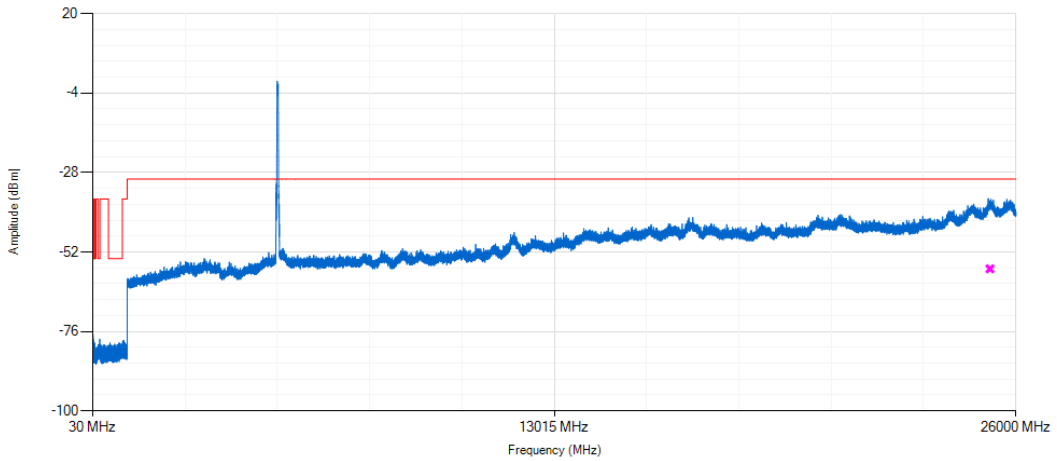


### TX1-802.11n-HT40

#### Lowest channel



#### Highest channel



## 6.7 Transmitter Unwanted emission Within 5GHz R-LAN Bands

**Test Method:** EN 301 893: clause 5.4.6.

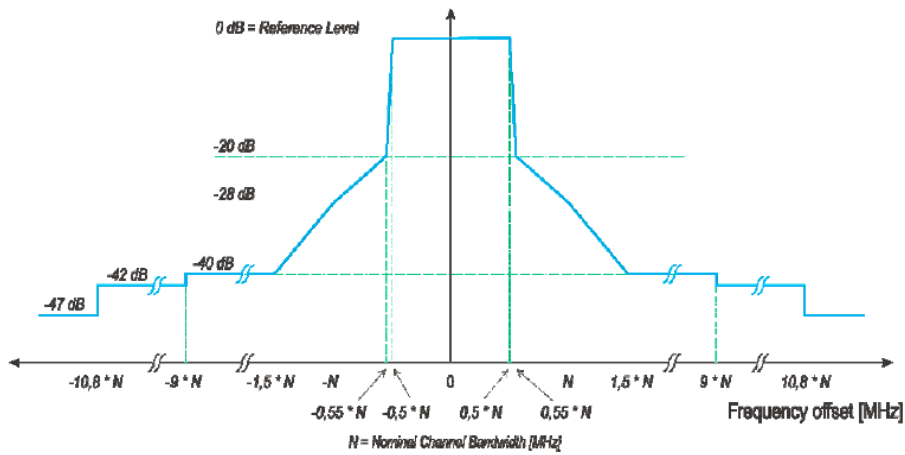
**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 25 °C Humid.: 52% Press.: 1010 mBar

**Equipment Used:** Refer section 5.8 of this report

### 6.7.1 Test Limit

Refer EN 301 893 : clause 4.2.4.2.2

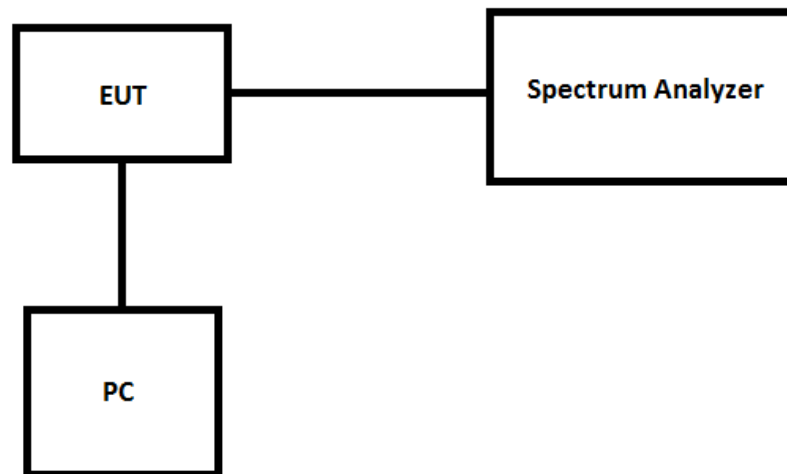


NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

Figure 1: Transmit spectral power mask

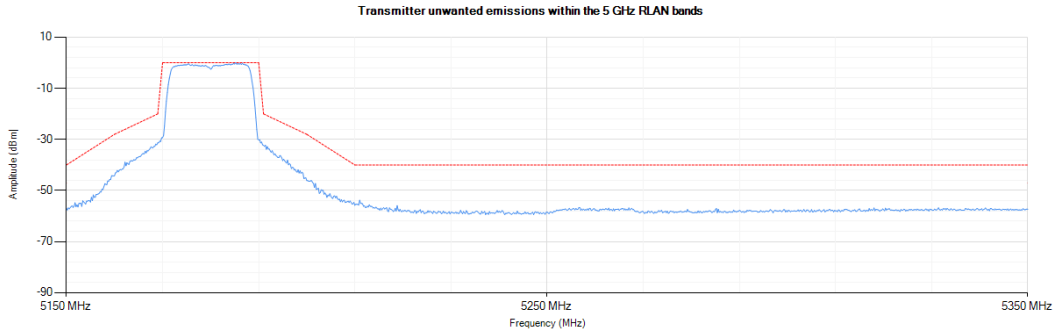
### 6.7.2 Test Setup

For Conducted method

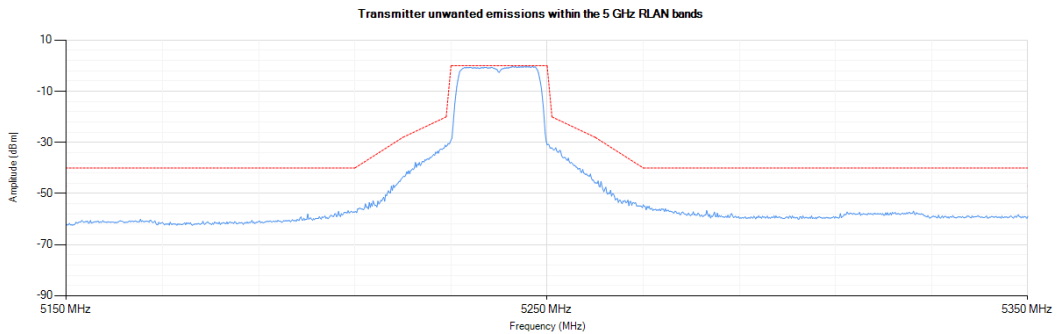


### 6.7.3 Measurement Record:

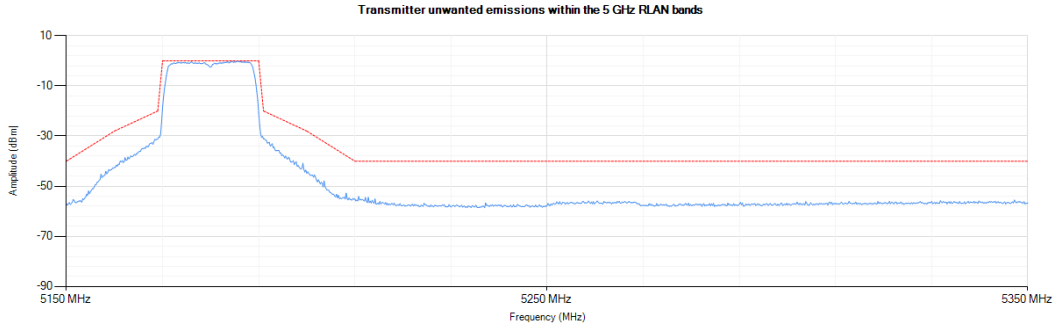
TX0-802.11a mode  
Lowest Channel



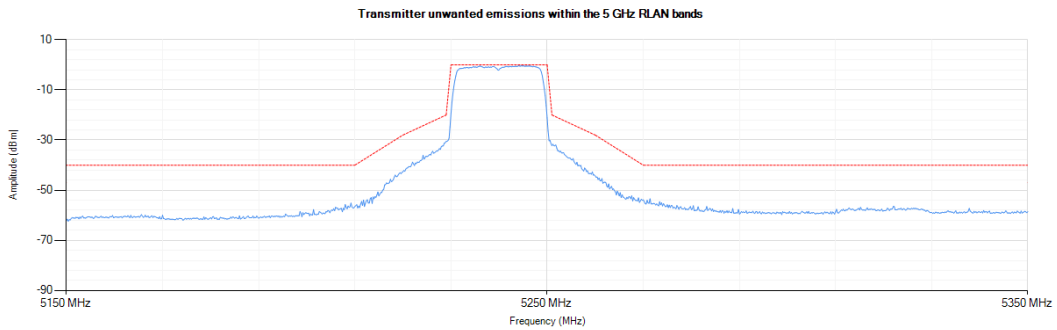
Highest Channel



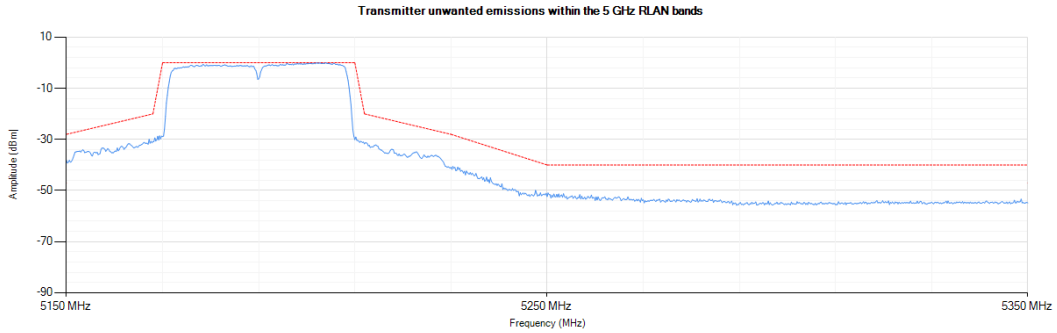
### TX0-802.11n-HT20 mode Lowest Channel



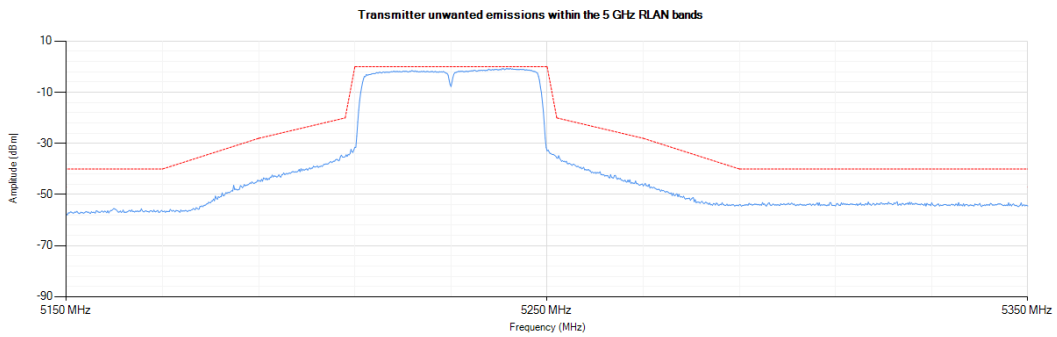
### Highest Channel



## TX0-802.11n-HT40 mode Lowest Channel

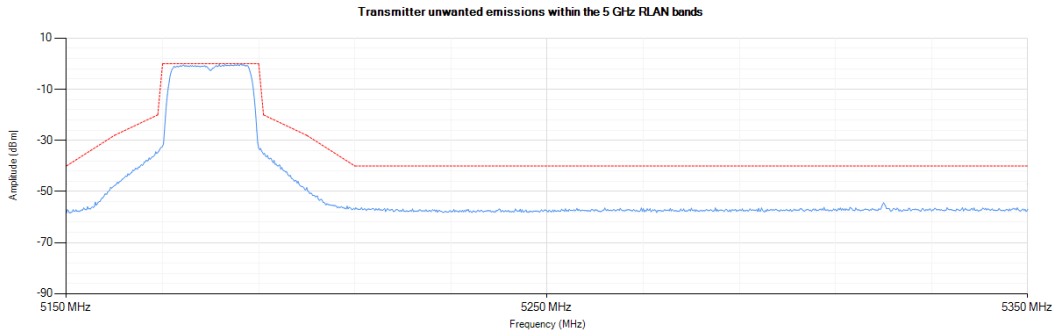


## Highest Channel

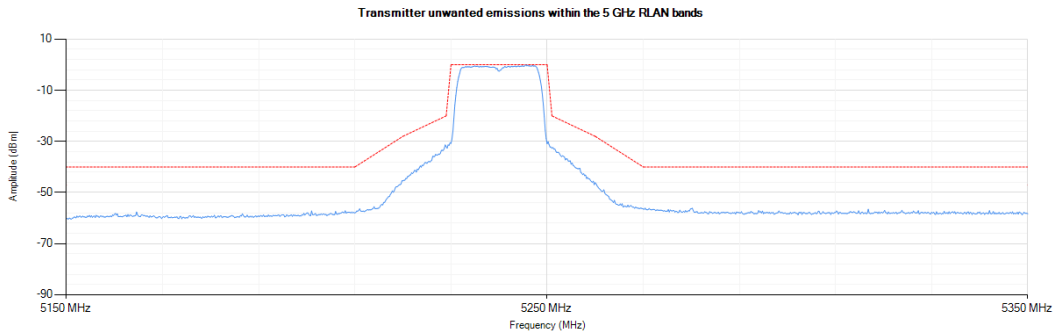




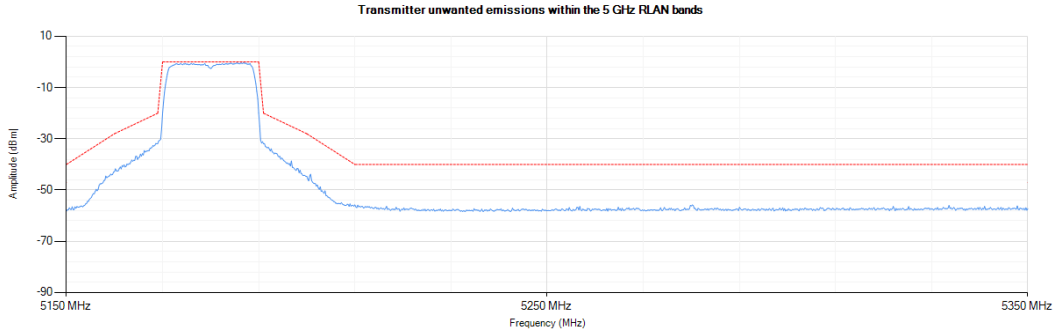
## TX1-802.11a mode Lowest Channel



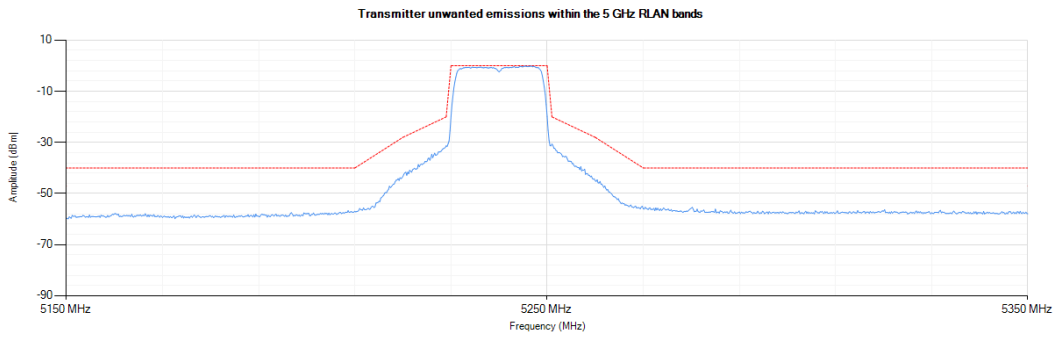
## Highest Channel



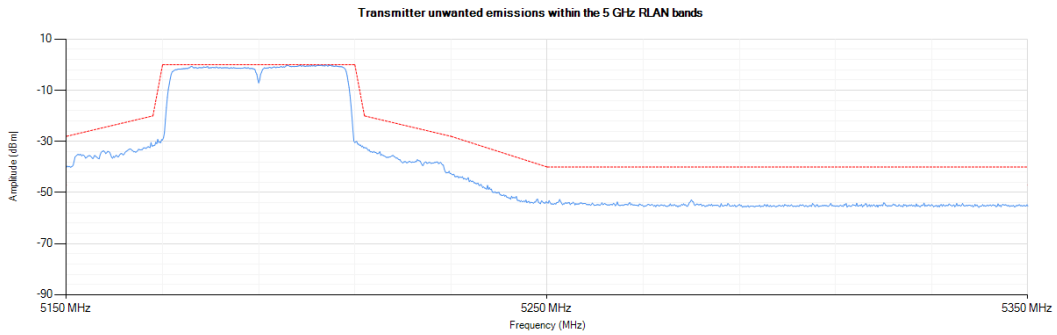
## TX1-802.11n-HT20 mode Lowest Channel



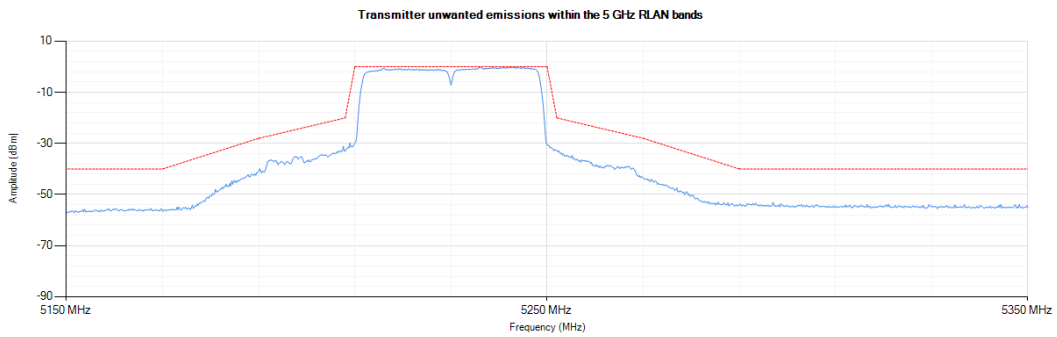
## Highest Channel



### TX1-802.11n-HT40 mode Lowest Channel



### Highest Channel



## 6.8 Receiver Spurious Emission

**Test Method:** EN 301 893: clause 5.4.7.

**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 25 °C Humid.: 52% Press.: 1010 mBar

**Equipment Used:** Refer section 5.8 of this report

### 6.8.1 Test Limit

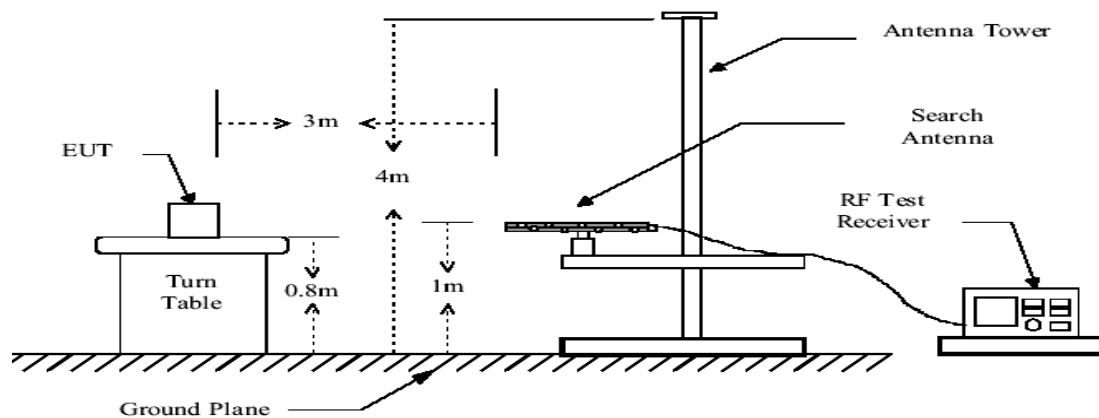
Refer EN 301 893 : clause 4.2.5.2

**Table 4: Spurious radiated emission limits**

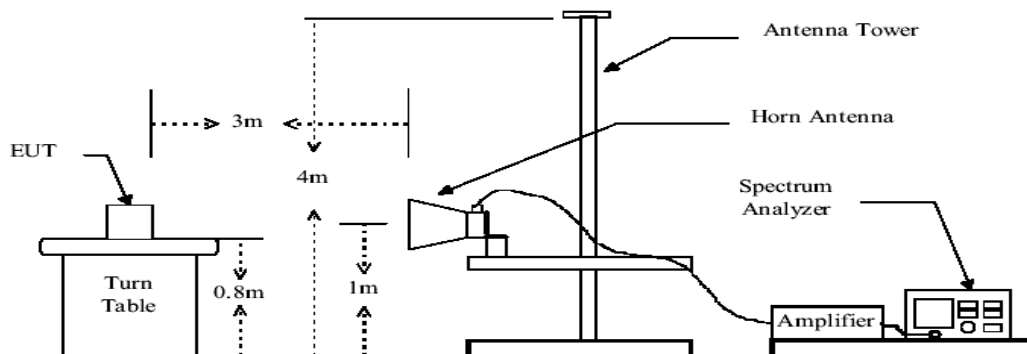
Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

### 6.8.2 Test Setup

#### Below 1 GHz



#### Above 1 GHz



6.8.3 Measurement Record:

802.11a mode middle channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
119.86	Vertical	-64.39	2nW/ -57dBm below 1GHz,  20nW/ -47dBm above 1GHz.	Pass
747.48	V	-62.55		
10360.00	V	-56.21		
121.55	Horizontal	-64.79		
143.33	H	-63.36		
10360.00	H	-56.32		

802.11n-H20 mode middle channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
119.86	Vertical	-63.48	2nW/ -57dBm below 1GHz,  20nW/ -47dBm above 1GHz.	Pass
747.48	V	-62.71		
10360.00	V	-56.85		
121.55	Horizontal	-64.81		
143.33	H	-64.02		
10360.00	H	-56.55		

802.11n-H40 mode middle channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
119.86	Vertical	-64.21	2nW/ -57dBm below 1GHz,  20nW/ -47dBm above 1GHz.	Pass
747.48	V	-62.38		
10380.00	V	-56.56		
121.55	Horizontal	-64.68		
143.33	H	-62.26		
10380.00	H	-56.74		

## 6.9 Dynamic Frequency Selection (DFS)

According to EN 301 893 section 4.2.6.1.2, Radar detection shall be used when operating on channels whose nominal bandwidth falls partly or completely within the frequency ranges 5 250 MHz to 5 350 MHz or 5 470 MHz to 5 725 MHz. This requirement applies to all types of RLAN devices regardless of the type of communication between these devices.

*Uniform Spreading* is required across the frequency ranges 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. *Uniform Spreading* is not applicable for equipment that only operates in the band 5 150 MHz to 5 250 MHz. The EUT only operates in the band 5150 to 5250, so the DFS test is not required.

## 6.10 Adaptivity (Channel Access Mechanism)

**Test Method:** EN 301 893: clause 5.4.9.

**EUT Operations:** Refer to section 5.4 of this report.

**Ambient:** Temp.: 22 °C Humid.: 52% Press.: 1010 mBar

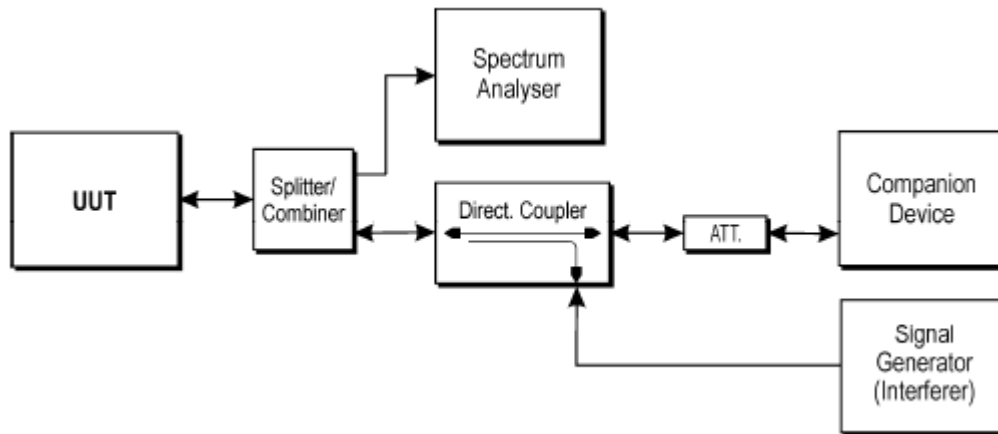
**Equipment Used:** Refer section 5.8 of this report

### 6.10.1 Test Limit

Refer EN 301 893 : clause 4.2.7.3.3.3

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

### 6.10.2 Test Setup



### 6.10.3 Result

PASS

DUT Frequency (MHz)	e.i.r.p (dBm)	AWGN Level (dBm)	Blocking Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Shot Control Width (ms)	Duty Cycle (%)
5180	19.67	-69.67	-35	0.41	0.07	0	0
Limit	<23			<10		<2.5	<5

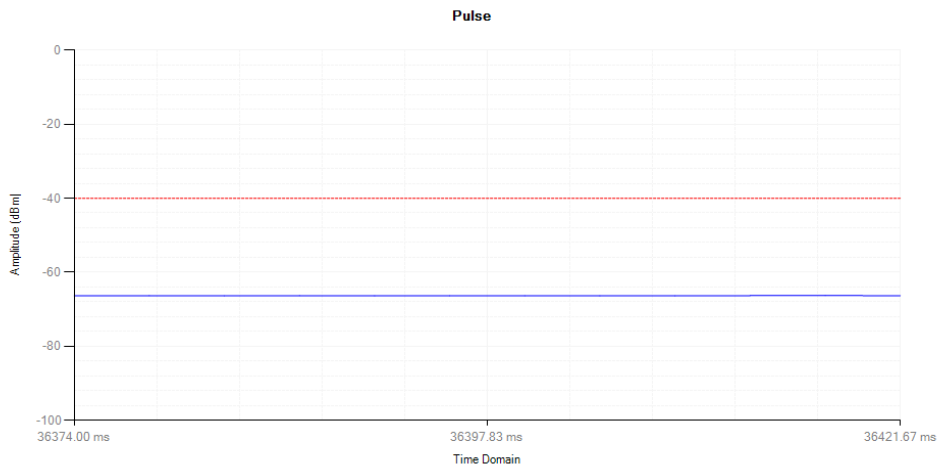
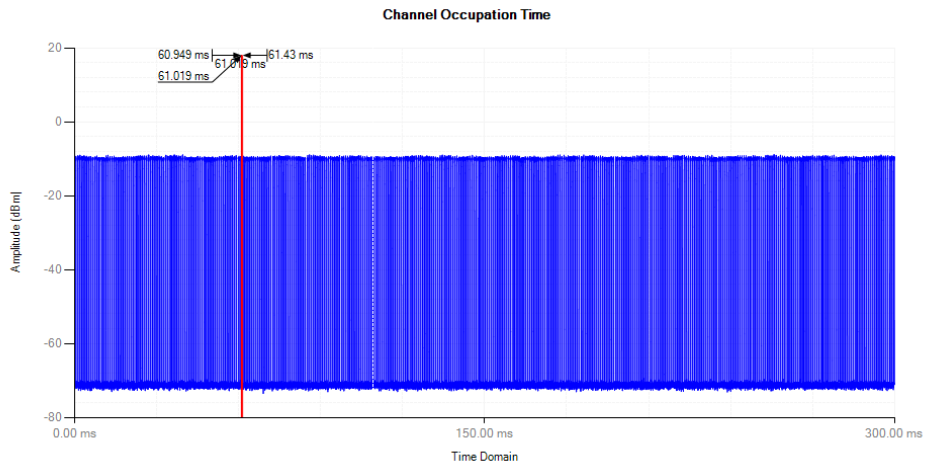
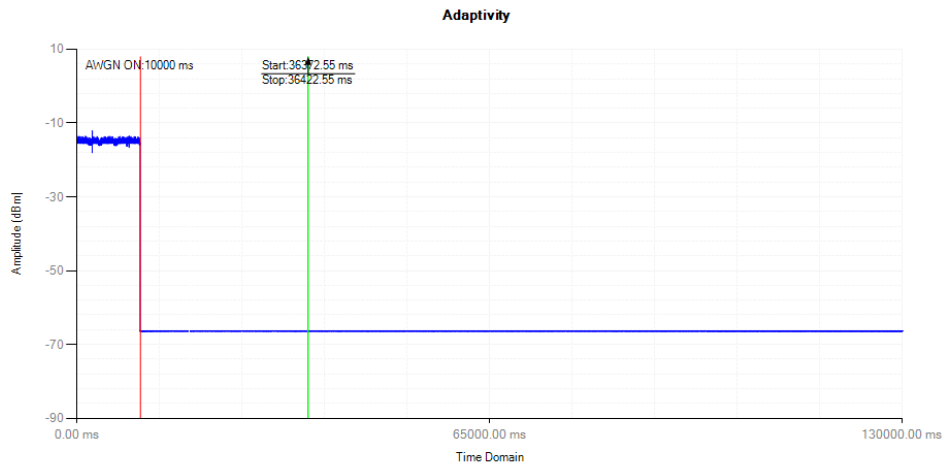
Remark:

1. Pre-scan AWGN, OFDM and LTE of the interference signal, found injected AWGN interference signal was worse case mode, the report only reflects the worst model.



Measurement Data:

Test Plots:



## 6.11 Receiver Blocking

<b>Test Method:</b>	EN 301 893: clause 5.4.10		
<b>EUT Operations:</b>	Refer to section 5.4 of this report.		
<b>Ambient:</b>	Temp.: 22 °C	Humid.: 52%	Press.: 1010 mBar
<b>Equipment Used:</b>	Refer section 5.8 of this report		

### 6.11.1 Test Limit

Refer EN 301 893 : clause 4.2.8.4

The minimum performance criterion shall be a PER of less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1, item t)).

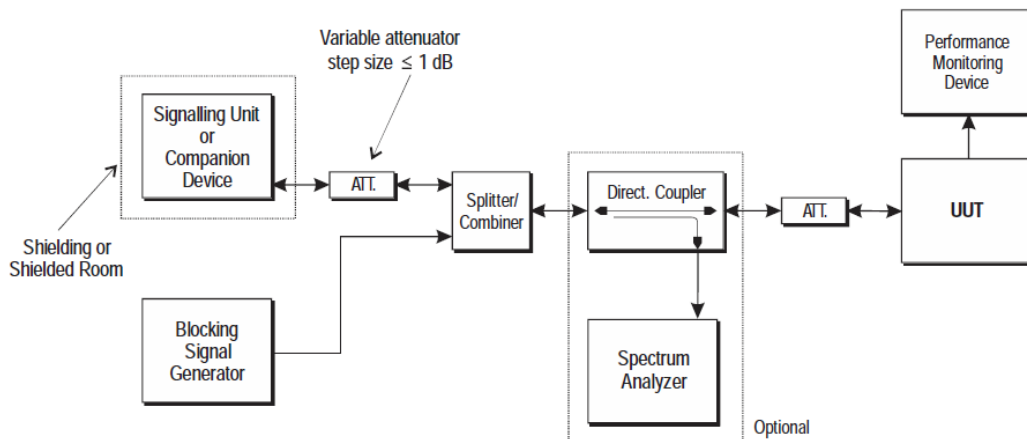
While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 9.

**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.

### 6.11.2 Test Setup



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

### 6.11.3 Result: Pass

**Measurement Data:**

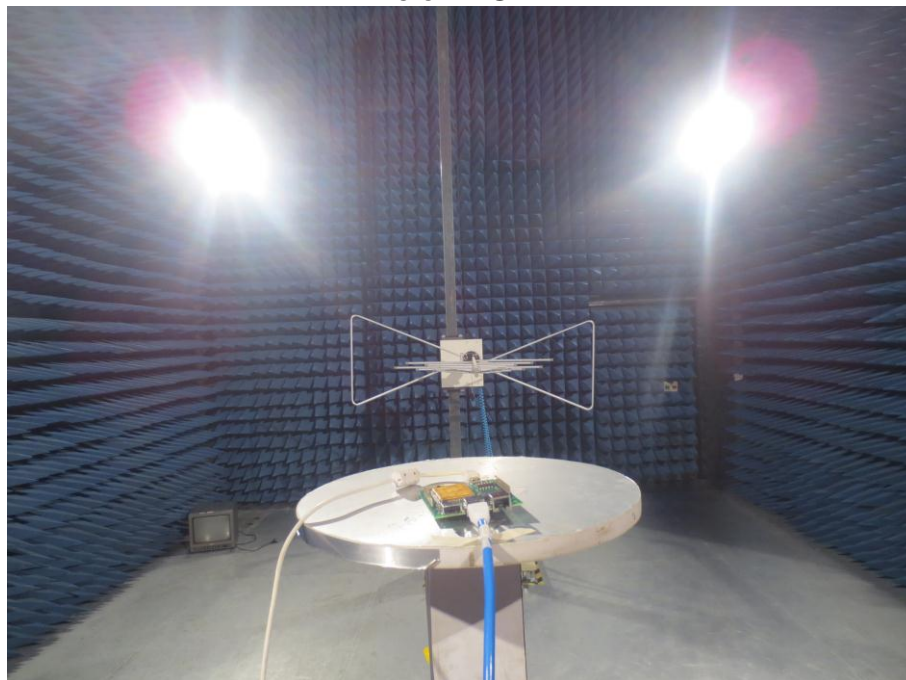
Band 1					
802.11a Lowest Channel					
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power(dBm) CW	PER measurement level (%)	PER Limit (%)	Results
-79.00 (Pmin+6dBm)	5100	-59	3	10	Pass
			3		
-79.00 (Pmin+6dBm)	4900	-53	5	10	Pass
	5000		2		
	5975		4		
NOTE:					
(1) The minimum performance criterion shall be a PER less than or equal to 10 %.					
(2) Manufacturer is declared PER less than or equal to 10 %, can be used is Min Power -85dBm.					
802.11n40 Lowest Channel					
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power(dBm) CW	PER measurement level (%)	PER Limit (%)	Results
-80.00 (Pmin+6dBm)	5100	-59	3	10	Pass
			2		
-80.00 (Pmin+6dBm)	4900	-53	7	10	Pass
	5000		2		
	5975		6		
NOTE:					
(1) The minimum performance criterion shall be a PER less than or equal to 10 %.					
(2) Manufacturer is declared PER less than or equal to 10 %, can be used is Min Power -86dBm.					

## 6.12 User Access Restrictions

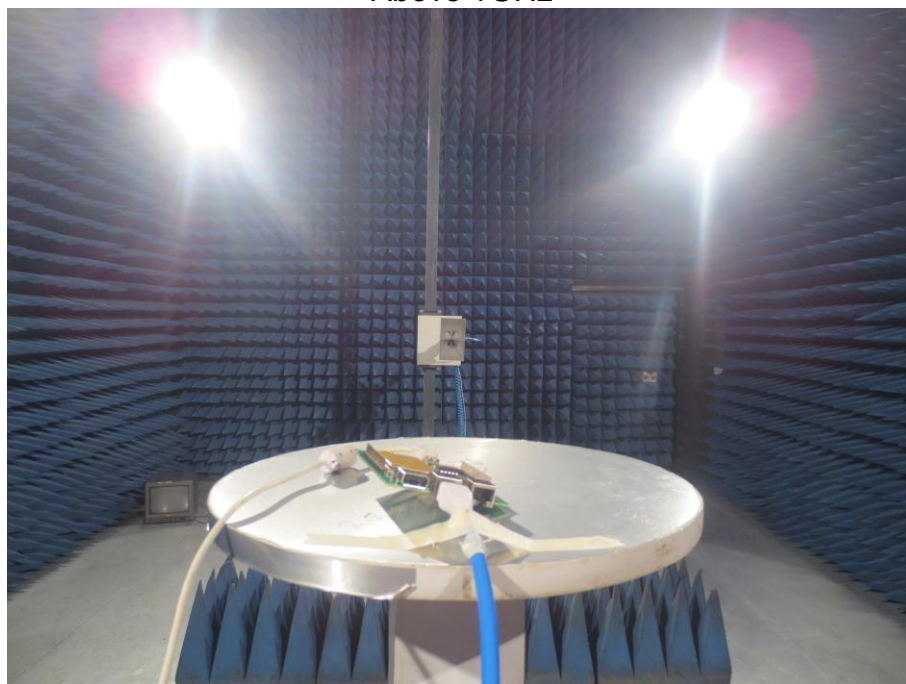
<b>6.12.1 Requirement</b>
The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements in clause 4.2.6.
<b>6.12.2 Result</b>
The EUT has no radar detection function and the manufacturer will restrict access for the user to change certain hardware and/or software settings of the equipment.

## 7 Test Setup Photos

Below 1GHz



Above 1GHz



## 8 EUT photos

Refer to the report No.: CCISE171001301

-- End of report--