CE Test Report

Equipment	:	**45 Series WB module with Bluetooth**
Model No.	:	**WB45NBT**
Brand Name	:	**Laird Technologies**
Applicant	:	**Laird Technologies**
Address	:	**W66N220 Commerce Court, Cedarburg, Wisconsin 53012, USA**
Standard	:	**EN 301 893 V2.1.1 (2017-05)**
Received Date	:	**Apr. 19, 2017**
Tested Date	:	**May 12 ~ Jun. 30, 2016 (for original test)** **May 11, 2017 (for new test)**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: **Approved by:**

James Fan / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
ER350301-03AN	Rev. 01	Initial issue	Jun. 05, 2017

Summary of Test Result

Ref. Std. Clause	Test Items	Measured	Result
4.2.1	Carrier Frequencies	Meet the requirement of limit.	Pass
4.2.2	Nominal Channel Bandwidth and Occupied Channel Bandwidth	Meet the requirement of limit.	Pass
4.2.3	RF Output Power, Transmit Power Control (TPC)	5.15-5.25GHz: 21.43 dBm 5.25-5.35GHz: 21.33 dBm 5.47-5.725GHz: 22.08 dBm	Pass
4.2.3	Power Density	Meet the requirement of limit.	Pass
4.2.4	Transmitter Unwanted Emissions	Meet the requirement of limit.	Pass
4.2.5	Receiver Spurious Emissions	Meet the requirement of limit.	Pass
4.2.6	Dynamic Frequency Selection (DFS)	Meet the requirement of limit.	Pass
4.2.7	Adaptivity (Channel Access Mechanism)	Meet the requirement of limit.	Pass[Note2]
4.2.8	Receiver Blocking	Meet the requirement of limit.	Pass
4.2.9	User Access Restrictions	Meet the requirement of limit.	Pass
4.2.10	Geo-Location Capability	This test is not required since the device does not support this function	N/A

Note:
1. The DFS measurement was recorded in Report No.: EY350301-03.
2. Channel Access Mechanism and maximum Channel Occupancy Time are declared compliance with requirement by manufacturer. Both items are not evaluated.

1 General Description

1.1 Information

This report is issued as a supplementary report to original ICC report no. ER350301-02AN. The difference is concerned with following items:

- ✧ Modified address of applicant.
- ✧ Updating standard version from V1.8.1 to V2.1.1.

Therefore, related test items had been performed and presented in the following sections.

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
IEEE Std. 802.11	**Frequency Range (MHz)**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**Data Rate / MCS**
a	5150-5250 5250-5350 5500-5700	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [8]	1	6-54 Mbps
n (HT20)	5150-5250 5250-5350 5500-5700	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [8]	1	MCS 0-7
Note : 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)			
				2400~2483.5	**5150~5250**	**5250~5350**	**5470~5725**
1	MAG.LAYERS/EDA-1513-25GR2-B2-CY	Dipole	SMA Jack Reverse	2	2	2	2
2	MAG.LAYERS/PCA-4606-2G4C1-A13-CY	PCB Dipole	UFL	2.21	2.21	2.21	2.21
3	Larid/NanoBlade-IP04	PCB Dipole	UFL	2	3.90	3.90	4
4	Larid/MAF95310 Mini NanoBlade Flex	PCB Dipole	UFL	2.79	3.38	3.38	3.38
5	Laird/NanoBlue-IP04	PCB Dipole	UFL	2	---	---	---
6	Ethertronics/WLAN_1000146	PIFA	UFL	2.5	3.5	3.5	3.5

1.1.3 EUT Operational Condition

Power Supply Type	3.3Vdc or 1.8Vdc from host.		
SW Version	3.5.0.36		
Operational Voltage	☒ Vnom (1.8 V)	☒ Vmax (1.89 V)	☒ Vmin (1.71 V)
Operational Voltage	☒ Vnom (3.3 V)	☒ Vmax (3.46 V)	☒ Vmin (3.14 V)
Operational Climatic	☒ Tnom (20°C)	☒ Tmax (70°C)	☒ Tmin (-10°C)

1.1.4 Accessories

N/A

1.1.5 Adaptive Equipment

Adaptive Equipment		
☒	Adaptive Equipment without the possibility to switch to a non-adaptive mode:	
	☐	The equipment has implemented an LBT based DAA mechanism:
		☐ The equipment is Frame Based equipment
		☒ The equipment is Load Based equipment
		☐ The equipment can switch dynamically between Frame Based and Load Based equipment
	☐	The equipment has implemented an non-LBT based DAA mechanism
	☐	The equipment can operate in more than one adaptive mode
☐	Adaptive Equipment which can also operate in a non-adaptive mode	

1.1.6 Channel List

Frequency band (MHz)	
802.11 a / n HT20	
Channel	Frequency(MHz)
36	5180
40	5200
44	5220
48	5240
52	5260
56	5280
60	5300
64	5320

Frequency band (MHz)	
802.11 a / n HT20	
Channel	Frequency(MHz)
100	5500
104	5520
108	5540
112	5560
116	5580
132	5660
136	5680
140	5700

1.1.7 Test Tool and Duty Cycle

Test tool	WB45 Manufacture Test Software, Version: 1.3
Duty Cycle Of Test Signal (%)	98.56% - IEEE 802.11a 98.97% - IEEE 802.11n (HT20)
Duty Factor	0.06 - IEEE 802.11a 0.05 - IEEE 802.11n (HT20)

1.1.8 Power Setting

Configuration 1: Dipole Antenna

Modulation Mode	**Test Frequency (MHz)**			
	a / HT20			
	5180	**5320**	**5500**	**5700**
a	18	18.5	19.5	20
n (HT20)	18	18.5	19.5	20

Configuration 2: PCB Dipole Antenna

Modulation Mode	**Test Frequency (MHz)**			
	a / HT20			
	5180	**5320**	**5500**	**5700**
a	15.5	16.5	18	18
n (HT20)	16	16.5	18	18

Configuration 3: PIFA Antenna

Modulation Mode	**Test Frequency (MHz)**			
	a / HT20			
	5180	**5320**	**5500**	**5700**
a	16	17	18	18.5
n (HT20)	16.5	17	18	18.5

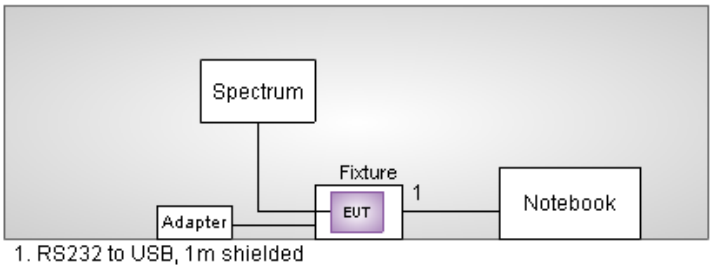
1.2 Local Support Equipment List

Support Equipment List						
No.	**Equipment**	**Brand**	**Model**	**S/N**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E6440	JPXMD12	DoC	RS232, 1m shielded
2	Adapter for fixture	LEADER ELECTRONICS INC.	MU12-2050200-A1	---	---	Remarks: Input:100-240Vac, 50/60Hz, 21-28V, 0.5A Output:5Vdc, 2A
3	Fixture	---	---	---	---	---

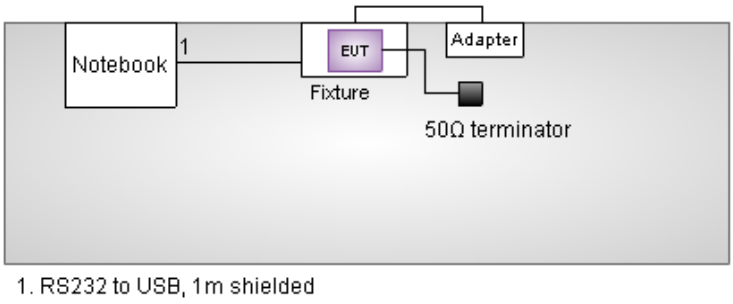
Note: No. 2 & 3 were supplied by applicant.

1.3 Test Setup Chart

Test Setup Diagram (Conducted)



Test Setup Diagram (Radiated)



1.4 Test Equipment and Calibration Data

Test Item	Radiated Emissions				
Test Site	Fully-anechoic chamber 1 / (05CH01-WS)				
Tested Date	May 12, 2016				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY54200247	Aug. 24, 2015	Aug. 23, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-524	Oct. 03, 2015	Oct. 02, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1094	Oct. 20, 2015	Oct. 19, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 04, 2016	Jan. 03, 2017
Preamplifier	Agilent	83017A	MY39501310	Dec. 11, 2015	Dec. 10, 2016
Preamplifier	EMC	EMC02325	980146	Oct. 14, 2015	Oct. 13, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16609/4	Dec. 04, 2015	Dec. 03, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16608/4	Dec. 04, 2015	Dec. 03, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16617/4	Dec. 04, 2015	Dec. 03, 2016
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-005	Dec. 04, 2015	Dec. 03, 2016
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-006	Dec. 04, 2015	Dec. 03, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jun. 29 ~ Jun. 30, 2016				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Oct. 14, 2015	Oct. 13, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2015	Nov. 26, 2016
Power Sensor	Agilent	U2021XA	MY53480019	Feb. 02, 2016	Feb. 01, 2017
Power Sensor	Agilent	U2021XA	MY53510003	Feb. 02, 2016	Feb. 01, 2017
Power Sensor	Agilent	U2021XA	MY54070003	Feb. 15, 2016	Feb. 14, 2017
Power Sensor	Agilent	U2021XA	MY54060013	Feb. 15, 2016	Feb. 14, 2017
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 26, 2015	Oct. 25, 2016
Combiner(1X2)	woken	0120A02201801O	DOM2AEW1A22	Dec. 17, 2015	Dec. 16, 2016
Combiner(1X4)	woken	0120A04056002D	111204	Dec. 17, 2015	Dec. 16, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Measurement Software	Agilent	EN RF test	1.1501125	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Adaptivity				
Test Site	(TH01-WS)				
Tested Date	May 11, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum	Keysight	N9010A	MY54510374	May 24, 2016	May 23, 2017
RF cable-4M	HUBER+SUHNER	SUCOFLEX_104	MY15686/4	Dec. 16, 2016	Dec. 15, 2017
RF cable-0.5M	HUBER+SUHNER	SUCOFLEX_104	296081/4	Dec. 16, 2016	Dec. 15, 2017
RF cable-0.2M	HUBER+SUHNER	SUCOFLEX_104	329023/4	Dec. 16, 2016	Dec. 15, 2017
RF cable-0.2M	HUBER+SUHNER	SUCOFLEX_104	329021/4	Dec. 16, 2016	Dec. 15, 2017
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050081	Apr. 15, 2017	Apr. 14, 2018
Preamplifier	Burgeon	BPA-530	100219	Nov. 02, 2016	Nov. 01, 2017
Oscilloscope	National Instruments	USB-5133	F651FF	Jun. 22, 2016	Jun. 21, 2017
Measurement Software	Sporton	Sporton_3	1.0.0.22	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Receiver Blocking				
Test Site	(05CH01-WS)				
Tested Date	May 11, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Wireless connectivity tester	ROHDE&SCHWARZ	CMW270	100856	Nov. 07, 2016	Nov. 06, 2017
Signal Generator	R&S	SMB100A	175727	Oct. 19, 2016	Oct. 18, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX_104	500202/4	Dec. 16, 2016	Dec. 15, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX_104	296088/4	Dec. 16, 2016	Dec. 15, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX_104	329023/4	Dec. 16, 2016	Dec. 15, 2017
Note: Calibration Interval of instruments listed above is one year.					

1.5 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

EN 301 893 V2.1.1 (2017-05)

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty		
Parameters	**Uncertainty**	**Limit**
Radio Frequency	±1.4 x 10^{-9}	±1 × 10^{-5}
RF power conducted	±0.808 dB	±1,5 dB
RF power radiated	±3.401 dB	±6 dB
Spurious emission, conducted	±2.994 dB	±3 dB
Spurious emission, radiated	±3.401 dB	±6 dB
Humidity	±0.6 ^{o}C	±5 %
Temperature	±0.29 %	±2 °C
Time	±0.1 %	±10 %

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
RF Conducted	TH01-WS	25°C / 65%	Ryan Lee
Radiated Emission	05CH01-WS	26°C / 66%	Ryan Lee
Adaptivity	TH01-WS	25°C / 64%	Ryan Lee
Receiver Blocking	05CH01-WS	23°C / 63%	Jack Li

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Carrier Frequencies Occupied Channel Bandwidth RF Output Power Power Spectral Density	11a HT20	5180 / 5320 / 5500 / 5700 5180 / 5320 / 5500 / 5700	6 Mbps MCS 0	1, 2, 3
Transmitter Conducted Unwanted Emissions outside the 5 GHz RLAN Bands	11a HT20	5180 / 5700 5180 / 5700	6 Mbps MCS 0	1 Note3
Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands	11a HT20	5180 / 5700 5180 / 5700	6 Mbps MCS 0	1 Note3
Transmitter Unwanted Emissions within the 5 GHz RLAN Band	11a HT20	5180 / 5320 / 5500 / 5700 5180 / 5320 / 5500 / 5700	6 Mbps MCS 0	1, 2, 3
Receiver Conducted Spurious Emissions	11a HT20	5180 / 5700 5180 / 5700	6 Mbps MCS 0	1 Note3
Receiver Spurious Emissions	11a HT20	5180 / 5700 5180 / 5700	6 Mbps MCS 0	1 Note4
Adaptivity	HT20	5180 / 5500	MCS 0	1 Note5
Receiver Blocking	11a	5180 / 5700	6 Mbps	2

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** result was found as the worst case and was shown in this report.
2. The test configurations are listed as follows:
   Configuration 1 : Dipole Antenna
   Configuration 2 : PCB Dipole Antenna
   Configuration 3 : PIFA Antenna
3. Conducted emission is only measured for configuration 1 which has maximum conducted power.
4. 50Ω terminator is connected to antenna port of EUT for radiated emission measurement.
5. Adaptivity is only tested for configuration 1 since adaptivity detection threshold Level of configuration 1 is lowest that is the worst case.
6. EUT supports two DC voltage options, 3.3Vdc and 1.8Vdc. Both options were tested and were recorded in the following sections.

3 Transmitter Test Results

3.1 Carrier Frequencies

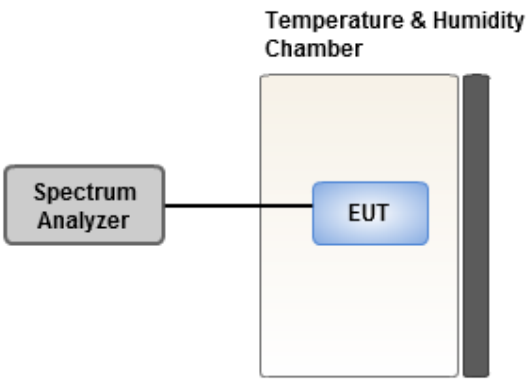
3.1.1 Limit of Carrier Frequencies

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

3.1.2 Test Procedures

Reference to clause 5.4.2.2 of ETSI EN 301 893 V2.1.1 (2017-05).

3.1.3 Test Setup



3.1.4 Test Result of Carrier Frequencies

Configuration 1: Dipole Antenna for 1.8V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07215	13.93	20
$T_{min}V_{max}$	802.11a	5180	5180.07944	15.34	20
$T_{min}V_{min}$	802.11a	5180	5180.07944	15.34	20
$T_{max}V_{max}$	802.11a	5180	5180.06678	12.89	20
$T_{max}V_{min}$	802.11a	5180	5180.06678	12.89	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07261	13.65	20
$T_{min}V_{max}$	802.11a	5320	5320.07865	14.78	20
$T_{min}V_{min}$	802.11a	5320	5320.07865	14.78	20
$T_{max}V_{max}$	802.11a	5320	5320.06771	12.73	20
$T_{max}V_{min}$	802.11a	5320	5320.06771	12.73	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07275	13.23	20
$T_{min}V_{max}$	802.11a	5500	5500.07954	14.46	20
$T_{min}V_{min}$	802.11a	5500	5500.07954	14.46	20
$T_{max}V_{max}$	802.11a	5500	5500.06648	12.09	20
$T_{max}V_{min}$	802.11a	5500	5500.06648	12.09	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07285	12.78	20
$T_{min}V_{max}$	802.11a	5700	5700.07862	13.79	20
$T_{min}V_{min}$	802.11a	5700	5700.07862	13.79	20
$T_{max}V_{max}$	802.11a	5700	5700.06684	11.73	20
$T_{max}V_{min}$	802.11a	5700	5700.06684	11.73	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07281	14.06	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07835	15.13	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07835	15.13	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06916	13.35	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06916	13.35	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07225	13.58	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07788	14.64	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07788	14.64	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06815	12.81	20
$T_{max}V_{min}$	802.11n HT20	5320	5500.07255	12.81	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07787	13.19	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07787	14.16	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.06930	14.16	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06930	12.60	20
$T_{max}V_{min}$	802.11n HT20	5500	5700.07242	12.60	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07744	12.71	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07744	13.59	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.06858	13.59	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06858	12.03	20
$T_{max}V_{min}$	802.11n HT20	5700	5500.07255	12.03	20

Configuration 1: Dipole Antenna for 3.3V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07212	13.92	20
$T_{min}V_{max}$	802.11a	5180	5180.07965	15.38	20
$T_{min}V_{min}$	802.11a	5180	5180.07965	15.38	20
$T_{max}V_{max}$	802.11a	5180	5180.06667	12.87	20
$T_{max}V_{min}$	802.11a	5180	5180.06667	12.87	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07269	13.66	20
$T_{min}V_{max}$	802.11a	5320	5320.07890	14.83	20
$T_{min}V_{min}$	802.11a	5320	5320.07890	14.83	20
$T_{max}V_{max}$	802.11a	5320	5320.06756	12.70	20
$T_{max}V_{min}$	802.11a	5320	5320.06756	12.70	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07275	13.23	20
$T_{min}V_{max}$	802.11a	5500	5500.07944	14.44	20
$T_{min}V_{min}$	802.11a	5500	5500.07944	14.44	20
$T_{max}V_{max}$	802.11a	5500	5500.06629	12.05	20
$T_{max}V_{min}$	802.11a	5500	5500.06629	12.05	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07285	12.78	20
$T_{min}V_{max}$	802.11a	5700	5700.07844	13.76	20
$T_{min}V_{min}$	802.11a	5700	5700.07844	13.76	20
$T_{max}V_{max}$	802.11a	5700	5700.06679	11.72	20
$T_{max}V_{min}$	802.11a	5700	5700.06679	11.72	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07286	14.07	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07816	15.09	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07816	15.09	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06897	13.31	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06897	13.31	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07224	13.58	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07769	14.60	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07769	14.60	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06798	12.78	20
$T_{max}V_{min}$	802.11n HT20	5320	5320.06798	12.78	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07254	13.19	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07775	14.14	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.07775	14.14	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06894	12.53	20
$T_{max}V_{min}$	802.11n HT20	5500	5500.06894	12.53	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07245	12.71	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07789	13.66	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.07789	13.66	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06834	11.99	20
$T_{max}V_{min}$	802.11n HT20	5700	5700.06834	11.99	20

Configuration 2: PCB Dipole Antenna for 1.8V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07250	14.00	20
$T_{min}V_{max}$	802.11a	5180	5180.07944	15.34	20
$T_{min}V_{min}$	802.11a	5180	5180.07944	15.34	20
$T_{max}V_{max}$	802.11a	5180	5180.06675	12.89	20
$T_{max}V_{min}$	802.11a	5180	5180.06675	12.89	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07267	13.66	20
$T_{min}V_{max}$	802.11a	5320	5320.07861	14.78	20
$T_{min}V_{min}$	802.11a	5320	5320.07861	14.78	20
$T_{max}V_{max}$	802.11a	5320	5320.06775	12.73	20
$T_{max}V_{min}$	802.11a	5320	5320.06775	12.73	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07240	13.16	20
$T_{min}V_{max}$	802.11a	5500	5500.07955	14.46	20
$T_{min}V_{min}$	802.11a	5500	5500.07955	14.46	20
$T_{max}V_{max}$	802.11a	5500	5500.06647	12.09	20
$T_{max}V_{min}$	802.11a	5500	5500.06647	12.09	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07285	12.78	20
$T_{min}V_{max}$	802.11a	5700	5700.07861	13.79	20
$T_{min}V_{min}$	802.11a	5700	5700.07861	13.79	20
$T_{max}V_{max}$	802.11a	5700	5700.06688	11.73	20
$T_{max}V_{min}$	802.11a	5700	5700.06688	11.73	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07285	14.06	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07835	15.13	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07835	15.13	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06911	13.34	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06911	13.34	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07227	13.58	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07785	14.63	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07785	14.63	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06819	12.82	20
$T_{max}V_{min}$	802.11n HT20	5320	5320.06819	12.82	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07259	13.20	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07787	14.16	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.07787	14.16	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06940	12.62	20
$T_{max}V_{min}$	802.11n HT20	5500	5500.06940	12.62	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07249	12.72	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07748	13.59	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.07748	13.59	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06857	12.03	20
$T_{max}V_{min}$	802.11n HT20	5700	5700.06857	12.03	20

Configuration 2: PCB Dipole Antenna for 3.3V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07215	13.93	20
$T_{min}V_{max}$	802.11a	5180	5180.07961	15.37	20
$T_{min}V_{min}$	802.11a	5180	5180.07961	15.37	20
$T_{max}V_{max}$	802.11a	5180	5180.06665	12.87	20
$T_{max}V_{min}$	802.11a	5180	5180.06665	12.87	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07262	13.65	20
$T_{min}V_{max}$	802.11a	5320	5320.07885	14.82	20
$T_{min}V_{min}$	802.11a	5320	5320.07885	14.82	20
$T_{max}V_{max}$	802.11a	5320	5320.06744	12.68	20
$T_{max}V_{min}$	802.11a	5320	5320.06744	12.68	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07275	13.23	20
$T_{min}V_{max}$	802.11a	5500	5500.07944	14.44	20
$T_{min}V_{min}$	802.11a	5500	5500.07944	14.44	20
$T_{max}V_{max}$	802.11a	5500	5500.06628	12.05	20
$T_{max}V_{min}$	802.11a	5500	5500.06628	12.05	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07282	12.78	20
$T_{min}V_{max}$	802.11a	5700	5700.07844	13.76	20
$T_{min}V_{min}$	802.11a	5700	5700.07844	13.76	20
$T_{max}V_{max}$	802.11a	5700	5700.06678	11.72	20
$T_{max}V_{min}$	802.11a	5700	5700.06678	11.72	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07287	14.07	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07814	15.08	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07814	15.08	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06898	13.32	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06898	13.32	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07225	13.58	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07768	14.60	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07768	14.60	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06792	12.77	20
$T_{max}V_{min}$	802.11n HT20	5320	5320.06792	12.77	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07251	13.18	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07777	14.14	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.07777	14.14	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06895	12.54	20
$T_{max}V_{min}$	802.11n HT20	5500	5500.06895	12.54	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07249	12.72	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07785	13.66	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.07785	13.66	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06831	11.98	20
$T_{max}V_{min}$	802.11n HT20	5700	5700.06831	11.98	20

Configuration 3: PIFA Antenna for 1.8V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07214	13.93	20
$T_{min}V_{max}$	802.11a	5180	5180.07947	15.34	20
$T_{min}V_{min}$	802.11a	5180	5180.07947	15.34	20
$T_{max}V_{max}$	802.11a	5180	5180.06675	12.89	20
$T_{max}V_{min}$	802.11a	5180	5180.06675	12.89	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07264	13.65	20
$T_{min}V_{max}$	802.11a	5320	5320.07869	14.79	20
$T_{min}V_{min}$	802.11a	5320	5320.07869	14.79	20
$T_{max}V_{max}$	802.11a	5320	5320.06774	12.73	20
$T_{max}V_{min}$	802.11a	5320	5320.06774	12.73	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07274	13.23	20
$T_{min}V_{max}$	802.11a	5500	5500.07954	14.46	20
$T_{min}V_{min}$	802.11a	5500	5500.07954	14.46	20
$T_{max}V_{max}$	802.11a	5500	5500.06642	12.08	20
$T_{max}V_{min}$	802.11a	5500	5500.06642	12.08	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07288	12.79	20
$T_{min}V_{max}$	802.11a	5700	5700.07864	13.80	20
$T_{min}V_{min}$	802.11a	5700	5700.07864	13.80	20
$T_{max}V_{max}$	802.11a	5700	5700.06682	11.72	20
$T_{max}V_{min}$	802.11a	5700	5700.06682	11.72	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07284	14.06	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07837	15.13	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07837	15.13	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06915	13.35	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06915	13.35	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07229	13.59	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07785	14.63	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07785	14.63	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06814	12.81	20
$T_{max}V_{min}$	802.11n HT20	5320	5320.06814	12.81	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07251	13.18	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07787	14.16	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.07787	14.16	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06950	12.64	20
$T_{max}V_{min}$	802.11n HT20	5500	5500.06950	12.64	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07246	12.71	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07742	13.58	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.07742	13.58	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06857	12.03	20
$T_{max}V_{min}$	802.11n HT20	5700	5700.06857	12.03	20

Configuration 3: PIFA Antenna for 3.3V

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11a	5180	5180.07215	13.93	20
$T_{min}V_{max}$	802.11a	5180	5180.07964	15.37	20
$T_{min}V_{min}$	802.11a	5180	5180.07964	15.37	20
$T_{max}V_{max}$	802.11a	5180	5180.06662	12.86	20
$T_{max}V_{min}$	802.11a	5180	5180.06662	12.86	20
$T_{nom}V_{nom}$	802.11a	5320	5320.07264	13.65	20
$T_{min}V_{max}$	802.11a	5320	5320.07887	14.83	20
$T_{min}V_{min}$	802.11a	5320	5320.07887	14.83	20
$T_{max}V_{max}$	802.11a	5320	5320.06745	12.68	20
$T_{max}V_{min}$	802.11a	5320	5320.06745	12.68	20
$T_{nom}V_{nom}$	802.11a	5500	5500.07250	13.18	20
$T_{min}V_{max}$	802.11a	5500	5500.07947	14.45	20
$T_{min}V_{min}$	802.11a	5500	5500.07947	14.45	20
$T_{max}V_{max}$	802.11a	5500	5500.06625	12.05	20
$T_{max}V_{min}$	802.11a	5500	5500.06625	12.05	20
$T_{nom}V_{nom}$	802.11a	5700	5700.07282	12.78	20
$T_{min}V_{max}$	802.11a	5700	5700.07844	13.76	20
$T_{min}V_{min}$	802.11a	5700	5700.07844	13.76	20
$T_{max}V_{max}$	802.11a	5700	5700.06678	11.72	20
$T_{max}V_{min}$	802.11a	5700	5700.06678	11.72	20

Condition	Modulation Mode	Freq. (MHz)	Carrier Centre Frequencies (ppm)		Limit (ppm)
			Freqeuncy (MHz)	Carrier Stability	
$T_{nom}V_{nom}$	802.11n HT20	5180	5180.07287	14.07	20
$T_{min}V_{max}$	802.11n HT20	5180	5180.07810	15.08	20
$T_{min}V_{min}$	802.11n HT20	5180	5180.07810	15.08	20
$T_{max}V_{max}$	802.11n HT20	5180	5180.06898	13.32	20
$T_{max}V_{min}$	802.11n HT20	5180	5180.06898	13.32	20
$T_{nom}V_{nom}$	802.11n HT20	5320	5320.07225	13.58	20
$T_{min}V_{max}$	802.11n HT20	5320	5320.07769	14.60	20
$T_{min}V_{min}$	802.11n HT20	5320	5320.07769	14.60	20
$T_{max}V_{max}$	802.11n HT20	5320	5320.06794	12.77	20
$T_{max}V_{min}$	802.11n HT20	5320	5320.06794	12.77	20
$T_{nom}V_{nom}$	802.11n HT20	5500	5500.07259	13.20	20
$T_{min}V_{max}$	802.11n HT20	5500	5500.07774	14.13	20
$T_{min}V_{min}$	802.11n HT20	5500	5500.07774	14.13	20
$T_{max}V_{max}$	802.11n HT20	5500	5500.06894	12.53	20
$T_{max}V_{min}$	802.11n HT20	5500	5500.06894	12.53	20
$T_{nom}V_{nom}$	802.11n HT20	5700	5700.07241	12.70	20
$T_{min}V_{max}$	802.11n HT20	5700	5700.07787	13.66	20
$T_{min}V_{min}$	802.11n HT20	5700	5700.07787	13.66	20
$T_{max}V_{max}$	802.11n HT20	5700	5700.06835	11.99	20
$T_{max}V_{min}$	802.11n HT20	5700	5700.06835	11.99	20

3.2 Occupied Channel Bandwidth

3.2.1 Limit of Occupied Channel Bandwidth

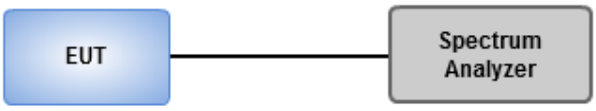
The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.
The Occupied Channel Bandwidth might change with time/payload.

3.2.2 Test Procedures

Reference to clause 5.4.3.2 of ETSI EN 301 893 V2.1.1 (2017-05).

3.2.3 Test Setup



3.2.4 Test Result of Occupied Channel Bandwidth

Configuration 1: Dipole Antenna

Modulation Mode	Frequency (MHz)	Occupied Channel Bandwidth (MHz)	Occupied Channel Bandwidth Limit (MHz)
802.11a	5180	16.43	16-20
802.11a	5320	16.38	16-20
802.11a	5500	16.43	16-20
802.11a	5700	16.38	16-20
802.11n HT20	5180	17.65	16-20
802.11n HT20	5320	17.59	16-20
802.11n HT20	5500	17.59	16-20
802.11n HT20	5700	17.59	16-20

Configuration 2: PCB Dipole Antenna

Modulation Mode	Frequency (MHz)	Occupied Channel Bandwidth (MHz)	Occupied Channel Bandwidth Limit (MHz)
802.11a	5180	16.38	16-20
802.11a	5320	16.38	16-20
802.11a	5500	16.38	16-20
802.11a	5700	16.38	16-20
802.11n HT20	5180	17.53	16-20
802.11n HT20	5320	17.59	16-20
802.11n HT20	5500	17.59	16-20
802.11n HT20	5700	17.59	16-20

Configuration 3: PIFA Antenna

Modulation Mode	Frequency (MHz)	Occupied Channel Bandwidth (MHz)	Occupied Channel Bandwidth Limit (MHz)
802.11a	5180	16.38	16-20
802.11a	5320	16.38	16-20
802.11a	5500	16.38	16-20
802.11a	5700	16.38	16-20
802.11n HT20	5180	17.59	16-20
802.11n HT20	5320	17.59	16-20
802.11n HT20	5500	17.59	16-20
802.11n HT20	5700	17.59	16-20

3.3 RF Output Power, Transmit Power Control (TPC) and Power Density

3.3.1 Limit of RF Output Power, Transmit Power Control (TPC) and Power Density

Mean e.i.r.p. limits for RF output power and Power Density at the highest power level (P_H)

Frequency range (MHz)	Mean e.i.r.p. limit for P_H (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 frequency range 5 250 MHz to 5 350 MHz.

Mean e.i.r.p. limits for RF Output Power at the lowest power level of the TPC range

Frequency range (MHz)	Mean e.i.r.p. (dBm) limit for P_L
5 250 to 5 350	17
5 470 to 5 725	24 (see note)

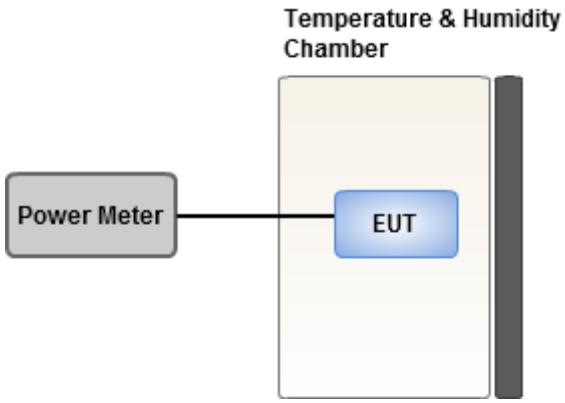
Note: Slave devices without a *Radar Interference Detection* function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

3.3.2 Test Procedures

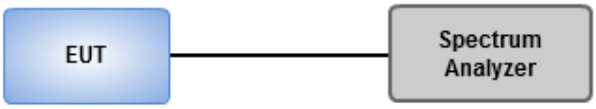
Reference to clause 5.4.4.2 of ETSI EN 301 893 V2.1.1 (2017-05).

3.3.3 Test Setup

For RF Output Power, Transmit Power Control (TPC)



For Power Density



3.3.4 Test Result of RF Output Power at the Highest Power

Configuration 1: Dipole Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.73	23
$T_{min}V_{max}$	5180	20.98	23
$T_{min}V_{min}$	5180	21.00	23
$T_{max}V_{max}$	5180	20.18	23
$T_{max}V_{min}$	5180	20.15	23
$T_{nom}V_{nom}$	5320	20.75	23
$T_{min}V_{max}$	5320	20.89	23
$T_{min}V_{min}$	5320	20.91	23
$T_{max}V_{max}$	5320	20.53	23
$T_{max}V_{min}$	5320	20.51	23
$T_{nom}V_{nom}$	5500	21.41	23
$T_{min}V_{max}$	5500	22.03	23
$T_{min}V_{min}$	5500	22.05	23
$T_{max}V_{max}$	5500	21.02	23
$T_{max}V_{min}$	5500	20.99	23
$T_{nom}V_{nom}$	5700	21.27	23
$T_{min}V_{max}$	5700	21.22	23
$T_{min}V_{min}$	5700	21.25	23
$T_{max}V_{max}$	5700	20.40	23
$T_{max}V_{min}$	5700	20.38	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.54	23
$T_{min}V_{max}$	5180	19.44	23
$T_{min}V_{min}$	5180	19.47	23
$T_{max}V_{max}$	5180	18.41	23
$T_{max}V_{min}$	5180	18.39	23
$T_{nom}V_{nom}$	5320	20.67	23
$T_{min}V_{max}$	5320	18.87	23
$T_{min}V_{min}$	5320	18.89	23
$T_{max}V_{max}$	5320	20.06	23
$T_{max}V_{min}$	5320	20.04	23
$T_{nom}V_{nom}$	5500	21.15	23
$T_{min}V_{max}$	5500	20.30	23
$T_{min}V_{min}$	5500	20.33	23
$T_{max}V_{max}$	5500	19.72	23
$T_{max}V_{min}$	5500	19.70	23
$T_{nom}V_{nom}$	5700	21.54	23
$T_{min}V_{max}$	5700	21.32	23
$T_{min}V_{min}$	5700	21.34	23
$T_{max}V_{max}$	5700	20.37	23
$T_{max}V_{min}$	5700	20.35	23

Configuration 1: Dipole Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.73	23
$T_{min}V_{max}$	5180	21.10	23
$T_{min}V_{min}$	5180	21.12	23
$T_{max}V_{max}$	5180	20.30	23
$T_{max}V_{min}$	5180	20.27	23
$T_{nom}V_{nom}$	5320	20.75	23
$T_{min}V_{max}$	5320	21.00	23
$T_{min}V_{min}$	5320	21.02	23
$T_{max}V_{max}$	5320	20.64	23
$T_{max}V_{min}$	5320	20.62	23
$T_{nom}V_{nom}$	5500	21.41	23
$T_{min}V_{max}$	5500	21.84	23
$T_{min}V_{min}$	5500	21.86	23
$T_{max}V_{max}$	5500	20.83	23
$T_{max}V_{min}$	5500	20.80	23
$T_{nom}V_{nom}$	5700	21.27	23
$T_{min}V_{max}$	5700	21.33	23
$T_{min}V_{min}$	5700	21.36	23
$T_{max}V_{max}$	5700	20.51	23
$T_{max}V_{min}$	5700	20.49	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.54	23
$T_{min}V_{max}$	5180	19.52	23
$T_{min}V_{min}$	5180	19.55	23
$T_{max}V_{max}$	5180	18.49	23
$T_{max}V_{min}$	5180	18.47	23
$T_{nom}V_{nom}$	5320	20.67	23
$T_{min}V_{max}$	5320	18.95	23
$T_{min}V_{min}$	5320	18.97	23
$T_{max}V_{max}$	5320	20.14	23
$T_{max}V_{min}$	5320	20.12	23
$T_{nom}V_{nom}$	5500	21.15	23
$T_{min}V_{max}$	5500	20.40	23
$T_{min}V_{min}$	5500	20.43	23
$T_{max}V_{max}$	5500	19.82	23
$T_{max}V_{min}$	5500	19.80	23
$T_{nom}V_{nom}$	5700	21.54	23
$T_{min}V_{max}$	5700	21.37	23
$T_{min}V_{min}$	5700	21.39	23
$T_{max}V_{max}$	5700	20.42	23
$T_{max}V_{min}$	5700	20.40	23

Configuration 2: PCB Dipole Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.89	23
$T_{min}V_{max}$	5180	21.22	23
$T_{min}V_{min}$	5180	21.24	23
$T_{max}V_{max}$	5180	20.42	23
$T_{max}V_{min}$	5180	20.39	23
$T_{nom}V_{nom}$	5320	21.06	23
$T_{min}V_{max}$	5320	21.20	23
$T_{min}V_{min}$	5320	21.22	23
$T_{max}V_{max}$	5320	20.84	23
$T_{max}V_{min}$	5320	20.82	23
$T_{nom}V_{nom}$	5500	21.63	23
$T_{min}V_{max}$	5500	21.90	23
$T_{min}V_{min}$	5500	21.92	23
$T_{max}V_{max}$	5500	20.89	23
$T_{max}V_{min}$	5500	20.86	23
$T_{nom}V_{nom}$	5700	21.25	23
$T_{min}V_{max}$	5700	21.21	23
$T_{min}V_{min}$	5700	21.24	23
$T_{max}V_{max}$	5700	20.39	23
$T_{max}V_{min}$	5700	20.37	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.88	23
$T_{min}V_{max}$	5180	19.77	23
$T_{min}V_{min}$	5180	19.80	23
$T_{max}V_{max}$	5180	18.74	23
$T_{max}V_{min}$	5180	18.72	23
$T_{nom}V_{nom}$	5320	20.94	23
$T_{min}V_{max}$	5320	19.14	23
$T_{min}V_{min}$	5320	19.16	23
$T_{max}V_{max}$	5320	20.33	23
$T_{max}V_{min}$	5320	20.31	23
$T_{nom}V_{nom}$	5500	21.75	23
$T_{min}V_{max}$	5500	20.88	23
$T_{min}V_{min}$	5500	20.91	23
$T_{max}V_{max}$	5500	20.30	23
$T_{max}V_{min}$	5500	20.28	23
$T_{nom}V_{nom}$	5700	21.52	23
$T_{min}V_{max}$	5700	21.27	23
$T_{min}V_{min}$	5700	21.29	23
$T_{max}V_{max}$	5700	20.32	23
$T_{max}V_{min}$	5700	20.30	23

Configuration 2: PCB Dipole Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.89	23
$T_{min}V_{max}$	5180	21.26	23
$T_{min}V_{min}$	5180	21.28	23
$T_{max}V_{max}$	5180	20.46	23
$T_{max}V_{min}$	5180	20.43	23
$T_{nom}V_{nom}$	5320	21.06	23
$T_{min}V_{max}$	5320	21.31	23
$T_{min}V_{min}$	5320	21.33	23
$T_{max}V_{max}$	5320	20.95	23
$T_{max}V_{min}$	5320	20.93	23
$T_{nom}V_{nom}$	5500	21.63	23
$T_{min}V_{max}$	5500	22.06	23
$T_{min}V_{min}$	5500	**22.08**	23
$T_{max}V_{max}$	5500	21.05	23
$T_{max}V_{min}$	5500	21.02	23
$T_{nom}V_{nom}$	5700	21.25	23
$T_{min}V_{max}$	5700	21.31	23
$T_{min}V_{min}$	5700	21.34	23
$T_{max}V_{max}$	5700	20.49	23
$T_{max}V_{min}$	5700	20.47	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.88	23
$T_{min}V_{max}$	5180	19.86	23
$T_{min}V_{min}$	5180	19.89	23
$T_{max}V_{max}$	5180	18.83	23
$T_{max}V_{min}$	5180	18.81	23
$T_{nom}V_{nom}$	5320	20.94	23
$T_{min}V_{max}$	5320	19.22	23
$T_{min}V_{min}$	5320	19.24	23
$T_{max}V_{max}$	5320	20.41	23
$T_{max}V_{min}$	5320	20.39	23
$T_{nom}V_{nom}$	5500	21.75	23
$T_{min}V_{max}$	5500	21.00	23
$T_{min}V_{min}$	5500	21.03	23
$T_{max}V_{max}$	5500	20.42	23
$T_{max}V_{min}$	5500	20.40	23
$T_{nom}V_{nom}$	5700	21.52	23
$T_{min}V_{max}$	5700	21.35	23
$T_{min}V_{min}$	5700	21.37	23
$T_{max}V_{max}$	5700	20.40	23
$T_{max}V_{min}$	5700	20.38	23

Configuration 3: PIFA Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	21.04	23
$T_{min}V_{max}$	5180	21.37	23
$T_{min}V_{min}$	5180	21.39	23
$T_{max}V_{max}$	5180	20.57	23
$T_{max}V_{min}$	5180	20.54	23
$T_{nom}V_{nom}$	5320	20.94	23
$T_{min}V_{max}$	5320	21.07	23
$T_{min}V_{min}$	5320	21.09	23
$T_{max}V_{max}$	5320	20.71	23
$T_{max}V_{min}$	5320	20.69	23
$T_{nom}V_{nom}$	5500	21.33	23
$T_{min}V_{max}$	5500	21.60	23
$T_{min}V_{min}$	5500	21.62	23
$T_{max}V_{max}$	5500	20.59	23
$T_{max}V_{min}$	5500	20.56	23
$T_{nom}V_{nom}$	5700	21.01	23
$T_{min}V_{max}$	5700	20.97	23
$T_{min}V_{min}$	5700	21.00	23
$T_{max}V_{max}$	5700	20.15	23
$T_{max}V_{min}$	5700	20.13	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.64	23
$T_{min}V_{max}$	5180	19.50	23
$T_{min}V_{min}$	5180	19.53	23
$T_{max}V_{max}$	5180	18.47	23
$T_{max}V_{min}$	5180	18.45	23
$T_{nom}V_{nom}$	5320	20.90	23
$T_{min}V_{max}$	5320	19.06	23
$T_{min}V_{min}$	5320	19.08	23
$T_{max}V_{max}$	5320	20.25	23
$T_{max}V_{min}$	5320	20.23	23
$T_{nom}V_{nom}$	5500	21.15	23
$T_{min}V_{max}$	5500	20.28	23
$T_{min}V_{min}$	5500	20.31	23
$T_{max}V_{max}$	5500	19.70	23
$T_{max}V_{min}$	5500	19.68	23
$T_{nom}V_{nom}$	5700	21.24	23
$T_{min}V_{max}$	5700	21.02	23
$T_{min}V_{min}$	5700	21.04	23
$T_{max}V_{max}$	5700	20.07	23
$T_{max}V_{min}$	5700	20.05	23

Configuration 3: PIFA Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	21.04	23
$T_{min}V_{max}$	5180	21.41	23
$T_{min}V_{min}$	5180	**21.43**	23
$T_{max}V_{max}$	5180	20.61	23
$T_{max}V_{min}$	5180	20.58	23
$T_{nom}V_{nom}$	5320	20.94	23
$T_{min}V_{max}$	5320	21.19	23
$T_{min}V_{min}$	5320	21.21	23
$T_{max}V_{max}$	5320	20.83	23
$T_{max}V_{min}$	5320	20.81	23
$T_{nom}V_{nom}$	5500	**21.33**	23
$T_{min}V_{max}$	5500	21.76	23
$T_{min}V_{min}$	5500	21.78	23
$T_{max}V_{max}$	5500	20.75	23
$T_{max}V_{min}$	5500	20.72	23
$T_{nom}V_{nom}$	5700	21.01	23
$T_{min}V_{max}$	5700	21.07	23
$T_{min}V_{min}$	5700	21.10	23
$T_{max}V_{max}$	5700	20.25	23
$T_{max}V_{min}$	5700	20.23	23

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5180	20.64	23
$T_{min}V_{max}$	5180	19.62	23
$T_{min}V_{min}$	5180	19.65	23
$T_{max}V_{max}$	5180	18.59	23
$T_{max}V_{min}$	5180	18.57	23
$T_{nom}V_{nom}$	5320	20.90	23
$T_{min}V_{max}$	5320	19.18	23
$T_{min}V_{min}$	5320	19.20	23
$T_{max}V_{max}$	5320	20.37	23
$T_{max}V_{min}$	5320	20.35	23
$T_{nom}V_{nom}$	5500	21.15	23
$T_{min}V_{max}$	5500	20.40	23
$T_{min}V_{min}$	5500	20.43	23
$T_{max}V_{max}$	5500	19.82	23
$T_{max}V_{min}$	5500	19.80	23
$T_{nom}V_{nom}$	5700	21.24	23
$T_{min}V_{max}$	5700	21.07	23
$T_{min}V_{min}$	5700	21.09	23
$T_{max}V_{max}$	5700	20.12	23
$T_{max}V_{min}$	5700	20.10	23

3.3.5 Test Result of RF Output Power at the Lowest Power

Configuration 1: Dipole Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.75	17
$T_{min}V_{max}$	5320	14.89	17
$T_{min}V_{min}$	5320	14.91	17
$T_{max}V_{max}$	5320	14.53	17
$T_{max}V_{min}$	5320	14.51	17
$T_{nom}V_{nom}$	5500	15.41	17
$T_{min}V_{max}$	5500	16.03	17
$T_{min}V_{min}$	5500	16.05	17
$T_{max}V_{max}$	5500	15.02	17
$T_{max}V_{min}$	5500	14.99	17
$T_{nom}V_{nom}$	5700	15.27	17
$T_{min}V_{max}$	5700	15.22	17
$T_{min}V_{min}$	5700	15.25	17
$T_{max}V_{max}$	5700	14.40	17
$T_{max}V_{min}$	5700	14.38	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.67	17
$T_{min}V_{max}$	5320	12.87	17
$T_{min}V_{min}$	5320	12.89	17
$T_{max}V_{max}$	5320	14.06	17
$T_{max}V_{min}$	5320	14.04	17
$T_{nom}V_{nom}$	5500	15.15	17
$T_{min}V_{max}$	5500	14.30	17
$T_{min}V_{min}$	5500	14.33	17
$T_{max}V_{max}$	5500	13.72	17
$T_{max}V_{min}$	5500	13.70	17
$T_{nom}V_{nom}$	5700	15.54	17
$T_{min}V_{max}$	5700	15.32	17
$T_{min}V_{min}$	5700	15.34	17
$T_{max}V_{max}$	5700	14.37	17
$T_{max}V_{min}$	5700	14.35	17

Configuration 1: Dipole Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.75	17
$T_{min}V_{max}$	5320	15.00	17
$T_{min}V_{min}$	5320	15.02	17
$T_{max}V_{max}$	5320	14.64	17
$T_{max}V_{min}$	5320	14.62	17
$T_{nom}V_{nom}$	5500	15.41	17
$T_{min}V_{max}$	5500	15.84	17
$T_{min}V_{min}$	5500	15.86	17
$T_{max}V_{max}$	5500	14.83	17
$T_{max}V_{min}$	5500	14.80	17
$T_{nom}V_{nom}$	5700	15.27	17
$T_{min}V_{max}$	5700	15.33	17
$T_{min}V_{min}$	5700	15.36	17
$T_{max}V_{max}$	5700	14.51	17
$T_{max}V_{min}$	5700	14.49	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.67	17
$T_{min}V_{max}$	5320	12.95	17
$T_{min}V_{min}$	5320	12.97	17
$T_{max}V_{max}$	5320	14.14	17
$T_{max}V_{min}$	5320	14.12	17
$T_{nom}V_{nom}$	5500	15.15	17
$T_{min}V_{max}$	5500	14.40	17
$T_{min}V_{min}$	5500	14.43	17
$T_{max}V_{max}$	5500	13.82	17
$T_{max}V_{min}$	5500	13.80	17
$T_{nom}V_{nom}$	5700	15.54	17
$T_{min}V_{max}$	5700	15.37	17
$T_{min}V_{min}$	5700	15.39	17
$T_{max}V_{max}$	5700	14.42	17
$T_{max}V_{min}$	5700	14.40	17

Configuration 2: PCB Dipole Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	15.06	17
$T_{min}V_{max}$	5320	15.20	17
$T_{min}V_{min}$	5320	15.22	17
$T_{max}V_{max}$	5320	14.84	17
$T_{max}V_{min}$	5320	14.82	17
$T_{nom}V_{nom}$	5500	15.63	17
$T_{min}V_{max}$	5500	15.90	17
$T_{min}V_{min}$	5500	15.92	17
$T_{max}V_{max}$	5500	14.89	17
$T_{max}V_{min}$	5500	14.86	17
$T_{nom}V_{nom}$	5700	15.25	17
$T_{min}V_{max}$	5700	15.21	17
$T_{min}V_{min}$	5700	15.24	17
$T_{max}V_{max}$	5700	14.39	17
$T_{max}V_{min}$	5700	14.37	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.94	17
$T_{min}V_{max}$	5320	13.14	17
$T_{min}V_{min}$	5320	13.16	17
$T_{max}V_{max}$	5320	14.33	17
$T_{max}V_{min}$	5320	14.31	17
$T_{nom}V_{nom}$	5500	15.75	17
$T_{min}V_{max}$	5500	14.88	17
$T_{min}V_{min}$	5500	14.91	17
$T_{max}V_{max}$	5500	14.30	17
$T_{max}V_{min}$	5500	14.28	17
$T_{nom}V_{nom}$	5700	15.52	17
$T_{min}V_{max}$	5700	15.27	17
$T_{min}V_{min}$	5700	15.29	17
$T_{max}V_{max}$	5700	14.32	17
$T_{max}V_{min}$	5700	14.30	17

Configuration 2: PCB Dipole Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	15.06	17
$T_{min}V_{max}$	5320	15.31	17
$T_{min}V_{min}$	5320	15.33	17
$T_{max}V_{max}$	5320	14.95	17
$T_{max}V_{min}$	5320	14.93	17
$T_{nom}V_{nom}$	5500	15.63	17
$T_{min}V_{max}$	5500	16.06	17
$T_{min}V_{min}$	5500	16.08	17
$T_{max}V_{max}$	5500	15.05	17
$T_{max}V_{min}$	5500	15.02	17
$T_{nom}V_{nom}$	5700	15.25	17
$T_{min}V_{max}$	5700	15.31	17
$T_{min}V_{min}$	5700	15.34	17
$T_{max}V_{max}$	5700	14.49	17
$T_{max}V_{min}$	5700	14.47	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.94	17
$T_{min}V_{max}$	5320	13.22	17
$T_{min}V_{min}$	5320	13.24	17
$T_{max}V_{max}$	5320	14.41	17
$T_{max}V_{min}$	5320	14.39	17
$T_{nom}V_{nom}$	5500	15.75	17
$T_{min}V_{max}$	5500	15.00	17
$T_{min}V_{min}$	5500	15.03	17
$T_{max}V_{max}$	5500	14.42	17
$T_{max}V_{min}$	5500	14.40	17
$T_{nom}V_{nom}$	5700	15.52	17
$T_{min}V_{max}$	5700	15.35	17
$T_{min}V_{min}$	5700	15.37	17
$T_{max}V_{max}$	5700	14.40	17
$T_{max}V_{min}$	5700	14.38	17

Configuration 3: PIFA Antenna for 1.8V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.94	17
$T_{min}V_{max}$	5320	15.07	17
$T_{min}V_{min}$	5320	15.09	17
$T_{max}V_{max}$	5320	14.71	17
$T_{max}V_{min}$	5320	14.69	17
$T_{nom}V_{nom}$	5500	15.33	17
$T_{min}V_{max}$	5500	15.60	17
$T_{min}V_{min}$	5500	15.62	17
$T_{max}V_{max}$	5500	14.59	17
$T_{max}V_{min}$	5500	14.56	17
$T_{nom}V_{nom}$	5700	15.01	17
$T_{min}V_{max}$	5700	14.97	17
$T_{min}V_{min}$	5700	15.00	17
$T_{max}V_{max}$	5700	14.15	17
$T_{max}V_{min}$	5700	14.13	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.90	17
$T_{min}V_{max}$	5320	13.06	17
$T_{min}V_{min}$	5320	13.08	17
$T_{max}V_{max}$	5320	14.25	17
$T_{max}V_{min}$	5320	14.23	17
$T_{nom}V_{nom}$	5500	15.15	17
$T_{min}V_{max}$	5500	14.28	17
$T_{min}V_{min}$	5500	14.31	17
$T_{max}V_{max}$	5500	13.70	17
$T_{max}V_{min}$	5500	13.68	17
$T_{nom}V_{nom}$	5700	15.24	17
$T_{min}V_{max}$	5700	15.02	17
$T_{min}V_{min}$	5700	15.04	17
$T_{max}V_{max}$	5700	14.07	17
$T_{max}V_{min}$	5700	14.05	17

Configuration 3: PIFA Antenna for 3.3V

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11a**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.94	17
$T_{min}V_{max}$	5320	15.19	17
$T_{min}V_{min}$	5320	15.21	17
$T_{max}V_{max}$	5320	14.83	17
$T_{max}V_{min}$	5320	14.81	17
$T_{nom}V_{nom}$	5500	15.33	17
$T_{min}V_{max}$	5500	15.76	17
$T_{min}V_{min}$	5500	15.78	17
$T_{max}V_{max}$	5500	14.75	17
$T_{max}V_{min}$	5500	14.72	17
$T_{nom}V_{nom}$	5700	15.01	17
$T_{min}V_{max}$	5700	15.07	17
$T_{min}V_{min}$	5700	15.10	17
$T_{max}V_{max}$	5700	14.25	17
$T_{max}V_{min}$	5700	14.23	17

Maximum Transmit Power (dBm)			
Condition	**Freq. (MHz)**	**802.11n HT20**	**Limit (dBm)**
$T_{nom}V_{nom}$	5320	14.90	17
$T_{min}V_{max}$	5320	13.18	17
$T_{min}V_{min}$	5320	13.20	17
$T_{max}V_{max}$	5320	14.37	17
$T_{max}V_{min}$	5320	14.35	17
$T_{nom}V_{nom}$	5500	15.15	17
$T_{min}V_{max}$	5500	14.40	17
$T_{min}V_{min}$	5500	14.43	17
$T_{max}V_{max}$	5500	13.82	17
$T_{max}V_{min}$	5500	13.80	17
$T_{nom}V_{nom}$	5700	15.24	17
$T_{min}V_{max}$	5700	15.07	17
$T_{min}V_{min}$	5700	15.09	17
$T_{max}V_{max}$	5700	14.12	17
$T_{max}V_{min}$	5700	14.10	17

3.3.6 Test Result of Power Density

Configuration 1: Dipole Antenna

Modulation Mode	Freq. (MHz)	Power Density (dBm/1MHz) e.i.r.p.	Limit (dBm/1MHz) e.i.r.p.	Results
802.11a	5180	9.22	10	Pass
802.11a	5320	9.37	10	Pass
802.11a	5500	9.75	10	Pass
802.11a	5700	9.63	10	Pass
802.11n HT20	5180	9.12	10	Pass
802.11n HT20	5320	9.25	10	Pass
802.11n HT20	5500	9.48	10	Pass
802.11n HT20	5700	9.59	10	Pass

Configuration 2: PCB Dipole Antenna

Modulation Mode	Freq. (MHz)	Power Density (dBm/1MHz) e.i.r.p.	Limit (dBm/1MHz) e.i.r.p.	Results
802.11a	5180	9.42	10	Pass
802.11a	5320	9.55	10	Pass
802.11a	5500	9.95	10	Pass
802.11a	5700	9.63	10	Pass
802.11n HT20	5180	9.40	10	Pass
802.11n HT20	5320	9.48	10	Pass
802.11n HT20	5500	9.90	10	Pass
802.11n HT20	5700	9.70	10	Pass

Configuration 3: PIFA Antenna

Modulation Mode	Freq. (MHz)	Power Density (dBm/1MHz) e.i.r.p.	Limit (dBm/1MHz) e.i.r.p.	Results
802.11a	5180	9.55	10	Pass
802.11a	5320	9.31	10	Pass
802.11a	5500	9.66	10	Pass
802.11a	5700	9.39	10	Pass
802.11n HT20	5180	9.32	10	Pass
802.11n HT20	5320	9.35	10	Pass
802.11n HT20	5500	9.47	10	Pass
802.11n HT20	5700	9.53	10	Pass

3.4 Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands

3.4.1 Limit of Transmitter Unwanted Emissions 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

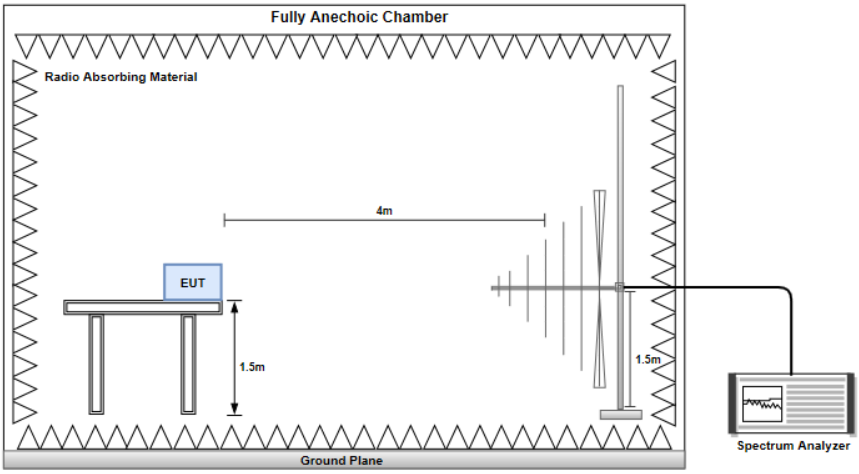
3.4.2 Test Procedures

Reference to clause 5.4.5.2 of ETSI EN 301 893 V2.1.1 (2017-05).

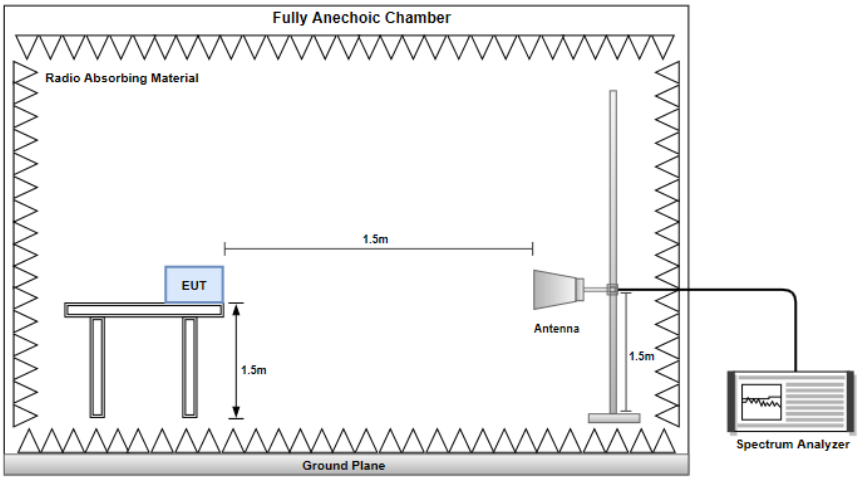
3.4.3 Test Setup

Radiated Emission

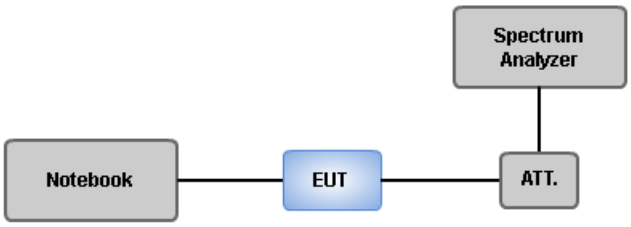
Below 1GHz



Above 1 GHz

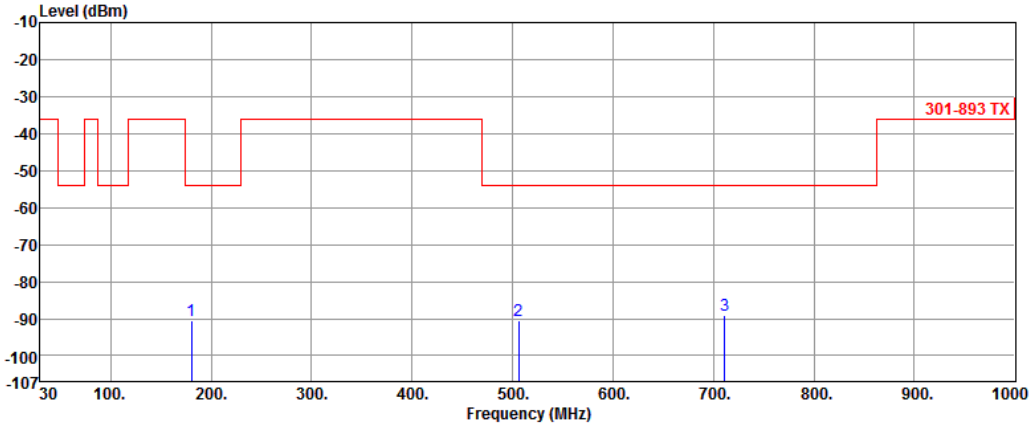


Conducted Emission



3.4.4 Transmitter Conducted Unwanted Emissions (Below 1GHz)

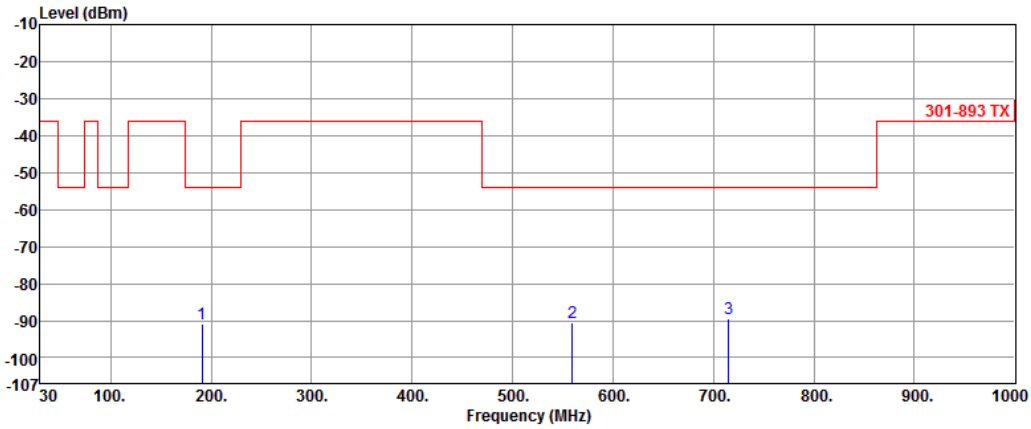
Modulation	11a	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	180.35	-90.41	-54.00	-36.41	0.00	-90.41
2	506.27	-90.39	-54.00	-36.39	0.00	-90.39
3	710.94	-89.17	-54.00	-35.17	0.00	-89.17

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

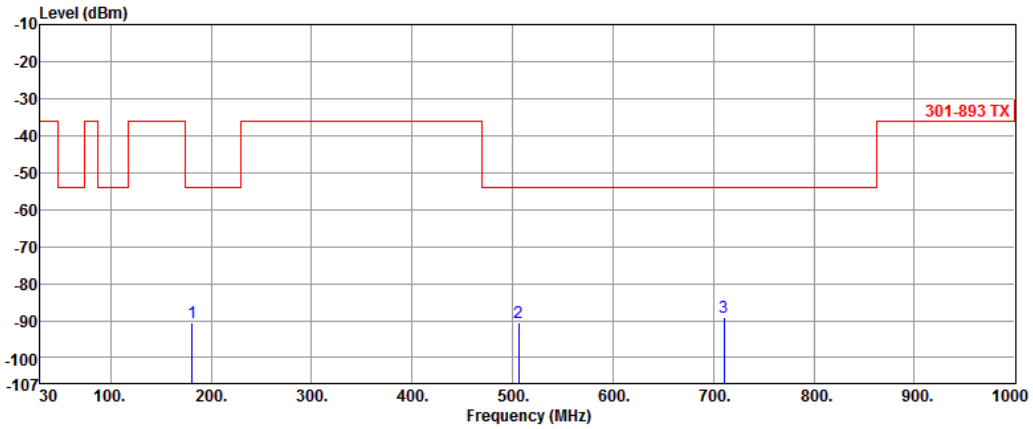
Modulation	11a	Test Freq. (MHz)	5700



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	191.02	-90.85	-54.00	-36.85	0.00	-90.85
2	559.62	-90.49	-54.00	-36.49	0.00	-90.49
3	714.82	-89.43	-54.00	-35.43	0.00	-89.43

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

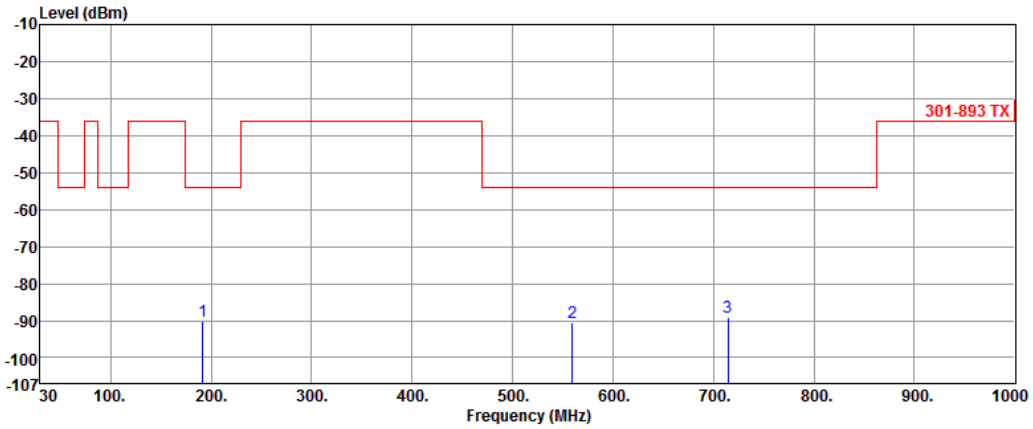
Modulation	HT20	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	180.88	-90.46	-54.00	-36.46	0.00	-90.46
2	506.12	-90.46	-54.00	-36.46	0.00	-90.46
3	710.46	-89.13	-54.00	-35.13	0.00	-89.13

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700

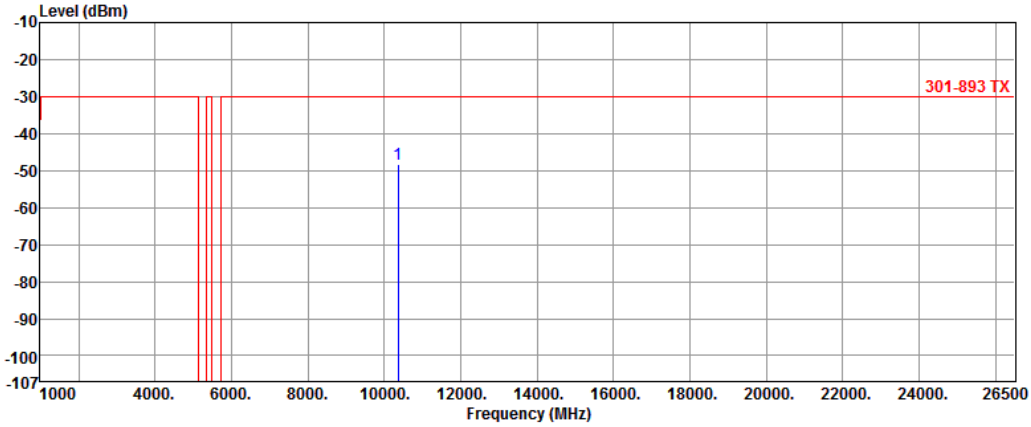


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	191.46	-90.13	-54.00	-36.13	0.00	-90.13
2	559.79	-90.42	-54.00	-36.42	0.00	-90.42
3	714.23	-89.12	-54.00	-35.12	0.00	-89.12

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

3.4.5 Transmitter Conducted Unwanted Emissions (Above 1GHz)

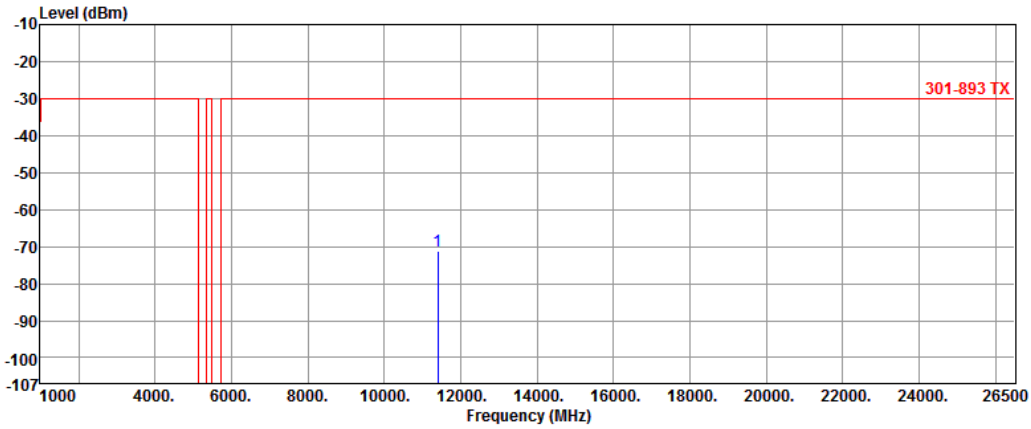
Modulation	11a	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10361.00	-48.26	-30.00	-18.26	0.00	-48.26

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

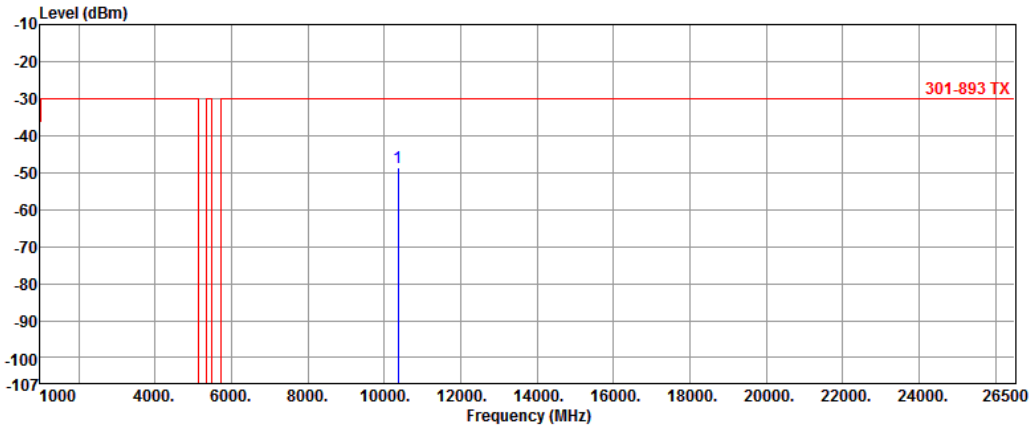
Modulation	11a	Test Freq. (MHz)	5700



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11402.00	-71.08	-30.00	-41.08	0.00	-71.08

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

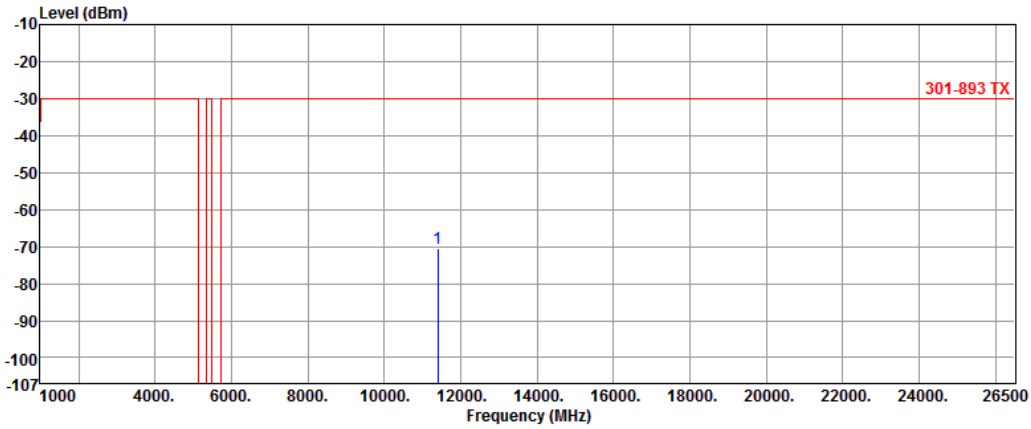
Modulation	HT20	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10365.00	-48.83	-30.00	-18.83	0.00	-48.83

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700

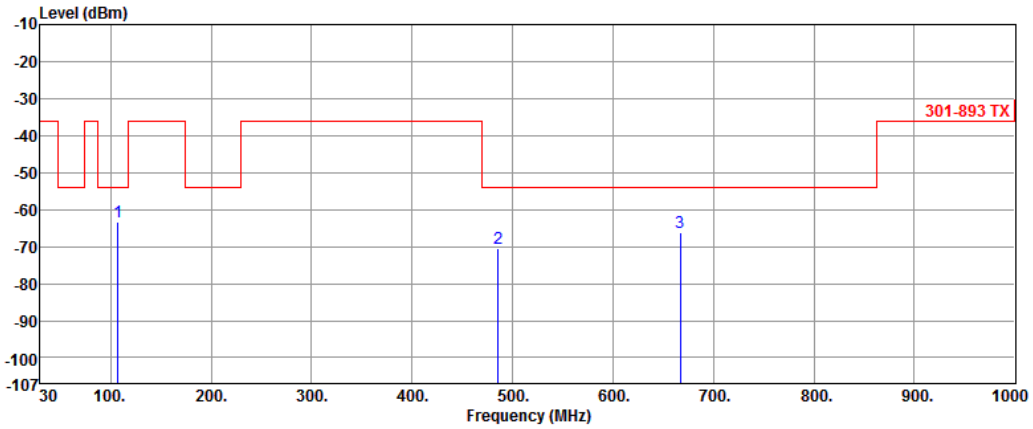


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11407.00	-70.37	-30.00	-40.37	0.00	-70.37

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

3.4.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

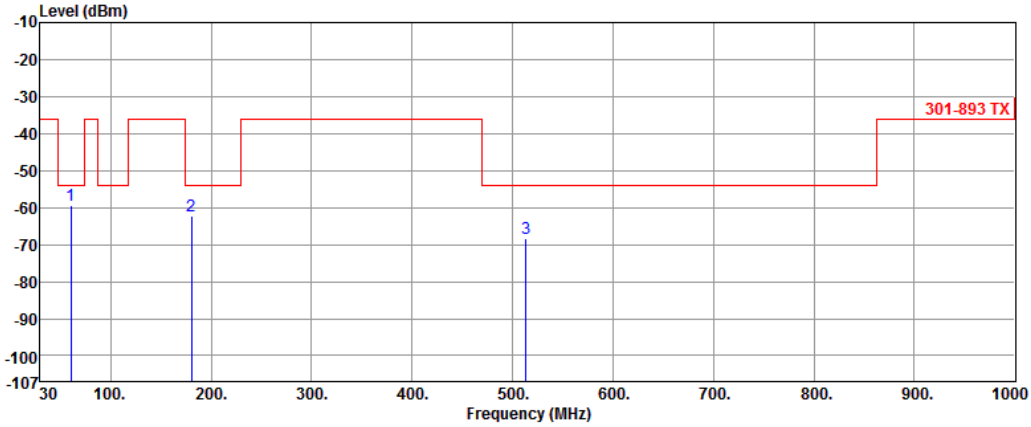
Modulation	11a	**Test Freq. (MHz)**	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	107.21	-63.47	-54.00	-9.47	-6.58	-56.89
2	485.47	-70.32	-54.00	-16.32	2.77	-73.09
3	666.88	-66.23	-54.00	-12.23	7.05	-73.28

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

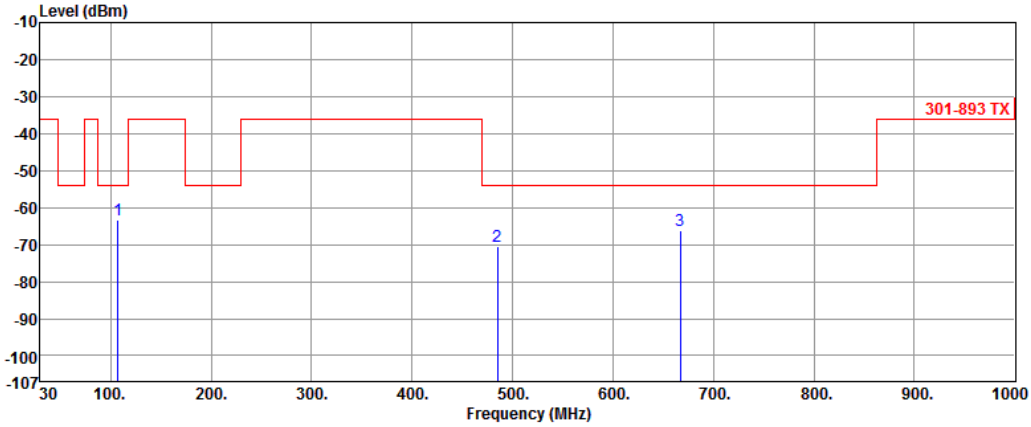
Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	60.46	-59.32	-54.00	-5.32	-2.08	-57.24
2	180.65	-62.32	-54.00	-8.32	-2.96	-59.36
3	513.13	-68.47	-54.00	-14.47	3.03	-71.50

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

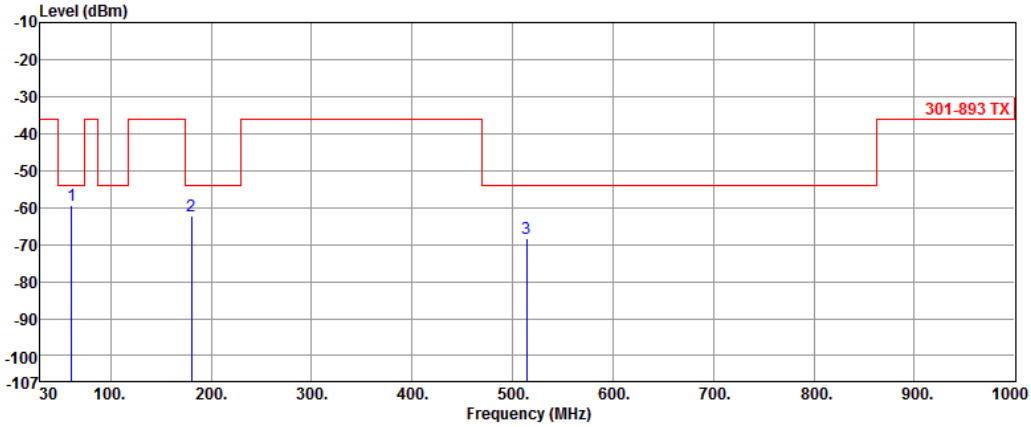
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	107.46	-63.32	-54.00	-9.32	-6.53	-56.79
2	485.32	-70.46	-54.00	-16.46	2.77	-73.23
3	666.80	-66.32	-54.00	-12.32	7.06	-73.38

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

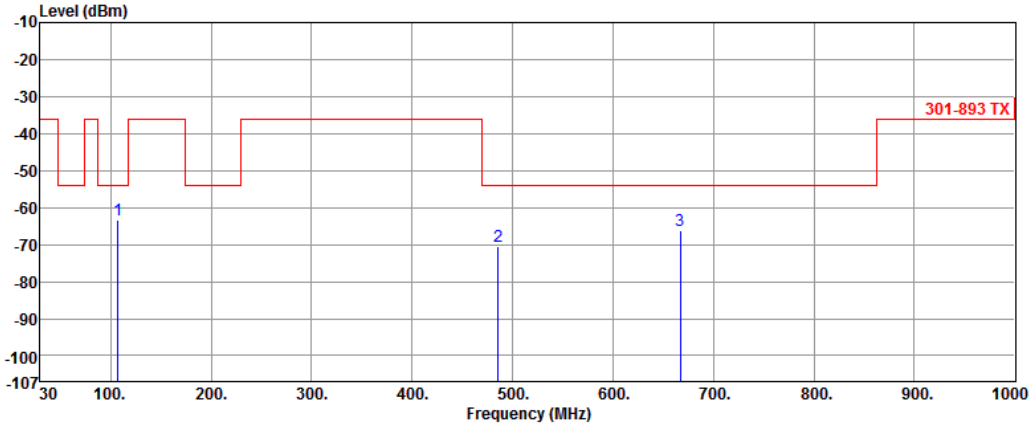
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	60.88	-59.32	-54.00	-5.32	-2.11	-57.21
2	180.47	-62.32	-54.00	-8.32	-2.94	-59.38
3	513.79	-68.31	-54.00	-14.31	3.03	-71.34

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

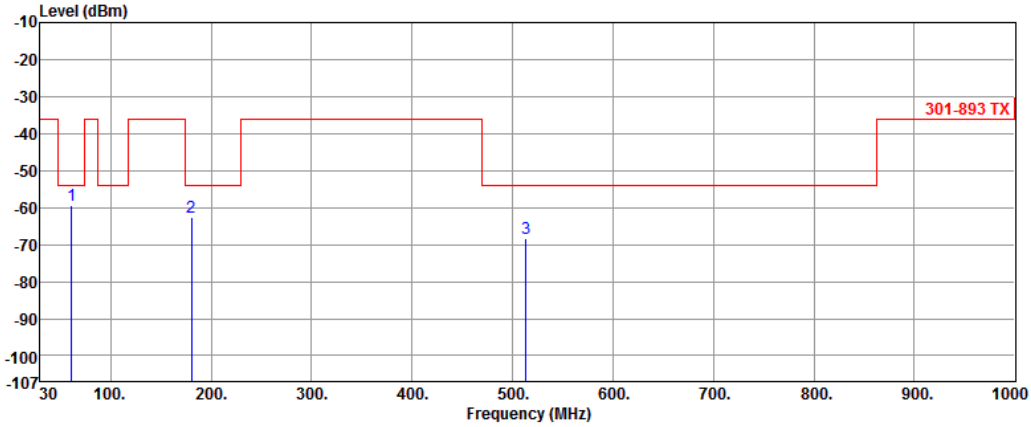
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	107.13	-63.47	-54.00	-9.47	-6.59	-56.88
2	485.55	-70.32	-54.00	-16.32	2.77	-73.09
3	666.90	-66.23	-54.00	-12.23	7.05	-73.28

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

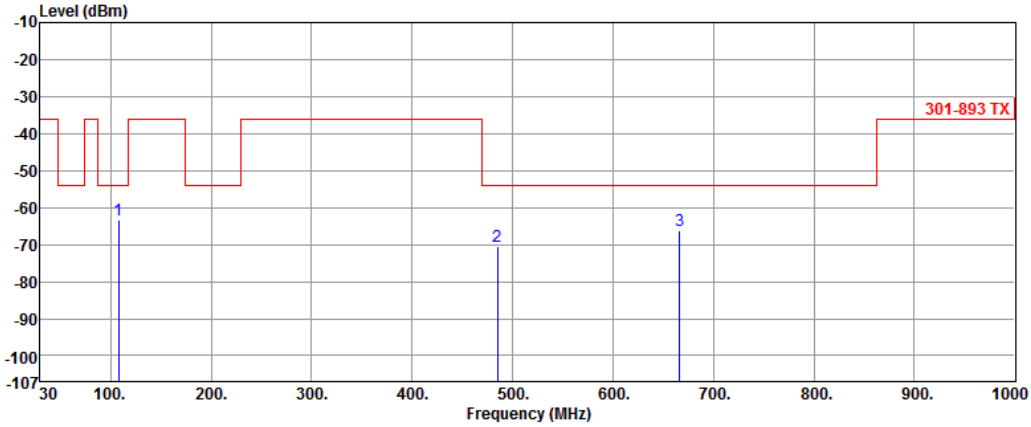
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	60.75	-59.32	-54.00	-5.32	-2.10	-57.22
2	180.31	-62.47	-54.00	-8.47	-2.92	-59.55
3	513.46	-68.31	-54.00	-14.31	3.03	-71.34

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

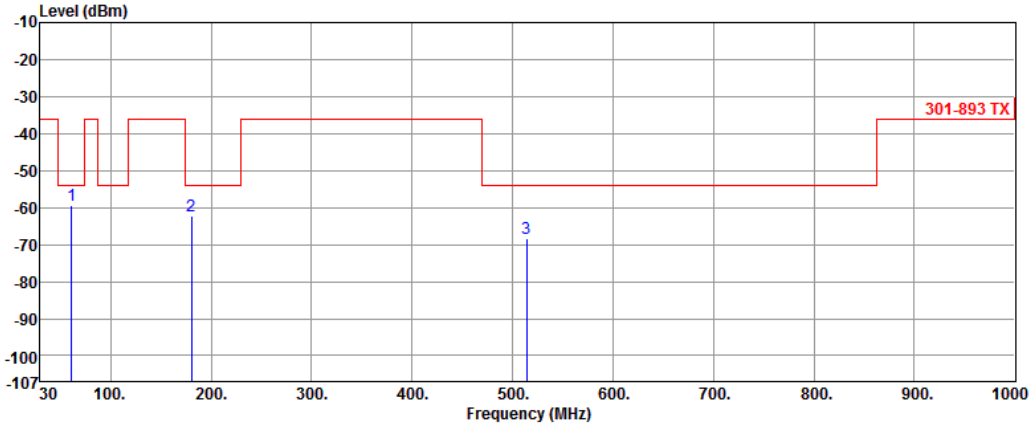
Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	107.88	-63.32	-54.00	-9.32	-6.46	-56.86
2	485.23	-70.46	-54.00	-16.46	2.77	-73.23
3	666.46	-66.23	-54.00	-12.23	7.07	-73.30

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Vertical		

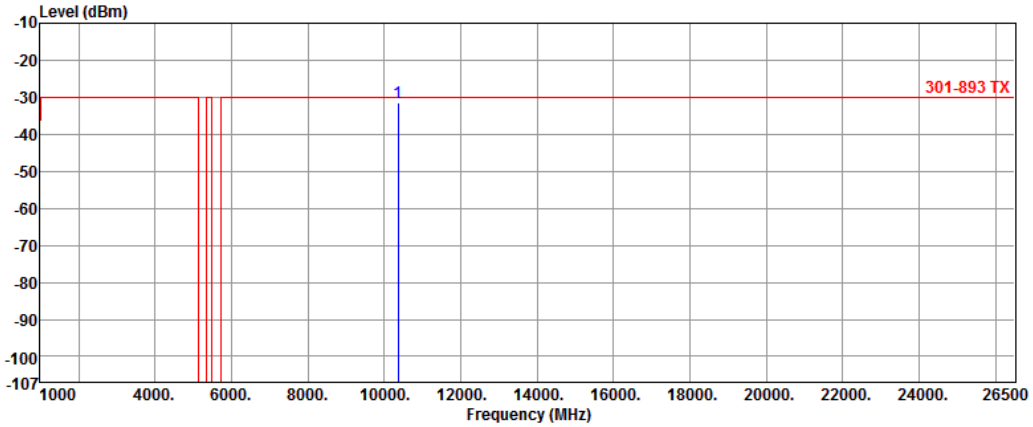


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	60.79	-59.32	-54.00	-5.32	-2.11	-57.21
2	180.47	-62.31	-54.00	-8.31	-2.94	-59.37
3	513.88	-68.32	-54.00	-14.32	3.03	-71.35

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

3.4.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

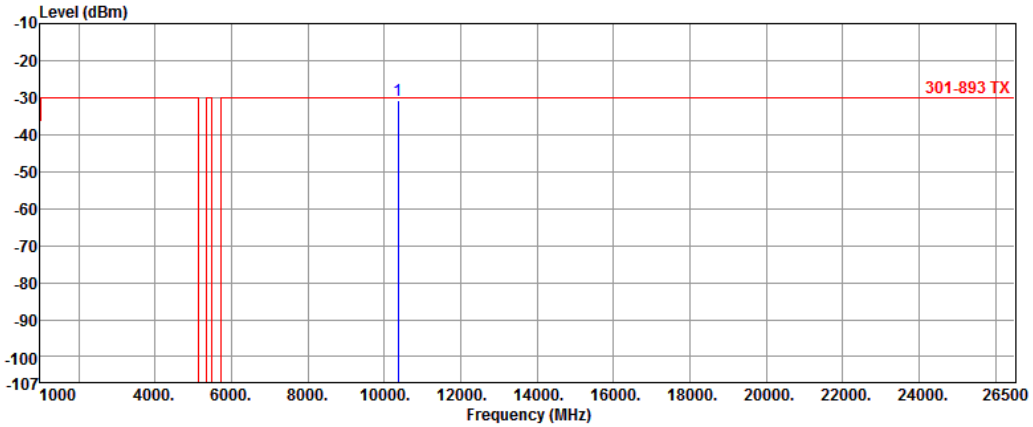
Modulation	11a	**Test Freq. (MHz)**	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10361.80	-31.36	-30.00	-1.36	21.82	-53.18

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

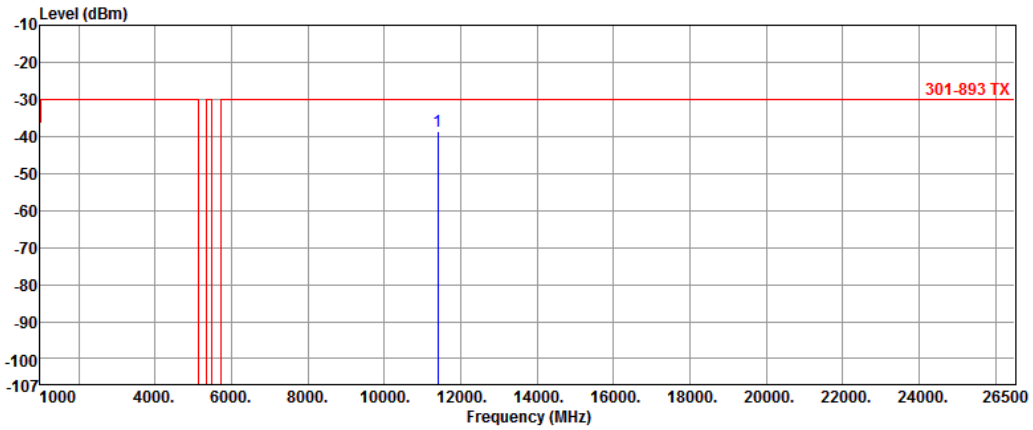
Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10362.50	-30.66	-30.00	-0.66	22.32	-52.98

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

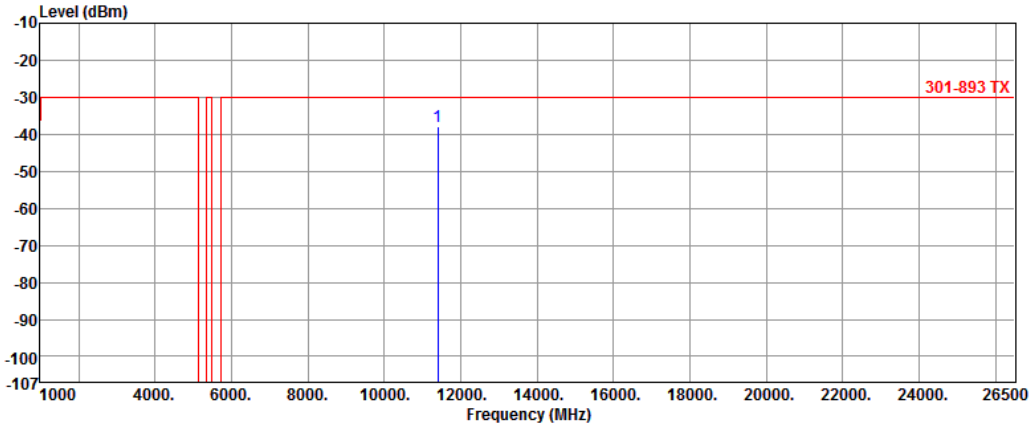
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11398.30	-38.66	-30.00	-8.66	20.99	-59.65

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

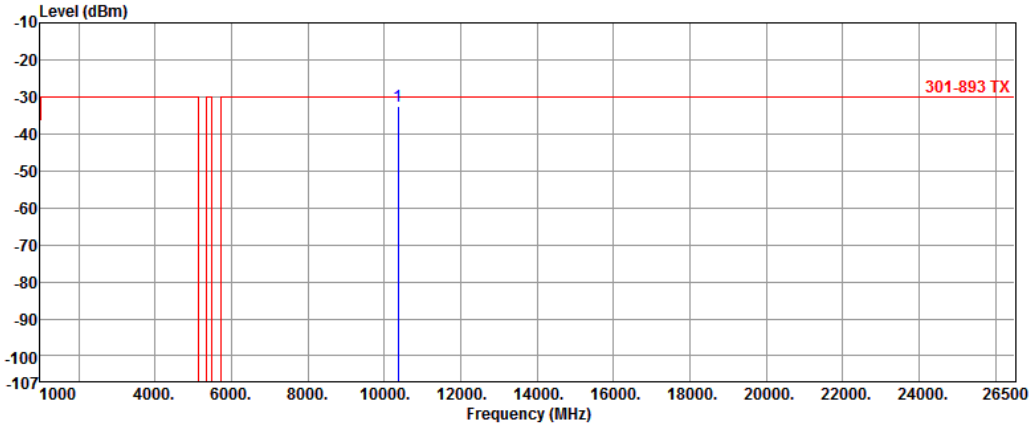
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11392.70	-38.00	-30.00	-8.00	21.05	-59.05

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

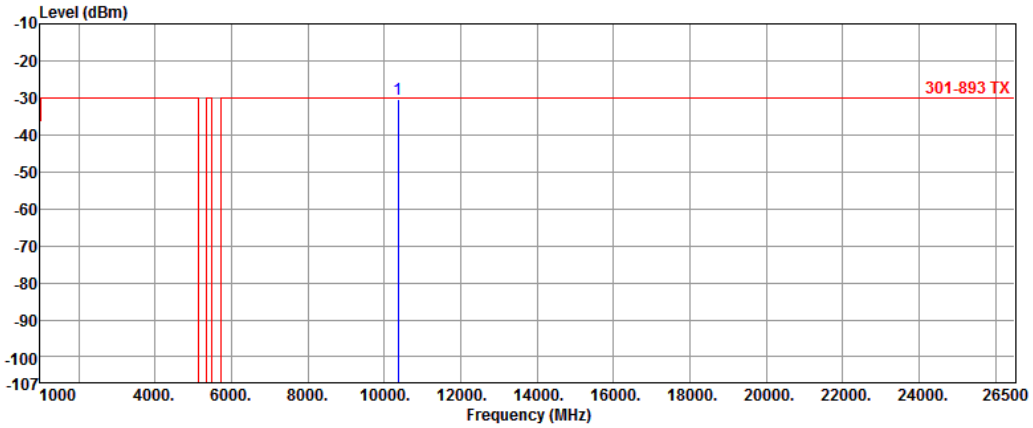
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10359.20	-32.53	-30.00	-2.53	21.81	-54.34

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

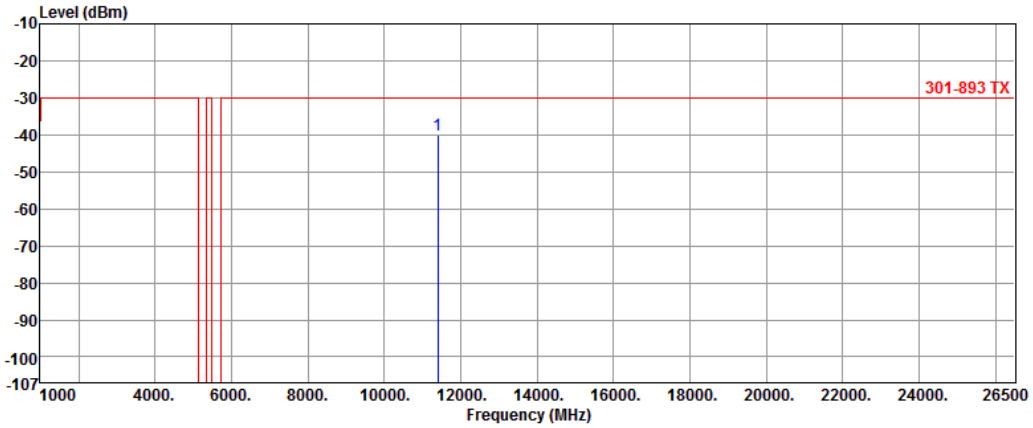
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10360.50	-30.51	-30.00	-0.51	22.32	-52.83

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

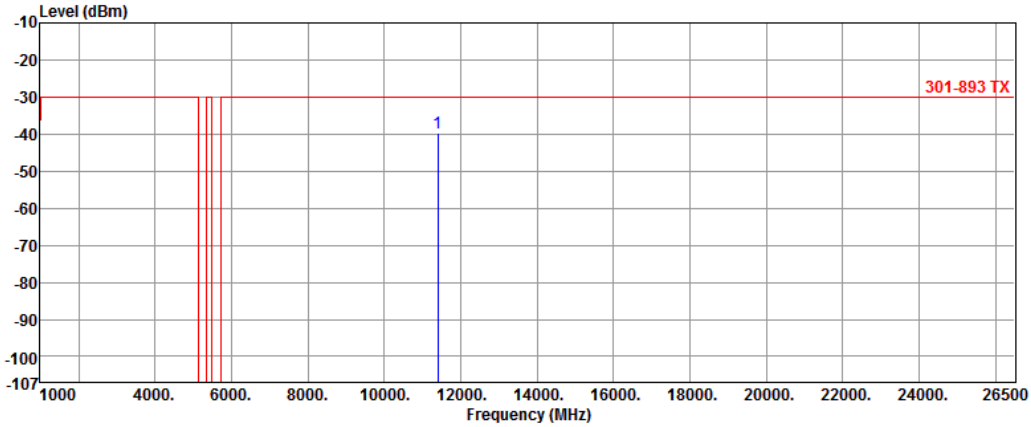
Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11405.90	-40.17	-30.00	-10.17	20.99	-61.16

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Vertical		

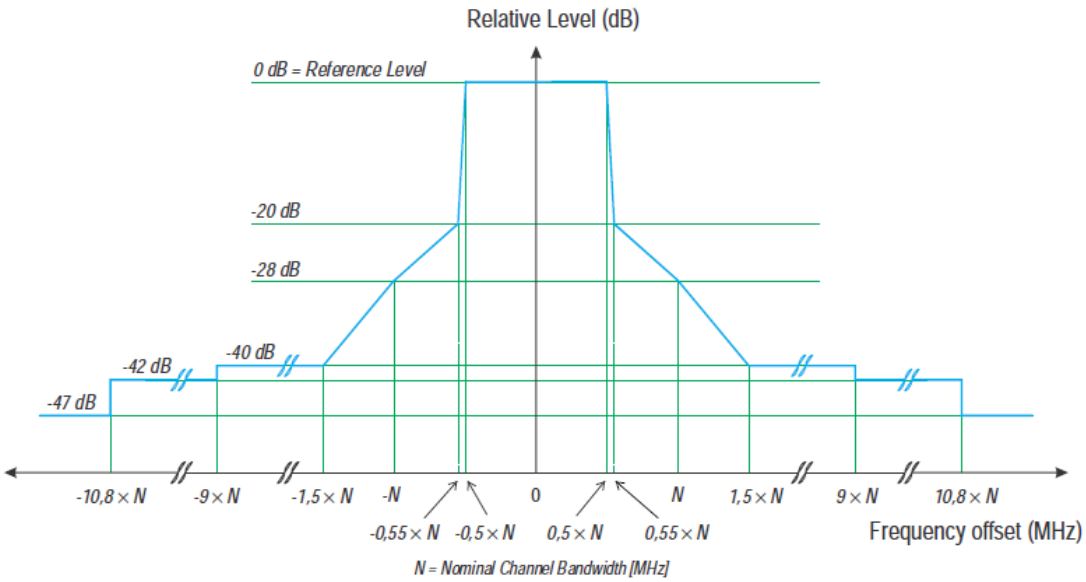


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11393.50	-39.82	-30.00	-9.82	21.05	-60.87

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

3.5 Transmitter Unwanted Emissions within the 5 GHz RLAN Band

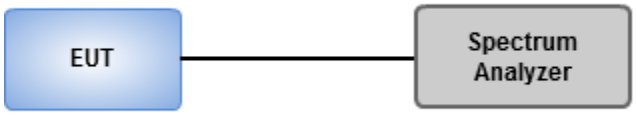
3.5.1 Limit of Transmitter Unwanted Emissions within the 5 GHz RLAN Band



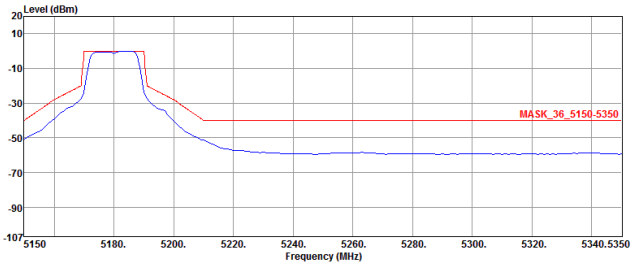
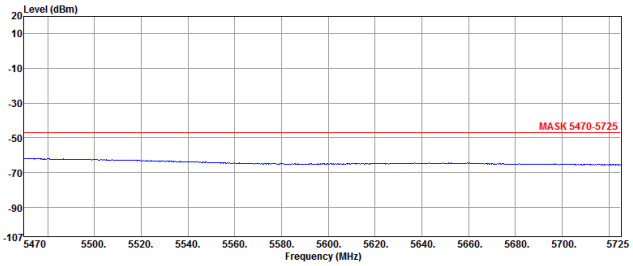
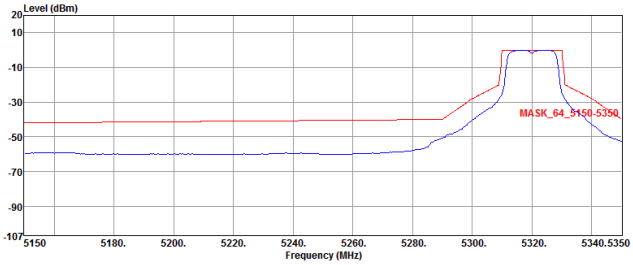
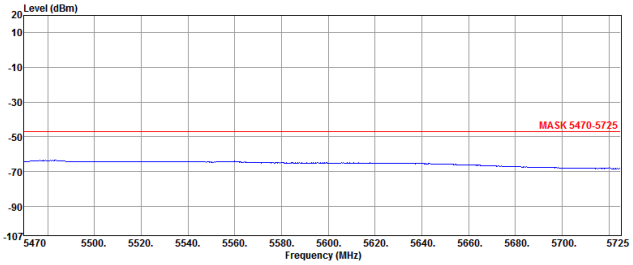
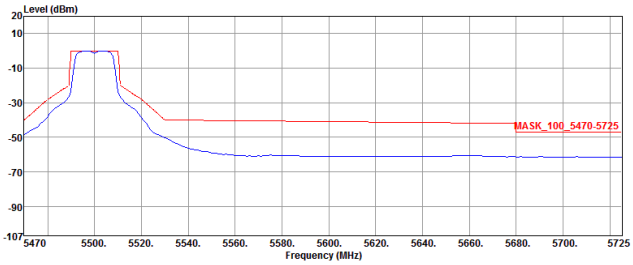
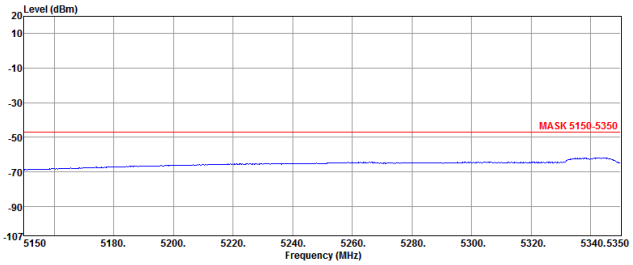
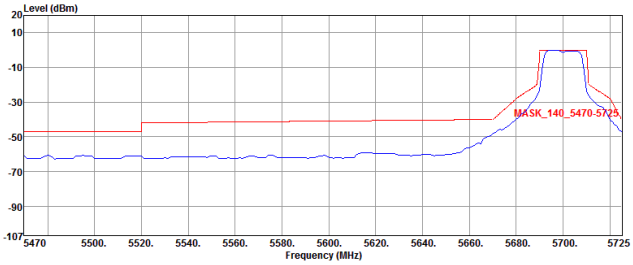
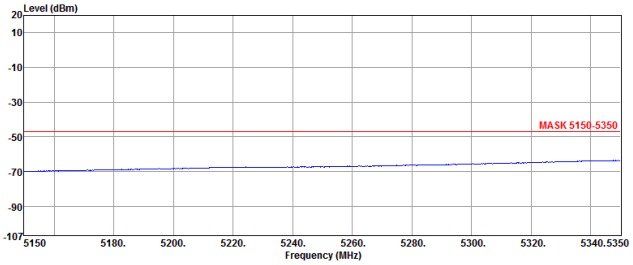
3.5.2 Test Procedures

Reference to clause 5.4.6.2 of ETSI EN 301 893 V2.1.1 (2017-05).

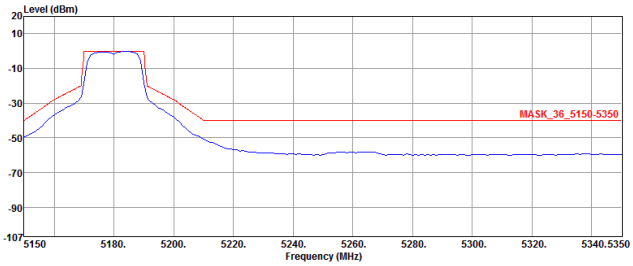
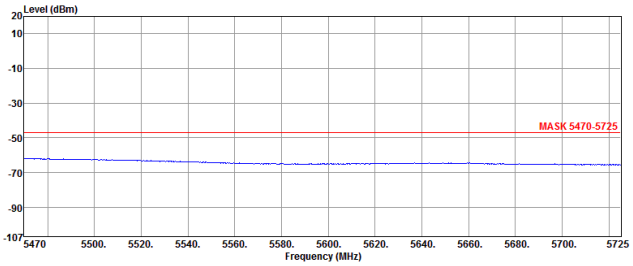
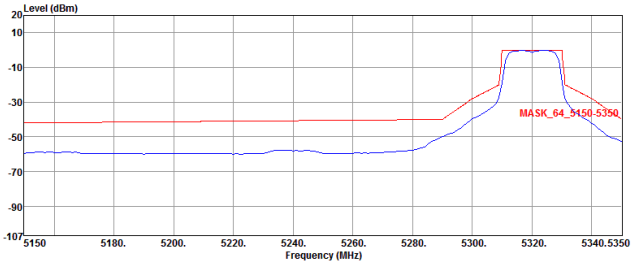
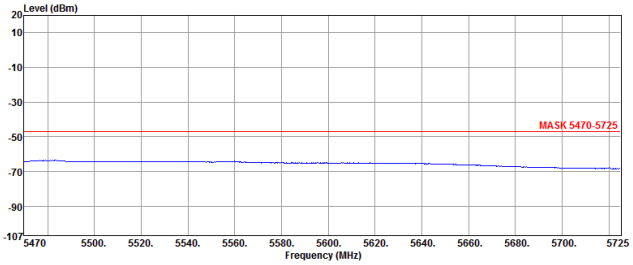
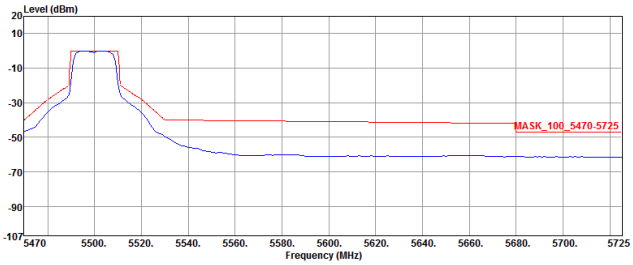
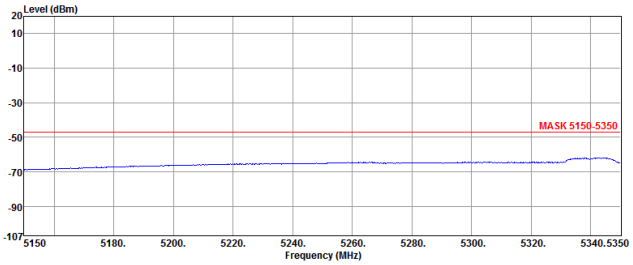
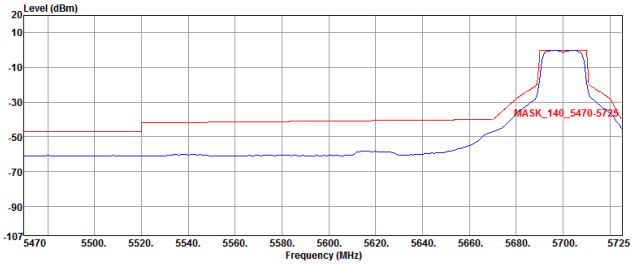
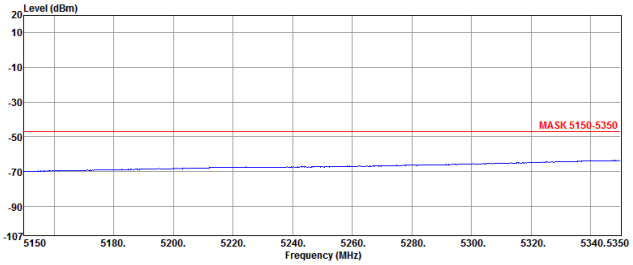
3.5.3 Test Setup



3.5.4 Test Result of Transmitter Unwanted Emissions within the 5 GHz RLAN Band for 802.11a

5180MHz	5180MHz
	
5320MHz	**5320MHz**
	
5500MHz	**5500MHz**
	
5700MHz	**5700MHz**
	

3.5.5 Test Result of Transmitter Unwanted Emissions within the 5 GHz RLAN Band for 802.11n HT20

5180MHz	5180MHz
	
5320MHz	**5320MHz**
	
5500MHz	**5500MHz**
	
5700MHz	**5700MHz**
	

4 Receiver Test Results

4.1 Receiver Spurious Emissions

4.1.1 Limit of Receiver Spurious Emissions

Frequency Range	Maximum Power	Measurement Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

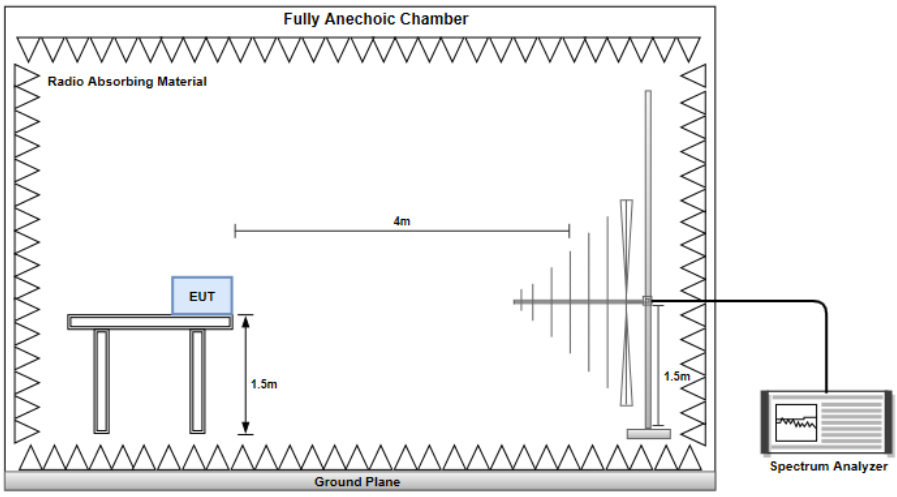
4.1.2 Test Procedures

Reference to clause 5.4.7.2 of ETSI EN 301 893 V2.1.1 (2017-05).

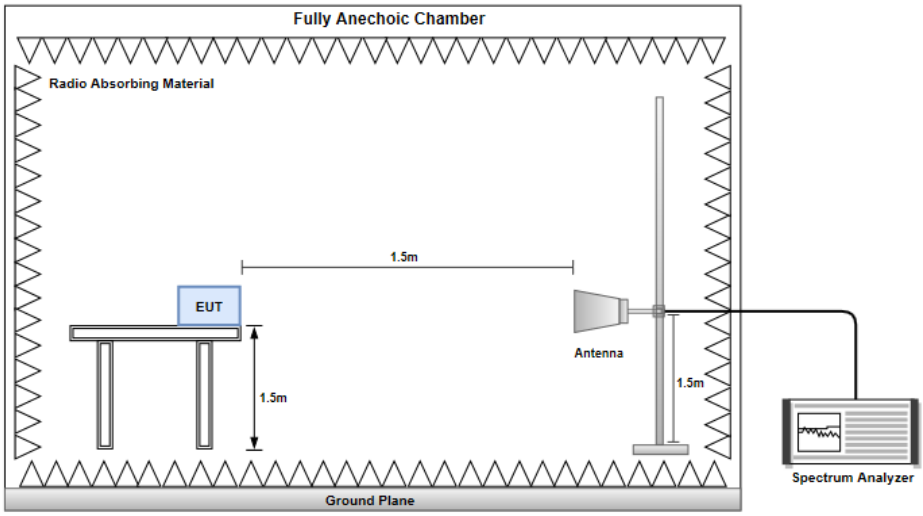
4.1.3 Test Setup

Radiated Emission

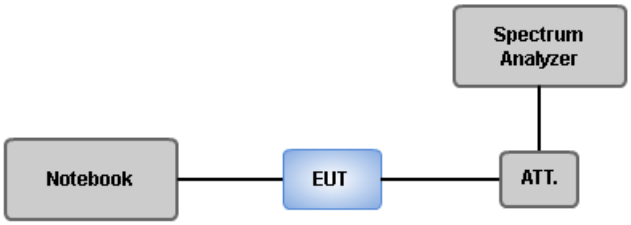
Below 1GHz



Above 1 GHz

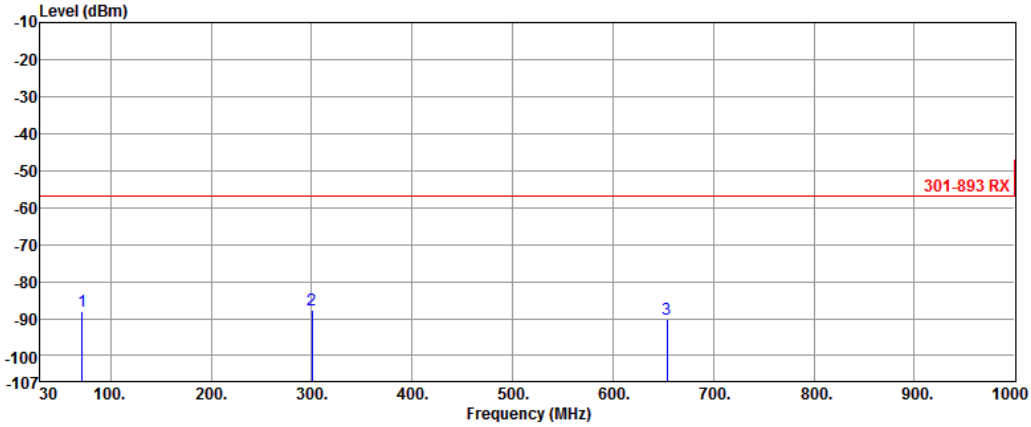


Conducted Emission



4.1.4 Receiver Conducted Spurious Emissions (Below 1GHz)

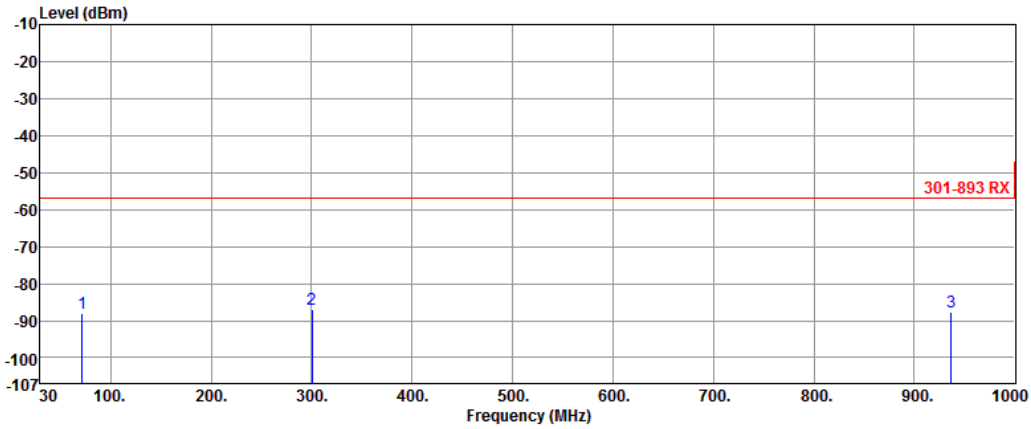
Modulation	11a	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	71.71	-88.17	-57.00	-31.17	0.00	-88.17
2	300.63	-87.55	-57.00	-30.55	0.00	-87.55
3	653.71	-90.17	-57.00	-33.17	0.00	-90.17

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

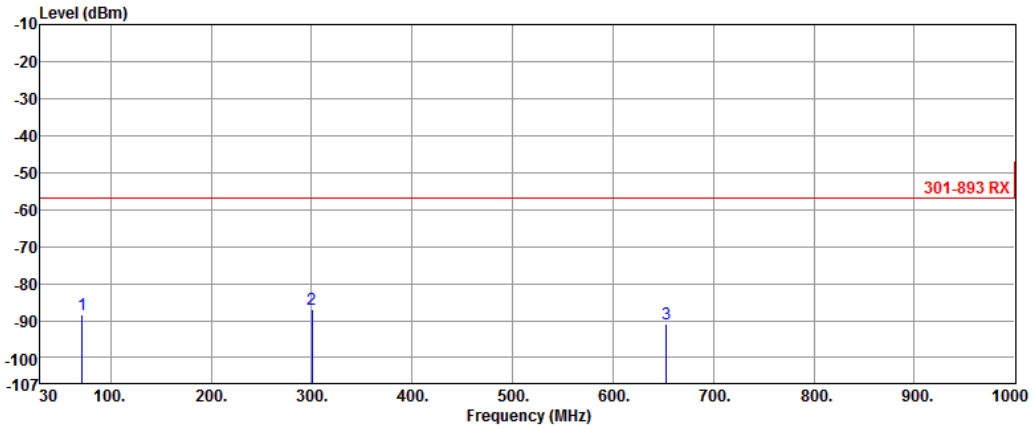
Modulation	11a	Test Freq. (MHz)	5700



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	71.71	-88.17	-57.00	-31.17	0.00	-88.17
2	300.63	-87.00	-57.00	-30.00	0.00	-87.00
3	936.95	-87.74	-57.00	-30.74	0.00	-87.74

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

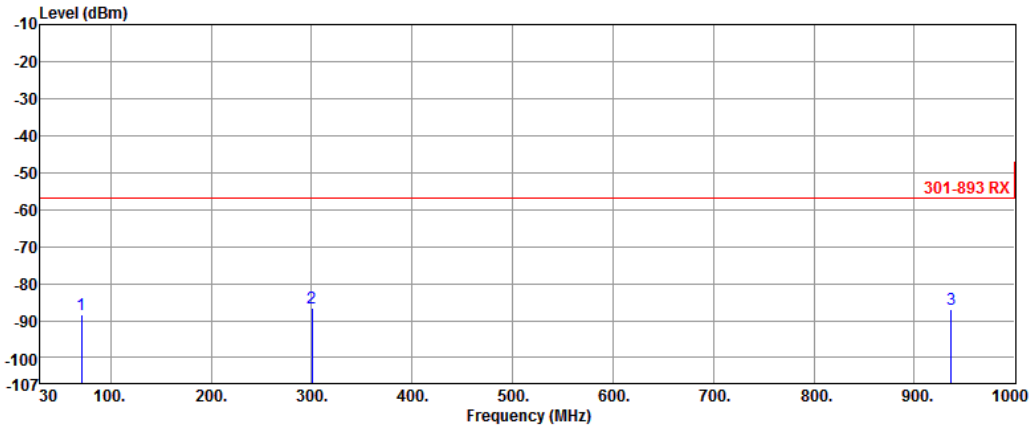
Modulation	HT20	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	71.79	-88.23	-57.00	-31.23	0.00	-88.23
2	300.47	-87.13	-57.00	-30.13	0.00	-87.13
3	653.21	-90.79	-57.00	-33.79	0.00	-90.79

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700

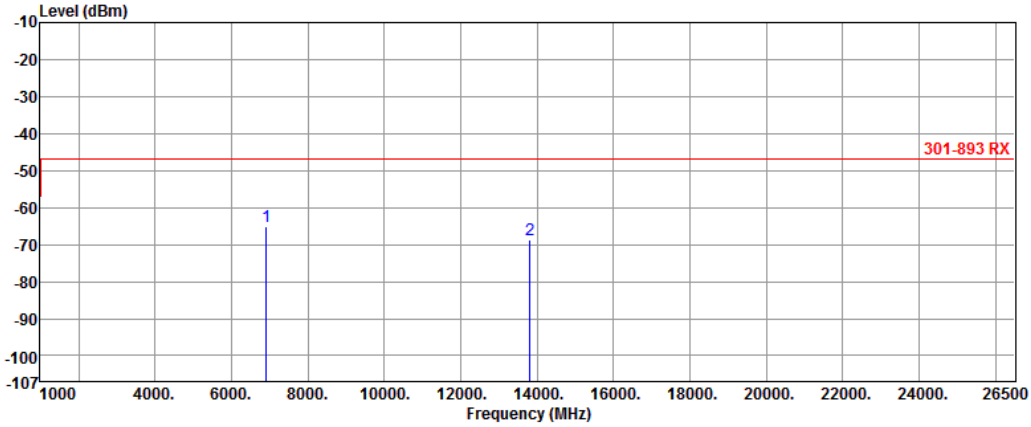


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	71.12	-88.46	-57.00	-31.46	0.00	-88.46
2	300.46	-86.46	-57.00	-29.46	0.00	-86.46
3	936.88	-87.12	-57.00	-30.12	0.00	-87.12

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

4.1.5 Receiver Conducted Spurious Emissions (Above 1GHz)

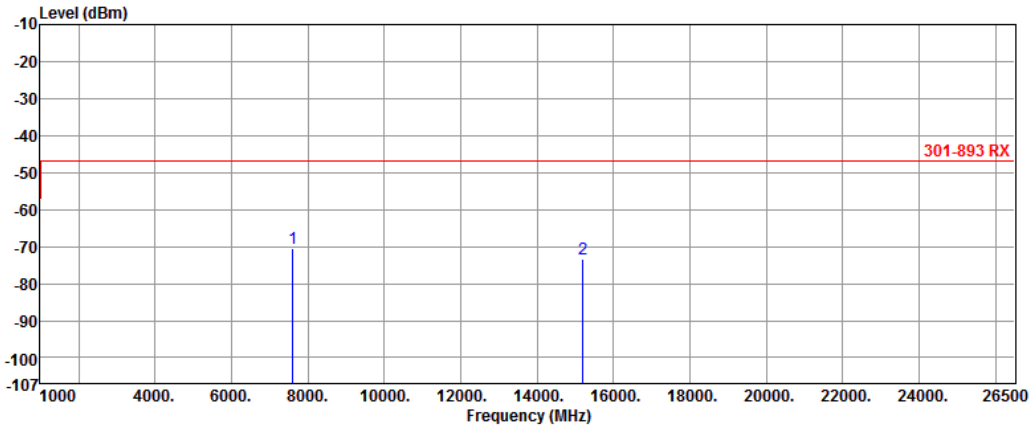
Modulation	11a	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	6906.71	-64.96	-47.00	-17.96	0.00	-64.96
2	13813.42	-68.79	-47.00	-21.79	0.00	-68.79

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

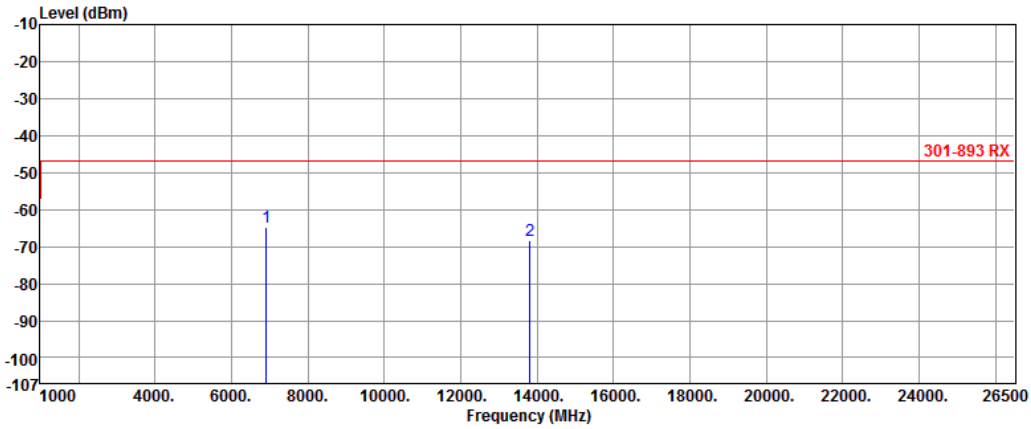
Modulation	11a	Test Freq. (MHz)	5700



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	7600.20	-70.40	-47.00	-23.40	0.00	-70.40
2	15200.15	-73.26	-47.00	-26.26	0.00	-73.26

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

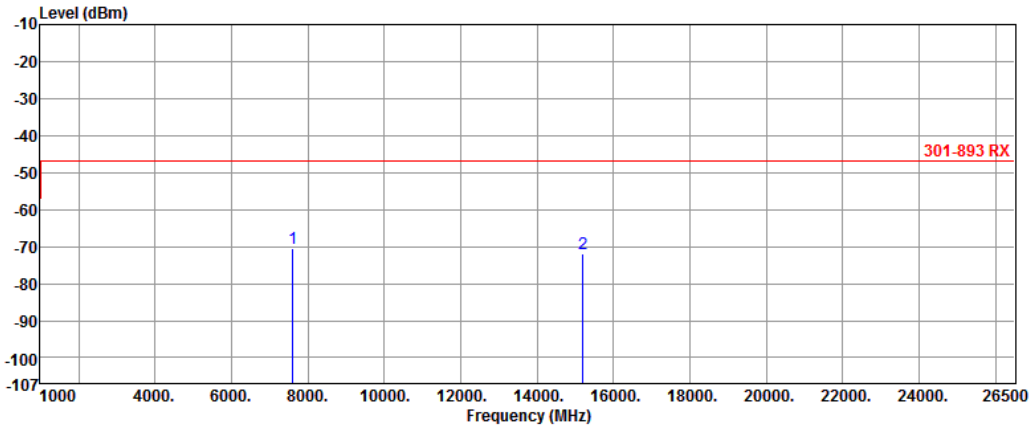
Modulation	HT20	Test Freq. (MHz)	5180



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	6906.66	-64.69	-47.00	-17.69	0.00	-64.69
2	13813.46	-68.35	-47.00	-21.35	0.00	-68.35

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700

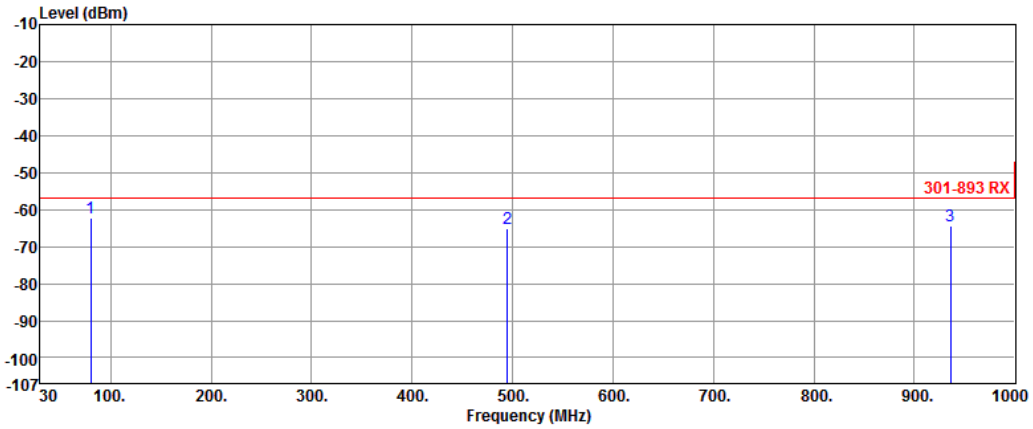


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	7600.19	-70.52	-47.00	-23.52	0.00	-70.52
2	15199.99	-71.84	-47.00	-24.84	0.00	-71.84

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

4.1.6 Receiver Radiated Spurious Emissions (Below 1GHz)

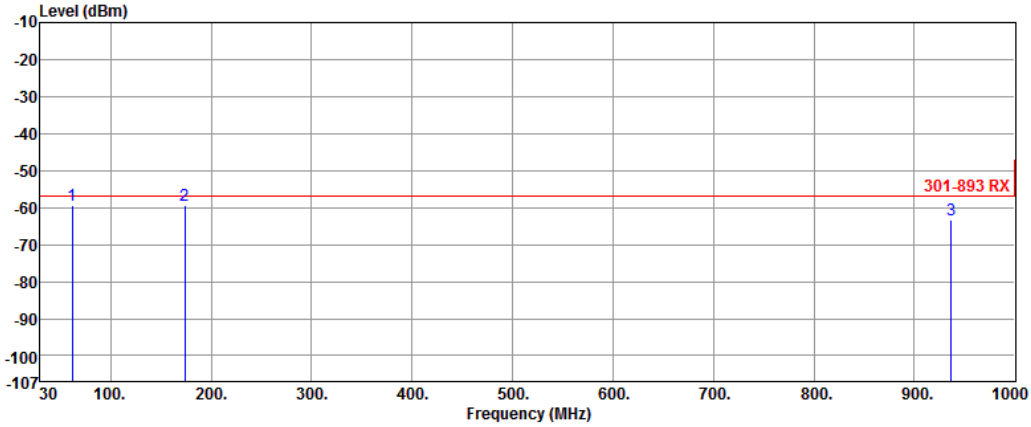
Modulation	11a	**Test Freq. (MHz)**	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	80.46	-62.12	-57.00	-5.12	-6.60	-55.52
2	494.88	-65.23	-57.00	-8.23	3.00	-68.23
3	936.12	-64.32	-57.00	-7.32	11.67	-75.99

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

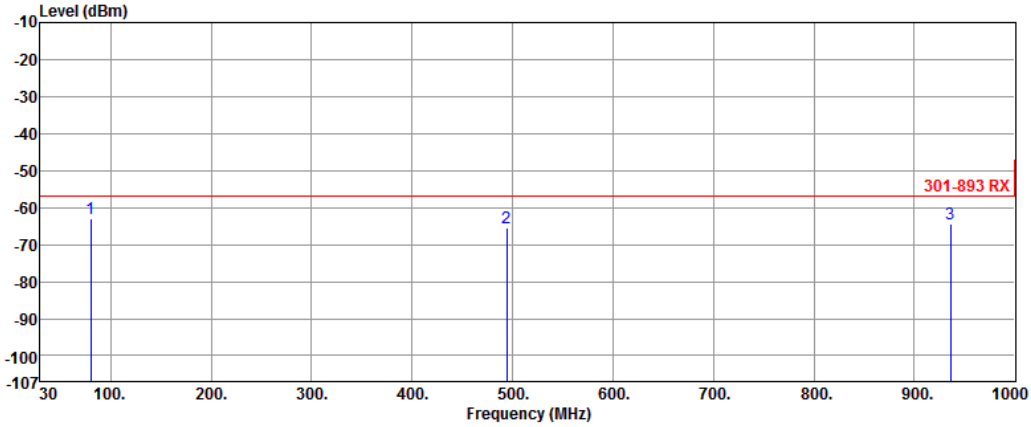
Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	61.46	-59.32	-57.00	-2.32	-2.16	-57.16
2	173.99	-59.32	-57.00	-2.32	-1.83	-57.49
3	936.45	-63.32	-57.00	-6.32	11.17	-74.49

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

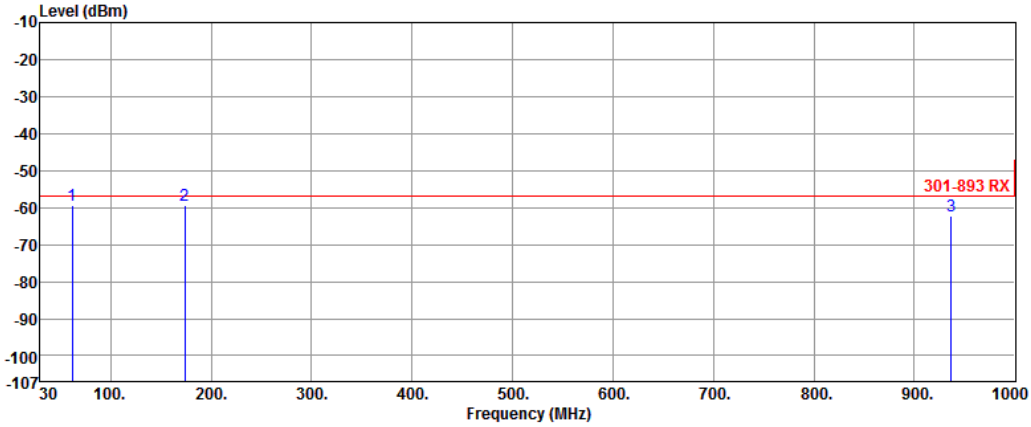
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	80.23	-62.80	-57.00	-5.80	-6.54	-56.26
2	494.55	-65.32	-57.00	-8.32	2.99	-68.31
3	936.12	-64.32	-57.00	-7.32	11.67	-75.99

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

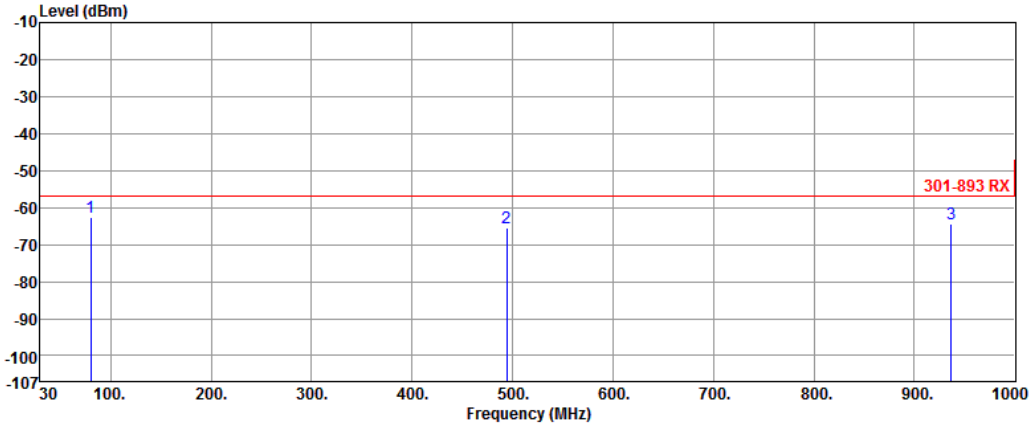
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	61.79	-59.32	-57.00	-2.32	-2.19	-57.13
2	173.90	-59.32	-57.00	-2.32	-1.82	-57.50
3	936.46	-62.32	-57.00	-5.32	11.17	-73.49

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

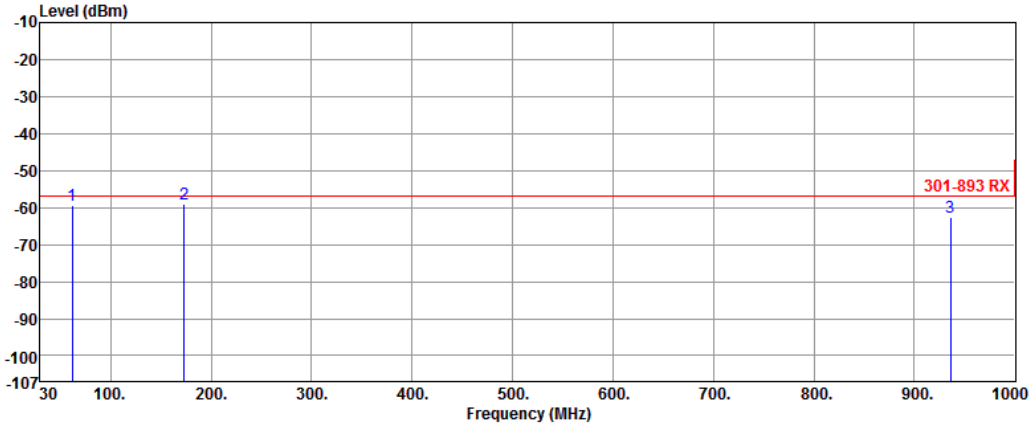
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	80.13	-62.65	-57.00	-5.65	-6.52	-56.13
2	494.46	-65.32	-57.00	-8.32	2.99	-68.31
3	936.79	-64.32	-57.00	-7.32	11.64	-75.96

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

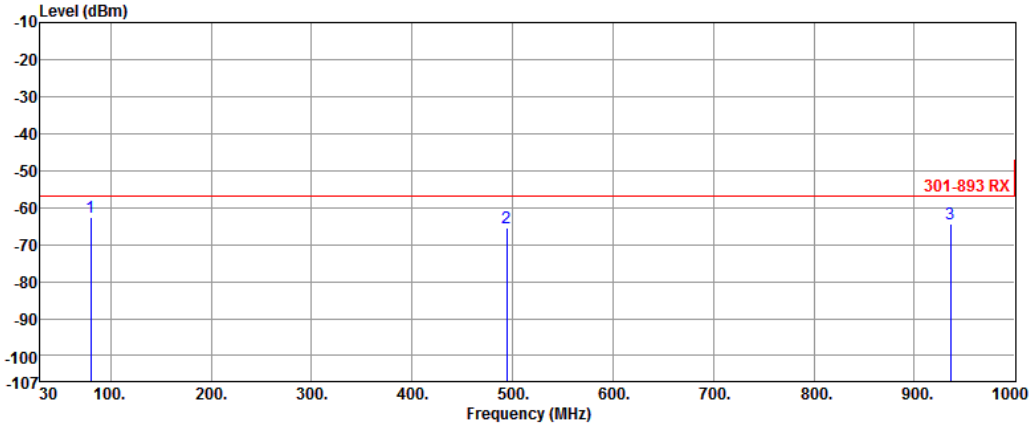
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	61.80	-59.32	-57.00	-2.32	-2.19	-57.13
2	173.35	-59.13	-57.00	-2.13	-1.71	-57.42
3	936.12	-62.46	-57.00	-5.46	11.19	-73.65

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

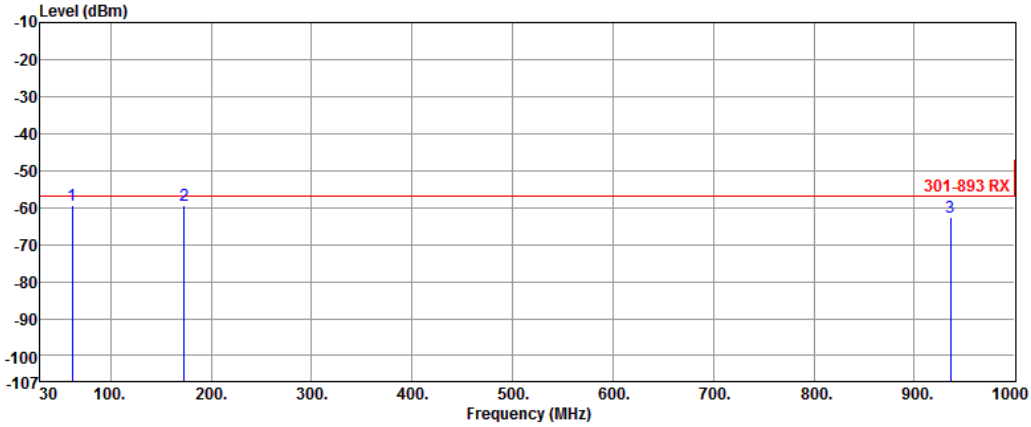
Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	80.23	-62.46	-57.00	-5.46	-6.54	-55.92
2	494.47	-65.32	-57.00	-8.32	2.99	-68.31
3	936.16	-64.32	-57.00	-7.32	11.67	-75.99

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Vertical		

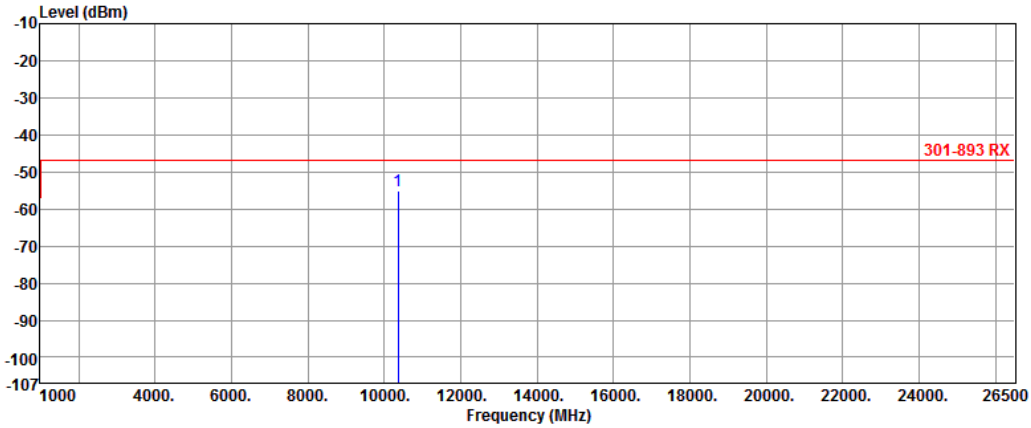


	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	61.80	-59.32	-57.00	-2.32	-2.19	-57.13
2	173.35	-59.31	-57.00	-2.31	-1.71	-57.60
3	936.13	-62.47	-57.00	-5.47	11.19	-73.66

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

4.1.7 Receiver Radiated Spurious Emissions (Above 1GHz)

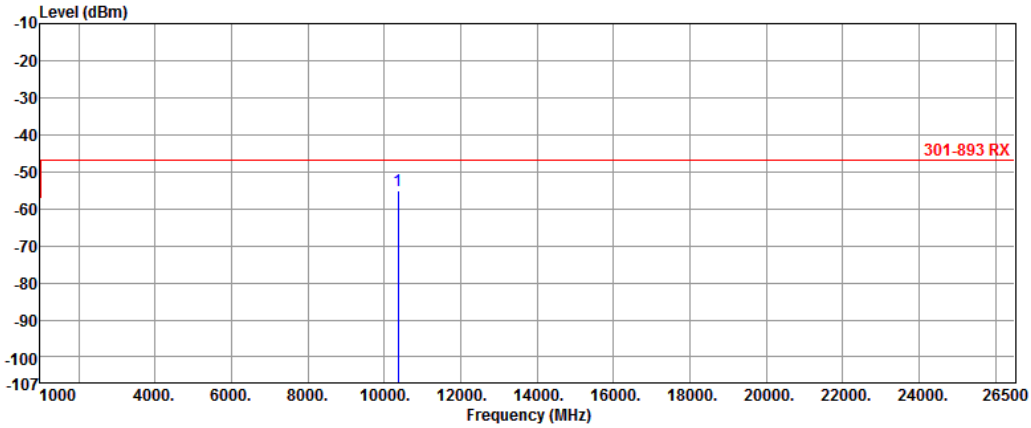
Modulation	11a	**Test Freq. (MHz)**	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10360.56	-54.98	-47.00	-7.98	21.81	-76.79

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

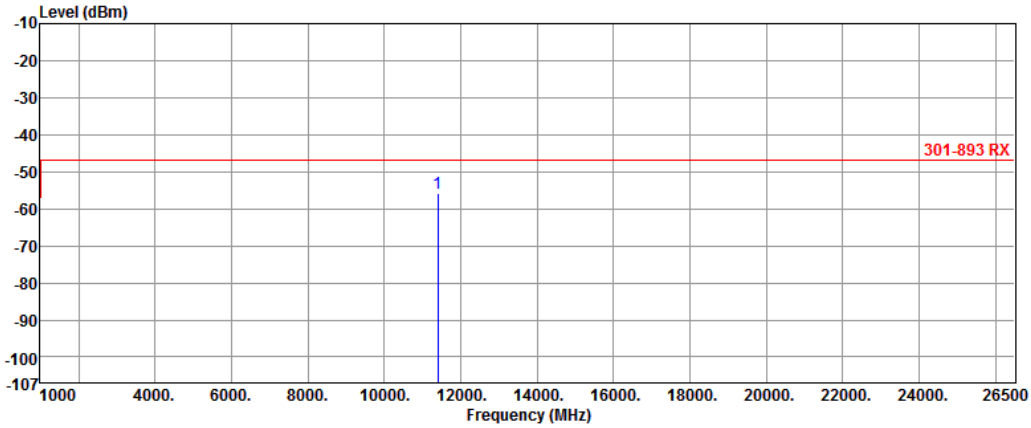
Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10360.90	-55.17	-47.00	-8.17	22.32	-77.49

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

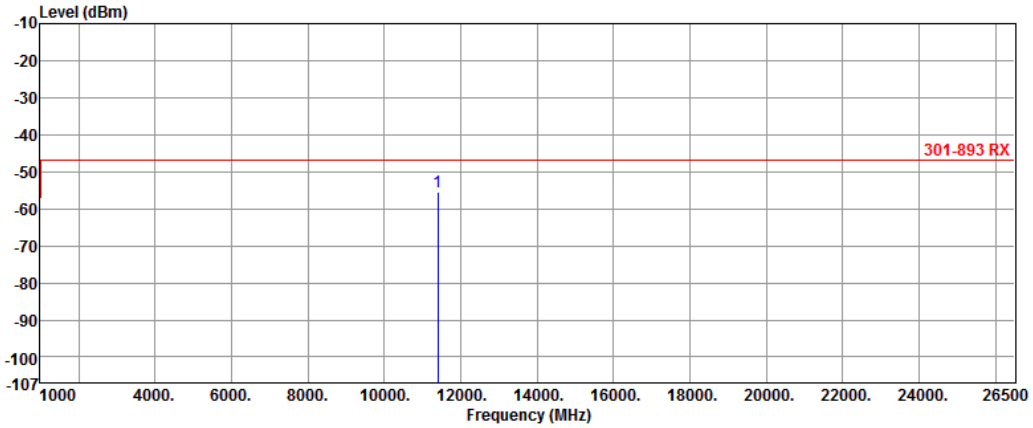
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11399.23	-55.64	-47.00	-8.64	20.98	-76.62

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

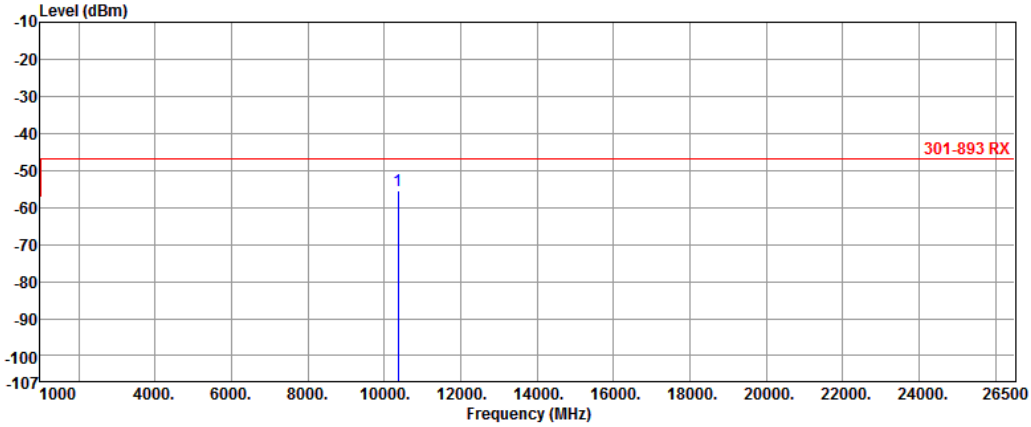
Modulation	11a	Test Freq. (MHz)	5700
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11399.21	-55.41	-47.00	-8.41	21.08	-76.49

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

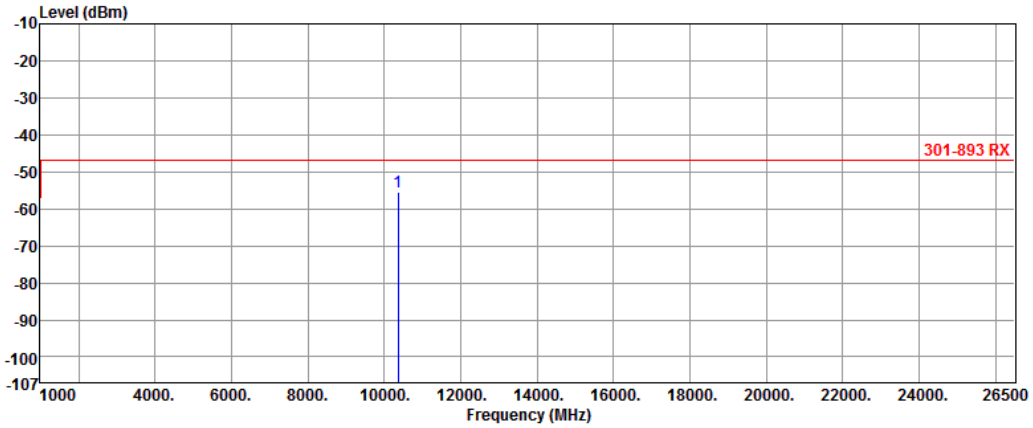
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10360.46	-55.36	-47.00	-8.36	21.81	-77.17

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

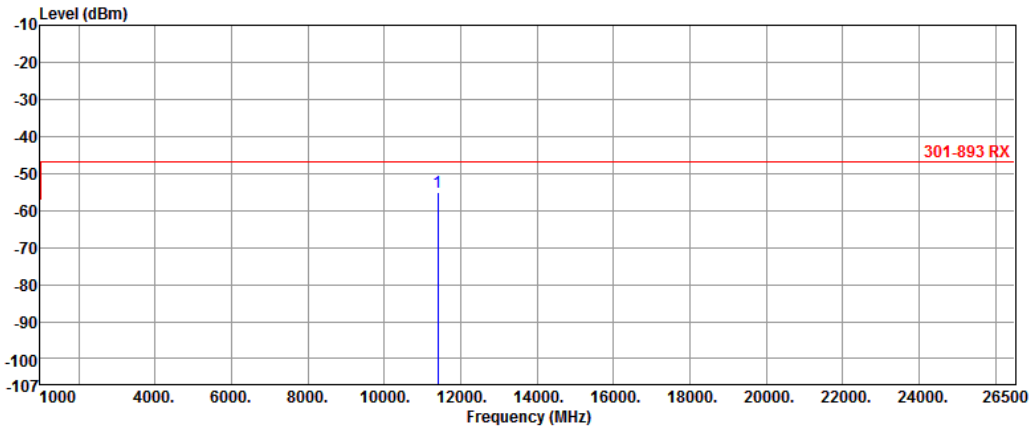
Modulation	HT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	10360.55	-55.36	-47.00	-8.36	22.32	-77.68

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

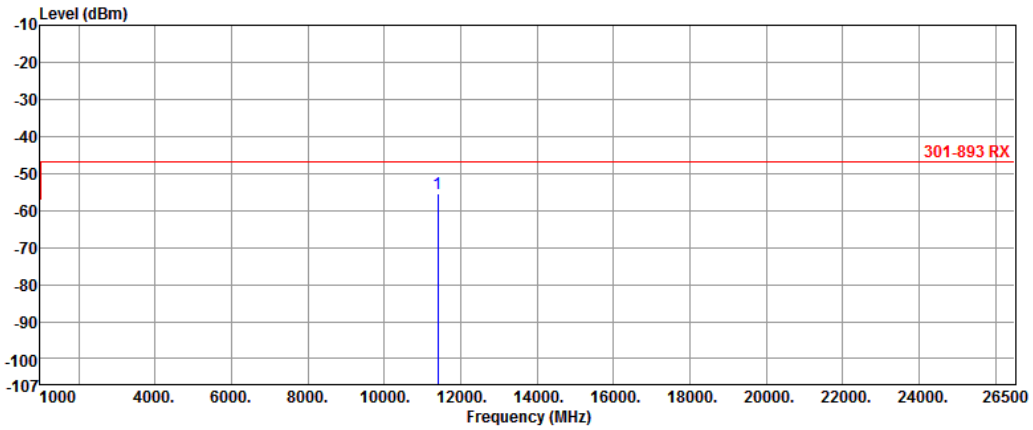
Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Horizontal		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11399.73	-54.94	-47.00	-7.94	20.98	-75.92

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

Modulation	HT20	Test Freq. (MHz)	5700
Polarization	Vertical		



	Freq.	Measured value	Limit	Margin	Factor	Reading
	MHz	dBm	dBm	dB	dB	dBm
1	11399.34	-55.29	-47.00	-8.29	21.08	-76.37

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

5 Adaptivity Test Results

5.1 Adaptivity

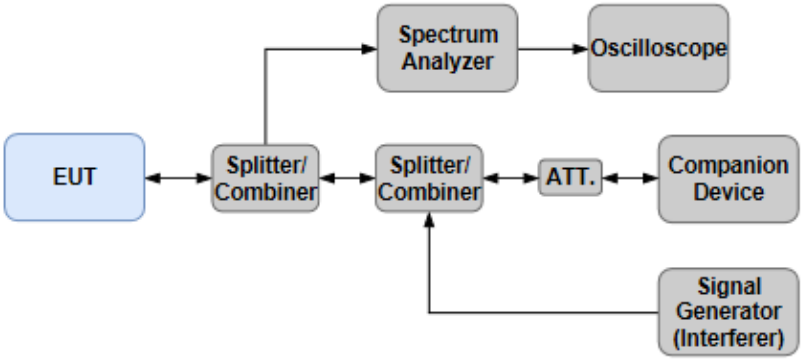
5.1.1 Adaptivity Limit

Adaptivity Limit
☐ Frame Based Equipment The ED 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. For P_H ≤ 13 dBm: TL = -75 dBm/MHz For 13 dBm < P_H < 23 dBm: TL = -85 dBm/MHz + (23 dBm - P_H) For P_H ≥ 23 dBm: TL = -85 dBm/MHz
☒ Load Based Equipment ☒ **Option 1:** For equipment that for its operation in the 5 GHz bands is conforming to IEEE 802.11™-2016 [9], clause 17, clause 19 or clause 21, or any combination of these clauses, the *ED Threshold Level (TL)* is independent of the equipment's maximum transmit power (P_H). Assuming a 0 dBi receive antenna the *ED Threshold Level (TL)* shall be: TL = -75 dBm/MHz
☐ **Option 2:** For equipment conforming to one or more of the clauses listed in Option 1, and to at least one other operating mode, and for equipment conforming to none of the clauses listed in Option 1, the *ED Threshold Level (TL)* shall be proportional to the equipment's maximum transmit power (P_H). Assuming a 0 dBi receive antenna the *ED Threshold Level (TL)* shall be: For P_H ≤ 13 dBm: TL = -75 dBm/MHz For 13 dBm < P_H < 23 dBm: TL = -85 dBm/MHz + (23 dBm - P_H) For P_H ≥ 23 dBm: TL = -85 dBm/MHz
☒ Short Control Signalling Transmissions: ● within an observation period of 50 ms, the number of *Short Control Signalling Transmissions* by the equipment shall be equal to or less than 50; and ● the total duration of the equipment's *Short Control Signalling Transmissions* shall be less than 2 500 µs within said observation period.
☒ Channel Access Mechanism / Maximum Channel Occupancy Time(s) : For Supervising Devices refer to clause 4.2.7.3.2.4 Table 7. For Supervised Devices refer to clause 4.2.7.3.2.4 Table 8. ☐Option A: Measurement for Channel Access Mechanism and Maximum Channel Occupancy Time(s) ☒Option B: Compliance by declaration for the Channel Access Mechanism and Maximum Channel Occupancy Time(s)

5.1.2 Test Procedures

Reference to clause 5.4.9.3 of ETSI EN 301 893 V2.1.1 (2017-05).

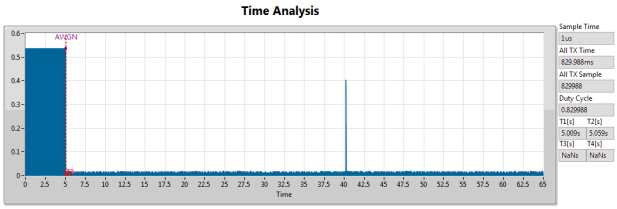
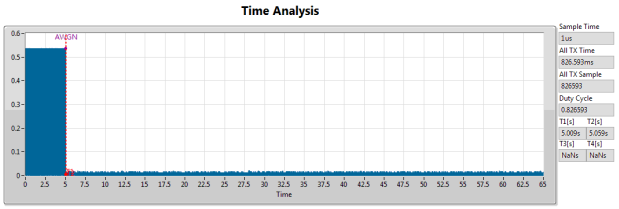
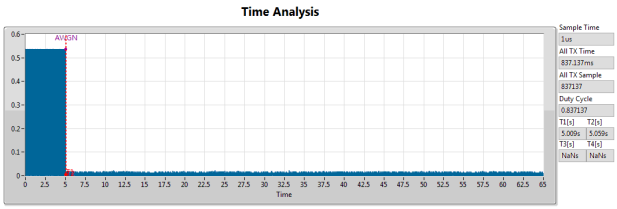
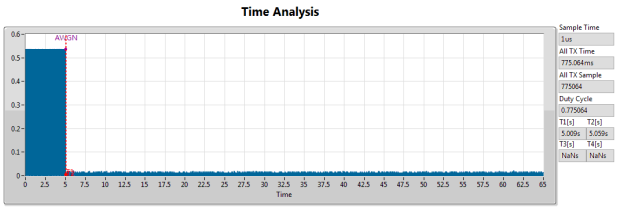
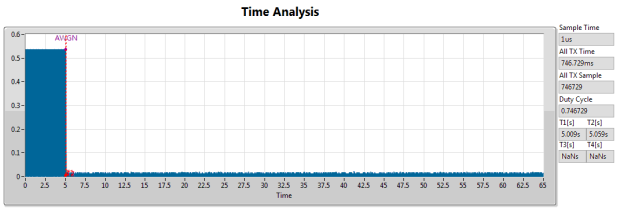
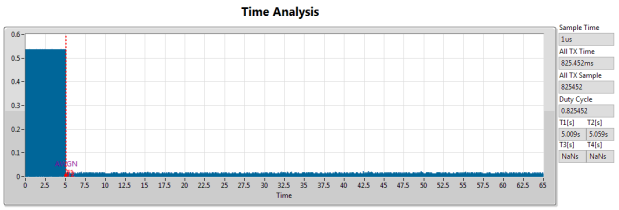
5.1.3 Test Setup



5.1.4 Test Result of Adaptivity and Short Control Signalling Transmissions

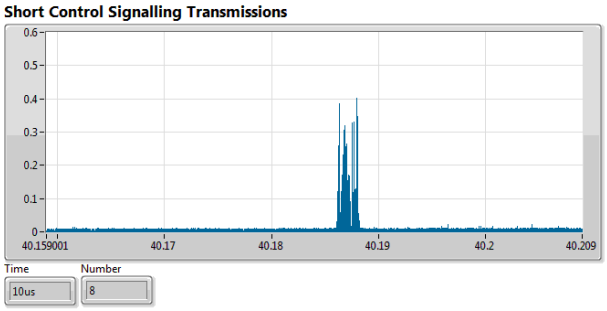
Adaptivity Result					
Equipment / Device type		Load Based Equipment / Supervised Device			
EUT firmware / software version		3.5.0.36			
Energy Detect Threshold Level (dBm)		-75			
Modulation Mode	**Freq. (MHz)**	**Interference Signal Frequency (MHz)**	**Interference Signal Type**	**Short Control Signalling Transmissions (ms)/period Numbers**	**Adaptivity**
802.11an (HT20)	5180	5180	AWGN	0.010/8	PASS
802.11an (HT20)	5180	5180	OFDM	0/0	
802.11an (HT20)	5180	5180	LTE	0/0	
802.11an (HT20)	5500	5500	AWGN	0/0	PASS
802.11an (HT20)	5500	5500	OFDM	0/0	
802.11an (HT20)	5500	5500	LTE	0/0	
Limit				< 2.5 ms / 50	N/A

Adaptivity Result Plots

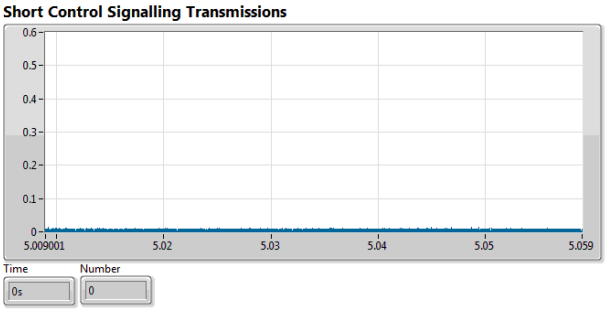
802.11an (HT20) - 5180MHz (AWGN)	802.11an (HT20) - 5180MHz (OFDM)
	
802.11an (HT20) - 5180MHz (LTE)	**802.11an (HT20) - 5500MHz (AWGN)**
	
802.11an (HT20) - 5500MHz (OFDM)	**802.11an (HT20) - 5500MHz (LTE)**
	

Short Control Signalling Transmissions Plots

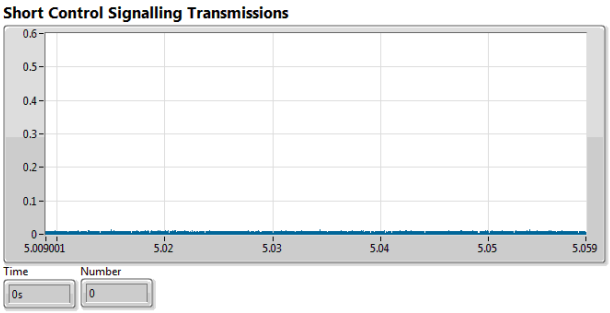
802.11an (HT20) - 5180MHz (AWGN)



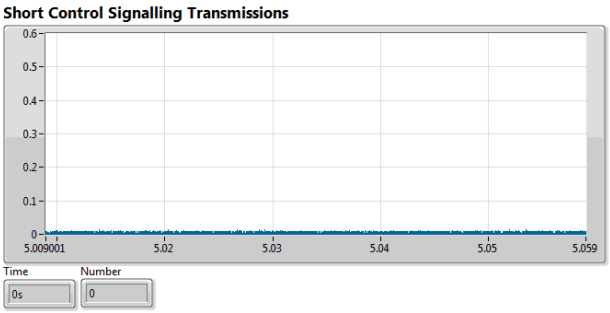
802.11an (HT20) - 5180MHz (OFDM)



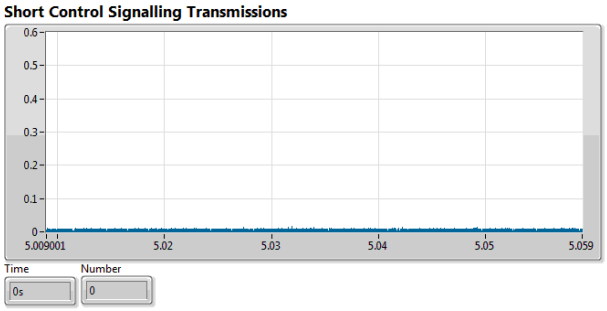
802.11an (HT20) - 5180MHz (LTE)



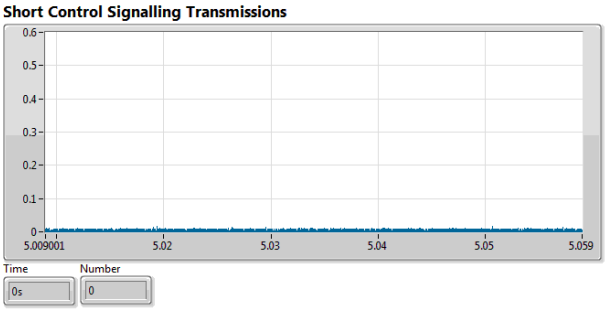
802.11an (HT20) - 5500MHz (AWGN)



802.11an (HT20) - 5500MHz (OFDM)



802.11an (HT20) - 5500MHz (LTE)



6 Receiver Blocking Test Results

6.1 Receiver Blocking

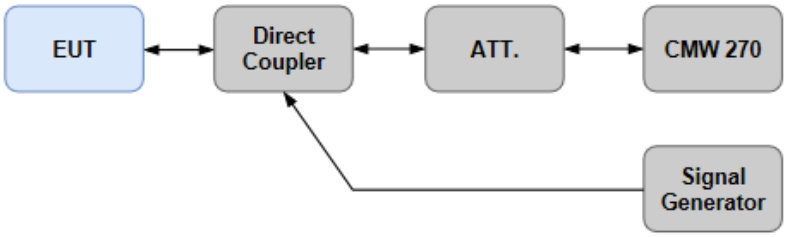
6.1.1 Limit of Receiver Blocking

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	Slave without radar detection	
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 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria (The minimum performance criterion shall be a PER of less than or equal to 10 %) 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.				

6.1.2 Test Procedures

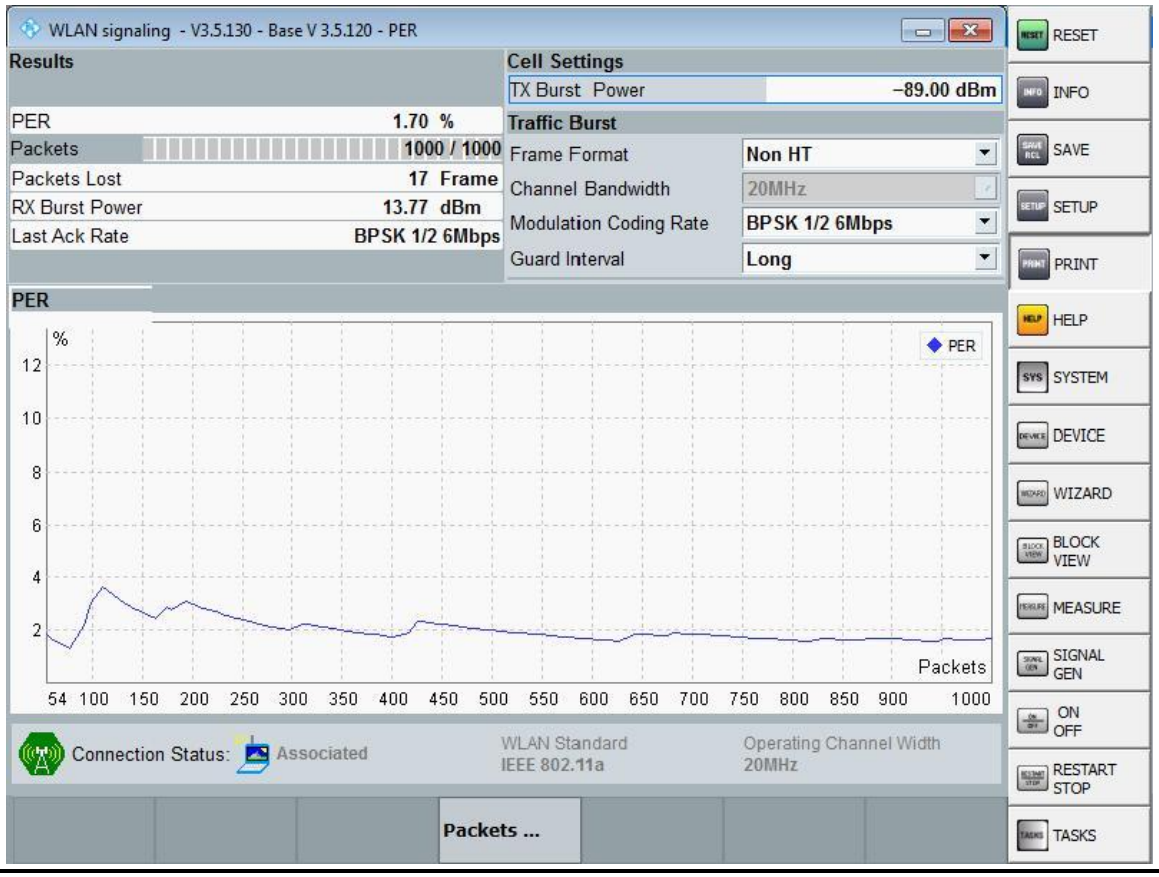
Reference to clause 5.4.10.2 of ETSI EN 301 893 V2.1.1 (2017-05).

6.1.3 Test Setup



6.1.4 Test Result of Receiver Blocking

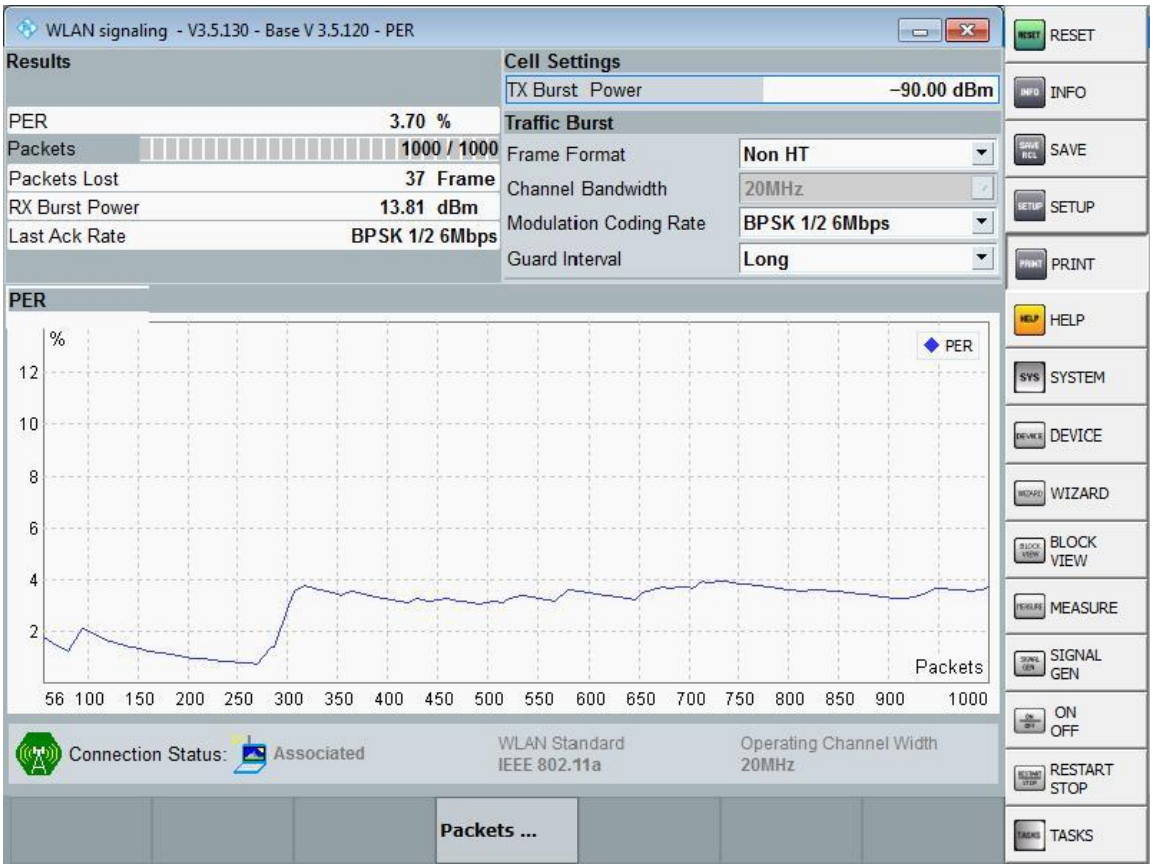
11a / 5180 MHz
Without Interference Signal Sensitivity Level



PER Minimum Performance Criteria	10 %		
Sensitivity Level	-89		**dBm**
Want Signal Mean Power form Companion Device (dBm)	**Blocking Signal Frequency (MHz)**	**Blocking Signal Power (dBm)**	**Test Result**
-83	5100	-55.1	Pass
-83	4900	-49.1	Pass
-83	5000		Pass
-83	5975		Pass

11a / 5700 MHz

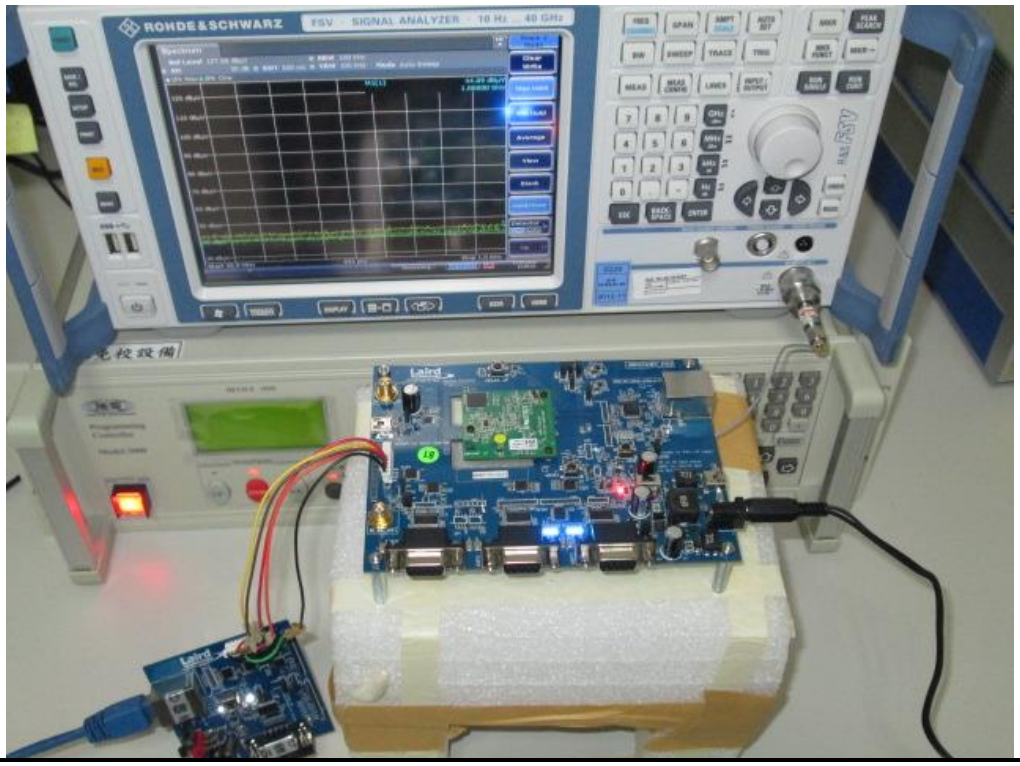
Without Interference Signal Sensitivity Level



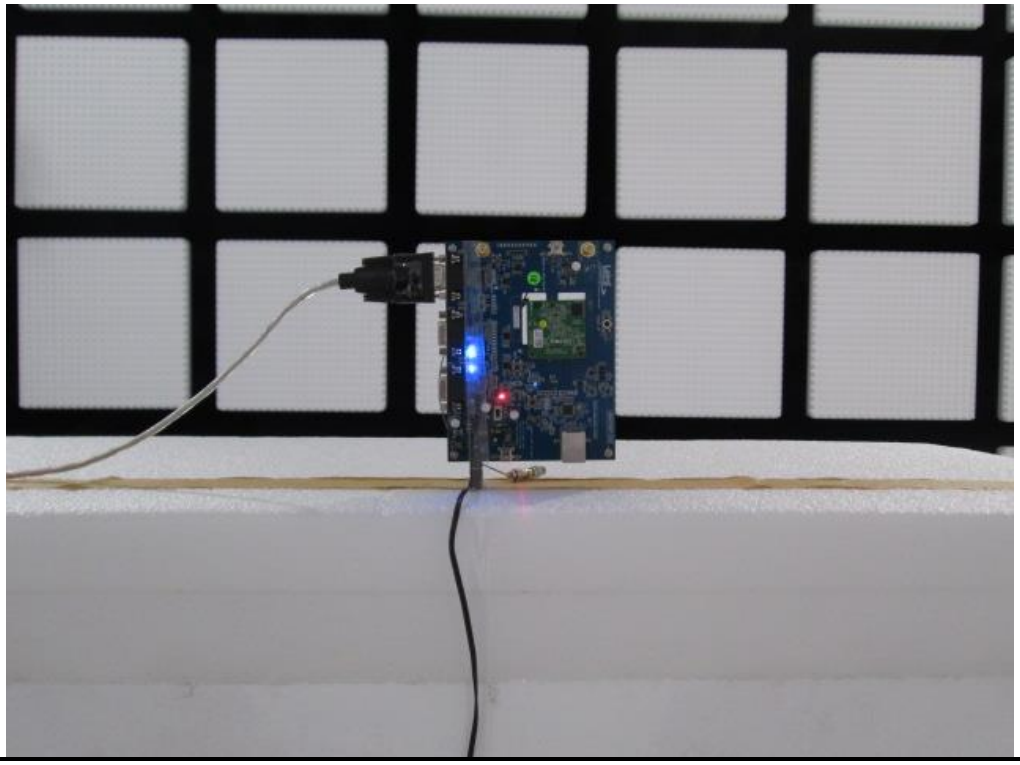
PER Minimum Performance Criteria	10 %		
Sensitivity Level	-90		**dBm**
Want Signal Mean Power form Companion Device (dBm)	**Blocking Signal Frequency (MHz)**	**Blocking Signal Power (dBm)**	**Test Result**
-84	5100	-55	Pass
-84	4900	-49	Pass
-84	5000		Pass
-84	5975		Pass

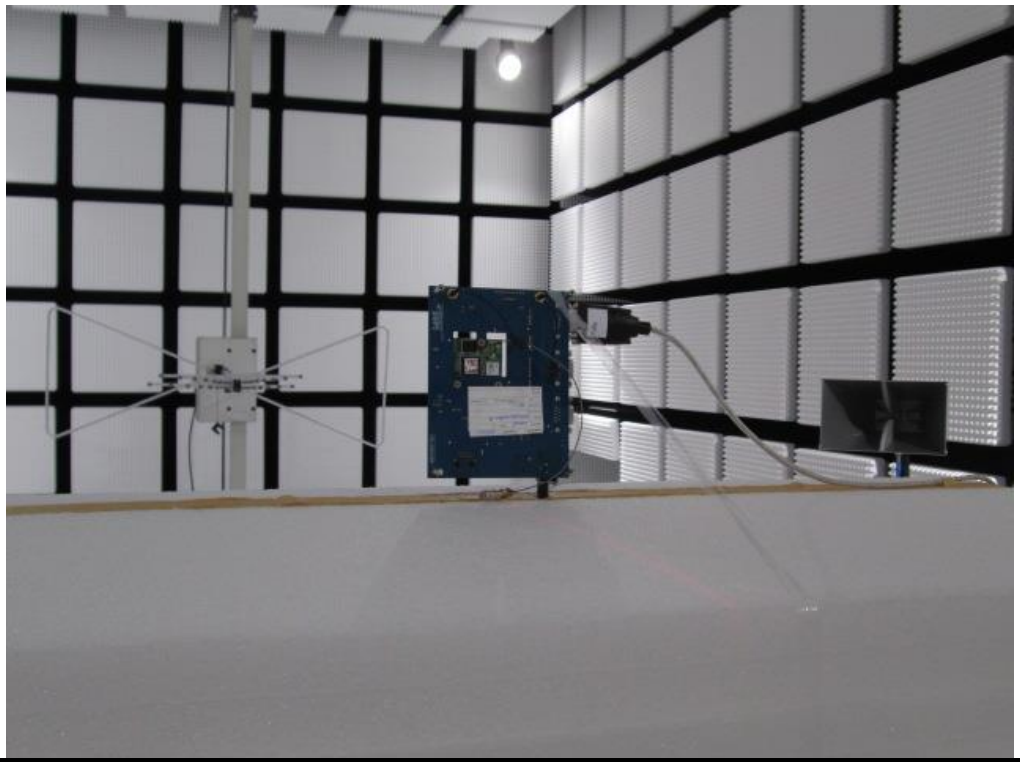
7 Photographs of the Test Configuration

Conducted Spurious Emission Test

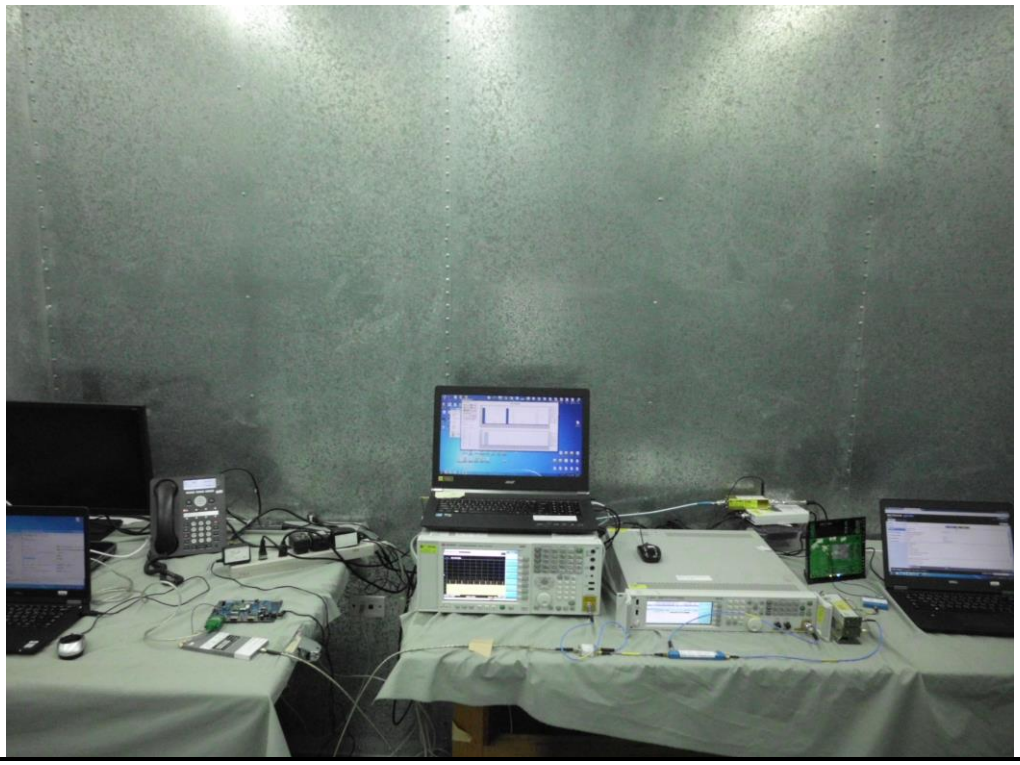


Radiated Spurious Emission Test

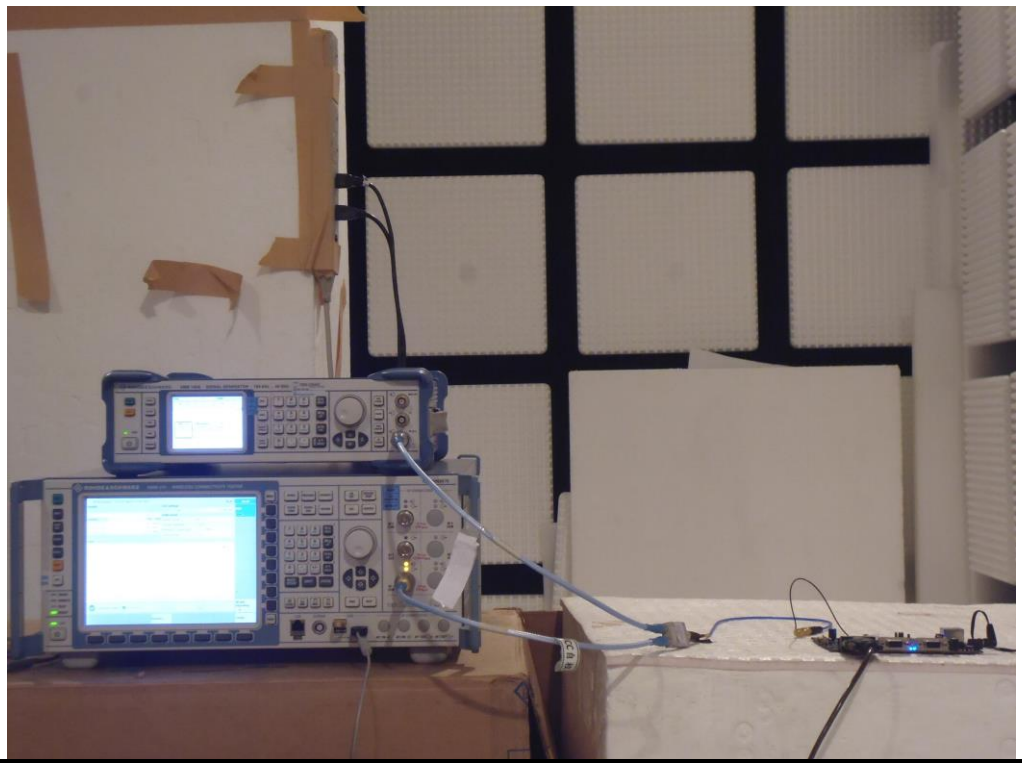




Adaptivity Test



Receiver Blocking Test



8 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C..

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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