Global United Technology Services Co., Ltd.

SPECTRUM REPORT (WIFI)

Applicant:	Shenzhen Sunchip Technology Co., Ltd
Address of Applicant:	201-301, Building A4, No. 90, Dayang Road, FuYong town, Bao'an District, Shenzhen, China
Equipment Under Test (EUT)	
Product Name:	XDV
Model No.:	X3, X1
Applicable standards:	ETSI EN 300 328 V1.9.1 (2015-02)
Date of sample receipt:	March 21, 2016
Date of Test:	March 22-25, 2016
Date of report issue:	March 28, 2016
Test Result :	PASS *

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 1999/5/EC are considered.

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*March 28, 2016*	*Original*

Prepared By:	Sam. Gao	***Date:***	*March 28, 2016*
	Project Engineer		
Check By:	hank. yan	***Date:***	*March 28, 2016*
	Reviewer		

3 Contents

4 Test Summary

Radio Spectrum Matter (RSM) Part of Tx					
Test	**Test Requirement**	**Test method**	**Limit/Severity**	**Uncertainty**	**Result**
RF Output Power	Clause 4.3.2.1	Clause 5.3.2.2	20dBm	±1.5dB	PASS
Power Spectral Density	Clause 4.3.2.2	Clause 5.3.3.2	10dBm/MHz	±3dB	PASS
Duty Cycle, Tx-sequence, Tx-gap	Clause 4.3.2.3	Clause 5.3.2.2	Clause 4.3.2.3.2	±5 %	N/A
Medium Utilisation (MU) factor	Clause 4.3.2.4	Clause 5.3.2.2	≤ 10%	±5 %	N/A
Adaptivity	Clause 4.3.2.5	Clause 5.3.7.2	Clause 4.3.2.5.1.2 & Clause 4.3.2.5.2.2 & Clause 4.3.2.5.3.2	--	PASS
Occupied Channel Bandwidth	Clause 4.3.2.6	Clause 5.3.8.2	Clause 4.3.2.6.2	±5 %	PASS
Transmitter unwanted emissions in the OOB domain	Clause 4.3.2.7	Clause 5.3.9.2	Clause 4.3.2.7.2	±3dB	PASS
Transmitter unwanted emissions in the spurious domain	Clause 4.3.2.8	Clause 5.3.10.2	Clause 4.3.2.8.2	±6dB	PASS
Radio Spectrum Matter (RSM) Part of Rx					
Receiver spurious emissions	Clause 4.3.2.9	Clause 5.3.11.2	Clause 4.3.2.9.2	±6dB	PASS
Receiver Blocking	Clause 4.3.2.10	Clause 5.3.7.2	Clause 4.3.2.10.2	--	PASS

Remark:

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

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

Temperature (Uncertainty): ±1°C   Humidity(Uncertainty): ±5%

Uncertainty: ± 3%(for DC and low frequency voltages)

5 General Information

5.1 Client Information

Applicant:	Shenzhen Sunchip Technology Co., Ltd
Address of Applicant:	201-301, Building A4, No. 90, Dayang Road, FuYong town, Bao'an District, Shenzhen, China
Manufacturer:	Shenzhen Sunchip Technology Co., Ltd
Address of Manufacturer:	201-301, Building A4, No. 90, Dayang Road, FuYong town, Bao'an District, Shenzhen, China

5.2 General Description of EUT

Product Name:	XDV
Model No.:	X3, X1
Operation Frequency:	2412MHz~2472MHz(802.11b/802.11g/802.11n(H20)) 2422MHz~2462MHz(802.11n(H40))
Channel numbers:	13 for 802.11b/802.11g/802.11n(HT20) 9 for 802.11n(HT40)
Channel separation:	5MHz
Modulation Technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum(DSSS)
Modulation Technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	Integral antenna
Antenna gain:	0dBi (declare by Applicant)
Power Supply:	3.7V Li-ion Battery 900mAh

WIFI Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	5	2432MHz	9	2452MHz	13	2472MHz
2	2417MHz	6	2437MHz	10	2457MHz		
3	2422MHz	7	2442MHz	11	2462MHz		
4	2427MHz	8	2447MHz	12	2467MHz		

The EUT operation in above frequency list, and used test software to control the EUT for staying in continuous transmitting and receiving mode. So test frequency is below:

Test channel	**Frequency (MHz)**	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2442MHz	2442MHz
Highest channel	2472MHz	2462MHz

5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	*802.11b*	*802.11g*	*802.11n(HT20)*	*802.11n(HT40)*
Data rate	*1Mbps*	*6Mbps*	*6.5Mbps*	*13Mbps*

5.4 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Description of Support Units

The EUT has been tested as an independent unit.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 Test Instruments List

Radiated:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 30 2015	June 29 2016
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015	Feb. 21 2016
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015	June 25 2016
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
10	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 30 2015	June 29 2016
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 30 2015	June 29 2016
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 26 2015	June 25 2016
15	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016
16	Constant temperature and humidity box	Oregon Scientific	BA-888	GTS248	May 09 2015	May 08 2016
17	D.C. Power Supply	Instek	PS-3030	GTS232	May 09 2015	May 08 2016

Conducted:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Signal Analyzer	Agilent	N9010A	MY48030494	Jan. 19 2015	Jan. 18 2016
2	vector Signal Generator	Agilent	E4438C	MY49070163	Jan. 19 2015	Jan. 18 2016
3	splitter	Mini-Circuits	ZAP-50W	NN256400424	Jan. 19 2015	Jan. 18 2016
4	Directional Coupler	Agilent	87300C	MY44300299	Jan. 19 2015	Jan. 18 2016
5	vector Signal Generator	Agilent	E4438C	US44271917	Jan. 19 2015	Jan. 18 2016
6	X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080020	Jan. 19 2015	Jan. 18 2016
7	X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54110001	Jan. 19 2015	Jan. 18 2016
8	X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY53480008	Jan. 19 2015	Jan. 18 2016
9	X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080019	Jan. 19 2015	Jan. 18 2016
10	4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063507	Jan. 19 2015	Jan. 18 2016
11	4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063513	Jan. 19 2015	Jan. 18 2016
12	splitter	Mini	PS3-7	4463	Jan. 19 2015	Jan. 18 2016

7 Radio Technical Specification in ETSI EN 300 328

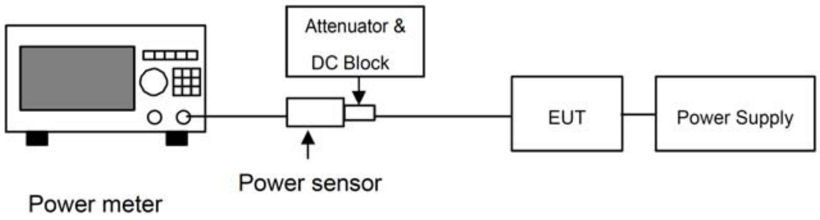
7.1 Test Environment and Mode

Test mode:						
Transmitting mode:	Keep the EUT in transmitting mode with modulation.					
Receiving mode	Keep the EUT in receiving mode.					
Operating Environment:						
Item	**Normal condition**	**Extreme condition**				
		HVHT	**LVHT**	**HVLT**	**LVLT**	
Temperature	+25ºC	+25ºC	+25ºC	-10ºC	-10ºC	
Voltage	DC 3.7V	DC 4.2V	DC 3.6V	DC 4.2V	DC 3.6V	
Humidity	20%-95%					
Atmospheric Pressure:	1008 mbar					

Setting	Value
Modulation	Other
Adaptive	Yes
Number of Transmission Chains	1
Antenna Gain 1	0dBi
Beamforming Gain	1dB
Nominal Channel Bandwidth	20MHz/40MHz
Maximum EIRP	9.85dBm
DUT Frequency not configurable	No
Frequency Low	2412MHz/2422MHz
Frequency Mid	2442MHz
Frequency High	2472MHz/2462MHz
Attenuation/Pathloss File 1	Attenuator Port1
DUT Port Occupied Channel Bandwidth	1
LBT/DAA Based	Yes
DUT Port Adaptivity	1
Channel Occupation Time	13ms

7.2 Transmitter Requirement

7.2.1 RF Output Power

Test Requirement:	ETSI EN 300 328 clause 4.3.2.1
Test Method:	ETSI EN 300 328 clause 5.3.2.2.1.1
Limit:	20dBm
Test setup:	
Test procedure:	**Step 1:** Use a fast power sensor suitable for 2,4 GHz and capable of 1 MS/s. Use the following settings: - Sample speed 1 MS/s or faster. - The samples must represent the power of the signal. - Measurement duration: For non-adaptive equipment: equal to the observation period defined in clauses 4.3.1.2.1 or 4.3.2.3.1. For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured. NOTE 1: For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used. **Step 2:** For conducted measurements on devices with one transmit chain: -Connect the power sensor to the transmit port, sample the transmit signal and store the raw data.Use these stored samples in all following steps. For conducted measurements on devices with multiple transmit chains: -Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports. -Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than half the time between two samples. -For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps. **Step 3:** Find the start and stop times of each burst in the stored measurement samples. NOTE 2: The start and stop times are defined as the points where the power is at least 20 dB below the RMS burst power calculated in step 4. **Step 4:** Between the start and stop times of each individual burst calculate the

	RMS power over the burst. Save these Pburst values, as well as the start and stop times for each burst. **Step 5:** The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations. **Step 6:** Add the (stated) antenna assembly gain "G" in dBi of the individual antenna. If applicable, add the additional beamforming gain "Y" in dB. If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used. The RF Output Power (P) shall be calculated using the formula below: P = A + G + Y
Measurement Record:	Uncertainty: ± 1.5dB
Test Instruments:	See section 6.0
Test mode:	Transmitting mode

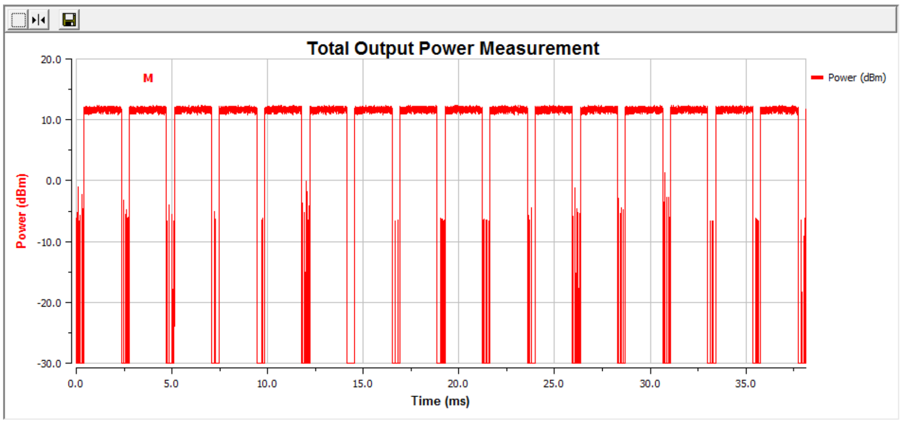
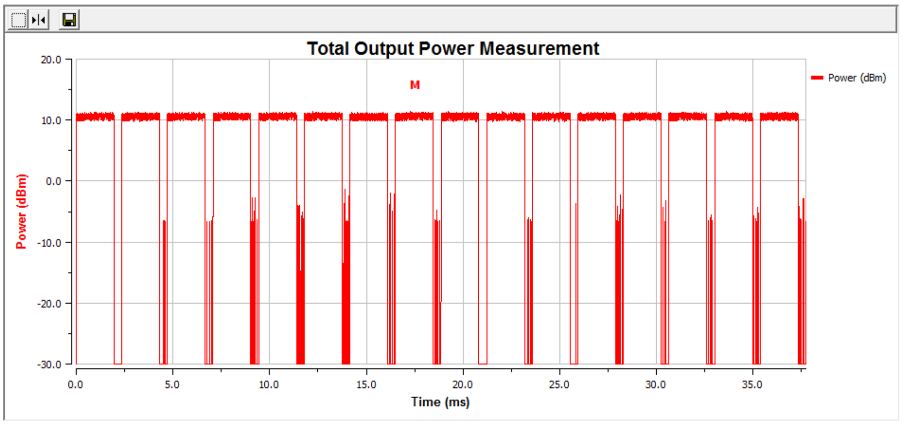
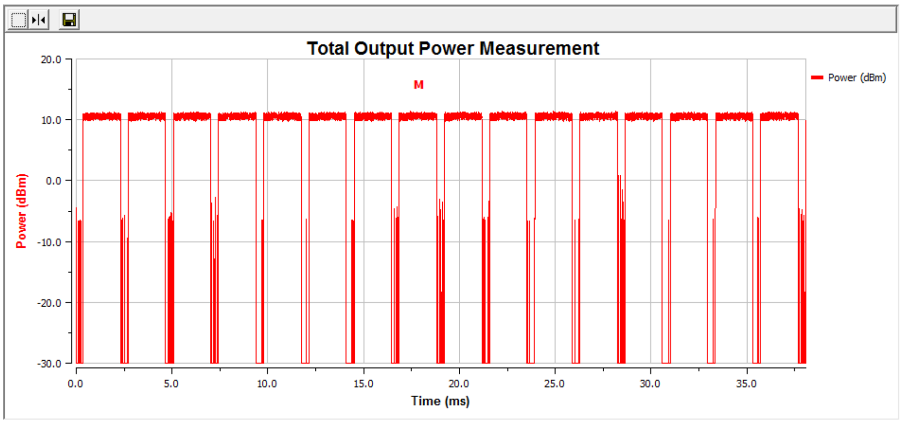
Measurement Data

802.11b mode						
Test conditions	**Channel**	**Burst RMS power (dBm)**	**Antenna Gain(dBi)**	**Calculated Power (dBm)**	**Limit (dBm)**	**Result**
Normal	Lowest	9.85	0.00	9.85	20	Pass
	Middle	8.77	0.00	8.77		
	Highest	8.73	0.00	8.73		
LVHT	Lowest	9.78	0.00	9.78		
	Middle	8.67	0.00	8.67		
	Highest	8.63	0.00	8.63		
LVLT	Lowest	9.83	0.00	9.83		
	Middle	8.75	0.00	8.75		
	Highest	8.71	0.00	8.71		
HVHT	Lowest	9.84	0.00	9.84		
	Middle	8.76	0.00	8.76		
	Highest	8.72	0.00	8.72		
HVLT	Lowest	9.79	0.00	9.79		
	Middle	8.71	0.00	8.71		
	Highest	8.66	0.00	8.66		
802.11g mode						
Test conditions	**Channel**	**Burst RMS power (dBm)**	**Antenna Gain(dBi)**	**Calculated Power (dBm)**	**Limit (dBm)**	**Result**
Normal	Lowest	8.58	0.00	8.58	20	Pass
	Middle	8.12	0.00	8.12		
	Highest	8.21	0.00	8.21		
LVHT	Lowest	8.51	0.00	8.51		
	Middle	8.02	0.00	8.02		
	Highest	8.11	0.00	8.11		
LVLT	Lowest	8.56	0.00	8.56		
	Middle	8.10	0.00	8.10		
	Highest	8.19	0.00	8.19		
HVHT	Lowest	8.57	0.00	8.57		
	Middle	8.11	0.00	8.11		
	Highest	8.20	0.00	8.20		
HVLT	Lowest	8.52	0.00	8.52		
	Middle	8.06	0.00	8.06		
	Highest	8.14	0.00	8.14		

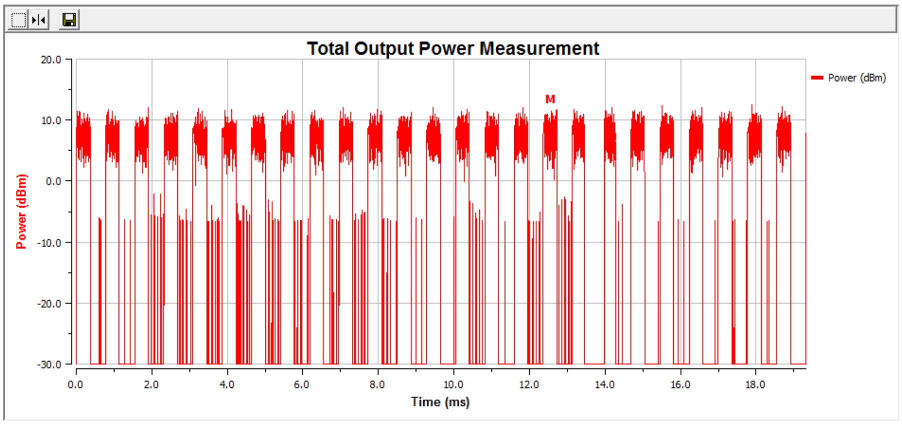
802.11n(HT20) mode						
Test conditions	**Channel**	**Burst RMS power (dBm)**	**Antenna Gain(dBi)**	**Calculated Power (dBm)**	**Limit (dBm)**	**Result**
Normal	Lowest	8.48	0.00	8.48	20	Pass
	Middle	7.96	0.00	7.96		
	Highest	8.15	0.00	8.15		
LVHT	Lowest	8.49	0.00	8.49		
	Middle	7.96	0.00	7.96		
	Highest	8.15	0.00	8.15		
LVLT	Lowest	8.42	0.00	8.42		
	Middle	7.86	0.00	7.86		
	Highest	8.05	0.00	8.05		
HVHT	Lowest	8.47	0.00	8.47		
	Middle	7.94	0.00	7.94		
	Highest	8.13	0.00	8.13		
HVLT	Lowest	8.48	0.00	8.48		
	Middle	7.95	0.00	7.95		
	Highest	8.14	0.00	8.14		

802.11n(HT40) mode						
Test conditions	**Channel**	**Burst RMS power (dBm)**	**Antenna Gain(dBi)**	**Calculated Power (dBm)**	**Limit (dBm)**	**Result**
Normal	Lowest	6.45	0.00	6.45	20	Pass
	Middle	6.09	0.00	6.09		
	Highest	6.23	0.00	6.23		
LVHT	Lowest	6.38	0.00	6.38		
	Middle	5.99	0.00	5.99		
	Highest	6.13	0.00	6.13		
LVLT	Lowest	6.43	0.00	6.43		
	Middle	6.07	0.00	6.07		
	Highest	6.21	0.00	6.21		
HVHT	Lowest	6.44	0.00	6.44		
	Middle	6.08	0.00	6.08		
	Highest	6.22	0.00	6.22		
HVLT	Lowest	6.39	0.00	6.39		
	Middle	6.03	0.00	6.03		
	Highest	6.16	0.00	6.16		

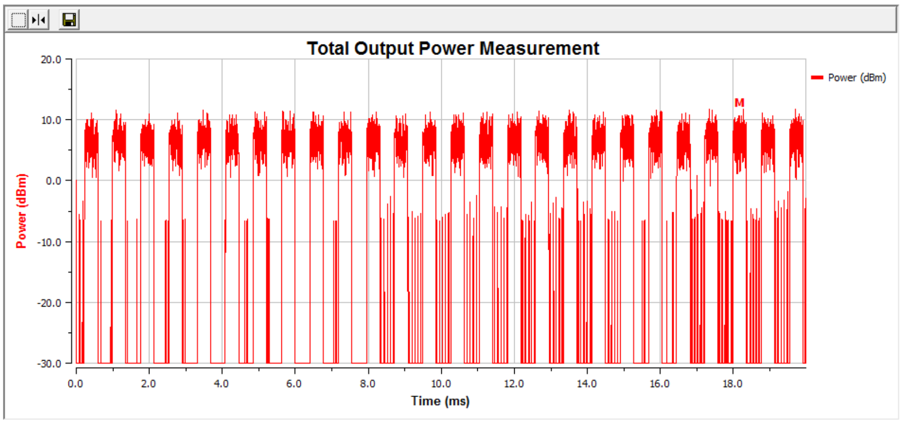
Remark:1>. Volt= Voltage, Temp= Temperature
2>. Duty cycle=100%, Antenna Gain=0dBi

Test mode:	802.11b
	
Lowest Channel	
	
Middle Channel	
	
Highest Channel	

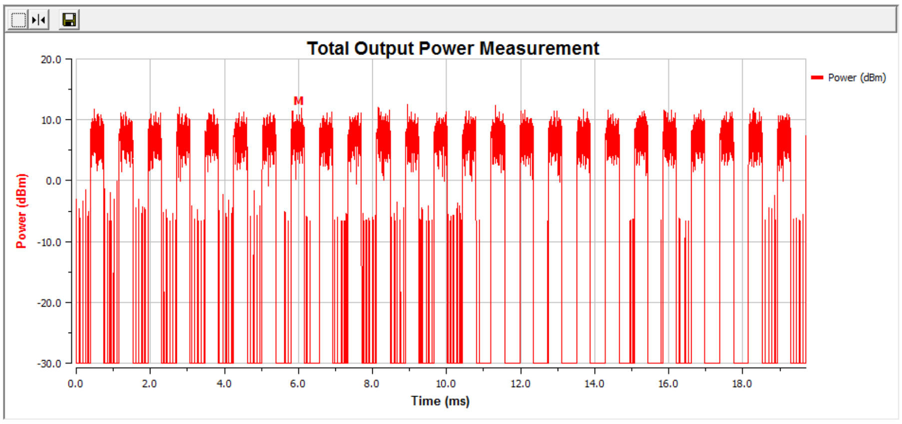
Test mode:	802.11g



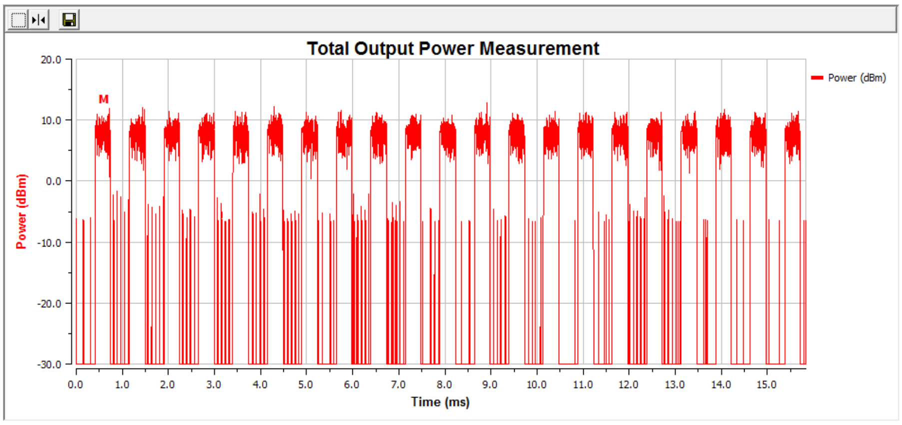
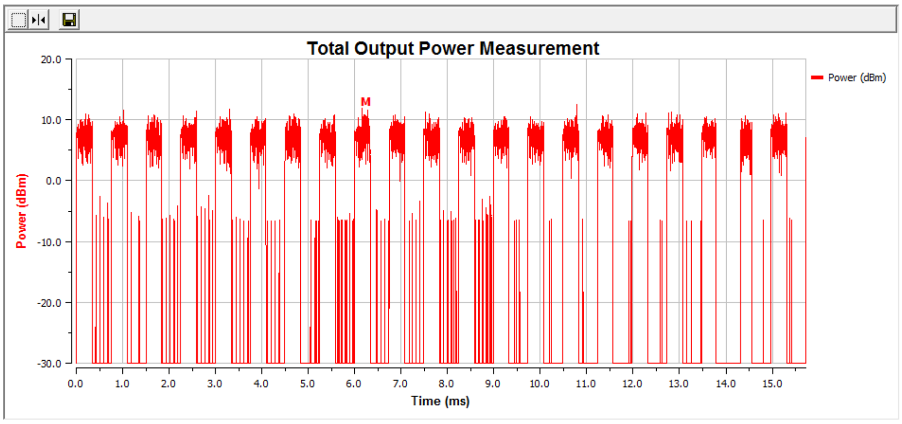
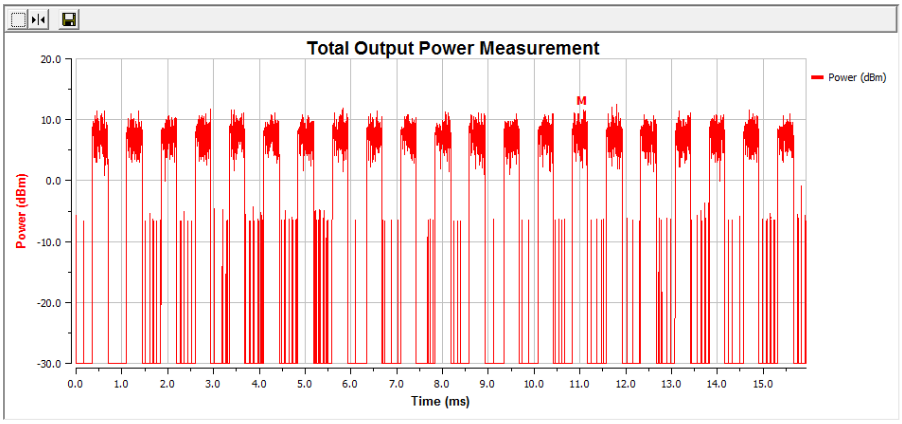
Lowest Channel

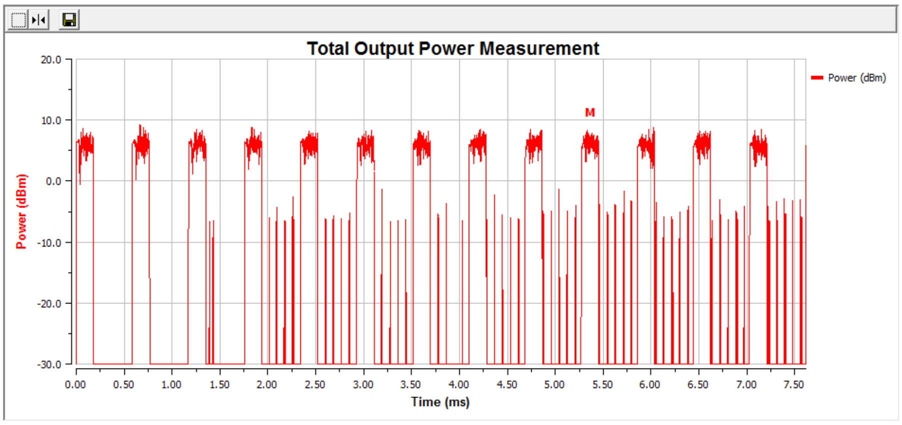
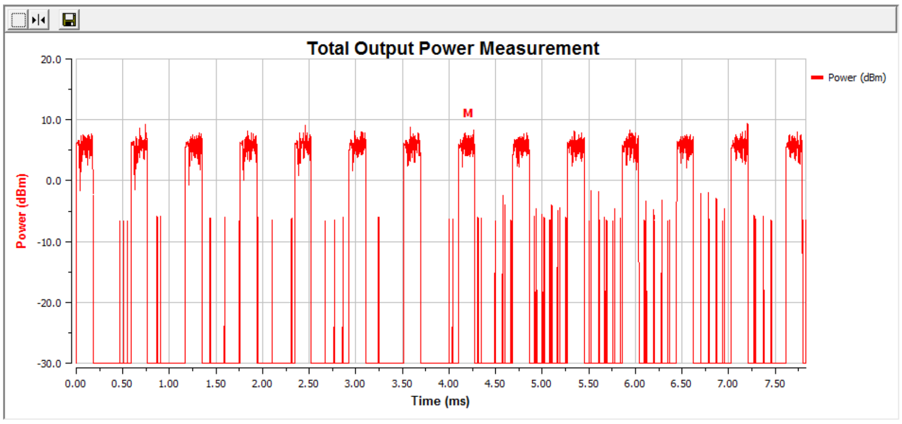
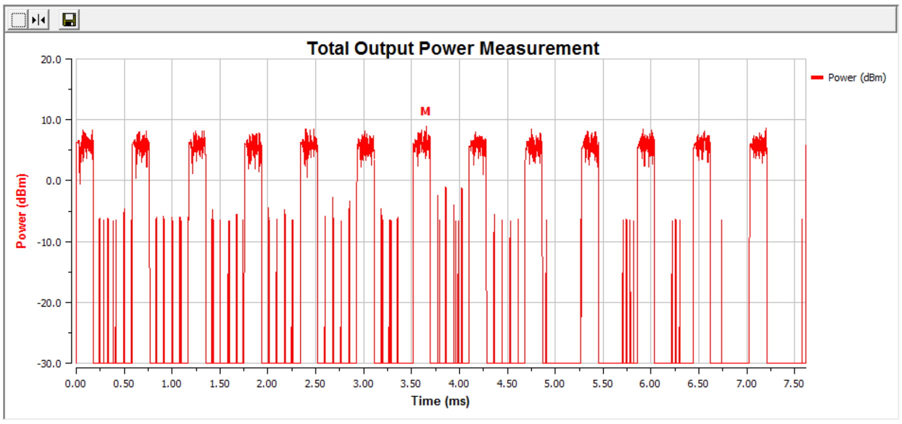


Middle Channel

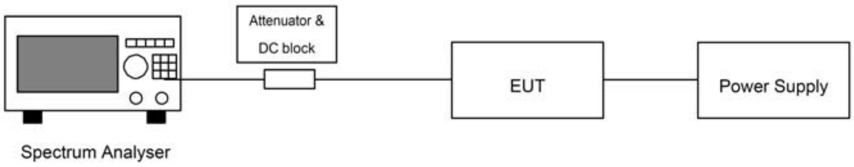


Highest Channel

Test mode:	802.11n-HT20
	
Lowest Channel	
	
Middle Channel	
	
Highest Channel	

Test mode:	802.11n-HT40
	
Lowest Channel	
	
Middle Channel	
	
Highest Channel	

7.2.2 Power Spectral Density

Test Requirement:	ETSI EN 300 328 clause 4.3.2.2
Test Method:	ETSI EN 300 328 clause 5.3.3.2.1
Limit:	10dBm/MHz
Test setup:	
Test procedure:	**Step 1:** Connect the UUT to the spectrum analyser and use the following settings: Start Frequency: 2400 MHz Stop Frequency: 2483.5 MHz Resolution BW: 10 kHz Video BW: 30 kHz Sweep Points: > 8350 NOTE:For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. Detector: RMS Trace Mode: Max Hold Sweep time: Auto For non-continuous signals, wait for the trace to be completed. Save the (trace) data set to a file. **Step 2:** For conducted measurements on smart antenna systems using either operating mode 2 or 3 (see clause 5.1.3.2), repeat the measurement for each of the transmit ports. For each frequency point, add up the amplitude (power) values for the different transmit chains and use this as the new data set. **Step 3:** Add up the values for amplitude (power) for all the samples in the file. **Step 4:** Normalize the individual values for amplitude so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.3.2. **Step 5:** Starting from the first sample in the file (lowest frequency), add up the power of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to #100). This is the Power Spectral Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded. **Step 6:** Shift the start point of the samples added up in step 5 by 1 sample and repeat the procedure in step 5 (i.e. sample #2 to

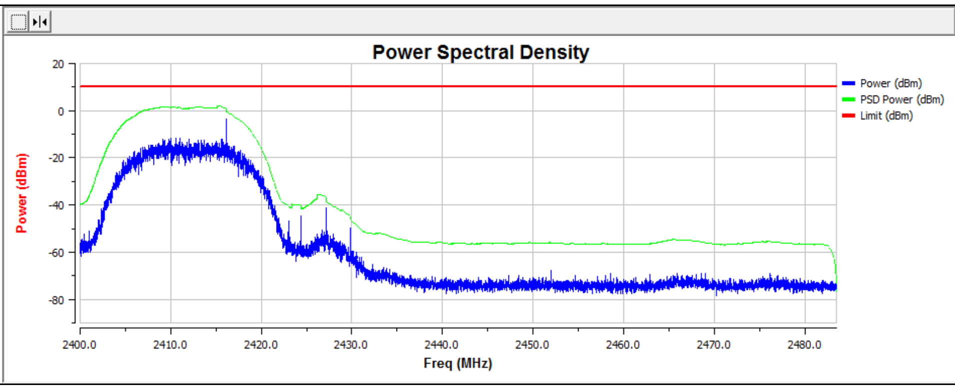
	#101). **Step 7:** Repeat step 6 until the end of the data set and record the radiated Power Spectral Density values for each of the 1 MHz segments.
Measurement Record:	Uncertainty: ±3dB
Test Instruments:	See section 6.0
Test mode:	Transmitting mode

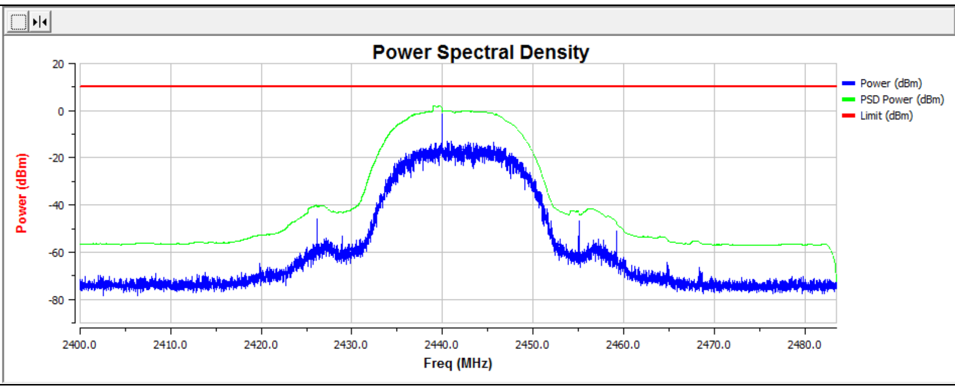
Measurement Data

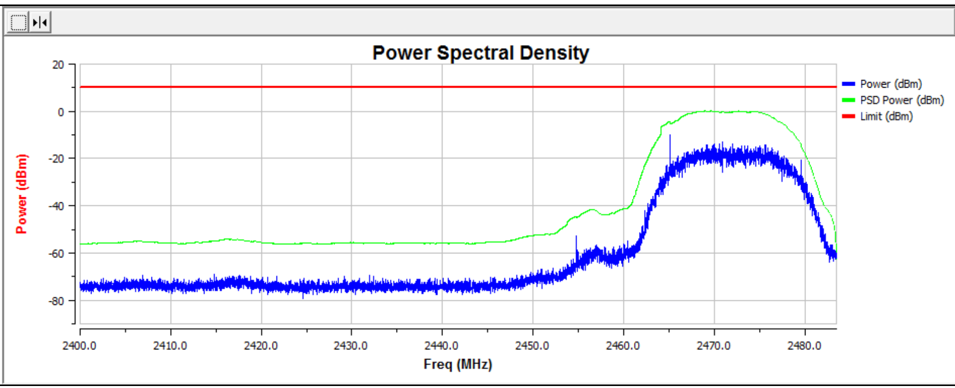
802.11b mode			
Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH 1	2.17	10.00	Pass
CH 7	1.96		
CH 13	0.26		
802.11g mode			
Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH 1	-3.04	10.00	Pass
CH 7	-3.44		
CH 13	-3.27		
802.11n-HT20 mode			
Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH 1	-3.08	10.00	Pass
CH 7	-3.65		
CH 13	-3.34		
802.11n-HT40 mode			
Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH 3	-8.14	10.00	Pass
CH 7	-8.50		
CH 11	-8.37		

Test plots are followed:

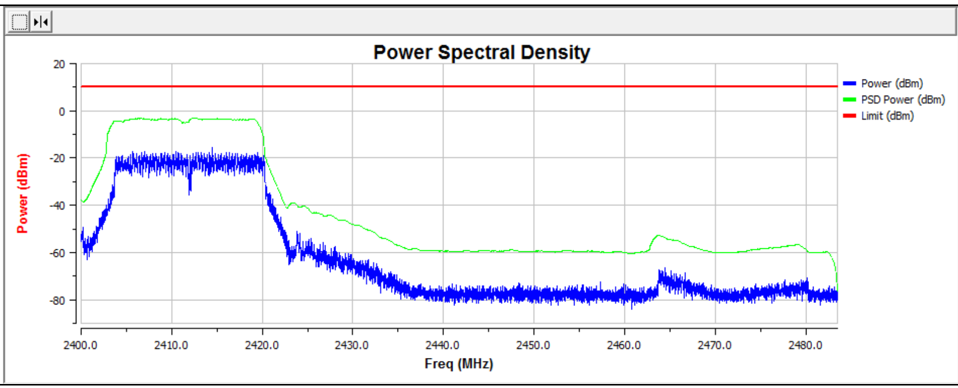
802.11b mode


Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
Freq (MHz)
20
0
-20
-40
-60
-80
2400.0
2410.0
2420.0
2430.0
2440.0
2450.0
2460.0
2470.0
2480.0


Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
Freq (MHz)
20
0
-20
-40
-60
-80
2400.0
2410.0
2420.0
2430.0
2440.0
2450.0
2460.0
2470.0
2480.0


Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
Freq (MHz)
20
0
-20
-40
-60
-80
2400.0
2410.0
2420.0
2430.0
2440.0
2450.0
2460.0
2470.0
2480.0

802.11g mode


Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
20
0
-20
-40
-60
-80
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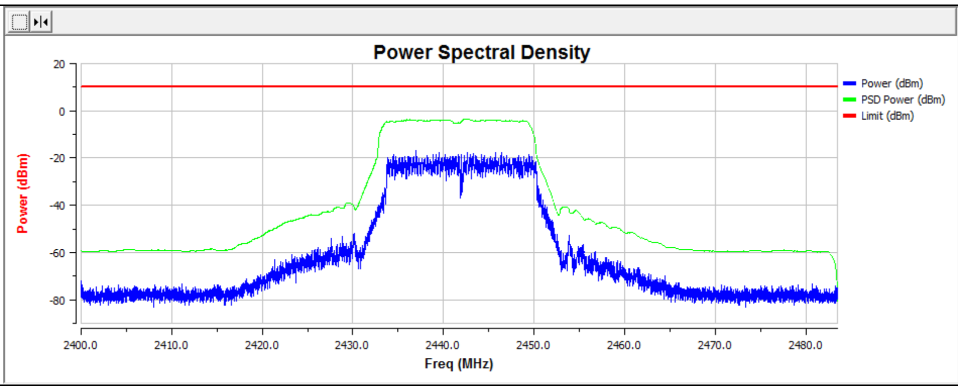
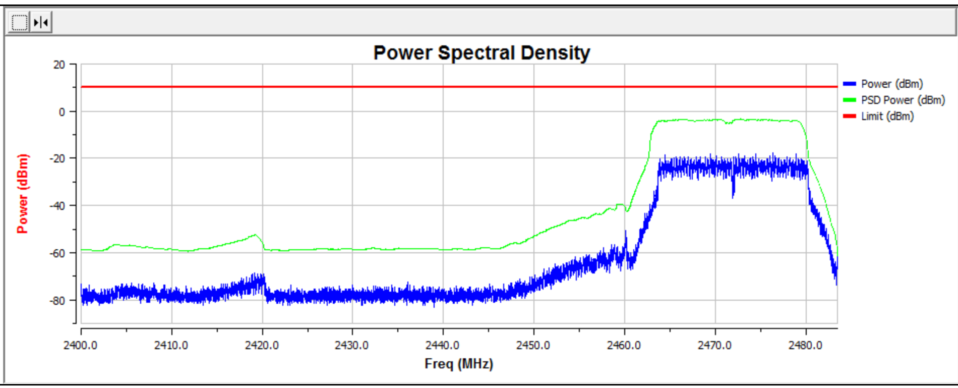
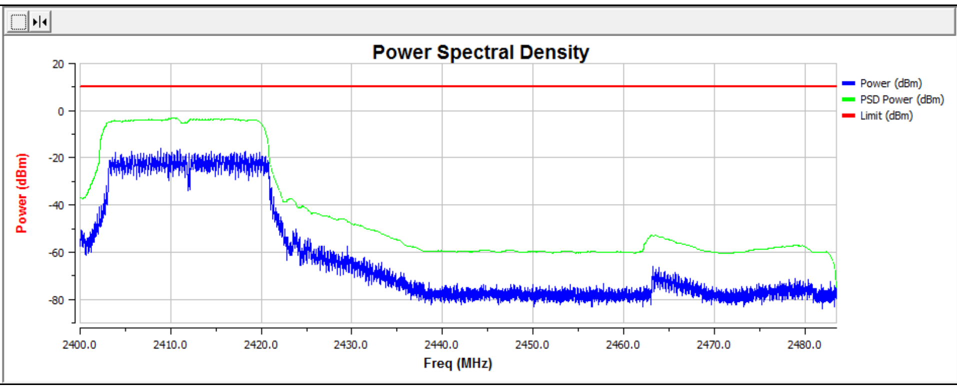
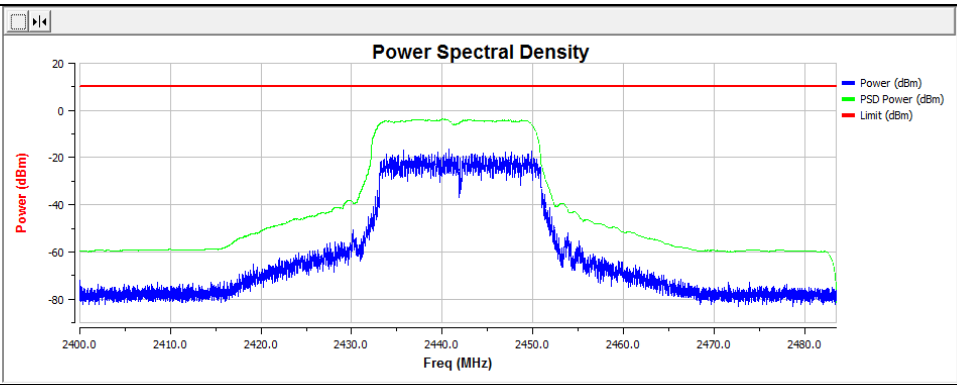
2460.0
2470.0
2480.0
Freq (MHz)

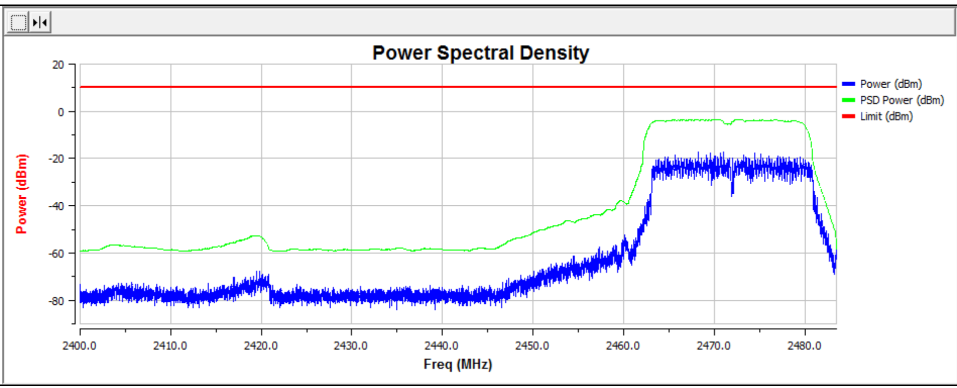

Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
20
0
-20
-40
-60
-80
2400.0
2410.0
2420.0
2430.0
2440.0
2450.0
2460.0
2470.0
2480.0
Freq (MHz)


Power Spectral Density
Power (dBm)
PSD Power (dBm)
Limit (dBm)
Power (dBm)
20
0
-20
-40
-60
-80
2400.0
2410.0
2420.0
2430.0
2440.0
2450.0
2460.0
2470.0
2480.0
Freq (MHz)

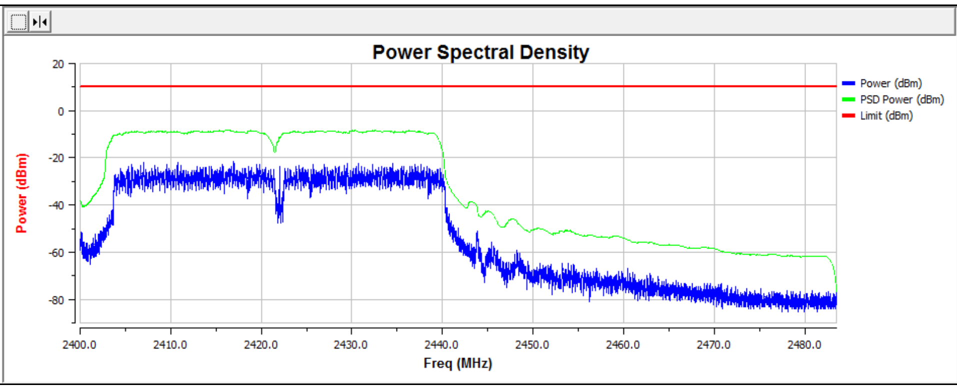
802.11n-HT20 mode

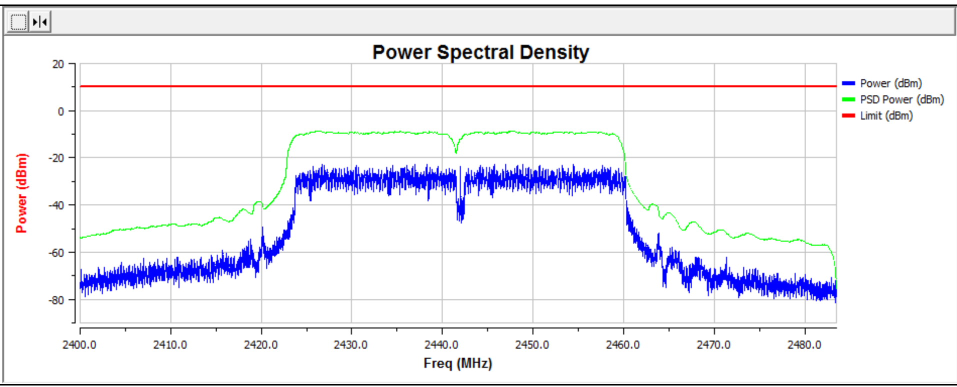


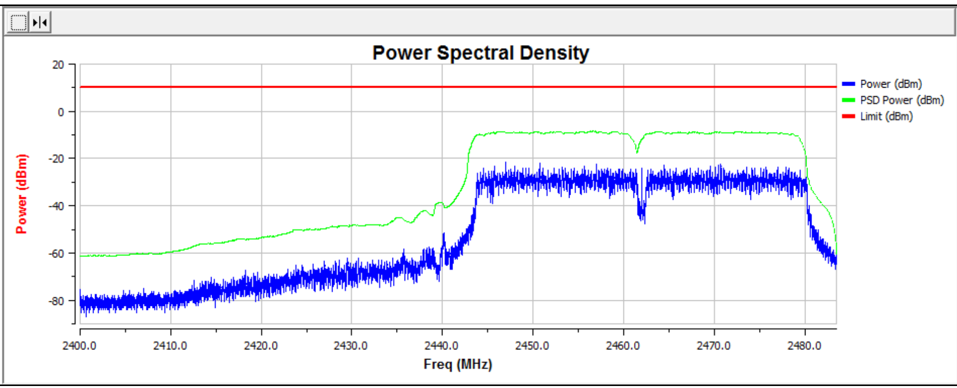




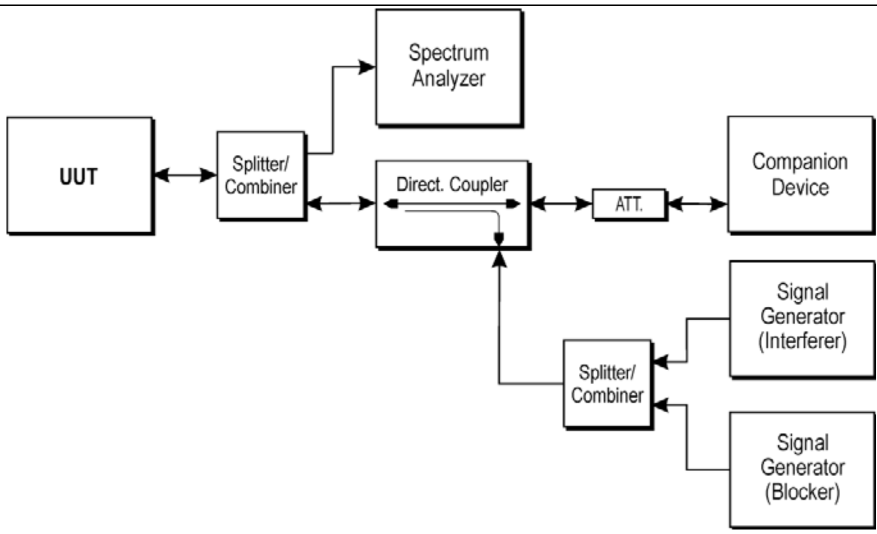
802.11n-HT40 mode







7.2.3 Adaptivity

Test Requirement:	ETSI EN 300 328 clause 4.3.2.5
Test Method:	ETSI EN 300 328 clause 5.3.7.2.1
Limit:	Clause 4.3.2.5.1.2 & Clause 4.3.2.5.2.2 & Clause 4.3.2.5.3.2
Test setup:	
Test procedure:	**1. Adaptive Frequency Hopping equipment using DAA** The different steps below define the procedure to verify the efficiency of the DAA based adaptive mechanisms for frequency hopping equipment. These mechanisms are described in clause 4.3.1.6. **Step 1:** The UUT may connect to a companion device during the test. The interference signal generator, the blocking signal generator, the spectrum analyser, the UUT and the companion device are connected using a set-up equivalent to the example given by figure 5, although the interference and blocking signal generators do not generate any signals at this point in time. The spectrum analyser is used to monitor the transmissions of the UUT in response to the interfering and the blocking signals. For the hopping frequency to be tested, adjust the received signal level (wanted signal from the companion device) at the UUT to the value defined in table 3 (clause 4). NOTE 1: Testing of Unidirectional equipment does not require a link to be established with a companion device. The analyzer shall be set as follows: RBW: ≥ Occupied Channel Bandwidth (use next available RBW setting above the Occupied Channel Bandwidth) Filter type: Channel Filter VBW: ≥ RBW Detector Mode: RMS Centre Frequency: Equal to the hopping frequency to be tested Span: 0Hz

	Sweep time: Channel Occupancy Time of the UUT. If the Channel Occupancy Time is non-contiguous (non-LBT based equipment), the sweep time shall be sufficient to cover the period over which the Channel Occupancy Time is spread out. Trace Mode: Clear/Write Trigger Mode: Video **Step 2:** Configure the UUT for normal transmissions with a sufficiently high payload to allow demonstration of compliance of the adaptive mechanism on the hopping frequency being tested. Using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that, for systems with a dwell time greater than the maximum allowable Channel Occupancy Time, the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clauses 4.3.1.6.1.2 and 4.3.1.6.2.2. **Step 3: Adding the interference signal** A 100 % duty cycle interference signal is injected centred on the hopping frequency being tested. This interference signal shall be a band limited noise signal which has a flat Power Spectral Density, and shall have a bandwidth greater than the Occupied Channel Bandwidth of the UUT. The maximum ripple of this interfering signal shall be ±1,5 dB within the Occupied Channel Bandwidth and the Power Spectral Density (at the input of the UUT) shall be as defined in clauses 4.3.1.6.1.2 or 4.3.1.6.2.2. **Step 4: Verification of reaction to the interference signal** The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected hopping frequency with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal. Using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that: i) The UUT shall stop transmissions on the hopping frequency being tested. NOTE 2: The UUT is assumed to stop transmissions on this hopping frequency within a period equal to the maximum Channel Occupancy Time defined in clauses 4.3.1.6.1 or 4.3.1.6.2. As stated in clause 4.3.1.6.2.2, the Channel Occupancy Time for non-LBT based frequency hopping systems may be non-contiguous. ii) For LBT based frequency hopping equipment, apart from Short Control Signalling Transmissions (see below), there shall be no subsequent transmissions on this hopping frequency, as long as the interference signal remains present. For non-LBT based frequency hopping equipment, apart from Short Control Signalling Transmissions (see iii) below), there shall be no subsequent transmissions on this hopping frequency for a (silent) period defined in clause 4.3.1.6.2.2 step 3. After that, the UUT may have normal transmissions again for the duration of a single Channel Occupancy Time period (which may be non-contiguous). Because the interference signal is still present, another silent period as defined in

	clause 4.3.1.6.2.2 step 3 needs to be included. This sequence is repeated as long as the interfering signal is present. NOTE 3: In case of overlapping channels, transmissions in adjacent channels may generate transmission bursts on the channel being investigated, however they will have a lower amplitude as on-channel transmissions. Care should be taken to only evaluate the on-channel transmissions. The Time Domain Power Option of the analyser may be used to measure the RMS power of the individual bursts to distinguish on-channel transmissions from transmissions on adjacent channels. In some cases, the RBW may need to be reduced. iii) The UUT may continue to have Short Control Signalling Transmissions on the hopping frequency being tested while the interference signal is present. These transmissions shall comply with the limits defined in clause 4.3.1.6.3.2. NOTE 4: The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time). iv) Alternatively, the equipment may switch to a non-adaptive mode. **Step 5: Adding the blocking signal** With the interfering signal present, a 100 % duty cycle CW signal is inserted as the blocking signal. The frequency and the level are provided in table 3 of clause 4.3.1.10.2. Repeat step 4 to verify that the UUT does not resume any normal transmissions on the hopping frequency being investigated. **Step 6: Removing the interference and blocking signal** On removal of the interference and blocking signal, the UUT is allowed to re-include any channel previously marked as unavailable; however, for non-LBT based systems, it shall be verified that this shall only be done after the period defined in clause 4.3.1.6.2.2 point 3. **Step 7:** The steps 2 to 6 shall be repeated for each of the hopping frequencies to be tested. **2. Non-LBT based adaptive equipment using modulations other than FHSS** The different steps below define the procedure to verify the efficiency of the non-LBT based DAA adaptive mechanism of equipment using wide band modulations other than FHSS. **Step 1:** The UUT may connect to a companion device during the test. The interference signal generator, the blocking signal generator, the spectrum analyser, the UUT and the companion device are connected using a set-up equivalent to the example given by figure 5 although the interference and blocking signal generator do not generate any signals at this point in time. The spectrum analyser is used to monitor the transmissions of the UUT in response to the interfering and the blocking signals. Adjust the received signal level (wanted signal from the companion device) at the UUT to the value defined in table 6 (clause 4). NOTE 1: Testing of Unidirectional equipment does not require a link to be established with a companion device.

	The analyzer shall be set as follows: RBW: ≥ Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting s hall be used) VBW: 3 × RBW (if the analyser does not support this setting, the highest available setting shall be used) Detector Mode: RMS Centre Frequency: Equal to the hopping frequency to be tested Span: 0Hz Sweep time: > Channel Occupancy Time of the UUT Trace Mode: Clear/Write Trigger Mode: Video **Step 2:** Configure the UUT for normal transmissions with a sufficiently high payload to allow demonstration of compliance of the adaptive mechanism on the channel being tested. Using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.5.1.2. **Step 3: Adding the interference signal** A 100 % duty cycle interference signal is injected on the current operating channel of the UUT. This interference signal shall be a band limited noise signal which has a flat power spectral density, and shall have a bandwidth greater than the Occupied Channel Bandwidth of the UUT. The maximum ripple of this interfering signal shall be ±1,5 dB within the Occupied Channel Bandwidth and the power spectral density (at the input of the UUT) shall be as defined in clause 4.3.2.5.1.2. **Step 4: Verification of reaction to the interference signal** The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal. Using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that: i) The UUT shall stop transmissions on the current operating channel being tested. NOTE 2: The UUT is assumed to stop transmissions within a period equal to the maximum Channel Occupancy Time defined in clause 4.3.2.5.1.2 step 3. ii) Apart from Short Control Signalling Transmissions (see iii) below), there shall be no subsequent transmissions on this operating channel for a (silent) period defined in clause 4.3.2.5.1.2 step 2. After that, the UUT may have normal transmissions again for the duration of a single Channel Occupancy Time period. Because the interference signal is still present, another silent period as defined in clause 4.3.2.5.1.2 step 2 needs to be included. This sequence is repeated as long as the interfering signal is present. iii) The UUT may continue to have Short Control Signalling

	Transmissions on the operating channel while the interference signal is present. These transmissions shall comply with the limits defined in clause 4.3.2.5.3.2. NOTE 3: The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time). iv) Alternatively, the equipment may switch to a non-adaptive mode. **Step 5: Adding the blocking signal** With the interfering signal present, a 100 % duty cycle CW signal is inserted as the blocking signal. The frequency and the level are provided in table 6 of clause 4.3.2.10.2. Repeat step 4 to verify that the UUT does not resume any normal transmissions. **Step 6: Removing the interference and blocking signal** On removal of the interference and blocking signal the UUT is allowed to start transmissions again on this channel however, it shall be verified that this shall only be done after the period defined in clause 4.3.2.5.1.2 step 2. **Step 7:** The steps 2 to 6 shall be repeated for each of the frequencies to be tested. **3. LBT based adaptive equipment using modulations other than FHSS** The different steps below define the procedure to verify the efficiency of the LBT based adaptive mechanism of equipment using wide band modulations other than FHSS. This method can be applied on Load Based Equipment and Frame Based Equipment. **Step 1:** The UUT may connect to a companion device during the test. The interference signal generator, the blocking signal generator, the spectrum analyser, the UUT and the companion device are connected using a set-up equivalent to the example given by figure 5 although the interference and blocking signal generator do not generate any signals at this point in time. The spectrum analyser is used to monitor the transmissions of the UUT in response to the interfering and the blocking signals. Adjust the received signal level (wanted signal from the companion device) at the UUT to the value defined in table 6 (clause 4). NOTE 1: Testing of Unidirectional equipment does not require a link to be established with a companion device. The analyzer shall be set as follows: RBW: ≥ Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used) VBW: 3 × RBW (if the analyser does not support this setting, the highest available setting shall be used) Detector Mode: RMS Centre Frequency: Equal to the hopping frequency to be tested Span: 0Hz Sweep time: > maximum Channel Occupancy Time

	Trace Mode: Clear/Write Trigger Mode: Video **Step 2:** Configure the UUT for normal transmissions with a sufficiently high payload to allow demonstration of compliance of the adaptive mechanism on the channel being tested. For Frame Based Equipment, using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.5.2.2.1. For Load Based equipment, using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that the UUT complies with the maximum Channel Occupancy Time defined in clause 4.3.2.5.2.2.2. It shall also be verified (if necessary by repeating the test) that the Idle Period varies between CCA and q × CCA as defined in clause 4.3.2.5.2.2.2. NOTE 2: For Load Based Equipment referred to in the first paragraph of clause 4.3.2.5.2.2.2 (IEEE 802.11 [i.3] or IEEE 802.15.4 [i.5] equipment), the minimum Idle Period and the maximum Channel Occupancy Time are as defined for other types of Load Based Equipment (see clause 4.3.2.5.2.2.2 points 2 and 3). The CCA observation time is declared by the supplier (see clause 5.3.1 d). **Step 3: Adding the interference signal** A 100 % duty cycle interference signal is injected on the current operating channel of the UUT. This interference signal shall be a band limited noise signal which has a flat power spectral density, and shall have a bandwidth greater than the Occupied Channel Bandwidth of the UUT. The maximum ripple of this interfering signal shall be ±1,5 dB within the Occupied Channel Bandwidth and the power spectral density (at the input of the UUT) shall be as defined in clause 4.3.2.5.2.2.1 step 5 (frame based equipment) or clause 4.3.2.5.2.2.2 step 5 (load based equipment). **Step 4: Verification of reaction to the interference signal** The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal. Using the procedure defined in clause 5.3.7.2.1.4, it shall be verified that: i) The UUT shall stop transmissions on the current operating channel. NOTE 3: The UUT is assumed to stop transmissions within a period equal to the maximum Channel Occupancy Time defined in clauses 4.3.2.5.2.2.1 (frame based equipment) or 4.3.2.5.2.2.2 (load based equipment). ii) Apart from Short Control Signalling Transmissions, there shall be no subsequent transmissions while the interfering signal is present. iii) The UUT may continue to have Short Control Signalling Transmissions on the operating channel while the interfering signal is present. These transmissions shall comply with the limits defined in clause 4.3.2.5.3.2. NOTE 4: The verification of the Short Control Signalling transmissions

	may require the analyser settings to be changed (e.g. sweep time). iv) Alternatively, the equipment may switch to a non-adaptive mode. **Step 5: Adding the blocking signal** With the interfering signal present, a 100 % duty cycle CW signal is inserted as the blocking signal. The frequency and the level are provided in table 6 of clause 4.3.2.10.2. Repeat step 4 to verify that the UUT does not resume any normal transmissions. **Step 6: Removing the interference and blocking signal** On removal of the interference and blocking signal the UUT is allowed to start transmissions again on this channel however this is not a requirement and therefore does not require testing. **Step 7:** The steps 2 to 6 shall be repeated for each of the frequencies to be tested. **4. Generic test procedure for measuring channel/frequency usage** This is a generic test method to evaluate transmissions on the operating (hopping) frequency being investigated. This test is performed as part of the procedures described in clause 5.3.7.2.1.1 up to clause 5.3.7.2.1.3. The test procedure shall be as follows: **Step 1:** The analyzer shall be set as follows: Centre Frequency: Equal to the hopping frequency or centre frequency of the channel beinginvestigated Frequency Span: 0Hz RBW: ~ 50 % of the Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used) VBW: ≥ RBW (if the analyser does not support this setting, the highest available setting shall be used) Detector Mode: RMS Sweep time: > the Channel Occupancy Time. It shall be noted that if the Channel Occupancy Time is non-contiguous (for non-LBT based Frequency Hopping Systems), the sweep time shall be sufficient to cover the period over which the Channel Occupancy Time is spread out Number of sweep points: see note NOTE: The time resolution has to be sufficient to meet the maximum measurement uncertainty of 5 % for the period to be measured. In most cases, the Idle Period is the shortest period to be measured and thereby defining the time resolution. If the Channel Occupancy Time is non-contiguous (non-LBT based Frequency Hopping Systems), there is no Idle Period to be measured and therefore the time resolution can be increased (e.g. to 5 % of the dwell time) to cover the period over which the Channel Occupancy Time is spread

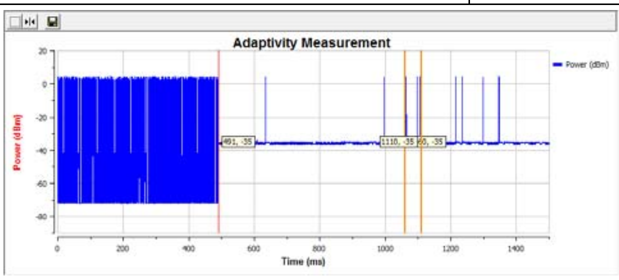
	out, without resulting in too high a number of sweep points for the analyzer. EXAMPLE 1: For a Channel Occupancy Time of 60 ms, the minimum Idle Period is 3 ms, hence the minimum time resolution should be < 150 µs. EXAMPLE 2: For a Channel Occupancy Time of 2 ms, the minimum Idle Period is 100 µs, hence the minimum time resolution should be < 5 µs. EXAMPLE 3: In case of a system using the non-contiguous Channel Occupancy Time approach (40 ms) and using 79 hopping frequencies with a dwell time of 3,75 ms, the total period over which the Channel Occupancy Time is spread out is 3,2 s. With a time resolution 0,1875 ms (5 % of the dwell time), the minimum number of sweep points is ~ 17 000. Trace mode: Clear / Write Trigger: Video In case of Frequency Hopping Equipment, the data points resulting from transmissions on the hopping frequency being investigated are assumed to have much higher levels compared to data points resulting from transmissions on adjacent hopping frequencies. If a clear determination between these transmissions is not possible, the RBW in step 1 shall be further reduced. In addition, a channel filter may be used. **Step 2:** Save the trace data to a file for further analysis by a computing device using an appropriate software application or program. **Step 3:** Indentify the data points related to the frequency being investigated by applying a threshold. Count the number of consecutive data points identified as resulting from a single transmission on the frequency being investigated and multiply this number by the time difference between two consecutive data points. Repeat this for all the transmissions within the measurement window. For measuring idle or silent periods, count the number of consecutive data points identified as resulting from a single transmitter off period on the frequency being investigated and multiply this number by the time difference between two consecutive data points. Repeat this for all the transmitter off periods within the measurement window.
Measurement Record:	Uncertainty: N/A
Test Instruments:	See section 6.0
Test mode:	Normal link mode

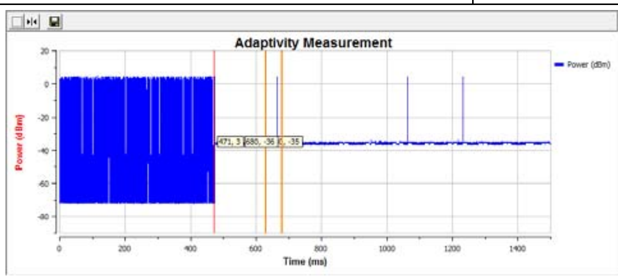
Measurement Data:

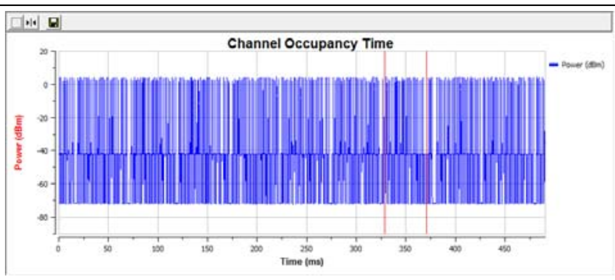
Spectrum Setting:					
RBW:	8MHz	VBW:	8MHz	Span:	0Hz
Note: The highest available setting of RBW is 8MHz.					

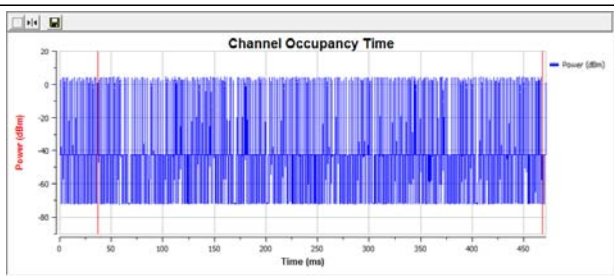
Test plots are below:

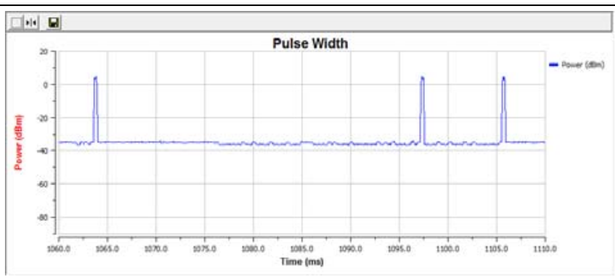
802.11b mode lowest channel		802.11b mode highest channel	
AWGN Interference Level (dBm)	-61.83	AWGN Interference Level (dBm)	-60.77
Blocking Interference Level (dBm)	-30	Blocking Interference Level (dBm)	-30
AWGN Interference Start Time (ms)	490.71	AWGN Interference Start Time (ms)	471.43
Blocking Interference Start Time (ms)	540.71	Blocking Interference Start Time (ms)	521.43
Suggest q Level	1	Suggest q Level	1
Max COT (ms)	0.30	Max COT (ms)	0.12
Idle Time (ms)	0.12	Idle Time (ms)	0.48
Pulse width (ms)	0.90	Pulse width (ms)	0.30
Duty Cycle (%)	1.80	Duty Cycle (%)	0.60

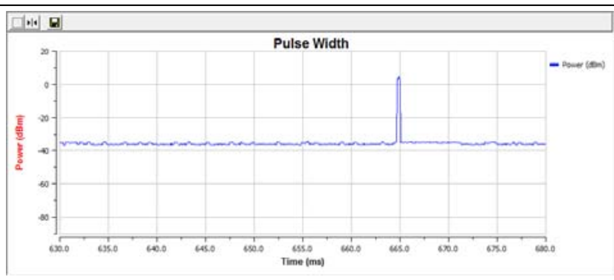








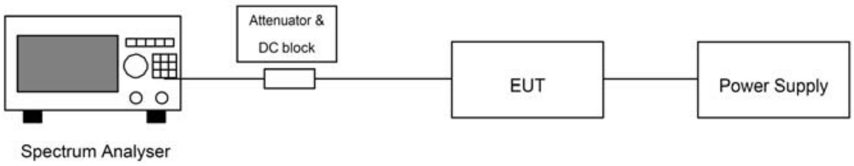




Note:

1. During the test, the signal observed on the channel being investigated is the Short Control Signalling Transmissions.
2. The EIRP of 802.11g and 802.11n mode is less than 10dBm, so this test is not applicable.

7.2.4 Occupied Channel Bandwidth

Test Requirement:	ETSI EN 300 328 clause 4.3.2.6
Limit:	The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band 2400MHz ~ 2483.5MHz. For non-adaptive Frequency Hopping equipment with e.i.r.p greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the value declared by the supplier. This declared value shall not be greater than 5 MHz.
Test setup:	
Test Precedure:	**Step 1:** Connect the UUT to the spectrum analyser and use the following settings: Centre Frequency: The centre frequency of the channel under test Resolution BW: ~ 1 % of the span without going below 1 % Video BW: 3 × RBW Frequency Span: 2 × Occupied Channel Bandwidth (e.g. 40 MHz for a 20 MHz channel) Detector Mode: RMS Trace mode: Clear / Write **Step 2:** Wait until the trace is completed. Find the peak value of the trace and place the analyser marker on this peak. **Step 3:** Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded. NOTE: Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.
Test Instruments:	See section 6.0
Test mode:	Transmitting mode

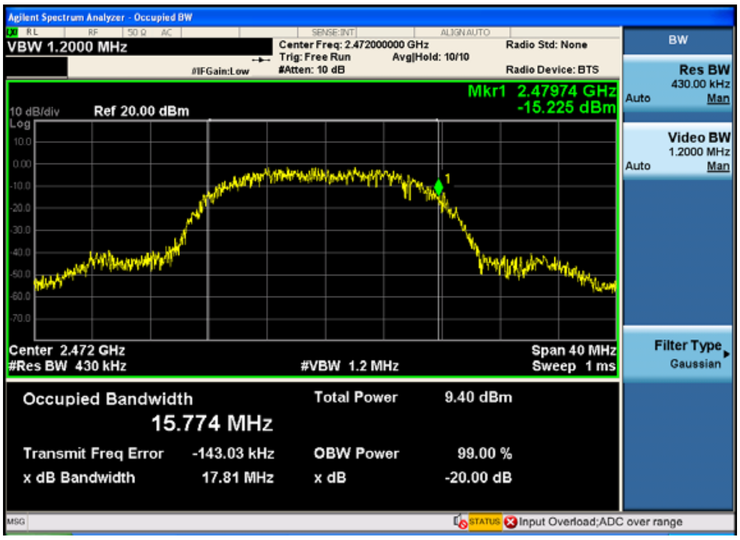
Measurement Data:

802.11b					
Test Channel	**99% Bandwidth (MHz)**	**Declared Bandwidth (MHz)**	**F_L/F_H (MHz)**	**Limit**	**Result**
Lowest	16.342	20	2403.86	2400MHz ~ 2483.5MHz	Pass
Highest	15.774	20	2479.74		Pass
802.11g					
Test Channel	**99% Bandwidth (MHz)**	**Declared Bandwidth (MHz)**	**F_L/F_H (MHz)**	**Limit**	**Result**
Lowest	17.145	20	2403.40	2400MHz ~ 2483.5MHz	Pass
Highest	17.034	20	2480.51		Pass
802.11n(H20)					
Test Channel	**99% Bandwidth (MHz)**	**Declared Bandwidth (MHz)**	**F_L/F_H (MHz)**	**Limit**	**Result**
Lowest	17.988	20	2403.04	2400MHz ~ 2483.5MHz	Pass
Highest	17.931	20	2480.95		Pass
802.11n(H40)					
Test Channel	**99% Bandwidth (MHz)**	**Declared Bandwidth (MHz)**	**F_L/F_H (MHz)**	**Limit**	**Result**
Lowest	36.340	40	2403.89	2400MHz ~ 2483.5MHz	Pass
Highest	36.276	40	2480.20		Pass

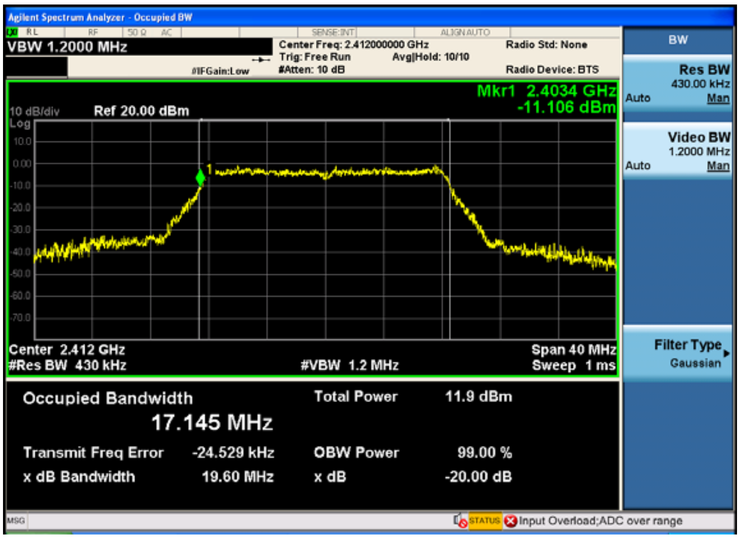
Test plots are followed:

Mode:	802.11b	Channel:	Lowest

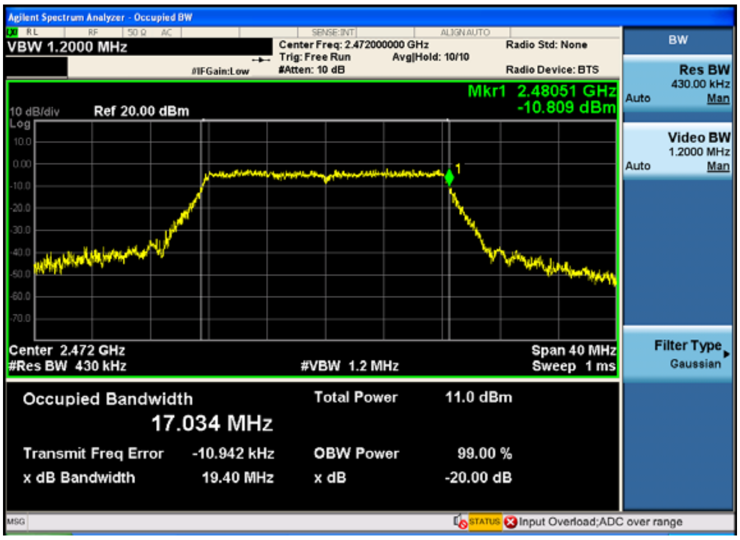
Mode:	802.11b	Channel:	Highest

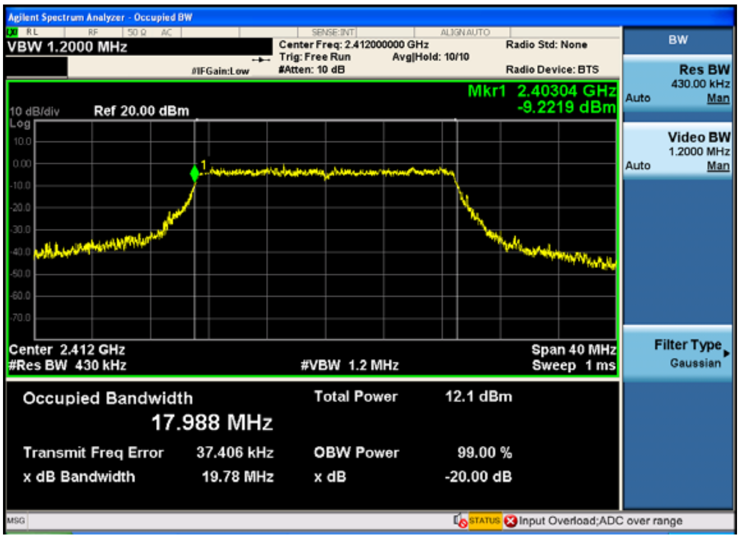
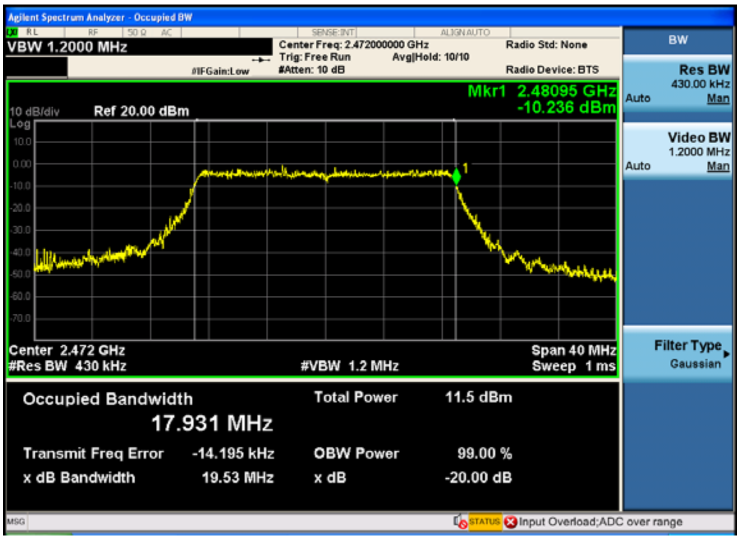


Mode:	802.11g	Channel:	Lowest

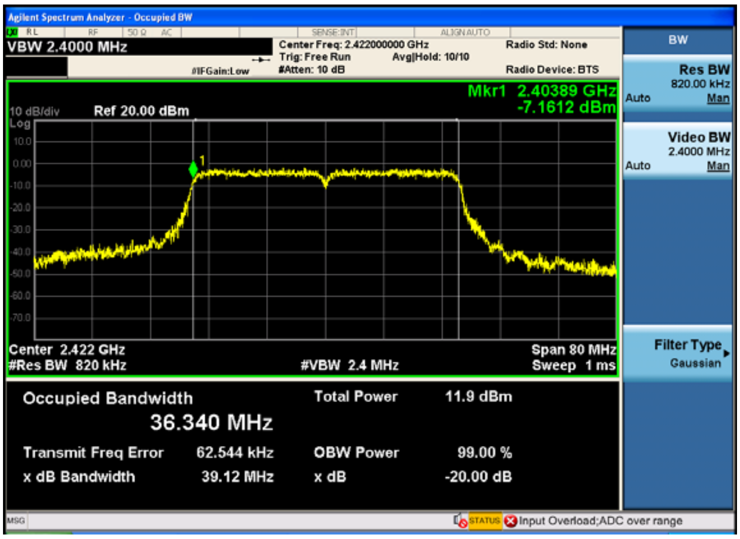


Mode:	802.11g	Channel:	Highest

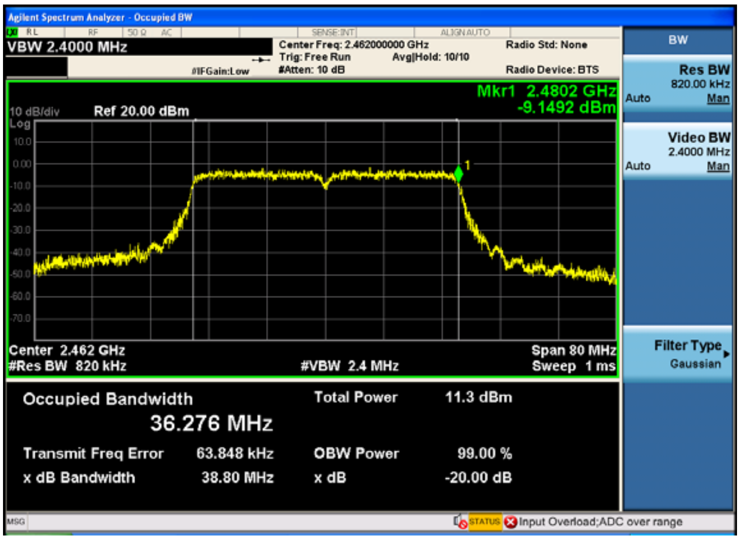


Mode:	802.11n(HT20)	Channel:	Lowest
			
Mode:	802.11n(HT20)	Channel:	Highest
			

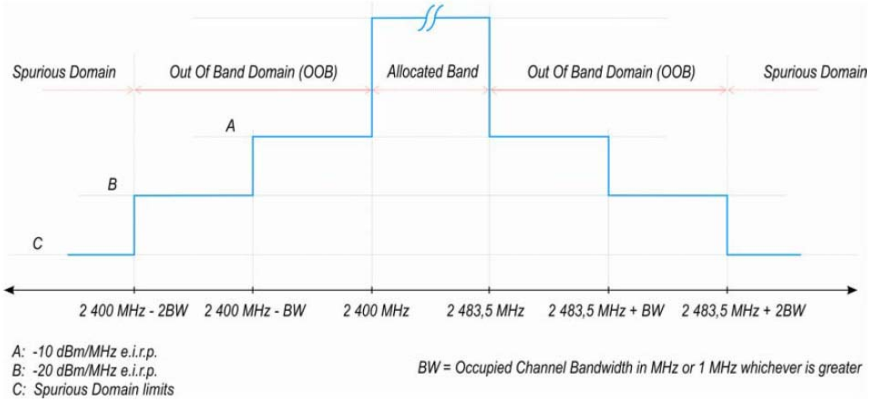
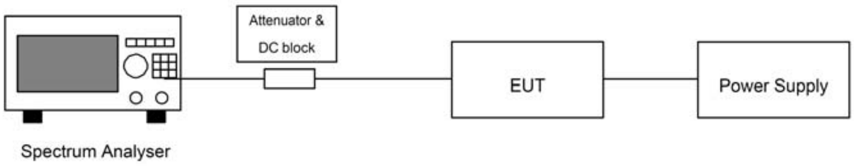
Mode:	802.11n(HT40)	Channel:	Lowest



Mode:	802.11n(HT40)	Channel:	Highest



7.2.5 Transmitter unwanted emissions in the OOB domain

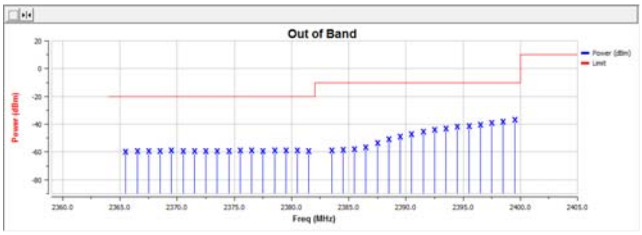
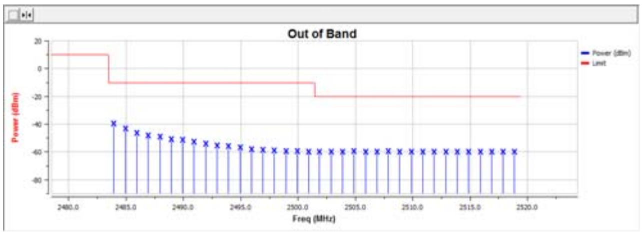
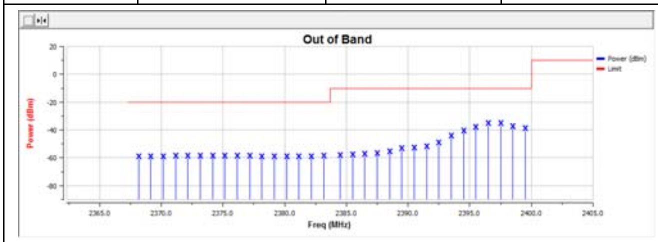
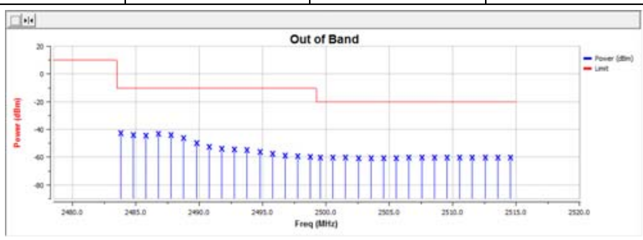
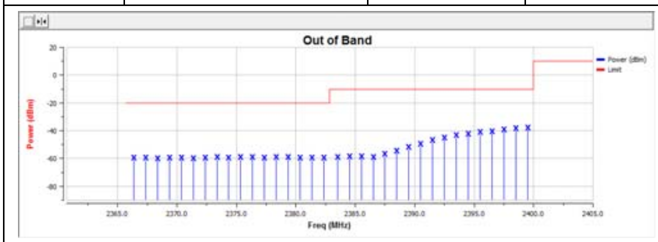
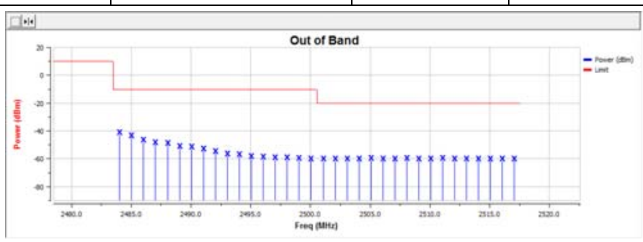
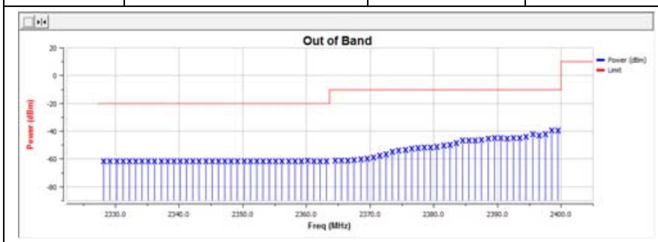
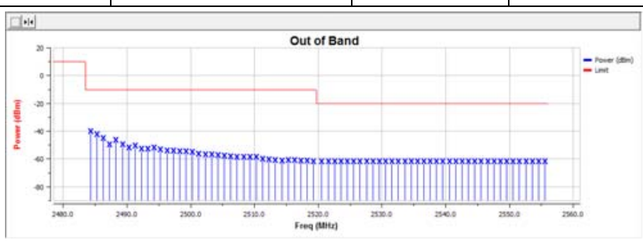
Test Requirement:	ETSI EN 300 328 clause 4.3.2.7
Test Method:	ETSI EN 300 328 clause 5.3.9.2
Limit:	The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure 1.  **Figure 1: Transmit mask**
Test setup:	
Test procedure:	The applicable mask is defined by the measurement results from the tests performed under clause 5.3.8 (Occupied Channel Bandwidth). The Out-of-band emissions within the different horizontal segments of the mask provided in figures 1 and 3 shall be measured using the steps below. This method assumes the spectrum analyser is equipped with the Time Domain Power option. **Step 1:** Connect the UUT to the spectrum analyser and use the following settings: Centre Frequency: 2 484 MHz Span: Hz Resolution BW: 1 MHz Filter mode: Channel filter Video BW: 3 MHz Detector Mode: RMS Trace Mode: Clear / Write Sweep Mode: Continuous Sweep Points: 5000 Trigger Mode: Video trigger NOTE 1: In case video triggering is not possible, an external trigger

	source may be used. Sweep Time: Suitable to capture one transmission burst **Step 2: (segment 2 483,5 MHz to 2 483,5 MHz + BW)** Adjust the trigger level to select the transmissions with the highest power level. For frequency hopping equipment operating in a normal hopping mode, the different hops will result in signal bursts with different power levels. In this case the burst with the highest power level shall be selected. Set a window (start and stop lines) to match with the start and end of the burst and in which the RMS power shall be measured using the Time Domain Power function. Select RMS power to be measured within the selected window and note the result which is the RMS power within this 1 MHz segment (2 483,5 MHz to 2 484,5 MHz). Compare this value with the applicable limit provided by the mask. Increase the centre frequency in steps of 1 MHz and repeat this measurement for every 1 MHz segment within the range 2 483,5 MHz to 2 483,5 MHz + BW. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment). **Step 3: (segment 2 483,5 MHz + BW to 2 483,5 MHz + 2BW)** Change the centre frequency of the analyser to 2 484 MHz + BW and perform the measurement for the first 1 MHz segment within range 2 483,5 MHz + BW to 2 483,5 MHz + 2BW. Increase the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + 2 BW - 0,5 MHz. **Step 4: (segment 2 400 MHz - BW to 2 400 MHz)** Change the centre frequency of the analyser to 2 399,5 MHz and perform the measurement for the first 1 MHz segment within range 2 400 MHz - BW to 2 400 MHz Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0,5 MHz. **Step 5: (segment 2 400 MHz - 2BW to 2 400 MHz - BW)** Change the centre frequency of the analyser to 2 399,5 MHz - BW and perform the measurement for the first 1 MHz segment within range 2 400 MHz - 2BW to 2 400 MHz - BW. Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0,5 MHz. **Step 6:** In case of conducted measurements on equipment with a single transmit chain, the declared antenna assembly gain "G" in dBi shall be added to the results for each of the 1 MHz segments and compared with the limits provided by the mask given in figures 1 or 3. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered.

	In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements need to be repeated for each of the active transmit chains. The declared antenna assembly gain "G" in dBi for a single antenna shall be added to these results. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered. Comparison with the applicable limits shall be done using any of the options given below: Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added. The additional beamforming gain "Y" in dB shall be added as well and the resulting values compared with the limits provided by the mask given in figures 1 or 3. Option 2: the limits provided by the mask given in figures 1 or 3 shall be reduced by 10 x log10(Ach) and the additional beamforming gain "Y" in dB. The results for each of the transmit chains shall be individually compared with these reduced limits. NOTE 2: Ach refers to the number of active transmit chains. It shall be recorded whether the equipment complies with the mask provided in figures 1 or 3.
Measurement Record:	Uncertainty: ± 1.5dB
Test Instruments:	See section 6.0
Test mode:	Transmitting mode

Measurement Data:

Test plots at normal condition are followed:

<table>
<tr><td>Test Condition:</td><td colspan="3"></td><td>Normal condition</td><td colspan="3"></td></tr>
<tr><td>Mode:</td><td>802.11b</td><td>Channel:</td><td>Lowest</td><td>Mode:</td><td>802.11b</td><td>Channel:</td><td>Highest</td></tr>
<tr><td colspan="4">
</td><td colspan="4">
</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td>Mode:</td><td>802.11g</td><td>Channel:</td><td>Lowest</td><td>Mode:</td><td>802.11g</td><td>Channel:</td><td>Highest</td></tr>
<tr><td colspan="4">
</td><td colspan="4">
</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td>Mode:</td><td>802.11n(HT20)</td><td>Channel:</td><td>Lowest</td><td>Mode:</td><td>802.11n(HT20)</td><td>Channel:</td><td>Highest</td></tr>
<tr><td colspan="4">
</td><td colspan="4">
</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td>Mode:</td><td>802.11n(HT40)</td><td>Channel:</td><td>Lowest</td><td>Mode:</td><td>802.11n(HT40)</td><td>Channel:</td><td>Highest</td></tr>
<tr><td colspan="4">
</td><td colspan="4">
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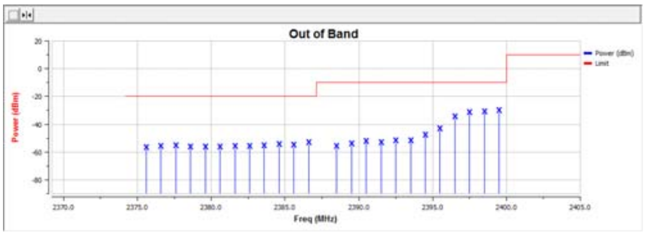
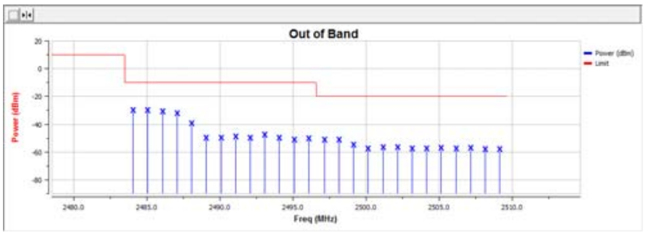
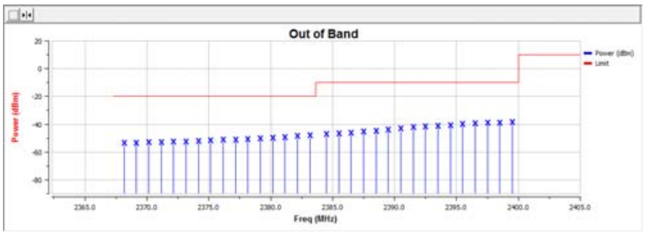
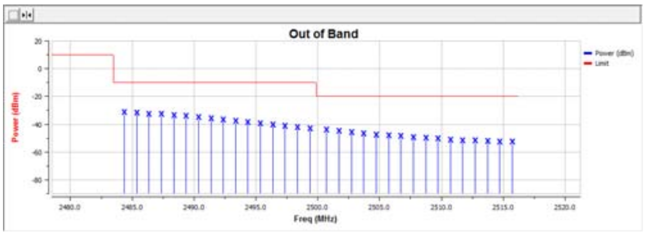
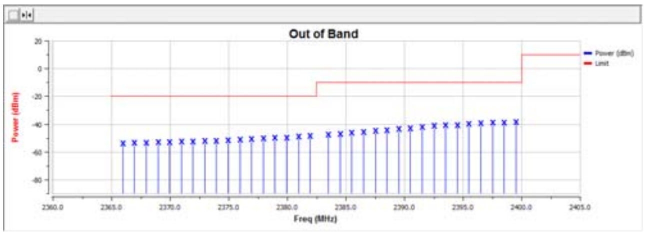
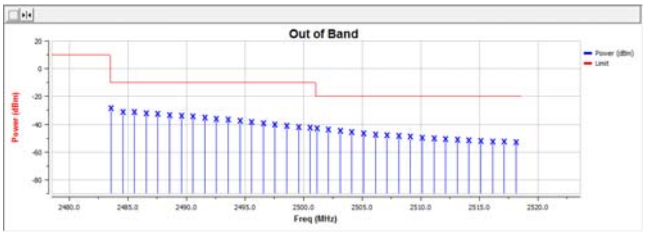
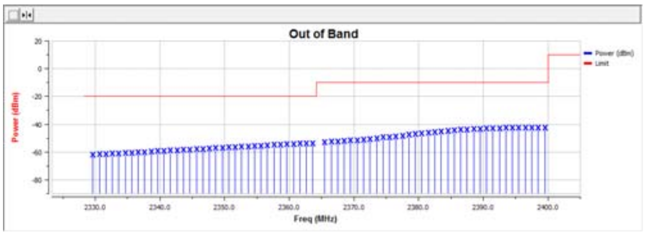
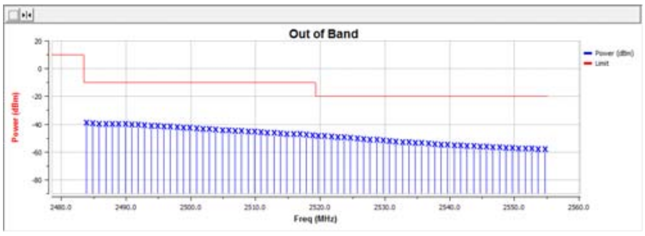
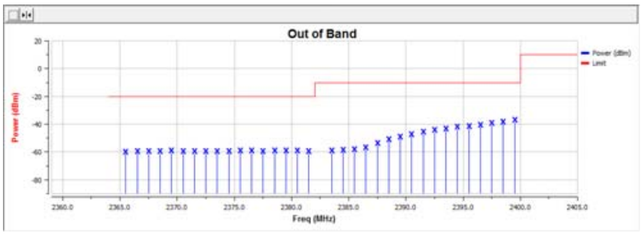
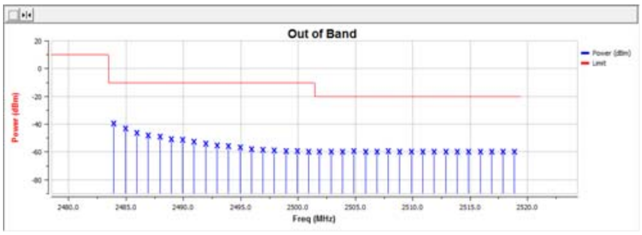
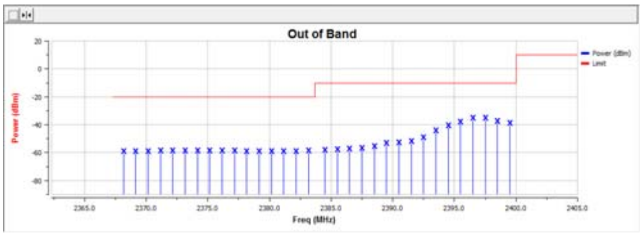
Test Condition:				NVLT			
Mode:	802.11b	Channel:	Lowest	Mode:	802.11b	Channel:	Highest
							
Mode:	802.11g	Channel:	Lowest	Mode:	802.11g	Channel:	Highest
							
Mode:	802.11n(HT20)	Channel:	Lowest	Mode:	802.11n(HT20)	Channel:	Highest
							
Mode:	802.11n(HT40)	Channel:	Lowest	Mode:	802.11n(HT40)	Channel:	Highest
							

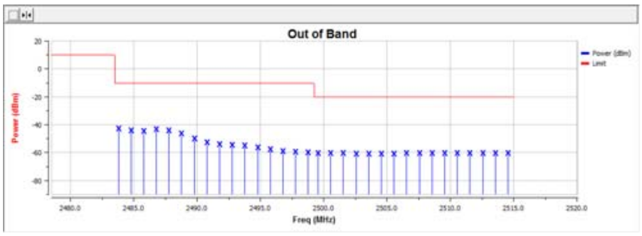
Test Condition:				NVHT			
Mode:	802.11b	Channel:	Lowest	Mode:	802.11b	Channel:	Highest



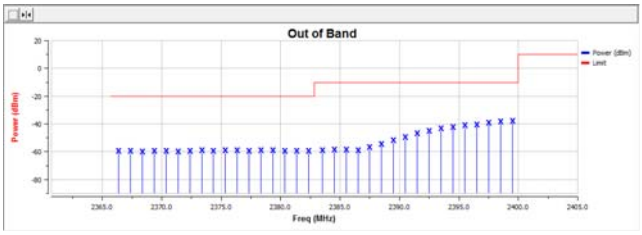


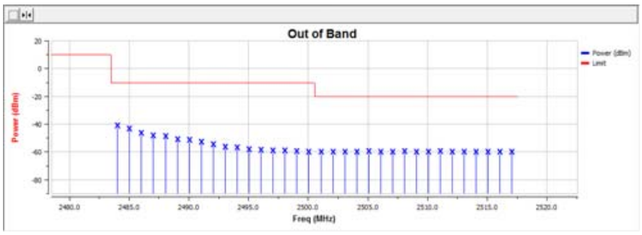
Mode:	802.11g	Channel:	Lowest	Mode:	802.11g	Channel:	Highest



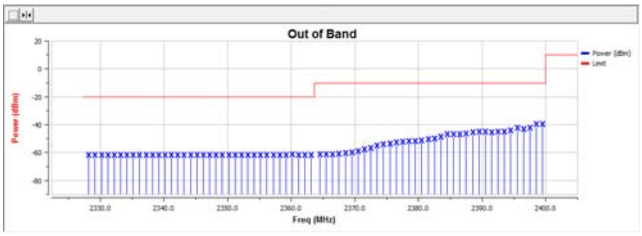


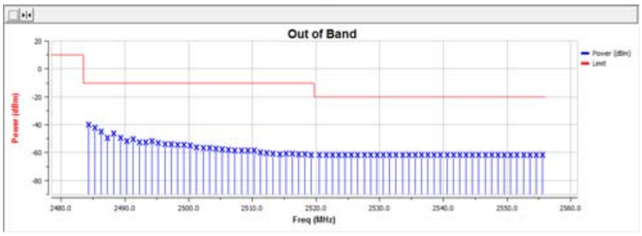
Mode:	802.11n(HT20)	Channel:	Lowest	Mode:	802.11n(HT20)	Channel:	Highest





Mode:	802.11n(HT40)	Channel:	Lowest	Mode:	802.11n(HT40)	Channel:	Highest

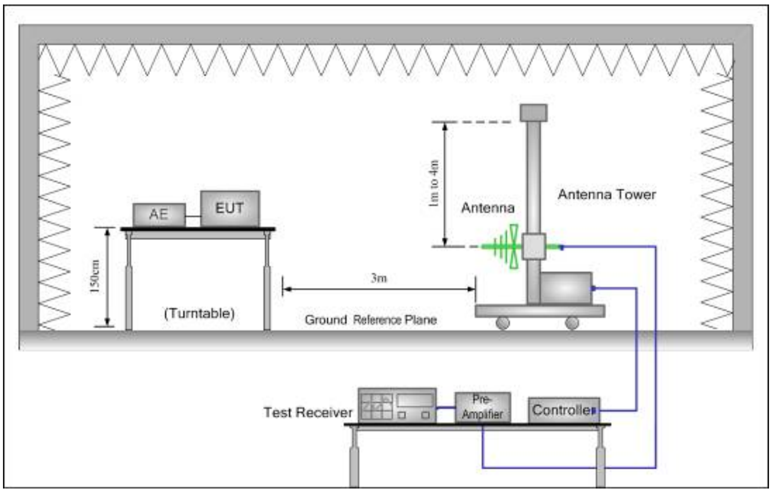




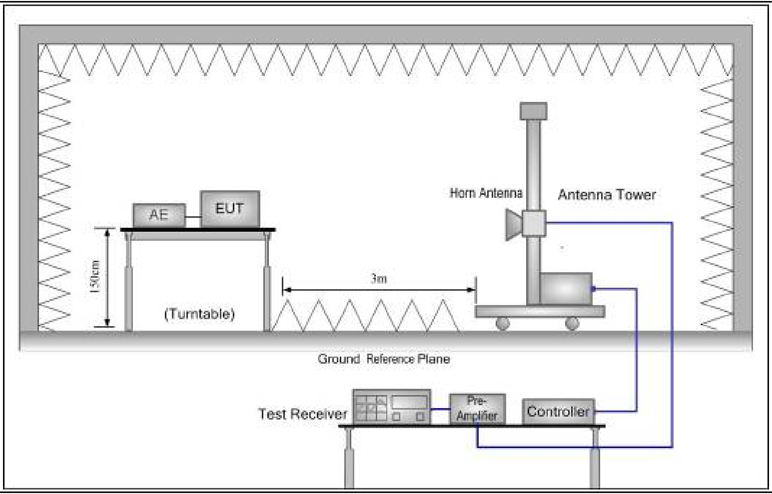
7.2.6 Transmitter unwanted emissions in the spurious domain

Test Requirement:	ETSI EN 300 328 clause 4.3.2.8
Test Method:	ETSI EN 300 328 clause 5.3.10.2
Limit:	see table below
Test Frequency range:	30MHz to 12.75GHz
Test setup:	Below 1GHz

Frequency Range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	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 12.75 GHz	-30 dBm	1 MHz



Above 1GHz

	
Test procedure:	**1. Pre-scan** The test procedure below shall be used to identify potential unwanted emissions of the UUT. **Step 1:** The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in tables 1 or 4. **Step 2:** The emissions over the range 30 MHz to 1 000 MHz shall be identified. Spectrum analyser settings: Resolution BW: 100 kHz Video BW 300 kHz Detector mode: Peak Trace Mode: Max Hold Sweep Points: ≥ 9970 NOTE 1: For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented. Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT. For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on the same hopping frequency in different hopping sequences. Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.3.10.2.1.2 and compared to the limits given in tables 1 or 4. **Step 3:** The emissions over the range 1 GHz to 12,75 GHz shall be identified. Spectrum analyser settings:

	Resolution BW: 1 MHz Video BW 3 MHz Detector mode: Peak Trace Mode: Max Hold Sweep Points: ≥ 11750 NOTE 2: For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented. Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT. For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on the same hopping frequency in different hopping sequences. Allow the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.3.10.2.1.2 and compared to the limits given in tables 1 or 4. Frequency Hopping equipment may generate a block (or several blocks) of spurious emissions anywhere within the spurious domain. If this is the case, only the highest peak of each block of emissions shall be measured using the procedure in clause 5.3.10.2.1.2. **Step 4:** In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the steps 2 and 3 need to be repeated for each of the active transmit chains (Ach).The limits used to identifyemissions during this pre-scan need to be reduced with 10 × log10 (Ach) (number of active transmit chains). **2. Measurement of the emissions identified during the pre-scan** The steps below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. **Step 1:** The level of the emissions shall be measured using the following spectrum analyser settings: Centre Frequency: Frequency of emission identified during the pre-scan Resolution BW: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz) Video BW 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz) Frequency Span: Wide enough to capture each individual emission indentified during the pre-scan Sweep mode: Continuous Sweep time: Auto

	Trigger: Free run Detector: RMS Trace Mode: Max Hold **Step 2:** In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the step 1 needs to be repeated for each of the active transmit chains (Ach). The trace data for each transmit chain has to be recorded. Sum the power in each of the traces for each individual frequency bin. **Step 3:** Use the marker function to find the highest peak within the measurement trace and record its value and its frequency. **Step 4:** The measured values shall be compared to the limits defined in tables 1 and 4.
Measurement Record:	Uncertainty: ± 6dB
Test Instruments:	See section 6.0
Test mode:	Transmitting mode

Measurement Data

802.11b mode				
The lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
89.12	Vertical	-69.46	-54.00	Pass
390.80	V	-65.86	-36.00	
4824.00	V	-45.20	-30.00	
7236.00	V	-47.41	-30.00	
9648.00	V	-44.35	-30.00	
12060.00	V	-42.11	-30.00	
172.24	Horizontal	-68.26	-36.00	
588.54	H	-63.83	-54.00	
4824.00	H	-45.88	-30.00	
7236.00	H	-42.05	-30.00	
9648.00	H	-42.97	-30.00	
12060.00	H	-43.19	-30.00	
The highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
137.33	Vertical	-64.34	-36.00	Pass
557.96	V	-60.94	-54.00	
4944.00	V	-40.45	-30.00	
7416.00	V	-42.83	-30.00	
9888.00	V	-39.92	-30.00	
12360.00	V	-37.83	-30.00	
251.49	Horizontal	-63.19	-36.00	
769.44	H	-58.95	-54.00	
4944.00	H	-41.18	-30.00	
7416.00	H	-37.51	-30.00	
9888.00	H	-38.58	-30.00	
12360.00	H	-38.94	-30.00	

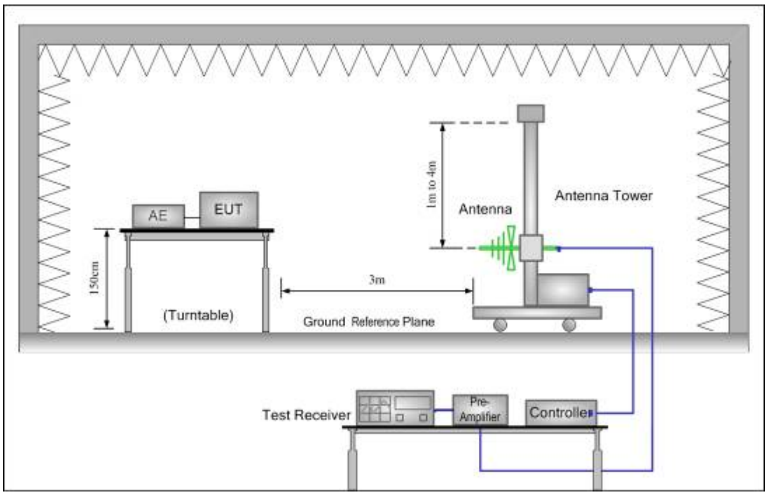
802.11g mode				
The lowest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
94.82	Vertical	-64.74	-54.00	Pass
308.45	V	-61.32	-36.00	
4824.00	V	-40.82	-30.00	
7236.00	V	-43.18	-30.00	
9648.00	V	-40.26	-30.00	
12060.00	V	-38.16	-30.00	
122.17	Horizontal	-63.58	-36.00	
646.49	H	-59.32	-54.00	
4824.00	H	-41.54	-30.00	
7236.00	H	-37.86	-30.00	
9648.00	H	-38.92	-30.00	
12060.00	H	-39.27	-30.00	
The highest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
150.79	Vertical	-64.15	-36.00	Pass
912.76	V	-60.75	-36.00	
4944.00	V	-40.27	-30.00	
7416.00	V	-42.65	-30.00	
9888.00	V	-39.75	-30.00	
12360.00	V	-37.66	-30.00	
121.83	Horizontal	-62.99	-36.00	
728.35	H	-58.76	-54.00	
4944.00	H	-40.99	-30.00	
7416.00	H	-37.33	-30.00	
9888.00	H	-38.41	-30.00	
12360.00	H	-38.78	-30.00	

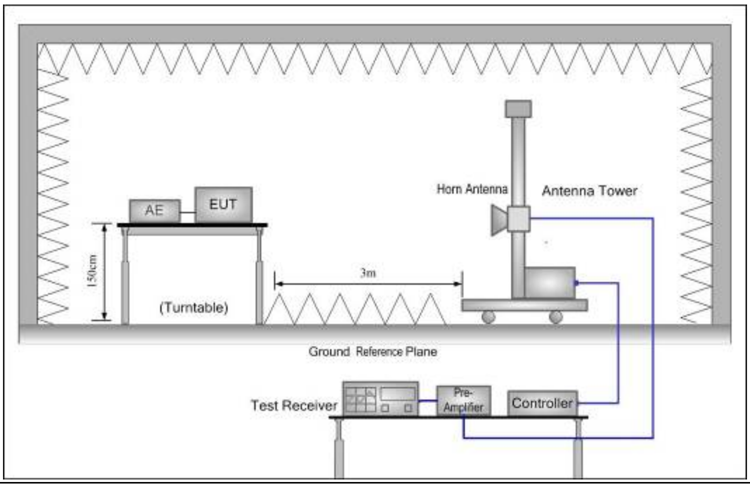
802.11n(HT20) mode				
The lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
190.82	Vertical	-64.04	-54.00	Pass
706.24	V	-60.65	-54.00	
4824.00	V	-40.17	-30.00	
7236.00	V	-42.56	-30.00	
9648.00	V	-39.66	-30.00	
12060.00	V	-37.58	-30.00	
199.87	Horizontal	-62.89	-54.00	
660.39	H	-58.66	-54.00	
4824.00	H	-40.90	-30.00	
7236.00	H	-37.24	-30.00	
9648.00	H	-38.32	-30.00	
12060.00	H	-38.69	-30.00	
The highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
280.79	Vertical	-64.44	-36.00	Pass
948.60	V	-61.03	-36.00	
4944.00	V	-40.54	-30.00	
7416.00	V	-42.91	-30.00	
9888.00	V	-40.00	-30.00	
12360.00	V	-37.91	-30.00	
141.69	Horizontal	-63.28	-36.00	
836.01	H	-59.04	-54.00	
4944.00	H	-41.26	-30.00	
7416.00	H	-37.59	-30.00	
9888.00	H	-38.66	-30.00	
12360.00	H	-39.02	-30.00	

802.11n(HT40) mode				
The lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
111.40	Vertical	-63.76	-54.00	Pass
907.62	V	-60.38	-36.00	
4824.00	V	-39.91	-30.00	
7236.00	V	-42.31	-30.00	
9648.00	V	-39.42	-30.00	
12110.00	V	-37.34	-30.00	
149.61	Horizontal	-62.61	-36.00	
644.93	H	-58.40	-54.00	
4824.00	H	-40.64	-30.00	
7236.00	H	-36.99	-30.00	
9648.00	H	-38.08	-30.00	
12110.00	H	-38.46	-30.00	
The highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
113.92	Vertical	-64.78	-54.00	Pass
800.00	V	-61.36	-54.00	
4944.00	V	-40.85	-30.00	
7416.00	V	-43.22	-30.00	
9888.00	V	-40.30	-30.00	
12310.00	V	-38.19	-30.00	
192.30	Horizontal	-63.62	-54.00	
562.49	H	-59.36	-54.00	
4944.00	H	-41.57	-30.00	
7416.00	H	-37.89	-30.00	
9888.00	H	-38.95	-30.00	
12310.00	H	-39.30	-30.00	

7.3 Receiver Requirement

7.3.1 Spurious Emissions

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 328 clause 4.3.2.9</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 328 clause 5.3.11.2</td></tr>
<tr><td>Limit:</td><td><table>
<tr><td>Frequency</td><td>Maximum power
e.r.p. (≤ 1 GHz)
e.i.r.p. (> 1 GHz)</td><td>Measurement bandwidth</td></tr>
<tr><td>30MHz to 1000 MHz</td><td>-57 dBm</td><td>100 kHz</td></tr>
<tr><td>1GHz to 12.75GHz</td><td>-47 dBm</td><td>1 MHz</td></tr>
</table></td></tr>
<tr><td>Test Frequency range:</td><td>30MHz to 12.75GHz</td></tr>
<tr><td>Test setup:</td><td>Below 1GHz


Above 1GHz

</td></tr>
</table>

Test procedure:	**1. Pre-scan** The test procedure below shall be used to identify potential unwanted emissions of the UUT. **Step 1:** The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in tables 2 or 5. **Step 2:** The emissions over the range 30 MHz to 1 000 MHz shall be identified. Spectrum analyser settings: Resolution BW: 100 kHz Video BW 300 kHz Detector mode: Peak Trace Mode: Max Hold Sweep Points: ≥ 9970 Sweep time: Auto Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.3.11.2.1.2 and compared to the limits given in tables 2 or 5. **Step 3:** The emissions over the range 1 GHz to 12,75 GHz shall be identified. Spectrum analyser settings: Resolution BW: 1 MHz Video BW 3 MHz Detector mode: Peak Trace Mode: Max Hold Sweep Points: ≥ 11750 Sweep time: Auto Allow the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.3.11.2.1.2 and compared to the limits given in tables 2 or 5. Frequency Hopping equipment may generate a block (or several blocks) of spurious emissions anywhere within the spurious domain. If this is the case, only the highest peak of each block of emissions shall be measured using the procedure in clause 5.3.11.2.1.2. **Step 4:** In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the steps 2 and 3 need to be repeated for each of the active transmit chains (Ach).The limits used to identifyemissions during this pre-scan need to be reduced with 10 × log10 (Ach) (number of active transmit chains). **2. Measurement of the emissions identified during the pre-scan**

<table>
<tr><td></td><td>The steps below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above.
Step 1:
The level of the emissions shall be measured using the following spectrum analyser settings:
Centre Frequency: Frequency of emission identified during the pre-scan
Resolution BW: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
Video BW 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
Frequency Span: Wide enough to capture each individual emission indentified during the pre-scan
Sweep mode: Continuous
Sweep time: Auto
Trigger: Free run
Detector: RMS
Trace Mode: Max Hold

Step 2:
In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the step 1 needs to be repeated for each of the active transmit chains (Ach).
The trace data for each transmit chain has to be recorded.
Sum the power in each of the traces for each individual frequency bin.
Step 3:
Use the marker function to find the highest peak within the measurement trace and record its value and its frequency.
Step 4:
The measured values shall be compared to the limits defined in tables 2 and 5.</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ± 6dB</td></tr>
<tr><td>Test mode:</td><td>Kept Rx in receiving mode</td></tr>
<tr><td>Test Instruments:</td><td>See section 6.0</td></tr>
</table>

Measurement Data:

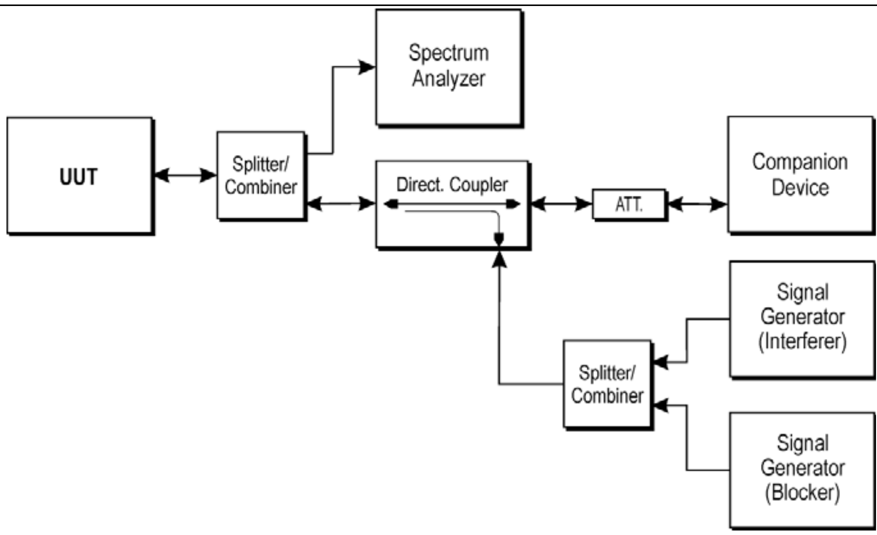
802.11b mode				
The lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
57.39	Vertical	-67.28	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
682.93	V	-64.98		
4824.00	V	-63.85		
7236.00	V	-60.10		
9648.00	V	-57.49		
12060.00	V	-68.89		
174.34	Horizontal	-67.23		
415.93	H	-64.99		
4824.00	H	-66.22		
7236.00	H	-58.46		
9648.00	H	-52.33		
12060.00	H	-55.17		
The highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
42.19	Vertical	-74.86	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
528.48	V	-72.27		
4944.00	V	-70.88		
7416.00	V	-66.88		
9888.00	V	-64.04		
12360.00	V	-75.23		
137.77	Horizontal	-74.74		
455.53	H	-72.22		
4944.00	H	-73.19		
7416.00	H	-65.18		
9888.00	H	-58.83		
12360.00	H	-61.46		

802.11g mode				
The lowest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
46.97	Vertical	-74.28	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
538.68	V	-71.71		
4944.00	V	-70.34		
7416.00	V	-66.36		
9888.00	V	-63.54		
12360.00	V	-74.74		
67.52	Horizontal	-74.16		
487.13	H	-71.66		
4944.00	H	-72.65		
7416.00	H	-64.67		
9888.00	H	-58.33		
12360.00	H	-60.97		
The highest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
87.22	Vertical	-75.15	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
567.50	V	-72.55		
4944.00	V	-71.15		
7416.00	V	-67.14		
9888.00	V	-64.29		
12360.00	V	-75.47		
112.74	Horizontal	-75.02		
663.96	H	-72.49		
4944.00	H	-73.45		
7416.00	H	-65.44		
9888.00	H	-59.08		
12360.00	H	-61.70		

802.11n(HT20) mode				
The lowest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
67.47	Vertical	-75.31	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
495.97	V	-72.70		
4824.00	V	-71.29		
7236.00	V	-67.28		
9648.00	V	-64.43		
12060.00	V	-75.60		
77.73	Horizontal	-75.18		
645.36	H	-72.64		
4824.00	H	-73.60		
7236.00	H	-65.58		
9648.00	H	-59.21		
12060.00	H	-61.83		
The highest channel				
Frequency (MHz)	**Spurious Emission**		**Limit (dBm)**	**Test Result**
	polarization	**Level(dBm)**		
184.34	Vertical	-74.72	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
831.18	V	-72.14		
4944.00	V	-70.75		
7416.00	V	-66.76		
9888.00	V	-63.92		
12360.00	V	-75.11		
285.75	Horizontal	-74.60		
854.38	H	-72.08		
4944.00	H	-73.06		
7416.00	H	-65.06		
9888.00	H	-58.71		
12360.00	H	-61.34		

802.11n(HT40) mode				
The lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
65.00	Vertical	-75.72	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
678.69	V	-73.10		
4844.00	V	-71.68		
7266.00	V	-67.65		
9688.00	V	-64.79		
12110.00	V	-75.95		
118.98	Horizontal	-75.59		
798.86	H	-73.04		
4844.00	H	-73.98		
7266.00	H	-65.95		
9688.00	H	-59.56		
12110.00	H	-62.17		
The highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
259.45	Vertical	-74.22	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
552.71	V	-71.66		
4924.00	V	-70.28		
7386.00	V	-66.31		
9848.00	V	-63.49		
12310.00	V	-74.69		
331.80	Horizontal	-74.10		
572.61	H	-71.60		
4924.00	H	-72.60		
7386.00	H	-64.61		
9848.00	H	-58.28		
12310.00	H	-60.92		

7.3.2 Receiver Blocking

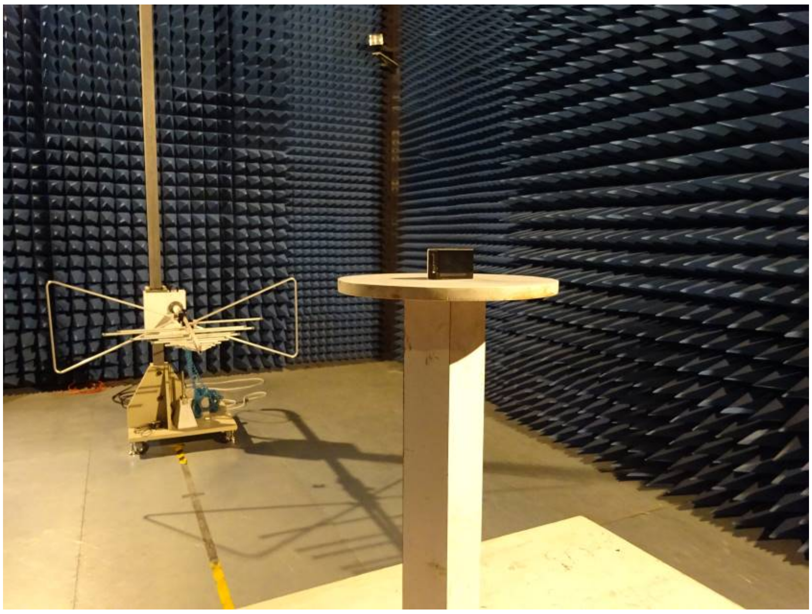
<table>
<tr><td>Test Requirement:</td><td>ETSI EN 300 328 clause 4.3.2.10</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 300 328 clause 5.3.7.2.1</td></tr>
<tr><td>Limit:</td><td>
Table 6: Receiver Blocking parameters
<table>
<tr><th>Equipment Type (LBT / non- LBT)</th><th>Wanted signal mean power from companion device</th><th>Blocking signal frequency [MHz]</th><th>Blocking signal power [dBm]</th><th>Type of interfering signal</th></tr>
<tr><td>LBT</td><td>sufficient to maintain the link (see note 2)</td><td rowspan="2">2 395 or 2 488,5 (see note 1)</td><td rowspan="2">-30</td><td rowspan="2">CW</td></tr>
<tr><td>Non-LBT</td><td>-30 dBm</td></tr>
<tr><td colspan="5">NOTE 1: The highest blocking frequency shall be used for testing the lowest operating channel, while the lowest blocking frequency shall be used for testing the highest operating channel.
NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>


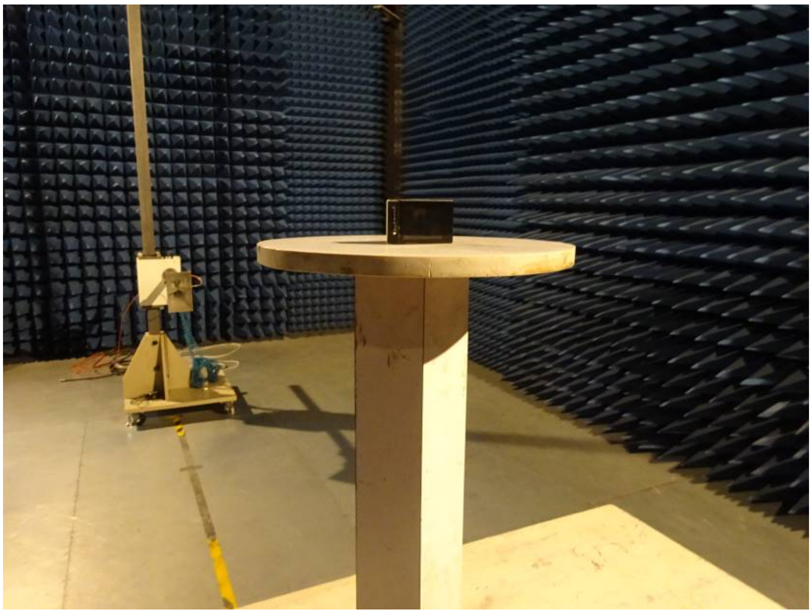
</td></tr>
<tr><td>Test procedure:</td><td>Refer to the procedure of adaptivity</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: N/A</td></tr>
<tr><td>Test Instruments:</td><td>See section 6.0</td></tr>
<tr><td>Test mode:</td><td>Normal link mode</td></tr>
</table>

Measurement Data:

Observation Result: Refer to section 7.2.3, the blocking signal is injected while interference signal is present. With the presence of the blocking signal, channel of the observation does not resume the link.

8 Test setup photo





9 EUT Constructional Details

Reference to the test report No. : GTS16000346E01

ANNEX E

E.1 Information as required by EN 300 328 V1.9.1, clause 5.3.1

In accordance with EN 300 328, clause 5.3.1, the following information is provided by the supplier.

a) The type of modulation used by the equipment:

☐FHSS

☒Other forms of modulation

b) In case of FHSS modulation:

In case of non-Adaptive Frequency Hopping equipment:

The number of Hopping Frequencies: ________

In case of Adaptive Frequency Hopping Equipment: ________

The maximum number of Hopping Frequencies: ________

The minimum number of Hopping Frequencies: ________

The Dwell Time: ________

The Minimum Channel Occupation Time: ________

c) Adaptive / non-adaptive equipment:

☐Non-adaptive Equipment

☒Adaptive Equipment without the possibility to switch to a non-adaptive mode

☐Adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The Channel Occupancy Time implemented by the equipment: ________ ms

☒The equipment has implemented an LBT based DAA mechanism

In case of equipment using modulation different from FHSS:

☐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 CCA time implemented by the equipment: ________ μs

The value q as referred to in clause 4.3.2.5.2.2.2: ________

☐The equipment has implemented an non-LBT based DAA mechanism

☐The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): ________ dBm

The maximum (corresponding) Duty Cycle: ________ %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared): ________

f) The worst case operational mode for each of the following tests:

RF Output Power: 802.11b mode

Power Spectral Density: 802.11b mode

Duty cycle, Tx-Sequence, Tx-gap: N/A

Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment) : N/A

Hopping Frequency Separation (only for FHSS equipment) : N/A

Medium Utilisation: N/A

Adaptivity & Receiver Blocking: 802.11b mode

Occupied Channel Bandwidth: 802.11n(HT40) mode

Transmitter unwanted emissions in the OOB domain: 802.11b mode

Transmitter unwanted emissions in the spurious domain: 802.11b mode

Receiver spurious emissions: 802.11b mode

g) The different transmit operating modes (tick all that apply):

☒Operating mode 1: Single Antenna Equipment

- ☒Equipment with only 1 antenna
- ☐Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
- ☐Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)

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

- ☐Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
- ☐High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
- ☐High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

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

- ☐Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
- ☐High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
- ☐High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

The number of Receive chains: ________

The number of Transmit chains: ________

- ☐Symmetrical power distribution
- ☐Asymmetrical power distribution

In case of beam forming, the maximum beam forming gain: ________

NOTE: Beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

Operating Frequency Range 1: 2412 MHz to 2472 MHz

Operating Frequency Range 2: 2422 MHz to 2462 MHz

NOTE: Add more lines if more Frequency Ranges are supported.

j) Occupied Channel Bandwidth(s):

Occupied Channel Bandwidth 1: 20 MHz

Occupied Channel Bandwidth 2: 40 MHz

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

☒Stand-alone

☐Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)

☐Plug-in radio device (Equipment intended for a variety of host systems)

☐Other ________

l) The extreme operating conditions that apply to the equipment:

Operating temperature range: -20 ° C to 55 ° C

Operating voltage range: 3.6 V to 4.2 V ☐AC ☒DC

Details provided are for the: ☒stand-alone equipment

☐Combined (or host) equipment

☐Test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:

Antenna Type:

☒Integral Antenna

Antenna Gain: 0 dBi

If applicable, additional beamforming gain (excluding basic antenna gain): ________ dB

☐Temporary RF connector provided

☐No temporary RF connector provided

☐Dedicated Antennas (equipment with antenna connector)

☐Single power level with corresponding antenna(s)

☐Multiple power settings and corresponding antenna(s)

Number of different Power Levels:

Power Level 1:		dBm
Power Level 2:		dBm
Power Level 3:		dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: ________ dBm

Number of antenna assemblies provided for this power level: ________

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2: ________ dBm

Number of antenna assemblies provided for this power level: ________

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 3: ________ dBm

Number of antenna assemblies provided for this power level: ________

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

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

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

Supply Voltage ☐AC mains State AC voltage ________ V
☒DC State DC voltage 3.7 V

In case of DC, indicate the type of power source

☐Internal Power Supply
☒External Power Supply or AC/DC adapter
☒Battery
☐Other: ________

o) Describe the test modes available which can facilitate testing:

X3, X1

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):

IEEE 802.11TM

------end------