RADIO TEST REPORT

for

Dongguan Meiloon Acoustic Equipments Co., Ltd.

Smart Tabletop Radio

Model Number: R2 mk4

Prepared for	:	Dongguan Meiloon Acoustic Equipments Co., Ltd.
Address	:	No.80 Yuanlin Road, Fenghuang Gang, Tangxia Town, Dongguan City, Guangdong Province, P.R. China.
Prepared by	:	Guangdong Keyway Testing Technology Co., Ltd.
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Report No.	:	TR21120148-E-001
Date of Test	:	Jan. 06 ~ Mar. 22, 2022
Date of Report	:	Mar. 23, 2022

Guangdong Keyway Testing Technology Co., Ltd.

Applicant: **Address:**	Dongguan Meiloon Acoustic Equipments Co., Ltd. No.80 Yuanlin Road, Fenghuang Gang, Tangxia Town, Dongguan City, Guangdong Province, P.R. China.		
Manufacturer: **Address:**	Ruark Audio Limited 59 Tailors Court,Temple Farm Industrial Estate,Southend on Sea, Essex, SS2 5TH, United Kingdom		
E.U.T:	Smart Tabletop Radio		
Model Number:	R2 mk4		
Trade Name:	ruark audio	**Sample Number:**	211209001
Date of Receipt:	Jan. 05, 2022	**Date of Test:**	Jan. 06 ~ Mar. 22, 2022
Test Specification:	ETSI EN 300 328 V2.2.2 (2019-07)		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Mar. 23, 2022**		

Tested by:	Reviewed by:	Approved by:
Jacob Ouyang / Engineer	Billy Zeng / Supervisor	Andy Gao / Manager

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Guangdong Keyway Testing Technology Co., Ltd.

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1. Summary Of Test Results

Test procedures according to the technical standards:

The following essential requirements and test specifications refer to ETSI EN 300 328 V2.2.2 (2019-07)			
No	Test Parameter	Clause No	Results
Transmitter Parameters			
1	RF output power	4.3.2.2	PASS
2	Power Spectral Density	4.3.2.3	PASS
3	Duty Cycle, Tx-sequence, Tx-gap	4.3.2.4	N/A
4	Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	4.3.1.4	N/A
5	Hopping Frequency Separation	4.3.1.5	N/A
6	Medium Utilisation (MU) factor	4.3.2.5	N/A
7	Adaptivity (adaptive equipment using modulations other than FHSS)	4.3.2.6	PASS
8	Occupied Channel Bandwidth	4.3.2.7	PASS
9	Transmitter unwanted emissions in the out-of-band domain	4.3.2.8	PASS
10	Transmitter unwanted emissions in the spurious domain	4.3.2.9	PASS
Receiver Parameters			
11	Receiver spurious emissions	4.3.2.10	PASS
12	Receiver Blocking	4.3.2.11	PASS
Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device.			

1.1. Test Facility

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

● CNAS —Registration No.: CNAS L5783

Guangdong Keyway Testing Technology Co., Ltd., EMC Laboratory has been registered and fuly described in a report filed with the Certificated by CNAS China.

Registration No.: CNAS L5783.

Date of registration: August 8, 2012

● Industry Canada (IC)

The 3m Semi-anechoic chamber of Guangdong Keyway Testing Technology Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9868A -1.

1.2. Measurement Uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y)

RF frequency	1×10^{-7}
RF power, conducted	± 1.0 dB
Conducted emission of receivers	± 1 dB
Radiated emission of transmitter	± 6 dB
Radiated emission of receiver	± 6 dB
Temperature	±1 degree
Humidity	± 5 %

2. General Information

2.1. General Description Of EUT

Product Name:	Smart Tabletop Radio
Test Model No.:	R2 mk4
Series Model:	N/A
Operation Frequency:	802.11b/g/n(20): 2412MHz~2472MHz 802.11n(40): 2422MHz~2462MHz
Channel Numbers:	802.11b/g/802.11n(HT20):13 802.11n(HT40):9
Modulation Technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/n: Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	PIFA Antenna
Antenna Gain:	2.5dBi
Power Input:	DC 14V/2A from adapter
Power:	28W
Adapter information:	Manufacturer:Dongguan Dongsong Electronic Co., Ltd. Model:DYS830-140200W-K Power Input:100-240V~ 50/60Hz 0.8A MAX Output:14.0V/2.0A, 28.0W

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	13	2472
02	2417	06	2437	10	2457		
03	2422	07	2442	11	2462		
04	2427	08	2447	12	2467		

3. Annex E

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:

☒ 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:

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.): 12.76dBm

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

802.11 b

• Power Spectral Density

802.11 b

• 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

N/A

• Occupied Channel Bandwidth

802.11 n

• Transmitter unwanted emissions in the OOB domain

802.11 g

• Transmitter unwanted emissions in the spurious domain

802.11 b

• Receiver spurious emissions

802.11 b

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:2

• The number of Transmit chains: 2

☐ 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 : 2412 MHz to 2472 MHz

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

j) Occupied Channel Bandwidth(s):

Occupied Channel Bandwidth 1: 36.377MHz

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: 0° C to 50° C

Operating voltage: ☐ 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

☒ PIFA Antenna

Antenna Gain: 2.5dBi

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

☐ 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:

Power Level 2:

Power Level 3:

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).

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 :

☐ DC State DC voltage :DC 14V/2A from Adapter

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:

N/A

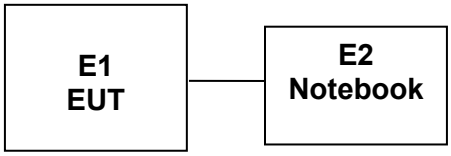
p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):

WiFi

2.2. Description Of Test Conditions

(1) EUT was tested in normal configuration (Please See following Block diagram)

1. Block diagram of EUT configuration



2.3. Test Conditions and Channel

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	0°C ~ 50°C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	AC 230V/50Hz	N/A

802.11b/11g/11n(20)		
Test Channel	EUT Channel	Test Frequency (MHz)
lowest	CH01	2412
middle	CH07	2442
highest	CH13	2472

802.11n(40)		
Test Channel	EUT Channel	Test Frequency (MHz)
lowest	CH03	2422
middle	CH07	2442
highest	CH11	2462

Note:

(1) The HT 50°C and LT 0°C was declared by manufacturer, The EUT couldn't be operate normally with higher or lower temperature.

(2) The measurements are performed at the highest, middle, lowest available channels.

2.4. Description Of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Smart Tabletop Radio	ruark audio	R2 mk4	N/A	EUT
E-2	Notebook	Lenovo	300-15SK	GB14477457	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in m in『Length』column.

2.5. Equipments List For All Test Items

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXG Signal Analyzer	Keysight	N9020A	MY56070279	2021/04/06	2022/04/05
MIMO4TX-1	Keysight	MIMO4TX	TW5451101,TW5451102,TW5451103,TW5451104	2021/04/06	2022/04/05
MXG Vector Signal Generator	Agilent	N5182A	MY50143410	2021/04/06	2022/04/05
MXG Analog Signal Generator	Agilent	N5181B	MY53050432	2021/04/06	2022/04/05
Comprehensive tester	R&S	CMW500	106288	2020/04/20	2022/04/19
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	2021/04/06	2022/04/05
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00829	2021/04/11	2022/04/10
3m Semi-anechoic Chamber	ETS-LINDGREN	966	170326	2020/04/20	2022/04/19
RF Cable	Junkosha	MWX322-2m	1305G007	2021/04/06	2022/04/05
RF Cable	Junkosha	MWX322-8m	1305G008	2021/04/06	2022/04/05
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	2021/04/06	2022/04/05
Horn Antenna	DAZE	ZN30701	11003	2021/04/11	2022/04/10
Spectrum Analyzer	Keysight	N9020A	MY56070279	2021/04/06	2022/04/05
3m anechoic Chamber	ETS-LINDGREN	966	170326	2022/04/20	2022/04/19
Signal Amplifier	ZHINAN	ZN3380C	11001	2021/04/10	2022/04/05
RF Cable	Junkosha	MWX322-1m	1305G006	2021/04/06	2022/04/05
RF Cable	Junkosha	MWX322-2m	1305G007	2021/04/06	2022/04/05
RF Cable	Junkosha	MWX322-8m	1305G008	2021/04/06	2022/04/05
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

3. RF output power

3.1. Limit

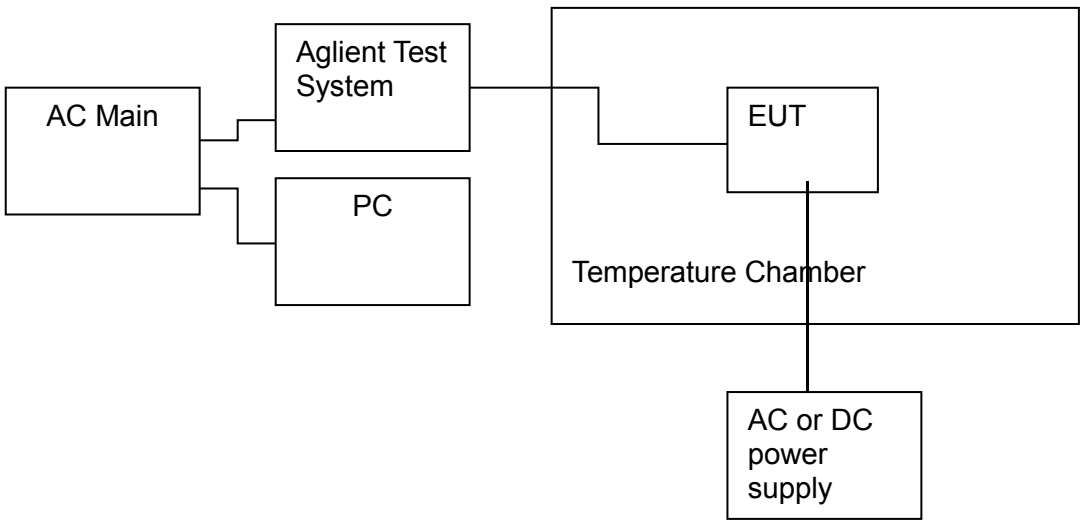
For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. See clause 5.3.1 m). For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

Limit
20dBm

3.2. Test Setup



3.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.2
The conformance tests for this requirement are defined in clause 5.4.2 and specifically in clause 5.4.2.2.1.2.

3.4. Test Result

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Test Mode: 802.11b					
TEST CONDITIONS			Total e.i.r.p (dBm)		
			CH01	CH07	CH13
Normal voltage	T nom (°C)	25.00	12.76	11.64	11.65
	T min (°C)	0.00	12.53	11.41	11.50
	T max (°C)	50.00	12.36	11.26	11.34
Max RF Power			**12.76**		
Limits			20dBm		
Result			**Complies**		

Test Mode: 802.11g					
TEST CONDITIONS			Total e.i.r.p (dBm)		
			CH01	CH07	CH13
Normal voltage	T nom (°C)	25.00	12.60	11.79	11.54
	T min (°C)	0.00	12.39	11.54	11.28
	T max (°C)	50.00	12.06	11.24	11.01
Max RF Power			**12.60**		
Limits			20dBm		
Result			**Complies**		

Test Mode: 802.11n(20M)					
TEST CONDITIONS			Total e.i.r.p (dBm)		
			CH01	CH07	CH13
Normal voltage	T nom (°C)	25.00	12.66	11.82	11.78
	T min (°C)	0.00	12.37	11.54	11.51
	T max (°C)	50.00	12.05	11.27	11.23
Max RF Power			**12.66**		
Limits			20dBm		
Result			**Complies**		

Test Mode: 802.11n(40M)					
TEST CONDITIONS			Total e.i.r.p (dBm)		
			CH03	CH07	CH11
Normal voltage	T nom (°C)	25.00	12.54	11.89	11.68
	T min (°C)	0.00	12.36	11.57	11.46
	T max (°C)	50.00	12.03	11.24	11.22
Max RF Power			**12.54**		
Limits			20dBm		
Result			**Complies**		

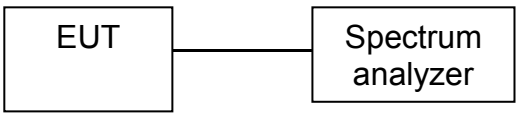
4. Power Spectral Density

4.1. Limit

For equipment using wide band modulations other than FHSS, the maximum Power Spectral Density is limited to 10 dBm per MHz.

Limit
10dBm/MHz

4.2. Test Setup



4.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.3

Connect the UUT to the spectrum analyzer and use the following settings:

Frequency range	2400MHz-2483.5MHz
RBW/VBW	10KHz/30KHz
Sweep points/time	>8350 / 10S
Detector	RMS
Trace	Max hold

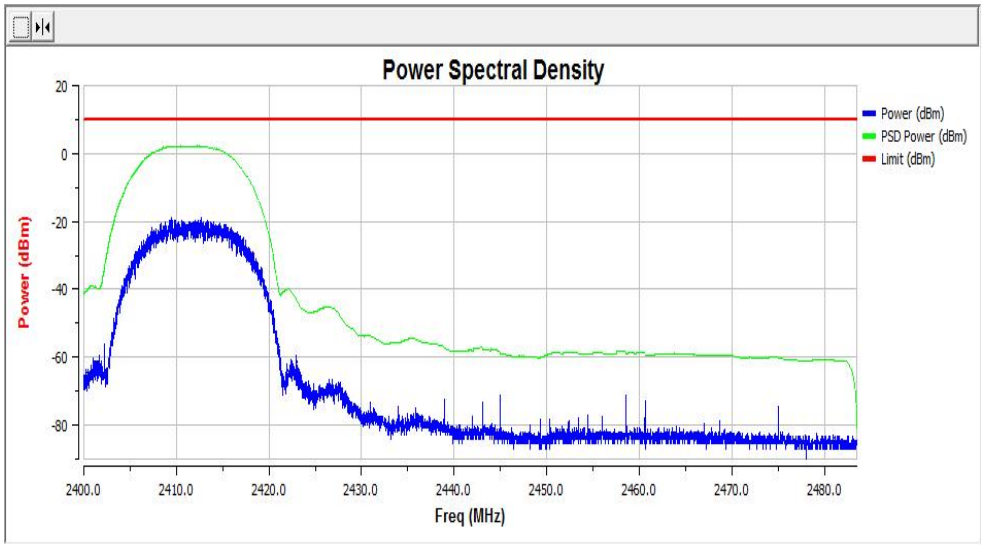
4.4. Test Result

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

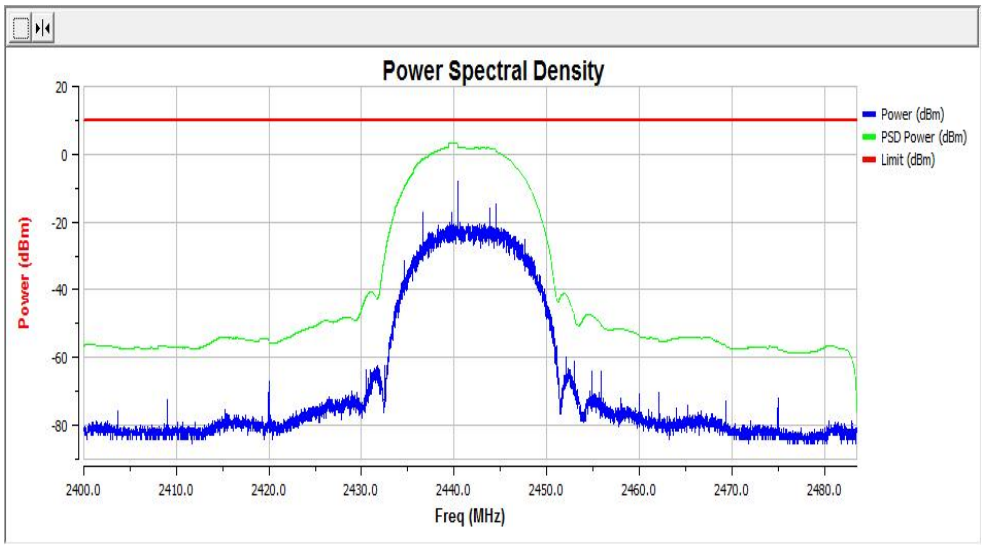
Test Mode: 802.11b			
Channel Frequency (MHz)	Power Density (dBm/MHz)	Limit (dBm/1 MHz) (E.I.R.P)	PASS/FAIL
2412	2.32	10	PASS
2442	3.28	10	PASS
2472	2.41	10	PASS

The Test Plots

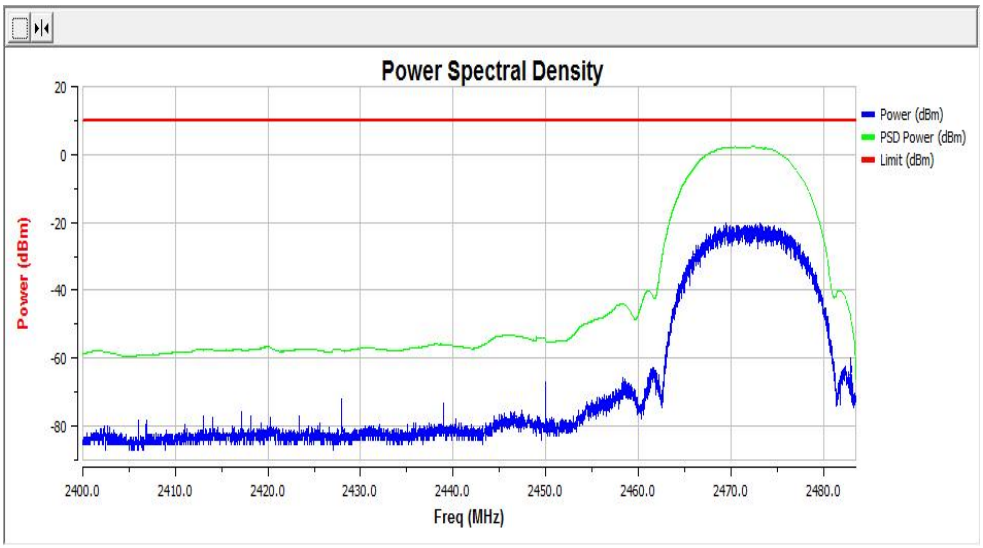
Channal-2412



Channal-2442



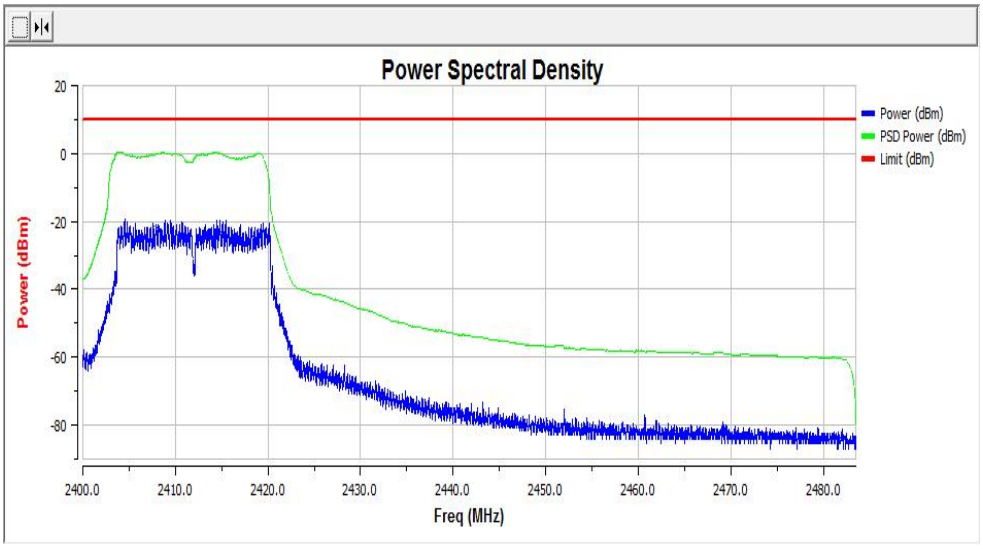
Channal-2472



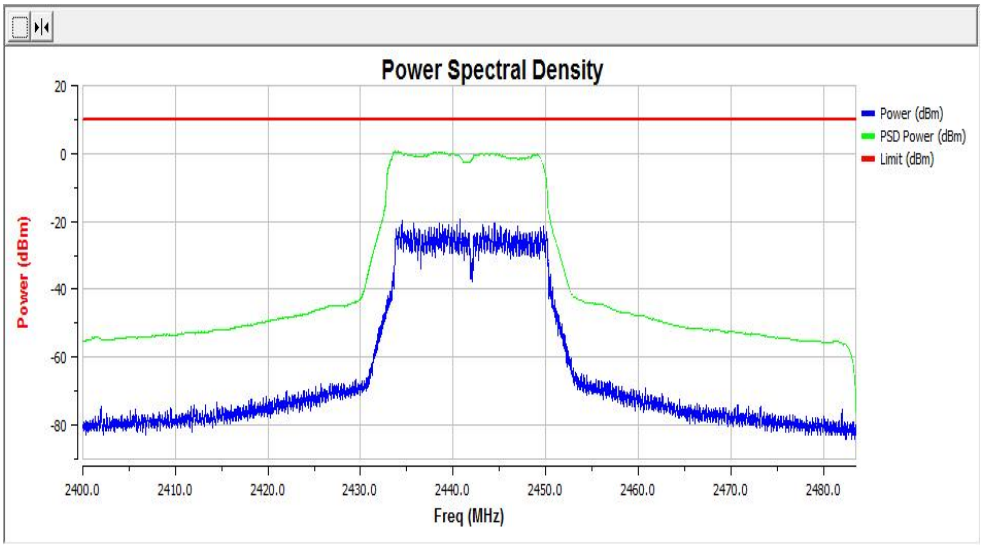
Test Mode: 802.11g			
Channel Frequency (MHz)	Power Density (dBm/MHz)	Limit (dBm/1 MHz) (E.I.R.P)	PASS/FAIL
2412	0.51	10	PASS
2442	0.67	10	PASS
2472	0.37	10	PASS

The Test Plots

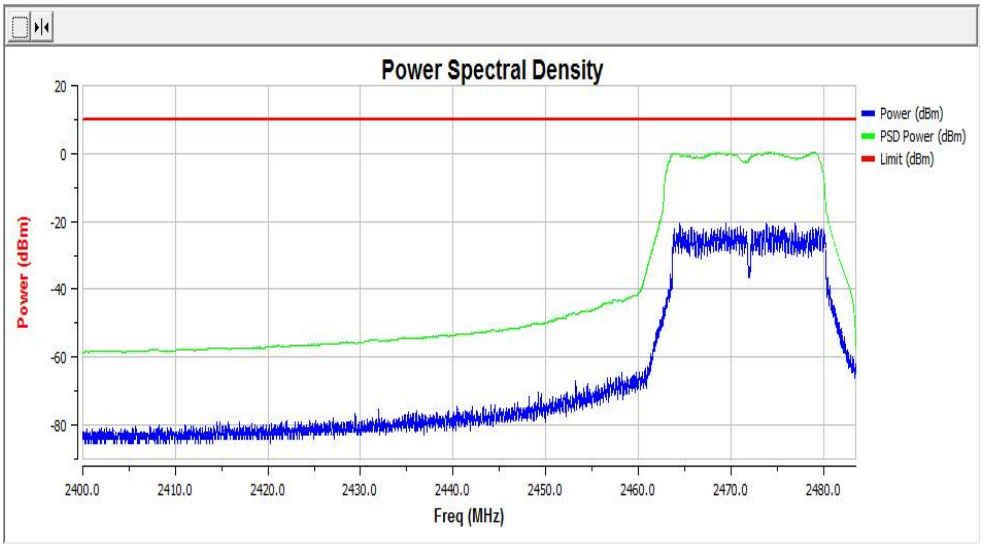
Channal-2412



Channal-2442



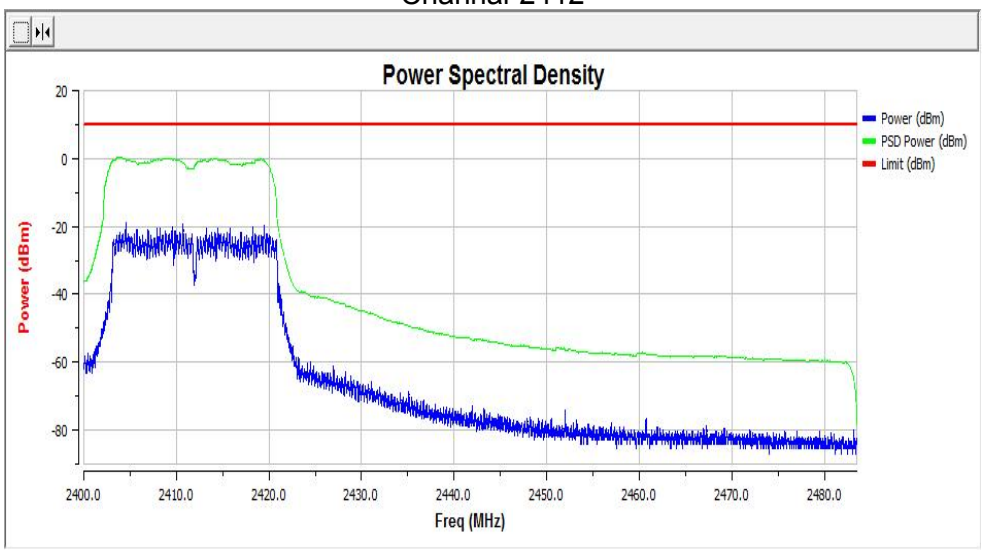
Channal-2472



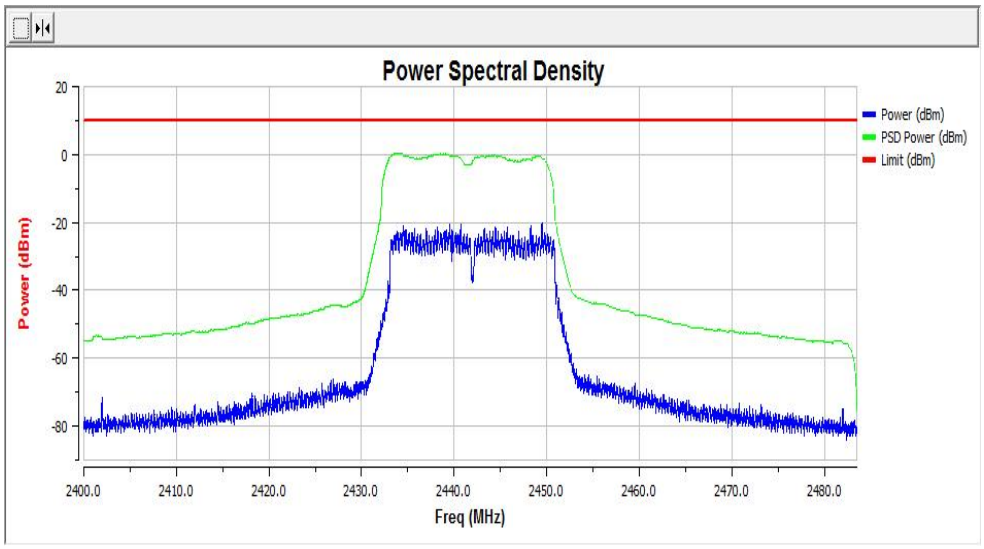
Test Mode: 802.11n(20M)			
Channel Frequency (MHz)	Power Density (dBm/MHz)	Limit (dBm/1 MHz) (E.I.R.P)	PASS/FAIL
2412	0.48	10	PASS
2442	0.58	10	PASS
2472	0.17	10	PASS

The Test Plots

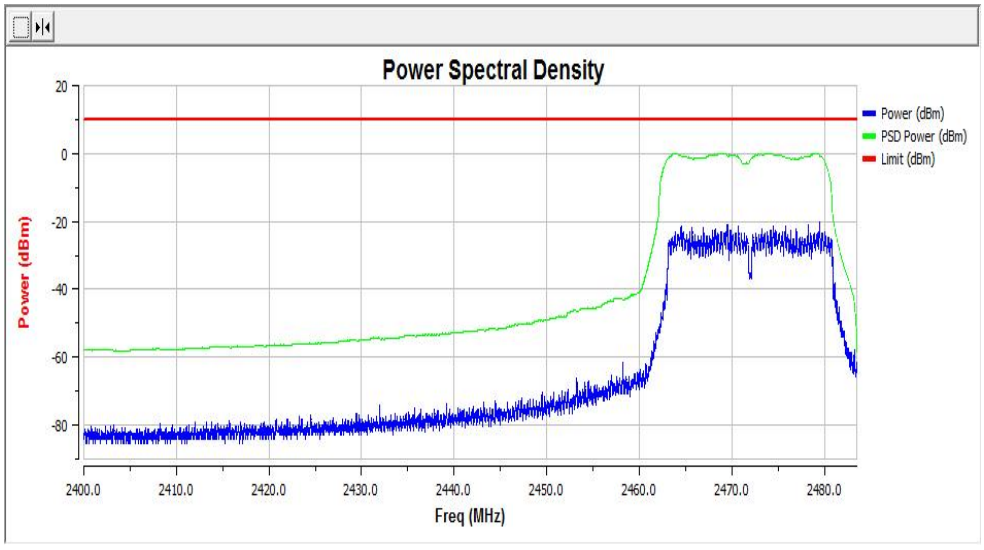
Channal-2412



Channal-2442



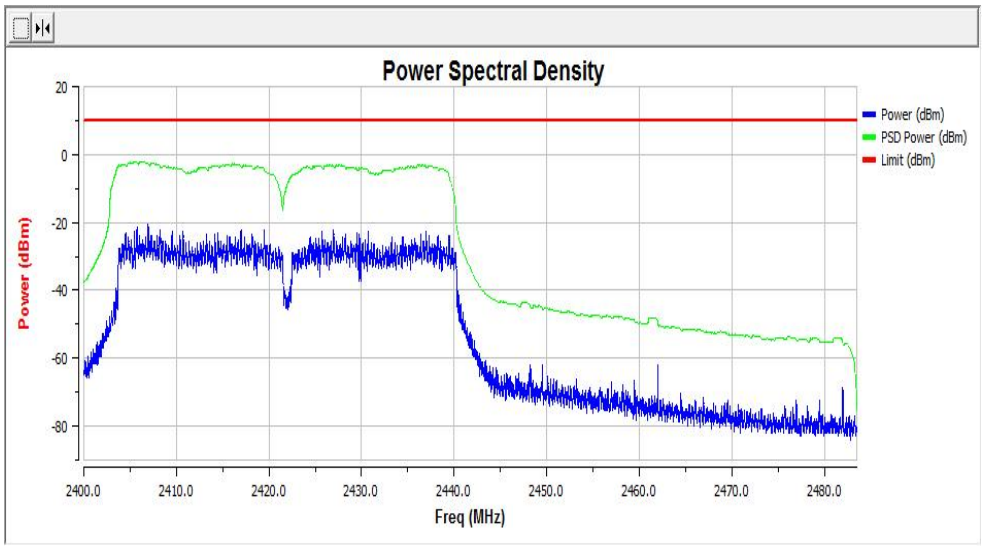
Channal-2472



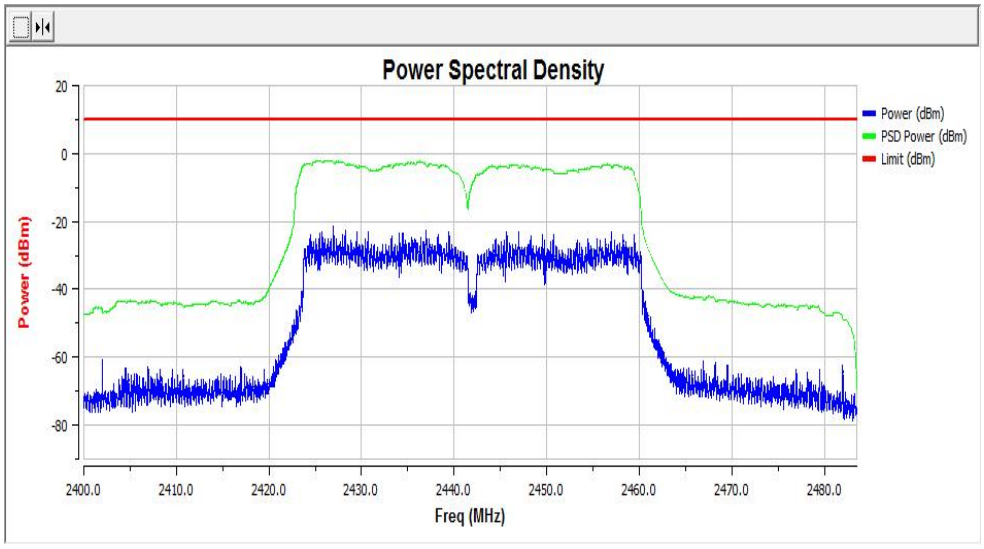
Test Mode: 802.11n(40M)			
Channel Frequency (MHz)	Power Density (dBm/MHz)	Limit (dBm/1 MHz) (E.I.R.P)	PASS/FAIL
2422	-2.07	10	PASS
2442	-1.98	10	PASS
2462	-2.42	10	PASS

The Test Plots

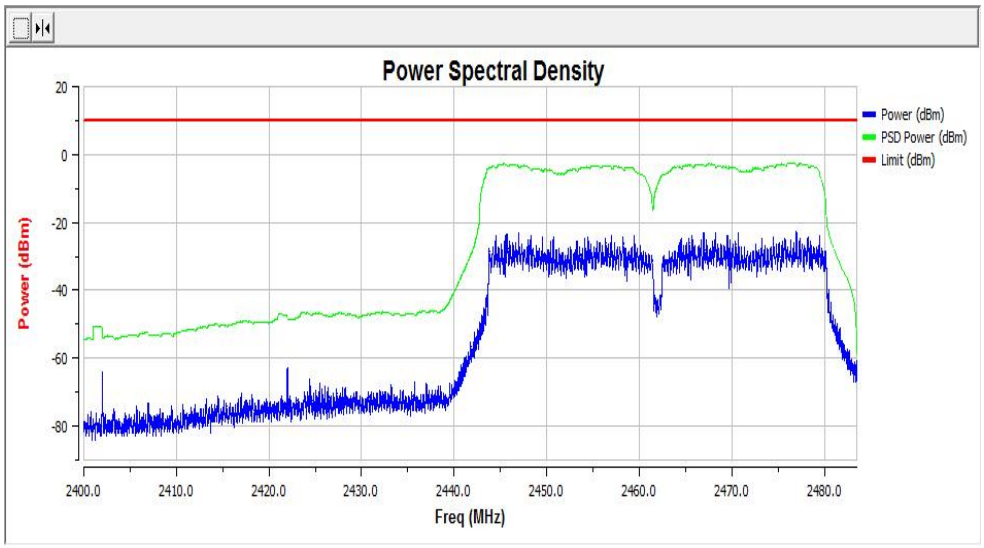
Channal-2422



Channal-2442



Channal-2462



5. Adaptivity

5.1. Limit

Adaptive non-FHSS equipment using DAA shall comply with the following minimum set of requirements:

1) During normal operation, the equipment shall evaluate the presence of a signal on its current operating channel(s). If it is determined that a signal is present with a level above the detection threshold defined in step 5 that channel shall be marked as 'unavailable'.
2) The channel(s) shall remain unavailable for a minimum time equal to 1 s after which the channel may be considered again as an 'available' channel
3) The total time during which an equipment has transmissions on a given channel without re-evaluating the availability of that channel, is defined as the Channel Occupancy Time. The Channel Occupancy Time shall be less than 40 ms. Each such transmission sequence shall be followed by an Idle Period (no transmissions) of minimum 5 % of the Channel Occupancy Time with a minimum of 100 µs. After this, the procedure as in step 1 needs to be repeated.
4) The detection threshold shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the detection threshold level may be relaxed to:

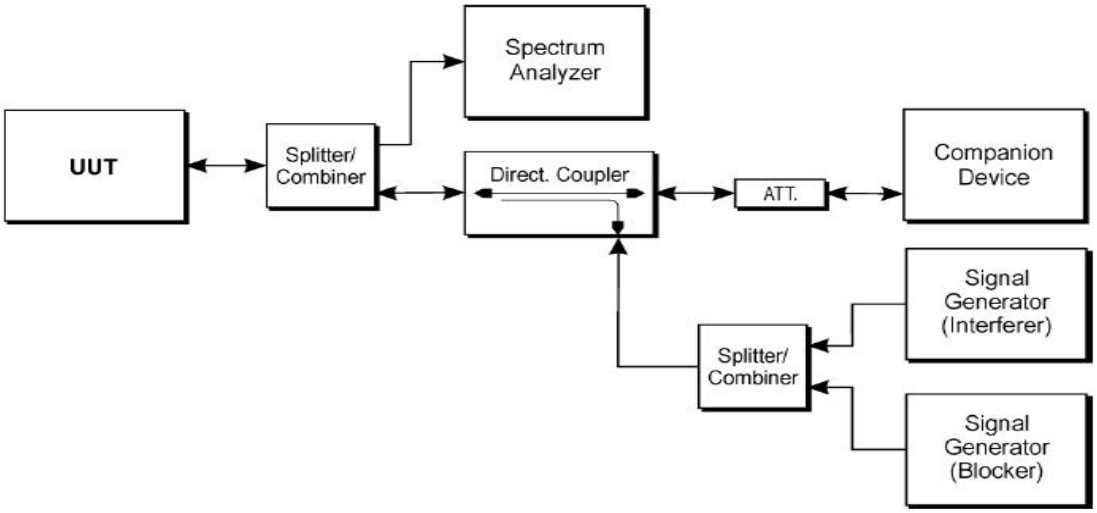
$$TL = -70 \text{ dBm/MHz} + 10 \times \log10 (100 \text{ mW} / P_{out}) \quad (P_{out} \text{ in mW e.i.r.p.})$$

5) The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined in table 9.

Table 9: Unwanted Signal parameters

Wanted signal mean power from companion device (dBm)	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
-30 (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 2)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1.		
NOTE 2: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density in front of the UUT antenna.		

5.2. Test Setup

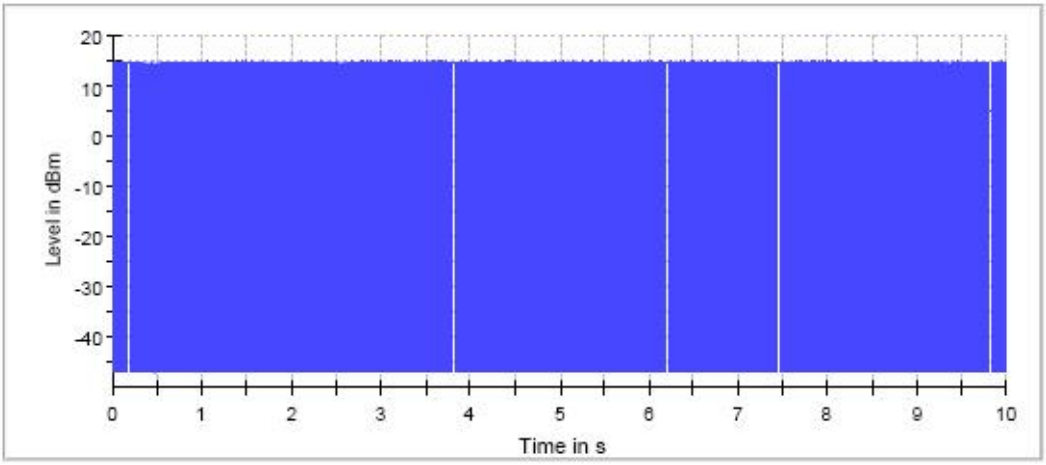


5.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.6.

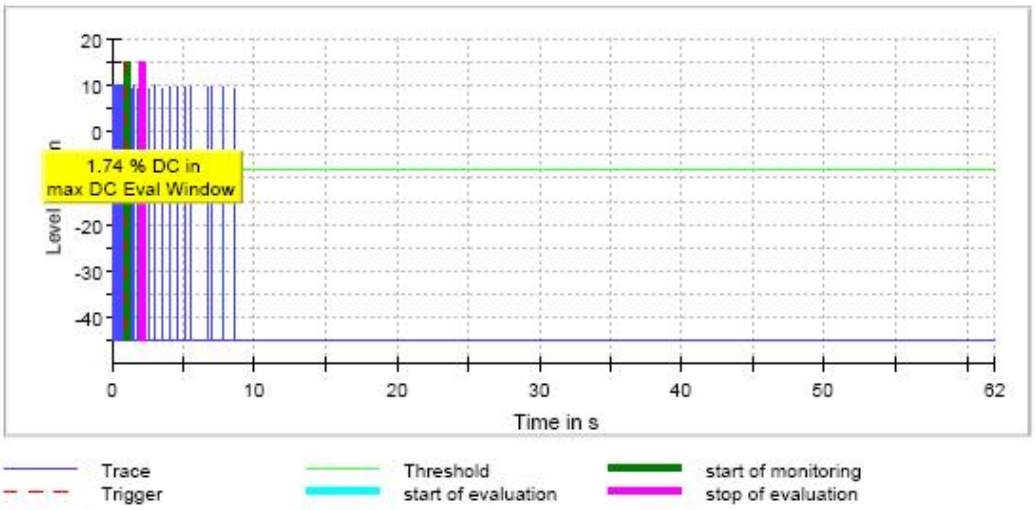
5.4. Test Result

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter



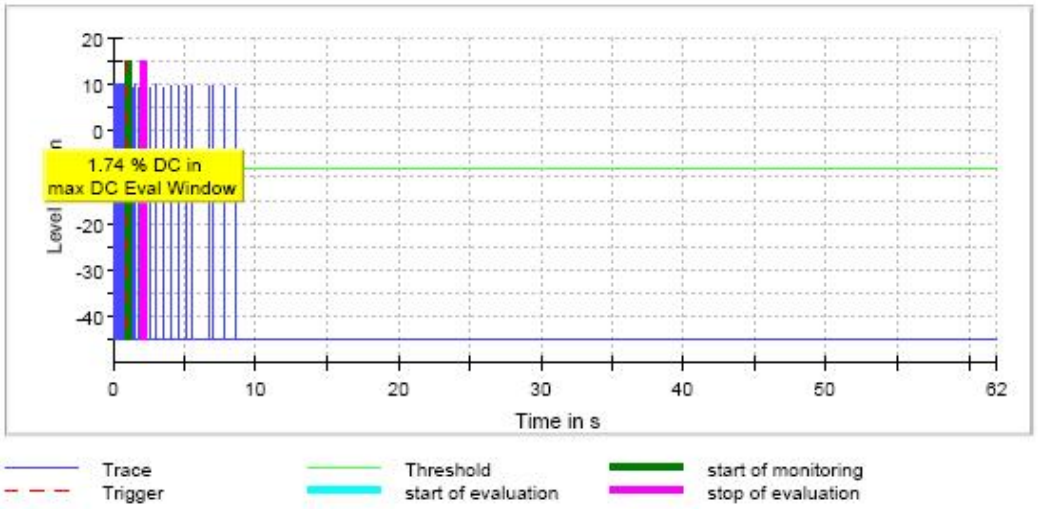
Maximun Channel Occupancy Time: 1.683ms
Related limit: <13ms
Result: PASS

Minimun Idel Period: 22us
Related limit: >18us
Result: PASS



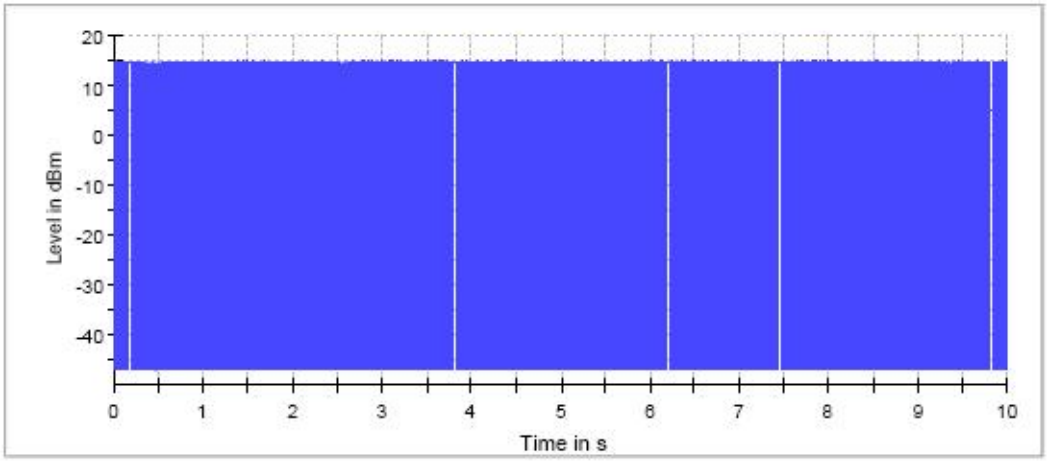
Adding the Interference Signal
Related limit: Stop transmissions response time <Maximun Channel Occupancy Time
Result:PASS

Adding the Unwanted Signal
Unwanted signal added: 2488.5MHz/-35dBm/CW
Verified: The UUT does not resume any normal transmissions
Result: PASS



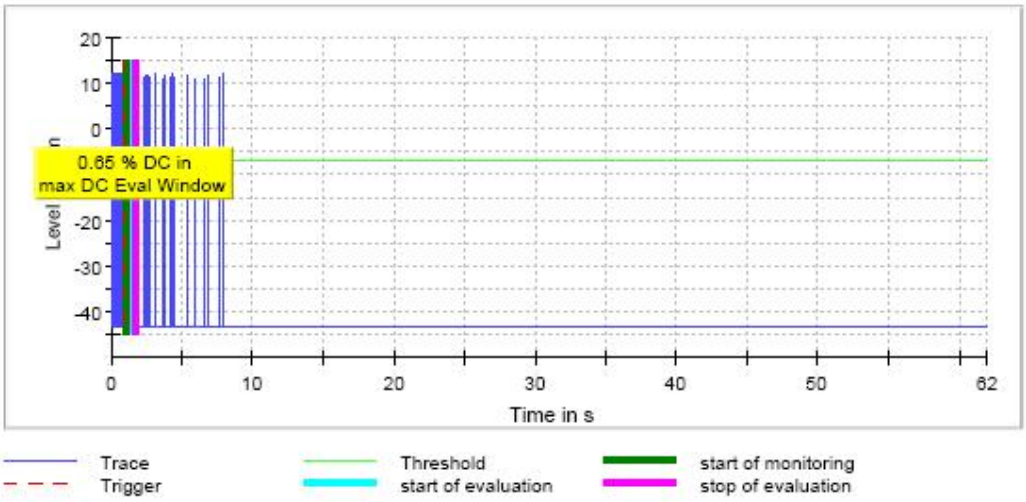
Short Control Signaling transmissions: 1.74%
Related limit: <10%
Result: PASS

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter



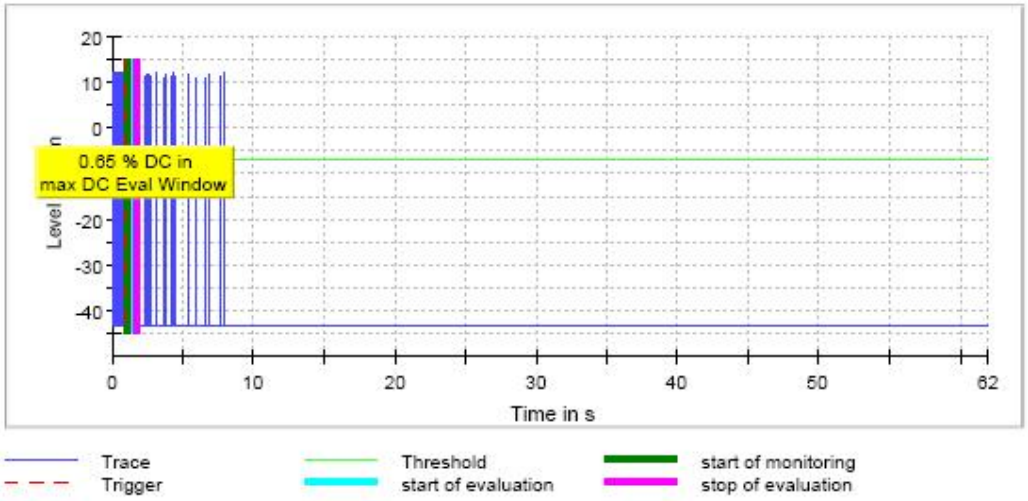
Maximun Channel Occupancy Time: 2.540ms
Related limit: <13ms
Result: PASS

Minimun Idel Period: 24us
Related limit: >18us
Result: PASS



Adding the Interference Signal
Related limit: Stop transmissions response time <Maximun Channel Occupancy Time
Result: PASS

Adding the Unwanted Signal
Unwanted signal added: 2395MHz/-35dBm/CW
Verified: The UUT does not resume any normal transmissions
Result: PASS



Short Control Signaling transmissions: 0.65%
Related limit: <10%
Result:PASS

Note: We tested at 802.11b/802.11g/802.11n(20M) mode at the ANT A and ANT B, recored the worst data 802.11b mode for ANT B in report.

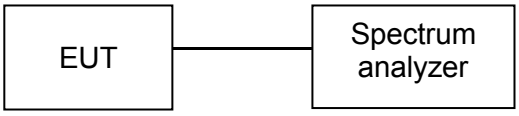
6. Occupied Channel Bandwidth

6.1. Limit

The Occupied Channel Bandwidth shall fall completely within the band given in 2.4GHz to 2.4835GHz.

In addition, for non-adaptive systems using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

6.2. Test Setup



6.3. Test Procedure

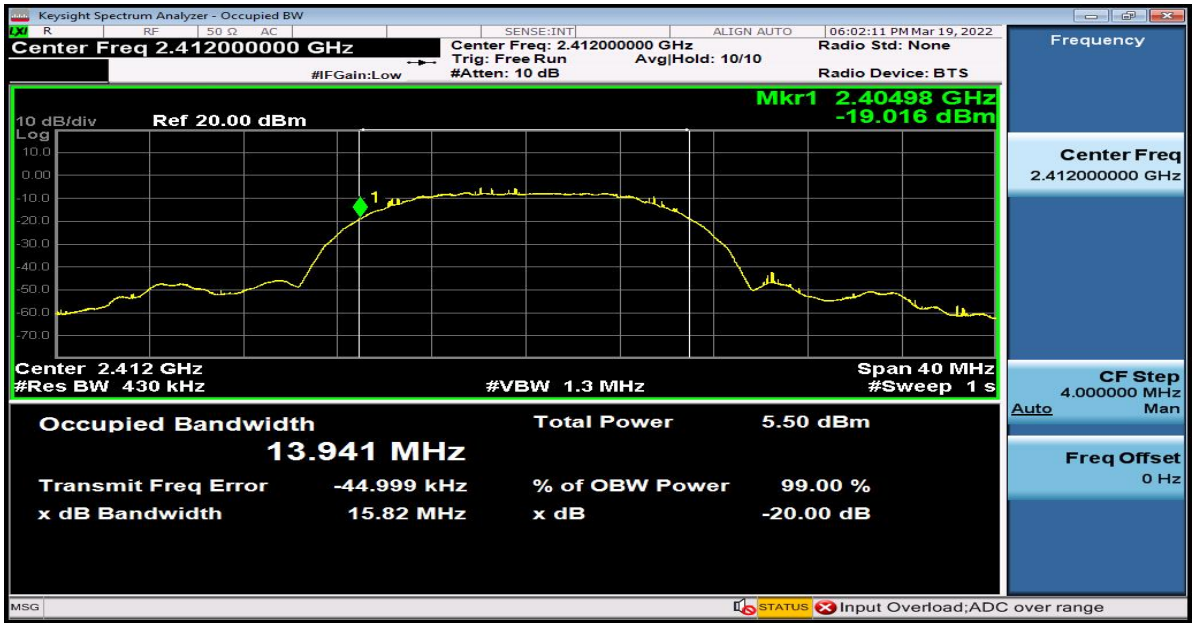
Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.7.

Connect the UUT to the spectrum analyzer and use the following settings:

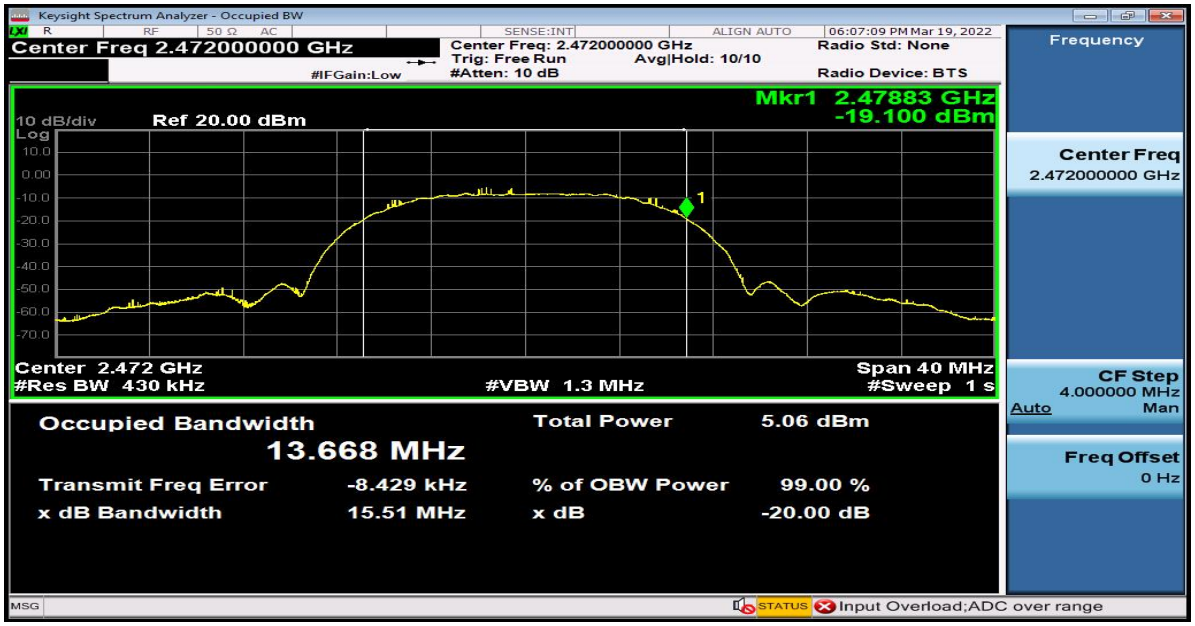
Centre Frequency	The centre frequency of the channel under test
Frequency Span	2 × Occupied Channel Bandwidth (e.g. 40 MHz for a 20 MHz channel)
RBW	~ 1 % of the span without going below 1 %
VBW	3 × RBW
Detector	RMS
Trace	Max hold
Sweep time	1s

6.4. Test Result

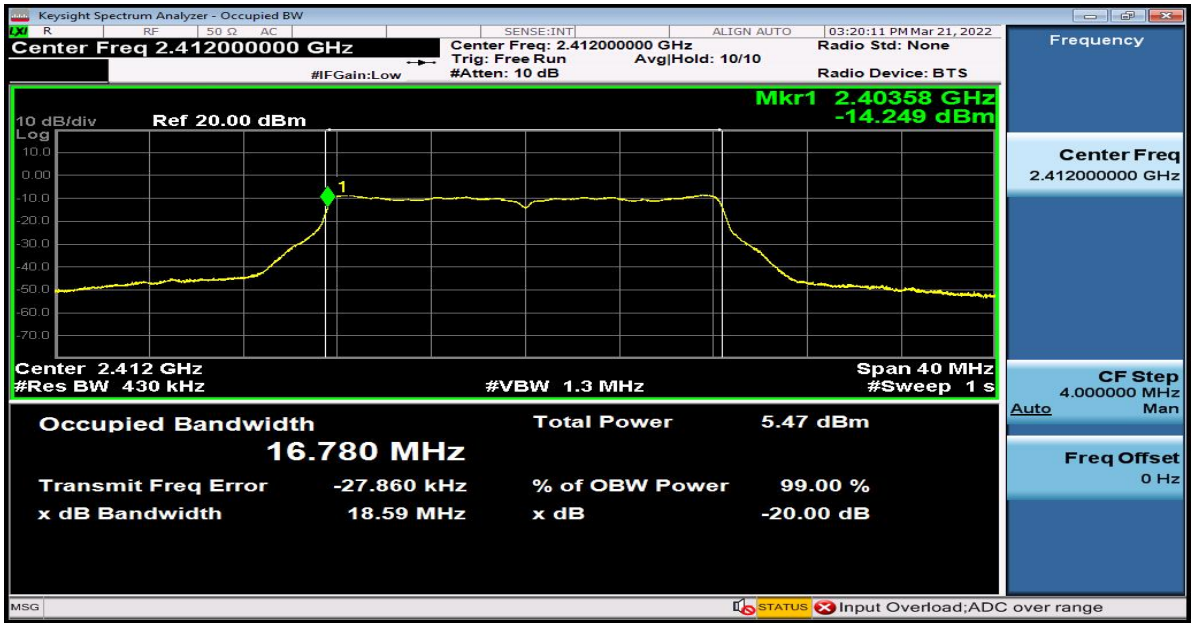
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11b	2404.98	13.941	2404.98	> 2400	Pass



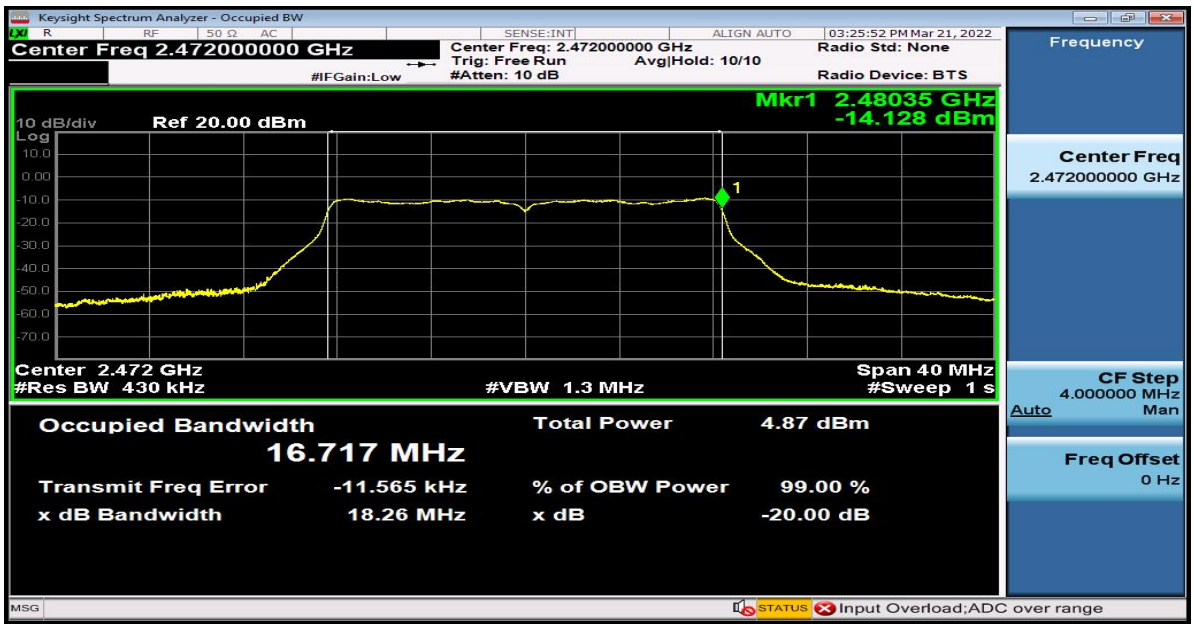
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11b	2478.83	13.668	2478.83	< 2483.5	Pass



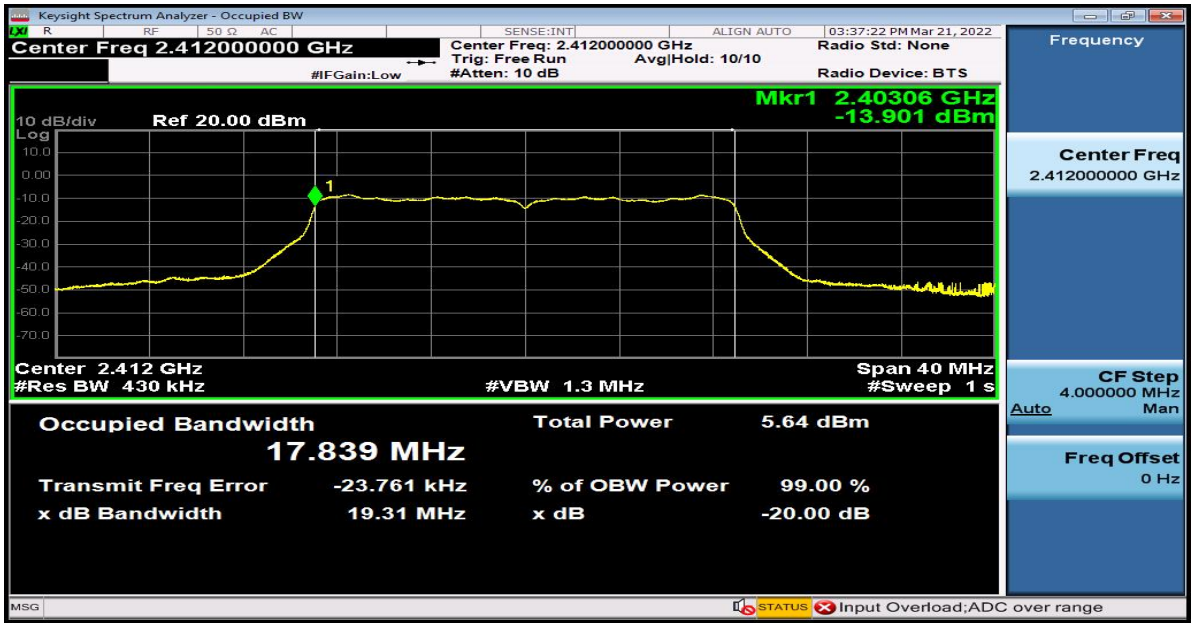
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11g	2403.58	16.78	2403.58	> 2400	Pass



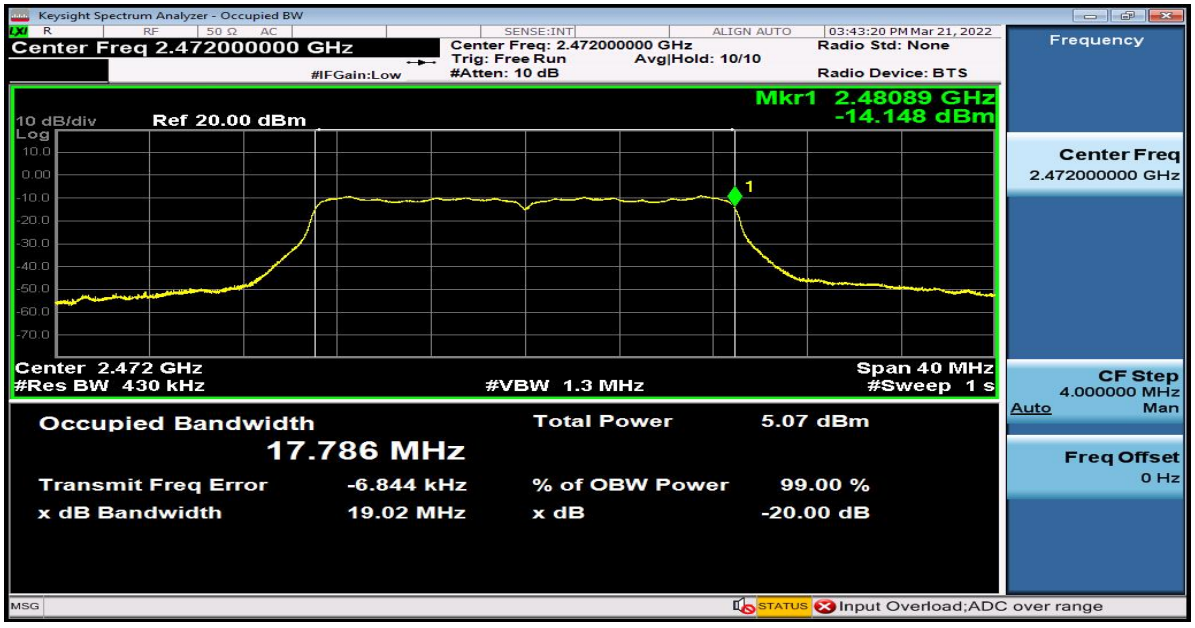
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11g	2480.35	16.717	2480.35	< 2483.5	Pass



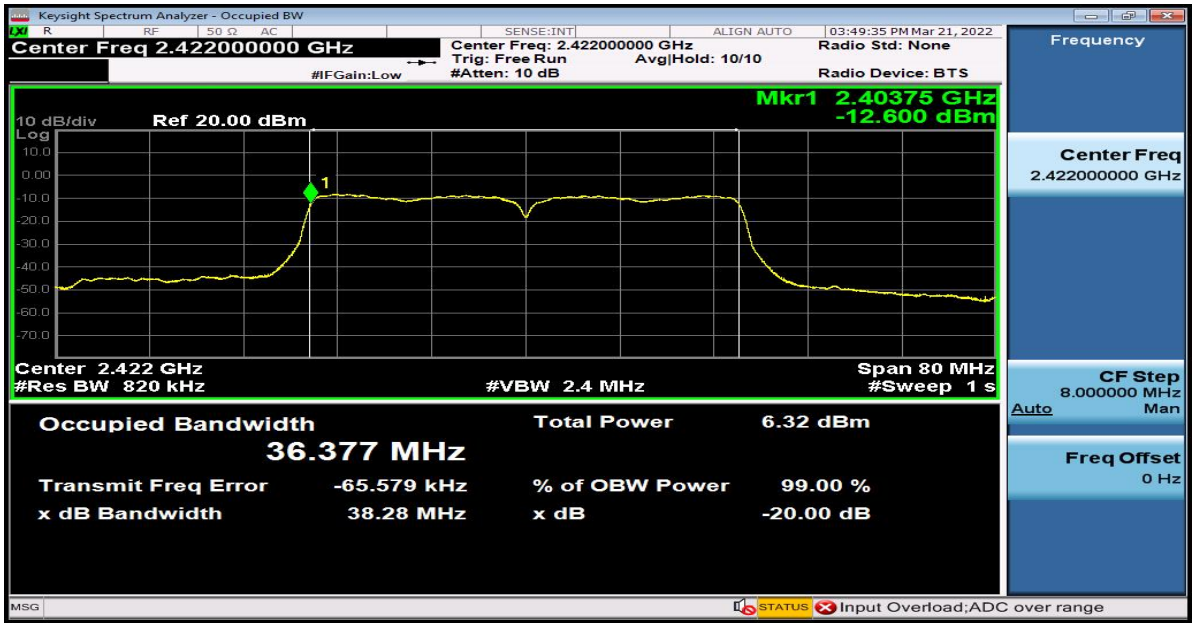
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11n(20M)	2403.06	17.839	2403.06	> 2400	Pass



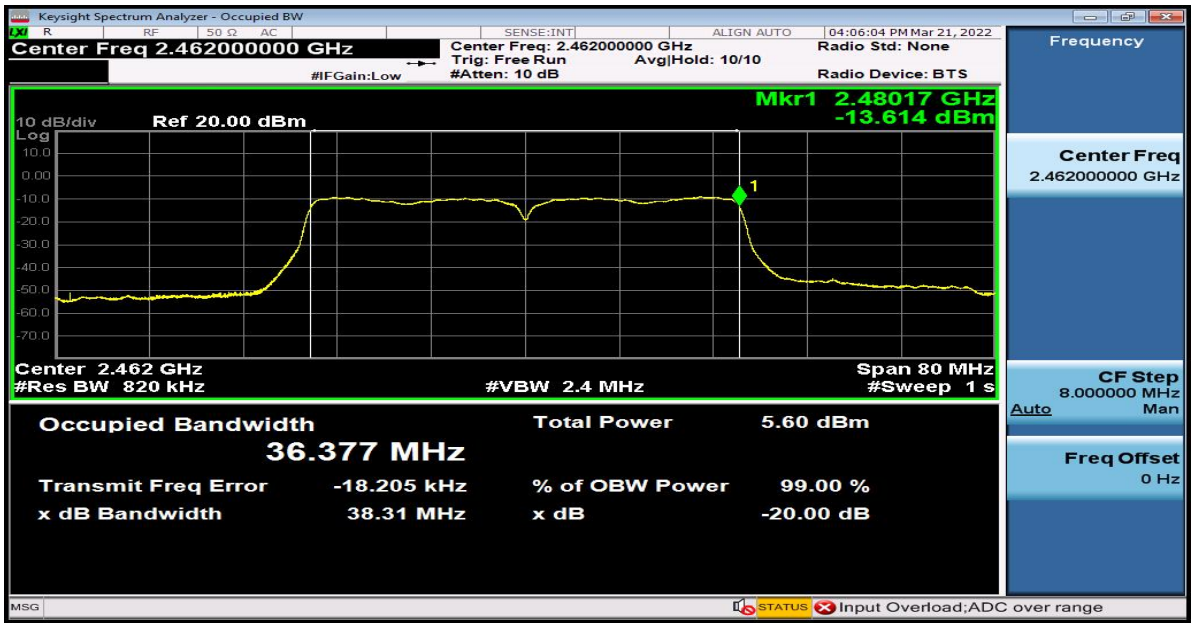
Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11n(20M)	2480.89	17.786	2480.89	< 2483.5	Pass



Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11n(40M)	2403.75	36.377	2403.75	> 2400	Pass



Modulation	Measured Channel	Occupied BandWidth (MHz)	Measured Freq (MHz)	Limit (MHz)	Status
802.11n(40M)	2480.17	36.377	2480.17	< 2483.5	Pass



7. Transmitter unwanted emissions in the out-of-band domain

7.1. 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 3.

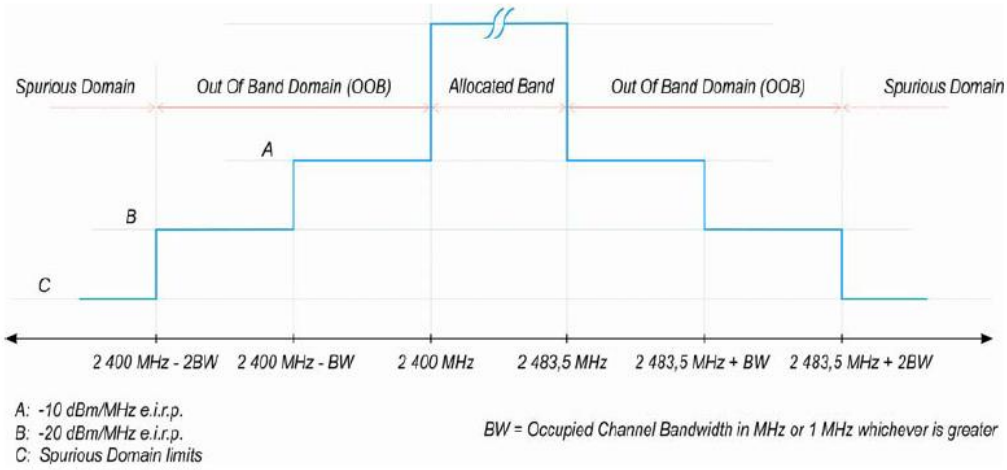


Figure 3: Transmit mask

7.2. Test Setup

The measurements were performed at normal environmental conditions. The measurement was performed at the lowest and the highest channel on which the equipment can operate.
The equipment was configured to operate under its worst case situation with respect to output power. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator. The frequency has to be recorded for the right and left end above threshold of highest and lowest channel respectively.

7.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.8.

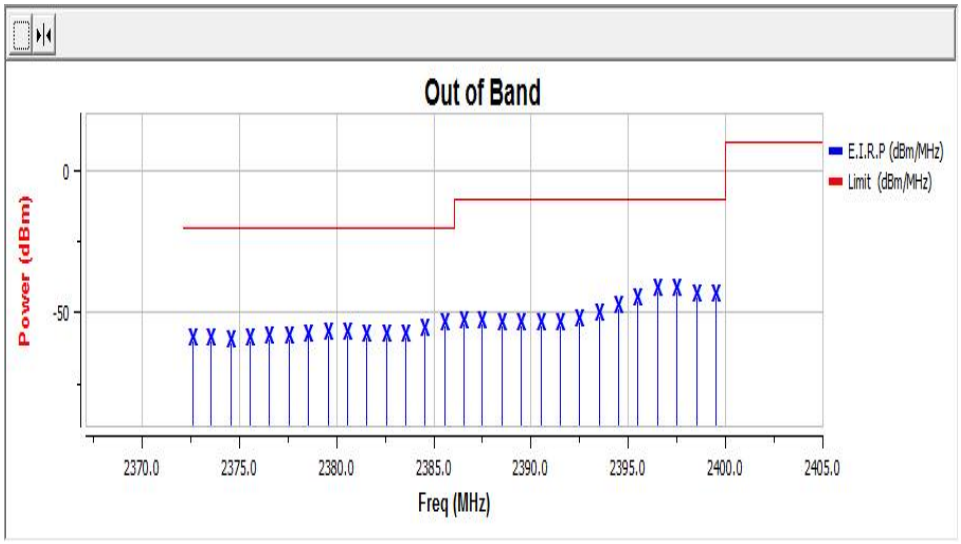
Connect the UUT to the spectrum analyzer and use the following settings:

RBW/ VBW	1MHz/3MHz
Span	0Hz
Filter mode	Channel filter
Sweep mode	Continuous
Sweep Points	5000
Detector	RMS
Trace mode	Clear / Write
Trigger Mode	Video trigger

7.4. Test Result

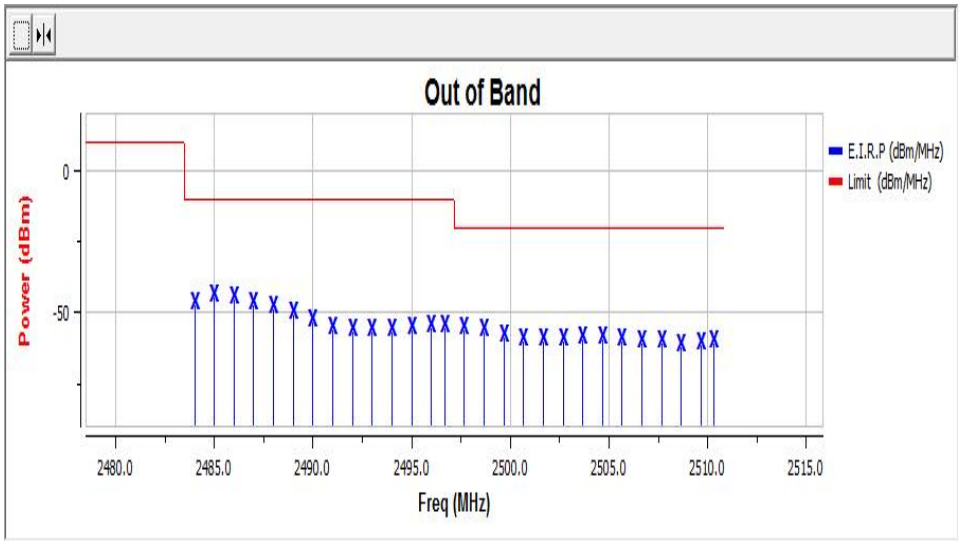
Test Mode: 802.11b			
Channel	Freq(MHz)	Level	Limit
CH Low-2412	2399.5	-45.27	-10
CH Low-2412	2398.5	-44.88	-10
CH Low-2412	2397.5	-43.27	-10
CH Low-2412	2396.5	-43.18	-10
CH Low-2412	2395.5	-46.15	-10
CH Low-2412	2394.5	-49.06	-10
CH Low-2412	2393.5	-52.04	-10
CH Low-2412	2392.5	-53.68	-10
CH Low-2412	2391.5	-55.18	-10
CH Low-2412	2390.5	-54.96	-10
CH Low-2412	2389.5	-55.06	-10
CH Low-2412	2388.5	-55.04	-10
CH Low-2412	2387.5	-54.73	-10
CH Low-2412	2386.559	-54.68	-10
CH Low-2412	2385.559	-55.31	-20
CH Low-2412	2384.559	-57.12	-20
CH Low-2412	2383.559	-58.85	-20
CH Low-2412	2382.559	-59.14	-20
CH Low-2412	2381.559	-58.89	-20
CH Low-2412	2380.559	-58.79	-20
CH Low-2412	2379.559	-58.79	-20
CH Low-2412	2378.559	-58.8	-20
CH Low-2412	2377.559	-59.59	-20
CH Low-2412	2376.559	-59.99	-20
CH Low-2412	2375.559	-60.4	-20
CH Low-2412	2374.559	-60.87	-20
CH Low-2412	2373.559	-60.73	-20
CH Low-2412	2372.618	-60.28	-20

The Test Plots



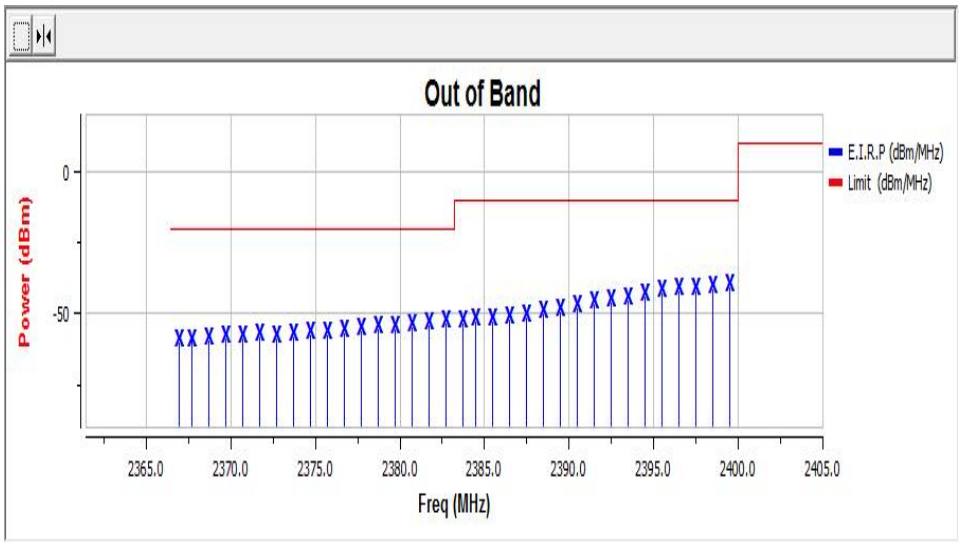
Test Mode: 802.11b			
Channel	Freq(MHz)	Level	Limit
CH Low-2472	2484	-48.03	-10
CH Low-2472	2485	-44.95	-10
CH Low-2472	2486	-45.44	-10
CH Low-2472	2487	-47.45	-10
CH Low-2472	2488	-48.99	-10
CH Low-2472	2489	-50.77	-10
CH Low-2472	2490	-53.75	-10
CH Low-2472	2491	-56.28	-10
CH Low-2472	2492	-57.01	-10
CH Low-2472	2493	-57.43	-10
CH Low-2472	2494	-56.99	-10
CH Low-2472	2495	-56.4	-10
CH Low-2472	2496	-55.99	-10
CH Low-2472	2496.668	-55.97	-10
CH Low-2472	2497.668	-56.29	-20
CH Low-2472	2498.668	-57.32	-20
CH Low-2472	2499.668	-59.29	-20
CH Low-2472	2500.668	-60.47	-20
CH Low-2472	2501.668	-60.68	-20
CH Low-2472	2502.668	-60.41	-20
CH Low-2472	2503.668	-59.98	-20
CH Low-2472	2504.668	-59.98	-20
CH Low-2472	2505.668	-60.4	-20
CH Low-2472	2506.668	-61.03	-20
CH Low-2472	2507.668	-61.47	-20
CH Low-2472	2508.668	-62.23	-20
CH Low-2472	2509.668	-61.84	-20
CH Low-2472	2510.336	-60.96	-20

The Test Plots



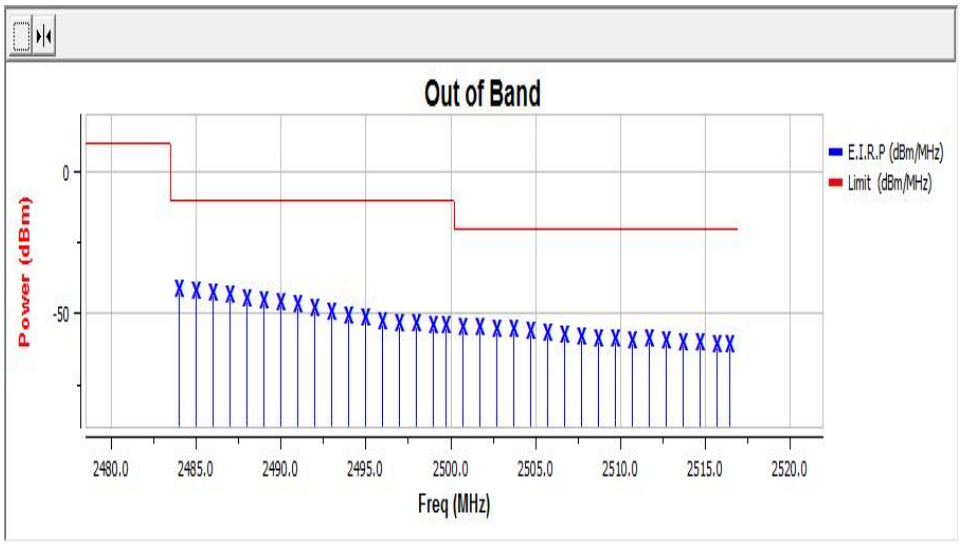
Test Mode: 802.11g			
Channel	Freq(MHz)	Level	Limit
CH Low-2412	2399.5	-41.12	-10
CH Low-2412	2398.5	-41.69	-10
CH Low-2412	2397.5	-42.06	-10
CH Low-2412	2396.5	-42.46	-10
CH Low-2412	2395.5	-43.36	-10
CH Low-2412	2394.5	-44.34	-10
CH Low-2412	2393.5	-45.4	-10
CH Low-2412	2392.5	-46.38	-10
CH Low-2412	2391.5	-47.28	-10
CH Low-2412	2390.5	-48.09	-10
CH Low-2412	2389.5	-49.51	-10
CH Low-2412	2388.5	-50.71	-10
CH Low-2412	2387.5	-51.47	-10
CH Low-2412	2386.5	-52.43	-10
CH Low-2412	2385.5	-52.79	-10
CH Low-2412	2384.5	-53.18	-10
CH Low-2412	2383.72	-53.7	-10
CH Low-2412	2382.72	-53.67	-20
CH Low-2412	2381.72	-54.22	-20
CH Low-2412	2380.72	-55.34	-20
CH Low-2412	2379.72	-55.51	-20
CH Low-2412	2378.72	-55.77	-20
CH Low-2412	2377.72	-56.59	-20
CH Low-2412	2376.72	-57.33	-20
CH Low-2412	2375.72	-57.48	-20
CH Low-2412	2374.72	-57.74	-20
CH Low-2412	2373.72	-58.36	-20
CH Low-2412	2372.72	-58.93	-20
CH Low-2412	2371.72	-58.24	-20
CH Low-2412	2370.72	-59.34	-20
CH Low-2412	2369.72	-59.44	-20
CH Low-2412	2368.72	-60.02	-20
CH Low-2412	2367.72	-60.15	-20
CH Low-2412	2366.94	-60.53	-20

The Test Plots



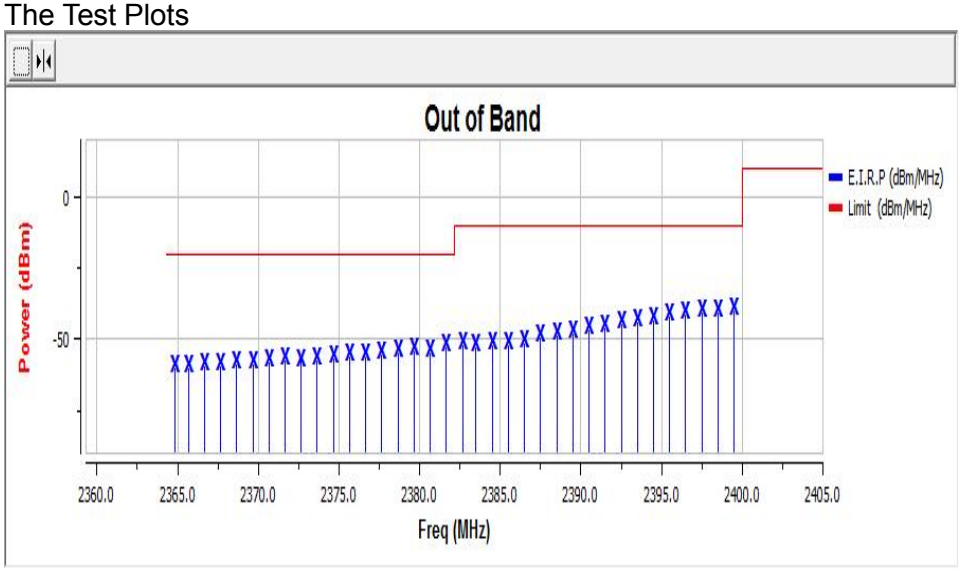
Test Mode: 802.11g			
Channel	Freq(MHz)	Level	Limit
CH Low-2472	2484	-43.03	-10
CH Low-2472	2485	-43.82	-10
CH Low-2472	2486	-44.58	-10
CH Low-2472	2487	-45.15	-10
CH Low-2472	2488	-46.44	-10
CH Low-2472	2489	-47.01	-10
CH Low-2472	2490	-47.84	-10
CH Low-2472	2491	-48.71	-10
CH Low-2472	2492	-49.86	-10
CH Low-2472	2493	-50.87	-10
CH Low-2472	2494	-52.16	-10
CH Low-2472	2495	-53.05	-10
CH Low-2472	2496	-54.22	-10
CH Low-2472	2497	-54.91	-10
CH Low-2472	2498	-55.26	-10
CH Low-2472	2499	-55.57	-10
CH Low-2472	2499.717	-55.85	-10
CH Low-2472	2500.717	-56.16	-20
CH Low-2472	2501.717	-56.61	-20
CH Low-2472	2502.717	-56.94	-20
CH Low-2472	2503.717	-57.21	-20
CH Low-2472	2504.717	-57.99	-20
CH Low-2472	2505.717	-58.53	-20
CH Low-2472	2506.717	-59.08	-20
CH Low-2472	2507.717	-59.74	-20
CH Low-2472	2508.717	-60.25	-20
CH Low-2472	2509.717	-60.52	-20
CH Low-2472	2510.717	-60.87	-20
CH Low-2472	2511.717	-60.67	-20
CH Low-2472	2512.717	-61.22	-20
CH Low-2472	2513.717	-61.68	-20
CH Low-2472	2514.717	-61.97	-20
CH Low-2472	2515.717	-62.25	-20
CH Low-2472	2516.434	-62.37	-20

The Test Plots



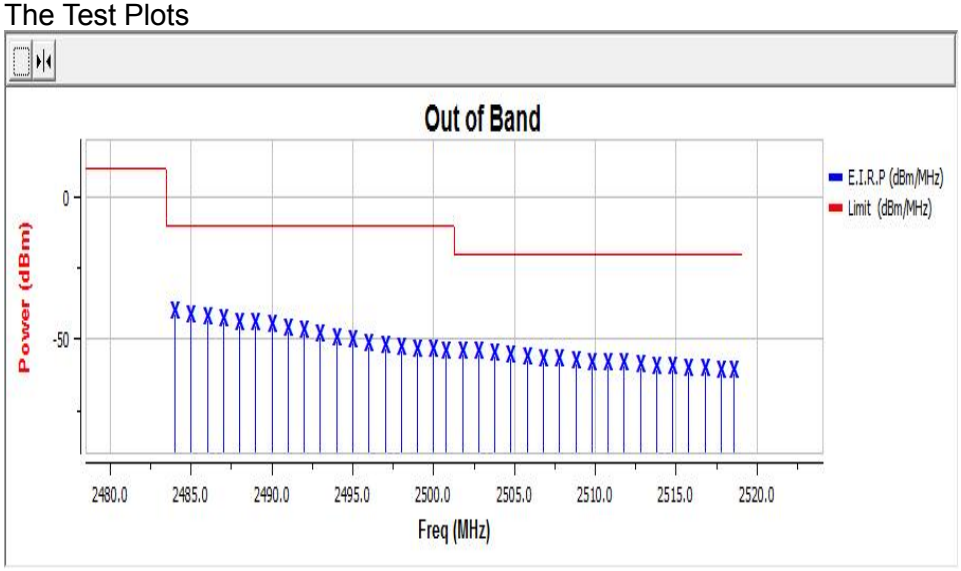
est Mode: 802.11n(20M)			
Channel	Freq(MHz)	Level	Limit
CH Low-2412	2399.5	-40.54	-10
CH Low-2412	2398.5	-41	-10
CH Low-2412	2397.5	-41.14	-10
CH Low-2412	2396.5	-41.72	-10
CH Low-2412	2395.5	-42.69	-10
CH Low-2412	2394.5	-43.58	-10
CH Low-2412	2393.5	-44.42	-10
CH Low-2412	2392.5	-45.32	-10
CH Low-2412	2391.5	-46.23	-10
CH Low-2412	2390.5	-46.81	-10
CH Low-2412	2389.5	-48.1	-10
CH Low-2412	2388.5	-49.18	-10
CH Low-2412	2387.5	-49.82	-10
CH Low-2412	2386.5	-51.47	-10
CH Low-2412	2385.5	-52.37	-10
CH Low-2412	2384.5	-52.64	-10
CH Low-2412	2383.5	-53.08	-10
CH Low-2412	2382.661	-52.7	-10
CH Low-2412	2381.661	-53.37	-20
CH Low-2412	2380.661	-54.79	-20
CH Low-2412	2379.661	-54.7	-20
CH Low-2412	2378.661	-55.08	-20
CH Low-2412	2377.661	-55.91	-20
CH Low-2412	2376.661	-56.39	-20
CH Low-2412	2375.661	-56.61	-20
CH Low-2412	2374.661	-56.82	-20
CH Low-2412	2373.661	-57.61	-20
CH Low-2412	2372.661	-58.14	-20
CH Low-2412	2371.661	-57.6	-20
CH Low-2412	2370.661	-58.51	-20
CH Low-2412	2369.661	-58.85	-20
CH Low-2412	2368.661	-59.39	-20
CH Low-2412	2367.661	-59.62	-20
CH Low-2412	2366.661	-60.12	-20
CH Low-2412	2365.661	-60.22	-20
CH Low-2412	2364.822	-60.35	-20

The Test Plots



Test Mode: 802.11n(20M)			
Channel	Freq(MHz)	Level	Limit
CH Low-2472	2484	-41.98	-10
CH Low-2472	2485	-42.82	-10
CH Low-2472	2486	-43.56	-10
CH Low-2472	2487	-44.21	-10
CH Low-2472	2488	-45.4	-10
CH Low-2472	2489	-45.89	-10
CH Low-2472	2490	-46.71	-10
CH Low-2472	2491	-47.54	-10
CH Low-2472	2492	-48.67	-10
CH Low-2472	2493	-49.55	-10
CH Low-2472	2494	-50.84	-10
CH Low-2472	2495	-51.58	-10
CH Low-2472	2496	-52.86	-10
CH Low-2472	2497	-53.72	-10
CH Low-2472	2498	-54.45	-10
CH Low-2472	2499	-54.97	-10
CH Low-2472	2500	-55.34	-10
CH Low-2472	2500.786	-55.54	-10
CH Low-2472	2501.786	-56.03	-20
CH Low-2472	2502.786	-56.1	-20
CH Low-2472	2503.786	-56.45	-20
CH Low-2472	2504.786	-57.32	-20
CH Low-2472	2505.786	-57.82	-20
CH Low-2472	2506.786	-58.21	-20
CH Low-2472	2507.786	-58.66	-20
CH Low-2472	2508.786	-59.12	-20
CH Low-2472	2509.786	-59.62	-20
CH Low-2472	2510.786	-60.01	-20
CH Low-2472	2511.786	-59.95	-20
CH Low-2472	2512.786	-60.59	-20
CH Low-2472	2513.786	-61.12	-20
CH Low-2472	2514.786	-61.34	-20
CH Low-2472	2515.786	-61.7	-20
CH Low-2472	2516.786	-61.84	-20
CH Low-2472	2517.786	-62.25	-20
CH Low-2472	2518.572	-62.32	-20

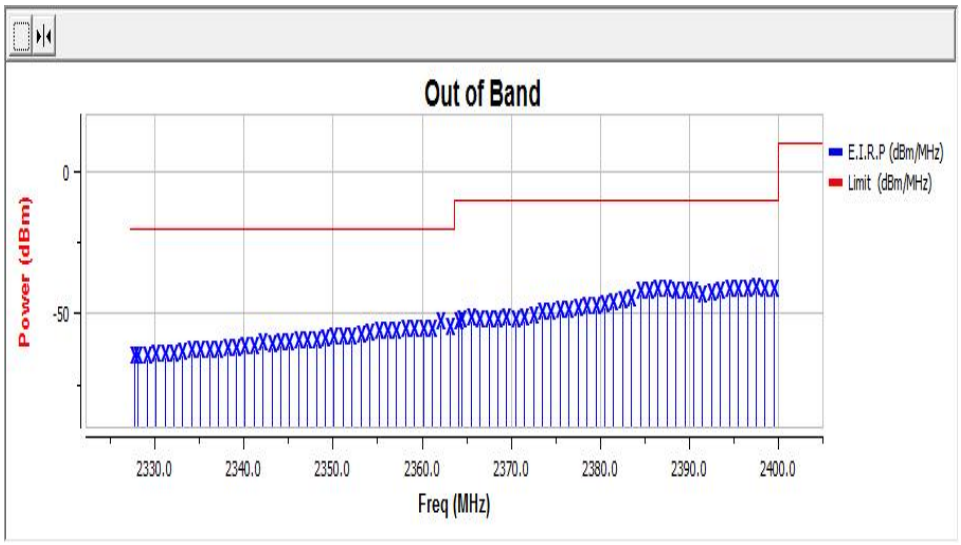
The Test Plots



Test Mode: 802.11n(40M)			
Channel	Freq(MHz)	Level	Limit
CH Low-2422	2399.5	-42.74	-10
CH Low-2422	2398.5	-43	-10
CH Low-2422	2397.5	-42.35	-10
CH Low-2422	2396.5	-42.85	-10
CH Low-2422	2395.5	-43.25	-10
CH Low-2422	2394.5	-42.86	-10
CH Low-2422	2393.5	-43.99	-10
CH Low-2422	2392.5	-44.34	-10
CH Low-2422	2391.5	-45.02	-10
CH Low-2422	2390.5	-43.72	-10
CH Low-2422	2389.5	-43.64	-10
CH Low-2422	2388.5	-43.38	-10
CH Low-2422	2387.5	-43.13	-10
CH Low-2422	2386.5	-43.31	-10
CH Low-2422	2385.5	-43.59	-10
CH Low-2422	2384.5	-44.01	-10
CH Low-2422	2383.5	-46.64	-10
CH Low-2422	2382.5	-47.32	-10
CH Low-2422	2381.5	-47.64	-10
CH Low-2422	2380.5	-48.72	-10
CH Low-2422	2379.5	-48.95	-10
CH Low-2422	2378.5	-49.27	-10
CH Low-2422	2377.5	-49.76	-10
CH Low-2422	2376.5	-50.37	-10
CH Low-2422	2375.5	-50.7	-10
CH Low-2422	2374.5	-51.11	-10
CH Low-2422	2373.5	-51	-10
CH Low-2422	2372.5	-52.43	-10
CH Low-2422	2371.5	-53.34	-10
CH Low-2422	2370.5	-53.59	-10
CH Low-2422	2369.5	-52.82	-10
CH Low-2422	2368.5	-53.92	-10
CH Low-2422	2367.5	-53.77	-10
CH Low-2422	2366.5	-53.63	-10
CH Low-2422	2365.5	-52.92	-10
CH Low-2422	2364.5	-53.82	-10
CH Low-2422	2364.123	-54.29	-10
CH Low-2422	2363.123	-56.75	-20
CH Low-2422	2362.123	-54.56	-20
CH Low-2422	2361.123	-57.06	-20
CH Low-2422	2360.123	-57.04	-20
CH Low-2422	2359.123	-57.45	-20
CH Low-2422	2358.123	-57.34	-20
CH Low-2422	2357.123	-57.99	-20
CH Low-2422	2356.123	-57.56	-20
CH Low-2422	2355.123	-57.98	-20
CH Low-2422	2354.123	-58.43	-20

CH Low-2422	2353.123	-59.38	-20
CH Low-2422	2352.123	-59.56	-20
CH Low-2422	2351.123	-60.07	-20
CH Low-2422	2350.123	-60.02	-20
CH Low-2422	2349.123	-60.38	-20
CH Low-2422	2348.123	-60.9	-20
CH Low-2422	2347.123	-60.99	-20
CH Low-2422	2346.123	-61.02	-20
CH Low-2422	2345.123	-61.51	-20
CH Low-2422	2344.123	-61.5	-20
CH Low-2422	2343.123	-62.79	-20
CH Low-2422	2342.123	-61.66	-20
CH Low-2422	2341.123	-63.28	-20
CH Low-2422	2340.123	-63.24	-20
CH Low-2422	2339.123	-64.11	-20
CH Low-2422	2338.123	-63.67	-20
CH Low-2422	2337.123	-64.43	-20
CH Low-2422	2336.123	-64.57	-20
CH Low-2422	2335.123	-64.51	-20
CH Low-2422	2334.123	-64.8	-20
CH Low-2422	2333.123	-65.32	-20
CH Low-2422	2332.123	-66.06	-20
CH Low-2422	2331.123	-65.89	-20
CH Low-2422	2330.123	-66.01	-20
CH Low-2422	2329.123	-66.71	-20
CH Low-2422	2328.123	-66.76	-20
CH Low-2422	2327.746	-66.72	-20

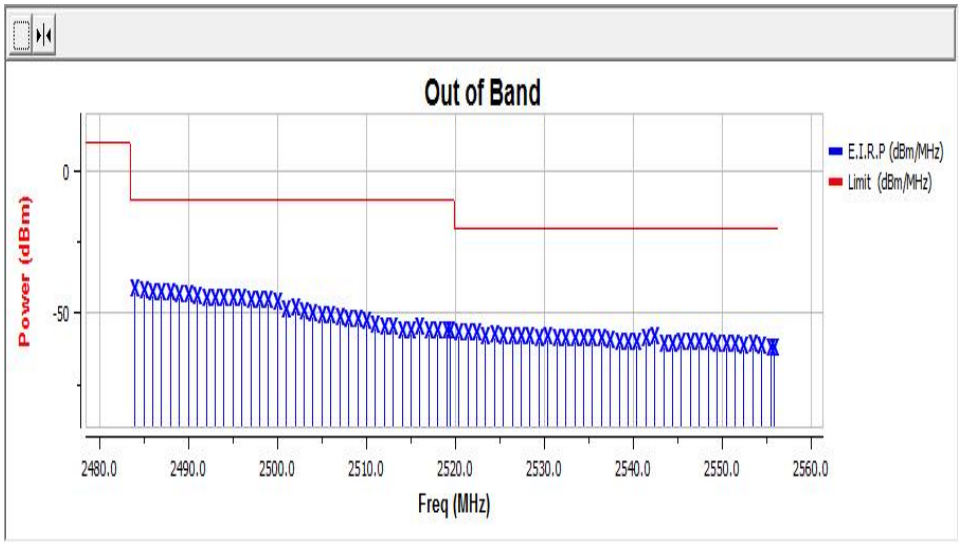
The Test Plots



Test Mode: 802.11n(40M)			
Channel	Freq(MHz)	Level	Limit
CH High-2462	2484	-42.91	-10
CH High-2462	2485	-43.7	-10
CH High-2462	2486	-44.52	-10
CH High-2462	2487	-44.32	-10
CH High-2462	2488	-44.05	-10
CH High-2462	2489	-44.96	-10
CH High-2462	2490	-45.35	-10
CH High-2462	2491	-46.01	-10
CH High-2462	2492	-46.72	-10
CH High-2462	2493	-46.51	-10
CH High-2462	2494	-46.59	-10
CH High-2462	2495	-46.56	-10
CH High-2462	2496	-46.22	-10
CH High-2462	2497	-46.88	-10
CH High-2462	2498	-46.83	-10
CH High-2462	2499	-47.15	-10
CH High-2462	2500	-47.6	-10
CH High-2462	2501	-50.28	-10
CH High-2462	2502	-50	-10
CH High-2462	2503	-51.31	-10
CH High-2462	2504	-51.67	-10
CH High-2462	2505	-52.22	-10
CH High-2462	2506	-52.32	-10
CH High-2462	2507	-53.3	-10
CH High-2462	2508	-53.59	-10
CH High-2462	2509	-53.77	-10
CH High-2462	2510	-54.46	-10
CH High-2462	2511	-55.79	-10
CH High-2462	2512	-56.61	-10
CH High-2462	2513	-56.76	-10
CH High-2462	2514	-57.65	-10
CH High-2462	2515	-57.71	-10
CH High-2462	2516	-56.63	-10
CH High-2462	2517	-58	-10
CH High-2462	2518	-58	-10
CH High-2462	2519	-57.72	-10
CH High-2462	2519.377	-57.64	-10
CH High-2462	2520.377	-58.31	-20
CH High-2462	2521.377	-58.36	-20
CH High-2462	2522.377	-58.48	-20
CH High-2462	2523.377	-59.73	-20
CH High-2462	2524.377	-59.24	-20
CH High-2462	2525.377	-59.81	-20
CH High-2462	2526.377	-59.66	-20
CH High-2462	2527.377	-59.68	-20
CH High-2462	2528.377	-59.69	-20
CH High-2462	2529.377	-60.22	-20

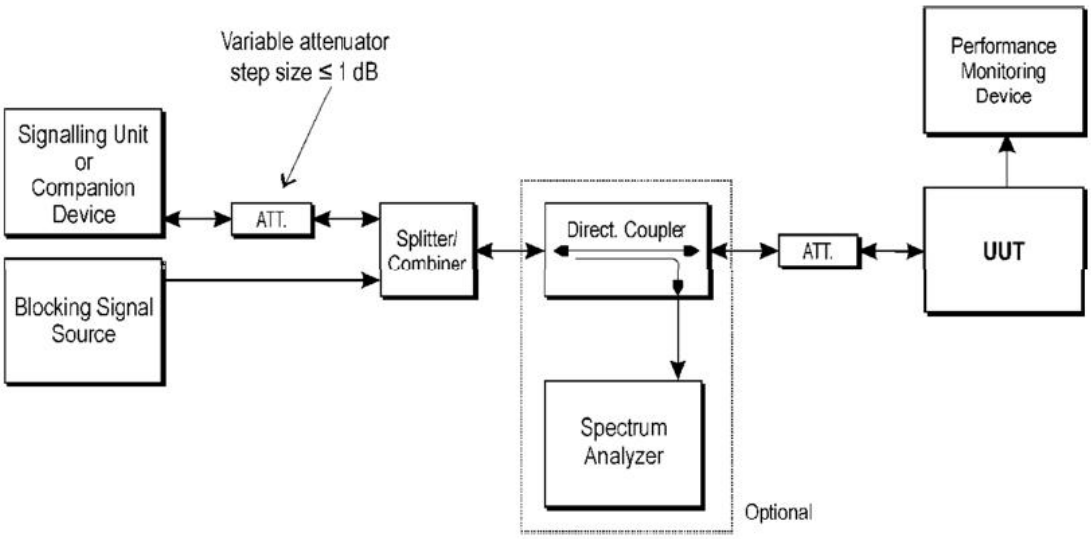
CH High-2462	2530.377	-60.12	-20
CH High-2462	2531.377	-60.37	-20
CH High-2462	2532.377	-60.61	-20
CH High-2462	2533.377	-60.58	-20
CH High-2462	2534.377	-60.71	-20
CH High-2462	2535.377	-60.6	-20
CH High-2462	2536.377	-60.75	-20
CH High-2462	2537.377	-60.98	-20
CH High-2462	2538.377	-61.69	-20
CH High-2462	2539.377	-61.93	-20
CH High-2462	2540.377	-62.03	-20
CH High-2462	2541.377	-60.42	-20
CH High-2462	2542.377	-59.87	-20
CH High-2462	2543.377	-62.37	-20
CH High-2462	2544.377	-62.19	-20
CH High-2462	2545.377	-62.01	-20
CH High-2462	2546.377	-61.86	-20
CH High-2462	2547.377	-61.88	-20
CH High-2462	2548.377	-62.14	-20
CH High-2462	2549.377	-62.35	-20
CH High-2462	2550.377	-62.6	-20
CH High-2462	2551.377	-62.57	-20
CH High-2462	2552.377	-63.03	-20
CH High-2462	2553.377	-62.68	-20
CH High-2462	2554.377	-63.16	-20
CH High-2462	2555.377	-63.59	-20
CH High-2462	2555.754	-63.59	-20

The Test Plots



8. Receiver Blocking

8.1. Test Setup



8.2. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.11.

8.3. Categorization

Receiver category 1
Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.

Receiver category 2
Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % (irrespective of the maximum RF output power); or quipment (adaptive or non-adaptive) with a maximum RF output power greater than 0 dBm e.i.r.p. and less than or equal to 10 dBm e.i.r.p.

Receiver category 3
Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % (irrespective of the maximum RF output power); or equipment (adaptive or non-adaptive) with a maximum RF output power of 0 dBm e.i.r.p.

8.4. Limit

Table 14 contains the Receiver Blocking parameters for Receiver Category 1 equipment.

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × $\log_{10}$(OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × $\log_{10}$(OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 26 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 20 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Table 15 contains the Receiver Blocking parameters for Receiver Category 2 equipment.

Table 15: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 26 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Table 16 contains the Receiver Blocking parameters for Receiver Category 3 equipment.

Table 16: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW

NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 30 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

8.5. Test Result

Test Mode	802.11b Low Channel					
Wanted signal Mean power From companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal Power (dBm)	Type of blocking signal	PER (%)	PER (%) Limit	Result
-59.14	2380	-34	CW	2.14	≦10	Pass
	2504			1.83		Pass
-65.14	2300			3.47		Pass
	2330			1.59		Pass
	2360			2.31		Pass
	2524			0.98		Pass
	2584			1.47		Pass
	2674			2.14		Pass

Test Mode	802.11b High Channel					
Wanted signal Mean power From companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal Power (dBm)	Type of blocking signal	PER (%)	PER (%) Limit	Result
-59.06	2380	-34	CW	1.63	≦10	Pass
	2504			0.96		Pass
-65.06	2300			1.47		Pass
	2330			2.59		Pass
	2360			1.63		Pass
	2524			2.88		Pass
	2584			1.24		Pass
	2674			3.26		Pass

Note: 802.11b mode is the worst data of test, which has been recorded in this report.

9. Transmitter unwanted emissions in the spurious domain

9.1. Applied procedures / limit

Frequency range	Maximum power	Bandwidth
30MHz-47MHz	-36dBm	100kHz
47MHz-74MHz	-54dBm	100kHz
74MHz-87.5MHz	-36dBm	100kHz
87.5MHz-118MHz	-54dBm	100kHz
118MHz-174MHz	-36dBm	100kHz
174MHz-230MHz	-54dBm	100kHz
230MHz-470MHz	-36dBm	100kHz
470MHz-694MHz	-54dBm	100kHz
694MHz-1GHz	-36dBm	100kHz
1GHz -12.75GHz	-30dBm	1MHz

9.2. Measuring Instruments and Setting

The following table is the setting of the Spectrum Analyzer.

The emissions over the range 30 MHz to 1 000 MHz shall be identified.

Spectrum Analyzer	Setting
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Detector Mode	Peak
Trace Mode	Max Hold
Filter type	3 dB (Gaussian)
RBW / VBW	100 kHz / 300 kHz
Sweep Points	≥ 19 400

The emissions over the range 1 GHz to 12.75 GHz shall be identified.

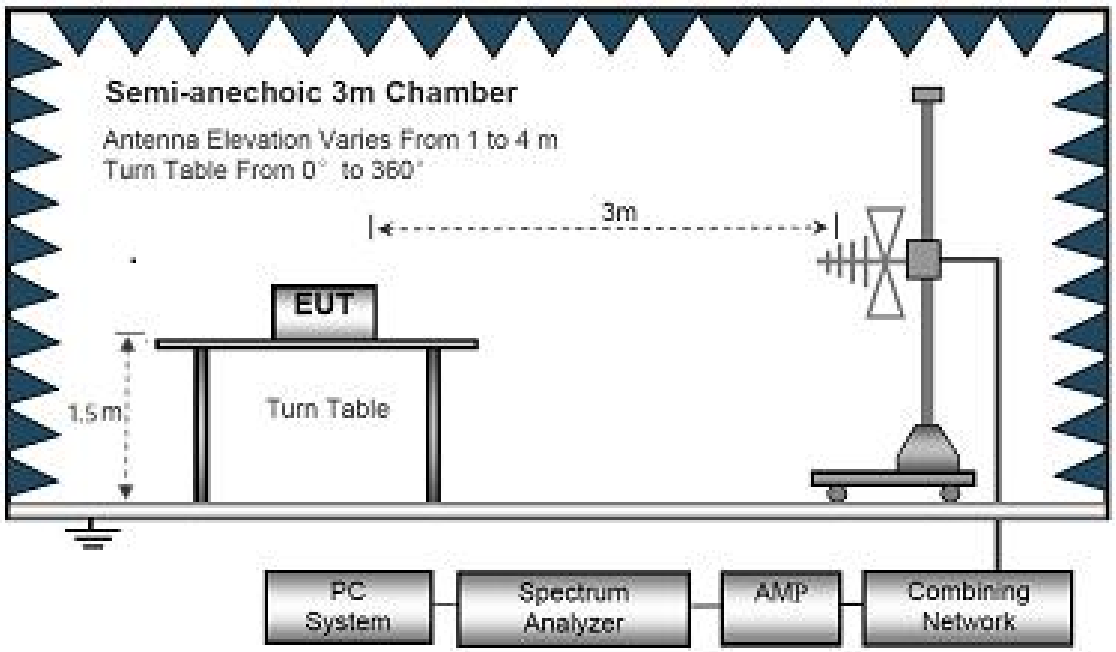
Spectrum Analyzer	Setting
Start Frequency	1 GHz
Stop Frequency	12.75 GHz
Detector Mode	Peak
Trace Mode	Max Hold
Filter type	3 dB (Gaussian)
RBW / VBW	1 MHz / 3 MHz
Sweep Points	≥ 23 500

9.3. Test Procedures

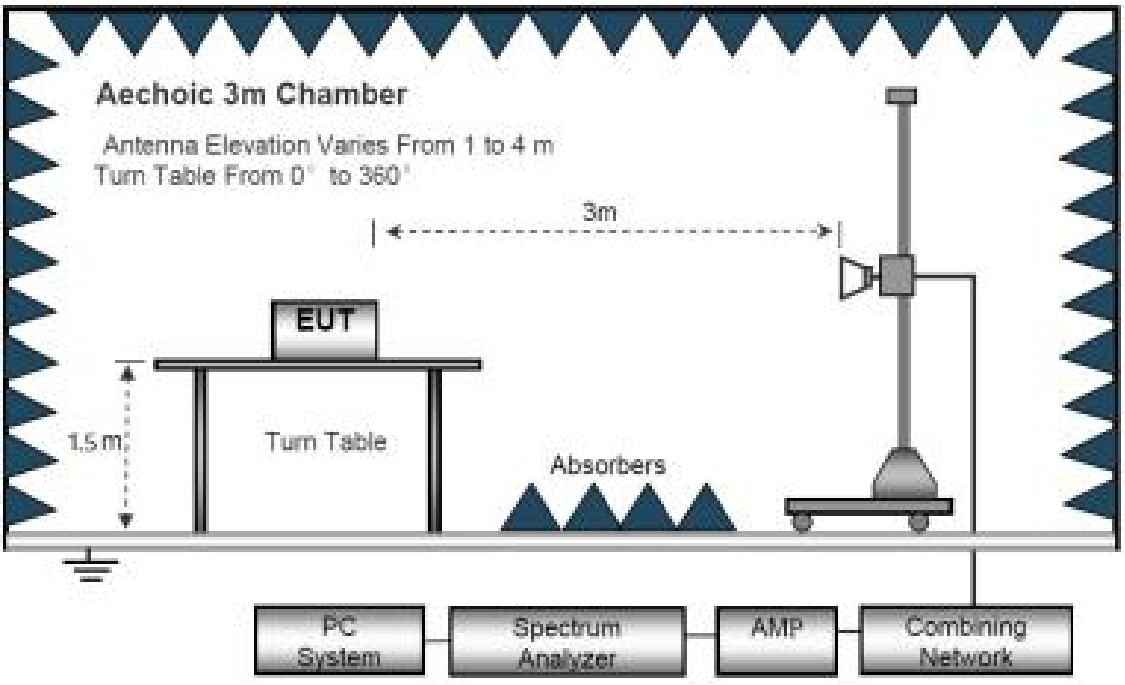
Refer to EN 300 328 V2.2.2 Clause 5.4.9.

9.4. Test Setup

Below 1GHz



Above 1GHz



9.5. Test Results

Below 1GHz

Test Mode: 802.11b mode-CH01			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
139.4521	-60.35	2.36	-57.99	-36	-21.99	peak	Horizontal
247.8541	-62.14	3.55	-58.59	-36	-22.59	peak	Horizontal
358.4163	-64.75	3.64	-61.11	-36	-25.11	peak	Horizontal
535.4126	-73.45	4.05	-69.40	-54	-15.40	peak	Horizontal
608.4125	-69.43	4.65	-64.78	-54	-10.78	peak	Horizontal
686.3524	-74.18	5.58	-68.60	-54	-14.60	peak	Horizontal
137.4952	-68.29	2.21	-66.08	-54	-12.08	peak	Vertical
241.5612	-63.49	3.55	-59.94	-36	-23.94	peak	Vertical
442.5163	-62.18	3.64	-58.54	-36	-22.54	peak	Vertical
543.1263	-70.19	4.05	-66.14	-54	-12.14	peak	Vertical
618.4962	-74.16	4.65	-69.51	-54	-15.51	peak	Vertical
686.4953	-72.51	5.58	-66.93	-54	-12.93	peak	Vertical

Test Mode: 802.11b mode-CH13			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
135.4216	-60.34	2.36	-57.98	-36	-21.98	peak	Horizontal
247.1854	-61.42	3.55	-57.87	-36	-21.87	peak	Horizontal
359.6342	-63.27	3.64	-59.63	-36	-23.63	peak	Horizontal
544.2639	-75.18	4.05	-71.13	-54	-17.13	peak	Horizontal
598.6341	-77.41	4.65	-72.76	-54	-18.76	peak	Horizontal
657.4123	-75.46	5.58	-69.88	-54	-15.88	peak	Horizontal
99.4635	-64.53	2.21	-62.32	-54	-8.32	peak	Vertical
243.6521	-62.51	3.55	-58.96	-36	-22.96	peak	Vertical
447.1536	-65.89	3.64	-62.25	-36	-26.25	peak	Vertical
538.6942	-79.36	4.05	-75.31	-54	-21.31	peak	Vertical
587.9683	-75.81	4.65	-71.16	-54	-17.16	peak	Vertical
645.3259	-74.24	5.58	-68.66	-54	-14.66	peak	Vertical

Note:
1. The emission behaviour belongs to narrowband spurious emission.
2. Calculation of result is: Result (dBm)= Reading (dBm)+ Correct Factor (dB).
3. Recored the worst data 802.11b mode for ANT B in report.

Above 1GHz

Test Mode: 802.11b mode-CH01			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
4824.365	-60.41	12.35	-48.06	-30	-18.06	peak	Horizontal
7236.415	-64.35	18.21	-46.14	-30	-16.14	peak	Horizontal
7649.365	-65.28	18.87	-46.41	-30	-16.41	peak	Horizontal
9648.784	-63.49	20.25	-43.24	-30	-13.24	peak	Horizontal
10457.896	-62.11	21.65	-40.46	-30	-10.46	peak	Horizontal
12546.362	-64.85	23.67	-41.18	-30	-11.18	peak	Horizontal
4824.196	-63.49	12.35	-51.14	-30	-21.14	peak	Vertical
7236.541	-65.32	18.21	-47.11	-30	-17.11	peak	Vertical
7849.635	-67.18	18.87	-48.31	-30	-18.31	peak	Vertical
9648.126	-64.59	20.25	-44.34	-30	-14.34	peak	Vertical
10528.436	-66.38	21.65	-44.73	-30	-14.73	peak	Vertical
12063.695	-68.27	23.67	-44.6	-30	-14.6	peak	Vertical

Test Mode: 802.11b mode-CH13			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
4944.653	-61.53	12.38	-49.15	-30	-19.15	peak	Horizontal
7416.385	-64.78	18.55	-46.23	-30	-16.23	peak	Horizontal
7849.526	-63.59	18.89	-44.7	-30	-14.7	peak	Horizontal
9888.374	-65.47	20.25	-45.22	-30	-15.22	peak	Horizontal
10536.748	-66.38	21.64	-44.74	-30	-14.74	peak	Horizontal
11865.362	-67.19	23.65	-43.54	-30	-13.54	peak	Horizontal
4944.856	-60.35	12.38	-47.97	-30	-17.97	peak	Vertical
7416.395	-64.71	18.55	-46.16	-30	-16.16	peak	Vertical
7749.263	-66.38	18.89	-47.49	-30	-17.49	peak	Vertical
9888.654	-67.18	20.25	-46.93	-30	-16.93	peak	Vertical
10356.362	-65.49	21.64	-43.85	-30	-13.85	peak	Vertical
11847.523	-67.19	23.65	-43.54	-30	-13.54	peak	Vertical

Note:
1. The emission behaviour belongs to narrowband spurious emission.
2. Calculation of result is: Result (dBm)= Reading (dBm)+ Correct Factor (dB).
3. Recored the worst data 802.11b mode for ANT B in report.

10. Receiver spurious emissions

10.1. Applied procedures / limit

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

Clause	Frequency range	Maximum power	Bandwidth
4.3.1.11.3	30MHz-1GHz	-57dBm	100kHz
	1GHz -12.75GHz	-47dBm	1MHz

10.2. Measuring Instruments and Setting

The following table is the setting of the Spectrum Analyzer.

The emissions over the range 30 MHz to 1 000 MHz shall be identified.

Spectrum Analyzer	Setting
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Detector Mode	Peak
Trace Mode	Max Hold
Filter type	3 dB (Gaussian)
RBW / VBW	100 kHz / 300 kHz
Sweep Points	≥ 19 400

The emissions over the range 1 GHz to 12.75 GHz shall be identified.

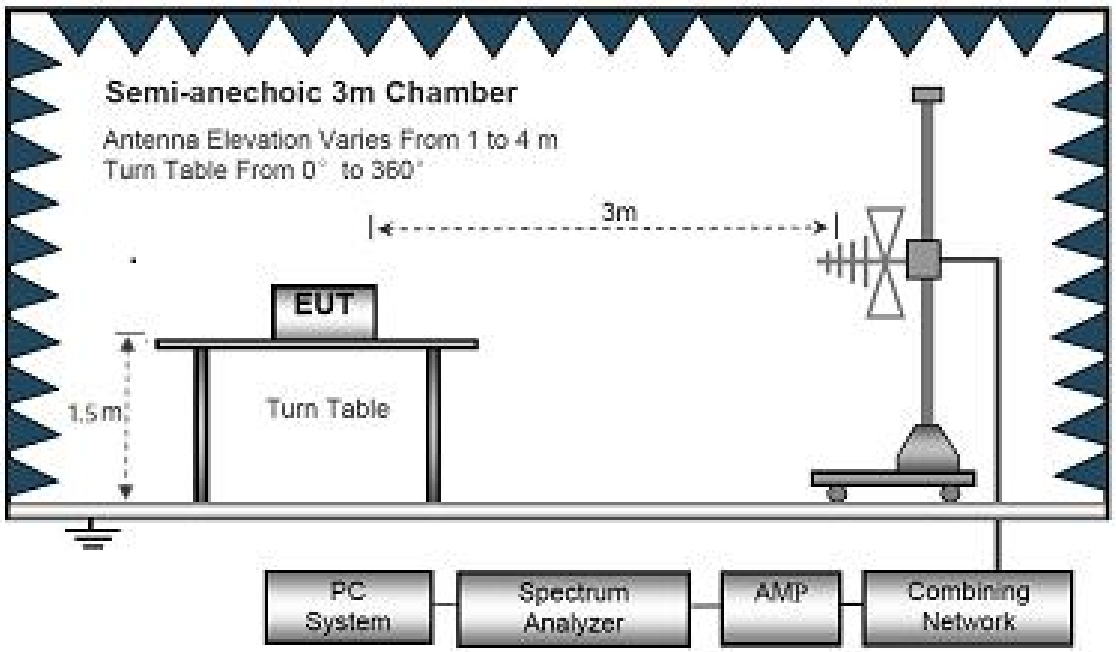
Spectrum Analyzer	Setting
Start Frequency	1 GHz
Stop Frequency	12.75 GHz
Detector Mode	Peak
Trace Mode	Max Hold
Filter type	3 dB (Gaussian)
RBW / VBW	1 MHz / 3 MHz
Sweep Points	≥ 23 500

10.3. Test Procedures

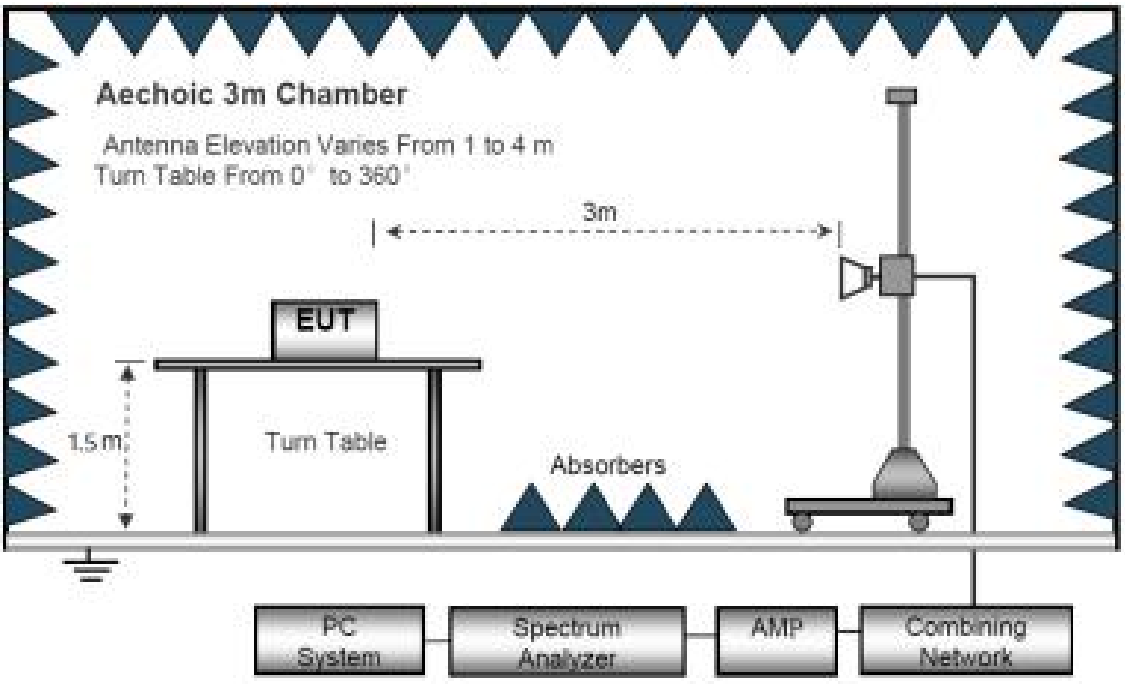
Refer to EN 300 328 V2.2.2 Clause 5.4.10.

10.4. Test Setup

Below 1GHz



Above 1GHz



10.5. Test Results

Below 1GHz

Test Mode: 802.11b mode-CH01			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
132.5986	-68.49	2.34	-66.15	-57	-9.15	peak	Horizontal
244.1563	-67.18	3.55	-63.63	-57	-6.63	peak	Horizontal
547.1826	-75.63	3.65	-71.98	-57	-14.98	peak	Horizontal
669.3521	-74.19	4.01	-70.18	-57	-13.18	peak	Horizontal
783.5974	-77.19	4.76	-72.43	-57	-15.43	peak	Horizontal
945.8263	-79.63	5.68	-73.95	-57	-16.95	peak	Horizontal
101.2546	-69.35	2.21	-67.14	-57	-10.14	peak	Vertical
248.6536	-68.47	3.56	-64.91	-57	-7.91	peak	Vertical
533.6241	-76.38	3.65	-72.73	-57	-15.73	peak	Vertical
667.4956	-75.96	4.01	-71.95	-57	-14.95	peak	Vertical
829.4163	-76.89	4.72	-72.17	-57	-15.17	peak	Vertical
894.2653	-77.19	5.62	-71.57	-57	-14.57	peak	Vertical

Test Mode: 802.11b mode-CH13			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
246.3524	-67.49	3.36	-64.13	-57	-7.13	peak	Horizontal
396.8453	-68.29	3.58	-64.71	-57	-7.71	peak	Horizontal
576.3625	-77.49	3.85	-73.64	-57	-16.64	peak	Horizontal
696.4125	-76.34	3.94	-72.4	-57	-15.4	peak	Horizontal
812.3652	-70.13	4.51	-65.62	-57	-8.62	peak	Horizontal
904.5362	-80.26	5.51	-74.75	-57	-17.75	peak	Horizontal
134.5625	-72.53	3.21	-69.32	-57	-12.32	peak	Vertical
246.2516	-70.39	3.52	-66.87	-57	-9.87	peak	Vertical
441.2536	-75.41	3.74	-71.67	-57	-14.67	peak	Vertical
547.1826	-77.49	3.84	-73.65	-57	-16.65	peak	Vertical
726.3594	-74.96	4.59	-70.37	-57	-13.37	peak	Vertical
881.2463	-78.23	5.58	-72.65	-57	-15.65	peak	Vertical

Note:
1. The emission behaviour belongs to narrowband spurious emission.
2. Calculation of result is: Result (dBm)= Reading (dBm)+ Correct Factor (dB).
3. Recored the worst data 802.11b mode for ANT B in report.

Above 1GHz

Test Mode: 802.11b mode-CH01			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
3247.635	-72.36	12.04	-60.32	-47	-13.32	peak	Horizontal
4685.635	-70.16	12.31	-57.85	-47	-10.85	peak	Horizontal
5741.635	-72.53	17.98	-54.55	-47	-7.55	peak	Horizontal
6693.254	-74.63	18.55	-56.08	-47	-9.08	peak	Horizontal
8253.142	-75.96	19.54	-56.42	-47	-9.42	peak	Horizontal
9736.562	-78.33	21.69	-56.64	-47	-9.64	peak	Horizontal
3856.636	-76.43	12.14	-64.29	-47	-17.29	peak	Vertical
4952.163	-73.19	12.33	-60.86	-47	-13.86	peak	Vertical
5963.745	-72.49	17.99	-54.5	-47	-7.5	peak	Vertical
6925.364	-77.19	18.67	-58.52	-47	-11.52	peak	Vertical
8416.356	-76.83	19.56	-57.27	-47	-10.27	peak	Vertical
9574.125	-75.49	21.58	-53.91	-47	-6.91	peak	Vertical

Test Mode: 802.11b mode-CH13			
Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14V/2A from adapter

Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Polarization
3645.635	-72.63	12.05	-60.58	-47	-13.58	peak	Horizontal
4863.256	-75.46	12.32	-63.14	-47	-16.14	peak	Horizontal
5814.263	-74.26	17.99	-56.27	-47	-9.27	peak	Horizontal
6674.532	-73.96	18.56	-55.4	-47	-8.4	peak	Horizontal
8246.351	-75.49	19.55	-55.94	-47	-8.94	peak	Horizontal
9785.415	-78.13	21.71	-56.42	-47	-9.42	peak	Horizontal
7863.524	-74.63	12.15	-62.48	-47	-15.48	peak	Vertical
4965.325	-75.36	12.34	-63.02	-47	-16.02	peak	Vertical
5871.463	-76.42	18.02	-58.4	-47	-11.4	peak	Vertical
6836.428	-77.19	18.68	-58.51	-47	-11.51	peak	Vertical
8634.521	-77.46	19.58	-57.88	-47	-10.88	peak	Vertical
9624.536	-75.36	21.62	-53.74	-47	-6.74	peak	Vertical

Note:
1. The emission behaviour belongs to narrowband spurious emission.
2. Calculation of result is: Result (dBm)= Reading (dBm)+ Correct Factor (dB).
3. Recored the worst data 802.11b mode for ANT B in report.

11. Test Photograph

Spurious Emission Test

Spurious Emission Test (Horn)

12. EUT Constructional Details

Reference to the test report No. TR21120148-E-004.

*** the end of report ***