



RADIO TEST REPORT

ETSI EN 300 328 V1.8.1

MEASUREMENT AND TEST REPORT

Model:

Feb. 05, 2015

This Report Concerns: ☒ Original Report	Equipment Type: 802.11b/g/n Long Range Wireless LAN Router
Test Engineer:	<i>Bin Jiang</i>
Report Number:	POCE15013061LRF
Test Date:	Jan. Feb. 02, 2015 to Feb. 05, 2015
Reviewed By:	<i>Michael</i>
Prepared By:	Shenzhen POCE Technology Co., Ltd. H Building, Hongfa Science and Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, China Tel: 86-755-2911 3252 Fax: 86-755-2911 3135

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen POCE Technology Co., Ltd.

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1. Summary Of Test Results

EMISSION				
Results Summary				
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result
RF output power	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.1	PASS
Power Spectral Density (Modulations other than FHSS equipment)	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.2	PASS
Adaptivity (Adaptive equipment)	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.5	PASS
Occupied Channel Bandwidth	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.6	PASS
Transmitter unwanted emissions in the out-of-band domain	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.7	PASS
Transmitter spurious emission	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.8	PASS
Receiver spurious emission	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.9	PASS
Receiver Blocking (Only for adaptive equipment)	ETSI EN 300 328 V1.8.1 (2012-06)	ETSI EN 300 328 V1.8.1 (2012-06)	Clause 4.3.2.10	PASS

1.1 Test Facility

Shenzhen POCE Technology Co., Ltd.

Add. : H Building, Hongfa Science and Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, China

FCC Registered No.: 222278

1.2 Measurement Uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$

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

Equipment	802.11b/g/n Long Range Wireless LAN Router	
Model Name		
OEM Brand/Model Name		
Model Difference	All the models are identical except the model name.	
Product Description	The EUT is a Wireless Router	
	Operation Frequency:	802.11b/g/n: 2412~2472 MHz
	Modulation Type:	CCK/OFDM/DBPSK/DQPSK/QPSK /BPSK
	Number Of Channel	13 CH, Please see Note 2.
	Antenna Designation:	Internal Antenna
	Antenna Gain(Peak)	0dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Power Source	AC 230V/50Hz	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	N/A	

Note:

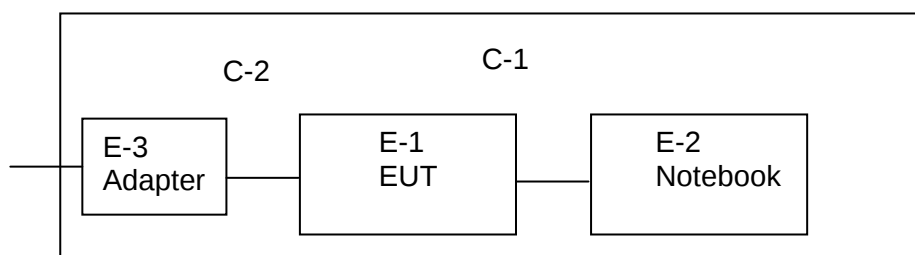
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

Channel List for 802.11b/g/n							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452	13	2472

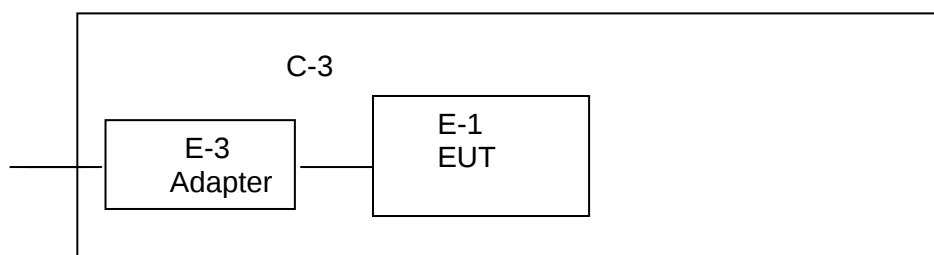
2.2 Description Of Test Conditions

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

Radiated:



Conduction:



2.2.1 Test Conditions and Channel

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	0°C ~ 35°C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	AC 230V	AC 253V, AC 207V

Pretest Mode	Description
Mode 1	802.11b CH1/ CH7/ CH13
Mode 2	802.11g CH1/ CH7/ CH13
Mode 3	802.11n20 CH1/ CH7/ CH13
Mode 4	802.11n40 CH3/ CH7/ CH11

Note:

- (1) For tests at extreme temperatures, measurements shall be made in accordance with the procedures specified in clause 5.3.4.3, at the upper and lower temperatures of the range as follow: temperature: -20°C to +55°C;

Where the manufacture's stated operating range does not include the range of -20°C to +55°C, the equipment shall be tested over the following temperature ranges:

- a) 0°C to +35°C for equipment intended for indoor use only, or intended for use in areas where the temperature is controlled within this range;
 - b) over the extremes of the operating temperature range(s) of the stated combination(s) or host equipment(s) in case of plug-in radio devices.
- (2) For the Leclanché or lithium type battery: 0.85 times the nominal voltage of the battery; for the mercury or nickel-cadmium type of battery: 0.9 times the nominal voltage of the battery. In both cases, the upper extreme test voltage shall be 1.15 times the nominal voltage of the battery.
- (3) The measurements are performed at the highest, middle, lowest available channels.

2.3 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	802.11b/g/n Long Range Wireless LAN Router		AIP	N/A	EUT

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.

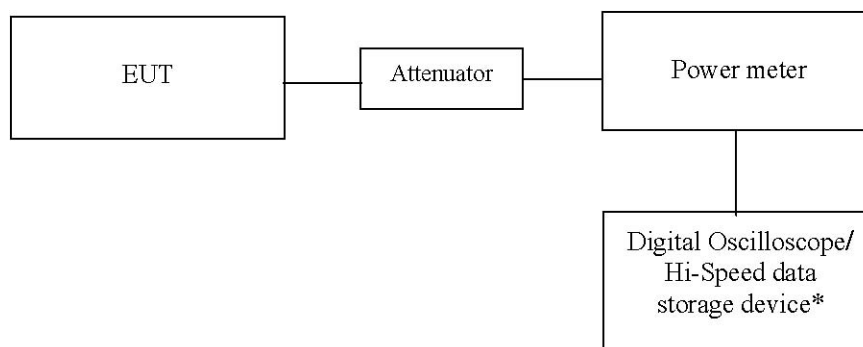
2.4 Equipments List For All Test Items

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	Calibrated until
EMD036	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100388	Nov. 19, 2015
EMD061	BICONILOG ANTENNA	ETS.LINDGREN	3142C	00060439	Nov. 19, 2015
EMD062	DOUBLE-RIDGED WAVEGUIDE	ETS.LINDGREN	3117	00075933	Nov. 19, 2015
EMD102	INTELLIGENT FREQUENCY	AINUO LNSTRUMENT CO., LTD	AN97005 SS	79707454	N/A
EMD072	TV-MESSENDER .TV TEST TRANSMITTER	ROHDE & SCHWARZ	SFQ	100528	Mar. 20, 2015
EMD137	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMB100A	1406 600K02 -104532-DF	May 13, 2015
EMD141	SIGNAL ANALYZER	AGILENT TECHNOLOGIES	MXA N9020A	MY46472144	Mar. 13, 2015
EMD143	POWER SENSOR	AGILENT TECHNOLOGIES	U2022XA	MY53470002	Mar. 13, 2015
EMD212	SPLITTER/ COMBINER	PULSAR	PS2-F50-450/6S	542	Nov. 19, 2015
EMD213	SPLITTER/ COMBINER	PULSAR	PS2-F50-450/6S	534	May 25, 2015
EMD214	SPLITTER/ COMBINER	PULSAR	PS2-F50-450/6S	622	Nov. 29, 2015
EMD215	ATTENUATOR	NARDA	745	69	Dec. 16, 2015

3. Test Results

3.1.1 RF output power

Test Setup



Digital Oscilloscope/ Hi-Speed data storage device would be connected to power meter if measuring time is >1s

Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.2

Nominal transmit frequency: 2412MHz (802.11b)

Nominal transmit frequency: 2.412GHz (602.115)					
Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	13.52	0	13.52	100	20
0°C, AC 253V	13.64		13.64	100	20
35°C, AC 207V	13.81		13.81	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2442MHz (802.11b)

Nominal transmit frequency: 2.412 GHz (5000 Hz)					
Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	13.26	0	13.26	100	20
0°C, AC 253V	13.58		13.58	100	20
35°C, AC 207V	13.49		13.49	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2472MHz (802.11b)

Nominal transmit frequency: 2.452112 (500.112)					
Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	13.62	0	13.62	100	20
0°C, AC 253V	13.67		13.67	100	20
35°C, AC 207V	13.54		13.54	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2412MHz (802.11g)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	13.84	0	13.84	100	20
0°C, AC 253V	13.82		13.82	100	20
35°C, AC 207V	13.91		13.91	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2442MHz (802.11g)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	13.75	0	13.75	100	20
0°C, AC 253V	13.86		13.86	100	20
35°C, AC 207V	13.95		13.95	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2472MHz (802.11g)

Nominal transmit frequency: 2.45GHz (6027.5)					
Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.02	0	14.02	100	20
0°C, AC 253V	13.98		13.98	100	20
35°C, AC 207V	14.11		14.11	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2412MHz (802.11n20)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.37	0	14.37	100	20
0°C, AC 253V	14.41		14.41	100	20
35°C, AC 207V	14.39		14.39	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2442MHz (802.11n20)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.24	0	14.24	100	20
0°C, AC 253V	14.59		14.59	100	20
35°C, AC 207V	14.67		14.67	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2472MHz (802.11n20)

Nominal transmit frequency: 2.45 GHz (6027 MHz)					
Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.11	0	14.11	100	20
0°C, AC 253V	14.59		14.59	100	20
35°C, AC 207V	14.09		14.09	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2422MHz (802.11n40)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.02	0	14.02	100	20
0°C, AC 253V	14.11		14.11	100	20
35°C, AC 207V	14.21		14.21	100	20
Measurement uncertainty: ±1.0dB					

Nominal transmit frequency: 2442MHz (802.11n40)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.00	0	14.00	100	20
0°C, AC 253V	14.13		14.13	100	20
35°C, AC 207V	14.25		14.25	100	20
Measurement uncertainty: ±1.0dB					

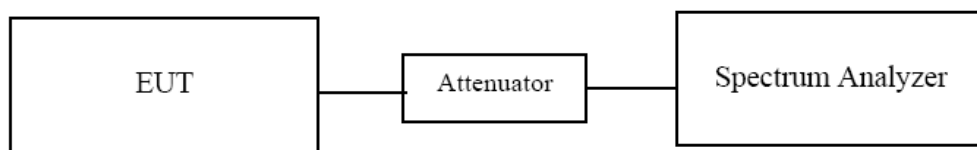
Nominal transmit frequency: 2462MHz (802.11n40)

Test Condition	Result (dBm)	Antenna Gain (dB)	EIRP (dBm)	Limit (mW)	Limit (dBm)
20°C, AC 230V	14.19	0	14.19	100	20
0°C, AC 253V	14.24		14.24	100	20
35°C, AC 207V	14.29		14.29	100	20
Measurement uncertainty: ±1.0dB					

Remarks: The listed results were the calculated highest RMS value of the measurement of all Pburst at each carrier frequency, details of the Pburst were shown in Appendix C.
The EIRP value were the summation of the calculated RMS value + Antenna Gain

3.1.2 Power Spectral Density

Test Setup



Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.3

Setting of Spectrum Analyzer

Start Frequency	Stop Frequency	RBW	VBW	Sweep points	Detector
2400MHz	2483.5 MHz	10kHz	30kHz	8351	RMS

Maximum e.i.r.p. spectral density(802.11 b)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (dBm/MHz) (EIRP)	LIMIT (dBm/MHz) (EIRP)	PASS/FAIL
1	2412	5.21	10	PASS
7	2442	5.32	10	PASS
13	2472	5.44	10	PASS

Maximum e.i.r.p. spectral density(802.11 g)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (dBm/MHz) (EIRP)	LIMIT (dBm/MHz) (EIRP)	PASS/FAIL
1	2412	4.26	10	PASS
7	2442	4.59	10	PASS
13	2472	4.41	10	PASS

Maximum e.i.r.p. spectral density(802.11 n20)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (dBm/MHz) (EIRP)	(dBm/MHz) (EIRP)	PASS/FAIL
1	2412	3.25	10	PASS
7	2442	3.28	10	PASS
13	2472	3.31	10	PASS

Maximum e.i.r.p. spectral density(802.11 n40)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (dBm/MHz) (EIRP)	(dBm/MHz) (EIRP)	PASS/FAIL
3	2422	3.29	10	PASS
7	2442	3.38	10	PASS
11	2462	3.05	10	PASS

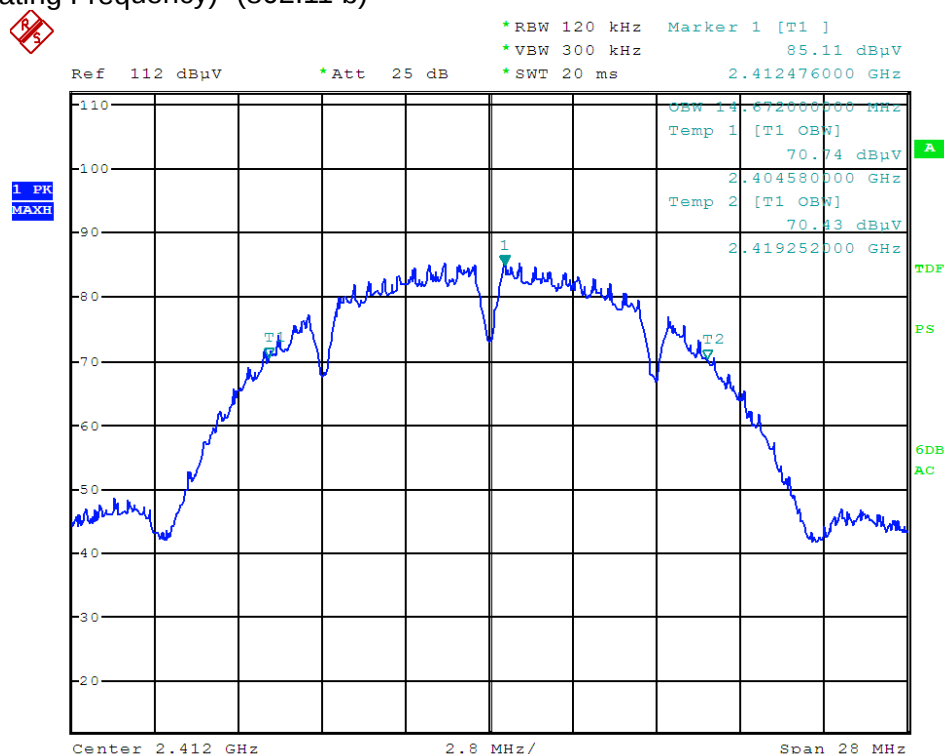
Measurement uncertainty = ± 1.0 dB

3.1.3 Occupied Channel Bandwidth

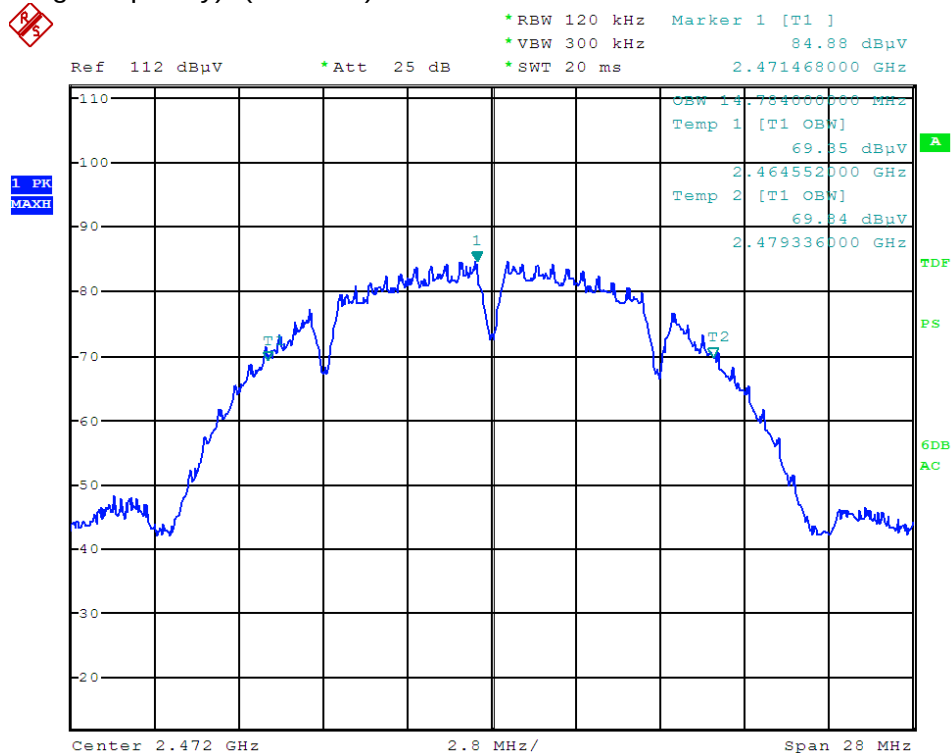
The Occupied Channel Bandwidth is the bandwidth that contains 99 % of the power of the signal. The Occupied Channel Bandwidth shall fall completely within the band given in clause 1. In addition, for non-adaptive systems using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2412	14.672
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz.	

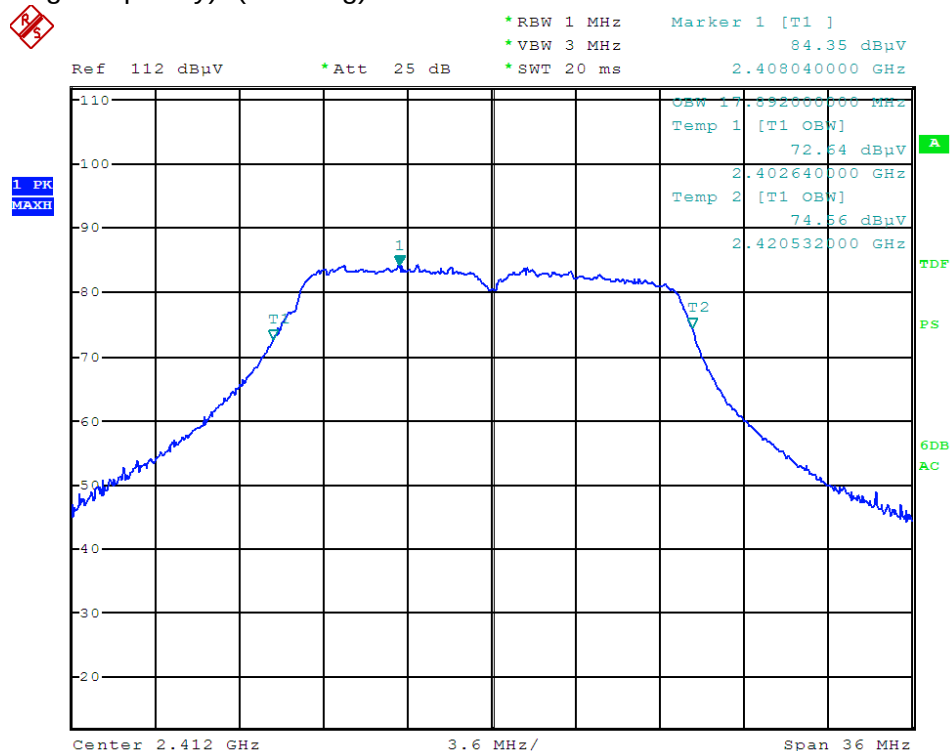
(Lowest Operating Frequency)- (802.11 b)



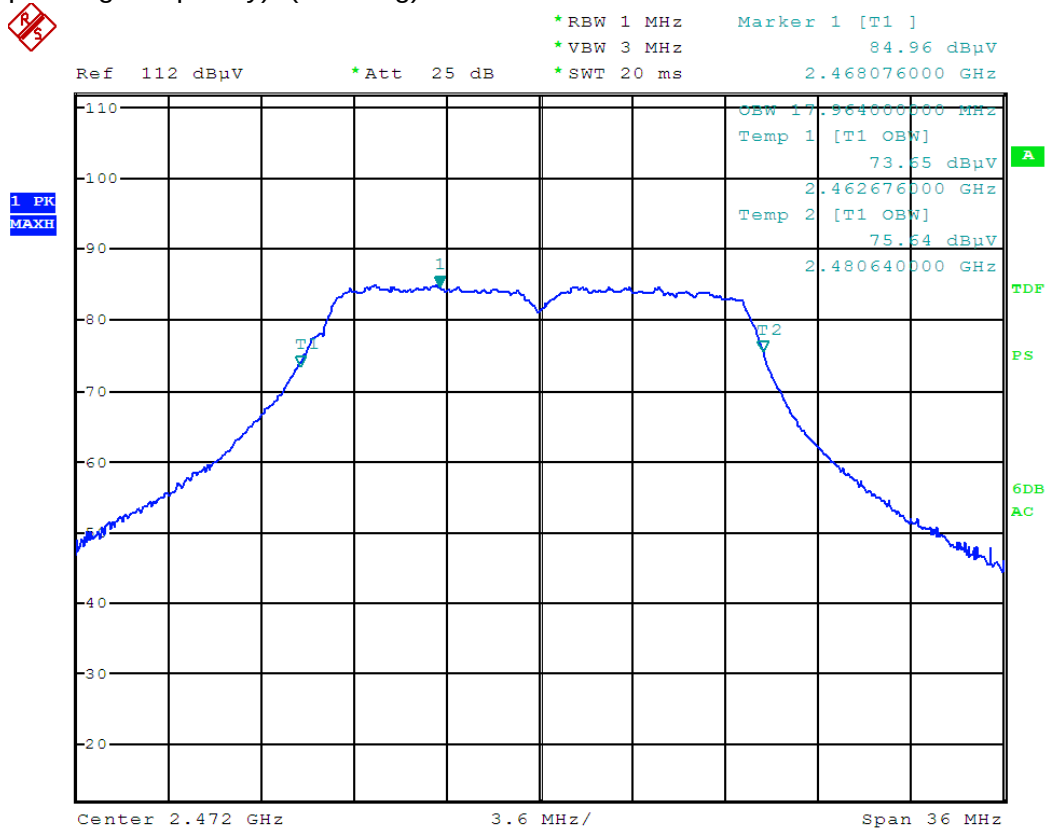
Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2472	14.784
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz.	
(Highest Operating Frequency)- (802.11 b)	



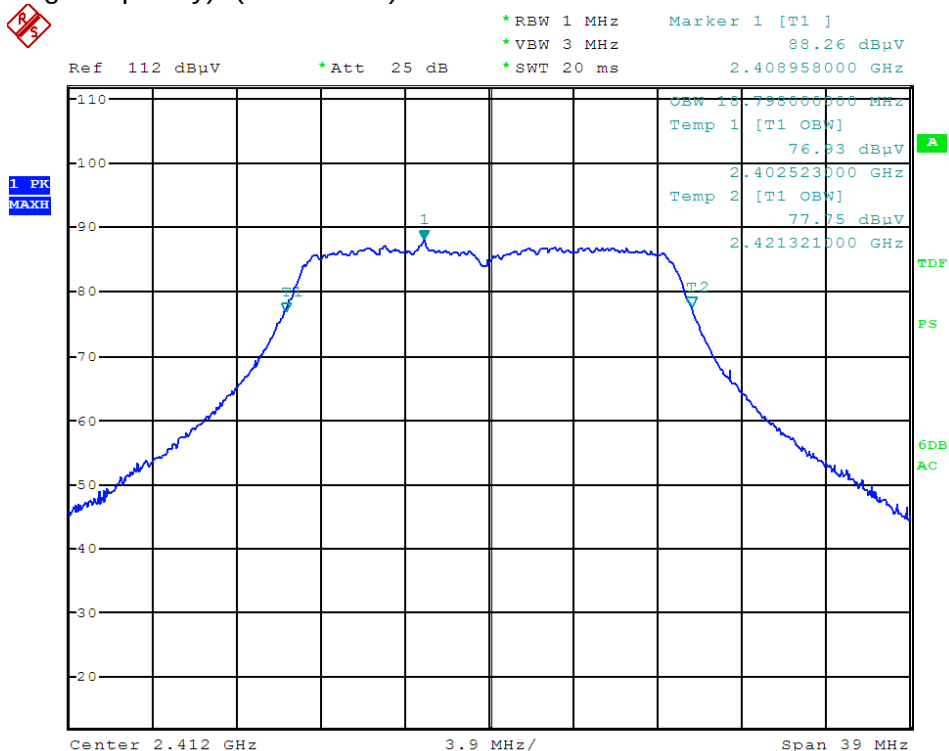
Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2412	17.892
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz.	
(Lowest Operating Frequency)- (802.11 g)	



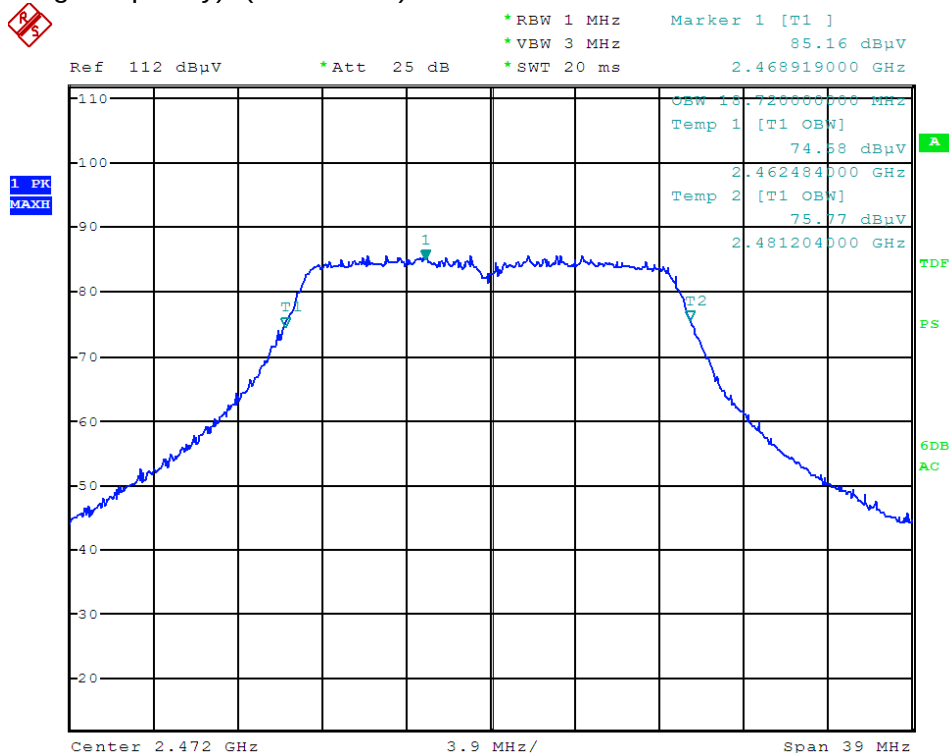
Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2472	17.964
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz. (Highest Operating Frequency)- (802.11 g)	



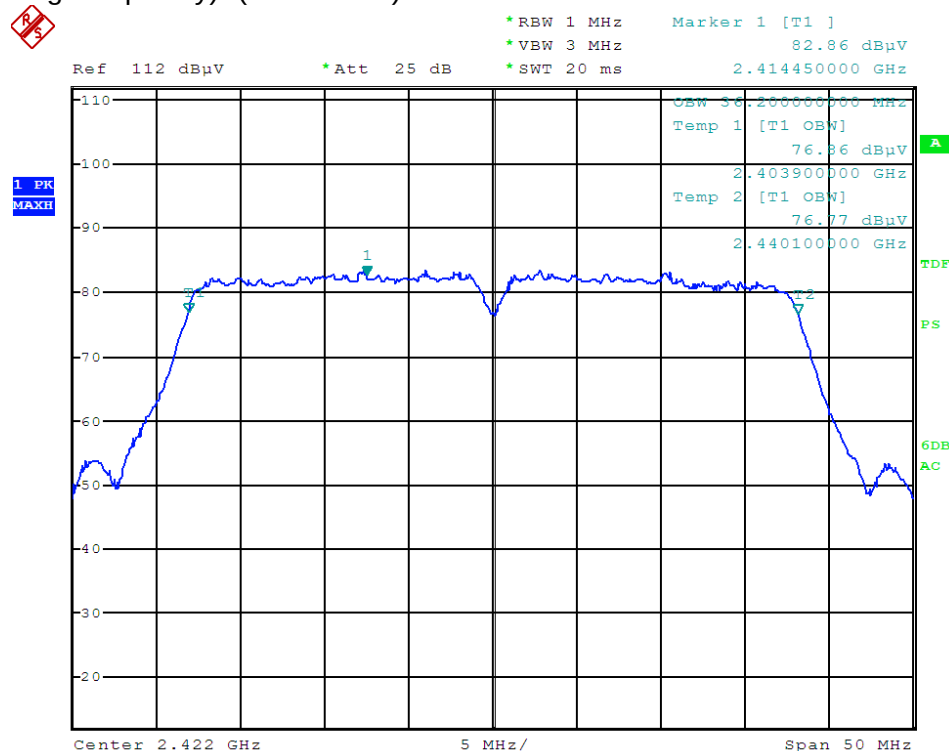
Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2412	18.798
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz. (Lowest Operating Frequency)- (802.11 n20)	



Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2472	18.720
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz. (Highest Operating Frequency)- (802.11 n20)	

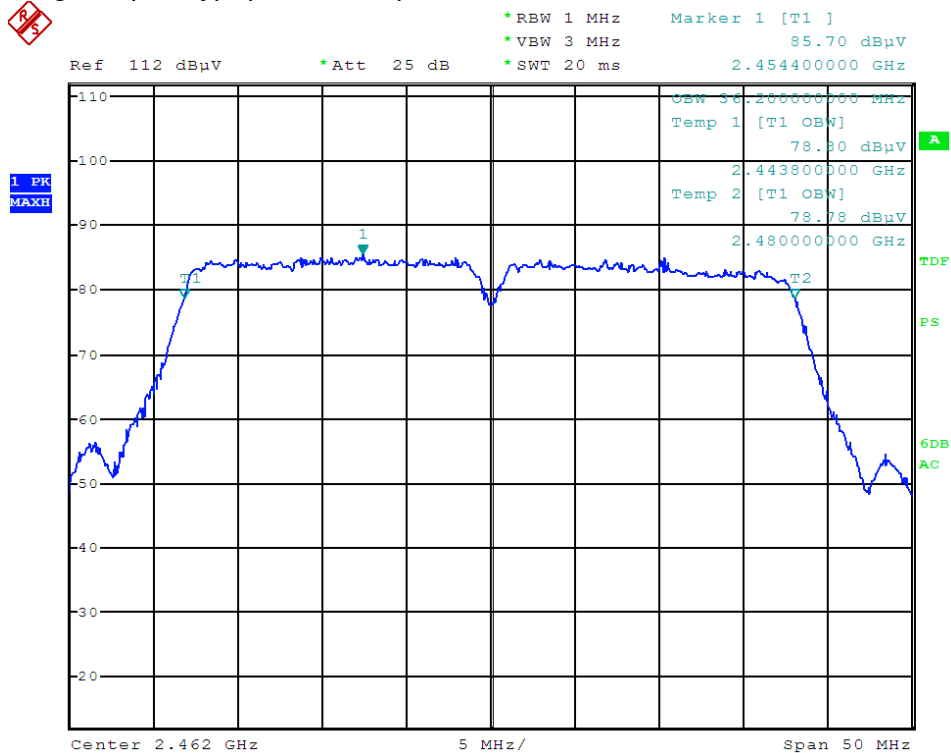


Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2422	36.200
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz. (Lowest Operating Frequency)- (802.11 n40)	



Fundamental Frequency	99% Bandwidth [MHz] [MHz]
2462	36.200
All types of equipment : Shall fall completely within the band 2400 to 2483.5 MHz.	

(Highest Operating Frequency)- (802.11 n40)



3.1.4 Transmitter unwanted emissions in the out-of-band domain

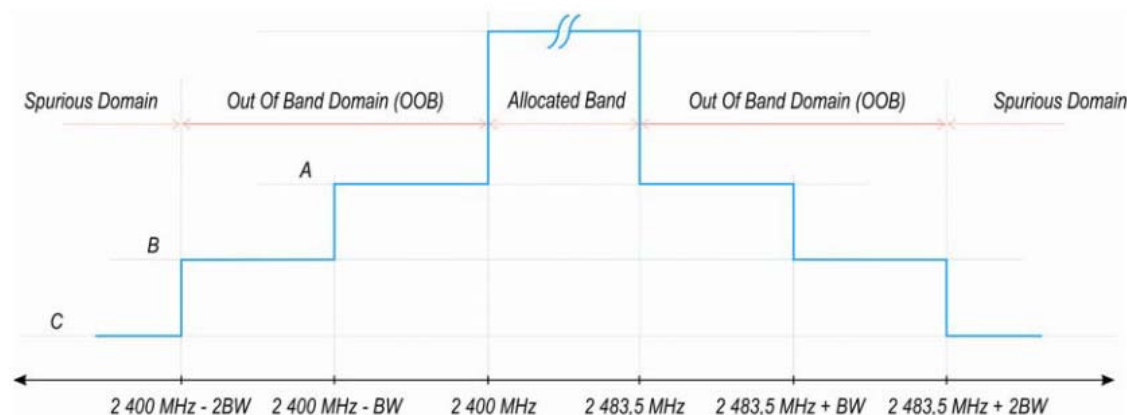
Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious.

Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.9

Limit:

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values.



BW = Occupied Channel Bandwidth in MHz or 1MHz whichever is greater

A: -10dBm/MHz e.i.r.p

B: -20dBm/MHz e.i.r.p

C: Spurious Domain Limits

802.11b

CHANNEL FREQUENCY		2412MHz		2472MHz	
TEST CONDITION		OOB EMISSION		OOB EMISSION	
		2400-BW MHz ~ 2400 MHz	2400-2BWMHz ~ 2400-BW MHz	2483.5+BW MHz ~ 2483.5 MHz	2483.5+2BW MHz ~ 2483.5+BW MHz
		MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)
Tnom20°C	Vnom(v)	-18.42	-41.53	-28.52	-41.62
Tmin 0°C	Vmin(v)	-18.41	-41.44	-28.37	-41.46
	Vmax(v)	-18.47	-41.57	-28.64	-41.64
	Vnom(v)	-18.53	-41.82	-28.27	-41.56
Tmax 35°C	Vmin(v)	-18.46	-41.46	-28.46	-41.62
	Vmax(v)	-18.42	-41.82	-28.63	-41.56
	Vnom(v)	-18.36	-41.66	-28.57	-41.52
Limit (dBm/MHz)		-10.00	-20.00	-10.00	-20.00
PASS/FAIL		PASS	PASS	PASS	PASS

802.11g

CHANNEL FREQUENCY		2412MHz		2472MHz	
TEST CONDITION		OOB EMISSION		OOB EMISSION	
		2400-BW MHz ~ 2400 MHz	2400-2BWMHz ~ 2400-BW MHz	2483.5+BW MHz ~ 2483.5 MHz	2483.5+2BW MHz ~ 2483.5+BW MHz
		MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)
Tnom20℃	Vnom(v)	-17.15	-41.63	-29.56	-41.96
Tmin 0℃	Vmin(v)	-17.53	-41.47	-29.76	-41.76
	Vmax(v)	-17.57	-41.47	-29.44	-41.83
	Vnom(v)	-17.74	-41.63	-29.06	-41.68
Tmax 35℃	Vmin(v)	-17.59	-41.85	-29.23	-41.55
	Vmax(v)	-17.51	-41.66	-29.16	-41.93
	Vnom(v)	-17.55	-41.73	-29.34	-41.01
Limit (dBm/MHz)		-10.00	-20.00	-10.00	-20.00
PASS/FAIL		PASS	PASS	PASS	PASS

802.11n20

CHANNEL FREQUENCY		2412MHz		2472MHz	
TEST CONDITION		OOB EMISSION		OOB EMISSION	
		2400-BW MHz ~ 2400 MHz	2400-2BWMHz ~ 2400-BW MHz	2483.5+BW MHz ~ 2483.5 MHz	2483.5+2BW MHz ~ 2483.5+BW MHz
		MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)
Tnom20℃	Vnom(v)	-19.29	-41.65	-31.51	-41.92
Tmin 0℃	Vmin(v)	-19.35	-41.43	-31.45	-42.03
	Vmax(v)	-19.23	-41.45	-31.07	-42.16
	Vnom(v)	-19.45	-41.67	-31.14	-41.95
Tmax 35℃	Vmin(v)	-19.36	-41.82	-31.16	-41.84
	Vmax(v)	-19.59	-41.65	-31.84	-42.33
	Vnom(v)	-19.55	-41.76	-31.65	-42.27
Limit (dBm/MHz)		-10.00	-20.00	-10.00	-20.00
PASS/FAIL		PASS	PASS	PASS	PASS

802.11n40

CHANNEL FREQUENCY		2422MHz		2462MHz	
TEST CONDITION		OOB EMISSION		OOB EMISSION	
		2400-BW MHz ~ 2400 MHz	2400-2BWMHz ~ 2400-BW MHz	2483.5+BW MHz ~ 2483.5 MHz	2483.5+2BW MHz ~ 2483.5+BW MHz
		MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)	MAX. POWER (dBm/MHz)
Tnom20℃	Vnom(v)	-19.25	-41.64	-31.56	-41.96
Tmin 0℃	Vmin(v)	-19.33	-41.46	-31.43	-42.04
	Vmax(v)	-19.27	-41.40	-31.05	-42.13
	Vnom(v)	-19.43	-41.65	-31.11	-41.91
Tmax 35℃	Vmin(v)	-19.36	-41.81	-31.14	-41.85
	Vmax(v)	-19.57	-41.64	-31.85	-42.37
	Vnom(v)	-19.56	-41.75	-31.67	-42.25
Limit (dBm/MHz)		-10.00	-20.00	-10.00	-20.00
PASS/FAIL		PASS	PASS	PASS	PASS

3.1.5 Transmitter spurious emissions (30MHz to 12.75GHz)

Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.10

Nominal transmit frequency: 2412MHz (802.11b)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4824.0	1	-37.32						
7236.0	1	-40.35						
9648.0	1	-40.52						
12060.0	1	<-45.00						
Measurement uncertainty					±5.3 dB (substituted)			

Nominal transmit frequency: 2442MHz (802.11b)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4884.0	1	-38.57						
7326.0	1	-39.63						
9768.0	1	-40.58						
12210.0	1	<-45.00						

Nominal transmit frequency: 2472MHz (802.11b)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4944.0	1	-38.76						
7416.0	1	-39.58						
9888.0	1	-40.18						
12360.0	1	<-45.00						

Nominal transmit frequency: 2412MHz (802.11g)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4824.0	1	-37.69						
7236.0	1	-40.06						
9648.0	1	-40.26						
12060.0	1	<-45.00						
Measurement uncertainty					±5.3 dB (substituted)			

Nominal transmit frequency: 2442MHz (802.11g)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4884.0	1	-38.68						
7326.0	1	-39.74						
9768.0	1	-40.16						
12210.0	1	<-45.00						

Nominal transmit frequency: 2472MHz (802.11g)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4944.0	1	-38.58						
7416.0	1	-39.63						
9888.0	1	-40.69						
12360.0	1	<-45.00						

Nominal transmit frequency: 2412MHz (802.11n20)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4824.0	1	-37.63						
7236.0	1	-40.68						
9648.0	1	-40.63						
12060.0	1	<-45.00						
Measurement uncertainty					±5.3 dB (substituted)			

Nominal transmit frequency: 2442MHz (802.11n20)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4884.0	1	-38.13						
7326.0	1	-39.25						
9768.0	1	-40.85						
12210.0	1	<-45.00						

Nominal transmit frequency: 2472MHz (802.11n20)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4944.0	1	-38.63						
7416.0	1	-39.46						
9888.0	1	-40.59						
12360.0	1	<-45.00						

Nominal transmit frequency: 2422MHz (802.11n40)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4844.0	1	-37.11						
7266.0	1	-40.65						
9688.0	1	-40.27						
12110.0	1	<-45.00						
Measurement uncertainty					±5.3 dB (substituted)			

Nominal transmit frequency: 2442MHz (802.11n40)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4884.0	1	-38.75						
7326.0	1	-39.46						
9768.0	1	-40.09						
12210.0	1	<-45.00						

Nominal transmit frequency: 2462MHz (802.11n40)

Transmitter operating, transmitter modulated

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (MHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
4924.0	1	-38.53						
7386.0	1	-39.57						
9848.0	1	-40.24						
12310.0	1	<-45.00						

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver
 LIMIT Transmitter limits for spurious emissions

Frequency Range	Maximum Power Limit (e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz))	Bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87,5 MHz	-36dBm	100kHz
87,5 MHz to 118 MHz	-54dBm	100kHz
118 MHz to 174 MHz	-36dBm	100kHz
174 MHz to 230 MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 862 MHz	-54dBm	100kHz
862 MHz to 1 GHz	-36dBm	100kHz
1GHz ~ 12.75GHz	-30dBm	1MHz

3.1.6 Receiver spurious emissions (30MHz to 12.75GHz)

Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.9

Nominal transmit frequency: 2412-2472MHz (802.11b)

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (kHz)	Level (dBm/Hz)	F(MHz)	Band-Width (kHz)	Level (dBm/Hz)	F(MHz)	Band-Width (kHz)	Level (dBm/Hz)
		Emissions detected are more than 20dB below the limit line.						
Measurement uncertainty				±5.3 dB (substituted)				

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

LIMIT spurious emission limits for receivers

Frequency range	Limit
30MHz to 1GHz	-57dBm
1GHz to12.75GHz	-47dBm

Nominal transmit frequency: 2412-2472MHz (802.11g)

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
		Emissions detected are more than 20dB below the limit line.						
Measurement uncertainty				±5.3 dB (substituted)				

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

LIMIT spurious emission limits for receivers

Frequency range	Limit
30MHz to 1GHz	-57dBm
1GHz to 12.75GHz	-47dBm

Nominal transmit frequency: 2412-2472MHz (802.11n20)

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
		Emissions detected are more than 20dB below the limit line.						
Measurement uncertainty				±5.3 dB (substituted)				

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

LIMIT spurious emission limits for receivers

Frequency range	Limit
30MHz to 1GHz	-57dBm
1GHz to 12.75GHz	-47dBm

Nominal transmit frequency: 2422-2462MHz (802.11n40)

SPURIOUS EMISSIONS LEVEL Single frequency								
F (MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)	F(MHz)	Band-Width (kHz)	Level (dBm)
		Emissions detected are more than 20dB below the limit line.						
Measurement uncertainty				±5.3 dB (substituted)				

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

LIMIT spurious emission limits for receivers

Frequency range	Limit
30MHz to 1GHz	-57dBm
1GHz to 12.75GHz	-47dBm

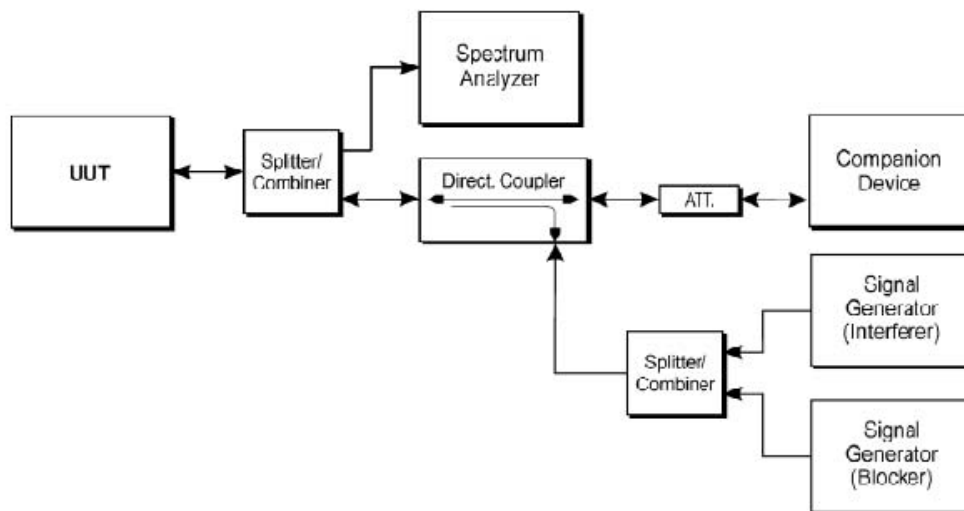
3.1.7 Adaptivity and Receiver Blocking

Definition

This requirement does not apply to non-adaptive equipment or adaptive equipment operating in a nonadaptive mode providing the equipment complies with the requirements and/or restrictions applicable to non-adaptive equipment. In addition, this requirement does not apply for equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.

Receiver blocking is a measure of the capability of the adaptivity mechanism to operate as intended (see clause 4.3.2.5) in the presence of an unwanted signal (blocking signal) on frequencies other than those of the operating channel and the adjacent channels.

Test Setup



Test Procedure

Refer to ETSI EN 300 328 V1.8.1 Clause 5.3.7

Limit

Requirement	Adaptive Mode			
	Non-LBT based Detect and Avoid	LBT based Detect and Avoid		
		Frame Based Equipment	Load Based Equipment (CCA using 'energy detect')	Load Based Equipment (CCA not using any of the mechanisms referenced as note 2)
Minimum remain unavailable time	1 s	N/A	N/A	N/A
Minimum Clear Channel Assessment (CCA) Time	N/A	20 us (see note 1)	(see note 2)	> 20 us (see note 1)
Maximum Channel Occupancy (COT) Time	40 ms	1 ms to 10 ms	(see note 2)	< (13/32)*q ms (see note 3)
Maximum Idle Period	100 us	5% of COT	(see note 2)	CCA to (CCA x q)
Minimum Idle Period	100 us	5% of COT	(see note 2)	CCA to (CCA x q)
Detection threshold level	= -70 dBm/MHz + 20 – Pout e.i.r.p. (Pout in dBm)			
Short Control Signalling Transmissions	Maximum duty cycle of 10 % within an observation period of 50 ms (see note 5)			
Receiver Blocking	Maximum duty cycle of 10 % within an observation period of 50 ms			
Note 1: The CCA time used by the equipment shall be declared by the supplier. Note 2: Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using energy detect, as described in IEEE Std. 802.11™-2007clauses 9, 15, 18 or 19, in IEEE Std. 802.11n™-2009, clauses 9, 11 and 20 or in IEEE Std. 802.15.4™-2011, clauses 4 and 5. Note 3: q is selected by the manufacturer in the range [4...32] Note 4: The value of R shall be randomly selected in the range [1..q] Note 5: Adaptive equipment may or may not have Short Control Signaling Transmissions.				

Remarks:

The EUT was set to the supported lowest data rate in each standard (802.11b/g/n) during test and the Duty cycle of the RF transmission EUT was set up to 50%, to help achieve a sufficiently high payload for the measurement.

Test Result:

EUT Adaptive mode: LBT based Detect and Avoid (Load Based Equipment)

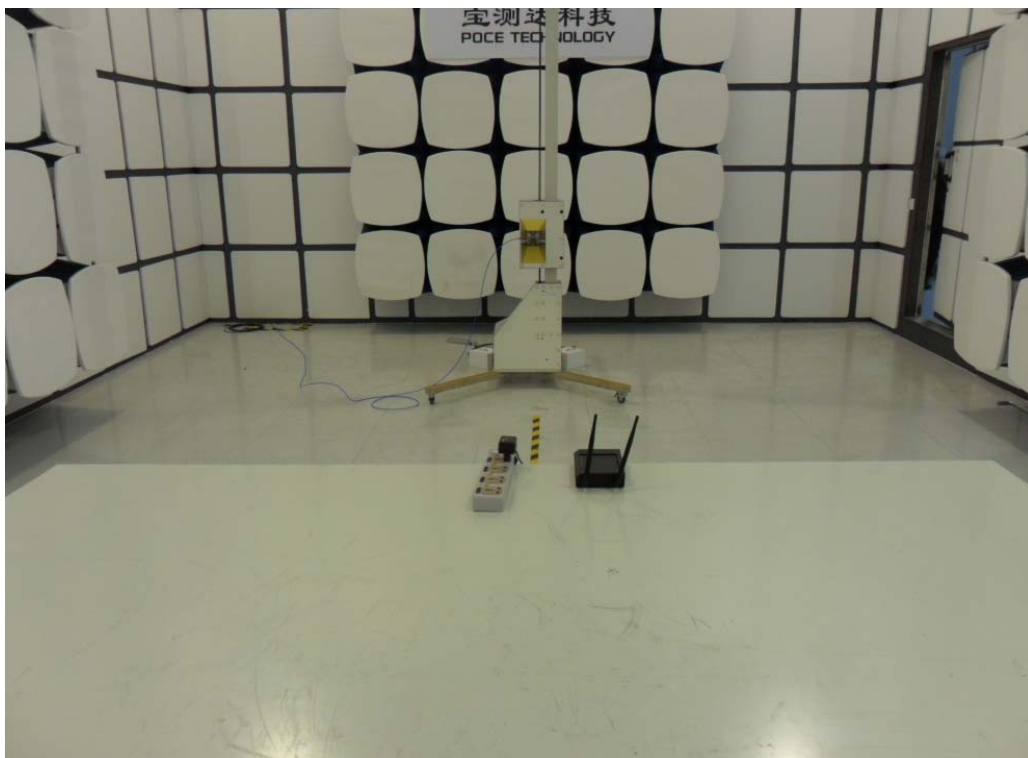
Requirement	Test mode: 802.11 b		
	Lowest frequency channel 2412 MHz	Highest frequency channel 2472 MHz	Limit
CCA Time (ms)	0.378	0.378	> 20 us
q factor	32	32	4 -32 Declare by manufacturer
Maximum Channel Occupancy Time (ms)	8.555	8.563	$(13/32) \times q$
Maximum idle period (ms)	9.572	9.366	CCA to $(CCA \times q)$ (0.575ms to 18.4ms)
Minimum idle period (ms)	0.4026	0.5631	CCA to $(CCA \times q)$ (0.575ms to 18.4ms)
CCA threshold level (dBm)	-66.016	-67.258	$= -70 \text{ dBm/MHz} + 20 - \text{Pout e.i.r.p.}$ (Pout in dBm)
Short Control Signaling Transmissions (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms
Receiver Blocking (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms

Requirement	Test mode: 802.11 g		
	Lowest frequency channel 2412 MHz	Highest frequency channel 2472 MHz	Limit
CCA Time (ms)	0.177	0.177	> 20 us
q factor	32	32	4 -32 Declare by manufacturer
Maximum Channel Occupancy Time (ms)	1.423	1.423	$(13/32) \times q$
Maximum idle period (ms)	2.782	2.235	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
Minimum idle period (ms)	0.251	0.254	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
CCA threshold level (dBm)	-66.657	-67.482	$= -70 \text{ dBm/MHz} + 20 - \text{Pout e.i.r.p.}$ (Pout in dBm)
Short Control Signaling Transmissions (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms
Receiver Blocking (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms

Requirement	Test mode: 802.11 n20		
	Lowest frequency channel 2412 MHz	Highest frequency channel 2472 MHz	Limit
CCA Time (ms)	0.173	0.173	> 20 us
q factor	32	32	4 -32 Declare by manufacturer
Maximum Channel Occupancy Time (ms)	1.332	1.334	$(13/32) \times q$
Maximum idle period (ms)	2.415	2.159	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
Minimum idle period (ms)	0.2711	0.2466	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
CCA threshold level (dBm)	-66.604	-67.428	$= -70 \text{ dBm/MHz} + 20 - P_{\text{out e.i.r.p.}}$ (Pout in dBm)
Short Control Signaling Transmissions (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms
Receiver Blocking (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms

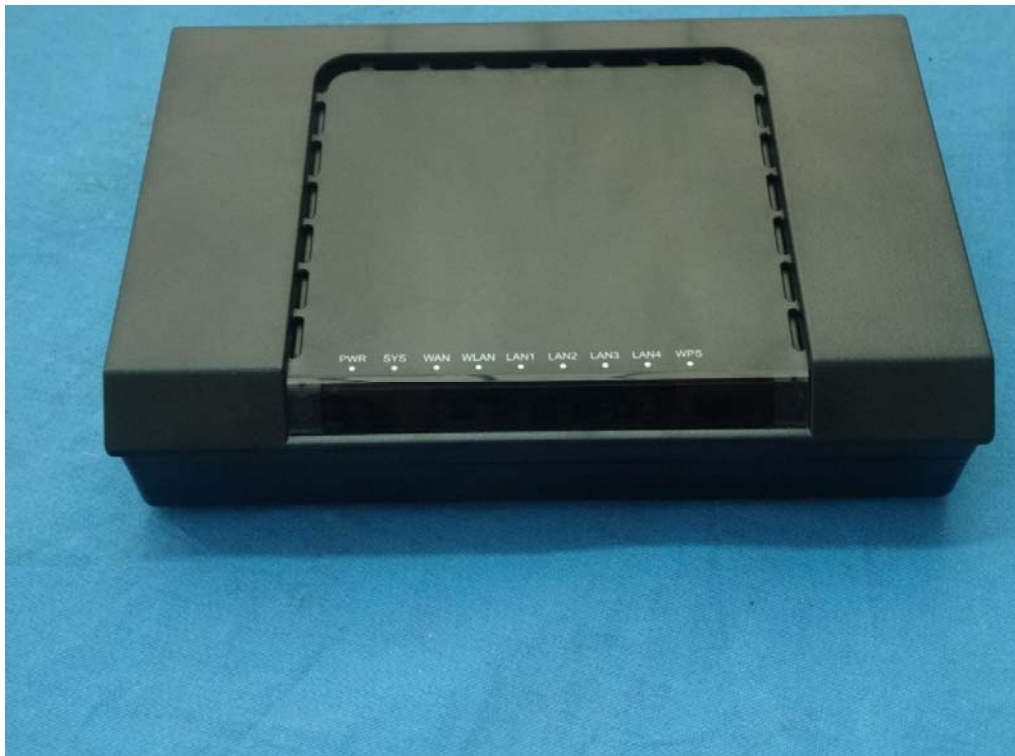
Requirement	Test mode: 802.11 n40		
	Lowest frequency channel 2412 MHz	Highest frequency channel 2472 MHz	Limit
CCA Time (ms)	0.173	0.173	> 20 us
q factor	32	32	4 -32 Declare by manufacturer
Maximum Channel Occupancy Time (ms)	1.336	1.338	$(13/32) \times q$
Maximum idle period (ms)	2.413	2.156	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
Minimum idle period (ms)	0.2711	0.2467	CCA to $(CCA \times q)$ (0.172ms to 5.5ms)
CCA threshold level (dBm)	-66.604	-67.429	$= -70 \text{ dBm/MHz} + 20 - P_{\text{out e.i.r.p.}}$ (Pout in dBm)
Short Control Signaling Transmissions (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms
Receiver Blocking (ms)	0	0	Maximum duty cycle of 10 % within an observation period of 50 ms

4. Test Setup photos

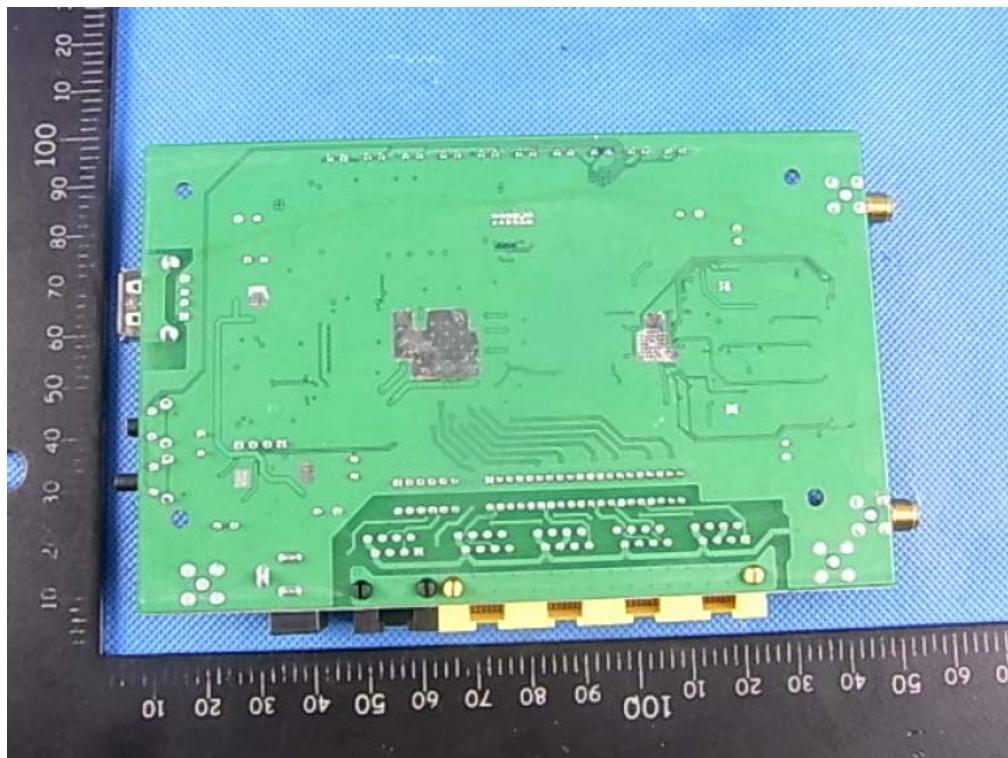


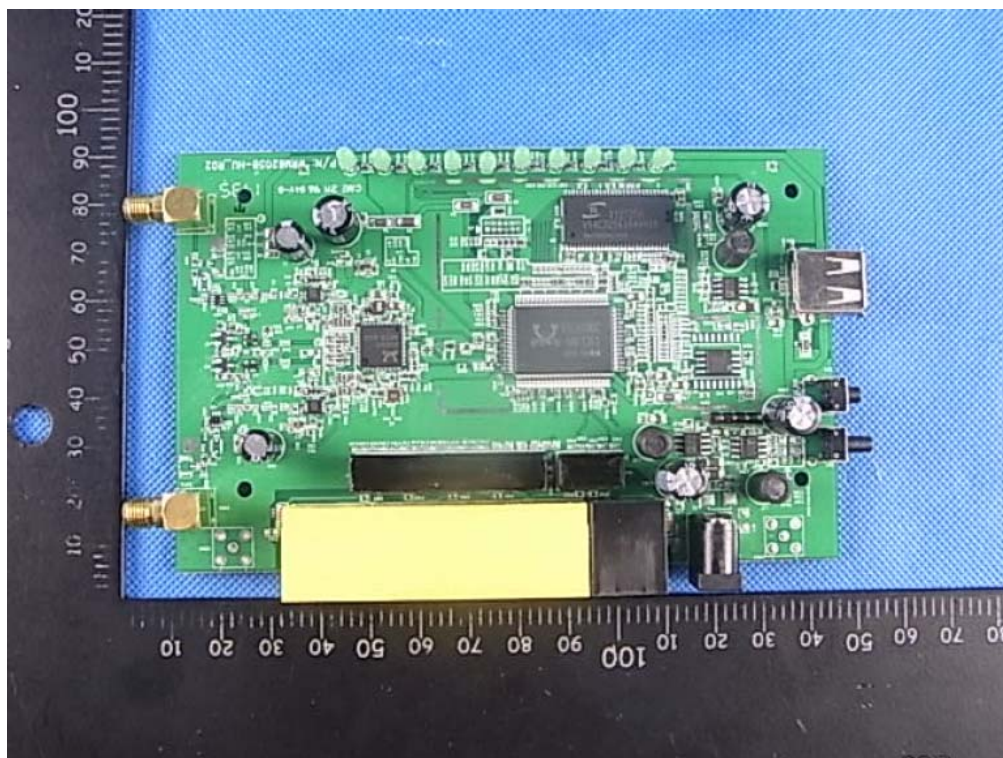
5. Photos of EUT











*****END OF THE REPORT*****