EMC TEST REPORT
No. 151101871SHA-002

Applicant	:	Ericsson WiFi Inc. 6300 Legacy Drive, Plano Texas 75024 USA
Manufacturer	:	Ericsson WiFi Inc. 6300 Legacy Drive, Plano Texas 75024 USA
Product Name	:	Access Point
Type/Model	:	AP 6335
TEST RESULT	**:**	**PASS**

SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

47CFR Part 15 (2014): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 1 (May 2015): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 4 (December 2014): General Requirements for Compliance of Radio Apparatus

Date of issue: February 4, 2016

Prepared by: Reviewed by:

Nemo Li (*Project Engineer*) Daniel Zhao (*Reviewer*)

Description of Test Facility

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Content

1 GENERAL INFORMATION

1.1 Description of Client

Applicant	:	Ericsson WiFi Inc. 6300 Legacy Drive, Plano Texas 75024 USA
Manufacturer	:	Ericsson WiFi Inc. 6300 Legacy Drive, Plano Texas 75024 USA

1.2 Identification of the EUT

Product Name	:	Access Point
Type/model	:	AP 6335
FCC ID	:	RAR60005008
IC	:	4674A-60005008

1.3 Technical Specification

Operation Frequency Band	:	2400~2483.5 MHz
Type of Modulation	:	DBPSK, DQPSK, CCK, BPSK, QPSK, 16-QAM, 64-QAM
EUT Modes of Modulation	:	802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40)
Channel Number	:	11Channels for 802.11b, 802.11g and 802.11n(HT20), 7 Channels for 802.11n(HT40)
Description of EUT	:	The EUT is a wireless access point containing Wi-Fi module, it is a MIMO device and has only one model.
Antenna	:	PCB antenna 2.4G band: 4.3dBi, 5G band: 5.2dBi
Rating	:	44-90 Vac, 2.5A, 47-63Hz
Category of EUT	:	Class B
EUT type	:	☒ Table top ☐ Floor standing
Sample received date	:	November 16, 2015
Date of test	:	November 18, 2015 – January 29, 2016

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2014)
RSS-247 Issue 1 (May 2015)
RSS-Gen Issue 4 (December 2014)
ANSI C63.10 (2013)
KDB 558074 (v03r03)
KDB 662911 D01 (v02r01)

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)	Mode	Lowest (MHz)	Middle (MHz)	Highest (MHz)
2400-2483.5	802.11b	2412	2437	2462
	802.11g	2412	2437	2462
	802.11n(HT20)	2412	2437	2462
	802.11n(HT40)	2422	2437	2452

MIMO Function Description:

Mode	Tx/Rx Function	Beamforming
802.11b	4Tx/4Rx	No
802.11g	4Tx/4Rx	No
802.11n(HT20)	4Tx/4Rx	Yes
802.11n(HT40)	4Tx/4Rx	Yes

Data rate VS Power:

The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

After this pre-scan,we choose the following table of the data rata as the worst case.

Frequency Band (MHz)	Mode	Worst case data rate
2400-2483.5	802.11b	1Mbps
	802.11g	6Mbps
	802.11n(HT20)	MCS0, MCS24
	802.11n(HT40)	MCS0, MCS24

There are two modes of EUT in 802.11n, one is beamforming mode and the other is non-beamforming mode. After evaluating, beamforming mode is evaluated on MCS0, non-beamforming mode is evaluated on MCS24 for representative.

Test software setting:

The power level setting for 802.11b/g/n is used with QDART software offered by the manufactory.

Mode	Frequency (MHz)	Power level Setting	Note
802.11b	2412	23	-
	2437	23	-
	2462	23	-
802.11g	2412	23	-
	2437	23	-
	2462	23	-

Mode	Frequency (MHz)	Power level Setting	
		Beamforming	Non-beamforming
802.11n(HT20)	2412	20.5	23
	2437	20.5	23
	2462	20.5	23
802.11n(HT40)	2422	19.5	23
	2437	19.5	23
	2452	19.5	23

Duty cycle:

Mode	Tx on (ms)	Tx on + Tx off (ms)	Duty cycle factor (dB)
802.11b	12.42	12.50	0.03
802.11g	2.065	2.140	0.15
802.11n20	4.995	5.050	0.05
802.11n40	2.425	2.500	0.13

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	HP ProBook 6470b	100-240V AC, 50/60Hz

2.5 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Shielded room	-	Zhongyu	EC 2838	1/9/2016	1/8/2017
Test Receiver	ESCS 30	R&S	EC 2107	10/20/2015	10/19/2016
A.M.N.	ESH2-Z5	R&S	EC 3119	12/17/2015	12/16/2016
A.M.N.	ENV 216	R&S	EC 3394	8/2/2015	8/1/2016
A.M.N.	ENV4200	R&S	EC3558	8/2/2015	8/1/2016
Voltage Probe	ESH2-Z3	R&S	EC 3405	1/9/2016	1/8/2017
Voltage Probe	TK9420	Schwarzbeck	EC 4888	11/21/2015	11/20/2016
Current probe	EZ-17	R&S	EC 3221	1/9/2016	1/8/2017
I.S.N.	FCC-TLISN-2	FCC	EC3754	1/9/2016	1/8/2017
I.S.N.	FCC-TLISN-4	FCC	EC3755	1/9/2016	1/8/2017
I.S.N.	FCC-TLISN-8	FCC	EC3756	1/9/2016	1/8/2017
Click meter	CL55C	AFJ	EC 5320	12/19/2015	12/18/2016
AMN	LS16C	AFJ	EC 5320-1	12/10/2015	12/9/2016
Absorbing clamp	MDS 21	R&S	EC 2108	1/9/2016	1/8/2017
Tri-loop	HXYZ 9170	Schwarzbeck	EC 3384	6/19/2015	6/18/2016
Harmonic-flicker system	5001ix-PACS-1	CI	EC 2110	5/7/2015	5/6/2016
Three phase Harmonic-flicker system	PFS 503N	EM TEST	EC 5383	3/12/2015	3/11/2016
	DPA 503N	EM TEST	EC 5383-1	3/19/2015	3/18/2016
	NETWAVE30	EM TEST	EC 5383-2	3/19/2015	3/18/2016
Semi-anechoic chamber	-	Albatross project	EC 3048	5/12/2015	5/11/2016
Test Receiver	ESIB 26	R&S	EC 3045	10/20/2015	10/19/2016
Active Loop Antenna	FMZB1519	Schwarzbeck	EC5345	1/20/2016	1/19/2017
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	4/28/2015	4/27/2016
Horn antenna	HF 906	R&S	EC 3049	4/28/2015	4/27/2016
Horn antenna	3117	ETS	EC 4792-1	4/22/2015	4/21/2016
Horn antenna	HAP18-26W	TOYO	EC 4792-3	6/12/2015	6/11/2016
Pre-amplifier	Pre-amp 18	R&S	EC 5262	5/26/2015	5/25/2016
Pre-amplifier	Tpa0118-40	TOYO	EC 4792-2	4/12/2015	4/11/2016
EMF meter	ELT-400	NARDA	EC2928	8/4/2015	8/3/2016
Protection Network	VDHH 9502	Schwarzbeck	EC4631	7/7/2015	7/6/2016
Shielded room	-	Zhongyu	EC 2839	1/9/2016	1/8/2017
ESD generator	ditto	EM TEST	EC 2956	5/9/2015	5/8/2016
ESD generator	NSG 437	TESEQ	EC 4792-4	3/4/2015	3/3/2016

Conducted immunity system	UCS 500M6B	EM TEST	EC 2958	4/8/2015	4/7/2016
Automatic transformer	MV2616	EM TEST	EC 2957	Not required	Not required
Surge generator	TSS 500M2F	EM TEST	EC 2960	9/24/2015	9/23/2016
Surge generator	TSS 500M4	EM TEST	EC 2961	1/9/2016	1/8/2017
Surge Coupling network	CNV 504M	EM TEST	EC 2958-2	1/9/2016	1/8/2017
Surge Coupling network	CNV 504S1	EM TEST	EC 2958-1	1/9/2016	1/8/2017
Capacity clamp	HFK	EM TEST	EC 2959	Not required	Not required
Ring wave generator	SKS-1206GB	SANKI	EC 5033-1	2/26/2015	2/25/2016
EFT generator	SKS-0404IB	SANKI	EC 5033-2	1/9/2016	1/8/2017
Surge generator	SKS-0506GB-30	SANKI	EC 5033-3	1/9/2016	1/8/2017
DIPs generator	SKS-1130GT	SANKI	EC 5033	1/9/2016	1/8/2017
Signal generator	SML 01	R&S	EC 2338	4/11/2015	4/10/2016
Power amplifier	75A250	AR	EC 3043-1	8/15/2015	8/14/2016
Attenuator	ATT6/75	EM TEST	EC 3043-3	1/7/2016	1/8/2017
CDN	CDN M216	Schaffner	EC 2113-2	8/2/2015	8/1/2016
CDN	CDN M316	Schaffner	EC 2113-1	9/29/2015	9/28/2016
CDN	CDN T2	EM TEST	EC 4970	10/22/2015	10/21/2016
CDN	CDN T4	EM TEST	EC 3043-4	1/7/2016	1/8/2017
CDN	CDN M1/16A	EM TEST	EC 4792-6	2/17/2015	2/16/2016
CDN	CDN M1/16A	EM TEST	EC 4792-7	2/17/2015	2/16/2016
CDN	CDN M1/32A	EM TEST	EC4792-10	2/17/2015	2/16/2016
CDN	CDN M3N/16A	EM TEST	EC 4792-12	2/17/2015	2/16/2016
CDN	CDN M3N/32A	EM TEST	EC 4792-13	2/17/2015	2/16/2016
CDN	CDN T8-RJ45	EM TEST	EC 4792-15	2/17/2015	2/16/2016
EM clamp	EM 101	EM TEST	EC 3043-6	10/20/2015	10/19/2016
Attenuator	68-6-44	Weinschel	EC 3043-9	1/9/2016	1/8/2017
Fully-anechoic chamber	-	Albatross project	EC 3047	5/12/2015	5/11/2016
Signal generator	SMR 20	R&S	EC 3044-1	8/18/2015	8/17/2016
Power amplifier	150W1000	AR	EC 3044-2	8/15/2015	8/14/2016
Power amplifier	25S1G4	AR	EC 3044-4	8/15/2015	8/14/2016
DDC	DC 6180A	AR	EC 3044-5	8/2/2015	8/1/2016
DDC	DC 7144A	AR	EC 3044-6	1/9/2016	1/8/2017
Power meter	PM2002	AR	EC3043-7	10/24/2015	10/23/2016

Power sensor	PH2000	AR	EC3043-8	10/24/2015	10/23/2016
Log-period antenna	AT 1080	AR	EC 3044-7	4/28/2015	4/27/2016
Horn antenna	AT 4002	AR	EC 3044-8	4/28/2015	4/27/2016
Field meter	FM 5004	AR	EC 3044-3	10/21/2015	7/27/2016
Field sensor	FP 6001	AR	EC 3044-9	10/21/2015	7/27/2016
Magnetic field coil	MS 100	EM TEST	EH2016	6/13/2015	6/12/2016
Current transformer	MC 2630	EM TEST	EH2015	6/13/2015	6/12/2016
Light Meter	1335	TES	EC 5203	3/4/2015	3/3/2016
TV generator	TG39	ShibaSoku	EC3555	4/8/2015	4/7/2016
Multi-meter	179	FLUKE	EC 3226	9/11/2015	9/10/2016
Multi-meter	187	FLUKE	EC 2560	3/4/2015	3/3/2016
Clamp meter	318	FLUKE	EC 3486	12/15/2015	12/14/2016
Pulse Engine Tachometer	PET-20000XR	OPPAMA	EC4782	1/20/2016	1/19/2017
Time relay	-	-	EC4186-1	5/5/2015	5/4/2016
Test Receiver	ESCI 7	R&S	EC4501	1/14/2016	1/13/2017
Power sensor / Power meter	N1911A/N1921A	Agilent	EC4318	4/9/2015	4/8/2016
PXA Signal Analyzer	N9030A	Agilent	EC5338	5/15/2015	5/14/2016
Power sensor	U2021XA	Agilent	EC5338-1	3/6/2015	3/5/2016
Vector Signal Generator	N5182B	Agilent	EC5175	1/9/2016	1/8/2017
MXG Analog Signal Generator	N5181A	Agilent	EC5338-2	3/6/2015	3/5/2016
Mobile Test System	Iqxel	Litepoint	EC 5176	1/9/2016	1/8/2017
Spectrum analyzer	E7402A	Agilent	EC2254	8/15/2015	8/14/2016

2.6 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Minimum 6dB Bandwidth & Occupied bandwidth	15.247(a)(2)	RSS-247 Issue 1 Annex 5.2	Pass
Maximum peak output power	15.247(b)	RSS-247 Issue 1 Annex 5.4	Pass
Power spectrum density	15.247(e)	RSS-247 Issue 1 Annex 5.2	Pass
Radiated emission	15.205 & 15.209	RSS-Gen Issue 4 Clause 8.9	Pass
Emission outside the frequency band	15.247(d)	RSS-247 Issue 1 Annex 5.5	Pass
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested

Notes: 1: NA =Not Applicable

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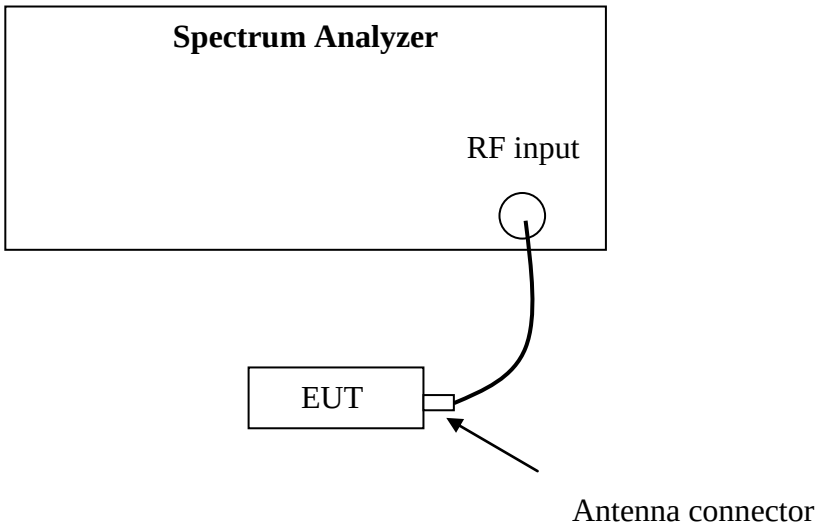
3 Minimum 6dB Bandwidth

Test result: Pass

3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Test Configuration



3.3 Test Procedure and test setup

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements(clause 8.2).

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

Mode	Channel	Minimum 6dB Bandwidth (MHz)				Limits (MHz)
		Port0	Port 1	Port 2	Port 3	
802.11b	L	8.065	8.065	8.065	8.065	> 0.5
	M	8.062	8.063	8.063	8.062	> 0.5
	H	8.063	8.064	8.064	8.064	> 0.5
802.11g	L	15.94	15.92	15.92	15.94	> 0.5
	M	16.31	16.31	16.30	16.30	> 0.5
	H	16.05	16.05	16.05	16.05	> 0.5
802.11n (HT20)	L	16.34	16.33	16.33	16.58	> 0.5
	M	17.15	17.16	17.16	17.15	> 0.5
	H	17.16	17.18	17.16	17.18	> 0.5
802.11n (HT40)	L	35.66	35.69	35.64	35.65	> 0.5
	M	35.10	35.11	35.07	35.08	> 0.5
	H	35.72	35.71	35.73	35.72	> 0.5

4 Maximum Conducted Output power

Test result: Pass

4.1 Test limit

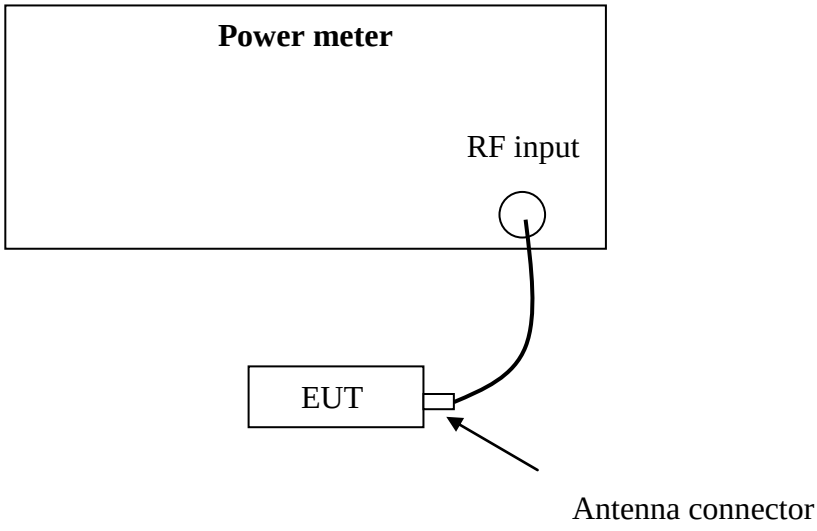
☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

☐ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

☒ For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt (EIRP: 4 watt).

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

4.2 Test Configuration



4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r03” for compliance to FCC 47CFR 15.247 requirements (clause 9.2.3 PM method.).

4.4 Test protocol

Temperature: 25 °C
Relative Humidity: 55 %

Mode	Channel	Reading (dBm)				Duty cycle factor (dB)	Total Power (dBm)	Limit (dBm)	Margin (dBm)
		Port 0	Port 1	Port 2	Port 3				
802.11b	L	22.15	22.35	23.20	22.86	0.03	28.71	30.00	1.29
	M	21.83	23.15	23.52	23.22	0.03	29.02	30.00	0.98
	H	21.73	23.10	23.27	23.13	0.03	28.90	30.00	1.10
802.11g	L	21.95	22.08	22.32	22.83	0.15	28.48	30.00	1.52
	M	22.33	21.88	23.01	23.41	0.15	28.87	30.00	1.13
	H	22.00	21.51	22.78	23.34	0.15	28.64	30.00	1.36

The maximum EIRP of the EUT = 29.02dBm + 4.30dBi = 33.32dBm = 2147.83mW which is lower than the EIRP limit of RSS-247.

Note:

1. Total power = $10 * \lg(10^{(\text{port 0 + Duty cycle factor}) / 10} + 10^{(\text{port 1 + Duty cycle factor}) / 10} + 10^{(\text{port 2 + Duty cycle factor}) / 10} + 10^{(\text{port 3 + Duty cycle factor}) / 10})$

For beamforming mode:

Mode	Channel	Reading (dBm)				Duty cycle factor (dB)	Total Power (dBm)	Limit (dBm)	Margin (dBm)
		Port 0	Port 1	Port 2	Port 3				
802.11n (HT20)	L	18.60	18.83	18.98	19.15	0.05	24.97	25.70	0.73
	M	18.61	19.28	19.59	19.27	0.05	25.27	25.70	0.43
	H	18.49	19.02	19.76	19.21	0.05	25.21	25.70	0.49
802.11n (HT40)	L	18.47	18.77	19.20	19.05	0.13	25.03	25.70	0.67
	M	18.47	19.25	19.61	18.87	0.13	25.22	25.70	0.48
	H	18.55	19.08	19.72	18.82	0.13	25.22	25.70	0.48

The maximum EIRP of the EUT = 25.27dBm + 4.30dBi = 29.57dBm = 805.73mW which is lower than the EIRP limit of RSS-247.

Note:

1. For antenna gain = 4.3dBi and with beamforming, the limit should be corrected.
2. Total power = $10 * \lg(10^{(\text{port 0 + Duty cycle factor}) / 10} + 10^{(\text{port 1 + Duty cycle factor}) / 10} + 10^{(\text{port 2 + Duty cycle factor}) / 10} + 10^{(\text{port 3 + Duty cycle factor}) / 10})$

For non-beamforming mode:

Mode	Channel	Reading (dBm)				Duty cycle factor (dB)	Total Power (dBm)	Limit (dBm)	Margin (dBm)
		Port 0	Port 1	Port 2	Port 3				
802.11n (HT20)	L	21.99	21.77	22.03	21.53	0.05	27.91	30.00	2.09
	M	22.10	22.40	22.52	21.51	0.05	28.22	30.00	1.78
	H	21.83	21.84	22.27	21.38	0.05	27.91	30.00	2.09
802.11n (HT40)	L	22.74	22.77	23.06	22.83	0.13	29.00	30.00	1.00
	M	22.79	23.28	23.29	22.54	0.13	29.14	30.00	0.86
	H	22.65	23.12	23.21	22.45	0.13	29.02	30.00	0.98

The maximum EIRP of the EUT = 29.14dBm + 4.30dBi = 33.44dBm = 2208.00mW which is lower than the EIRP limit of RSS-247.

Note:

1. Total power = $10 * \lg(10^{(\text{port 0} + \text{Duty cycle factor}) / 10} + 10^{(\text{port 1} + \text{Duty cycle factor}) / 10} + 10^{(\text{port 2} + \text{Duty cycle factor}) / 10} + 10^{(\text{port 3} + \text{Duty cycle factor}) / 10})$

5 Power spectrum density

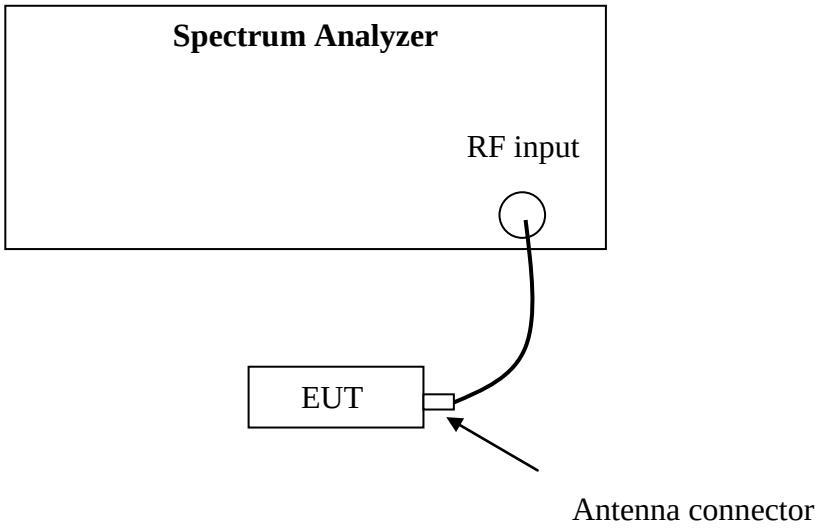
Test result: **Pass**

5.1 Test limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 8dBm/3kHz and 8+ (6 –antenna gain-beam forming gain).

5.2 Test Configuration



5.3 Test procedure and test setup

The power spectrum density per FCC §15.247(e) was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" (clause 10.5) for compliance to FCC 47CFR 15.247 requirements.

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98%), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent):

a) Measure the duty cycle (x) of the transmitter output signal as described in 6.0.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz..
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to "free run".
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.
m) If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

5.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

Mode	Channel	Reading (dBm/10kHz)				Duty cycle factor (dB)	Total PSD (dBm /10kHz)	Limit (dBm /3kHz)	Margin (dB)
		Port 0	Port 1	Port 2	Port 3				
802.11b	L	-4.66	-4.54	-3.35	-3.51	0.03	2.08	3.70	1.62
	M	-4.88	-3.18	-2.50	-3.42	0.03	2.63	3.70	1.07
	H	-4.90	-4.31	-2.67	-4.19	0.03	2.11	3.70	1.59
802.11g	L	-6.55	-5.77	-5.64	-5.43	0.15	0.35	3.70	3.35
	M	-7.04	-5.58	-4.63	-5.75	0.15	0.51	3.70	3.19
	H	-7.17	-6.24	-4.87	-5.48	0.15	0.32	3.70	3.38

Note:

1. For antenna gain = 4.3dBi and with CDD function, the limit should be corrected.
2. Total PSD = $10 * \lg(10^{(\text{port 0 + Duty cycle factor}) / 10} + 10^{(\text{port 1 + Duty cycle factor}) / 10} + 10^{(\text{port 2 + Duty cycle factor}) / 10} + 10^{(\text{port 3 + Duty cycle factor}) / 10})$
3. For CDD transmissions, If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows:
   Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

For beamforming mode:

Mode	Channel	Reading (dBm/10kHz)				Duty cycle factor (dB)	Total PSD (dBm /10kHz)	Limit (dBm /3kHz)	Margin (dB)
		Port 0	Port 1	Port 2	Port 3				
802.11n (HT20)	L	-10.22	-9.67	-9.35	-9.92	0.05	-3.71	3.70	7.41
	M	-10.95	-9.76	-8.47	-9.24	0.05	-3.44	3.70	7.14
	H	-11.42	-10.05	-8.18	-9.70	0.05	-3.61	3.70	7.31
802.11n (HT40)	L	-12.33	-13.64	-11.64	-12.92	0.13	-6.42	3.70	10.12
	M	-12.94	-13.59	-11.50	-13.00	0.13	-6.53	3.70	10.23
	H	-12.86	-13.81	-11.51	-12.17	0.13	-6.35	3.70	10.05

Note:

1. For antenna gain = 4.3dBi and with beamforming function, the limit should be corrected.
2. Total PSD = $10 * \lg(10^{(\text{port 0 + Duty cycle factor}) / 10} + 10^{(\text{port 1 + Duty cycle factor}) / 10} + 10^{(\text{port 2 + Duty cycle factor}) / 10} + 10^{(\text{port 3 + Duty cycle factor}) / 10})$

For beamforming mode:

Mode	Channel	Reading (dBm/10kHz)				Duty cycle factor (dB)	Total PSD (dBm /10kHz)	Limit (dBm /3kHz)	Margin (dB)
		Port 0	Port 1	Port 2	Port 3				
802.11n (HT20)	L	-6.78	-6.03	-6.35	-6.52	0.05	-0.34	8.00	8.34
	M	-6.22	-5.18	-5.44	-6.22	0.05	0.33	8.00	7.67
	H	-6.16	-4.49	-6.03	-7.06	0.05	0.24	8.00	7.76
802.11n (HT40)	L	-8.35	-8.23	-7.51	-8.18	0.13	-1.90	8.00	9.90
	M	-8.06	-7.00	-7.11	-8.67	0.13	-1.50	8.00	9.50
	H	-8.36	-7.32	-7.80	-8.72	0.13	-1.86	8.00	9.86

Note:

1. Total PSD = $10 * \lg(10^{(\text{port 0 + Duty cycle factor}) / 10} + 10^{(\text{port 1 + Duty cycle factor}) / 10} + 10^{(\text{port 2 + Duty cycle factor}) / 10} + 10^{(\text{port 3 + Duty cycle factor}) / 10})$

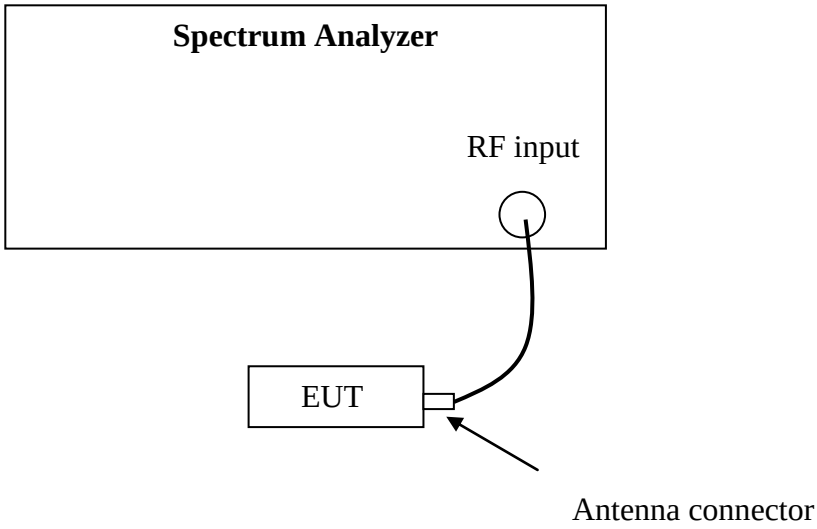
6 Emission outside the frequency band

Test result: **Pass**

6.1 Test limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.2 Test Configuration



6.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc)

Reference level measurement

Establish a reference level by using the following procedure:
a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 times the *DTS bandwidth*.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Emission level measurement

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

6.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

Mode	Channel	Results (dB)				Limits (dB)
		Port 0	Port 1	Port 2	Port 3	
802.11b	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30
802.11g	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30

For beamforming mode:

Mode	Channel	Results (dB)				Limits (dB)
		Port 0	Port 1	Port 2	Port 3	
802.11n (HT20)	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30
802.11n (HT40)	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30

For non-beamforming mode:

Mode	Channel	Results (dB)				Limits (dB)
		Port 0	Port 1	Port 2	Port 3	
802.11n (HT20)	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30
802.11n (HT40)	L	Pass	Pass	Pass	Pass	≥30
	M	Pass	Pass	Pass	Pass	≥30
	H	Pass	Pass	Pass	Pass	≥30

7 Radiated Emissions

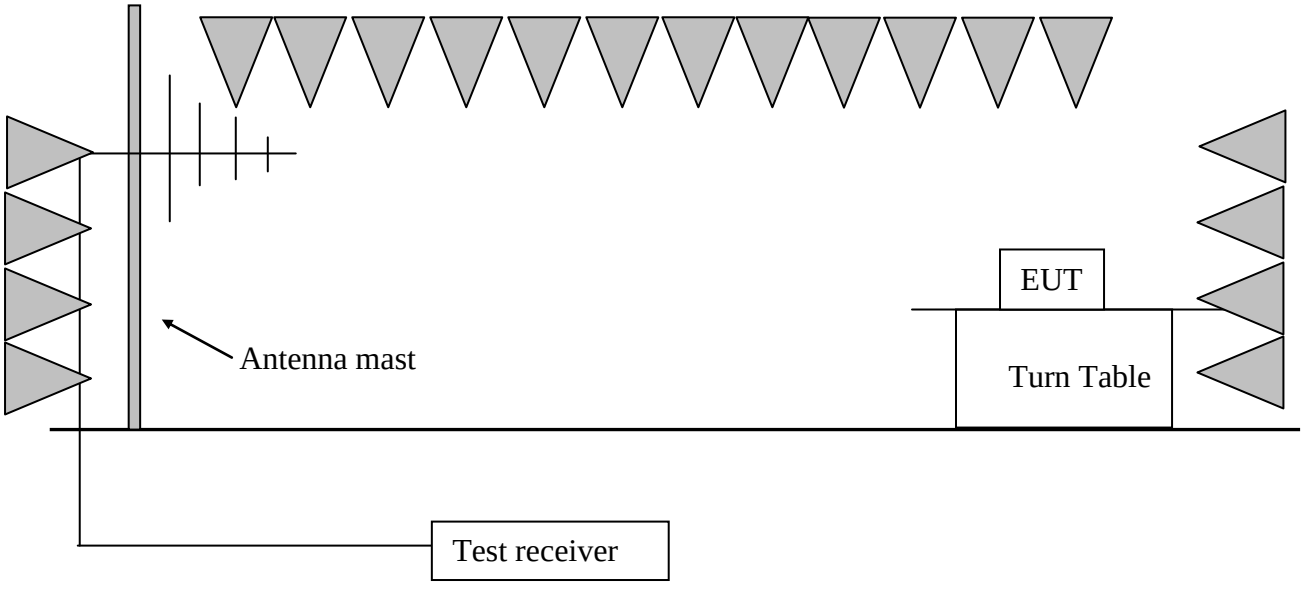
Test result: **Pass**

7.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

7.2 Test Configuration



7.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The EUT was tested according to DTS test procedure of KDB558074 D01 DTS "Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

Remark:
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided.

Example:

Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Measured level = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m,
Measured level = 10.20dBuV/m, then Margin = 54 - 10.20 = 43.80dBuV/m.

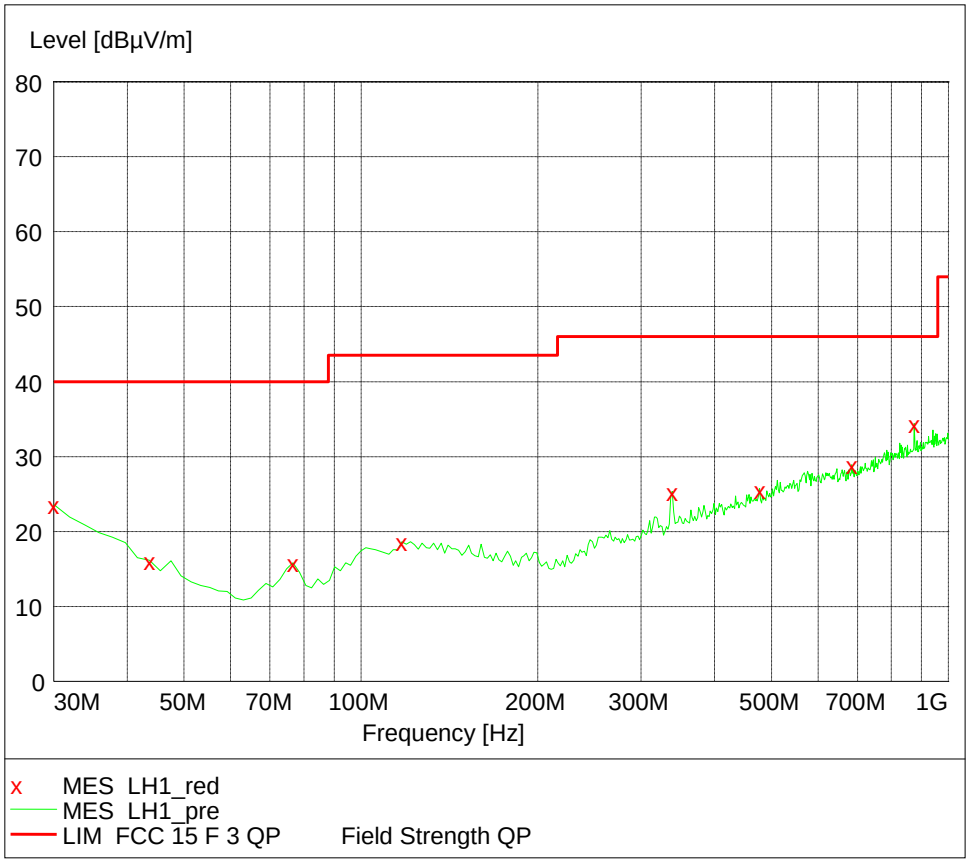
7.4 Test Protocol

Temperature:	25 °C
Relative Humidity:	55 %

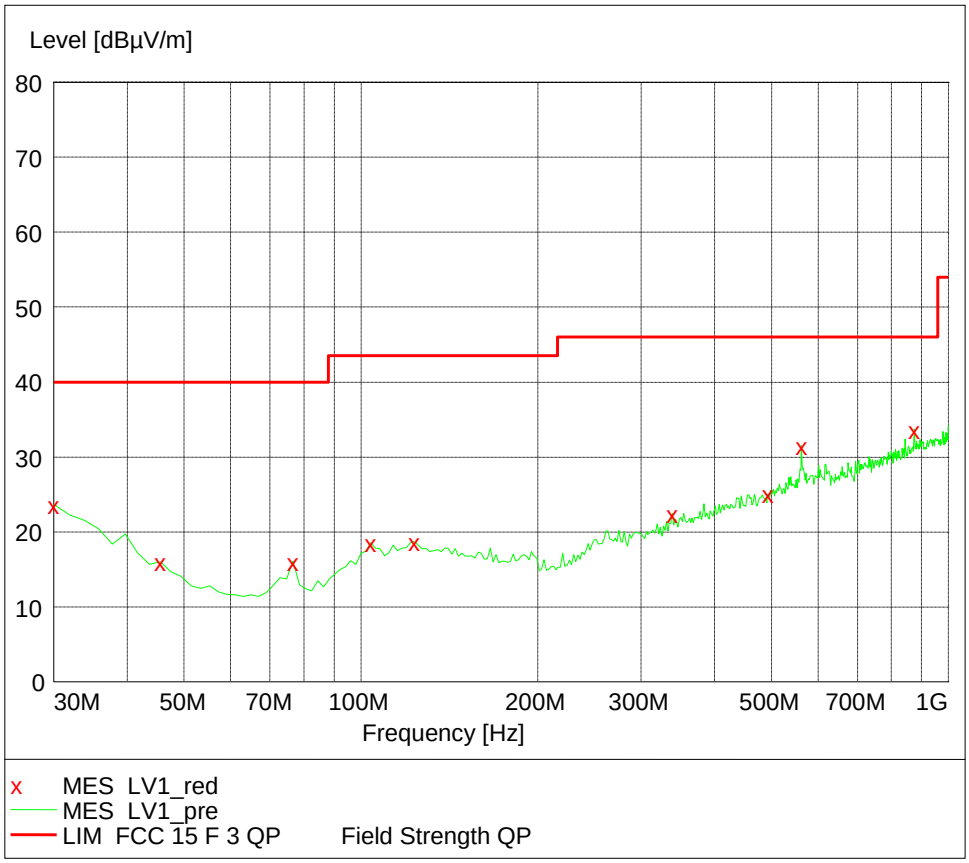
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:

Horizontal



Vertical



30MHz~1GHz, Test data:

Polarization	Frequency (MHz)	Measured level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
H	30.00	23.60	40.00	16.40	PK
	685.35	29.20	46.00	16.80	PK
	875.65	34.50	46.00	11.50	PK
V	30.00	23.60	40.00	16.40	PK
	562.75	31.70	46.00	14.30	PK
	879.98	33.60	46.00	12.40	PK

Note: The worst test result (30MHz to 1GHz) of channel H (802.11b 2462MHz) was chosen to list in the report as representative.

Test result above 1GHz:

The emission was conducted from 1GHz to 25GHz.

802.11b

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2412.25	123.10	34.10	Fundamental	/	PK
	V	2389.58	52.34	34.20	74.00	21.66	PK
M	V	2437.35	123.30	34.20	Fundamental	/	PK
H	V	2462.50	123.70	34.40	Fundamental	/	PK
	V	2488.58	51.50	34.80	74.00	22.50	PK

802.11g

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2412.25	125.50	34.10	Fundamental	/	PK
	V	2389.20	52.52	34.20	74.00	21.48	PK
M	V	2437.45	125.80	34.20	Fundamental	/	PK
H	V	2462.45	125.40	34.40	Fundamental	/	PK
	V	2485.91	51.80	34.80	74.00	22.20	PK

802.11n(HT20) (Beamforming mode)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2412.40	122.90	34.10	Fundamental	/	PK
	V	2388.56	52.23	34.20	74.00	21.77	PK
M	V	2437.45	122.45	34.20	Fundamental	/	PK
H	V	2462.35	122.40	34.40	Fundamental	/	PK
	V	2494.29	51.90	34.80	74.00	22.10	PK

802.11n(HT40) (Beamforming mode)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2422.25	119.60	34.10	Fundamental	/	PK
	V	2385.77	53.32	34.20	74.00	20.68	PK
M	V	2437.34	119.80	34.20	Fundamental	/	PK
H	V	2452.80	119.00	34.30	Fundamental	/	PK
	V	2483.54	56.75	34.80	74.00	17.25	PK
	V	2483.54	43.00	34.80	54.00	11.00	AV

802.11n(HT20) (Non-beamforming mode)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2412.40	125.60	34.10	Fundamental	/	PK
	V	2388.73	60.50	34.20	74.00	21.77	PK
	V	2388.73	47.00	34.20	54.00	7.00	AV
M	V	2437.45	122.45	34.20	Fundamental	/	PK
	V	2388.82	60.00	34.20	74.00	14.00	PK
	V	2388.82	46.50	34.20	54.00	7.50	AV
H	V	2462.35	125.50	34.40	Fundamental	/	PK
	V	2483.90	60.50	34.80	74.00	13.50	PK
	V	2483.90	47.00	34.80	54.00	7.00	AV

802.11n(HT40) (Non-beamforming mode)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2422.25	126.40	34.10	Fundamental	/	PK
	V	2389.12	64.50	34.20	74.00	9.50	AV
	V	2389.12	51.00	34.20	54.00	3.00	PK
M	V	2437.34	126.10	34.20	Fundamental	/	PK
	V	2488.68	61.50	34.80	74.00	12.50	PK

	V	2488.68	48.50	34.80	54.00	5.50	AV
H	V	2452.80	126.20	34.30	Fundamental	/	PK
	V	2487.70	63.50	34.80	74.00	10.50	PK
	V	2487.70	50.00	34.80	54.00	4.00	AV

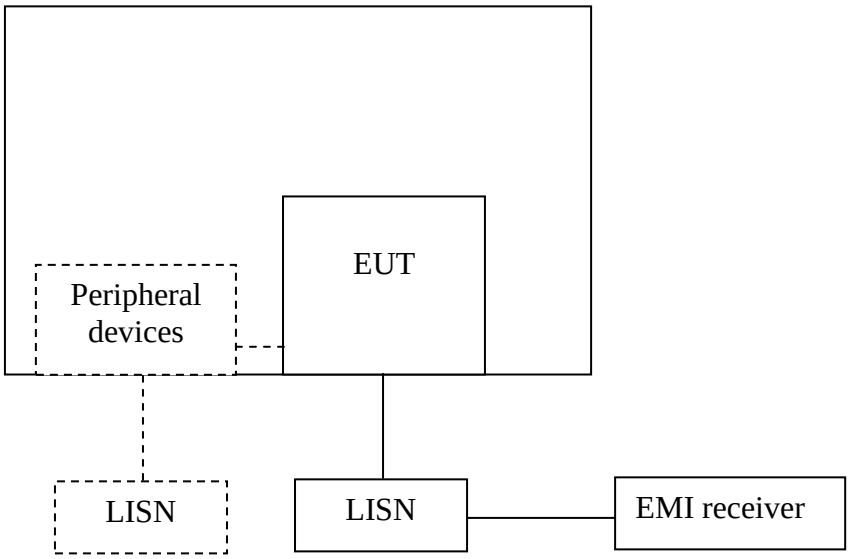
8 Power line conducted emission

Test result: **Pass**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

8.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

8.3 Test procedure and test set up

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

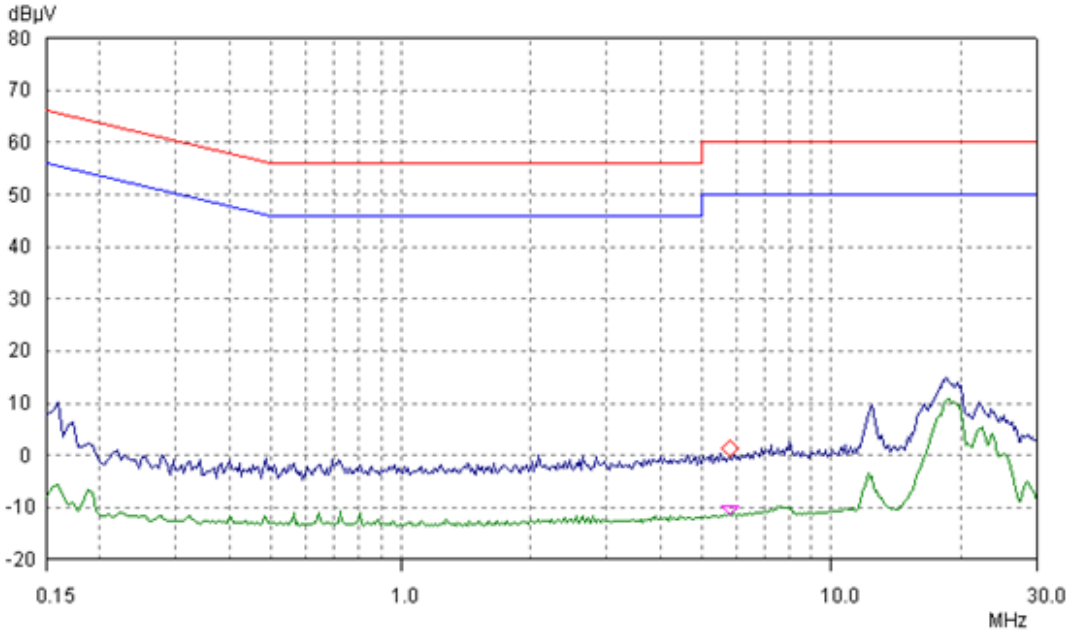
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

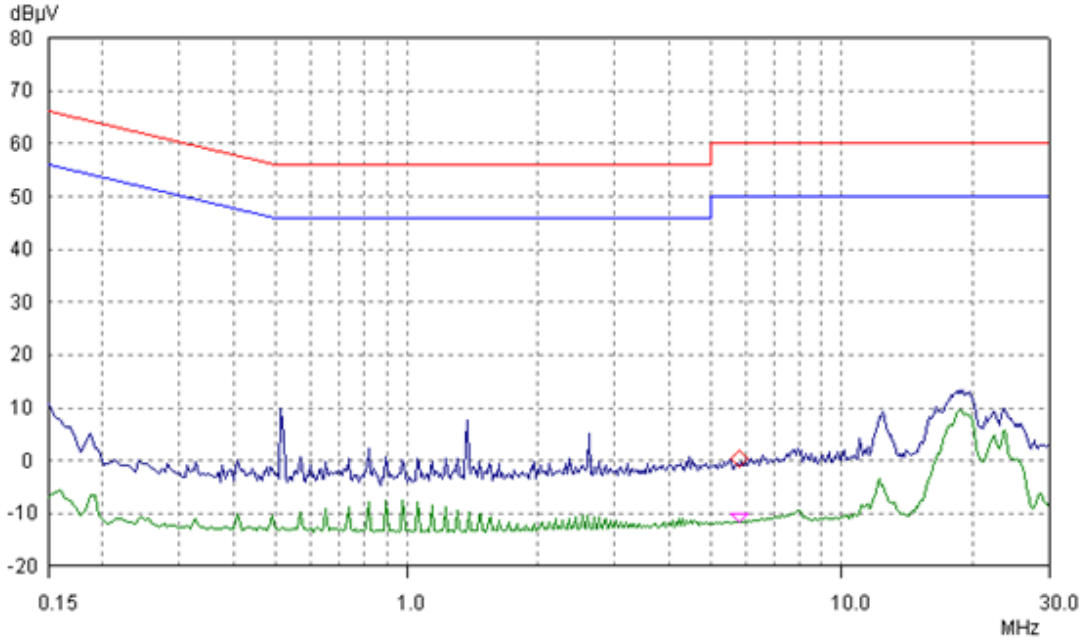
8.4 Test protocol

Temperature: 25 °C
Relative Humidity: 55 %

L Line:



N line



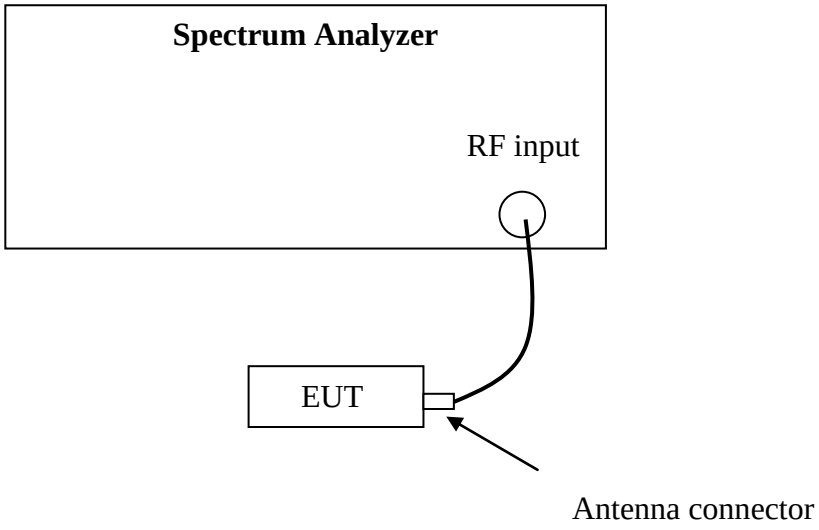
9 Occupied Bandwidth

Test Status: Tested

9.1 Test limit

None

9.2 Test Configuration



9.3 Test procedure and test setup

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

9.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %

Mode	Mode	99% Bandwidth (MHz)			
		Port0	Port 1	Port 2	Port 3
802.11b	L	12.783	12.779	12.777	12.781
	M	12.616	12.604	12.640	12.626
	H	12.616	12.597	12.586	12.587
802.11g	L	16.351	16.351	16.356	16.354
	M	16.327	16.325	16.329	16.332
	H	16.323	16.323	16.323	16.325
802.11n (HT20)	L	17.549	17.555	17.553	17.547
	M	17.526	17.526	17.538	17.527
	H	17.522	17.534	17.523	17.530
802.11n (HT40)	L	35.932	35.941	35.938	35.936
	M	35.983	35.964	35.982	35.973
	H	36.022	36.016	36.030	36.030