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TEST REPORT

Application No.: HKEM2110001108AT

Applicant: BINATONE ELECTRONICS INTERNATIONAL LIMITED

Address of Applicant: 25/F, Guangdong Investment Tower, 148 Connaught Road Central, Sheung

Wan, Hong Kong

Equipment Under Test (EUT):

EUT Name: Video Baby Monitor

Model No.: Nursery Pal Glow+ (BU), Nursery Pal Glow Plus (BU)

Additional Model: Please refer to section 2 of this report which indicates which item was

actually tested and which were electrically identical.

Trademark: Hubble

FCC ID: VLJ-NP560BU **IC**: 4522A-NP560BU

HVIN: NP560BU

Standard(s): CFR 47 FCC Part 15 Subpart C, 2020

RSS-247 Issue 2: May 2017 RSS-Gen: Issue 5 Amdt 2019

Date of Receipt: 2021-11-07

Date of Test: 2021-11-07 to 2021-11-17

Date of Issue: 2021-11-18

Test Result: Pass*



Law Man Kit EMC Manager

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

^{*} In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record						
Version	Chapter	Date	Modifier	Remark			
01		2021-11-18		Original			

Authorized for issue by:		
	Len Xn.	
	Leo Xu /Project Engineer	Date: 2021-11-18
	Law	
	Law Man Kit	
	/Reviewer	Date: 2021-11-18



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2 Test Summary

Radio Spectrum Technical Requirement							
Item Standard Method Requirement Res							
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass			

Radio Spectrum Matter Part					
Item	Standard	Method	Requirement	Result	
Conducted Disturbance at AC Power Line(150kHz- 30MHz)	47 CFR Part 15, Subpart C 15.207	ANSI C63.10: 2013 Section 6.2	47 CFR FCC Part 15, Subpart C 15.207	Pass	
Minimum 6dB	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15,	Pass	
Bandwidth	Subpart C 15.247	Section 11.8.1	Subpart C 15.247a(2)		
Conducted Peak	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15,	Pass	
Output Power	Subpart C 15.247	Section 11.9.2.3	Subpart C 15.247(b)(3)		
Power Spectrum	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15,	Pass	
Density	Subpart C 15.247	Section 11.10.2	Subpart C 15.247(e)		
Conducted Band	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15,	Pass	
Edges Measurement	Subpart C 15.247	Section 11.13.3.2	Subpart C 15.247(d)		
Conducted Spurious	47 CFR Part 15,	ANSI C63.10 (2013)	47 CFR Part 15,	Pass	
Emissions	Subpart C 15.247	Section 11.11	Subpart C 15.247(d)		
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass	
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass	

Radio Spectrum Technical Requirement						
Item Standard Method Requirement Resul						
Antenna Requirement	RSS-Gen Issue 5, Amdt 2019	N/A	RSS-Gen Section 6.8	Pass		

Radio Spectrum Matter Part						
Item	Standard	Method	Requirement	Result		
Conducted Emissions at AC Power Line (150kHz-30MHz)	RSS-Gen Issue 5: Amdt 2019	ANSI C63.10 (2013) Section 6.2	RSS-Gen Section 8.8	Pass		
99% Bandwidth	RSS-Gen Issue 5: Amdt 2019	ANSI C63.10 Section 6.9.3	RSS-Gen Section 6.7	Pass		
Minimum 6dB Bandwidth	RSS-247 Issue 2, February 2017	ANSI C63.10 (2013) Section 11.8.1	RSS-247 Section 5.2(a)	Pass		
Conducted Peak Output Power	RSS-247 Issue 2, February 2017	ANSI C63.10 (2013) Section 11.9.1	RSS-247 Section 5.4(d)	Pass		



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Radio Spectrum Matter Part						
Item Standard Method		Method	Requirement	Result		
Power Spectrum Density	RSS-247 Issue 2, February 2017	ANSI C63.10 (2013) Section 11.10.2	RSS-247 Clause 5.2(b)	Pass		
Conducted Band Edges Measurement	RSS-247 Issue 2, February 2017	ANSI C63.10 (2013) Section 11.12	RSS-247 Section 5.5	Pass		
Spurious Emissions	RSS-247 Issue 2, February 2017	ANSI C63.10 (2013) Section 11.11	RSS-247 Section 5.5	Pass		
Radiated Emissions which fall in the restricted bands	RSS-Gen Issue 5: Amdt 2019	ANSI C63.10 (2013) Section 6.4&6.5&6.6	RSS-247 Section Section 3.3 & RSS-Gen Section 8.10	Pass		
Frequency stability	RSS-247 Issue 2, February 2017	RSS-Gen Section 6.11	RSS-Gen Section 8.11	Pass		

Note: Frequency stability requested in RSS GEN Section 8.1.1 has been complied since the result of band edge can demonstrate.

Declaration of EUT Family Grouping:

Item no.: Nursery Pal Glow+ (BU), Nursery Pal Glow Plus (BU)

According to the confirmation from the applicant, the above models are identical in all electrical aspects in relating to the circuit design, PCB layout, electrical components used, internal wiring and functions. The differences are only the model name.

Therefore, only the model Nursery Pal Glow+ (BU) was tested in this report.

Abbreviation:

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

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

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application.



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4 General Information

4.1 Details of E.U.T.

T. I DCtall3 Of E.O. I .			
Power supply:	Model: YWK-AD050150-U		
	Input: AC 100-240V, 50/60Hz, 0.3A		
	Output: DC 5V, 1.5A, 7.5W		
Test voltage:	AC 120 V		
Cable:	Power Cable: 180cm unshielded 2 wires DC cable		
Antenna Gain:	0 dBi		
Antenna Type:	Integral Antenna		
Channel Spacing:	5MHz		
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK)		
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)		
Data rate:	802.11b: 1Mbps, 2Mbps, 5.5Mbps, 11 Mbps		
	802.11g: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54		
	802.11n: 6.5Mbps, 13Mbps, 19.5Mbps, 26Mbps, 39Mbps, 52Mbps, 58.5Mbps, 65Mbps		
Number of Channels:	802.11b/g/n(HT20):11		
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz		
Tested Channels:	2412MHz, 2442MHz, 2462MHz		
Series number:	A1		
Hardware Version:	V1.0		
Software Version:	RC06		
	Remark: Power level setting was not adjustable and fixed default through SW Version.		

Frequency List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		

Remark: 1. Testing Channels are highlighted in **bold**.



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4.2 Description of Support Units

The EUT has been tested with corresponding accessories as below:

Supplied by client

Description	Manufacturer	Model No.	SN/Certificate NO
Test Software	MicroRidge System	Version 3.0.0.108	N/A

Supplied by SGS:

Description	Manufacturer	Model No.	SN/Certificate NO
NoteBook (EMC4)	Dell	P75F	N/A

4.3 Measurement Uncertainty

RF

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10 ⁻⁸
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	RF conducted power (30MHz-40GHz)	1.5dB
5	RF power density	1.5dB
6	Conducted Spurious emissions	1.5dB
		4.4dB (30MHz-1GHz)
7	RF Radiated power &	4.7dB (1GHz-6GHz)
'	Radiated Spurious emission test	4.7dB (6GHz-18GHz)
		5.7dB (18GHz-40GHz)
8	Temperature test	± 1°C
9	Humidity test	± 3%
10	Supply voltages	± 1.5%
11	Time	± 3%

Remark:

The U_{lab} (lab Uncertainty) is less than U_{cispr} (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

According to decision rule based on Clause 4.2 of CISPR 16-4-2, the EUT complied with the standards specified above.



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4.4 Test Location

All tests were performed at:

SGS Hong Kong Limited

Unit 2 and 3, G/F, Block A, Po Lung Centre,

11 Wang Chiu Road, Kowloon Bay, Kowloon, Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480

No tests were sub-contracted.

4.5 Test Facility

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

• IAS Accreditation (Lab Code: TL-187)

SGS HONG KONGLimited has met the requirements of AC89, IAS Accreditation Criteria for Testing Laboratories, and has demonstrated compliance with ISO/IEC Standard 17025:2017, General requirements for the competence of testing and calibration laboratories. This organization is accredited to provide the services specified in the scope of accreditation maintained on the IAS website (www.iasonline.org).

The report must not be used by the client to claim product certification, approval, or endorsement by IAS, NIST, or any agency of the Federal Government.

FCC Recognized Accredited Test Firm(CAB Registration No.: 514599)

SGS HONG KONG Limited has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: HK0015, Test Firm Registration Number: 514599.

• Industry Canada (Site Registration No.: 26103; CAB Identifier No.: HK0015)

SGS HONG KONG Limited has been recognized by Department of Innovation, Science and Economic Development (ISED) Canada as a wireless testing laboratory. The acceptance letter from the ISED is maintained in our files. CAB Identifier No: HK0015, Site Registration Number: 26103.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

WMS32 Test Software

Minimum 6dB Bandwidth, Conducted Peak Output Power, Power Spectrum Density, Conducted Band **Edges Measurement, Conducted Spurious Emissions Equipment** Manufacturer **Model No Inventory No Cal Date** Cal Due Date SMBV100A VECTOR SMBV100A E234 2022/08/16 Rohde & Schwarz 2021/08/17 SIGNAL GENERATOR FSV40 SIGNAL Rohde & Schwarz FSV40 E235 2021/08/17 2022/08/16 ANALYZER 40GHz Wireless Conn. Tester Rohde & Schwarz CMW270 E240 2021/08/20 2022/08/19 (CMW) OSP OSP-B157W8 E242 Rohde & Schwarz 2021/04/20 2022/04/19 J12J103539-Cable Rohde & Schwarz E239 2021/09/17 2022/09/16 00-2

R&S

Conducted Emissions at Mains Terminals (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
EMI Test Receiver 9kHz to 3.6GHz	Rohde & Schwarz	ESR3 / 102326	E231	2021/08/17	2022/08/16	
Artificial Mains Network (LISN)	Schwarzbeck	NSLK 8127 / 8127312	E005	2021/04/13	2022/04/12	
Impulse Limiter	Rohde & Schwarz	ESH-3-Z2 / 357881052	E028	2021/07/15	2022/07/14	
EMC32 Test Software	R&S	Version 10	N/A			

Version 10

N/A

Radiated Spurious Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ChamPro	N/A	E229	2021/08/09	2022/08/08
Coaxial Cable	SGS	N/A	E167	2021/07/15	2022/07/14
EMI Test Receiver 9kHz to 7GHz	Rohde & Schwarz	ESR7 / 102298	E314	2021/04/26	2022/04/25
TRILOG Super Broadb. Test Antenna, (25) 30-1000 MHz	Schwarzbeck	9168-1110	E311	2020/02/13	2022/02/12
EMC32 Test software	Rohde & Schwarz	Version 10	N/A	N/A	N/A
Boresight Mast Controller	ChamPro	AM-BS-4500-E	E237	N/A	N/A
Turntable with Controller	ChamPro	EM1000	E238	N/A	N/A



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Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ChamPro	N/A	E229	2021/08/09	2022/08/08
Coaxial Cable	SGS	N/A	E167	2021/07/15	2022/07/14
EMI Test Receiver 9kHz to 7GHz	Rohde & Schwarz	ESR7 / 102298	E314	2021/04/26	2022/04/25
TRILOG Super Broadb. Test Antenna, (25) 30-1000 MHz	Schwarzbeck	9168-1110	E311	2020/02/13	2022/02/12
Signal and Spectrum Analyzer 2Hz - 26.5GHz	Rohde & Schwarz	FSW26	E296	2021/09/17	2022/09/16
Spectrum Analyzer 9kHz - 30GHz	Rohde & Schwarz	FSP30	E204	2020/03/11	2022/03/10
Horn Antenna 1 - 18GHz	Schwarzbeck	BBHA9120D	E211	2020/01/29	2022/01/28
Horn Antenna 15 - 40GHz	Schwarzbeck	BBHA9170	E212	2020/01/29	2022/01/28
Preamplifier 33dB, 1 - 18GHz	Schwarzbeck	BBV9718	E214	2019/04/24	2022/04/23
Preamplifier 33dB, 18 - 26.5GHz	Schwarzbeck	BBV9719	E215	2020/09/21	2022/09/20
Broadband Coaxial Preamplifier typ. 30 dB, 18-40GHz	Schwarzbeck	BBV 9721	E266	2021/09/17	2022/09/16
Highpass Filter 3.5-26.5GHz	Wainwright	WHNX3.5/26.5 G-6SS	E205	2019/04/24	2022/04/23
Band Reject Filter 2.4-2.5GHz	Wainwright	WRCJV 2400/2500- 2100	E206	2019/04/24	2022/04/23
RF cable SMA to SMA 10000mm	HUBER+SUHNER	SF104- 26.5/2*11SMA 45	E207-1	2021/09/17	2022/09/16
Boresight Mast Controller	ChamPro	AM-BS-4500-E	E237	N/A	N/A
Turntable with Controller	ChamPro	EM1000	E238	N/A	N/A



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General used equipmen	t				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Digital temperature & humidity data logger	SATO	SK-L200TH II	E232	2021/08/16	2022/08/15
Electronic Digital Thermometer with Hygrometer	nil	2074/2075	E159	2021/08/16	2022/08/15
Barometer with digital thermometer	SATO	7612-00	E218	2021/03/29	2022/03/28
Conditional Chamber	Zhong Zhi Testing Instruments	CZ-E-608D	E216	2021/08/17	2022/08/16



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

FCC Part 15 Subpart C Section 15.247 & 15.203 RSS-Gen Section 8.3

6.1.2 Conclusion

Standard Requirement:

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0 dBi.

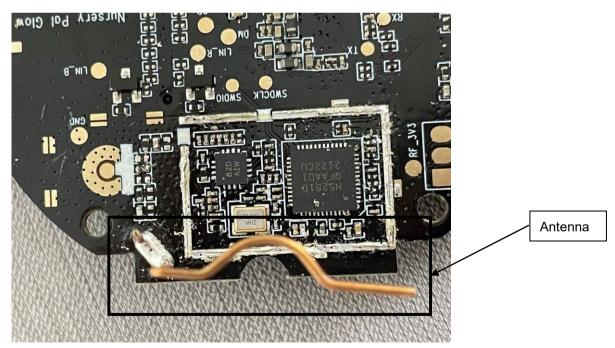


Photo of antenna refer to Appendix – Internal photo.



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7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207, RSS-Gen Section 8.8

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Francisco of amicaian/MII-	Conducted limit(dBµV)			
Frequency of emission(MHz)	Quasi-peak	Average		
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.				



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7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C Humidity: 51.2 % RH :

Test mode a :TX mode Keep the EUT in continuously transmitting mode with all modulation

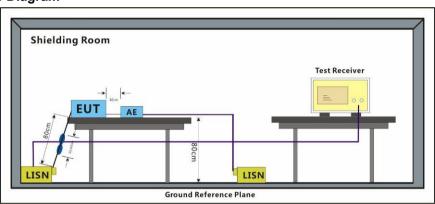
types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11q; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20)..11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

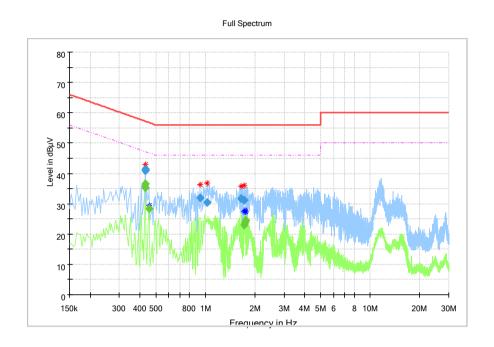
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50 \text{ohm}/50 \mu\text{H} + 5 \text{ohm}$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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Mode:a; Line: Live Line



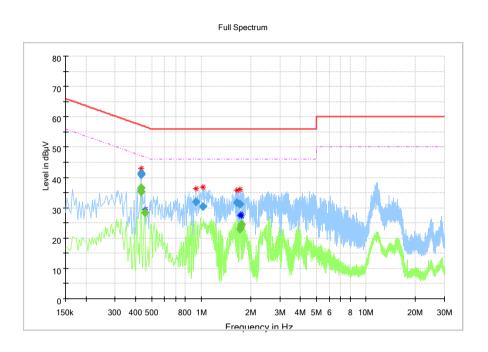
Frequency	QuasiPeak	Average	Limit	Margin	Corr.	- "
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)	Result
0.430000		36.60	47.25	10.65	10.1	Pass
0.430000	41.43		57.25	15.82	10.1	Pass
0.434000		35.29	47.18	11.89	10.1	Pass
0.434000	40.92		57.18	16.26	10.1	Pass
0.454000		28.43	46.80	18.37	10.1	Pass
0.926000	31.89		56.00	24.11	10.1	Pass
1.022000	30.43		56.00	25.57	10.1	Pass
1.642000	31.62		56.00	24.38	10.2	Pass
1.710000		23.12	46.00	22.89	10.2	Pass
1.718000	31.13		56.00	24.87	10.2	Pass
1.730000		23.72	46.00	22.28	10.2	Pass
1.750000		24.62	46.00	21.38	10.2	Pass



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Mode:a;

Line: Neutral Line



Frequency	QuasiPeak	Average	Limit	Margin	Corr.	5 "
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)	Result
0.430000		36.60	47.25	10.65	10.1	Pass
0.430000	41.43	-	57.25	15.82	10.1	Pass
0.434000		35.29	47.18	11.89	10.1	Pass
0.434000	40.92		57.18	16.26	10.1	Pass
0.454000		28.43	46.80	18.37	10.1	Pass
0.926000	31.89		56.00	24.11	10.1	Pass
1.022000	30.43		56.00	25.57	10.1	Pass
1.642000	31.62		56.00	24.38	10.2	Pass
1.710000		23.12	46.00	22.89	10.2	Pass
1.718000	31.13		56.00	24.87	10.2	Pass
1.730000		23.72	46.00	22.28	10.2	Pass
1.750000		24.62	46.00	21.38	10.2	Pass



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7.2 99% Bandwidth

Test Requirement RSS-Gen Section 6.6
Test Method: ANSI C63.10 Section 6.9.3

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C Humidity: 51.2 % RH

Test mode a:TX mode Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram

Spectrum Analyzer E.U.T Non-Conducted Table

Ground Reference Plane

7.2.3 Measurement Procedure and Data



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7.3 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C Humidity: 49.1 % RH

Test mode b:TX mode Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20)..11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram

Spectrum Analyzer E.U.T Non-Conducted Table

Ground Reference Plane

7.3.3 Measurement Procedure and Data



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7.4 Conducted Peak Output Power

Test Requirement 47 CFR Part 15 Subpart C 15.247:2019(b)(1) & 15.247(b)(3),

RSS-247 Section 5.4(b)

Test Method: ANSI C63.10 (2013) Section 7.8.5

7.4.1 E.U.T. Operation

Operating Environment:

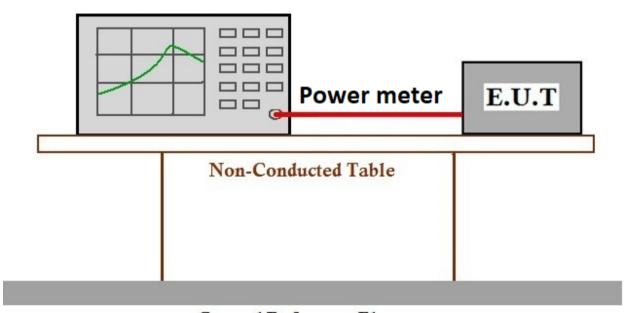
Temperature: 22.5 °C Humidity: 51.2 % RH

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

7.4.2 Test Setup Diagram



Ground Reference Plane

7.4.3 Measurement Procedure and Data



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7.5 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e), RSS-247 Clause 5.2(b)

Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit: ≤8dBm in any 3 kHz band during any time interval of continuous

transmission

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C Humidity: 49.1 % RH

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram

Spectrum Analyzer E.U.T Non-Conducted Table

Ground Reference Plane

7.5.3 Measurement Procedure and Data



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7.6 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247:2019(d), RSS-247 Section 5.5

Test Method: ANSI C63.10 (2013) Section7.8.6
Limit: In any 100 kHz bandwidth outside

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated

FCC Part15 C Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. only spurious emissions are permitted in any of the frequency bands listed below:

emission limits specified in §15.209(a) (see §15.205(c)

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

RSS-Gen Section 8.10 Restricted bands of operation.

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio



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apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, *Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).*

- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7 – Restricted frequency	MHz	GHz
bands* MHz		
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	* Certain frequency bands
8.37625 - 8.38675	1718.8 - 1722.2	listed in table 7 and in bands
8.41425 - 8.41475	2200 - 2300	above 38.6 GHz are
12.29 - 12.293	2310 - 2390	designated for licence-exempt applications. These frequency
12.51975 - 12.52025	2483.5 - 2500	 applications: These frequency bands and the requirements
12.57675 - 12.57725	2655 - 2900	that apply to related devices
13.36 - 13.41	3260 - 3267	are set out in the 200 and 300
16.42 - 16.423	3332 - 3339	series of RSSs.
16.69475 - 16.69525	3345.8 - 3358	301100 01 11000.
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		



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7.6.1 E.U.T. Operation

Operating Environment:

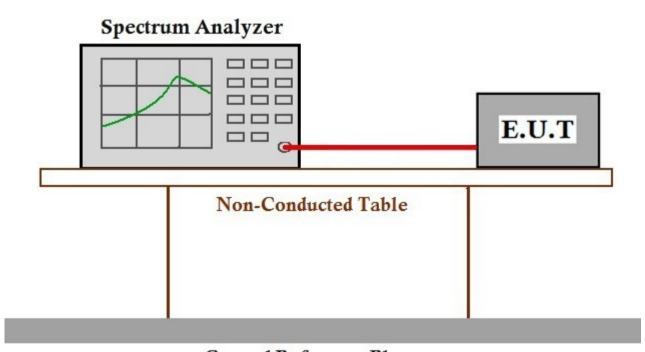
Temperature: 22.5 °C Humidity: 51.1 % RH :

Test mode a:TX mode Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

7.6.2 Test Setup Diagram



Ground Reference Plane

7.6.3 Measurement Procedure and Data



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7.7 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247:2019(d), RSS-247 Section 5.5

Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit: In any 100 kHz bandwidth outside the frequency band in which the spread

spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is

not required.

7.7.1 E.U.T. Operation

Operating Environment:

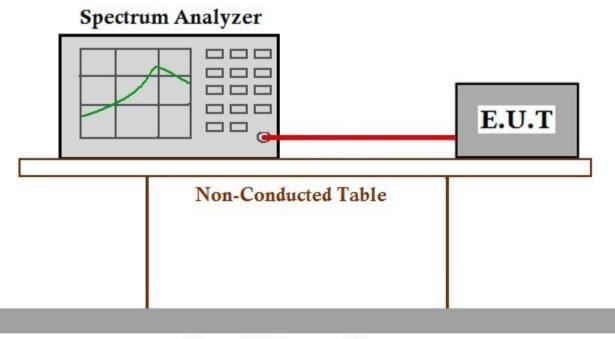
Temperature: 22.5 °C Humidity: 51.2 % RH

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

7.7.2 Test Setup Diagram



Ground Reference Plane

7.7.3 Measurement Procedure and Data



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7.8 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d), Section 3.3 & RSS-Gen

Section 8.9

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Table 5 - General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (μ V/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 6 - General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H- Field) (µ A/m)	Measurement distance (m)
9 - 490 kHz 1	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23.1 °C Humidity: 51.4 % RH

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation

types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

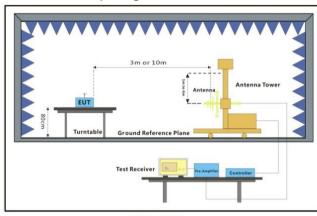
802.11n(HT20).

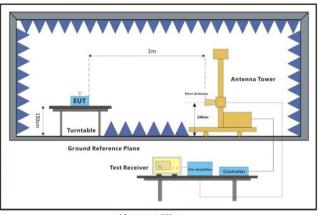
Only the data of worst case is recorded in the report.



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7.8.2 Test Setup Diagram





30MHz-1GHz

Above 1GHz

7.8.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.
- Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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Worse test reulst as shown below:

Mode: 802.11b

Frequency	Antenna	Emission Level (dBµV/m)		Limit (d	Result	
(MHz)	Polarization	Peak	Average	Peak	Average	Nesuit
2390.000	Н	61.2	49.2	74.0	54.0	Pass
2483.500	V	59.1	47.8	74.0	54.0	Pass

Mode: 802.11g

Frequency	Antenna	Emission Level (dBµV/m)		Limit (d	Result	
(MHz)	Polarization	Peak	Average	Peak	Average	Resuit
2390.000	Н	62.2	47.6	74.0	54.0	Pass
2483.500	V	60.9	48.9	74.0	54.0	Pass

Mode: 802.11n20

Frequency	Antenna	Emission Level (dBµV/m)		Limit (d	Result	
(MHz)	Polarization	Peak	Average	Peak	Average	Result
2390.000	V	61.9	47.8	74.0	54.0	Pass
2483.500	V	64.2	48.1	74.0	54.0	Pass



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7.9 Radiated Spurious Emissions

Test Requirement Section 3.3 & RSS-Gen Section 8.9

Test Method: ANSI C63.10 (2013) Section 6.4, 6.5 & 6.6

Limit:

Table 5 - General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (μ V/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 6 - General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H- Field) (Measurement distance (m)
9 - 490 kHz 1	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.



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7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C Humidity: 52.3 % RH :

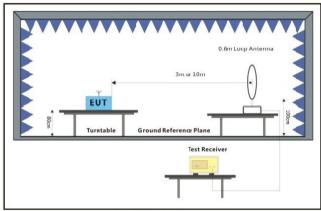
Test mode a:TX mode Keep the EUT in continuously transmitting mode with all modulation

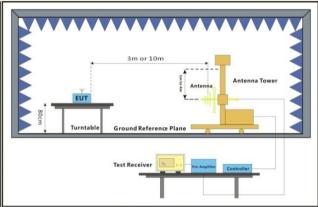
types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE

802.11n(HT20).

Only the data of worst case is recorded in the report.

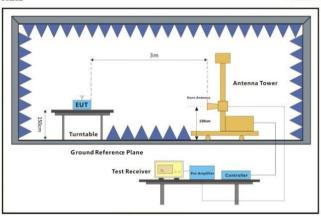
7.9.2 Test Setup Diagram





Below 30MHz

30MHz-1GHz



Above 1GHz



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7.9.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

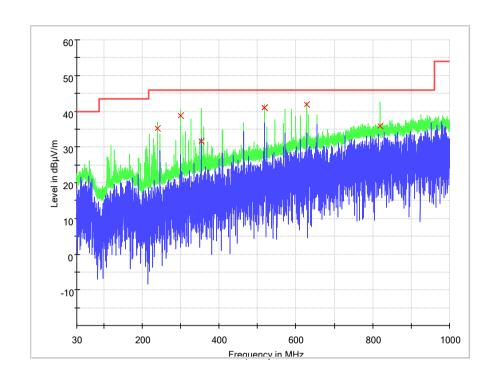
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

- 3) Scan from 9kHz to 40GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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802.11b Radiated emission below 1GHz Horizontal (worse plots was shown as below)

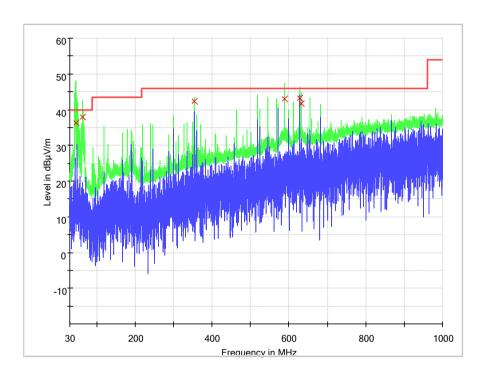


Frequency	QuasiPeak		Corr.	Margin	Limit	5 "
(MHz)	(dBµV/m)	Pol.	(dB/m)	(dB)	(dBµV/m)	Result
240.005000	35.3	Н	12.4	10.7	46.0	Pass
300.006429	38.8	Н	14.9	7.2	46.0	Pass
354.534286	31.7	Н	16.1	14.3	46.0	Pass
518.187143	41.0	Н	20.1	5.0	46.0	Pass
518.187143	41.0	Н	20.1	5.0	46.0	Pass
627.312143	41.8	н	22.3	4.2	46.0	Pass



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Vertical (worse plots was shown as below)



Frequency	QuasiPeak	Del	Corr.	Margin	Limit	Result
(MHz)	(dBµV/m)	Pol.	(dB/m)	(dB)	(dBµV/m)	Result
45.658571	36.3	V	14.1	3.7	40.0	Pass
63.118571	39.5	V	13.3	0.5	40.0	Pass
354.534286	42.3	٧	16.1	3.8	46.0	Pass
589.135714	43.0	٧	21.6	3.0	46.0	Pass
627.242857	43.2	٧	22.3	2.8	46.0	Pass
632.716429	41.6	٧	22.3	4.4	46.0	Pass



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Above 1GHz

Channel:Low

Frequency	Frequency Antenna Emission Level (dE		vel (dBµV/m)	Limit (d	BμV/m)	Remark
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1152.875	Н	41.7	/	74.0	54.0	Pass
3699.250	Н	47.2	/	74.0	54.0	Pass
4864.500	V	48.6	/	74.0	54.0	Pass
8191.000	Н	57.9	45.0	74.0	54.0	Pass
9574.000	V	57.8	44.9	74.0	54.0	Pass
11921.000	V	61.6	48.0	74.0	54.0	Pass

Channel:Middle

Frequency	requency Antenna Emission Level (dBμV/m)		Limit (d	BμV/m)	Remark	
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1923.600	V	41.2	/	74.0	54.0	Pass
4473.000	V	46.5	1	74.0	54.0	Pass
7892.000	Н	58.3	44.4	74.0	54.0	Pass
9691.500	Н	59.7	44.8	74.0	54.0	Pass
10667.500	V	61.2	46.7	74.0	54.0	Pass
11026.000	Н	62.8	47.7	74.0	54.0	Pass

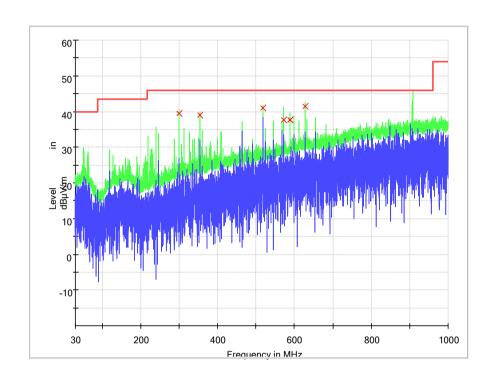
Channel: High

Frequency	requency Antenna Emission Level (dBμV/m)		Limit (d	BμV/m)	Remark	
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1143.875	V	39.9	/	74.0	54.0	Pass
1349.750	V	40.3	/	74.0	54.0	Pass
3926.250	Н	45.5	1	74.0	54.0	Pass
5014.500	V	51.6	1	74.0	54.0	Pass
8297.500	Н	58.2	45.0	74.0	54.0	Pass
10885.500	V	61.6	48.0	74.0	54.0	Pass



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802.11g Radiated emission below 1GHz Horizontal (worse plots was shown as below)

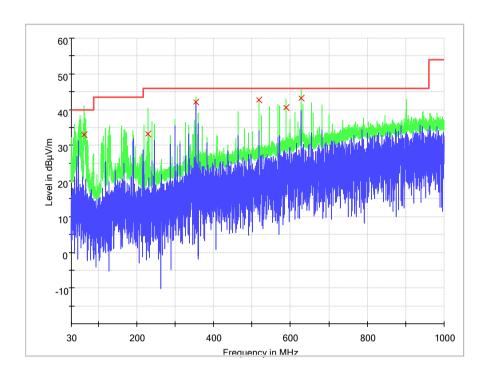


Frequency	QuasiPeak	Pol.	Corr.	Margin	Limit	Decult
(MHz)	(dBµV/m)	POI.	(dB/m)	(dB)	(dBµV/m)	Result
300.006429	39.4	Н	14.9	6.6	46.0	Pass
354.534286	39.0	Н	16.1	7.0	46.0	Pass
518.187143	41.1	Н	20.1	4.9	46.0	Pass
572.715000	37.6	Н	21.0	8.4	46.0	Pass
589.135714	37.7	Н	21.6	8.3	46.0	Pass
627.312143	41.4	Н	22.3	4.6	46.0	Pass



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Vertical (worse plots was shown as below)



Frequency	QuasiPeak	Pol.	Corr.	Margin	Limit	Result
(MHz)	(dBµV/m)		(dB/m)	(dB)	(dBµV/m)	
63.049286	32.9	V	13.3	7.1	40.0	Pass
230.027857	33.1	V	11.3	12.9	46.0	Pass
354.534286	42.2	V	16.1	3.8	46.0	Pass
518.187143	43.4	٧	20.1	2.6	46.0	Pass
589.066429	40.6	V	21.6	5.4	46.0	Pass
627.312143	43.9	V	22.3	2.1	46.0	Pass



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Above 1GHz

Channel:Low

Frequency	Antenna	Emission Level (dBµV/m)		Limit (Remark	
(MHz)	Polarization	Peak	Average	Peak	Average	Kemark
1906.370	V	44.1	/	74.0	54.0	Pass
4782.125	Н	48.7	1	74.0	54.0	Pass
5173.500	V	49.6	/	74.0	54.0	Pass
7899.000	V	57.2	45.3	74.0	54.0	Pass
8131.000	Н	58.3	44.7	74.0	54.0	Pass
10552.000	Н	62.4	48.0	74.0	54.0	Pass

Channel:Middle

Frequency	Antenna	Emission Level (dBµV/m)		Limit (d	dΒμV/m)	Remark
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1227.000	Н	42.3	/	74.0	54.0	Pass
3689.250	Н	46.9	/	74.0	54.0	Pass
4987.000	V	49.5	/	74.0	54.0	Pass
7899.000	Н	58.5	44.5	74.0	54.0	Pass
9288.500	V	58.7	47.8	74.0	54.0	Pass
10891.500	V	60.9	48.9	74.0	54.0	Pass

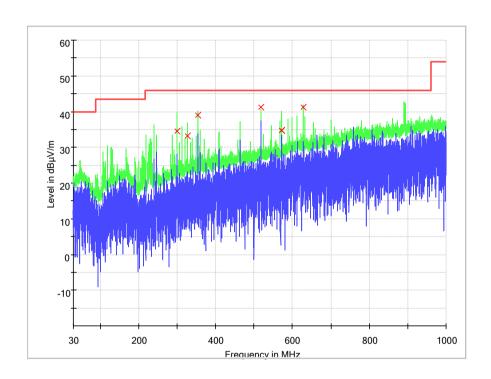
Channel: High

Frequency	Antenna	Emission Le	vel (dBµV/m)	Limit (d	Result	
(MHz)	Polarization	Peak	Average	Peak	Average	Result
1966.625	V	43.5	/	74.0	54.0	Pass
3790.875	V	46.1	/	74.0	54.0	Pass
5937.500	Н	49.4	/	74.0	54.0	Pass
8181.000	V	58.5	45.0	74.0	54.0	Pass
10921.000	Н	61.6	47.9	74.0	54.0	Pass
11563.000	V	61.7	48.9	74.0	54.0	Pass



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802.11n20 Radiated emission below 1GHz Horizontal (worse plots was shown as below)

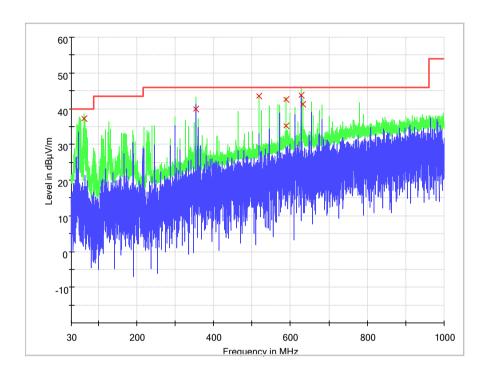


Frequency	QuasiPeak	Pol.	Corr.	Margin	Limit	Result
(MHz)	(dBµV/m)	POI.	(dB/m)	(dB)	(dBµV/m)	Result
300.006429	34.4	Н	14.9	11.6	46.0	Pass
327.235714	33.3	Н	15.8	12.7	46.0	Pass
354.534286	38.9	Н	16.1	7.1	46.0	Pass
518.187143	41.2	Н	20.1	4.9	46.0	Pass
572.715000	34.7	Н	21.0	11.3	46.0	Pass
627.312143	41.1	Н	22.3	4.9	46.0	Pass



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Vertical (worse plots was shown as below)



Frequency	QuasiPeak	Dal	Corr.	Margin	Limit	Decult
(MHz)	(dBµV/m)	Pol.	(dB/m)	(dB)	(dBµV/m)	Result
64.157857	37.3	Н	13.2	2.8	40.0	Pass
354.534286	40.0	Н	16.1	6.1	46.0	Pass
518.187143	43.6	Н	20.1	2.4	46.0	Pass
589.066429	42.5	Н	21.6	3.5	46.0	Pass
627.312143	43.5	Н	22.3	2.5	46.0	Pass
632.785714	41.2	Н	22.3	4.8	46.0	Pass



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Above 1GHz

Channel:Low

Frequency	Antenna	Emission Le	vel (dBµV/m)	Limit (d	BμV/m)	Remark
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1906.000	Н	45.4	/	74.0	54.0	Pass
4785.500	V	49.4	/	74.0	54.0	Pass
5077.000	Н	48.2	/	74.0	54.0	Pass
7561.500	V	53.4	/	74.0	54.0	Pass
8590.500	Н	58.1	45.0	74.0	54.0	Pass
10495.500	V	62.4	48.2	74.0	54.0	Pass

Channel:Middle

Frequency	Antenna	Antenna Emission Level (dBμV/m) Limit (dBμV/m)		Remark		
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1886.375	V	43.9	/	74.0	54.0	Pass
2184.375	V	41.5	/	74.0	54.0	Pass
4948.000	Н	47.2	1	74.0	54.0	Pass
8321.700	Н	58.3	44.2	74.0	54.0	Pass
9378.000	V	59.4	45.1	74.0	54.0	Pass
10491.000	V	60.5	46.8	74.0	54.0	Pass

Channel: High

Frequency	Antenna	Emission Le	vel (dBµV/m)	Limit (dBµV/m)		Remark
(MHz)	Polarization	Peak	Average	Peak	Average	Remark
1216.000	V	41.9	/	74.0	54.0	Pass
1853.250	V	42.3	/	74.0	54.0	Pass
4929.000	V	47.6	1	74.0	54.0	Pass
7324.000	V	56.7	43.2	74.0	54.0	Pass
10512.500	Н	58.6	46.6	74.0	54.0	Pass
11415.000	V	61.9	47.6	74.0	54.0	Pass



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Photographs 8

Remark: Photos refer to Appendix: External Photo, Internal Phot, and Setup Photo



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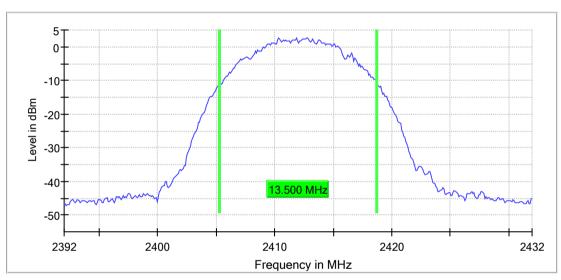
9 Appendix

9.1 99% Bandwidth

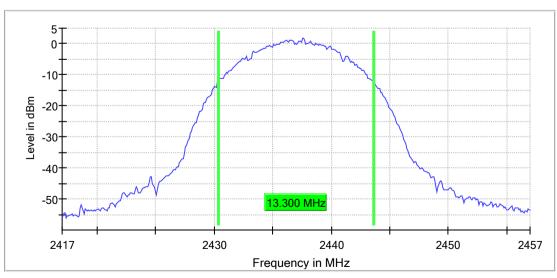
802.11b:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	13.500000			2405.250000	2418.750000
2437.000000	13.300000			2430.350000	2443.650000
2462.000000	13.500000			2455.250000	2468.750000

99 % Bandwidth



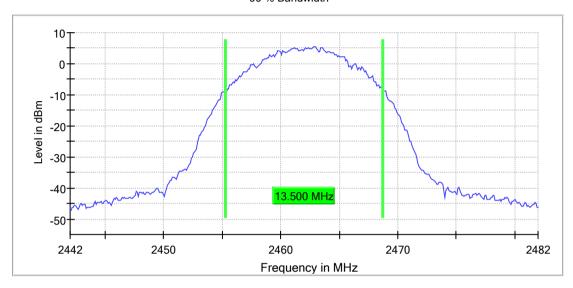
99 % Bandwidth





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99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	>= 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	400	~ 400
Sweeptime	47.266 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	32 / max. 150	max. 150
Stable	3/3	3
Max Stable Difference	0.22 dB	0.30 dB

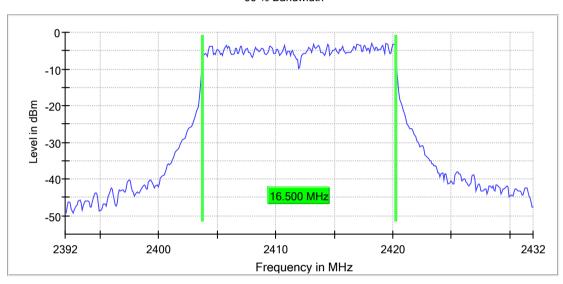


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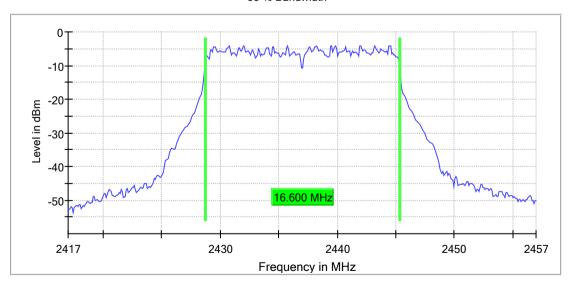
802.11g:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	16.500000			2403.750000	2420.250000
2437.000000	16.600000			2428.750000	2445.350000
2462.000000	16.600000			2453.650000	2470.250000

99 % Bandwidth



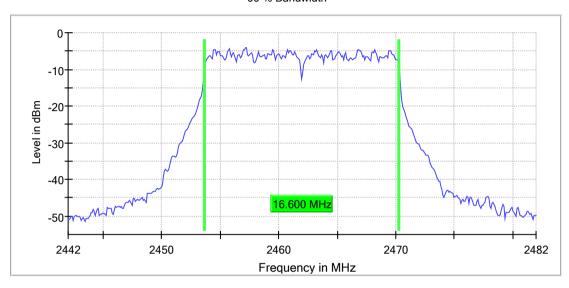
99 % Bandwidth





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99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	>= 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	400	~ 400
Sweeptime	47.266 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	31 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.06 dB	0.30 dB

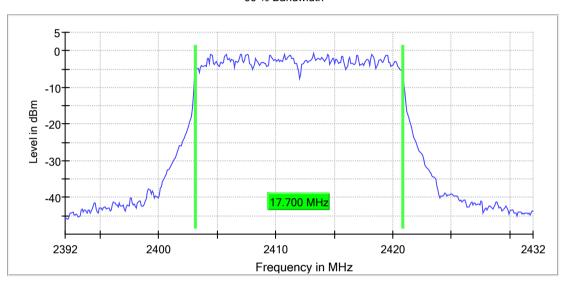


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802.11n20:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	17.700000			2403.150000	2420.850000
2442.000000	17.700000			2433.150000	2450.850000
2462.000000	17.700000			2453.150000	2470.850000

99 % Bandwidth



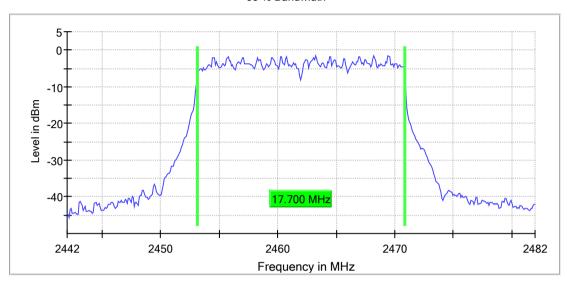
99 % Bandwidth





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99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	>= 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	400	~ 400
Sweeptime	47.266 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	22 / max. 150	max. 150
Stable	3/3	3
Max Stable Difference	0.17 dB	0.30 dB



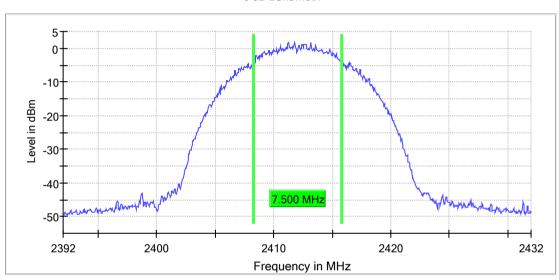
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9.2 Minimum Emission Bandwidth 6 dB

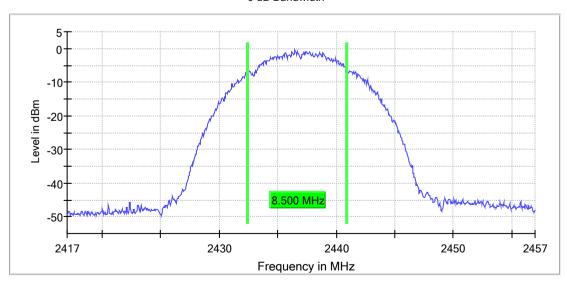
802.11b:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	7.500000	0.500000		2408.275000	2415.775000
2437.000000	8.500000	0.500000		2432.425000	2440.925000
2462.000000	8.850000	0.500000		2457.525000	2466.375000

6 dB Bandwidth



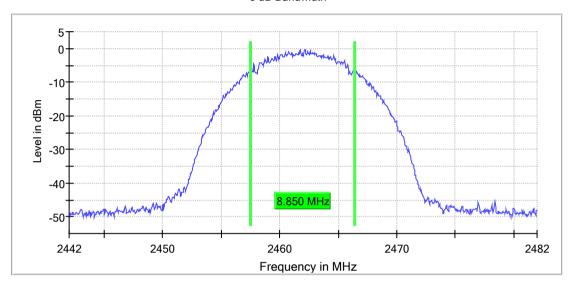
6 dB Bandwidth





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6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	800	~ 800
Sweeptime	94.922 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	53 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.40 dB	0.50 dB

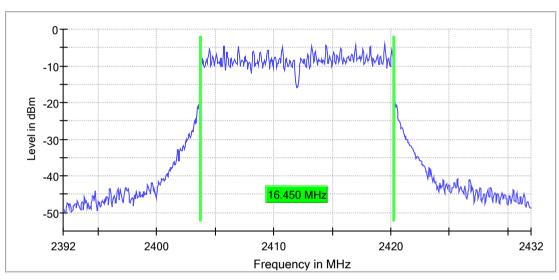


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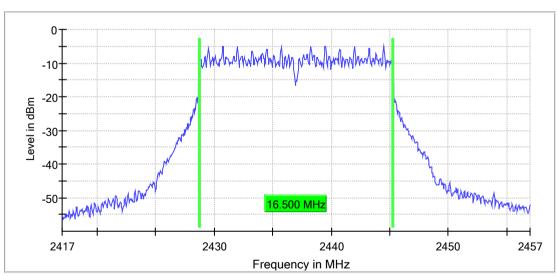
802.11g:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	16.450000	0.500000		2403.775000	2420.225000
2437.000000	16.500000	0.500000		2428.725000	2445.225000
2462.000000	16.550000	0.500000		2453.725000	2470.275000

6 dB Bandwidth



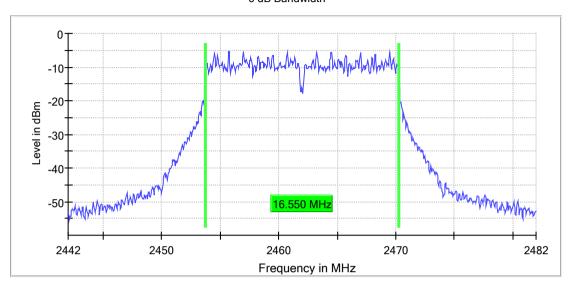
6 dB Bandwidth





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6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	800	~ 800
Sweeptime	94.922 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	18 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.27 dB	0.50 dB

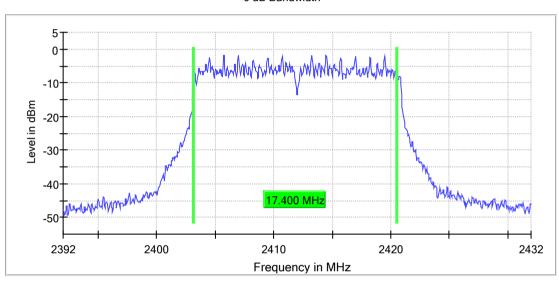


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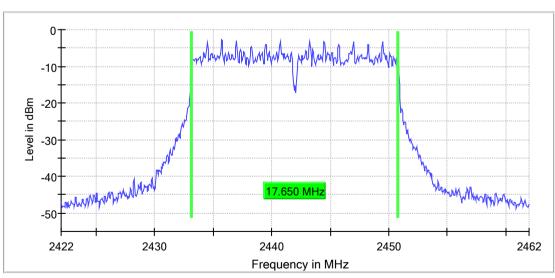
802.11n20:

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2412.000000	17.400000	0.500000		2403.125000	2420.525000
2442.000000	17.650000	0.500000		2433.125000	2450.775000
2462.000000	17.700000	0.500000		2453.125000	2470.825000

6 dB Bandwidth



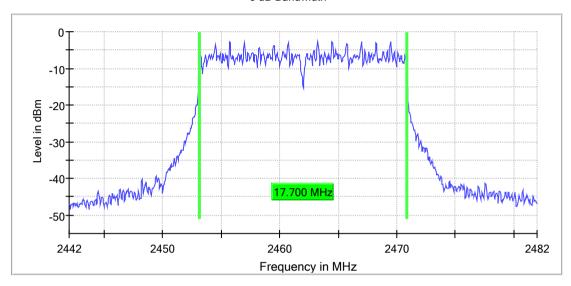
6 dB Bandwidth





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6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	800	~ 800
Sweeptime	94.922 us	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	23 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.09 dB	0.50 dB



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9.3 RF output power

Operation Mode	DUT Frequency (MHz)	Limit Max (dBm)	Gated Level (dBm)	Result
802.11b	2412.000000	30.0	13.0	PASS
802.11b	2437.000000	30.0	11.8	PASS
802.11b	2462.000000	30.0	12.5	PASS
802.11g	2412.000000	30.0	11.4	PASS
802.11g	2437.000000	30.0	9.6	PASS
802.11g	2462.000000	30.0	10.1	PASS
802.11n20	2412.000000	30.0	10.8	PASS
802.11n20	2437.000000	30.0	10.0	PASS
802.11n20	2462.000000	30.0	9.8	PASS

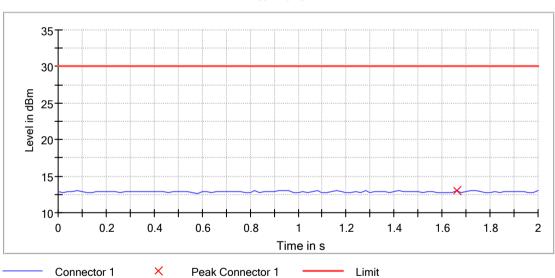
Remark: Antenna gain: 0 dBi

Remark: Cable loss 0.8dB was considered and set in system configuration.

(only worst case shown)

802.11b:



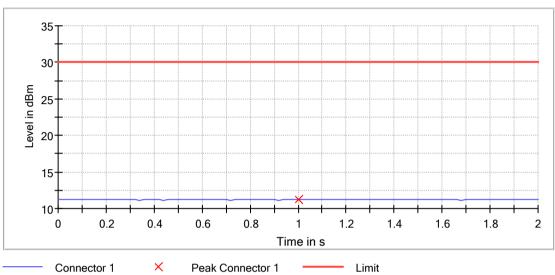




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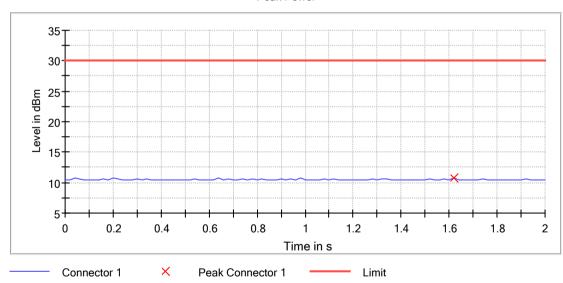
802.11g:





802.11n20:

Peak Power





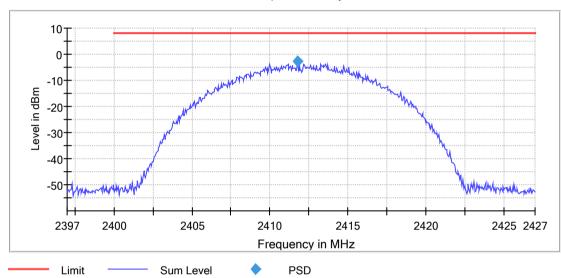
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9.4 Power Spectral Density

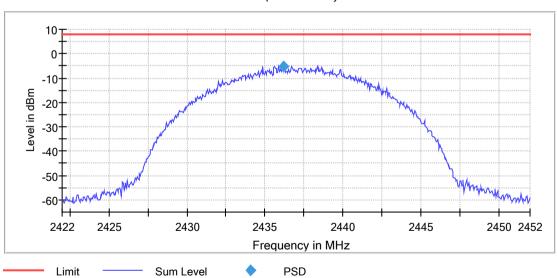
802.11b:

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2411.775000	-2.867	8.0	PASS
2437.000000	2436.225000	-5.143	8.0	PASS
2462.000000	2462.525000	-4.987	8.0	PASS

Power Spectral Density



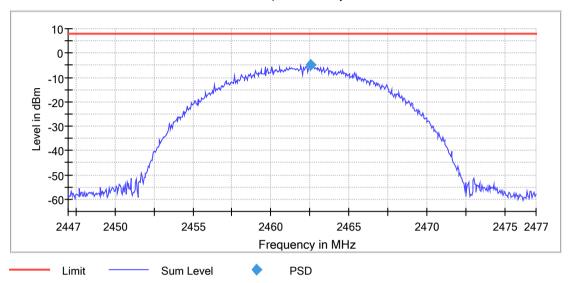
Power Spectral Density





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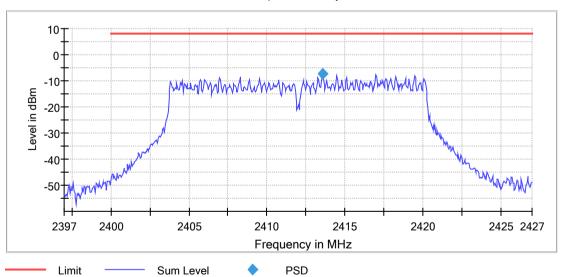
Power Spectral Density



802.11g:

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2413.575000	-7.440	8.0	PASS
2437.000000	2441.975000	-9.104	8.0	PASS
2462.000000	2466.975000	-9.236	8.0	PASS

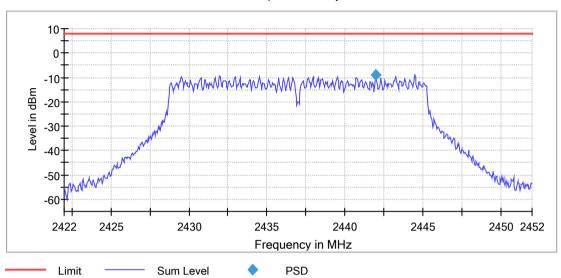
Power Spectral Density



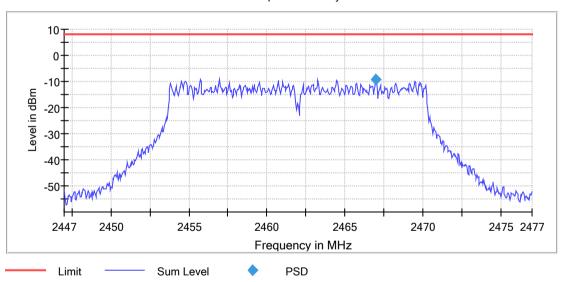


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Power Spectral Density



Power Spectral Density



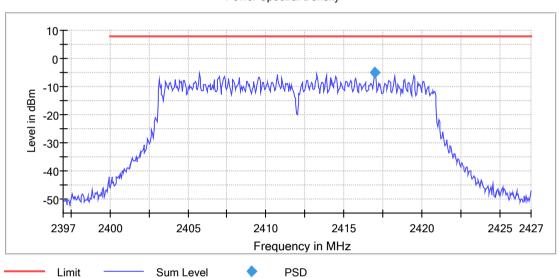


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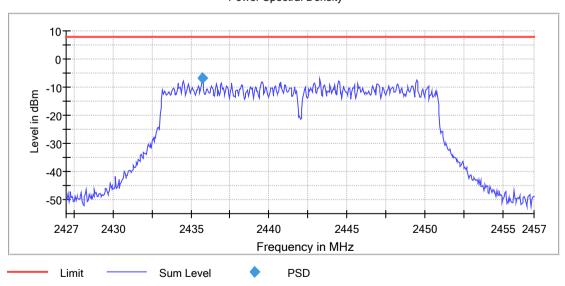
802.11n20:

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2416.975000	-5.060	8.0	PASS
2442.000000	2435.725000	-6.671	8.0	PASS
2462 000000	2466 975000	-6 072	8.0	PASS

Power Spectral Density



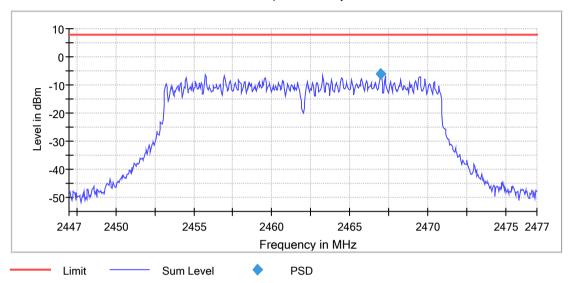
Power Spectral Density





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Power Spectral Density



Measurement

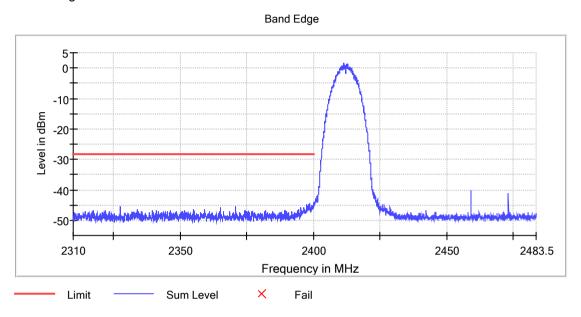
Setting	Instrument Value	Target Value
Span	30.000 MHz	30.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	600	~ 600
Sweeptime	12.000 ms	12.000 ms
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	80 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.27 dB	0.50 dB



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9.5 Band Edge

802.11b Band Edge Low



Inband Peak

Frequency	Level
(MHz)	(dBm)
2411.375000	1.7

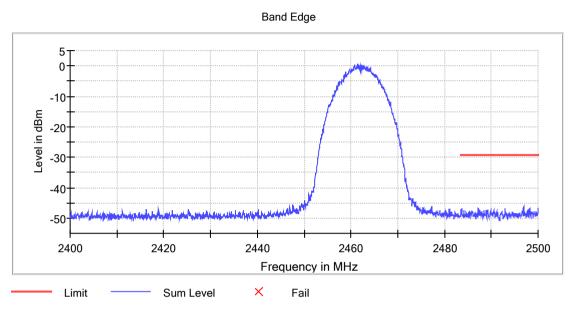
Remark: Limit = Inband peak - 30dB

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2398.525000	-44.5	16.2	-28.3	PASS
2398.425000	-44.6	16.3	-28.3	PASS
2398.375000	-44.6	16.3	-28.3	PASS
2398,575000	-44.7	16.4	-28.3	PASS
2397.525000	-44.8	16.5	-28.3	PASS
2397.475000	-44.8	16.5	-28.3	PASS
2399.725000	-45.0	16.7	-28.3	PASS
2398.075000	-45.1	16.8	-28.3	PASS
2399.375000	-45.2	16.9	-28.3	PASS
2399.625000	-45.2	17.0	-28.3	PASS
2397.875000	-45.3	17.0	-28.3	PASS
2398.025000	-45.4	17.1	-28.3	PASS
2399.675000	-45.4	17.1	-28.3	PASS
2399.575000	-45.4	17.1	-28.3	PASS
2370.975000	-45.5	17.2	-28.3	PASS



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802.11b Band Edge High



Inband Peak

Frequency	Level
(MHz)	(dBm)
2461.475000	0.8

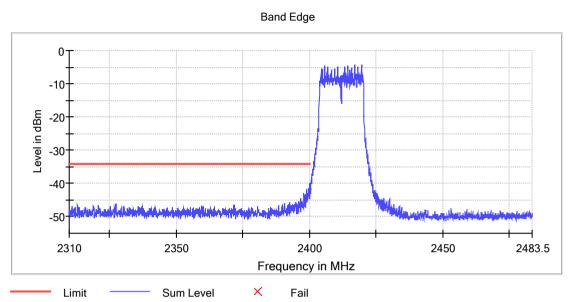
Remark: Limit = Inband peak - 30dB

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2496.925000	-46.1	16.8	-29.2	PASS
2496.975000	-46.5	17.2	-29.2	PASS
2496.875000	-46.7	17.4	-29.2	PASS
2492.975000	-46.7	17.5	-29.2	PASS
2498.225000	-46.8	17.6	-29.2	PASS
2483.675000	-46.8	17.6	-29.2	PASS
2499.975000	-46.8	17.6	-29.2	PASS
2500.000000	-46.8	17.6	-29.2	PASS
2487.225000	-46.8	17.6	-29.2	PASS
2496.825000	-46.9	17.7	-29.2	PASS
2483.525000	-46.9	17.7	-29.2	PASS
2498.175000	-47.0	17.8	-29.2	PASS
2483.725000	-47.0	17.8	-29.2	PASS
2487.325000	-47.1	17.8	-29.2	PASS
2487.275000	-47.2	18.0	-29.2	PASS



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802.11g Band Edge Low



Inband Peak

Frequency	Level
(MHz)	(dBm)
2419.525000	-4.1

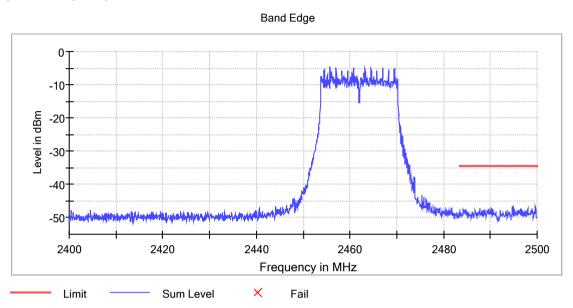
Remark: Limit = Inband peak - 30dB

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.825000	-41.4	7.3	-34.1	PASS
2399.875000	-41.7	7.6	-34.1	PASS
2399.025000	-41.9	7.8	-34.1	PASS
2399.975000	-42.0	7.9	-34.1	PASS
2398.975000	-42.3	8.2	-34.1	PASS
2399.925000	-42.4	8.3	-34.1	PASS
2399.775000	-42.7	8.6	-34.1	PASS
2397.975000	-42.9	8.8	-34.1	PASS
2398.025000	-43.1	9.0	-34.1	PASS
2398.625000	-43.1	9.0	-34.1	PASS
2399.275000	-43.1	9.0	-34.1	PASS
2399.225000	-43.2	9.1	-34.1	PASS
2399.425000	-43.3	9.2	-34.1	PASS
2399.625000	-43.3	9.2	-34.1	PASS
2399.675000	-43.4	9.3	-34.1	PASS



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802.11g Band Edge High



Inband Peak

Frequency	Level
(MHz)	(dBm)
2455,775000	-4.5

Remark: Limit = Inband peak - 30dB

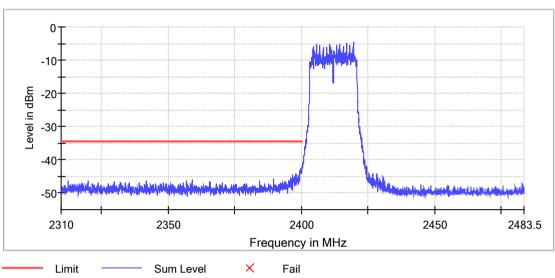
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2494.775000	-46.6	12.1	-34.5	PASS
2499.675000	-46.6	12.1	-34.5	PASS
2494.675000	-46.8	12.3	-34.5	PASS
2494.625000	-46.8	12.3	-34.5	PASS
2494.725000	-46.8	12.3	-34.5	PASS
2499.625000	-47.1	12.6	-34.5	PASS
2497.975000	-47.1	12.6	-34.5	PASS
2490.225000	-47.2	12.7	-34.5	PASS
2498.025000	-47.2	12.7	-34.5	PASS
2487.775000	-47.3	12.8	-34.5	PASS
2487.725000	-47.3	12.8	-34.5	PASS
2499.725000	-47.3	12.8	-34.5	PASS
2489.625000	-47.4	12.9	-34.5	PASS
2495.175000	-47.4	12.9	-34.5	PASS
2490.275000	-47.4	12.9	-34.5	PASS



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802.11n20 Band Edge Low





Inband Peak

Frequency	Level
(MHz)	(dBm)
2419.525000	-4.6

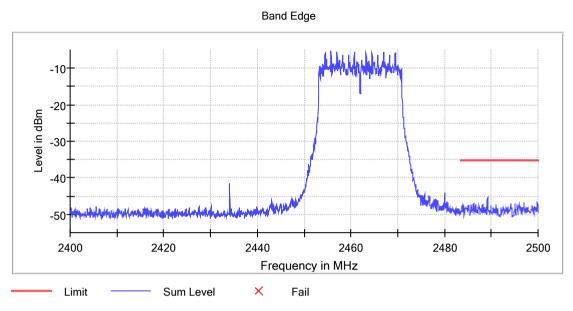
Remark: Limit = Inband peak - 30dB

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.725000	-42.5	8.0	-34.6	PASS
2399.675000	-42.5	8.0	-34.6	PASS
2399.625000	-43.0	8.4	-34.6	PASS
2399.575000	-43.1	8.5	-34.6	PASS
2399.525000	-43.3	8.7	-34.6	PASS
2399.475000	-43.4	8.8	-34.6	PASS
2399.875000	-43.5	8.9	-34.6	PASS
2399.775000	-43.8	9.3	-34.6	PASS
2399.825000	-44.0	9.4	-34.6	PASS
2399.925000	-44.0	9.4	-34.6	PASS
2397.925000	-44.0	9.5	-34.6	PASS
2397.975000	-44.2	9.6	-34.6	PASS
2399.975000	-44.2	9.7	-34.6	PASS
2396.675000	-44.5	9.9	-34.6	PASS
2398.225000	-44.6	10.0	-34.6	PASS



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802.11n20 Band Edge High



Inband Peak

Frequency (MHz)	Level
2455 775000	-5.1

Remark: Limit = Inband peak - 30dB

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.225000	-45.3	10.2	-35.1	PASS
2489.275000	-45.7	10.5	-35.1	PASS
2489.175000	-45.9	10.7	-35.1	PASS
2499.875000	-46.7	11.6	-35.1	PASS
2497.025000	-46.8	11.7	-35.1	PASS
2495.075000	-46.9	11.8	-35.1	PASS
2496.975000	-47.0	11.9	-35.1	PASS
2494.125000	-47.1	11.9	-35.1	PASS
2486.225000	-47.1	12.0	-35.1	PASS
2489.325000	-47.1	12.0	-35.1	PASS
2495.025000	-47.2	12.0	-35.1	PASS
2499.825000	-47.2	12.1	-35.1	PASS
2494.175000	-47.2	12.1	-35.1	PASS
2485.725000	-47.3	12.1	-35.1	PASS
2496.025000	-47.3	12.1	-35.1	PASS



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Measurement

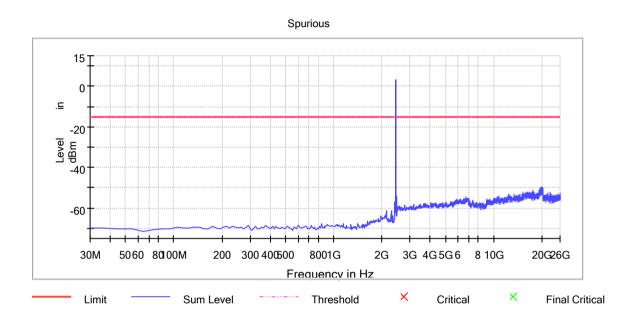
Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	19 / max. 150	max. 150
Stable	3/3	3
Max Stable Difference	0.29 dB	0.50 dB



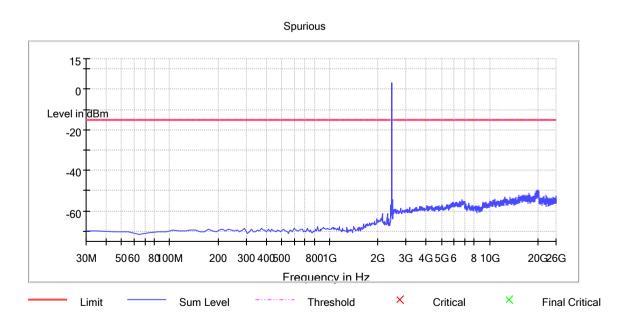
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9.6 Conducted spurious emission

(Only worst case is shown) 802.11b



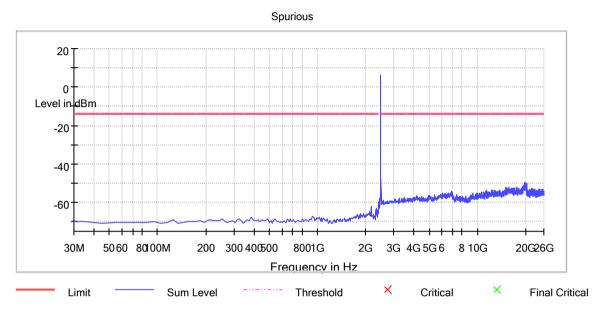
802.11g





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Measurement Setting

Setting	Instrument Value	Target Value			
RBW	100.000 kHz	<= 100.000			
VBW	300.000 kHz	>= 300.000			
SweepPoints	238	~ 238			
Sweeptime	23.700 ms	AUTO			
Reference Level	-10.000 dBm	-30.000 dBm			
Attenuation	20.000 dB	AUTO			
Detector	MaxPeak	MaxPeak			
SweepCount	3	3			
Filter	3 dB	3 dB			
Trace Mode	Max Hold	Max Hold			
Sweeptype	Sweep	AUTO			
Preamp	off	off			
Stablemode	Trace	Trace			
Stablevalue	0.50 dB	0.50 dB			
Run	14 / max. 40	max. 40			
Stable	3/3	3			
Max Stable Difference	0.00 dB	0.50 dB			

Remark: Cable loss 0.8dB was considered and set in system configuration.

- End of the Report -