

# GD Midea Heating & Ventilating Equipment Co., Ltd.

# TEST REPORT

SCOPE OF WORK EMC TESTING-KJRH-120L2/BMWFNKDOU-E

**REPORT NUMBER** 241108165GZU-003

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DOCUMENT CONTROL NUMBER FCC ISED WIFI © 2021 INTERTEK



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Manufacturing Site	:	Same as Applicant
Intertek Report No:		241108165GZU-003
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# Test standards 47 CFR PART 15 Subpart C: 2023 section 15.247 RSS-247 Issue 3: August 2023 RSS-Gen Issue 5: April 2018+A1: March 2019+A2: February 2021 Sample Description

Product	:	Wired Controller
Model No.	:	KJRH-120L2/BMWFNKDOU-E
Electrical Rating	:	12V DC
Serial No.	:	Test sample 1
Date Received	:	08 November 2024
Date Test	:	03 December 2024-04 December 2024
Conducted		

Prepared and Checked By

Approved By:

Richard Liu

Richard Liu Engineer

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Dean Liu Sr. Project Engineer

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Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

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# **1.0 TEST RESULT SUMMARY**

Test Item	Test Requirement	Test Method	Result			
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203 RSS-Gen Clause 8.3	FCC PART 15 C section 15.247 (c) and Section 15.203 RSS-Gen Clause 6.8	PASS			
6 dB Bandwidth (DTS bandwidth) 99% Bandwidth	FCC PART 15 C section 15.247 (a)(2) RSS-247 Clause 5.2(a)	ANSI C63.10: Clause 11.8 RSS-Gen clause 6.7	PASS			
Maximum Average Conducted Output Power and E.I.R.P	FCC PART 15 C clause 5.247(b)(3) RSS-247 Clause 5.4(d)	ANSI C63.10: Clause 11.9.2.3.1 RSS-Gen clause 6.12	PASS			
Peak Power Spectral Density	FCC PART 15 C section 15.247(e) RSS-247 Clause 5.2(b)	ANSI C63.10: Clause 11.10.2 RSS-Gen clause 6.13	PASS			
Out of Band Conducted Emissions	FCC PART 15 C section 15.209 &15.247(d) RSS-247 Clause 5.5	ANSI C63.10: Clause 11.11 RSS-Gen clause 6.13	PASS			
Radiated Emission	FCC PART 15 C section 15.209 &15.247(d) RSS-247 Clause 3.3 &5.5	ANSI C63.10: Clause 11.11, 11.12.1, 6.4, 6.5 and 6.6 RSS-Gen clause 6.13, 8.10	PASS			
Band Edges Measurement	FCC PART 15 C section 15.247 (d) &15.205 RSS-247 Clause 5.5	ANSI C63.10: Clause 11.11 and 11.13 RSS-Gen clause 6.13	PASS			
Conducted Emissions at Mains TerminalsFCC PART 15 C section 15.207 RSS-Gen Clause 8.8ANSI C63.10: Clause 6.2PASS						
Remark: N/A: not applicable. Refer to the relative section for the details. EUT: In this whole report EUT means Equipment Under Test. 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 Radio Frequency. ANSI C63.10: the detail version is ANSI C63.10:2013 in the whole report HVIN: KJRH-120L2/BMWFNKDOU-E PMN: Wired Controller						

FVIN:N/A

HMN:N/A



# **TEST REPORT**

# 2.0 General Description

#### 2.1 Product Description

Operating Frequency:	2412 MHz to 2462 MHz for 802.11b/g/n(HT20)
Type of Modulation:	802.11b: DSSS(CCK/QPSK/BPSK)
	802.11g: OFDM(BPSK/QPSK/16QAM/64QAM)
	802.11n: OFDM (BPSK/QPSK/16QAM/64QAM)
Transmit Data Rate:	802.11b :1/2/5.5/11 Mbps
	802.11g :6/9/12/18/24/36/48/54 Mbps
	802.11n(HT20): 6.5/13/19.5/26/39/52/58.5/65 Mbps/72.2Mbps
Number of Channels	11 Channels for 802.11b/g/n(HT20)
Channel Separation:	5 MHz
Antenna Type	PCB antenna
Function:	Wired Controller with 2.4 GHz WIFI
EUT Power Supply:	12V DC

EUT channels and frequencies list:

For 802.11b/g/n(HT20): test frequencies are lowest channel 1: 2412 MHz, middle channel 6: 2437 MHz and highest channel 11: 2462 MHz.

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



# **TEST REPORT**

#### 2.2 Related Submittal(s) Grants

This is an application for certification of: DTS- Part 15 Digital Transmission Systems (WIFI transmitter portion)

Remaining portions are subject to the following procedures: 1. Receiver portion of WIFI: exempt from technical requirement of this Part.

#### 2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

#### 2.4 Test Facility

All tests were performed at: Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China Except Conducted Emissions was performed at: Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China

A2LA Certificate Number 0078.10

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is recognized by ISED, the ISED Conformity Assessment Body Identification Number (CAB ID) is CN0024.

## **3.0** System Test Configuration

#### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply



# TEST REPORT

voltages during testing. During testing, AC power line was manipulated to produce worst case emissions. It was powered by AC 120V/60Hz supply.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. The spurious emissions more than 20 dB below the permissible value are not reported.

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Frequency range of radiated emission measurements

#### Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device	Number of	Location in frequency
operates	frequencies	range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

#### 3.2 EUT Exercising Software

Description	Manufacturer	Model No.	SN/Version	Supplied by
For fixing frequency	VANDYKE	secureCRT	Version:V8.1.4	Client



#### **3.3** Special Accessories

No special accessories used.

#### 3.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
	20 dB Bandwidth	
1	6dB Bandwidth	2.3%
	99% Bandwidth	
2	Carrier Frequencies Separated	2.3%
3	Dwell Time	1.2%
4	Maximum Peak Conducted Output Power	1.5dB
5	Peak Power Spectral Density	1.5dB
6	Out of Band Conducted Emissions	1.5dB
7	Band edges measurement	1.5dB
		3.64 dB (9 kHz-30 MHz)
		4.26 dB (30 MHz-1 GHz)
	Radiated Emissions	4.46 dB (1 GHz-6 GHz)
8		4.96 dB (6 GHz-18 GHz)
		5.15dB (18GZH-26GHz)
		5.15dB (26GZH-40GHz)
9	Conducted Emissions at Mains Terminals	2.58dB
10	Temperature	0.5 °C
11	Humidity	0.4 %
12	Time	1.2%

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with ETSI TR 100 028-2001. The measurement uncertainty is given with a confidence of 95%, k=2.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value



#### 3.5 Equipment Modification

Any modifications installed previous to testing by GD Midea Heating & Ventilating Equipment Co., Ltd. will be incorporated in each production model sold / leased in the United States and Canada.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

#### 3.6 Support Equipment List and Description

This product was tested with corresponding support equipment as below:

#### Support Equipment

Description	Model No.	Rating	Supplied by
NoteBook	Latitude 5420	100-240V,50/60Hz	Intertek
Load box		120V/60Hz	Clinet

#### Cable

Description	Model No.	Connector type	Cable length/type	Supplied by
Antenna cable	RF-01	SMA	0.2 m(shielded)	Intertek
USB cable		USB-A	2.0 m(shielded)	Client
Control cable			1.0 m(shielded)	Client



# 4.0 Measurement Results

#### 4.1 Antenna Requirement

Standard requirement:

15.203 requirement:

For intentional device. According to 15.203 an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

RSS-GEN section 8.3

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licenceexempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 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.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

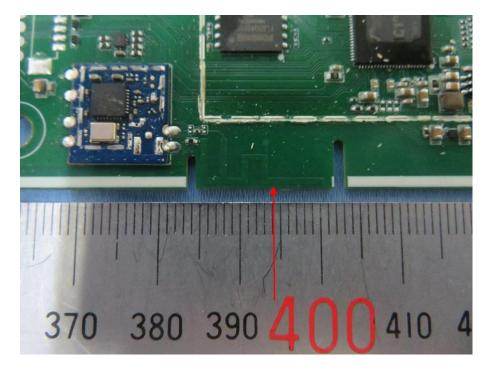
Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

EUT Antenna

The antenna is an integral antenna and no consideration of replacement. The best case gain of the antenna is 1.78 dBi as declared by applicant.



# **TEST REPORT**



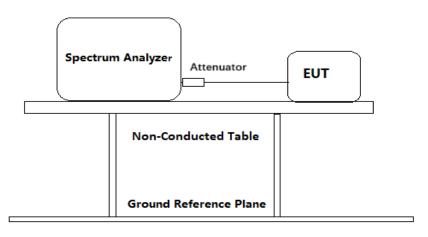


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#### 4.2 6 dB Bandwidth (DTS bandwidth)

Test Requirement:	FCC Part 15 C section 15.247 RSS-247 Clause 5.2(a)
	<ul> <li>(a)(2)Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.</li> <li>5.2 Digital transmission systems</li> </ul>
	DTSs include systems that employ digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to the bands 902-928 MHz and 2400-2483.5 MHz: a) The minimum 6 dB bandwidth shall be 500 kHz.
Test Method:	ANSI C63.10: Clause 11.8 RSS-Gen clause 6.7
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

#### Test Configuration:



#### Test Procedure:

- 1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1dB, with a 10dB attenuator) from the antenna port to the spectrum.
- 2. Set the spectrum analyzer:
  - a) Set RBW = 100 kHz
  - b) Set the VBW  $\geq$  [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.

- h) Span=2\*BW~5\*BW
- 3. Repeat until all the test status is investigated.
- 4. Report the worst case.

#### **Used Test Equipment List**

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured 6dB bandwidth (MHz)	Limit	Result
1	2412		1 Mbps	9.03		Pass
6	2437	802.11b	1 Mbps	8.97		Pass
11	2462		1 Mbps	9.03		Pass
1	2412		6 Mbps	10.25		Pass
6	2437	802.11g	6 Mbps	10.30		Pass
11	2462		6 Mbps	10.25	≥500KHz	Pass
1	2412	802.11n	6.5 Mbps	10.30	2200⊻⊔2	Pass
6	2437	(HT20)	6.5 Mbps	10.25		Pass
11	2462		6.5 Mbps	10.30		Pass

#### 6 dB bandwidth

#### 99% bandwidth

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured 99%bandwidth (MHz)	Limit	Result
1	2412		1 Mbps	12.21		Pass
6	2437	802.11b	1 Mbps	12.21		Pass
11	2462		1 Mbps	12.21		Pass
1	2412		6 Mbps	12.56		Pass
6	2437	802.11g	6 Mbps	12.62		Pass
11	2462		6 Mbps	12.85		Pass



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1	2412	802.11n	6.5 Mbps	13.26	/	Pass
6	2437	(HT20)	6.5 Mbps	13.26		Pass
11	2462		6.5 Mbps	13.14		Pass



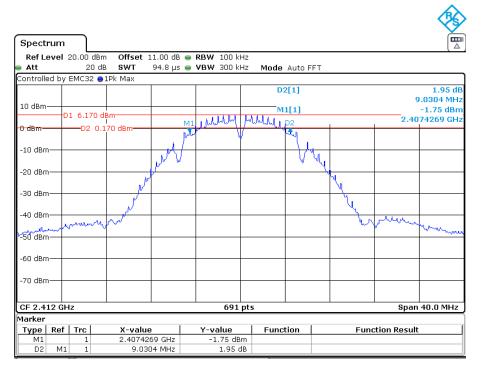
# **TEST REPORT**

#### **Result plot as follows:**

#### 6dB bandwidth:

802.11b mode with 1Mbps data rate

Channel 1: 2.412GHz



#### Channel 6: 2.437GHz:

Spectr	um	$\neg$	Spe	ctrum 2	X	Sp	ectrum 3	X	) s	pectrum	4	X		
Ref Le	evel	20.00	dBm	Offset	11.00 dB	•	<b>RBW</b> 100 kl	Ηz			_			
🗕 Att		20	) dB	SWT	94.8 µs	•	<b>VBW</b> 300 ki	Hz M	ode	Auto FFT				
Controlle	d by	EMC32	: <mark>0</mark> 1P	k Max										
									D2	2[1]				0.30 dB
10 dBm-									_				1	3.9725 MHz
10 0.0	— D	1 5.68	0 dBn	n		M1		11.11	MC L A	1[1]				-0.23 dBm 24848 GHz
0 dBm	_	D2	-0.32	20 dBm			unun	pr.n.	MU		-		2.70	24040 0112
						pM	l I	1		ta i				
-10 dBm	-		_		- N	$\vdash$				- Hu	-			
					NN V	/				- V V.				
-20 dBm	-		-							1	<b>.</b>			
				, l	v						N.			
-30 dBm	-			ſ							+	1		
				N.								4		
-40 dBm		pound		1								la	mar.	
∿ <del>S®°¢</del> ₿m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ponto	-Ψ	~8								<i></i>	٣ ×	mann
-30 ubiii														
-60 dBm	_													
-70 dBm	_				_						-			
CF 2.43	17 GF	17					691	nts					Snar	40.0 MHz
Marker							0,71						opui	
	Ref	Trc		X-valu	ie		Y-value	F	unct	rction Function Result			: I	
M1		1			848 GHz		-0.23 dB							
D2	M1	1		8.97	725 MHz		0.30 c	В						

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# **TEST REPORT**

#### Channel 11: 2.462GHz:

												<b></b>
Spectr	um	1	Spe	ectrum 2	X	Spectr	um 3	X	Spectr	um 4 🛛 🕱		(m)
Ref Le	evel	20.0	00 dBm	Offset	11.00 dB	RBW	100 kHz					( - )
🛢 Att			20 dB	SWT	94.8 µs	🕳 VBW	300 kHz	Mod	le Auto F	FT		
Controlle	ed by	y EM¢	32 🔵 1	.Pk Max								
									D2[1]			0.24 dB
10 dBm-											9	9.0304 MHz
TO UBIII-		01.5	.620 dB						M1[1]			-0.51 dBm
0 dBm-			1			M1 LM	MM	MM	_ D2	1	2.45	574848 GHz
			02 -0.3	80 dBm		paper	Y					
-10 dBm					wy				V	N.		
-20 dBm				J	P					- Yu		
-30 dBm				<u> </u>						- Yu		
-40 dBm		w	m	rw -						- W	men	him
∿sordBm												mann
-60 dBm												
-70 dBm	-											
CF 2.46	52 G	Hz					691 p	ts			Spar	1 40.0 MHz
Marker												
Туре	Ref	f   Tr	_	X-value			alue		nction	Fun	ction Resul	t
M1 D2	М	1	1	2.45748 9.03	48 GHz D4 MHz	-0	).51 dBm 0.24 dB					

802.11g mode with 6Mbps data rate

Channel 1: 2.412GHz:

Spectrum	Spectrum 2 🛛 🛛	Spectrum 3	Spectrum	4 🛞	
Ref Level 20.00	dBm Offset 11.00 d	18 👄 RBW 100 kHz			
Att 🗧	20 dB <b>SWT</b> 94.8 j	is 😑 VBW 300 kHz	Mode Auto FFT		
Controlled by EMC:	32 😑 1 Pk Max				
			D2[1]		-0.07 dB
10.10					10.2460 MHz
10 dBm			M1[1]		-4.81 dBm
D1 18	350 dBm	and added the and			2.4068480 GHz
U UBIII		Mine and all we	White and white		
-	2 -4.150 dBm	7 4	A Contraction of the second se		
-10 dBm		1	- Wy		
	and and a second second		men	h	
-20 dBm				<u>₿</u>	
				II.	
-30 dBm	- And			1	
	alla Martheren			m	Murphlynn
-40 dBm	upon 1				MAAAA
mon	×				I TOMAN
NSO dBm					- Cannon -
-60 dBm					
-70 dBm					
CF 2.412 GHz		691 pt	5		Span 40.0 MHz
Marker		1 .			
Type Ref Tro		Y-value	Function	Fund	ction Result
	1 2.406848 GHz				
D2 M1 :	1 10.246 MHz	-0.07 dB			

Channel 6: 2.437GHz:



Spectrum Sp	ectrum 2 🛛 🗴	Spectrum 3	Spectru	m 4 🛛 🗶	
RefLevel 20.00 dBm Att 20 dB		<ul> <li>RBW 100 kHz</li> <li>VBW 300 kHz</li> </ul>	Mode Auto FF	т.	
Controlled by EMC32 🔵		_			
10 dBm			M1[1]		-6.92 dBm 2.4317902 GHz 2.41 dB 10.3039 MHz
0 dBm D1 1.440 d	Bm	why and a start and a	Martin Lando		10.3039 (4112
-10 dBm	560 dBm	pro para para para para para para para p	4		
-20 dBm	hooming			wy	
-30 dBm	when			- L	
-40 dBm	and the second s			- Www	Minhulwennes
~50 dBm					- Charles
-60 dBm					
-70 dBm					
CF 2.437 GHz		691 pts			Span 40.0 MHz
Marker					
Type Ref Trc	X-value	Y-value	Function	Fun	ction Result
M1 1 D2 M1 1	2.4317902 GHz 10.3039 MHz	-6.92 dBm 2.41 dB			

#### Channel 11: 2.462GHz:

Spectr	um	Υ	Spec	trum 2	×	Spec	trum 3	X	Spectru	um 4	X		
Ref Le	evel	20.00	dBm	Offset	11.00 dB	😑 RB'	N 100 kH:	2					
🔵 Att		2	) dB	SWT	94.8 µs	👄 VB'	<b>И</b> 300 kH:	2 Mode	Auto F	FT			
Controlle	ed by	EMC32	2 😑 1 P	k Max									
10 dBm-									1[1] 2[1]				-5.37 dBm 568480 GHz 0.50 dB 10.2460 MHz
U dBm—	D	1 1.01	- I	0 dBm	N	Burren		hydraette ar an	ung2				0.2400 MH2
-10 dBm			-		- week				- <del>1</del> 8 - ~ v	w			
-20 dBm	-		+		/ I								
-30 dBm				North							have a		
-40 dBm	mb	what	hout	Now							~~~~	munu	here when the second
-60 dBm													0.0000000
-70 dBm													
								-					
CF 2.46	52 GH	z					691 p	ts				Spa	n 40.0 MHz
Marker Type	Ref	Trc		X-valu	ie 🔤	<u>Y</u> -	value	Func	tion		Fun	ction Resu	lt
M1 D2	M1	1			848 GHz 246 MHz		-5.37 dBm 0.50 dB						
	-												

# 802.11n(HT20) mode with 6Mbps data rate

Channel 1: 2.412GHz:



Spectrum	pectrum 2 🛛 🗴	Spectrum 3	Spectru	ım 4 🛛 🕱	
Ref Level 20.00 de		😑 RBW 100 kHz			
Att 20		💿 <b>VBW</b> 300 kHz	Mode Auto Fl	FT	
Controlled by EMC32 (	●1Pk Max				
			M1[1]		-3.99 dBm 2.4068480 GHz
10 dBm			D2[1]		2.408480 GHZ -0.44 dB
					10.3039 MHz
0 dBm D1 2.240	dBm .	Alexandra Lan	two www.		10.0005 mil2
D2 -	3.760 dBm	<b>₹</b>	<u> </u>		
-10 dBm		(			
	and the second second		~	Welling .	
-20 dBm				<u> </u>	
-30 dBm				- Yu	
	www.			where a	Muthoman
-40 dBm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Mak
-40 dBm					Munne
~58 BBM					- wolling and
-60 dBm					
-70 dBm					
05.0.410.00					
CF 2.412 GHz		691 pts			Span 40.0 MHz
Marker					
Type Ref Trc	2.406848 GHz	Y-value -3.99 dBm	Function	Fund	tion Result
D2 M1 1	2.406848 GHZ 10.3039 MHz	-3.99 dBm -0.44 dB			
	10.3039 MHZ	-0,44 ub			

#### Channel 6: 2.437GHz:

D1         D2         3.820 dBm         Mg	Spect	rum	$\neg$	Spec	ctrum 2	2 🗴	S	pectr	um 3	X	Spectro	um 4	+ X		
Controlled by EMC32 ● 1Pk Max         M1[1]         -4.39 dBm           10 dBm         D2[1]         0.03 dB           0 dBm         D2 -3.820 dBm         10.2460 MHz           -10 dBm         D2 -3.820 dBm         4           -20 dBm         -20 dBm         -4.39 dBm           -30 dBm         -4.39 dBm         -4.39 dBm           -20 dBm         -4.39 dBm         -4.39 dBm           -20 dBm         -4.44         -4.44           -30 dBm         -4.44         -4.44           -70 dBm         -4.44         -4.44	Ref L	evel	20.00	dBm	Offset	11.00 dE	•	RBW	100 kH	z					
10 dBm     M1[1]     -4.39 dBm       10 dBm     0.24318480 GHz     0.03 dB       0 dBm     D2 [1]     0.03 dB       0 dBm     D2 -3.820 dBm     0       -10 dBm     -20 dBm     -4.0       -20 dBm     -4.0     -4.0       -30 dBm     -4.0     -4.0       -70 dBm     -4.0     -4.0	🗎 Att		20	) dB	SWT	94.8 µs		VBW	300 kH	z Moo	<b>ie</b> Auto F	FT			
10 dBm     0.1 2.180 dBm     0.03 dB       0 dBm     02[1]     10.2460 MHz       0 dBm     02 -3.820 dBm     0       -10 dBm     02 -3.820 dBm     0       -20 dBm     0     0       -30 dBm     0       -30 dBm	Controlle	ed by	EMC32	<b>○</b> 1P	k Max										
0 dBm     D2 -3.820 dBm       -10 dBm     D2 -3.820 dBm       -20 dBm     -0.00000000000000000000000000000000000	10 dBm														318480 GHz 0.03 dB
-10 dBm     -20 dBm     -10 dBm	0 ID		01 2.18	0 dBr	۱ <del></del>	_		nunne	MADDL A	naria Astin	dul .			1	0.2460 MHz
-20 dBm	и авт-		D2	-3.82	0 dBm		1 Ambrill		Ŵ		4 4				
-20 dBm	-10 dBm	+י		+		al walk and					- 702	w.			
-40 dBm	-20 dBm	<u>ו</u> רי		+	/	M							4		
-60 dBm70 dB	-30 dBr	<u>+</u>		+	mond								- Courosa		
-60 dBm70 dB	-40 dBm	<u>ا</u> -۲	mm	von									V	W WWWWWW	
-70 dBm 691 pts Span 40.0 MHz Marker	50-d8h	punk	/*	-											and appendix
CF 2.437 GHz 691 pts Span 40.0 MHz Marker	-60 dBrr	<u>+</u>		+											
Marker	-70 dBrr	<b>-</b> +		+											
		37 GI	Ηz						691 p	ıts				Spa	n 40.0 MHz
			1 - 1							1 -					
Type Ref Trc X-value Y-value Function Function Result		Ref									nction		Fund	ction Resul	t
M1         1         2.431848 GHz         -4.39 dBm           D2         M1         1         10.246 MHz         0.03 dB		M1						-4							

## Channel 11: 2.462GHz:



Spectrum Sp	ectrum 2 🛛 🗴	Spectrum 3	Spectru	um 4 🛛 🗴	
Ref Level 20.00 dBn		👄 RBW 100 kHz			
Att 20 di		👄 VBW 300 kHz	Mode Auto F	FT	
Controlled by EMC32 😑	1Pk Max				
			D2[1]		-0.36 dB
10 dBm					10.3039 MHz
20 0.0.11			M1[1]		-5.28 dBm 2.4568480 GHz
0 dBm D1 0.820 d	Bm	- Parton the second second	mat.		2.4308480 GHZ
o dom	180 dBm	Party and the	2 million and the		
-10 dBm	100 UBIII	)	<u> </u>		
10 0011	1 Martin		2 mg	weather.	
-20 dBm	antone			When a	
-20 0011	/			1	
-30 dBm					
-50 0011	1 M				
-40 dBm	N			where we are	
	Jour 1				Mulan marcal and and
					manul parts
- ae-ae-a					0
-60 dBm					
-00 0611					
-70 dBm					
-70 ubiii					
CF 2.462 GHz		691 pts			Span 40.0 MHz
Marker					
Type Ref Trc	X-value	Y-value	Function	Fun	ction Result
M1 1	2.456848 GHz	-5.28 dBm			
D2 M1 1	10.3039 MHz	-0.36 dB			

# **Result plot as follows:**

#### 99% bandwidth:

802.11b mode with 1Mbps data rate

Channel 1: 2.412GHz

Spectr	um		Spectrum 2	×									
e Att			db SWT	11.00 dB 38.1 μs				Mode	Auto F	FT			
Controlle	d by	EMC32	●1Pk Max	1									
10 dBm-						M1	M		1[1] cc Bw				6.57 dBm 14790 GHz 82344 MHz
0 dBm—	+			T1	M	ww	<u> </u>	***W	₩ 1 ₽	2			
-10 dBm·	+			NA						h			
-20 dBm			~~							0	by		
-30 dBm·											"hy i	2	
$\sim$	v	$\sim \sim$	MP ~								v.	N. N	mon
-50 dBm·													
-60 dBm·	+												
-70 dBm·													
CF 2.41	2 G⊦	łz		·		691	pts					Span	40.0 MHz
Marker													
	Ref	Trc	X-value		Y-	value		Funct	ion		Fund	tion Result	
M1 T1		1	2.4114	79 GHz		6.57 dBi -6.89 dBi		0	c Bw			10 01/11	32344 MHz
T2		1	2.40592			-8.29 dBi -8.29 dBi		00	.u D₩			12.2141	52344 MHZ

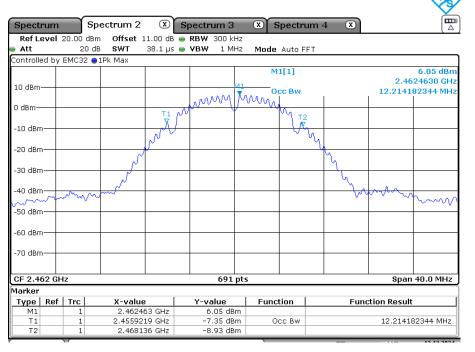
Channel 6: 2.437GHz:

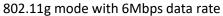


# **TEST REPORT**

						<b></b>
Spectrum	Spectrum 2	Spect	rum 3	X Spectru	ım 4 🕱	
	D dB <b>SWT</b> 38	00 dB 🔵 RBV 3.1 μs 🔵 VBV		Mode Auto Fl	FT	
Controlled by EMC32	2 😑 1Pk Max	1		M1[1]		6.26 dBm
10 dBm			M1			2.4364790 GHz 12.214182344 MHz
0 dBm		T1 N	m			
-10 dBm		N.		\X.	Ъ.	
-20 dBm	- Ar	,			-1 <u>h</u>	
-30 dBm						
-40 dBm	m					
-50 dBm						
-60 dBm						
-70 dBm						
CF 2.437 GHz			691 pts			Span 40.0 MHz
Marker		1				
TypeRefTrcM11	X-value 2.436479	GHz	olue 6.26 dBm	Function	Func	tion Result
T1 1 T2 1	2.4309219 2.443136		7.14 dBm 8.61 dBm	Occ Bw		12.214182344 MHz

Channel 11: 2.462GHz:





Channel 1: 2.412GHz:



Spectr	um	) S	pectrum 2	X	Spectr	um 3	×s	pectri	um 4	. 🗶		
Ref Le	evel :	20.00 dB	m Offset 1	.1.00 dB (	RBW	300 kHz				-		
Att 🗧		20 c	IB SWT	38.1 µs (	VBW	1 MHz	Mode	Auto F	FT			
Controlle	d by	ЕМСЗ2 🤇	1Pk Max									
							M	1[1]			2.4	6.24 dBm 111320 GHz
10 dBm-						M1	0	CC BW			12.561	505065 MHz
0 dBm—					~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m				
				T1								
-10 dBm				and the second second					m			
-20 dBm	_		/							\		
										$\mathbf{X}$		
-30 dBm	-									-m	~	
-40 dBm	_ (	M	~~~~								h	
~~~~~	יץ~	V									- Contraction	mm
-50 dBm	-		-								-	
-60 dBm												
-70 dBm	_											
CF 2.41	2 GH	z				691 pt	5				Spa	n 40.0 MHz
Marker												
Туре	Ref	Trc	X-value		Y-va	alue	Func	tion		Fur	nction Resul	t
M1		1	2.4111			.24 dBm						
T1		1	2.40563			.28 dBm	0	cc Bw			12.5615	505065 MHz
T2		1	2.41819	39 GHz	-8	.42 dBm						

#### Channel 6: 2.437GHz:

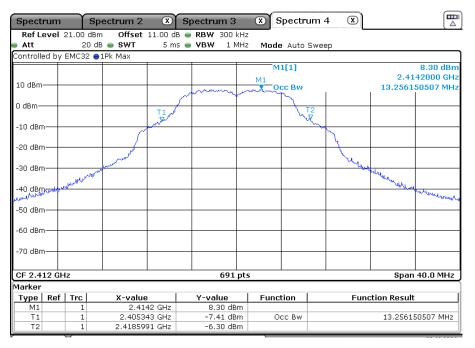
Spectru	Im	Υ	Spe	ctrum	12	X	s	pectr	um 3		X	Spectru	um 4	1 🗵	)			
Ref Lev	el 2	20.00 (	зВт	Offse	et 1	1.00 dl	3 👄	RBW	300 k	Hz					-			
Att 🗧			) dB	SWT		38.1 µ	s 😑	VBW	1 M	Hz	Mod	e Auto F	FT					
Controllec	by	EMC32	•1	°k Max														
											I	M1[1]				2	43/	6.41 dBm 46850 GHz
10 dBm—	+							M.	<u> </u>	m		Occ Bw						2185 MHz
0 dBm—			_							٢		-						
-10 dBm-							1						7					
-10 0011					1	~~							m	\				
-20 dBm-					1													
-30 dBm-			_											<u> </u>				
-40 dBm-		n	$\mathcal{N}$	· · ·											$\sim$	m., a	_	
mm	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~															υų	mm
-50 dBm-			-															
-60 dBm-	_																	
-70 dBm-																		
CF 2.43	GH	z						1	691	pts		-				Sp	ban	40.0 MHz
Marker																		
Type   I	lef	Trc		X-va	alue			Y-ve	alue		Fun	ction		F	unc	tion Res	sult	
M1		1				85 GHz			.41 dB									
T1		1				24 GHz			.16 dB	_		Occ Bw				12.61	1939	2185 MHz
T2		1		2.44	3251	L8 GHz		-7	.83 dB	m								

#### Channel 11: 2.462GHz:



Spect	rum	S	bectrum 2	× s	pectrum 3	× :	Spectru	ım 4	×		
	evel :	21.00 dB			RBW 300 k				_		
Att			B 👄 SWT	5 ms 🧉	VBW 1M	Hz Mod	e Auto S	Sweep			
Controlle	ed by	ЕМСЗ2 🧲	1Pk Max								
						M	1[1]				7.01 dBm
10 dBm·					M1						599160 GHz
TO UPIN.					untin	Company Company	CC BW			12.8509	40666 MHz
0 dBm—				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	P	,	$\sim$				
u asm—				T1.			<b>Δ</b> τ2	, I			
10 40				No to Me			LT2	ζ.			
-10 dBm	'			p <sup>on</sup>				M			
-20 dBm			/					- N			
-20 UBII											
			1 mm						$\sim$		
-30 dBm		alleral Road	Maria						- MAN	1.1.1	Mutahula
		hund the								Windry .	
-40 dBm	June	du <sup>ar</sup>								- vw	Mulules 1.
											0. outlo
-50 dBm											
-60 dBm											
-70 dBm	<u>ו</u> וי										
CF 2.40	52 GH	z	•		691	ots	•			Spar	40.0 MHz
Marker											
Type	Ref	Trc	X-value	.	Y-value	Fund	tion		Fund	tion Result	t
M1		1	2.4599	16 GHz	7.01 dBr	n					
Τ1		1	2.45551	66 GHz	-7.71 dBm Occ Bw 12.850940			40666 MHz			
T2		1	2.46836	76 GHz	-8.33 dBr	n					

# 802.11n(HT20) mode with 6.5Mbps data rate Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



Spectrum	Sp	ectrum 2	_	Spectrum 3	X	Spectru	um 4	×		
Ref Level				🖷 RBW 300 k						
Att		e swt	5 ms	<b>● VBW</b> 1 M	1Hz Mo	<b>de</b> Auto	Sweep			
Controlled by	EMC32 😑	1Pk Max								]
						M1[1]				7.14 dBm
					М1					78100 GHz
10 dBm				and marken	Jam	Occ Bw			13.2561	50507 MHz
			1	-	<i>"</i>	M.				
0 dBm			T1			- \ ·	F2			
			T1 Tur			Les May	X,			
-10 dBm							- market			
							1			
-20 dBm		, j						1		
		CHANNEL .						Walked and		
-30 dBm	a dal	from the						- Aldrew	ha .	
-30 dBm -40 dBm	. Marth Store								- Annual	
-40 dBm	dial and a second								There we are a second	the mallower the
and a start and a start										murente
-50 dBm										
-60 dBm										
-70 dBm										
CF 2.437 GH	Ηz			691	pts				Span	40.0 MHz
Marker										i
	Trc	X-value		Y-value	Eur	nction		Fund	tion Result	· 1
M1 M1	1		31 GHz	7.14 dB						
T1	1	2.4303		-7.54 dB		Occ Bw			13.2561	50507 MHz
T2	1	2.44359	91 GHz	-7.81 dB	n					

#### Channel 11: 2.462GHz:

Spectrum	S	pectrum 2	X	Spectru	m 3	× s	pectri	um 4	X		
Ref Level	21.00 dB	m Offset	11.00 dB	RBW	300 kHz				_		
🖷 Att	20 c	ib 👄 SWT	5 ms	👄 VBW	1 MHz	Mode	Auto	Sweep			
Controlled by	ЕМСЗ2 🤇	1Pk Max									
						M	[1]			2.46	6.35 dBm 04370 GHz
10 dBm				- N		00	c Bw				76266 MHz
0 dBm			- f	martine a	~~~~~	- m	m				
			T1 Weber				- W	2 12			
-10 dBm		r							<u> </u>		
-20 dBm		+									
-30 dBm		Jan							Maria		
40 d0m	In AM	Mary							" Vuly	which a	
-40 dBm	Tru.									and a	evennen
-50 dBm											
-60 dBm											
-70 dBm											
CF 2.462 GH	lz				691 pts					Span	40.0 MHz
Marker											
Type Ref	Trc	X-value		Y-val		Funct	ion		Func	tion Result	:]
M1	1	2.4604			35 dBm						
T1	1	2.45540			DO dBm	00	c Bw			13.1403	76266 MHz
T2	1	2.46854	12 GHz	-9.:	19 dBm						



# **TEST REPORT**

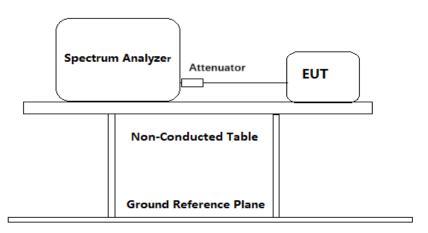
#### 4.3 Duty Cycle

Test Requirement:FCC KDB 558074 D01 15.247 Meas Guidance v05r02, Clause<br/>6Test Method:ANSI C63.10: Clause 11.6Test Status:Pre-Scan has been conducted to determine the worst-case<br/>mode from all possible combinations between available<br/>modulations, data rates and antenna ports (if EUT with

antenna diversity architecture). Following channel(s) was

(were) selected for the final test as listed below.

Test Configuration:



#### Test Procedure:

- 1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1dB, with a 10dB attenuator) from the antenna port to the spectrum.
- 2. Set the spectrum analyser:
  - a) Set the center frequency of the instrument to the center frequency of the transmission. Set the VBW  $\geq$  [3 x RBW]
  - b) Set RBW ≥OBW if possible; otherwise, set RBW to the largest available value. Span = Zero span
  - c) Set VBW  $\geq$  RBW. Set detector = peak or average. Trace mode = Free run
- 3. Report the worst case.

Used Test Equipment List

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

#### Test result:



# **TEST REPORT**

Channel No.	Frequency (MHz)	Mode	On time (ms)	Period (ms)	Duty Cycle (%)
6	2437	802.11b	100	100	100
6	2437	802.11g	100	100	100
6	2437	802.11n (HT20)	100	100	100

Result plot as follows:

802.11b mode

Channel 6: 2437 MHz:

Spectrum			_	pectrum		Spectrum 4	t 🔊	
				RBW 10 VBW 10				
TRG:VID Controlled by Ef	MC32 01	AP Clow						 
Jointrolled by El	1002							
30 dBm								
20 dBm								
10 dBm	18.200	dBm						
10 0000								
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm								 
-40 dBm								
-50 dBm								
CF 2.437 GHz				69	1 pts			 10.0 ms/
Marker								



# **TEST REPORT**

802.11g mode Channel 6: 2437 MHz:

Spectrun	n Sp	ectrum 2	× SI	pectrum 3	× s	pectrum -	4 🗵	
	41.00 dBm						_	
Att	40 dB	SWT	100 ms 👄	<b>VBW</b> 10 M	IHz			
TRG: VID								
Controlled b	y EMC32 😑	1AP Clrw						 
30 d8m								
30 dbm								
20 d8m	man		-			alan Japana		 
20 dBm-	TRG 17.700	dBm						
10 d8m								
10 08m-								
0.40								
0 dBm								
10.10								
-10 dBm								
an da								
-20 dBm								
00 d0 -								
-30 dBm								
40 -10								
-40 dBm								
FO dour								
-50 dBm								
CF 2.437 (	GHz			691	pts			10.0 ms/
Marker								

# 802.11n(HT 20) mode

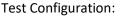
Channel 6: 2437 MHz:

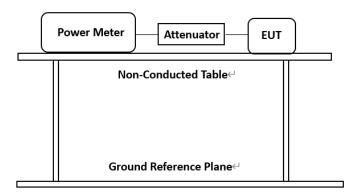
Spectrum	S	oect	rum 2	×	Sp	ectru	um 3	*	Spect	trum 4	4 🕱	ו	
Ref Level · Att TRG:VID				11.00 dB 100 ms									
Controlled by	ЕМСЗ2 🧲	1AP	Clrw		_				_			_	
30 dBm		-			_				_			_	
20 dBm Ti	RG 20.60	0 dBi	n		-							-	 
10 dBm					_							_	
0 dBm					+							-	
-10 dBm		-			+				_			+	 
-20 dBm		+							_			-	
-30 dBm		+			+							+	
-40 dBm		-			+				_			+	
-50 dBm												-	
CF 2.437 GH	Iz	_					691	pts					10.0 ms/
Marker													



# **TEST REPORT**

4.4 Maximum Averag	ge Conducted Output Power and E.I.R.P
Test Requirement:	FCC Part 15 C section 15.247 RSS-247 Clause 5.4(d)
	Section 15.247: (b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.
	Clause 5.4(d): For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W.
Test Method:	Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. ANSI C63.10: Clause 11.9.2.3.1
Test Status:	RSS-Gen clause 6.12 Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	





Test Procedure:

- 1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the power meter.
- 2. The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- 3. If the EUT is transmitting at all times, it must be transmitting at its maximum power



# **TEST REPORT**

control level.

- 4. If the EUT does not transmit continuously, measure the duty cycle and adjust the measurement in dBm by adding  $10\log(1/x)$  where x is the duty cycle of transmitter output signal. This measurement is an average over both the ON and OFF periods of the transmitter.
- 5. Report the worst case.

Used Test Equipment List

Power meter. Refer to Clause 5 Test Equipment List for details.

lest r	esuit:							
Channel No.	Frequency (MHz)	Mode	Data Rate Measured Power		e.i.r.p (dBm)	Limit		Result
				(dBm)		Measured Channel Power	e.i.r.p	
1	2412		1 Mbps	18.25	20.03			Pass
6	2437	802.11b	1 Mbps	17.70	19.48			Pass
11	2462		1 Mbps	17.15	18.93			Pass
1	2412		6 Mbps	16.09	17.87			Pass
6	2437	802.11g	6 Mbps	15.06	16.84	114/	4W (36dBm)	Pass
11	2462		6 Mbps	16.05	17.83	1W		Pass
1	2412	802.11n	6.5 Mbps	14.81	16.59	(30dBm)		Pass
6	2437	(HT20)	6.5 Mbps	15.52	17.30			Pass
11	2462	( - )	6.5 Mbps	15.80	17.58			Pass
3	2422	802.11n	13.5 Mbps	14.02	15.80			Pass
6	2437	(HT40)	13.5 Mbps	14.47	16.25			Pass
9	2452		13.5 Mbps	14.09	15.87			Pass

# Test result:

**Remark:** The measured power in the table has considered the compensation of duty cycle,

cable loss and attenuator.

cable lose+ attenuator =11.0 dB Antenna gain=1.78 dBi

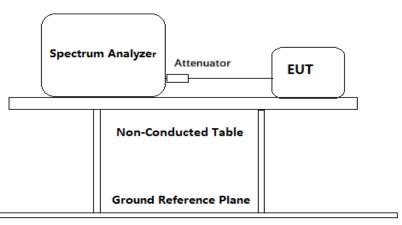
e.i.r.p=output power + antenna gain



#### 4.4 Peak Power Spectral Density

Test Requirement:	FCC Part 15 C section 15.247 RSS-247 Clause 5.2(b)
	(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
	This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Tost Mothod:	5.2(b)The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).
Test Method: Test Status:	ANSI C63.10: Clause 11.10.2 Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

#### Test Configuration:



#### Test Procedure:

- 1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable(cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum analyzer or power meter.
- 2. Set the spectrum analyzer:
  - a) Set analyzer center frequency to DTS channel center frequency.



# **TEST REPORT**

- b) Set the span= 1.5 × DTS bandwidth.
- c) Set the RBW to 3 kHz  $\leq$  RBW  $\leq$  100 kHz.
- d) Set the VBW  $\geq$  [3 × 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 amplitude level within the RBW.
- j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
- 3. Measure the Power Spectral Density of the test frequency with special test status.
- 4. Repeat until all the test status is investigated.
- 5. Report the worst case.

#### Used Test Equipment List

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

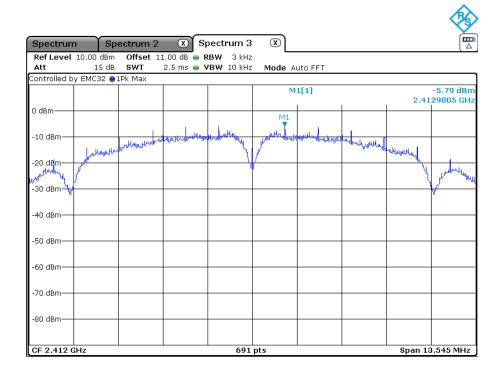
Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Peak Power Spectral Density (dBm/3kHz)	Limit	Result
1	2412		1 Mbps	-5.79		Pass
6	2437	802.11b	1 Mbps	-6.13		Pass
11	2462		1 Mbps	-6.37		Pass
1	2412		6 Mbps	-9.14		Pass
6	2437	802.11g	6 Mbps	-9.26	O d Dura /	Pass
11	2462		6 Mbps	-9.43	8dBm/	Pass
1	2412	802.11n	6.5 Mbps	-8.40	3 KHz	Pass
6	2437	(HT20)	6.5 Mbps	-8.69		Pass
11	2462	(==)	6.5 Mbps	-9.44		Pass



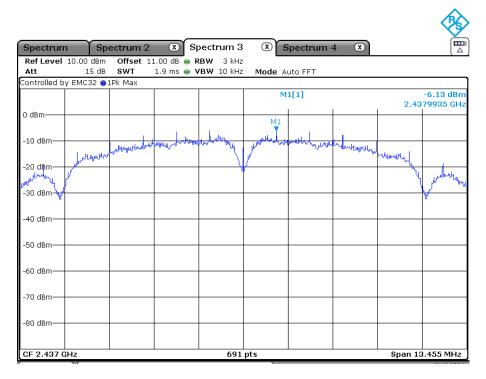
# **TEST REPORT**

Result plot as follows:

802.11b mode with 1Mbps data rate Channel 1: 2.412GHz:



#### Channel 6: 2.437GHz:





# **TEST REPORT**

#### Channel 11: 2.462GHz:

Spectrum	Spectrum 2	2 🗴 SI	pectrum 3	(X) 6	Spectrum -	4 🗙		
Ref Level 10.00 Att	dBm Offset	11.00 dB 👄 F	RBW 3 kHz VBW 10 kHz		uto FFT			
Controlled by EMC		2.0 115		Mode A				
				м	1[1]		2.46	-6.37 dBr 09805 GH
0 dBm							2.40	09800 GH
			M1					
-10 dBm	handhaderstangeland	al you the markey	atribut way	1 Martha Janet	woodhallautawa	March methy		
-20 dBm	hugethe		1	1		~ www.wvdl	adama Nay	
well with the providence of the second secon			1	ŕ			- W	1 minute
-30 dBm								J T
v								•
-40 dBm								
-50 dBm								
SO UDIN								
-60 dBm								
-70 dBm								
-80 dBm		_						

# 802.11g mode with 6Mbps data rate Channel 1: 2.412GHz:

Spectrum	Spectrum 2 🛞	Spectrum 3	Spectrum 4	X X
Ref Level 20.00 Att 2	dBm Offset 11.00 dB 0 dB SWT 2.5 m			
Controlled by EMC3		S 🖶 VEW IUKHZ  V	ode Auto FFT	
			M1[1]	-9.14 dBm 2.4138670 GHz
10 dBm				
0 dBm				
-10 dBm	vum		M	A A A
-20 dBm				Mary
-40 dBm				
-50 dBm				
-60 dBm				
-70 dBm				
CF 2.412 GHz		691 pts		Span 15.0 MHz



# **TEST REPORT**

Channel 6: 2.437GHz:

Spectrum	Spe	ectrum 2	🗴 si	bectrum 3	× s	pectrum -	4 X		
Ref Level	20.00 dBm 20 dB	Offset 1 SWT	1.00 dB 👄	RBW 3 kH VBW 10 kH					
Controlled by			2.5 ms 🔲	ARM TO KH	2 Mode /	Auto FFT			
					М	1[1]			-9.26 dBm 88560 GHz
10 dBm									
0 dBm						M1			
-10 dBm	M	ww	MW	ww	hiv	NWV	WW	1/1	
-20 dBm	NN			t l	}			my	MAMAA
-40 dBm									ັ ນ ພ ໄປ 
-50 dBm									
-60 dBm									
-70 dBm									
CF 2.437 G	Hz			691	pts	I	I	Span 1	.5.45 MHz

Channel 11: 2.462GHz:

Spectrum	Sp	ectrum 2	🗴 SI	bectrum 3	x s	pectrum -	4 🗶		
	20.00 dBm		.1.00 dB 😑						
Att Controlled by	20 dB		2.5 ms 👄	VBW 10 kH	z Mode /	Auto FFT			
Controlled by	/ EMC32 🔵 I	грк мах				4543			0.40.40
					IVI.	1[1]			-9.43 dBm 07160 GHz
10 dBm								2.10	67100 GH2
0 dBm									
o doni									
10.10				M1					
-10 dBm	1.4	www	AAAA	AAAA	ANAN	ላለ ፣ ስդ	mm		
	M	18866	r v <del>v</del> v v	* * * *	1	0 00 00	00000	rvi –	
-20 dBm								A .	
-20 dBm ~30 dBm	NM			Ů				W	h. s.
r-98VefBoxV								U	-142 AAA
-40 dBm									
-50 dBm									
-60 dBm									
00 42									
-70 dBm									
-70 ubili									
CF 2.462 G	Hz		1	691	pts	1	1	Span	15.3 MHz

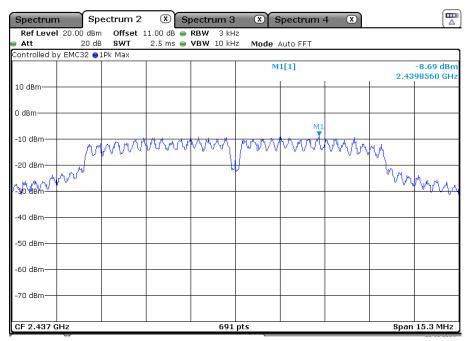




802.11n(HT20) mode with 6.5Mbps data rate Channel 1: 2.412GHz:

Spectrum	Spectrum 2	Spectrum 3	Spectrum	4 🗴	
Ref Level 20.00		00 dB 👄 RBW 3 kHa			
Att 20 Controlled by EMC32		2.5 ms 👄 <b>VBW</b> 10 kH;	Mode Auto FFT		
Controlled by EMC32			M1[1]		-8.40 dBm
			milil		2.4126040 GHz
10 dBm				+	
0 dBm					
			M1		
-10 dBm		A. JAMAA	A A A A A A A A A		
	MWW.	VVVVVVV	1000 Mar War	Marnha	
-20 dBm					
-20 dBm		1 1	,	V	hymn
ASO UBM					· YWAA
-30 ubin					
10.10					
-40 dBm					
-50 dBm					
-60 dBm					
-70 dBm					
CF 2.412 GHz		691	nts		Span 15.45 MHz
		071			

#### Channel 6: 2.437GHz:





# **TEST REPORT**

Channel 11: 2.462GHz:

Spectrum	Spectrum 2	🗶 Sp	ectrum 3	×s	pectrum 4	4 🛛 🛪		
RefLevel 20.00 d Att 20	Bm Offset 1 dB SWT	1.00 dB 👄 F 2.5 ms 👄 <b>V</b>			Auto FFT			
Controlled by EMC32	●1Pk Max							
				M	1[1]			-9.44 dBm 04130 GHz
10 dBm								
0 dBm								
		м						
-10 dBm	www	ww	www	NW	www	MAMA.	<u>к. к</u>	
	VU VU			[		* • V • V	1 1	
				,			4u	WHAA A
236 0010								
-40 dBm								
-50 dBm								
-60 dBm								
-70 dBm								
CF 2.462 GHz			691	pts			Span 1	.5.45 MHz



#### **TEST REPORT**

#### 4.5 Out of Band Conducted Emissions

Test Requirement: FCC Part 15 C section 15.247 RSS-247 Clause 5.5

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

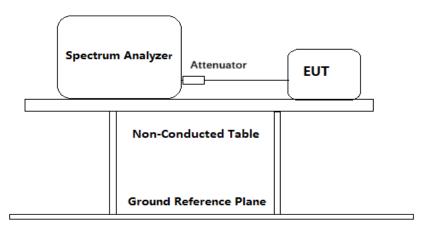
Clause 5.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based 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.

Test Method: ANSI C63.10: Clause 11.11 RSS-Gen clause 6.13

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:





## Test Procedure:

- Remove the antenna from the EUT and then connect a low RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum analyzer or power meter.
- 2. Establish a reference level by using the following procedure:
  - a) Set instrument center frequency to DTS channel center frequency.
  - b) Set the span to  $\geqslant$  1.5 imes DTS bandwidth.
  - c) Set the RBW = 100 kHz.
  - d) Set the VBW  $\geq$  [3 × 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

- 3. 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  $\geq$  [3 × 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.
- 4. Measure the Conducted unwanted Emissions of the test frequency with special test status.
- 5. Repeat until all the test status is investigated.
- 6. Report the worst case.

### Used Test Equipment List

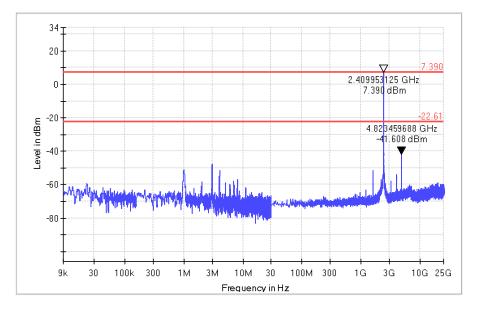
Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.



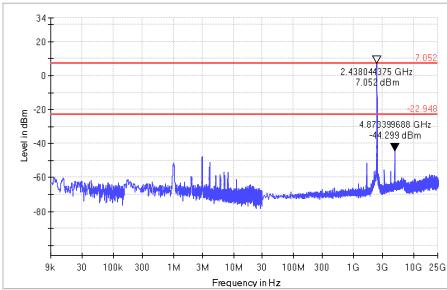
# **TEST REPORT**

Result plot as follows:

802.11b mode with 1Mbps data rate Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

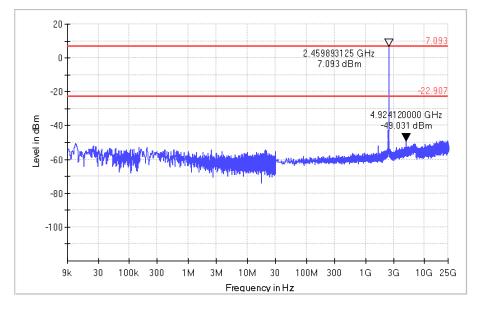


In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

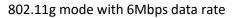
Channel 6: 2.437GHz:



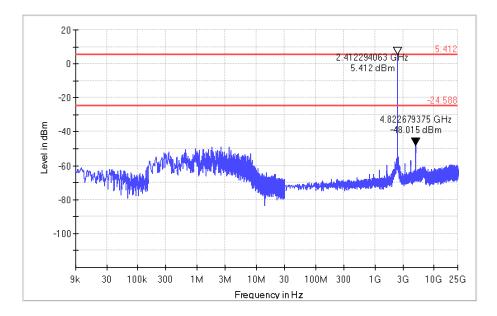
Channel 11:2.462 GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

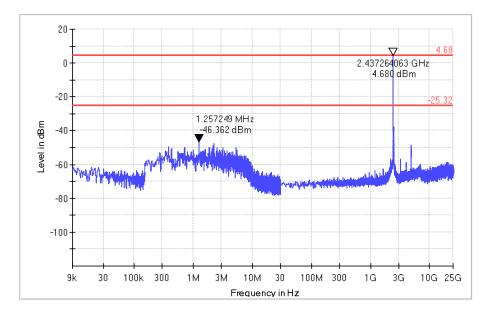


Channel 1: 2.412GHz:

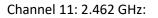


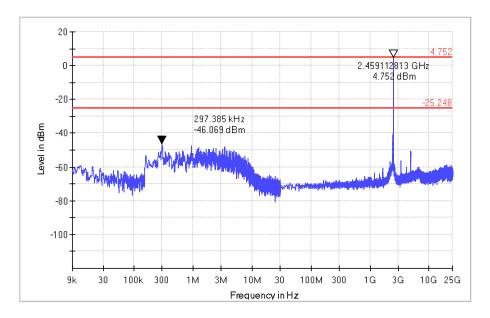
Channel 6: 2.437GHz:





In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.



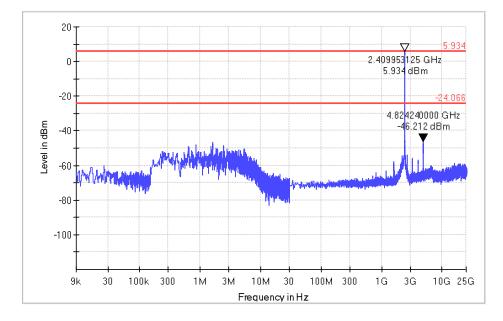


In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

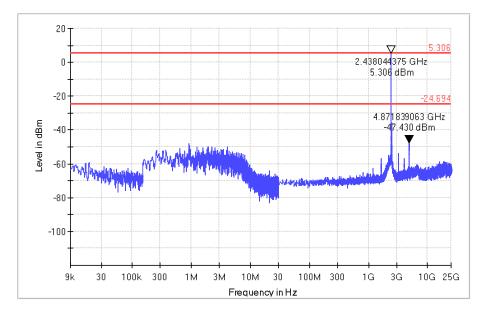
802.11n(HT20) mode with 6.5Mbps data rate

Channel 1: 2.412GHz:





In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

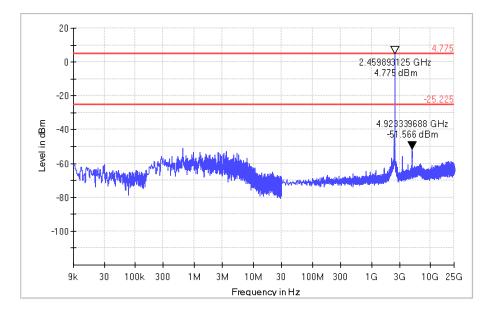


Channel 6: 2.437GHz:

In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11:2.462 GHz:





In any 100kHz bandwidth, the Conducted Spurious Emissions from 9 kHz to 25 GHz were greater than 30dB below the peak emission within the band that contains the highest level of the desired power.

## 4.6 Radiated Emissions

Test Requirement:	FCC Part 15 C section 15.247 RSS-247 Clause 5.5
	section 15.247: (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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 emission limits specified in § 15.209(a) (see § 15.205(c)).



	Clause 5.5: 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 be30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.
	Clause 3.3 Equipment certified under this standard is required to comply with the provisions in RSS-Gen with respect to emissions falling within restricted frequency bands. These restricted frequency bands are listed in RSS-Gen.
Test Method:	ANSI C63.10: Clause 11.11, 11.12.1, 6.4, 6.5 and 6.6 RSS-Gen clause 6.13 and 8.10
Test Status: Test site:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below. Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz;
Linit.	43.5 dB $\mu$ V/m between 88MHz & 216MHz;
	46.0 dB $\mu$ V/m between 216MHz & 960MHz;
	54.0 dB $\mu$ V/m above 960MHz.
Detector:	For Peak and Quasi-Peak value: RBW = 1 MHz for $f \ge 1$ GHz, 200 Hz for 9 kHz to 150 kHz 9 kHz for 150 kHz to 30 MHz 120 kHz for 30 MHz to 1GHz VBW $\ge$ RBW Sweep = auto Detector function = peak for $f \ge 1$ GHz, QP for $f < 1$ GHz Trace = max hold For AV value: RBW = 1 MHz for $f \ge 1$ GHz, 100 kHz for $f < 1$ GHz VBW=10 Hz Sweep = auto Trace = max hold
	Trace = max hold



## **TEST REPORT**

Field Strength Calculation: Where:	The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below: FS = RA + AF + CF - AG + PD + AV FS = RA + Correct Factor + AV $FS = Field Strength in dB\muV/m$ $RA = Receiver Amplitude (including preamplifier) in dB\muV$ AF = Antenna Factor in dB CF = Cable Attenuation Factor in dB AG = Amplifier Gain in dB PD = Pulse Desensitization in dB AV = Average Factor in -dB Correct Factor = $AF + CF - AG + PD$
	Conrect Factor = AF + CF = AG + FD In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows: FS = RA + AF + CF - AG + PD + AV Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. RA = 62.0 dB $\mu$ V AF = 7.4 dB/m CF = 1.6 dB AG = 29.0 dB PD = 0 dB AV = -10 dB Correct Factor = 7.4 + 1.6 - 29.0 + 0 = -20 dB FS = 62 + (-20) + (-10) = 32 dB $\mu$ V/m

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:

FCC Part 15 C section 15.247

	MHz	MHz	MHz	GHz
--	-----	-----	-----	-----



## **TEST REPORT**

0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		



## **TEST REPORT**

RSS-247 Clause 5.5

MHz
0.090 - 0.110
0.495 - 0.505
2.1735 - 2.1905
3.020 - 3.026
4.125 - 4.128
4.17725 - 4.17775
4.20725 - 4.20775
5.677 - 5.683
6.215 - 6.218
6.26775 - 6.26825
6.31175 - 6.31225
8.291 - 8.294
8.362 - 8.366
8.37625 - 8.38675
8.41425 - 8.41475
12.29 - 12.293
12.51975 - 12.52025
12.57675 - 12.57725
13.36 - 13.41
16.42 - 16.423
16.69475 - 16.69525
16.80425 - 16.80475
25.5 - 25.67
37.5 - 38.25
73 - 74.6
74.8 - 75.2
108 - 138

MHz
149.9 - 150.05
156.52475 - 156.52525
156.7 - 156.9
162.0125 - 167.17
167.72 - 173.2
240 - 285
322 - 335.4
399.9 - 410
608 - 614
960 - 1427
1435 - 1626.5
1645.5 - 1646.5
1660 - 1710
1718.8 - 1722.2
2200 - 2300
2310 - 2390
2483.5 - 2500
2655 - 2900
3260 - 3267
3332 - 3339
3345.8 - 3358
3500 - 4400
4500 - 5150
5350 - 5460
7250 - 7750
8025 - 8500

GHz
9.0 - 9.2
9.3 - 9.5
10.6 - 12.7
13.25 - 13.4
14.47 - 14.5
15.35 - 16.2
17.7 - 21.4
22.01 - 23.12
23.6 - 24.0
31.2 - 31.8
36.43 - 36.5
Above 38.6

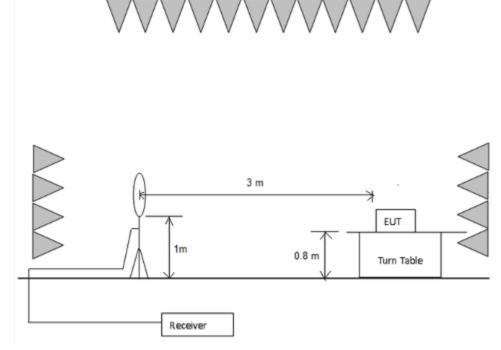
\* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licenceexempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.



# **TEST REPORT**

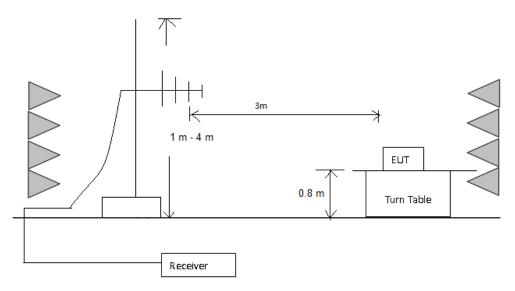
Test Configuration:

1) 9 kHz to 30 MHz emissions:



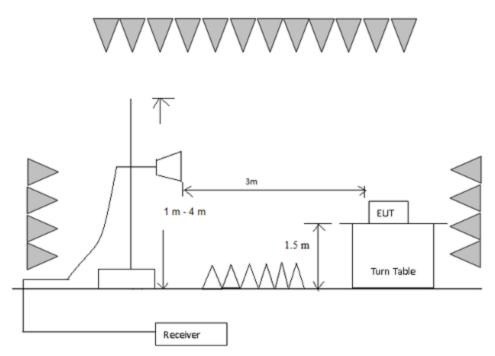
2) 30 MHz to 1 GHz emissions:





3) 1 GHz to 40 GHz emissions:





### Test Procedure:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2010 was used to perform radiated emission test above 1 GHz.

The receiver was scanned from 9 kHz to 25 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

## Used Test Equipment List:

3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment List for details.

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

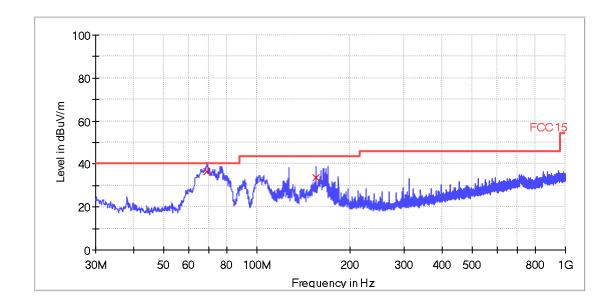
30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement Pre-scan all modes, worst case as below

802.11b mode with 1Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status



# **TEST REPORT**

Vertical:



# QP

Frequency (MHz)	Quasi Peak (dBuV/ m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
68.880000	36.6	120.000	V	9.6	3.4	40.0
155.520000	33.5	120.000	۷	20.7	10.1	43.5

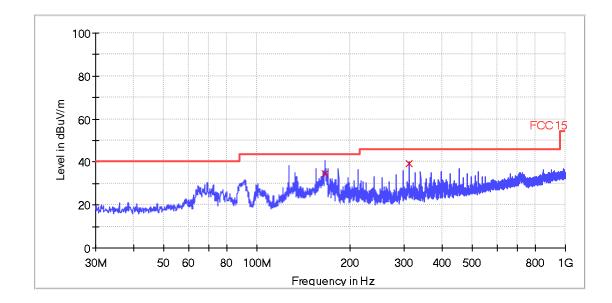
Remark:

- 1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
- 2. Quasi Peak (dBµV/m) = Corr. (dB) + Read Level (dBµV)
- 3. Margin (dB) = Limit QPK (dBµV/m) –Quasi Peak (dBµV/m)



# **TEST REPORT**

Horizontal:



# QP

Frequency (MHz)	Quasi Peak (dBuV/ m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
166.200000	34.8	120.000	Н	19.2	8.7	43.5
311.120000	39.3	120.000	Н	15.6	6.7	46.0

# Remark:

- 1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
- 2. Quasi Peak (dBµV/m) = Corr. (dB) + Read Level (dBµV)
- 3. Margin (dB) = Limit QPK (dBµV/m) –Quasi Peak (dBµV/m)

1~25 GHz Radiated Emissions.

802.11b mode with 1Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

## PK Measurement:

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4883.5	43.9	-1.0	42.9	74	V
8068.0	42.2	4.0	46.2	74	V
3602.5	42.6	-3.8	38.8	74	Н
9073.0	41.1	4.6	45.7	74	Н

## **AV Measurement:**

Frequency	AV Reading	Correction	AV Emission AV Limit	Antenna	
Frequency	Level	factors	Level		polarization

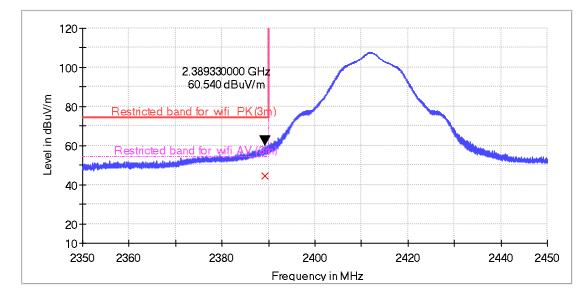


(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4883.5	-	-1.0	-	54	V
8068.0	-	4.0	-	54	V
3602.5	-	-3.8	-	54	Н
9073.0	-	4.6	-	54	Н

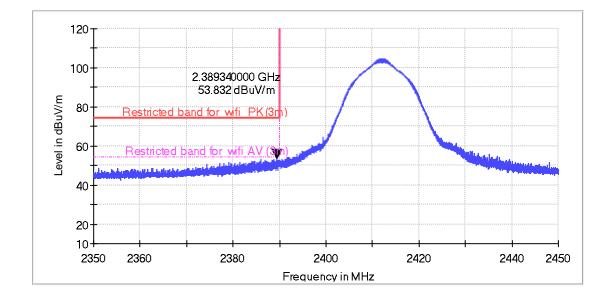
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

### Bandedge Measurement

### Horizontal



Vertical



Version: 25 December 2024



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization					
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)						
2389.3	68.7	-8.2	60.5	74	Н					
2389.3	62.0	-8.2	53.8	74	V					
AV Measureme	AV Measurement:									
	AV Reading	Correction	AV Emission		Antenna					

Frequency	AV Reading	Correction	AV Emission	AV Limit	Antenna
rrequency	Level	factors	Level		polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2389.3	52.6	-8.2	44.4	54	Н
2389.3	-	-8.2	-	54	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

# Test at Channel 6 (2.437 GHz) in transmitting status **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1661.5	51.2	-11.2	40.0	74	V
5333.5	41.9	-0.3	41.6	74	V
3763.0	42.8	-3.4	39.4	74	Н
7277.5	41.4	2.4	43.8	74	Н

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded

Test at Channel 11 (2.462 GHz) in transmitting status

### PK Measurement:

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(2, 2, 2, 2)				( )=( )	polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1331.5	53.2	-12.8	40.4	74	V
5419.0	42.0	-0.2	41.8	74	V
2204.5	46.5	-8.8	37.7	74	Н
7277.5	41.4	2.4	43.8	74	Н

### AV Measurement:

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1331.5	-	-12.8	-	54	V
5419.0	-	-0.2	-	54	V
2204.5	-	-8.8	-	54	Н
7277.5	-	2.4	-	54	Н

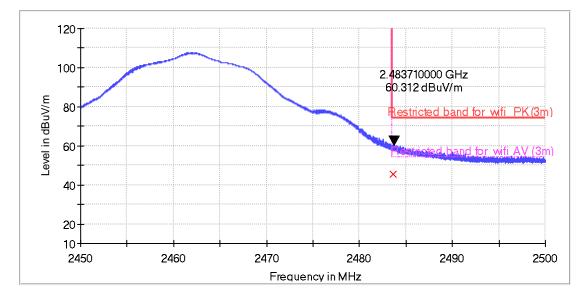


# **TEST REPORT**

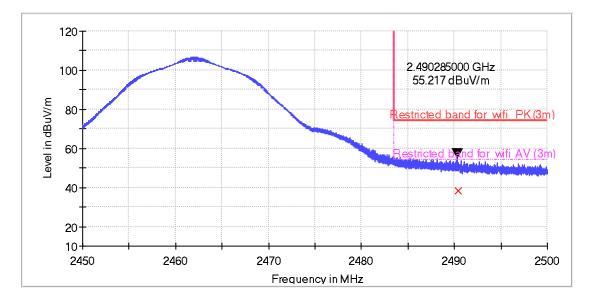
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

## BandedgeMeasurement

Horizontal



Vertical



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	



2483.7	68.1	-7.8	60.3	74	Н			
2490.3	63.0	-7.8	55.2	74	V			
AV Measurement:								
Frequency	AV Reading	Correction	AV Emission	AV Limit	Antenna			
Frequency	Level	factors	Level		polarization			
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)				
2483.7	53.0	-7.8	45.2	54	Н			
2490.3	46.1	-7.8	38.3	54	V			

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

802.11g mode with 6Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status

#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	polalization
1331.5	51.0	-12.8	38.2	74	V
7603.0	41.6	3.0	44.6	74	V
2201.5	47.8	-8.8	39.0	74	Н
8027.5	41.1	4.0	45.1	74	Н

### AV Measurement:

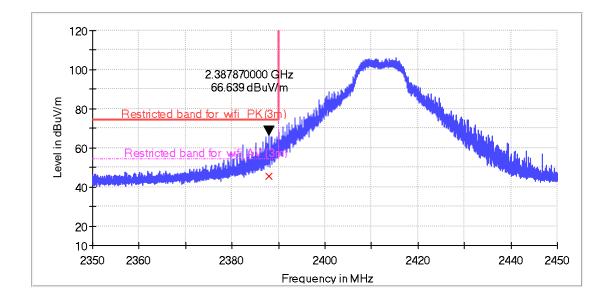
Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1331.5	-	-12.8	-	54	V
7603.0	-	3.0	-	54	V
2201.5	-	-8.8	-	54	Н
8027.5	-	4.0	-	54	Н

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

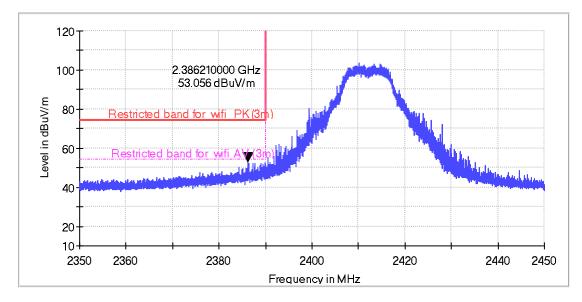
Bandedge Measurement

Horizontal





Vertical



### **PK Measurement:**

PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization				
(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					
74.8	-8.2	66.6	74	Н				
61.2	-8.2	53.0	74	V				
AV Measurement:								
AV Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization				
(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					
	Level (dBuV) 74.8 61.2 nt: AV Reading Level	Levelfactors(dBuV)(dB)74.8-8.261.2-8.2nt:AV Reading LevelCorrection factors	LevelfactorsLevel(dBuV)(dB)(dBuV/m)74.8-8.266.661.2-8.253.0nt:AV Reading LevelCorrection factorsPK Emission Level	LevelfactorsLevelPK Limit(dBuV)(dB)(dBuV/m)(dBuV/m)74.8-8.266.67461.2-8.253.074nt:AV Reading LevelCorrection factorsPK Emission Level				



## **TEST REPORT**

2387.9	53.6	-8.2	45.4	74	Н
2386.2	-	-8.2	-	74	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Channel 6 (2.437GHz) in transmitting status

#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1658.5	49.2	-11.2	38.0	74	V
7336.0	41.7	2.5	44.2	74	V
1397.5	44.2	-12.5	31.7	74	Н
5371.0	42.2	-0.2	42.0	74	Н

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1658.5	-	-11.2	-	54	V
7336.0	-	2.5	-	54	V
1397.5	-	-12.5	-	54	Н
5371.0	-	-0.2	-	54	Н

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

## Test at Channel 11 (2.462 GHz) in transmitting status

PK Measurement:									
Fraguanay	PK Reading	Correction	PK Emission	DK Limit	Antenna				
Frequency	Level	factors	Level	PK Limit	polarization				
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					
3653.5	42.7	-3.7	39.0	74	V				
5366.5	42.0	-0.2	41.8	74	V				
2888.5	43.1	-6.3	36.8	74	Н				
10751.5	39.2	6.7	45.9	74	Н				
AV Measureme	nt:								
Fraguanay	AV Reading	Correction	AV Emission	A) ( Lingit	Antenna				
Frequency	Level	factors	Level	AV Limit	polarization				
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					

. ,	Level	factors	Level		polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
3653.5	-	-3.7	-	54	V
5366.5	-	-0.2	-	54	V
2888.5	-	-6.3	-	54	Н
10751.5	-	6.7	-	54	Н

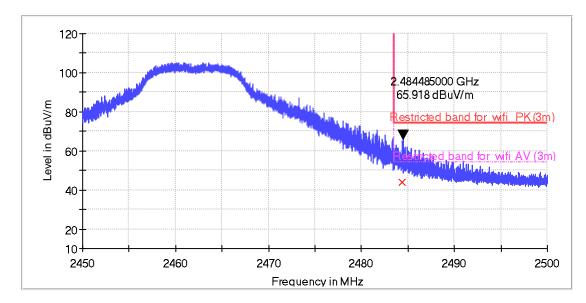


# **TEST REPORT**

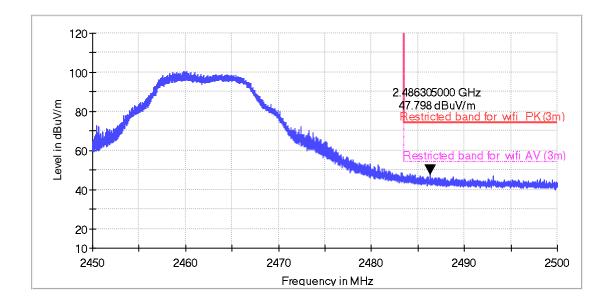
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

### Bandedge Measurement

#### Horizontal



Vertical



**PK Measurement:** 

Fraguanay	PK Reading	Correction	PK Emission	DK Limit	Antenna
Frequency	Level	factors	Level	PK Limit	polarization



(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					
2484.5	73.7	-7.8	65.9	74	Н				
2486.3	55.6	-7.8	47.8	74	V				
AV Measureme	AV Measurement:								
Frequency	AV Reading	Correction	AV Emission	AV Limit	Antenna				
Frequency	Level	factors	Level		polarization				
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)					
2484.5	52.0	-7.8	44.2	54	Н				
2486.3	-	-7.8	-	54	V				

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

## 802.11n (HT20) mode with 6.5Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status

#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1327.0	46.4	-12.8	33.6	74	V
4840.0	43.4	-1.1	42.3	74	V
1660.0	52.5	-11.2	41.3	74	Н
9355.0	42.2	4.7	46.9	74	Н

### **AV Measurement:**

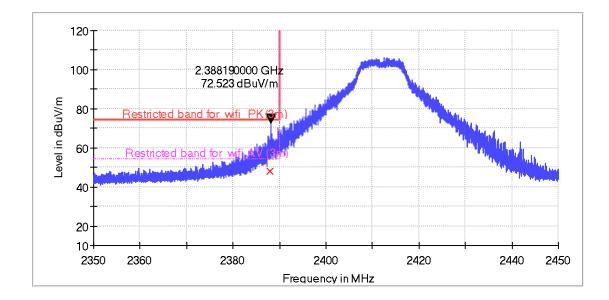
Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1327.0	-	-12.8	-	54	V
4840.0	-	-1.1	-	54	V
1660.0	-	-11.2	-	54	Н
9355.0	-	4.7	-	54	Н

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

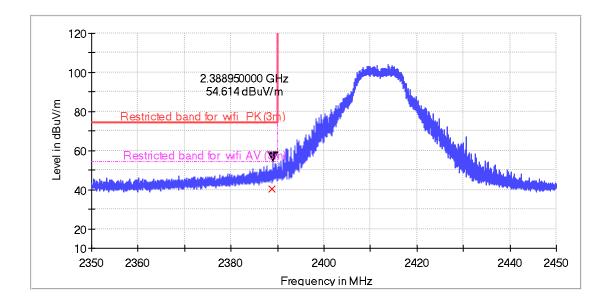
Bandedge Measurement

Horizontal





Vertical



## **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization				
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	polarization				
	(ивиу)	(ив)	(ивиу/пі)	(ubuv/III)					
2388.2	80.7	-8.2	72.5	74	Н				
2389.0	62.8	-8.2	54.6	74	V				
AV Measureme	AV Measurement:								
Frequency	AV Reading	Correction	AV Emission	AV Limit	Antenna				

Version: 25 December 2024



	Level	factors	Level		polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2388.2	56.1	-8.2	47.9	54	Н
2389.0	48.4	-8.2	40.2	54	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Channel 6 (2.437 GHz) in transmitting status

## **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1330.0	50.9	-12.8	38.1	74	V
7337.5	41.3	2.5	43.8	74	V
2236.0	47.9	-8.7	39.2	74	Н
9496.0	41.4	4.7	46.1	74	Н

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
1330.0	-	-12.8	-	54	V
7337.5	-	2.5	-	54	V
2236.0	-	-8.7	-	54	Н
9496.0	-	4.7	-	54	Н

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.462 GHz) in transmitting status

### PK Measurement:

Frequency	PK Reading	Correction	PK Emission	PK Limit	Antenna
Frequency	Level	factors	Level	PKLIIIII	polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
3658.0	43.3	-3.7	39.6	74	V
7414.0	40.9	2.6	43.5	74	V
1330.0	45.7	-12.8	32.9	74	Н
8429.5	41.5	4.3	45.8	74	Н

### AV Measurement:

Frequency	AV Reading	Correction	AV Emission	AV Limit	Antenna
i equency	Level	factors	Level		polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
3658.0	-	-3.7	-	54	V
7414.0	-	2.6	-	54	V
1330.0	-	-12.8	-	54	Н
8429.5	-	4.3	-	54	Н

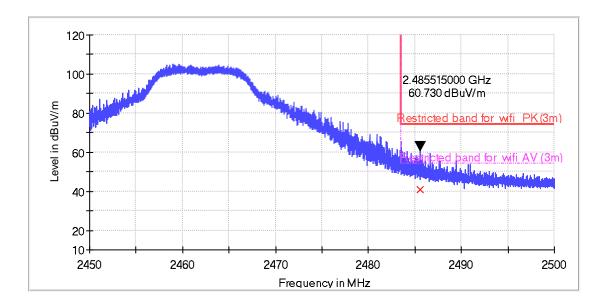


# **TEST REPORT**

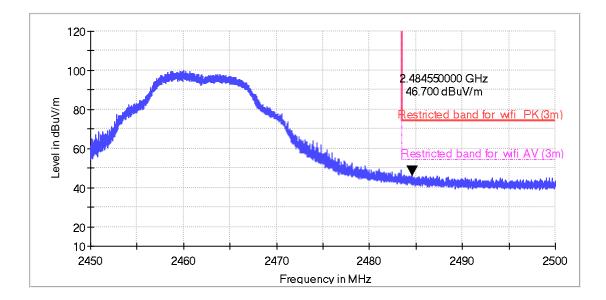
Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Bandedge Measurement

Horizontal



Vertical



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	

Version: 25 December 2024



2485.5	68.5	-7.8	60.7	74	Н
2485.5	54.5	-7.8	46.7	74	V
AV Measureme	nt:				
Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	polarization
2485.5	48.9	-7.8	41.1	54	Н
2485.5	-	-7.8	-	54	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

### 4.7 Band Edges Requirement

Test Requirement:

FCC Part 15 C section 15.247 RSS-247 Clause 5.5

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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 emission limits specified in § 15.209(a) (see § 15.205(c)).

Clause 5.5: 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.

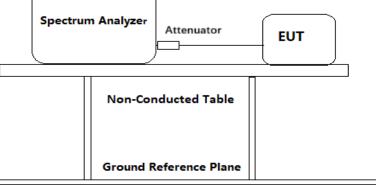
Frequency Band: Test Method:

2400 MHz to 2483.5 MHz ANSI C63.10: Clause 11.11 and 11.13



# **TEST REPORT**

	RSS-Gen clause 6.13
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	For Band Edges Emission in Radiated mode, please refer to clause 4.7
ſ	



Test Procedure:

For Band Edges Emission in Radiated mode, Please refer to clause 4.7

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.

a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

b) Set the center frequency and span to encompass frequency range to be measured.

- c) RBW = 100 kHz.
- d) VBW  $\geq$  [3 × RBW].
- e) Detector = peak.

f) Sweep time = auto.

g) Trace mode = max hold.

h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).

i) For radiated Band-edge emissions within a restricted band and within 2 MHz of an authorized band edge, integration method is considered.

- 2. Repeat until all the test status is investigated.
- 3. Report the worst case.

### **Used Test Equipment List:**

3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment



## **TEST REPORT**

List for details.

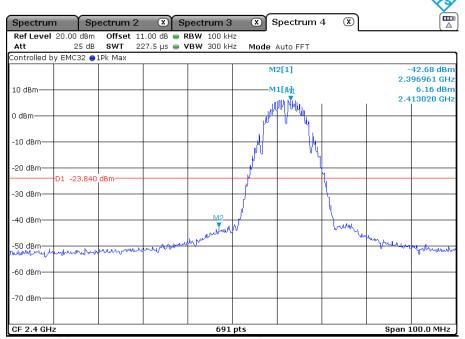
Test result with plots as follows: For conduct mode:

The band edges was measured and recorded Result:

The Lower Edges attenuated more than 30dB.

The Upper Edges attenuated more than 30dB.

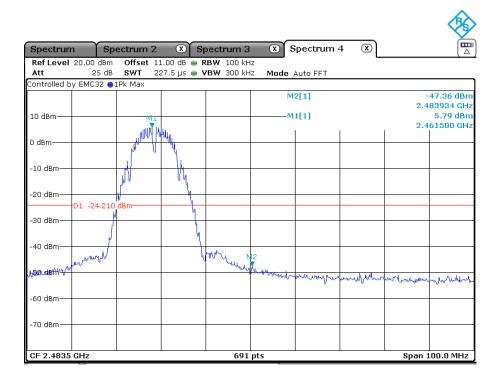
Result plots as follows: 802.11b mode with 1 Mbps data rate Channel1: 2.412 GHz



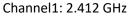
Channel 11: 2.462 GHz

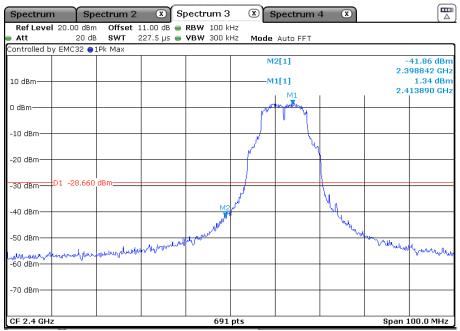


# **TEST REPORT**



## 802.11g mode with 6 Mbps data rate





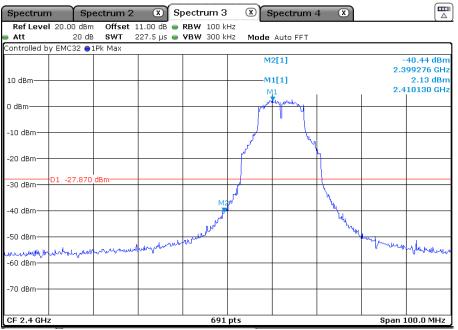
Channel 11: 2.462 GHz



Spectrum Sp	ectrum 2	X Spect	rum 3	xs	pectrum 4	1 X		
Ref Level 20.00 dBm								
Att 20 dB Controlled by EMC32 • :		5 µs 👄 <b>VBW</b>	/ 300 kHz	Mode	Auto FFT			
10 dBm	M1				2[1] L[1]		2.4	53.22 dBm 85092 GHz 1.21 dBm 59910 GHz
0 dBm		4						
-10 dBm		Wy -						
- <del>30 dBm</del> D1 -29.290	dBm							
-40 dBm		- Y						
-50 dBm			Marine Mar	Wheneyou	monution	within Jon Wiln	white researching	Muruhah
-60 dBm							. V	
-70 dBm								
CF 2.4835 GHz			691 pt	5			Span 1	.00.0 MHz

# 802.11n(HT20) mode with 6.5Mbps data rate

#### Channel 1: 2.412 GHz



Channel 11: 2.462 GHz

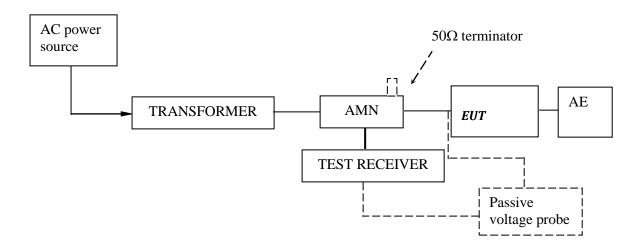


# **TEST REPORT**

Spectrum	Spe	ctrum 2	X S	ectrum 3	× s	Spectrum -	4 🗶		
Ref Level 20				<b>RBW</b> 100 k					
Att Controlled by Ef	20 dB		227.5 µs 👄	<b>VBW</b> 300 ki	Hz Mode	Auto FFT			
Controlled by Er	VIC32 01	-k Max			М	2[1]			52.63 dBm 84513 GHz
10 dBm		M1			M	1[1]	I	2.4	0.23 dBm 59480 GHz
0 dBm		- Ingenter	have						
-10 dBm		J.	- hu						
-20 dBm	ľ	/							
	-29.770 c	lBm							
-40 dBm	with			Marylan.	40				
-50 dBm					The work of the second of the	hendelson really	unantan	munder	njurtululu
-70 dBm									
-70 UBIN									
CF 2.4835 GH	z			691	pts			Span 1	.00.0 MHz

4.9 Conducted Emission Test

Test Configuration:





# **TEST REPORT**

### Test Setup and Procedure:

Test was performed according to ANSI C63.10 Clause 6.2. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a  $50\Omega$  linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m

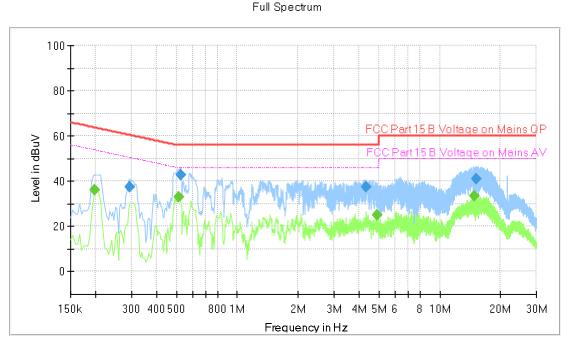
The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

Test Data and Curve

At main terminal: Pass

Tested Wire: Live

Operation Mode: transmitting mode



# Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
					(ms)				
0.198000		35.93	53.69	17.76	1000.0	9.000	L1	ON	9.6
0.294000	37.45		60.41	22.96	1000.0	9.000	L1	ON	9.6
0.514000		32.99	46.00	13.01	1000.0	9.000	L1	ON	9.6



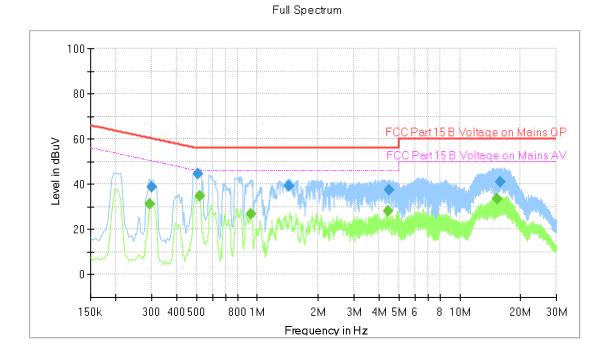
0.526000	42.82		56.00	13.18	1000.0	9.000	L1	ON	9.6
4.334000	37.58		56.00	18.42	1000.0	9.000	L1	ON	9.7
4.926000		25.24	46.00	20.76	1000.0	9.000	L1	ON	9.7
14.770000		33.26	50.00	16.74	1000.0	9.000	L1	ON	9.9
15.194000	41.14		60.00	18.86	1000.0	9.000	L1	ON	9.9

Remark:

- 1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Level  $(dB\mu V) = Corr. (dB) + Read Level (dB\mu V)$
- 3. Delta Limit (dB) = Level (dB $\mu$ V)-Limit (dB $\mu$ V)

Tested Wire: Neutral

Operation Mode: transmitting mode



# Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.294000		31.23	50.41	19.18	1000.0	9.000	Ν	ON	9.5
0.302000	38.78		60.19	21.41	1000.0	9.000	Ν	ON	9.5
0.510000	44.45		56.00	11.55	1000.0	9.000	Ν	ON	9.5
0.518000		34.95	46.00	11.05	1000.0	9.000	Ν	ON	9.5
0.926000		26.98	46.00	19.02	1000.0	9.000	Ν	ON	9.5
1.438000	39.03		56.00	16.97	1000.0	9.000	Ν	ON	9.5
4.438000		28.28	46.00	17.72	1000.0	9.000	Ν	ON	9.6
4.462000	37.66		56.00	18.34	1000.0	9.000	Ν	ON	9.6
15.378000		33.55	50.00	16.45	1000.0	9.000	Ν	ON	9.9
15.858000	41.04		60.00	18.96	1000.0	9.000	Ν	ON	9.9

Remark:

- 1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Level (dB $\mu$ V) = Corr. (dB) + Read Level (dB $\mu$ V)
- 3. Delta Limit (dB) = Level (dB $\mu$ V)-Limit (dB $\mu$ V)



# **TEST REPORT**

# 5.0 Test Equipment List

Radiated Emissio	n/Radio				
Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS · LINDGREN	2025-04-09	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2025-11-10	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2025-11-10	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2025-07-07	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	2024-12-05	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2025-07-02	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2025-04-22	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2025-04-22	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2025-04-09	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2025-04-09	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2025-04-25	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2025-03-17	1Y
EM040-01	Band Reject/Notch Filter	WRHFV	Wainwright	N/A	1Y
EM040-02	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM040-03	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	2025-05-15	1Y
SA016-29	Climatic Test Chamber	MHU-80L	JIANQIAO	2025-01-04	1Y
EM046-05	Power meter	NPR6A	R&S	2025-04-22	1Y
EM046-06	Power meter	NPR6A	R&S	2025-05-09	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A
EM045-01-10	10dB Attenuator	N/A	R&S	2024-12-25	1Y

#### Conducted Disturbance-Mains Terminal(2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date	Calibration
Equipment No.	Equipment	WIGGET	Manufacturer	(DD-MM-YYYY)	Interval
EM031-04	EMI receiver	ESR3	R&S	04/01/2025	1Y
EM006-06	LISN	ENV216	R&S	01/09/2025	1Y
SA047-111	Digital Temperature-Humidity Recorder	RS210	YIJIE	20/10/2025	1Y
EM004-03	EMC shield Room	8m×4m×3m	Zhongyu	03/01/2025	1Y
EM031-04-01	EMC32 software (CE)	V10.01.00	R&S	N/A	1Y