

# Bradley Smoker Inc.

# **TEST REPORT**

[-----]

SCOPE OF WORK EMC TESTING–BS1120BT

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## **TEST REPORT**

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Intertek Report No:		240208011GZU-001
FCC ID:		2BFC5-BS1120BT

## Test standards

#### 47 CFR PART 15 Subpart C: 2021 section 15.247

## Sample Description

Product	:	Raven Smoker
Model No.	:	BS1120BT
Electrical Rating	:	110 - 120V, 50/60Hz, 1005-1200W
Serial No.	:	Not Labeled
Date Received	:	08 February 2024
Date Test	:	28 February 2024-09 March 2024
Conducted		

Prepared and Checked By

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Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

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# **TEST REPORT**

## **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	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
6 dB Bandwidth (DTS bandwidth)	FCC PART 15 C section 15.247 (a)(2)	ANSI C63.10: Clause 11.8	PASS
Maximum Peak Conducted Output Power	FCC PART 15 C section 15.247(b)(3)	ANSI C63.10: Clause 11.9.1.2	PASS
Peak Power Spectral Density	FCC PART 15 C section 15.247(e)	ANSI C63.10: Clause 11.10.2	PASS
Out of Band Conducted Emissions	FCC PART 15 C section 15.209 & 15.247(d)	ANSI C63.10: Clause 11.11	PASS
Out of Band Radiated Emission	FCC PART 15 C section 15.209 & 15.247(d)	ANSI C63.10: Clause 11.11, 6.4, 6.5 and 6.6	N/A
Radiated Emissions in Restricted Bands	FCC PART 15 C section 15.209 & 15.247(d)	ANSI C63.10: Clause 11.12.1, 6.4, 6.5 and 6.6	PASS
Band Edges Measurement	FCC PART 15 C section 15.247 (d) & 15.205	ANSI C63.10: Clause 11.11 and 11.13	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	PASS

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.



## **TEST REPORT**

## 2.0 General Description

#### 2.1 **Product Description**

Operating Frequency:	2402 MHz – 2480MHz
Type of Modulation:	GFSK
Number of Channels:	40 Channels
Channel Separation:	2 MHz
Antenna Type:	PCB antenna
Antenna Gain:	-1.15 dBi
Speciality:	Bluetooth 5.0 with BLE (Bluetooth Low Energy)
Power Supply:	AC 120V 60 Hz
EUT modulation and data packet during	tost

EUT modulation and data packet during test:

The EUT has been tested on the Modulation of GFSK with 1 Mbps and 2Mbps data rate.

EUT channels and frequencies list:

Test frequencies are lowest channel 0: 2402 MHz, middle channel 19: 2440 MHz and highest channel 39: 2480 MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	/	/
13	2428	27	2456	/	/



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## 2.2 Related Submittal(s) Grants

This is an application for certification of: DTS- Part 15 Digital Transmission Systems

Remaining portions are subject to the following procedures:

- 1. Receiver portion of BLE: exempt from technical requirement of this Part.
- 2. Raven Smoker: FCC SDoC requirement.

## 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.

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



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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 meters 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:

Frequency range of radiated emission measurements

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	5th harmonic of highest fundamental frequency or to	
30 GHz	100 GHz, whichever is lower	
	5th harmonic of highest fundamental frequency or to	
At or above 30 GHz	200 GHz, whichever is lower, unless otherwise	
	specified	

#### 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		sscom	V5.13.1	Client

#### **3.3** Special Accessories

No special accessories used.



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## 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	
		4.7 dB (25 MHz-1 GHz)	
8	Radiated Emissions	4.8 dB (1 GHz-18 GHz)	
0		5.21dB (18GZH-26GHz)	
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 Bradley Technologies Canada Inc. will be incorporated in each production model sold / leased in the United States.

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



# **TEST REPORT**

## 3.6 Support Equipment List and Description

This product was tested with corresponding support equipment as below:

<u> </u>	1.1	
Ca	DI	le

Description	Model No.	Connector type	Cable length/type	Supplied by
Antenna cable	RF-01	SMA	0.2 m(shielded)	Intertek

## Support equipment

Description	Description Model No.		Supplied by	
NoteBook	Latitude 5400		Intertek	



# TEST REPORT

## 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.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

The antenna is an integral antenna and no consideration of replacement. The best case gain of the antenna is -1.15 dBi.

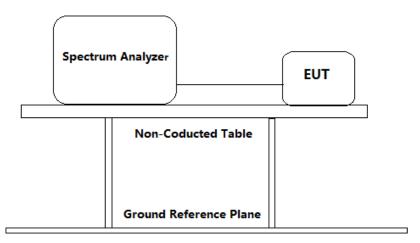


# **TEST REPORT**

## 4.2 6 dB Bandwidth (DTS bandwidth)

Test Requirement:	FCC Part 15 C section 15.247 (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.
Test Method:	ANSI C63.10: Clause 11.8
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 =1 dB, 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.



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4. Report the worst case.

## Used Test Equipment List

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

1M

Channel No.	Frequency (MHz)	Measured 6dB bandwidth (kHz)	Limit (kHz)	Result
0	2402	703.3		Pass
19	2440	706.2	≥500	Pass
39	2480	694.6		Pass

2M

Channel No.	Frequency (MHz)	Measured 6dB bandwidth (kHz)	Limit (kHz)	Result
0	2402	1159.2		Pass
19	2440	1150.5	≥500	Pass
39	2480	1185.2		Pass

Test result: The unit does meet the FCC requirements.

# Result plot as follows:



## **TEST REPORT**

## 1M

Lowest Channel(2.402 GHz):

10 dBm         2.40200870 Gl           0 dBm         11           0 dBm         11           0 dBm         11           0 dBm         11           -10 dBm         0 factor 12           -20 dBm         -20 dBm           -30 dBm         -30 dBm           -20 dBm         -40 dBm           -20 dBm         -40 dBm           -20 dBm         -40 dBm           -50 dBm         -50 dBm           -60 dBm         -60 dBm           -70 dBm         -70 dBm           -70 dBm         -10           -70 dBm         -70           M1         1           1         2.4020087 GHz           -5.54 dBm         ndB down           -70.33 kH           T1         1	Spectrum		Spectrum 2	×						
Image: Second	Ref Level	21.00 d	Bm Offset 11.	00 dB 😐 RB'	<b>W</b> 100 kHz					
M1[1]         0.44 dB           10 dBm         ndB         2.40200870 Gf           0 dBm         ndB         6.00 df           0 dBm         11         0 facter T2         3415           -10 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -40 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -50 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -50 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -70 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -10 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -10 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -10 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm         -20 dBm           -10 dBm         -20 dBm         -20 dBm         -20 dBm	Att 🗧	20	dB <b>SWT</b> 18	3.9 µs 👄 <b>VB</b>	<b>W</b> 300 kHz	Mode Au	to FFT			
10 dBm	●1Pk Max									
10 dBm     ndB     6.00       0 dBm     0 dBm     0 factor T2     3415       -10 dBm     0 factor T2     3415       -20 dBm     -0 factor T2     3415       -20 dBm     -0 factor T2     -0 factor T2       -30 dBm     -0 factor T2     -0 factor T2       -20 dBm     -0 factor T2     -0 factor T2       -50 dBm     -0 factor T2     -0 factor T2       -70 dBm     -0 factor T						M1[1	1			0.44 dBm
N1         Bw         703.30000000 k           0 dBm         0 factor 12         3415           -10 dBm         0         0 factor 12         3415           -20 dBm         0         0         0         0           30 dBm         0         0         0         0         0           -20 dBm         0         0         0         0         0         0           -40 dBm         0         0         0         0         0         0         0           -50 dBm         0         0         0         0         0         0         0         0           -60 dBm         0 <td< td=""><td>10 10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2.402</td><td></td></td<>	10 10								2.402	
0 dBm 0 dBm 33415 -10 dBm20 dBm20 dBm20 dBm	IU aBm									6.00 dB
-10 dBm -20 dBm -20 dBm -20 dBm -40 dBm -50 dBm -50 dBm -50 dBm -70 dBm -70 dBm -70 dBm -10	0 10				11 I I I I I I I I I I I I I I I I I I				703.3000	
-10 dBm -20 dBm -20 dBm -20 dBm -40 dBm -40 dBm -50 dBm -50 dBm -70 dBm -70 dBm -70 dBm -70 dBm -10	U dBm					Q tac	ter T2			3415.2
-20 dBm -20 dBm -20 dBm -40 dBm -40 dBm -50 dBm -50 dBm -60 dBm -70 dBm -70 dBm -70 dBm -70 dBm -1 -1 -1 -1 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2	10 d0m						a de			
30 dBm     -40 dBm       -40 dBm     -50 dBm       -50 dBm     -60 dBm       -60 dBm     -70 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -71 dBm     -70 dBm	-10 UBIII									
30 dBm     -40 dBm       -40 dBm     -50 dBm       -50 dBm     -50 dBm       -60 dBm     -60 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -70 dBm     -70 dBm       -71 dBm     -70 dBm	-20 dBm								<u></u>	
-40 dBm     -40 dBm     Image: Constraint of the second of the s	-20 ubiii								$\sim$	
-40 dBm     -40 dBm     Image: Constraint of the second of the s	28 dBm									
-50 dBm -60 dBm -70	-30 0000	_								_
-50 dBm -60 dBm -70	-40 dBm									
-60 dBm     -60 dBm     Image: Constraint of the second se	-+0 ubiii									
-60 dBm     -60 dBm     Image: Constraint of the second se	-50 dBm									
-70 dBm         691 pts         Span 2.0 MH           GF 2.402 GHz         691 pts         Span 2.0 MH           Marker         Type         Ref         Tc         X-value         Y-value         Function         Function Result           M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH;           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 dl	So abiii									
-70 dBm         CF 2.402 GHz         691 pts         Span 2.0 MH           Marker           Type Ref Trc X-value         Y-value         Function         Function Result           M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH;           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 df	-60 dBm									
CF 2.402 GHz         691 pts         Span 2.0 MH           Marker	00 00									
CF 2.402 GHz         691 pts         Span 2.0 MH           Marker	-70 dBm									
Marker           Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH.           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 db										
Marker           Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH.           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 db	CE 2 402 CL	1-7			601 pt/					n 2 0 MUz
Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH.           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 db		14			091 pt:	,			oha	1 2.0 MHZ
M1         1         2.4020087 GHz         0.44 dBm         ndB down         703.3 kH.           T1         1         2.4016527 GHz         -5.54 dBm         ndB         6.00 dl		Tro	V-ualite	1 0	ualuo	Eupotion		Euro	tion Bocult	1
T1 1 2.4016527 GHz -5.54 dBm ndB 6.00 di							-	Func	cion Result	
										6.00 dB
T2 1 2.402356 GHz -5.55 dBm Q factor 3415.2	T2	1			-5.55 dBm					3415.2

Middle Channel(2.440 GHz):

Spectr	um	Sp	ectrum 2	x	Spectr	um 3	×s	pectru	um 4	×		
	vel :	21.00 dBn										
Att		20 di	3 SWT	18.9 µs	e vbw	300 kHz	Mode	Auto F	FT			
⊖1Pk Ma	IX .											
							M	1[1]				0.30 dBm
10 dBm-											2.440	00870 GHz
TO UBIII-							no				706 0000	6.00 dB
0 dBm—						M1	Bi				706.2000	000000 kHz
U UBIII-				- <u>T1</u>	$\rightarrow$		U	factor			I	3455.0
-10 dBm				-					-			
-10 ubiii										~		
-20 dBm												
-20 ubiii												
-30 dBm												
-30 660	-											
-40 dBm												
-40 UBIII												
-50 dBm												
-30 ubiii												
-60 dBm												
-60 UBIII												
-70 dBm												
-70 UBIII												
CF 2.44	GHz					691 pt	5				Spa	n 2.0 MHz
Marker												
	Ref	Trc	X-value			alue	Func			Func	tion Result	
M1		1	2.440008			).30 dBm	ndB	down				706.2 kHz
T1		1	2.439655			5.68 dBm		ndB				6.00 dB
T2		1	2.440361	.8 GHZ	-5	5.72 dBm	Q .	factor				3455.0



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# Highest Channel(2.480 GHz):

Spectrum	Spe	ctrum 2	X Spe	ectrum 3	× s	Spectru	ım 4	X		
	21.00 dBm	Offset 11.00								
Att	20 dB	SWT 18.9	9 µs 🖷 V	<b>BW</b> 300 kHz	: Mode	Auto F	FT			
●1Pk Max		1								
					M	1[1]				0.04 dBm
10 dBm						1			2.480	00870 GHz
10 0000					ni Bi	dB			604 6000	6.00 dB 100000 kHz
				M11		n faeter			094.0000	3570.2
o ubiii		t T V			~	Increa	V 12		I	3370.2
-10 dBm										
								$\sim$		
-20 dBm										
-30 dBm										
-40 dBm										
-50 dBm										
6 0 ID										
-60 dBm										
-70 dBm										
-70 ubiii										
CF 2.48 GH:	2			691 p	ts				spa	n 2.0 MHz
Marker	1 - 1				1 -			_		
Type Ref M1	Trc 1	2.4800087 G		<u>r-value</u> 0.04 dBm	Func	tion down		Func	tion Result	694.6 kHz
T1	1	2.4800087 G		-5.95 dBm		aown ndB				6.00 dB
T2	1	2.4803502 G		-5.95 dBm		factor				3570.2
		21.000002.0		0.51 000	X	100101				00.0.2

2M

Lowest Channel(2.402 GHz):

Spectrum	Spe	ectrum 2	x s	bectrum 3	× 5	spectrum 4	4 🕱		
Ref Level Att	21.00 dBm 20 dB		11.00 dB 😑 19 us 👄	<b>RBW</b> 100 ki <b>VBW</b> 300 ki		Auto FFT			
●1Pk Max					- mouo				
					D	2[1]			-0.31 dB
10 dBm					M	1[1]			15920 MHz -5.74 dBm 43560 GHz
0 dBm(	0.430 de	3m			- <b>.</b>				
o abiii		170 dBm		$\sim$	$\sim$		2		
-10 dBm						-			
-20 dBm	$\square$	~					>	$\sim$	
-30 d8m									
-40 dBm									`
-50 dBm									
-60 dBm									
-70 dBm									
CF 2.402 G	Hz			691	pts			Spa	n 3.0 MHz



# **TEST REPORT**

# Middle Channel(2.440 GHz):

Spectrum	Sp	ectrum 2	× s	pectrum 3	× ×	6pectrum 4	4 X		
Ref Level Att	21.00 dBm 20 dB			<b>RBW</b> 100 k <b>VBW</b> 300 k		Auto FFT			
⊖1Pk Max									
						2[1]		1.	-0.13 dB 15050 MHz
10 dBm					M	1[1]		2.439	-5.78 dBm 43560 GHz
0 dBm——I	01 0.300 di	8m	M1	~	<u> </u>		2		
-10 dBm									
-20 dBm	/								
-30 d8m									
40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
CF 2.44 GH	z			691	pts			Spa	n 3.0 MHz

# Highest Channel(2.480 GHz):

Spectrum	Spe	ctrum 2	🗴 sı	bectrum 3	X	6pectrum 4	4 X		
Ref Level 2				<b>RBW</b> 100 k					
🖷 Att	20 dB	SWT	19 µs 😑	<b>VBW</b> 300 k	Hz Mode	Auto FFT			
●1Pk Max									
					D	2[1]			0.24 dB
									18520 MHz
10 dBm					M	1[1]			-6.75 dBm 40955 GHz
						1		2.779	40900 GHZ
0 dBm D:	1 0.050 dBn	n			<u> </u>				
		N N N		$\sim$			2		
-10 dBm	02 -3.95						5		
10 abiii							$ $ $\sim$	$\sim$	
-20 dBm								<u> </u>	~
									$\sim$
-30 dBm									
									$\rightarrow$
40 dBm									
-50 dBm									
-60 dBm									
-60 aBm									
-70 dBm									
CF 2.48 GHz			L	691	pts		1	Spa	n 3.0 MHz

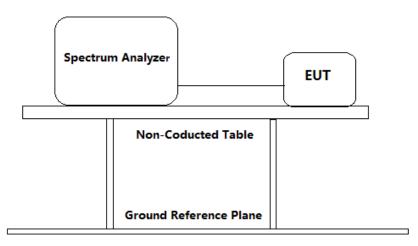


# **TEST REPORT**

#### 4.3 Maximum Peak Conducted Output Power

Test Requirement:	FCC Part 15 C 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. 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.
Test Method:	ANSI C63.10: Clause 11.9.1.1(RBW $\geq$ DTS bandwidth)
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 =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
- 2. Set the spectrum analyzer:
  - a) Set the RBW = 3 MHz (RBW $\geq$ DTS bandwidth).

b) Set the VBW  $\geq$  [3 × RBW].

c) Set the span  $\geq$  10 MHz[3 × RBW].

d) Detector = peak.

- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.
- 3. Repeat until all the test status is investigated.
- 4. Report the worst case.



# **TEST REPORT**

## Used Test Equipment List

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

## Test result:

#### 1M

Channel No.	Frequency (MHz)	Measured channel Power (dBm)	Limit	Result
0	2402	0.56	1W	Pass
19	2440	0.42	(30 dBm)	Pass
39	2480	0.16		Pass

2M

Channel No.	Frequency (MHz)	Measured channel Power (dBm)	Limit	Result
0	2402	0.55	1W	Pass
19	2440	0.39	(30 dBm)	Pass
39	2480	0.15	(50 0611)	Pass

Remark: Level = Read Level + Cable Loss

Result plot as follows:



# **TEST REPORT**

1M:

Lowest channel (2.402 GHz):

Spectrum				
RefLevel 21.00 dBm Att 20 dB	Offset 11.00 dB  SWT 1 ms		Auto Sweep	X
●1Pk Max		induc		
		м	1[1]	0.56 dBm 2.4022320 GHz
10 dBm				
0 dBm		M1		
-10 dBm				
-20 dBm				
-30 dBm				
-40 dBm				
-50 dBm				
-60 dBm				
-70 dBm				
CF 2.402 GHz		691 pts		Span 10.0 MHz

## Middle Channel (2.440 GHz):

Spectrum Spe	ctrum 2 🛛 🗶 Sp	ectrum 3	Spectrum 4 (X)	
Ref Level         21.00 dBm           Att         20 dB	Offset 11.00 dB	RBW 3 MHz VBW 10 MHz	Mode Auto Sweep	
●1Pk Max			M1[1]	0.42 dBm
10 dBm				2.4397680 GHz
		M1		
0 dBm				
-10 dBm				
-20 dBm				
-30 dBm				
-40 dBm				
-50 dBm				
-60 dBm				
-70 dBm				
CF 2.44 GHz		691 pt:		Span 10.0 MHz



# **TEST REPORT**

## Highest Channel (2.480 GHz):

	 bectrum 3	Spectrum 4	X		
RefLevel 21.00 dBm Att 20 dB	RBW 3 MHz VBW 10 MHz	Mode Auto Sweep			
●1Pk Max		· · · ·			
		M1[1]		2.47	0.16 dBm 98120 GHz
10 dBm					
	M1				
0 dBm	 		_		
-10 dBm					
-20 dBm					<u> </u>
-30 dBm					
-40 dBm					
-50 dBm					
-60 dBm					
-70 dBm					
CF 2.48 GHz	691 pt	5		Span	10.0 MHz

## 2M:

Lowest channel (2.402 GHz):

Spectrum	Spe	ctrum 2	🗶 Sp	ectrum 3	x s	pectrum 4	4 🛛 🗶		
Ref Level 21			1.00 dB 😑						
Att	20 dB	SWT	1 ms 😑	<b>VBW</b> 10 MH	z Mode	Auto Sweep			,
●1Pk Max									
					M	1[1]		2.40	0.55 dBm 14930 GHz
10 dBm									
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-40 0811									
-50 dBm									
-60 dBm									
-70 dBm									
CF 2.402 GHz				691	pts			Span	10.0 MHz



# **TEST REPORT**

## Middle Channel (2.440 GHz):

Spectrum Sp	ectrum 2 🛛 🗴 S	pectrum 3	Spectrum 4	X	
RefLevel 21.00 dBm Att 20 dB		RBW 3 MHz VBW 10 MHz	Mode Auto Sweep		
• 1Pk Max		101112	Mode Adto Sweep		
			M1[1]		0.39 dBm 2.4394500 GHz
10 dBm					
0 dBm		M1			
-10 dBm					
-20 dBm					
-30 dBm					
-40 dBm					
-50 dBm					
-60 dBm					
-70 dBm					
-/0 4011					
CF 2.44 GHz		691 pt:	<u> </u>	I	Span 10.0 MHz

# Highest Channel (2.480 GHz):

Spectrum SI	pectrum 2 🛛 🗴 S	pectrum 3	Spectrum 4	×	
Ref Level 21.00 dB Att 20 d		RBW 3 MHz VBW 10 MHz	Mode Auto Sweep		
●1Pk Max		-			0.15 dBm
			M1[1]		2.4795510 GHz
10 dBm					
0 dBm		M1			
-10 dBm					
-20 dBm					
american a second s					
-30 dBm					
-40 dBm					
-50 dBm					
-50 dBm					
-60 dBm					
-70 dBm					
, o abii					
CF 2.48 GHz		691 pt	s		Span 10.0 MHz

Test result: The unit does meet the FCC requirements.

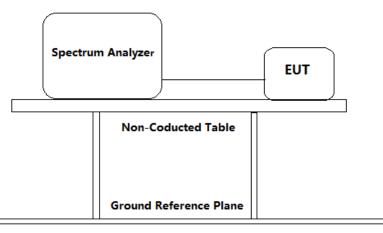


# TEST REPORT

## 4.4 Peak Power Spectral Density

Test Requirement:	FCC Part 15 C section 15.247 (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.
Test Method:	ANSI C63.10: Clause 11.10.2
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 =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.

b) Set the span= 1.5 × DTS bandwidth.

- c) Set the RBW to 3 kHz  $\leqslant$  RBW  $\leqslant$  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



## **TEST REPORT**

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.

Test result:

1M

Channel No.	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3 kHz)	Limit	Result
0	2402	-14.94		Pass
19	2440	-15.16	8 dBm/3kHz	Pass
39	2480	-15.49		Pass

2M

Channel No.	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3 kHz)	Limit	Result
0	2402	-17.40		Pass
19	2440	-17.62	8 dBm/3kHz	Pass
39	2480	-17.89		Pass

Test result: Level = Read Level + Cable Loss.

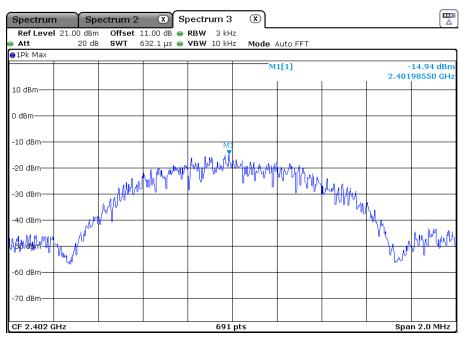


# **TEST REPORT**

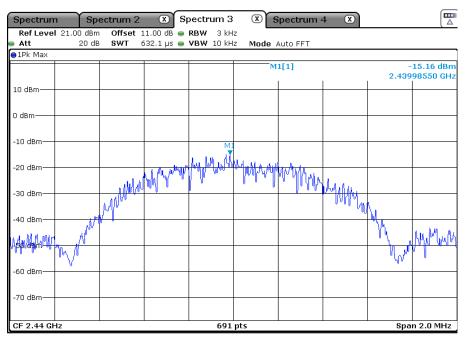
Result plot as follows:

## 1M:

Lowest channel (2.402 GHz):



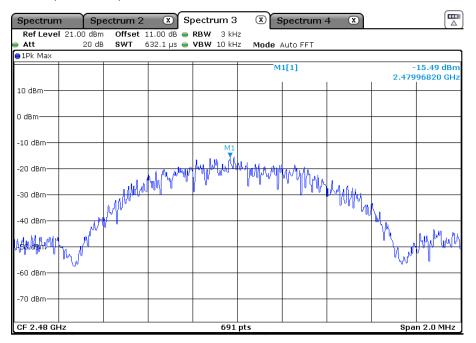
#### Middle Channel (2.440 GHz):





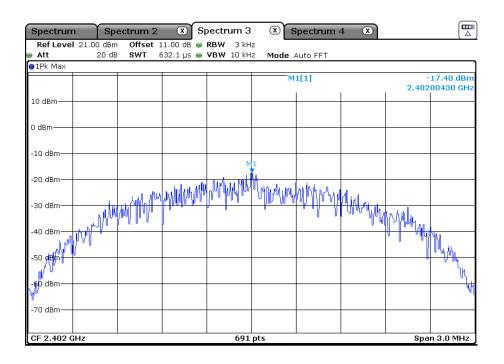
# **TEST REPORT**

Highest Channel (2.480 GHz):



2M:

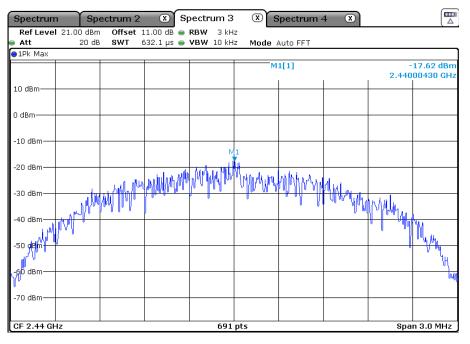
Lowest channel (2.402 GHz):



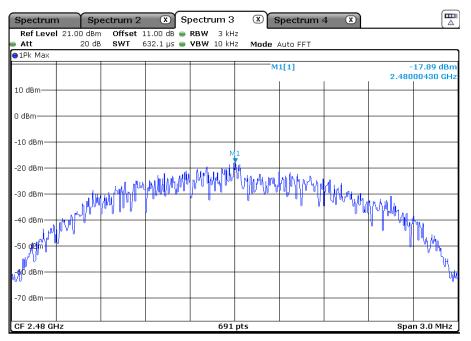


# **TEST REPORT**

#### Middle Channel (2.440 GHz):



## Highest Channel (2.480 GHz):





## **TEST REPORT**

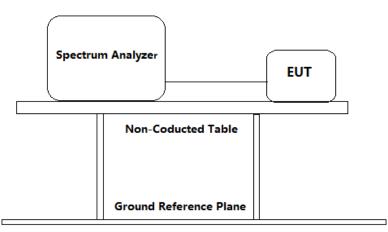
#### 4.5 Out of Band Conducted Emissions

Test Requirement:	FCC Part 15 C section 15.247
rest negan ement.	

(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.

- Test Method: ANSI C63.10: Clause 11.11
- 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 RF cable (cable loss =2dB) 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  $\geq$  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



# **TEST REPORT**

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.

Result plot as follows:

1M

Lowest channel (2.402 GHz):

9 kHz to 25 GHz:

Spectrun	n 🍸 Spi	ectrum 2		bectrum 3	× 5	Spectrum	4 ⊗		
Ref Leve Att	21.00 dBm 20 dB			RBW 100 k VBW 300 k		Auto Cures	_		
All     A	20 UB	391	250 IIIS 🖶	Y D YY 300 K	nz Moue	Auto Swee	ρ		
10 dBm						2[1] 1[1]		20	51.46 dBm ).2424 GHz 0.22 dBm 2.4059 GHz
0 dBm	1								
-10 dBm									
-20 dBm-	D1 -19.780	dBm							
-30 dBm——									
-40 dBm								м2	
-50 dBm	unment	wentwork	wannun	marrie	hormer	mm	p	1 Curve	www
-70 dBm—									
Start 9.0 k	Hz			691	pts			 Stop	25.0 GHz



## **TEST REPORT**

Middle Channel (2.440 GHz):

9 kHz to 25 GHz:

Spectrum		ctrum 2		ectrum 3		Spectrum -	4 ເ⊗		
Ref Level 2 Att	21.00 dBm 20 dB	Offset 1 SWT		<b>RBW</b> 100 k <b>VBW</b> 300 k		Auto Swee	-		
IPk Max	20 40	0111	200 115 -	TBN 000 K	ne mode	A010 3466	2		
						2[1] 1[1]			51.96 dBm 5.8285 GHz -0.22 dBm
10 dBm								:	2.4420 GHz
0 dBm									
-10 dBm									
<u>20 dBmD</u>	1 -20.220	dBm <del></del>							
-30 dBm									
-40 dBm									
-50 dBm	May make all	human	halle	whenter	www	M2 WWWWWW	mmum	munun	www.
,*60 dBm <sup>run</sup>	սիս -								
-70 dBm									
Start 9.0 kH	z			691	pts	1	1	Stop	25.0 GHz

Highest Channel (2.480 GHz):

9 kHz to 25 GHz:

Spectrum	Spe	ectrum 2	X Sp	ectrum 3	× ÷	Spectrum	4 🕱		
	21.00 dBm	Offset		RBW 100 k			_		
Att 1Pk Max	20 dB	SWT	250 ms 😑	<b>VBW</b> 300 k	Hz Mode	Auto Swee	р		
10 dBm						11[1]		-	-1.03 dBm 2.4780 GHz 51.48 dBm 5.8285 GHz
0 dBm									
-10 dBm									
-20 dBm(	01 -21.030	dBm <del></del>							
-30 dBm									
-40 dBm									
-50 dBm		the work when the	and the	Allertor		M2 phone when	inna	muur	mmuhu
REAL DBIRH	ulproved or			~ • • ~					
-70 dBm									
Start 9.0 kl	-lz			691	pts			Stop	25.0 GHz



# **TEST REPORT**

#### 2M

Lowest channel (2.402 GHz):

9 kHz to 25 GHz:

Spectrum		ectrum 2		ectrum 3		Spectrum	4 🕱		
Ref Level Att	21.00 dBm 20 dB	Offset 1 SWT		RBW 100 k VBW 300 k		Auto Swee	'n		
●1Pk Max	20 40				ne mode	1400 0100	Ρ		
10 dBm						12[1]			-45.44 dBm 1.7550 GHz 0.09 dBm 2.4060 GHz
0 dBm									
-10 dBm—									
	D1 -19.910	dBm							
-30 dBm									
<b>T</b>							44. h. a. h. M	en reals	ي مار ماه
-50 dBm	wonderword	we want where	nadapantanta	whenever	nuuroold		14// VI / W *	Verber	and membre
-70 dBm									
Start 9.0 kl	Hz			691	pts	1	1	Stop	25.0 GHz

Middle Channel (2.440 GHz):

9 kHz to 25 GHz:

Spectrum	n Spe	ectrum 2	× Sp	ectrum 3	x s	Spectrum	4 ເ⊗		
Ref Level	21.00 dBm 20 dB	Offset 1 SWT		RBW 100 k VBW 300 k		Auto Swee	n		
• 1Pk Max	20 00	0111	200 110 -	TBN 000 K	ne mode	Adto Swee	P		
						2[1] 1[1]			52.06 dBm 6.5880 GHz 0.24 dBm
10 dBm	L					1[1]	1	:	2.4420 GHz
0 dBm									
-10 dBm									
-20 dBm-	D1 -19.760	dBm							
-30 dBm									
-40 dBm									
-50 dBm—	للاستان والم	mandalla		all the order and the	A og runde	M2	mm	Mundre	winder
.,26,0~cl8m <sup>h//l</sup>	when we	νų	www.www.ww	n Ann alli a _a	w V v				
-70 dBm									
Start 9.0 k	Hz			691	pts			l Stop	25.0 GHz



# **TEST REPORT**

Highest Channel (2.480 GHz):

#### 9 kHz to 25 GHz:

Spectrum Spec	ctrum 2 🛛 🗷 Sp	oectrum 3 🛛 🗶	Spectrum 4	×	
Ref Level 21.00 dBm	Offset 11.00 dB 👄				
Att 20 dB 1Pk Max	SWT 250 ms 👄	VBW 300 kHz Mod	e Auto Sweep		
The wax			M2[1]	2	41.36 dBm .4059 GHz
10 dBm		r	M1[1]		-0.05 dBm 2.4780 GHz
0 dBm					
-10 dBm					
-20 dBm D1 -20.010 dE	Bm				
-30 dBm					
-40 dBm					
-50 dBm	war war when you when	mannan	vern manual	Marthurbou	mound
-70 dBm					
Start 9.0 kHz		691 pts		Ston	25.0 GHz

#### 4.6 Out of Band Radiated Emissions

For out of band radiated emissions into Non-Restricted Frequency Bands were performed at a 3m separation distance to determine whether these emissions complied with the 20dB attenuation requirement.

- [×] Not required, since all emissions are more than 20dB below fundamental
- [] See attached data sheet

#### 4.7 Radiated Emissions in Restricted Bands

Test Requirement:	FCC Part 15 C section 15.247
	(d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI C63.10: Clause 11.12.1, 6.4, 6.5 and 6.6
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 REPORT**

Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz;
	43.5 dBμV/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:
Delector.	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
Field Strength Calculation:	Trace = max hold
	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
Where:	FS = Field Strength in dBμV/m
	RA = Receiver Amplitude (including preamplifier) in $dB\mu V$
	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
	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 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



## **TEST REPORT**

was -10 dB. The net field strength for comparison to the appropriate emission limit is  $32 \text{ dB}\mu\text{V/m}$ . RA =  $62.0 \text{ dB}\mu\text{V}$ AF = 7.4 dBCF = 1.6 dBAG = 29.0 dBPD = 0 dBAV = -10 dB Correct Factor = 7.4 + 1.6 - 29.0 + 0 = -20 dBFS =  $62 + (-20) + (-10) = 32 \text{ dB}\mu\text{V/m}$ 

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:

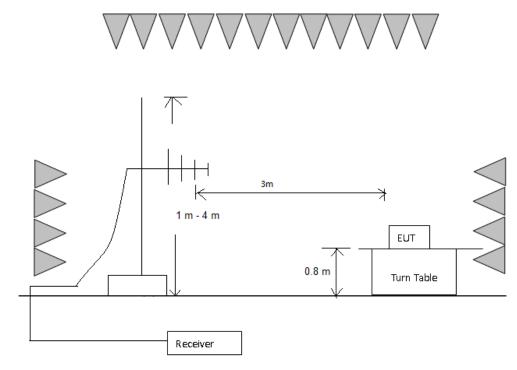
MHz	MHz	MHz	GHz
$\begin{array}{c} 0.090 - 0.110 \\ 10.495 - 0.505 \\ 2.1735 - 2.1905 \\ 4.125 - 4.128 \\ 4.17725 - 4.17775 \\ 4.20725 - 4.20775 \\ 6.215 - 6.218 \\ 6.26775 - 6.26825 \\ 6.31175 - 6.31225 \\ 8.291 - 8.294 \\ 8.362 - 8.366 \\ 8.37625 - 8.38675 \\ 8.41425 - 8.41475 \\ 12.29 - 12.293 \\ 12.51975 - 12.52025 \\ 12.57675 - 12.57725 \\ 13.36 - 13.41 \\ \end{array}$	$\begin{array}{c} 16.42 - 16.423 \\ 16.69475 - 16.69525 \\ 16.80425 - 16.80475 \\ 25.5 - 25.67 \\ 37.5 - 38.25 \\ 73 - 74.6 \\ 74.8 - 75.2 \\ 108 - 121.94 \\ 123 - 138 \\ 149.9 - 150.05 \\ 156.52475 - \\ 156.52525 \\ 156.7 - 156.9 \\ 162.0125 - 167.17 \\ 167.72 - 173.2 \\ 240 - 285 \\ 322 - 335.4 \end{array}$	399.9 - 410 608 - 614 960 - 1240 1300 - 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 3600 - 4400	$\begin{array}{r} 4.5 - 5.15 \\ 5.35 - 5.46 \\ 7.25 - 7.75 \\ 8.025 - 8.5 \\ 9.0 - 9.2 \\ 9.3 - 9.5 \\ 10.6 - 12.7 \\ 13.25 - 13.4 \\ 14.47 - 14.5 \\ 15.35 - 16.2 \\ 17.7 - 21.4 \\ 22.01 - 23.12 \\ 23.6 - 24.0 \\ 31.2 - 31.8 \\ 36.43 - 36.5 \end{array}$

Test Configuration:

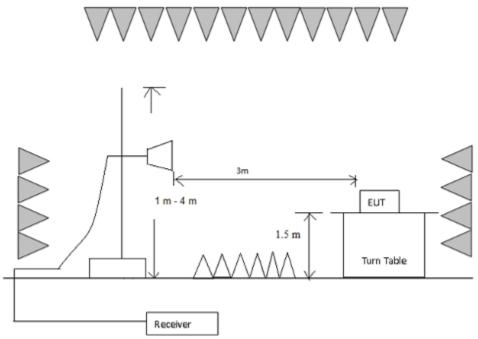
1) 30 MHz to 1 GHz emissions:



# **TEST REPORT**



2) 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,



# **TEST REPORT**

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.

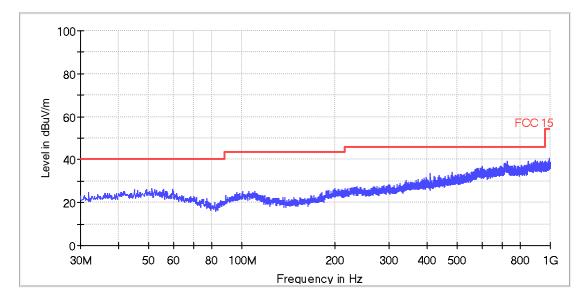
9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

Pre-scan all modes, worst case as below

1Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status

Vertical:

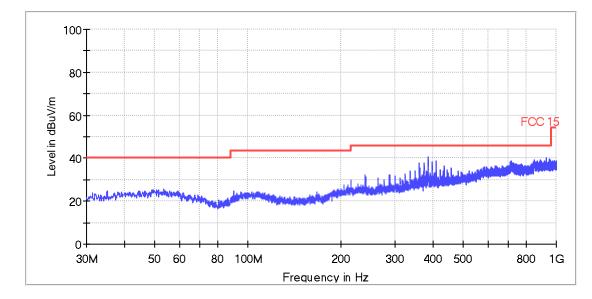


All emission levels are more than 6dB below the limit.



# **TEST REPORT**

## Horizontal:



All emission levels are more than 6dB below the limit.

1~25 GHz Radiated Emissions.

1M:

Test at Channel 0 (2.402 GHz) in transmitting status

РК	Measurement:
	Wicusul Chieffe

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4803.8	54.6	-1.1	53.5	74	Н
7207.1	54.8	2.3	57.1	74	Н
4803.8	46.9	-1.1	45.8	74	V
7205.0	47.1	2.3	49.4	74	V

## **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4803.8	/	-1.1	/	54	Н
7207.1	43.4	2.3	45.7	54	Н
4803.8	/	-1.1	/	54	V
7205.0	/	2.3	/	54	V

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



# **TEST REPORT**

### Test at Channel 19 (2.440 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)	
4880.2	54.6	-1.0	53.6	74	Н
7319.8	56.3	2.4	58.7	74	Н
4878.1	46.5	-1.0	45.5	74	V
7319.8	50.1	2.4	52.5	74	V

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4880.2	/	-1.0	/	54	Н
7319.8	43.0	2.4	45.4	54	Н
4878.1	/	-1.0	/	54	V
7319.8	/	2.4	/	54	V

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

# Test at Channel 39 (2.480 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)	
4958.9	57.9	-0.9	57.0	74	Н
7438.8	51.3	2.6	53.9	74	Н
4961.0	47.9	-0.9	47.0	74	V
7438.8	45.8	2.6	48.4	74	V

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4958.9	41.3	-0.9	40.4	54	Н
7438.8	/	2.6	/	54	Н
4961.0	/	-0.9	/	54	V
7438.8	/	2.6	/	54	V

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



2M:

Test at Channel 0 (2.402 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)	
4801.6	54.7	-1.1	53.6	74	Н
7205.0	55.3	2.3	57.6	74	Н
4801.6	46.9	-1.1	45.8	74	V
7205.0	48.4	2.3	50.7	74	V

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4801.6	/	-1.1		54	Н
7205.0	44.9	2.3	47.2	54	Н
4801.6	/	-1.1	/	54	V
7205.0	/	2.3	/	54	V

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

# Test at Channel 19 (2.440 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)	
4878.1	52.1	-1.0	51.1	74	Н
7317.6	56.0	2.4	58.4	74	Н
4878.1	44.9	-1.0	43.9	74	V
7321.9	48.8	2.4	51.2	74	V

## **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4878.1	/	-1.0	/	54	Н
7317.6	44.1	2.4	46.5	54	Н
4878.1	/	-1.0	/	54	V
7321.9	/	2.4	/	54	V

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



## Test at Channel 39 (2.480 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)	
4961.0	59.1	-0.9	58.2	74	Н
7438.8	49.4	2.6	52.0	74	Н
4958.9	48.6	-0.9	47.7	74	V
7440.9	46.6	2.6	49.2	74	V

#### **AV Measurement:**

Frequency	AV Reading Level	Correction factors	AV Emission Level	AV Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBµV/m)	(dBµV/m)	
4961.0	39.8	-0.9	38.9	54	Н
7438.8	/	2.6	/	54	Н
4958.9	/	-0.9	/	54	V
7440.9	/	2.6	/	54	V

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



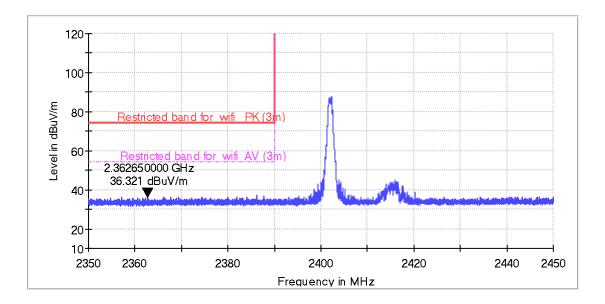
# **TEST REPORT**

#### **Restricted Bands Measurement**

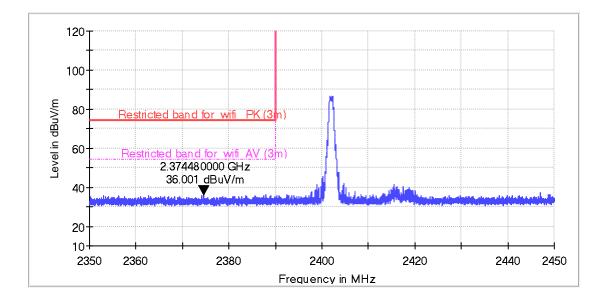
#### 1M

Test at Channel 0 (2.402 GHz) in transmitting status

Horizontal



Vertical





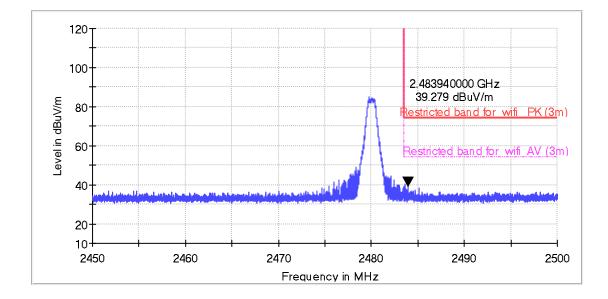
#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2362.7	44.6	-8.3	36.3	74	Н
2374.5	44.2	-8.2	36.0	74	V

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

Test at Channel 39 (2.480 GHz) in transmitting status

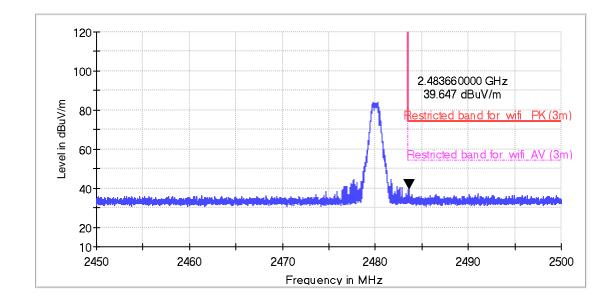
### Horizontal





# **TEST REPORT**

Vertical



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2483.9	47.1	-7.8	39.3	74	Н
2483.7	47.4	-7.8	39.6	74	V

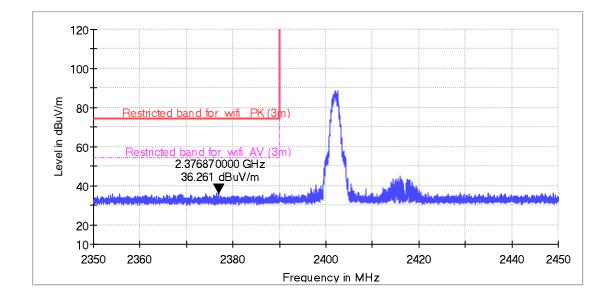
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

2M

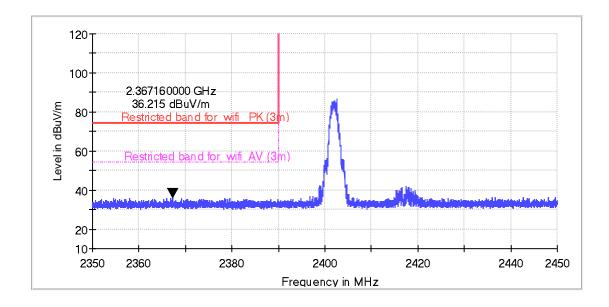
Test at Channel 0 (2.402 GHz) in transmitting status

Horizontal





Vertical



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2376.9	44.6	-8.3	36.3	74	Н
2367.2	44.4	-8.2	36.2	74	V

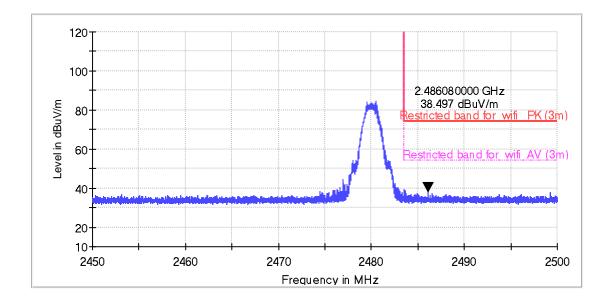
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.



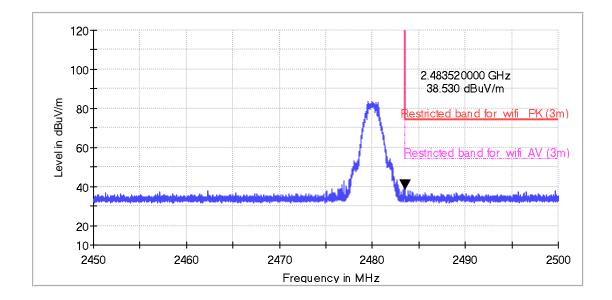
# **TEST REPORT**

## Test at Channel 39 (2.480 GHz) in transmitting status

## Horizontal



## Vertical



#### **PK Measurement:**

Frequency	PK Reading Level	Correction factors	PK Emission Level	PK Limit	Antenna polarization
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	
2486.1	46.3	-7.8	38.5	74	Н
2483.5	46.3	-7.8	38.5	74	V



# **TEST REPORT**

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

\* Band Edges Emission

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 Loss –Preamplifier Factor.

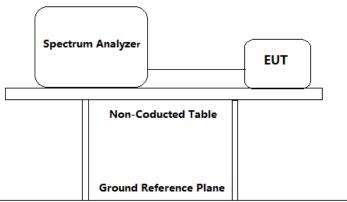
As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.



## 4.8 Band Edges Requirement

Test Requirement:	FCC Part 15 C 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.
Frequency Band:	2400 MHz to 2483.5 MHz
Test Method:	ANSI C63.10: Clause 11.11 and 11.13
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



Test Procedure:

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



# **TEST REPORT**

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:

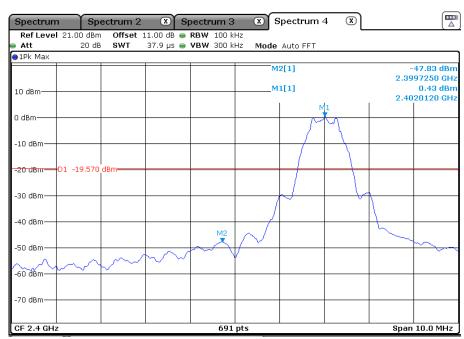
3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment 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 20dB.

The Upper Edges attenuated more than 20dB.

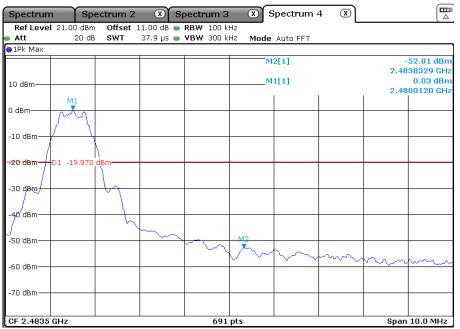


#### 1M: Channel 0: 2.402 GHz



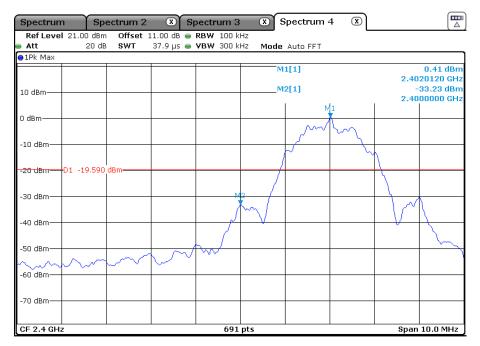
## **TEST REPORT**

#### Channel 39: 2.480 GHz



## 2M:

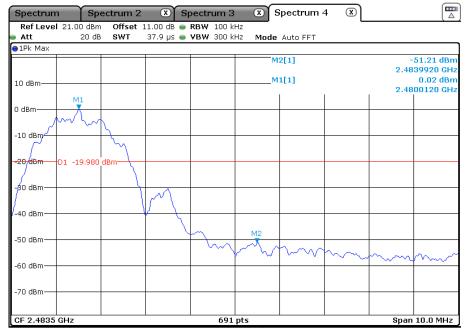
Channel 0: 2.402 GHz





# **TEST REPORT**

Channel 39: 2.480 GHz



For radiated mode:

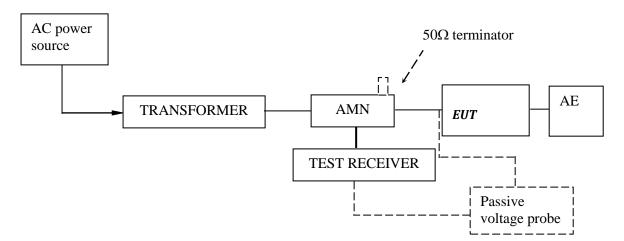
Please refer Clause 4.7 Radiated Emissions in Restricted Bands of this test report for more details. The resultant field strength in band edges meet the general radiated emission limit in section 15.209, which does not exceed 74 dB $\mu$ V/m (Peak Limit) and 54 dB $\mu$ V/m (Average Limit).



## **TEST REPORT**

#### 4.9 Conducted Emission Test

Test Configuration:



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.



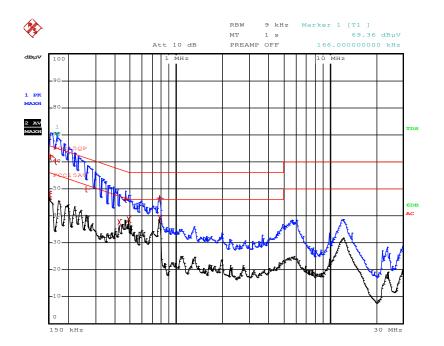
# **TEST REPORT**

Test Data and Curve

At main terminal: Pass

Tested Wire: Live

# Operation Mode: transmitting



		EDIT	PEAR	K LIST	(Final	Measure	ement	Resul	ts)	
Tra	cel:		FCC1	5QP						
Tra	ce2:		FCCl	5AV						
Tra	ce3:									
	TRAC	CE		FREQUEN	NCY	LEVEL	dBµV		DELTA LIMIT	dB
2	CISPR	Average	150	kHz		47.46	Ll		-8.53	
1	Quasi	Peak	150.	3 kHz		62.35	Ll		-3.63	
2	CISPR	Average	150.	3 kHz		48.14	Ll		-7.83	
1	Quasi	Peak	154	kHz		61.85	Ll		-3.92	
1	Quasi	Peak	166	kHz		60.13	Ll		-5.02	
1	Quasi	Peak	262	kHz		49.95	Ll		-11.41	
2	CISPR	Average	422	kHz		37.64	Ll		-9.76	
1	Quasi	Peak	466	kHz		45.94	Ll		-10.63	
2	CISPR	Average	486	kHz		38.65	Ll		-7.58	
1	Quasi	Peak	778	kHz		46.56	Ll		-9.43	
2	CISPR	Average	778	kHz		39.11	Ll		-6.88	

Remark:

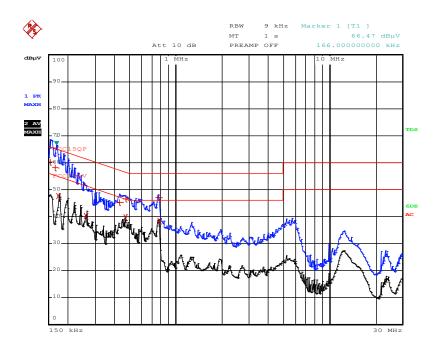
- 1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Level (dBµV) = Corr. (dB) + Read Level (dBµV)
- 3. Delta Limit (dB) = Level (dB $\mu$ V)-Limit (dB $\mu$ V)



## **TEST REPORT**

Tested Wire: Neutral

Operation Mode: transmitting



	EDII	PEA	K LIST (Final	Measure	ment Resul	ts)	
Tra	cel:	FCC15QP					
Tra	ce2:	FCC15AV					
Trace3:							
	TRACE		FREQUENCY	LEVEL d	BμV	DELTA LIMIT dB	
l	Quasi Peak	154	kHz	60.18	Ll	-5.59	
l	Quasi Peak	166	kHz	58.20	Ll	-6.95	
2	CISPR Average	174	kHz	47.59	Ll	-7.17	
2	CISPR Average	262	kHz	40.38	Ll	-10.98	
l	Quasi Peak	430	kHz	45.26	Ll	-11.99	
2	CISPR Average	466	kHz	39.84	Ll	-6.73	
l	Quasi Peak	470	kHz	46.48	Ll	-10.03	
1	Quasi Peak	770	kHz	47.18	Ll	-8.81	
2	CISPR Average	778	kHz	38.45	Ll	-7.54	

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 (dBµV)-Limit (dBµV)



# **TEST REPORT**

# 5.0 Test Equipment List

Radiated Emissio	on/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	2024-04-10	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2024-11-15	1Y
EM031-03	EM031-03 Signal and Spectrum Analyzer (10 Hz~40 GHz)		R&S	2024-11-12	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2024-07-02	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	2024-12-05	1 <b>Y</b>
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2024-07-02	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2024-04-22	1 <b>Y</b>
EM033-04	B-04 High Frequency Antenna & R&S SCU-40 R&S preamplifier (26 GHz-40 GHz)		R&S	2024-04-22	1 <b>Y</b>
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2024-04-10	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2024-04-10	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2024-04-22	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2024-07-19	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	2024-05-09	1Y
SA016-29	Climatic Test Chamber	MHU-80L	JIANQIAO	2024-01-03	1Y
EM046-05	Power meter	NPR6A	R&S	2024-04-19	1Y
EM046-06	Power meter	NPR6A	R&S	2024-04-19	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A

Conducted Disturbance-Mains Terminal(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date	Last calibration date
Equipment ro.	Equipment	Model	Manufacturer	(DD-MM-YYYY)	(DD-MM-YYYY)
EM080-05	EMI receiver	ESCI	R&S	06/06/2024	07/06/2023
EM006-05	LISN	ENV216	R&S	06/06/2024	07/06/2023
SA047-112	Digital Temperature-Humidity Recorder	RS210	YIJIE	22/10/2024	23/10/2023
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	03/01/2025	04/01/2024