

FCC RF Test Report

APPLICANT	: Persimmon Kaki LLC
EQUIPMENT	: Digital Media Receiver
MODEL NAME	: G6A87E
FCC ID	: 2A8UX-2892
STANDARD	: FCC Part 15 Subpart C §15.247
CLASSIFICATION	: (DSS) Spread Spectrum Transmitter
TEST DATE(S)	: Feb. 14, 2023 ~ Mar. 03, 2023

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

JasonJia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen) 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China



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AP	PEND	X A. CONDUCTED TEST RESULTS	
AP	PEND	X B. AC CONDUCTED EMISSION TEST RESULT	
AP	PEND	X C. RADIATED SPURIOUS EMISSION	
AP	PEND	X D. RADIATED SPURIOUS EMISSION PLOTS	
AP	PEND	X E. DUTY CYCLE PLOTS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR2N0202-01A	Rev. 01	Initial issue of report	May 25, 2023



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	-	Report only	-
3.4	-	99% Bandwidth	-	Report only	-
3.5	15.247(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	≤ 20dBc	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 11.56 dB at 239.520 MHz
3.9	15.207	AC Conducted Emission	15.207(a) Pass		Under limit 12.76 dB at 0.596 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Persimmon Kaki LLC

6975 Union Park Avenue, Suite 600, Cottonwood Heights, Utah 84047

1.2 Product Feature of Equipment Under Test

	Product Feature				
Equipment	Digital Media Receiver				
Model Name	G6A87E				
FCC ID	2A8UX-2892				
SN Code	Conducted: P0B33R01302503S3 Conduction: G0B2JK013055002A Radiation: G0B2JK0130550029				

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification				
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz			
Number of Channels	79			
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78			
Maximum Output Power to Antenna	Bluetooth BR(1Mbps) : 9.90 dBm (0.0098 W) Bluetooth EDR (2Mbps) : 10.10 dBm (0.0102 W) Bluetooth EDR (3Mbps) : 10.17 dBm (0.0104 W)			
99% Occupied Bandwidth	Bluetooth BR(1Mbps) : 0.753MHz Bluetooth EDR (2Mbps) : 1.143MHz Bluetooth EDR (3Mbps) : 1.143MHz			
Antenna Type / Gain	PCB IFA Antenna type with gain 4.0 dBi			
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) :π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK			

1.4 Modification of EUT

No modifications are made to the EUT during all test items.





1.5 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)							
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595							
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm					
			Registration No.					
	TH01-SZ	CN1256	421272					
Test Firm	Sporton International Inc.	(Shenzhen)						
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398							
	Sporton Sito No	ECC Designation No	FCC Test Firm					
Test Site No.	Sporton Site No.	FCC Designation No.	Registration No.					
Test one No.								

1.6 Test Software

		Manufacturer	Name	Version	
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a	
2.	CO02-SZ	AUDIX	E3	6.120613b	



1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	0	2402	27	2429	54	2456
	1	2403	28	2430	55	2457
	2	2404	29	2431	56	2458
	3	2405	30	2432	57	2459
	4	2406	31	2433	58	2460
	5	2407	32	2434	59	2461
	6	2408	33	2435	60	2462
	7	2409	34	2436	61	2463
	8	2410	35	2437	62	2464
	9	2411	36	2438	63	2465
	10	2412	37	2439	64	2466
	11 12 ИНz 13	2413	38	2440	65	2467
		2414	39	2441	66	2468
2400-2483.5 MHz		2415	40	2442	67	2469
	14	2416	41	2443	68	2470
	15	2417	42	2444	69	2471
	16	2418	43	2445	70	2472
	17	2419	44	2446	71	2473
	18	2420	45	2447	72	2474
	19	2421	46	2448	73	2475
	20	2422	47	2449	74	2476
	21	2423	48	2450	75	2477
	22	2424	49	2451	76	2478
	23	2425	50	2452	77	2479
	24	2426	51	2453	78	2480
	25	2427	52	2454	-	-
	26	2428	53	2455	-	-



2.2 Test Mode

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report, and the worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

Summary table of Test Cases							
		Data Rate / Modulation					
Test Item	Bluetooth BR 1Mbps	Bluetooth EDR 2Mbps	Bluetooth EDR 3Mbps				
	GFSK	π/4-DQPSK	8-DPSK				
Conducted	Mode 1: CH00_2402 MHz	Mode 4: CH00_2402 MHz	Mode 7: CH00_2402 MHz				
	Mode 2: CH39_2441 MHz	Mode 5: CH39_2441 MHz	Mode 8: CH39_2441 MHz				
Test Cases	Mode 3: CH78_2480 MHz	Mode 6: CH78_2480 MHz	Mode 9: CH78_2480 MHz				
	В	luetooth EDR 3Mbps 8-DPS	K				
Radiated	Mode 1: CH00_2402 MHz						
Test Cases	Mode 2: CH39_2441 MHz						
		Mode 3: CH78_2480 MHz					
AC	Mada 1 . Jara Tv. J. Zighaa	Ex + Diveteeth Tx + WIEI/2 40) Ty + LICD Cable (Charging				
Conducted	-	Tx + Bluetooth Tx + WIFI(2.4G	b) TX + USB Cable (Charging				
Emission	from Adapter)						
Remark:							
1. For radiate	ed test cases, the worst mode	data rate 3Mbps was reported	only, because this data rate				
has the hig	hest RF output power at prelir	ninary tests, and no other sign	ificantly frequencies found in				
conducted	spurious emission.						

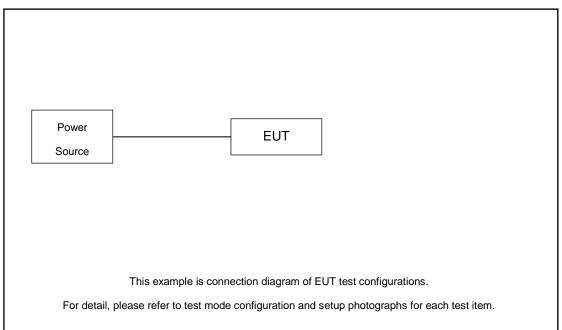
The following summary table is showing all test modes to demonstrate in compliance with the standard.

2. For Radiated Test Cases, The tests were performed with Adapter .

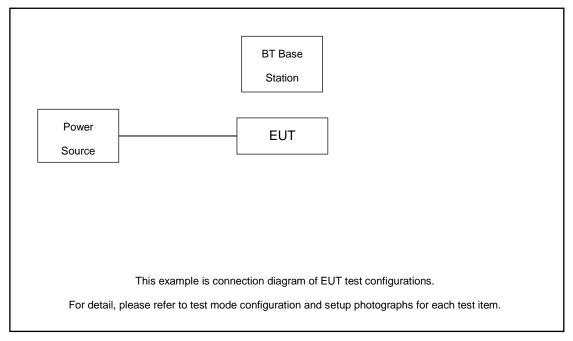


2.3 Connection Diagram of Test System

For Conducted Emission



For Radiated Emission



2.4 Support Unit used in test configuration and system

lte	m	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.		BT Base Station	СВТ	N/A	N/A	Unshielded, 1.8 m	N/A





2.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 1.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 1.2 + 10 = 11.2 (dB)



3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

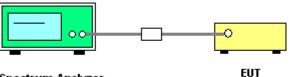
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 7.8.3.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- Use the following spectrum analyzer settings: Span = the frequency band of operation;
 RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
- 6. The number of hopping frequency used is defined as the number of total channel.
- 7. Record the measurement data derived from spectrum analyzer.

3.1.4 Test Setup



Spectrum Analyzer

3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.



Ref Level 30			11.20 dB 👄							
Att	30 dB	SWT	19 µs 👄	VBW	300 kHz	Mode	Auto FFT			
	T		Ĩ	Ĩ						T
20 dBm										
20 UBIII	0.0									
10 dBm	MAN	n m m m		0.0		MMM	MMAM	M PT PT PT	M DA PT PT	D AMM
1000	VWVW	VVV	NVVV	VV	VVV	JVVI	INNY	VVVI	10001	12001
0 dBm	-				-					
-10 dBm										
-20 dBm										
-30 dBm			-							
N										
-40 dBm										
-50 dBm										
-60 dBm										
Start 2.4 GHz					691 pt	s			Stop	 2.441 GHz
							Méasuri	800		
							<u></u>			
ate: 22.FEB.2	2023 16:	19:19								
Con a structure										
Spectrum Ref Level 30		Offcot	11.20 dB 👄	DDW	200 ku-					
Att	30 dB	SWT					Auto FFT			
1Pk Max										

vvvvvv

691 pts

LM.

VVVVV

VIVV

Number of Hopping Channel Plot on Channel 00 - 78

Date: 22.FEB.2023 16:21:01

Start 2.441 GHz

Stop 2.4835 GHz

III 646



3.2 Hopping Channel Separation Measurement

3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

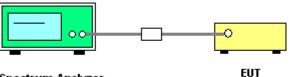
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.2.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- Use the following spectrum analyzer settings:
 Span = wide enough to capture the peaks of two adjacent channels;
 RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
- 6. Measure and record the results in the test report.

3.2.4 Test Setup



Spectrum Analyzer

3.2.5 Test Result of Hopping Channel Separation

Please refer to Appendix A.



<1Mbps>

Channel Separation Plot on Channel 00 - 01



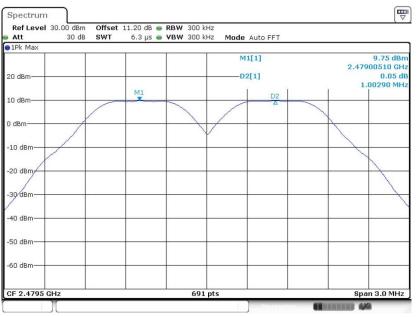
Date: 22.FEB.2023 12:48:42

Channel Separation Plot on Channel 39 - 40



Date: 22.FEB.2023 12:53:01



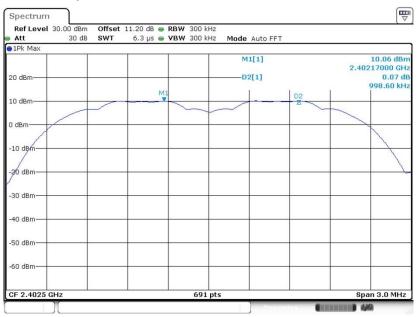


Channel Separation Plot on Channel 77 - 78

Date: 22.FEB.2023 13:06:50

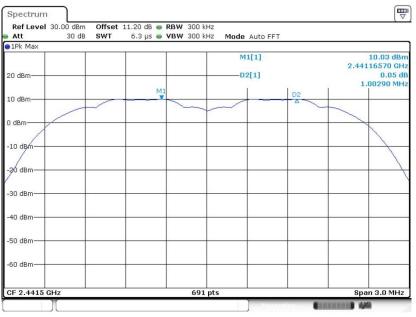
<2Mbps>

Channel Separation Plot on Channel 00 - 01



Date: 22.FEB.2023 13:21:38

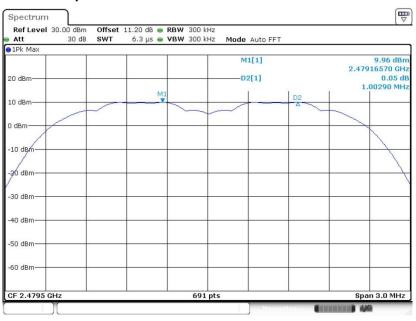




Channel Separation Plot on Channel 39 - 40

Date: 22.FEB.2023 13:31:21

Channel Separation Plot on Channel 77 - 78

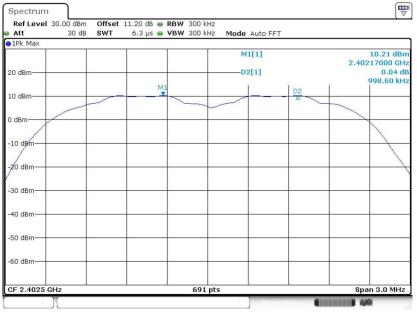


Date: 22.FEB.2023 13:35:57



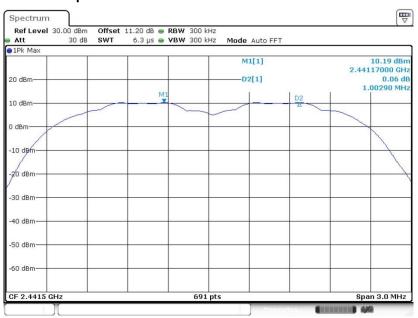
<3Mbps>

Channel Separation Plot on Channel 00 - 01



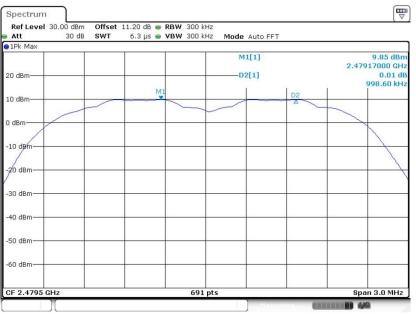
Date: 22.FEB.2023 13:45:41

Channel Separation Plot on Channel 39 - 40



Date: 22.FEB.2023 14:53:44





Channel Separation Plot on Channel 77 - 78

Date: 22.FEB.2023 15:01:14



3.3 Dwell Time Measurement

3.3.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

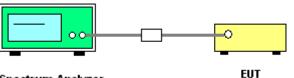
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.4.
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
- 6. Measure and record the results in the test report.

3.3.4 Test Setup

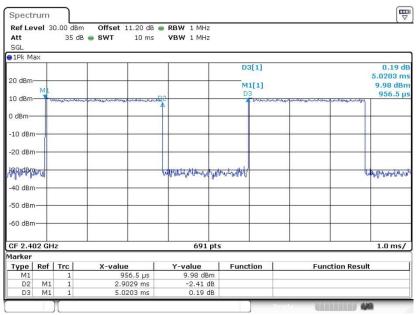


Spectrum Analyzer



3.3.5 Test Result of Dwell Time

Please refer to Appendix A.



Package Transfer Time Plot

Date: 21.FEB.2023 16:09:57

Remark:

 In normal mode, hopping rate is 1600 hops/s with 6 slots (5 Transmit and 1 Receive slot) in 79 hopping channels.

With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4×79) (s), Hops Over Occupancy Time comes to $(1600 / 6 / 79) \times (0.4 \times 79) = 106.67$ hops.

- In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels.
 With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 x 20) (s),
 Hops Over Occupancy Time comes to (800 / 6 / 20) x (0.4 x 20) = 53.33 hops.
- 3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time



3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

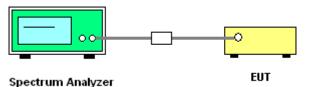
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
 Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel; The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;
 Sweep = auto; Detector function = peak; Trace = max hold.
- 5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
 Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel; The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;
 Sweep = auto; Detector function = peak;
 - Trace = max hold.
- 6. Measure and record the results in the test report.

3.4.4 Test Setup



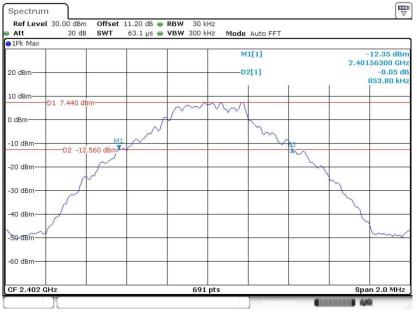
3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.



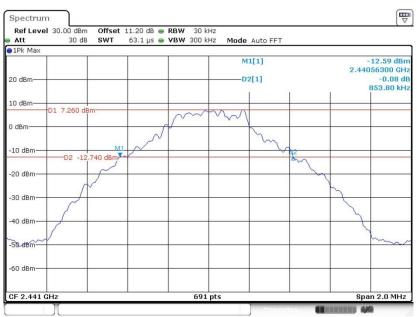
<1Mbps>

20 dB Bandwidth Plot on Channel 00



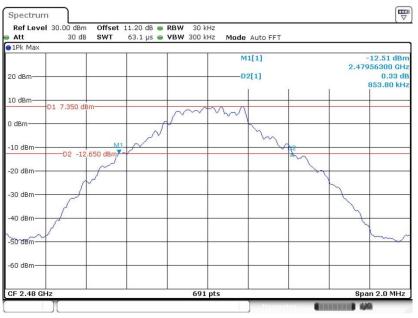
Date: 22.FEB.2023 12:59:53

20 dB Bandwidth Plot on Channel 39



Date: 22.FEB.2023 12:58:32



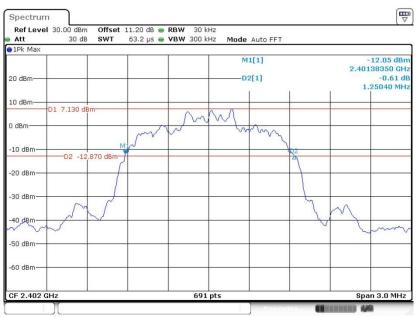


20 dB Bandwidth Plot on Channel 78

Date: 22.FEB.2023 13:09:16

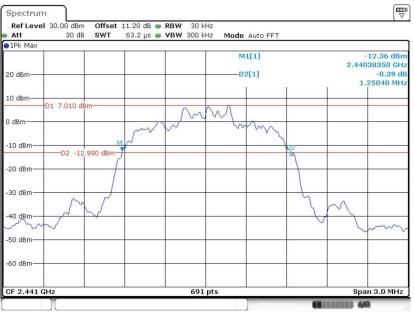
<2Mbps>

20 dB Bandwidth Plot on Channel 00



Date: 22.FEB.2023 13:26:59

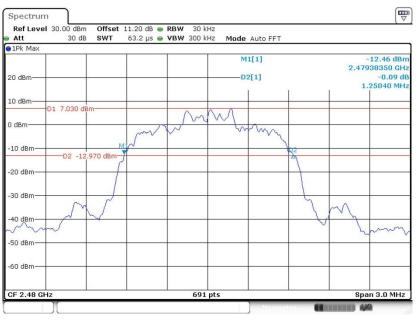




20 dB Bandwidth Plot on Channel 39

Date: 22.FEB.2023 13:32:46

20 dB Bandwidth Plot on Channel 78

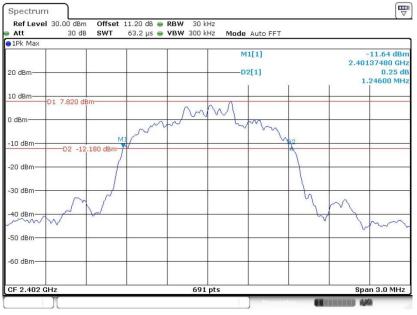


Date: 22.FEB.2023 13:38:38



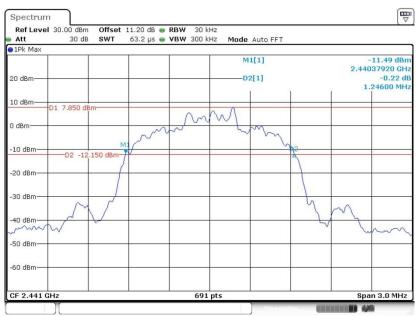
<3Mbps>

20 dB Bandwidth Plot on Channel 00



Date: 22.FEB.2023 13:48:58





Date: 22.FEB.2023 14:54:56





20 dB Bandwidth Plot on Channel 78

Date: 22.FEB.2023 15:02:39

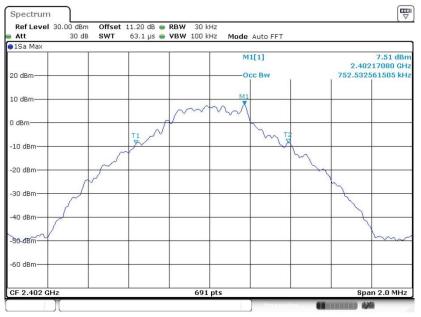


3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

<1Mbps>

99% Occupied Bandwidth Plot on Channel 00



Date: 22.FEB.2023 12:49:49

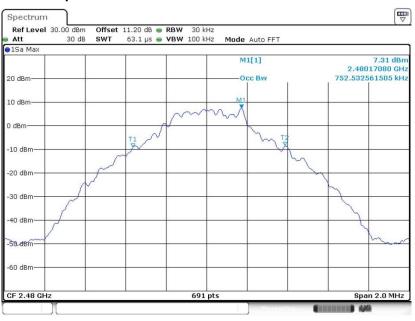




99% Occupied Bandwidth Plot on Channel 39

Date: 22.FEB.2023 13:01:10



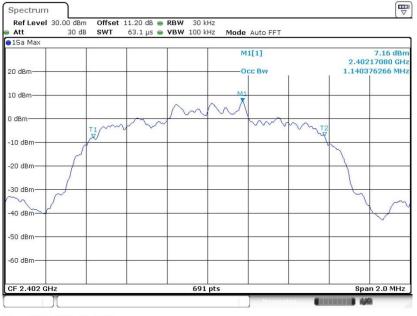


Date: 22.FEB.2023 13:10:04



<2Mbps>

99% Occupied Bandwidth Plot on Channel 00



Date: 22.FEB.2023 13:28:55

99% Occupied Bandwidth Plot on Channel 39



Date: 22.FEB.2023 13:33:27





99% Occupied Bandwidth Plot on Channel 78

Date: 22.FEB.2023 13:40:31

<3Mbps>

99% Occupied Bandwidth Plot on Channel 00



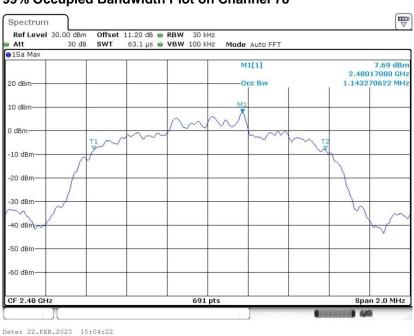
Date: 22.FEB.2023 13:50:17





99% Occupied Bandwidth Plot on Channel 39

Date: 22.FEB.2023 14:55:44



99% Occupied Bandwidth Plot on Channel 78

Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



3.5 Output Power Measurement

3.5.1 Limit of Output Power

The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps, 2Mbps, 3Mbps and AFH modes are 0.125 watts.

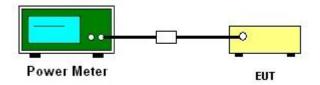
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.5.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Measure the conducted output power with cable loss and record the results in the test report.
- 5. Measure and record the results in the test report.

3.5.4 Test Setup



3.5.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.5.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.



3.6 Conducted Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

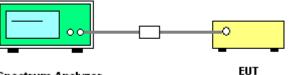
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.6.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- 3. Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
- 4. Enable hopping function of the EUT and then repeat step 2. and 3.
- 5. Measure and record the results in the test report.

3.6.4 Test Setup



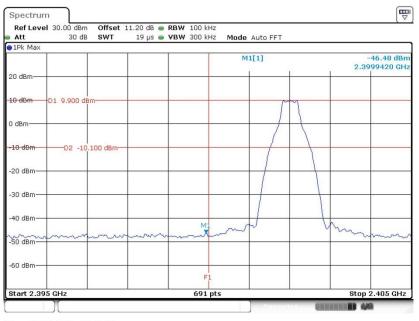
Spectrum Analyzer



3.6.5 Test Result of Conducted Band Edges

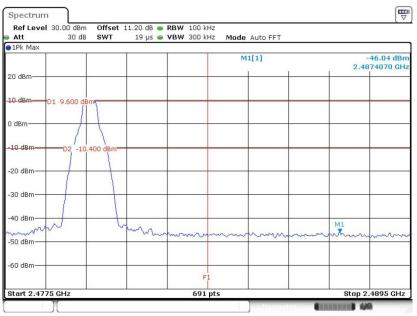
<1Mbps>

Low Band Edge Plot on Channel 00



Date: 22.FEB.2023 12:49:09

High Band Edge Plot on Channel 78

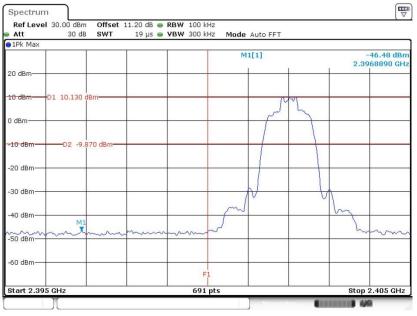


Date: 22.FEB.2023 13:12:03



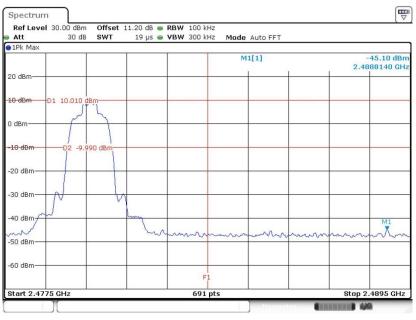
<2Mbps>

Low Band Edge Plot on Channel 00



Date: 22.FEB.2023 13:27:22

High Band Edge Plot on Channel 78

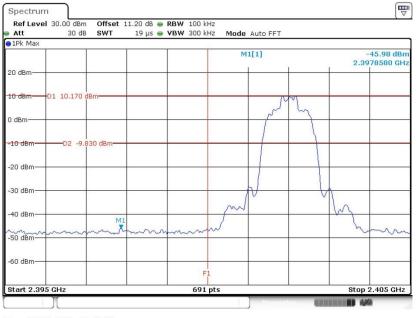


Date: 22.FEB.2023 13:39:16



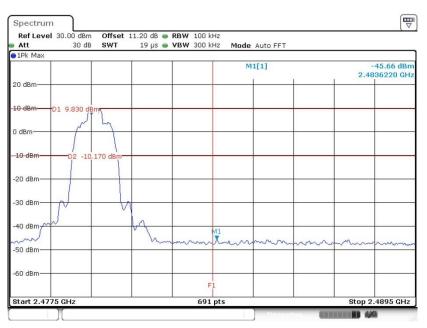
<3Mbps>

Low Band Edge Plot on Channel 00



Date: 22.FEB.2023 13:49:20

High Band Edge Plot on Channel 78



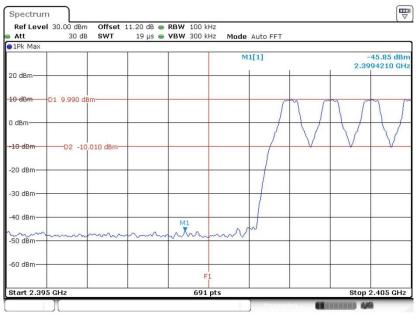
Date: 22.FEB.2023 15:03:00



3.6.6 Test Result of Conducted Hopping Mode Band Edges

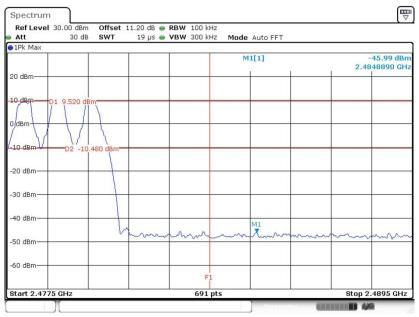
<1Mbps>

Hopping Mode Low Band Edge Plot



Date: 21.FEB.2023 17:09:16

Hopping Mode High Band Edge Plot

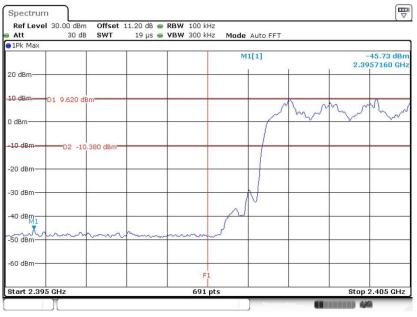


Date: 22.FEB.2023 12:41:06



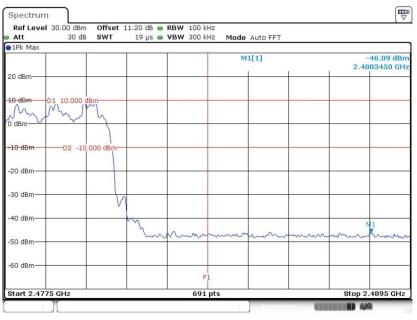
<2Mbps>

Hopping Mode Low Band Edge Plot



Date: 22.FEB.2023 13:28:09

Hopping Mode High Band Edge Plot

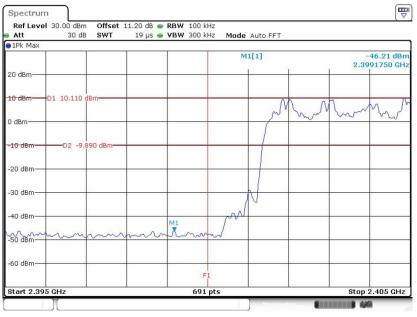


Date: 22.FEB.2023 13:39:43



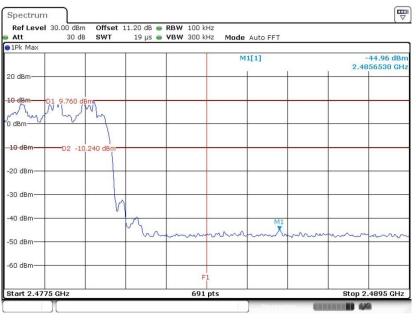
<3Mbps>

Hopping Mode Low Band Edge Plot



Date: 22.FEB.2023 13:49:39

Hopping Mode High Band Edge Plot



Date: 22.FEB.2023 15:03:43



3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

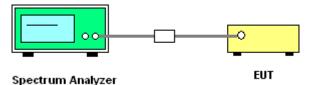
3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 7.8.8.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
- 5. Measure and record the results in the test report.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4 Test Setup



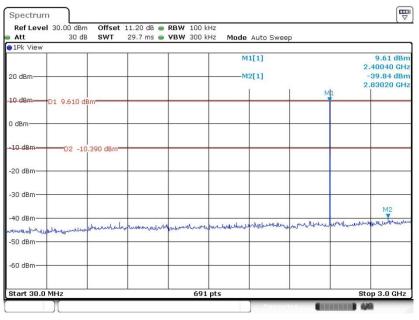
Sporton International Inc. (ShenZhen) TEL:+86-755-8637-9589 FAX:+86-755-8637-9595 FCC ID: 2A8UX-2892



3.7.5 Test Result of Conducted Spurious Emission

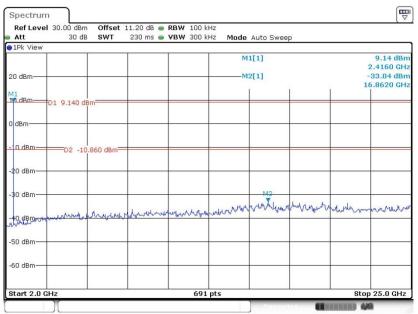
<1Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 22.FEB.2023 12:50:45

CSE Plot on Ch 00 between 2 GHz ~ 25 GHz



Date: 22.FEB.2023 12:51:19



1Pk View	30 dB	SWT	29.7 113	VBW 300	NII2 MOU	e Auto Swee	ah		
0 dBm						M1[1] M2[1]			9.52 dBn 2.43910 GH: -39.75 dBn 2.91620 GH:
.0 dBm	D1 9.520 di	3m						M1	
I dBm					-				
10 dBm	D2 -10	.480 dBm=							
20 dBm									
30 dBm									
40 dBm				N. contract	a L a with	menutionen	1. Monarth	m low show	M2
nturynthan 50 dBm	howwww.hui	hundelicen	and the second second	under and a contraction	Therefore a fer				
60 dBm								_	

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 13:01:46

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Ref Level 30.0 Att	0 αBM OTTSE 30 dB SWT	t 11.20 dB 👄 230 ms 👄	VBW 300 ki		Auto Swee	n		
1Pk View				in induo	nate ence	-		
20 dBm					1[1] 2[1]			9.63 dBr 2.4490 GH -33.10 dBr 4.9830 GH
M1 19 dBm D1 9.	630 dBm							
dBm								
	02 -10.370 dBm	1						
20 dBm								
30 dBm					d a bar is	N.D. a. K. J. Ma		
40.dBaaroontub	hanny you Ababin light	un a that filled that	mmann	wwwww	a la mana an	e - omder e	and a company	and the second
50 dBm								
60 dBm								
Start 2.0 GHz			691					p 25.0 GHz

Date: 22.FEB.2023 13:02:15



1Pk View]	SWT	2011 110	• VBW 300	NIZ MOUE	Auto Swee	ιμ		
20 dBm						41[1] 42[1]	87.	ši	9.62 dBn 2.48210 GH: -39.93 dBn 2.83880 GH:
l0 dBm	D1 9.620 d	Bm						M1	
) dBm							-		
10 dBm-	D2 -10	.380 dBm							
20 dBm—									
30 dBm	-						0		
40 dBm									M2
50 dBm—	for the service with	wernhalter	which	deduchter	durthandran	nennen	Handhamma	a glan con	home distributions
60 dBm								ļ	

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 13:10:55

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

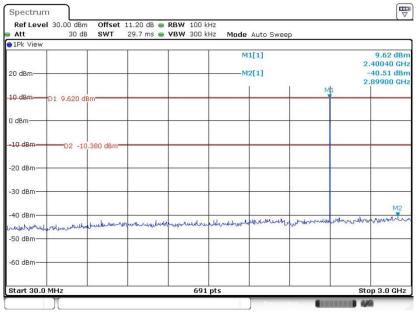
Att	30 dB SWT	230 ms 🖷	VBW 300 kH	Hz Mode	Auto Swee	р		
1Pk View 20 dBm					1[1] 2[1]			9.16 dBr 2.4830 GH -32.35 dBr 8.2930 GH
M1 11 dBm D1	9.160 dBm							
D dBm								
10 dBm	=D2 -10.840 dBn	n						7
20 dBm								
30 dBm	2 2 2			. hash	a secondates a	M2		and the l
40 dBm	www.mayanderword	manter	monorduna	Hugh (NO)	altre a come	4 - 800(10 c	-whom have	hand
50 dBm								
-60 dBm								
Start 2.0 GHz			691					p 25.0 GHz

Date: 22.FEB.2023 13:11:25



<2Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 22.FEB.2023 13:29:26

CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

Ref Level 3 Att	30.00 dBm 30 dB	Offset SWT	11.20 dB 👄	RBW 100 k VBW 300 k					
1Pk View	30 UB	5W1	230 ms 🦷	VBW 300 K	H2 Mode	Auto Swee	p		
20 dBm						1[1] 2[1]			5.40 dBn 2.4160 GH: -33.02 dBn 9.9570 GH:
12 dBm D dBm	1 5.400 dB	m							
-10 dBm	—D2 -14.	600 dBm—							
-30 dBm					dere M	4 rolphane	Marin	have that the second	and providenter
40 dBq	alon aller and	Allun realise	and purchase w	hourself planore	We North a second			W - Vano	
-50 dBm									
-60 dBm									
Start 2.0 GH	,			691	nts			Stor	p 25.0 GHz

Date: 22.FEB.2023 13:29:54



Att 1Pk View	30 dB	SWT	2011 110	VBW 30		e Auto Swe	ор 		
0 dBm						M1[1] M2[1]			9.15 dBn 2.43910 GH: -39.95 dBn 2.31020 GH:
	1 9.150 dBn	1						M1	
dBm				-					
10 dBm	-D2 -10.8	50 dBm							
20 dBm					_				
30 dBm									
40 dBm		a tilte and	a Lais M	ant, this at a		hypermethorse	M2	molution	harrielinourode
all-Anni-Anni-Anni-Anni-Anni-Anni-Anni-An	hunderstendenten			nhund nnh					
60 dBm					_				_

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 13:34:02

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Att	30.00 dBm 30 dB	SWT		RBW 100 k VBW 300 k		Auto Swee	n			
1Pk View					in the second	nate ence	-			
20 dBm					M1[1] M2[1]			5.40 dBn 2.4160 GH -33.02 dBn 19.9570 GH		
10 dBm	D1 5.400 dB	m								
D dBm									_	
10 dBm	D2 -14.	600 dBm								
-20 dBm										
-30 dBm		l.	19 mar and			groballyne	Marin	my which show	mounder	
10 dBq	and and the states	Murrey	and many white w	Muu Uynu wu	When the last					
-50 dBm										
-60 dBm										
Start 2.0 G	LI-7			691	nte			Stor	p 25.0 GHz	

Date: 22.FEB.2023 13:29:54



1Pk View)			
0 dBm				M1[1] M2[1]			9.15 dE 2.43910 G -39.95 dE 2.31020 G		
0.dBm01 9.3	150 dBm						M1		
dBm								-	
10.dBmD	2 -10.850 dBm							-	
20 dBm								-	
30 dBm	-		-		-			+	
10 dBm	the tills of	من المن الم	u. Hilda La	La la Lan Lake	all regulations	M2	whethere	Mullingerodd	
abraadaan 50 dBm	Marting and a start	a management of the part	Administration of the Angles	00000000000000000000000000000000000000		and a second second second second			
50 dBm									

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 13:34:02

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

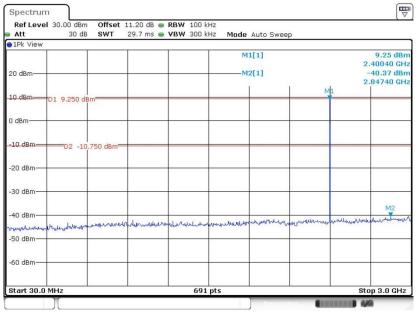
Ref Level 3 Att	0.00 dBm 30 dB	Offset SWT	11.20 dB	RBW 100		Auto Swee	n		
1Pk View	50 45	UNI	200 110	1011 0001	Houe	Auto Dwee	P		
20 dBm	~ ~					1[1] 2[1]	80)		4.66 dBn 2.4490 GH -33.46 dBn 6.5290 GH
	4.660 dBm	1							
-10 dBm	-D2 -15.34	10 d8m-							
-20 dBm									
30 dBm	investory internet	Udunute	a house the mail	makerystan	alundaria	m2 ruhamme	rennen	Mesmound	northere
40 BBIRGAR									
50 dBm									
-60 dBm									
Start 2.0 GHz				601	l pts			Stor	25.0 GHz

Date: 22.FEB.2023 13:34:30



<3Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 22.FEB.2023 13:50:50

CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

Ref Level 30.0 Att	00 dBm Offset 30 dB SWT	11.20 dB 👄 🖡 230 ms 👄 🛚	RBW 100 kH					
1Pk View	30 UB SWI	230 ms 🖷 🕯	IBW 300 KH	2 Mode	Auto Swee	эр		
20 dBm					1[1] 2[1]			4.71 dBn 2.4160 GH 33.14 dBn 6.8950 GH
D1 4	.710 dBm				5			
10 dBm	D2 -15.290 dBm-				-			
30 dBm	and the alles and all				M2	n Arm R. M. where	art and ard -	MARA J. A
O dBm and	mounderand	wanne	manutaphy	www.			wwwwwww	2. Andre market
50 dBm								
60 dBm					·			
Start 2.0 GHz			691	nts			Stor	25.0 GHz

Date: 22.FEB.2023 13:51:19



1Pk View					Auto Sweep				
0 dBm				M1[1] M2[1]			9.10 dB 2.43910 GF -40.31 dB 2.79580 GF		
0 dBm D1	9.100 dBm						11		
dBm									
10 dBm	=D2 -10.900 dBn								
20 dBm									
30 dBm	2								
40 dBm	whether ghimself	and a second	. 1.6. 1.16		La longer rolling (munkunun	- align of allow	M2	
oluchilana 50 dBm	wohnter future to	welling welling water	and the second						
50 dBm									

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 14:56:18

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Ref Level Att	30.00 dBm 30 dB			RBW 100 k					
1Pk View	30 UB	5W1	230 ms 🦷	VBW 300 K	H2 MOGE	Auto Swee	p		
20 dBm						1[1] 2[1]			4.77 dBn 2.4490 GH -32.48 dBn 4.9500 GH
10 dBm	D1 4.770 de	3m							
10 dBm	D2 -15	.230 dBm—							
20 dBm									
O demos	uch the have	Muddenader	montheliane	Mary March	mourtan	warmuld	Hollow www.	whichhave	anarwak
50 dBm									
60 dBm									
Start 2.0 G	Hz			691	pts			Sto	25.0 GHz

Date: 22.FEB.2023 14:56:47



1Pk View	10:27		<i>20</i>		Auto Sweej				
0 dBm				M1[1] M2[1]			9.08 dBn 2.47780 GH -40.86 dBn 2.94630 GH		
	080 dBm						M1		
dBm									
10. dBmD	2 -10.920 dBm								
20 dBm									
30 dBm									
40 dBm								M2	
40 dBm անդերագլերակությո 50 dBm	Manuturentership	midunation	umurtuned	, Augener alline has	-whome have a feature of the	Manan	the real beaution	- and the second	
60 dBm									

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 22.FEB.2023 15:05:10

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

Ref Level 30.0 Att	30 dB SWT	t 11.20 dB 👄 l 230 ms 👄 '	VBW 300 kH		Auto Swee	p		
1Pk View	02-18							
20 dBm				M1[1] M2[1]		5.20 dBr 2.4830 GH -33.32 dBr 18.2600 GH		
0 dBm D1 5	.200 dBm							
) dBm								
	D2 -14.800 dBm							
20 dBm						M2		
10 dBm months in t	Wenty and Marchand	uputeralara	www	hourse	werman	hranum	manuluu	runn
50 dBm								
50 dBm								
Start 2.0 GHz			691				Oter	25.0 GHz

Date: 22.FEB.2023 15:05:39



3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.8.3 Test Procedures

- 1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 4. Set to the maximum power setting and enable the EUT transmit continuously.
- 5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds On time = N₁*L₁+N₂*L₂+...+N_{n-1}*LN_{n-1}+N_n*L_n Where N₁ is number of type 1 pulses, L₁ is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
- 6. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
- 8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.