



FCC RADIO TEST REPORT

FCC ID	:	2AFZZK11AG
Equipment	:	Mobile Phone
Brand Name	:	POCO
Model Name	:	M2012K11AG
Applicant	:	Xiaomi Communications Co., Ltd. #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer	:	Xiaomi Communications Co., Ltd. #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Standard	:	FCC Part 15 Subpart C §15.247

The product was received on Jan. 05, 2021 and testing was started from Jan. 11, 2021 and completed on Jan. 26, 2021. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Lunis Win

Reviewed by: Louis Wu SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR110409A	01	Initial issue of report	Feb. 08, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(1)	Number of Channels	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	Pass	-
3.4	2.1049	99% Occupied Bandwidth	Reporting only	-
3.5	15.247(b)(1)	Peak Output Power	Pass	-
3.6	15.247(d)	Conducted Band Edges	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 9.02 dB at 78.500 MHz
3.9	15.207	AC Conducted Emission	Pass	Under limit 15.79 dB at 0.503 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	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.

Reviewed by: Wii Chang Report Producer: Tina Chuang



General Description 1

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE/5G NR, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, NFC, and GNSS.

Produc	ct Specification subjective to this standard			
Sample 1	EUT with Battery 1			
Sample 2	EUT with Battery 2			
	WWAN: PIFA Antenna			
	WLAN 5GHz:			
	<ant. 11="">: PIFA Antenna</ant.>			
	<ant. 6="">: PIFA Antenna</ant.>			
	WLAN 2.4GHz:			
	<ant. 11="">: PIFA Antenna</ant.>			
Antonno Turno	<ant. 7="">: PIFA Antenna</ant.>			
Antenna Type	Bluetooth:			
	<ant. 11="">: PIFA Antenna</ant.>			
	<ant. 7="">: PIFA Antenna</ant.>			
	GPS / Glonass / BDS / Galileo:			
	<l1 ant.="">: PIFA Antenna</l1>			
	<l5 ant.="">: PIFA Antenna</l5>			
	NFC: Planar Antenna			
	Antenna information			
2400 MHz ~ 2483 5 MHz	Peak Gain (dBi) Ant. 11: -3.1 dBi			

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

Ant. 7: -3.4 dBi

Peak Gain (dBi)

1.2 Modification of EUT

2400 MHz ~ 2483.5 MHz

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



1.3 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. TH05-HY, CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH16-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW0007

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- 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. The TAF code is not including all the FCC KDB listed without accreditation.
- 3. 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	2413	38	2440	65	2467
	12	2414	39	2441	66	2468
2400-2483.5 MHz	13	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 (X plane) were recorded in this report, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode for Ant. 11 and 3Mbps mode for Ant. 7 and recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

	Su	mmary table	of Test Cases	
Test Item		Data Rate /	Modulation	
	Bluetooth BR 1Mbps GFSK		EDR 2Mbps QPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted	Mode 1: CH00_2402 MHz	Mode 4: CH0	0_2402 MHz	Mode 7: CH00_2402 MHz
Test Cases	Mode 2: CH39_2441 MHz	Mode 5: CH3	39_2441 MHz	Mode 8: CH39_2441 MHz
	Mode 3: CH78_2480 MHz	Mode 6: CH7	78_2480 MHz	Mode 9: CH78_2480 MHz
	Bluetooth BR 1Mbps	s GFSK	Bluetoot	h EDR 3Mbps 8-DPSK
Radiated	Mode 1: CH00_2402	2 MHz	Mode	4: CH00_2402 MHz
Test Cases	Mode 2: CH39_244	1 MHz	Mode	5: CH39_2441 MHz
	Mode 3: CH78_2480) MHz	Mode	6: CH78_2480 MHz
AC Conducted	Mode 1 :Bluetooth Link	+ WLAN (2.4	4GHz) Link ·	+ MPEG4 + USB Cable
Emission	(Charging from A	dapter) for Sa	mple 1	
reported only	est cases, the worst mode d since the highest RF output I conducted band edge mea	, power in the p	oreliminary test	s. The conducted spurious

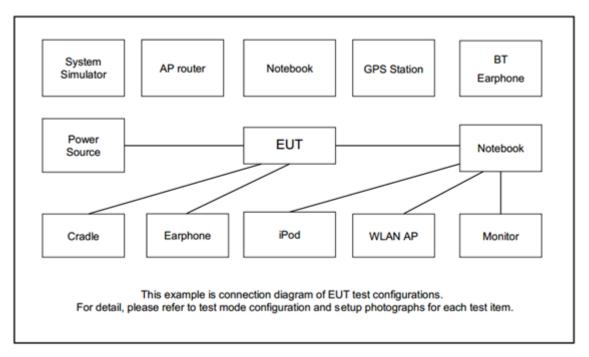
1Mbps for Ant. 11 and 3Mbps for Ant. 7, and no other significantly frequencies found in

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

conducted spurious emission.2. For Radiated Test Cases, the tests were performed with Sample 1



2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

ltem	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
4.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m

2.5 EUT Operation Test Setup

The RF test items, make the EUT get into the engineering modes to contact with base station to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.



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 4.2 dB and 10dB attenuator.

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

= 4.2 + 10 = 14.2 (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

See list of measuring equipment of this test report.

3.1.3 Test Procedure

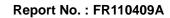
- 1. The testing follows ANSI C63.10-2013 clause 7.8.3.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. 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

EUT



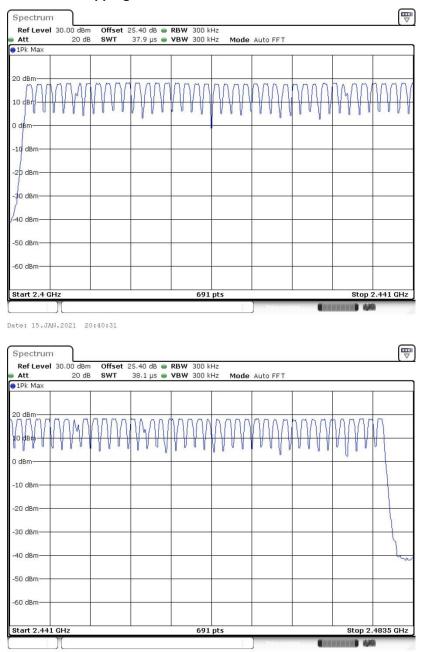


3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

<Ant. 11>

Number of Hopping Channel Plot on Channel 00 - 78

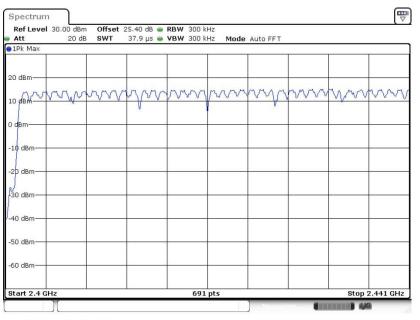


Date: 15.JAN.2021 20:41:07



<Ant. 7>

Number of Hopping Channel Plot on Channel 00 - 78



Date: 15.JAN.2021 22:17:04

Att	20 dB	SWT	38.1 µs 🖷	VBW 300 k	Hz Mode	Auto FFT			
1Pk Max					1				
0 dBm									
	m	mm	ww	vvvv	mm	mp	www	yw	7
dBm									
10 dBm									
20 dBm				3					4
30 dBm									
10 dBm									×
50 dBm									
60 dBm									
tart 2.441	GHz			691	nts			Ston 2	.4835 GH

Date: 15.JAN.2021 22:17:48

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

See list of measuring equipment 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

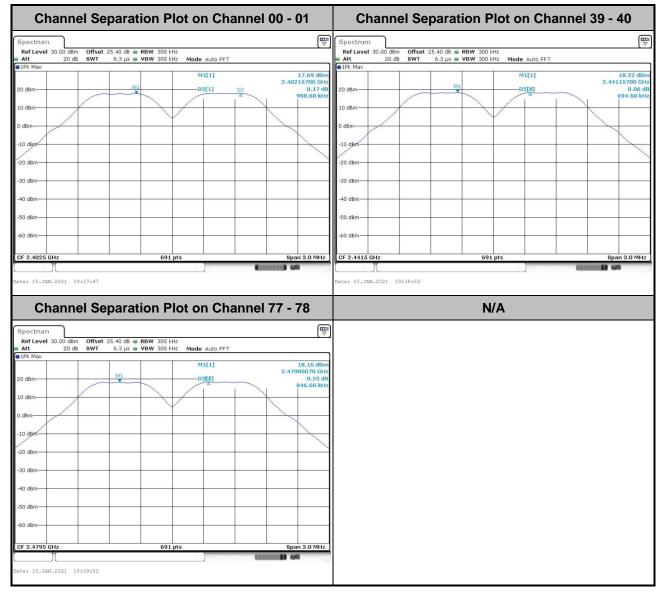
3.2.5 Test Result of Hopping Channel Separation

Please refer to Appendix A.



<Ant. 11>

<1Mbps>





<2Mbps>

	paration Plot on Ch	nannel 00 - 01	Channel Sep	paration Plot on Cha	annel 39 - 40
Spectrum			Spectrum		
Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	 40 dB RBW 300 kHz 30 μs VBW 300 kHz Mode Auto FF[*] 		Ref Level 30.00 dBm Offset 25	5.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FFT	(.
• 1Pk Max	M1[1]	17.63 dBm	●1Pk Max	M1[1]	16.04 dBm
20 dBm	-D2[b]	2.40184880 GHz 0.20 dB	20 dBm		2.44099640 GHz 2.12 dE
		998.60 kHz			872.60 kHz
10 dBm			10 dBm		
0 dBm			0 dBm		
-10 dBm			-10 dBm-		
-20 dBm			-20 dBm		
-30 dBm			-30 dBm		
-40 dBm			-40 dBm		
-50 dBm			-50 dBm		
-60 dBm			-60 dBm		
CF 2.4025 GHz	691 pts	Span 3.0 MHz	CF 2.4415 GHz	691 pts	Span 3.0 MHz
ate: 15.JAN.2021 19:42:27			Date: 15.JAN.2021 19:44:29	Measur	
Channel Se	paration Plot on Ch		Date: 15.JAN.2021 19:44:29	N/A	
Channel Se		nannel 77 - 78 (1970)	Date: 15.JAN.2021 19:44:29	N/A	
Spectrum Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	Daration Plot on Ch 15.40 db RBW 300 kHz 6.3 µs VBW 300 kHz		Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	15.40 dB 🖷 RBW 300 kHz	(₩) T 16.15 dBm	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	15.40 dB ● RBW 300 kHz 6.3 μs ● VBW 300 kHz Mode Auto FF [*]	T 16.15 dbm 2.47900070 0Hz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Seg	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 20 dB SWT 20 dBm 20 dBm 10 dBm	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 20 dB SWT 21Pk Max 20 dBm 10 dBm	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sej	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 20 dB Swr 10 k Max 20 dBm 10 dBm 20 dBm	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sej	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sey	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Seg Spectrum 0 dBm Offset 2 10 dBm 0 dB Swr 10 dBm 0 0 20 dBm 0 0 20 dBm 0 0 50 dBm 0 0 -20 dBm	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Seg	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	
Channel Sey	15.40 dB ⊕ RBW 300 kHz 6.3 µs ⊕ VBW 300 kHz Mode Auto FF ^{**} M1[1]	(₩) 16.15 dBm 2.47900070 GHz	Date: 15.JAN.2021 19:44:29	N/A	



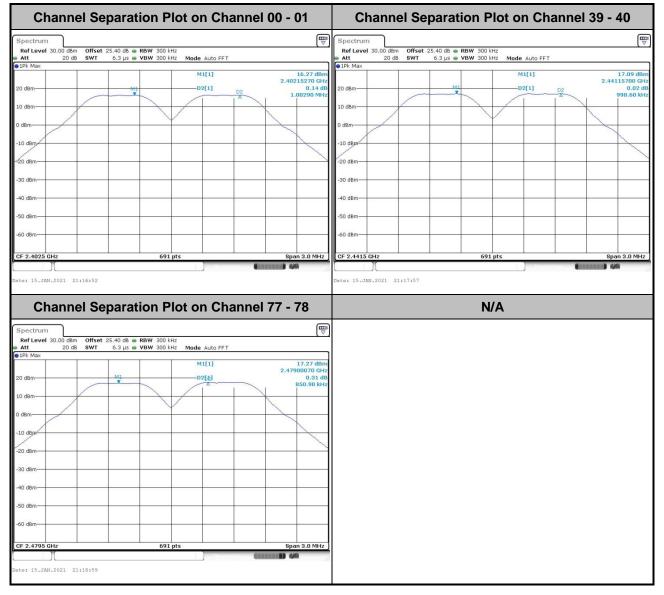
<3Mbps>

Channel Separa	ation Plot on Chani	nel 00 - 01	Channel Separation Plot on Channel 39 - 40
Spectrum			Spectrum 🕎
Ref Level 30.00 dBm Offset 25.40 dB Att 20 dB SWT 6.3 µs	RBW 300 kHz VBW 300 kHz Mode Auto FFT		Ref Level 30.00 dBm Offset 25.40 dB RBW 300 kHz Att 20 dB SWT 6.3 µs VBW 300 kHz Mode Auto FFT
● 1Pk Max		an a	€1Pk Max
M1	M1[1]	17.60 dBm 2.40185310 GHz	20 dBm M1 20 dBm D2[1] D2 0.18 dE
20 dBm		0.27 dB 994.20 kHz	20 dBm M1 D2[1] D2 0.18 dE 1.15050 MH2
10 dBm			10 dBm
0 dBm-			0 dBm
-10 dBm			-10 ^d dBm
-20 dBm-			-20 dBm
-30 dBm			-30 dBm
-40 dBm			-40 dBm-
-50 dBm			-50 dBm-
-60 dBm-			-60 dBm-
-60 dBin			-50 0811
CF 2.4025 GHz	691 pts	Span 3.0 MHz	CF 2.4415 GHz 691 pts Span 3.0 MHz
	Mexiciting	CI II I	Nerrorine (Interes) 49
Channel Separa	ation Plot on Chan	nel 77 - 78	N/A
Spectrum			
	RBW 300 kHz VBW 300 kHz Mode Auto FFT		
e 1Pk Max	M1[1]	16,14 dBm	
20 dBm	-D2[1] D2	2.47900070 GHz 1.87 dB	
20 dBm		1.07 UB	
10 dBm			
0 dBm			
-10 dBm			
-20 dBm			
-30 dBm			
50 dum			
-40 dBm			
-50 dBm			
-60 dBm			
CF 2.4795 GHz	691 pts	Span 3.0 MHz	
	tiescuring.	(
Date: 15.JAN.2021 19:51:13		179	



<Ant. 7>

<1Mbps>





<2Mbps>

Channel Se	paration Plot on Ch	nannel 00 - 01	Channel Sep	paration Plot on	Channel 39 - 40
Spectrum			Spectrum		Ē
	25.40 dB e RBW 300 kHz 6.3 μs e VBW 300 kHz Mode Auto FF [*]		Ref Level 30.00 dBm Offset 25	5.40 dB 💩 RBW 300 kHz 6.3 µs 🖷 VBW 300 kHz 🛛 Mode Au	
1Pk Max	M1[1]	14.04 dBm	● 1Pk Max	M1[1	
20 dBm	02[1]	2.40215270 GHz	20 dBm	0211	2.44100070 GH
		D2 1.00290 MHz			D2 998.60 kH
10 dBm			10 dBm		
0 dBm-			0 dBm		
10 dBm			-10 dBm		
-20 dBm			-20 dBm		
0.00000000					
30 dBm			-30 dBm		
-40 dBm			-40 dBm		
50 dBm			-50 dBm-		
-60 dBm			-60 dBm-		
CF 2.4025 GHz	691 pts	Span 3.0 MHz	CF 2.4415 GHz	691 pts	Span 3.0 MHz
ate: 15.JAN.2021 21:20:15	itteau		Date: 15.JAN.2021 21:21:23		(Internet) 440
Channel Se	paration Plot on Ch	annel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Spectrum	-		Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	paration Plot on Ch 25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 Att 20 dB Swr	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 20 dB SWT 20 dBm	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF* M1[1] 02[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 20 dB SwT 11Pk Max	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sej	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sej	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 20 dB Swr 10k Max 0 dBm 0 dBm dBm dBm	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2 20 dB Swr 10 dBm 0 dBm 0 dBm 20 dBm	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sej	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JJAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 20 dB Swr 10k Max 0 dBm 0 dBm 10 dBm	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 20 dB SWT 10Pk Max 20 dBm 0 dBm 10 dBm 20 dBm 30 dBm 40 dBm	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Se Spectrum Ref Level 30.00 dBm Offset 2 20 dB SWT 10 dBm 0 0	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JAN.2021 21:21:23	N/A	
Channel Sep Spectrum Ref Level 30.00 dBm Offset 2	25.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FF ^{**} M1[1]	nannel 77 - 78	Date: 15.JJAN.2021 21:21:23	N/A	



<3Mbps>

Channel S	eparation Plot on Cl	nannel 00 - 01	Channel Se	paration Plot on Channe	el 39 - 40
Spectrum			Spectrum		
Ref Level 30.00 dBm Offs Att 20 dB SWT	et 25.40 dB 👄 RBW 300 kHz 6.3 µs 👄 VBW 300 kHz 🛛 Mode Auto FF	т	Ref Level 30.00 dBm Offset 2 Att 20 dB SWT	5.40 dB RBW 300 kHz 6.3 µs VBW 300 kHz Mode Auto FFT	
● 1Pk Max	M1[1]	14.04 dBm	●1Pk Max	M1[1]	15.81 dBm
20 dBm	D2[1]	2.40215700 GHz 2.33 dB	20 dBm-	M1 D2[5]	2.44100070 GHz 1.31 dB
	MI	D2 994.20 kHz	20 0511		846.60 kHz
10 dBm			10 dBm		
0 dBm			0 dBm		
-10/dBm-			-10 dBm		
-20 dBm			-20 dBm		
-30 dBm			-30 dBm		
-40 dBm			-40 dBm		_
-50 dBm			-50 dBm		
-60 dBm			-60 dBm		
CF 2.4025 GHz	691 pts	Span 3.0 MHz	CF 2.4415 GHz	691 pts	Span 3.0 MHz
	091 pts				
Channel S	eparation Plot on Cl	nannel 77 - 78		N/A	
Spectrum					
Ref Level 30.00 dBm Offs	et 25.40 dB 👄 RBW 300 kHz 6.3 µs 👄 VBW 300 kHz 🛛 Mode Auto FF				
e 1Pk Max	M1[1]	15.31 dBm			
20 dBm		2.47899640 GHz 2.25 dB			
20 000		850.90 kHz			
10 10 -					
10 dBm					
10 dBm					
0 dBm-					
0 dBm					
0 dBm					
0 dBm					
0 dBm					
0 dBm -10 dBm -20 dBm -30 dBm -40 dBm					
0 dBm					
0 d8m -10 d8m -20 d8m -30 d8m -40 d8m					
0 d8m -10 d8m -20 d8m -30 d8m -40 d8m -50 d8m -50 d8m					
0 dBm	691 pts	Span 3.0 MHz			
0 dBm		Span 3.0 MHz			



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.

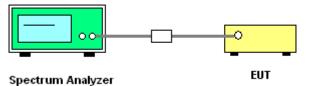
3.3.2 Measuring Instruments

See list of measuring equipment 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.

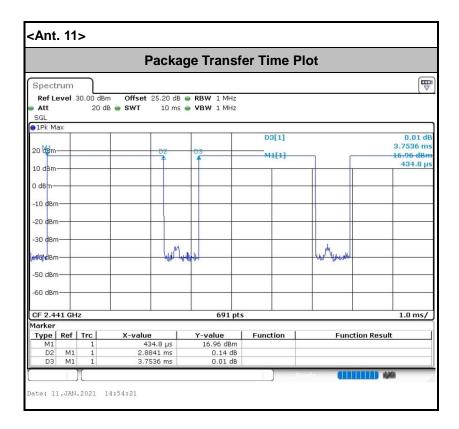
3.3.4 Test Setup

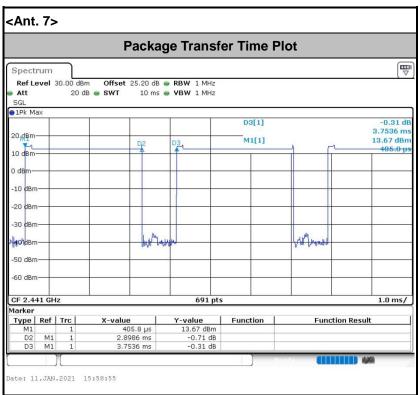


3.3.5 Test Result of Dwell Time

Please refer to Appendix A.







Remark:

1. In normal mode, hopping rate is 1600 hops/s with 6 slots 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.

2. 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 (0.4×20) (s), Hops Over Occupancy Time comes to $(800 / 6 / 20) \times (0.4 \times 20) = 53.33$ 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

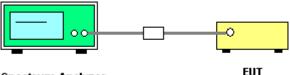
3.4.2 Measuring Instruments

See list of measuring equipment 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;
 RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
 Trace = max hold.
- 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;
 RBW ≥ 1-5% of the 99% bandwidth; VBW ≥ 3 * RBW; Sweep = auto; Detector function = peak;
 Trace = max hold.
- 6. Measure and record the results in the test report.

3.4.4 Test Setup



Spectrum Analyzer

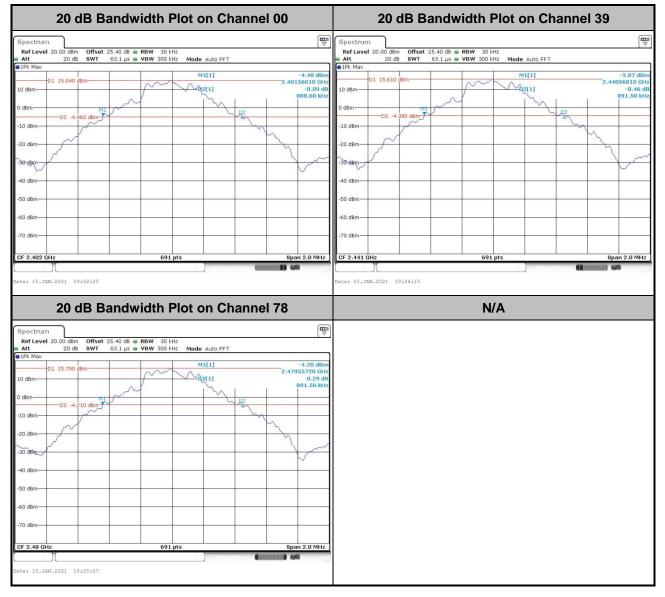
3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.



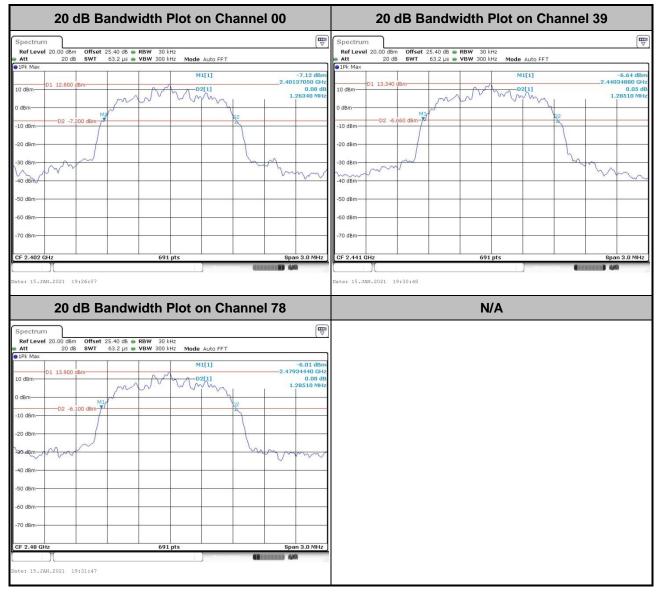
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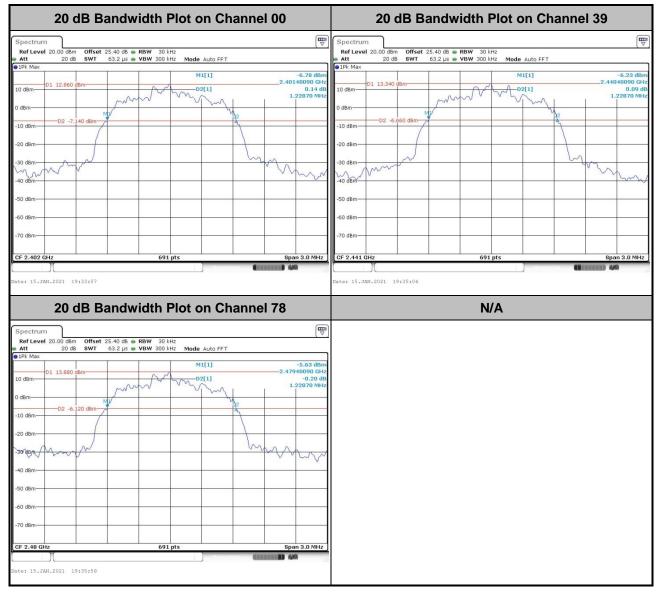


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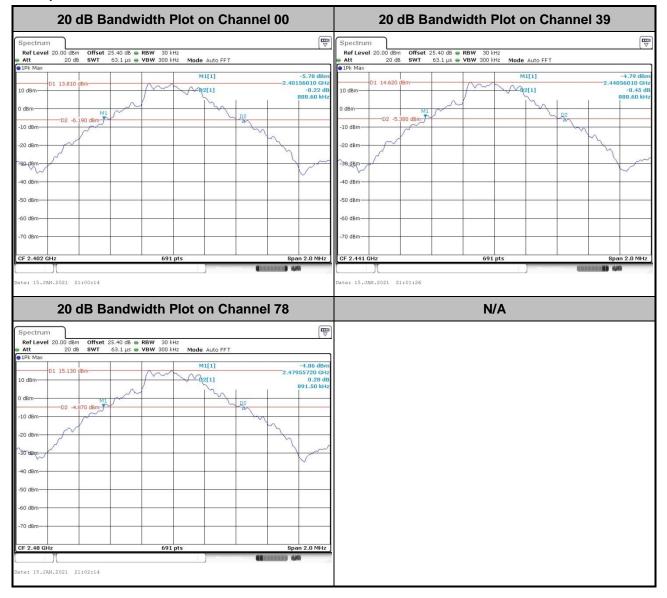
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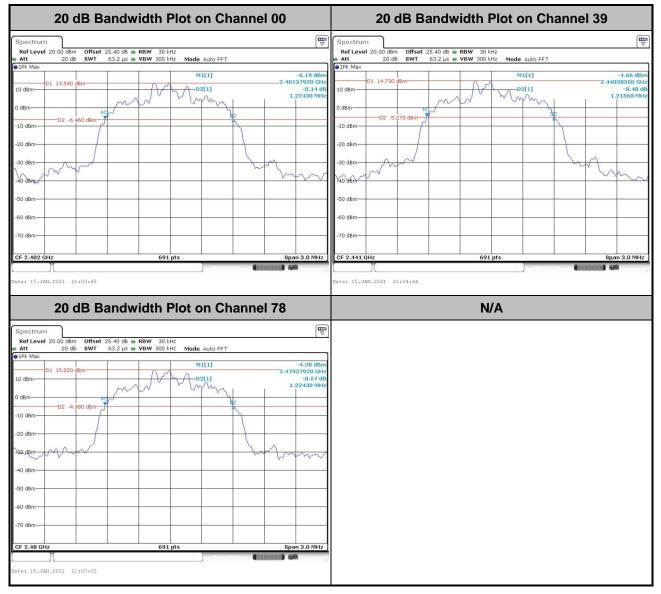
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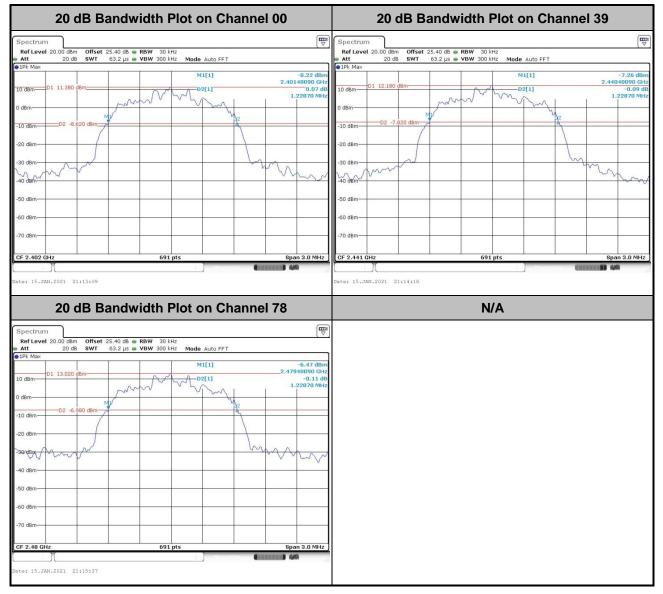


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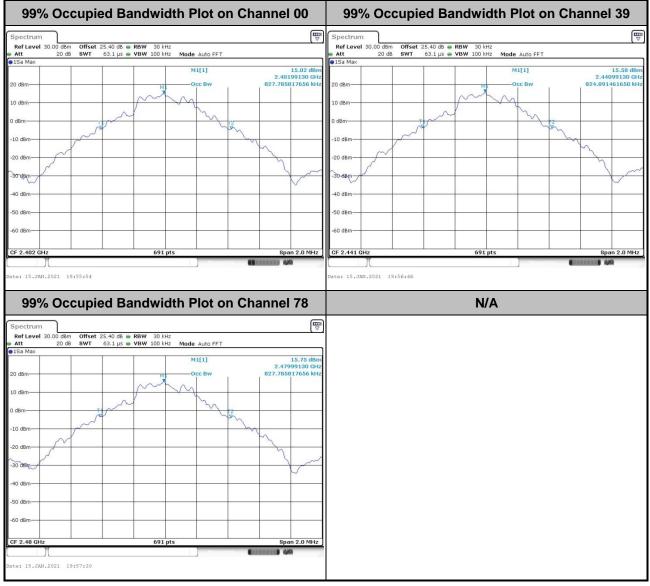


3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

<Ant. 11>

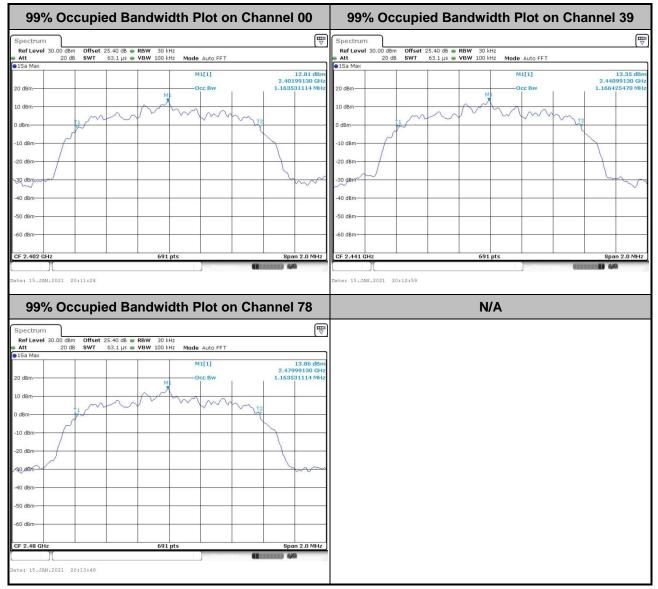
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



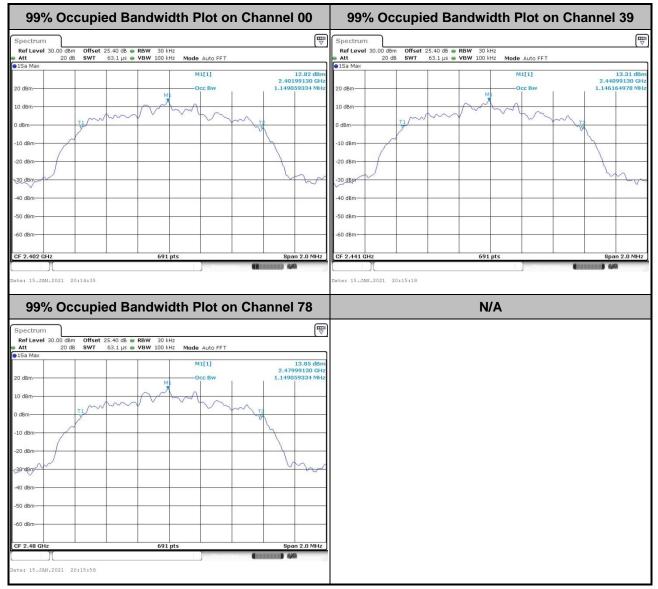
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



<3Mbps>

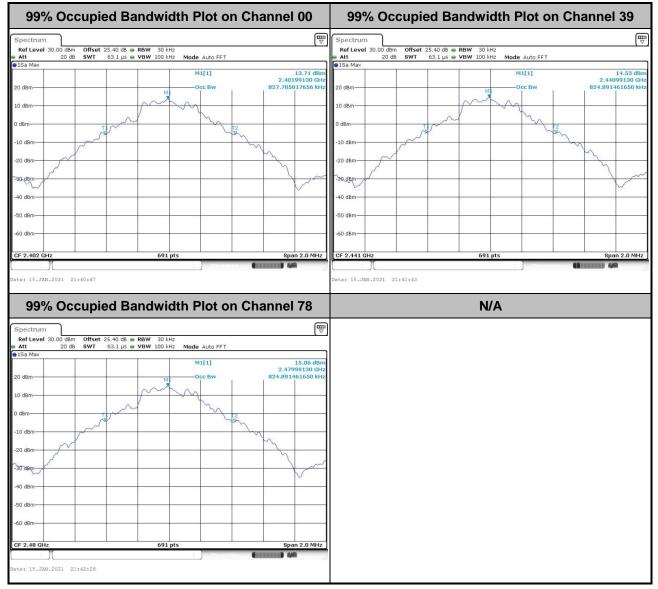


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



<Ant. 7>

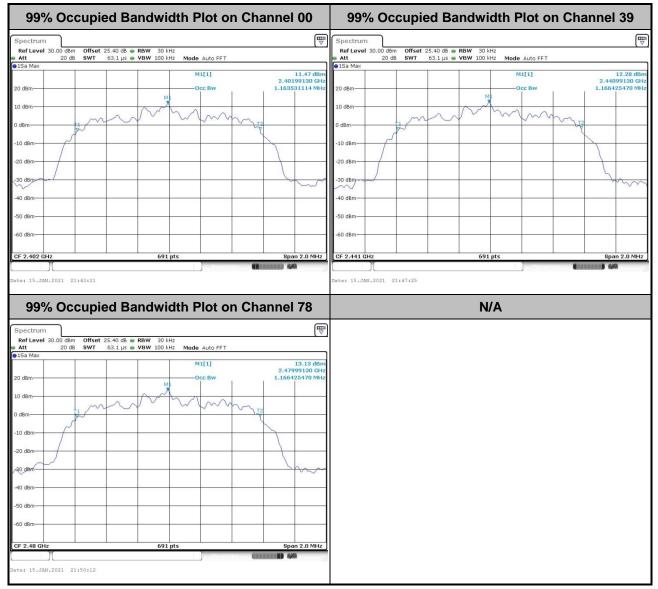
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



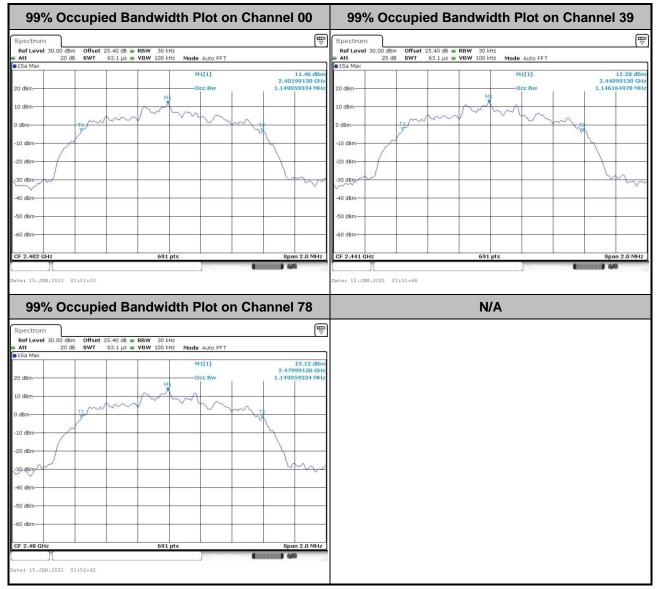
<2Mbps>



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



<3Mbps>



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: 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.

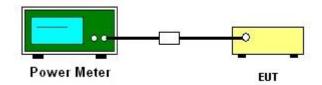
3.5.2 Measuring Instruments

See list of measuring equipment 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.

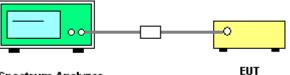
3.6.2 Measuring Instruments

See list of measuring equipment 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



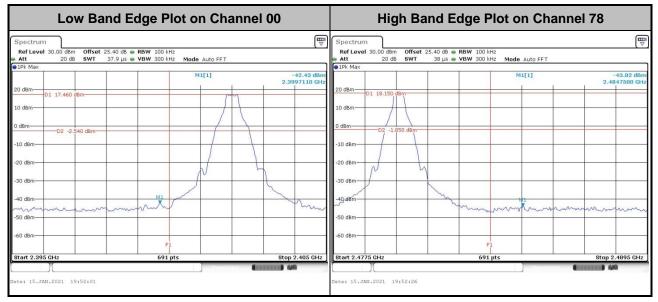
Spectrum Analyzer



3.6.5 Test Result of Conducted Band Edges

<Ant. 11>

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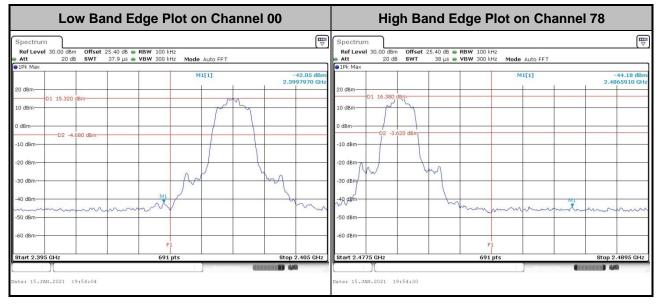


<2Mbps>

Low Band	nel 00	Hig	h Band Edg	e Plot on Cha	nnel 78	
) dB • RBW 100 kHz 9 µs • VBW 300 kHz Моde Auto FFT		Spectrum Ref Level 30.00 dBm Att 20 dB		100 kHz 300 kHz Mode Auto FFT	₩ ⊽
20 dBm 01 15.210 dBm 04 15.210 dBm 04 Bm 0		-43.04 dBm 2.399560 GHz	20 dBm 01 16.270 dBm 0 d	730 dBm		43.97 dBm 2.4838130 GH;
-50 dBm	F1 691 pts	Stop 2.405 GHz	-50 dBm -60 dBm Stort 2.4775 GHz Date: 15.JAN.2021 19	+53:31	F1 691 pts	Stop 2.4895 GHz



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Low Band	Edge Plot on Chann	el 00	High	Band Edge F	Plot on Chan	nel 78
	d8 ● RBW 100 kHz µs ● VBW 300 kHz Mode Auto FFT M1[1]	-44.14 dBm 2.3958030 GHz		0ffset 25.40 dB ● RBW 100 k WT 38 µs ● VBW 300 k		-44.05 dBm 2.4849410 GHz
20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm	F1		20 dBm 01 17.450 dBm 10 dBm 02 -2.550 d -10 dBm	Bri-		
Start 2.395 GHz	691 pts	Stop 2.405 GHz	Start 2.4775 GHz	691	pts	Stop 2.4895 GHz
Date: 15.JAN.2021 21:27:09			Date: 15.JAN.2021 21:32	:06		



<2Mbps>

Low Band Edge Plot on Channel 00	High Band Edge Plot on Channel 78
Spectrum Image: Spectrum Ref Level 30.00 dBm Offset 25.40 dB	Spectrum TTD Ref Level 30.00 dBm Offset 25.40 dB • RBW 100 kHz Att 20 dB SWT 20 dB SWT 38 µs • VBW 300 kHz Mode Auto FFT ● IPk Max
20 d8m 01 13.870 d8m 0 d8m 0 d8m -10 d8m -20 d8m -20 d8m -30 d8m -60 d8m -50 d8m -50 d8m -50 d8m	20 dBm 01 15.550 dBm 04 042 10 dBm 04 042 0 dBm 02 -4.450 dBm 04 042 -10 dBm 02 -4.450 dBm 04 04 -20 dBm 04 04 -30 dBm 04 04 -30 dBm 04 04 -30 dBm 04 04 -30 dBm 04 04 -40 gen 04 04 -50 dBm 04
Start 2.395 GHz 691 pts Stop 2.405 GHz	Start 2.4775 GHz 691 pts Stop 2.4895 GHz
	Date: 15.JAN.2021 21:33:39

<3Mbps>

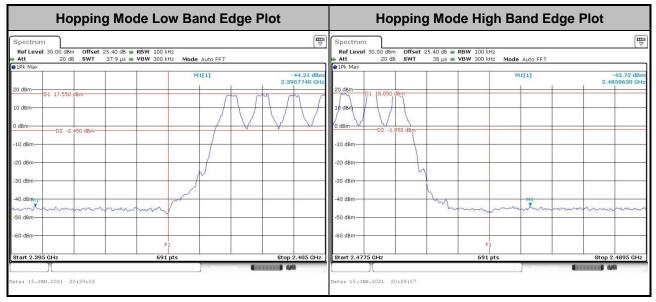
Low Band E	dge Plot on Chan	nel 00	High I	Band Edge Plot on Ch	annel 78
Spectrum Ref Level 30.00 dBm Offset 25.40 dB Att 20 dB SWT 37.9 µs EIPL Max 20 dB SWT 37.9 µs	RBW 100 kHz VBW 300 kHz Mode Auto FFT	®	Spectrum Ref Level 30.00 dBm Off Att 20 dB SW	set 25.40 dB 🕢 RBW 100 kHz Τ 38 μs 🖶 VBW 300 kHz Mode Auto FFT	(⊞)
DPE Max 20 dBm 10 dBm 0 dBm 0 dBm 0 dBm -10 dBm -20 dBm		-43.72 dBm 2.3997970 GHz	20 dBm D1 15.650 dBm 0 d	M1[1]	-44.19 dBm 2.4853060 GHz
-30 dBm -40 dBm -50 dBm -60 dBm	F)		-30 dBm	F1	
Start 2.395 GHz	691 pts	(mmm) 44	Start 2.4775 GHz	691 pts	Stop 2.4895 GHz



3.6.6 Test Result of Conducted Hopping Mode Band Edges

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Hopping N	lode Low Band Edg	e Plot	Нор	d Edge Plot	
Att 20 dB SWT 37.9 μ	JB ● RBW 100 kHz JS ● VBW 300 kHz Mode Auto FFT		Spectrum Ref Level 30.00 dBm Att 20 dB	Offset 25.40 dB ● RBW 100 kHz SWT 38 µs ● VBW 300 kHz Mode Auto	Ū FFT
1Pk Max	MI[1]	-43.77 dBm 2.3976850 GHz	1Pk Max 20 dBm 01 16.270 dB 10 dBm 02 -3.73 -10 dBm -20 dBm -30 dBm -50 dBm -50 dBm	~Ъ <u>у</u>	-43.60 dBm 2.4885190 GH:
Start 2.395 GHz	691 pts	Stop 2.405 GHz	Start 2.4775 GHz	691 pts	Stop 2.4895 GHz



<3Mbps>

Hopping Mode Low Band Edge Plot				Hopping	g Moc	le High	Band E	dge Pl	ot
👄 Att 20 dB SWT 37.9 μ	B ● RBW 100 kHz Is ● VBW 300 kHz Mode Auto FFT		Spectrum Ref Level	30.00 dBm Offset 20 dB SWT		RBW 100 kHz VBW 300 kHz	Mode Auto FFT		
1Pk Max 20 dBm 01 15,450 dBm 0 dBm 0 dBm 02 -4,550 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -60 dBm -60 dBm -60 dBm	M1[1]		1Pk Max 20 dBm 0 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -50 dBm			F1 691 pts	M1[1]		-+43.62 dB 2.4876850 Gł
Date: 15.JAN.2021 20:33:04	Na Horiza			.2021 20:34:30			Merror		

<Ant. 7>

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Hopping N	Node Low Band Edge	e Plot	Нор	ping Mode	High Band	Edge Plot	
Att 20 dB SWT 37.9 IPk Max 20 dBm	dB ⊕ RBW 100 kHz µs ⊕ VBW 300 kHz Mode Auto FFT M1[1]	-+13.89 dBm 2.3950760 GHz			100 kHz 300 kHz Mode Auto M1[1]		-43.85 dBm 8850280 GHz
01 16.070 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm mtt			10 dBm D2 2.51 -10 dBm				
-50 dBm -60 dBm Btart 2.395 GHz Date: 15.JAN.2021 22:11:06	FI 691 pts	Stop 2.405 GHz	-50 dBm -60 dBm Start 2.4775 GHz Date: 15.JAN.2021 22:		F1 691 pts		2.4895 GHz