



Report No.: FR371809A

FCC RADIO TEST REPORT

FCC ID : 2AUS4-NFL1

Equipment : Accessory for video conferencing device

Brand Name : neat.

Model Name : NF-L1

Applicant : Neatframe Limited

Cannon Green, 27 Bush Lane, London,

EC4R 0AA, United Kingdom

Manufacturer : Neatframe Limited

Cannon Green, 27 Bush Lane, London,

EC4R 0AA, United Kingdom

Standard : FCC Part 15 Subpart C §15.247

The product was received on Jul. 18, 2023 and testing was performed from Jul. 26, 2023 to Sep. 16, 2023. We, Sporton International Inc. Wensan 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 from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Lunis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

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Summary of Test Result

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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) 15.247(b)(4)	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	2.30 dB under the limit at 51.06 MHz
3.9	15.207	AC Conducted Emission	Pass	5.34 dB under the limit at 19.42 MHz
3.10	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the
 regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who
 shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken
 into account.
- 2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng Report Producer: Lucy Wu

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1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature

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General Specs

WLAN 11 a/b/g/n HT20/HT40

WLAN 11ac VHT20/VHT40/VHT80/VHT160

WLAN 11ax HE20/HE40/HE80/HE160

Bluetooth BR/EDR/LE

Antenna Type

WLAN: PIFA Antenna Bluetooth: PIFA Antenna

Antenna information					
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<ant. 1="">: 4.0 <ant. 2="">: 3.9</ant.></ant.>			

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

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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 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
rest site No.	CO05-HY (TAF Code: 1190)
Remark	The Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

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

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
rest one ivo:	TH05-HY, 03CH16-HY

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

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by 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 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

- 1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
- 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.

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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	2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480
	23	2425	50	2452	77	2479
	24	2426	51	2453	78	2480
	25	2427	52	2454	-	-
	26	2428	53	2455	-	-

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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, the worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.

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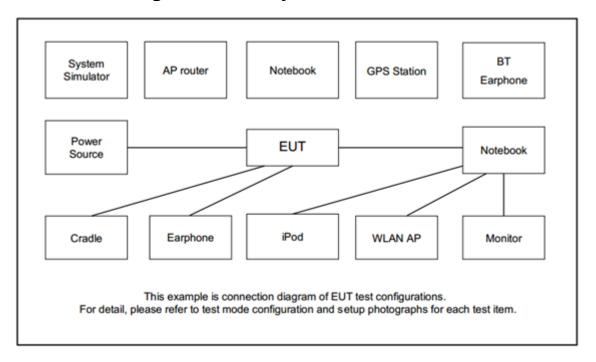
b. AC power line Conducted Emission was tested under maximum output power.

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

The following summary table is snowing all test modes to demonstrate in compilance with the standard.								
	Summary table of Test Cases							
Test Item		Data Rate / Modulation						
	Bluetooth BR 1Mbps GFSK	Bluetooth EDR 2Mbps π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK					
Conducted	Mode 1: CH00_2402 MHz	Mode 4: CH00_2402 MHz	Mode 7: CH00_2402 MHz					
Test Cases	Mode 2: CH39_2441 MHz	Mode 5: CH39_2441 MHz	Mode 8: CH39_2441 MHz					
	Mode 3: CH78_2480 MHz	Mode 6: CH78_2480 MHz	Mode 9: CH78_2480 MHz					
	Bl	uetooth EDR 3Mbps 8-DP	SK					
	<ant. 1="">:</ant.>							
Radiated	Mode 1: CH00_2402 MHz	z						
	Mode 2: CH39_2441 MHz							
Test Cases	Mode 3: CH78_2480 MHz							
	<ant. 2="">:</ant.>							
	Mode 4: CH00_2402 MHz							
AC Conducted	Mode 1 :WLAN (2.4GHz) Link + Bluetooth Link + Camera on + RJ45 Link + POE							
Emission	Adapter + USB (Load with Notebook)							
	diated Test Cases, the worst mode data rate 3Mbps was reported only since the t RF output power in the preliminary tests. The conducted spurious emissions and							
conduc	conducted band edge measurement for other data rates were not worse than 3Mbps, and							
no othe	r significantly frequencies fo	ound in conducted spurious	emission.					

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2.3 Connection Diagram of Test System



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2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY700A2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0m	N/A
4.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Notebook	Allienware	m16 r1	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	POE Adapter	PHIHONG	POE16R-1AFG6	FCC DoC	N/A	N/A
7.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT V4.0 Version4.0211.0" was installed in Notebook which was programmed in order to 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.

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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.

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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 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
=
$$4.2 + 10 = 14.2$$
 (dB)

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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.

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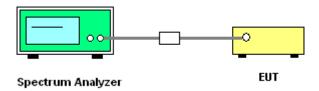
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
- 3. Set the maximum power setting and enable the EUT to transmit continuously.
- 4. Enable the EUT hopping function.
- Use the following spectrum analyzer settings: Span = the frequency band of operation;
 RBW = 300 kHz; 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



3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

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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.

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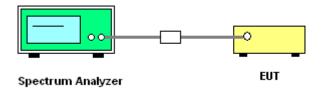
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
- 3. Set the maximum power setting and enable the EUT to 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 = 300 kHz; 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



3.2.5 Test Result of Hopping Channel Separation

Please refer to Appendix A.

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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.

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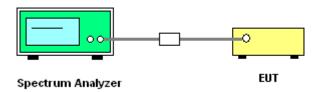
3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.4.
- 2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
- 3. Set the maximum power setting and enable the EUT to 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.

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3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

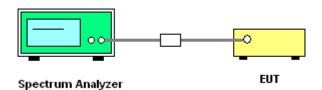
3.4.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
- 2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.

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- 3. Set the maximum power setting and enable the EUT to transmit continuously.
- 4. Use the following spectrum analyzer settings for 20 dB 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.
- 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;
 - 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



3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.

3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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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.

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If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi.

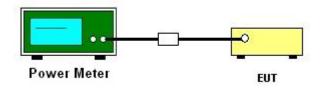
3.5.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
- 3. Set the maximum power setting and enable the EUT to 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.

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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.

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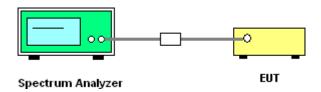
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.6.
- 2. Set the maximum power setting and enable the EUT to transmit continuously.
- 3. Set RBW = 100 kHz, VBW = 300 kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz 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



3.6.5 Test Result of Conducted Band Edges

Please refer to Appendix A.

3.6.6 Test Result of Conducted Hopping Mode Band Edges

Please refer to Appendix A.

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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.

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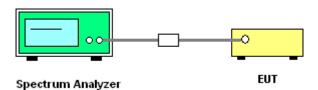
3.7.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
- 3. Set the maximum power setting and enable the EUT to transmit continuously.
- 4. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurious 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



3.7.5 Test Result of Conducted Spurious Emission

Please refer to Appendix A.

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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.

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addition of the state of the st						
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

Please refer to the measuring equipment list in this test report.

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3.8.3 Test Procedures

1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.

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- 2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
- 3. For each suspected emission, the EUT is 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 the maximum power setting and enable the EUT to 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 = 1 MHz for f>1 GHz; 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 = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$

Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.

Average Emission Level = Peak Emission Level + 20*log (Duty cycle)

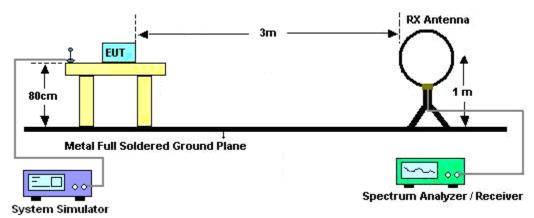
- 6. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
- 8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".

Note: The average levels are calculated from the peak level corrected with duty cycle correction factor (-24.76dB) 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.

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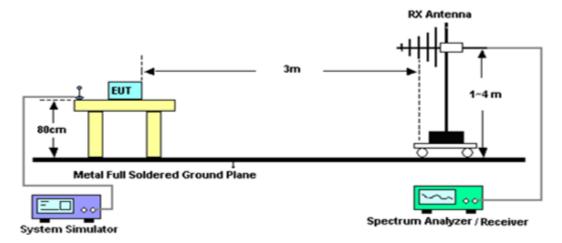
3.8.4 Test Setup

For radiated test below 30MHz

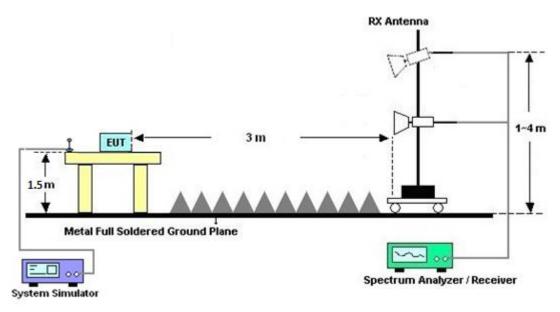


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For radiated test from 30MHz to 1GHz

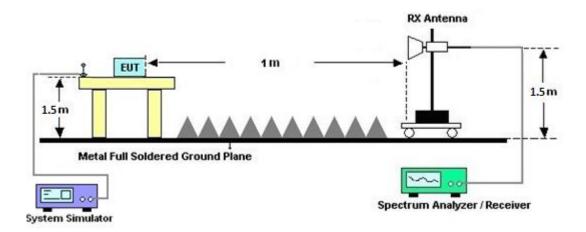


For radiated test from 1GHz to 18GHz



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For radiated test above 18GHz



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3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.8.7 Duty Cycle

Please refer to Appendix E.

3.8.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

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3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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Eraguanay of amission (MHz)	Conducted	limit (dΒμV)
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

^{*}Decreases with the logarithm of the frequency.

3.9.2 Measuring Instruments

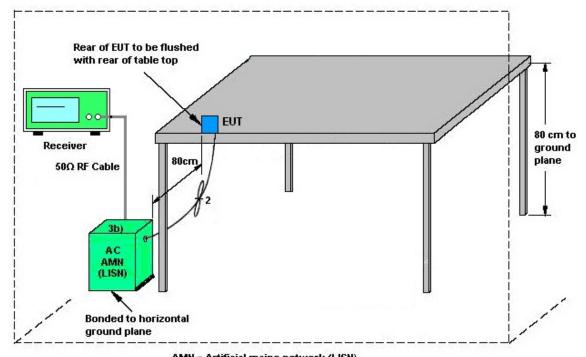
Please refer to the measuring equipment list in this test report.

3.9.3 Test Procedures

- 1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
- 6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
- 7. The frequency range from 150 kHz to 30 MHz is scanned.
- Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

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3.9.4 Test Setup



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AMN = Artificial mains network (LISN)

AE = Associated equipment

EUT = Equipment under test

ISN = Impedance stabilization network

3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

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3.10 Antenna Requirements

3.10.1 Standard Applicable

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

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3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

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4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 20, 2022	Aug. 02, 2023~ Sep. 16, 2023	Sep. 19, 2023	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 07, 2022	Aug. 02, 2023~ Sep. 16, 2023	Dec. 06, 2023	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2022	Aug. 02, 2023~ Sep. 16, 2023	Nov. 23, 2023	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1GHz	Jul. 03, 2023	Aug. 02, 2023~ Sep. 16, 2023	Jul. 02, 2024	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N-06	47020 & 06	30MHz~1GHz	Oct. 08, 2022	Aug. 02, 2023~ Sep. 16, 2023	Oct. 07, 2023	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec. 15, 2022	Aug. 02, 2023~ Sep. 16, 2023	Dec. 14, 2023	Radiation (03CH16-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Sep. 11, 2022	Aug. 02, 2023~ Sep. 06, 2023	Sep. 10, 2023	Radiation (03CH16-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Aug. 31, 2023	Sep.16, 2023	Aug. 30, 2024	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1522	1GHz~18GHz	Mar. 23, 2023	Aug. 02, 2023~ Sep. 16, 2023	Mar. 22, 2024	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 09, 2022	Aug. 02, 2023~ Sep. 16, 2023	Dec. 08, 2023	Radiation (03CH16-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Dec. 26, 2022	Aug. 02, 2023~ Sep. 16, 2023	Dec. 25, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	805935/4	N/A	Aug. 09, 2022	Aug. 02, 2023~ Aug. 07, 2023	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	802434/4	N/A	Aug. 08, 2023	Aug. 08, 2023~ Sep. 16, 2023	Aug. 07, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	802434/4	N/A	Aug. 09, 2022	Aug. 02, 2023~ Aug. 07, 2023	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	802434/4	N/A	Aug. 08, 2023	Aug. 08, 2023~ Sep. 16, 2023	Aug. 07, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	N/A	Aug. 09, 2022	Aug. 02, 2023~ Aug. 07, 2023	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	N/A	Aug. 08, 2023	Aug. 08, 2023~ Sep. 16, 2023	Aug. 07, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 08, 2023	Aug. 02, 2023~ Sep. 16, 2023	Feb. 07, 2024	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Aug. 02, 2023~ Sep. 16, 2023	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 02, 2023~ Sep. 16, 2023	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 02, 2023~ Sep. 16, 2023	N/A	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Aug. 02, 2023~ Sep. 16, 2023	N/A	Radiation (03CH16-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 17, 2022	Jul. 26, 2023~ Sep. 16, 2023	Nov. 16, 2023	Conducted (TH05-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Jul. 12, 2023	Jul. 26, 2023~ Sep. 16, 2023	Jul. 11, 2024	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Jul. 12, 2023	Jul. 26, 2023~ Sep. 16, 2023	Jul. 11, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Sep. 01, 2022	Jul. 26, 2023~ Aug. 11, 2023	Aug. 31, 2023	Conducted
Signal Analyzer	Rohde & Schwarz	FSV40	101565	10Hz~40GHz	Dec. 26, 2022	Sep. 15, 2023~ Sep. 16, 2023	Dec. 25, 2023	Conducted (TH05-HY)
BT Base Station(Measure)	Rohde & Schwarz	СВТ	101136	BT 3.0	Oct. 25, 2022	Jul. 26, 2023~ Sep. 16, 2023	Oct. 24 ,2023	Conducted (TH05-HY)

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Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 27, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Jul. 27, 2023	Nov. 30, 2023	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2022	Jul. 27, 2023	Nov. 16, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Jul. 27, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 17, 2022	Jul. 27, 2023	Nov. 16, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Jul. 27, 2023	N/A	Conduction (CO05-HY)
ISN Cable	MVE	RG-400	200260	N/A	Dec. 29, 2022	Jul. 27, 2023	Dec. 28, 2023	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBE CK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Nov. 01, 2022	Jul. 27, 2023	Oct. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Jul. 27, 2023	Dec. 28, 2023	Conduction (CO05-HY)

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5 Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	3.5 dB
of 95% (U = 2Uc(y))	3.3 ub

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<u>Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	6.5 dB
of 95% (U = 2Uc(y))	0.5 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence	4.6 dB
of 95% (U = 2Uc(y))	4.0 UB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence	A.E. J.D.
of 95% (U = 2Uc(y))	4.5 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence	5.6 dB
of 95% (U = 2Uc(y))	3.0 dB

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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Junyu Jhou	Temperature:	21~25	°C
Test Date:	2023/7/26~2023/9/16	Relative Humidity:	51~54	%

<Ant. 1>

TEST RESULTS DATA 20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	0.904	0.829	0.999	0.6029	Pass
DH	1Mbps	1	39	2441	0.904	0.829	1.003	0.6029	Pass
DH	1Mbps	1	78	2480	0.904	0.829	0.994	0.6029	Pass
2DH	2Mbps	1	0	2402	1.296	1.167	0.994	0.8638	Pass
2DH	2Mbps	1	39	2441	1.296	1.169	0.999	0.8638	Pass
2DH	2Mbps	1	78	2480	1.296	1.165	1.007	0.8638	Pass
3DH	3Mbps	1	0	2402	1.235	1.147	0.999	0.8232	Pass
3DH	3Mbps	1	39	2441	1.239	1.147	0.999	0.8261	Pass
3DH	3Mbps	1	78	2480	1.235	1.147	1.007	0.8232	Pass

TEST RESULTS DATA Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupanc y Time (hops)	U	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	79	106.670	2.89	0.31	0.4	Pass
DH5 (AFH)	20	53.330	2.89	0.15	0.4	Pass

TEST RESULTS DATA

Peak Power Table

DH	CH.	NTX	Peak Power	Power Limit	Test
υп	Сп.	INIA	(dBm)	(dBm)	Result
	0	1	3.84	30.00	Pass
DH1	39	1	4.07	30.00	Pass
	78	1	3.32	30.00	Pass
	0	1	4.91	20.97	Pass
2DH1	39	1	5.13	20.97	Pass
	78	1	4.31	20.97	Pass
	0	1	5.40	20.97	Pass
3DH1	39	1	5.55	20.97	Pass
	78	1	4.71	20.97	Pass

TEST RESULTS DATA

Average Power Table

(Reporting Only)

DH	CH. NTX		Average Power (dBm)	Duty Factor (dB)
	0	1	3.55	5.19
DH1	39	1	3.81	5.19
	78	1	3.03	5.19
	0	1	2.66	5.13
2DH1	39	1	2.90	5.13
	78	1	2.05	5.13
	0	1	2.74	5.13
3DH1	39	1	2.93	5.13
	78	1	2.08	5.13

TEST RESULTS DATA

Number of Hoppina Frequency

	Adaptive		
Number of Hopping	Frequency	Limits	Pass/Fail
(Channel)	Hopping	(Channel)	1 455/1 411
	(Channel)		
79	20	> 15	Pass

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<Ant. 2>

<u>TEST RESULTS DATA</u>
20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	0.900	0.829	1.311	0.6000	Pass
DH	1Mbps	1	39	2441	0.900	0.831	0.999	0.6000	Pass
DH	1Mbps	1	78	2480	0.904	0.829	0.990	0.6029	Pass
2DH	2Mbps	1	0	2402	1.300	1.169	1.307	0.8667	Pass
2DH	2Mbps	1	39	2441	1.296	1.167	1.012	0.8638	Pass
2DH	2Mbps	1	78	2480	1.300	1.169	1.033	0.8667	Pass
3DH	3Mbps	1	0	2402	1.235	1.149	1.129	0.8232	Pass
3DH	3Mbps	1	39	2441	1.235	1.151	1.007	0.8232	Pass
3DH	3Mbps	1	78	2480	1.239	1.147	0.994	0.8261	Pass

TEST RESULTS DATA Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupanc y Time (hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	79	106.670	2.89	0.31	0.4	Pass
DH5 (AFH)	20	53.330	2.89	0.15	0.4	Pass

TEST RESULTS DATA Peak Power Table

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
	0	1	3.01	30.00	Pass
DH1	39	1	3.45	30.00	Pass
	78	1	2.56	30.00	Pass
	0	1	4.17	20.97	Pass
2DH1	39	1	4.50	20.97	Pass
	78	1	3.50	20.97	Pass
3DH1	0	1	4.68	20.97	Pass
	39	1	4.82	20.97	Pass
	78	1	3.93	20.97	Pass

TEST RESULTS DATA

Average Power Table (Reporting Only)

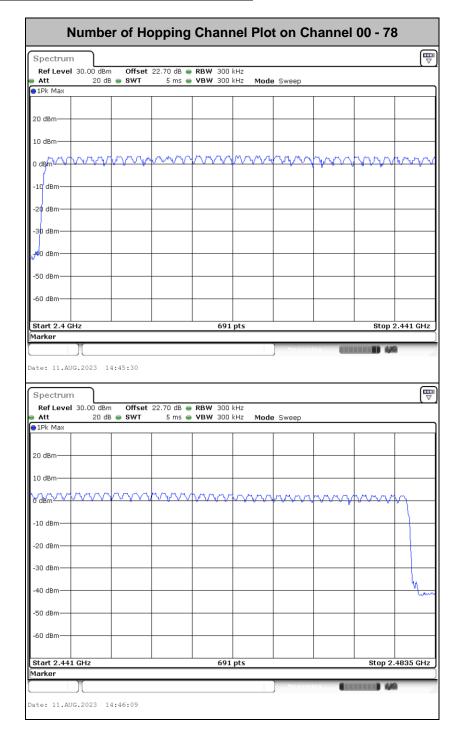
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
	0	1	2.66	5.19
DH1	39	1	3.10	5.19
	78	1	2.07	5.19
2DH1	0	1	1.77	5.13
	39	1	2.15	5.13
	78	1	1.17	5.13
3DH1	0	1	1.84	5.13
	39	1	2.23	5.13
	78	1	1.23	5.13

TEST RESULTS DATA Number of Hopping Frequency

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

<Ant. 1>

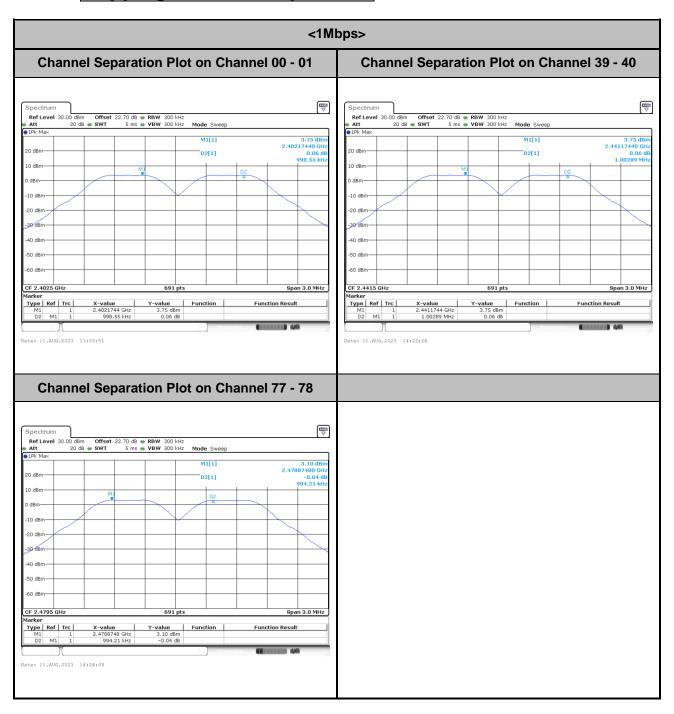
Number of Hopping Frequency



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Hopping Channel Separation



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<2Mbps> **Channel Separation Plot on Channel 00 - 01 Channel Separation Plot on Channel 39 - 40** D2[1] -10 dBm-
 X-value
 Y-value
 Function

 2.4021831 GHz
 3.12 dBm

 994,21 kHz
 0.08 dB
 X-value 2.4408705 GHz 998.55 kHz Function Result **Function Result Channel Separation Plot on Channel 77 - 78** Ref Level 30.00 dBm
Att 20 dB e Offset 22.70 dB • RBW 300 kHz SWT 5 ms • VBW 300 kHz Mode Sweep 20 dB
SWT D2[1] 30 dBm 40 dBm 50 dBm 60 dBm CF 2.4795 GHz
 X-value
 Y-value
 Function

 2.4788748 GHz
 2.44 dBm

 1.00724 MHz
 0.62 dB
 Function Result Date: 11.AUG.2023 14:40:15

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<3Mbps> Channel Separation Plot on Channel 00 - 01 **Channel Separation Plot on Channel 39 - 40**
 Ref Level
 30.00 dBm
 Offset
 22.70 dB
 ■ RBW

 Att
 20 dB
 ■ SWT
 5 ms
 ■ VBW
 D2[1] X-value 2.4021744 GHz 998.55 kHz X-value 2.4408748 GHz 998.55 kHz Function Function Result Function Function Result Date: 11.AUG.2023 14:51:52 Channel Separation Plot on Channel 77 - 78
 Ref Level
 30.00 dBm
 Offset
 22.70 dB
 RBW
 300 kHz

 Att
 20 dB
 SWT
 5 ms
 VBW
 300 kHz
 Mode
 Sweep
 2[1] 30 dBm CF 2.4795 GHz
 X-value
 Y-value
 Function

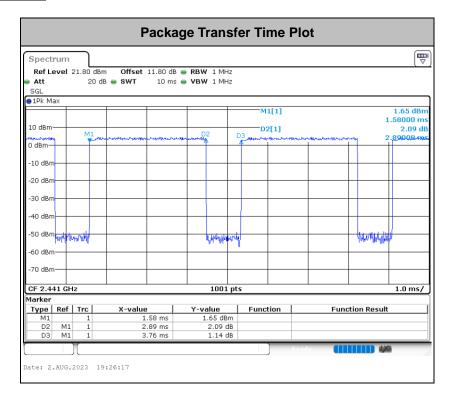
 2.4788705 GHz
 2.44 dBm

 1.00724 MHz
 -0.05 dB
 Date: 11.AUG.2023 14:54:48

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Dwell Time



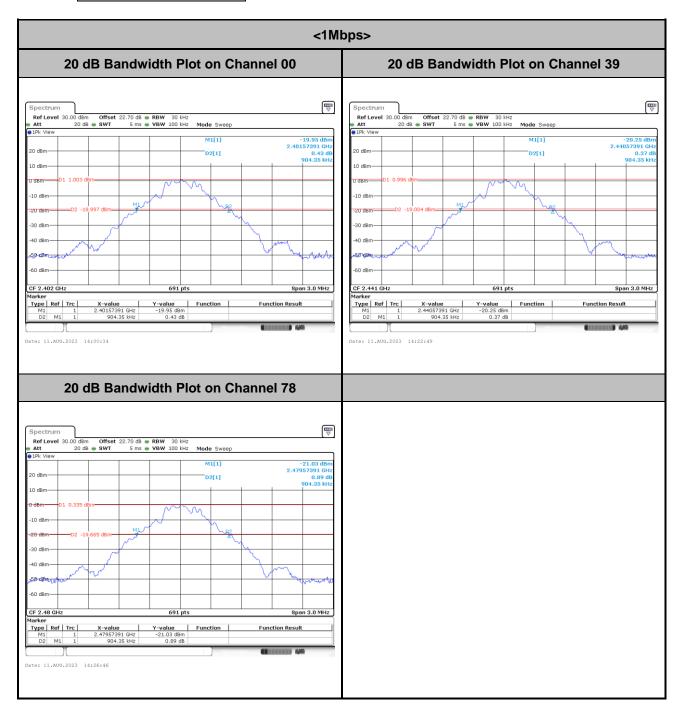
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Remark:

- 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

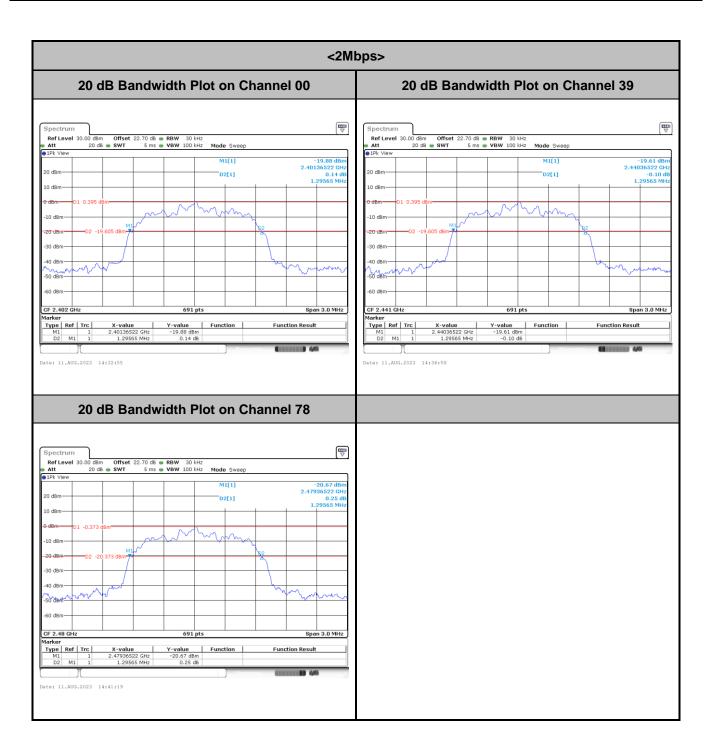
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20dB Bandwidth



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<3Mbps> 20 dB Bandwidth Plot on Channel 39 20 dB Bandwidth Plot on Channel 00 D2[1] D2[1] X-value 2.44041739 GHz 1.23913 MHz Function Function Result Function Function Result Date: 11.AUG.2023 14:52:13 20 dB Bandwidth Plot on Channel 78 Ref Level 30.00 dBm
Att 20 dB d Offset 22.70 dB • RBW 30 kHz SWT 5 ms • VBW 100 kHz Mode Swee 20 dB
SWT n dBm D2[1] 30 dBm -50 dBm CF 2.48 GH
 X-value
 Y-value
 Function

 2.47942174 GHz
 -20.49 dBm

 1.23478 MHz
 -0.29 dB

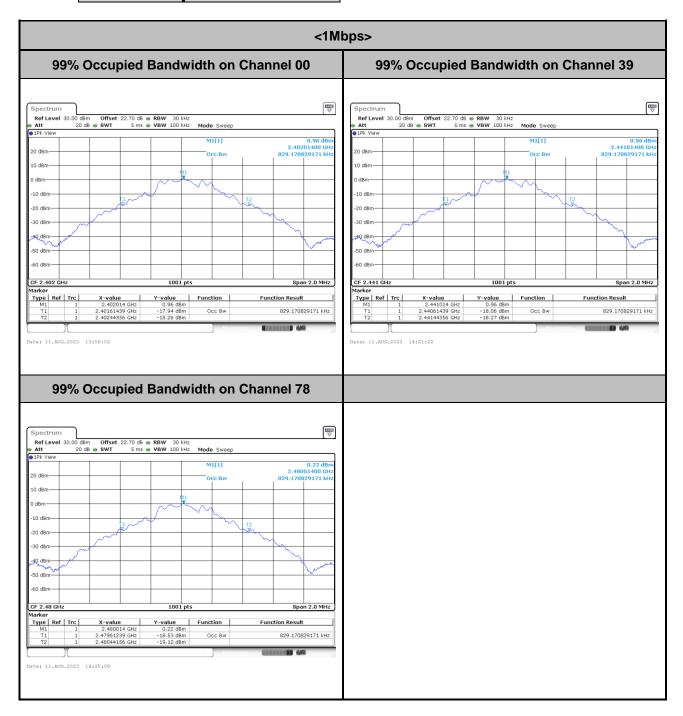
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FAX: 886-3-327-0855

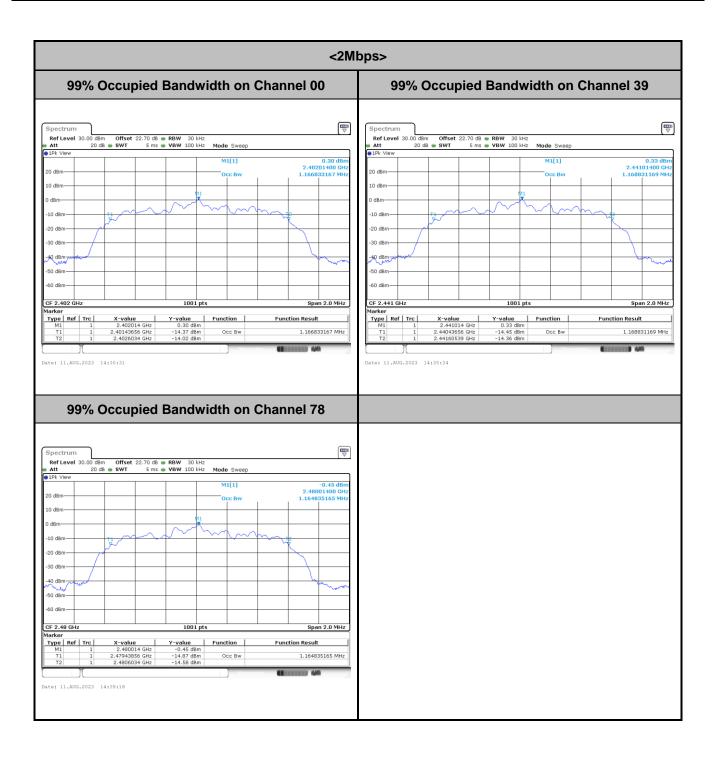
Date: 11.AUG.2023 14:55:43

99% Occupied Bandwidth



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1001 pts

Occ Bw

<3Mbps> 99% Occupied Bandwidth on Channel 00 99% Occupied Bandwidth on Channel 39 Ref Level 30.00 dBm Offs
Att 20 dB SWT 10 dBm 20 dBn 50 dBm 1001 pts 1001 pts Type Ref Trc Type Ref Trc Y-value 0.27 dBm -14.30 dBm -14.79 dBm Function **Function Result** Y-value Function **Function Result** 1.146853147 MHz 1.146853147 MHz 99% Occupied Bandwidth on Channel 78 Ref Level 30.00 -0.45 dE 2.48001400 G 1.146853147 M 40 dBm

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

1.146853147 MHz

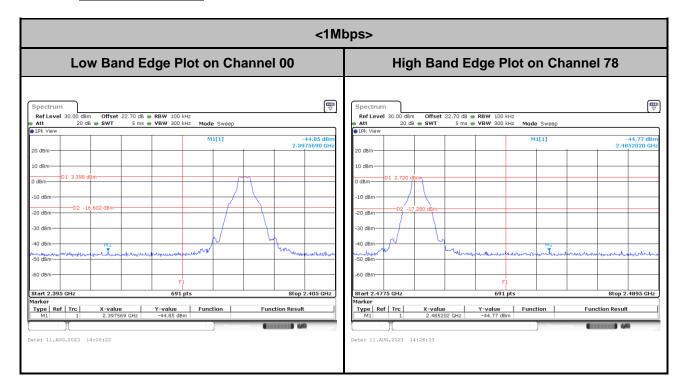
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FAX: 886-3-327-0855

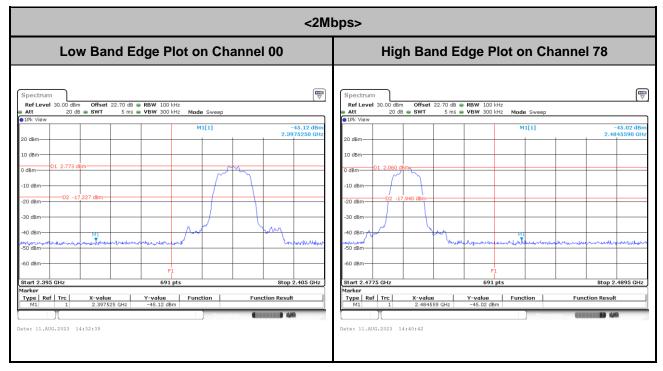
Type Ref Trc

Date: 11.AUG.2023 14:53:36

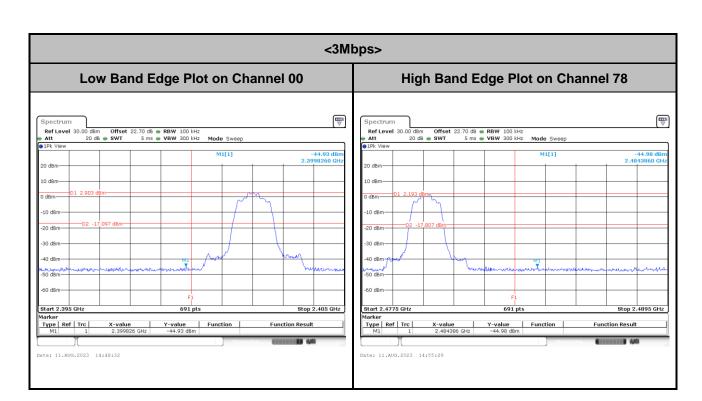
Band Edges



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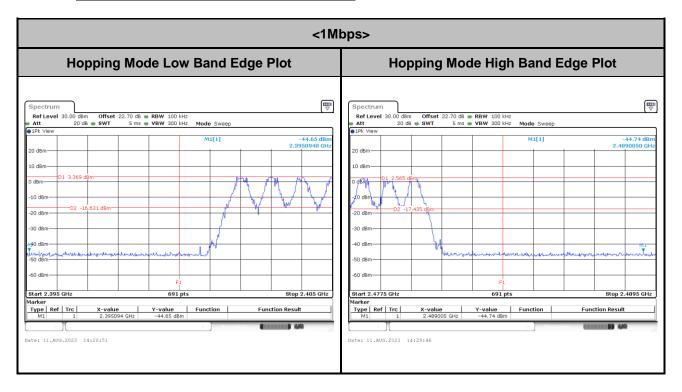


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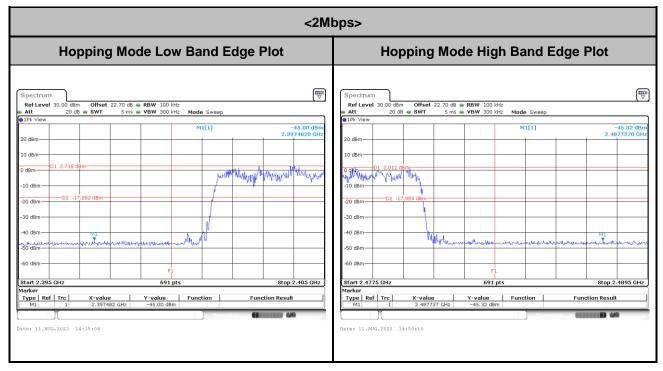


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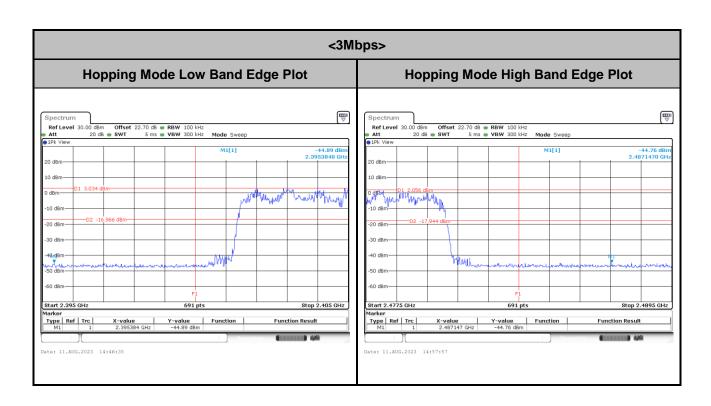
Hopping Mode Band Edges



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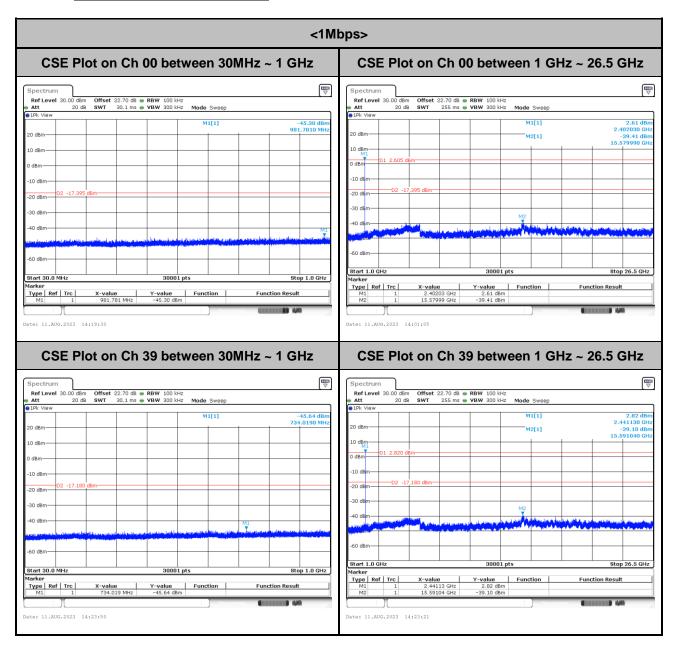


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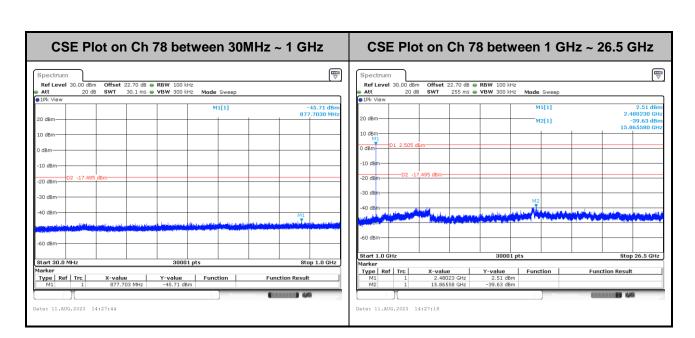
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Spurious Emission



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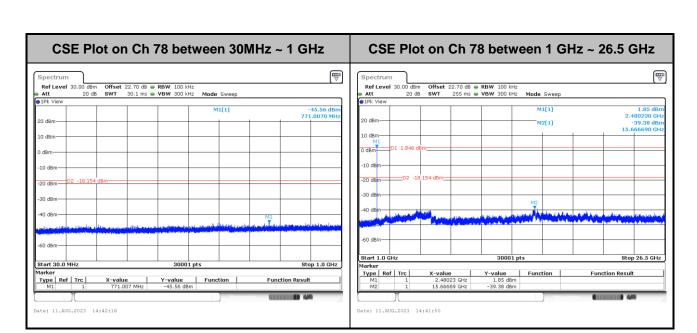
<2Mbps> CSE Plot on Ch 00 between 30MHz ~ 1 GHz CSE Plot on Ch 00 between 1 GHz ~ 26.5 GHz Ref Level 30.00 dBm
Att 20 dB Ref Level 30.00 dBm
Att 20 dB 0.63 dBn 2.402030 GH: -38.97 dBn 15.572340 GH: M2[1] 10 dBm dBm-10 dBm 40 dBm 60 dBm Stop 26.5 GHz Start 30.0 MHz Type Ref Trc X-value 2.40203 GHz 15.57234 GHz Function Type Ref Trc Date: 11.AUG.2023 14:34:16 Date: 11.AUG.2023 14:33:49 CSE Plot on Ch 39 between 30MHz ~ 1 GHz CSE Plot on Ch 39 between 1 GHz ~ 26.5 GHz Ref Level 30.00 dBm
Att 20 dB Ref Level 30.00 dBm
Att 20 dB Mode Sweep 20 dBn 10 dBm 10 dBm 40 dBm Stop 26.5 GHz
 X-value
 Y-value

 2.44113 GHz
 0.89 dBm

 15.58764 GHz
 -38.61 dBm
 Type Ref Trc Function Function Result Type Ref Trc Y-value Function Date: 11.AUG.2023 14:38:07

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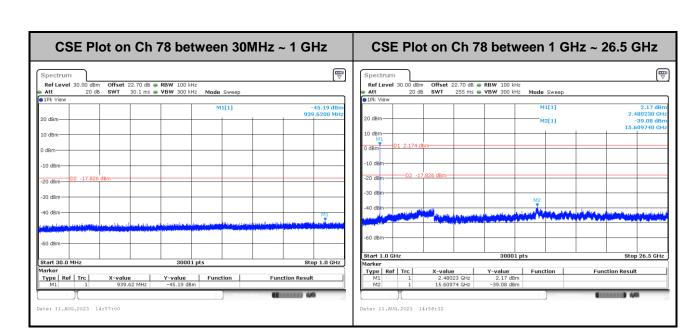
<3Mbps> CSE Plot on Ch 00 between 30MHz ~ 1 GHz CSE Plot on Ch 00 between 1 GHz ~ 26.5 GHz Ref Level 30.00 dBm
Att 20 dB Ref Level 30.00 dBm
Att 20 dB -37.94 dBn 15.575740 GH M2[1] 10 dBm dBm-10 dBm 40 dBm 60 dBm Start 30.0 MHz Type Ref Trc X-value 2.40203 GHz 15.57574 GHz Function Type Ref Trc Date: 11.AUG.2023 14:49:40 Date: 11.AUG.2023 14:49:14 CSE Plot on Ch 39 between 30MHz ~ 1 GHz CSE Plot on Ch 39 between 1 GHz ~ 26.5 GHz Ref Level 30.00 dBm
Att 20 dB Ref Level 30.00 dBm
Att 20 dB Mode Sweep 20 dBn 10 dBm 02 -17.97 40 dBm Stop 26.5 GHz
 X-value
 Y-value

 2.44113 GHz
 2.02 dBm

 15.60039 GHz
 -39.34 dBm
 Type Ref Trc Function Function Result Type Ref Trc Y-value Function
2 -44.26 dBm Date: 11.AUG.2023 14:53:09

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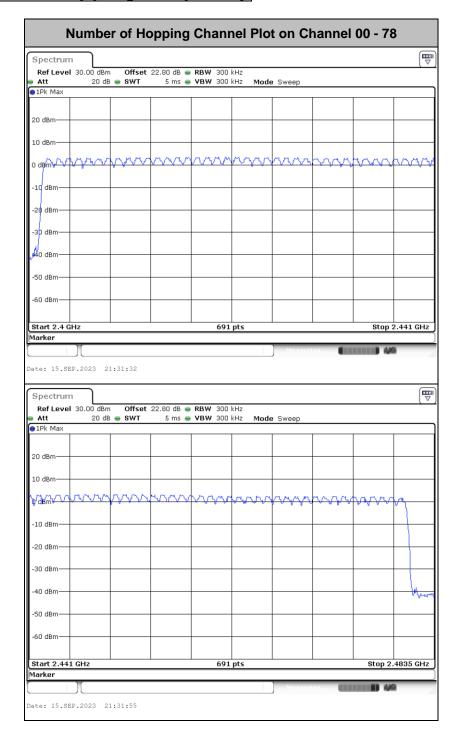
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<Ant. 2>

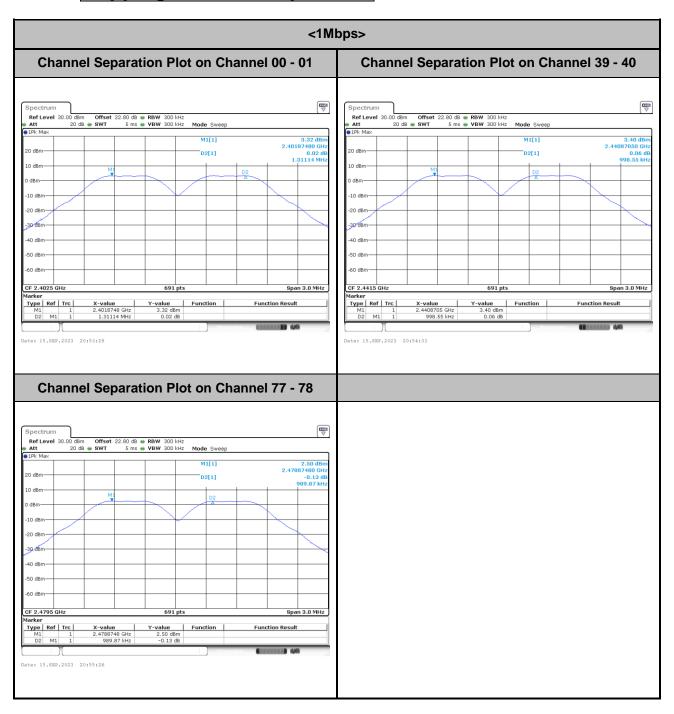
Number of Hopping Frequency



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Hopping Channel Separation



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<2Mbps> **Channel Separation Plot on Channel 00 - 01 Channel Separation Plot on Channel 39 - 40** D2[1] -10 dBm Y-value Function
2.78 dBm
0.02 dB Y-value Function
2.83 dBm
0.07 dB X-value 2.4018705 GHz 1.3068 MHz X-value 2.4408705 GHz 1.01158 MHz Function Result **Function Result Channel Separation Plot on Channel 77 - 78** Ref Level 30.00 dBm
Att 20 dB e Offset 22.80 dB • RBW 300 kHz SWT 5 ms • VBW 300 kHz Mode Sweep 20 dB
SWT D2[1] 20 dBm 30 dBm 40 dBm 50 dBm 60 dBm CF 2.4795 GHz
 X-value
 Y-value
 Function

 2.4788661 GHz
 1.95 dBm

 1.03329 MHz
 0.43 dB
 Function Result Date: 15.SEP.2023 21:14:18

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<3Mbps> Channel Separation Plot on Channel 00 - 01 **Channel Separation Plot on Channel 39 - 40**
 Ref Level
 30.00 dBm
 Offset
 22.80 dB
 ■ RBW

 Att
 20 dB
 ■ SWT
 5 ms
 ■ VBW
 D2[1] D2[1] X-value 2.4411787 GHz 1.00724 MHz Function Function Result Function Function Result Date: 15.SEP.2023 21:29:09 Channel Separation Plot on Channel 77 - 78 Spectrum

Ref Level 30.00 dBm Offse
Att 20 dB • SWT Offset 22.80 dB • RBW 300 kHz SWT 5 ms • VBW 300 kHz Mode Sweep D2[1] IO dBm-CF 2.4795 GHz
 X-value
 Y-value
 Function

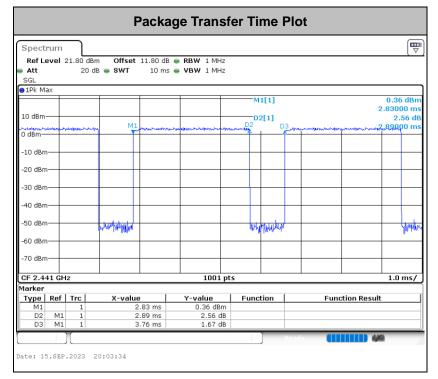
 2.4788792 GHz
 2.07 dBm

 994.21 kHz
 0.48 dB
 Date: 15.SEP.2023 21:30:25

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Dwell Time



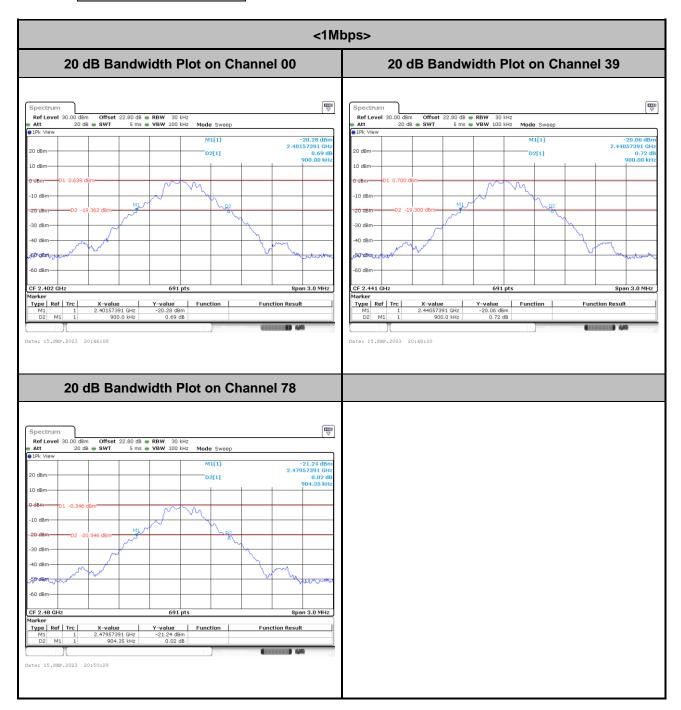
Report No.: FR371809A

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

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20dB Bandwidth



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<2Mbps> 20 dB Bandwidth Plot on Channel 00 20 dB Bandwidth Plot on Channel 39 ### Ref Level 30.00 dbm | Offset 22.80 d8 | RBW | 30 kHz |
Att | 20 d8 | SWT | 5 ms | VBW | 100 kHz |
\$1Pk View | D2[1] D2[1] $\sim\sim$ Function Function Result Function Function Result Date: 15.SEP.2023 21:02:11 Date: 15.SEP.2023 21:03:52 20 dB Bandwidth Plot on Channel 78 Ref Level 30.00 dBm
Att 20 dB (Offset 22.80 dB • RBW 30 kHz SWT 5 ms • VBW 100 kHz Mode Swee 20 dB
SWT n dBm D2[1] 30 dBm SO Bm CF 2.48 GF Date: 15.SEP.2023 21:06:32

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<3Mbps> 20 dB Bandwidth Plot on Channel 39 20 dB Bandwidth Plot on Channel 00 ### Ref Level 30.00 dbm | Offset 22.80 d8 | RBW | 30 kHz |
Att | 20 d8 | SWT | 5 ms | VBW | 100 kHz |
\$1Pk View | D2[1] D2[1] Mush X-value 2.40142174 GHz 1.23478 MHz X-value 2.44042174 GHz 1.23478 MHz Function Function Result Function Function Result Date: 15.SEP.2023 21:20:58 Date: 15.SEP.2023 21:22:44 20 dB Bandwidth Plot on Channel 78 Ref Level 30.00 dBm
Att 20 dB (Offset 22.80 dB • RBW 30 kHz SWT 5 ms • VBW 100 kHz Mode Swee 20 dB
SWT n dBm D2[1] 10 dBm 30 dBm 50 dBm CF 2.48 GH
 X-value
 Y-value
 Function

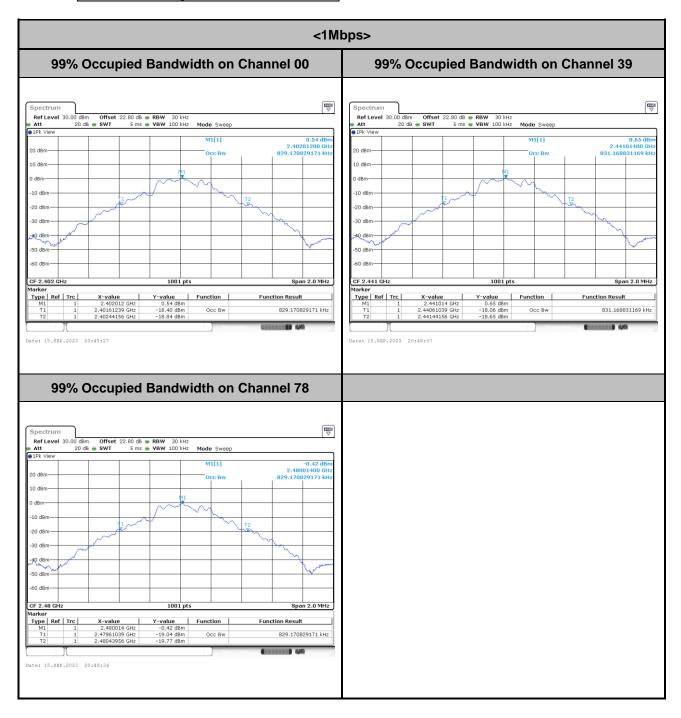
 2.47942174 GHz
 -21.20 dBm

 1.23913 MHz
 -0.11 dB
 Date: 15.SEP.2023 21:25:01

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99% Occupied Bandwidth



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<2Mbps> 99% Occupied Bandwidth on Channel 00 99% Occupied Bandwidth on Channel 39
 Ref Level
 30.00 dBm
 Offset
 22.80 dB
 ■ RBW
 30 kHz

 Att
 20 dB
 ■ SWT
 5 ms
 ■ VBW
 100 kHz
 10 dBm 20 dBm 50 dBm 60 dBm 1001 pts 1001 pts Type Ref Trc Type Ref Trc Y-value Function
-0.01 dBm
-14.70 dBm Occ Bw
-14.69 dBm X-value 2.441012 GHz 2.44043656 GHz 2.4416034 GHz Y-value Function
0.05 dBm Function Result **Function Result** 1.168831169 MHz 1.166833167 MHz Date: 15.SEP.2023 21:01:34 99% Occupied Bandwidth on Channel 78 Ref Level 30.00 dBm Mode Sweep -1.00 dB 2.48001600 GF 1.168831169 MF 30 dBm 40 dBm 1001 pts X-value 2.480016 GHz 2.47943457 GHz 2.4806034 GHz Occ Bw 1.168831169 MHz Date: 15.SEP.2023 21:05:30

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<3Mbps> 99% Occupied Bandwidth on Channel 00 99% Occupied Bandwidth on Channel 39 Ref Level 30.00 dBm Offs
Att 20 dB SWT 10 dBn 20 dBn 50 dBm 1001 pts 1001 pts Type Ref Trc Type Ref Trc Y-value 0.11 dBm -14.66 dBm -14.98 dBm Function **Function Result** Y-value Function **Function Result** 1.148851149 MHz 1.150849151 MHz 99% Occupied Bandwidth on Channel 78 Ref Level 30.00 2.48001800 G 1.146853147 M 40 dBrr 1001 pt Type Ref Trc Occ Bw 1.146853147 MHz

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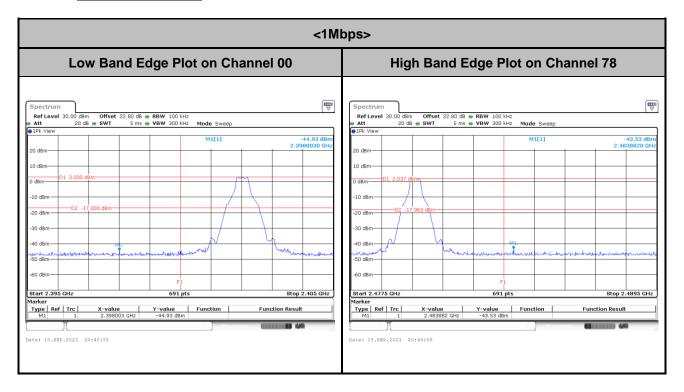
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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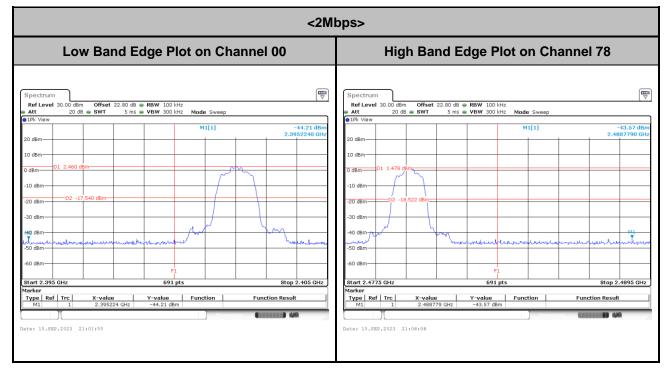
FAX: 886-3-327-0855

Date: 15.SEP.2023 21:24:26

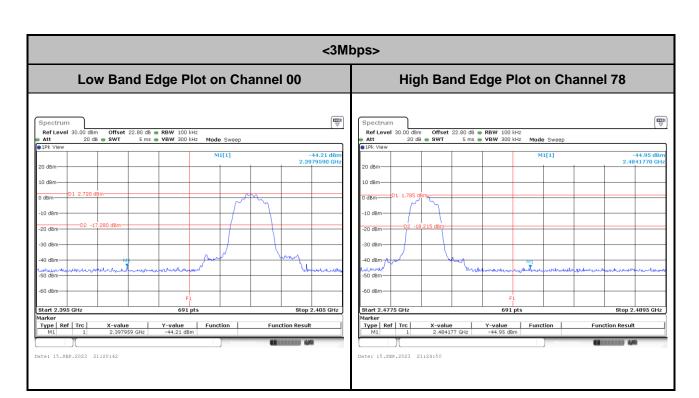
Band Edges



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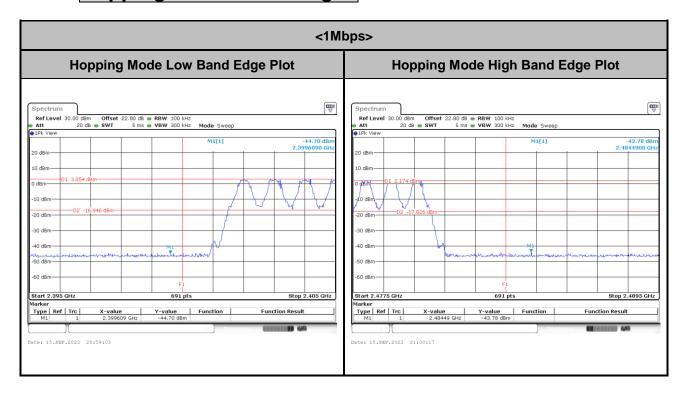


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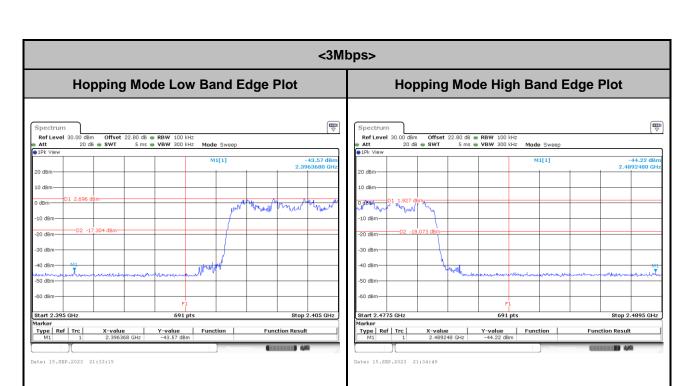
Hopping Mode Band Edges



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