



FCC RADIO TEST REPORT

FCC ID	: HLZA24001
Equipment	: Tablet PC
Brand Name	: acer
Model Name	: A24001
Applicant	: Acer Incorporated
	8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R.O.C)
Manufacturer	: Acer Incorporated
	8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R.O.C)
Standard	: FCC Part 15 Subpart C §15.247

The product was received on Dec. 28, 2023 and testing was performed from Jan. 11, 2024 to Feb. 23, 2024. 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.

Louis 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

Report No.	Version	Description	Issue Date
FR3D2701A	01	Initial issue of report	Mar. 14, 2024



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) 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	6.32 dB under the limit at 70.23 MHz
3.9	15.207	AC Conducted Emission	Pass	5.44 dB under the limit at 13.08 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: Lewis Ho

Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature			
Sample 1	With PCB 1, Camera 1, DDR 1		
Sample 2	With PCB 2, Camera 2, DDR 2		
Sample 3	With PCB 2, Camera 1, DDR 1		
General Specs Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/a and GNSS.			
Antenna Type WLAN: FPC Antenna Bluetooth: FPC Antenna Bluetooth: FPC Antenna GPS / Glonass / BDS: PIFA Antenna			
Antenna information			
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi) 1.78		

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.

1.3 Testing Location

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. TH05-HY, CO07-HY, 03CH22-HY		

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

FCC designation No.: 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.

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, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst plane, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode, and recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

	Summary table of Test Cases					
Test Item	Data Rate / Modulation					
	Bluetooth BR 1Mbps GFSK	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			
	E	Bluetooth BR 1Mbps GFS	(
Radiated	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz					
Test Cases						
		Mode 3: CH78_2480 MHz				

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

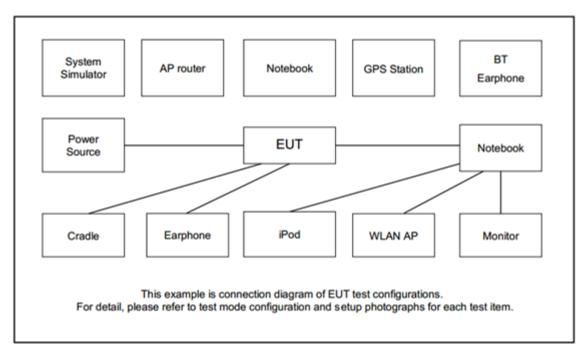


Summary table of Test Cases						
Test Item	Data Rate / Modulation					
	Mode 1 :Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + Earphone + USB					
	Cable (Charging from Adapter) for Sample 1					
AC Conducted	Mode 2 Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + Earphone + USB					
Emission	Cable (Charging from Adapter) for Sample 2					
	Mode 3 Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + Earphone + USB					
Cable (Charging from Adapter) for Sample 3						
Remark:						
1. For Radiated	1. For Radiated Test Cases, the worst mode data rate 1Mbps was reported only since the highest					

RF output power in the preliminary tests. The conducted spurious emissions and conducted band edge measurement for other data rates were not worse than 1Mbps, and no other significantly frequencies found in conducted spurious emission.

2. The worst case of Conducted Emission is mode 2; only the test data of it was reported.

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 Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC52	MSQ-RTAC4A00	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Earphone + Mic	Samsung	Ecouteur	N/A	Unshielded, 1.8 m	N/A
5.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
6.	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 "Acer_AV0U0_P11-11_0.004.03_PAPAP_GEN1" was installed in EUT 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.

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 10 dB 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.

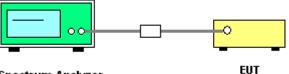
3.1.2 Measuring Instruments

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



Spectrum Analyzer

3.1.5 Test Result of Number of Hopping Frequency

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

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



Spectrum Analyzer

3.2.5 Test Result of Hopping Channel Separation



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.

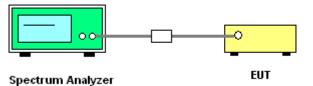
3.3.2 Measuring Instruments

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



3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

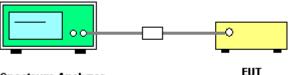
3.4.2 Measuring Instruments

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.
- 3. Set the maximum power setting and enable the EUT to transmit continuously.
- 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.
- 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.

3.4.6 Test Result of 99% Occupied Bandwidth



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. 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.

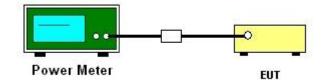
3.5.2 Measuring Instruments

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)



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.

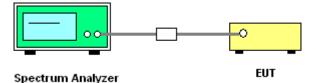
3.6.2 Measuring Instruments

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

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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

3.7.2 Measuring Instruments

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.
- 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



Spectrum Analyzer

3.7.5 Test Result of Conducted Spurious Emission

3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

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

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

3.8.2 Measuring Instruments

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

3.8.3 Test Procedures

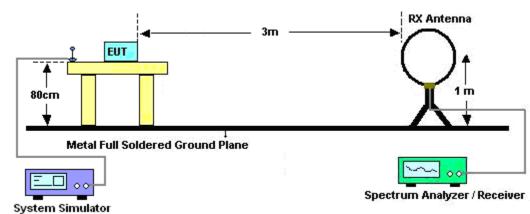
- 1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
- 2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
- 3. For each suspected emission, 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
 - $\begin{array}{ll} \mbox{(3)} & \mbox{For average measurement: use duty cycle correction factor method per 15.35(c).} \\ & \mbox{Duty cycle = On time/100 milliseconds} \\ & \mbox{On time = $N_1^*L_1 + N_2^*L_2 + ... + N_{n-1}^*LN_{n-1} + N_n^*L_n$} \\ & \mbox{Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.} \end{array}$
 - 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 (-24.80dB for Sample 1, -24.79dB for Sample 2, and -24.82dB for Sample 3) 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.

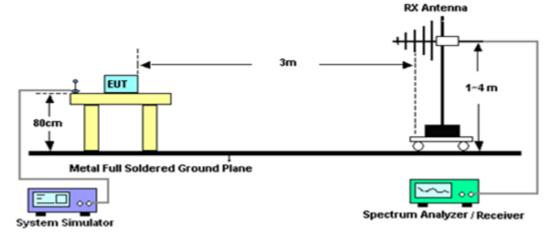


3.8.4 Test Setup

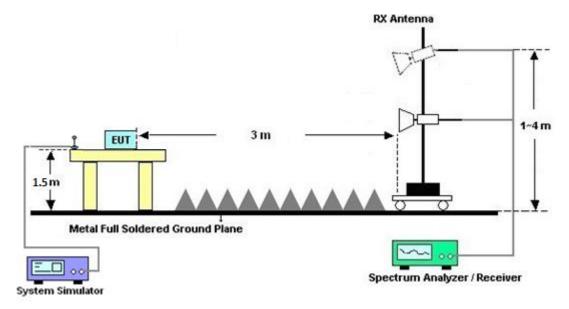
For radiated test below 30MHz





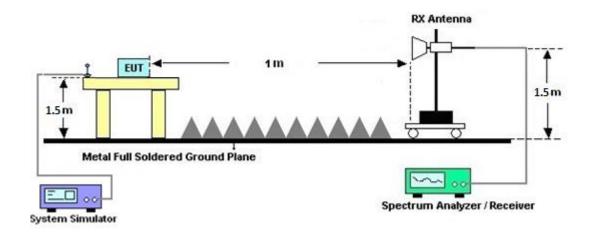








For radiated test above 18GHz



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.



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.

Frequency of emission (MHz)	Conducted	limit (dBµV)
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

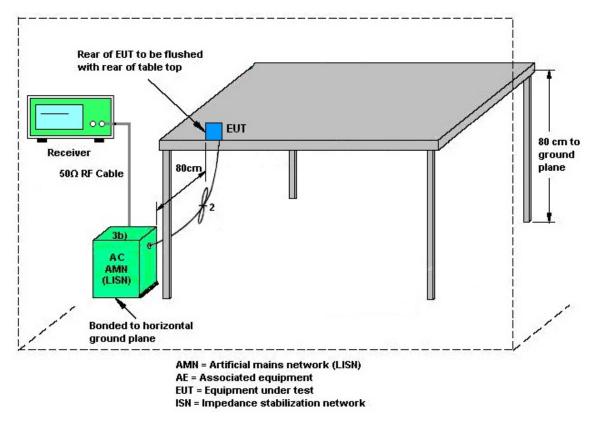
Please refer to the measuring equipment list in this test report.

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.



3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission



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.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration	Test Date	Due Date	Remark
mstrument	Brand Name	Woder No.	Senai No.	Characteristics	Date	Test Date	Due Dale	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9kHz~30MHz	Feb. 28, 2023	Feb. 03, 2024~ Feb. 23, 2024	Feb. 27, 2024	Radiation (03CH22-HY)
Bilog Antenna with 6dB	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63304 & 002	30MHz~1GHz	Oct. 15, 2023	Feb. 03, 2024~ Feb. 23, 2024	Oct. 14, 2024	Radiation (03CH22-HY)
Amplifier	SONOMA	310N	421581	N/A	Jul. 15, 2023	Feb. 03, 2024~ Feb. 23, 2024	Jul. 14, 2024	Radiation (03CH22-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C04A18E N	1GHz~18GHz	Jul. 12, 2023	Feb. 03, 2024~ Feb. 23, 2024	Jul. 11, 2024	Radiation (03CH22-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	1223	18GHz-40GHz	Jul. 10, 2023	Feb. 03, 2024~ Feb. 23, 2024	Jul. 09, 2024	Radiation (03CH22-HY)
Amplifier	EMEC	EM01G18GA	060877	N/A	Sep. 28, 2023	Feb. 03, 2024~ Feb. 23, 2024	Sep. 27, 2024	Radiation (03CH22-HY)
Preamplifier	EMEC	EM18G40G	060801	18-40GHz	Jun. 27, 2023	Feb. 03, 2024~ Feb. 23, 2024	Jun. 26, 2024	Radiation (03CH22-HY)
Signal Analyzer	Keysight	N9010B	MY60241058	10Hz~44GHz	Jul. 06, 2023	Feb. 03, 2024~ Feb. 23, 2024	Jul. 05, 2024	Radiation (03CH22-HY)
Hygrometer	TECPEL	DTM-303A	TP211469	N/A	Jan. 03, 2024	Feb. 03, 2024~ Feb. 23, 2024	Jan. 02, 2025	Radiation (03CH22-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 03, 2024~ Feb. 23, 2024	N/A	Radiation (03CH22-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Feb. 03, 2024~ Feb. 23, 2024	N/A	Radiation (03CH22-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Feb. 03, 2024~ Feb. 23, 2024	N/A	Radiation (03CH22-HY)
Software	Audix	E3 6.09824_2019 122	RK-002347	N/A	N/A	Feb. 03, 2024~ Feb. 23, 2024	N/A	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 07, 2023	Feb. 03, 2024~ Feb. 23, 2024	Mar. 06, 2024	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804390/2,804 611/2,804615/ 2	N/A	Oct. 24, 2023	Feb. 03, 2024~ Feb. 23, 2024	Oct. 23, 2024	Radiation (03CH22-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Jan. 11, 2024~ Feb. 23, 2024	Nov. 06, 2024	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 27, 2023	Jan. 11, 2024~ Feb. 23, 2024	Jul. 26, 2024	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GH z	Jul. 27, 2023	Jan. 11, 2024~ Feb. 23, 2024	Jul. 26, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 23, 2023	Jan. 11, 2024~ Feb. 23, 2024	Aug. 22, 2024	Conducted (TH05-HY)
BT Base Station (Measure)	Rohde & Schwarz	СВТ	101136	BT 3.0	Oct. 22, 2023	Jan. 11, 2024~ Feb. 23, 2024	Oct. 21, 2024	Conducted (TH05-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Feb. 02, 2024~ Feb. 07, 2024	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Feb. 02, 2024~ Feb. 07, 2024	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBE CK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 20, 2023	Feb. 02, 2024~ Feb. 07, 2024	Oct. 19, 2024	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 15, 2023	Feb. 02, 2024~ Feb. 07, 2024	Mar. 14, 2024	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 05, 2023	Feb. 02, 2024~ Feb. 07, 2024	Mar. 04, 2024	Conduction (CO07-HY)
Four-Line V-Network	TESEQ	NNB 52	36122	N/A	Mar. 13, 2023	Feb. 02, 2024~ Feb. 07, 2024	Mar. 12, 2024	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 20, 2023	Feb. 02, 2024~ Feb. 07, 2024	Sep. 19, 2024	Conduction (CO07-HY)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence	3.44 dB
of 95% (U = 2Uc(y))	3.44 UB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	6.5 dB
of 95% (U = 2Uc(y))	0.3 UB

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

Measuring Uncertainty for a Level of Confidence	
of 95% (U = 2Uc(y))	4.5 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5 dB
--	--------

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

Measuring Uncertainty for a Level of Confidence	5.4 dB
of 95% (U = 2Uc(y))	5.4 dB

Report Number : FR3D2701A

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Junyu Jhou	Temperature:	21~25	°C
Test Date:	2024/01/11~2024/02/23	Relative Humidity:	51~54	%

	<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	0.821	0.731	1.007	0.5476	Pass	
DH	1Mbps	1	39	2441	0.828	0.733	0.994	0.5520	Pass	
DH	1Mbps	1	78	2480	0.867	0.731	0.990	0.5778	Pass	
2DH	2Mbps	1	0	2402	1.239	1.139	1.007	0.8262	Pass	
2DH	2Mbps	1	39	2441	1.240	1.141	1.003	0.8264	Pass	
2DH	2Mbps	1	78	2480	1.241	1.141	1.324	0.8276	Pass	
3DH	3Mbps	1	0	2402	1.214	1.121	0.999	0.8096	Pass	
3DH	3Mbps	1	39	2441	1.214	1.123	1.003	0.8094	Pass	
3DH	3Mbps	1	78	2480	1.216	1.123	1.012	0.8106	Pass	

Mod.Hopping Channel Number RateHops Over Occupanc y Time (hops)Package Transfer Time (msec)Dwell Time (sec)Limits (sec)Pass/FailDH579106.6702.880.310.4PassDH5 (AFH)2053.3302.880.150.4Pass					RESULTS Well Time		
	Mod.	Hopping Channel	Occupanc y Time	Transfer Time	Time		Pass/Fail
DH5 (AFH) 20 53.330 2.88 0.15 0.4 Pass	DH5	79	106.670	2.88	0.31	0.4	Pass
	DH5 (AFH)	20	53.330	2.88	0.15	0.4	Pass

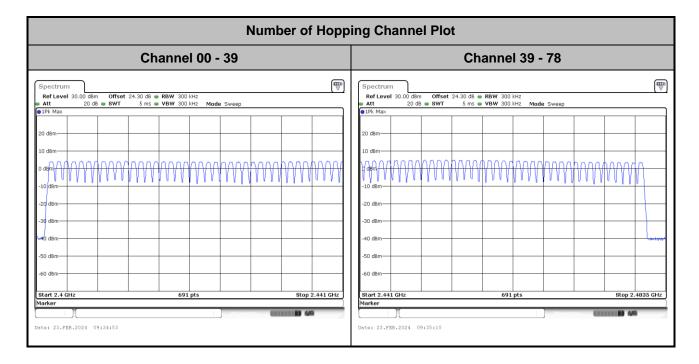
<u>TEST RESULTS DATA</u> Peak Power Table								
			Peak Power	Power Limit	Test			
DH	CH.	NTX	(dBm)	(dBm)	Result			
	0	1	4.50	20.97	Pass			
DH1 3	39	1	4.53	20.97	Pass			
Γ	78	1	3.88	20.97	Pass			
	0	1	3.51	20.97	Pass			
2DH1	39	1	3.85	20.97	Pass			
	78	1	3.09	20.97	Pass			
	0	1	3.54	20.97	Pass			
3DH1	39	1	3.87	20.97	Pass			
	78	1	3.10	20.97	Pass			

				Ave	ST RESULTS DATA erage Power Table Reporting Only)
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)	
	0	1	3.83	5.23	
DH1	39	1	4.13	5.23	
	78	1	3.29	5.23	
	0	1	1.23	5.17	
2DH1	39	1	1.76	5.17	
	78	1	1.01	5.17	
	0	1	1.38	5.11	
3DH1	39	1	1.77	5.11]
	78	1	1.02	5.11	

		<u>TEST RE</u> Number of He	SULTS DA		
Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail		
79	20	> 15	Pass	1	



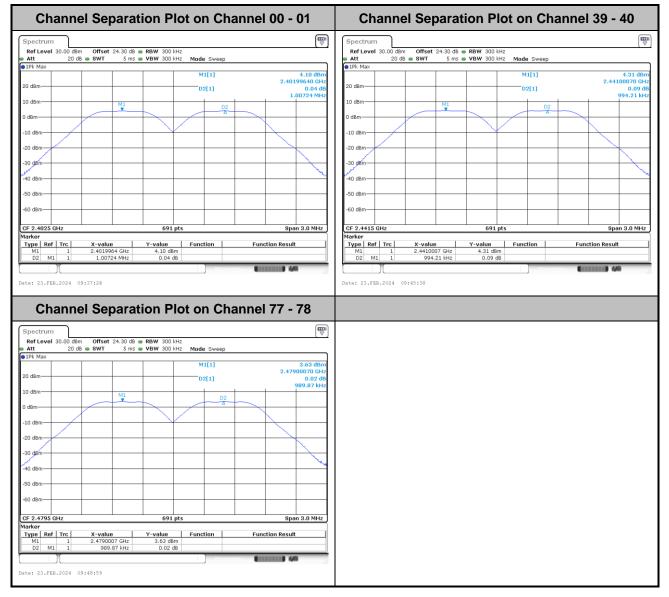
Number of Hopping Frequency





Hopping Channel Separation

<1Mbps>





<2Mbps>

Pectrum mm Ref Level 30.00 dBm Offset 24.30 dB ⊕ RBW 300 kHz Made Sweep Att 20 dB ⊕ SWT 5 ms ⊕ VBW 300 kHz Made Sweep JPK Max M1[1] 3.07 dBn 0.05 dB J dBm D2[1] 0.05 dB 0.05 dB J dBm M1[1] 0.0724 MHz 0.02	Ref Level 30.00 dBm Offset 24.30 dB RBW 300 kHz Att 20 dB SWT 5 ms VBW 300 kHz Mode Sweep @ 1Pk Max MI[1] 2.441 20 dBm 02[1]	
Max Offset 24.30 dB end	Ref Level 30.00 dBm Offset 24.30 dB RBW 300 kHz Att 20 dB SWT 5 ms VBW 300 kHz Mode Sweep @ 1Pk Max MI[1] 2.441 20 dBm 02[1]	(
JPK Max M1[1] 3.07 dBn J dBm D2[1] 0.05 df J dBm D2[1] 0.0724 MH:		
D dBm D2[1] 22.40215270 GH 0.05 dt 1.00724 MH 0.05 dt 0.05 dt 0.0724 MH	20 dBm 2.441	3.48 dB
0.03 tr 1.00724 MH: 0.2		16140 Gł
M1 D2	10 dBm-	0.10 d 00289 MH
	M1 02	
dBm	0 dBm	
0 dBm	-10 dBm	
0,dBm	-20, d Bm	
0 dBm	-30 dBm	
0 d8m	-40 dBm-	
0 dBm	-50 dBm	
	-60 dBm	
d8m	-00 UBIN	
2.4025 GHz 691 pts Span 3.0 MHz		n 3.0 MH:
ker pe Ref Trc X-value Y-value Function Function Result	Marker Type Ref Trc X-value Y-value Function Function Result	
M1 1 2.4021527 GHz 3.07 dBm D2 M1 1 1.00724 MHz 0.05 dB	M1 1 2.4411614 GHz 3.48 dBm D2 M1 1 1.00289 MHz 0.10 dB	
Measuring	Measuring	1
9: 23.FEB.2024 10:12:06	Date: 23.FEB.2024 10:18:40	
Channel Separation Plot on Channel 77 - 78		
Ref Level 30.00 dBm Offset 24.30 dB 🖷 RBW 300 kHz		
tert Level 30.00 dBm Offset 24.30 dB RBW 300 kHz Att 20 dB SWT 5 ms VBW 300 kHz Mode Sweep PK Max 20 dB SWT 5 ms VBW 300 kHz Mode Sweep		
Var Offset 24.30 db ● RBW 300 kHz Xtt 20 db ● SWT 5 ms ● VBW 300 kHz Mode Sweep Pr Pk Max M1[1] 2.84 dBm		
Interference Offset 24.30.db RBW 200.bHz tit 20 dB SWT 5 ms VBW 200.bHz Mode Sweep Prevent		
Ker Laved 30.00 dBm Offset 24.30 dB @ RBW 300 HHZ Xtt 20 dB @ SWT 5 ms VBW 300 kHZ Mode Sweep Pk Max		
Max Offset 24.30 dB end 80 MBW 300 kHz Mode Sweep tt 20 dB end 80 MB SWT 5 ms end 80 MBW 300 kHz Mode Sweep Pk Max M1[1] 2.494 dBm dBm D2[1] 0.03 df dBm D2 D2		
Utt Offset 24.30 dB Offset 24.30 dB RBW 300 kHz tt 20 dB SWT S ms VBW 300 kHz Max Milling 2.84 dBm 0.03 di dBm D2[1] 0.03 di 1.32417 MHz Bm M1 2.94 dBm 0.03 di		
of Level 30.00 dBm Offset 24.30 dB RBW 300 kHz tt 20 dB 8WT S ms VBW 300 kHz k Max MI[1] 2.84 dBm dBm D2[1] 0.03 dI dBm MI 1.32417 MH dBm MI D2		
off Level 30.00 dbm Offset 24.30 db RBW 300 kHz tt 20 db 8 WT 5 ms VBW 300 kHz Mode Sweep % Max MI[1] 2.84 dbm 0.03 dbm 0.03 dbm 0.03 dbm dbm D2[1] 0.03 dbm 1.32417 MHz 0.02 dbm 0.04 dbm dbm M1 0.2 0.03 dbm 0.02 dbm 0.04 dbm 0.02 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.02 dbm 0.03 dbm 0.02 dbm 0.03 dbm <td< td=""><td></td><td></td></td<>		
Level 30.00 dbm Offset 24.30 db @ RBW 300 kHz Ltt 20 db @ SWT 20 db @ SWT 5 ms @ VBW 300 kHz Max M1[1] 2.84 dbm dbm D2[1] 0.03 dt 1.32417 MHz dbm 0 dbm 0 dbm		
Link Offset 24.30 dB RBW 300 kHz Litt 20 dB SWT 5 ms VBW 300 kHz Max MI[1] 2.84 dBm 0.03 di dBm D2[1] 0.03 di 1.32417 MHz dBm M1 02 0 0.03 di dBm 0 dBm 02 0 0 0.03 di dBm 0.03 di 0.03 di 0.03 di 0.03 di 0.03 di dBm 0.04 min 0.02 min 0 0.03 di 0		
Link Offset 24.30 dB RBW 300 kHz Litt 20 dB SWT 5 ms VBW 300 kHz Max MI[1] 2.84 dBm 0.03 di dBm D2[1] 0.03 di 1.32417 MHz dBm M1 02 0 0.03 di dBm 0 dBm 02 0 0 0.03 di dBm 0.03 di 0.03 di 0.03 di 0.03 di 0.03 di dBm 0.04 min 0.02 min 0 0.03 di 0		
Interference Offset 24.30.db RBW 200.kHz Max 0.05 ms VBW 200.kHz Mode Sweep Pk. Max M1[1] 2.84 dBm 2.84 dBm dBm D2[1] 0.03.di 1.32417 MHz dBm 02 02 02 02 dBm 0.03.di 1.32417 MHz 0.02 02 dBm 0.03.di 0.03.di 0.03.di 0.03.di dBm 0.2 0.2 0.03.di 0.03.di dBm 0.02 0.03.di 0.03.di 0.03.di dBm 0.02 0.03.di 0.03.di 0.03.di dBm 0.02 0.02 0.03.di 0.03.di dBm 0.02 0.02 0.03.di 0.03.di dBm 0.03.di 0.02 0.03.di 0.03.di dBm 0.04 0.04 0.04 0.04 0.04		
Left Lavel 30.00 dBm Offset 24.30 dB @ RBW 300 kHz Lt 20 dB @ SWT Sms @ VBW 300 kHz Mode Sweep Pk Max M1[1] dBm 0.2[1] 0.03 di 1.32417 MHz dBm 0.2 0 dBm 0.0 0 dBm 0.0 0 dBm 0.0 0 dBm 0.0		
Interference Offset 24.30 dB RBW 200 HHz Max 20 dB 9 WT 5 ms VBW 300 kHz Mode Sweep Pk Max 0 dB 9 WT 5 ms VBW 300 kHz Mode Sweep dBm 0 dB 0 D2 (1) 0 .03 di 1.32417 MHz dBm 0 dB 0 dB 0 dB 0 dB 0 dB dBm 0 dB		
Vert Level 30.00 dbm Offset 24.30 db @ RBW 300 kH2 Mode Sweep Vert Level 30.00 dbm Offset 24.30 db @ RBW 300 kH2 Mode Sweep Pk Max 2.49 dbm 2.49 dbm dbm D2[1] 2.49 dbm dbm D2[1] 0.03 db dbm D2[1] 0.04 db		
Ref Level 30.00 dBm Offset 24.30 dB @ RBW 300 HHz Att 20 dB @ SWT 5 ms @ VBW 300 HHz Max 0 dB @ SWT 5 ms @ VBW 300 HHz Max 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m 0 dB m		

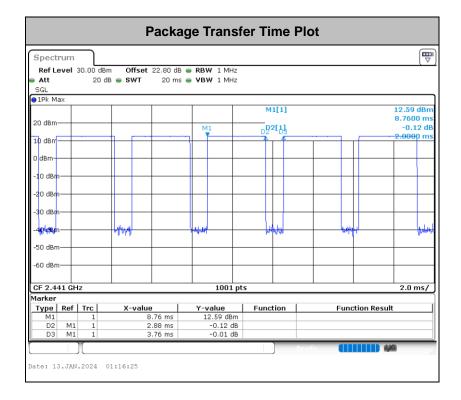


<3Mbps>

Channel Separ	ation Plot on Cha	annel 00 - 01	Channe	I Separat	ion Plot	on Cha	annel 39 - 40
pectrum			Spectrum				ſ
Ref Level 30.00 dBm Offset 24.30	dB 🖷 RBW 300 kHz	(*)	Ref Level 30.00 dBm				l
Att 20 dB 👄 SWT 5 Pk Max	ms 🖶 VBW 300 kHz Mode Sweep		 Att 20 dB 1Pk Max 	🔵 SWT 5 m s 🖷	• VBW 300 kHz N		
	M1[1]	3.03 dBm 2.40184010 GHz				M1[1]	3.37 dt 2.44083570 G
dBm	D2[1]	0.05 dB 998.55 kHz	20 dBm			D2[1]	0.09 1.00289 M
dBm M1	D2		10 dBm	M1		D2	
Sm			0 dBm	-			
dBm			-10 dBm				
dBm			-20,0Bm				
dBm			-30 dBm				
dBm			-40 dBm				
18m			-50 dBm				
Bm			-60 dBm				
.4025 GHz	691 pts	Span 3.0 MHz	CF 2.4415 GHz		691 pts		Span 3.0 MH
er		·	Marker	Muselus 1			
e Ref Trc X-value 11 1 2.4018401 GH		Function Result	Type Ref Trc M1 1	2.4408357 GHz	3.37 dBm	unction	Function Result
02 M1 1 998.55 kH:	z 0.05 dB	1	D2 M1 1	1.00289 MHz	0.09 dB		In the
	interaction in the second s					The second se	4/4
	ration Plot on Cha	annel 77 - 78	Date: 23.FEB.2024 10	:59:12			
Channel Separ	ration Plot on Cha		Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB 🖷 RBW 300 kHz	annel 77 - 78	Date: 23.FEB.2024 10	:59:12			
Channel Separ			Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB 🖷 RBW 300 kHz	(₩) 2.76 dBm	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB ● RBW 300 kHz ms ● VBW 300 kHz Mode Sweep	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	(₩) 2.76 dBm 2.47883140 GHz	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB • RBW 300 kHz ms • VBW 300 kHz Mode Sweep M1[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ ectrum of Level 30.00 dBm offset 24.30 t 20 dB • 8WT 5 k Max IBm M1 IBm M1 M1	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ setrum f Level 30.00 dBm Offset 24.30 K Max 20 dB • SWT 5 Max 0 Bm m M3 M3 m M3 M3	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ strum fLevel 30.00 dBm offset 24.30 Max Max Bm Max Bm Max Bm Max	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ actrum ft Level 30.00 dBm Offset 24.30 X 20 dB # SWT Max Bm Max Bm Max Bm Max	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	:59:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	(₩) 2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	259:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	(₩) 2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	259:12			
Channel Separ	dB == RBW 300 HHz ms == VBW 300 HHz Mode Sweep M1[1] D2[1]	(₩) 2.76 dBm 2.47883140 GHz 0.03 dB	Date: 23.FEB.2024 10	259:12			
Channel Separ	d8 e RBW 300 HHz ms e VBW 300 HHz ms e VBW 300 HHz M1[1] D2[1] 02 A 02 A 02 A 02 A 02 A 02 A 02 A 02	2.76 dBm 2.47883140 GHz 0.03 dB 1.01158 MHz	Date: 23.FEB.2024 10	259:12			
Channel Separ rectrum off.set 24.30 def.set 30.00 dBm Off.set 24.30 vit Max swr dBm dBm dBm dBm	dB = RBW 300 HHz ms = VBW 300 HHz M1[1] D2[1] 02 A 0 A 0 A 0 A 0 0 A 0 A 0 0 A A A A A A A A A A A A A	2.76 dBm 2.47883140 045 0.03 dB 1.01158 MHz	Date: 23.FEB.2024 10	259:12			
Description Offset 24.30 tef Level 30.00 dlm Offset 24.30 tt 20 dll is SWT 5 Pk Max dllm 5 dllm dllm 1	dB = RBW 300 HHz ms = VBW 300 HHz M1[1] D2[1] 02 A 0 A 0 A 0 A 0 0 A 0 A 0 0 A A A A A A A A A A A A A	2.76 dBm 2.47883140 045 0.03 dB 1.01158 MHz	Date: 23.FEB.2024 10	:59:12			



Dwell Time



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.

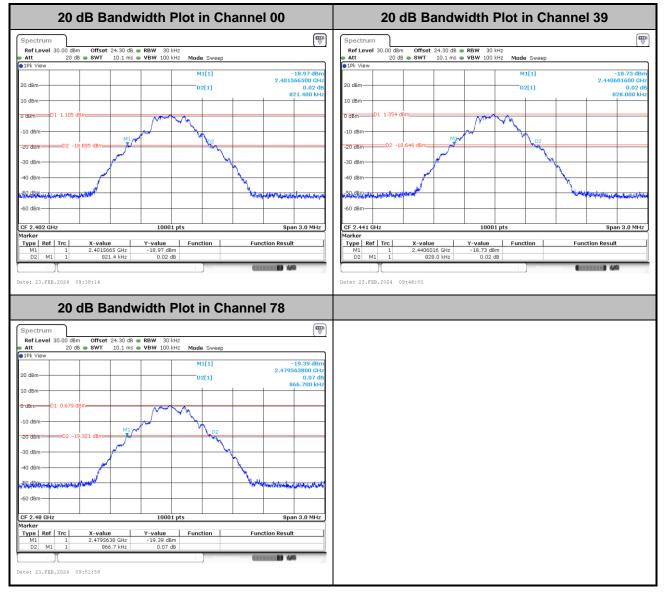
2. In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels. With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4×20) (s), Hops Over Occupancy Time comes to $(800 / 6 / 20) \times (0.4 \times 20) = 53.33$ hops.

3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time



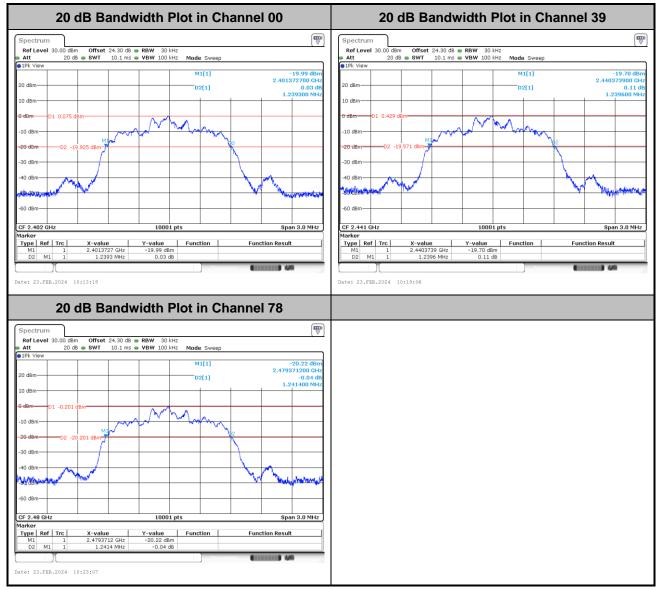
20dB Bandwidth

<1Mbps>



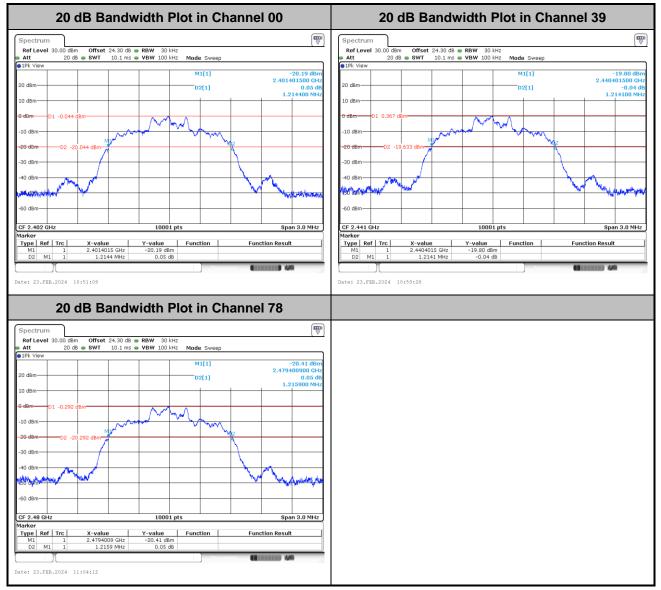


<2Mbps>





<3Mbps>

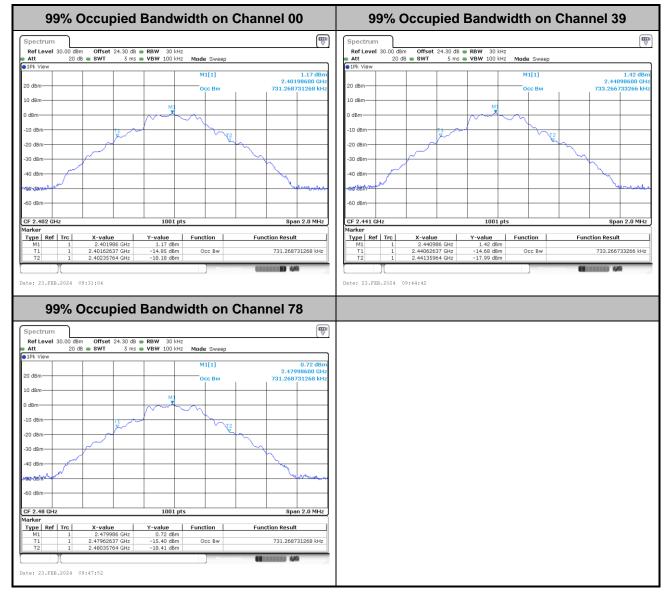






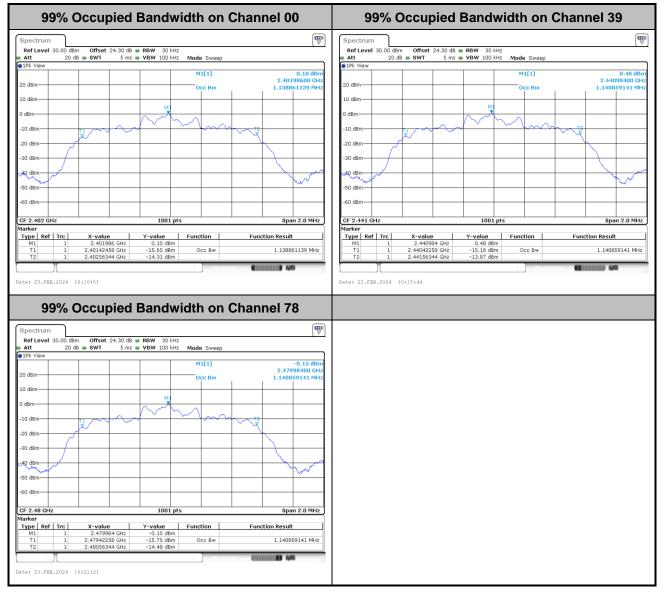
99% Occupied Bandwidth

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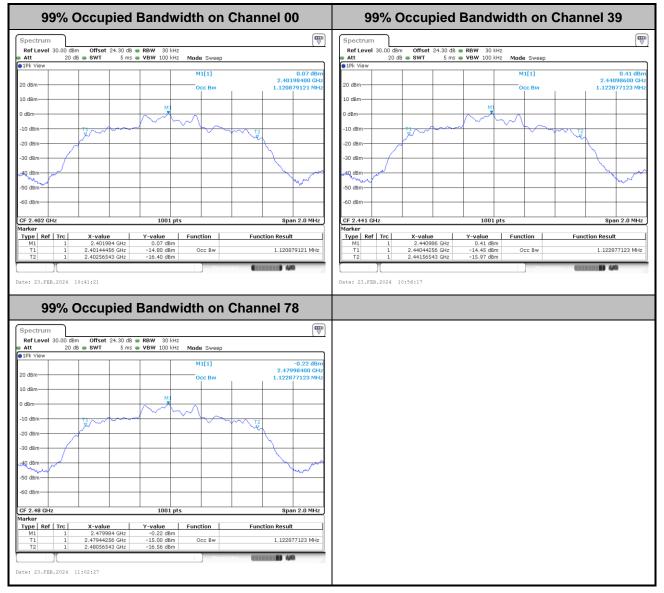


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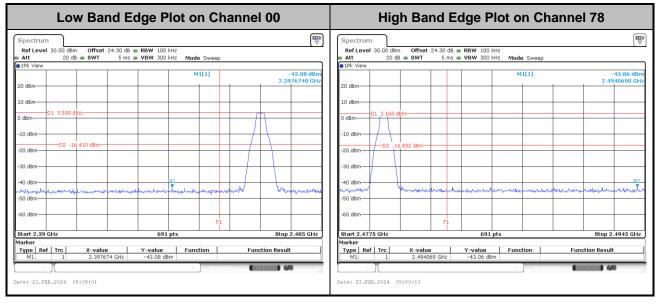
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Band Edges

<1Mbps>



<2Mbps>

Low Band E	dge Plot on Char	nnel 00	High Band Edge Plot on Channel 78
Spectrum Ref Level 30.00 dBm Offset 24.30 dB Att 20 dB SWT 5 ms	RBW 100 kHz VBW 300 kHz Mode Sweep		Spectrum Image: Constraint of the second secon
1Pk View			IPk View
20 dBm	M1[1]	-43.13 dBm 2.3991280 GHz	20 dBm 41[1] -42.57 dBn 2.4891000 CH:
10 dBm			10 dBm
0 dBm-01 2.777 dBm-01 2.777 dBm-01 2.777 dBm-01 0 dBm-01			0 dBm 01 2,570 dBm 0
-10 dBm D2 -17,223 dBm			-10 dBm
-20 dBm			-20 dBm
-40 dBm	and the second second build	N Junimerson	
-50 dBm			-50 d8m-
-60 dBm-	F1		-60 d8m
Start 2.39 GHz	691 pts	Stop 2.405 GHz	Start 2.4775 GHz 691 pts Stop 2.4945 GHz
Marker			Marker
Type Ref Trc X-value M1 1 2.399128 GHz	-43.13 dBm	Function Result	Type Ref Trc X-value Y-value Function Function Result M1 1 2.4891 GHz -42.57 dBm -42.57 dBm -42.57 dBm
	Measuring.	G	
Date: 23.FEB.2024 10:12:57			Date: 23.FEB.2024 10:22:50



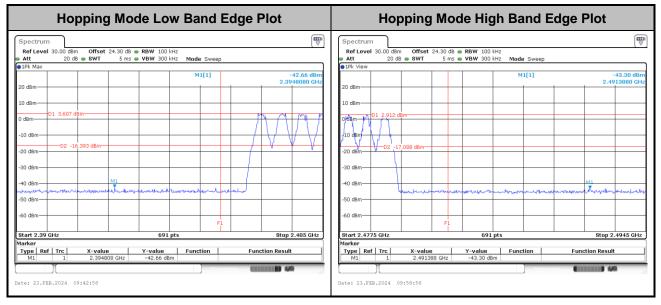
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Low Ba	nd Edge Plot o	n Channel 0	Hi	gh Band	Edge Pl	lot on Ch	annel 78	
Spectrum Ref Level 30.00 dBm Offse	24.30 dB 🖷 RBW 100 kHz			Spectrum Ref Level 30.00 d	Bm Offset 24.30	dB 👄 RBW 100 kł	12	
Att 20 dB SWT	5 ms 🖷 VBW 300 kHz Mod	e Sweep		Att 20	dB 🖷 SWT 5	ms 🖷 VBW 300 kH	z Mode Sweep	
1Pk View				1Pk View				
20 d8m	M	1(1)	-42.72 dBm 2.3976300 GHz	20 d8m			M1[1]	-43.27 di 2.4944880 G
20 0Bm				20 0811				
10 dBm				10 dBm				
0 dBm D1 2.906 dBm				0 dBm D1 2.669	dBm			
-10 dBm				-10 dBm				
-20 dBm-D2 -17.094 dBm-				-20 dBm D2 -	17.331 dBm			
-30 dBm			In	-30 dBm	h			
-40 dBm	male how where he have he	august a for the second of the	werd with a stronger	-40 dBhan	Lauran	madreename	workensteine	Uleran-ismeras prescharter and a series
-50 dBm				-50 dBm				
-60 dBm		F1		-60 dBm	F	1		
Start 2.39 GHz	691 pts		Stop 2.405 GHz	Start 2.4775 GHz		691 p	ts	Stop 2.4945 GF
Marker				Marker				
Type Ref Trc X-val M1 1 2.39	1e Y-value Fund 763 GHz -42.72 dBm	tion Function	Result	Type Ref Trc M1 1	X-value 2.494488 GH:	Y-value -43.27 dBm	Function	Function Result
		Measuring	ID 4/4				Measur	ina (11111) 4/8
Date: 23.FEB.2024 10:49:12				Date: 23.FEB.2024	11:03:56			



Hopping Mode Band Edges

<1Mbps>



<2Mbps>

Hopping Mod	le Low Band Edge Plot		Hopping Mode High Band Edge Plot
Spectrum Ref Level 30.00 dBm Offset 24.30 dB Att 20 dB SWT 5 ms	RBW 100 kHz VBW 300 kHz Mode Sweep		Spectrum RefLevel 30.00 dBm Offset 24.30 dB RBW 100 kHz Att 20 dB SWT 5 ms VBW 300 kHz
• 1Pk View	-		IPk View
20 dBm		3.01 dBm 8890 GHz	20 dBm
10 dBm			10 dBm
0 dBm 01 2.451 dBm	A AL MARINE	atre of	012,501 dBm
-10 dBm D2 -17.549 dBm			-10 dBm
-30 dBm			-20 dem-
-40 dBm	www.winder.org		-40 dBm M3
-50 dBm			-50 dBm
-60 dBm	F1		-60 dBm - F1
Start 2.39 GHz	691 pts Stop 2.		Start 2.4775 GHz 691 pts Stop 2.4945
Marker Type Ref Trc X-value M1 1 2.399889 GHz	Y-value Function Function Result		Marker Ype Ref Trc X-value Y-value Function Function Result M1 1 2.483958 GHz -43.32 dBm -43
	Measuring		Messining.
Date: 23.FEB.2024 10:14:49		D	Date: 23.FEB.2024 10:32:25



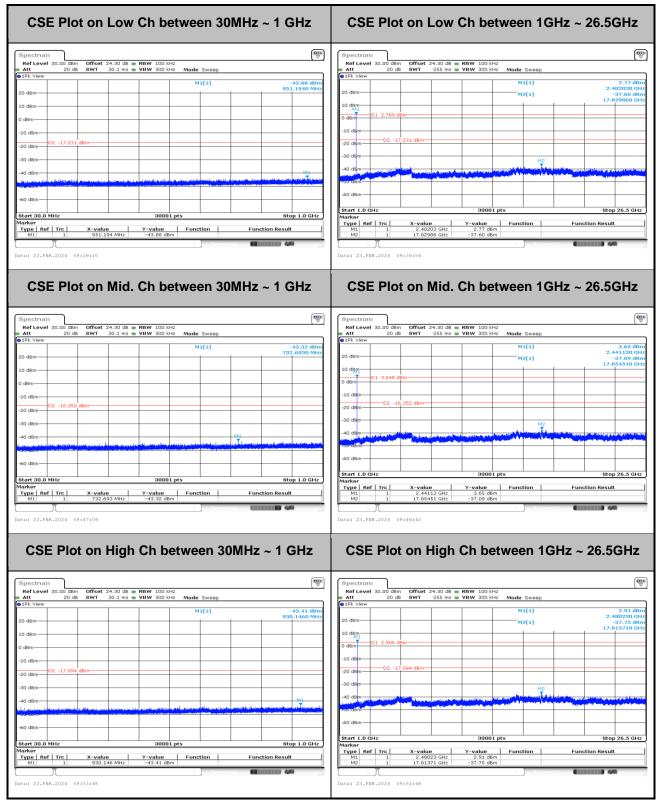
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Hopping M	lode Low Band E	dge Plot	Нор	ping Mode High Band E	dge Plot
Spectrum Ref Level 30.00 dBm Offset 24.3	0 dB 🖷 RBW 100 kHz		Spectrum Ref Level 30.00 dBm	Offset 24.30 dB RBW 100 kHz	
	5 ms - VBW 300 kHz Mode Sweep			SWT 5 ms VBW 300 kHz Mode Sweep	
1Pk Max			1Pk Max		
22.45	M1[1]	-42.94 dBm 2.3963280 GHz	22 /b -	M1[1]	-43.24 dBm 2.4858520 GHz
20 dBm			20 dBm		
10 dBm			10 dBm		
0 dBm 01 2.763 dBm		Martana	0.00 dBr D1 2.000 dBr	m	
-10 dBm			-10 dBm		
-20 dBm			-20 dBm D2 -18.0	000 dBm	
-30 dBm			-30 dBm		
-40 dBm	M1	hul	-40 dBm	Manaharan mon market and the market and the second se	- martine - martine -
-50 dBm			-50 dBm		
-60 dBm	F1		-60 dBm	F1	
Start 2.39 GHz	691 pts	Stop 2.405 GHz	Start 2.4775 GHz	691 pts	Stop 2.4945 GHz
Marker	031 (0	otop 21100 dite	Marker	051 pts	
Type Ref Trc X-value M1 1 2.396328 GF	Y-value Function	Function Result	Type Ref Trc M1 1	X-value Y-value Function 2.485852 GHz -43.24 dBm	Function Result
	Measu	199- (IIIII) 4/4 //		Measurin	(
Date: 23.FEB.2024 10:54:44			Date: 23.FEB.2024 11:	:06:06	



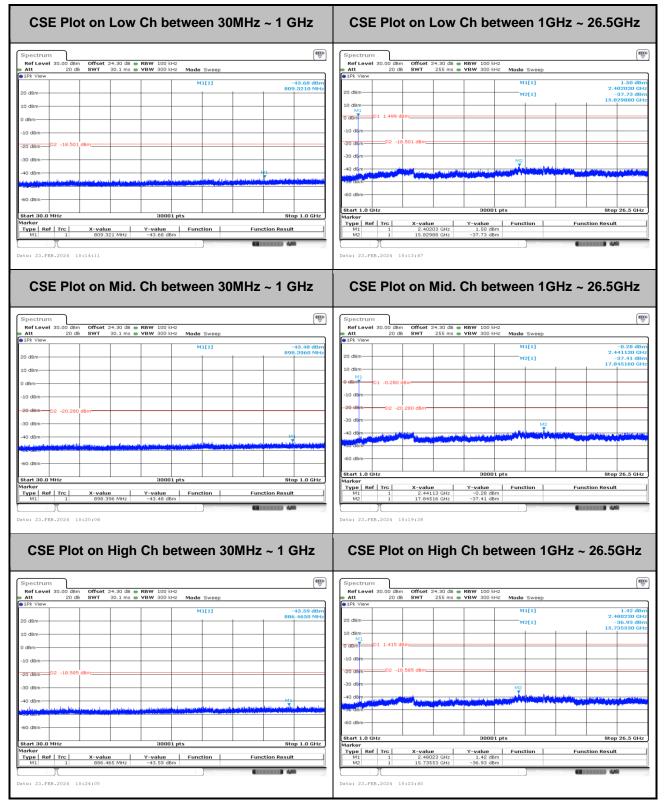
Conducted Spurious Emission

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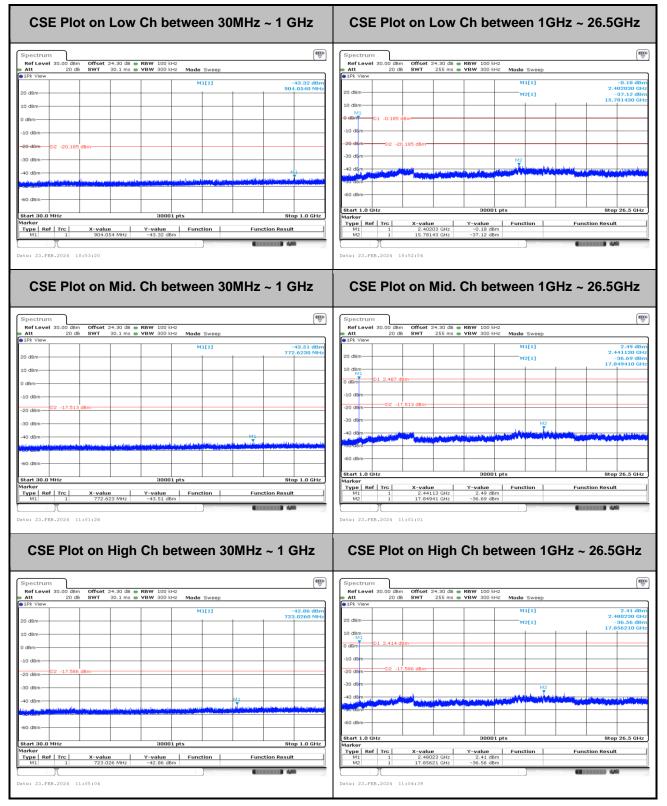


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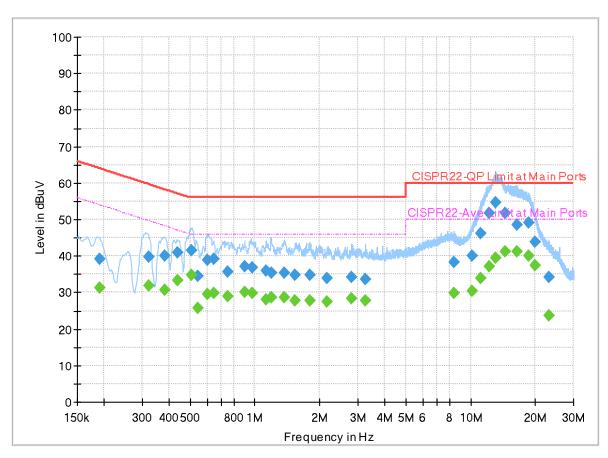


Appendix B. AC Conducted Emission Test Results

Test Engineer : Lo		Temperature :	18.8~24.2℃
Test Engineer.		Relative Humidity :	50.2~60.4%

EUT Information

Report NO : Test Mode : Test Voltage : Phase : 3D2701 Mode 2 120Vac/60Hz Line



FullSpectrum

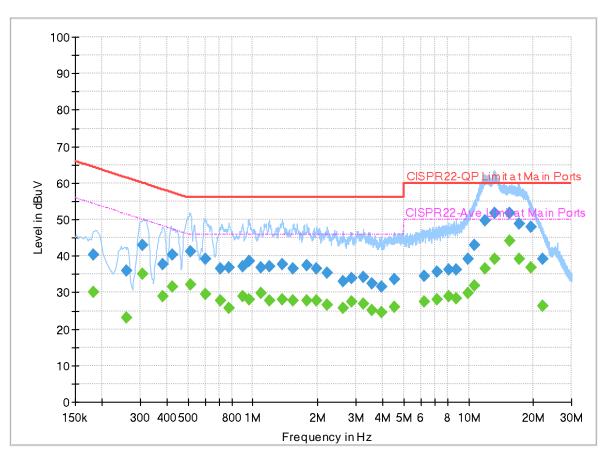
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.189960		31.28	54.04	22.76	L1	OFF	19.9
0.189960	39.15		64.04	24.89	L1	OFF	19.9
0.320010		31.78	49.71	17.93	L1	OFF	19.9
0.320010	39.82		59.71	19.89	L1	OFF	19.9
0.382290		30.61	48.23	17.62	L1	OFF	19.9
0.382290	40.02		58.23	18.21	L1	OFF	19.9
0.435660		33.36	47.14	13.78	L1	OFF	19.9
0.435660	40.83		57.14	16.31	L1	OFF	19.9
0.505500		34.90	46.00	11.10	L1	OFF	19.9
0.505500	41.48		56.00	14.52	L1	OFF	19.9
0.541500		25.76	46.00	20.24	L1	OFF	19.9
0.541500	34.38		56.00	21.62	L1	OFF	19.9
0.602430		29.51	46.00	16.49	L1	OFF	19.9
0.602430	38.78		56.00	17.22	L1	OFF	19.9
0.644370		29.86	46.00	16.14	L1	OFF	19.9
0.644370	39.11		56.00	16.89	L1	OFF	19.9
0.744090		28.84	46.00	17.16	L1	OFF	19.9
0.744090	35.81		56.00	20.19	L1	OFF	19.9
0.899250		30.11	46.00	15.89	L1	OFF	19.9

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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							Q • • •	
1.128750 35.92 56.00 20.08 L1 OFF 20.0 1.191570 28.64 46.00 17.36 L1 OFF 20.0 1.364370 28.58 46.00 17.42 L1 OFF 20.0 1.364370 28.58 46.00 17.42 L1 OFF 20.0 1.541760 27.85 46.00 18.15 L1 OFF 20.0 1.792590 27.88 46.00 18.12 L1 OFF 20.0 1.792590 27.40 46.00 18.60 L1 OFF 20.0 2.169690 28.00 21.15 L1 OFF 20.0 2.810850 28.00 17.53 L1 OFF 20.0 3.258780 27.80 46.00 18.20 L1 OFF 20.0 3.258780 29.88 50.00 <td></td> <td>36.90</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>		36.90					-	
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2.810850 28.47 46.00 17.53 L1 OFF 20.0 2.810850 34.26 56.00 21.74 L1 OFF 20.0 3.258780 27.80 46.00 18.20 L1 OFF 20.0 3.258780 33.68 56.00 22.32 L1 OFF 20.0 8.380500 29.88 50.00 20.12 L1 OFF 20.0 8.380500 38.25 60.00 21.75 L1 OFF 20.0 10.132170 30.44 50.00 19.56 L1 OFF 20.1 11.184000 33.78 50.00 16.22 L1 OFF 20.1 11.184000 46.27 60.00 13.73 L1 OFF 20.1 12.146190 51.61 60.00 8.39 L1 OFF 20.1 13.082550			27.40				-	
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3.258780 27.80 46.00 18.20 L1 OFF 20.0 3.258780 33.68 56.00 22.32 L1 OFF 20.0 8.380500 29.88 50.00 20.12 L1 OFF 20.0 8.380500 38.25 60.00 21.75 L1 OFF 20.0 10.132170 30.44 50.00 19.56 L1 OFF 20.1 11.184000 33.78 50.00 16.22 L1 OFF 20.1 11.184000 46.27 60.00 13.73 L1 OFF 20.1 12.146190 37.14 50.00 12.86 L1 OFF 20.1 13.082550 39.34 50.00 10.66 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 14.463060 -			28.47				-	
3.258780 33.68 56.00 22.32 L1 OFF 20.0 8.380500 29.88 50.00 20.12 L1 OFF 20.0 8.380500 38.25 60.00 21.75 L1 OFF 20.0 10.132170 30.44 50.00 19.56 L1 OFF 20.1 10.132170 40.03 60.00 19.97 L1 OFF 20.1 11.184000 33.78 50.00 16.22 L1 OFF 20.1 11.184000 46.27 60.00 13.73 L1 OFF 20.1 12.146190 37.14 50.00 12.86 L1 OFF 20.1 13.082550 39.34 50.00 10.66 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 14.463060		34.26					-	
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10.132170 40.03 60.00 19.97 L1 OFF 20.1 11.184000 33.78 50.00 16.22 L1 OFF 20.1 11.184000 46.27 60.00 13.73 L1 OFF 20.1 12.146190 37.14 50.00 12.86 L1 OFF 20.1 12.146190 37.14 50.00 12.86 L1 OFF 20.1 13.082550 39.34 50.00 10.66 L1 OFF 20.1 13.082550 54.56 60.00 5.44 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 <td< td=""><td></td><td>38.25</td><td></td><td></td><td>-</td><td></td><td>-</td><td></td></td<>		38.25			-		-	
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12.146190 37.14 50.00 12.86 L1 OFF 20.1 12.146190 51.61 60.00 8.39 L1 OFF 20.1 13.082550 39.34 50.00 10.66 L1 OFF 20.1 13.082550 54.56 60.00 5.44 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 14.463060 51.85 60.00 8.15 L1 OFF 20.1 16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43	11.184000		33.78	50.00	16.22		-	-
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13.082550 54.56 60.00 5.44 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 14.463060 51.85 60.00 8.15 L1 OFF 20.1 16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	12.146190	51.61			8.39	L1	OFF	20.1
13.082550 54.56 60.00 5.44 L1 OFF 20.1 14.463060 41.30 50.00 8.70 L1 OFF 20.1 14.463060 51.85 60.00 8.15 L1 OFF 20.1 16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	13.082550		39.34	50.00	10.66	L1	OFF	20.1
14.463060 51.85 60.00 8.15 L1 OFF 20.1 16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	13.082550	54.56			5.44	L1	OFF	20.1
16.364040 41.20 50.00 8.80 L1 OFF 20.1 16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	14.463060		41.30	50.00	8.70	L1	OFF	20.1
16.364040 48.60 60.00 11.40 L1 OFF 20.1 18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	14.463060	51.85		60.00	8.15	L1	OFF	20.1
18.521250 40.09 50.00 9.91 L1 OFF 20.1 18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	16.364040		41.20	50.00	8.80		OFF	20.1
18.521250 49.09 60.00 10.91 L1 OFF 20.1 19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	16.364040	48.60		60.00	11.40	L1	OFF	20.1
19.965750 37.48 50.00 12.52 L1 OFF 20.1 19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	18.521250		40.09	50.00	9.91	L1	OFF	20.1
19.965750 43.88 60.00 16.12 L1 OFF 20.1 23.193060 23.76 50.00 26.24 L1 OFF 20.2	18.521250	49.09		60.00	10.91	L1	OFF	20.1
23.193060 23.76 50.00 26.24 L1 OFF 20.2	19.965750		37.48	50.00	12.52	L1	OFF	20.1
	19.965750	43.88		60.00	16.12	L1	OFF	20.1
23.193060 34.29 60.00 25.71 L1 OFF 20.2	23.193060		23.76	50.00	26.24	L1	OFF	20.2
	23.193060	34.29		60.00	25.71	L1	OFF	20.2

EUT Information

Report NO : Test Mode : Test Voltage : Phase : 3D2701 Mode 2 120Vac/60Hz Neutral



Full Spectrum

Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.182760	40.27		64.36	24.09	Ν	OFF	19.9
0.182760		30.10	54.36	24.26	Ν	OFF	19.9
0.260430	36.07		61.42	25.35	Ν	OFF	19.9
0.260430		23.09	51.42	28.33	Ν	OFF	19.9
0.309210	42.92		59.99	17.07	Ν	OFF	19.9
0.309210		35.08	49.99	14.91	Ν	OFF	19.9
0.381930	37.70		58.24	20.54	Ν	OFF	19.9
0.381930		28.93	48.24	19.31	Ν	OFF	19.9
0.424500	40.47		57.36	16.89	Ν	OFF	19.9
0.424500		31.60	47.36	15.76	Ν	OFF	19.9
0.512700	41.14		56.00	14.86	Ν	OFF	19.9
0.512700		32.17	46.00	13.83	Ν	OFF	19.9
0.604500	39.19		56.00	16.81	Ν	OFF	19.9
0.604500		29.49	46.00	16.51	Ν	OFF	19.9
0.710250	36.63		56.00	19.37	Ν	OFF	19.9
0.710250		27.70	46.00	18.30	Ν	OFF	19.9
0.774420	36.84		56.00	19.16	Ν	OFF	19.9
0.774420		25.71	46.00	20.29	Ν	OFF	19.9
0.899250	37.11		56.00	18.89	Ν	OFF	19.9

						1	
0.899250		29.04	46.00	16.96	Ν	OFF	19.9
0.955500	38.50		56.00	17.50	Ν	OFF	19.9
0.955500		28.02	46.00	17.98	Ν	OFF	19.9
1.084470	36.96		56.00	19.04	Ν	OFF	20.0
1.084470		29.71	46.00	16.29	Ν	OFF	20.0
1.191480	37.12		56.00	18.88	Ν	OFF	20.0
1.191480		27.67	46.00	18.33	Ν	OFF	20.0
1.364280	37.69		56.00	18.31	Ν	OFF	20.0
1.364280		28.13	46.00	17.87	Ν	OFF	20.0
1.538250	36.58		56.00	19.42	Ν	OFF	20.0
1.538250		27.92	46.00	18.08	Ν	OFF	20.0
1.782960	37.34		56.00	18.66	Ν	OFF	20.0
1.782960		27.89	46.00	18.11	Ν	OFF	20.0
1.964220	36.63		56.00	19.37	Ν	OFF	20.0
1.964220		27.68	46.00	18.32	Ν	OFF	20.0
2.211000	35.51		56.00	20.49	N	OFF	20.0
2.211000		26.58	46.00	19.42	N	OFF	20.0
2.628150	33.16		56.00	22.84	N	OFF	20.0
2.628150		25.86	46.00	20.14	N	OFF	20.0
2.867820	33.96		56.00	22.04	N	OFF	20.0
2.867820		27.49	46.00	18.51	N	OFF	20.0
3.255990	34.24		56.00	21.76	N	OFF	20.0
3.255990		26.95	46.00	19.05	N	OFF	20.0
3.576750	32.57		56.00	23.43	N	OFF	20.0
3.576750	52.57	25.27	46.00	20.73	N	OFF	20.0
3.948000	31.45		56.00	20.73	N	OFF	20.0
3.948000		24.53	46.00	24.55	N	OFF	20.0
			56.00			OFF	
4.530750	33.51			22.49	N		20.0
4.530750		26.07	46.00	19.93	N	OFF	20.0
6.216000	34.44		60.00	25.56	N	OFF	20.0
6.216000		27.36	50.00	22.64	N	OFF	20.0
7.104750	35.80		60.00	24.20	N	OFF	20.0
7.104750		28.00	50.00	22.00	N	OFF	20.0
8.117160	36.22		60.00	23.78	N	OFF	20.0
8.117160		28.86	50.00	21.14	Ν	OFF	20.0
8.751300	36.24		60.00	23.76	Ν	OFF	20.0
8.751300		28.47	50.00	21.53	Ν	OFF	20.0
9.891330	39.20		60.00	20.80	Ν	OFF	20.0
9.891330		29.83	50.00	20.17	Ν	OFF	20.0
10.672080	43.04		60.00	16.96	Ν	OFF	20.1
10.672080		31.96	50.00	18.04	Ν	OFF	20.1
11.915430	49.72		60.00	10.28	Ν	OFF	20.1
11.915430		36.56	50.00	13.44	Ν	OFF	20.1
13.184250	51.82		60.00	8.18	Ν	OFF	20.1
13.184250		39.29	50.00	10.71	Ν	OFF	20.1
15.508950	51.63		60.00	8.37	Ν	OFF	20.1
15.508950		44.19	50.00	5.81	Ν	OFF	20.1
17.164500	48.84		60.00	11.16	Ν	OFF	20.2
17.164500		39.13	50.00	10.87	Ν	OFF	20.2
19.502250	48.05		60.00	11.95	Ν	OFF	20.2
19.502250		36.86	50.00	13.14	Ν	OFF	20.2
22.092630	39.11		60.00	20.89	Ν	OFF	20.2
22.092630		26.27	50.00	23.73	Ν	OFF	20.2



Appendix C. Radiated Spurious Emission

Test Engineer :	BANK Lin, Ken Kuo and Lucifer Jiang	Temperature :	20~23°C
lest Engineer .		Relative Humidity :	42~55%

<Sample 1>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)		(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)		(P/A)	(H/V)
		2370.9	41.07	-32.93	74	37.92	27	8.49	32.34	100	43	Р	Н
		2370.9	16.27	-37.73	54	-	-	-	-	-	-	А	Н
	*	2402	96.72	-	-	93.54	27	8.54	32.36	100	43	Ρ	Н
	*	2402	71.92	-	-	-	-	-	-	-	-	А	Н
вт													Н
СН00													Н
2402MHz		2312.73	41.53	-32.47	74	38.43	27.03	8.38	32.31	304	266	Ρ	V
		2312.73	16.73	-37.27	54	-	-	-	-	-	-	А	V
	*	2402	100.87	-	-	97.69	27	8.54	32.36	304	266	Р	V
	*	2402	76.07	-	-	-	-	-	-	-	-	А	V
													V
													V
		2361.52	41.3	-32.7	74	38.17	27	8.47	32.34	110	44	Р	Н
		2361.52	16.5	-37.5	54	-	-	-	-	-	-	А	Н
	*	2441	97.98	-	-	94.94	26.81	8.61	32.38	110	44	Р	Н
	*	2441	73.18	-	-	-	-	-	-	-	-	А	Н
D.T.		2484.04	41.39	-32.61	74	38.21	26.9	8.69	32.41	110	44	Ρ	Н
ВТ СН 39		2484.04	16.59	-37.41	54	-	-	-	-	-	-	А	Н
СП 39 2441MHz		2346.12	41.62	-32.38	74	38.51	27	8.44	32.33	206	281	Р	V
		2346.12	16.82	-37.18	54	-	-	-	-	-	-	А	V
	*	2441	100.89	-	-	97.85	26.81	8.61	32.38	206	281	Ρ	V
	*	2441	76.09	-	-	-	-	-	-	-	-	А	V
		2489.22	40.84	-33.16	74	37.65	26.9	8.7	32.41	206	281	Р	V
		2489.22	16.04	-37.96	54	-	-	-	-	-	-	А	V

Page Number : C1 of C17



	*	2480	99.16	-	-	95.99	26.9	8.68	32.41	109	46	Р	Н
	*	2480	74.36	-	-	-	-	-	-	-	-	А	Н
		2483.72	42.8	-31.2	74	39.62	26.9	8.69	32.41	109	46	Ρ	Н
		2483.72	18	-36	54	-	-	-	-	-	-	А	Н
вт													н
CH 78													н
2480MHz	*	2480	101.59	-	-	98.42	26.9	8.68	32.41	306	274	Ρ	V
24001112	*	2480	76.79	-	-	-	-	-	-	-	-	А	V
		2483.92	43.74	-30.26	74	40.56	26.9	8.69	32.41	306	274	Р	V
		2483.92	18.94	-35.06	54	-	-	-	-	-	-	А	V
													V
													V
Remark		o other spurious I results are PA		Peak and	Average lin	nit line.							



2.4GHz 2400~2483.5MHz

	r		1	•	BI (Harmo		,,	-	F	-	-	ſ	
BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
			(dBµV/m)		(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)		
		4804	44.76	-29.24	74	32.91	32.32	13.03	33.5	-	-	Р	Н
		4804	19.96	-34.04	54	-	-	-	-	-	-	Α	Н
													Н
													Н
													Н
													Н
													Н
													Н
													Н
													Н
вт													Н
CH 00													н
2402MHz		4804	43.45	-30.55	74	31.6	32.32	13.03	33.5	-	-	Р	V
		4804	18.65	-35.35	54	-	-	-	-	-	-	А	V
													V
													V
													V
													V
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													V
													V

BT (Harmonic @ 3m)



ВТ	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBµV/m)	(dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	
		4882	44.92	-29.08	74	32.78	32.56	13.07	33.49	400	0	Р	Н
		4882	20.12	-33.88	54	-	-	-	-	-	-	А	Н
		7323	49.54	-24.46	74	31.87	37.5	16.02	35.85	400	0	Р	Н
		7323	24.74	-29.26	54	-	-	-	-	-	-	А	Н
													Н
													Н
													Н
													Н
													Н
													Н
вт													Н
CH 39													н
2441MHz		4882	45.23	-28.77	74	33.09	32.56	13.07	33.49	100	0	Р	V
2		4882	20.43	-33.57	54	-	-	-	-	-	-	А	V
		7323	48.81	-25.19	74	31.14	37.5	16.02	35.85	100	0	Р	V
		7323	24.01	-29.99	54	-	-	-	-	-	-	А	V
													V
													V
													V
													V
													V
													V
													V
													V



вт	Not	e Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos		Avg.	
		(MHz)	(dBµV/m)		(dBµV/m)		(dB/m)	(dB)	(dB)	(cm)	(deg)		
		4960	45.24	-28.76	74	32.9	32.7	13.11	33.47	-	-	P	н
		4960	20.44	-33.56	54	-	-	-	-	-	-	A	Н
		7440	49.81	-24.19	74	31.47	37.32	16.15	35.93	-	-	Р	Н
		7440	25.01	-28.99	54	-	-	-	-	-	-	Α	Н
													Н
													Н
													н
													Н
													н
													н
													н
BT													н
CH 78		4960	45.68	-28.32	74	33.34	32.7	13.11	33.47	-	-	Р	V
2480MHz		4960	20.88	-33.12	54	-	-	-	-	_	-	A	V
		7440	49.01	-24.99	74	31.47	37.32	16.15	35.93	-		P	v
		7440	24.21	-29.79	54	-	-	-	-			A	v
		7440	24.21	-29.79	- 54	-	-	-	-	-	-	A	
													V
													V
													V
													V
													V
													V
													V
													V
	1.	No other spuriou	s found.										
Remark		All results are PA											
	3	The emission po	sition marked	l as "-" m	eans no sus	pected em	ission found	d with suf	ficient mar	gin agai	nst limit	line or	noise
	1	floor only.											



Emission above 18GHz

					2.4GHz	ы (эпг)						
BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
	<u> </u>				Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)		(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)		(P/A)	
		24678	33.06	-40.94	74	34.13	39.44	19.63	60.14	-	-	Р	Н
													Н
													Н
													Н
													н
													Н
													н
													Н
													Н
													Н
													н
2.4GHz													
вт													H
SHF		24174	32.32	-41.68	74	34.27	38.75	19.41	60.11	-	-	Р	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
	1. No	o other spurious	s found.								1	1	<u> </u>
		' I results are PA		mit line.									
Remark		e emission pos			eans no susr	pected em	ission found	d with suf	ficient mar	gin agai	inst limit	line or	noise
		or only.			·					- 0			
		- ,											

2.4GHz BT (SHF)



Emission below 1GHz

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		70.23	30.65	-9.35	40	49.31	12.6	1.47	32.73	-	-	Ρ	Н
		89.13	29.75	-13.75	43.5	45.92	14.87	1.69	32.73	-	-	Ρ	Н
		230.61	29.31	-16.69	46	43.12	16.15	2.71	32.67	-	-	Ρ	Н
		760.6	31.69	-14.31	46	31.08	28.3	4.94	32.63	-	-	Ρ	Н
		940.5	34.84	-11.16	46	30.43	30.38	5.52	31.49	-	-	Ρ	Н
		980.4	35.63	-18.37	54	30.4	30.64	5.67	31.08	-	-	Ρ	Н
													Н
													Н
													Н
													Н
2.4GHz													Н
BT													Н
LF		32.7	33.42	-6.58	40	41.59	23.66	0.92	32.75	100	251	Q	V
		40.26	32.34	-7.66	40	44.15	19.87	1.06	32.74	100	302	Q	V
		70.23	33.68	-6.32	40	52.34	12.6	1.47	32.73	-	-	Ρ	V
		813.8	32.35	-13.65	46	31.73	27.88	5.15	32.41	-	-	Ρ	V
		867.7	33.08	-12.92	46	30.6	29.26	5.3	32.08	-	-	Ρ	V
		958	35.23	-10.77	46	29.92	31.06	5.57	31.32	-	-	Ρ	V
													V
													V
													V
													V
													V
													V
	1. No	o other spurious	s found.										
Remark	2. All	results are PA	SS against li	mit line.									
Nemai K	3. Th	e emission pos	sition marked	l as "-" m	ieans no sus	pected err	nission foun	d and em	ission leve	el has a	t least 60	dB ma	rgin
	ag	ainst limit or er	nission is no	ise floor	only.								

2.4GHz BT (LF)



<Sample 2>

2.4GHz 2400~2483.5MHz

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2480	100.95	-	-	97.78	26.9	8.68	32.41	133	13	Ρ	Н
	*	2480	76.16	-	-	-	-	-	-	-	-	А	Н
		2483.64	42.5	-31.5	74	39.32	26.9	8.69	32.41	133	13	Р	Н
		2483.64	17.71	-36.29	54	-	-	-	-	-	-	А	Н
													Н
BT													Н
CH 78 2480MHz	*	2480	97.7	-	-	94.53	26.9	8.68	32.41	387	214	Ρ	V
240010172	*	2480	72.91	-	-	-	-	-	-	-	-	А	V
		2483.52	50.23	-23.77	74	47.05	26.9	8.69	32.41	387	214	Р	V
		2483.52	25.44	-28.56	54	-	-	-	-	-	-	А	V
													V
													V
	1. No	o other spurious	s found.										
Remark		results are PA		Peak and	Average lim	it line.							
	,												

BT (Band Edge @ 3m)



2.4GHz 2400~2483.5MHz

					BT (Harmo		-		[[[1
ВТ	Note	Frequency	Level	Margin		Read	Antenna	Path	Preamp	Ant		Peak	
		(MHz)	(dBµV/m)	(dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	
		4960	45.85	-28.15	74	33.51	32.7	13.11	33.47	-	-	P	H
		4960	21.06	-32.94	54	-	-	-	-	-	-	А	Н
		7440	49.14	-24.86	74	31.6	37.32	16.15	35.93	-	-	Ρ	н
		7440	24.35	-29.65	54	-	-	I	-	-	-	А	Н
													Н
													Н
													н
													Н
													Н
													Н
вт													Н
CH 78													Н
2480MHz		4960	45.96	-28.04	74	33.62	32.7	13.11	33.47	-	-	Р	V
		4960	21.17	-32.83	54	-	-	-	-	-	-	А	V
		7440	49.06	-24.94	74	31.52	37.32	16.15	35.93	-	-	Ρ	V
		7440	24.27	-29.73	54	-	-	-	-	-	-	А	V
													V
													V
													V
													V
													V
													V
													V
													V
		o other spurious		De els ere l	A	it line							
Remark		results are PA e emission pos	-		-		incion four	d with auf	ficiont mar	ain aga	inct limit	line er	noine
		e emission pos or only.	Suon marked	ias - M	eans no sus	pectea em	1551011 10UN	a with SUT	ncient mar	yin aga	inst iimit	ine or	noise
	10	or only.											



Emission above 18GHz

					2.4GHz)						
BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	
		24818	32.08	-41.92	74	32.71	39.54	19.69	59.86	-	-	Р	Н
													Н
													Н
													Н
													Н
													Н
													Н
													Н
													Н
													н
													н
2.4GHz													н
вт		0.4700	00.04	40.00	74	00.0	00.07	40.07	50.00				
SHF		24783	33.01	-40.99	74	33.9	39.37	19.67	59.93	-	-	Р	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
	1. No	o other spuriou	s found.	1	1		1		1	L	I	1	
	2. All	l results are PA	SS against li	mit line.									
Remark	3. Th	e emission pos	sition marked	as "-" m	eans no sus	pected em	ission found	d with suf	ficient mar	gin agai	inst limit	line or	noise
	flo	or only.											
	1												

2.4GHz BT (SHF)



Emission below 1GHz

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)		(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)		(H/V
		54.03	26.64	-13.36	40	45.25	12.84	1.28	32.73	-	-	Р	Н
		70.77	30	-10	40	48.64	12.61	1.48	32.73	-	-	Р	Н
		88.59	32.84	-10.66	43.5	49.08	14.8	1.68	32.72	-	-	Р	н
		213.33	25.7	-17.8	43.5	40.85	14.92	2.6	32.67	-	-	Р	н
		228.18	29.36	-16.64	46	43.46	15.87	2.7	32.67	-	-	Р	н
		996.5	35.9	-18.1	54	30.6	30.45	5.75	30.9	-	-	Р	Н
													н
													Н
													H
													H H
2.4GHz													н
BT		31.62	29.44	-10.56	40	37.12	24.16	0.91	32.75	100	163	Q	v
LF		40.53	26.08	-13.92	40	38.03	19.72	1.07	32.74	100	119	Q	v
		45.93	32.73	-7.27	40	47.43	16.86	1.16	32.72	-	-	Р	V
		71.04	29.34	-10.66	40	47.97	12.62	1.48	32.73	132	360	Q	V
		88.59	35.73	-7.77	43.5	51.97	14.8	1.68	32.72	-	-	Р	V
		970.6	35.79	-18.21	54	30.48	30.86	5.63	31.18	-	-	Р	V
													V
													V
													V
													V
													V
													V
	1. No	o other spurious	s found.										
Remark	2. All	results are PA	SS against li	mit line.									
i vernai K	3. Th	e emission pos	sition marked	l as "-" m	eans no sus	pected em	ission foun	d and em	ission leve	el has at	t least 6o	lB mai	rgin
	ag	ainst limit or er	nission is no	ise floor	only.								

2.4GHz BT (LF)



<Sample 3>

2.4GHz 2400~2483.5MHz

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
_	*	2480	95.52	-	-	92.35	26.9	8.68	32.41	263	47	Р	Н
	*	2480	70.7	-	-	-	-	-	-	-	-	А	Н
		2498.56	41.8	-32.2	74	38.51	26.99	8.72	32.42	263	47	Р	Н
		2498.56	16.98	-37.02	54	-	-	-	-	-	-	А	Н
DT													Н
BT													Н
СП 78 2480MHz -	*	2480	100.87	-	-	97.7	26.9	8.68	32.41	317	235	Р	V
240010112	*	2480	76.05	-	-	-	-	-	-	-	-	А	V
		2483.52	52.04	-21.96	74	48.86	26.9	8.69	32.41	317	235	Р	V
		2483.52	27.22	-26.78	54	-	-	-	-	-	-	А	V
													V
													V
-	1. No	o other spurious	s found.										
Remark		results are PA		Peak and	Average lim	it line							
	,												

BT (Band Edge @ 3m)



2.4GHz 2400~2483.5MHz

		_		Ĩ.	BT (Harmo	ſ	-			_	[
BT	Note	Frequency	Level	Margin		Read	Antenna	Path	Preamp	Ant	Table	1	Pol.
		(MHz)	(dBµV/m)	(dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)
		4960	45.67	-28.33	74	33.33	32.7	13.11	33.47	-	-	Р	Н
		4960	20.85	-33.15	54	-	-	-	-	-	-	А	Н
		7440	49.24	-24.76	74	31.7	37.32	16.15	35.93	-	-	Ρ	Н
		7440	24.42	-29.58	54	-	-	-	-	-	-	А	н
													Н
													Н
													н
													Н
													Н
													Н
вт													Н
CH 78													Н
2480MHz		4960	46.55	-27.45	74	34.21	32.7	13.11	33.47	-	-	Р	V
		4960	21.73	-32.27	54	-	-	-	-	-	-	A	V
		7440	49.04	-24.96	74	31.5	37.32	16.15	35.93	-	-	Р	V
		7440	24.22	-29.78	54	-	-	-	-	-	-	A	V
													V
													V
													V
													V
													V
													V
													V
	1 1	othor couries	found										V
		o other spurious results are PA		Deak and	Average lim	it line							
Remark		e emission pos	-		-		ission found	d with suf	ficient mar	ain adai	inst limit	line or	noise
		or only.								3 494			
		,-											



Emission above 18GHz

					2.4GHz		/						
BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos		Avg.	
		(MHz)	(dBµV/m)		(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)		
		24951	32.7	-41.3	74	33.15	39.4	19.75	59.6	-	-	Р	Н
													Н
													н
													н
													Н
													н
													н
													Н
													н
													Н
2.4GHz													Н
вт													Н
SHF		23838	32.36	-41.64	74	34.65	38.48	19.19	59.96	-	-	Р	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
		o other spurious		,									
Remark		results are PA				<i>,</i> .			.				
		e emission pos	sition marked	l as "-" m	eans no susp	pected em	ission found	d with suf	ticient mar	gin agai	inst limit	line or	noise
	flo	or only.											

2.4GHz BT (SHF)



Emission below 1GHz

вт	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V
		40.26	25.83	-14.17	40	37.64	19.87	1.06	32.74	-	-	Р	Н
		101.82	27.9	-15.6	43.5	42.65	16.16	1.81	32.72	-	-	Р	н
		180.66	22.23	-21.27	43.5	37.51	14.93	2.46	32.67	-	-	Р	Н
		231.96	28.96	-17.04	46	42.59	16.32	2.72	32.67	-	-	Р	Н
		631.8	28.15	-17.85	46	30.14	26.33	4.49	32.81	-	-	Р	Н
		972.7	35.84	-18.16	54	30.53	30.83	5.64	31.16	-	-	Р	н
													н
													Н
													Н
													Н
2.4GHz													Н
BT													Н
LF		33.78	33.29	-6.71	40	42.49	22.98	0.94	32.74	100	354	Q	V
		40.26	32.75	-7.25	40	44.56	19.87	1.06	32.74	100	115	Q	V
		46.2	32.9	-7.1	40	47.73	16.72	1.17	32.72	-	-	Р	V
		99.39	25.09	-18.41	43.5	40.06	15.96	1.79	32.72	-	-	Р	V
		231.96	23.19	-22.81	46	36.82	16.32	2.72	32.67	-	-	Р	V
		967.1	35.65	-18.35	54	30.34	30.92	5.61	31.22	-	-	Р	V
													V
													V
													V
													V
													V
													V
	1. No other spurious found.												
Remark	2. All results are PASS against limit line.												
	3. Th	3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin											
	ag	against limit or emission is noise floor only.											

2.4GHz BT (LF)



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any					
	unwanted emissions shall not exceed the level of the fundamental frequency.					
!	Test result is Margin line.					
P/A	Peak or Average					
H/V	Horizontal or Vertical					



A calculation example for radiated spurious emission is shown as below:

ВТ	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
вт													
CH 00		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	Р	н
2402MHz													

- 1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
- 2. Level(dBµV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

3. Margin (dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- = 32.22(dB/m) + 4.58(dB) + 54.51(dBµV) 35.86 (dB)
- = 55.45 (dBµV/m)
- 2. Margin (dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

Peak measured complies with the limit line, so test result is "PASS".



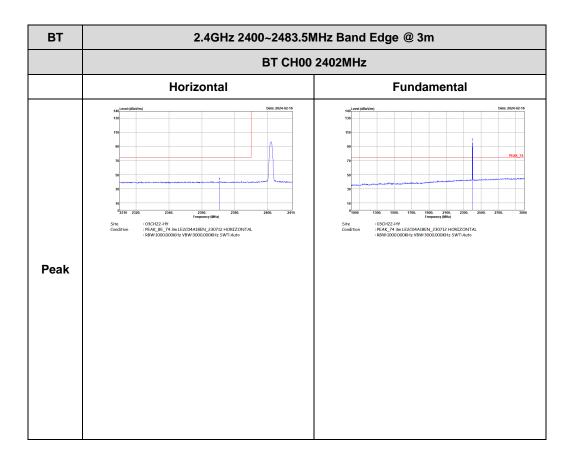
Appendix D. Radiated Spurious Emission Plots

Test Engineer :	BANK Lin, Ken Kuo and Lucifer Jiang	Temperature :	20~23°C
lest Engineer .	BANK LIN, KEN KUU and Lucher Slang	Relative Humidity :	42~55%

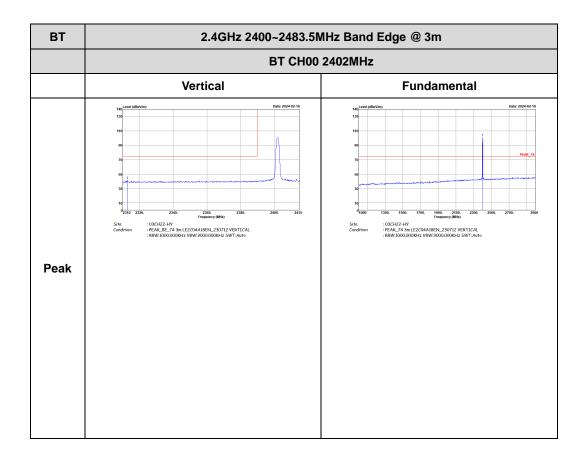
<Sample 1>

2.4GHz 2400~2483.5MHz

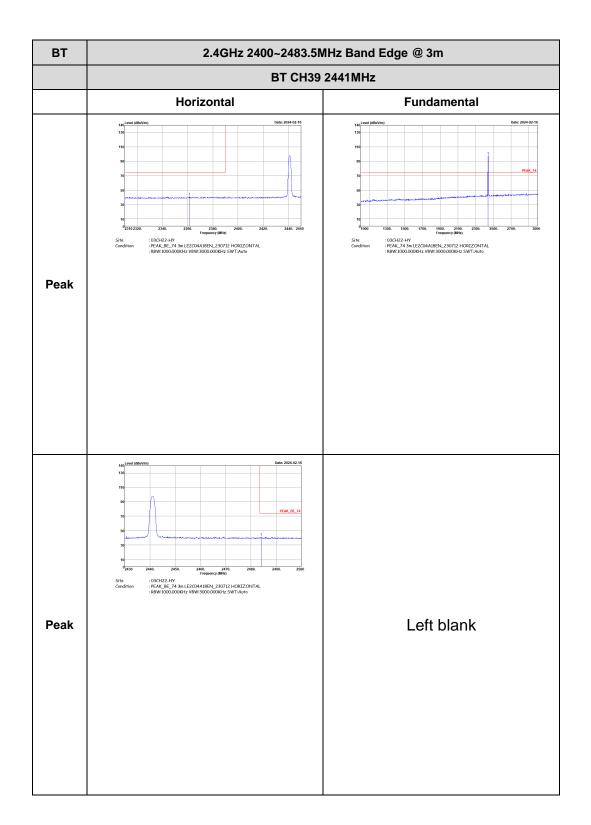
BT (Band Edge @ 3m)



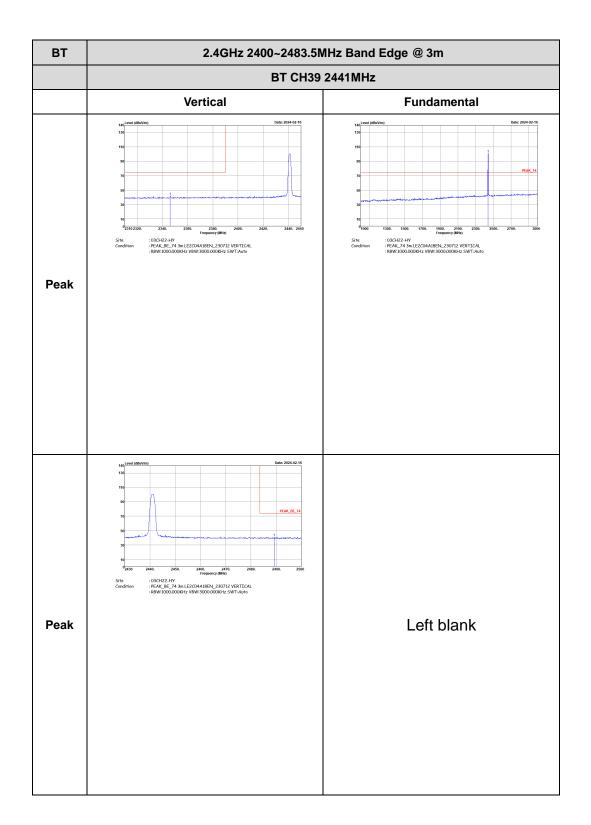




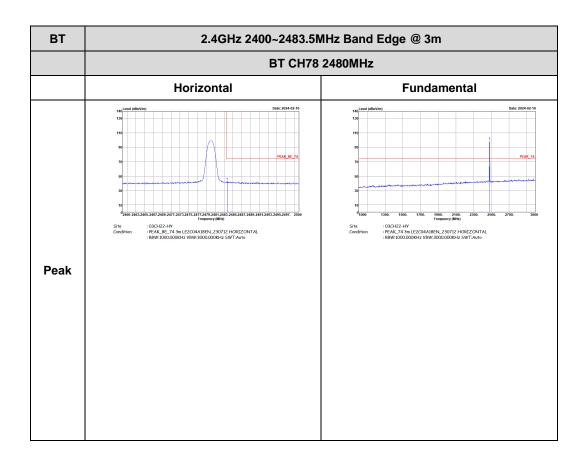




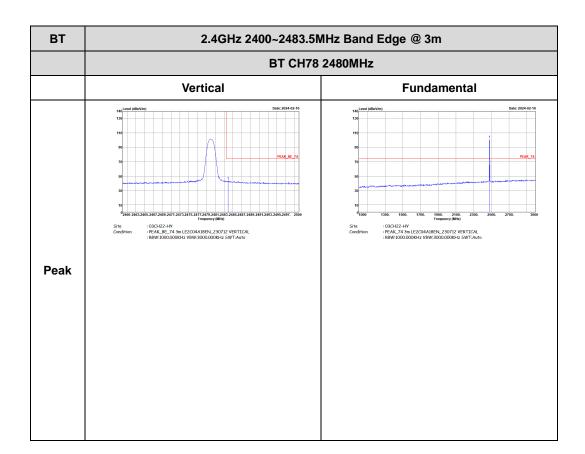






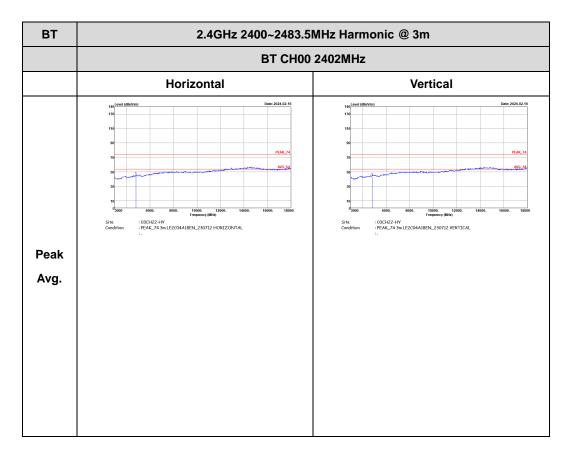






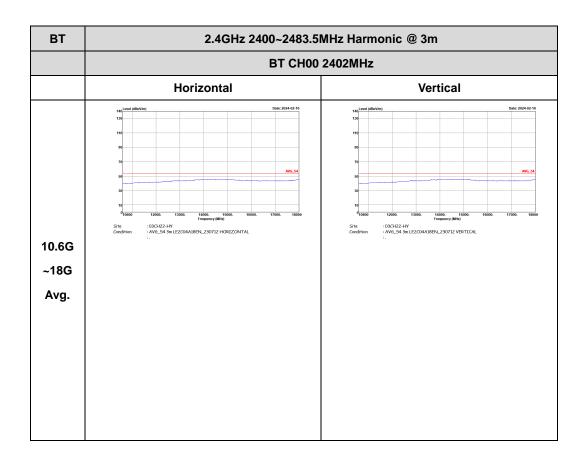


2.4GHz 2400~2483.5MHz

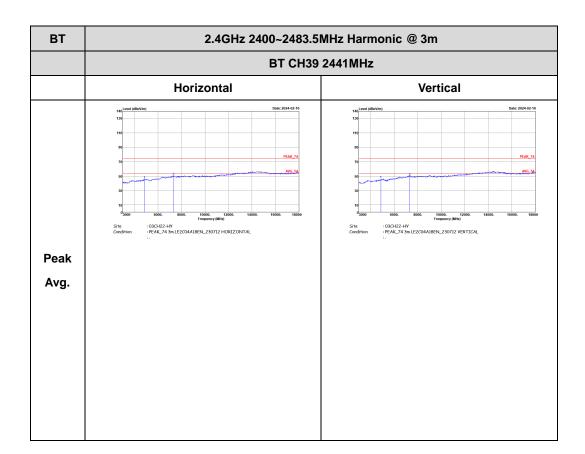


BT (Harmonic @ 3m)

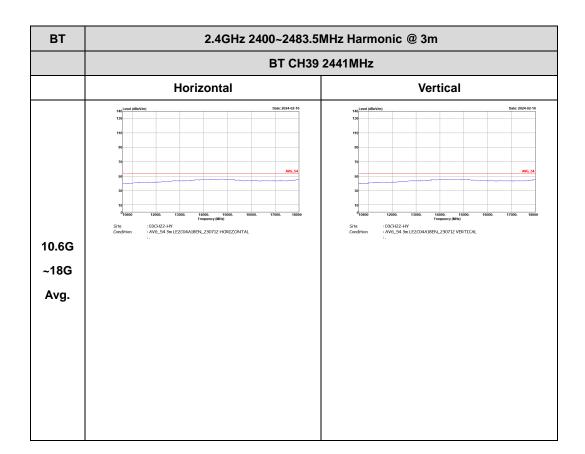




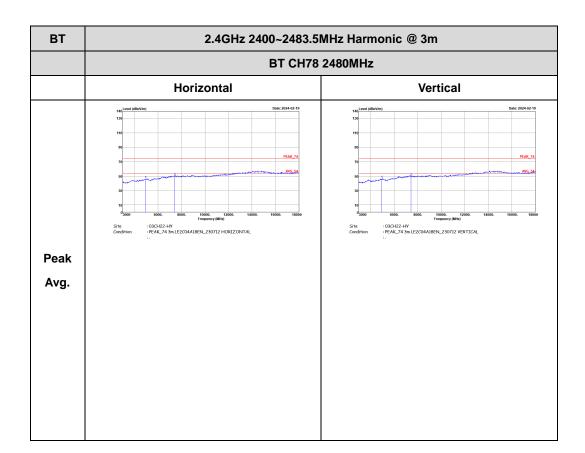




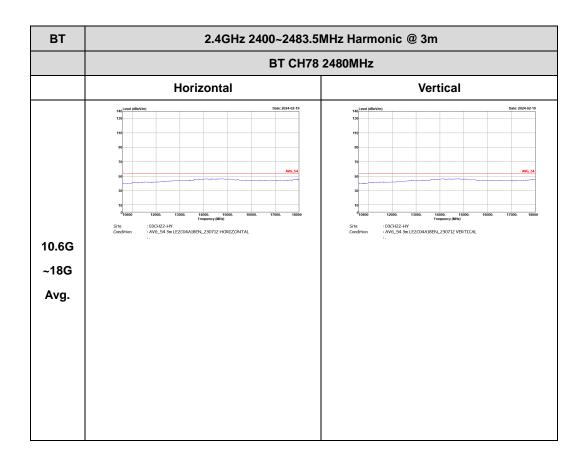






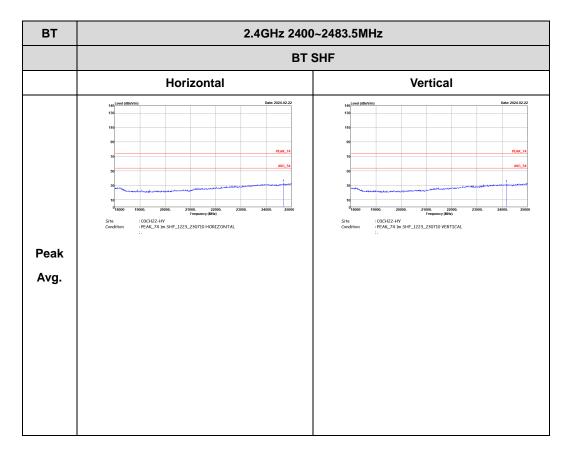








Emission above 18GHz

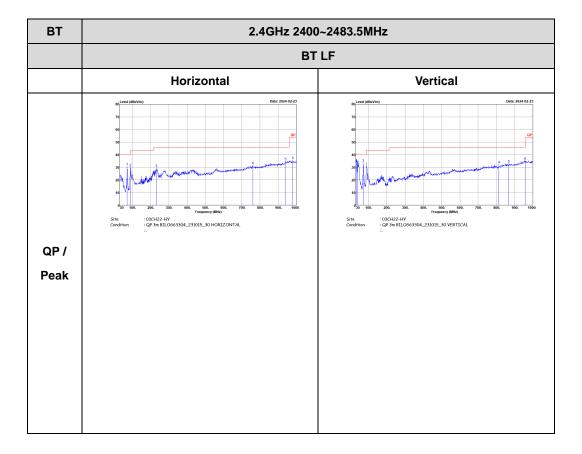


2.4GHz BT (SHF @ 1m)



Emission below 1GHz



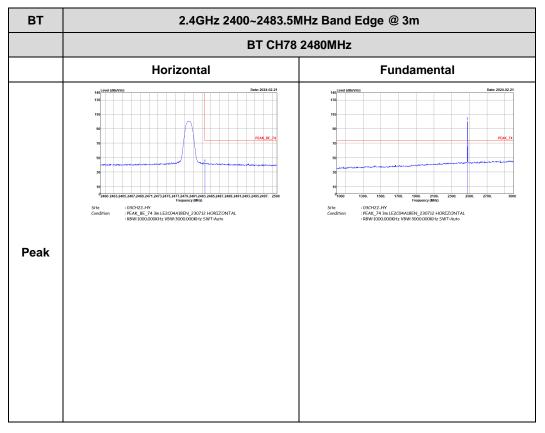




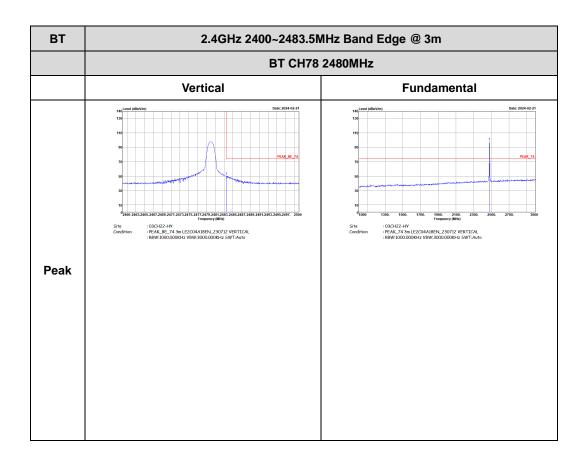
<Sample 2>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

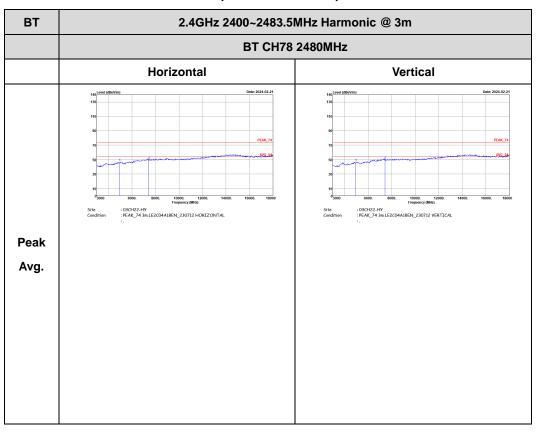






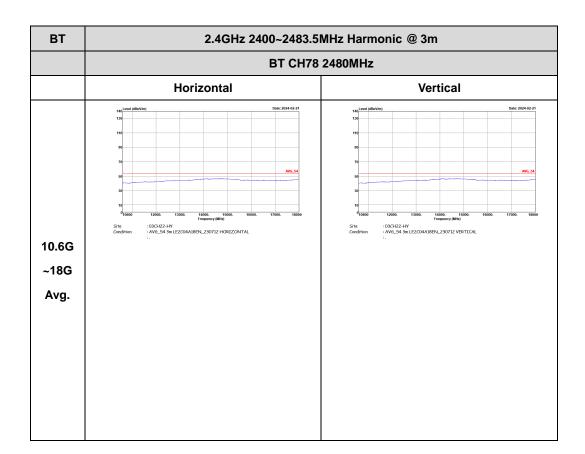


2.4GHz 2400~2483.5MHz



BT (Harmonic @ 3m)

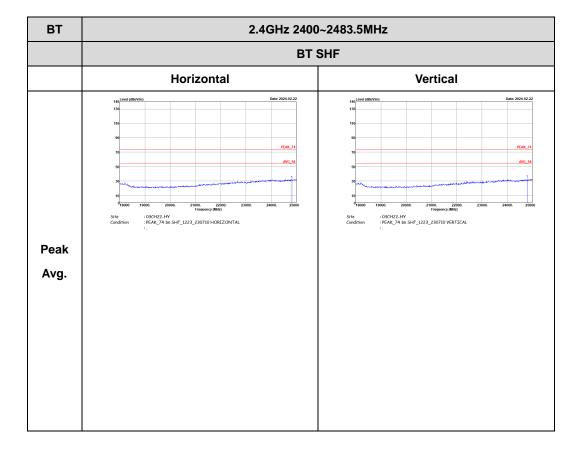






Emission above 18GHz

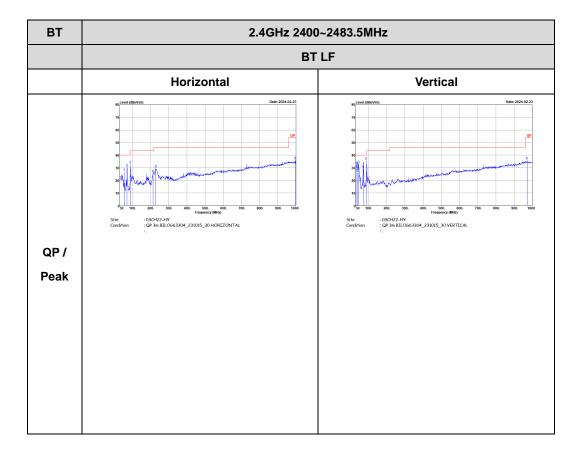
2.4GHz BT (SHF @ 1m)





Emission below 1GHz

2.4GHz BT (LF)

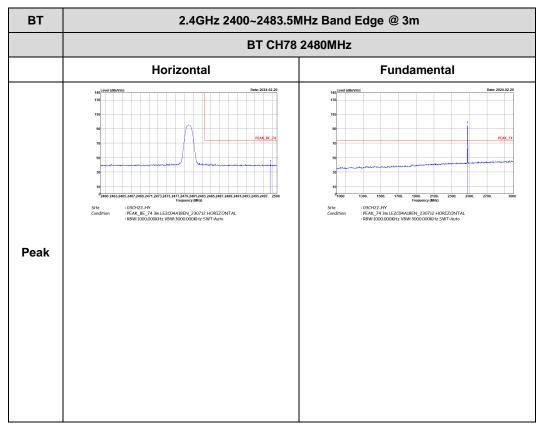




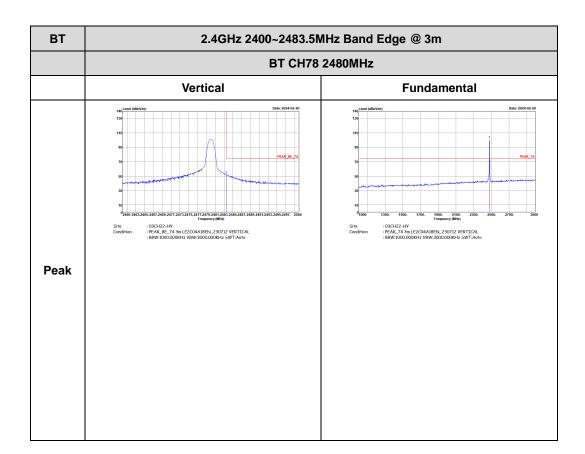
<Sample 3>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

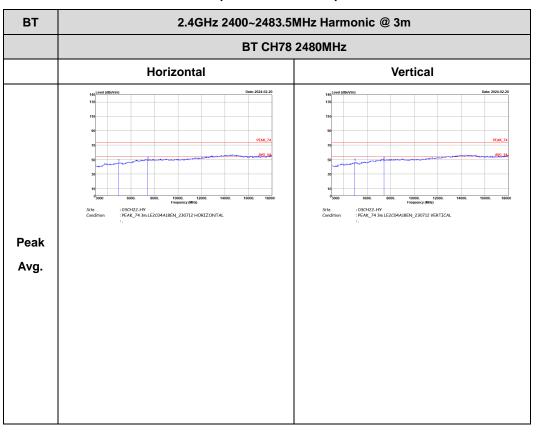






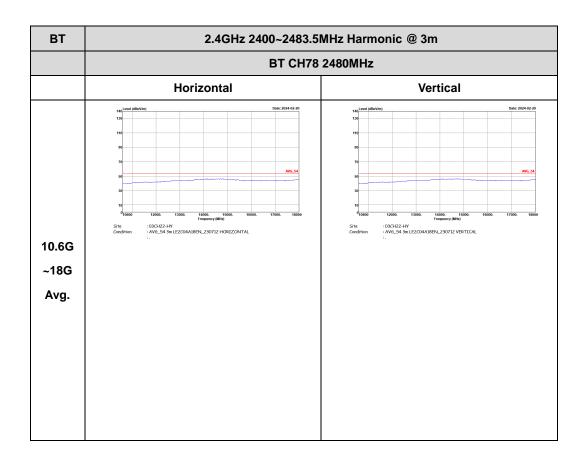


2.4GHz 2400~2483.5MHz



BT (Harmonic @ 3m)

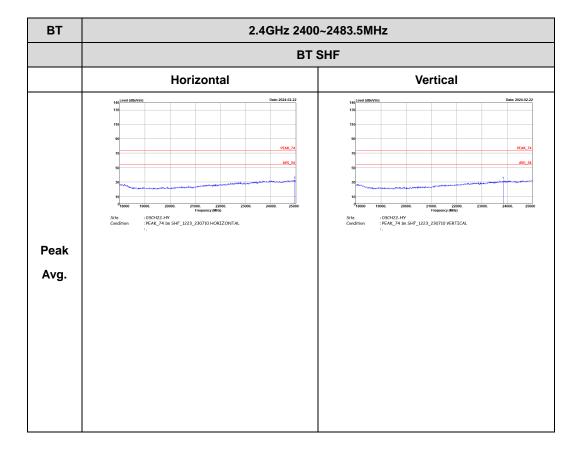






Emission above 18GHz

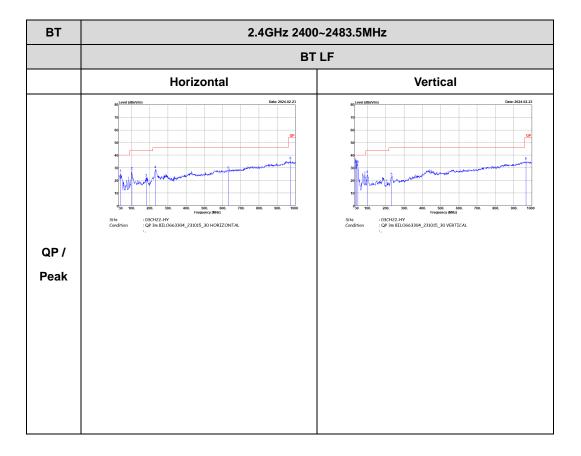
2.4GHz BT (SHF @ 1m)





Emission below 1GHz

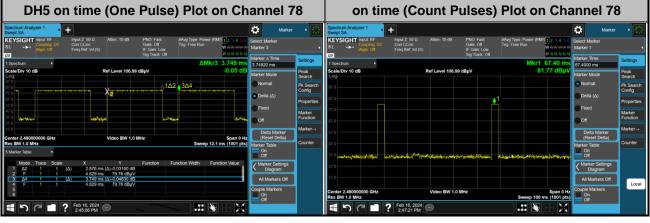
2.4GHz BT (LF)





Appendix E. Duty Cycle Plots

<Sample 1>



Note:

- 1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.876 / 100 = 5.752 %
- 2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.80 dB
- 3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

2.876 ms x 20 channels = 57.52 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100 ms / 57.52 ms] = 2 hops Thus, the maximum possible ON time:

2.876 ms x 2 = 5.752 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

 $20 \times \log(5.752 \text{ ms}/100 \text{ ms}) = -24.80 \text{ dB}$



<Sample 2>

DH5 or	n time (One Pulse	e) Plot on Ch	annel 78	on time (Count Pulses) Plot on Channel 78					
Bendrum Analyzer 1 Bendrum Analyzer 1 Bendrum Analyzer 1 Bendrum Statistics Bendrum Statistic	Ingal 2 50 0 Corr Corr Frag Ref Is(s) Alter: 10 dB PNO Fast Caller: 00 dB Sig Track Off Ref Level 106.99 dBg/V 0 102 0 304 0 102 0 304 0 102 0 304 0 102 0 104 0 104	#Avg Type: Power (HMS) 2 4 5 Trg: Free Run We wave wave We wave wave We wave wave Ø Mit Nin 3.740 ms -0.02 dB Ø Mit Nin 0.02 dB 0.02 dB Ø Mit Nin 4.540 ms -0.02 dB	Proquency Program Center Frequency Center Frequency Secury Secu	Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF R1 Coupting: DC	Propriet to 0 Attern 10 dB Prevo Frad Grade Off Soy Track Off Red Level 106.99 dBpV	#Avg Type Power (RMS 1 2 3 4 5 6	Marker Marker Stelect Marker - Marker Three Stelect Varker Three Stelect Varker Mode Stelect • Normal Pasker Otelsa (A) Poster Promet Marker Otelsa (A) Poster Off Marker Off Marker		
Res BW 10 MHz 5 Marker Table Mode Trace Scale 1 1 2 P 4 P 5 6 6 0	X Y Function 2 280 ms (a) -0191 eB 1.530 ms 65.39 dBy/ a) 37.40 ms (a) -01992 85 1.540 ms (b) -01992 85 1.540 ms (b) -01992 48 1.540 ms (b) -01982 48 1.540 ms (b) -019	Sweep 10.0 ms (1001 pts) Function Width Function Value	GF Slep 1.00000 MHz: Man Freq Offset 0 Hz: Xaxis Scale Lin Egnal Track Repen Zoom	27.0 17.0 Center 2.480000000 GHz Res BW 1.0 MHz	, ла да да та да да да да да на	Sweep 100 ms (100 pts)	Markers Off On Diagram All Markers Off On Off		

Note:

- 1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
- 2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
- 3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

2.88 ms x 20 channels = 57.6 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100 ms / 57.6 ms] = 2 hops Thus, the maximum possible ON time:

2.88 ms x 2 = 5.76 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.76 ms/100 ms) = -24.79 dB



<Sample 3>

DH5 or	n time (One Pul	on time (Count Pulses) Plot on Channel 78							
Spectrum Analyzer 1 Swept SA	÷		Frequency 🔹 🎇	Spectrum Analyzer 1 Swept SA	• +			Marker	*
KEYSIGHT Input: RF RL +++ Coupling DC Align: Off	Input Z: 50 Ω Atten: 10 dB PNO: Fast Corr CCorr Freq Ref: Int (S) IF Gain: L Sign Track	ow Trig: Free Run	Center Frequency 2.480000000 GHz	KEYSIGHT Input: RF RL →→ Align: Off TVI	Input Z: 50 Ω Atten: 10 dB Corr CCorr Freq Ref: Int (S)	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off		Select Marker Marker 1	
1 Spectrum v Scale/Div 10 dB	Ref Level 106.99 dBuV	ΔMkr3 3.750 ms 0.00 dB	Span 0.00000000 Hz	1 Spectrum v Scale/Div 10 dB	Ref Level 106.9		Mkr1 21.70 ms 85.50 dBuV	Marker Time 21.7000 ms	Settings Peak
Log		0.00 dE	Swept Span Zero Span	Log	Ref Level 100.5	aa qiibha	65.50 dBµV	Peak Search	Search
87.0 Xa			Full Span	97.0	11			Next Peak	Pk Search Config
67.0			Start Freq 2.480000000 GHz	87.0	h i			Next Pk Right	Properties
47.0 37.0			Stop Freq 2 480000000 GHz	77.0 87.0				Next Pk Left	Marker Function
27.0			AUTO TUNE	57.0				Minimum Peak	Marker→
Center 2.480000000 GHz Res BW 1.0 MHz	#Video BW 1.0 MHz	Span 0 Ha Sweep 10.0 ms (1001 pts)		47.0				Pk-Pk Search	Counter
5 Marker Table T				37.0	on nonarthic tration country full	ant and debut recently you have a	ta in a 1/1 Jaho Leo M	Marker Delta	
Mode Trace Scale X Y Function Function Wath Function Value Man 1 Δ2 1 t (Δ) 2.870 ms (Δ)=0.02352 dB Man <				27.0	and the second state of the second state by			Mkr→CF	
2 F 1 t 3 04 1 t (1.600 ms 85.49 dBμV Δ) 3.750 ms (Δ)0.004410 dB		Freq Offset 0 Hz	17.0				Mkr→Ref Lvi	
4 F 1 t 5 6	1.600 ms 85.49 dBµV		X Axis Scale Log	Center 2.480000000 GHz Res BW 1.0 MHz	#Video BW 1.	.0 MHz	Span 0 Hz Sweep 100 ms (1001 pts)	On	
1 C I ?	Feb 20, 2024 6:03:36 AM		Signal Track (Soan Zoom)	1 1	Feb 20, 2024 6:11:57 AM			Of	

Note:

- 1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.87 / 100 = 5.74 %
- 2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.82 dB
- 3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

2.87 ms x 20 channels = 57.4 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100 ms / 57.4 ms] = 2 hops Thus, the maximum possible ON time:

2.87 ms x 2 = 5.74 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

 $20 \times \log(5.74 \text{ ms}/100 \text{ ms}) = -24.82 \text{ dB}$