FCC RADIO TEST REPORT

FCC ID	:	**QYLAX211NG**
Equipment	:	**Wireless Module**
Brand Name	:	**Getac**
Model Name	:	**AX211NGW**
Applicant	:	**Getac Technology Corporation.** **5F., Building A, No. 209, Sec.1, Nangang Rd.,Nangang Dist., Taipei City 115018, Taiwan, R.O.C.**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Feb. 11, 2025 and testing was performed from Feb. 17, 2025 to Mar. 09, 2025. 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
FR521111A	01	Initial issue of report	Mar. 20, 2025

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.247(a)(1)	Number of Channels	Pass	See note
-	15.247(a)(1)	Hopping Channel Separation	Pass	See note
-	15.247(a)(1)	Dwell Time of Each Channel	Pass	See note
-	15.247(a)(1)	20dB Bandwidth	Pass	See note
-	2.1049	99% Occupied Bandwidth	Pass	See note
3.1	15.247(b)(1) 15.247(b)(4)	Peak Output Power	Pass	-
-	15.247(d)	Conducted Band Edges	Pass	-
-	15.247(d)	Conducted Spurious Emission	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	-
3.3	15.207	AC Conducted Emission	Pass	-
3.4	15.203	Antenna Requirement	Pass	-

Note:

1. For host device, Radiated Spurious Emission is verified and complies with the limit in this test report.
2. For host device, the Conducted Output Power is no difference after compared to module (Model: WLAN AX211NGW)

Conformity Assessment Condition:
1. 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: Yun Huang

Report Producer: Sandy Hsieh

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
General Specs	Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, Wi-Fi 6GHz 802.11ax,
Antenna Type	WLAN: <Main>: PIFA Antenna <Aux.>: PIFA Antenna

The product was installed into Tablet PC (Brand Name: Getac, Model Name: A140, A140G2, A140Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, "-", "_" or blank for marketing purpose and no impact safety related critical components and constructions.)) during test, and the host information was recorded in the following table.

Antenna Information for Host		
Antenna	**Manufacturer**	GTK
	Antenna Type	PIFA Antenna
	Part number	340140100003
	Peak gain(dBi)	1.97

	SKU 5
WWAN	Support
DDR	(EM7511)
WLAN	Support
PANEL	(AX211NGW)
RFID	Not Support
GPS	Support
Expansion Bay	(MC1010)
Finger printer	Support
Barcode	Support
AC Adapter 1 (65W)	Not Support
AC Adapter 2 (120W)	Not Support
AC Adapter 3 (65W)	Support
AC Adapter 3 (65W)	Support

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, 03CH12-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.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 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
	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.

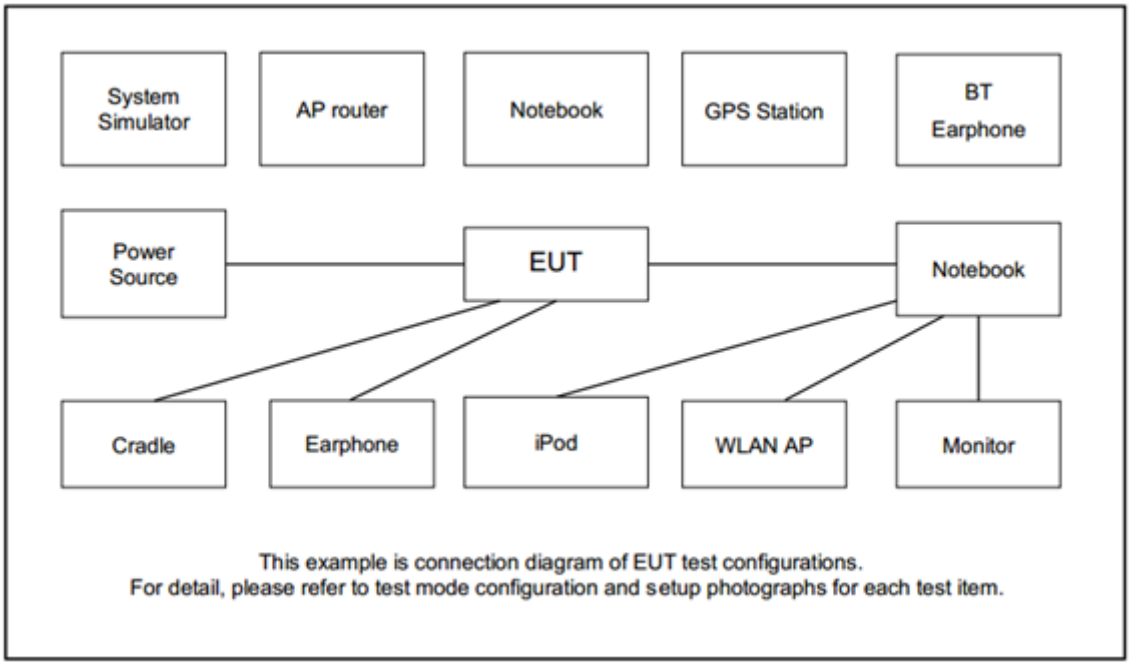
b. AC power line Conducted Emission was tested under maximum output power.

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**
Radiated Test Cases	**Bluetooth BR 1Mbps GFSK**
	Mode 1: CH78_2480 MHz
AC Conducted Emission	Mode 1 :Bluetooth link + WLAN (2.4GHz) Link + H-patten + Earphone + Barttery + AC dapter 3

Remark:
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. For Radiated Test Cases, the tests were performed with Adapter3
3. The detailed Radiated test modes are shown in Appendix C.

2.3 Connection Diagram of Test System



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	Netgear	RAXE500	PY320300508	N/A	Unshielded,1.8m
3.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
4.	Earphone + Mic	Samsung	Ecouteur	N/A	Unshielded 1.8m	N/A
5.	Earphone	Apple	A1285	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “QCRT 0.7332.23.90.0” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Output Power Measurement

3.1.1 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.

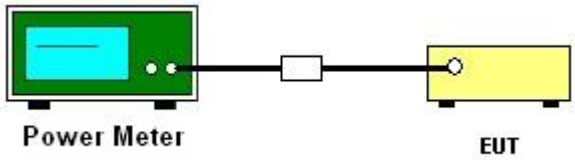
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
1. 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.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Measure the conducted output power with cable loss and record the results in the test report.
4. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.1.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (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

3.2.2 Measuring Instruments

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

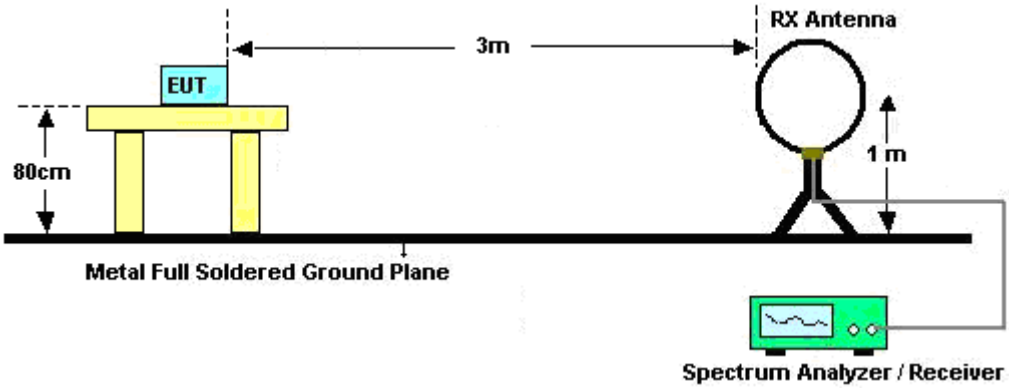
3.2.3 Test Procedures

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
   (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 “-“.

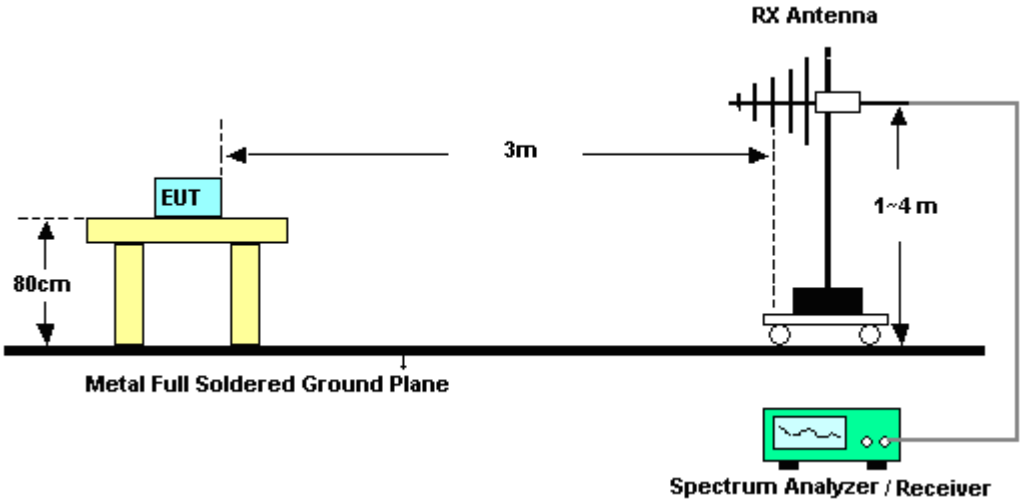
Note: The average levels are calculated from the peak level corrected with duty cycle correction factor (24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent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

3.2.4 Test Setup

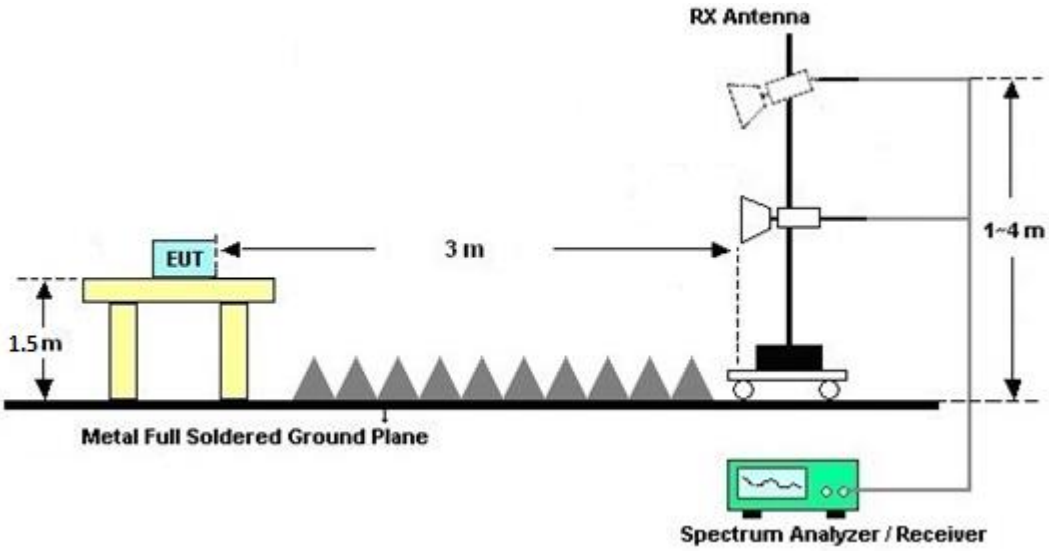
For radiated test below 30MHz



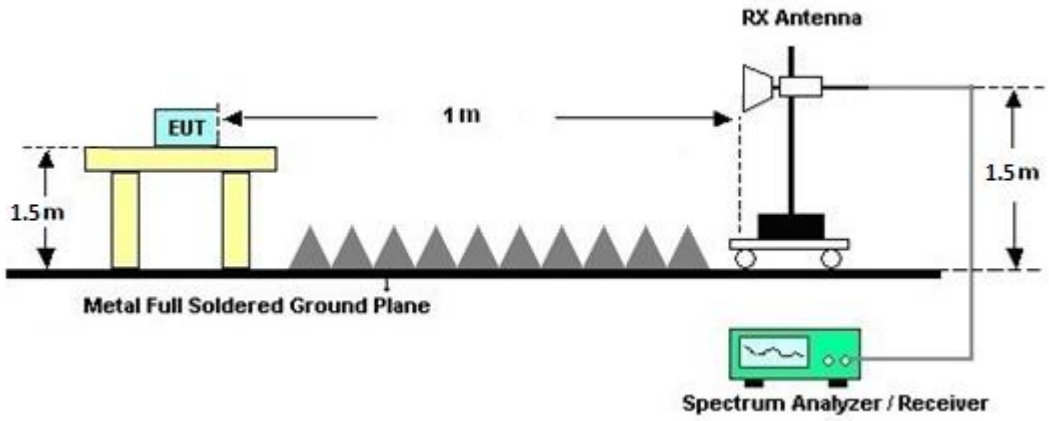
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.2.5 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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and.

3.2.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C

3.3 AC Conducted Emission Measurement

3.3.1 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)	
	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.

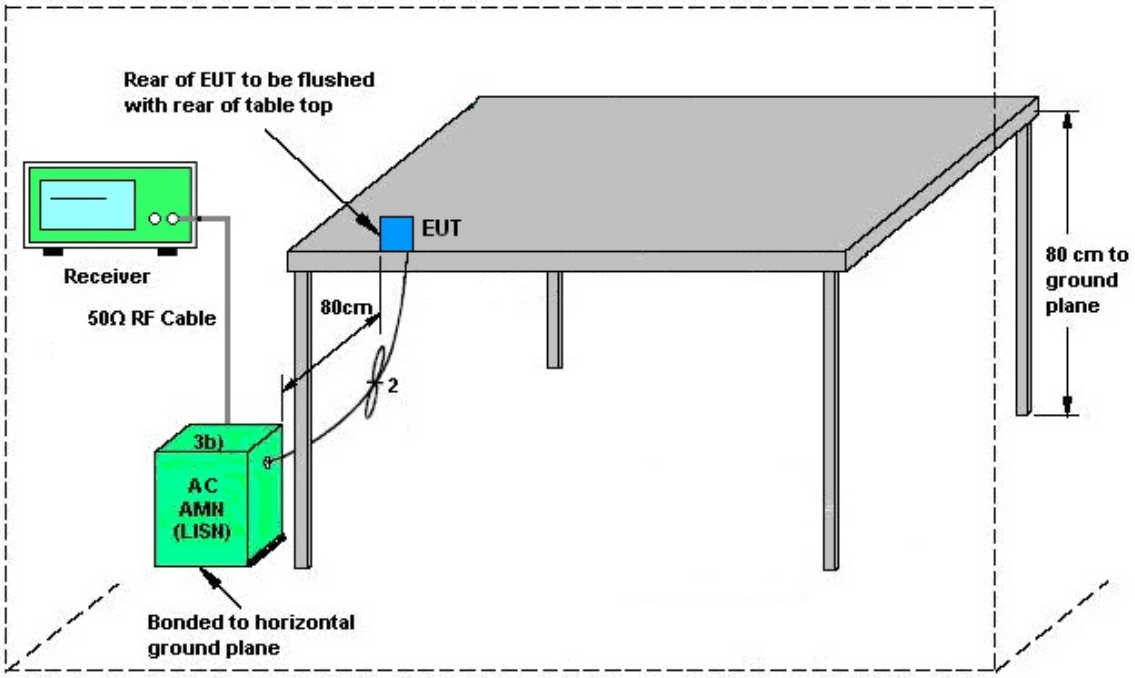
3.3.2 Measuring Instruments

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

3.3.3 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.
8. 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.

3.3.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.4 Antenna Requirements

3.4.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.4.2 Antenna Anti-Replacement Construction

Unique (non-standard) antenna connector.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 01, 2024	Feb. 17, 2025~ Feb. 18, 2025	Oct. 31, 2025	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 04, 2024	Feb. 17, 2025~ Feb. 18, 2025	Jul. 03, 2025	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101466	10HZ~44GHZ	Aug. 14, 2024	Feb. 17, 2025~ Feb. 18, 2025	Aug. 13, 2025	Conducted (TH05-HY)
Switch Control Mainframe	Burgeon	ETF-058	EC1300484 (BOX3)	N/A	May 20, 2024	Feb. 17, 2025~ Feb. 18, 2025	May 19, 2025	Conducted (TH05-HY)
Software	Sporton	BTWIFI_Final_version_250114	N/A	Conducted Other Test Item	N/A	Feb. 17, 2025~ Feb. 18, 2025	N/A	Conducted (TH05-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Mar. 05, 2025	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Mar. 05, 2025	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 23, 2024	Mar. 5, 2025	Oct. 22, 2025	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 03, 2025	Mar. 05, 2025	Mar. 02, 2026	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 10, 2024	Mar. 05, 2025	Mar. 09, 2025	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 23, 2024	Mar. 05, 2025	Sep. 22, 2025	Conduction (CO07-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9kHz~30MHz	Aug. 29, 2024	Mar. 07, 2025~ Mar. 09 2025	Aug. 28, 2025	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	37059 & 01	30MHz~1GHz	Nov. 27, 2024	Mar. 07, 2025~ Mar. 09, 2025	Nov. 26, 2025	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-02114	1GHz~18GHz	Jul. 11, 2024	Mar. 07, 2025~ Mar. 09, 2025	Jul. 10, 2025	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	00993	18GHz-40GHz	Nov. 18, 2024	Mar. 07, 2025~ Mar. 09, 2025	Nov. 17, 2025	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 20, 2024	Mar. 07, 2025~ Mar. 09, 2025	Mar. 19, 2025	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	Feb. 07, 2025	Mar. 07, 2025~ Mar. 09, 2025	Feb. 06, 2026	Radiation (03CH12-HY)
Preamplifier	E-INSTRUME NT TECH LTD.	ERA-100M-18 G-56-01-A70	EC1900269	1GHz-18GHz	Dec. 19, 2024	Mar. 07, 2025~ Mar. 09, 2025	Dec. 18, 2025	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 02, 2024	Mar. 07, 2025~ Mar. 09, 2025	Dec. 01, 2025	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Aug. 09, 2024	Mar. 07, 2025~ Mar. 09, 2025	Aug. 08, 2025	Radiation (03CH12-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz~26.5GHz	Sep. 09, 2024	Mar. 07, 2025~ Mar. 09, 2025	Sep. 08, 2025	Radiation (03CH12-HY)
Notch Filter	Wainwright	WHKX12-2700 -3000-18000-6 0ST	SN2	3GHz High Pass Filter	Mar. 13, 2024	Mar. 07, 2025~ Mar. 09, 2025	Mar. 12, 2025	Radiation (03CH12-HY)
Notch Filter	Wainwright	WLKS1200-12 SS	SN2	1.2GHz Low Pass Filter	Mar. 13, 2024	Mar. 07, 2025~ Mar. 09, 2025	Mar. 12, 2025	Radiation (03CH12-HY)
Notch Filter	Wainwright	WHKX6-7268- 9200-26500-40 CD	SN1	9GHz High Pass Filter	May. 21, 2024	Mar. 07, 2025~ Mar. 09, 2025	May. 20, 2025	Radiation (03CH12-HY)
Notch Filter	Wainwright	WHKX8-5872. 5-6750-18000- 40ST	SN2	6.75GHz High Pass Filter	Mar. 13, 2024	Mar. 07, 2025~ Mar. 09, 2025	Mar. 12, 2025	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 05, 2025	Mar. 07, 2025~ Mar. 09, 2025	Mar. 04, 2026	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Dec. 19, 2024	Mar. 07, 2025~ Mar. 09, 2025	Dec. 18, 2025	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803955/2	30MHz~40GHz	Nov. 01, 2024	Mar. 07, 2025~ Mar. 09, 2025	Oct. 31, 2025	Radiation (03CH12-HY)
RF Cable	EMCI	EMC101Y-KM- KM-100	240907	30MHz~40GHz	Nov. 14, 2024	Mar. 07, 2025~ Mar. 09, 2025	Dec. 13, 2025	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP210090	N/A	Aug. 29, 2024	Mar. 07, 2025~ Mar. 09, 2025	Aug. 28, 2025	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Mar. 07, 2025~ Mar. 09, 2025	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Mar. 07, 2025~ Mar. 09, 2025	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Mar. 07, 2025~ Mar. 09, 2025	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Mar. 07, 2025~ Mar. 09, 2025	N/A	Radiation (03CH12-HY)

5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.70 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.30 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.70 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.00 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.10 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Beck Chen	Temperature:	21~25	°C
Test Date:	2025/2/17-2025/2/18	Relative Humidity:	51~54	%

TEST RESULTS DATA
Peak Power Table

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH1	78	1	**10.44**	20.97	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

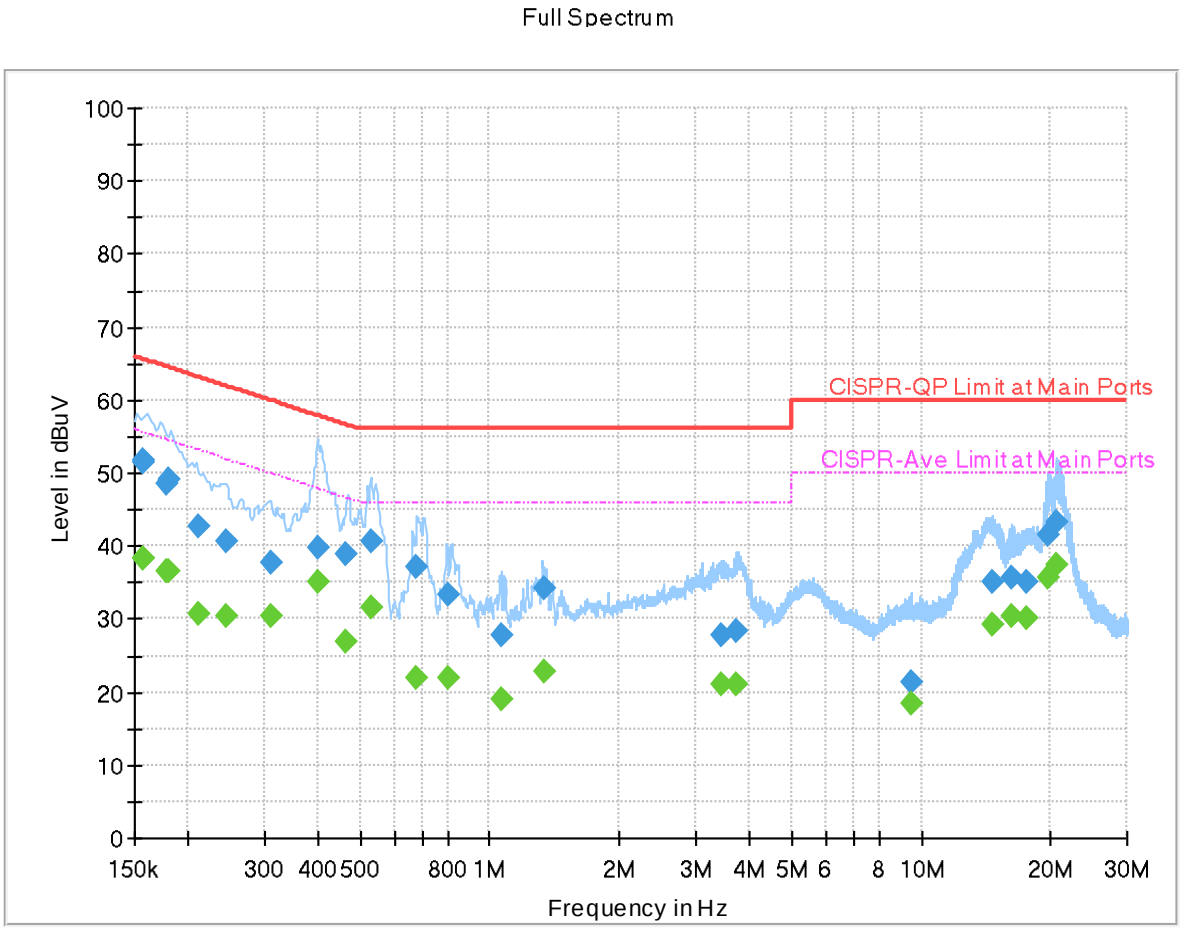
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	78	1	**9.92**	5.15

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	**Temperature :**	20.1~23.3℃
		Relative Humidity :	47.3~61.2%

EUT Information

Report NO :	521111
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line



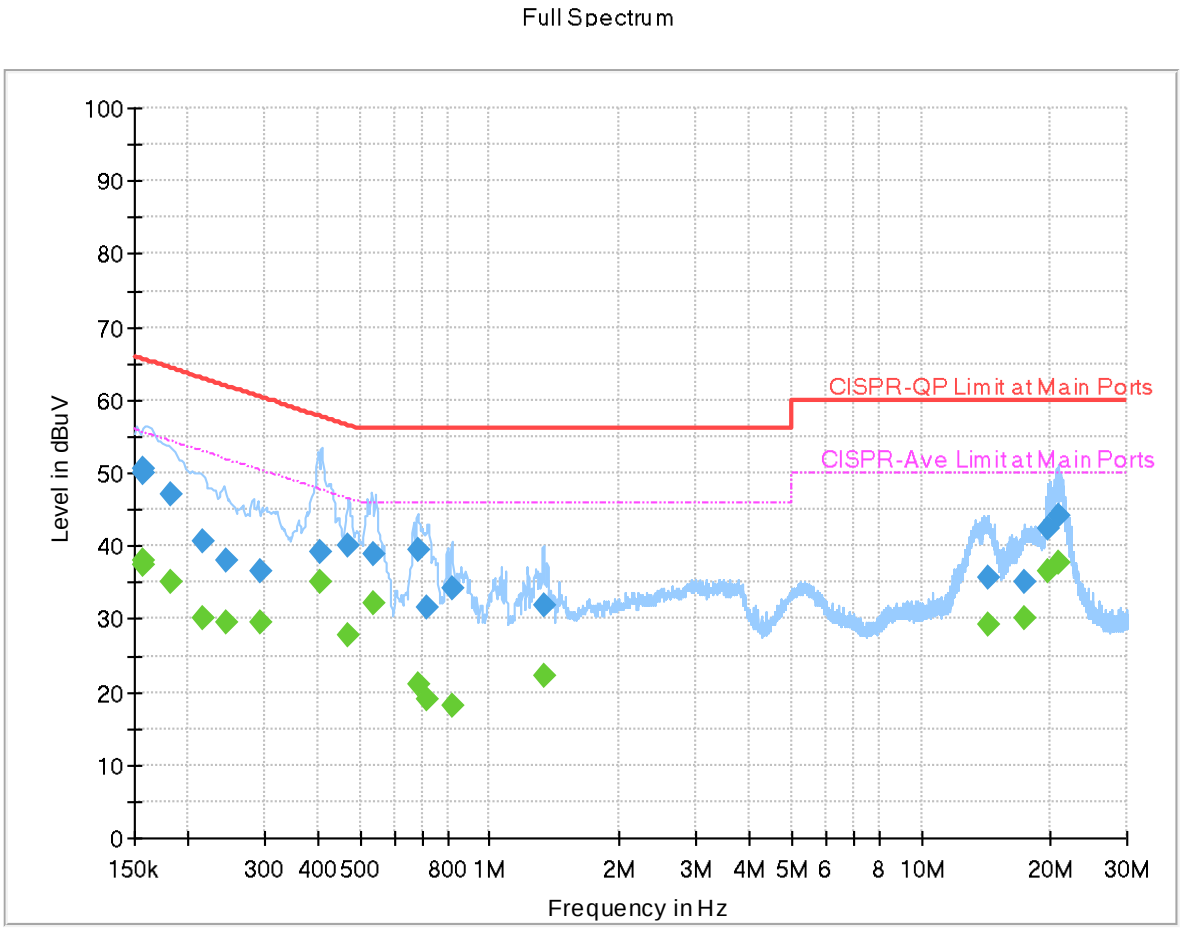
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	PE	Corr. (dB)
0.156548	---	38.22	55.65	17.43	L1	FLO	20.0
0.156548	51.54	---	65.65	14.11	L1	FLO	20.0
0.156750	---	38.37	55.63	17.26	L1	FLO	20.0
0.156750	51.87	---	65.63	13.76	L1	FLO	20.0
0.177000	---	36.64	54.63	17.99	L1	FLO	20.0
0.177000	48.62	---	64.63	16.01	L1	FLO	20.0
0.179250	---	36.43	54.52	18.09	L1	FLO	20.0
0.179250	48.99	---	64.52	15.53	L1	FLO	20.0
0.210750	---	30.76	53.18	22.42	L1	FLO	20.0
0.210750	42.78	---	63.18	20.40	L1	FLO	20.0
0.243600	---	30.40	51.97	21.57	L1	FLO	20.0
0.243600	40.75	---	61.97	21.22	L1	FLO	20.0
0.312000	---	30.47	49.92	19.45	L1	FLO	20.0
0.312000	37.66	---	59.92	22.26	L1	FLO	20.0
0.401280	---	35.05	47.83	12.78	L1	FLO	20.0
0.401280	39.70	---	57.83	18.13	L1	FLO	20.0
0.465630	---	27.03	46.59	19.56	L1	FLO	20.0
0.465630	38.85	---	56.59	17.74	L1	FLO	20.0
0.534030	---	31.65	46.00	14.35	L1	FLO	20.0

0.534030	40.72	---	56.00	15.28	L1	FLO	20.0
0.675510	---	22.03	46.00	23.97	L1	FLO	20.0
0.675510	37.28	---	56.00	18.72	L1	FLO	20.0
0.800160	---	21.84	46.00	24.16	L1	FLO	20.0
0.800160	33.21	---	56.00	22.79	L1	FLO	20.0
1.065750	---	19.14	46.00	26.86	L1	FLO	20.0
1.065750	27.83	---	56.00	28.17	L1	FLO	20.0
1.331250	---	22.74	46.00	23.26	L1	FLO	20.0
1.331250	34.27	---	56.00	21.73	L1	FLO	20.0
3.459660	---	21.17	46.00	24.83	L1	FLO	20.1
3.459660	27.72	---	56.00	28.28	L1	FLO	20.1
3.735870	---	21.11	46.00	24.89	L1	FLO	20.1
3.735870	28.28	---	56.00	27.72	L1	FLO	20.1
9.464190	---	18.54	50.00	31.46	L1	FLO	20.3
9.464190	21.36	---	60.00	38.64	L1	FLO	20.3
14.575290	---	29.17	50.00	20.83	L1	FLO	20.6
14.575290	35.16	---	60.00	24.84	L1	FLO	20.6
16.146870	---	30.53	50.00	19.47	L1	FLO	20.6
16.146870	35.56	---	60.00	24.44	L1	FLO	20.6
17.652660	---	30.18	50.00	19.82	L1	FLO	20.7
17.652660	35.07	---	60.00	24.93	L1	FLO	20.7
19.698540	---	35.70	50.00	14.30	L1	FLO	20.8
19.698540	41.45	---	60.00	18.55	L1	FLO	20.8
20.632200	---	37.30	50.00	12.70	L1	FLO	20.8
20.632200	43.41	---	60.00	16.59	L1	FLO	20.8

EUT Information

Report NO :	521111
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	PE	Corr. (dB)
0.156750	---	37.89	55.63	17.74	N	FLO	20.0
0.156750	50.65	---	65.63	14.98	N	FLO	20.0
0.157200	---	37.38	55.61	18.23	N	FLO	20.0
0.157200	50.03	---	65.61	15.58	N	FLO	20.0
0.182940	---	35.09	54.35	19.26	N	FLO	20.0
0.182940	46.95	---	64.35	17.40	N	FLO	20.0
0.215250	---	30.14	53.00	22.86	N	FLO	20.0
0.215250	40.78	---	63.00	22.22	N	FLO	20.0
0.244950	---	29.64	51.93	22.29	N	FLO	20.0
0.244950	38.14	---	61.93	23.79	N	FLO	20.0
0.294000	---	29.42	50.41	20.99	N	FLO	20.0
0.294000	36.63	---	60.41	23.78	N	FLO	20.0
0.404250	---	35.07	47.77	12.70	N	FLO	20.0
0.404250	39.27	---	57.77	18.50	N	FLO	20.0
0.469320	---	27.80	46.53	18.73	N	FLO	20.0
0.469320	40.13	---	56.53	16.40	N	FLO	20.0
0.535470	---	32.21	46.00	13.79	N	FLO	20.0
0.535470	38.99	---	56.00	17.01	N	FLO	20.0
0.680370	---	21.11	46.00	24.89	N	FLO	20.0

0.680370	39.61	---	56.00	16.39	N	FLO	20.0
0.717000	---	19.15	46.00	26.85	N	FLO	20.0
0.717000	31.59	---	56.00	24.41	N	FLO	20.0
0.818160	---	18.22	46.00	27.78	N	FLO	20.0
0.818160	34.20	---	56.00	21.80	N	FLO	20.0
1.335750	---	22.29	46.00	23.71	N	FLO	20.0
1.335750	31.89	---	56.00	24.11	N	FLO	20.0
14.264610	---	29.18	50.00	20.82	N	FLO	20.5
14.264610	35.70	---	60.00	24.30	N	FLO	20.5
17.344500	---	30.02	50.00	19.98	N	FLO	20.7
17.344500	35.10	---	60.00	24.90	N	FLO	20.7
19.779000	---	36.49	50.00	13.51	N	FLO	20.8
19.779000	42.35	---	60.00	17.65	N	FLO	20.8
20.825250	---	37.61	50.00	12.39	N	FLO	20.8
20.825250	44.14	---	60.00	15.86	N	FLO	20.8

Appendix C. Radiated Spurious Emission Test Data

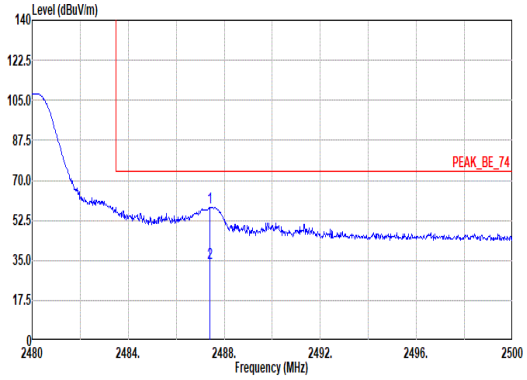
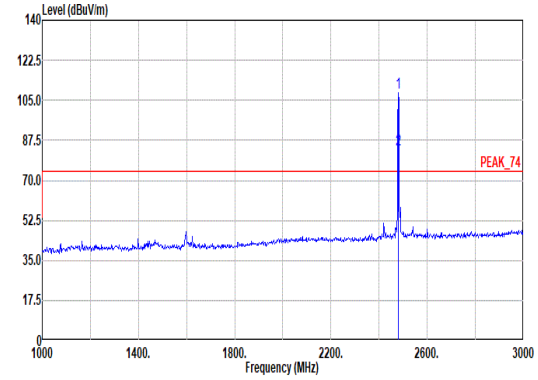
Test Engineer :	Jack Cheng Tim Lee and Wilson Wu	**Relative Humidity :**	50~60%
		Temperature :	20~25℃

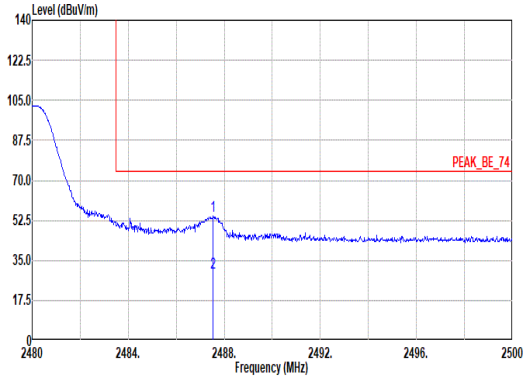
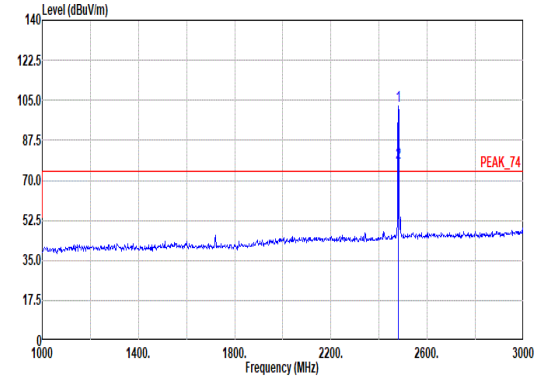
C1.Radiated Spurious Emission Test Modes

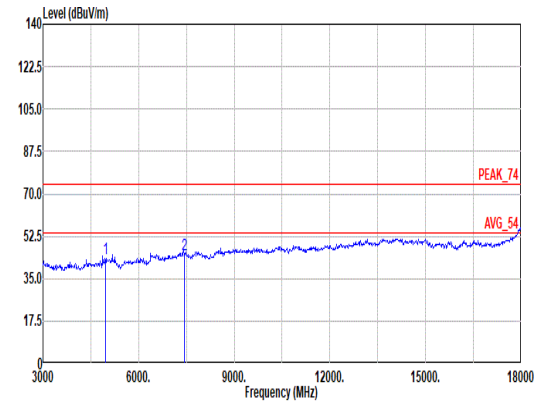
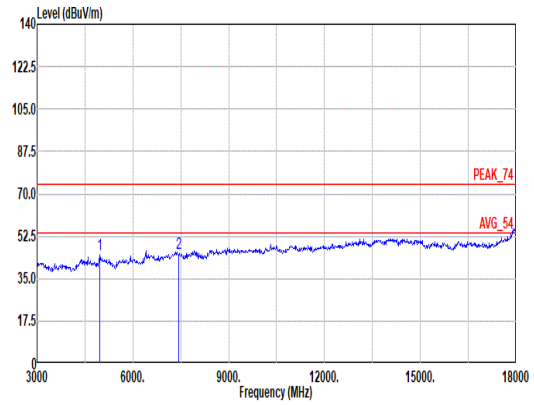
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	1	Bluetooth BR	78	2480	1Mbps	-	-
Mode 2	2400-2483.5	1	Bluetooth BR	78	2480	1Mbps	-	SHF
Mode 3	2400-2483.5	1	Bluetooth BR	78	2480	1Mbps	-	LF

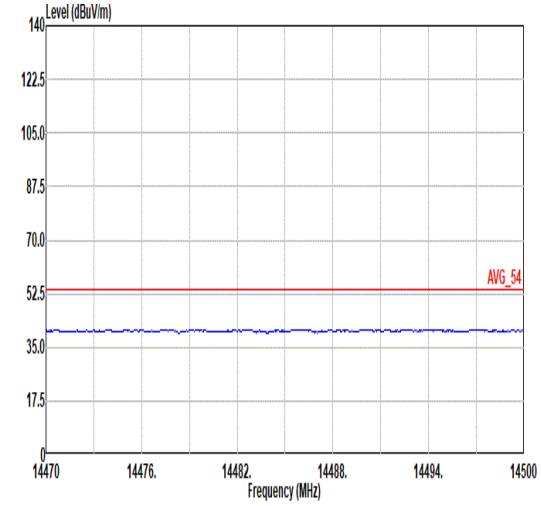
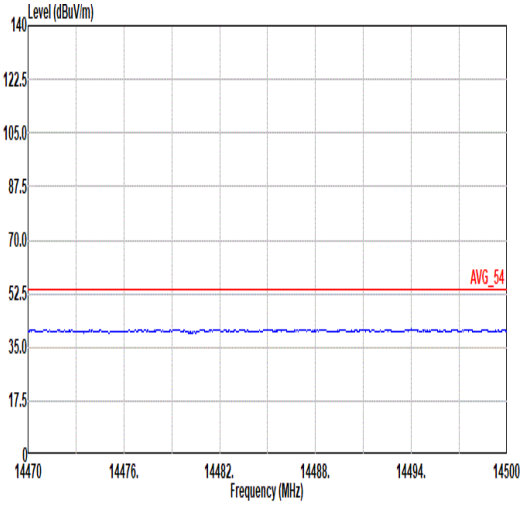
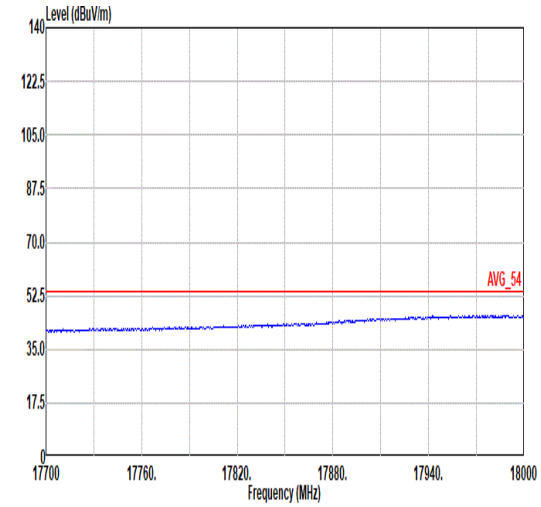
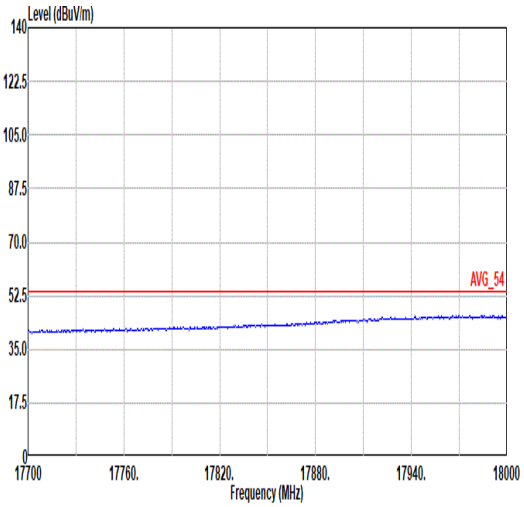
C2.Summary of each worse mode

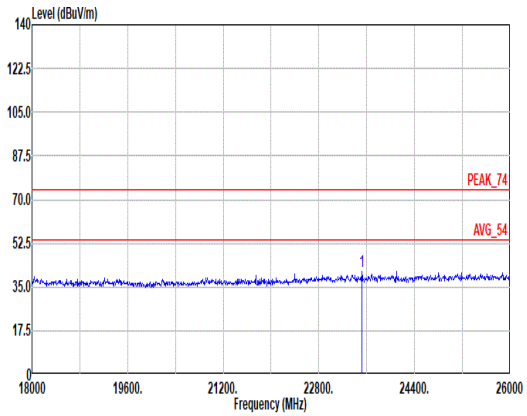
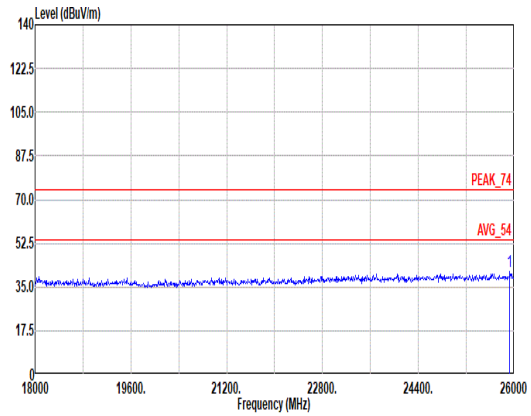
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	RU	Remark
1	Bluetooth BR	78	2487.40	58.34	74.00	-15.66	H	Peak	Pass	-	Band Edge
1	Bluetooth BR	78	7440.00	45.28	74.00	-28.72	V	Peak	Pass	-	Harmonic
2	Bluetooth BR	78	23520.00	41.35	74.00	-32.65	H	Peak	Pass	-	SHF
3	Bluetooth BR	78	69.77	32.78	40.00	-7.22	H	Peak	Pass	-	LF

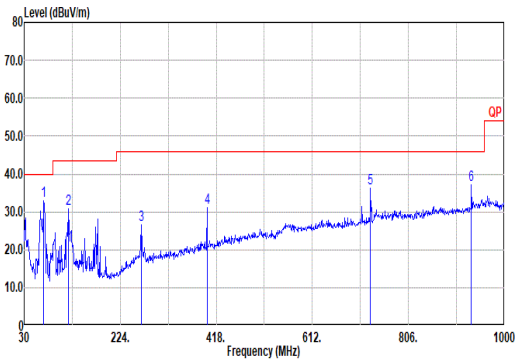
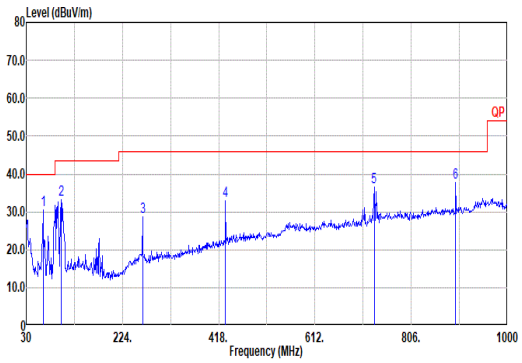
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition: PEAK_BE_74 3m 9120D-02114-240711 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2487.40 58.34 74.00 -15.66 57.66 27.97 6.91 34.20 0.00 117 303 PEAK 2 2487.40 33.55 54.00 -20.45 -- -- -- -- -- 117 303 AVERAGE	 Site : 03CH12-HY Condition: PEAK_74 3m 9120D-02114-240711 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 108.14 ------ ------ 107.54 27.90 6.90 34.20 0.00 117 303 PEAK 2 2480.00 83.35 ------ ------ -- -- -- -- -- 117 303 AVERAGE

Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition: PEAK_BE_74 3m 9120D-02114-240711 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2487.54 54.25 74.00 -19.75 53.56 27.98 6.91 34.20 0.00 350 197 PEAK 2 2487.54 29.46 54.00 -24.54 -- -- -- -- -- 350 197 AVERAGE	 Site : 03CH12-HY Condition: PEAK_74 3m 9120D-02114-240711 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 102.55 ------ ------ 101.95 27.90 6.90 34.20 0.00 350 197 PEAK 2 2480.00 77.76 ------ ------ -- -- -- -- -- 350 197 AVERAGE

Mode	1	
	Harmonic	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Horizontal	Vertical
Peak Avg	 Site : 03CH12-HY Condition: PEAK_74 3m 9120D-02114-240711 HORIZONTAL Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 43.09 74.00 -30.91 66.06 33.32 10.63 67.38 0.46 -- -- PEAK 2 7440.00 45.07 74.00 -28.93 61.46 36.68 13.25 66.66 0.34 -- -- PEAK	 Site : 03CH12-HY Condition: PEAK_74 3m 9120D-02114-240711 VERTICAL Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 44.90 74.00 -29.10 67.87 33.32 10.63 67.38 0.46 -- -- PEAK 2 7440.00 45.28 74.00 -28.72 61.67 36.68 13.25 66.66 0.34 -- -- PEAK

Mode	1	
	Harmonic	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Horizontal	Vertical
14.47G ~14.5G Avg	 Site : 03CH12-HY Condition: AVG_54 3m 9120D-02114-240711 HORIZONTAL	 Site : 03CH12-HY Condition: AVG_54 3m 9120D-02114-240711 VERTICAL
17.7G ~18G Avg	 Site : 03CH12-HY Condition: AVG_54 3m 9120D-02114-240711 HORIZONTAL	 Site : 03CH12-HY Condition: AVG_54 3m 9120D-02114-240711 VERTICAL

Mode	2	
	SHF	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition: PEAK_74 1m BBHA9170_1223_240622 HORIZONTAL Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 23520.00 41.35 74.00 -32.65 42.93 38.80 22.26 53.10 -9.54 -- -- Peak	 Site : 03CH12-HY Condition: PEAK_74 1m BBHA9170_1223_240622 VERTICAL Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 25928.00 41.05 74.00 -32.95 41.09 39.16 23.25 52.91 -9.54 -- -- Peak

Mode	3	
	LF	
	2400-2483.5_Bluetooth BR_CH78_2480MHz	
ANT	1	
Pol.	Horizontal	Vertical
QP/ Peak		

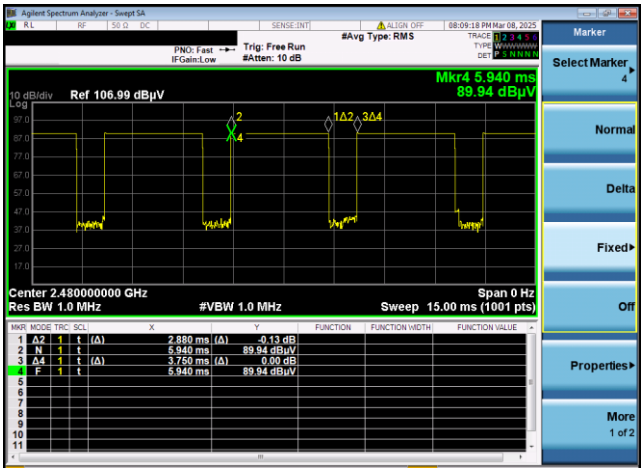
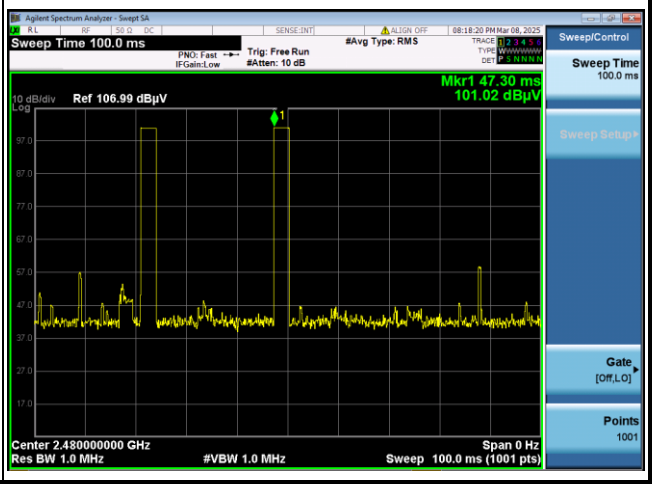
Site : 03CH12-HY
Condition: QP 3m Bilog_37059_20241127 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	69.77	32.78	40.00	-7.22	48.84	12.57	1.18	29.89	0.08	--	--	Peak
2	119.24	30.75	43.50	-12.75	41.47	17.55	1.50	29.89	0.12	--	--	Peak
3	266.68	26.44	46.00	-19.56	34.06	19.60	2.26	29.63	0.15	--	--	Peak
4	399.57	30.96	46.00	-15.04	35.54	21.95	2.74	29.44	0.17	--	--	Peak
5	729.37	36.09	46.00	-9.91	33.17	27.82	3.74	28.96	0.32	--	--	Peak
6	933.07	37.01	46.00	-8.99	30.63	30.11	4.23	28.37	0.41	--	--	Peak

Site : 03CH12-HY
Condition: QP 3m Bilog_37059_20241127 VERTICAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	63.95	30.62	40.00	-9.38	47.06	12.23	1.13	29.90	0.10	--	--	Peak
2	100.81	33.27	43.50	-10.23	45.30	16.42	1.39	29.92	0.08	--	--	Peak
3	264.74	28.57	46.00	-17.43	35.81	19.99	2.25	29.63	0.15	--	--	Peak
4	431.58	32.87	46.00	-13.13	36.19	23.02	2.87	29.39	0.18	--	--	Peak
5	731.31	36.64	46.00	-9.36	33.58	27.95	3.74	28.96	0.33	--	--	Peak
6	895.24	37.65	46.00	-8.35	32.53	29.15	4.16	28.53	0.34	--	--	Peak

Appendix D. Duty Cycle Plots

DH5 on time (One Pulse) Plot on Channel 78	on time (Count Pulses) Plot on Channel 78
	

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