TEST REPORT

Client Information:

Applicant:	**Dongguan Shinecon Industrial Co., Ltd**
Applicant add.:	NO.9 SHIBEI ROAD TANGLI DISTRICT, FENGGANG DONGGUAN,China
Manufacturer:	**Dongguan Shinecon Technology Co., LTD**
Manufacturer add.:	NO.33 SHIBEI ROAD TANGLI FENGGANG TOWN, DONGGUAN CITY, GUANGDONG PROVINCE, CHINA

Product Information:

Product Name:	Smart Glasses
Model No.:	GL01, JK01, JK02, JK03, JK04, JK05, JK06
Brand Name:	N/A
FCC ID:	2ATPS-GL01
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

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Date of Receipt: Nov. 12, 2025 Date of Test: Nov. 12, 2025~ Nov. 19, 2025

Date of Issue: Dec. 01, 2025 Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Reviewed by: Emiya Lin
Emiya Lin

Approved by: Simba Huang
Simba Huang

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 01, 2025	Valid	Initial release

2 Test Summary

Test Item	Section in CFR 47	Result
Maximum Conducted Output Power	§15.247(b)	Pass
20dB Bandwidth	§15.247(a)	Pass
Frequency Separation	§15.247(a)	Pass
Number Of Hopping Frequency	§15.247(a)	Pass
Time Of Occupancy (Dwell Time)	§15.247(a)	Pass
Conducted Spurious Emissions and Band Edges Emissions	§15.205, §15.247(d)	Pass
Radiated Spurious Emissions	§15.209, §15.247(d)	Pass
Emissions at Restricted Band	§15.205	Pass
AC Mains Conducted Emissions	§15.207(a)	Pass
Antenna Requirements	§15.203	Pass

Note

1. Test according to ANSI C63.10:2020.

2. The measurement uncertainty is not included in the test result.

3. Test results in other test report (RF Exposure Evaluation Report)

2.1 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the AiT quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.2 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	0.009MHz-30MHz	3.10dB	(1)
Radiated Emission	30MHz-1GHz	3.75dB	(1)
Radiated Emission	1GHz-18GHz	3.88dB	(1)
Radiated Emission	18GHz-40GHz	3.88dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	1.20dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

3 Test Facility

The test facility is recognized, certified or accredited by the following organizations:

CNAS-Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on April 18, 2022

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC-Registration No.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

3.3 Test Location

Dongguan Yaxu (AiT) Technology Limited

Address: No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan, Guangdong, China

Tel.: +86-769-8202 0499

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4 General Information

EUT Name:	Smart Glasses
Model No:	GL01
Serial Model:	JK01, JK02, JK03, JK04, JK05, JK06
Test sample(s) ID:	AiTSZ-251112027-1(Normal sample) AiTSZ-251112027-2(Engineer sample)
Operation frequency:	2402MHz-2480MHz
Channel Number:	79 Channels
Channel separation:	1MHz
Modulation Technology:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	Chip antenna
Antenna gain:	1.95dBi
Hardware version.:	N/A
Software version.:	N/A
Power Supply:	DC 5V⎓1A
Battery:	DC 3.7V,80mAh
Model different:	All models are same as the samples except model name, all the models are electrical identical same mechanical structure and design.
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.1 Test frequencies

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	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	--	--

4.2 EUT Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A

4.3 Test Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	Signal cord
1	Adapter	xiaomi	MDY-14-EU	A62502T103407S	Test lab	/

4.4 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2020, FCC CFR PART 15C 15.207, 15.209, 15.247 and KDB 558074 D01 15.247 Meas Guidance v05r02.

EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT Exercise

The EUT was operated in the normal operating mode for Hopping Numbers and Dwell Time test and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209, 15.247, ANSI C63.10:2020 under the FCC Rules Part 15 Subpart C

General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10:2020 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10:2020.

4.5 Description of Test Modes

The EUT has been tested under operating condition.

AC main conducted emission pre-test voltage at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case;

AC main conducted emission pre-test at charge from power adapter modes, recorded worst case;

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power that was determined to be TX (1Mbps).

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX(1Mbps-Low Channel).

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Transmitting mode	Keep the EUT in continuously transmitting mode.		
Test software:	FCC_assist_1.0.2.2		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	Default	Default	Default
Parameters(2Mbps)	Default	Default	Default
Parameters(3Mbps)	Default	Default	Default

5 Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2025.09.26	2026.09.25
2	EMI Measuring Receiver	R&S	ESPI	100773	2025.09.25	2026.09.24
3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2025.09.25	2026.09.24
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2025.09.25	2026.09.24
5	Passive Loop	ETS	6512	00165355	2024.09.04	2026.09.03
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB-9160	9160-3206	2024.08.29	2026.08.28
7	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	452	2024.08.29	2026.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367	2023.09.12	2026.09.11
9	EMI Test Receiver	R&S	ESCI	100124	2025.09.25	2026.09.24
10	LISN	R&S	ESH3-Z5	892785/016	2025.09.26	2026.09.25
11	LISN	KYORITSU	KNW-242	8-837-4	2025.09.26	2026.09.25
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2025.09.25	2026.09.24
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2025.09.26	2026.09.25
14	Signal Generator	Agilent	N5182A	MY50143009	2025.09.26	2026.09.25
15	Wideband Radio communication tester	R&S	CMW500	135866	2025.09.23	2026.09.22
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2025.09.25	2026.09.24
17	Pulse Limiter	R&S	ESH3-Z2	03578810.54	2025.09.25	2026.09.24
18	Switch	MFJ Rhinos	MFJ-2702	CZ3457	2025.09.25	2026.09.24
19	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
20	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
21	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
22	RF Software	TST	TSTPASS	Version 2.0	N/A	N/A
23	temporary antenna	NTS	R001	N/A	N/A	N/A

	connector(Note)					
24	RF Automatic Test system(Power meter)	MW	MW100-PSB	Frequency range: 9kHz-26.5GHz; Power measuring Range: 10MHz~6GHz/ -40dBm~ +20dBm	2025.09.26	2026.09.25
25	Spectrum Analyzer	Agilent	N9020A	MY53421570	2025.09.23	2026.09.22
Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

6 Test results and Measurement Data

6.1 Antenna requirement

6.1.1 Standard requirement:

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 re-placed 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 Sections 15.211, 15.213, 15.217, 15.219, or 15.221. 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 Section 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.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

6.1.2 EUT Antenna:

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sa-mple identified in the report., reference to the Internal photos for details.

6.2 Peak Power Measurement

6.2.1 Standard requirement:

According to §15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

6.2.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.2.3 Test Procedures:

According to ANSI C63.10-2020 Section 7.8.5

a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

b) RBW > 20 dB bandwidth of the emission being measured.

c) VBW ≥ RBW.

d) Sweep: No faster than coupled (auto) time.

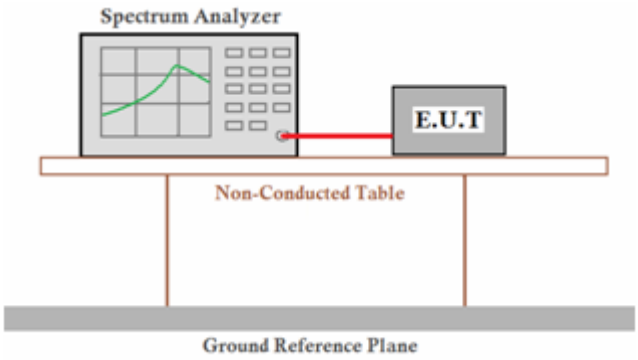
e) Detector function: Peak.

f) Trace: Max-hold.

g) Allow trace to stabilize.

h) Use the marker-to-peak function to set the marker to the peak of the emission.

6.2.4 Test Setup Layout



6.2.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.2.6 Test result

Note:

For test data, please refer to Appendix RF test data for BT R.

6.3 Frequency Separation and 20 dB Bandwidth

6.3.1 Standard requirement:

According to §15.247(a) (1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

6.3.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.3.3 Test Procedures

20dB Bandwidth:

According to ANSI C63.10-2020 Section 6.9.2

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.

d) Steps a) through c) might require iteration to adjust within the specified tolerances.

e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.

f) Set detection mode to peak and trace mode to max-hold.

Frequency Separation:

According to ANSI C63.10-2020 Section 7.8.2

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: Wide enough to capture the peaks of two adjacent channels.

b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

c) Video (or average) bandwidth (VBW) ≥ RBW.

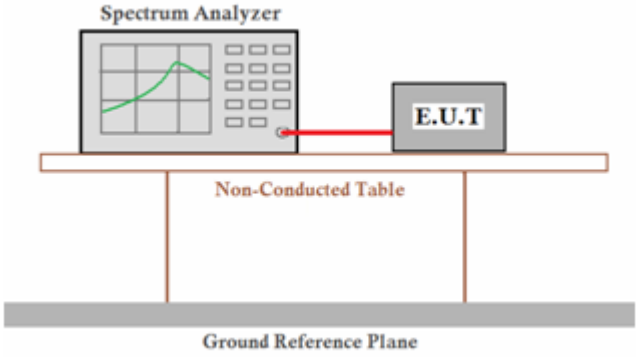
d) Sweep: No faster than coupled (auto) time.

e) Detector function: Peak.

f) Trace: Max-hold.

g) Allow the trace to stabilize.

6.3.4 Test Setup Layout



6.3.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.3.6 Test result

PASS

Note:

For test data, please refer to Appendix RF test data for BT R

6.4 Number of Hopping Frequency

6.4.1 Standard requirement:

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

6.4.2 Measuring Instruments and Setting:

Please refer to equipment's list in this report.

6.4.3 Test Procedures

1). Place the EUT on the table and set it in transmitting mode.

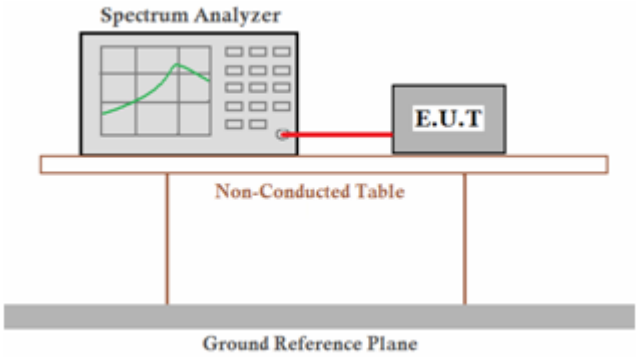
2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

3). Set Spectrum Analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.

4). Set the Spectrum Analyzer as RBW/VBW=100KHz/300KHz.

5). Max hold, view and count how many channel in the band.

6.4.4 Test Setup Layout



6.4.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.4.6 Test result

PASS

Note:

For test data, please refer to Appendix RF test data for BT R

6.5 Time of Occupancy (Dwell Time)

6.5.1 Standard requirement:

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz- 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

6.5.2 Measuring Instruments and Setting:

Please refer to equipment's list in this report. The following table is the setting of Spectrum Analyzer.

6.5.3 Test Procedures

1). Place the EUT on the table and set it in transmitting mode.

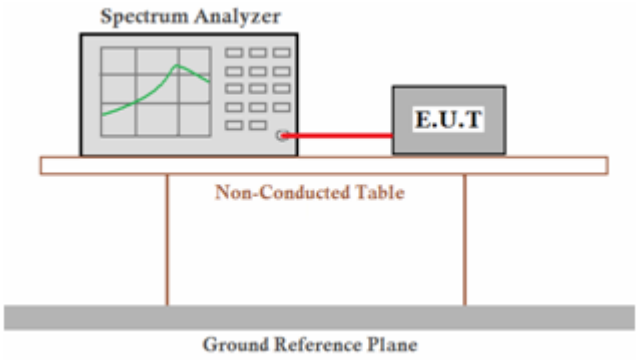
2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

3). Set center frequency of Spectrum Analyzer = operating frequency.

4). Set the Spectrum Analyzer as RBW=1MHz, VBW=3MHz, Span = 0Hz, Sweep = auto.

5). Repeat above procedures until all frequency measured was complete.

6.5.4 Test Setup Layout



6.5.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.5.6 Test result

PASS

Note:

For test data, please refer to Appendix RF test data for BT R.

6.6 Conducted Spurious Emissions and Band Edges Test

6.6.1 Standard requirement:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

6.6.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
RB / VB (Emission in restricted band)	100KHz/300KHz
RB / VB (Emission in non-restricted band)	100KHz/300KHz

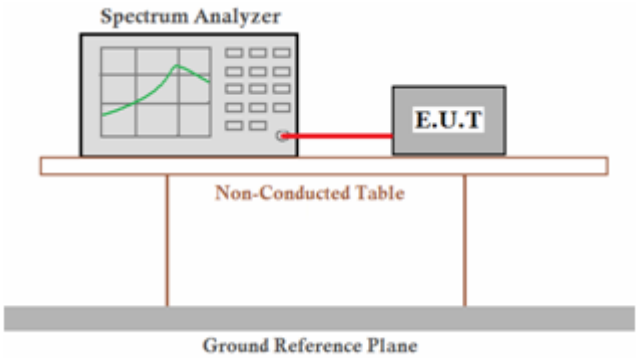
6.6.3 Test Procedures

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz.

Measurements are made over the 9kHz to 25GHz range with the transmitter set to the lowest, middle, and highest channels.

6.6.4 Test Setup Layout



6.6.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.6.6 Test result

PASS

Note:

For test data, please refer to Appendix RF test data for BT R

6.7 Restrict-band Band-edge Measurements

6.7.1 Standard requirement:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

6.7.2 Measuring Instruments:

Please refer to equipment list in this report.

6.7.3 Test Procedures

According to KDB 412172 section 1.1 Field Strength Approach (linear terms):

$eirp = p_t \times g_t = (E \times d)^2/30$

Where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m,

d = measurement distance in meters (m).

$erp = eirp/1.64 = (E \times d)^2/(30 \times 1.64)$

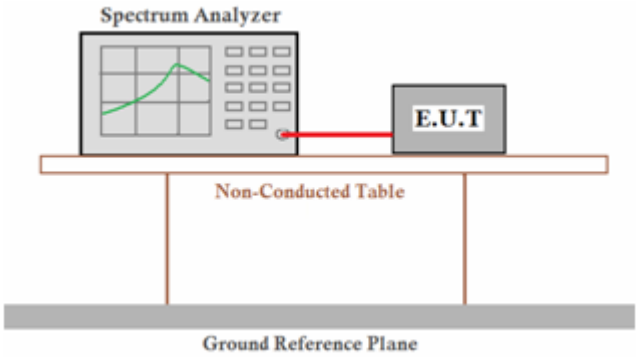
Where all terms are as previously defined.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=1/T for AV detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤

30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Compare the resultant electric field strength level to the applicable regulatory limit.
11. Perform radiated spurious emission test duress until all measured frequencies were complete.

6.7.4 Test Setup Layout



6.7.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.7.6 Test result

PASS

Note:

For test data, please refer to Appendix RF test data for BT R.

6.8 Radiated Emissions Measurement

6.8.1 Standard requirement:

According to §15.247 (d): 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (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

6.8.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

6.8.3 Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 1.5 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

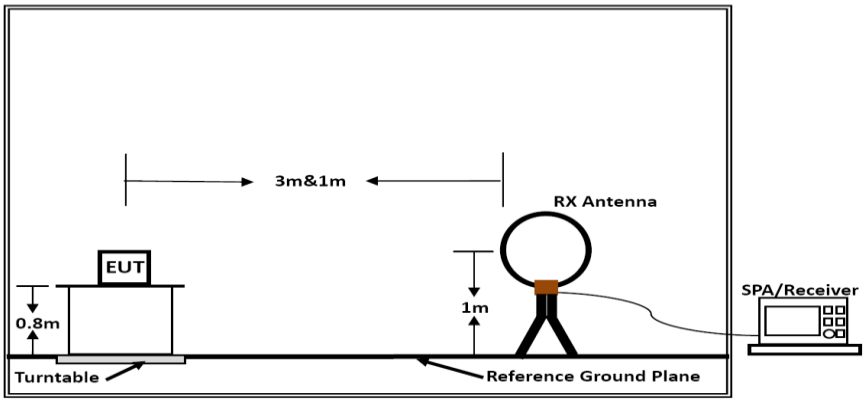
--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

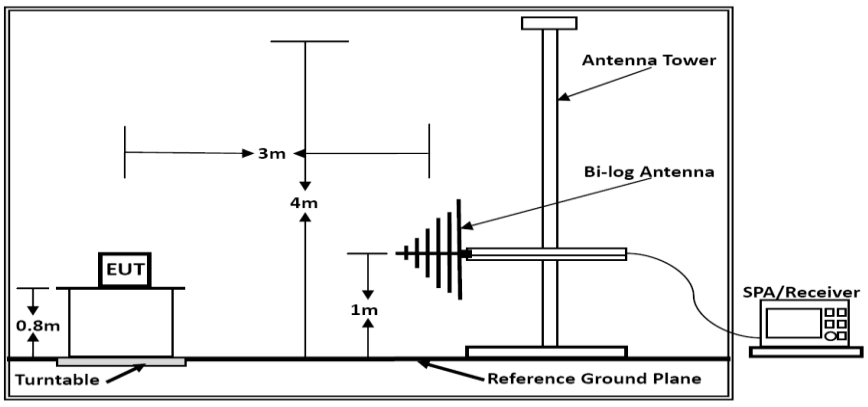
--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

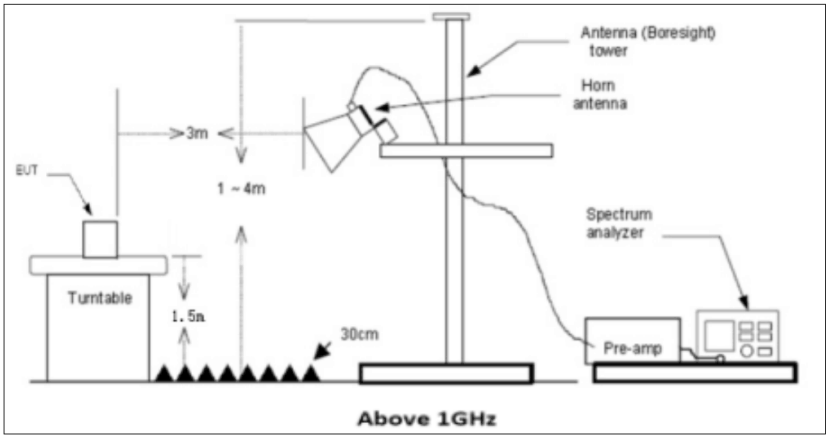
6.8.4 Test Setup Layout



Below 30MHz



Below 1GHz



Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

6.8.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.8.6 Test result

.

Temperature	25.5℃	Humidity	52.2%
Test Engineer	Emiya Lin	Configurations	BT

Remarks:

1. *Only the worst case Main Antenna test data.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

■ **Results of Radiated Emissions (9 KHz~30MHz)**

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

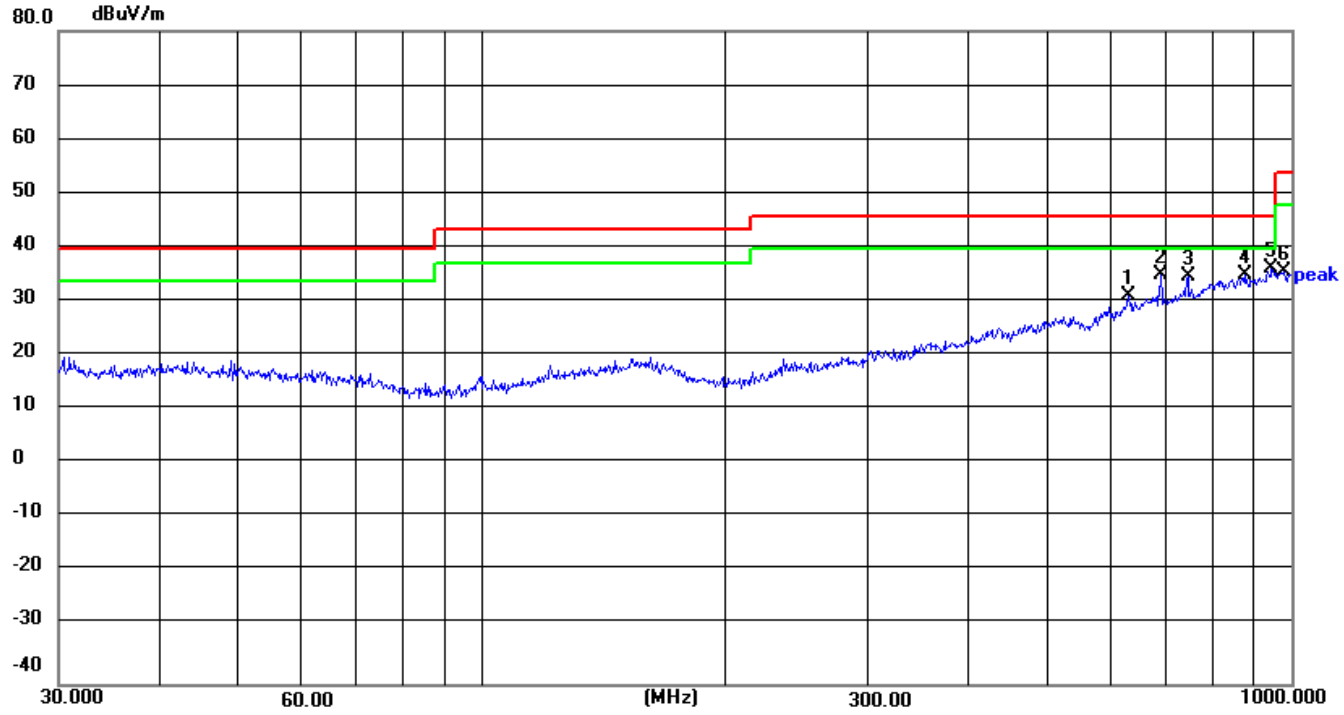
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

■ **Results of Radiated Emissions (30MHz~1GHz)**

Pre-scan all test modes, found worst case at GFSK (LCH), and so only show the test result of GFSK (LCH).

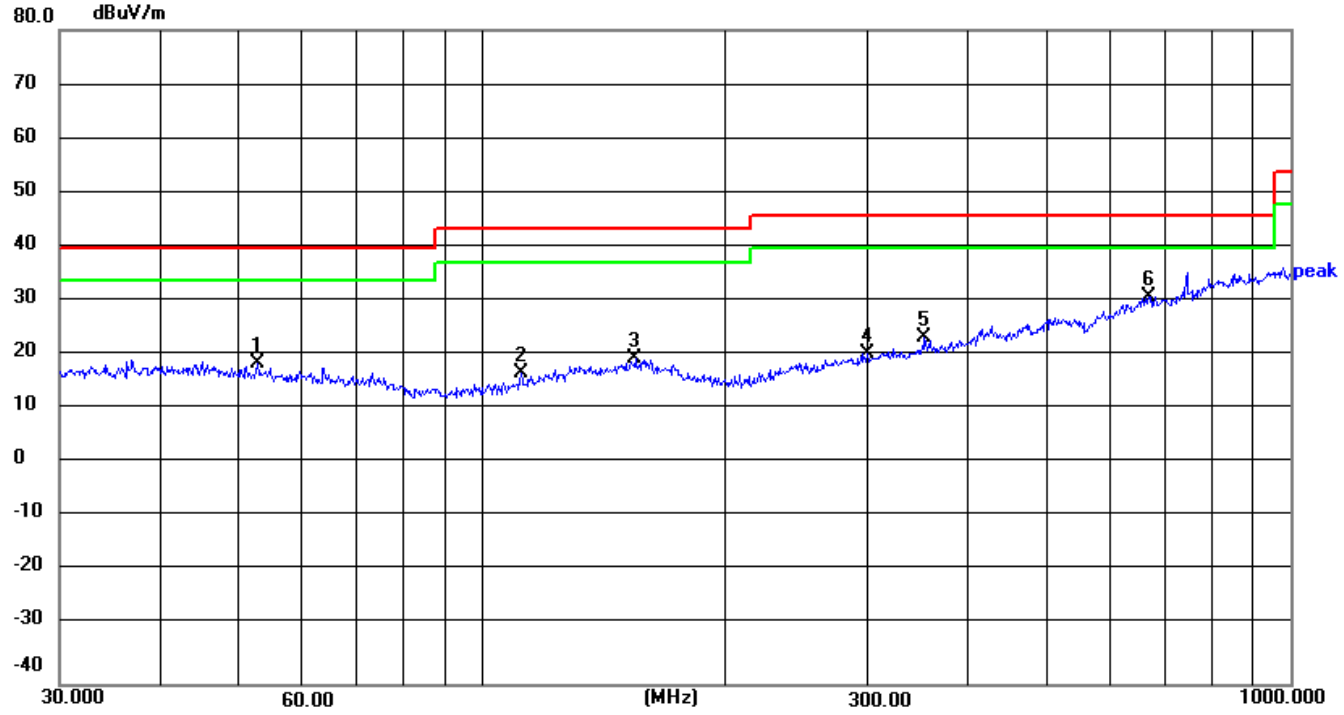
Model name:	GL01	Test Date :	2025-11-12
Polarization :	Vertical	Test Result:	☒ Pass ☐ Fail



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	629.4772	31.04	0.29	31.33	46.00	-14.67	QP
2	689.5644	34.07	1.31	35.38	46.00	-10.62	QP
3	744.8660	32.43	2.58	35.01	46.00	-10.99	QP
4	875.2470	30.37	5.01	35.38	46.00	-10.62	QP
5	945.4400	30.75	5.81	36.56	46.00	-9.44	QP
6	979.1804	29.53	6.33	35.86	54.00	-18.14	QP

Model name:	GL01	Test Date :	2025-11-12
Polarization :	Horizontal	Test Result:	☒ Pass ☐ Fail



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	52.7600	28.61	-9.68	18.93	40.00	-21.07	QP
2	111.7380	29.66	-12.41	17.25	43.50	-26.25	QP
3	154.8204	28.51	-8.77	19.74	43.50	-23.76	QP
4	300.3672	28.70	-7.85	20.85	46.00	-25.15	QP
5	352.9433	30.15	-6.42	23.73	46.00	-22.27	QP
6	668.1422	30.26	1.02	31.28	46.00	-14.72	QP

For 1GHz to 25GHz

Note:GFSK, Pi/4 DQPSK and 8DPSK all have been tested, only worse case GFSK is reported as bellow:

GFSK (above 1GHz)

Frequency(MHz):		**2402**		**Polarity:**	**Horizontal**	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4804.00	52.03	-7.55	44.48	74	-29.52	PEAK
--	--	--	--	--	--	AVG
7206.60	44.83	-1.63	43.20	74	-30.80	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		**2402**		**Polarity:**	**VERTICAL**	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4804.00	52.41	-7.55	44.86	74	-29.14	PEAK
--	--	--	--	--	--	AVG
7206.60	45.46	-1.63	43.83	74	-30.17	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		**2441**		**Polarity:**	**Horizontal**	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4884.00	50.87	-6.71	44.16	74	-29.84	PEAK
--	--	--	--	--	--	AVG
7326.00	43.44	-0.48	42.96	74	-31.04	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		**2441**		**Polarity:**	**VERTICAL**	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4884.00	51.68	-6.71	44.97	74	-29.03	PEAK
--	--	--	--	--	--	AVG
7326.00	44.63	-0.48	44.15	74	-29.85	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960.35	47.02	-5.77	44.07	74	-29.93	PEAK
--	--	--	--	--	--	AVG
7440.50	46.47	-0.52	44.18	74	-29.82	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	VERTICAL	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960.35	45.63	-5.77	45.08	74	-28.92	PEAK
--	--	--	--	--	--	AVG
7440.50	45.02	-0.52	44.78	74	-29.22	PEAK
--	--	--	--	--	--	AVG

REMARKS:

1. Emission level (dBuV/m) = Reading (dBuV)+ Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Emission level- Limit value.
4. -- Mean the PK detector measured value is below average limit.
5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Radiation Restricted band

Note:GFSK, Pi/4 DQPSK and 8DPSK all have been tested, only worse case GFSK is reported as below:

Frequency(MHz):		2402		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2386.29	52.31	-4.04	48.27	74	-25.73	PEAK
--	--	--	--	--	--	AVG
2390.00	40.62	-4.10	44.66	74	-29.34	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2402		Polarity:	Vertical	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2389.62	52.77	-4.09	48.68	74	-25.32	PEAK
--	--	--	--	--	--	AVG
2390.00	49.80	-4.10	45.70	74	-28.30	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	52.73	-3.09	49.64	74	-24.36	PEAK
--	--	--	--	--	--	AVG
2486.44	50.52	-3.05	47.47	74	-26.53	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Vertical	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	53.14	-3.09	50.05	74	-23.95	PEAK
--	--	--	--	--	--	AVG
2487.97	51.08	-3.03	48.05	74	-25.95	PEAK
--	--	--	--	--	--	AVG

REMARKS:

1. Emission level (dBuV/m) = Reading (dBuV)+ Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Emission level- Limit value.
4. -- Mean the PK detector measured value is below average limit.
5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

6.9 Conducted Emissions

6.9.1 Standard requirement:

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

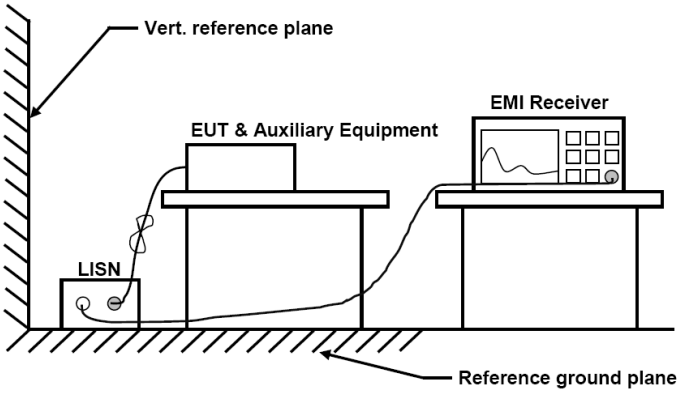
* Decreasing linearly with the logarithm of the frequency

6.9.2 Test Procedures

The transmitter output is connected to EMI receiver. The resolution bandwidth is set to 9 kHz. The video bandwidth is set to 30 kHz, Sweep time=Auto

The spectrum from 150 kHz to 30MHz is investigated with the transmitter set to the lowest, middle, and highest channels.

6.9.3 Test Setup Layout



6.9.4 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.9.5 Test result

PASS

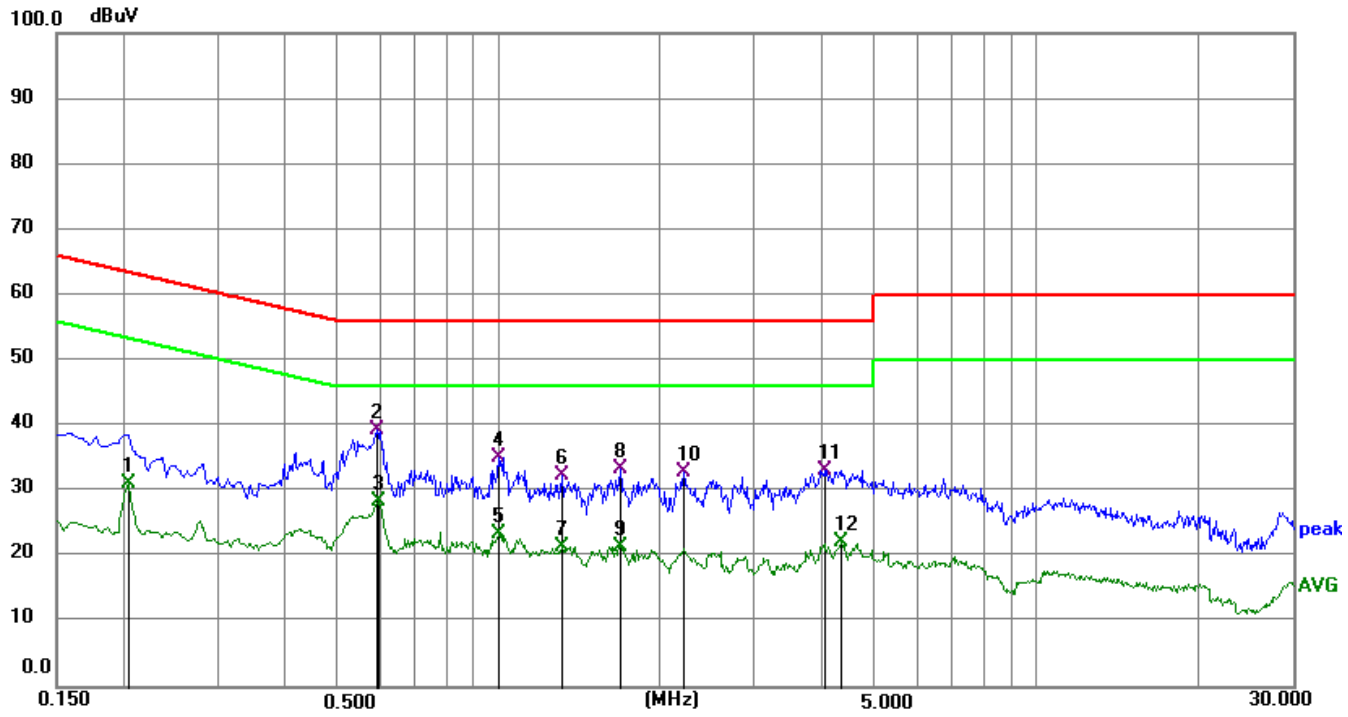
The test data please refer to following page.

Temperature	25.5℃	Humidity	52.2%
Test Engineer	Emiya Lin	Configurations	BT

Measurement data:

Pre-scan all test modes, found worst case at GFSK 2480MHz, and so only show the test result of GFSK 2480MHz

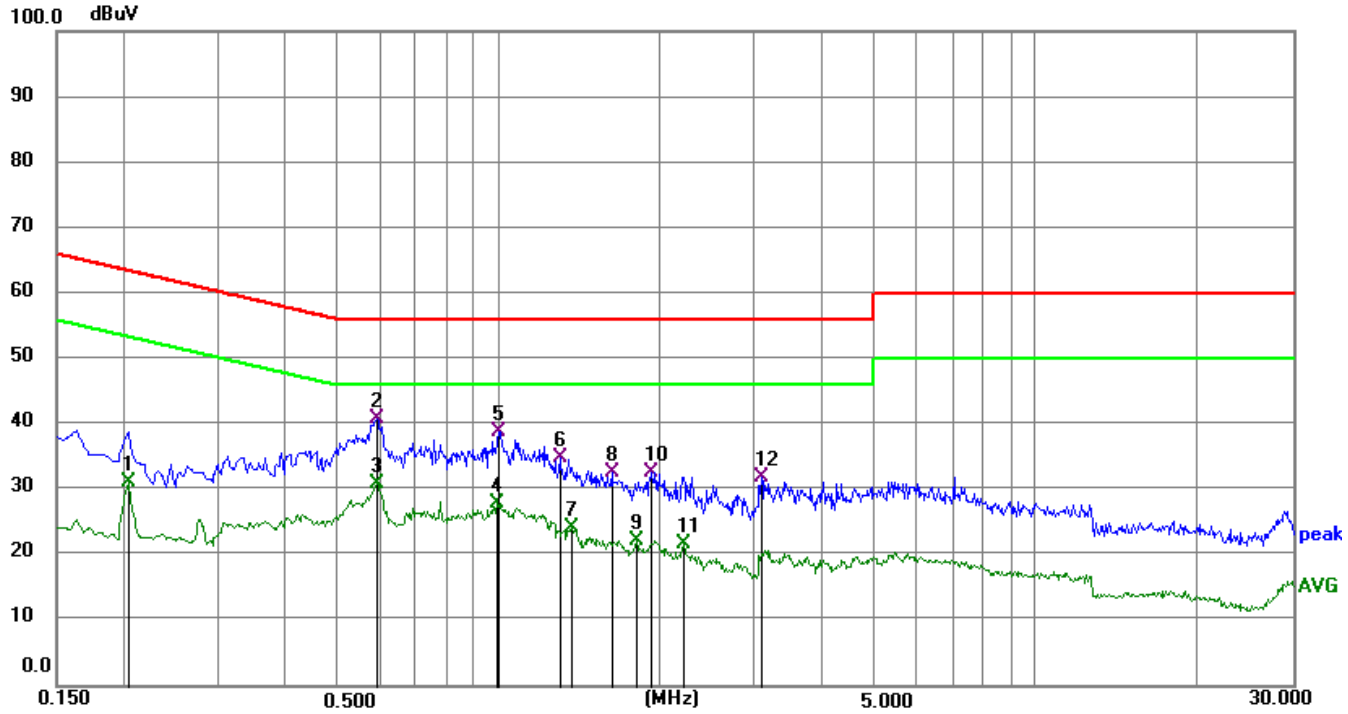
Model name:	GL01	Test Date :	2025-11-12
ATM Pressure:	101 kPa	Test by:	Emiya Lin
Phase :	Line	Test Result:	☒ Pass ☐ Fail



Remark: Factor =insertion loss of LISN + Cable loss +insertion loss of Pulse Limiter +insertion loss of Switch.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2040	21.00	10.26	31.26	53.45	-22.19	AVG
2	0.5910	29.16	10.25	39.41	56.00	-16.59	QP
3	0.5955	18.04	10.25	28.29	46.00	-17.71	AVG
4	0.9960	24.94	10.27	35.21	56.00	-20.79	QP
5	0.9960	13.06	10.27	23.33	46.00	-22.67	AVG
6	1.3152	22.12	10.26	32.38	56.00	-23.62	QP
7	1.3152	11.26	10.26	21.52	46.00	-24.48	AVG
8	1.6845	23.22	10.25	33.47	56.00	-22.53	QP
9	1.6845	11.18	10.25	21.43	46.00	-24.57	AVG
10	2.2020	22.64	10.23	32.87	56.00	-23.13	QP
11	4.0380	23.03	10.17	33.20	56.00	-22.80	QP
12	4.3395	12.16	10.15	22.31	46.00	-23.69	AVG

Model name:	GL01	Test Date :	2025-11-12
ATM Pressure:	101 kPa	Test by:	Emiya Lin
Phase :	Neutral	Test Result:	☒ Pass ☐ Fail



Remark: Factor =insertion loss of LISN + Cable loss +insertion loss of Pulse Limiter +insertion loss of Switch.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2040	21.03	10.18	31.21	53.45	-22.24	AVG
2	0.5910	30.70	10.19	40.89	56.00	-15.11	QP
3	0.5910	20.80	10.19	30.99	46.00	-15.01	AVG
4	0.9915	17.65	10.20	27.85	46.00	-18.15	AVG
5	0.9960	28.71	10.20	38.91	56.00	-17.09	QP
6	1.3020	24.70	10.19	34.89	56.00	-21.11	QP
7	1.3693	14.03	10.19	24.22	46.00	-21.78	AVG
8	1.6213	22.51	10.19	32.70	56.00	-23.30	QP
9	1.8015	12.10	10.19	22.29	46.00	-23.71	AVG
10	1.9274	22.46	10.18	32.64	56.00	-23.36	QP
11	2.2065	11.42	10.17	21.59	46.00	-24.41	AVG
12	3.0840	21.80	10.13	31.93	56.00	-24.07	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

6.10 Pseudorandom frequency hopping sequence

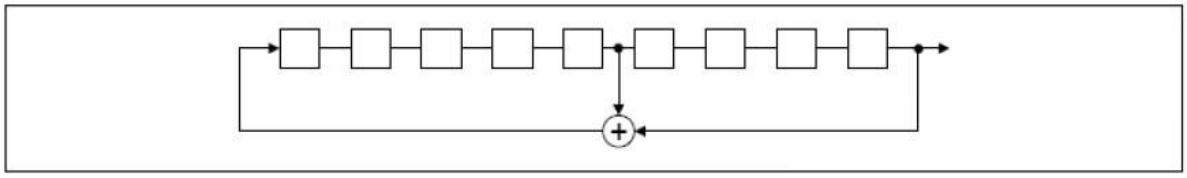
For 47 CFR Part 15C sections §15.247(a)(1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement:

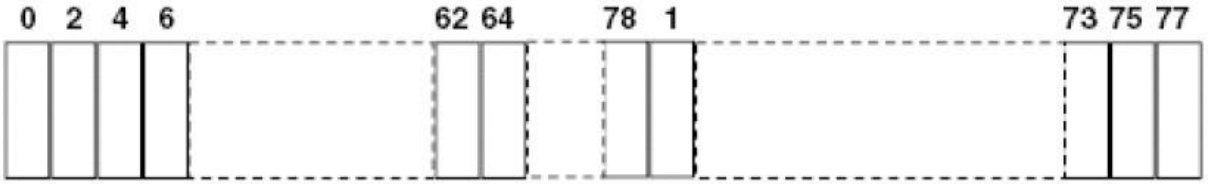
The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages:9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros:8(non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

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7 Test Setup Photographs of EUT

Please refer to separated files for Test Setup Photos of the EUT.

8 External Photographs of EUT

Please refer to separated files for External Photos of the EUT.

9 Internal Photographs of EUT

Please refer to separated files for Internal Photos of the EUT.

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