

TEST REPORT

Client Information:

Applicant: **National Protective Systems, Inc.**

Applicant add.: 6 Blackburn Center 2nd Floor Gloucester, MA 1930

Manufacturer: **National Protective Systems, Inc.**

Manufacturer add.: 6 Blackburn Center 2nd Floor Gloucester, MA 1930

Product Information:

Product Name: PAL2

Model No: PAL2

Brand Name: IT / Safety

FCC ID: 2BV6KPAL2

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: Sep. 22, 2026

Date of Test: Sep. 22, 2026~ Sep. 29, 2026

Date of Issue: Sep. 29, 2026

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	/	Sep. 29, 2026	Valid	Initial release

2 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	§15.203	Pass
On Time and Duty Cycle	/	/
AC Power Line Conducted Emission	§15.207(a)	Pass
Conducted Peak Output Power	§15.247 (b)(3)	N/A ^{Note 4}
Channel Bandwidth	§15.247 (a)(2)	N/A ^{Note 4}
Power Spectral Density	§15.247 (e)	N/A ^{Note 4}
Transmitter Radiated Spurious Emission	§15.205/15.209	Pass
Restricted Bands	§15.205/15.209	Pass
Conducted Unwanted emissions and Bandedge	§15.205, §15.247(d)	N/A ^{Note 4}

Note

1. Test according to ANSI C63.10:2020.
2. The measurement uncertainty is not included in the test result.
3. As the module has already been certified and its RF conducted measurement data can be referenced from the original report, the scope of this report is further extended to include radiated emission and AC power-port conducted emission tests.
4. For the measurement of RF conducted test data, please refer to Test Report No. FR330803C issued by Sporton International Inc. (Kunshan).

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.: 362653 Designation Number: CN1457

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:	PAL2
Model No:	PAL2
Serial Model:	N/A
Test sample(s) ID:	AiTDG-260824014-1(Normal sample) AiTDG-260824014-2(Engineer sample)
Serial No.:	N/A
Operation frequency:	2405MHz ~ 2480MHz
Channel Number:	16 channels
Channel separation:	5MHz
Modulation Technology:	OQPSK (DSSS)
Antenna Type:	PCB antenna
Antenna gain:	3.96 dBi
H/W No.:	PAL2
S/W No.:	V1.0.0
Power supply:	DC 3.6V from battery or DC 5V from external circuit
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	Channel	Frequency
11	2405 MHz	19	2445 MHz
12	2410 MHz	20	2450 MHz
13	2415 MHz	21	2455 MHz
14	2420 MHz	22	2460 MHz
15	2425 MHz	23	2465 MHz
16	2430 MHz	24	2470 MHz
17	2435 MHz	25	2475 MHz
18	2440 MHz	26	2480 MHz

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	N/A

4.4 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Dongguan Yaxu (AiT) Technology Limited

4.4.1 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.

4.4.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

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

4.4.3 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.

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

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 Zigbee mode (Low Channel).

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

Zigbee: OQPSK (DSSS)

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:

Test Software Version	EspRFTestTool_v3.6_		
Frequency	2405MHz	2440MHz	2480MHz
Zigbee	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	2025.09.25 2026.09.25	2026.09.24 2027.09.24
2	EMI Measuring Receiver	R&S	ESPI	100773	2025.09.25 2026.09.25	2026.09.24 2027.09.24
3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2025.09.25 2026.09.25	2026.09.24 2027.09.24
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2025.09.25 2026.09.25	2026.09.24 2027.09.24
5	Passive Loop	ETS	6512	00165355	2026.09.04	2028.09.03
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2026.08.28	2028.08.27
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2026.08.29	2028.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2026.09.12	2029.09.11
9	EMI Test Receiver	R&S	ESCI	100124	2025.09.25 2026.09.25	2026.09.24 2027.09.24
10	LISN	R&S	ESH3-Z5	892785/016	2025.09.25 2026.09.25	2026.09.24 2027.09.24
11	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2025.09.25 2026.09.25	2026.09.24 2027.09.24
12	RF Automatic Test system	MW	MW100-RFCB	21033016	2025.09.25 2026.09.25	2026.09.24 2027.09.24
13	Signal Generator	Agilent	N5182A	MY50143009	2025.09.25 2026.09.25	2026.09.24 2027.09.24
14	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2025.09.25 2026.09.25	2026.09.24 2027.09.24
15	RF Automatic Test system	MW	MW100-RFCB	21033016	2025.09.25 2026.09.25	2026.09.24 2027.09.24
16	Pulse Limiter	R&S	ESH3-Z2	03578810.54	2025.09.25 2026.09.25	2026.09.24 2027.09.24
17	Switch	MFJ Rhinos	MFJ-2702	CZ3457	2025.09.25 2026.09.25	2026.09.24 2027.09.24
18	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
19	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
20	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
21	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A



22	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
23	RF Software	TST	TSTPASS	Version 2.0	N/A	N/A
24	RF Automatic Test system(Power meter)	MW	MW100-PSB	21033016	2025.09.26 2026.09.26	2026.09.25 2027.09.25
25	Spectrum Analyzer	Agilent	N9020A	MY53421570	2025.09.23 2026.09.23	2026.09.22 2027.09.22

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

Standard requirement:

FCC §15.203: Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.⁹ When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

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(b)(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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 Radiated Emissions and Restrict-band Band-edge Measurement

Standard requirement:

According to FCC §15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB.

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

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	10 th 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

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 ($\pm 45^\circ$) 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 ($\pm 45^\circ$) 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.

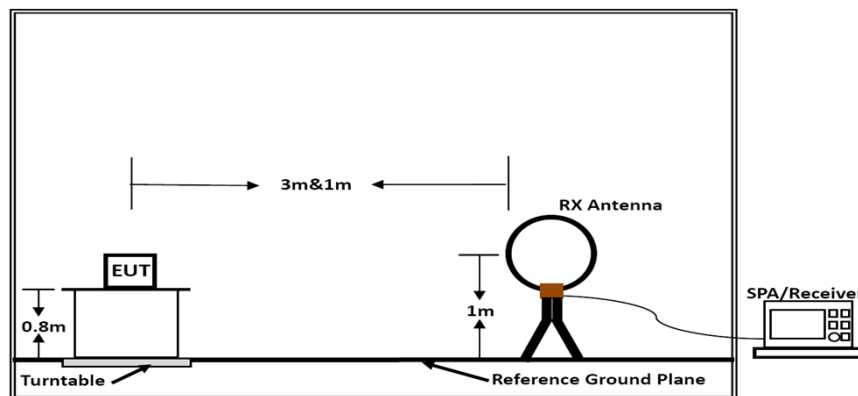
Premeasurement:

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

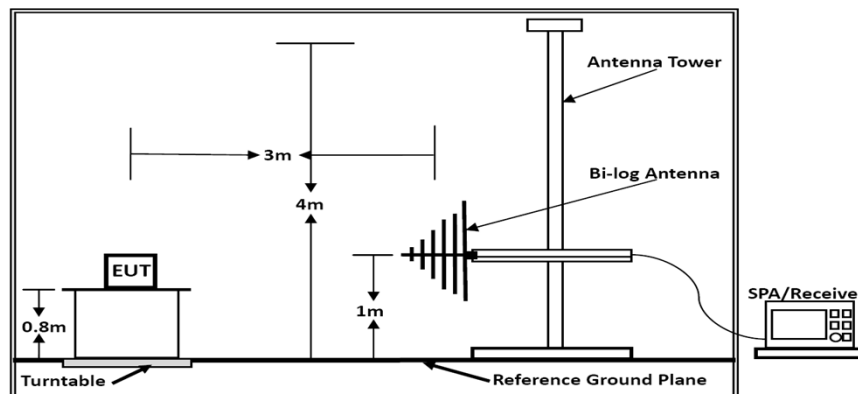
Final measurement:

- 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.

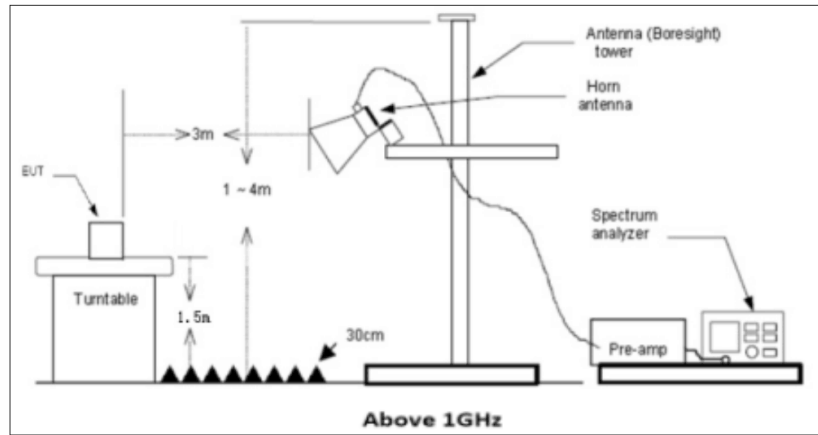
Test Setup Layout



Below 30MHz



Below 1GHz



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

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

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

EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

Test result

Temperature	25.5°C	Humidity	52.2%
Test Engineer	Emiya Lin	Configurations	Zigbee

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 X-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.

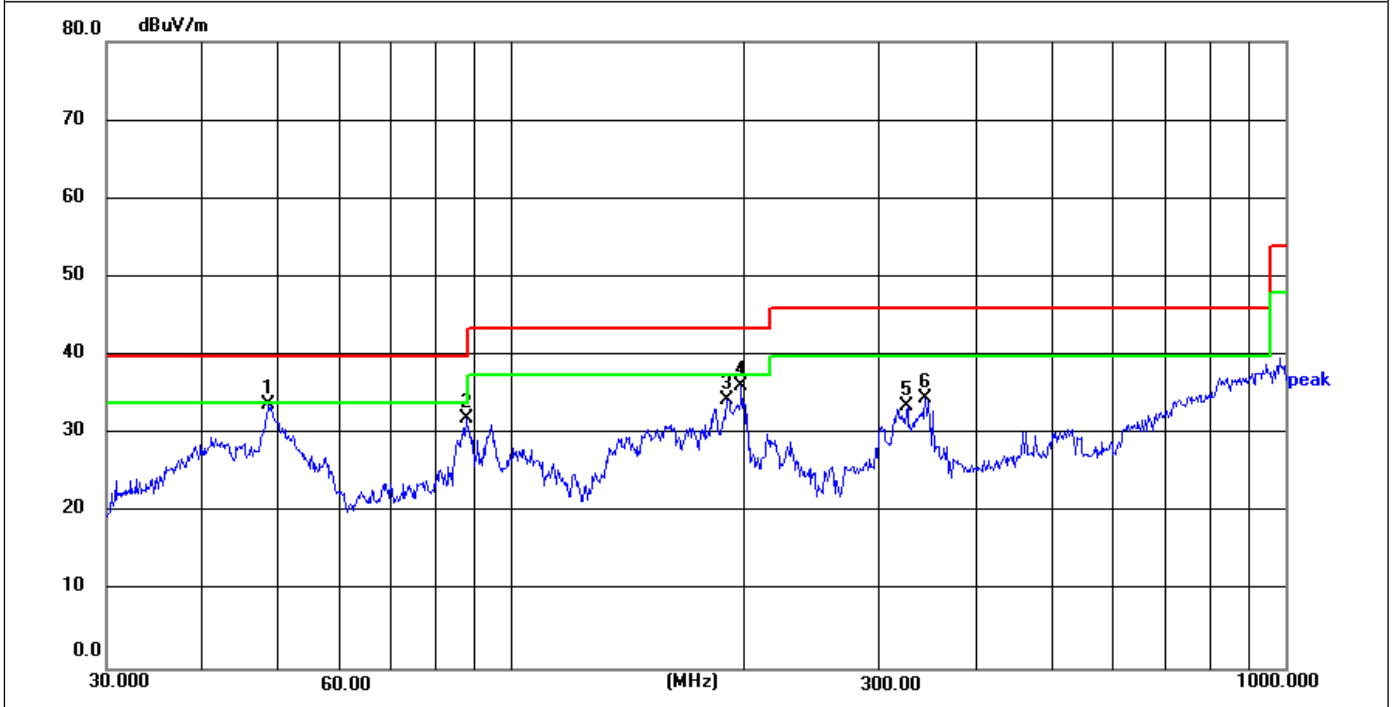
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

Results of Radiated Emissions (30MHz~1GHz)

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

Model name:	PAL2	Test Date :	2026-09-27
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	48.5247	43.36	-9.50	33.86	40.00	-6.14	peak
2	87.5113	45.66	-13.69	31.97	40.00	-8.03	peak
3	190.0891	46.07	-11.62	34.45	43.50	-9.05	peak
4	198.2666	48.38	-12.15	36.23	43.50	-7.27	peak
5	325.2301	40.65	-7.18	33.47	46.00	-12.53	peak
6	342.8127	41.28	-6.70	34.58	46.00	-11.42	peak

Model name:	PAL2	Test Date :	2026-09-27
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	41.4350	43.34	-9.30	34.04	40.00	-5.96	peak
2	77.3944	46.39	-12.79	33.60	40.00	-6.40	peak
3	184.8255	46.58	-11.12	35.46	43.50	-8.04	peak
4	209.7203	46.56	-11.80	34.76	43.50	-8.74	peak
5	333.3201	43.96	-6.95	37.01	46.00	-8.99	peak
6	361.3457	44.28	-6.28	38.00	46.00	-8.00	peak

Results for Radiated Emissions (1- 26 GHz)

Note: All the modes have been tested and recorded worst mode in the report.

Test channel:	Lowest channel
---------------	----------------

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4810.000	48.48	5.10	53.58	74.00	-20.42	
7215.000	39.48	7.26	46.74	74.00	-27.26	AVG
4810.000	47.95	5.10	53.05	74.00	-20.95	PEAK
7215.000	40.68	7.26	47.94	74.00	-26.06	AVG

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4810.000	33.72	5.10	38.82	54.00	-15.18	
7215.000	30.78	7.26	38.04	54.00	-15.96	AVG
4810.000	38.41	5.10	43.51	54.00	-10.49	PEAK
7215.000	32.03	7.26	39.29	54.00	-14.71	AVG

Test channel:	Middle channel
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H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4880.000	48.12	5.14	53.26	74.00	-20.74	
7320.000	43.35	7.52	50.87	74.00	-23.13	AVG
4880.000	49.10	5.14	54.24	74.00	-19.76	PEAK
7320.000	42.84	7.52	50.36	74.00	-23.64	AVG

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4880.000	35.60	5.14	40.74	54.00	-13.26	
7320.000	33.06	7.52	40.58	54.00	-13.42	AVG
4880.000	37.14	5.14	42.28	54.00	-11.72	PEAK
7320.000	33.47	7.52	40.99	54.00	-13.01	AVG

Test channel:	Highest channel
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H

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	48.10	5.18	53.28	74.00	-20.72	PEAK
7440.000	44.48	7.80	52.28	74.00	-21.72	AVG
4960.000	49.07	5.18	54.25	74.00	-19.75	PEAK
7440.000	42.66	7.80	50.46	74.00	-23.54	AVG

V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	32.84	5.18	38.02	54.00	-15.98	PEAK
7440.000	31.99	7.80	39.79	54.00	-14.21	AVG
4960.000	35.94	5.18	41.12	54.00	-12.88	PEAK
7440.000	31.80	7.80	39.60	54.00	-14.40	AVG

Notes:

- 1). Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
- 3). All other emissions are attenuated more than 20dB below the permissible limits so it does not recorded in the report.
- 4). Margin= Final Level – Limit
- 5). Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 6). All the modes have been tested and the only shows the worst case GFSK mode

Band-edge Measurements

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310.000	44.11	-5.92	38.19	74.00	-35.81	Vertical
2390.000	43.97	-5.79	38.18	74.00	-35.82	Vertical
2310.000	44.79	-5.92	38.87	74.00	-35.13	Horizontal
2390.000	44.69	-5.79	38.90	74.00	-35.10	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310.000	30.29	-5.92	24.37	54.00	-29.63	Vertical
2390.000	30.53	-5.79	24.74	54.00	-29.26	Vertical
2310.000	29.58	-5.92	23.66	54.00	-30.34	Horizontal
2390.000	29.76	-5.79	23.97	54.00	-30.03	Horizontal

Test channel:	Highest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.500	45.52	-4.98	40.54	74.00	-33.46	Vertical
2500.000	46.16	-4.83	41.33	74.00	-32.67	Vertical
2483.500	44.76	-4.98	39.78	74.00	-34.22	Horizontal
2500.000	45.72	-4.83	40.89	74.00	-33.11	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.500	32.15	-4.98	27.17	54.00	-26.83	Vertical
2500.000	34.88	-4.83	30.05	54.00	-23.95	Vertical
2483.500	30.71	-4.98	25.73	54.00	-28.27	Horizontal
2500.000	29.80	-4.83	24.97	54.00	-29.03	Horizontal

Remark:

1. *Final Level* = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

6.3 Conducted Emissions

Standard requirement:

According to FCC§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

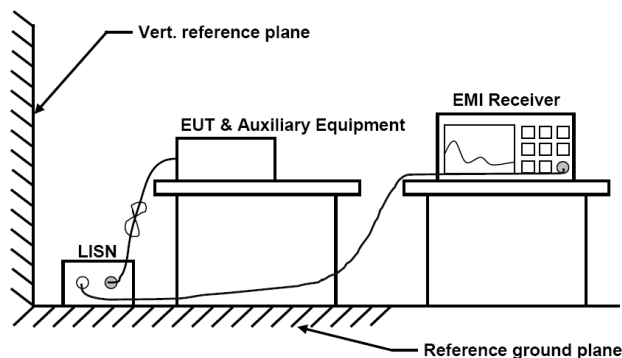
* Decreasing linearly with the logarithm of the frequency

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.

Test Setup Layout



EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

Test result

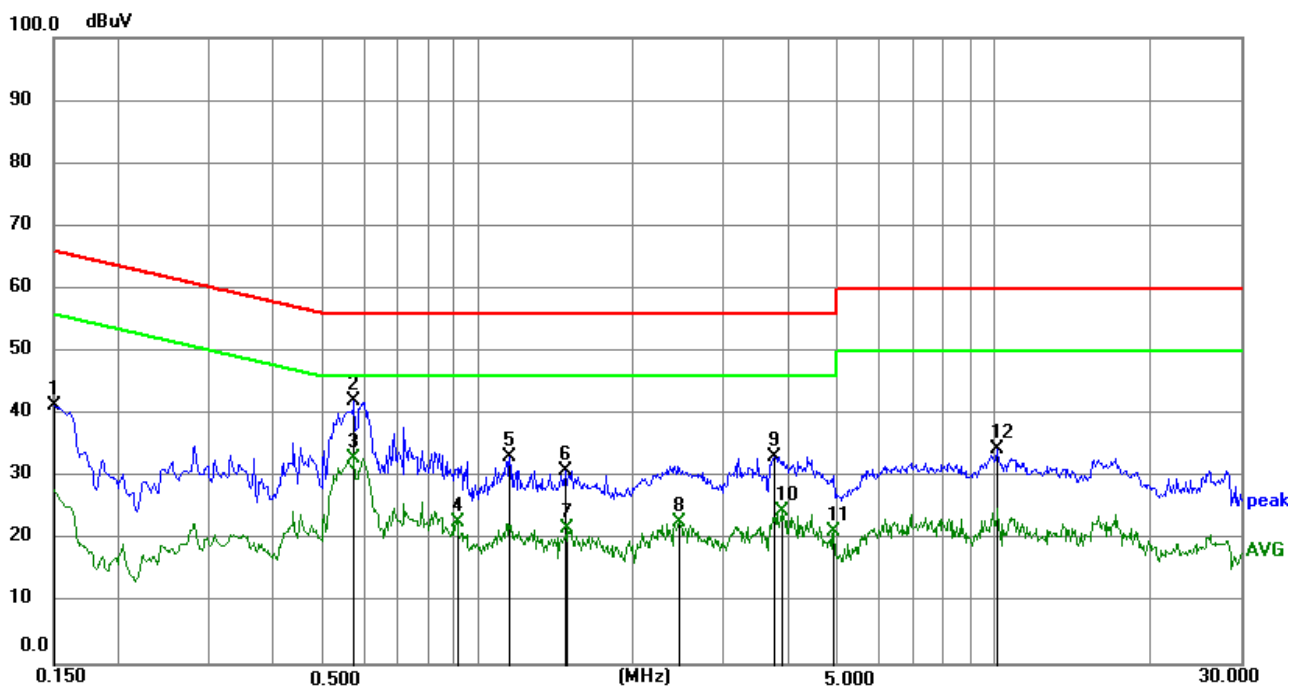
PASS

The test data please refer to following page.

Measurement data:

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

Model name:	PAL2	Test Date :	2026-09-27
Temperature:	25.4C	Relative Humidity:	52.1%
ATM Pressure:	101 kPa	Test by:	Emiya Lin
Phase :	Line	Test Result:	☒ Pass ☐ Fail



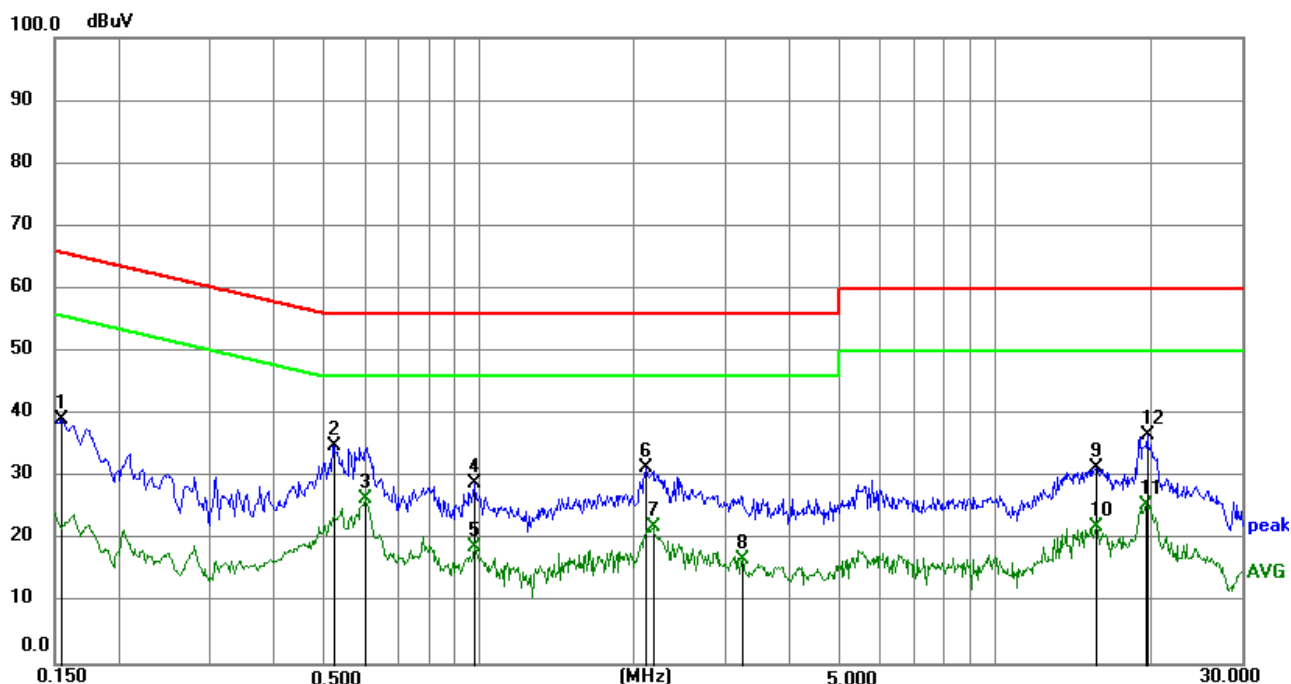
Remark: Factor =insertion loss of LISN + Cable loss +insertion loss of Pulse Limiter +insertion loss of Switch.

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	0.1500	29.06	12.29	41.35	66.00	-24.65	peak
2	0.5730	30.88	11.06	41.94	56.00	-14.06	peak
3	0.5730	21.91	11.06	32.97	46.00	-13.03	AVG
4	0.9102	11.70	11.07	22.77	46.00	-23.23	AVG
5	1.1490	22.08	11.07	33.15	56.00	-22.85	peak
6	1.4730	19.85	11.06	30.91	56.00	-25.09	peak
7	1.4910	10.54	11.06	21.60	46.00	-24.40	AVG
8	2.4584	11.66	11.02	22.68	46.00	-23.32	AVG
9	3.7590	22.02	11.17	33.19	56.00	-22.81	peak
10	3.8850	13.29	11.17	24.46	46.00	-21.54	AVG
11	4.8974	10.10	11.14	21.24	46.00	-24.76	AVG
12	10.1355	23.15	11.16	34.31	60.00	-25.69	peak

Model name:	PAL2	Test Date :	2026-09-27
Temperature:	25.4C	Relative Humidity:	52.1%
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	0.1544	27.54	11.66	39.20	65.76	-26.56	peak
2	0.5210	23.89	11.00	34.89	56.00	-21.11	peak
3	0.6000	15.33	10.99	26.32	46.00	-19.68	AVG
4	0.9825	17.94	11.00	28.94	56.00	-27.06	peak
5	0.9825	7.75	11.00	18.75	46.00	-27.25	AVG
6	2.1074	20.35	10.97	31.32	56.00	-24.68	peak
7	2.1705	10.93	10.97	21.90	46.00	-24.10	AVG
8	3.2414	5.67	10.96	16.63	46.00	-29.37	AVG
9	15.6432	19.87	11.51	31.38	60.00	-28.62	peak
10	15.6432	10.46	11.51	21.97	50.00	-28.03	AVG
11	19.5990	13.23	12.25	25.48	50.00	-24.52	AVG
12	19.6661	24.35	12.26	36.61	60.00	-23.39	peak

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. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. 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.

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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