RF Test Report

For

Applicant Name:	**Shenzhen Torras Technology Co., Ltd.**
Address:	RM1215, BLK C, Zhantao Technology BLDG, Minzhi Avenue, Minzhi ST, Longhua DIST, Shenzhen, China
EUT Name:	PolyPow 3-in-1 Wireless Charger
Brand Name:	TORRAS
Model Number:	WX-M153-01

Issued By

Company Name:	**BTF Testing Lab (Shenzhen) Co., Ltd.**
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Report Number:	BTF230817R00101
Test Standards:	47 CFR Part 15 Subpart C
FCC ID:	2AN4Y-WX-M153-01
Test Conclusion:	Pass
Test Date:	2023-08-17 to 2023-09-06
Date of Issue:	2023-09-07

Prepared By: Elma.Yang

Elma.yang / Project Engineer

Date: 2023-09-07

Approved By: Ryan.CJ

Ryan.CJ / EMC Manager

Date: 2023-09-07

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Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-09-07	Original
Note:	*Once the revision has been made, then previous versions reports are invalid.*	

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Table of Contents

1. Introduction 4
1.1 Identification of Testing Laboratory 4
1.2 Identification of the Responsible Testing Location 4
1.3 Laboratory Condition 4
1.4 Announcement 4
2. Product Information 5
2.1 Application Information 5
2.2 Manufacturer Information 5
2.3 General Description of Equipment under Test (EUT) 5
2.4 Technical Information 6
3. Summary of Test Results 7
3.1 Test Standards 7
3.2 Summary of Test Result 7
3.3 Uncertainty of Test 7
4. Test Configuration 8
4.1 Environment Condition 8
4.2 Test Equipment List 8
4.3 Test Mode 10
4.4 Test Auxiliary Equipment 11
4.5 Test Setup 12
5. Test Items 14
5.1 Antenna Requirements 14
5.2 20dB Occupied Bandwidth 15
5.3 AC Power Line Conducted Emissions 16
5.4 Radiated Spurious Emission 17
ANNEX A Test Results 22
A.1 20dB Occupied Bandwidth 22
A.2 AC Power Line Conducted Emissions 24
A.3 Radiated Spurious Emission 26
ANNEX BTEST SETUP PHOTOS 29
ANNEX CEUT EXTERNAL PHOTOS 31
ANNEX DEUT INTERNAL PHOTOS 34

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1. Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Test Location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Description:	All measurement facilities used to collect the measurement data are located at F101,201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
FCC Registration Number:	518915
Designation Number:	CN1330

1.3 Laboratory Condition

Ambient Temperature:	20℃ to 25℃
Ambient Relative Humidity:	45% to 55%
Ambient Pressure:	100 kPa to 102 kPa

1.4 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.

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(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

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2. Product Information

2.1 Application Information

Company Name:	Shenzhen Torras Technology Co., Ltd.
Address:	RM1215, BLK C, Zhantao Technology BLDG, Minzhi Avenue, Minzhi ST, Longhua DIST, Shenzhen, China

2.2 Manufacturer Information

Company Name:	Shenzhen Torras Technology Co., Ltd.
Address:	RM1215, BLK C, Zhantao Technology BLDG, Minzhi Avenue, Minzhi ST, Longhua DIST, Shenzhen, China

2.3 Factory Information

Company Name:	Shenzhen Torras Technology Co., Ltd.
Address:	RM1215, BLK C, Zhantao Technology BLDG, Minzhi Avenue, Minzhi ST, Longhua DIST, Shenzhen, China

2.4 General Description of Equipment under Test (EUT)

EUT Name	PolyPow 3-in-1 Wireless Charger
Under Test Model Name	WX-M153-01

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2.5 Technical Information

Network and Wireless connectivity	Wireless power transmission

The requirement for the following technical information of the EUT was tested in this report:

Modulation Type	FSK
Frequency Range	The operation frequency is 110.677 KHz to 203.683 KHz

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3. Summary of Test Results

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Summary of Test Result

No.	Description	FCC Part No.	Test Result	Test By	Verdict	Remark
1	Antenna Requirements	15.203	--	Elma Yang	Pass	--
2	20dB Occupied Bandwidth	2.1049	ANNEX A.1	Elma Yang	Pass	--
3	AC Power Line Conducted Emissions	15.207	ANNEX A.2	Elma Yang	Pass	--
4	Spurious Emissions	15.209	ANNEX A.3	Elma Yang	Pass	--

3.3 Uncertainty of Test

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 and TR100 028-1/-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	69 KHz
RF output power, conducted	0.87 dB
Power Spectral Density, conducted	0.69 dB
Unwanted Emissions, conducted	0.94 dB
All emissions, radiated(<1GHz)	4.12 dB
All emissions, radiated(>1GHz)	4.16 dB
Temperature	0.82 °C
Humidity	4.1 %

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4. Test Configuration

4.1 Environment Condition

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	20°C to 25°C	DC 9V	30% to 60%	100 kPa to 102 kPa

4.2 Test Equipment List

Conducted Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022.11.24	2023.11.23	☒
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022.11.24	2023.11.23	☒
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022.11.24	2023.11.23	☒
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022.11.24	2023.11.23	☒
RF Sensor Unit	Techy	TR1029-2	/	2022.11.24	2023.11.23	☒
RF Control Unit	Techy	TR1029-1	/	2022.11.24	2023.11.23	☒
RFTest software	/	V1.00	/	/	/	☒

Radiated Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022.11.24	2023.11.23	☒
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022.11.24	2023.11.23	☒
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021.11.28	2023.11.27	☒
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021.11.28	2023.11.27	☒
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/	☒
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022.11.24	2023.11.23	☒

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RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022.11.24	2023.11.23	☒
Preamplifier	SCHWARZBECK	BBV9744	00246	2022.11.24	2023.11.23	☒
Horn Antenna	Schwarzbeck	BBHA9120D	2597	2023.3.26	2024.3.25	☒
Low Noise Pre-amplifier	Sket	LNPA_1840G-50	SK2022032902	2023.3.26	2024.3.25	☒
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023.3.26	2024.3.25	☒
Broadband Preamplilifier	Schwarzbeck	BBV9718D	00008	2023.3.26	2024.3.25	☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022.11.24	2023.11.23	☒
LISN	AFJ	LS16/110VAC	16010020076	2022.11.24	2023.11.23	☐
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022.11.24	2023.11.23	☒
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022.11.24	2023.11.23	☒
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022.11.24	2023.11.23	☒
EZ_EMC	Frad	EMC-CON 3A1.1+	/	/	/	☒

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4.3 Test Mode

Test item	Test mode	Description
Radiated&Conducted Test cases	ANT1+ANT2	Mode 1: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <1%) +Earbuds (Battery Status: <1%)
		Mode 2: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <50%) +Earbuds (Battery Status: <50%)
		Mode 3: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <100%) +Earbuds (Battery Status: <100%)
	ANT1 Alone (Folding Mode)	Mode 1: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <1%) Mode 2: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <50%) Mode 3: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <100%)
	ANT2 Alone	Mode 1: AC/DC Adapter + EUT + Earbuds (Battery Status: <1%) Mode 2: AC/DC Adapter + EUT + Earbuds (Battery Status: <50%) Mode 3: AC/DC Adapter + EUT + Earbuds (Battery Status: <100%)
	No Loads	AC/DC Adapter + EUT(Null Load)

Note: All modes have been tested, and only the worst case ANT1+ANT2(Mode 2) mode are in the report.
ANT1 : Mobile Phone charging
ANT2: Earbuds charging

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4.4 Test Auxiliary Equipment

Description	Manufacturer	Model	Serial No.	Length	Description	Use
Adapter	Apple	A2518	/	/	Rated power. 20.3V⎓ 3.3A 15V⎓ 3A 9V⎓ 3A 5.2V⎓ 3A	☒
Mobile phone	Apple	iphone 14	/	/	Rated power: 15W	☒
Earbuds	Apple	AirPods 2	/	/	Rated power: 5W	☒

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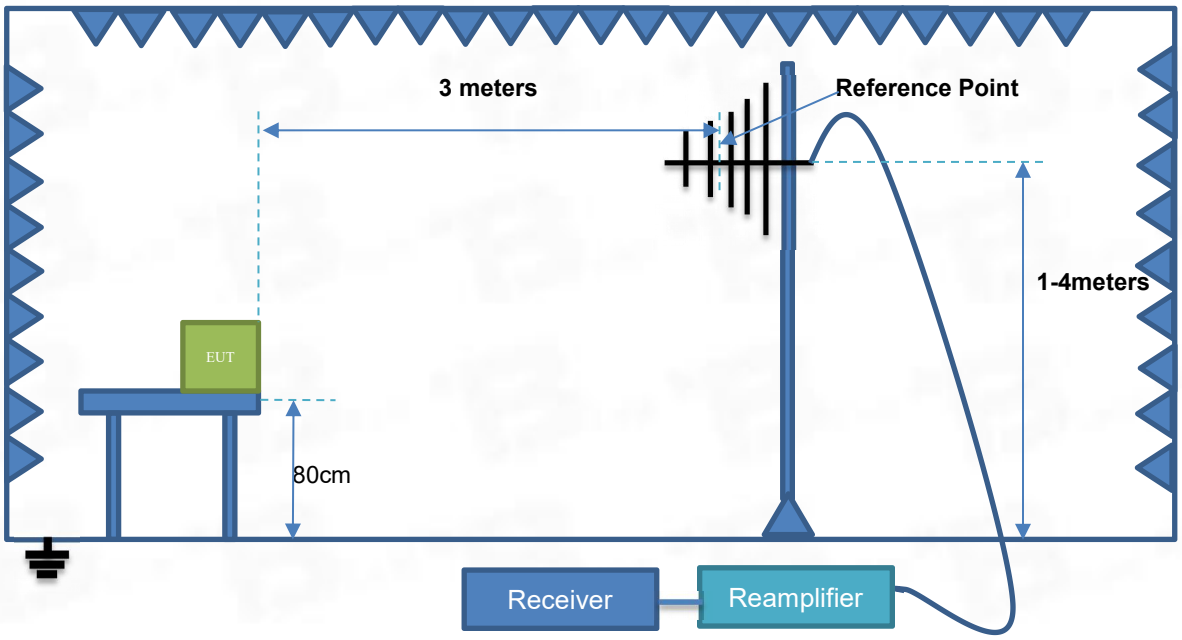
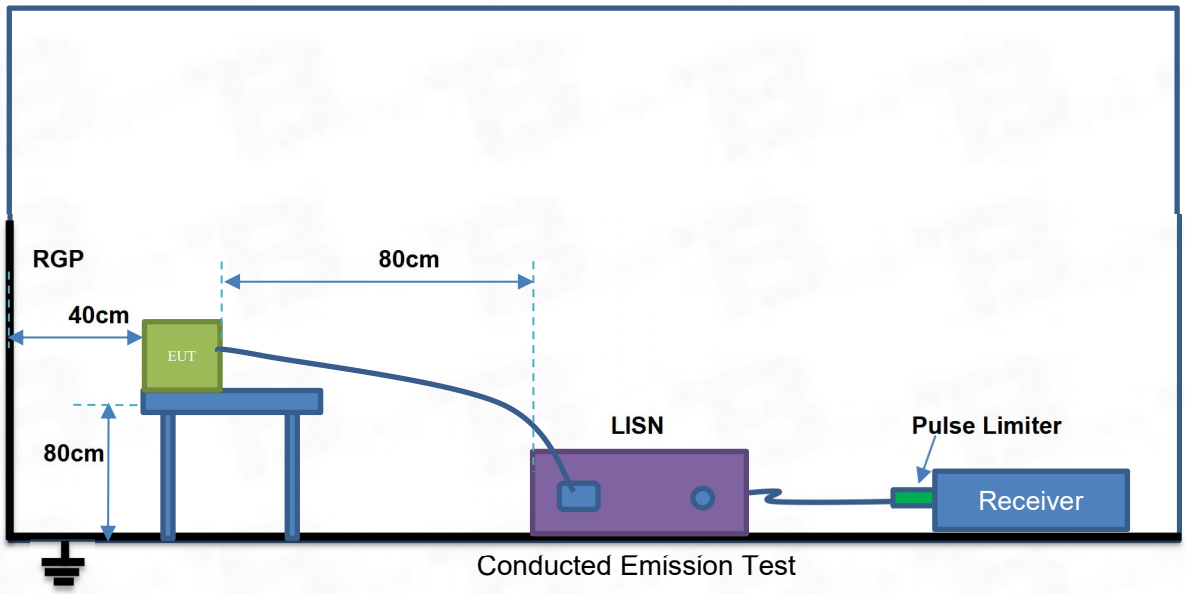
4.5 Test Setup

Test Setup 1



Radiation Test (30MHz – 1GHz)

Test Setup 2



Conducted Emission Test

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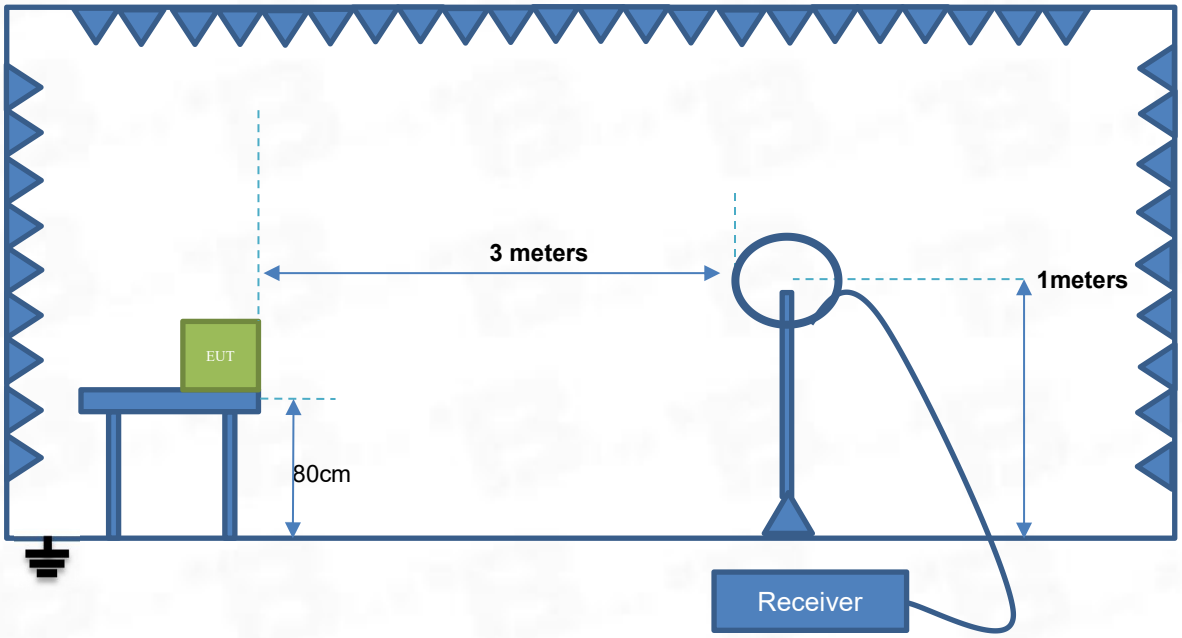
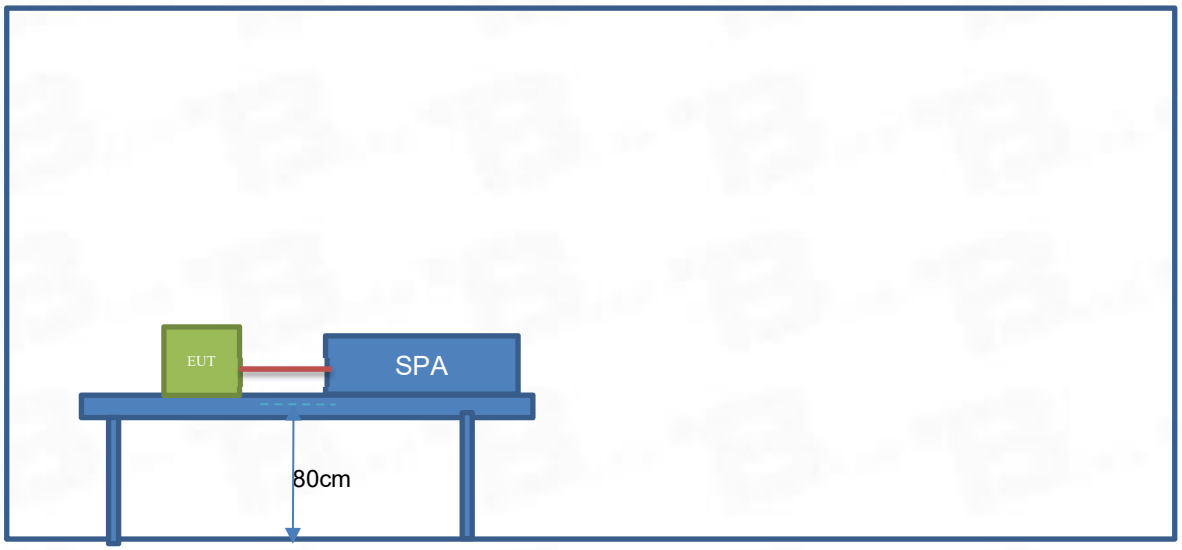
Test Setup 3



Radiation Test (9k - 30MHz)

Test Setup 4



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5. Test Items

5.1 Antenna Requirements

FCC §15.203; RSS-247, 5.4(f)

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, 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
§ 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.

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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.
The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

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5.2 20dB Occupied Bandwidth

5.2.1 Limit

FCC Part 2.1049.

5.2.2 Test Setup

See section 4.4 for test setup 4 description for the antenna port. The photo of test setup please refer to ANNEX B

5.2.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
   RBW≥1% of the 20 dB bandwidth, VBW ≥ RBW
   Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

5.2.4 Test Result

Please refer to ANNEX A.1

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5.3 AC Power Line Conducted Emissions

5.3.1 Limit

FCC §15.207

For an intentional radiator 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 within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.3.2 Test Setup

See section 4.4 for test setup description for setup 2. The photo of test setup please refer to ANNEX B

5.3.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.3.4 Test Result

Please refer to ANNEX A.2

NOTE:

1. Results (dBuV) = Reading (dBuV) + Factor (dB)
   The reading level is calculated by software which is not shown in the sheet
2. Factor = Insertion loss + Cable loss
3. Over limit = Results – Limit.

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5.4 Radiated Spurious Emission

5.4.1 Limit

FCC §15.209&15.247(d) ; RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a). According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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

Note:

1. Field Strength (dBμV/m) = 20*log[Field Strength (μV/m)].
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.4.2 Test Setup

See section 4.4 for test setup description for setup 1 and 3. The photo of test setup please refer to ANNEX B

5.4.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious

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emissions is required.

General Procedure for conducted measurements in restricted bands:
a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
c) 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).
d) 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).
e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$E = EIRP – 20\log D + 104.8$

where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm D = specified measurement distance in meters.
f) Compare the resultant electric field strength level to the applicable limit.

g) Perform radiated spurious emission test.

<u>Quasi-Peak measurement procedure</u>

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.
As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.
Peak power measurement procedure:

Peak emission levels are measured by setting the instrument as follows:
a)RBW = as specified in Table 1.
b)VBW ≥ 3 x RBW.
c)Detector = Peak.
d)Sweep time = auto.
e)Trace mode = max hold.
f)Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer

for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction:

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.

c) RBW = 1 MHz (unless otherwise specified).

d) VBW ≥ 3 x RBW.

e) Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is 20 log(1/x), where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not

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permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain:

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).
Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test:

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.
For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.
The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.
Use the following spectrum analyzer settings:

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Span = wide enough to fully capture the emission being measured RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak Trace = max hold

5.4.4 Test Result

Please refer to ANNEX A.3

NOTE:
1. Results (dBuV) = Reading (dBuV) + Factor (dB)
The reading level is calculated by software which is not shown in the sheet
2. Factor = Insertion loss + Cable loss
3. Over limit = Results – Limit.

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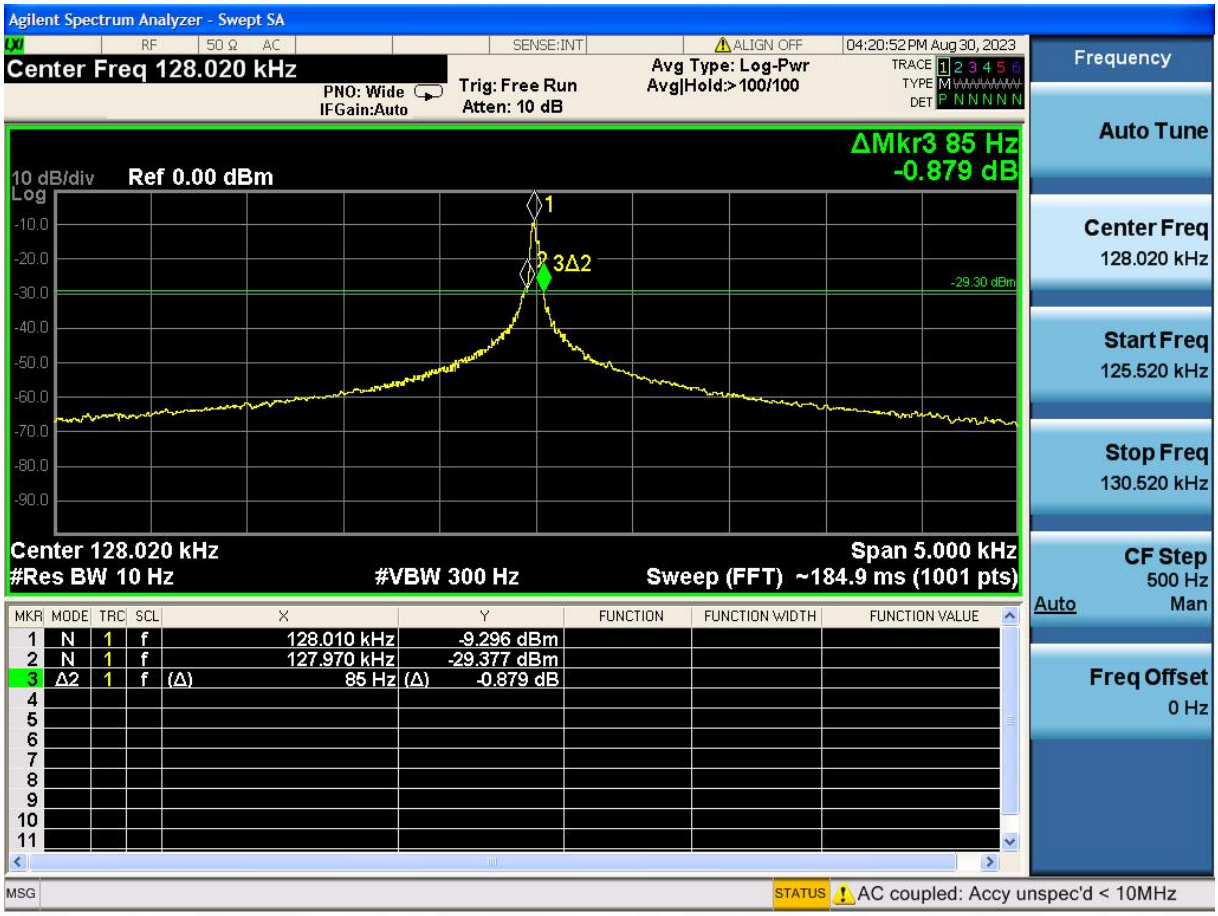
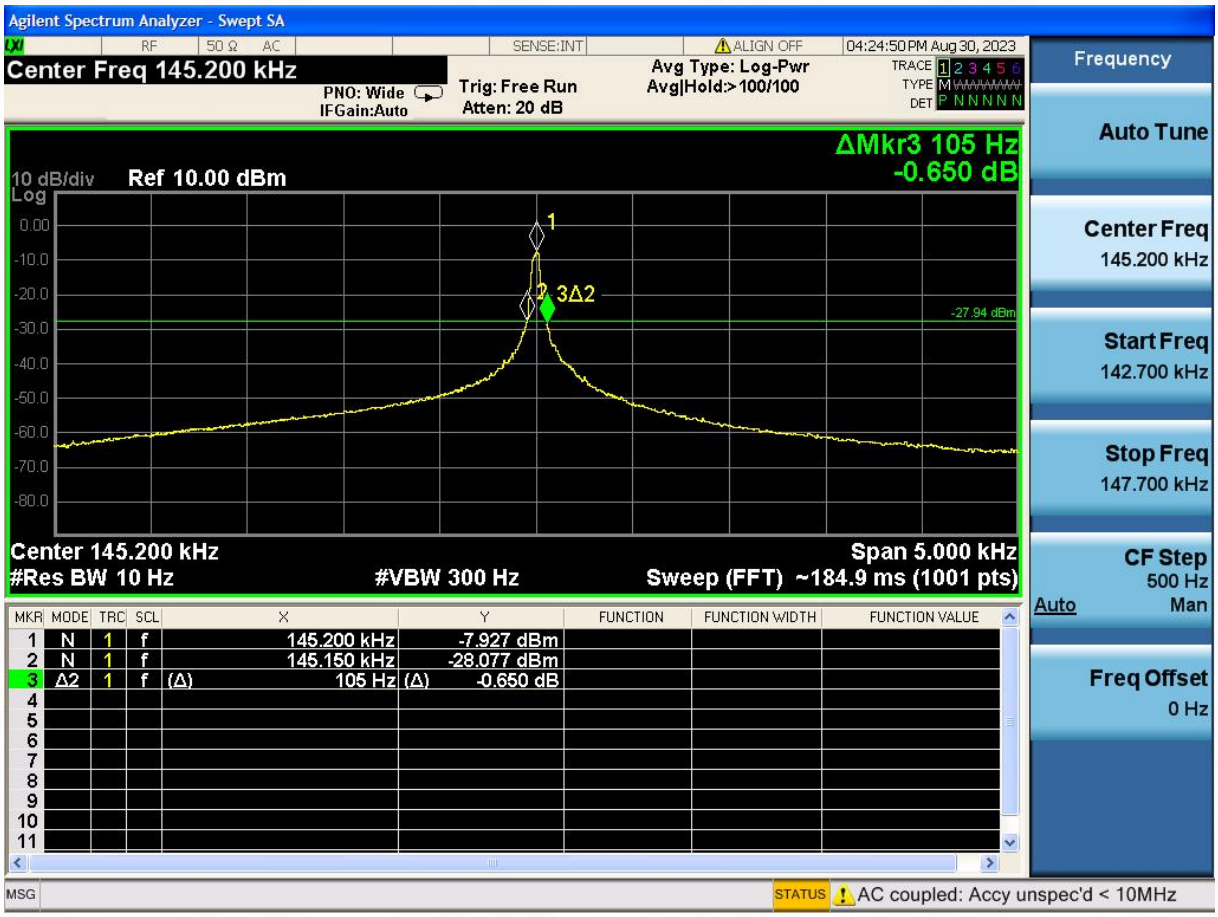
ANNEX A Test Results

A.1 20dB Occupied Bandwidth

ANT1



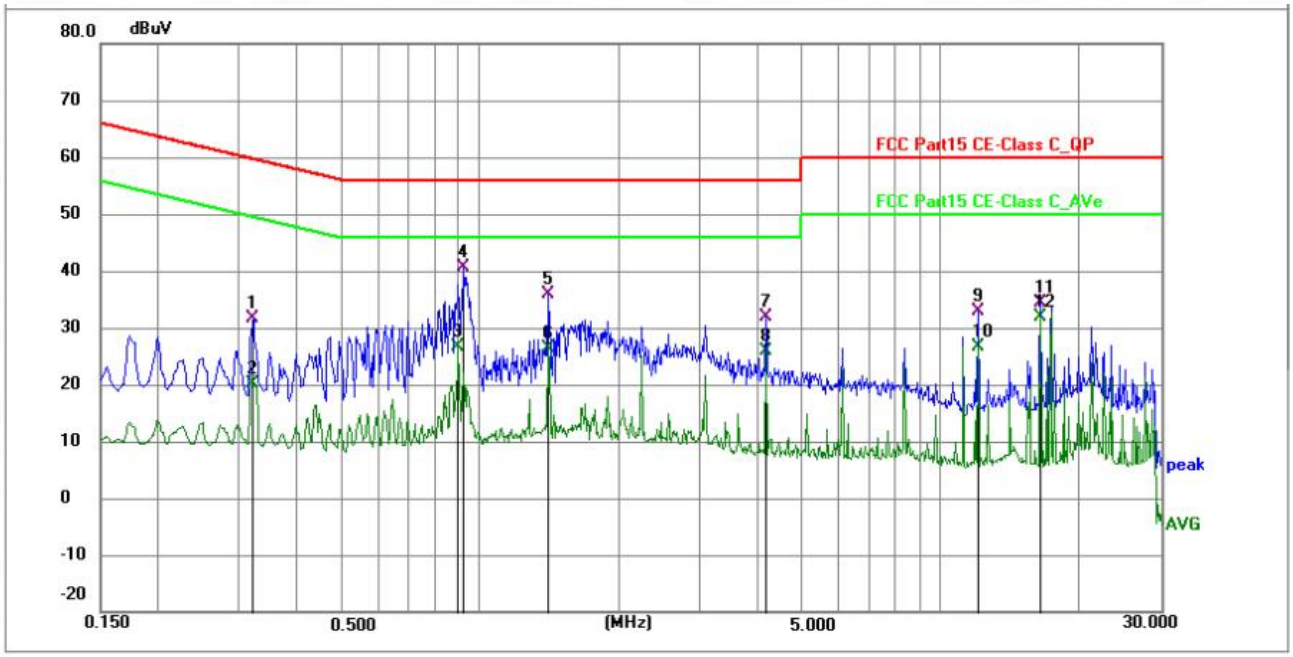
ANT2


Agilent Spectrum Analyzer - Swept SA
Center Freq 145.200 kHz
PNO: Wide
IFGain:Auto
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
04:24:50 PM Aug 30, 2023
ΔMkr3 105 Hz
-0.650 dB
10 dB/div
Ref 10.00 dBm
-27.94 dBm
Center 145.200 kHz
#Res BW 10 Hz
#VBW 300 Hz
Span 5.000 kHz
Sweep (FFT) ~184.9 ms (1001 pts)
1 N 1 f 145.200 kHz -7.927 dBm
2 N 1 f 145.150 kHz -28.077 dBm
3 Δ2 1 f (Δ) 105 Hz (Δ) -0.650 dB
Frequency
Auto Tune
Center Freq 145.200 kHz
Start Freq 142.700 kHz
Stop Freq 147.700 kHz
CF Step 500 Hz
Auto Man
Freq Offset 0 Hz
AC coupled: Accy unspec'd < 10MHz

A.2 AC Power Line Conducted Emissions

Test Data and Plots

A.2.1 Test at L Phase



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3209	20.97	10.54	31.51	59.68	-28.17	QP	P	
2	0.3209	9.49	10.54	20.03	49.68	-29.65	AVG	P	
3	0.8970	15.92	10.72	26.64	46.00	-19.36	AVG	P	
4 *	0.9194	29.90	10.72	40.62	56.00	-15.38	QP	P	
5	1.4100	25.09	10.74	35.83	56.00	-20.17	QP	P	
6	1.4100	15.69	10.74	26.43	46.00	-19.57	AVG	P	
7	4.1684	21.04	10.85	31.89	56.00	-24.11	QP	P	
8	4.1684	14.97	10.85	25.82	46.00	-20.18	AVG	P	
9	12.0390	21.79	11.13	32.92	60.00	-27.08	QP	P	
10	12.0390	15.51	11.13	26.64	50.00	-23.36	AVG	P	
11	16.3994	22.97	11.30	34.27	60.00	-25.73	QP	P	
12	16.3994	20.60	11.30	31.90	50.00	-18.10	AVG	P	

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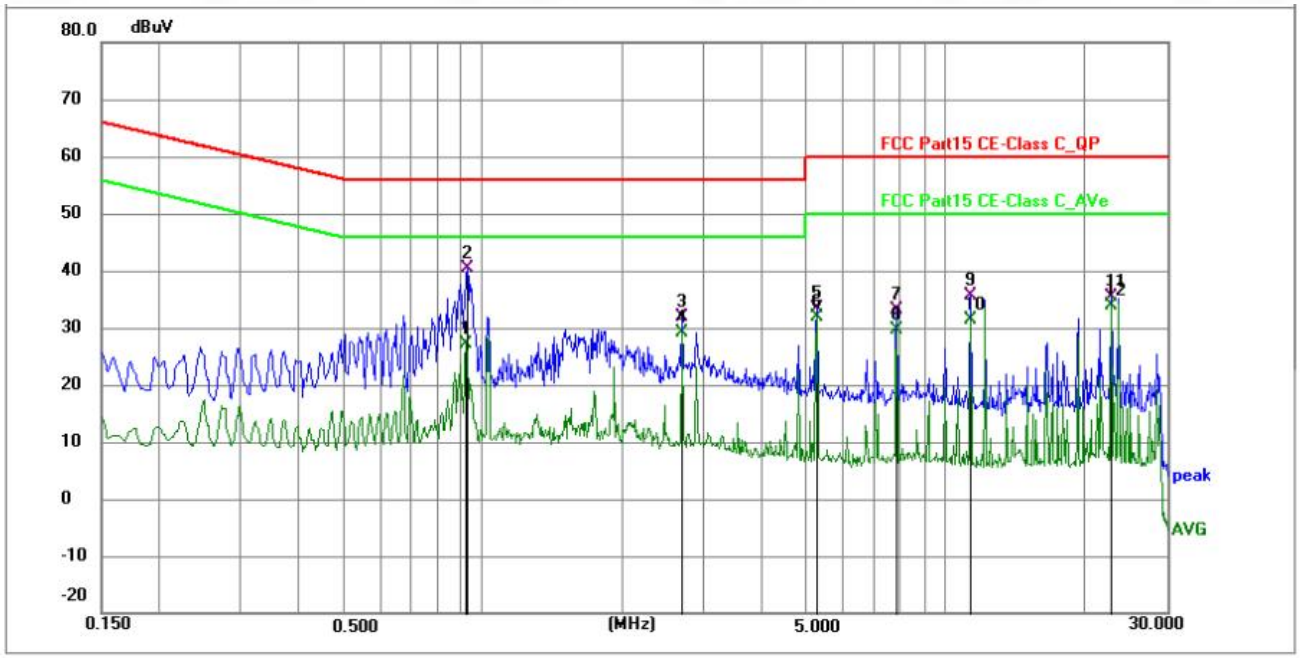
A.2.2 Test at N Phase



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.9193	16.50	10.72	27.22	46.00	-18.78	AVG	P	
2 *	0.9240	29.63	10.72	40.35	56.00	-15.65	QP	P	
3	2.6924	21.11	10.77	31.88	56.00	-24.12	QP	P	
4	2.6924	18.41	10.77	29.18	46.00	-16.82	AVG	P	
5	5.2530	22.65	10.85	33.50	60.00	-26.50	QP	P	
6	5.2530	20.91	10.85	31.76	50.00	-18.24	AVG	P	
7	7.8135	22.26	10.95	33.21	60.00	-26.79	QP	P	
8	7.8135	18.79	10.95	29.74	50.00	-20.26	AVG	P	
9	11.2782	24.56	11.10	35.66	60.00	-24.34	QP	P	
10	11.2782	20.17	11.10	31.27	50.00	-18.73	AVG	P	
11	22.6770	24.10	11.40	35.50	60.00	-24.50	QP	P	
12	22.6770	22.59	11.40	33.99	50.00	-16.01	AVG	P	

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A.3 Radiated Spurious Emission

9 kHz ~ 30 MHz

Test Antenna coaxial

Suspected Date List							
NO	Freq.(MHz)	Reading (dBμV/m)	Factor（dB）	Level（dBμV/m）	Limit（dBμV/m）	Margin（dB）	Detector
1	0.0152	23.11	21.13	44.24	170.53	-126.29	PK
2	0.1487	22.18	21.22	43.40	95.24	-51.84	PK
3	0.2324	21.23	24.13	45.36	87.34	-41.98	PK
4	1.7582	17.55	25.24	42.79	53.32	-10.53	PK
5	7.5691	23.66	26.37	50.03	67.28	-17.25	PK
6	10.6284	22.99	23.26	46.25	68.66	-22.41	PK

Test Antenna coplanar

Suspected Date List							
NO	Freq.(MHz)	Reading (dBμV/m)	Factor（dB）	Level（dBμV/m）	Limit（dBμV/m）	Margin（dB）	Detector
1	0.0117	23.12	21.54	44.66	171.56	-126.90	PK
2	0.1572	22.15	21.23	43.38	94.33	-50.95	PK
3	0.2152	20.33	24.22	44.55	87.24	-42.69	PK
4	1.8247	17.68	26.58	44.26	53.25	-8.99	PK
5	8.2247	21.69	26.54	48.23	67.36	-19.13	PK
6	10.5587	22.98	23.11	46.09	67.22	-21.13	PK

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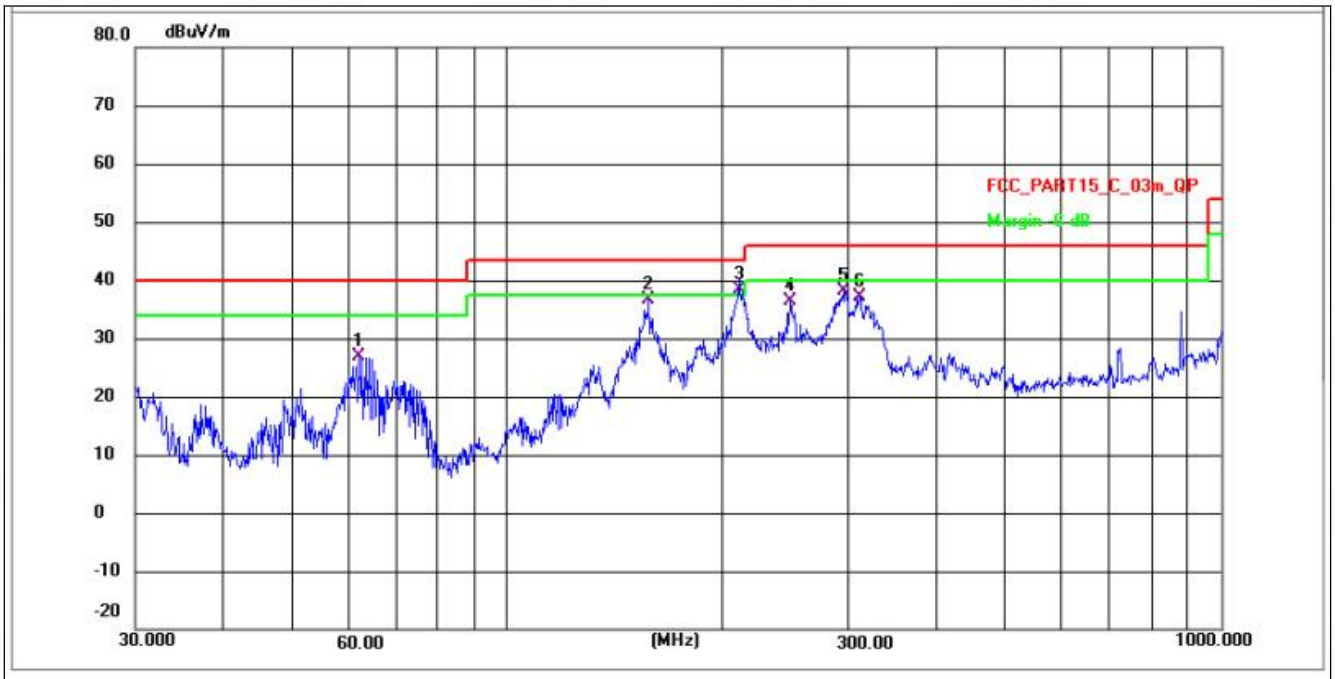
30 MHz ~ 1GHz

Test Antenna Horizontal (30MHz to 1GHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	61.8864	44.99	-18.18	26.81	40.00	-13.19	QP	P
2	157.8353	64.41	-27.71	36.70	43.50	-6.80	QP	P
3 *	211.5264	65.13	-26.83	38.30	43.50	-5.20	QP	P
4	249.4250	62.15	-25.85	36.30	46.00	-9.70	QP	P
5	296.1836	63.50	-25.47	38.03	46.00	-7.97	QP	P
6	312.1794	62.57	-25.33	37.24	46.00	-8.76	QP	P

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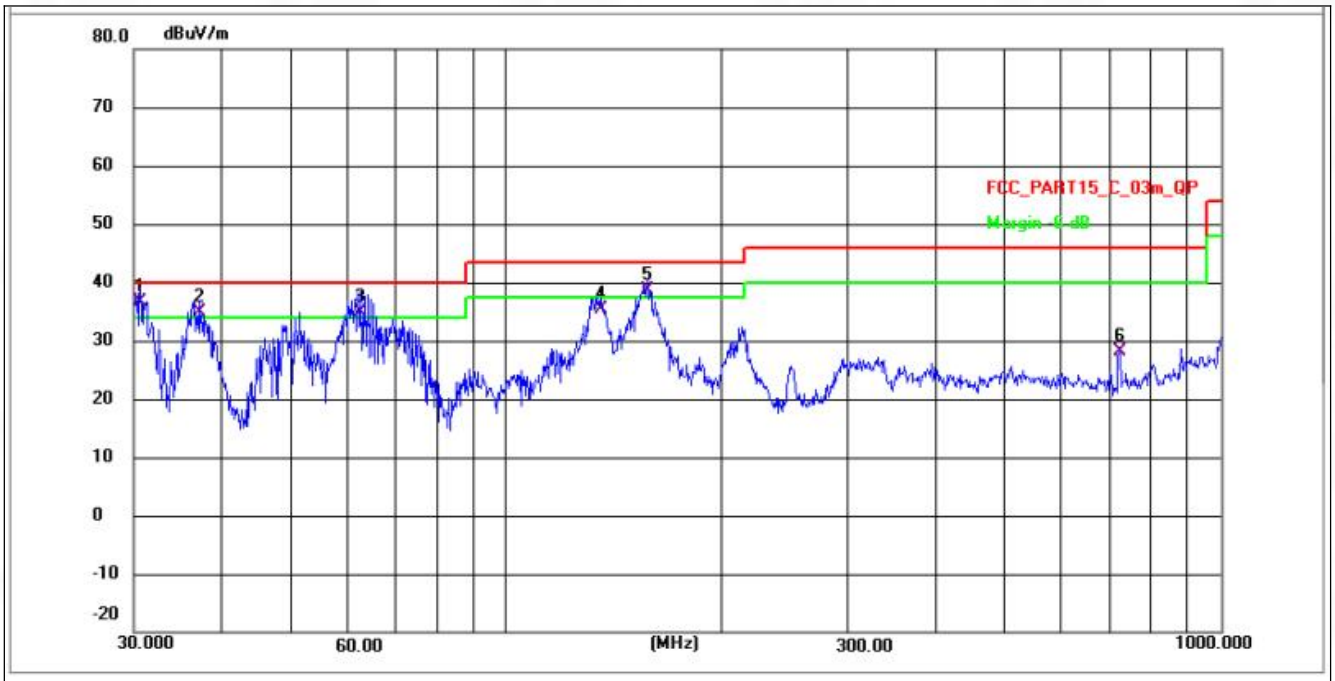
Test Antenna Vertical (30MHz to 1GHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	30.6379	56.33	-19.63	36.70	40.00	-3.30	QP	P
2 !	37.0899	55.59	-20.59	35.00	40.00	-5.00	QP	P
3 !	62.5409	54.92	-20.12	34.80	40.00	-5.20	QP	P
4	135.7440	63.21	-27.91	35.30	43.50	-8.20	QP	P
5 !	157.8354	66.31	-27.71	38.60	43.50	-4.90	QP	P
6	722.9924	51.79	-23.69	28.10	46.00	-17.90	QP	P

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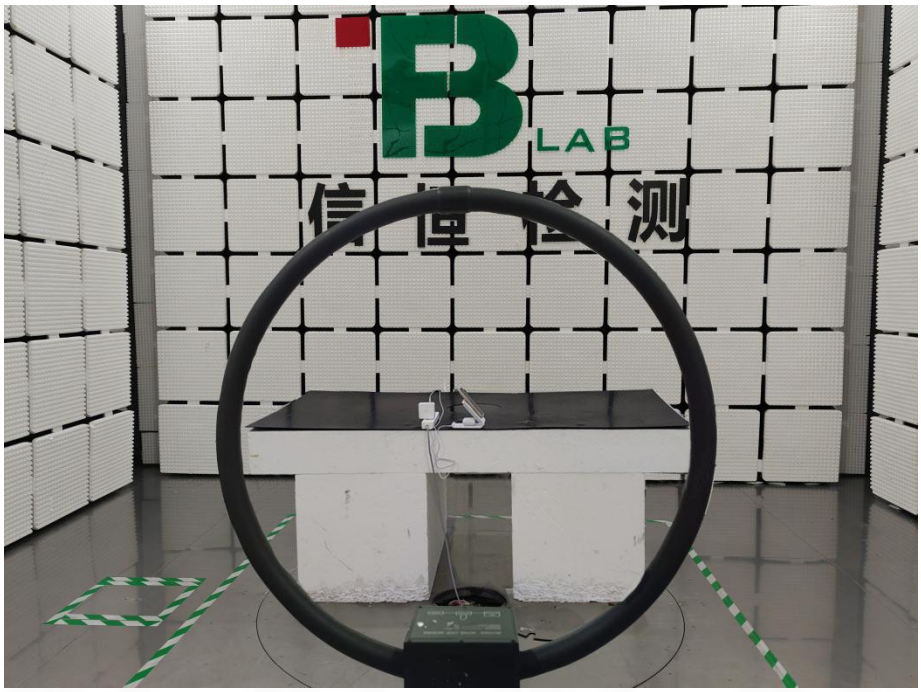
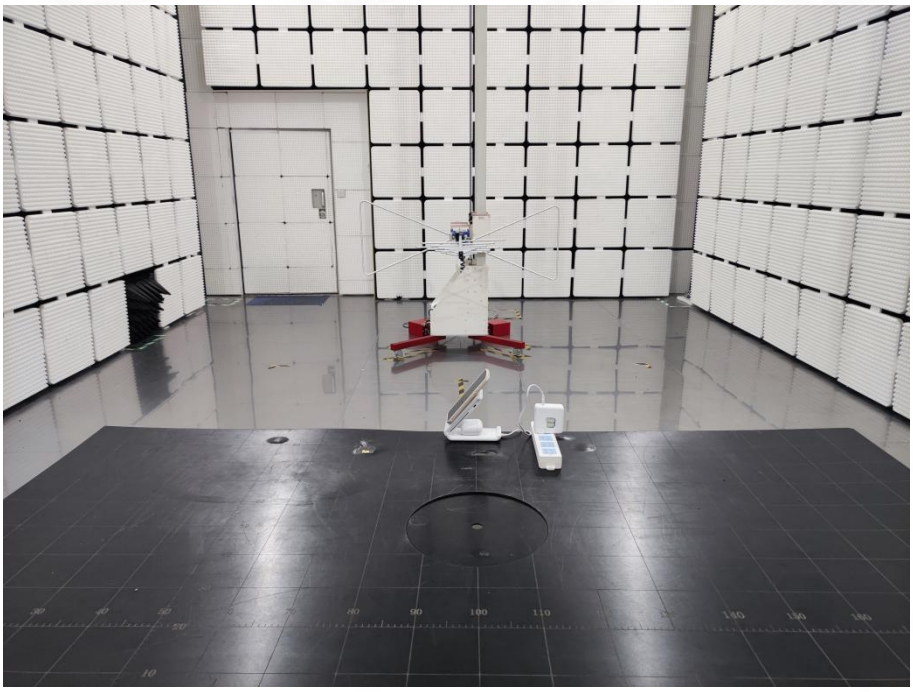
ANNEX B TEST SETUP PHOTOS

Radiated Emission (9 kHz -30MHz)


Radiated Emission (30MHz-1GHz)



Conducted Emission (AC Mains)

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ANNEX C EUT EXTERNAL PHOTOS

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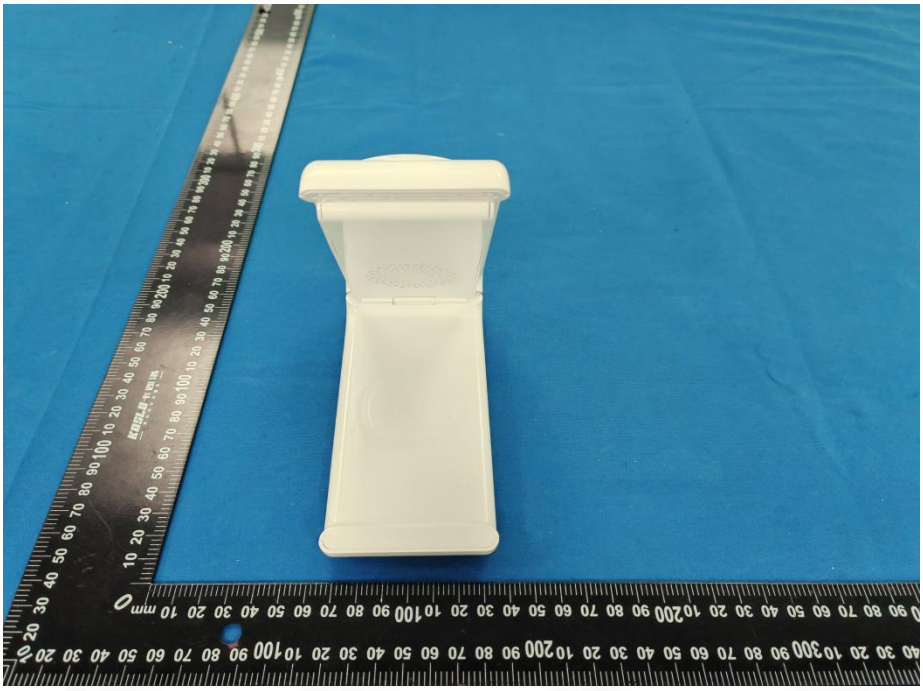

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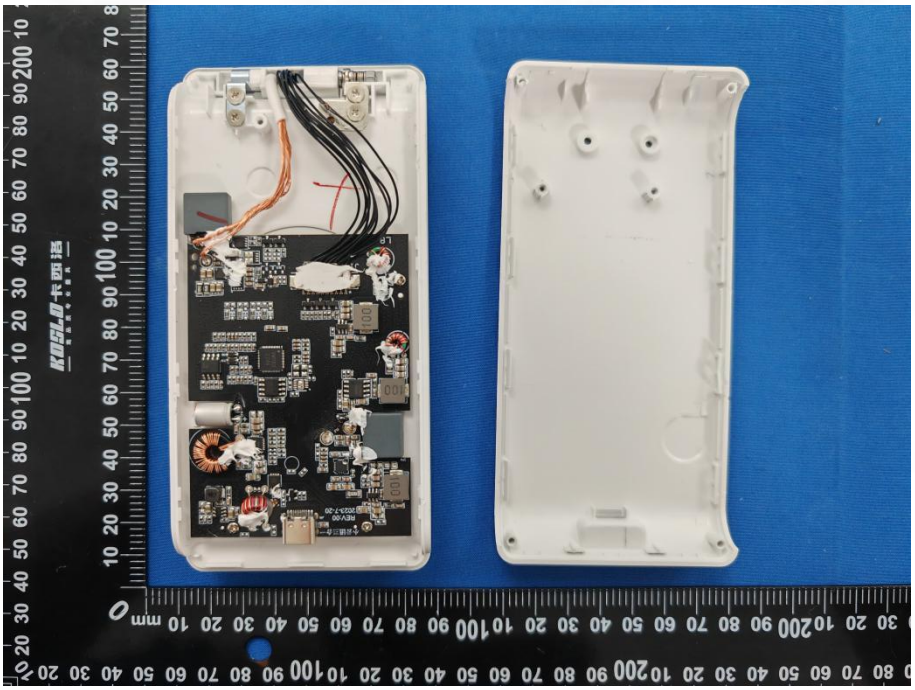
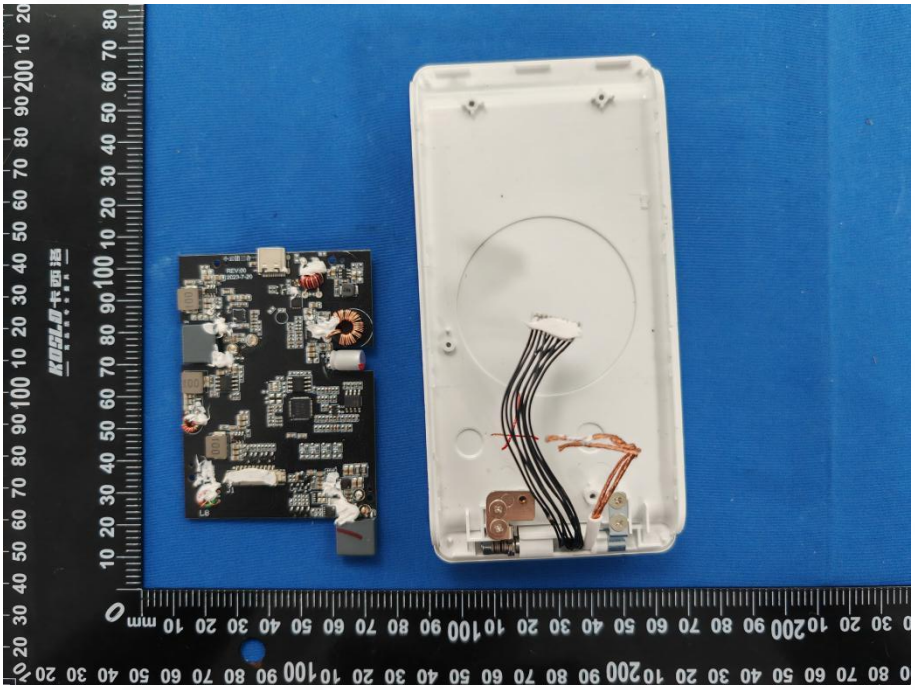
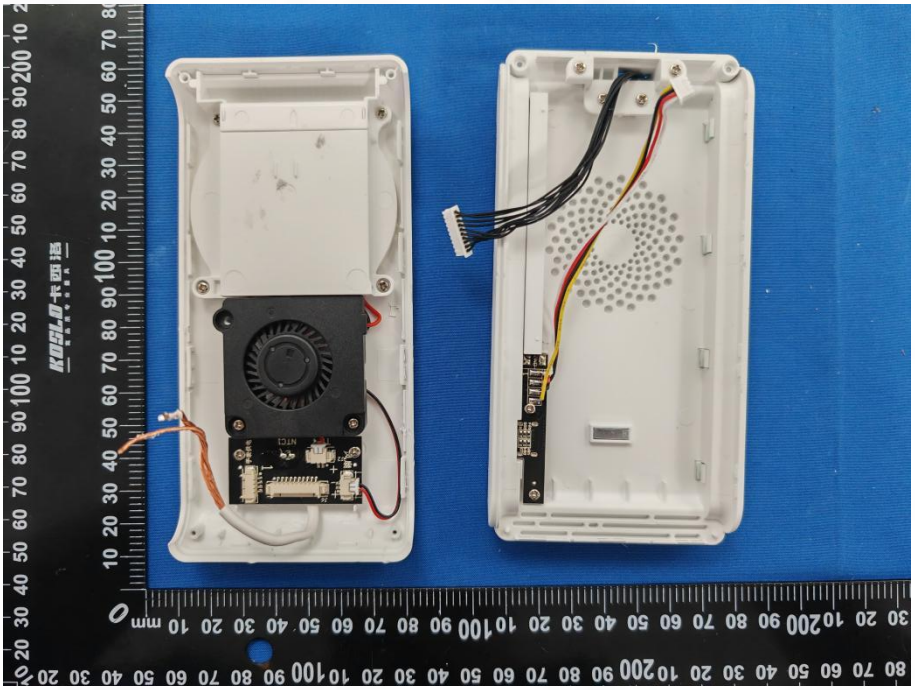
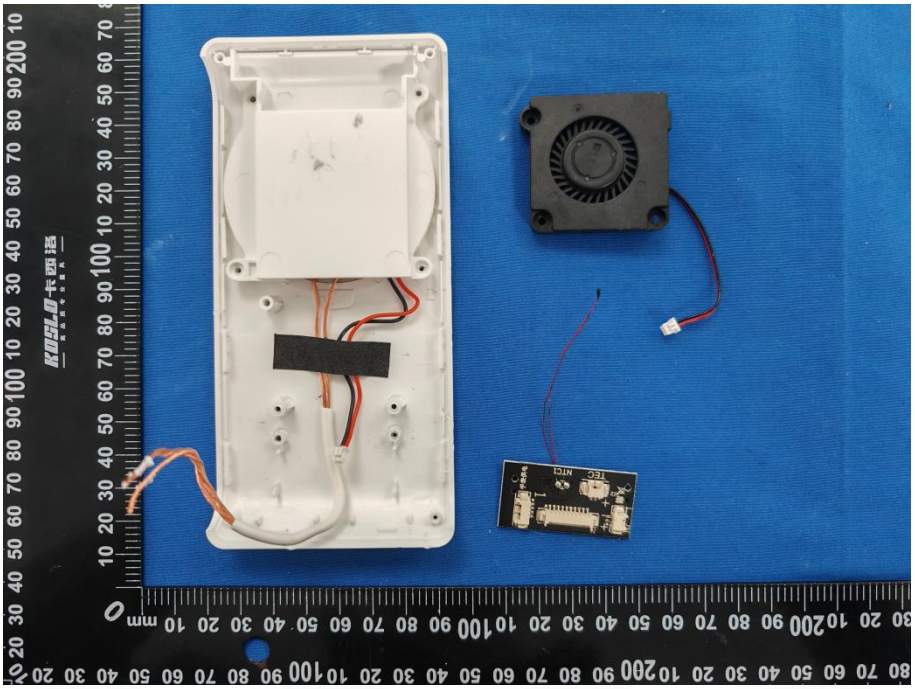
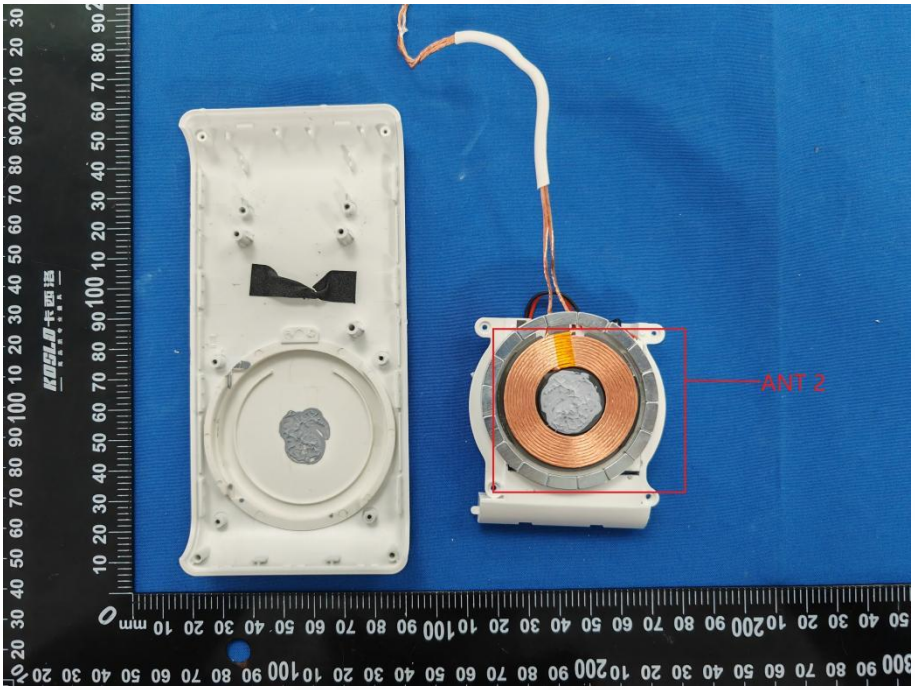
ANNEX D EUT INTERNAL PHOTOS







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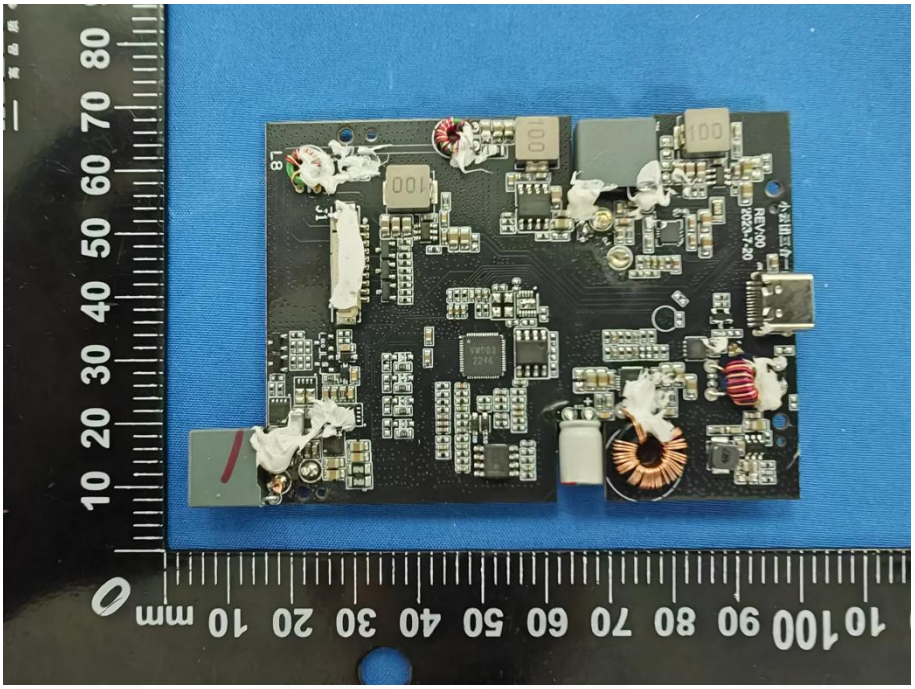
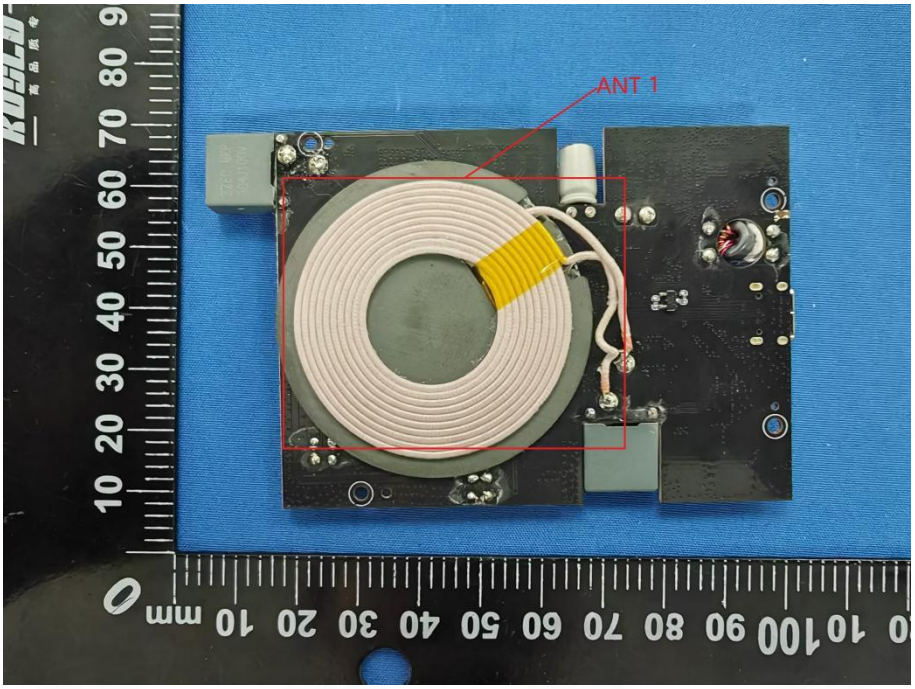
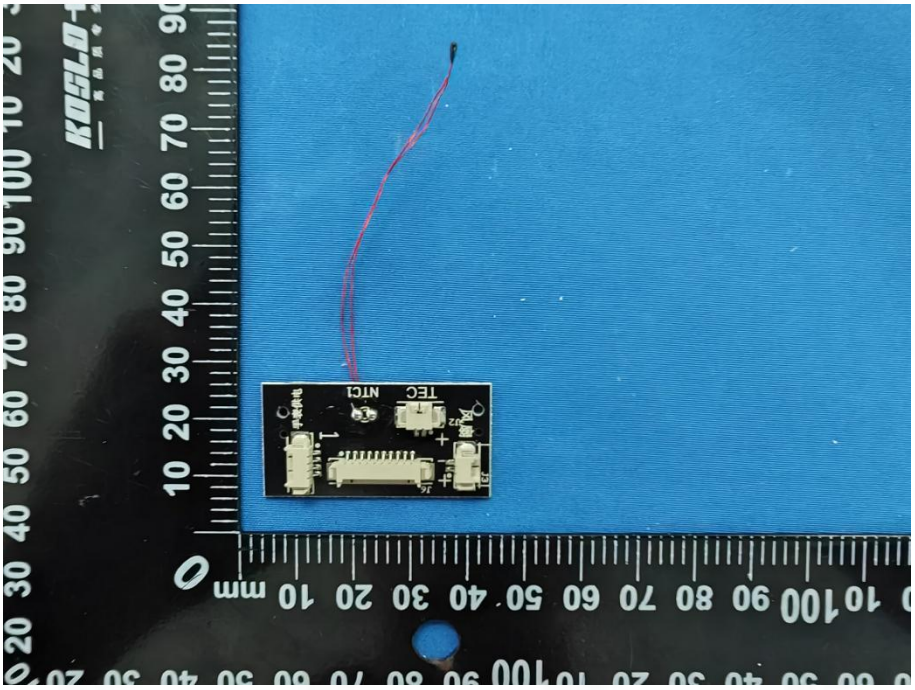
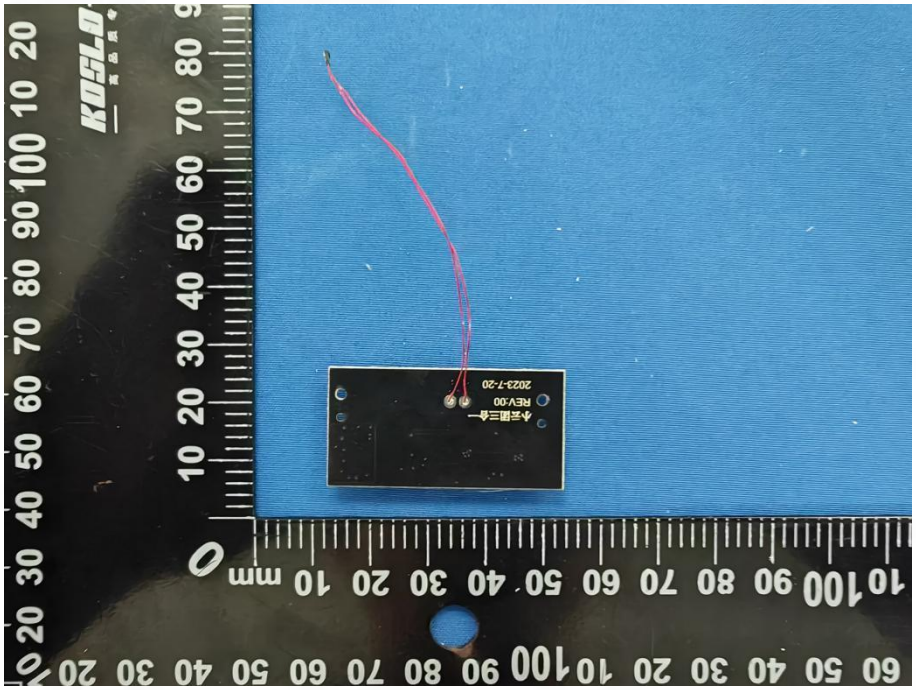
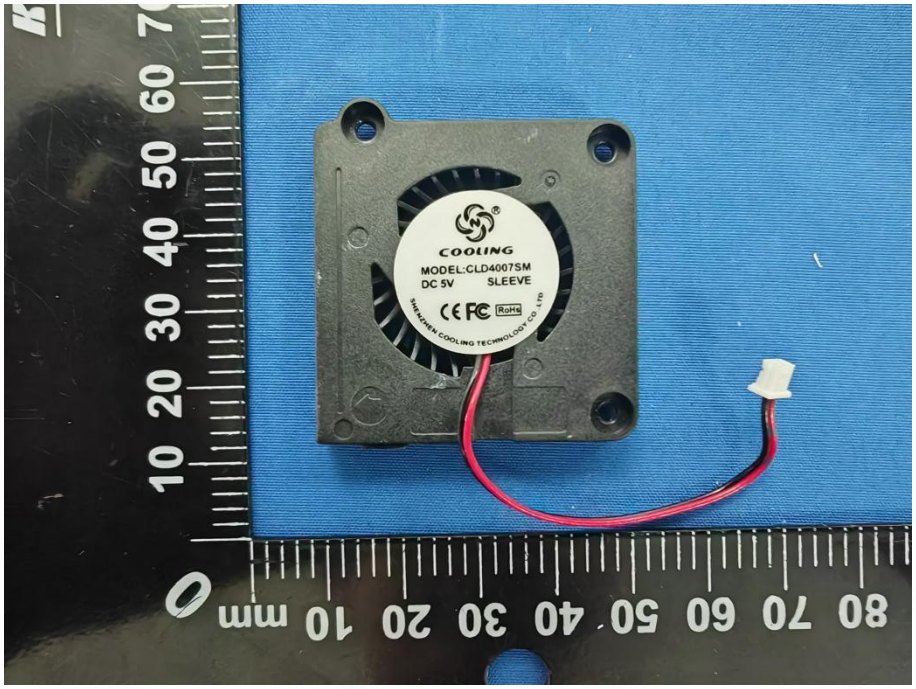



ANT 1


TEC
NTC1





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