TEST REPORT

Applicant:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
Equipment Type:	Mobile Phone
Model Name:	CPH2557, A303OP
Brand Name:	OPPO
FCC ID:	R9C-AC105
Test Standard:	47 CFR Part 15 Subpart C ANSI C63.10-2020
Sample Arrival Date:	Jun. 25, 2023
Test Date:	Jun. 27, 2023 - Jul. 22, 2023
Date of Issue:	Oct. 16, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Liu Zhenxiang **Checked by:** Xia Long **Approved by:** Liao Jianming (Technical Director)

Revision History

Version	Issue Date	Revisions
Rev. 01	Oct. 09, 2023	Initial Issue
Rev. 02	Oct. 16, 2023	Update antenna type.

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China

2.2 Manufacturer Information

Manufacturer	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Mobile Phone
Model Name Under Test	CPH2557
Series Model Name	A303OP
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, only differ in model name, Single and dual card. (this information provided by the applicant)
Hardware Version	11
Software Version	ColorOS 13.1
Dimensions (Approx.)	165.61*76.02*7.99 mm
Weight (Approx.)	193 g
EUT ID	S04
IMEI Number	S04: IMEI1:862484060026534, IMEI2:862484060026526

2.4 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EDGE 850/1900 MHz 3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network LTE FDD Band 2/4/5/7/12/13/17/26 LTE TDD Band 38/41 Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40), VHT20/40 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80) U-NII-1/2A/2C/3, GPS, GLONASS, BDS, Galileo, SBAS, FM Receiver, NFC

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

Modulation Type	ASK
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Frequency Range	13.56 MHz
Receiver Categorization	3
Number of channel	1
Tested Channel	1
Antenna Type	FPC Antenna

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	ISED Part No.	Verdict
1	Antenna Requirement	15.203	RSS-Gen 6.8	N/A Note1
2	Emissions Bandwidth	15.215	RSS-Gen 6.7	Pass
3	Field Strength of Fundamental Emissions	15.225(a)	RSS-210 B.6	Pass
4	Radiated Emissions	15.225(d) 15.209	RSS-210 B.6	Pass
5	Frequency Stability	15.225(e)	RSS-210 B.6	Pass
6	Conducted Emission	15.207	RSS-Gen 8.8	Pass

Note1: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203 & RSS-Gen 8.3.

Note2: Compared with the EUT of test report BL-SZ2360554-402, the changes of the EUT of this report as below:

1. Remove LTE B66, LTE CA and 5G NR Bands.
2. NFC device are modified from PN560 to SN220P.
3. Add series model name A303OP.(Just Single and dual card differences.)

Other hardware circuit and software are the same as EUT referred in test report BL-SZ2360554-402.

All items were retest in this report, but only the worst data was shown in this report.

3.3 Test Uncertainty

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

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.2 dB
Radiated emissions (9 kHz-30 MHz)	4.3 dB
Radiated emissions (30 MHz-1 GHz)-10m	4.8 dB
Radiated emissions (30 MHz-1 GHz)-3m	4.8 dB
Radiated emissions (1 GHz-18 GHz)-3m	4.9 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

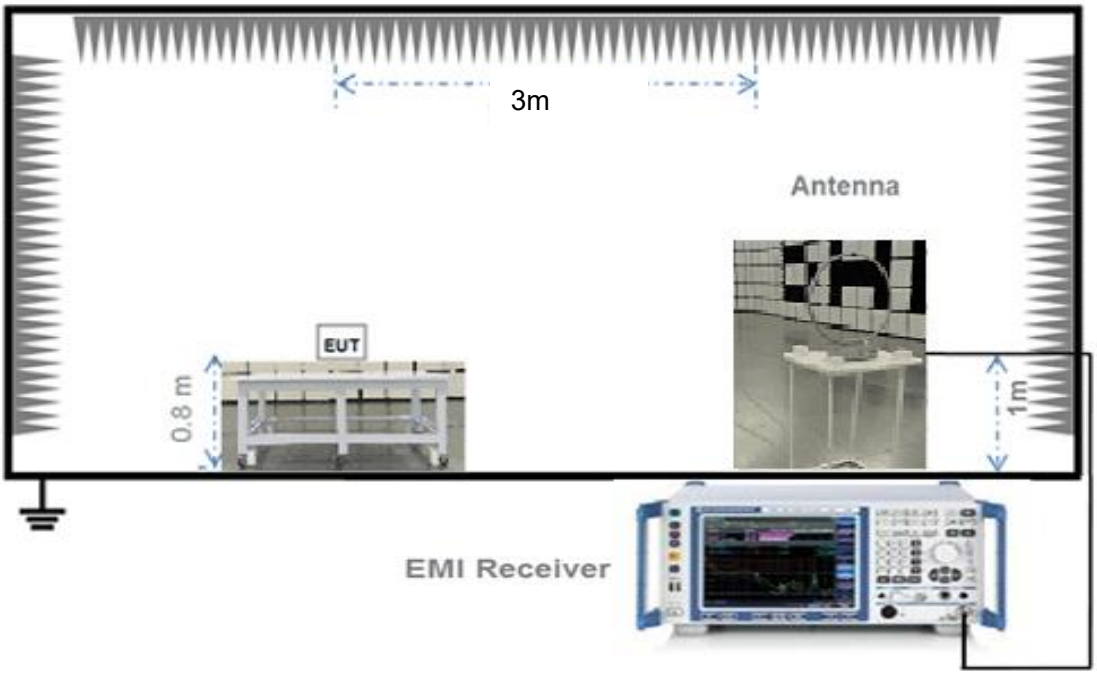
During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	30% to 60%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22℃ to +25℃
Working Voltage of the EUT	NV (Normal Voltage)	3.91 V

4.2 Test Setups

Test Setup 1

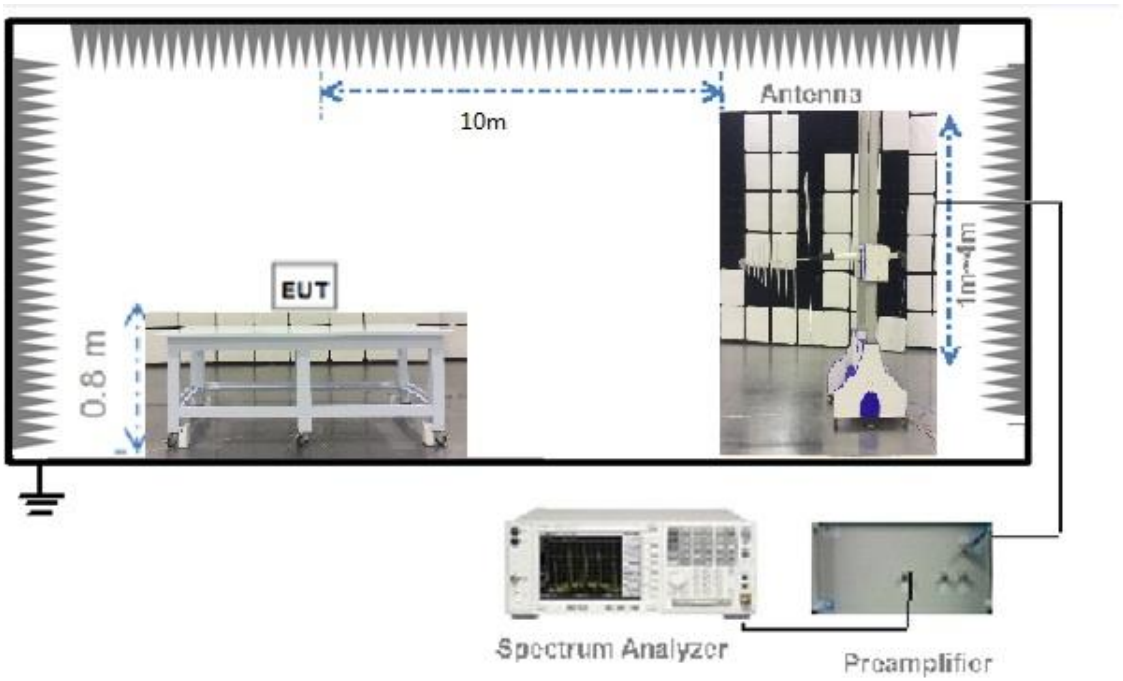
Radiated Test (Below 30 MHz)



(Diagram 1)

Test Setup 2

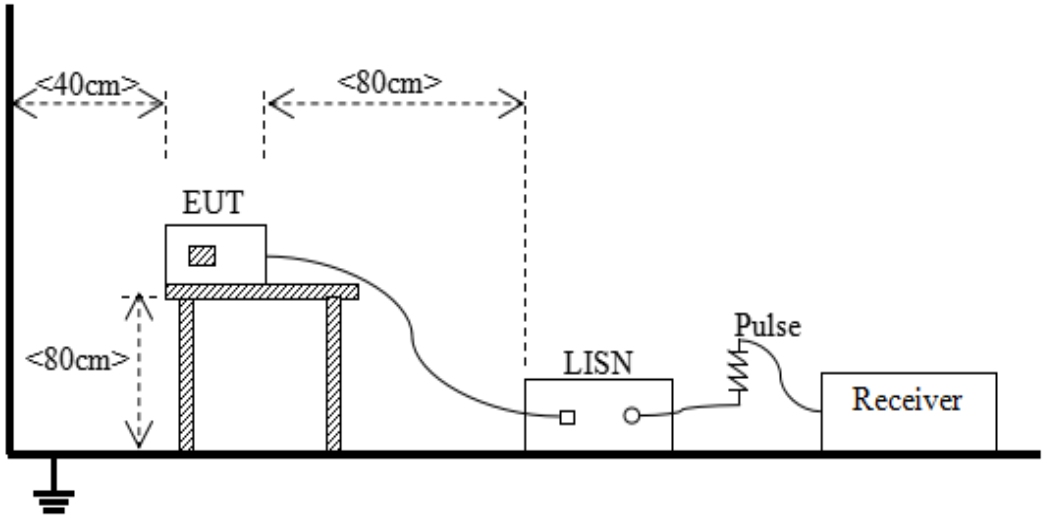
Radiated Test (30 MHz-1 GHz)



(Diagram 2)

Test Setup 3

AC Power Supply Port Test



(Diagram 3)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203

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.

RSS-Gen 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which

can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

Reference Documents	Item
Photo	Please refer EUT internal photos.

5.2 Emission Bandwidth

5.2.1 Definition

15.215(c);

Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

RSS-Gen 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSS.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

• The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.

• The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

5.2.2 Test Setup

See section 4.2(Diagram 1) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = between 2 to 5 times the OBW

RBW = 1% to 5% the OBW

VBW ≥ 3RBW

Sweep = auto

Detector function = peak

Trace = max hold

The 99% emission bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = between 1.5 to 5 times the OBW

RBW = 1% to 5% OBW

VBW ≥ 3RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.2.4 Test Result and Test Equipment List

Please refer to ANNEX A.1

5.3 Field Strength of Fundamental Emissions and Radiated Emissions

5.3.1 Limit

FCC §15.225(a), (b), (c); RSS-210 B.6

According to FCC section 15.225, for <30 MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT)

There was no detected Restricted bands and Radiated spurious emission below 30MHz. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows; 3 m Limit(dBμV/m) = 20log(X)+40log(30/3)= 20log(15848)+40log(30/3) = 124dBμV

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 range (MHz)	Field Strength@30m		Field Strength@10m	Field Strength@3m
	μV/m	dBμV/m	dBμV/m	dBμV/m
Below 13.110	30	29.5	48.58	69.5
13.110 ~ 13.410	106	40.5	59.58	80.5
13.410 ~ 13.553	334	50.5	69.58	90.5
13.553 ~13.567	15848	84	103.08	124
13.567 ~ 13.710	334	50.5	69.58	90.5
13.710 ~14.010	106	40.5	59.58	80.5
Above 14.010	30	29.5	48.58	69.5

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.

FCC §15.225(d)

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 (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

Note:

1. 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 20 dB above the maximum permitted average limit.

2. For above 1000 MHz, limit field strength of harmonics: 54dBμV/m@3m (AV) and 74dBμV/m@3m (PK).

5.3.2 Test Setup

See section 4.2(Diagram 1 and Diagram 2) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The measurement frequency range is from 9 kHz 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:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for 30 MHz < f < 1 GHz, 10 kHz for 150 kHz < f < 30 MHz,
300 Hz for f < 150 kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.3.4 Test Result and Test Equipment List

Please refer to ANNEX A.2 and A.3

NOTE:

1. Results (dBμV/m) = Reading (dBμV/m) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain (dB)

3. Margin = Limit – Results

5.4 Frequency Tolerance

5.4.1 Limit

FCC §15.225(e)

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

RSS-210 B.6

(a) at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage; and

(b) at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage.

If the frequency stability limits are only met within a temperature range that is smaller than the -30°C to +50°C range specified in (a), the frequency stability requirement will be deemed to be met if the transmitter is automatically prevented from operating outside this smaller temperature range and if the published operating characteristics for the equipment are revised to reflect this restricted temperature range.

5.4.2 Test Setup

See section 4.2(Diagram 1) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

5.4.4 Test Result and Test Equipment List

Please refer to ANNEX A.4.

5.5 Conducted Emission

5.5.1 Limit

FCC §15.207; RSS-Gen

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

5.5.2 Test Setup

See section 4.2(Diagram 3) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 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.

5.5.4 Test Result and Test Equipment List

Please refer to ANNEX A.5.

NOTE:

1. Results (dBμV) = Reading (dBμV) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Margin = Limit – Results

ANNEX A TEST RESULT

A.1 Emission Bandwidth

Note: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

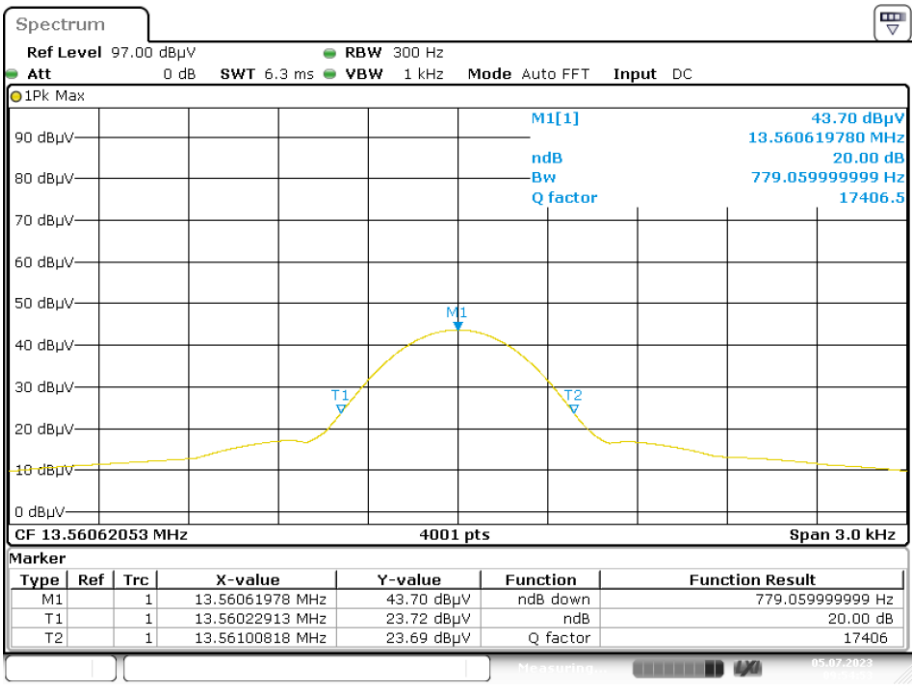
Sample No.	S04	Temperature	24.4℃
Humidity	55%RH	Pressure	101kPa
Test Engineer	Xi Zifeng	Test date	2023.6.27

Test Data

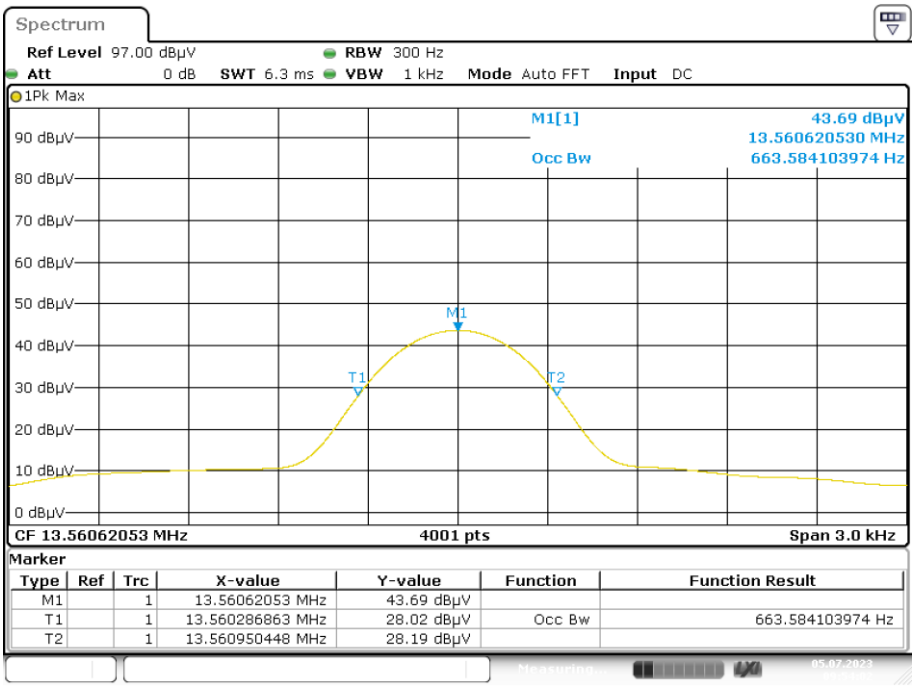
Frequency (MHz)	Emission Bandwidth(20dB down) (kHz)	Occupied Bandwidth(99%) (kHz)
13.56	0.779	0.664

Test Plots

Emission Bandwidth



99% Occupied Bandwidth



Note: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08	☒
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15	☒
Anechoic Chamber（10M）	EMC TECHNOLOGY LTD	20.1m*11.6m*7.35m	130	2021.08.15	2024.08.14	☒

A.2 Field Strength of Fundamental Emissions

Note: Field Strength of Fundamental Emissions tests were performed in X, Y, Z axis direction of EUT. And only the worst axis test condition was recorded in this test report.

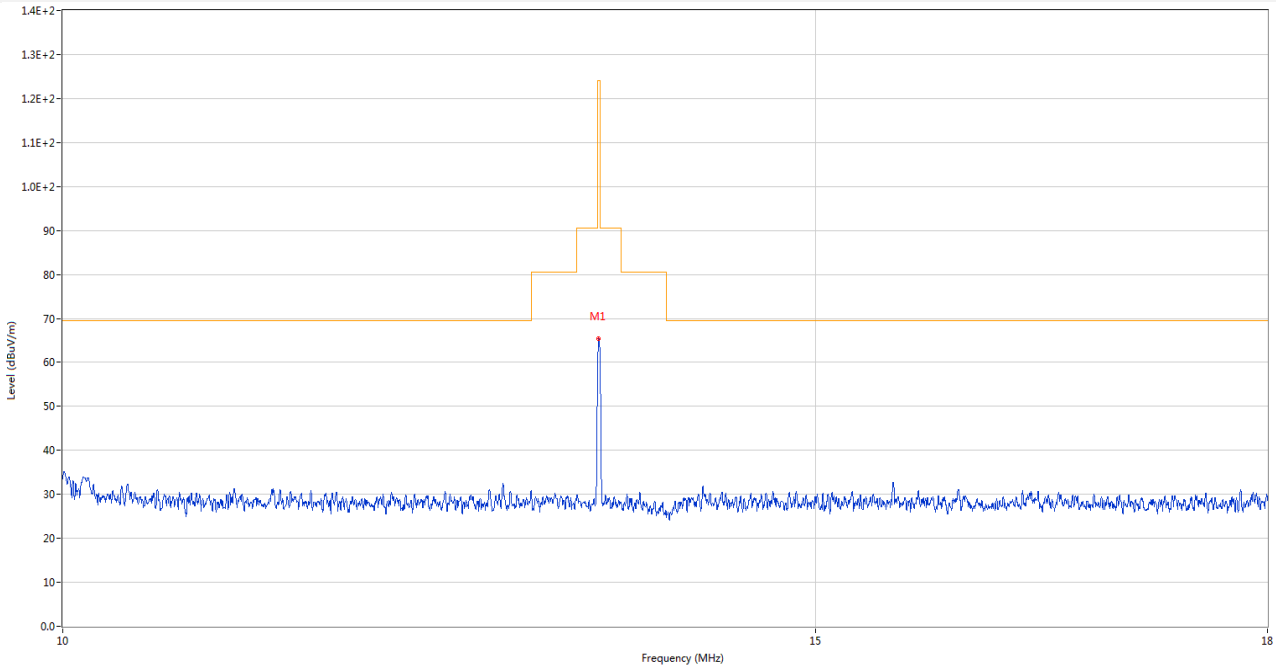
Sample No.	S04	Temperature	24.4℃
Humidity	56%RH	Pressure	101kPa
Test Engineer	Xi Zifeng	Test date	2023.6.27

Test Data

Field Strength of Fundamental Emissions Value					
Frequency (MHz)	Detector	Field Strength (dBμV/m)	Limit @3m (dBμV/m)	EUT	Margin (dB)
13.560	PEAK	65.47	124.0	Y axis	58.53

Test Plot

Test Antenna-LOOP, EUT Y axis



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	13.560	65.47	20.86	124.0	58.53	Peak	335.00	100	Vertical	N/A

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08	☒
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15	☒
Anechoic Chamber（10M）	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2021.08.15	2024.08.14	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

A.3 Radiated Emissions

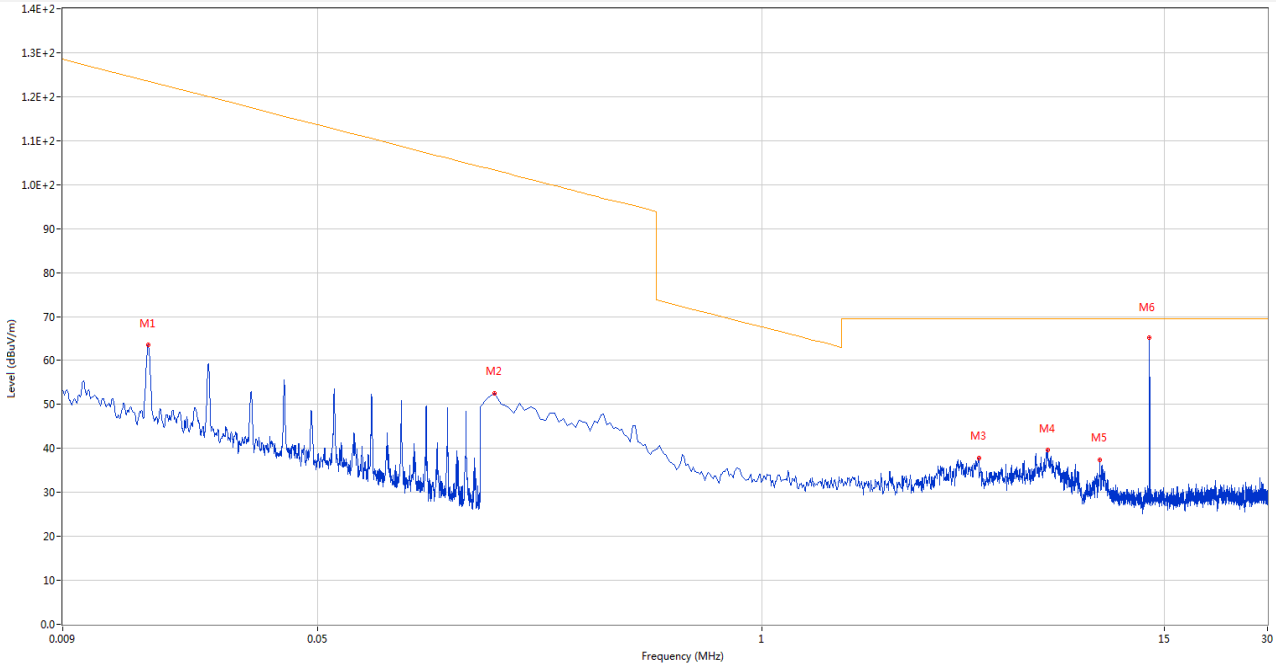
Note 1: This frequency which near 13.560 MHz with circle should be ignored because they are NFC carrier frequency.

Note 2: All Radiated Emissions tests were performed in X, Y, Z axis direction of EUT. And only the worst axis test condition was recorded in this test report.

The Data and Plots (9 kHz ~ 30 MHz)(at 10m chamber)

Sample No.	S04	Temperature	24.4℃
Humidity	56%RH	Pressure	101kPa
Test Engineer	Xi Zifeng	Test date	2023.6.27

Below 30 MHz, Test Antenna LOOP, EUT Y axis



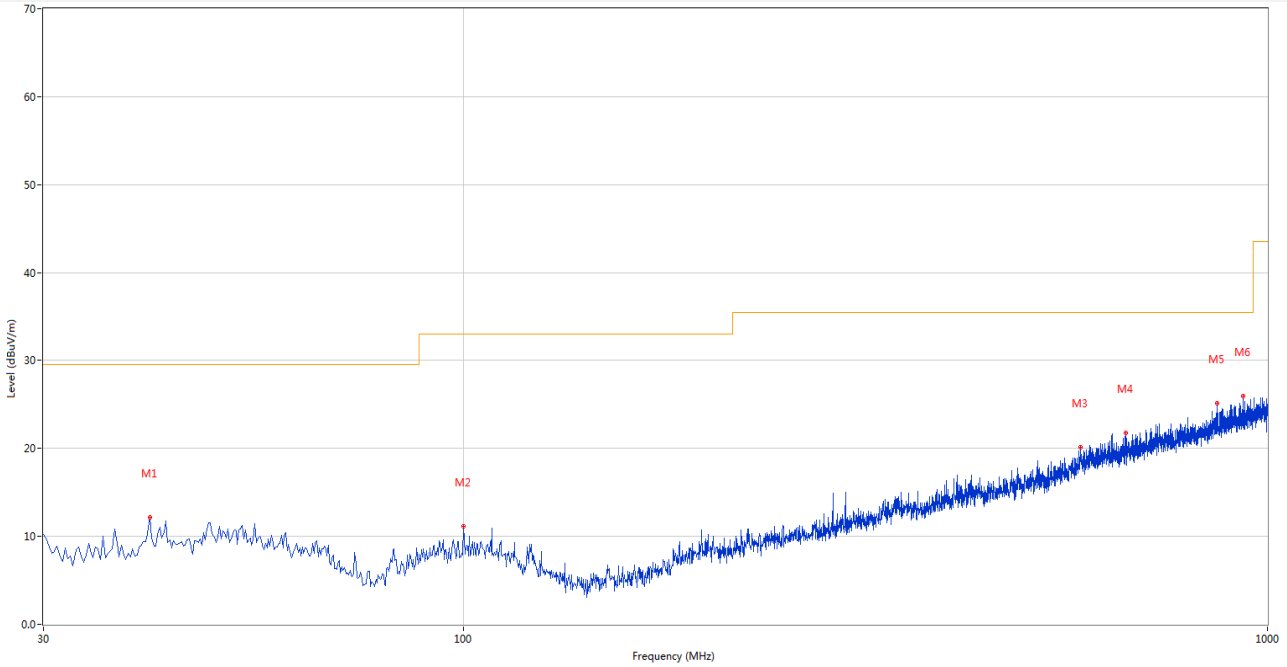
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	0.016	63.48	20.13	123.5	60.02	Peak	340.00	100	Vertical	Pass
2	0.165	52.57	20.10	103.3	50.73	Peak	118.00	100	Vertical	Pass
3	4.292	37.82	20.74	69.5	31.68	Peak	249.00	100	Vertical	Pass
4	6.836	39.59	20.81	69.5	29.91	Peak	69.00	100	Vertical	Pass
5	9.695	37.45	20.81	69.5	32.05	Peak	42.00	100	Vertical	Pass
6	13.560	65.14	20.86	69.5	4.36	Peak	330.00	100	Vertical	N/A

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
Frequency Below 30 MHz						
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08	☒
Amplifier (30-1GHz)	COM-MV	ZT30-1000M	B2018054558	2022.12.07	2023.12.06	☐
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-01162	2023.08.04	2024.08.03	☒
Anechoic Chamber （10M）	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2021.08.15	2024.08.14	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

The Data and Plots (30 MHz ~ 10th Harmonic)

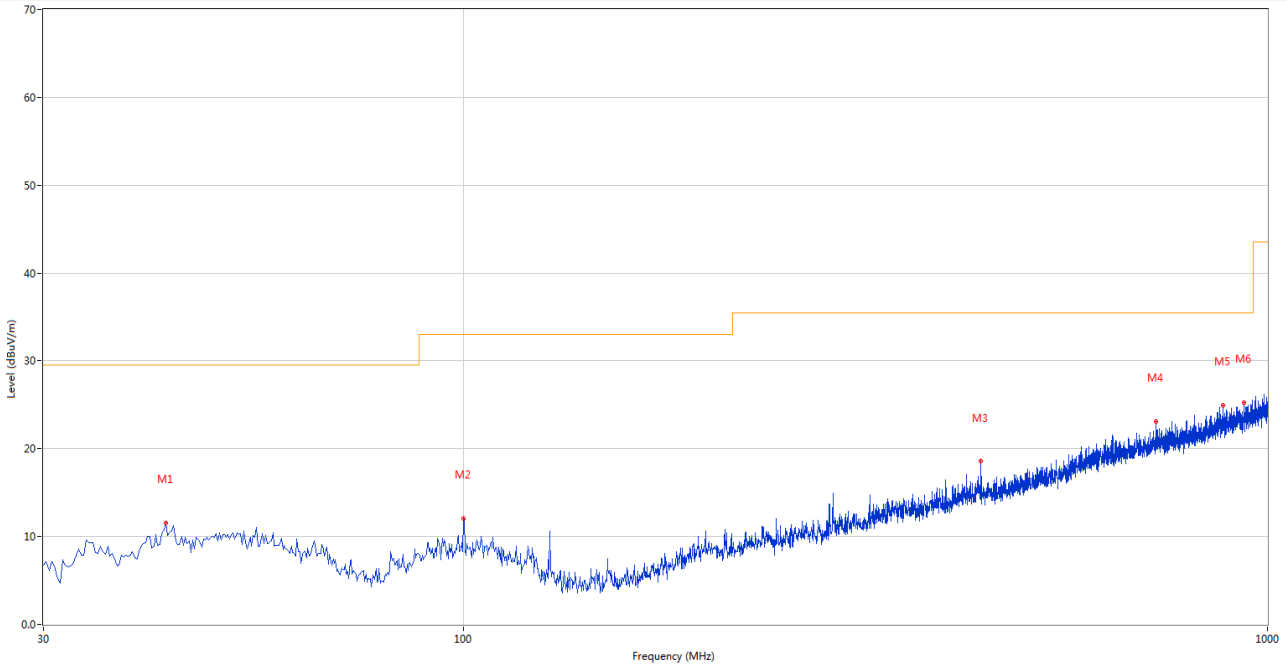
Sample No.	S04	Temperature	24.4℃
Humidity	56%RH	Pressure	101kPa
Test Engineer	Xi Zifeng	Test date	2023.6.27

30 MHz to 1 GHz, Test Antenna Vertical, EUT Y axis



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.667	12.13	-27.19	29.5	17.37	Peak	0.00	100	Vertical	Pass
2	99.823	11.13	-27.98	33.0	21.87	Peak	304.00	100	Vertical	Pass
3	585.429	20.12	-18.37	35.5	15.38	Peak	134.00	100	Vertical	Pass
4	666.646	21.81	-16.93	35.5	13.69	Peak	226.00	100	Vertical	Pass
5	866.173	25.13	-13.29	35.5	10.37	Peak	65.00	100	Vertical	Pass
6	932.844	25.93	-12.20	35.5	9.57	Peak	155.00	100	Vertical	Pass

30 MHz to 1 GHz, Test Antenna Horizontal, EUT Y axis



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.607	11.51	-26.23	29.5	17.99	Peak	161.00	100	Horizontal	Pass
2	99.823	12.02	-27.98	33.0	20.98	Peak	351.00	100	Horizontal	Pass
3	440.207	18.55	-21.76	35.5	16.95	Peak	124.00	100	Horizontal	Pass
4	726.286	23.13	-15.65	35.5	12.37	Peak	13.00	100	Horizontal	Pass
5	881.205	24.98	-12.86	35.5	10.52	Peak	208.00	100	Horizontal	Pass
6	934.784	25.21	-12.39	35.5	10.29	Peak	130.00	100	Horizontal	Pass

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
Frequency Below 30 MHz						
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08	☒
Amplifier (30-1GHz)	COM-MV	ZT30-1000M	B2018054558	2022.12.07	2023.12.06	☒
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15	☐
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-01162	2023.08.04	2024.08.03	☒
Anechoic Chamber （10M）	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2021.08.15	2024.08.14	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

A.4 Frequency Stability

Note 1: Because the 85%(3.3235V) and 115% (4.4965V)of the rated supply voltage value exceeds the cut-off voltage upper(4.5V) and lower(3.5V) limit of the manufacturer, the cut-off voltage of EUT is test here.
Note 2: The operating temperature range of the EUT is 0°C to 35°C.

OPERATING FREQUENCY:	13560000 Hz
REFERENCE VOLTAGE:	3.91 V
DEVIATION LIMIT:	±0.01%

VOLTAGE (%)	Test Conditions		Frequency(Hz)	Deviation(%)	Verdict
	Power (VDC)	Temperature (°C)			
100	3.91	-20	13560620	0.004572	
100		-10	13560619	0.004565	
100		0	13560620	0.004572	
100		+10	13560620	0.004572	
100		+20	13560620	0.004572	
100		+25	13560619	0.004565	
100		+30	13560619	0.004565	
100		+40	13560619	0.004565	
100		+50	13560619	0.004565	
MAX(Battery End Point, 85)	3.5	+20	13560619	0.004565	
MIN(Battery End Point, 115)	4.5	-20	13560620	0.004572	

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08	☒
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15	☒
Temperature Chamber	AHK	SP20	1412	2022.09.20	2023.09.19	☒
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2023.05.15	2024.05.14	☒
Anechoic Chamber（10M）	EMC TECHNOLOGY LTD	20.1m*11.6m*7.35m	130	2021.08.15	2024.08.14	☒
Description	Supplier	Name	Version	/		Use
Test Software	/	/	/	/		☒

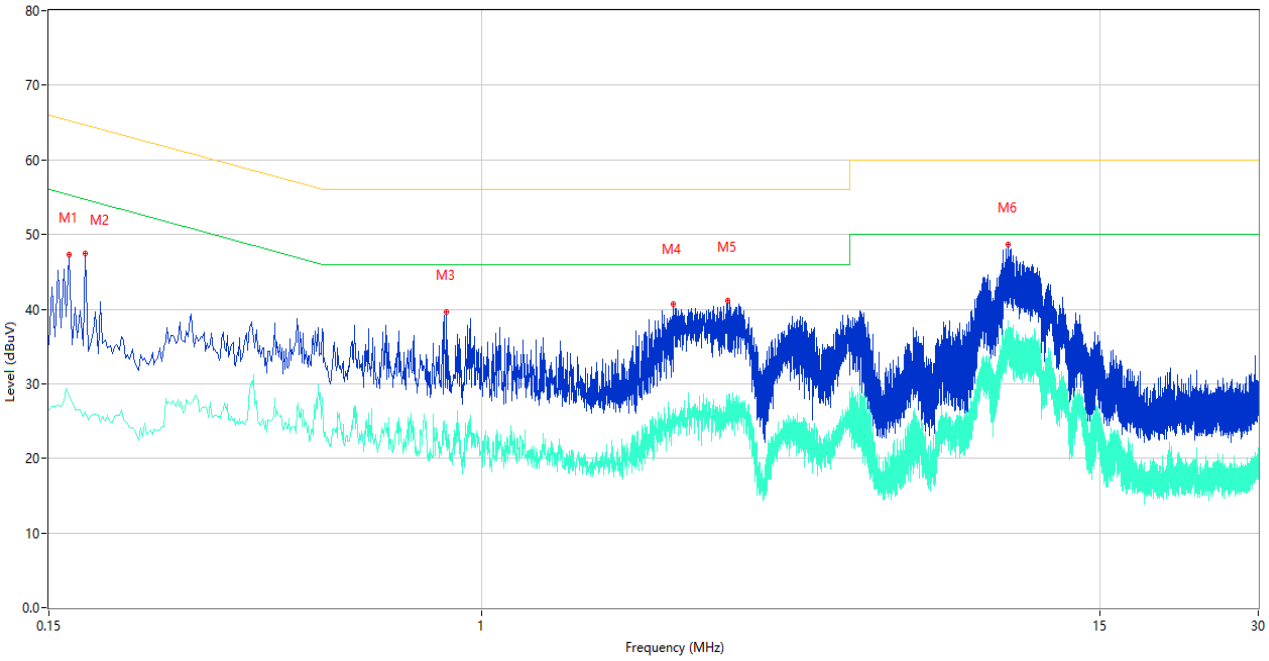
A.5 Conducted Emissions

Note 1: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Test Data and Plots

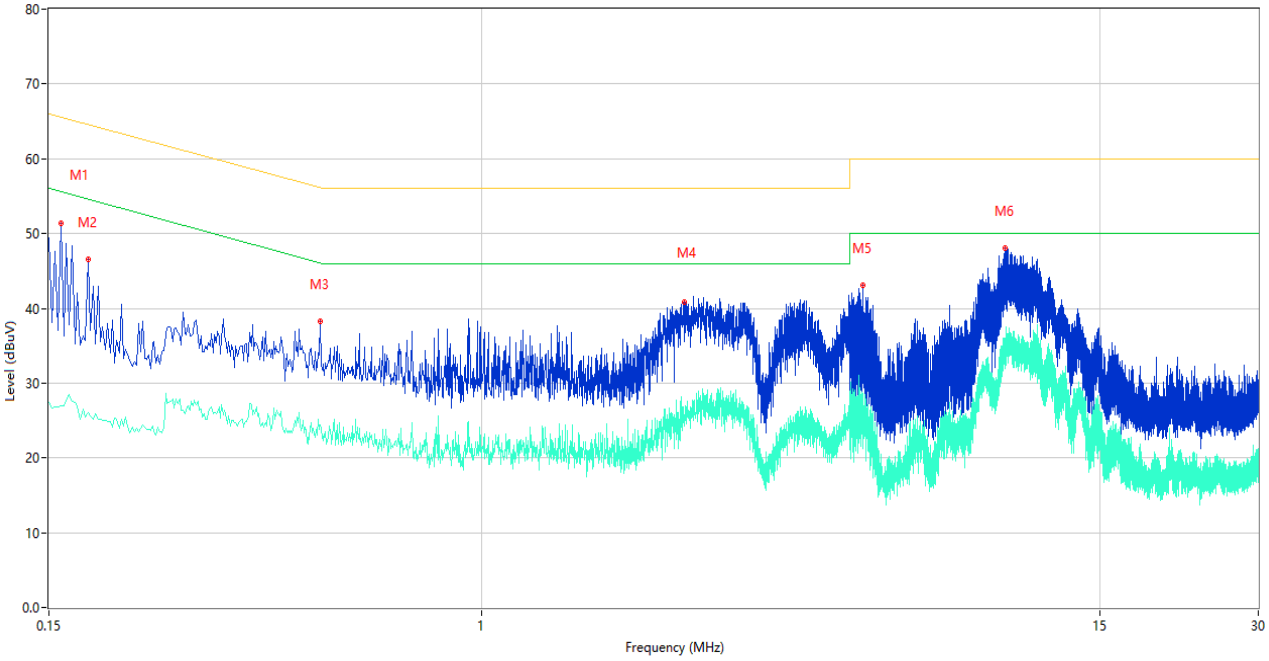
Sample No.	S04	Temperature	24.4℃
Humidity	60%RH	Pressure	101kPa
Test Engineer	Yang yang	Test date	2023.7.22

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.164	47.38	9.82	65.26	17.88	Peak	L	Pass
1**	0.164	28.35	9.82	55.26	26.91	AV	L	Pass
2	0.176	47.43	9.81	64.67	17.24	Peak	L	Pass
2**	0.176	26.21	9.81	54.67	28.46	AV	L	Pass
3	0.856	39.61	10.29	56.00	16.39	Peak	L	Pass
3**	0.856	24.63	10.29	46.00	21.37	AV	L	Pass
4	2.316	40.71	10.26	56.00	15.29	Peak	L	Pass
4**	2.316	25.24	10.26	46.00	20.76	AV	L	Pass
5	2.936	41.16	10.40	56.00	14.84	Peak	L	Pass
5**	2.936	27.85	10.40	46.00	18.15	AV	L	Pass
6	10.008	48.62	10.43	60.00	11.38	Peak	L	Pass
6**	10.008	38.35	10.43	50.00	11.65	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.158	51.34	9.83	65.57	14.23	Peak	N	Pass
1**	0.158	26.91	9.83	55.57	28.66	AV	N	Pass
2	0.178	46.49	9.81	64.58	18.09	Peak	N	Pass
2**	0.178	26.04	9.81	54.58	28.54	AV	N	Pass
3	0.492	38.29	10.10	56.13	17.84	Peak	N	Pass
3**	0.492	24.45	10.10	46.13	21.68	AV	N	Pass
4	2.426	40.82	10.15	56.00	15.18	Peak	N	Pass
4**	2.426	25.83	10.15	46.00	20.17	AV	N	Pass
5	5.318	43.03	10.17	60.00	16.97	Peak	N	Pass
5**	5.318	27.95	10.17	50.00	22.05	AV	N	Pass
6	9.894	48.09	10.03	60.00	11.91	Peak	N	Pass
6**	9.894	34.96	10.03	50.00	15.04	AV	N	Pass

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2022.09.09	2023.09.08	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2023.05.16	2024.05.15	☒
ISN	TESEQ	ISN T800	34449	2022.11.11	2023.11.10	☐
ISN	TESEQ	ISN T8-Cat6	53561	2023.04.23	2024.04.22	☐
Shielded Room	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	112	2022.02.19	2025.02.18	☒
Description	Manufacturer	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2360557-AE-2.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2360557-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2360557-AI.PDF”.

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--END OF REPORT--