

TEST REPORT

Applicant/Manufacture: Shenzhen Huafurui Technology Co., Ltd.
Address : Unit 1401 & 1402, 14/F, Jinqi Zhigu Mansion (No.4 Building of Chongwen Garden), Crossing of the Liuxian Street and Tangling Road, Taoyuan Street, Nanshan District, Shenzhen, P.R. China
Report Number : SZ1220118-02706E-EM-01B

Test Standard (s)

BS EN 55032:2015/A11:2020; BS EN 55035:2017/A11:2020;
BS EN IEC 61000-3-2: 2019/A1:2021; BS EN 61000-3-3:2013/A1:2019

Sample Description

Product Type: Smartphone
Model No.: P50
Multiple Model(s) No.: N/A
Trade Mark: CUBOT
Date Received: 2022/01/18
Date of Test: 2022/02/27~2022/03/07
Report Date: 2022/03/08

Test Result:	Pass*
--------------	-------

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:

Joson Xiao

Joson Xiao
EMC Engineer

Moon Liu
EMC Supervisor

Note: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk (*). Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

Bay Area Compliance Laboratories Corp. (Shenzhen)

5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China
Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE.....	4
PERFORMANCE CRITERION.....	4
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY.....	5
SYSTEM TEST CONFIGURATION.....	6
JUSTIFICATION.....	6
EUT EXERCISE SOFTWARE.....	6
EQUIPMENT MODIFICATIONS.....	6
SUPPORT EQUIPMENT LIST AND DETAILS.....	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP.....	7
SUMMARY OF TEST REPORT.....	9
TEST EQUIPMENT LIST.....	9
BS EN 55032 §A.3 - CONDUCTED DISTURBANCE.....	11
APPLICABLE STANDARD.....	12
TEST SYSTEM SETUP.....	12
EMI TEST RECEIVER SETUP.....	12
TEST PROCEDURE.....	12
CORRECTED FACTOR & MARGIN CALCULATION.....	13
TEST RESULTS SUMMARY.....	13
TEST DATA.....	13
BS EN 55032 §A.2-RADIATED DISTURBANCE.....	21
APPLICABLE STANDARD.....	22
TEST SYSTEM SETUP.....	22
EMI TEST RECEIVER SETUP.....	22
TEST PROCEDURE.....	23
CORRECTED AMPLITUDE & MARGIN CALCULATION.....	23
TEST RESULTS SUMMARY.....	23
TEST DATA.....	23
BS EN 55035 §4.2.1-ELECTROSTATIC DISCHARGES (IEC 61000-4-2).....	29
TEST SYSTEM SETUP.....	30
TEST STANDARD.....	30
TEST PROCEDURE.....	30
TEST DATA.....	31
BS EN 55035 §4.2.2.2-CONTINUOUS RADIATED IMMUNITY (IEC 61000-4-3).....	34
TEST SYSTEM SETUP.....	35
TEST STANDARD.....	35
TEST PROCEDURE.....	35
TEST DATA.....	36

BS EN 55035 §4.2.2.3-CONTINUOUS CONDUCTED IMMUNITY (IEC 61000-4-6)..... 38
 TEST SETUP.....39
 TEST STANDARD..... 39
 TEST PROCEDURE..... 39
 TEST DATA..... 39

BS EN 55035 §4.2.3-POWER FREQUENCY MAGNETIC FIELDS (IEC 61000-4-8).....41
 TEST SETUP.....42
 TEST STANDARD.....42
 TEST PROCEDURE..... 42
 TEST DATA AND SETUP PHOTO..... 42

BS EN 55035 §4.2.4-ELECTRICAL FAST TRANSIENTS (IEC 61000-4-4)..... 44
 TEST SYSTEM SETUP.....45
 TEST STANDARD.....45
 TEST PROCEDURE..... 45
 TEST DATA..... 45

BS EN 55035 §4.2.5-SURGES (IEC 61000-4-5)..... 47
 TEST SYSTEM SETUP.....48
 TEST STANDARD.....48
 TEST PROCEDURE..... 48
 TEST DATA..... 48

EN 55035 §4.2.6-VOLTAGE DIPS AND INTERRUPTIONS (IEC 61000-4-11)..... 49
 TEST SETUP.....50
 TEST STANDARD.....50
 TEST PROCEDURE..... 50
 TEST DATA..... 50

BS EN IEC 61000-3-2 – HARMONIC CURRENT EMISSIONS..... 52

BS EN 61000-3-3 – VOLTAGE FLUCTUATION AND FLICKER.....53
 TEST SYSTEM SETUP.....54
 TEST STANDARD.....54
 TEST DATA..... 55

EXHIBIT A - EUT PHOTOGRAPHS.....57

EXHIBIT B - TEST SETUP PHOTOGRAPHS..... 73
 CONDUCTED DISTURBANCE - FRONT VIEW.....74
 CONDUCTED DISTURBANCE - SIDE VIEW.....74
 RADIATED DISTURBANCE – FRONT VIEW (BELOW 1 GHz).....75
 RADIATED DISTURBANCE – REAR VIEW (BELOW 1 GHz).....75
 RADIATED DISTURBANCE – FRONT VIEW (ABOVE 1 GHz).....75
 RADIATED DISTURBANCE – REAR VIEW (ABOVE 1 GHz).....76
 RADIATED DISTURBANCE – FRONT VIEW (BELOW 1 GHz).....77
 RADIATED DISTURBANCE – REAR VIEW (BELOW 1 GHz).....77
 RADIATED DISTURBANCE – FRONT VIEW (ABOVE 1 GHz).....77
 RADIATED DISTURBANCE – REAR VIEW (ABOVE 1 GHz).....78

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Voltage Range	DC 5V from adapter,DC 3.85V from battery
Highest operating frequency	5850MHz
Equipment Class	Class B
Sample serial number	SZ1220118-02706E-EM-S1 (Assigned by BAACL, Shenzhen)
Sample/EUT Status	Good condition
EU Adapter information	Model: HJ-0502000W2-EU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2A
UK Adapter information	Model: HJ-0502000W2-UK Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2A

Note:The two adapters only have different pins, so we chose the European standard adapter test

Objective

This test report is in accordance with BS EN 55032: Electromagnetic compatibility of multimedia equipment -Emission Requirements. BS EN 55035: Electromagnetic compatibility of multimedia equipment -Immunity requirements. BS EN IEC 61000-3-2, Limits – Limits for harmonic current emissions (equipment input current up to and including 16 A per phase), and also in accordance with BS EN 61000-3-3, Limits Section 3; Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current<16A.

The objective is to determine the compliance of EUT with BS EN 55032, BS EN 55035, BS EN IEC 61000-3-2 and BS EN 61000-3-3.

Performance criterion

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Measurement Uncertainty

Item	Frequency Range		Expanded Measurement uncertainty
Conducted Emissions	AC Mains	150 KHz ~30MHz	2.88dB(k=2, 95% level of confidence)
Radiated emission	30MHz~200MHz	Horizontal	4.46 dB (k=2, 95% level of confidence)
	30MHz~200MHz	Vertical	4.53 dB (k=2, 95% level of confidence)
	200MHz~1000MHz	Horizontal	4.85 dB (k=2, 95% level of confidence)
	200MHz~1000MHz	Vertical	4.76 dB (k=2, 95% level of confidence)
	1GHz~6GHz	/	5.02 dB (k=2, 95% level of confidence)

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in normal mode.

Test Mode 1: Charging& playing

Test Mode 2: Charging& FM

Test Mode 3: Downloading

EUT exercise software

No software was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

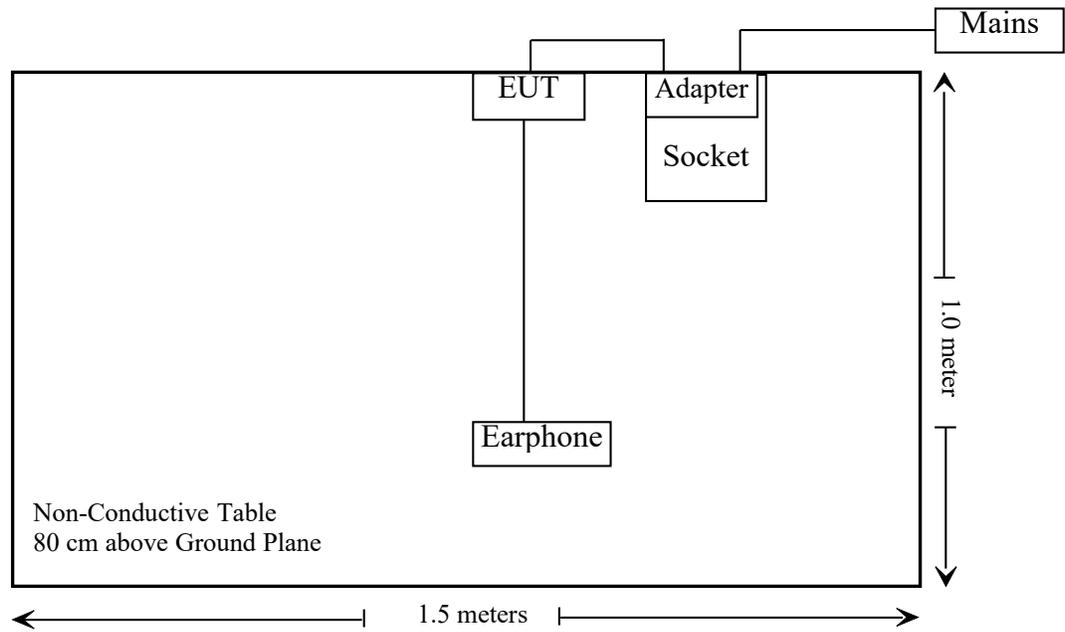
Manufacturer	Description	Model	Serial Number
HP	Signal Generator	8657A	3217A04699
COM-POWER	Antenna	AD-100	721027
PC	Dell	P74001	N/A

External I/O Cable

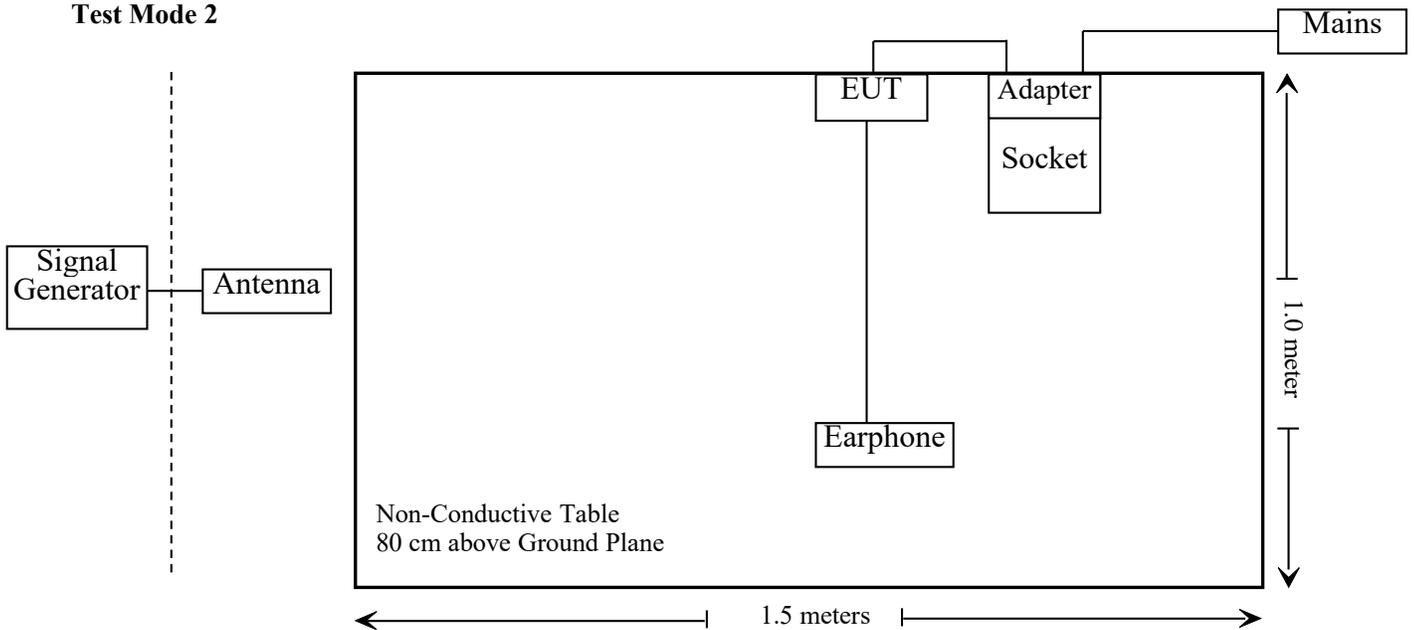
Cable Description	Length (m)	From/Port	To
Unshielded Un-detachable AC cable	1.2	Socket	Mains
Shielded detachable USB cable	1.0	EUT	Adapter
Unshielded Un-detachable earphone cable	1.2	EUT	Earphone
Shielded detachable RF cable	8.0	Antenna	Signal Generator
Shielded detachable USB cable	1.0	EUT	PC
Unshielded detachable RJ45 cable	8.0	PC	Internet

Block Diagram of Test Setup

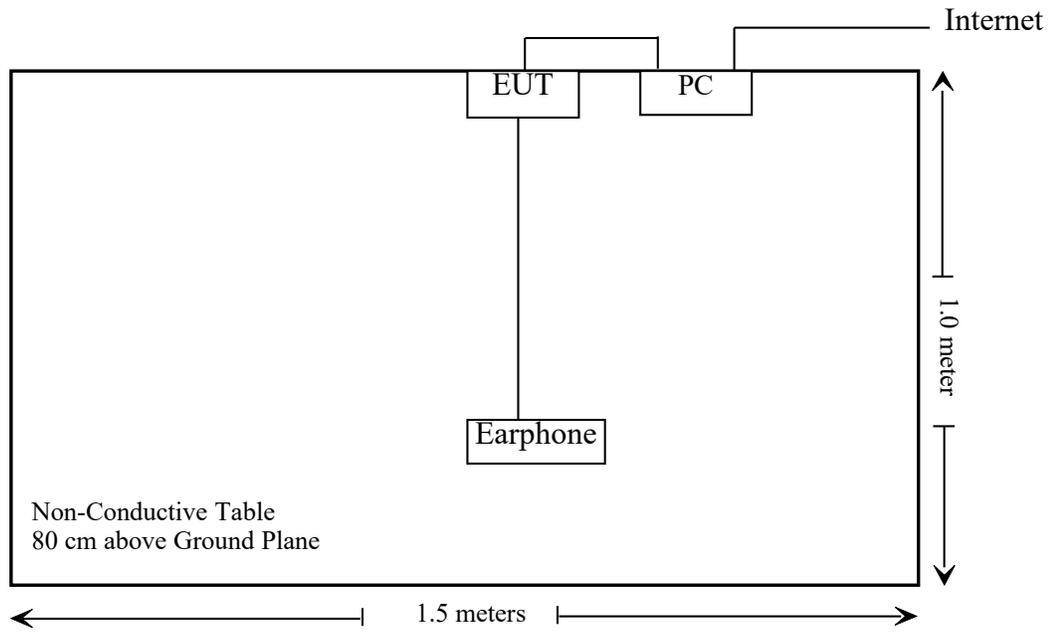
Test Mode 1



Test Mode 2



Test Mode 3



SUMMARY OF TEST REPORT

BS EN 55032

RULE	DESCRIPTION	RESULTS
§ A.3	Conducted Disturbance	Compliant
§ A.2	Radiated Disturbance	Compliant

BS EN 55035

RULE	DESCRIPTION	RESULTS
§4.2.1	Electrostatic Discharge IEC 61000-4-2	Compliant
§4.2.2.2	Continuous Radiated Immunity IEC 61000-4-3	Compliant
§4.2.2.3	Continuous Conducted Immunity IEC 61000-4-6	Compliant
§4.2.3	Power Frequency Magnetic Fields IEC 61000-4-8	Compliant
§4.2.4	Electrical Fast Transients IEC 61000-4-4	Compliant
§4.2.5	Surges IEC 61000-4-5	Compliant
§4.2.6	Voltage Dips And Interruptions, IEC 61000-4-11	Compliant
§4.2.7	Broadband impulsive conducted disturbances	Not Applicable

BS EN IEC 61000-3-2

Rule	Description	Results
§7	Harmonic Current Emissions	Not Applicable

BS EN 61000-3-3

Rule	Description	Results
§5	Voltage Fluctuation and Flicker	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMI					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2021/07/07	2022/07/06
Rohde & Schwarz	LISN	ENV216	101613	2021/07/07	2022/07/06
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2021/11/26	2022/11/25
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2021/11/26	2022/11/25
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
R&S	EMI Test Receiver	ESR3	102455	2021/07/06	2022/07/05
Sonoma instrument	Pre-amplifier	310 N	186238	2021/08/03	2022/08/02
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable	Chamber Cable 1	F-03-EM236	2021/08/03	2022/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2021/08/03	2022/08/02
Rohde & Schwarz	Auto test software	EMC 32	V9.10.00	NCR	NCR
R&S	Audio Analyzer	UPV	101782	2021/07/07	2022/07/06
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2021/07/06	2022/07/05
COM-POWER	Pre-amplifier	PA-122	181919	2021/11/26	2022/11/25
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
Insulated Wire Inc.	RF Cable	SPS-2503-3150	02222010	2021/11/26	2022/11/25
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2021/11/26	2022/11/25
EM TEST	Harmonics/flicker Analyer	DPA 500N	V0939105176	2021/04/30	2022/04/29
EM TEST	AC Source	ACS500	303276	2021/10/8	2022/10/7
EM Test	DPA.Control	V5.0.3.0	Unknown	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMS					
EM Test	ESD Generator	NSG 438	1476	2021/10/9	2022/10/8
HP	Signal Generator	8665B	3744A01692	2021/07/06	2022/07/05
AR	Amplifier	500W1000B	0348446	NCR	NCR
AR	Amplifier	60S1G6	0348712	NCR	NCR
AR	Antenna	ATL80M1G	0348837	NCR	NCR
AR	Antenna	ATT700M12G	0349411	NCR	NCR
BACL	Test Software	VEE PRO	V2.3 VXE	NCR	NCR
HP	Signal Generator	8648C	3426A01345	2021/07/06	2022/07/05
A&R	Power Amplifier	15A250	13444	2021/11/26	2022/11/25
WEINSCHEL	6dB Attenuator	50-6	R4376	NCR	NCR
Com-Power Corporation	CDN	CDN M325E	521145	2021/07/07	2022/07/06
BACL	Test Software	VEE PRO	V2.3 VXE	NCR	NCR
EM TEST	EMS Combination Tester	UCS 500 N5	V0939105172	2021/10/8	2022/10/7
EM TEST	AC Source	MV2616	V0939105173	2021/10/8	2022/10/7
EM TEST	Loop Antenna	MS100	0809-05	2021/12/27	2024/12/26
EM TEST	Current Transformer	MC 2630	0309-59	2021/04/30	2022/04/29
EM TEST	IEC.Control	V5.1.3.0	135689	NCR	NCR
R&S	Audio Analyzer	UPV	101782	2021/07/07	2022/07/06

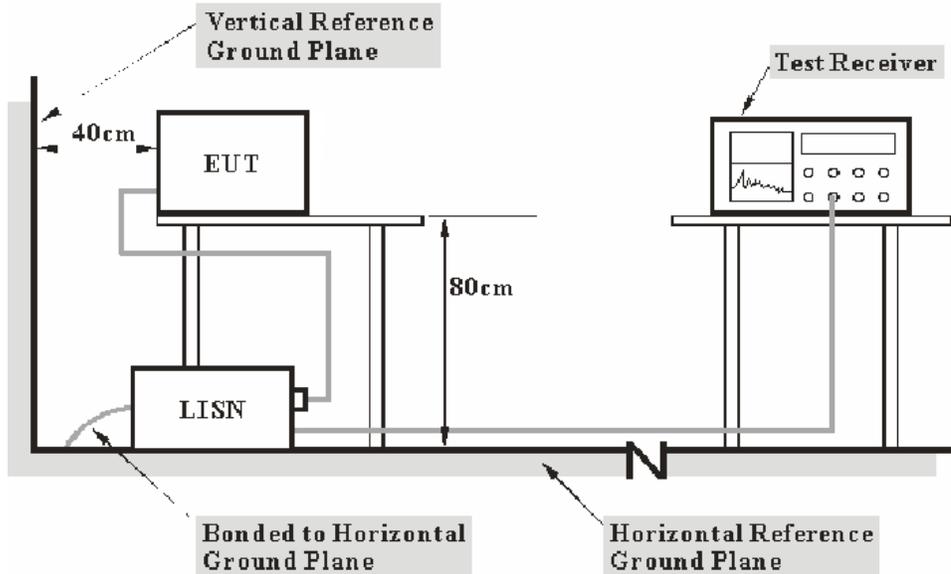
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

BS EN 55032 §A.3 - CONDUCTED DISTURBANCE

Applicable Standard

According to BS EN 55032 §A.3

Test System Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is in according with CISPR 16-1-1:2010+A1:2010+A2:2014, CISPR 16-2-1:2014. The related limit was specified in the BS EN 55032.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN/ISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the limit of BS EN 55032

Test Data

Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.0 kPa

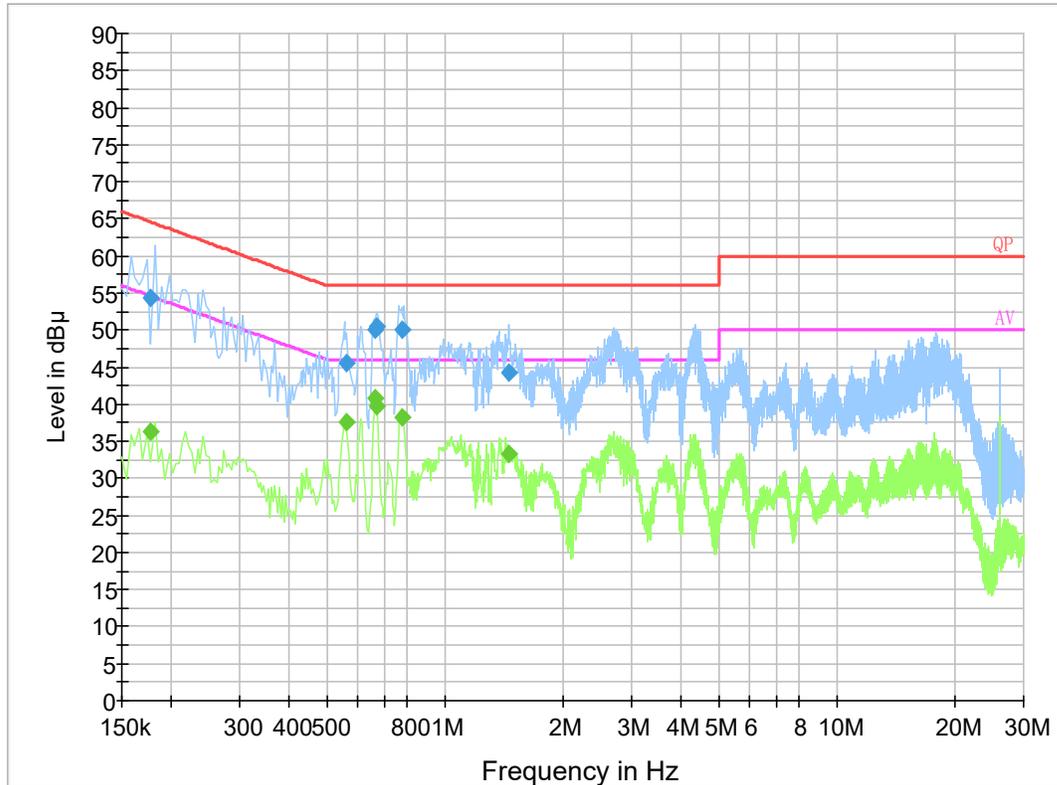
The testing was performed by Haiguo Li on 2022-03-05.

EUT Operation Mode Test Mode 1& Test Mode 2

Test Mode 1

AC Mains:

AC 230V/50 Hz, Line



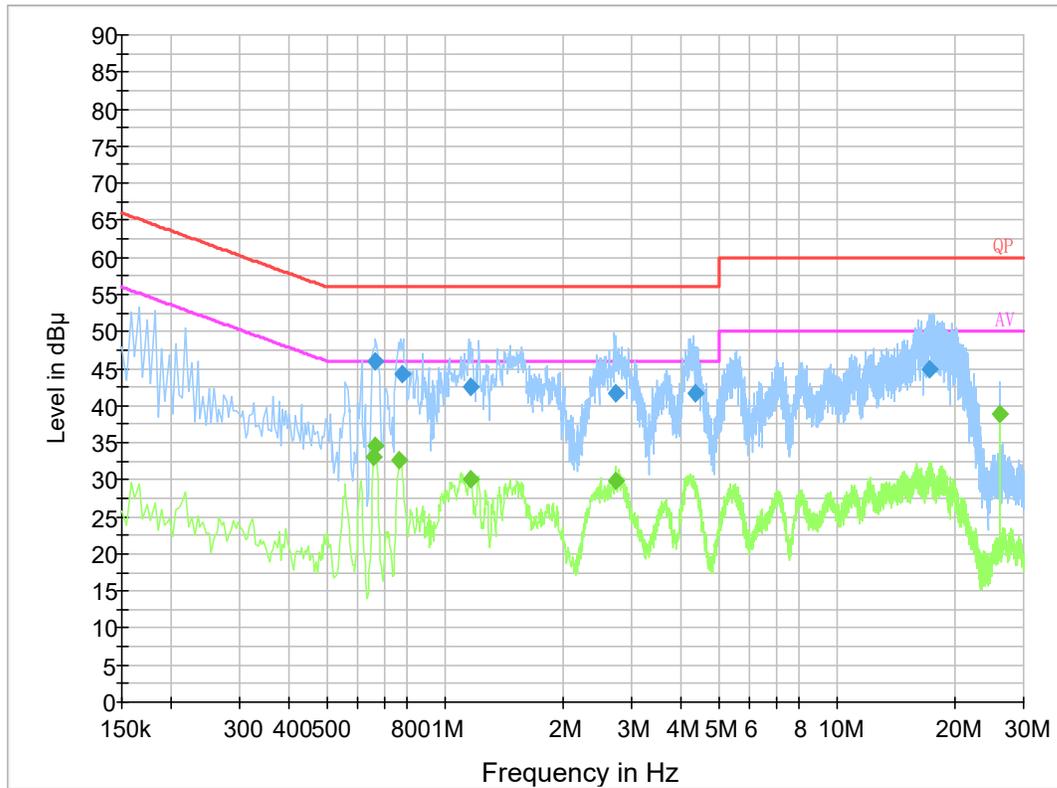
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.177500	54.3	9.000	L1	20.2	10.3	64.6
0.561690	45.5	9.000	L1	20.2	10.5	56.0
0.663950	50.0	9.000	L1	20.2	6.0	56.0
0.667870	50.6	9.000	L1	20.2	5.4	56.0
0.782150	50.0	9.000	L1	20.3	6.0	56.0
1.452130	44.3	9.000	L1	20.3	11.7	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.177500	36.3	9.000	L1	20.2	18.3	54.6
0.561690	37.5	9.000	L1	20.2	8.5	46.0
0.663950	40.9	9.000	L1	20.2	5.1	46.0
0.667870	39.8	9.000	L1	20.2	6.2	46.0
0.782150	38.3	9.000	L1	20.3	7.7	46.0
1.452130	33.2	9.000	L1	20.3	12.8	46.0

AC 230V/50 Hz, Neutral:



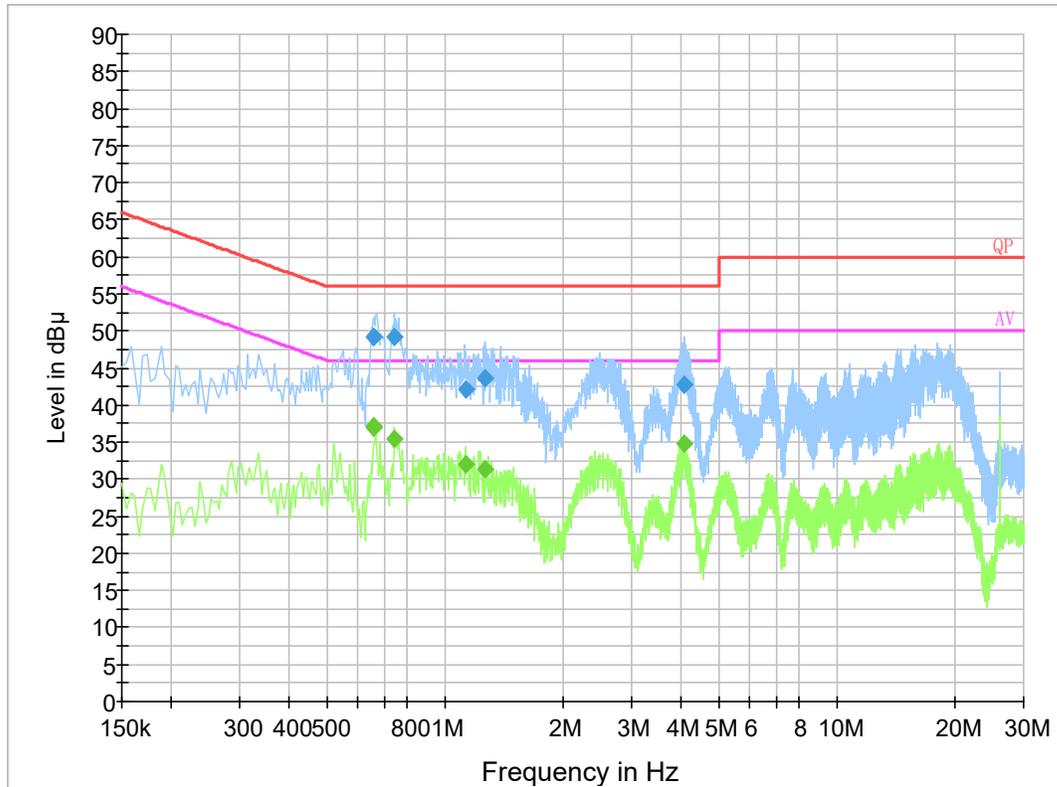
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.664010	45.9	9.000	N	20.2	10.1	56.0
0.778210	44.3	9.000	N	20.3	11.7	56.0
1.164750	42.6	9.000	N	20.2	13.4	56.0
2.721230	41.6	9.000	N	20.3	14.4	56.0
4.345050	41.7	9.000	N	20.4	14.3	56.0
17.331050	44.9	9.000	N	20.2	15.1	60.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.658000	33.2	9.000	N	20.2	12.8	46.0
0.662000	34.7	9.000	N	20.2	11.3	46.0
0.766000	32.8	9.000	N	20.3	13.2	46.0
1.162000	30.2	9.000	N	20.2	15.8	46.0
2.726000	29.9	9.000	N	20.3	16.1	46.0
25.998000	38.8	9.000	N	20.2	11.2	50.0

AC 110V/60 Hz, Line



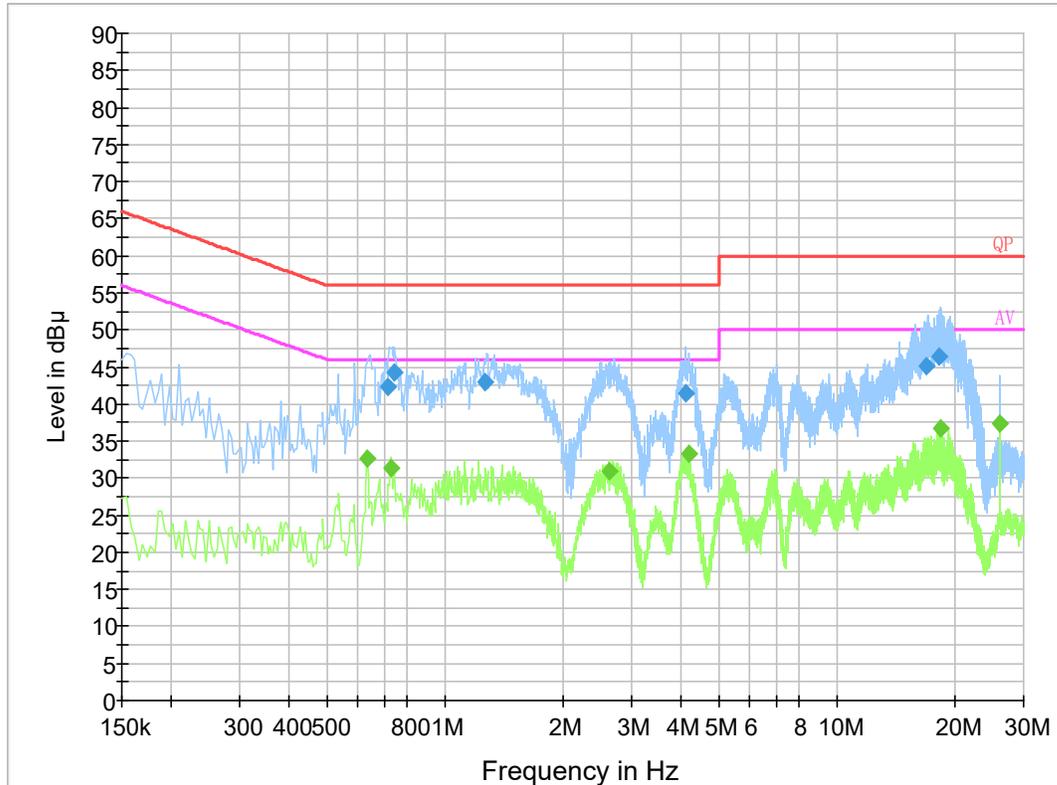
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.659950	49.3	9.000	L1	20.2	6.7	56.0
0.660130	49.2	9.000	L1	20.2	6.8	56.0
0.742810	49.2	9.000	L1	20.3	6.8	56.0
1.137110	42.1	9.000	L1	20.2	13.9	56.0
1.270950	43.6	9.000	L1	20.2	12.4	56.0
4.068650	42.7	9.000	L1	20.3	13.3	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.659950	37.2	9.000	L1	20.2	8.8	46.0
0.660130	37.0	9.000	L1	20.2	9.0	46.0
0.742810	35.5	9.000	L1	20.3	10.5	46.0
1.137110	31.9	9.000	L1	20.2	14.1	46.0
1.270950	31.4	9.000	L1	20.2	14.6	46.0
4.068650	34.7	9.000	L1	20.3	11.3	46.0

AC 110V/60 Hz, Neutral:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.715170	42.2	9.000	N	20.3	13.8	56.0
0.742810	44.2	9.000	N	20.3	11.8	56.0
1.266770	42.9	9.000	N	20.2	13.1	56.0
4.131990	41.5	9.000	N	20.4	14.5	56.0
16.874430	45.1	9.000	N	20.2	14.9	60.0
18.285850	46.3	9.000	N	20.3	13.7	60.0

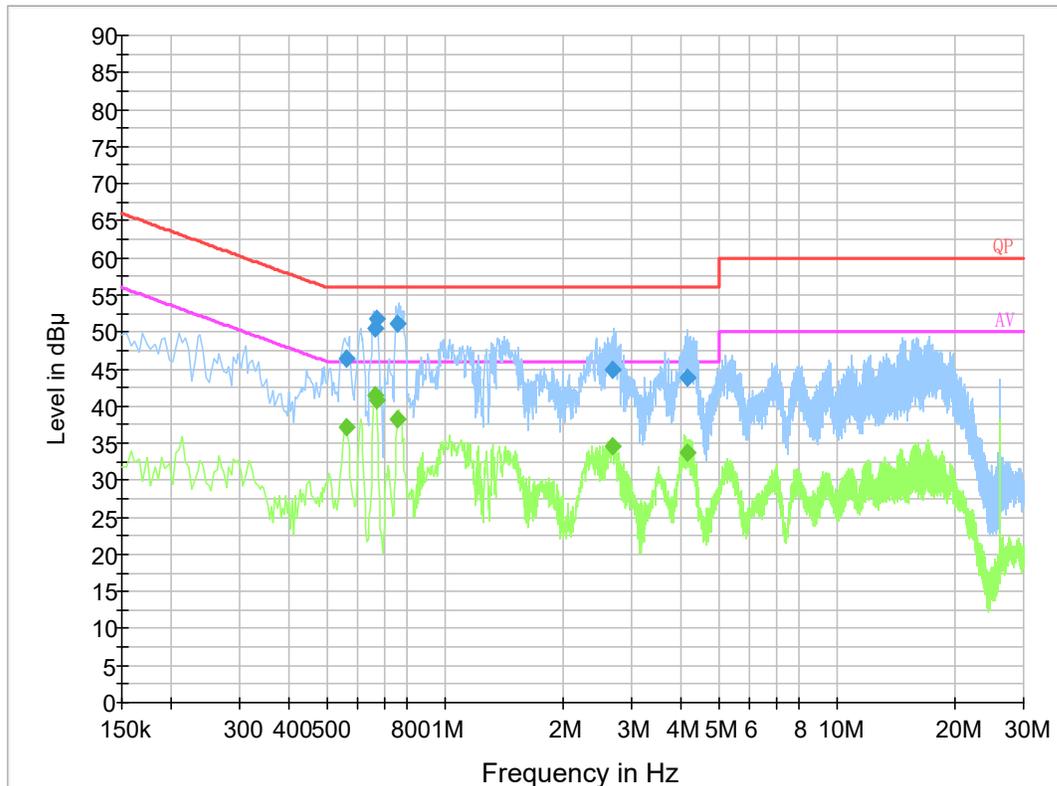
Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.634000	32.6	9.000	N	20.2	13.4	46.0
0.730000	31.5	9.000	N	20.3	14.5	46.0
2.622000	30.8	9.000	N	20.3	15.2	46.0
4.190000	33.3	9.000	N	20.4	12.7	46.0
18.406000	36.7	9.000	N	20.3	13.3	50.0
25.998000	37.5	9.000	N	20.2	12.5	50.0

Test Mode 2

AC Mains:

AC 230V/50 Hz, Line



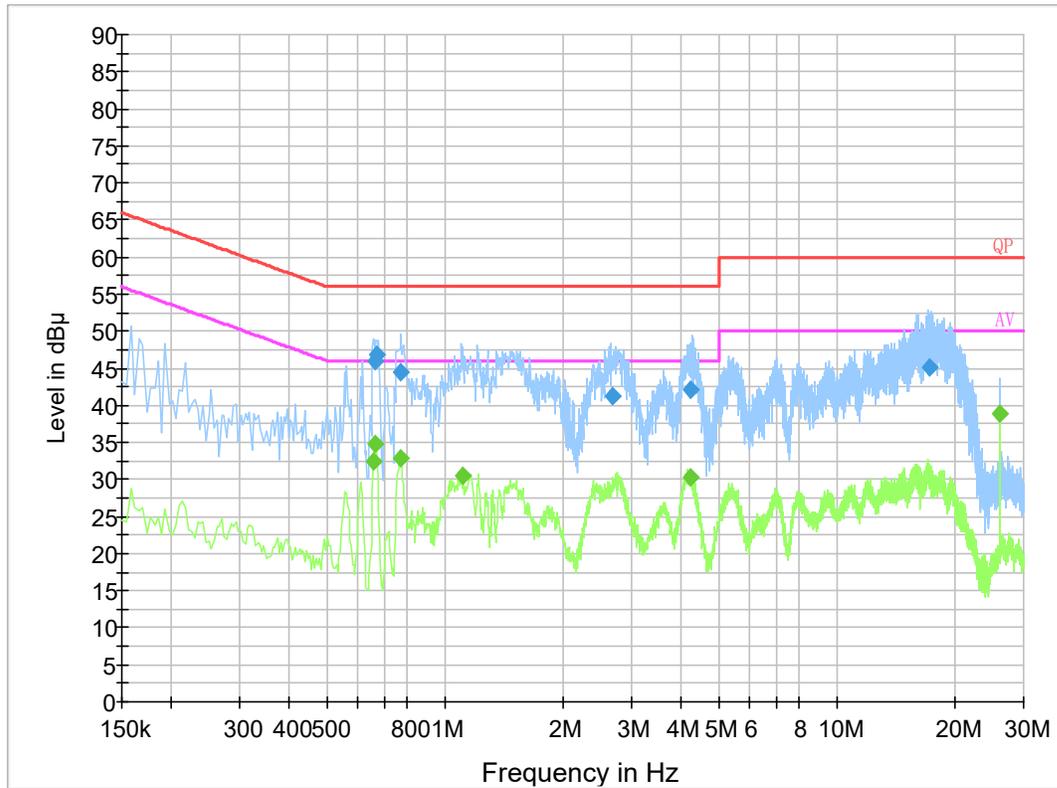
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.561450	46.4	9.000	L1	20.2	9.6	56.0
0.663950	50.4	9.000	L1	20.2	5.6	56.0
0.667870	51.7	9.000	L1	20.2	4.3	56.0
0.758570	51.1	9.000	L1	20.3	4.9	56.0
2.673290	44.9	9.000	L1	20.3	11.1	56.0
4.171570	43.9	9.000	L1	20.3	12.1	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.561450	37.2	9.000	L1	20.2	8.8	46.0
0.663950	41.5	9.000	L1	20.2	4.5	46.0
0.667870	40.9	9.000	L1	20.2	5.1	46.0
0.758570	38.3	9.000	L1	20.3	7.7	46.0
2.673290	34.5	9.000	L1	20.3	11.5	46.0
4.171570	33.7	9.000	L1	20.3	12.3	46.0

AC 230V/50 Hz, Neutral:



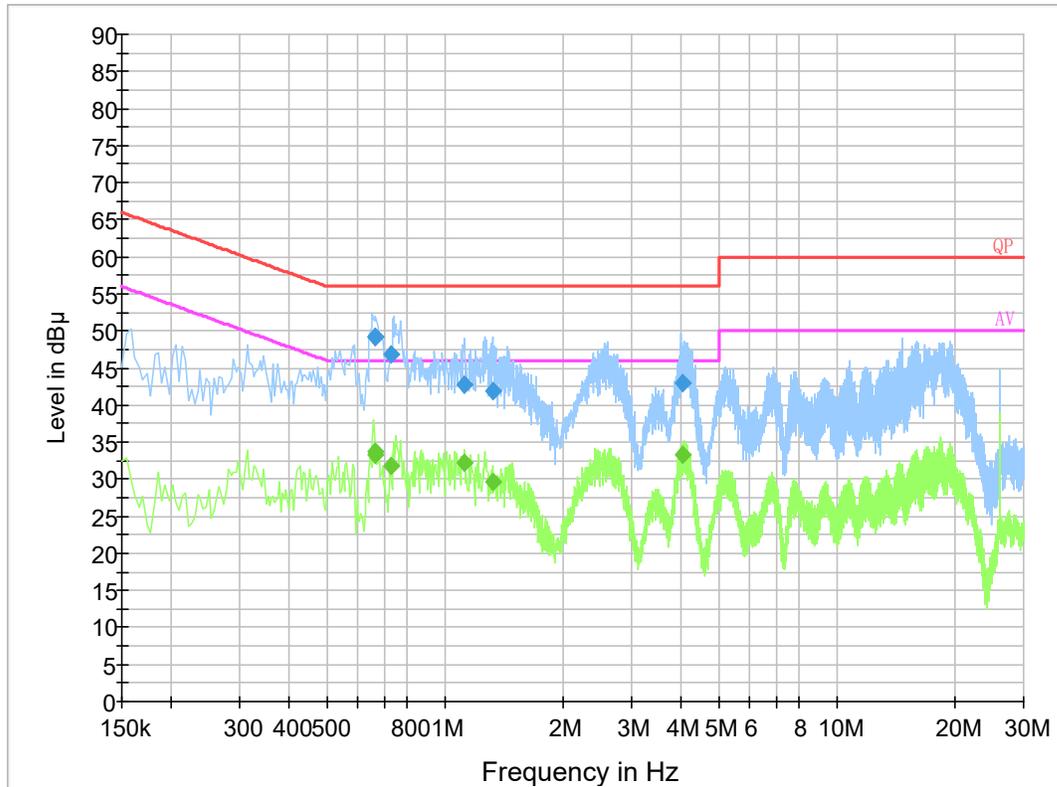
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.664130	46.0	9.000	N	20.2	10.0	56.0
0.671830	46.7	9.000	N	20.2	9.3	56.0
0.774390	44.6	9.000	N	20.3	11.4	56.0
2.682070	41.3	9.000	N	20.3	14.7	56.0
4.249710	42.2	9.000	N	20.4	13.8	56.0
17.193170	45.1	9.000	N	20.2	14.9	60.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.658000	32.4	9.000	N	20.2	13.6	46.0
0.662000	34.8	9.000	N	20.2	11.2	46.0
0.770000	32.9	9.000	N	20.3	13.1	46.0
1.114000	30.4	9.000	N	20.3	15.6	46.0
4.222000	30.2	9.000	N	20.4	15.8	46.0
25.998000	38.9	9.000	N	20.2	11.1	50.0

AC 110V/60 Hz, Line



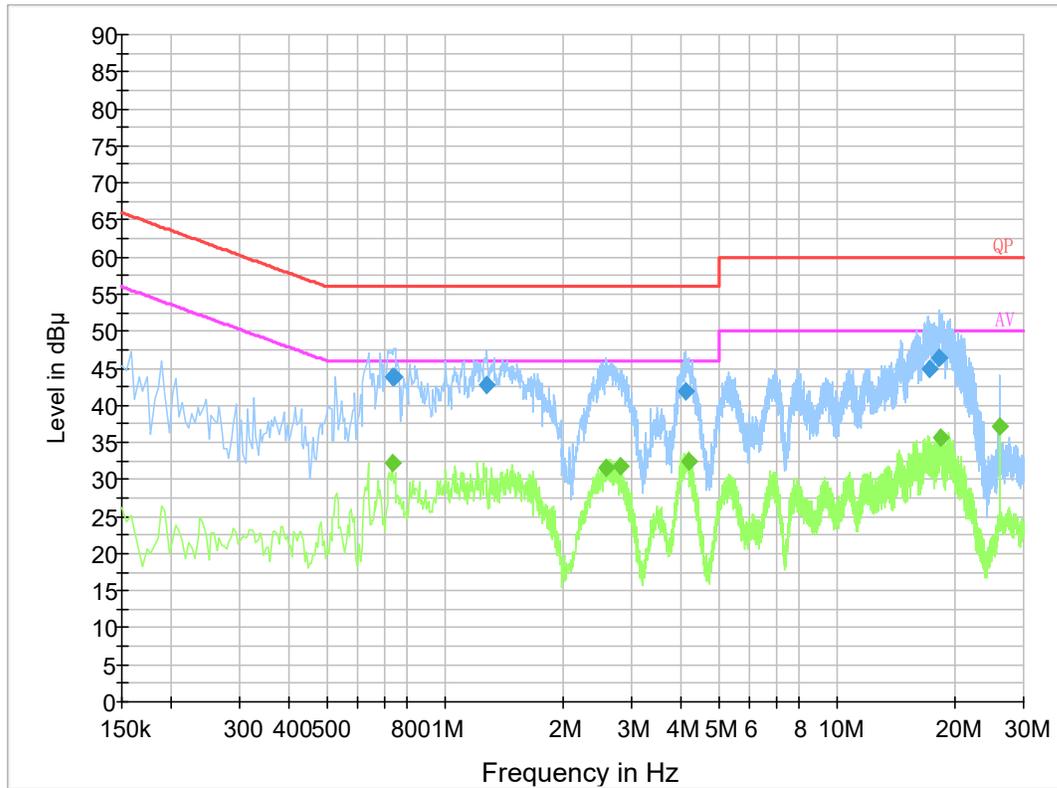
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.663810	49.2	9.000	L1	20.2	6.8	56.0
0.664010	49.2	9.000	L1	20.2	6.8	56.0
0.730870	46.9	9.000	L1	20.3	9.1	56.0
1.121170	42.8	9.000	L1	20.3	13.2	56.0
1.334110	42.0	9.000	L1	20.2	14.0	56.0
4.045730	43.0	9.000	L1	20.3	13.0	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.663810	33.4	9.000	L1	20.2	12.6	46.0
0.664010	33.8	9.000	L1	20.2	12.2	46.0
0.730870	31.7	9.000	L1	20.3	14.3	46.0
1.121170	32.2	9.000	L1	20.3	13.8	46.0
1.334110	29.7	9.000	L1	20.2	16.3	46.0
4.045730	33.3	9.000	L1	20.3	12.7	46.0

AC 110/60 Hz, Neutral:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.738990	43.8	9.000	N	20.3	12.2	56.0
0.742750	43.8	9.000	N	20.3	12.2	56.0
1.274770	42.7	9.000	N	20.2	13.3	56.0
4.120290	41.9	9.000	N	20.4	14.1	56.0
17.257950	44.9	9.000	N	20.2	15.1	60.0
18.283650	46.4	9.000	N	20.3	13.6	60.0

Final Result 2

Frequency (MHz)	Average (dB µV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.734000	32.2	9.000	N	20.3	13.8	46.0
2.586000	31.6	9.000	N	20.3	14.4	46.0
2.806000	31.8	9.000	N	20.3	14.2	46.0
4.194000	32.5	9.000	N	20.4	13.5	46.0
18.354000	35.7	9.000	N	20.3	14.3	50.0
26.002000	37.2	9.000	N	20.2	12.8	50.0

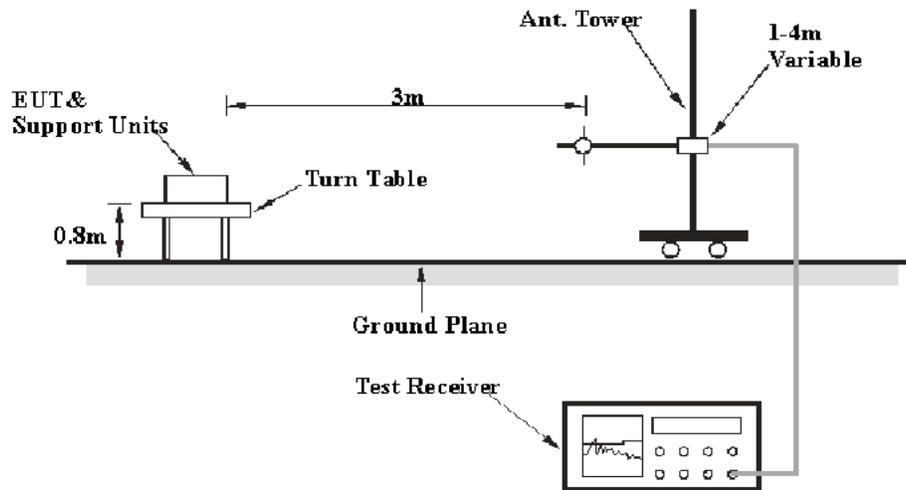
BS EN 55032 §A.2-RADIATED DISTURBANCE

Applicable Standard

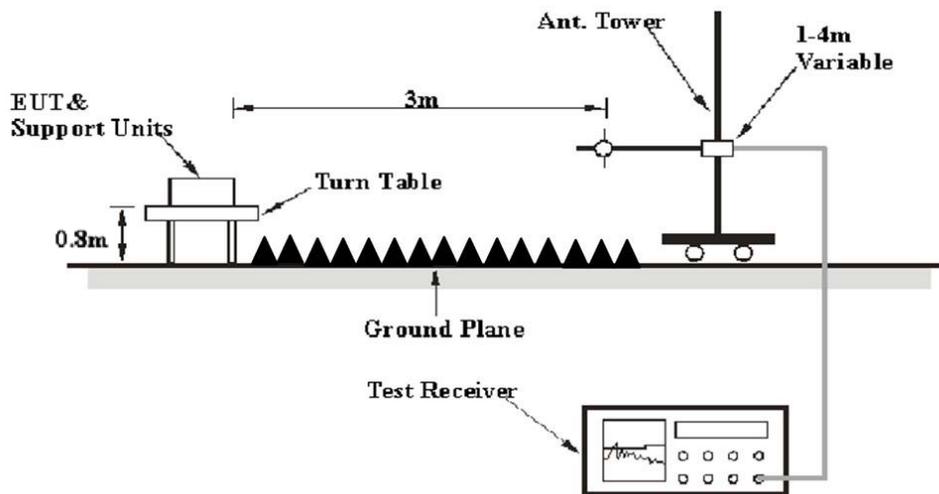
BS EN 55032 §A.2

Test System Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the CISPR16-1-4:2010+A1:2012, CISPR 16-2-3:2010+A1:2010+A2:2014. The limit was specified in BS EN 55032.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
1 GHz~6 GHz	1 MHz	3 MHz	/	Peak
1 GHz~6 GHz	1 MHz	10 Hz	/	Average

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude.}$$

Test Results Summary

According to the data in the following table, the EUT complied with the limit of BS EN 55032.

Test Data

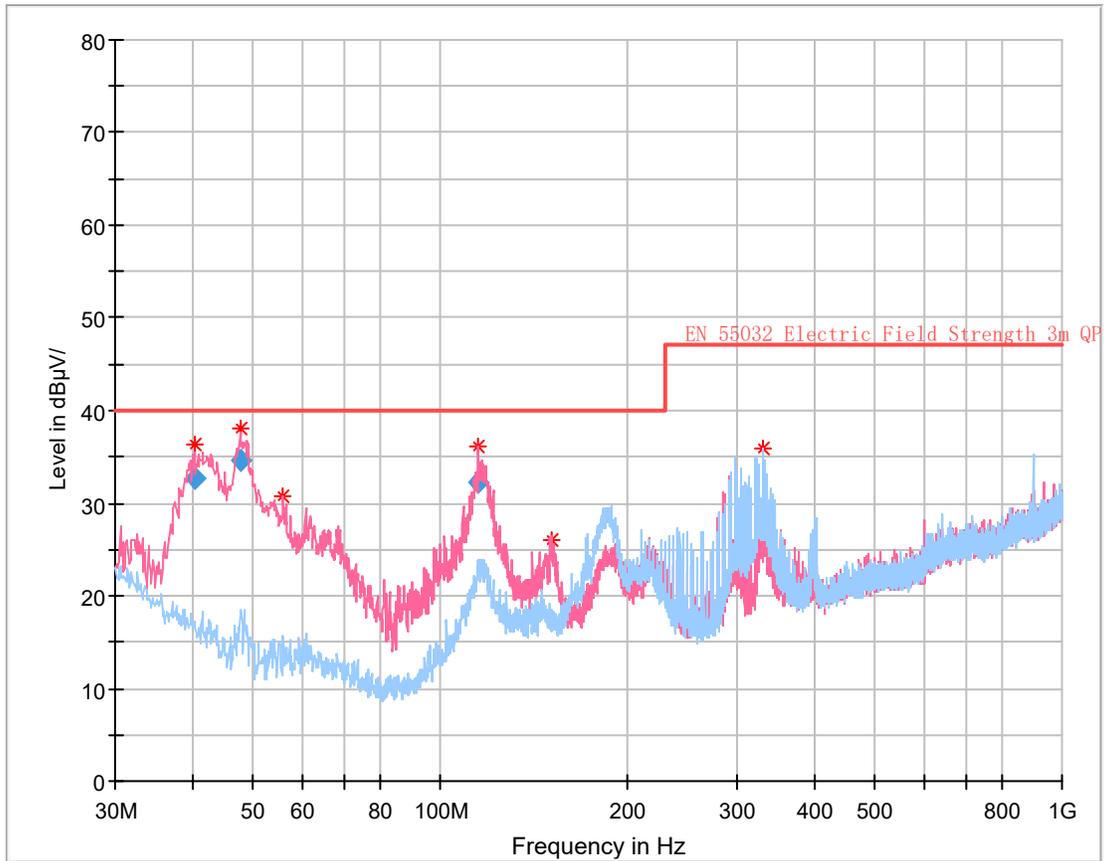
Environmental Conditions

Temperature:	20~25.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Cloud Qiu on 2022-03-05 for below 1GHz, and Zenos Qiao on 2022--03-05 for above 1G

Test Mode 1

30 MHz~1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.351250	32.65	40.00	7.35	100.0	V	226.0	-10.6
47.778625	34.59	40.00	5.41	100.0	V	20.0	-15.4
115.206500	32.33	40.00	7.67	138.0	V	282.0	-10.7

Critical Freqs

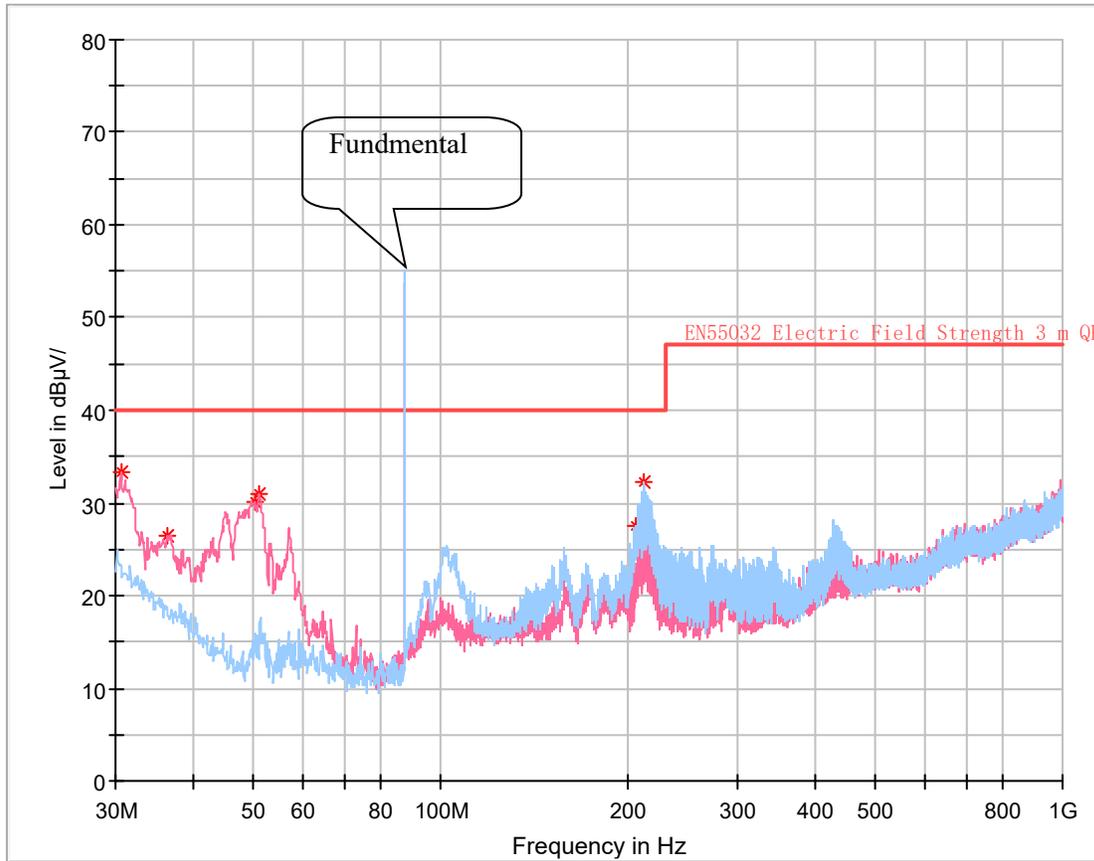
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
55.705000	30.66	40.00	9.34	100.0	V	102.0	-16.6
151.250000	25.98	40.00	14.02	100.0	V	0.0	-11.4
329.608750	35.92	47.00	11.08	100.0	H	102.0	-9.3

1-6 GHz

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	EN 55032	
	Reading (dB μ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB μ V/m)	Margin (dB)
1289.36	44.54	PK	132	1.9	H	-4.37	40.17	70	29.83
1289.36	29.75	Ave.	132	1.9	H	-4.37	25.38	50	24.62
1289.36	44.96	PK	56	2.0	V	-4.37	40.59	70	29.41
1289.36	29.93	Ave.	56	2.0	V	-4.37	25.56	50	24.44
2048.59	44.86	PK	253	1.9	H	-0.75	44.11	70	25.89
2048.59	29.87	Ave.	253	1.9	H	-0.75	29.12	50	20.88
2048.59	45.21	PK	202	2.2	V	-0.75	44.46	70	25.54
2048.59	30.08	Ave.	202	2.2	V	-0.75	29.33	50	20.67

Test Mode 2

30 MHz~1 GHz



Critical Freqs

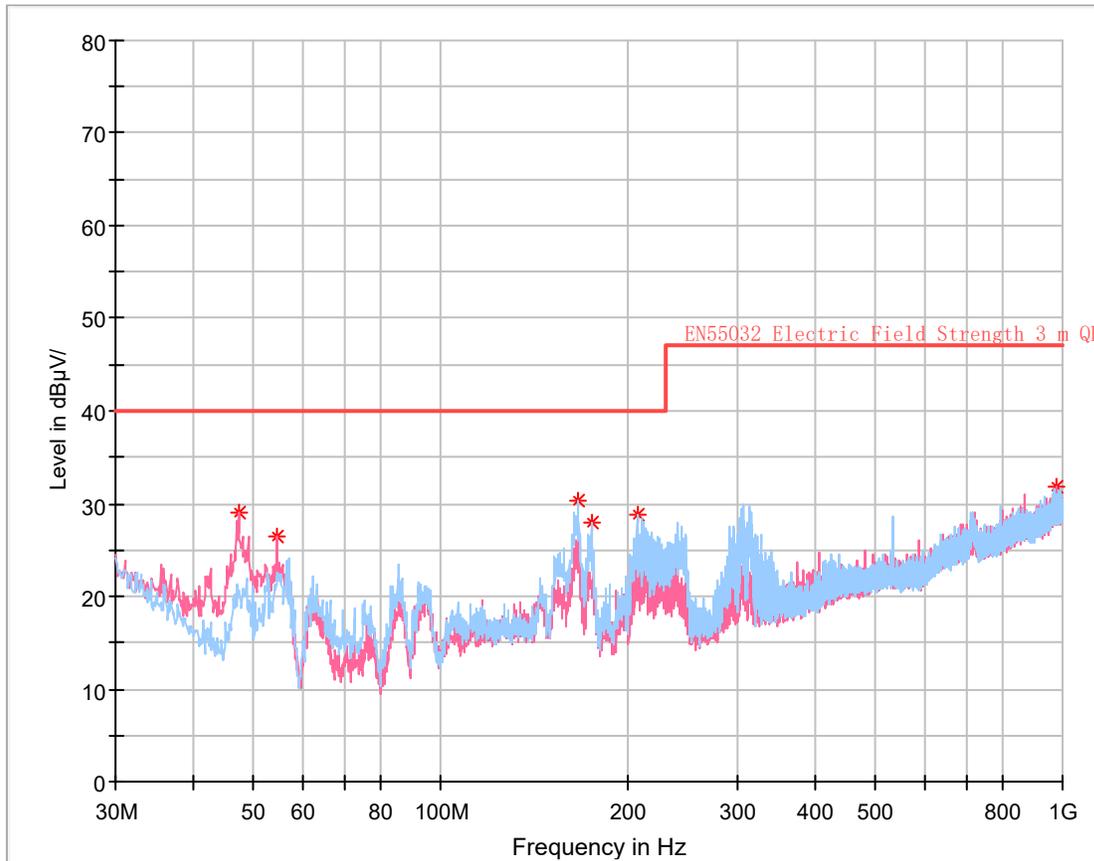
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.606250	33.26	40.00	6.74	100.0	V	126.0	-4.0
36.305000	26.47	40.00	13.53	100.0	V	253.0	-8.1
50.127500	30.12	40.00	9.88	100.0	V	106.0	-16.7
50.976250	30.96	40.00	9.04	100.0	V	76.0	-16.7
205.570000	27.62	40.00	12.38	200.0	H	26.0	-11.1
212.360000	32.36	40.00	7.64	200.0	H	36.0	-11.3

1-6 GHz

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	EN 55032	
	Reading (dB μ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB μ V/m)	Margin (dB)
1339.07	44.75	PK	186	2.1	H	-4.07	40.68	70	29.32
1339.07	29.84	Ave.	186	2.1	H	-4.07	25.77	50	24.23
1339.07	45.26	PK	274	2.2	V	-4.07	41.19	70	28.81
1339.07	29.98	Ave.	274	2.2	V	-4.07	25.91	50	24.09
2132.45	44.93	PK	215	2.3	H	-0.42	44.51	70	25.49
2132.45	29.91	Ave.	215	2.3	H	-0.42	29.49	50	20.51
2132.45	45.42	PK	158	1.5	V	-0.42	45.00	70	25.00
2132.45	30.15	Ave.	158	1.5	V	-0.42	29.73	50	20.27

Test Mode 3

30 MHz~1 GHz



Critical Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
47.460000	29.08	40.00	10.92	100.0	V	259.0	-15.2
54.613750	26.48	40.00	13.52	100.0	V	308.0	-16.6
166.163750	30.42	40.00	9.58	300.0	H	60.0	-12.0
174.530000	27.90	40.00	12.10	100.0	H	205.0	-12.1
206.782500	28.80	40.00	11.20	200.0	H	306.0	-11.2
974.780000	31.83	47.00	15.17	300.0	V	57.0	2.5

1-6 GHz

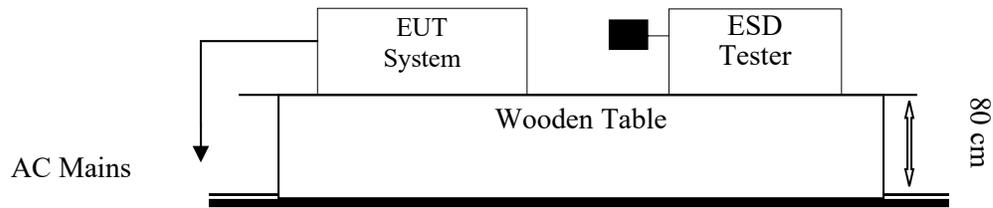
Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	EN 55032	
	Reading (dB μ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB μ V/m)	Margin (dB)
1425.98	45.24	PK	336	2.5	H	-3.18	42.06	70	27.94
1425.98	30.11	Ave.	336	2.5	H	-3.18	26.93	50	23.07
1425.98	45.87	PK	133	2.5	V	-3.18	42.69	70	27.31
1425.98	30.45	Ave.	133	2.5	V	-3.18	27.27	50	22.73
2210.75	45.64	PK	42	2.3	H	-0.24	45.40	70	24.60
2210.75	30.36	Ave.	42	2.3	H	-0.24	30.12	50	19.88
2210.75	46.19	PK	148	1.5	V	-0.24	45.95	70	24.05
2210.75	30.63	Ave.	148	1.5	V	-0.24	30.39	50	19.61

Note:

- 1) Corrected Amplitude = Meter Reading + Correction Factor
- 2) Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain
- 3) Margin = Limit – Corrected Amplitude

BS EN 55035 §4.2.1-ELECTROSTATIC DISCHARGES (IEC 61000-4-2)

Test System Setup



Remark: ■ is the tip of the electrode

IEC 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-2:2008)

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of IEC 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1 m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 20 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m × 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Environmental Conditions

Temperature:	25
Relative Humidity:	47
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1& Test Mode 2& Test Mode 3

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front	(3 points)	A	A	A	A	A	A	/	/
Back	(1 points)	A	A	A	A	A	A	/	/
Left	(1 points)	A	A	A	A	A	A	/	/
Right	(3 points)	A	A	A	A	A	A	/	/
Top	(6points)	A	A	A	A	A	A		
Bottom	(5points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
/		/	/	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side		A	A	A	A	/	/	/	/
Back Side		A	A	A	A	/	/	/	/
Left Side		A	A	A	A	/	/	/	/
Right Side		A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side		A	A	A	A	/	/	/	/
Back Side		A	A	A	A	/	/	/	/
Left Side		A	A	A	A	/	/	/	/
Right Side		A	A	A	A	/	/	/	/



Note:  represents air discharge,  represents direct contact

Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.

Test Mode 1& Test Mode 2



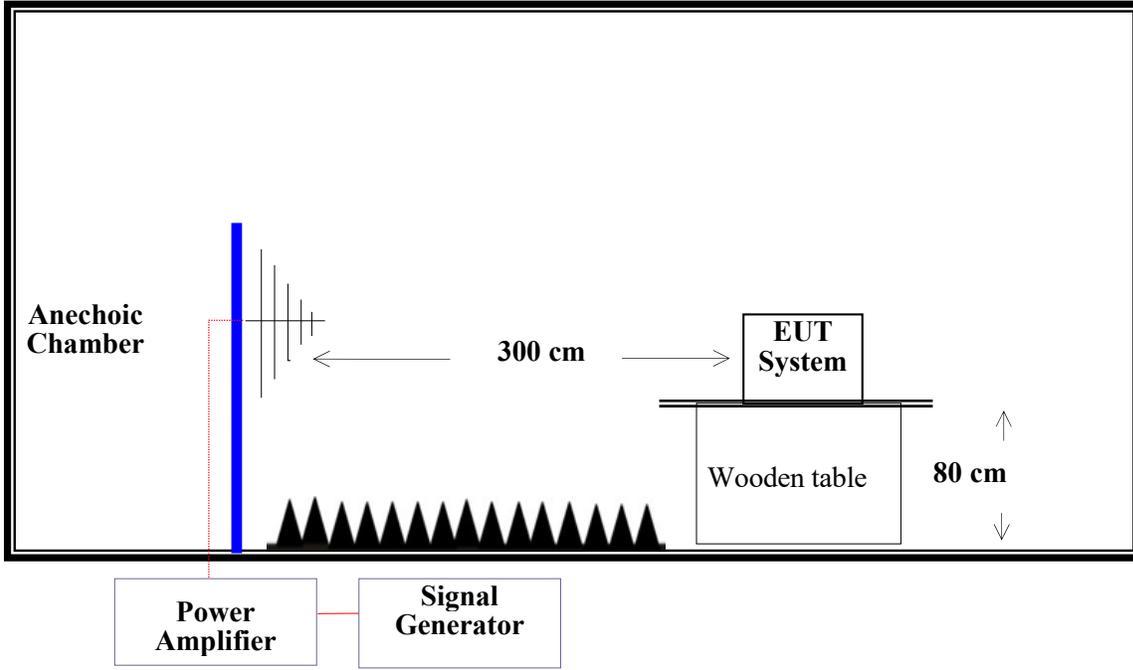
Test Mode 3



Test setup photo

BS EN 55035 §4.2.2.2-CONTINUOUS RADIATED IMMUNITY (IEC 61000-4-3)

Test System Setup



Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-3: 2006 + A1:2007 + A2:2010)

Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Test level 2)
2. Radiated Signal	AM 80%, 1 kHz Modulation
3. Scanning Frequency	80 – 1000 MHz,1800MHz,2600MHz, 3500MHz, 5000MHz
4. Frequency step	1%
5. Dwell Time	1 sec.

Test Data

Environmental Conditions

Temperature:	24
Relative Humidity:	49
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1 & Test Mode 2 & Test Mode 3

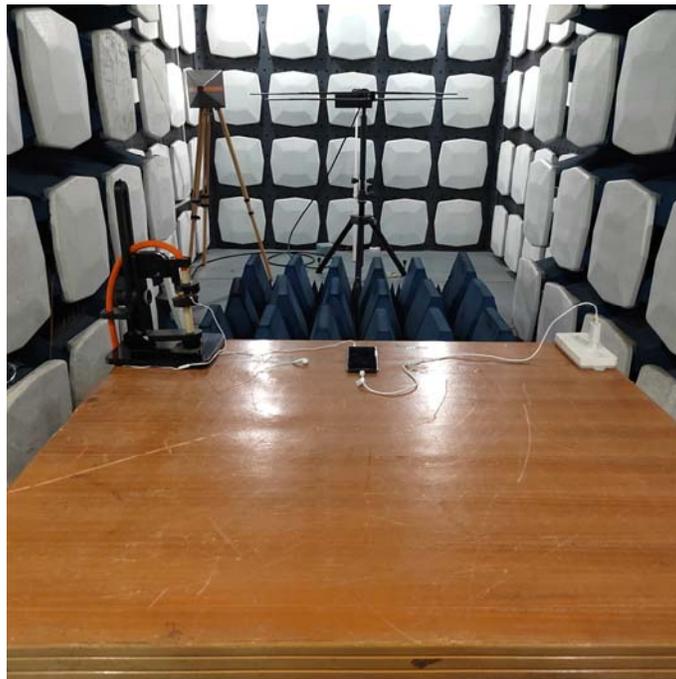
Frequency (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1800	A	A	A	A	A	A	A	A
2600	A	A	A	A	A	A	A	A
3500	A	A	A	A	A	A	A	A
5000	A	A	A	A	A	A	A	A

Note:

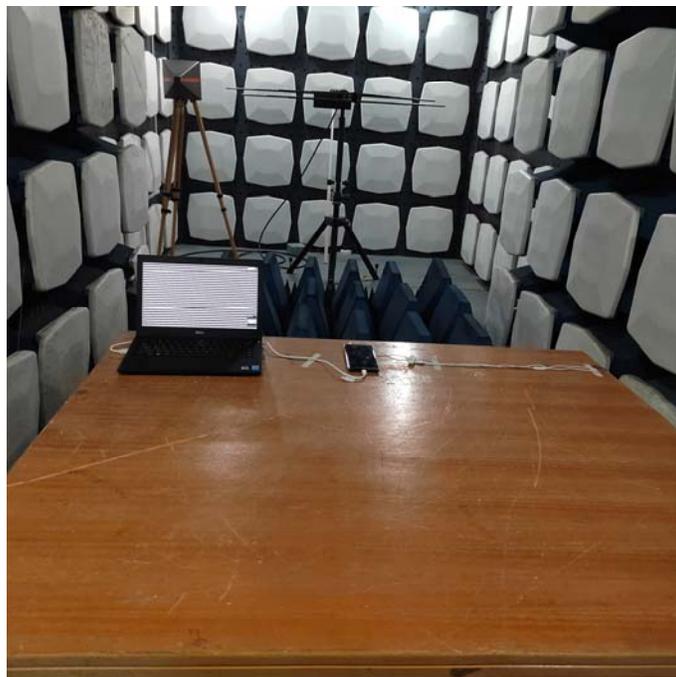
Frequency Range (MHz)	Field Strength	L0(dB)	L1(dB)	Margin(dB)	Limit(dB)	Perform Criterion	Remark
80-1000	3V/m	75	45	-30	≤ -20	A	PASS

Spot Test (MHz)	Field Strength	L0(dB)	L1(dB)	Margin(dB)	Limit(dB)	Perform Criterion	Remark
1800	3V/m	75	44	-31	≤ -20	A	PASS
2600	3V/m	75	43	-32	≤ -20	A	PASS
3500	3V/m	75	45	-30	≤ -20	A	PASS
5000	3V/m	75	43	-32	≤ -20	A	PASS

Test Mode 1&2



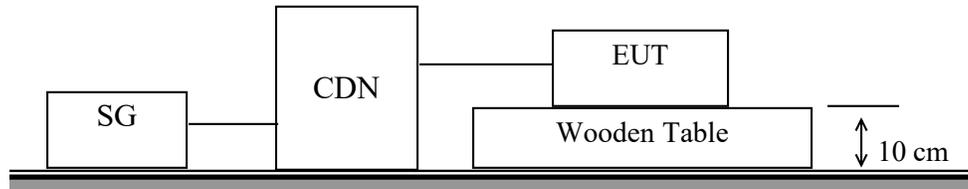
Test Mode 3



Test setup photo

BS EN 55035 §4.2.2.3-CONTINUOUS CONDUCTED IMMUNITY (IEC 61000-4-6)

Test Setup



Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-6:2008)

Test Level

Frequency(MHz)	Voltage Level (r.m.s.) (V)
0.15 to 10	3
10 to 30	3 to 1
30 to 80	1

Performance Criterion: A

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) The rate of sweep shall not exceed $1.5 \cdot 10^{-3}$ decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 7) An artificial ear and sound level meter are used to monitor the sound pressure level. RF communication test set is used to monitor the noise level.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data**Environmental Conditions**

Temperature:	25
Relative Humidity:	50
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1 Test Mode 2

AC Mains

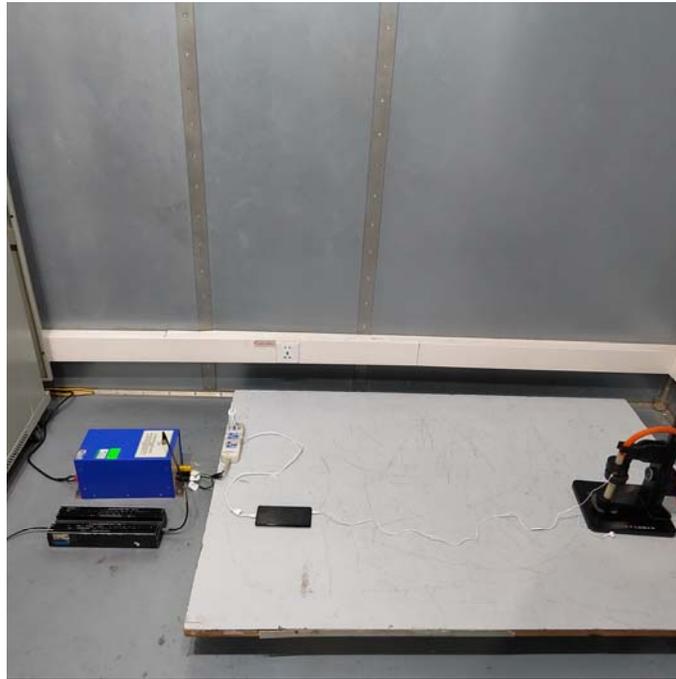
Modulation: Amplitude 80%, 1 kHz sine wave

Test Level:

Frequency (MHz)	Voltage Level (r.m.s.) (V)	Pass	Fail
0.15 to 10	3	A	/
10 to 30	3 to 1	A	/
30 to 80	1	A	/
X	Special	/	/

Note:

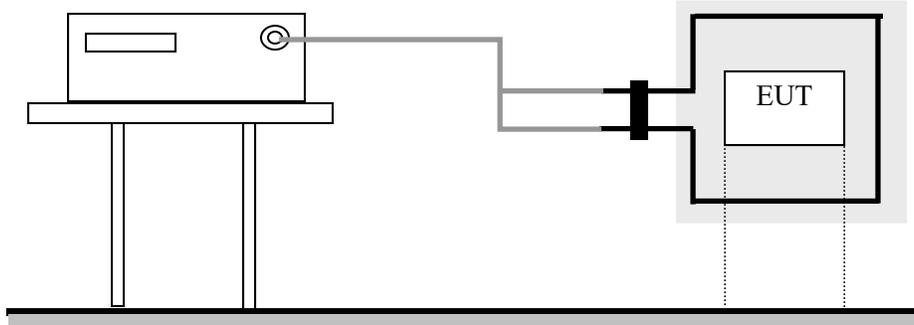
Frequency (MHz)	Field Strength	L0 (dB)	L1 (dB)	Margin (dB)	Limit (dB)	Perform Criterion	Remark
0.15-10	3V	75	43	-32	≤-20	A	PASS
10-30	3V-1V						
30-80	1V						



Test setup photo

BS EN 55035 §4.2.3-POWER FREQUENCY MAGNETIC FIELDS (IEC 61000-4-8)

Test Setup



Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-8:2009)

Test Level

Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X.	Special

Performance criterion: A

Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1 m*1 m). The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

Test Data and Setup Photo**Environmental Conditions**

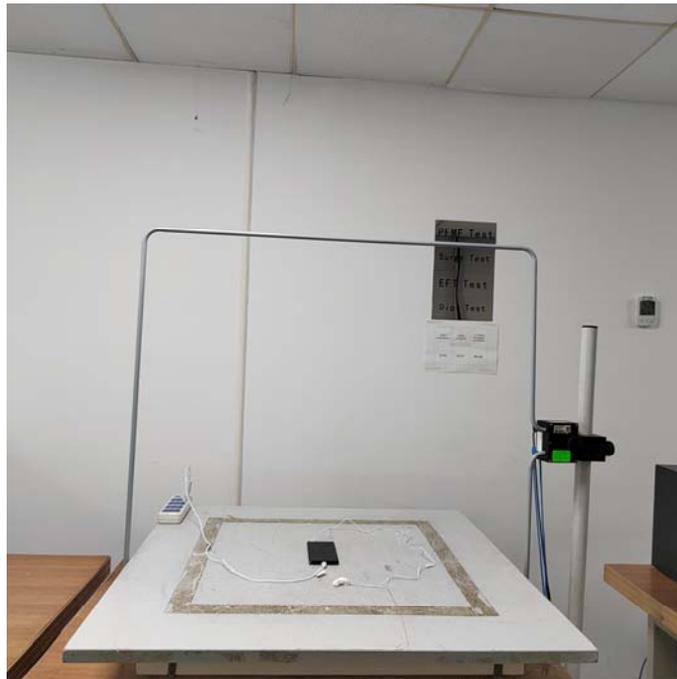
Temperature:	25
Relative Humidity:	46
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1 & Test Mode 2 & Mode 3

Level	Magnetic Field Strength A/m	X (Horizontal)	Y (Vertical)	Z (Special)
1	1	A	A	A
2	3	/	/	/
3	10	/	/	/
4	30	/	/	/
5	100	/	/	/
X	Special	/	/	/

Test Mode 1 & Test Mode 2



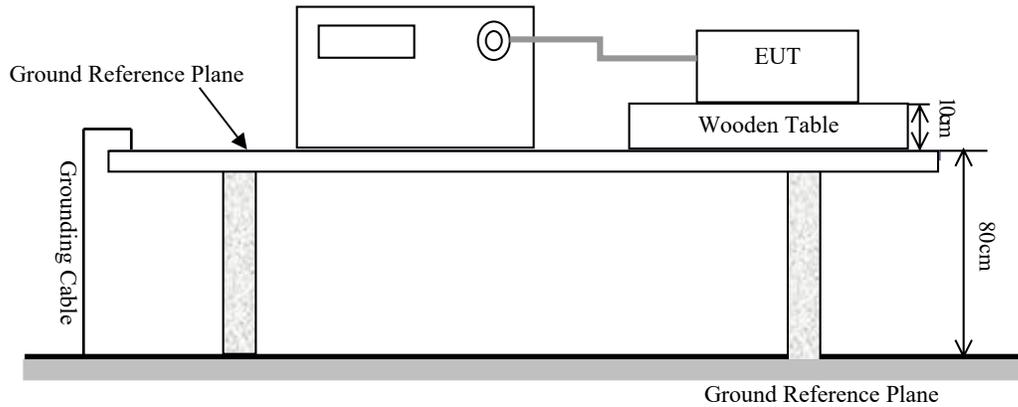
Test Mode 3



Test setup photo

BS EN 55035 §4.2.4-ELECTRICAL FAST TRANSIENTS (IEC 61000-4-4)

Test System Setup



Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-4:2012)

Test Level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility’s electrical earth.

Test Data

Environmental Conditions

Temperature:	25
Relative Humidity:	49
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1 & Test Mode 2

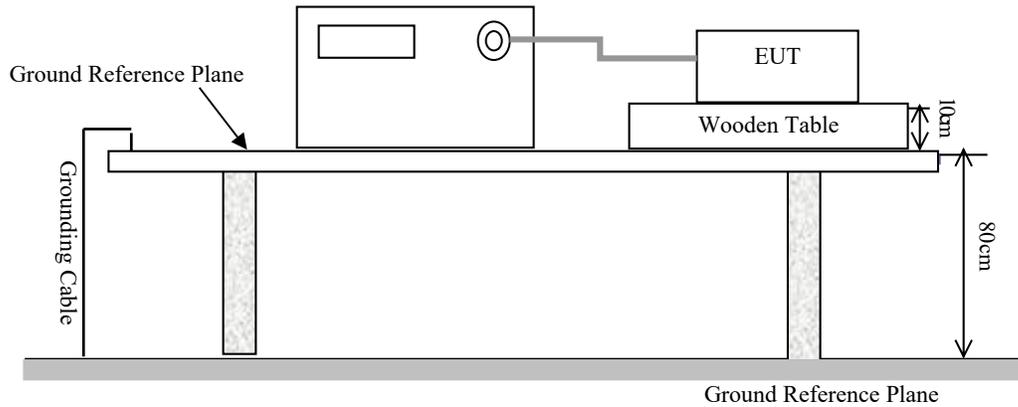
IEC 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC mains power input ports	L1	/	/	/	A	A	/	/	/
	N	/	/	/	A	A	/	/	/
	PE	/	/		/	/	/	/	/
	L1/N	/	/		A	A	/	/	/
	L1/PE	/	/	/	/	/	/	/	/
	N/PE	/	/	/	/	/	/	/	/
	L1/N/PE	/	/	/	/	/	/	/	/
Signal Port	RJ45	/	/	/	/	/	/	/	/



Test setup photo

BS EN 55035 §4.2.5-SURGES (IEC 61000-4-5)

Test System Setup



Test Standard

BS EN 55035:2017/A11:2020 (IEC 61000-4-5:2014)

Test Level

Level	Open Circuit Output Test Voltage $\pm 10\%$	Performance Criterion	
		AC Mains	Signal Port
1	0.5 kV	B	C
2	1 kV	B	C
3	2 kV	B	C
4	4 kV	B	C
X	Special	/	/

Test Procedure

- 1) For input a.c. power ports, provide a 1.2/50 μ s voltage surge (at open-circuit condition) and a 8/20 μ s current surge into a short circuit.
- 2) For telecommunication port, provide a 10/700 μ s voltage surge (at open-circuit condition) and a 5/320 μ s current surge into a short circuit.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data

Environmental Conditions

Temperature:	26
Relative Humidity:	46%
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test Mode 1&Test Mode 2

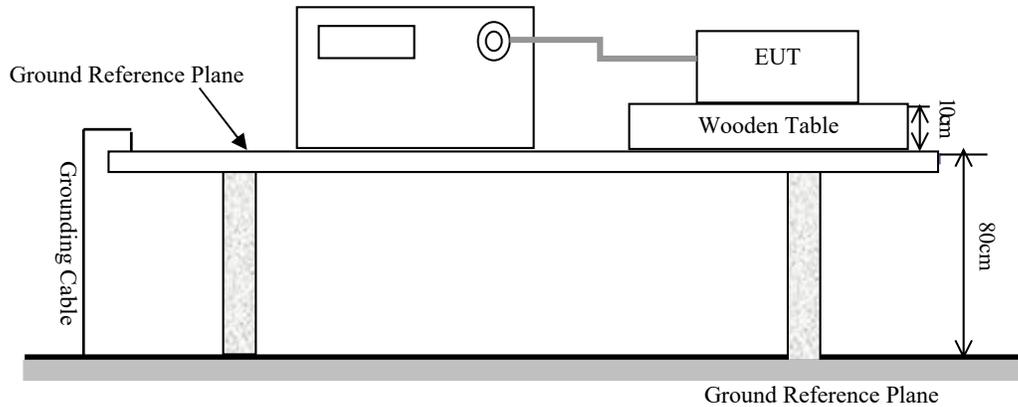
Port	Level	Voltage	Poll	Path	Criterion
AC Main	1	0.5 kV	±	/	/
	2	1 kV	±	L1/N	A
	3	2 kV	±	/	/
	4	4 kV	±	/	/
Signal Port (RJ45)	1	0.5 kV	±	/	/
	2	1 kV	±	/	/
	3	2 kV	±	/	/
	4	4 kV	±	/	/



Test setup photo

EN 55035 §4.2.6-VOLTAGE DIPS AND INTERRUPTIONS (IEC 61000-4-11)

Test Setup



Test Standard

EN 55035:2017/A11:2020 (IEC 61000-4-11:2004)

Test levels and Performance Criterion

Test Level	Voltage dip and short interruptions %UT	Duration (Periods)	Performance Criterion
1	>95	0.5	B
2	30	25	C
3	>95	250	C

Test Procedure

- 1) The interruption is introduced at selected phase angles with specified duration.
- 2) Record any degradation of performance.

Test Data

Environmental Conditions

Temperature:	25
Relative Humidity:	48
ATM Pressure:	101.0 kPa

The testing was performed by Lei Zhou on 2022-03-07

Test mode 1 & Test mode 2

Level	U2 (% Reduction)	Td(Periods)	Phase Angle	N	Pass	Fail
1	0	0.5	0/180	3	A	/
2	70	25	0/180	3	A	/
3	0	250	0/180	3	B	/

Note: B means charging interrupt and restore automatically.



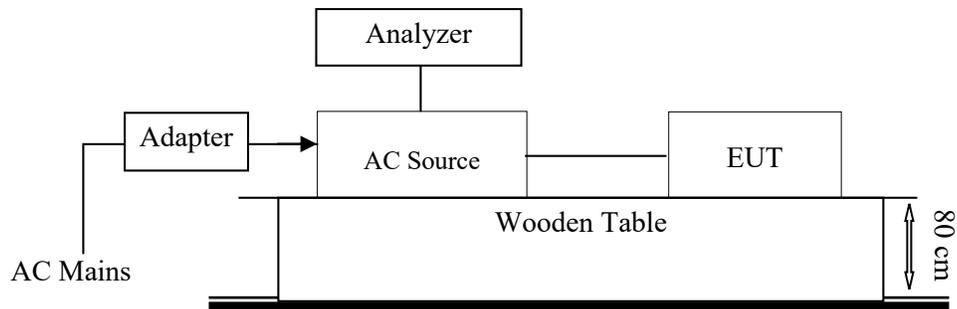
Test setup photos

BS EN IEC 61000-3-2 – HARMONIC CURRENT EMISSIONS

According to BS EN IEC 61000-3-2:2019/A1:2021 section 7: Equipment with a rated power of 75 W or less, other than lighting equipment, are not included in this standard.

BS EN 61000-3-3 – VOLTAGE FLUCTUATION AND FLICKER

Test System Setup



Test Standard

According to BS EN 61000-3-3:2013/A1:2019

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of P_{st} shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of $d(t)$ during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc , shall not exceed 3,3 %;
- the maximum relative voltage change d_{max} , shall not exceed
 - a) 4 % without additional conditions;
 - b) 6 % for equipment which is:

– switched manually, or

– switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the P_{st} and Plt limit. For example: a d_{max} of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0.65.

c) 7 % for equipment which is

– attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

– switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and

c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply

depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data

Environmental Conditions

Test Mode 1

Temperature:	24°C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

Date of test:	9:01 7.Mar 2022
Tester:	Lei Zhou
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurement)
Flicker meter:	230V / 50Hz
Model:	P50
EUT operation mode:	Test Mode 1

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	Pass
Plt	0.028	0.65	Pass
dc [%]	0.014	3.30	Pass
dmax [%]	0.071	4.00	Pass
dt [s]	0.000	0.50	Pass

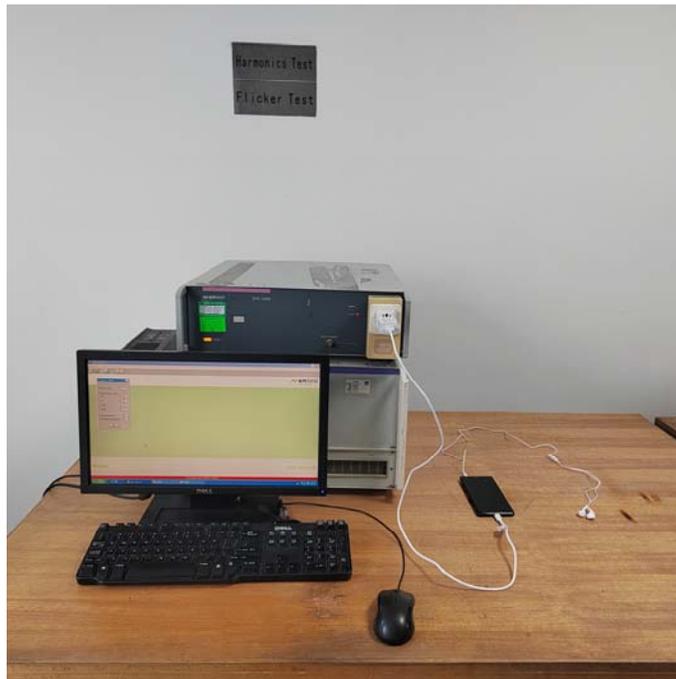
Test Mode 2

Date of test:	11:03 7.Mar 2022
Tester:	Lei Zhou
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurement)
Flicker meter:	230V / 50Hz
Model:	P50
EUT operation mode:	Test Mode 2

Maximum Flicker results

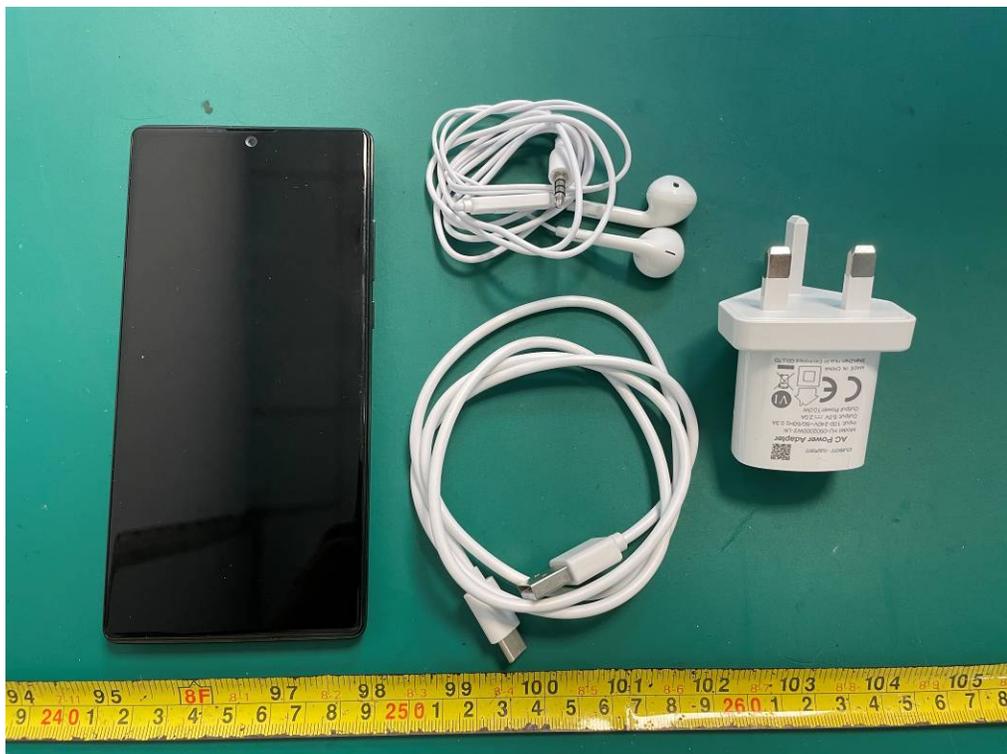
	EUT values	Limit	Result
Pst	0.028	1.00	Pass
Plt	0.028	0.65	Pass
dc [%]	0.013	3.30	Pass
dmax [%]	0.076	4.00	Pass
dt [s]	0.000	0.50	Pass

Test Mode 1& 2



Test setup photo

EXHIBIT A - EUT PHOTOGRAPHS

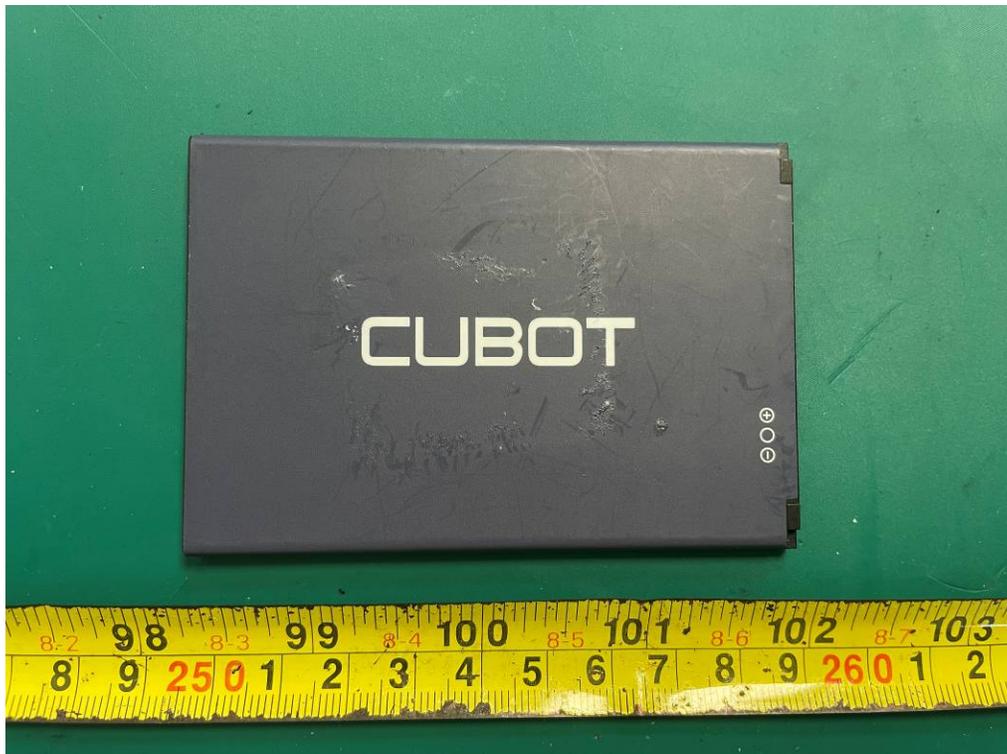


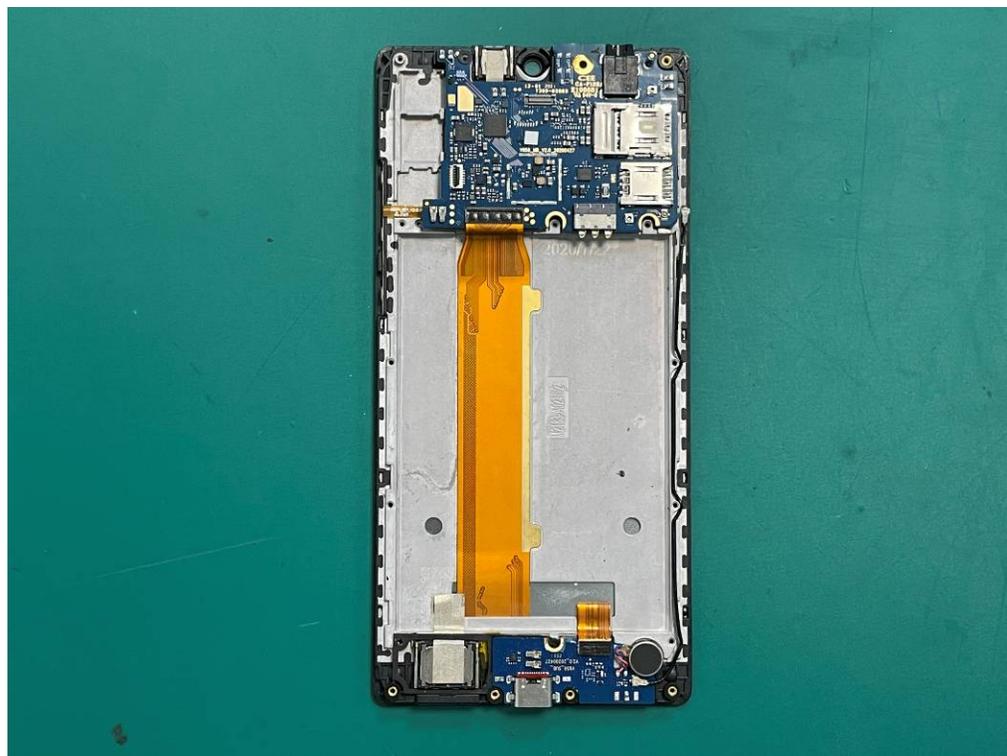


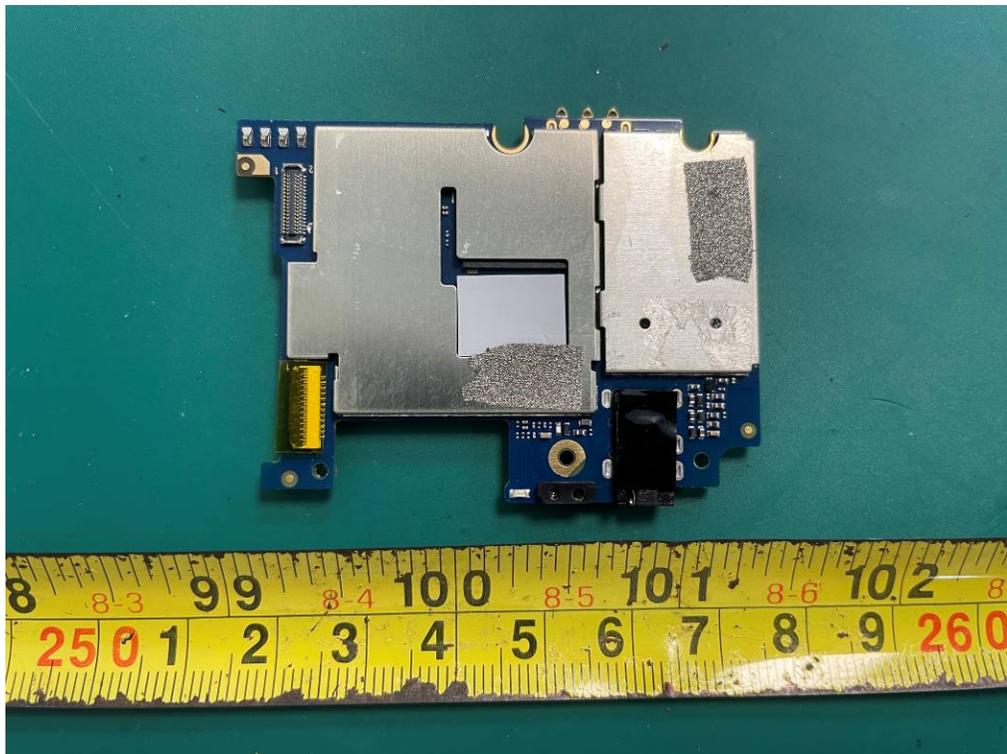
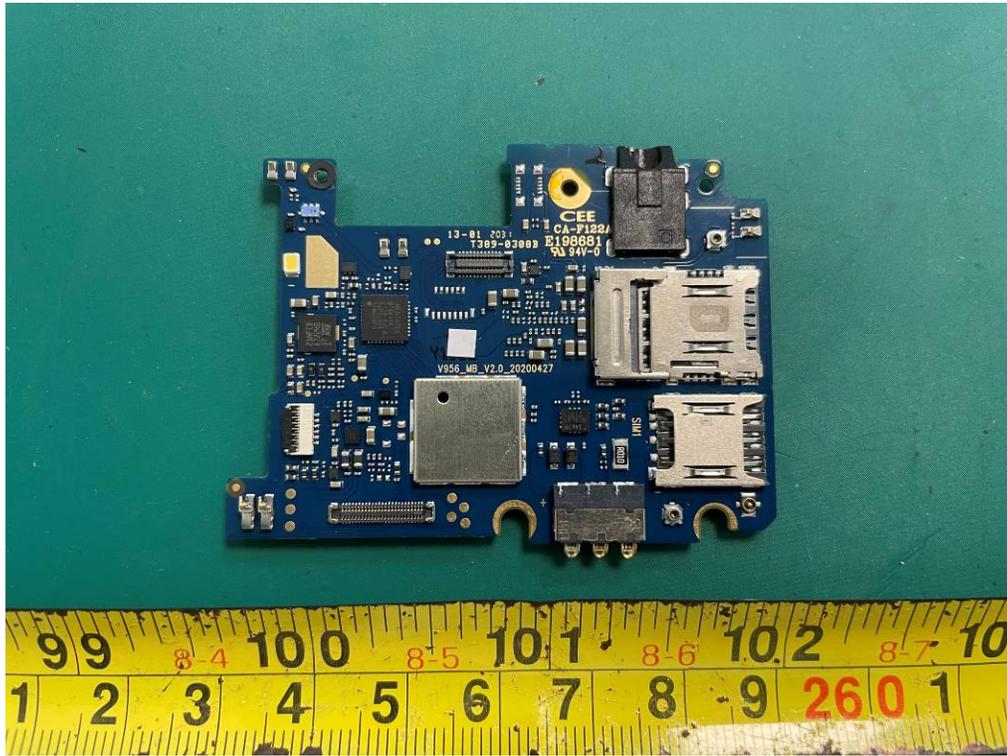


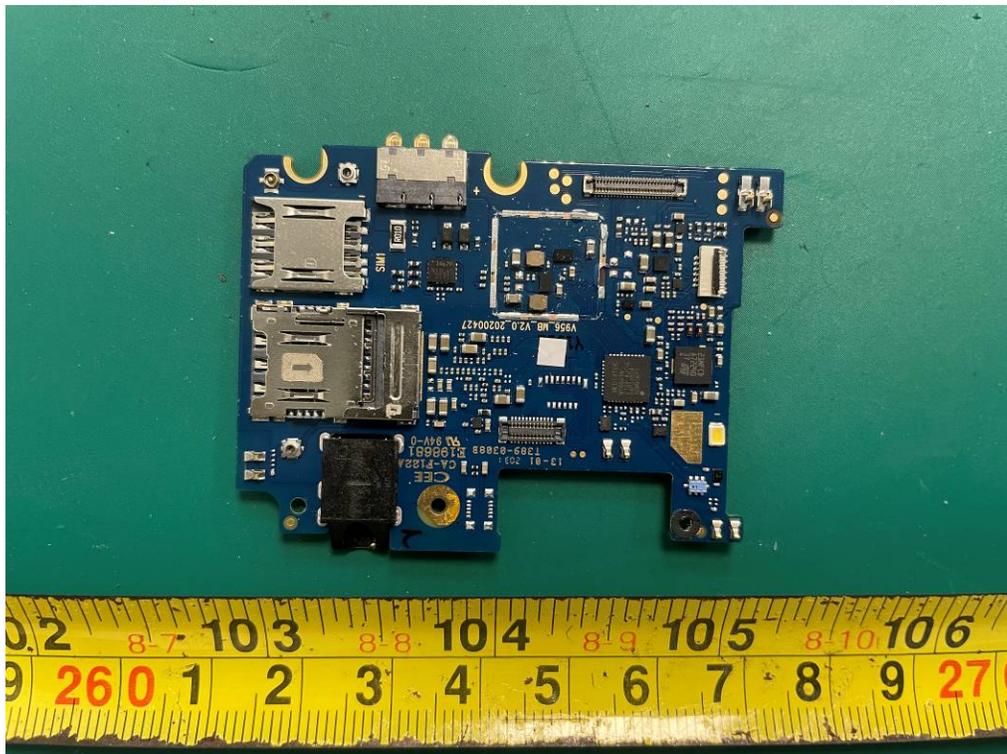
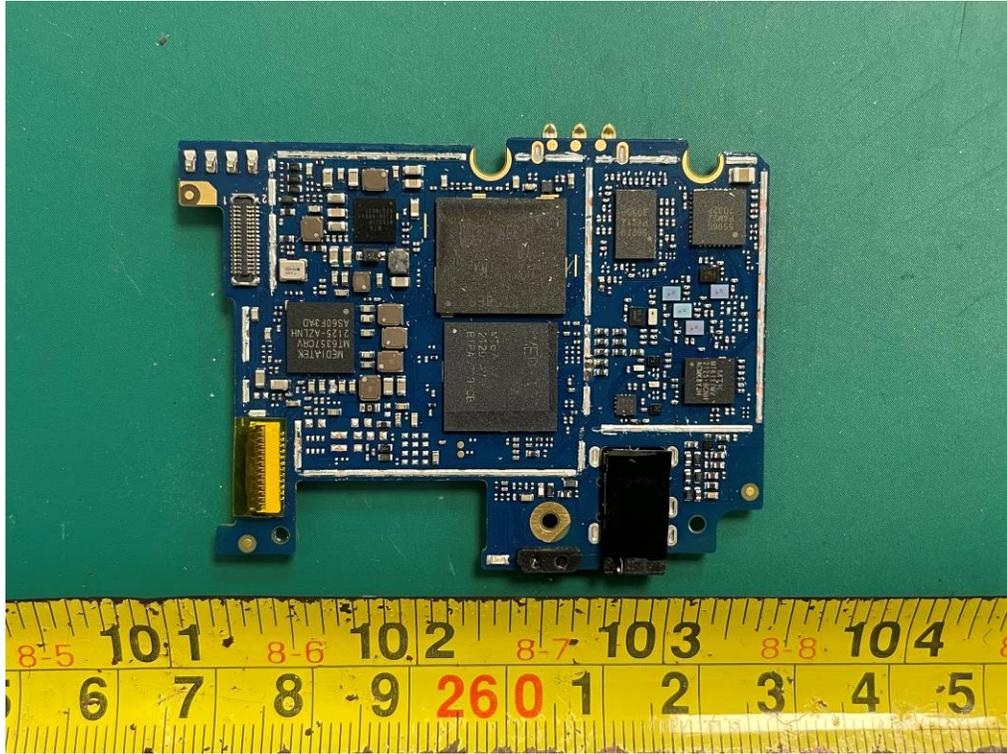


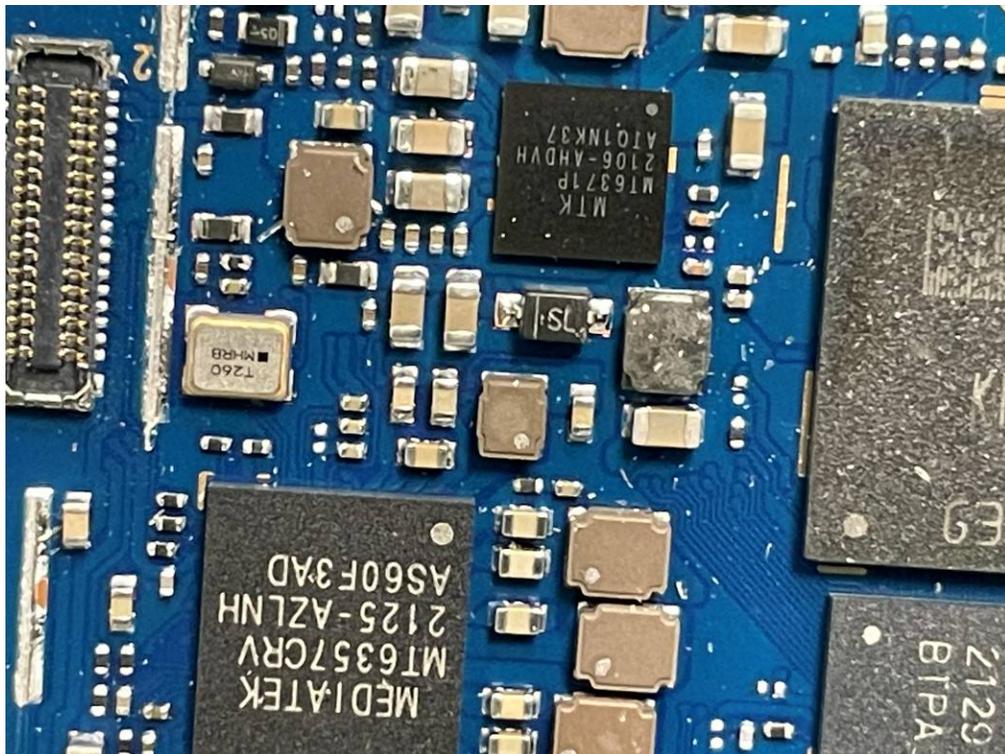
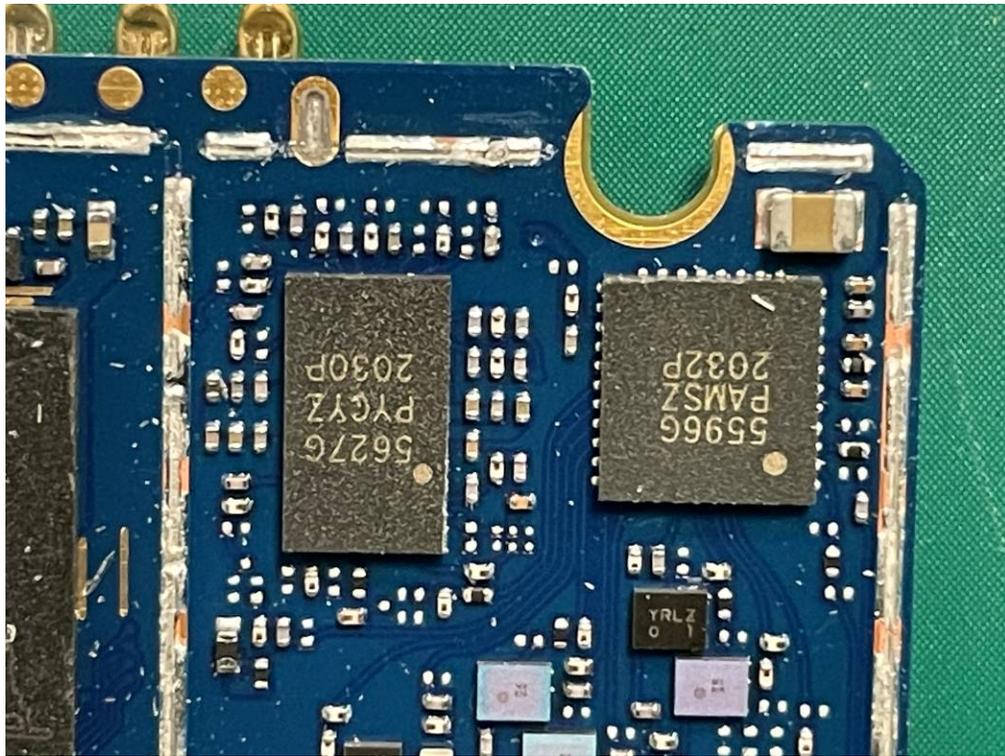


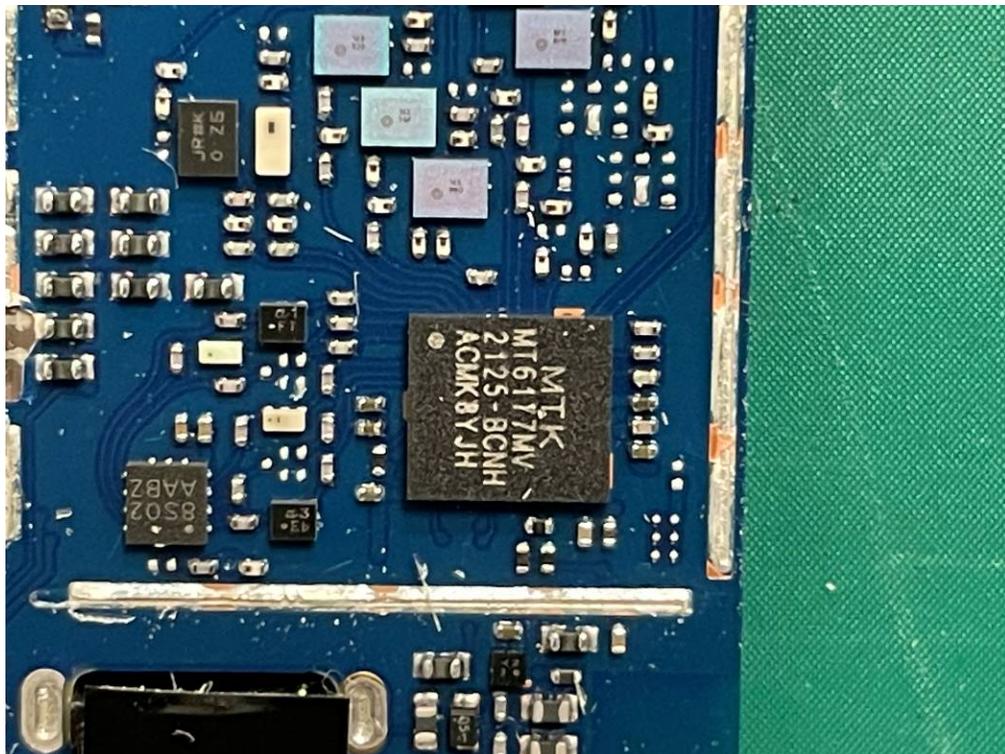
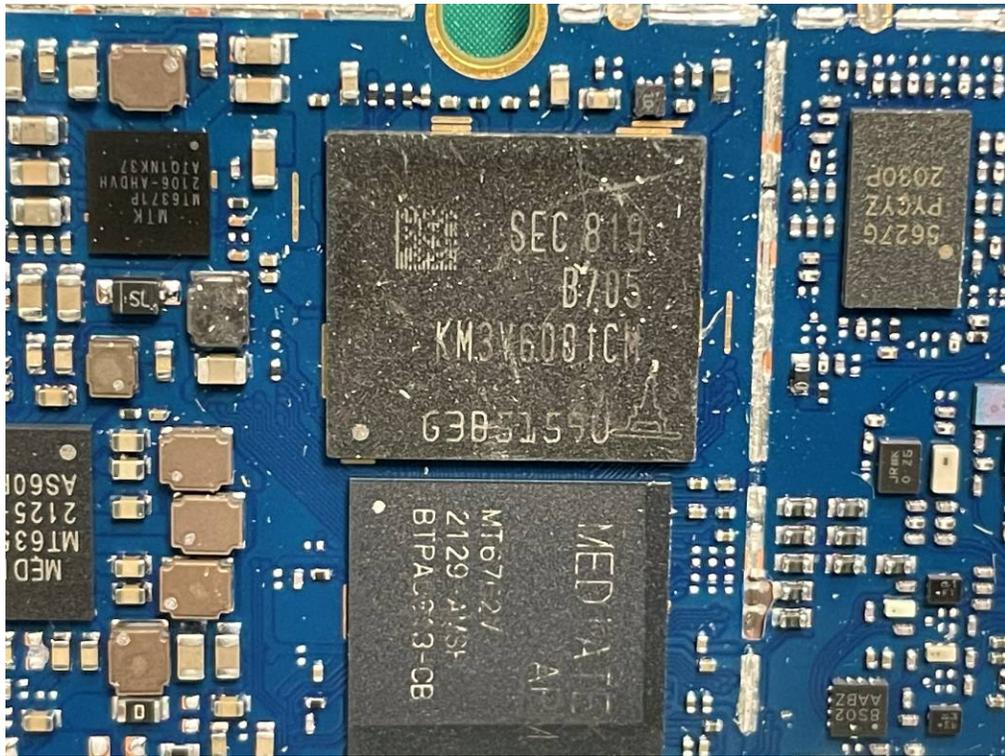


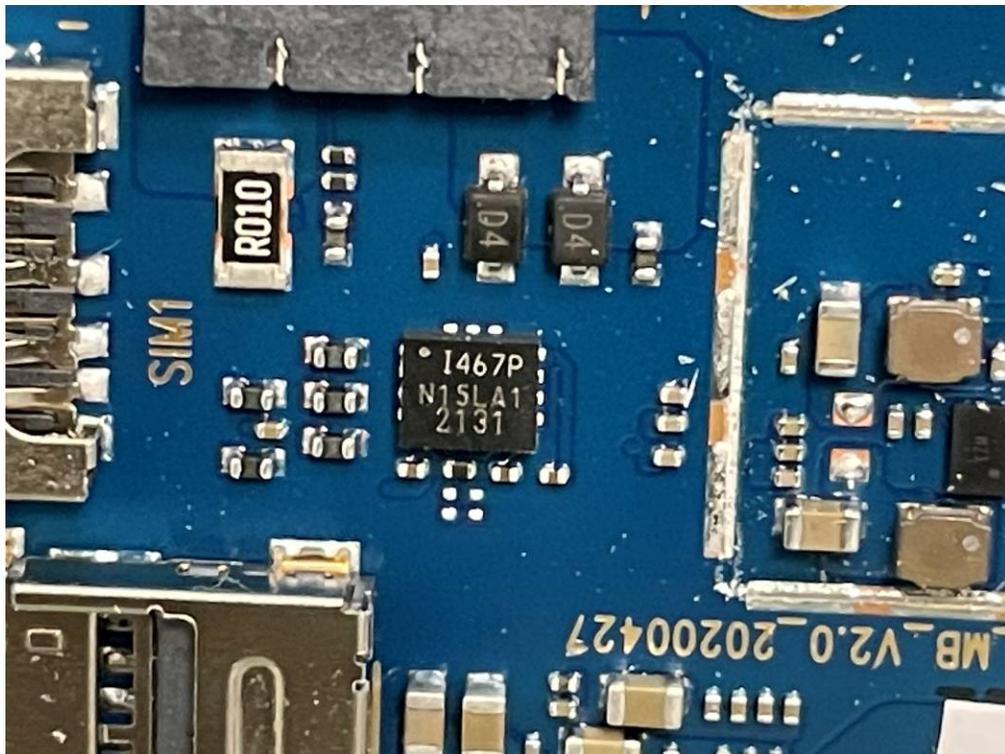
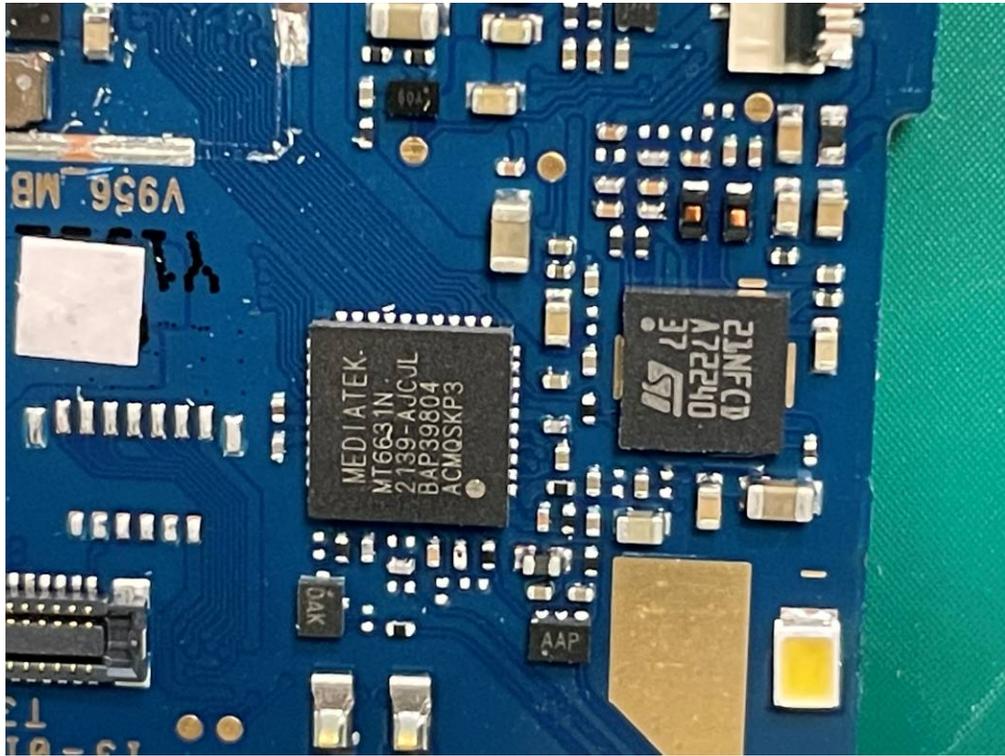


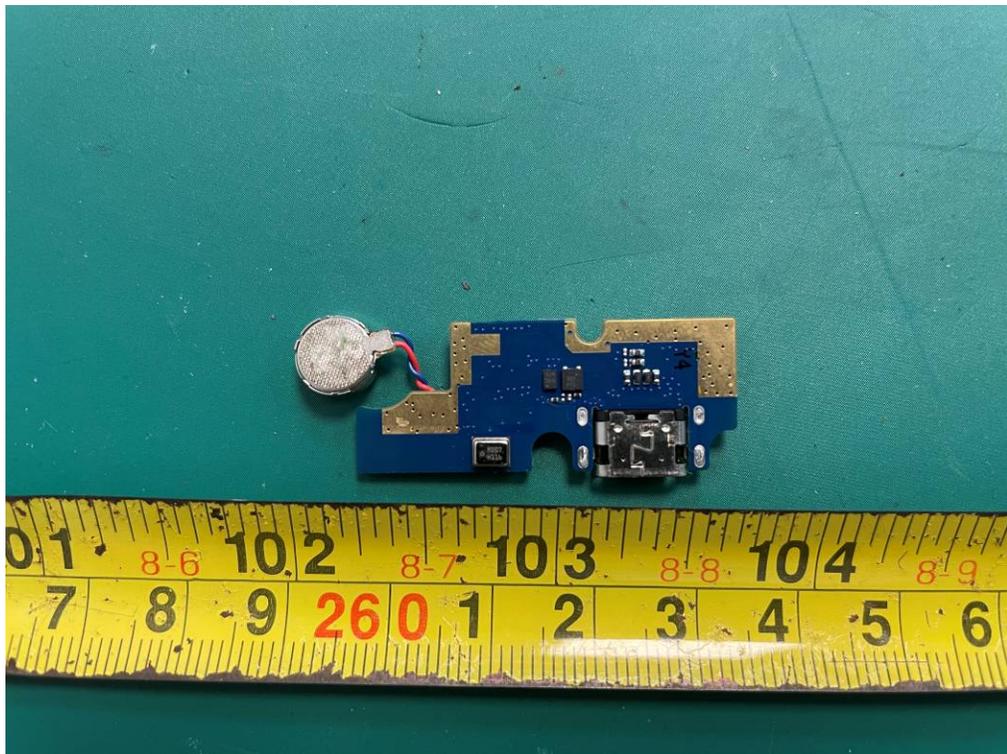
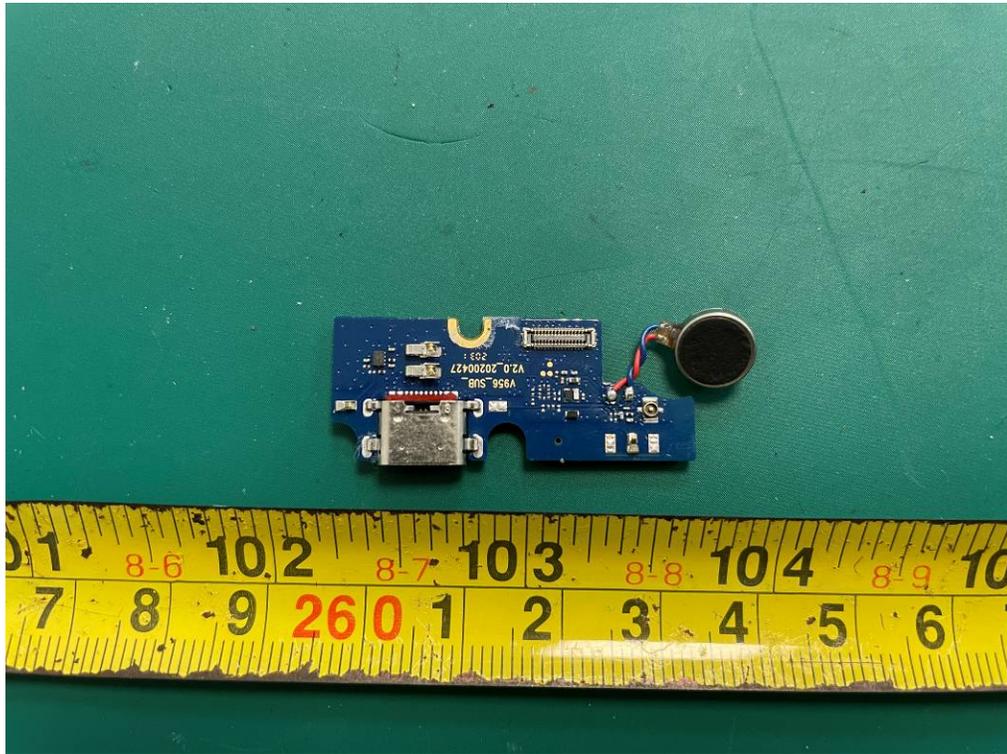


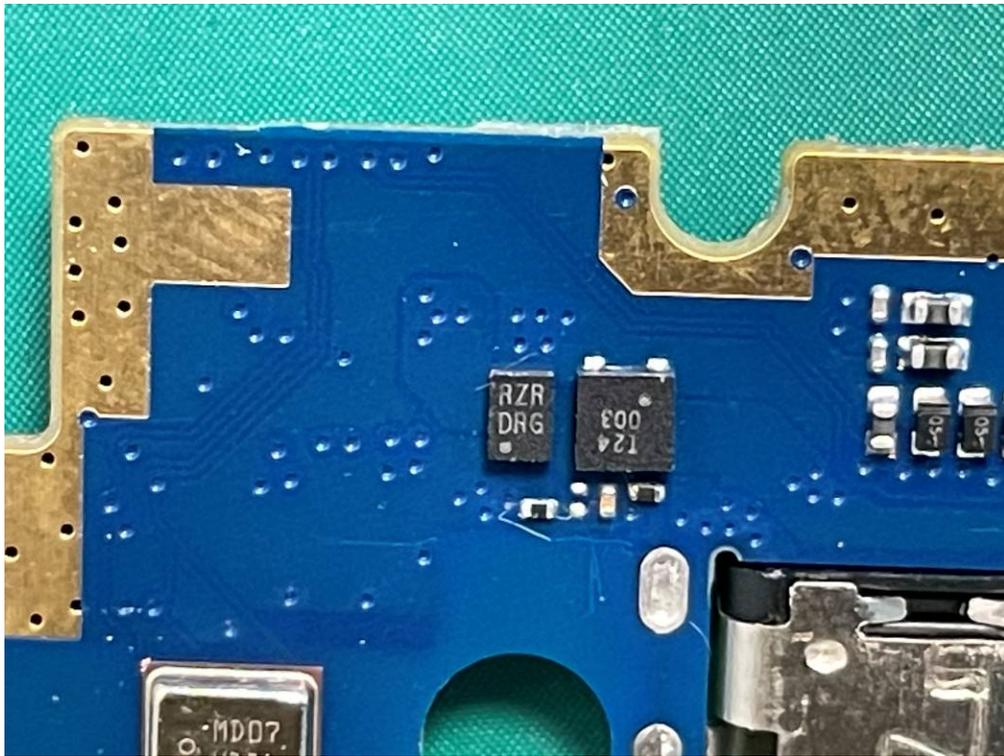












GSM/WCDMA/LTE Antenna



GNSS/Wi-Fi/Bluetooth Antenna



DIV Antenna





EXHIBIT B - TEST SETUP PHOTOGRAPHS

Conducted Disturbance - Front View



Conducted Disturbance - Side View



Test Mode 1 & Test Mode 2

Radiated Disturbance – Front View (Below 1 GHz)



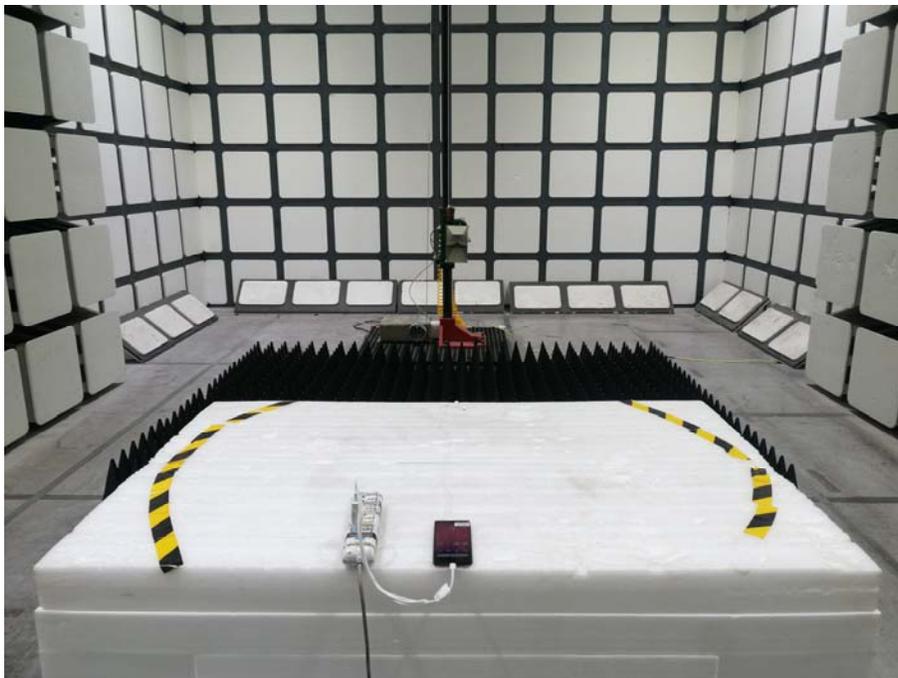
Radiated Disturbance – Rear View (Below 1 GHz)



Radiated Disturbance – Front View (Above 1 GHz)



Radiated Disturbance – Rear View (Above 1 GHz)



Test Mode 3
Radiated Disturbance – Front View (Below 1 GHz)



Radiated Disturbance – Rear View (Below 1 GHz)



Radiated Disturbance – Front View (Above 1 GHz)



Radiated Disturbance – Rear View (Above 1 GHz)



******* END OF REPORT *******