

ETSI EN 301 489-1_{V2.2.0}/ -3_{V2.1.1}/ -17_{V3.2.0}/ -19_{V2.1.0}/ -52_{V1.1.0}

EMISSION/IMMUNITY/HARMONICS/FLICKER
COMPLIANCE

Test Report

FOR

Multifunctional Handheld

Model No.: CL7202K

Trade Mark: Hopeland

Report No.: ES180321026W01

Issue Date: May 31, 2018

Prepared for

SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.

17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North,
Nanshan District, 518007, Shenzhen, China

Prepared by

EMTEK(SHENZHEN) CO., LTD.

Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

TEL: 86-755-26954280

FAX: 86-755-26954282

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TABLE OF CONTENTS

1	TEST RESULT CERTIFICATION.....	5
2	EUT DESCRIPTION	7
3	SUMMARY OF TEST RESULT	8
4	TEST METHODOLOGY	10
4.1	GENERAL DESCRIPTION OF APPLIED STANDARDS	10
4.2	MEASUREMENT EQUIPMENT USED	10
4.3	DESCRIPTION OF TEST MODES	14
4.4	BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM	14
4.5	SUPPORT EQUIPMENT	14
5	FACILITIES AND ACCREDITATIONS	15
5.1	FACILITIES	15
5.2	LABORATORY ACCREDITATIONS AND LISTINGS	15
6	TEST SYSTEM UNCERTAINTY	16
7	CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS	17
7.1	BLOCK DIAGRAM OF TEST SETUP	17
7.2	MEASURING STANDARD	17
7.3	CONDUCTED EMISSION LIMITS (CLASS B)	17
7.4	EUT CONFIGURATION ON MEASUREMENT	17
7.5	OPERATING CONDITION OF EUT	17
7.6	TEST PROCEDURE	17
7.7	MEASURING RESULTS	18
8	ASYMMETRIC MODE CONDUCTED EMISSIONS.....	19
8.1	BLOCK DIAGRAM OF TEST SETUP	19
8.2	MEASURING STANDARD	19
8.3	CONDUCTED EMISSION LIMITS	19
8.4	EUT CONFIGURATION ON MEASUREMENT	20
8.5	OPERATING CONDITION OF EUT	20
8.6	TEST PROCEDURE	20
8.7	MEASURING RESULTS	20
9	RADIATED EMISSIONS.....	21
9.1	BLOCK DIAGRAM OF TEST SETUP	21
9.2	MEASURING STANDARD	21
9.3	RADIATED EMISSION LIMITS (CLASS B)	21
9.4	EUT CONFIGURATION ON MEASUREMENT	22
9.5	OPERATING CONDITION OF EUT	22
9.6	TEST PROCEDURE	22
9.7	MEASURING RESULTS	23
10	HARMONIC CURRENT EMISSION TEST.....	24
10.1	BLOCK DIAGRAM OF TEST SETUP	24
10.2	MEASURING STANDARD	24
10.3	OPERATION CONDITION OF EUT	24
10.4	MEASURING RESULTS	24

11 VOLTAGE FLUCTUATION AND FLICKER TESTS	25
11.1 BLOCK DIAGRAM OF TEST SETUP	25
11.2 MEASURING STANDARD	25
11.3 OPERATION CONDITION OF EUT	25
11.4 MEASURING RESULTS	25
12 PERFORMANCE CRITERIA	26
12.1 GENERAL PERFORMANCE CRITERIA	26
12.2 PERFORMANCE TABLE	26
13 ELECTROSTATIC DISCHARGE	31
13.1 BLOCK DIAGRAM OF TEST SETUP	31
13.2 TEST STANDARD	31
13.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	31
13.4 OPERATING CONDITION OF EUT	31
13.5 TEST PROCEDURE	31
13.6 TEST RESULTS	32
14 RADIO FREQUENCY ELECTROMAGNETIC FIELD	33
14.1 BLOCK DIAGRAM OF TEST SETUP	33
14.2 TEST STANDARD	33
14.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	33
14.4 OPERATING CONDITION OF EUT	34
14.5 TEST PROCEDURE	34
14.6 TEST RESULTS	34
15 FAST TRANSIENTS, COMMON MODE	35
15.1 BLOCK DIAGRAM OF TEST SETUP	35
15.2 TEST STANDARD	35
15.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	35
15.4 OPERATING CONDITION OF EUT	36
15.5 TEST PROCEDURE	36
15.6 TEST RESULTS	36
16 SURGE	37
16.1 BLOCK DIAGRAM OF TEST SETUP	37
16.2 TEST STANDARD	37
16.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	37
16.4 OPERATING CONDITION OF EUT	37
16.5 TEST PROCEDURE	37
16.6 TEST RESULTS	37
17 RADIO FREQUENCY, COMMON MODE	38
17.1 BLOCK DIAGRAM OF TEST SETUP	38
17.2 TEST STANDARD	38
17.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	38
17.4 OPERATING CONDITION OF EUT	38
17.5 TEST PROCEDURE	38
17.6 TEST RESULTS	38
18 VOLTAGE DIPS AND INTERRUPTIONS	39
18.1 BLOCK DIAGRAM OF TEST SETUP	39
18.2 TEST STANDARD	39
18.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	39
18.4 OPERATING CONDITION OF EUT	39
18.5 TEST PROCEDURE	39

18.6	TEST RESULTS	39
19	APPENDIX A TEST DATA	40
19.1	DATA FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS.....	40
19.2	DATA FOR RADIATED EMISSIONS	42
19.3	DATA FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS	46
19.4	DATA FOR ELECTROSTATIC DISCHARGE	47
19.5	DATA FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD	48
19.6	DATA FOR FAST TRANSIENTS, COMMON MODE.....	49
19.7	DATA FOR SURGE.....	50
19.8	DATA FOR RADIO FREQUENCY, COMMON MODE.....	51
19.9	DATA FOR VOLTAGE DIPS AND INTERRUPTIONS.....	52
20	APPENDIX B PHOTOGRAPHS OF TEST SETUP	53
20.1	PHOTO FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS	53
20.2	PHOTO FOR RADIATED EMISSIONS.....	54
20.3	PHOTO FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS	55
20.4	PHOTO FOR ELECTROSTATIC DISCHARGE.....	55
20.5	PHOTO FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD.....	56
20.6	PHOTO FOR FAST TRANSIENTS, COMMON MODE	57
20.7	PHOTO FOR SURGE	57
20.8	PHOTO FOR RADIO FREQUENCY, COMMON MODE	58
20.9	PHOTO FOR VOLTAGE DIPS AND INTERRUPTIONS	58
21	APPENDIX C PHOTOGRAPHS OF EUT.....	59

1 TEST RESULT CERTIFICATION

Applicant : SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.
 17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North, Nanshan District, 518007, Shenzhen, China

Manufacturer : SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.
 17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North, Nanshan District, 518007, Shenzhen, China

EUT : Hopeland

Model : Multifunctional Handheld

Trademark : CL7202K

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
ETSI EN 301 489-1 V2.2.0: 2017	PASS
ETSI EN 301 489-52 V1.1.0:2016	PASS
ETSI EN 301 489-17 V3.2.0: 2017	PASS
ETSI EN 301 489-19 V2.1.0: 2017	PASS
ETSI EN 301 489-3 V2.1.1: 2017	PASS

The device described above is tested by EMTEK (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (Shenzhen) Co., Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the ETSI EN 301 489-1 V2.2.0: 2017, ETSI EN 301 489-52 V1.1.0:2016, ETSI EN 301 489-17 V3.2.0: 2017, ETSI EN 301 489-19 V2.1.0: 2017 and ETSI EN 301 489-3 V2.1.1: 2017 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (Shenzhen) Co., Ltd.

Date of Test : March 21, 2018 to May 18, 2018

Prepared by : 
 Sevin Li/Editor

Reviewer : 
 Joe Xia/Supervisor

Approved & Authorized Signer : 
 Lisa Wang/Manager



Modified History

Rev.	Summary	Date of Rev.	Report No.
V1.0	Original Report	/	ES180321026W01

2 EUT DESCRIPTION

Device Type:	Portable Device
Exposure Category:	Uncontrolled Environment/General Population
Product Name:	Multifunctional Handheld
Model Number:	CL7202K
Operating Mode(s) & Operating Frequency Range(s):	WIFI 802.11b/g/n:2412MHz-2472MHz GPS Receiver:1575.42MHz RFID: 865.7MHz – 867.5MHz E-GSM900:TX880.2MHz~914.8MHz /RX925.2MHz~959.8MHz DCS1800:TX1710.2MHz~1784.8MHz /RX1805.2MHz~1879.8MHz WCDMA Band I:TX1922.4MHz~1977.6MHz/RX 2112.4MHz~2167.6MHz
Test Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n DSSS with DBPSK/DQPSK/CCK for 802.11b QPSK for WCDMA ASK for RFID
Type of Antenna:	WiFi: FPC Antenna WCDMA/LTE: FPC Antenna RFID: Panel Antenna
Hardware Version:	V4.0
Software Version:	V1.2.5
Power supply	☒ DC 3.7V via Battery ☒ DC 5V Via charging Cradle from adapter1 ☒ DC 5V Via adapter2 ☒ Adapter1 Model: BI24-050400-AdU Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 5V, 4A ☒ Adapter2 Model: BI20-050350-Adc Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 5V, 3.5A
Temperature Extreme Range:	-20°C ~ +55°C

Note: for more details, please refer to the User's manual of the EUT.

3 SUMMARY OF TEST RESULT

Applicable Standard: ETSI EN 301 489-1 v2.2.0: 2017			
Standard	Description of Test Item	Result	Remarks
EN 55032:2015	Conducted Emissions From The AC Mains Power Ports Emission Test 150 kHz – 30 MHz	PASS	
	Asymmetric Mode Conducted Emissions Emission Test 150 kHz – 30 MHz	N/A	
	Radiated Emissions 30 MHz – 1000 MHz @ 3 m 1000 MHz – 6000 MHz @ 3 m	PASS	
EN 61000-3-2:2014	Harmonic current emission test	N/A	
EN 61000-3-3:2013	Voltage fluctuations & flicker tests	PASS	
EN 61000-4-2:2009	Electrostatic Discharge ± 2, 4 kV Contact Discharge ± 2, 4, 8 kV Air Discharge Standard Criterion B	PASS	
EN 61000-4-3:2006 +A1:2008+A2:2010	Radio frequency electromagnetic field Frequency Range: 80 MHz to 6000 MHz and Electromagnetic field: 3 V/m (unmodulated, r.m.s) Amplitude modulated: 80 % AM (1 kHz) Standard Criterion A	PASS	
EN 61000-4-4:2012	Fast transients, common mode AC ports 5/50 ns, ± 1 kV, 5 kHz DC ports 5/50 ns, ± 0.5 kV I/O ports 5/50 ns, ± 0.5 kV, 5 kHz Standard Criterion B	PASS	
EN 61000-4-5:2006	Surge (Power port 1.2/50 µs, Signal port 10/700 µs / 1.2/50 µs) AC ports: line to line: ± 0.5 kV, 1 kV line to earth: ± 0.5 kV, 1 kV, 2 kV indoor signal ports and telecommunication ports: ± 0.5 kV outdoor signal ports and telecommunication ports for symmetrically operated: ± 1 kV non-symmetrically operated: ± 0.5 kV, 1 kV Standard Criterion B	PASS	
EN 61000-4-6:2009	Radio frequency, common mode Frequency Range: 150 kHz to 80 MHz Electromagnetic field: 3 V (unmodulated, r.m.s) Amplitude modulated: 80 % AM (1 kHz) Standard Criterion A	PASS	
EN 61000-4-11:2004	Voltage dips and interruptions voltage dip 0% 10 ms (0.5 cycles) - Standard Criterion B voltage dip 0% 20 ms (1.0 cycles) - Standard Criterion B voltage dip 70% (at 50 Hz) 500 ms (25 cycles) - Standard Criterion C voltage interruption 0% (at 50 Hz) 5000 ms (250 cycles) - Standard Criterion C	PASS	
Note: N/A			

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:

ETSI EN 301 489-1: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

Part 52: Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

ETSI EN 301 489-17: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

ETSI EN 301 489-19: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band (ROGNSS) providing positioning, navigation, and timing data; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

ETSI EN 301 489-3: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

4.2 MEASUREMENT EQUIPMENT USED

For Conducted Emission Measurement for AC(site 1)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R & S	ESCI	26115-010-0027	May 20, 2017	1 Year
2	L.I.S.N.	R & S	ENV216	101161	May 20, 2017	1 Year
3	50Ω Coaxial Switch	Anritsu	MP59B	6100175589	May 21, 2017	1 Year
4	Voltage Probe	R & S	ESH2-Z3	100122	May 21, 2017	1 Year
5	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year

For 3m Radiated Emission Measurement (30M-1GHz) (3m chamber 3#)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R & S	ESCI	101414	May 20, 2017	1 Year
2	Pre-Amplifier	LUNAR-EM	LNA30M3G-25	J10100000071	May 20, 2017	1 Year
3	Bilog Antenna	Schwarzbeck	VULB9163	660	May 21, 2017	1 Year
4	Cable	H+B	NmSm-05-C15052	/	May 21, 2017	1 Year
5	Cable	H+B	NmSm-2-C15201	/	May 21, 2017	1 Year
6	Cable	H+B	NmNm-7-C15702	/	May 21, 2017	1 Year
7	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year

For 3m Radiated Emission Measurement(1-18GHz)(3m chamber 3#)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R & S	FSV40	132.1-3008K39-100967-AP	May 20, 2017	1 Year
2	Pre-Amplifier	Lunar EM	LNA1G18-48	J1011131010001	May 20, 2017	1 Year
3	Horn Antenna	Schwarzbeck	BBHA 9120	1178	May 21, 2017	1 Year

4	Cable	H+B	SAC-40G-1	414	May 21, 2017	1 Year
5	Cable	H+B	SUCOFLEX104	MY14871/4	May 21, 2017	1 Year
6	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year
7	Cable	H+B	BLU18A-NmSm-6500	D8501	May 21, 2017	1 Year

For Harmonic Current / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 20, 2017	1 Year
2	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 20, 2017	1 Year
3	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	May 20, 2017	1 Year
4	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	May 20, 2017	1 Year
5	Proflin 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	May 20, 2017	1 Year
6	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year

For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	ESD Tester	TESEQ AG	NSG 438A	130	May 21, 2017	1 Year
2	Impulse Module	TESEQ AG	IN NSG 438A A 4380-150pF/330Ohm	403-550/1712	May 21, 2017	1 Year
3	Impulse Module	TESEQ AG	INA 4553-330pF/330Ohm	403-588/1912	May 21, 2017	1 Year
4	Impulse Module	TESEQ AG	INA 4381-150pF/2kOhm	403-564/1812	May 21, 2017	1 Year
5	Impulse Module	TESEQ AG	INA 4382-330pF/2kOhm	403-565/1912	May 21, 2017	1 Year
6	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year

For Radio-frequency, Electromagnetic Field Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5181A	MY50145187	May 20, 2017	1 Year
2	Ear simulator	Brüel Kjaer	BK-4182	SB3442/05	May 20, 2017	1 Year
3	Audio Analyzer	Rohde&Schwarz	UPL	SB3439	May 20, 2017	1 Year
4	Audio Analyzer	Rohde &Schwarz	UPL	102216	May 20, 2017	1 Year
5	Field probe	ETS	HI-6005	89587	May 20, 2017	1 Year
6	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 21, 2017	1 Year
7	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 21, 2017	1 Year
8	Field Strength Meter	DARE	RSS1006A	10100037SO22	May 21, 2017	1 Year
9	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 21, 2017	1 Year
10	Power Amplifier	MILMEGA	80RF1000-175	1059345	May 20, 2017	1 Year
11	Power Amplifier	MILMEGA	AS0102-55	1018770	May 20, 2017	1 Year

12	Power Amplifier	MILMEGA	AS1860-50	1059346	May 20, 2017	1 Year
13	Log.-Per. Antenna	Schwarzbeck	VULP 9118E	811	May 21, 2017	1 Year
14	Broad-Band Horn Antenna	Schwarzbeck	STLP 9149	9149-227	May 21, 2017	1 Year
15	Multi-function interface system	DARE	CTR1009B	12I00250SNO 72	N/A	N/A
16	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A
17	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50 -140822zk	May 21, 2017	1Year

For Electrical Fast Transient / Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Burst Tester	HAEFELY	PEFT4010	080981-16	May 21, 2017	1Year
2	Coupling Clamp	HAEFELY	IP-4A	147147	May 21, 2017	1Year
3	Three phase CDN	Teseq	CDN 163	202	May 21, 2017	1 Year
4	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50 -140822zk	May 21, 2017	1Year

For Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Surge Controller	HAEFELY	Psurge 8000	174031	May 21, 2017	1Year
2	Impulse Module	HAEFELY	PIM 100	174124	May 21, 2017	1Year
3	Coupling Decoupling Filter	HAEFELY	PCD 130	172181	May 21, 2017	1Year
4	Coupling Module	HAEFELY	PCD122	174354	May 21, 2017	1Year
5	Surge Impulse Module	HAEFELY	PIM 120	174435	May 21, 2017	1Year
6	Coupling Module	HAEFELY	PCD 126A	174387	May 21, 2017	1Year
7	Impulse Module	HAEFELY	PIM 110	174391	May 21, 2017	1Year
8	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50 -140822zk	May 21, 2017	1Year

For Immunity Test of Conducted Disturbance Induced by RF Field

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5181A	MY50145187	May 20, 2017	1 Year
2	Ear simulator	Brüel Kjaer	BK-4182	SB3442/05	May 20, 2017	1 Year
3	Audio Analyzer	Rohde&Schwarz	UPL	SB3439	May 20, 2017	1 Year
4	Field probe	ETS	HI-6005	89587	May 20, 2017	1 Year
5	Simulator	EMTEST	CWS500C	0900-12	May 21, 2017	1 Year
6	CDN	EMTEST	CDN-M2	5100100100	May 21, 2017	1 Year
7	CDN	EMTEST	CDN-M3	0900-11	May 21, 2017	1 Year
8	Injection Clamp	EMTEST	F-2031-23MM	368	May 21, 2017	1 Year
9	Attenuator	EMTEST	ATT6	0010222A	May 21, 2017	1 Year
10	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50 -140822zk	May 21, 2017	1Year

For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	45KVA AC Power	Teseq	NSG	1305A02873	May 20, 2017	1 Year

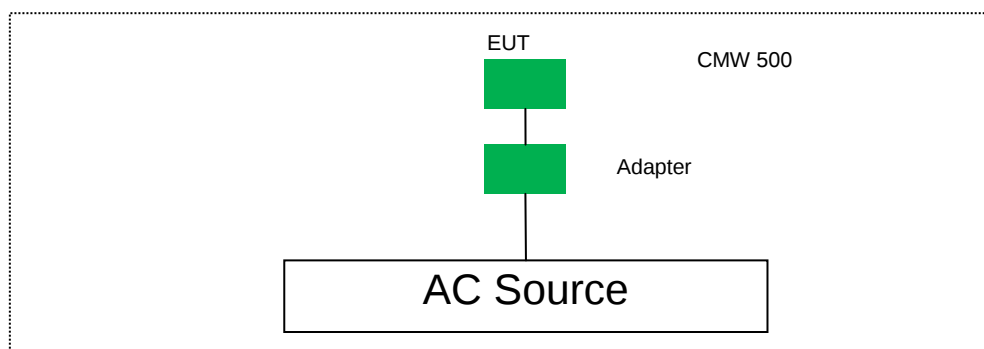
	source		1007-45/45KVA			
2	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 20, 2017	1 Year
3	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	May 20, 2017	1 Year
4	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	May 20, 2017	1 Year
5	Proflin 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	May 20, 2017	1 Year
6	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 21, 2017	1Year

4.3 DESCRIPTION OF TEST MODES

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Mode	Description
1	RFID & WiFi & GPS & WCDMA Band 1 Data Link
2	Charging & RFID & WiFi & GPS & GSM 900 Data Link
3	Charging with Cradle & RFID & WiFi & GPS & GSM 900 Data Link
4	Charging with Cradle & RFID & WiFi & GPS & GSM 900 Idle
5	Charging with Cradle & RFID & WiFi & GPS & DCS 1800 Data Link
6	Charging with Cradle & RFID & WiFi & GPS & WCDMA Band 1 Data Link
7	Charging with Cradle & WiFi Mode
8	Charging with Cradle & RFID Mode
9	Charging with Cradle & GPS Mode
10	Charging with Cradle & GSM Mode
11	Charging with Cradle & WCDMA Mode
After the preliminary scan, the following test Mode3: Charging & WiFi & GPS & GSM 900 Data Link was found to produce the highest emission level for EMI Test	

4.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



4.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description	
EMC Lab.	: Accredited by CNAS, 2016.10.24 The certificate is valid until 2022.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005) The Certificate Registration Number is L2291 : Accredited by TUV Rheinland Shenzhen, 2016.05.19 The Laboratory has been assessed according to the requirements ISO/IEC 17025. : Accredited by FCC, August 03,2017 The Certificate Registration Number is CN1204 : Accredited by Industry Canada, November 24, 2015 The Certificate Registration Number is 4480A

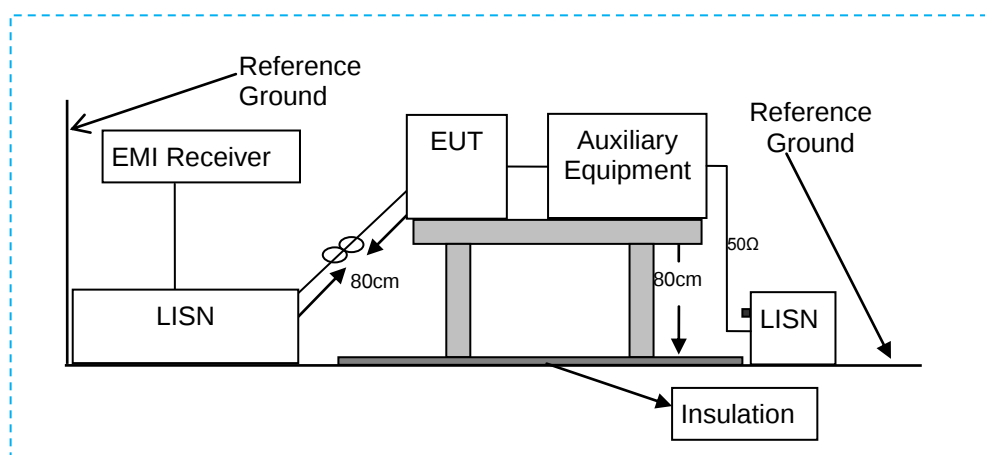
6 TEST SYSTEM UNCERTAINTY

Maximum measurement uncertainty of the test system

Test Item	Measurement Uncertainty
Conducted Emissions	2.96dB(9k~150kHz Conduction 1#) 2.74dB(150k-30MHz Conduction 1#)
Radiated Emission(3m Chamber)	3.78dB (30M~1GHz Polarize: H) 4.27dB (30M~1GHz Polarize: V) 3.7dB (1~18GHz Polarize: H) 3.6dB (1~18GHz Polarize: V)
Voltage fluctuations & flicker tests	0.07%
Harmonic current emission test	1.8%
Electrostatic Discharge	6 %
Radio frequency, common mode	1.45(Using CDN Test) 2.37(Using EM Clamp Test)
Radio frequency electromagnetic field	2.10dB(80MHz-1000MHz) 1.76dB(1000MHz-6000MHz)
Uncertainty for test site temperature and humidity	0.6℃ 4%

7 CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS

7.1 BLOCK DIAGRAM OF TEST SETUP



7.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.4
 EN 55032: 2015 Clause A.3

7.3 CONDUCTED EMISSION LIMITS (CLASS B)

Power Line Conducted Emission Limits

Applicable to 1. AC mains power ports				
Table clause	Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
A10.1	0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
	0,5 to 5			56
	5 to 30			60
A10.2	0,15 to 0,5	AMN	Average / 9 kHz	56 to 46
	0,5 to 5			46
	5 to 30			50
Apply A10.1 and A10.2 across the entire frequency range.				

7.4 EUT CONFIGURATION ON MEASUREMENT

The following equipments are installed on Conducted Emission Measurement to meet EN 55032 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

7.5 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

7.6 TEST PROCEDURE

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN55032 regulations during conducted emission measurement.

The bandwidth of the Receiver (ESCI) is set at 9kHz in 150kHz~30MHz and 200Hz in

9kHz~150kHz.

The frequency range from 150kHz to 30MHz is investigated.

The results were obtained from the following equation

Result dB(uV):

Measurement Level dB(uV)= LISN factor(dB) +Cable Loss(dB) +Reading LeveldB(uV)

Note: LISN factor(dB) and Cable Loss(dB) are included Reading dB(uV) in test software.

Over(dB)= Emission Level dB(uV)- Limit dB(uV)

7.7 MEASURING RESULTS

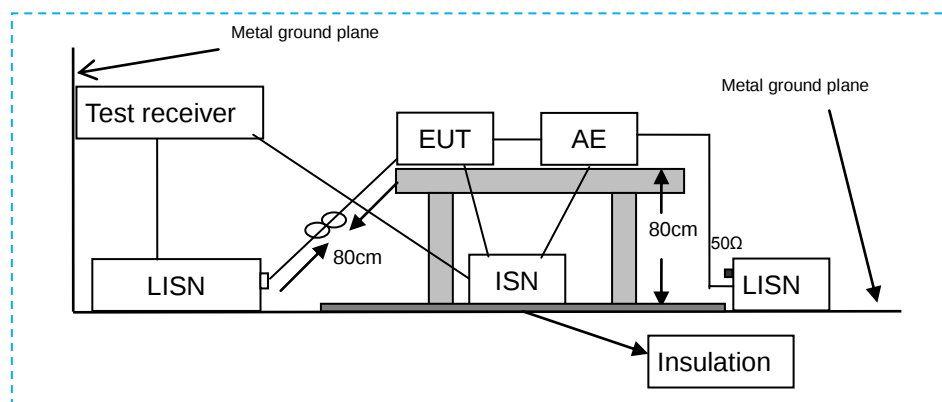
PASS.

All of the Configurations were tested,

The AC 230V/50Hz, AC 120V/60Hz power supply had been test. the data of the worst case are recorded in the appendix A.

8 ASYMMETRIC MODE CONDUCTED EMISSIONS

8.1 BLOCK DIAGRAM OF TEST SETUP



8.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.7
EN 55032: 2015 Clause A.3

8.3 CONDUCTED EMISSION LIMITS

Applicable to					
1. Wired Network Ports					
2. Optical Fibre Ports With Metallic Shield or Tension Members					
3. Broadcast Receiver Tuner Ports					
4. Antenna Ports					
Table clause	Frequency range MHz	Coupling device (see Table A.8)	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
A12.1	0,15 to 0,5	AAN	Quasi Peak / 9 kHz	84 to 74	n/a
	0,5 to 30			74	
	0,15 to 0,5	AAN	Average / 9 kHz	74 to 64	
	0,5 to 30			64	
A12.2	0,15 to 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 to 74	40 to 30
	0,5 to 30			74	30
	0,15 to 0,5	CVP and current probe	Average / 9 kHz	74 to 64	30 to 20
	0,5 to 30			64	20
A12.3	0,15 to 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 to 30
	0,5 to 30				30
	0,15 to 0,5	Current Probe	Average / 9 kHz		30 to 20
	0,5 to 30				20
The choice of coupling device and measurement procedure is defined in Annex C. Screened ports including TV broadcast receiver tuner ports are measured with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth. AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.10. The measurement shall cover the entire frequency range. The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability. Measurement is required at only one EUT supply voltage and frequency. Applicable to ports listed above and intended to connect to cables longer than 3 m.					

8.4 EUT CONFIGURATION ON MEASUREMENT

The following equipments are installed on Conducted Emission Measurement to meet EN 55032 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

8.5 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

8.6 TEST PROCEDURE

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N) or connected to the telecommunication port through an impedance stabilization network (ISN). L.I.S.N provided a 50ohm coupling impedance for the tested equipments AC mains port, I.S.N provided a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test. Both sides of AC line and telecommunication line are investigated to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement.

The bandwidth of the Receiver (R&S ESCS30) is set at 9kHz in 150kHz~30MHz and 200Hz in 9kHz~150kHz.

The frequency range from 150kHz to 30MHz is investigated.

Result dB(uV):

Measurement Level dB(uV)= ISN factor(dB) +Cable Loss(dB) +Reading Level dB(uV)

Note: ISN factor(dB) and Cable Loss(dB) are included Reading dB(uV) in test software.

Over(dB)= Emission Level dB(uV)- Limit dB(uV)

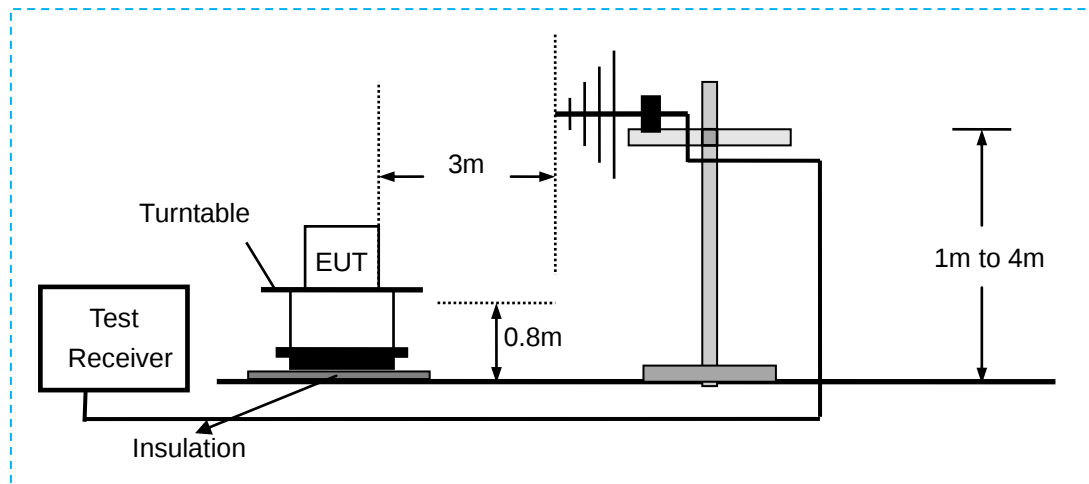
8.7 MEASURING RESULTS

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

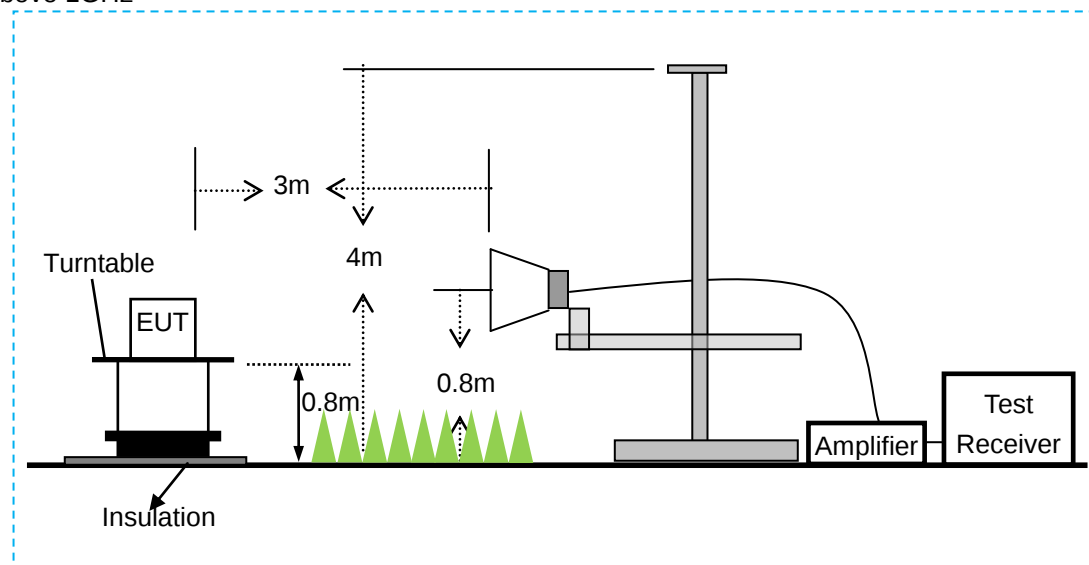
9 RADIATED EMISSIONS

9.1 BLOCK DIAGRAM OF TEST SETUP

Below 1GHz



Above 1GHz



9.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.2
EN 55032: 2015 Clause A.2

9.3 RADIATED EMISSION LIMITS (CLASS B)

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Table clause	Frequency range MHz	Measurement			Class B limits dB(mV/m)
		Facility (see Table A.1)	Distance m	Detector type /bandwidth	
A4.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
	230 to 1 000				37
A4.2	30 to 230	OATS/SAC	3		40
	230 to 1 000				47
A4.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	32 to 25
	230 to 1 000				32
A4.4	30 to 230	FAR	3		42 to 35
	230 to 1 000				42
Apply only table clause A4.1 or A4.2 or A4.3 or A4.4 across the entire frequency range. These requirements are not applicable to the local oscillator and harmonics frequencies of equipment covered by Table A.6.					

Table clause	Frequency range MHz	Measurement			Class B limits dB(mV/m)
		Facility (see Table A.1)	Distance m	Detector type/ bandwidth	
A5.1	1 000 to 3 000	FSOATS	3	Average/ 1 MHz	50
	3 000 to 6 000				54
A5.2	1 000 to 3 000			Peak/ 1 MHz	70
	3 000 to 6 000				74
Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.					

9.4 EUT CONFIGURATION ON MEASUREMENT

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

9.5 OPERATING CONDITION OF EUT

Operating Condition of EUT is listed in section 4.4.

9.6 TEST PROCEDURE

The EUT is placed on a turntable which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 and 10 meters away from the receiving antenna that is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) and horn antenna are used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

ResultdB(uV/m):

Measurement Level dB(uV/m)= Antenna factor(dB) –Amp Factor +Cable Loss(dB) +Reading Level dB(uV)

Note: Antenna factor(dB) and Cable Loss(dB) are included Correct factor(dB) in test software.

Margin QP(db)=Reading Level dB(uV/m)- Limit dB(uV/m) for 30~1GHz
Over(db)= Emission Level dB(uV/m)- Limit dB(uV/m) for above 1GHz

The bandwidth of the Receiver is set at 120 kHz (For 30MHz to 1000MHz).
The resolution bandwidth of the receiver RS ESU26 was set at 1MHz ((For above 1GHz.).
The frequency range for 1GHz to 6GHz was checked with peak and average detector, measurement distance is 3m in 3m Anechoic chamber.

The frequency range for 30MHz to 1GHz was checked with Quasi-peak detector, measurement distance is 3m in 3m semi-chamber.

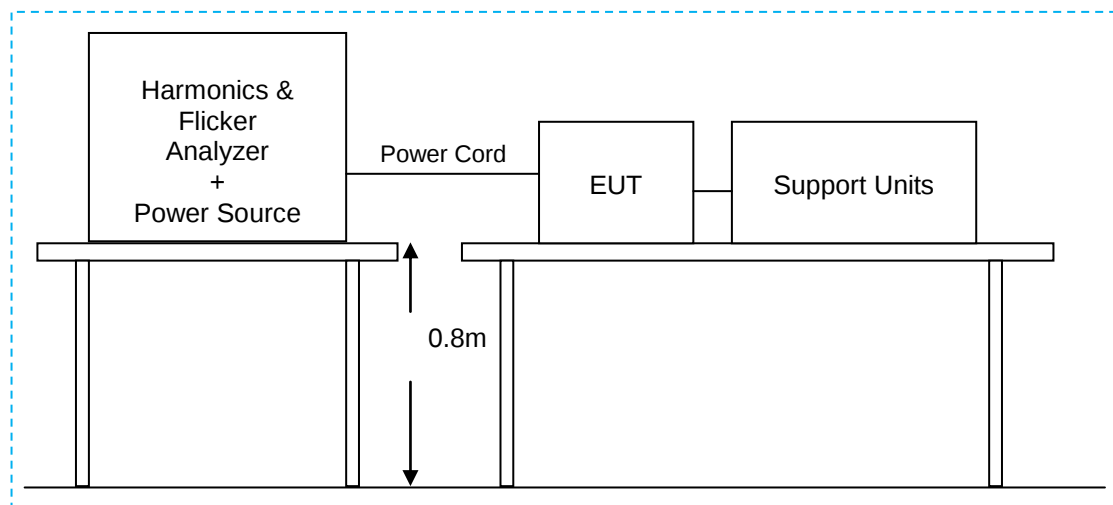
9.7 MEASURING RESULTS

PASS.

All of the Configurations were tested,
The AC 230V/50Hz, AC 120V/60Hz power supply had been test; the data of the worst case are recorded in the appendix A.

10 HARMONIC CURRENT EMISSION TEST

10.1 BLOCK DIAGRAM OF TEST SETUP



10.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.5
EN 61000-3-2

10.3 OPERATION CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

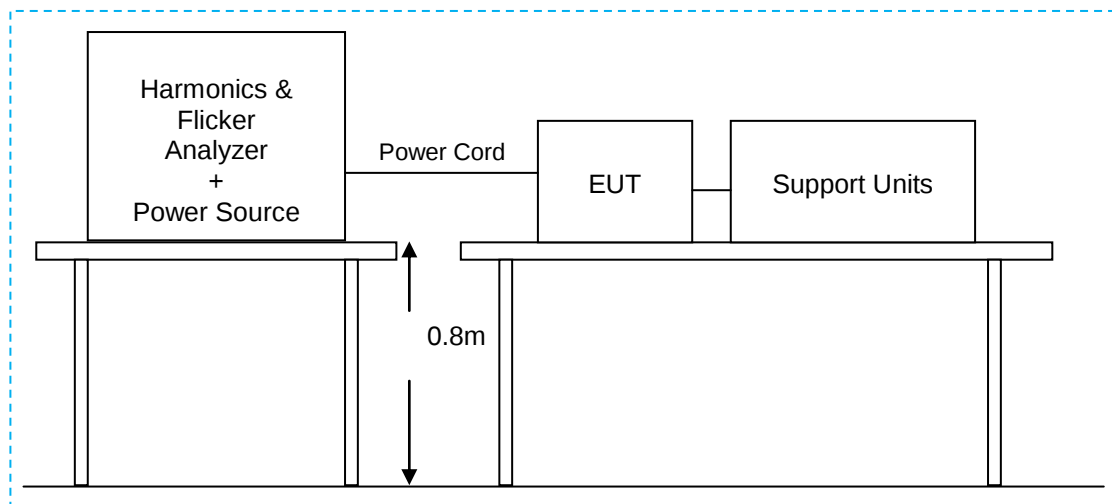
10.4 MEASURING RESULTS

N/A

Note: According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply.

11 VOLTAGE FLUCTUATION AND FLICKER TESTS

11.1 BLOCK DIAGRAM OF TEST SETUP



11.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.6
EN 61000-3-3

11.3 OPERATION CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

11.4 MEASURING RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

12 PERFORMANCE CRITERIA

12.1 GENERAL PERFORMANCE CRITERIA

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

12.2 PERFORMANCE TABLE

ETSI 301 489-17 Performance criteria;

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.		

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

ETSI 301 489-52 Performance criteria;

The equipment shall meet the performance criteria specified in this clause and clauses 6.1.1 to 6.1.4, as appropriate.

Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out in ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for mobile equipment.

Portable or mobile equipment powered by the AC mains shall additionally fulfil the applicable requirements of ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for radio and ancillary equipment for fixed use.

The establishment and maintenance of a communications link, the assessment of RXQUAL, and the assessment of the audio breakthrough by monitoring the speech output signal level, are used as performance criteria to ensure that all primary functions of the transmitter and receiver are evaluated during the immunity tests. In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.

The maintenance of a communications link shall be assessed using an indicator which may be part of the test system or the EUT.

If an equipment is of a specialized nature, such that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.3 and 4.2.4.

During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Transient phenomena applied to Transmitters (TT)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.4.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Continuous phenomena applied to Receivers (CR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.6.

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2. to 4.2.6.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

Performance criteria for ancillary equipment tested on a stand alone basis

The provision of ETSI EN 301 489-1 [1], clause 6.4 shall apply.

ETSI 301 489-19 Performance criteria;**General performance criteria**

If the EUT is of a non specialized nature or the EUT is combined with an ancillary equipment, the test modulation, test arrangements, etc. as required in clause 4 shall apply.

The EUT, for all immunity tests according to the present document, except the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2), shall be assessed for:

- the storage of messages in the memory of the EUT at the start of the test;
- unintentional responses of the EUT during the test;
- the maintenance of the EUT memory assessed at the conclusion of the test;
- the ability to receive and store messages at the conclusion of the test.

For the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the EUT shall be assessed by monitoring the accuracy of the call received alert signal.

Performance criteria for Continuous phenomena applied to ROMES and ROGNSS receivers (CR)

For the EUT, excluding spot frequency tests as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2):

- the general performance criteria set out in clause 6.1;
- during the test no false calls shall occur;
- at the conclusion of the test comprising the series of individual exposures the EUT shall operate as intended with no loss of functions or stored data (messages), as declared by the manufacturer.

For the spot frequency test as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the EUT shall be assessed by monitoring the accuracy of the call received alert signal.

Performance criteria for Transient phenomena applied to ROMES and ROGNSS receivers (TR)

For the EUT:

- the general performance criteria set out in clause 6.1;
- during the test no false calls shall occur;
- at the conclusion of the test comprising the series of individual exposures, the EUT shall operate as intended with no loss of function and/or stored data (messages), as declared by the manufacturer

Performance criteria for equipment which does not provide a continuous communication link

The provision of ETSI EN 301 489-1 [1], clause 6.3 shall apply with the following modifications.

For EUTs of a specialized nature and/or ancillary equipment tested on a stand alone basis the manufacturer shall define the method of test to determine the acceptable level of performance or degradation of performance during and/or after the test. Under these circumstances the manufacturer will also provide the following information:

- the primary functions of the equipment to be tested during and after EMC stress;
- the intended functions of the EUT which shall be in accordance with the documentation accompanying the equipment;
- the pass/failure criteria for the equipment;
- the method of observing a degradation of performance of the equipment.

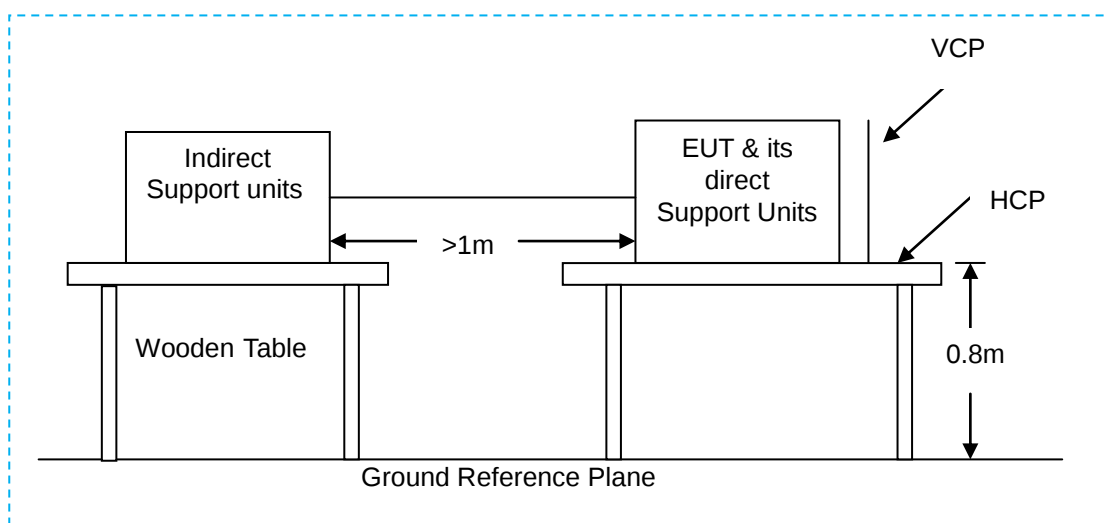
The assessment of the performance or the degradation of performance which shall be carried out during and/or at the conclusion of the tests, shall be simple, but at the same time give adequate proof that the primary functions of the equipment are operational.

ETSI 301 489-3 Performance criteria;

Criteria	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Where "operate as intended" or "no loss of function" is specified, the EUT shall demonstrate correct functioning as described in clause 5. Where the EUT has more than one mode of operation (see clause 4.5.2), an unplanned transition from one mode to another is considered as an unintentional response. The EUT shall be tested in sufficient modes to confirm there are no such unintentional responses.		

13 ELECTROSTATIC DISCHARGE

13.1 BLOCK DIAGRAM OF TEST SETUP



13.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.3 and EN 61000-4-2

13.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

13.3.1 SEVERITY 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

13.3.2 PERFORMANCE CRITERION

☐ CT	☒ TT	☐ CR	☒ TR
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13.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

13.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

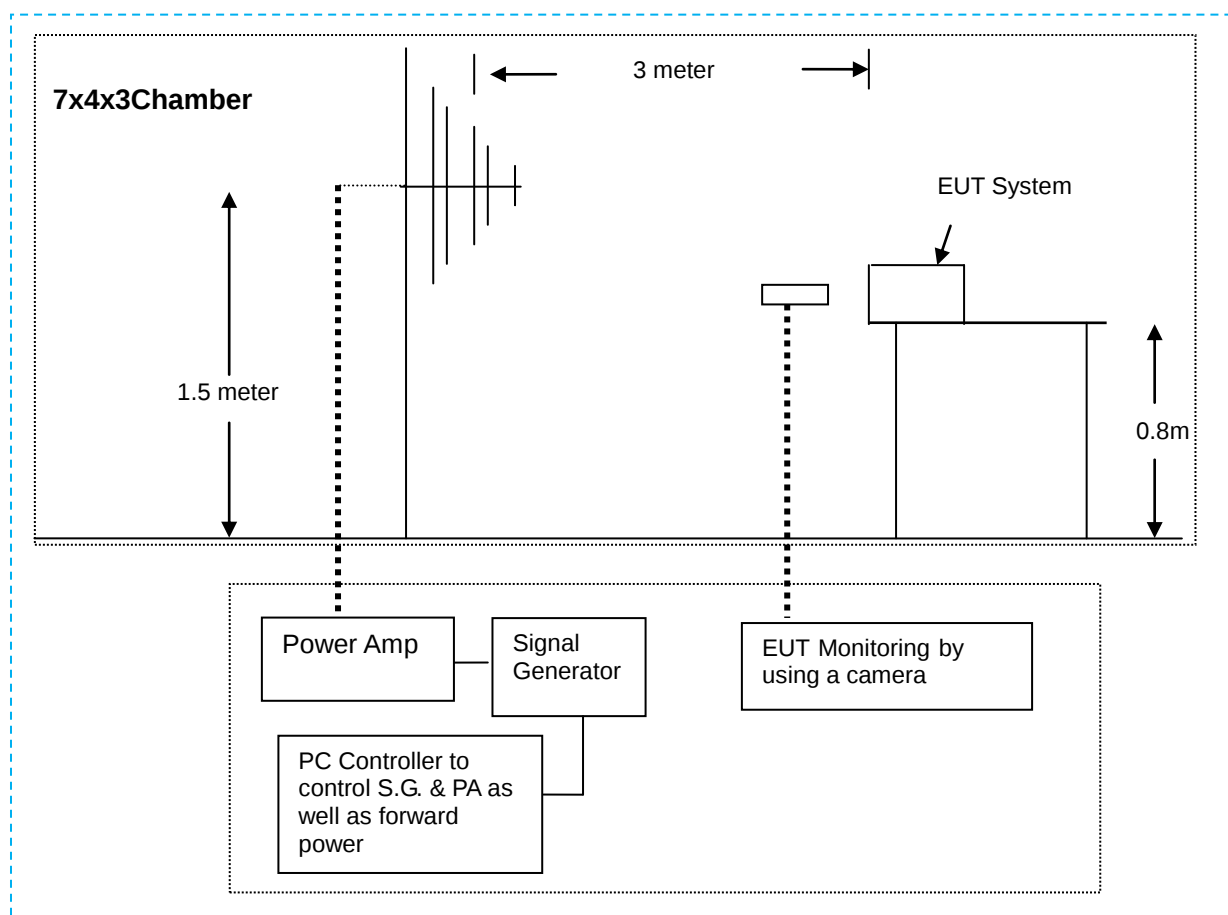
13.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

14 RADIO FREQUENCY ELECTROMAGNETIC FIELD

14.1 BLOCK DIAGRAM OF TEST SETUP



14.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.2 and EN 61000-4-3

14.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

14.3.1 SEVERITY LEVELS

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

14.3.2 PERFORMANCE CRITERION

☒ CT	☐ TT	☒ CR	☐ TR
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14.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

14.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.

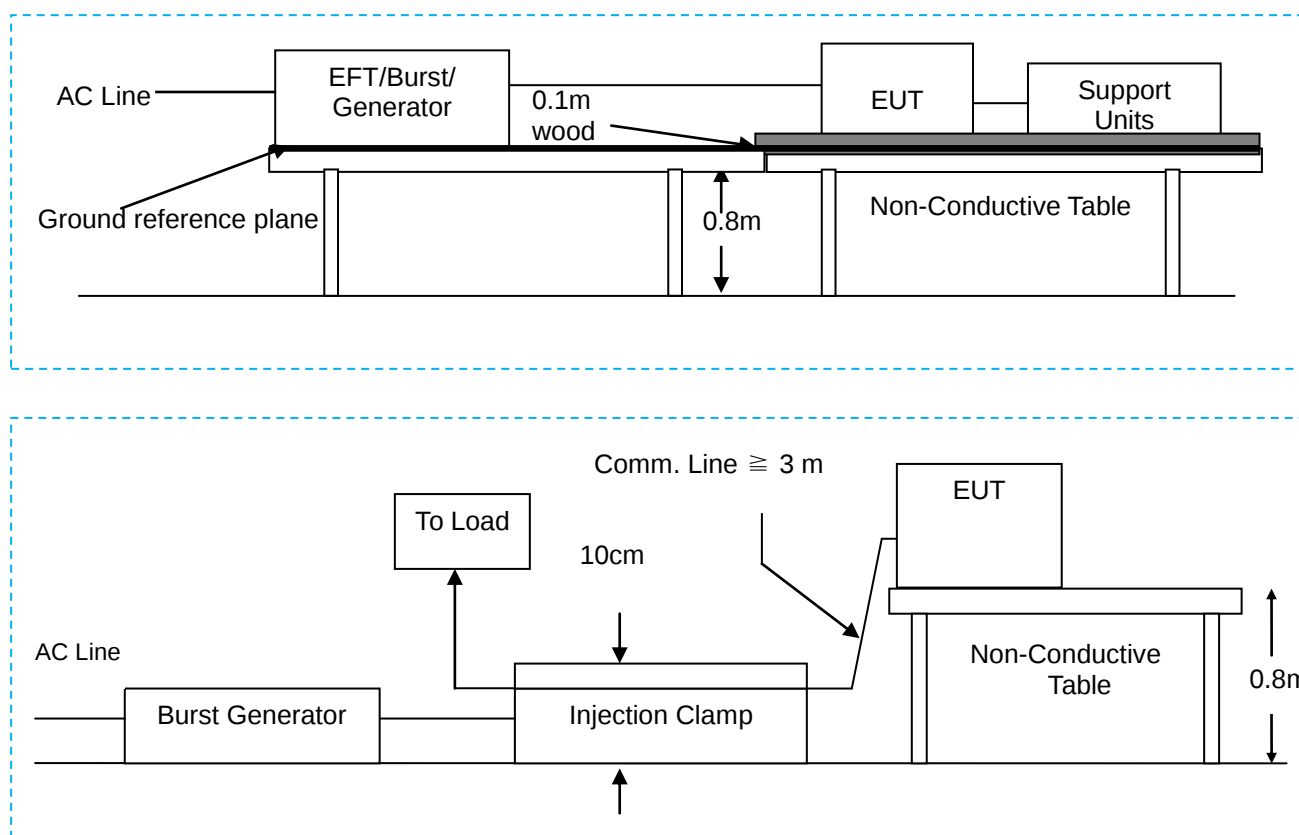
14.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

15 FAST TRANSIENTS, COMMON MODE

15.1 BLOCK DIAGRAM OF TEST SETUP



15.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.4 and EN 61000-4-4

15.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

15.3.1 SEVERITY LEVEL

Open Circuit Output Test Voltage $\pm 10\%$		
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

15.3.2 Performance criterion

☐ CT	☒ TT	☐ CR	☒ TR
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15.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

15.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

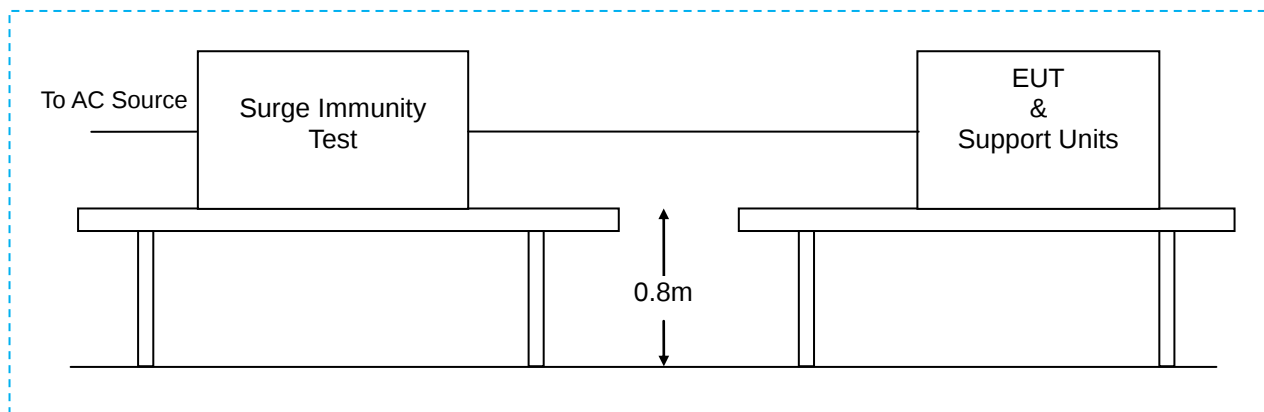
15.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

16 SURGE

16.1 BLOCK DIAGRAM OF TEST SETUP



16.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.8 and EN 61000-4-5

16.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

16.3.1 SEVERITY LEVEL

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

16.3.2 PERFORMANCE CRITERION

☐ CT	☒ TT	☐ CR	☒ TR
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16.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

16.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

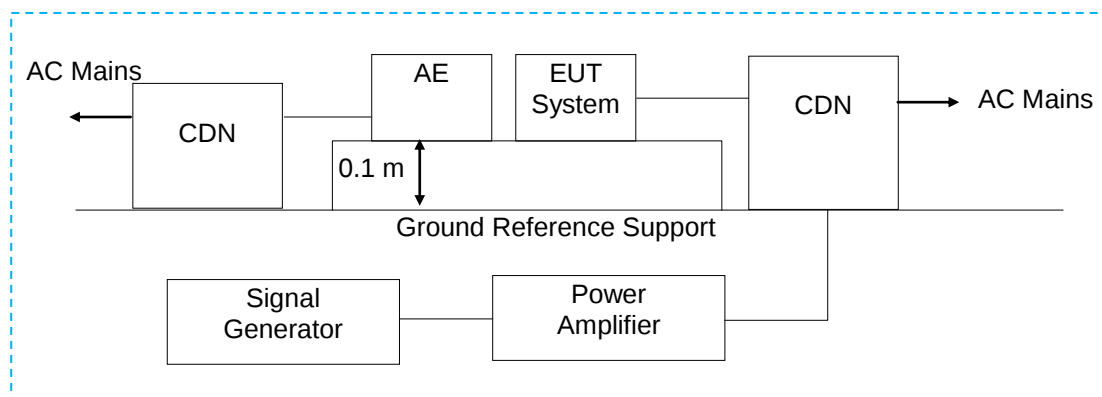
16.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

17 RADIO FREQUENCY, COMMON MODE

17.1 BLOCK DIAGRAM OF TEST SETUP



17.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.5 and EN 61000-4-6

17.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

17.3.1 Severity level

Level	Field Strength V
1	1
2	3
3	10
X	Special

17.3.2 Performance criterion

☒ CT	☐ TT	☒ CR	☐ TR
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17.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

17.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2 and EN 61000-4-6 for the measurement methods.

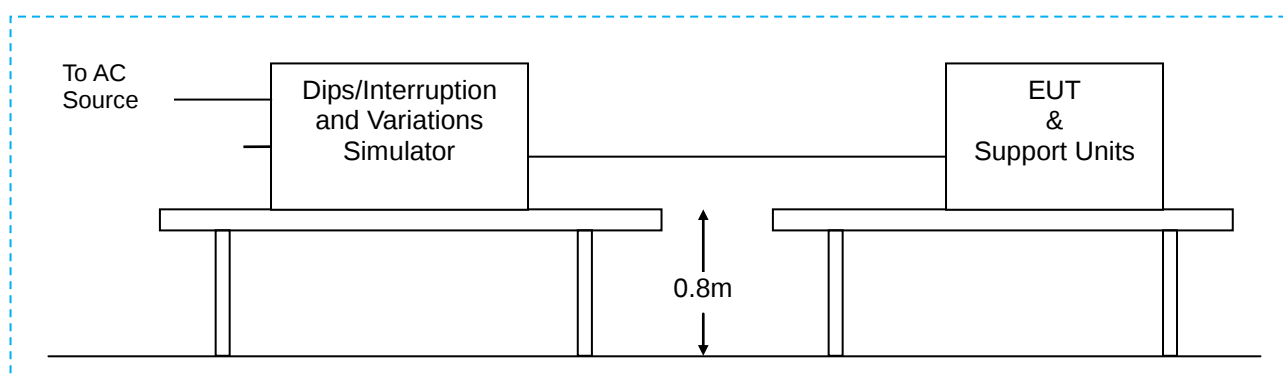
17.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

18 VOLTAGE DIPS AND INTERRUPTIONS

18.1 BLOCK DIAGRAM OF TEST SETUP



18.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.7 and EN 61000-4-11

18.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

18.3.1 SEVERITY LEVEL

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)	Performance criterion
0	100	0.5	B
0	100	1	B
70	30	25	C
0	100	250	C

18.3.2 Performance criterion

☐ CT	☒ TT	☐ CR	☒ TR
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18.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

18.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.

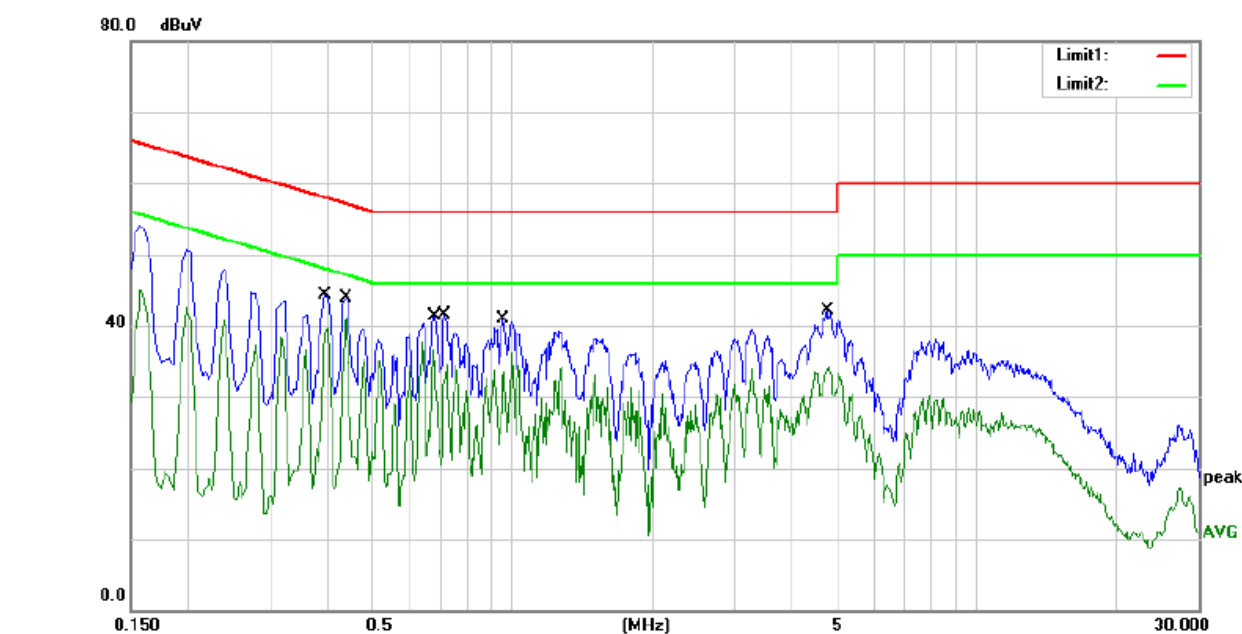
18.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

19 APPENDIX A TEST DATA

19.1 DATA FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS



Site Conduction #1

Phase: **L1**

Temperature: 24.9

Limit: (CE)EN55032 class B_QP

Power: AC 230V/50Hz

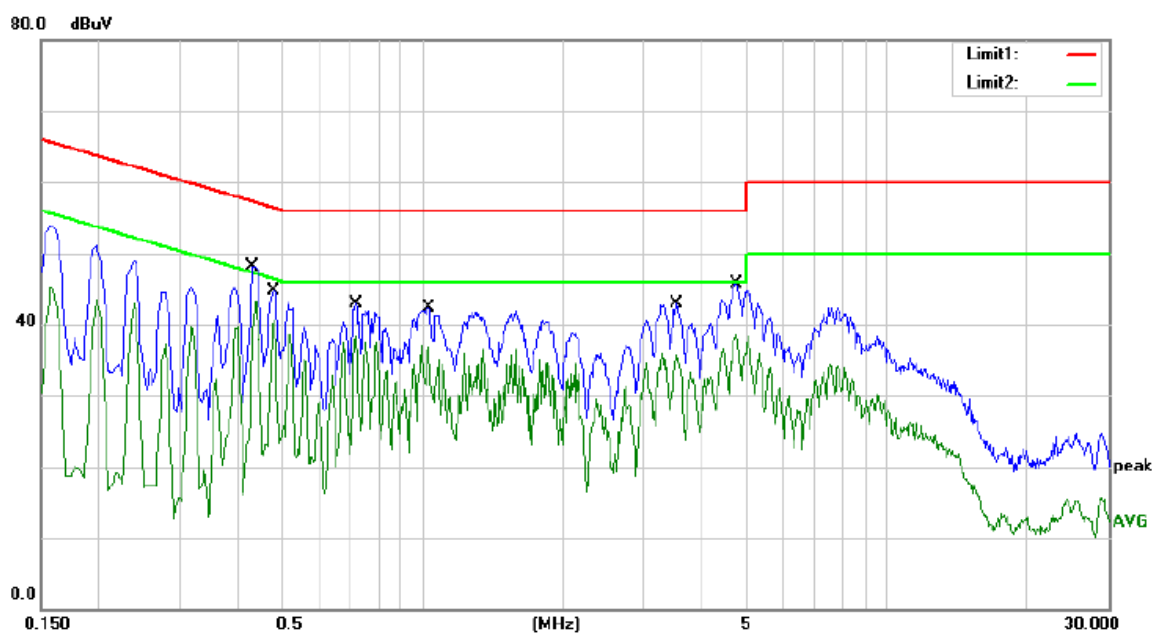
Humidity: 54 %

Mode: Mode 3

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3955	34.37	9.67	44.04	57.95	-13.91	QP	
2		0.3955	30.11	9.67	39.78	47.95	-8.17	AVG	
3		0.4380	34.22	9.68	43.90	57.10	-13.20	QP	
4	*	0.4380	31.45	9.68	41.13	47.10	-5.97	AVG	
5		0.6780	31.58	9.70	41.28	56.00	-14.72	QP	
6		0.6780	28.01	9.70	37.71	46.00	-8.29	AVG	
7		0.7140	31.70	9.70	41.40	56.00	-14.60	QP	
8		0.7140	24.74	9.70	34.44	46.00	-11.56	AVG	
9		0.9580	31.21	9.70	40.91	56.00	-15.09	QP	
10		0.9580	26.35	9.70	36.05	46.00	-9.95	AVG	
11		4.7500	32.36	9.80	42.16	56.00	-13.84	QP	
12		4.7500	24.24	9.80	34.04	46.00	-11.96	AVG	

! :Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator:



Site Conduction #1

Phase: **N**

Temperature: 24.9

Limit: (CE)EN55032 class B_QP

Power: AC 230V/50Hz

Humidity: 54 %

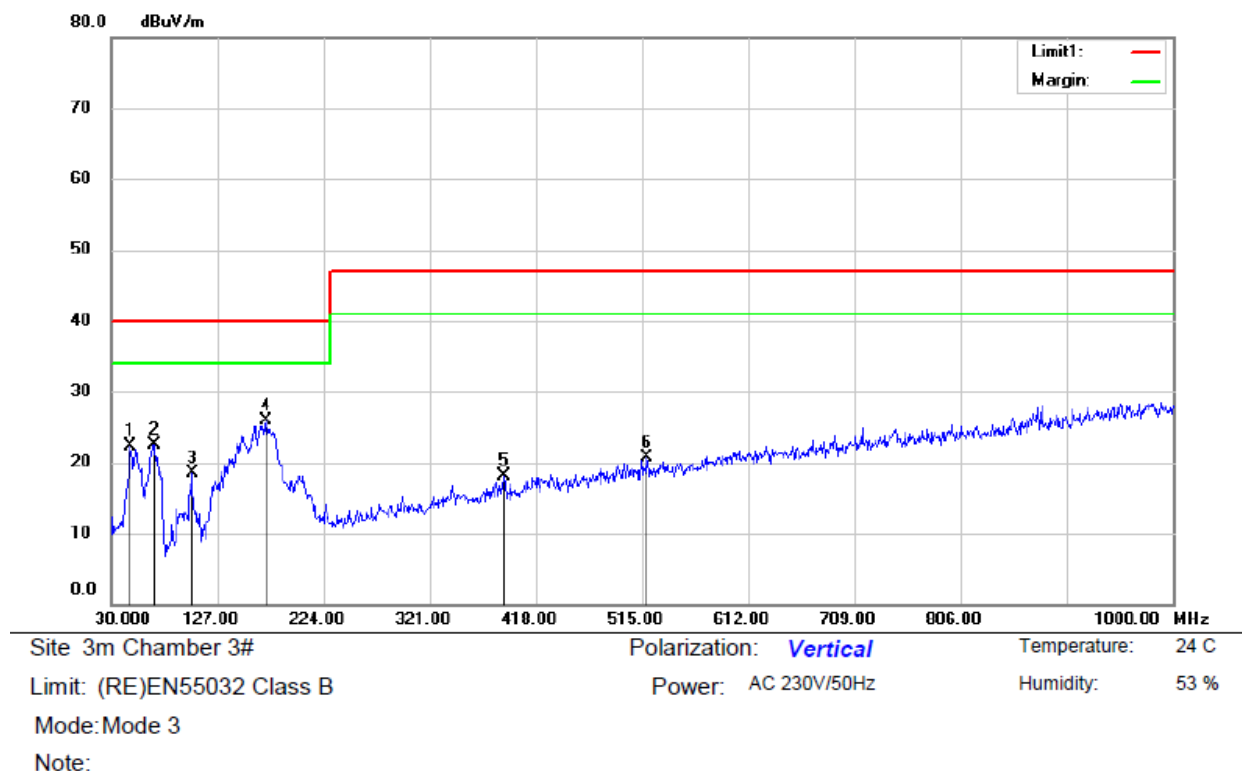
Mode: Mode 3

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.4300	38.42	9.68	48.10	57.25	-9.15	QP	
2	*	0.4300	33.72	9.68	43.40	47.25	-3.85	AVG	
3		0.4780	35.09	9.69	44.78	56.37	-11.59	QP	
4		0.4780	30.86	9.69	40.55	46.37	-5.82	AVG	
5		0.7180	33.16	9.70	42.86	56.00	-13.14	QP	
6		0.7180	28.63	9.70	38.33	46.00	-7.67	AVG	
7		1.0180	32.30	9.70	42.00	56.00	-14.00	QP	
8		1.0180	27.47	9.70	37.17	46.00	-8.83	AVG	
9		3.5260	33.11	9.80	42.91	56.00	-13.09	QP	
10		3.5260	26.07	9.80	35.87	46.00	-10.13	AVG	
11		4.7340	35.90	9.80	45.70	56.00	-10.30	QP	
12		4.7340	28.75	9.80	38.55	46.00	-7.45	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator:

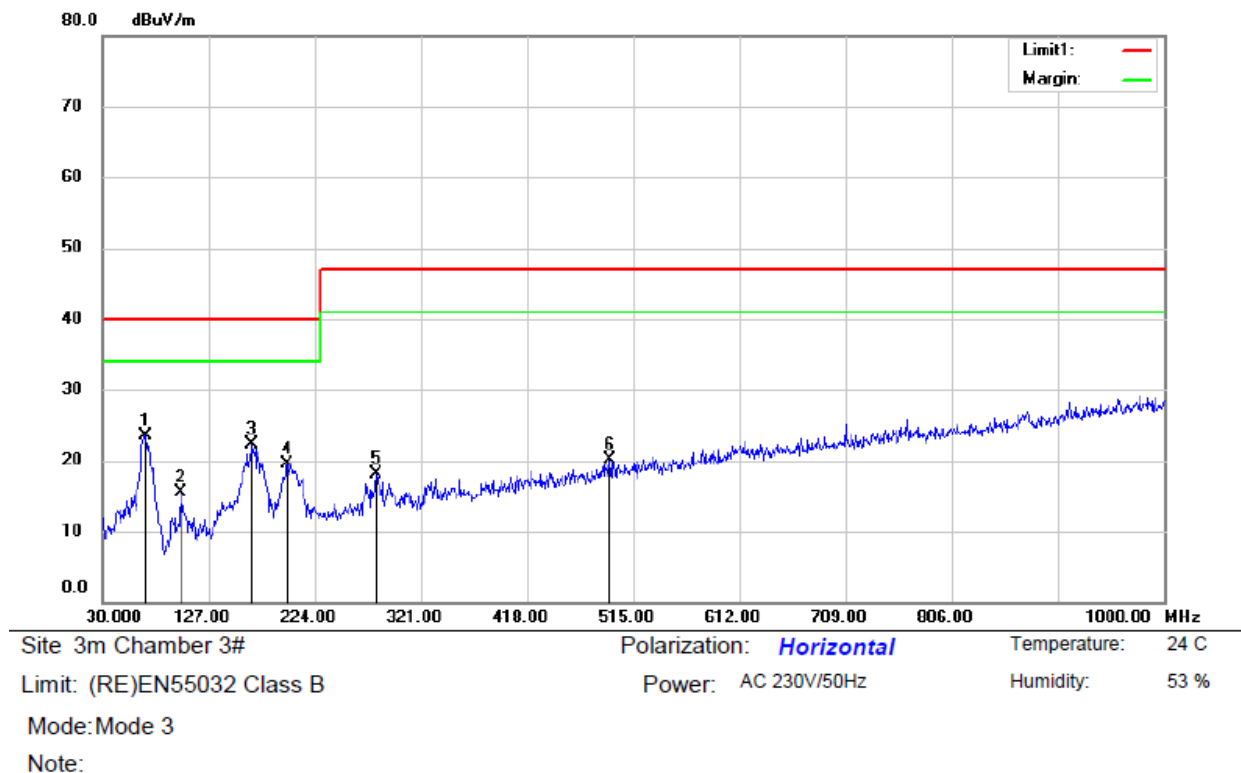
19.2 DATA FOR RADIATED EMISSIONS



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		47.4600	36.07	-13.85	22.22	40.00	-17.78	QP		
2		68.8000	40.34	-17.83	22.51	40.00	-17.49	QP		
3		103.7200	34.23	-15.64	18.59	40.00	-21.41	QP		
4	*	171.6200	43.91	-17.98	25.93	40.00	-14.07	QP		
5		388.9000	27.97	-9.88	18.09	47.00	-28.91	QP		
6		518.8800	27.85	-7.13	20.72	47.00	-26.28	QP		

*:Maximum data x:Over limit !:over margin

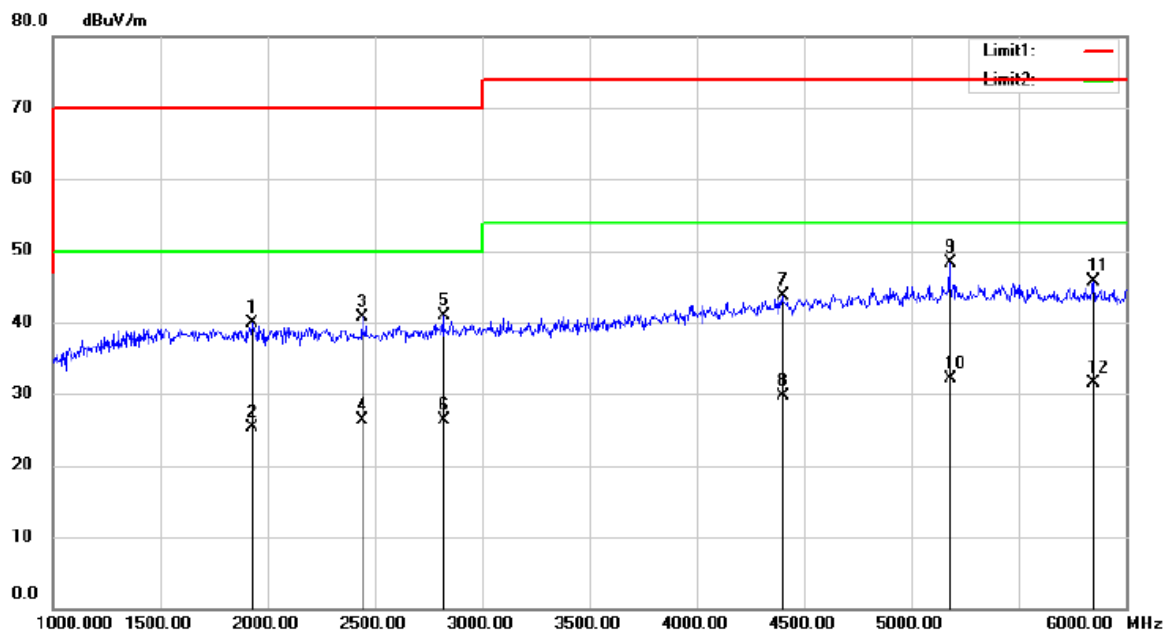
Operator: KK



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	69.7700	41.81	-18.25	23.56	40.00	-16.44	QP		
2		101.7800	31.26	-15.82	15.44	40.00	-24.56	QP		
3		166.7700	40.47	-18.19	22.28	40.00	-17.72	QP		
4		198.7800	34.74	-15.21	19.53	40.00	-20.47	QP		
5		280.2600	30.80	-12.78	18.02	47.00	-28.98	QP		
6		493.6600	27.64	-7.56	20.08	47.00	-26.92	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK



Site 3m Chamber 3#

Polarization: **Vertical**

Temperature: 24 C

Limit: (RE)EN55032 class B

Power: AC 230V/50Hz

Humidity: 53 %

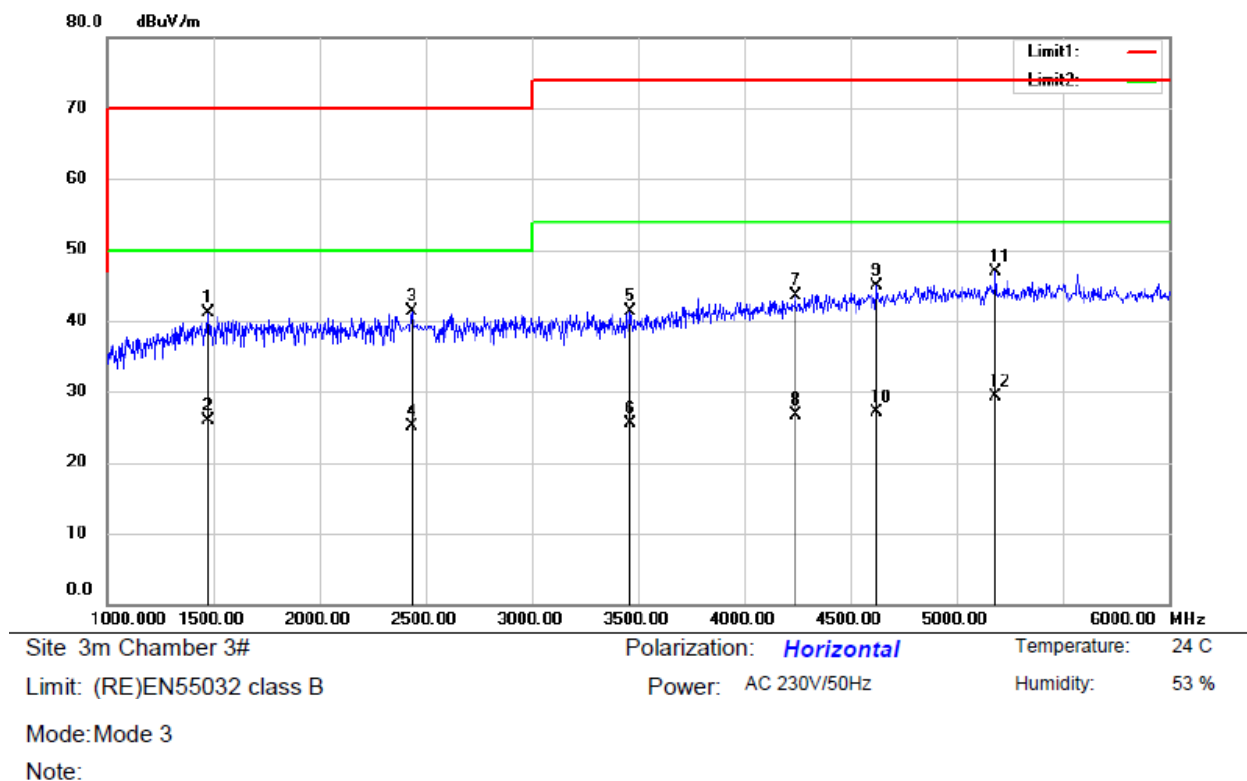
Mode: Mode 3

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		1930.000	53.04	-13.17	39.87	70.00	-30.13			peak
2		1930.000	38.57	-13.17	25.40	50.00	-24.60			AVG
3		2440.000	52.61	-11.98	40.63	70.00	-29.37			peak
4		2440.000	38.28	-11.98	26.30	50.00	-23.70			AVG
5		2820.000	51.99	-11.13	40.86	70.00	-29.14			peak
6		2820.000	37.53	-11.13	26.40	50.00	-23.60			AVG
7		4400.000	51.58	-7.93	43.65	74.00	-30.35			peak
8		4400.000	37.63	-7.93	29.70	54.00	-24.30			AVG
9		5180.000	54.65	-6.41	48.24	74.00	-25.76			peak
10	*	5180.000	38.51	-6.41	32.10	54.00	-21.90			AVG
11		5850.000	51.02	-5.39	45.63	74.00	-28.37			peak
12		5850.000	36.89	-5.39	31.50	54.00	-22.50			AVG

*:Maximum data x:Over limit !:over margin

Operator: KK



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1		1475.000	55.24	-14.07	41.17	70.00	-28.83	peak		
2	*	1475.000	39.97	-14.07	25.90	50.00	-24.10	AVG		
3		2435.000	53.27	-11.98	41.29	70.00	-28.71	peak		
4		2435.000	37.08	-11.98	25.10	50.00	-24.90	AVG		
5		3465.000	51.21	-9.91	41.30	74.00	-32.70	peak		
6		3465.000	35.51	-9.91	25.60	54.00	-28.40	AVG		
7		4240.000	51.83	-8.34	43.49	74.00	-30.51	peak		
8		4240.000	35.04	-8.34	26.70	54.00	-27.30	AVG		
9		4625.000	52.26	-7.43	44.83	74.00	-29.17	peak		
10		4625.000	34.63	-7.43	27.20	54.00	-26.80	AVG		
11		5185.000	53.26	-6.40	46.86	74.00	-27.14	peak		
12		5185.000	35.70	-6.40	29.30	54.00	-24.70	AVG		

*:Maximum data x:Over limit !:over margin

Operator: KK

19.3 DATA FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Multifunctional Handheld
 Test category: All parameters (European limits)
 Test date: 2018/4/8
 Test duration (min): 10
 Comment: Mode 3

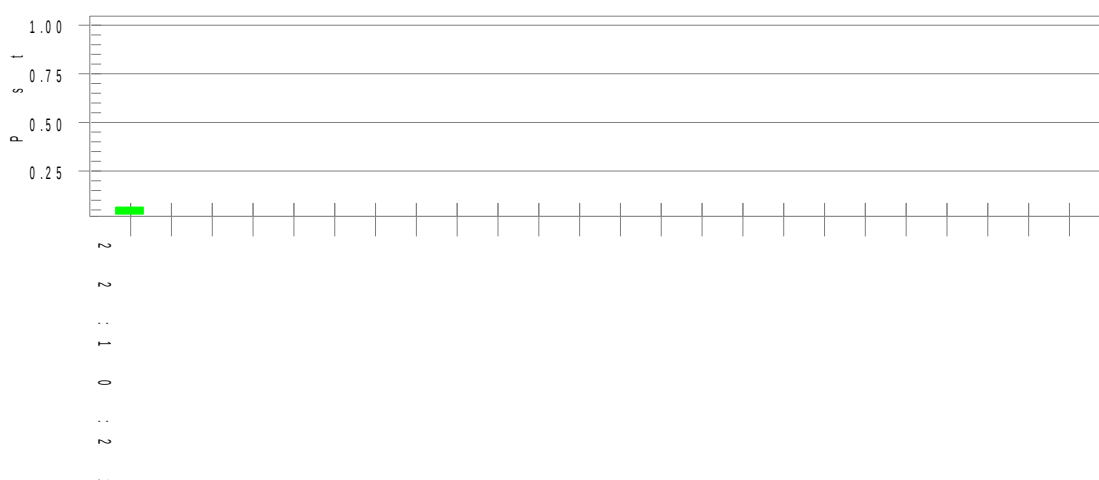
Tested by: XF
 Test Margin: 100
 Start time: 21:59:51
 End time: 22:10:22
 Data file name: WIN2105_F-000113.cts_data

Test Result: Pass

Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.62		
Highest dt (%):	0.00	Test limit (%):	N/A
T-max (mS):	0.0	Test limit (mS):	500.0
Highest dc (%):	0.00	Test limit (%):	3.30
Highest dmax (%):	0.04	Test limit (%):	4.00
Highest Pst (10 min. period):	0.064	Test limit:	1.000

19.4 DATA FOR ELECTROSTATIC DISCHARGE

Electrostatic Discharge Test Results

Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.		
EUT	Multifunctional Handheld	Test Date	April 12, 2018
M/N	CL7202K	Temperature	22°C
Power Supply	AC 230V/50Hz, DC 3.7V	Humidity	50%
Air discharge	±2.0, ± 4.0 kV, ± 8.0kV	Test engineer	ZZY
Contact discharge	± 2.0, ± 4.0kV	Criterion	TT&TR
Test Mode	All Mode		
Location		Kind A-Air Discharge C-Contact Discharge	Result
SLOT, Screen, button, camera		A	CT&CR
METAL, Screw, USB com		C	CT&CR
HCP of front, rear, left, right		C	CT&CR
VCP of front, rear, left, right		C	CT&CR

19.5 DATA FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD

Radio-Frequency, Electromagnetic Field Test Results Test Results

Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.		
EUT	Multifunctional Handheld	Test Date	April 12, 2018
M/N	CL7202K	Temperature	22℃
Field Strength	3 V/m	Humidity	50%
Power Supply	AC 230V/50Hz,DC 3.7V	Criterion	CT&CR
Test engineer	ZZY	Steps	1%
Test Mode	All Mode		

GSM/WCDMA Mode							
Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass
1000-6000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass

WIFI Link							
Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass
1000-6000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass

RFID Mode							
Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass
1000-6000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CT&CR	CT&CR	Pass

GPS Link							
Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CR	CR	Pass
1000-6000	3V/m	AM, 80%, 1kHz	H / V	0, 90,180, 270	CR	CR	Pass
80,104, 136, 165, 200, 260, 330, 430, 560, 715,	3V/m	AM, 80%,1kHz	H / V	0, 90,180, 270	CR	CR	Pass
920	3V/m	Pulses modulated, 100%, 200Hz	H / V	0, 90,180, 270	CR	CR	Pass

19.6 DATA FOR FAST TRANSIENTS, COMMON MODE

Fast Transients, Common Mode Test Results

Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.		
EUT	Multifunctional Handheld	Test Date	April 12, 2018
M/N	CL7202K	Temperature	22°C
Input Voltage	AC 230V/50Hz	Humidity	58%
Test Engineer	ZZY	Criterion	TT&TR
Line :	☒ AC Mains ☐ DC Line	Line :	☐ Signal ☐ I/O Cable
Coupling :	☒ Direct	Coupling :	☐ Capacitive
Test Time : 120s			
OperationMode	All Mode		
Line	Test Voltage	Result(+)	Result(-)
L	0.5/1kV	CT&CR	CT&CR
N	0.5/1kV	CT&CR	CT&CR
PE	0.5/1kV	CT&CR	CT&CR
L 、 N	0.5/1kV	CT&CR	CT&CR
L 、 PE	0.5/1kV	CT&CR	CT&CR
N 、 PE	0.5/1kV	CT&CR	CT&CR
L 、 N 、 PE	0.5/1kV	CT&CR	CT&CR
Signal Line	0.5kV	N/A	N/A
Note:			

19.7 DATA FOR SURGE

Surge Test Results

Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.				
EUT	Multifunctional Handheld		Test Date	April 12, 2018	
M/N	CL7202K		Temperature	22℃	
Power Supply	AC 230V/50Hz		Humidity	50%	
Test engineer	ZZY		Criterion	TT&TR	
Test Mode	All Mode				
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
L-N	+	0°	5	0.5/1.0	CT&CR
	+	90°	5	0.5/1.0	CT&CR
	+	180°	5	0.5/1.0	CT&CR
	+	270°	5	0.5/1.0	CT&CR
	-	0°	5	0.5/1.0	CT&CR
	-	90°	5	0.5/1.0	CT&CR
	-	180°	5	0.5/1.0	CT&CR
	-	270°	5	0.5/1.0	CT&CR
L-PE	+	0°	5	1.0/2.0	CT&CR
	+	90°	5	1.0/2.0	CT&CR
	+	180°	5	1.0/2.0	CT&CR
	+	270°	5	1.0/2.0	CT&CR
	-	0°	5	1.0/2.0	CT&CR
	-	90°	5	1.0/2.0	CT&CR
	-	180°	5	1.0/2.0	CT&CR
	-	270°	5	1.0/2.0	CT&CR
N-PE	+	0°	5	1.0/2.0	CT&CR
	+	90°	5	1.0/2.0	CT&CR
	+	180°	5	1.0/2.0	CT&CR
	+	270°	5	1.0/2.0	CT&CR
	-	0°	5	1.0/2.0	CT&CR
	-	90°	5	1.0/2.0	CT&CR
	-	180°	5	1.0/2.0	CT&CR
	-	270°	5	1.0/2.0	CT&CR
Signal Line			5	1.0	N/A
			5	1.0	N/A

19.8 DATA FOR RADIO FREQUENCY, COMMON MODE

Radio frequency, common mode Test Results

Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.		
EUT	Multifunctional Handheld	Test Date	April 12, 2018
M/N	CL7202K	Temperature	22°C
Power Supply	AC 230V/50Hz	Humidity	58%
Test Engineer	ZZY	Criterion	TT&TR
Test Mode	All Mode		

LTE/WCDMA Data Link			
Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass

BT/WIFI Link			
Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass

RFID Mode			
Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass

GPS Link			
Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass

PERFORMANCE CRITERIA	
Criteria requested	☒ CT ☒ CR
Criteria meet	☒ CT ☒ CR

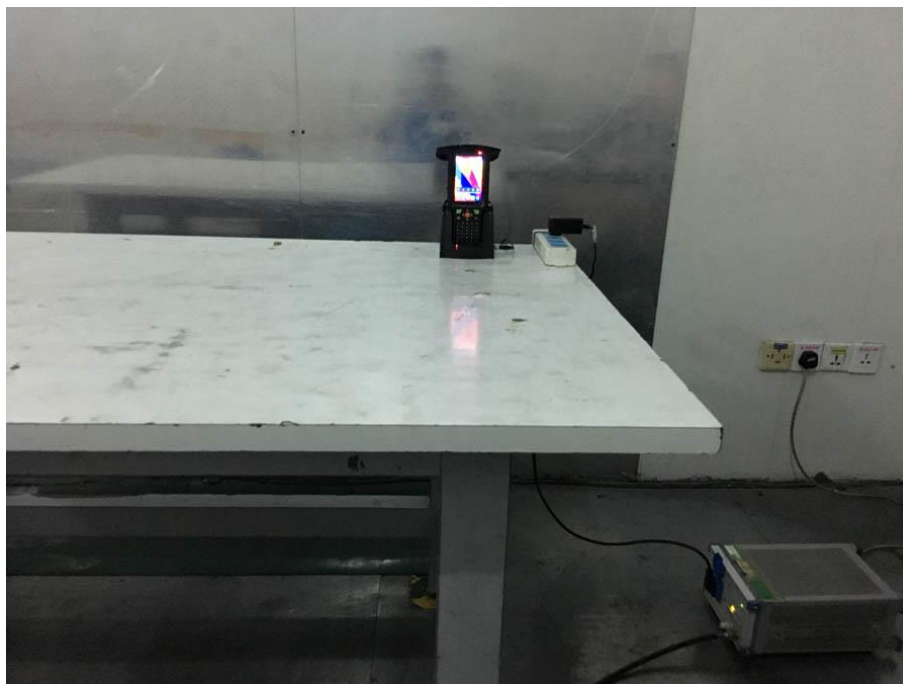
19.9 DATA FOR VOLTAGE DIPS AND INTERRUPTIONS

Voltage Dips and Interruptions Test Results

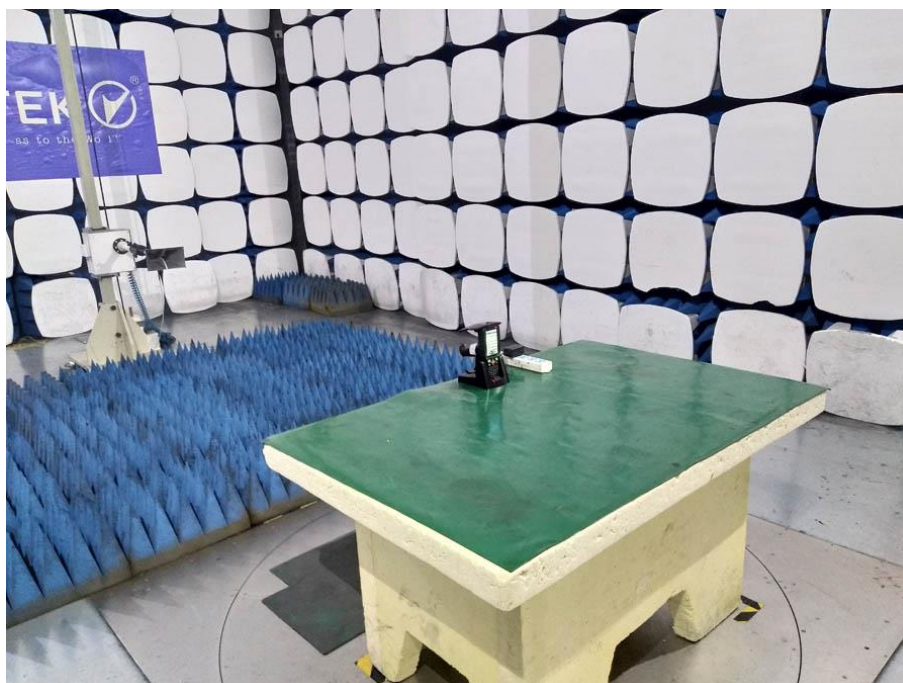
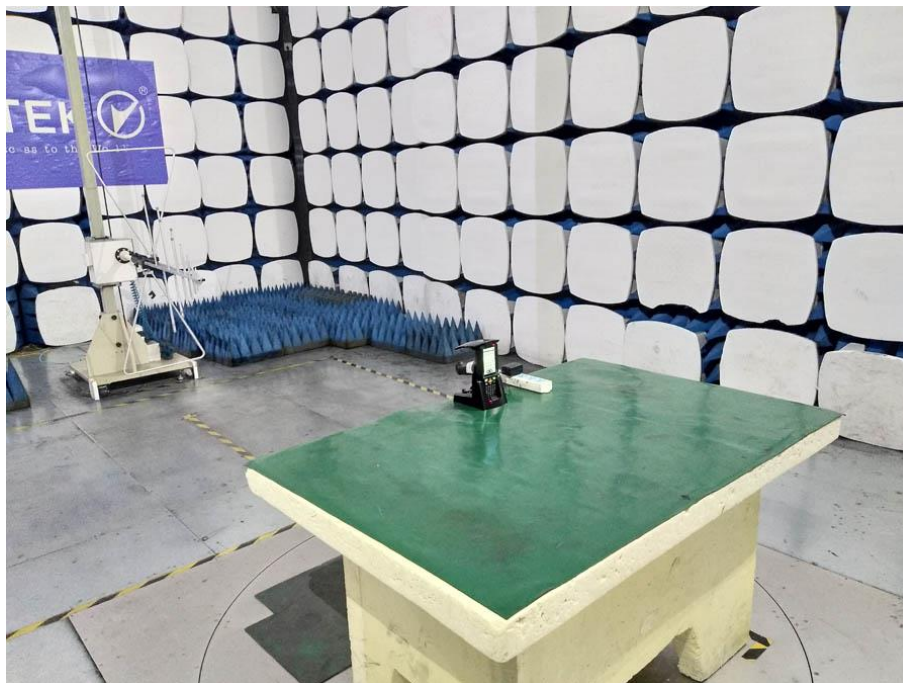
Applicant	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.				
EUT	Multifunctional Handheld	Test Date	April 12, 2018		
M/N	CL7202K	Temperature	22℃		
Power Supply	AC 230V/50Hz	Humidity	50%		
Test Engineer	ZZY	Criterion	TT&TR		
Test Mode	All Mode				
Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Phase Angle	Criterion TT&TR	Result
0	100	0.5P	0°-360°	TT&TR	CT&CR
0	100	1P	0°-360°	TT&TR	CT&CR
70	30	25P	0°-360°	TT&TR	CT&CR
0	100	250P	0°-360°	TT&TR	CT&CR

20 APPENDIX B PHOTOGRAPHS OF TEST SETUP

20.1 PHOTO FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS



20.2 PHOTO FOR RADIATED EMISSIONS



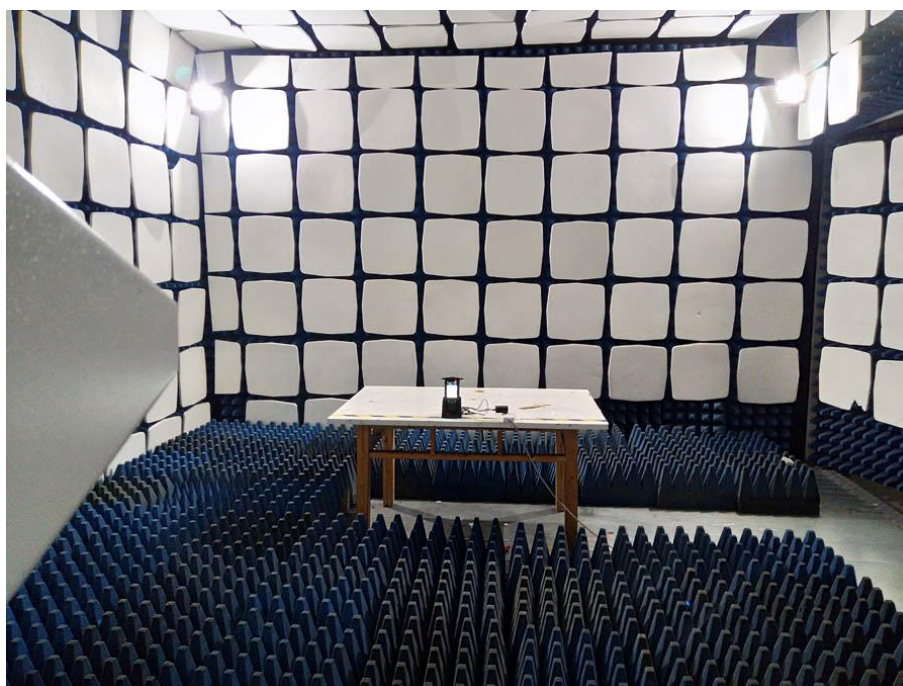
20.3 PHOTO FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS



20.4 PHOTO FOR ELECTROSTATIC DISCHARGE



20.5 PHOTO FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD



20.6 PHOTO FOR FAST TRANSIENTS, COMMON MODE



20.7 PHOTO FOR SURGE



20.8 PHOTO FOR RADIO FREQUENCY, COMMON MODE



20.9 PHOTO FOR VOLTAGE DIPS AND INTERRUPTIONS



21 APPENDIX C PHOTOGRAPHS OF EUT

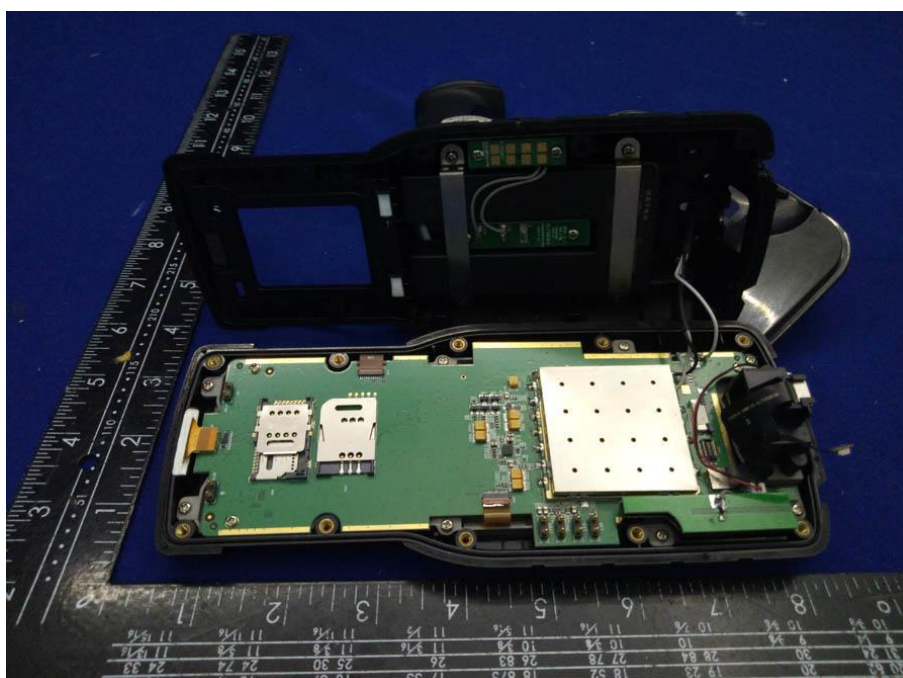


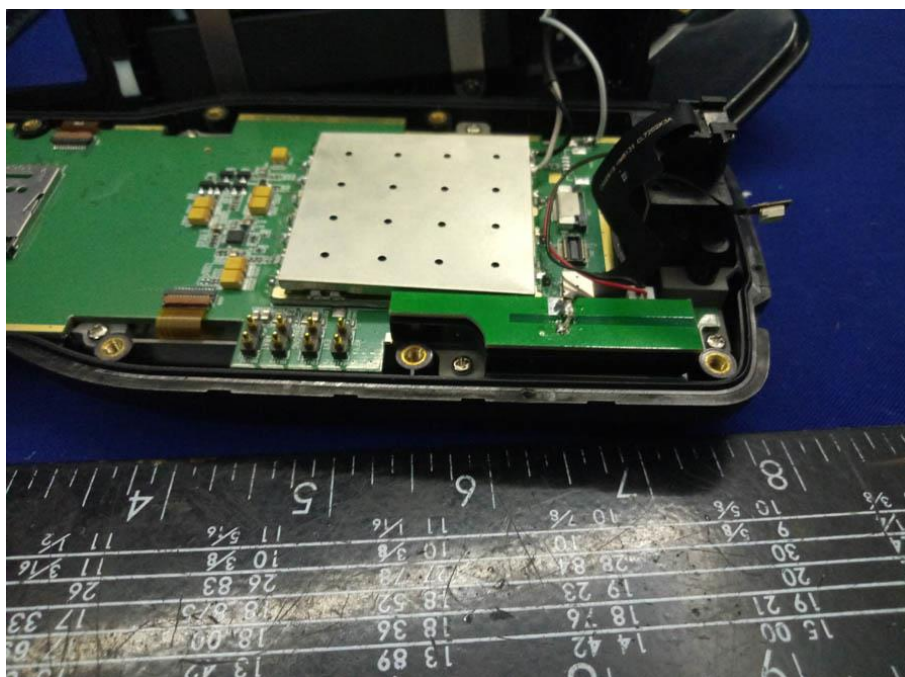


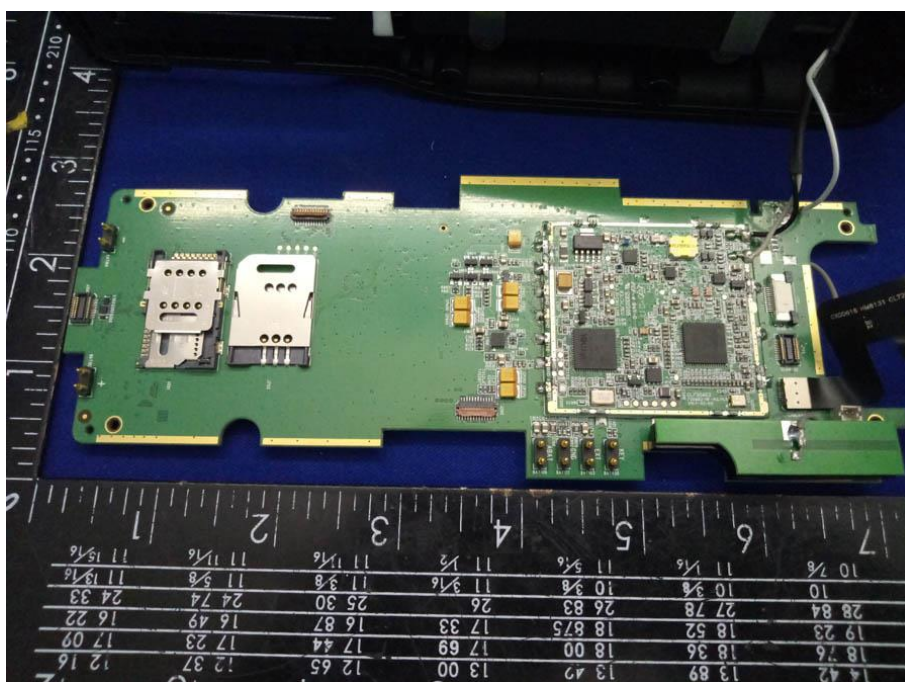
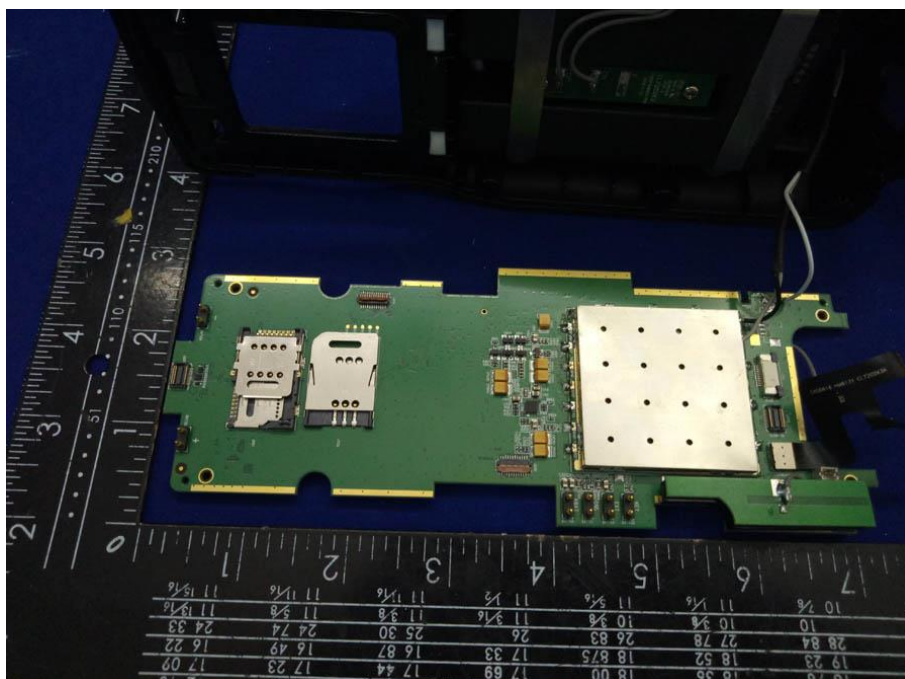


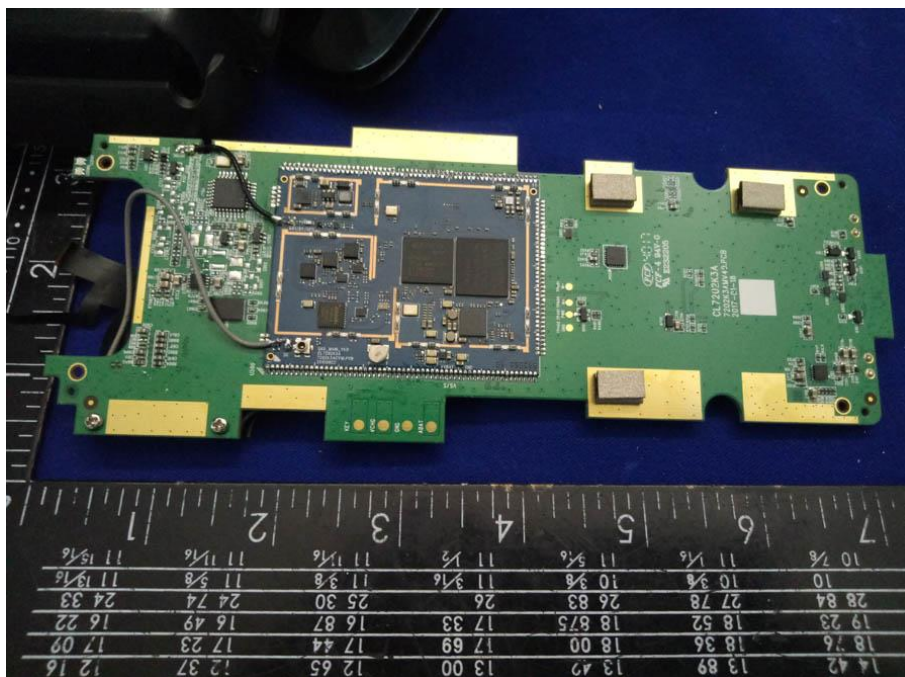
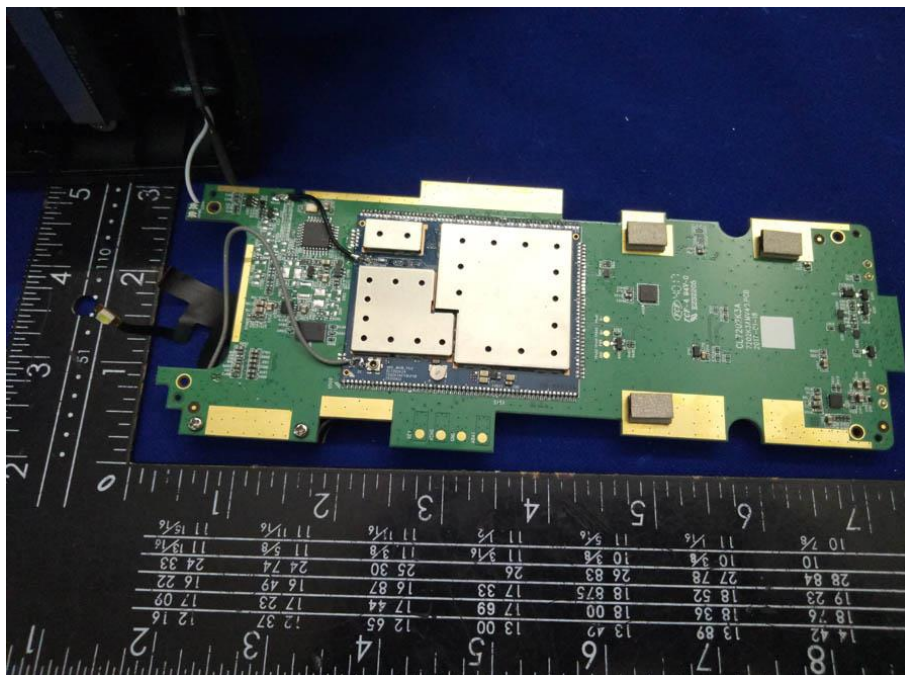




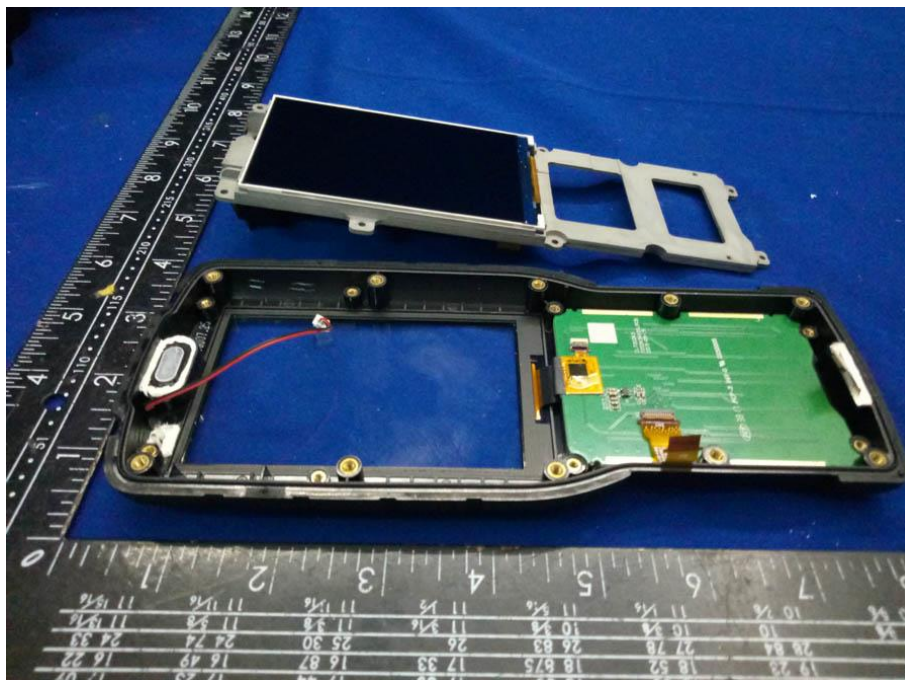


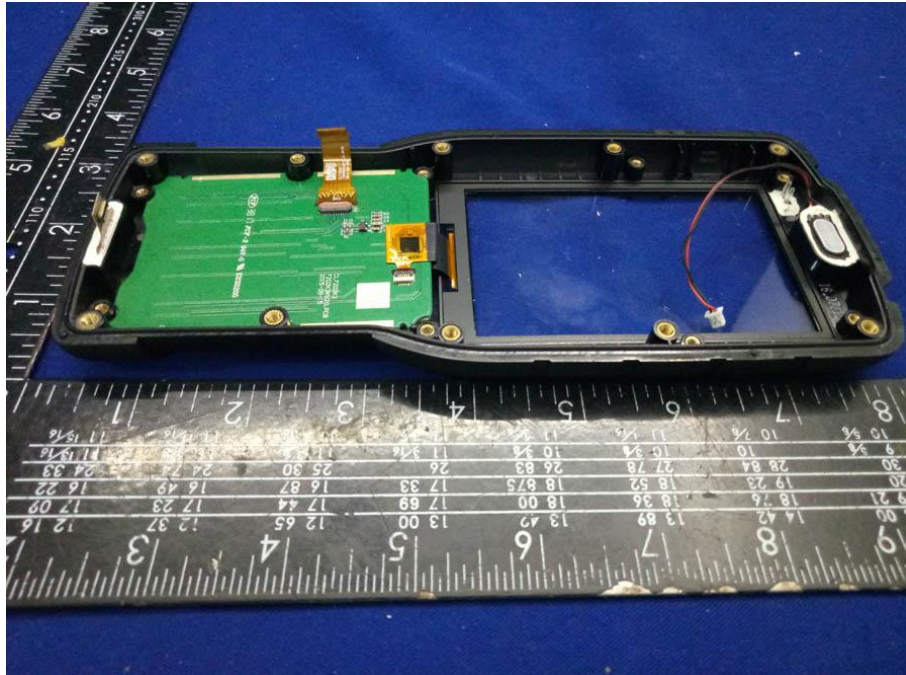












END OF REPORT