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# EMC Test Report

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Report No.: AGC01813161203EE11

**PRODUCT DESIGNATION** : 3G Dual-SIM Smartphone

**BRAND NAME** : vonino

**MODEL NAME** : Volt S

**CLIENT** : Vonino Electronics LTD

**DATE OF ISSUE** : Dec. 30, 2016

**STANDARD(S)** : EN 55032:2012/AC:2013  
EN 61000-3-2:2014  
EN 61000-3-3:2013  
EN 55024:2010

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 30, 2016	Valid	Original Report

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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Vonino EElectronics LTD
<b>Address</b>	Miramar Tower 10F- No.1010, 132 Nathan Road, Tsim Sha Tsui, Kowloon, Hong Kong
<b>Manufacturer</b>	Gui zhou Fortuneship Technology Co., Ltd
<b>Address</b>	No. 4 Plant, High-tech Industrial Park, Xinpu Economic Development Zone) Jingkai Road, Xinpu Jingkai District, Xinpu New District, Zunyi City, Guizhou Province, P. R. China
<b>Product Designation</b>	3G Dual-SIM Smartphone
<b>Brand Name</b>	vonino
<b>Test Model</b>	Volt S
<b>Hardware Version</b>	ZH066-MB-V3.0
<b>Software Version</b>	N/A
<b>Date of test</b>	Dec. 15, 2016 to Dec. 22, 2016
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Report Template</b>	AGCRT-EC-IT/AC

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in EU Directive and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

## 2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION	
<b>EMI TEST MODE</b>	
Mode 1	Camera (By Adapter Charging)
Mode 2	Sound Recorder (By Adapter Charging)
Mode 3	Audio Play (By Adapter Charging)
Mode 4	Video Play (By Adapter Charging)
Mode 5	FM radio (By Adapter Charging)
Mode 6	IDLE Mode (By Adapter Charging)
Mode 7	USB Mode (By PC data transferring)
<b>EMS TEST MODE</b>	
Mode 1	Camera (By Adapter Charging)
Mode 2	Sound Recorder (By Adapter Charging)
Mode 3	Audio Play (By Adapter Charging)
Mode 4	Video Play (By Adapter Charging)
Mode 5	FM radio (By Adapter Charging)
Mode 6	IDLE Mode (By Adapter Charging)
Mode 7	USB Mode (By PC data transferring)
<p>Note: 1. The above test modes in list items were carried out for all operation modes, only the worst test data recorded in the test report.</p> <p>2.The EUT can be operated during charging via USB(adaptor or PC connection)</p> <p>3. The USB port can be used for charging and also can be used to transfer data with PC.</p>	

## 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by ISO.

- Uncertainty of Conducted Emission,  $U_c = \pm 2.75\text{dB}$
- Uncertainty of Radiated Emission,  $U_c = \pm 3.2\text{Db}$

**4. PRODUCT INFORMATION**

<b>Adapter Test Model Name</b>	VNA-V50JS
<b>Housing Type</b>	Plastic
<b>Power Supply</b>	DC 5V, 1000mA

I/O Port Information (Applicable Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB Port	1	0.8m, Unshielded	1
Earphone	1	1m, Unshielded	1

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**5. SUPPORT EQUIPMENT**

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
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**6. TEST FACILITY**

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location-1</b>	2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
<b>Location-2</b>	B112-B113, Building 12, Baoan Building Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen, Guangdong, P.R.China
<b>Description</b>	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The chamber and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.
Note: The test items RS&CS were tested in the Laboratory of Location 2. Others were tested in the Laboratory of Location 1.	

**TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	July 02,2016	July 01,2017
LISN	R&S	ESH2-Z5	100086	Aug.25,2016	Aug.24,2017

**TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	July 02,2016	July 01,2017
WIDEBAND REQUENCY ANTENNA	SCHWARZBEC K	VULB9168	VULB9168-494	Mar.12, 2016	Mar.11, 2017
POSITIONING CONTROLLER	MF	UC3000	MF780208138	--	--
Horn Antenna	EM	EM-AH-10180	67	Mar.01,2016	Feb.28,2017

**TEST EQUIPMENT OF POWER HARMONICS / VOLTAGE FLUCTUATION / FLICKER TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Harmonic Emission Flicker Test System	LAPLACE	AC2000A	377951	Feb.29,2016	Feb.28,2017

**SURGE/EFT/DIPS**

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Electrical Fast Transient Burst Generator	LIONCEL	EFT-404B	EFT04401011	July 02,2016	July 01,2017
Lightning Surge Generator	LIONCEL	LSG-506A	LSG056001010	July 02,2016	July 01,2017

Voltage Dip Immunity Test Generator	LIONCEL	VDS-1120D	VSD11200901	Feb.29,2016	Feb.28,2017
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**TEST EQUIPMENT OF ESD TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Generator	EM	DITO	P1527160053	Jan.19,2016	Jan.18,2017

**TEST EQUIPMENT OF RS IMMUNITY TEST**

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
SIGNAL GENERATOR	Aglient	E4421B	MY43351603	July 01,2016	June 31,2017
ANTENNA	SCHWARZBECK	VULB9168	D69250	Mar.01,2016	Feb.28,2017
Power Probe	R&S	URV5-Z4	100124	July 03,2016	July 02,2017
POWER METER	R&S	NRVD	8323781027	July 04,2016	July 03,2017
POWER AMPLIFIER	KALMUS	7100LC	04-02/17-06-00 1	July 01,2016	June 31,2017
RF Amplifier	Milmega	AS0104-55_55	1004793	July 01,2016	June 31,2017
HORN ANTENNA	ETS LINDGREN	3117	00034609	Mar.01,2016	Feb.28,2017

**TEST EQUIPMENT OF CS IMMUNITY TEST**

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	AR	75A250	18464	July 01,2016	June 31,2017
CDN	Schaffner	M016	21264	Aug.25,2016	Aug.24,2017
6dB attenuator	JFW	50FHC-006-50	5N-20	Feb.29,2016	Feb.28,2017
Electromagnetic Injection Clamp	Luthi	EM101	35773	Aug.25,2016	Aug.24,2017
Power Probe	R&S	URV5-Z4	100124	July 03,2016	July 02,2017
Power Meter	R&S	NRVD	8323781027	July 04,2016	July 03,2017
Power Amplifier	KALMUS	7100LC	04-02/17-06-001	July.01,2016	June 31,2017
Signal Generator	R&S	SML01	104228	June 30,2016	May 31,2017

## 7. EN 55032 LINE CONDUCTED EMISSION TEST

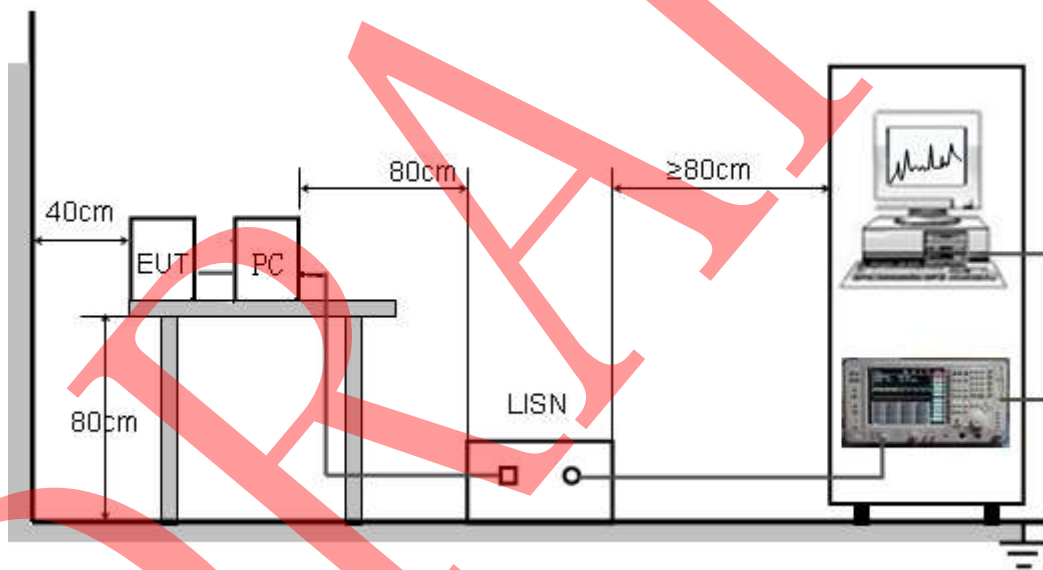
### 7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

EN 55032 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class B limits (dBuV)
A9.1	0.15 - 0.5	AMN	Quasi-peak / 9kHz	66 - 56
	0.5 - 5			56
	5 - 30.0			60
A9.2	0.15 - 0.5		Average / 9kHz	56 - 46
	0.5 - 5			46
	5 - 30.0			50

**Note:**

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

### 7.2. BLOCK DIAGRAM OF TEST SETUP



**Note: 1. Support units were connected to second LISN.**

2. **The distance specified between EUT/AE and other metallic objects is  $\geq 0.8$  m in the measurement arrangement for table-top EUT.**

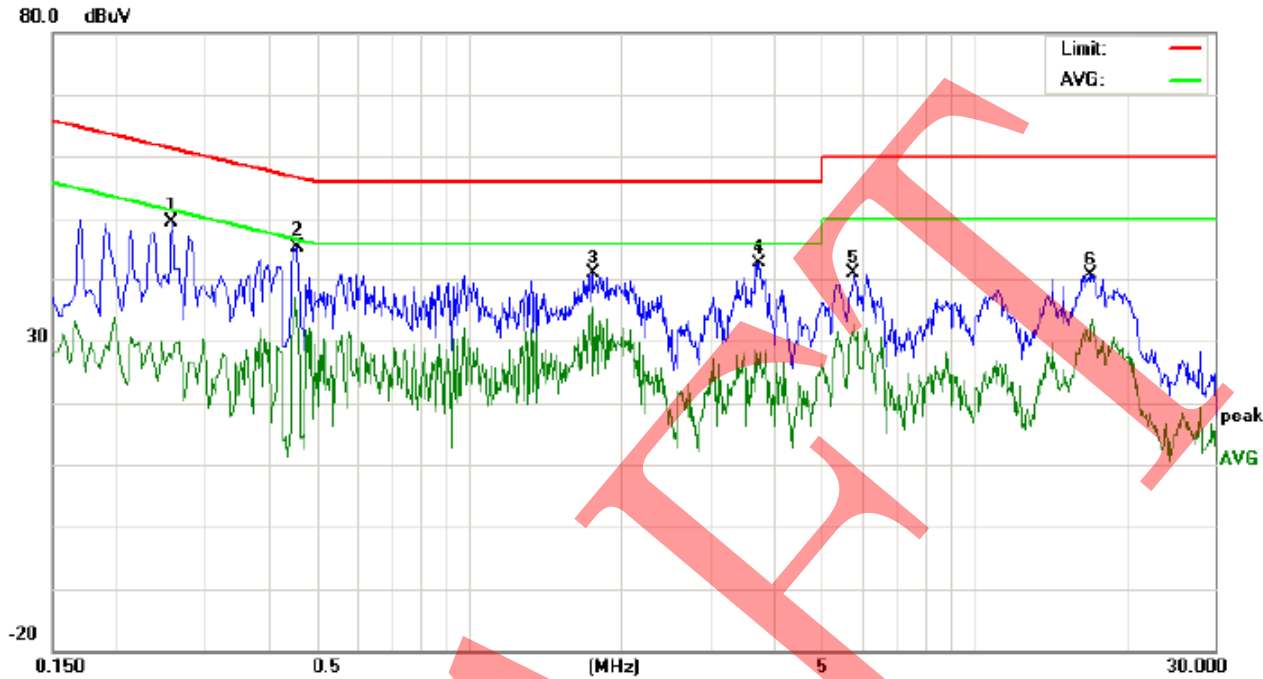
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN55032.
- (4) The EUT received AC230V/50Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received power from a second LISN supplying power of AC 230V/50Hz, if any.
- (6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- (8) During the above scans, the emissions were maximized by cable manipulation.
- (9) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (10) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

**Note:** The test modes were carried out for all operation modes  
The worst case (Video Play) was showed as the follow:

**7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST**  
**LINE CONDUCTED EMISSION TEST-L**



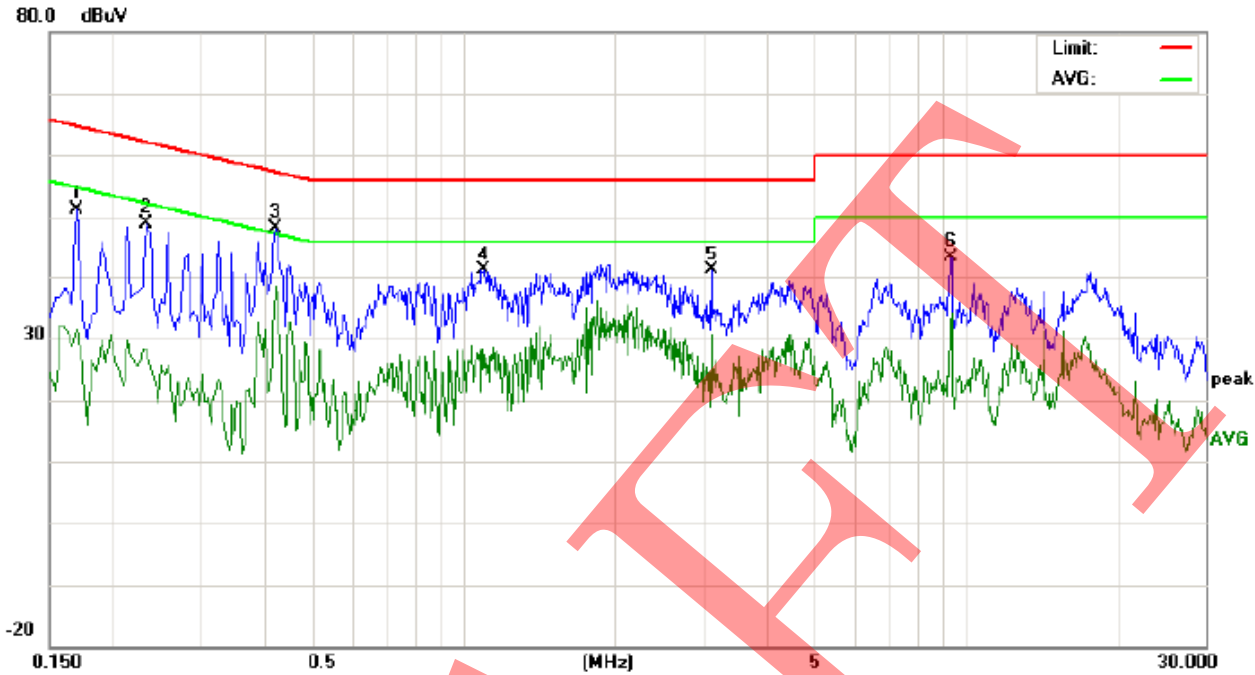
Site: Conduction  
 Limit: EN55032 Class B Conduction(QP)  
 EUT:Smart Phone  
 M/N:VOLT S  
 Mode:Video Play  
 Note:

Phase: **L1**  
 Power: AC 120V/60Hz

Temperature: 26  
 Humidity: 60 %

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor (dB)	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2580	39.17		16.80	10.27	49.44	27.07	61.49	51.49	-12.05	-24.42	P		
2	0.4580	35.05		22.79	10.37	45.42	33.16	56.73	46.73	-11.31	-13.57	P		
3	1.7540	30.65		25.20	10.30	40.95	35.50	56.00	46.00	-15.05	-10.50	P		
4	3.7500	32.26		15.64	10.47	42.73	26.11	56.00	46.00	-13.27	-19.89	P		
5	5.7779	30.59		22.40	10.27	40.86	32.67	60.00	50.00	-19.14	-17.33	P		
6	16.9379	30.57		19.84	10.13	40.70	29.97	60.00	50.00	-19.30	-20.03	P		

LINE CONDUCTED EMISSION TEST-N



Site: Conduction Phase: **N** Temperature: 26  
 Limit: EN55032 Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60 %  
 EUT: Smart Phone  
 M/N: VOLT S  
 Mode: Video Play  
 Note:

No.	Freq. (MHz)	Reading Level (dBuV)			Correct Factor (dB)	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1700	40.85		21.23	10.18	51.03		31.41	64.96	54.96	-13.93	-23.55	P	
2	0.2340	38.57		18.01	10.25	48.82		28.26	62.30	52.30	-13.48	-24.04	P	
3	0.4220	37.68		27.99	10.35	48.03		38.34	57.41	47.41	-9.38	-9.07	P	
4	1.0980	30.87		16.24	10.37	41.24		26.61	56.00	46.00	-14.76	-19.39	P	
5	3.1140	30.49		20.03	10.54	41.03		30.57	56.00	46.00	-14.97	-15.43	P	
6	9.3499	33.05		21.87	10.33	43.38		32.20	60.00	50.00	-16.62	-17.80	P	

## 8. EN 55032 RADIATED EMISSION TEST

### 8.1. LIMITS OF RADIATED DISTURBANCES

#### Radiated Emission at Frequencies up to 1GHz

For Class B Equipment

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
A4.1	30 - 230	10	30
	230 - 1000		37
A4.2	30 - 230	3	40
	230 - 1000		47

#### Radiated Emission at Frequencies above 1GHz

For Class B Equipment

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
A5.1	1000 - 3000	3	Average	50
	3000 - 6000			54
A5.2	1000 - 3000		Peak	70
	3000 - 6000			74

Note: The lower limit shall apply at the transition frequency.

#### Required highest frequency for radiated measurement

EN 55032 Table clause	Highest internal frequency (Fx)	Highest measured frequency
1	$F_x \leq 108 \text{ MHz}$	1 GHz
	$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz
	$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz
	$F_x > 1$	5 x Fx up to a maximum of 6 GHz

NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.

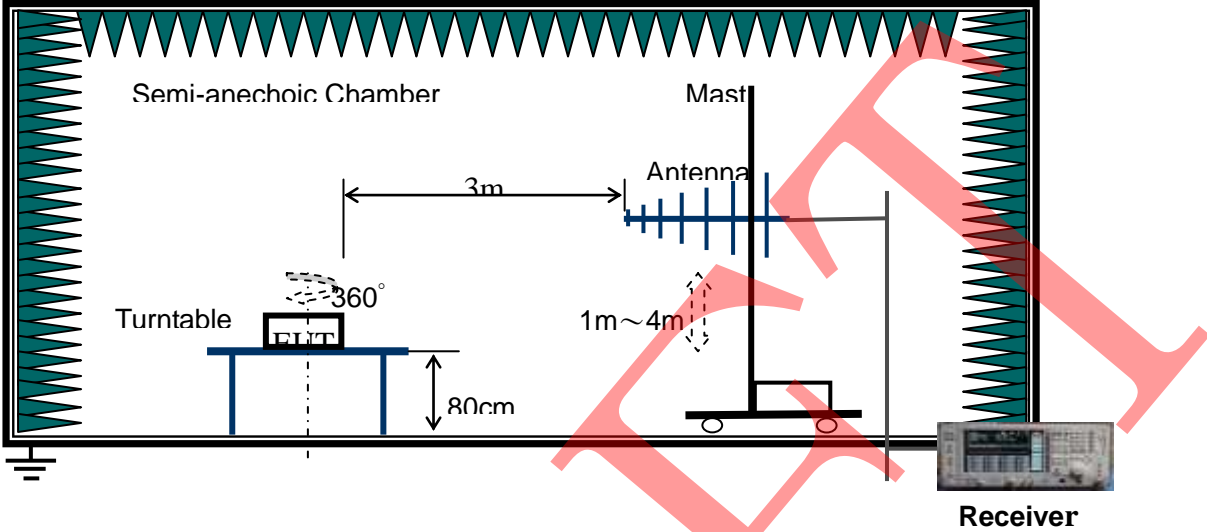
NOTE 2 Fx is highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.

Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz.

**8.2. BLOCK DIAGRAM OF TEST SETUP**

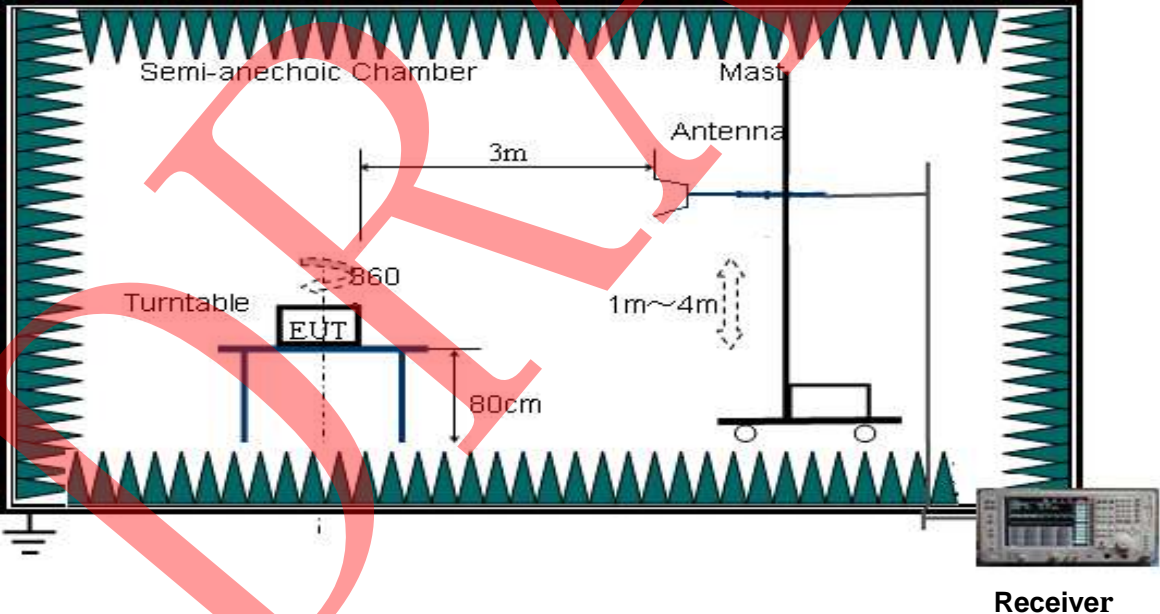
System Diagram of Connections between EUT and Simulators

**Radiated Disturbance 30M to1 GHz**



Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.

**Radiated Disturbance above 1 GHz**



Note: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

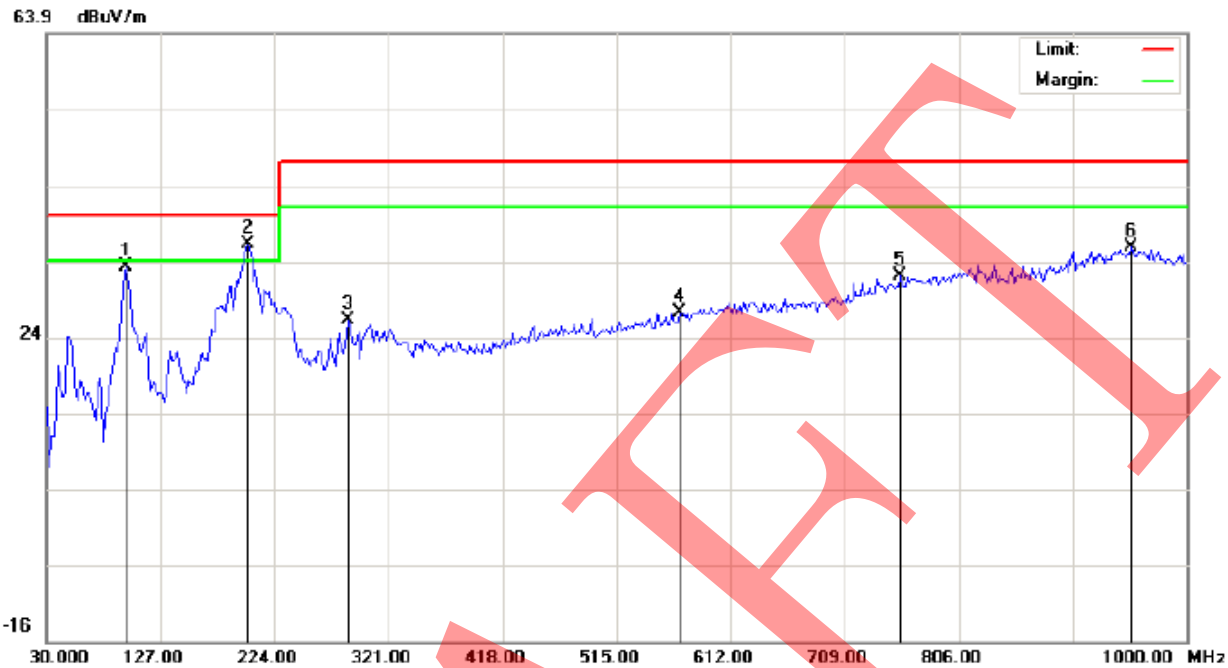


### 8.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
- (4) The EUT received AC230V/50Hz power through the outlet socket under the turntable. All support equipments received AC230V/50Hz power from socket under the turntable, if any.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

**Note:** The test modes were carried out for all operation modes  
The worst case (Video Play) was showed as the follow:

**8.4. TEST RESULT OF RADIATED EMISSION TEST**  
**RADIATED EMISSION BELOW 1GHZ- HORIZONTAL**



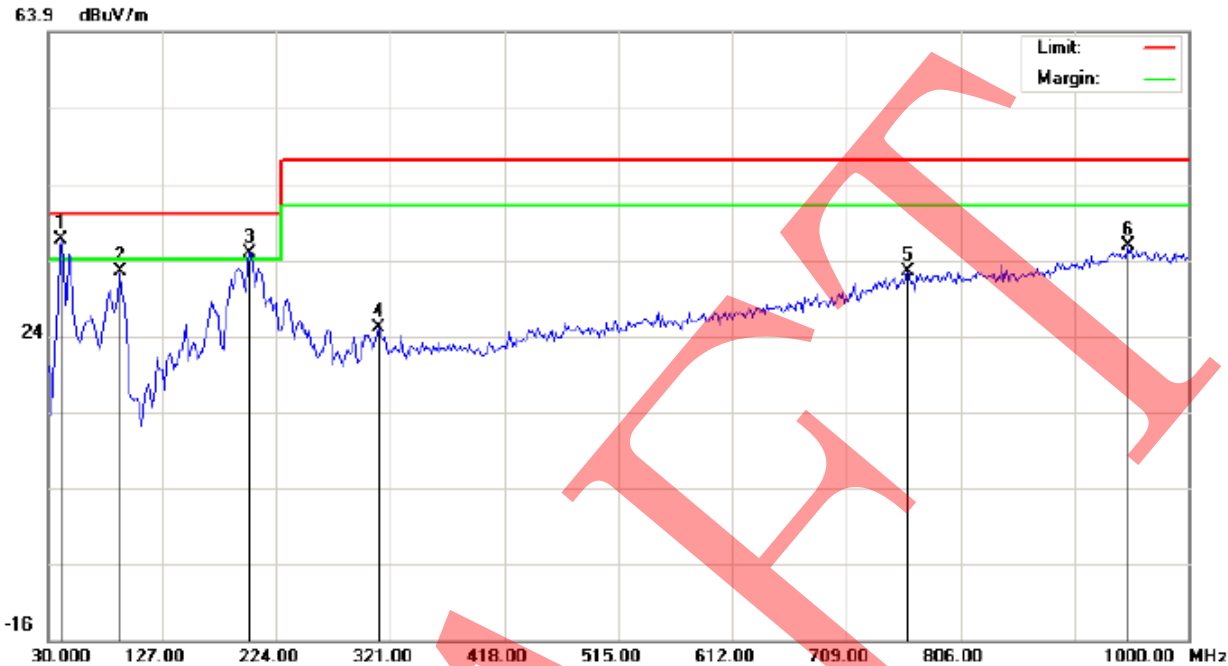
Site: site #1  
 Limit: EN55032 ClassB 3M Radiation  
 EUT:Smart Phone  
 M/N: VOLT S  
 Mode: Video Play  
 Note:

Polarization: *Horizontal*  
 Power:  
 Distance:

Temperature: 22.6  
 Humidity: 54.9 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		97.9000	24.75	8.38	33.13	40.00	-6.87	peak			
2	*	201.3667	24.34	11.86	36.20	40.00	-3.80	peak			
3		287.0500	12.94	13.21	26.15	47.00	-20.85	peak			
4		568.3500	4.20	22.94	27.14	47.00	-19.86	peak			
5		755.8832	5.35	26.71	32.06	47.00	-14.94	peak			
6		953.1167	5.83	29.97	35.80	47.00	-11.20	peak			

RADIATED EMISSION BELOW 1GHZ- VERTICAL



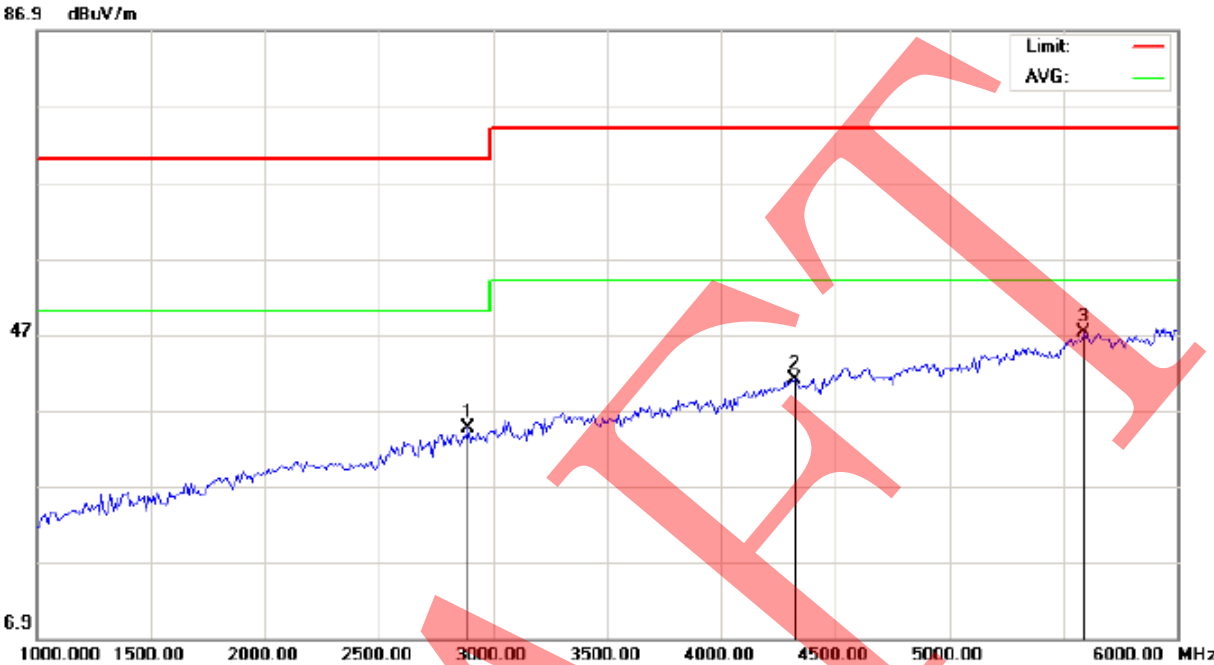
Site: site #1  
 Limit: EN55032 ClassB 3M Radiation  
 EUT:Smart Phone  
 M/N: VOLT S  
 Mode: Video Play  
 Note:

Polarization: *Vertical*  
 Power:  
 Distance:

Temperature: 22.6  
 Humidity: 54.9 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1	*	41.3167	27.81	8.81	36.62	40.00	-3.38	peak			
2		91.4333	28.16	4.16	32.32	40.00	-7.68	peak			
3	!	201.3667	25.74	9.13	34.87	40.00	-5.13	peak			
4		311.3000	8.80	16.16	24.96	47.00	-22.04	peak			
5		760.7333	5.57	26.78	32.35	47.00	-14.65	peak			
6		948.2667	5.85	29.95	35.80	47.00	-11.20	peak			

RADIATED EMISSION ABOVE 1GHZ – HORIZONTAL



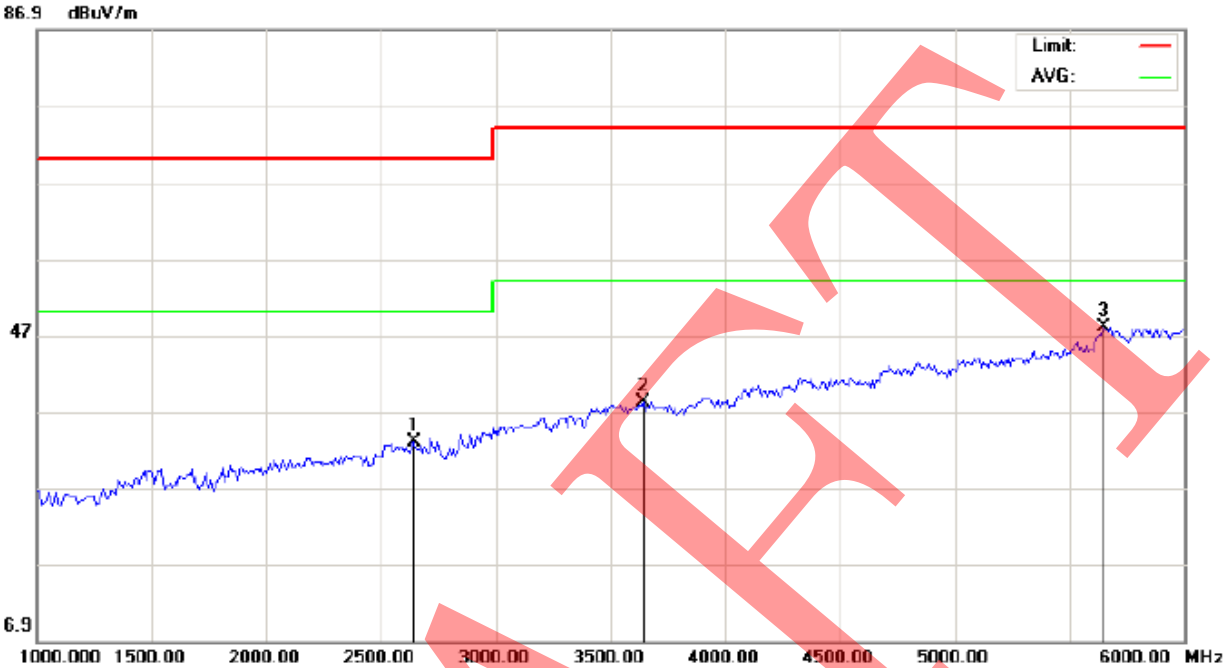
Site: site #1  
 Limit: EN55032 Class B Above 1G(Peak)  
 EUT:Smart Phone  
 M/N:VOLT S  
 Mode:Video Play  
 Note:

Polarization: *Horizontal*  
 Power:  
 Distance: 3m

Temperature: 26  
 Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1		2891.667	43.18	-8.62	34.56	70.00	-35.44	peak			
2		4325.000	44.61	-3.70	40.91	74.00	-33.09	peak			
3	*	5591.667	48.96	-1.77	47.19	74.00	-26.81	peak			

RADIATED EMISSION ABOVE 1GHZ - VERTICAL



Site: site #1  
 Limit: EN55032 Class B Above 1G(Peak)  
 EUT:Smart Phone  
 M/N:VOLT S  
 Mode:Video Play  
 Note:

Polarization: **Vertical**  
 Power:  
 Distance: 3m

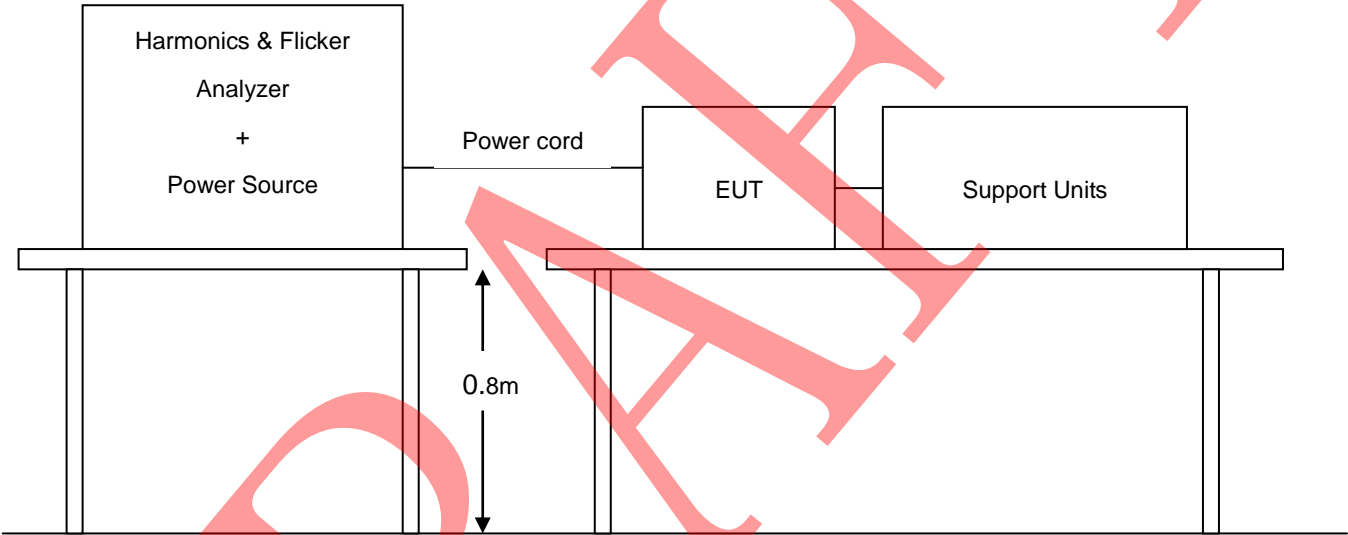
Temperature: 26  
 Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2641.667	42.14	-9.23	32.91	70.00	-37.09	peak			
2		3641.667	45.23	-7.02	38.21	74.00	-35.79	peak			
3	*	5650.000	49.84	-1.74	48.10	74.00	-25.90	peak			

**9. EN 61000-3-2 POWER HARMONICS TEST**  
**POWER HARMONICS MEASUREMENT**

<b>Port</b>	AC mains
<b>Basic Standard</b>	EN 61000-3-2
<b>Limits</b>	<input checked="" type="checkbox"/> CLASS A ; <input type="checkbox"/> CLASS B ; <input type="checkbox"/> CLASS C ; <input type="checkbox"/> CLASS D
<b>Tester</b>	Snowy
<b>Temperature</b>	21.3°C
<b>Humidity</b>	52.6%

**9.1. BLOCK DIAGRAM OF TEST SETUP**



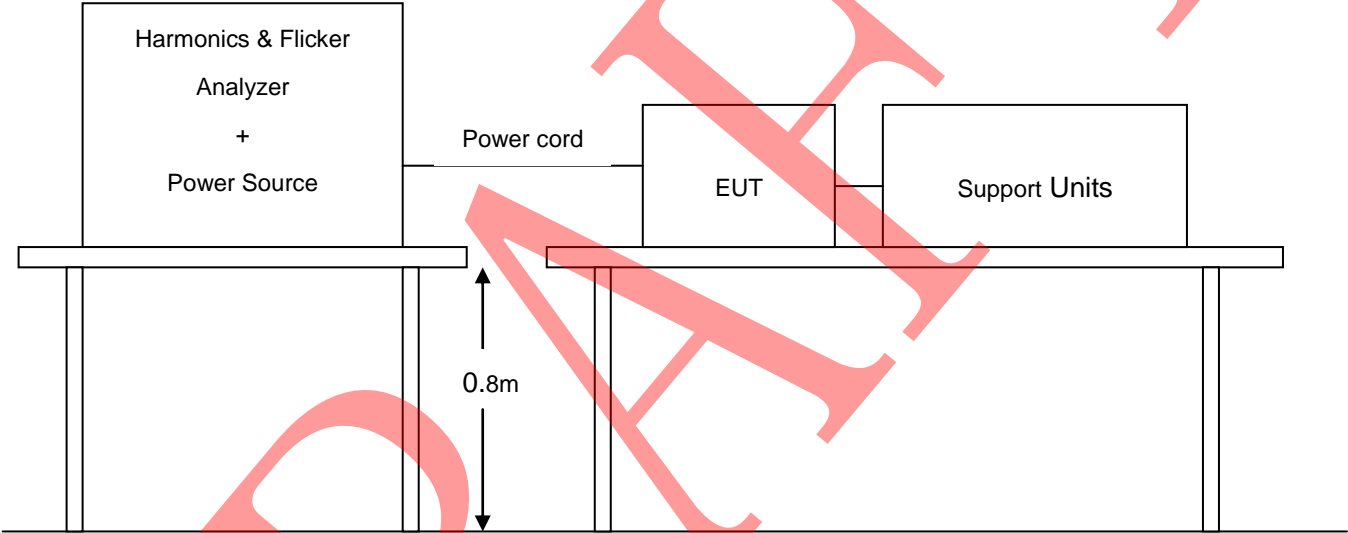
**9.2. RESULT**

**Note:** Owing to the power of EUT is less than 75W, so test is not applicable.

**10. EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST**  
**VOLTAGE FLUCTUATION/FLICKER MEASUREMENT**

<b>Port</b>	AC mains
<b>Basic Standard</b>	EN 61000-3-3
<b>Limits</b>	§5 of EN 61000-3-3
<b>Tester:</b>	Snowy
<b>Temperature</b>	21.5°C
<b>Humidity</b>	52.8%

**10.1. BLOCK DIAGRAM OF TEST SETUP**



## 10.2. THE RESULT

**Note:** The test modes were carried out for all operation modes

The worst case \_ Camera (By Adapter Charging) was showed as the follow:

### Flicker Test Summary per EN/EN 61000-3-3 (Run time)

EUT: 3G Dual-SIM Smartphone  
Test category: All parameters (European limits)  
Test date: 2016-12-15  
Test duration (min): 10  
Comment: On  
Customer: Vonino EElectronics LTD

Tested by: Snowy  
Test Margin: 100  
Start time: 10:05:03  
End time: 10:15:03  
Data file name: unnamed

Time is too short for Plt plot

Parameter values recorded during the test:

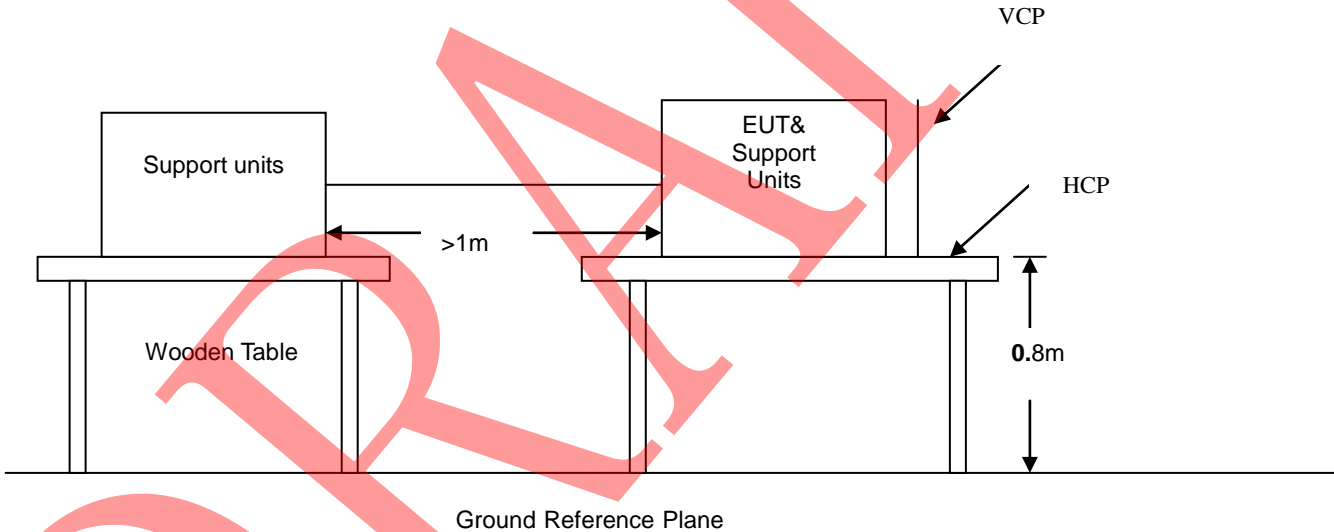
Short Term Flicker Pst:	0.28	Test limit:	1.0	Pass
Highest d(t) of 500ms:	0.0	Test limit (mS):	500	Pass
Max d(c) Between Adjacent:	0.01%	Test limit (%):	3.30	Pass
d(max):	0.46%	Test limit (%):	4	Pass



**11. EN 61000-4-2 ESD IMMUNITY TEST**  
**ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST**

<b>Port</b>	Enclosure
<b>Basic Standard</b>	EN 61000-4-2
<b>Test Level</b>	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
<b>Standard require</b>	B
<b>Tester</b>	Snowy
<b>Temperature</b>	20.8°C
<b>Humidity</b>	50.5%

**11.1. BLOCK DIAGRAM OF TEST SETUP**  
 (The 470 k ohm resistors are installed per standard requirement)



## 11.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.

The support units were located 1 m minimum away from the EUT.

EUT worked with resistance load, and make sure EUT worked normally.

Active the communication function if the EUT with such port(s).

As per the requirement of EN 55024; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.

Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.

The application of ESD to the contact of open connectors is not required.

**Note:** As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

### TEST RESULT:

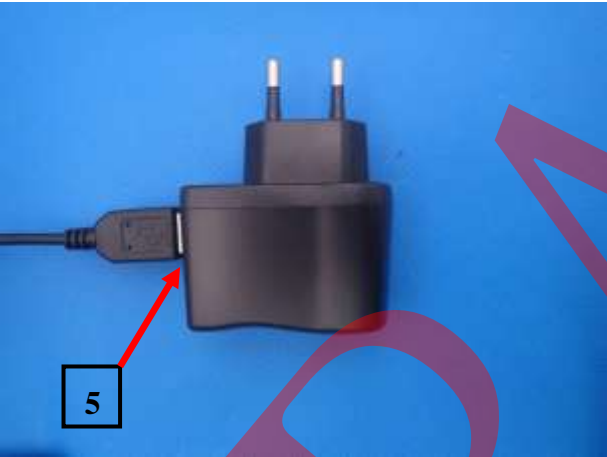
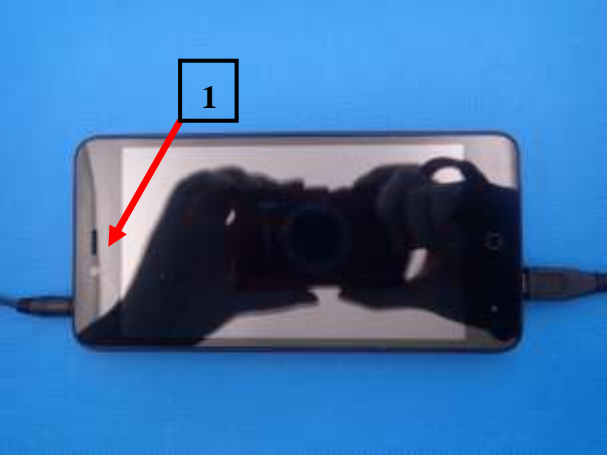
Note: The test modes were carried out for all operation modes

The worst case \_Sound Recorder (by adapter charging) was showed as the follow:

The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Result (Pass/Fail)
±2kV; ±4kV	Contact Discharge	No function loss	Pass
±2kV; ±4kV	Indirect Discharge HCP (Front)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge HCP (Left)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge HCP (Back)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge HCP (Right)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge VCP (Front)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge VCP (Left)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge VCP (Back)	No function loss	Pass
±2kV; ±4kV	Indirect Discharge VCP (Right)	No function loss	Pass
±2kV; ±4kV; ±8kV	Air Discharge	No function loss	Pass

**Discharge points:**



**Note:** The air discharge points are 1~3. The contact discharge points are 4 and 5.

11.3. PERFORMANCE

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

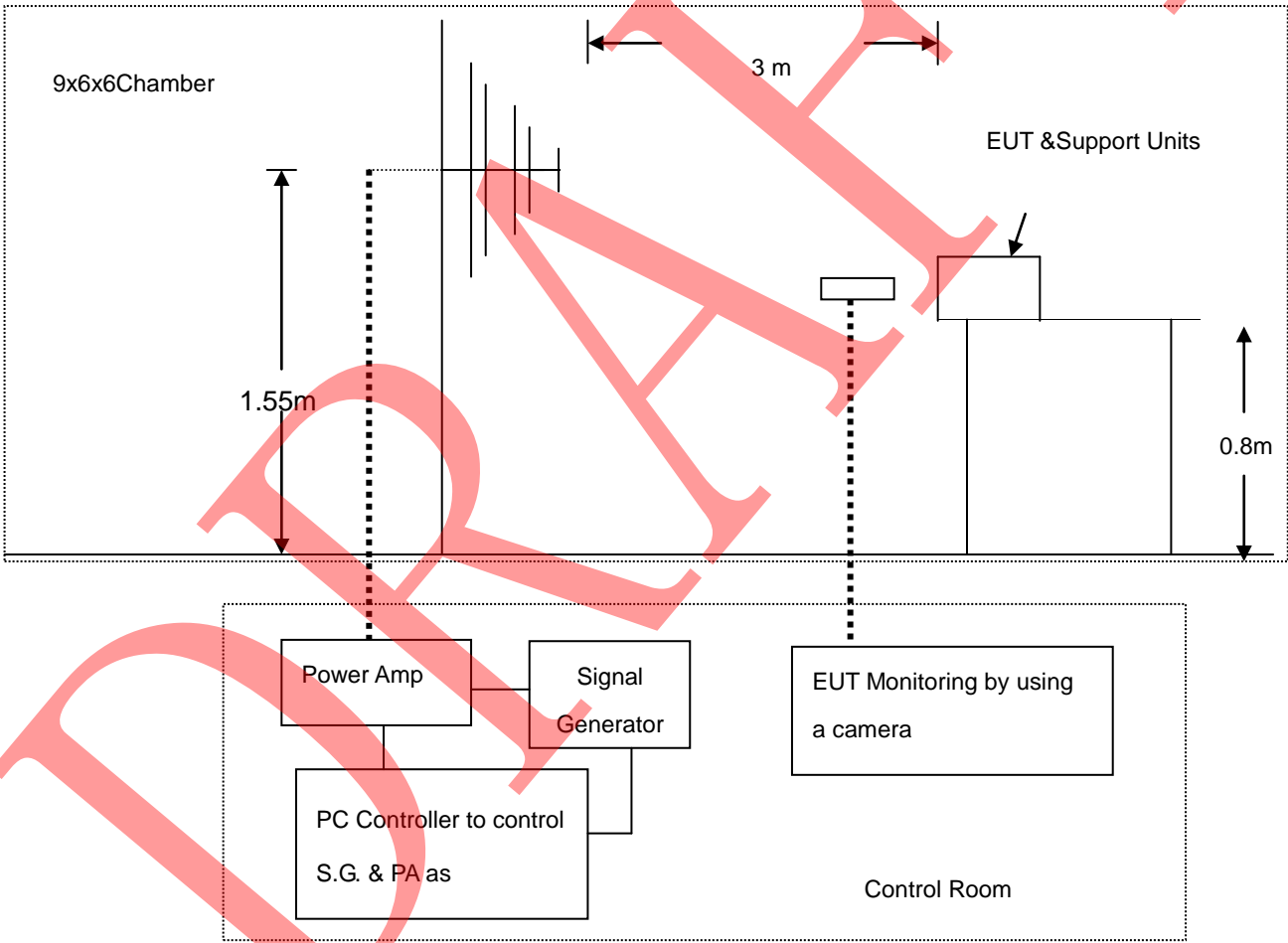
<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

DRAFT

**12. EN 61000-4-3 RS IMMUNITY TEST**  
**RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST**

<b>Port</b>	Enclosure
<b>Basic Standard</b>	EN 61000-4-3
<b>Test Level:</b>	3V/m with 80% AM. 1kHz Modulation.
<b>Standard require</b>	A
<b>Tester</b>	Snowy
<b>Temperature</b>	21.3°C
<b>Humidity</b>	51.6%

**12.1. BLOCK DIAGRAM OF TEST SETUP**



## 12.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per EN 61000-4-3.

EUT worked with resistance load, and make sure EUT worked normally.

Setting the testing parameters of RS test software perEN 61000-4-3.

Performing the test at each side of with specified level (3V/m) at 1% steps and test frequency from 80MHz to 1000MHz

Recording the test result in following table.

### EN 61000-4-3 Final test conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

### TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ Video Play (by adapter charging) was showed as the follow:

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result (Pass/Fail)
80-1000	3V/m	AM	H	Front	No function loss	Pass
80-1000	3V/m	AM	H	Left	No function loss	Pass
80-1000	3V/m	AM	H	Back	No function loss	Pass
80-1000	3V/m	AM	H	Right	No function loss	Pass
80-1000	3V/m	AM	V	Front	No function loss	Pass
80-1000	3V/m	AM	V	Left	No function loss	Pass
80-1000	3V/m	AM	V	Back	No function loss	Pass
80-1000	3V/m	AM	V	Right	No function loss	Pass

**12.3. PERFORMANCE**

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

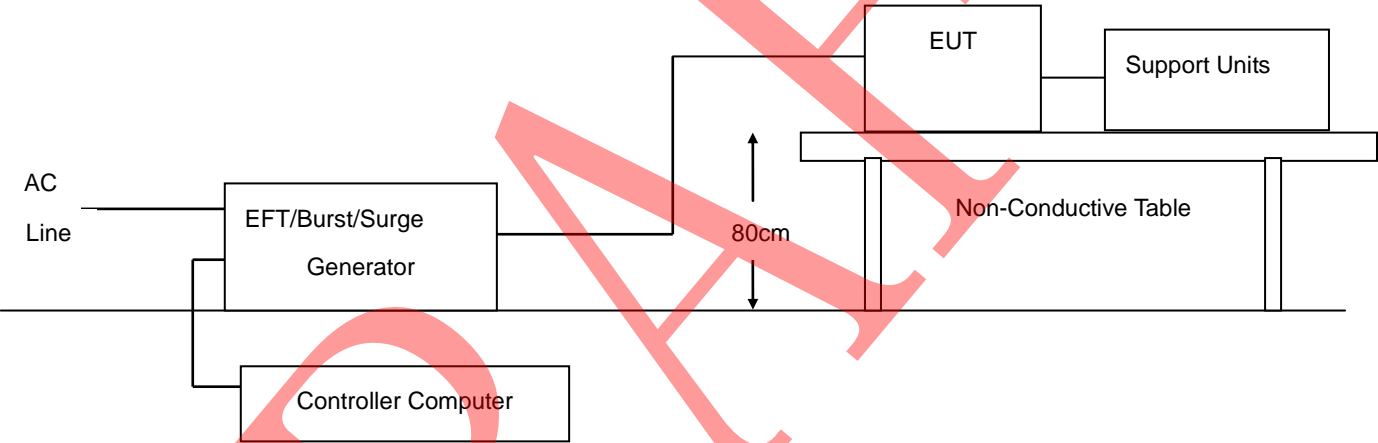
<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

DRAFT

**13. EN 61000-4-4 EFT IMMUNITY TEST**  
**ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST**

<b>Port</b>	On Power Supply Lines
<b>Basic Standard</b>	EN 61000-4-4
<b>Test Level</b>	+/- 1kV for Power Supply Lines
<b>Standard require</b>	B
<b>Tester</b>	Snowy
<b>Temperature</b>	22.1°C
<b>Humidity</b>	52.3%

**13.1. BLOCK DIAGRAM OF TEST SETUP**





**13.2. TEST PROCEDURE**

The EUT and support units were located on a wooden table 0.8m away from ground reference plane.  
 A 1.0 meter long power cord was attached to EUT during the test.  
 The length of communication cable between communication port and clamp was keeping within 1 meter.  
 EUT worked with resistance load, and make sure EUT worked normally.  
 Related peripherals work during the test.  
 Recording the test result as shown in following table.

**Test conditions:**

Impulse Frequency: 5 kHz  
 Tr/Th: 5/50ns  
 Burst Duration: 15ms  
 Burst Period: 300ms

**TEST RESULT:**

Note: The test modes were carried out for all operation modes  
 The worst case \_ Video Play (By Adapter Charging) was showed as the follow:

Inject Line	Voltage kV	Inject Method	Test Performance	Result (Pass/Fail)
L+N	+/- 1	Indirect	No function loss	Pass

**13.3. PERFORMANCE**

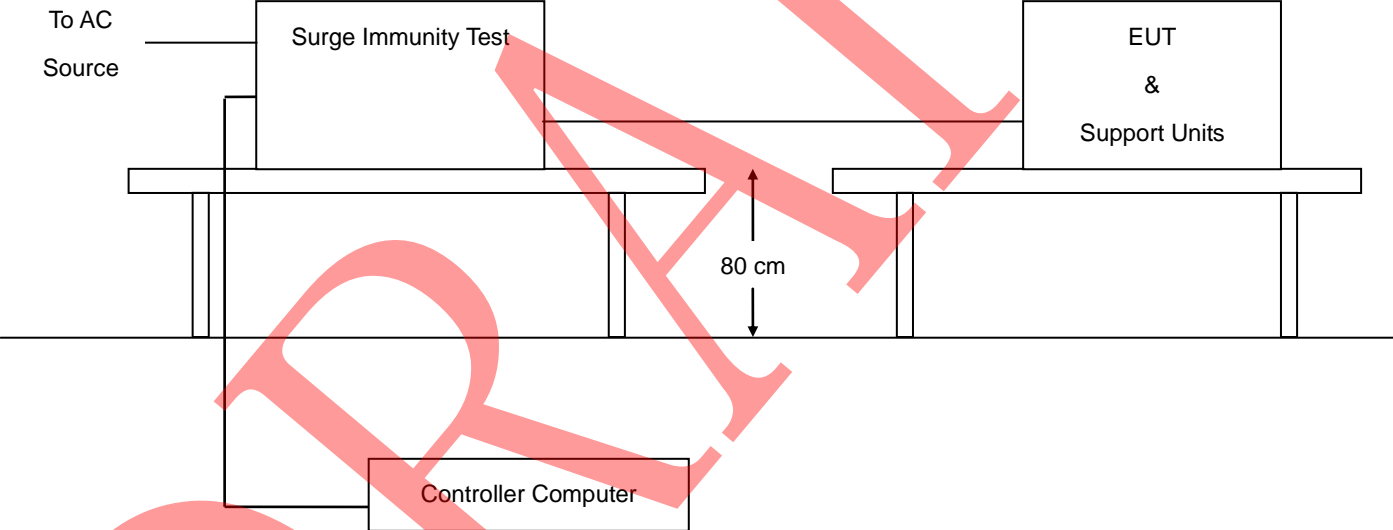
<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**PASS**
                         
  **FAIL**

**14. EN 61000-4-5 SURGE IMMUNITY TEST**  
**SURGE IMMUNITY TEST**

<b>Port</b>	On Power Supply Lines
<b>Basic Standard</b>	EN 61000-4-5
<b>Requirements</b>	+/- 1kV (Line to Line)
<b>Standard require</b>	B
<b>Tester</b>	Snowy
<b>Temperature</b>	21.8°C
<b>Humidity</b>	52.4%

**14.1. BLOCK DIAGRAM OF TEST SETUP**



### 14.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8 m away from ground floor.  
EUT worked with resistance load, and make sure EUT worked normally.  
Recording the test result as shown in following table.

**Test conditions:**

<b>Voltage Waveform</b>	1.2/50 <i>us</i>
<b>Current Waveform</b>	8/20 <i>us</i>
<b>Polarity</b>	Positive/Negative
<b>Phase angle</b>	0°, 180°, 90°, 270°
<b>Number of Test</b>	5

### TEST RESULT:

Note: The test modes were carried out for all operation modes  
The worst case \_ Video Play (By Adapter Charging) was showed as the follow:

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Test Performance	Result (Pass/Fail)
L1-N	1	Positive	Capacitive	No function loss	Pass
L1-N	1	Negative	Capacitive	No function loss	Pass

### 14.3. PERFORMANCE

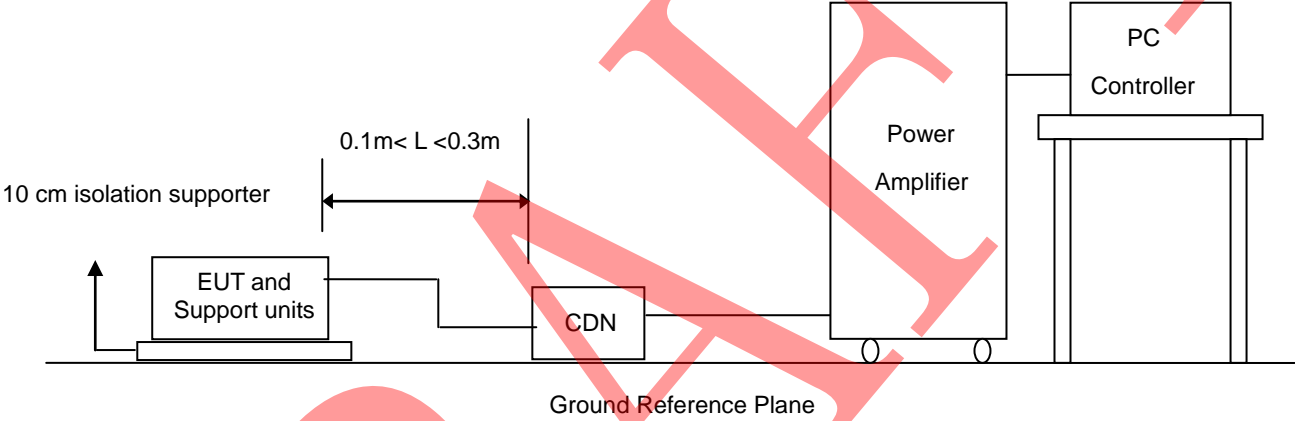
<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

**15. EN 61000-4-6 CS IMMUNITY TEST**

<b>Port</b>	On Power Supply Lines
<b>Basic Standard</b>	EN 61000-4-6
<b>Requirements</b>	3V with 80% AM. 1 kHz Modulation
<b>Standard require</b>	A
<b>Tester</b>	Snowy
<b>Temperature</b>	22.5°C
<b>Humidity</b>	53.2%

**15.1. BLOCK DIAGRAM OF TEST SETUP**



**15.2. TEST PROCEDURE**

The EUT and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.

EUT worked with resistance load, and make sure EUT worked normally.

Related peripherals work during the test.

Setting the testing parameters of CS test software per EN 61000-4-6.

Recording the test result in following table.

**Test conditions:**

<b>Frequency Range</b>	0.15MHz-80MHz
<b>Frequency Step</b>	1% of fundamental
<b>Dwell Time</b>	1 sec

**TEST RESULT:**

Note: The test modes were carried out for all operation modes

The worst case \_ Camera (By Adapter Charging) was showed as the follow:

Range (MHz)	Strength	Modulation	Result (Pass/Fail)
0.15-80	3V	AM	Pass

**15.3. PERFORMANCE**

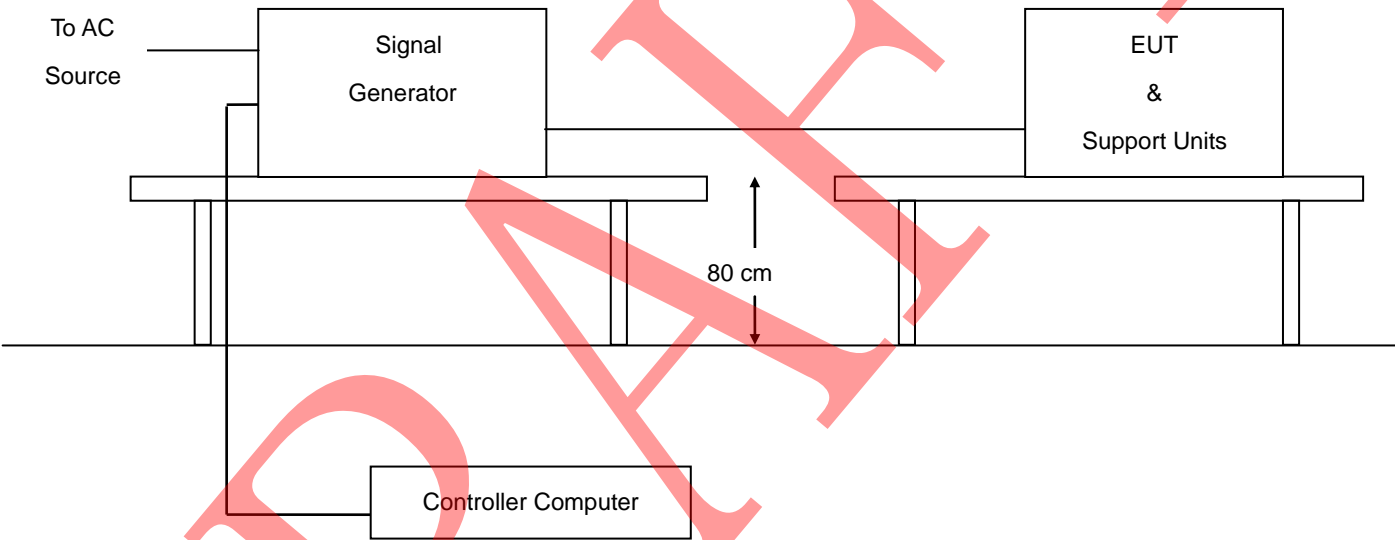
<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

**16. EN 61000-4-8 PFMF TEST**  
**POWER FREQUENCY MAGNETIC FIELDS IMMUNITY TEST**

<b>Port</b>	Enclosure
<b>Basic Standard</b>	EN 61000-4-8
<b>Requirements</b>	50/60 Hz, 3A/m
<b>Standard require</b>	A
<b>Tester</b>	Snowy
<b>Temperature</b>	23.3 °C
<b>Humidity</b>	53.6%

**16.1. BLOCK DIAGRAM OF TEST SETUP**



**16.2. TEST PROCEDURE**

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

**Test Conditions:**

Frequency	Polarity	Level	Test Performance	Performance Result
50 Hz	X	3 A/m	No function loss	A
50 Hz	Y	3 A/m	No function loss	A
50 Hz	Z	3 A/m	No function loss	A

**16.3. PERFORMANCE & RESULT**

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**TEST RESULT:**

Note: The test modes were carried out for all operation modes

The worst case \_ Camera (By Adapter Charging) was showed as the follow:

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

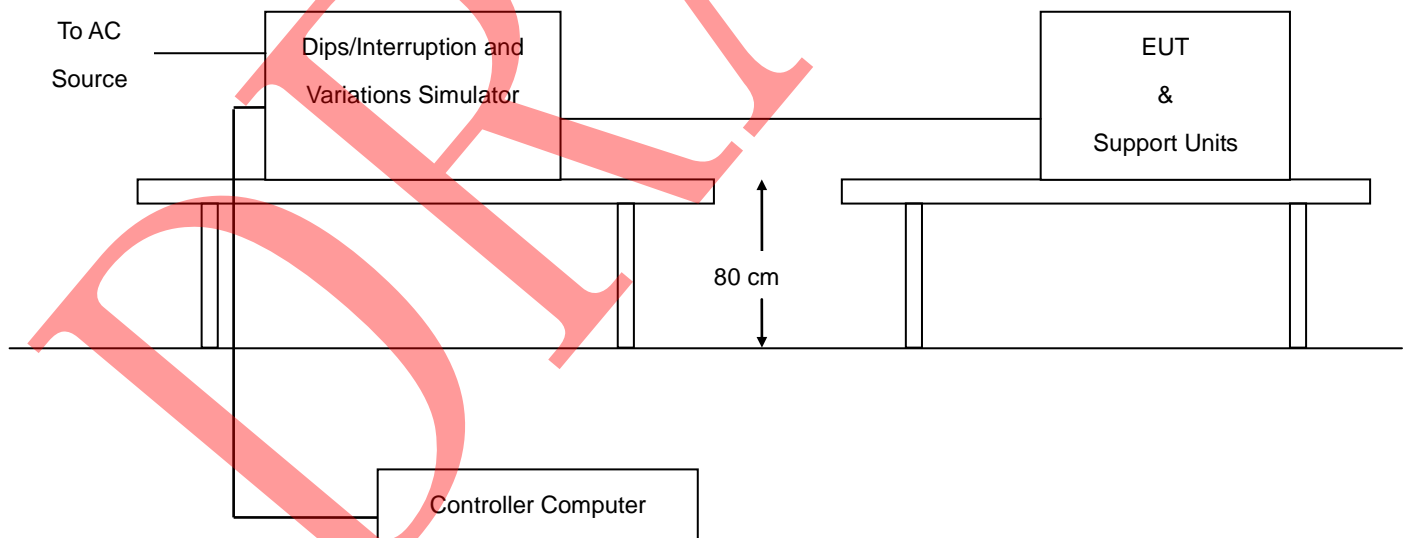
**17. EN 61000-4-11 DIPS IMMUNITY TEST**  
**VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS IMMUNITY TEST**

<b>Port</b>	On Power Supply Lines
<b>Basic Standard</b>	EN 61000-4-11
<b>Requirements</b>	0, 45, 90, 135, 180, 225, 270, 315 degrees
<b>Test Interval</b>	Min. 10 sec.
<b>Tester</b>	Snowy
<b>Temperature</b>	24.1°C
<b>Humidity</b>	53.8%

	<b>Test Level % U<sub>T</sub></b>	<b>Reduction (%)</b>	<b>Duration (periods)</b>	<b>Performance Criteria</b>
<b>Voltage Dips</b>	<5	>95	0.5	B
	70	30	25	C

	<b>Test Level % U<sub>T</sub></b>	<b>Reduction (%)</b>	<b>Duration (periods)</b>	<b>Performance Criteria</b>
<b>Voltage Interruptions</b>	<5	>95	250	C

**17.1. BLOCK DIAGRAM OF TEST SETUP**





**17.2. TEST PROCEDURE**

The EUT and support units were located on a wooden table, 0.8 m away from ground floor.  
EUT worked with resistance load, and make sure EUT worked normally.  
Setting the parameter of tests and then perform the test software of test simulator.  
Conditions changes to occur at 0 degree crossover point of the voltage waveform.  
Recording the test result in test record form.

**Test conditions:**

The duration with a sequence of three dips/interruptions with interval of 10 s minimum  
(Between each test event)

**TEST RESULT:**

Note: The test modes were carried out for all operation modes

The worst case \_ Camera (By Adapter Charging) was showed as the follow:

**Voltage Dips:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Performance Result
<5	>95	0.5	Normal	B
70	30	25	Normal	C

**Voltage Interruptions:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Performance Result
<5	>95	250	Normal	C

**17.3. INTERPRETATION**

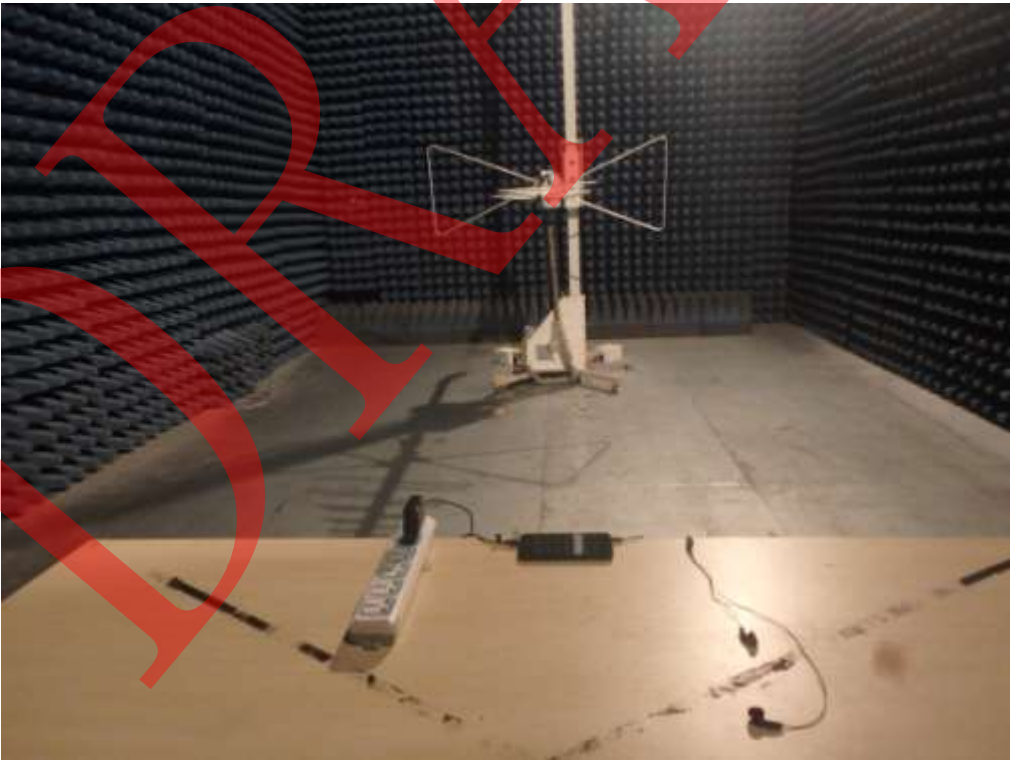
<input type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input checked="" type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input checked="" type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

**APPENDIX A: PHOTOGRAPHS OF TEST SETUP**  
EN 55032 CONDUCTED EMISSION TEST SETUP



EN 55032 RADIATED EMISSION TEST SETUP



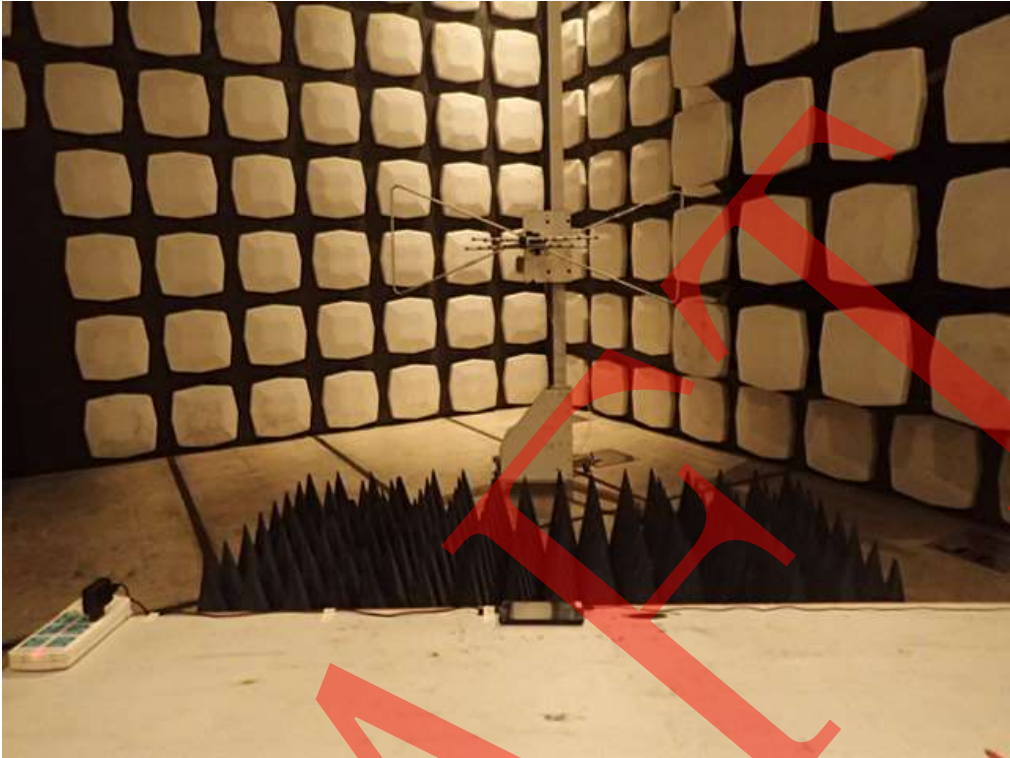
EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST



EN 61000-4-2 ESD IMMUNITY TEST SETUP



EN 61000-4-3 RS IMMUNITY TEST SETUP



EN 61000-4-4 EFT IMMUNITY TEST SETUP



EN 61000-4-5 SURGE IMMUNITY TSET SETUP



EN 61000-4-6 CS IMMUNITY TSET SETUP



EN 61000-4-8 PFMFIMMUNITY TSET SETUP



EN 61000-4-11 DIPS IMMUNITY TEST SETUP



**APPENDIX B: PHOTOGRAPHS OF EUT**  
All VIEW OF EUT



TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT





BACK VIEW OF EUT



LEFT VIEW OF EUT



RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1



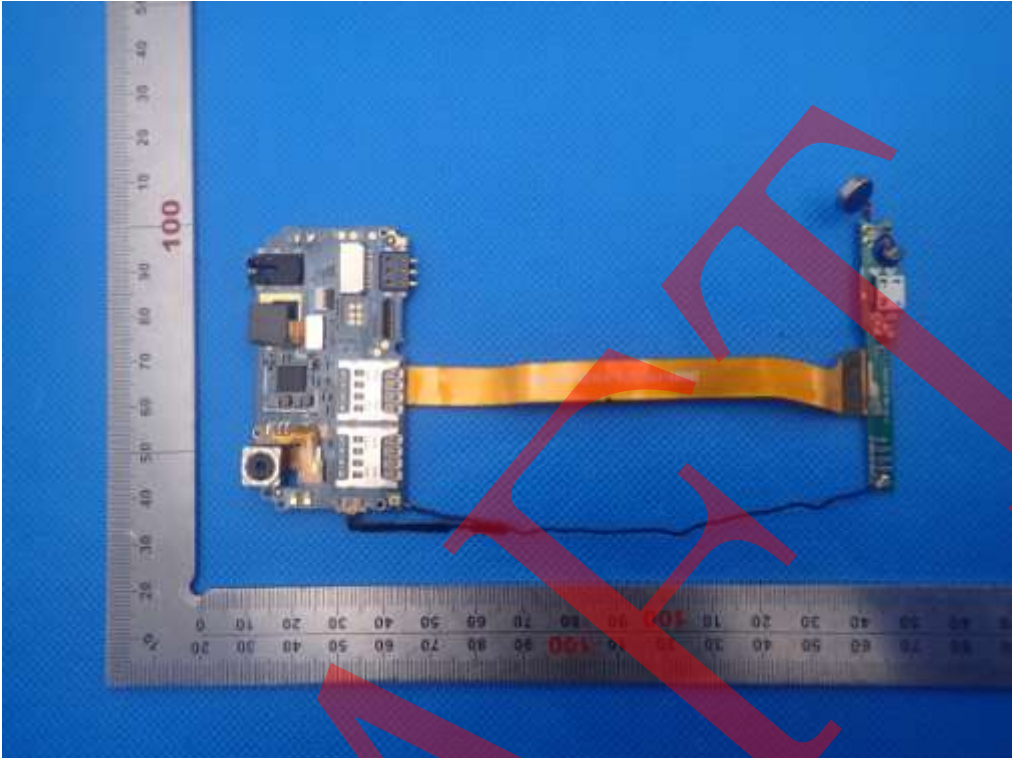
OPEN VIEW OF EUT-2



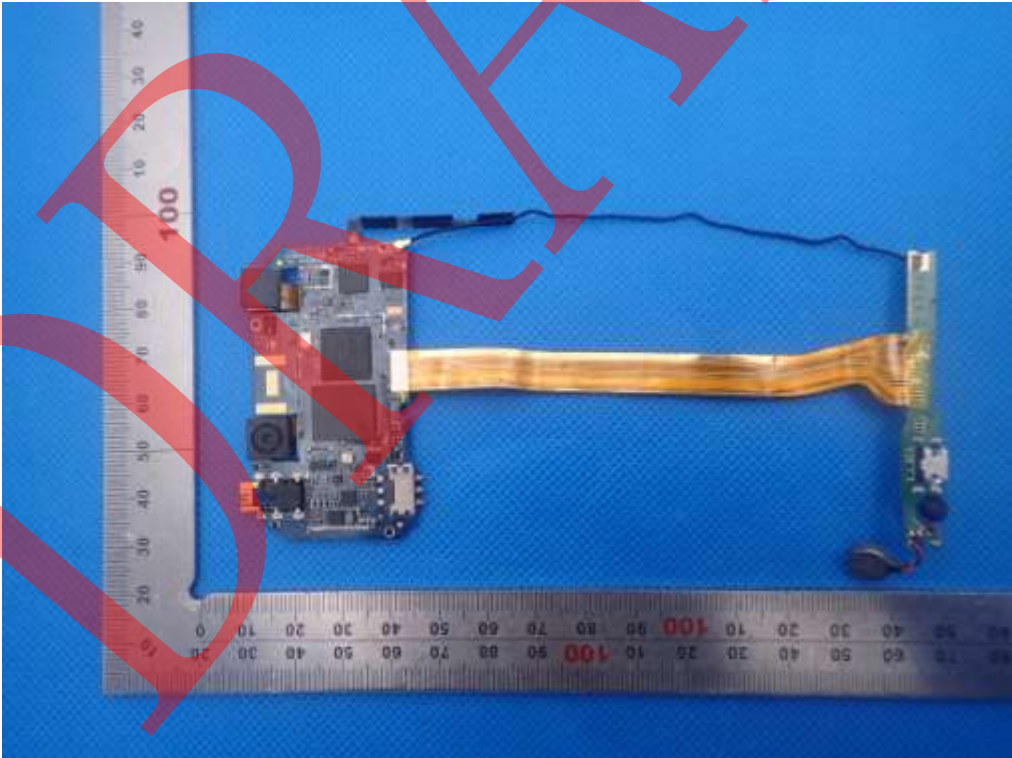
OPEN VIEW OF EUT-3



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----