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FCC TEST REPORT

Under:
FCC Part 15, Class B
JBP-Part 15 Class B Computing Device Peripheral

Prepared For:

Grandstream Networks, Inc.

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

FCC ID: YZZGXV3370
EUT: IP Multimedia Phone
Model: GXV3370

May 11, 2018 **Issue Date:**
Original Report **Report Type:**
Test Engineer: Jacky Huang
Review By: Apollo Liu / Manager

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Report Revision History

Report #	Version	Description	Issued Date
KSZ2018031601J06	Rev.01	Initial issue of report	April 23, 2018
KSZ2018031601J06	Rev.02	Update the signature of cover page & section 1.2	May 11, 2018

1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.6. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Test Firm Name:	**Ke Mei Ou Lab Co., Ltd.**
Test Firm Address:	2013-2016, 20th Floor, Business Center, Jiahui Xin Cheng, No 3027, Shen Nan Road, Fu Tian, Shen Zhen, Guang Dong, P. R. China
FCC Designation Number:	CN1532
Test Firm Registration Number:	344480
Internet:	www.kmolab.com
Email:	kmo@kmolab.com
ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.	

1. 3 Detai1. 3 Details of Applicant

Name: **Grandstream Networks, Inc.**
Address: **126 Brookline Ave, 3rd Floor Boston, MA 02215, USA**

1. 4 Application Details

Date of Receipt of Application: March 16, 2018
Date of Receipt of Test Item: March 16, 2018
Date of Test : March 23~April 24, 2018

1. 5 Details of Manufacturer

Name: **Grandstream Networks, Inc.**
Address: **126 Brookline Ave, 3rd Floor Boston, MA 02215, USA**

1. 6 Test Item

EUT Feature	
EUT Description:	IP Multimedia Phone
Brand Name:	Grandstream
Model Name:	GXV3370
EUT RF Technology:	☒Bluetooth v3.0 + EDR ☒ Bluetooth v4.0 LE ☐Bluetooth v4.2 LE ☐Bluetooth v5.0 LE ☒WLAN 2.4GHz 802.11b/g/n HT/20/40 ☒WLAN 5GHz 802.11a/n HT20/HT40 ☐WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
HW Version:	v1.2A
SW Version:	1.0.0.5
EUT Stage:	Identical Prototype
Note: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

Additional Information

Specification of Accessory				
☒AC/DC Adapter #1 (EU)	**Brand Name**	Sunlight	**Model Name**	H18DE1200150A
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.8A; O/P:DC 12V /1.5A		
☒AC/DC Adapter #2 (EU)	**Brand Name**	Frecom	**Model Name**	F18W8-120150SPAVY
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.6A; O/P:DC 12V /1.5A		

1. 7 Applicable Standards

Applicable Standards
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards: FCC Part 15 Subpart B ANSI C63.4-2014
Note: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC Rules	Test Type	Limit	Result	Notes
FCC Part 15, Paragraph 15.107	AC Conducted Test	< 15.107 Limits	**PASS**	Complies.
FCC Part 15, Paragraph 15.109	Radiated Test	< 15.109 Limits	**PASS**	Complies.

2. 2 Measurement Uncertainty

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz~30MHz	1.72
Radiated emissions	30MHz ~ 300MHz	3.88
Radiated emissions	300MHz ~1000MHz	3.86
Radiated emissions	>1000MHz	4.42

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

4. 1 Test Equipment

Please refer to Section 8 this report.

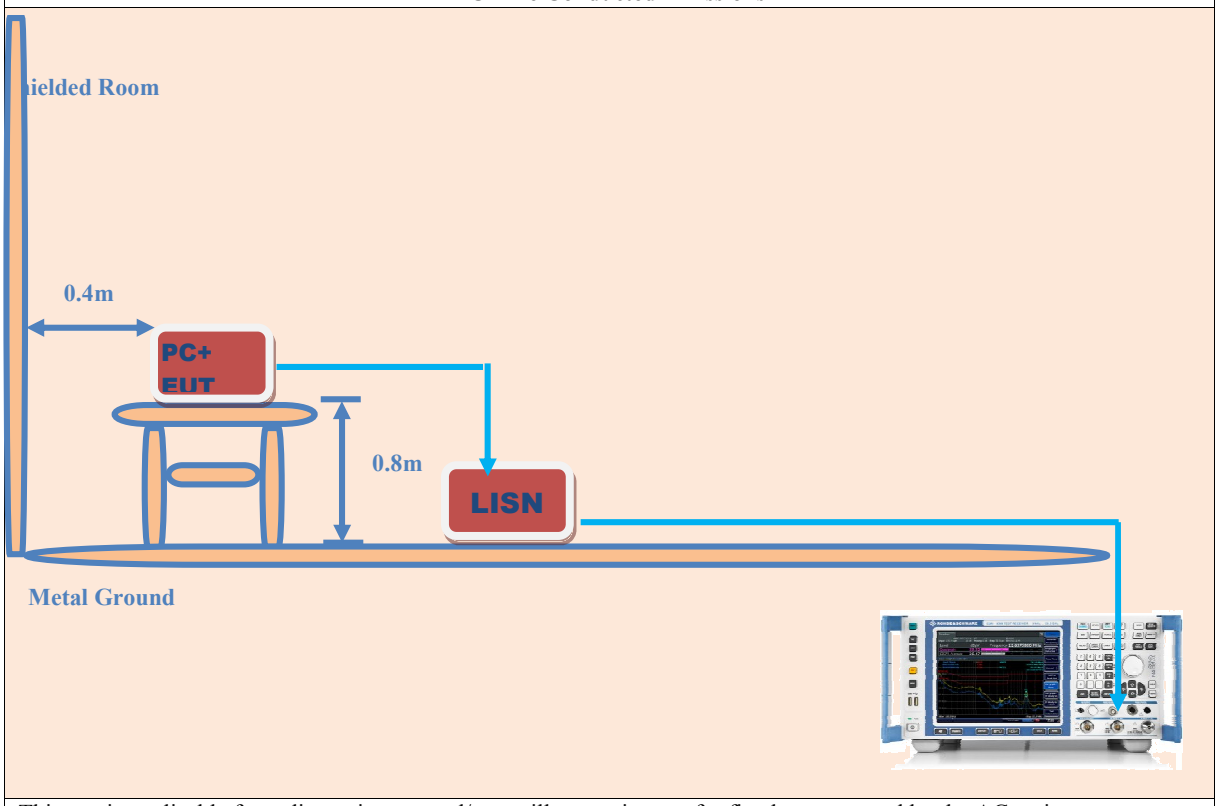
4. 2 Test Procedure

Test Method	
☒	The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4. 3 Test Setup

Test Setup

AC Line Conducted Emissions



This test is applicable for radio equipment and/or ancillary equipment for fixed use powered by the AC mains.
This test shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment.
This test assesses the level of internally generated electrical noise present on the AC power input/output ports.

4. 4 Configuration of the EUT

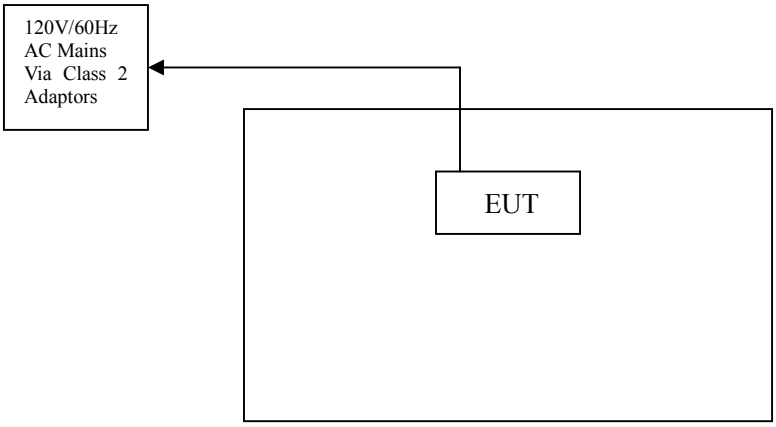
The EUT was configured according to ANSI C63.4:2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

EUT Operation Test Setup	
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations. Only the worst test mode data was reported.	
Pre-Scan Mode	
Test Mode	**Operating Description**
1	EUT power by AC/DC Adapter #1
2	EUT power by AC/DC Adapter #2
3	EUT power by POE
4	EUT with BT/WiFi & AC/DC Adapter #1
5	EUT with BT/WiFi & AC/DC Adapter #2
6	EUT with BT/WiFi & POE
Conducted Emissions → Final	
Test Mode	**Operating Description**
1	EUT power by AC/DC Adapter #1
Radiated Emissions → Final	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter #1
Note: The test modes were carried out for all operation modes (include link and idle). The final test mode of the EUT was the worst test mode for Mode 1, and its test data was reported.	

Support Unit				
Device	**Manufacturer**	**Model #**	**FCC ID**	**Cable**
Notebook	ACER	ZQE	HLZ-AR5B97	1.5m unshielded power cord
-	-	-	-	-

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4:2014.



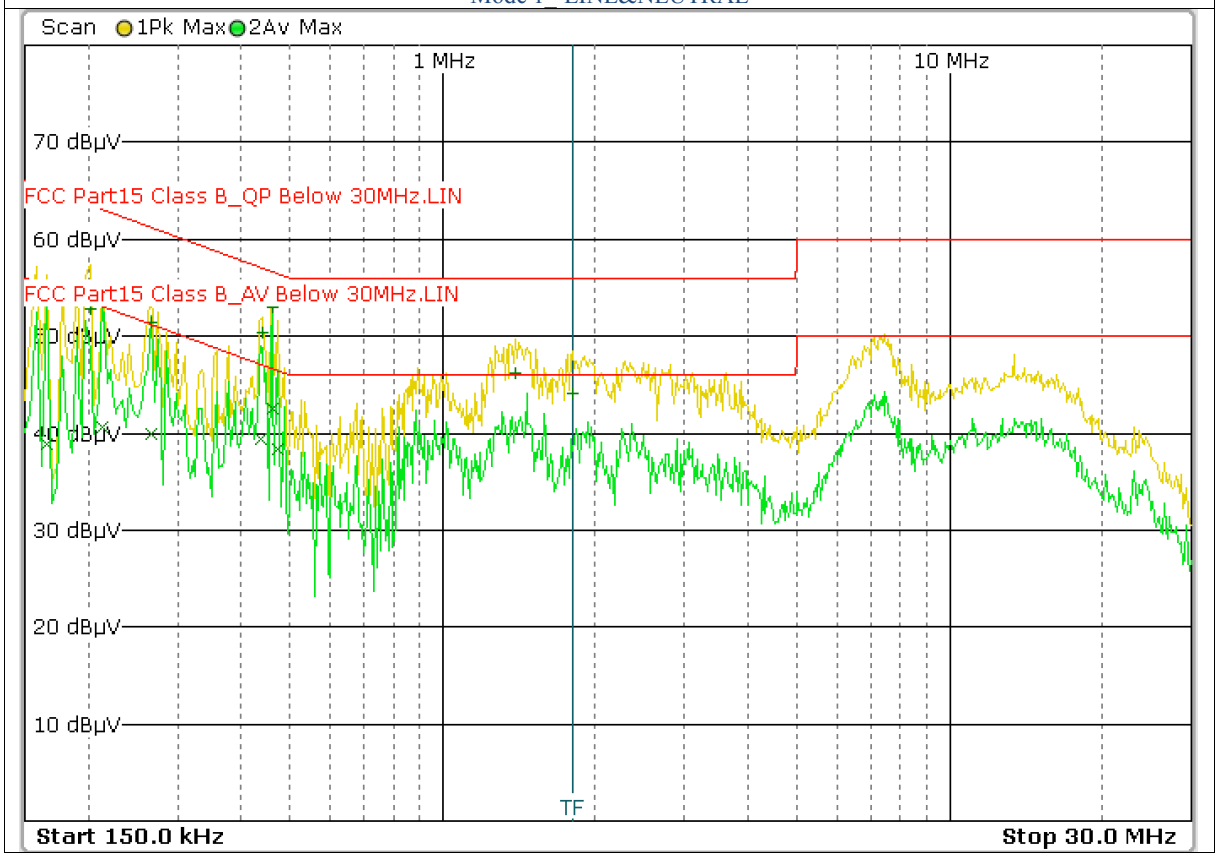
4. 6 Conducted Power Line Emission Limits

Frequency Range (MHz)	Class A QP/AV (dBuV)	Class B QP/AV (dBuV)
0.15 – 0.5	79/66	66 –56/56 –46
0.5 – 5.0	73/60	56/46
5.0 – 30	73/60	60/50

Note: In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

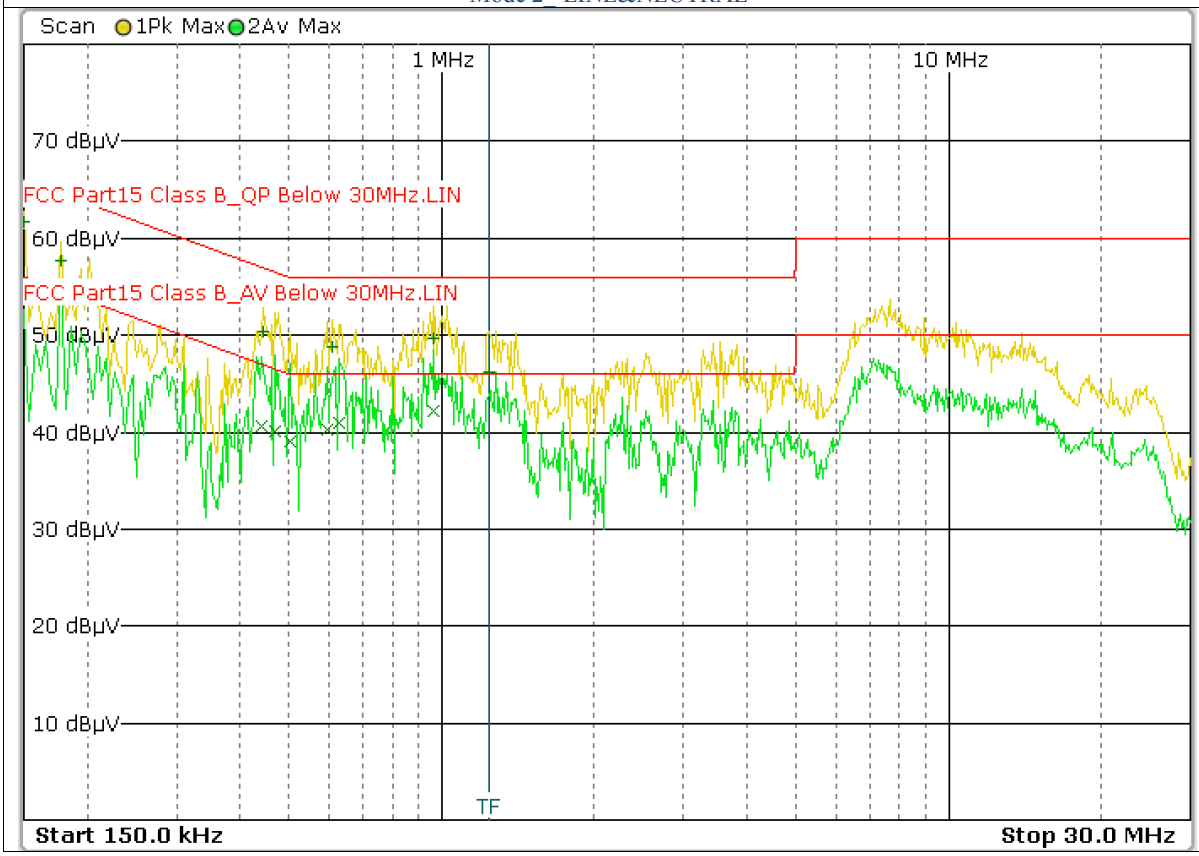
Mode 1_ LINE&NEUTRAL



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
0.166	42.49	28.59	10.30	52.79	38.89	Line	65.16	55.16	-12.37	-16.27
0.266	41.08	29.65	10.30	51.38	39.95	Line	61.24	51.24	-9.86	-11.29
0.442	40.01	29.02	10.40	50.41	39.42	Line	57.02	47.02	-6.61	-7.60
0.462	42.53	32.07	10.40	52.93	42.47	Line	56.66	46.66	-3.73	-4.19
0.474	39.22	28.20	10.40	49.62	38.6	Line	56.44	46.44	-6.82	-7.84
1.390	35.86	22.55	10.40	46.26	32.95	Line	56.00	46.00	-9.74	-13.05
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value = Emission Level - Limit Value.

Mode 2 _ LINE&NEUTRAL



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
0.150	51.47	25.35	10.30	61.77	35.65	Neutral	66.00	56.00	-4.23	-20.35
0.178	47.37	23.72	10.30	57.67	34.02	Neutral	64.58	54.58	-6.91	-20.56
0.446	40.00	30.27	10.40	50.40	40.67	Neutral	56.95	46.95	-6.55	-6.28
0.610	38.47	29.80	10.40	48.87	40.20	Neutral	56.00	46.00	-7.13	-5.80
0.996	39.24	31.77	10.40	49.64	42.17	Neutral	56.00	46.00	-6.36	-3.83
1.238	35.84	20.88	10.40	46.24	31.28	Neutral	56.00	46.00	-9.76	-14.72
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value = Emission Level - Limit Value.

5. Radiated Emission Test

5. 1 Test Equipment

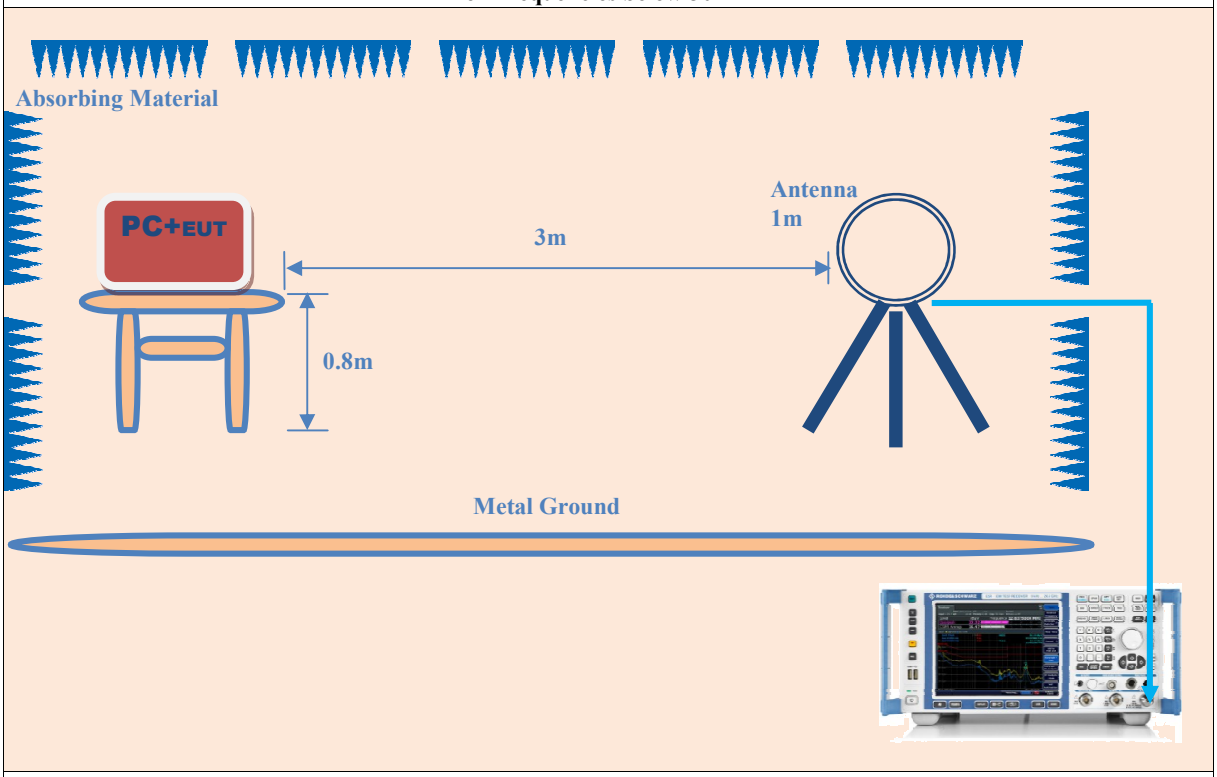
Please refer to Section 8 this report.

5. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m, and which is 1.5 m high for above 1 GHz. All set up is according to ANSI C63.4:2014 .
3. The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4:2014

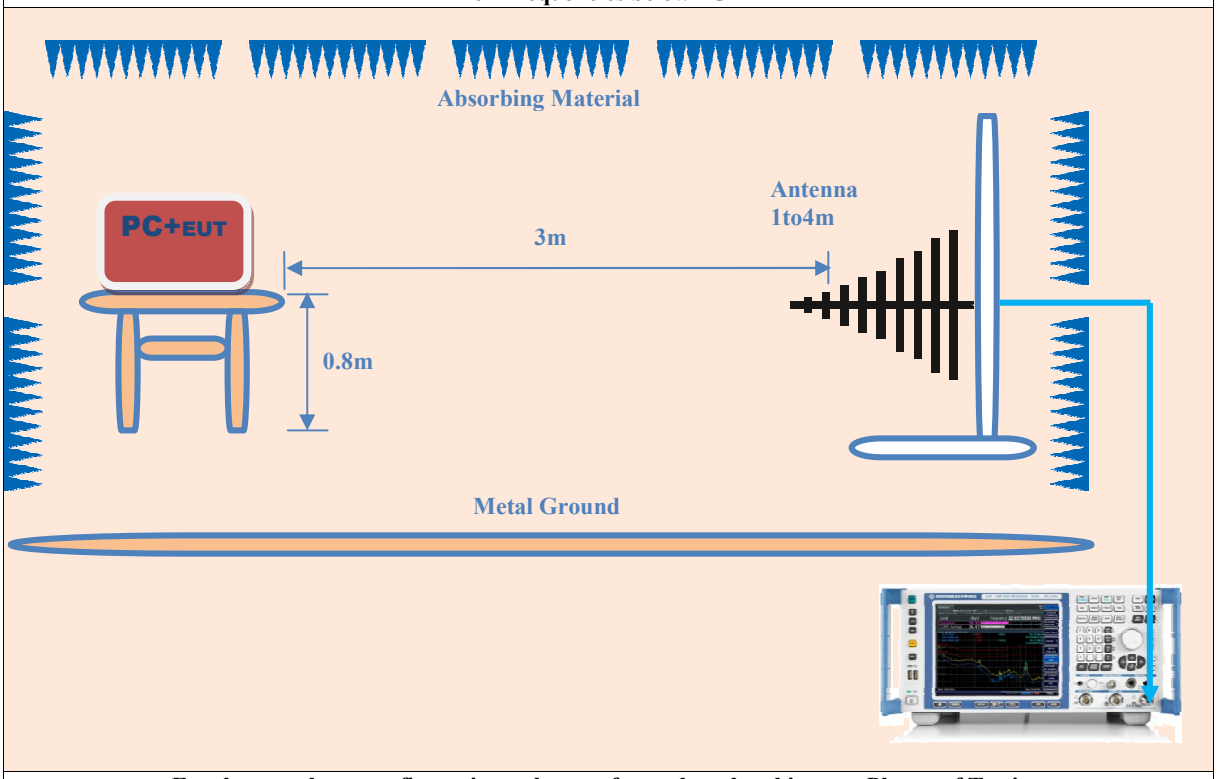
5. 3 Radiated Test Setup

For Frequencies below 30MHz



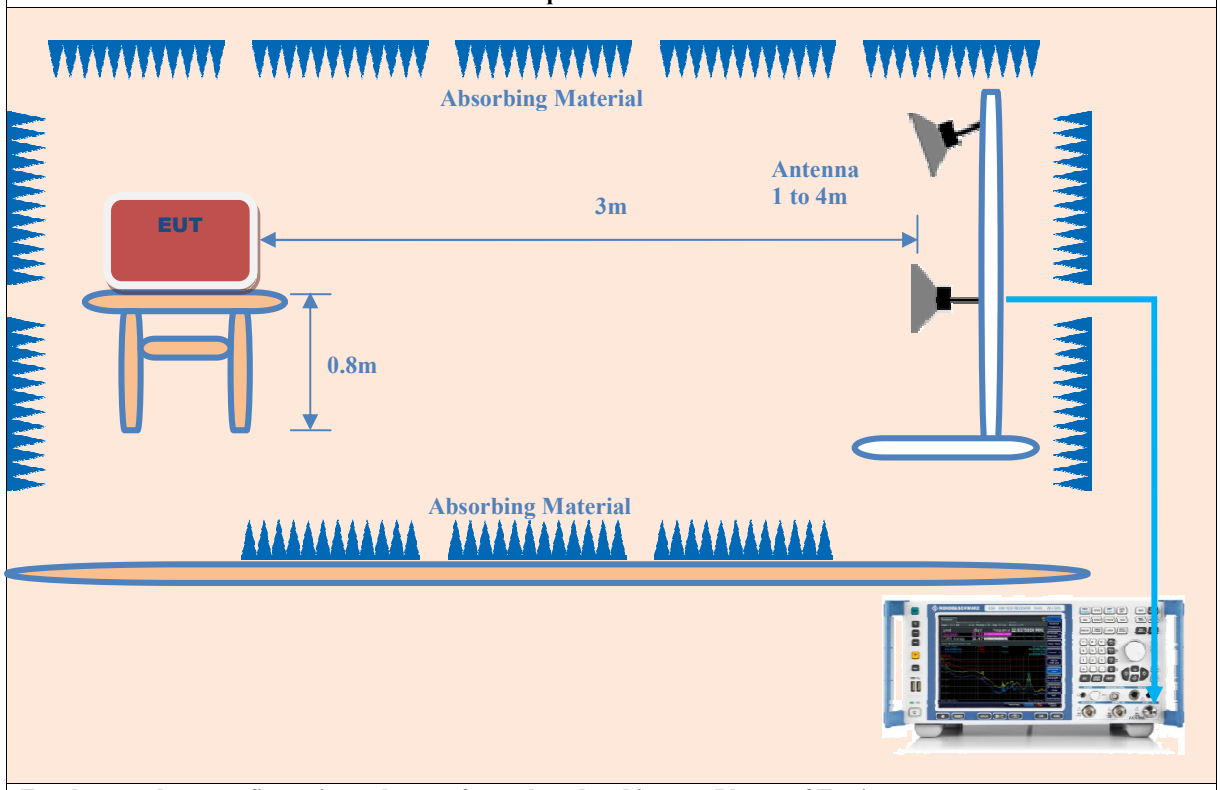
For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies below 1GHz



For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies above 1GHz



For the actual test configuration , please refer to the related items – Photos of Testing

5. 4 Configuration of The EUT

Same as section 4.4 of this report

5. 5 EUT Operating Condition

Same as section 4.5 of this report

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.109.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. The lower limit shall apply at the transition frequencies.

5. 7 Radiated Emission Test Result

For Frequency below 30MHz

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
N/A						
N/A						
N/A						
N/A						
N/A						
N/A						

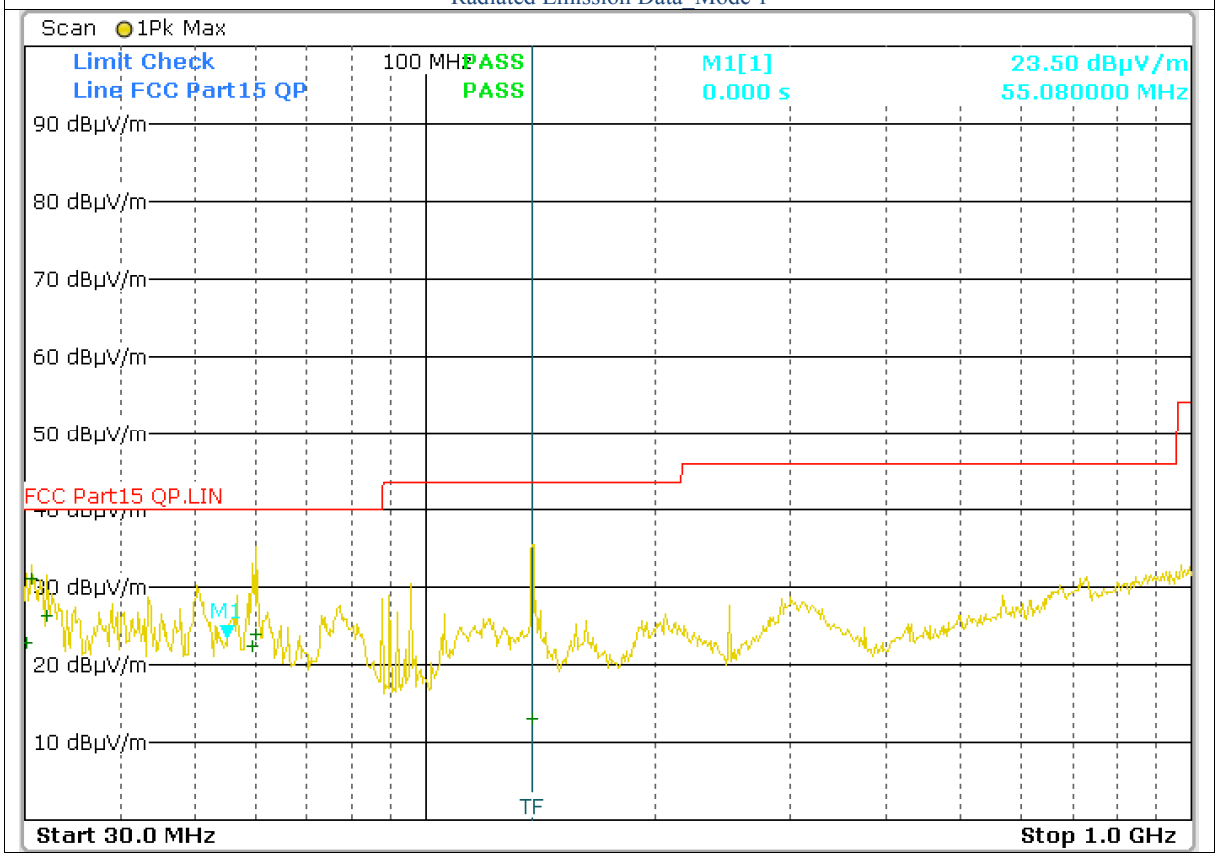
Note:
(1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency from 30MHz to 1GHz

Radiated Emission Data_Mode 1

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
55.24	9.64	10.66	20.30	Horiz./	40.0	-19.70
57.28	10.64	10.66	21.30	Horiz./	40.0	-18.70
59.96	15.29	10.66	25.95	Horiz./	40.0	-14.05
70.12	14.04	7.24	21.28	Horiz./	40.0	-18.72
888.52	2.32	22.68	25.00	Horiz./	46.0	-21.00
889.04	1.32	22.68	24.00	Horiz./	46.0	-22.00

Radiated Emission Data_Mode 1

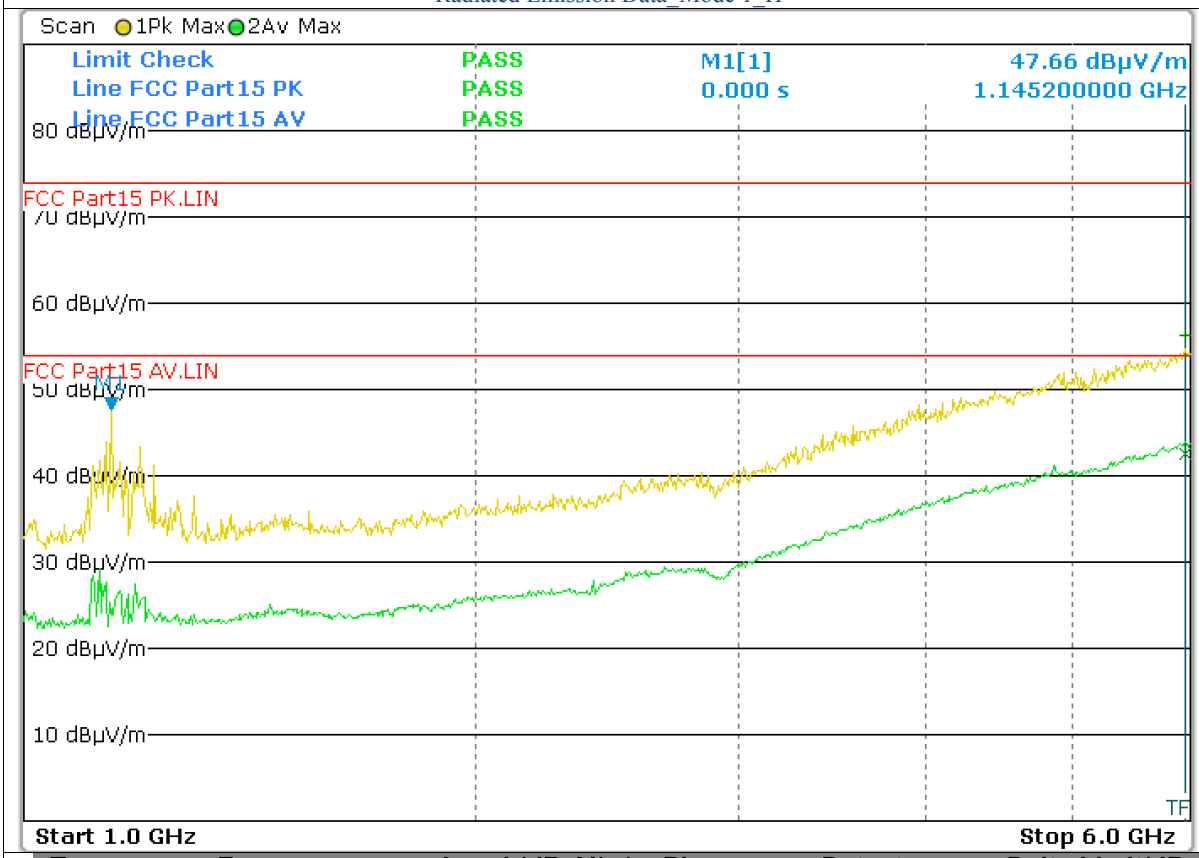


Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
30.12	10.81	12.06	22.87	Vert.	40.0	-17.13
30.64	18.99	12.06	31.05	Vert.	40.0	-8.95
32.04	14.26	12.06	26.32	Vert.	40.0	-13.68
59.44	11.83	10.66	22.49	Vert.	40.0	-17.51
60.08	15.10	8.81	23.91	Vert.	40.0	-16.09
137.88	10.28	13.83	24.11	Vert.	43.5	-19.39

Note:
(1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

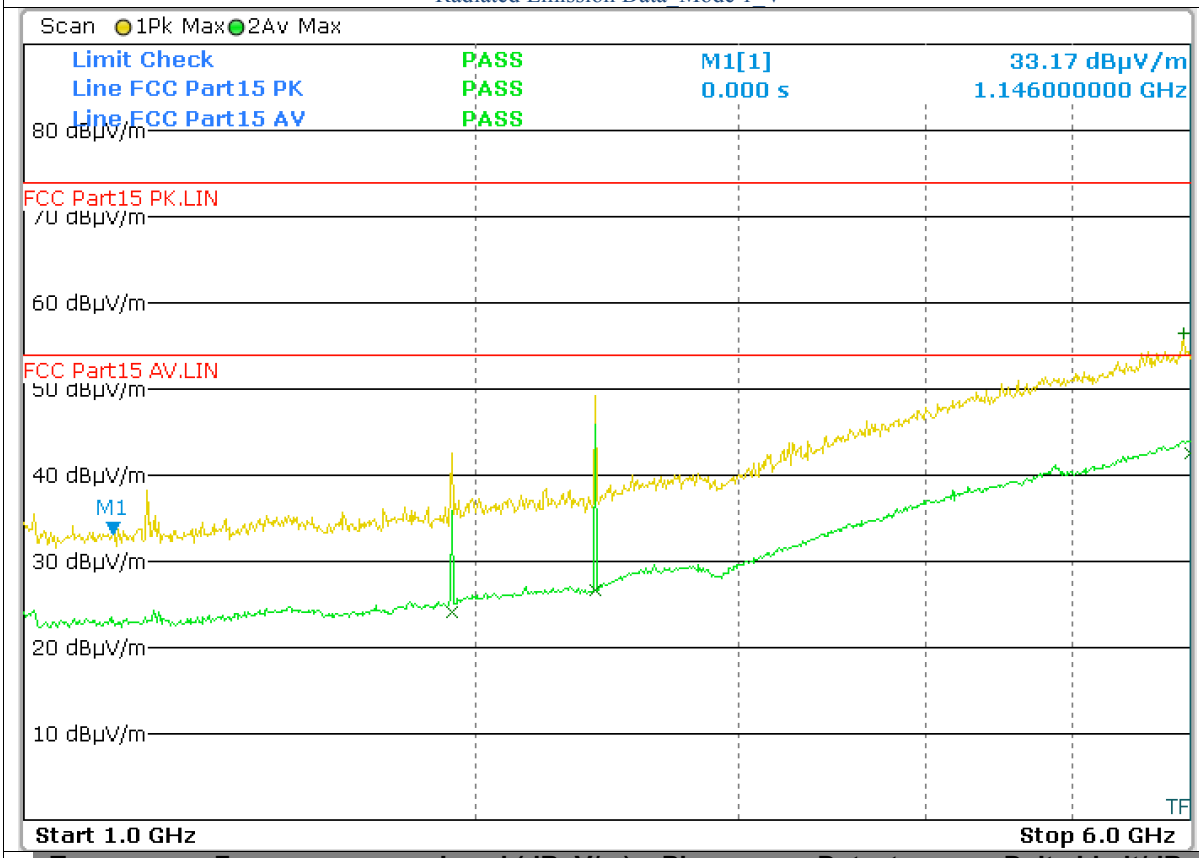
For Frequency above 1GHz

Radiated Emission Data_Mode 1_H



Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	5.953200000 GHz	42.60		Average	-11.40
1	5.955200000 GHz	56.37		Positive Peak	**-17.63**

Radiated Emission Data_Mode 1_V



Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	1.928800000 GHz	24.02		Average	-29.98
2	2.408400000 GHz	26.66		Average	-27.34
1	5.942400000 GHz	56.42		Positive Peak	-17.58
2	5.996800000 GHz	42.61		Average	-11.39

6. Photo of Testing

6.1 Emission test view

Conducted Emission test view

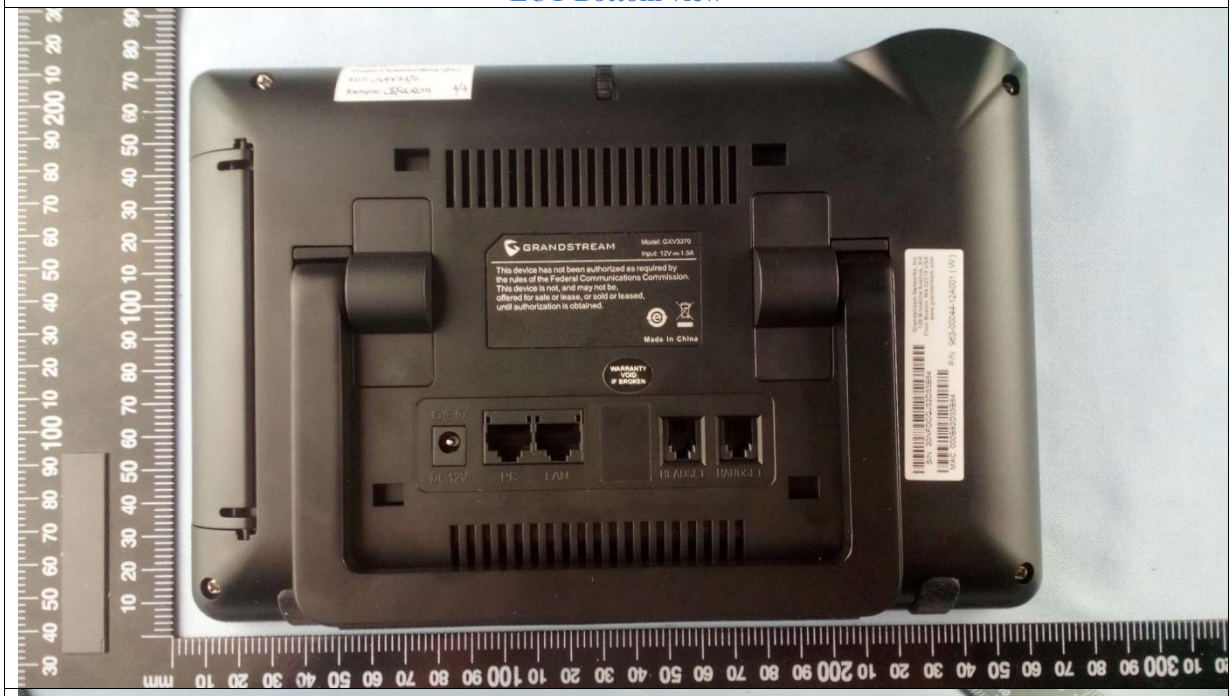
Radiated Emission test view (Frequency from 30MHz to 1GHz)

Radiated Emission test view (Frequency above 1GHz)

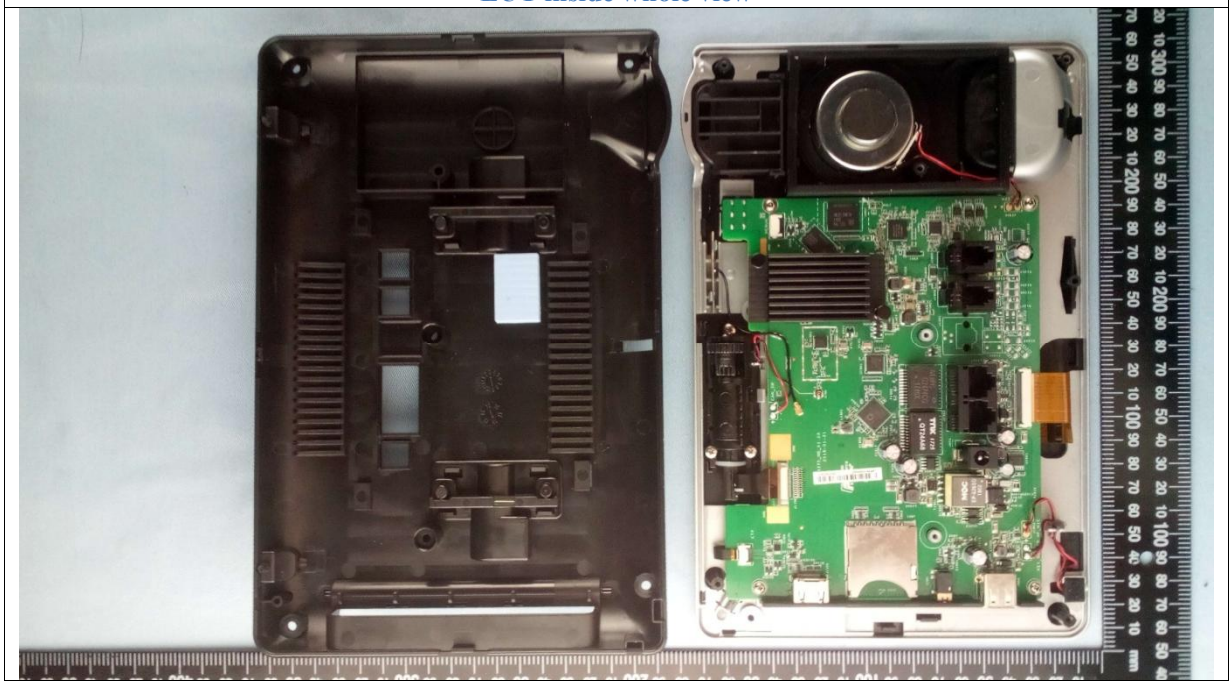
6.2 Photograph - EUT

EUT top view
EUT Top view

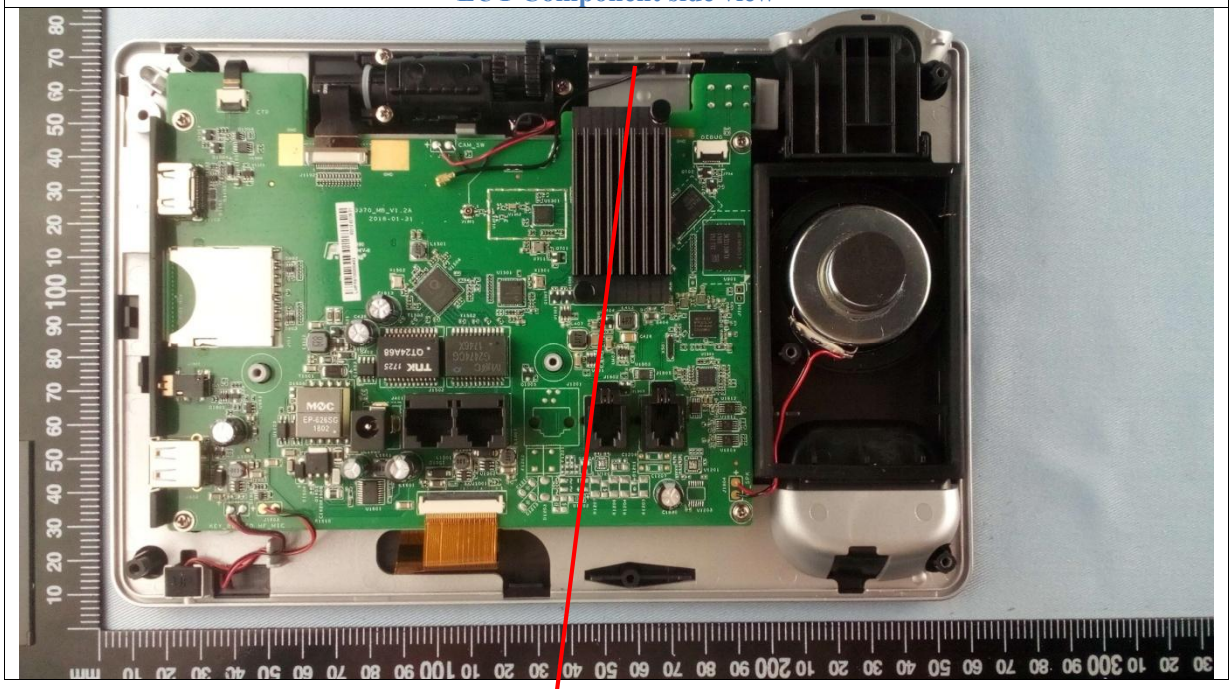
EUT Bottom view



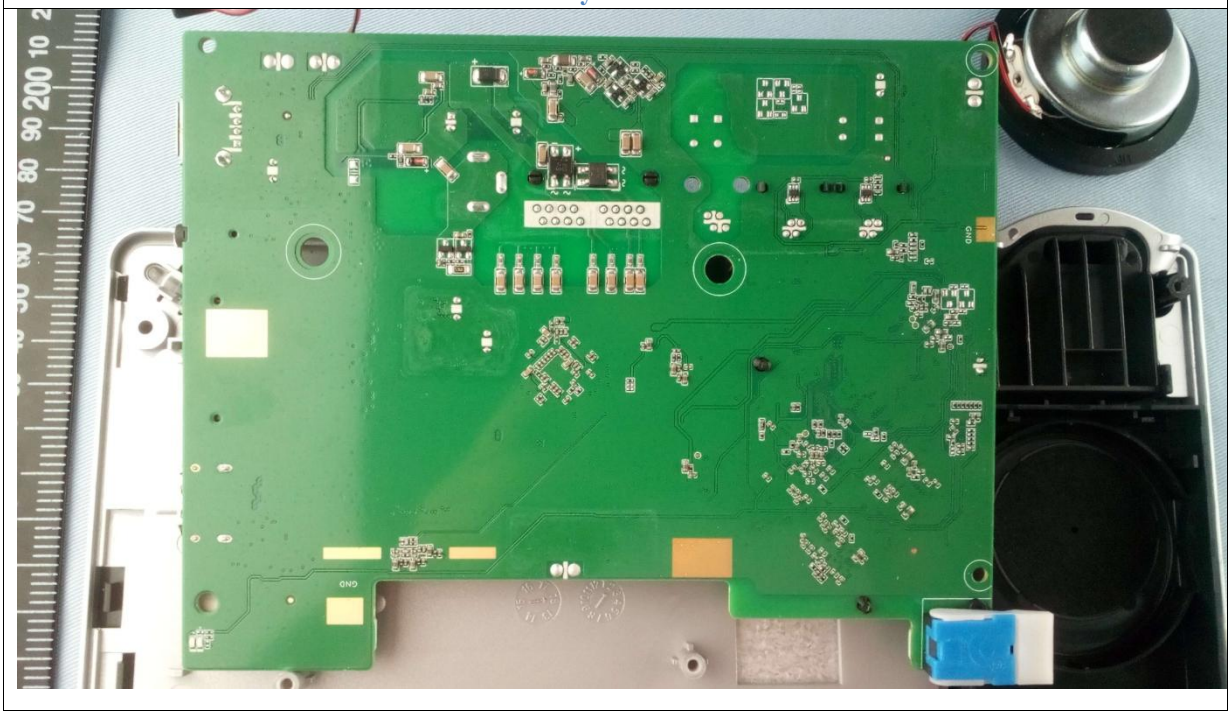
EUT inside whole view



EUT Component side view

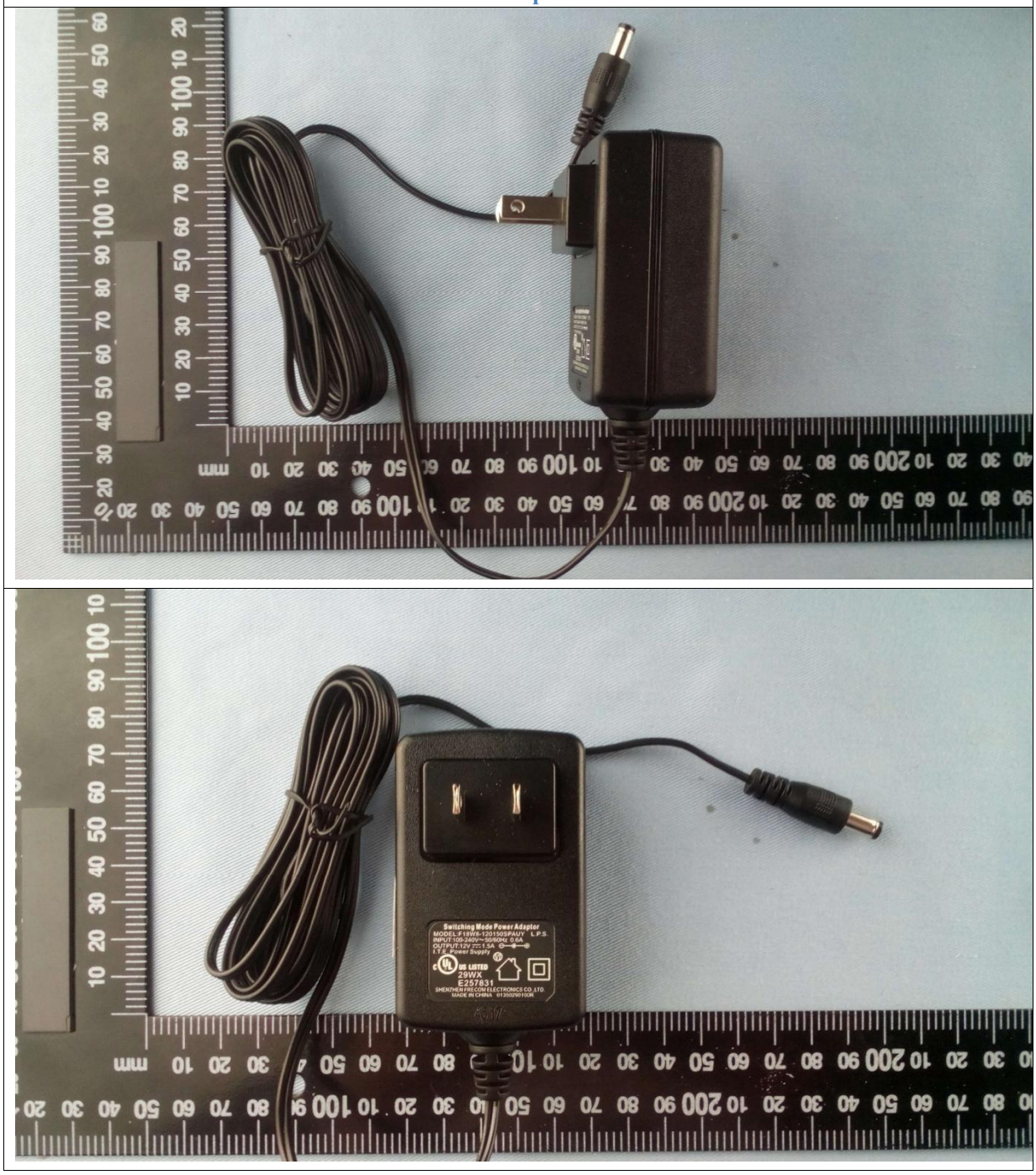


EUT Layout side view

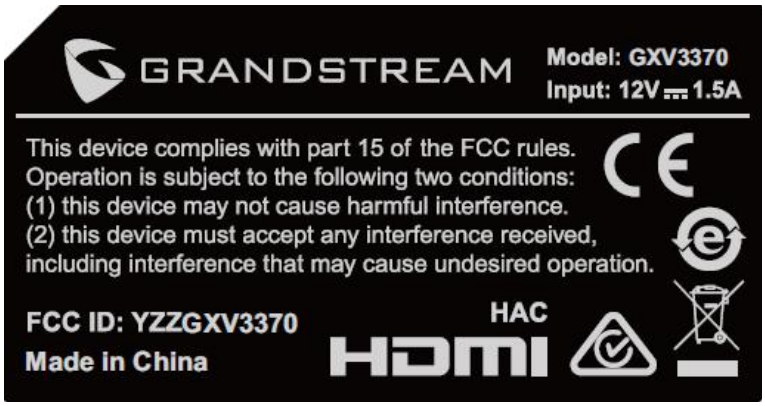


AC/DC Adapter view

AC/DC Adapter view



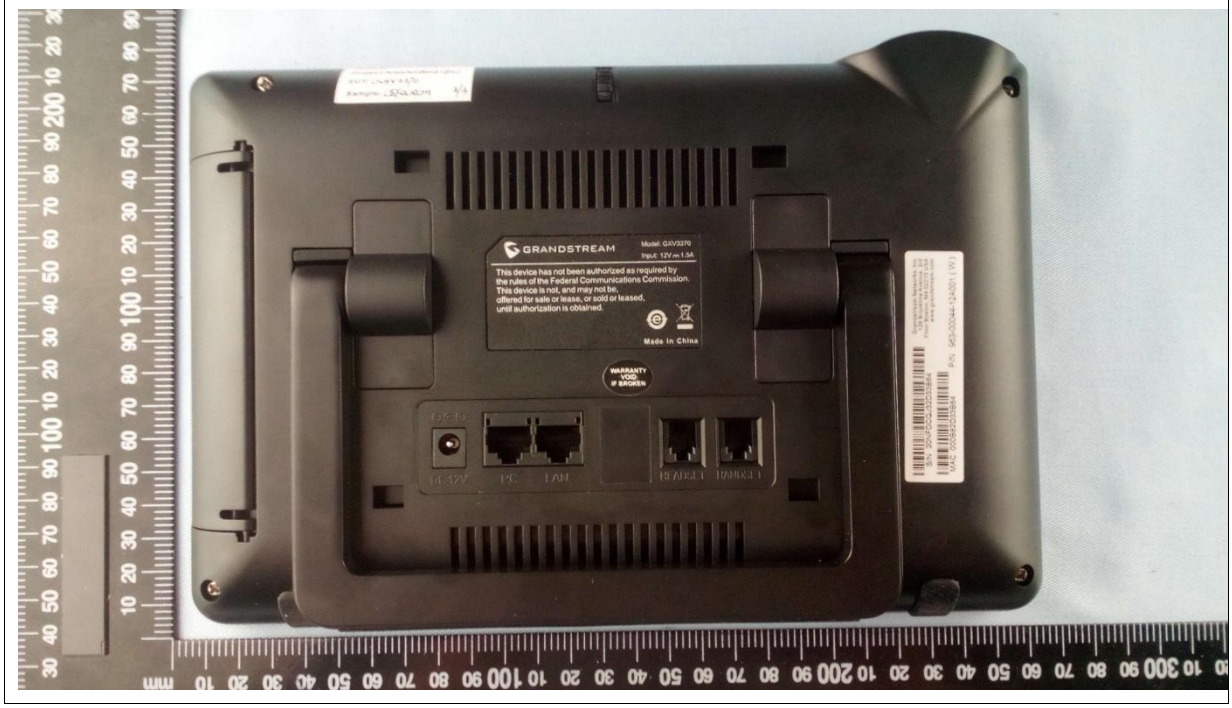
7. FCC ID Label



The following note shall be conspicuously placed in the user manual: "**Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.**"

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT



8. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	Innco systems GmbH	CT-0801	KMO-SZ114	NCR
Antenna Tower	Innco systems GmbH	MA-4640-XP-ET	KMO-SZ115	NCR
Controller	Innco systems GmbH	CO3000	KMO-SZ116	NCR
Pre-Amplifier	Agilent	87405C	KMO-SZ155	Dec.6, 2019
Pre-Amplifier	Com-Power	PAM-840	KMO-SZ156	Dec.6, 2019
Horn Antenna	SCHWARZBECK	BBHA 9170	KMO-SZ157	Dec.6, 2019
EMI Test Receiver	Rohde & Schwarz	ESR7	KMO-SZ002	Dec.6, 2018
Spectrum Analyzer	Rohde & Schwarz	FSP40	KMO-SZ003	Dec.14, 2019
Loop Antenna	Rohde & Schwarz	HFH2-Z2	KMO-SZ004	Feb.21, 2020
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	August 27, 2018
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ006	August 19, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ007	August 19, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ008	August 19, 2018
AMN	Rohde & Schwarz	ESH3-Z5	KMO-SZ009	Dec.25, 2019
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	KMO-SZ077	Dec.25, 2019
ISN	SCHWARZBECK	NTFM 8158 CAT3	KMO-SZ070	Dec.25, 2019
ISN	SCHWARZBECK	NTFM 8158 CAT5	KMO-SZ071	Dec.25, 2019
ISN	SCHWARZBECK	NTFM 8158 CAT6	KMO-SZ072	Dec.25, 2019
KMO Shielded Room	KMO	KMO-001	KMO-SZ036	NCR
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	KMO-SZ037	Sep.18, 2019
AC Power Source / Analyzer	Agilent	6813B	KMO-SZ166	July 14, 2019
AC Power Source / Analyzer	Tektronix	PA1000	KMO-SZ229	Dec.18, 2019
Power Meter	Rohde & Schwarz	OSP-B157	KMO-HK015	Dec.14, 2019
Regulatory Test System 30 MHz to 40 GHz	Rohde & Schwarz	TS8997	KMO-HK015	Dec.14, 2019
Digital Radio Communication Tester	Rohde & Schwarz	CMD60	KMO-SZ169	Dec.14, 2019
UNIVERSAL RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMU200	KMO-SZ170	Dec.14, 2019
Program Control Telephone Exchanger	Excelltel	CDX8000-M	KMO-SZ221	NCR
3m Anechoic Chamber	KMO	KMO-3AC	KMO-3AC-1	Dec.23, 2019
Temperature Chamber	TABAI	PSL-4GTW	KMO-SZ230	Feb.10, 2019