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FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.247
Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
(DTS) Digital Transmission System

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
KSZ2018031601J03	Rev.01	Initial issue of report	April 24, 2018
KSZ2018031601J03	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 1.5. 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
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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

Standard Product Specification		
Tx/Rx Frequency Range	☒2412~2462 MHz	☐2412~2472 MHz
Number of Channels	☒11	☐13
Antenna Type / Gain	Ant.1: Internal PCB Antenna with gain 3 dBi	
Type of Modulation	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64 QAM)	
Antenna Function for Transmitter	802.11 b/g/n SISO ☒Ant. 1 ☐Ant. 2 802.11n MIMO ☐Ant. 1 ☐Ant. 2	

Specification of Accessory				
☒**AC/DC Adapter #1 (US)**	**Brand Name**	Sunlight	**Model Name**	H18US1200150A
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.8A; O/P:DC 12V /1.5A		
☒**AC/DC Adapter #2 (US)**	**Brand Name**	Frecom	**Model Name**	F18W8-120150SPAUY
	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 C 15.247 FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04 FCC KDB 662911 D01 Multiple Transmitter Output v02r01. ANSI C63.10-2013
Note: 1) All test items were verified and recorded according to the standards and without any deviation during the test. 2) This EUT has also been tested and complied with the requirements of FCC 15 Part 15, Subpart B, recorded in a separate test report.

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
15.247(a)(2)	6dB Bandwidth	≥0.5MHz	PASS	Complies.
-	99% Bandwidth	-	PASS	Complies.
15.247(b)(3)	Peak Output Power	≤ 30dBm	PASS	Complies.
15.247(e)	Power Spectral Density	≤8dBm/3kHz	PASS	Complies.
15.247(d)	Conducted Band Edges and Spurious Emission	≤20dBc	PASS	Complies.
15.247(d)	Radiated Band Edges and Spurious Emission	FCC 15.209(a) & 15.247(d)	PASS	Complies
15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	PASS	Complies
15.207	AC Conducted Emission	FCC15.207(a)	PASS	Complies
15.203 & 15.247(b)	Antenna Requirement	N/A	PASS	Complies
15.247(i) & 1.1307(b)(1) & 2.1091	Maximum Permissible Exposure (MPE)	< 1mW/cm^2	PASS	Complies

2. 2 Antenna Requirement

A. Regulation

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

B. Result

The EUT has one internal PCB antenna, which was permanently attached and the gain is 3 dBi, Therefore the EUT complies with Section 15.203 of the FCC rules.

2. 3 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
6 dB & 99% Bandwidth	-	5%
Peak Power	-	1.10
Peak PowerSpectral Density	-	1.10
Band EdgesMeasurement	-	1.10

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

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

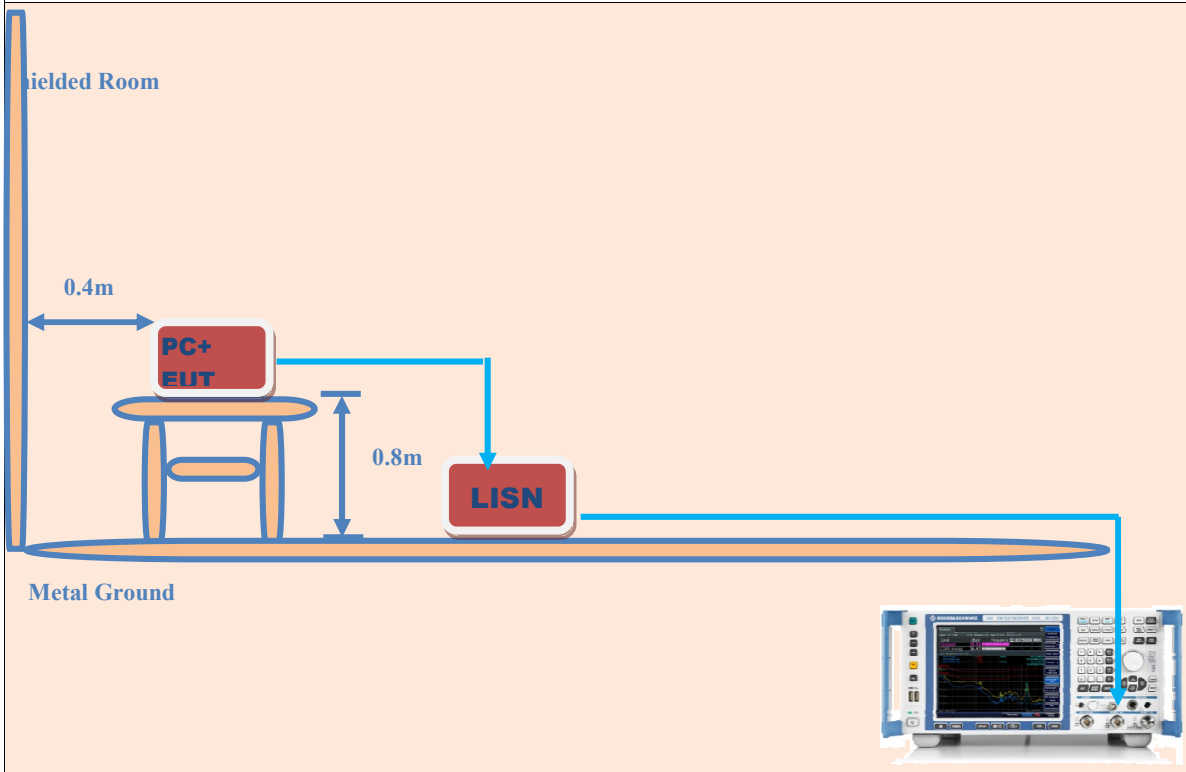
4. 1 Test Equipment

Please refer to Section 10 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 C63.10:2013 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

WiFi Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

SISO Antenna	
Modulation	**Data Rate**
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Summary Tables of Test Mode	
AC Conducted Emission	Mode 1: Bluetooth Link with Controller + WLAN Link(2.4G) + Earphone + USB Cable (Adapter #1 mode) Mode 2: Bluetooth Link with Controller + WLAN Link(2.4G) + Earphone + USB Cable (Adapter #2 mode)
Note: 1) The worst case of conducted emission is mode 2; only the worst case was reported. 2) For Radiated case, the tests were performed with Adapter #1, Controller, Earphone and USB Cable.	

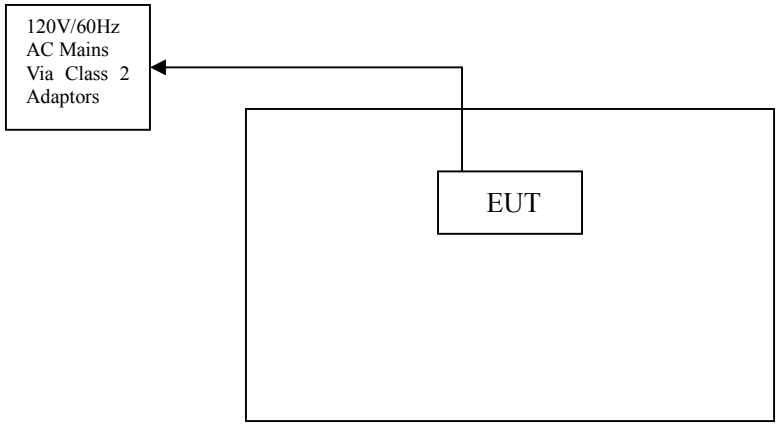
EUT Operation Test Setup
For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive. For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

Carrier Frequencies For 2.4GHz Band				
Frequency Band	**Channel No.**	**Frequency**	**Channel No.**	**Frequency**
2400-2483.5MHz	1	2412MHz	8	2447MHz
	2	2417MHz	9	2452MHz
	3	2422MHz	10	2457MHz
	4	2427MHz	11	2462MHz
	5	2432MHz	-	-
	6	2437MHz	-	-
	7	2442MHz	-	-

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

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.10:2013.
A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
c. Modulate output capacity of EUT up to specification.

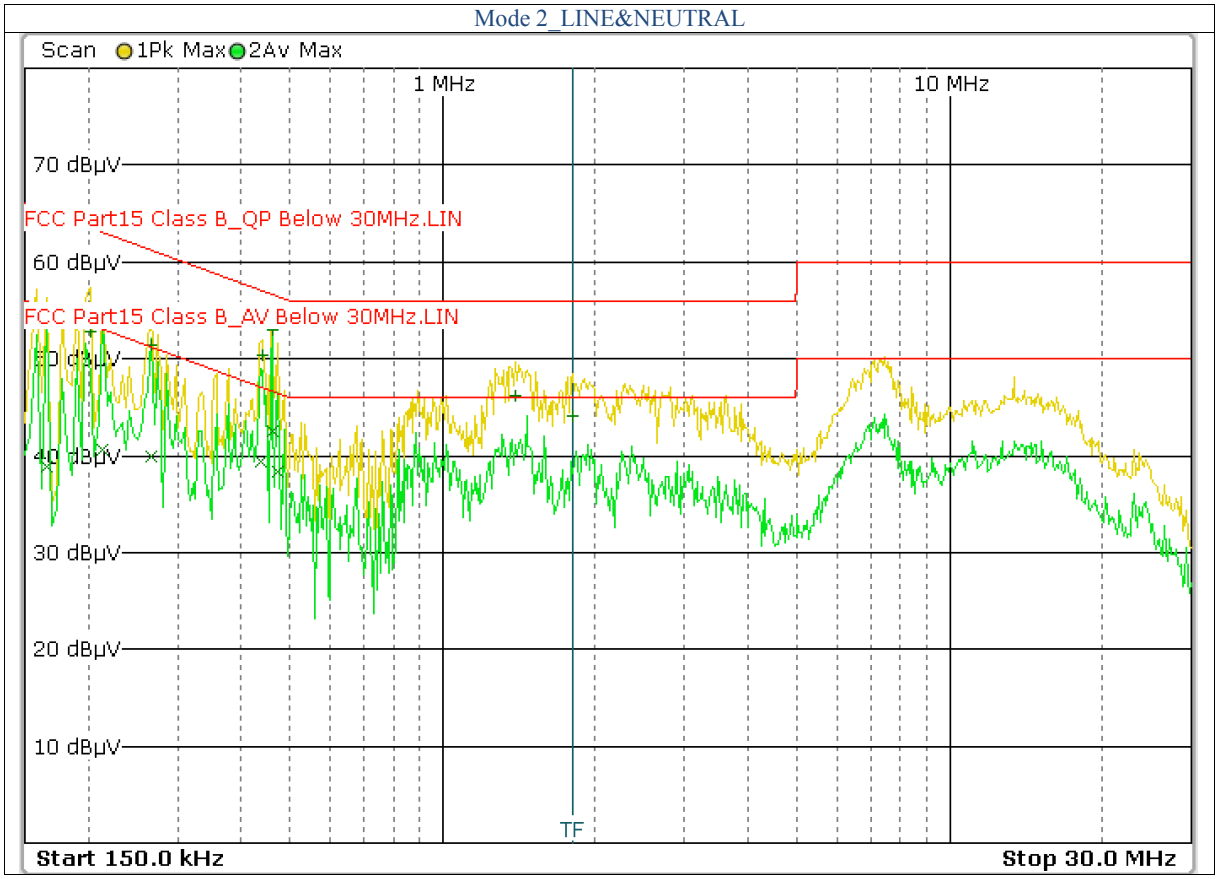


4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)	
Frequency Range (MHz)	**QP/AV**
0.15 – 0.5	66-56/56-46
0.5 – 5.0	56/46
5.0 - 30	60/50

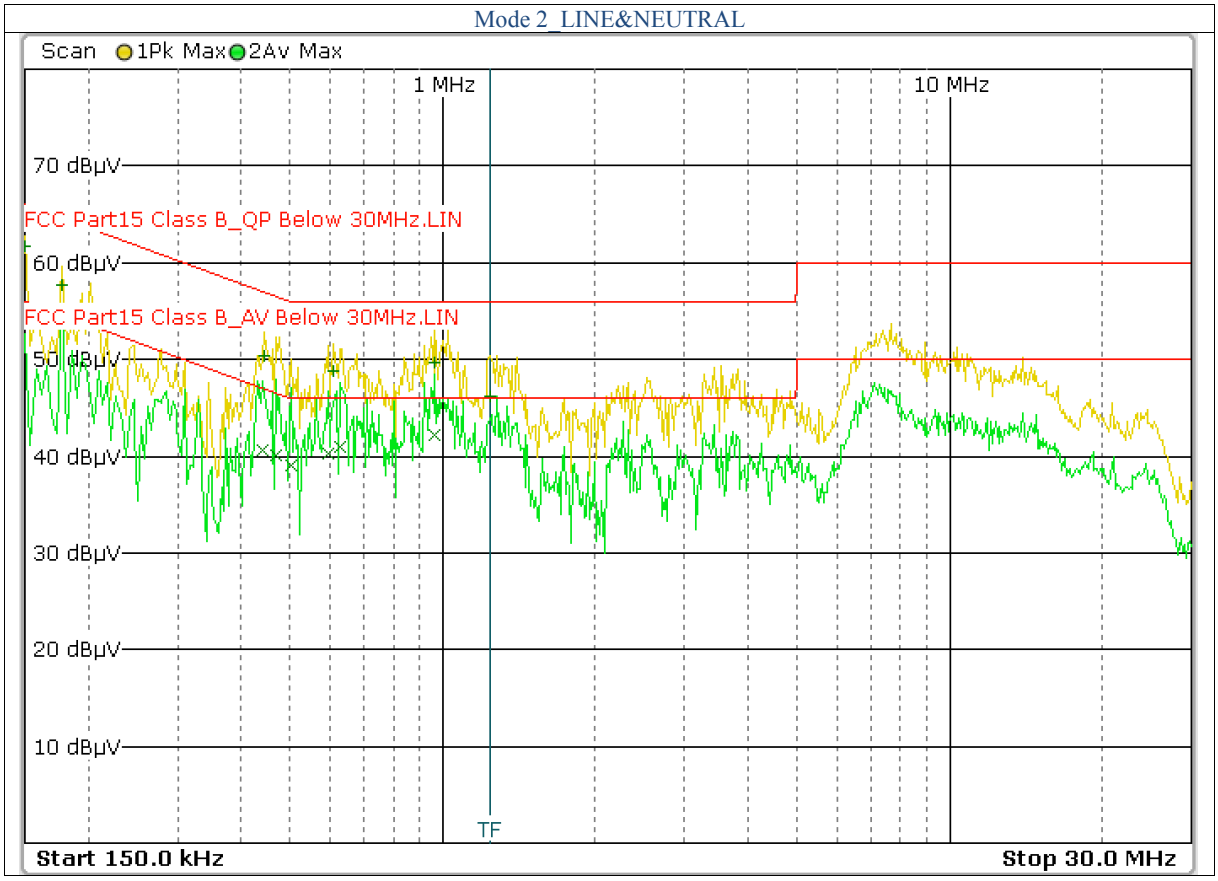
Note: In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result



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
0.202	42.49	30.37	10.30	52.79	40.67	Line	63.53	53.53	-10.74	-12.86
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
1.390	35.76	22.15	10.50	46.26	32.65	Line	56.00	46.00	-9.74	-13.35
1.810	33.74	19.72	10.40	44.14	30.12	Line	56.00	46.00	-11.86	-15.88
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.



FCC15										
Frequency (MHz)	Read Level (dBuV)		Factor (dB)	Emission (dBuV)		Line/ Neutral	Limit (dBuV)		Margin(dBuV)	
	QP	AV		QP	AV		QP	AV	QP	AV
0.150	51.47	32.35	10.30	61.77	42.65	Neutral	66.00	56.00	-4.23	-13.35
0.178	47.35	29.91	10.30	57.65	40.21	Neutral	64.58	54.58	-6.93	-14.37
0.446	40.00	30.27	10.40	50.4	40.67	Neutral	56.95	46.95	-6.55	-6.28
0.470	40.20	29.61	10.40	50.6	40.01	Neutral	56.51	46.51	-5.91	-6.50
0.610	38.47	29.80	10.40	48.87	40.20	Neutral	56.00	46.00	-7.13	-5.80
0.966	39.24	31.77	10.40	49.64	42.17	Neutral	56.00	46.00	-6.36	-3.83
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. FCC Part 15.247 Requirements for 802.11b/g/n Systems

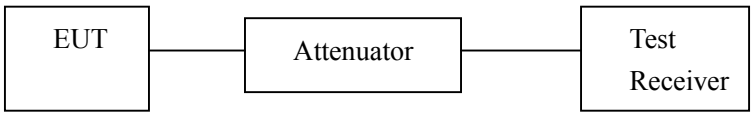
5. 1 Test Equipment

Please refer to Section 10 this report.

5. 2 Test Procedure

<table>
<tr><td>6 dB & 99% Bandwidth</td><td colspan="2">Refer to FCC 15.247(a)(2), ANSI C63.10:2013</td></tr>
<tr><td>Test Method:</td><td colspan="2">FCC KDB Publication No.558074 D01 DTS Meas Guidance v04. - 8.1 Option 1</td></tr>
<tr><td colspan="2">a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.</td><td>g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
*For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 30kHz and set the Video bandwidth (VBW) = 100kHz.</td></tr>
<tr><td>Peak Power:</td><td colspan="2">Refer to FCC 15.247(b)(3), ANSI C63.10:2013</td></tr>
<tr><td>Test Method:</td><td colspan="2">FCC KDB Publication No.558074 D01 DTS Meas Guidance v04. - 9.1.3 PKPM1 Peak power meter method</td></tr>
<tr><td colspan="3">The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.</td></tr>
<tr><td>Peak Power Spectral Density:</td><td colspan="2">Refer to FCC 15.247(e), ANSI C63.10:2013</td></tr>
<tr><td>Test Method:</td><td colspan="2">FCC KDB Publication No.558074 D01 DTS Meas Guidance v04. - 10.2 Method PKPSD</td></tr>
<tr><td colspan="2">a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.</td><td>g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.</td></tr>
<tr><td>Band Edges Measurement:</td><td colspan="2">Refer to FCC 15.247(d), ANSI C63.10:2013</td></tr>
<tr><td>Test Method:</td><td colspan="2">FCC KDB Publication No.558074 D01 DTS Meas Guidance v04.& 15.247</td></tr>
<tr><td colspan="3">a. The transmitter output was connected to the spectrum analyzer via a low lose cable.
b. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.
c. The band edges was measured and recorded.</td></tr>
</table>

5. 3 Test Setup



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 Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 ~ 928 MHz, 2400 ~ 2483.5 MHz, and 5725 ~ 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.
According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).
According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

5. 7 Test Result

A. 6 dB Bandwidth

Refer to Appendix_DTS_WiFi

B. Peak Power

Refer to Appendix_DTS_WiFi

C. Band Edges Measurement

Refer to Appendix_DTS_WiFi

D. Peak Power Spectral Density

Refer to Appendix_DTS_WiFi

6. Transmitter Spurious Radiated Emission at 3 Meters

6. 1 Test Equipment

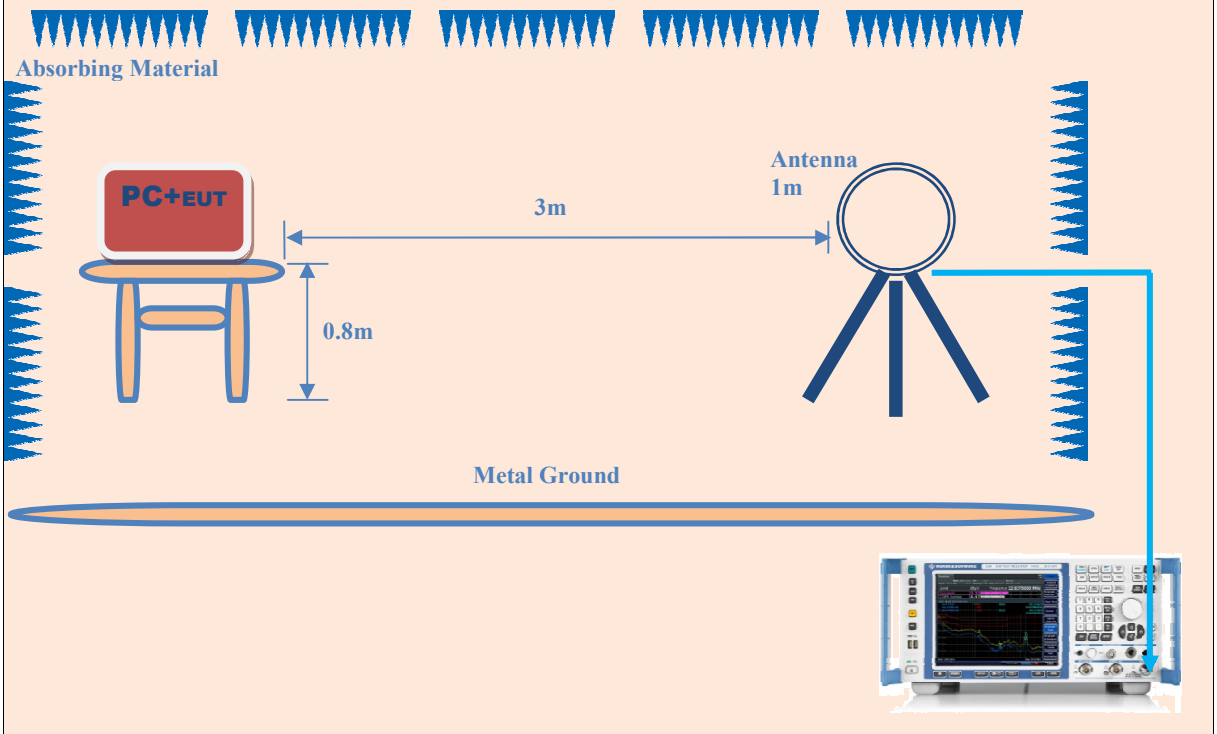
Please refer to Section 10 this report.

6. 2 Test Procedure

1. The EUT was tested according to ANSI C63.10:2013.
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 C63.10:2013 .
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. 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 C63.10:2013

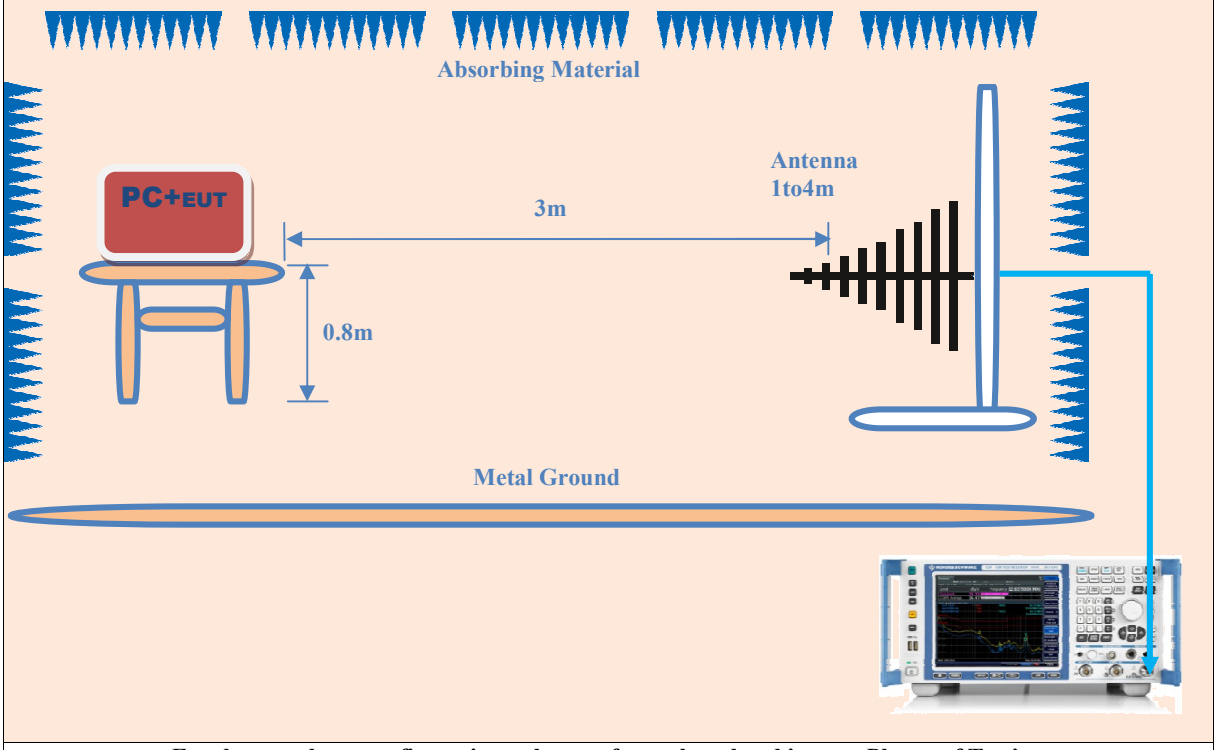
6. 3 Test Setup

For Frequencies below 30MHz



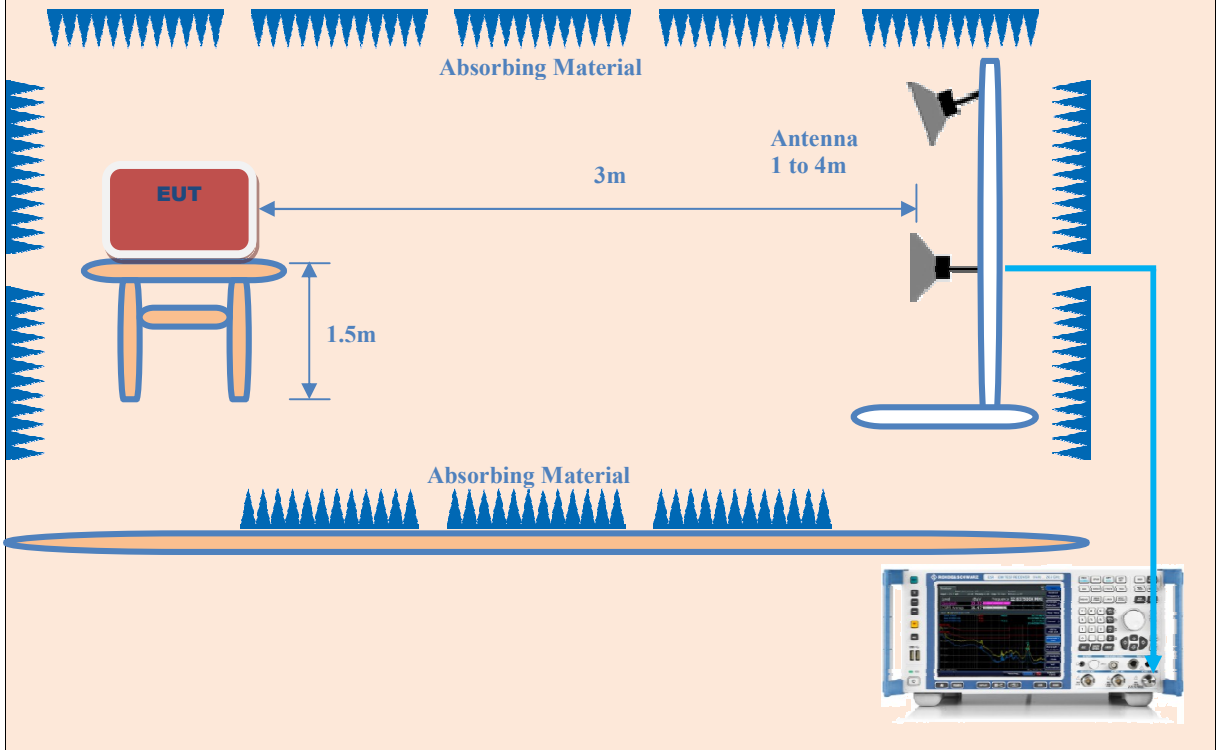
For the actual test configuration , please refer to the related items – Photos of Testing

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

6. 4 Configuration of the EUT
Same as section 4.4 of this report

6. 5 EUT Operating Condition
Same as section 4.5 of this report.

6. 6 Limit
In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in section 15.209(a), which lesser attenuation.

All other emissions inside restricted bands specified in section 15.205(a) shall not exceed the general radiated emission limits specified in section 15.209(a)

Note:
Applies to harmonics/spurious emissions that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.
47 CFR § 15.237(c): The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

FCC CFR 47, Part 15, Subpart C, Para, 15.205(a) – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1]0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41.			

[1]UntilFebruary1,1999,this restricted band shall be 0.490–0.510MHz.
[2]Above 38.6

FCC 47 CFR, Part 15.209(a) – Field Strength Limits within Restricted Frequency Bands

Frequency(MHz)	Field strength (microvolts/meter)	Measure-mentdis-tance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above960	500	3

6. 7 Test Result

Restricted Frequency Bands Data_802.11b_CH Low									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2388.462	43.75	33.22	0.90	44.65	34.12	Horiz./	74.0	54.0	-29.35	-19.88
2389.600	47.02	35.37	0.90	47.92	36.27	Vert.	74.0	54.0	-26.08	-17.73
Restricted Frequency Bands Data_802.11b_CH High									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2485.420	46.48	34.69	0.37	46.85	35.06	Horiz./	74.0	54.0	-27.15	-18.94
2486.310	49.31	38.27	0.37	49.68	38.64	Vert.	74.0	54.0	-24.32	-15.36

Restricted Frequency Bands Data_802.11g_CH Low									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2387.600	49.36	39.13	0.90	50.26	40.03	Horiz./	74.0	54.0	-23.74	-13.97
2389.200	52.78	41.96	0.90	53.68	42.86	Vert.	74.0	54.0	-20.32	-11.14
Restricted Frequency Bands Data_802.11g_CH High									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2485.130	52.00	41.48	0.37	52.37	41.85	Horiz./	74.0	54.0	-21.63	-12.15
2483.790	59.25	47.48	0.37	59.62	47.85	Vert.	74.0	54.0	-14.38	-6.15

Restricted Frequency Bands Data_802.11n HT20_CH Low									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2389.240	53.75	41.86	0.90	54.65	42.76	Horiz./	74.0	54.0	-19.35	-11.24
2389.370	58.72	47.35	0.90	59.62	48.25	Vert.	74.0	54.0	-14.38	-5.75
Restricted Frequency Bands Data_802.11n HT20_CH High									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2484.320	53.25	40.91	0.37	53.62	41.28	Horiz./	74.0	54.0	-20.38	-12.72
2483.700	61.97	49.25	0.37	62.34	49.62	Vert.	74.0	54.0	-11.66	-4.38

Restricted Frequency Bands Data_802.11n HT40_CH Low									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2388.130	45.38	35.06	0.90	46.28	35.96	Horiz./	74.0	54.0	-27.72	-18.04
2485.100	48.60	37.70	0.37	48.97	38.07	Vert.	74.0	54.0	-25.03	-15.93
Restricted Frequency Bands Data_802.11n HT40_CH High									
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2484.120	45.33	34.76	0.37	45.70	35.13	Horiz./	74.0	54.0	-28.30	-18.87
2483.500	48.24	37.58	0.37	48.61	37.95	Vert.	74.0	54.0	-25.39	-16.05

Harmonics Radiated Emission Data_802.11b_CH Low										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4824.000	31.16	-	10.10	41.26	-	Horiz./	74.0	54.0	-32.74	-
4824.000	32.55	-	10.10	42.65	-	Vert.	74.0	54.0	-31.35	-
7236.000	27.10	-	13.10	40.20	-	Horiz./	74.0	54.0	-33.80	-
7236.000	27.50	-	13.10	40.60	-	Vert.	74.0	54.0	-33.40	-
24120.00	-	-	-	-	-	-	-	-	-	-
24120.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11b_CH Mid										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4874.000	30.06	-	10.10	40.16	-	Horiz./	74.0	54.0	-33.84	-
4874.000	33.42	-	10.10	43.52	-	Vert.	74.0	54.0	-30.48	-
7311.000	27.56	-	13.10	40.66	-	Horiz./	74.0	54.0	-33.34	-
7311.000	31.28	-	13.10	44.38	-	Vert.	74.0	54.0	-29.62	-
24370.00	-	-	-	-	-	-	-	-	-	-
24370.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11b_CH Hgih										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4924.000	30.16	-	10.10	40.26	-	Horiz./	74.0	54.0	-33.74	-
4924.000	31.22	-	10.10	41.32	-	Vert.	74.0	54.0	-32.68	-
7386.000	27.47	-	13.10	40.57	-	Horiz./	74.0	54.0	-33.43	-
7386.000	28.99	-	13.10	42.09	-	Vert.	74.0	54.0	-31.91	-
24620.00	-	-	-	-	-	-	-	-	-	-
24620.00	-	-	-	-	-	-	-	-	-	-

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss - Preamp Gain.
(3) Span shall wide enough to fully capture thee mission being measured;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geqslant$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
(4) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(5)Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

Harmonics Radiated Emission Data_802.11g_CH Low										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4824.000	30.52	-	10.10	40.62	-	Horiz./	74.0	54.0	-33.38	-
4824.000	31.15	-	10.10	41.25	-	Vert.	74.0	54.0	-32.75	-
7236.000	27.02	-	13.10	40.12	-	Horiz./	74.0	54.0	-33.88	-
7236.000	28.19	-	13.10	41.29	-	Vert.	74.0	54.0	-32.71	-
24120.00	-	-	-	-	-	-	-	-	-	-
24120.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11g_CH Mid										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4874.000	30.18	-	10.10	40.28	-	Horiz./	74.0	54.0	-33.72	-
4874.000	31.54	-	10.10	41.64	-	Vert.	74.0	54.0	-32.36	-
7311.000	29.79	-	13.10	42.89	-	Horiz./	74.0	54.0	-31.11	-
7311.000	30.41	-	13.10	43.51	-	Vert.	74.0	54.0	-30.49	-
24370.00	-	-	-	-	-	-	-	-	-	-
24370.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11g_CH Hgih										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4924.000	30.02	-	10.10	40.12	-	Horiz./	74.0	54.0	-33.88	-
4924.000	31.24	-	10.10	41.34	-	Vert.	74.0	54.0	-32.66	-
7386.000	29.58	-	13.10	42.68	-	Horiz./	74.0	54.0	-31.32	-
7386.000	30.66	-	13.10	43.76	-	Vert.	74.0	54.0	-30.24	-
24620.00	-	-	-	-	-	-	-	-	-	-
24620.00	-	-	-	-	-	-	-	-	-	-

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss - Preamp Gain.
(3) Span shall wide enough to fully capture thee mission being measured;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
(4) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(5)Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

Harmonics Radiated Emission Data_802.11n HT20_CH Low										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4824.000	30.11	-	10.10	40.21	-	Horiz./	74.0	54.0	-33.79	-
4824.000	31.25	-	10.10	41.35	-	Vert.	74.0	54.0	-32.65	-
7236.000	26.92	-	13.10	40.02	-	Horiz./	74.0	54.0	-33.98	-
7236.000	27.97	-	13.10	41.07	-	Vert.	74.0	54.0	-32.93	-
24120.00	-	-	-	-	-	-	-	-	-	-
24120.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11n HT20_CH Mid										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4874.000	30.28	-	10.10	40.38	-	Horiz./	74.0	54.0	-33.62	-
4874.000	31.59	-	10.10	41.69	-	Vert.	74.0	54.0	-32.31	-
7311.000	29.21	-	13.10	42.31	-	Horiz./	74.0	54.0	-31.69	-
7311.000	31.76	-	13.10	44.86	-	Vert.	74.0	54.0	-29.14	-
24370.00	-	-	-	-	-	-	-	-	-	-
24370.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11n HT20_CH Hgih										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4924.000	30.54	-	10.10	40.64	-	Horiz./	74.0	54.0	-33.36	-
4924.000	33.49	-	10.10	43.59	-	Vert.	74.0	54.0	-30.41	-
7386.000	27.13	-	13.10	40.23	-	Horiz./	74.0	54.0	-33.77	-
7386.000	31.14	-	13.10	44.24	-	Vert.	74.0	54.0	-29.76	-
24620.00	-	-	-	-	-	-	-	-	-	-
24620.00	-	-	-	-	-	-	-	-	-	-

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss - Preamp Gain.
(3) Span shall wide enough to fully capture thee mission being measured;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
(4) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(5)Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

Harmonics Radiated Emission Data_802.11n HT40_CH Low										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4844.000	30.21	-	10.10	40.31	-	Horiz./	74.0	54.0	-33.69	-
4844.000	31.59	-	10.10	41.69	-	Vert.	74.0	54.0	-32.31	-
7266.000	28.46	-	13.10	41.56	-	Horiz./	74.0	54.0	-32.44	-
7266.000	29.75	-	13.10	42.85	-	Vert.	74.0	54.0	-31.15	-
24220.04	-	-	-	-	-	-	-	-	-	-
24220.20	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11n HT40_CH Mid										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4874.000	31.19	-	10.10	41.29	-	Horiz./	74.0	54.0	-32.71	-
4874.000	32.08	-	10.10	42.18	-	Vert.	74.0	54.0	-31.82	-
7311.000	29.21	-	13.10	42.31	-	Horiz./	74.0	54.0	-31.69	-
7311.000	30.57	-	13.10	43.67	-	Vert.	74.0	54.0	-30.33	-
24370.00	-	-	-	-	-	-	-	-	-	-
24370.00	-	-	-	-	-	-	-	-	-	-
Harmonics Radiated Emission Data_802.11n HT40_CH Hgih										
Frequency (MHz)	Read Level (dBuV) PK	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV/m) PK	Emission (dBuV/m) AV	Horiz./ Vert.	Limit (dBuV/m) PK	Limit (dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4904.000	31.03	-	10.10	41.13	-	Horiz./	74.0	54.0	-32.87	-
4904.000	32.11	-	10.10	42.21	-	Vert.	74.0	54.0	-31.79	-
7356.000	28.76	-	13.10	41.86	-	Horiz./	74.0	54.0	-32.14	-
7356.000	29.57	-	13.10	42.67	-	Vert.	74.0	54.0	-31.33	-
24520.11	-	-	-	-	-	-	-	-	-	-
24520.00	-	-	-	-	-	-	-	-	-	-

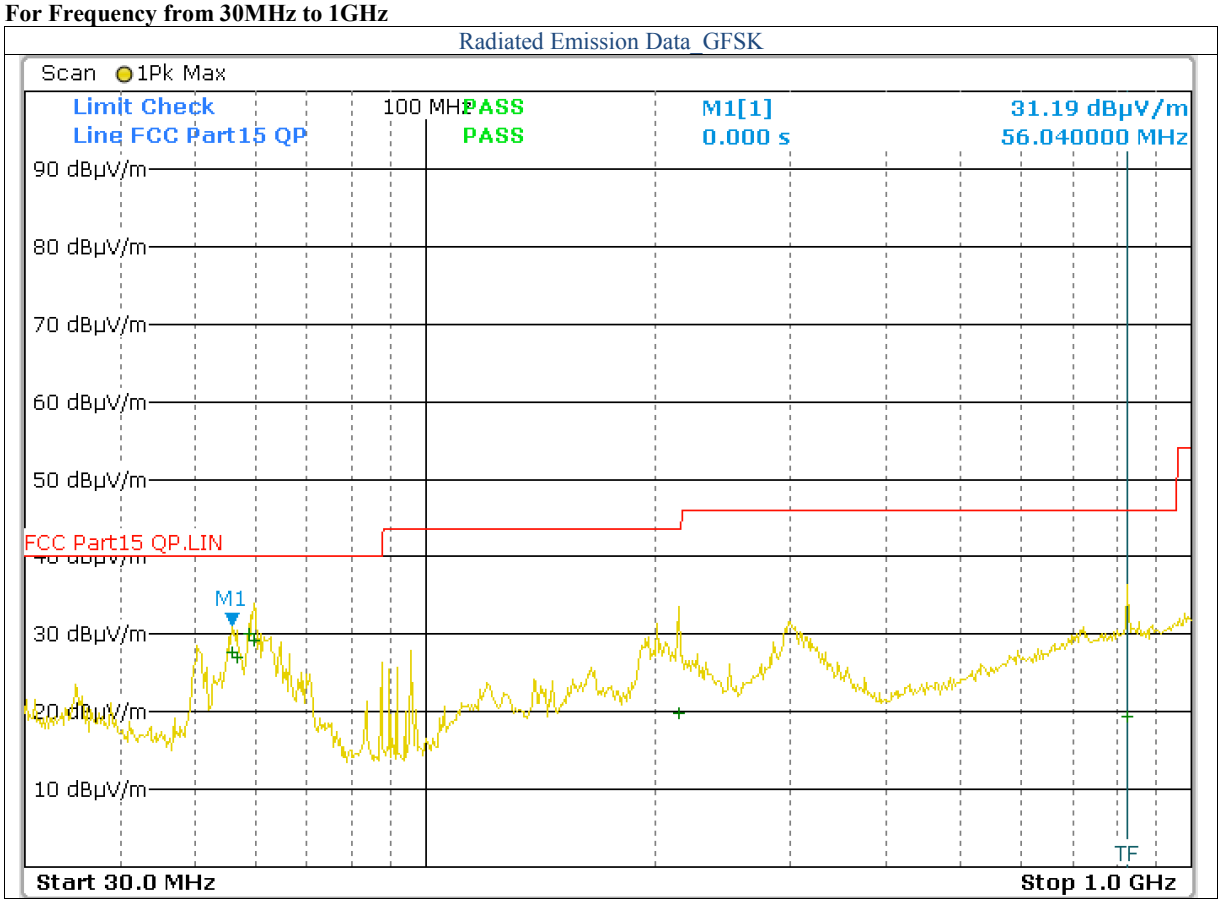
Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss - Preamp Gain.
(3) Span shall wide enough to fully capture thee mission being measured;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
(4) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(5)Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

General Radiated Emission Data
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						

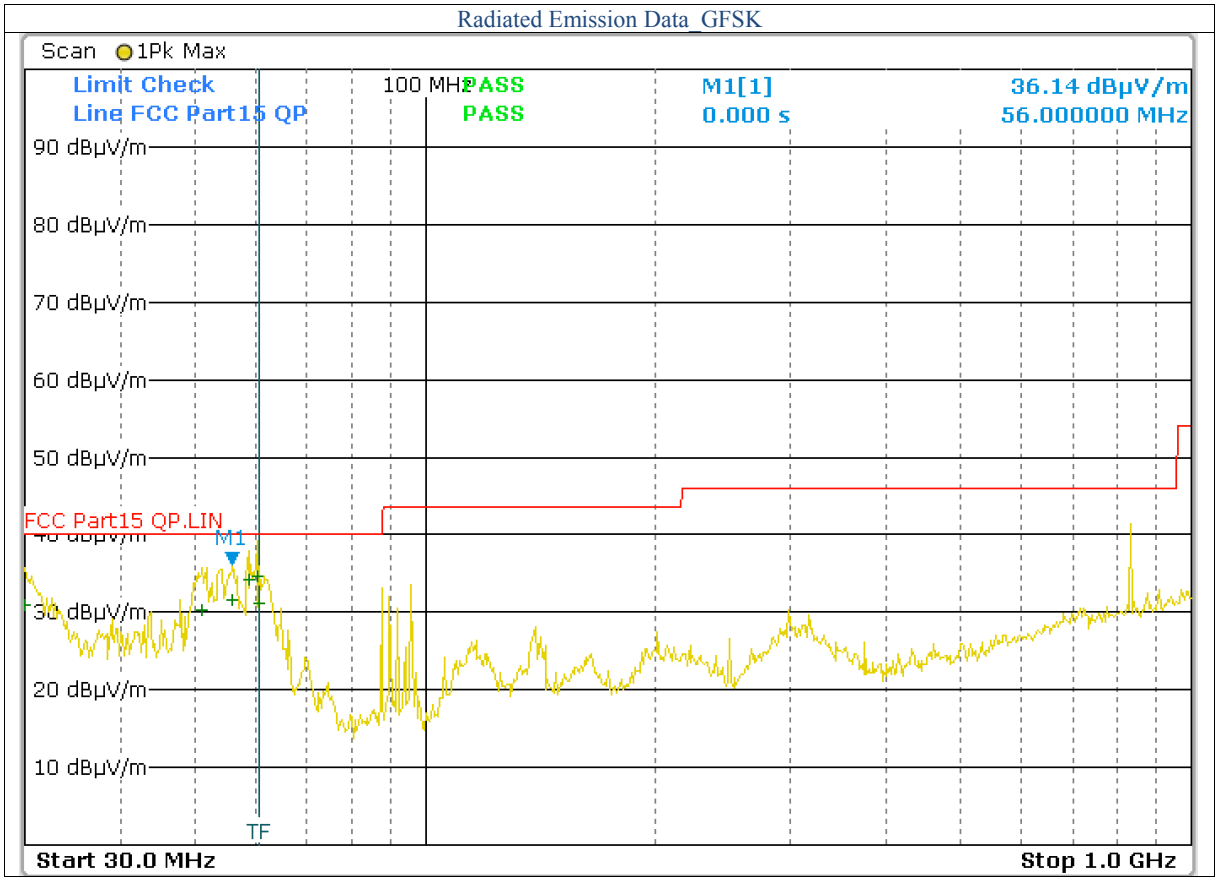
Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3)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

For Frequency from 30MHz to 1GHz



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
56.040	16.99	10.66	27.65	Horiz./	40.0	-12.35
56.600	16.27	10.66	26.93	Horiz./	40.0	-13.07
58.720	19.43	10.66	30.09	Horiz./	40.0	-9.91
59.760	18.53	10.66	29.19	Horiz./	40.0	-10.81
214.120	4.59	18.19	22.78	Horiz./	43.5	-20.72
826.400	0.81	22.68	23.49	Horiz./	46.0	-22.51

Radiated Emission Data_GFSK



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
30.000	18.80	12.06	30.86	Vert.	40.0	-9.14
51.120	19.69	10.66	30.35	Vert.	40.0	-9.65
56.000	20.99	10.66	31.65	Vert.	40.0	-8.35
58.720	23.63	10.66	34.29	Vert.	40.0	-5.71
60.240	25.93	8.81	34.74	Vert.	40.0	-5.26
60.900	22.29	8.81	31.10	Vert.	40.0	-8.90

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.

7. RF Exposure Requirements

7. 1 Limit

According to FCC 15.247(e)(i) and FCC 1.1307(b)(1), 2.1091 Systems operating under provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commissions guidelines.

TABLE1—LIMITSFORMAXIMUMPERMISSIBLEEXPOSURE(MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A)Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	*100	6
3.0–30	1842/f	4.89/f	*900/f^2	6
30–300	61.4	0.163	1.0	6
300–1,500			f/300	6
1,500–100,000			5	6
(B)Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*100	30
1.34–30	824/f	2.19/f	*180/f^2	30
30–300	27.5	0.073	0.2	30
300–1,500			f/1500	30
1,500–100,000			1.0	30

f=frequency in MHz*=Plane-wave equivalent power density

7. 2 MPE Calculation Method

The MPE was calculated at a given distance to show compliance with the power density limit.
The following formula was used to calculate the Power Density:

$$S = PG/4\pi R^2$$

S=Power density (in appropriate units, e.g. mW/cm^2)
P=Power input to the antenna
G=Power gain of the antenna relative to an isotropic radiator
R=Distance to the center of radiation of the antenna (e.g. cm)

7. 3 Test Result

Mode/Band	Maximum Antenna gain (dBi)	Maximum tune-up Conducted Power (dBm)	Evaluation Distance(cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
2412~2462MHz 802.11g_ 2437MHz	3.0	22.02	20	0.0632	1.0
2422~2452MHz 802.11n HT40_ 2437MH	3.0		20	0.0626	1.0

Note: BT and 2.4GHz or 5GHz Wi-Fi can't transmit simultaneously.

8. Photos of Testing

8. 1 EUT Test Photographs

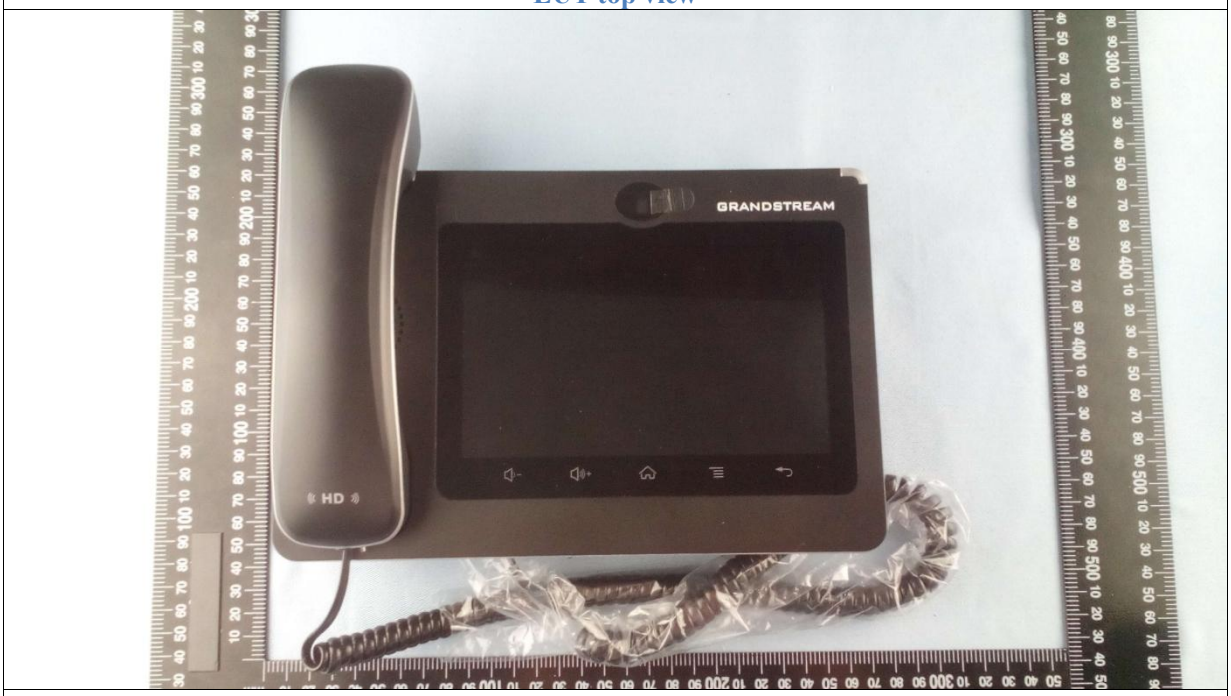
Conducted Emission test view


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


Radiated Emission test view (Frequency above 1GHz)

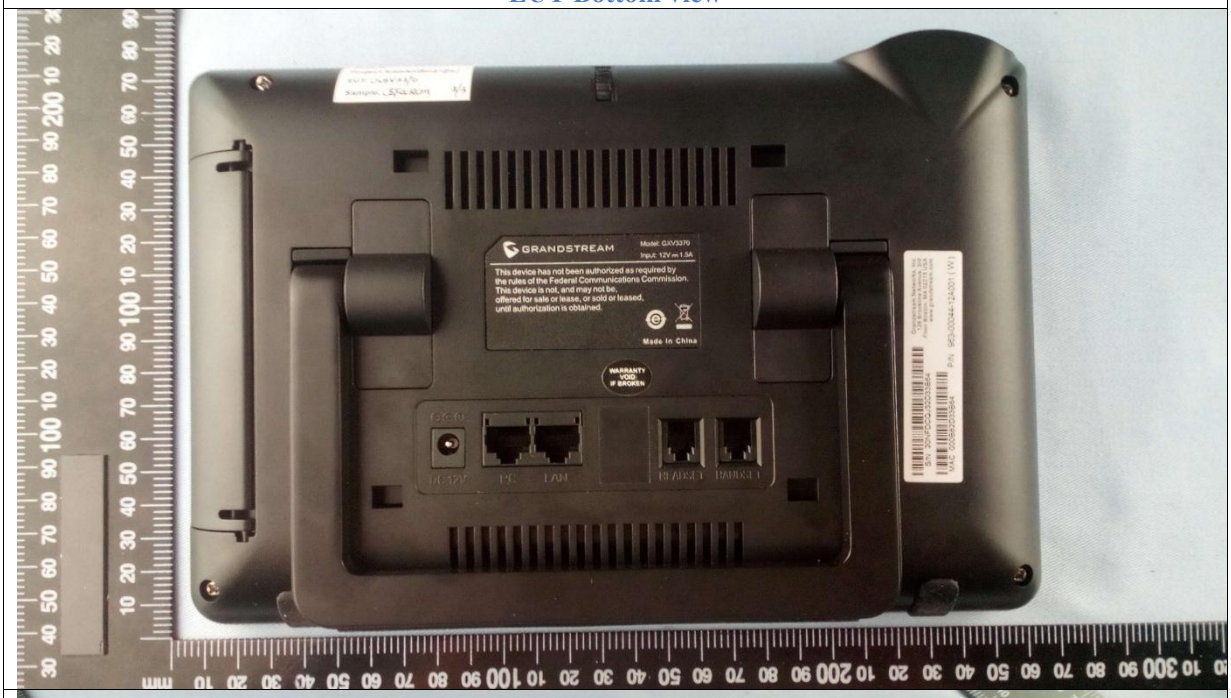

8. 2 EUT Detailed Photographs

EUT top view

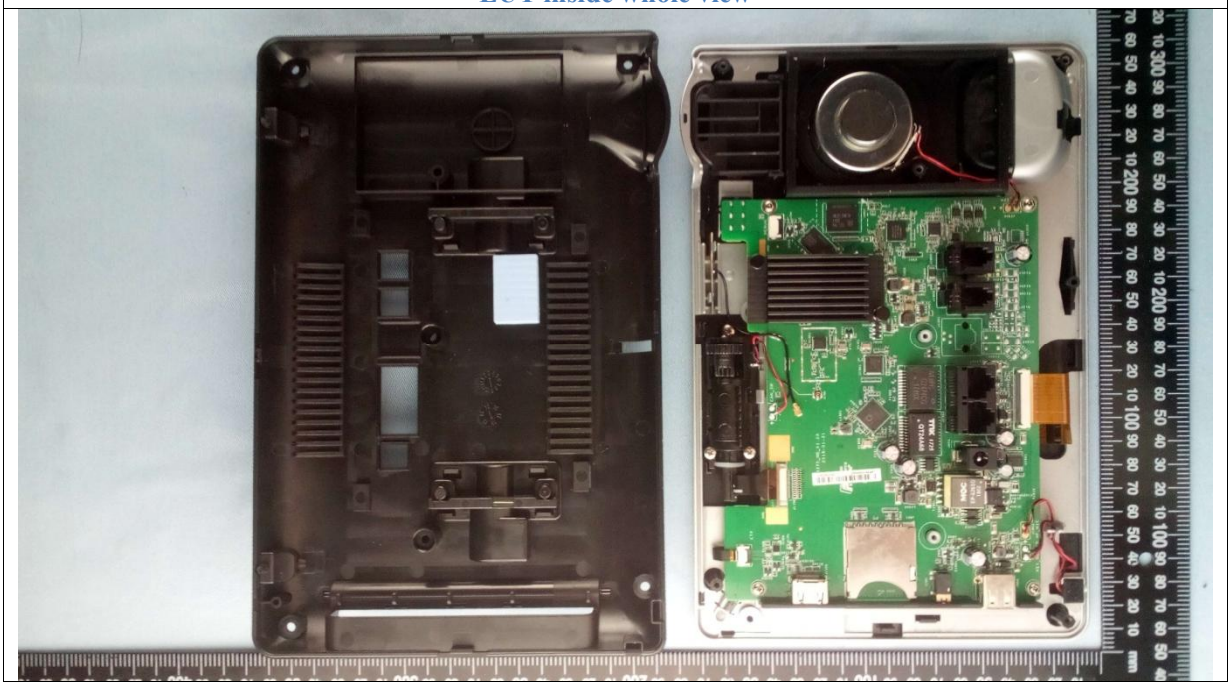


EUT Top view

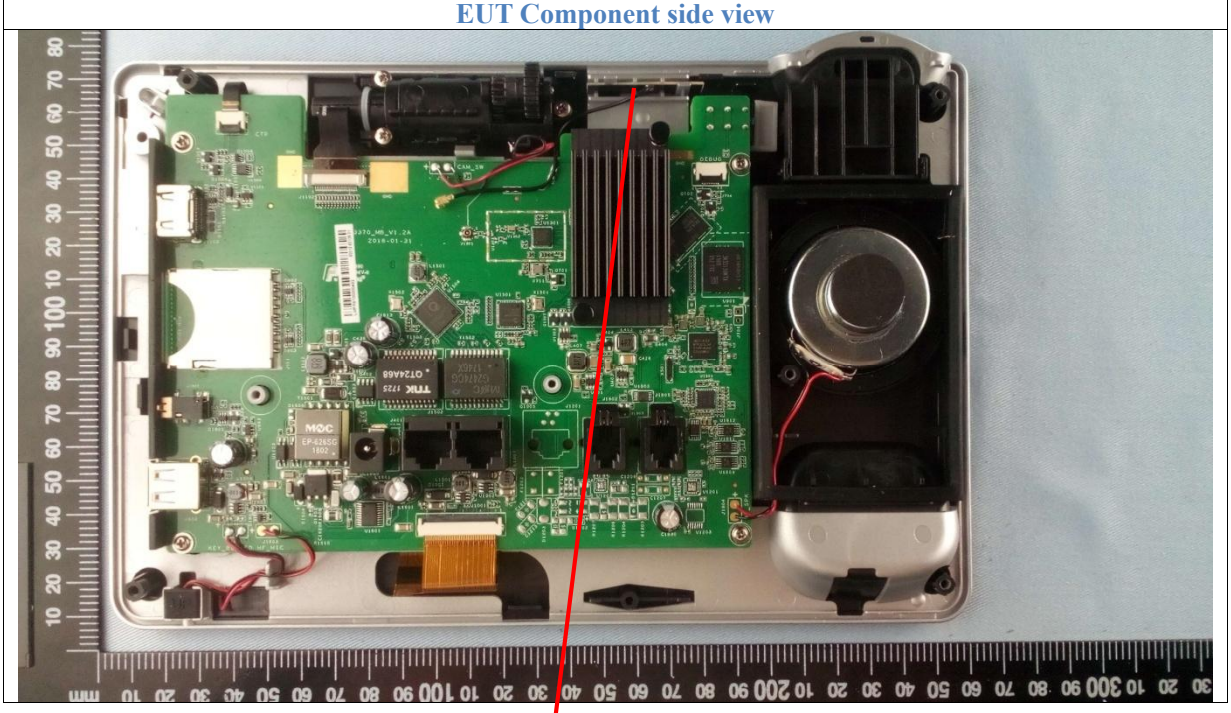
EUT Bottom view



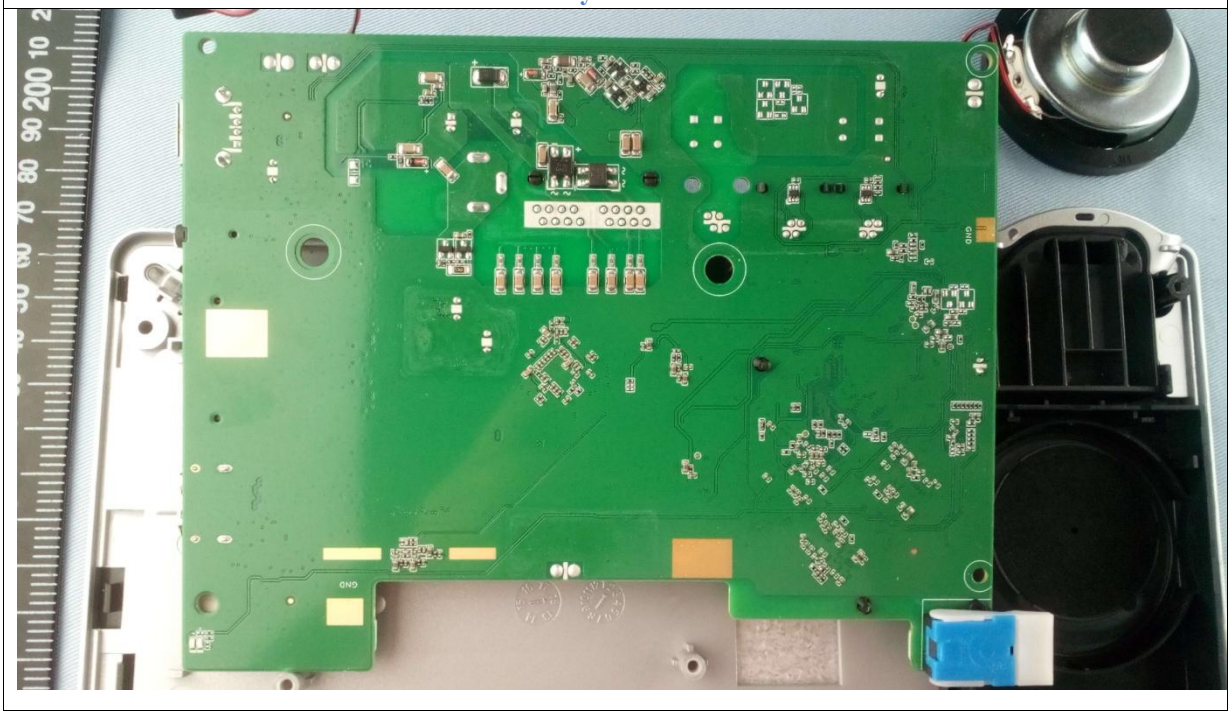
EUT inside whole view



EUT Component side view



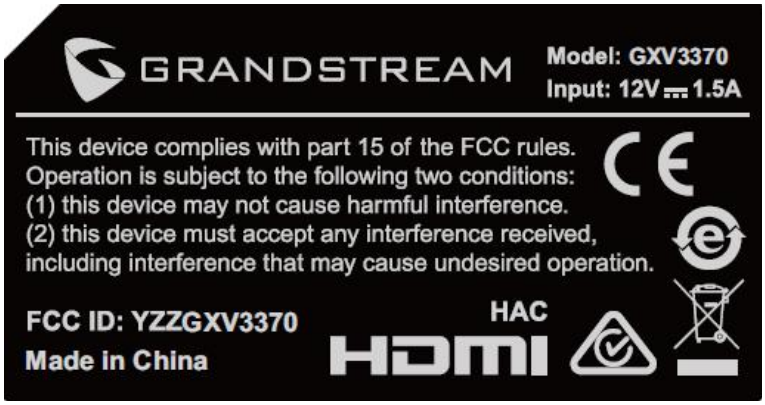
EUT Layout side view



AC/DC Adapter view

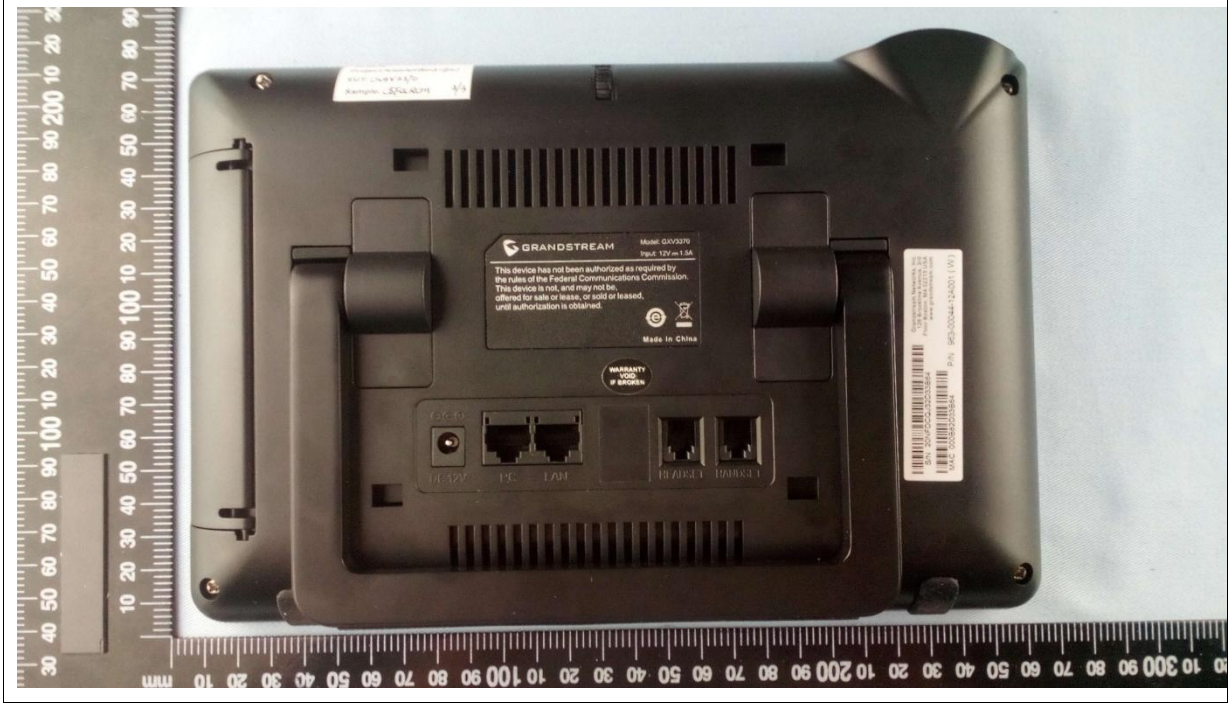
AC/DC Adapter view

9. 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 interferencethat 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


10. Test Equipment

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