RF TEST REPORT

Report No.: 18020543-FCC-R3
Supersede Report No.: N/A

Applicant	Nanjing Hanlong Technology Co., Ltd.
Product Name	IP PHONE
Main Model	UC912E
Serial Model	N/A
Test Standard	FCC Part 15.247: 2017, ANSI C63.10: 2013
Test Date	May 29 to June 30, 2018
Issue Date	August 8, 2018
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

peter Wei	Amos. Xia	
Peter Wei **Test Engineer**	**Amos Xia** **Engineer Reviewer**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
SIEMIC (Nanjing-China) Laboratories
2-1 Longcang Avenue Yuhua Economic and
Technology Development Park, Nanjing, China
Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email: China@siemic.com.cn

Laboratories Introduction

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Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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CONTENTS

1. REPORT REVISION HISTORY 5

2. CUSTOMER INFORMATION 5

3. TEST SITE INFORMATION 5

4. EQUIPMENT UNDER TEST (EUT) INFORMATION 6

5. TEST SUMMARY 8

6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS 9

6.1 RF EXPOSURE 9

6.2 ANTENNA REQUIREMENT 10

6.3 DTS (6 DB) CHANNEL BANDWIDTH 11

6.4 MAXIMUM OUTPUT POWER 13

6.5 POWER SPECTRAL DENSITY 15

6.6 BAND-EDGE & UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS 17

6.7 AC POWER LINE CONDUCTED EMISSIONS 19

6.8 RADIATED EMISSIONS 27

ANNEX A. TEST INSTRUMENT 32

ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS 33

ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT 42

ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST 45

ANNEX E. DECLARATION OF SIMILARITY 46

1. Report Revision History

Report No.	Report Version	Description	Issue Date
18020543-FCC-R3	NONE	Original	August 8, 2018

2. Customer information

Applicant Name	Nanjing Hanlong Technology Co., Ltd.
Applicant Add	5th Floor, 1st Building, Huashen Tech Park, 10 Huashen Temple, Yuhuatai Dis, Nanjing China
Manufacturer	Nanjing Hanlong Technology Co., Ltd.
Manufacturer Add	5th Floor, 1st Building, Huashen Tech Park, 10 Huashen Temple, Yuhuatai Dis, Nanjing China

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic andTechnology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMC

4. Equipment under Test (EUT) Information

Description of EUT:	IP PHONE
Main Model:	UC912E
Serial Model:	N/A
Date EUT received:	May 21, 2018
Test Date(s):	May 29 to June 30, 2018
Output Max power	0.66 dBm
Antenna Gain:	BLE: 3.8 dBi
Type of Modulation:	BLE: GFSK
RF Operating Frequency (ies):	BLE: 2402-2480 MHz
Number of Channels:	BLE: 40CH
Port:	Power Port, Internet Port, PC Port, Earphone Port, Phone Port
Input Power:	AC Adapter: MODEL: RD0501200-C55-KOG INPUT: 100-240V~50/60Hz 250mA OUTPUT: DC 5V 1.2A POE: DC48V 500 mA
Trade Name :	Htek
FCC ID:	2ACUGUC912ESERIAL

Operating channel list

Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.247 (i), §2.1091	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	DTS (6 dB) CHANNEL BANDWIDTH	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Test Item	Description	Uncertainty
Radiated Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	3.952dB

6. Measurements, Examination And Derived Results

6.1 RF Exposure

The EUT is a mobile device, thus requires RF exposure evaluation;
Please refer to SIEMIC RF Exposure Report: 18020543-FCC-H1.

6.2 Antenna Requirement

Applicable Standard

According to § 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 this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

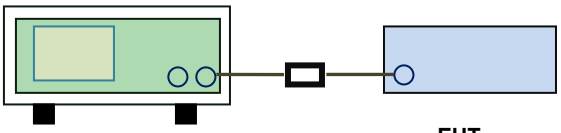
The EUT has 1 antenna:
A permanently attached antenna for BT/WIFI/BLE, the gain is 3.8 dBi .

Antenna must be permanently attached to the unit ,it meets up with the ANTENNA REQUIREMENT.

Result: Compliant.

6.3 DTS (6 dB) Channel Bandwidth

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	June 30, 2018
Tested By :	Peter Wei

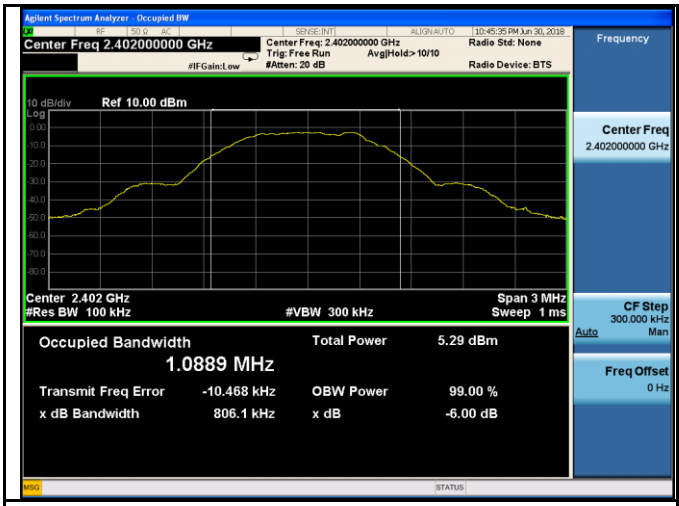
Spec	Item	Requirement	Applicable
§ 15.247(a)(2) RSSGen (4.6.1)	a)	6dB BW≥500kHz;	☑
	b)	20dB BW: For FCC reference only; required by IC.	N/A
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance V04, 8.1 DTS bandwidth 6dB Emission bandwidth measurement procedure - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 3 x RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. 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.		
Remark			
Result	☑ Pass ☐ Fail		
Test Data	☑ Yes ☐ N/A		
Test Plot	☑ Yes (See below) ☐ N/A		

6dB Bandwidth measurement result

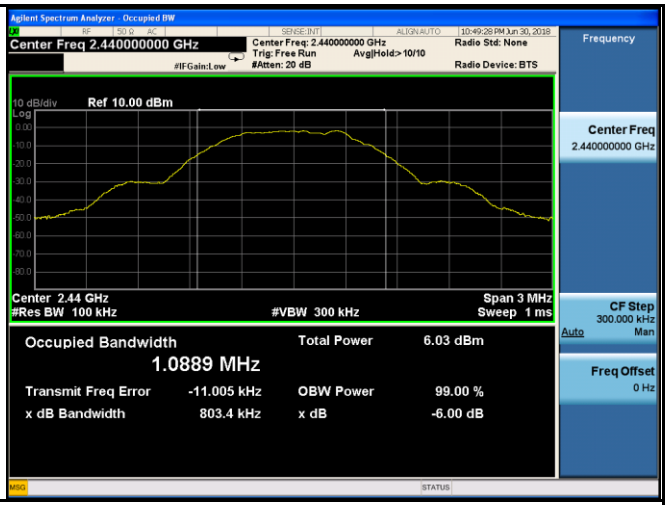
Type	Test mode	CH	Freq (MHz)	Result (MHz)	Limit (MHz)	Result
6dB BW	BLE	Low	2402	0.8061	≥0.5	Pass
		Mid	2440	0.8034	≥0.5	Pass
		High	2480	0.8005	≥0.5	Pass

Test Plots

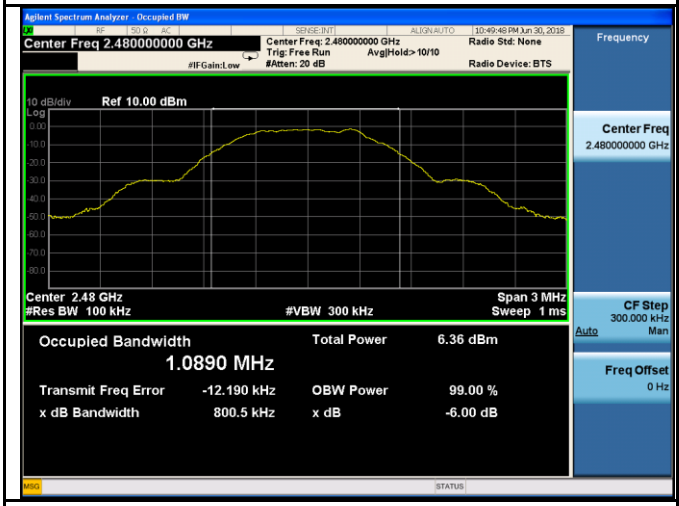
6dB Bandwidth measurement result



6dB Bandwidth - Low CH 2402



6dB Bandwidth - Mid CH 2440

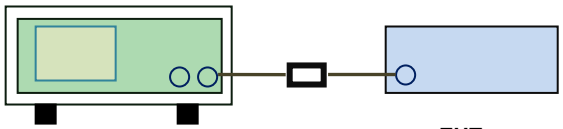


6dB Bandwidth - High CH 2480

6.4 Maximum Output Power

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	June 30, 2018
Tested By :	Peter Wei

Requirement(s):

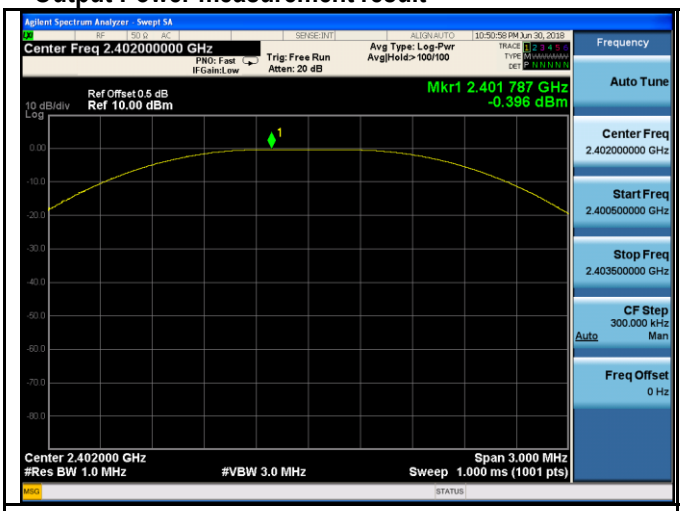
Spec	Item	Requirement	Applicable
§15.247(b)(2),RSS210 (A8.4)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤0.25 Watt	☐
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤1 Watt	☑
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance V04, 9.1.2 Integrated band power method Maximum output power measurement procedure a) Set the RBW ≥ DTS bandwidth. b) Set VBW ≥ 3 × RBW. c) Set span ≥ 3 x RBW d) Sweep time = auto couple. e) Detector = peak. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use peak marker function to determine the peak amplitude level.		
Remark			
Result	☑ Pass	☐ Fail	
Test Data	☑ Yes	☐ N/A	
Test Plot	☑ Yes (See below)	☐ N/A	

Output Power measurement result

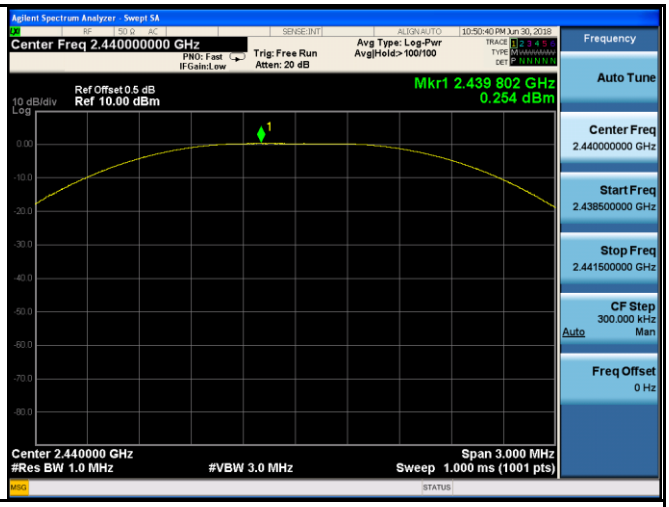
Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	BLE	Low	2402	-0.396	30	Pass
		Mid	2440	0.254	30	Pass
		High	2480	0.660	30	Pass

Test Plots

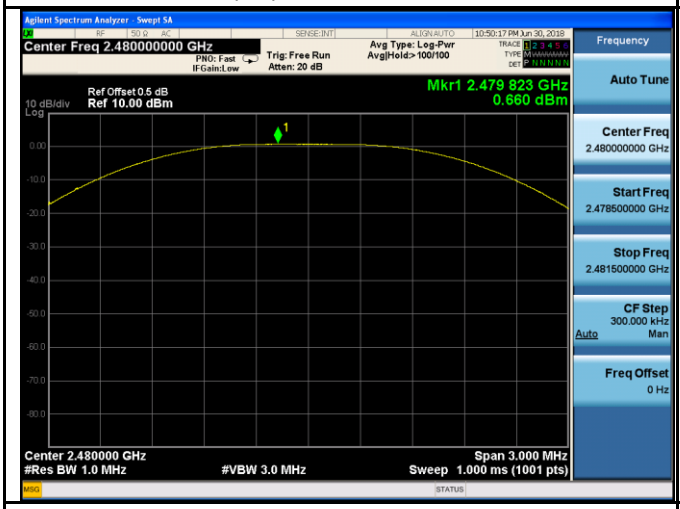
Output Power measurement result



Output power - Low CH 2402



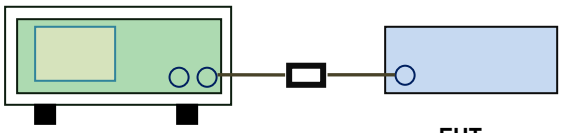
Output power - Mid CH 2440



Output power - High CH 2480

6.5 Power Spectral Density

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	June 30, 2018
Tested By :	Peter Wei

Spec	Item	Requirement	Applicable
§15.247(e)	a)	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.	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance V04, 10.2 power spectral density method power spectral density measurement procedure 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 × RBW. e) Detector = peak. f) Sweep time = auto couple. 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.		
Remark			
Result	☑ Pass ☐ Fail		
Result	☑ Pass ☐ Fail		
Test Data	☑ Yes ☐ N/A		

Power Spectral Density measurement result

Type	Test mode	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	BLE	Low	2402	-6.028	8	Pass
		Mid	2440	-5.414	8	Pass
		High	2480	-4.992	8	Pass

Test Plots

Power Spectral Density measurement result

PSD - Low CH 2402

PSD - Mid CH 2440

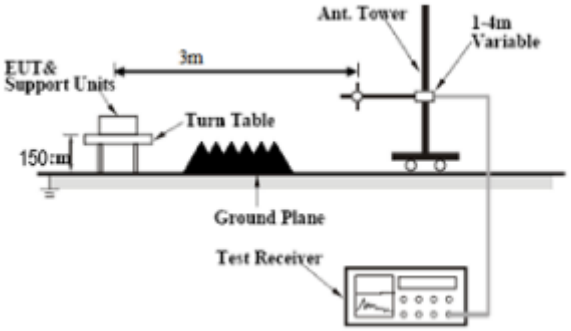
PSD - High CH 2480

6.6 Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1018mbar
Test date :	June 21, 2018
Tested By :	Peter Wei

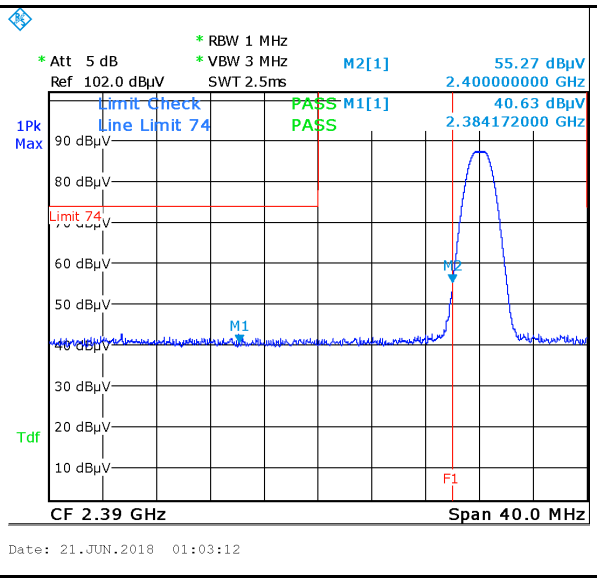
Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(d)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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.	☑

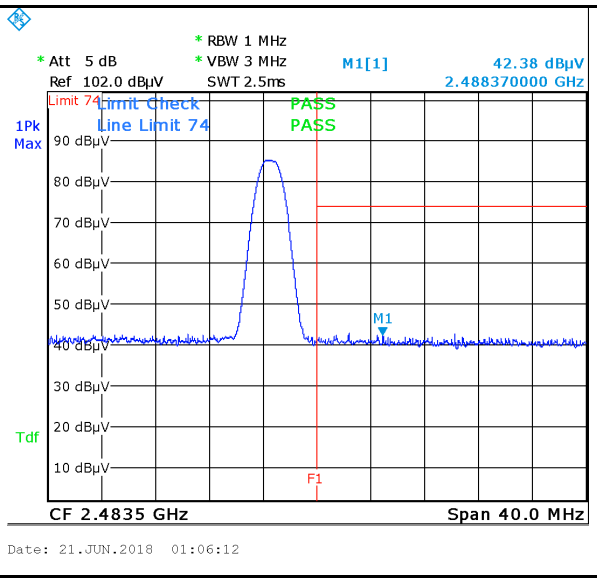
Test Setup	
Test Procedure	Radiated Method Only - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth for Average detection (AV) as below at frequency above 1GHz. ■ 1/T kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) - 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. - 5. Repeat above procedures until all measured frequencies were complete.
Remark	
Result	☑ Pass ☐ Fail
Test Data	☐ Yes ☑ N/A
Test Plot	☑ Yes (See below) ☐ N/A

Test Plots

Band Edge measurement result



GFSK-Left Side-PK

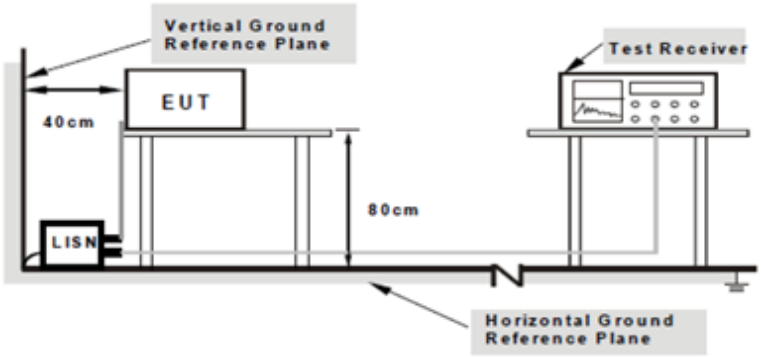


GFSK-Right Side-PK

6.7 AC Power Line Conducted Emissions

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	March 29, 2018
Tested By :	Peter Wei

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.207</td><td>a)</td><td>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.
Class A Limit
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>79</td><td>66</td></tr>
<tr><td>0.5 ~ 30</td><td>73</td><td>60</td></tr>
</table>
Class B Limit
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr>
<tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr>
<tr><td>5 ~ 30</td><td>60</td><td>50</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.
8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</td></tr>
<tr><td>Remark</td><td colspan="3"></td></tr>
<tr><td>Result</td><td colspan="3">☑ Pass ☐ Fail</td></tr>
</table>

Test Data	☑ Yes ☐ N/A
Test Plot	☑ Yes (See below) ☐ N/A

Data sample

No.	Frequency	Reading	Detector	Lisn/Isn	Ps_Lmt	Cab_L	Result	Limit	Margin
	(MHz)	(dBμV)		(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV) = Receiver Reading Value

Detector=Quasi Peak Detector or Average Detector

Lisn/ISN= Insertion loss of LISN

Ps_Lmt= Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Cab_L= cable loss

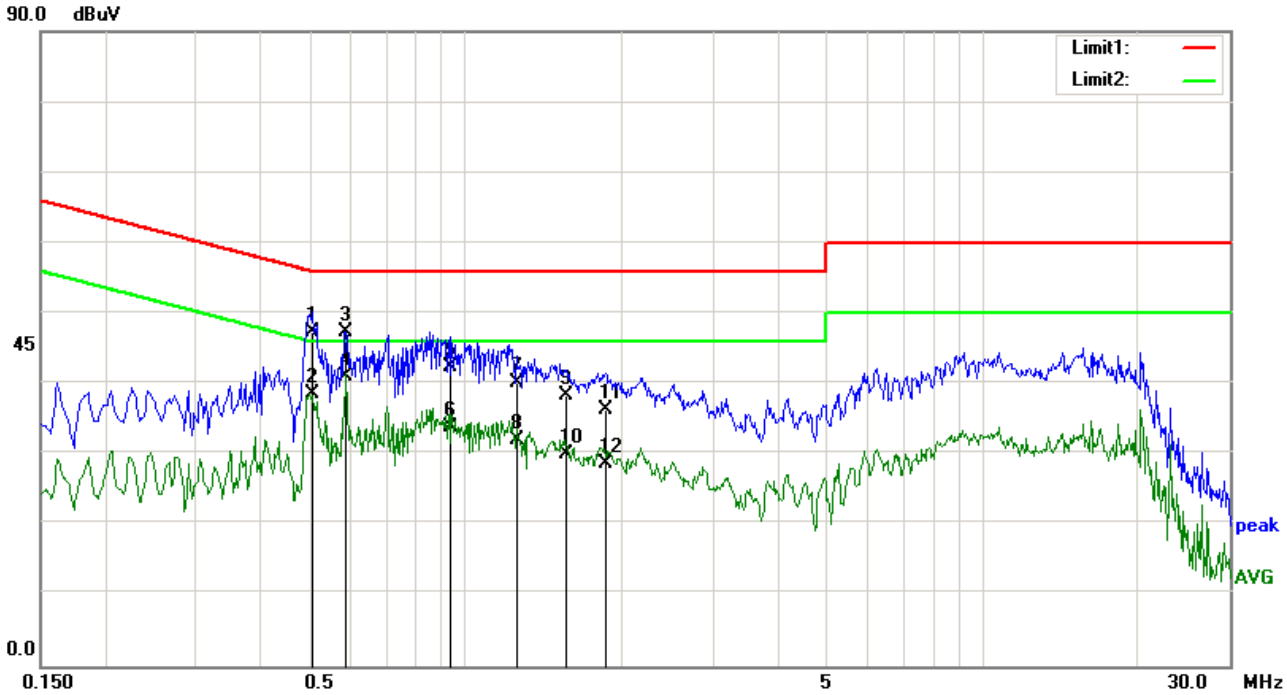
Result (dBμV) = Reading Value + Corrected Value

Limit (dBμV) = Limit stated in standard

Calculation Formula:

Margin (dB) = Result (dBμV) – limit (dBμV)

Test Mode(Adapter) :	Normal Working Mode

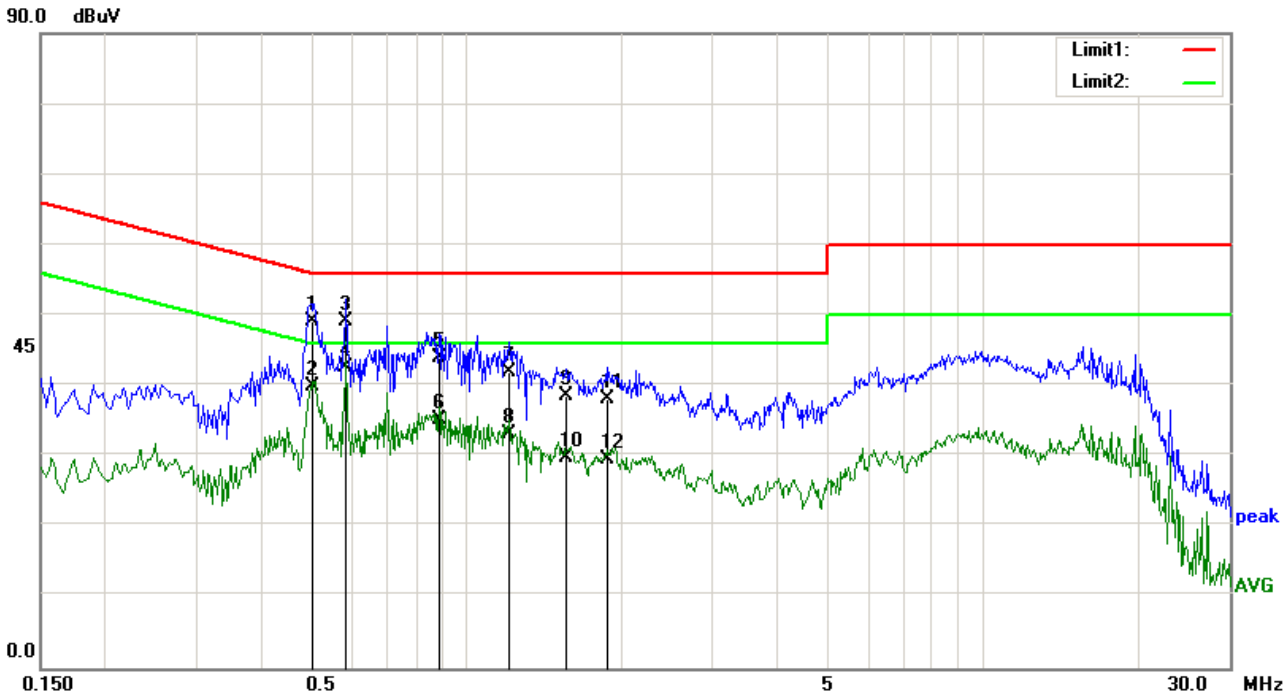


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	Frequency (MHz)	Reading (dBµV)	Detector	Lisn/Isn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	0.5060	37.07	QP	0.12	-10.00	0.21	47.40	56.00	-8.60
2	0.5060	28.19	AVG	0.12	-10.00	0.21	38.52	46.00	-7.48
3	0.5860	37.03	QP	0.12	-10.00	0.21	47.36	56.00	-8.64
4	0.5860	30.83	AVG	0.12	-10.00	0.21	41.16	46.00	-4.84
5	0.9340	32.13	QP	0.14	-10.00	0.19	42.46	56.00	-13.54
6	0.9340	23.47	AVG	0.14	-10.00	0.19	33.80	46.00	-12.20
7	1.2500	29.91	QP	0.15	-10.00	0.21	40.27	56.00	-15.73
8	1.2500	21.72	AVG	0.15	-10.00	0.21	32.08	46.00	-13.92
9	1.5620	27.95	QP	0.15	-10.00	0.20	38.30	56.00	-17.70
10	1.5620	19.63	AVG	0.15	-10.00	0.20	29.98	46.00	-16.02
11	1.8620	26.00	QP	0.16	-10.00	0.20	36.36	56.00	-19.64
12	1.8620	18.24	AVG	0.16	-10.00	0.20	28.60	46.00	-17.40

Test Mode(Adapter) :	Normal Working Mode

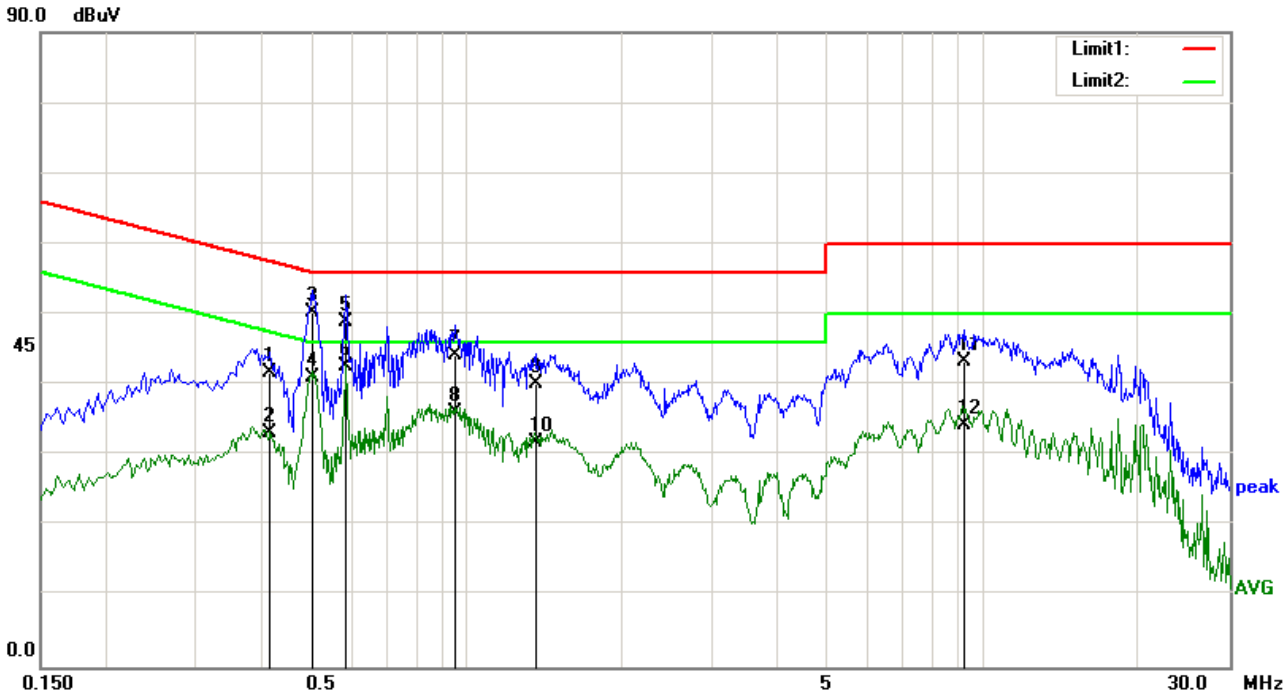


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	Frequency (MHz)	Reading (dBμV)	Detector	Lisn/Isn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
1	0.5020	38.80	QP	0.11	-10.00	0.21	49.12	56.00	-6.88
2	0.5020	29.60	AVG	0.11	-10.00	0.21	39.92	46.00	-6.08
3	0.5860	38.78	QP	0.11	-10.00	0.21	49.10	56.00	-6.90
4	0.5860	32.34	AVG	0.11	-10.00	0.21	42.66	46.00	-3.34
5	0.8860	33.60	QP	0.13	-10.00	0.19	43.92	56.00	-12.08
6	0.8860	24.82	AVG	0.13	-10.00	0.19	35.14	46.00	-10.86
7	1.2100	31.59	QP	0.14	-10.00	0.21	41.94	56.00	-14.06
8	1.2100	22.95	AVG	0.14	-10.00	0.21	33.30	46.00	-12.70
9	1.5660	28.21	QP	0.15	-10.00	0.20	38.56	56.00	-17.44
10	1.5660	19.45	AVG	0.15	-10.00	0.20	29.80	46.00	-16.20
11	1.8740	27.78	QP	0.16	-10.00	0.20	38.14	56.00	-17.86
12	1.8740	19.24	AVG	0.16	-10.00	0.20	29.60	46.00	-16.40

Test Mode(Adapter) :	Normal Working Mode

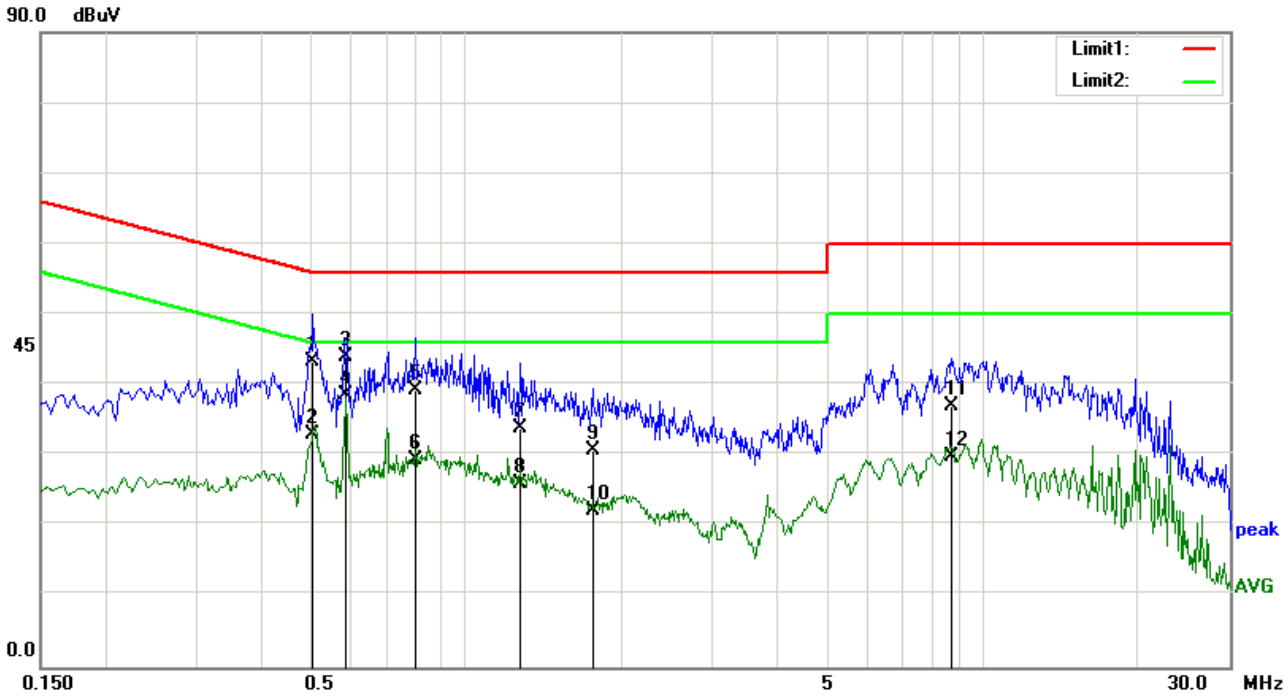


Test Data

Phase Line Plot at 230Vac, 50Hz

No.	Frequency (MHz)	Reading (dBμV)	Detector	Lisn/lsn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
1	0.4180	31.48	QP	0.11	-10.00	0.21	41.80	57.49	-15.69
2	0.4180	22.96	AVG	0.11	-10.00	0.21	33.28	47.49	-14.21
3	0.5020	40.05	QP	0.12	-10.00	0.21	50.38	56.00	-5.62
4	0.5020	30.69	AVG	0.12	-10.00	0.21	41.02	46.00	-4.98
5	0.5860	38.54	QP	0.12	-10.00	0.21	48.87	56.00	-7.13
6	0.5860	32.34	AVG	0.12	-10.00	0.21	42.67	46.00	-3.33
7	0.9500	33.81	QP	0.14	-10.00	0.19	44.14	56.00	-11.86
8	0.9500	25.83	AVG	0.14	-10.00	0.19	36.16	46.00	-9.84
9	1.3620	29.80	QP	0.15	-10.00	0.21	40.16	56.00	-15.84
10	1.3620	21.51	AVG	0.15	-10.00	0.21	31.87	46.00	-14.13
11	9.1900	32.37	QP	0.46	-10.00	0.38	43.21	60.00	-16.79
12	9.1900	23.37	AVG	0.46	-10.00	0.38	34.21	50.00	-15.79

Test Mode(Adapter) :	Normal Working Mode

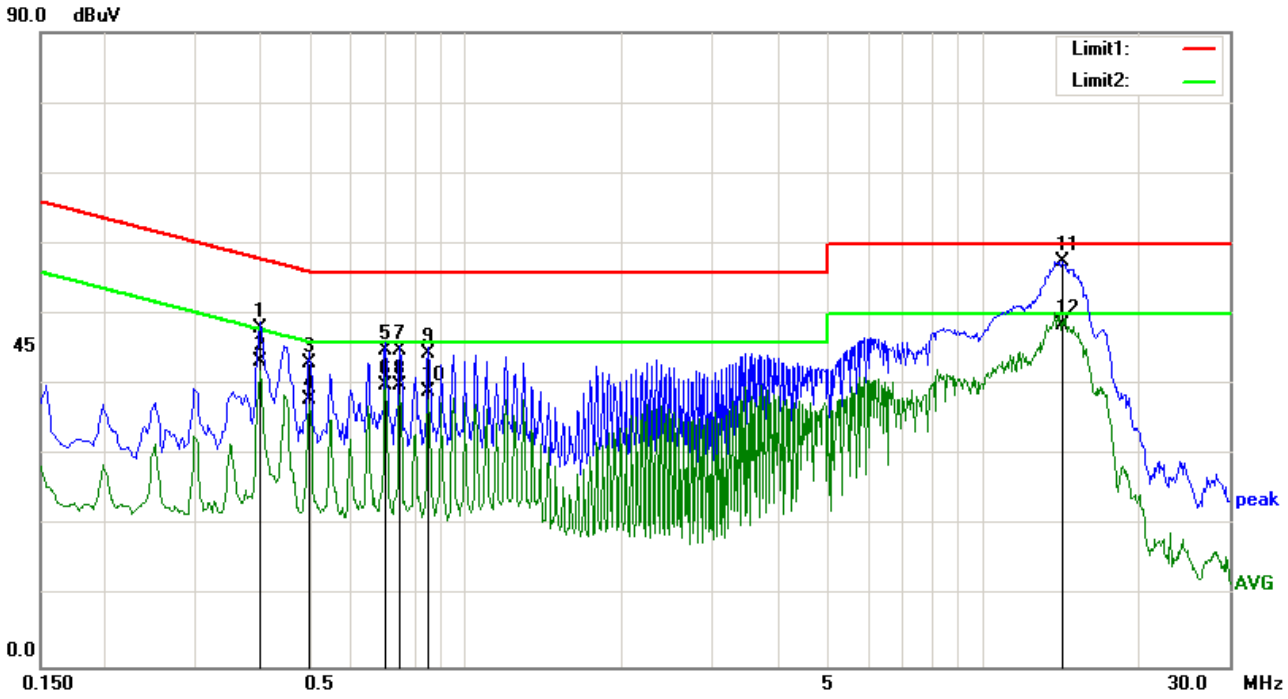


Test Data

Phase Neutral Plot at 230Vac, 50Hz

No.	Frequency	Reading	Detector	Lisn/Isn	Ps_Lmt	Cab_L	Result	Limit	Margin
	(MHz)	(dBµV)		(dB)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)
1	0.5060	33.09	QP	0.11	-10.00	0.21	43.41	56.00	-12.59
2	0.5060	22.55	AVG	0.11	-10.00	0.21	32.87	46.00	-13.13
3	0.5860	33.75	QP	0.11	-10.00	0.21	44.07	56.00	-11.93
4	0.5860	28.26	AVG	0.11	-10.00	0.21	38.58	46.00	-7.42
5	0.7980	29.00	QP	0.12	-10.00	0.20	39.32	56.00	-16.68
6	0.7980	19.09	AVG	0.12	-10.00	0.20	29.41	46.00	-16.59
7	1.2740	23.49	QP	0.14	-10.00	0.21	33.84	56.00	-22.16
8	1.2740	15.57	AVG	0.14	-10.00	0.21	25.92	46.00	-20.08
9	1.7620	20.26	QP	0.16	-10.00	0.21	30.63	56.00	-25.37
10	1.7620	11.75	AVG	0.16	-10.00	0.21	22.12	46.00	-23.88
11	8.6900	26.06	QP	0.48	-10.00	0.37	36.91	60.00	-23.09
12	8.6900	18.92	AVG	0.48	-10.00	0.37	29.77	50.00	-20.23

Test Mode(POE) :	Normal Working Mode

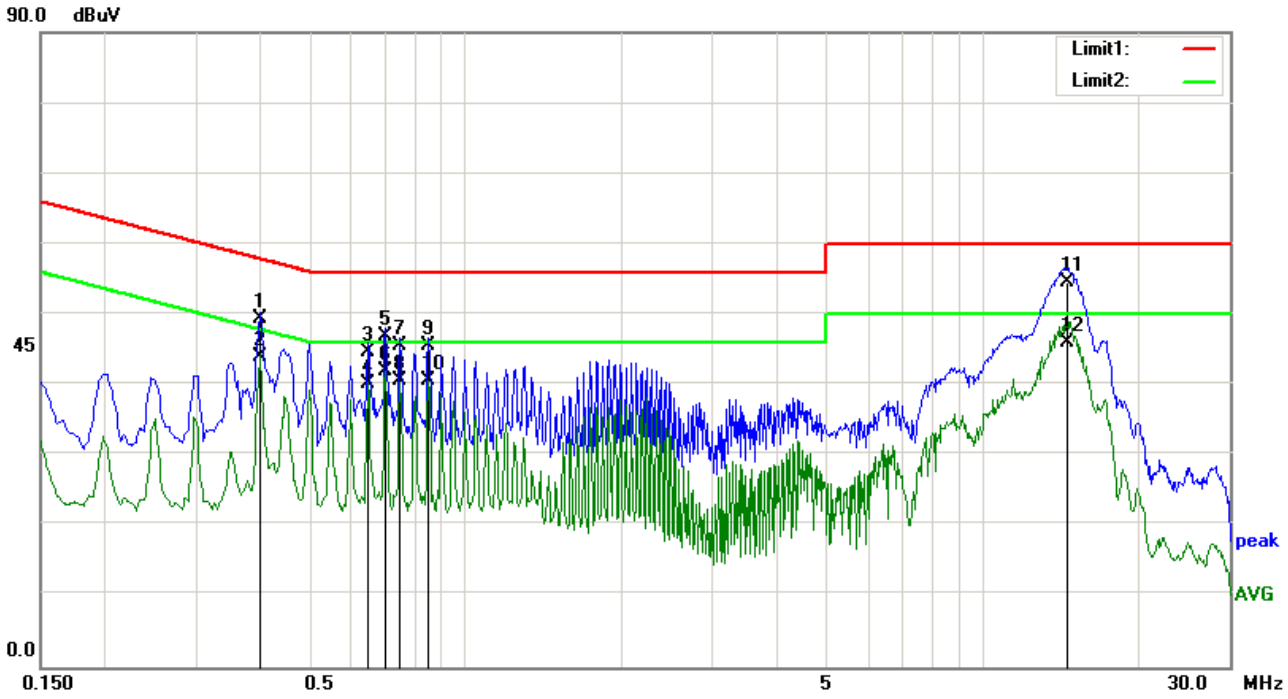


Test Data

Phase Line

No.	Frequency (MHz)	Reading (dBμV)	Detector	Lisn/lsn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
1	0.3980	37.77	QP	0.11	-10.00	0.21	48.09	57.90	-9.81
2	0.3980	33.00	AVG	0.11	-10.00	0.21	43.32	47.90	-4.58
3	0.4980	32.76	QP	0.12	-10.00	0.21	43.09	56.03	-12.94
4	0.4980	27.59	AVG	0.12	-10.00	0.21	37.92	46.03	-8.11
5	0.6980	34.62	QP	0.13	-10.00	0.20	44.95	56.00	-11.05
6	0.6980	29.56	AVG	0.13	-10.00	0.20	39.89	46.00	-6.11
7	0.7460	34.47	QP	0.13	-10.00	0.20	44.80	56.00	-11.20
8	0.7460	29.58	AVG	0.13	-10.00	0.20	39.91	46.00	-6.09
9	0.8460	34.08	QP	0.13	-10.00	0.20	44.41	56.00	-11.59
10	0.8460	28.71	AVG	0.13	-10.00	0.20	39.04	46.00	-6.96
11	14.2740	46.22	QP	0.81	-10.00	0.47	57.50	60.00	-2.50
12	14.2740	37.27	AVG	0.81	-10.00	0.47	48.55	50.00	-1.45

Test Mode(POE) :	Normal Working Mode



Test Data

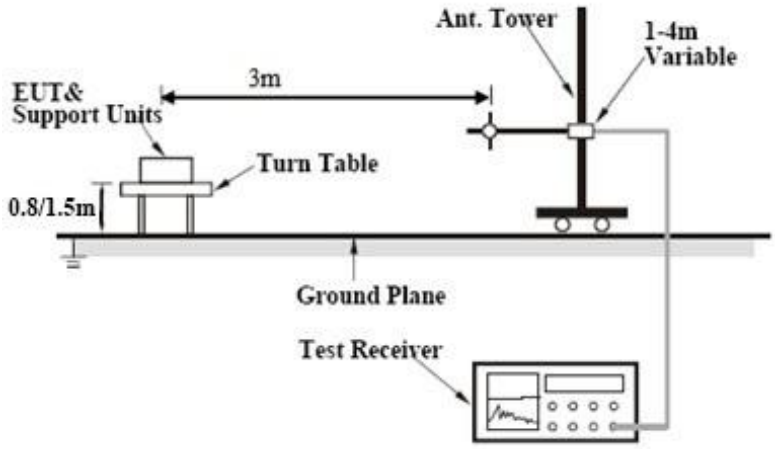
Phase Neutral

No.	Frequency (MHz)	Reading (dBμV)	Detector	Lisn/Isn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
1	0.3980	39.08	QP	0.11	-10.00	0.21	49.40	57.90	-8.50
2	0.3980	33.76	AVG	0.11	-10.00	0.21	44.08	47.90	-3.82
3	0.6460	34.36	QP	0.12	-10.00	0.20	44.68	56.00	-11.32
4	0.6460	29.88	AVG	0.12	-10.00	0.20	40.20	46.00	-5.80
5	0.6980	36.50	QP	0.12	-10.00	0.20	46.82	56.00	-9.18
6	0.6980	31.68	AVG	0.12	-10.00	0.20	42.00	46.00	-4.00
7	0.7460	35.22	QP	0.12	-10.00	0.20	45.54	56.00	-10.46
8	0.7460	30.35	AVG	0.12	-10.00	0.20	40.67	46.00	-5.33
9	0.8460	35.24	QP	0.12	-10.00	0.20	45.56	56.00	-10.44
10	0.8460	30.33	AVG	0.12	-10.00	0.20	40.65	46.00	-5.35
11	14.5260	43.10	QP	0.91	-10.00	0.47	54.48	60.00	-5.52
12	14.5260	34.63	AVG	0.91	-10.00	0.47	46.01	50.00	-3.99

6.8 Radiated Emissions

Temperature	28°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	March 29, 2018
Tested By :	Peter Wei

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.209</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
Class A Limit
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>90</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 – 960</td><td>210</td></tr>
<tr><td>Above 960</td><td>300</td></tr>
</table>
Class B Limit
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 – 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.
The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak</td></tr>
</table>

	detection for Average Measurement as below at frequency above 1GHz. ■ 1/T kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail
Test Data	☑ Yes ☐ N/A
Test Plot	☑ Yes (See below) ☐ N/A

Data sample

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBμV/m)		(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(cm)	(°)

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV/m) = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Ant_F=Antenna Factor

PA_G=Pre-Amplifier Gain

Cab_L=Cable Loss

Result (dBμV/m) = Read ing Value + Corrected Value

Limit (dBμV/m) = Limit stated in standard

Height (cm) = Height of Receiver antenna

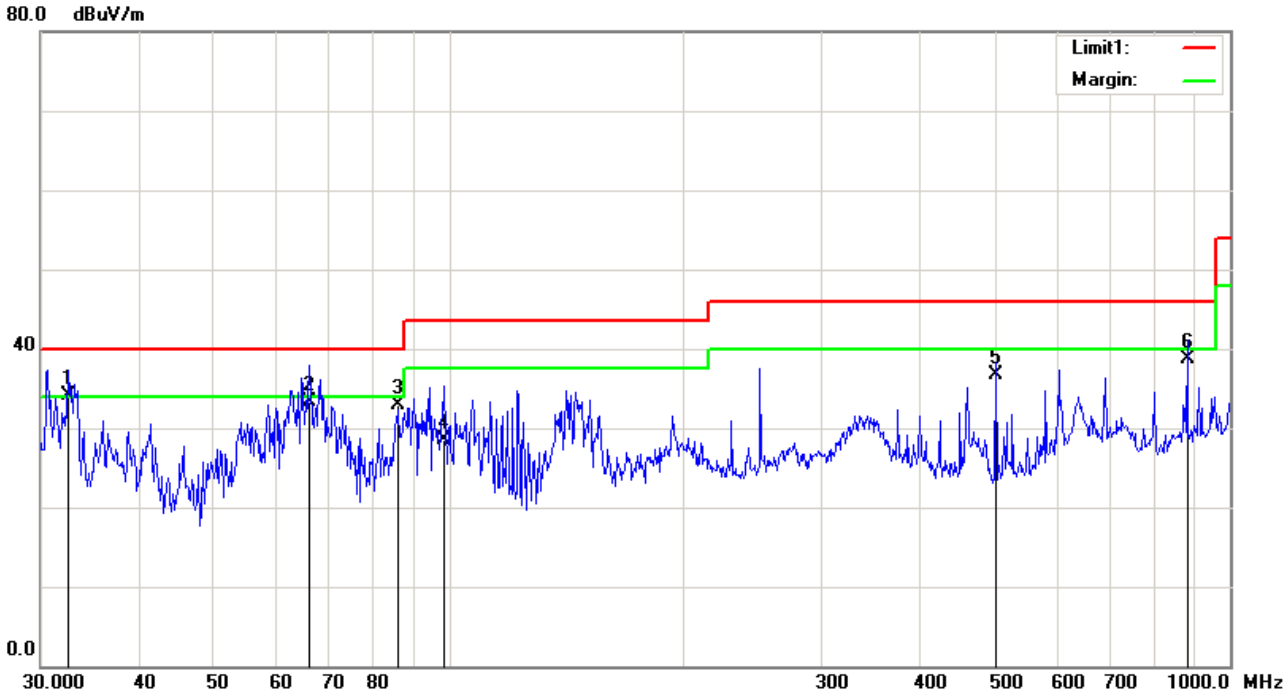
Degree = Turn table degree

Calculation Formula:

Margin (dB) = Result (dBμV/m) – limit (dBμV/m)

Test Mode(Adapter) :	Normal Working Mode

Below 1GHz



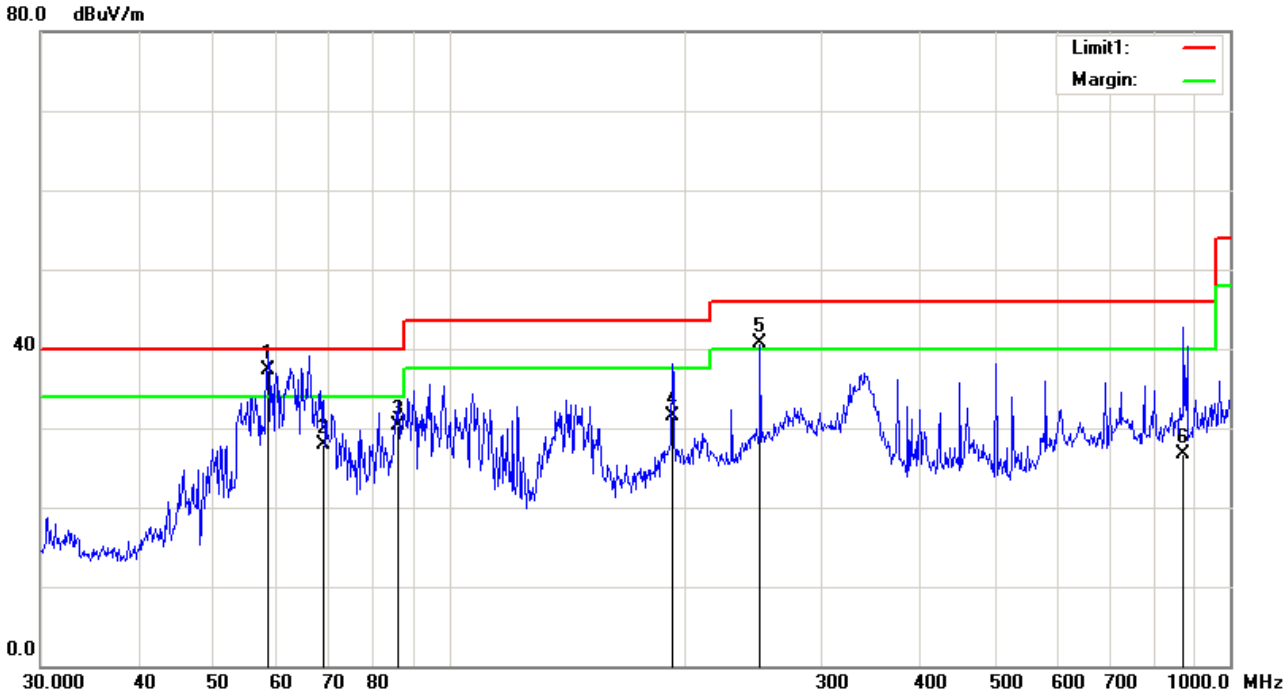
Test Data

Vertical Polarity Plot @3m

No.	Frequency (MHz)	Reading (dBμV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)
1	32.5198	58.71	QP	20.13	45.66	0.92	34.10	40.00	-5.90	100	259
2	66.2662	70.13	QP	9.48	47.70	1.39	33.30	40.00	-6.70	100	35
3	85.8984	70.53	QP	8.32	47.43	1.48	32.90	40.00	-7.10	100	76
4	98.4866	62.67	QP	10.79	46.56	1.60	28.50	43.50	-15.00	121	360
5	501.1790	67.13	QP	15.38	49.27	3.56	36.80	46.00	-9.20	100	162
6	881.4067	56.67	QP	23.28	45.95	4.80	38.80	46.00	-7.20	200	322

Test Mode(Adapter) :	Normal Working Mode

Below 1GHz



Test Data

Horizontal Polarity Plot @3m

No.	Frequency (MHz)	Reading (dBμV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)
1	58.6126	73.59	QP	9.54	47.12	1.29	37.30	40.00	-2.70	300	148
2	69.1141	63.80	QP	10.61	47.84	1.43	28.00	40.00	-12.00	200	154
3	85.8984	66.72	QP	9.63	47.43	1.48	30.40	40.00	-9.60	200	154
4	193.0945	63.29	QP	12.98	46.90	2.23	31.60	43.50	-11.90	200	201
5	250.3012	70.87	QP	15.16	47.74	2.51	40.80	46.00	-5.20	100	181
6	872.1832	45.31	QP	22.78	46.06	4.77	26.80	46.00	-19.20	100	213

Test Mode :	Low Channel

Above 1GHz

Low Channel

Frequency	S.A.	Detector	Polarity	Ant.	Cable	Pre-Amp.	Cord.	Limit	Margin
(MHz)	Reading	(PK/AV)	(H/V)	Factor	Loss	Gain	Amp.	(dBµV/m)	(dB)
	(dBµV)			(dB/m)	(dB)	(dB)	(dBµV/m)		
4804	45.25	AV	V	33.39	7.22	48.46	37.40	54	-16.60
4804	44.98	AV	H	33.39	7.22	48.46	37.13	54	-16.87
4804	49.89	PK	V	33.39	7.22	48.46	42.04	74	-31.96
4804	50.05	PK	H	33.39	7.22	48.46	42.20	74	-31.80
10313	31.42	AV	V	39.23	10.54	46.51	34.68	54	-19.32
10313	26.76	AV	H	39.23	10.54	46.51	30.02	54	-23.98
10313	36.83	PK	V	39.23	10.54	46.51	40.09	74	-33.91
10313	40.08	PK	H	39.23	10.54	46.51	43.34	74	-30.66

Middle Channel

Frequency	S.A.	Detector	Polarity	Ant.	Cable	Pre-Amp.	Cord.	Limit	Margin
(MHz)	Reading	(PK/AV)	(H/V)	Factor	Loss	Gain	Amp.	(dBµV/m)	(dB)
	(dBµV)			(dB/m)	(dB)	(dB)	(dBµV/m)		
4880	47.98	AV	V	33.62	7.53	48.36	40.77	54	-13.23
4880	49.76	AV	H	33.62	7.53	48.36	42.55	54	-11.45
4880	55.29	PK	V	33.62	7.53	48.36	48.08	74	-25.92
4880	53.27	PK	H	33.62	7.53	48.36	46.06	74	-27.94
9183	29.76	AV	V	38.14	8.94	47.72	29.12	54	-24.88
9183	30.98	AV	H	38.14	8.94	47.72	30.34	54	-23.66
9183	48.09	PK	V	38.14	8.94	47.72	47.45	74	-26.55
9183	41.25	PK	H	38.14	8.94	47.72	40.61	74	-33.39

High Channel

Frequency	S.A.	Detector	Polarity	Ant.	Cable	Pre-Amp.	Cord.	Limit	Margin
(MHz)	Reading	(PK/AV)	(H/V)	Factor	Loss	Gain	Amp.	(dBµV/m)	(dB)
	(dBµV)			(dB/m)	(dB)	(dB)	(dBµV/m)		
4880	47.78	AV	V	33.62	7.53	48.36	40.57	54	-13.43
4880	50.91	AV	H	33.62	7.53	48.36	43.70	54	-10.3
4880	47.77	PK	V	33.62	7.53	48.36	40.56	74	-33.44
4880	54.03	PK	H	33.62	7.53	48.36	46.82	74	-27.18
9183	29.48	AV	V	38.14	8.94	47.72	28.84	54	-25.16
9183	30.99	AV	H	38.14	8.94	47.72	30.35	54	-23.65
9183	47.63	PK	V	38.14	8.94	47.72	46.99	74	-27.01
9183	42.11	PK	H	38.14	8.94	47.72	41.47	74	-32.53

Annex A. TEST INSTRUMENT

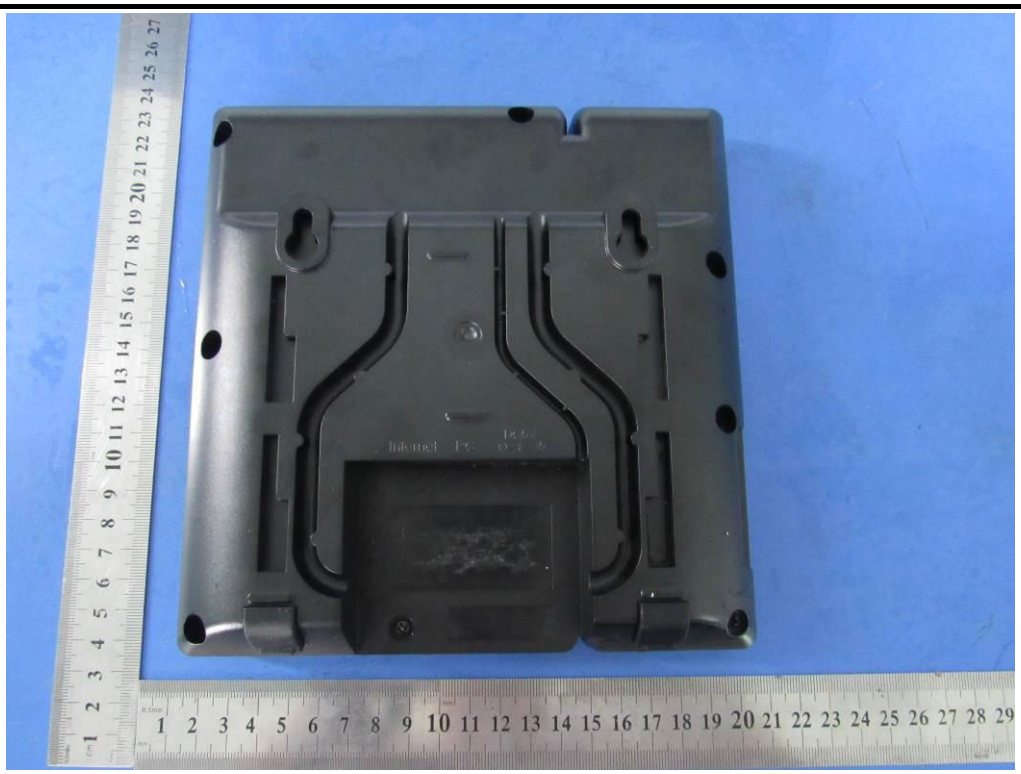
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	04/26/2018	04/25/2019	☒
V-LISN	ESH3-Z5	838979/005	04/26/2018	04/25/2019	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	05/19/2018	05/18/2019	☒
SIEMIC Labview Conducted Emissions software	V1.0	N/A	N/A	N/A	☒
RF Conducted Test					
R&S EMI Receiver	ESPI3	101216	04/26/2018	04/25/2019	☒
Spectrum Analyzer	N9010A	MY47191130	04/26/2018	04/25/2019	☒
Radiated Emissions					
Spectrum Analyzer	N9010A	MY47191130	04/26/2018	04/25/2019	☒
R&S EMI Receiver	ESPI3	101216	04/26/2018	04/25/2019	☒
Antenna (30MHz~6GHz)	JB6	A121411	05/19/2018	05/18/2019	☒
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	04/26/2018	04/25/2019	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	04/26/2018	04/25/2019	☒
Hp Pre-Amplifier	8447F	1937A01160	04/26/2018	04/25/2019	☒
SIEMIC Labview Radiated Emissions software	V1.0	N/A	N/A	N/A	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

The Whole Package – Front View

EUT - Top View

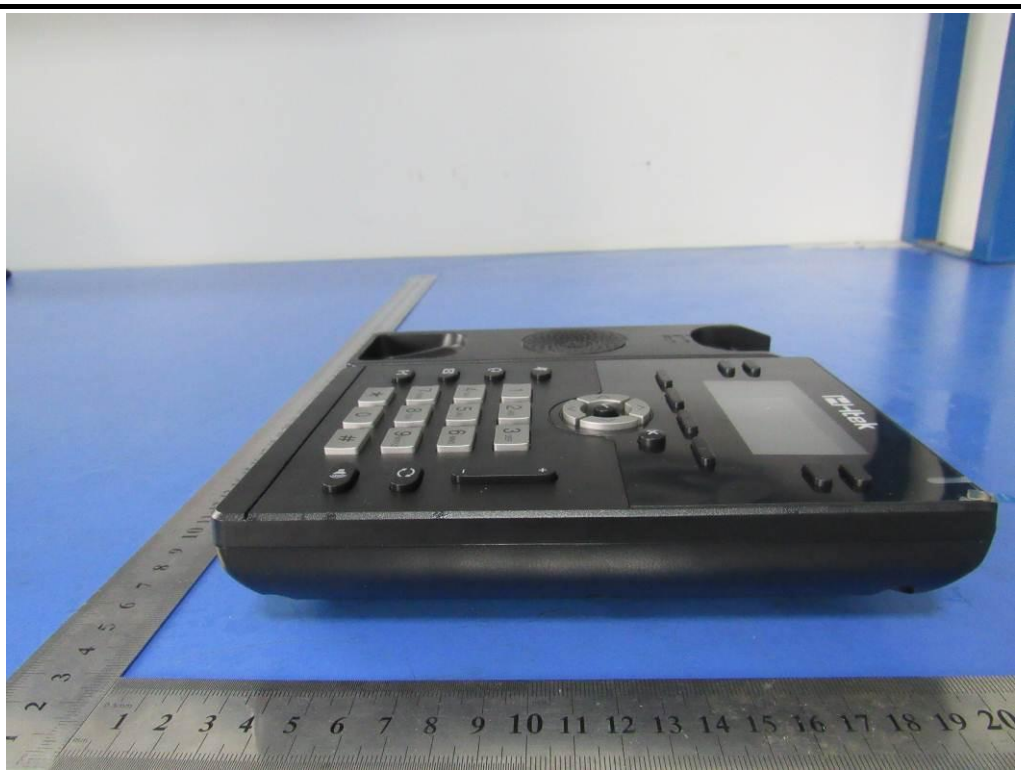


EUT - Bottom View

EUT - Front View

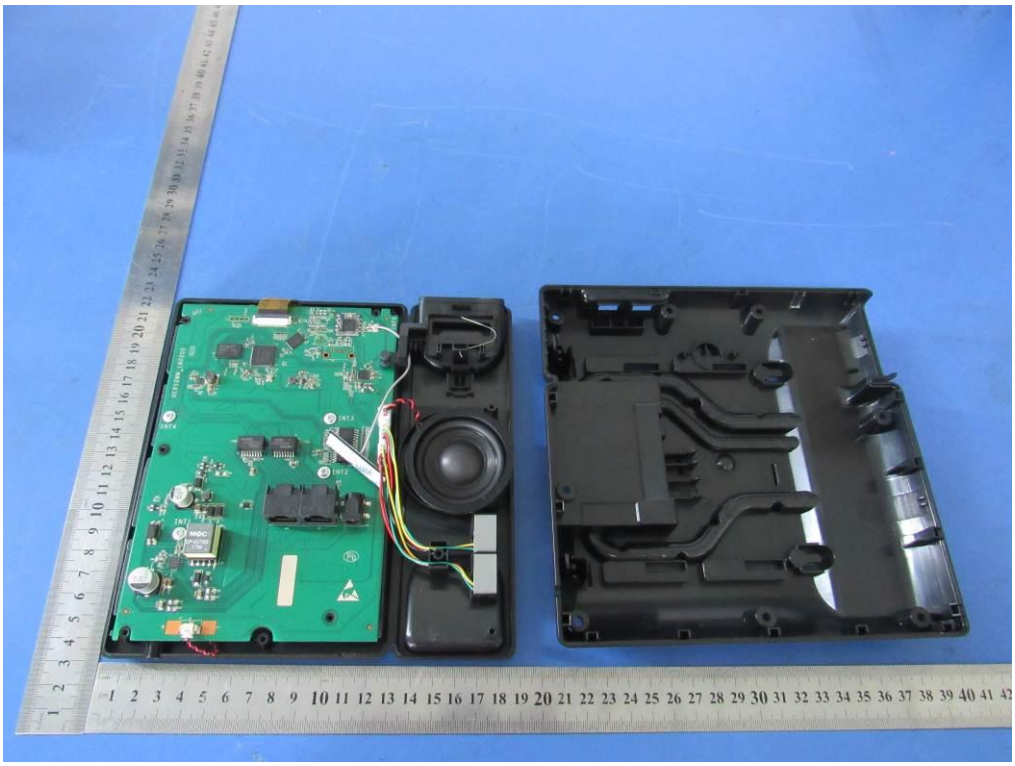
EUT - Rear View

EUT - Left View

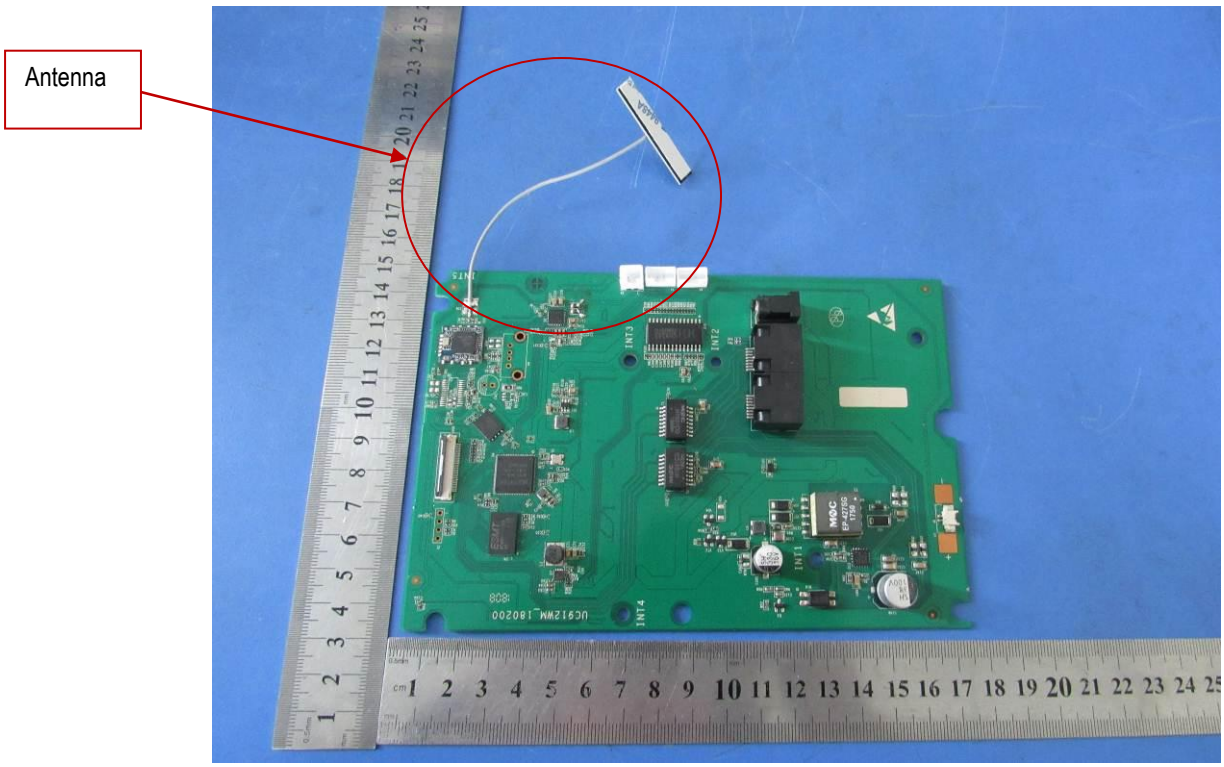


EUT - Right View

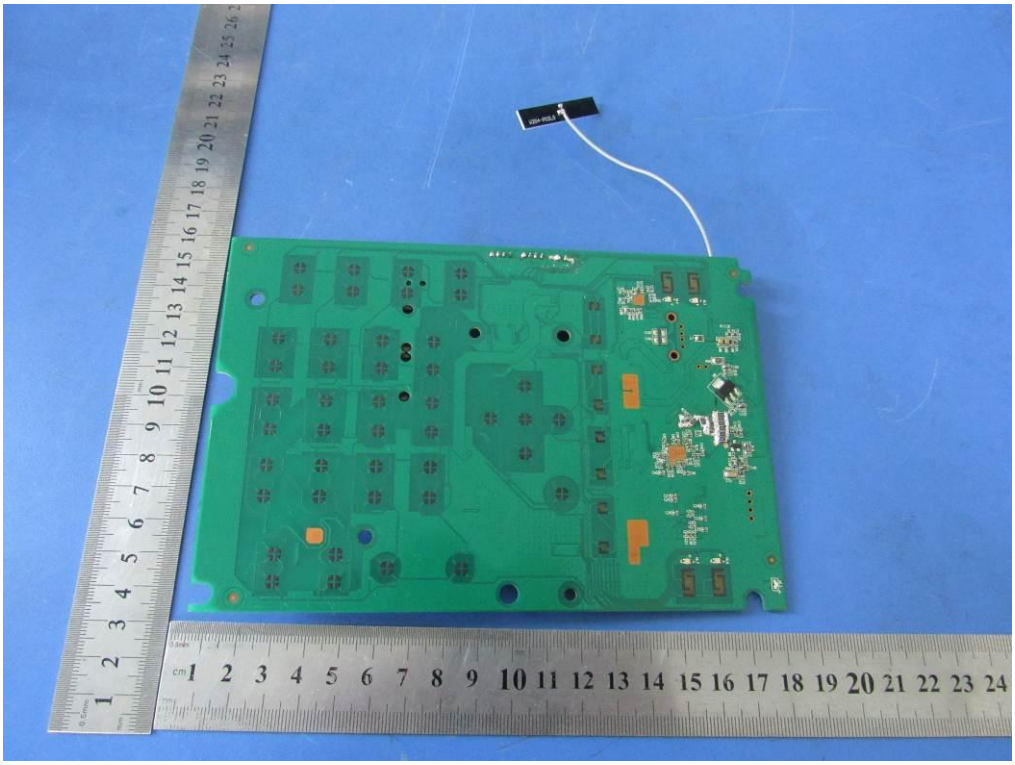
Annex B.ii. Photograph: EUT Internal Photo



EUT Uncover – Front View



EUT PCBA – Front View

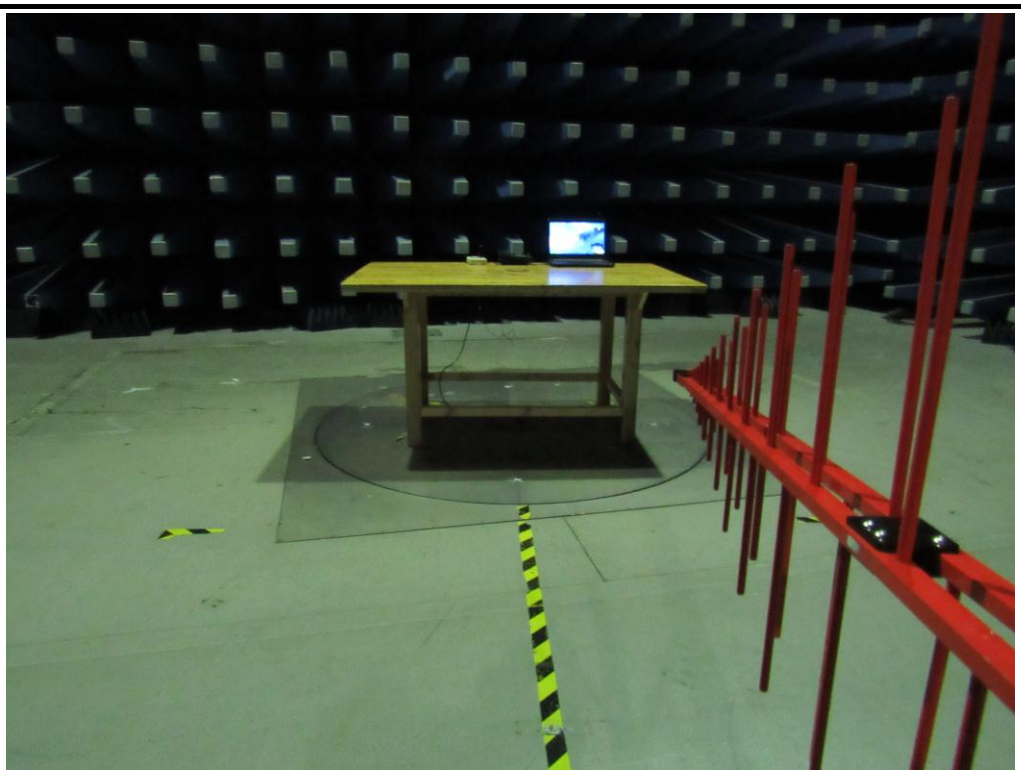


EUT PCBA– Rear View

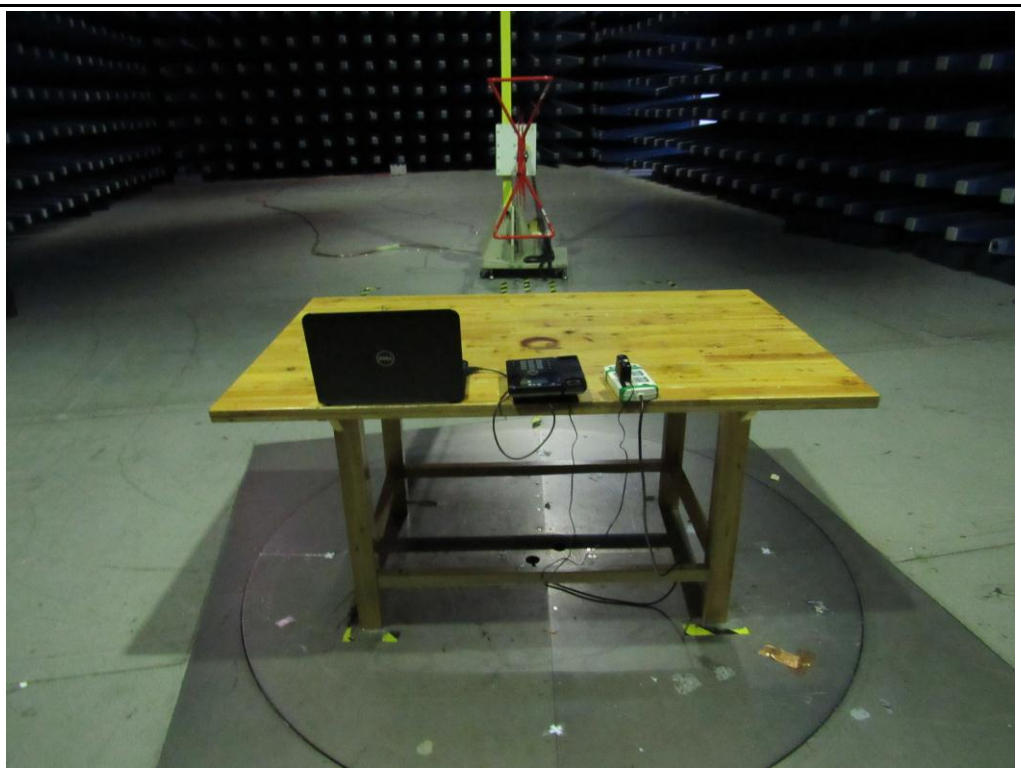
Annex B.iii. Photograph: Test Setup Photo

Conducted Emissions Test Setup Front View

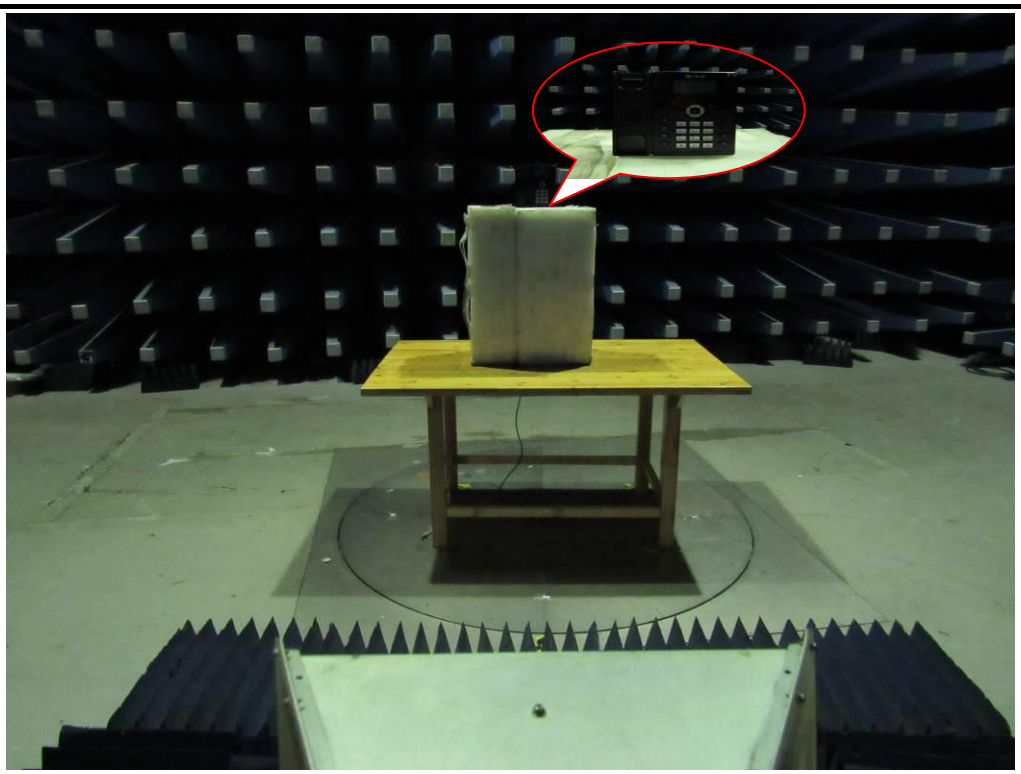
Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Front View Below 1GHz



Radiated Spurious Emissions Test Setup Rear View Below 1GHz

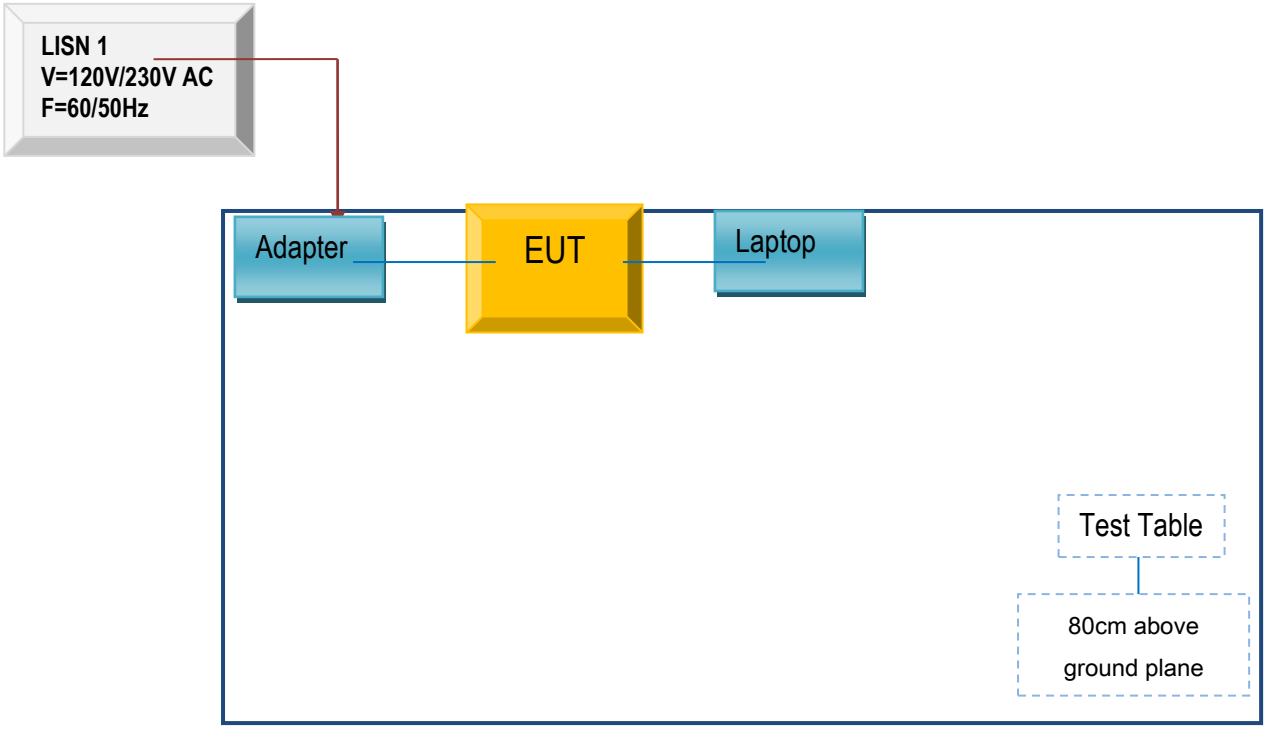


Radiated Spurious Emissions Test Setup Above 1GHz

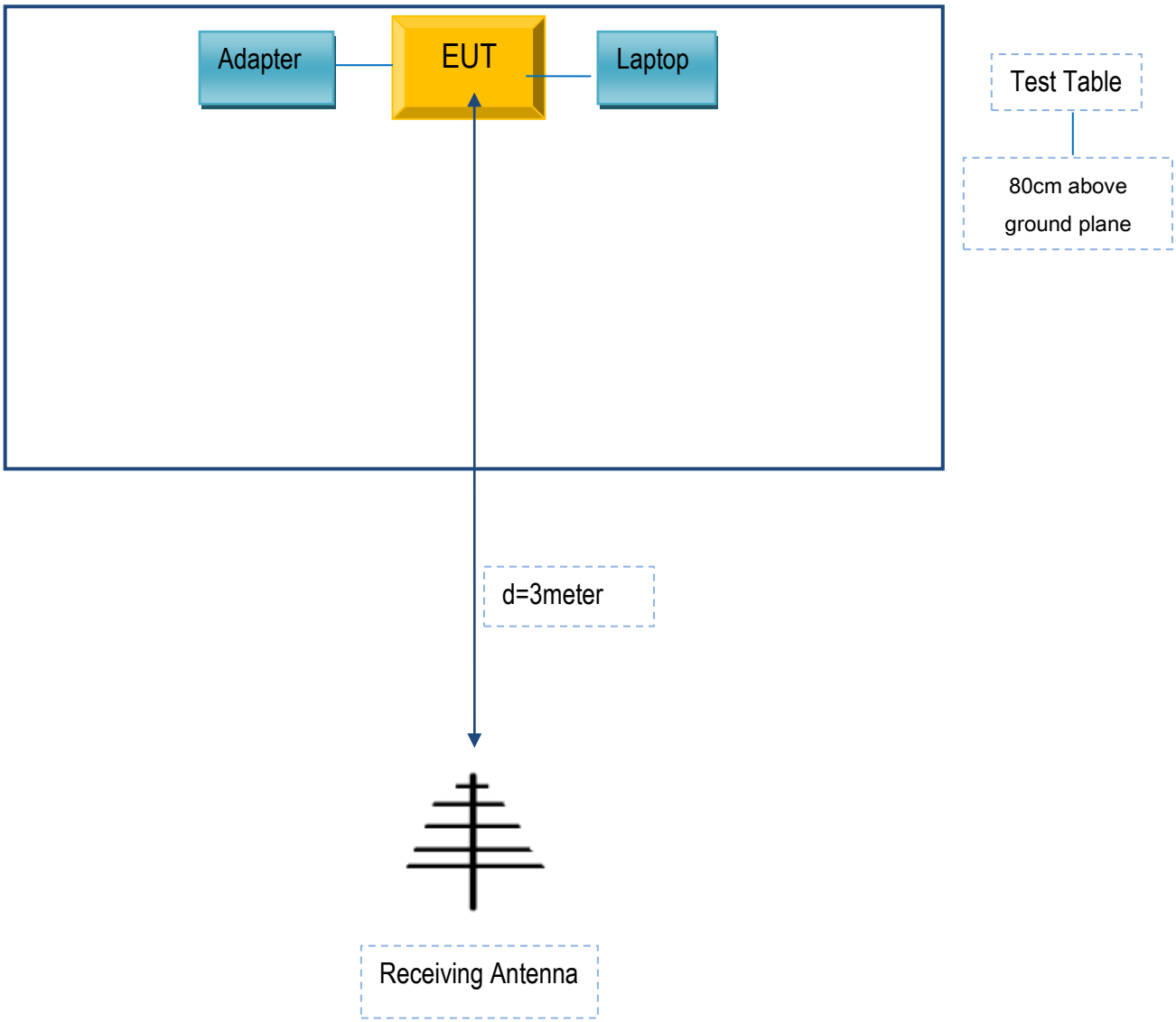
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.i. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
HP	Laptop	4321S	N/A
N/A	Earphone	N/A	N/A
PROCET	POE	PT-PSE101	PT1050000242

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
Power Cable	Un-shielding	No	0.8m	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

N/A