

TEST REPORT

Report No.: 19110037HKG-003

Plantronics, Inc.

Application For Certification
(Class II Permissive Change)

FCC ID: AL8-E60XXX

Transmitter

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TEST REPORT

GENERAL INFORMATION

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Manufacturer:	VTech (Dongguan) Telecommunications Limited
Manufacturer Address:	VTech Science Park, Xia Ling Bei Management Zone, Liaobu, Dongguan, Guangdong, China.
Brand Name:	Plantronics
Model:	Elara 60 WS
Type of EUT:	Transmitter
Description of EUT:	Mobile Phone Station with Bluetooth
Serial Number:	N/A
Firmware Version:	0.8.10
FCC ID:	AL8-E60XXX
Date of Sample Submitted:	December 14, 2019
Date of Test:	December 14, 2019 to January 20, 2020
Report No.:	19110037HKG-003
Report Date:	January 21, 2020
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

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SUMMARY OF TEST RESULT

Test Specification	Reference	Results
Radiated Emission	15.209	Pass
Radiated Emission on the Bandedge		
Transmitter Power Line Conducted Emissions	15.207	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2018 Edition

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT) is a wireless power transfer device that operating at 115kHz and 147kHz which is powered by AC/DC adaptor (100-240VAC to 15VDC). After placing the smartphone on the EUT, it can be charged.

Antenna Type: Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Purpose of Change

The purpose of change is saved with filename: product change.pdf

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been placed on file with the FCC.

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2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The device was powered by AC/DC adaptor (Input: 100-240V 50/60HZ 600mA: Output: 15.0V)

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data report in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

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2.5 Support Equipment List and Description

- 1) Adaptor model: S024AMM1500160(Provided by Client)
Input: 100-240V 50/60HZ 600mA
Output: 15.0V
- 2) 1pc of dummy loading for 115kHz(Provided by Intertek)
- 3) 1pc of dummy loading for 127.7kHz(Provided by Intertek)
- 4) Pika Cradle model: 5200 #003 and docking. (Provided by Client)
- 5) Pika Cradle model: Focus #01 and docking. (Provided by Client)
- 6) Pika Cradle model: USB-A #01 (Provided by Client)
- 7) Bluetooth USB Model:BT600 (Provided by Client)
- 8) Bluetooth hands-free model: Voyager 5200 (Provided by Client)
- 9) Bluetooth headset model: B825 (Provided by Client)
- 10) Wired headset model: C3220 (Provided by Client)
- 11) Wired headset model: Blackwire 5220 (C5220T stereo headset + C5200 control panel kit)
- 12) Bluetooth USB Dongle Model:BT900 with audio loop back mode test software (Provided by Client)
- 13) USB loading 5V 1A (Provided by Intertek)
- 14) Samsung S8 (provided by Intertek)

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3.0 EMISSION RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

FS = Field Strength in dB μ V/m

RR = RA - AG - AV in dB μ V

LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 1.035 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 10.7 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 202.5 kHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photo.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Pass by 4.29 dB

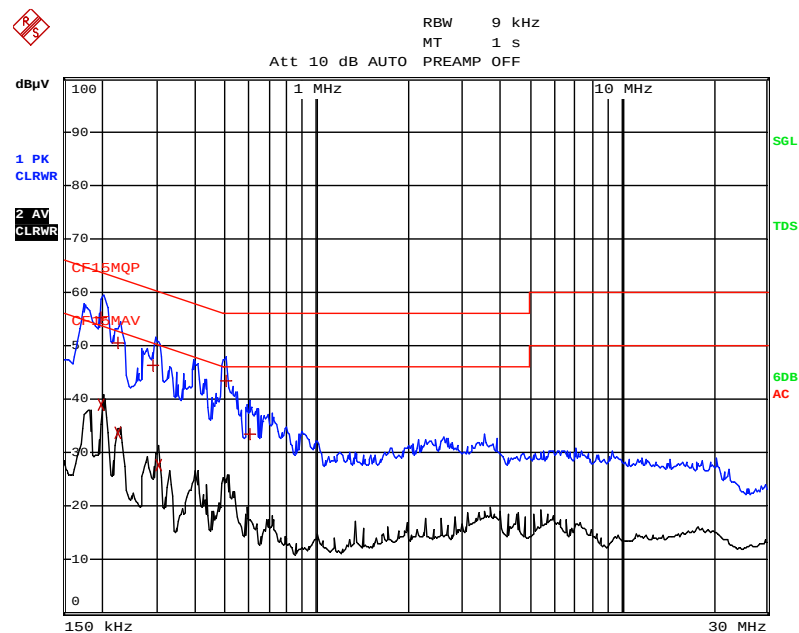
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CONDUCTED EMISSION

Model: Elara 60 WS

Date of Test: December 17, 2018 to February 26, 2019

Worst-Case Operating Mode: 115kHz loading



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	199.5 kHz	55.31	N	-8.31
2 CISPR Average	199.5 kHz	38.93	N	-14.69
1 Quasi Peak	226.5 kHz	50.42	N	-12.15
2 CISPR Average	226.5 kHz	33.73	N	-18.84
1 Quasi Peak	294 kHz	46.43	N	-13.97
2 CISPR Average	303 kHz	27.77	N	-22.38
1 Quasi Peak	505.5 kHz	43.42	N	-12.57
1 Quasi Peak	600 kHz	33.37	N	-22.62

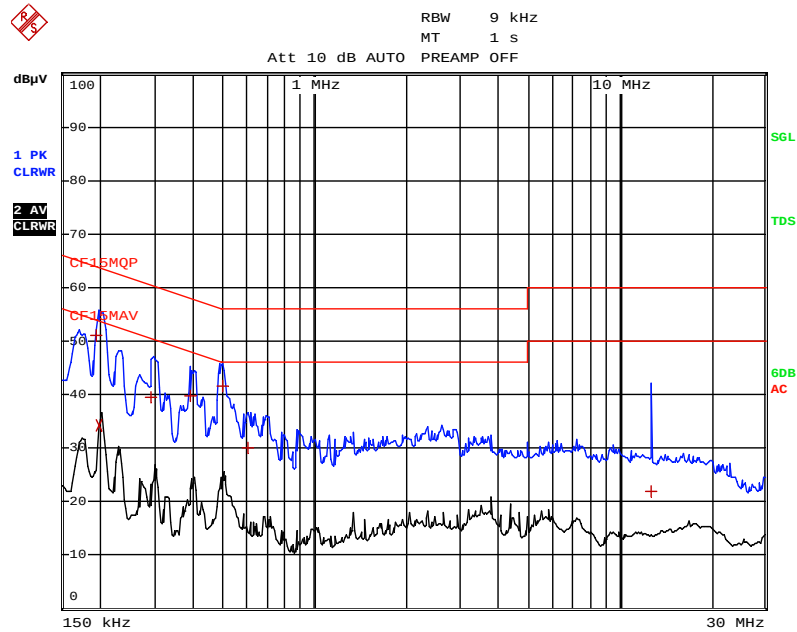
Note: Measurement Uncertainty is ± 4.2 dB at a level of confidence of 95%.

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Model: Elara 60 WS

Date of Test: December 17, 2018 to February 26, 2019

Worst-Case Operating Mode: 127.7kHz loading



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	C11MIAV			
Trace2:	---			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	9 kHz	28.97	L1	-4.29
2 CISPR Average	9 kHz	26.85	L1	
1 Quasi Peak	22.5 kHz	26.12	L1	
2 CISPR Average	22.5 kHz	21.18	L1	
1 Quasi Peak	27 kHz	24.28	L1	
2 CISPR Average	27 kHz	19.65	L1	
1 Quasi Peak	67.5 kHz	16.73	L1	
2 CISPR Average	67.5 kHz	11.31	N	
1 Quasi Peak	99 kHz	35.64	L1	
2 CISPR Average	99 kHz	31.85	N	
1 Quasi Peak	126 kHz	29.12	N	
2 CISPR Average	126 kHz	24.70	L1	
1 Quasi Peak	202.5 kHz	49.15	N	
2 CISPR Average	202.5 kHz	30.40	N	
2 CISPR Average	504 kHz	25.48	L1	
2 CISPR Average	526.5 kHz	20.38	N	
2 CISPR Average	1.341 MHz	17.54	L1	
2 CISPR Average	2.16 MHz	15.10	N	
2 CISPR Average	3.2265 MHz	23.51	L1	
2 CISPR Average	6.453 MHz	16.70	N	

Note: Measurement Uncertainty is ± 4.2 dB at a level of confidence of 95%.

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RADIATED EMISSIONS

Model: Elara 60 WS

Date of Test: December 17, 2018 to February 26, 2019

Worst-Case Operating Mode: Transmitting

Table 1
Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Calculated at 300m (dBμV/m)	Limit at 300m (dBμV/m)	Margin (dB)
H	0.115	84.3	0	11.8	96.1	16.1	26.4	-10.3
H	0.230	41.0	0	11.7	52.7	-27.3	20.4	-47.7
H	0.345	51.7	0	11.6	63.3	-16.7	16.8	-33.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Distance Factor (-dB)	Calculated at 30m (dBμV/m)	Limit at 30m (dBμV/m)	Margin (dB)
H	0.575	33.3	0	11.5	44.8	40.0	4.8	32.4	-27.6
H	0.690	32.4	0	11.4	43.8	40.0	3.8	30.8	-27.0
H	0.805	31.8	0	11.3	43.1	40.0	3.1	29.5	-26.4
H	0.920	28.2	0	11.3	39.5	40.0	-0.5	28.3	-28.8
H	1.035	45.3	0	11.3	56.6	40.0	16.6	27.3	-10.7

- NOTES:
1. Peak Detector Data unless otherwise stated.
 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative sign in the column shows value below limit.
 4. Loop antenna is used for the emissions below 30MHz.
 5. Measurement Uncertainty is ± 5.3 dB at a level of confidence of 95%.

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4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 PRODUCT LABELLING

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 INSTRUCTION MANUAL

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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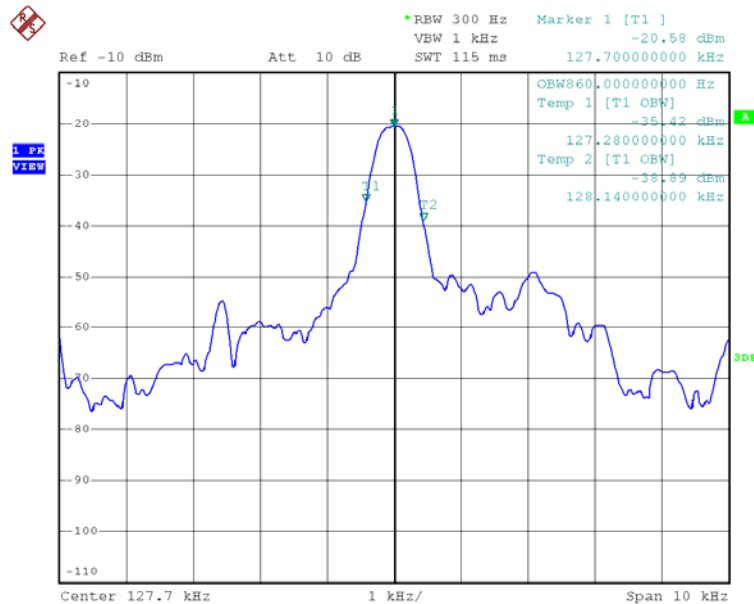
8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Measured Bandwidth

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designed (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

127.7kHz



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8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

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8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

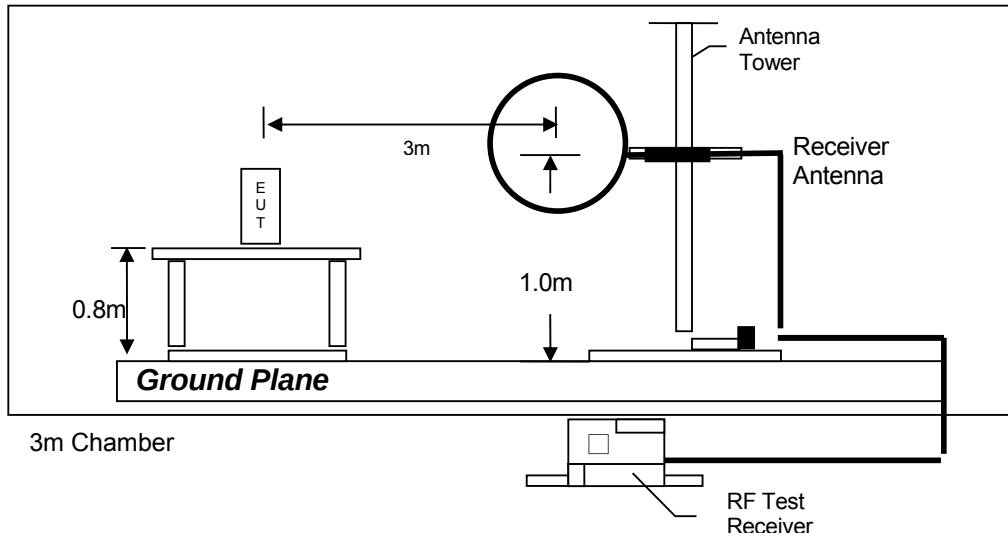
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

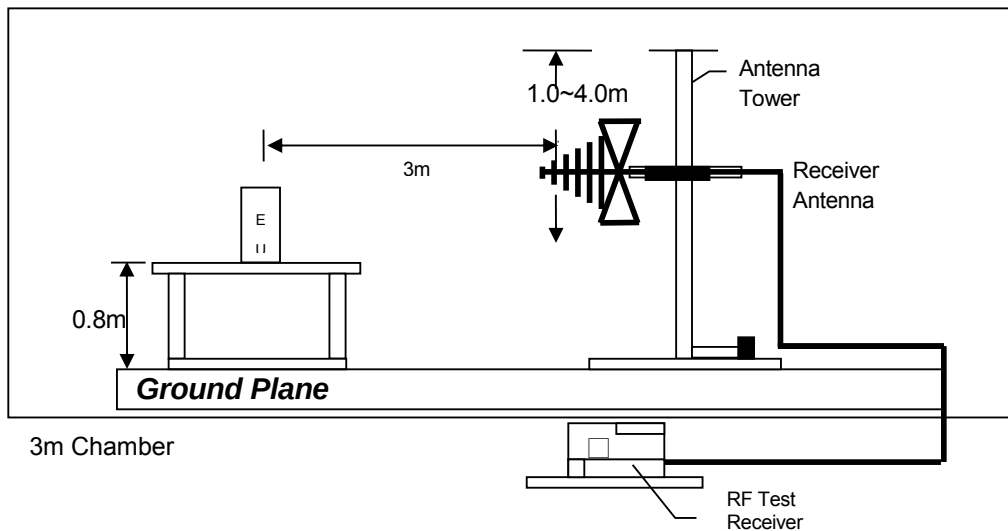
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8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 30MHz



Test setup of radiated emissions above 1GHz

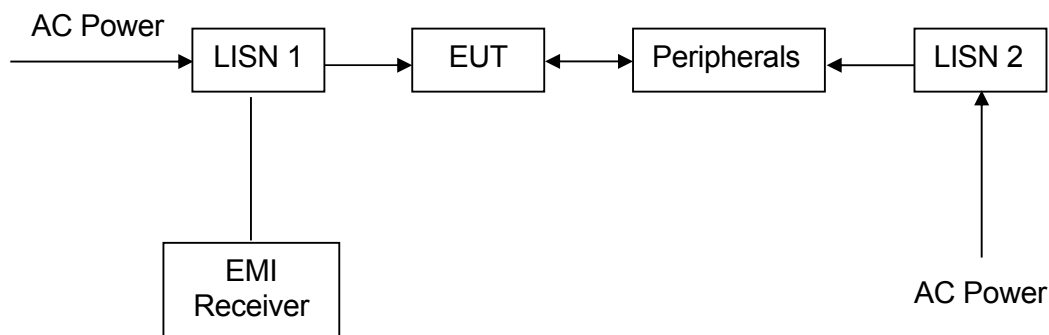
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8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4.3 Conducted Emission Test Setup



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9.0 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

10.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Emi Test Receiver	Log Periodic Antenna	Biconical Antenna
Registration No.	EW-3095	EW-0447	EW-0571
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI	3146	3104C
Calibration Date	March 26, 2019	September 01, 2019	July 23, 2019
Calibration Due Date	March 26, 2020	September 01, 2021	July 23, 2021

Equipment	14m Double Shield Rf Cable (9kHz To 6GHz)	Active Loop H-field (9kHz to 30MHz)
Registration No.	EW-2505	EW-3326
Manufacturer	RADIAL	EMCO
Model No.	nm / br5d / sma 14m	6502
Calibration Date	November 14, 2019	March 21, 2019
Calibration Due Date	November 14, 2020	September 21, 2020

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Artificial Mains Network
Registration No.	EW-3095	EW-2874
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	March 26, 2019	July 05, 2019
Calibration Due Date	March 26, 2020	July 05, 2020

3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2253
Manufacturer	R&S
Model No.	FSP40
Calibration Date	November 18, 2019
Calibration Due Date	November 18, 2020

END OF TEST REPORT