

ETSI EN 301 489-1 V1.9.2 (2011-09)
ETSI EN 301 489-5 V1.3.1 (2002-08)

TEST REPORT

For

Fujian Beifeng Telecom Technology Co., Ltd.

A15 Huaqiao Economic Development Zone, Shuangyang, Luojiang, Quanzhou, Fujian, China

Model: BF-TD505

Report Type: Original Report	Product Type: DIGITAL TRANSCEIVER
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Report Number: RSZ160329003-02	
Report Date: 2016-04-30	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Fujian Beifeng Telecom Technology Co., Ltd.*'s product, model number: *BF-TD505* or the "EUT" in this report was a *DIGITAL TRANSCEIVER*, which was measured approximately: 109 mm (L) × 56 mm (W) × 32 mm (H), rated with input voltage: DC 7.4 V rechargeable battery; For Charger: 84 mm (L) x 103 mm (W) x 68 mm (H), rated with input voltage: DC 9 V from adapter.

Adapter Information:

Model: RSF-DY009-0901000

Input: AC 100-240V, 50/60 Hz, 0.35A

Output: DC 9V, 1.0A

** All measurement and test data in this report was gathered from production sample serial number: 1601785 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2016-03-29.*

Objective

This test report is prepared on behalf of *Fujian Beifeng Telecom Technology Co., Ltd.* in accordance with ETSI EN 301 489-1 V1.9.2 (2011-09) Plus Provisions of ETSI EN 301 489-5 V1.3.1 (2002-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech).

The objective of the manufacturer is to determine the compliance of the EUT with ETSI EN 301 489-1 V1.9.2 (2011-09) Plus Provisions of ETSI EN 301 489-5 V1.3.1 (2002-08).

Related Submittal(s)/Grant(s)

No Related Submittal(s).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V1.9.2 (2011-09).

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modification was made to the EUT tested.

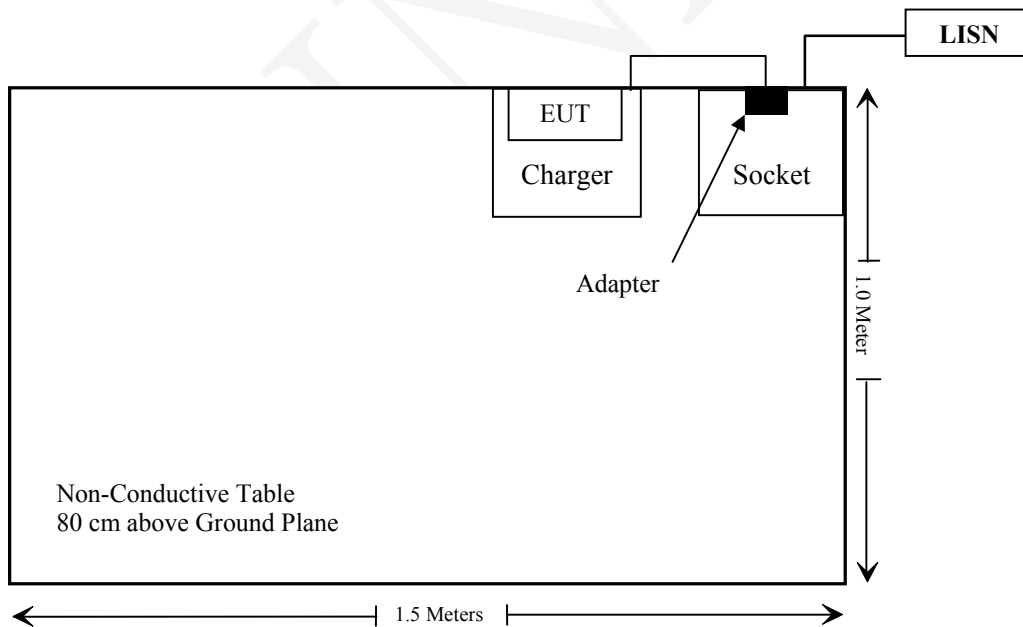
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable	1.2	Adapter	Charge base

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliance
	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable*
	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliance
	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Compliance
	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliance
	Reference to clauses EN 301 489-1 §8.7 Telecommunication ports	Not Applicable*
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz)(EN 61000-4-3)	Compliance
	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliance
	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliance
	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliance
	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	Not Applicable
	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliance
	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliance

Not Applicable: This equipment will not be used in the vehicular environment.

Not Applicable*: This equipment has no telecommunication port and DC power ports.

§7.1 - CONDUCTED EMISSIONS

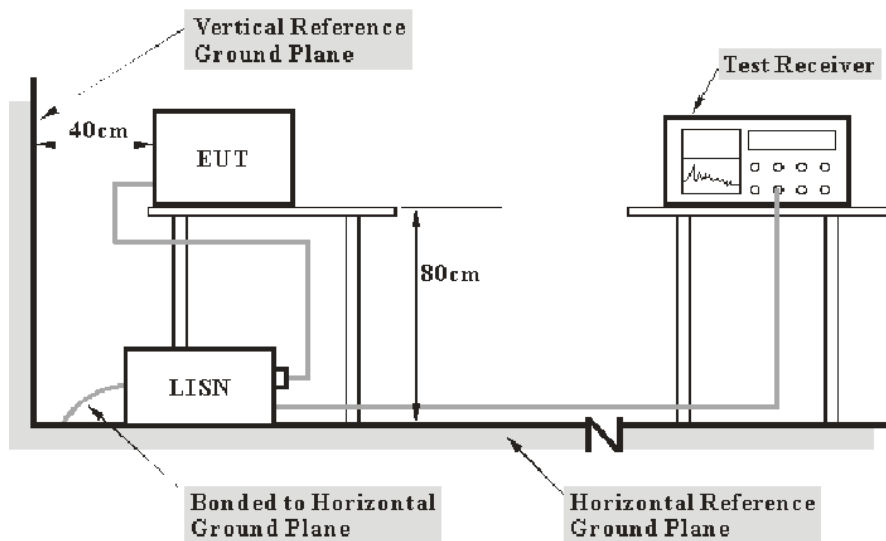
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.34 dB (k=2, 95% level of confidence)
CAT 3	3.72 dB (k=2, 95% level of confidence)
CAT 5	3.74 dB (k=2, 95% level of confidence)
CAT 6	4.54 dB (k=2, 95% level of confidence)

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per EN 301 489-1 measurement procedures. The specification used was with the EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2015-06-01	2016-05-31
Rohde & Schwarz	LISN	ESH2-Z5	892107/021	2015-08-22	2016-08-22
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2015-05-14	2016-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emissions test, the socket was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Pulse Limiter Attenuation

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

in our lab., $U_{(L_m)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

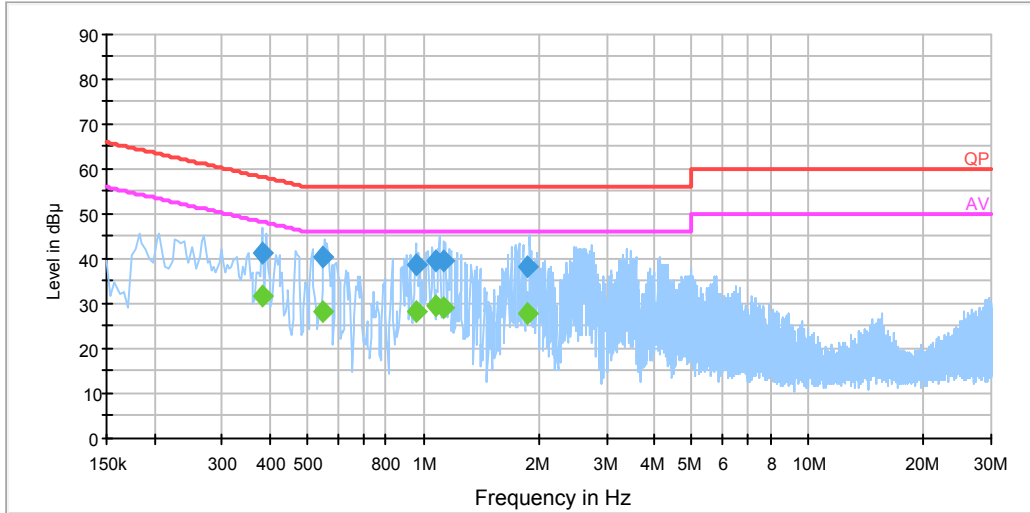
Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-23.

Test Mode: Charging & Transmitting

AC 230 V/ 50 Hz, Line:

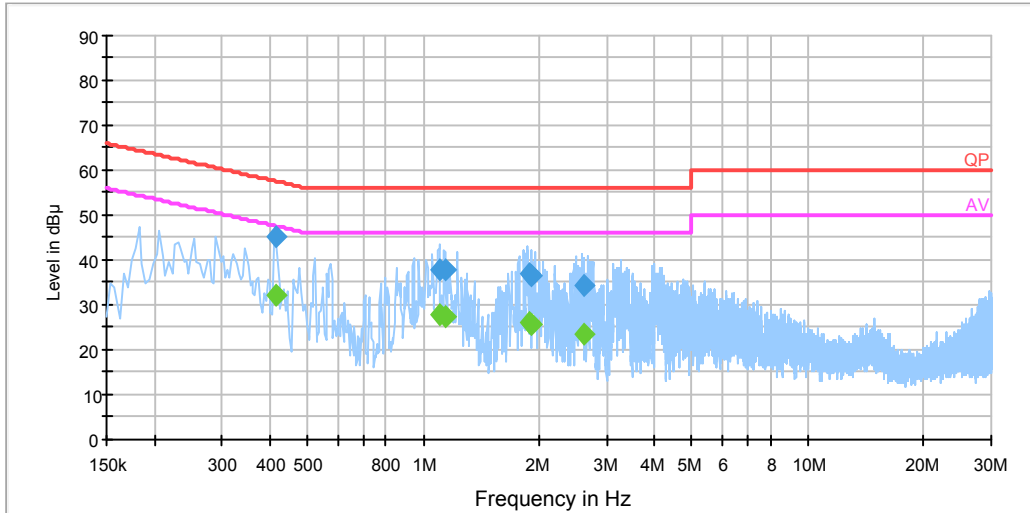
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.380270	41.5	19.9	58.3	16.8	QP
0.380270	31.6	19.9	48.3	16.7	Ave.
0.545690	40.2	19.9	56.0	15.8	QP
0.545690	28.5	19.9	46.0	17.5	Ave.
0.963690	38.8	20.0	56.0	17.2	QP
0.963690	28.3	20.0	46.0	17.7	Ave.
1.081530	39.5	20.0	56.0	16.5	QP
1.081530	29.4	20.0	46.0	16.6	Ave.
1.132990	39.6	20.0	56.0	16.4	QP
1.132990	29.3	20.0	46.0	16.7	Ave.
1.861650	38.3	20.0	56.0	17.7	QP
1.861650	28.0	20.0	46.0	18.0	Ave.

AC 230 V/ 50 Hz, Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.416150	45.4	19.9	57.5	12.1	QP
0.416150	32.0	19.9	47.5	15.5	Ave.
1.101470	37.8	20.0	56.0	18.2	QP
1.101470	27.6	20.0	46.0	18.4	Ave.
1.136990	37.9	20.0	56.0	18.1	QP
1.136990	27.2	20.0	46.0	18.8	Ave.
1.885950	37.1	20.0	56.0	18.9	QP
1.885950	26.1	20.0	46.0	19.9	Ave.
1.905290	36.6	20.0	56.0	19.4	QP
1.905290	25.8	20.0	46.0	20.2	Ave.
2.619150	34.2	20.0	56.0	21.8	QP
2.619150	23.5	20.0	46.0	22.5	Ave.

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit - Corrected Amplitude

§7.1 - RADIATED EMISSIONS

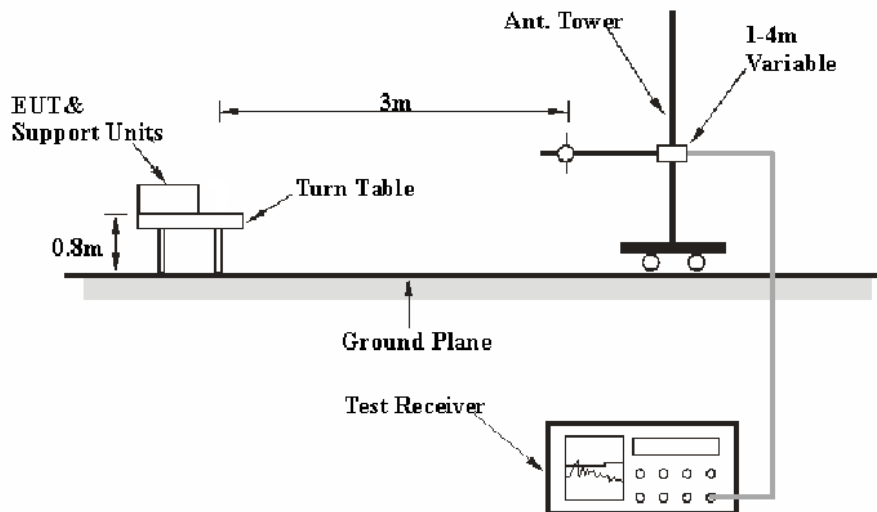
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.04 dB (k=2, 95% level of confidence)
	Vertical	4.52 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.72 dB (k=2, 95% level of confidence)
	Vertical	5.81 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal/Vertical	4.64 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal/Vertical	4.88 dB (k=2, 95% level of confidence)

Test System Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the CISPR 16-1-4:2012, CISPR 16-2-3:2010. The limit was specified in EN 301 489-1.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in the Quasi-peak detection mode for below 1 GHz, and Peak and Average for above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude.}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-11-03	2016-11-03
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
Sunol Sciences	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the data in the following table,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(L_m)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

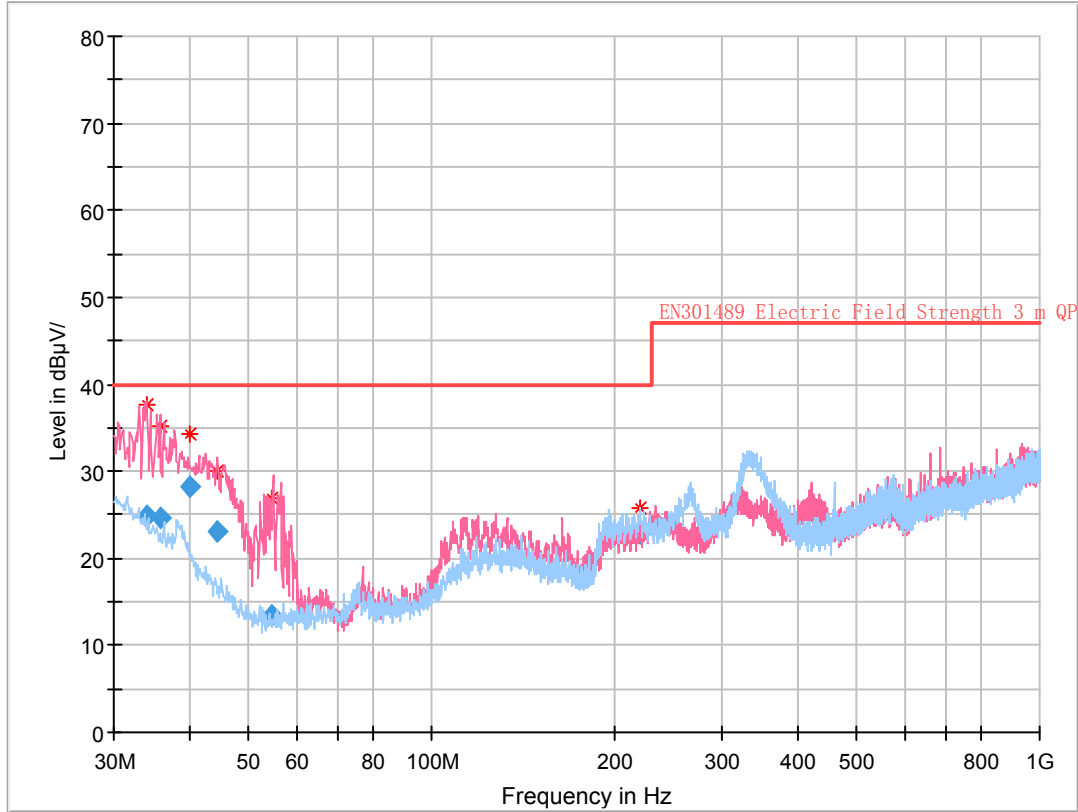
Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-19.

Test Mode: charging & transmitting

30 MHz ~ 1 GHz:

Full Spectrum



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
34.116375	24.81	105.0	V	133.0	-3.4	40.00	15.19
35.919625	24.57	102.0	V	187.0	-4.8	40.00	15.43
39.983750	28.28	106.0	V	156.0	-7.3	40.00	11.72
44.474125	23.10	101.0	V	57.0	-10.6	40.00	16.90
54.652250	13.47	126.0	V	28.0	-14.1	40.00	26.53
220.126375	22.96	177.0	H	346.0	-9.4	40.00	17.04

Above 1 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBuV/m)	EN 301489	
	Reading (dB μ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBuV/m)	Margin (dB)
1298.6	40.26	PK	294	1.0	H	-11.84	28.42	70	41.58
1298.6	24.55	AV	294	1.0	H	-11.84	12.71	50	37.29
1298.6	39.98	PK	338	1.1	V	-11.84	28.14	70	41.86
1298.6	23.82	AV	338	1.1	V	-11.84	11.98	50	38.02

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + cable loss – amplifier factor

Margin = Limit- Corr. Amplitude

§7.1 - HARMONIC CURRENT EMISSIONS

According to EN 61000-3-2-2006 +A1:2009 + A2: 2009 section 7: Equipment with a rated power of 75 Watt or less, other than lighting equipment, are not included in this standard.

FUNZAL

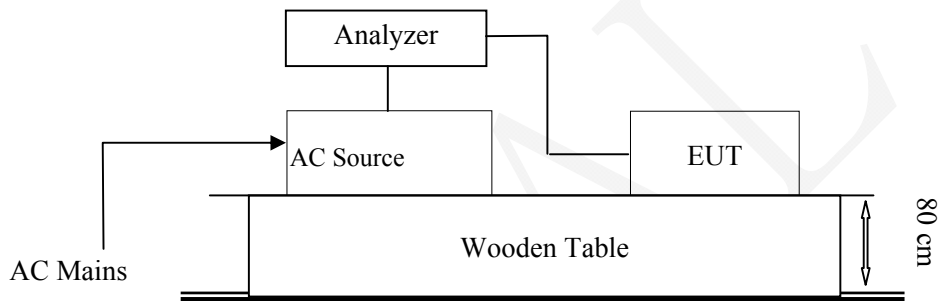
§7.1-VOLTAGE FLUCTUATION AND FLICKER

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	Digital power analyzer	DPA 500N	V0939105176	2015-12-15	2016-12-14
EM Test	AC Source	ACS500	303276	2015-12-15	2016-12-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Test Standard

EN 61000-3-3:2008

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed
 - a) 4 % without additional conditions;
 - b) 6 % for equipment which is:
 - switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

c) 7 % for equipment which is

– attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

– switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

Date of test:	19:00 23.Apr 2016
Tester:	Simon Wang
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	1 min
Observation time:	12 min (12 Flicker measurement)
Flicker meter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Customer:	Fujian Beifeng Telecom Technology Co., Ltd.
E. U. T.:	DIGITAL TRANSCEIVER
Model:	BF-TD505
EUT operation mode	Charging & transmitting

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	Pass
Plt	0.028	0.65	Pass
dc [%]	0.016	3.30	Pass
dmax [%]	0.058	4.00	Pass
dt [s]	0.000	0.50	Pass

**Test Setup Photo**

§7.2 - RF ELECTROMAGNETIC FIELD (80-1000 MHz, 1400- 2700 MHz)

Electromagnetic Field Test System

A signal generator and a power amplifier are used to provide a signal at the appropriate power and frequency to a Broadband antenna to obtain the required electromagnetic field at the position of the EUT in accordance with the EN 61000-4-3 basic EMC publication.

Electromagnetic Field Test System Measurement Uncertainty

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%.

Application of Electromagnetic Field

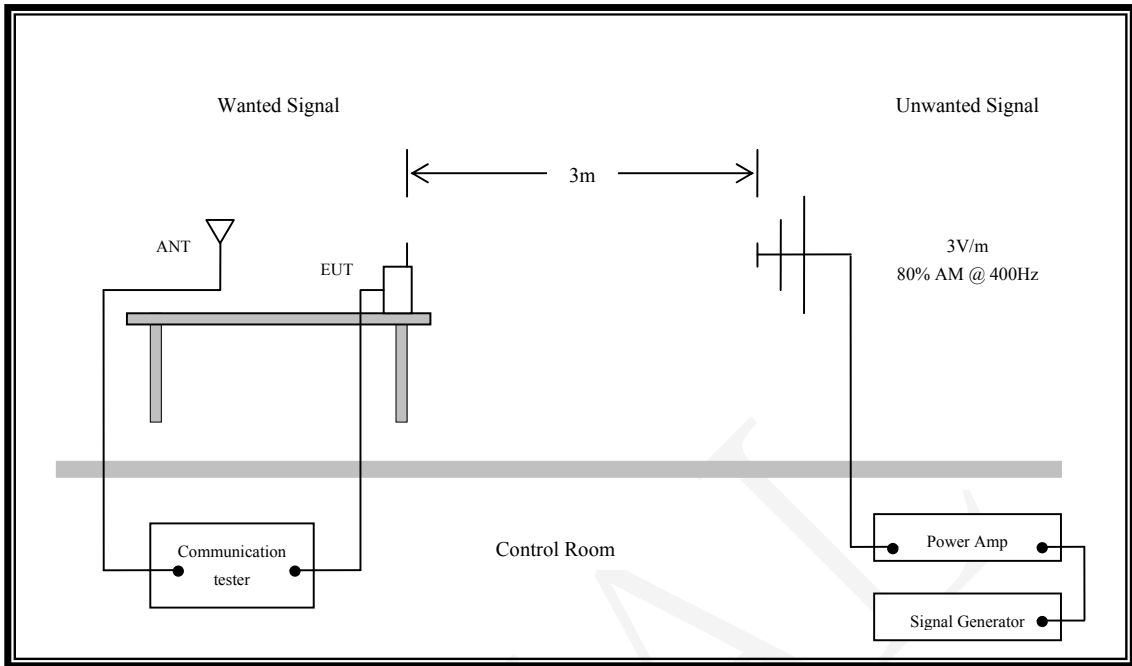
The electromagnetic field is established at the front edge of the EUT. The frequency range is swept from 80 to 1000 MHz and 1400 to 2700 MHz using a power level necessary to obtain a 3 volt/meter, 400Hz AM sine wave modulated at 80% depth, field directed at the EUT. The test is performed with the most susceptible side of the EUT facing the field-generating antenna. If an error is detected, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing the scan.

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Amplifier Research	Power Amplifier	200W1000/M2	H1004497	2015-11-03	2016-11-03
Amplifier Research	Microwave Amplifier	5S1G4	71377	NCR	NCR
Amplifier Research	Field Meter	FM5004	302149	2016-01-08	2019-01-08
ETS-LINDGREN	Sensor	HI-6005	00069461	2016-01-08	2019-01-08
HP	Signal Generator	8648C	3426A01345	2015-06-09	2016-06-09
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
HP	Synthesized Sweeper	8341B	2624A00116	2015-07-02	2016-07-01
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
HP Agilent	RF Communication Test Set	8920A	3325U00859	2015-06-03	2016-06-02

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

EUT Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 / EN 61000-4-3:2006 + A1:2008 + A2:2010
 Test Level 2 at 3V / m
 Test Levels and Performance Criterion

Test Level

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-22.

Test Mode: Charging & transmitting

Frequency Range (MHz)	Front (3 V/m)		Rear (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1400-2700	A	A	A	A	A	A	A	A

NOTE:

- A: Performance Criterion A
- a bit error not exceed 1×10^{-2}
- No unintentional transmission is found.

Test Result: Pass



Test Setup Photo

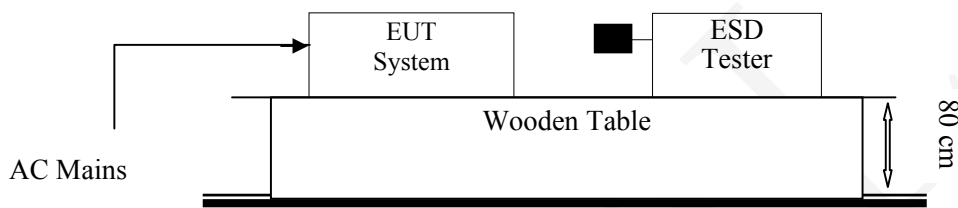
§7.2 - ELECTROSTATIC DISCHARGE

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
SCHAFFNER	ESD Tester	NSG435	005 101	2015-05-19	2016-05-19

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

ETSI EN 301 489-1 V1.9.2 / EN 61000-4-2:2009

Air Discharge at ± 2 , ± 4 , ± 8 kV

Contact Discharge at ± 2 kV, ± 4 kV

Test Level

Level	Test Voltage Contact Discharge (\pm kV)	Test Voltage Air Discharge (\pm kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m × 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-22.

Test Mode: Charging & transmitting

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front (16 points)	A	A	A	A	A	A	/	/
Back (1 points)	A	A	A	A	A	A	/	/
Left (3 points)	A	A	A	A	A	A	/	/
Right (1 points)	A	A	A	A	A	A	/	/
Top (3 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Back (6 points)	A	A	A	A	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

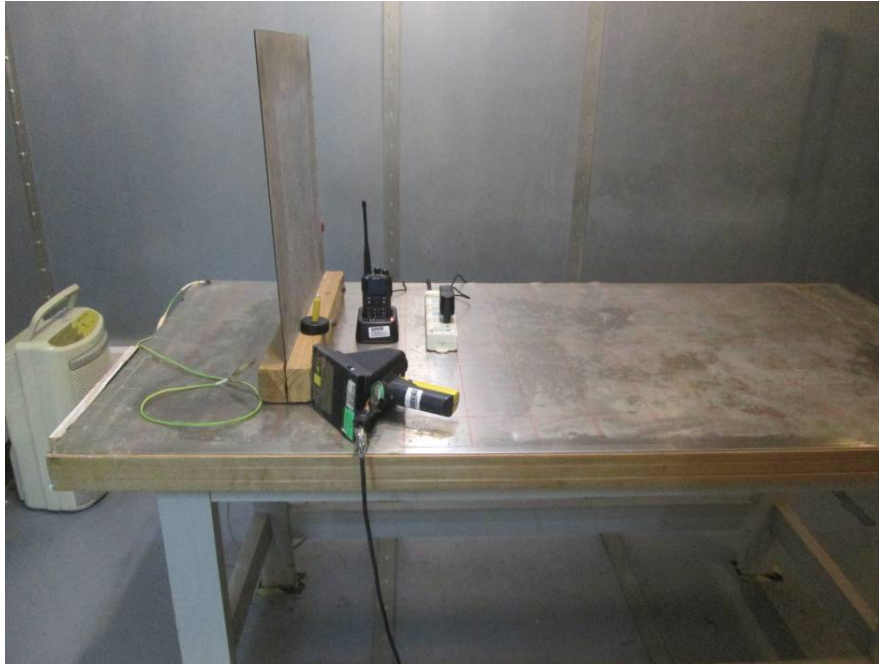
EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/



Note:  represents air discharge,  represents direct contact



Test Setup Photo

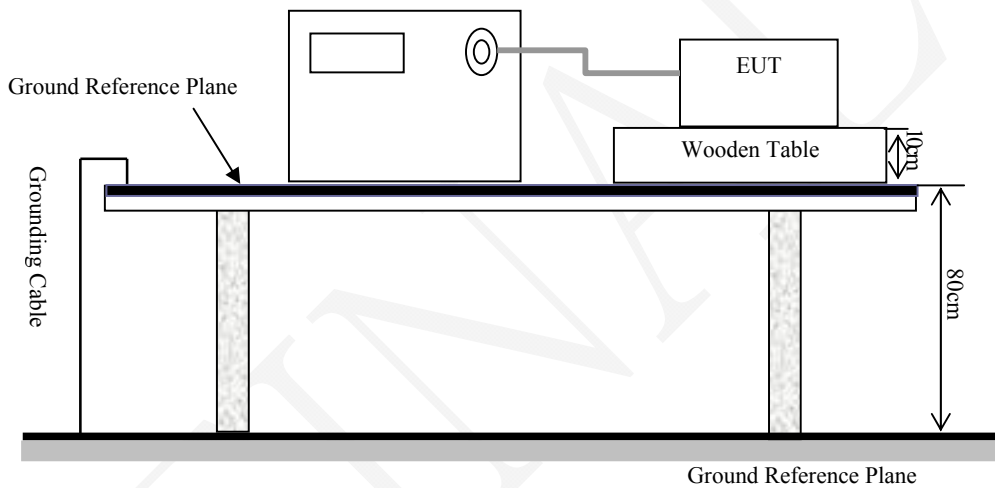
§7.2 - ELECTRICAL FAST TRANSIENT IMMUNITY

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	Ultra Compact Generator	UCS 500 N5	V0939105172	2015-12-15	2016-12-14
EM Test	Auto-transformer	MV2616	V0939105173	2015-12-15	2016-12-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 (2011-09)/ EN 61000-4-4: 2004 + A1:2010
AC Mains: Test level 2 at 1 kV

Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility’s electrical earth.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-21.

Test Mode: Charging & Transmitting

EN 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
	L+N	A	A	A	A	/	/	/	/
	L + Earth	/	/	/	/	/	/	/	/
	N + Earth	/	/	/	/	/	/	/	/
	L+N+Earth	/	/	/	/	/	/	/	/
Signal Port	RJ11	/	/	/	/	/	/	/	/



Test Setup Photo

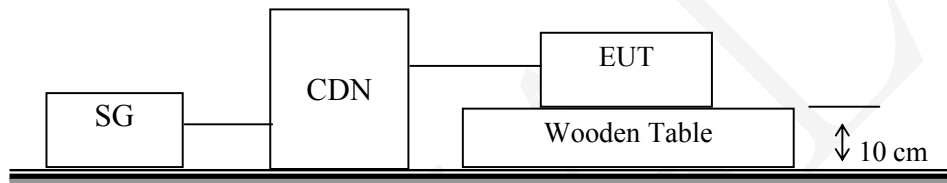
§7.2 - RF COMMON MODE

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	CDN	M3	1201-05	2015-12-15	2016-12-14
EM Test	C/S Tester	CWS500	303277	2015-12-15	2016-12-14
EM Test	Attenuator	6 dB	303282	NCR	NCR

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 (2011-09)/EN 61000-4-6: 2009
Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,

Test Level

Level	Voltage Level (r.m.s.) (U ₀)
1	1
2	3
3	10
X	Special

Performance Criterion: A

Note: "A" stand for, during test, operate as intended no loss function, no degradation of performance, no unintentional retransmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data and Setup Photo

Environmental Conditions

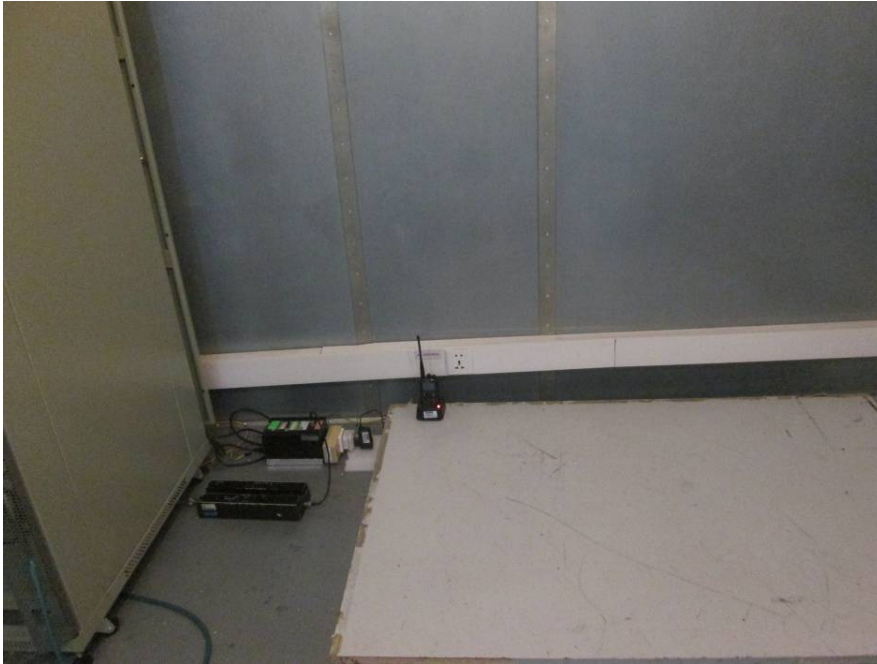
Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-22.

Test Mode: Charging & Transmitting

Table 1: AC mains power input port
Frequency range: 150 kHz to 80 MHz
Modulation: Amplitude 80%, 1 kHz sine wave
Test level: 3V r.m.s.

Level	Voltage Level (r.m.s.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/



Test Setup photo

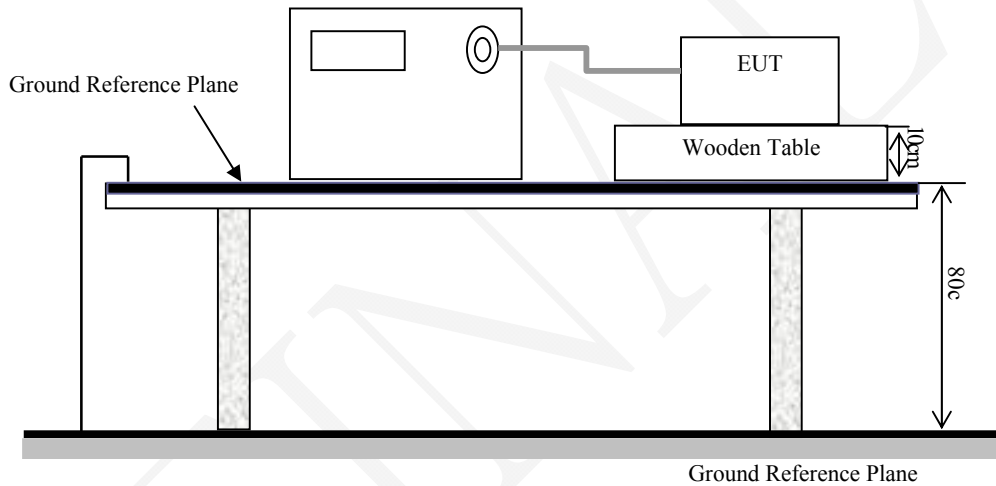
§7.2 - SURGES, LINE TO LINE AND LINE TO GROUND

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	Ultra Compact Generator	UCS 500 N5	V0939105172	2015-12-15	2016-12-14
EM Test	Auto-transformer	MV2616	V0939105173	2015-12-15	2016-12-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 (2011-09) / EN 61000-4-5: 2006

AC Mains port:

Line to Line at 0.5 kV, 1kV;

Test Level

Level	Open Circuit Output Test Voltage $\pm 10\%$	Performance Criterion	
		AC Mains	Signal Port
1	0.5 kV	B	C
2	1 kV	B	C
3	2 kV	B	C
4	4 kV	B	C
X	Special	/	/

Test Procedure

- 1) For line to line coupling mode, provide a 1.2/50 μ s voltage surge (at open-circuit condition) and a 8/20 μ s current surge into a short circuit.
- 2) For telecommunication port, provide a 10/700 μ s voltage surge (at open-circuit condition) and a 5/320 μ s current surge into a short circuit.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-22.

Test Mode: Charging & Transmitting

Table 1: AC mains power input port

Level	Voltage	Poll	Path	Pass	Fail
1	0.5 kV	±	L-N	A	/
2	1 kV	±	L-N	A	/
3	2 kV	±	L-PE, N-PE	/	/
4	4 kV	±	L-PE, N-PE	/	/



Test Setup photo

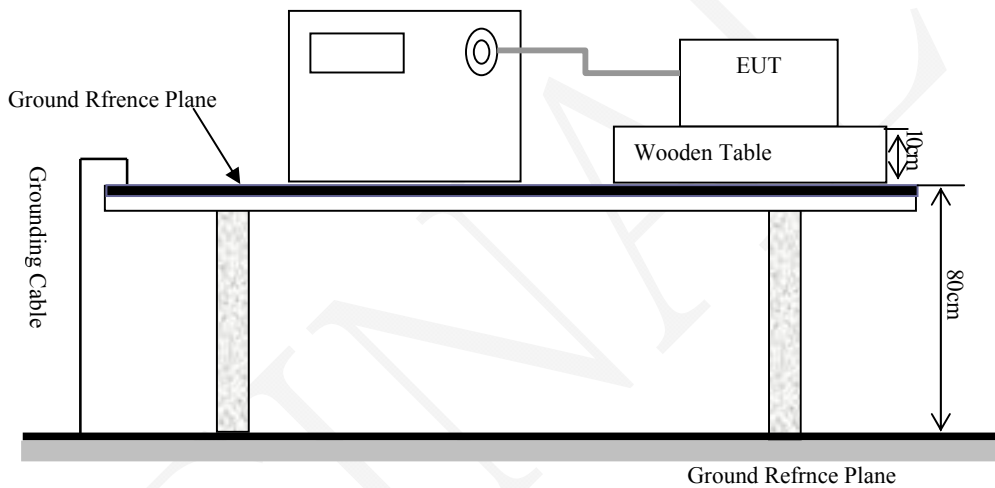
§7.2 - VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	Ultra Compact Generator	UCS 500 N5	V0939105172	2015-12-15	2016-12-14
EM Test	Auto-transformer	MV2616	V0939105173	2015-12-15	2016-12-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 (2011-09) / EN 61000-4-11: 2004
 Test levels and Performance Criterion

Test Level

Test Level	Voltage dip and short interruptions (% Residual Voltage)	Duration (in period)	Performance criterion:
1	0	0.5	B
2	0	1	B
3	70	25	C
4	0	250	C

Test Procedure

- 1) The interruption is introduced at selected phase angles with specified duration.
- 2) Record any degradation of performance.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Simon Wang on 2016-04-22.

Test Mode: Charging & Transmitting

Level	Voltage dip and short interruptions (% Residual Voltage)	Periods	Phase Angle	N	Result
1	0	0.5	0/90/180/270	3	A
2	0	1	0/90/180/270	3	A
3	70	25	0/90/180/270	3	A
4	0	250	0/90/180/270	3	B



Test Setup photo

EXHIBIT A - CE PRODUCT LABELING

CE Label Format

C E1313 Ⓢ

Specifications: The marking set out above must be affixed to the apparatus or to its data plate and have a minimum height of 5 mm. The elements should be easily readable and indelible. They may be placed anywhere on the apparatus case or in its battery compartment. No tool should be needed to view the marking. 1313: 4 digit notified body number

Note: The label should contain the below content:

- ① The name of the manufacturer or the person responsible for placing the apparatus on the market
- ② Type
- ③ Batch and/or serial numbers

Proposed Location of Label on EUT



EXHIBIT B - EUT PHOTOGRAPHS

EUT – Front View



EUT – Rear View



EUT – Top View



EUT – Bottom View



EUT – Left View



EUT – Right View



EUT – Antenna View



EUT – Antenna Port View



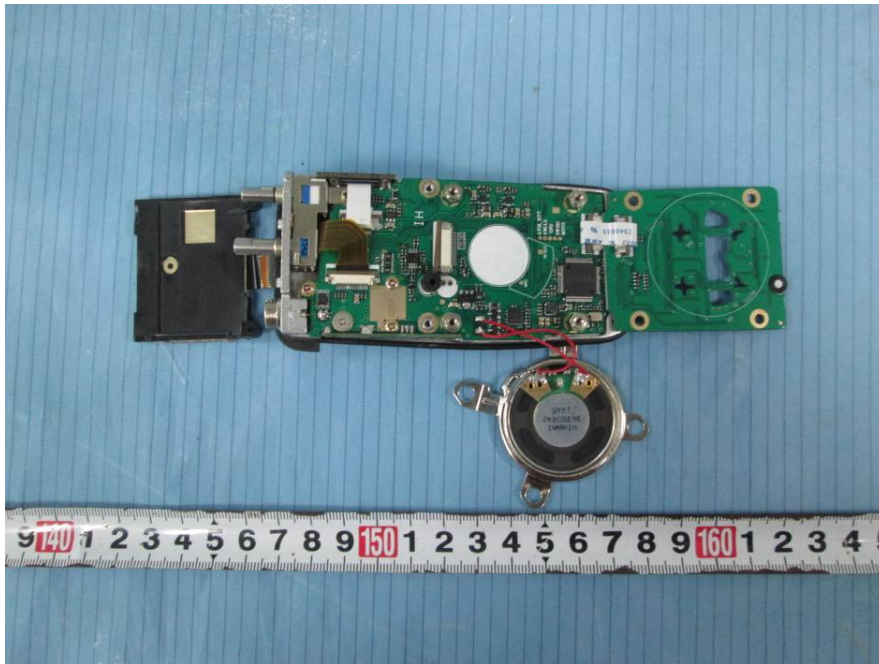
EUT – Cover off View 1



EUT – Cover off View 2



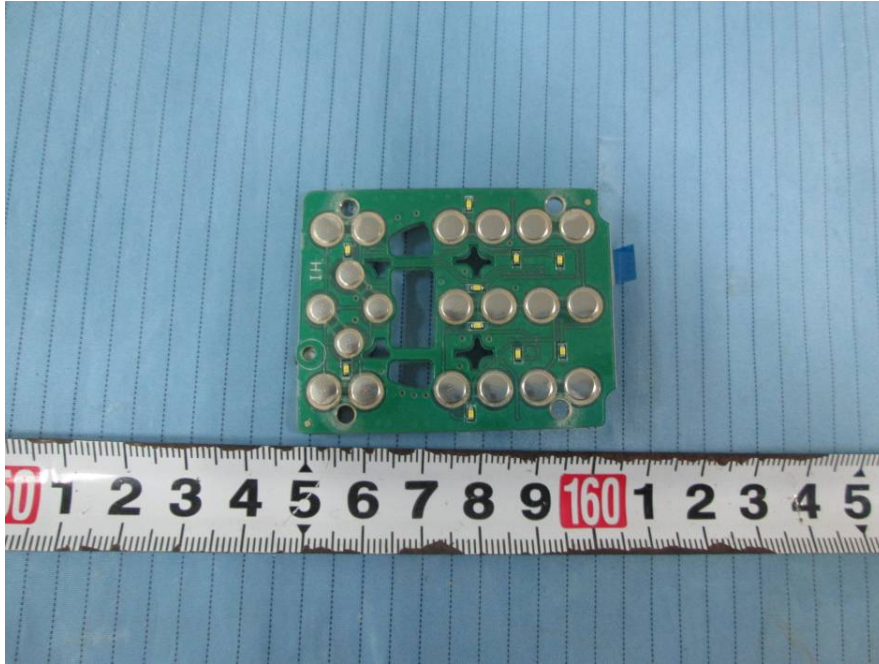
EUT – Cover off View 3



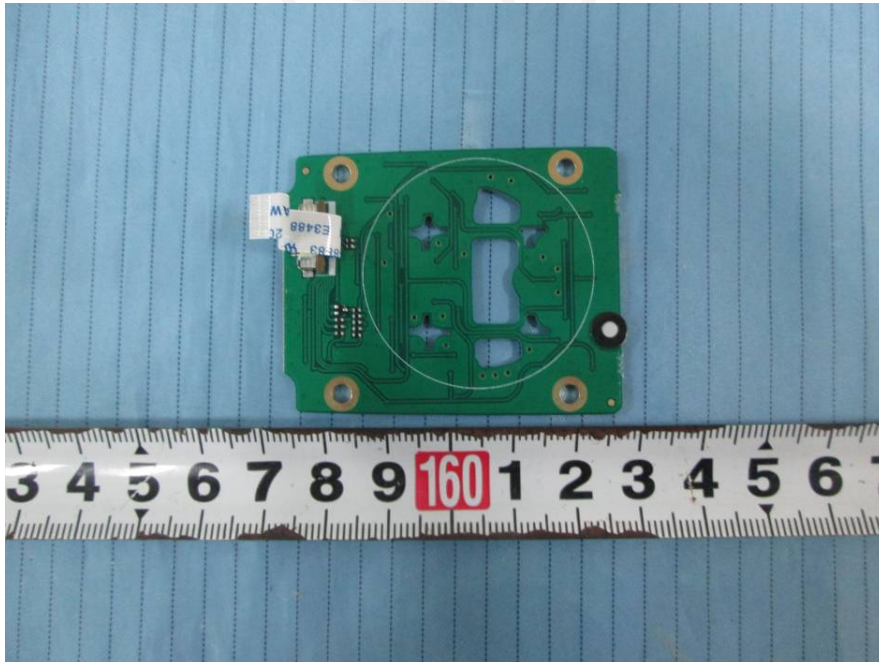
EUT – Cover off View 4



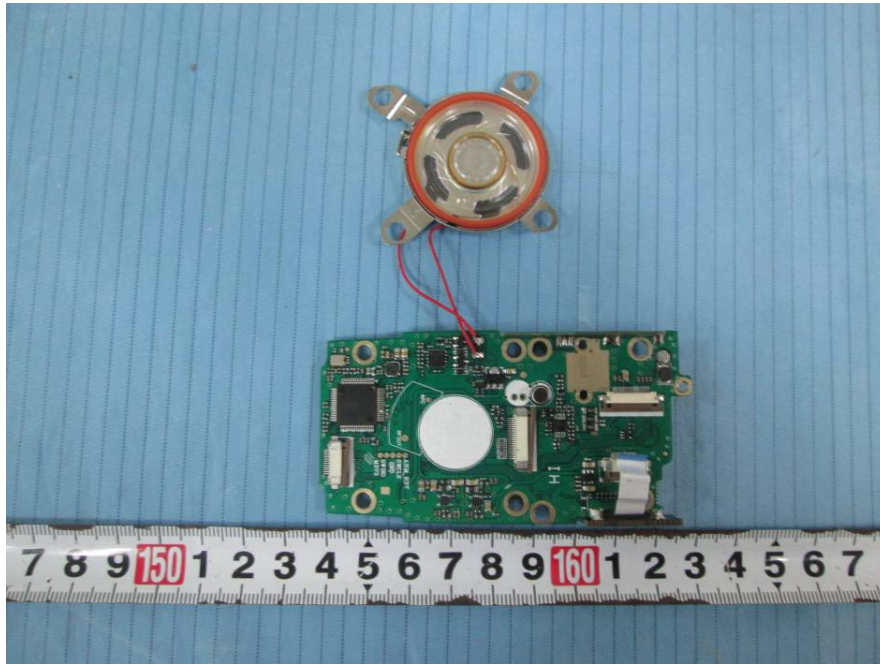
EUT Key-Board Top View



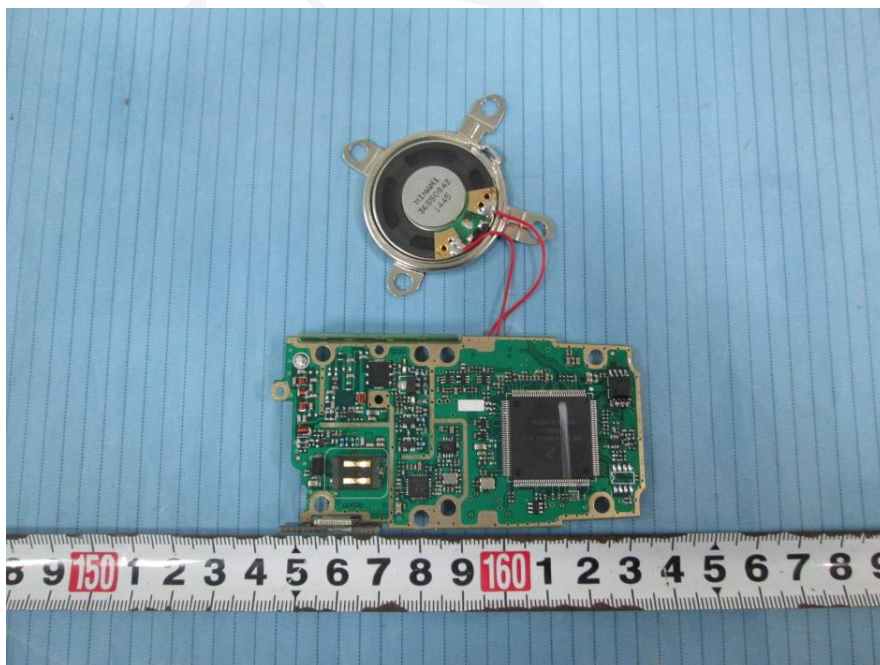
EUT Key-Board Bottom View



EUT – Main Board Top View



EUT – Main Board Bottom View



EUT – Front View (Charger)



EUT – Rear View (Charger)



EUT – Top View (Charger)



EUT – Bottom View (Charger)



EUT – Left View (Charger)



EUT – Right View (Charger)



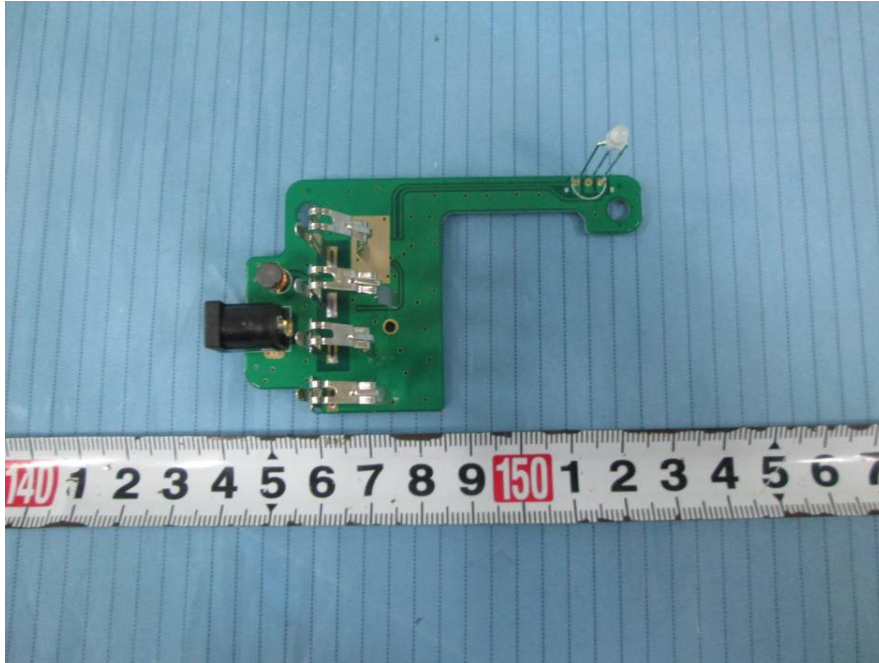
EUT – Cover off View 1 (Charger)



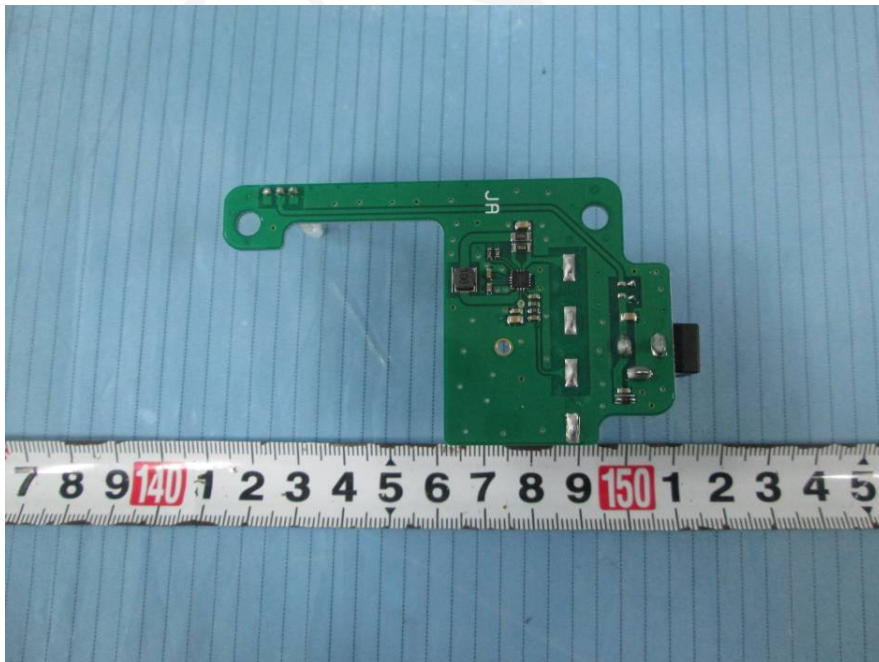
EUT – Cover off View 2 (Charger)



EUT – Main Board Top View (Charger)



EUT –Main Board Bottom View (Charger)



EUT – Adapter View



EUT –Adapter Label View



EXHIBIT C - TEST SETUP PHOTOGRAPHS

AC Line Conducted Emissions - Front View



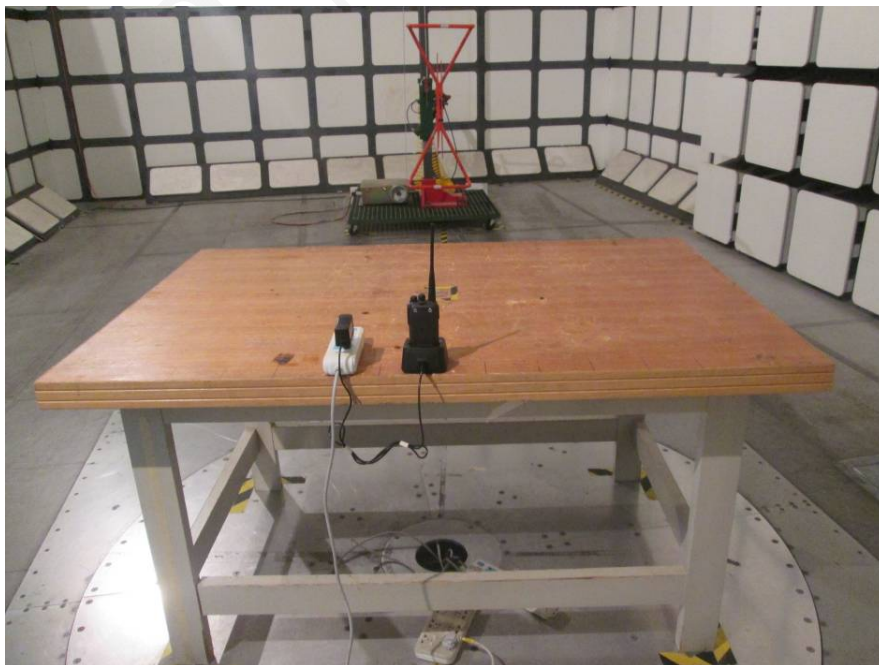
AC Line Conducted Emissions - Side View



Radiated Emissions - Front View (Below 1 GHz)



Radiated Emissions - Rear View (Below 1 GHz)



Radiated Emissions - Front View (Above 1 GHz)



Radiated Emissions - Rear View (Above 1 GHz)



******* END OF REPORT *******