Shenzhen	POCE	Technology	Co., Lta
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Report NO .: POCE19062413YRE

# **EMC TEST REPORT**

Draft ETSI EN 301 489-1 V2.2.1 (2019-03) & ETSI EN 301 489-3 V2.1.1 (2019-03)

	Report Reference No.	:	POCE19062413YRE
	Applicant's Name	:	
	Address of Applicant	:	
	Test Firm	:	Shenzhen POCE Technology Co., Ltd.
	Address of Test Firm	Ģ	H Building, Hongfa Science and Technology Park, Tangtou,
			Shiyan, Bao'An District, Shenzhen, China
	Test Specification Standard	:	Draft ETSI EN 301 489-1 V2.2.1 (2019-03)
			ETSI EN 301 489-3 V2.1.1 (2019-03)
	Product Name	i	Wireless Charger
9 1	Model/Type Reference		WPC420-10W
	Listed Models	:	N/A
	Date of Receipt	:	Jun. 24, 2019
	Date of Test	••	Jun. 24, 2019 Jun. 29, 2019
	Data of Issue	:	Jun. 29, 2019
	Result	:	PASS

Compiled by:

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## **Revision History Of Report**

REPORT No.	Version	Description	Issue Date
POCE19062413YRE	V1.0	Initial Test Report Release	Jun. 29, 2019
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## **1. GENERAL INFORMATION**

## 1.1 Test Standards

**Draft ETSI EN 301 489-1 V2.2.1 (2019-03)** —ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

**ETSI EN 301 489-3 V2.1.1 (2019-03)** — Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

## 1.2 Summary Of Test Result

Draft ETSI EN 301 489-1/ Requirements		
POUL POUL DO	Emission	POU
Conducted Emission( AC Mains)	Draft ETSI EN301 489-1 V2.2.1 Clause 7.1	PASS
Radiated Emission	Draft ETSI EN301 489-1 V2.2.1 Clause 7.1	PASS
Conducted Emission( Telecommunication Ports)	Draft ETSI EN301 489-1 V2.2.1 Clause 7.1	N/A P
Harmonic Current Emissions	Draft ETSI EN301 489-1 V2.2.1 Clause 7.1	N/A
Voltage Fluctuations and Flicker	Draft ETSI EN301 489-1 V2.2.1 Clause 7.1	N/A
POUL POUL	Immunity	PO
Electrostatic Discharge	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	PASS
RF Electromagnetic Field	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	PASS
Fast Transients Common Mode	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	N/A
Surges	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	N/A
RF Common Mode 0,15 MHz to 80 MHz	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	∫⊂ N/A
Transients and Surges	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	N/A
Voltage Dips and Interruptions	Draft ETSI EN301 489-1 V2.2.1 Clause 7.2	N/A

Note: N/A means this test item is not applicable for this device.

Note: This device also belong to information technology equipment, and most of EN55032 and EN55035's test items are same with draft ETSI EN301 489's.so most of EN55032 and EN55035's tests were performed together with draft EN301 489's test.

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## 2. GENERAL INFORMATION

- 2.1 Client Information
  - Applicant

CE POCE POCE POCE POCE JMTek Industries(Shenzhen) Co., Ltd.

Address

14G, Innovation Tech Building, Quanzhi Science and Technology innovation Park, ShaJing Street, Baoan District, ShenZhen, China

Manufacturer

JMTek Industries(Shenzhen) Co., Ltd.

Address

14G, Innovation Tech Building, Quanzhi Science and Technology innovation Park, ShaJing Street, Baoan District, ShenZhen, China

## 2.2 TEST Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	15°C -35°C
Relative Humidity	35%-55 %
Air Pressure	101KPa
Description of Device (EUT)	

## 2.3 Description of Device (EUT)

Equipment	Wireless Charger
Model Name	WPC420-10W
Charger Information	Input: 5V==2A; 9V==1.67A Wireless Output: 5V==1A(5W), 9V==1.1A(10W) USB Output: 5V==1A Max
Operation Frequency	114.28KHz
Modulation Type	MSK POUL POUL POCE
Antenna Type	Loop coil antenna
Antenna Gain	0 dBi

Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

## 2.4 Description of Test Modes

The EUT has been tested under typical operating condition. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

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Test Mode				
EMI	Mode 1: normal working mode/ Transmitting			
EMS	Mode 1: Transmitting Mode 2: Standby	JE PO		

NOTE: For DC (battery-powered equipment, no adapter) equipment, we tested the conducted Emission using HP notebook, notebook model:HP-CQ45, notebook adapter model: 0713A1990 INPUT:100-240V~1.5A 50-60Hz OUTPUT:19V ......4.74A

## 2.5 Equipments Used During The Test

## Power Line Conducted Emission

POW	er Line Conducted Emi	ssion	of the	PI	pQ	UP
ltem	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interva
5	Test Receiver	Rohde & Schwarz	ESCI 3	101431	Dec. 14, 2018	1 Year
2	L.I.S.N	Rohde & Schwarz	ESH3-Z5	831.5518.5 2	Dec. 14, 2018	1 Year
3	50ΩCoaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
4	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	Dec. 14, 2018	1 Year
5	Voltage Probe	Rohde & Schwarz	TK9416	N/A of	Dec. 14, 2018	1 Year

## **Radiated Emission Measurement**

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Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
10	Spectrum Analyzer	Agilent	E4408B	CFG006	Dec. 14, 2018	1 Year
2	Test Receiver	R&S	ESCI	101431	Dec. 14, 2018	1 Year
3	Bilog Antenna	Model JB6	CBL6111D	A090414	Dec. 14, 2018	1 Year
4	50 Coaxial Switch	Anritsu Corp	MP59B	610023724 8	Dec. 14, 2018	1 Year
5	EMI Power Line Filter	DUOJI EME	FNF 201 BQ6686	N/A	Dec. 14, 2018	1 Year
6	EMI Power Line Filter	JIANLI	DL-40C	N/A	Dec. 14, 2018	1 Year
7	Cable	Schwarzbeck	AK9513	ACRX1	Dec. 14, 2018	1 Year
8	Cable	Rosenberger	N/A	FP2RX2	Dec. 14, 2018	1 Year
9	Cable	Schwarzbeck	AK9513	CRPX1	Dec. 14, 2018	1 Year
10	Cable	Schwarzbeck	AK9513	CRRX2	Dec. 14, 2018	1 Year
11	Signal Generator	HP	8648A	3625U0057	Dec. 14, 2018	1 Year

## **Electrostatic Discharge Immunity Test**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
_1	ESD Tester	PRIMA	61002AG	PR14042705	Dec. 14, 2018	1 Year
2	Audio Analyzer	R&S	UPV	100419	Dec. 14, 2018	1 Year

 

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## 2.6 Test Lab Information

## CNAS Registration Number is L8229

Shenzhen POCE Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Jan. 06, 2016.

## VCCI Membership No.: 3941

The 3m Semi-anechoic chamber of Shenzhen POCE Technology Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-3941. Date of Registration: Oct. 22, 2018.

## 2.7 Statement Of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented .quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	±2.50dB	(1)
Radiated Emission	1~12.75GHz	±3.20dB	(1)
Conducted Emission	0.15~30MHz	±2.64dB	(1)

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

#### Harmonic Current Emission

The measurement uncertainty is evaluated as ± 1.4 %.

### Voltage Fluctuations and Flicker

The measurement uncertainty is evaluated as ± 1.2 %.

### Electrostatic Discharge

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in ESD testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant ESD standards. The immunity test signal from the ESD system meet the required specifications in IEC 61000-4-2 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.22% and 2.36%.

### RF Electromagnetic Field

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in RS testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant RS standards. The immunity test signal from the RS system meet the required specifications in IEC 61000-4-3 through the calibration for the uniform field strength and monitoring for the test level with the uncertainty evaluation report for the electrical filed strength as being 2.50 dB.

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#### Fast Transients Common Mode

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in EFT/Burst testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant EFT/Burst standards. The immunity test signal from the EFT/Burst system meet the required specifications in IEC 61000-4-4 through the calibration report with the calibrated uncertainty for the waveform of voltage. Frequency and timing as being 1.33% and 2.50%.

#### RF Common Mode

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in CS testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant CS standards. The immunity test signal from the CS system meet the required specifications in IEC 61000-4-6 through the calibration for unmodulated signal and monitoring for the test level with the uncertainty evaluation report for the injected modulated signal level through CDN and EM Clamp/Direct Injection as being 2.46 dB and 2.85 dB.

#### Voltage Dips and Interruption

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in DIP testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant DIP standards. The immunity test signal from the DIP system meet the required specifications in IEC 61000-4-11 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.95% and 3.24%.

#### Transients and Surges

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in Transients and Surges testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant DIP standards. The immunity test signal from the Transients and Surges system meet the required specifications in ISO 7637-2 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.25% and 2.75%.

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## 3. EMC EMISSIONS MEASURMENT METHODS AND RESULTS

## Test configuration

This clause defines the requirements for test configurations:

• measurements shall be made in the operational mode producing the largest emission in the frequency band being investigated consistent with normal applications;

• the equipment shall be configured in a manner which is representative for normal/typical operation, wherepractical;

• where radio equipment is provided with an integral antenna, it shall be tested with the antenna fitted in a manner typical of normal intended use, unless declared as a removable antenna;

• if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum representative configuration of ancillary equipment necessary to exercise the ports;

• if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operational conditions and to ensure that all the different types of ports are covered;

• ports, which in normal operation are connected, shall be connected to an ancillary equipment or to a representative piece of cable terminated to simulate the impedance of the ancillary equipment. RF input/output ports shall be correctly terminated;

• the configuration and mode of operation during the measurements shall be precisely noted in the test report.

## **General**

This test is only applicable to ancillary equipment not incorporated in the radio equipment and intended to be measured on a stand-alone basis, as declared by the manufacturer. This test shall be performed on a representative configuration of the ancillary equipment.

This test is not applicable for ancillary equipment incorporated in the radio equipment, or for ancillary equipment intended to be measured in combination with the radio equipment. In these cases the requirements of the relevant product standard for the effective use of the radio spectrum shall apply.

Product related conditions for combined testing of radio and ancillary equipment may be contained in the relevant part of draft ETSI EN 301 489 series [i.13].

This test assesses the level of radiated electromagnetic noise from the enclosure of ancillary equipment.

### Test method

The test method shall be in accordance with CENELEC EN 55032 [1], annex A.2.

## **Limits**

The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

Alternatively, for ancillary equipment intended to be used exclusively in an industrial environment or telecommunication centres, the class A limits given in CENELEC EN 55032 [1], annex A tables A.2 and A.3 may be used.

## 3.1 Radiated Emission

**Block Diagram of Test** 

1 Radiated Emission ock Diagram of Test			
LIMITS OF	RADIATED EMISSION MEASU	REMENT (Below 1000MHz)	E
	Class B(at 10m)	Class B (at 3m)	
	dBuV/m	dBuV/m	
30 – 230	30 000	40	2E
230 – 1000	00E 37	47	2002

#### LIMITS OF RADIATED EMISSION MEASUREMENT(Above 1000MHz)

			••••	
	Class A (at 1	0m) dBuV/m	Class B (at 3	3m) dBuV/m
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	DOC 50
3000-6000	80 20	60	74	54

Notes: (1)The limit for radiated test was performed according to as following: Draft ETSI EN 301 489-1/ EN55032:2015

(2)The tighter limit applies at the band edges.

## TEST PROCEDURE

- a) The EUT was placed on the top of a rotating table 3 meters away from the receiver antenna and 0.8 meters above the ground at a 9X9X6 anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The height of the equipment shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode c) pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak/Average detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak/Average Mode Limit, the d) EUT shall be deemed to meet QP/AV Limits and then no additional QP/AV Mode measurement performed.
- For the actual test configuration, please refer to the related Item -EUT Test Photos.

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Note: Above 1-6GHz have been tested and found no emission except floor noise

## 3.2 Conducted Emission (AC Mains)

LIMIT

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	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note: (1)The tighter limit applies at the band edges.

(2)The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

Test Procedure

- a) The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

----PASS----

d) LISN at least 80 cm from nearest part of EUT chassis.





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## 4. IMMUNITY TEST METHODS AND RESULTS

## Test configuration

- This clause defines the requirements for test configurations:
- the tests shall be made in the mode(s) of operation specified in clause 4 in the relevant part of the draft ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment:
- the tests shall be carried out at a point within the specified normal operating environmental range and at the rated supply voltage for the equipment;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment connected to the minimum representative configuration of ancillary equipment necessary to exercise the ports;

• where radio equipment is provided with an integral antenna, it shall be tested with the antenna fitted in a manner typical of normal intended use, unless declared as a removable antenna;

· for the immunity tests of ancillary equipment, without a separate pass/fail criteria, the receiver or transmitter coupled to the ancillary equipment, shall be used to judge whether the ancillary equipment passes or fails; • if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operational conditions and to ensure that all the different types of termination are covered:

• ports, which in normal operation are connected, shall be connected to an ancillary equipment or to a representative piece of cable terminated to simulate the impedance of the ancillary equipment. RF input/output ports shall be correctly terminated;

ports which are not connected to cables during normal intended operation, e.g. service connectors, programming connectors, temporary connectors etc. shall not be connected to any cables for the purpose of EMC testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the Equipment Under Test (EUT), ی۔ valuation یو of operation during the tests : precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables:

• the configuration and mode of operation during the tests shall be precisely noted in the test report.

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Contact Discharge: min. 200 times in total

1 second minimum(min. 20 times)

4.1 Electrostatic Discharge	
Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B POCE POCE POCE
Discharge Voltage:	Air Discharge:2kV/4kV/8kV (Direct) Contact Discharge:2kV/4kV (Direct/Indirect)
Contact Discharge:2kV/4kV (Direct/Indirect)	Direct
Number of Discharge:	Air Discharge: min. 20 times at each test point

Shenzhen POCE Technology Co., Ltd.

## Block diagram of ESD test setup

**Discharge Period:** 

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The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

## FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

## **Severity Levels and Performance Criterion**

Severity leve	PU- 000-	-OCE CE
Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
DOCT	±2	±2
2	±4	±4
23	±6 CE	±8
4	±8	±15
X	Special	Special

### **Test Procedure**

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a) Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

## Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

sults Air discharges at insulation surfaces of the EUT. It was at least ten single discharges with positive and negative at the same selected point.

### Test Results

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Direct discharge				
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
Contact	±2	OCE A DCE	B	CE F
discharge	±4.0	B	В	POUL
POCE	±2	A POUL	PBCE	Pass
Air discharge	±4	POCEB	E B CE	FO
POUL	2005 ±8 005	В	B	POCE
Indirect discharge	9			
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
	±20	AOCE	B	CE PC
HCP (6 sides)	e±4	OCE A CE	B	Dees
VCD (4 sides)	±2 £	A	POB	Pass
VCP (4 sides)	±4	POUT A DOCK	BOE	-E

Note1: The EUT can maintain communication link and not operate unintentionally during the test also can operate without any loss of user control functions after test.



## **TEST SPECIFICATION**

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Basic Standard:	IEC/EN 61000-4-3
Required Performance	ACE
Frequency Range:	80 MHz - 6000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m

## Test Procedure

The EUT are placed on a table which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a audio analyzer is used to monitor SINAD values. All the scanning conditions are as following:



---PASS--

Requency Range (MHz) RF Field R.F. Field Strength Reference Refere	ons Perform. nce Criteria Result
E POCE POCE POCE DOE DOE	POUL POCE P
POCE POCE Front	POOL POCE
80~6000  H / V  3 V/m (rms)  Rear    AM Modulated  A	A PASS
1000Hz, 80% Left	DOE POOL POUL
Right	DOCE DOCE POU
Bottom	POCE POCE PO

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