

EMC TEST REPORT

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-5 V2.2.1 (2019-04)

Report Reference No. : POCE210325025KRE-R1

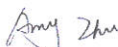
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Test Specification Standard : ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-5 V2.2.1 (2019-04)

Product Name : walkie talkie
Model/Type Reference : T388
Listed Models : N/A
Date of Receipt : Apr. 06, 2021
Date of Test : Apr. 06, 2021 -- Apr. 08, 2021
Data of Issue : Apr. 08, 2021
Result : PASS

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V2.0	Update	POCE210325025KRE-R1	Apr. 08, 2021

NOTE1:

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.

**NOTE2:**

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

ETSI EN 301 489-1 V2.2.3 (2019-11) -- ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-5 V2.2.1 (2019-04) -- 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) and Terrestrial Trunked Radio (TETRA);

1.2 Summary of test result

ETSI EN 301 489-1/ Requirements		
Emission		
Conducted Emission(AC Mains)	ETSI EN301 489-1 V2.2.3 Clause 7.1	PASS
Radiated Emission	ETSI EN301 489-1 V2.2.3 Clause 7.1	PASS
Conducted Emission (Telecommunication Ports)	ETSI EN301 489-1 V2.2.3 Clause 7.1	N/A
Harmonic Current Emissions	ETSI EN301 489-1 V2.2.3 Clause 7.1	N/A
Voltage Fluctuations and Flicker	ETSI EN301 489-1 V2.2.3 Clause 7.1	N/A
Immunity		
Electrostatic Discharge	ETSI EN301 489-1 V2.2.3 Clause 7.2	PASS
RF Electromagnetic Field	ETSI EN301 489-1 V2.2.3 Clause 7.2	PASS
Fast Transients Common Mode	ETSI EN301 489-1 V2.2.3 Clause 7.2	N/A
Surges	ETSI EN301 489-1 V2.2.3 Clause 7.2	N/A
RF Common Mode 0.15 MHz to 80 MHz	ETSI EN301 489-1 V2.2.3 Clause 7.2	N/A
Transients and Surges	ETSI EN301 489-1 V2.2.3 Clause 7.2	N/A
Voltage Dips and Interruptions	ETSI EN301 489-1 V2.2.3 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.

2 GENERAL INFORMATION

2.1 Client Information

Applicant : Shenzhen Sunjet Electronic Co., Ltd
West, 3rd floor, Building 1, Xinkecheng Industry Park, No. 51,
Address : Dabao Road, District 28, Xinan Street, Baoan District,
Shenzhen City, Guangdong province, China

Manufacturer : Shenzhen Sunjet Electronic Co., Ltd
West, 3rd floor, Building 1, Xinkecheng Industry Park, No. 51,
Address : Dabao Road, District 28, Xinan Street, Baoan District,
Shenzhen City, Guangdong province, China

2.2 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

2.3 Description of Device (EUT)

Product Name:	walkie talkie
Model/Type reference:	T388
Serial models:	/
Trade Name	/
Power supply:	DC 6.0V battery (AAA*4)
HW/SW:	V01 / V1.0
SRD	
Frequency Range:	446.00625 –446.09375MHz
Modulation:	FM-F3E
Operation frequency:	12.5KHz
Channel number:	Spring antenna
Operating frequency:	0dBi

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:

Test Mode

EMI	Mode 1: Standby mode Mode 2: Operating mode
EMS	Mode 1: Standby mode Mode 2: Operating mode

Note: In mode1 and mode 3, the machine is powered on but in standby mode, so the radiation is very good and the data is not recorded in the report, The report only shows the worst mode2 data tested.

Report record test pattern data

Test Mode	
EMI	Mode 2: Operating mode
EMS	Mode 2: Operating mode

2.5 Equipments Used during the Test

Conducted Emission

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Test Receiver	Rohde & Schwarz	ESCI 3	101431	Dec. 10, 2020	1 Year
2	L.I.S.N	Rohde & Schwarz	ESH3-Z5	831.5518.52	Dec. 10, 2020	1 Year
3	50ΩCoaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
4	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	Dec. 10, 2020	1 Year
5	Voltage Probe	Rohde & Schwarz	TK9416	N/A	Dec. 10, 2020	1 Year

Radiated Emission

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4408B	CFG006	Dec. 10, 2020	1 Year
2	Test Receiver	R&S	ESCI	101431	Dec. 10, 2020	1 Year
3	Bilog Antenna	Model JB6	CBL6111D	A090414	Dec. 10, 2020	1 Year
4	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	Dec. 10, 2020	1 Year
5	EMI Power Line Filter	DUOJI EME	FNF 201 BQ6686	N/A	Dec. 10, 2020	1 Year
6	EMI Power Line Filter	JIANLI	DL-40C	N/A	Dec. 10, 2020	1 Year
7	Cable	Schwarzbeck	AK9513	ACRX1	Dec. 10, 2020	1 Year
8	Cable	Rosenberger	N/A	FP2RX2	Dec. 10, 2020	1 Year
9	Cable	Schwarzbeck	AK9513	CRPX1	Dec. 10, 2020	1 Year
10	Cable	Schwarzbeck	AK9513	CRRX2	Dec. 10, 2020	1 Year
11	Signal Generator	HP	8648A	3625U0057	Dec. 10, 2020	1 Year

Harmonic Current / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Factory Number	Last Cal.	Cal.Due
1	Coupling decoupling network	SCHAFFNER	M016	20812	Dec. 10, 2020	1 Year
2	PC	N/A	P2L97	N/A	Dec. 10, 2020	1 Year

Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Factory Number	Last Cal.	Cal.Due
1.	Burst Tester	HTEC	HEFT 51	144303	Dec. 10, 2020	1 Year
2.	Coupling Clamp	HTEC	IP-4A	147147	Dec. 10, 2020	1 Year

Electrostatic Discharge

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	ESD Tester	PRIMA	61002AG	PR14042705	Dec. 10, 2020	1 Year
2	Audio Analyzer	R&S	UPV	100419	Dec. 10, 2020	1 Year

1.

RF Field Strength Susceptibility

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	HP	8648A	3625U00573	Dec. 10, 2020	1 Year
2	Amplifier	AR	500A100	17034	NCR	NCR
3	Amplifier	AR	100W/1000M	17028	NCR	NCR
4	Isotropic Field Monitor	AR	FM2000	16829	NCR	NCR
5	Isotropic Field Probe	AR	FP2000	16755	Dec. 10, 2020	1 Year
6	Biconic Antenna	EMCO	3108	9507-2534	NCR	NCR
7	Log-periodic Antenna	AR	AT1080	16812	NCR	NCR
8	Audio Analyzer	R&S	UPV	100419	Dec. 10, 2020	1 Year

Injected Current Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Factory Number	Last Cal.	Cal. Interval
1.	Simulator	EMTEST	CWS500C	0900-12	Dec. 10, 2020	1 Year
2.	CDN	EMTEST	CDN-M2	5100100100	Dec. 10, 2020	1 Year
3.	CDN	EMTEST	CDN-M3	0900-11	Dec. 10, 2020	1 Year
4.	Injection Clamp	EMTEST	F-2031-23MM	368	Dec. 10, 2020	1 Year
5.	Attenuator	EMTEST	ATT6	0010222A	Dec. 10, 2020	1 Year

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.

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 $\pm 1.4\%$.

Voltage Fluctuations and Flicker

The measurement uncertainty is evaluated as $\pm 1.2\%$.

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.

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%.

3 EMC EMISSIONS MEASUREMENT METHODS AND RESULTS

3.1 Radiated Emission

Block Diagram of Test

LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class B(at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 – 230	30	40
230 – 1000	37	47

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 10m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	50
3000-6000	80	60	74	54

Notes: (1)The limit for radiated test was performed according to as following:

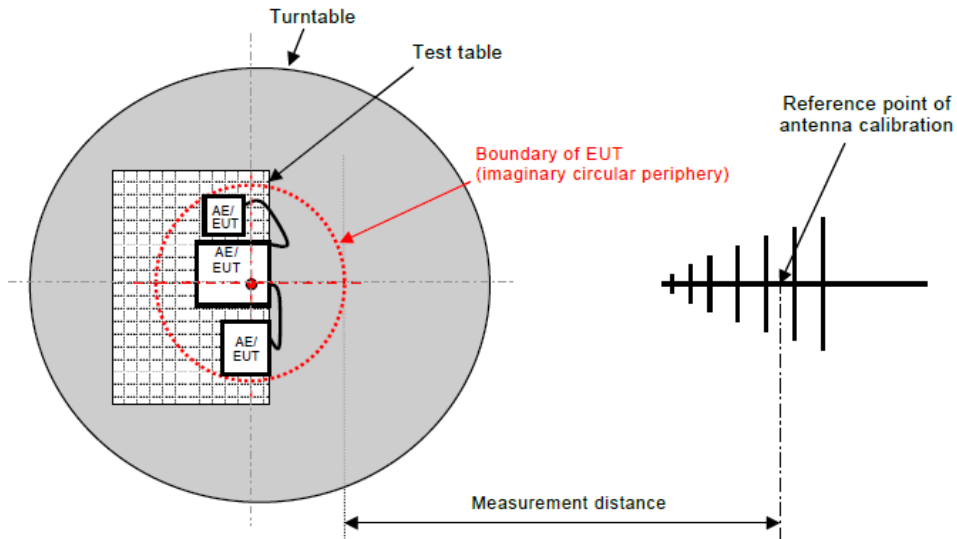
Draft ETSI EN 301 489-1/ EN55032:2015

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

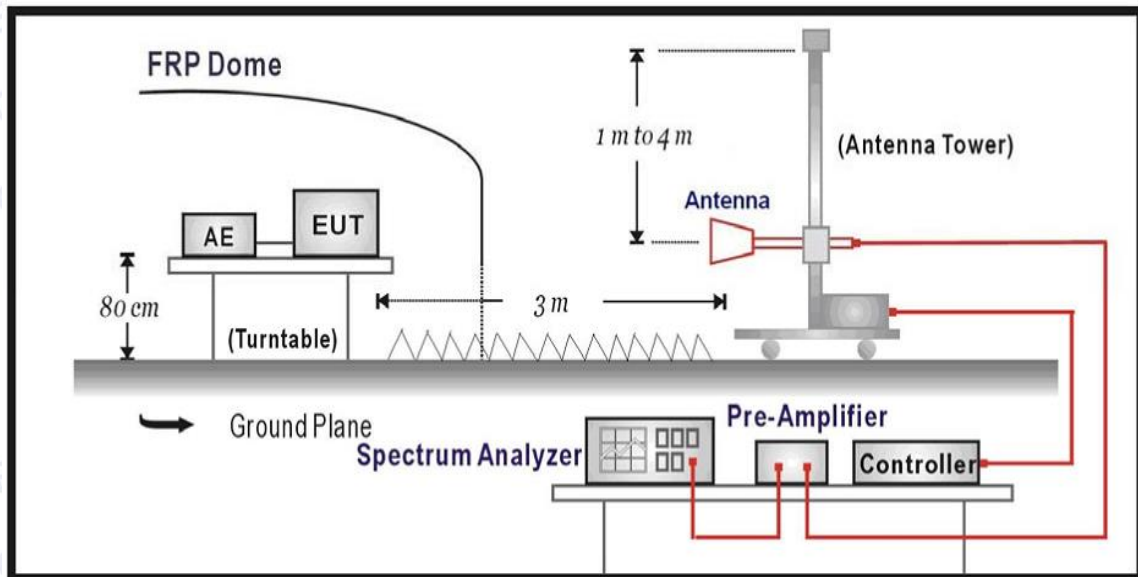
TEST PROCEDURE

- 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.
- 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 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 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.

TEST SETUP



Below 1000MHz



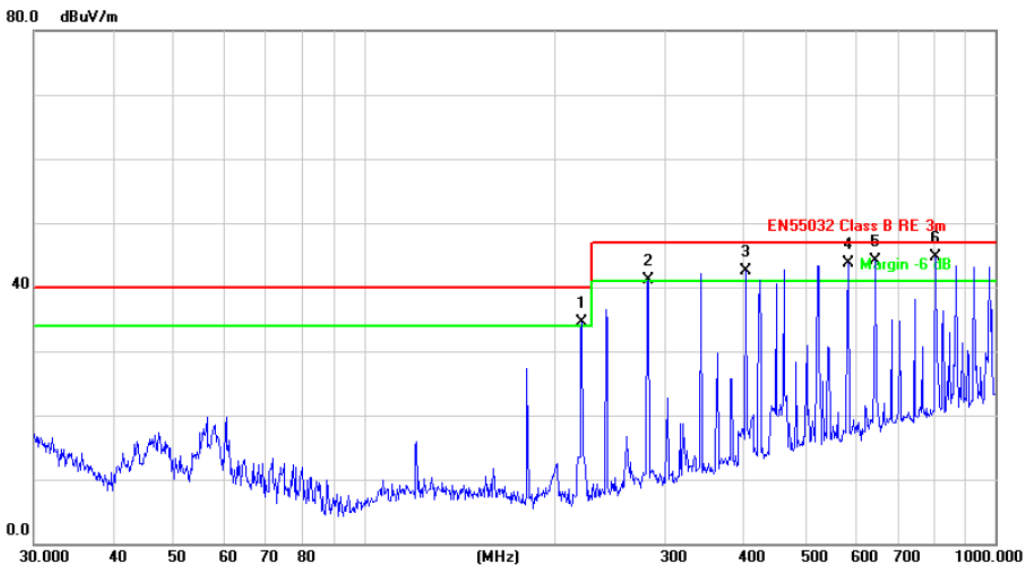
Above 1000MHz

TEST RESULTS

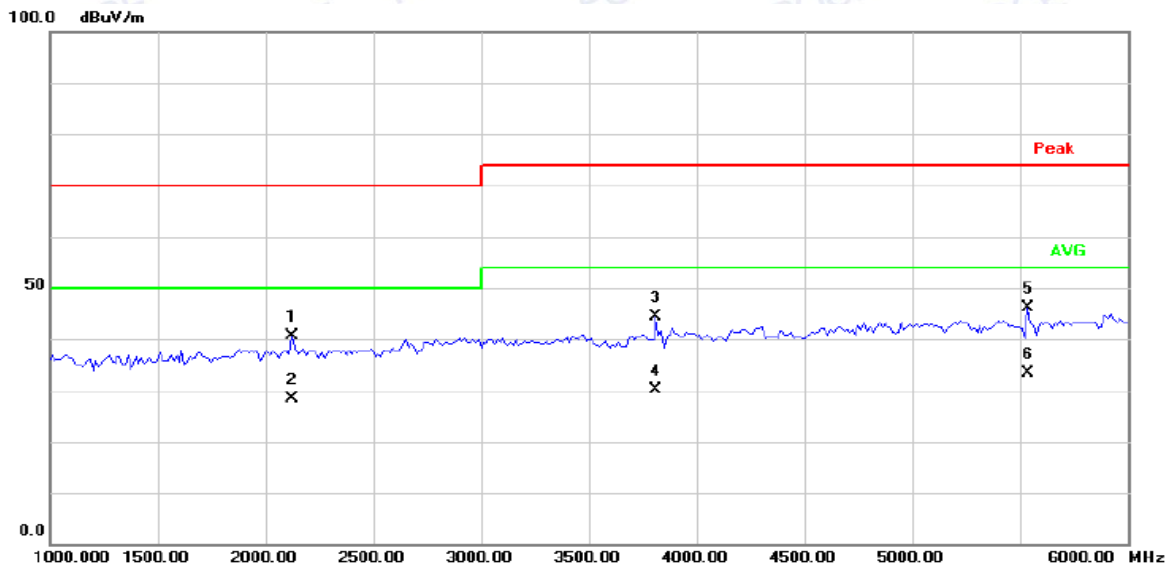
---PASS---

Please reference to the following:

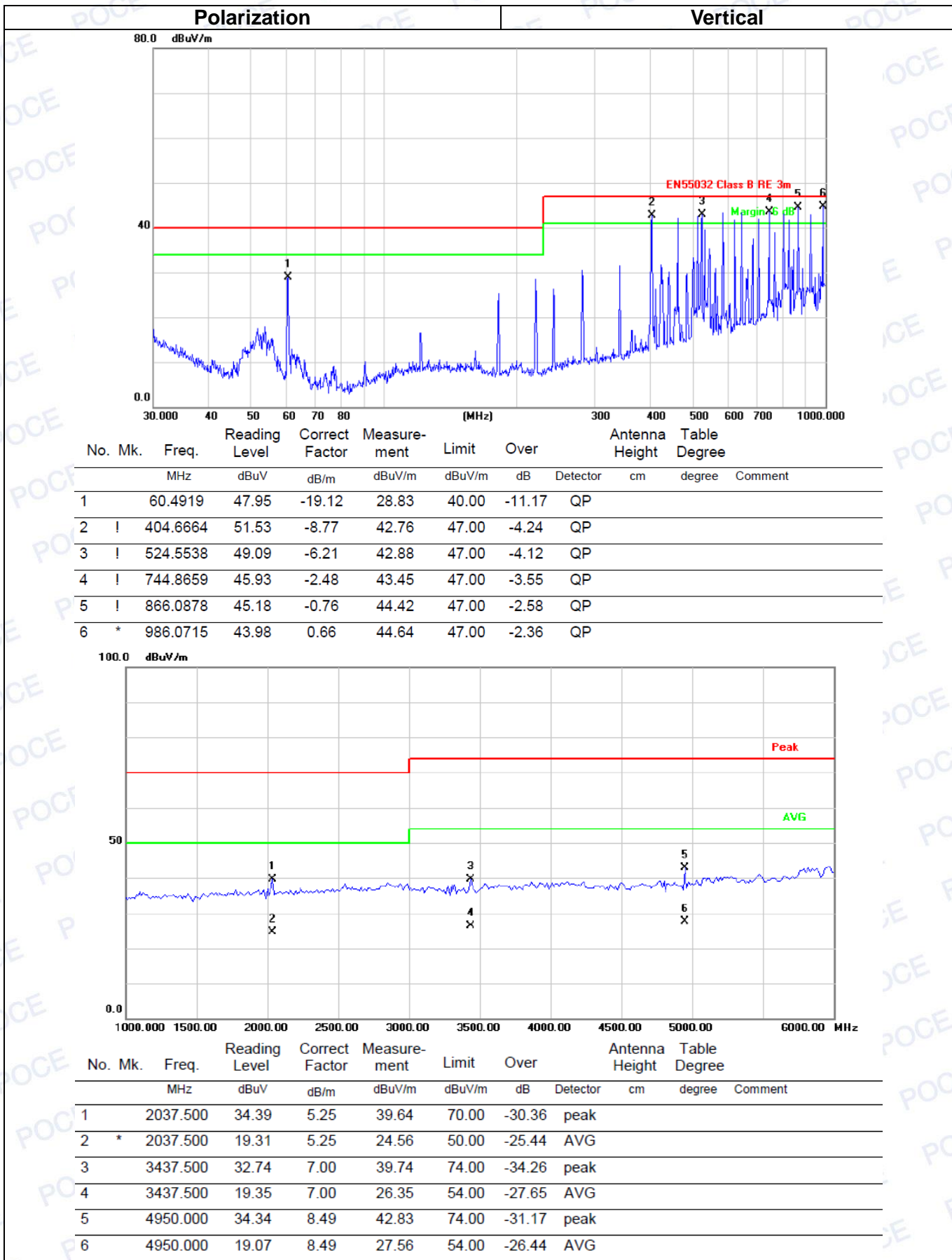
Test Mode	Mode:2
Polarization	Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	!	221.3917	48.59	-14.16	34.43	40.00	-5.57	QP		
2	!	281.9945	52.57	-11.43	41.14	47.00	-5.86	QP		
3	!	401.8385	50.97	-8.53	42.44	47.00	-4.56	QP		
4	!	584.7894	48.23	-4.56	43.67	47.00	-3.33	QP		
5	!	645.1195	47.55	-3.50	44.05	47.00	-2.95	QP		
6	*	804.6028	45.57	-0.94	44.63	47.00	-2.37	QP		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		2125.000	35.22	5.36	40.58	70.00	-29.42	peak		
2		2125.000	23.09	5.36	28.45	50.00	-21.55	AVG		
3		3812.500	36.84	7.47	44.31	74.00	-29.69	peak		
4		3812.500	22.74	7.47	30.21	54.00	-23.79	AVG		
5		5537.500	37.03	8.98	46.01	74.00	-27.99	peak		
6	*	5537.500	24.47	8.98	33.45	54.00	-20.55	AVG		



3.2 Conducted Emission (AC Mains)

LIMIT

FREQUENCY (MHz)	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

- The EUT was placed 0.8 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.

Test Results

N/A

4 IMMUNITY TEST METHODS AND RESULTS

Test configuration

A. General Requirements (ETSI EN 301489-1):

The performance criteria are used to take a decision on whether radio equipment passes or fails immunity tests.

For the purpose of the present document four categories of performance criteria apply:

- Performance criteria for continuous phenomena applied to transmitters and receivers
- Performance criteria for transient phenomena applied to transmitters and receivers
- Performance criteria for equipment which does not provide a continuous communication link
- Performance criteria for ancillary equipment tested on a stand alone basis

(1) Performance criteria for continuous phenomena applied to transmitters and receivers

If no further details are given in the relevant part of ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

(2) Performance criteria for transient phenomena applied to transmitters and receivers

If no further details are given in the relevant part of ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

- e) For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
- f) For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For all other ports the following applies:

- g) After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

- h) During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.
- i) If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

(3) Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

(4) Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a standalone basis, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

B. ETSI EN 301 489-5

General performance criteria

The equipment shall meet the minimum performance criteria as specified in clauses 6.1, 6.2, 6.3 and 6.4.

The establishment of the communication link at the start of the test, its maintenance and the assessment of the recovered signal are used as the performance criteria for the evaluation of the essential functions of the equipment during and after the test.

If an equipment is of a specialized nature and the performance criteria specified in the table are not appropriate the manufacturer shall declare a substituted specification for an acceptable performance level or performance degradation as required by the present document. The performance specification shall be included in the test report and the product description and documentation.

The equipment shall meet the minimum performance criteria as specified in clauses 6.1, 6.2, 6.3 and 6.4.

A portable equipment powered by the battery in the vehicle shall fulfil the applicable requirements in ETSI EN 301 489-1 [1] for vehicular mobile equipment.

A portable or mobile equipment powered by AC mains shall fulfil the applicable requirements in ETSI EN 301 489-1 [1] for base station equipment, although the tests performed are only those applicable to the input/output arrangements of the equipment, the performance criteria will remain as the origin class for the equipment.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 dB bandwidth of 300 Hz to 3 kHz, without the use of psophometric weighting filter.

For equipment which can be measured using continuous bit streams, a bit error shall not exceed 1×10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

Performance criteria for Transient phenomena applied to Transmitters (TT)

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

Performance criteria for Continuous phenomena applied to Receivers (CR)

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 dB bandwidth of 300 Hz to 3 kHz, without the use of psophometric weighting filter.

For equipment which can be measured using continuous bit streams, the bit error rate shall not exceed 10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for Transient phenomena applied to Receivers (TR)

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

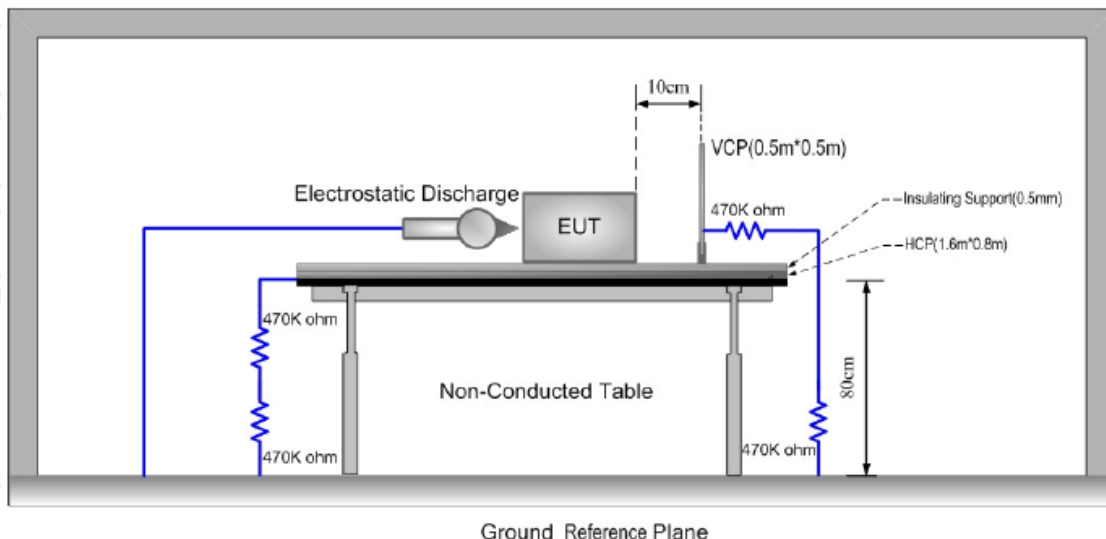
Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.1 Electrostatic Discharge

TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge:2kV/4kV/8kV (Direct) Contact Discharge:2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Period:	1 second minimum

Block diagram of test setup



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 of 1-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 of 0.1-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 level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	±2	±2
2	±4	±4
3	±6	±8
4	±8	±15
X	Special	Special

The test method shall be in accordance with CENELEC EN 61000-4-2 [2], clause 8.

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.

- b) 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

---PASS---

Please refer to the following :

Direct discharge				
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
Contact discharge	±2	A	B	Pass
	±4	A	B	
Air discharge	±2	A	B	
	±4	A	B	
	±8	B	B	
Indirect discharge				
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
HCP (6 sides)	±2	A	B	Pass
	±4	A	B	
VCP (4 sides)	±2	A	B	
	±4	A	B	

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.

4.2 RF Field Strength Susceptibility Test

TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
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
Dwell Time:	at least 3 seconds

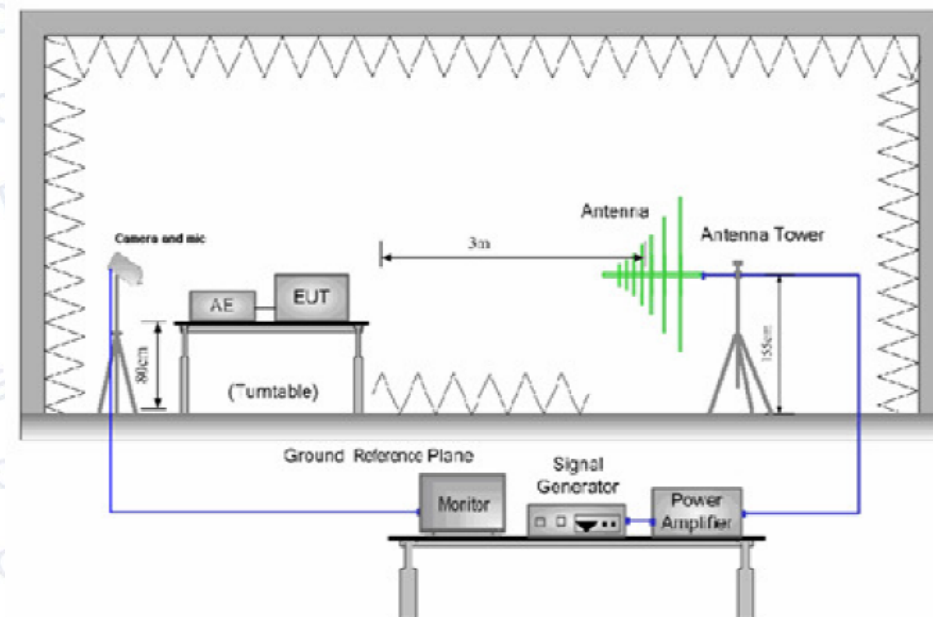
TEST PROCEDURE

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 six 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:

Condition of Test	Remark
1. Fielded Strength	3V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80-1000MHz 1400MHz~2700MHz
4. Sweep time of radiated	0.0015 Decade/s
2. Dwell Time	1 Sec.

Block diagram of test setup



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

TEST RESULTS

---PASS---

Please refer to the below test data:

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observations Performance	Perform. Criteria	Result
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Top	A	A	PASS
			Front			
			Rear			
			Left			
			Right			
			Bottom			

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.

5 PHOTOGRAPHS OF TEST

Radiated Emission 30MHz-1GHZ



Electrostatic Discharge



6 PHOTOGRAPHS OF EUT

External photos

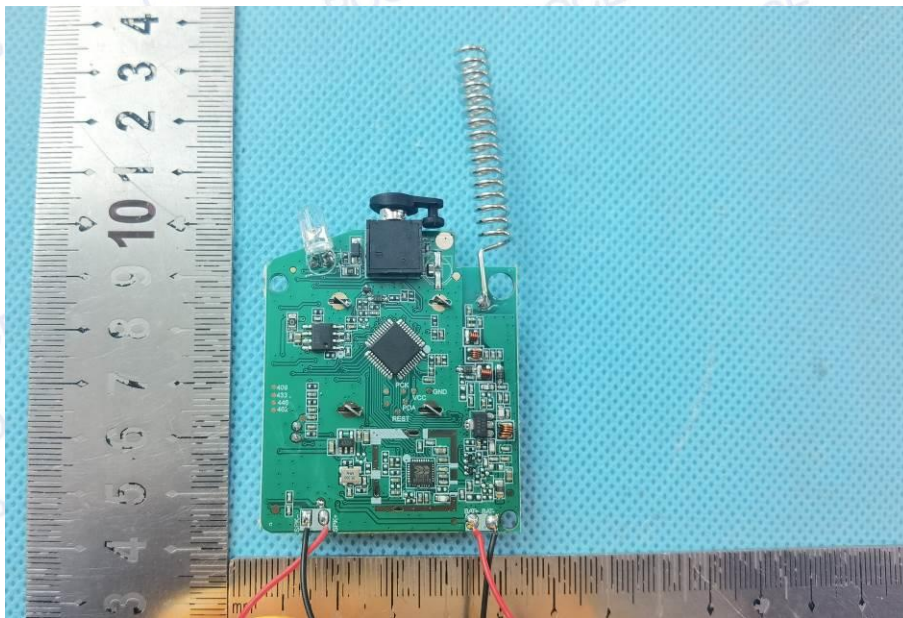


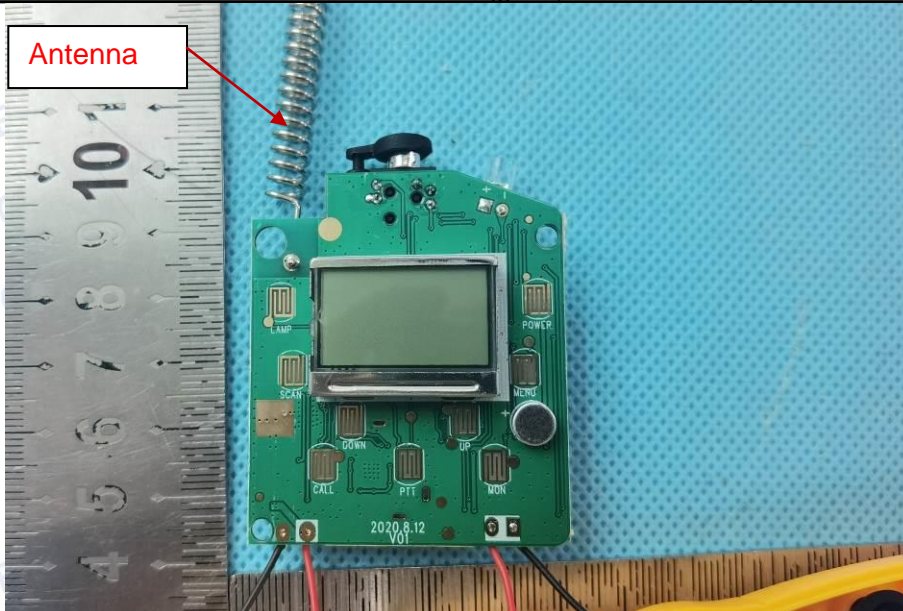




Internal photos







*****THE END*****