RED-EMC Test Report

For

JEICO

Industrial wireless remote controller

Model No.: JREMO 6K, JREMO 6KA, JREMO 6KB, JREMO 6KC, JREMO 6KM

Prepared For	:	JEICO
Address	:	94-1, Choryang-ro, Dong-gu, Busan, Korea (48805)
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102 Tel: (86) 755-26066440 Fax: (86) 755-26014772
Report Number	:	SZAWW180912003-01E
Date of Receipt	:	Sept. 12, 2018
Date of Test	:	Sept. 12~Oct. 09, 2018
Date of Report	:	Oct. 09, 2018

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TEST REPORT

Applicant	:	JEICO
Manufacturer	:	JEICO
Product Name	:	Industrial wireless remote controller
Model No.	:	JREMO 6K, JREMO 6KA, JREMO 6KB, JREMO 6KC, JREMO 6KM
Trade Mark	:	JEICO
Rating(s)	:	TX Power: 3V⎓ 32mA RX Power: 100-230V~ 50/60Hz, 0.5A
Test Standard(s)	:	**Draft ETSI EN 301 489-1 V2.2.0 (2017-03)** **EN 55032: 2015** **EN 55035: 2017** **Final draft ETSI EN 301 489-3 V2.1.1 (2017-03)**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 301 489-1, EN 301 489-3 & EN 55032 and EN 55035 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test: Sept. 12~Oct. 09, 2018

Prepared By: (Engineer / Oliay Yang)

Reviewer: (Supervisor / Snowy Meng)

Approved & Authorized Signer: (Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	JEICO
Address	:	94-1, Choryang-ro, Dong-gu, Busan, Korea (48805)
Manufacturer	:	JEICO
Address	:	94-1, Choryang-ro, Dong-gu, Busan, Korea (48805)
Factory	:	JEICO
Address	:	94-1, Choryang-ro, Dong-gu, Busan, Korea (48805)

1.2. Description of Device (EUT)

Product Name	:	Industrial wireless remote controller	
Model No.	:	JREMO 6K, JREMO 6KA, JREMO 6KB, JREMO 6KC, JREMO 6KM (Note: All samples are the same except the name, so we prepare "JREMO 6K" for test only.)	
Trade Mark	:	JEICO®	
Test Power Supply	:	TX Power: DC 3V RX Power: AC 110V, 50Hz / AC 230V, 50Hz	
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)	
Product Description	:	Operation Frequency:	433.050~434.775MHz
		Number of Channel:	70 Channels
		Software Version:	V13
		Hardware Version:	V4.3
		Product Serial Number:	1510001
		Modulation Type:	GFSK
		Antenna Type:	TX: Monopole (Film type) Antenna RX: Monopole Antenna
		Antenna Gain(Peak):	TX & RX: 1.5 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

1.3. Auxiliary Equipment Used During Test

N/A		

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	On Mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	On Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	On Mode

1.5. Test Equipment List

Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	1 Year
4.	Software Name EZ-EMC	Ferrari Tcchnology	ANB-03A	N/A	N/A	N/A

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	1 Year
4.	Software Name EZ-EMC	Ferrari Tcchnology	ANB-03A	N/A	N/A	N/A
5.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 17, 2017	1 Year
6.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 17, 2017	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2017	1 Year

Harmonic and Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	IVYTECH	APS-5005A	632734	June 15, 2018	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HRRMOINCS-1000-1P	164	Dec. 16, 2017	1 Year
3.	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	N/A	N/A

Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3Ctest	ESD-30T	ES0131505	Nov. 17, 2017	1 Year

Electrical Fast Transient/Burst Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Nov. 17, 2017	1 Year
1.2	EFT-Clamp	PRIMA	EFT-Clamp	/	Nov. 17, 2017	1 Year
2.1	EFT Burst Simulator	TESEQ	NSG 3060	1480	Nov. 17, 2017	1 Year
2.2	CDN	TESEQ	CDN 3061	1408	Nov. 17, 2017	1 Year

R/S Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5182A	MY48180656	Nov. 17, 2017	1 Year
2	Amplifier	Amplifier Research	150W1000M3	309410	N/A	N/A
3	Amplifier	Amplifier Research	60S1G3	309433	N/A	N/A
4	Log-Periodic Antenna	Schwarzbeck	VULP9118E	00992	Aug. 17, 2018	3 Year
5	Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 18, 2017	3 Year
6	Power Sensor	Agilent	E9301A	MY41498906	N/A	N/A
7	Power Sensor	Agilent	E9301A	MY41498088	N/A	N/A
8	Power Meter	Agilent	E4419B	GB40202909	N/A	N/A
9	Field Probe	ETS-Lindgren	HI-6006	00212747	Apr. 20, 2017	3 Year
10	software	EMtrace	EM 3	N/A	N/A	N/A

Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	6kV Surge Generator	TESEQ	NSG 3060	1480	Nov. 17, 2017	1 Year
1.2	CDN	TESEQ	CDN 3061	1408	Nov. 17, 2017	1 Year
2.1	6kV Surge Generator	EMPEK	LSG-5060G	06010017N	Nov. 17, 2017	1 Year
2.2	CDN	EMPEK	CDN-5110G	061100005N	Nov. 17, 2017	1 Year

Injected Currents Susceptibility Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Nov. 17, 2017	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Nov. 17, 2017	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Nov. 17, 2017	1 Year
4.	CIT-10	FRANKONIA	Version1.1.7	N/A	N.A	N/A

Voltage Dips and Interruptions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011AG	PR12046234	Nov. 17, 2017	1 Year

1.6. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

1.7. Performance Criteria

1.7.1. For EMS Test:

√ A: Normal performance within the specification limits;
√ B: Temporary degradation or loss of function or performance which is self-recoverable;
√ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset;
√ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.
This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.

1.7.2. For EN 301 489-3:

The performance criteria are:
• performance criteria A for immunity tests with phenomena of a continuous nature;
• performance criteria B for immunity tests with phenomena of a transient nature;
• performance criteria C for immunity tests with power interruptions exceeding a certain time.
The equipment shall meet the minimum performance criteria as specified in the following clauses.

Table 1: Performance criteria

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the

transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.3 and 4.2.4.

During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

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. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Transient phenomena applied to Transmitters (TT)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.4.

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. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Continuous phenomena applied to Receivers (CR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.6.

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz. 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.

Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2. to 4.2.6.

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.

2. Summary of Test Results

EMC Emission				
Test Items	**Standard**	**Basic Standard**	**Limit**	**Results**
Conducted Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.3 & 8.4	EN 55032: 2015	Class B	PASS
Radiated Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.2	EN 55032: 2015	Class B	PASS
Harmonic Current Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.5	EN 61000-3-2: 2014	Class A	N/A
Voltage Fluctuations& Flicker	ETSI EN 301 489-1 V2.2.0 Clause 8.6	EN 61000-3-3: 2013	/	PASS
EMC Immunity				
Test Items	**Standard**	**Basic Standard**	**Performance Criteria**	**Results**
Electrostatic Discharge	ETSI EN 301 489-1 V2.2.0 Clause 9.3	EN 61000-4-2 :2009	B	PASS
RF Electromagnetic Field	ETSI EN 301 489-1 V2.2.0 Clause 9.2	EN 61000-4-3: 2006 +A1: 2008+A2: 2010	A	PASS
Fast transients, common mode	ETSI EN 301 489-1 V2.2.0 Clause 9.4	EN 61000-4-4: 2012	B	PASS
Surges	ETSI EN 301 489-1 V2.2.0 Clause 9.8	EN 61000-4-5: 2014+A1: 2017	B	PASS
Radio frequency, common mode	ETSI EN 301 489-1 V2.2.0 Clause 9.5	EN 61000-4-6: 2014	A	PASS
Volt. Interruptions Volt. Dips	ETSI EN 301 489-1 V2.2.0 Clause 9.7	EN 61000-4-11: 2004	B / C / C NOTE (3)	PASS

NOTE:

(1) ” N/A” denotes test is not applicable in this Test Report

(2) Alternatively, for equipment intended to be used exclusively in an industrial environment or a telecommunicationcentre, the class A limits may be used.

(3) Voltage dip: 100% reduction – Performance Criteria B

Voltage dip: 100% reduction – Performance Criteria B

Voltage dip: 70% reduction – Performance Criteria C

Voltage Interruption: 0% Interruption – Performance Criteria C

3. Emission Test

3.1. Conducted Emission Test at Main Ports

3.1.1. Test Standard and Limit

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 8.3 & 8.4
Basic Standard	EN 55032: 2015

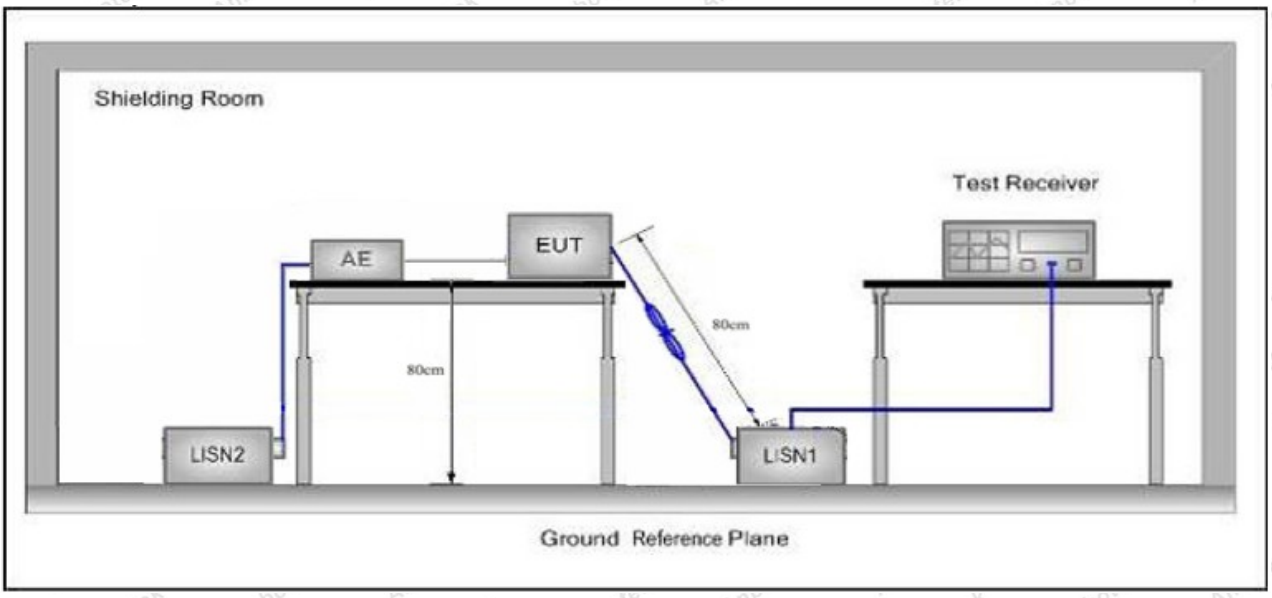
Limits for conducted emissions

Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: *Decreasing linearly with logarithm of the frequency.			

Limits for conducted emissions of equipment
intended to be used in telecommunication centres and industrial environment

Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	79	66
	500kHz~30MHz	73	60

3.1.2. Test Setup



3.1.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ETSI EN 301 489-1 V2.2.0 & EN 55032: 2015 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

For the actual test configuration, please refer to the related Item EUT Test Photos.

3.1.4. Test Data

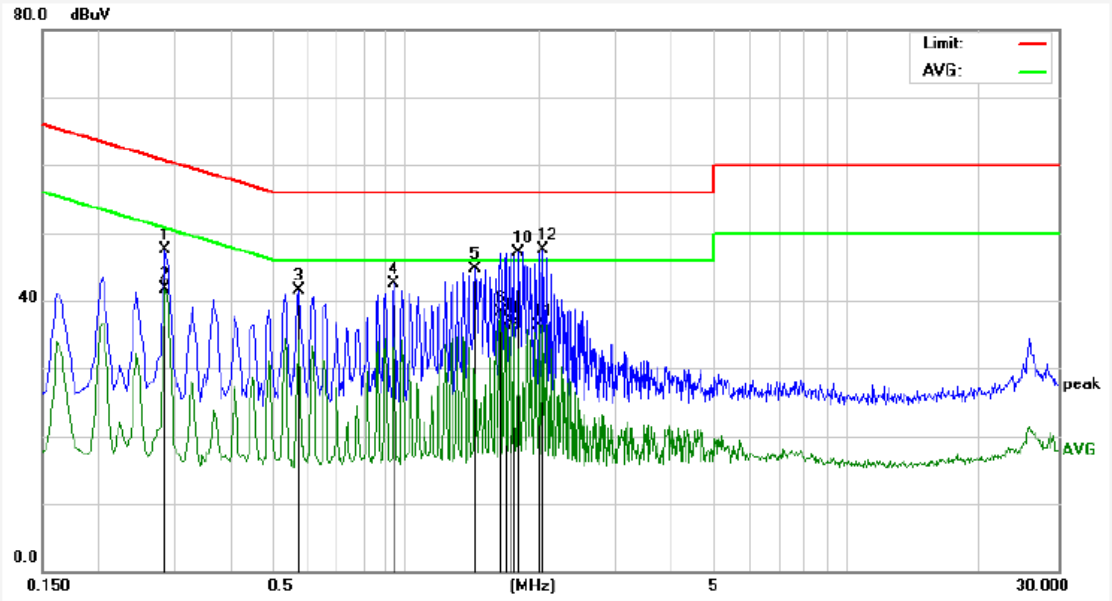
PASS

The EUT should be compliance to the limit of Class B

Only the worst case data was showed in the report, please to see the following pages

Conducted Emission Test Data

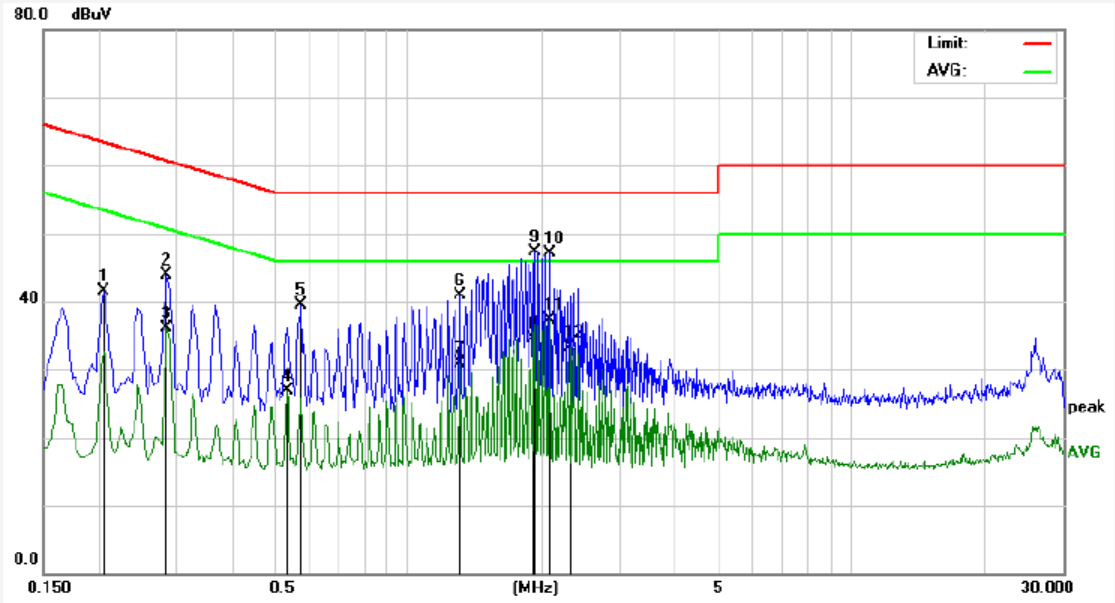
Test Site:	1# Shielded Room
Operating Condition:	Mode 1
Test Specification:	TX: DC 3V RX: AC 110V, 50Hz
Comment:	Live Line Tem.: 25.4℃ Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2860	27.57	19.89	47.46	60.64	-13.18	QP	
2	0.2860	21.81	19.89	41.70	50.64	-8.94	AVG	
3	0.5740	21.54	20.00	41.54	56.00	-14.46	QP	
4	0.9420	22.38	20.10	42.48	56.00	-13.52	QP	
5	1.4340	24.59	20.13	44.72	56.00	-11.28	QP	
6	1.6420	18.19	20.13	38.32	46.00	-7.68	AVG	
7	1.6780	16.24	20.13	36.37	46.00	-9.63	AVG	
8	1.7180	17.07	20.13	37.20	46.00	-8.80	AVG	
9	1.7580	16.53	20.14	36.67	46.00	-9.33	AVG	
10	1.8020	26.94	20.14	47.08	56.00	-8.92	QP	
11	2.0059	16.21	20.14	36.35	46.00	-9.65	AVG	
12	2.0460	27.44	20.14	47.58	56.00	-8.42	QP	

Conducted Emission Test Data

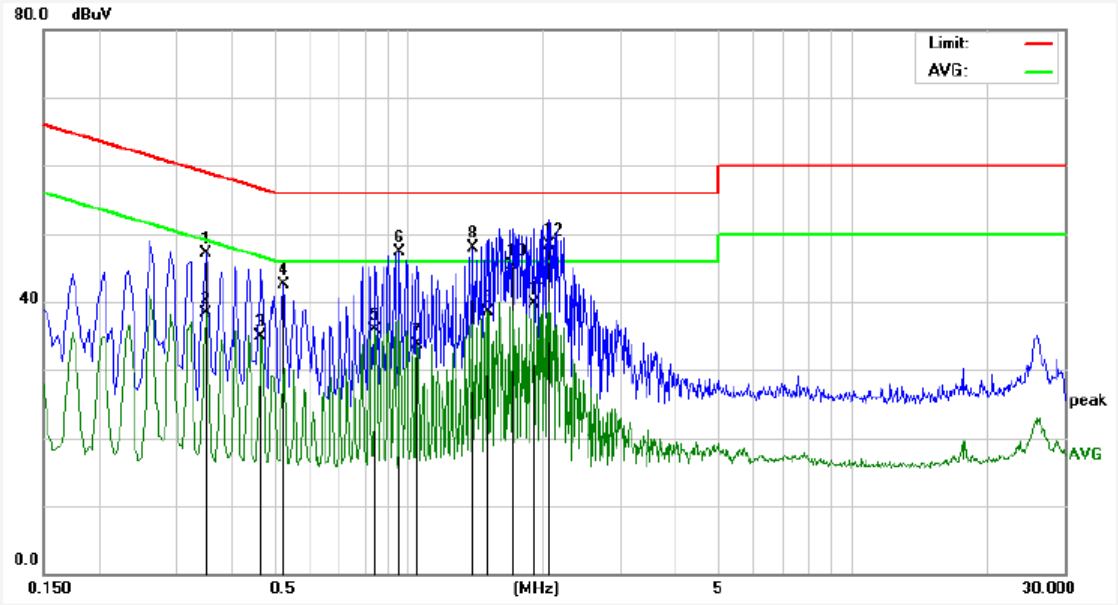
Test Site:	1# Shielded Room
Operating Condition:	Mode 1
Test Specification:	TX: DC 3V RX: AC 110V, 50Hz
Comment:	Neutral Line Tem.: 25.4℃ Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2060	21.57	19.90	41.47	63.36	-21.89	QP	
2	0.2860	24.04	19.89	43.93	60.64	-16.71	QP	
3	0.2860	16.26	19.89	36.15	50.64	-14.49	AVG	
4	0.5340	6.90	19.99	26.89	46.00	-19.11	AVG	
5	0.5740	19.59	20.00	39.59	56.00	-16.41	QP	
6	1.3099	20.75	20.13	40.88	56.00	-15.12	QP	
7	1.3099	10.69	20.13	30.82	46.00	-15.18	AVG	
8	1.9260	14.39	20.14	34.53	46.00	-11.47	AVG	
9	1.9300	27.15	20.14	47.29	56.00	-8.71	QP	
10	2.0860	26.97	20.14	47.11	56.00	-8.89	QP	
11	2.0860	17.15	20.14	37.29	46.00	-8.71	AVG	
12	2.3300	13.19	20.15	33.34	46.00	-12.66	AVG	

Conducted Emission Test Data

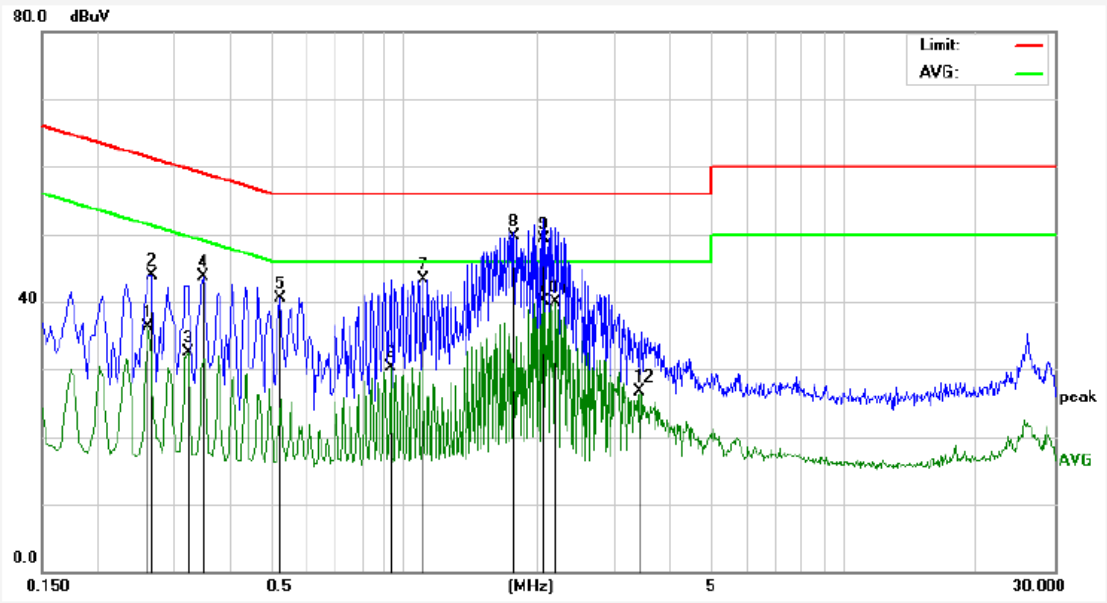
Test Site:	1# Shielded Room
Operating Condition:	Mode 1
Test Specification:	TX: DC 3V RX: AC 230V, 50Hz
Comment:	Live Line Tem.: 25.4℃ Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3500	27.26	19.91	47.17	58.96	-11.79	QP	
2	0.3500	18.42	19.91	38.33	48.96	-10.63	AVG	
3	0.4660	15.00	19.96	34.96	46.58	-11.62	AVG	
4	0.5220	22.48	19.99	42.47	56.00	-13.53	QP	
5	0.8420	15.80	20.08	35.88	46.00	-10.12	AVG	
6	0.9580	27.10	20.11	47.21	56.00	-8.79	QP	
7	1.0460	13.67	20.12	33.79	46.00	-12.21	AVG	
8	1.3980	27.71	20.13	47.84	56.00	-8.16	QP	
9	1.5100	18.35	20.13	38.48	46.00	-7.52	AVG	
10	1.7140	25.17	20.13	45.30	56.00	-10.70	QP	
11	1.9220	19.49	20.14	39.63	46.00	-6.37	AVG	
12	2.0660	28.12	20.14	48.26	56.00	-7.74	QP	

Conducted Emission Test Data

Test Site:	1# Shielded Room
Operating Condition:	Mode 1
Test Specification:	TX: DC 3V RX: AC 230V, 50Hz
Comment:	Neutral Line Tem.: 25.4℃ Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2620	16.35	19.89	36.24	51.36	-15.12	AVG	
2	0.2660	24.02	19.89	43.91	61.24	-17.33	QP	
3	0.3220	12.69	19.90	32.59	49.65	-17.06	AVG	
4	0.3500	23.87	19.91	43.78	58.96	-15.18	QP	
5	0.5220	20.54	19.99	40.53	56.00	-15.47	QP	
6	0.9300	10.23	20.10	30.33	46.00	-15.67	AVG	
7	1.1060	23.22	20.12	43.34	56.00	-12.66	QP	
8	1.7740	29.51	20.14	49.65	56.00	-6.35	QP	
9	2.0660	29.22	20.14	49.36	56.00	-6.64	QP	
10	2.0660	19.88	20.14	40.02	46.00	-5.98	AVG	
11	2.2100	19.69	20.14	39.83	46.00	-6.17	AVG	
12	3.4300	6.46	20.17	26.63	46.00	-19.37	AVG	

3.2. Radiated Emission Test

3.2.1. Test Standard and Limit

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 8.2
Basic Standard	EN 55032: 2015

Radiated Emission Test Limit (Below 1000MHz)

Frequency (MHz)	Limit (dBμV/m)	
	Quasi-peak Level	
	Class B	Class A
30MHz~230MHz	40	50
230MHz~1000MHz	47	57
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.		

Radiated Emission Test Limit (Above 1000MHz)

Frequency (MHz)	Limit (dBμV/m)			
	Class B		Class A	
	Peak	Average	Peak	Average
1000 MHz -3000 MHz	70	50	76	56
3000 MHz -6000 MHz	74	54	80	60
Remark: 1. The lower limit applies at the transition frequency. 2. The test distance is 3m.				

Radiated Emission Test Limit for FM Receivers

Frequency (MHz)	Limit (dBμV/m)	
	Quasi-peak Level	
	Fundamental	Harmonics
30MHz~230MHz	60	52
230MHz~300MHz	60	52
300MHz~1000MHz	60	56
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.		

Frequency Range of Radiated Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 6 GHz, whichever is lower

3.2.2. Test Setup

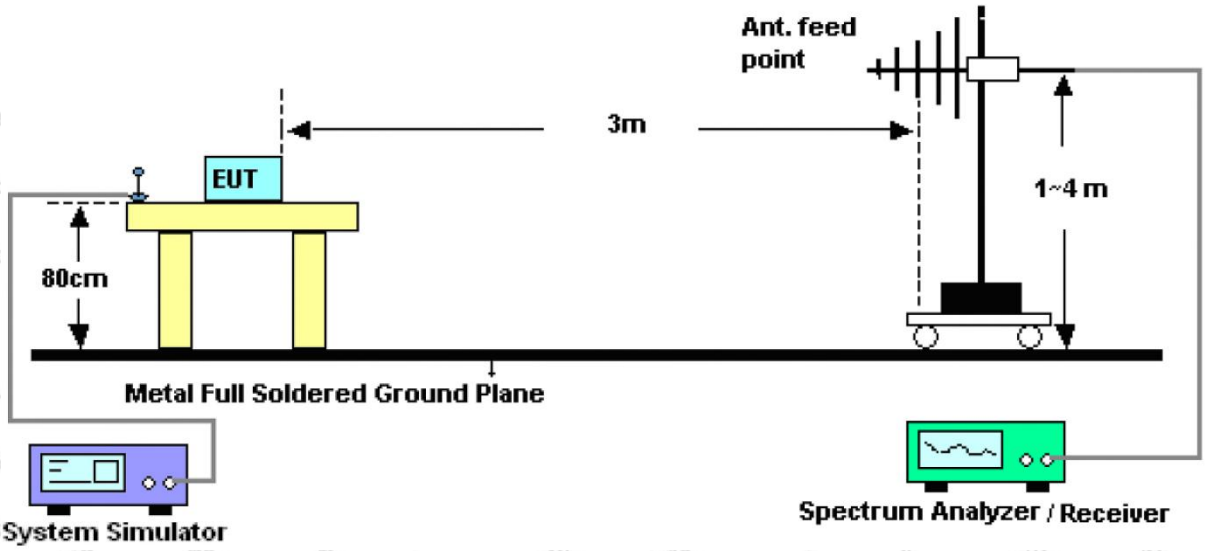


Figure 1. 30MHz to 1GHz

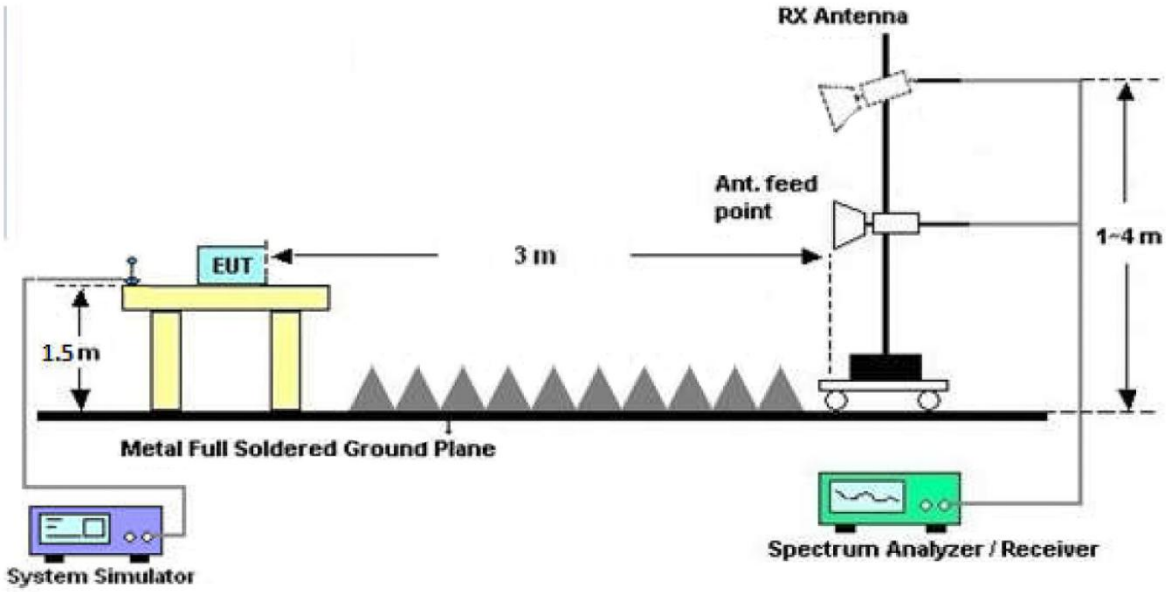


Figure 2. Above 1 GHz

3.2.3. Test Procedure

1) The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

2) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter test site. The table was rotated 360 degrees to determine the position of the highest radiation.

3) The height of the equipment or of the substitution antenna 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.

4) The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

5) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold

mode when the test frequency is below 1GHz.

The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

6) For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak/ Average detection at frequency above 1GHz.

3.2.4. Test Data

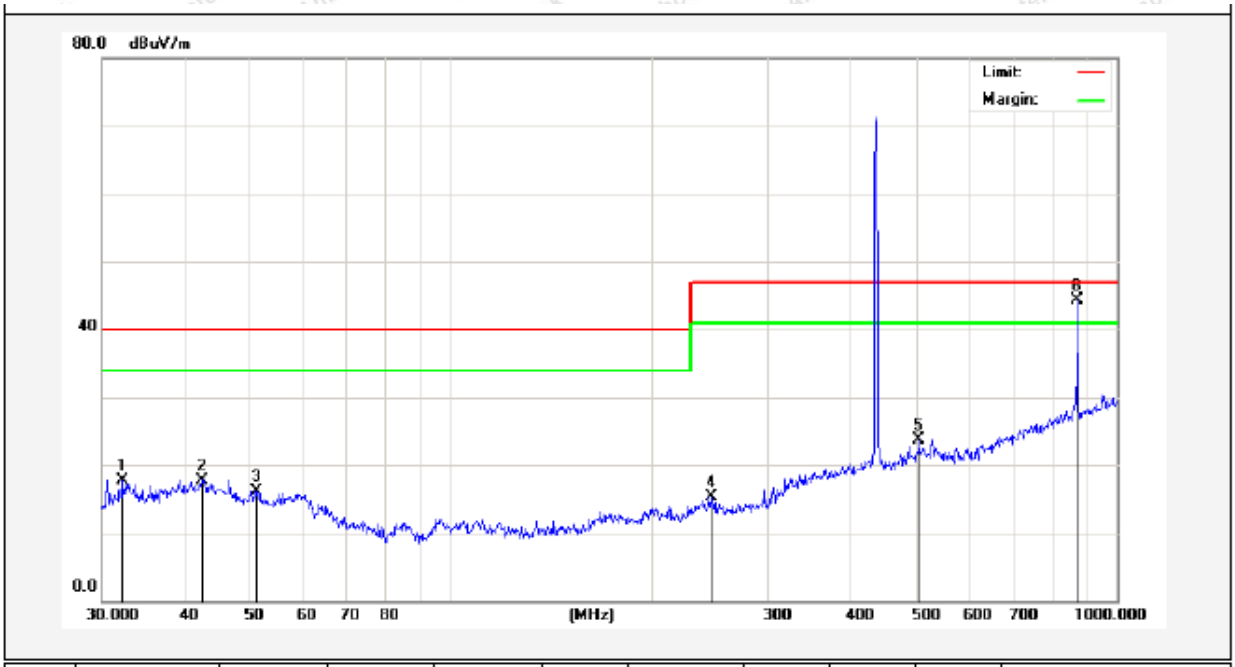
PASS

The EUT should be compliance to the limit of Class B

Only the worst case data was showed in the report, please to see the following pages

Test Results (30~1000MHz)

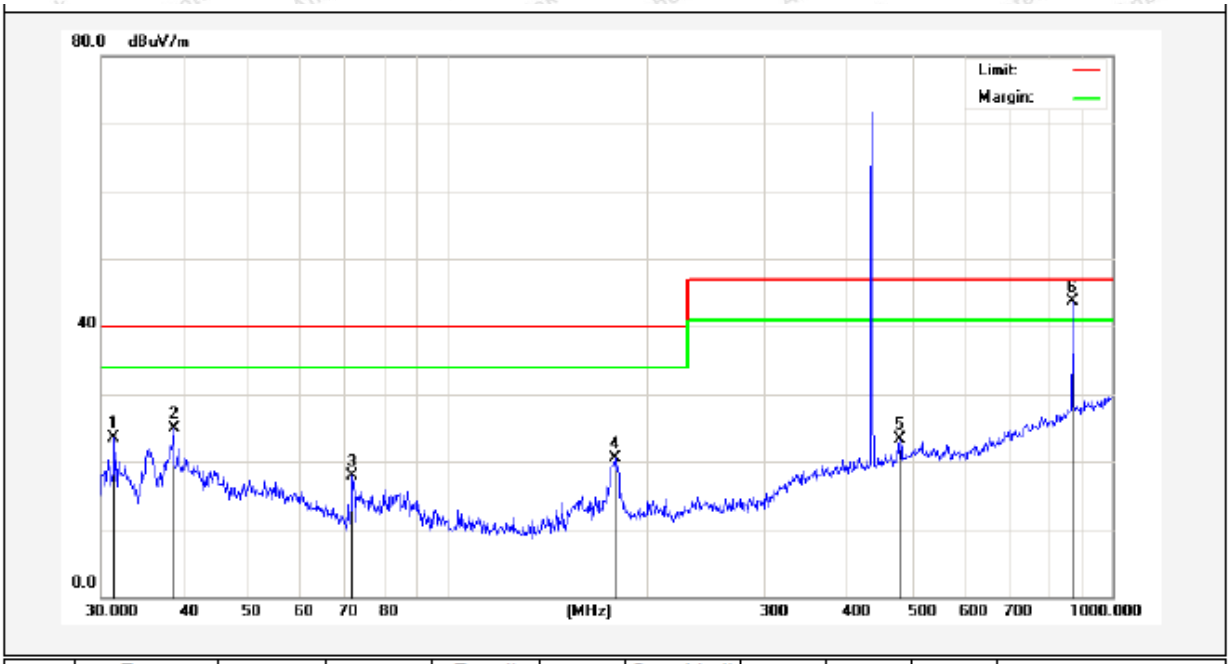
Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	26.6℃/60%RH
Standard:	EN301489_Class B_3m	Power Source:	TX: DC 3V RX: AC 110V, 50Hz
Test Mode:	Mode 1	Polarization:	Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.2924	35.63	-17.88	17.75	40.00	-22.25	peak			
2	42.4508	32.64	-14.84	17.80	40.00	-22.20	peak			
3	51.3004	32.71	-16.61	16.10	40.00	-23.90	peak			
4	245.9507	33.21	-17.82	15.39	47.00	-31.61	peak			
5	504.7062	34.69	-10.96	23.73	47.00	-23.27	peak			
6	872.1832	49.55	-5.24	44.31	47.00	-2.69	peak			

Test Results (30~1000MHz)

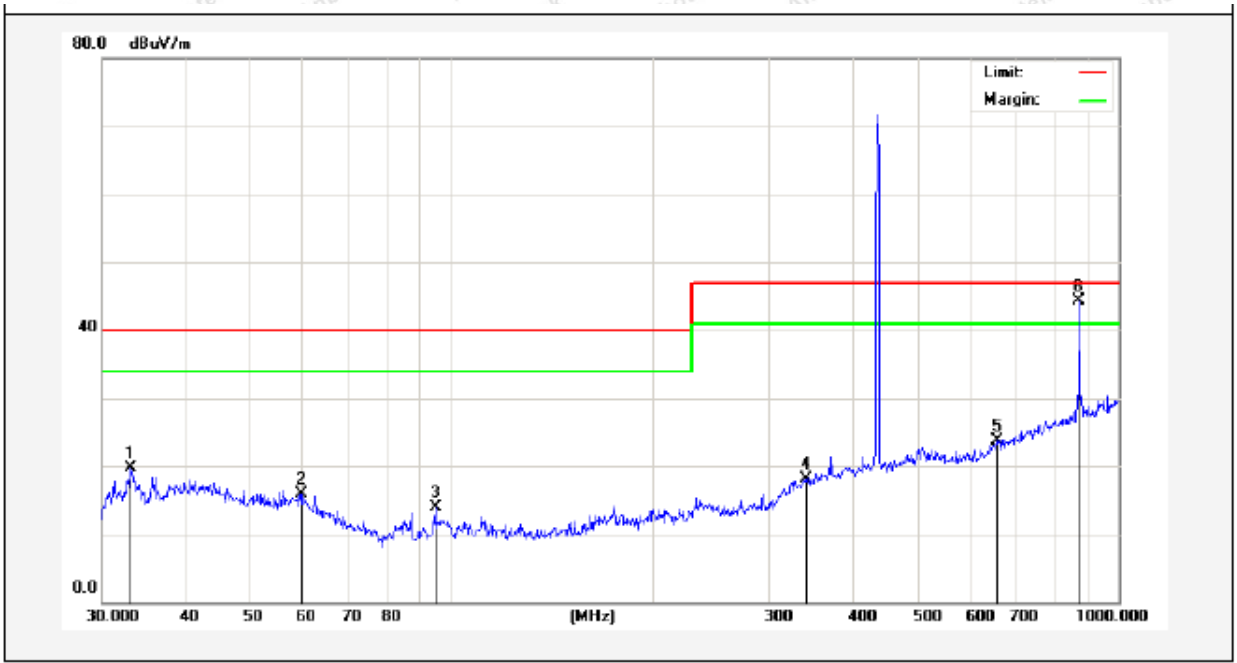
Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	26.6℃/60%RH
Standard:	EN301489_Class B_3m	Power Source:	TX: DC 3V RX: AC 110V, 50Hz
Test Mode:	Mode 1	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.3992	40.56	-17.15	23.41	40.00	-16.59	peak			
2	38.6160	39.08	-14.12	24.96	40.00	-15.04	peak			
3	71.8319	37.97	-20.11	17.86	40.00	-22.14	peak			
4	178.1325	36.56	-15.98	20.58	40.00	-19.42	peak			
5	478.8455	34.82	-11.57	23.25	47.00	-23.75	peak			
6	872.1832	47.91	-4.24	43.67	47.00	-3.33	peak			

Test Results (30~1000MHz)

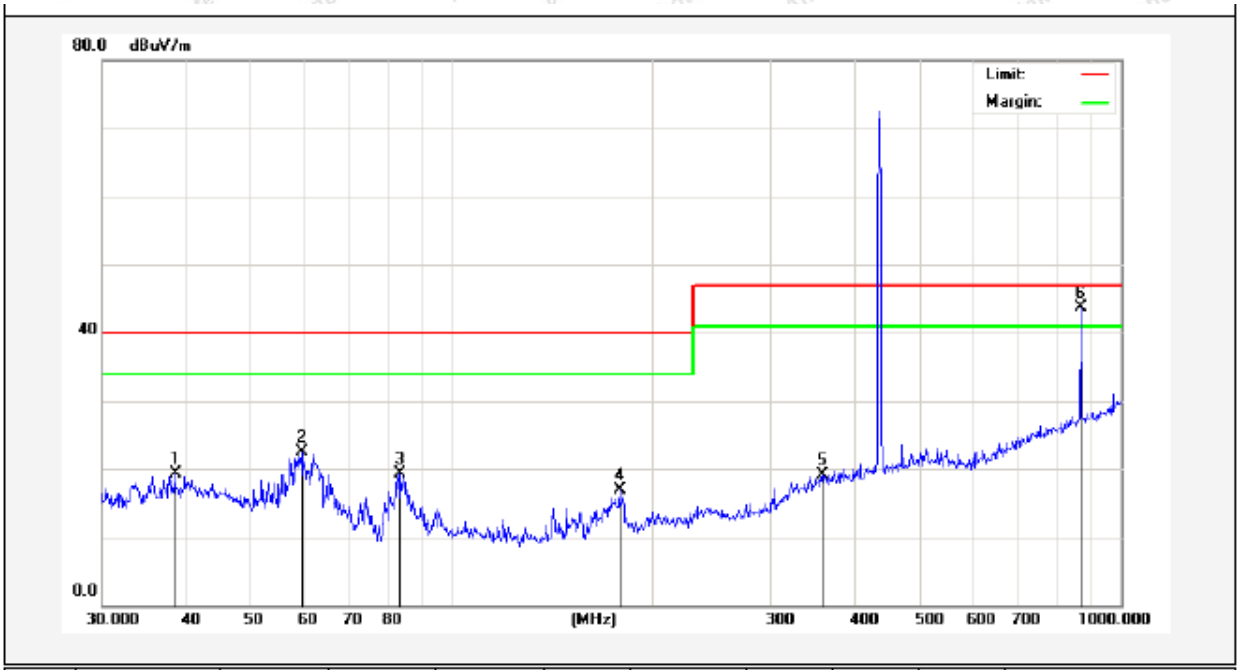
Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	26.6℃/60%RH
Standard:	EN301489_Class B_3m	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1	Polarization:	Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.2111	37.26	-17.61	19.65	40.00	-20.35	peak			
2	59.8588	32.98	-16.99	15.99	40.00	-24.01	peak			
3	94.7600	35.29	-21.31	13.98	40.00	-26.02	peak			
4	339.5887	32.43	-14.33	18.10	47.00	-28.90	peak			
5	656.5298	33.30	-9.67	23.63	47.00	-23.37	peak			
6	872.1832	49.54	-5.24	44.30	47.00	-2.70	peak			

Test Results (30~1000MHz)

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	26.6℃/60%RH
Standard:	EN301489_Class B_3m	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	38.6160	33.44	-14.12	19.32	40.00	-20.68	peak			
2	59.6492	38.48	-15.98	22.50	40.00	-17.50	peak			
3	83.8156	37.63	-18.38	19.25	40.00	-20.75	peak			
4	178.1324	32.84	-15.98	16.86	40.00	-23.14	peak			
5	357.9286	31.87	-12.73	19.14	47.00	-27.86	peak			
6	872.1832	47.99	-4.24	43.75	47.00	-3.25	peak			

Test Results (1GHz~6GHz)

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
1349.75	52.02	-3.19	48.84	70.00	-21.16	H	PEAK
1841.58	45.54	-2.66	42.88	70.00	-27.12	H	PEAK
2288.04	49.98	-3.86	46.11	70.00	-23.89	H	PEAK
4013.65	54.51	-5.15	49.36	74.00	-24.64	H	PEAK
4370.53	46.14	-5.04	41.10	74.00	-32.90	H	PEAK
4847.99	46.34	-5.59	40.75	74.00	-33.25	H	PEAK
1349.75	36.00	-3.19	32.81	50.00	-17.19	H	AVG
1841.58	41.36	-2.66	38.70	50.00	-11.30	H	AVG
2288.04	37.79	-3.86	33.93	50.00	-16.07	H	AVG
4013.65	40.31	-5.15	35.15	54.00	-18.85	H	AVG
4370.53	37.47	-5.04	32.43	54.00	-21.57	H	AVG
4847.99	41.74	-5.59	36.15	54.00	-17.85	H	AVG
1439.15	50.95	-2.74	48.22	70.00	-21.78	V	PEAK
1932.10	47.10	-3.35	43.75	70.00	-26.25	V	PEAK
2163.70	49.36	-3.58	45.77	70.00	-24.23	V	PEAK
3854.40	48.73	-4.84	43.89	74.00	-30.11	V	PEAK
4624.32	48.69	-5.14	43.55	74.00	-30.45	V	PEAK
5123.85	51.67	-5.60	46.07	74.00	-27.93	V	PEAK
1439.15	40.23	-2.74	37.49	50.00	-12.51	V	AVG
1932.10	39.98	-3.35	36.63	50.00	-13.37	V	AVG
2163.70	41.24	-3.58	37.66	50.00	-12.34	V	AVG
3854.40	40.07	-4.84	35.23	54.00	-18.77	V	AVG
4624.32	41.29	-5.14	36.15	54.00	-17.85	V	AVG
5123.85	42.44	-5.60	36.84	54.00	-17.16	V	AVG

Remark:

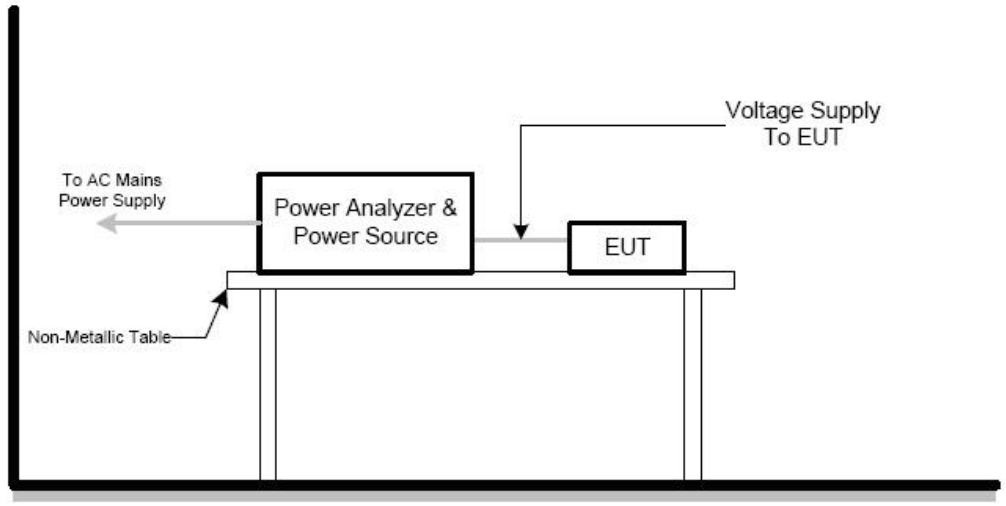
1. Level =Receiver Read level + Antenna Factor

3.3. Harmonic Current Emissions

3.3.1. Test Standard and Limit

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 8.5
Basic Standard	EN 61000-3-2: 2014
Test Limit	Please to refer to the clause 7 of standard EN 61000-3-2: 2014.

3.3.2. Test Setup



3.3.3. Test Procedure

1) The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.

2) The classification of EUT is according to section 5 of EN 61000-3-2: 2014.The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television.

3) The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

4) For the actual test configuration, please refer to the related item –EUT Test Photos.

3.3.4. Test Data

The active input power of the EUT is less than 75W. Therefore, according to EN 61000-3-2, no limits are necessary.

3.4. Voltage Fluctuations and Flicker

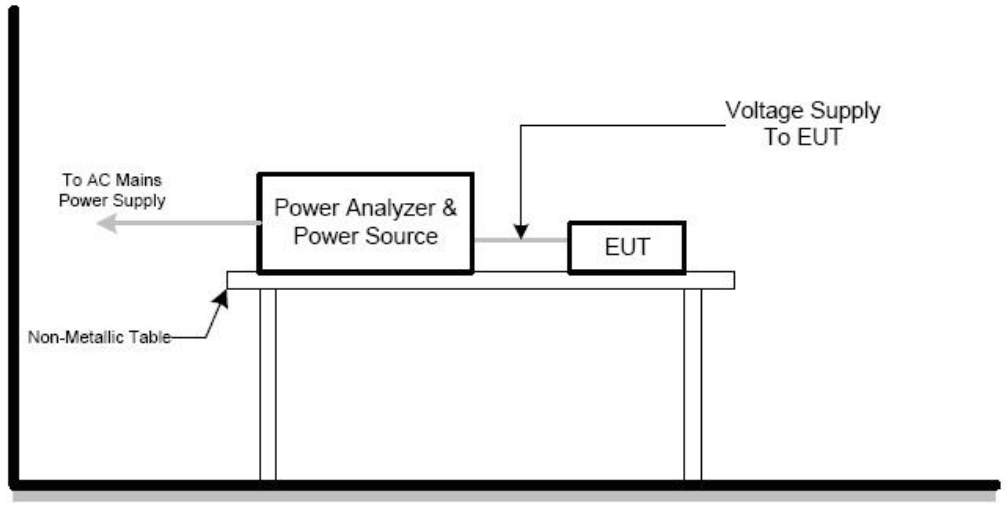
3.4.1. Test Standard and Limit

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 8.6
Basic Standard	EN 61000-3-3: 2013

Voltage Fluctuation and Flicker Test Limit

Test Items	Limits
Pst	1.0
Plt	0.65
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

3.4.2. Test Setup



3.4.3. Test Procedure

1) Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

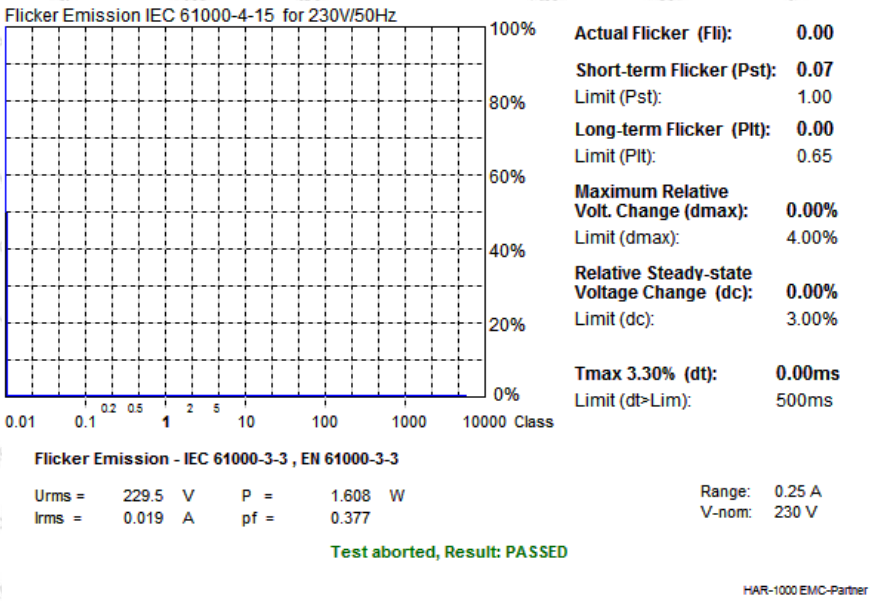
2) All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3) For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.4.4. Test Data

Please to see the following pages

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-3-3	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		



Full Bar : Actual Values
Empty Bar : Maximum Values
Circles : Average Values
Blue : Current , Green : Voltage , Red : Failed

Urms =	**229.5V**	**Freq =**	**50.000**	**Range:**	**0.25 A**
Irms =	**0.019A**	**Ipk =**	**0.104A**	**cf =**	**5.605**
P =	**1.608W**	**S =**	**4.259VA**	**pf =**	**0.377**

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits :	**Plt :**	**0.65**	**Pst :**	**1.00**
	dmax :	**4.00 %**	**dc :**	**3.00 %**
	dtLim:	**3.30 %**	**dt>Lim:**	**500ms**

Test aborted, Result: PASSED

	dmax [%]	dc [%]	dt>Lim [ms]
1	**0.000**	**0.000**	**0.000**

4. Immunity Test

General Performance Criteria

◆ Performance criteria for continuous phenomena applied to transmitters and receivers (CT/CR)

During and after the test, the apparatus 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 apparatus 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 apparatus if used as intended.

◆ Performance criteria for transient phenomena applied to transmitters and receivers (TT/TR)

After the test, the apparatus 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 apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

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.

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 apparatus if used as intended.

◆ 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 CT/CR and TT/TR are not appropriate, then 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 criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

◆ Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in CT/CR and TT/TR are not appropriate, then 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.

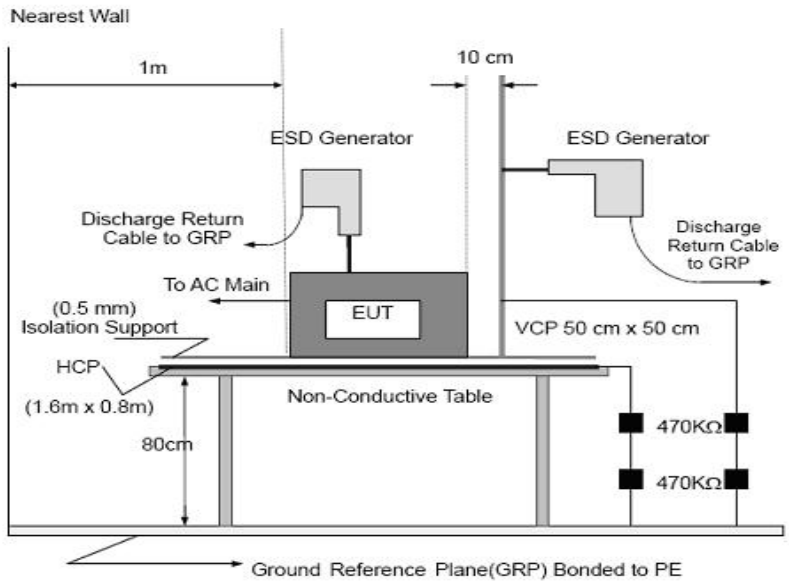
The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

4.1. Electrostatic Discharge Test

4.1.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.3/EN 55035 Clause 4.2.1
Basic Standard	EN 61000-4-2: 2009
Discharge Impedance:	330 ohm / 150 pF
Performance Criterion:	CT/CR
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV 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 Mode:	Single Discharge
Discharge Period:	1 second minimum

4.1.2. Test Setup



Note:

TABLE-TOP EQUIPMENT:

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 940kohm 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 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.

4.1.3. Test Procedure

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

1) 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.

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.

2) Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

3）When applying direct discharges to a portable or handheld battery-powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during this test, the EUT may be mounted vertically using non-metallic supports.

4）For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4. Test Data

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-4-2	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		

Item	Contact Discharge to conducted surfaces and to coupling planes		Air Discharge at insulating surfaces
	Direct Contact Discharge	Indirect Contact Discharge	
Test Voltage	Reaction of EUT / Result	Reaction of EUT / Result	Reaction of EUT / Result
+2kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
-2kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
+4kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
-4kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
+6kV	-	-	n.r.r. PASS
-6kV	-	-	n.r.r. PASS
+8kV	-	-	n.r.r. PASS
-8kV	-	-	n.r.r. PASS

Remarks: n.r.r. = no reaction recognized

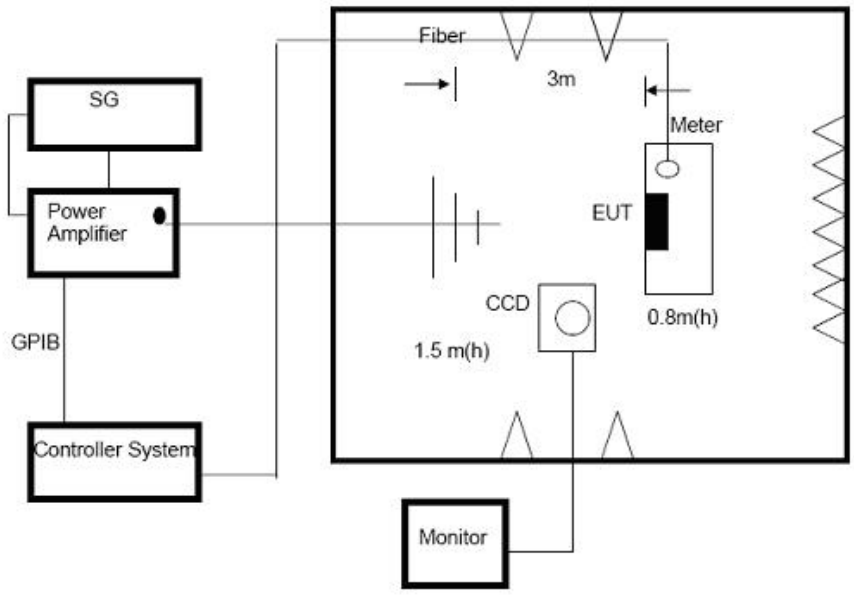
Performace Criteria A observed and No any function degraded during the tests.

4.2. Radiated, RF Electromagnetic Fields Test

4.2.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.2/EN 55035 Clause 5
Basic Standard	EN 61000-4-3: 2006+A1: 2008+A2: 2010
Required Performance	A
Frequency Range	80MHz to 6GHz
Field Strength	3 V/m
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5 m
Dwell Time	at least 0.5 seconds

4.2.2. Test Setup



4.2.3. Test Procedure

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber. The testing distance from antenna to the EUT was 3 meters.

1) The field strength level was 3V/m

2) The frequency range is swept from 80 MHz to 6000 MHz with the signal 80%amplitude modulated with a 1kHz sine wave.

3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0.5s.

4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.2.4. Test Data

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	23.1℃/56.7%RH
Standard:	EN 61000-4-3	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		

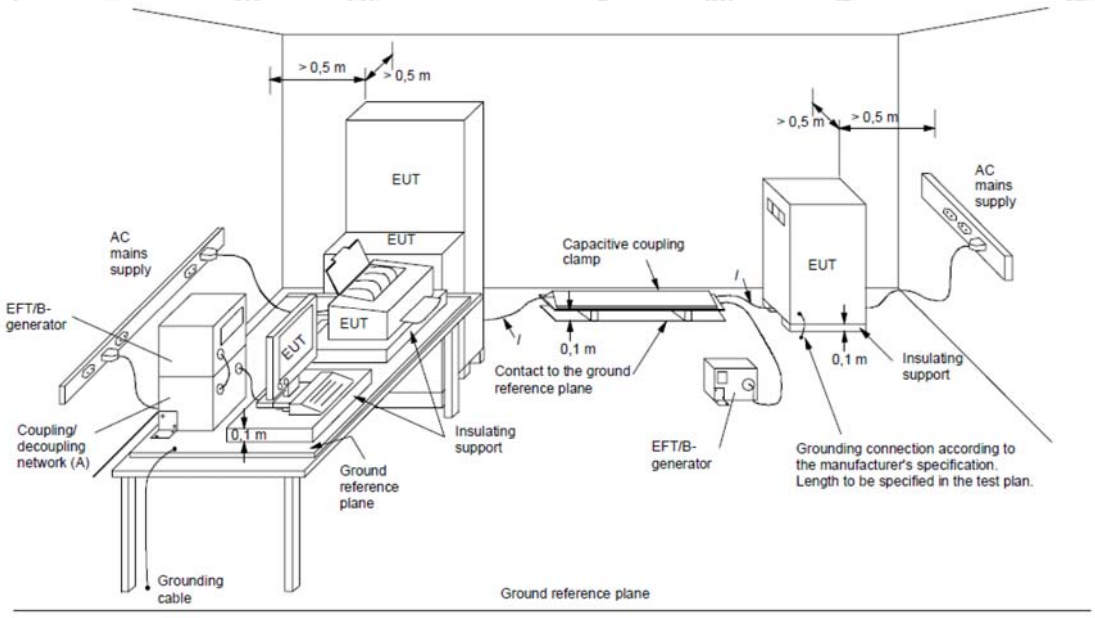
Frequency Range (MHz)	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	☑ A ☐ B ☐ C ☐ D
			Rear	
			Left	
			Right	

4.3. Fast Transients, Common Mode Test

4.3.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.4/EN 55035 Clause 4.2.4
Basic Standard	EN 61000-4-4: 2012
Required Performance	B
Test Voltage:	Power Line: 1 kV Signal/Control Line: 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	Tr/Th 5/50 ns
Burst Duration:	15 ms for 5KHz Repetition Frequency 0.75 ms for 100KHz Repetition Frequency
Burst Period:	300 ms
Test Duration	1 min

4.3.2. Test Setup



Note: (A) location for supply line coupling

(B) location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Setup

4.3.3. Test Procedure

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

1) The distance between any coupling devices and the EUT should be (0.5-0/+0.1)m for table-top equipment

testing, and (1.0±0.1)m for floor standing equipment.

2) Both positive and negative polarity discharges were applied.

3) The duration time of each test sequential was 1 minute

4) For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.3.4. Test Data

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-4-4	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		

Coupling Line		Test level (kV)								Observation	Criterion	Results
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC Line	L	P	P	P	P					TT,TR	B	PASS
	N	P	P	P	P							PASS
	L+N	P	P	P	P							PASS

Note: 1)There was not any unintentional transmission in standby mode

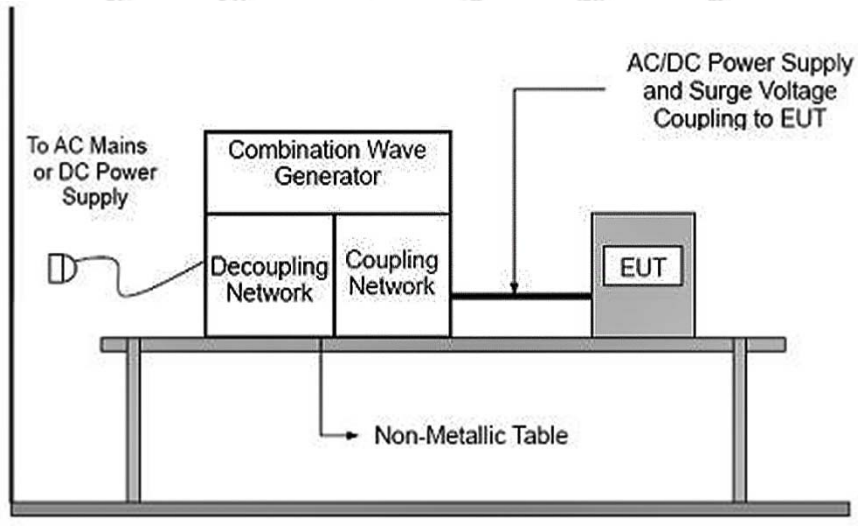
2) In the table: ‘P’ represents ‘PASS’; ‘F’ represents ‘FAIL’.

4.4. Surges Test

4.4.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.8/EN 55035 Clause 4.2.5
Basic Standard	EN 61000-4-5: 2014
Required Performance	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Line to Line: 1 kV; Line to ground: 2kV
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0°/90°/180°/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.4.2. Test Setup



4.4.3. Test Procedure

1) For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as

for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.

2) For Unshielded unsymmetrical interconnection lines:

The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

3) Unshielded symmetrical interconnections communication lines:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

4) For Shielded lines:

Direct application,

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with single or multiple shielded cables.

Rules for application of the surge to shielded lines:

i) Shields grounded at both ends

> The surge injection on the shield.

ii) Shields grounded at one end

> If in the installation the shield is connected only at the auxiliary equipment, test shall be done in that configuration but with the generator still connected to the EUT side. If cable lengths allow, the cables shall be on insulated supports 0.1 m above the ground plane or cable tray.

For products which do not have metallic enclosures, the surge is applied directly to the shielded cable.

- Alternative coupling method for testing single cables in a multi-shield configuration, Surges are applied in close proximity to the interconnection cable under test by a wire. The length of the cable between the port(s) under test and the device attached to the other end of the cable shall be the lesser of the maximum length permitted by the EUT's specification, or 20 m. Where the length exceeds 1 m, excess lengths of cables shall be bundled at the approximate centre of the cables with the bundles 30 cm to 40 cm in length.

4.4.4. Test Data

Job No.: SZAWW180912003-01E Temp.(℃)/Hum.(%RH): 24.3℃/55%RH

Standard: EN 61000-4-5 Power Source: TX: DC 3V
RX: AC 230V, 50Hz

Test Mode: Mode 1

Coupling Line			Test level								Observation	Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV				
			+	-	+	-	+	-	+	-			
AC line	L-N	0°			P	P					TT,TR	B	PASS
		90°			P	P							
		180°			P	P							
		270°			P	P							

Note: 1)There was not any unintentional transmission in standby mode

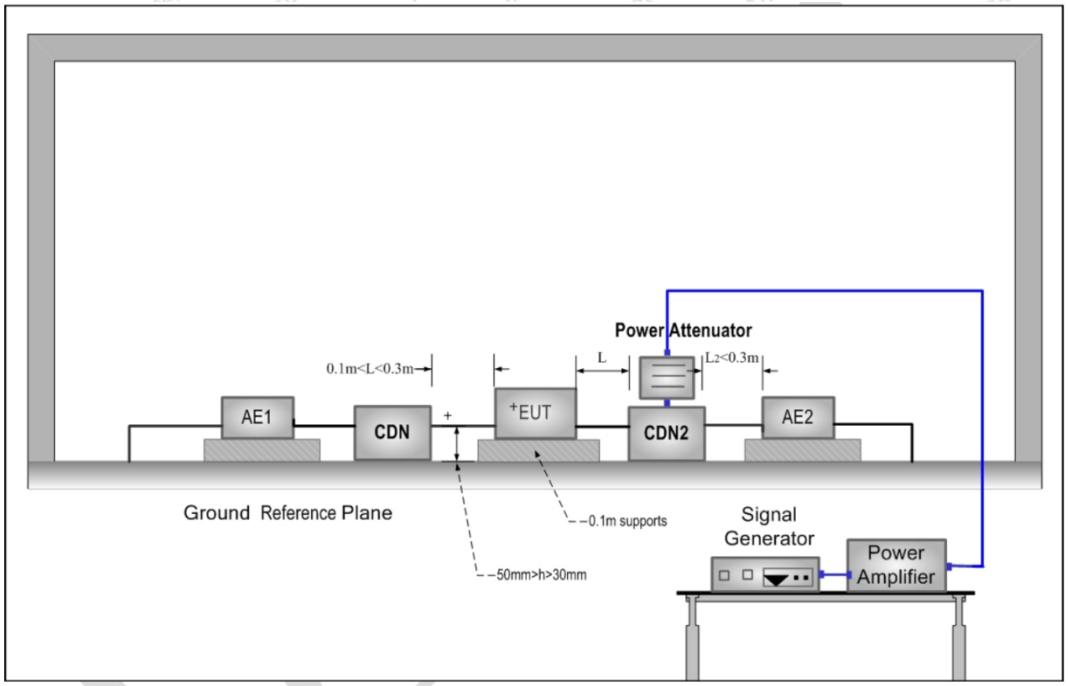
2) In the table: ‘P’ represents ‘PASS’; ‘F’ represents ‘FAIL’.

4.5. Radio Frequency, Common Mode Test

4.5.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.5/EN 55035:2017 Clause 5
Basic Standard	EN 61000-4-6: 2014
Required Performance	A
Frequency Range:	0.15 MHz~80 MHz/0.15MHz~10MHz, 10MHz~30MHz, 30MHz~80MHz
Field Strength:	3 Vr.m.s./3V~1Vr.m.s./3Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

4.5.2. Test Setup



4.5.3. Test Procedure

1) The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement. All cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane.

2) The coupling and decoupling devices were required, they were located between 0.1 m and 0.3 m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device.

3) Each AE, used with clamp injection, shall be placed on an insulating support 0.1 m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test.

All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0.3 m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30 mm and 50 mm above the ground reference plane.

4) The frequency range was swept from 150 kHz to 230 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size do not exceed 1% of the preceding frequency

4.5.4. Test Data

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-4-6	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		

Voltage (V)	Test Frequency (MHz)	Tested Line	Injection Method.	Performance Criterion	Test Result
3	0.15~80	AC line	CDN-M2	CT/CR	PASS

Remark: For normal operating function: There was no change compared with the initial operation during and after the test.

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-4-6	Power Source:	AC 230V, 50Hz
Test Mode:	Mode 1		

Voltage (V)	Test Frequency (MHz)	Tested Line	Injection Method.	Performance Criterion	Test Result
3	0.15~10	AC line	CDN-M2	CT/CR	PASS
3~1	10~30	AC line	CDN-M2	CT/CR	PASS
3	30~80	AC line	CDN-M2	CT/CR	PASS

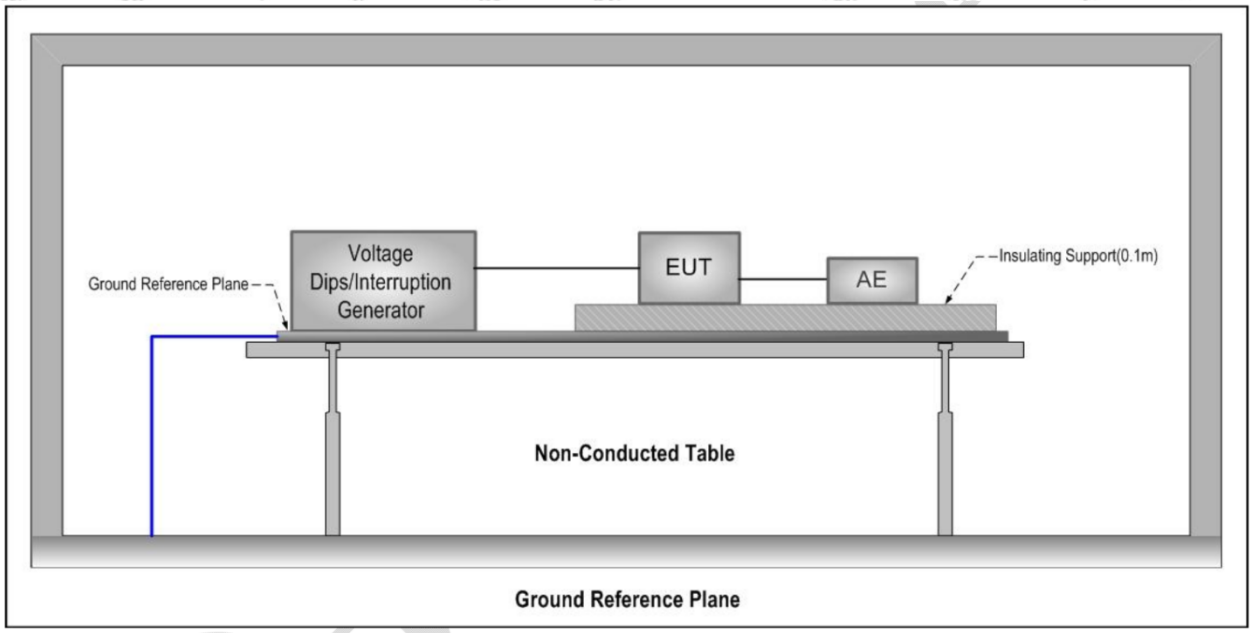
Remark: For normal operating function: There was no change compared with the initial operation during and after the test.

4.6. Voltage Dips and Interruptions

4.6.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.7/EN 55035:2017 Clause 4.2.6
Basic Standard	EN 61000-4-11: 2004
Voltage Dips:	0% reduction, 0.5 Cycle 0% reduction, 1.0 Cycle 70% reduction, 25 Cycles
Voltage Interruptions:	0% reduction, 250 Cycles
Interval between Event:	Minimum 10 seconds
Phase Angle:	0°/180°
Test Cycle:	3 times

4.6.2. Test Setup



4.6.3. Test Procedure

1) The EUT was placed on a ground reference plane(GRP)insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.

2. The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

3. The EUT was tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.

4. For EUT with more than one power cord, each power cord was tested individually.

4.6.4. Test Data

Job No.:	SZAWW180912003-01E	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	EN 61000-4-11	Power Source:	TX: DC 3V RX: AC 230V, 50Hz
Test Mode:	Mode 1		

Ut:230Vac 50Hz	Durations		Event interval (sec)	Total events (time)	Performance Criterion	Result
Voltage residual (%)	(period)	(ms)	10	3	TT/TR	PASS
0	1	20	10	3	TT/TR	PASS
0	0.5	10	10	3	TT/TR	PASS
70	25	500	10	3	TT/TR	PASS
0	250	5000	10	3	TT/TR	PASS
70	0.5	10	10	3	TT or CR	PASS

Ut:100Vac 50Hz	Durations		Event interval (sec)	Total events (time)	Performance Criterion	Result
Voltage residual (%)	(period)	(ms)	10	3	TT/TR	PASS
0	1	20	10	3	TT/TR	PASS
0	0.5	10	10	3	TT/TR	PASS
70	25	500	10	3	TT/TR	PASS
0	250	5000	10	3	TT/TR	PASS
70	0.5	10	10	3	TT or CR	PASS

Ut:240Vac 50Hz	Durations		Event interval (sec)	Total events (time)	Performance Criterion	Result
Voltage residual (%)	(period)	(ms)	10	3	TT/TR	PASS
0	1	20	10	3	TT/TR	PASS
0	0.5	10	10	3	TT/TR	PASS
70	25	500	10	3	TT/TR	PASS
0	250	5000	10	3	TT/TR	PASS
70	0.5	10	10	3	TT or CR	PASS

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Test

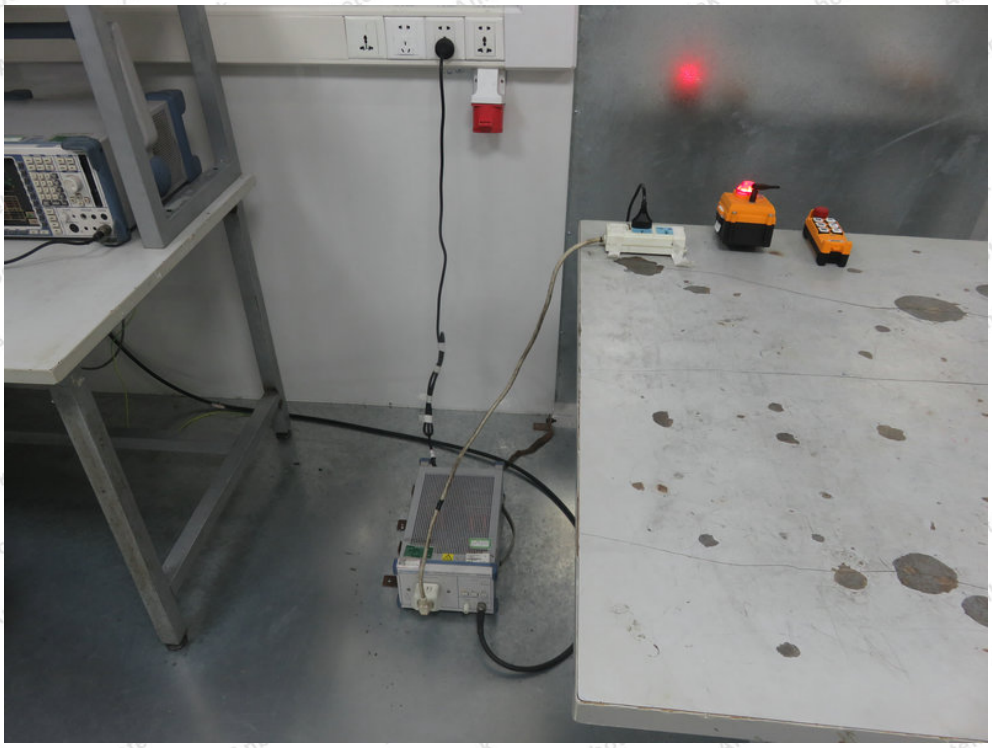


Photo of Radiation Emission Test

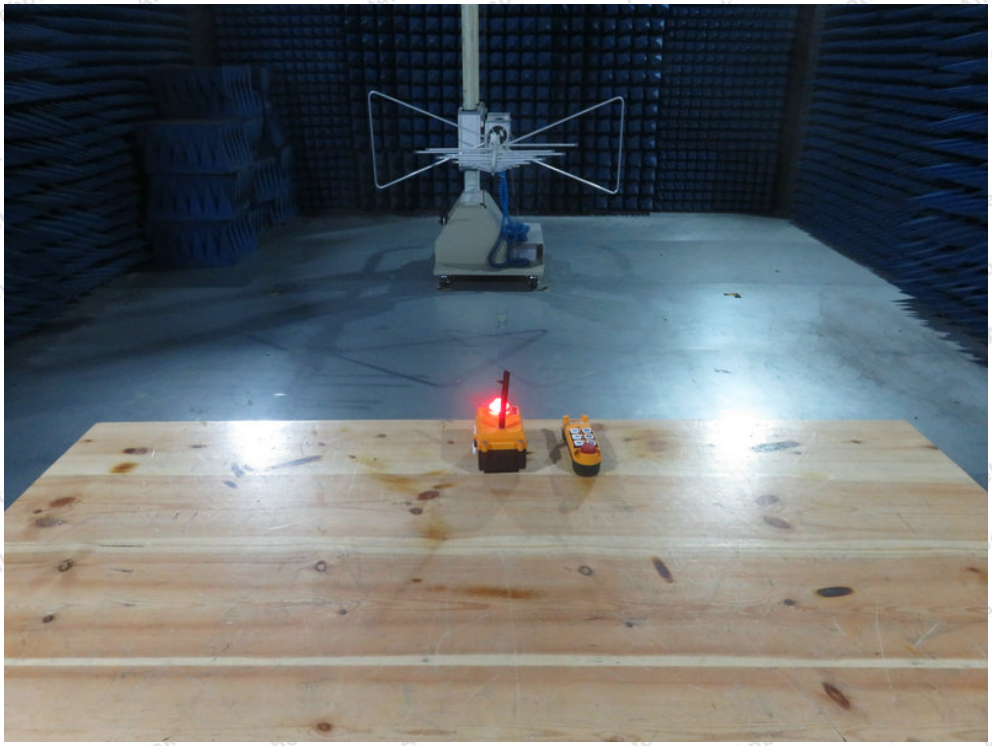


Photo of Flicker Test

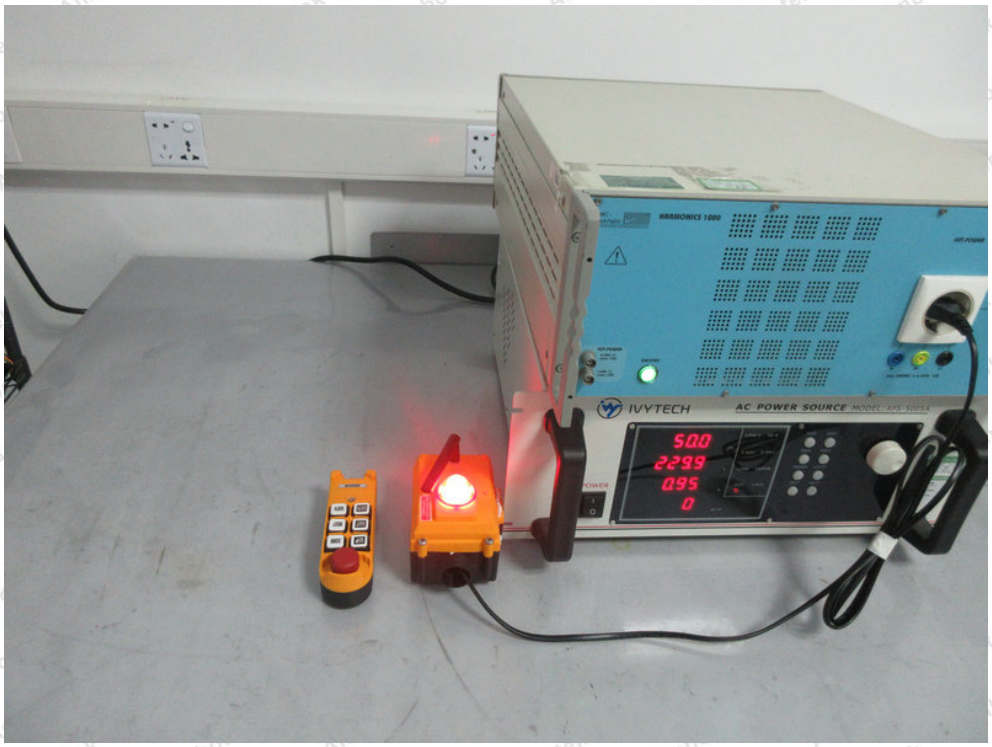


Photo of Electrostatic Discharge Test

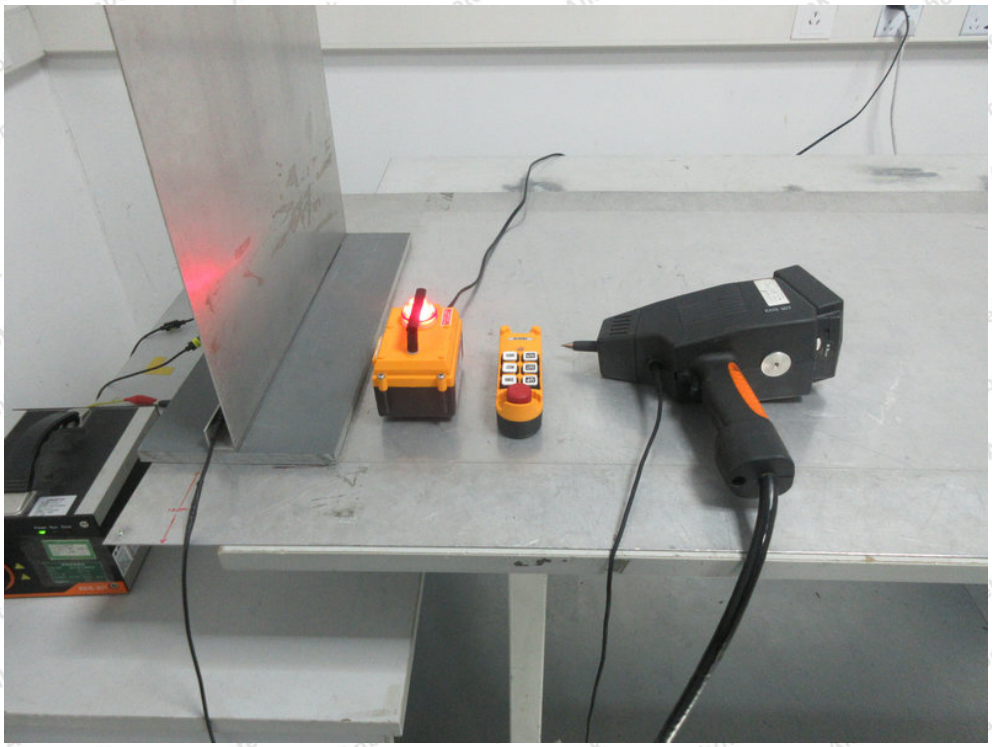


Photo of RF Field Strength Susceptibility Test

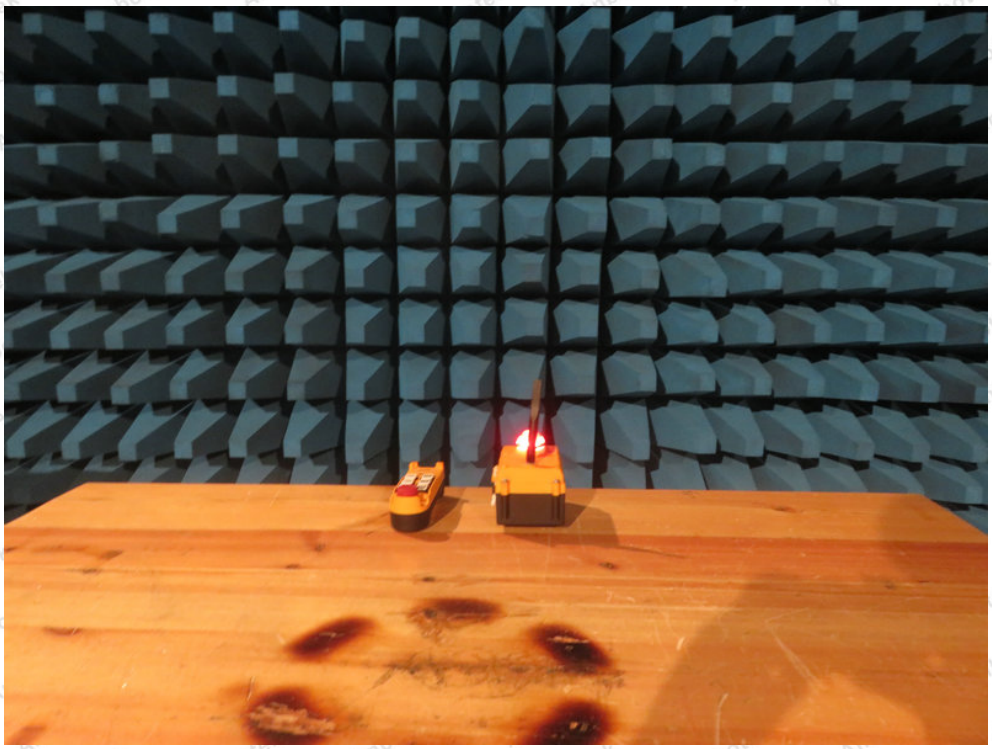


Photo of Electrical Fast Transient /Burst Immunity Test

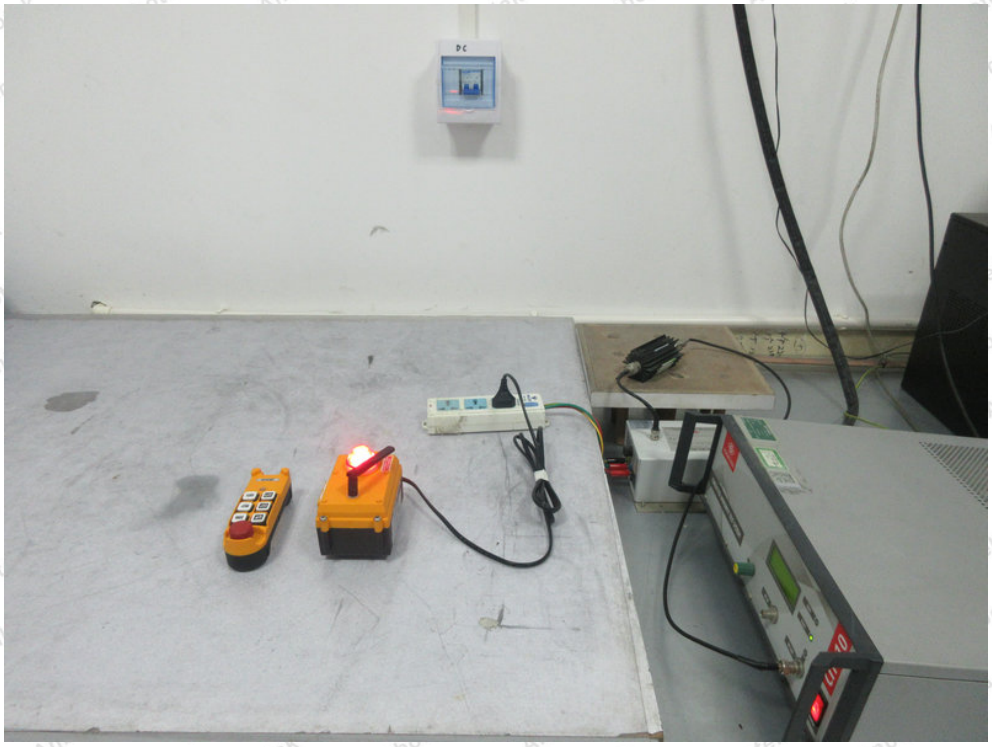


Photo of Surge Test



Photo of C/S Test

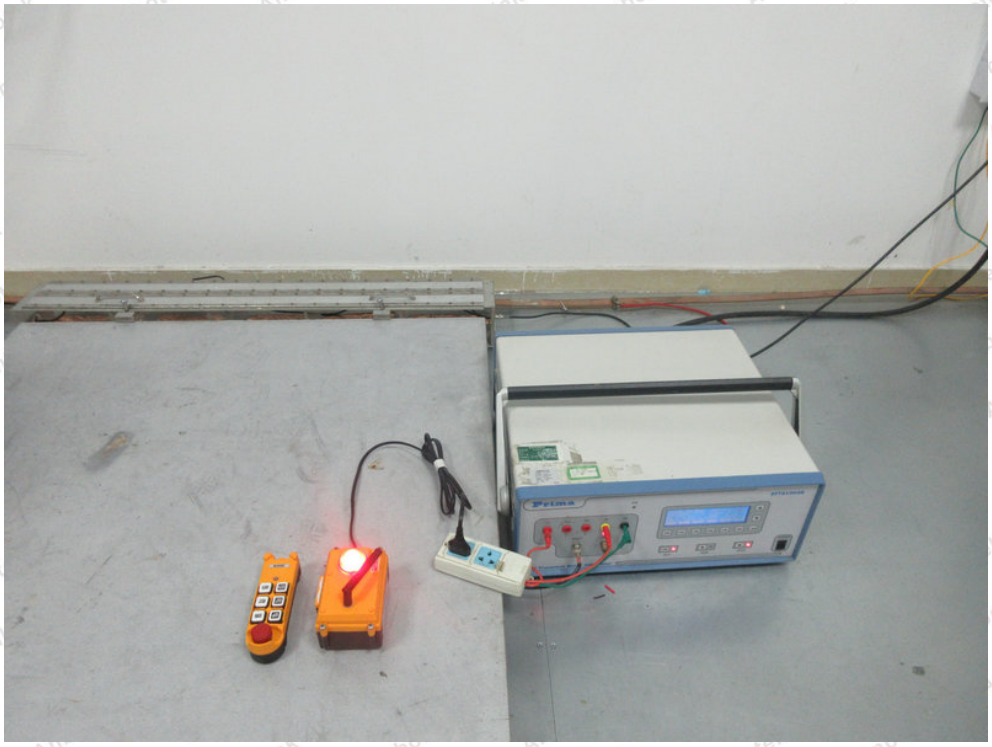
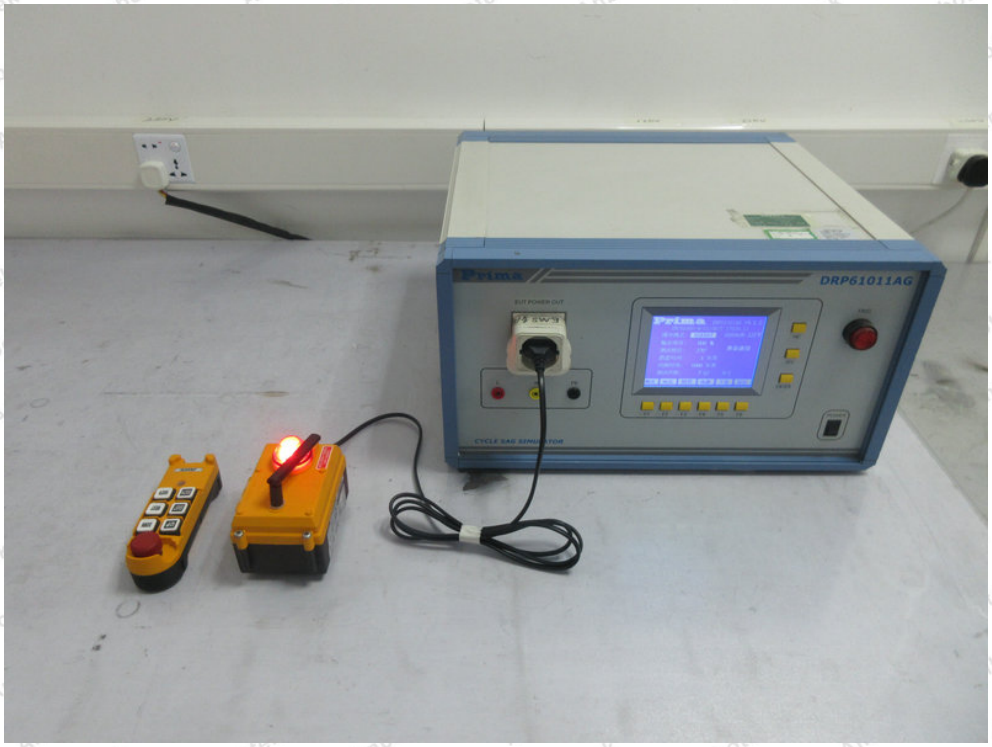


Photo of Dips Immunity Test

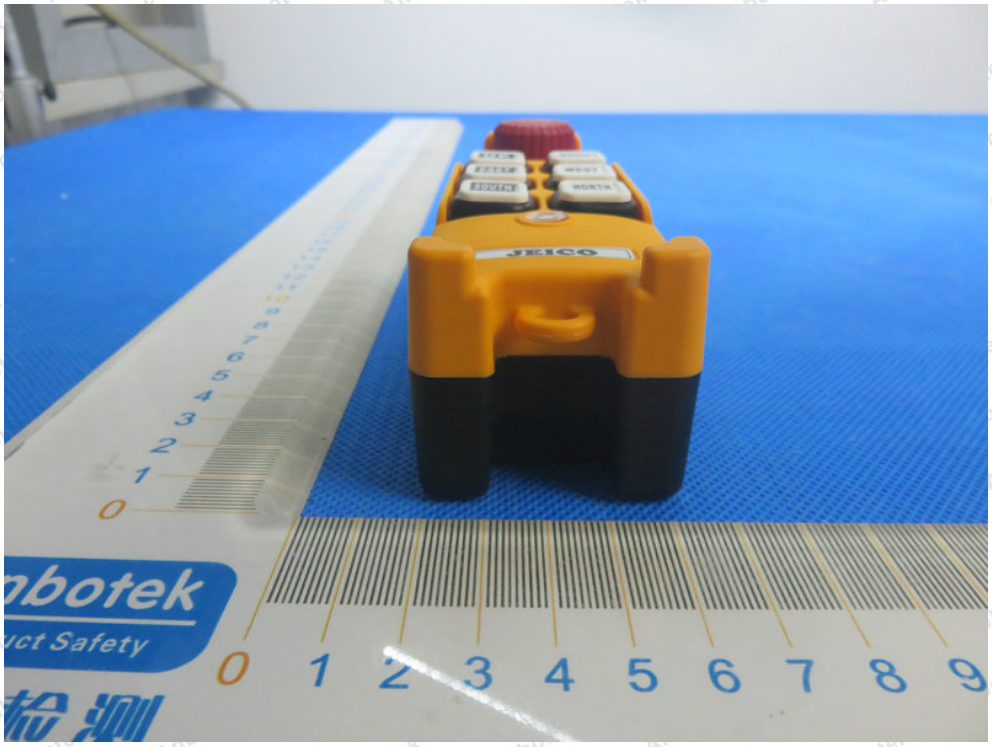


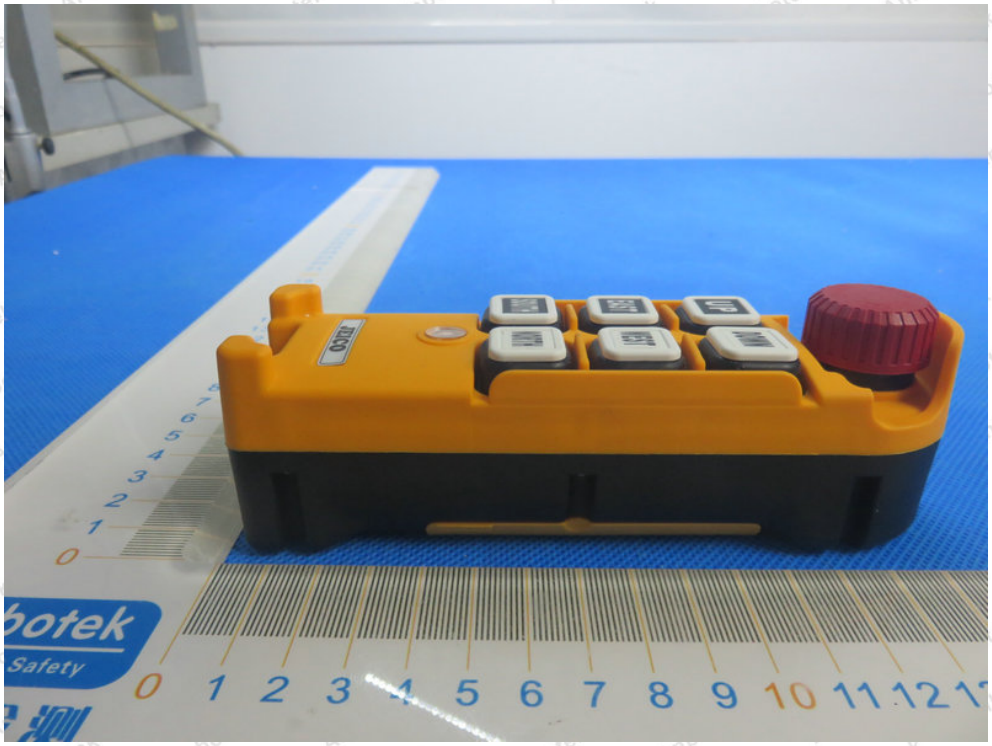
APPENDIX II -- EXTERNAL PHOTOGRAPH






JREMO 6K
581189
JEICO
Anbotek
Product Safety
安博检测


JEICO
Anbotek
Product Safety






Anbotek
Product Safety
安博检测


JEICO
JREMO 6KA
AC WIRE DIAGRAM
Anbotek
Product Safety


Anbotek
Product Safety

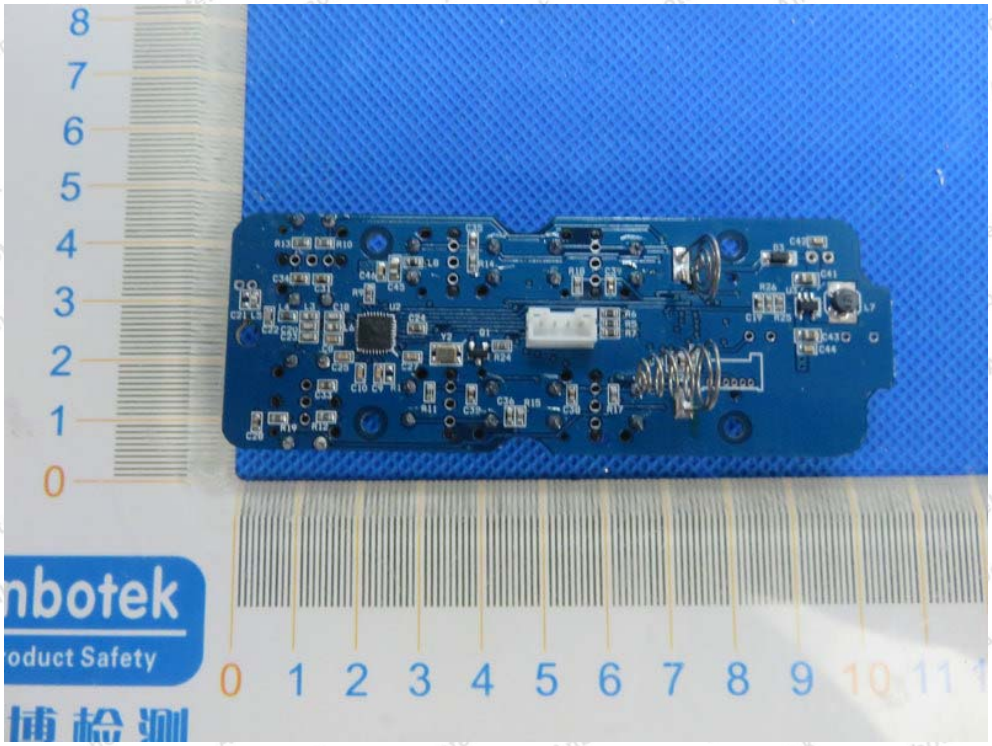

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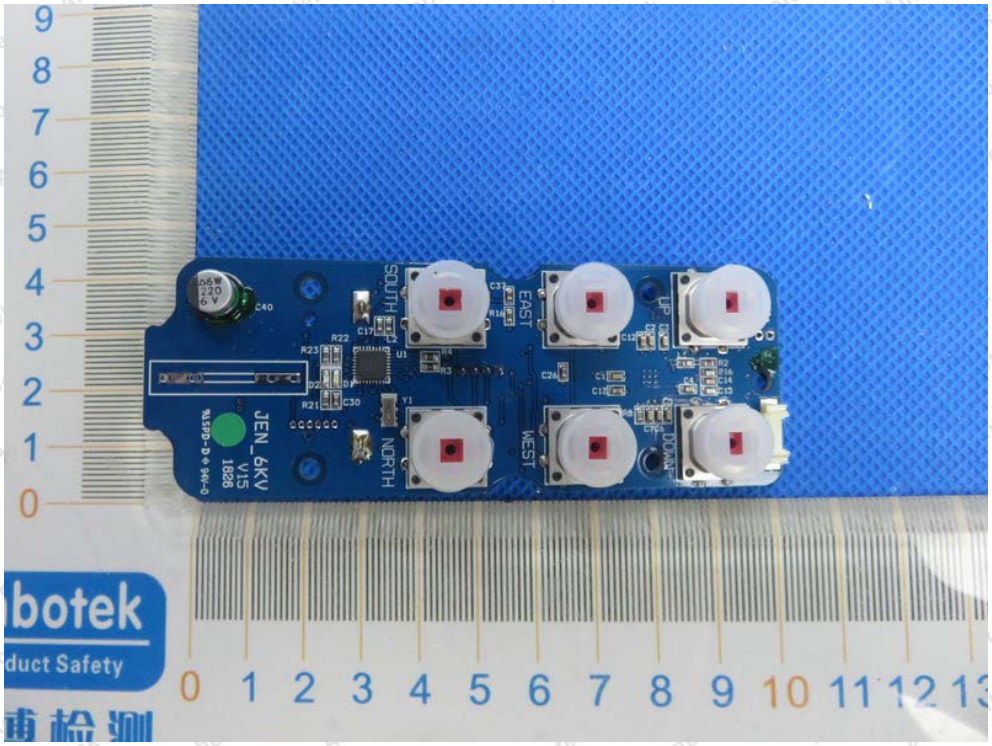


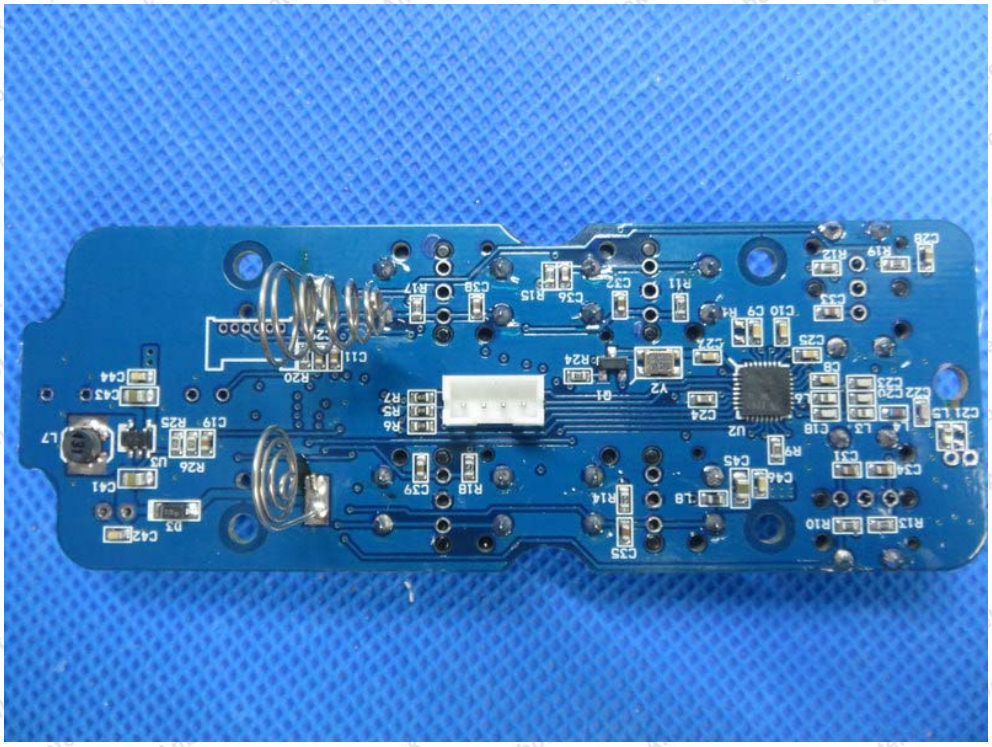


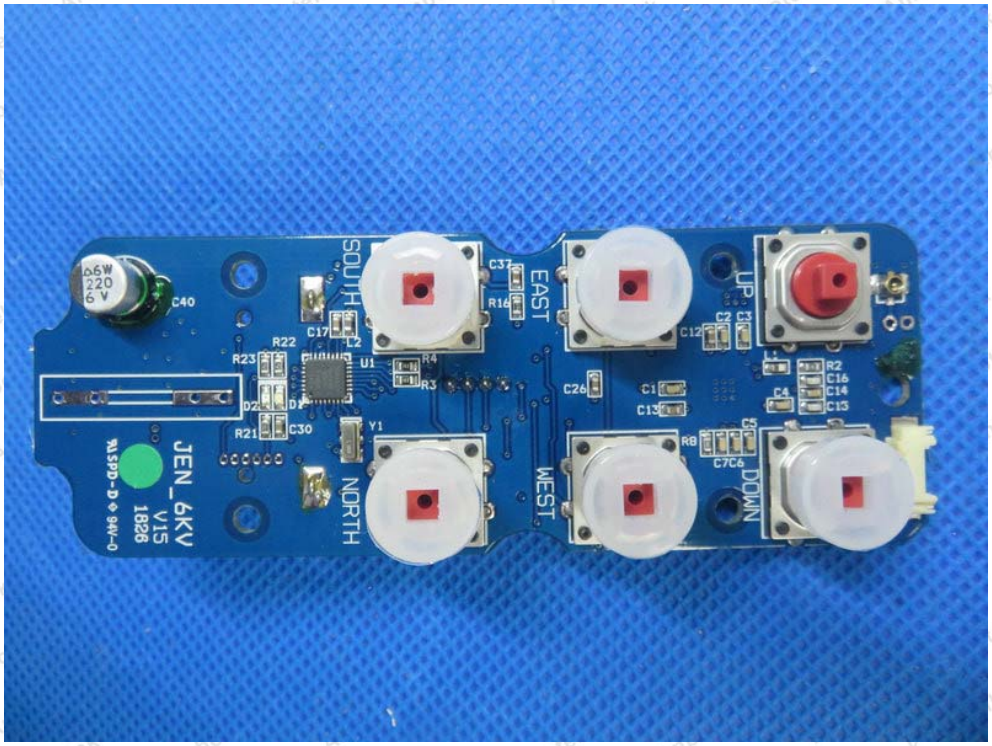
APPENDIX III -- INTERNAL PHOTOGRAPH

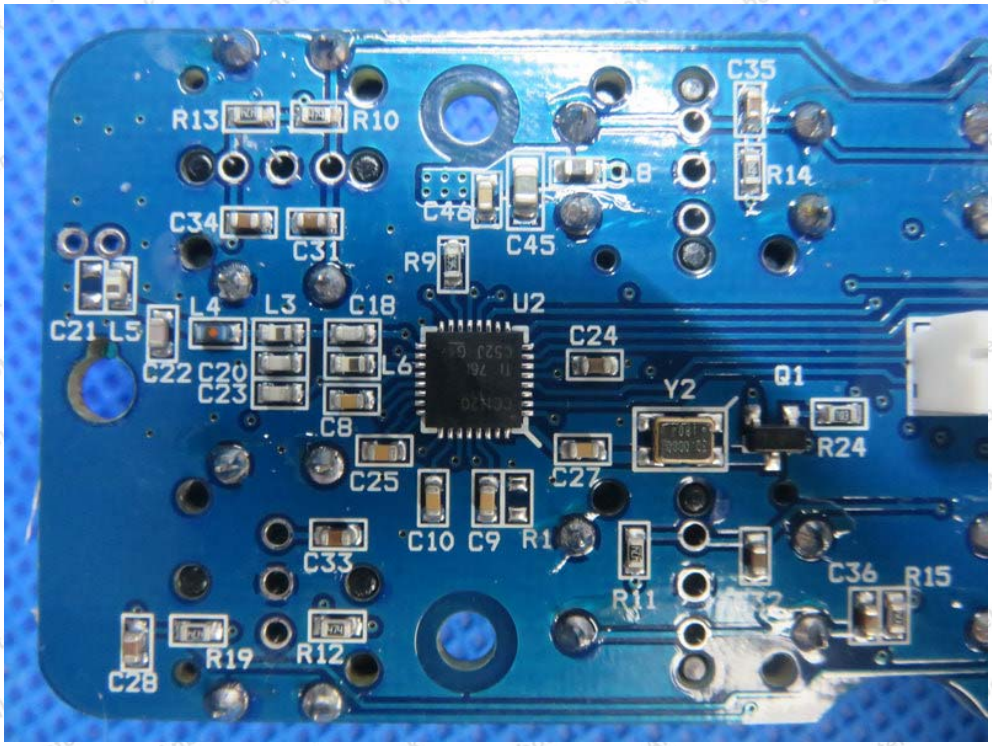


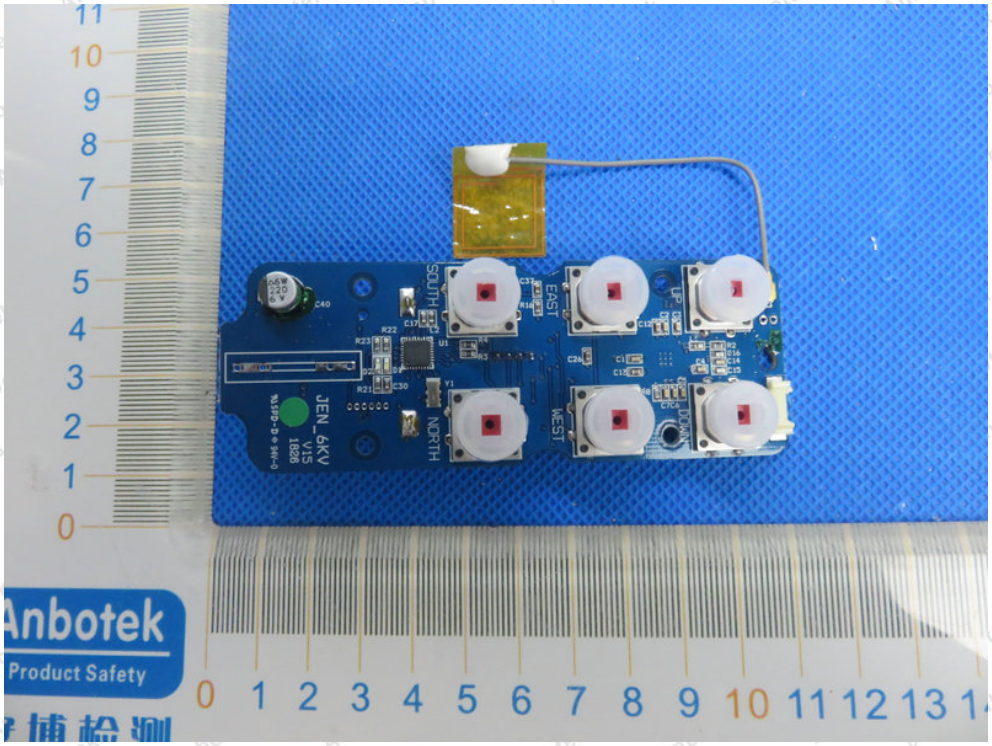


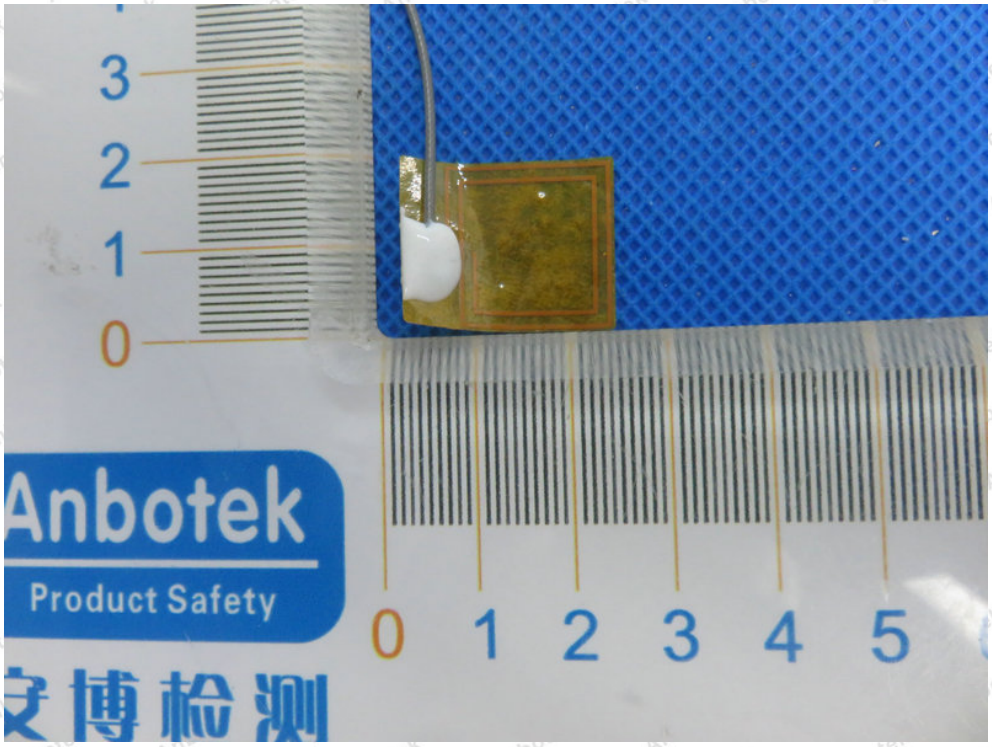

SOUTH
EAST
UP
NORTH
WEST
JEN_6KV
V15
1826




SOUTH
EAST
UP
NORTH
WEST
DOWN
JEN_6KV
V15
1828

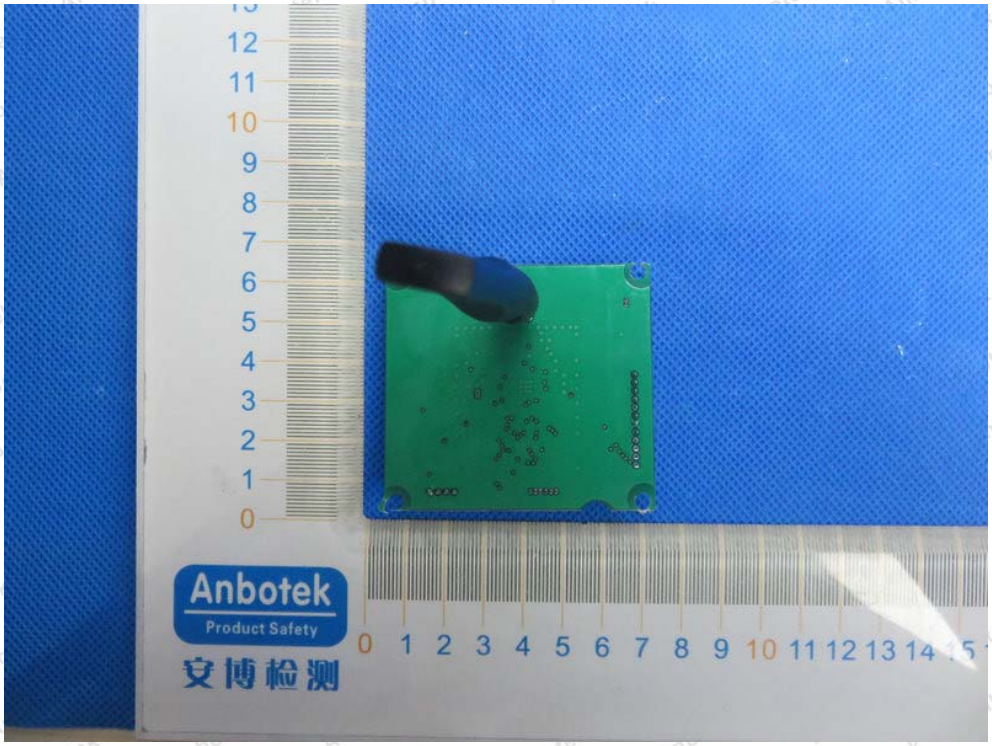

R13
R10
C35
R14
C34
C31
C46
C45
R9
U2
C21
L5
L4
L3
C18
C22
C20
C23
L6
C24
Y2
Q1
R24
C8
C25
C27
C10
C9
R1
C33
R11
C36
R15
C28
R19
R12


SOUTH
EAST
WEST
NORTH
JEN_6KV
Anbotek
Product Safety

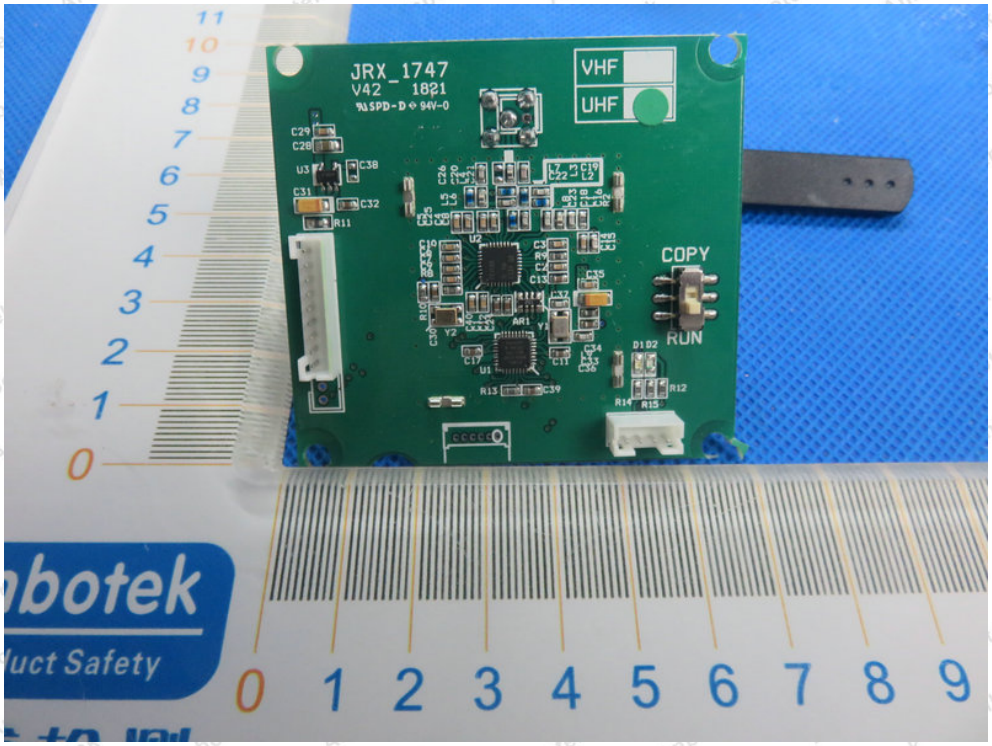

Anbotek
Product Safety

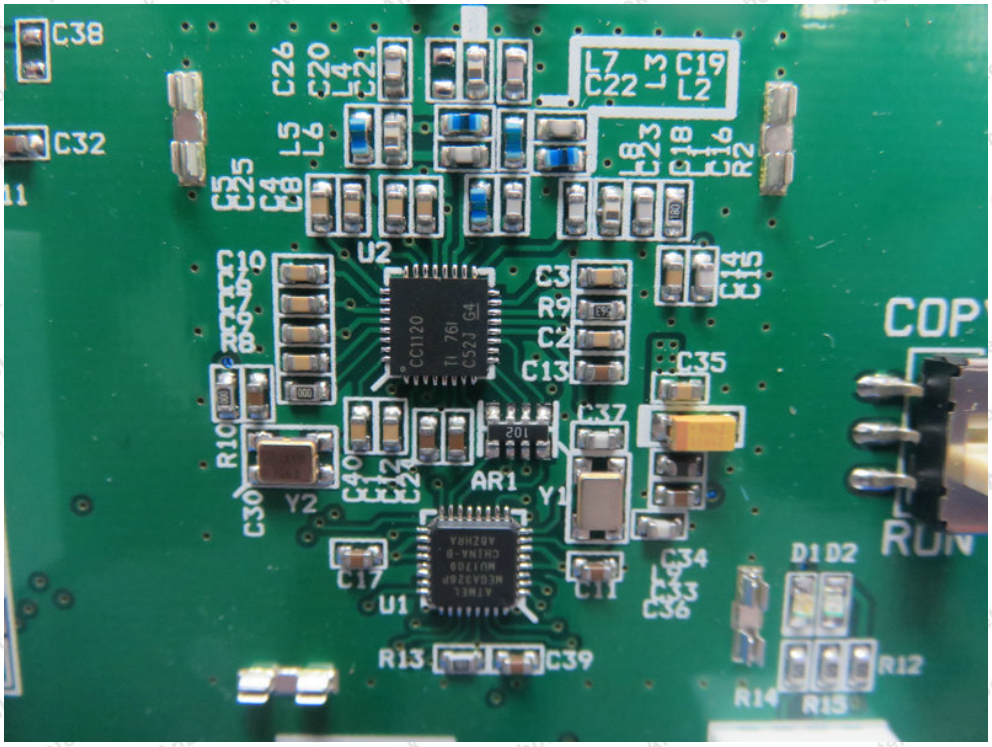


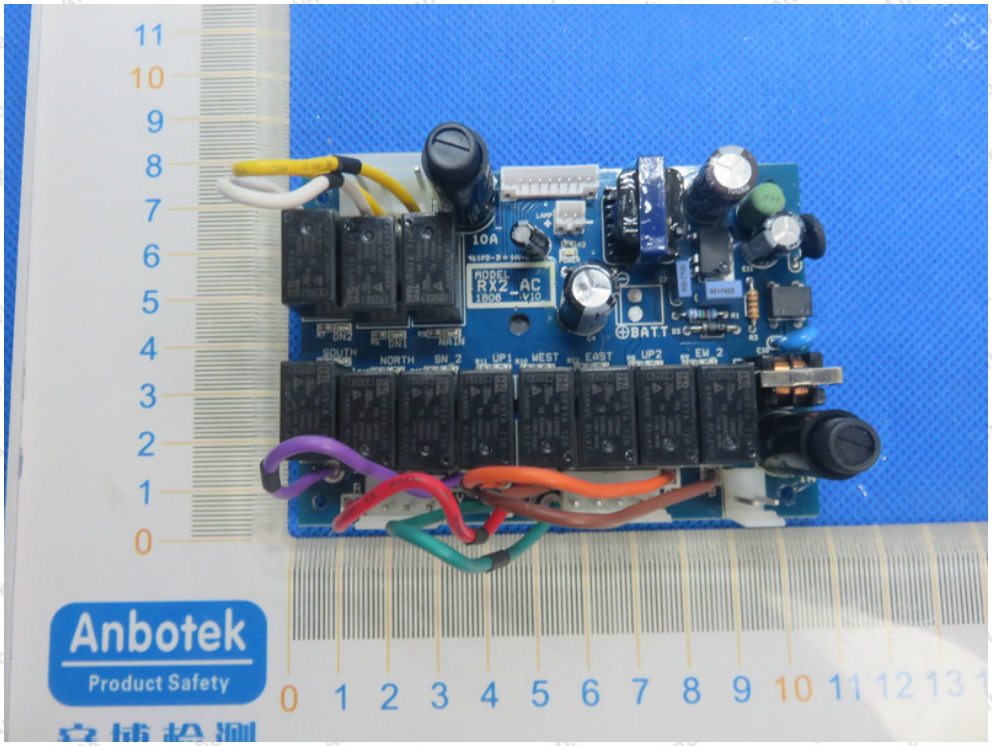

Anbotek
Product Safety

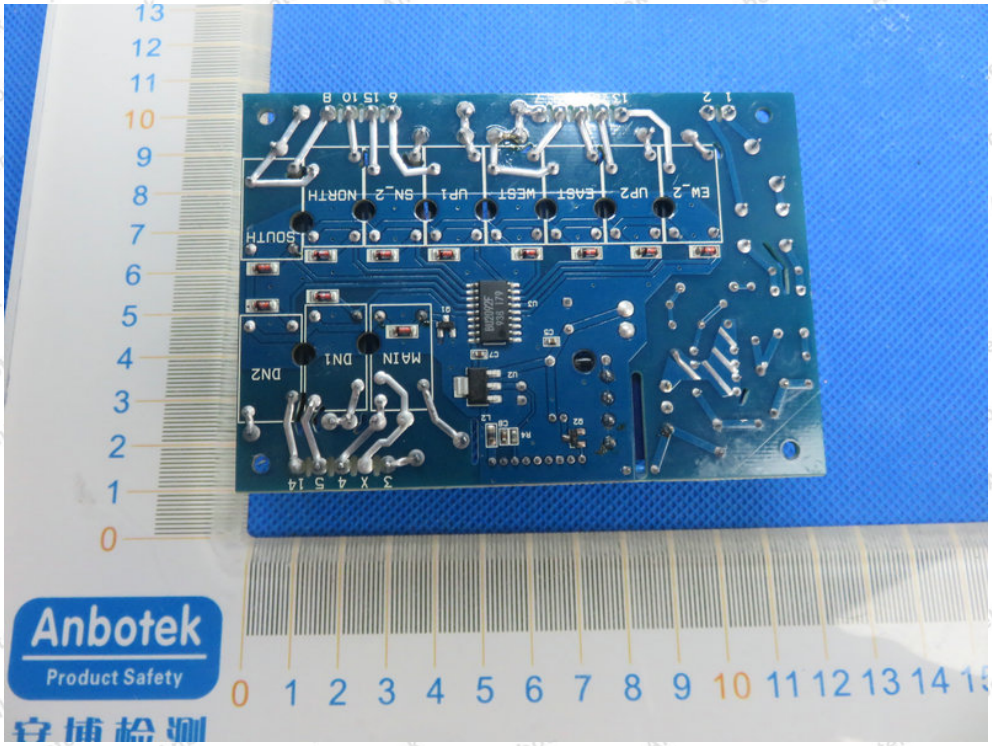

Anbotek
Product Safety
安博检测

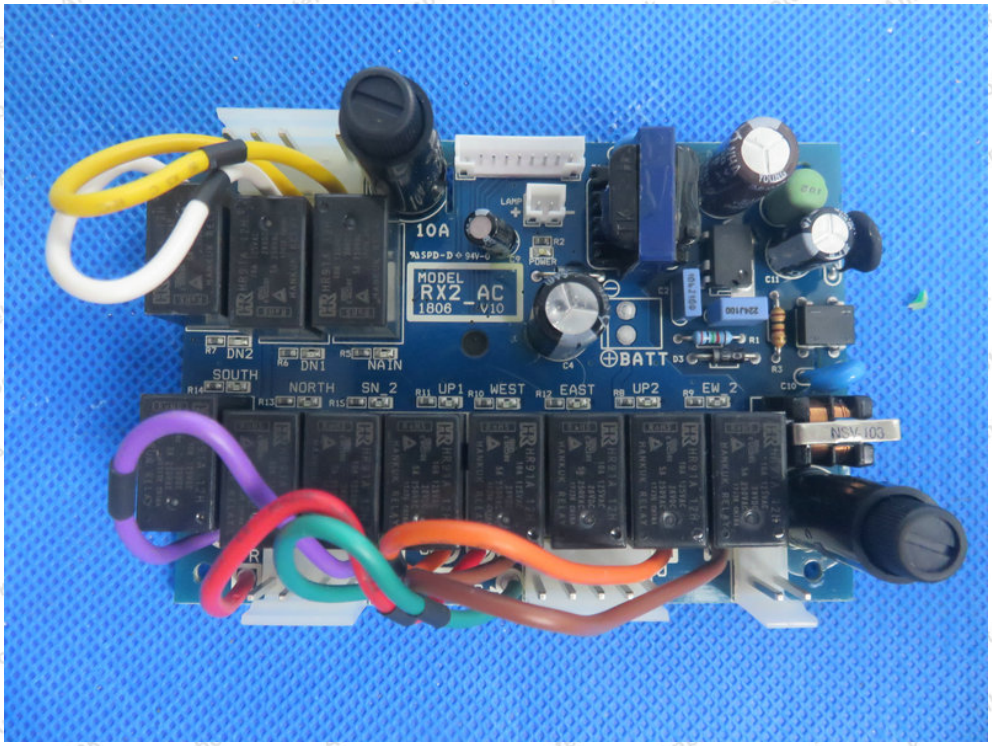

JRX_1747
V42 1821
VHF
UHF
581189 029
JREMO 6P A
COPY
RUN
Anbotek
Product Safety

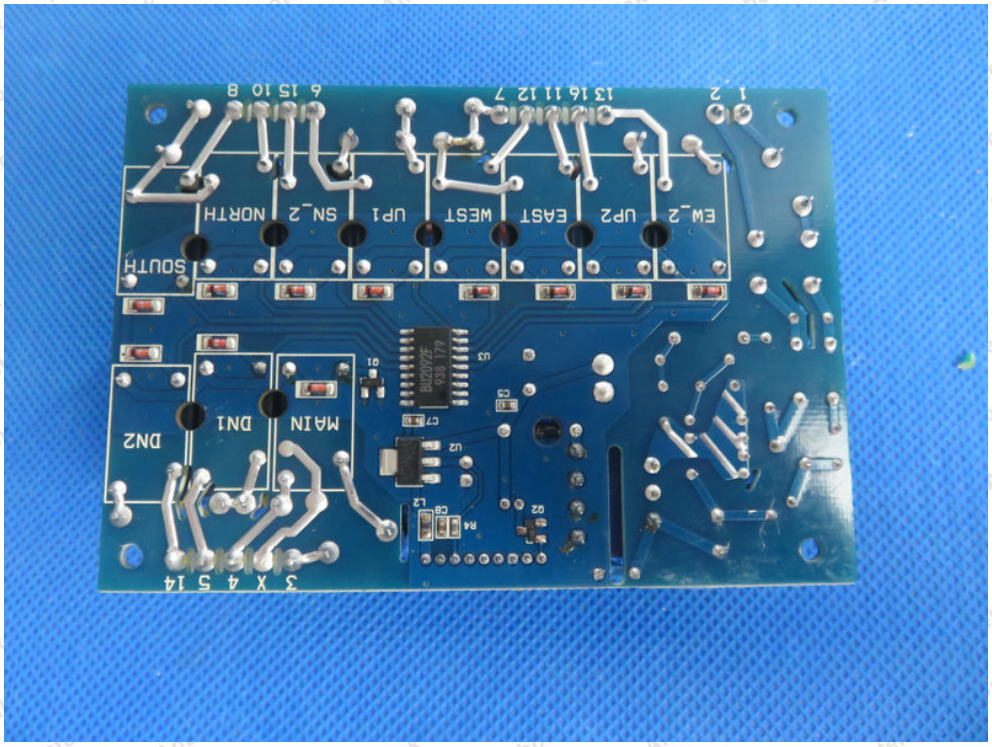

JRX_1747
V42 1821
VHF
UHF
COPY
RUN


C38
C32
C26
C20
L4
L21
L7
C22
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L2
L5
L6
C25
C4
C8
U2
C10
C6
C5
R8
C3
R9
C2
C13
C35
C37
R10
C30
Y2
AR1
Y1
C17
U1
C34
C33
C36
D1
D2
R13
C39
R12
R14
R15
RUN


MODEL
RX2_AC
BATT
SOUTH
NORTH
SN_2
UP1
WEST
EAST
UP2
EW_2
Anbotek
Product Safety


SOUTH
NORTH
SN_2
UP1
WEST
EAST
UP2
EW_2
DN2
DN1
MAIN
Anbotek
Product Safety





---------- End of Report ----------