

Test Report

Report No.: MTi190617E051

Date of issue: June. 17, 2019

Sample Description: wireless charger power bank

Model(s):

Applicant:

Address:

Date of Test: June. 06, 2019 to June. 17, 2019

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>



Table of Contents

Table of Contents	2
1 General description.....	5
1.1 Feature of equipment under test (EUT).....	5
1.2 Test mode.....	5
1.3 Test conditions.....	5
1.4 Ancillary equipment list.....	5
1.5 Measurement Uncertainty	6
2 Testing site.....	6
3 List of test equipment	7
4 EMC emission test.....	8
4.1 Conducted emission	8
4.2 Radiated emission	11
4.3 Harmonic current emission / Voltage fluctuations & flicker	14
5 Immunity test	15
5.1 Electrostatic discharge immunity (ESD)	15
5.2 RF electromagnetic field immunity (RS)	18
5.3 Fast transients immunity (EFT)	20
5.4 Surges immunity.....	22
5.5 Injected current immunity (CS)	24
5.6 Voltage interruptions voltage Dips	26
Photographs of the Test Setup.....	28

Test Result Certification	
Applicant's name:	
Address:	
Manufacture's Name:	
Address:	
Product name:	wireless charger power bank
Trademark:	N/A
Model name:	
Standards:	(Draft) EN 301 489-1 V2.2.0 (2017-03) (Draft) EN 301 489-3 V3.2.0 (2017-03)

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the Radio equipment directive requirements. And it is applicable only to the tested sample identified in the report.

Tested by:

Demi Mu

Demi Mu

June. 17, 2019

Reviewed by:

Smith Chen

Smith Chen

June. 17, 2019

Approved by:

Tom Xue

Tom Xue

June. 17, 2019

Summary of Test Result

Item	Description of Test	Result
EMC emission		
1	Conducted emission	Pass
2	Radiated emission	Pass
3	Harmonic current emission	N/A*
4	Voltage fluctuations & flicker	Pass
Immunity		
1	Electrostatic discharge immunity (ESD)	Pass
2	Radiated electromagnetic field immunity(RS)	Pass
3	Fast transients / burst immunity (EFT)	Pass
4	Surge immunity	Pass
5	Conducted disturbance immunity (CS)	Pass
6	Voltage interruptions & voltage Dips immunity	Pass

*Not Applicable.

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	wireless charger power bank
Model name:	
Power source:	DC 5V form AC 230V/50Hz
Battery:	DC 3.7V 8000mAh
Specification:	N/A

1.2 Test mode

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.

Test mode	Description
Mode 1	USB Discharging
Mode 2	Wireless charging
Mode 3	Charging

NOTE: The test modes were carried out for all operation modes. The final test mode of the EUT was the worst test mode for EMI, and its test data was showed.

Note: Pre-scan above all test mode, found below test mode which it was worse case mode.

Test item	Test mode (Worse case mode)
Conducted emission	Mode 1
Radiated emission below 1GHz	Mode 1

1.3 Test conditions

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

- Temperature: 20℃ ~30℃
- Humidity: 30%~70% (30%~60% for ESD test)
- Atmospheric pressure: 98kPa~101kPa

1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer
Adapter	D31-05050100E	/	/

1.5 Measurement Uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$

Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

2 Testing site

Test laboratory:	Shenzhen Microtest Co., Ltd.
Laboratory location:	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
CNAS Registration No.:	L5868
Telephone:	(86-755)88850135
Fax:	(86-755)88850136

3 List of test equipment

Emission test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
LISN	Schwarzbeck	NSLK8127	#841	2019/9/25
LISN	Laplace	LISN-16A	003420	2019/11/4
EMI Test Receiver	Rohde&schwarz	ESCI3	101368	2019/11/4
Broadband TRILOG Antenna	Schwarabeck	VULB9163	9163-872	2019/11/14
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1145	2019/11/14
Amplifier	HP	8447D	3113A06150	2019/11/4
Amplifier	Agilent	8449B	3008A02400	2019/11/4
Test Receiver	Schwarabeck	ESPI7	100314	2019/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2019/11/4
Harmonics, Flicker & Power Analyser	Laplace	AC 2000A	311216	2019/11/4

Immunity test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
ESD Generator	Schloder	SESD 3000	509325	2019/11/14
Surge Generator	HTEC	HCWG 51	153702	2019/11/17
EFT Generator	HTEC	HEFT 51	153701	2019/11/17
Cycle SAG Simulator	Prima	DRP61011AG	PR15056303	2019/11/4
Conducted Disturbances Test System	Schloder	CDG-6000-25	126A1343/2015	2019/11/4
CDN	Schloder	CDN-M2+3	A2210332/2015	2019/11/4
Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3058	2019/11/14
Signal Generator	Agilent	E4438C	MY49070163	2019/11/4
Power Amplifier	AR	SESD 3000	509325	2019/11/4

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4 EMC emission test

4.1 Conducted emission

4.1.1 Limits

Frequency (MHz)	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79	66	66 - 56 *	56 - 46 *
0.5 -5	73	60	56	46
5 -30	73	60	60	50

4.1.2 Test Procedures

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through an Artificial mains networks (AMN). All other support equipment powered from additional AMN. 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.

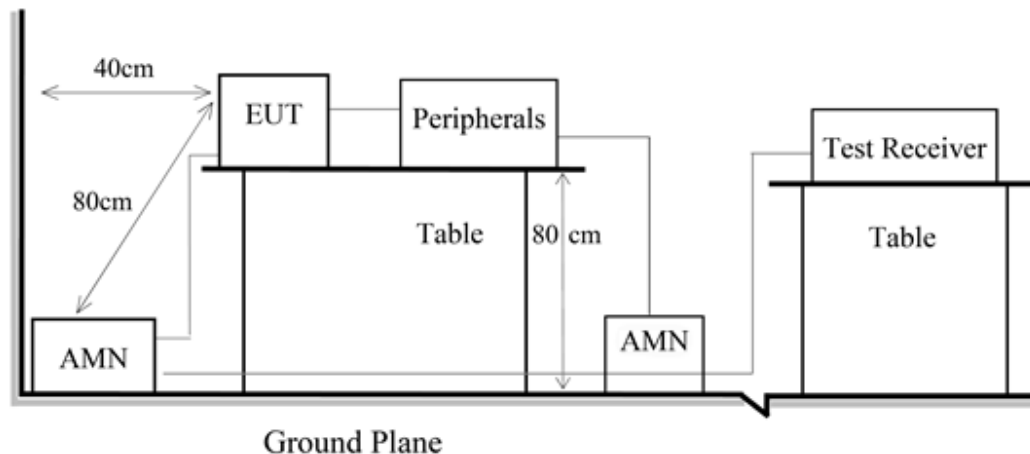
I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

AMN is at least 80 cm from nearest part of EUT chassis.

Setup of the receiver

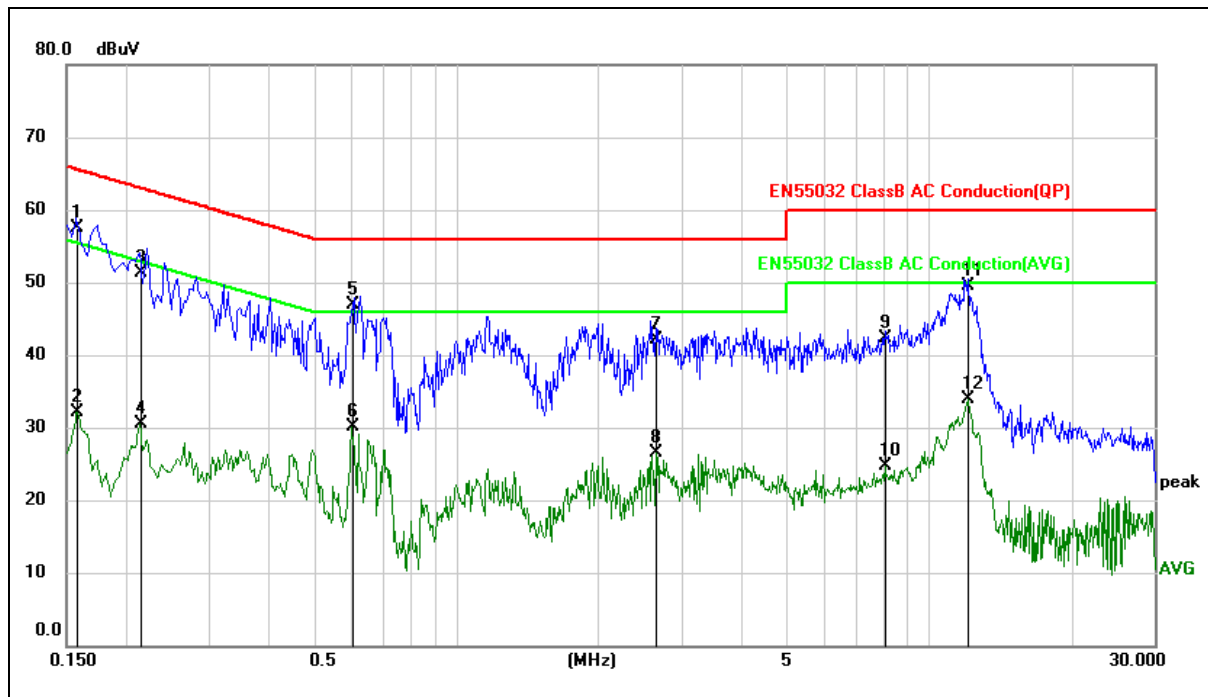
Frequency	Detector	Setting
0.15MHz – 30MHz	QP	IF bandwidth: 9kHz

4.1.3 Test setup



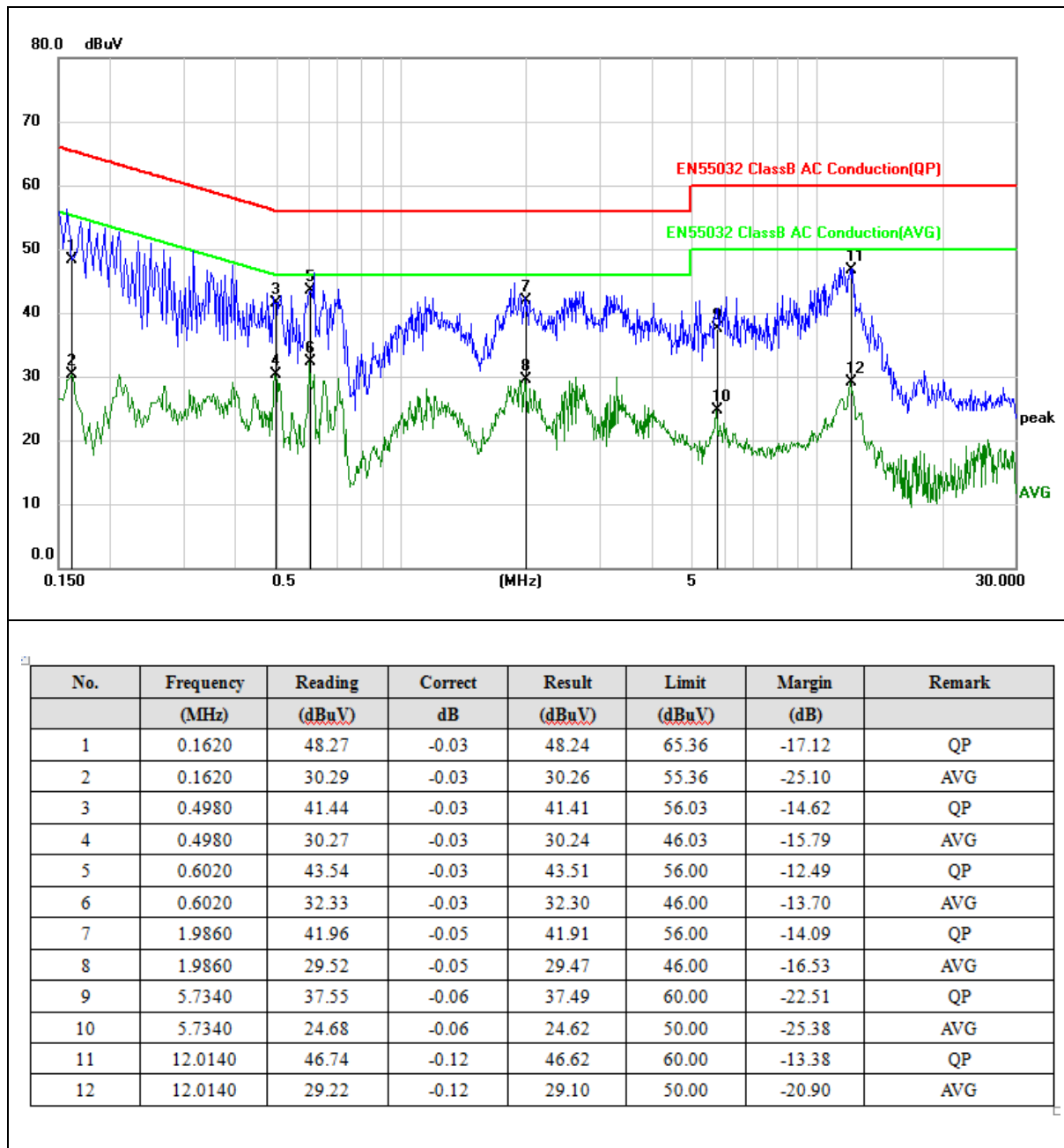
4.1.4 Test Result

Temperature:	25°C	Relative Humidity:	52%
Pressure:	101kPa	Phase:	L
Test voltage:	DC 5V form AC 230V/50Hz	Test mode:	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	57.48	-0.04	57.44	65.57	-8.13	QP
2	0.1580	32.20	-0.04	32.16	55.57	-23.41	AVG
3	0.2140	51.35	-0.03	51.32	63.05	-11.73	QP
4	0.2140	30.49	-0.03	30.46	53.05	-22.59	AVG
5	0.6020	46.95	-0.03	46.92	56.00	-9.08	QP
6	0.6020	30.11	-0.03	30.08	46.00	-15.92	AVG
7	2.6500	42.11	-0.05	42.06	56.00	-13.94	QP
8	2.6500	26.57	-0.05	26.52	46.00	-19.48	AVG
9	8.0780	42.41	-0.07	42.34	60.00	-17.66	QP
10	8.0780	24.87	-0.07	24.80	50.00	-25.20	AVG
11	12.0700	49.60	-0.12	49.48	60.00	-10.52	QP
12	12.0700	34.10	-0.12	33.98	50.00	-16.02	AVG

Temperature:	25°C	Relative Humidity:	52%
Pressure:	101kPa	Phase:	N
Test voltage:	DC 5V form AC 230V/50Hz	Test mode:	Mode 1



4.2 Radiated emission

4.2.1 Limits

Frequency (MHz)	Class B Limit (dB μ V/m)		Class A Limit (dB μ V/m)	
	Quasi-peak/Peak	Average	Quasi-peak/Peak	Average
30 ~ 230	40 (at 3m)	/	50 (at 3m)	/
230 ~ 1000	47 (at 3m)	/	57 (at 3m)	/
1000 ~ 3000	70 (at 3m)	50 (at 3m)	76 (at 3m)	56 (at 3m)
3000 ~ 6000	74 (at 3m)	54 (at 3m)	80 (at 3m)	60 (at 3m)

4.2.2 Test Procedures

The radiated emission tests were performed in the 3 meters.

The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

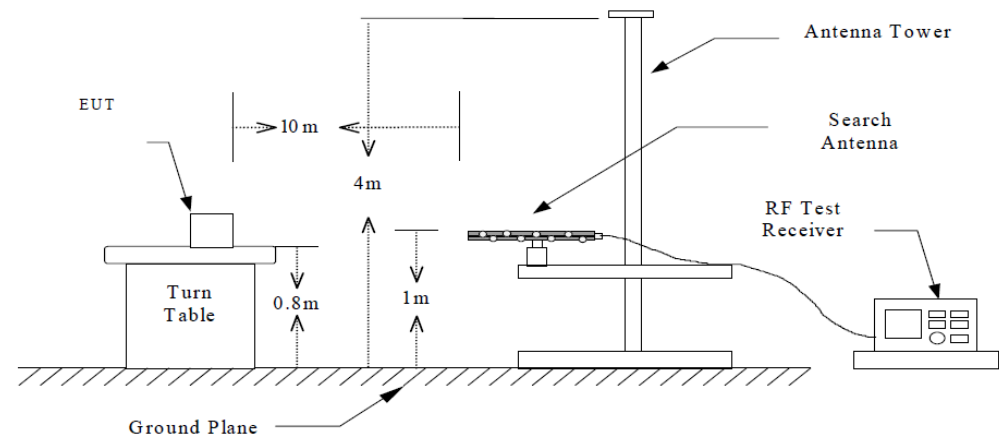
If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.

If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

Setup of receiver

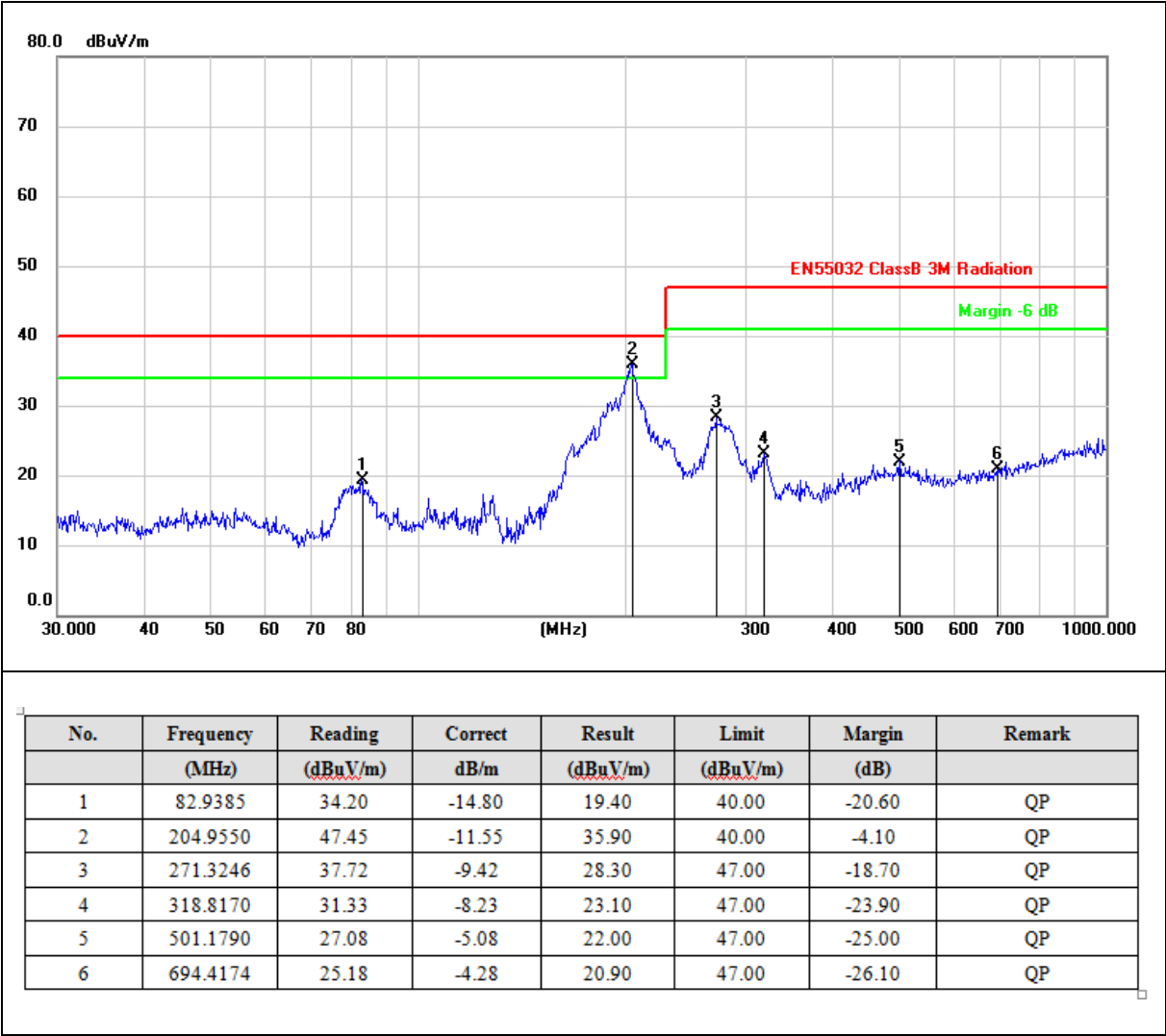
Frequency	Detector	Setting
30MHz – 1GHz	QP	IF bandwidth: 120kHz
Above 1GHz	Peak	RBW: 1MHz, VBW: 3MHz
	AV	RBW: 1MHz, VBW: 10Hz

4.2.3 Test Setup

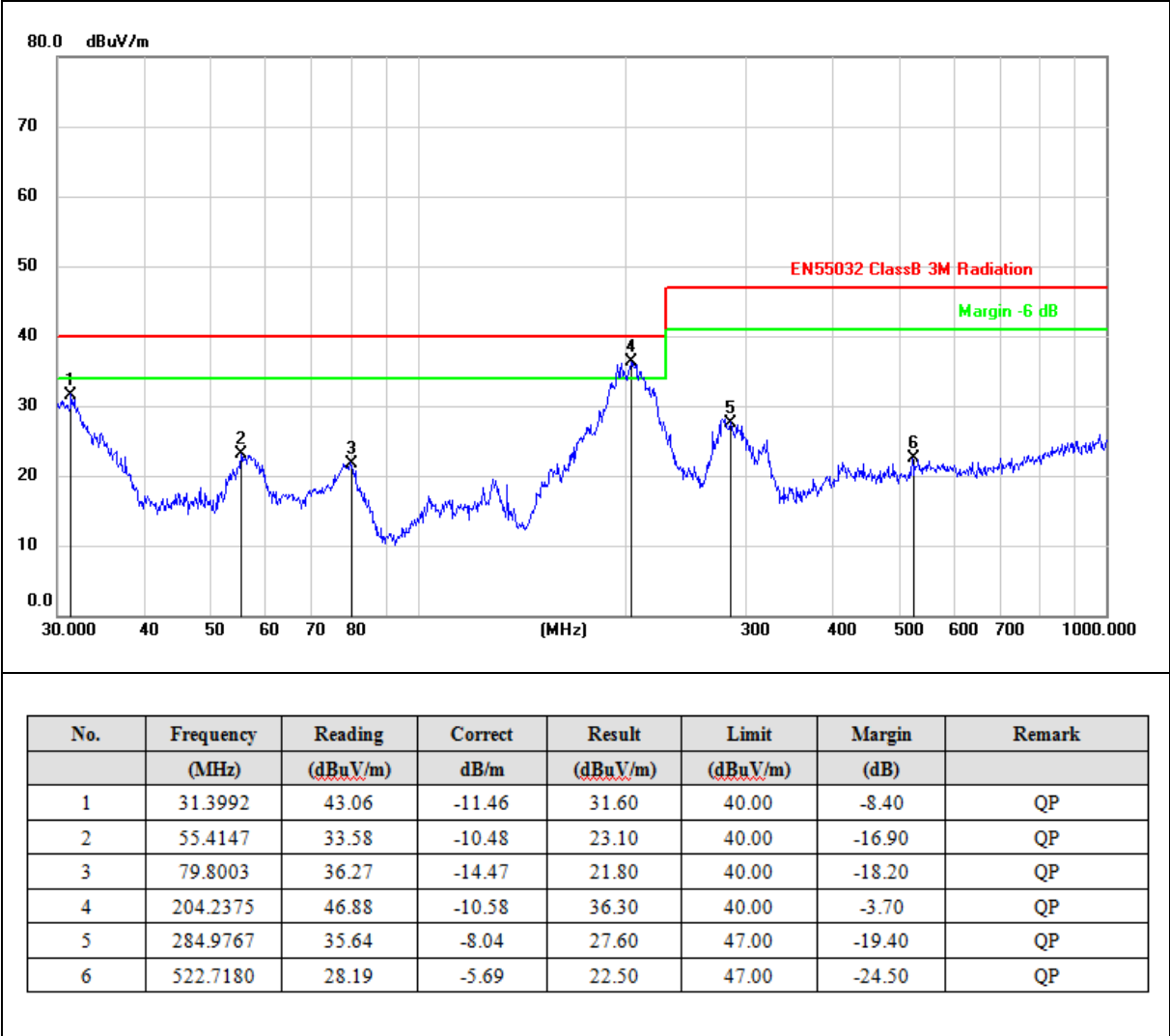


4.2.4 Test Result

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	DC 5V form AC 230V/50Hz	Test mode:	Mode 1



Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	DC 5V form AC 230V/50Hz	Test mode:	Mode 1



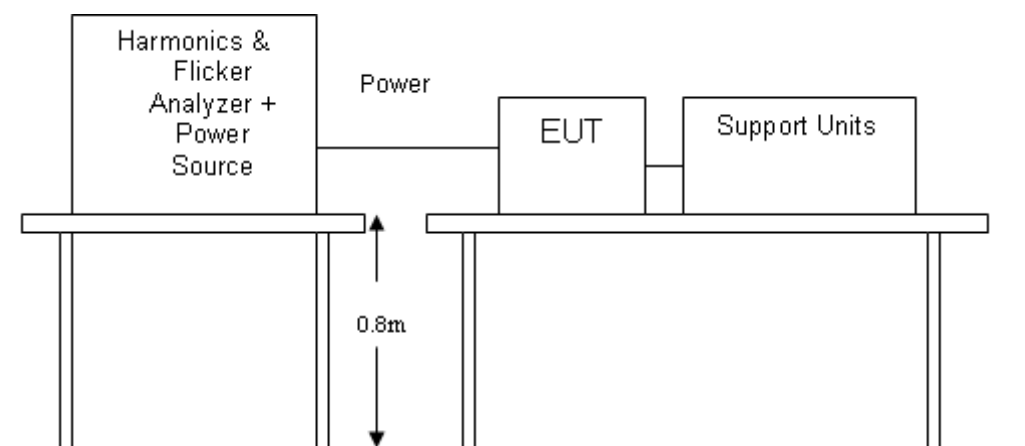
4.3 Harmonic current emission / Voltage fluctuations & flicker

4.3.1 Test Procedures

The EUT was installed and placed on a non-conductive table and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The correspondent test program of test instrument to measure the current harmonics / voltage fluctuations & flicker emanated from EUT. The measure time shall be not less than the time necessary for the EUT to be exercised.

4.3.2 Test Setup



4.3.3 Test Result

Harmonic current emission:

N/A, the rated power of EUT is below 75W.

Voltage fluctuations & flicker:

Temperature:	23℃	Relative Humidity:	46%
Pressure:	101kPa	Test mode:	Mode 1

	Pst	dc (%)	dmax (%)	d(t) > 3.3% (ms)
Limit	1.000	3.300	4.000	500
Reading	0.17	0.24	0.96	0

5 Immunity test

5.1 Electrostatic discharge immunity (ESD)

5.1.1 Test Method

The test method shall be in accordance with EN 61000-4-2.

For radio equipment and ancillary equipment the following requirements and evaluation of test results shall apply.

The test severity level for contact discharge shall be 4 kV and for air discharge 8kV. All other details, including intermediate test levels, are contained within EN 61000-4-2.

Electrostatic discharges shall be applied to all exposed surfaces of the EUT except where the user documentation specifically indicates a requirement for appropriate protective measures (see EN 61000-4-2).

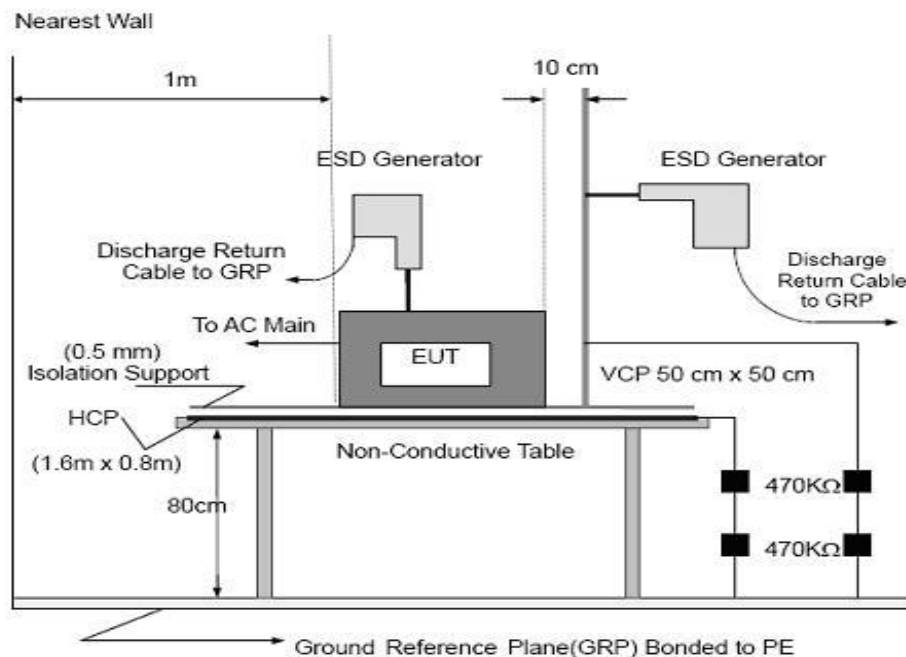
5.1.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitter shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

5.1.3 Test Setup



5.1.4 Test Result

Temperature:	25℃	Relative Humidity:	47%
Pressure:	101kPa	Test mode:	Mode 1

Indirect discharge

Test Point	Contact discharge level (kV)	Number and polarity	Criterion met	Criterion Required
1. VCP-Front side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	B
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	
2.VCP-Rear side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	
3.VCP-Left side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	
4. VCP-Right side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	
5. HCP	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	

Result: Compliance.

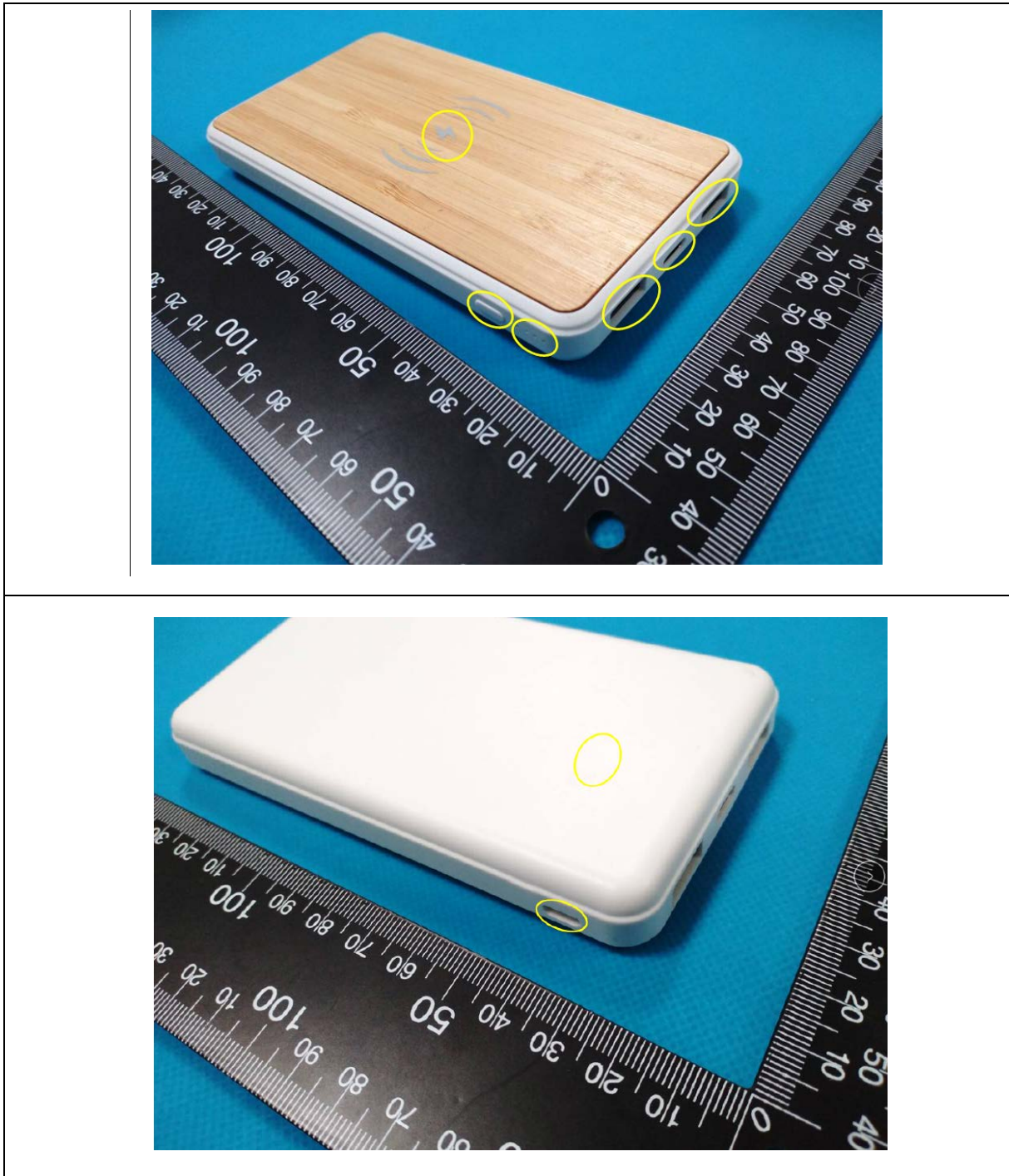
Direct discharge

Test Point	discharge level (kV)	Air discharge level (kV)	Number and polarity	Criterion met	Criterion Required
1. Each nonconductive location touchable by hand	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4	<input checked="" type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4	25 (+)	A	B
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	<input type="checkbox"/> ..6 <input checked="" type="checkbox"/> ..8	25 (-)	A	
1. Each conductive location touchable by hand	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4	25 (+)	A	
	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	<input type="checkbox"/> ..6 <input type="checkbox"/> ..8	25 (-)	A	

Result: compliance.

Note1: Please see the photographs below about the details of test points.

Test location



Note: Yellow circle for Air Discharge, Red circle for Contact Discharge

5.2 RF electromagnetic field immunity (RS)

5.2.1 Test Method

The test method shall be in accordance with EN 61000-4-3.

The following requirements and evaluation of test results shall apply:

- the test level shall be 3V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80% by a sinusoidal audio signal of 1000Hz. If the wanted signal is modulated at 1000Hz, then an audio signal of 400Hz shall be used;
- the test shall be performed over the frequency range 80MHz to 1000MHz and 1400MHz to 2700MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers, as appropriate;
- for receivers and transmitters the stepped frequency increments shall be 1% frequency increment of the momentary used frequency;
- responses on receivers occurring at discrete frequencies, which are narrow band responses, shall be disregarded from the test;

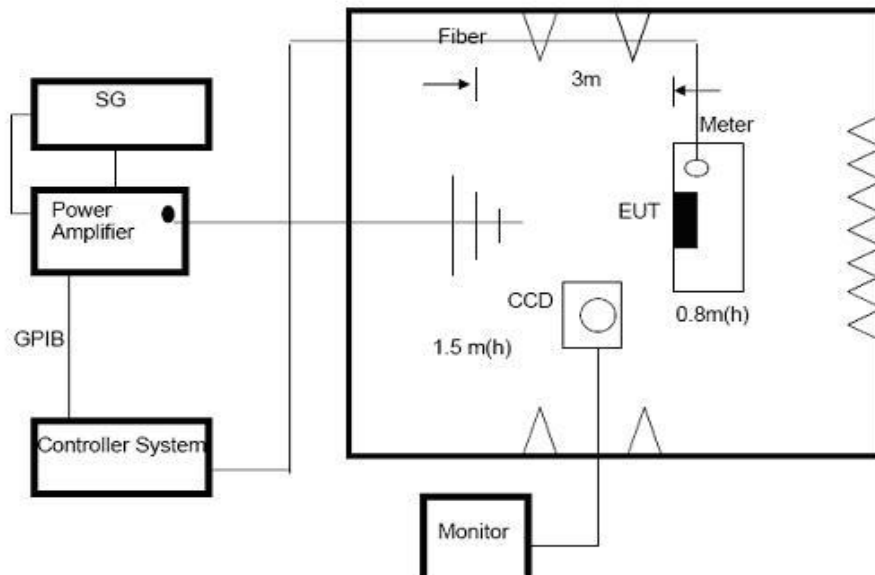
5.2.2 Performance criteria

For transmitters the performance criteria for continuous phenomena for transmitters shall apply.

For receivers the performance criteria for continuous phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

5.2.3 Test setup



5.2.4 Test Result

Temperature:	25℃	Relative Humidity:	56%
Pressure:	101kPa	Test mode:	Mode 1

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Criterion met	Criterion Required
80~1000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A
			Rear		
			Left		
			Right		

Result: compliance.

5.3 Fast transients immunity (EFT)

5.3.1 Test Procedures

The test method shall be in accordance with EN 61000-4-4.

The following requirements and evaluation of test results shall apply:

- the test level for signal ports, telecommunication ports, and control ports shall be 0.5kV open circuit voltage at a repetition rate of 5kHz as given in EN 61000-4-4;
- the test level for DC power input ports shall be 0.5kV open circuit voltage as given EN 61000-4-4;
- the test level for AC mains power input ports shall be 1kV open circuit voltage as given EN 61000-4-4.

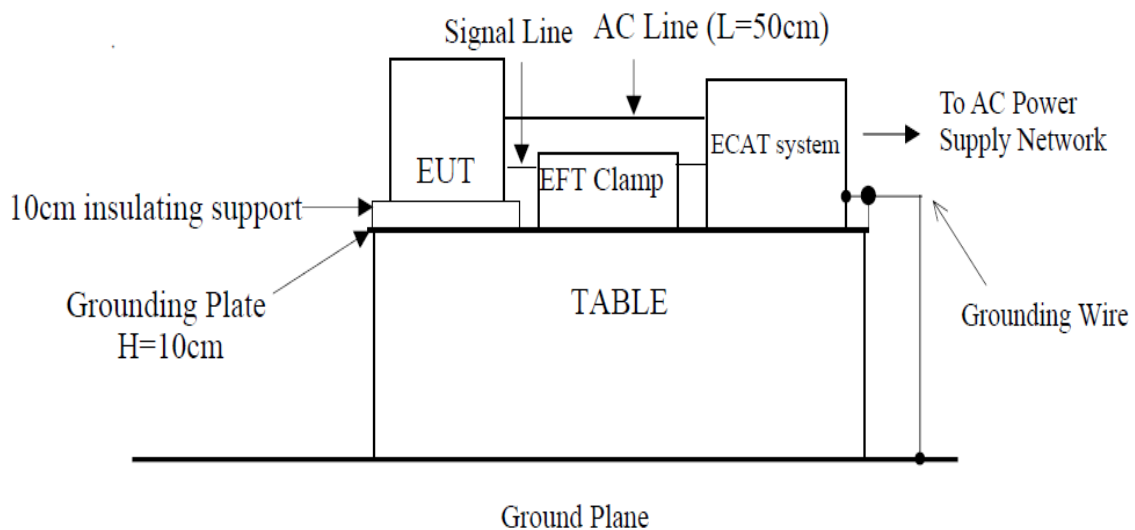
5.3.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitter shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria shall apply.

5.3.3 Test Setup



5.3.4 Test Result

Temperature:	23℃	Relative Humidity:	46%
Pressure:	101kPa	Test mode:	Mode 1

Port Type	Injected Line	Test Voltage	Criterion met	Criterion Required
AC Mains	L	±1kV	A	B
	N	±1kV	A	
	L+N	±1kV	A	

Result: compliance.

5.4 Surges immunity

5.4.1 Test Method

The test method shall be in accordance with EN 61000-4-5.

Test method for telecommunication ports directly connected to outdoor cables:

The test level for telecommunications ports, intended to be directly connected to the telecommunications network via outdoor cables, shall be 1kV line to ground as given in EN 61000-4-5, however, in telecommunications centres 0.5kV line to ground shall be used. In this case the total output impedance of the surge generator shall be in accordance with the basic standard EN 61000-4-5. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

Test method for telecommunication ports connected to indoor cables:

The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10m) shall be 0.5kV line to ground. In this case the total output impedance of the surge generator shall be in accordance with the basic standard EN 61000-4-5. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

Test method for mains ports:

The test level for ac mains power input ports shall be 2kV line to ground, and 1kV line to line, with the output impedance of the surge generator as given in EN 61000-4-5. In telecom centres 1kV line to ground and 0.5kV line to line shall be used. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

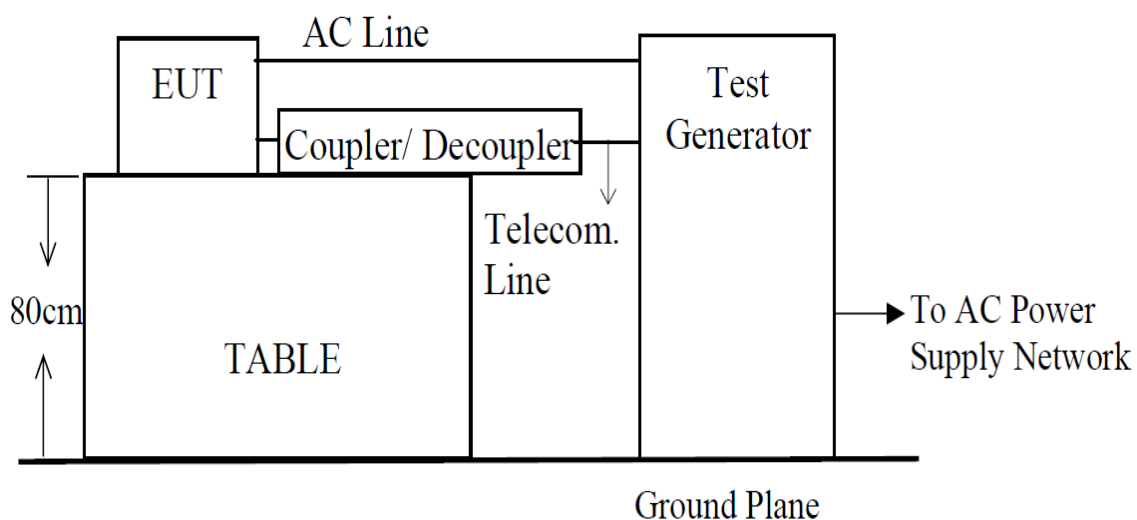
5.4.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitters shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

5.4.3 Test Setup



5.4.4 Test Result

Temperature:	23℃	Relative Humidity:	46%
Pressure:	101kPa	Test mode:	Mode 1

Port Type	Injected Line	Test Voltage	Criterion met	Criterion Required
AC Mains	L – N	±0.5kV, ±1kV	A	B

Result: Compliance.

5.5 Injected current immunity (CS)

5.5.1 Test Method

The test method shall be in accordance with EN 61000-4-6.

The following requirements and evaluation of test results shall apply:

- the test level shall be severity level 2 as given in EN 61000-4-6 corresponding to 3V rms unmodulated. The test signal shall then be amplitude modulated to a depth of 80% by a sinusoidal audio signal of 1000Hz. If the wanted signal is modulated at 1000Hz, then the test signal of 400Hz shall be used;
- the test shall be performed over the frequency range 150kHz to 80MHz with the exception of an exclusion band for transmitters, and for receivers and duplex transceivers;
- for receivers and transmitters the stepped frequency increments shall be 1% frequency increment of the momentary frequency in the frequency range 150kHz to 80MHz;
- the injection method to be used shall be selected according to the basic standard EN 61000-4-6;
- responses on receivers or receiver parts of transceivers occurring at discrete frequencies which are narrow band responses (spurious responses), are disregarded from the test;

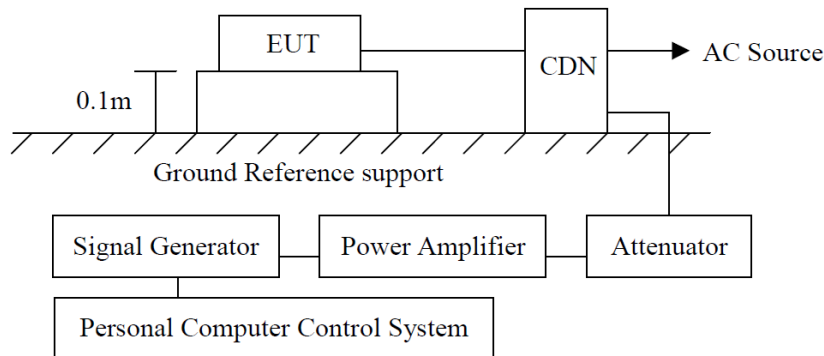
5.5.2 Performance criteria

For transmitters the performance criteria for continuous phenomena for transmitter shall apply.

For receivers the performance criteria for continuous phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers or transmitters in which case the corresponding performance criteria above shall apply.

5.5.3 Test Setup



5.5.4 Test Result

Temperature:	23℃	Relative Humidity:	46%
Pressure:	101kPa	Test mode:	Mode 1

Port Type	Frequency (MHz)	Test Voltage	Criterion met	Criterion Required
AC Mains	0.15 to 80	3 V (rms) AM Modulated 1000Hz, 80%	A	A

Result: Compliance.

5.6 Voltage interruptions voltage Dips

5.6.1 Test Method

The test method shall be in accordance with EN 61000-4-11.

The test levels shall be:

- voltage dip: 0% residual voltage for 0.5 cycle;
- voltage dip: 0% residual voltage for 1 cycle;
- voltage dip: 70% residual voltage for 25 cycles (at 50Hz);
- voltage interruption: 0% residual voltage for 250 cycles (at 50 Hz).

5.6.2 Performance criteria

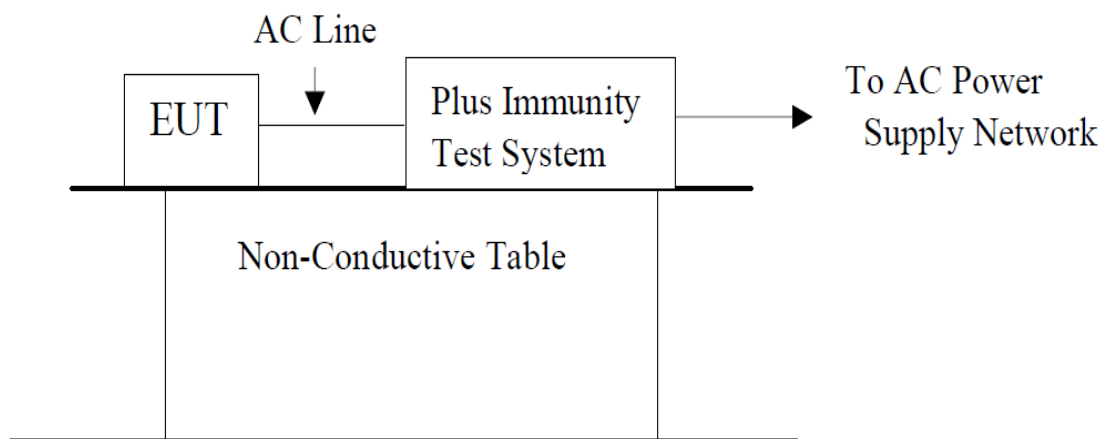
For a voltage dip the following performance criteria apply:

- for transmitters the performance criteria for transient phenomena for transmitter shall apply;
- for receivers the performance criteria for transient phenomena for receiver shall apply;
- for ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

For a voltage interruption the following performance criteria apply:

- in the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena for transmitters or for receivers shall apply;
- in the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator;
- no unintentional responses shall occur at the end of the test; • in the event of loss of function(s) or in the event of loss of user stored data, this fact shall be recorded in the test report;
- for ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with

5.6.3 Test Setup



5.6.4 Test Result

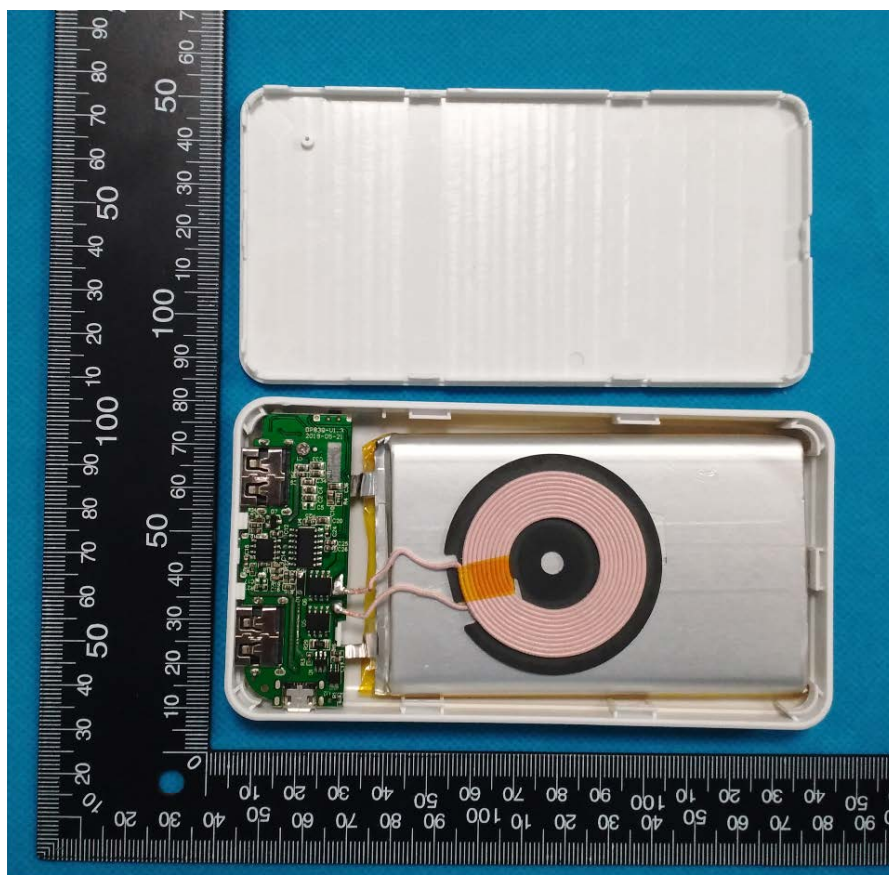
Temperature:	23℃	Relative Humidity:	46%
Pressure:	101kPa	Test mode:	Mode 1

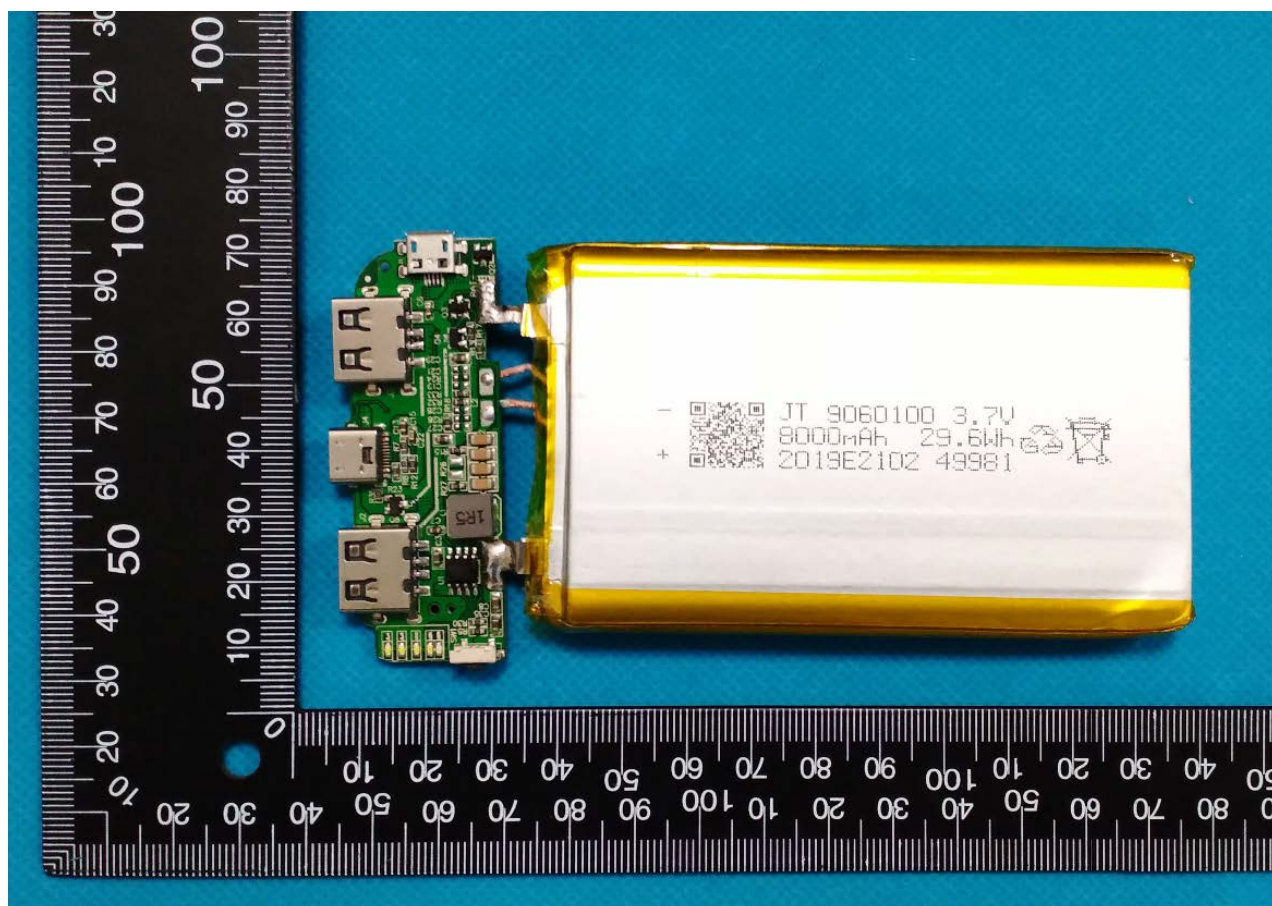
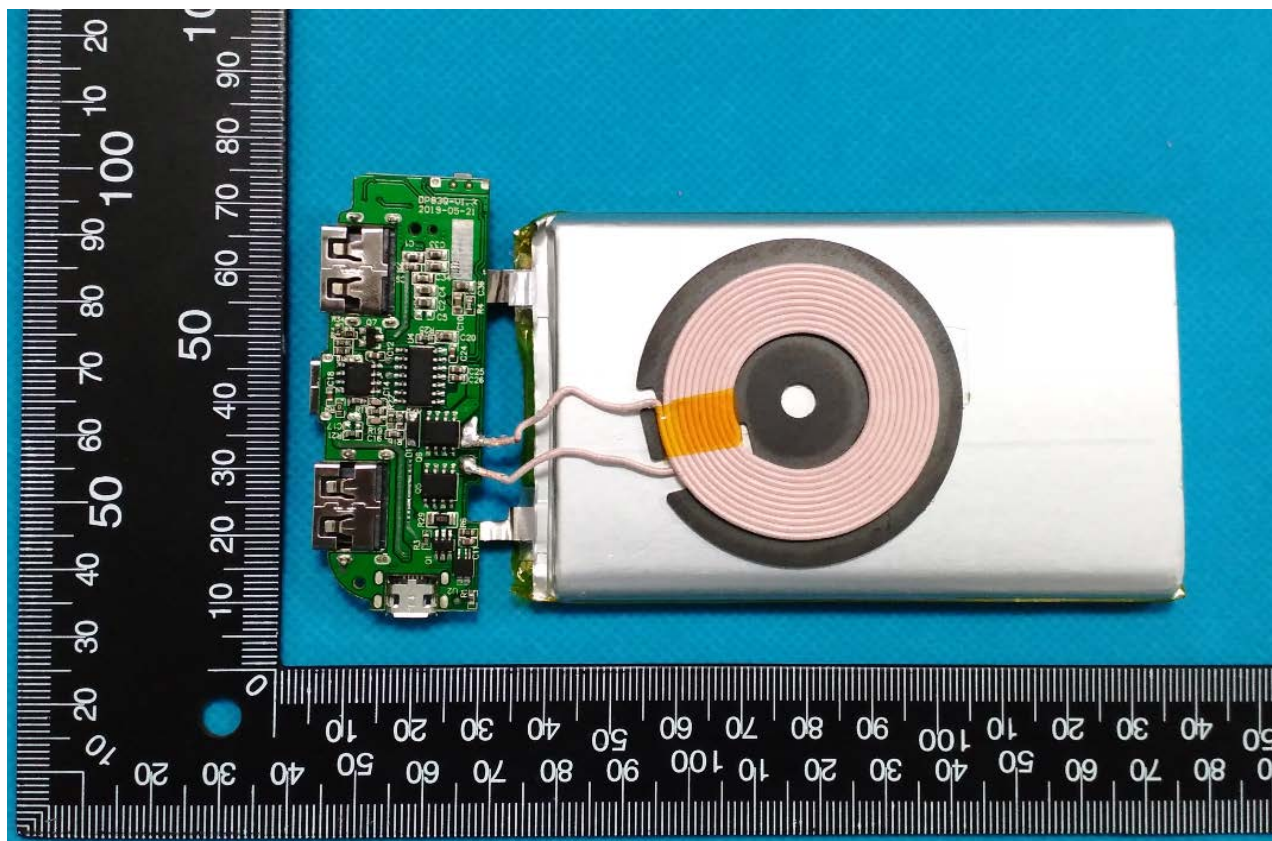
Test Level in %U _T	Duration (Period)	Criterion Required	Criterion met
0%	0.5	B	A
0%	1	B	A
70%	5	B	A
0%	250	C	C

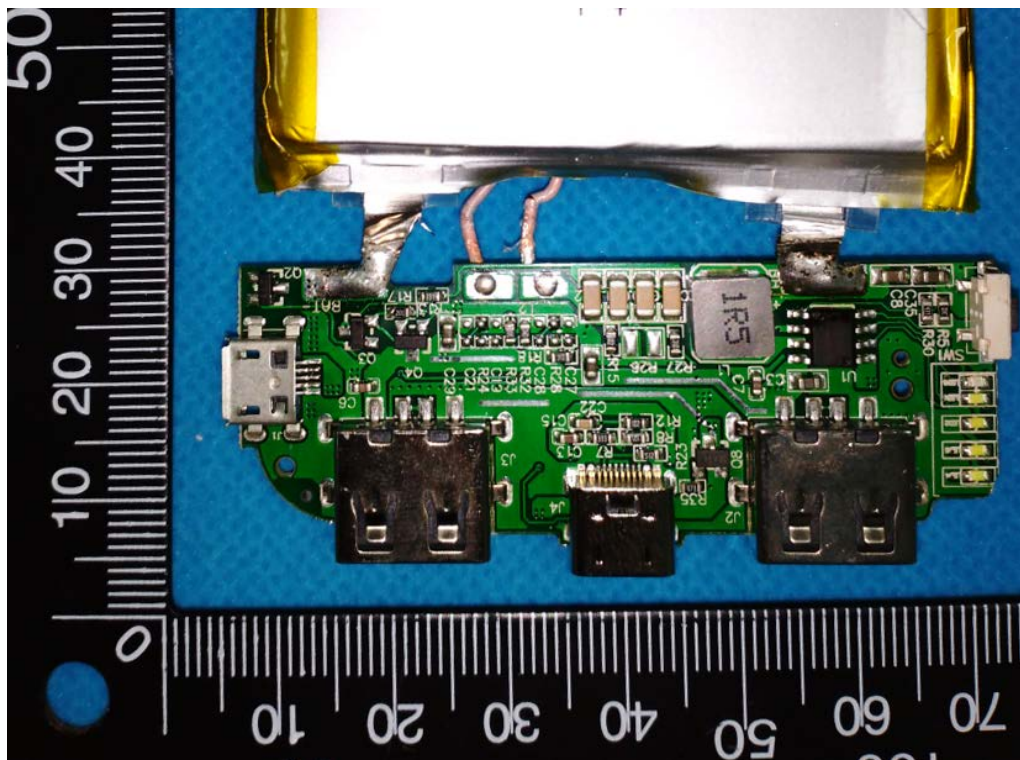
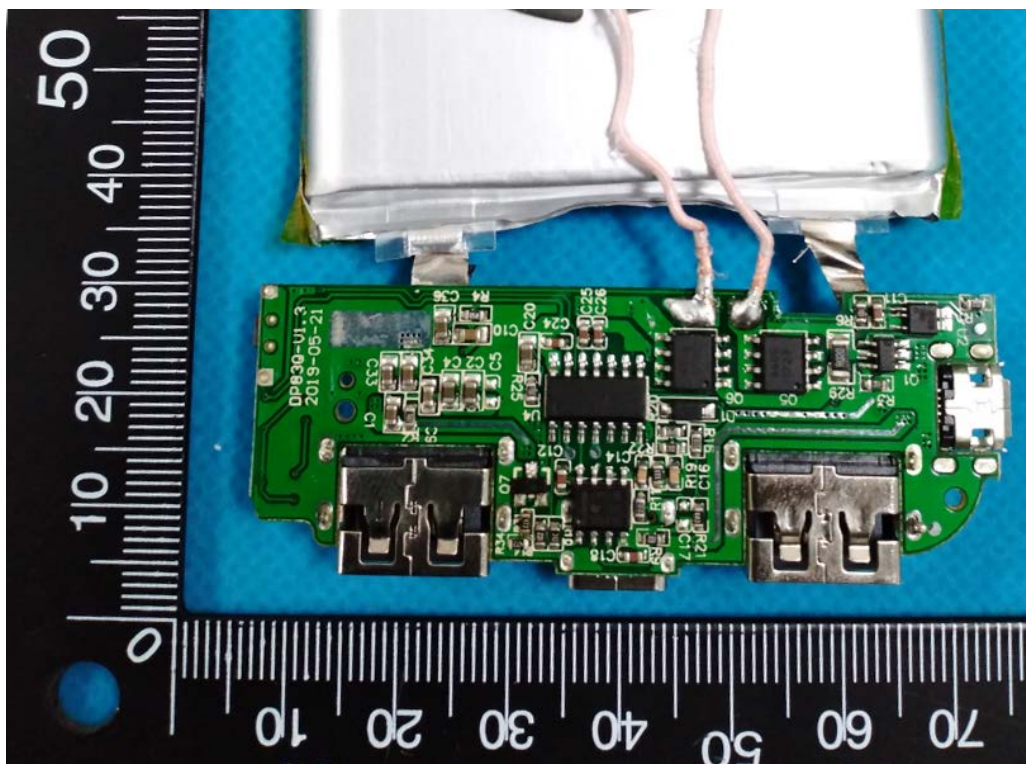
Result: Compliance.

Photographs of the Test Setup









----END OF REPORT----