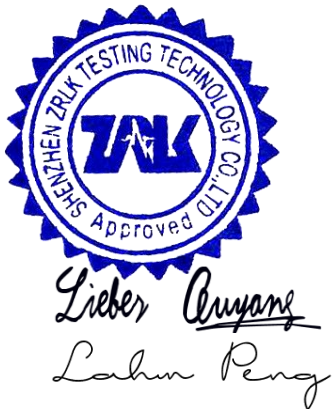
CE EMC Test Report

Test Standard(s):	EN 55032 :2015 EN 55035 :2017
Applicant:	Verico InternationalCo.,Ltd
Product Name:	Power Bank XL
Model:	WC020
Report No.:	ZKS20000060R
Tested Date:	2020-04-01
Issued Date:	2020-04-17
Tested By :	Lieber Ouyang (Engineer)
Approved By:	Lahm Peng (Manager)
Prepared By:	



Shenzhen ZRLK Testing Technology Co., Ltd.

6F, Fuxinfa Industrial Park, Liuxiandong, Xili Street, Nanshan District, Shenzhen, China

Tel.: +86-755-33019599 Fax.: +86-755-33019599 Website: www.zrlklab.com

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1. General Information

1.1 Product Information

Applicant and Manufacturer	
Applicant:	Verico InternationalCo.,Ltd
Address of Applicant:	12F-6., No.872, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235,
	Taiwan (R.O.C.)
Manufacturer:	Verico InternationalCo.,Ltd
Address of Manufacturer:	12F-6., No.872, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235,
	Taiwan (R.O.C.)

General Description of EUT	
Product Name:	Power Pro PD
Model No.:	WC020
Trade Name:	--
Adding Model(s):	None
Class of Equipment:	Class B
Rated Voltage:	DC 3.7V, 14.8Wh
Note 1: The test data is gathered from a production sample, provided by the manufacturer. Note 2: The appearance of others models listed in the report is different from main-test model WC020,but the circuit and the electronic construction do not change, declared by the manufacturer.	

1.2 Compliance Standards

Compliance Standards	
EN 55032	Electromagnetic compatibility of multimedia equipment - Emission requirements
EN 55035	Electromagnetic compatibility of multimedia equipment - Immunity requirements
EN 61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)
EN 61000-3-3	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
The objective of the manufacturer or applicant is to demonstrate compliance with the above standards.	
According to standards for test methodology	
IEC 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
IEC 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
IEC 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
IEC 61000-4-8	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
IEC 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
All measurements contained in this report were conducted with all above standards	
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.3 Test Facilities

Testing Lab: Global United Technology Services Co., Ltd.
All measurement facilities used to collect the measurement data are located at No.301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

1.4 Test Setup Information

List of Test Modes			
Test Mode	Description	Remark	
TM1	Discharging	--	
TM2	Charging	--	
List and Details of Auxiliary Cable			
Description	Length (M)	Shielded/Unshielded	With/Without Ferrite
--	--	--	--
--	--	--	--
List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
--	--	--	--
--	--	--	--
The equipment under test (EUT) was configured to measure its highest possible emission and immunity level. The test modes were adapted according to the operation manual for use.			

1.5 Measurement Uncertainty

Parameter	Conditions	Uncertainty
Conducted Disturbance	9kHz ~30MHz	±2.75 dB
Radiated Disturbance	30MHz ~ 1GHz	±4.89 dB
Radiated Disturbance	1Hz ~ 6GHz	±4.93 dB

1.6 Performance Criteria for EMS

All the test data has been collected and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:	
A	The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.
B	The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
C	Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

1.7 List of Test and Measurement Instruments

Description	Manufacturer	Model	Serial Number	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2019-04-24
AMN	Rohde & Schwarz	ESH2-Z5	100002	2019-04-24
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	2019-04-24
Pre-amplifier	CD	PAP-0118	24004	2019-04-24
Bilog Antenna	Chase	CBL6112B	2591	2019-04-24
Horn Antenna	Rohde & Schwarz	HF906	100014	2019-04-24
Digital Power Analyzer	California Instrument	5001ix-CTS-400	X71730	2019-04-24
ESD Generator	SCHNAFFNER	NSG 435	2103	2019-04-24
Signal Generator	Rohde & Schwarz	SMT03	100059	2019-04-24
Voltage Probe	Rohde & Schwarz	URV5-Z2	100013	2019-04-24
Power Amplifier	AR	150W1000	300999	2019-04-24
Power Amplifier	AR	25S1G4AM1	305993	2019-04-24
Immunity Simulator	EMTEST	UCS500M4	0800-44	2019-04-24
CS Immunity Tester	EMTEST	CWS500	0900-12	2019-04-24
EMCPRO	KEYTEK	EMCPRO	9909302	2019-04-24
Coil	KEYTEK	F-1000-4-8	9935	2019-04-24

2. Summary of Test Results

Standards	Description of Test Items	Result
EN 55032	Conducted Emissions for AC Mains Power Port	N/A
	Conducted Emissions for Wired Network Port	N/A
	Conducted Emissions for Antenna Terminals	N/A
	Radiated Emissions	Passed
EN 61000-3-2	Harmonic Current Emission	N/A
EN 61000-3-3	Voltage Fluctuation and Flicker	N/A
EN 55025	Electrostatic Discharge	Passed
	Continuous Radiated Disturbances Immunity	Passed
	Electrical Fast Transient/Burst Immunity	N/A
	Surges Immunity	N/A
	Continuous Conducted Disturbances Immunity	N/A
	Power-frequency Magnetic Fields Immunity	N/A
	Voltage Dips/Interruptions Immunity	N/A
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

3. Radiated Disturbance

3.1 Standard and Limit

According to the standard EN 55032, table A.4, A.5, A.6, limit for radiated emissions as below:

Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47
Apply only table clause A4.1 or A4.2 across the entire frequency range.				

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment

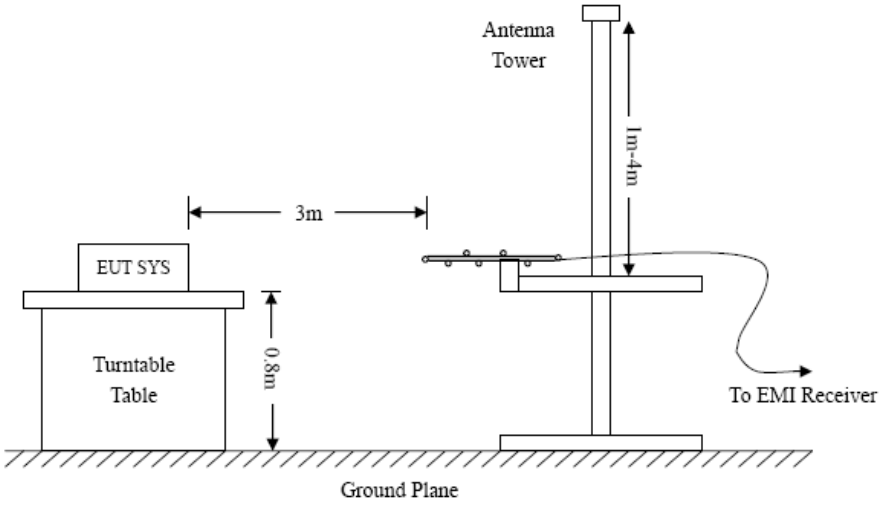
Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74
Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

Table A.6 – Requirements for radiated emissions from FM receivers

Table clause	Frequency range MHz	Measurement		Class B limit dB(μV/m)	
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42
	230 – 300				42
	300 – 1 000				46
A6.2	30 – 230	3		60	52
	230 – 300				52
	300 – 1 000				56
Apply only A.6.1 or A.6.2 across the entire frequency range. These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.					

3.2 Test Procedure

Test is conducting under the description of EN55032, measurement of radiation emission of annex C.

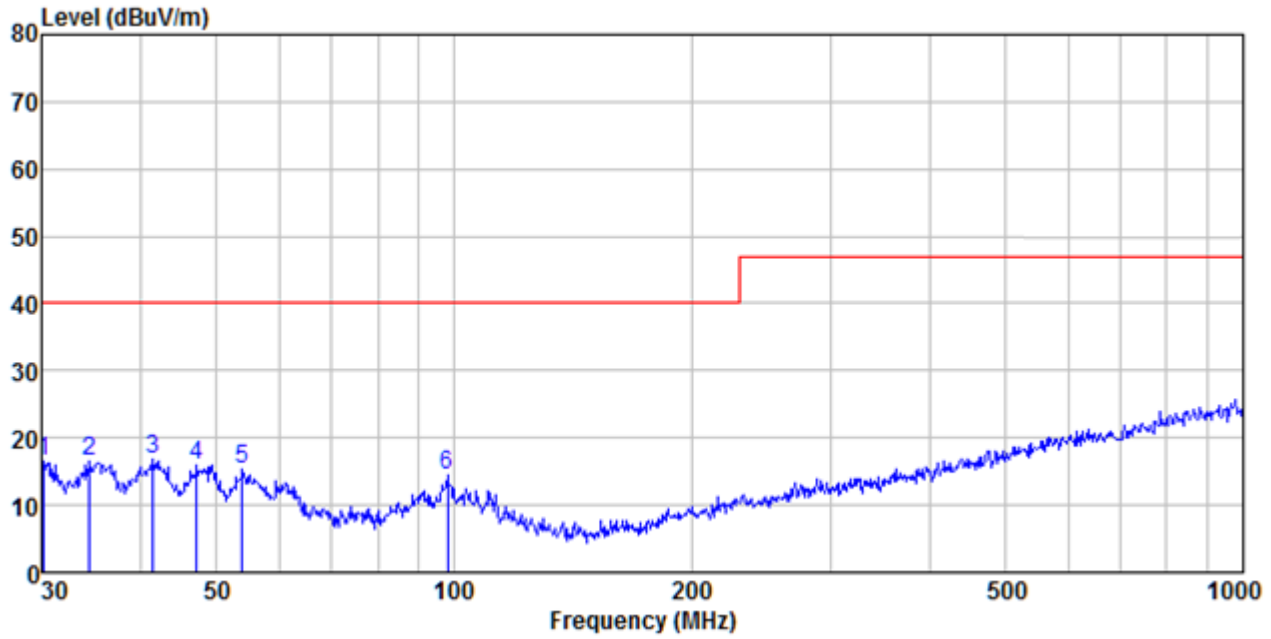


Test Setup Block Diagram

3.3 Test Data and Results

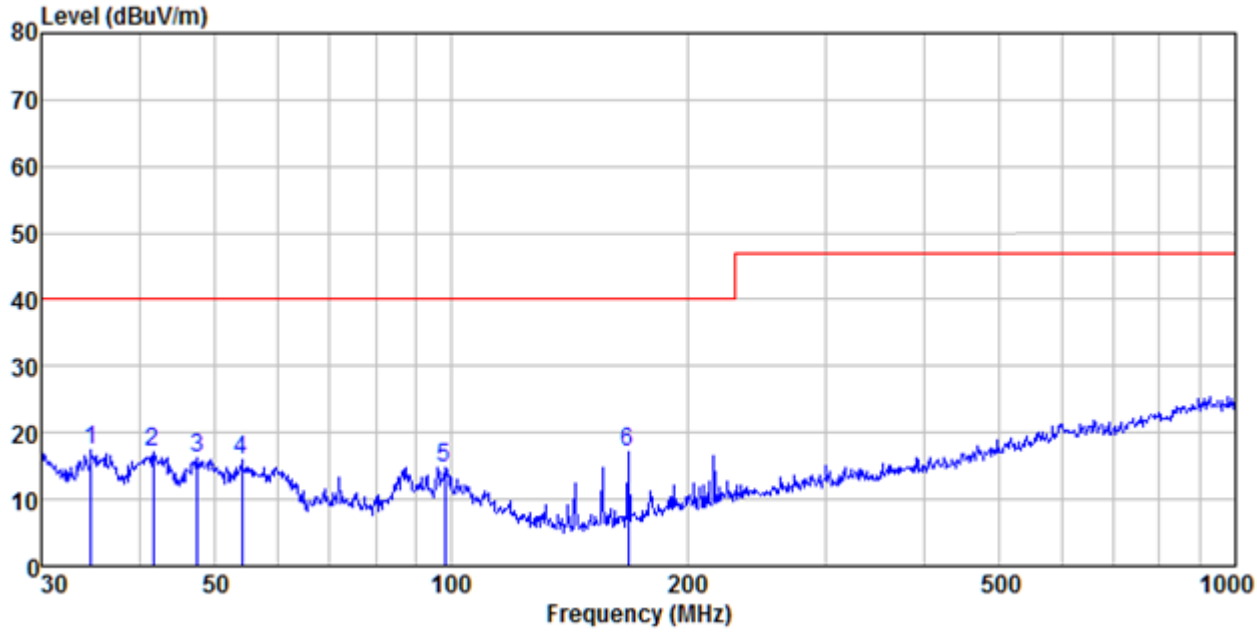
Based on all tested data, the EUT complied with the EN 55032 standard limit for a Class B device, and with the worst case as below:

Test Plots and Data of Radiated Emissions	
Tested Model:	WC020
Tested Mode:	TM1
Test Power Specification:	DC 3.7V
Test Antenna Polarization:	Horizontal
Remark:	



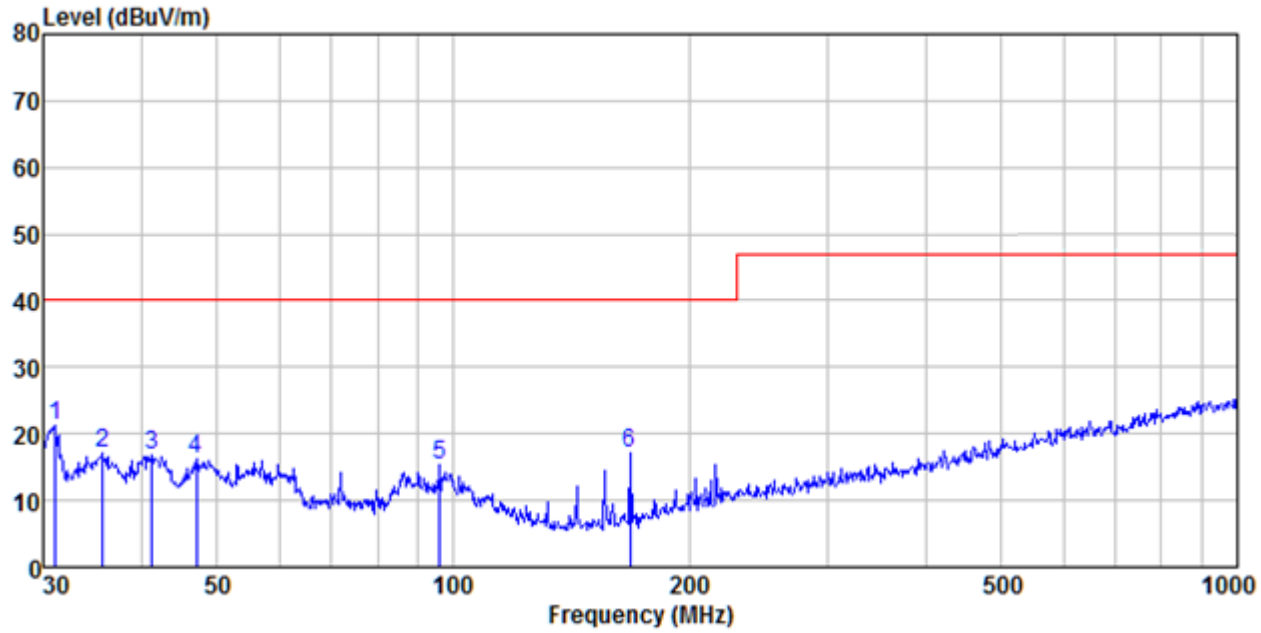
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.211	39.84	11.21	35.02	0.55	16.58	40.00	-23.42	Peak
2	34.517	39.97	11.29	35.32	0.60	16.54	40.00	-23.46	Peak
3	41.567	39.74	12.22	35.75	0.68	16.89	40.00	-23.11	Peak
4	47.160	39.05	12.27	36.04	0.74	16.02	40.00	-23.98	Peak
5	53.882	38.77	11.90	36.24	0.81	15.24	40.00	-24.76	Peak
6	98.142	38.01	11.93	36.71	1.18	14.41	40.00	-25.59	Peak

Test Plots and Data of Radiated Emissions	
Tested Model:	WC020
Tested Mode:	TM1
Test Power Specification:	DC 3.7V
Test Antenna Polarization:	Vertical
Remark:	



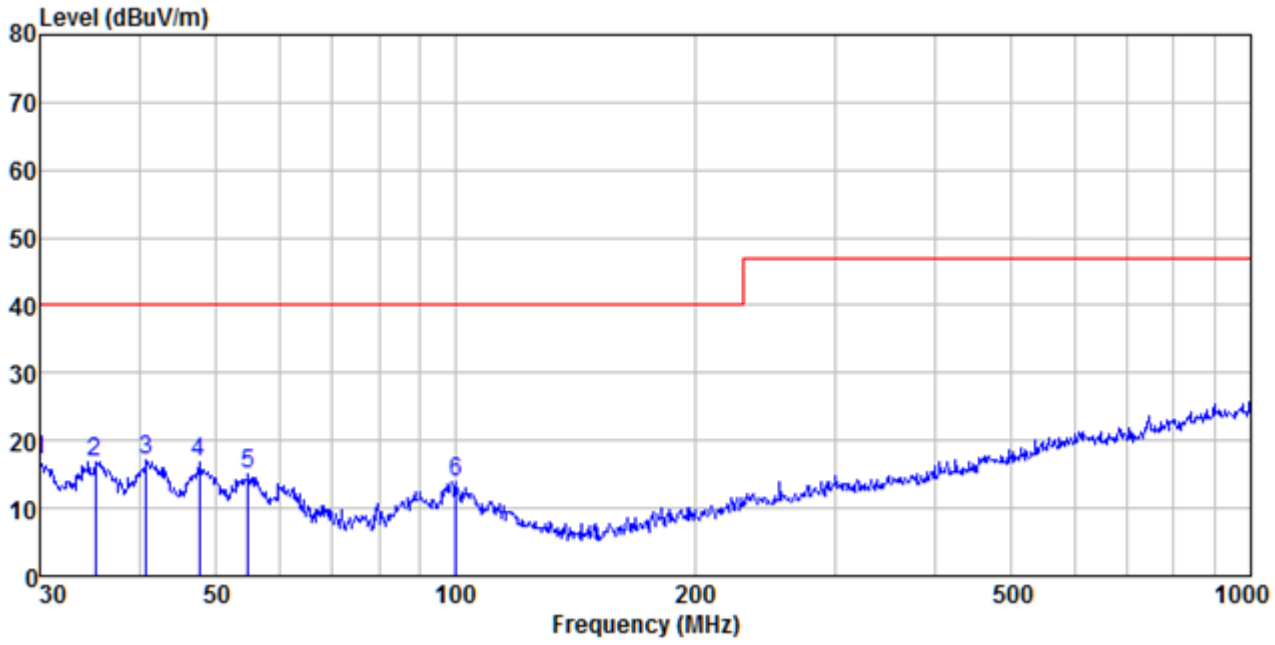
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	34.760	40.85	11.30	35.34	0.61	17.42	40.00	-22.58	Peak
2	41.713	39.90	12.22	35.76	0.68	17.04	40.00	-22.96	Peak
3	47.492	39.29	12.28	36.06	0.74	16.25	40.00	-23.75	Peak
4	54.071	39.49	11.88	36.24	0.81	15.94	40.00	-24.06	Peak
5	98.142	38.43	11.93	36.71	1.18	14.83	40.00	-25.17	Peak
6	167.824	44.05	8.46	37.18	1.67	17.00	40.00	-23.00	Peak

Test Plots and Data of Radiated Emissions	
Tested Model:	WC020
Tested Mode:	TM2
Test Power Specification:	DC 4.2V
Test Antenna Polarization:	Horizontal
Remark:	



	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	31.071	44.51	11.22	35.08	0.56	21.21	40.00	-18.79	Peak
2	35.749	40.33	11.46	35.41	0.62	17.00	40.00	-23.00	Peak
3	41.277	39.71	12.21	35.74	0.68	16.86	40.00	-23.14	Peak
4	46.995	39.22	12.27	36.04	0.74	16.19	40.00	-23.81	Peak
5	96.099	39.14	11.65	36.69	1.16	15.26	40.00	-24.74	Peak
6	167.824	44.16	8.46	37.18	1.67	17.11	40.00	-22.89	Peak

Test Plots and Data of Radiated Emissions	
Tested Model:	WC020
Tested Mode:	TM2
Test Power Specification:	DC 4.2V
Test Antenna Polarization:	Vertical
Remark:	



	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.000	40.31	11.20	35.00	0.55	17.06	40.00	-22.94	Peak
2	35.251	40.16	11.36	35.37	0.61	16.76	40.00	-23.24	Peak
3	40.845	39.83	12.21	35.71	0.67	17.00	40.00	-23.00	Peak
4	47.659	39.74	12.28	36.07	0.75	16.70	40.00	-23.30	Peak
5	54.835	38.70	11.80	36.25	0.82	15.07	40.00	-24.93	Peak
6	100.229	37.38	12.15	36.72	1.19	14.00	40.00	-26.00	Peak

4. Electrostatic Discharges (ESD)

4.1 Standard and Limit

According to the standard EN 55035 Clause 4.2.1, Limit as below:

Test Specifications	Test Levels	Performance Criterion
Air Discharge	8kV	B
Contact Discharge	4kV	B

4.2 Test Procedure

Test is conducting under the description of IEC 61000-4-2.

4.3 Test Results

Air Discharge	**Test Levels (kV)**							
Test Points	-2	+2	-4	+4	-8	+8	-15	+15
Surface	A	A	A	A	A	A	--	--
--	--	--	--	--	--	--	--	--

Contact Discharge	**Test Levels (kV)**							
Test Points	-2	+2	-4	+4	-6	+6	-8	+8
Metal Parts	A	A	A	A	--	--	--	--
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5. Continuous Radiated Disturbances (R/S)

5.1 Standard and Limit

According to the standard EN 55035 Clause 4.2.2, Limit as below:

Test Specifications	Test Levels	Performance Criterion
80MHz-1000MHz	3V/m	A

5.2 Test Procedure

Test is conducting under the description of IEC 61000-4-3.

5.3 Test Results

Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth

Frequency Range	**EM Field**	**Polarization**	**Front**	**Rear**	**Left**	**Right**
80MHz-1GHz	3V/m	Horizontal	A	A	A	A
80MHz-1GHz	3V/m	Vertical	A	A	A	A

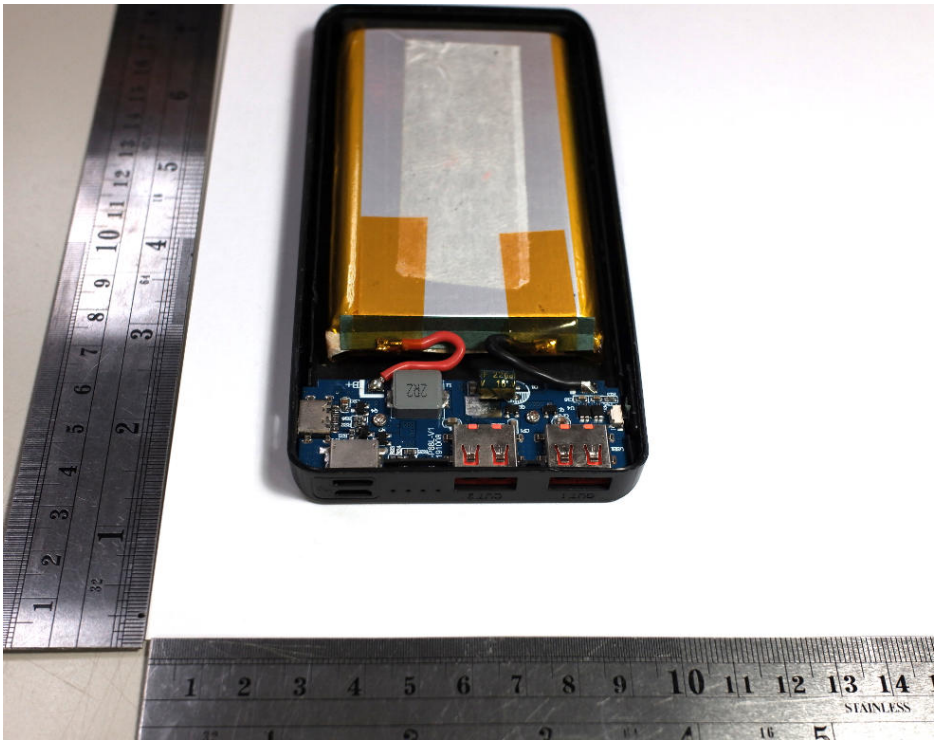
Annex A. EUT Photos

EUT View 1

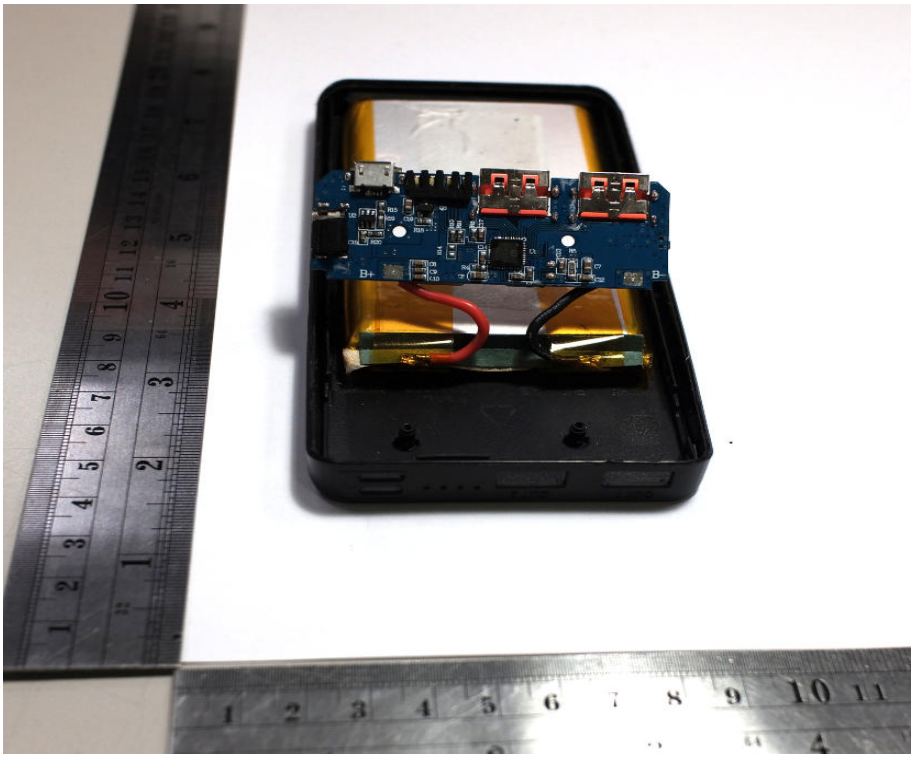
EUT View 2

EUT View 3

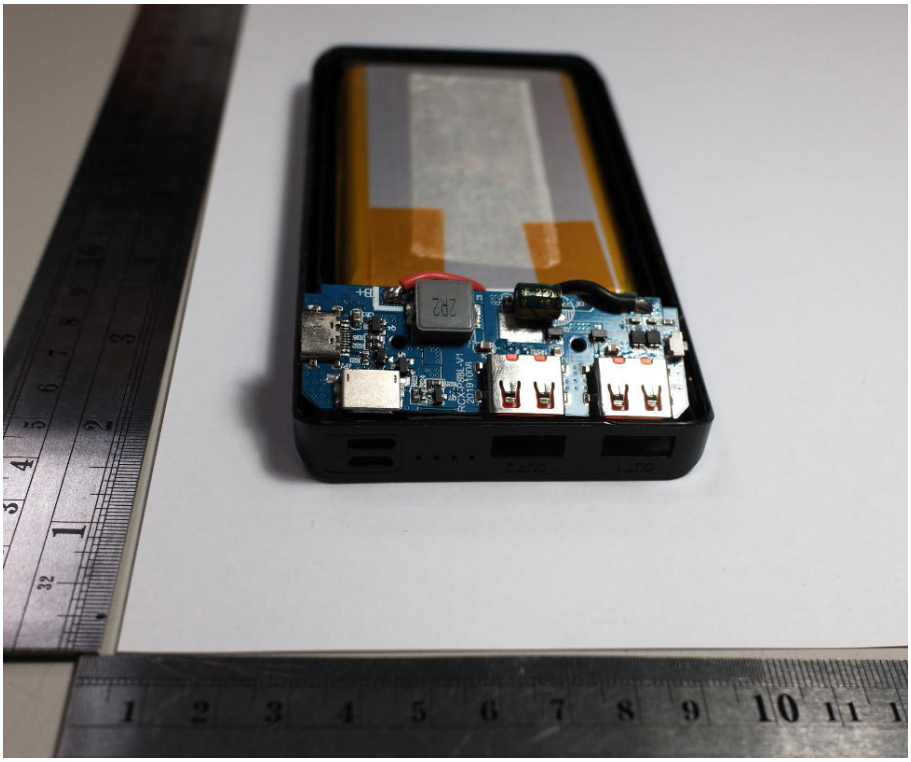
EUT View 4



EUT View 5

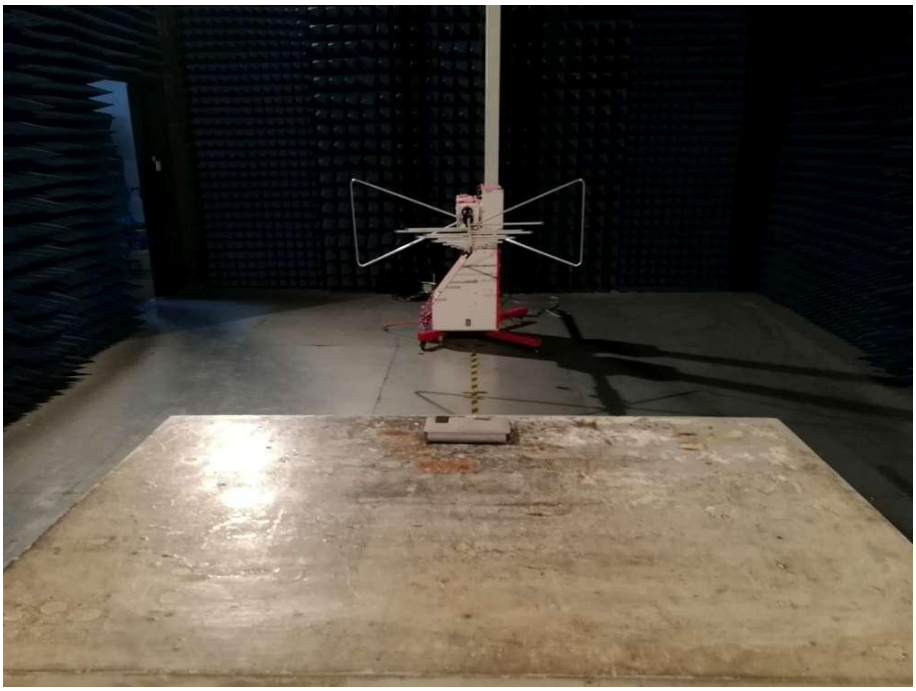


EUT View 6

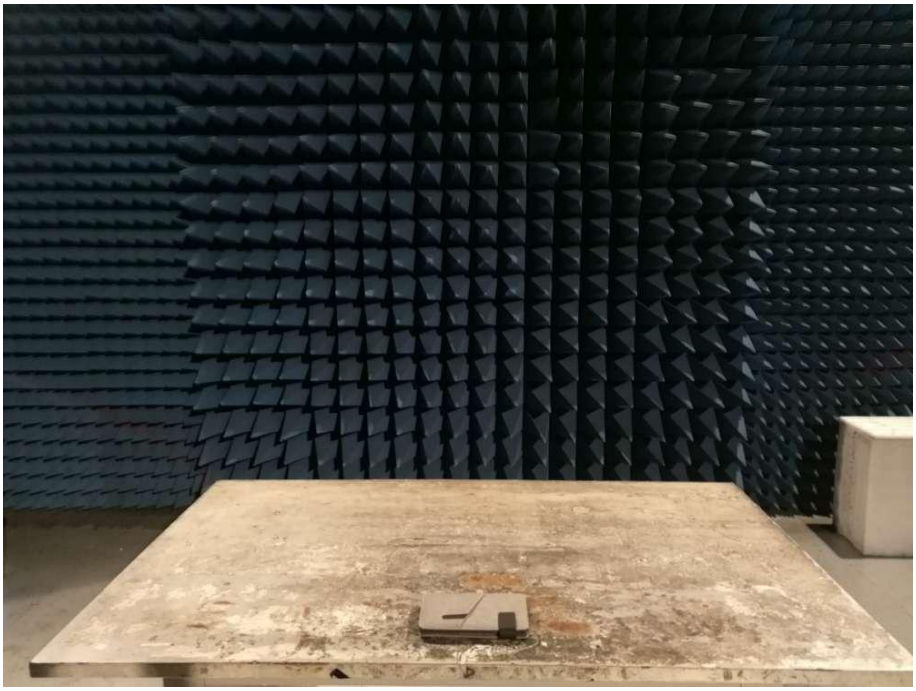


Annex B. Test Setup Photos

Test View 1



Test View 2



Annex C. Label and Information

CE Mark Sample

CE Mark Specifications

Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The ‘CE’ marking must be affixed to the EUT or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents. The ‘CE’ marking must have a height of at least 5 mm. If the ‘CE’ marking is reduced or enlarged the proportions given in the above graduated drawing must be respected.

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