

EMC TEST REPORT

For

STICK AND WATCH WIRELESS CAHRGER

Test Model: BM3001

Prepared for :
Address :

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Serial number : Prototype
Date of Test : March 29, 2019 ~ April 03, 2019
Date of Report : April 08, 2019



EMC TEST REPORT**Final draft ETSI EN 301 489-3 V2.1.1 (2017-03)**

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

Report Reference No. : LCS190322083AEA

Date Of Issue : April 08, 2019

Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address : 101, 601, Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure..... : Full application of Harmonised standards ☒
Partial application of Harmonised standards ☐
Other standard testing method ☐

Applicant's Name..... :

Address :

Test Specification

Standard : ETSI EN 301 489-1 V2.1.1 (2017-02)
Final draft ETSI EN 301 489-3 V2.1.1 (2017-03)

Test Report Form No. : LCSEMC-1.0

TRF Originator : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF : Dated 2017-06

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Test Item Description. : STICK AND WATCH WIRELESS CHARGER

Trade Mark :

Test Model : BM3001

Ratings : DC 5V

Result : Positive

Compiled by:

Raing Ye

Raing Ye / Administrators

Supervised by:

Calvin Weng

Calvin Weng / Technique principal

Approved by:

Gavin Liang

Gavin Liang / Manager

EMC -- TEST REPORT

Test Report No. : LCS190322083AEAApril 08, 2019

Date of issue

Test Model : BM3001

EUT..... : STICK AND WATCH WIRELESS CAHRGER

Applicant..... :

Address..... :

Telephone..... : /

Fax..... : /

Manufacturer..... :

Address..... :

Telephone..... : /

Fax..... : /

Factory..... : /

Address..... : /

Telephone..... : /

Fax..... : /

Test Result**Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	April 08, 2019	Initial Issue	Gavin Liang

TABLE OF CONTENT

Test Report Description	Page
TABLE OF CONTENT	5
1. GENERAL INFORMATION	7
1.1. PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	7
1.2. OBJECTIVE	7
1.3. RELATED SUBMITTAL(S)/GRANT(S)	7
1.4. TEST METHODOLOGY	7
1.5. DESCRIPTION OF TEST FACILITY	7
1.6. SUPPORT EQUIPMENT LIST	8
1.7. EXTERNAL I/O	8
1.8. MEASUREMENT UNCERTAINTY	8
1.9. DESCRIPTION OF TEST MODES	8
2. SUMMARY OF TEST RESULTS	9
3. LINE CONDUCTED EMISSION	10
3.1. CONDUCTED EMISSION LIMIT	10
3.2. TEST CONFIGURATION	10
3.3. EMI TEST RECEIVER SETUP	11
3.4. TEST PROCEDURE	11
3.5. TEST DATA	12
4. RADIATED DISTURBANCE	13
4.1. RADIATED EMISSION LIMIT	13
4.2. TEST CONFIGURATION	13
4.3. TEST PROCEDURE	14
4.4. TEST DATA	14
5. HARMONIC CURRENT EMISSIONS	16
5.1. TEST CONFIGURATION	16
5.2. TEST STANDARD	16
5.3. TEST DATA	16
6. VOLTAGE FLUCTUATION AND FLICKER	17
6.1. TEST CONFIGURATION	17
6.2. TEST STANDARD	17
6.3. TEST DATA	17
7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST	18
7.1. PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO TRANSMITTER (CT)	18
7.2. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTER (TT)	18
7.3. PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVER (CR)	18
7.4. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVER (TR)	18
8. RF ELECTROMAGNETIC FIELD (80 MHZ - 6000 MHZ)	19
8.1. TEST CONFIGURATION	19
8.2. TEST STANDARD	20
8.3. SEVERITY LEVEL	20
8.4. TEST PROCEDURE	20
8.5. TEST RESULT	21
9. ELECTROSTATIC DISCHARGE	22
9.1. TEST CONFIGURATION	22
9.2. TEST PROCEDURE	23
9.3. TEST DATA	23
10. ELECTRICAL FAST TRANSIENT IMMUNITY	25
10.1. TEST CONFIGURATION	25
10.2. TEST STANDARD	25
10.3. TEST PROCEDURE	25

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Report No.: LCS190322083AEA

10.4. TEST DATA.....	25
11. RF COMMON MODE	27
11.1. TEST CONFIGURATION	27
11.2. TEST STANDARD	27
11.3. TEST PROCEDURE.....	28
11.4. TEST DATA.....	28
12. SURGES, LINE TO LINE AND LINE TO GROUND	30
12.1. TEST CONFIGURATION	30
12.2. TEST STANDARD	30
12.3. TEST PROCEDURE.....	30
12.4. TEST DATA.....	30
13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST	32
13.1. TEST CONFIGURATION	32
13.2. TEST STANDARD	32
13.3. TEST PROCEDURE.....	32
13.4. TEST DATA.....	32
14. LIST OF MEASURING EQUIPMENT	34
15. TEST SETUP PHOTOGRAPHS	36
16. EUT EXTERIOR AND INTERIOR PHOTOGRAPHS	41

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT : STICK AND WATCH WIRELESS CAHRGER
Test Model : BM3001
Hardware Version :
Software Version :
Operating Frequency : 110.0~205.0KHz
Modulation Type : Continuous Wave
Antenna Type : Coil Antenna
Ratings : DC 5V

1.2. Objective

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
Final draft ETSI EN 301 489-3 V2.1.1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

The objective is to determine compliance with ETSI EN 301 489-1 V2.1.1 (2017-02), Final draft ETSI EN 301 489-3 V2.1.1 (2017-03).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.1.1 (2017-02), Final draft ETSI EN 301 489-3 V2.1.1 (2017-03).

1.5. Description of Test Facility

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A-1.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001
NVLAP Registration Code is 600167-0

1.6. Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Apple Inc.	Mobile Phone	iPhone X	--	CE
Dongguan City Yingju Electronics Co., Ltd	Adapter	YJC005Z-0501000G	--	CE

Note: The Adapter is only Test.

1.7. External I/O

I/O Port Description	Quantity	Cable
USB Port	1	N/A

1.8. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

1.9. Description Of Test Modes

There was 2 test Modes. TM1 to TM2 were shown below:

TM1 : Wireless charging mode
TM2 : Idle mode

***Note: All test modes were tested, but we only recorded the worst case in this report.

2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	N/A*
§7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	N/A*
§7.1	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.7 Telecommunication ports	N/A*
§7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 6 000 MHz)(EN 61000-4-3)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliant

3. LINE CONDUCTED EMISSION

3.1. Conducted Emission Limit

ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032 Class B

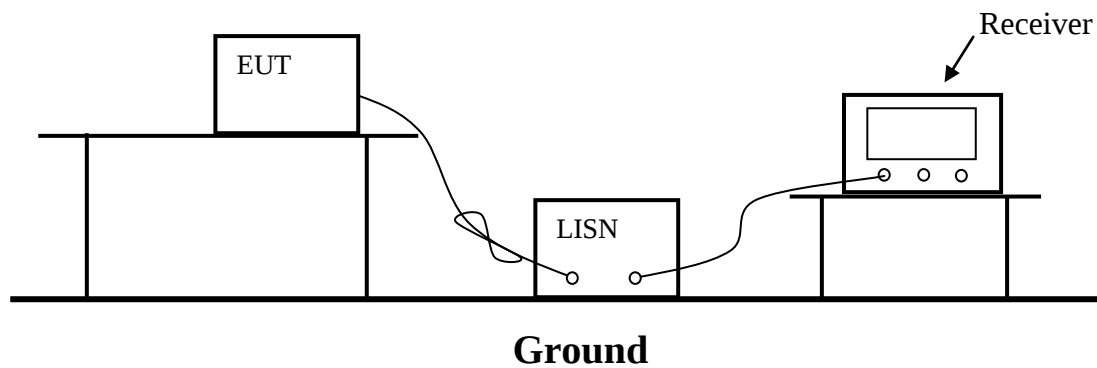
Limits for Line Conducted Emission

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15~0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50~5.00	56.0	46.0
5.00~30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.2. Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The EUT received AC 230V/50Hz power through a LISN supplying power of AC 230V/50Hz.

3.3. EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range
150 kHz – 30 MHz

IFBW
9 kHz

3.4. Test Procedure

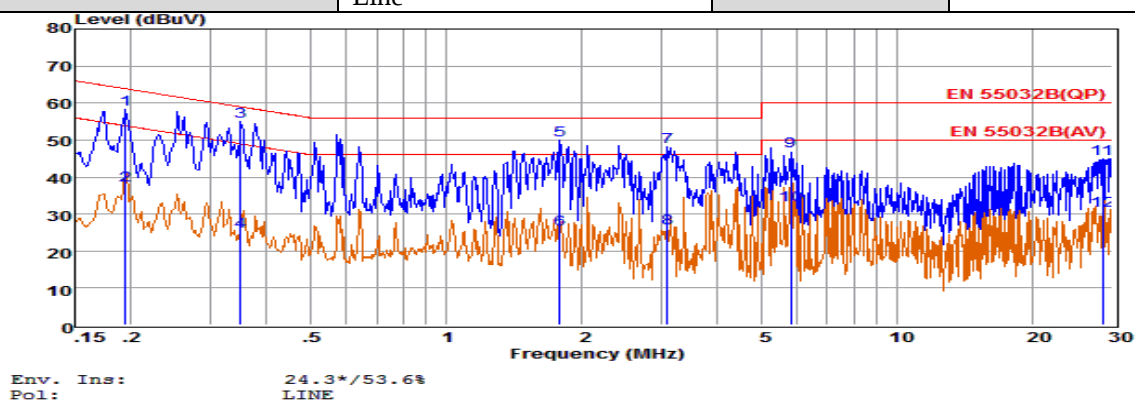
Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

3.5. Test Data

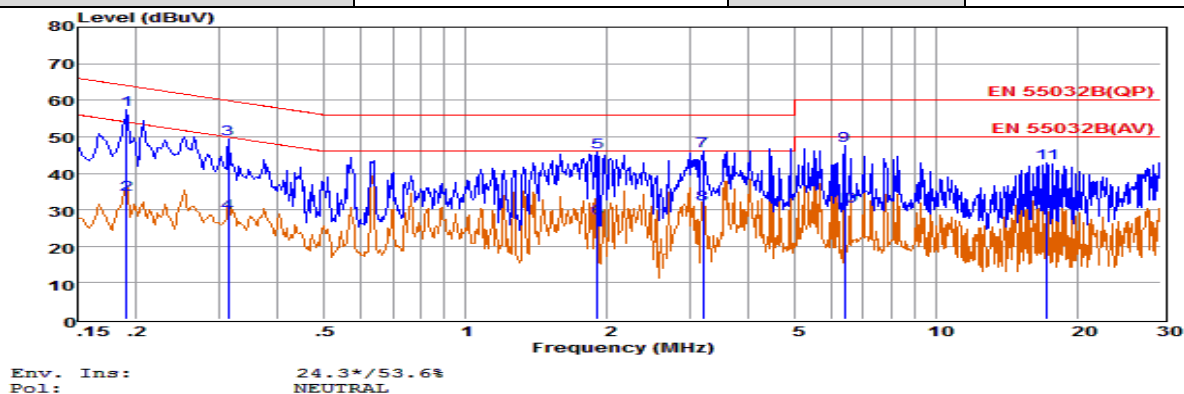
Model No.	BM3001	Test Mode	TM1
Environmental Conditions	24.3℃, 53.6% RH	Test Engineer	Diamind Lu
Pol	Line		



	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.19	38.61	9.62	0.02	10.00	58.25	63.84	-5.59	QP
2	0.19	18.24	9.62	0.02	10.00	37.88	53.84	-15.96	Average
3	0.35	35.48	9.62	0.03	10.00	55.13	58.96	-3.83	QP
4	0.35	5.58	9.62	0.03	10.00	25.23	48.96	-23.73	Average
5	1.78	30.19	9.64	0.05	10.00	49.88	56.00	-6.12	QP
6	1.78	6.23	9.64	0.05	10.00	25.92	46.00	-20.08	Average
7	3.09	28.50	9.64	0.06	10.00	48.20	56.00	-7.80	QP
8	3.09	6.55	9.64	0.06	10.00	26.25	46.00	-19.75	Average
9	5.80	27.24	9.66	0.06	10.00	46.96	60.00	-13.04	QP
10	5.81	12.78	9.66	0.06	10.00	32.50	50.00	-17.50	Average
11	28.60	25.19	9.71	0.14	10.00	45.04	60.00	-14.96	QP
12	28.60	11.07	9.71	0.14	10.00	30.92	50.00	-19.08	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Model No.	BM3001	Test Mode	TM1
Environmental Conditions	24.3℃, 53.6% RH	Test Engineer	Diamind Lu
Pol	Neutral		



	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.19	37.80	9.61	0.02	10.00	57.43	64.02	-6.59	QP
2	0.19	14.43	9.61	0.02	10.00	34.06	54.02	-19.96	Average
3	0.31	29.64	9.60	0.03	10.00	49.27	59.88	-10.61	QP
4	0.31	9.54	9.60	0.03	10.00	29.17	49.88	-20.71	Average
5	1.91	26.11	9.63	0.05	10.00	45.79	56.00	-10.21	QP
6	1.91	7.93	9.63	0.05	10.00	27.61	46.00	-18.39	Average
7	3.19	26.50	9.65	0.06	10.00	46.21	56.00	-9.79	QP
8	3.19	11.67	9.65	0.06	10.00	31.38	46.00	-14.62	Average
9	6.39	27.94	9.68	0.07	10.00	47.69	60.00	-12.31	QP
10	6.39	11.32	9.68	0.07	10.00	31.07	50.00	-18.93	Average
11	17.20	23.05	9.77	0.11	10.00	42.93	60.00	-17.07	QP
12	17.20	10.15	9.77	0.11	10.00	30.03	50.00	-19.97	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

4. RADIATED DISTURBANCE

4.1. Radiated Emission Limit

ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032 Class B

Limits for radiated disturbance Blow 1GHz

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

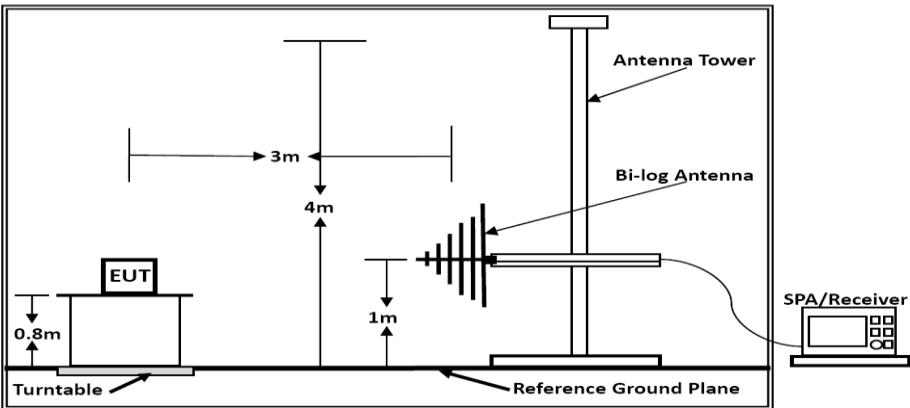
Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

Limits for radiated disturbance Above 1GHz

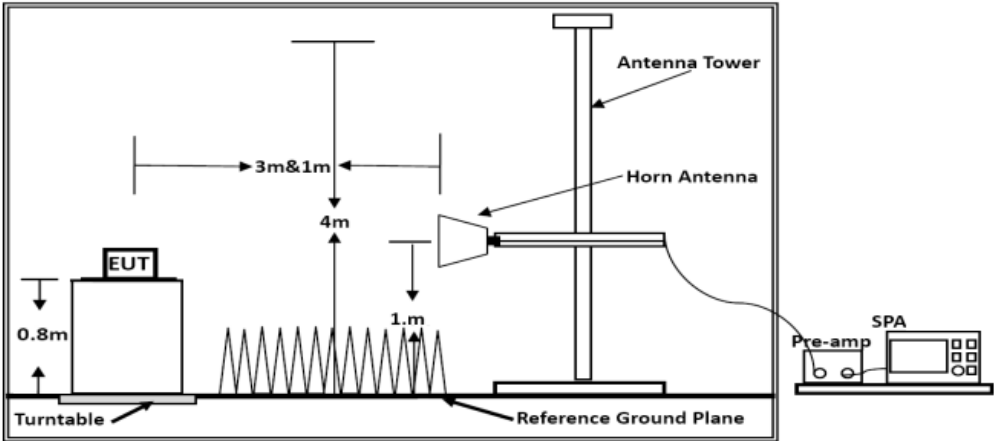
FREQUENCY (MHz)	DISTANCE (Meters)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
1000-3000	3	50	70
3000-6000	3	54	74

Note: The lower limit applies at the transition frequency.

4.2. Test Configuration



Below 1GHz



Above 1GHz
Above 1000MHz

4.3. Test Procedure

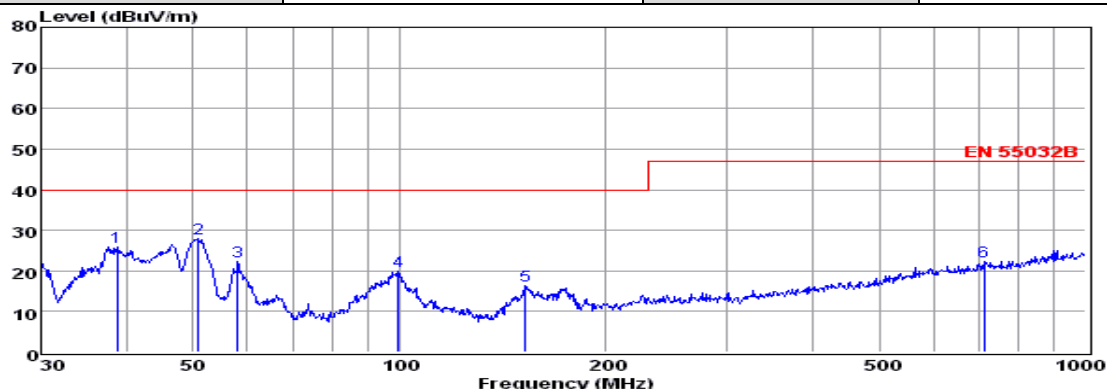
Please refer to ETSI EN 301 489-1 V2.1.1 (2017-02) Clause 8.2.3 and EN 55032 Annex A.2 for the measurement methods.

4.4. Test Data

PASS

Please refer to the following page

Model No.	BM3001	Test Mode	TM1
Environmental Conditions	24.4°C, 53.4% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Diamind Lu		

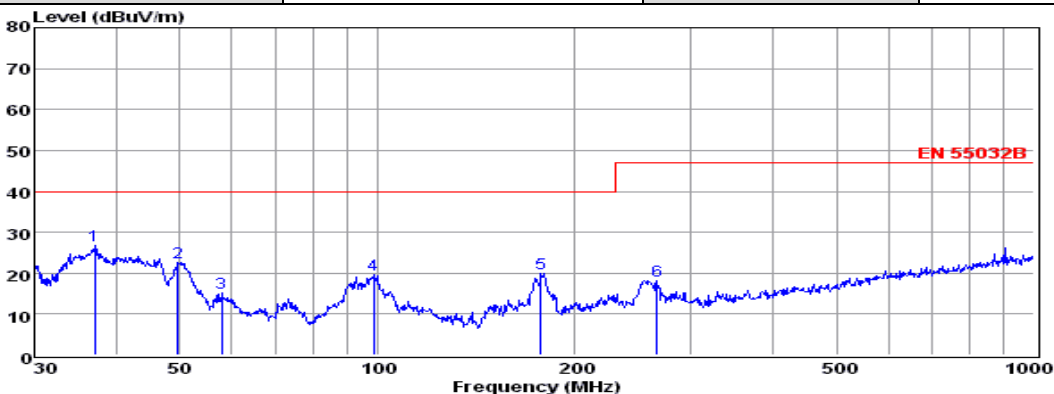


Env./Ins: 24.4°C/53.4%
pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	38.75	12.14	0.38	13.26	25.78	40.00	-14.22	QP
2	50.94	14.25	0.54	13.21	28.00	40.00	-12.00	QP
3	58.00	8.99	0.47	12.82	22.28	40.00	-17.72	QP
4	99.53	6.23	0.61	13.13	19.97	40.00	-20.03	QP
5	152.66	7.18	0.73	8.37	16.28	40.00	-23.72	QP
6	711.67	1.69	1.63	18.96	22.28	47.00	-24.72	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Model No.	BM3001	Test Mode	TM1
Environmental Conditions	2°C, 53.4% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Diamind Lu		



Env./Ins: 24.4°C/53.4%
pol: HORIZONTAL

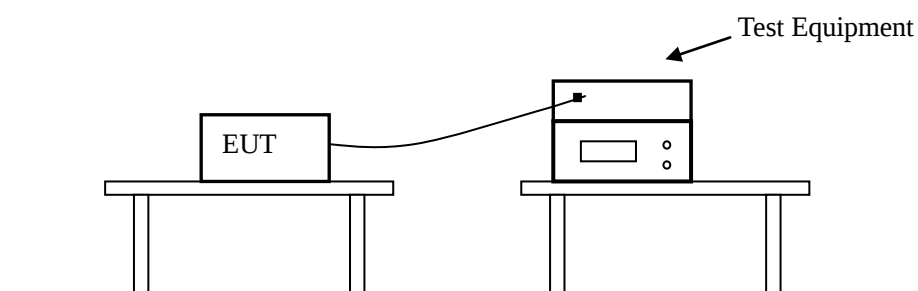
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	37.02	13.50	0.41	12.82	26.73	40.00	-13.27	QP
2	49.71	8.91	0.54	13.27	22.72	40.00	-17.28	QP
3	57.80	1.82	0.47	12.84	15.13	40.00	-24.87	QP
4	98.49	6.00	0.61	13.06	19.67	40.00	-20.33	QP
5	177.51	9.62	0.89	9.50	20.01	40.00	-19.99	QP
6	266.61	5.00	1.00	12.25	18.25	47.00	-28.75	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

5. HARMONIC CURRENT EMISSIONS

5.1. Test Configuration



5.2. Test Standard

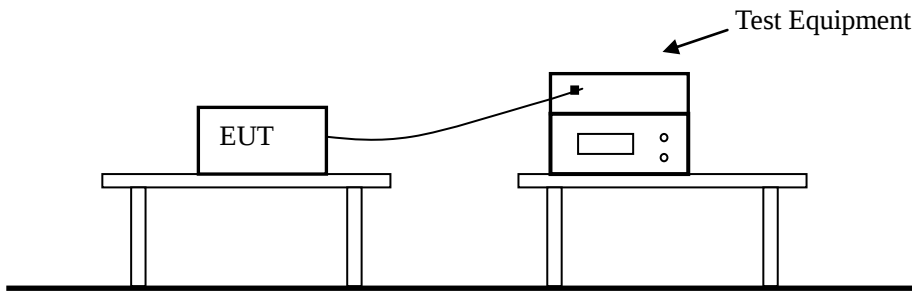
According to EN 301489-1 V2.1.1 (2017-02) & EN 61000-3-2: 2014

5.3. Test Data

Because power of EUT less than 75W, According standard EN 61000-3-2, Harmonic current unnecessary to test.

6. VOLTAGE FLUCTUATION AND FLICKER

6.1. Test Configuration



6.2. Test Standard

According to EN 301489-1 V2.1.1 (2017-02) & EN 61000-3-3: 2013

6.3. Test Data

Model No.		BM3001		Test Mode	TM1
Test result		Pass		Test Engineer	Diamind Lu
Overall Result: PASS		Notes: Measurement method - Voltage			
	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)	
Limit	1.000	3.300	4.000	500	
Reading 1	0.089	0.008	0.189	0	

7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

7.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

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

7.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

7.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

7.4. Performance criteria for Transient phenomena applied to Receiver (TR)

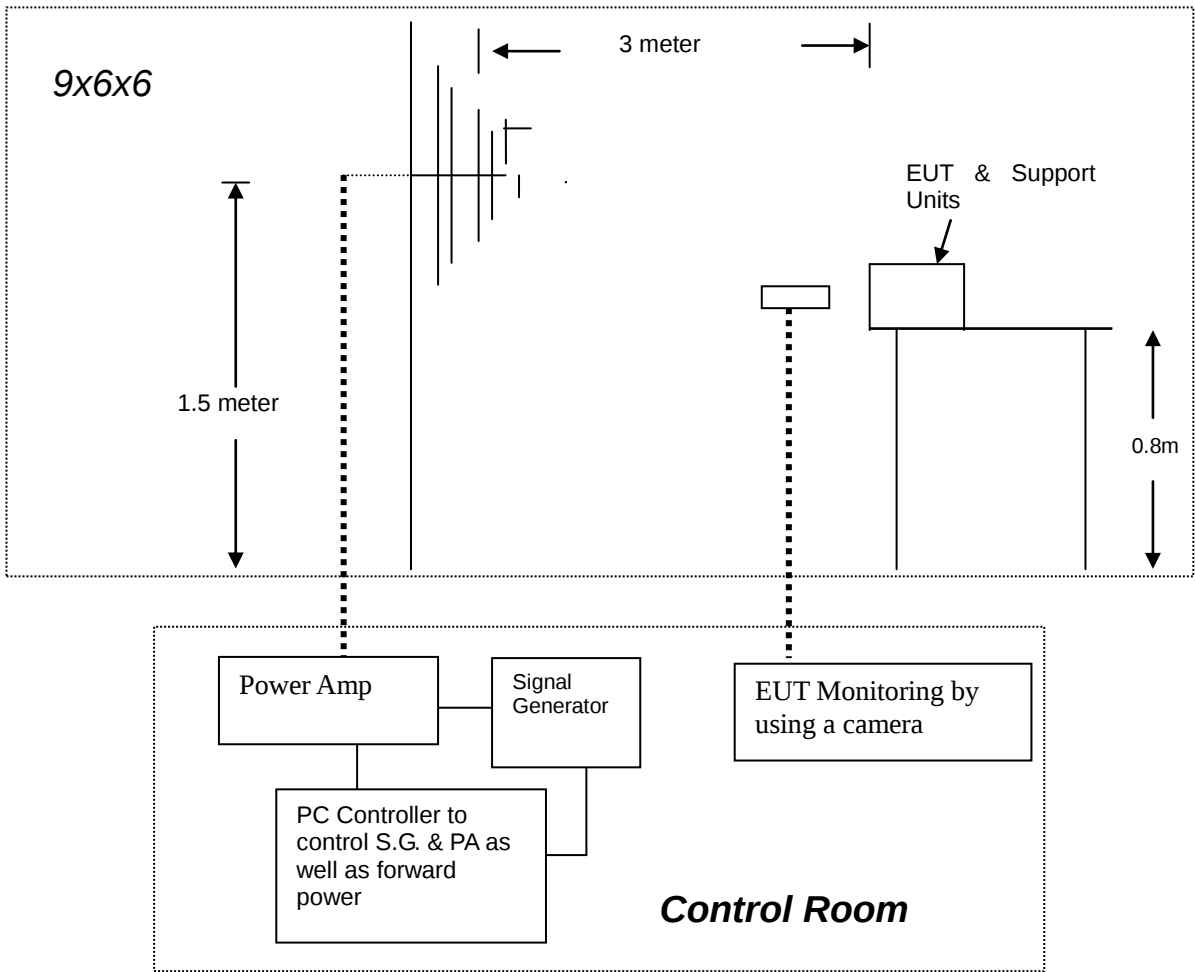
For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for Final draft ETSI EN 301 489-3 V2.1.1 (2017-03)

Criterion	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

8. RF ELECTROMAGNETIC FIELD (80 MHZ - 6000 MHZ)

8.1. Test Configuration



8.2. Test Standard

ETSI 301 489-1,(EN 61000-4-3: 2006+A1: 2008+A2: 2010)

Test level 2 at 3V / m.

8.3. Severity Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

Performance criterion: A

8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80 - 6000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	3 Sec.

5.5. Test Result

RF ELECTROMAGNETIC FIELD			
Standard	☐ IEC 61000-4-3 ☒ EN 61000-4-3		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS	Temperature	24.4°C
M/N	BM3001	Humidity	53.4%
Test Mode	TM1-TM2	Criterion	B
Test Engineer	Diamind Lu		

TM1 Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Field Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-1000, 1000-6000	3	CT,CR	Front, Right, Left, Back	Pass
	Horizontal	80-1000, 1000-6000	3	CT,CR	Front, Right, Left, Back	Pass
Idle	Vertical	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass

TM2 Test Result:

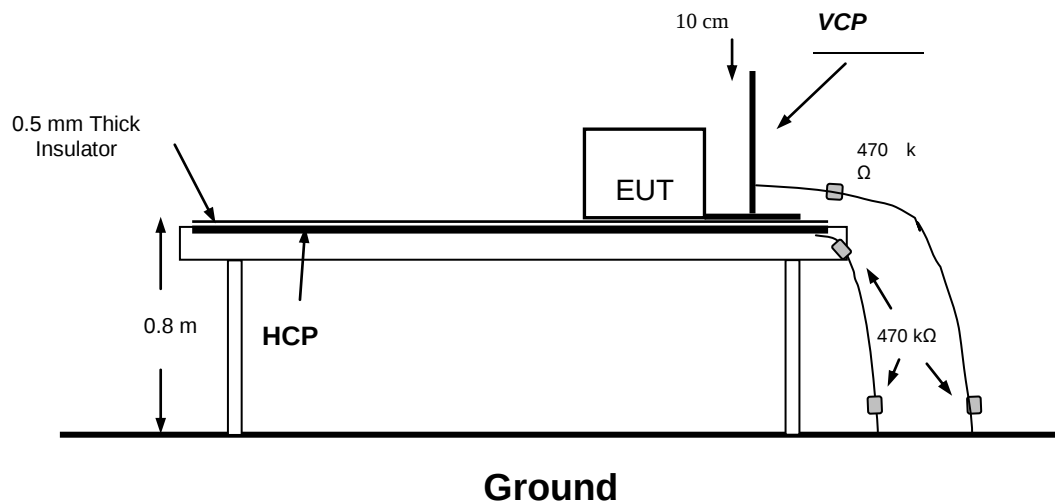
EUT Working Mode	Antenna Polarity	Frequency (MHz)	Field Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass
Idle	Vertical	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-1000, 1000-6000	3	See Note	Front, Right, Left, Back	Pass

***Note: Unintentional transmission is not founded from the EUT.

9. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 V2.1.1 (2017-02) and EN 61000-4-2.

9.1. Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

9.2. Test Procedure

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-2: 2009

Test level 3 for Air Discharge at ± 8 kV

Test level 2 for Contact Discharge at ± 4 kV

9.2.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

9.2.2. Contact Discharge

All the procedure shall be same as Section 6.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

9.2.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

9.2.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

9.3. Test Data

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

Standard	☐ IEC 61000-4-2 ☒ EN 61000-4-2		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS CAHRGER	Temperature	24.6°C
M/N	BM3001	Humidity	53.1%
Criterion	B	Pressure	1021mbar
Test Mode	TM1-TM2	Test Engineer	Diamind Lu

TEST RESULT OF TM1

Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	TT, TR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge HCP	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge VCP	TT, TR	Pass

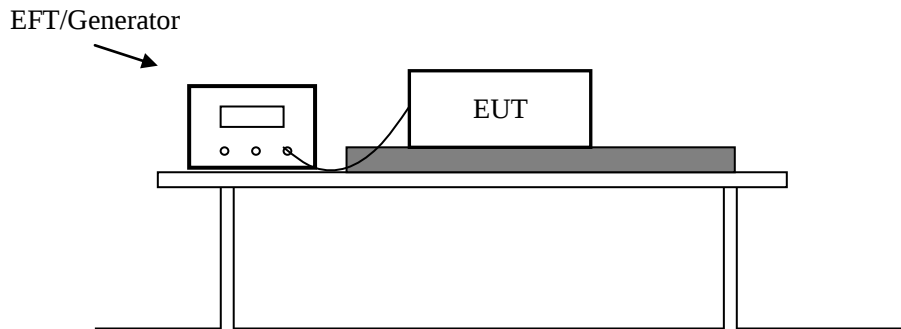
TEST RESULT OF TM2

Test Voltage	Coupling	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	Pass
±2KV, ±4kV, ±8kV	Air Discharge	Pass
±2KV, ±4kV	Indirect Discharge HCP	Pass
±2KV, ±4kV	Indirect Discharge VCP	Pass

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.

10. ELECTRICAL FAST TRANSIENT IMMUNITY

10.1. Test Configuration



10.2. Test Standard

EN 301 489-1 V2.1.1 (2017-02)/ EN61000-4-4: 2012

Test level 2 at 1 kV

Test level

Level	Open Circuit Output Test Voltage $\pm 10\%$	
	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance criterion: B

10.3. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

10.4.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.4.2. For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

10.4.3. For DC output line ports: It's unnecessary to test.

10.4. Test Data

PASS.

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Standard	☐ IEC 61000-4-4 ☒ EN 61000-4-4		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS CAHRGER	Temperature	24.6℃
M/N	BM3001	Humidity	53.1%
Test Mode	TM1-TM2	Criterion	B
Test Engineer	Diamind Lu		

TEST RESULT OF TM1

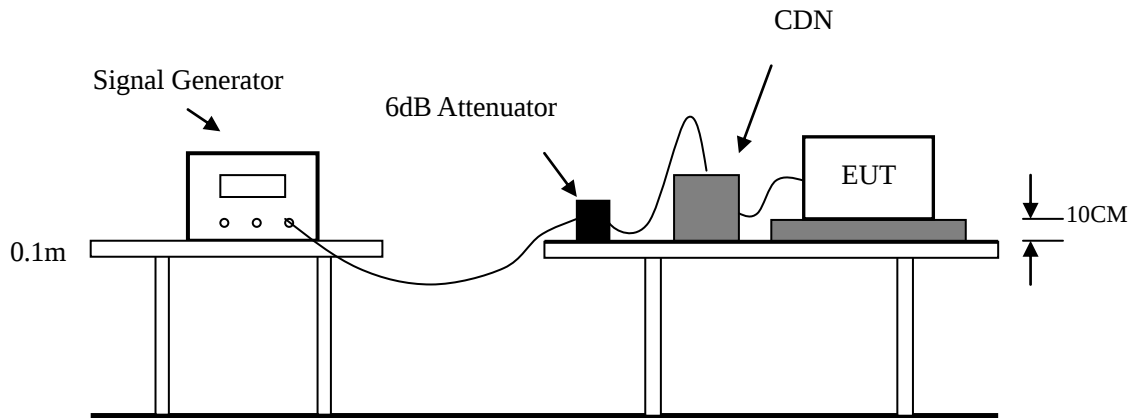
Line	Test Voltage	Polarity	Observation	Result (Pass/Fail)
L	1KV	+/-	TT, TR	Pass
N	1KV	+/-	TT, TR	Pass
L-N	1KV	+/-	TT, TR	Pass

TEST RESULT OF TM2

Line	Test Voltage	Polarity	Result (Pass/Fail)
L	1KV	+/-	Pass
N	1KV	+/-	Pass
L-N	1KV	+/-	Pass

11. RF COMMON MODE

11.1. Test Configuration



11.2. Test Standard

EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-6: 2014
Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,
Modulation type: AM
Modulation depth: 80%
Modulation signal: 1 kHz

Test level

Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special

Performance criterion: A

11.3. Test Procedure

11.3.1. Let the EUT work in test mode and test it.

11.3.2. The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

11.3.3. The disturbance signal described below is injected to EUT through CDN.

11.3.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

11.3.5. The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

11.3.6. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

11.3.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.4. Test Data

PASS.

Please refer to the following page.

Injected Currents Susceptibility Test Results

Standard	☐ IEC 61000-4-6 ☒ EN 61000-4-6		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS CAHRGER	Temperature	24.6℃
M/N	BM3001	Humidity	53.1%
Test Mode	TM1-TM2	Criterion	A
Test Engineer	Diamind Lu		

TEST RESULT OF TM1

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Observation	Result (Pass/Fail)
0.15 ~ 80	AC Mains	3V	CT, CR	Pass

TEST RESULT OF TM2

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result (Pass/Fail)
0.15 ~ 80	AC Mains	3V	Pass

Remark:

1. Modulation Signal:1kHz 80% AM

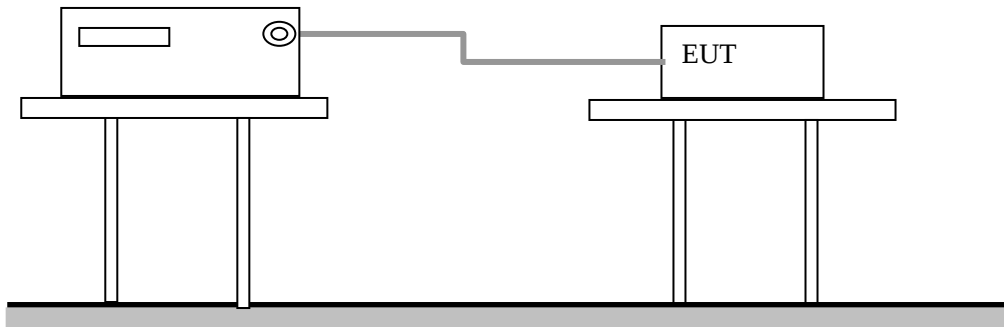
2. Measurement Equipment :

Simulator: CIT-10 (FRANKONIA)

CDN : ☒CDN-M2 (FRANKONIA)☐CDN-M3 (FRANKONIA)

12. SURGES, LINE TO LINE AND LINE TO GROUND

12.1. Test Configuration



12.2. Test Standard

Ground Plane

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-5: 2014

L-N: Test level 2 at 1 kV

L-PE, N-PE Test Level 3 at 2kV

Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance criterion: B

12.3. Test Procedure

- 12.3.1. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
- 12.3.2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 12.3.3. Different phase angles are done individually.
- 12.3.4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

12.4. Test Data

PASS.

Please refer to the following page.

Surge Immunity Test Result

Standard	☐ IEC 61000-4-5 ☒ EN 61000-4-5		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS CAHRGER	Temperature	24.6℃
M/N	BM3001	Humidity	53.1%
Test Mode	TM1-TM2	Criterion	A
Test Engineer	Diamind Lu		

TEST RESULT OF TM1

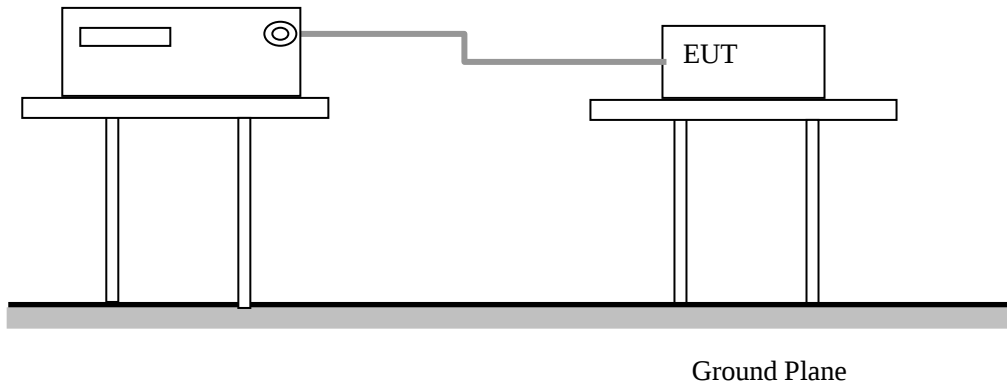
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Observation	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	TT, TR	Pass
	-	0°, 90°, 180°, 270°	5	1.0	TT, TR	Pass

TEST RESULT OF TM2

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	Pass
	-	0°, 90°, 180°, 270°	5	1.0	Pass

13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

13.1. Test Configuration



13.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-11: 2004
Test levels and Performance Criterion

Test Level

Voltage Reduction %UT	Voltage dips %UT	Duration (in period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction %UT	Voltage Interruptions %UT	Duration (in period)
100	0	250

Performance criterion: B&C

13.3. Test Procedure

13.3.1. The interruption is introduced at selected phase angles with specified duration.

13.3.2. Record any degradation of performance.

13.4. Test Data

PASS.

Please refer to the following page.

Voltage Dips And Interruptions Test Results

Standard	☐ IEC 61000-4-11 ☒ EN 61000-4-11		
Applicant	BETEC GROUP LIMITED		
EUT	STICK AND WATCH WIRELESS CAHRGER	Temperature	24.6°C
M/N	BM3001	Humidity	53.1%
Test Mode	TM1-TM2	Criterion	A
Test Engineer	Diamind Lu		

TEST RESULT OF TM1

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Observation	Result (Pass/Fail)
0	100	0.5P	TT, TR	Pass
0	100	1P	TT, TR	Pass
70	30	25P	TT, TR	Pass
0	100	250P	TT, TR	Pass

TEST RESULT OF TM2

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Result (Pass/Fail)
0	100	0.5P	Pass
0	100	1P	Pass
70	30	25P	Pass
0	100	250P	Pass

14. LIST OF MEASURING EQUIPMENT

LINE CONDUCTED EMISSION

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	2018-06-16	2019-06-15
2	EMI Test Receiver	R&S	ESPI	101840	2018-06-16	2019-06-15
3	Artificial Mains	R&S	ENV216	101288	2018-06-16	2019-06-15
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2018-06-16	2019-06-15

RADIATED DISTURBANCE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	2018-06-16	2019-06-15
2	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16	2019-06-15
3	Positioning Controller	MF	MF-7082	/	2018-06-16	2019-06-15
4	By-log Antenna	SCHWARZBEC K	VULB9163	9163-470	2018-07-26	2019-07-25
5	Horn Antenna	SCHWARZBEC K	BBHA 9120D	9120D-1925	2018-07-02	2019-07-01
6	EMI Test Receiver	R&S	ESR 7	101181	2018-06-16	2019-06-15
7	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15	2019-11-14
8	AMPLIFIER	QuieTek	QTK	CHM/0809065	2018-11-15	2019-11-14
9	RF Cable-R03m	Jye Bao	RG142	CB021	2018-06-16	2019-06-15
10	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2018-06-16	2019-06-15

VOLTAGE FLUCTUATION AND FLICKER/HARMONIC CURRENT EMISSIONS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Analyzer Test System	Voltech	PM6000	200006700523	2018-06-16	2019-06-15

RF ELECTROMAGNETIC FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	RS Test Software	Tonscend	/	/	2018-06-16	2019-06-15
2	ESG Vector Signal Generator	Agilent	E4438C	MY42081396	2018-11-15	2019-11-14
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16	2019-06-15
4	RF POWER AMPLIFIER	OPHIR	5225R	1052	NCR	NCR
5	RF POWER AMPLIFIER	OPHIR	5273F	1019	NCR	NCR
6	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	NCR	NCR
7	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	NCR	NCR
8	Electric field probe	Narda S.TS./PMM	EP601	611WX80208	2019-03-25	2020-03-24

ELECTROSTATIC DISCHARGE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	SCHLODER	SESD 230	604035	2018-07-02	2019-07-01

ELECTRICAL FAST TRANSIENT IMMUNITY

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500 M4	0101-34	2018-11-15	2019-11-14
2	CAPACITANCE COUPLING CLAMP	3CTEST	EFTC	EC0441098	2018-06-16	2019-06-15

RF COMMON MODE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2018-06-16	2019-06-15
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2018-06-16	2019-06-15
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2018-06-16	2019-06-15

SURGES, LINE TO LINE AND LINE TO GROUND

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500 M4	0101-34	2018-11-15	2019-11-14

VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

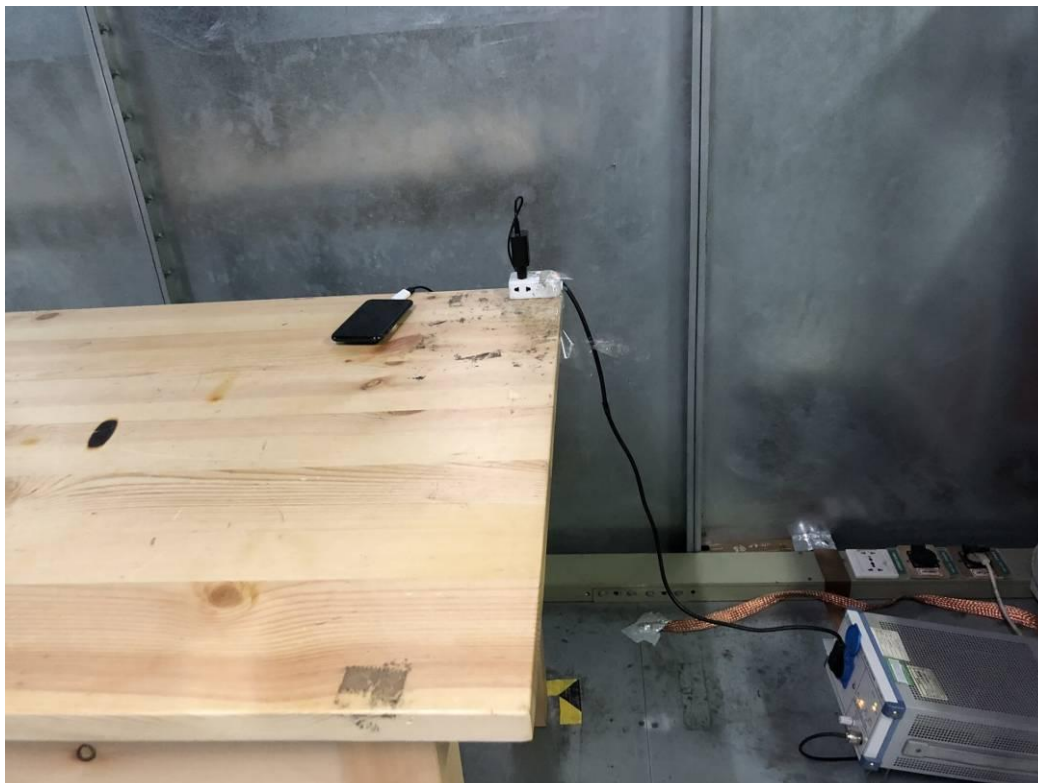
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2018-06-16	2019-06-15

RADIATED ELECTROMAGNETIC DISTURBANCES

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Large Loop Antenna	LAPLACE	LLA-2	9161	2018-06-16	2019-06-15
2	10dB Attenuator	Mini-circuits	HAT-10	15542	2018-06-16	2019-06-15
3	EMI Test Software	AUDIX	E3	/	2018-06-16	2019-06-15
4	EMI Test Receiver	R&S	ESPI	101840	2018-06-16	2019-06-15

Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.

15. TEST SETUP PHOTOGRAPHS



Conducted Emission



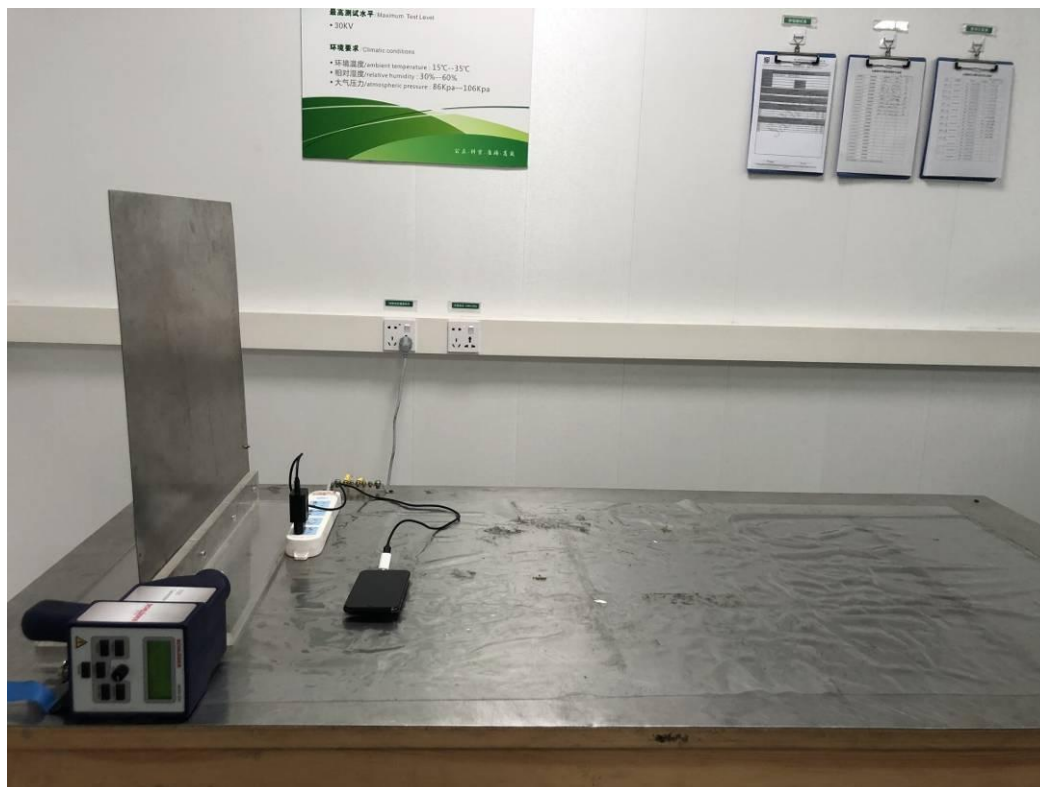
Radiated Emission below 30MHz



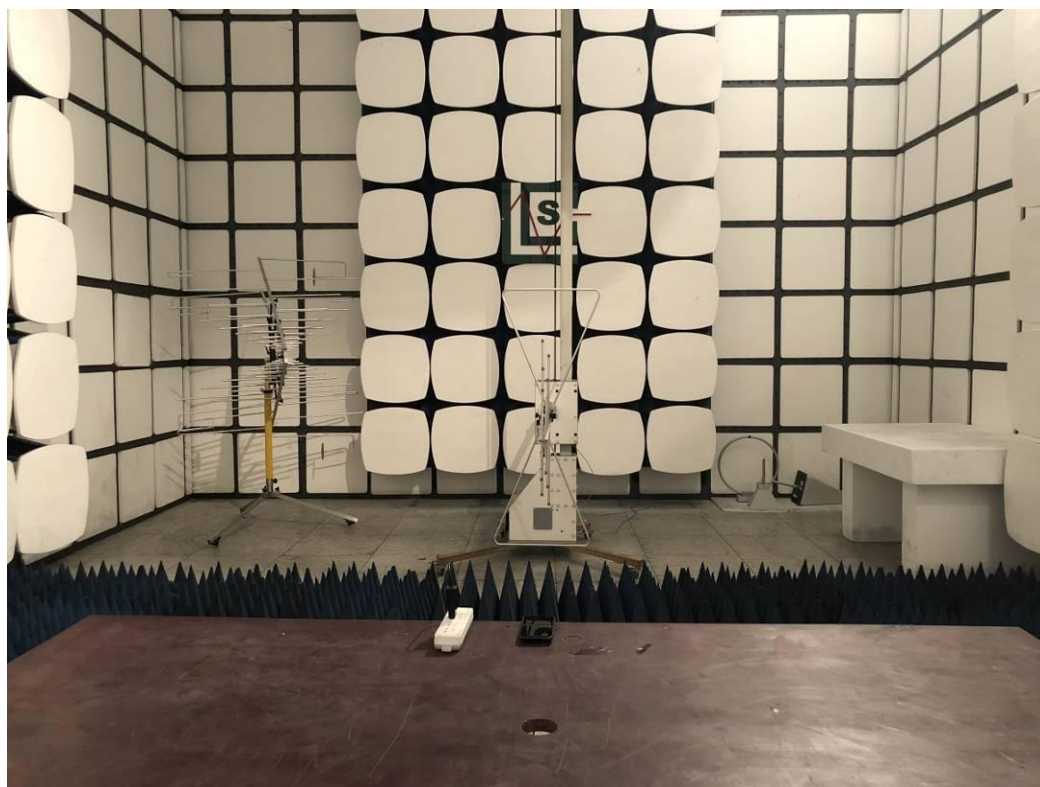
Radiated Emission Above 1GHz



Flicker



ESD



RS



CS



EFT



Surge



Dips

16. EUT EXTERIOR AND INTERIOR PHOTOGRAPHS

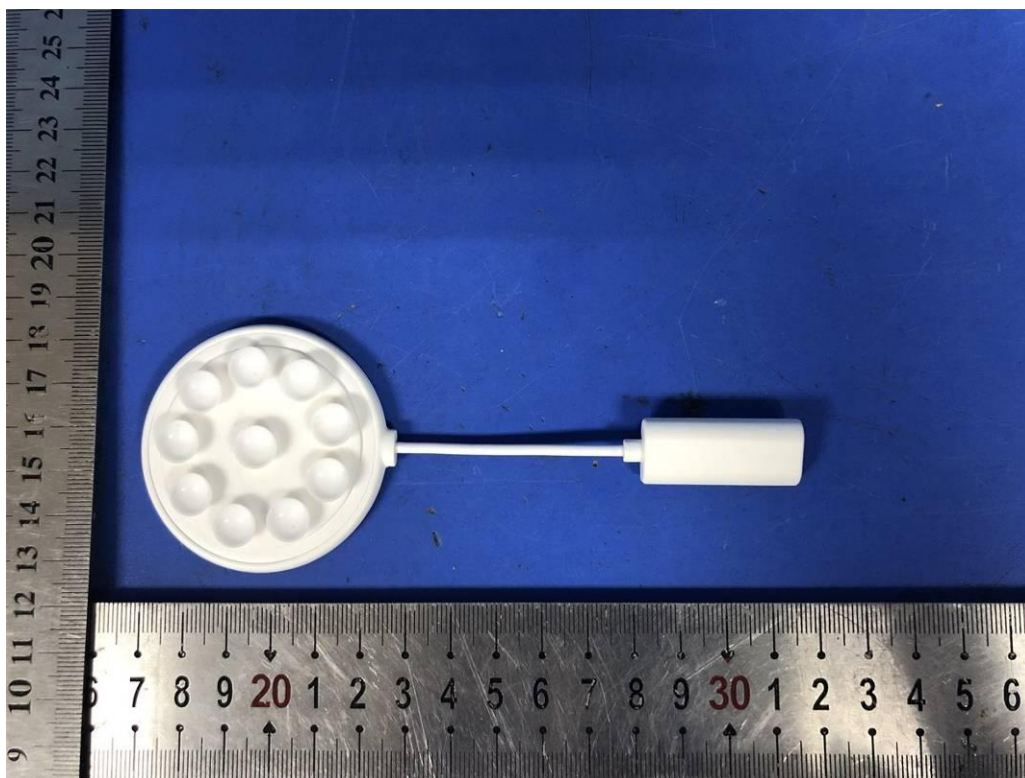


Fig. 1

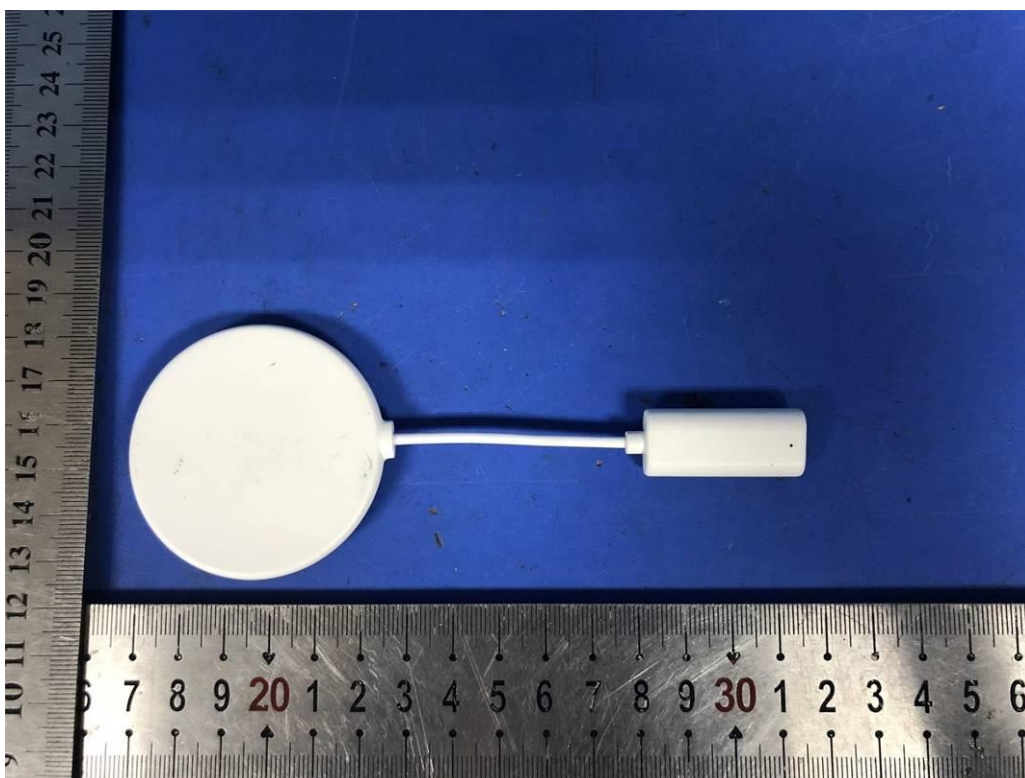


Fig. 2



Fig. 3



Fig. 4

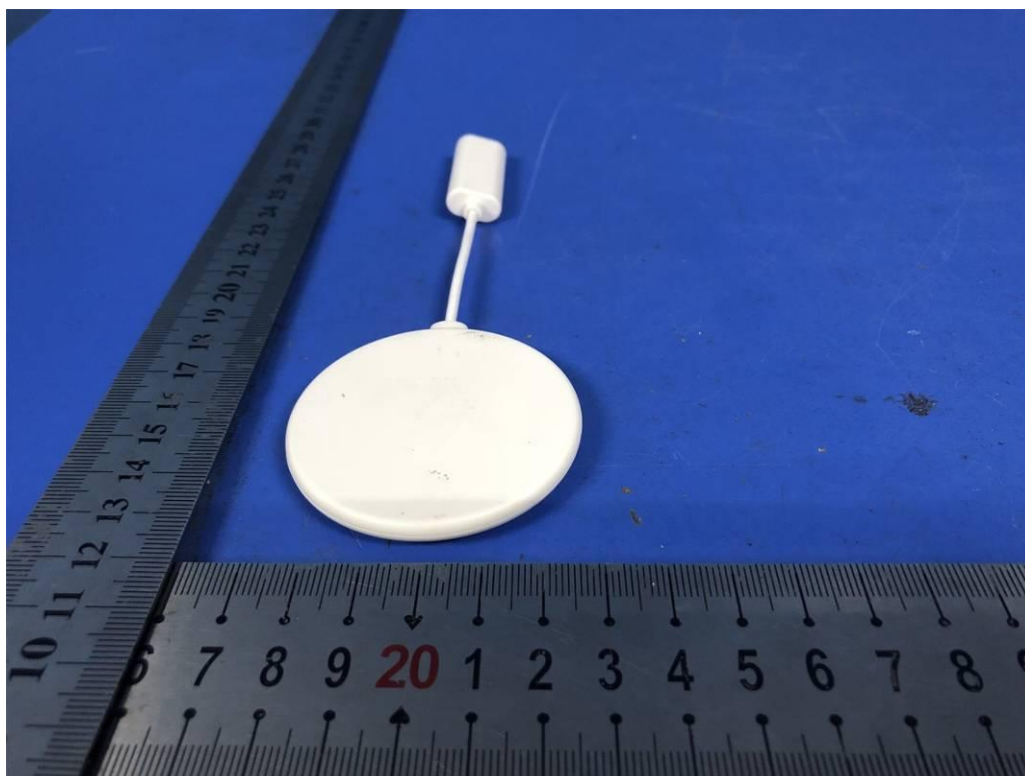


Fig. 5



Fig. 6

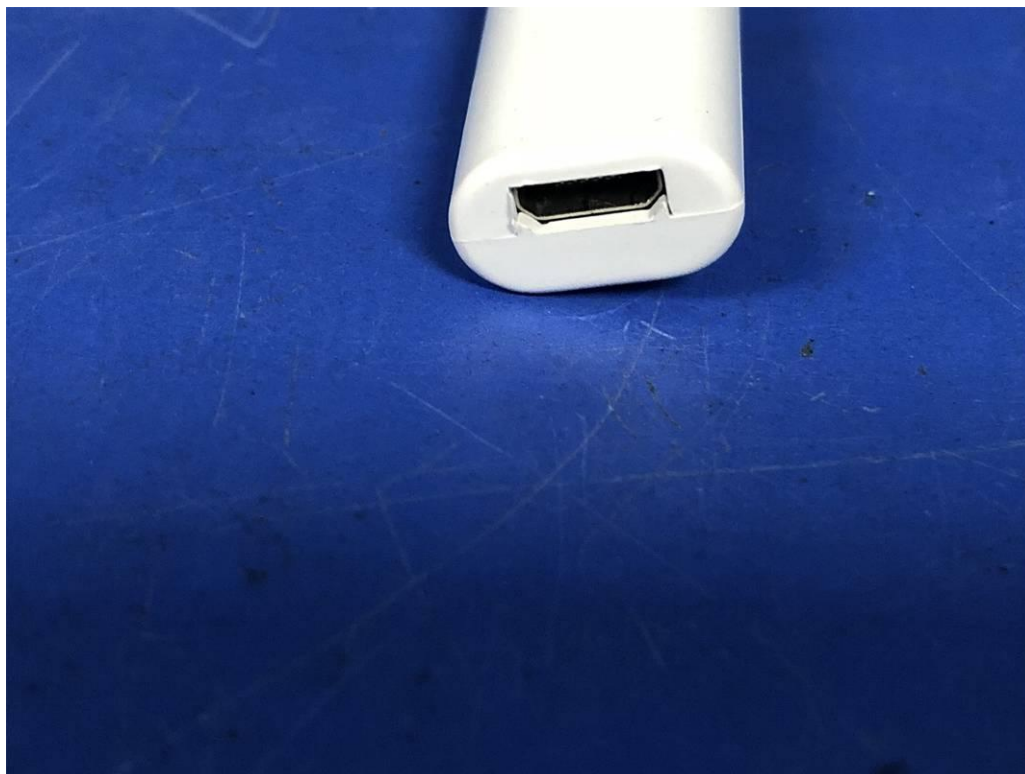


Fig. 7

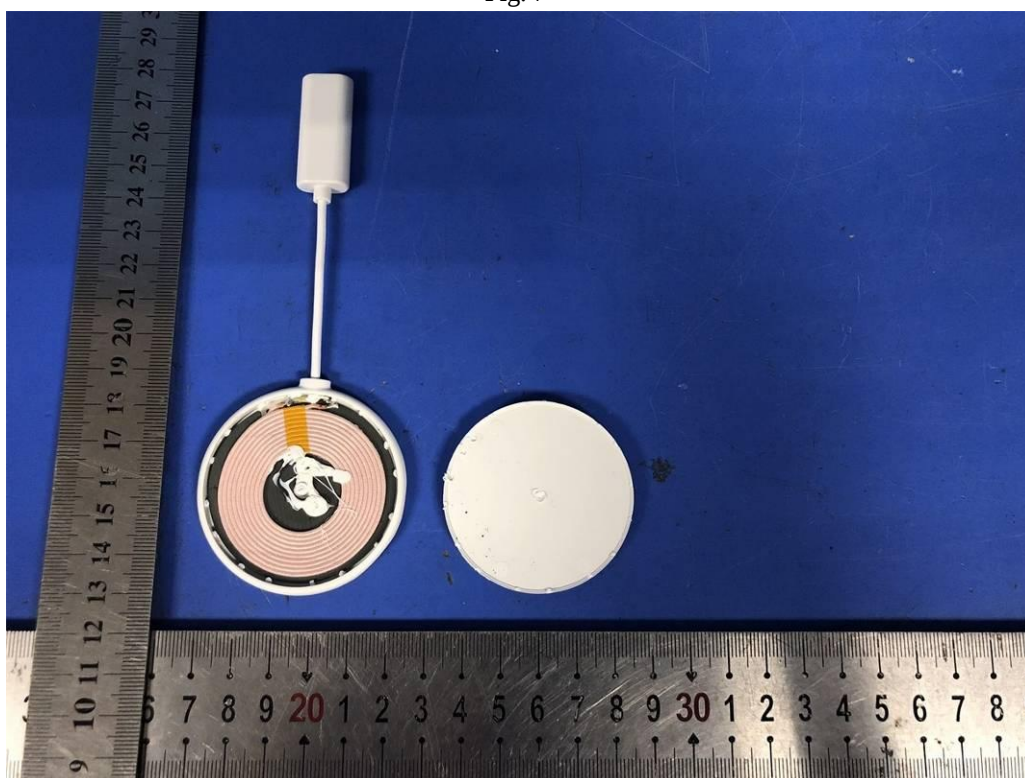


Fig. 8

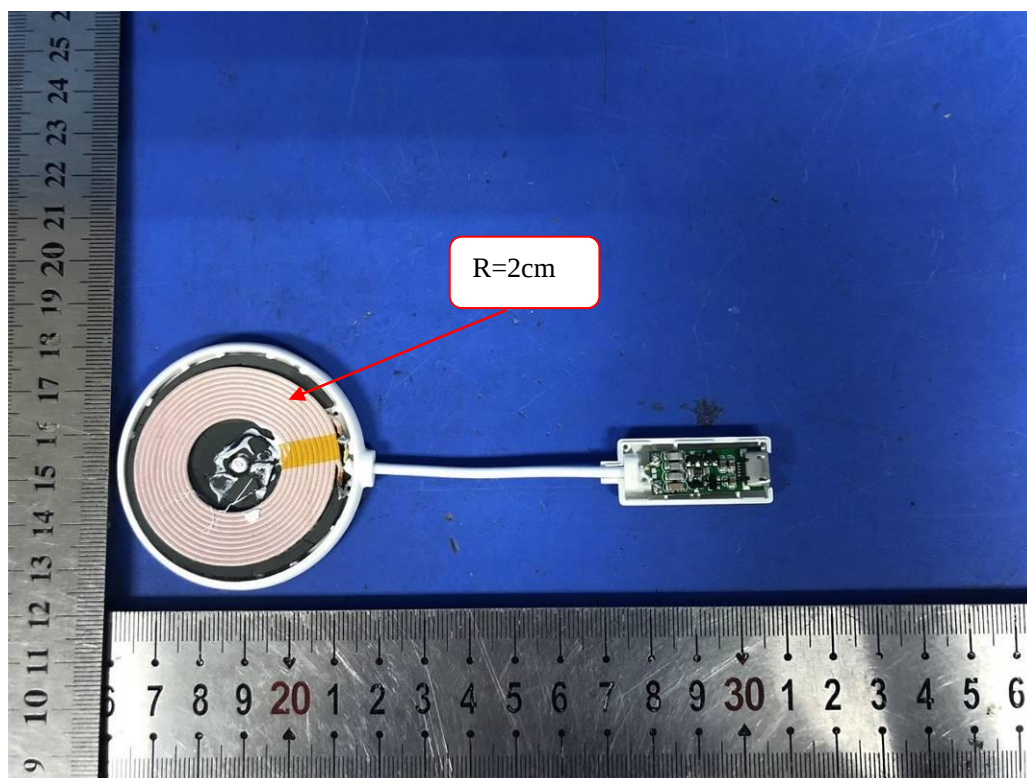


Fig. 9

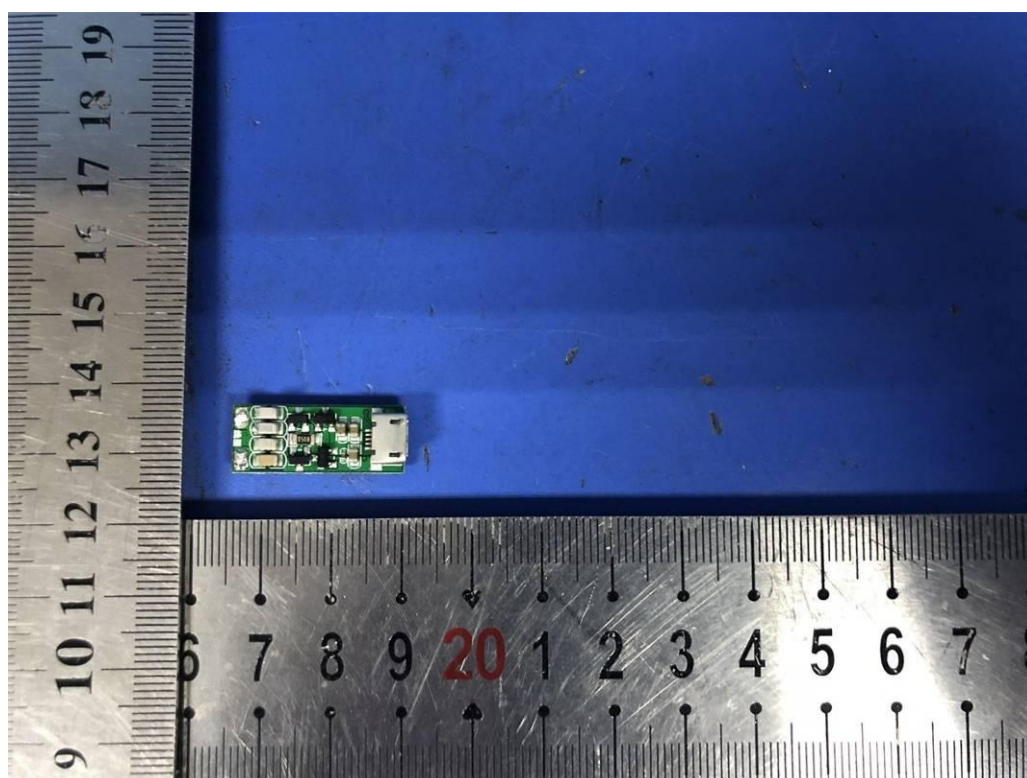


Fig. 10

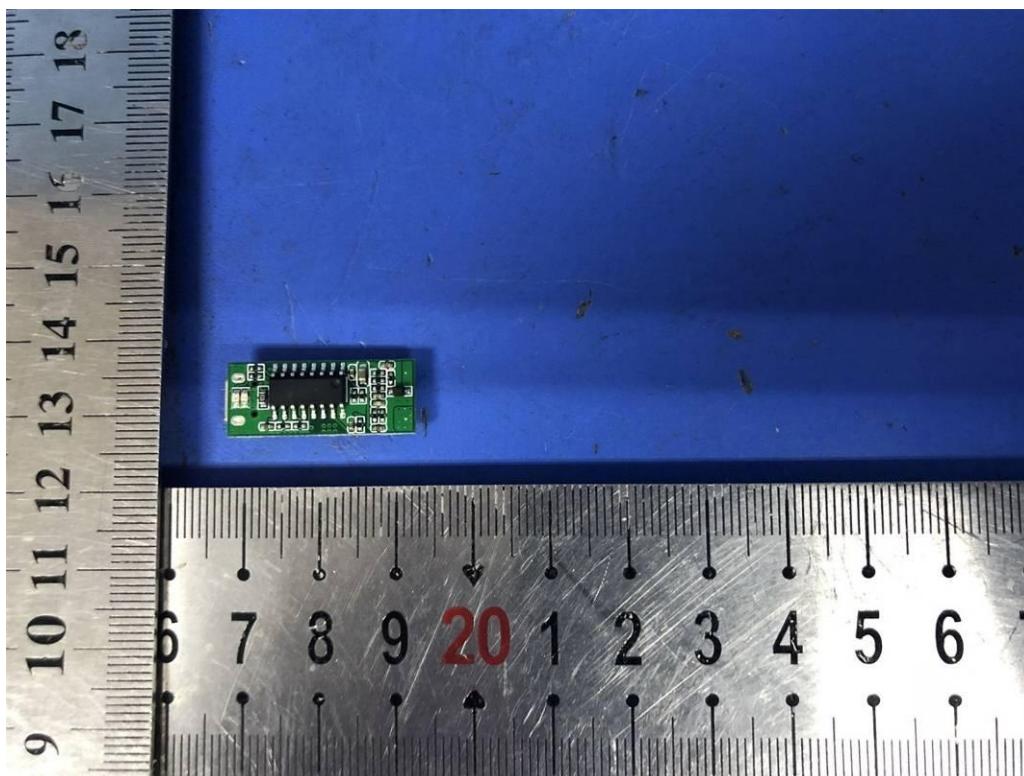


Fig. 11

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