

EMC REPORT

Applicant:

Address of Applicant:

Manufacturer/Factory:

Address of

Manufacturer/Factory:

Equipment Under Test (EUT)

Product Name: WIRELESS CHARGER

Brand Name:

Model No.:

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

ETSI EN 301 489-3 V2.1.1 (2019-03)

Date of sample receipt: August 3, 2022

Date of Test: August 3, 2022 To August 11, 2022

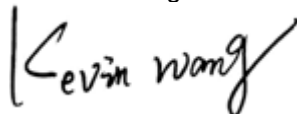
Date of report issue: August 11, 2022

Test Result : Pass *

* In the configuration tested, the EUT complied with the standards specified above.

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

Authorized Signature



Kevin Wang

Laboratory Manager



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2 Version

Version No.	Date	Description
00	August 11, 2022	Original

Prepared By:

Gary Wang

Date:

August 11, 2022

Project Engineer

Reviewed By:

Kevin Wang

Date:

August 11, 2022

Reviewer



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4 Test Summary

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-3	ETSI EN301 489-1	Enclosure	Pass
Conducted Emission	ETSI EN 301 489-3	ETSI EN301 489-1	AC port	Pass
Harmonic Current Emissions	ETSI EN 301 489-3	ETSI EN301 489-1	AC port	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-3	ETSI EN301 489-1	AC port	Pass
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-3	EN 61000-4-2	Enclosure	Pass
Radio Frequency Electromagnetic Field (80 MHz to 6 000 MHz)	ETSI EN 301 489-3	EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients)	ETSI EN 301 489-3	EN 61000-4-4	AC port	Pass
Surges	ETSI EN 301 489-3	EN 61000-4-5	AC port	Pass
Radio Frequency, Common Mode	ETSI EN 301 489-3	EN 61000-4-6	AC port	Pass
Voltage Dips and Interruptions	ETSI EN 301 489-3	EN 61000-4-11	AC port	Pass

Pass: The EUT complies with the essential requirements in the standard.



5 General Information

5.1 General Description of EUT

Product Name:	WIRELESS CHARGER
Model No.:	
Operation Frequency:	100-300kHz
Modulation type:	ASK
Antenna Type:	Coil Antenna
Antenna Gain:	0dBi
Power Supply:	Input: DC 9V, 2A Output:15W

5.2 Operating Modes

WPT mode:	Keep the EUT in Wireless charging mode.
-----------	---

5.3 Description of Support Units

None

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.



6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventor y No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Jul. 2 2022	Jul. 1 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 28 2022	Jun. 27 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jun. 28 2022	Jun. 27 2023
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Jun. 28 2022	Jun. 27 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Jun. 28 2022	Jun. 27 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Jun. 28 2022	Jun. 27 2023
9	Coaxial Cable	GTS	N/A	GTS211	Jun. 28 2022	Jun. 27 2023
10	Coaxial cable	GTS	N/A	GTS210	Jun. 28 2022	Jun. 27 2023
11	Coaxial Cable	GTS	N/A	GTS212	Jun. 28 2022	Jun. 27 2023
12	Amplifier(100kHz- 3GHz)	HP	8347A	GTS204	Jun. 28 2022	Jun. 27 2023
13	Amplifier(2GHz- 20GHz)	HP	84722A	GTS206	Jun. 28 2022	Jun. 27 2023
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jun. 28 2022	Jun. 27 2023
15	Band filter	Amindeon	82346	GTS219	Jun. 28 2022	Jun. 27 2023
16	Power Meter	Anritsu	ML2495A	GTS540	Jun. 28 2022	Jun. 27 2023
17	Power Sensor	Anritsu	MA2411B	GTS541	Jun. 28 2022	Jun. 27 2023
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jun. 28 2022	Jun. 27 2023
19	Splitter	Agilent	11636B	GTS237	Jun. 28 2022	Jun. 27 2023
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	Jun. 28 2022	Jun. 27 2023
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Jun. 28 2022	Jun. 27 2023
22	Amplifier	TDK	PA-02-02	GTS574	Jun. 28 2022	Jun. 27 2023
23	Amplifier	TDK	PA-02-03	GTS576	Jun. 28 2022	Jun. 27 2023
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	Jun. 28 2022	Jun. 27 2023

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Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 2 2022	Jul. 1 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Jun. 28 2022	Jun. 27 2023
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 28 2022	Jun. 27 2023
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	Jun. 28 2022	Jun. 27 2023
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	Jun. 28 2022	Jun. 27 2023
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Jun. 28 2022	Jun. 27 2023
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	Jun. 28 2022	Jun. 27 2023

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	Jun. 28 2022	Jun. 27 2023
2	Thermo meter	KTJ	TA328	GTS243	Jun. 28 2022	Jun. 27 2023

Conducted Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Signal Generator	ROHDE & SCHWARZ	SMB 100A	GTS553	Jun. 28 2022	Jun. 27 2023
2	CDN	LionCEL	CDN-M3-16	GTS554	Jun. 28 2022	Jun. 27 2023
3	CDN	CYBERTEK	EM 5070	GTS559	Jun. 28 2022	Jun. 27 2023
4	Power amplifier	rflight	NTWPA-00010475	GTS555	Jun. 28 2022	Jun. 27 2023
5	ATT	SUNWAVE	SJ-50-06DB	GTS556	Jun. 28 2022	Jun. 27 2023
6	Clamp	SCHAFFNER	KEMZ 801	GTS558	Jun. 28 2022	Jun. 27 2023

Harmonic/ Flicker						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Power Analyzer H/F	EMTEST	DPA500	GTS235	Jun. 28 2022	Jun. 27 2023
2	AC POWER SUPPLY	EMTEST	ACS500	GTS236	Jun. 28 2022	Jun. 27 2023
3	Thermo meter	KTJ	TA328	GTS256	Jun. 28 2022	Jun. 27 2023

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Report No.: EBO2208016-E031

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EFT, Surge, Voltage dips and Interruption						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	Jun. 28 2022	Jun. 27 2023
2	Clamp	EMTEST	HFK	GTS557	Jun. 28 2022	Jun. 27 2023
3	Thermo meter	KTJ	TA328	GTS238	Jun. 28 2022	Jun. 27 2023

Radiated Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	Jun. 28 2022	Jun. 27 2023
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	Jun. 28 2022	Jun. 27 2023
3	Stacked Log.-Per.-Broadband Antenna (70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
4	Signal Generator (9kHz-6GHz)	Rohde & Schwarz	SMB100A	SEM006-11	Jun. 28 2022	Jun. 27 2023
5	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	Jun. 28 2022	Jun. 27 2023
6	Broadband Amplifier(800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	Jun. 28 2022	Jun. 27 2023
7	Broadband Amplifier(2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	Jun. 28 2022	Jun. 27 2023
8	Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A

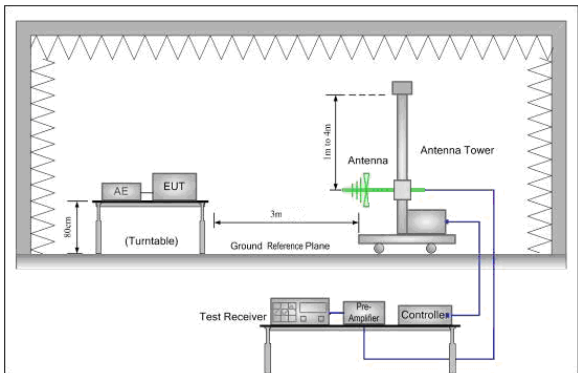
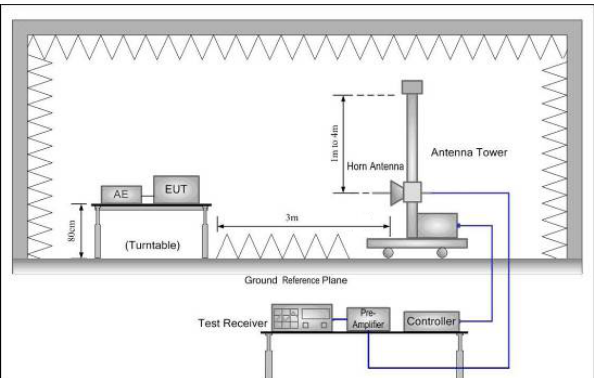
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/Temperature Indicator	KTJ	TA328	GTS243	Jun. 28 2022	Jun. 27 2023
2	Barometer	ChangChun	DYM3	GTS255	Jun. 28 2022	Jun. 27 2023

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7 EMC Requirements Specification in ETSI EN 301 489-3

7.1 EMI (Emission)

7.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489-3				
Test Method:	ETSI EN 301 489-1 and EN 55032				
Test Frequency Range:	30MHz to 1GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
AV		1MHz	3MHz	Average Value	
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-230MHz		40.00		Quasi-peak Value
	230MHz-1GHz		47.00		Quasi-peak Value
	1GHz-3GHz		50.00		Average Value
			70.00		Peak Value
	3GHz-6GHz		54.00		Average Value
74.00			Peak Value		
Test setup:	Below 1GHz				
					
Test setup:	Above 1GHz				
					

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Test Procedure:	<p>■ From 30MHz to 1GHz:</p> <ol style="list-style-type: none">1. The radiated emissions test was conducted in a semi-anechoic chamber.2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. <p>■ Above 1GHz:</p> <ol style="list-style-type: none">1. The radiated emissions test was conducted in a fully-anechoic chamber.2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT.4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.					
Test environment:	Temp.:	25 °C	Humid.:	50%	Press.:	1 010mbar
Measurement Record:	Uncertainty: 3.8039dB (30MHz-200MHz) 3.9679dB (200MHz-1GHz)					

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	4.29dB (1GHz-18GHz)
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

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**Measurement Data
Below 1GHz**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
37.16	45.48	12.83	0.63	35.49	23.45	40.00	-16.55	Vertical
62.21	49.59	11.93	0.88	36.35	26.05	40.00	-13.95	Vertical
138.87	52.77	11.97	1.50	37.01	29.23	40.00	-10.77	Vertical
296.18	38.30	12.29	2.34	37.42	15.51	47.00	-31.49	Vertical
607.79	34.20	19.38	3.75	37.55	19.78	47.00	-27.22	Vertical
965.54	33.58	23.99	5.09	37.54	25.12	47.00	-21.88	Vertical
139.85	50.18	12.00	1.50	37.02	26.66	40.00	-13.34	Horizontal
151.07	49.11	12.80	1.58	37.08	26.41	40.00	-13.59	Horizontal
267.55	45.43	11.40	2.21	37.39	21.65	47.00	-25.35	Horizontal
568.61	32.40	18.44	3.59	37.53	16.90	47.00	-30.10	Horizontal
779.61	34.17	21.96	4.38	37.62	22.89	47.00	-24.11	Horizontal
965.54	33.76	23.99	5.09	37.54	25.30	47.00	-21.70	Horizontal

Above 1GHz**Peak measurement**

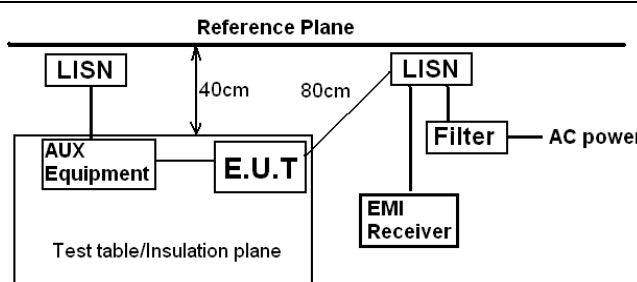
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1630.00	36.47	25.53	2.36	36.26	28.10	70.00	-41.90	Vertical
2010.00	36.46	26.14	2.54	36.51	28.63	70.00	-41.37	Vertical
2430.00	35.78	27.49	2.94	36.88	29.33	70.00	-40.67	Vertical
3225.00	35.11	28.40	3.62	37.33	29.80	74.00	-44.20	Vertical
3560.00	35.10	28.58	3.81	37.36	30.13	74.00	-43.87	Vertical
4535.00	31.30	30.76	4.45	37.62	28.89	74.00	-45.11	Vertical
1100.00	37.87	24.61	2.07	35.81	28.74	70.00	-41.26	Horizontal
1775.00	36.57	25.77	2.47	36.36	28.45	70.00	-41.55	Horizontal
1955.00	35.90	26.04	2.53	36.47	28.00	70.00	-42.00	Horizontal
2775.00	35.57	28.10	3.19	37.15	29.71	70.00	-40.29	Horizontal
3385.00	36.48	28.40	3.64	37.34	31.18	74.00	-42.82	Horizontal
4075.00	32.90	29.93	3.95	37.43	29.35	74.00	-44.65	Horizontal

Remark:

1. The EUT was test at 3m in field chamber.
2. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

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7.1.2 Conducted Emissions

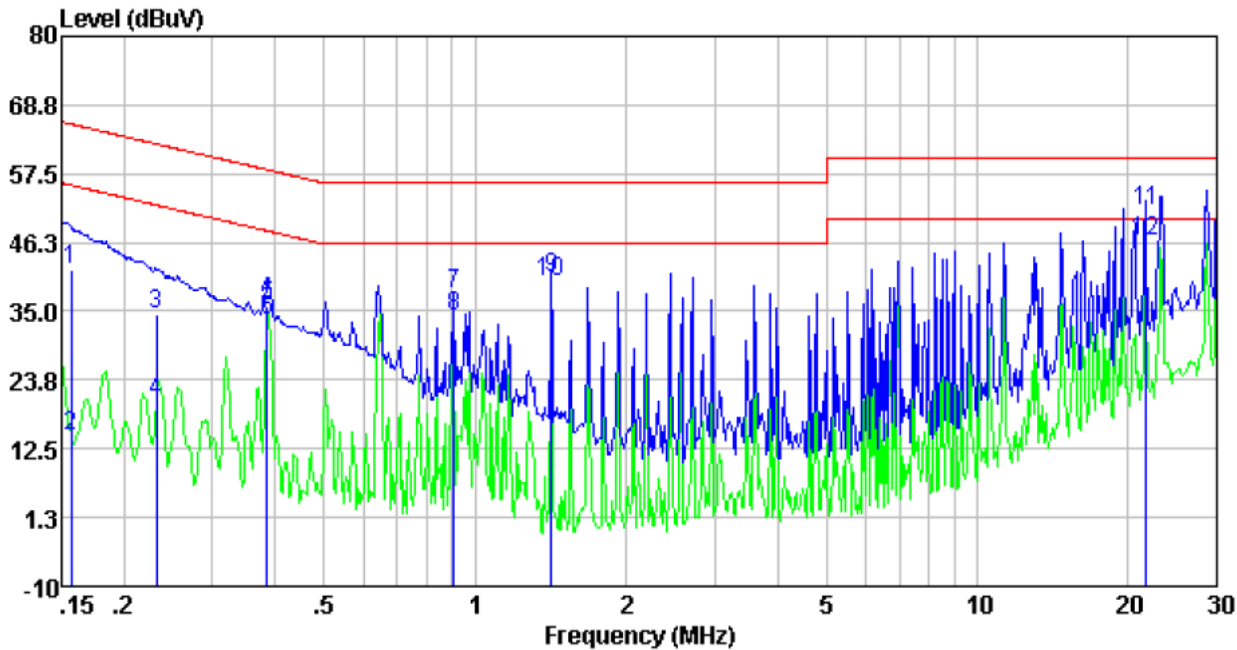
Test Requirement:	ETSI EN 301489-3					
Test Method:	ETSI EN 301 489-1 and EN55032					
Test Frequency Range:	150kHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9kHz, VBW=30kHz					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
	5-30		60		50	
* Decreases with the logarithm of the frequency.						
Test setup:	<div><p style="text-align: center;">Reference Plane</p><p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>					
Test procedure	<div><div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment.</div><div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs).</div><div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.</div></div>					
Test Instruments:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Measurement Record:	Uncertainty: 3.44dB					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

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Measurement Data

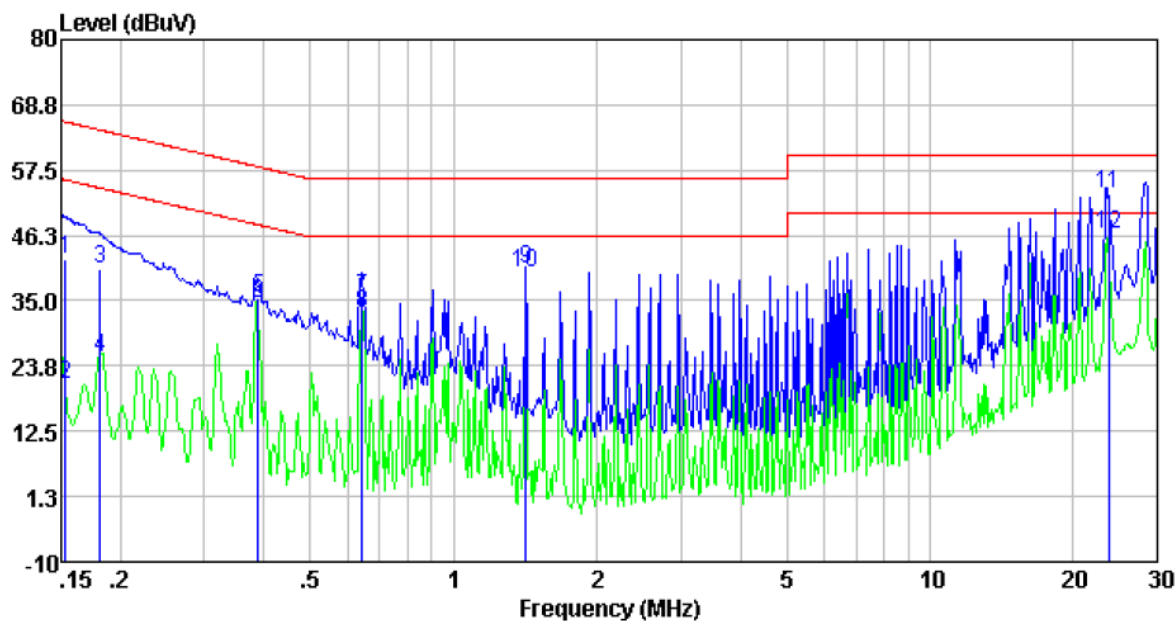
Line:



Freq	Reading	LISN/ISN	Cable		Limit	Over	
	level	factor	loss	Level	level	limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	31.34	10.40	0.01	41.75	65.65	-23.90	QP
0.16	4.22	10.40	0.01	14.63	55.65	-41.02	Average
0.23	24.07	10.40	0.01	34.48	62.39	-27.91	QP
0.23	9.80	10.40	0.01	20.21	52.39	-32.18	Average
0.39	25.37	10.36	0.01	35.74	58.17	-22.43	QP
0.39	22.99	10.36	0.01	33.36	48.17	-14.81	Average
0.91	27.48	10.22	0.03	37.73	56.00	-18.27	QP
0.91	23.91	10.22	0.03	34.16	46.00	-11.84	Average
1.42	30.12	10.20	0.04	40.36	56.00	-15.64	QP
1.42	29.55	10.20	0.04	39.79	46.00	-6.21	Average
21.72	40.91	10.32	0.19	51.42	60.00	-8.58	QP
21.72	35.80	10.32	0.19	46.31	50.00	-3.69	Average

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Neutral:



Freq	Reading	LISN/ISN	Cable	Level	Limit	Over	Remark
MHz	dBuV	dB	loss	dBuV	dBuV	dB	
0.15	31.87	10.40	0.01	42.28	65.82	-23.54	QP
0.15	10.04	10.40	0.01	20.45	55.82	-35.37	Average
0.18	29.91	10.40	0.01	40.32	64.42	-24.10	QP
0.18	14.82	10.40	0.01	25.23	54.42	-29.19	Average
0.39	25.02	10.36	0.01	35.39	58.08	-22.69	QP
0.39	24.27	10.36	0.01	34.64	48.08	-13.44	Average
0.64	25.13	10.27	0.02	35.42	56.00	-20.58	QP
0.64	22.43	10.27	0.02	32.72	46.00	-13.28	Average
1.42	30.40	10.20	0.04	40.64	56.00	-15.36	QP
1.42	29.48	10.20	0.04	39.72	46.00	-6.28	Average
23.76	42.80	10.34	0.19	53.33	60.00	-6.67	QP
23.76	36.01	10.34	0.19	46.54	50.00	-3.46	Average

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7.1.3 Harmonics Test Results

Test Requirement:	ETSI EN 301489-3, EN 61000-3-2
Test Method:	N/A (See Remark)
Remark:	<p>There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.</p> <p>For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states:</p> <p>“For the following categories of equipment limits are not specified in this edition of the standard.</p> <p>Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”</p>

7.1.4 Flicker Test Results

Test Requirement:	ETSI EN 301489-3; EN 61000-3-3					
Test Method:	EN 61000-3-3					
Class/Severity:	Clause 5 of EN 61000-3-3					
Measurement Time:	10 min					
Detector:	As per EN 61000-3-3					
Test Instruments:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details.					
Test results:	Pass					

Measurement Data

	EUT values	Limit	Result
Pst	0.036	1.00	PASS
Plt	0.068	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.045	4.00	PASS
dt [s]	0.000	0.50	PASS



7.2 Immunity

Performance Criteria of ETSI EN 301 489-1, clause 6	
6.0 Introduction	<p>The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests.</p> <p>For the purpose of the present document two categories of performance criteria apply:</p> <ul style="list-style-type: none">• Performance criteria for continuous phenomena.• Performance criteria for transient phenomena. <p>NOTE: Normally, the performance criteria depends upon the type of radio equipment and/or its intended application. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment.</p>
6.1 Performance criteria for continuous phenomena	<p>During the test, the equipment shall:</p> <ul style="list-style-type: none">• continue to operate as intended;• not unintentionally transmit;• not unintentionally change its operating state;• not unintentionally change critical stored data.
6.2 Performance criteria for transient phenomena	<p>For all ports and transient phenomena with the exception described below, the following applies:</p> <ul style="list-style-type: none">• The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data.• After application of the transient phenomena, the equipment shall operate as intended. <p>For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:</p> <ul style="list-style-type: none">• For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.• For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



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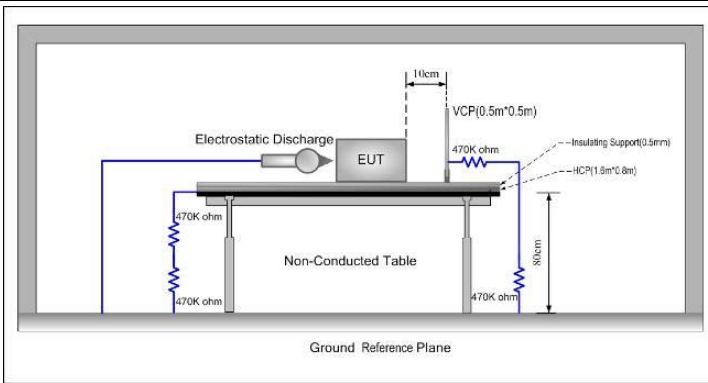
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Performance Criteria of ETSI EN 301 489-3, clause 6		
Criteria	During Test	After Test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data 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

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7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301489-3
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 10 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	<p>Air discharge:</p> <ol style="list-style-type: none"> 1. The test was applied on non-conductive surfaces of EUT. 2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. 3. After each discharge, the discharge electrode was removed from the EUT. 4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 5. This procedure was repeated until all the air discharge completed <p>Contact Discharge:</p> <ol style="list-style-type: none"> 1. The test was applied on conductive surfaces of EUT. 2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. <p>Indirect discharge for horizontal coupling plane</p> <ol style="list-style-type: none"> 1. At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT.

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	<p>2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.</p> <p>3. Consideration should be given to exposing all sides of the EUT.</p> <p>Indirect discharge for vertical coupling plane</p> <p>1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane.</p> <p>2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT.</p> <p>3. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.</p>					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

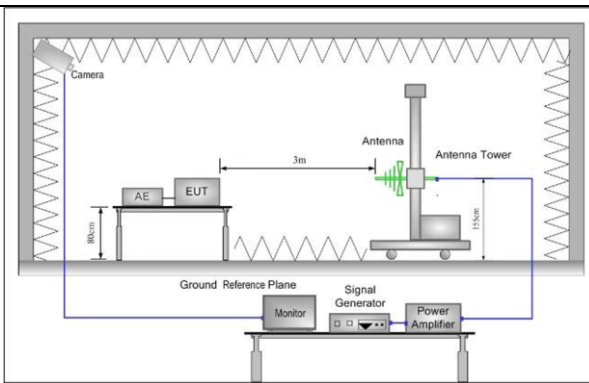
Measurement Record:

Test points:	I: N/A			
	II: Seams			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations Performance	Result
± 4	Contact	I	N/A	N/A
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

A: Normal performance within the specification limits.

7.2.2 Radiated Immunity

Test Requirement:	ETSI EN 301489-3
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 6GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	<ol style="list-style-type: none">1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value.5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s.6. The test normally was performed with the generating antenna facing each side of the EUT.7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to

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	monitor the performance of the EUT.					
Test monitor:	Traffic mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
	Idle mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

Measurement Record

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

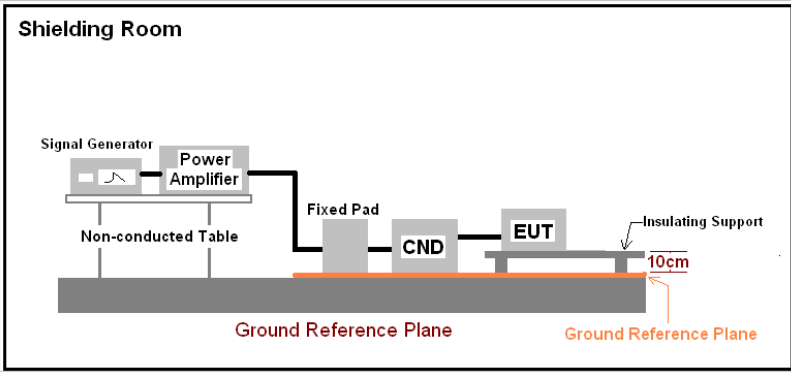
Remark:

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7.2.3 Radio frequency common mode

Test Requirement:	ETSI EN 301489-3					
Test Method:	EN 61000-4-6					
Frequency range:	0.15MHz to 80MHz					
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)					
Modulation:	80%, 1kHz Amplitude Modulation					
Performance Criterion:	Criteria A					
Test setup:						
Test Procedure:	<ol style="list-style-type: none">1. Let the EUT work in test mode and test it.2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m 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).3. The disturbance signal described below is injected to EUT through CDN.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.5. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. 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.6. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

Measurement Record:

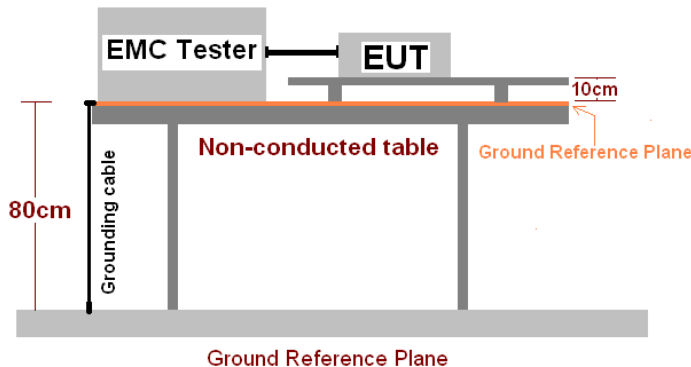
Frequency	Injected Position	Test Level	Modulation	Step Size	Dwell Time	Observations (Performance Criterion)
150kHz to 80MHz	AC Main	3Vrms	80%, 1kHz Amp. Mod.	1%	2s	A

Remark:

A: Normal performance within the specification limits.

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7.2.4 Electrical Fast Transients

Test Requirement:	ETSI EN 301489-3
Test Method:	EN 61000-4-4
Test Level:	1.0kV on AC port, 2.0kV on Earth
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Performance Criterion:	B
Test setup:	
Test Procedure:	<ol style="list-style-type: none">1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness.2. This reference ground plane was 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 was more than 0.5m.3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.4. The length of the signal and power lines between the coupling device and the EUT is 0.5m <p>Test on Signal Ports, Telecommunication Ports and Control Ports: The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes.</p> <p>Test on power supply ports:</p> <ol style="list-style-type: none">1. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal.2. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details

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Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

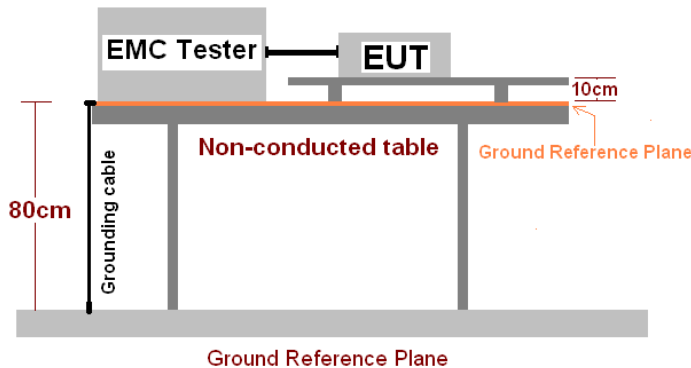
Lead under Test	Level (\pm kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass

Remark:

A: Normal performance within the specification limits

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7.2.5 Surge

Test Requirement:	ETSI EN 301489-3
Test Method:	ETSI EN 61000-4-5
Test Level:	1kV line to line: Differential mode 2kV line to earth: Common mode
Polarity:	Positive & Negative
Test Interval:	60s between each surge
No. of surges:	5 positive, 5 negative at 0°, 90°, 180°, 270°.
Performance Criterion:	B
Test setup:	
Test Procedure:	<ol style="list-style-type: none">1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.3. Different phase angles are done individually.4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass



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Measurement Record:

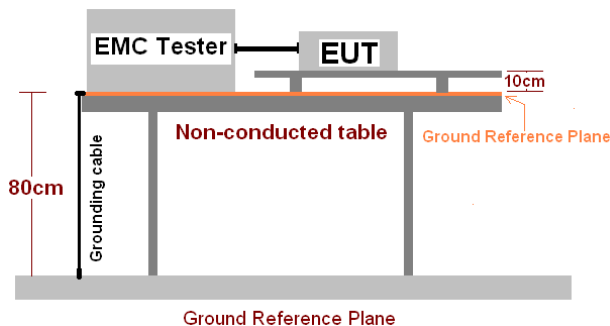
Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)
L-N	± 1	5	60s	0°	A
				90°	A
				180°	A
				270°	A

Remark:

A. Normal performance within the specification limits

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7.2.6 Voltage Dip and Voltage Interruptions

Test Requirement:	ETSI EN 301489-3
Test Method:	EN 61000-4-11
Test Level:	0% of VT(Supply Voltage) for 0.5 period 0% of VT(Supply Voltage) for 1.0 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
No. of Dips / Interruptions:	3 per Level
Performance Criterion:	0% VD, 0.5 period----Performance criterion: B 0% VD, 1 period----Performance criterion: B 70% VD, 25 period----Performance criterion: C 0% VI, 250 period----Performance criterion: C
Test setup:	
Test Procedure:	1>.The EUT and test generator were setup as shown on above setup photo. 2>.The interruptions are introduced at selected phase angles with specified duration. 3>.Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Test Level U_T	Duration (Periods)	Phase angle	No of dropout	Time between dropout	Observations (Performance Criterion)
0%	0.5	0°, 90°, 180°, 270°	3	10s	A
0%	1.0	0°, 90°, 180°, 270°	3	10s	A
70%	25	0°, 90°, 180°, 270°	3	10s	A
0%	250	0°, 90°, 180°, 270°	3	10s	C

Remark:

A: No loss of function was observed.

C: During the test, the EUT stops work, but after the test, it can be recovered by user.

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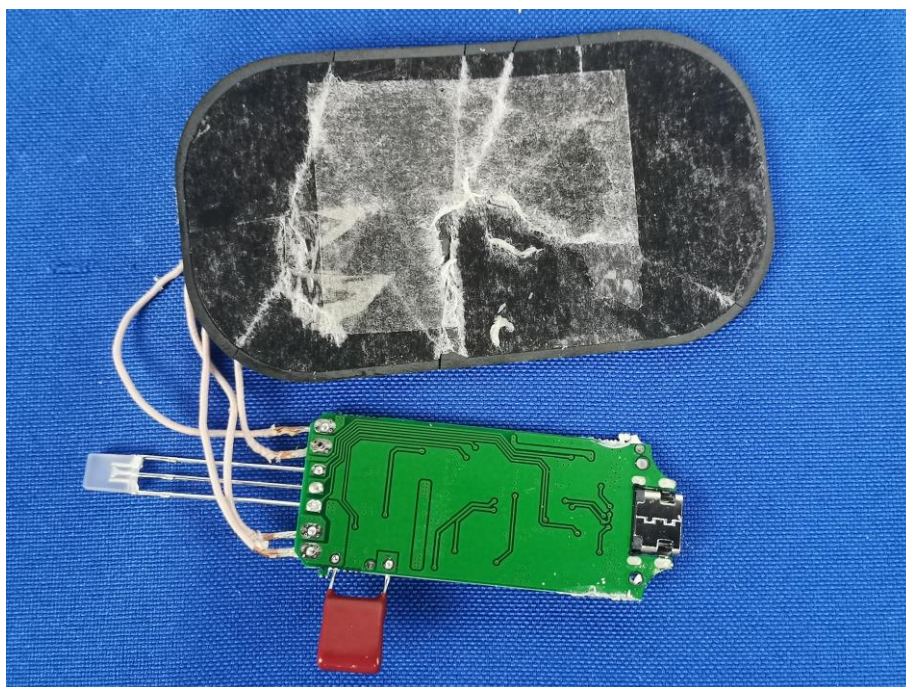
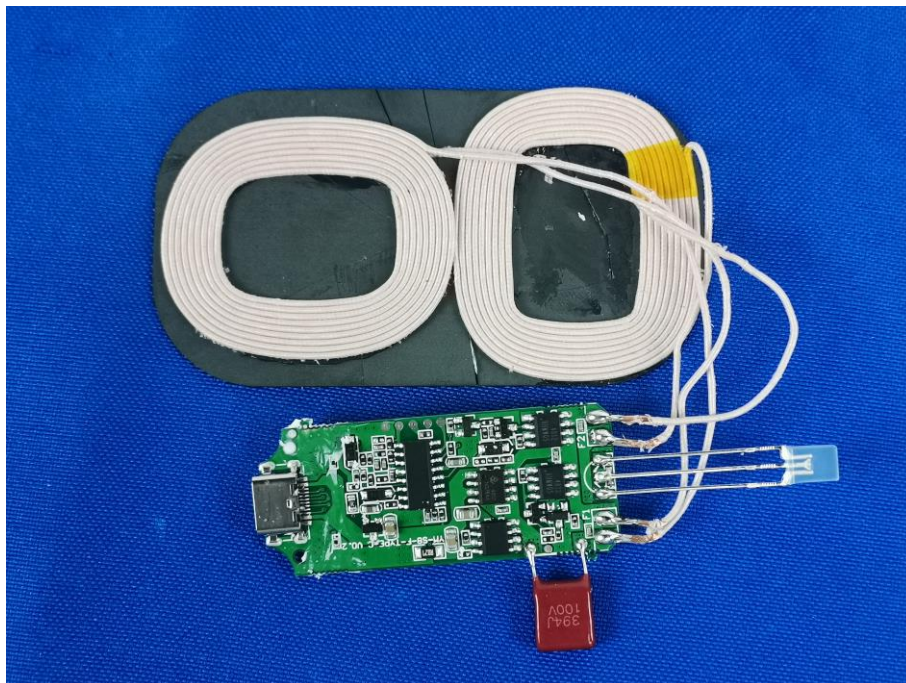
8 EUT Constructional Details



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