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### TEST REPORT

Application No.:	SZEM1806005468CR
Applicant:	HANK ELECTRONICS CO., LTD.
Address of Applicant:	Floor 2nd-7th, A8, Hongye Industry City Lezhujiao, Zhoushi Road,Baoan District Shenzhen China
Manufacturer/ Factory:	HANK Electronics co., Ltd.
Address of Manufacturer/ Factory:	Floor 2nd-7th, A8, Hongye Industry City, Lezhujiao, Zhoushi Road, Baoan District, Shenzhen, China
Equipment Under Test (EUT)	:
EUT Name:	Wireless Charging Pad
Model No.:	HKWP1010-10QFC, QIC31FA, QIC-31, QIC31FA7440, QIC31FARG, QIC31FAR11G •
÷	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID:	2AIOC-1010QFC
Standard(s) :	47 CFR Part 15, Subpart C
Date of Receipt:	2018-06-28
Date of Test:	2018-06-29 to 2018-07-03
Date of Issue:	2018-07-05
Test Result:	Pass*

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



EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record					
Version	Chapter	Date	Modifier	Remark	
01		2018-07-05		Original	

Authorized for issue by:		
	Peter. Comy	
	Peter Geng /Project Engineer	-
	Evic Fu	
	Eric Fu /Reviewer	-



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### 2 Test Summary

Emission Part						
Item	Standard	Method	Requirement	Result		
Antenna Requirement	47 CFR Part 15, Subpart C	N/A	47 CFR Part 15, Subpart C 15.203	Pass		
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass		
Radiated Emissions (9kHz-1GHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass		
Restricted Bands	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.205	Pass		
20% Bandwidth	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.215	Pass		

#### **Declaration of EUT Family Grouping:**

Model No.: HKWP1010-10QFC, QIC31FA, QIC-31, QIC31FA7440, QIC31FARG, QIC31FAR11G

Only the model HKWP1010-10QFC was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model number.



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### 4 General Information

### 4.1 Details of E.U.T.

Power supply:	<ul> <li>AC/DC adapter information:</li> <li>MODEL: HKAP1231Q</li> <li>INPUT: AC 100-240V, 50/60Hz</li> <li>OUTPUT: DC 5V/3A, 9V/2A, 12V/1.5A</li> <li>for wireless charger:</li> <li>INPUT: DC 5V/2A, 9V/1.7A</li> <li>OUTPUT: DC 5V/1A, 9V/1.1A</li> </ul>	
Cable:	USB charging line with Type C port: 180cm, unshielded	
Operation frequency:	110.6-161.8 kHz	
Modulation type:	Load modulation	
Antenna type:	Inductive Loop Coil Antenna	
Remark:	Tests were conducted in both load modes and the worst case (10W) is reported only.	

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
E-loading	Provided by SGS	N/A	DC 5V/1A
Mobile phone	SAMSUNG	SM-G9500	R28J9140LPB

### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.5dB (30MHz-1GHz)
3	Temperature test	± 1 ℃
4	Humidity test	± 3%



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### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### 4.5 Test Facility

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

#### CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC

Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

#### • VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

#### FCC – Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

#### Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None



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### 5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2017-05-10	2020-05-09	
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM024-01	2017-07-13	2018-07-12	
LISN	Rohde & Schwarz	ENV216	SEM007-01	2017-09-27	2018-09-26	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2018-04-02	2019-04-01	
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018-04-02	2019-04-01	

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2017-07-13	2018-07-12
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2017-09-27	2018-09-26
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01

Occupied Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09
Coaxial Cable	SGS	N/A	SEM024-01	2017-07-13	2018-07-12



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Radiated Emissions (below 30MHz)								
Test Equipment Manufacturer		Model No. Inventory No.		Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)			
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30			
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2018-04-02	2019-04-01			
Trilog-Broadband Antenna(25MHz- 2GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28			
Pre-amplifier (9kHz- 1GHz)	Sonoma Instrument Co	310N	SEM005-04	2018-04-13	2019-04-12			
Loop Antenna (9kHz- 30MHz)	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21			
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A			
Coaxial Cable	SGS	N/A	SEM029-01	2017-07-13	2018-07-12			

General used equipment							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2017-09-29	2018-09-28		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2017-09-29	2018-09-28		
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2017-09-29	2018-09-28		
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07		



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### 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

#### 6.1.2 Conclusion

#### Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement.





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### 7 Emission Test Results

### 7.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart C 15.207
Test Method:	ANSI C63.10 (2013) Section 6.2
Frequency Range:	150kHz to 30MHz
Limit:	
Frequency of	Conducted limit(dBµV)
emission(MHz)	

	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.					

7.1.1 E.U.T. Operation

Operating Environment:

Temperature:23.2 °CHumidity:64.9 % RHAtmospheric Pressure:1005mbarPretest these<br/>modes to find<br/>the worst case:a:Charge mode\_Keep the EUT charging(5W)<br/>b: Charge mode\_Keep the EUT charging(10W)b: Charge mode\_Keep the EUT charging(10W)The worst case<br/>for final test:b: Charge mode\_Keep the EUT charging(10W)

#### 7.1.2 Test Setup Diagram



#### 7.1.3 Measurement Data

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.



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Mode:b; Line:Live Line
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Site : Shielding Room Condition: Line Job No. : 05468CR Test mode: b

	Cable	LISN	Read		Limit	0ver	
Freq	Loss	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB	dBuV	dBuV	dBuV	dB	
0.17	0.02	9.52	15.02	24.56	54.90	-30.34	Average
0.17	0.02	9.52	30.79	40.33	64.90	-24.57	QP
0.40	0.04	9.49	16.82	26.35	47.95	-21.60	Average
0.40	0.04	9.49	28.58	38.11	57.95	-19.84	QP
0.45	0.04	9.49	25.99	35.52	46.89	-11.37	Average
0.45	0.04	9.49	32.75	42.28	56.89	-14.61	QP
0.51	0.04	9.49	30.95	40.48	46.00	-5.52	Average
0.51	0.04	9.49	35.98	45.51	56.00	-10.49	QP
0.82	0.08	9.50	19.62	29.20	46.00	-16.80	Average
0.82	0.08	9.50	28.46	38.04	56.00	-17.96	QP
1.03	0.10	9.50	14.94	24.54	46.00	-21.46	Average
1.03	0.10	9.50	23.46	33.06	56.00	-22.94	QP
	Freq MHz 0.17 0.40 0.40 0.45 0.45 0.45 0.51 0.51 0.82 0.82 1.03 1.03	Cable Freq Loss MHz dB 0.17 0.02 0.17 0.02 0.40 0.04 0.40 0.04 0.45 0.04 0.45 0.04 0.45 0.04 0.51 0.04 0.51 0.04 0.51 0.04 0.51 0.04 0.82 0.08 0.82 0.08 1.03 0.10 1.03 0.10	Cable         LISN           Freq         Loss         Factor           MHz         dB         dB           0.17         0.02         9.52           0.17         0.02         9.52           0.17         0.02         9.52           0.40         0.04         9.49           0.45         0.04         9.49           0.45         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.51         0.04         9.49           0.82         0.08         9.50           0.82         0.08         9.50           1.03         0.10         9.50	Cable         LISN         Read           Freq         Loss         Factor         Level           MHz         dB         dB         dBuV           0.17         0.02         9.52         15.02           0.17         0.02         9.52         30.79           0.40         0.04         9.49         16.82           0.40         0.04         9.49         28.58           0.45         0.04         9.49         25.99           0.45         0.04         9.49         32.75           0.51         0.04         9.49         30.95           0.51         0.04         9.49         35.98           0.82         0.08         9.50         19.62           0.82         0.08         9.50         14.94           1.03         0.10         9.50         23.46	Cable         LISN         Read           Freq         Loss         Factor         Level         Level           MHz         dB         dB         dBuV         dBuV           0.17         0.02         9.52         15.02         24.56           0.17         0.02         9.52         30.79         40.33           0.40         0.04         9.49         16.82         26.35           0.40         0.04         9.49         28.58         38.11           0.45         0.04         9.49         25.99         35.52           0.45         0.04         9.49         30.95         40.48           0.51         0.04         9.49         35.98         45.51           0.82         0.08         9.50         19.62         29.20           0.82         0.08         9.50         28.46         38.04           1.03         0.10         9.50         14.94         24.54	Cable         LISN         Read         Limit           Freq         Loss         Factor         Level         Level         Line           MHz         dB         dB         dBuV         dBuV         dBuV         dBuV           0.17         0.02         9.52         15.02         24.56         54.90           0.17         0.02         9.52         30.79         40.33         64.90           0.40         0.04         9.49         16.82         26.35         47.95           0.40         0.04         9.49         28.58         38.11         57.95           0.45         0.04         9.49         25.99         35.52         46.89           0.45         0.04         9.49         30.95         40.48         46.00           0.51         0.04         9.49         35.98         45.51         56.00           0.82         0.08         9.50         19.62         29.20         46.00           0.82         0.08         9.50         28.46         38.04         56.00           1.03         0.10         9.50         23.46         33.06         56.00	Cable         LISN         Read         Limit         Over           Freq         Loss         Factor         Level         Level         Line         Limit           MHz         dB         dB         dBuV         dBuV         dBuV         dBuV         dB           0.17         0.02         9.52         15.02         24.56         54.90         -30.34           0.17         0.02         9.52         30.79         40.33         64.90         -24.57           0.40         0.04         9.49         16.82         26.35         47.95         -21.60           0.40         0.04         9.49         28.58         38.11         57.95         -19.84           0.45         0.04         9.49         25.99         35.52         46.89         -11.37           0.45         0.04         9.49         32.75         42.28         56.89         -14.61           0.51         0.04         9.49         30.95         40.48         46.00         -5.52           0.51         0.04         9.49         35.98         45.51         56.00         -10.49           0.82         0.08         9.50         19.62         29.20



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Mode:b; Line:Neutral Line





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### 7.1 20% Bandwidth and Restricted Bands

Test Requirement	47 CFR Part 15, Subpart C 15.215
Test Method:	ANSI C63.10 (2013) Section 7.8.7

#### 7.1.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25.9 °C	Humidity:	54 % RH	Atmospheric Pressure:	1010	mbar
Pretest these	a:Charge mode	_Keep the E	EUT charging(5)	N)		
modes to find the worst case:	b: Charge mode	e_Keep the	EUT charging(1	0W)		
The worst case for final test:	b: Charge mode	e_Keep the	EUT charging(1	0W)		

#### 7.1.2 Test Setup Diagram



### **Ground Reference Plane**

7.1.3 Measurement Data



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### 7.2 Radiated Emissions (9kHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Frequency Range:	9kHz to 1GHz
Measurement Distance:	3m and 10m
Limit:	

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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#### 7.2.1 E.U.T. Operation

#### Operating Environment:

Temperature:	25.9 °C	Humidity:	54	% RH	Atmospheric Pressure:	1010	mbar
Pretest these	a:Charge mode	Keep the I	EUT d	harging(5W	)		
modes to find the worst case:	b: Charge mode_Keep the EUT charging(10W)						
The worst case for final test:	b: Charge mode	e_Keep the	EUT	charging(10	W)		

#### 7.2.2 Test Setup Diagram



Above 1GHz

#### 7.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.



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9kHz-150kHz Mode:b; Polarization:Horizontal





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150kHz-30MHz Mode:b; Polarization:Vertical



Condition: 10m Job No. : 05468CR Test Mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 pp 3	0.17 1.55 3.11	0.07 0.30 0.39	11.79 12.06 12.19	32.67 32.65 32.65	78.35 59.28 55.76	57.54 38.99 35.69	81.88 42.88 48.63	-24.34 -3.89 -12.94



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#### **Below 30MHz**

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

 $L_{30/300} / L_{10} = D_{10} / D_{30/300}$ 

Note:

L<sub>30/300</sub>: Level @ 30m/300m distance. Unit: uV/m;

L10: Level @ 10m distance. Unit: uV/m;

D<sub>30/300</sub>: 30m/300m distance. Unit: m

D<sub>10</sub>: 10m distance. Unit: m

The level at 30m/300m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 30m/300m (dBuV/m)	Limit @ 30m/300m (dBuV/m)	Margin (dB)
0.01593	64.39	5.31	43.56	-38.25
0.03532	55.98	-3.1	36.64	-39.75
0.1406	44.8	-14.28	24.64	-38.93
0.17399	57.54	-1.54	22.79	-24.34
1.552	38.99	19.91	23.79	-3.88
3.107	35.69	16.61	29.54	-12.93



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30MHz-1GHz Mode:b; Polarization:Horizontal



Condition: 3m HORIZONTAL Job No. : 05468CR Test mode: b

		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.92	0.60	20.37	27.34	25.62	19.25	40.00	-20.75
2	192.42	1.39	16.28	26.73	31.50	22.44	43.50	-21.06
3	263.82	1.74	19.04	26.50	30.27	24.55	46.00	-21.45
4 pp	297.22	1.89	19.49	26.41	33.68	28.65	46.00	-17.35
5	420.58	2.29	22.89	27.25	27.64	25.57	46.00	-20.43
6	457.51	2.44	23.72	27.48	28.87	27.55	46.00	-18.45



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Mode:b; Polarization:Vertical



#### Condition: 3m VERTICAL Job No. : 05468CR Test mode: b

		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	49.36	0.79	14.39	27.29	40.34	28.23	40.00	-11.77
2 pp	54.26	0.80	13.75	27.28	43.74	31.01	40.00	-8.99
3	69.84	0.80	12.81	27.25	43.44	29.80	40.00	-10.20
4	72.59	0.88	12.58	27.24	43.69	29.91	40.00	-10.09
5	133.62	1.28	13.52	26.99	42.04	29.85	43.50	-13.65
6	304.61	1.91	19.75	26.42	33.67	28.91	46.00	-17.09



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### 8 Photographs

8.1 Conducted Emissions at Mains Terminals (150kHz-30MHz) Test Setup



8.2 Radiated Emissions (30MHz-1GHz) Test Setup





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### 8.3 Radiated Emissions (below 30MHz) Test Setup

#### 8.4 EUT Constructional Details (EUT Photos) Refer to External and Internal photos.

- End of the Report -