

TEST REPORT

Applicant: Shenzhen Shi Aiker Electronic Technology Co., Ltd.

Address of Applicant: 6th Floor, Building C, No. 9 East, Shangxue Technology Industrial City, Xinxue Community, Bantian Street, Longgang District, Shenzhen, China

Manufacturer/Factory: Shenzhen Shi Aiker Electronic Technology Co., Ltd.

Address of Manufacturer/Factory: 6th Floor, Building C, No. 9 East, Shangxue Technology Industrial City, Xinxue Community, Bantian Street, Longgang District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: F400 Car fast wireless charger

Model No.: F400

FCC ID: 2AVG2-F400

Applicable standards: FCC CFR Title 47 Part 15 Subpart C

Date of sample receipt: Dec. 02, 2019

Date of Test: Apr. 06, 2020- Apr. 22, 2020

Date of report issued: Apr. 22, 2020

Test Result : PASS *

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

Authorized Signature:



The stamp contains the text "GTS" in the center, surrounded by "GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD." and "APRIL 2016".

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	Apr. 22, 2020	Original

Prepared By:

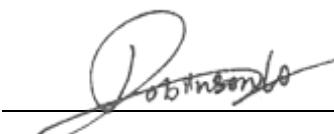


Date:

Apr. 22, 2020

Project Engineer

Check By:



Date:

Apr. 22, 2020

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Radiated Emission	15.209(a)(f)	Pass
20dB Bandwidth	15.215	Pass

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	F400 Car fast wireless charger
Model/Type reference:	F400
Serial No.:	NA
Test sample(s) ID:	GTS202003000183-1
Sample(s) Status	Engineer sample
Power supply:	DC 5V or 9V from adapter
Operation frequency:	110KHz - 205KHz
Modulation type:	ASK
Antenna type:	Loop coil antenna

5.2 Test mode

Equipment under test was operated during the measurement under the following conditions:

Charging and communication mode

Test Modes:		
Mode 1	AC/DC Adapter (5V/2A) + EUT + Mobile Phone1 (Battery Status: <1%)	Record
Mode 2	AC/DC Adapter (5V/2A) + EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 3	AC/DC Adapter (5V/2A) + EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 4	AC/DC Adapter (9V/1.8A) + EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 5	AC/DC Adapter (9V/1.8A) + EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 6	AC/DC Adapter (9V/1.8A) + EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested

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

5.3 Description of Support Units

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	CHENYANG ELECTRONICS	CD107	Input: 100-240V~, 50/60Hz, 0.5A Output: 5V=2A / 9V=1.8A	CE/FCC	laboratory

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.8 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory 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	July. 03 2015	July. 02 2020
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	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

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	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	ENV216 2-L-V- NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

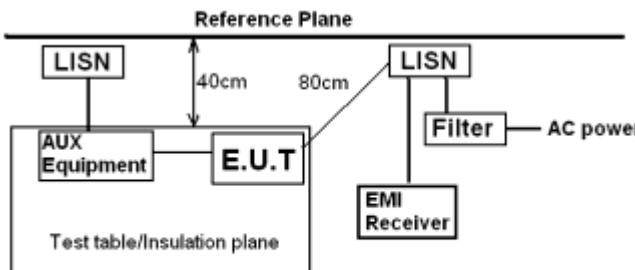
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

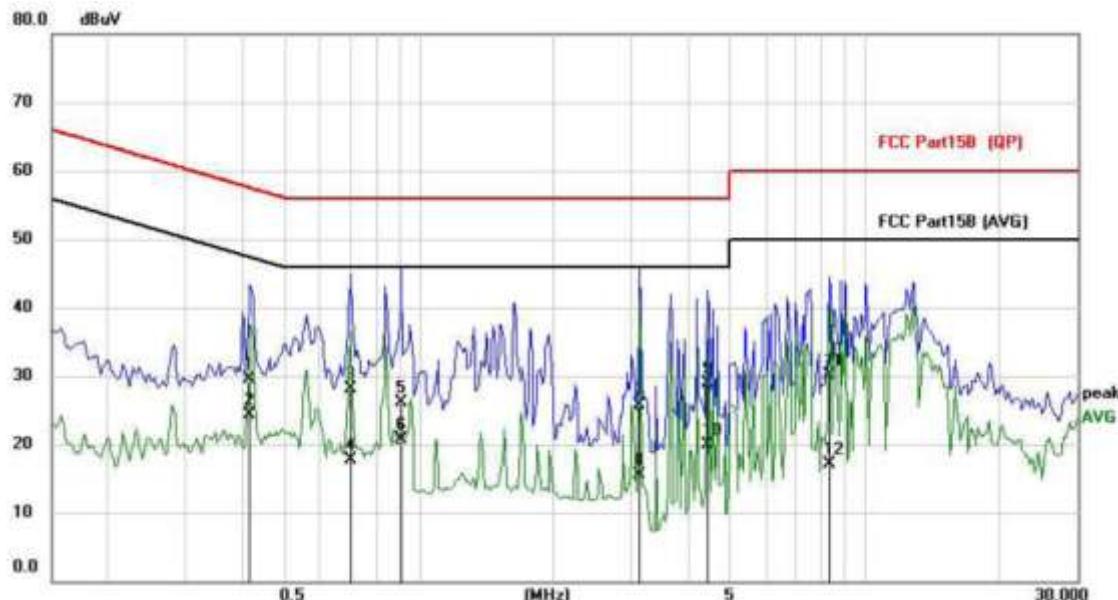
7 Test results and Measurement Data

7.1 Antenna requirement:

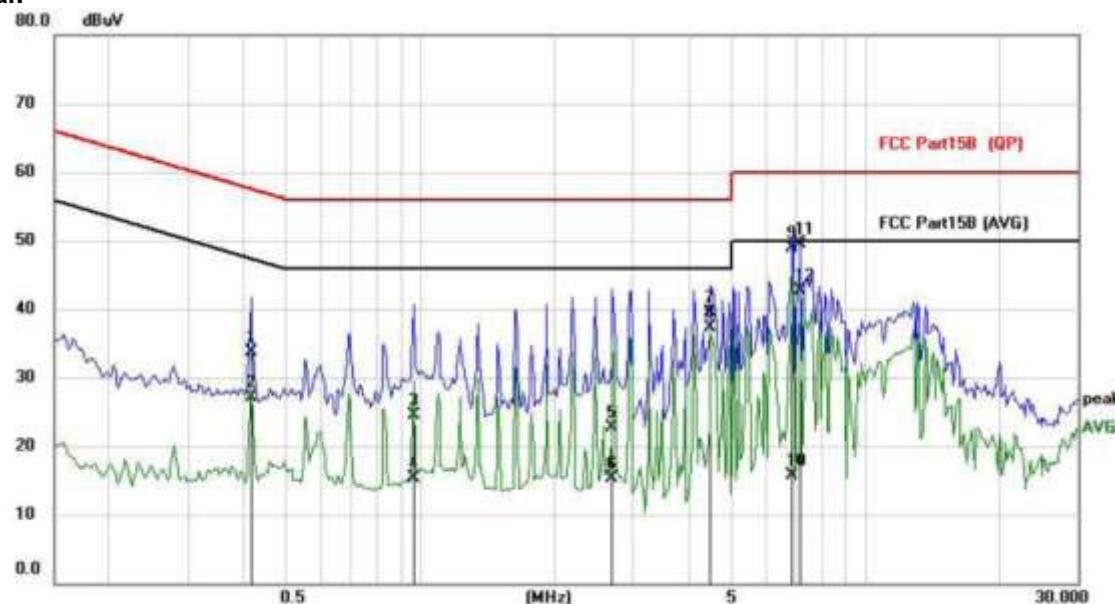
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling 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 Inductive loop coil Antenna, the best case gain of the antenna is 0dBi, reference to the appendix II for details.	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.10:2013																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			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
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															
	<small>* Decreases with the logarithm of the frequency.</small>																
Test setup:	 <p><i>Remark</i> <i>E.U.T. Equipment Under Test</i> <i>LISN Line Impedance Stabilization Network</i> <i>Test table height=0.8m</i></p>																
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 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 refer to the block diagram of the test setup and photographs). 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 ANSI C63.10 on conducted measurement. 																
Test Instruments:	Refer to section 6.0 for details																
Test mode:	Refer to section 5.2 for details																
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar											
Test voltage:	AC 120V, 60Hz																
Test results:	Pass																

Measurement data:
Line:


No.	Mk.	Freq. MHz	Reading	Correct	Measure-	Limit	Over	Detector
			Level dBuV	Factor dB	ment dBuV			
1		0.4191	18.67	10.92	29.59	57.47	-27.88	QP
2	*	0.4191	13.40	10.92	24.32	47.47	-23.15	AVG
3		0.7038	17.19	10.92	28.11	56.00	-27.89	QP
4		0.7038	6.76	10.92	17.68	46.00	-28.32	AVG
5		0.9183	15.23	10.92	26.15	56.00	-29.85	QP
6		0.9183	9.83	10.92	20.75	46.00	-25.25	AVG
7		3.1247	14.66	11.02	25.68	56.00	-30.32	QP
8		3.1247	4.41	11.02	15.43	46.00	-30.57	AVG
9		4.4391	17.76	11.08	28.84	56.00	-27.16	QP
10		4.4391	8.79	11.08	19.87	46.00	-26.13	AVG
11		8.3586	18.78	11.27	30.05	60.00	-29.95	QP
12		8.3586	5.88	11.27	17.15	50.00	-32.85	AVG

Neutral:


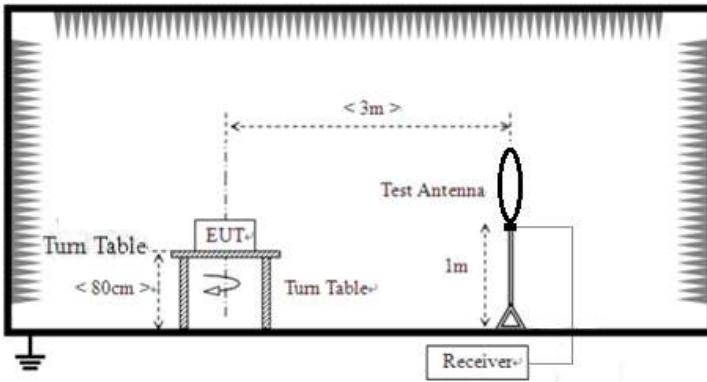
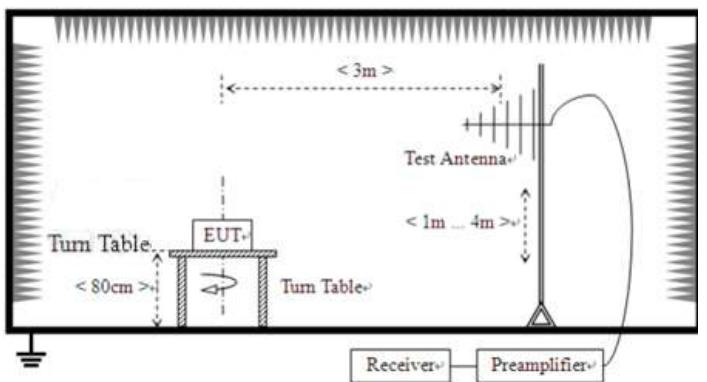
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.4152	22.83	10.92	33.75	57.54	-23.79	QP
2		0.4152	16.27	10.92	27.19	47.54	-20.35	AVG
3		0.9651	13.65	10.92	24.57	56.00	-31.43	QP
4		0.9651	4.33	10.92	15.25	46.00	-30.75	AVG
5		2.6967	11.69	11.00	22.69	56.00	-33.31	QP
6		2.6967	4.27	11.00	15.27	46.00	-30.73	AVG
7		4.4898	28.35	11.08	39.43	56.00	-16.57	QP
8		4.4898	26.31	11.08	37.39	46.00	-8.61	AVG
9		6.8766	37.67	11.20	48.87	60.00	-11.13	QP
10		6.8766	4.60	11.20	15.80	50.00	-34.20	AVG
11		7.1574	38.36	11.21	49.57	60.00	-10.43	QP
12	*	7.1574	31.57	11.21	42.78	50.00	-7.22	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

7.3 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209									
Test Method:	ANSI C63.10:2013									
Test Frequency Range:	9kHz to 1GHz									
Test site:	Measurement Distance: 3m									
Receiver setup:	Frequency	Detector	RBW	VBW	Remark					
	9kHz- 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value					
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value					
	Above 1GHz	Peak	1MHz	3MHz	Peak Value					
AV										
Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.										
Limit: (Spurious Emissions)	Limits for frequency below 30MHz									
	Frequency	Limit (uV/m)	Measurement Distance(m)	Remark						
	0.009-0.490	2400/F(kHz)	300	Quasi-peak Value						
	0.490-1.705	24000/F(kHz)	30	Quasi-peak Value						
	1.705-30	30	30	Quasi-peak Value						
	Limits for frequency Above 30MHz									
	Frequency	Limit (dBuV/m @3m)	Remark							
	30MHz-88MHz	40.00	Quasi-peak Value							
	88MHz-216MHz	43.50	Quasi-peak Value							
Test Procedure:	216MHz-960MHz	46.00	Quasi-peak Value							
	960MHz-1GHz	54.00	Quasi-peak Value							
	Above 1GHz	54.00	Average Value							
		74.00	Peak Value							
	Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.									
	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.									
	2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.									
	3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.									
	4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.									
	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.									
	6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the									

	<p>EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p>
Test setup:	<p>Below 30MHz</p>  <p>30MHz ~ 1000MHz</p> 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Measurement data:
For 9 KHz-30MHz
WORST-CASE RADIATED EMISSION BELOW 30 MHz

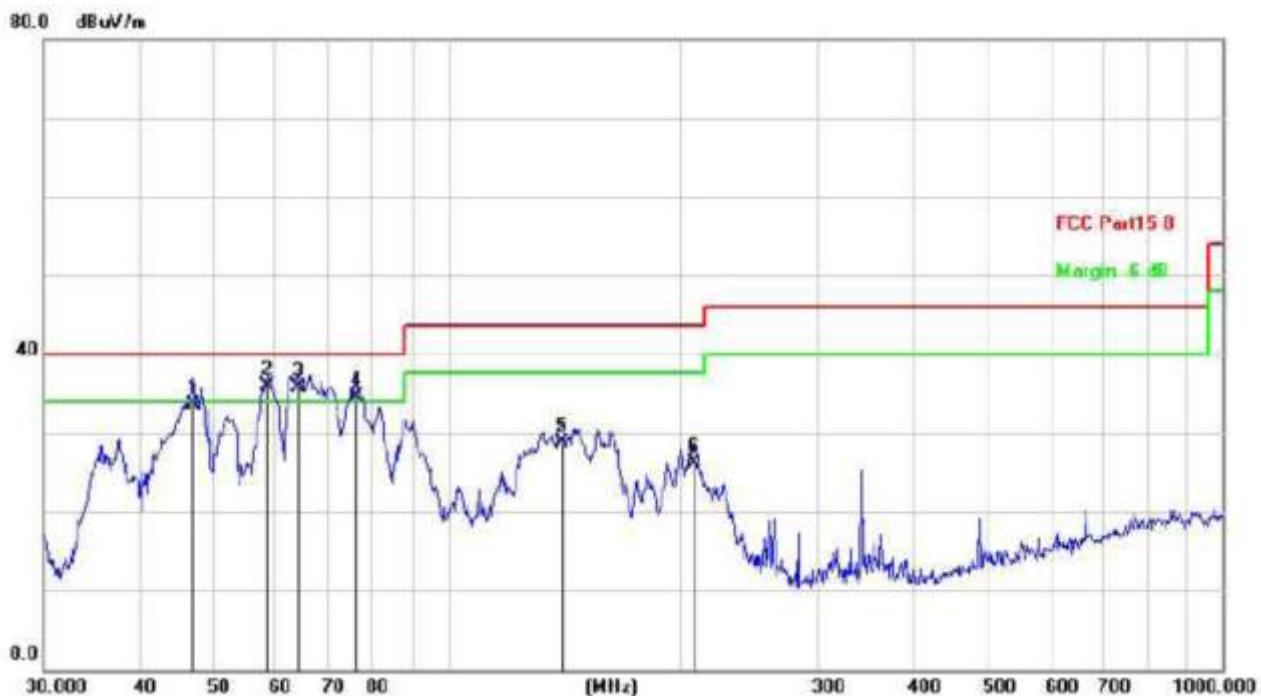
Frequency	Reading	Polar	Antenna Factor	Cable Loss	Emission Levels	Limits at 3m	Margin	Detector Mode
(MHz)	(dB μ V/m)	Loop	(dB/m)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
0.113(F)	62.71	Loop	23.64	0.01	86.36	103.91	17.55	PK
0.113(F)	51.22	Loop	23.64	0.01	74.87	83.91	9.04	AV
0.110	41.73	Loop	23.55	0.01	65.29	106.78	41.49	PK
0.110	34.87	Loop	23.55	0.01	58.43	86.78	28.35	AV
0.685	25.48	Loop	25.07	-0.17	50.38	70.89	20.51	QP
1.735	20.46	Loop	27.12	-0.25	47.33	62.82	15.49	QP
6.525	26.99	Loop	23.91	-0.24	50.66	69.54	18.88	QP
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Remark:

1. Data of measurement within this frequency range shown “-- in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits and not recorded.
2. The test limit distance is 3m limit.
3. PK means Peak Value, QP means Quasi Peak Value, AV means Average Value.
4. F means Fundamental Frequency.
5. Emission level (dB μ V/m) =Reading + Antenna Factor + Cable Loss.
6. Margin value = Limit value- Emission level.

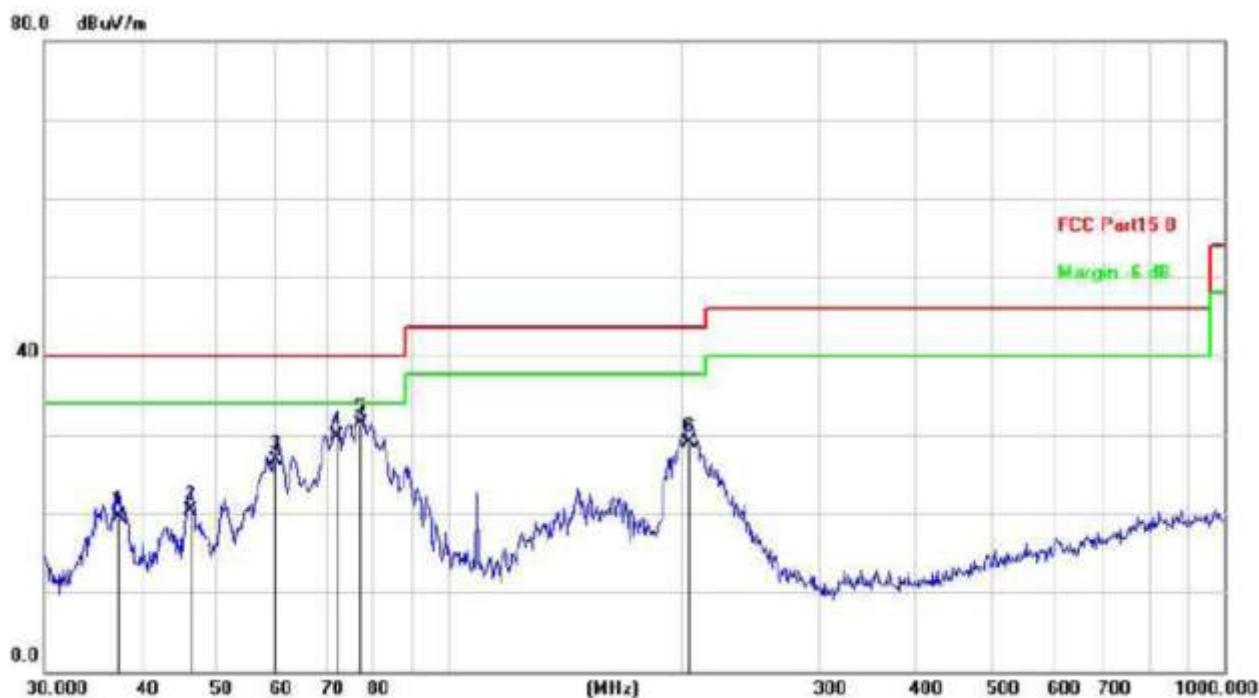
30MHz~1GHz

Horizontal



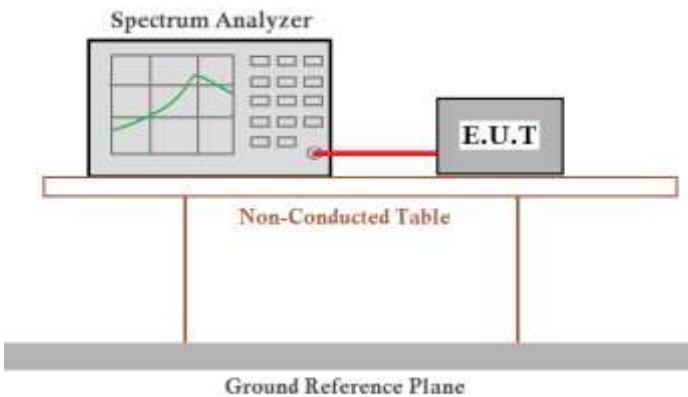
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		46.8303	51.82	-18.34	33.48	40.00	-6.52	QP
2	*	58.4074	54.68	-18.70	35.98	40.00	-4.02	QP
3	!	63.9827	54.89	-19.22	35.67	40.00	-4.33	QP
4	!	76.2442	54.96	-20.48	34.48	40.00	-5.52	QP
5		140.8351	47.06	-18.43	28.63	43.50	-14.87	QP
6		207.8500	46.05	-19.88	26.17	43.50	-17.33	QP

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		37.4164	37.70	-18.14	19.56	40.00	-20.44	QP
2		46.5030	38.66	-18.33	20.33	40.00	-19.67	QP
3		59.8588	45.54	-18.75	26.79	40.00	-13.21	QP
4		71.5806	49.69	-20.07	29.62	40.00	-10.38	QP
5	*	77.0504	51.81	-20.55	31.26	40.00	-8.74	QP
6		204.2376	48.93	-20.02	28.91	43.50	-14.59	QP

7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10:2013
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Conclusion
Tx Mode	136	4.832	4.066	PASS



8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----