Microtest
微测检测

Test Report

FCC ID: 2ATYS-BTAAX100

Date of issue: July 30, 2019

Report Number:	MTi19062103-14E3
Sample Description:	Smart car charge
Model(s):	BTAAX100
Applicant:	AAMP GLOBAL
Address:	15500 Lightwave Drive, Clearwater, Florida 33760
Date of Test:	June 26, 2019 to July 30, 2019

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

Tel:(86-755)88850135 Fax: (86-755) 88850136 Web: http://www.mtitest.com E-mail: mti@51mti.com
Address: No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China

Table of Contents

Test Result Certification

Applicant's name:	AAMP GLOBAL
Address:	15500 Lightwave Drive, Clearwater, Florida 33760
Manufacture's name:	Shenzhen Sowye Technology Co., Ltd.
Address:	2F, A9 Building, Longwangmiao Industrial, East District, Baishixia, Fuyong, Bao'an, Shenzhen, 518103, Guangdong, China
Product name:	Smart car charge
Trademark:	N/A
Model name:	BTAAX100
Standards:	FCC Part 15.239
Test Procedure:	ANSI C63.10-2013 DA 00-705

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by: Jone Lee — July 30, 2019

Reviewed by: Blue Zheng — July 30, 2019

Approved by: Smith Chen — July 30, 2019

1 General description

1.1 Descriptions of EUT

Product name:	Smart car charge
Model name:	BTAAX100
Series model:	N/A
Difference of series model:	N/A
Tx/Rx frequency range:	88.1 MHz to 107.9 MHz
Modulation type:	FM
Power source:	DC 24V from Battery
Adapter information:	N/A
Antenna designation:	Cable Antenna (Antenna Gain: 2dBi)
Hardware version:	V1.2
Software version:	V1.0.1

1.2 199 channels are provided to FM

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	88.1	100	98.0	198	107.8
2	88.2	101	98.1	199	107.9
k	88.1+0.1(k-1)	--	--		

1.3 Frequency Channel Under Test

Channel	Frequency
Low	88.1MHz
Middle	98.1MHz
High	107.9MHz

1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer
Mobile phone	/	/	/
Battery	/	/	/
Load	/	/	/

1.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
/	/	/	/	/	
/	/	/	/	/	

Note:

(1)The support equipment was authorized by Declaration of Confirmation.

(2)For detachable type I/O cable should be specified the length in cm in『Length』column.

2 Summary of Test Results

Test procedures according to the technical standards:

Item	FCC Part No.	Description of Test	Result	Remark
1	15.203	Antenna requirement	Pass	
2	15.207	AC power line conducted emission	Pass	
3	15.239 (b)	Field strength of fundamental and harmonic emissions	Pass	
4	15.209	Radiated emission	Pass	
5	15.239 (a)	Operating frequency	Pass	
6	15.239 (a)	Occupied Bandwidth	Pass	
The meaning of symbols: “N/A” – Not Applicable				

3 Test Facilities and Accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

3.2 Environmental conditions

Temperature:	15ºC~35ºC
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %

RF frequency	1×10^{-7}
RF power, conducted	±1.38dB
Conducted emission(150kHz~30MHz)	±0.21dB
Radiated emission(30MHz~1GHz)	±4.68dB
Radiated emission (above 1GHz)	±4.89dB
Temperature	±0.5°C
Humidity	± 2 %

3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Shenzhen JS tonscend co,.ltd	JS1120-3	2.5.77.0418

4 Equipment list

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI7	100314	2018/10/09	2019/10/08
MTI-E006	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-872	2018/10/15	2020/10/14
MTI-E014	amplifier	Hewlett-Packard	8447D	3113A06150	2018/10/09	2019/10/08
MTI-E036	Single path vehicle AMN(LISN)	Schwarzbeck	NNBM 8124	01175	2018/10/09	2019/10/08
MTI-E038	Low noise active vertical monopole antenna	Schwarzbeck	VAMP 9243	#565	2018/10/16	2019/10/15
MTI-E039	Biconical antenna	Schwarzbeck	BBA 9106	#164	2018/10/15	2019/10/14
MTI-E041	MXG Vector Signal Generator	Agilent	N5182A	MY49060455	2019/04/16	2020/04/15
MTI-E042	ESG Series Analog signal generator	Agilent	E4421B	GB40051240	2019/05/21	2020/05/20
MTI-E044	Thermometer clock humidity monitor	-	HTC-1	/	2019/04/17	2020/04/16
MTI-E062	Log Periodic Antenna	Schwarzbeck	VUSLP 9111B	#312	2018/04/11	2020/04/10
MTI-E063	Log Periodic Dipole Array Antenna	ETS-LINDGREN	3148B	00224524	2018/04/11	2020/04/10
MTI-E065	Amplifier	EMtrace	RP06A	00117	2019/04/29	2020/04/28
MTI-E066	Comprehensive test instrument	Rohde&schwarz	CMW500	149155	2019/04/16	2020/04/15
MTI-E071	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2018/10/25	2019/10/24
MTI-E076	EMI Test Receiver	Rohde&schwarz	ESIB26	100273	2019/04/16	2020/04/15
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2019/04/16	2020/04/15
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2019/04/16	2020/04/15
MTI-E093	Artificial mains network	3ctest	LISN J50	ES3911805	2019/04/16	2020/04/15
MTI-E096	Power amplifier	Space-Dtroniccs	EWLNA0118G-P40	1852001	2019/04/29	2020/04/28
MTI-E097	Current Probe	SOLAR ELECTRONICS CO.	9207-1	220095-1	2019/04/17	2020/04/16
MTI-E098	Loop Sensor	SOLAR ELECTRONICS CO.	7334-1	220095-2	2019/04/21	2020/04/20
Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).						

5 Test Result

5.1 Antenna requirement

5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: 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

5.1.2 EUT antenna description

The EUT antenna is PCB antenna (2dBi). It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 AC power line conducted emission

5.2.1 Limit

Frequency (MHz)	Limit	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency from 0.15MHz to 0.5MHz.

5.2.2 Test method

1. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

4. LISN is at least 80 cm from nearest part of EUT chassis.

5. The resolution bandwidth of EMI test receiver is set at 9kHz.

5.2.3 Test Result

Note: the device is battery powered, so this item is not available.

5.3 Field strength of fundamental and harmonic emissions

5.3.1 Limits

§15.239 (b): The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

5.3.2 Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

3. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz
RBW = 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = Auto
Detector function = Peak
Trace = max hold

4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

5. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the spectrum to

RBW = 1MHz
VBW = 10Hz
Detector = PK for AV value, while maintaining all of the other instrument settings

5.3.3 Test Result

Field Strength of Fundamental Emissions and Field strength of spurious emissions Value					
Operating Frequency (MHz)	Field Strength (dBuV/m)	Detector	Limit @3m (dBuV/m)	Margin (dB)	Antenna
88.1	41.31	QP	67.96	26.65	Vertical
	21.71	Average	47.96	26.25	Horizontal
98.1	43.28	QP	67.96	24.68	Vertical
	21.46	Average	47.96	26.5	Horizontal
107.9	42.31	QP	67.96	25.65	Vertical
	20.82	Average	47.96	27.14	Horizontal

Note: If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

5.4 Operating frequency& Occupied Bandwidth

5.4.1 Limits

§15.239 (a): Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.4.2 Test method

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥1% of the 20 dB bandwidth
VBW ≥RBW
Sweep = auto
Detector function = peak
Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission.

5.4.3 Test result

Permitted range of operating frequencies				
F_L (KHz) (kHz)	F_H(kHz)	Limit (MHz)		Result
88.0658	107.9342	F_L≥88	F_H≤108	Pass

Frequency (MHz)	20dBm emission bandwidth (KHz)	Limit (KHz)
88.1	68.23	200
98.1	68.37	200
107.9	68.49	200

5.5 Radiated emission

5.5.1 Limit

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, (b)shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

Frequency (MHz)	Field strength μV/m	Field strength dBμV/m	Detector	Measurement distance
30-88	100	40	QP	3m
88-216	150	43.5	QP	
216-960	200	46	QP	
960-1000	500	54	QP	
Above 1000	500	54	AV	
Above 1000	5000	74	PK	

5.5.2 Test method

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

3. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz
100 kHz for f < 1 GHz, VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

5. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

5.5.3 Test Result

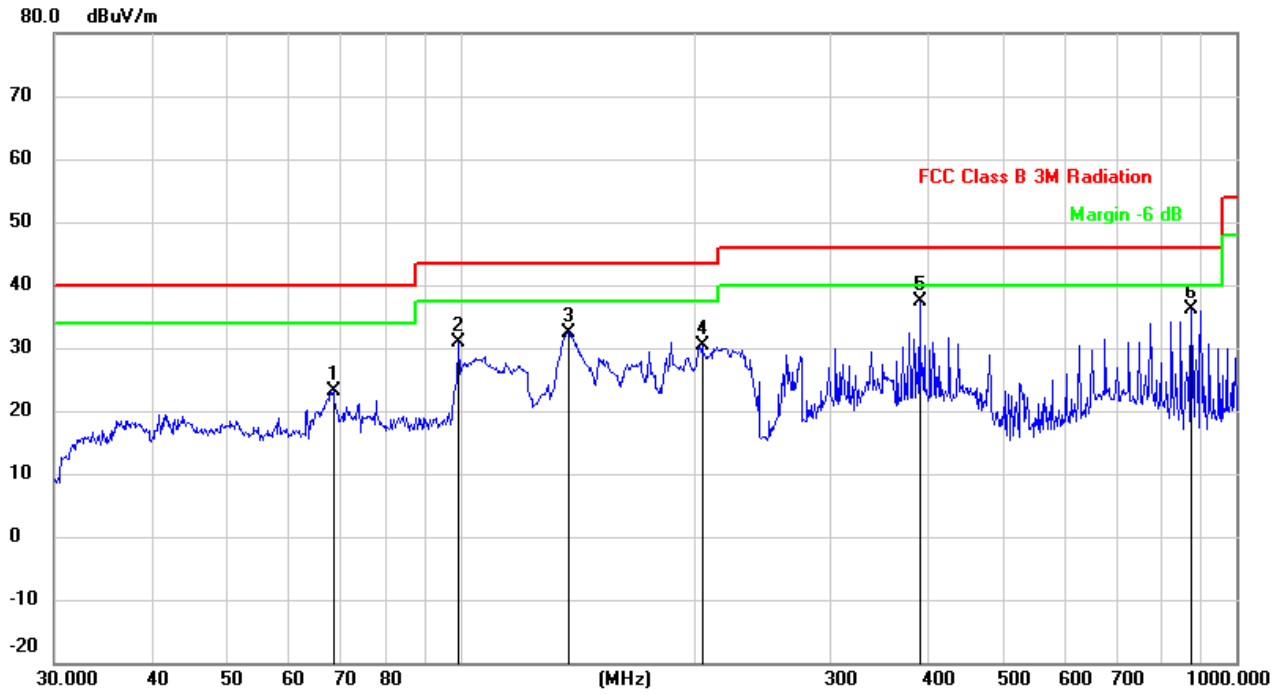
Remark:
If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

Radiated emission

Between 30MHz – 1GHz

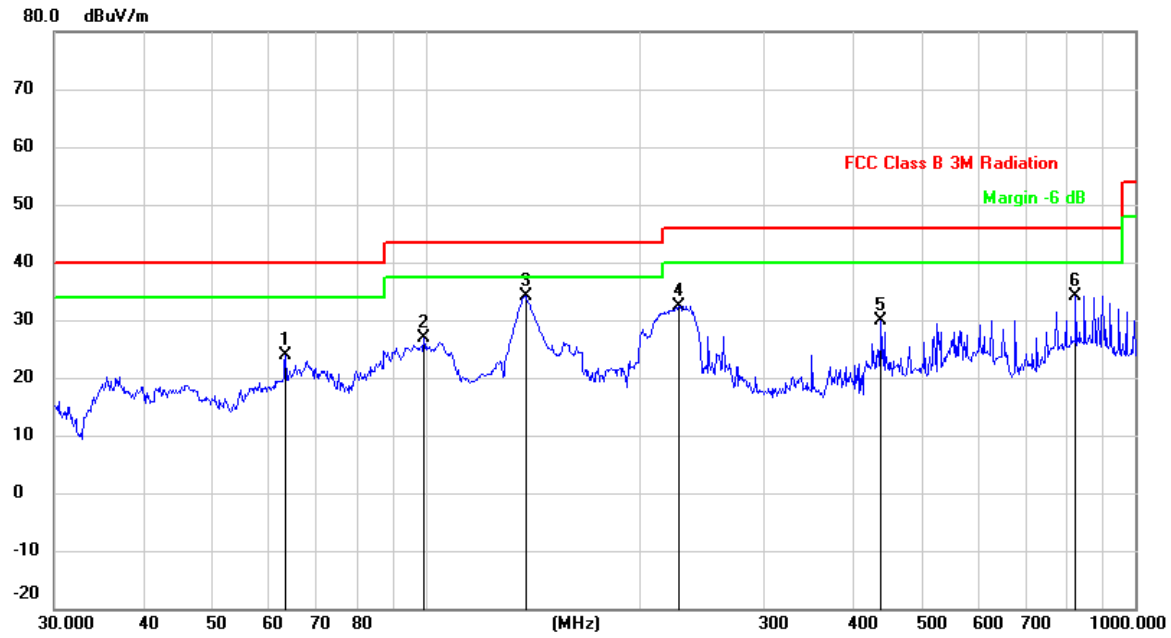
Note: All the modulation modes have been tested, and the worst result was report as below:

EUT：	Smart car charge	Model Name ：	BTAAX100
Pressure：	1010 hPa	Phase:	H
Test Mode ：	TX (98.1MHz)	Test Voltage ：	DC 24V from battery



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		68.6310	38.70	-15.54	23.16	40.00	-16.84	QP
2		99.5279	44.85	-13.87	30.98	43.50	-12.52	QP
3		137.9028	49.30	-16.85	32.45	43.50	-11.05	QP
4		204.9550	43.46	-13.01	30.45	43.50	-13.05	QP
5	*	390.7225	47.43	-9.93	37.50	46.00	-8.50	QP
6		875.2468	39.63	-3.51	36.12	46.00	-9.88	QP

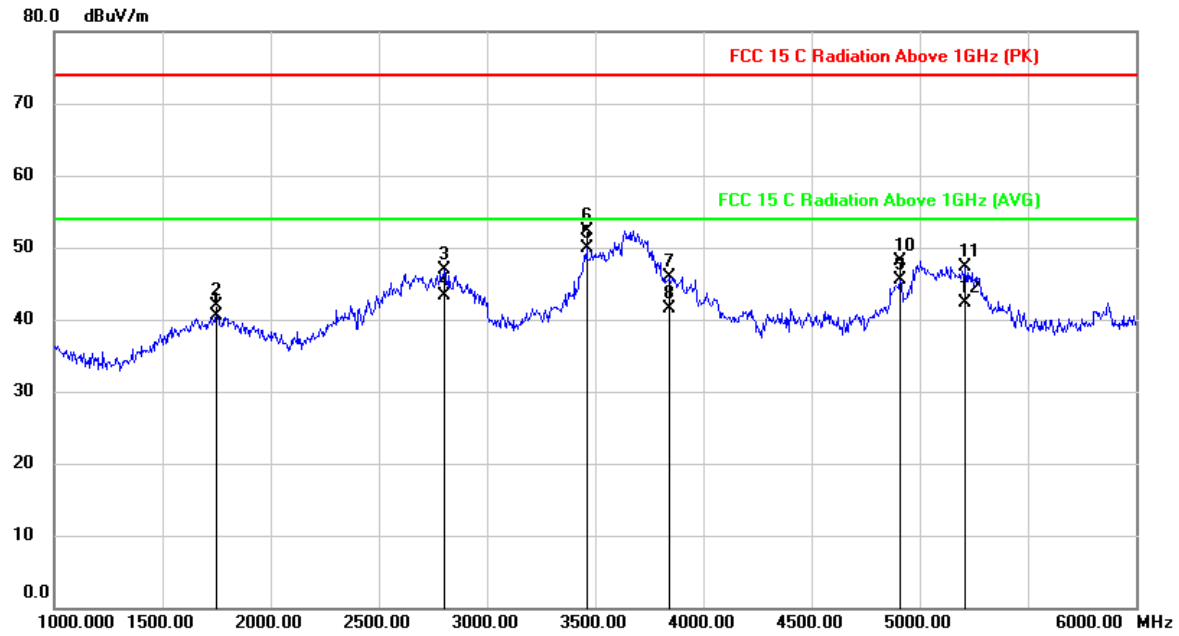
EUT：	Smart car charge	Model Name ：	BTAAX100
Pressure：	1010 hPa	Phase:	V
Test Mode ：	TX (98.1MHz)	Test Voltage ：	DC 24V from battery



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		63.5356	38.53	-14.74	23.79	40.00	-16.21	QP
2		99.5279	40.83	-13.87	26.96	43.50	-16.54	QP
3	*	138.3873	51.05	-16.83	34.22	43.50	-9.28	QP
4		227.6904	45.26	-12.76	32.50	46.00	-13.50	QP
5		438.6553	38.79	-8.96	29.83	46.00	-16.17	QP
6		824.5968	37.52	-3.45	34.07	46.00	-11.93	QP

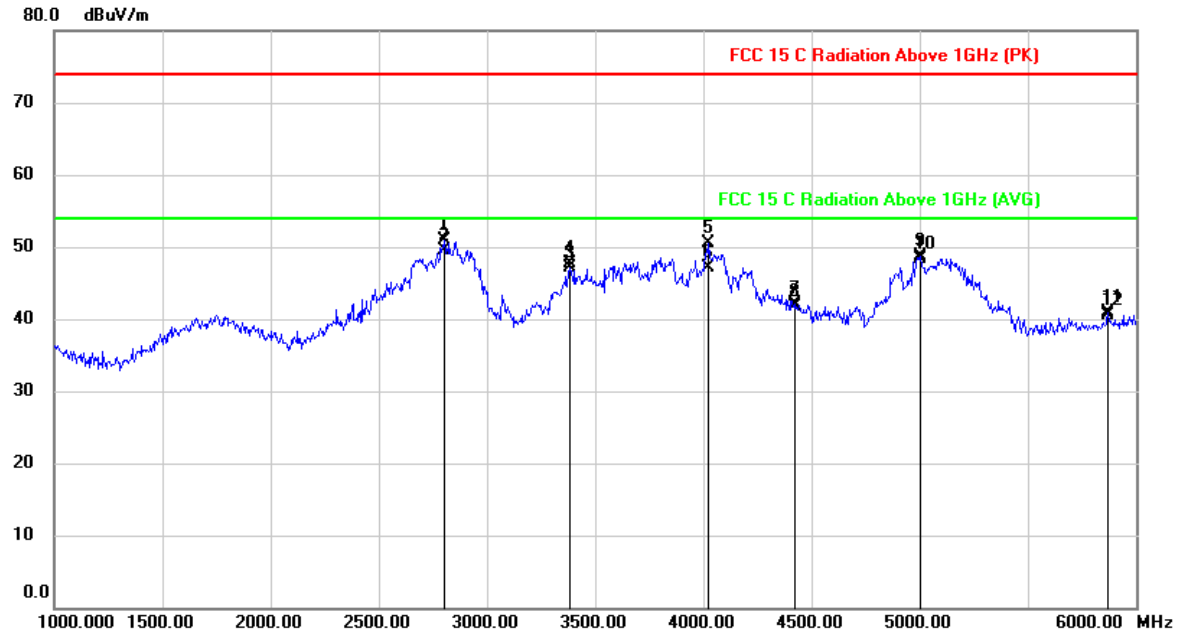
ABOVE 1GHz

EUT：	Smart car charge	Model Name ：	BTAAX100
Pressure：	1010 hPa	Phase:	H
Test Mode ：	TX (98.1MHz)	Test Voltage ：	DC 24V from battery



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		1750.000	55.44	-14.95	40.49	74.00	-33.51	peak		
2		1750.000	56.78	-14.95	41.83	54.00	-12.17	AVG		
3		2805.000	54.78	-7.83	46.95	74.00	-27.05	peak		
4		2805.000	51.17	-7.83	43.34	54.00	-10.66	AVG		
5		3460.000	55.95	-6.07	49.88	74.00	-24.12	peak		
6	*	3460.000	58.35	-6.07	52.28	54.00	-1.72	AVG		
7		3845.000	50.63	-4.77	45.86	74.00	-28.14	peak		
8		3845.000	46.36	-4.77	41.59	54.00	-12.41	AVG		
9		4910.000	55.01	-9.48	45.53	74.00	-28.47	peak		
10		4910.000	57.62	-9.48	48.14	54.00	-5.86	AVG		
11		5210.000	56.92	-9.60	47.32	74.00	-26.68	peak		
12		5210.000	51.99	-9.60	42.39	54.00	-11.61	AVG		

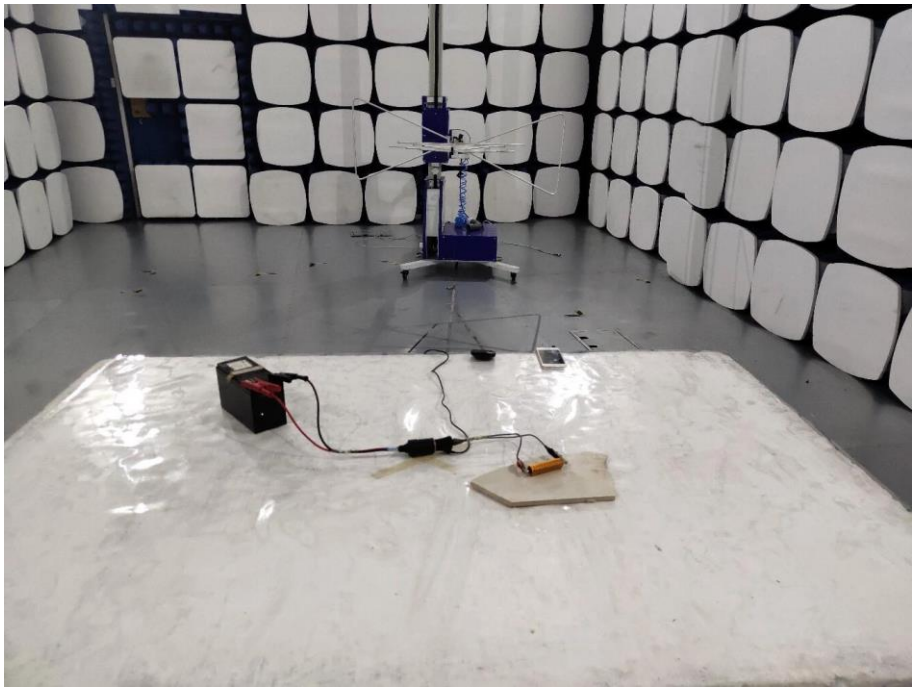
EUT：	Smart car charge	Model Name ：	BTAAX100
Pressure：	1010 hPa	Phase:	V
Test Mode ：	TX (98.1MHz)	Test Voltage ：	DC 24V from battery



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		2805.000	58.78	-7.83	50.95	74.00	-23.05	peak		
2	*	2805.000	57.26	-7.83	49.43	54.00	-4.57	AVG		
3		3385.000	53.34	-6.18	47.16	74.00	-26.84	peak		
4		3385.000	53.96	-6.18	47.78	54.00	-6.22	AVG		
5		4025.000	54.82	-4.38	50.44	74.00	-23.56	peak		
6		4025.000	51.45	-4.38	47.07	54.00	-6.93	AVG		
7		4425.000	48.86	-6.79	42.07	74.00	-31.93	peak		
8		4425.000	48.58	-6.79	41.79	54.00	-12.21	AVG		
9		5005.000	58.62	-9.98	48.64	74.00	-25.36	peak		
10		5005.000	58.29	-9.98	48.31	54.00	-5.69	AVG		
11		5870.000	48.86	-7.97	40.89	74.00	-33.11	peak		
12		5870.000	48.50	-7.97	40.53	54.00	-13.47	AVG		

PHOTOGRAPHS OF THE TEST SETUP

Radiated emission



PHOTOGRAPHS OF THE EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi19062103-14E1-1.

----END OF REPORT----