FCC TEST REPORT

For

Guangdong Bekey Technology Co., Ltd.

Qi Wireless Car Charger

Test Model: AT1436

Additional Model No.: AT1533

Prepared for	:	Guangdong Bekey Technology Co., Ltd.
Address	:	R building, Dong Yuan Reservoir Region Immigration base, Butterfly Lodge Ind District, Dongyuan, Heyuan city, GuangDong, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
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Date of receipt of test sample	:	July 15, 2020
Number of tested samples	:	1
Sample number		200708072A
Serial number	:	Prototype
Date of Test	:	July 15, 2020 ~ July 27, 2020
Date of Report	:	July 27, 2020

FCC TEST REPORT
FCC CFR 47 PART 18

Report Reference No.	**:**	**LCS200708072AEA**
Date Of Issue	:	July 27, 2020
Testing Laboratory Name.....	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
Testing Location/ Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name	**:**	**Guangdong Bekey Technology Co., Ltd.**
Address	:	R building, Dong Yuan Reservoir Region Immigration base, Butterfly Lodge Ind District, Dongyuan, Heyuan city, GuangDong, China
Test Specification		
Standard	:	FCC CFR 47 PART 18
Test Report Form No.	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

Test Item Description.....	**:**	**Qi Wireless Car Charger**
Trade Mark	:	Atomi
Test Model.....	:	AT1436
Power Supply	:	Input: 5Vdc/2A, 9Vdc/1.67A Output: 10W
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Linda He/ Administrators	Jin Wang/ Technique principal	Gavin Liang/ Manager

FCC TEST REPORT

Test Report No. : **LCS200708072AEA**	July 27, 2020 Date of issue

Test Model.....	: AT1436
EUT.....	: Qi Wireless Car Charger
Applicant.....	**: Guangdong Bekey Technology Co., Ltd.**
Address.....	: R building, Dong Yuan Reservoir Region Immigration base, Butterfly Lodge Ind District, Dongyuan, Heyuan city, GuangDong, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Guangdong Bekey Technology Co., Ltd.**
Address.....	: R building, Dong Yuan Reservoir Region Immigration base, Butterfly Lodge Ind District, Dongyuan, Heyuan city, GuangDong, China
Telephone.....	: /
Fax.....	: /
Factory.....	: **Guangdong Bekey Technology Co., Ltd.**
Address.....	: R building, Dong Yuan Reservoir Region Immigration base, Butterfly Lodge Ind District, Dongyuan, Heyuan city, GuangDong, China
Telephone.....	: /
Fax.....	: /

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	July 27, 2020	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	Qi Wireless Car Charger
Test Model	:	AT1436
Additional Model No	:	AT1533
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	:	Input: 5Vdc/2A, 9Vdc/1.67A Output: 10W
Hardware Version	:	REV2.0
Software Version	:	V1.02
Wireless Charging	:	
Operating Frequency	:	110.0~205.0KHz
Modulation Type	:	Continuous Wave
Antenna Type	:	Coil Antenna

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Apple	Phone	ipone 11	--	SDOC
Panasonic	Battery	UP-RW1228ST1	--	SDOC
Car charger	G&J INDUSTRY LIMITED	GJ-2034	--	SDOC

Note: Car charger、battery and mobile phone are only used test, not shipped

1.3 External I/O Cable

I/O Port Description	Quantity	Cable
Type-C USB Port	1	N/A

1.4 Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
		200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7 Description of Test Modes

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

☒ Charging and communication mode

Modulation Type: CW (Continuous Wave)

Test Modes		
Mode 1	Car Adapter (5V/2A) + EUT+ Mobile Phone (Battery Status: <1%)	Record
Mode 2	Car Adapter (5V/2A) + EUT+ Mobile Phone (Battery Status: <50%)	Pre-tested
Mode 3	Car Adapter (5V/2A) + EUT+ Mobile Phone (Battery Status: 100%)	Pre-tested
Mode 4	Car Adapter (9V/1.67A) + EUT+ Mobile Phone (Battery Status: <1%)	Pre-tested
Mode 5	Car Adapter (9V/1.67A) + EUT+ Mobile Phone (Battery Status: <50%)	Pre-tested
Mode 6	Car Adapter (9V/1.67A) + EUT+ Mobile Phone (Battery Status: 100%)	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

For AC conducted emission, pre-test at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case;

For AC conducted emission, pre-test at both AC charge from power adapter, recorded worst case.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with MP-5, and FCC CFR PART 18.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the charging and compunction mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 18.305 and 18.307 under the FCC Rules Part 18.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in FCC MP-5 for Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in FCC MP-5 for radiated emission.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a normal condition.

3.2 EUT Exercise Software

N/A.

3.3 Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2020-06-22	2021-06-21
2	SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-14	2020-11-13
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2020-04-03	2023-04-02
4	Positioning Controller	MF	MF7082	MF78020803	2020-06-22	2021-06-21
5	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
6	EMI Test Receiver	R&S	ESR 7	101181	2020-06-22	2021-06-21
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018-07-26	2021-07-25
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2021-07-25
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2021-07-01
10	RF Cable-R03m	Jye Bao	RG142	CB021	2020-06-22	2021-06-21
11	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2020-06-22	2021-06-21
12	EMI Test Receiver	R&S	ESPI	101840	2020-06-22	2021-06-21
13	Artificial Mains	R&S	ENV216	101288	2020-06-22	2021-06-21
14	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2020-06-22	2021-06-21
15	6dB Attenuator	/	100W/6dB	1172040	2020-06-22	2021-06-21
16	3dB Attenuator	/	2N-3dB	/	2020-06-22	2021-06-21
17	Broadband Preamplifier	SCHWARZBECK	BBV9745	9719-025	2020-06-22	2021-06-21
Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.						

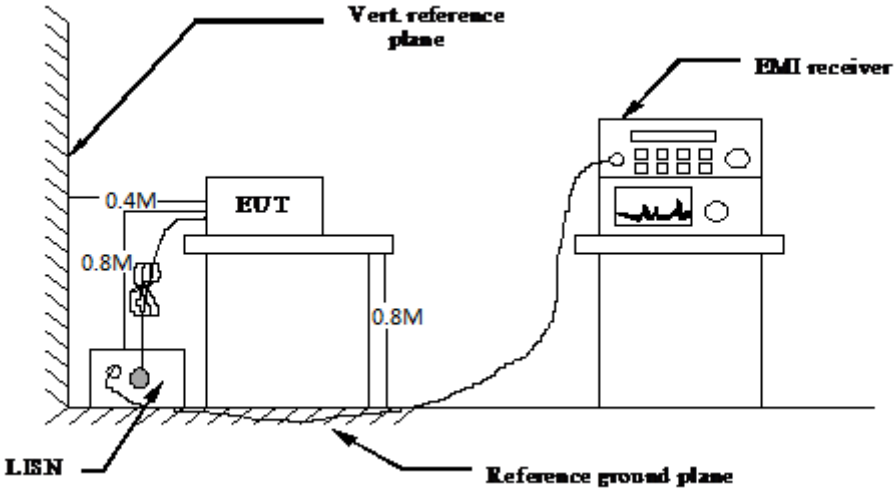
5. SUMMARY OF TEST RESULT

Test Item	FCC Rule No.	Temperature conditions	Power source conditions	C	NC	NA	NP	Remark
Radiated Emission	§18.305 (b)	Nominal	Nominal	☒	☐	☐	☐	**-/-**
AC conducted emission	§18.307 (a)	Nominal	Nominal	☐	☐	☒	☐	**-/-**

Remark: The measurement uncertainty is not included in the test result.
N/A – Not Applicable!!!

6. POWER LINE CONDUCTED MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Standard Applicable

According to §18.307 (b): For all other part 18 consumer devices which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

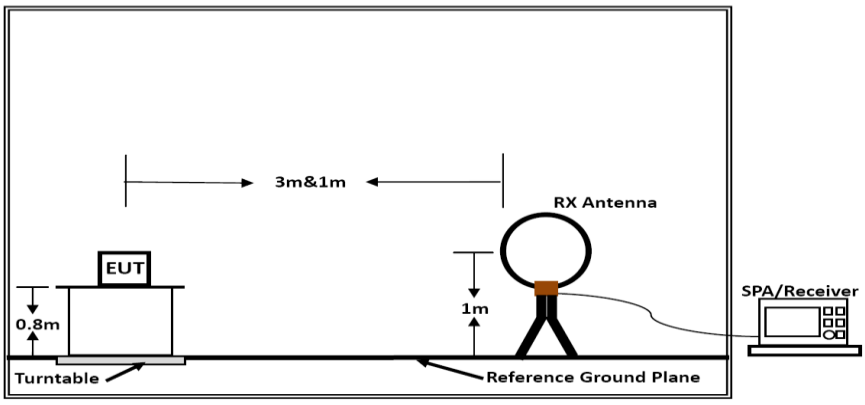
6.3 Test Results

Not Applicable.

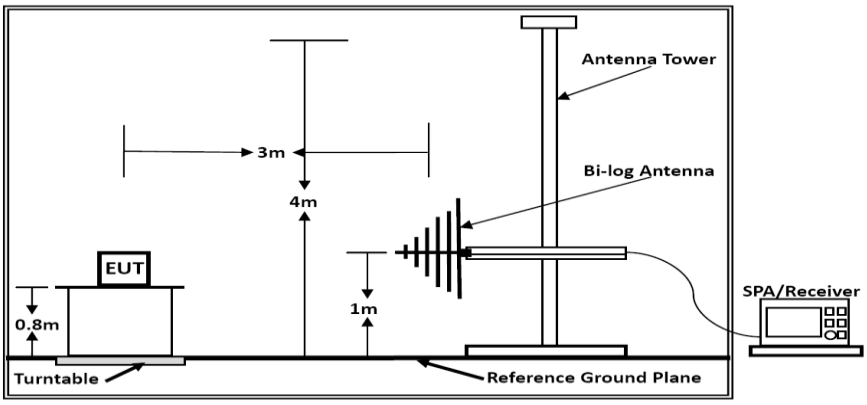
The device was powered by DC and only used at Car!!!

7. RADIATED EMISSION MEASUREMENT

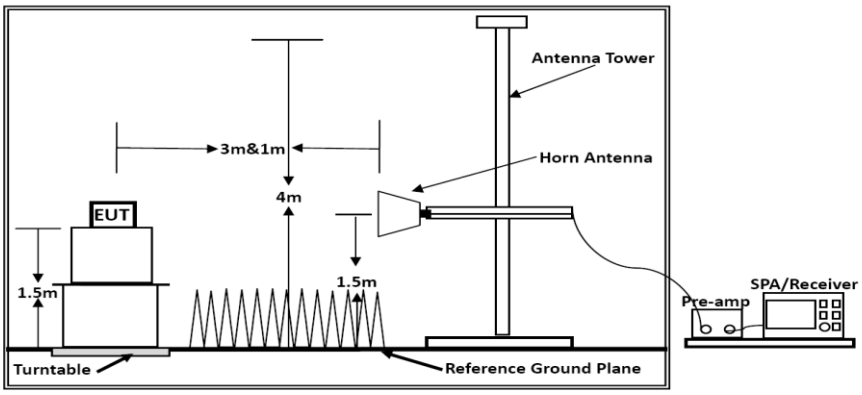
7.1. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

7.2. Radiated Emission Limit

Except as provided elsewhere in this Subpart 18.305 (b), the field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following table:

Frequency MHz	Distance Meters	Field Strengths Limit	
		dBμV/m	Remark
0.009~30MHz	3	103.5	Quasi-peak

Remark:
(1) Emission level dBμV/m for 0.009~30MHz = 20log (15) + 40log (300/3) dBμV/m;
(2) Calculated according FCC 18.305.
(3) The smaller limit shall apply at the cross point between two frequency bands.
(4) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.3. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4. Operating Condition of EUT

(1) Setup the EUT as shown in Section 4.1.

(2) Let the EUT work in worst test mode (Mode 1) and measure it.

7.5. Measuring Setting

The following table is the setting of spectrum analyzer and receiver.

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP/Average
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/Average
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

7.6. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

7.7. Test Results

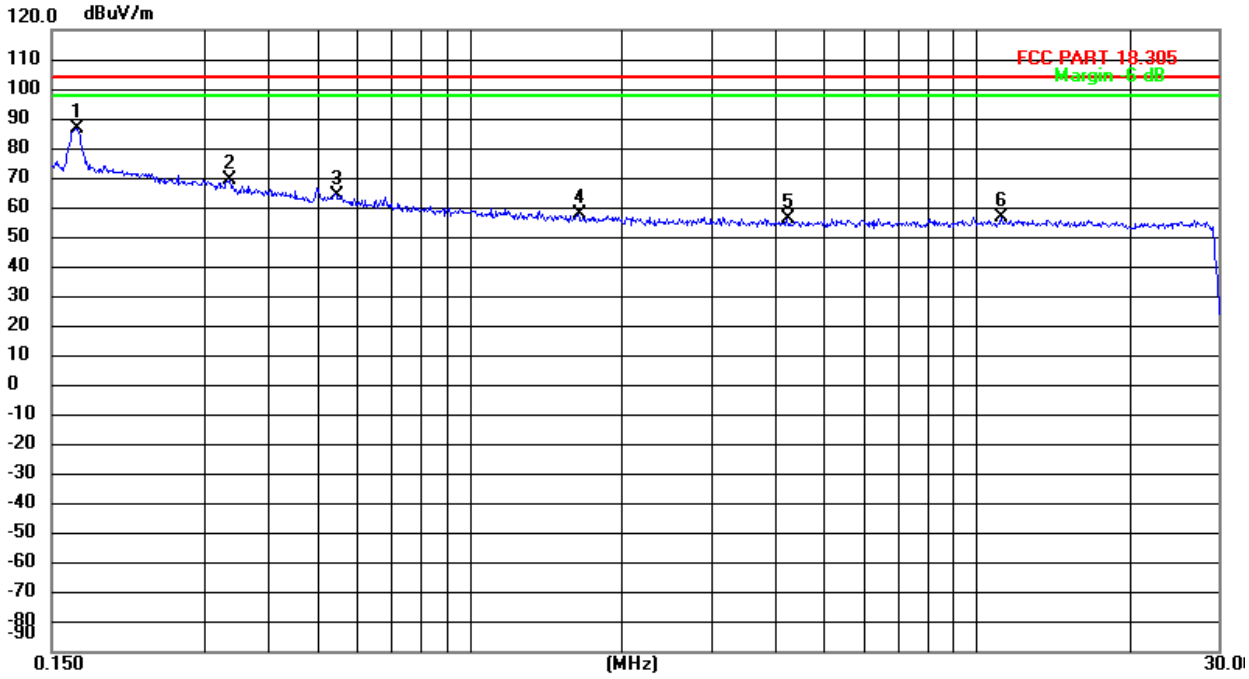
PASS.

Only report the worst test data (Mode 1) in test report;

The test data please refer to following page:

Temperature	24.6℃	Humidity	54.1%
Test Engineer	Jam Zheng	Configurations	Transmit

0.009 MHz – 30 MHz



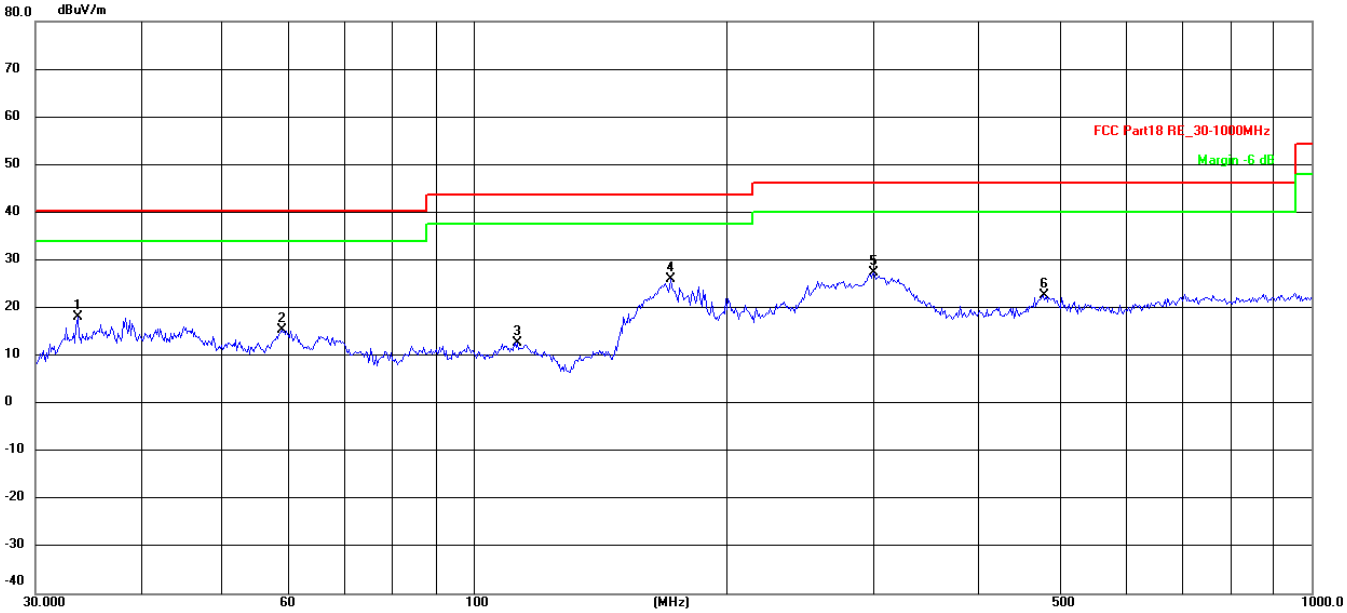
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.1677	66.49	20.36	86.85	103.50	-16.65	QP
2	0.3356	48.92	20.28	69.20	103.50	-34.30	QP
3	0.5464	43.99	20.28	64.27	103.50	-39.23	QP
4	1.6363	37.44	20.25	57.69	103.50	-45.81	QP
5	4.2242	36.11	20.24	56.35	103.50	-47.15	QP
6	11.1977	36.61	20.21	56.82	103.50	-46.68	QP

Remark: Measured at antenna position 0 degree and 90 degree, recorded worst case at 0 degree.
Margin= Reading level + Correct factor - Limit

Temperature	24.6℃	Humidity	54.1%
Test Engineer	Jam Zheng	Configurations	Transmit

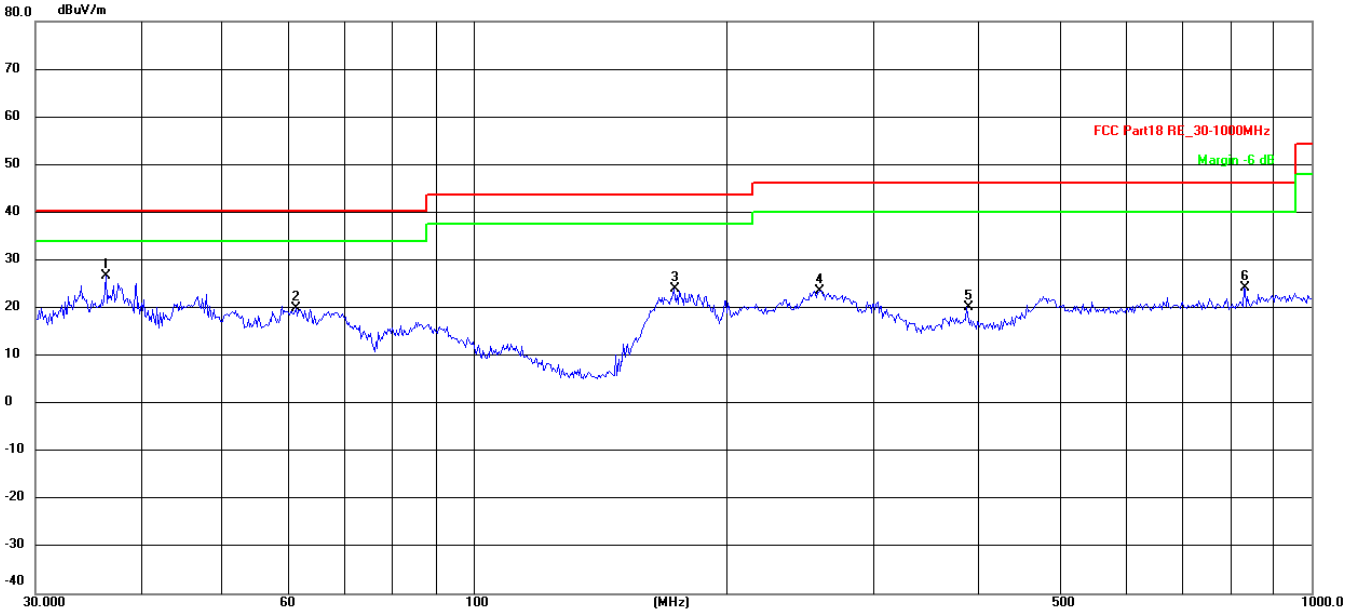
Below 1GHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	33.6802	37.49	-19.35	18.14	40.00	-21.86	QP
2	59.0251	32.08	-16.64	15.44	40.00	-24.56	QP
3	112.9196	30.56	-17.90	12.66	43.50	-30.84	QP
4 *	171.9946	46.04	-19.93	26.11	43.50	-17.39	QP
5	300.3672	41.95	-14.59	27.36	46.00	-18.64	QP
6	478.8456	33.91	-11.26	22.65	46.00	-23.35	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1 *	36.3814	43.79	-17.16	26.63	40.00	-13.37	QP
2	61.3463	37.13	-17.20	19.93	40.00	-20.07	QP
3	173.2051	43.79	-19.88	23.91	43.50	-19.59	QP
4	259.2338	39.02	-15.42	23.60	46.00	-22.40	QP
5	387.9920	32.51	-12.48	20.03	46.00	-25.97	QP
6	830.4002	30.89	-6.69	24.20	46.00	-21.80	QP

****Note: Pre-scan all modes and recorded the worst case results in this report.*
Margin= Reading level + Correct factor - Limit

8. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files for Test Setup Photos of the EUT.

9. EXTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

10. INTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF REPORT----------