



FCC Test Report

APPLICANT : Brightstar Corporation
EQUIPMENT : GSM mobile phone
BRAND NAME : Avvio
MODEL NAME : Avvio 200S, Avvio 200
FCC ID : WVBA200X
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Aug. 24, 2016 and testing was completed on Aug. 30, 2016. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

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REVISION HISTORY



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 4.01 dB at 0.350 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.28 dB at 228.180 MHz



1. General Description

1.1 Applicant

Brightstar Corporation

9725 NW 117th Ave.,Miami,Florida, FL 33178, United States

1.2 Manufacturer

KCMobile Co.,Ltd.

#1305-1, Kolon Digital Tower Billant II , 31, Digital-ro 30-gil, Guro-Gu, Seoul, KOREA (08390)

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM mobile phone
Brand Name	Avvio
Model Name	Avvio 200S, Avvio 200
FCC ID	WVBA200X
EUT supports Radios application	GSM/GPRS/ Bluetooth v3.0 + EDR
IMEI Code	Conduction: 861673000000557/861673000000546 Radiation: 861673000000535/861673000000524
HW Version	L1_MB_V1.1
SW Version	L1_CLARO_A200_V1_07_20160719
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two different types of EUT. They are single SIM card mobile (Model Name: Avvio 200) and dual SIM card mobile (Model Name: Avvio 200S). The others are the same including circuit design, PCB board, structure and all components. It is special to declare. After pre-scan two types of EUT, we found test result of the sample that dual SIM (Model Name: Avvio 200S) was the worst, so we chose dual SIM card mobile to perform all test.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Antenna Type	WWAN : PIFA Antenna Bluetooth : Monopole Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Test Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	Sporton Site No.	
	CO01-SZ	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH02-SZ	566869

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR FCC Part 15 Subpart B
- ANSI C63.4-2014

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.



2. Test Configuration of Equipment Under Test

2.1 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test modes as the worst cases and recorded in this report.

Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Charging Mode (EUT with adapter)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Note 1
2.	Data application transferred mode (EUT connected with notebook)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Abbreviations:

- EMI AC: AC conducted emissions
- EMI RE \geq 1G: EUT radiated emissions \geq 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Note 1: Testing for this mode is not required or not the worst case.

Remark: For signal above 1GHz, the worst case was test item 2.

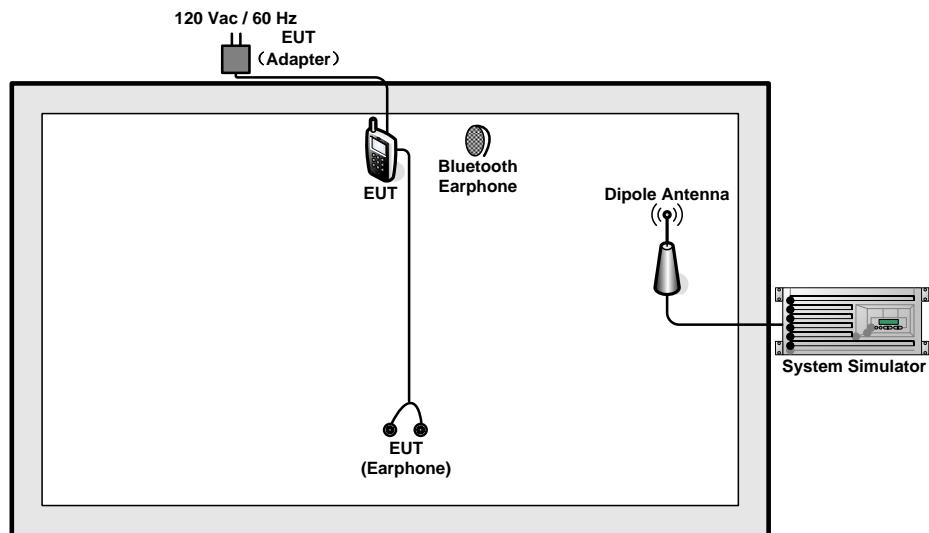


Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: GSM 850 Idle + Bluetooth Idle + Adapter + Earphone + Camera(Rear) + SIM1 <Fig.1> Mode 2: GSM 1900 Idle + Bluetooth Idle + Adapter + Earphone + MP3 + SIM2 < Fig.1> Mode 3: GSM 1900 Idle + Bluetooth Idle + USB Link(Data Link with Notebook) + Earphone + SIM2< Fig.2>
Radiated Emissions < 1GHz	1/2	Mode 1: GSM 850 Idle + Bluetooth Idle + Adapter + Earphone + Camera(Rear) + SIM1 <Fig.1> Mode 2: GSM 1900 Idle + Bluetooth Idle + Adapter + Earphone + MP3 + SIM2 <Fig.1> Mode 3: GSM 1900 Idle + Bluetooth Idle + USB Link(Data Link with Notebook) + Earphone + SIM2 <Fig.2>
Radiated Emissions \geq 1GHz	2	Mode 1: GSM 1900 Idle + Bluetooth Idle + USB Link(Data Link with Notebook) + Earphone + SIM2< Fig.2>

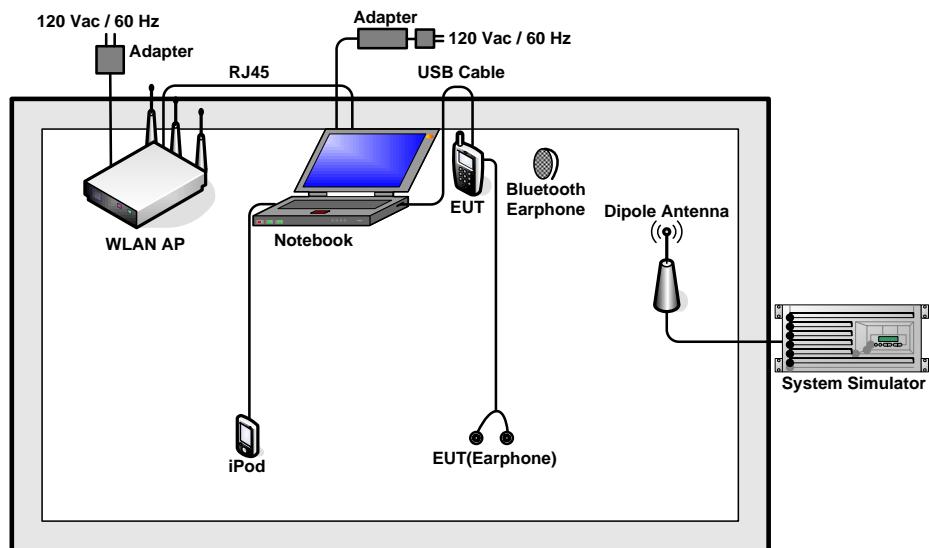
Remark:

1. The worst case of AC is mode 2; and the USB Link mode of AC is mode 3, the test data of these modes are reported.
2. The worst case of RE < 1G is mode 3; only the test data of this mode was reported.
3. Link with Notebook means data application transferred mode between EUT and Notebook.

2.2 Connection Diagram of Test System



<Fig.1>



<Fig.2>



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 2.7 m
3.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
4.	Bluetooth Earphone	Samsung	HS3000	A3LHS3000	N/A	N/A
5.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	SD Card	SanDisk	4G class 4	FCC DoC	N/A	N/A
7.	SD Card	Kingston	3300-10000-078	FCC DoC	N/A	N/A
8.	iPod nano 8GB	Apple	MC690 ZP/A	FCC DoC	Shielded, 1.2 m	N/A
9.	USB Cable	ECOMOTO	SKN6378A	FCC DoC	Shielded, 1.2 m	N/A



2.4 EUT Operation Test Setup

The EUT was in GSM idle mode during the testing. The EUT was synchronized to the BCCH, and was in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between notebook and EUT via USB cable.
2. Execute "Music Player" to play MP3 file.
3. Turn on camera to capture images.



3. Test Result

3.1 Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment that 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 the limits in the following table.

Frequency of emission (MHz)	Conducted 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.

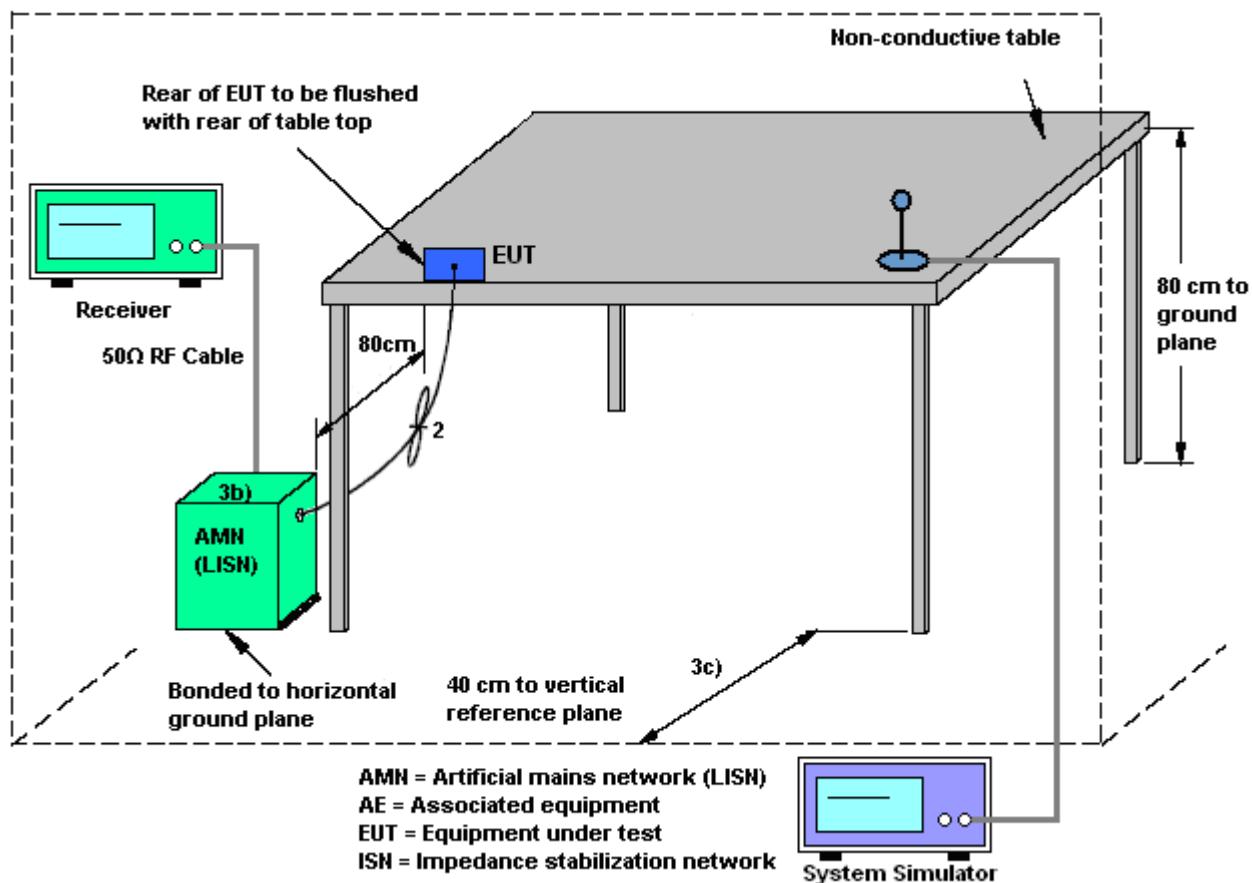
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

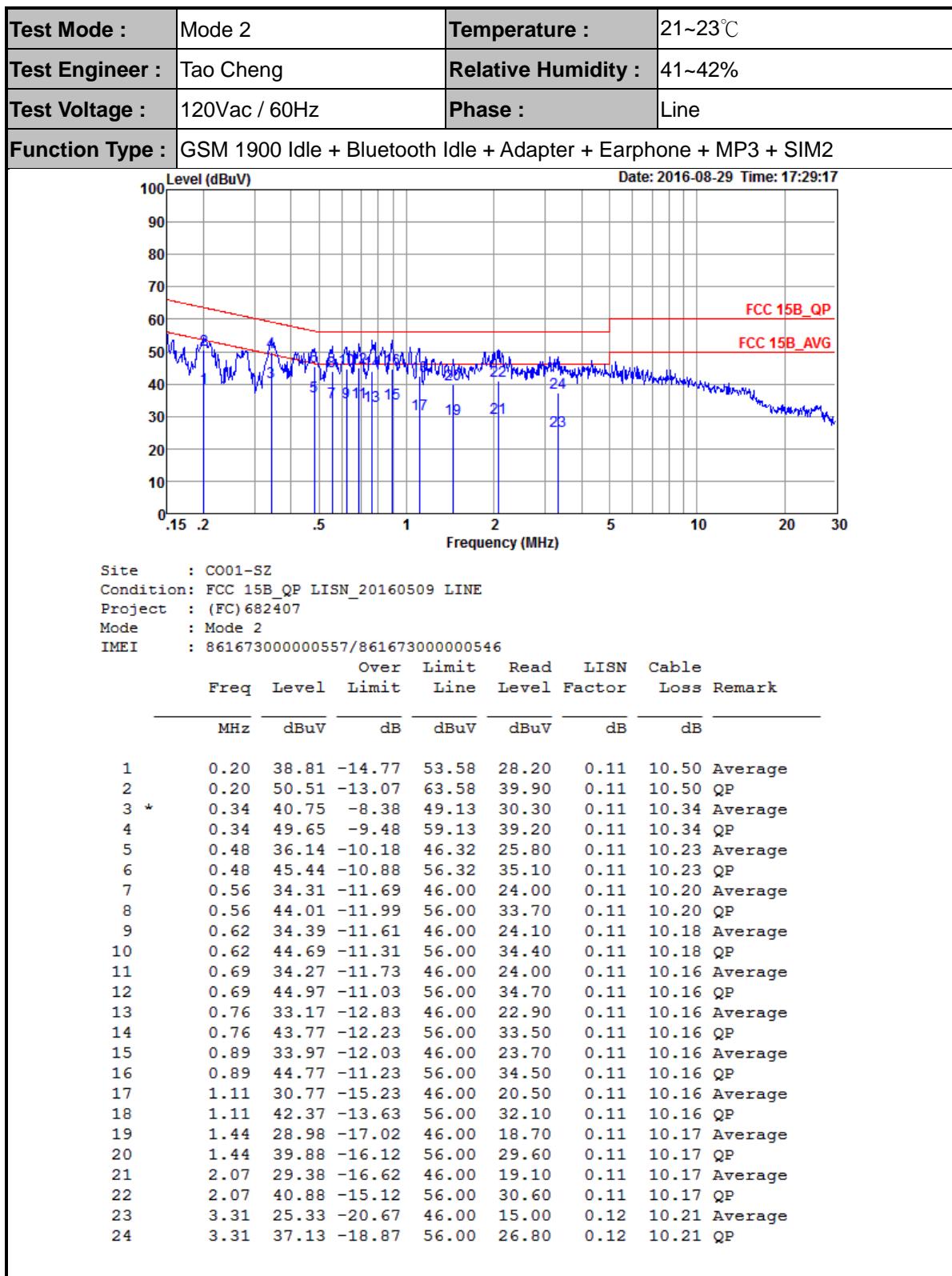
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

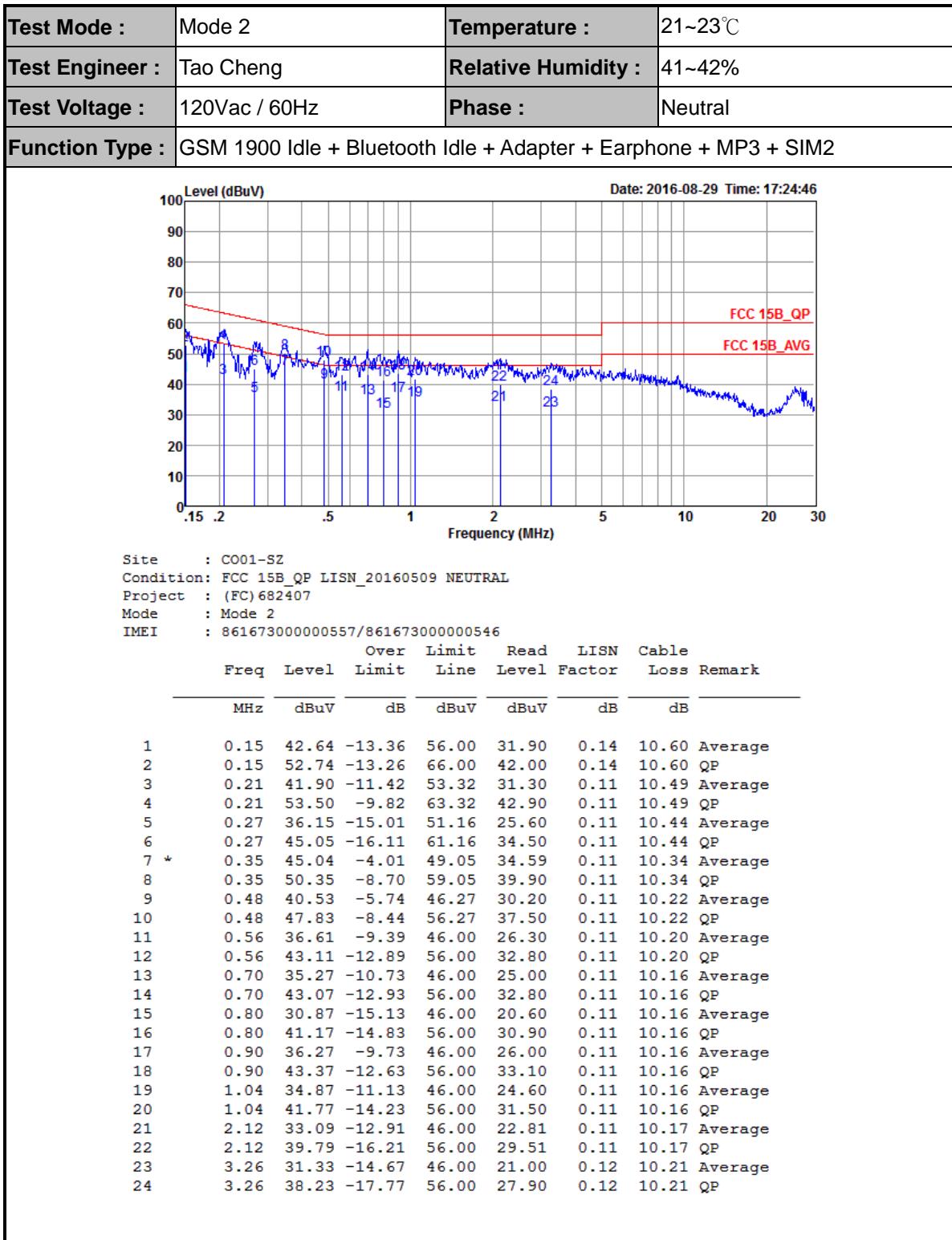
3.1.4 Test Setup

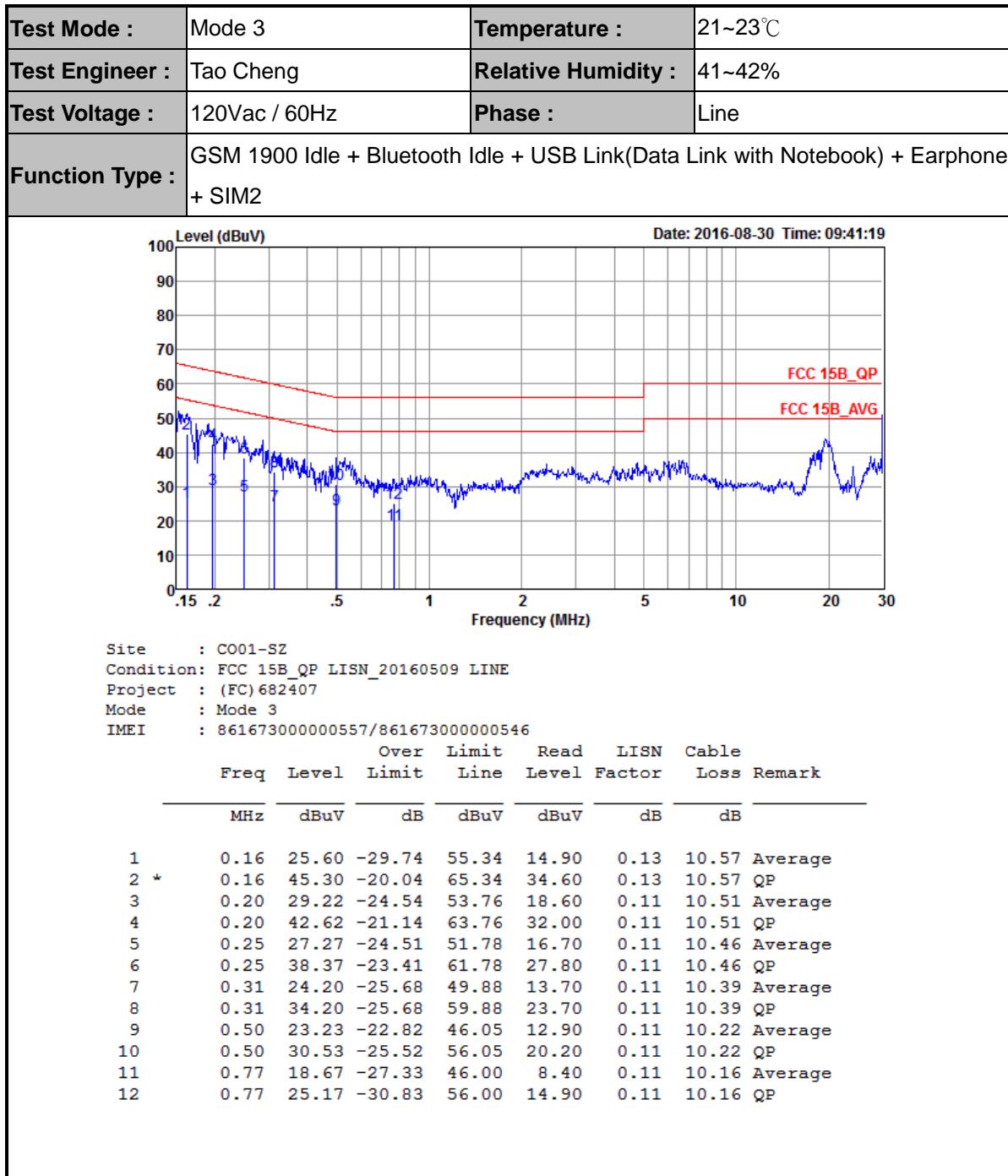


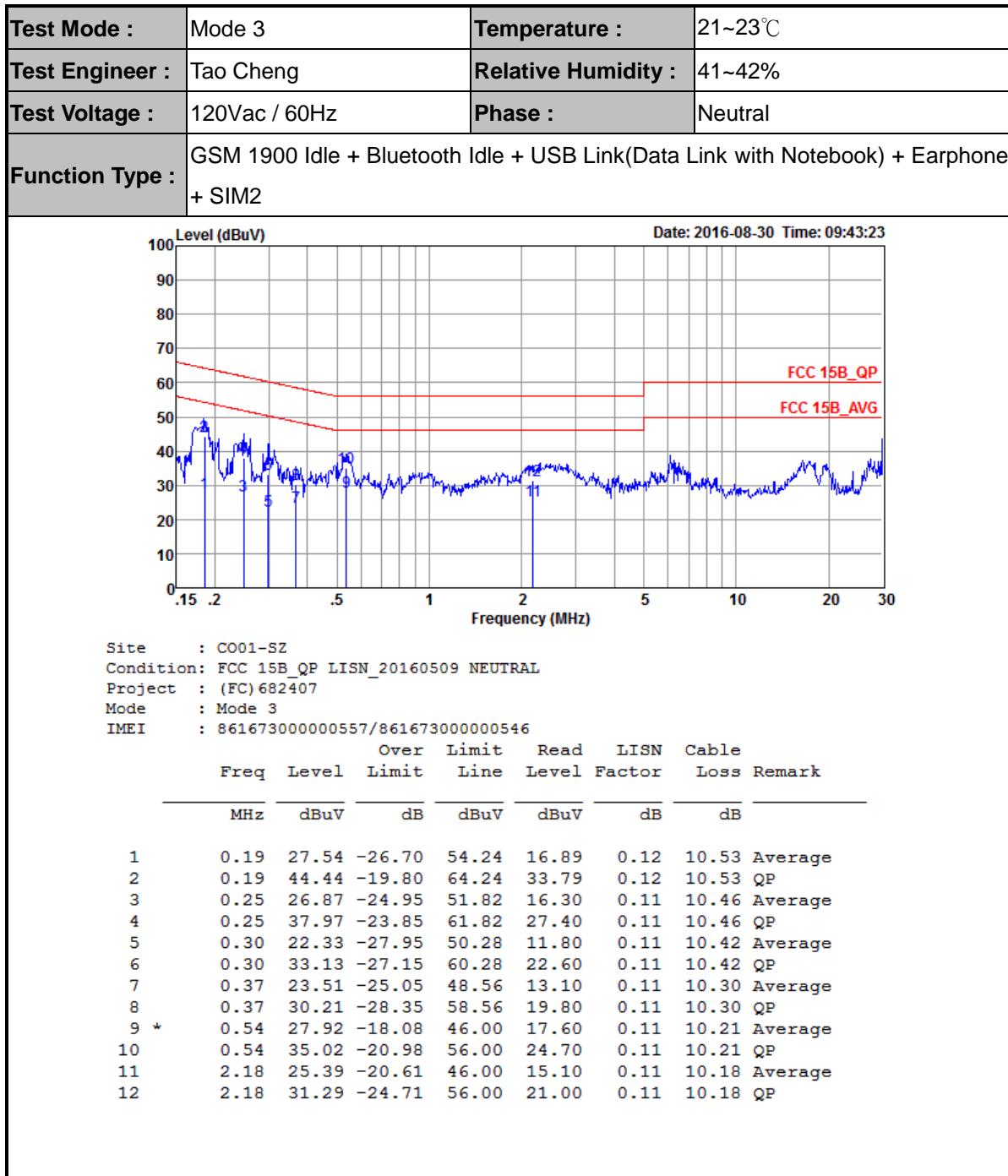


3.1.5 Test Result of AC Conducted Emission











3.2 Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

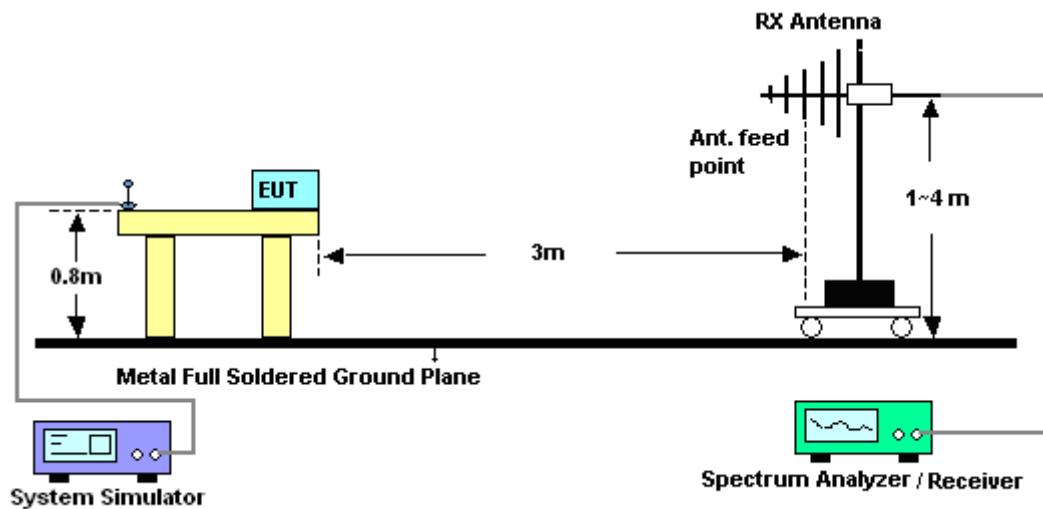
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

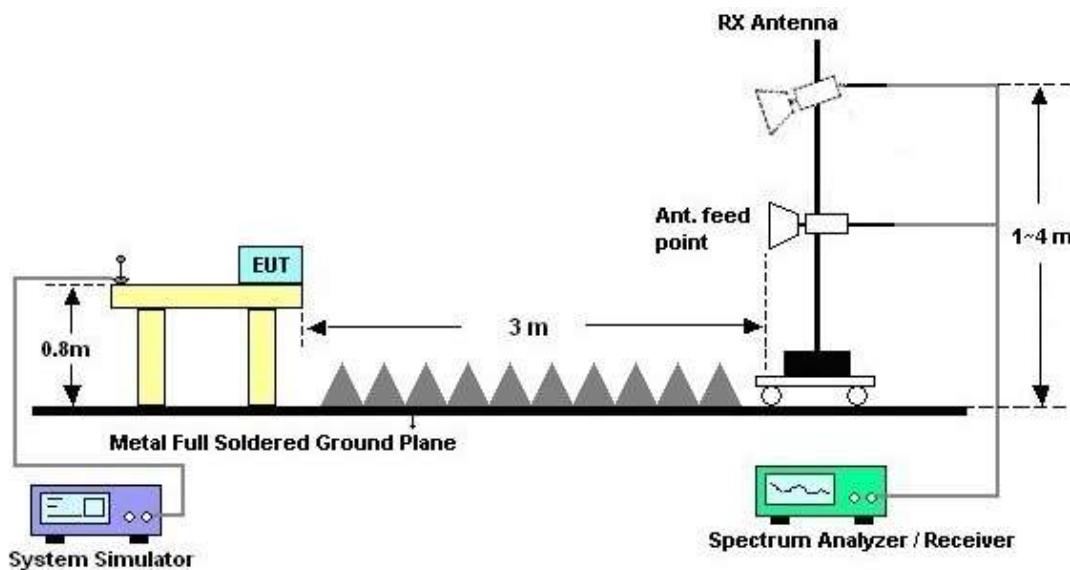
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 3	Temperature :	23~25°C
Test Engineer :	Liang liang LU	Relative Humidity :	48~52%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM 1900 Idle + Bluetooth Idle + USB Link(Data Link with Notebook) + Earphone + SIM2		

Level (dBuV/m)

Date: 2016-08-30

FCC CLASS-B

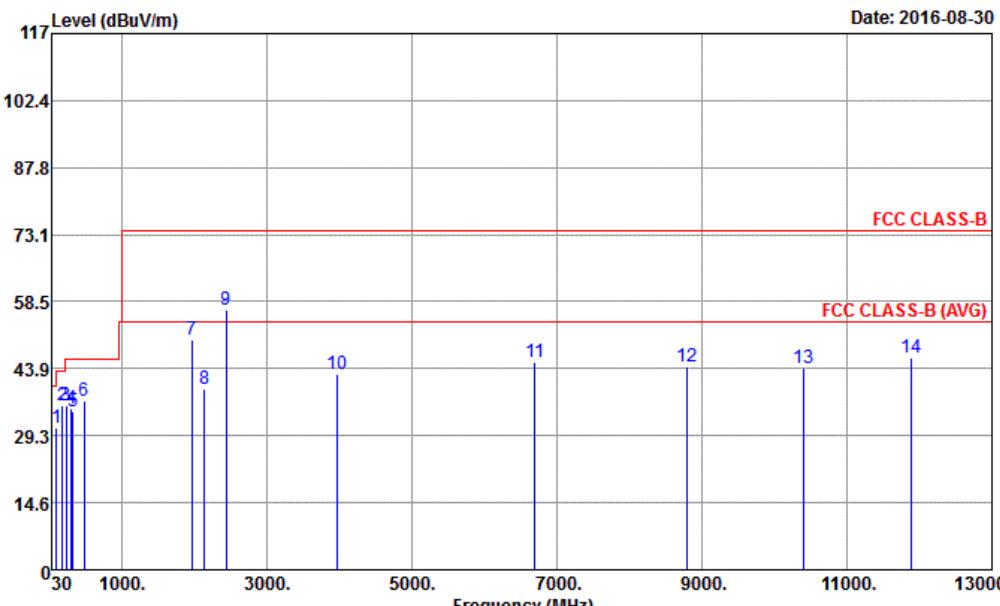
FCC CLASS-B (AVG)

Frequency (MHz)

Site	: 03CH02-SZ
Condition	: FCC CLASS-B 3m LF_ANT41909_6 HORIZONTAL
Project	: (FC)682407
Mode	: Mode 3
IMEI	: 86167300000535/86167300000524
Plane	: Y

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		Line	Level	Factor	dBuV	dB/m	dB	dB	cm	
MHz	dBuV/m		dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	102.09	39.26	-4.24	43.50	53.31	16.56	0.96	31.57	---	--- Peak
2	179.85	38.39	-5.11	43.50	52.25	16.29	1.17	31.32	---	--- Peak
3	228.18	42.72	-3.28	46.00	56.11	16.61	1.27	31.27	135	60 Peak
4	300.00	38.31	-7.69	46.00	48.70	19.50	1.44	31.33	---	--- Peak
5	474.30	37.56	-8.44	46.00	44.73	22.27	1.73	31.17	---	--- Peak
6	743.80	32.29	-13.71	46.00	35.39	25.98	2.15	31.23	---	--- Peak
7	1960.00	48.12	-25.88	74.00	76.83	25.15	3.43	57.29	---	--- Peak
8	2440.00	52.80	-21.20	74.00	79.59	26.10	3.84	56.73	---	--- Peak
9	2636.00	39.63	-34.37	74.00	65.67	26.63	4.05	56.72	---	--- Peak
10	3876.00	44.64	-29.36	74.00	68.46	28.63	5.02	57.47	---	--- Peak
11	6932.00	45.91	-28.09	74.00	64.04	32.95	6.86	57.94	---	--- Peak
12	7678.00	50.54	-30.50	74.00	64.23	36.12	7.04	56.85	---	--- Peak
13	9532.00	41.36	-32.64	74.00	52.30	37.41	8.11	56.46	---	--- Peak
14	11846.00	46.72	-27.28	74.00	54.81	39.40	8.93	56.42	100	0 Peak



Test Mode :	Mode 3	Temperature :	23~25°C							
Test Engineer :	Liang liang LU	Relative Humidity :	48~52%							
Test Distance :	3m	Polarization :	Vertical							
Function Type :	GSM 1900 Idle + Bluetooth Idle + USB Link(Data Link with Notebook) + Earphone + SIM2									
 <p>Level (dBuV/m) Date: 2016-08-30</p> <p>FCC CLASS-B</p> <p>FCC CLASS-B (AVG)</p> <p>Frequency (MHz)</p>										
Site	: 03CH02-SZ									
Condition	: FCC CLASS-B 3m LF_ANT41909_6 VERTICAL									
Project	: (FC)682407									
Mode	: Mode 3									
IMEI	: 86167300000535/86167300000524									
Plane	: Y									
	Over Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos				
	Freq	Level	Line	Level	Factor	Loss	Factor	Remark		
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	102.09	30.97	-12.53	43.50	45.02	16.56	0.96	31.57	---	--- Peak
2	179.85	35.69	-7.81	43.50	49.55	16.29	1.17	31.32	100	20 Peak
3	227.91	35.89	-10.11	46.00	49.28	16.61	1.27	31.27	---	--- Peak
4	300.00	35.32	-10.68	46.00	45.71	19.50	1.44	31.33	---	--- Peak
5	323.80	34.57	-11.43	46.00	44.65	19.79	1.44	31.31	---	--- Peak
6	479.90	36.88	-9.12	46.00	43.87	22.45	1.73	31.17	---	--- Peak
7	1960.00	50.07	-23.93	74.00	78.78	25.15	3.43	57.29	---	--- Peak
8	2142.00	39.55	-34.45	74.00	67.56	25.48	3.61	57.10	---	--- Peak
9	2440.00	56.55	-17.45	74.00	83.34	26.10	3.84	56.73	---	--- Peak
10	3964.00	42.63	-31.37	74.00	66.39	28.68	5.07	57.51	---	--- Peak
11	6696.00	45.20	-28.80	74.00	63.15	32.76	6.85	57.56	---	--- Peak
12	8802.00	44.45	-29.55	74.00	54.53	37.28	7.59	54.95	---	--- Peak
13	10392.00	44.00	-30.00	74.00	54.37	37.87	8.22	56.46	---	--- Peak
14	11882.00	46.28	-27.72	74.00	54.36	39.45	8.93	56.46	150	100 Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100724	9kHz~3GHz;	Nov. 23, 2015	Aug. 29, 2016~ Aug. 30, 2016	Nov. 22, 2016	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan. 12, 2016	Aug. 29, 2016~ Aug. 30, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 12, 2016	Aug. 29, 2016~ Aug. 30, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 16, 2016	Aug. 29, 2016~ Aug. 30, 2016	Jul. 15, 2017	Conduction (CO01-SZ)
Pulse Limiter	COM-POWER	LIT-153 Transient Limiter	53139	150kHz~30MHz	Oct. 20, 2015	Aug. 29, 2016~ Aug. 30, 2016	Oct. 19, 2016	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz; Max 30dBm	Oct. 20, 2015	Aug. 30, 2016	Oct. 19, 2016	Radiation (03CH02-SZ)
Spectrum Analyzer	R&S	FSV40	101041	10kHz~40GHz; Max 30dBm	Oct. 20, 2015	Aug. 30, 2016	Oct. 19, 2016	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	May 21, 2016	Aug. 30, 2016	May 20, 2017	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 11, 2016	Aug. 30, 2016	Jan. 10, 2017	Radiation (03CH02-SZ)
Amplifier	HP	8447F	3113A04622	9kHz~1300MHz / 30 dB	Jul. 16, 2016	Aug. 30, 2016	Jul. 15, 2017	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-001 01800-30-10 P-R	1943528	1GHz~18GHz	Oct. 20, 2015	Aug. 30, 2016	Oct. 19, 2016	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct. 20, 2015	Aug. 30, 2016	Oct. 19, 2016	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Aug. 30, 2016	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Aug. 30, 2016	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Aug. 30, 2016	NCR	Radiation (03CH02-SZ)

NCR: No Calibration Required



5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.2 dB
---------------------------------------------------------------------	--------

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1 dB
---------------------------------------------------------------------	--------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0 dB
---------------------------------------------------------------------	--------