FCC Test Report

APPLICANT : Brightstar Corporation EQUIPMENT : CDMA mobile phone

BRAND NAME : Avvio

MODEL NAME : Avvio C622 FCC ID : WVBAC622X

STANDARD : FCC 47 CFR FCC Part 15 Subpart B

CLASSIFICATION: Certification

The product was received on Dec. 04, 2015 and testing was completed on Dec. 24, 2015. 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 C63.4-2009 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.

Prepared by: Andy Yeh / Manager

Andy Jeh

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.

1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China

SPORTON INTERNATIONAL (SHENZHEN) INC.

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Testing Laboratory

Report No.: FC5D0405

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC5D0405	Rev. 01	Initial issue of report	Dec. 29, 2015

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SUMMARY OF TEST RESULT

Report Section	FCC Rule Description		FCC Rule Description Limit		Result	Remark
					Under limit	
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	18.01 dB at	
					0.150 MHz	
					Under limit	
3.2	15.109	15.109 Radiated Emission	< 15.109 limits	PASS	3.24 dB at	
					288.120 MHz	

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1. General Description

1.1. Applicant

Brightstar Corporation

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

1.2. Manufacturer

Lakia Networks Co., Ltd.

2F, Unit A, Technology Service Building, Software Garden 1, Xiamen, Fujian, China

1.3. Product Feature of Equipment Under Test

	Product Feature		
Equipment	CDMA mobile phone		
Brand Name	Avvio		
Model Name	Avvio C622		
FCC ID	WVBAC622X		
EUT supports Radios application	CDMA		
MEID Code	Conduction: A100002107E095		
WEID Code	Radiation: A100002107E096		
HW Version	MC6022 V1.2		
SW Version	C622_V0.1.0		
EUT Stage	Identical Prototype		

Remark:

The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

SPORTON INTERNATIONAL (SHENZHEN) INC.

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1.4. Product Specification subjective to this standard

Product Specification subjective to this standard						
Tx Frequency	CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz					
Rx Frequency	CDMA2000 BC0 : 869.70 MHz ~ 893.31 MHz CDMA2000 BC1 : 1931.25 MHz ~ 1988.75 MHz					
Antenna Type	WWAN : PIFA Antenna					
Type of Modulation	CDMA2000 : QPSK					

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.					
	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili				
Test Site Location	Town, Nanshan District, Shenzhen, Guangdong, P. R. China				
rest site Location	TEL: +86-755-8637-9589				
	FAX: +86-755-8637-9595				
Toot Site No	Sporton Site No.				
Test Site No.	CO01-SZ				

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.				
	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan				
Test Site Location	warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China				
	TEL: +86-755- 3320-2398				
Toot Site No	Sporton Site No. FCC Registration No.				
Test Site No.	03CH02-SZ 566869				

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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 C63.4-2009

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

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2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2009 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.

		Test Condition			
Item	EUT Configuration		EMI RE<1G	EMI RE≥1G	
1	Charging Mode (EUT with adapter)	AC 🖂		Note 1	
2.	Data application transferred mode			14010-1	
	(EUT connected with notebook)				

Abbreviations:

EMI AC: AC conducted emissions

EMI RE ≥ 1G: EUT radiated emissions ≥ 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.

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Test Items	EUT Configure Mode	Function Type
	1/2	Mode 1: CDMA2000 BC0 Idle + USB Cable (Charging from Adapter) + Earphone + Camera + Battery <fig.1></fig.1>
AC Conducted Emission		Mode 2: CDMA2000 BC1 Idle + USB Cable (Charging from Adapter) + Earphone + MPEG4 + Battery <fig.1></fig.1>
		Mode 3: CDMA2000 BC0 Idle + USB Cable (Data Link with Notebook) + Earphone + SD Card + Battery <fig.2></fig.2>
	ted < 1GHz	Mode 1: CDMA2000 BC0 Idle + USB Cable (Charging from Adapter) + Earphone + Camera + Battery <fig.1></fig.1>
Radiated Emissions < 1GHz		Mode 2: CDMA2000 BC1 Idle + USB Cable (Charging from Adapter) + Earphone + MPEG4 + Battery <fig.1></fig.1>
		Mode 3: CDMA2000 BC0 Idle + USB Cable (Data Link with Notebook) + Earphone + SD Card + Battery <fig.2></fig.2>
Radiated Emissions ≥ 1GHz	2	Mode 1: CDMA2000 BC0 Idle + USB Cable (Data Link with Notebook) + Earphone + SD Card + Battery <fig.2></fig.2>

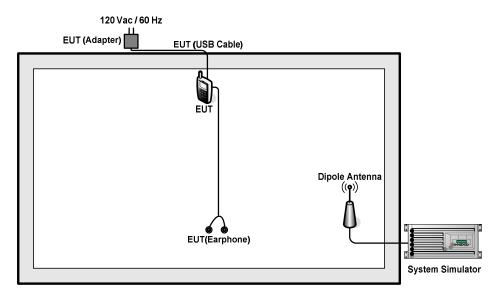
Remark:

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

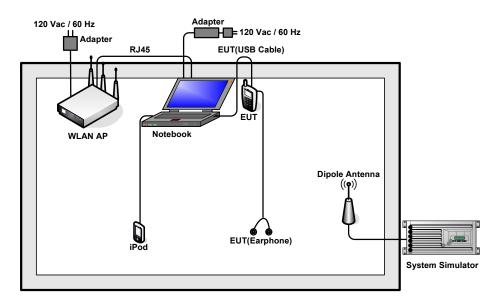
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2.2. Connection Diagram of Test System



<Fig.1>



<Fig.2>

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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.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	WLAN AP	ASUSTek	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 2.7 m with Core
5.	SD Card	SanDisk	4G class 4	FCC DoC	N/A	N/A
6.	iPod nano 8GB	Apple	MC690ZP/A	FCC DoC	Unshielded, 1.2 m	N/A
7.	iPod	Apple	MC525 ZP/A	FCC DoC	Shielded, 1.0 m	N/A

2.4. EUT Operation Test Setup

The EUT was in CDMA2000 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 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 "Video Player" to play MPEG4 files.
- 3. Turn on camera to capture images.

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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	Conducted	limit (dBuV)
(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.

3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

- 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.

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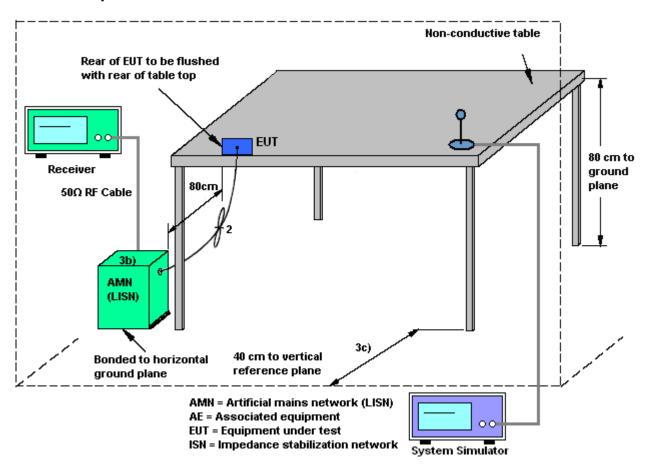
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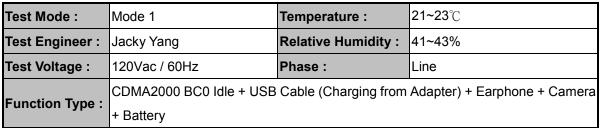
3.1.4 Test Setup

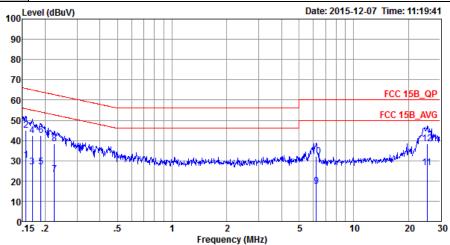


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3.1.5 Test Result of AC Conducted Emission





Site : CO01-SZ

Condition: FCC 15B_QP LISN_L_20150304 LINE

Project : (FC)5D0405 Mode : Mode 1 MEID : A100002107E095

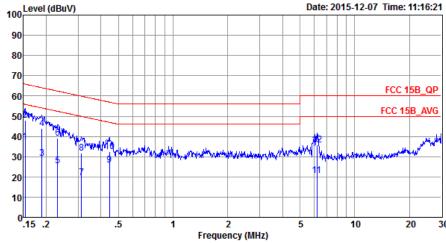
				Over	Limit	Read	LISN	Cable	
		Freq	Level	Limit	Line	Level	Factor	Loss	Remark
	-	MHz	dBuV	dB	dBu∀	dBuV	dB	——dB	
		MITZ	abuv	αь	abav	abuv	αь	ав	
1		0.16	30.19	-25.46	55.65	19.40	0.44	10.35	Average
2	*	0.16	45.09	-20.56	65.65	34.30	0.44	10.35	QP
3		0.17	26.80	-28.14	54.94	16.00	0.47	10.33	Average
4		0.17	42.60	-22.34	64.94	31.80	0.47	10.33	QP
5		0.19	27.11	-26.95	54.06	16.30	0.50	10.31	Average
6		0.19	42.31	-21.75	64.06	31.50	0.50	10.31	QP
7		0.22	23.40	-29.26	52.66	12.60	0.53	10.27	Average
8		0.22	38.30	-24.36	62.66	27.50	0.53	10.27	QP
9		6.22	17.23	-32.77	50.00	6.30	0.66	10.27	Average
10		6.22	32.03	-27.97	60.00	21.10	0.66	10.27	QP
11		25.32	26.47	-23.53	50.00	15.11	0.81	10.55	Average
12		25.32	38.47	-21.53	60.00	27.11	0.81	10.55	QP

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Test Mode :	Mode 1	Temperature :	21~23℃				
Test Engineer :	Jacky Yang	Relative Humidity :	41~43%				
Test Voltage :	120Vac / 60Hz	Phase :	Neutral				
Function Type :	CDMA2000 BC0 Idle + USB	Cable (Charging from	Adapter) + Earphone + Camera				
Function Type :	+ Battery						
1	evel (dBuV)	Date:	2015-12-07 Time: 11:16:21				



Site : CO01-SZ Condition: FCC 15B_QP LISN_N_20150304 NEUTRAL

Project : (FC)5D0405 Mode : Mode 1

MEID : A100002107E095

			Over	Limit	Read	LISN	Cable	
	Freq	Level	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBu∀	dB	dBuV	dBuV	dB	dB	
1	0.15	37.41	-18.41	55.82	26.60	0.45	10.36	Average
2 *	0.15	47.81	-18.01	65.82	37.00	0.45	10.36	QP
3	0.19	29.11	-24.95	54.06	18.30	0.50	10.31	Average
4	0.19	43.91	-20.15	64.06	33.10	0.50	10.31	QP
5	0.23	25.40	-26.99	52.39	14.60	0.54	10.26	Average
6	0.23	39.00	-23.39	62.39	28.20	0.54	10.26	QP
7	0.31	19.48	-30.40	49.88	8.70	0.58	10.20	Average
8	0.31	31.58	-28.30	59.88	20.80	0.58	10.20	QP
9	0.45	25.84	-21.09	46.93	15.10	0.58	10.16	Average
10	0.45	32.64	-24.29	56.93	21.90	0.58	10.16	QP
11	6.19	20.74	-29.26	50.00	9.80	0.68	10.26	Average
12	6.19	35.64	-24.36	60.00	24.70	0.68	10.26	QP

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LAB.	FCC Test Report

Test Mode :	Mode 3			Ten	Temperature :			21~23 ℃		
Test Engineer :	Jacky Yang			Rela	Relative Humidity :			41~43%		
Test Voltage :	120Vac /	60Hz		Pha	se:		Line			
Eunation Type :	CDMA20	000 BC	Oldle +	USB Ca	ıble (Da	ata Link w	ith No	tebook) + E	arphone + SD	
Function Type :	Card + B	attery								
100 ^L	evel (dBuV)					Date	e: 2015-1	2-07 Time: 11:42	2:15	
									1	
90										
80										
70										
70								ECC 4ED (on.	
60								FCC 15B_0	ap-	
50	-							FCC 15B_A	<u>VG</u>	
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20										
10										
0										
· ·	15 .2	.5	1		2 2004 (MHz)	5	10) 20	30	
				Frequ	ency (MHz))				
Site	: CO01-S		CN T 2011		NTE.					
	n: FCC 15 : (FC)5D		2N_L_201;	00304 LI	NE					
Mode	: Mode 3									
MEID	: A10000	2107E09	5							
I			Over	Limit	Read	LISN	Cable			
	Freq	Level	Limit	Line	Level	Factor	Loss	Remark		
_	MHz	dBu₹	dB	dBu₹	dBuV	dB	dB		_	
1	0.26	25.29	-26.13	51.42	14.51	0.55	10.23	Average		
2	0.26		-20.43			0.55	10.23			
3	0.36	24.93	-23.85	48.78	14.20	0.55		Average		
4	0.36		-22.95		25.10	0.55	10.18	QP		
5	0.41		-24.66			0.55		Average		
6	0.41		-20.76				10.17			
7	0.46							Average		
8 9	0.46		-21.08			0.62	10.16			
10	0.59 0.59		-21.54 -19.34			0.61 0.61	10.15	Average		
11	0.70		-21.01		14.30	0.54		Qr Average		
12 *	0.70			56.00		0.54	10.15	_		
		_	_	_		_		-		

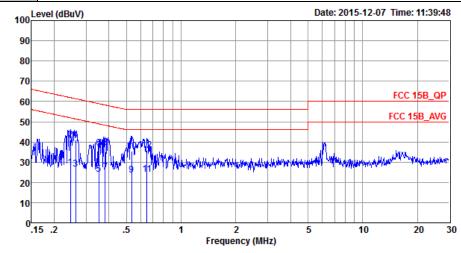
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Test Mode :	Mode 3	Temperature :	21~23 ℃				
Test Engineer :	Jacky Yang	Relative Humidity :	41~43%				
Test Voltage :	120Vac / 60Hz	Phase :	Neutral				
Euratian Tuna	CDMA2000 BC0 Idle + USB Cable (Data Link with Notebook) + Earphone + SD						
Function Type :	Card + Battery						



Site : CO01-SZ

Condition: FCC 15B_QP LISN_N_20150304 NEUTRAL

Project : (FC)5D0405 Mode : Mode 3 MEID : A100002107F

MEID : A100002107E095

			Over	Limit	Read	LISN	Cable	
	Freq	Level	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBu∀	dBuV	dB	dB	
1	0.25	27.20	-24.71	51.91	16.40	0.55	10.25	Average
2	0.25	40.90	-21.01	61.91	30.10	0.55	10.25	QP
3	0.26	26.49	-24.85	51.34	15.70	0.56	10.23	Average
4	0.26	41.09	-20.25	61.34	30.30	0.56	10.23	QP
5	0.35	23.95	-24.96	48.91	13.20	0.57	10.18	Average
6	0.35	37.05	-21.86	58.91	26.30	0.57	10.18	QP
7	0.38	25.03	-23.22	48.25	14.29	0.56	10.18	Average
8	0.38	37.33	-20.92	58.25	26.59	0.56	10.18	QP
9	0.53	23.45	-22.55	46.00	12.70	0.60	10.15	Average
10	0.53	35.25	-20.75	56.00	24.50	0.60	10.15	QP
11	0.65	23.81	-22.19	46.00	13.10	0.56	10.15	Average
12 *	0.65	35.91	-20.09	56.00	25.20	0.56	10.15	QP

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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	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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

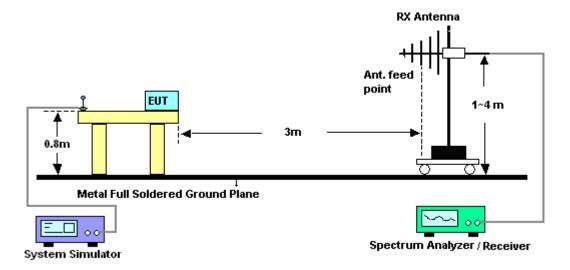
- 1. The EUT was placed on a turntable with 0.8 meter above ground.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest radiation.
- 4. The 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.
- 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

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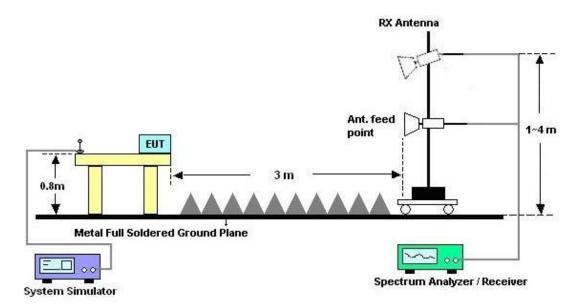
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3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



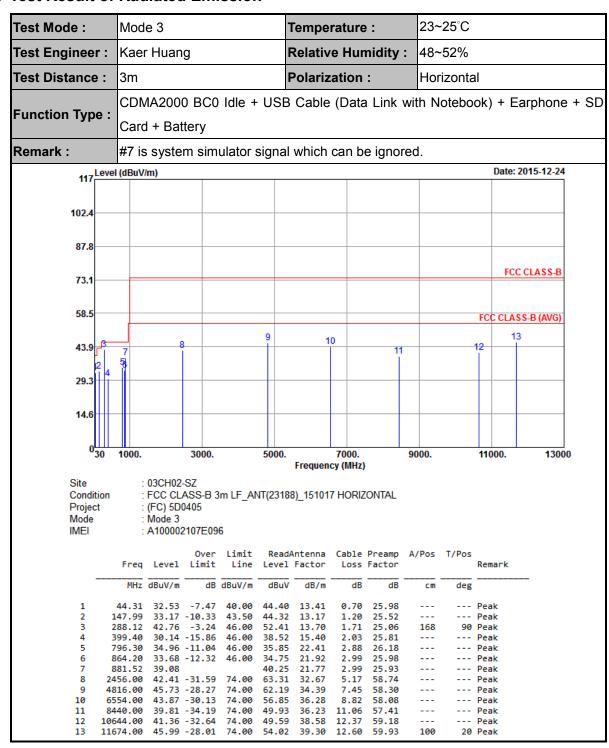
For radiated emissions above 1GHz



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3.2.5. Test Result of Radiated Emission



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23~25°C Test Mode: Mode 3 Temperature: Test Engineer: **Relative Humidity:** 48~52% Kaer Huang Polarization: Test Distance: 3m Vertical CDMA2000 BC0 Idle + USB Cable (Data Link with Notebook) + Earphone + SD **Function Type:** Card + Battery Remark: #7 is system simulator signal which can be ignored. 117 Level (dBuV/m) Date: 2015-12-24 102.4 87.8 FCC CLASS-B 73.1 58.5 FCC CLASS-B (AVG) 12 43.9 29.3 14.6 30 1000. 3000. 5000. 7000. 9000. 11000. 13000 Frequency (MHz) Site : 03CH02-SZ Condition : FCC CLASS-B 3m LF_ANT(23188)_151017 VERTICAL Project : (FC) 5D0405 Mode : Mode 3 IMEI : A100002107E096 ReadAntenna Cable Preamp A/Pos T/Pos Over Limit ReadAntenna Freq Level Limit Line Level Factor Remark Loss Factor MHz dBuV/m dB dBuV/m dBuV dB/m dB dB deg cm 32.80 -7.20 27.23 -16.27 60 Peak 44.31 40.00 44.67 13.41 0.70 25.98 158 199.83 43.50 --- Peak 39.38 11.60 1.50 25.25 ---26.43 -19.57 294.06 46.00 35.87 13.90 1.71 25.05 Peak 456.10 30.38 -15.62 46.00 36.76 17.63 2.10 26.11 --- Peak --- Peak 715.10 33.11 -12.89 46.00 36.12 20.62 2.71 26.34 799.10 32.72 -13.28 46.00 33.53 22.48 2.88 26.17 --- Peak 881.52 37.28 21.77 38.45 --- Peak 2.99 25.93

10

11

12

2594.00

4888.00

6576.00

8502.00

10528.00

39.23 -34.77

41.53 -32.47

43.10 -30.90

43.93 -30.07

44.99 -29.01

46.61 -27.39

74.00

74.00

74.00

74.00

74.00

74.00

59.93

58.34

56.10

54.03

53.24

55.14

32.78

34.44

36.27

36.20

38.51

5.35

7.50

8.82

11.06

12.30

58.75

58.09

57.36

59.06

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Peak

--- Peak --- Peak

--- Peak

--- Peak

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4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz;Ma x 30dBm	Oct. 20, 2015	Dec. 24, 2015	Oct. 19, 2016	Radiation (03CH02-SZ)
Spectrum Analyzer	R&S	FSV40	101041	10kHz~40GHz; Max 30dBm	Oct. 20, 2015	Dec. 24, 2015	Oct. 19, 2016	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	May 06, 2015	Dec. 24, 2015	May 05, 2016	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 17, 2015	Dec. 24, 2015	Oct. 16, 2016	Radiation (03CH02-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz ~3000MHz / 30 dB	Jan. 28, 2015	Dec. 24, 2015	Jan. 27, 2016	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct. 20, 2015	Dec. 24, 2015	Oct. 19, 2016	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	61601000247 0	N/A	NCR	Dec. 24, 2015	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Dec. 24, 2015	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Dec. 24, 2015	NCR	Radiation (03CH02-SZ)
EMI Receiver	R&S	ESCI7	100724	9kHz~3GHz;	Jan. 28, 2015	Dec. 07, 2015	Jan. 27, 2016	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	103892	9kHz~30MHz	Feb. 02, 2015	Dec. 07, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	AN3016	16850	9kHz~30MHz	Feb. 02, 2015	Dec. 07, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	61602000089 1	100Vac~250Vac	Aug. 07, 2015	Dec. 07, 2015	Aug. 06, 2016	Conduction (CO01-SZ)
Pulse Limiter	COM-POWER	LIT-153 Transient Limiter	53139	150kHz~30MHz	Oct. 20, 2015	Dec. 07, 2015	Oct. 19, 2016	Conduction (CO01-SZ)

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5. Uncertainty of Evaluation

<u>Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)</u>

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of	5.0dB
Confidence of 95% (U = 2Uc(y))	5.00B

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