



FCC RF Test Report

APPLICANT : Yulong Computer Telecommunication
Scientific (Shenzhen) Co., Ltd.
EQUIPMENT : Smartphone
BRAND NAME : Coolpad
MODEL NAME : Coolpad 3300A
FCC ID : R38YL3300A
STANDARD : FCC 47 CFR Part 2, and 90(S)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jan. 28, 2015 and testing was completed on Mar. 04, 2015. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown 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.

Reviewed by: Joseph Lin / Supervisor

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**

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW512807	Rev. 01	Initial issue of report	Mar. 16, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A , Reporting only	PASS	-
3.2	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	N/A, Reporting only	PASS	-
3.3	§2.1051 §90.691	Emission masks – In-band emissions	$< 50+10\log_{10}(P[\text{Watts}])$	PASS	-
3.4	§2.1051 §90.691	Emission masks – Out of band emissions	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	-
3.5	§2.1053 §90.691	Field Strength of Spurious Radiation	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 25.90 dB at 2461.500 MHz
3.6	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	$< 2.5 \text{ ppm}$	PASS	-

1 General Description

1.1 Applicant

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.

Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial Park(North), Nanshan district, Shenzhen, P.R.C.

1.2 Manufacturer

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.

Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial Park(North), Nanshan district, Shenzhen, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smartphone
Brand Name	Coolpad
Model Name	Coolpad 3300A
FCC ID	R38YL3300A
EUT supports Radios application	CDMA/EV-DO/WLAN 2.4GHz 802.11b/g/n HT20/Bluetooth v2.1 + EDR/Bluetooth v4.0 LE
HW Version	P1
SW Version	3300A.SP010
EUT Stage	Production Unit

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	CDMA2000 BC10 : 817.9 MHz ~ 823.1 MHz
Rx Frequency	CDMA2000 BC10 : 862.9 MHz ~ 868.1 MHz
Maximum Output Power to Antenna	CDMA2000 BC10 : 23.78 dBm
Antenna Type	PIFA Antenna
Type of Modulation	CDMA2000 1xRTT : QPSK CDMA2000 1xEV-DO : 8PSK

Remark: This test report recorded only product characteristics and test results of PCS Licensed Transmitter Held to Ear (PCE).

1.5 Modification of EUT

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

1.6 Maximum Frequency Tolerance and Emission Designator

FCC Rule	System	Type of Modulation	Frequency Tolerance (ppm)	Emission Designator
Part 90S	CDMA2000 BC10 1xRTT	QPSK	0.0061 ppm	1M28F9W

1.7 Testing Site

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.		
	TH01-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	831040

Note: The test site complies with ANSI C63.4 2009 requirement.

1.8 Applied Standards

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

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ FCC 47 CFR Part 2, 90
- ♦ ANSI / TIA / EIA-603-C-2004

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (Z Plane).

Frequency range investigated for radiated emission: 30MHz to 10th harmonic.

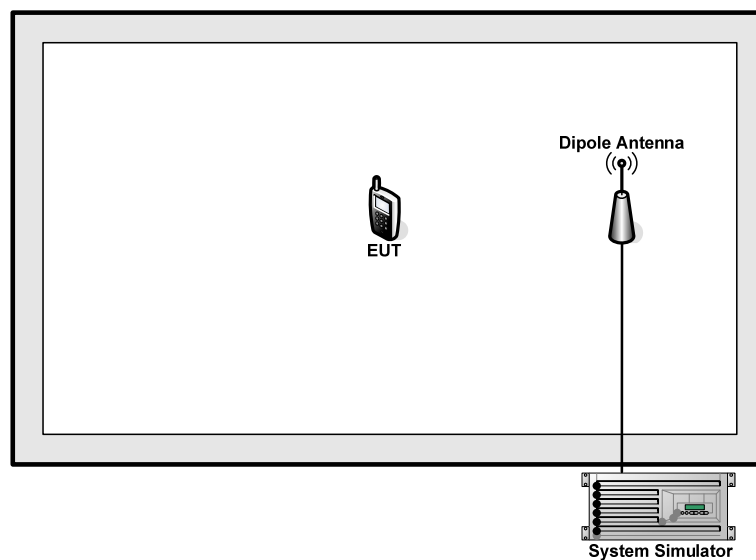
Test Modes		
Band	Radiated TCs	Conducted TCs
CDMA2000 BC10	■ 1xRTT Link	■ 1xRTT Link

Note: The maximum RF output power levels are 1xRTT RC3+SO55 mode for CDMA2000 BC10 on QPSK Link; only these modes were used for all tests.

The conducted power table is as follows:

Conducted Power (*Unit: dBm)			
Band	CDMA2000 BC10		
Channel	476	580	684
Frequency	817.9	820.5	823.1
1xRTT RC1+SO55	23.73	23.76	23.69
1xRTT RC3+SO55	23.74	23.78	23.71
1xRTT RC3 SO32(+ F-SCH)	23.68	23.76	23.67
1xRTT RC3 SO32 (+SCH)	23.65	23.74	23.64
1xEVDO RTAP 153.6Kbps	23.72	23.77	23.70
1xEVDO RETAP 4096Bits	23.65	23.68	23.62

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.5 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset (dB)} &= \text{RF cable loss (dB)} + \text{attenuator factor (dB)} \\ &= 4.5 + 10 = 14.5 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

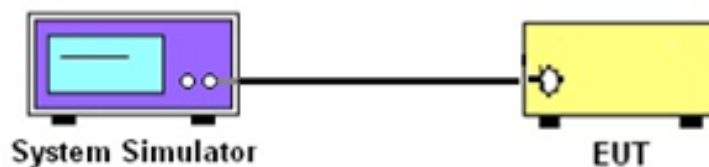
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

CDMA 2000 BC10			
Modes	CDMA 2000 1xRTT		
Test Status	RC3+SO55		
Channel	467 (Low)	580 (Mid)	684 (High)
Frequency (MHz)	817.9	820.5	823.1
Conducted Power (dBm)	23.74	23.78	23.71

Note: Maximum burst average power for CDMA.

3.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.2.1 Description of (Occupied) Bandwidth Limitations Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

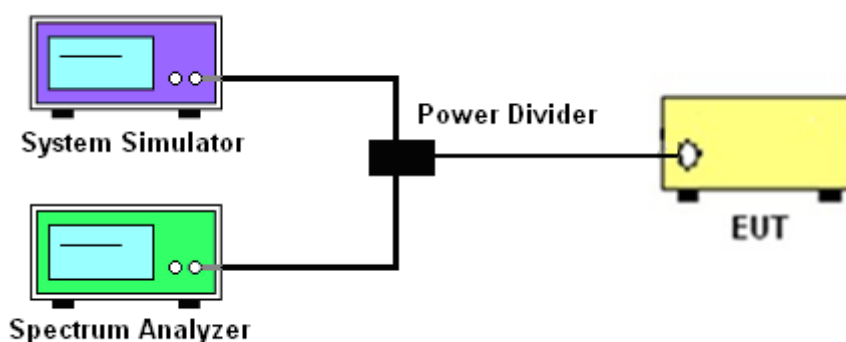
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.

3.2.4 Test Setup

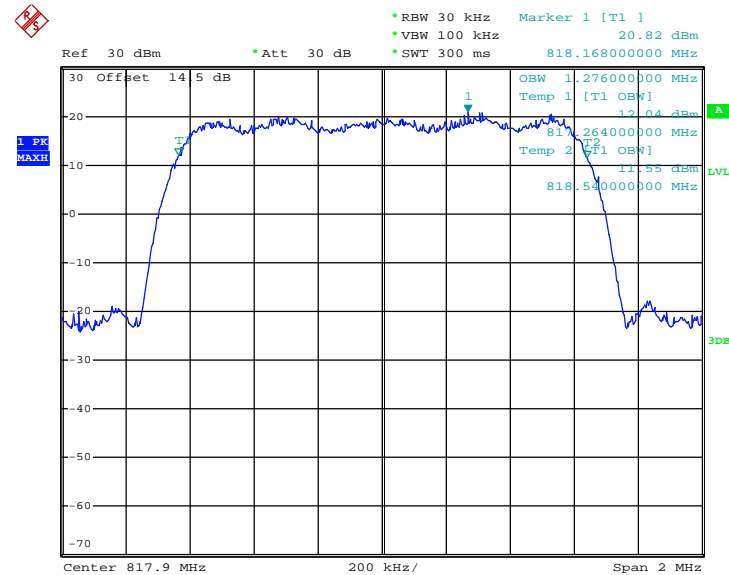


3.2.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

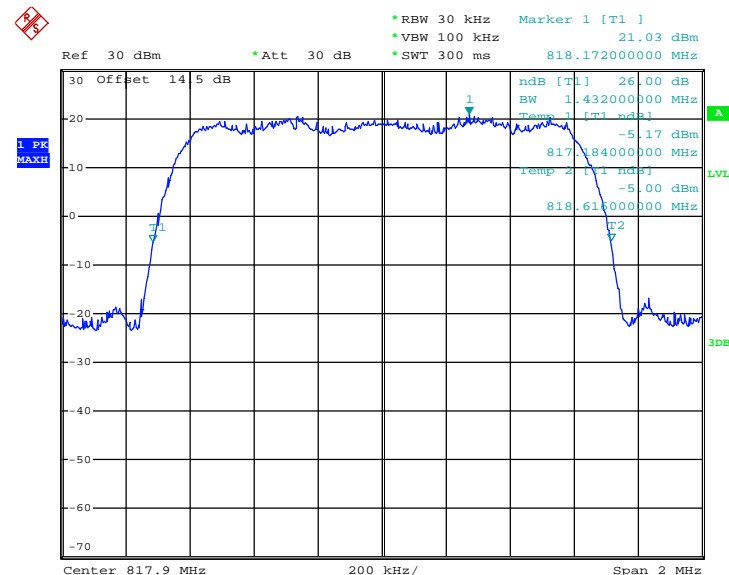
CDMA2000 BC10			
Test Mode	CDMA 2000 1xRTT		
Test Status	RC3+SO55		
Channel	476 (Low)	580 (Mid)	684 (High)
Frequency (MHz)	817.9	820.5	823.1
99% OBW (MHz)	1.276	1.276	1.276
26dB BW (MHz)	1.432	1.428	1.424

3.2.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth

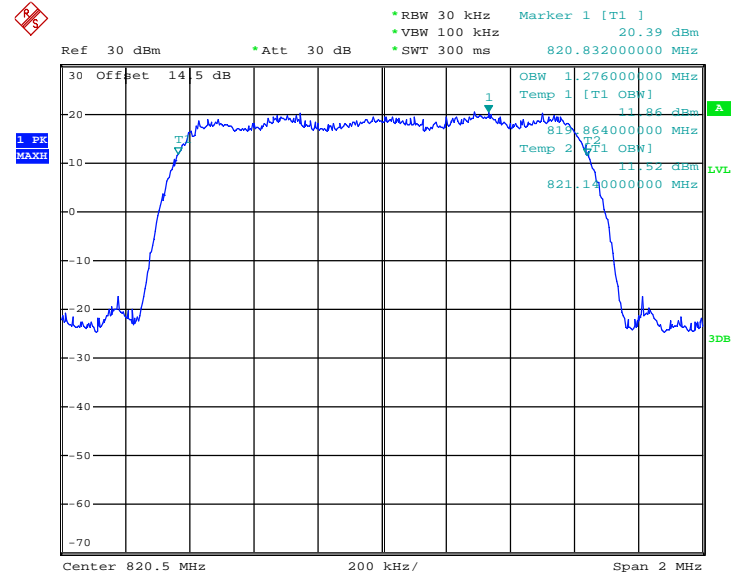
Band :	CDMA2000 BC 10	Test Mode :	1xRTT_RC3+SO55
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99% Occupied Bandwidth Plot on Channel 476 (817.9MHz)


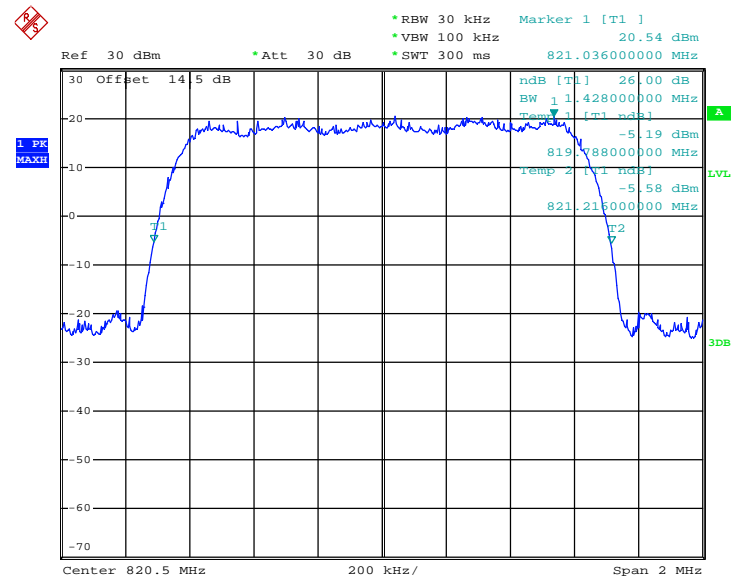
Date: 13.FEB.2015 09:36:42

26dB Bandwidth Plot on Channel 476 (817.9MHz)


Date: 13.FEB.2015 09:38:08

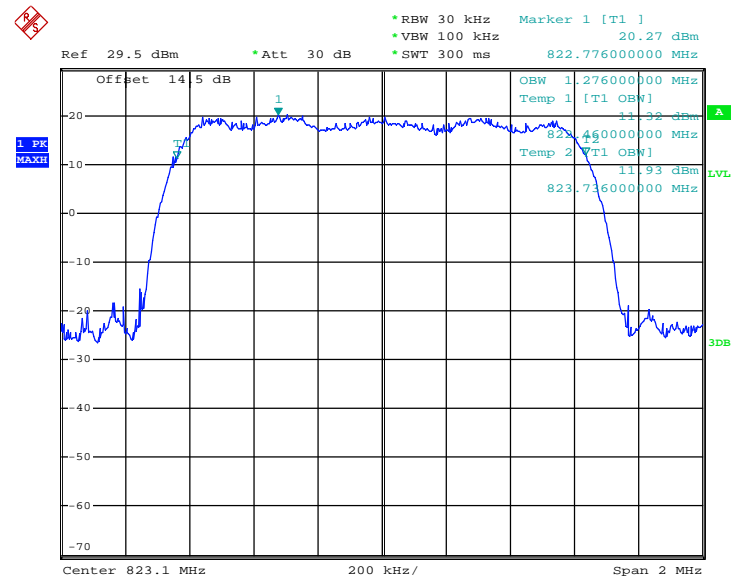
99% Occupied Bandwidth Plot on Channel 580 (820.5MHz)


Date: 13.FEB.2015 09:35:45

26dB Bandwidth Plot on Channel 580 (820.5MHz)


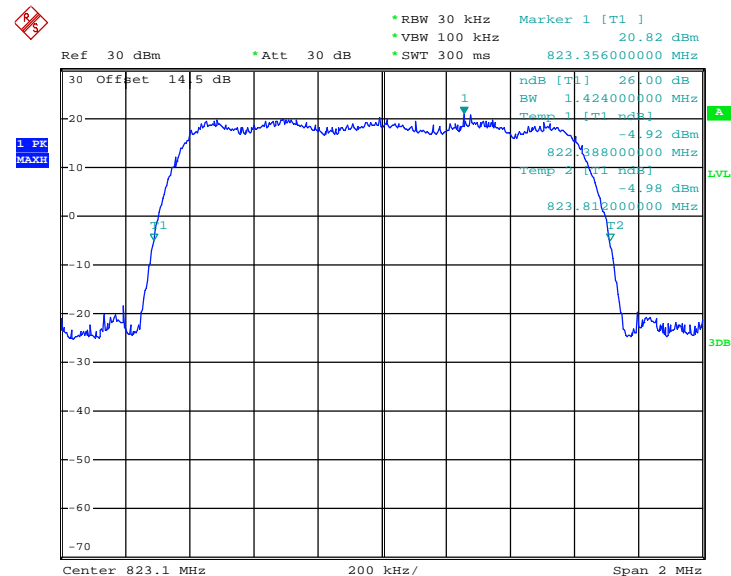
Date: 13.FEB.2015 09:34:49

99% Occupied Bandwidth Plot on Channel 684 (823.1MHz)



Date: 13.FEB.2015 09:32:50

26dB Bandwidth Plot on Channel 684 (823.1MHz)



Date: 13.FEB.2015 09:39:37

3.3 Emissions Mask Measurement

3.3.1 Description of Emissions Mask Measurement

Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC Part 90.691.(a)(1)

(a). Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

- (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

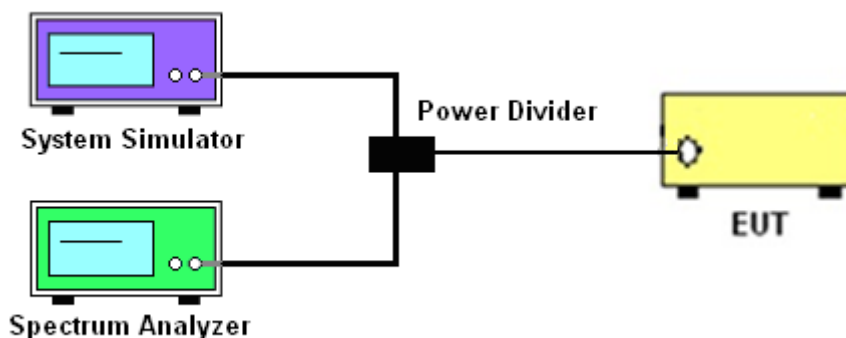
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The emissions mask of low and high channels for the highest RF powers were measured.
3. The RBW was set 1% of 99% Occupied Bandwidth, and VBW was set 3 times of RBW.
4. The final test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

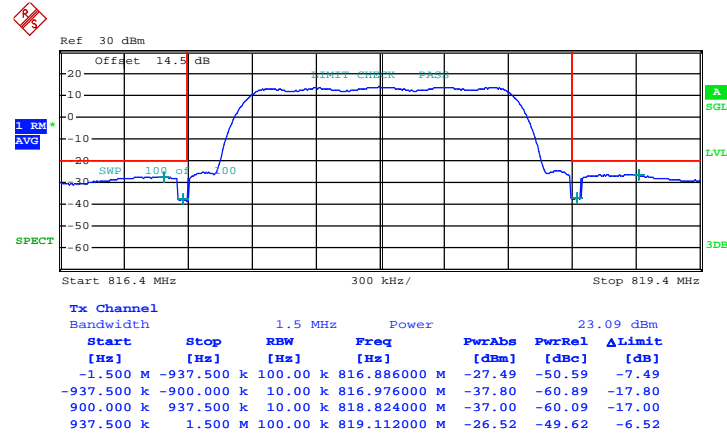
3.3.4 Test Setup



3.3.5 Test Result (Plots) of Conducted Emissions Mask

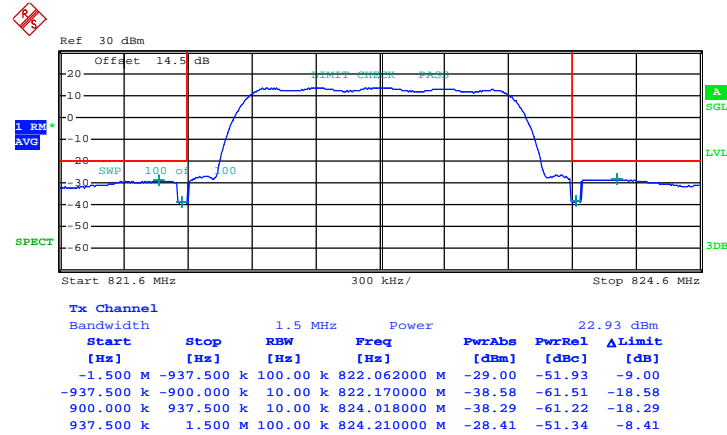
Band :	CDMA2000 BC10	Test Mode :	1xRTT_RC3+SO55
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Lower Band Edge Plot on Channel 476 (817.9MHz)



Date: 4.MAR.2015 13:58:12

Higher Band Edge Plot on Channel 684 (823.1MHz)



Date: 4.MAR.2015 13:59:33

3.4 Emissions Mask – Out Of Band Emissions Measurement

3.4.1 Description of Conducted Emissions Out of band emissions measurement

The power of any emission FCC Part 90.691 (a)(2) on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least $43 + 10 \log (P)$ dB. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

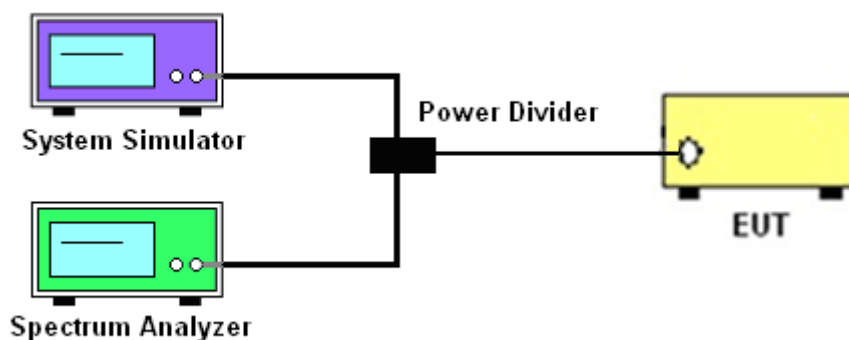
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.
4. The final test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

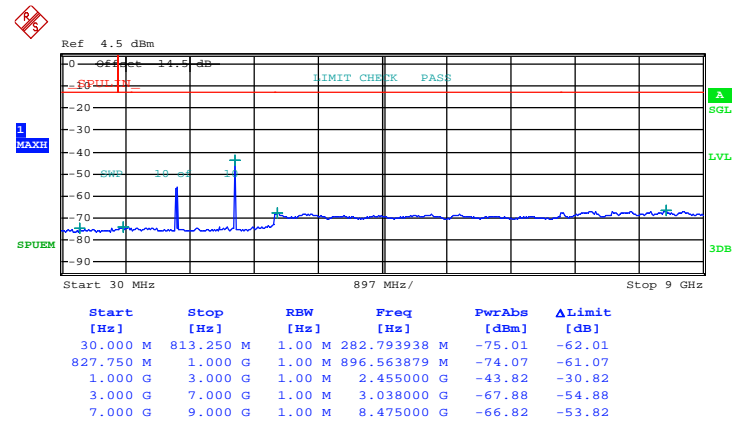
3.4.4 Test Setup



3.4.5 Test Result (Plots) of Conducted Emission

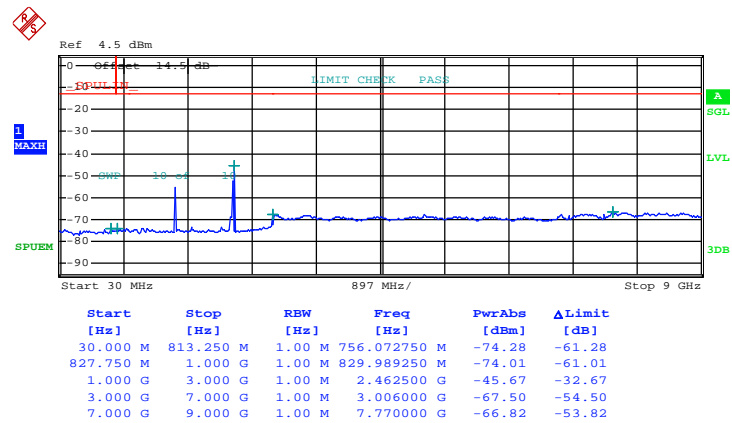
Band :	CDMA2000 BC10	Test Mode :	1xRTT_RC3+SO55
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Conducted Emission Plot between on Channel 476 (817.9MHz)



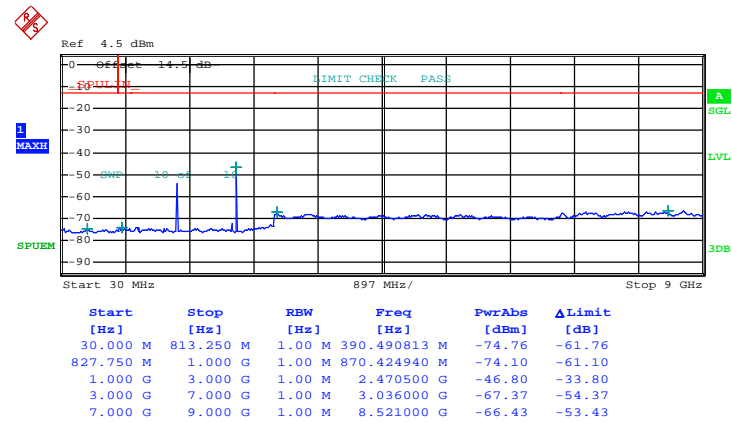
Date: 13.FEB.2015 10:07:15

Conducted Emission Plot between on Channel 580 (820.5MHz)



Date: 13.FEB.2015 10:06:44

Conducted Emission Plot between on Channel 684 (823.1MHz)



Date: 13.FEB.2015 10:06:14

3.5 Field Strength of Spurious Radiation Measurement

3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log_{10}(P[\text{Watts}])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

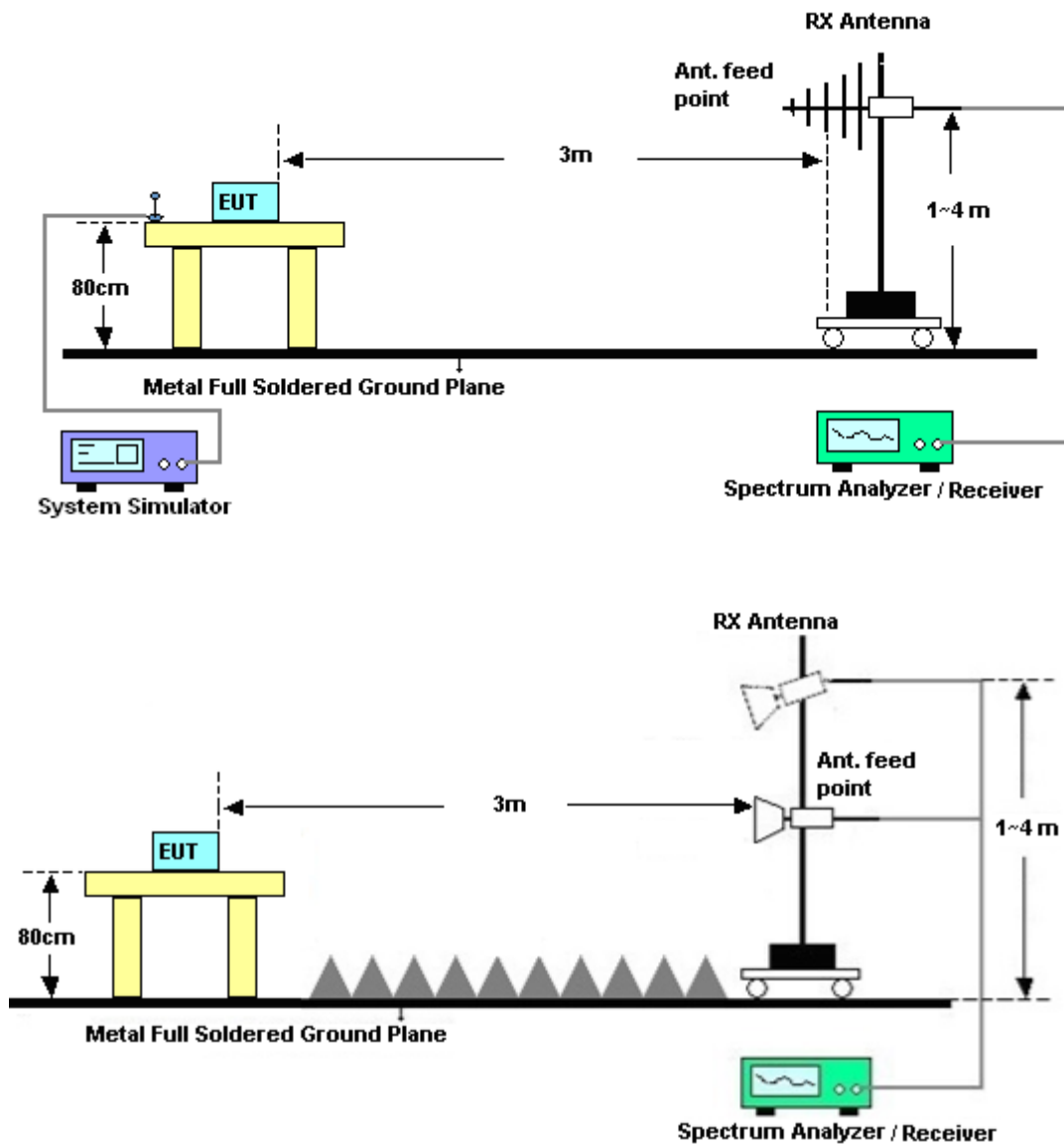
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
11. $\text{ERP (dBm)} = \text{EIRP} - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10 \log(P)] \text{ (dB)}$
 $= [30 + 10 \log(P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)}$
 $= -13 \text{ dBm}.$

3.5.4 Test Setup



3.5.5 Test Result of Field Strength of Spurious Radiated

Band :	CDMA2000 BC10	Temperature :	23~25°C						
Test Mode :	1xRTT_RC3+SO55	Relative Humidity :	48~52%						
Test Engineer :	Sam Li	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1641	-55.04	-13	-42.04	-54.10	-59.80	0.89	7.80	H	Pass
2461.5	-38.90	-13	-25.90	-46.15	-45.06	1.09	9.40	H	Pass
3282	-63.44	-13	-50.44	-63.44	-69.32	1.17	9.20	H	Pass

Band :	CDMA2000 BC10	Temperature :	23~25°C						
Test Mode :	1xRTT_RC3+SO55	Relative Humidity :	48~52%						
Test Engineer :	Sam Li	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1641	-53.09	-13	-40.09	-52.86	-57.85	0.89	7.80	V	Pass
2461.5	-49.01	-13	-36.01	-53.54	-55.17	1.09	9.40	V	Pass
3282	-63.01	-13	-50.01	-63.75	-68.89	1.17	9.20	V	Pass

3.6 Frequency Stability Measurement

3.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency according to FCC Part 90.213.

3.6.2 Measuring Instruments

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

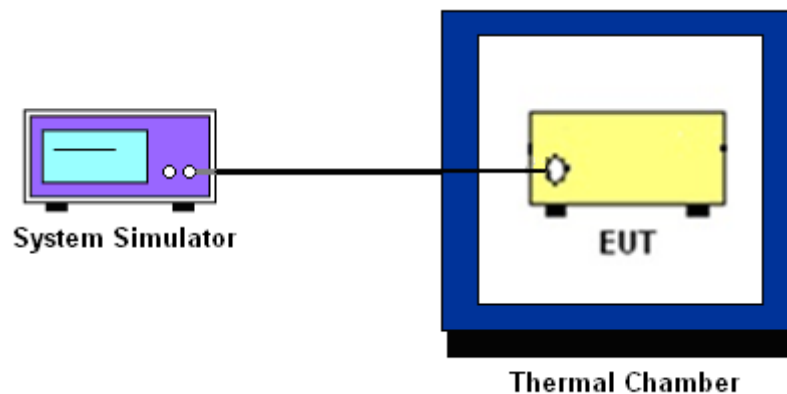
3.6.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.6.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.6.5 Test Setup



3.6.6 Test Result of Temperature Variation

Band :	CDMA2000 BC10	Channel :	580
Test Mode :	1xRTT_RC3+SO55	Limit (ppm) :	2.5

Temperature (°C)	Deviation (ppm)	Result
50	0.0061	PASS
40	0.0037	
30	0.0024	
20(Ref.)	0.0000	
10	0.0037	
0	0.0012	
-10	0.0049	
-20	0.0000	
-30	0.0024	

3.6.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
CDMA2000 BC10 CH580	1xRTT_RC3+SO55	4.2	0.0012	2.5	PASS
		3.7	0.0000		
		BEP	0.0024		

Note:

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.6 V.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Jan. 28, 2015	Feb. 13, 2015~ Mar 04, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Thermal Chamber	Hongzhangroup	LP-150U	HD20120425	-40℃~150℃	Jan. 28, 2015	Feb. 13, 2015~ Mar 04, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI TEST Receiver	R&S	ESC17	100768	9kHz~3GHz	May 04, 2014	Feb. 14, 2015	May 03, 2015	Radiation (03CH02-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Feb. 14, 2015	May 25, 2015	Radiation (03CH02-SZ)
Bilog Antenna	TESEQ	CBL 6112D	37877	30MHz~2GHz	Oct. 15, 2014	Feb. 14, 2015	Oct. 14, 2015	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 20, 2015	Feb. 14, 2015	Jan. 19, 2016	Radiation (03CH02-SZ)
Amplifier	com-power	PA-103A	161069	1~1000MHz	May 04, 2014	Feb. 14, 2015	May 03, 2015	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct. 29, 2014	Feb. 14, 2015	Oct. 28, 2015	Radiation (03CH02-SZ)
AC Source(AVR)	CHROMA	61601ACS OURCE	616010002470	100Vac~240Vac	NCR	Feb. 14, 2015	NCR	Radiation (03CH02-SZ)
Turn Table	Qiangdian	3000	N/A	0~360 degree	NCR	Feb. 14, 2015	NCR	Radiation (03CH02-SZ)
Antenna Mast	Qiangdian	3000	N/A	1 m~4 m	NCR	Feb. 14, 2015	NCR	Radiation (03CH02-SZ)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
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