

# **FCC RF Test Report**

APPLICANT : TCT Mobile Limited

**EQUIPMENT**: CDMA 1X BC0/BC1/BC10 mobile phone

BRAND NAME ALCATEL ONETOUCH

MODEL NAME : 1018B FCC ID : RAD556

STANDARD : FCC 47 CFR Part 2, and 90(S)

**CLASSIFICATION**: PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Aug. 12, 2015 and testing was completed on Aug. 22, 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

SPORTON INTERNATIONAL (SHENZHEN) INC.

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# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW581206	Rev. 01	Initial issue of report	Sep. 07, 2015



**SUMMARY OF TEST RESULT** 

Report FCC Rule Description		Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting only	PASS	-
3.2	§2.1049 §90.209	99% Occupied Bandwidth and 26dB Bandwidth	Reporting only	PASS	-
3.3	§2.1051 §90.691	Emission masks – In-band emissions	< 50+10log <sub>10</sub> (P[Watts])	PASS	-
3.4	§2.1051 Emission masks – §90.691 Out of band emissions		< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.5	§2.1053 Field Strength of Spurious §90.691 Radiation		< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 45.01 dB at 3282.00 MHz
3.6	3.6 §2.1055 Frequency Stability for Temperature & Voltage		< 2.5 ppm	PASS	-

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#### **General Description** 1

## 1.1 Applicant

#### **TCT Mobile Limited**

5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

## 1.2 Manufacturer

#### **TCT Mobile Limited**

5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

## 1.3 Feature of Equipment Under Test

Product Feature & Specification				
Equipment	CDMA 1X BC0/BC1/BC10 mobile phone			
Brand Name	ALCATEL ONETOUCH			
Model Name	1018B			
FCC ID	RAD556			
EUT supports Radios application	CDMA			
EUT Supports Radios application	Bluetooth v3.0+EDR			
HW Version	Revision1.1			
SW Version	1018BVE3			
EUT Stage	Production Unit			

# 1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard				
Tx Frequency				
Rx Frequency	CDMA2000 BC10 : 862.9 MHz ~ 868.1 MHz			
Maximum Output Power to Antenna	CDMA2000 BC10 : 24.65 dBm			
Antenna Type	Fixed Internal Antenna			
Type of Modulation	CDMA2000 1xRTT : QPSK			

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

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# 1.5 Specification of Accessory

Specification of Accessory					
	Brand Name	ALCATEL	Model Name	S004EU0500055	
AC Adapter	Power Rating	I/P: 100-240Vac, 150mA, O/P: 5.0Vdc, 550mA			
	P/N	CBA0066AG0C2			
Pottom.	Brand Name	ALCATEL	Model Name	CAB22B0000C1	
Battery	Power Rating	3.7Vdc, 750mAh			

## 1.6 Modification of EUT

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

# 1.7 Maximum Frequency Tolerance and Emission Designator

FCC Rule	System	Type of Modulation	Frequency Tolerance (ppm)	Emission Designator
Part 90S	CDMA2000 BC10 1xRTT	QPSK	0.0084 ppm	1M27F9W

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## 1.8 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
	1F & 2F,Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,
	Nanshan District, Shenzhen, Guangdong, P. R. China
Test Site Location	TEL: +86-755-8637-9589
	FAX: +86-755-8637-9595
Took Cita No	Sporton Site No.
Test 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			
Took Cita No	Sporton Site No. FCC Registration			
Test Site No.	03CH01-SZ	831040		

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

## 1.9 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:

- 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.

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#### **Test Configuration of Equipment Under Test** 2

#### 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 (Y Plane).

Frequency range investigated for radiated emission: 30MHz to 10<sup>th</sup> 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	24.62	24.48	24.50		
1xRTT RC3+SO55	<mark>24.65</mark>	24.51	24.58		
1xRTT RC3 SO32(+ F-SCH)	24.64	24.49	24.55		
1xRTT RC3 SO32 (+SCH)	24.60	24.47	24.52		

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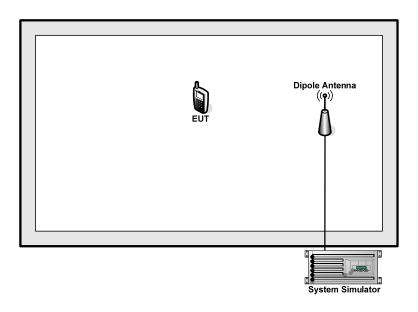
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# 2.2 Connection Diagram of Test System



# 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	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

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#### **Measurement Results Explanation Example** 2.4

#### 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.

Offset 
$$(dB) = RF$$
 cable loss  $(dB)$  + attenuator factor  $(dB)$ .  
=  $4.5 + 10 = 14.5$   $(dB)$ 

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### 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.

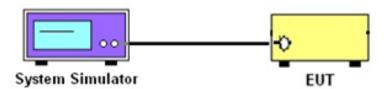
#### 3.1.2 Measuring Instruments

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



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## 3.1.5 Test Result of Conducted Output Power

CDMA 2000 BC10						
Modes	CDMA 2000 1xRTT					
Test Status	RC3+SO55					
Channel	476 (Low)	684 (High)				
Frequency (MHz)	817.9	820.5	823.1			
Conducted Power (dBm)	24.65	24.51	24.58			

Note: Maximum burst average power for CDMA.

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## 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.

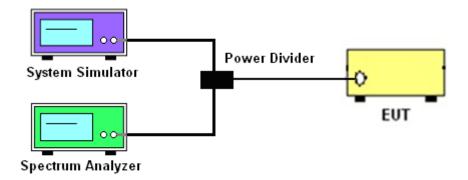
#### 3.2.2 Measuring Instruments

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



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## 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)	<b>99% OBW (MHz)</b> 1.272		1.274			
26dB BW (MHz)	1.414	1.414 1.408 1.408				

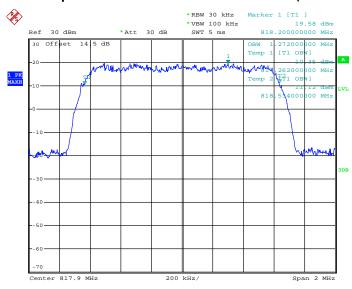
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## 3.2.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth

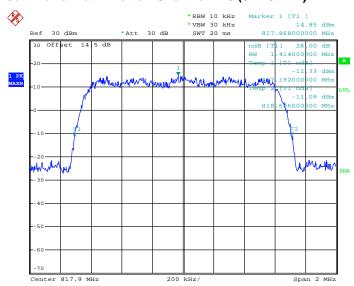
Band: CDMA2000 BC 10	Test Mode :	1xRTT_RC3+SO55
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#### 99% Occupied Bandwidth Plot on Channel 476 (817.9MHz)



Date: 19.AUG.2015 15:08:51

#### 26dB Bandwidth Plot on Channel 476 (817.9MHz)



Date: 19.AUG.2015 13:11:54

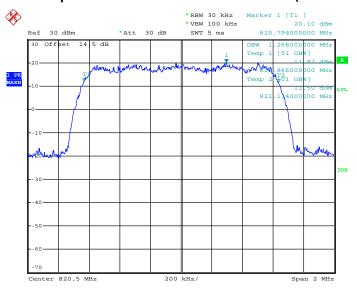
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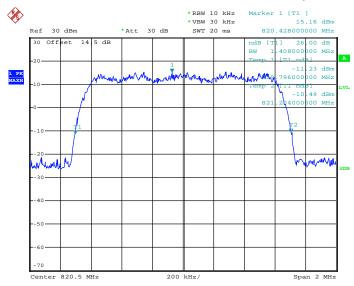
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#### 99% Occupied Bandwidth Plot on Channel 580 (820.5MHz)



Date: 19.AUG.2015 15:09:28

#### 26dB Bandwidth Plot on Channel 580 (820.5MHz)



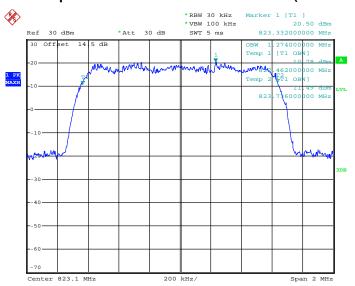
Date: 19.AUG.2015 15:07:10

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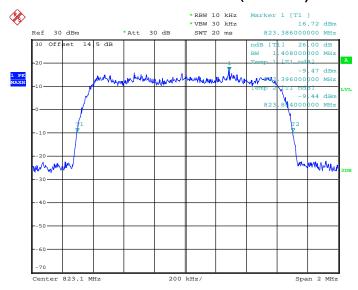
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#### 99% Occupied Bandwidth Plot on Channel 684 (823.1MHz)



Date: 19.AUG.2015 15:10:02

#### 26dB Bandwidth Plot on Channel 684 (823.1MHz)



Date: 19.AUG.2015 15:07:51

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#### 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 Log10(f/6.1) decibels or 50 + 10 Log10(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.

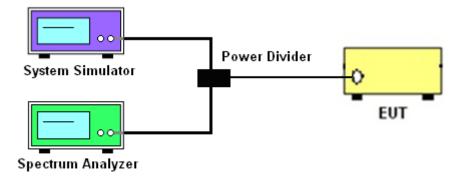
#### 3.3.2 Measuring Instruments

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



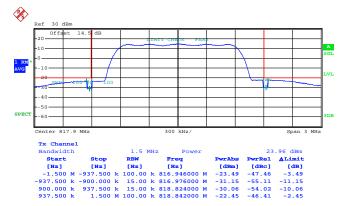
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## 3.3.5 Test Result (Plots) of Conducted Emissions Mask

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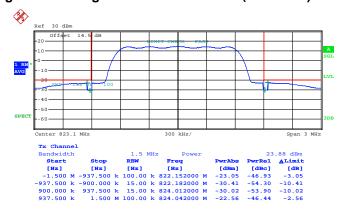
### Lower Band Edge Plot on Channel 476 (817.9MHz)



Date: 19.AUG.2015 15:42:21

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## Higher Band Edge Plot on Channel 684 (823.1MHz)



Date: 19.AUG.2015 15:41:42

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#### 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<sup>th</sup> harmonic.

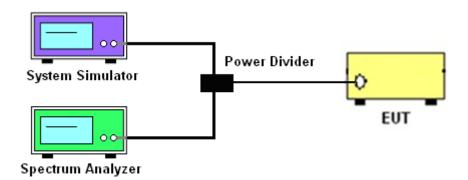
#### 3.4.2 Measuring Instruments

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



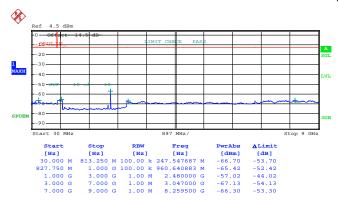
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## Test Result (Plots) of Conducted Emission

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



Date: 28.AUG.2015 16:33:47

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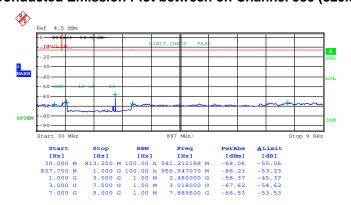
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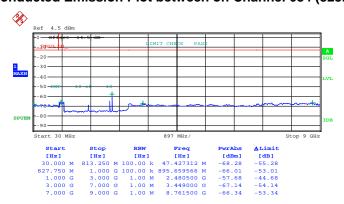
## Conducted Emission Plot between on Channel 580 (820.5MHz)



Date: 28.AUG.2015 16:34:27

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### Conducted Emission Plot between on Channel 684 (823.1MHz)



Date: 28.AUG.2015 16:35:03

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## 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+10log<sub>10</sub>(P[Watts]) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

## 3.5.2 Measuring Instruments

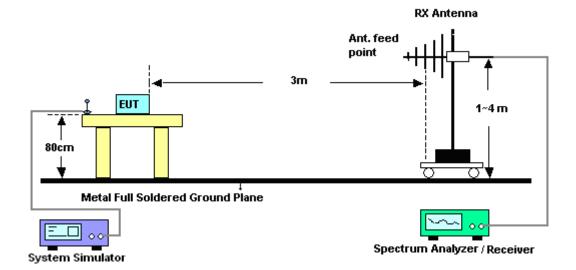
The measuring equipment is listed in the section 4 of this test report.

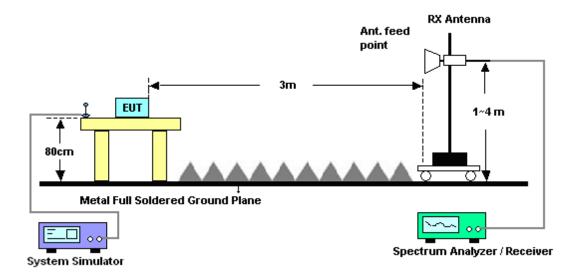
#### 3.5.3 Test Procedures

- 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.
- 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. EIRP (dBm) = S.G. Power Tx Cable Loss + Tx Antenna Gain
- 11. ERP (dBm) = 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 + 10log(P) dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
  - = -13dBm.



## 3.5.4 Test Setup





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## 3.5.5 Test Result of Field Strength of Spurious Radiated

Band :		CDMA2000 BC10 Temperature :						23~25°C			
Test Mode		1xRTT_RC	xRTT_RC3+SO55 Relative Humidity:					48~52%	6		
Test Engine	eer :	Sam Li	am Li Polarization : H					Horizon	tal		
Remark :		Spurious e	missions	within 30-	1000MHz v	were fou	ınd n	nore than 200	dB be	low limi	t line.
Frequency	ERF	Limit	Over	SPA	S.G.	TX Ca	ble	TX Antenna	Polar	rization	Result
			Limit	Reading	Power	loss	5	Gain			
(MHz)	(dBm	n) (dBm)	(dB)	(dBm)	(dBm)	( dB	)	(dBi)	(H	H/V)	
1641	-62.2	0 -13	-49.20	-63.90	-65.17	0.88	3	6.00		Н	Pass
2461.5	-60.5	3 -13	-47.53	-65.03	-63.14	1.08	3	5.84		Н	Pass
3282	-58.0	8 -13	-45.08	-65.96	-62.45	1.14	1	7.66		Н	Pass

Band :		CDMA2000	BC10				Tem	perature :		23~25°	С
Test Mode		1xRTT_RC	Relative Humidity:			48~52%	6				
Test Engine	er:	Sam Li	am Li Polarization :						Vertical		
Remark :	;	Spurious e	missions	within 30-	1000MHz v	were fou	ınd r	nore than 20	dB be	low limi	t line.
Frequency	ERP	Limit	Over	SPA	S.G.	TX Ca	ble	TX Antenna	Pola	rization	Result
			Limit	Reading	Power	loss	5	Gain			
(MHz)	(dBm	) (dBm)	(dB)	(dBm)	(dBm)	( dB	)	(dBi)	(ł	H/V)	
1641	-61.48	3 -13	-48.48	-63.60	-64.45	0.88	3	6.00		V	Pass
2461.5	-60.44	4 -13	-47.44	-64.81	-63.05	1.08	3	5.84		V	Pass
3282	-58.0	1 -13	-45.01	-65.91	-62.38	1.14	1	7.66		V	Pass

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## 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 ±0.00025% (±2.5ppm) 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**

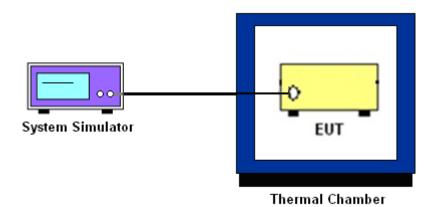
- The EUT was set up in the thermal chamber and connected with the base station. 1.
- 2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 3. With power OFF, the temperature 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±5° 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	0.0084	
40	0.0060	
30	0.0036	
20(Ref.)	0.0000	
10	0.0012	PASS
0	0.0024	
-10	0.0048	
-20	0.0060	
-30	0.0072	

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## 3.6.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
		4.2	0.0024		
CDMA2000 BC10 CH580	1xRTT_RC3+SO55	3.7	0.0000	2.5	PASS
3.1300		BEP	0.0024		

#### Note:

- 1. Normal Voltage = 3.7V.
- 2. Battery End Point (BEP) = 3.5 V.
- 3. The manufacturer declared that the EUT could work properly between voltage 3.5V ~ 4.2V.

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**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~40GHz	Jan. 28, 2015	Aug. 19, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Thermal Chamber	Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Sep. 16, 2014	Aug. 19, 2015	Sep. 15, 2015	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2015	Aug. 22, 2015	May 25, 2016	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSV40	101041	10kHz~40GHz;Ma x 30dBm	Sep. 25, 2014	Aug. 22, 2015	Sep. 24, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz~2GHz	Nov. 07, 2014	Aug. 22, 2015	Nov. 06, 2015	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Oct. 15, 2014	Aug. 22, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Sep. 04, 2014	Aug. 22, 2015	Sep. 03, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz / 30 dB	Jan. 28, 2015	Aug. 22, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 05, 2015	Aug. 22, 2015	May 04, 2016	Radiation (03CH01-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 28, 2015	Aug. 22, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Aug. 22, 2015	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Aug. 22, 2015	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Aug. 22, 2015	NCR	Radiation (03CH01-SZ)

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# 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of	3.9dB
Confidence of 95% (U = 2Uc(y))	3.900

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