



Report No: SYBH(R) 02122006EB
FCC ID: QISBTS3606E-1900

**FCC TEST REPORT OF
Huawei CDMA2000 1900MHz Base
Station**

M/N: BTS3606E-1900

Jan. 13, 2007

Reliability Laboratory of Huawei Technologies Co., Ltd.

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REPORT ON FCC Test of Huawei CDMA2000 1900MHz Base Station

M/N: BTS3606E-1900

Report No: SYBH(R) 02122006EB

REGULATION **FCC CFR47 Part 2: Subpart J;**
FCC CFR47 Part 24: Subpart E;
FCC CFR47 Part 15: Subpart B;

CONCLUSION There are 9 items need to be tested, 9 items have been tested. The sample of the model completely meets the requirements

Final Judgement: Pass

General Manager

2007.01.28
Date

Guo Xiaoqi
Name

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**Technical Responsibility
For Area of Testing**

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Date

Zhang Xinghai
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Contents

1	<u>Summary</u>	5
2	<u>Product Description</u>	6
2.1	PRODUCTION INFORMATION	6
3	<u>Test Site Description</u>	7
3.1	TESTING PERIOD	7
4	<u>Product Description</u>	8
4.1	TECHNICAL CHARACTERISTICS	8
4.2	EUT IDENTIFICATION LIST	10
5	<u>Main Test Instruments</u>	12
6	<u>Transmitter Measurements</u>	13
6.1	MAXIMUM CHANNEL POWER	13
6.2	MODULATION CHARACTERISTICS	16
6.3	OCCUPIED BANDWIDTH.....	19
6.4	BAND EDGES COMPLIANCE	22
6.5	SPURIOUS EMISSION AT ANTENNA TERMINAL	25
6.6	RADIATED SPURIOUS EMISSION	28
6.7	FREQUENCY STABILITY	32
7	<u>EMC Test</u>	36
7.1	RADIATED EMISSION OF ENCLOSURE IN IDLE MODE.....	36
8	<u>System Measurement Uncertainty</u>	39
9	<u>Appendices</u>	40

1 Summary

The table below summarizes the measurements and results for the Huawei CDMA2000 1900MHz Base Station. Detailed results and descriptions are shown in the following pages.

table 1. Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Maximum Channel Power	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Band Edges Compliance	PASS
2.1051	24.238	Spurious Emission at Antenna Terminal	PASS
2.1053	24.238	Radiated Spurious Emission	PASS
2.1055	24.235	Frequency Stability	PASS
-	15.109	Radiated Emission of Enclosure in Idle Mode	PASS

2 Product Description

2.1 Production Information

2.1.1 General Description

The BTS3606E is located between the base station controller (BSC) and the mobile station (MS)/access terminal (AT) in the CDMA network. Under the control of the BSC, it serves one cell or several logical sectors.

The BTS3606E is connected with the BSC through the Abis interface. It manages the following:

- Radio resources
- Radio parameters
- Interfaces

It also implements radio transmission over the Um interface, as well as the related control functions. The BTS3606E is an indoor BTS supporting multi-cell configuration.

The BTS3606E has the following features:

- Large capacity
- Compact size
- Easy installation
- Flexible coverage

It is ideal for the areas with medium or high traffic density.

The BTS3606E system has advanced structure, which is compatible with CDMA2000 1X and CDMA2000 1xEV-DO (DO Enhancement, DO Rev A). It can operate in the following modes:

- CDMA2000 1X mode
- CDMA2000 1xEV-DO mode
- CDMA2000 1X/1xEV-DO hybrid mode

The BTS3606E can be expanded smoothly to meet the requirements of CDMA AIE phase I.

The BTS3606E supports CDMA trunking communication technology, and thus provides trunking functions such as Push To Talk (PTT).

2.1.2 Main Equipment Technical Data

Input Rated Voltage:	=== -48V
Rated Power:	Max 3550 W
Dimensions:	650 (depth) ×600 (width) ×1600 (height) (mm ³)
Weight:	280kg
Transmitt Frequency:	1931.25MHz ~1988.75MHz
Receive Frequency:	1851.25MHz ~1908.75MHz

3 Test Site Description

The test site of:

***Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China***

The test site description has been submitted to  and registration granted under the registration number **97456** on April 20, 2006. The test site has been accredited by



and the accredited number is **2174.01** in Jan of 2006.

3.1 Testing Period

The test have been performed during the period of

Dec. 10, 2006 to Dec. 30, 2006

4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Uplink band:	1851.25 to 1908.75 MHz
Downlink band:	1931.25 to 1988.75 MHz

4.1.2 Channel Spacing / Separation

Channel spacing:	50 KHz
Channel separation:	1.25 MHz

4.1.3 Type of Emission

table 2. Type of Emission

Emission Designation:	1M25F9W
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According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Environmental Requirements

table 3. Environmental Requirements

Minimum temperature:	- 5°C
Maximum temperature:	+ 50 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

table 4. Power Source

DC voltage nominal:	 -48V
DC voltage range	-60V ~ -40V
DC current maximal:	50A

4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

4.2 EUT Identification List

4.2.1 Board Information

table 5. Board Information

Model Name	Qty.	Hardware Version	Serial	Description
QC51BCKM	2	VER.C	0373191049000039 0373191049000026	BTS Control & Clock Module
QC52BCIM	4	VER.A	0362831045000285 036283104B000131 036283104B000115 036283103C000025	BTS Control Interface Module
QCK2CCPM	9	VER.A	0376071058000097 0376071058000034 0376071058000028 0376071058000102 0376071058000136 0376071058000056 0376071058000196 0376071058000006 0376071058000024	Compact-BTS Channel Process Module
QCK2CECM	1	VER.B	036283103C000025	Compact-BTS EV-DO Channel Module
PSU 0	3	VER.0	21021305512069000041 21021305512069000042 21021305512069000043	Power Supply Unit
QCKM1MTRX	2	VER.0	2102314387106A000013 2102314387106A000014	Multi-carrier Transceiver Module
QCMM1MTRX	2	VER.0	2102314259106A000020 2102314259106A000021	Multi-carrier Transceiver Module
QCLM1MTRX	2	VER.0	2102314259106A000063 2102314259106A000065	Multi-carrier Transceiver Module
QCKM1CMPA	2	VER.0	2102314387106A000013 2102314387106A000014	Multi-carrier Power Amplifier Module
QCMM1CMPA	2	VER.0	2102314387106A000017 2102314387106A000018	Multi-carrier Power Amplifier Module
QCLM1CMPA	2	VER.0	2102314387106A000015 2102314387106A000016	Multi-carrier Power Amplifier Module
1900M-CDFU	2	VER.0	2102314259106A000024 2102314259106A000025	Duplexer and Filter
1900M-CDDU	2	VER.0	2102314259106A000214 2102314259106A000155	Duplexer and Filter

4.2.2 Adapter Technical Data

Not Applicable for BTS.

4.2.3 Battery Technical Data

Not Applicable for BTS.

4.2.4 FCC Identification

Grantee Code: QIS
Product Code: BTS3606E-1900
FCC Identification: QISBTS3606E-1900

5 Main Test Instruments

table 6. Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
3m Semi Anechoic Chamber	S+M	N/A	N/A	12.24.2006
3m Full Anechoic Chamber	S+M	N/A	N/A	12.05.2006
Signal Analyzer	R&S	FSQ 40	100266	08.30.2007
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	05.30.2007
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	05.30.2007
Receiver	R&S	ESCS30	830245/018	05.30.2007
Pre-Amplifier	Agilent	8447D	2944A10146	05.30.2007
Pre-Amplifier	Agilent	83017A	3950M00246	01.03.2007
Loop Antenna	Schwarzbeck	FMZB1516	1516115	01.08.2007
BiLog Antenna	Schaffner	CBL 6112B	2747	08.30.2007
BiLog Antenna	Schaffner	CBL 6112B	2536	08.30.2007
Horn Antenna	R&S	HF906 4044.4507.02	359287/005	12.05.2006
Horn Antenna	R&S	HF906 4044.4507.02	359287/006	12.05.2006
Horn Antenna	ETS-Lindgren	3116	00031541	01.15.2007
Dipole	Schwarzbeck	D69250- UHAP/D69250- VHAP	979/917	08.28.2007
Signal Generator	R&S	SMR 40	100325	06.25.2007
Artificial Mains Network	Schwarzbeck	NNLK8121	8121416	05.29.2007
Power Supply	KIKUSUI	PAD110-32LA	EM004681	11.13.2007
Climate Chamber	WZH	ACS-2	3605050256	05,14,2007

6 Transmitter Measurements

6.1 Maximum Channel Power

6.1.1 Test Conditions

table 7. Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	23.5°C
Relative humidity:	55%

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.1.2.2 Supporting Standards

table 8. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.1.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a base station transmitter exceeds 100 watts. $W \text{ (dBm)} = 10 \cdot \log (W \text{ watts})$.

table 9. Limits

Maximum Output Power (Watts)	< 1640 Watts
Maximum Output Power (dBm)	< 62 dBm

6.1.3 Test Method and Setup

Base Station was connected to the wireless signal analyzer R&S FSQ40 via the one RF connector. Other RF connectors were connected to match load. The band class is set Band Class 1(1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Maximum Channel Power of the Base Station by the R&S FSQ40.

Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an RMS equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Test setup

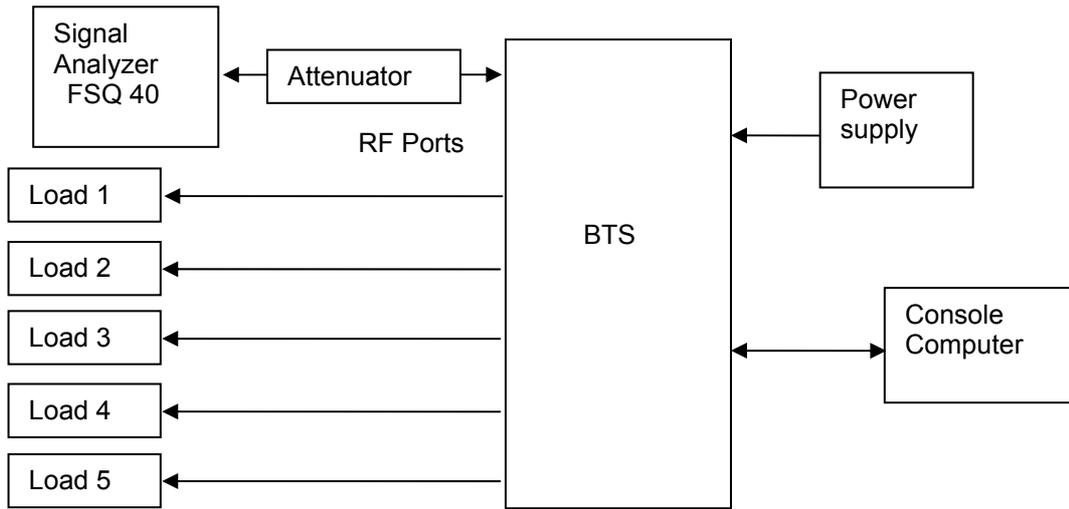


Figure 1. TEST SETUP

6.1.4 Measurement Results

The system is operating as 'Per-Channel Power' type. For CDMA2000 1X system, set the base station to transmit a Pilot, Sync, Paging, and 6 traffic channels. For CDMA2000 1X EV-DO system, configure the MAC channel with 14 MAC indices, i.e. the RA channel and 13 RPC channels.

CDMA2000 1X
A. Single Carrier:

table 10. Measurement Results for single carrier

TEST CONDITIONS		Maximum Output Power					
		Channel25 1931.25MHz		Channel600 1960.00MHz		Channel1175 1988.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (25 °C)	V_{nom} (-48 V)	42.98	< 62	42.90	< 62	43.08	< 62

B. Two Carriers:

table 11. Measurement Results for two carriers

TEST CONDITIONS		Maximum Output Power					
		Channel25 & 50		Channel600 & 625		Channel1150 & 1175	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (25 °C)	V_{nom} (-48 V)						
		Carrier 1					
		42.98	< 62	42.92	< 62	42.88	< 62
		Carrier 2					
		43.03	< 62	42.91	< 62	42.89	< 62
		Total					
		46.03	< 62	45.92	< 62	45.90	< 62

C. Three Carriers:

table 12. Measurement Results for three carriers

TEST CONDITIONS		Maximum Output Power					
		Channel25 & 50 & 75		Channel575&600 & 625		Channel1125&1150& 1175	
		dBm		dBm		dBm	
T _{nom} (25 °C)	V _{nom} (-48 V)	Measured	Limit	Measured	Limit	Measured	Limit
Carrier 1							
		43.03	< 62	42.90	< 62	42.92	< 62
Carrier 2							
		43.07	< 62	42.96	< 62	42.89	< 62
Carrier 3							
		43.06	< 62	43.00	< 62	42.95	< 62
Total							
		48.10	< 62	47.86	< 62	47.81	< 62

CDMA2000 1X EV-DO

table 13. Measurement Results for EV-DO

TEST CONDITIONS		Maximum Output Power					
		Channel25 1931.25MHz		Channel600 1960.00MHz		Channel1175 1988.75MHz	
		dBm		dBm		dBm	
T _{nom} (25 °C)	V _{nom} (-48 V)	Measured	Limit	Measured	Limit	Measured	Limit
		42.48	< 62	42.40	< 62	42.50	< 62

6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.

6.2 Modulation Characteristics

6.2.1 Test Conditions

table 14. Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	49 %

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 24 subpart E

6.2.2.2 Supporting Standards

table 15. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.2.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 24 subpart E.

table 16. Limits

Limits	Rho > 0.89
--------	------------

6.2.3 Test Method and Setup

Base Station was connected to the wireless signal analyzer R&S FSQ40 via the one RF connector. Other RF connectors were connected to match load. The band class is set Band Class 1(1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Code Domain Power and the constellation of the Base Station by the R&S FSQ40.

Test setup

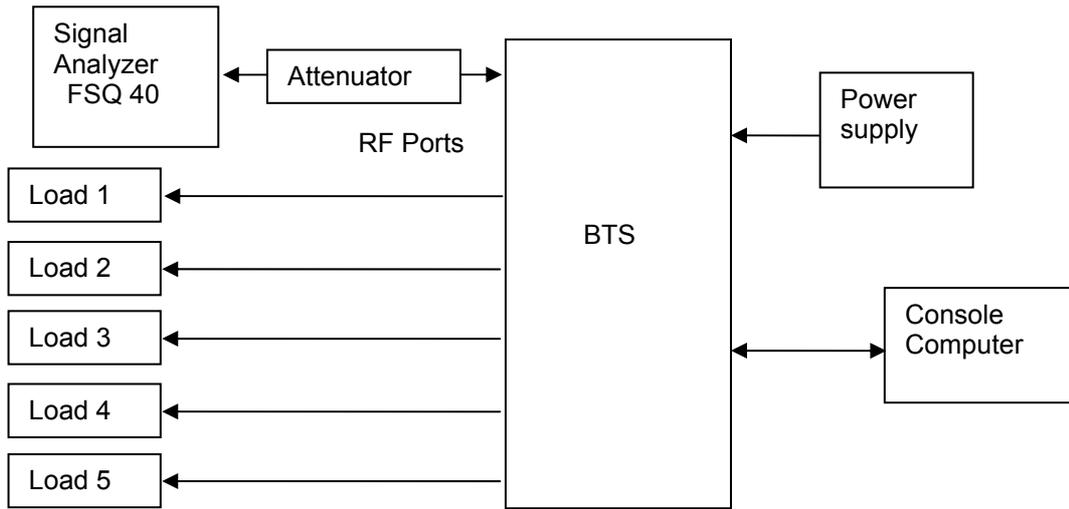


Figure 2. TEST SETUP

6.2.4 Measurement Results

For the CDMA2000 1X, the measurement was made based on two Radio Configurations: RC1 and RC3. The modulation mode of RC1 is BPSK, and the modulation mode of RC3 is QPSK. For the CDMA2000 1X EV-DO, the modulation mode is 16-QAM.

CDMA2000 1X:
RC1:

table 17. Measurement Results for RC1

TEST CONDITIONS		Rho(RC1/1)		
		Channel600 1960MHz		
		N/A		
		Type	Measured	Limit
T_{nom} (25 °C)	V_{nom} (-48V)	BPSK	0.98494	0.89

RC3:

table 18. Measurement Results for RC3

TEST CONDITIONS		Rho(RC3/3)		
		Channel600 1960MHz		
		N/A		
		Type	Measured	Limit
T_{nom} (25 °C)	V_{nom} (-48V)	QPSK	0.99198	0.89

CDMA2000 1X EV-DO:

table 19. Measurement Results for EV-DO

TEST CONDITIONS		Rho		
		Channel600		

		1960MHz		
		N/A		
		Type	Measured	Limit
T_{nom} (25 °C)	V_{nom} (-48V)	16-QAM	0.99212	0.89

6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.

For the measurement results refer to appendix A with 4 pages.

6.3 Occupied Bandwidth

6.3.1 Test Conditions

table 20. Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 2.1049 and part 24 subpart E

6.3.2.2 Supporting Standards

table 21. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.3.2.3 Limits

No specific occupied bandwidth requirement in part 24 subpart E, but the occupied bandwidth was defined in part 2.1049: the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

table 22. Limits

Upper /lower frequency limits	0.5% of the mean power
-------------------------------	------------------------

6.3.3 Test Method and Setup

Base Station was connected to the wireless signal analyzer R&S FSQ40 via the one RF connector. Other RF connectors were connected to match load. The band class is set Band Class 1(1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Occupied Bandwidth of the Base Station by the R&S FSQ40.

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

Refer to 47CFR part2.1049 section (g)&(h).

(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules,

the tests should provide the manufacturer’s maximum rated condition.

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudorandom generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

Measurement bandwidth (RBW): 30 kHz
 Video bandwidth (VBW): 100 kHz

Test Set-up

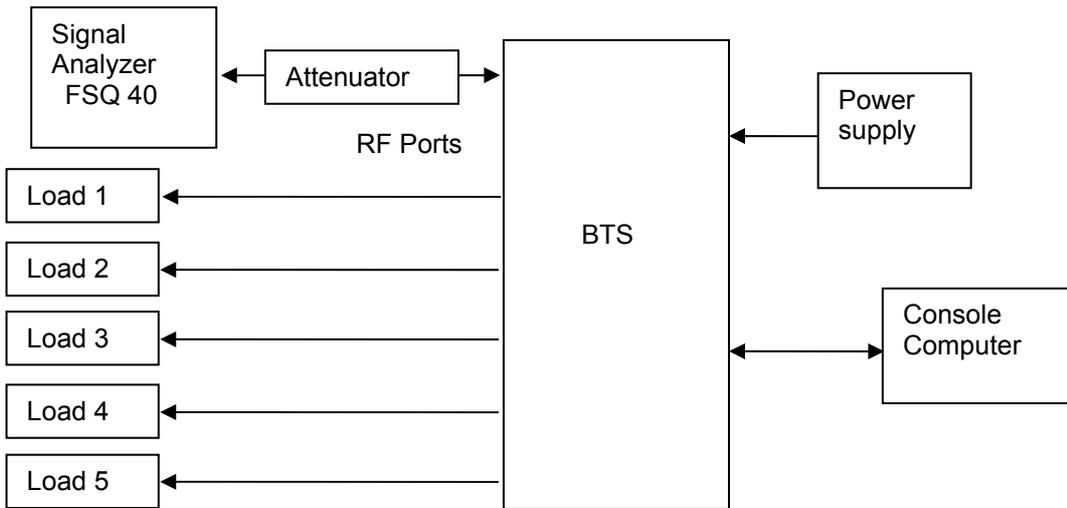


Figure 3. TEST SETUP

6.3.4 Measurement Results

CDMA2000 1X:

table 23. Measurement Results for 1X

TEST CONDITIONS		Occupied Bandwidth	
		Channel600 1960MHz	
		Measured (MHz)	Limit (MHz)
T _{nom} (25 °C)	V _{nom} (-48 V)	1.2788	1.48

CDMA2000 1X EV-DO:

table 24. Measurement Results for DO

TEST CONDITIONS		Occupied Bandwidth	
		Channel600 1960MHz	
		Measured (MHz)	Limit (MHz)
T _{nom} (25 °C)	V _{nom} (-48 V)	1.2788	1.48

6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix B with 3 pages.

6.4 Band Edges Compliance

6.4.1 Test Conditions

table 25. Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	23.5°C
Relative humidity:	55 %

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.4.2.2 Supporting Standards

table 26. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.4.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least $43 + 10 \log_{10} P$. (Whereas P is the rated power of the EUT).

table 27. Limits

Rated Power:	43 dBm
Required attenuation:	$43 + 10 \log(20) = 56$, 43 dBm – 56 dB
Absolute level	- 13 dBm

6.4.3 Test Method and Setup

Base Station was connected to the wireless signal analyzer R&S FSQ40 via the one RF connector. Other RF connectors were connected to match load. The band class is set Band Class 1(1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Occupied Bandwidth of the Base Station by the R&S FSQ40.

RBW of 20kHz (more than 1% of 1.25MHz) was used up to 1MHz away from the band edge .So the FCC rules specify that RBW of 1MHz for measurements of emissions >1MHz away from the band edges for Band Class 1(1900MHz).

Test Set-up

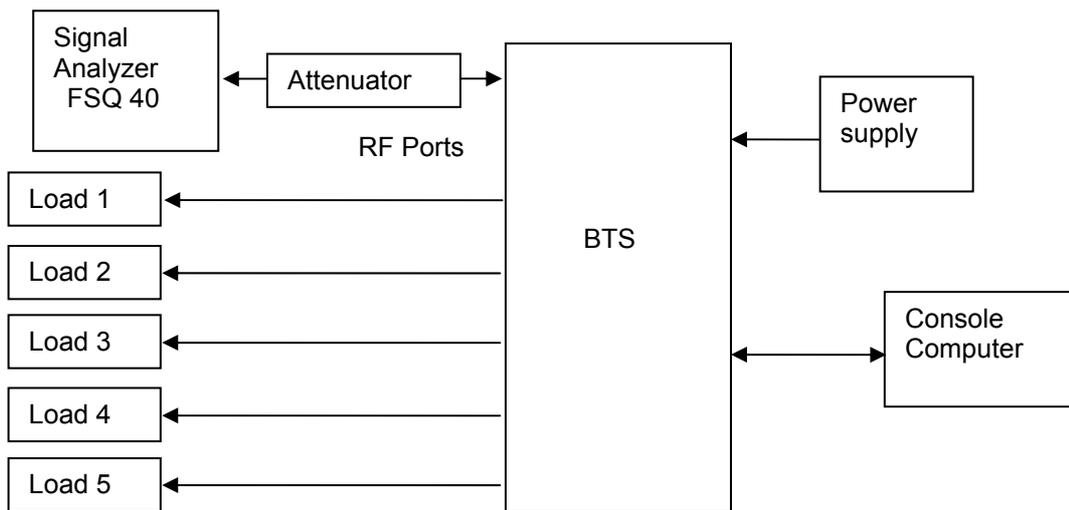


Figure 4. Test Set-up

6.4.4 Measurement Results

CDMA2000 1X:

A. Single Carrier

table 28. Measurement Results for single carrier

Channel Number	Frequency of Band edge [MHz]	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25	1930	43	<-13(See appendix C)	- 13 dBm	Pass
1175	1990	43	<-13(See appendix C)	- 13 dBm	Pass

B. Multiple Carriers

table 29. Measurement Results for multiple carriers

Channel Number	Frequency of Band edge [MHz]	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25/50/75	1930	43	<-13(See appendix C)	- 13 dBm	Pass
1125/1150/1175	1990	43	<-13(See appendix C)	- 13 dBm	Pass

CDMA2000 1X EV-DO:

table 30. Measurement Results for EV-DO

Channel Number	Frequency of Band edge [MHz]	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25	1930	43	<-13(See appendix C)	- 13 dBm	Pass
1175	1990	43	<-13(See appendix C)	- 13 dBm	Pass

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix C with 13 pages.

6.5 Spurious Emission at Antenna Terminal

6.5.1 Test Conditions

table 31. Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	20°C
Relative humidity:	50 %

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.5.2.2 Supporting Standards

table 32. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.5.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least $43 + 10 \log_{10} P$. (Whereas P is the rated power of the EUT).

table 33. Limits

Rated Power:	43dBm
Required attenuation:	$43 + 10 \log(20) = 53$, 43 dBm – 56 dB
Absolute level	-13 dBm

6.5.3 Test Method and Setup

Base Station was connected to the wireless signal analyzer R&S FSQ40 via the one RF connector. Other RF connectors were connected to match load. The band class is set Band Class 0(800MHz) or Band Class 1(1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Occupied Bandwidth of the Base Station by the R&S FSQ40.

According to 47CFR part 24.238, this defined the measurement bandwidth of as following:
 Measurement bandwidth (RBW) for 9 kHz up to 3GHz: 1MHz;
 Measurement bandwidth (RBW) for 3GHz up to 20GHz: 1MHz;

Test Set-up

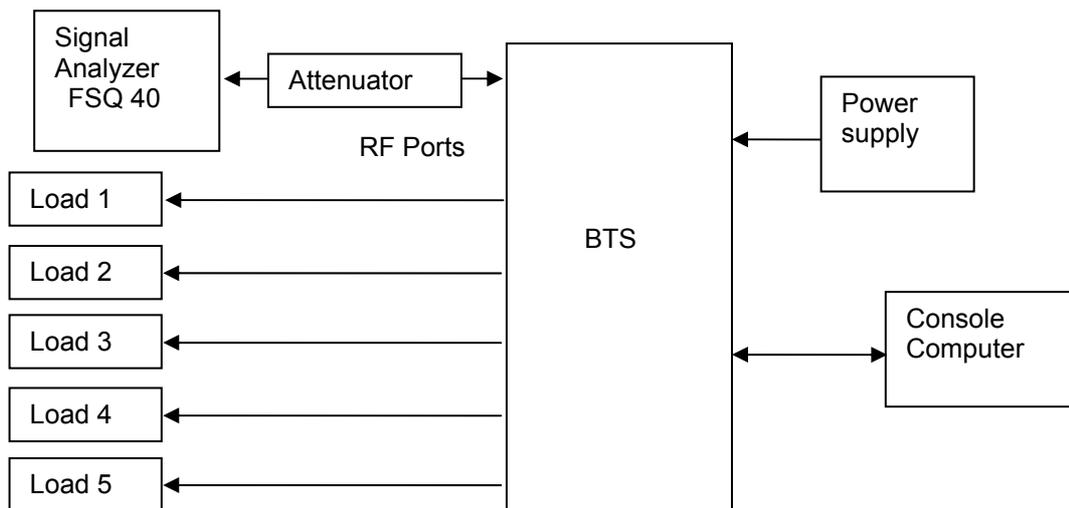


Figure 5. Test Set-up

6.5.4 Measurement Results

CDMA2000 1X:

A. Single Carrier

table 34. Measurement Results for single carrier

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass
1175	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass

B. Multiple Carriers

table 35. Measurement Results for multiple carriers

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25/50/75	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass
1125/1150/1175	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass

CDMA2000 1X EV-DO:

table 36. Measurement Results for EV-DO

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
25	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass
1175	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm/1MHz	Pass

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix D with 13 pages.

6.6 Radiated Spurious Emission

6.6.1 Test Conditions

table 37. Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	22 °C
Relative humidity:	53 %

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1053 and part 24.238

6.6.2.2 Supporting Standards

table 38. Supporting Standards:

EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/TIA-102-CAAA:1999	Digital C4FM/CQPSK Transceiver Measurement Methods (ANSI/TIA/EIA-102.CAAA-1999)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.6.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least $43 + 10 \log_{10} P$. (Whereas P is the rated power of the EUT).

table 39. Limits

Rated Power:	43dBm
Required attenuation:	$43 + 10 \log(20) = 56$, 43 dBm – 56 dB
Absolute level	- 13 dBm

6.6.3 Test Method and Setup

(a) Measurements were made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.1049(c) as appropriate. For equipment operating on frequencies below 890 MHz, an Open Field Test is normally required with the measuring instrument antenna located in the far field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections, which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the

rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:

- (1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
- (2) All equipment operating on frequencies higher than 25 MHz
- (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
- (4) Other types of equipment as required, when deemed necessary by the Commission.

Huawei CDMA2000 1900MHz Base Station BTS3606E is equipment with non-integral antenna. And it should test according to part (b) of above section.

BTS is connected to match loads. The console computer controls the CDMA2000 1900MHz Base Station BTS3606E to transmitter the maximum power which defined in specification of product. The Base Station operates on a typical channel.

The test procedure:

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, E.R.P. shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). HUAWEI CDMA2000 1900MHz Base Station BTS3606E was connected to ancillary in order to simulate normal operating conditions with reference to the guidance given in the standard for this type of equipment.
- (b) Test the radiated maximum output power by the R&S test receiver ESMI received from test antenna.
- (c) Use substitution method to verify the Maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on ESMI, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

According to part 24.238, the defined measurement bandwidth as following:

24.238 (b) Measurement procedure: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 1GHz: 1 MHz;

Measurement bandwidth (RBW) for 1GHz up to 20GHz: 1MHz;

Test setup

Step 1: Pre-test

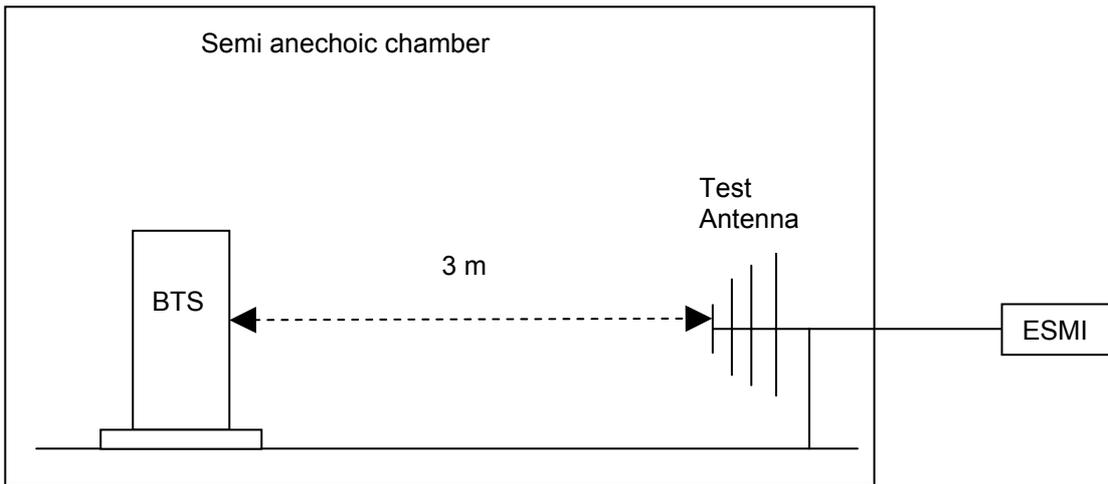


Figure 6. Test Set-up

Step 2: Substitution method to verify the maximum ERP

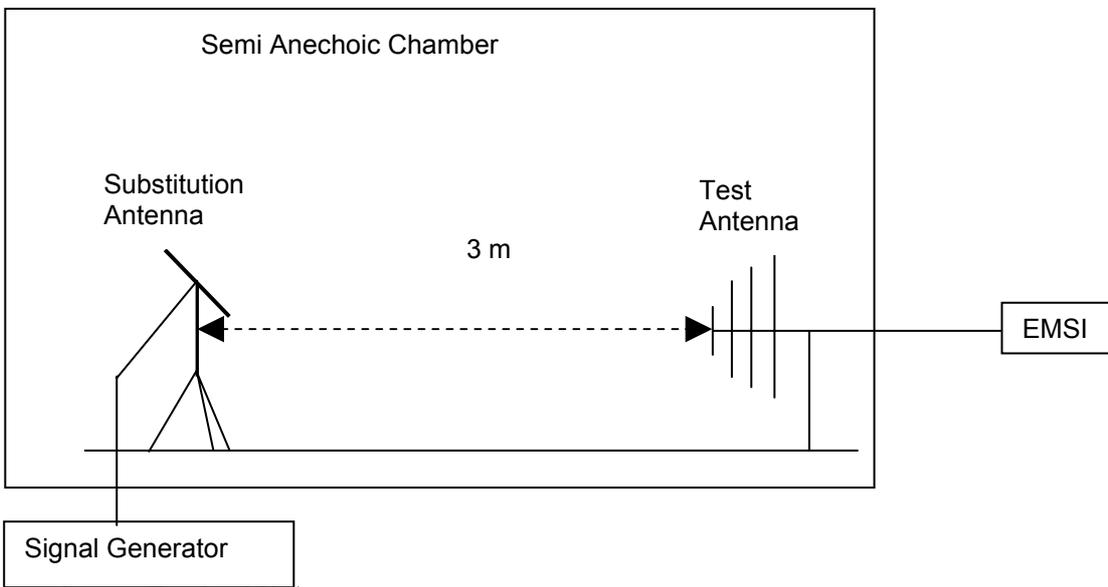


Figure 7. Test Set-up

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

6.6.4 Measurement Results

6.6.4.1 Pre-test Measurement Results

table 40. Measurement Result

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel600 1960MHz	9 kHz ~20GHz	43	<- 13 dBm (See appendix E)	- 13 dBm	Pass

6.6.4.2 Substitution Results

table 41. Substitution Results

Freq.	Measur	Substitution	Gain	Cable	Signal	Substitution	FCC	Result
-------	--------	--------------	------	-------	--------	--------------	-----	--------

[MHz]	ement Value [dBm]	Antenna Type	[dBd]	Loss [dB]	Generator Level [dBm]	Level [dBm]	limit [dBm]	
3916.67	-39.12	Horn Ant.	5.5	2.00	-42.15	-39.65	-13	Pass

Note: For get the EIRP. (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

NOTE: SGP- Signal Generator Level

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix E with 5 pages.

6.7 Frequency Stability

6.7.1 Test Conditions

table 42. Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % at 20 °C

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1055 and part 24.235

6.7.2.2 Supporting Standards

table 43. Supporting Standards:

ANSI C63.4-1992	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
EIA/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

6.7.2.3 Limits

No specific frequency stability requirement in part 2.1055 and part 24.235.

6.7.3 Test Method and Setup

The frequency stability shall be measured with variation of ambient temperature as follows:

- (1) From -30° to $+50^{\circ}$ centigrade for all equipment except that specified in subparagraphs (2) and (3) of paragraph 2.1055

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

- (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
- (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.
- (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply

voltage and at each extreme also shall be shown.

(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

Test Set up

Connect the Base Station to the Wireless Signal Analyzer R&S FSQ40 via the antenna connector. Then measure the frequency error by the R&S FSQ40. The Other antenna output ports were matched with 50 Ω match loads.

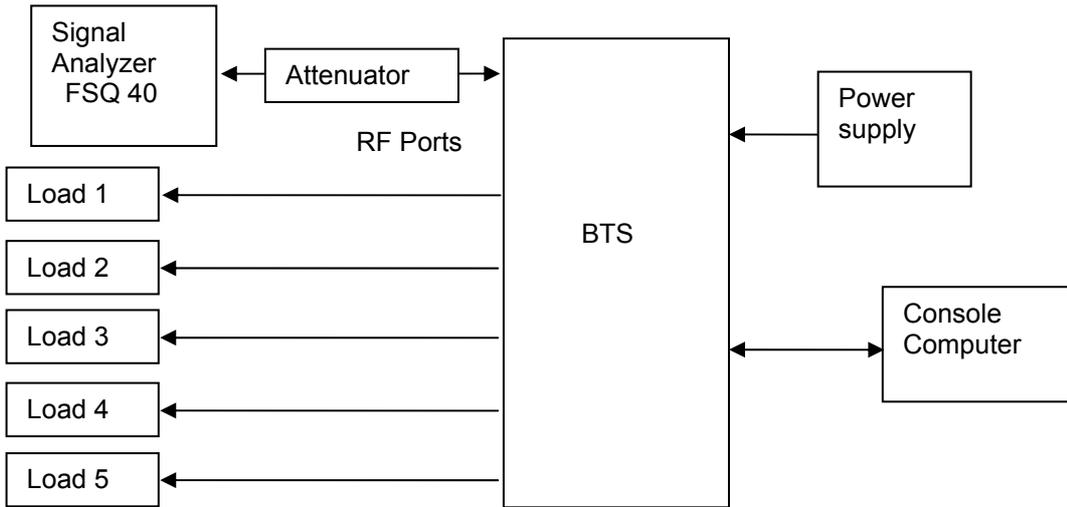


Figure 8. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

CDMA2000 1X:

- TRX1: Channel No.600(1960MHz)

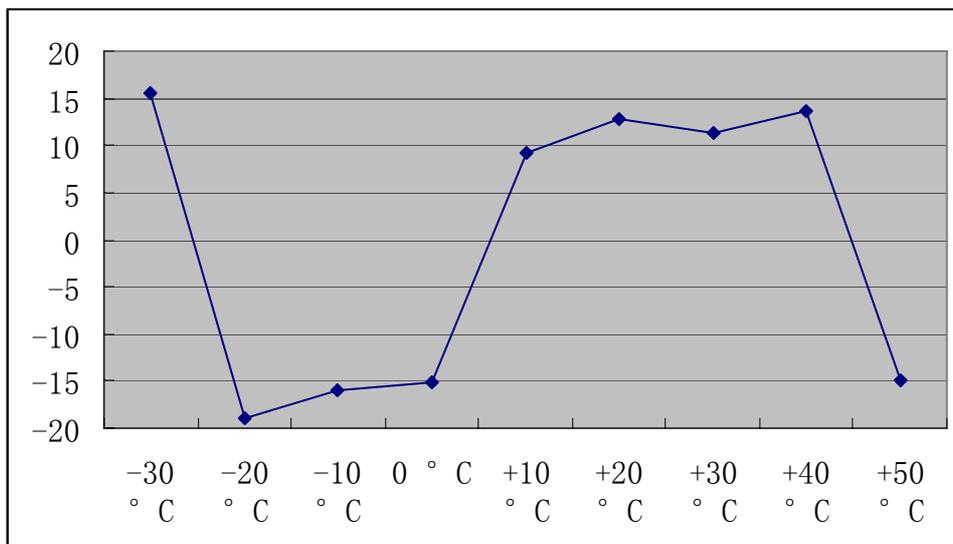


Figure 9. Measurement Results for 1X

CDMA2000 1X EV-DO:

- TRX1: Channel No.600(1960MHz)

Figure 10.Measurement Results for 1X EV-DO

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	43	1960	-11.51	Pass
-20 °C	43	1960	-12.14	Pass
-10 °C	43	1960	-15.25	Pass
0 °C	43	1960	-8.96	Pass
+10 °C	43	1960	-11.72	Pass
+20 °C	43	1960	-8.03	Pass
+30 °C	43	1960	7.78	Pass
+40 °C	43	1960	10.90	Pass
+50 °C	43	1960	-10.74	Pass

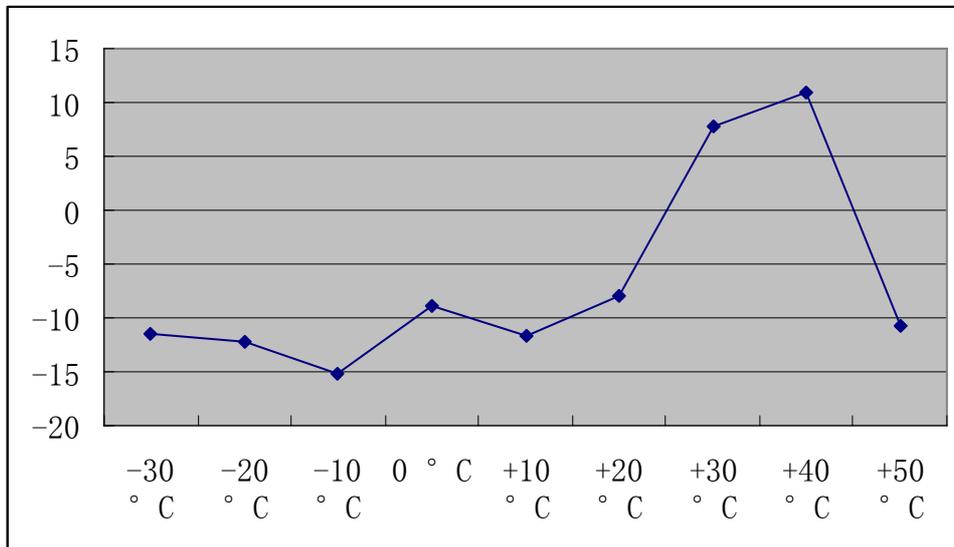


Figure 11. Measurement Results for 1X EV-DO

6.7.4.2 Measurement Results vs. Variation of Voltage

CDMA2000 1X:

- TRX1: Channel No.600(1960MHz)

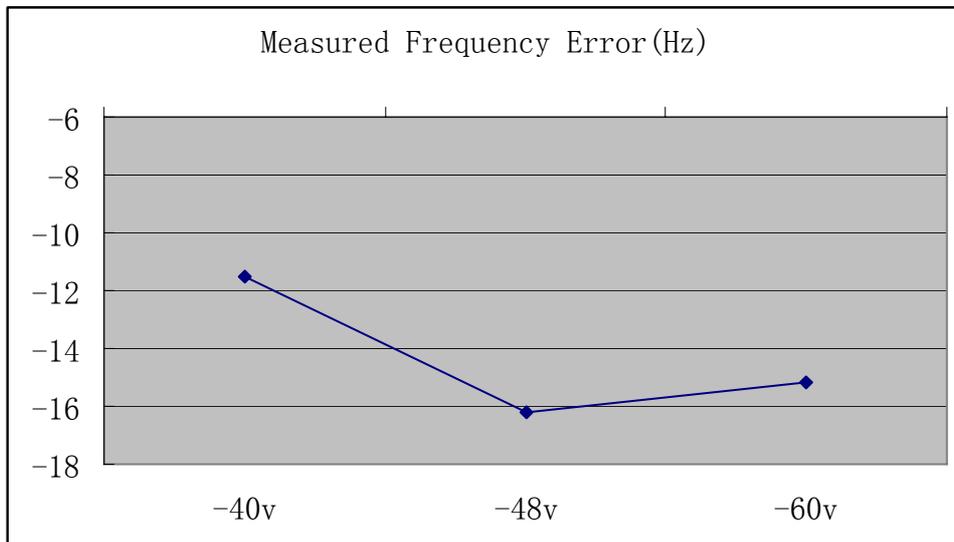


Figure 12. Measurement Results for 1X

CDMA2000 1X EV-DO:

- TRX1: Channel No.600(1960MHz)

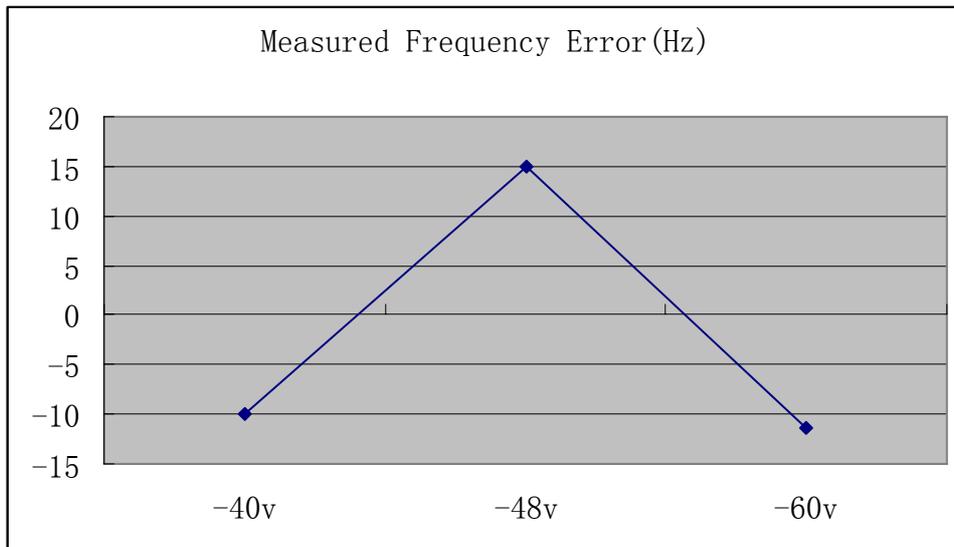


Figure 13. Measurement Results for 1X EV-DO

6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix F with 25 pages.

7 EMC Test

7.1 Radiated Emission of Enclosure in Idle Mode

7.1.1 Test Conditions

table 44. Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25 °C
Relative humidity:	51 %

7.1.2 Test Specifications and Limits

7.1.2.1 Specification

CFR 47 (FCC) part 15.109

7.1.2.2 Supporting Standards

table 45. Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
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7.1.2.3 Limits

The Radiated Emission of enclosure of EUT should compliance with the requirement of part 15.109. The limit showed in following table.

table 46. Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit(uV/m)	Unit(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
960-1000	500	54

7.1.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The test distance was 3m. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to EN 55022/CISPR 22

The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. The maximal emission

value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

The test was performed in one power supply mode: DC power supply, and the test performed at worst emission state.

All RF ports of CDMA2000 1900MHz Base Station BTS3606E were terminated with match load. And the Base Station was operated on the typical channel. The transceivers of Base Station were worked in idle mode.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz
 Measurement bandwidth: 1GHz – 12.75 GHz: 1 MHz

Test set up

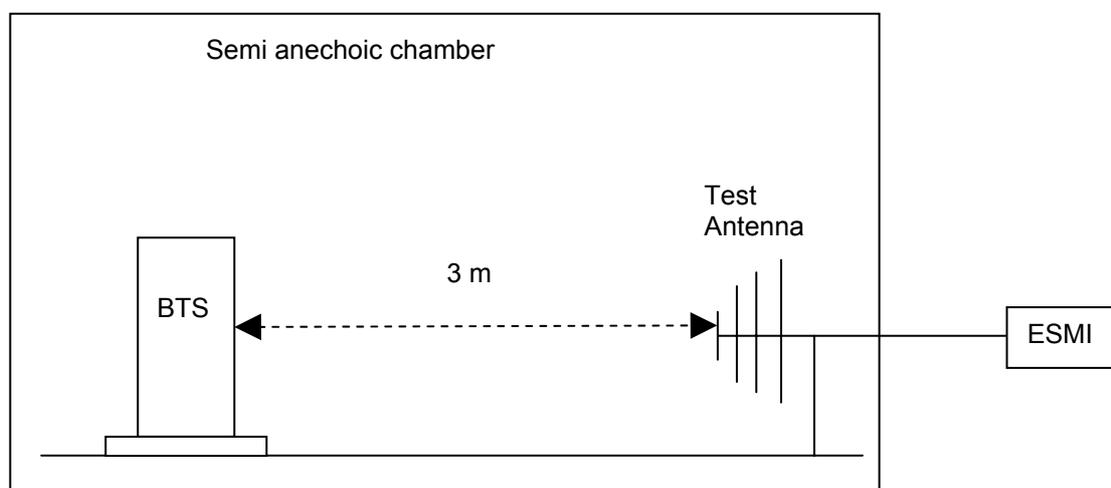


Figure 14. Test set up

7.1.4 Measurement Results

30MHz~1GHz:

table 47. MEASUREMENT RESULT: QP DETECTOR

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
30.300000	19.70	-4.2	40.0	20.3	100.0	62.00	VERTICAL
78.600000	28.20	-15.1	40.0	11.8	223.0	61.00	HORIZONTAL
122.880000	33.50	-9.6	43.5	10.0	140.0	125.00	HORIZONTAL
245.820000	33.90	-8.6	46.0	12.1	126.0	113.00	HORIZONTAL
368.640000	33.50	-5.2	46.0	12.5	100.0	134.00	HORIZONTAL
860.160000	34.40	1.0	46.0	11.6	100.0	349.00	VERTICAL

1GHz~12.75GHz:

table 48. MEASUREMENT RESULT: QP DETECTOR

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
2500.000000	34.70	2.1	53.9	19.2	100.0	342.00	VERTICAL

7.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix G with 2 pages.

8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

table 49. System Measurement Uncertainty

Items		Extended Uncertainty
Band Width	Magnitude (%)	U=0.2%; k=2
Band Edge Compliance	Disturbance Power (dBm)	U=2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power (dBm)	U=2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U=0.21ppm; k=2
Field Strength of Spurious Radiation	ERP (dBm)(30MHz~1G)	U=4.6dB; k=2
	ERP (dBm) (>1G)	U=3dB; k=2
Conducted Output Power	Power(dBm)	U=0.39dB; k=2
Conducted Emission at Power Port	Disturbance Voltage (dB μ V)	U=3.3dB; k=2
Radiated Emission of enclosure at ideal mode	Field strength (dB μ V/m)	U=4.6dB; k=2

9 Appendices

Appendix A	Measurement Results Modulation Characteristics	4 pages
Appendix B	Measurement Results Occupied Bandwidth	3 pages
Appendix C	Measurement Results Band Edges	13 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	13 pages
Appendix E	Measurement Results Radiated Spurious Emission	5 pages
Appendix F	Frequency Stability Measurements	25 pages
Appendix G	Measurement Results Radiated Emission of Enclosure at Idle Mode	2 pages
Appendix H	Photos of Test Setup	3 pages