

Huawei Technologies Co., Ltd.	  	
Prüfbericht - Nr.: <i>Test Report No.</i>	SYBH(E)25022005	Seite 1 von 43 Page 1 of 43

Auftraggeber: <i>Client:</i>	Huawei Technologies Co., Ltd. Huawei Base Bantian. Longgang District Shenzhen 518057 P.R. China
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Gegenstand der Prüfung: <i>Test item:</i>	HUAWEI CDMA Base Station
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Bezeichnung: BTS3606A-1900 <i>Identification:</i>	Serien-Nr.: <i>Serial No.</i>
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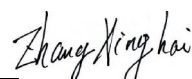
Wareneingangs-Nr.: <i>Receipt No.:</i>	Eingangsdatum: 07.22.2005 <i>Date of receipt:</i>
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Prüfört: <i>Testing location:</i>	Huawei EMC Laboratory FCC registered test site number 97456 as of March 11. 2003.
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Prüfgrundlage: <i>Test specification:</i>	FCC Part 24, subpart E FCC Part 2, subpart J, §2.1033 - §2.1057 FCC Part 15 subpart 15.109 & 15.207
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Prüfergebnis: <i>Test Result</i>	Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The a. m. test item passed.
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geprüft / tested by:	kontrolliert / reviewed by
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<u>2005-07-22</u> Datum <i>Date</i> <u>Deng Jiang</u> Name <i>Name</i>  Unterschrift <i>Signature</i>	<u>2005-07-28</u> Datum <i>Date</i> <u>Zhang Xinghai</u> Name <i>Name</i>  Unterschrift <i>Signature</i>
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Sonstiges / Other Aspects:

Abkürzungen: OK, Pass = entspricht Prüfgrundlage Fail = entspricht nicht Prüfgrundlage N/A = nicht anwendbar	Abbreviations: OK, Pass = passed Fail = failed N/A = not applicable
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Dieser Prüfbericht bezieht sich nur auf den o.g. Prüfgegenstand und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.
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1. SUMMARY

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

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Maximum Output power limits	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Spurious Emission at Antenna Terminals	PASS
2.1053	24.238	Field Strength of Spurious Emissions	PASS
2.1055	24.235	Frequency Stability	PASS
-	15.207	Conducted Emission at Power Supply Terminal Port	PASS
-	15.109	Radiated Emission in Idle Mode	PASS

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2. PRODUCT DESCRIPTION

2.1. Production Information

HUAWEI CDMA Base Station BTS3606A-1900 is access equipment in the CDMA system. The frequency band is Band Class 1 (PCS band). BTS3606A-1900 implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice and SMS service etc.

2.2. Report Update Information

For the upgrade of Base Station BTS3606A-1900, this report is update for the modification of Base Station. All the change of the Base Station is described in following table.

Model Number	Board/Module	Original Version	New Version	Modify Information
BTS3606A-1900	TRX	V1	V2	V1: It only have one RF channel V2: It can provide up to 3 RF channels.
BTS3606A-1900	PA	V1	V2	V1: It only supports 1 carrier and the maximum total output power is 40W. V2: It can support up to 3 carriers and the maximum total output power is also 40W.

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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 FCC and registration granted under the registration number 97456 on March 11. 2003. The test site has been accredited by A2LA and the accredited number is 2714.01 in Jan of 2004.

3.1. Testing Period

The test have been performed during the period of

Jun. 15, 2005 to Jul. 5, 2005

3.2. General Set up Description

Huawei CDMA Base Station BTS3606A-1900 can only support CDMA mode and Band Class 1(PCS Band). During this measurement, the Base Station only works in CDMA mode and band class 1.

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4. PRODUCT DESCRIPTION

4.1. Technical Characteristics

4.1.1. Frequency Range

Uplink band:	1850 to 1910 MHz
Downlink band:	1930 to 1990 MHz

4.1.2. Channel Spacing / Separation

Channel spacing:	50 KHz
Channel separation:	1.25 MHz

4.1.3. 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

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4.1.4. Environmental Requirements

BTS3606A-1900

Minimum temperature:	- 40 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5% ~ 95% RH

4.1.5. Power Source

BTS3606A-1900

AC voltage nominal:	~ 220V
AC voltage range	176V ~ 276V
AC current maximal:	50A

4.1.6. Tune-up Procedure

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

Please reference the document Tune-up Procedure in TCF.

4.1.7. Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033 (8)

The voltage and current in the final RF stage is:

Voltage:	27VDC
Current:	20A According to CFR (FCC) part 2, subpart 2, section 2.1033 (8)

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4.2. EUT Identification List

4.2.1. Board Information

1900MHz CDMA Base Station
BTS3606A-1900

Board and Module		
Equipment Designation / Description	Serial Number	Remarks
CCPM	036215104A000067	Channel Process Module (1X)
	036215104A000065	
	036215104A000012	
	036215104A000035	
	036215104A000036	
	036215104A000037	
BCIM	0362831045000285	BTS Control Interface Module
	0362831045000301	
BCKM	0373191049000039	BTS Control and Clock Module
	0373191049000040	
CMTR	2102313035104C800015	Transceiver Module
	2102313035104C800016	
	2102313035104C800011	
	2102313035104C800013	
	2102313035104C800030	
	2102313035104C800031	
CMPA	2102313043104C800029	High Power Amplifier Module
	2102313043104C800030	
	2102313043104C800031	

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	2102313043104C800021 2102313043104C800022 2102313043104C800023	
CDDU	2199052560L04200001 2199052560L04200002 2199052560L04200003	BTS Dual Duplexer Unit
FAN	2102312558104C000040 2102312558104C000025 2102312558104C000037 2102312558104C000038 2102312558104C000036 2102312558104C000052	Fan Module
PWR	21022805362015000056 21022805362015000015 21022805362015000016	DC/DC Power Module
PSU	21021304772039000014 21021304972038000014 21021304972038000068 21021304972038000002 21021304972038000051 21021304972038000067 21021304972038000074 21021304972038000015	AC/DC Power Module
PMU(PSM-87A):	210224400082043000002	Power Monitor Unit
Base Band Fan Monitor Board	N.A.	
E1 Lighting Protect Board	N.A.	

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APW Door(Heat Exchange System)	04019957-2	
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4.2.2. Adapter Technical Data

Not Application for BTS.

4.2.3. Battery Technical Data

Not Application for BTS.

4.2.4. FCC Identification

Grantee Code: QIS
Product Code: BTS3606A-1900
FCC Identification: QISCBTS3606A-1900D

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5. TRANSMITTER MEASUREMENTS

5.1. Maximum Channel Power

5.1.1. Test Conditions

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

5.1.2. Test Specifications and Limits

5.1.2.1. Specification

CFR 47 (FCC) part 2.1046 and part 24.232

5.1.2.2. 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

5.1.2.3. Limits

Compliance with 24.232 requires in no any case may the peak power of a Mobile Station transmitter exceed 1640 watts. And calculate longitude output power by following formula: $W(\text{dBm}) = 10 \cdot \log(W_{\text{in watts}})$.

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

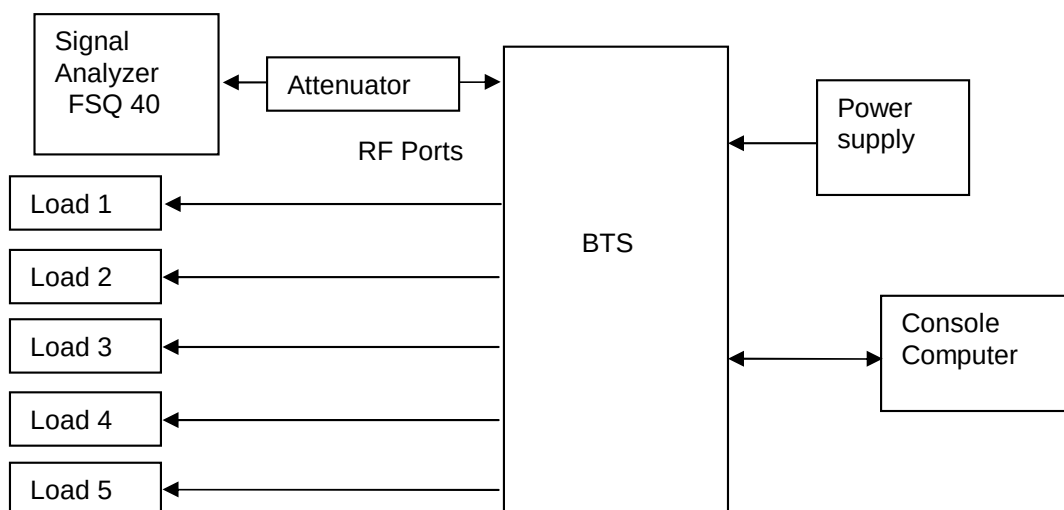
5.1.3. Test Method and Setup

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 as US PCS (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



5.1.4. Measurement Results

A. 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} (3.7 V)	44.17	< 62	43.20	< 62	43.42	< 62
Measurement uncertainty (dB)		Equipment			Requirement		
		0.5 dB			N/A		

B. Two Carriers:

TEST CONDITIONS		Maximum Output Power					
		Channel25 & 50		Channel600 & 625		Channel1150 & 1175	
		dBm		dBm		dBm	
T_{nom} (25 °C)	V_{nom} (3.7 V)	Measured	Limit	Measured	Limit	Measured	Limit
		Carrier 1					
		42.90	< 62	43.11	< 62	42.91	< 62

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	Carrier 2					
	42.93	< 62	43.37	< 62	42.86	< 62
	Total					
	45.93	< 62	46.26	< 62	45.89	< 62
Measurement uncertainty (dB)	Equipment			Requirement		
	0.5 dB			N/A		

C. Three Carriers:

TEST CONDITIONS		Maximum Output Power					
		Channel25 & 50 & 75		Channel600 & 625		Channel1175	
		dBm		dBm		dBm	
T _{nom} (25 °C)	V _{nom} (3.7 V)	Measured	Limit	Measured	Limit	Measured	Limit
	Carrier 1						
	41.59	< 62	41.06	< 62	41.26	< 62	
	Carrier 2						
	41.58	< 62	41.21	< 62	41.21	< 62	
	Carrier 3						
	41.69	< 62	41.17	< 62	41.19	< 62	
	Total						
	46.39	< 62	45.92	< 62	45.99	< 62	
Measurement uncertainty (dB)	Equipment			Requirement			
	0.5 dB			N/A			

5.1.4.1. Conclusion

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

For the measurement results refer to appendix A with 10 pages.

5.1.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Analyzer	R&S	FSQ 40	100025	01.02.2006
Attenuator	Shanghai Huaxiang	DTS100	15	05.06.2005

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		(30dB)		
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test

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5.2. Modulation Characteristics

5.2.1. Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	22 °C
Relative humidity:	47 %

5.2.2. Test Specifications and Limits

5.2.2.1. Specification

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

5.2.2.2. 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

5.2.2.3. Limits

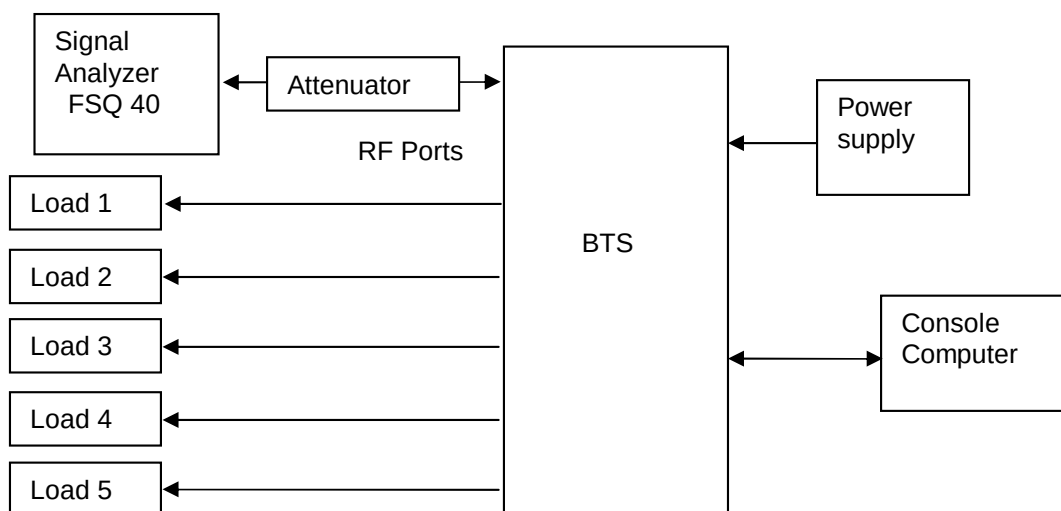
Compliance with 2.1047 requires not a specific modulation characteristic since the EUT is applied for part 24 subpart E

Limits	Rho > 0.89
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5.2.3. 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 as US PCS (1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Modulation Waveform Quality ρ of the Base Station by the R&S FSQ40.

Test setup



5.2.4. Measurement Results

TEST CONDITIONS		Rho(RC1/1)					
		Channel25 1931.25MHz		Channel600 1960.00Mhz		Channel1175 1988.75MHz	
		N/A		N/A		N/A	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (25 °C)	V_{nom} (3.7)	0.99229 >	0.89	0.99136 >	0.89	0.99443 >	0.89
Measurement uncertainty		Equipment				Requirement	
		0.001				N/A	

TEST CONDITIONS		Rho(RC3/3)					
		Channel25 1931.25MHz		Channel600 1960.00Mhz		Channel1175 1988.75MHz	
		N/A		N/A		N/A	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (25 °C)	V_{nom} (3.7)	0.99358 >	0.89	0.99341 >	0.89	0.99151 >	0.89

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Measurement uncertainty	Equipment	Requirement
	0.001	N/A

5.2.4.1. Conclusion

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

For the measurement results refer to appendix B with 7 pages.

5.2.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Analyzer	R&S	FSQ 40	100025	01.02.2006
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test

5.3. Occupied Bandwidth

5.3.1. Test Conditions

Preconditioning:	1 hour
Measured at:	RF connector
Ambient temperature:	25 °C
Relative humidity:	55 %

5.3.2. Test Specifications and Limits

5.3.2.1. Specification

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

5.3.2.2. 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

5.3.2.3. Limits

Compliance with 2.1049 requires not a specific occupied bandwidth since the EUT is applied for part 24 subpart E and possesses a digital modulation there is no specific requirement formulated in before mentioned rules the 99% rules applies.

Upper /lower frequency limits	0.5% of the mean power
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5.3.3. 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 as US PCS (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).

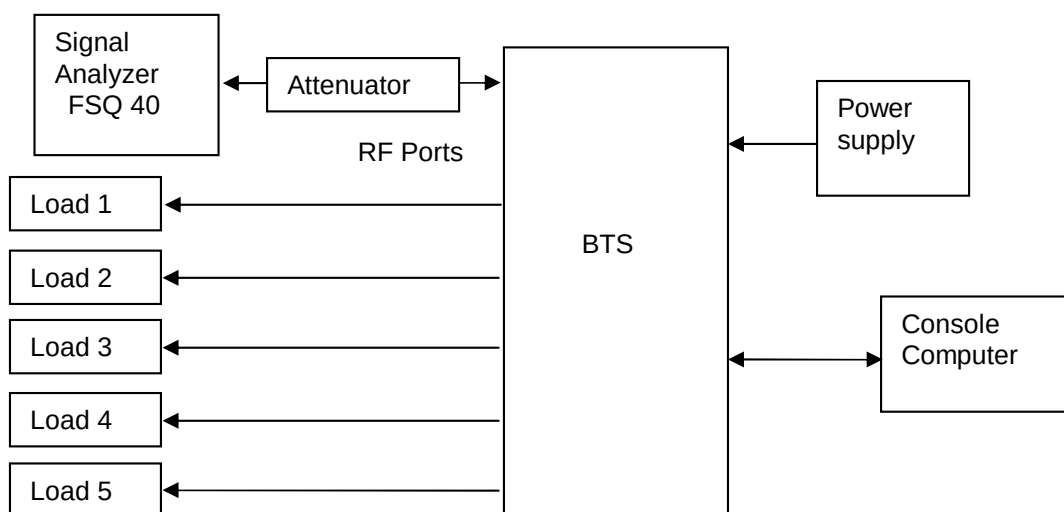
(g) Transmitter in which the modulating base band comprises not more than three independent channels -

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): 300 kHz

Test Set-up



5.3.4. Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel 25 1931.25MHz		Channel 600 1960.00Mhz		Channel 1175 1988.75MHz	
		Measured (MHz)	Limit (MHz)	Measured (MHz)	Limit (MHz)	Measured (MHz)	Limit (MHz)
T_{nom} (25 °C)	V_{nom} (3.7 V)	1.2721	1.48	1.2788	1.48	1.2788	1.48
Measurement uncertainty (dB)		Equipment			Requirement		
		0.2%			N/A		

5.3.4.1. Conclusion

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

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

5.3.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Analyzer	R&S	FSQ 40	100025	01.02.2006
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test

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5.4. Spurious Emission at Antenna Terminal (Block edge compliance and outside band compliance)

5.4.1. Test Conditions

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

5.4.2. Test Specifications and Limits

5.4.2.1. Specification

CFR 47 (FCC) part 2.1051 and part 24.238

5.4.2.2. 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

5.4.2.3. Limits

Compliance with part 24.238 requires that 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).

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

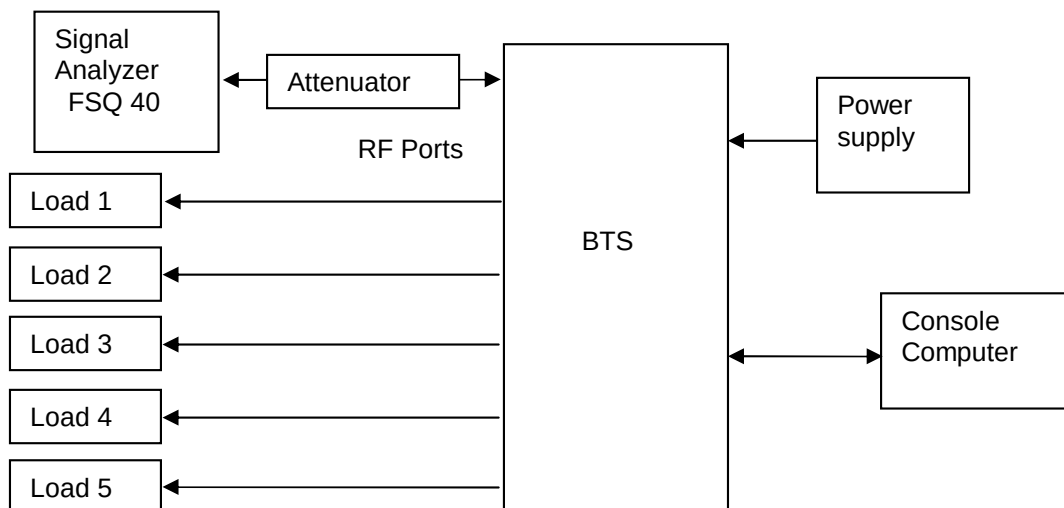
5.4.3. Test Method and Setup

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 as US PCS (1900MHz). BTS was controlled to transmit Maximum power by console computer. Measure and record the Spurious Emission of the Base Station by the R&S FSQ40.

Measurement bandwidth (RBW) for up to 150kHz adjacent to carrier: 1 kHz;
Measurement bandwidth (RBW) for 150kHz up to 30 MHz: 10 kHz;
Measurement bandwidth (RBW) for 30MHz up to 1 GHz: 100 kHz;

Measurement bandwidth (RBW) for all others frequencies above 1GHz: 1MHz;

Test Set-up



5.4.4. Measurement Results at Block Edges

A. Single Carrier

Block NO.	Frequency of Block edge [MHz]	Channel Number	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
A	1930	25	43	<-13(See appendix D)	- 13 dBm	Pass
	1945	275	43	<-13(See appendix D)	- 13 dBm	Pass
D	1945	325	43	<-13(See appendix D)	- 13 dBm	Pass
	1950	375	43	<-13(See appendix D)	- 13 dBm	Pass
B	1950	425	43	<-13(See appendix D)	- 13 dBm	Pass
	1965	675	43	<-13(See appendix D)	- 13 dBm	Pass
E	1965	725	43	<-13(See appendix D)	- 13 dBm	Pass
	1970	775	43	<-13(See appendix D)	- 13 dBm	Pass
F	1970	825	43	<-13(See appendix D)	- 13 dBm	Pass
	1975	875	43	<-13(See appendix D)	- 13	Pass

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					dBm	
C	1975	925	43	<-13(See appendix D)	- 13 dBm	Pass
	1990	1175	43	<-13(See appendix D)	- 13 dBm	Pass

B. Multiple Carrier

Block NO.	Frequency of Block edge [MHz]	Channel Number	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
A	1930	25/50/75	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1945	225/250/275	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
D	1945	325/350/375	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1950	325/350/375	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
B	1950	425/450/475	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1965	625/650/675	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
E	1965	725/750/775	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1970	725/750/775	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
F	1970	825/850/875	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1975	825/850/875	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
C	1975	925/950/975	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass
	1990	1125/1150/1175	41(Each One) 46(Total)	<-13(See appendix D)	- 13 dBm	Pass

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5.4.5. Measurement Results outside Band Edges

A. Single Carrier

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
600	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass

B. Multiple Carrier

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
575/600/625	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass

5.4.5.1. Conclusion

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

For the measurement results refer to appendix D with 36 pages.

5.4.5.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Analyzer	R&S	FSQ 40	100025	01.02.2006
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test

5.5. Field Strength of Spurious Radiation

5.5.1. Test Conditions

Preconditioning:	1 hour
Measured at:	Channel 600, Frequency 1960MHz
Ambient temperature:	22 °C
Relative humidity:	53 %

5.5.2. Test Specifications and Limits

5.5.2.1. Specification

CFR 47 (FCC) part 2.1053 and part 24.238

5.5.2.2. 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)
EIA/TIA -95B-1999	Mobile Station-Base Station Compatibility Standard for Wideband Spread Spectrum Cellular Systems (ANSI/TIA/EIA-95-B-99)
3GPP2 C.S0010-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations. Release B

5.5.2.3. Limits

Compliance with 24.238 requires that 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).

Rated Power:	43 dBm (20W)
Required attenuation:	$43 + 10 \log_{10} (20W) = 56 \text{ dB}$
Absolute level	$43 \text{ dBm} - 56 \text{ dB} = -13 \text{ dBm}$

5.5.3. 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

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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 CDMA Base Station BTS3606A-1900 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 CDMA Base Station to transmitter the maximum power which defined in specification of product. The Base Station operates on a typical channel.

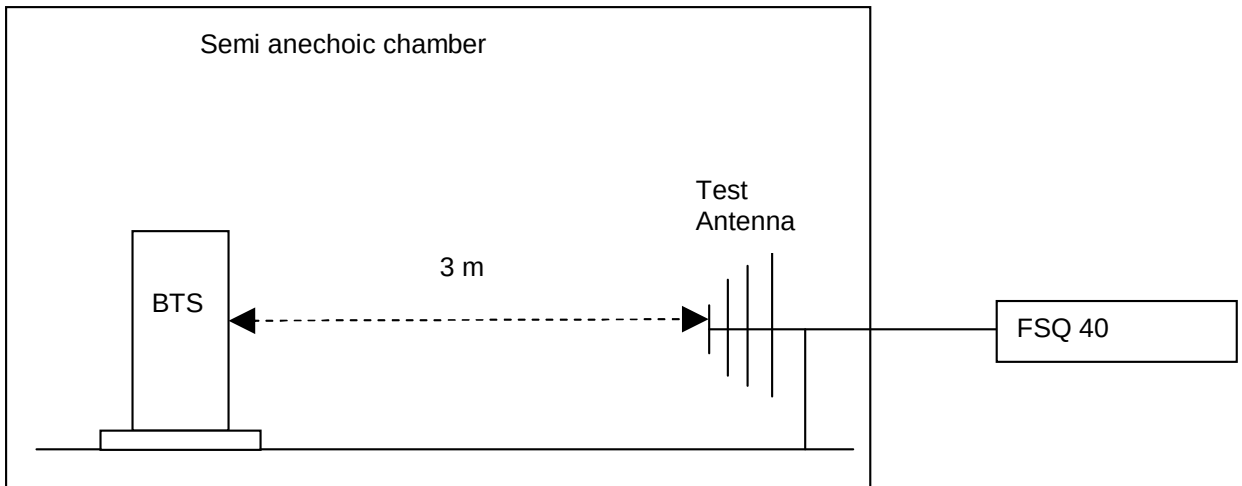
The test procedure:

- (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)(9). Connect the handset to the wireless communication tester R&S FSQ40 via the air interface. The band class is set as US Cellular.
- (b) Test the Radiated maximum output power by the R&S FSQ40 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 R&S FSQ40, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

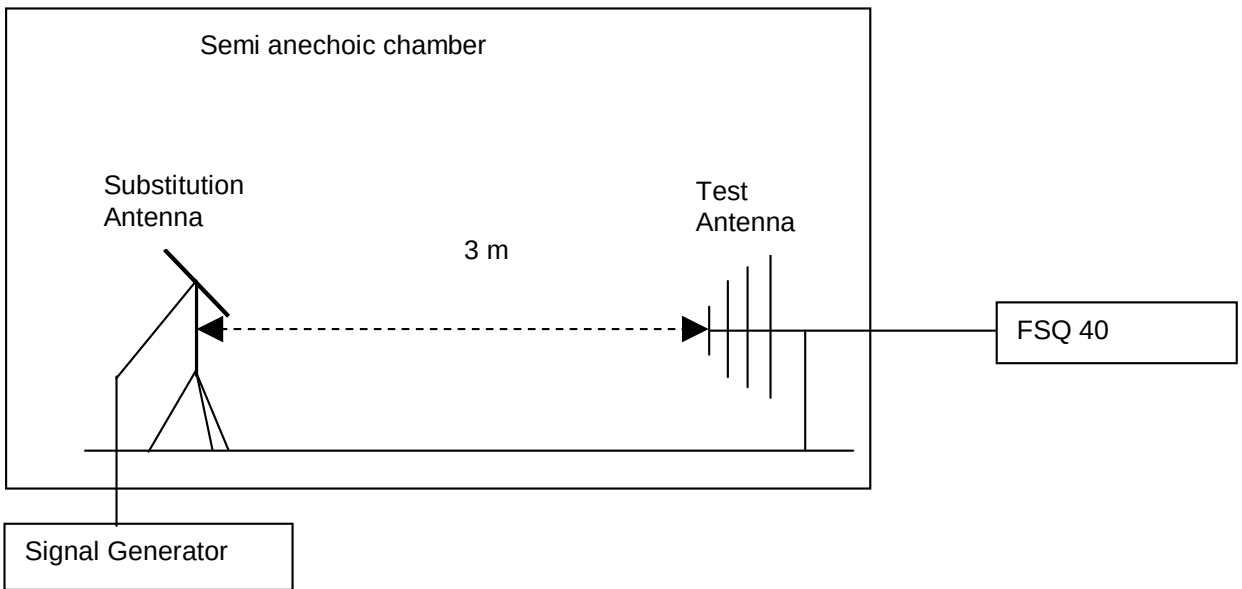
Test setup

Measurement bandwidth: 9 kHz – 150 kHz:	1 kHz
Measurement bandwidth: 150 kHz – 30 MHz:	9 kHz
Measurement bandwidth: 30 MHz – 1000 MHz:	120 kHz
Measurement bandwidth: 1 GHz – 12.75 GHz:	1 MHz

Step 1: find the maximum E.R.P.



Step 2: substitution method



5.5.4. Measurement Results

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
600	9 kHz ~20GHz	43	<- 13 dBm (See appendix E)	- 13 dBm	Pass

Measurement Uncertainty: 5 dB

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5.5.5. Substitution Results

BTS3606A-1900

Freq. [MHz]	Substitution Antenna Type	Measurement Result [dBm]	Gain [dBd]	Cable Loss [dB]	Signal Generator Level [dBm]	Substitution Level [dBm]	FCC limit [dBm]	Result
3923.33	Horn Ant.	-36.01	7.85	2.20	-41.24	-35.59	-13	Pass

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

$$\text{E.R.P. [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

NOTE: SGP- Signal Generator Level

5.5.5.1. Conclusion

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

For the measurement results refer to appendix E with 6 pages.

5.5.5.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	05.30.2005
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	05.30.2005
BiLog Antenna	Schaffner	CBL 6112B	2747	10.15.2005
Pre-Amplifier	Agilent	83017A	3950M00246	01.03.2006
Horn Antenna	R&S	HF906 4044.4507.02	359287/005	12.05.2005
Horn Antenna	R&S	HF906 4044.4507.02	359287/006	12.05.2005
Dipole	Schwarzbeck	D69250-VHAD	979	08.10.2005
Chamber_NSA	S+M	N/A	N/A	12.24.2005
Power amplifier	Agilent	8447D	2944A10146	05.30.2005
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006

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Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Signal Generator	R&S	SMR 40	100325	12.09.2005

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5.6. Frequency Stability

5.6.1. Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % at 20 °C

5.6.2. Test Specifications and Limits

CFR 47 (FCC) part 2.1055 and part 24.235

5.6.2.1. 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

5.6.3. 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.

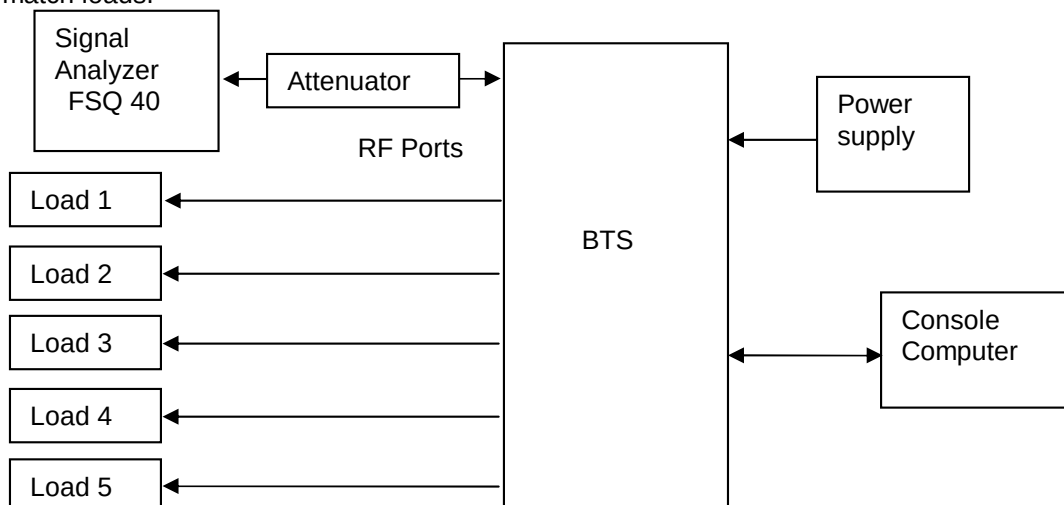
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal 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

Measurement Bandwidth: 30 kHz

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 $50\ \Omega$ match loads.



5.6.4. Measurement Results vs. Variation of Temperature

BTS3606A-1900

I TRX1: Channel No.**25(1931.25MHz)**

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	43	1931.25	2.04	Pass
-20 °C	43	1931.25	15.21	Pass
-10 °C	43	1931.25	3.09	Pass
0 °C	43	1931.25	-7.75	Pass
+10 °C	43	1931.25	13.18	Pass
+20 °C	43	1931.25	-3.67	Pass
+30 °C	43	1931.25	0.15	Pass
+40 °C	43	1931.25	5.34	Pass
+50 °C	43	1931.25	-12.23	Pass

I TRX2: Channel No.**600(1960.00MHz)**

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	43	1960.00	-12.66	Pass
-20 °C	43	1960.00	-9.44	Pass
-10 °C	43	1960.00	2.19	Pass
0 °C	43	1960.00	2.85	Pass
+10 °C	43	1960.00	-11.98	Pass
+20 °C	43	1960.00	-5.16	Pass
+30 °C	43	1960.00	-1.36	Pass
+40 °C	43	1960.00	5.66	Pass
+50 °C	43	1960.00	13.53	Pass

I TRX3: Channel No.**1175(1988.75MHz)**

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result

-30 °C	43	1988.75	8.97	Pass
-20 °C	43	1988.75	-10.63	Pass
-10 °C	43	1988.75	-1.66	Pass
0 °C	43	1988.75	-11.26	Pass
+10 °C	43	1988.75	-10.47	Pass
+20 °C	43	1988.75	12.13	Pass
+30 °C	43	1988.75	2.82	Pass
+40 °C	43	1988.75	12.62	Pass
+50 °C	43	1988.75	7.33	Pass

5.6.5. Measurement Results vs. Variation of Voltage

BTS3606A-1900

I TRX1: Channel No. **25(1931.25MHz)**

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
187v	43	1931.25	-3.15	Pass
220v	43	1931.25	-5.08	Pass
253v	43	1931.25	0.72	Pass

I TRX2: Channel No. **600(1960.00MHz)**

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
187v	43	1960.00	-6.92	Pass
220v	43	1960.00	4.78	Pass
253v	43	1960.00	-1.98	Pass

I TRX3: Channel No. **1175(1988.75MHz)**

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
187v	43	1988.75	-1.55	Pass
220v	43	1988.75	-14.27	Pass
253v	43	1988.75	3.69	Pass

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5.6.5.1. Conclusion

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

For the measurement results refer to appendix F with 37 pages.

5.6.5.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Analyzer	R&S	FSQ 40	100025	01.02.2006
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test
Climate Chamber	WEISS	ACS-1	3604040034	2006.04.24
Power Supply	KIKUSUI	PCR 6000L	EM004681	2006.05.30

6. EMC TEST

6.1. Conducted Emission at Power Port

6.1.1. 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 15.107

6.1.2.2. 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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6.1.2.3. Limits

Compliance with CFR 47 part15.107 requires that conducted emission must meet the requirement of following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note * Decreases with the logarithm of the frequency.

6.1.3. Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

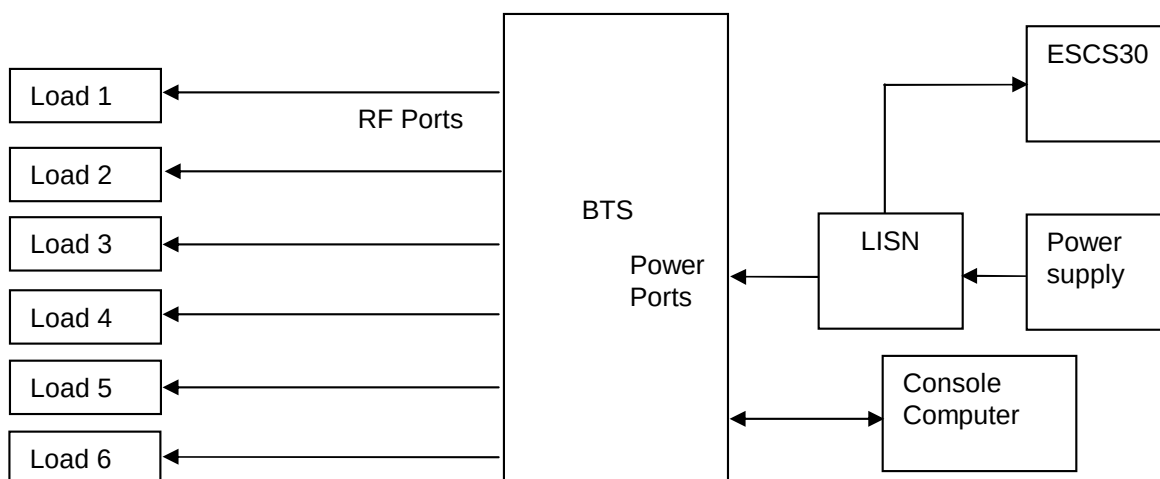
Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

HUAWEI CDMA Base Station BTS3606A-1900 was communicated with the BTS simulator through Air interface. The Base Station operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up

The CDMA Base Station was setup in the screened chamber and operated under nominal conditions.



6.1.4. Measurement Results

BTS3606A-1900

MEASUREMENT RESULT: " C20050406028 fin QP"

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
1.536000	29.80	10.1	56	26.2	N	GND
4.609500	15.50	10.1	56	40.5	L1	GND

MEASUREMENT RESULT: " C20050406028 fin AV "

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
1.536000	23.60	10.1	46	22.4	N	GND
2.557500	36.90	10.1	46	9.1	L3	GND
4.605000	10.60	10.1	46	35.4	L1	GND
24.999000	38.60	14.9	50	11.4	L1	GND

Measurement Uncertainty: 4 dB

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6.1.4.1. Conclusion

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

For the measurement results refer to appendix G with 2 pages.

6.1.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Receiver	R&S	ESCS30	830245/018	05.30.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062357	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006
Artificial Mains Network	NNLK8121	8960	8121416	05.30.2006
Cable	Huber&Suhner	SF 104PE	N/A	Before test

6.2. Radiated Emission of Enclosure in ideal mode

6.2.1. Test Conditions

Preconditioning:	0.5 hour
Nominal Output Power:	26 dBm
Measured at:	Channel 1000, Frequency 1980MHz
Ambient temperature:	25 °C
Relative humidity:	45 %

6.2.2. Test Specifications and Limits

6.2.2.1. Specification

CFR 47 (FCC) part 15.109

6.2.2.2. 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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6.2.2.3. Limits

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

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

6.2.3. 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.

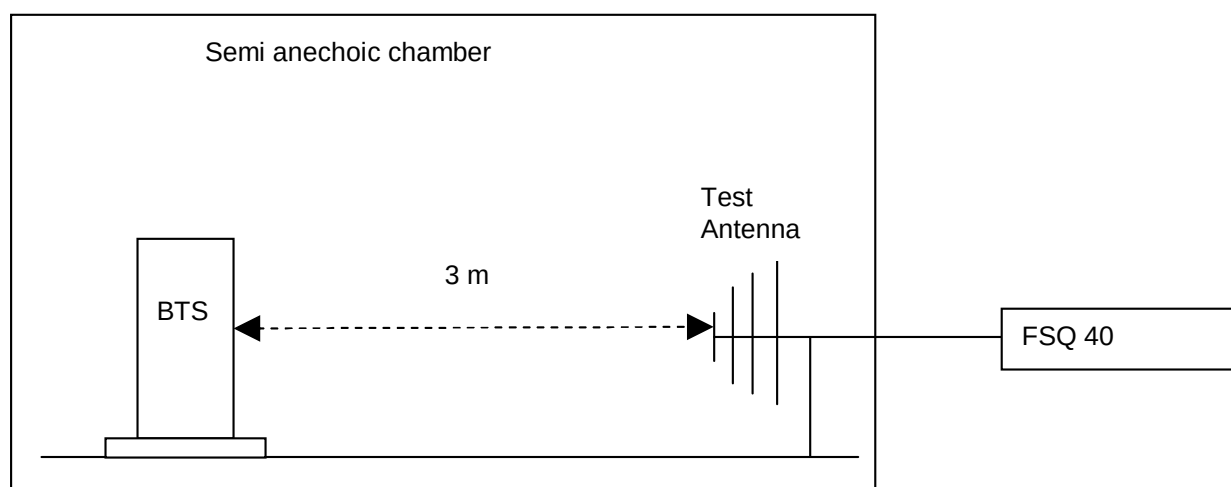
A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with 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 Base Station BTS3606A-1900 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 – 10 GHz: 1 MHz

Test set up



6.2.4. Measurement Results

BTS3606A-1900

MEASUREMENT RESULT: "R2005041132 fin QP"

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
30.600000	26.10	-3.7	40.0	13.9	112.0	95.00	VERTICAL
87.420000	29.50	-12.5	40.0	10.5	111.0	303.00	VERTICAL
176.940000	31.40	-11.0	43.5	12.1	100.0	280.00	VERTICAL
199.980000	34.60	-10.7	43.5	8.9	100.0	0.00	VERTICAL

Measurement Uncertainty: 5 dB

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6.2.4.1. Conclusion

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

For the measurement results refer to appendix H with 2 pages.

6.2.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	05.30.2006
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	05.30.2006
BiLog Antenna	Schaffner	CBL 6112B	2747	10.15.2006
Chamber_NSA	S+M	N/A	N/A	12.24.2006
Power amplifier	Agilent	8447D	2944A10146	05.30.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062357	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062360	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062361	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062365	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062355	02.07.2006
Match load	Shanghai Huaxiang	TF100 (30dB)	03062353	02.07.2006

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7. APPENDIXES

Appendix A	Measurement Results Maximum Output power limits	10 pages
Appendix B	Measurement Results Modulation Characteristics	7 pages
Appendix C	Measurement Results Occupied Bandwidth	4 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	36 pages
Appendix E	Measurement Results Field Strength of Spurious Radiation	6 pages
Appendix F	Measurement Results Frequency Stability versus Temperature and Voltage	37 pages
Appendix G	Measurement Results Conducted Emission at Power Port	2 pages
Appendix H	Measurement Results Radiated Emission of Enclosure at ideal mode	2 pages
Appendix I	Photos of Test Setup	5 pages