Huawei Technologies Co., Ltd.

No. L0310 HUAWEI Accredited No. 2174.01

Prüfbericht - Nr.: 17002467 001

Test Report No.

Auftraggeber: *Client:*
Huawei Technologies Co., Ltd.
Huawei Base
Bantian.
Longgang District
Shenzhen 518057 P.R. China

Gegenstand der Prüfung: *Test item:* **Out-door Type One-carrier 800MHz CDMA Base Station**

Bezeichnung: *Identification:* **BTS3601C-800, ODU3601C-800**
Serien-Nr.: *Serial No.* **Pre-production Model**

Wareneingangs-Nr.: *Receipt No.:*
Eingangsdatum: *Date of receipt:* **08.15.2004**

Prüfort: *Testing location:*
Huawei EMC Laboratory
A2LA registered test site number 2174.01 as of April 14. 2004.

Prüfgrundlage: *Test specification:*
FCC Part 22, subpart H, §22.901(d)
FCC Part 2, subpart J, §2.1033 - §2.1057

Prüfergebnis: *Test Result*
Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage.
The a. m. test item passed.

geprüft / *tested by:*			**kontrolliert** / *reviewed by*		
2004-08-31	Deng Jiang	Deng Jiang	2004-09-03	Zhang Xinghai	Zhang Xinghai
Datum *Date*	**Name** *Name*	**Unterschrift** *Signature*	**Datum** *Date*	**Name** *Name*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

Abkürzungen:			Abbreviations:		
	OK, Pass	= entspricht Prüfgrundlage		OK, Pass	= passed
	Fail	= entspricht nicht Prüfgrundlage		Fail	= failed
	N/A	= nicht anwendbar		N/A	= not applicable

Authorized format 16.12.1996, R.M.

1. SUMMARY

Below table summarizes the measurements and results for the CDMA base station. Detailed results and descriptions are shown in the following pages.

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	22.913	RF Output Power	PASS
2.1047	22.901	Modulation Characteristics	PASS
2.1049	22.917	Occupied Bandwidth	PASS
2.1051	22.917(e)	Spurious Emission at Antenna Terminals	PASS
2.1053	22.917(e)	Field Strength of Spurious Emissions	PASS
2.1055	22.355	Frequency Stability	PASS
15.207	15.207	Conducted Emission at Power Supply Terminal Port	PASS

The base station is intended for use in the licensed domestic public cellular radio service and is designed to be placed and operated under the conditions of FCC rules part 22 subpart H, section 22.901 (d).

2. TABLE OF CONTENT

3. PRODUCT DESCRIPTION

The BTS3601C/ODU3601C is located between the BSC and the MS in the CDMA2000 mobile communication system.

Under the control of the BSC, the BTS3601C/ODU3601C serves as the radio transceiver equipment of one cell or multiple logical sectors. By connecting to the BSC via the Abis interface, it assists the BSC in managing the radio resource, radio parameter and interface resource. It also implements, via the Um interface, the radio transmission between the BTS and the MS as well as related control functions.

The outdoor BTS3601C/ODU3601C can accommodate to various climates and complex electromagnetic environments. It features low cost, fast installation and flexible environment adaptability. As an essential part of Huawei CDMA BTS series, it allows the radio network to achieve seamless coverage more easily. Different from BTS3601C, ODU3601C don't have Base band Processing Module (MBPM).

4. 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.

4.1. Testing Period

The test have been performed during the period of

August 15, 2004 to August 30, 2004

4.2. General Set up Description

The base station BTS3601C-800/ODU3601C-800 is equipped with a total one identical transceiver. One transceiver has been tested.

5. PRODUCT DESCRIPTION

5.1. Technical Characteristics

5.1.1. Transmission Frequency Range

Lower frequency:	869 MHz
Upper frequency:	894 MHz

5.1.2. Transmitter Power Rating

Minimum Power:	No level adjustment possible according to manufacturer statement
Maximum Power:	43 dBm +2/-4 dBm

5.1.3. Channel Spacing / Separation

Channel spacing:	Channel 37: 871.11 MHz, Channel 466: 883.98MHz, Channel 1013: 869.70 MHz
Channel separation	Min. 1.23MHz

5.1.4. Type of Emission

Emission Designation:	**1M25F9W**

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

5.1.5. Environmental Conditions for Base station

Minimum temperature:	- 30 °C
Maximum temperature:	+ 50 °C
Relative Humidity:	Max. 90% R.H

5.1.6. Power Source

AC nominal:	200-240 VAC & -48 VDC
AC voltage range	176~-264VAC & -38.4□-57.6V
AC current maximal:	4A(AC) & 15A(DC)

5.1.7. Tune-up Procedure

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

Please reference the document Tune-up Procedure in TCF

5.1.8. 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: 10 A

5.2. EUT Identification List

Power Supply for type designation BTS3601C-800/ODU3601C-800		
Equipment Designation / Description	Serial Number	Remarks
AC-DC Power Module MAPM	21021305432045000016	220VAC to 27VDC
DC-DC Power Module MDPM	21021354824501000013	48VDC to 27VDC

MFEM for type designation BTS3601C-800/ODU3601C-800		
Equipment Designation / Description	Serial Number	Remarks
Dual Duplexer Unit MFEM	21023114881045000012	

Transceiver module (BTRM) for type designation BTS3601C-800/ODU3601C-800		
Equipment Designation / Description	Serial Number	Remarks
Transceiver module MTRM No. 1	21023114891045000034	Transceiver Module

Power Amplifier Module for type designation BTS3601C-800/ODU3601C-800		
Equipment Designation / Description	Serial Number	Remarks
Transceiver Unit MPAM No. 1	21023114791045000023	Each transceiver unit consist of MTRM module a MPAM module and a fan module

Controller for type designation BTS3601C-800		
Equipment Designation / Description	Serial Number	Remarks
BTS Base band Processing Module MBPM	21023119341045000021	

Note: Different from BTS3601C, ODU3601C don't have Base band Processing Module (MBPM).

5.2.1. FCC Identification

Grantee Code: **QIS**
Product Code: **BTS3601C-800, ODU3601C-800**

FCC Identification: **QISBTS3601C-800, QISODU3601C-800**

6. TRANSMITTER MEASUREMENTS

6.1. RF Output Power

6.1.1. Test Conditions

Preconditioning:	1 hour
Maximum Specified Transmitter Power:	43 dBm
Measured at:	MFEM Output Port
Ambient temperature:	23 °C
Relative humidity:	57 %
Date of Testing:	08.15.2004~08.30.2004

6.1.2. Test Specifications and Limits

6.1.2.1. Specification

CFR 47 (FCC) part 2.1046 and part 22.913

Supporting Standards:

EIA/TIA-603-A: 1992 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)
EIA/TIA-97D-2001 Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.1.2.2. Limits

Compliance with 22.913 requires that the effective radiated power must not exceed 500W.

Max. ERP	500W

According to the above requires of peak power as 10*log(P)=57dBm.

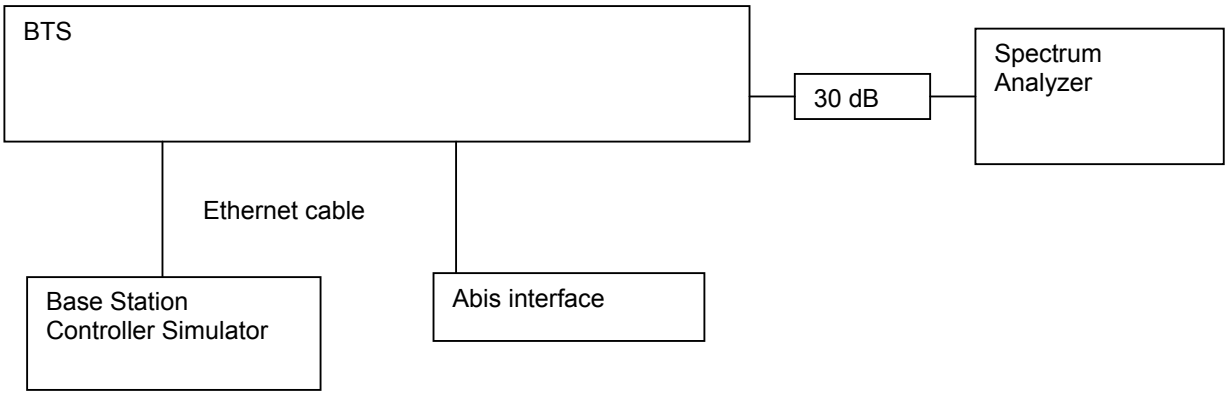
6.1.3. Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals 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 2.983(d)(5). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

Test Set up

The CDMA BTS was set up via the BTS controller simulator and operated at maximal load. The Spectrum analyzer was set with the following settings.

Resolution bandwidth:	28 kHz
Video bandwidth:	300 kHz
Max. Hold function:	active



6.1.4. Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel 37 871.11 MHz		Channel 466 883.98MHz		Channel 1013 869.7 MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (23.5 °C)	V_{nom} (220 VAC) *	44.14	57**	43.83	57**	43.46	57**
Measurement uncertainty (dB)		Equipment		Requirement			
		0.4 dB		N/A			

*() It is the voltage that is measured on the rack within the cabinet.
** peak power of a base station transmitter

6.1.4.1. Conclusion

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

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

6.1.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until(D/M/Y)
PSA Series Spectrum Analyzer	Agilent	E4445A	MY41000146	10.24.2004
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	06.05.2005
Cable	Diverse	RG58-U	n.a	Before test

6.2. Modulation Characteristics

6.2.1. Test Conditions

Preconditioning:	1 hour
Maximum Specified Transmitter Power:	43 dBm
Measured at:	MFEM Output Port
Ambient temperature:	24 °C
Relative humidity:	57 %
Date of Testing:	08.15.2004~08.30.2004

6.2.2. Test Specifications and Limits

6.2.2.1. Specification

CFR 47 (FCC) part 2.1047 and part 22.917

Supporting Standards:

EIA/TIA-603-A: 1992 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)
EIA/TIA-97D-2001 Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.2.2.2. Limits

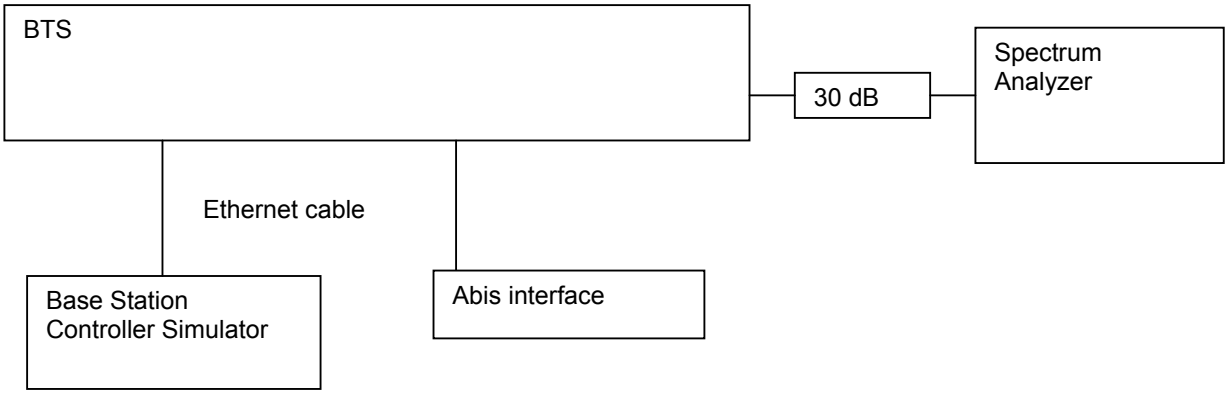
Compliance with 22.917 requires not a specific modulation characteristic since the EUT is applied for 22.901 (d).

Limits	Not applicable

6.2.3. Test Method and Setup

The CDMA BTS was controlled via the BTS simulator. The antenna port was connected to spectrum analyzer through a 30 dB attenuator

Test Set-up



6.2.4. Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel 37 871.11 MHz		Channel 466 883.98MHz		Channel 1013 869.7 MHz	
		Rho		Rho		Rho	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (23.5 °C)	V_{nom}(220 VAC)*	0.99847	N.A.	0.99865	N/A	0.99844	N/A
Measurement uncertainty		Equipment		Requirement			
		0.001		N/A			

*() It is the voltage that is measured on the rack within the cabinet.

6.2.4.1. Conclusion

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

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

6.2.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (D/M/Y)
PSA Series Spectrum Analyzer	Agilent	E4445A	MY41000146	10.24.2004
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	06.05.2005
Cable	Diverse	RG58-U	n.a	Before test

6.3. Occupied Bandwidth

6.3.1. Test Conditions

Preconditioning:	1 hour
Nominal Output Power:	43 dBm
Measured at:	MFEM Output Port
Ambient temperature:	23.5 °C
Relative humidity:	55 %
Date of Testing:	08.15.2003~08.30.2003

6.3.2. Test Specifications and Limits

6.3.2.1. Specification

CFR 47 (FCC) part 2.1049 and part 22.917

Supporting Standards:

EIA/TIA-603-A: 1992 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)
EIA/TIA-97D-2001 Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.3.2.2. Limits

Compliance with 22.917 requires not a specific occupied bandwidth since the EUT is applied for 22.901 (d) and possesses a digital modulation there is no specific requirement formulated in before mentioned rules the 99% rules applies.

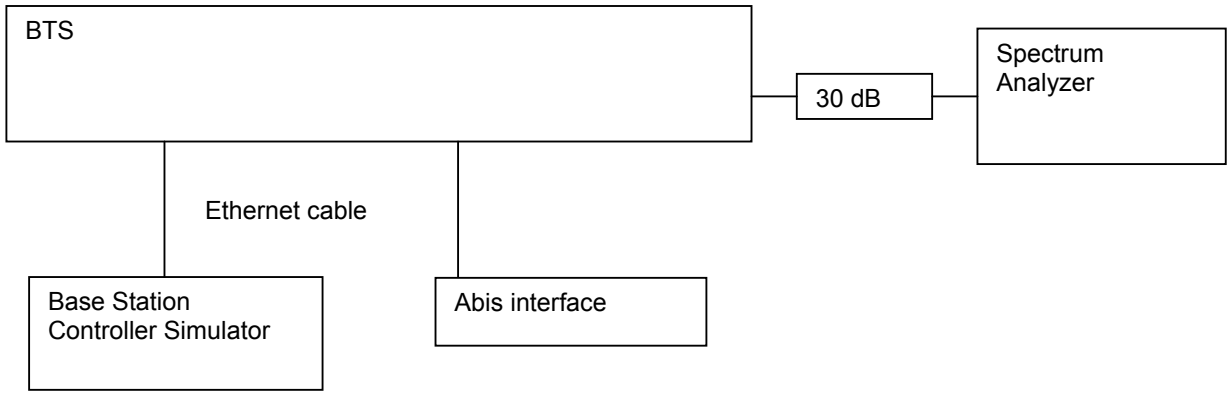
Upper /lower frequency limits	0.5% of the mean power

6.3.3. Test Method and Setup

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:
(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 (Resolution bandwidth)
Video bandwidth (VBW): 200 kHz

Test Set-up



6.3.4. Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel 37 871.11 MHz		Channel 466 1980 MHz		Channel 1013 1988.75. MHz	
		Measured (MHz)	Limit	Measured (MHz)	Limit	Measured (MHz)	Limit
T_{nom} (23.5 °C)	V_{nom} (220 VAC)*	1.2453	N/A	1.2429	N/A	1.2240	N/A
Measurement uncertainty (dB)		Equipment			Requirement		
		0.2%					

*() It is the voltage that is measured on the rack within the cabinet.

6.3.4.1. Conclusion

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

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

6.3.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
PSA Series Spectrum Analyzer	Agilent	E4445A	MY41000146	24.10.2004
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Cable	Diverse	RG58-U	n.a	Before test

6.4. Spurious Emission at Antenna Terminal

6.4.1. Test Conditions

Preconditioning:	1 hour
Nominal Output Power:	43 dBm
Measured at:	MFEM Output Port
Ambient temperature:	23.5°C
Relative humidity:	55 %
Date of Testing:	08.15.2004~08.30.2004

6.4.2. Test Specifications and Limits

6.4.2.1. Specification

CFR 47 (FCC) part 2.1051 and part 22.917

Supporting Standards:

EIA/TIA-603-A: 1992 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)

EIA/TIA-97D-2001 Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.4.2.2. Limits

Compliance with 2.1051 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).

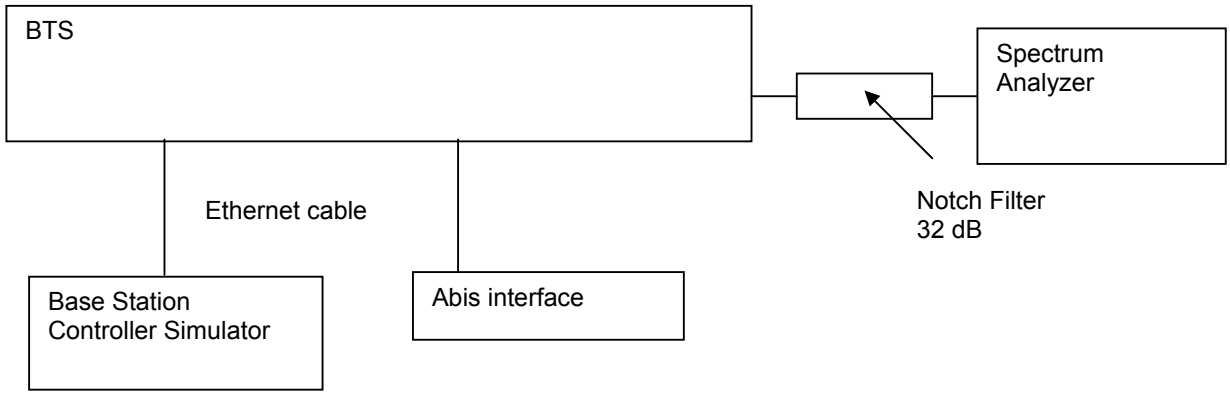
Rated Power:	43 dBm
Required attenuation:	43+10log (20W) = 56dB
Absolute level	- 13 dBm

6.4.3. Test Method and Setup

The BTS simulator controls the CDMA base station. Antenna port is connected to an spectrum analyzer through a 32 dB notch filter. The BTS operates two channels at a time.

Measurement bandwidth (RBW) for up to 1 MHz adjacent to carrier: 30 kHz
Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz
Measurement bandwidth (RBW) for 150 kHz up to 30 MHz: 10 kHz
Measurement bandwidth (RBW) for 30 MHz up to 1 GHz: 100 kHz
Measurement bandwidth (RBW) for all others frequencies above 1 GHz 1 MHz

Test Set up



6.4.4. Measurement Results at Block Edges

Channel Number	Frequency of Band edge [MHz]	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
34	871.02MHz	43	-20.01	- 13 dBm	Pass
119	873.57MHz	43	-20.07	- 13 dBm	Pass
283	878.49MHz	43	-17.20	- 13 dBm	Pass
384	881.52MHz	43	-17.73	- 13 dBm	Pass
466	883.98MHz	43	-18.56	- 13 dBm	Pass
691	890.73MHz	43	-20.41	- 13 dBm	Pass
777	893.31MHz Highest frequency	43	-18.32	- 13 dBm	Pass
1013	869.70MHz Lowest frequency	43	-20.41	- 13 dBm	Pass

Measurement Uncertainty: 1.2 dB

6.4.5. Measurement Results outside Band Edges

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
37	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass
1013	9kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass

Measurement Uncertainty: 1.2 dB

6.4.5.1. Conclusion

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

For the measurement results refer to appendix D with 17 pages.

6.4.5.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
PSA Series Spectrum Analyzer	Agilent	E4440	US40420781	05.26.2005
Attenuator	Shanghai Huaxiang	DTS100	15	06.05.2005
Notch Filter	Celecom	CCF811-1960/60-70A	SZ200069333	07.04.2005
Cable	Huber&Suhner	RG58U	--	Before test

6.5. Field Strength of Spurious Radiation

6.5.1. Test Conditions

Preconditioning:	0.5 hour
Nominal Output Power:	43 dBm
Measured at:	Cabinet
Ambient temperature:	23 °C
Relative humidity:	51 %
Date of testing:	08.20.2004

6.5.2. Test Specifications and Limits

6.5.2.1. Specification

CFR 47 (FCC) part 2.1053 and part.238

Supporting Standards:

EIA/TIA-603-A: 1992 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)
EIA/TIA-97D-2001 Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.5.2.2. Limits

Compliance with 22.917 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 log10 (20W) = 56 dB
Absolute level	43 dBm – 56 dB= - 13 dBm

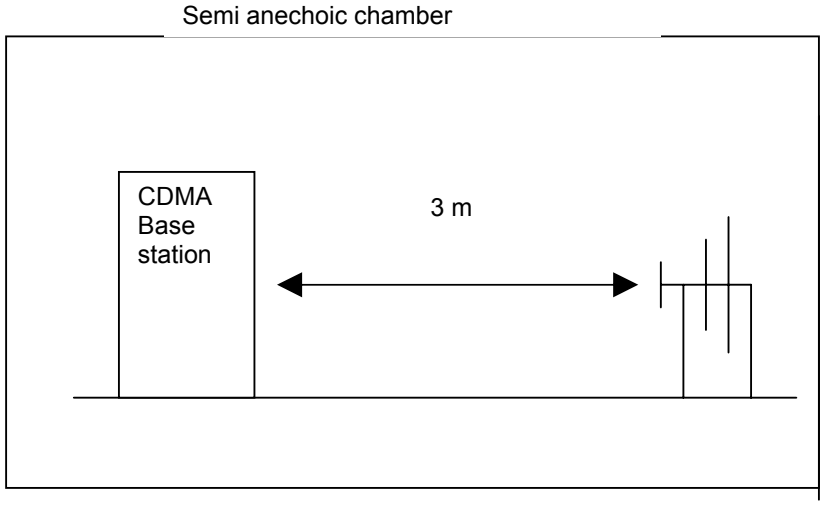
6.5.3. Test Method and Setup

(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 2.989(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 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.

The BSC simulator controls the CDMA base station. Every antenna port is connected to an artificial 50-Ohm load. The BTS operates two channels at a time.

Measurement bandwidth: 10 kHz – 150 kHz:	200 Hz
Measurement bandwidth: 150 kHz – 30 MHz:	9 kHz
Measurement bandwidth: 30 MHz – 1000 MHz:	120 kHz
Measurement bandwidth: 1GHz – 10 GHz:	1 MHz

Test set up



6.5.4. Measurement Results

Frequency in [MHz]	Spurious Emission measurement reading In [dBm]	Signal Generator Level [dBm]	Cable loss [dB]	Antenna gain [dB]	Effective Power ERP [in dBm]	Power in [dBc]	Spurious Emission Limits [dBm]
1231.1111	-45.1	-55	-2.1	9.8	-47.3	90.3	-13dBm
1973.3333	-48.9	-53	-4.5	10.1	-47.5	90.5	-13dBm

Measurement Uncertainty: 6 dB

6.5.4.1. Conclusion

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

For the measurement results refer to appendix E with 11 pages.

6.5.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Signal Generator	R&S	SMT 06 1039.2000.06	830723/007	05.31.2005
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	05.31.2005
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	05.31.2005
BiLog Antenna	Schaffner	CBL 6111B	2536	10.16.2004
Pre-Amplifier	Agilent	83017A	3950M00246	12.29.2004
Pre-Amplifier	Agilent	8447D	3950M00246	05.31.2005
Horn Antenna	R&S	HF906 4044.4507.02	359287/005	11.17.2004
Active Monopole-Antenna	Schwarzbeck	VAMP 9240 9k~30MHz	9240119	11.17.2004
Attenuator	HP	8491A (3dB)	36239	Calibrated with setup
Horn Antenna	R&S	HF906 4044.4507.02	359287/006	11.17.2004
Notch Filter	Celecom	CCF811-1960/60-70A	SZ200069333	04.07.2005
Match load	Shanghai Huaxiang	TF100 (30dB)	03062310	07.02.2005

6.6. Frequency Stability

6.6.1. Test Conditions

Preconditioning:	1 hour
Nominal Output Power:	-43 dBm
Measured at:	MFEM Output Port
Ambient temperature:	See below
Relative humidity:	55 % at 20 °C
Date of Testing:	08.22.2004 – 08.30.2004

6.6.2. Test Specifications and Limits

CFR 47 (FCC) part 2.1055 and part 22.355

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
EIA/TIA-603-A: 1992	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)
EIA/TIA-97D-2001	Recommended Minimum Performance Standard for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations

6.6.3. Test Method and Setup

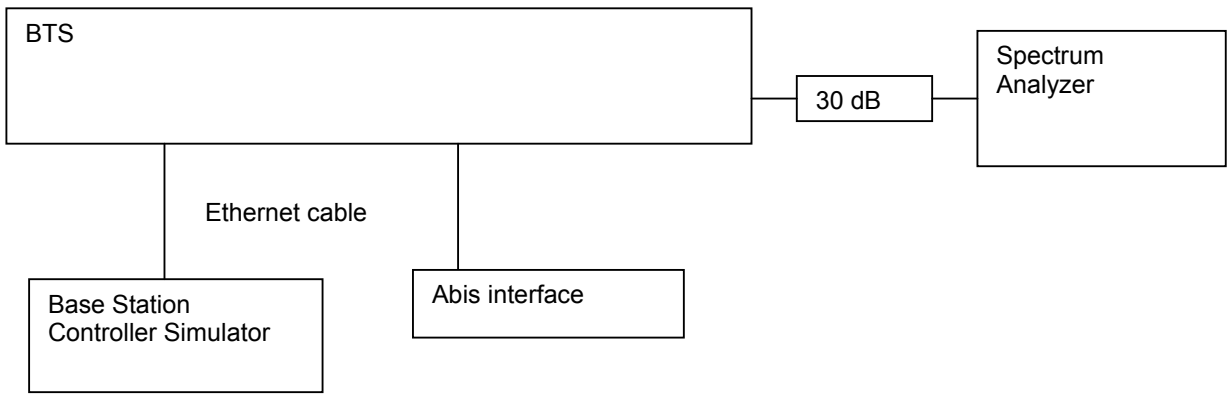
The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From –30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
(2) and (3) of paragraph 2.1055

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10o 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

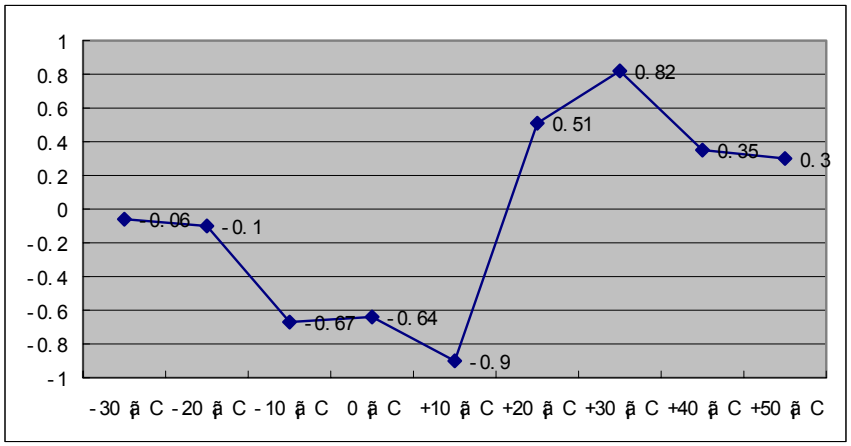
Measurement Bandwidth: 30 kHz



6.6.4. Measurement Results vs. Variation of Temperature

- TRX1: Channel No. 37(871.11MHz)

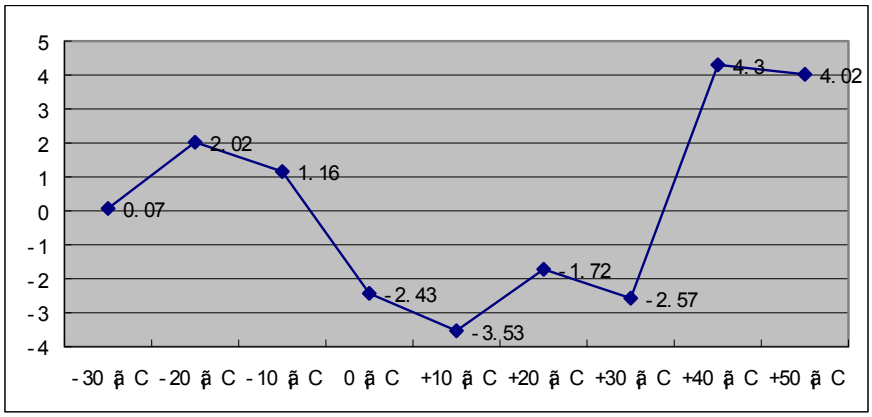
Temperature	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-30 °C	43	871.11MHz	-0.06	Pass
-20 °C	43	871.11MHz	-0.10	Pass
-10 °C	43	871.11MHz	-0.67	Pass
0 °C	43	871.11MHz	-0.64	Pass
+10 °C	43	871.11MHz	-0.90	Pass
+20 °C	43	871.11MHz	0.51	Pass
+30 °C	43	871.11MHz	0.82	Pass
+40 °C	43	871.11MHz	0.35	Pass
+50 °C	43	871.11MHz	0.30	Pass



- TRX2: Channel No. 1013(869.7MHz)

Temperature	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-30 °C	43	869.7MHz	0.07	Pass
-20 °C	43	869.7MHz	2.02	Pass
-10 °C	43	869.7MHz	1.16	Pass
0 °C	43	869.7MHz	-2.43	Pass
+10 °C	43	869.7MHz	-3.53	Pass

+20 °C	43	869.7MHz	-1.72	Pass
+30 °C	43	869.7MHz	-2.57	Pass
+40 °C	43	869.7MHz	4.30	Pass
+50 °C	43	869.7MHz	4.02	Pass



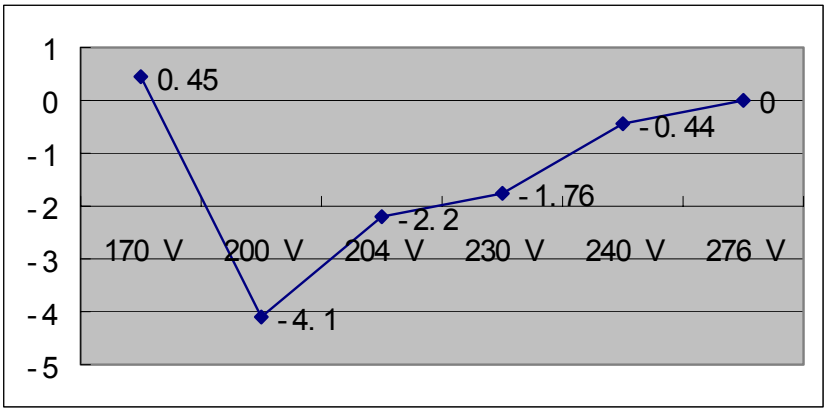
6.6.5. Measurement Results vs. Variation of Voltage

6.6.5.1. AC Power Test Result

- TRX1: Channel No. 37(871.11MHz)

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
170 V	43	871.11MHz	0.45	Pass
200 V	43	871.11MHz	-4.10	Pass
230 V	43	871.11MHz	-2.20	Pass

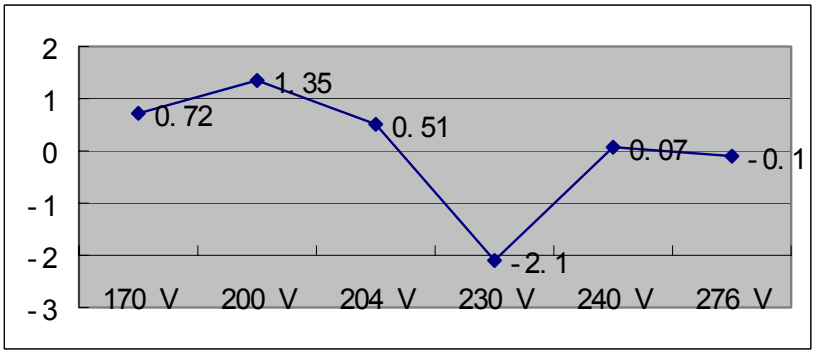
Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
204 V	43	871.11MHz	-1.76	Pass
240 V	43	871.11MHz	-0.44	Pass
276 V	43	871.11MHz	0.00	Pass



- TRX2: Channel No. 1013(869.7MHz)

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
170 V	43	869.7MHz	0.72	Pass
200 V	43	869.7MHz	1.35	Pass
230 V	43	869.7MHz	0.51	Pass

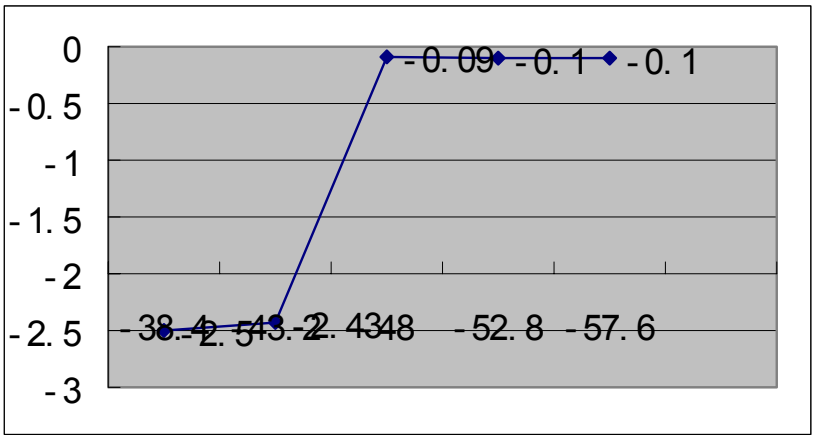
Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
204 V	43	869.7MHz	-2.10	Pass
240 V	43	869.7MHz	0.07	Pass
276 V	43	869.7MHz	-0.10	Pass



6.6.5.2. DC Power Test Result

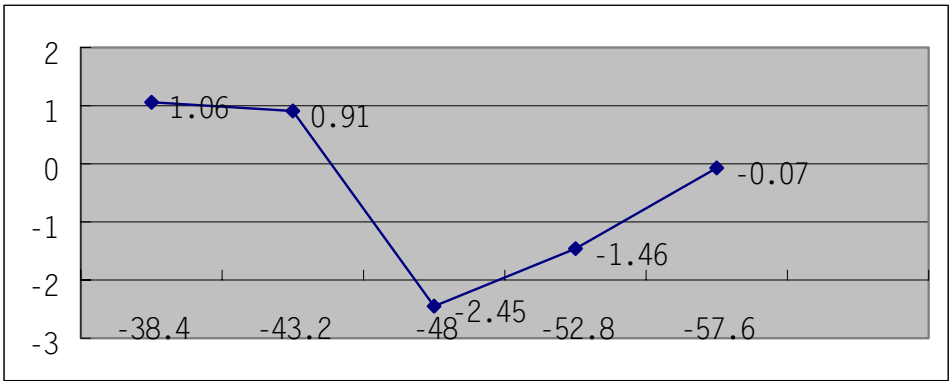
- TRX1: Channel No.37(871.11MHz)

Voltage □V□	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-38.4	43	871.11MHz	-2.5	Pass
-43.2	43	871.11MHz	-2.43	Pass
-48.0	43	871.11MHz	-0.09	Pass
-52.8	43	871.11MHz	-0.10	Pass
-57.6	43	871.11MHz	-0.10	Pass



- TRX2: Channel No. 1013(869.7MHz)

Voltage □V□	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-38.4	43	869.7MHz	1.06	Pass
-43.2	43	869.7MHz	0.91	Pass
-48.0	43	869.7MHz	-2.45	Pass
-52.8	43	869.7MHz	-1.46	Pass
-57.6	43	869.7MHz	-0.07	Pass


2
1
0
-1
-2
-3
1.06
0.91
-2.45
-1.46
-0.07
-38.4
-43.2
-48
-52.8
-57.6

6.6.5.3. Conclusion

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

For the measurement results refer to appendix F with 50 pages.

6.6.5.4. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until □D/M/Y□
PSA Series Spectrum Analyzer	Agilent	E4445A	MY41000146	10.24.2004
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	06.05.2005
Cable	Diverse	RG58-U	n.a.	Before test
Climatic Chamber	Weiss	SB2/1500/80	222/21262	12.10.2004

6.7. Conducted Emission at Power Supply Terminal Port

6.7.1. Test Conditions

Preconditioning:	0.5 hour
Nominal Output Power:	43 dBm
Measured at:	AC Power Port
Ambient temperature:	21 °C
Relative humidity:	55 %
Power Supply:	220 VAC
Date of Testing:	08.24.2004

6.7.2. Test Specifications and Limits

6.7.2.1. Specification

CFR 47 (FCC) part 15.207

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

6.7.2.2. Limits

Compliance with 15.207 requires that all spurious emission must be below the specified limits in clause 15.207.

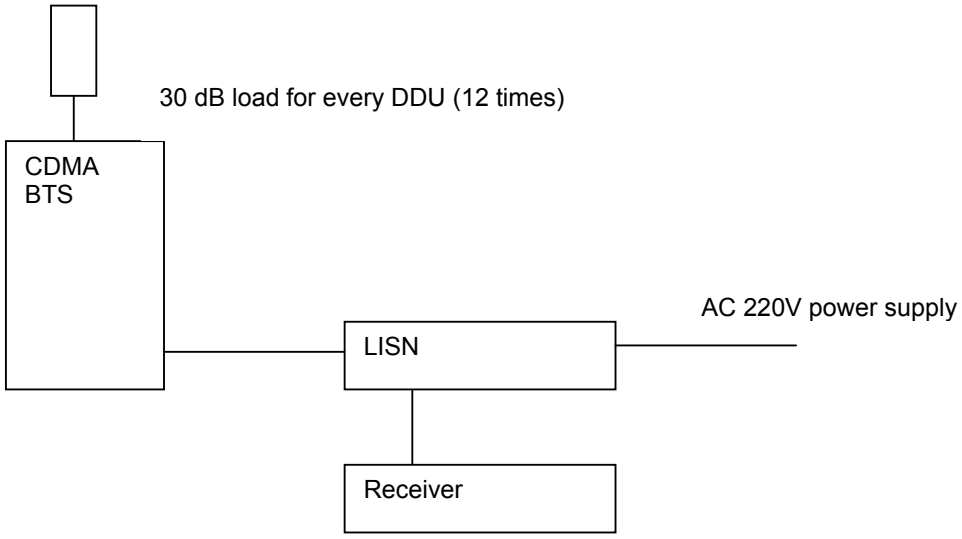
Frequency of Emission	Conducted Limit (dBμV)	
	QP	AV
150 kHz – 0.5 MHz	66-56	56-46
0.5 MHz – 5 MHz	56	46
5 MHz – 30 MHz	60	50

6.7.3. Test Method and Setup

The CDMA BTS was setup in the anechoic chamber and operated under nominal conditions.

Measurement Bandwidth: 150 kHz – 30 MHz: 10 kHz

Test set up



6.7.4. Measurement Results

- Test Result of BTS3601C

Frequency in [MHz]	Measured Conducted Emission [dBµV]	Conducted Emission Limits [dBµV]	Remarks
0.150000	62.10	66	QP
2.323500	36.50	56	QP
6.657000	46.20	60	QP
0.343500	38.10	49	AV
2.116500	30.80	46	AV
2.391000	35.10	46	AV
2.458500	32.90	46	AV
5.626500	35.70	50	AV
6.661500	44.20	50	AV

- Test Result of ODU3601C

Frequency in [MHz]	Measured Conducted Emission [dBµV]	Conducted Emission Limits [dBµV]	Remarks
0.150000	61.30	66	QP
2.377500	36.70	56	QP
0.204000	40.00	53	QP
0.339000	37.60	49	AV
0.883500	30.70	46	AV
0.951000	30.70	46	AV
2.175000	32.10	46	AV

6.7.4.1. Conclusion

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

For the measurement results refer to appendix G with 5 pages.

6.7.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until □D/M/Y□
LISN	R&S	ENV4200	100001	06.15.2005
Test Receiver	R&S	ESMI-DU 1032.5510.53 ESMI-RF 1032.5640.53	829214/011 829550/008	06.15.2005
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	06.05.2005
Cable	Diverse	RG58-U	n.a	Before test
Match load	Shanghai Huaxiang	TF100 (30dB)	03062357	07.02.2005

7. APPENDIXES

Appendix A	Measurement Results RF Output Power	4 pages
Appendix B	Measurement Results Modulation Characteristics	4 pages
Appendix C	Measurement Results Occupied Bandwidth	4 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	17 pages
Appendix E	Measurement Results Field Strength of Spurious Radiation	11 pages
Appendix F	Measurement Results Frequency Stability versus Temperature and Voltage	50 pages
Appendix G	Measurement Results Conducted Emission at Power Port	4 pages
Appendix H	Photos of Test Setup	5 pages