

Prüfbericht - Nr.: 17001675 001		Seite 1 von 38																				
<i>Test Report No.</i>		<i>Page 1 of 38</i>																				
Auftraggeber: <i>Client:</i>	Huawei Technologies Co., Ltd. Kefa Rd. Science-Based Industrial Park Nanshan District Shenzhen 518057 P.R. China																					
Gegenstand der Prüfung: <i>Test item:</i>	CDMA Base Station																					
Bezeichnung: <i>Identification:</i>	BTS3612A-1900	Serien-Nr.: <i>Serial No.</i>																				
		Pre-production Model																				
Wareneingangs-Nr.: <i>Receipt No.:</i>	17001675001	Eingangsdatum: <i>Date of receipt:</i>																				
		15.12.2003																				
Prüfart: <i>Testing location:</i>	Huawei EMC Laboratory FCC registered test site number 97456 as of March 11. 2003.																					
Prüfgrundlage: <i>Test specification:</i>	FCC Part 24, subpart E FCC Part 2, subpart J, §2.1033 - §2.1057																					
Prüfresultat: <i>Test Result</i>	Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The a. m. test item passed.																					
geprüft / tested by:	kontrolliert / reviewed by																					
<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 33%;">15.12.2003</td> <td style="text-align: center; width: 33%;">Deng Jiang</td> <td style="text-align: center; width: 33%;">17.12.2003</td> <td style="text-align: center; width: 33%;">Zhang Xinghai</td> </tr> <tr> <td style="text-align: center;">Datum</td> <td style="text-align: center;">Name</td> <td style="text-align: center;">Datum</td> <td style="text-align: center;">Name</td> </tr> <tr> <td style="text-align: center;"><i>Date</i></td> <td style="text-align: center;"><i>Name</i></td> <td style="text-align: center;"><i>Date</i></td> <td style="text-align: center;"><i>Name</i></td> </tr> <tr> <td></td> <td style="text-align: center;">Unterschrift</td> <td></td> <td style="text-align: center;">Unterschrift</td> </tr> <tr> <td></td> <td style="text-align: center;"><i>Signature</i></td> <td></td> <td style="text-align: center;"><i>Signature</i></td> </tr> </table>			15.12.2003	Deng Jiang	17.12.2003	Zhang Xinghai	Datum	Name	Datum	Name	<i>Date</i>	<i>Name</i>	<i>Date</i>	<i>Name</i>		Unterschrift		Unterschrift		<i>Signature</i>		<i>Signature</i>
15.12.2003	Deng Jiang	17.12.2003	Zhang Xinghai																			
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	Unterschrift		Unterschrift																			
	<i>Signature</i>		<i>Signature</i>																			
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<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"> Abkürzungen: OK, Pass = entspricht Prüfgrundlage Fail = entspricht nicht Prüfgrundlage N/A = nicht anwendbar </td> <td style="width: 50%;"> Abbreviations: OK, Pass = passed Fail = failed N/A = not applicable </td> </tr> </table>			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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<p>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 centre 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.</p>																						
<small>Authorized format 16.12.1996, R.M.</small>																						

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	24.232	RF Output Power	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

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 24 subpart E.

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3. PRODUCT DESCRIPTION

The BTS3612A is located between the BSC and the MS in the CDMA2000 1X mobile communication system.

Under the control of the BSC, the BTS3612A 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 BTS3612A 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.

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.

4.1. Testing Period

The test have been performed during the period of

July 15. 2003 to Dec. 05, 2003

4.2. General Set up Description

The base station BTS3612A-1900 is equipped with a total of 6 identical transceivers. Although only three transceivers have been tested, all other transceiver have been operated to produce most unfavourable conditions for the testing.

5. PRODUCT DESCRIPTION

5.1. Technical Characteristics

5.1.1. Frequency Range

Lower frequency:	1930 MHz
Upper frequency:	1990 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 25: 1931.25 MHz, Channel1000: 1980.00MHz, Channel 1175: 1988.75 MHz
Channel separation	Min. 1.25MHz

5.1.4. 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

5.1.5. Environmental Conditions for Base station

Minimum temperature:	- 5 °C
Maximum temperature:	+ 50 °C
Relative Humidity:	Max. 90% R.H

5.1.6. Power Source

AC nominal:	200-240 VAC
AC voltage range	176~-264VAC
AC current maximal:	65A

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 BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
DC-DC Power Module NPSU No. 1	21022805362033000593 HM48S27/1800	
DC-DC Power Module NPSU No. 2	21022805362033000598 HM48S27/1800	
DC-DC Power Module NPSU No. 3	21022805362033000538 HM48S27/1800	
AC-DC Power Module No. 1	21021304772039000014 HRS1450-9000B	
AC-DC Power Module No. 2	21021304772039000003 HRS1450-9000B	
AC-DC Power Module No. 3	21021304772039000001 HRS1450-9000B	
AC-DC Power Module No. 4	21021304772039000011 HRS1450-9000B	
AC-DC Power Module No. 5	21021304772039000012 HRS1450-9000B	
AC-DC Power Module No. 6	21021304772039000013 HRS1450-9000B	
AC-DC Power Module No. 7	21021304772039000008 HRS1450-9000B	
AC-DC Power Module No. 8	21021304772039000009 HRS1450-9000B	
AC-DC Power Module No. 9	21021304772039000007 HRS1450-9000B	

DDU for type designation BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
Dual Duplexer Unit DDU No. 1	03030097 TMR1902000320	DDUC2K-1900C ITEM:27060047
Dual Duplexer Unit DDU No. 2	03030020 TMR1902000320	DDUC2K-1900C ITEM:27060047
Dual Duplexer Unit DDU No. 3	02110001	DDUC2K-1900C

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Transceiver module (BTRM) for type designation BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
Transceiver module BTRM No. 1	21023118471033000042 QC9M1BTRMA	Transceiver Module
Transceiver module BTRM No. 2	21023118471033000043 QC9M1BTRMA	Transceiver Module
Transceiver module BTRM No. 3	21023118471033000011 QC9M1BTRMA	Transceiver Module
Transceiver module BTRM No. 4	21023118471033000055 QC9M1BTRMA	Transceiver Module
Transceiver module BTRM No. 5	21023118471033000052 QC9M1BTRMA	Transceiver Module
Transceiver module BTRM No. 6	21023118471033000031 QC9M1BTRMA	Transceiver Module

Transceiver Module for type designation BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
Transceiver Unit BRFM No. 1	21023110131024000191 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit BRFM No. 2	21023110131027000023 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit BRFM No. 3	21023110131027000256 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit BRFM No. 4	21023110131027000029 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit BRFM No. 5	21023110131027000394 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit BRFM No. 6	21023110131027000400 QC51BRFM	Each transceiver unit consist of BTRM module a BHPA module and a fan module

Power Amplifier Module for type designation BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
Transceiver Unit HPA No. 1	21023118461034000040 QC9M1BHPA	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit HPA No. 2	21023118461034000021	Each transceiver unit consist of BTRM module a BHPA

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	QC9M1BHPA	module and a fan module
Transceiver Unit HPA No. 3	21023118461031000008 QC9M1BHPA	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit HPA No. 4	21023118461034000032 QC9M1BHPA	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit HPA No. 5	21023118461036000044 QC9M1BHPA	Each transceiver unit consist of BTRM module a BHPA module and a fan module
Transceiver Unit HPA No. 6	21023118461031000017 QC9M1BHPA	Each transceiver unit consist of BTRM module a BHPA module and a fan module

Controller for type designation BTS3612A-1900

Equipment Designation / Description	Serial Number	Remarks
BTS Control Interface Module BCIM No.1	0330291034000008 QC51BCIM0	
BTS Control Interface Module BCIM No.2	0330291033000402 QC51BCIM0	
BTS Channel Processing Module BCPM No.1	0335761035000080 QC51BCPMB1	
BTS Channel Processing Module BCPM No.2	0335761035000080 QC51BCPMB1	
BTS Channel Processing Module BCPM No.3	0335761035000080 QC51BCPMB1	
BTS Channel Processing Module BCPM No.4	0335761035000080 QC51BCPMB1	
BTS Channel Processing Module BCPM No.5	0335761035000080 QC51BCPMB1	
BTS Channel Processing Module BCPM No.6	0335761035000080 QC51BCPMB1	
BTS Resource Distribution Module BRDM No.1	0357761035000071 QC51BRDM0	
BTS Resource Distribution Module BRDM No.2	0357761035000012 QC51BRDM0	
BTS Control and Clock Module BCKM	0330281035000015 QC51BCKM0	
BTS Control and Clock Module BCKM	0330281034000015 QC51BCKM0	

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Fan Unit No.1	21023110121033000336 QC5M1BFAN	
Fan Unit No.2	21023110121033000334 QC5M1BFAN	
Receive LNA Distribution Unit RLDU No.1	21023116571032000008 QC9M1RLDU	
Receive LNA Distribution Unit RLDU No.2	21023116571032000005 QC9M1RLDU	
Power Monitor Unit (PMU)	0254482039000257 PSM-137A	
Base Band Fan Monitor Board	n.a.	
E1 Lighting Protect Board	n.a.	

Air-conditioner for type designation BTS3612A-1900		
Equipment Designation / Description	Serial Number	Remarks
APW Air-conditioner	103110056	

5.2.1. FCC Identification

Grantee Code: QIS
Product Code: BTS3612A-1900
FCC Identification: QISBTS3612A-1900

6. TRANSMITTER MEASUREMENTS

6.1. RF Output Power

6.1.1. Test Conditions

Preconditioning:	1 hour
Maximum Specified Transmitter Power:	43 dBm
Measured at:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	23.5 °C
Relative humidity:	55 %
Date of Testing:	11.07.2003~18.07.2003

6.1.2. Test Specifications and Limits

6.1.2.1. Specification

CFR 47 (FCC) part 2.1046 and part 24 subpart E

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 24.232 requires that the effective radiated power must not exceed 1640W, and in no any case may the peak power of a base station transmitter exceed 100 W.

Max. ERIP	1640W
Max. peak power	100W

According to the above requires of E.I.R.P, the limits calculated as: $10 \cdot \log(P) = 62 \text{ dBm}$ and the peak power as $10 \cdot \log(P) = 50 \text{ dBm}$.

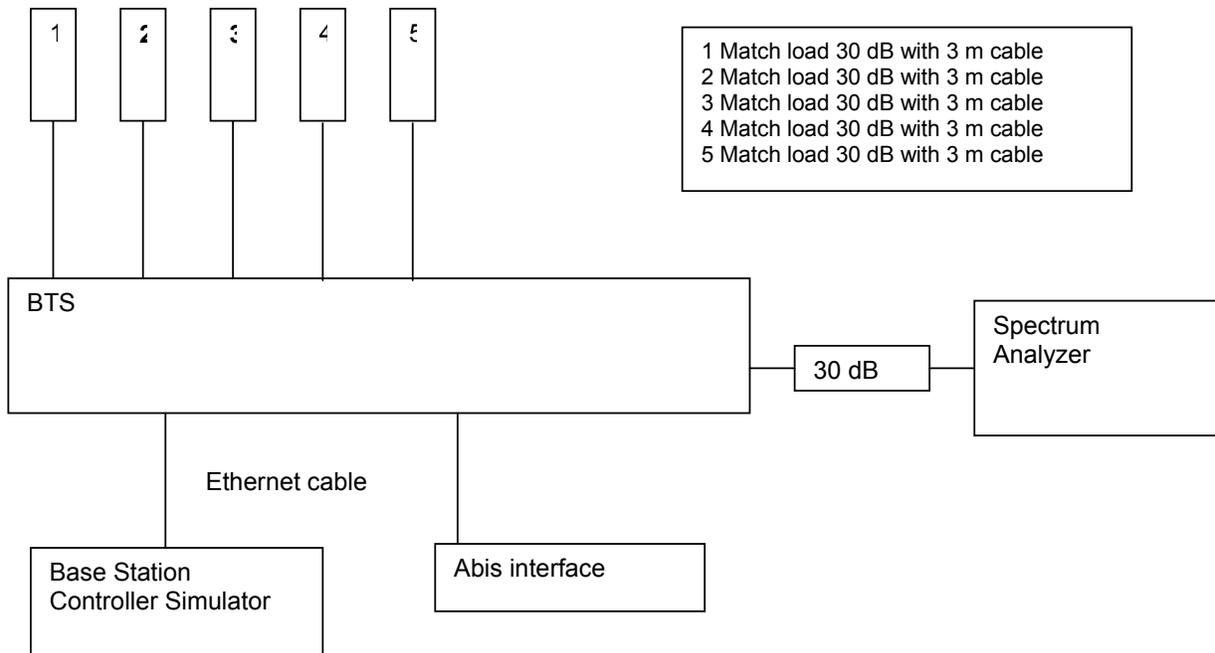
6.1.3. Test Method and Setup

(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 25 1931.25 MHz		Channel 1000 1980MHz		Channel 1175 1988.75 MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
T_{nom} (23.5 °C)	V_{nom} (- 48 V) *	44.06	62(50)**	43.50	62(50)**	42.29	62(50)**
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 three pages.

6.1.4.2. 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

6.2. Modulation Characteristics

6.2.1. Test Conditions

Preconditioning:	1 hour
Maximum Specified Transmitter Power	43 dBm
Measured at:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	23.5 °C
Relative humidity:	55 %

6.2.2. Test Specifications and Limits

6.2.2.1. Specification

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

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

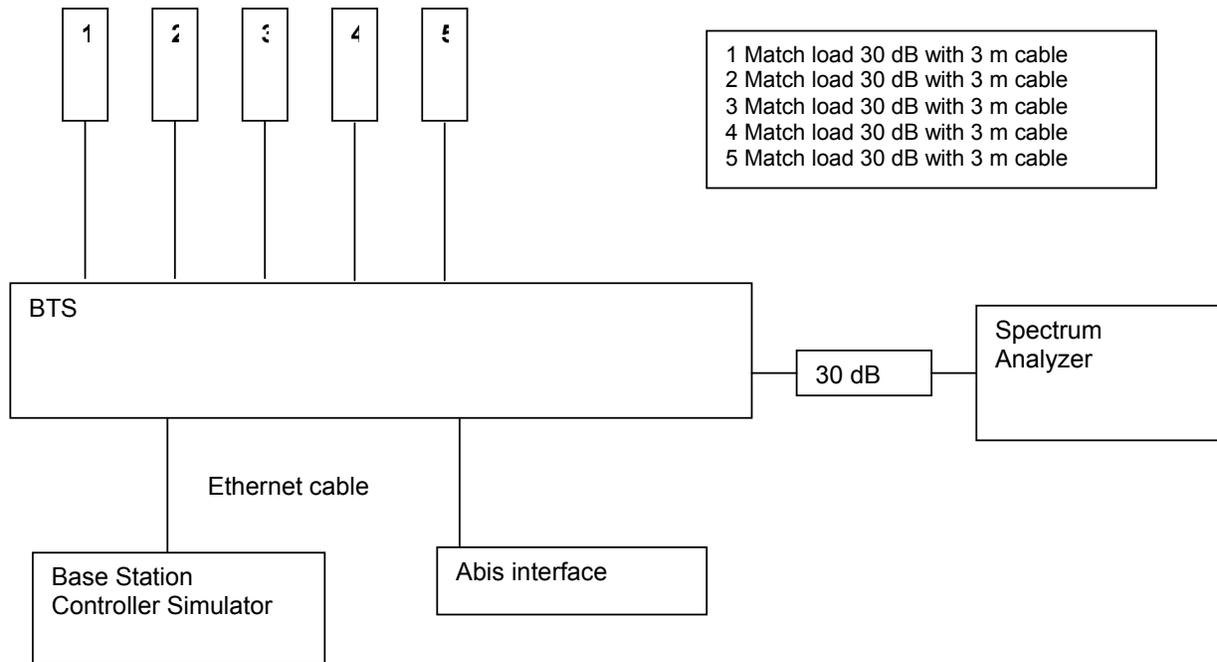
Compliance with 2.1047 requires not a specific modulation characteristic since the EUT is applied for part 24 subpart E.

Limits	Not applicable
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6.2.3. Test Method and Setup

The CDMA BTS was controlled via the BTS simulator. The antenna port was connected to a 30 dB load

Test Set-up



6.2.4. Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel 25 1931.25 MHz		Channel 1000 1980MHz		Channel 1175 1988.75 MHz	
		Rho		Rho		Rho	
		Measured	Limit	Measured	Limit	Measured	Limit
T _{nom} (23.5 °C)	V _{nom} (- 48 V)*	0.99777	N.A.	0.99796	N/A	0.99764	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 3 pages.

6.2.4.2. 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

6.3. Occupied Bandwidth

6.3.1. Test Conditions

Preconditioning:	1 hour
Nominal Output Power:	43 dBm
Measured at:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	23.5 °C
Relative humidity:	55 %
Date of Testing:	15.07.2003~18.07.2003

6.3.2. Test Specifications and Limits

6.3.2.1. Specification

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

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 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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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:

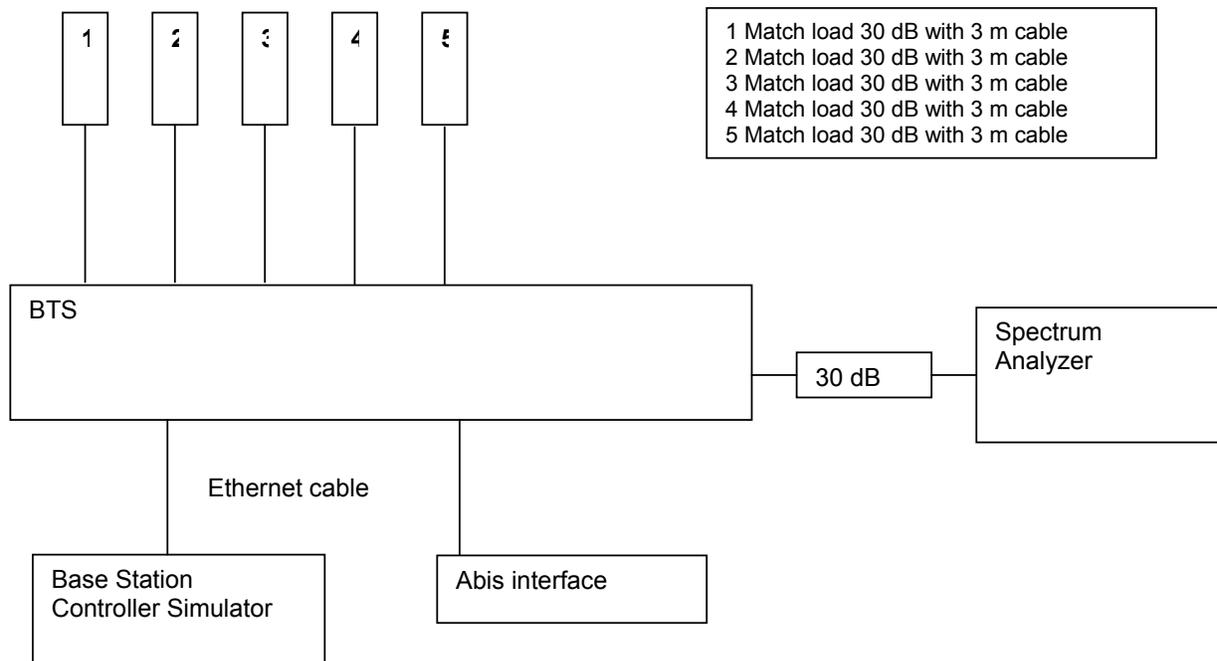
(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services 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 25 1931.25 MHz		Channel 1000 1980 MHz		Channel 1175 1988.75. MHz	
		Measured (MHz)	Limit	Measured (MHz)	Limit	Measured (MHz)	Limit
T_{nom} (23.5 °C)	V_{nom} (- 48 V)*	1.2421	N/A	1.2446	N/A	1.2416	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 3 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:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	23.5°C
Relative humidity:	55 %
Date of Testing:	16.07.2003~26.08.2003

6.4.2. Test Specifications and Limits

6.4.2.1. Specification

CFR 47 (FCC) part 2.1051 and part 24.238

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

6.4.2.2. 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).

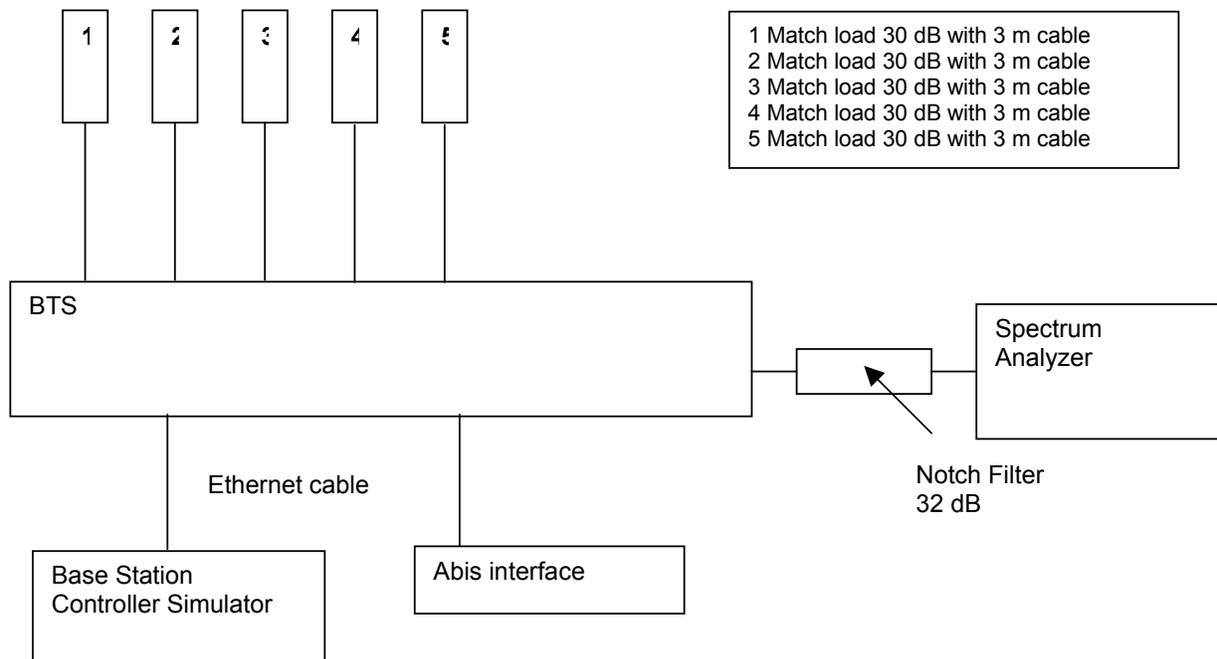
Rated Power:	43 dBm
Required attenuation:	$43 + 10 \log_{10} (20W) = 56$, 43 dBm – 56 dB
Absolute level	- 13 dBm

6.4.3. Test Method and Setup

The BTSC 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 (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
13	1930.65MHz, Lower edge of block A	43	- 23.39	- 13 dBm	Pass
287	1944.35MHz, Higher edge of block A	43	- 26.88	- 13 dBm	Pass
313	1945.65MHz, Lower edge of block D	43	- 36.49	- 13 dBm	Pass
887	1974.35MHz, Higher edge of block F	43	- 21.02	- 13 dBm	Pass
913	1975.65MHz, Lower edge of block C	43	- 22.86	- 13 dBm	Pass
1187	1989.35MHz, Higher edge of block C	43	- 21.90	- 13 dBm	Pass

6.4.5. Measurement Results outside Band Edges

Channel Number	Test Range (Frequency)	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
13	9 kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass
1187	9kHz ~20GHz	43	<- 13 dBm (See appendix D)	- 13 dBm	Pass

6.4.5.1. Conclusion

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

For the measurement results refer to appendix D with 20 pages.

6.4.5.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
PSA Series Spectrum Analyzer	Agilent	E4440	US40420781	26.05.2004
Attenuator	Shanghai Huaxiang	DTS100	15	05.06.2005
Notch Filter	Celecom	CCF811-1960/60-70A	SZ200069333	07.04.2004
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:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	22 °C
Relative humidity:	55 %
Date of testing:	05.12.2003

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

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 1990 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:

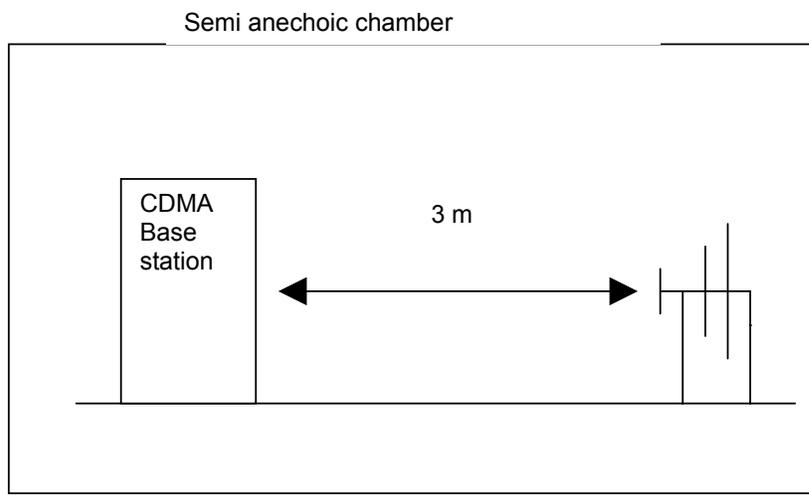
- (1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
- (2) All equipment operating on frequencies higher than 25 MHz
- (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
- (4) Other types 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: 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]
3922	-37.75	-45	-4.5	10.0	- 39.5	79.5	-13 dBm

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 7 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	15-06-2004
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	15.06.2004
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	15.06.2004
BiLog Antenna	Schaffner	CBL 6111B	2536	01.08.2004
Pre-Amplifier	Agilent	83017A	3950M00246	16.10.2004
Horn Antenna	R&S	HF901 4044.4507.02	359287/005	04.08.2004
Attenuator	HP	8491A (3dB)	36239	Calibrated with setup
Horn Antenna	R&S	HF901 4044.4507.02	359287/006	04.08.2004
Notch Filter	Celecom	CCF811-1960/60-70A	SZ200069333	07.04.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062357	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062310	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062311	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062318	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062328	02.07.2004

6.6. Frequency Stability

6.6.1. Test Conditions

Preconditioning:	1 hour
Nominal Output Power:	-43 dBm
Measured at:	DDU Output No.1(Low frequency DDU) and No.3(High frequency DDU)
Ambient temperature:	See below
Relative humidity:	55 % at 20 °C
Date of Testing:	28.08.2003 – 28.08.2003 & 01.12.2003 – 01.12.2003*

* The date is about frequency stability various with voltage.

6.6.2. Test Specifications and Limits

CFR 47 (FCC) part 2.1055 and part 24.235

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-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 $+50^{\circ}$ 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 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.

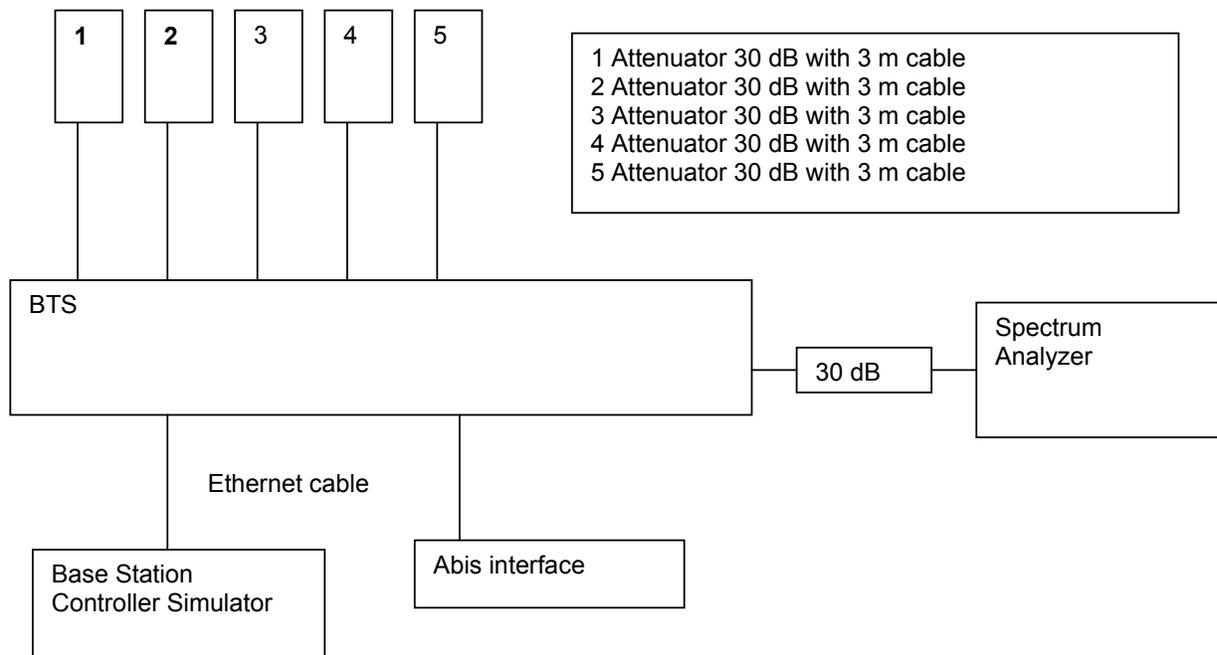
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

- (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

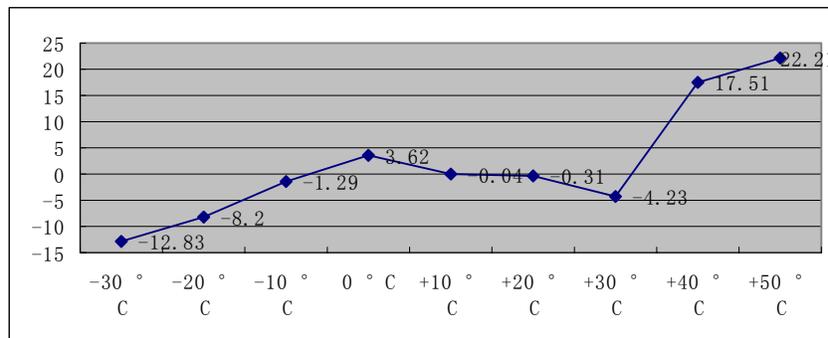
Measurement Bandwidth: 30 kHz



6.6.4. Measurement Results vs. Variation of Temperature

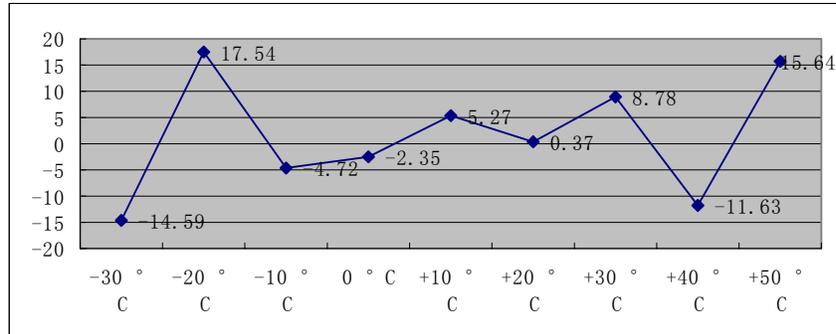
- TRX1: Channel No. 25(1931.25MHz)

Temperature	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-30 °C	43	1931.25MHz	-12.83	Pass
-20 °C	43	1931.25MHz	-8.20	Pass
-10 °C	43	1931.25MHz	-1.29	Pass
0 °C	43	1931.25MHz	3.62	Pass
+10 °C	43	1931.25MHz	-0.04	Pass
+20 °C	43	1931.25MHz	-0.31	Pass
+30 °C	43	1931.25MHz	-4.23	Pass
+40 °C	43	1931.25MHz	17.51	Pass
+50 °C	43	1931.25MHz	22.21	Pass



- TRX2: Channel No. 1175(1988.75MHz)

Temperature	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
-30 °C	43	1988.75MHz	-14.59	Pass
-20 °C	43	1988.75MHz	17.54	Pass
-10 °C	43	1988.75MHz	-4.72	Pass
0 °C	43	1988.75MHz	-2.35	Pass
+10 °C	43	1988.75MHz	5.27	Pass
+20 °C	43	1988.75MHz	0.37	Pass
+30 °C	43	1988.75MHz	8.78	Pass
+40 °C	43	1988.75MHz	-11.63	Pass
+50 °C	43	1988.75MHz	15.64	Pass

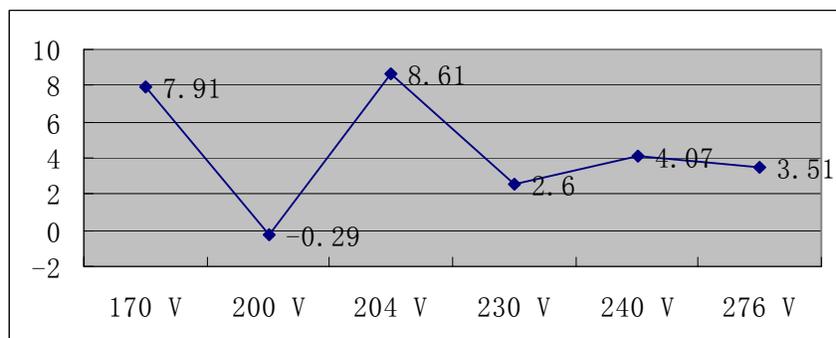


6.6.5. Measurement Results vs. Variation of Voltage

- TRX1: Channel No. 25(1931.25MHz)

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
170 V	43	1931.25MHz	7.91	Pass
200 V	43	1931.25MHz	-0.29	Pass
230 V	43	1931.25MHz	2.60	Pass

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
204 V	43	1931.25MHz	8.61	Pass
240 V	43	1931.25MHz	4.07	Pass
276 V	43	1931.25MHz	3.51	Pass



- TRX2: Channel No. 1175(1988.75MHz)

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
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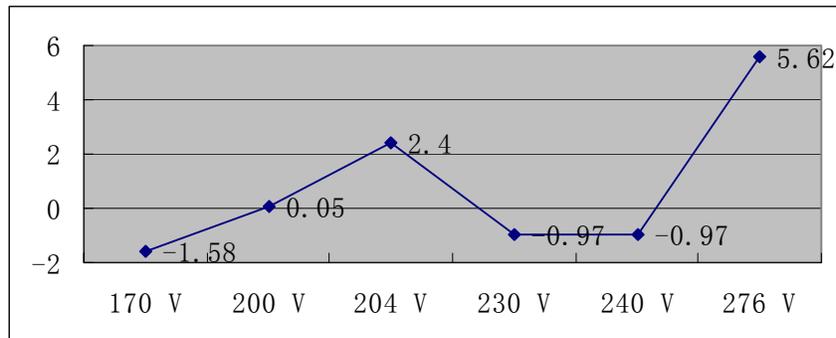
Test Report No.

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170 V	43	1988.75MHz	-1.58	Pass
200 V	43	1988.75MHz	0.05	Pass
230 V	43	1988.75MHz	-0.97	Pass

Voltage	Power (dBm)	Nominal Frequency	Measured Frequency Error	Result
204 V	43	1988.75MHz	2.40	Pass
240 V	43	1988.75MHz	-0.97	Pass
276 V	43	1988.75MHz	5.62	Pass



6.6.5.1. Conclusion

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

For the measurement results refer to appendix F with 8 pages.

6.6.5.2. 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
Climatic Chamber	Weiss	SB2/1500/80	222/21262	10.12.2004

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:	DDU Output
Ambient temperature:	21 °C
Relative humidity:	55 %
Power Supply:	220 VAC
Date of Testing:	04.12.2003

6.7.2. Test Specifications and Limits

6.7.2.1. Specification

CFR 47 (FCC) part 15.207

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

6.7.2.2. Limits

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

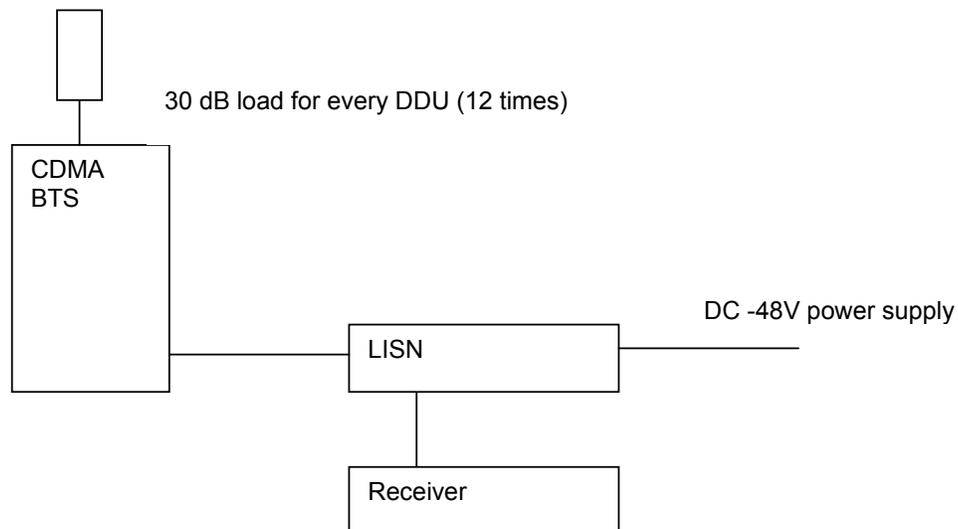
Frequency of Emission	Conducted Limit (dB μ V)	
	QP	AV
150 kHz – 0.5 MHz	66-56	56-46
0.5 MHz – 5 MHz	56	46
5 MHz – 30 MHz	60	50

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

Frequency in [MHz]	Measured Conducted Emission [dB μ V]	Conducted Emission Limits [dB μ V]	Remarks
1.216500	40.10	56	QP
4.866000	43.70	56	QP
6.270000	54.70	60	QP
7.719000	50.10	60	QP
8.695500	54.10	60	QP
6.270000	45.10	50	AV
7.719000	45.90	50	AV
8.200500	44.20	50	AV
8.691000	44.70	50	AV
9.645000	43.80	50	AV
10.140000	43.90	50	AV

6.7.4.1. Conclusion

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

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

6.7.4.2. Equipment List

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
LISN	R&S	ENV4200	100001	15.06.2004
Test Receiver	R&S	ESMI-DU 1032.5510.53 ESMI-RF 1032.5640.53	829214/011 829550/008	15.06.2004
Attenuator	Shanghai Huaxiang	DTS100 (30dB)	15	05.06.2005
Cable	Diverse	RG58-U	n.a	Before test
Match load	Shanghai Huaxiang	TF100 (30dB)	03062357	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062310	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062311	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062318	02.07.2004
Match load	Shanghai Huaxiang	TF100 (30dB)	03062328	02.07.2004

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	20 pages
Appendix E	Measurement Results Field Strength of Spurious Radiation	6 pages
Appendix F	Measurement Results Frequency Stability versus Temperature and Voltage	25 pages
Appendix G	Photos of Test Setup	4 pages