



FCC RF Test Report

Product Name: CDMA2000 1x Module

Model Number: MC323

Report No: SYBHZ(R)E038102010EB-3

FCC ID: QISMC323

IC ID: 6369A-MC323

Reliability Laboratory of Huawei Technologies Co., Ltd.

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

Tel: +86 755 28780808 Fax: +86 755 89652518



Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-1.
4. The test report is invalid if not marked with "exclusive stamp for the test report".
5. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.
8. Normally, the test report is only responsible for the samples that have undergone the test.
9. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.



REGULATION	FCC CFR47 Part 2: Subpart J;
	FCC CFR47 Part 24: Subpart E;
	RSS-Gen Issue 2 June 2007
	RSS-133 Issue 5 September 2005
START OF TEST	Oct. 25, 2010
END OF TEST	NOV. 10, 2010
Final Judgement:	Pass

Approved By Nov. 10, 2010 Liuchunlin *Liuchunlin*
 Date Name Signature

Reviewed By Nov. 10, 2010 Chenxiaohong *Chen Xiaohong*
 Date Name Signature

Operator Nov. 10, 2010 Zhangting *Zhang Ting*
 Date Name Signature



Contents

1	<u>Summary</u>	5
2	<u>Product Description</u>	6
2.1	PRODUCTION INFORMATION	6
2.2	MODIFICATION INFORMATION.....	6
3	<u>Test Site Description</u>	7
3.1	TESTING PERIOD	7
3.2	GENERAL SET UP DESCRIPTION	7
4	<u>Product Description</u>	8
4.1	TECHNICAL CHARACTERISTICS	8
4.2	EUT IDENTIFICATION LIST	10
5	<u>Main Test Instruments</u>	11
6	<u>Transmitter Measurements</u>	12
6.1	EFFECTIVE ISOTROPIC RADIATED POWER OF TRANSMITTER (EIRP).....	12
6.2	CONDUCTED POWER OF TRANSMITTER.....	15
6.3	MODULATION CHARACTERISTICS	17
6.4	OCCUPIED BANDWIDTH.....	19
6.5	BAND EDGES COMPLIANCE	21
6.6	SPURIOUS EMISSION AT ANTENNA TERMINAL	23
6.7	FREQUENCY STABILITY	25
7	<u>System Measurement Uncertainty</u>	28
8	<u>Appendixes</u>	29



1 Summary

The table below summarizes the measurements and results for the MC323 CDMA2000 1x Module. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Effective Isotropic radiated power of Transmitter	PASS
2.1046	24.232	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Band Edges Compliance	PASS
2.1051	24.238	Spurious Emission at Antenna Terminal	PASS
2.1055	24.235	Frequency Stability	PASS
2.1053	24.238	Radiated Spurious Emissions	See Note

Section in CFR 47	Section in RSS-133	Description	Result
24.232(b)	6.4	Effective Isotropic radiated power of Transmitter	PASS
2.1046(a)	6.4	Conducted RF output power	
2.1049(h)	6.5	Occupied Bandwidth	PASS
24.238(a)	6.5	Band Edges Compliance	PASS
24.238(a), 2.1051	6.5	Spurious Emission at Antenna Terminal	PASS
24.238(a), 2.1053	6.5	Radiated Spurious Emission	PASS
2.1055(a)	6.3	Frequency Stability	PASS

Note: The Radiated Spurious Emissions' test results are shown in the EMC report.



2 Product Description

2.1 Production Information

2.1.1 General Description

MC323 Module is a subscriber equipment in the CDMA supports 1900MHz frequency band. By using the QSC1110 chipset and Zero-IF technologies, the Module implements such functions as RF signal reception/transmission, CDMA protocol process, high-rate packet data services. Externally they provide provides a 50-pin Board to Board connector interface.

2.1.2 Support function and Service

The MC323 Module supports the function and service as follows:

Table 2 CDMA Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
data and SMS	Modulation: QPSK	TM1*	
data and SMS	Modulation: HPSK	TM3*	

Note: *The test conditions and settings are defined in ANSI/TIA-98-E section 1.3 , 3GPP2C.S0033

2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable!				
Not applicable!				
Not applicable!				



3 Test Site Description

The test site of:

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

3.1 Testing Period

The test have been performed during the period of

Oct. 25, 2010 to Nov. 10, 2010

3.2 General Set up Description

The MC323 Module can Support PCS Band, and Support the CDMA2000 1x standard During this measurement, the MC323 Module works in CDMA and PCS Band.

CDMA:

TM1: Forward Traffic Channel Radio Configuration 1, Reverse Traffic Channel Radio Configuration 1

TM3: Forward Traffic Channel Radio Configuration 3, Reverse Traffic Channel Radio Configuration 3

Parameter	Units	Value
\hat{I}_{or}	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4



4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

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

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	50 KHz
Channel separation:	1.23 MHz

4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	1M25F9W
-----------------------	----------------

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



4.1.4 Environmental Requirements

Table 7 Environmental Requirements

Minimum temperature:	- 20 °C
Maximum temperature:	+ 70 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

Table 8 Power Source

DC voltage nominal:	3.8V; Supplied by 50-pin Board to Board connector
DC voltage range	3.3 - 4.2V
DC current maximal:	1A

4.1.6 Tune-up Procedure

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

Please reference the document Tune-up Procedure in TCF.

4.1.7 Applied DC Voltages and Currents

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

The voltage and current in the final RF stage is:

Table 9 Applied DC Voltages and Currents

Voltage:	+3.8V
Current:	1A According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



4.2 EUT Identification List

4.2.1 Board Information

Table 10 Board Information

CDMA2000 1x Module		
MC323		
Board and Module		
Model name	Serial Number	Remarks
MC323	A00000208B55192	ME1MC323M

4.2.2 Adapter Technical Data

Not Applicable.

4.2.3 Battery Technical Data

Not Applicable.

4.2.4 FCC Identification

FCC Identification: QISMC323



5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
EMI Test receiver	R&S	ESIB 26	100318	05.04.2011
Broadband Antenna	Schaffner	CBL 6112B	2941	04.17, 2011
Horn Antenna	R & S	HF906	359287/006	06.15.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	11.20.2010
Signal Generator	R&S	SMR 40	100325	05.12, 2011
Vector Signal Generator	R&S	SMU200A	3605064030	05.20.2011
Power Supply	Agilent	66311B	MY43006371	03.26.2011
Climate Chamber	WEISS	WK11-600/70	5922602844001 0	09.26.2011
Universal Radio Communication Tester	R&S	CMU200	113164	05.21.2011
Spectrum Analyzer	R&S	FSU26	200002	03.07.2011



6 Transmitter Measurements

6.1 Effective Isotropic radiated powerof Transmitter (EIRP)

6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	CDMA TM1 and TM3 at frequency B、 M、 T

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.1.2.2 Supporting Standards

Table 13 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations

6.1.2.3 Limits

Compliance with part 24.232, mobile/portable stations are limited to 2 watts EIRP peak power.
 $W(\text{dBm}) = 10 * \log(W_{\text{watts}})$.

Table 14 Limits

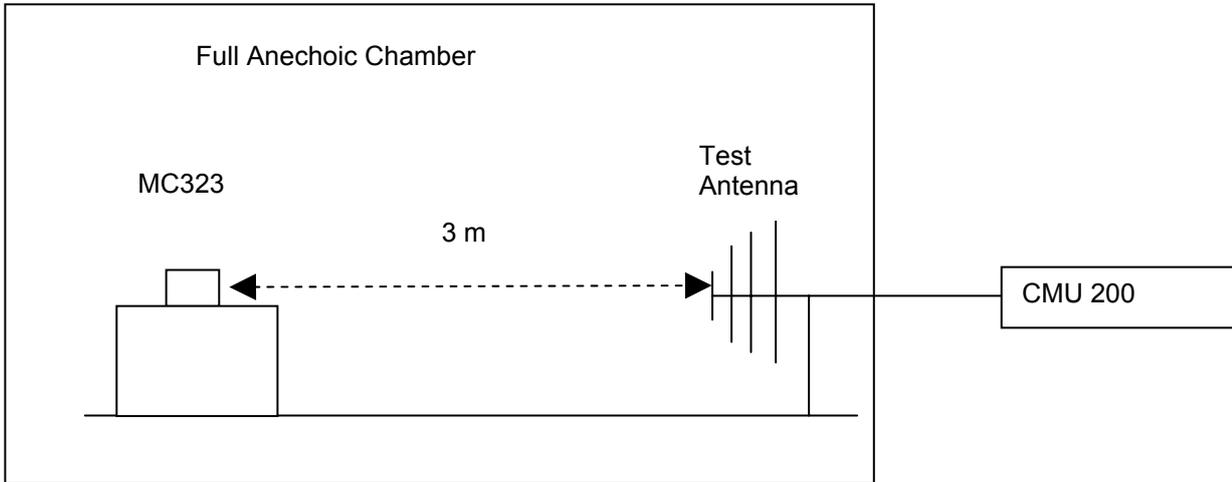
Maximum Output Power (Watts)	< 2 Watts
Maximum Output Power (dBm)	< 33 dBm

6.1.3 Test Method and Setup

- For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the wireless communication tester CMU 200 via the air interface. The band class is set as PCS.
- Test the Radiated maximum output power by the CMU 200 received from test antenna.
- Use substitution method to verify the maximum output power. The EUT is substituted by a horn antenna. The horn 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 CMU 200, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

Test setup

Step 1: Pre-test



Step 2: Substitution method to verify the maximum EIRP

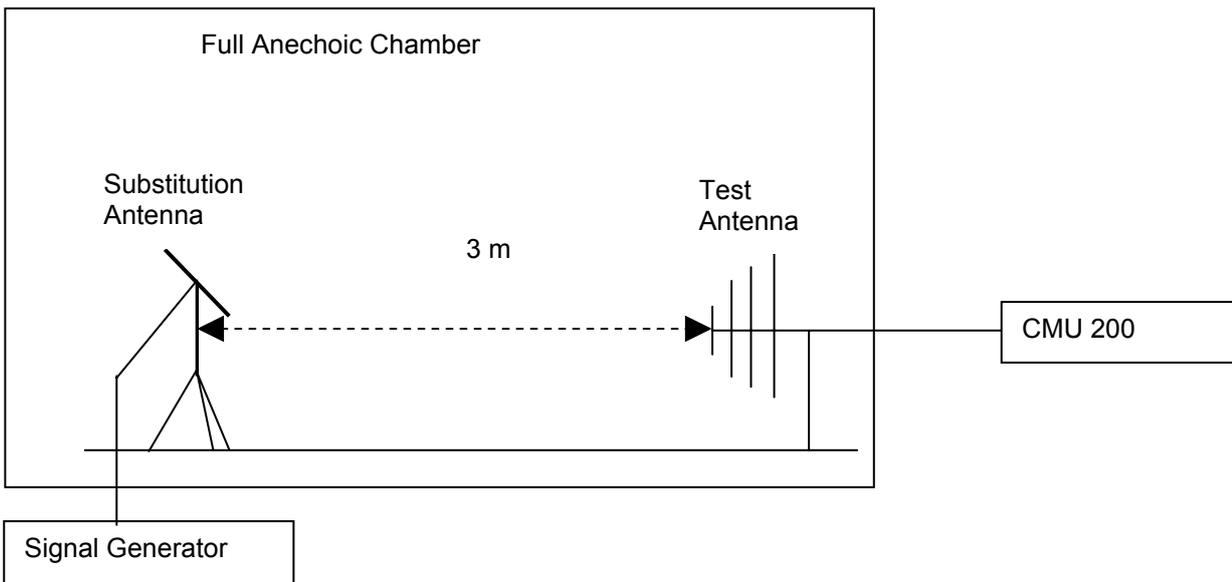


Figure 1. Test Set-up

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

There is a constant difference of 2.15 dB between ERP and EIRP.

$EIRP (dBm) = ERP (dBm) + 2.15$ (ITU-R Recommendation SM.329-10).

EIRP was measured using 1 host.

BenQ Joy book S72

6.1.4 Measurement Results

Table 15 Measurement Results

	RF Output Power
--	-----------------



TEST CONDITIONS		Channel25(B) 1851.25MHz		Channel600(M) 1880.0MHz		Channel1175(T) 1908.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measurd	Limit	Measurd	Limit
TM1	Tnom (25 °C) Vnom (3.8 V)	26.59	33	27.02	33	27.49	33
TM3	Tnom (25 °C) Vnom (3.8 V)	26.76	33	27.09	33	27.52	33

6.1.5 Conclusion

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



6.2 Conducted Power of Transmitter

6.2.1 Test Conditions

Table 16 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	CDMA TM1 and TM3 at frequency B、M、T

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.2.2.2 Supporting Standards

Table 17 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations

6.2.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a mobile station transmitter exceed 2 W. The calculated longitude EIRP by following formula:

$$EIRP(dBm) = 10 * \log(EIRP_{in\ watts}).$$

And for conducted power, we can use Antenna Gain to calculate the limit. So the conducted power:

$$P_{cod.}(dBm) = EIRP(dBm) - Gain(dBi).$$

$$\text{and Gain (dBi)} = \text{Gain(dBd)} + 2.15dB$$

Table 18 Limits

Maximum Output Power (Watts)	< 2 Watts=33 dBm
Antenna Gain(dBi):	3
Maximum Conducted Output Power (dBm)	< 30 dBm

6.2.3 Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, Conducted maximum power shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the MC323 Module to the wireless communication tester CMU 200 via the antenna connector. The band class is set as PCS.

(b) Test the Conducted maximum output power by the CMU 200.

Test setup

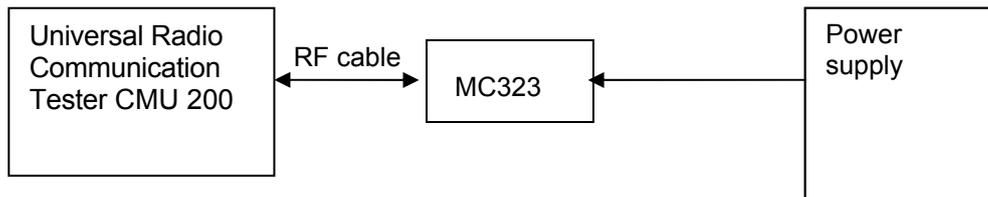


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 19 Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel25(B) 1851.25MHz		Channel600(M) 1880.0MHz		Channel1175(T) 1908.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measued	Limit
TM1	Tnom (25°C) Vnom (3.8 V)	23.59	30	24.02	30	24.49	30
TM3	Tnom (25 °C) Vnom (3.8 V)	23.76	30	24.09	30	24.52	30

6.2.5 Conclusion

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



6.3 Modulation Characteristics

6.3.1 Test Conditions

Table 20 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	54 %
Test Configurations:	CDMA mode TM1 and TM3 at frequency M

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

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

6.3.2.2 Supporting Standards

Table 21 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.

6.3.2.3 Limits

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

Table 22 Limits

Limits	Not applicable
--------	----------------

6.3.3 Test Method and Setup

Connect the MC323 Module to Universal Radio Communication Tester CMU200 via the antenna connector. The band class is set as PCS; the MC323 Module's output is matched with 50 Ω load, test method was according to ANSI/TIA-98-E and. The waveform quality and constellation of the MC323 Module was tested.

Test setup

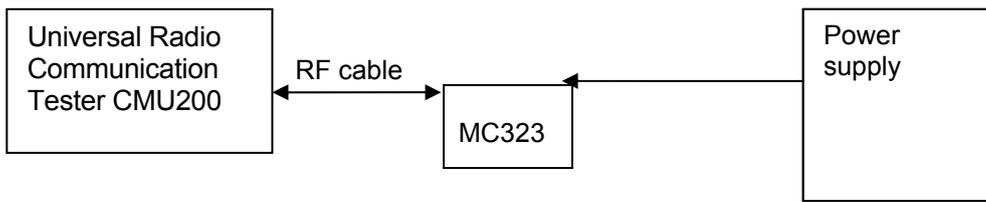


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 23 Measurement Results

		Modulation Characteristic
TEST CONDITIONS		Channel600(M) 1880.0MHz
		Measured
		CDMA TM1 & TM3
T _{nom} (25 °C)	V _{nom} (3.8V)	Refer to Appendix_A

6.3.5 Conclusion

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

For the measurement results refer to appendix_A.



6.4 Occupied Bandwidth

6.4.1 Test Conditions

Table 24 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	54 %
Test Configurations:	CDMA TM1 and TM3 at frequency B、 M、 T

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

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

6.4.2.2 Supporting Standards

Table 25 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.

6.4.2.3 Limits

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

Table 26 Limits

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

6.4.3 Test Method and Setup

MC323 Module was connected to the wireless signal analyzer R&S FSU26 via the one RF connector. The band class is set as PCS; MC323 Module was controlled to transmit maximum power. Measure and record the occupied bandwidth of the MC323 Module by the R&S FSU26.

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 (Resolution bandwidth)
 Video bandwidth (VBW): 300 kHz

Test Set-up

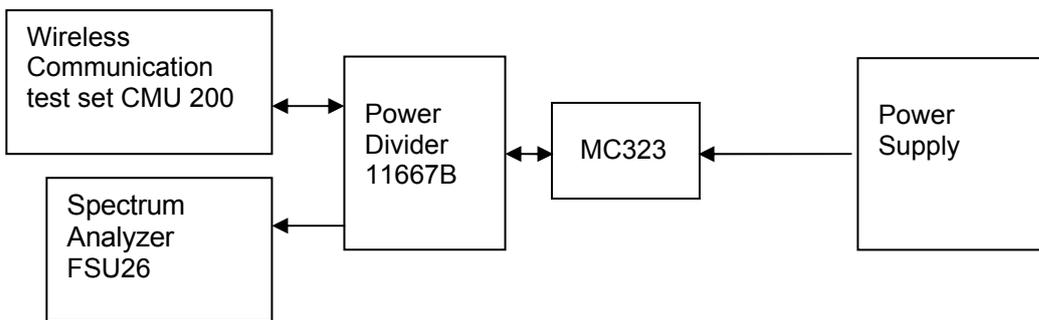


Figure 4. Test Set-up

6.4.4 Measurement Results

Table 27 Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel25(B) 1851.25MHz		Channel600(M) 1880.0MHz		Channel1175(T) 1908.75MHz	
		Measured (MHz)		Measured (MHz)		Measured (MHz)	
		CDMA		CDMA		CDMA	
		TM1	TM3	TM1	TM3	TM1	TM3
T _{nom} (25 °C)	V _{nom} (3.8 V)	1.28	1.28	1.28	1.27	1.30	1.28

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix_B.



6.5 Band Edges Compliance

6.5.1 Test Conditions

Table 28 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
Test Configurations:	CDMA TM1 and TM3 at frequency B、 T

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.5.2.2 Supporting Standards

Table 29 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.

6.5.2.3 Limits

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

Table 30 Limits

Rated Power:	24 dBm
Required attenuation:	$43 + 10 \log(0.25) = 37$, 24 dBm – 37 dB
Absolute level	- 13 dBm

6.5.3 Test Method and Setup

MC323 Module was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as PCS. MC323 Module was controlled to transmit maximum power. Measure and record band edges compliance of the MC323 Module by the R&S FSU26.

RBW of 20 kHz (1% of 2MHz) was used up to 5MHz away from the band edge. So the FCC rules specify that RBW of 1MHz for measurements of emissions >1MHz away from the band edges ,the limit was adjusted with -13dBm to -30dBm to compensate for the reduced measurement bandwidth.

Test Set-up

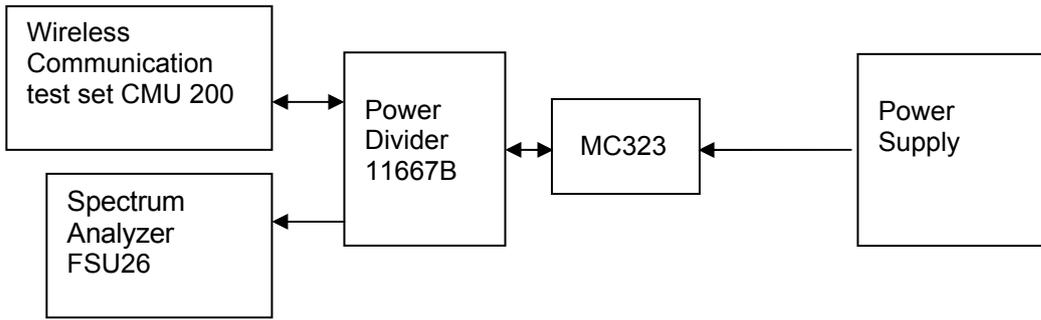


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 31 Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
US PCS	$T_{nom} (25\text{ }^{\circ}\text{C}), V_{nom} (3.8\text{ V})$						
	1850	25 (B)	TM1 & TM3	24	<-13(See appendix_C)	- 13 dBm	Pass
	1910	1175 (T)	TM1 & TM3	24	<-13(See appendix_C)	- 13 dBm	Pass

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix_C.



6.6 Spurious Emission at Antenna Terminal

6.6.1 Test Conditions

Table 32 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	50 %
Test Configurations:	TM1 and TM3 at frequency B、M、T

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.6.2.2 Supporting Standards

Table 33 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.

6.6.2.3 Limits

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

Table 34 Limits

Rated Power:	24 dBm
Required attenuation:	$43 + 10 \log(0.25) = 37$, 24 dBm – 37 dB
Absolute level	- 13 dBm

6.6.3 Test Method and Setup

MC323 Module was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as PCS. MC323 Module was controlled to transmit maximum power. Measure and record the Conducted Spurious Emission of the MC323 Module by the R&S FSU26.

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

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

Measurement bandwidth (RBW) for 9 kHz up to 3GHz: 1 MHz;
 Measurement bandwidth (RBW) for 3GHz up to 12.5GHz: 1MHz;
 Measurement bandwidth (RBW) for 12.5GHz up to 20GHz: 1MHz;

Test Set-up

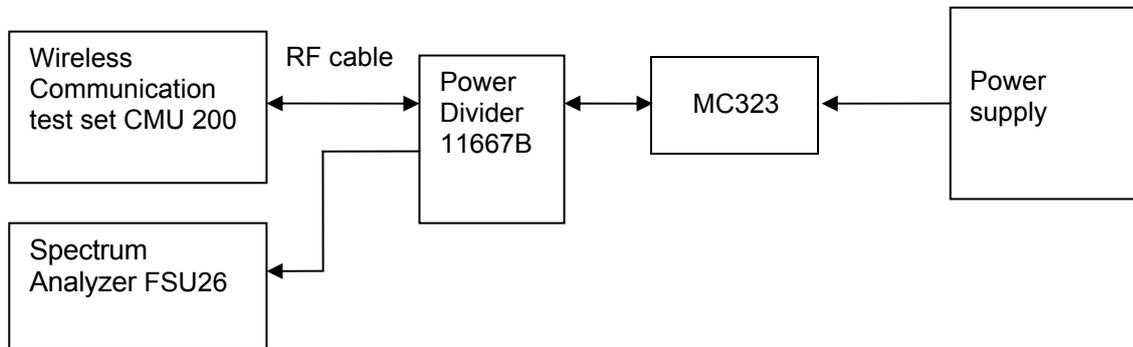


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 35 Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 25(B)	TM1	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass
Channel 600(M)	TM1	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass
Channel 1175(T)	TM1	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	24	<- 13 dBm (See appendix_D)	- 13 dBm	Pass

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix_D.



6.7 Frequency Stability

6.7.1 Test Conditions

Table 36 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	56 % at 25 °C
Test Configurations:	TM1 and TM3 at frequency M

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1055 and part 24.235

6.7.2.2 Supporting Standards

Table 37 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.

6.7.2.3 Limits

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

6.7.3 Test Method and Setup

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

- (1) From -20° to $+70^{\circ}$ 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 Setup

Connect the MC323 Module to the Wireless Communication test set CMU 200 via the connector. Then measure the frequency error by the Wireless Communication test set CMU 200. The MC323 Module's output is matched with a 50 Ω load.

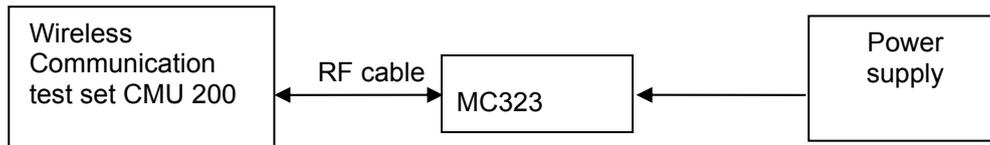


Figure 7. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

- TM1, 3.8 V DC Channel No.600(1880.0MHz)

Table 38 Measurement Results vs. Variation of Temperature—TM1

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-30	Pass
-20 °C	1880.0	-19	Pass
-10 °C	1880.0	-15	Pass
0 °C	1880.0	-8	Pass
+10 °C	1880.0	-6	Pass
+20 °C	1880.0	8	Pass
+30 °C	1880.0	-10	Pass
+40 °C	1880.0	-11	Pass
+50 °C	1880.0	-12	Pass
+60 °C	1880.0	9	Pass
+70 °C	1880.0	-8	Pass

- TM3, 3.8V DC Channel No.600(1880.0MHz)

Table 39 Measurement Results vs. Variation of Temperature—TM3

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-32	Pass



-20 °C	1880.0	-24	Pass
-10 °C	1880.0	12	Pass
0 °C	1880.0	7	Pass
+10 °C	1880.0	7	Pass
+20 °C	1880.0	-2	Pass
+30 °C	1880.0	-10	Pass
+40 °C	1880.0	13	Pass
+50 °C	1880.0	-13	Pass
+60 °C	1880.0	7	Pass
+70 °C	1880.0	-8	Pass

6.7.4.2 Measurement Results vs. Variation of Voltage

- TM1, 25 °C ,Channel No. **600(1880.0MHz)**

Table 40 Measurement Results vs. Variation of Voltage—TM1

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.3 V	1880.0	24	Pass
3.8 V	1880.0	24	Pass
4.2 V	1880.0	24	Pass

- TM3, 25 °C ,Channel No. **600(1880.0MHz)**

Table 41 Measurement Results vs. Variation of Voltage—TM3

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.3 V	1880.0	24	Pass
3.8 V	1880.0	24	Pass
4.2 V	1880.0	24	Pass

6.7.5 Conclusion

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



7 System Measurement Uncertainty

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

Table 42 System Measurement Uncertainty

Items		Extended Uncertainty
Efficient Isotropic Radiated Power of Transmitter	EIRP (dBm)	U=3dB; k=2
Band Width	Magnitude (%)	U=0.2%; k=2
Band Edge Compliance	Disturbance Power (dBm)	U=2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power (dBm)	U=2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U=0.21ppm; k=2
Field Strength of Spurious Radiation	ERP(dBm)	U=3dB; k=2
Conducted Output Power	Power(dBm)	U=0.39dB; k=2
Conducted Emission at Power Port	Disturbance Voltage (dBμV)	U=4dB; k=2
Radiated Emission of enclosure at ideal mode	Field strength (dBμV/m)	U=5dB; k=2



8 Appendixes

Appendix A	Measurement Results Modulation Characteristics	3 pages
Appendix B	Measurement Results Occupied Bandwidth	7 Pages
Appendix C	Measurement Results Band Edges	5 Pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	19 Pages