



# FCC Test Report

**Product Name: CDMA Mobile Phone**

**Model Number: M328**

**Report No: SYBH(R)012032008EB-4**  
**FCC ID: QISM328**

**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



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2. The laboratory has obtained the accreditation of THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION (A2LA), and Accreditation Council Certificate Number: 2174.01.
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**REPORT ON**                      FCC Test of Huawei CDMA Mobile Phone

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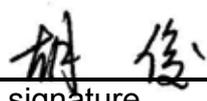
**REGULATION**                **FCC CFR47 Part 2: Subpart J;**

**FCC CFR47 Part 27: Subpart C & L;**

**CONCLUSION**                **Pass**

<b>General Manager</b>	<u>2008.03.21</u>	张兴海	
	Date	Name	

<b>Technical Responsibility For Area of Testing</b>	<u>2008.03.19</u>	余辉	
	Date	Name	

<b>Test Lab Engineer</b>	<u>2008.03.17</u>	胡俊	
	Date	Name	



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# 1 Summary

The table below summarizes the measurements and results for the Huawei CDMA Mobile Phone M328. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

<b>FCC Measurement Specification</b>	<b>FCC Limits Part(s)</b>	<b>Description</b>	<b>Result</b>
2.1046	27.50(d)(2)	Effective Radiated Power of Transmitter	PASS
2.1046	27.50(d)(2)	Conducted Power of Transmitter	PASS
2.1047	/	Modulation Characteristics	PASS
2.1049	/	Occupied Bandwidth	PASS
2.1051	27.53(g)	Band Edges Compliance	PASS
2.1051	27.53(g)	Spurious Emission at Antenna Terminal	PASS
2.1055	27.54	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

Huawei CDMA Mobile Phone M328 is subscriber equipment in the CDMA system. The frequency band is AWS band. The Mobile Phone implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice and SMS service etc.

#### 2.1.2 Support function and Service

The Mobile Station M328 support the function and service as follows:

Table 2 Service and Test mode List

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

Note: \* Refer to ANSI/TIA-98-E section 1.3 for the information of TM (Test Mode).

### 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!				



### 3 Test Site Description

The test site of:

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



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



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

#### 3.1 Testing Period

The test have been performed during the period of

Mar.11, 2008 to Mar.17, 2008

#### 3.2 General Set up Description

Huawei CDMA Mobile Phone M328 can support CDMA mode and US Cellular Band, PCS Band, AWS Band. During this measurement, the Mobile Station just works in CDMA mode and AWS Band.

**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
$\frac{Pilot Ec}{I_{or}}$	dB	-7
$\frac{Traffic Ec}{I_{or}}$	dB	-7.4



## 4 Product Description

### 4.1 Technical Characteristics

#### 4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	1710 to 1755 MHz
Downlink band:	2110 to 2155 MHz

#### 4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	50 kHz
Channel separation:	1.25 MHz

#### 4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	<b>1M25F9W</b>
-----------------------	----------------

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:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5% - 95%RH

#### 4.1.5 Power Source

Table 8 Power Source

AC voltage nominal:	~ 120V
AC voltage range	~100V - 240V
AC current maximal:	650mA

#### 4.1.6 Tune-up Procedure

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

Please reference the document Tune-up Procedure in TCF.

#### 4.1.7 Applied DC Voltages and Currents

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

The voltage and current in the final RF stage is:

Table 9 Applied RF ModuleDC Voltages and Currents

Voltage:	 2.85V
Current:	150mA According to CFR (FCC) part 2, subpart 2, section 2.1033 (8)



## 4.2 EUT Identification List

### 4.2.1 Board Information

Table 10 Board Information

CDMA Mobile Phone - AWS Band		
M328		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
-Main board	020GXT2082000217	HC2C3328M VER.C
-LCD	1802028901011Y	WB-F1216VX-7FLWa
-Battery	FMT810504154Y	HBU570

### 4.2.2 Adapter Technical Data

AC/DC Adapter Model:	ETPCA-053065UY
Manufacturer:	TECH-POWER ELECTRONICS (SHENZHEN) CO.,LTD
Rated Voltage	~ 120V, 60Hz
Input Voltage:	~ 100-240V 50/60Hz
Output Voltage;	 5.3V
Rated Power:	4W
S/N:	TPI791902005

### 4.2.3 Battery Technical Data

Battery Model:	HB4A2H
Rated capacity:	900mAh
Nominal Voltage:	 3.7V
Charging Voltage:	 4.2V

### 4.2.4 FCC Identification

Grantee Code: QIS  
Product Code: M328  
FCC Identification: QISM328



## 5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Signal Analyzer	R&S	FSQ 26	100266	03.20.2009
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	03.20.2009
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	03.20.2009
Receiver	R&S	ESIB 26	100318	08.17.2008
Receiver	R&S	ESCS30	830245/018	03.20.2009
Pre-Amplifier	Agilent	8447D	2944A10146	03.20.2009
Pre-Amplifier	Agilent	83017A	3950M00246	03.20.2009
Loop Antenna	Schwarzbeck	FMZB1516	1516115	03.20.2009
BiLog Antenna	Schaffner	CBL 6112B	2747	08.30.2008
BiLog Antenna	Schaffner	CBL 6112B	2536	08.30.2008
Horn Antenna	ETS-Lindgren	3117	00062533	03.20.2009
Horn Antenna	ETS-Lindgren	3116	00031541	03.20.2009
Dipole	Schwarzbeck	D69250- UHAP/D69250-VHAP	979/917	08.28.2008
Signal Generator	R&S	SMT06	830264/009	03.20.2009
Signal Generator	R&S	SMR 40	100325	12.09.2008
Power Supply	Keithley	2306	1045337	03.20.2009
Climate Chamber	WEISS	ACS-1	3604040034	03.20.2009
Universal Radio Communication Tester	R&S	CMU200	108035	03.20.2009
Wireless communication test set	Agilent	8960	GB43461081	03.13.2009
Spectrum Analyzer	Agilent	PSA E4445A	MY42510100	03.13.2009

## 6 Transmitter Measurements

### 6.1 Effective Radiated Power of Transmitter (EIRP)

#### 6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	1 hour
------------------	--------



Measured at:	enclosure
Ambient temperature:	24
Relative humidity:	54%
Test Configurations:	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 27.50(d)(2)

#### 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 27.50(d)(2), fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band are limited to a peak EIRP of 1 watt.. And calculate longitude EIRP by following formula:  $EIRP(dBm) = 10 * \log(EIRP_{in\ mwatts})$ .  $EIRP(dBm) = ERP(dBm) + 2.15dB$ .

Table 14 Limits

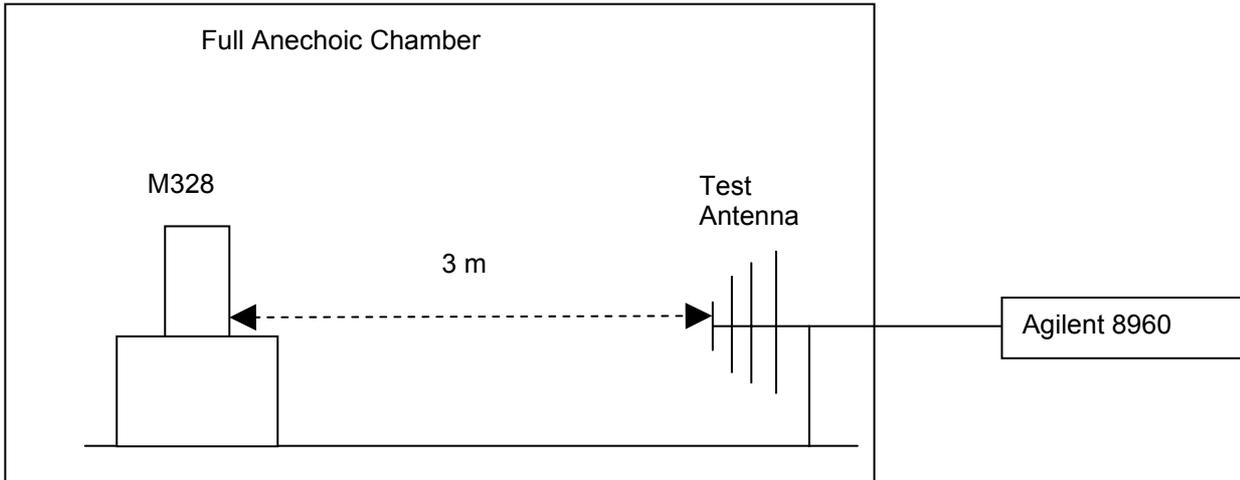
Maximum Output Power (Watts)	< 1 Watts
Maximum Output Power (dBm)	< 30 dBm

### 6.1.3 Test Method and Setup

- For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, E.R.P. shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the Mobile Station to the wireless communication tester Agilent 8960 via the air interface. The band class is set as AWS band.
- Test the Radiated maximum output power by the Agilent 8960 received from test antenna.
- Use substitution method to verify the Maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on Agilent 8960, 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 ERP**

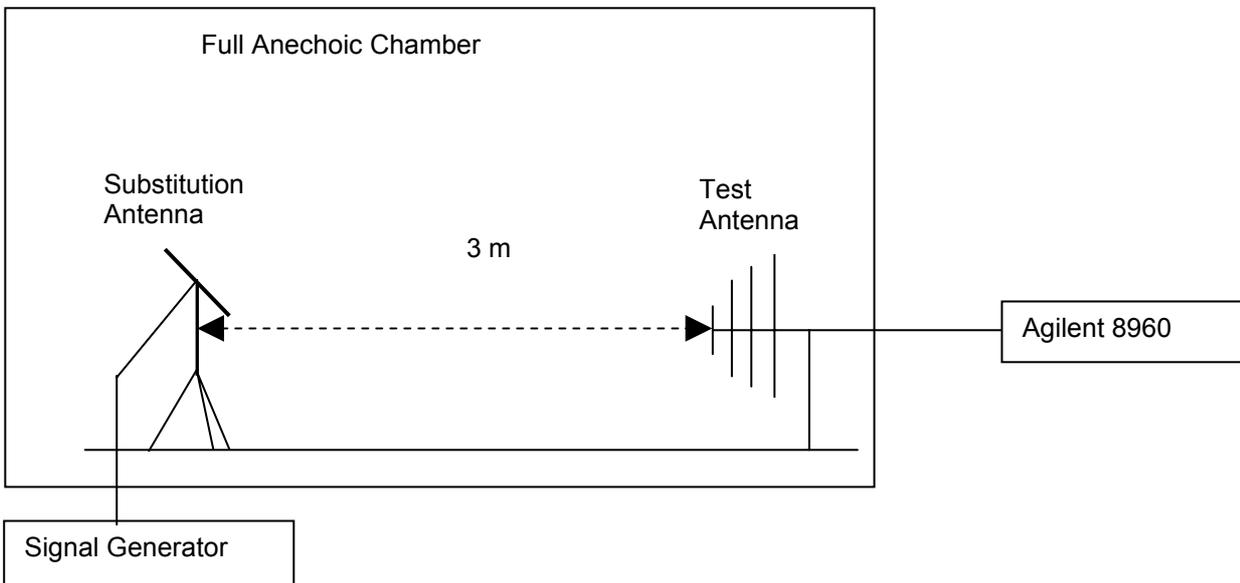


Figure 1. Test Set-up

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



### 6.1.3.1 Measurement Results

Table 15 Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel25(B) 1711.25MHz		Channel 425(M) 1731.25MHz		Channel 875(T) 1753.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T <sub>nom</sub> (24 °C) V <sub>nom</sub> (3.7 V)	23.74	<b>30</b>	23.89	<b>30</b>	23.78	<b>30</b>
TM3	T <sub>nom</sub> (24 °C) V <sub>nom</sub> (3.7 V)	23.79	<b>30</b>	23.97	<b>30</b>	23.83	<b>30</b>

### 6.1.3.2 Substitution Results

Table 16 Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	Result
TM1	1711.25	23.74	Horn Ant.	20.43	4.3	1.0	23.73	Pass
TM1	1731.25	23.89	Horn Ant..	20.51	4.3	1.0	23.81	Pass
TM1	1753.75	23.78	Horn Ant.	20.34	4.4	1.0	23.74	Pass
TM3	1711.25	23.79	Horn Ant..	20.45	4.3	1.0	23.75	Pass
TM3	1731.25	23.97	Horn Ant.	20.57	4.3	1.0	23.87	Pass
TM3	1753.75	23.83	Horn Ant.	20.38	4.4	1.0	23.78	Pass

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

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

SGP: Signal Generator Level

b, A CDMA signal with bandwidth of 1.25MHz are created by the vector generator R&S SMU200A.

c, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 1.25MHz.

### 6.1.4 Conclusion

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



## 6.2 Conducted output power

### 6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	23
Relative humidity:	55%
Test Configurations:	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 27.50(d)(2)

#### 6.2.2.2 Supporting Standards

Table 18 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 27.50(d)(2), fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band are limited to a peak EIRP of 1 watt. The calculated longitude EIRP by following formula:

$$EIRP(dBm) = 10 \cdot \log(EIRP_{in \text{ mwatts}})$$

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

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

and  $Gain(dBi) = Gain(dBd) + 2.15dB$

Table 19 Limits

Maximum Output Power (Watts)	< 1 Watts=30 dBm
Antenna Gain(dBi):	0 dBi
Maximum Conducted Output Power (dBm)	< 30dBm

### 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 Mobile Station to the wireless communication tester Agilent 8960 via the antenna connector. The band class is set as AWS band.

(b) Test the Conducted maximum output power by the Agilent 8960.

### Test setup

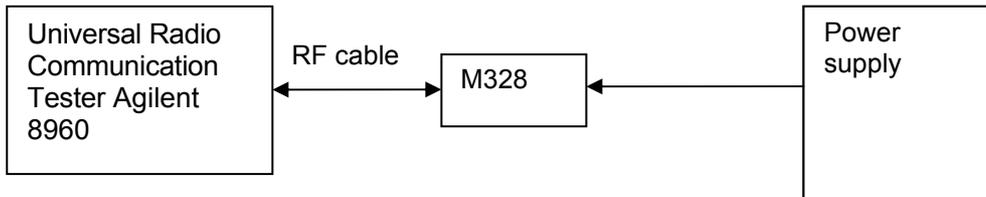


Figure 2. Test Set-up

### 6.2.4 Measurement Results

Table 20 Measurement Results

AWS band		RF Output Power					
TEST CONDITIONS		Channel 25(B) 1711.25MHz		Channel 425(M) 1731.25MHz		Channel 875(T) 1753.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T <sub>nom</sub> (23 °C) V <sub>nom</sub> (3.7 V)	23.76	30	23.97	30	23.81	30
TM3	T <sub>nom</sub> (23 °C) V <sub>nom</sub> (3.7 V)	23.79	30	24.00	30	23.85	30

### 6.2.5 Conclusion

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

## 6.3 Modulation Characteristics

### 6.3.1 Test Conditions

Table 21 Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	53 %
Test Configurations:	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 27.

#### 6.3.2.2 Supporting Standards

Table 22 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 27.

Table 23 Limits

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

### 6.3.3 Test Method and Setup

Connect the Mobile Station to the Universal Radio Communication Tester 8960 via the antenna connector. The band class is set as AWS band; the Mobile Station's output is matched with 50 Ω loads. Test method was according to ANSI/TIA-98-E. The waveform quality of the Mobile Station was tested.

#### Test setup

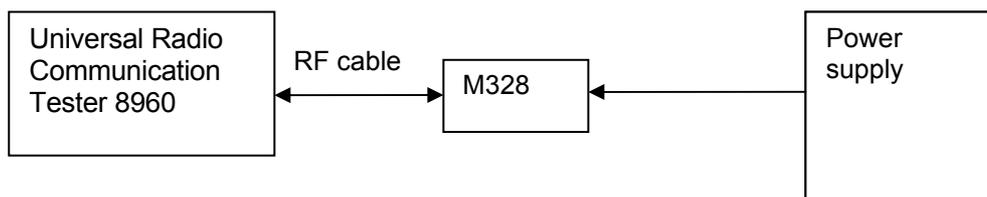


Figure 3. Test Set-up



### 6.3.4 Measurement Results

Table 24 Measurement Results

AWS Band  TEST CONDITIONS		Modulation Characteristic	
		Channel 425(M) 1731.25MHz	
		Measured	
		TM1	TM3
T <sub>nom</sub> (+25 °C)	V <sub>nom</sub> (3.7V)	Refer to Appendix A	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 25 Test Conditions

Preconditioning:	1 hour
Measured at:	RF connector
Ambient temperature:	24 °C
Relative humidity:	57 %
Test Configurations:	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 27.

#### 6.4.2.2 Supporting Standards

Table 26 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 27, 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 27 Limits

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

### 6.4.3 Test Method and Setup

Mobile Station was connected to the wireless communication test set Agilent 8960 and the Spectrum Analyzer E4445A via the divider. The band class is set as AWS band; Mobile Station was controlled to transmit Maximum power. Measure and record the Occupied Bandwidth of the Mobile Station by the Spectrum Analyzer E4445A

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**

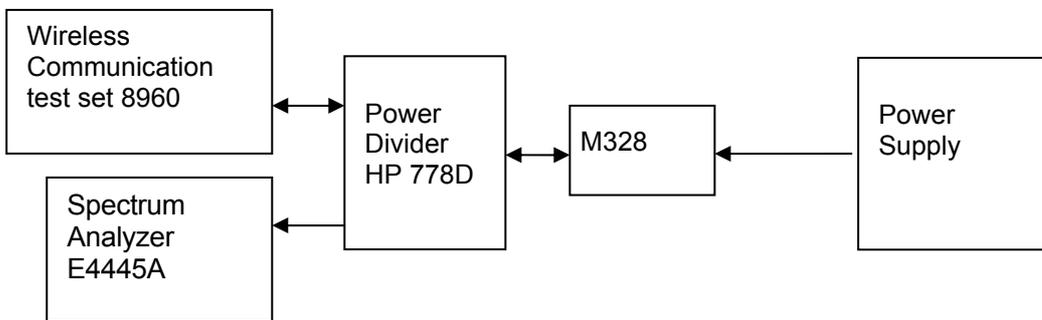


Figure 4. Test Set-up

**6.4.4 Measurement Results**

Table 28 Measurement Results

AWS Band  TEST CONDITIONS		Occupied Bandwidth					
		Channel 25 (B) 1711.25MHz				Channel 875(T) 1753.75MHz	
		Measured (MHz)				Measured (MHz)	
		TM1	TM3			TM1	TM3
T <sub>nom</sub> (+24°C)	V <sub>nom</sub> (3.7V)	1.2778	1.2761			1.2769	1.2732

**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 29 Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	50 %
Test Configurations:	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 27.53

#### 6.5.2.2 Supporting Standards

Table 30 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 27.53 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 31 Limits

Rated Power:	20dBm
Required attenuation:	$43 + 10 \log(0.1) = 33$ , 20Bm – 33dB
Absolute level	- 13 dBm

### 6.5.3 Test Method and Setup

Mobile Station was connected to the wireless communication test set Agilent 8960 and the Spectrum Analyzer E4445A via the divider, the band class is set as AWS band. Mobile Station was controlled to transmit Maximum power. Measure and record Band edge compliance of the Mobile Station by the E4445A.

RBW of 15 kHz (1% of 1.5MHz) was used up to 5MHz away from the band edge. So the FCC rules specify that RBW of 100kHz for measurements of emissions >1MHz away from the band edges ,the limit was adjusted with -13dBm to -20dBm to compensate for the reduced measurement bandwidth.

## Test Set-up

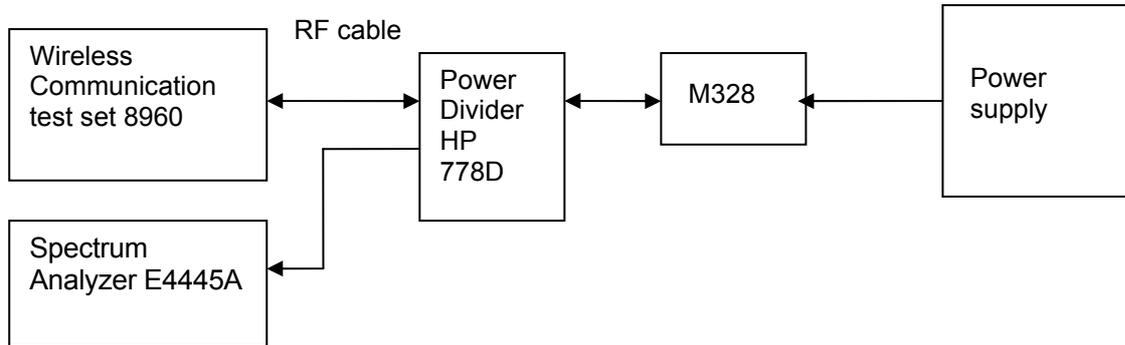


Figure 5. Test Set-up

### 6.5.4 Measurement Results at Band Edges

Table 32 Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Conducted Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
$T_{nom} (25\text{ }^{\circ}\text{C}), V_{nom} (3.7\text{V})$							
AWS Band	1710	25 (B)	TM1 & TM3	23.76	<-13(See appendix C)	- 13 dBm	Pass
	1755	875(T)	TM1 & TM3	23.81	<-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 33 Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	24°C
Relative humidity:	52 %
Test Configurations:	TM1 and TM3 at frequency B, T

### 6.6.2 Test Specifications and Limits

#### 6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 27.53

#### 6.6.2.2 Supporting Standards

Table 34 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. Release C

#### 6.6.2.3 Limits

Compliance with part 27.53, 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 35 Limits

Rated Power:	20Bm
Required attenuation:	$43 + 10 \log(0.1) = 33$ , 20dBm - 33dB
Absolute level	- 13 dBm

### 6.6.3 Test Method and Setup

Mobile Station was connected to the wireless communication test set Agilent 8960 and the Spectrum Analyzer E4440A via the divider, the band class is set as AWS band. Mobile Station was controlled to transmit Maximum power. Measure and record the Conducted Spurious Emission of the Mobile Station by the Spectrum Analyzer E4440A.

According to part 27.53, the defined measurement bandwidth as following:

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

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 20 GHz: 1 MHz;

**Test Set-up**

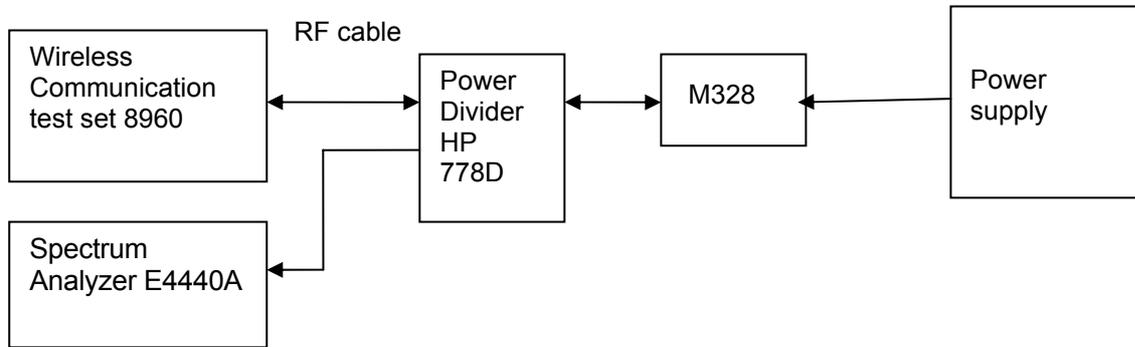


Figure 6. Test Set-up

**6.6.4 Measurement Results at Conducted Spurious Emission**

Table 36 Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Conducted Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 25(B)	TM1	9 kHz ~20GHz	23.76	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	23.76	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 875(T)	TM1	9 kHz ~20GHz	23.81	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	23.81	<- 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 37 Test Conditions

Preconditioning:	1 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	54% 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 27.54

#### 6.7.2.2 Supporting Standards

Table 38 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
EIA/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 27.54.

### 6.7.3 Test Method and Setup

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

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

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

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

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.

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

voltage and at each extreme also shall be shown.

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

### Test Set up

Connect the Mobile Station to the Wireless Communication test set 8960 via the connector. Then measure the frequency error by the Wireless Communication test set 8960. The Mobile Station's output is matched with a 50 Ω load.

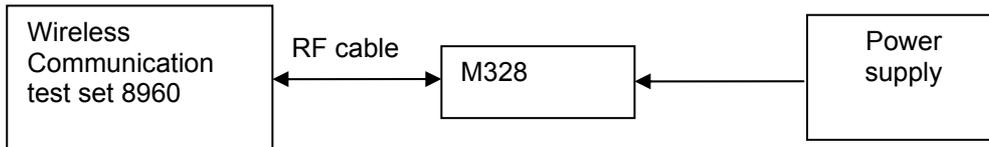


Figure 7. Test Set up

### 6.7.4 Measurement Results

#### 6.7.4.1 Measurement Results vs. Variation of Temperature

- AWS, TM1, 3.7V DC Channel No425(1731.25MHz)

Table 39 Measurement Results vs. Variation of Temperature—TM1

Temperature	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	1731.25	-28	Pass
-20 °C	24	1731.25	-30	Pass
-10 °C	24	1731.25	-24	Pass
0 °C	24	1731.25	25	Pass
+10 °C	24	1731.25	23	Pass
+20 °C	24	1731.25	-35	Pass
+30 °C	24	1731.25	-32	Pass
+40 °C	24	1731.25	-28	Pass
+50 °C	24	1731.25	30	Pass

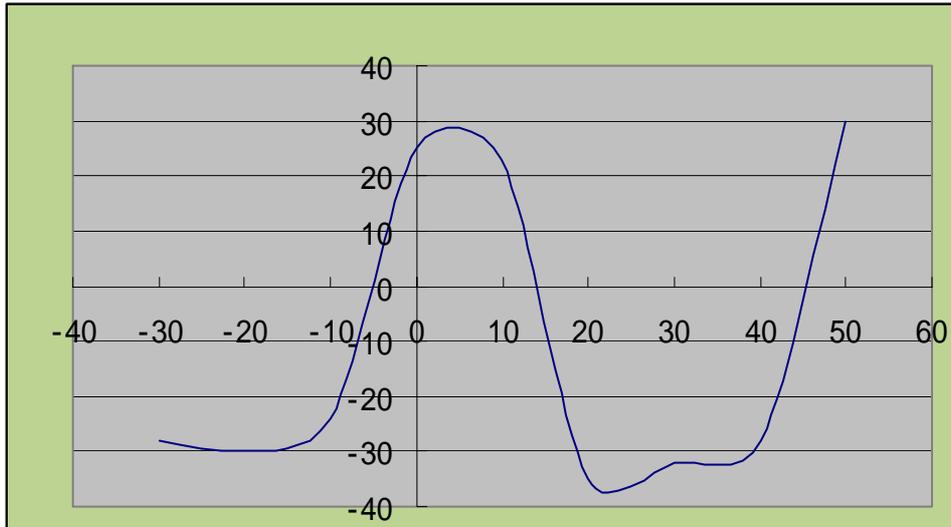


Figure 8. TM1 Test Graph

- AWS, TM3, 3.7V DC Channel No.425(1731.25MHz)

Table 40 Measurement Results vs. Variation of Temperature—TM3

Temperature	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	1731.25	-28	Pass
-20 °C	24	1731.25	-30	Pass
-10 °C	24	1731.25	-11	Pass
0 °C	24	1731.25	25	Pass
+10 °C	24	1731.25	23	Pass
+20 °C	24	1731.25	38	Pass
+30 °C	24	1731.25	-32	Pass
+40 °C	24	1731.25	-28	Pass
+50 °C	24	1731.25	30	Pass

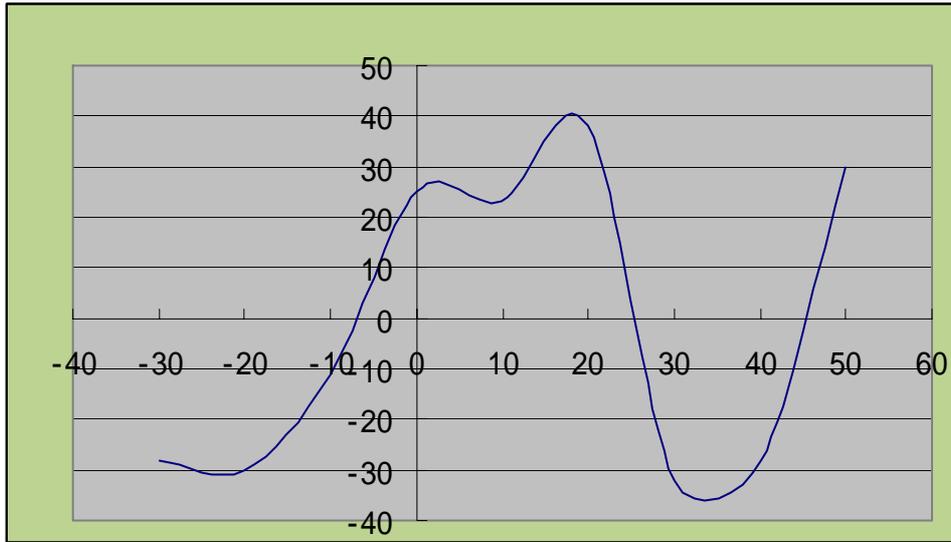


Figure 9. TM3 Test Graph

#### 6.7.4.2 Measurement Results vs. Variation of Voltage

- **AWS, TM1, 25 °C ,Channel No. 425(1731.25MHz)**

Table 41 Measurement Results vs. Variation of Voltage - TM1

Voltage	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.4	21.0	1880.0	-30	Pass
3.7	21.0	1880.0	-35	Pass
4.2	21.1	1880.0	-27	Pass

- **AWS, TM3, 25 °C ,Channel No. 425(1731.25MHz)**

Table 42 Measurement Results vs. Variation of Voltage - TM3

Voltage	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.4	21.0	1880.0	29	Pass
3.7	20.9	1880.0	38	Pass
4.2	21.0	1880.0	-32	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 43 System Measurement Uncertainty

Items		Extended Uncertainty
Effective Radiated Power of Transmitter	ERP(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=2.2dB; k=2
Conducted Output Power	Power(dBm)	U=0.39dB; k=2
Conducted Emission at Power Port	Disturbance Voltage ( dB $\mu$ V )	U=4dB; k=2
Radiated Emission of enclosure at idle mode	Field strength ( dB $\mu$ V/m )	U=5dB; k=2



## 8 Appendixes

Appendix A	Measurement Results Modulation Characteristics	3 pages
Appendix B	Measurement Results Occupied Bandwidth	5 pages
Appendix C	Measurement Results Band Edges	5 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	25pages

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