



FCC RF Test Report

Product Name: Handset Phone

Model Number: FC8221

**Report No: SYBH(R)006122010EB-2
FCC ID: QISFC8221**

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Notice

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Notice 2

Modification Information:

Modification Information

Modification Information	1	
	2	
	3	<i>Not Applicable!</i>
	4	
	5	
	6	
	7	



REPORT ON	EMC TEST OF Handset Phone
	M/N: FC8221
REGULATION	FCC CFR47 Part 2: Subpart J;
	FCC CFR47 Part 22: Subpart H;
START OF TEST	Sept.20, 2010
END OF TEST	Oct.12, 2010
Final Judgement:	Pass

Approved By 2010-10-29 Chen Xiaohong Chen Xiaohong
Date Name Signature

Reviewed By 2010-10-29 Xu Guangyi Xu Guangyi
Date Name Signature

Operator 2010-10-29 Lu Xiaoguang Lu Xiaoguang
Date Name Signature



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1 SUMMARY

The table below summarizes the measurements and results for the FC8221 CDMA Handset Phones. Detailed results and descriptions are shown in the following pages.

Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	22.913	Effective Radiated Power of Transmitter	PASS
2.1046	22.913	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	22.917	Band Edges compliance	PASS
2.1051	22.917	Spurious Emission at Antenna Terminal	PASS
2.1053	22.917	Radiated Spurious Emission	PASS
2.1055	22.355	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

FC8221 are CDMA Handset Phones. It's operated in Band Class 0 (800MHz). The Handset Phone implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice, data etc. The TX is 824.025MHz-848.985MHz and the RX 869.026MHz-893.985MHz.

2.1.2 Support function and Service

The FC8221 CDMA Handset Phones support the function and service as follows:

Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
voice and data	Modulation: QPSK	TM1*	
voice and data	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.

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***

3.1 Testing Period

The test have been performed during the period of

Oct. 12, 2010 to Oct. 26, 2010

3.2 General Set up Description

FC8221 CDMA Handset Phones can only support CDMA mode and US Cellular Band. During this measurement, the FC8221 CDMA Handset Phones just works in CDMA mode and US Cellular 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
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4



4 PRODUCT DESCRIPTION

4.1 Technical Characteristics

4.1.1 Frequency Range

Frequency Range	
Uplink band:	824 to 849 MHz
Downlink band:	869 to 894 MHz

4.1.2 Channel Spacing / Separation

Channel Spacing / Separation	
Channel spacing:	1.23 MHz
Channel raster:	30 KHz

4.1.3 Type of Emission

Type of Emission	
Emission Designation:	1M23F9W

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

4.1.4 Environmental Requirements

Environmental Requirements

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

4.1.5 Power Source

Power Source

AC voltage nominal:	~120V
AC voltage range	~90-240V
AC current maximal:	650mA

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:

Applied RF module DC Voltages and Currents

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



4.2 EUT Identification List

4.2.1 Board Information

Board Information

800MHz CDMA Handset Phones		
FC8221		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
-Module board	731052105587	WL1FC8221M
-Interface board	731052105896	WL41HSPU
-Battery	20100720000072	NA

4.2.2 Adapter Technical Data

AC/DCAdapter Model: HS-050040E1
 Manufacturer: SHENZHEN HUNTKEY ELECTRIC CO.,LTD
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA

AC/DCAdapter Model: HS-050040E1
 Manufacturer: TECH-POWER INTERNATIONAL CO.,LTD.
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA

AC/DCAdapter Model: HS-050040E1
 Manufacturer: BYD (HUIZHOU) COMPANY LIMITED
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA

AC/DCAdapter Model: HS-050040E7
 Manufacturer: SHENZHEN HUNTKEY ELECTRIC CO.,LTD
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA

AC/DCAdapter Model: HS-050040E7
 Manufacturer: TECH-POWER INTERNATIONAL CO.,LTD.
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA

AC/DCAdapter Model: HS-050040E7
 Manufacturer: BYD (HUIZHOU) COMPANY LIMITED
 Input Voltage: 100-240V ~50/60Hz, 0.2A
 Output Voltage:  5.0V 400mA



4.2.3 Battery Technical Data

Type:	NI-MH Battery
Manufacturer:	HUAWEI Technoly Co.,Ltd.
Battery Model:	HBC85S
Rated capacity:	850mAh
Nominal Voltage:	≡ +3.7V
Charging Voltage:	≡ +4.2V

4.2.4 FCC Identification

Grantee Code:	QIS
Product Code:	FC8221
FCC Identification:	QISFC8221

5 MAIN TEST INSTRUMENTS

Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	04.22.2011
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	04.22.2011
Receiver	R&S	ESIB 26	100318	05.21.2011
Receiver	R&S	ESCS30	830245/018	05.29.2011
Pre-Amplifier	Agilent	8447D	2944A10146	05.21.2011
Pre-Amplifier	Agilent	83017A	3950M00246	05.21.2011
Loop Antenna	Schwarzbeck	FMZB1516	1516115	05.29.2011
BiLog Antenna	Schaffner	CBL 6112B	2747	02.25.2011
BiLog Antenna	Schaffner	CBL 6112B	2536	06.07.2011
Horn Antenna	ETS-Lindgren	3117	00062549	06.05.2011
Horn Antenna	ETS-Lindgren	3116	00031541	03.20.2011
Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	08.27.2011
Signal Generator	R&S	SMT06	830264/009	09.29.2011
Signal Generator	R&S	SMR 40	100325	09.09.2011
Artificial Mains Network	R&S	ENV4200	100001	07.20.2011
Power Supply	Keithley	2306	1045337	09.14.2011
Climate Chamber	WEISS	WK11-180	58226049470010	12.09.2010
Universal Radio Communication Tester	R&S	CMU200	108522	05.29.2011
Wireless communication test set	Agilent	8960	GB45360866	11.20.2010
Spectrum Analyzer	Agilent	PSA E4440A	MY46187137	11.24.2010
Vector Generator	R&S	SMU 200A	101717	06.20.2011

6 TRANSMITTER MEASUREMENTS

6.1 Effective Radiated Power of Transmitter (ERP)

6.1.1 Test Conditions

Test Conditions	
Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25°C
Relative humidity:	55%
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 22.913

6.1.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones

6.1.2.3 Limits

Compliance with part 22.913, in no any case may the peak power of a FC8221 CDMA Handset Phones transmitter exceed 7 W. The calculated longitude ERP by following formula: $ERP(dBm) = 10 \cdot \log(ERP_{in} \text{mwatts})$.

Limits	
Maximum Output Power (Watts)	< 7 Watts
Maximum Output Power (dBm)	< 38.5 dBm

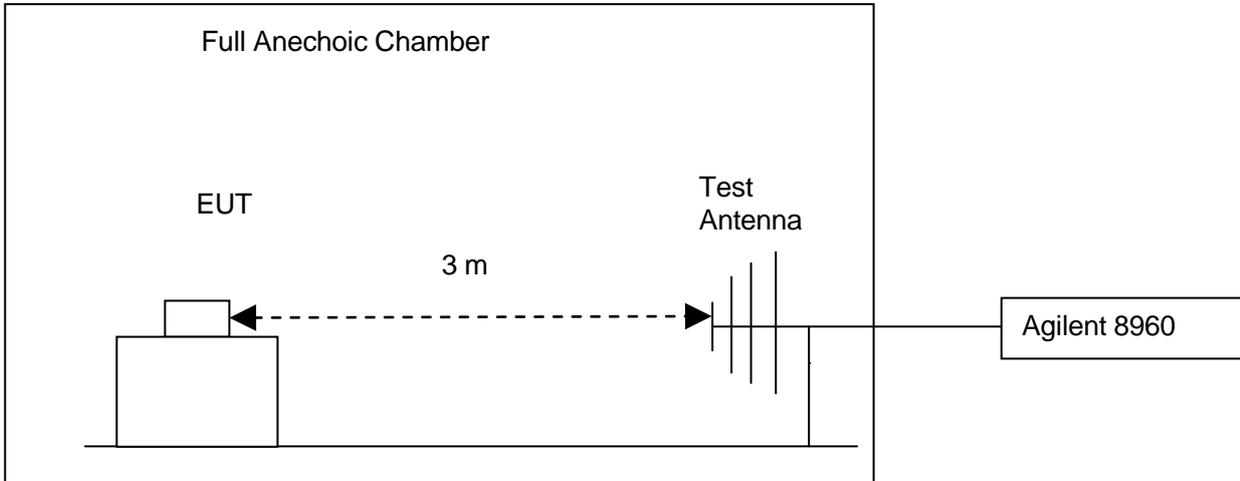
6.1.3 Test Method and Setup

- For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, ERP 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 FC8221 CDMA Handset Phones to the wireless communication tester Agilent 8960 via the air interface. The band class is set as US Cellular.
- 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

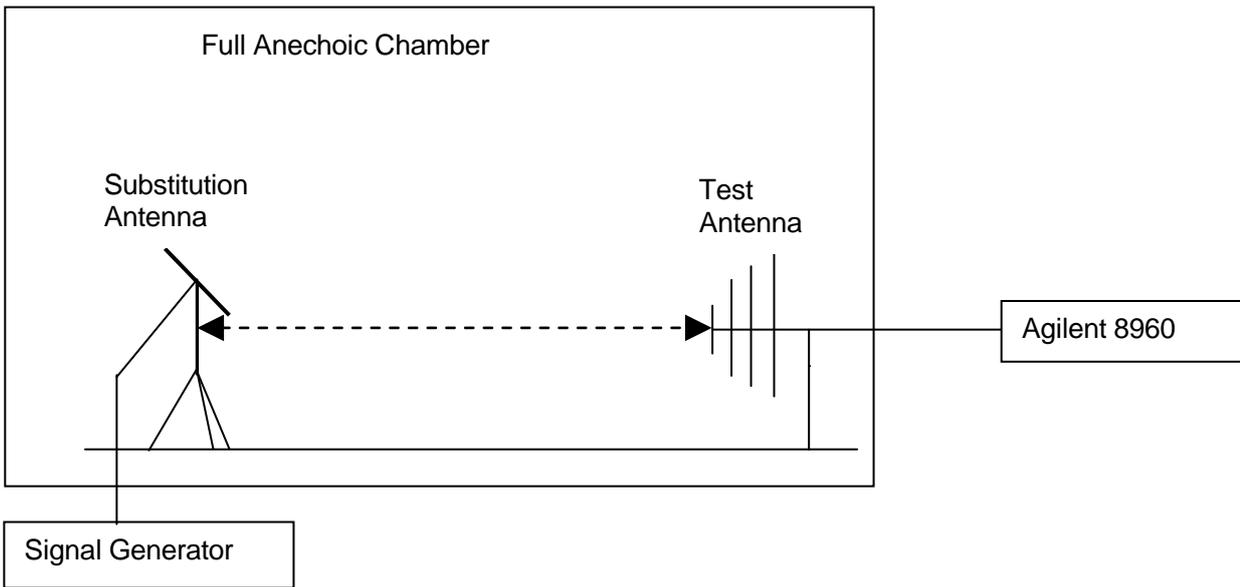


Figure 1. Test Set-up

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

6.1.4 Measurement Results



Measurement Results

TEST CONDITIONS		RF Output Power(ERP)					
		Channel1013(B) 824.7MHz		Channel283(M) 833.49Mhz		Channel777(T) 848.31MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T _{nom} (25 °C) V _{nom} (3.7 V)	24.05	38.5	24.55	38.5	24.87	38.5
TM3	T _{nom} (25 °C) V _{nom} (3.7 V)	24.5	38.5	25.31	38.5	25.13	38.5

6.1.4.1 Substitution Results

Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP) [dBm]	Limit [dBm]	Result
TM1	824.7	24.05	Dipole Ant.	27.26	-2.95	0.6	23.71	38.5	Pass
TM1	833.49	24.55	Dipole Ant.	28	-3.02	0.6	24.38	38.5	Pass
TM1	848.31	24.87	Dipole Ant.	28.08	-3.11	0.6	24.37	38.5	Pass
TM3	824.7	24.5	Dipole Ant.	27.79	-2.95	0.6	24.24	38.5	Pass
TM3	833.49	25.31	Dipole Ant.	28.91	-3.02	0.6	25.29	38.5	Pass
TM3	848.31	25.13	Dipole Ant.	28.62	-3.11	0.6	24.91	38.5	Pass

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

$$ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]$$

NOTE: SGP- Signal Generator Level

b, A CDMA signal with bandwidth of 1.23MHz is created by the vector generator R&S SMU200A.

c, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 1.23MHz.



6.1.5 Conclusion

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

6.2 Conducted output power

6.2.1 Test Conditions

Test Conditions	
Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
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 22.913

6.2.2.2 Supporting Standards

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 22.913, in no any case may the peak power of a mobile station transmitter exceed 7 W. The calculated longitude ERP by following formula:

$$ERP(\text{dBm}) = 10 \cdot \log(ERP_{\text{in mwatts}})$$

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

$$P_{\text{cond.}}(\text{dBm}) = ERP(\text{dBm}) - \text{Gain}(\text{dBd})$$

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

Limits	
Maximum Output Power (Watts)	< 7 Watts
Antenna Gain(dBd):	-0.15
Maximum Conducted Output Power (dBm)	< 38.65dBm

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 US Cellular.

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

Test setup

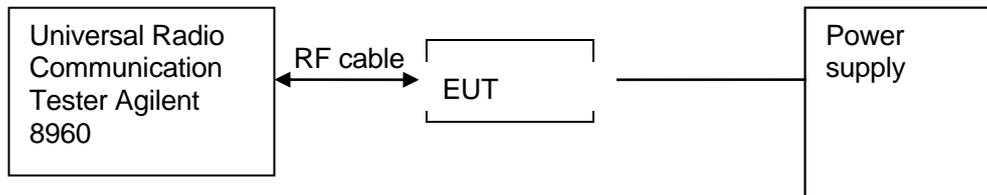


Figure 2. Test Set-up

6.2.4 Measurement Results

Measurement Results

TEST CONDITIONS		RF Output Power(ERP)					
		Channel1013(B) 824.7MHz		Channel283(M) 833.49Mhz		Channel777(T) 848.31MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T _{nom} (25 °C) V _{nom} (3.7V)	24.05	38.5	24.55	38.5	24.87	38.5
TM3	T _{nom} (25 °C) V _{nom} (3.7 V)	24.5	38.5	25.31	38.5	25.13	38.5

6.2.5 Conclusion

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

6.3 Modulation Characteristics

6.3.1 Test Conditions

Test Conditions	
Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	47 %
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 22 subpart H.

6.3.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones.

6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 22 subpart H.

Limits	
Limits	Not applicable

6.3.3 Test Method and Setup

Connect the FC8221 CDMA Handset Phones to Universal Radio Communication Tester CMU200 via the antenna connector. The band class is set as US Cellular; the FC8221 CDMA Handset Phones's output is matched with 50 Ω loads, test method was according to ANSI/TIA-98-E. The waveform quality and constellation of the FC8221 CDMA Handset Phones were tested.

Test setup

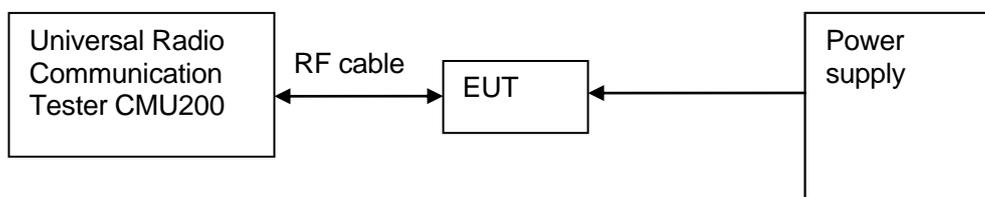


Figure 3. Test Set-up

6.3.4 Measurement Results

Measurement Results

TEST CONDITIONS		Modulation Characteristic	
		Channel283(M) 833.49MHz	
		Measured	
		TM1	TM3
T _{nom} (25 °C)	V _{nom} (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

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
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 22 subpart H.

6.4.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones.

6.4.2.3 Limits

No specific occupied bandwidth requirement in part 22 subpart H, 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.

Limits

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

6.4.3 Test Method and Setup

FC8221 CDMA Handset Phones was connected to the wireless signal analyzer PSA E4440A via the one RF connector. The band class is set as US Cellular; FC8221 CDMA Handset Phones was controlled to transmit maximum power. Measure and record the occupied bandwidth of the FC8221 CDMA Handset Phones by the Agilent E4440A.

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

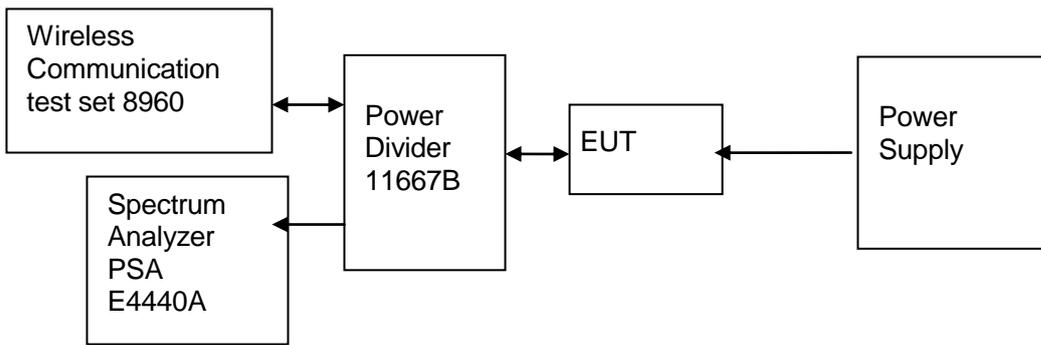


Figure 4. Test Set-up

6.4.4 Measurement Results

Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel 1013 (B) 824.7MHz		Channel283 (M) 833.49MHz		Channel 777 (T) 848.31MHz	
		Measured (MHz)		Measured (MHz)		Measured (MHz)	
		TM1	TM3	TM1	TM3	TM1	TM3
T _{nom} (25 °C)	V _{nom} (3.7V)	1.27	1.27	1.27	1.26	1.26	1.27

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

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
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 22.917

6.5.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones.

6.5.2.3 Limits

Compliance with 22.917, 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 in Watt).

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

FC8221 CDMA Handset Phones was connected to the wireless signal analyzer PSA E4440A via the one RF connector, the band class is set as US Cellular. FC8221 CDMA Handset Phones was controlled to transmit maximum power. Measure and record Band edge compliance of the FC8221 CDMA Handset Phones by the Agilent PSA E4440A.

Measurement bandwidth (RBW): 20 kHz (Resolution bandwidth)
Video bandwidth (VBW): 200 kHz

Test Set-up

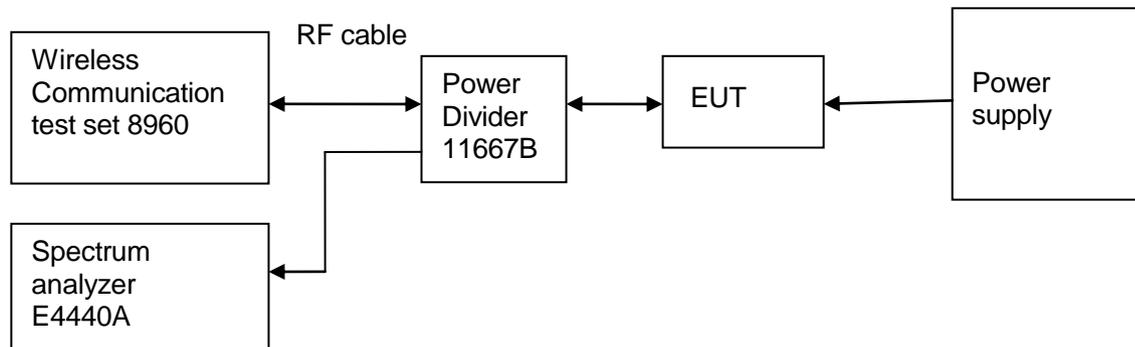


Figure 5. Test Set-up

6.5.4 Measurement Results

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 Cellular	T_{nom} (25 °C), V_{nom} (3.7V)						
	824	1013 (B)	TM1 & TM3	24	<-13(See appendix C)	- 13 dBm	Pass
	849	777 (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

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 22.917

6.6.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones.

6.6.2.3 Limits

Compliance with part 22.917, 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 in Watt).

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

FC8221 CDMA Handset Phones was connected to the wireless signal analyzer PSA E4440A via the one RF connector, the band class is set as US Cellular. FC8221 CDMA Handset Phones was controlled to transmit maximum power.

Measure and record the Conducted Spurious Emission of the FC8221 CDMA Handset Phones by the Agilent PSA E4440A.

According to part 22.917, the defined measurement bandwidth as following:

22.917(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz 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 1 GHz: 100 kHz;
 Measurement bandwidth (RBW) for 1GHz up to 12.75GHz: 1MHz;

Test Set-up

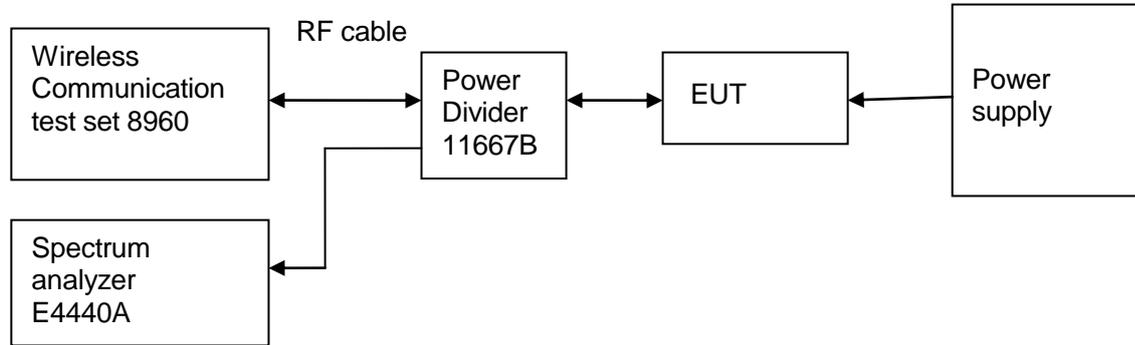


Figure 6. Test Set-up

6.6.4 Measurement Results

Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 1013(B)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 283(M)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 777(T)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	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

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % 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 22.355

6.7.2.2 Supporting Standards

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 FC8221 CDMA Handset Phones.

6.7.2.3 Limits

According to part 22.355, from 821MHz to 896MHz, for mobile device, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm.

6.7.3 Test Method and Setup

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

- (1) From -30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
- (2) and (3) of paragraph 2.1055

(a) 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.

(b) 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.

(c) 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) 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.)

The EUT can only work in such extreme voltage 3.5V and 4.2V, so here the EUT is tested in the 3.5V and 4.2V.

Test Set up

Connect the FC8221 CDMA Handset Phones to the Wireless Communication test set 8960 via the connector. Then measure the frequency error by the Wireless Communication test set 8960. The FC8221 CDMA Handset Phones's output is matched with a 50 Ω loads.

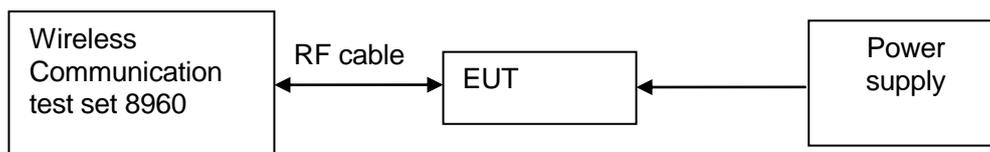


Figure 7. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

- TM1, 3.7V DC Channel No.283(833.49MHz)

Measurement Results vs. Variation of Temperature—TM1

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	833.49	-1	Pass
-20 °C	24	833.49	4	Pass
-10 °C	24	833.49	-9	Pass
0 °C	24	833.49	-3	Pass
+10 °C	24	833.49	7	Pass
+20 °C	24	833.49	1	Pass
+30 °C	24	833.49	-5	Pass
+40 °C	24	833.49	9	Pass
+50 °C	24	833.49	-4	Pass

- TM3, 3.7V DC Channel No.283(833.49MHz)

Measurement Results vs. Variation of Temperature—TM3

Temperature	Power	Nominal	Measured	Result
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	(dBm)	Frequency (MHz)	Frequency Error(Hz)	
-30 °C	24	833.49	3	Pass
-20 °C	24	833.49	5	Pass
-10 °C	24	833.49	5	Pass
0 °C	24	833.49	7	Pass
+10 °C	24	833.49	-5	Pass
+20 °C	24	833.49	8	Pass
+30 °C	24	833.49	-7	Pass
+40 °C	24	833.49	9	Pass
+50 °C	24	833.49	11	Pass

6.7.4.2 Measurement Results vs. Variation of Voltage

- TM1, 25 °C ,Channel No. **283(833.49MHz)**

Measurement Results vs. Variation of Voltage—TM1

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.5	24	833.49	3	Pass
3.7	24	833.49	-5	Pass
4.2	24	833.49	-2	Pass

- TM3, 25 °C ,Channel No. **283(833.49MHz)**

Measurement Results vs. Variation of Voltage—TM3

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.5	24	833.49	4	Pass
3.7	24	833.49	-4	Pass
4.2	24	833.49	7	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:

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



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	25 pages

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