

# FCC PART 22 TYPE APPROVALS EMI MEASUREMENT AND TEST REPORT

For

## ZTE Corporation

ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen,  
Guangdong, China 518057

**FCC ID: Q78-ZTEC332**  
**Model: ZTE C332**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report		<b>Product Type:</b> 800MHz CDMA2000 1X Mobile Phone	
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<b>Report No.:</b>	B07111214		
<b>Report Date:</b>	2007-11-15		
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

The ZTE Corporation's product, FCC ID: Q78-ZTEC332 or the "EUT" as referred to in this report is a 800 MHz CDMA2000 1X Mobile Phone, which measures approximately 104mm(L) × 46mm(W) × 13mm(H).

The frequency range is TX 824MHz~849MHz, RX 869MHz~894MHz.

### EUT Photo (picture of product)



*Additional Photos in Exhibit C*

### Objective

This type approval report is prepared on behalf of *ZTE Corporation* in accordance with Part 2, Subpart J, Part 22 Subpart H of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

### Related Submittal(s)/Grant(s)

No Related Submittals

## **Test Methodology**

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services  
Part 15 Subpart B – Unintentional radiators

Applicable Standards: TIA-98-E, TIA603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at ZTE Corporation Reliability Testing Center. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## **Test Facility**

ZTE Corporation Reliability Testing Center  
ZTE Plaza,Keji Road South,Hi-Tech Industrial Park, NanShan District, Shenzhen, Guangdong,  
518057, P.R. of China

Tel: +86-755-26770345 Fax: +86-755-26770347

Test site at ZTE Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC).

The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 25, 2005. ZTE Corporation Lab's FCC Registration Number is 373926.

## SYSTEM TEST CONFIGURATION

### Justification

The EUT was configured for testing according to TIA/EIA-603 C.

The final qualification test was performed with the EUT operating at normal mode.

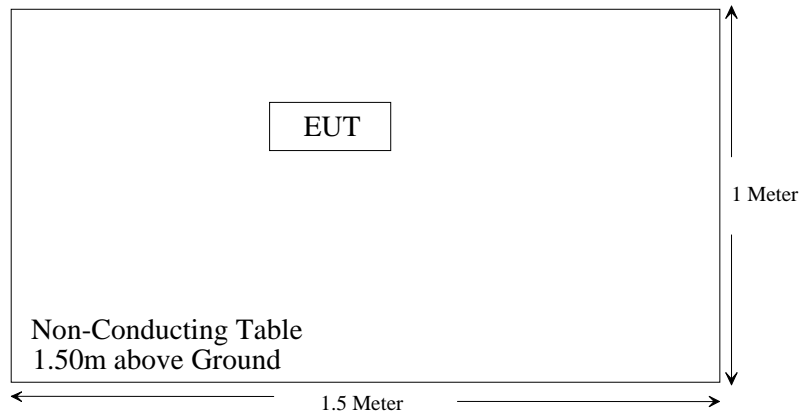
### Equipment Modifications

No modifications were made to the EUT.

### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Agilent	Wireless communication test set	8960 E5515C	GB42431673

### Test Setup Block Diagram



## **SUMMARY OF TEST RESULTS**

<b>FCC Rule</b>	<b>Description of Test</b>	<b>Result</b>
§ 2.1047	Modulation Characteristics	Compliant
§ 2.1053	Spurious Radiated Emissions	Compliant
§2.1093	RF Exposure	Compliant Refer to SAR report
§ 2.1046, § 22.912 (d)	RF Output Power	Compliant
§ 2.1049 § 22.917 § 22.905	Out of Band Emission, Occupied Bandwidth	Compliant
§ 2.1051, § 22.917	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a) § 2.1055 (d) § 22.355	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917	Band Edge	Compliant
§ 15.107	Conducted Emission at AC power port	Compliant
§ 15.109	Radiated Emission of Enclosure	Compliant

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## **§2.1047 - MODULATION CHARACTERISTIC**

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### **Applicable Standard**

Requirement: FCC § 2.1047(d). As part 22H has not specific requirement for CDMA modulation, therefore modulation characteristic is not presented.



## §2.1053 - SPURIOUS RADIATED EMISSIONS

### Applicable Standard

Requirements: CFR 47, § 2.1053.

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a 50 ohms load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log<sub>10</sub> (power out in Watts)

Measurement bandwidth (RBW) for 30MHz to 1000MHz: 100kHz.

Measurement bandwidth (RBW) for 1000 MHz to 12750 MHz: 1MHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
R&S	EMI Test Receiver 20Hz~26.5GHz	ESI26	100058	2007-10-25
R&S	Log periodic Antenna 30~3000MHz	HL562	100022	2007-3-7
R&S	Double-Ridged Waveguide Horn Antenna 1~18GHz	HF906 RX	100032	2007-10-10
R&S	Filters	TS-FILT	N/A	N/A
R&S	Cable Set Up to 18Ghz	RF Cable	N/A	N/A
Albatross	Anechoic Chamber 3m site	3m site	N/A	2007-5-14
SCHWARZBECK	VHF-UHF Broad band Antenna 30-1000MHz	VUBA 9117	173	2007-4-11
R&S	Double-Ridged Waveguide Horn Antenna 1~18GHz	HF906 TX	100446	2007-9-20
R&S	Signal generator 10MHz~20GHz	SMR20	100098	2007-10-16
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18

**\* Statement of Traceability:** ZTE Corporation Reliability Testing Center attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### Environmental Conditions

Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

\* The testing was performed by guan bin on 2007-10-23

### Test Result

Worst case reading as follows:

Part22:

33.13 dB at 8140.80 MHz

TX Spurious Emission scan 30 MHz – 12.75GHz (TX) Middle (283) channel (836.52MHz)

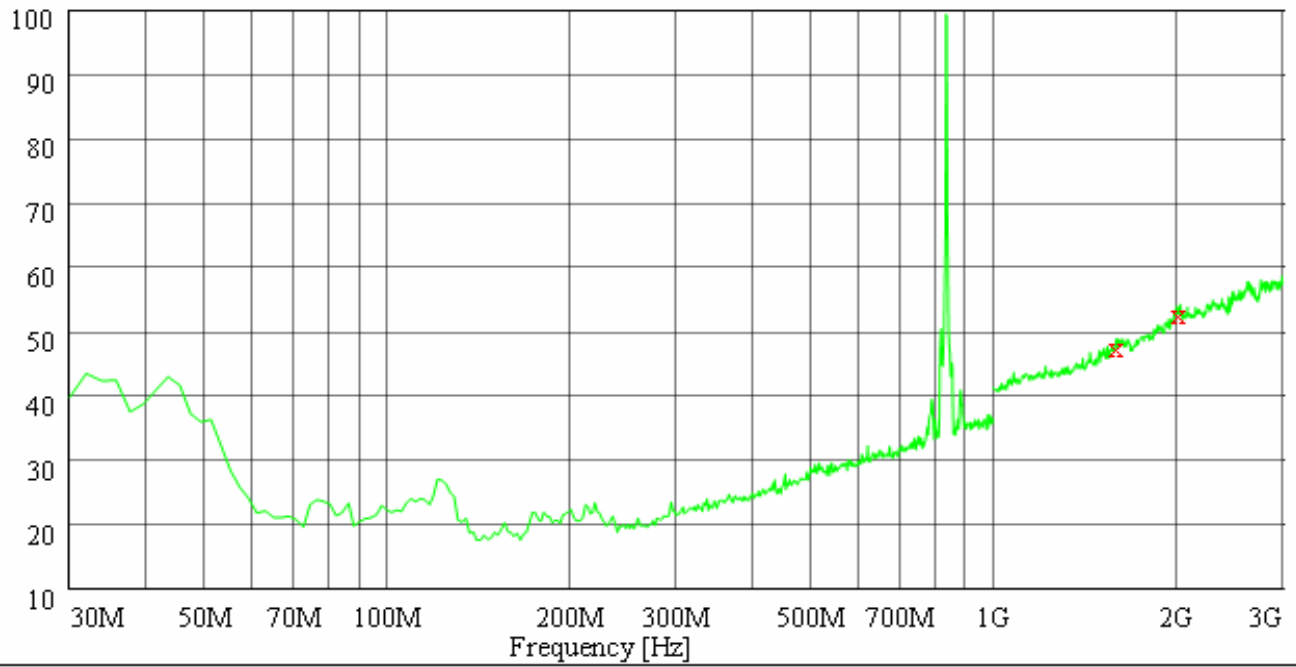
Indicated		Test Ant. Polar (H/V)	Substituted		Ant. Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	Amp. (dBuV/m)		Freq. (MHz)	Level (dBm)					
6182.3647	53.06	H	6182.36	-50.33	9.05	6.9	-50.33	-13	37.33
6983.6253	53.04	H	6983.63	-52.38	9.25	7.3	-52.58	-13	39.58
10284.068	57.38	H	10284.10	-51.56	11.35	8.9	-51.26	-13	38.26
1601.2024	48.98	V	1601.20	-58.89	6.55	3.3	-57.79	-13	44.79
2034.0681	54.26	V	2034.10	-53.26	7.05	3.8	-52.16	-13	39.16
8140.7816	55.49	V	8140.80	-45.43	9.45	8	-46.13	-13	33.13
10503.006	57.29	V	10503.1	-50.94	11.75	9.1	-50.44	-13	37.44

**Note:** No Pre-amplifier

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

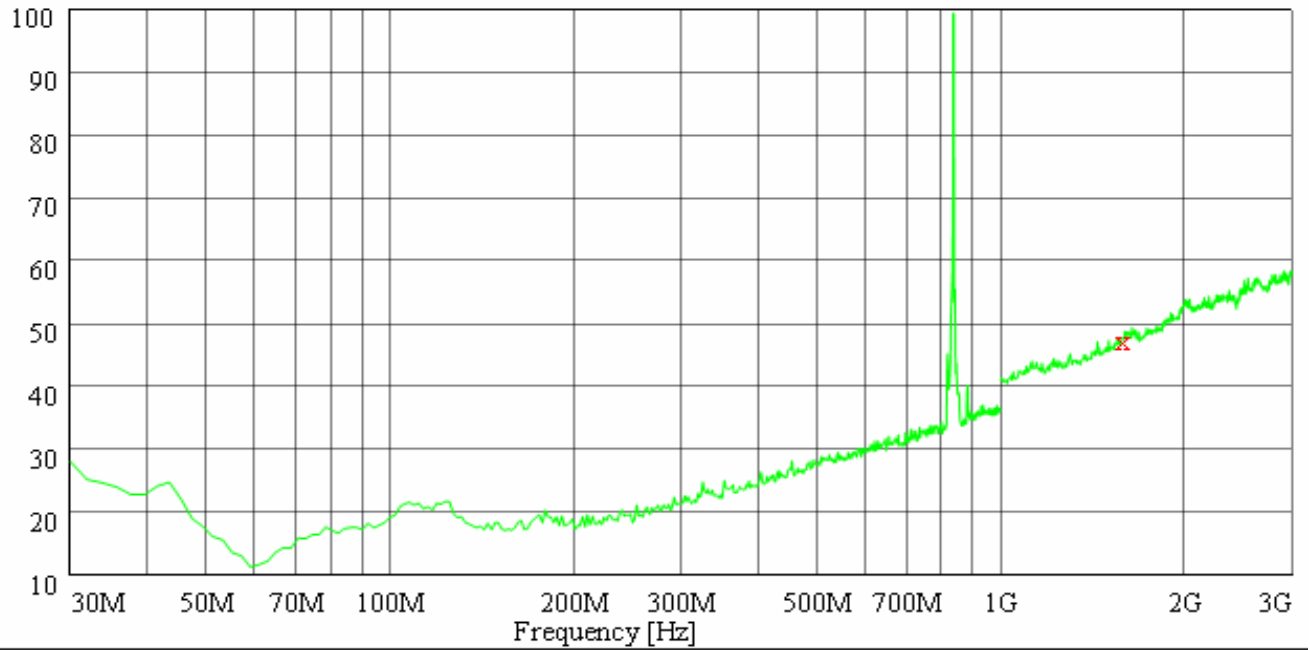
**(30MHz~3GHz)Vertical**

Level (dB $\mu$ V/m)



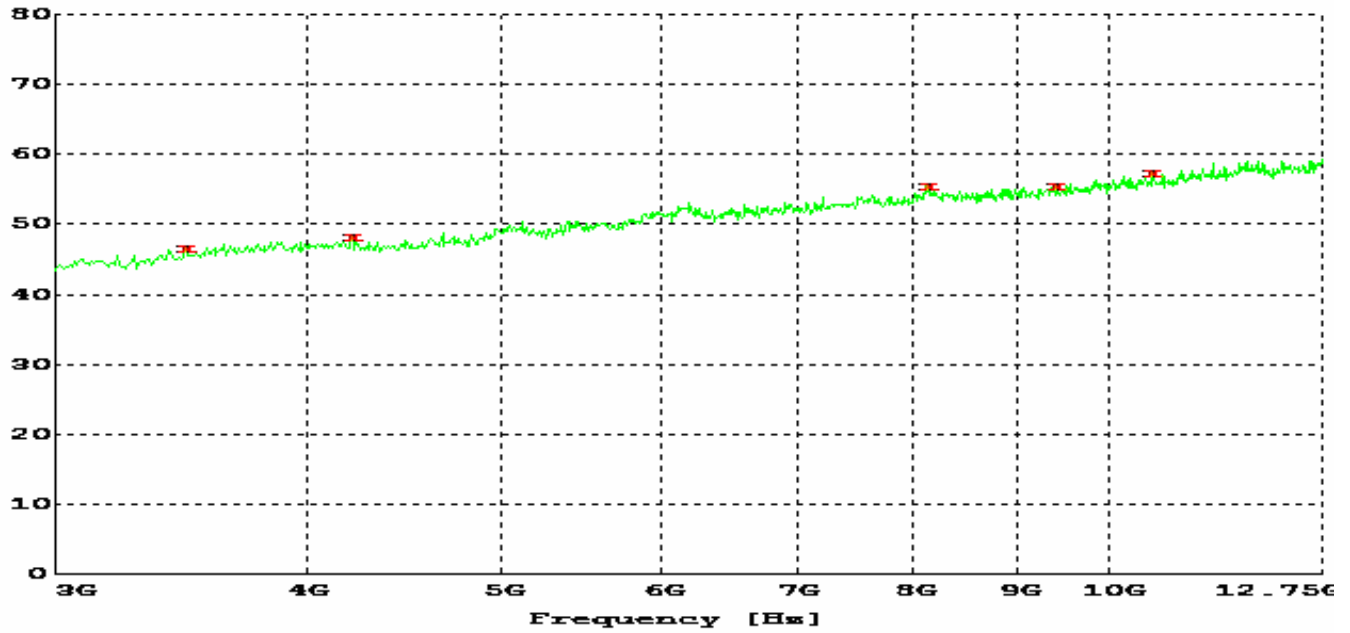
**(30MHz~3GHz)Horizontal**

Level [dBuV/m]



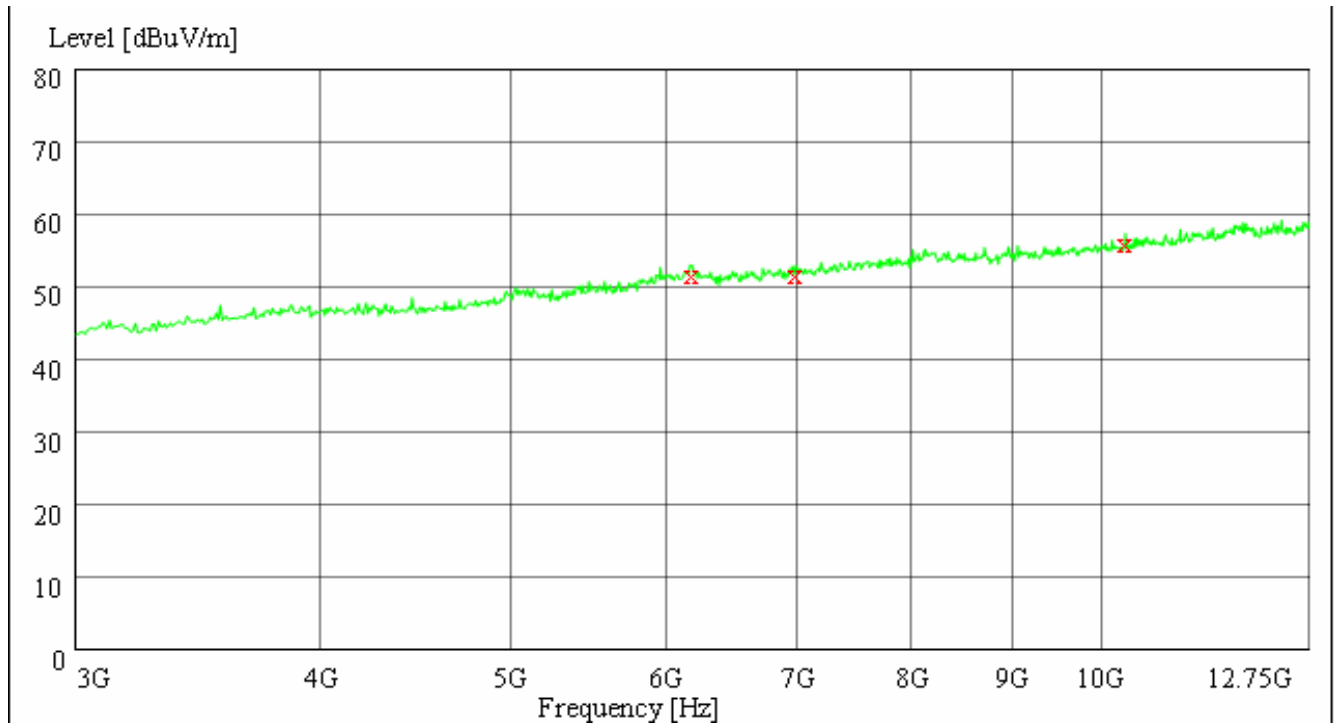
(3GHz~12.75GHz)Vertical

Level (dB $\mu$ V/m)



(3GHz~12.75GHz)Horizontal

Level [dBuV/m]



## §2.1046, §22.913(a) – RF OUTPUT POWER

### Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

### Test Procedure

*Conducted:*

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18
Agilent	Spectrum Analysis	E4405B	MY41440292	2007-01-18

\* **Statement of Traceability:** ZTE Corporation Reliability Testing Center attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### Environmental Conditions

Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

\* The testing was performed by Jeff Zhang on 2007-10-24

**Test Results**

<b>Channel</b>	<b>Radio Configuration and Conducted Power (dBm)</b>			
	<i>RC1</i>	<i>RC2</i>	<i>RC3</i>	<i>RC4</i>
<b>Low</b>	24.05	24.39	23.68	24.26
<b>Mid</b>	24.37	24.32	23.75	24.69
<b>High</b>	24.19	24.16	23.35	24.27

**Note:** The EUT antenna is non-retractable antenna with 0dBi gain, VSWR<2.0 and vertical polarization.

## **§2.1049, §22.917, §22.905 - OCCUPIED BANDWIDTH**

### **Applicable Standard**

Requirements: CFR 47, Section 2.1049, Section 22.901, Section 22.917.

### **Test Procedure**

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30kHz and the 26 dB & 99% bandwidth was recorded.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal. Date</b>
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18
Agilent	Spectrum Analysis	E4405B	MY41440292	2007-01-18

\* **Statement of Traceability:** ZTE Corporation Reliability Testing Center attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### **Environmental Conditions**

Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

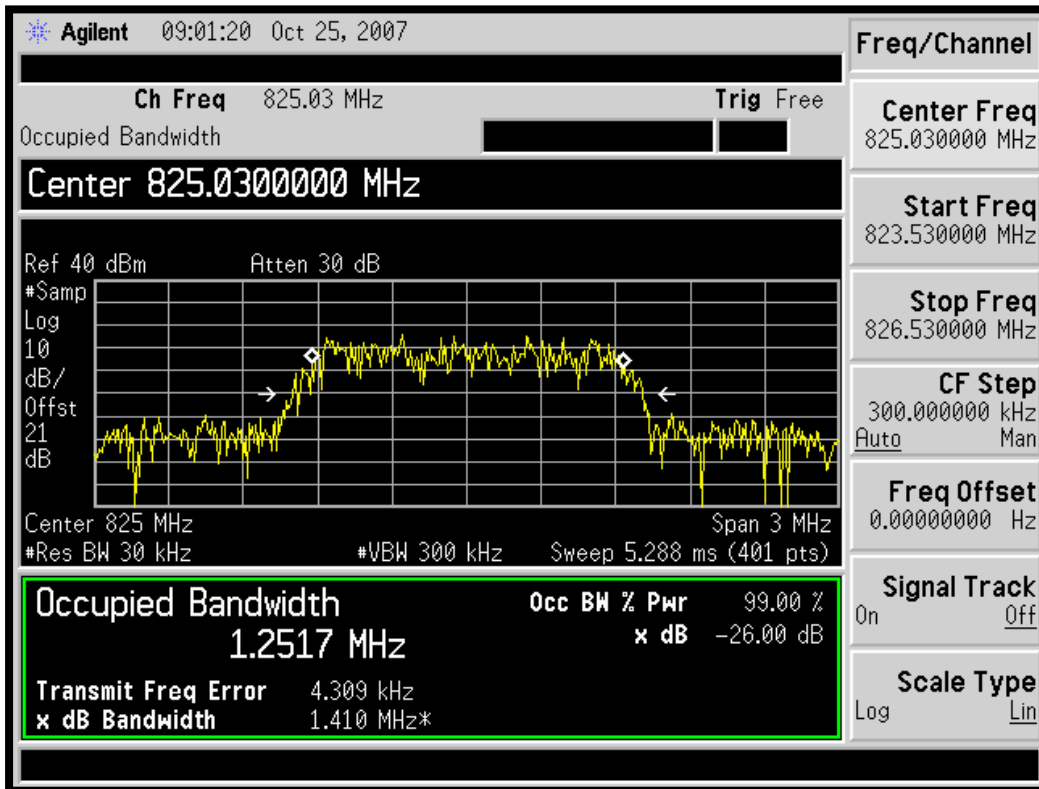
\* The testing was performed by Jeff Zhang on 2007-10-24

### **Test Results**

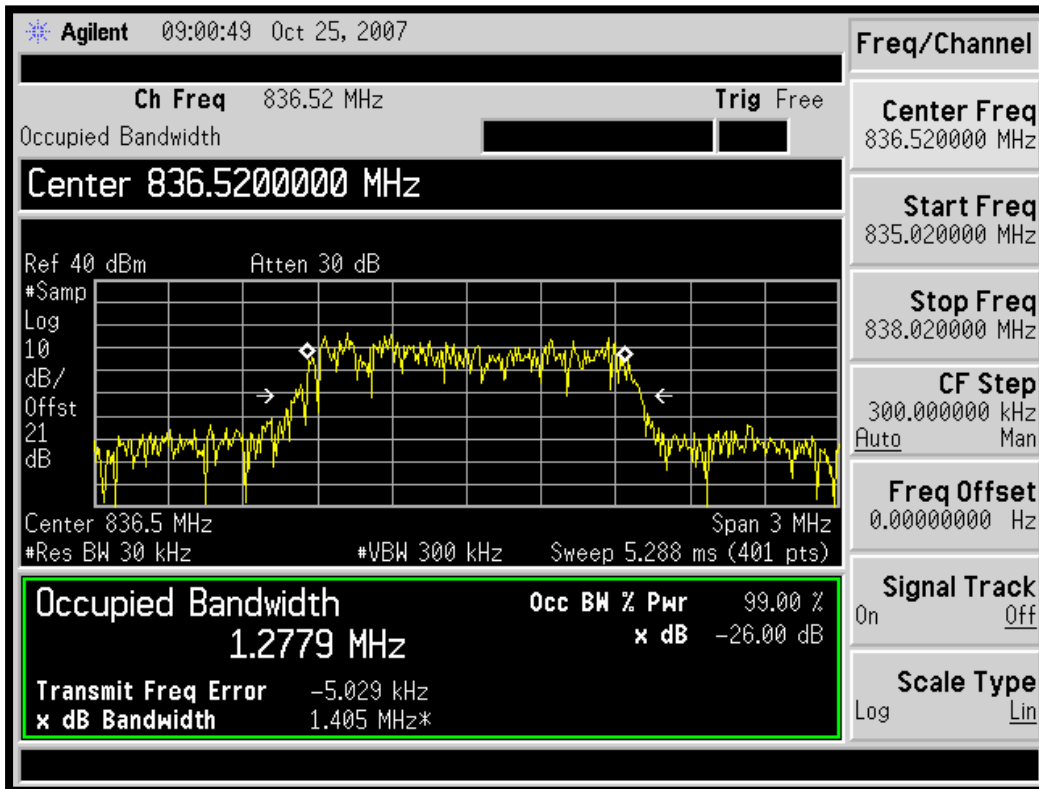
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Bandwidth (MHz)</b>	<b>26 dB Bandwidth (MHz)</b>
<b>Low</b>	825.03	1.2517	1.410
<b>Mid</b>	836.52	1.2779	1.405
<b>High</b>	848.31	1.2784	1.417

Please refer to the following plots.

Low Channel

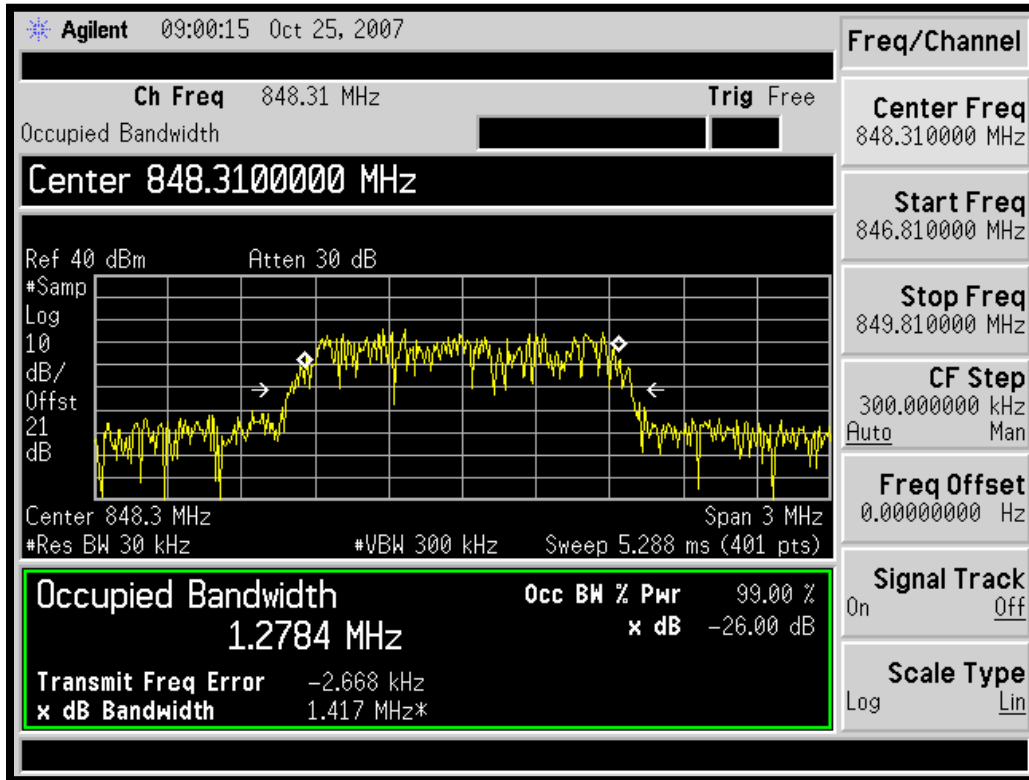


Mid Channel





### High Channel



## **§2.1051, §22.917 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

### **Applicable Standard**

Requirements: CFR 47, § 2.1051. § 22.917.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

### **Test Procedure**

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal. Date</b>
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18
Agilent	Spectrum Analysis	E4405B	MY41440292	2007-01-18

\* **Statement of Traceability: ZTE Corporation Reliability Testing Center** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

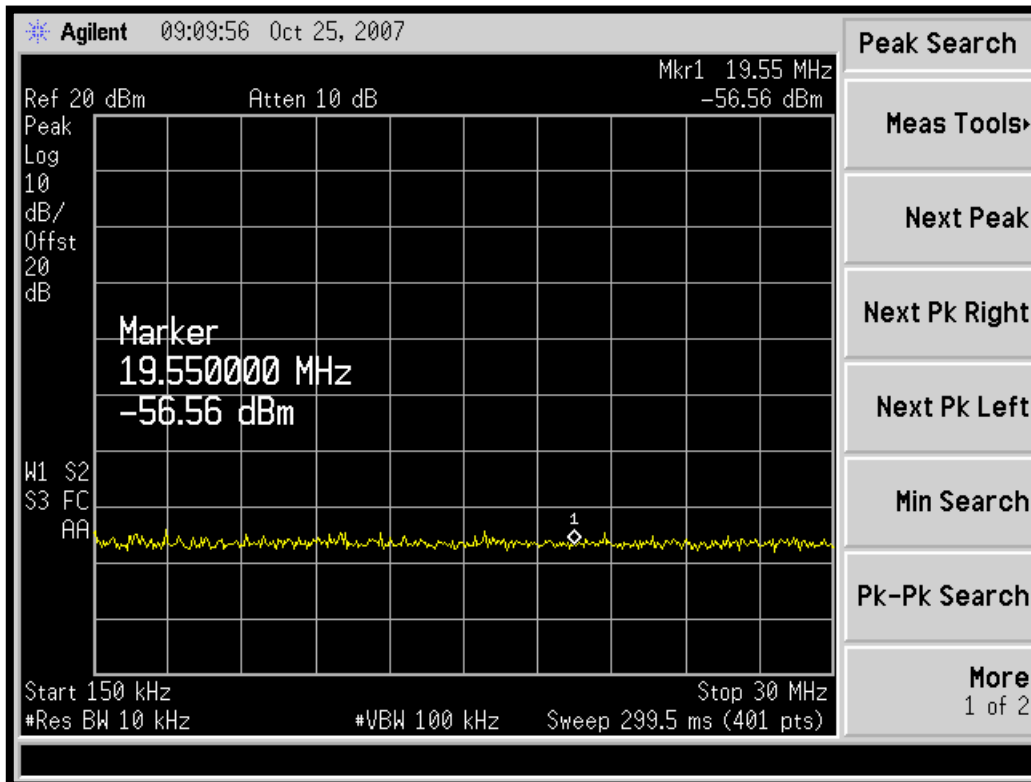
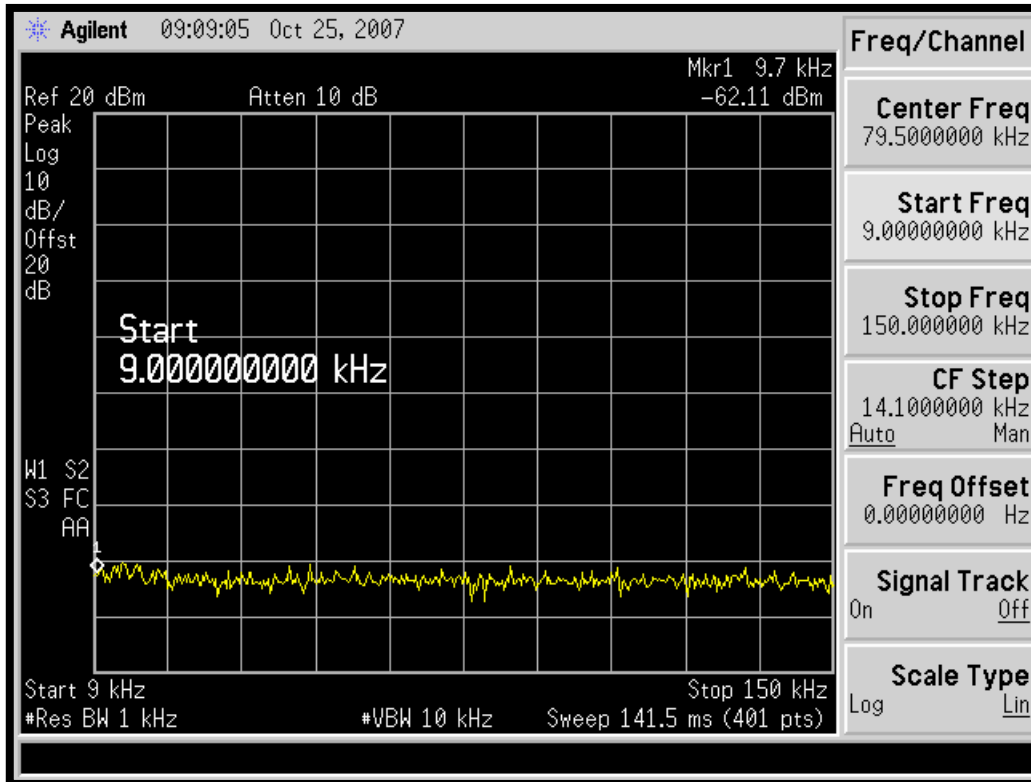
### **Environmental Conditions**

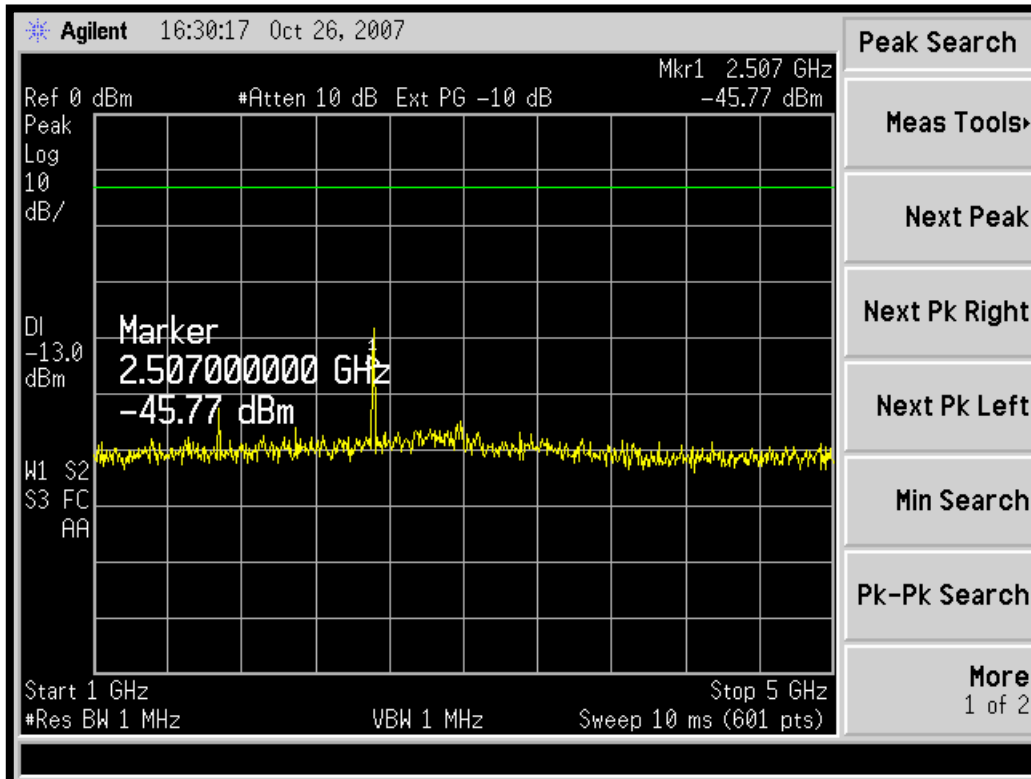
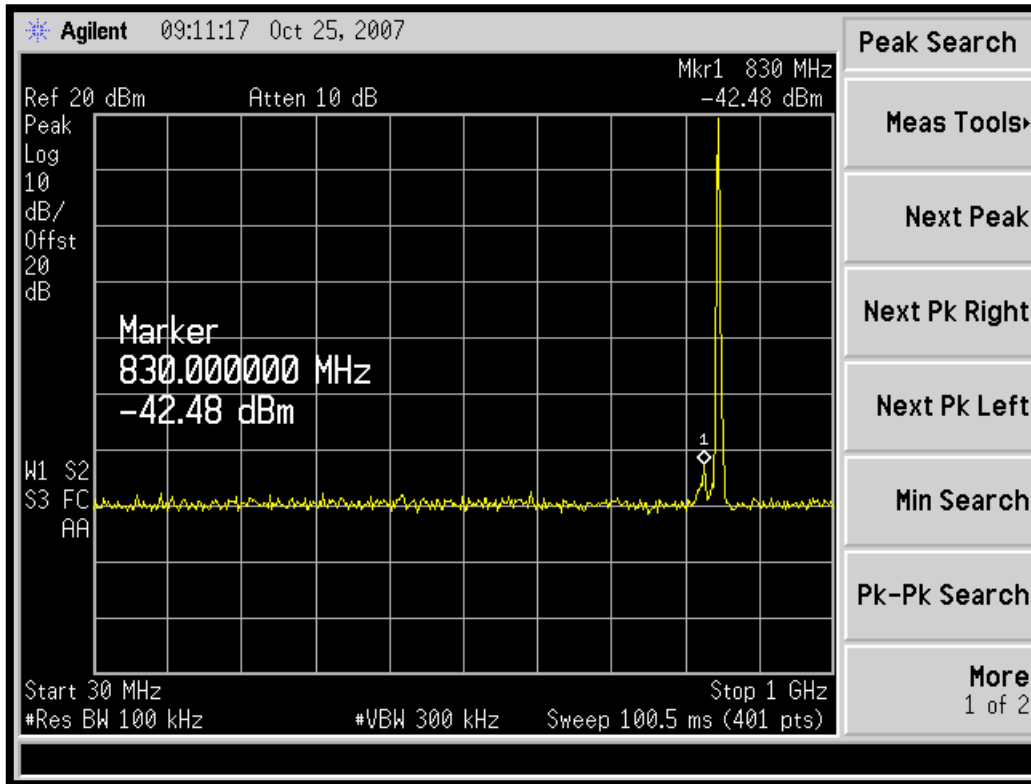
Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

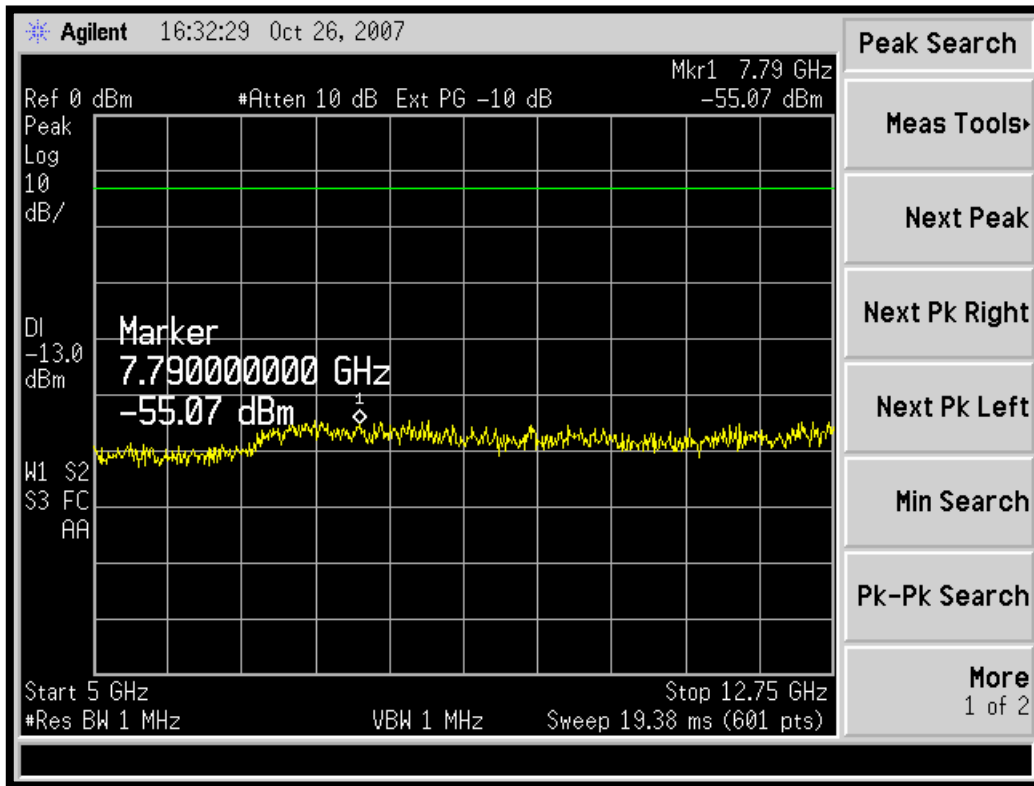
\* *The testing was performed by Jeff Zhang on 2007-10-25*

### **Test Results**

Please refer to the hereinafter plots. Channel 384







**§2.1055 (a), §2.1055 (d), §22.355 - FREQUENCY STABILITY**

**Applicable Standard**

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

**Table C-1\_Frequency Tolerance for Transmitters in the Public Mobile Services**

Frequency range (MHz) (ppm)	Mobile Base, fixed (ppm)	Mobile [le]3 watts (ppm)	[le]3 watts (ppm)
25 to 50.....	20.0	20.0	50.0
50 to 450.....	5.0	5.0	50.0
450 to 512.....	2.5	5.0	5.0
821 to 896.....	1.5	2.5	2.5
928 to 929.....	5.0	n/a	n/a
929 to 960.....	1.5	n/a	n/a
2110 to 2220.....	10.0	n/a	n/a

According to §24.235, The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**Test Procedure**

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18
Agilent	Spectrum Analysis	E4405B	MY41440292	2007-01-18
Wuxi	Temperature Oven	GDW-0100	G30064	2007-01-18

\* **Statement of Traceability:** ZTE Corporation Reliability Testing Center attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

**Environmental Conditions**

Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

The testing was performed by Jeff Zhang on 2007-10-25

## Test Results

### Frequency Stability versus Temperature

Reference Frequency: 836.52 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (VDC)	Measurement Results		
		Frequency Error ( Hz)	Error (ppm)	Limit (ppm)
50	3.7	4.1	0.005	2.5
40	3.7	-0.1	-0.0001	2.5
30	3.7	3.0	0.004	2.5
20	3.7	0.1	0.0001	2.5
10	3.7	3.5	0.004	2.5
0	3.7	2.4	0.003	2.5
-10	3.7	4.9	0.006	2.5
-20	3.7	1.3	0.002	2.5
-30	3.7	4.9	0.006	2.5

### Frequency Stability versus Voltage

Reference Frequency: 836.52 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (VDC)	Measurement Results		
		Frequency Error ( Hz)	Error (ppm)	Limit (ppm)
20	3.4	0.6	0.0007	2.5

## §22.917 – BAND EDGE

### Applicable Standard

According to § 22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Wireless communication test set	8960 E5515C	GB42431673	2007-01-18
Agilent	Spectrum Analysis	E4405B	MY41440292	2007-01-18

\* **Statement of Traceability:** ZTE Corporation Reliability Testing Center attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### Environmental Conditions

Temperature:	20° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

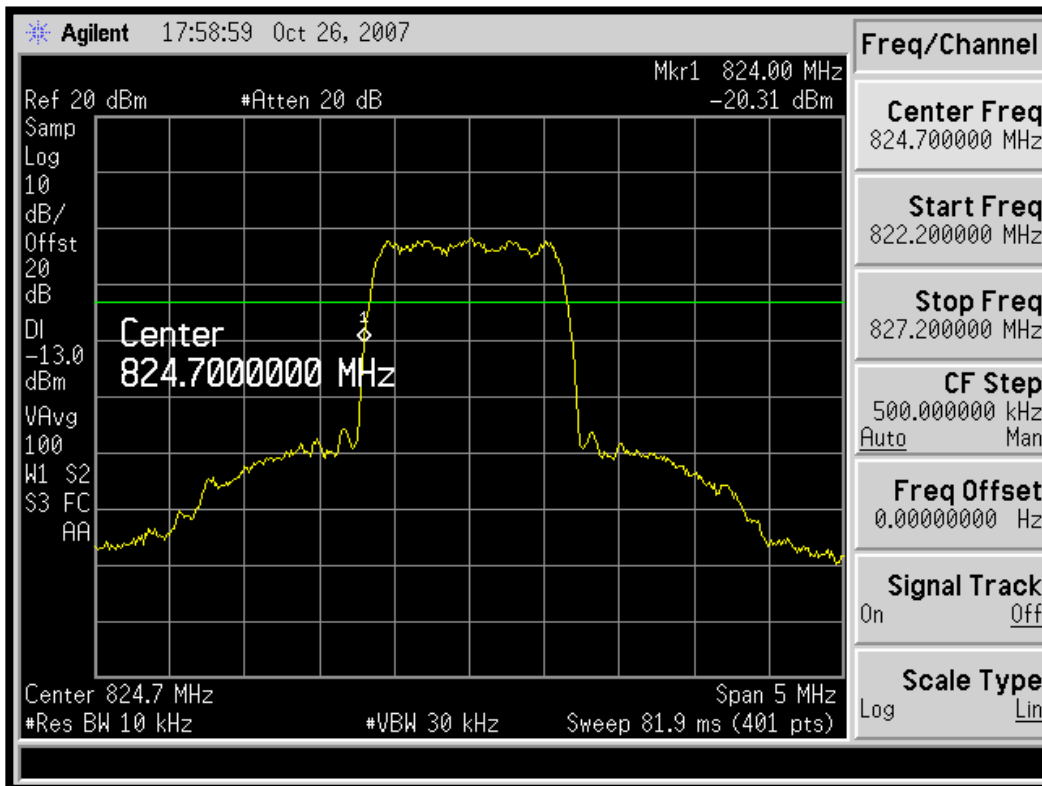
\* The testing was performed by Jeff Zhang on 2007-10-25

### Test Results

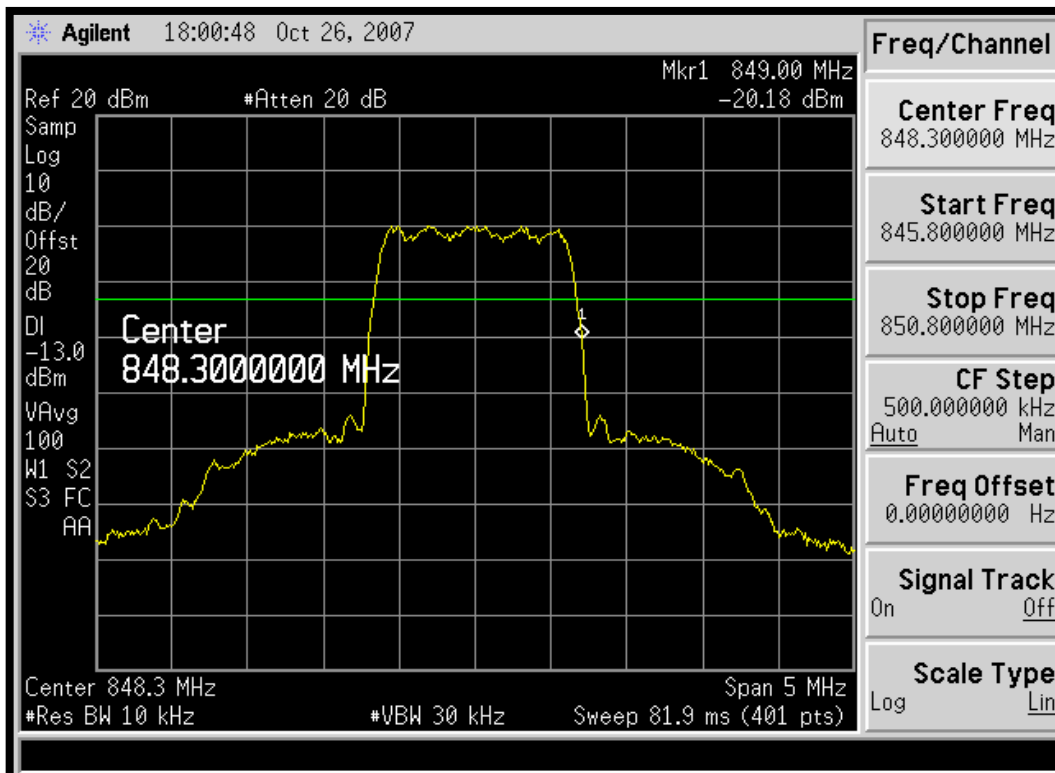
Please refer to the following plots.



Lowest Channel



Highest Channel



## §15.107 – Conducted Emission at AC power port

### Applicable Standard

CFR47(FCC) Part 15.107

### Test limits

Compliance with part 15.107, conducted emission must meet the requirement of following table.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: \* Decreases with the logarithm of the frequency.

### Test Procedure

The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal reference ground plane. EUT was connected to LISN and LISN was connected to reference ground plane. EUT was 0.8m from LISN.

Conducted Disturbance at AC port measurements were undertaken on the L and N lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The ZTE Mobile Phone C332 was communicated with the Universal radio communication tester through Air interface, the Universal radio communication tester controls the C332 to transmitter the maximum power which defined in specification of product. The Mobile Phone operated on the typical channel.

Measurement bandwidth (RBW) for 150 kHz to 30 MHz: 9 kHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
R&S	EMI Test Receiver 9kHz~2.75GHz	ESCS30	100068	2007-10-18
EMCO	LISN	4825/2	100022	2007-10-18
R&S	Pulse limiter 9KHz~30MHz	ESH3-Z2	100063	N/A
--	Cable	CE Cable	N/A	N/A

### Environmental Conditions

Temperature:	22° C
Relative Humidity:	55%
ATM Pressure:	1018mbar

\* The testing was performed by guan bin on 2007-10-25

**Test Results**

Worst case reading as follows:

*6.8 dB at 0.408557 MHz*

**Measurement Results: Quasi-Peak Detector**

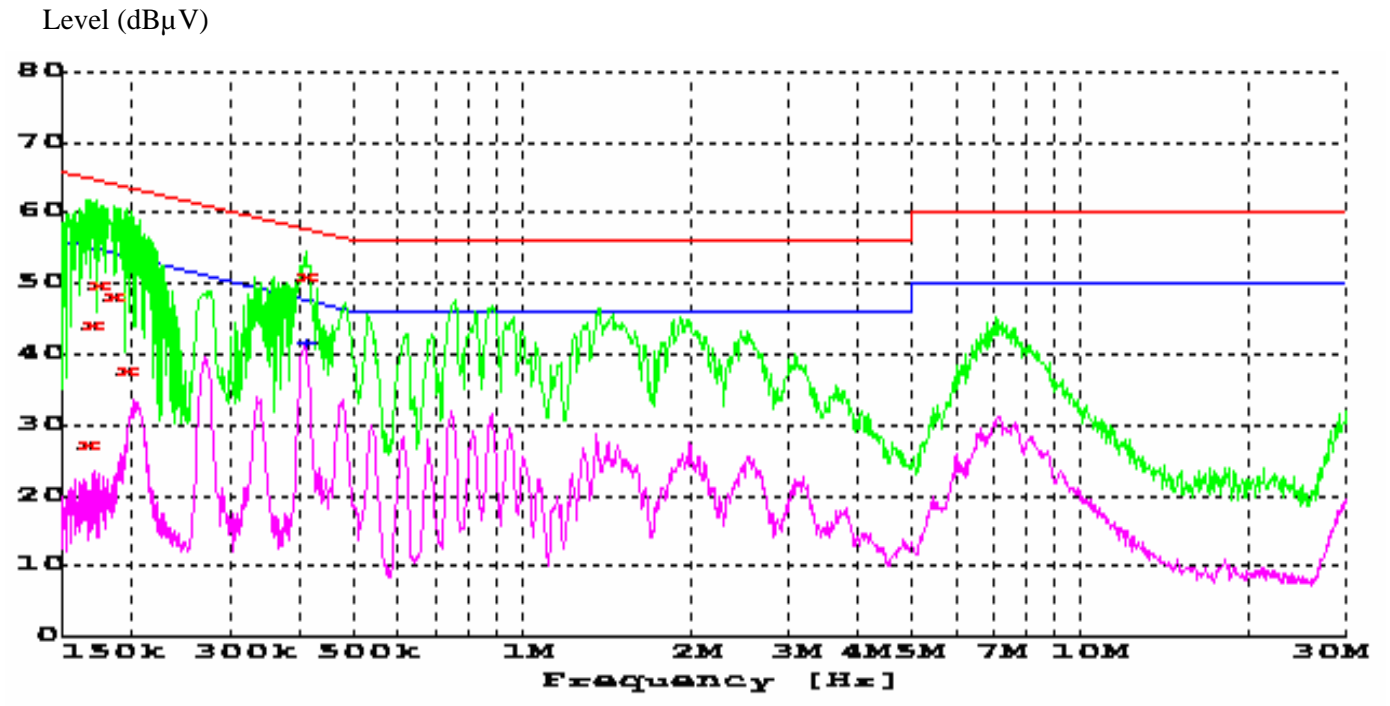
Frequency (MHz)	Level (dB $\mu$ V)	Transd (dB)	Limit (dB $\mu$ V)	Margin (dB)	Line (L/N)	PE
0.173876	49.6	9.9	65	15.4	L1	FLO
0.185344	48.1	9.9	64	15.9	L1	FLO
0.410192	51	9.9	58	7.0	L1	FLO
0.15799	46.5	9.9	66	19.5	N	FLO
0.160533	46.5	9.9	65	18.5	N	FLO
0.16182	43.6	9.9	65	21.4	N	FLO

**Measurement Results: Average Detector**

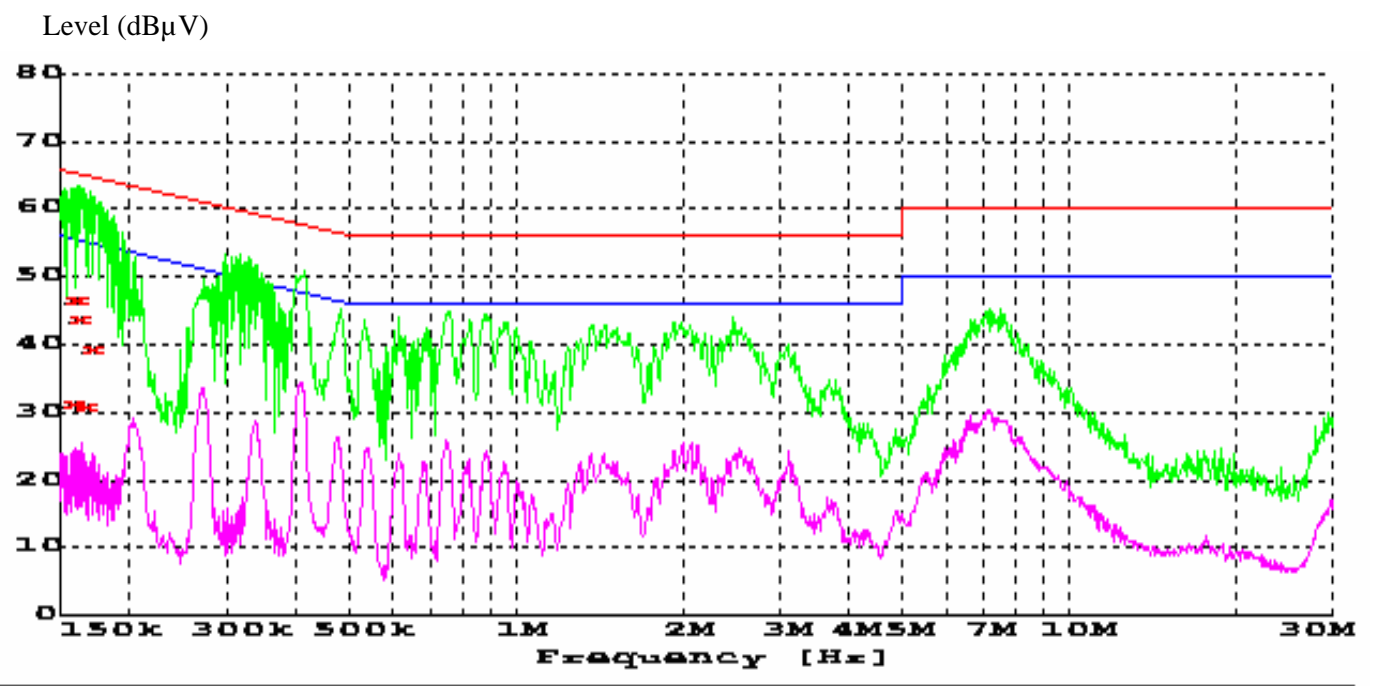
Frequency (MHz)	Level (dB $\mu$ V)	Transd (dB)	Limit (dB $\mu$ V)	Margin (dB)	Line (L/N)	PE
0.408557	41.20	9.9	48	6.8	L1	FLO

For measurement results refer to follows:

Conducted Disturbance at AC port measurements were undertaken on the L



Conducted Disturbance at AC port measurements were undertaken on the N



## §15.109 –Radiated Emission of Enclosure

### Applicable Standard

CFR47(FCC) Part 15.109

### Test limits

The Radiated Emission of enclosure of EUT should compliance with the requirement of part15.109. The limit showed in following table.

Frequency of Emission (MHz)	Radiated Limit	
	Unit( $\mu\text{V}/\text{m}$ )	Unit( $\text{dB}\mu\text{V}/\text{m}$ )
30-88	100	40
88-216	150	43.5
216-960	200	46
960-1000	500	54

### Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4(2003). The test distance was 3m. The EUT was set-up on insulator 0.8m above the Metallic Turntable

The radiated disturbance measurements were made using a Rohde and Schwarz ESI Test Receiver and control software ES-K1.

A preliminary scan and a final scan of the emissions were made form 30MHz to 1GHz by using test script of software; the emissions were measurement using a Quasi-Peak detector. The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was  $0^\circ$  to  $360^\circ$ . The receive antenna has two polarizations V and H.

The ZTE Mobile Phone C336 was communicated with the Universal radio communication tester through Air interface, the Universal radio communication tester controls the C336 to transmitter the maximum power which defined in specification of product. The Mobile Phone operated on the typical channel.

Measurement bandwidth (RBW) for 30MHz to 1000 MHz: 120 kHz.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Cal. Date
R&S	EMI Test Receiver 20Hz~26.5GHz	ESI26	100058	2007-10-25
R&S	Log periodic Antenna 30~3000MHz	HL562	100022	2007-3-7
R&S	Cable Set Up to 18Ghz	RF Cable	N/A	N/A
Albatross	Anechoic Chamber 3m site	3m site	N/A	2007-5-14
R&S	Software	ES-K1	N/A	N/A
Agilent	Universal radio communication tester	8960	GB42431673	2007-01-18

**Environmental Conditions**

Temperature:	22.5° C
Relative Humidity:	57%
ATM Pressure:	1016mbar

\* The testing was performed by guan bin on 2007-10-23

**Test Results**

Worst case reading as follows:

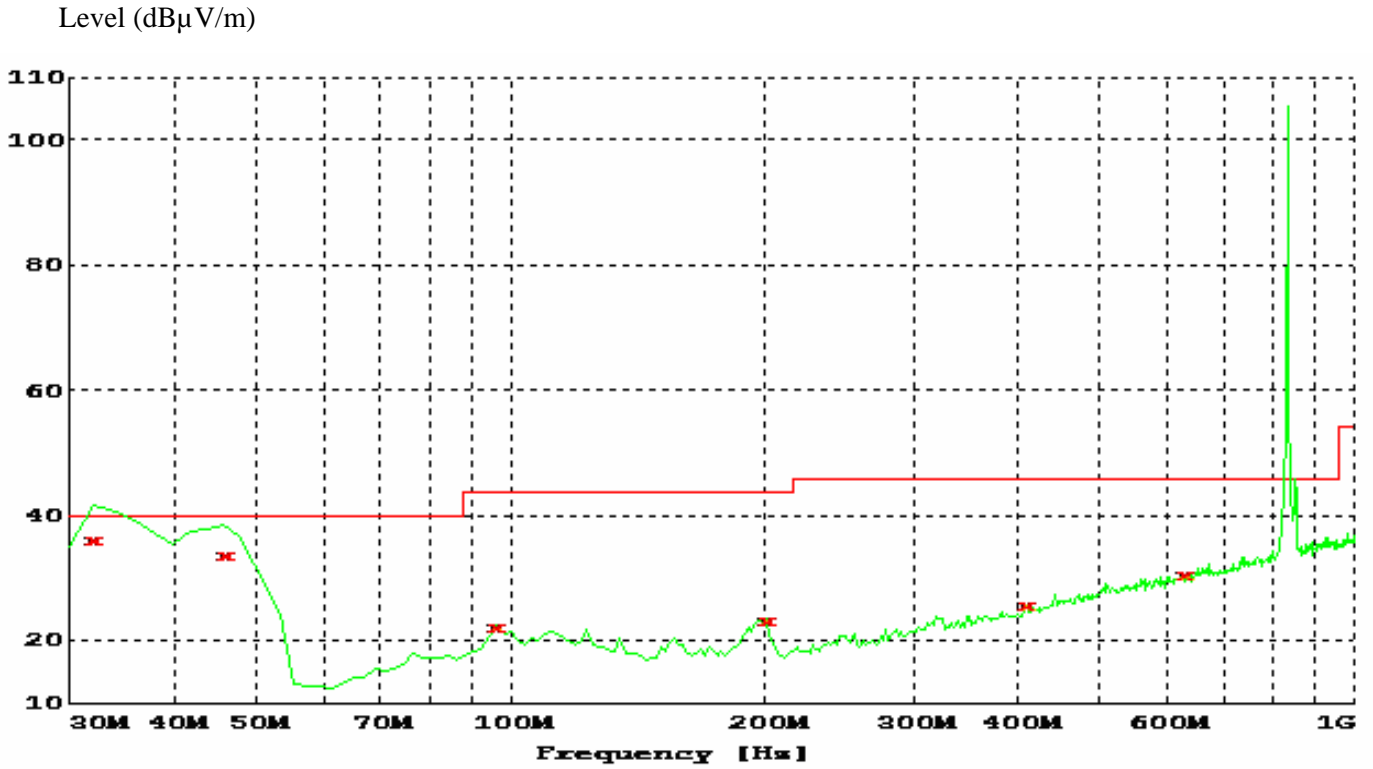
4 dB at 32.02 MHz

**Measurement Results: Quasi-Peak Detector**

Frequency (MHz)	Level (dBμV/m)	Azimuth Deg	Height (cm)	Polarization (H/V)	Transd (dB)	Limit (dBμV/m)	Margin (dB)
32.02	36.02	137	100	VER	-6.6	40	4
45.835671	33.58	101	100	VER	-15.3	40	6.5
632.60521	30.42	307	100	VER	-3.3	46	15.6
30	26.57	240	200	HOR	-5.6	40	13.4
197.174349	24.29	95	200	HOR	-16.1	43.5	19.2
584.008016	30.95	283	100	HOR	-4.2	46	15

For measurement results refer to follows:

The polarizations of receive antenna polarizations is Vertical



The polarizations of receive antenna polarizations is Horizontal

