



Part 24

TEST REPORT

Product Name	GSM Wireless Phone
Model Name	ZTE WP659+/ ZTE WP659PLUS
Brand Name	ZTE
FCC ID	SRQ-ZTEWP659PLUS
Applicant	ZTE CORPORATION
Manufacturer	ZTE CORPORATION
Date of issue	May 19, 2015

TA Technology (Shanghai) Co., Ltd.

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GENERAL SUMMARY

Reference Standard(s)	<p>FCC CFR47 Part 2 (2013) Frequency Allocations And Radio Treaty Matters; General Rules And Regulations</p> <p>FCC CFR47 Part 24E (2013) Personal Communications Services</p> <p>ANSI/TIA-603-C(2004) Land mobile FM or PM Communications Equipment Measurements and Performance Standards.</p> <p>KDB 971168 D01 Power Meas License Digital Systems v02r01 Measurement Guidance for Certification of Licensed Digital Transmitters</p>
Conclusion	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: Pass</p>
Comment	<p>The test result only responds to the measured sample.</p>

Approved by Kai Xu
Kai Xu
Director

Revised by Lingling Kang
Lingling Kang
RF Manager

Performed by Peng Tao
Peng Tao
RF Engineer

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1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. The sample under test was selected by the Client. This report only refers to the item that has undergone the test.

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of **TA Technology (Shanghai) Co., Ltd.**

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1.2. Testing laboratory

Company: TA Technology (Shanghai) Co., Ltd.
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1.3. Applicant Information

Company: ZTE CORPORATION
Address: ZTE Plaza, Keji Road South, Shenzhen, China

1.4. Manufacturer Information

Company: ZTE CORPORATION
Address: ZTE Plaza, Keji Road South, Shenzhen, China

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1.5. Information of EUT

General information

Product Name:	GSM Wireless Phone		
Product IMEI:	/		
Hardware Version:	WP659+ REV: V/1		
Software Version:	QX_XX_WP659+X.X.XBXX		
Antenna Type:	External Antenna		
Device Operating Configurations:			
Test Mode(s):	GSM1900;		
Test Modulation:	(GSM)GMSK;		
Maximum E.I.R.P.	GSM 1900: 32.86 dBm		
Power Supply:	Battery or Charger		
Rated Power Supply Voltage:	3.7V		
Extreme Voltage:	Minimum: 3.5V Maximum: 4.2V		
Extreme Temperature:	Lowest: -30°C Highest: +50°C		
Test Channel: (Low - Middle - High)	512 - 661 - 810 (GSM 1900)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8

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Auxiliary equipment details

Name	Model	Capacity	Manufacturer	SN
Battery	L1423450AR	600mAh	/	/

1.6. Test Date

The test is performed from May 14, 2015 to May 16, 2015.

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2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC rules	Verdict
1	Effective Isotropic Radiated power	24.232	PASS
2	Radiates Spurious Emission	2.1053 / 24.238	PASS

PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.

2.2. Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The measurement procedures in TIA- 603C are used.

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;
UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

P_s (dBm) : Input power to substitution antenna.

G_s (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

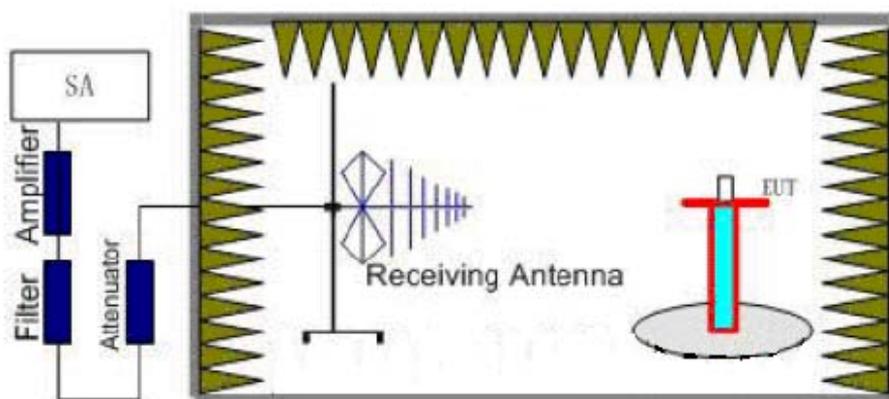
$E_s = R_s + AF$

AF (dB/m) : Receive antenna factor

R_t : The highest received signal in spectrum analyzer for EUT.

R_s : The highest received signal in spectrum analyzer for substitution antenna.

Test Setup



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Limits

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts EIRP. Peak power" and Rule Part 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage".

Limit (EIRP)	$\leq 2\text{ W}$ (33 dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 1.19\text{ dB}$

Test Results: Pass

GSM1900					
Horizontal Polarization					
Frequency(MHz)	Rt(dBm)	Rs(dBm)	Ps(dBm)	Gs(dBi)	EIRP(dBm)
1850.2	-22.52	-53.21	0	1.92	32.61
1880	-22.58	-53.42	0	1.94	32.78
1909.8	-22.71	-53.67	0	1.90	32.86
Vertical Polarization					
Frequency(MHz)	Rt(dBm)	Rs(dBm)	Ps(dBm)	Gs(dBi)	EIRP(dBm)
1850.2	-25.96	-53.70	0	1.92	29.66
1880	-25.78	-53.91	0	1.94	30.07
1909.8	-25.58	-54.55	0	1.90	30.87

2.3. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

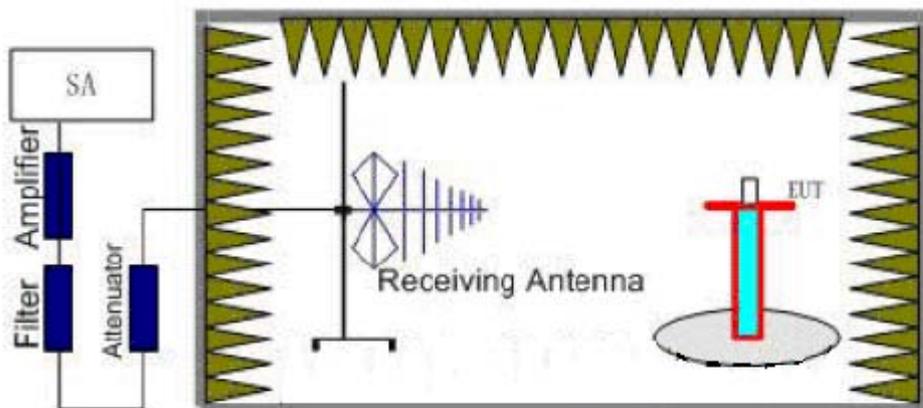
The measurements procedures in TIA -603C are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The procedure of Radiates Spurious Emission is as follows:

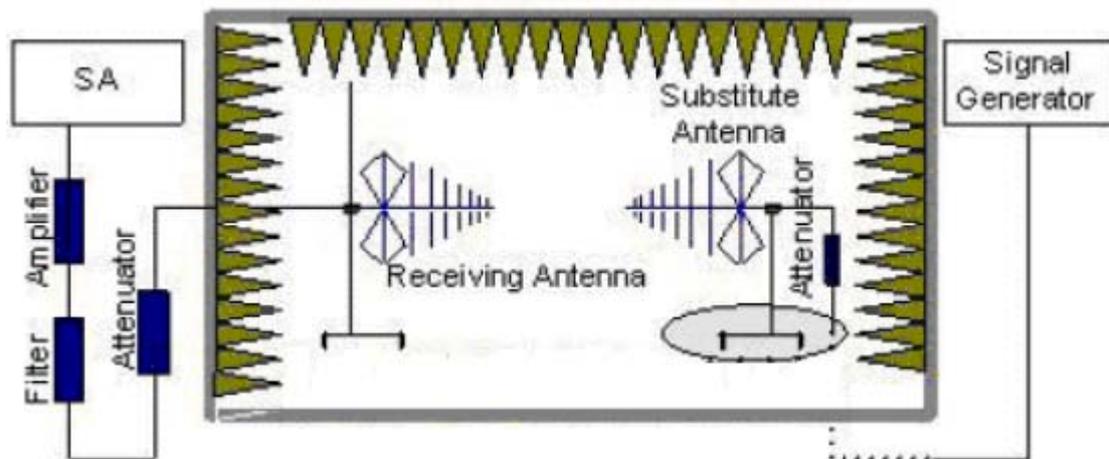
Step 1:

The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 1.5 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:

A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL). Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



$E.R.P$ (peak power) = S.G. - Tx Cable loss + Substitution antenna gain - 2.15.
 $EIRP = E.R.P + 2.15$

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), The worst emission was found in position (Z axis, vertical polarization) and the worst case was recorded.

Of those disturbances below (limit - 20 dB), the mark is not required for the EUT.

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

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Test Result

GSM 1900 CH 512

Harmonic	TX ch.512 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.4	-54.02	2	10.15	Vertical	-48.02	-13	35.33	180
3	5550.6	-53.1	2.51	11.35	Vertical	-46.41	-13	33.32	135
4	7400.8	-60.38	4.2	10.85	Vertical	-55.88	-13	42.80	90
5	9251	-58.25	5.2	11.35	Vertical	-54.25	-13	41.25	180
6	11101.2	-58.09	5.5	11.95	Vertical	-53.79	-13	40.70	270
7	12951.0	-60.5	5.7	13.55	Vertical	-54.80	-13	16.57	90
8	14801.6	-55.06	6.3	13.75	Vertical	-49.76	-13	36.49	180
9	16651.8	-45.64	6.8	13.85	Vertical	-40.74	-13	27.82	90
10	18502	-43.46	6.9	14.25	Vertical	-38.26	-13	25.14	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

GSM 1900 CH 661

Harmonic	TX ch.661 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-56.16	2	10.75	Vertical	-49.56	-13	36.86	0
3	5640	-52.22	2.51	11.05	Vertical	-45.83	-13	32.80	90
4	7520	-58.47	4.2	11.15	Vertical	-53.67	-13	40.76	180
5	9400	-60.54	5.2	11.15	Vertical	-56.74	-13	43.82	270
6	11280	-58.82	5.5	11.95	Vertical	-54.52	-13	41.59	0
7	13159.9	-56.89	5.7	13.55	Vertical	-51.19	-13	17.16	90
8	15040	-53.11	6.3	13.75	Vertical	-47.81	-13	34.94	90
9	16920	-44.59	6.8	13.85	Vertical	-39.69	-13	26.58	0
10	18800	-42.38	6.9	14.25	Vertical	-37.18	-13	24.10	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

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GSM 1900 CH 810

Harmonic	TX ch.810 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819.6	-56.45	2	10.15	Vertical	-50.45	-13	37.43	180
3	5729.4	-55.89	2.51	11.05	Vertical	-49.50	-13	36.56	270
4	7639.2	-60.28	4.2	11.15	Vertical	-55.48	-13	42.42	0
5	9549	-60.64	5.2	11.15	Vertical	-56.84	-13	43.80	180
6	11458.8	-59.86	5.5	11.95	Vertical	-55.56	-13	42.67	90
7	13369.1	-58.37	5.7	13.55	Vertical	-52.67	-13	15.89	270
8	15278.4	-52.15	6.3	13.75	Vertical	-46.85	-13	33.94	90
9	17188.2	-48.02	6.8	13.85	Vertical	-43.12	-13	30.00	0
10	19098	-43.62	6.9	14.25	Vertical	-38.42	-13	25.02	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time	Valid Period
01	Signal Generator	SMR27	R&S	100365	2014/5/26	2015-05-25	1 year
02	Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2014-05-26	2015-05-25	1 year
03	Signal Analyzer	FSV30	R&S	100815	2014-05-26	2015-05-25	1 year
04	Horn Antenna	HF907	R&S	100126	2012-07-01	2015-06-30	3 years
05	Horn Antenna	HF907	R&S	100125	2012-07-01	2015-06-30	3 years
06	Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-201	2012-06-19	2015-06-18	3 years
07	Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-391	2012-06-19	2015-06-18	3 years
08	RF Cable	SMA 15cm	Agilent	0001	2015-04-08	2015-06-07	Two months

*****END OF REPORT *****

ANNEX A: EUT Appearance and Test Setup

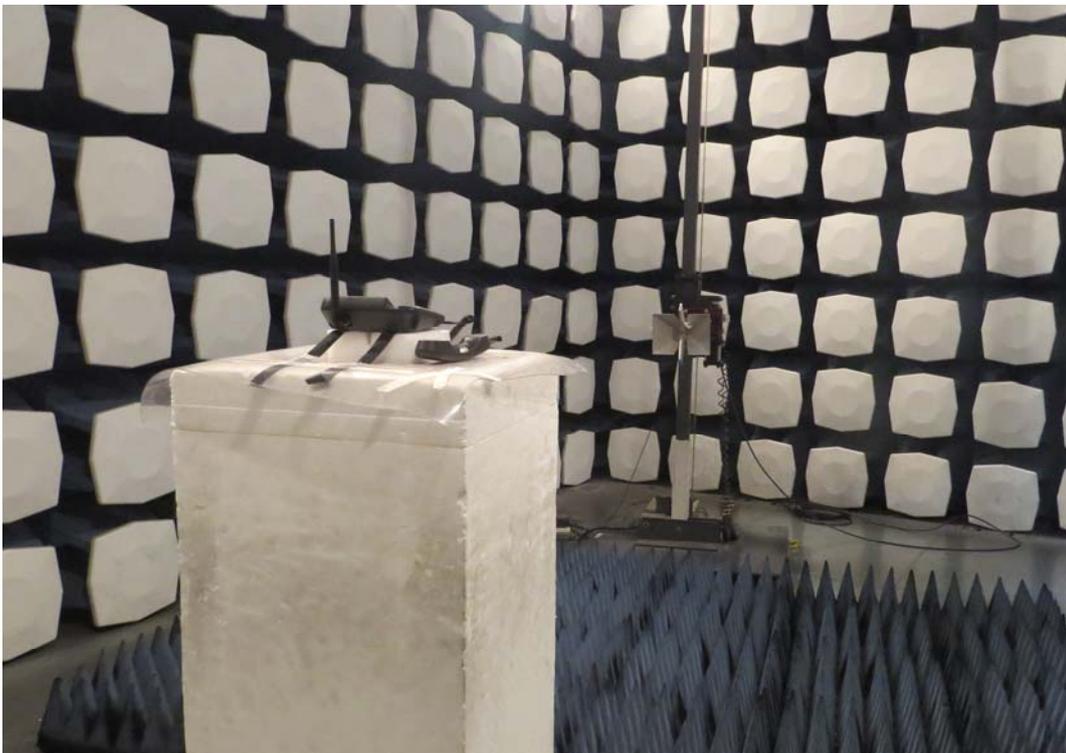
A.1 EUT Appearance



a: EUT

Picture 1 EUT and Auxiliary

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup