RF Exposure Evaluation Report

APPLICANT	**:**	**ZTE CORPORATION**
EQUIPMENT	**:**	**WCDMA/LTE CPE**
BRAND NAME	**:**	**ZTE**
MODEL NAME	**:**	**MF279**
FCC ID	**:**	**SRQ-MF279**
STANDARD	**:**	**47 CFR Part 2.1091**

We, Sporton International (KunShan) INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of Sporton International (KunShan) INC., the test report shall not be reproduced except in full.

Mark Qu

Reviewed by: Mark Qu / Manager

Jones Tsai

Approved by: Jones Tsai / Manager

Sporton International (KunShan) INC.
No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA762107	Rev. 01	Initial issue of report	Sep. 15, 2017

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	Sporton International (KunShan) INC.
Test Site Location	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958

Applicant	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

Manufacturer	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

2. Description of Equipment Under Test (EUT)

<table>
<tr><th colspan="2">Product Feature & Specification</th></tr>
<tr><td>EUT Type</td><td>WCDMA/LTE CPE</td></tr>
<tr><td>Brand Name</td><td>ZTE</td></tr>
<tr><td>Model Name</td><td>MF279</td></tr>
<tr><td>FCC ID</td><td>SRQ-MF279</td></tr>
<tr><td>IMEI Code</td><td>990008890000974</td></tr>
<tr><td>Wireless Technology and Frequency Range</td><td>WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
WCDMA Band V: 826.4 MHz ~ 846.6 MHz
LTE Band 2: 1850.7 MHz ~ 1909.3 MHz
LTE Band 4: 1710.7 MHz ~ 1754.3 MHz
LTE Band 5: 824.7 MHz ~ 848.3 MHz
LTE Band 12: 699.7 MHz ~ 715.3 MHz
LTE Band 30 : 2307.5 MHz ~2312.5 MHz
WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz
WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz
WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz</td></tr>
<tr><td>Mode</td><td>AMR/RMC 12.2Kbps
HSDPA
HSUPA
HSPA+ (16QAM uplink is not supported)
LTE: QPSK, 16QAM
WLAN 2.4GHz 802.11b/g/n HT20/HT40
WLAN 5GHz 802.11a/n HT20/HT40
WLAN 5GHz 802.11ac VHT20/VHT40/VHT80</td></tr>
<tr><td>Antenna Type</td><td>WWAN: PIFA Antenna
WLAN: PIFA Antenna</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><td></td><td>Ant.1</td><td>Ant.2</td></tr>
<tr><td>802.11 a/b/g/n/ac SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n/ac MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
<tr><td>HW Version</td><td>dqfA</td></tr>
<tr><td>SW Version</td><td>EN_ZTE_MF279V0.0.0B02</td></tr>
<tr><td>EUT Stage</td><td>Identical Prototype</td></tr>
<tr><td colspan="2">Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.</td></tr>
</table>

3. Maximum RF average output power among production units

<WCDMA>

Mode	Average Power (dBm)	
	WCDMA Band V	WCDMA Band II
AMR 12.2Kbps	24.50	24.50
RMC 12.2Kbps	24.50	24.50
HSDPA Subtest-1	23.00	23.50
HSDPA Subtest-2	23.00	23.50
HSDPA Subtest-3	22.50	23.00
HSDPA Subtest-4	22.50	23.00
HSUPA Subtest-1	23.00	23.50
HSUPA Subtest-2	21.00	21.50
HSUPA Subtest-3	22.00	22.50
HSUPA Subtest-4	21.00	21.50
HSUPA Subtest-5	23.00	23.50

<LTE>

Average Power (dBm)								
Modulation	BW (MHz)	RB Size	Target MPR	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 12	LTE Band 30
QPSK	20	≤ 18	0	25.00	25.00	-	-	-
QPSK	20	> 18	0-1	24.00	24.00	-	-	-
16QAM	20	≤ 18	0-1	24.00	24.00	-	-	-
16QAM	20	> 18	0-2	23.00	23.00	-	-	-
QPSK	15	≤ 16	0	25.00	25.00	-	-	-
QPSK	15	> 16	0-1	24.00	24.00	-	-	-
16QAM	15	≤ 16	0-1	24.00	24.00	-	-	-
16QAM	15	> 16	0-2	23.00	23.00	-	-	-
QPSK	10	≤ 12	0	25.00	25.00	24.00	23.00	23.00
QPSK	10	> 12	0-1	24.00	24.00	23.00	22.00	22.00
16QAM	10	≤ 12	0-1	24.00	24.00	23.00	22.00	22.00
16QAM	10	> 12	0-2	23.00	23.00	22.00	21.00	21.00
QPSK	5	≤ 8	0	25.00	25.00	24.00	23.00	23.00
QPSK	5	> 8	0-1	24.00	24.00	23.00	22.00	22.00
16QAM	5	≤ 8	0-1	24.00	24.00	23.00	22.00	22.00
16QAM	5	> 8	0-2	23.00	23.00	22.00	21.00	21.00
QPSK	3	≤ 4	0	25.00	25.00	24.00	23.00	-
QPSK	3	> 4	0-1	24.00	24.00	23.00	22.00	-
16QAM	3	≤ 4	0-1	24.00	24.00	23.00	22.00	-
16QAM	3	> 4	0-2	23.00	23.00	22.00	21.00	-
QPSK	1.4	≤ 5	0	25.00	25.00	24.00	23.00	-
QPSK	1.4	> 5	0-1	24.00	24.00	23.00	22.00	-
16QAM	1.4	≤ 5	0-1	24.00	24.00	23.00	22.00	-
16QAM	1.4	> 5	0-2	23.00	23.00	22.00	21.00	-

Remark: The mark "-" in gray means that this bandwidth is not supported.

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>SRQ-MF279</td></tr>
<tr><td>EUT</td><td>WCDMA/LTE CPE</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>LTE Band 2: 1850.7 MHz ~ 1909.3 MHz
LTE Band 4: 1710.7 MHz ~ 1754.3 MHz
LTE Band 5: 824.7 MHz ~ 848.3 MHz
LTE Band 12: 699.7 MHz ~ 715.3 MHz
LTE Band 30 : 2307.5 MHz ~2312.5 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, k20MHz
LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 30: 5MHz, 10MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK, and 16QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Voice and Data</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.</td></tr>
</table>

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711
LTE Band 30				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	27685	2307.5	27710	2310
M	27710	2310		
H	27735	2312.5		

<2.4GHz WLAN>

Frequency	Mode	Maximum Average Power (dBm)		
		Ant.1	Ant.2	Ant.1+2
WLAN 2.4GHz	802.11b	18.00	17.50	-
	802.11g	16.00	16.00	-
	802.11n-HT20	15.00	15.00	18.00
	802.11n-HT40	15.00	15.00	18.00

Remark: The mark "-" in gray means that this configuration is not supported.

<5GHz WLAN>

Frequency	Mode	Maximum Average Power (dBm)		
		Ant.1	Ant.2	Ant.1+2
WLAN 5.2GHz	802.11a	16.50	16.50	-
	802.11n-HT20/802.11ac VHT20	15.00	15.00	18.00
	802.11n-HT40/802.11ac VHT40	15.50	15.50	16.50
	802.11ac VHT80	13.50	13.50	16.50
WLAN 5.8GHz	802.11a	16.50	16.50	-
	802.11n-HT20/802.11ac VHT20	15.00	15.00	18.00
	802.11n-HT40/802.11ac VHT40	15.50	15.50	16.50
	802.11ac VHT80	13.50	13.50	16.50

Remark: The mark "-" in gray means that this configuration is not supported.

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
WCDMA Band V	826.4	-0.50	24.50	24.00	0.25	251.19	0.050	0.551	**0.091**
WCDMA Band II	1852.4	1.50	24.50	26.00	0.40	398.11	0.079	1.000	0.079
LTE Band 2	1850.7	1.50	25.00	26.50	0.45	446.68	0.089	1.000	0.089
LTE Band 4	1710.7	1.50	25.00	26.50	0.45	446.68	0.089	1.000	0.089
LTE Band 5	824.7	-0.50	24.00	23.50	0.22	223.87	0.045	0.550	0.081
LTE Band 12	699.7	-0.50	23.00	22.50	0.18	177.83	0.035	0.466	0.076
LTE Band 30	2307.5	1.50	23.00	24.50	0.28	281.84	0.056	1.000	0.056
WLAN2.4GHz 802.11b Ant.1	2412	2.00	18.00	20.00	0.10	100.00	0.020	1.000	**0.020**
WLAN2.4GHz 802.11g Ant.1	2412	2.00	16.00	18.00	0.06	63.10	0.013	1.000	0.013
WLAN2.4GHz 802.11n-HT20 Ant.1	2412	2.00	15.00	17.00	0.05	50.12	0.010	1.000	0.010
WLAN2.4GHz 802.11n-HT40 Ant.1	2422	2.00	15.00	17.00	0.05	50.12	0.010	1.000	0.010
WLAN2.4GHz 802.11b Ant.2	2412	2.10	17.50	19.60	0.09	91.20	0.018	1.000	0.018
WLAN2.4GHz 802.11g Ant.2	2412	2.10	16.00	18.10	0.06	64.57	0.013	1.000	0.013
WLAN2.4GHz 802.11n-HT20 Ant.2	2412	2.10	15.00	17.10	0.05	51.29	0.010	1.000	0.010
WLAN2.4GHz 802.11n-HT40 Ant.2	2422	2.10	15.00	17.10	0.05	51.29	0.010	1.000	0.010
WLAN2.4GHz 802.11n-HT20 Ant.1+2	2412	2.10	18.00	20.10	0.10	102.33	0.020	1.000	0.020
WLAN2.4GHz 802.11n-HT40 Ant.1+2	2422	2.10	18.00	20.10	0.10	102.33	0.020	1.000	0.020
WLAN5.2GHz 802.11a Ant.1	5180	2.40	16.50	18.90	0.08	77.62	0.015	1.000	0.015
WLAN5.2GHz 802.11n-HT20/ 802.11ac VHT20 Ant.1	5180	2.40	15.00	17.40	0.05	54.95	0.011	1.000	0.011
WLAN5.2GHz 802.11n-HT40/ 802.11ac VHT40 Ant.1	5190	2.40	15.50	17.90	0.06	61.66	0.012	1.000	0.012
WLAN5.2GHz 802.11ac VHT80 Ant.1	5210	2.40	13.50	15.90	0.04	38.90	0.008	1.000	0.008
WLAN5.2GHz 802.11a Ant.2	5180	2.30	16.50	18.80	0.08	75.86	0.015	1.000	0.015
WLAN5.2GHz 802.11n-HT20/ 802.11ac VHT20 Ant.2	5180	2.30	15.00	17.30	0.05	53.70	0.011	1.000	0.011
WLAN5.2GHz 802.11n-HT40/ 802.11ac VHT40 Ant.2	5190	2.30	15.50	17.80	0.06	60.26	0.012	1.000	0.012
WLAN5.2GHz 802.11ac VHT80 Ant.2	5210	2.30	13.50	15.80	0.04	38.02	0.008	1.000	0.008
WLAN5.2GHz 802.11n-HT20/ 802.11ac VHT20 Ant.1+2	5180	2.40	18.00	20.40	0.11	109.65	0.022	1.000	**0.022**
WLAN5.2GHz 802.11n-HT40/ 802.11ac VHT40 Ant.1+2	5190	2.40	16.50	18.90	0.08	77.62	0.015	1.000	0.015
WLAN5.2GHz 802.11ac VHT80 Ant.1+2	5210	2.40	16.50	18.90	0.08	77.62	0.015	1.000	0.015
WLAN5.8GHz 802.11a Ant.1	5745	2.50	16.50	19.00	0.08	79.43	0.016	1.000	0.016
WLAN5.8GHz 802.11n-HT20/ 802.11ac VHT20 Ant.1	5745	2.50	15.00	17.50	0.06	56.23	0.011	1.000	0.011
WLAN5.8GHz 802.11n-HT40/ 802.11ac VHT40 Ant.1	5755	2.50	15.50	18.00	0.06	63.10	0.013	1.000	0.013
WLAN5.8GHz 802.11ac VHT80 Ant.1	5775	2.50	13.50	16.00	0.04	39.81	0.008	1.000	0.008
WLAN5.8GHz 802.11a Ant.2	5745	2.50	16.50	19.00	0.08	79.43	0.016	1.000	0.016
WLAN5.8GHz 802.11n-HT20/ 802.11ac VHT20 Ant.2	5745	2.50	15.00	17.50	0.06	56.23	0.011	1.000	0.011
WLAN5.8GHz 802.11n-HT40/ 802.11ac VHT40 Ant.2	5755	2.50	15.50	18.00	0.06	63.10	0.013	1.000	0.013
WLAN5.8GHz 802.11ac VHT80 Ant.2	5775	2.50	13.50	16.00	0.04	39.81	0.008	1.000	0.008
WLAN5.8GHz 802.11n-HT20/ 802.11ac VHT20 Ant.1+2	5745	2.50	18.00	20.50	0.11	112.20	0.022	1.000	0.022
WLAN5.8GHz 802.11n-HT40/ 802.11ac VHT40 Ant.1+2	5755	2.50	16.50	19.00	0.08	79.43	0.016	1.000	0.016
WLAN5.8GHz 802.11ac VHT80 Ant.1+2	5775	2.50	16.50	19.00	0.08	79.43	0.016	1.000	0.016

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

5.2. Collocated Power Density Calculation

Power Density / Limit			Σ (Power Density / Limit) of WWAN+2.4GHz WLAN+5GHz WLAN
WWAN	2.4GHz WLAN	5GHz WLAN	
0.091	0.020	0.022	0.133

Note:

1. For colocation analysis, WCDMA Band V is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. ∑(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)].

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.