



MPE TEST REPORT

Applicant ZTE Corporation
FCC ID SRQ-MF293N
Product CPE
Model MF293N
Report No. R2109A0830-M1V1
Issue Date January 27, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	December 21, 2021
Rev.1	Update data.	January 27, 2022

Note: This revised report (Report No. R2109A0830-M1V1) supersedes and replaces the previously issued report (Report No. R2109A0830-M1). Please discard or destroy the previously issued report and dispose of it accordingly.

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City: Shanghai
Post code: 201201
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1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2 Description of Equipment under Test

Client Information

Applicant	ZTE Corporation
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
Manufacturer	ZTE Corporation
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

General Technologies

Model	MF293N
IMEI	863397050104476
Hardware Version	MF293N_HW1.0
Software Version	EN_ZTE_LMMF293NV1.0.0B01
Date of Sample Received:	September 27, 2021

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

2. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

3 Maximum conducted output power (measured) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by

$$\text{Numeric gain (G)} = 10^{(\text{antenna gain}/10)}$$

Band		Burst Tune up Power(dBm)	Division Factors (dB)	Time-Averaged Tune up Power (dBm)
GSM850	GSM	33.00	-9.03	23.97
GSM1900	GSM	31.50	-9.03	22.47

Note:

Division Factors

To average the power, the division factor is as follows:

1Txslot = 1 transmit time slot out of 8 time slots

=> conducted power divided by (8/1) => -9.03 dB

Band	Maximum Tune up Power		Antenna Gain (dBi)	Numeric gain
	(dBm)	(mW)		
GSM850	23.97	249.459	0.6	1.148
GSM1900	22.47	176.604	1.3	1.349
WCDMA Band 2	23.50	223.872	1.3	1.349
WCDMA Band 4	23.50	223.872	1.7	1.479
WCDMA Band 5	23.50	223.872	0.6	1.148
LTE Band 2	25.00	316.228	1.3	1.349
LTE Band 4	24.50	281.838	1.7	1.479
LTE Band 5	25.00	316.228	0.6	1.148
LTE Band 7	22.50	177.828	2.7	1.862
LTE Band 38	25.00	316.228	2.5	1.778
LTE Band 40	23.00	199.526	2.4	1.738
LTE Band 66	24.50	281.838	1.7	1.479
Wi-Fi 2.4G	22.00	158.489	2.2	1.660

4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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
3-30	1842/f	4.89/f	*(900/f ²)	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/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500 .....	.....	.....	f/1500	30
1500-100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



The maximum permissible exposure for 300~1500 MHz is $f/1500$, for 1500~100,000MHz is 1.0. So

Band	The maximum permissible exposure (mW/cm ²)
GSM850	0.549
GSM1900	1.000
WCDMA Band 2	1.000
WCDMA Band 4	1.000
WCDMA Band 5	0.549
LTE Band 2	1.000
LTE Band 4	1.000
LTE Band 5	0.549
LTE Band 7	1.000
LTE Band 38	1.000
LTE Band 40	1.000
LTE Band 66	1.000
Wi-Fi 2.4GHz	1.000

**RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Band	Antenna Gain (dBi)	Maximum tune up (dBm)	Maximum EIRP (dBm)	PG (mW)	Test Result (mW/cm ²)	Limit Value (mW/cm ²)	The MPE ratio
GSM850	0.6	23.97	24.570	286.418	0.057	0.549	0.104
GSM1900	1.3	22.47	23.770	238.232	0.047	1.000	0.047
WCDMA Band 2	1.3	23.50	24.800	301.995	0.060	1.000	0.060
WCDMA Band 4	1.7	23.50	25.200	331.131	0.066	1.000	0.066
WCDMA Band 5	0.6	23.50	24.100	257.040	0.051	0.549	0.093
LTE Band 2	1.3	25.00	26.300	426.580	0.085	1.000	0.085
LTE Band 4	1.7	24.50	26.200	416.869	0.083	1.000	0.083
LTE Band 5	0.6	25.00	25.600	363.078	0.072	0.549	0.132
LTE Band 7	2.7	22.50	25.200	331.131	0.066	1.000	0.066
LTE Band 38	2.5	25.00	27.500	562.341	0.112	1.000	0.112
LTE Band 40	2.4	23.00	25.400	346.737	0.069	1.000	0.069
LTE Band 66	1.7	24.50	26.200	416.869	0.083	1.000	0.083
Wi-Fi 2.4GHz	2.2	22.00	24.200	263.027	0.052	1.000	0.052
Note: R = 20cm $\pi = 3.1416$ The MPE ratio = Mac Test Result ÷ Limit Value							

So the simultaneous transmitting antenna pairs as below:

$$\sum \text{of MPE ratios} = \text{Main Antenna} + \text{Wi-Fi Antenna} = 0.132 + 0.052 = 0.184 < 1$$

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

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



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.