



# TEST REPORT

No. I15Z41308-EMC01

for

**ZTE CORPORATION**

**4G Wireless Router**

**Model Name: MF253M**

**FCC ID: SRQ-MF253MA**

with

**Hardware Version: MF253M.H01**

**Software Version: EN\_VIVO\_BR\_MF253MV1.0.1B02**

**Issued Date: 2015-07-06**

**Note:**

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 CTTL.

**Test Laboratory:**

**FCC 2.948 Listed: No. 525429**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I15Z41308-EMC01	Rev.0	1st edition	2015-07-06



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## 1. Test Laboratory

### 1.1. Testing Location

#### Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China  
100191

### 1.2. Testing Environment

Normal Temperature: 15-35 °C  
Relative Humidity: 20-75%

### 1.3. Project data

Testing Start Date: 2015-05-28  
Testing End Date: 2015-06-22

### 1.4. Signature



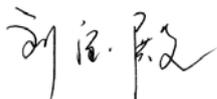
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## **2. Client Information**

### **2.1. Applicant Information**

Company Name: ZTE CORPORATION  
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### **2.2. Manufacturer Information**

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Telephone: +86 18616587757  
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### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	4G Wireless Router
Model Name	MF253M
FCC ID	SRQ-MF253MA
Extreme vol. Limits	3.2VDC to 3.6VDC (nominal: 3.3VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT.

#### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
EUT2	865461026007334	MF253M.H01	EN_VIVO_BR_MF253MV1.0.1B02

\*EUT ID: is used to identify the test sample in the lab internally.

#### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>	<b>Remarks</b>
AE1	Travel Charger	101406162891650	1541308CH004
AE2	Antenna	/	/
AE3	PC	/	/
AE4	Ethernet cable	/	/

AE1

Type	STC-A20120150C55-C
Manufacturer	Ruide Electronical Industrial Co., Ltd
Length of cable	150 cm

AE2

Type	/
Manufacturer	ZTE

AE3

Type	/
Manufacturer	/

AE4

Type	/
Manufacturer	/

\*AE ID: is used to identify the test sample in the lab internally.

#### **3.4. EUT set-ups**

<b>EUT set-up No.</b>	<b>Combination of EUT and AE</b>	<b>Remarks</b>
Set.1	EUT2 + AE1 + AE2 + AE3 + AE4	/

## **4. Reference Documents**

### **4.1. Reference Documents for testing**

The following documents listed in this section are referred for testing.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	10-1-13 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 6GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

**Shielded room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω



## 6. SUMMARY OF TEST RESULTS

<b>Abbreviations used in this clause:</b>		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

<b>Clause</b>	<b>List</b>	<b>Clause in FCC rules</b>	<b>Verdict</b>	<b>Location</b>
1	Radiated Emission	15.109(a)	P	1
2	Conducted Emission	15.107(a)	P	1



## 7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	EMI Antenna	VULB 9163	9163-301	Schwarzbeck	2017-12-16	3 Years
2.	Test Receiver	ESU26	100235	R&S	2016-03-02	1 Year
3.	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 Years
4.	Test Receiver	ESCI	100344	R&S	2016-03-03	1 Year
5.	LISN	ENV216	101200	R&S	2015-07-07	1 Year
6.	Universal Radio Communication Tester	CMU200	109914	R&S	2016-03-26	1 Year

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission (§15.109(a))**

#### **A.1.1 Method of measurement**

The field strength of radiated emissions from the unintentional radiator (USB mode of MS and charging mode of MS) at distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

#### **A.1.2 EUT Operating Mode:**

During the test EUT is connected to a PC via an Ethernet cable. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. Then ping the network address of the EUT continually.

#### **A.1.3 Measurement Limit**

Frequency range (MHz)	Field strength limit ( $\mu\text{V}/\text{m}$ )		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

#### **A.1.4 Test Condition**

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	15	Peak, Average

### A.1.5 Measurement Results

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + G_A + G_{\text{PL}}$$

Where

$G_A$ : Antenna factor of receive antenna

$G_{\text{PL}}$ : Path Loss

$P_{\text{Mea}}$ : Measurement result on receiver.

Measurement uncertainty (worst case):  $U = 4.3 \text{ dB}$ ,  $k=2$ .

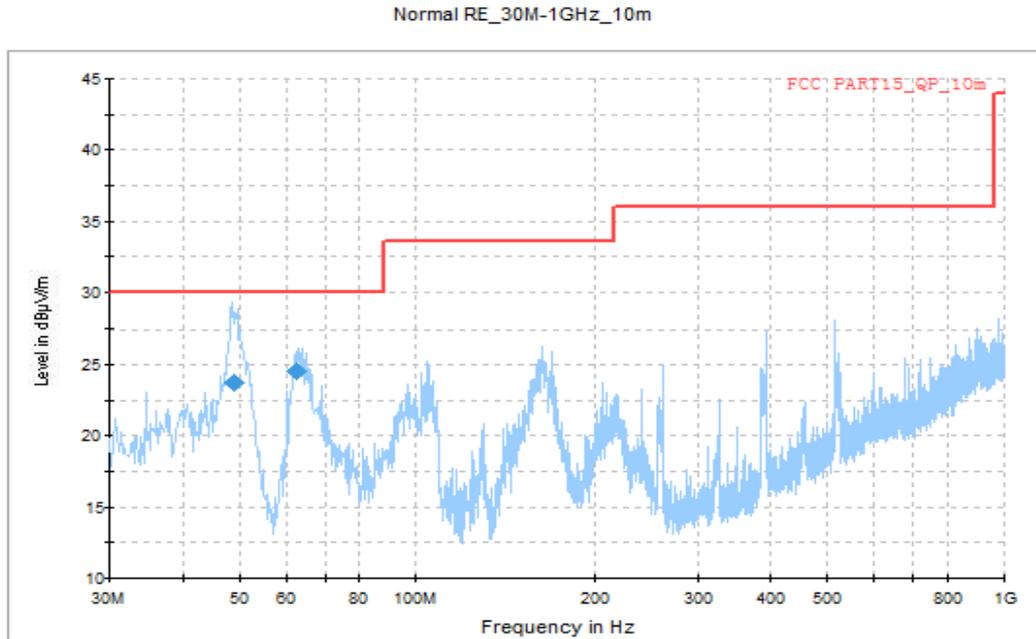
#### Measurement results:

##### Average detector

Frequency(MHz)	Result(dB $\mu$ V/m)	GPL (dB)	GA (dB/m)	PMea(dB $\mu$ V)	Polarity
17988.667	43.6	-17.7	45.6	15.700	H
17972.233	43.4	-17.7	45.6	15.500	H
17973.367	43.4	-17.7	45.6	15.500	V
17966.000	43.4	-17.7	45.6	15.500	H
17981.867	43.4	-17.7	45.6	15.500	H
17975.067	43.4	-17.7	45.6	15.500	H

##### Peak detector

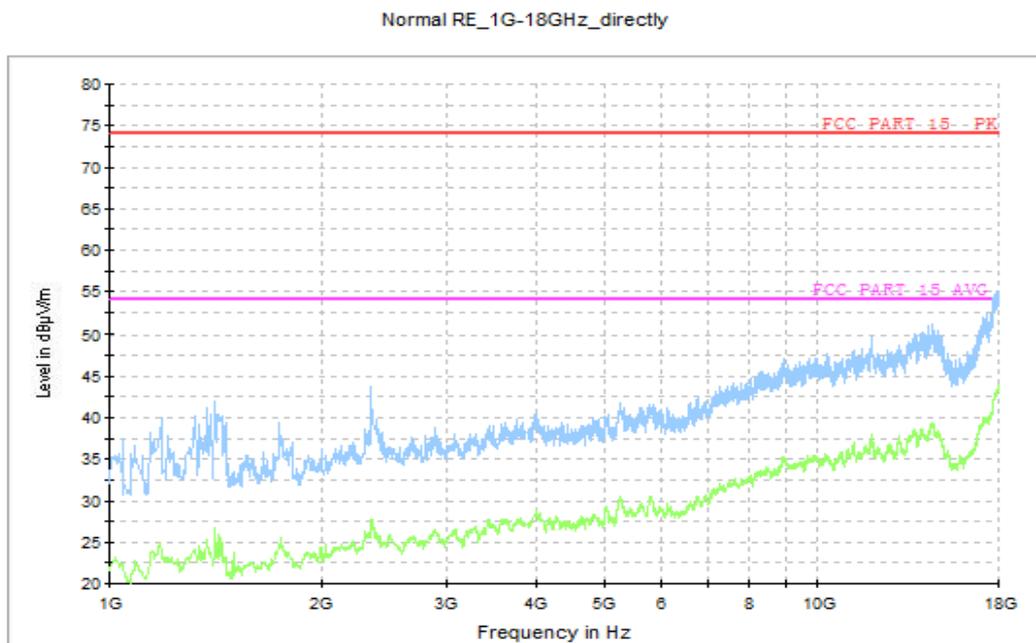
Frequency(MHz)	Result(dB $\mu$ V/m)	GPL (dB)	GA (dB/m)	PMea(dB $\mu$ V)	Polarity
17932.567	55.0	-17.7	45.6	27.100	H
17980.167	54.9	-17.7	45.6	27.000	H
17988.667	54.9	-17.7	45.6	27.000	V
17775.600	54.7	-18.5	45.6	27.600	H
17939.367	54.7	-17.7	45.6	26.800	H
17979.600	54.6	-17.7	45.6	26.700	H



**Fig.1 Radiated Emission from 30MHz to 1GHz**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
48.875500	23.8	125.0	V	30.0	-11.6	6.2	30.0
62.788500	24.6	175.0	V	90.0	-12.9	5.4	30.0



**Fig.2 Radiated Emission from 1GHz to 6GHz**

## A.2 Conducted Emission (§15.107(a))

### A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 7.2.

### A.2.2 EUT Operating Mode

During the test EUT is connected to a PC via an Ethernet cable. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. Then ping the network address of the EUT continually.

### A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency

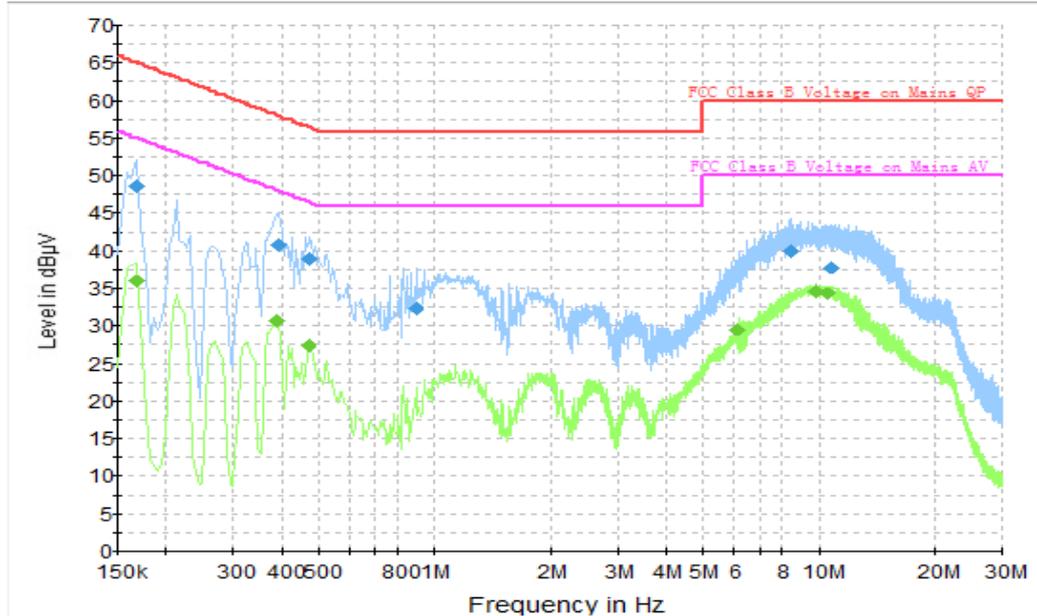
### A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

### A.2.5 Measurement Results

Measurement uncertainty:  $U= 2.9$  dB,  $k=2$ .



**Fig.3 Conducted Emission**

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.168000	48.7	2000.0	9.000	On	L1	19.7	16.4	65.1
0.393000	40.8	2000.0	9.000	On	L1	19.8	17.2	58.0
0.474000	38.9	2000.0	9.000	On	L1	19.8	17.5	56.4
0.892500	32.4	2000.0	9.000	On	N	19.7	23.6	56.0
8.407500	39.9	2000.0	9.000	On	N	19.8	20.1	60.0
10.702500	37.7	2000.0	9.000	On	L1	19.8	22.3	60.0

#### Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.168000	36.1	2000.0	9.000	On	L1	19.7	19.0	55.1
0.388500	30.6	2000.0	9.000	On	N	19.8	17.5	48.1
0.469500	27.4	2000.0	9.000	On	N	19.8	19.1	46.5
6.117000	29.5	2000.0	9.000	On	L1	19.7	20.5	50.0
9.789000	34.7	2000.0	9.000	On	L1	19.8	15.3	50.0
10.531500	34.3	2000.0	9.000	On	L1	19.8	15.7	50.0

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