



# Variant FCC RF Test Report

APPLICANT : ZTE CORPORATION  
EQUIPMENT : WCDMA, GSM(GPRS)Dual-Mode  
Digital Mobile Phone  
BRAND NAME : ZTE  
MODEL NAME : Z791G  
FCC ID : SRQ-Z791  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

This is a variant report which is only valid together with the original report. The product was received on Jan. 22, 2015 and testing was completed on Feb. 21, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



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## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 14.49 dB at 2483.500 MHz



# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

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

## 1.2 Manufacturer

**ZTE CORPORATION**

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

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	WCDMA, GSM(GPRS)Dual-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z791G
FCC ID	SRQ-Z791
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(DownlinkOnly)/ WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v2.1 + EDR/Bluetooth v4.0 LE
HW Version	wqpA
SW Version	Z791GV1.0.0B05
EUT Stage	Identical Prototype

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
<b>Tx/Rx Frequency Range</b>	2402 MHz ~ 2480 MHz
<b>Number of Channels</b>	79
<b>Carrier Frequency of Each Channel</b>	2402+n*1 MHz; n=0~78
<b>Antenna Type</b>	PIFA Antenna
<b>Type of Modulation</b>	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

### 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

### 1.6 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Registration No.</b>
	03CH01-KS	149928

**Note:** The test site complies with ANSI C63.4 2009 requirement.

### 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC Public Notice DA 00-705
- ♦ ANSI C63.10-2009

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



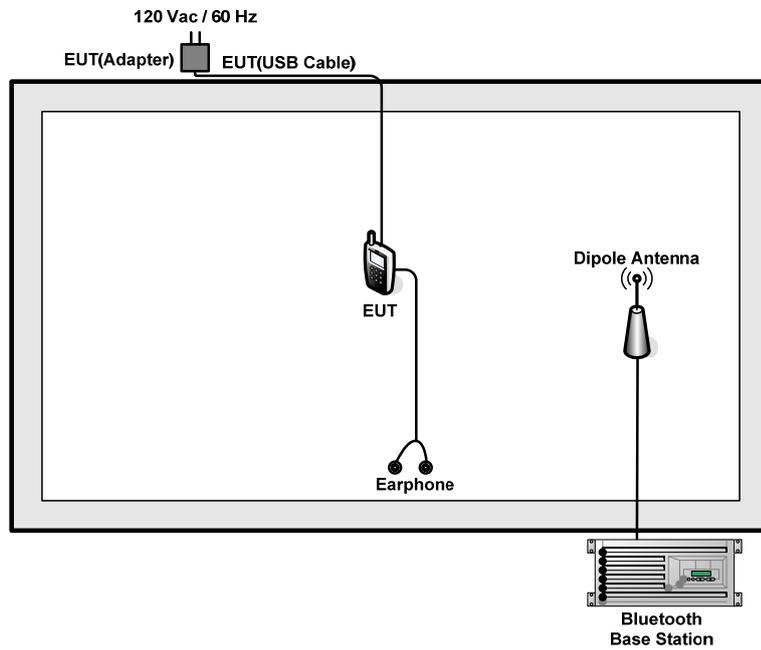
## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	Bluetooth BR 1Mbps GFSK
Radiated Test Cases	Mode 1 CH78_2480 MHz
<b>Remark:</b> For radiated test cases, the tests were performed with earphone, adapter and USB cable.	

## 2.2 Connection Diagram of Test System





### 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
2.	Earphone	Lenovo	SH100	N/A	N/A	N/A

### 2.4 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.



### 3 Test Result

#### 3.1 Radiated Band Edges and Spurious Emission Measurement

##### 3.1.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



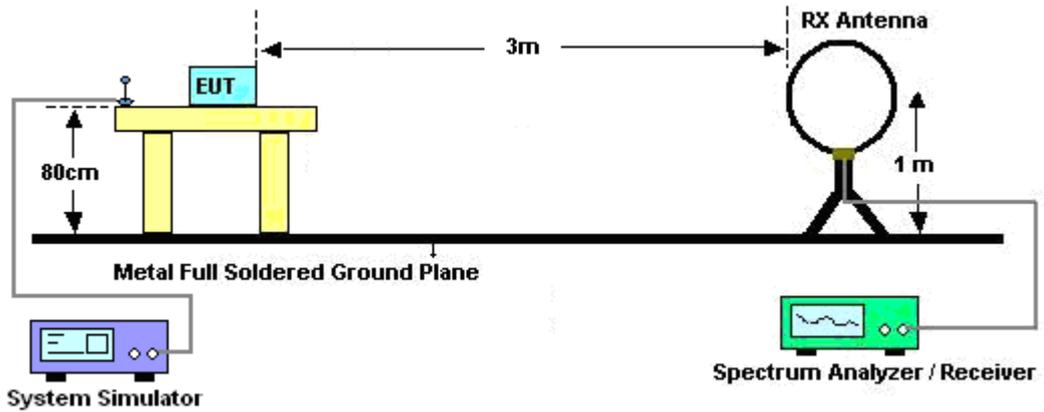
### 3.1.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 0.8 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1 \text{ GHz}$ , RBW=1MHz for  $f > 1\text{GHz}$  ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

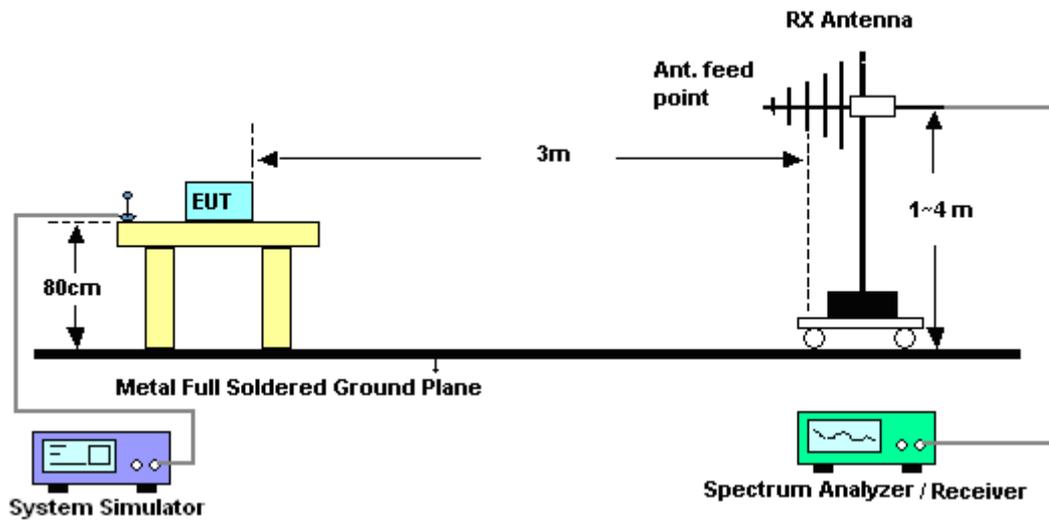
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from  $20 \log(\text{dwell time}/100\text{ms})$ . This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

### 3.1.4 Test Setup

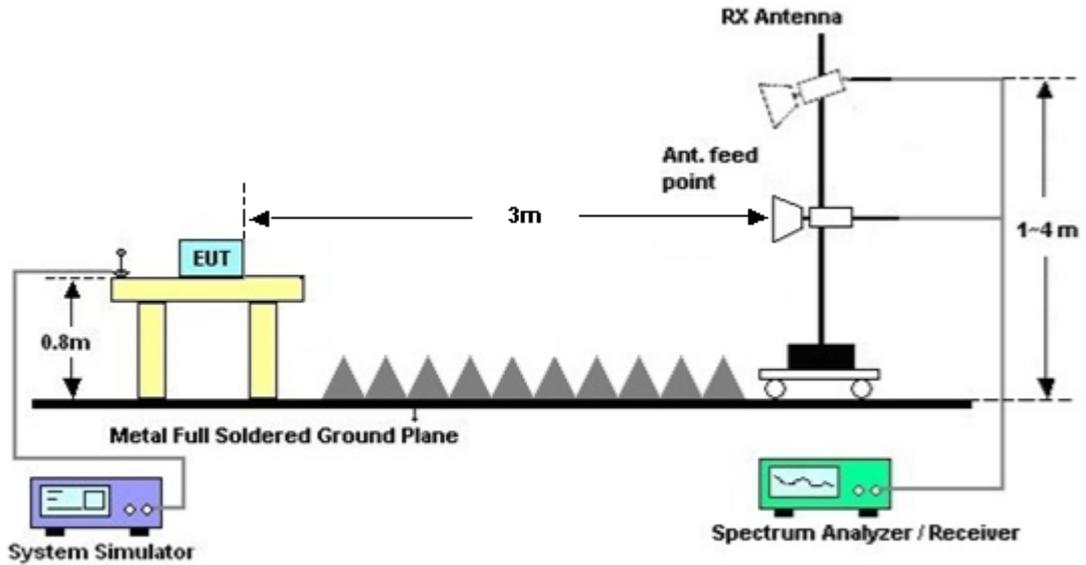
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



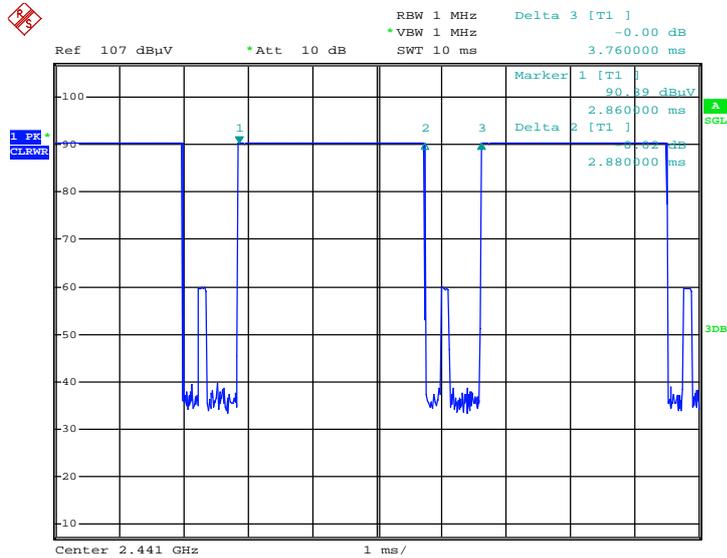
### 3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



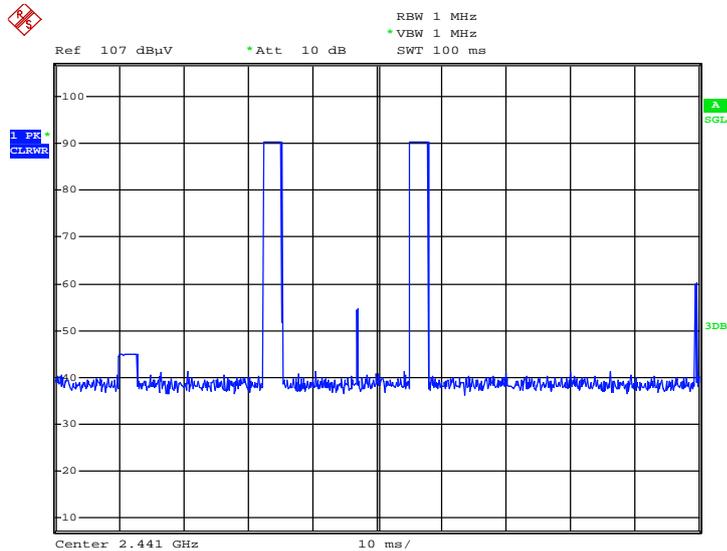
### 3.1.6 Duty cycle correction factor for average measurement

#### DH5 on time (One Pulse) Plot on Channel 39



Date: 21.FEB.2015 18:12:51

#### DH5 on time (Count Pulses) Plot on Channel 39



Date: 21.FEB.2015 18:18:54

#### Note:

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.



**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100\text{ms} / 57.6\text{ms}] = 2$  hops

Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100\text{ms}) = -24.79 \text{ dB}$$

**3.1.7 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix A.

**3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)**

Please refer to Appendix A.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 25, 2014	Feb. 21, 2015	Oct. 24, 2015	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Feb. 21, 2015	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Feb. 21, 2015	Nov. 12, 2015	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	25Mhz~2Ghz	Jan. 17, 2015	Feb. 21, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 17, 2015	Feb. 21, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Feb. 21, 2015	Nov. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Feb. 21, 2015	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz /32dB	May 04, 2014	Feb. 21, 2015	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Oct. 28, 2014	Feb. 21, 2015	Oct. 27, 2015	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Feb. 21, 2015	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 21, 2015	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 21, 2015	NCR	Radiation (03CH01-KS)



## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.5dB
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## Appendix A. Radiated Spurious Emission

15C 2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BT CH 78 2480MHz		2480.19	98.87	-	-	94.27	33.01	4.88	33.29	166	95	P	H
		2480.19	74.08	-	-	-	-	-	-	-	-	A	H
		2483.5	59.51	-14.49	74	54.91	33.01	4.88	33.29	166	95	P	H
		2483.5	34.72	-19.28	54	-	-	-	-	-	-	A	H
		2479.91	97.23	-	-	92.63	33.01	4.88	33.29	152	86	P	V
		2479.91	72.44	-	-	-	-	-	-	-	-	A	V
		2483.5	57.88	-16.12	74	53.28	33.01	4.88	33.29	152	86	P	V
		2483.5	33.09	-20.91	54	-	-	-	-	-	-	A	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



15C 2.4GHz 2400~2483.5MHz  
BT (Harmonic @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
BT CH 78 2480MHz		4959	47.06	-26.94	74	39.03	35.2	6.63	33.8	100	187	P	H
		7440	50.73	-23.27	74	40.36	36.27	8.28	34.18	100	147	P	H
		4959	46.86	-27.14	74	38.83	35.2	6.63	33.8	115	226	P	V
		7440	49.97	-24.03	74	39.6	36.27	8.28	34.18	133	269	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
2.4GHz BT LF		112.45	25.28	-18.22	43.5	46.1	11.8	0.99	33.61	100	100	P	H
		395.69	19.77	-26.23	46	35.34	15.91	1.83	33.31	-	-	P	H
		480.08	18.43	-27.57	46	32.72	16.87	2	33.16	-	-	P	H
		555.74	19.51	-26.49	46	31.88	18.51	2.13	33.01	-	-	P	H
		759.44	20.23	-25.77	46	30.6	19.89	2.5	32.76	-	-	P	H
		984.48	23	-31	54	31.55	21.01	2.87	32.43	-	-	P	H
		35.82	23.84	-16.16	40	42.26	14.65	0.55	33.62	166	29	P	V
		54.25	20.35	-19.65	40	46.76	6.49	0.68	33.58	-	-	P	V
		210.42	17.81	-25.69	43.5	40.51	9.49	1.35	33.54	-	-	P	V
		468.44	21.13	-24.87	46	35.74	16.59	1.98	33.18	-	-	P	V
		513.06	21.52	-24.48	46	35.13	17.47	2.03	33.11	-	-	P	V
		792.42	22.12	-23.88	46	32.36	19.86	2.54	32.64	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency per 15.209(c).
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
2412MHz													

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

**Both peak and average measured complies with the limit line, so test result is “PASS”.**



## Appendix C Product Change Description

**ZTE CORPORATION****Product Change Description**

As the applicant of the below model, [ZTE Corporation] declares that the product,

[Z791G]  
[ZTE Corporation]

is the variant of the initial certified product,

[Z791]  
[ZTE Corporation]

**SOFTWARE MODIFICATIONS:**

Protocol Stack changes: NO

MMS/STK changes: NO

JAVA changes: NO

Other changes detailed:

Changed the GPRS/EDGE class power 10.

AMR only support NB.

Software Version change from: MPCS\_Z791V1.0.0B04 to Z791GV1.0.0B05

**HARDWARE MODIFICATION:**

Band changes: NO

Power Amplifier changes: NO

Antenna changes: NO

PCB Layout changes: Yes,

Components on PCB changes: Yes, there is only small change on PCB so that make the new camera/SIM card socket/earphone compatible.

Hardware Version change from: wtjA to wqpA

LCD changes: NO

Speaker changes: NO

Camera changes: Yes, the camera is changed from FF to AF

Vibrator changes: NO

Bluetooth changes: NO

FM changes: NO

Other changes: Yes

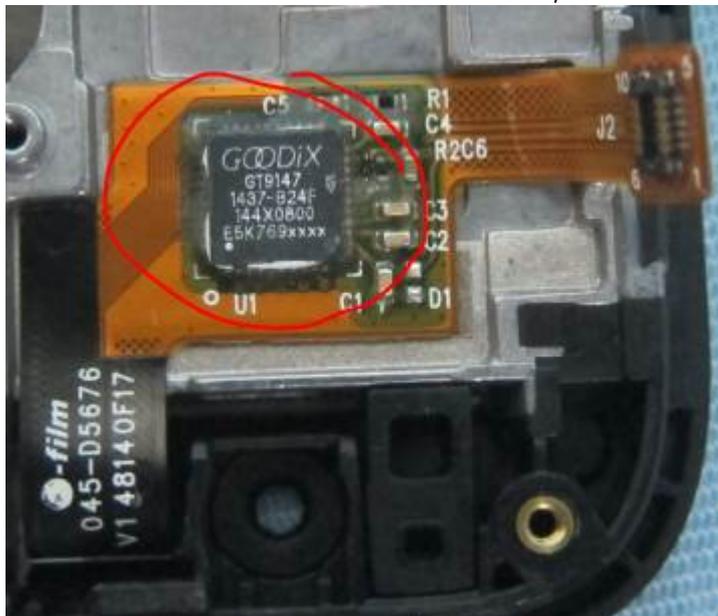
The SIM card socket is changed from push-push type to push-pull type

The earphone jack is changed from 13.1X6.6X4.55mm to 8.7\*12.66\*4.2mm

The vender of Z791 TP is OFILM, the IC vender is Focal tech.



The vender of Z791G TP is OFILM, the IC vender is GOODIX.



But the performance of both TP are the same.

The Diversity ANT change  
From Z791:



To Z791G



**MECHANICAL MODIFICATIONS:**

Use new metal front/back cover or keypad: NO

Mechanical shell changes: there is only small change on PCB so that make the new camera/SIM card socket/earphone compatible.

Other changes detailed: NO

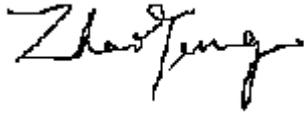
**ACCESSORY MODIFICATIONS:**

Battery changes: NO

AC Adaptor changes: Yes,

The AC Adaptor is changed from 5V/1.5A to 5V/1A

Earphone changes: NO



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