



Variant FCC Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE Ufi
BRAND NAME : ZTE
MODEL NAME : Z288L
FCC ID : SRQ-Z288L
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

This is a variant report which is only valid together with the original test report. The product was received on Jul. 06, 2015 and testing was completed on Jul. 09, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2009 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: Louis Wu / Manager

Approved by: Jones Tsai / Manager



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



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1. GENERAL DESCRIPTION	5
1.1. Applicant.....	5
1.2. Manufacturer	5
1.3. Product Feature of Equipment Under Test	5
1.4. Product Specification subjective to this standard.....	6
1.5. Modification of EUT.....	6
1.6. Test Location.....	7
1.7. Applicable Standards	7
2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....	8
2.1. Test Mode	8
2.2. Connection Diagram of Test System	9
2.3. Support Unit used in test configuration and system.....	10
2.4. EUT Operation Test Setup.....	11
3. TEST RESULT.....	12
3.1. Test of AC Conducted Emission Measurement	12
3.2. Test of Radiated Emission Measurement	16
4. LIST OF MEASURING EQUIPMENT	21
5. UNCERTAINTY OF EVALUATION.....	22
APPENDIX A. PRODUCT EQUALITY DECLARATION	
APPENDIX B. SETUP PHOTOGRAPHS	



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 11.31 dB at 0.470 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 5.22 dB at 228.850 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	LTE Ufi
Brand Name	ZTE
Model Name	Z288L
FCC ID	SRQ-Z288L
EUT supports Radios application	CDMA/EV-DO/LTE/ WLAN 2.4GHz 802.11b/g/n HT20
HW Version	Z288LHWV1.1
SW Version	TF_US_Z288LV1.0.0B05
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	
Tx Frequency	CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz
Rx Frequency	CDMA2000 BC0 : 869.70 MHz ~ 893.31 MHz CDMA2000 BC1 : 1931.25 MHz ~ 1988.75 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz
Antenna Type	WWAN : PIFA Antenna WLAN : Monopole Antenna
Type of Modulation	LTE: QPSK / 16QAM CDMA2000 : QPSK CDMA2000 1xEV-DO : QPSK/8PSK 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5. Modification of EUT

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



1.6. Test Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		FCC Registration No.
	CO01-KS	03CH02-KS	418269

1.7. Applicable Standards

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

- ♦ FCC 47 CFR FCC Part 15 Subpart B
- ♦ ANSI C63.4-2009

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2009 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test mode as the worst case and recorded in this report.

Item	EUT Configuration	Test Condition	
		EMI AC	EMI RE
1.	Data application transferred mode (EUT connected with notebook)	☒	☒

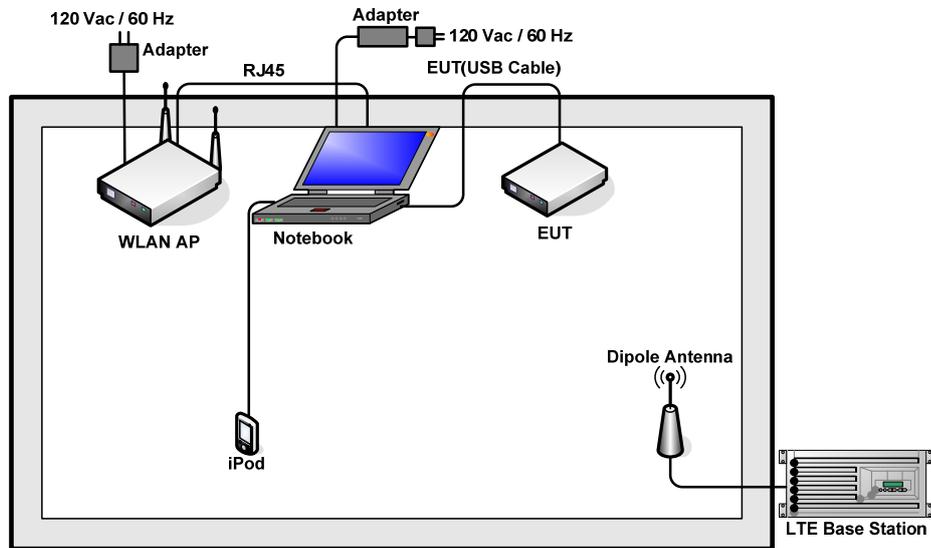
Abbreviations:

- EMI AC: AC conducted emissions
- EMI RE: EUT radiated emissions

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1: LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)
Radiated Emissions	1	Mode 1: LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)

Remark: Link with Notebook means data application transferred mode between EUT and Notebook.

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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
4.	iPod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A
5.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m



2.4. EUT Operation Test Setup

The EUT was in LTE idle mode during the testing. The EUT was synchronized to the BCCH, and was in continuous receiving mode by setting system simulator's paging reorganization.

And data application is transferred between notebook and EUT via USB cable.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

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 in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	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.

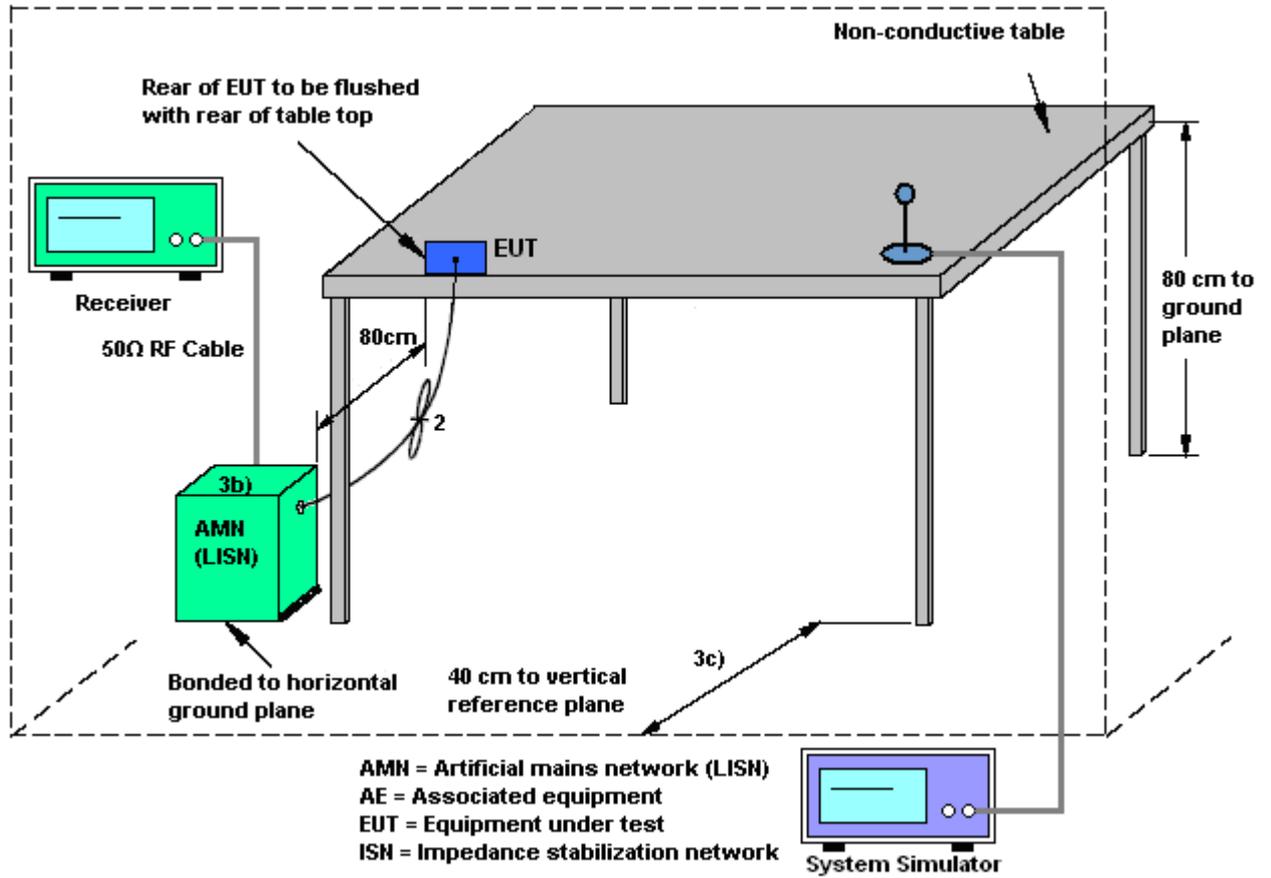
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

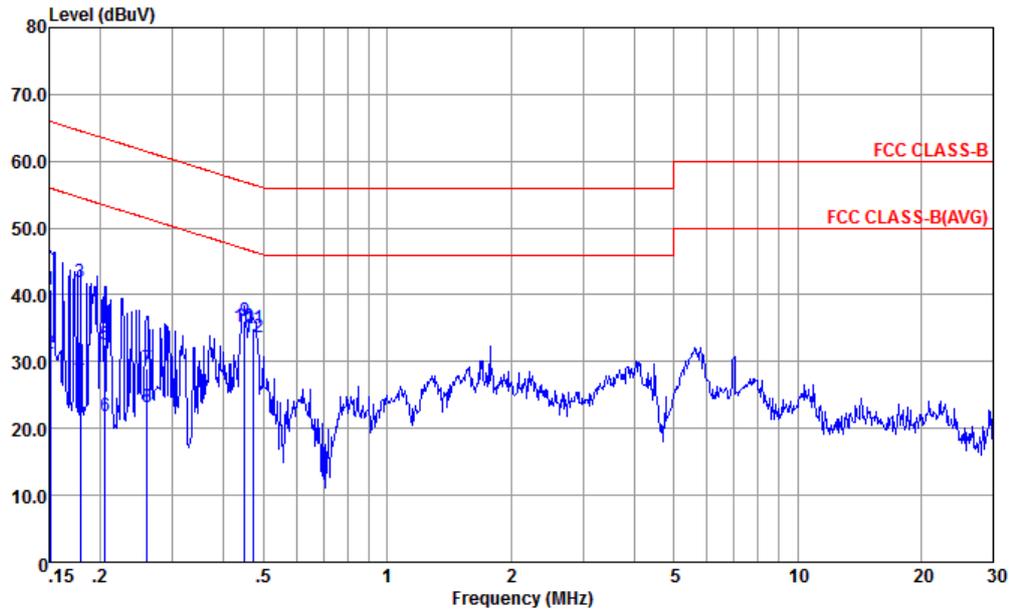
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Eko Guan	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)		

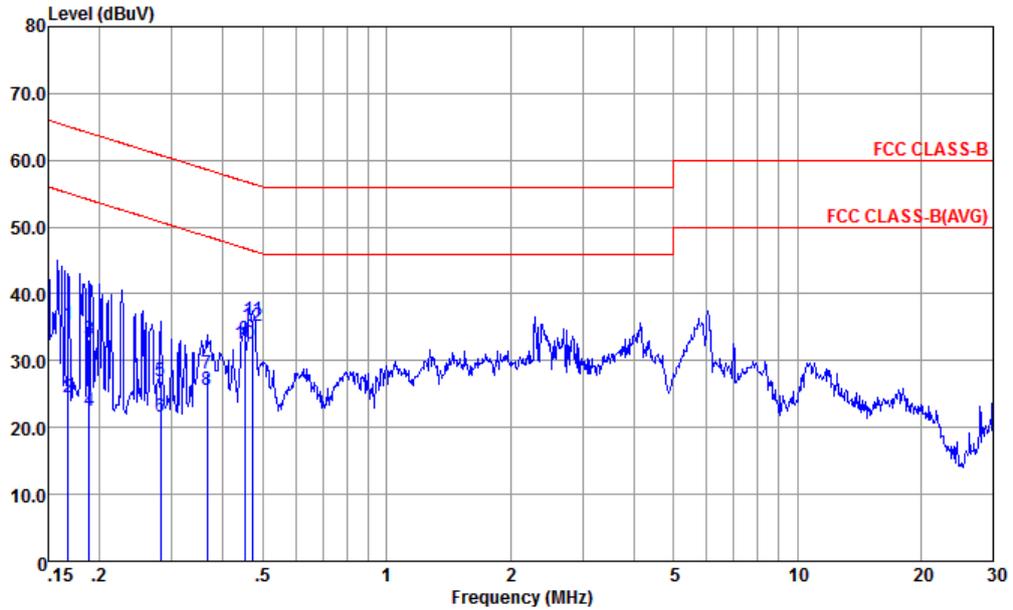


Site : CO01-KS
 Condition : FCC CLASS-B LISN-L20140306 LINE
 Project : (FC) 450601-01
 mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	40.81	-25.15	65.96	28.50	1.94	10.37	QP
2	0.15	31.21	-24.75	56.96	18.90	1.94	10.37	Average
3	0.18	41.98	-22.57	64.55	30.20	1.33	10.45	QP
4	0.18	28.28	-26.27	54.55	16.50	1.33	10.45	Average
5	0.21	32.59	-30.81	63.40	21.10	0.99	10.50	QP
6	0.21	21.79	-31.61	53.40	10.30	0.99	10.50	Average
7	0.26	28.88	-32.54	61.42	17.49	0.85	10.54	QP
8	0.26	23.28	-28.14	51.42	11.89	0.85	10.54	Average
9	0.45	36.07	-20.82	56.89	25.20	0.25	10.62	QP
10 *	0.45	35.17	-11.72	46.89	24.30	0.25	10.62	Average
11	0.47	35.05	-21.40	56.45	24.21	0.22	10.62	QP
12	0.47	33.75	-12.70	46.45	22.91	0.22	10.62	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Eko Guan	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)		



Site : CO01-KS
 Condition : FCC CLASS-B LISN-N20140306 NEUTRAL
 Project : (FC) 450601-01
 mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	35.50	-29.58	65.08	23.49	1.59	10.42	QP
2	0.17	24.50	-30.58	55.08	12.49	1.59	10.42	Average
3	0.19	33.22	-30.89	64.11	21.60	1.14	10.48	QP
4	0.19	22.42	-31.69	54.11	10.80	1.14	10.48	Average
5	0.28	26.96	-33.80	60.76	15.60	0.80	10.56	QP
6	0.28	21.56	-29.20	50.76	10.20	0.80	10.56	Average
7	0.37	27.98	-30.63	58.61	16.90	0.47	10.61	QP
8	0.37	25.68	-22.93	48.61	14.60	0.47	10.61	Average
9	0.45	33.16	-23.69	56.85	22.20	0.34	10.62	QP
10	0.45	32.56	-14.29	46.85	21.60	0.34	10.62	Average
11	0.47	36.04	-20.41	56.45	25.10	0.32	10.62	QP
12 *	0.47	35.14	-11.31	46.45	24.20	0.32	10.62	Average



3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3



3.2.2. Measuring Instruments

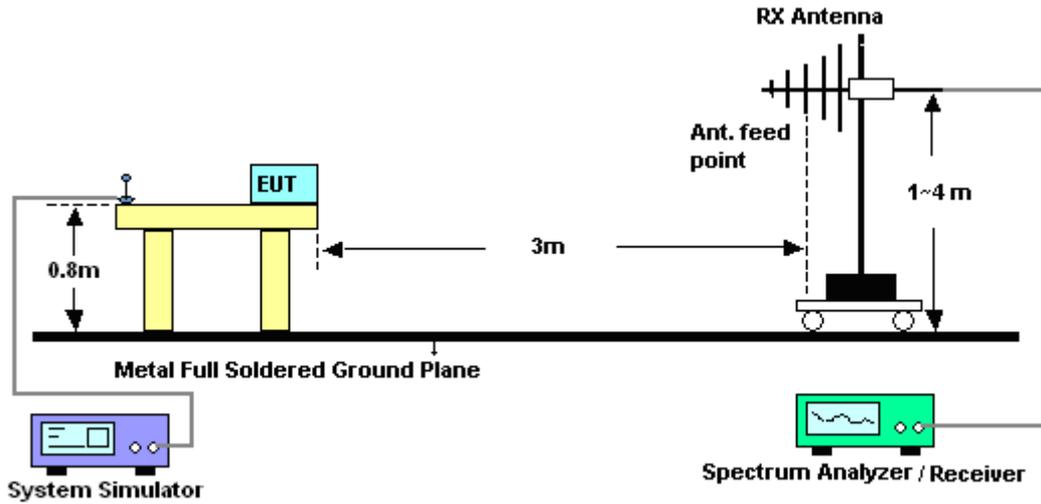
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

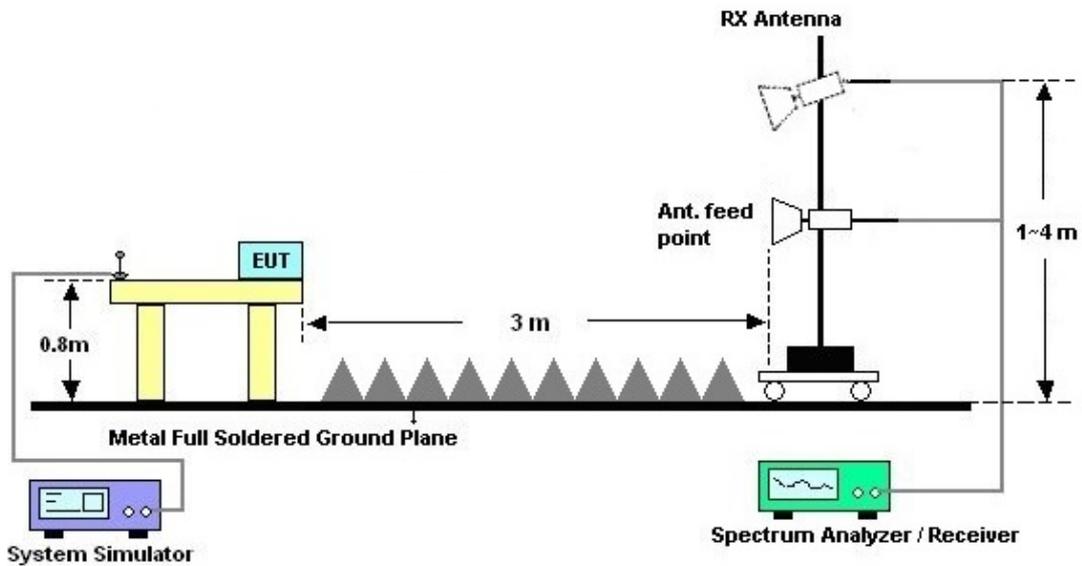
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. 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.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



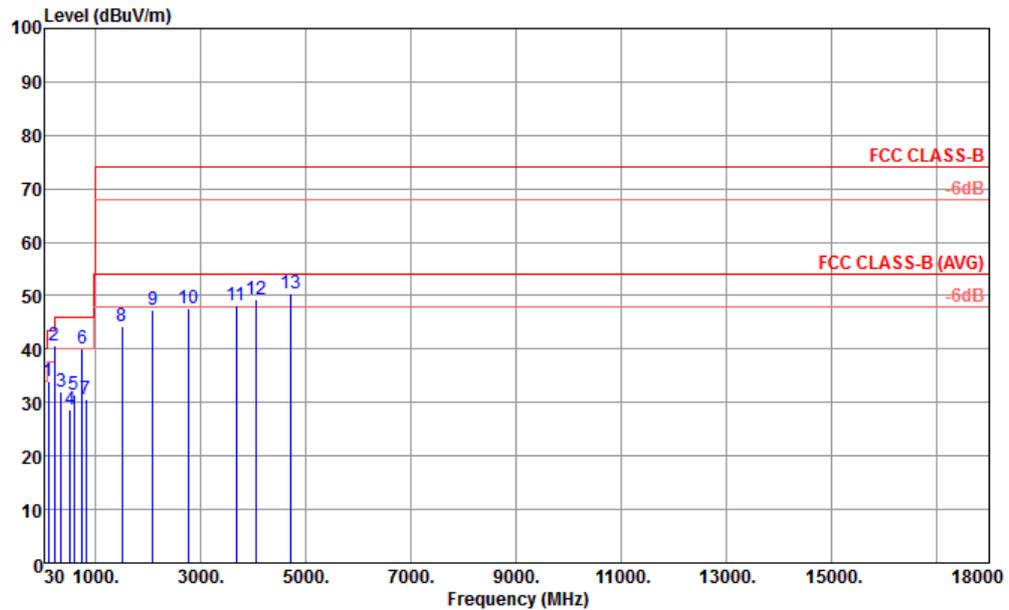
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Stone Gu	Relative Humidity :	42~43%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)		
Remark :	#6 is system simulator signal which can be ignored.		

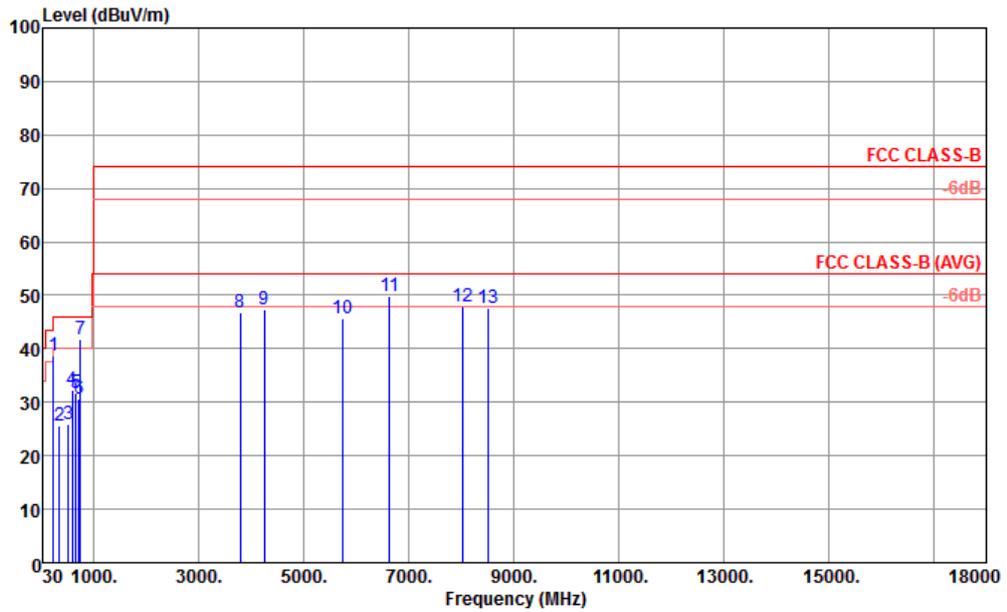


Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF ANT HORIZONTAL
 : RBW:100.000KHz VBW:300.000KHz SWT:Auto
 Project : (FC)450601-01
 Mode : 1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	111.48	33.89	-9.61	43.50	55.93	11.89	1.37	35.30	---	---	Peak
2 !	228.85	40.78	-5.22	46.00	63.21	10.55	1.98	34.96	100	220	Peak
3	345.25	31.96	-14.04	46.00	50.08	14.49	2.44	35.05	---	---	Peak
4	528.58	28.64	-17.36	46.00	42.29	17.81	3.06	34.52	---	---	Peak
5	599.39	31.40	-14.60	46.00	44.61	18.49	3.25	34.95	---	---	Peak
6 !	750.71	40.02	-----	-----	50.94	19.81	3.68	34.41	---	---	Peak
7	816.67	30.60	-15.40	46.00	40.66	20.57	3.84	34.47	---	---	Peak
8	1508.00	44.16	-29.84	74.00	52.82	25.17	3.67	37.50	---	---	Peak
9	2098.00	47.24	-26.76	74.00	52.82	27.04	4.37	36.99	---	---	Peak
10	2766.00	47.74	-26.26	74.00	51.23	28.32	5.07	36.88	---	---	Peak
11	3680.00	48.05	-25.95	74.00	49.37	29.31	5.89	36.52	---	---	Peak
12	4066.00	49.33	-24.67	74.00	49.55	29.97	6.21	36.40	---	---	Peak
13	4710.00	50.48	-23.52	74.00	49.13	31.28	6.74	36.67	---	---	Peak



Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Stone Gu	Relative Humidity :	42~43%
Test Distance :	3m	Polarization :	Vertical
Function Type :	LTE Band 13 Idle + WLAN Idle + USB Cable (Data Link with Notebook)		
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF ANT VERTICAL
 : RBW:100.000KHz VBW:300.000KHz SWT:Auto
 Project : (FC)450601-01
 Mode : 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	239.52	38.65	-7.35	46.00	60.55	10.98	2.03	34.91	152	116 Peak
2	345.25	25.53	-20.47	46.00	43.65	14.49	2.44	35.05	---	---
3	527.61	25.84	-20.16	46.00	39.51	17.79	3.06	34.52	---	---
4	597.45	32.37	-13.63	46.00	45.58	18.48	3.25	34.94	---	---
5	672.14	31.73	-14.27	46.00	43.95	19.13	3.48	34.83	---	---
6	720.64	30.65	-15.35	46.00	42.20	19.51	3.61	34.67	---	---
7 !	750.71	41.71			52.63	19.81	3.68	34.41	---	---
8	3792.00	46.93	-27.07	74.00	47.90	29.49	5.99	36.45	---	---
9	4254.00	47.27	-26.73	74.00	47.13	30.28	6.41	36.55	---	---
10	5750.00	45.66	-28.34	74.00	42.06	32.41	7.48	36.29	---	---
11	6634.00	49.73	-24.27	74.00	43.55	34.58	8.22	36.62	---	---
12	8038.00	48.03	-25.97	74.00	38.94	37.16	8.89	36.96	---	---
13	8516.00	47.76	-26.24	74.00	38.74	36.67	9.19	36.84	---	---



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Jul. 09, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Jul. 09, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Jul. 09, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Jul. 09, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Jul. 09, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Jul. 09, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Jul. 09, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 09, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 09, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz	May 04, 2015	Jul. 09, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Jul. 09, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Jul. 09, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Jul. 09, 2015	Oct. 24, 2015	Conduction (CO01-KS)



5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3dB
---	-------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
---	-------



Appendix A. Product Equality Declaration

ZTE CORPORATION

Product Change Description

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

[Z288L]
[ZTE Corporation]

is the variant of the initial certified product,

[Z288L]
[ZTE Corporation]

SOFTWARE MODIFICATIONS:

Protocol Stack changes: NO
MMS/STK changes: NO
JAVA changes: NO
Other changes detailed: NO

HARDWARE MODIFICATION:

Band changes: NO
Power Amplifier changes: NO
Antenna changes: YES Antenna matching changed
PCB Layout changes: YES
Components on PCB changes: YES

Duplexer Changed due to supply:

a. CDMA BC0: from 2520(MURATA:SAYFH836MCC0F0A) to 1814

(MURATA:SAYEY836MCA0F0A)

b. CDMA BC1: from 2520(AVAGO:ACMD-7407-TR1) to

1814(MURATA:SAYEY1G88BA0B0A)

c. LTE B13: from 2520(EPCOS: B39781B7677A710) to 2016 (TAIYO:D5PE782M0P3PZ-

ZAS)

Filter Changed due to supply:

a. Drx Chain for CDMA BC1: from 1411(MURATA:SAFEB1G96FL0F00) to

1109(MURATA:SAFFB1G96FL0F0A)

Tx Chain for LTE B13: from 1411(EPCOS:B39781B9475M410) to 1109(TBD)

d. Varistors changed due to supply. From yageo (VRS0402KR140161N) to sunlord(SDV1005E140C101NPTF)

Add second Flash vender ESMT

LCD changes: NO

Speaker changes: NO

Camera changes: NO

Vibrator changes: NO

Bluetooth changes: NO

FM changes: NO

Other changes: NO

MECHANICAL MODIFICATIONS:

Use new metal front/back cover or keypad: NO

Mechanical shell changes: NO

Other changes detailed: NO

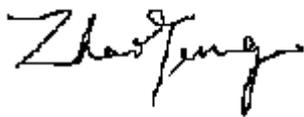
ACCESSORY MODIFICATIONS:

Battery changes: NO

AC Adaptor changes: NO

Earphone changes: NO

APPROVED BY:



Project Manager: Zhaoyang

Date: 2015-6-4

Company: ZTE Corporation

Address: B109, #889, Bibo Rd, Zhangjiang Hi-Tech Park, Shanghai, China

Tel: +86-21-68896840

Fax: +86-21-68896835