

Variant FCC RF Test Report

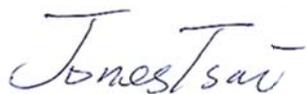
APPLICANT : ZTE CORPORATION
EQUIPMENT : WCDMA/LTE Hotspot
BRAND NAME : ZTE
MODEL NAME : Z289L
FCC ID : SRQ-Z289L
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

This is a variant report which is only valid together with the original report. The product was received on Jun. 19, 2015 and testing was completed on Jul. 24, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant 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(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.89 dB at 2483.520 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.37 dB at 0.480 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

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 Feature of Equipment Under Test

Product Feature	
Equipment	WCDMA/LTE Hotspot
Brand Name	ZTE
Model Name	Z289L
FCC ID	SRQ-Z289L
EUT supports Radios application	WCDMA/HSPA/HSPA+(Downlink Only)/LTE/ WLAN 2.4GHz 802.11bgn HT20
IMEI Code	Conduction: 359528303194338 Radiation: 359528031393827 Conducted:N/A
HW Version	Z289LHWV1.1
SW Version	TF_US_Z289LV2.0.0B01
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 of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to Antenna	802.11b : 20.21 dBm (0.1050 W) 802.11g : 24.88 dBm (0.3076 W) 802.11n HT20 : 24.93 dBm (0.3112 W)
Antenna Type	Monopole Antenna with gain 1.00 dBi
Type of Modulation	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 Testing Site

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

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

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	Sporton Site No.		
	TH01-SZ		

1.7 Applied 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 KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. 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

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-



2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	20.21	20.13	20.09	20.18

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	24.88	24.60	24.69	24.36	24.74	24.58	24.60	24.74

2.4GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	24.93	24.71	24.92	24.91	24.73	24.58	24.85	24.47



2.3 Test Mode

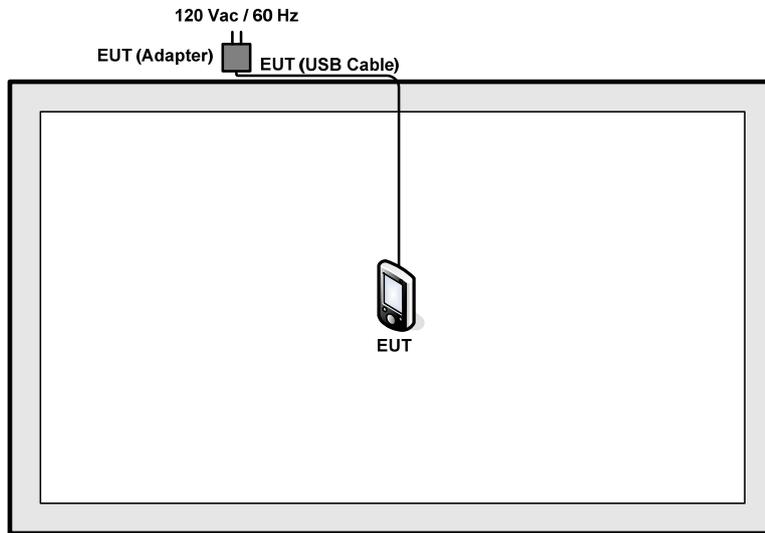
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

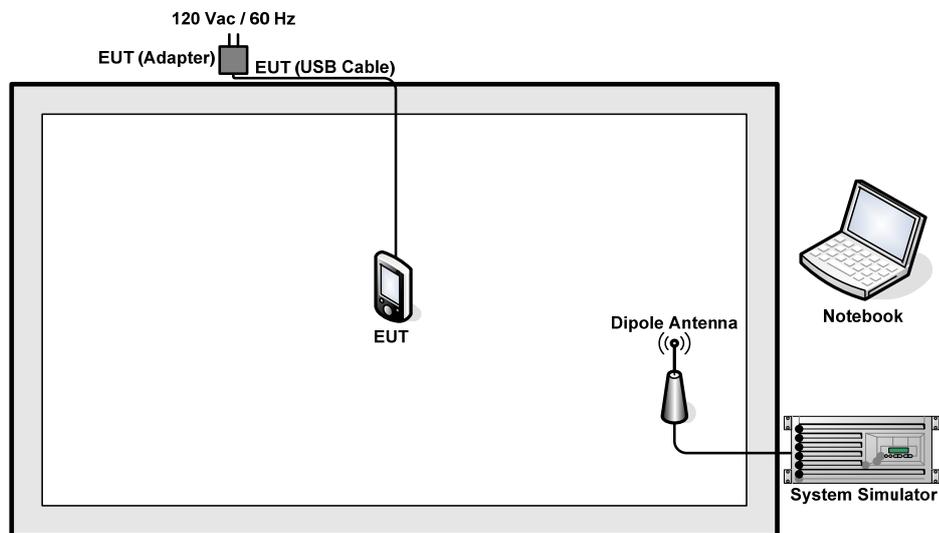
Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + WLAN Link + USB Cable (Charging from Adapter)

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN RF test items, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting Antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the Antenna exceeds 6dBi.

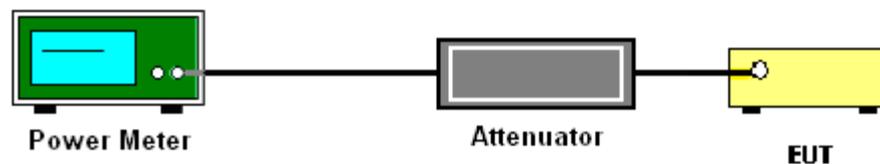
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r03.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A of this test report.

3.1.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A of this test report.



3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. 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

3.2.2 Measuring Instruments

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



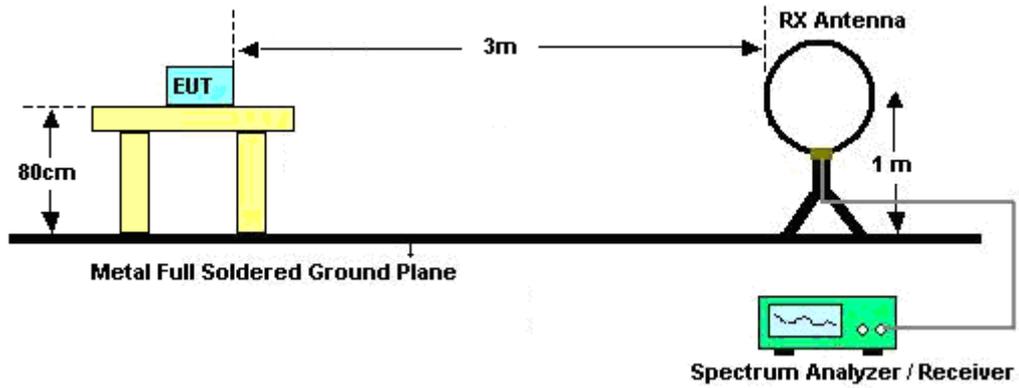
3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03.
2. 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.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - $VBW = 10$ Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

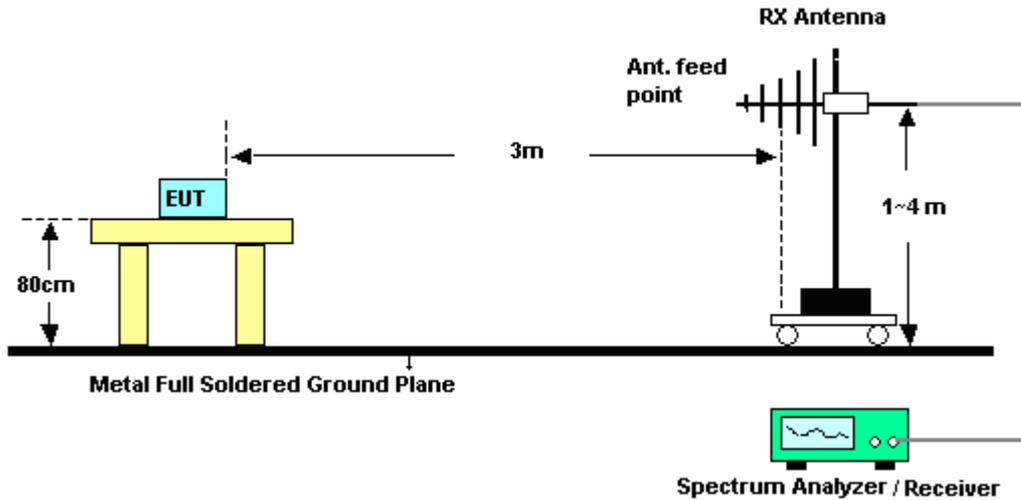
Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100.00	-	-	10Hz
802.11g	94.52	1.04	0.97	1kHz
2.4GHz 802.11n HT20	97.97	1.93	0.52	1kHz

3.2.4 Test Setup

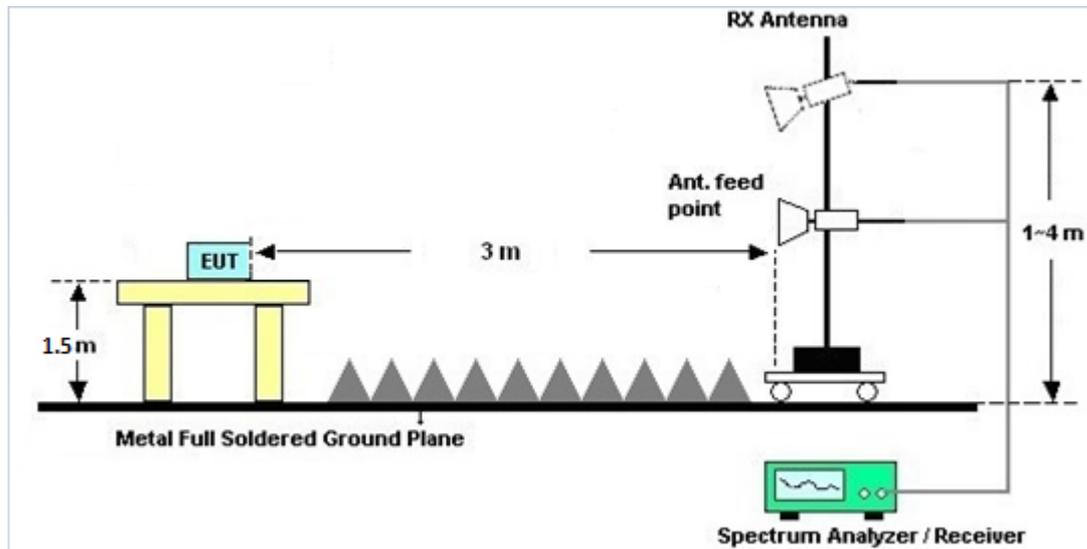
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.



3.3 AC Conducted Emission Measurement

3.3.1 Limit 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 (dB μ 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.

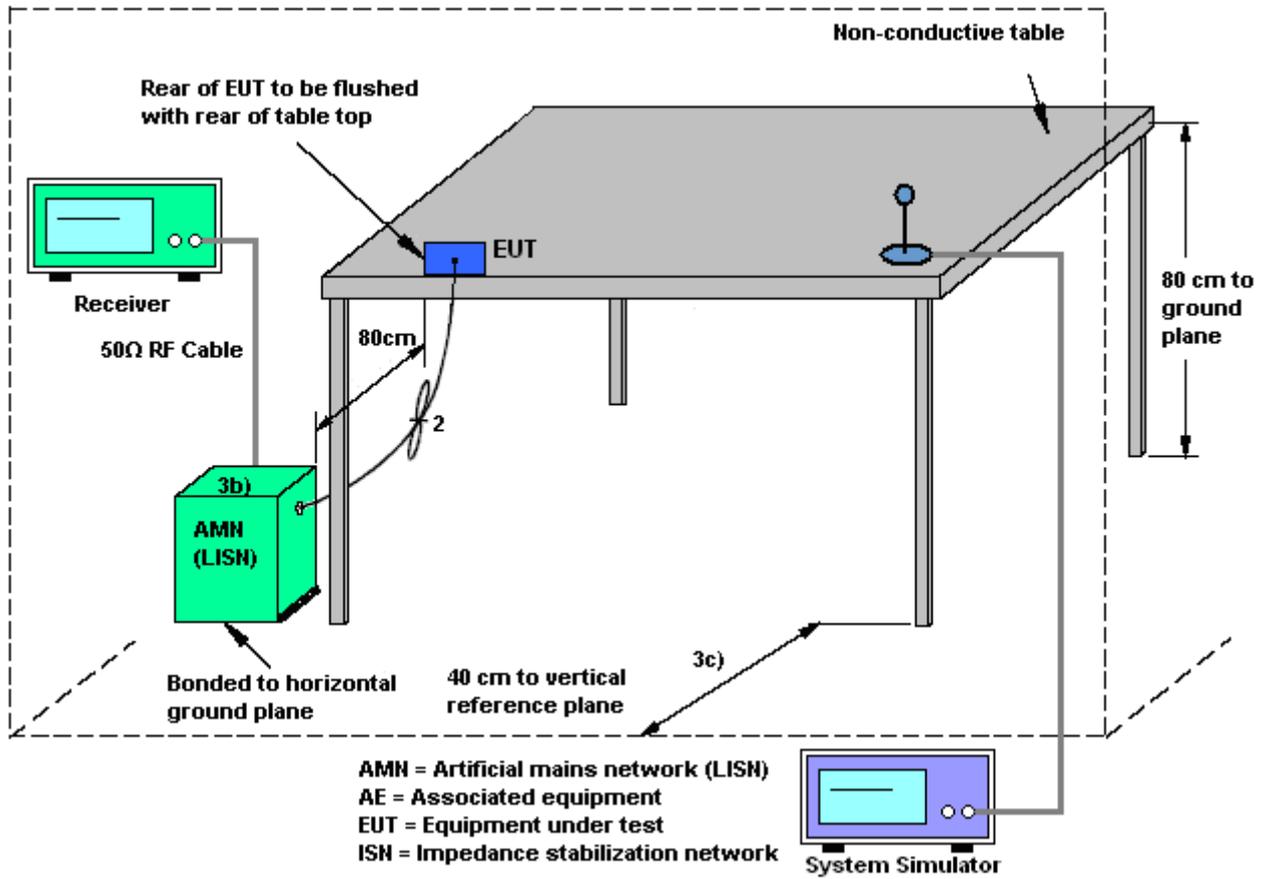
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it 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 with Maximum Hold Mode.

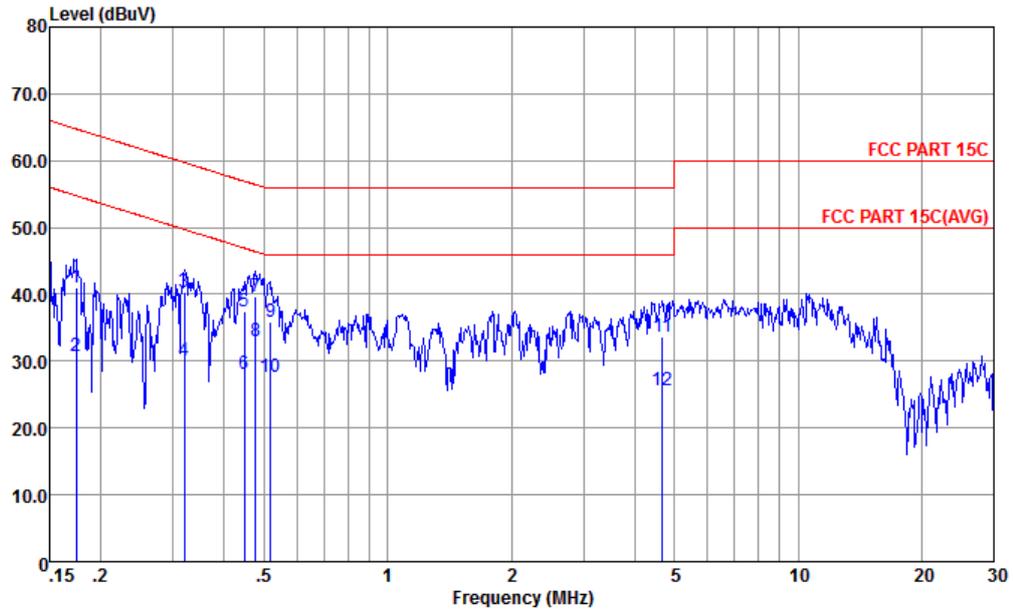
3.3.4 Test Setup





3.3.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~24°C
Test Engineer :	Eko Guan	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + WLAN Link + USB Cable (Charging from Adapter)		

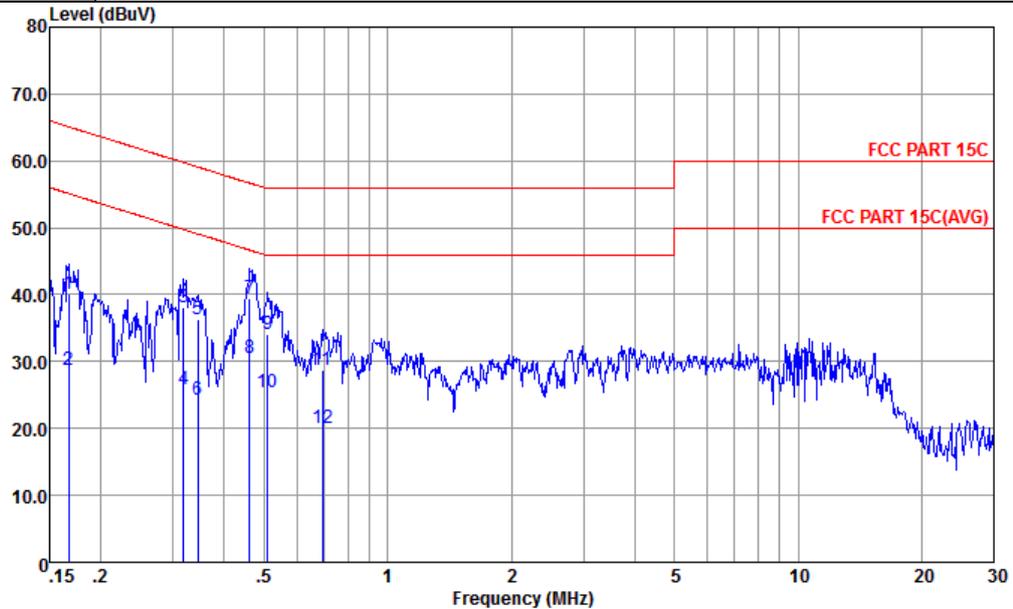


Site : CO01-KS
 Condition : FCC PART 15C LISN-L20140306 LINE
 Project : (FR) 3O1008-02
 mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	41.09	-23.68	64.77	29.20	1.45	10.44	QP
2	0.17	30.79	-23.98	54.77	18.90	1.45	10.44	Average
3	0.32	40.26	-19.45	59.71	29.10	0.57	10.59	QP
4	0.32	30.06	-19.65	49.71	18.90	0.57	10.59	Average
5	0.45	37.37	-19.56	56.93	26.50	0.25	10.62	QP
6	0.45	27.97	-18.96	46.93	17.10	0.25	10.62	Average
7	0.48	39.74	-16.67	56.41	28.90	0.22	10.62	QP
8 *	0.48	33.04	-13.37	46.41	22.20	0.22	10.62	Average
9	0.52	35.93	-20.07	56.00	25.10	0.20	10.63	QP
10	0.52	27.73	-18.27	46.00	16.90	0.20	10.63	Average
11	4.67	33.54	-22.46	56.00	22.50	0.20	10.84	QP
12	4.67	25.64	-20.36	46.00	14.60	0.20	10.84	Average



Test Mode :	Mode 1	Temperature :	20~24°C
Test Engineer :	Eko Guan	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN Link + USB Cable (Charging from Adapter)		



Site : CO01-KS
 Condition : FCC PART 15C LISN-N20140306 NEUTRAL
 Project : (FR) 3O1008-02
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.17	40.22	-24.90	65.12	28.20	1.61	10.41	QP
2	0.17	28.82	-26.30	55.12	16.80	1.61	10.41	Average
3	0.32	38.02	-21.73	59.75	26.80	0.63	10.59	QP
4	0.32	25.82	-23.93	49.75	14.60	0.63	10.59	Average
5	0.34	36.23	-22.86	59.09	25.11	0.52	10.60	QP
6	0.34	24.33	-24.76	49.09	13.21	0.52	10.60	Average
7	0.46	39.45	-17.22	56.67	28.50	0.33	10.62	QP
8 *	0.46	30.45	-16.22	46.67	19.50	0.33	10.62	Average
9	0.51	34.12	-21.88	56.00	23.19	0.30	10.63	QP
10	0.51	25.42	-20.58	46.00	14.49	0.30	10.63	Average
11	0.69	28.74	-27.26	56.00	17.90	0.20	10.64	QP
12	0.69	20.04	-25.96	46.00	9.20	0.20	10.64	Average



3.4 Antenna Requirements

3.4.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 28, 2015	Jul. 24, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 28, 2015	Jul. 24, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Jul. 22, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Jul. 22, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Jul. 22, 2015	Nov. 12, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Jul. 22, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Jul. 22, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Jul. 22, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	Jul. 22, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Jul. 22, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Jul. 22, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jul. 22, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 22, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 22, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Jul. 16, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Jul. 16, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Jul. 16, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Jul. 16, 2015	Oct. 24, 2015	Conduction (CO01-KS)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3dB
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Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Mygai Mo	Temperature:	24~26	°C
Test Date:	Jul. 24, 2015	Relative Humidity:	50~53	%

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	19.42	30.00	1.00	20.42	36.00	Pass
11b	1Mbps	1	6	2437	19.83	30.00	1.00	20.83	36.00	Pass
11b	1Mbps	1	11	2462	20.21	30.00	1.00	21.21	36.00	Pass
11g	6Mbps	1	1	2412	24.44	30.00	1.00	25.44	36.00	Pass
11g	6Mbps	1	6	2437	24.73	30.00	1.00	25.73	36.00	Pass
11g	6Mbps	1	11	2462	24.88	30.00	1.00	25.88	36.00	Pass
HT20	MCS0	1	1	2412	24.93	30.00	1.00	25.93	36.00	Pass
HT20	MCS0	1	6	2437	24.84	30.00	1.00	25.84	36.00	Pass
HT20	MCS0	1	11	2462	24.90	30.00	1.00	25.90	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	16.50
11b	1Mbps	1	6	2437	0.00	16.97
11b	1Mbps	1	11	2462	0.00	17.21
11g	6Mbps	1	1	2412	0.06	15.62
11g	6Mbps	1	6	2437	0.06	15.78
11g	6Mbps	1	11	2462	0.06	16.09
HT20	MCS0	1	1	2412	0.05	17.08
HT20	MCS0	1	6	2437	0.05	16.62
HT20	MCS0	1	11	2462	0.05	16.94



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz	*	2460.287	104.08	-	-	104.94	31.31	4.79	36.96	248	207	P	H
	*	2459.619	98.69	-	-	99.55	31.31	4.79	36.96	248	207	A	H
		2483.88	48.76	-25.24	74	49.56	31.34	4.8	36.94	249	208	P	H
		2483.52	34.36	-19.64	54	35.16	31.34	4.8	36.94	249	208	A	H
	*	2460.287	105.51	-	-	106.37	31.31	4.79	36.96	150	121	P	V
	*	2459.368	100.2	-	-	101.06	31.31	4.79	36.96	150	121	A	V
		2484.12	49.91	-24.09	74	50.71	31.34	4.8	36.94	150	121	P	V
		2483.52	36.34	-17.66	54	37.14	31.34	4.8	36.94	150	121	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz		4923	46.19	-27.81	74	40.95	34.97	6.92	36.65	150	205	P	H
		7386	47.93	-26.07	74	40.25	35.78	8.68	36.78	150	43	P	H
		4924	47.88	-26.12	74	42.64	34.97	6.92	36.65	150	111	P	V
		7386	47.53	-26.47	74	39.85	35.78	8.68	36.78	150	251	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)**

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz	*	2457.198	105.43	-	-	106.29	31.31	4.79	36.96	247	234	P	H
	*	2455.945	93.74	-	-	94.6	31.31	4.79	36.96	247	234	A	H
		2483.6	56.34	-17.66	74	57.14	31.34	4.8	36.94	247	234	P	H
		2483.52	36.21	-17.79	54	37.01	31.34	4.8	36.94	247	234	A	H
	*	2457.198	108.97	-	-	109.83	31.31	4.79	36.96	150	328	P	V
	*	2455.611	98.01	-	-	98.87	31.31	4.79	36.96	150	328	A	V
		2483.52	61.58	-12.42	74	62.38	31.34	4.8	36.94	150	328	P	V
		2483.52	42.73	-11.27	54	43.53	31.34	4.8	36.94	150	328	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)**

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz		4923	45.3	-28.7	74	40.06	34.97	6.92	36.65	150	279	P	H
		7386	47.83	-26.17	74	40.15	35.78	8.68	36.78	150	90	P	H
		4923	46.01	-27.99	74	40.77	34.97	6.92	36.65	150	102	P	V
		7386	46.76	-27.24	74	39.08	35.78	8.68	36.78	150	125	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz	*	2456.363	105.39	-	-	106.25	31.31	4.79	36.96	300	210	P	H
	*	2456.697	95.21	-	-	96.07	31.31	4.79	36.96	300	210	A	H
		2483.56	62.55	-11.45	74	63.35	31.34	4.8	36.94	300	210	P	H
		2483.52	41.39	-12.61	54	42.19	31.34	4.8	36.94	300	210	A	H
	*	2456.697	109.23	-	-	110.09	31.31	4.79	36.96	151	329	P	V
	*	2456.279	98.99	-	-	99.85	31.31	4.79	36.96	151	329	A	V
		2483.6	65.96	-8.04	74	66.76	31.34	4.8	36.94	151	329	P	V
		2483.52	46.11	-7.89	54	46.91	31.34	4.8	36.94	151	329	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz		4923	46.16	-27.84	74	40.92	34.97	6.92	36.65	150	22	P	H
		7386	48.23	-25.77	74	40.55	35.78	8.68	36.78	150	256	P	H
		4923	45.54	-28.46	74	40.3	34.97	6.92	36.65	150	73	P	V
		7386	48.14	-25.86	74	40.46	35.78	8.68	36.78	150	240	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz
2.4GHz WIFI 802.11b (LF)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
2.4GHz 802.11b LF		105.66	21.07	-22.43	43.5	43.07	12	1.33	35.33			P	H
		223.03	26.83	-19.17	46	49.55	10.32	1.95	34.99	100	165	P	H
		340.4	19.77	-26.23	46	37.98	14.39	2.42	35.02			P	H
		445.16	19.01	-26.99	46	34.23	16.92	2.79	34.93			P	H
		530.52	18.28	-27.72	46	31.88	17.85	3.07	34.52			P	H
		705.12	19.01	-26.99	46	30.88	19.35	3.58	34.8			P	H
		30	26.48	-13.52	40	41.87	19.1	0.73	35.22	162	115	P	V
		98.87	22.88	-20.62	43.5	44.93	11.96	1.29	35.3			P	V
		221.09	22.66	-23.34	46	45.46	10.25	1.94	34.99			P	V
		341.37	21.23	-24.77	46	39.43	14.41	2.42	35.03			P	V
		481.05	18.99	-27.01	46	33.59	17.18	2.9	34.68			P	V
		555.74	20.32	-25.68	46	33.49	18.23	3.15	34.55			P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz
2.4GHz WIFI 802.11g (LF)

Table with 14 columns: WIFI, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include frequency data for 2.4GHz 802.11g LF and a Remark section.



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
2.4GHz 802.11n HT20 LF		105.66	24.07	-19.43	43.5	46.07	12	1.33	35.33			P	H
		191.02	27	-16.5	43.5	50.52	9.72	1.79	35.03	100	152	P	H
		223.03	26.83	-19.17	46	49.55	10.32	1.95	34.99			P	H
		298.69	21.21	-24.79	46	40.24	13.46	2.27	34.76			P	H
		445.16	19.01	-26.99	46	34.23	16.92	2.79	34.93			P	H
		602.3	17.92	-28.08	46	31.1	18.52	3.26	34.96			P	H
		30	22.48	-17.52	40	37.87	19.1	0.73	35.22	100	199	P	V
		98.87	25.88	-17.62	43.5	47.93	11.96	1.29	35.3			P	V
		221.09	24.66	-21.34	46	47.46	10.25	1.94	34.99			P	V
		351.07	20.6	-25.4	46	38.6	14.63	2.46	35.09			P	V
		521.79	18.92	-27.08	46	32.73	17.69	3.03	34.53			P	V
	647.89	18.91	-27.09	46	31.37	18.98	3.39	34.83			P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

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



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

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

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. 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)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. 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)

2. 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 D. Product Change Description

ZTE CORPORATION**Product Change Description**

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

[Z289L]
[ZTE Corporation]

is the variant of the initial certified product,

[Z289L]
[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
PCB Layout changes: YES xs6A -> xs6B
Components on PCB changes: YES

4 bands Duplexer Changed:

- a. LTE/UMTS B4: from 2520(MURATA:SAYRF1G73CE0F0A) to 1814(WISOL:SFXG33UY902)
- b. LTE/UMTS B2: from 2520(AVAGO:ACMD-7407-TR1) to 1814(MURATA:SAYEY1G88BA0B0A)
- c. LTE/UMTS B5: from 2520(MURATASAYFH836MCC0F0A)to(MURATA:SAYEY836MCA0FO A)
- d. LTE B17: from 2520(EPCOS: B39741B7924P810) to 2016(MURATA:SAYFH710MCA0F0A)

3 bands Filter Changed due to supply:

- a. Drx Chain for LTE/UMTS B2: from 1411(MURATA:SAFEB1G96FLOF00) to

- 1109(MURATA: SAFFB1G96FLOFOA or Epcos: B39202B9860P810 or TAIYO: F6QG1G960P2KT)
- b. Drx Chain for LTE/UMTS B4: from 1411(MURATA: SAFE2G14FB0FOO) to 1109(MURATA: SAFFB2G14FA0FOA or TAIYO: F6QG2G140P2KA)
- c. Tx Chain for LTE B17: from 1411(MURATA: SAFEA710MALOFOO) to 1109(MURATA: SAFFB707MAA0FOA or TAIYO: F5QA707M5M2QY)

LCD changes: NO
Speaker changes: NO
Camera changes: NO
Vibrator changes: NO
Bluetooth changes: NO
FM changes: NO
Other changes: NO

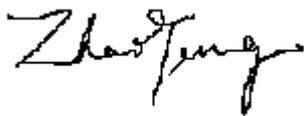
MECHANICAL MODIFICATIONS:

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: 2015-7-31

Company: ZTE Corporation

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

Tel: +86-21-68896840

Fax: +86-21-68896835