



FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE/WCDMA/GSM (GPRS)
Multi-Mode Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z999
FCC ID : SRQ-Z999
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Oct. 13, 2017 and testing was completed on Nov. 20, 2017. 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.



Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.

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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 of Equipment Under Test..... 6

 1.5 Modification of EUT 6

 1.6 Testing Location 7

 1.7 Applicable Standards 8

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 9

 2.1 Carrier Frequency and Channel 9

 2.2 Test Mode 10

 2.3 Connection Diagram of Test System 11

 2.4 Support Unit used in test configuration and system 11

 2.5 EUT Operation Test Setup 11

3 TEST RESULT 12

 3.1 Peak Output Power Measurement 12

 3.2 Radiated Band Edges and Spurious Emission Measurement 13

4 LIST OF MEASURING EQUIPMENT 17

5 UNCERTAINTY OF EVALUATION 18

APPENDIX A. CONDUCTED TEST RESULTS

APPENDIX B. RADIATED SPURIOUS EMISSION

APPENDIX C. DUTY CYCLE PLOTS

APPENDIX D. SETUP PHOTOGRAPHS

APPENDIX E. PRODUCT EQUALITY DECLARATION



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Not Required	-
-	-	99% Bandwidth	-	Not Required	-
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
-	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Not Required	-
-	15.247(d)	Conducted Band Edges	≤ 20dBc	Not Required	-
		Conducted Spurious Emission		Not Required	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.86 dB at 2483.520 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
-	15.203 & 15.247(b)	Antenna Requirement	N/A	Not Required	-

Remark: Not Required means the changes dose not affected the test result.



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/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z999
FCC ID	SRQ-Z999
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA / HSPA+(16QAM uplink is not supported)/LTE/NFC/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0 + EDR/ Bluetooth v 4.0 LE/ Bluetooth v4.1 LE
IMEI Code	Conducted: 865800030027954 Radiation: 865800030028028
HW Version	Z999HWV1.0
SW Version	Z999V1.0.0B25
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report for Z999. The product equality declaration could be referred to Appendix E. Based on the similarity between two models, we only retest conducted power and Radiated Spurious Emission for 11b/g mode and worse case of 11n mode from original test report (Sporton Report Number FR760101C) were verified for the differences.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification										
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz									
Maximum (Peak) Output Power to antenna	<Ant. 2> 802.11b : 18.35 dBm (0.0684 W) 802.11g : 19.75 dBm (0.0944 W) 802.11n HT20 : 18.11 dBm (0.0647 W) 802.11n HT40 : 18.59 dBm (0.0723 W) MIMO <Ant. 1 + 2> 802.11n HT20 : 21.35 dBm (0.1365 W) 802.11n HT40 : 21.58 dBm (0.1439 W)									
Antenna Type / Gain	Ant. 1: PIFA Antenna with gain -4.15 dBi Ant. 2: PIFA Antenna with gain 3.57 dBi									
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)									
Antenna Function for Transmitter	<table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> </tr> </thead> <tbody> <tr> <td>802.11 b/g/n SISO</td> <td>-</td> <td>V</td> </tr> <tr> <td>802.11 n MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table>		Ant. 1	Ant. 2	802.11 b/g/n SISO	-	V	802.11 n MIMO	V	V
		Ant. 1	Ant. 2							
802.11 b/g/n SISO	-	V								
802.11 n MIMO	V	V								

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.5 Modification of EUT

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



1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.	
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958	
Test Site No.	Sporton Site No.	FCC Test Firm Registration No.
	TH01-KS	630927

Note: The test site complies with ANSI C63.4 2014 requirement.

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No. is CN5019.

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	Sporton Site No.	FCC Test Firm Registration No.
	03CH04-SZ	577730

Note: The test site complies with ANSI C63.4 2014 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 KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ 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. 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: 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 were recorded in this report.

2.1 Carrier Frequency and 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 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Single Antenna

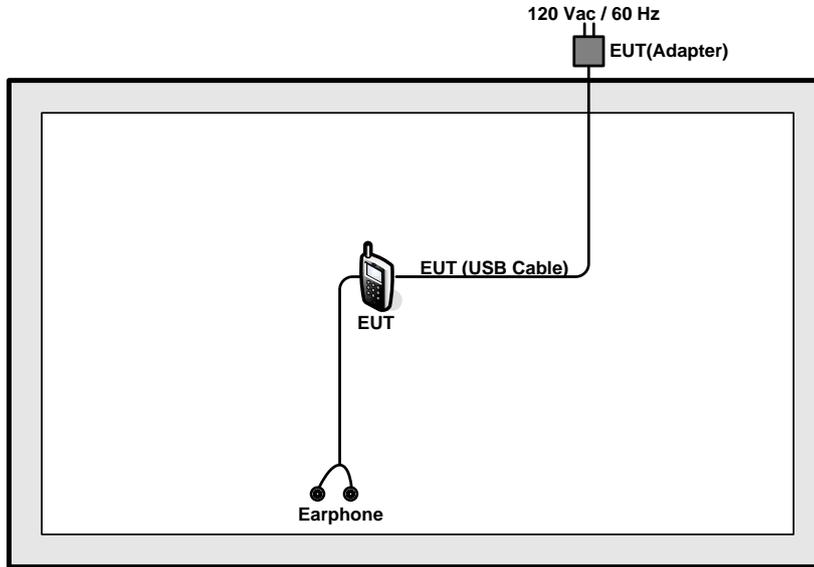
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

MIMO Antenna

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Earphone	Lenovo	LH102	N/A	Unshielded,1.2m	N/A

2.5 EUT Operation Test Setup

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

3 Test Result

3.1 Peak Output Power Measurement

3.1.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is 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.

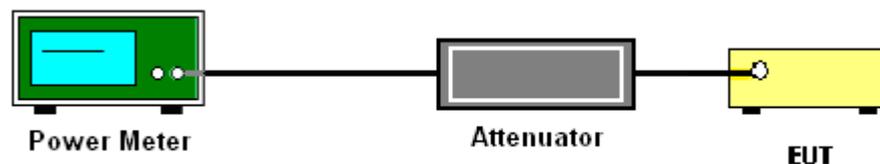
3.1.2 Measuring Instruments

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 v04 section 9.1.2 PKPM1 Peak power meter method.
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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.1.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A



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 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.

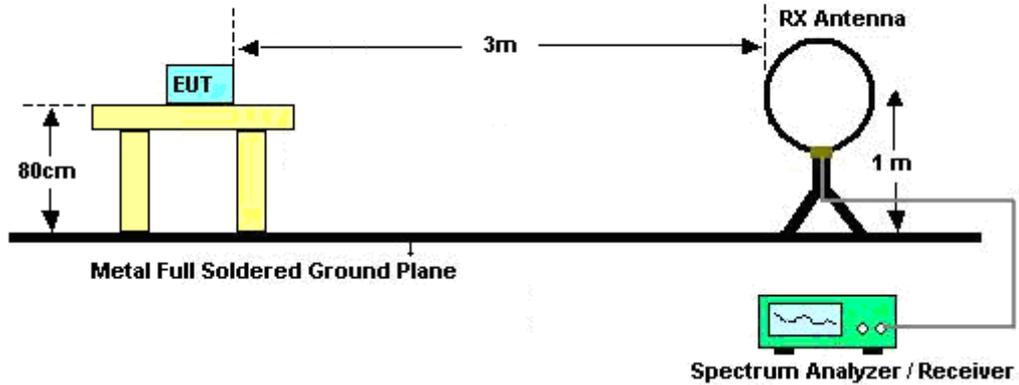


3.2.3 Test Procedures

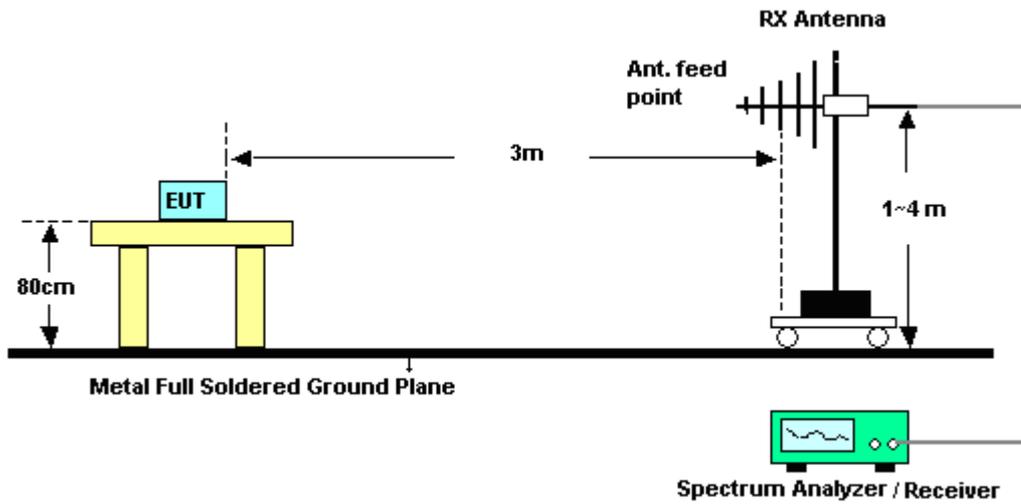
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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.

3.2.4 Test Setup

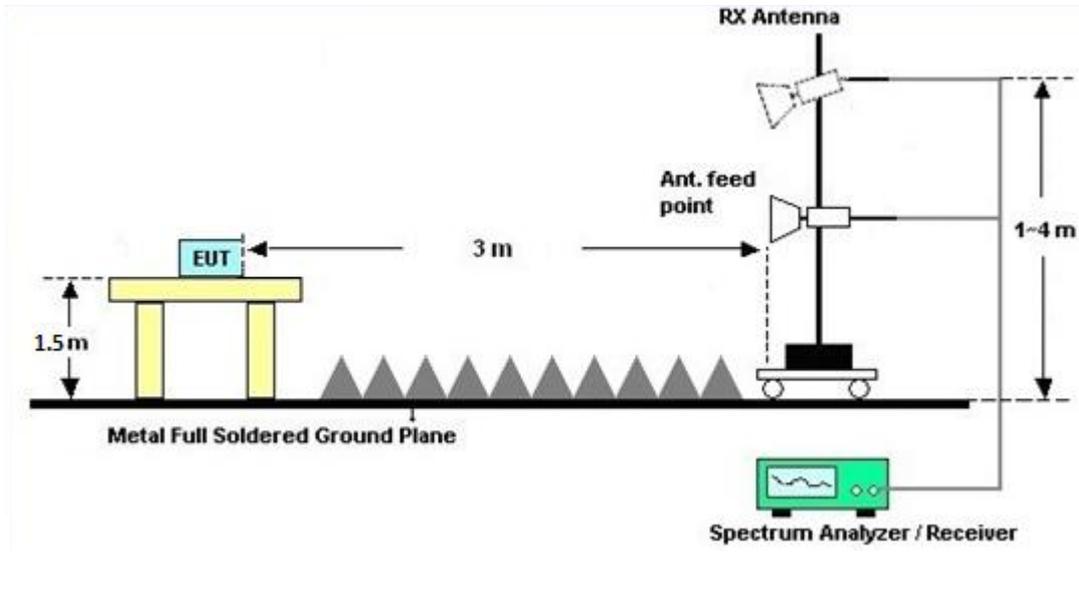
For radiated emissions below 30MHz



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 was not reported.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Nov. 10, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Nov. 10, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 20, 2017	Nov. 20, 2017	Apr. 19, 2018	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY551502 13	10Hz~44GHz	Apr. 20, 2017	Nov. 20, 2017	Apr. 19, 2018	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	Nov. 20, 2017	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	Nov. 20, 2017	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-147 4	1GHz~18GHz	Jan. 12, 2017	Nov. 20, 2017	Jan. 11, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	May 17, 2017	Nov. 20, 2017	May 16, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct.19, 2017	Nov. 20, 2017	Oct 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	Nov. 20, 2017	Jul. 26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY532701 56	500MHz~26.5GHz	Apr. 20, 2017	Nov. 20, 2017	Apr. 19, 2018	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Nov. 20, 2017	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Nov. 20, 2017	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Nov. 20, 2017	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

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

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/11/10	Relative Humidity:	51~55	%

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412		18.01		30.00	30.00	-4.15	3.57		21.58	36.00	36.00	Pass
11b	1Mbps	1	6	2437		18.33		30.00	30.00	-4.15	3.57		21.90	36.00	36.00	Pass
11b	1Mbps	1	11	2462		18.35		30.00	30.00	-4.15	3.57		21.92	36.00	36.00	Pass
11g	6Mbps	1	1	2412		19.43		30.00	30.00	-4.15	3.57		23.00	36.00	36.00	Pass
11g	6Mbps	1	6	2437		19.03		30.00	30.00	-4.15	3.57		22.60	36.00	36.00	Pass
11g	6Mbps	1	11	2462		19.75		30.00	30.00	-4.15	3.57		23.32	36.00	36.00	Pass
HT20	MCS0	1	1	2412		17.79		30.00	30.00	-4.15	3.57		21.36	36.00	36.00	Pass
HT20	MCS0	1	6	2437		18.11		30.00	30.00	-4.15	3.57		21.68	36.00	36.00	Pass
HT20	MCS0	1	11	2462		17.71		30.00	30.00	-4.15	3.57		21.28	36.00	36.00	Pass
HT40	MCS0	1	3	2422		18.59		30.00	30.00	-4.15	3.57		22.16	36.00	36.00	Pass
HT40	MCS0	1	6	2437		18.31		30.00	30.00	-4.15	3.57		21.88	36.00	36.00	Pass
HT40	MCS0	1	9	2452		17.26		30.00	30.00	-4.15	3.57		20.83	36.00	36.00	Pass
HT20	MCS0	2	1	2412	17.79	18.42	21.13	30.00		3.57		24.70		36.00		Pass
HT20	MCS0	2	6	2437	18.11	18.55	21.35	30.00		3.57		24.92		36.00		Pass
HT20	MCS0	2	11	2462	17.71	18.61	21.19	30.00		3.57		24.76		36.00		Pass
HT40	MCS0	2	3	2422	18.59	18.32	21.47	30.00		3.57		25.04		36.00		Pass
HT40	MCS0	2	6	2437	18.31	18.82	21.58	30.00		3.57		25.15		36.00		Pass
HT40	MCS0	2	9	2452	17.26	18.69	21.04	30.00		3.57		24.61		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412		0.00		15.23	
11b	1Mbps	1	6	2437		0.00		15.42	
11b	1Mbps	1	11	2462		0.00		15.45	
11g	6Mbps	1	1	2412		0.24		13.12	
11g	6Mbps	1	6	2437		0.24		12.78	
11g	6Mbps	1	11	2462		0.24		13.35	
HT20	MCS0	1	1	2412		0.25		11.07	
HT20	MCS0	1	6	2437		0.25		11.64	
HT20	MCS0	1	11	2462		0.25		11.00	
HT40	MCS0	1	3	2422		0.50		11.61	
HT40	MCS0	1	6	2437		0.50		11.39	
HT40	MCS0	1	9	2452		0.50		10.21	
HT20	MCS0	2	1	2412	0.25	0.25	11.07	11.66	14.39
HT20	MCS0	2	6	2437	0.25	0.25	11.64	11.99	14.83
HT20	MCS0	2	11	2462	0.25	0.25	11.00	11.83	14.45
HT40	MCS0	2	3	2422	0.50	0.44	11.61	11.65	14.64
HT40	MCS0	2	6	2437	0.50	0.44	11.39	11.86	14.64
HT40	MCS0	2	9	2452	0.50	0.44	10.21	11.76	14.06

Note: Measured power (dBm) has offset with cable loss.



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.17	52.08	-21.92	74	48.81	27.43	4.78	28.94	379	151	P	H
		2390	42.81	-11.19	54	39.54	27.43	4.78	28.94	379	151	A	H
	*	2412	106.11	-	-	102.78	27.49	4.78	28.94	379	151	P	H
	*	2412	102.56	-	-	99.23	27.49	4.78	28.94	379	151	A	H
		2388.435	49.36	-24.64	74	46.09	27.43	4.78	28.94	284	172	P	V
		2390	39.37	-14.63	54	36.1	27.43	4.78	28.94	284	172	A	V
	*	2412	103.03	-	-	99.7	27.49	4.78	28.94	284	172	P	V
	*	2412	100.05	-	-	96.72	27.49	4.78	28.94	284	172	A	V
802.11b CH 06 2437MHz		2389.94	49.57	-24.43	74	46.3	27.43	4.78	28.94	108	158	P	H
		2389.94	39.4	-14.6	54	36.13	27.43	4.78	28.94	108	158	A	H
	*	2437	107.02	-	-	103.53	27.61	4.82	28.94	108	158	P	H
	*	2437	104.04	-	-	100.55	27.61	4.82	28.94	108	158	A	H
		2483.76	51.09	-22.91	74	47.45	27.74	4.85	28.95	108	158	P	H
		2483.5	40.82	-13.18	54	37.18	27.74	4.85	28.95	108	158	A	H
		2386.44	47.83	-26.17	74	44.56	27.43	4.78	28.94	275	171	P	V
		2389.66	38.39	-15.61	54	35.12	27.43	4.78	28.94	275	171	A	V
	*	2437	104.02	-	-	100.53	27.61	4.82	28.94	275	171	P	V
	*	2437	101.6	-	-	98.11	27.61	4.82	28.94	275	171	A	V
		2483.83	49.56	-24.44	74	45.92	27.74	4.85	28.95	275	171	P	V
		2483.5	39.51	-14.49	54	35.87	27.74	4.85	28.95	275	171	A	V



802.11b CH 11 2462MHz	*	2462	107.5	-	-	103.95	27.68	4.82	28.95	109	158	P	H
	*	2462	104.06	-	-	100.51	27.68	4.82	28.95	109	158	A	H
		2485.16	52.06	-21.94	74	48.42	27.74	4.85	28.95	109	158	P	H
		2483.52	42.36	-11.64	54	38.72	27.74	4.85	28.95	109	158	A	H
	*	2462	104.51	-	-	100.96	27.68	4.82	28.95	275	171	P	V
	*	2462	101.28	-	-	97.73	27.68	4.82	28.95	275	171	A	V
		2483.92	50.82	-23.18	74	47.18	27.74	4.85	28.95	275	171	P	V
		2483.52	41.06	-12.94	54	37.42	27.74	4.85	28.95	275	171	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



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

WIFI Ant. 2	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 2412MHz		4824	43.49	-30.51	74	64.64	31.49	5.55	58.19	152	260	P	H
		4824	39.66	-34.34	74	60.81	31.49	5.55	58.19	152	260	P	V
802.11b CH 06 2437MHz		4874	41.49	-32.51	74	62.33	31.61	5.65	58.1	152	260	P	H
		7311	45.36	-28.64	74	59.85	36.17	7.26	57.92	189	238	P	H
		4874	37.98	-36.02	74	58.82	31.61	5.65	58.1	152	260	P	V
		7311	43.18	-30.82	74	57.67	36.17	7.26	57.92	189	238	P	V
802.11b CH 11 2462MHz		4924	40.69	-33.31	74	61.12	31.73	5.86	58.02	152	260	P	H
		7386	44.6	-29.4	74	58.77	36.28	7.2	57.65	189	238	P	H
		4924	41.73	-32.27	74	62.16	31.73	5.86	58.02	152	260	P	V
		7386	44.05	-29.95	74	58.22	36.28	7.2	57.65	189	238	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 Ant. 2	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 01 2412MHz		2389.8	59.17	-14.83	74	55.9	27.43	4.78	28.94	369	150	P	H
		2389.8	49.24	-4.76	54	45.97	27.43	4.78	28.94	369	150	A	H
	*	2412	107.81	-	-	104.48	27.49	4.78	28.94	369	150	P	H
	*	2412	100.01	-	-	96.68	27.49	4.78	28.94	369	150	A	H
		2389.8	52.97	-21.03	74	49.7	27.43	4.78	28.94	202	309	P	V
		2389.8	43.76	-10.24	54	40.49	27.43	4.78	28.94	202	309	A	V
	*	2412	102.67	-	-	99.34	27.49	4.78	28.94	202	309	P	V
	*	2412	94.72	-	-	91.39	27.49	4.78	28.94	202	309	A	V
802.11g CH 06 2437MHz		2389.8	49.19	-24.81	74	45.92	27.43	4.78	28.94	367	155	P	H
		2389.94	39.75	-14.25	54	36.48	27.43	4.78	28.94	367	155	A	H
	*	2437	108.6	-	-	105.11	27.61	4.82	28.94	367	155	P	H
	*	2437	100.95	-	-	97.46	27.61	4.82	28.94	367	155	A	H
		2485.51	52	-22	74	48.36	27.74	4.85	28.95	367	155	P	H
		2483.55	42.3	-11.7	54	38.66	27.74	4.85	28.95	367	155	A	H
		2389.94	46.99	-27.01	74	43.72	27.43	4.78	28.94	167	310	P	V
		2389.94	37.27	-16.73	54	34	27.43	4.78	28.94	167	310	A	V
	*	2437	104.47	-	-	100.98	27.61	4.82	28.94	167	310	P	V
	*	2437	95.51	-	-	92.02	27.61	4.82	28.94	167	310	A	V
		2483.55	48.58	-25.42	74	44.94	27.74	4.85	28.95	167	310	P	V
		2483.62	39.29	-14.71	54	35.65	27.74	4.85	28.95	167	310	A	V



802.11g CH 11 2462MHz	*	2462	107.96	-	-	104.41	27.68	4.82	28.95	375	155	P	H
	*	2462	100.02	-	-	96.47	27.68	4.82	28.95	375	155	A	H
		2483.68	60.33	-13.67	74	56.69	27.74	4.85	28.95	375	155	P	H
		2483.52	50.14	-3.86	54	46.5	27.74	4.85	28.95	375	155	A	H
	*	2462	102.71	-	-	99.16	27.68	4.82	28.95	157	194	P	V
	*	2462	95.02	-	-	91.47	27.68	4.82	28.95	157	194	A	V
		2483.92	54.73	-19.27	74	51.09	27.74	4.85	28.95	157	194	P	V
		2483.52	45.06	-8.94	54	41.42	27.74	4.85	28.95	157	194	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 2	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 01 2412MHz		4824	41.7	-32.3	74	62.85	31.49	5.55	58.19	152	260	P	H
		4824	39.99	-34.01	74	61.14	31.49	5.55	58.19	152	260	P	V
802.11g CH 06 2437MHz		4874	40.78	-33.22	74	61.62	31.61	5.65	58.1	152	260	P	H
		7311	44.82	-29.18	74	59.31	36.17	7.26	57.92	189	238	P	H
		4874	39.18	-34.82	74	60.02	31.61	5.65	58.1	152	260	P	V
802.11g CH 11 2462MHz		7311	44.47	-29.53	74	58.96	36.17	7.26	57.92	189	238	P	V
		4924	39.73	-34.27	74	60.16	31.73	5.86	58.02	152	260	P	H
		7386	45.44	-28.56	74	59.61	36.28	7.2	57.65	189	238	P	H
		4924	38.75	-35.25	74	59.18	31.73	5.86	58.02	152	260	P	V
		7386	43.91	-30.09	74	58.08	36.28	7.2	57.65	189	238	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 HT40 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1+2, 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 frequencies like 2388.26, 2389.24, 2422, 2485.23, 2483.83, 2388.12, 2388.82, 2422, 2422, 2483.97, 2484.25.



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1+2, 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 802.11n HT40 CH 03 and 2422MHz, and a Remark section.



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		30	23.63	-16.37	40	30.45	24.9	0.25	31.97	-	-	P	H
		106.63	20.28	-23.22	43.5	34.19	16.7	1.09	31.7	-	-	P	H
		387.93	24.64	-21.36	46	32.07	21.61	2.15	31.19	-	-	P	H
		728.4	29.23	-16.77	46	30.26	27.21	2.99	31.23	-	-	P	H
		831.22	31.3	-14.7	46	30.51	28.75	3.22	31.18	100	254	P	H
		987.39	31.29	-22.71	54	28.73	30.35	3.54	31.33	-	-	P	H
		30.97	22.95	-17.05	40	30.22	24.43	0.27	31.97	-	-	P	V
		105.66	19.29	-24.21	43.5	33.28	16.64	1.08	31.71	-	-	P	V
		466.5	25.84	-20.16	46	31.48	23.29	2.34	31.27	-	-	P	V
		668.26	27.07	-18.93	46	29.04	26.41	2.86	31.24	-	-	P	V
		822.49	29.33	-16.67	46	28.62	28.68	3.2	31.17	-	-	P	V
	923.37	29.95	-16.05	46	28.18	29.58	3.43	31.24	100	102	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	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
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													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- 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)

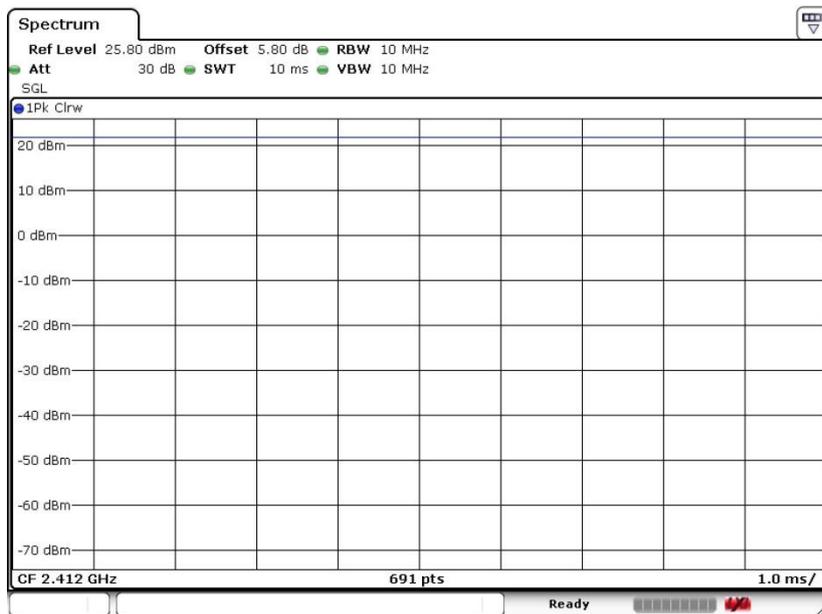
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Duty Cycle Plots

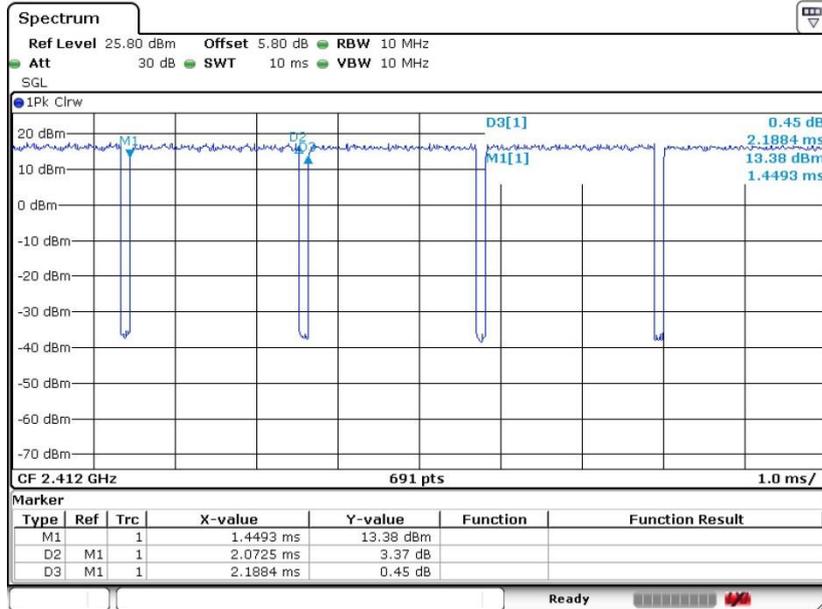
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
2	802.11 b	100	-	-	10Hz
2	802.11 g	94.70	2.073	0.483	1kHz
1+2	802.11n HT40	89.12	0.949	1.053	3kHz

802.11b Ant.2

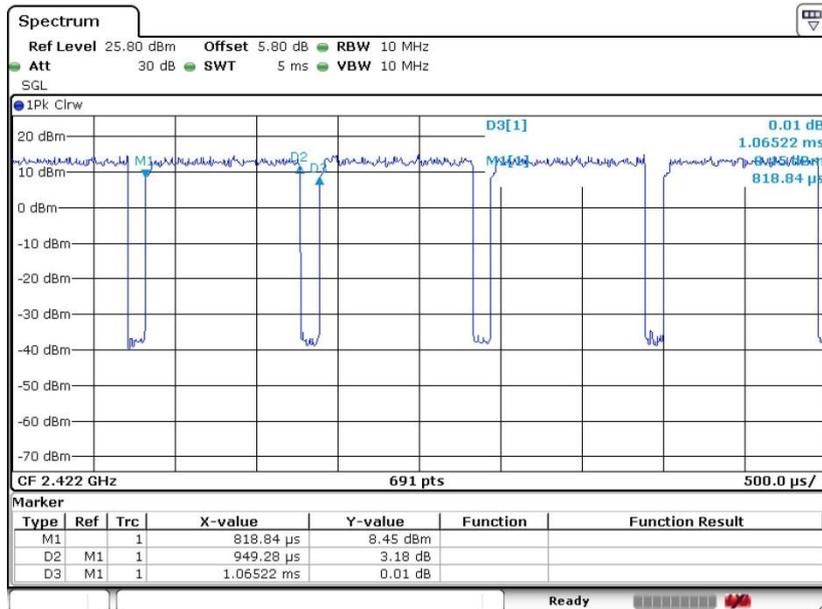




802.11g Ant.2



802.11n40 Ant.1+2





Appendix E. Product Equality Declaration

ZTE CORPORATION**Product Change Description**

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

[Z999]

[ZTE Corporation]

is the variant of the initial certified product,

[Z999]

[ZTE Corporation]

[Project Number:17ZTE191-01]

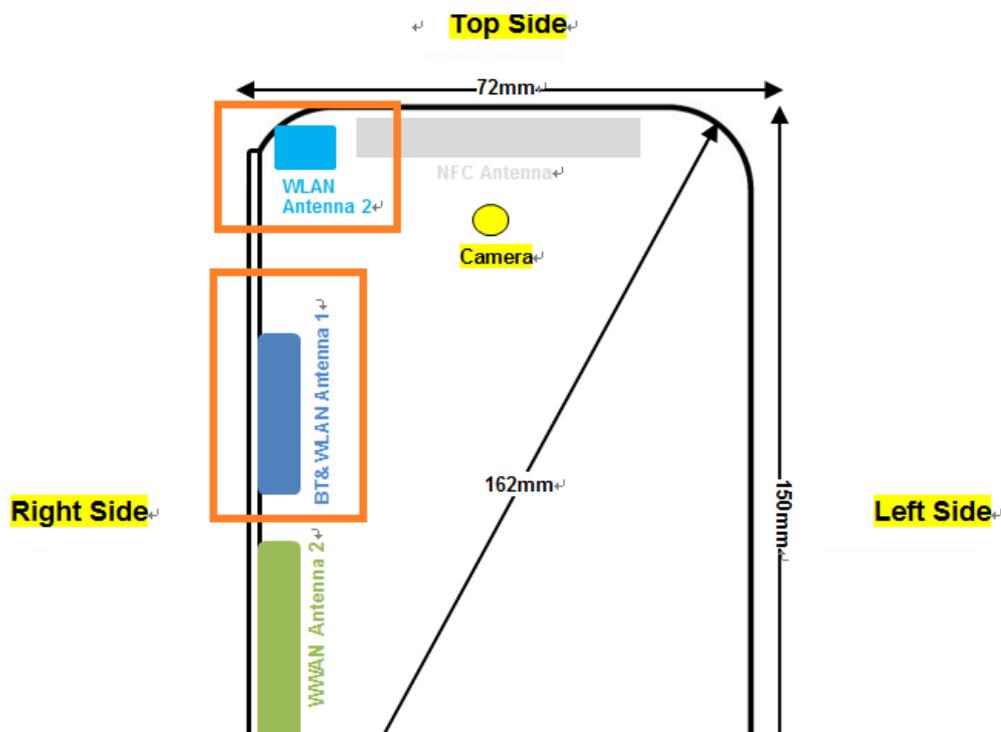
SOFTWARE MODIFICATIONS:

Protocol Stack changes: NO

MMS/STK changes: NO

JAVA changes: NO

Other changes detailed: Yes, ZTE now switch WLAN Antenna 1 and 2's function. This means WLAN Antenna 2 in below picture now support Bluetooth and WIFI while WLAN antenna 1 only supports WIFI MIMO function.



HARDWARE MODIFICATION:

Band changes: NO
Power Amplifier changes: NO
Antenna changes: NO
PCB Layout changes: NO
Components on PCB changes: NO
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

Min Zhang

APPROVED BY: Min Zhang

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