



FCC Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : WCDMA/LTE multi-mode Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z987
FCC ID : SRQ-Z987
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Sep. 25, 2014 and testing was completed on Oct. 15, 2014. 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 C63.4-2003 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



Testing Laboratory
2627

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. Feature of Equipment Under Test.....	5
1.4. Product Specification of Equipment Under Test	6
1.5. Modification of EUT.....	6
1.6. Test Site	7
1.7. Applied Standards	7
2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....	8
2.1. Test Mode	8
2.2. Connection Diagram of Test System	10
2.3. Support Unit used in test configuration and system.....	11
2.4. EUT Operation Test Setup.....	12
3. TEST RESULT.....	13
3.1. Test of AC Conducted Emission Measurement	13
3.2. Test of Radiated Emission Measurement	17
4. LIST OF MEASURING EQUIPMENT	21
5. UNCERTAINTY OF EVALUATION	22
APPENDIX A. 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 12.01 dB at 0.420 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.93 dB at 165.800 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/LTE multi-mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z987
FCC ID	SRQ-Z987
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/LTE/ WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	wvMA
SW Version	Z987V1.2.5
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	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz WCDMA Band II : 1932.4 MHz ~ 1987.6 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz GPS : 1.57542 GHz
Antenna Type	WWAN : PIFA Antenna WLAN : PIFA Antenna Bluetooth : PIFA Antenna GPS: PIFA Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (Downlink Only) LTE: QPSK / 16QAM / 64QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK GPS : BPSK

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	03CH01-KS	149928

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 C63.4-2003

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 C63.4-2003 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 modes as the worst cases and recorded in this report.

Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Charging Mode (EUT with adapter)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Note 1
2.	Data application transferred mode (EUT connected with notebook)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Abbreviations:

- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

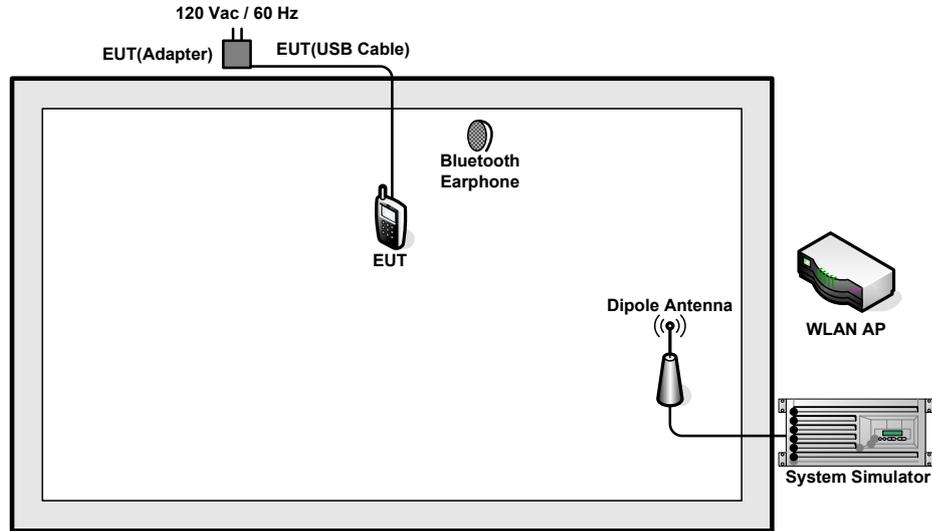
Note 1: Testing for this mode is not required or not the worst case.

Remark: For signal above 1GHz, the worst case was test item 2.

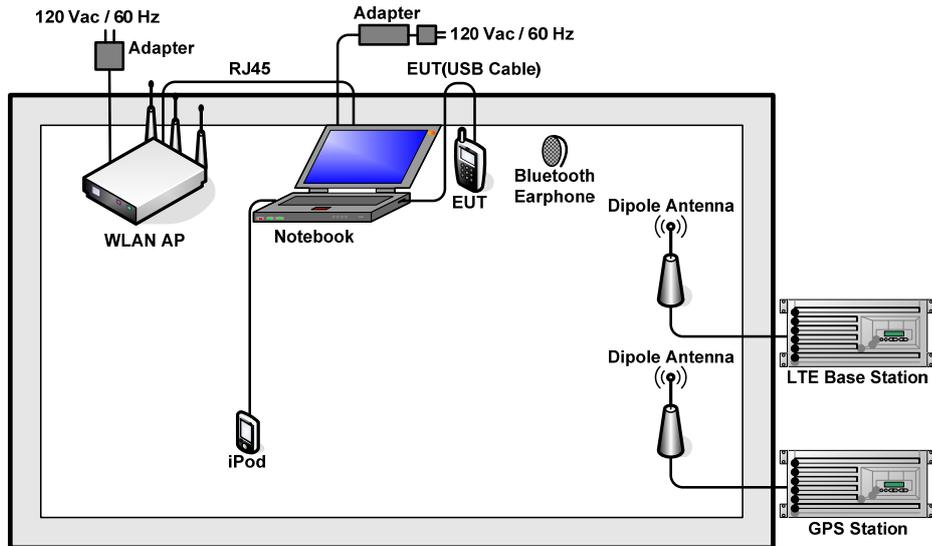


Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Charging from Adapter) + Camera<Fig.1> Mode 2: WDMA Band II Idle + Bluetooth Idle + WLAN Idle + USB Cable (Charging from Adapter) + MPEG4<Fig.1> Mode 3: LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx<Fig.2>
Radiated Emissions < 1GHz	1/2	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Charging from Adapter) + Camera<Fig.1> Mode 2: WDMA Band II Idle + Bluetooth Idle + WLAN Idle + USB Cable (Charging from Adapter) + MPEG4<Fig.1> Mode 3: LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx<Fig.2>
Radiated Emissions ≥ 1GHz	2	Mode 1: LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx<Fig.2>
Remark: <ol style="list-style-type: none">1. The worst case of AC is mode 3; and only the test data of this mode was reported.2. The worst case of RE < 1G is mode 3; only the test data of this mode was reported.3. Link with Notebook means data application transferred mode between EUT and Notebook		

2.2. Connection Diagram of Test System



<Fig.1>



<Fig.2>



2.3. 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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	GPS Station	ADIVIC	MP9000	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
5.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A
6.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	iPod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A



2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA or 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.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between Laptop and EUT via USB cable.
2. Turn on GPS function to make the EUT receive continuous signals from GPS station.
3. Execute "Video Player" to play MPEG4 files.
4. Turn on camera to capture images.



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.

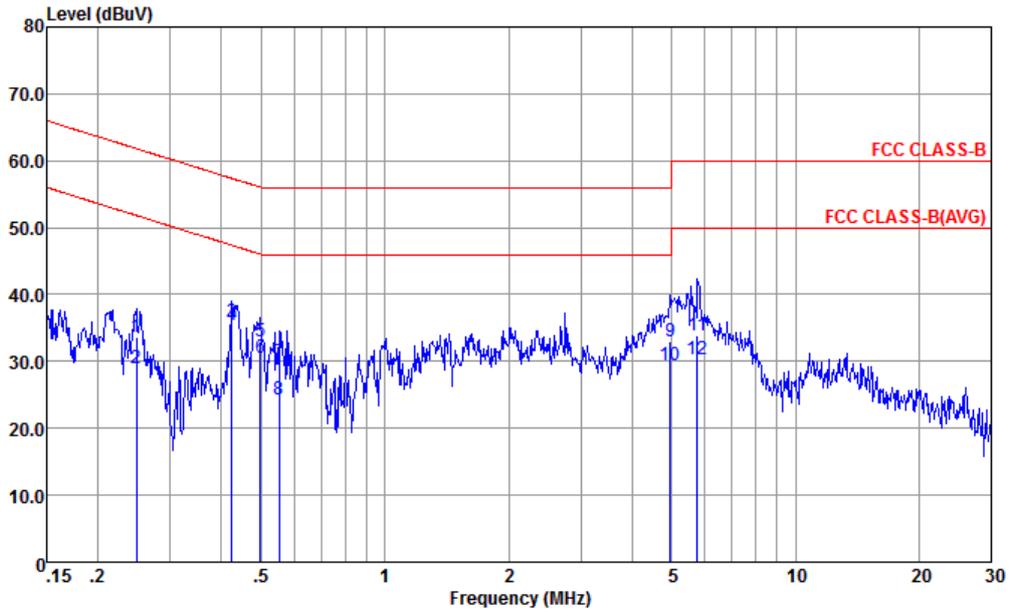
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 3	Temperature :	22~24°C
Test Engineer :	Eligah Wang	Relative Humidity :	55~58%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx		

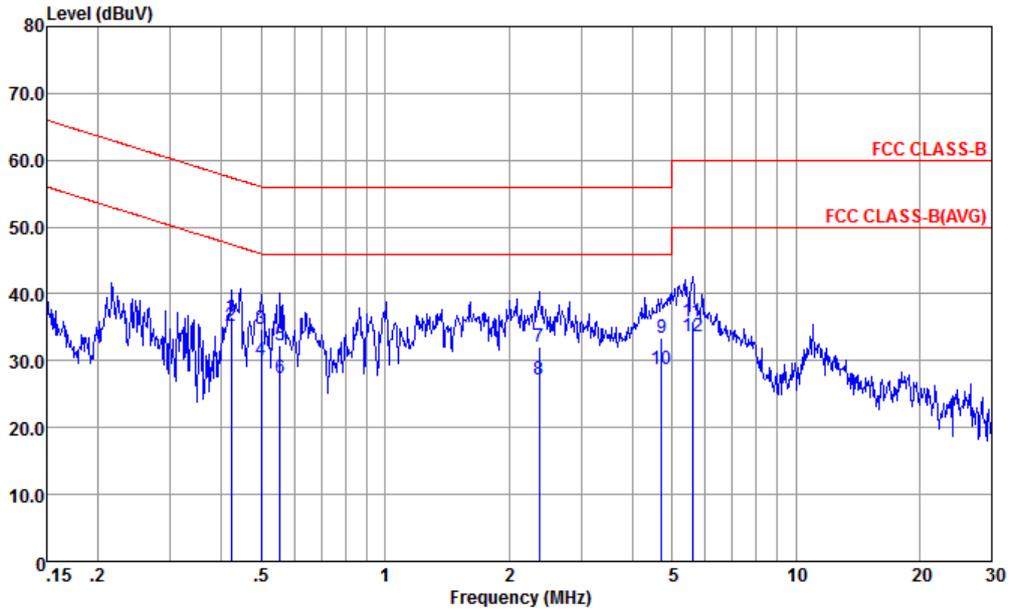


Site : CO01-KS
 Condition : FCC CLASS-B LISN-L20140306 LINE
 Project : (FC) 492504
 mode : Mode 3

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.25	33.69	-28.13	61.82	22.30	0.88	10.51	QP
2	0.25	28.89	-22.93	51.82	17.50	0.88	10.51	Average
3	0.42	35.86	-21.51	57.37	25.30	0.28	10.28	QP
4	0.42	35.36	-12.01	47.37	24.80	0.28	10.28	Average
5	0.50	33.07	-22.98	56.05	22.61	0.20	10.26	QP
6	0.50	30.57	-15.48	46.05	20.11	0.20	10.26	Average
7	0.55	29.75	-26.25	56.00	19.30	0.20	10.25	QP
8	0.55	24.35	-21.65	46.00	13.90	0.20	10.25	Average
9	4.95	32.96	-23.04	56.00	22.50	0.20	10.26	QP
10	4.95	29.36	-16.64	46.00	18.90	0.20	10.26	Average
11	5.77	33.98	-26.02	60.00	23.50	0.20	10.28	QP
12	5.77	30.28	-19.72	50.00	19.80	0.20	10.28	Average



Test Mode :	Mode 3	Temperature :	22~24°C
Test Engineer :	Eligah Wang	Relative Humidity :	55~58%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx		



Site : CO01-KS
 Condition : FCC CLASS-B LISN-N20140306 NEUTRAL
 Project : (FC) 492504
 mode : Mode 3

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.42	36.45	-20.97	57.42	25.80	0.37	10.28	QP
2	0.42	35.25	-12.17	47.42	24.60	0.37	10.28	Average
3	0.50	34.86	-21.15	56.01	24.30	0.30	10.26	QP
4	0.50	30.16	-15.85	46.01	19.60	0.30	10.26	Average
5	0.56	32.33	-23.67	56.00	21.81	0.27	10.25	QP
6	0.56	27.33	-18.67	46.00	16.81	0.27	10.25	Average
7	2.37	32.11	-23.89	56.00	21.80	0.11	10.20	QP
8	2.37	27.21	-18.79	46.00	16.90	0.11	10.20	Average
9	4.72	33.35	-22.65	56.00	22.90	0.20	10.25	QP
10	4.72	28.75	-17.25	46.00	18.30	0.20	10.25	Average
11	5.59	35.77	-24.23	60.00	25.30	0.20	10.27	QP
12	5.59	33.57	-16.43	50.00	23.10	0.20	10.27	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

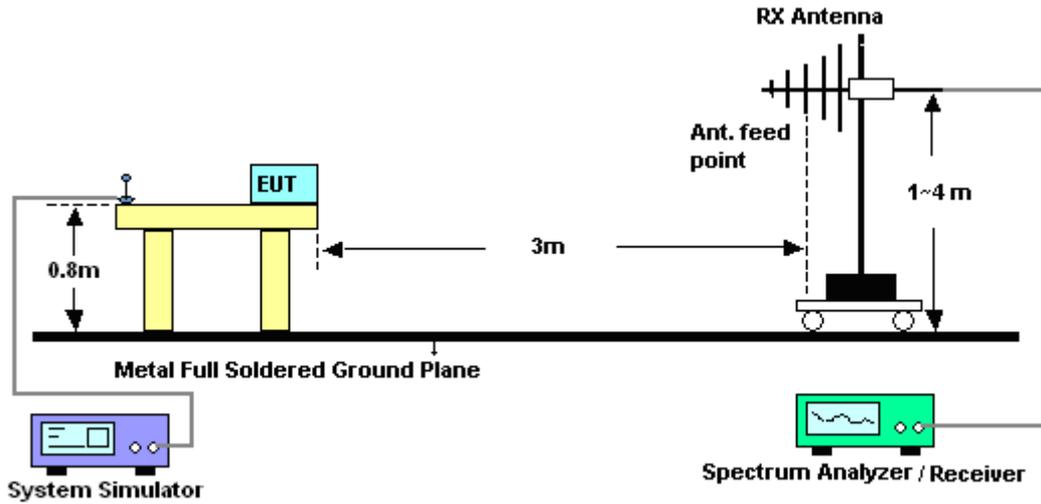
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

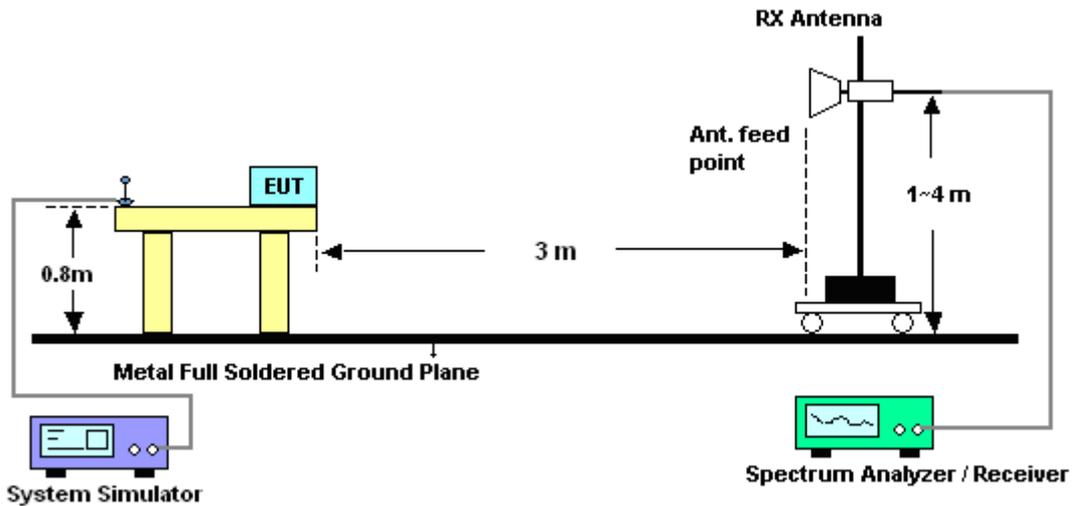
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBµV/m) = 20 log Emission level (µV/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



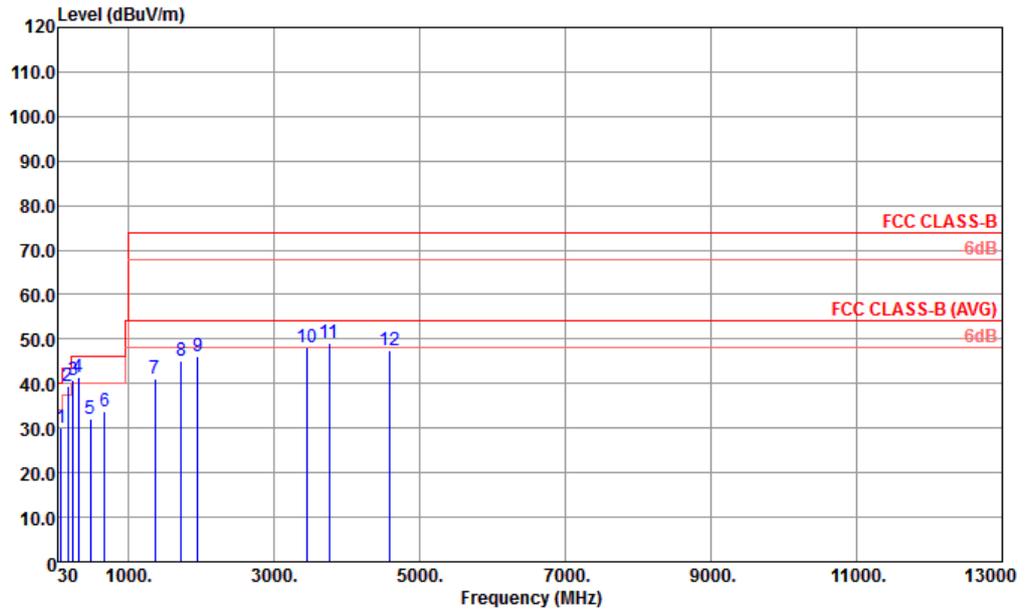
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 3	Temperature :	22~23°C
Test Engineer :	Star Wei	Relative Humidity :	40~41%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx		

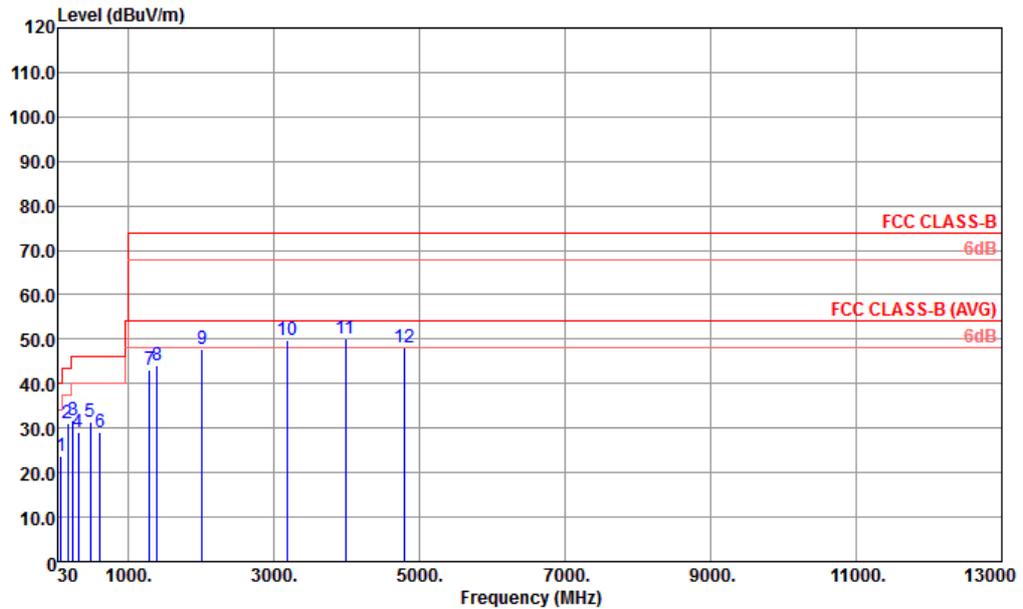


Site : 03CH01-KS
 Condition : FCC CLASS-B 3m LF_ANT_23182 HORIZONTAL
 Project : (FC) 492504
 Mode : 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	74.62	30.24	-9.76	40.00	57.24	5.80	0.80	33.60	---	Peak
2 !	165.80	39.57	-3.93	43.50	62.60	9.36	1.18	33.57	100	214 Peak
3 !	243.40	40.74	-5.26	46.00	61.05	11.70	1.44	33.45	---	Peak
4 !	314.21	41.36	-4.64	46.00	59.74	13.36	1.63	33.37	---	Peak
5	480.08	32.12	-13.88	46.00	46.41	16.87	2.00	33.16	---	Peak
6	676.02	33.77	-12.23	46.00	45.21	19.11	2.36	32.91	---	Peak
7	1362.00	40.96	-33.04	74.00	41.85	29.66	2.74	33.29	---	Peak
8	1728.00	45.02	-28.98	74.00	43.52	31.54	3.06	33.10	---	Peak
9	1956.00	46.26	-27.74	74.00	43.84	32.26	3.26	33.10	---	Peak
10	3460.00	48.17	-25.83	74.00	43.12	34.28	4.46	33.69	---	Peak
11	3762.00	49.18	-24.82	74.00	43.50	34.76	4.57	33.65	---	Peak
12	4584.00	47.55	-26.45	74.00	41.17	35.12	5.06	33.80	---	Peak



Test Mode :	Mode 3	Temperature :	22~23°C
Test Engineer :	Star Wei	Relative Humidity :	40~41%
Test Distance :	3m	Polarization :	Vertical
Function Type :	LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + USB Cable (Data Link with Notebook) + GPS Rx		



Site : 03CH01-KS
 Condition : FCC CLASS-B 3m LF_ANT_23182 VERTICAL
 Project : (FC) 492504
 Mode : 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	cm	deg	
			dB	dBuV/m	dBuV	dB	dB			
1	74.62	23.88	-16.12	40.00	50.88	5.80	0.80	33.60	---	Peak
2	165.80	31.05	-12.45	43.50	54.08	9.36	1.18	33.57	200	147 Peak
3	242.43	31.69	-14.31	46.00	52.04	11.66	1.44	33.45	---	Peak
4	314.21	29.05	-16.95	46.00	47.43	13.36	1.63	33.37	---	Peak
5	480.08	31.37	-14.63	46.00	45.66	16.87	2.00	33.16	---	Peak
6	614.91	29.04	-16.96	46.00	41.07	18.67	2.25	32.95	---	Peak
7	1296.00	43.19	-30.81	74.00	44.54	29.38	2.67	33.40	---	Peak
8	1392.00	44.17	-29.83	74.00	44.82	29.81	2.77	33.23	---	Peak
9	2018.00	47.71	-26.29	74.00	45.10	32.41	3.31	33.11	---	Peak
10	3190.00	49.72	-24.28	74.00	45.27	33.88	4.21	33.64	---	Peak
11	3982.00	49.97	-24.03	74.00	43.93	34.99	4.65	33.60	---	Peak
12	4790.00	48.25	-25.75	74.00	41.66	35.17	5.22	33.80	---	Peak



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	Nov. 05, 2013	Oct. 01, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Oct. 01, 2014	May 03, 2015	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Oct. 01, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Oct. 01, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Oct. 01, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Oct. 01, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 01, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Oct. 01, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Oct. 01, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Oct. 15, 2014	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 10, 2013	Oct. 15, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Dec. 10, 2013	Oct. 15, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Nov. 12, 2013	Oct. 15, 2014	Nov. 11, 2014	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% ($U = 2Uc(y)$)	2.3
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5
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