

FCC Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : USB Data Card
BRAND NAME : ZTE
MODEL NAME : MF861
FCC ID : SRQ-MF861
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Jan. 23, 2017 and testing was completed on Feb. 10, 2017. 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 C63.4-2014 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.



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Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC712302	Rev. 01	Initial issue of report	Feb. 28, 2017



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 11.36 dB at 0.444 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 12.00 dB at 53.760 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	USB Data Card
Brand Name	ZTE
Model Name	MF861
FCC ID	SRQ-MF861
EUT supports Radios application	WCDMA/HSPA/HSPA+ (16QAM uplink is not supported)/LTE
IMEI Code	Conduction/Radiation: 863832030001830
HW Version	MF861HW1.1
SW Version	MF861V1.3
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

Standards-related Product Specification	
Tx Frequency	WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz
Rx Frequency	WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 29 : 718.5 MHz ~ 726.5 MHz LTE Band 30 : 2352.5 MHz ~ 2357.5 MHz
Antenna Type	WWAN : Monopole Antenna
Type of Modulation	WCDMA : BPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (16QAM uplink is not supported) LTE: QPSK / 16QAM

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. 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 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 47 CFR FCC Part 15 Subpart B
- ♦ ANSI C63.4-2014

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

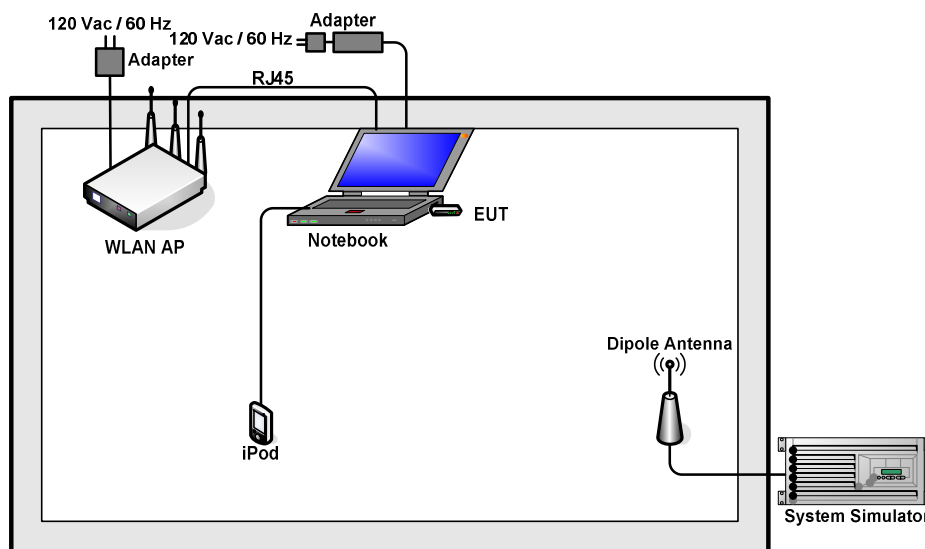
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 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).

Test Items	Function Type
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + USB Charging from Notebook
Radiated Emissions	Mode 1 : WCDMA Band V Idle + USB Charging from 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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	Lenovo	Latitude3440	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
6.	iPod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A

2.4. EUT Operation Test Setup

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

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.

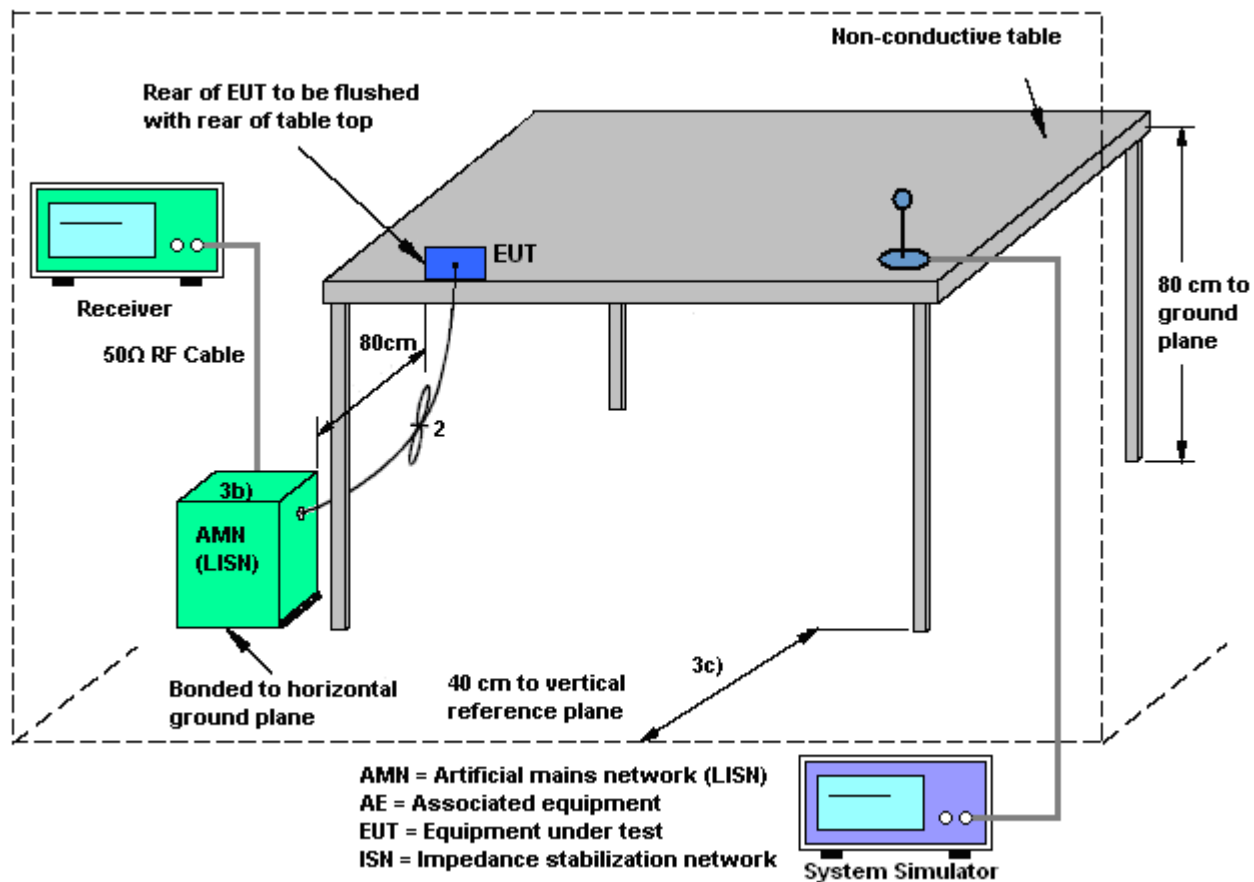
3.1.2 Measuring Instruments

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.

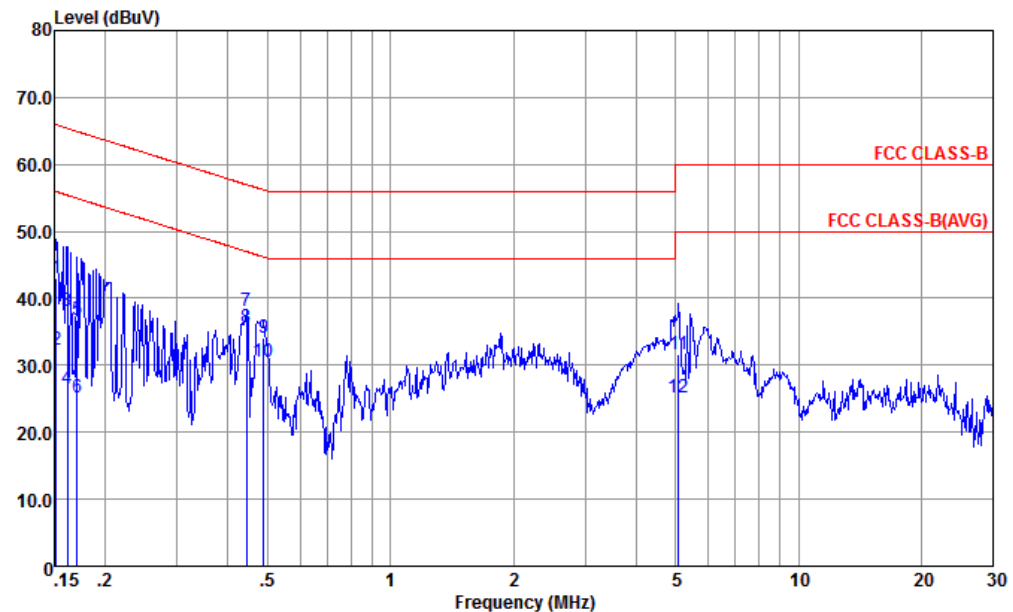
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + USB Charging from Notebook		



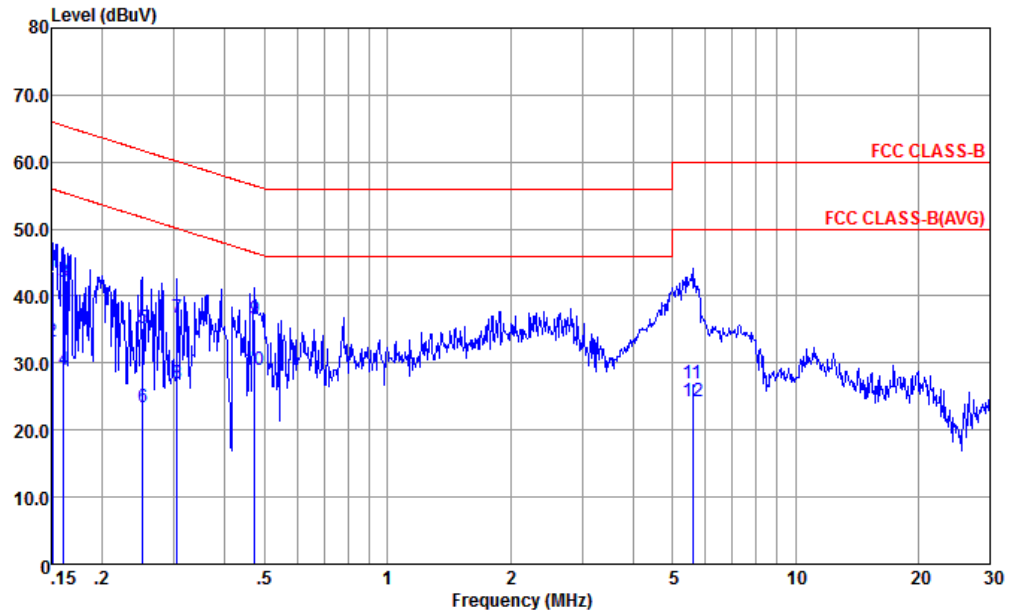
Site : CO01-KS
Condition : FCC CLASS-B LISN-L-20151024 LINE

mode : Mode 1
IMEI : 863832030001830
: #1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	43.01	-22.90	65.91	32.10	0.52	10.39	QP
2	0.152	32.31	-23.60	55.91	21.40	0.52	10.39	Average
3	0.162	38.03	-27.35	65.38	27.20	0.45	10.38	QP
4	0.162	26.43	-28.95	55.38	15.60	0.45	10.38	Average
5	0.170	36.86	-28.08	64.94	26.10	0.39	10.37	QP
6	0.170	25.26	-29.68	54.94	14.50	0.39	10.37	Average
7	0.444	38.02	-18.96	56.98	27.60	0.23	10.19	QP
8 *	0.444	35.62	-11.36	46.98	25.20	0.23	10.19	Average
9	0.489	34.02	-22.17	56.19	23.60	0.23	10.19	QP
10	0.489	30.52	-15.67	46.19	20.10	0.23	10.19	Average
11	5.085	31.64	-28.36	60.00	21.20	0.19	10.25	QP
12	5.085	25.24	-24.76	50.00	14.80	0.19	10.25	Average



Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + USB Charging from Notebook		



Site : CO01-KS
Condition : FCC CLASS-B LISN-N-20151024 NEUTRAL

mode : Mode 1
IMEI : 863832030001830
: #1

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.151	43.72	-22.24	65.96	33.03	0.30	10.39	QP
2	0.151	33.22	-22.74	55.96	22.53	0.30	10.39	Average
3	0.161	42.14	-23.29	65.43	31.46	0.30	10.38	QP
4	0.161	28.94	-26.49	55.43	18.26	0.30	10.38	Average
5	0.251	35.31	-26.42	61.73	24.71	0.31	10.29	QP
6	0.251	23.31	-28.42	51.73	12.71	0.31	10.29	Average
7	0.305	36.78	-23.32	60.10	26.22	0.31	10.25	QP
8	0.305	26.98	-23.12	50.10	16.42	0.31	10.25	Average
9	0.474	36.52	-19.93	56.45	26.01	0.32	10.19	QP
10 *	0.474	28.92	-17.53	46.45	18.41	0.32	10.19	Average
11	5.594	26.96	-33.04	60.00	16.37	0.34	10.25	QP
12	5.594	24.26	-25.74	50.00	13.67	0.34	10.25	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

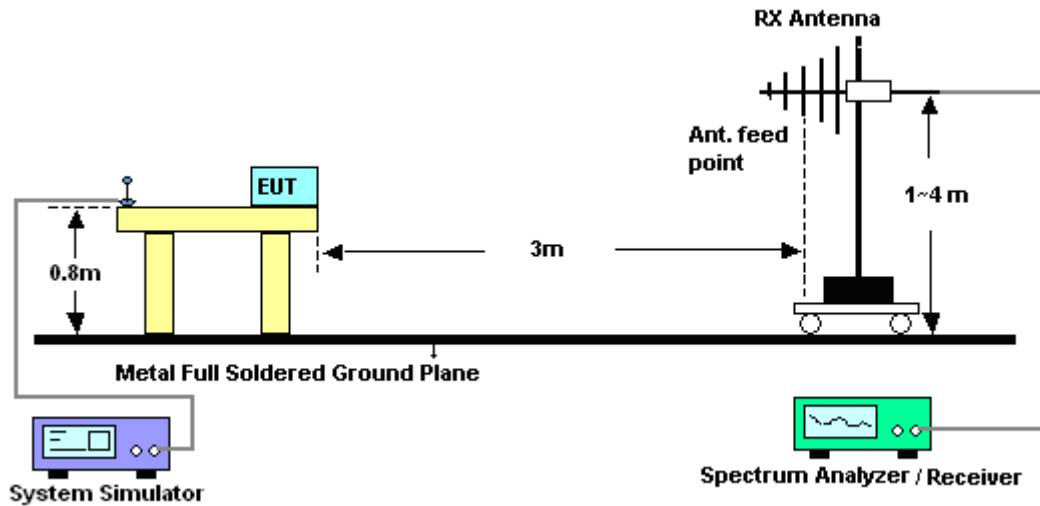
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

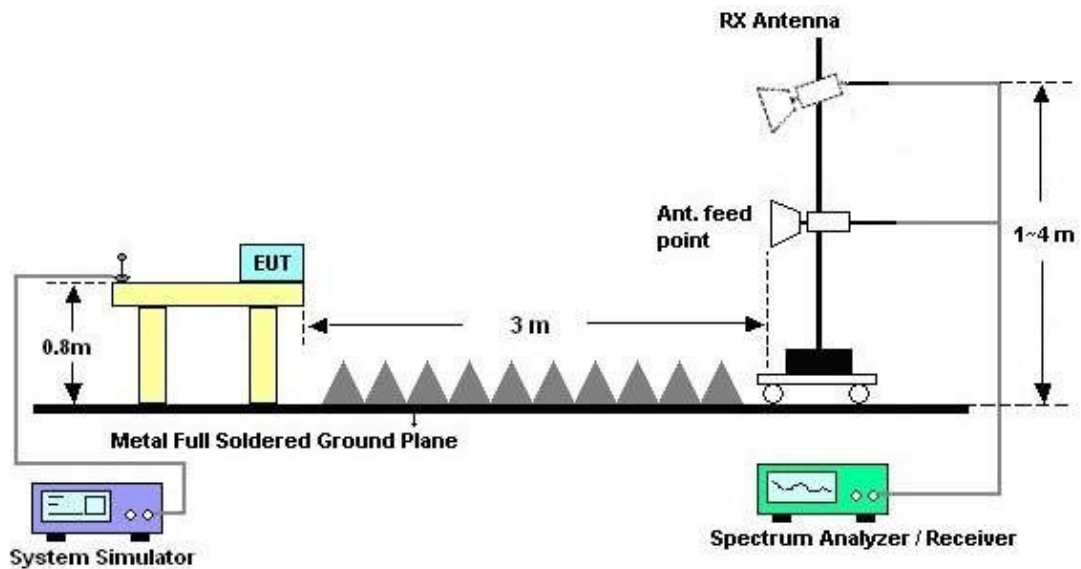
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 - Preamplifier Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



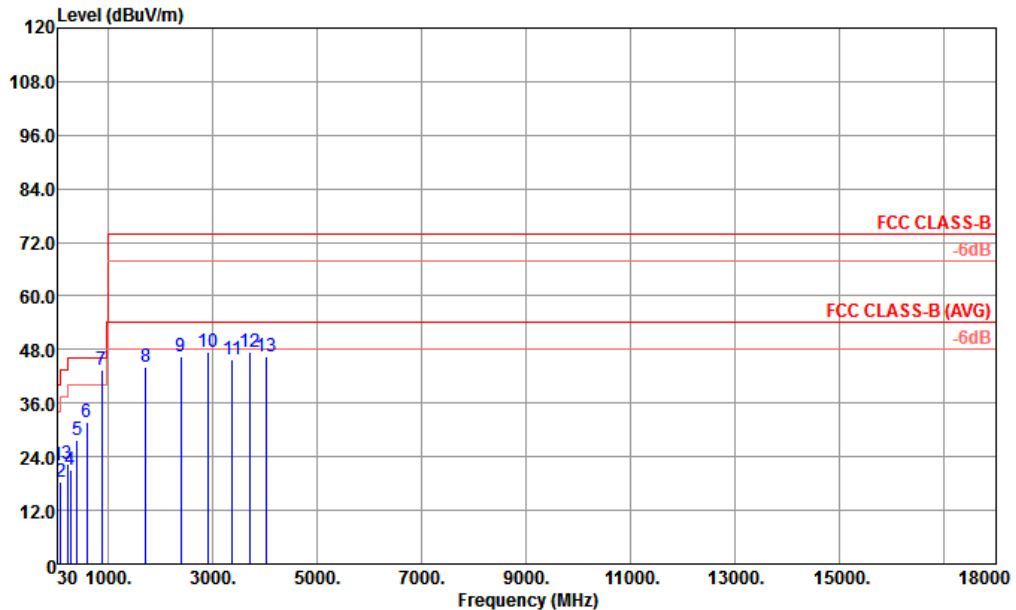
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Leo Liao	Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	WCDMA Band V Idle + USB Charging from Notebook		
Remark :	#7 is system simulator signal which can be ignored.		



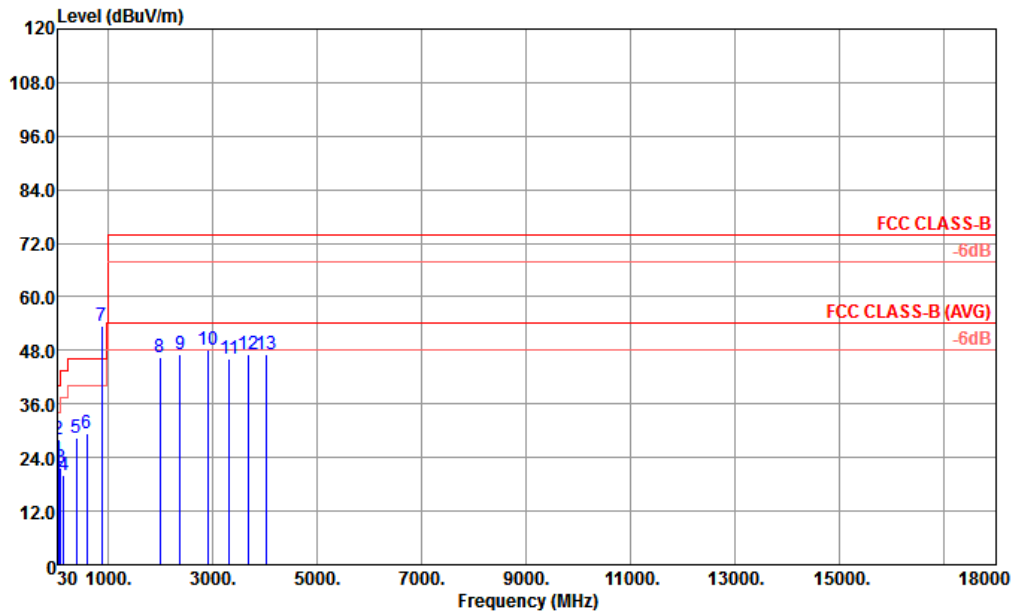
Site : 03CH02-KS
Condition : FCC CLASS-B 3m 966-02 LF ANT HORIZONTAL

Mode : 1
IMEI : 863832030001830 #1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	Level	Factor	Loss	Factor	cm	deg	
1	35.40	21.93	-18.07	40.00	29.26	24.30	0.12	31.75	---	---	Peak
2	100.20	18.50	-25.00	43.50	31.57	18.17	0.23	31.47	---	---	Peak
3	223.32	22.49	-23.51	46.00	36.81	16.27	0.45	31.04	---	---	Peak
4	286.77	21.21	-24.79	46.00	33.85	17.69	0.56	30.89	---	---	Peak
5	401.50	27.67	-18.33	46.00	32.00	25.28	0.93	30.54	---	---	Peak
6	597.50	31.79	-14.21	46.00	35.49	24.32	0.90	28.92	100	0	Peak
7 !	882.40	43.45			41.44	27.45	1.59	27.03	---	---	Peak
8	1728.00	44.08	-29.92	74.00	46.41	29.20	4.43	35.96	---	---	Peak
9	2392.00	46.47	-27.53	74.00	42.72	31.40	5.56	33.21	---	---	Peak
10	2902.00	47.41	-26.59	74.00	40.39	32.35	2.95	28.28	---	---	Peak
11	3381.00	45.87	-28.13	74.00	37.23	33.64	5.93	30.93	---	---	Peak
12	3723.00	47.56	-26.44	74.00	38.27	34.37	6.34	31.42	---	---	Peak
13	4038.00	46.46	-27.54	74.00	37.14	34.91	6.17	31.76	---	---	Peak



Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Leo Liao	Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical
Function Type :	WCDMA Band V Idle + USB Charging from Notebook		
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH02-KS
Condition : FCC CLASS-B 3m 966-02 LF ANT VERTICAL

Mode : 1
IMEI : 863832030001830 #1

	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	32.16	23.42	-16.58	40.00	29.75	25.30	0.11	31.74	---	---	Peak
2	53.76	28.00	-12.00	40.00	45.15	14.33	0.15	31.63	100	150	Peak
3	88.86	21.83	-21.67	43.50	36.52	16.75	0.21	31.65	---	---	Peak
4	145.29	20.08	-23.42	43.50	33.62	17.67	0.31	31.52	---	---	Peak
5	399.40	28.36	-17.64	46.00	32.79	25.20	0.92	30.55	---	---	Peak
6	598.20	29.56	-16.44	46.00	33.24	24.33	0.90	28.91	---	---	Peak
7 *	880.30	53.42			51.45	27.44	1.57	27.04	---	---	Peak
8	1992.00	46.49	-27.51	74.00	46.39	30.36	4.46	34.72	---	---	Peak
9	2380.00	47.13	-26.87	74.00	43.51	31.38	5.59	33.35	---	---	Peak
10	2914.00	48.16	-25.84	74.00	41.10	32.39	2.95	28.28	---	---	Peak
11	3321.00	46.00	-28.00	74.00	37.41	33.58	5.97	30.96	---	---	Peak
12	3678.00	47.17	-26.83	74.00	37.96	34.23	6.24	31.26	---	---	Peak
13	4026.00	47.09	-26.91	74.00	37.80	34.88	6.17	31.76	---	---	Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 29, 2016	Feb. 10, 2017	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Feb. 10, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Feb. 10, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Feb. 10, 2017	Oct. 12, 2017	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Feb. 07, 2017	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Feb. 07, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Aug. 20, 2016	Feb. 07, 2017	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Feb. 07, 2017	Oct. 21, 2017	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Feb. 07, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1-26.5GHz Gain 30dB	Oct. 13, 2016	Feb. 07, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Feb. 07, 2017	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 07, 2017	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 07, 2017	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required



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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7dB
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