FCC Test Report

APPLICANT	:	FIBOCOM WIRELESS INC.
EQUIPMENT	:	LTE Module
BRAND NAME	:	Fibocom
MODEL NAME	:	L830-EA
FCC ID	:	ZMOL830
STANDARD	:	FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION	:	Certification

The product was received on Aug. 25, 2015 and testing was completed on Oct. 10, 2015. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2009 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Prepared by: Andy Yeh / Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
2353

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC582503	Rev. 01	Initial issue of report	Jan. 27, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.31 dB at 38.910 MHz

1. General Description

1.1. Applicant

FIBOCOM WIRELESS INC.
5/F, Tower A, Technology Building II,1057# Nanhai Blvd, Shenzhen, P.R.China

1.2. Manufacturer

FIBOCOM WIRELESS INC.
5/F, Tower A, Technology Building II,1057# Nanhai Blvd, Shenzhen, P.R.China

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE Module
Brand Name	Fibocom
Model Name	L830-EA
FCC ID	ZMOL830
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/DC-HSDPA/LTE
IMEI Code	Radiation:867603020008762
HW Version	V1.0.2
SW Version	L830_V3E.1C.01.00
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	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 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 26: 814.7 MHz ~ 848.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 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 IV : 2112.4 MHz ~ 2152.6 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 26 : 859.7 MHz ~ 893.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz GPS: 1.57542 GHz Glonass : 1602 MHz + n× 0.5625MHz *(n=−7,−6,−5,...0,...,6)*
Antenna Type	WWAN : Fixed External Antenna GPS/ Glonass: PANNEL Antenna
Type of Modulation	GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : QPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (16QAM uplink is not supported) DC-HSDPA : 64QAM LTE: QPSK / 16QAM GPS/Glonass : 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 (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Registration No.**
	03CH01-SZ	831040

1.7. Applicable Standards

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

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

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

2. Test Configuration of Equipment Under Test

2.1. Test Mode

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

Frequency range investigated: 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.

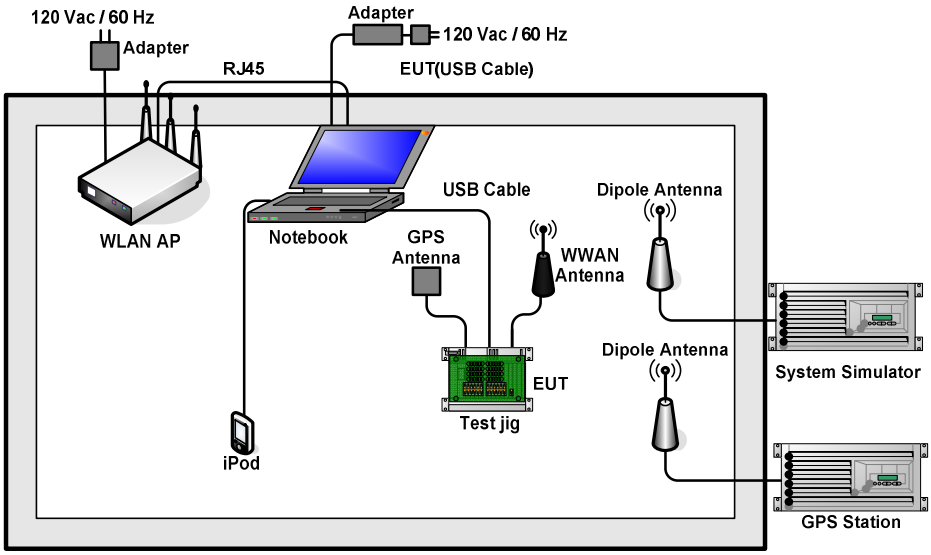
Item	EUT Configuration	Test Condition
		EMI RE
1.	Charging Mode (EUT with notebook)	☒

Abbreviations:

- EMI RE: EUT radiated emissions

Test Items	EUT Configure Mode	Function Type
Radiated Emissions	1	Mode 1: GPRS850 Idle + USB Cable (Charging from Notebook) + GPS Rx

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	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	ADIVIC	MP9000	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	ASUSTeK	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 2.7 m
4.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	USB Cable	N/A	N/A	N/A	N/A	Unshielded, 1.5 m
6.	iPod	Apple	MC525 ZP/A	FCC DoC	Shielded, 1.0 m	N/A
7.	GPS Antenna	N/A	N/A	N/A	N/A	N/A
8.	WWAN Antenna	N/A	N/A	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was in GPRS 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 Radiated Emission Measurement

3.1.1. 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

3.1.2. Measuring Instruments

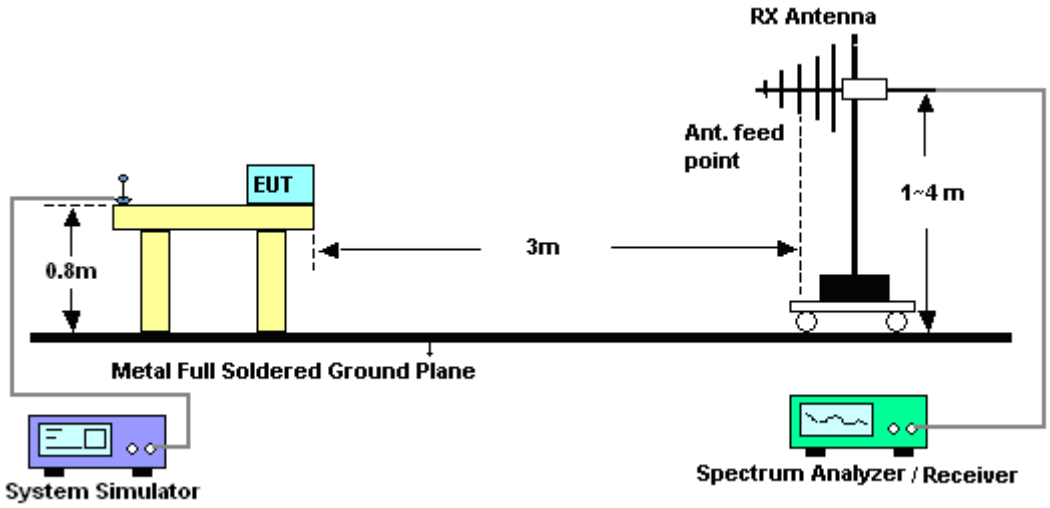
The measuring equipment is listed in the section 4 of this test report.

3.1.3. Test Procedures

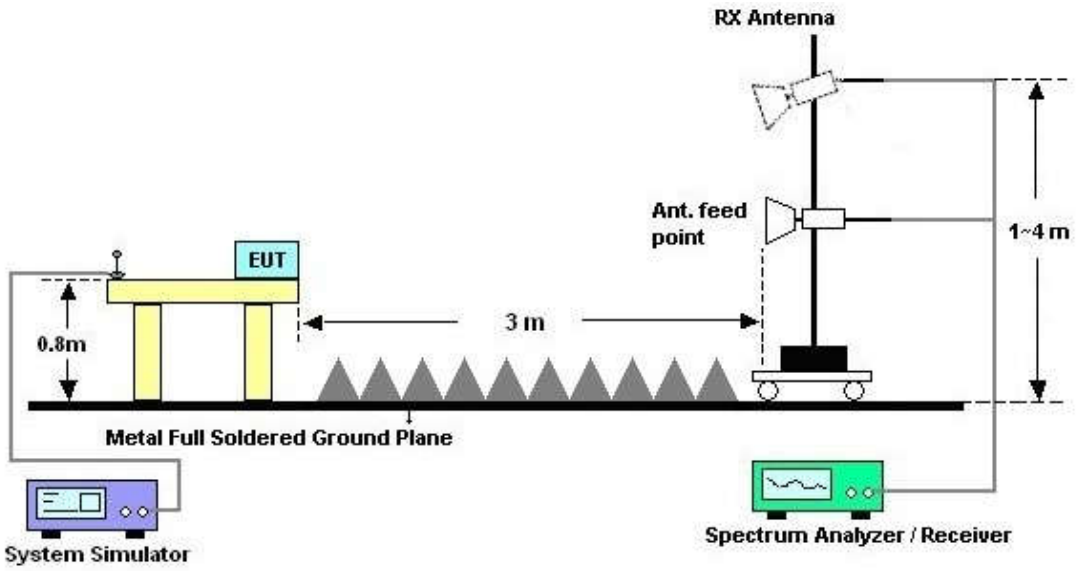
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

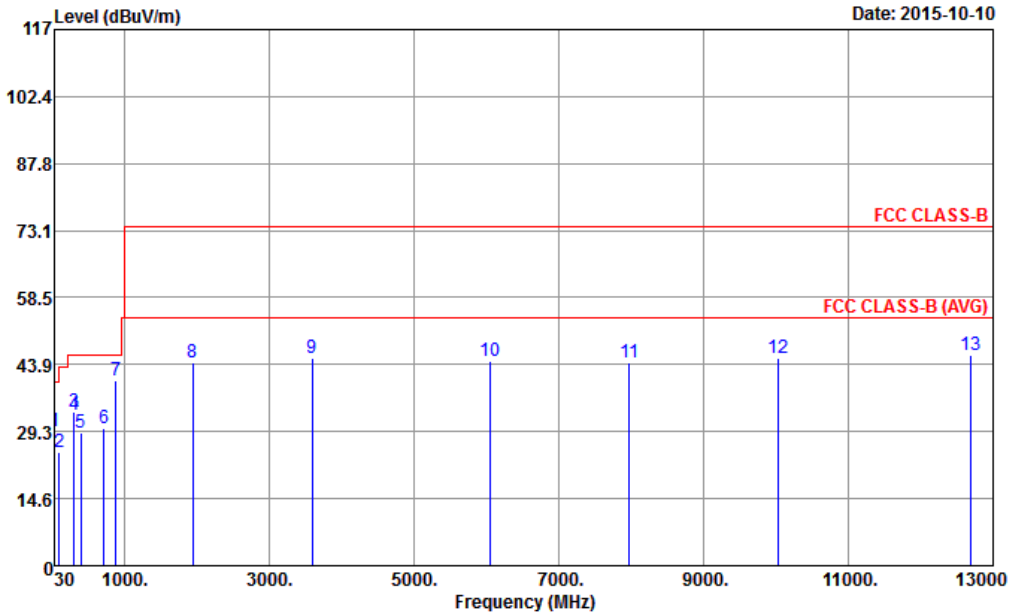


For radiated emissions above 1GHz



3.1.5. Test Result of Radiated Emission

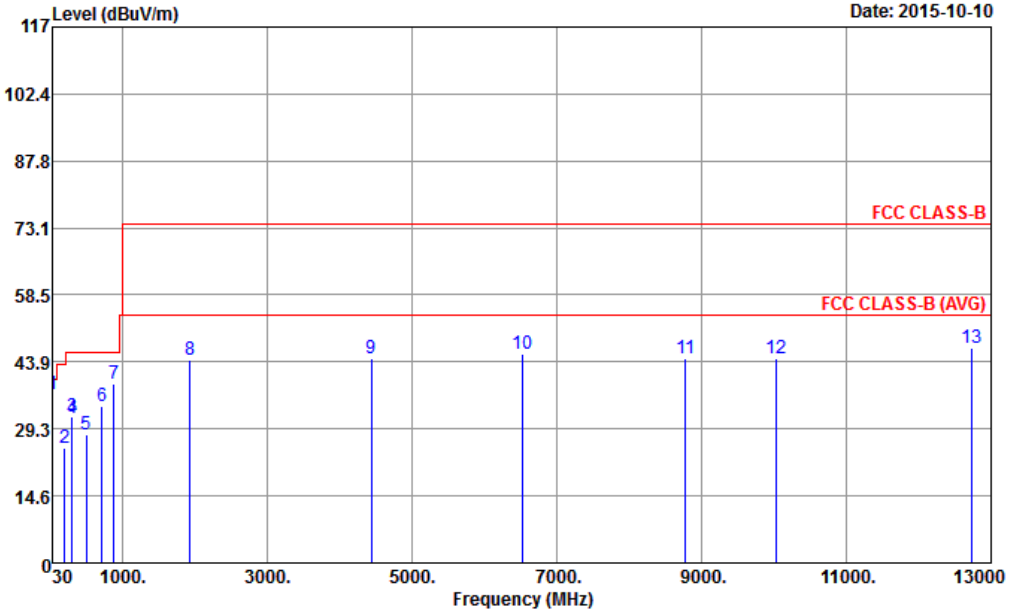
Test Mode :	Mode 1	**Temperature :**	23~25°C
Test Engineer :	Kaer Huang	**Relative Humidity :**	48~52%
Test Distance :	3m	**Polarization :**	Horizontal
Function Type :	GPRS850 Idle + USB Cable (Charging from Notebook) + GPS Rx		
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH01-SZ
Condition : FCC CLASS-B 3m LF_ANT_141107 HORIZONTAL
Project : (FC) 582503
Mode : Mode 1
IMEI : 867603020008762

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.81	29.25	-10.75	40.00	29.45	25.09	0.77	26.06	100	20	Peak
2	99.93	24.80	-18.70	43.50	37.38	11.70	1.50	25.78	---	---	Peak
3	299.73	33.58	-12.42	46.00	41.87	14.10	2.65	25.04	---	---	Peak
4	300.00	32.83	-13.17	46.00	41.12	14.10	2.65	25.04	---	---	Peak
5	391.00	29.04	-16.96	46.00	36.40	15.29	3.09	25.74	---	---	Peak
6	715.10	30.11	-15.89	46.00	31.16	20.62	4.67	26.34	---	---	Peak
7	881.70	40.57			39.40	21.77	5.33	25.93	---	---	Peak
8	1940.00	44.16	-29.84	74.00	32.66	31.59	9.48	29.57	---	---	Peak
9	3590.00	45.45	-28.55	74.00	26.56	33.49	13.76	28.36	---	---	Peak
10	6058.00	44.70	-29.30	74.00	20.84	35.87	16.08	28.09	---	---	Peak
11	7978.00	44.31	-29.69	74.00	16.99	36.49	17.35	26.52	---	---	Peak
12	10026.00	45.35	-28.65	74.00	13.36	38.13	19.13	25.27	---	---	Peak
13	12686.00	45.83	-28.17	74.00	12.21	39.19	18.63	24.20	100	30	Peak

Test Mode :	Mode 1	Temperature :	23~25°C
Test Engineer :	Kaer Huang	Relative Humidity :	48~52%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GPRS850 Idle + USB Cable (Charging from Notebook) + GPS Rx		
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH01-SZ
Condition : FCC CLASS-B 3m LF_ANT_141107 VERTICAL
Project : (FC) 582503
Mode : Mode 1
IMEI : 867603020008762

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	38.91	36.69	-3.31	40.00	45.84	16.01	0.86	26.02	150	60	Peak
2	199.83	25.06	-18.44	43.50	36.57	11.60	2.14	25.25	---	---	Peak
3	299.73	31.93	-14.07	46.00	40.22	14.10	2.65	25.04	---	---	Peak
4	300.00	31.59	-14.41	46.00	39.88	14.10	2.65	25.04	---	---	Peak
5	499.50	28.15	-17.85	46.00	31.48	19.36	3.64	26.33	---	---	Peak
6	715.10	34.19	-11.81	46.00	35.24	20.62	4.67	26.34	---	---	Peak
7	881.70	39.26			38.09	21.77	5.33	25.93	---	---	Peak
8	1932.00	44.39	-29.61	74.00	32.89	31.59	9.48	29.57	---	---	Peak
9	4440.00	44.51	-29.49	74.00	23.57	34.16	15.06	28.28	---	---	Peak
10	6522.00	45.54	-28.46	74.00	20.46	36.29	16.63	27.84	---	---	Peak
11	8778.00	44.55	-29.45	74.00	16.10	36.54	17.93	26.02	---	---	Peak
12	10036.00	44.52	-29.48	74.00	12.59	38.14	19.06	25.27	---	---	Peak
13	12732.00	46.83	-27.17	74.00	13.18	39.16	18.68	24.19	150	90	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver&SA	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2015	Oct. 10, 2015	May 25, 2016	Radiation (03CH01-SZ)
Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz;Max 30dBm	Jun. 07, 2015	Oct. 10, 2015	Jun. 06, 2016	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz~2GHz	Nov. 07, 2014	Oct. 10, 2015	Nov. 06, 2015	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Oct. 15, 2014	Oct. 10, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz ~3000MHz / 30 dB	Jan. 28, 2015	Oct. 10, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 28, 2015	Oct. 10, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Oct. 10, 2015	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Oct. 10, 2015	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Oct. 10, 2015	NCR	Radiation (03CH01-SZ)

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))	**4.8 dB**