



FCC Test Report

APPLICANT : Locus Solutions, LLC
EQUIPMENT : 2G/3G Tracker
BRAND NAME : Emerson
MODEL NAME : GO Real-Time 2G/3G
FCC ID : AMH101009
STANDARD : FCC CFR Title 47 Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Mar. 05, 2018 and testing was completed on Apr. 03, 2018. 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 C63.4-2014 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.



Approved by: Eric Shih / Manager

Sporton International (Shenzhen) Inc.

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City
Guangdong Province 518055 China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC830506	Rev. 01	Initial issue of report	Jun. 20, 2018



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 13.67 dB at 0.17 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 10.32 dB at 687.66 MHz for peak



1. General Description

1.1. Applicant

Locus Solutions, LLC

7121 Fairway Dr. Suite #400 | Palm Beach Gardens, FL 33418 USA

1.2. Manufacturer

Shenzhen Zhenhua Communication Equipment Co. Ltd

Zhenhua Industrial Park, No.44, Tiezai Rd., Xixiang Town, BaoAn, Shenzhen, Guang Dong, China

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	2G/3G Tracker
Brand Name	Emerson
Model Name	GO Real-Time 2G/3G
FCC ID	AMH101009
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA
HW Version	BV0
SW Version	ENG3606
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. There are two types of EUT: Sample1 uses the 5400mA battery pack, Sample2 uses the 1800mA battery pack. According to the difference, Sample 1 is assessed to full test, Sample2 verify the worst case.



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 II: 1852.4 MHz ~ 1907.6 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
Antenna Type	WWAN : PIFA
Type of Modulation	GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink)

1.5. Modification of EUT

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



1.6. Test Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	Sporton Site No.	FCC Test Firm Registration No.
	CO01-SZ	251365

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.
	03CH01-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 CFR Title 47 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

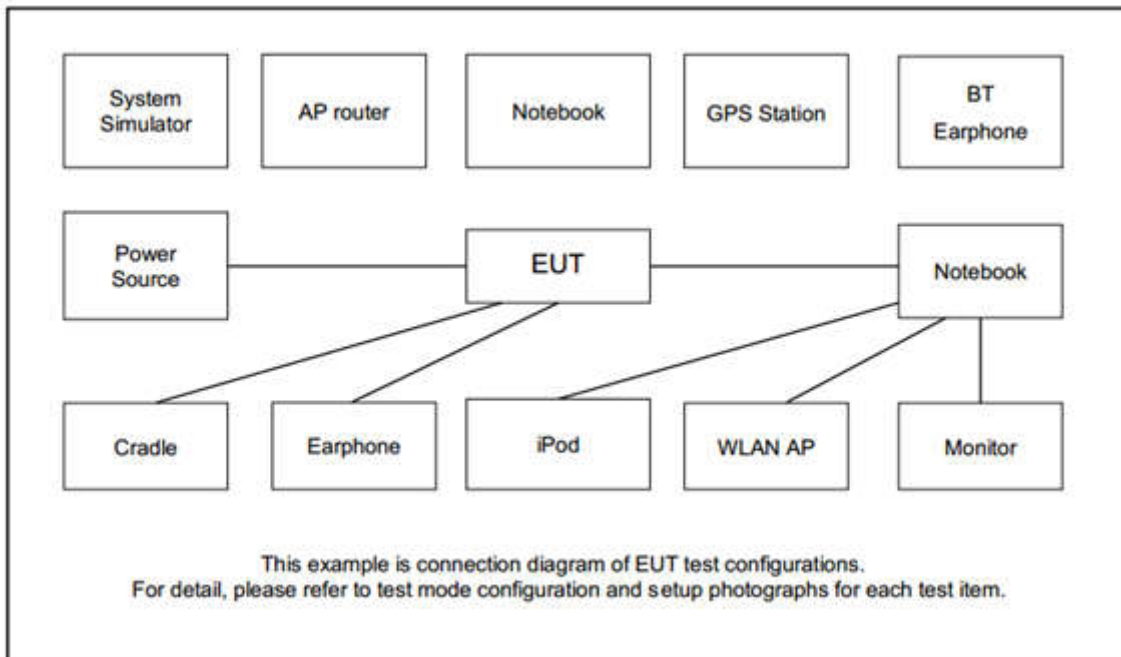
2.1. Test Mode

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 emission (150 kHz to 30 MHz), radiation emission (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: GPRS1900 Link + Battery + USB Cable (Charging from Notebook) for Sample 1
	Mode 2: WCDMA Band I Link + Battery + USB Cable (Charging from Notebook) for Sample 1
	Mode 3: GPRS1900 Link + Battery + USB Cable (Charging from Notebook) for Sample 2
Radiated Emissions	Mode 1: GPRS1900 Link + Battery + USB Cable (Charging from Notebook) for Sample 1
	Mode 2: WCDMA Band I Link + Battery + USB Cable (Charging from Notebook) for Sample 1
	Mode 3: WCDMA Band I Link + Battery + USB Cable (Charging from Notebook) for Sample 2
Remark:	
1. The worst case of AC is mode 3; only the test data of this mode is reported.	
2. The worst case of RE is mode 2; only the test data of this mode is reported.	

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, 1.8m
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	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.	iPod nano 8GB	Apple	MC690ZP/A	FCC DoC	Unshielded, 1.2 m	N/A
6.	iPod	Apple	MC525 ZP/A	FCC DoC	Unshielded, 1.0 m	N/A
7.	USB Cable	Motorola	SKN6378A	FCC DoC	Shielded, 0.6m	N/A

2.4. EUT Operation Test Setup

1. The EUT was in GPRS or WCDMA idle/Link mode during the testing.
2. The EUT was charging from Notebook.



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.

<Class B Limit>

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.

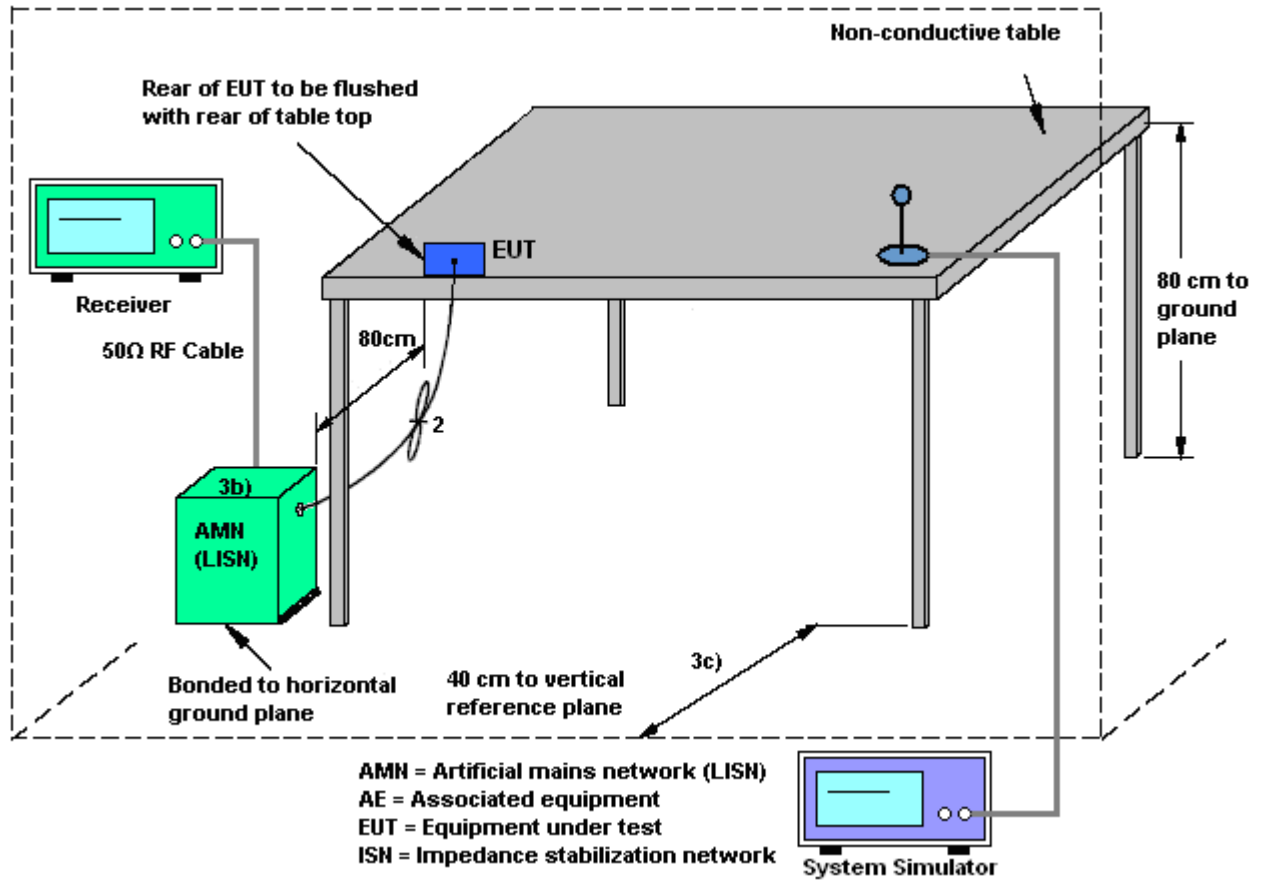
3.1.2 Measuring Instruments

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.

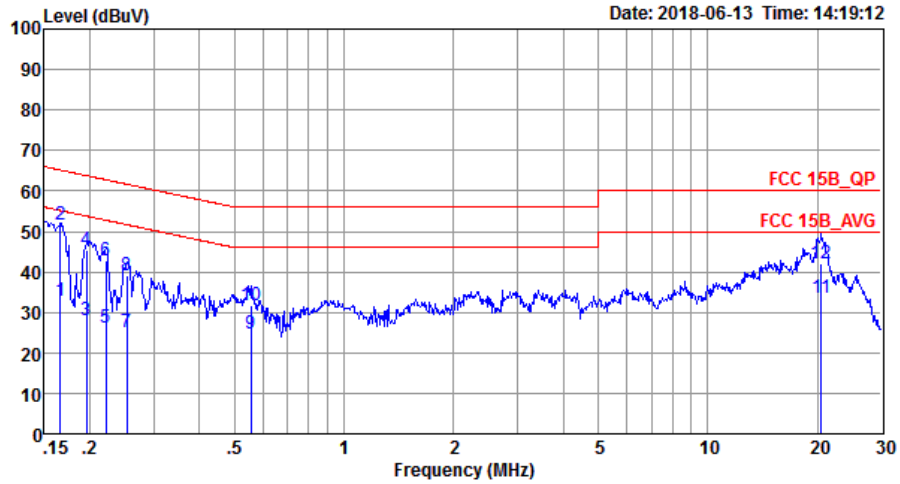
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Engineer :	Lion Gao	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line

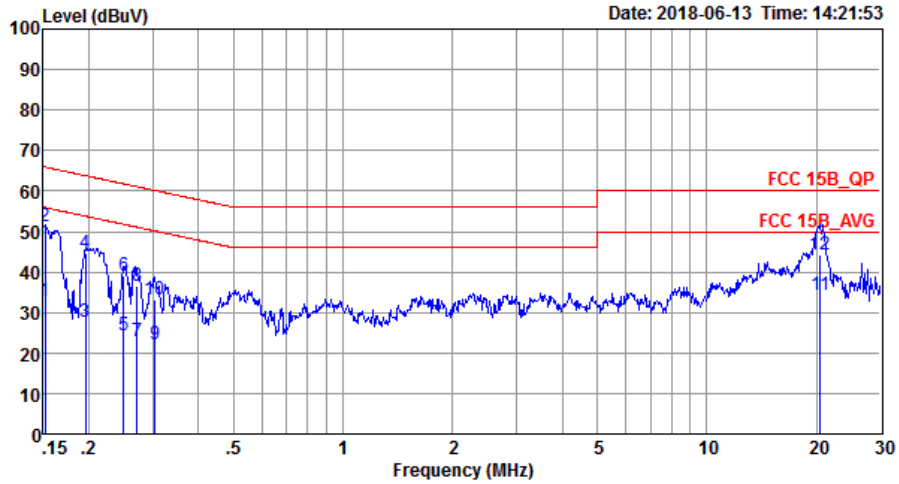


Site : CO01-SZ
 Condition: FCC 15B_QP LISN_20170907_L LINE
 Project : 830506

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	32.90	-22.26	55.16	22.80	0.03	10.07	Average
2 *	0.17	51.49	-13.67	65.16	41.39	0.03	10.07	QP
3	0.20	28.20	-25.60	53.80	18.10	0.03	10.07	Average
4	0.20	45.30	-18.50	63.80	35.20	0.03	10.07	QP
5	0.22	26.20	-26.54	52.74	16.10	0.03	10.07	Average
6	0.22	42.90	-19.84	62.74	32.80	0.03	10.07	QP
7	0.25	25.00	-26.64	51.64	14.90	0.03	10.07	Average
8	0.25	39.20	-22.44	61.64	29.10	0.03	10.07	QP
9	0.56	24.80	-21.20	46.00	14.70	0.02	10.08	Average
10	0.56	31.70	-24.30	56.00	21.60	0.02	10.08	QP
11	20.49	33.57	-16.43	50.00	21.89	1.32	10.36	Average
12	20.49	42.07	-17.93	60.00	30.39	1.32	10.36	QP



Test Engineer :	Lion Gao	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Site : CO01-SZ
 Condition: FCC 15B_QP LISN_20170907_N NEUTRAL
 Project : 830506

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	32.99	-22.92	55.91	22.90	0.03	10.06	Average
2 *	0.15	51.29	-14.62	65.91	41.20	0.03	10.06	QP
3	0.20	27.70	-26.10	53.80	17.60	0.03	10.07	Average
4	0.20	44.70	-19.10	63.80	34.60	0.03	10.07	QP
5	0.25	24.20	-27.58	51.78	14.10	0.03	10.07	Average
6	0.25	39.00	-22.78	61.78	28.90	0.03	10.07	QP
7	0.27	22.71	-28.36	51.07	12.60	0.03	10.08	Average
8	0.27	36.71	-24.36	61.07	26.60	0.03	10.08	QP
9	0.30	22.31	-27.84	50.15	12.20	0.03	10.08	Average
10	0.30	33.31	-26.84	60.15	23.20	0.03	10.08	QP
11	20.49	34.38	-15.62	50.00	23.40	0.62	10.36	Average
12	20.49	44.38	-15.62	60.00	33.40	0.62	10.36	QP



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:

<Class B Limit>

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.

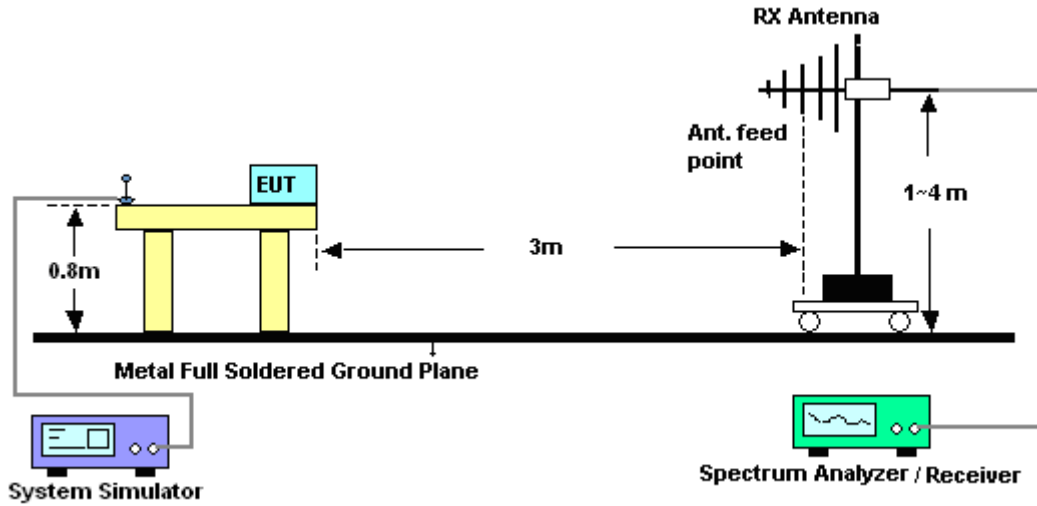


3.2.3. Test Procedures

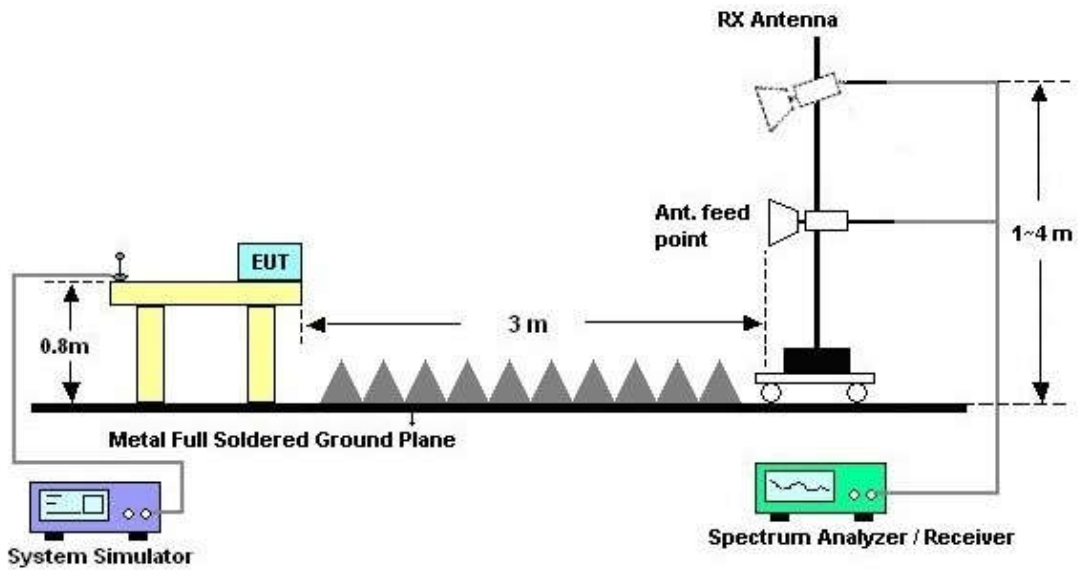
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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



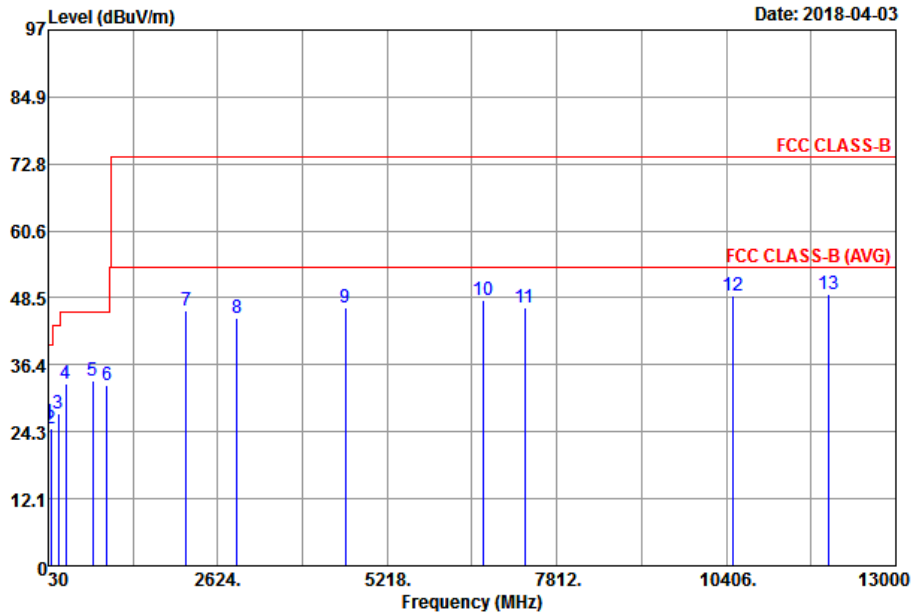
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Engineer :	Maker Qi	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Horizontal
Remark :	#7 is system simulator signal which can be ignored.		



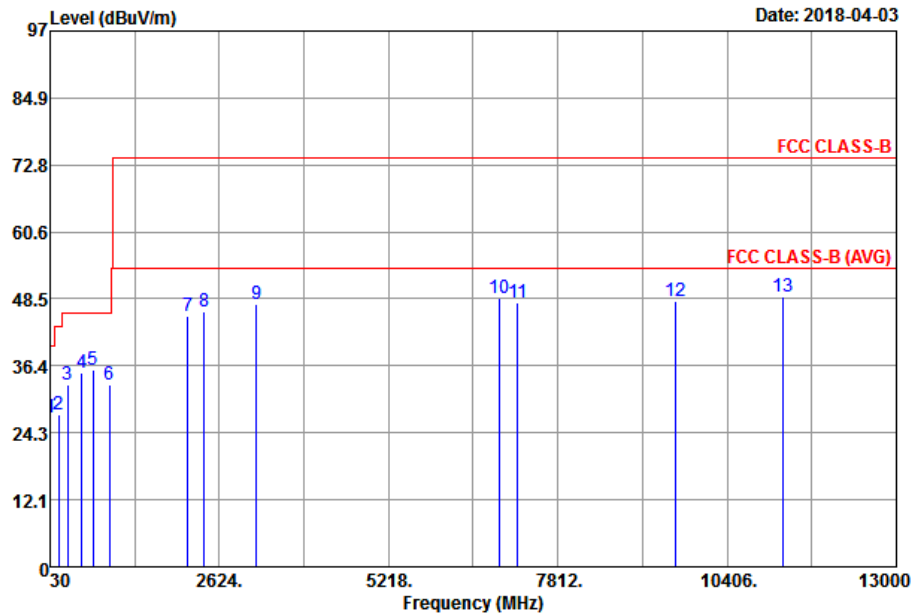
Site : 03CH01-SZ
 Condition : FCC CLASS-B 3m LF_CBL6112D-37879 HORIZONTAL
 Project : 830506

Plane : Y
 : USB Cable (Charging from NB)

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	30.00	26.05	-13.95	40.00	30.72	26.70	0.23	31.60	---	---	Peak
2	74.62	24.76	-15.24	40.00	40.31	15.40	0.65	31.60	---	---	Peak
3	179.38	27.68	-15.82	43.50	39.82	17.66	1.48	31.28	---	---	Peak
4	298.69	33.08	-12.92	46.00	42.96	19.17	2.04	31.09	---	---	Peak
5	715.79	33.38	-12.62	46.00	33.73	27.55	3.33	31.23	100	0	Peak
6	924.34	32.80	-13.20	46.00	31.08	29.14	3.88	31.30	---	---	Peak
7	2140.00	46.25			66.65	31.47	6.29	58.16	---	---	Peak
8	2914.00	44.72	-29.28	74.00	61.35	32.41	8.34	57.38	---	---	Peak
9	4582.00	46.80	-27.20	74.00	60.88	33.87	10.64	58.59	---	---	Peak
10	6682.00	48.23	-25.77	74.00	55.90	34.99	15.69	58.35	---	---	Peak
11	7320.00	46.76	-27.24	74.00	55.85	35.49	13.29	57.87	---	---	Peak
12	10506.00	48.78	-25.22	74.00	52.93	37.10	14.65	55.90	---	---	Peak
13	11980.00	49.24	-24.76	74.00	50.40	38.47	15.00	54.63	100	0	Peak



Test Engineer :	Maker Qi	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH01-SZ
 Condition : FCC CLASS-B 3m LF_CBL6112D-37879 VERTICAL
 Project : 830506

Plane : Y
 : USB Cable (Charging from NB)

	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	34.85	27.13	-12.87	40.00	32.51	25.90	0.32	31.60	---	Peak
2	165.80	27.55	-15.95	43.50	39.37	18.10	1.41	31.33	---	Peak
3	298.69	32.93	-13.07	46.00	42.81	19.17	2.04	31.09	---	Peak
4	515.00	35.20	-10.80	46.00	39.53	24.05	2.75	31.13	---	Peak
5	687.66	35.68	-10.32	46.00	36.84	26.80	3.24	31.20	100	Peak
6	936.95	33.01	-12.99	46.00	30.93	29.47	3.91	31.30	---	Peak
7	2140.00	45.34			65.74	31.47	6.29	58.16	---	Peak
8	2390.00	46.22	-27.78	74.00	65.82	31.50	6.81	57.91	---	Peak
9	3188.00	47.59	-26.41	74.00	61.89	34.40	9.04	57.74	---	Peak
10	6920.00	48.65	-25.35	74.00	57.40	34.93	15.08	58.76	---	Peak
11	7194.00	47.80	-26.20	74.00	57.31	35.24	13.55	58.30	---	Peak
12	9624.00	48.15	-25.85	74.00	53.88	36.50	13.13	55.36	---	Peak
13	11262.00	48.97	-25.03	74.00	52.28	37.56	14.82	55.69	100	Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2017	Mar. 23, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Dec. 26, 2017	Mar. 23, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Nov. 01, 2017	Mar. 23, 2018	Oct. 31, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 19, 2017	Mar. 23, 2018	Jul. 18, 2018	Conduction (CO01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Apr. 20, 2017	Apr. 03, 2018	Apr. 19, 2018	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5GHz	Oct. 19, 2017	Apr. 03, 2018	Oct. 18, 2018	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	May 10, 2017	Apr. 03, 2018	May 09, 2018	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	119436	1GHz~18GHz	Jul. 28, 2017	Apr. 03, 2018	Jul. 27, 2018	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 20, 2017	Apr. 03, 2018	Apr. 19, 2018	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1707137	1GHz~18GHz	Oct. 19, 2017	Apr. 03, 2018	Oct. 18, 2018	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Apr. 03, 2018	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 03, 2018	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 03, 2018	NCR	Radiation (03CH01-SZ)

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% ($U = 2Uc(y)$)	2.6 dB
-------------------------------------------------------------------------	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8 dB
-------------------------------------------------------------------------	--------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
-------------------------------------------------------------------------	--------