FCC Test Report

APPLICANT	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**Lenovo TB-8304F1**
FCC ID	:	**O57TB8304F1**
STANDARD	:	**FCC 47 CFR FCC Part 15 Subpart B**
CLASSIFICATION	:	**Certification**

The product was received on Jan. 09, 2018 and testing was completed on Mar. 15, 2018. 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.

James Huang

TESTING
NVLAP LAB CODE 600155-0

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC810905	Rev. 01	Initial issue of report	Mar. 27, 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 10.94 dB at 0.375 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.89 dB at 479.900 MHz for Quasi-Peak

1. General Description

1.1. Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.
NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

1.2. Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo TB-8304F1
FCC ID	O57TB8304F1
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/ WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.1 LE/Bluetooth v4.2 LE
HW Version	Lenovo Tablet TB-8304F1
SW Version	TB-8304F1_RF01_180208
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	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz GPS : 1.57542 GHz FM : 88 MHz ~ 108 MHz
Antenna Type	WLAN : IFA Antenna Bluetooth : IFA Antenna GPS: IFA Antenna FM: External headset Antenna
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps) : 8-DPSK GPS : BPSK FM

1.5. Component List

There are four samples under test, the differences of four samples are shown in the table below.

Based on the similarity of four samples, sample 1 perform full test and sample 2 verify the worse cases.

Object	Sample 1	Sample 2
LPDDR3 EMCP	Samsung: KMQE60013M-B318 (2+16G)	Hynix: H9TQ17ABJTBCUR-KUM (2+16G)
PCB	CEE: A5e5b_MainboardPCB	Huashen: A5e5b_Mainboard PCB
Battery	Sunwoda: L16D1P34	SCUD: L16D1P34
speakerBox1	Xichundz: ZA2060AAA601USAA_Speaker Box_1511_FPC_Xichundz	Keysound: ZA2060AAA601USAA_Speaker Box_1511_FPC_Keysound
LCM	TXD: TXDT800CXPA-36	Starry: 2081080BH8021006-51F
Camera_Back	JSL: HS6283A1D-0P0J0	JSL: HS6283A1D-0P0J0
Camera_Front	C&T: V20672 V0	Brodsands: B02SF0319
Object	**Sample 3**	**Sample 4**
LPDDR3 EMCP	Samsung: KMFE60012M-B214 (1+16G)	Samsung: KMFE60012M-B214 (1+16G)
PCB	CEE: A5e5b_MainboardPCB	Huashen: A5e5b_Mainboard PCB
Battery	Sunwoda: L16D1P34	SCUD: L16D1P34
speakerBox1	Xichundz: ZA2060AAA601USAA_Speaker Box_1511_FPC_Xichundz	Keysound: ZA2060AAA601USAA_Speaker Box_1511_FPC_Keysound
LCM	TXD: TXDT800CXPA-36	Starry: 2081080BH8021006-51F
Camera_Back	JSL: HS6283A1D-0P0J0	JSL: HS6283A1D-0P0J0
Camera_Front	C&T: V20672 V0	Brodsands: B02SF0319

1.6. Modification of EUT

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

1.7. Test Location

Sporton International (Kunshan) Inc. 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.**
	CO01-KS	03CH02-KS	630927

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

1.8. 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

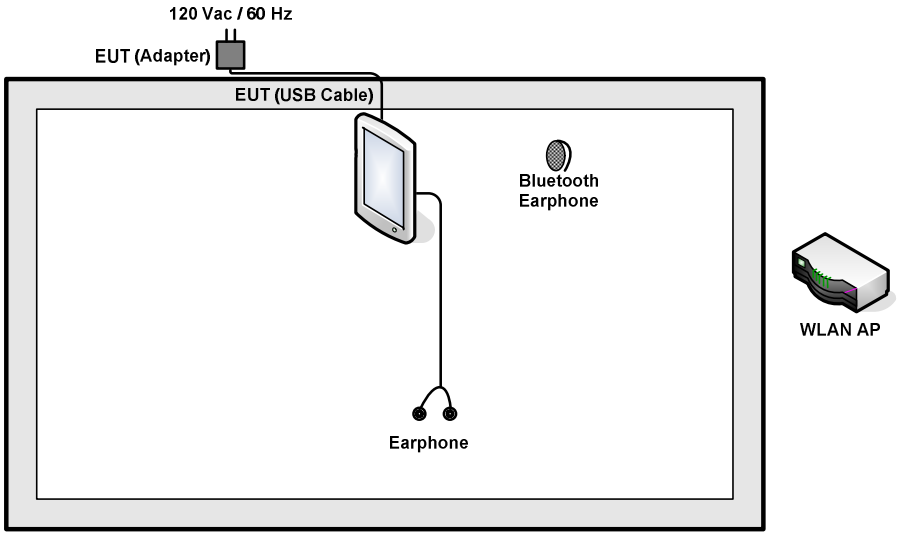
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

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).

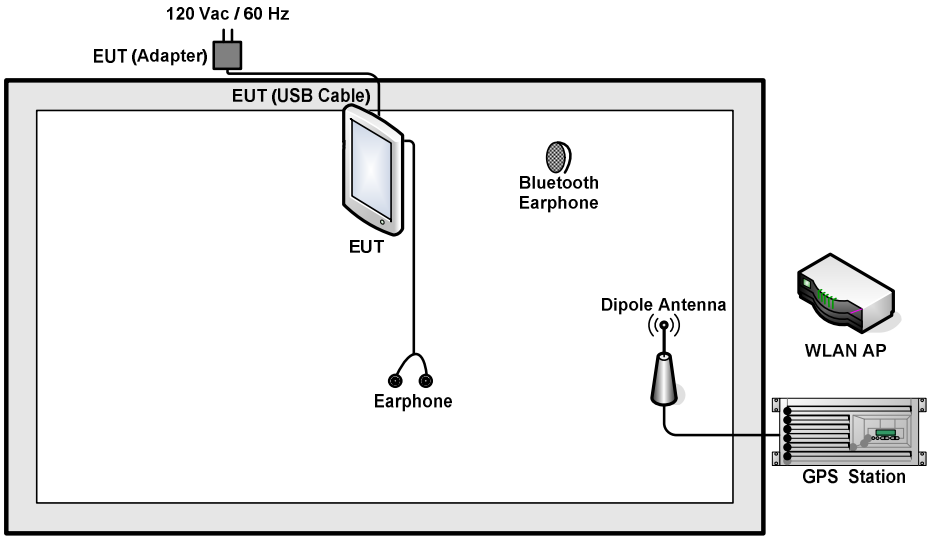
Test Items	Function Type
AC Conducted Emission	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1>
	Mode 2 : Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1>
	Mode 3 : Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1>
	Mode 4 : Bluetooth Idle + WLAN (5G) Idle + GPS Rx + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.2>
	Mode 5 : Bluetooth Idle + WLAN (2.4G) Idle + Camera(Front) + Earphone + Battery 2 + USB Cable 1(Charging from Adapter 2) + Sample 2<Fig.1>
	Mode 6 : Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1 (Charging from Adapter 1) + Earphone + Battery2 + Camera (Rear) for sample2<Fig.1>
	Mode 7 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (88MHz) for Sample 1<Fig.3>
	Mode 8 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (98MHz) for Sample 1<Fig.3>
	Mode 9 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (108MHz) for Sample 1<Fig.3>
	Mode 10 : USB Cable 2(Charging from Adapter 2) + Earphone + Battery 2 + FM Rx (88MHz) for Sample 2<Fig.3>
	Mode 11 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 1(Data Link with Notebook) + Battery 1 + GPS Rx for Sample 1<Fig.4>
	Mode 12 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 1 + GPS Rx for Sample 1<Fig.4>
	Mode 13 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2<Fig.4>

Radiated Emissions < 1GHz	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1> Mode 2 : Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1> Mode 3 : Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.1> Mode 4 : Bluetooth Idle + WLAN (5G) Idle + GPS Rx + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1<Fig.2> Mode 5 : Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone + Battery 2 + USB Cable 1(Charging from Adapter 2) + Sample 2<Fig.1> Mode 6 : Bluetooth Idle + WLAN (5G) Idle + USB Cable 1 (Charging from Adapter 2) + Earphone + Battery1 + Camera (Front) for sample1<Fig.1> Mode 7 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (88MHz) for Sample 1<Fig.3> Mode 8 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (98MHz) for Sample 1<Fig.3> Mode 9 : USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 + FM Rx (108MHz) for Sample 1<Fig.3> Mode 10 : USB Cable 2(Charging from Adapter 2) + Earphone + Battery 2 + FM Rx (108MHz) for Sample 2<Fig.3> Mode 11 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 1(Data Link with Notebook) + Battery 1 + GPS Rx for Sample 1<Fig.4> Mode 12 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 1 + GPS Rx for Sample 1<Fig.4> Mode 13 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2<Fig.4>
Radiated Emissions ≥ 1GHz	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2<Fig.4>
Remark: 1. The worst case of AC is mode 1; and the USB data link mode is mode 13, the test data of these modes are reported. 2. The worst case of RE < 1G is mode 13; only the test data of these modes are reported. **3.** Data Link with Notebook means data application transferred mode between EUT and Notebook.	

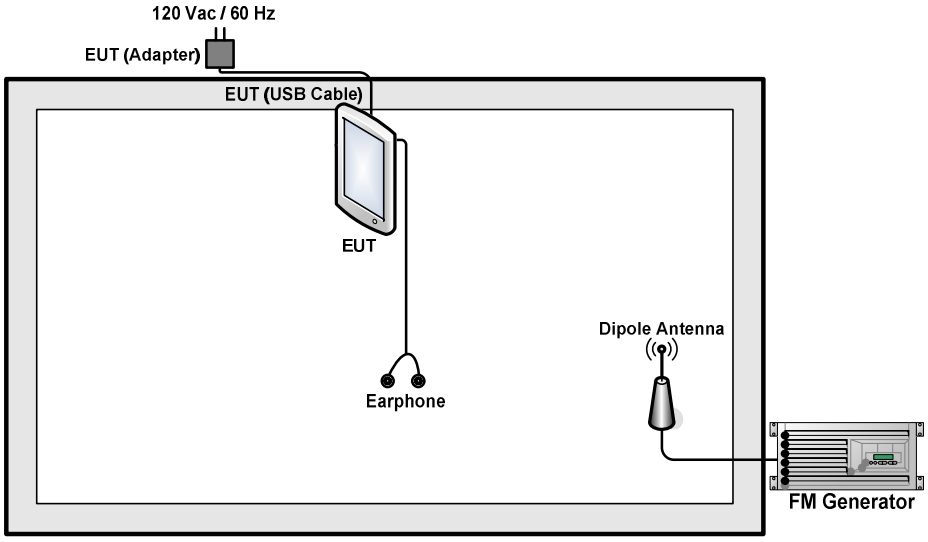
2.2. Connection Diagram of Test System



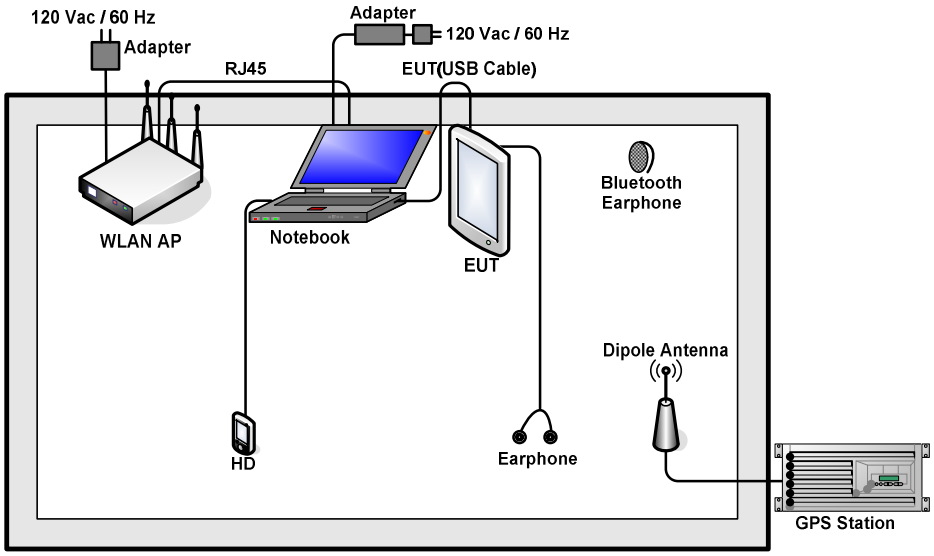
<Fig.1>



<Fig.2>


120 Vac / 60 Hz
EUT (Adapter)
EUT (USB Cable)
EUT
Earphone
Dipole Antenna
FM Generator

<Fig.3>


120 Vac / 60 Hz
Adapter
RJ45
Adapter
120 Vac / 60 Hz
EUT(USB Cable)
WLAN AP
Notebook
EUT
Bluetooth
Earphone
Dipole Antenna
HD
Earphone
GPS Station

<Fig.4>

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	FM Generator	R&S	SMBV100A	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	ADIVIC	MP9000	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	Unshielded, 1.8 m
5.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
6.	Notebook	Dell	Latitude3440	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
7.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
8.	Hard Disk	Lenovo	F310	FCC DoC	Shielded, 0.5 m	N/A
9.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
10.	SD Card	Kingston	8GB	N/A	N/A	N/A
11.	Earphone	Lenovo	P121	N/A	Unshielded,1.2m	N/A

2.4. EUT Operation Test Setup

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 Notebook and EUT via USB cable.
2. Turn on GPS function to make the EUT receive continuous signals from GPS station.
3. Turn on camera to capture images.
4. Execute “Video Player” to play MPEG4 files.
5. The EUT was turned to Radio frequency channels, FM88 MHz, FM98 MHz and FM108 MHz, from FM Generator.

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.

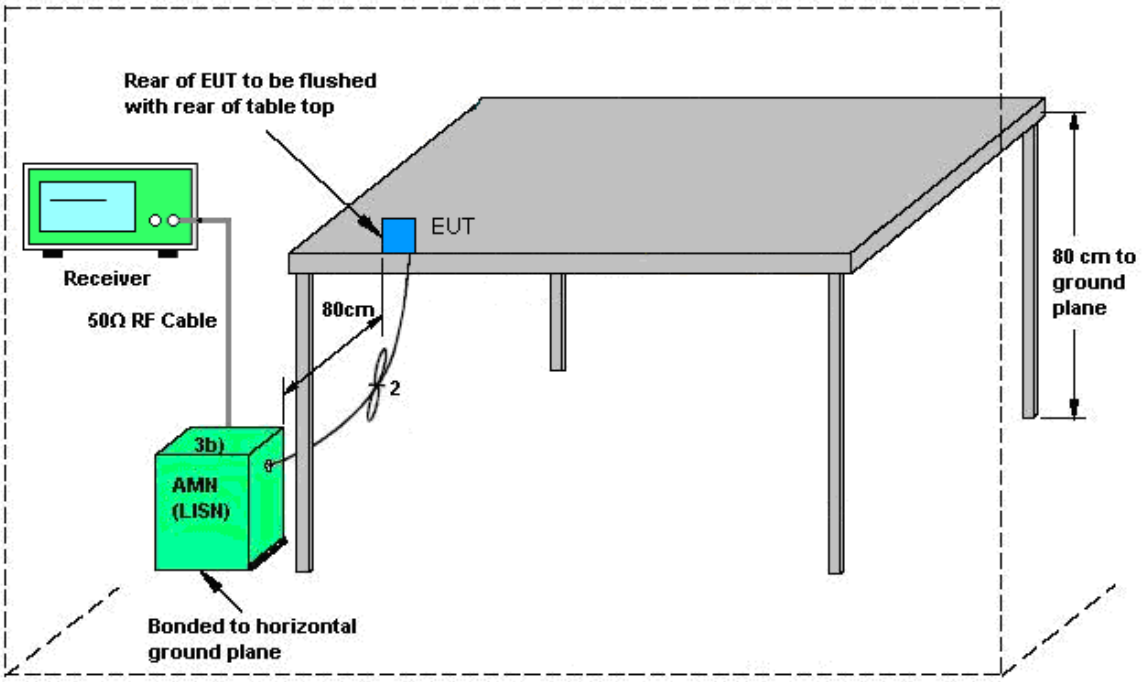
3.1.2 Measuring Instruments

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.

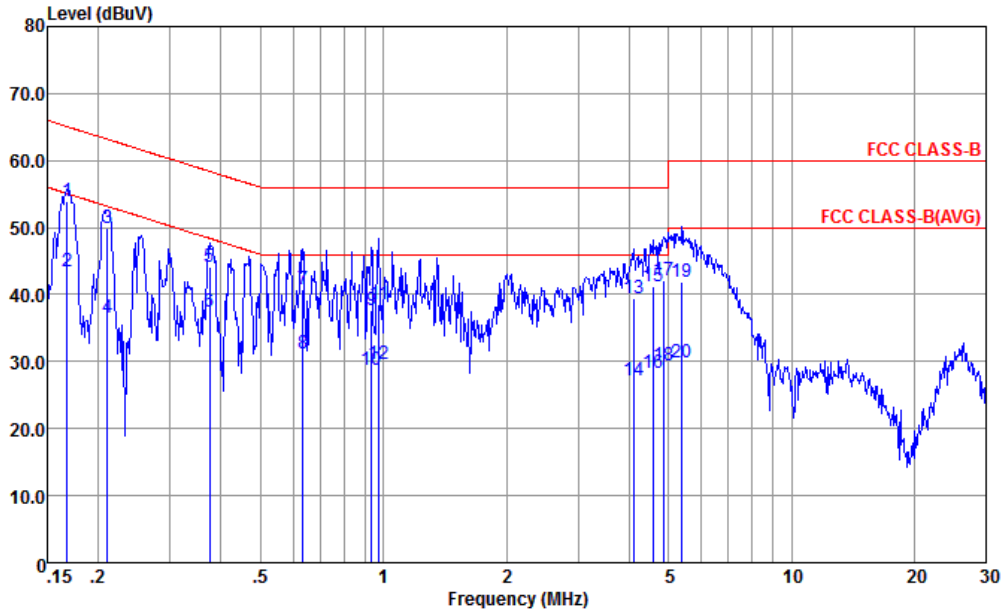
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	22.4~24.6℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	49~52%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1		

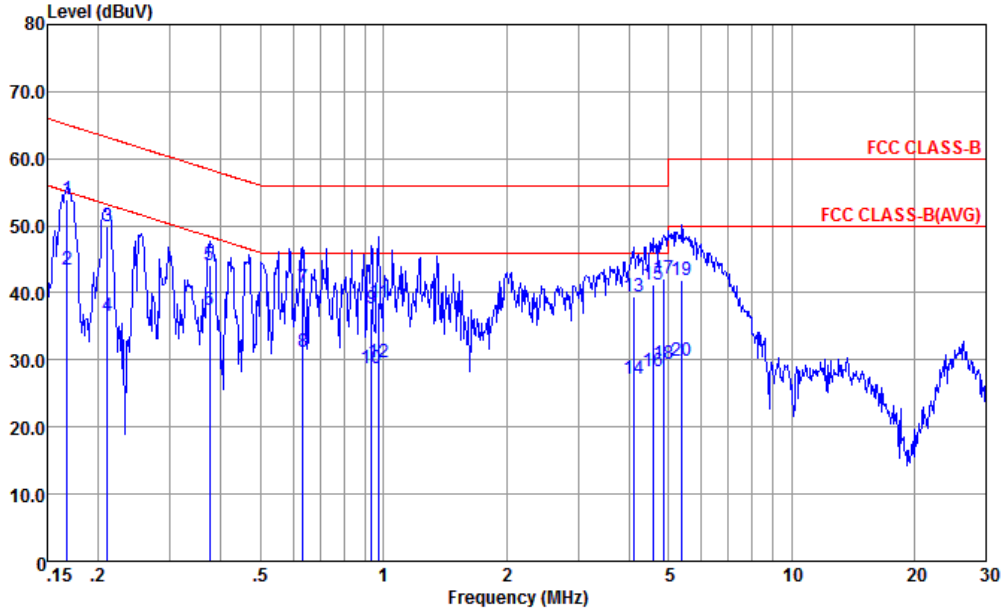


Site : CO01-KS
Condition : FCC CLASS-B LISN-L-171013-060103 LINE

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.168	54.03	-11.05	65.08	43.30	0.18	10.55	QP
2		0.168	43.53	-11.55	55.08	32.80	0.18	10.55	Average
3		0.211	49.86	-13.32	63.18	39.21	0.20	10.45	QP
4		0.211	36.56	-16.62	53.18	25.91	0.20	10.45	Average
5		0.375	44.05	-14.34	58.39	33.40	0.24	10.41	QP
6	*	0.375	37.45	-10.94	48.39	26.80	0.24	10.41	Average
7		0.634	40.76	-15.24	56.00	30.30	0.26	10.20	QP
8		0.634	31.26	-14.74	46.00	20.80	0.26	10.20	Average
9		0.933	37.57	-18.43	56.00	27.20	0.26	10.11	QP
10		0.933	28.67	-17.33	46.00	18.30	0.26	10.11	Average
11		0.974	38.57	-17.43	56.00	28.20	0.26	10.11	QP
12		0.974	29.67	-16.33	46.00	19.30	0.26	10.11	Average
13		4.114	39.42	-16.58	56.00	28.90	0.35	10.17	QP
14		4.114	27.12	-18.88	46.00	16.60	0.35	10.17	Average
15		4.574	41.17	-14.83	56.00	30.60	0.36	10.21	QP
16		4.574	28.37	-17.63	46.00	17.80	0.36	10.21	Average
17		4.848	42.19	-13.81	56.00	31.60	0.37	10.22	QP

Test Mode :	Mode 1	Temperature :	22.4~24.6℃
Test Engineer :	Amos Zhang	Relative Humidity :	49~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1		

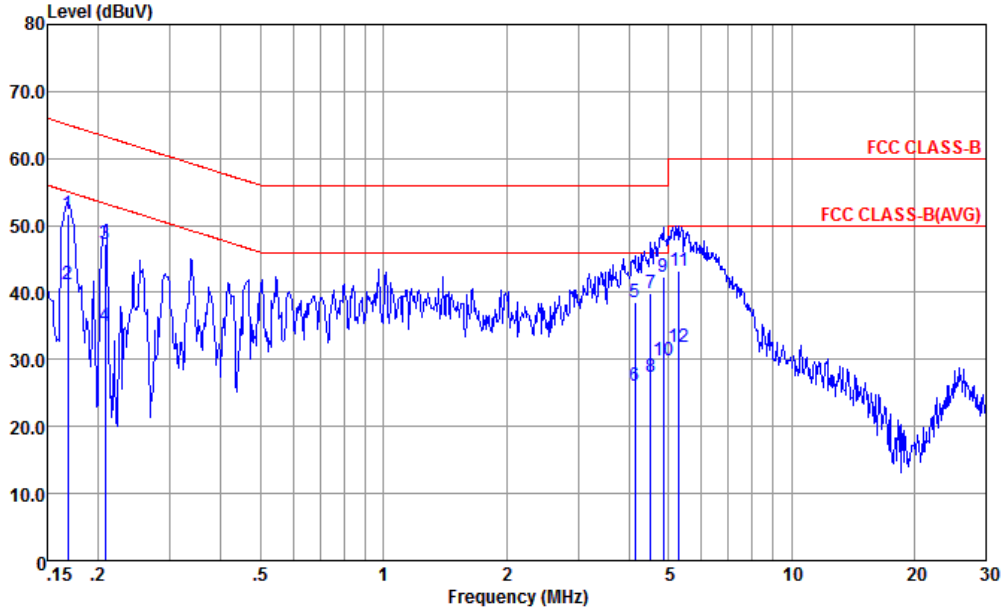


Site : CO01-KS
Condition : FCC CLASS-B LISN-L-171013-060103 LINE

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	4.848	29.49	-16.51	46.00	18.90	0.37	10.22	Average
19	5.390	41.94	-18.06	60.00	31.29	0.37	10.28	QP
20	5.390	29.94	-20.06	50.00	19.29	0.37	10.28	Average

Test Mode :	Mode 1	Temperature :	22.4~24.6℃
Test Engineer :	Amos Zhang	Relative Humidity :	49~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone + Battery 1 + USB Cable 1(Charging from Adapter 1) + Sample 1		

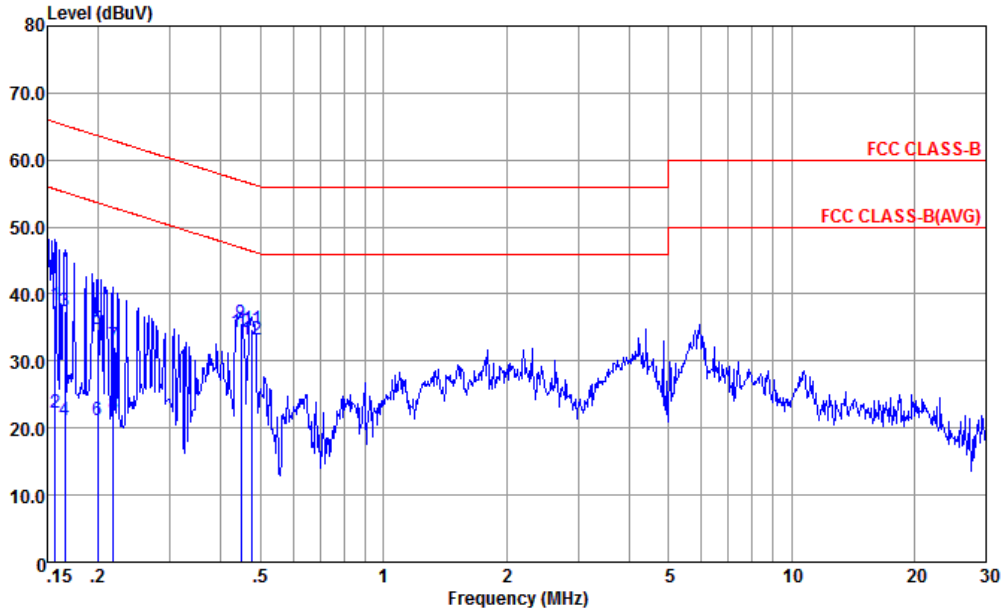


Site : CO01-KS
Condition : FCC CLASS-B LISN-N-171013-060103 NEUTRAL

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.169	51.73	-13.30	65.03	40.90	0.28	10.55	QP
2		0.169	41.33	-13.70	55.03	30.50	0.28	10.55	Average
3		0.208	47.33	-15.94	63.27	36.60	0.28	10.45	QP
4		0.208	35.03	-18.24	53.27	24.30	0.28	10.45	Average
5		4.136	38.61	-17.39	56.00	28.09	0.34	10.18	QP
6		4.136	26.11	-19.89	46.00	15.59	0.34	10.18	Average
7		4.525	39.84	-16.16	56.00	29.30	0.34	10.20	QP
8		4.525	27.44	-18.56	46.00	16.90	0.34	10.20	Average
9		4.848	42.36	-13.64	56.00	31.80	0.34	10.22	QP
10		4.848	29.76	-16.24	46.00	19.20	0.34	10.22	Average
11		5.305	43.20	-16.80	60.00	32.59	0.34	10.27	QP
12		5.305	31.90	-18.10	50.00	21.29	0.34	10.27	Average

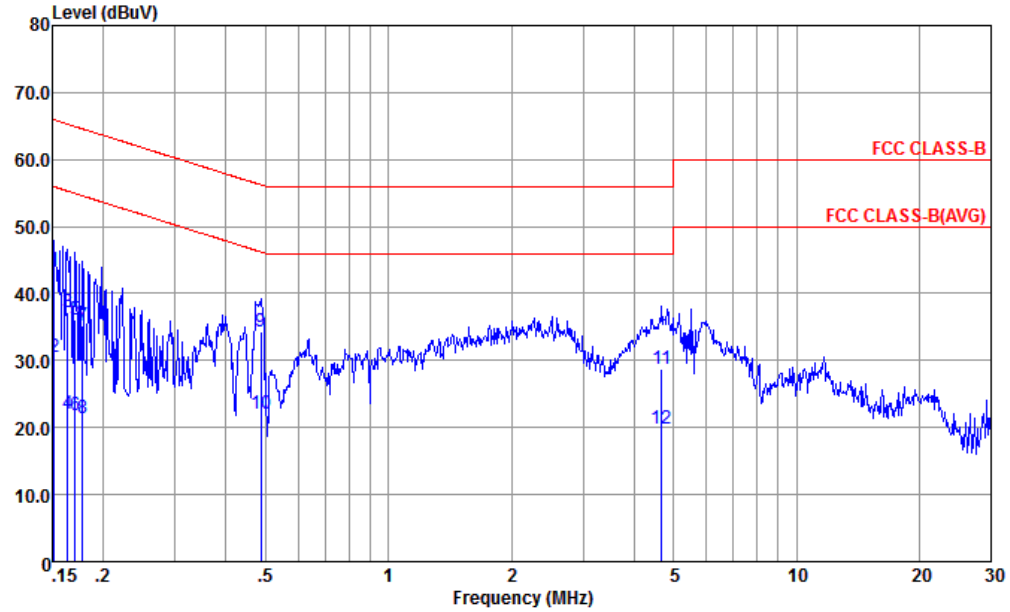
Test Mode :	Mode 13	Temperature :	22.4~24.6℃
Test Engineer :	Amos Zhang	Relative Humidity :	49~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2		



Site : CO01-KS
Condition : FCC CLASS-B LISN-L-171013-060103 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.156	38.26	-27.39	65.65	27.50	0.17	10.59	QP
2	0.156	22.36	-33.29	55.65	11.60	0.17	10.59	Average
3	0.166	37.33	-27.83	65.16	26.60	0.17	10.56	QP
4	0.166	21.23	-33.93	55.16	10.50	0.17	10.56	Average
5	0.200	34.86	-28.76	63.62	24.20	0.20	10.46	QP
6	0.200	21.26	-32.36	53.62	10.60	0.20	10.46	Average
7	0.217	32.26	-30.66	62.92	21.60	0.21	10.45	QP
8	0.217	21.96	-30.96	52.92	11.30	0.21	10.45	Average
9	0.447	35.71	-21.22	56.93	25.10	0.25	10.36	QP
10 *	0.447	34.21	-12.72	46.93	23.60	0.25	10.36	Average
11	0.476	34.78	-21.63	56.41	24.19	0.26	10.33	QP
12	0.476	33.18	-13.23	46.41	22.59	0.26	10.33	Average

Test Mode :	Mode 13	Temperature :	22.4~24.6℃
Test Engineer :	Amos Zhang	Relative Humidity :	49~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2		



Site : CO01-KS
Condition : FCC CLASS-B LISN-N-171013-060103 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.152	43.49	-22.42	65.91	32.60	0.28	10.61	QP
2		0.152	30.49	-25.42	55.91	19.60	0.28	10.61	Average
3		0.163	37.15	-28.15	65.30	26.30	0.28	10.57	QP
4		0.163	22.15	-33.15	55.30	11.30	0.28	10.57	Average
5		0.170	36.03	-28.91	64.94	25.20	0.28	10.55	QP
6		0.170	21.73	-33.21	54.94	10.90	0.28	10.55	Average
7		0.178	35.10	-29.49	64.59	24.30	0.28	10.52	QP
8		0.178	21.40	-33.19	54.59	10.60	0.28	10.52	Average
9	*	0.486	34.21	-22.02	56.23	23.60	0.29	10.32	QP
10		0.486	22.11	-24.12	46.23	11.50	0.29	10.32	Average
11		4.672	28.75	-27.25	56.00	18.20	0.34	10.21	QP
12		4.672	19.85	-26.15	46.00	9.30	0.34	10.21	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

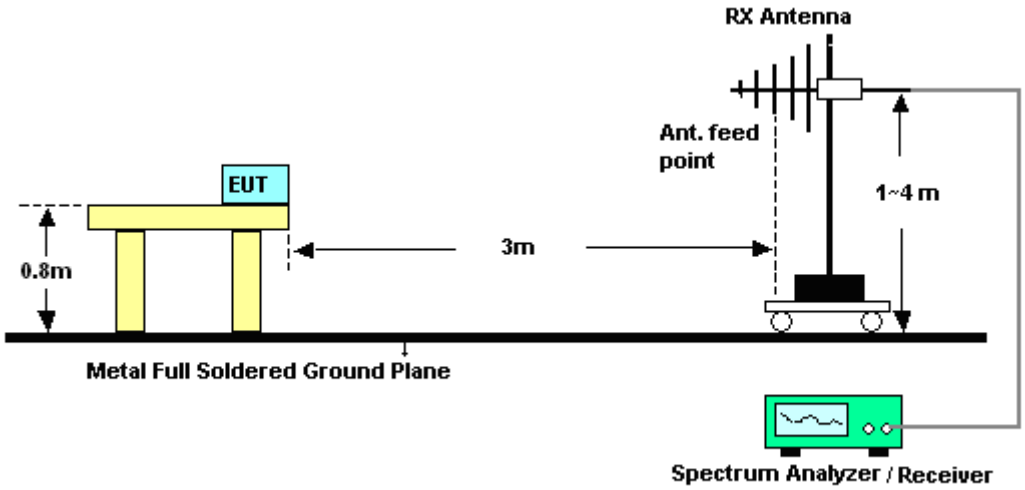
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

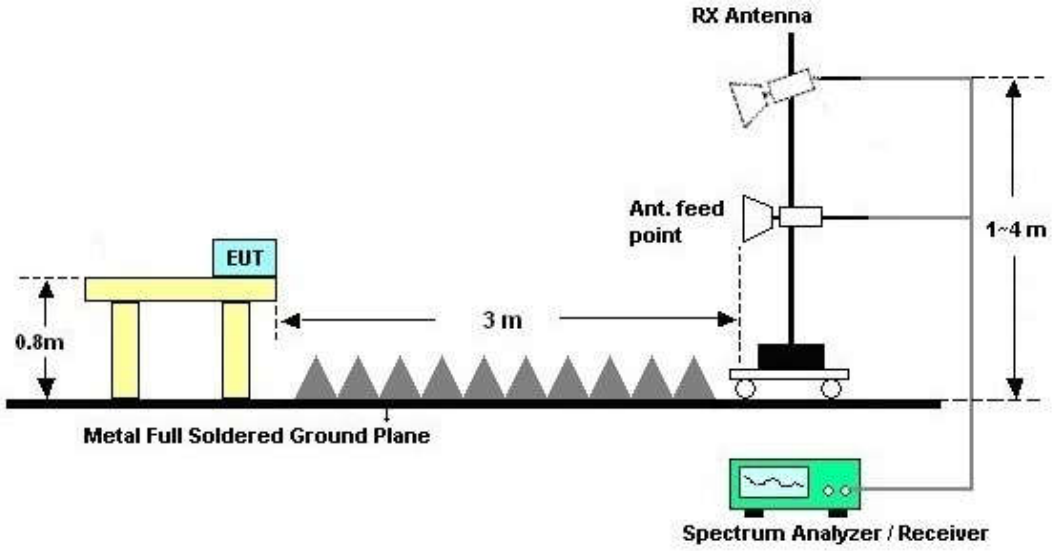
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

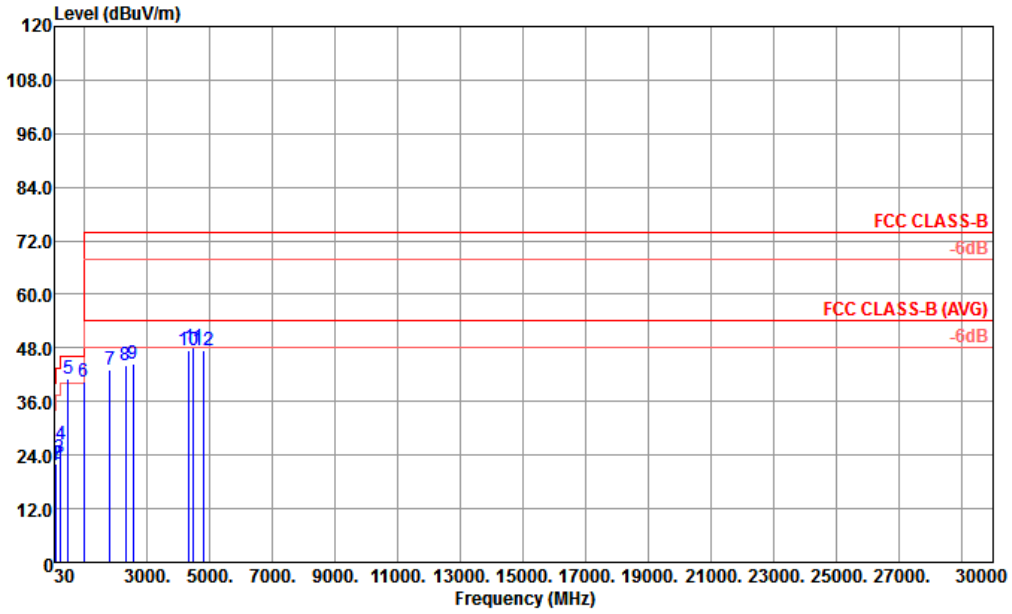


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

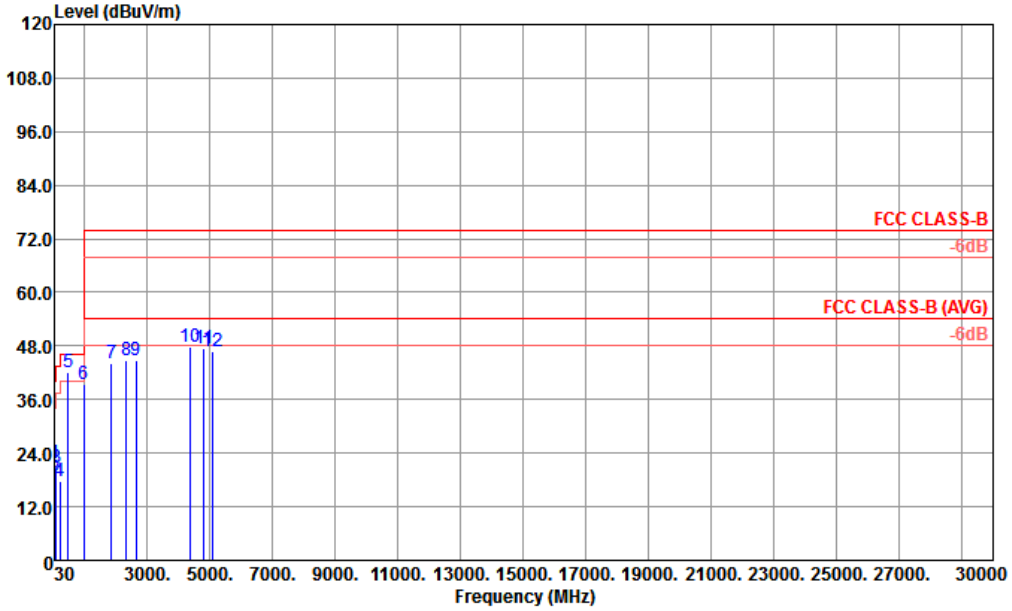
Test Mode :	Mode 13	**Temperature :**	21~22°C
Test Engineer :	Carl Ni	**Relative Humidity :**	41~42%
Test Distance :	3m	**Polarization :**	Horizontal
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2		



Site : 03CH02-KS
Condition : FCC CLASS-B 3m LF 47610 HORIZONTAL

		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		30.00	21.64	-18.36	40.00	28.10	25.00	0.57	32.03	---	---	Peak
2		97.50	22.01	-21.49	43.50	36.55	16.42	1.00	31.96	---	---	Peak
3		215.22	23.52	-19.98	43.50	38.36	15.25	1.54	31.63	---	---	Peak
4		229.80	26.53	-19.47	46.00	40.20	16.30	1.63	31.60	---	---	Peak
5	!	479.90	41.11	-4.89	46.00	45.99	23.22	2.30	30.40	100	0	QP
6	!	959.90	40.31	-5.69	46.00	37.17	27.01	3.21	27.08	---	---	Peak
7		1798.00	42.97	-31.03	74.00	43.24	29.33	4.44	34.04	---	---	Peak
8		2312.00	43.98	-30.02	74.00	39.45	31.16	5.07	31.70	---	---	Peak
9		2536.00	44.40	-29.60	74.00	38.36	31.53	5.29	30.78	---	---	Peak
10		4317.00	47.47	-26.53	74.00	34.78	35.61	7.21	30.13	---	---	Peak
11		4482.00	48.02	-25.98	74.00	34.98	35.87	7.32	30.15	---	---	Peak
12		4776.00	47.58	-26.42	74.00	36.36	35.69	7.69	32.16	---	---	Peak

Test Mode :	Mode 13	Temperature :	21~22°C
Test Engineer :	Carl Ni	Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2 + GPS Rx for Sample 2		



Site : 03CH02-KS
Condition : FCC CLASS-B 3m LF 47610 VERTICAL

	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	30.27	21.71	-18.29	40.00	28.17	25.00	0.57	32.03	---	---	Peak
2	49.44	18.41	-21.59	40.00	35.25	14.55	0.71	32.10	---	---	Peak
3	95.88	20.67	-22.83	43.50	35.63	16.04	0.99	31.99	---	---	Peak
4	207.39	17.58	-25.92	43.50	32.41	15.33	1.49	31.65	---	---	Peak
5 !	479.90	42.17	-3.83	46.00	47.05	23.22	2.30	30.40	100	0	Peak
6	959.90	39.47	-6.53	46.00	36.33	27.01	3.21	27.08	---	---	Peak
7	1856.00	44.24	-29.76	74.00	44.00	29.43	4.50	33.69	---	---	Peak
8	2336.00	44.81	-29.19	74.00	40.14	31.22	5.09	31.64	---	---	Peak
9	2628.00	44.82	-29.18	74.00	38.18	31.71	5.42	30.49	---	---	Peak
10	4350.00	47.69	-26.31	74.00	34.99	35.66	7.17	30.13	---	---	Peak
11	4815.00	47.57	-26.43	74.00	36.72	35.66	7.72	32.53	---	---	Peak
12	5088.00	46.91	-27.09	74.00	37.78	35.45	7.81	34.13	---	---	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. 20, 2017	Mar. 15, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Mar. 15, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Mar. 15, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Mar. 15, 2018	Oct. 11, 2018	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 08, 2017	Mar. 10, 2018	Aug. 07, 2018	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 18, 2017	Mar. 10, 2018	Apr. 17, 2018	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz~2GHz	Jan. 21, 2018	Mar. 10, 2018	Jan. 20, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 21, 2017	Mar. 10, 2018	Oct. 20, 2018	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 14, 2018	Mar. 10, 2018	Feb. 13, 2019	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 12, 2017	Mar. 10, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 07, 2017	Mar. 10, 2018	Aug. 06, 2018	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1-26.5GHz Gain 30dB	Oct. 12, 2017	Mar. 10, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Mar. 10, 2018	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Mar. 10, 2018	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Mar. 10, 2018	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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2dB

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

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