FCC Test Report

APPLICANT	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Notebook Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**Lenovo YB-J912F**
FCC ID	:	**O57YBJ912F**
STANDARD	:	**FCC 47 CFR FCC Part 15 Subpart B**
CLASSIFICATION	:	**Certification**

The product was received on Dec. 21, 2017 and testing was completed on Mar. 22, 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

NVLAP®
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
FC7D2101	Rev. 01	Initial issue of report	Mar. 30, 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 6.82 dB at 9.011 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.38 dB at 68.800 MHz for Quasi-Peak

1. General Description

1.1. Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.
NO.68 BUILDING, 199 FENJU RD, 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	Notebook Computer
Brand Name	Lenovo
Model Name	Lenovo YB-J912F
FCC ID	O57YBJ912F
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE/ Bluetooth v4.2 LE
HW Version	Lenovo YB-J912F
SW Version	Windows 10
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 ~ 2472 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500MHz ~ 5720 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500MHz ~ 5720 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Antenna Type	WLAN: PIFA Antenna Bluetooth: PIFA Antenna
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac : OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps) : 8-DPSK

1.5. Component List

There are three samples under test, the differences of them are shown in the table below.
Based on the similarity of three samples, sample 1 perform full test and sample 2/3 verify the worse cases.

Object	Sample 1	Sample 2	Sample 3
CPU	intel core i7-7Y75; 3.6GHz;FCBGA1515	CPU;i5-7Y54; 3.2GHz;FCBGA1515	CPU;m3-7Y30; 2.6GHz;FCBGA151
DDR/LPDDR3	Samsung K3QF4F40BM-AGCF	Samsung K3QF3F30BM-AGCF	Micron MT52L256M64D2PP-107 WT:B
SSD	Toshiba 512GB, BiCS3 PCIE Gen3 2lane	Toshiba 256GB, BiCS3 PCIE Gen3 2lane	Toshiba 128GB, BiCS3 PCIE Gen3 2lane
LCM	BOE;10.8WQ;TV108QDM-NL0	BOE;10.8WQ;TV108QDM-NL0	INX;10.8WQ;P108SFA-AF2
Sub TP	Laibo	Laibo	GIS
Camera	Oflime	Oflime	Chicony
Battery	SWD+ATL	SWD+ATL	SCUD + Veken

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).

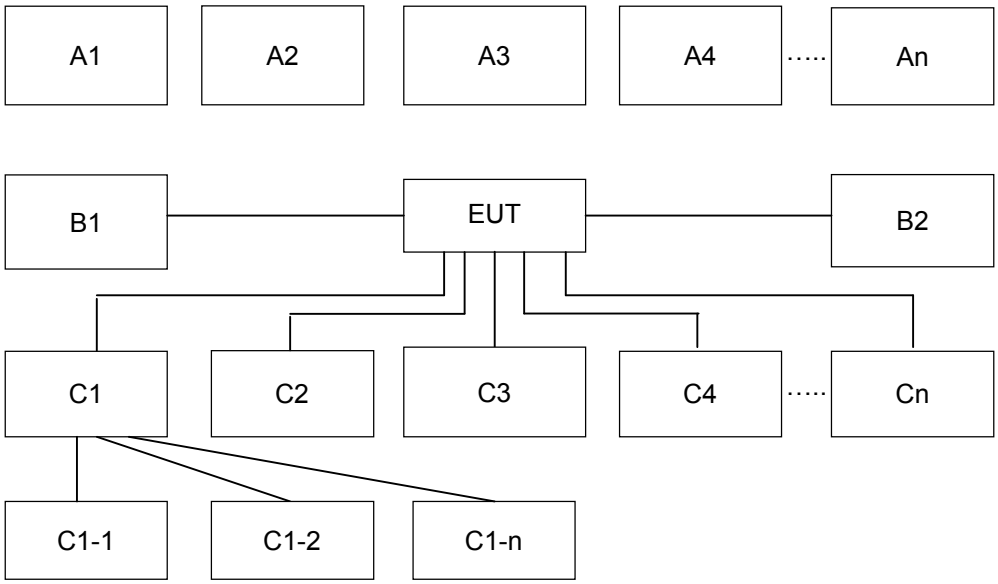
Test Items	Function Type
AC Conducted Emission	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1 Mode 2 : Bluetooth Idle with BT pen + WLAN (5G) Idle + Camera + USB Link with Type C 1 + MPEG4/Color Bar + Adapter 1 With Type C Cable 1 In Type C 2 for Sample 1 Mode 3 : Bluetooth Idle + WLAN (5G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 2 With Type C Cable 2 In Type C 1 for Sample 1 Mode 4 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1 Mode 5 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 1 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 2 for Sample 1 Mode 6 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 2 for Sample 2 Mode 7 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3
Radiated Emissions < 1GHz	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1 Mode 2 : Bluetooth Idle with BT pen + WLAN (5G) Idle + Camera + USB Link with Type C 1 + MPEG4/Color Bar + Adapter 1 With Type C Cable 1 In Type C 2 for Sample 1 Mode 3 : Bluetooth Idle + WLAN (5G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 2 With Type C Cable 2 In Type C 1 for Sample 1 Mode 4 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1 Mode 5 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 1 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 2 for Sample 1 Mode 6 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 1 + Play H Pattern + Video with Type C 2 for Sample 1 Mode 7 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 2 Mode 8 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3

Radiated Emissions ≥ 1GHz	Mode 1 : Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1

Remark:

1. The worst case of AC is mode 7; only the test data of this mode was reported.
2. The worst case of RE < 1G is mode 1; only the test data of this mode was reported.
3. USB Link with Type C1/2 means data application transferred mode between EUT and U disk via OTG cable.
4. Type C 1/2 is charging / data transfer port.
5. Type C cable 1/2 is USB cable1/2.
6. Video with Type C1/2 means media application transferred between EUT and Monitor via HDMI/DP cable.

2.2. Connection Diagram of Test System



Conduction Test Setup									
No.	Wireless Station	Connection Type	Test Mode						
			1	2	3	4	5	6	7
A1	BT Earphone/BT Pen	Bluetooth	X	X	X	X	X	X	X
A2	AP router	WiFi	X	X	X	X	X	X	X
No.	**Power Source**	**Connection Type**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
B1	AC :120V/60Hz	AC Power Cable	X	X	X	X	X	X	X
No.	**Setup Peripherals**	**Connection Type**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
C1	Monitor	Type C to HDMI/DP	-	-	-	X	X	X	X
C2	U Disk	Type C to USB	X	X	X	-	-	-	-
C3	SD Card	SD I/O interface without cable	X	X	X	X	X	X	X

Radiation Test Setup									
No.	Wireless Station	Connection Type	Test Mode						
			1	2	3	4	5	6	7	8
A1	BT Earphone/BT Pen	Bluetooth	X	X	X	X	X	X	X	X
A2	AP router	WiFi	X	X	X	X	X	X	X	X
No.	**Power Source**	**Connection Type**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
B1	AC : 230V/50Hz	AC Power Cable	X	X	X	X	X	-	X	X
No.	**Setup Peripherals**	**Connection Type**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
C1	Monitor	Type C to HDMI/DP	-	-	-	X	X	X	-	-
C2	U Disk	Type C to USB	X	X	X	-	-	-	X	X
C3	SD Card	SD I/O interface without cable	X	X	X	X	X	X	X	X

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	TP-LINK	TL-WDR5600	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
3.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
4.	Monitor	Philips	DBDM3275UP	N/A	N/A	Unshielded,1.8m
5.	Monitor	Dell	P2715QT	N/A	N/A	Unshielded,1.8m
6.	Monitor	Dell	IN1940MWb	Fcc DoC	N/A	Unshielded,1.8m
7.	Type C to HDMI/DP Cable	Dell	N/A	N/A	Unshielded,0.1m	N/A
8.	Type C to HDMI/DP Cable	Lianji	N/A	N/A	Unshielded,0.1m	N/A
9.	Type C to USB(OTG)	UNITEK	N/A	N/A	Unshielded,0.1m	N/A
10.	DP Cable	Dell	N/A	N/A	shielded,1.2m	N/A
11.	HDMI Cable	Dell	N/A	N/A	shielded,1.4m	N/A
12.	HDMI cable	N/A	N/A	N/A	shielded,1.4m	N/A
13.	U Disk	Kingston	DTSE9 G2 16GB	N/A	N/A	N/A
14.	U Disk	SanDisk	SDCZ51-004G	N/A	N/A	N/A
15.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
16.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.4. EUT Operation Test Setup

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 USB Disk and EUT via OTG cable.
2. Execute “Windows Media Player” to play MPEG4 files.
3. Turn on camera to capture images.
4. Execute “H Pattern” to show H Pattern.
5. Connect with Monitor via Type C to HDMI Cable/DP Cable.

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.

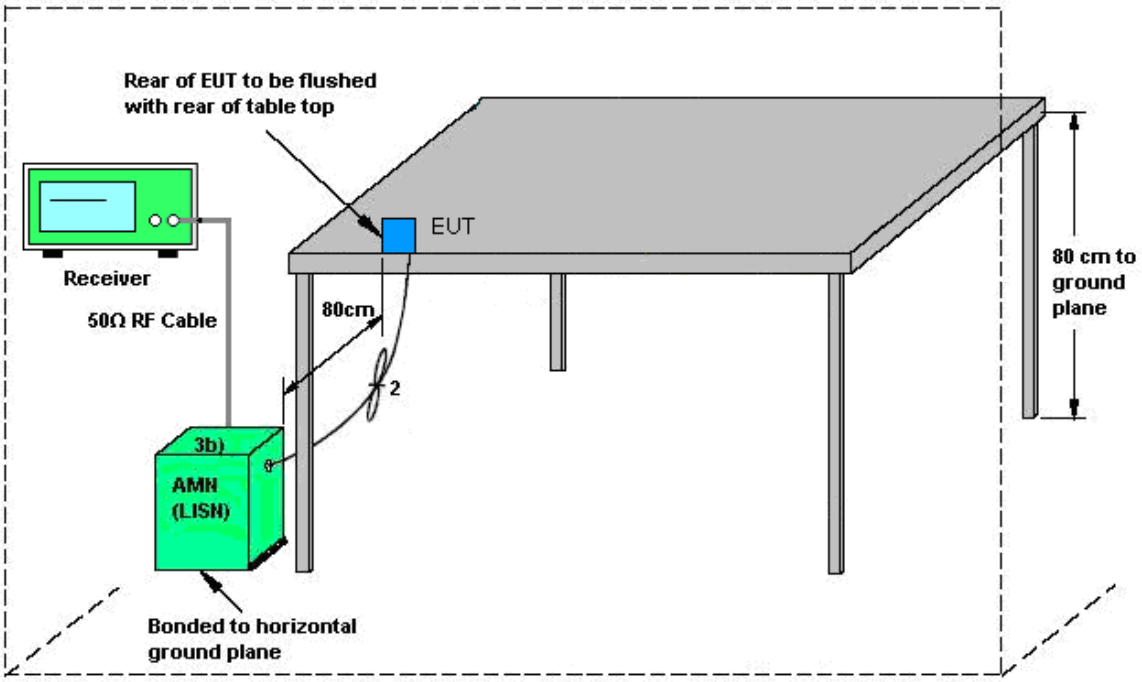
3.1.2 Measuring Instruments

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.

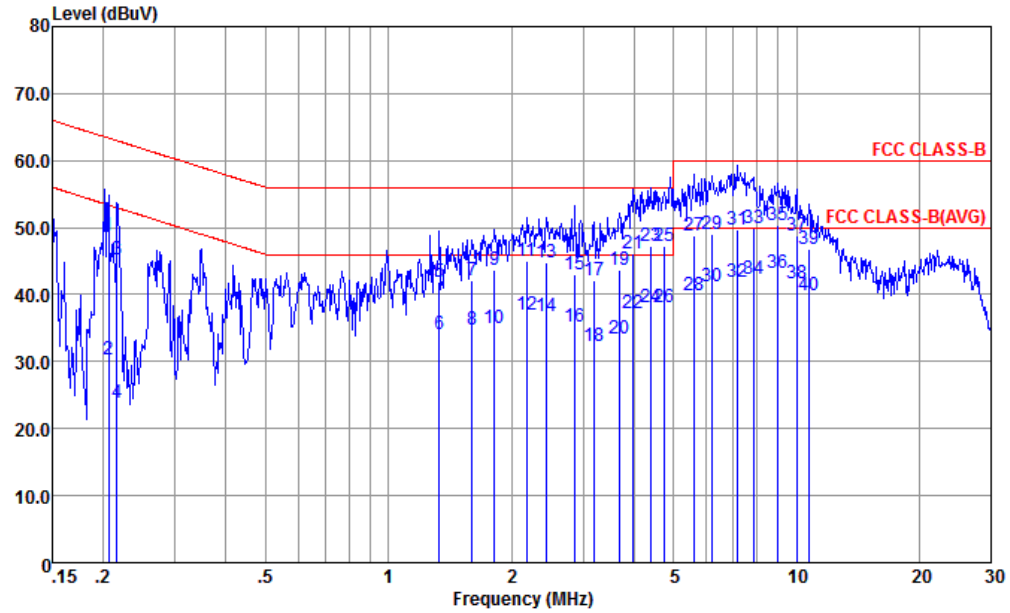
3.1.4 Test Setup



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

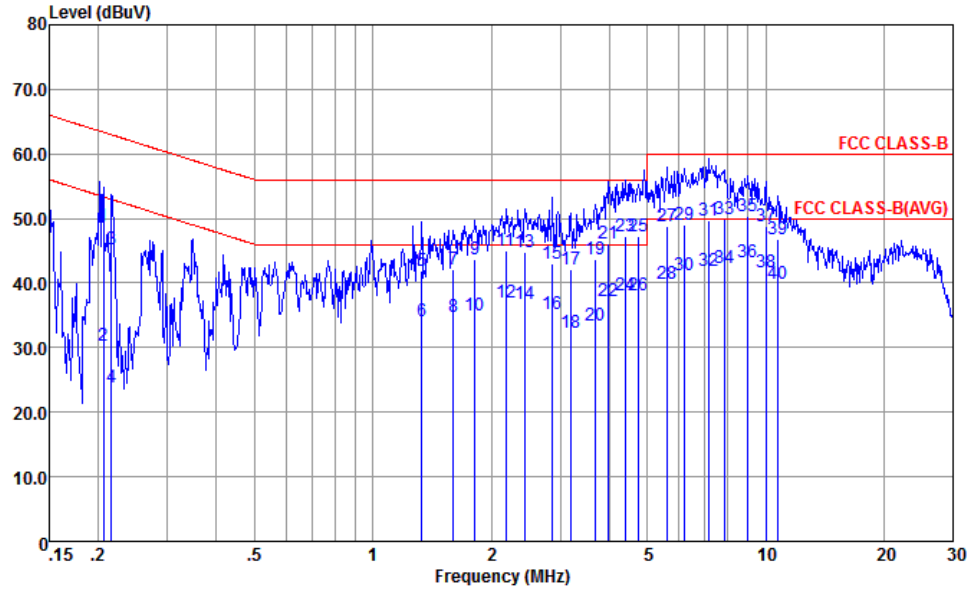
Test Mode :	Mode 7	**Temperature :**	21~23℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3		



Site : CO01-KS
Condition : FCC CLASS-B LISN-L-171013-060103 LINE
Project : (FC) 7D2101
mode : Mode 7

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.206	48.86	-14.50	63.36	38.21	0.20	10.45	QP
2	0.206	30.26	-23.10	53.36	19.61	0.20	10.45	Average
3	0.216	45.26	-17.70	62.96	34.60	0.21	10.45	QP
4	0.216	23.96	-29.00	52.96	13.30	0.21	10.45	Average
5	1.331	41.92	-14.08	56.00	31.50	0.27	10.15	QP
6	1.331	34.02	-11.98	46.00	23.60	0.27	10.15	Average
7	1.602	42.05	-13.95	56.00	31.60	0.27	10.18	QP
8	1.602	34.65	-11.35	46.00	24.20	0.27	10.18	Average
9	1.819	43.68	-12.32	56.00	33.20	0.28	10.20	QP
10	1.819	35.08	-10.92	46.00	24.60	0.28	10.20	Average
11	2.178	45.00	-11.00	56.00	34.50	0.29	10.21	QP
12	2.178	37.10	-8.90	46.00	26.60	0.29	10.21	Average
13	2.448	44.70	-11.30	56.00	34.20	0.30	10.20	QP
14	2.448	36.80	-9.20	46.00	26.30	0.30	10.20	Average
15	2.869	43.10	-12.90	56.00	32.59	0.32	10.19	QP
16	2.869	35.10	-10.90	46.00	24.59	0.32	10.19	Average
17	3.190	42.01	-13.99	56.00	31.50	0.33	10.18	QP

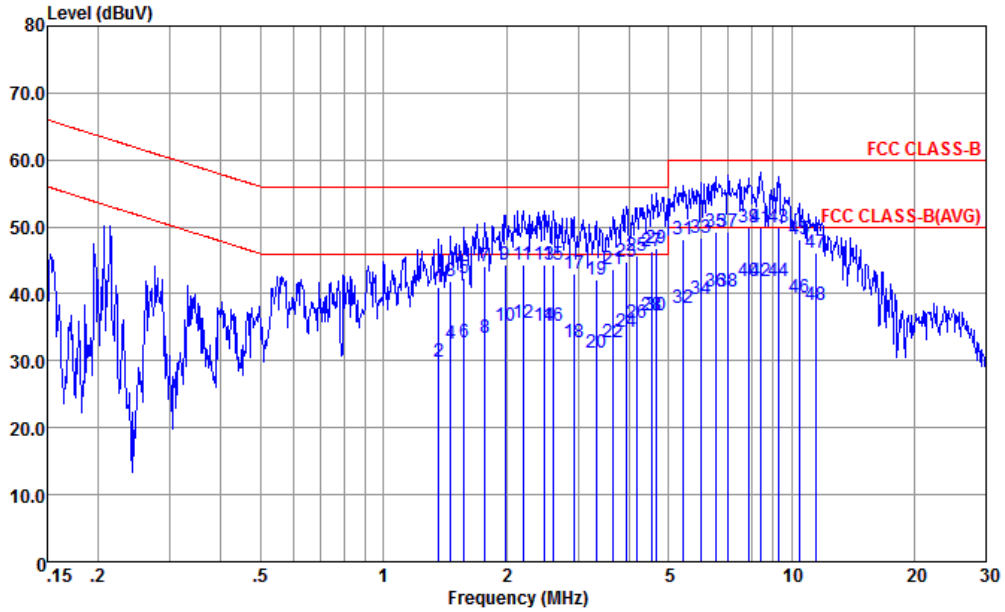
Test Mode :	Mode 7	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3		



Site : CO01-KS
Condition : FCC CLASS-B LISN-L-171013-060103 LINE
Project : (FC) 7D2101
mode : Mode 7

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	3.190	32.41	-13.59	46.00	21.90	0.33	10.18	Average
19	3.681	43.71	-12.29	56.00	33.20	0.34	10.17	QP
20	3.681	33.41	-12.59	46.00	22.90	0.34	10.17	Average
21	3.985	46.11	-9.89	56.00	35.59	0.35	10.17	QP
22	3.985	37.11	-8.89	46.00	26.59	0.35	10.17	Average
23	4.384	47.15	-8.85	56.00	36.60	0.36	10.19	QP
24	4.384	38.15	-7.85	46.00	27.60	0.36	10.19	Average
25	4.746	47.18	-8.82	56.00	36.59	0.37	10.22	QP
26	4.746	38.18	-7.82	46.00	27.59	0.37	10.22	Average
27	5.623	48.76	-11.24	60.00	38.10	0.36	10.30	QP
28	5.623	39.96	-10.04	50.00	29.30	0.36	10.30	Average
29	6.186	48.99	-11.01	60.00	38.30	0.36	10.33	QP
30	6.186	41.29	-8.71	50.00	30.60	0.36	10.33	Average
31	7.137	49.78	-10.22	60.00	39.10	0.35	10.33	QP
32	7.137	41.98	-8.02	50.00	31.30	0.35	10.33	Average
33	7.852	49.88	-10.12	60.00	39.20	0.35	10.33	QP
34	7.852	42.28	-7.72	50.00	31.60	0.35	10.33	Average
35	9.011	50.28	-9.72	60.00	39.60	0.35	10.33	QP
36 *	9.011	43.18	-6.82	50.00	32.50	0.35	10.33	Average
37	10.019	48.78	-11.22	60.00	38.10	0.35	10.33	QP
38	10.019	41.58	-8.42	50.00	30.90	0.35	10.33	Average
39	10.733	46.88	-13.12	60.00	36.19	0.34	10.35	QP
40	10.733	39.98	-10.02	50.00	29.29	0.34	10.35	Average

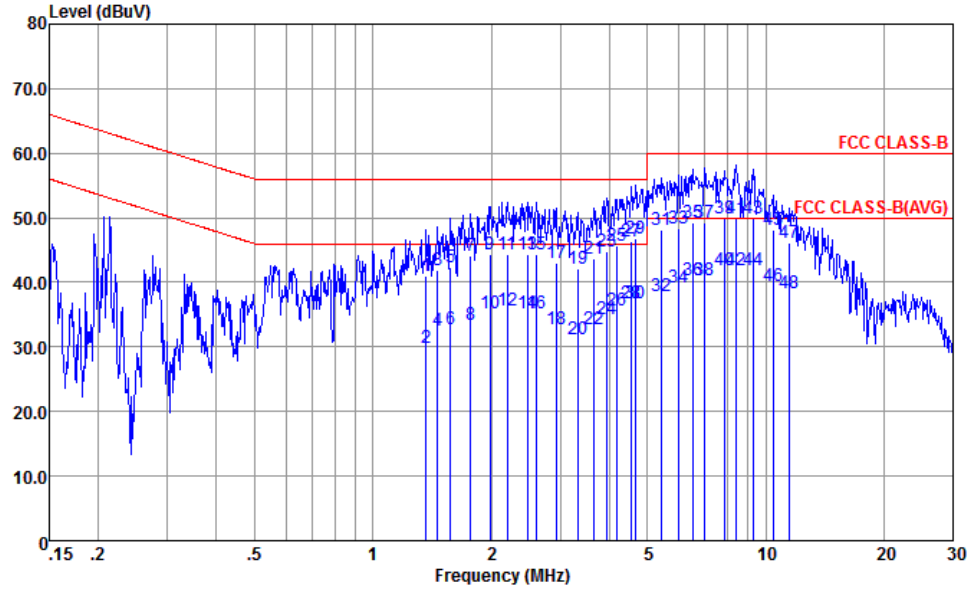
Test Mode :	Mode 7	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3		



Site : CO01-KS
Condition : FCC CLASS-B LISN-N-171013-060103 NEUTRAL
Project : (FC) 7D2101
mode : Mode 7

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.367	40.97	-15.03	56.00	30.50	0.31	10.16	QP
2	1.367	29.77	-16.23	46.00	19.30	0.31	10.16	Average
3	1.464	41.98	-14.02	56.00	31.49	0.32	10.17	QP
4	1.464	32.58	-13.42	46.00	22.09	0.32	10.17	Average
5	1.577	42.39	-13.61	56.00	31.89	0.32	10.18	QP
6	1.577	32.69	-13.31	46.00	22.19	0.32	10.18	Average
7	1.772	44.11	-11.89	56.00	33.59	0.32	10.20	QP
8	1.772	33.41	-12.59	46.00	22.89	0.32	10.20	Average
9	1.991	44.43	-11.57	56.00	33.90	0.32	10.21	QP
10	1.991	35.13	-10.87	46.00	24.60	0.32	10.21	Average
11	2.201	44.43	-11.57	56.00	33.90	0.32	10.21	QP
12	2.201	35.73	-10.27	46.00	25.20	0.32	10.21	Average
13	2.474	44.42	-11.58	56.00	33.90	0.32	10.20	QP
14	2.474	35.12	-10.88	46.00	24.60	0.32	10.20	Average
15	2.608	44.42	-11.58	56.00	33.89	0.33	10.20	QP
16	2.608	35.12	-10.88	46.00	24.59	0.33	10.20	Average
17	2.931	43.12	-12.88	56.00	32.60	0.33	10.19	QP

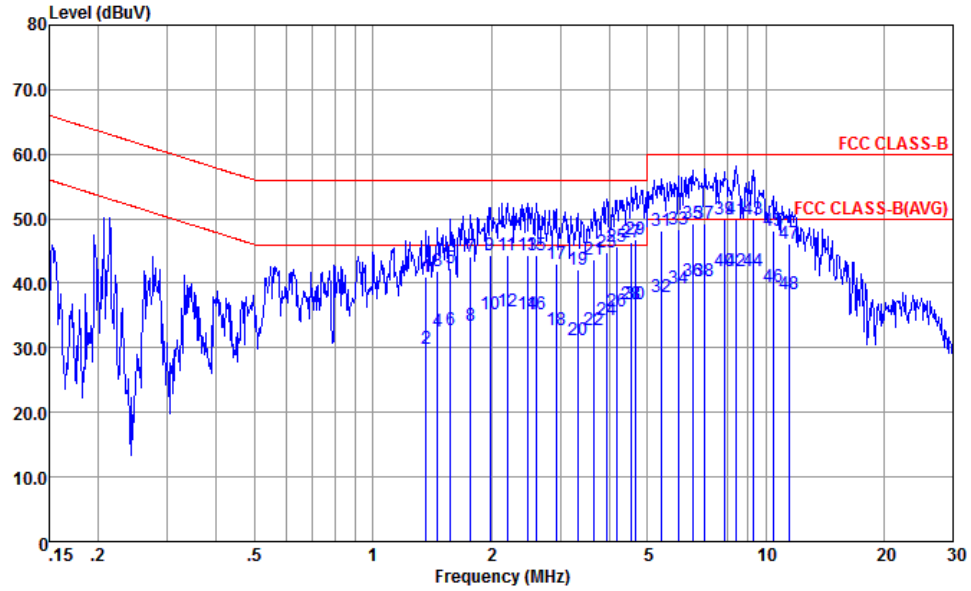
Test Mode :	Mode 7	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3		



Site : CO01-KS
Condition : FCC CLASS-B LISN-N-171013-060103 NEUTRAL
Project : (FC) 7D2101
mode : Mode 7

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	2.931	32.82	-13.18	46.00	22.30	0.33	10.19	Average
19	3.328	42.01	-13.99	56.00	31.50	0.33	10.18	QP
20	3.328	31.11	-14.89	46.00	20.60	0.33	10.18	Average
21	3.661	43.70	-12.30	56.00	33.20	0.33	10.17	QP
22	3.661	32.80	-13.20	46.00	22.30	0.33	10.17	Average
23	3.943	44.70	-11.30	56.00	34.20	0.33	10.17	QP
24	3.943	34.40	-11.60	46.00	23.90	0.33	10.17	Average
25	4.180	45.61	-10.39	56.00	35.09	0.34	10.18	QP
26	4.180	35.71	-10.29	46.00	25.19	0.34	10.18	Average
27	4.549	46.34	-9.66	56.00	35.80	0.34	10.20	QP
28	4.549	36.74	-9.26	46.00	26.20	0.34	10.20	Average
29	4.672	46.75	-9.25	56.00	36.20	0.34	10.21	QP
30	4.672	36.85	-9.15	46.00	26.30	0.34	10.21	Average
31	5.419	48.11	-11.89	60.00	37.49	0.34	10.28	QP
32	5.419	37.91	-12.09	50.00	27.29	0.34	10.28	Average
33	5.993	48.26	-11.74	60.00	37.59	0.33	10.34	QP
34	5.993	39.26	-10.74	50.00	28.59	0.33	10.34	Average

Test Mode :	Mode 7	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + Video with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 3		



Site : CO01-KS
Condition : FCC CLASS-B LISN-N-171013-060103 NEUTRAL
Project : (FC) 7D2101
mode : Mode 7

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
35		6.523	49.26	-10.74	60.00	38.61	0.32	10.33	QP
36		6.523	40.26	-9.74	50.00	29.61	0.32	10.33	Average
37		6.988	49.25	-10.75	60.00	38.60	0.32	10.33	QP
38		6.988	40.25	-9.75	50.00	29.60	0.32	10.33	Average
39		7.852	49.85	-10.15	60.00	39.21	0.31	10.33	QP
40	*	7.852	41.85	-8.15	50.00	31.21	0.31	10.33	Average
41		8.412	49.94	-10.06	60.00	39.30	0.31	10.33	QP
42		8.412	41.84	-8.16	50.00	31.20	0.31	10.33	Average
43		9.302	49.84	-10.16	60.00	39.21	0.30	10.33	QP
44		9.302	41.84	-8.16	50.00	31.21	0.30	10.33	Average
45		10.452	48.13	-11.87	60.00	37.50	0.29	10.34	QP
46		10.452	39.53	-10.47	50.00	28.90	0.29	10.34	Average
47		11.438	46.23	-13.77	60.00	35.60	0.27	10.36	QP
48		11.438	38.23	-11.77	50.00	27.60	0.27	10.36	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

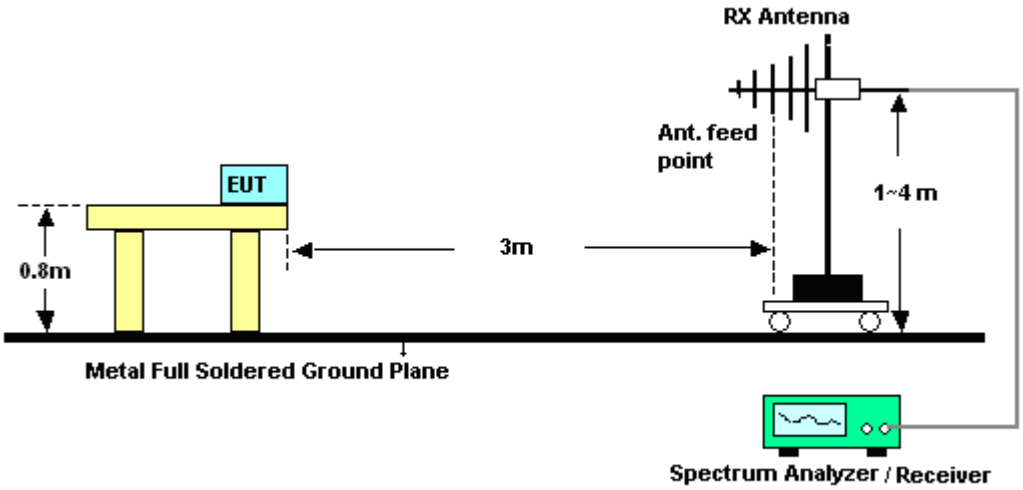
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

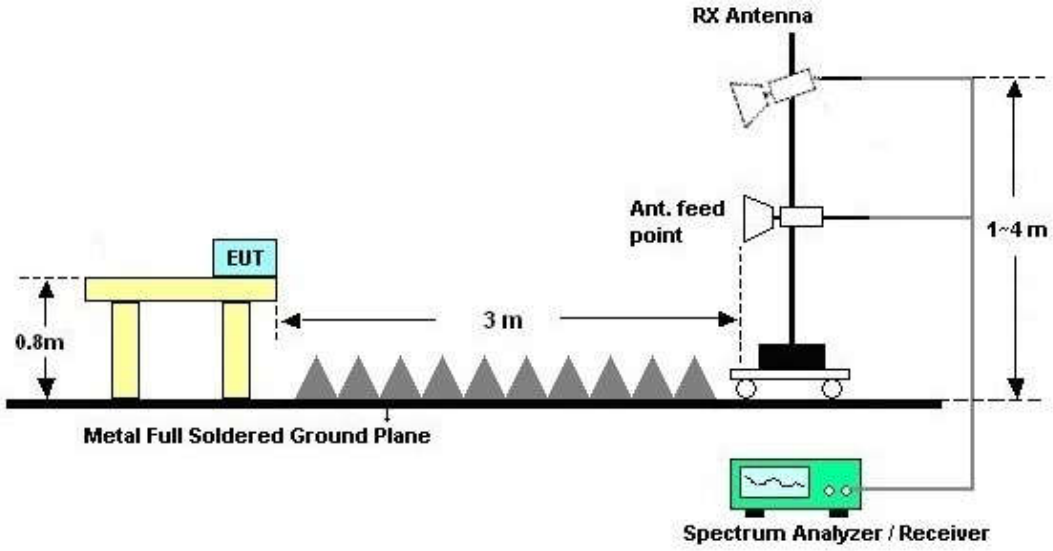
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

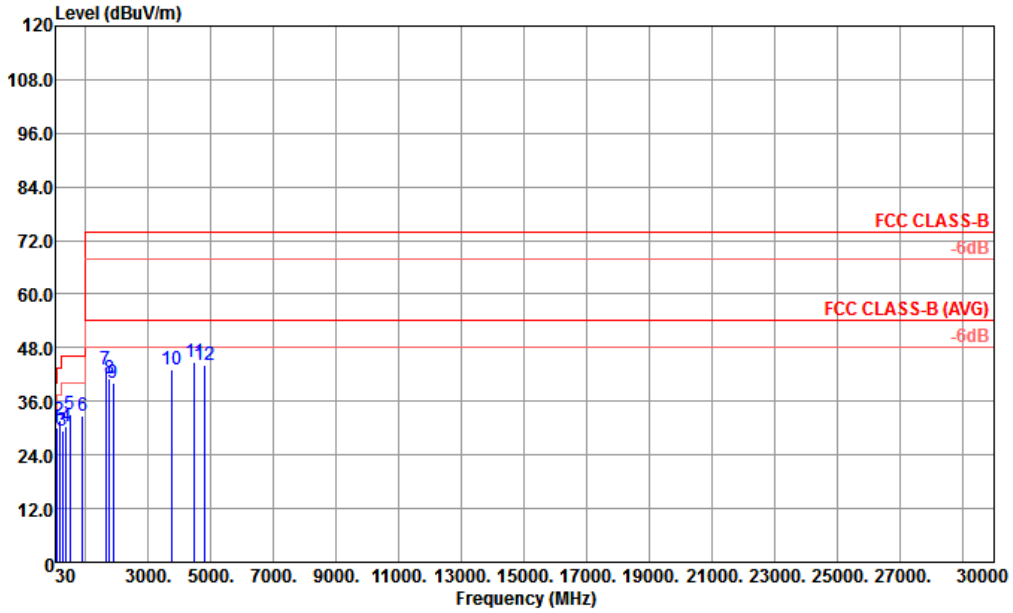


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

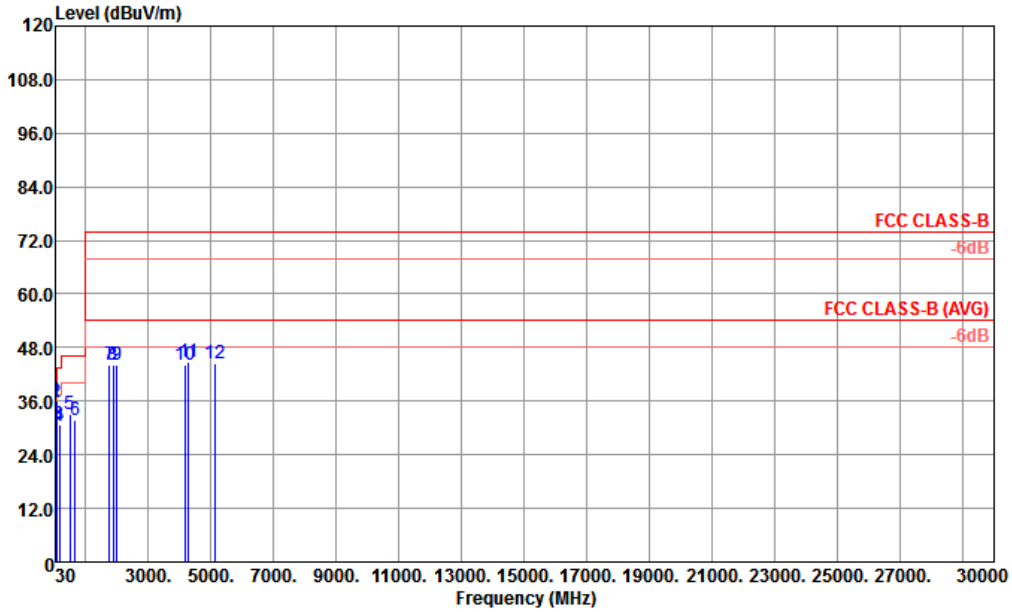
Test Mode :	Mode 1	**Temperature :**	21~22°C
Test Engineer :	Carl Ni	**Relative Humidity :**	41~42%
Test Distance :	3m	**Polarization :**	Horizontal
Function Type :	Bluetooth Idle + WLAN (2.4G) Idle + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1		



Site : 03CH02-KS
Condition : FCC CLASS-B 3m LF 47610 HORIZONTAL
Project : (FC)7D2101
Mode : 1

	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	72.68	29.99	-10.01	40.00	48.66	12.52	0.86	32.05	100	0	Peak
2	161.92	31.78	-11.72	43.50	46.25	16.02	1.31	31.80	---	---	Peak
3	249.22	29.57	-16.43	46.00	41.06	18.31	1.75	31.55	---	---	Peak
4	383.08	30.52	-15.48	46.00	38.04	21.23	2.02	30.77	---	---	Peak
5	500.45	33.15	-12.85	46.00	37.58	23.50	2.38	30.31	---	---	Peak
6	900.09	32.67	-13.33	46.00	30.49	26.60	3.09	27.51	---	---	Peak
7	1636.00	43.12	-30.88	74.00	72.40	29.02	4.23	62.53	---	---	Peak
8	1766.00	40.99	-33.01	74.00	69.79	29.27	4.41	62.48	---	---	Peak
9	1888.00	40.13	-33.87	74.00	68.50	29.50	4.52	62.39	---	---	Peak
10	3753.00	43.27	-30.73	74.00	63.65	34.70	6.59	61.67	---	---	Peak
11	4470.00	44.73	-29.27	74.00	63.59	35.85	7.32	62.03	---	---	Peak
12	4773.00	44.22	-29.78	74.00	62.27	35.69	7.69	61.43	---	---	Peak

Test Mode :	Mode 1	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 + Camera + USB Link with Type C 2 + Play H Pattern + Adapter 1 With Type C Cable 1 In Type C 1 for Sample 1		



Site : 03CH02-KS
Condition : FCC CLASS-B 3m LF 47610 VERTICAL
Project : (FC)7D2101
Mode : 1

		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	!	60.07	36.21	-3.79	40.00	55.18	12.40	0.79	32.16	---	---	Peak
2	!	68.80	35.62	-4.38	40.00	54.49	12.31	0.85	32.03	135	3	QP
3		149.31	30.89	-12.61	43.50	44.90	16.58	1.25	31.84	---	---	Peak
4		167.74	30.42	-13.08	43.50	45.09	15.78	1.33	31.78	---	---	Peak
5		500.45	33.01	-12.99	46.00	37.44	23.50	2.38	30.31	---	---	Peak
6		659.53	31.63	-14.37	46.00	33.17	25.00	2.70	29.24	---	---	Peak
7		1764.00	44.14	-29.86	74.00	72.94	29.27	4.41	62.48	---	---	Peak
8		1886.00	44.15	-29.85	74.00	72.52	29.50	4.52	62.39	---	---	Peak
9		1988.00	44.24	-29.76	74.00	71.78	30.19	4.61	62.34	---	---	Peak
10		4176.00	44.25	-29.75	74.00	63.56	35.40	7.24	61.95	---	---	Peak
11		4284.00	44.64	-29.36	74.00	63.83	35.56	7.23	61.98	---	---	Peak
12		5118.00	44.33	-29.67	74.00	62.28	35.42	7.78	61.15	---	---	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. 12, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Mar. 12, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Mar. 12, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Mar. 12, 2018	Oct. 11, 2018	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Aug. 08, 2017	Mar. 22, 2018	Aug. 07, 2018	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44G,MAX 30dB	Apr. 18, 2017	Mar. 22, 2018	Apr. 17, 2018	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz-2GHz	Apr. 25, 2017	Mar. 22, 2018	Apr. 24, 2018	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 21, 2017	Mar. 22, 2018	Oct. 20, 2018	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Mar. 22, 2018	Feb. 06, 2019	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 07, 2017	Mar. 22, 2018	Aug. 06, 2018	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1-26.5GHz Gain 30dB	Oct. 12, 2017	Mar. 22, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18~40GHz	Oct. 12, 2017	Mar. 22, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Mar. 22, 2018	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Mar. 22, 2018	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Mar. 22, 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