



FCC Test Report

APPLICANT : Lenovo (Shanghai) Electronics
Technology Co., Ltd.
EQUIPMENT : Portable Tablet Computer
BRAND NAME : Lenovo
MODEL NAME : Lenovo TB-J706F
FCC ID : O57TBJ706F
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on May 09, 2020 and testing was completed on Aug. 03, 2020. 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.

Reviewed by: Jason Jia / Supervisor

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC050905-01	Rev. 01	Initial issue of report	Aug. 13, 2020

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 5.45 dB at 0.156 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 6.87 dB at 42.610 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.

Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

1.2. Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, P.R.China

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo TB-J706F
FCC ID	O57TBJ706F
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac HT20/HT40/VHT20/VHT40/VHT80/VHT80+VHT80 Bluetooth BR/EDR/LE GNSS
HW Version	Lenovo TB-J706F
SW Version	TB-J706F_RF01_200701
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 sample 1 and sample 2, the difference between them can refer to the product equality declaration exhibit separately. According to the difference, the sample 1 to perform full test and the sample 2 is verified

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/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz GNSS : 1559 MHz ~ 1610 MHz
Antenna Type	WLAN : Fixed Internal Antenna Bluetooth : Fixed Internal Antenna GNSS: Fixed Internal 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) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK GNSS : BPSK

1.5. Modification of EUT

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

1.6. Test Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-KS 03CH02-KS	CN1257	314309

1.7. Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8. Applicable Standards

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

- ♦ 47 CFR 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.

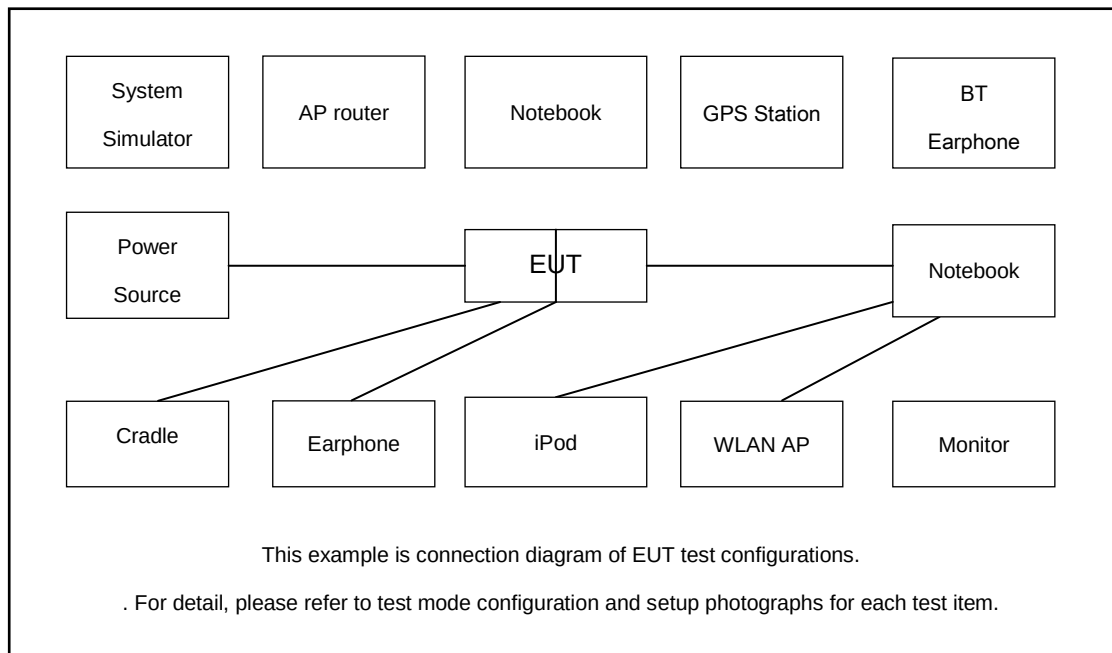
Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Battery1 + Keyboard + USB Cable(Charging from Adapter1) for Sample1
	Mode 2: Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Battery1 + Keyboard + USB Cable(Charging from Adapter2) for Sample1
	Mode 3: Bluetooth Idle + WLAN (5G) Idle + MPEG4(Run Color Bar) + Keyboard + Battery1 + USB Cable(Charging from Adapter2) for Sample1
	Mode 4: Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Battery1 + Keyboard + USB Cable (Data Link with Notebook) for Sample1
	Mode 5: Bluetooth Idle + WLAN (5G) Idle + Camera(Rear) + Battery2 + Keyboard + USB Cable(Charging from Adapter2) for Sample2
	Mode 6: Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Battery2 + Keyboard + USB Cable (Data Link with Notebook) for Sample2
Radiated Emissions	Mode 1: Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Keyboard + Battery1 + USB Cable(Charging from Adapter1) for Sample1
	Mode 2: Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Keyboard + Battery1 + USB Cable(Charging from Adapter2) for Sample1
	Mode 3: Bluetooth Idle + WLAN (5G) Idle + Run Color Bar + Keyboard + Earphone + Battery1 for Sample1
	Mode 4: Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Keyboard + Battery1 + USB Cable (Data Link with Notebook) for Sample1
	Mode 5: Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Keyboard + Battery2 + USB Cable (Data Link with Notebook) for Sample2
	Mode 6: Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Keyboard + Battery2 + USB Cable (Data Link with Notebook) for Sample2
	Mode 7: Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Keyboard + Battery2 + PAD Charging to pen for Sample2

Remark:

1. The worst case of AC is mode 2; only the test data of this mode is reported.
2. The worst case of RE is mode 5; only the test data of this mode is reported.
3. Data Link with Notebook / PC means data application transferred mode between EUT and Notebook / PC.

2.2.Connection Diagram of Test System



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

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
2.	SD Card	Kingston	8GB	N/A	N/A	N/A
3.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
4.	Hard disk	KINGSHARE	KSP6120G	Fcc DoC	Shielded, 1.2m	N/A
5.	Signal Generator	R&S	SMBV100A	N/A	N/A	Unshielded,1.8m
6.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	Unshielded,1.8m
7.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
8.	Earphone	N/A	N/A	N/A	N/A	N/A
9.	Base Station	Anritus	MT8000A	N/A	N/A	Unshielded,1.8m
10.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
11.	LTE Base Station	Anritus	MT8820C	N/A	N/A	Unshielded,1.8m
12.	Notebook	Dell	Latitude3440	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
13.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
14.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
15.	Vector Signal Generator	R&S	SMBV100A	258305	N/A	N/A

2.4. EUT Operation Test Setup

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

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 notebook and EUT via USB cable.
2. Turn on camera to capture images.
3. Turn on MPEG4 function.
4. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.

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.

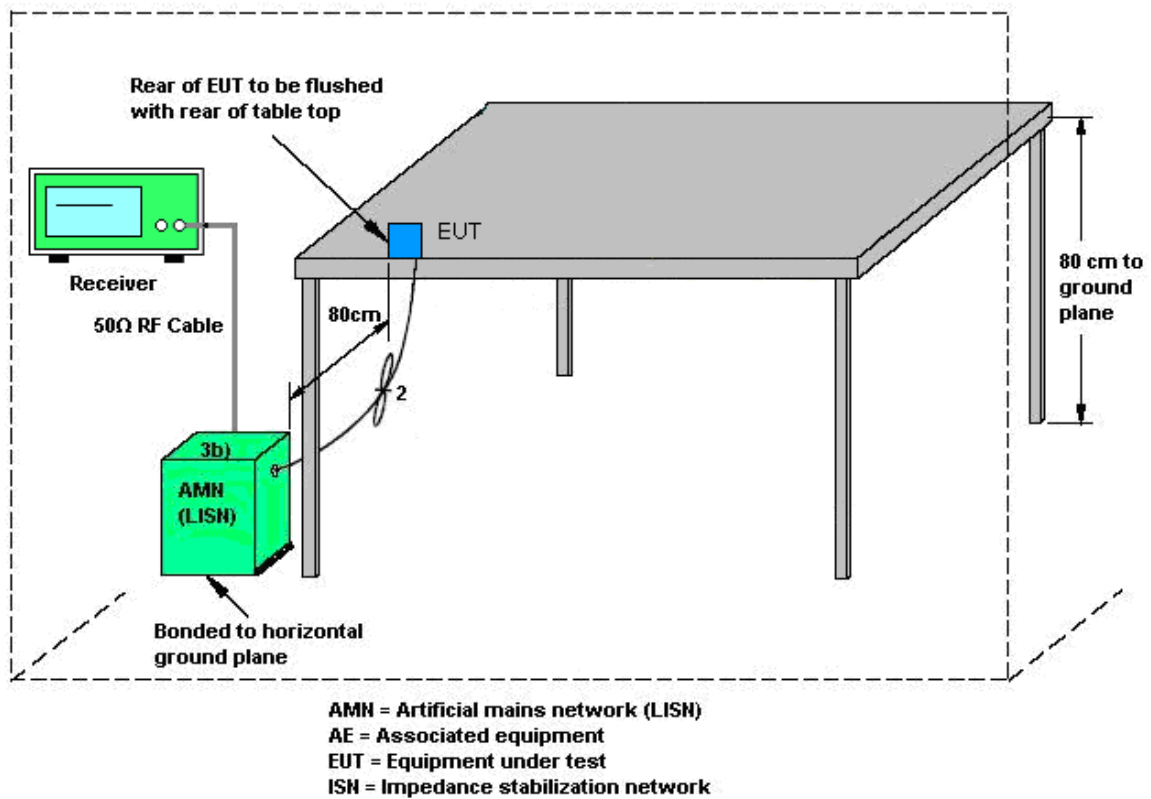
3.1.2 Measuring Instruments

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.

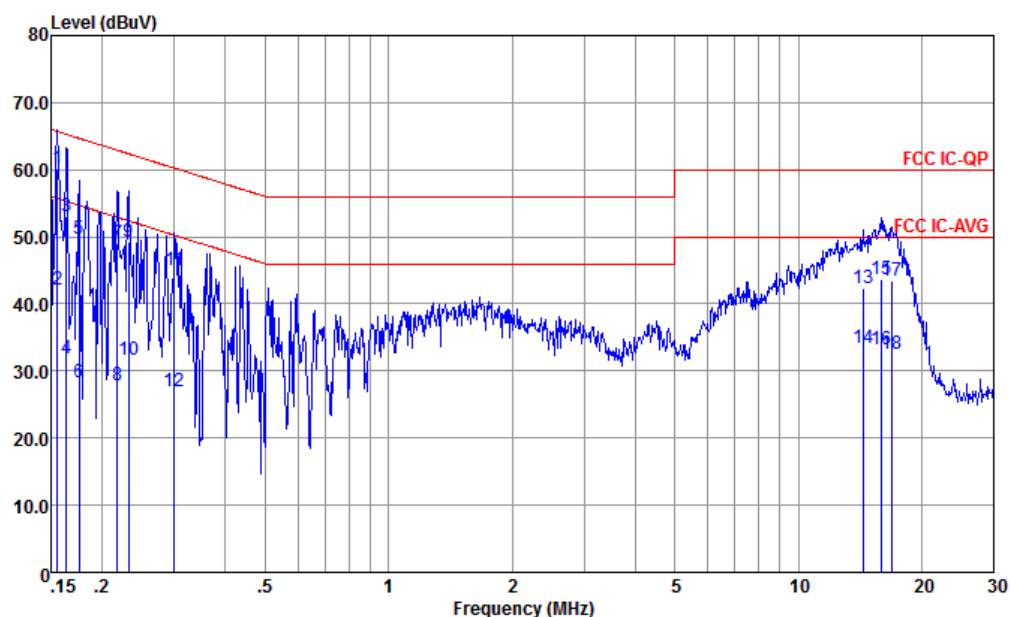
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Engineer :	Amos Zhang	Temperature :	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

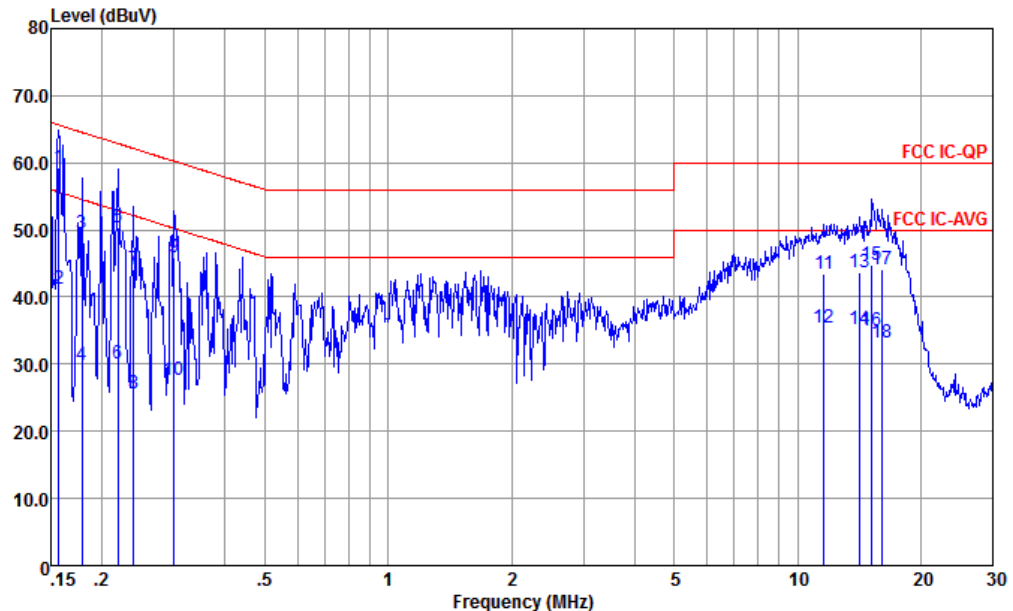


Site : CO01-KS
Condition : FCC IC-QP LISN-L-191028-CN02 LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.156	60.24	-5.45	65.69	49.70	0.07	10.47	QP
2	0.156	42.04	-13.65	55.69	31.50	0.07	10.47	Average
3	0.163	53.02	-12.28	65.30	42.50	0.07	10.45	QP
4	0.163	31.82	-23.48	55.30	21.30	0.07	10.45	Average
5	0.176	49.70	-14.98	64.68	39.20	0.08	10.42	QP
6	0.176	28.30	-26.38	54.68	17.80	0.08	10.42	Average
7	0.217	48.94	-13.98	62.92	38.50	0.09	10.35	QP
8	0.217	27.94	-24.98	52.92	17.50	0.09	10.35	Average
9	0.232	49.34	-13.05	62.39	38.91	0.09	10.34	QP
10	0.232	31.64	-20.75	52.39	21.21	0.09	10.34	Average
11	0.300	45.01	-15.23	60.24	34.59	0.11	10.31	QP
12	0.300	27.01	-23.23	50.24	16.59	0.11	10.31	Average
13	14.364	42.38	-17.62	60.00	30.50	1.49	10.39	QP
14	14.364	33.48	-16.52	50.00	21.60	1.49	10.39	Average
15	15.885	43.69	-16.31	60.00	31.59	1.68	10.42	QP
16	15.885	33.29	-16.71	50.00	21.19	1.68	10.42	Average
17	16.928	43.43	-16.57	60.00	31.19	1.80	10.44	QP
18	16.928	32.43	-17.57	50.00	20.19	1.80	10.44	Average



Test Engineer :	Amos Zhang	Temperature :	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC IC-QP LISN-N-191028-CN02 NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.156	59.22	-6.43	65.65	48.61	0.15	10.46	QP
2	0.156	41.22	-14.43	55.65	30.61	0.15	10.46	Average
3	0.179	49.47	-15.08	64.55	38.90	0.16	10.41	QP
4	0.179	29.77	-24.78	54.55	19.20	0.16	10.41	Average
5	0.219	50.43	-12.45	62.88	39.91	0.17	10.35	QP
6	0.219	30.13	-22.75	52.88	19.61	0.17	10.35	Average
7	0.239	44.02	-18.11	62.13	33.50	0.18	10.34	QP
8	0.239	25.62	-26.51	52.13	15.10	0.18	10.34	Average
9	0.300	46.00	-14.24	60.24	35.50	0.19	10.31	QP
10	0.300	27.70	-22.54	50.24	17.20	0.19	10.31	Average
11	11.621	43.43	-16.57	60.00	31.60	1.47	10.36	QP
12	11.621	35.33	-14.67	50.00	23.50	1.47	10.36	Average
13	14.213	43.73	-16.27	60.00	31.50	1.84	10.39	QP
14	14.213	35.13	-14.87	50.00	22.90	1.84	10.39	Average
15	15.226	44.86	-15.14	60.00	32.50	1.96	10.40	QP
16	15.226	34.96	-15.04	50.00	22.60	1.96	10.40	Average
17	16.140	44.08	-15.92	60.00	31.50	2.16	10.42	QP
18	16.140	33.18	-16.82	50.00	20.60	2.16	10.42	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

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

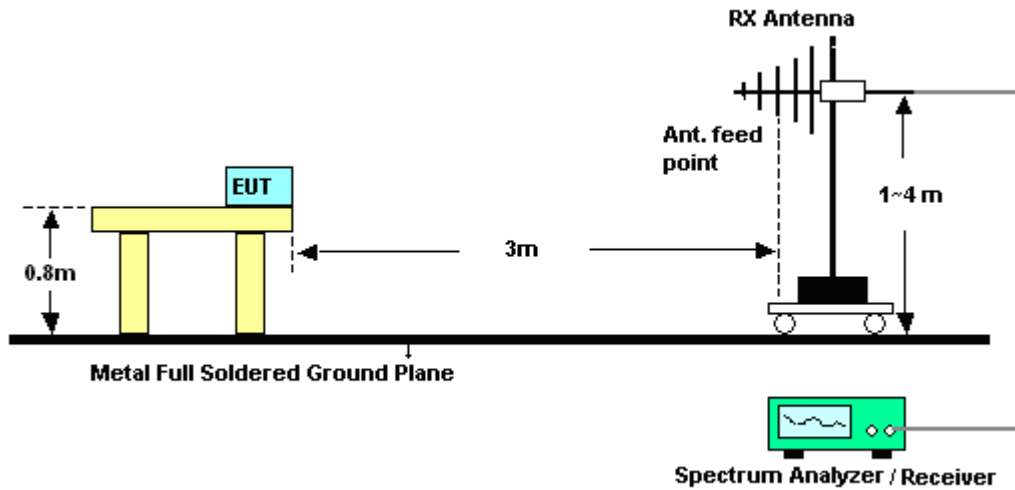
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

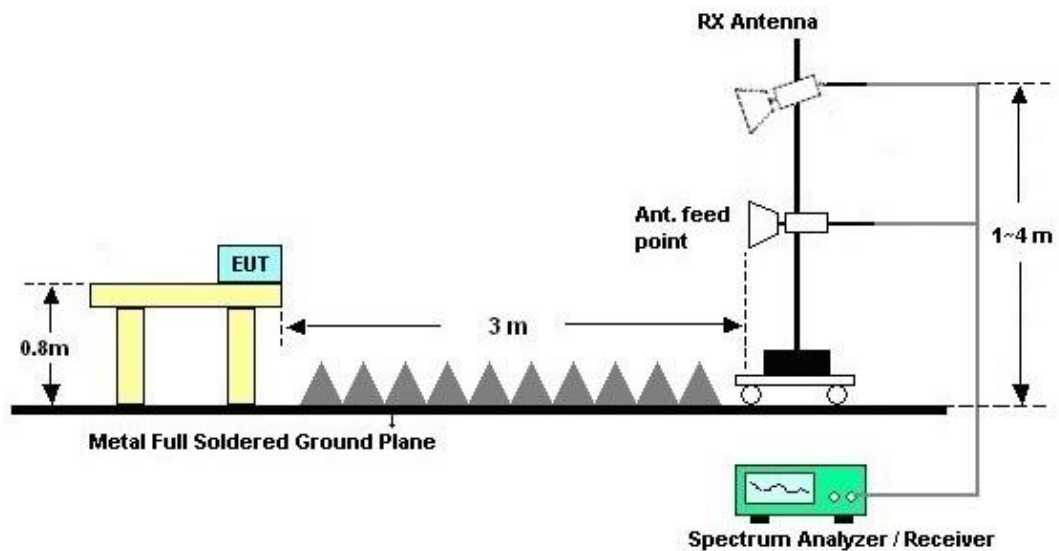
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

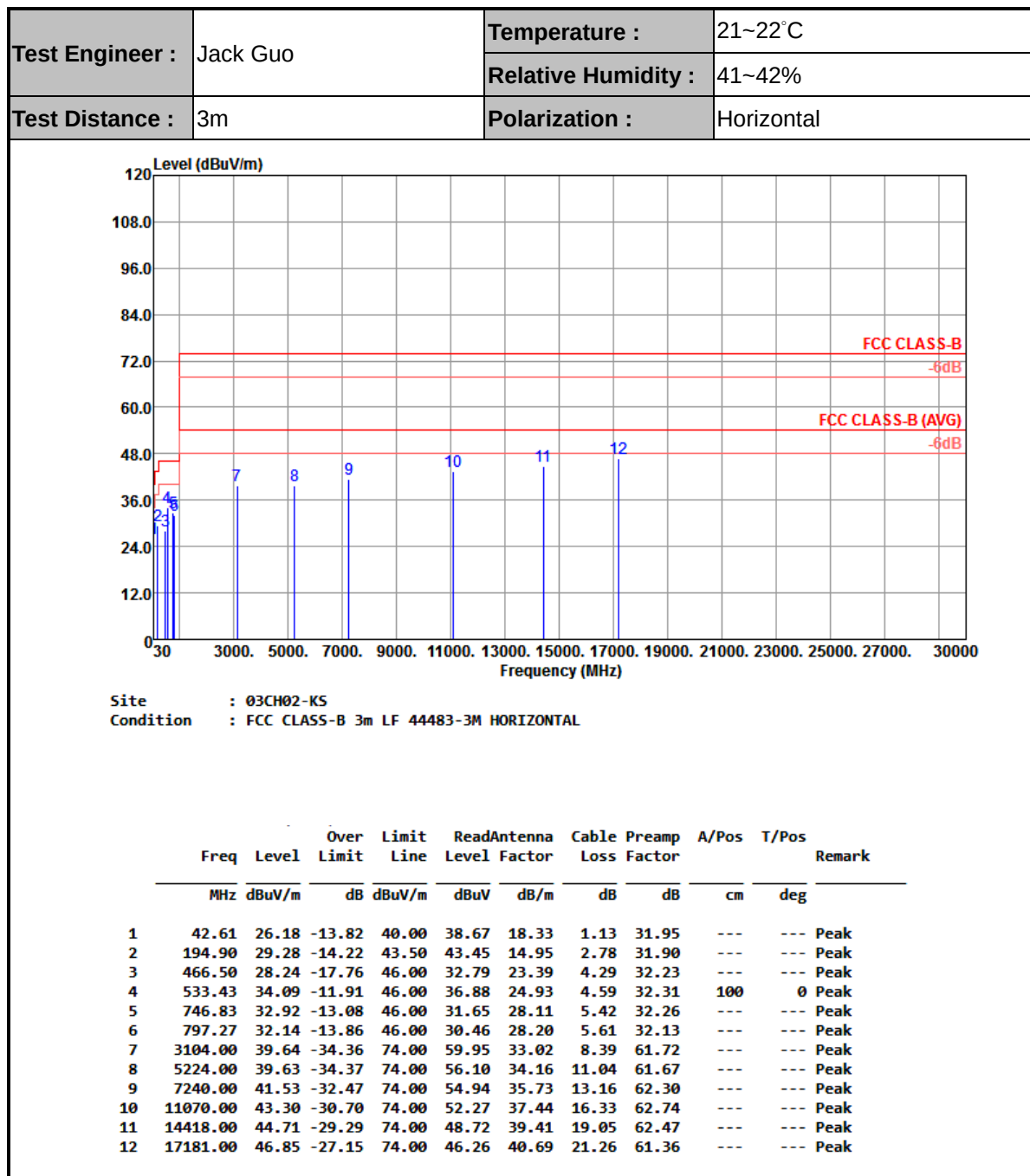


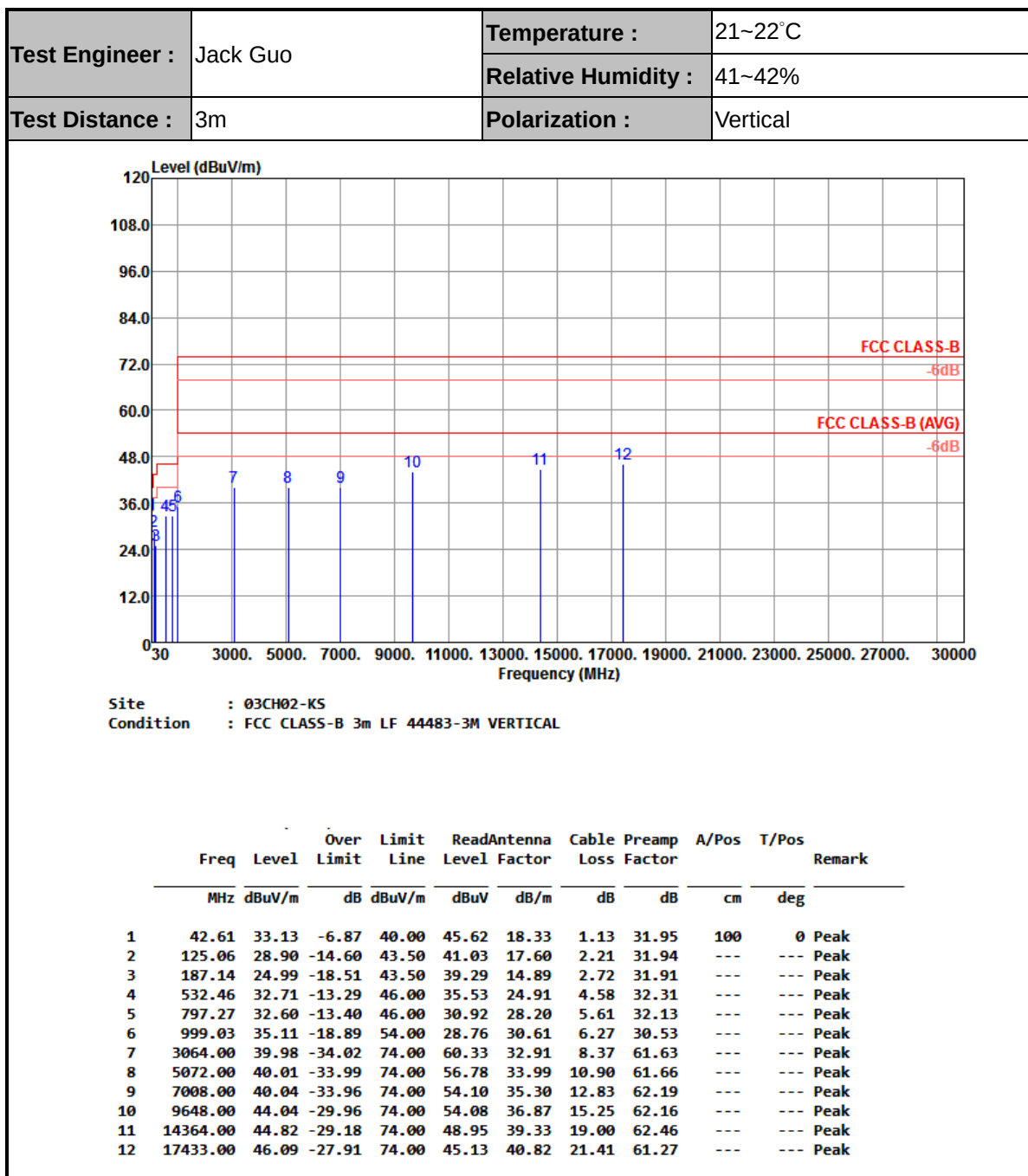
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission





Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)



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. 14, 2020	Aug. 03, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Aug. 03, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Aug. 03, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Aug. 03, 2020	Oct. 17, 2020	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Ma x 30dBm	Oct.18, 2019	Jul. 24, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct.18, 2019	Jul. 24, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 30, 2019	Jul. 24, 2020	Dec. 29, 2020	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 10, 2019	Jul. 24, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Jul. 24, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Jul. 24, 2020	Jan. 07, 2021	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Jan. 02, 2020	Jul. 24, 2020	Jan. 03, 2021	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5G Hz	Oct. 18, 2019	Jul. 24, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jul. 24, 2020	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 24, 2020	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 24, 2020	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% ($U = 2Uc(y)$)	2.9 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
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