

EMC TEST REPORT

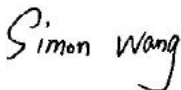

Applicant:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer or Supplier:	Lenovo PC HK Limited
Address:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China
Product:	Portable Tablet Computer
Brand Name:	Lenovo
Model Name:	TB311XU
FCC ID:	O57TB311XU
Date of tests:	Aug. 15, 2024~Sep. 24, 2024

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- ☐ FCC Part 15, Subpart B, Class A
☒ FCC Part 15, Subpart B, Class B
☒ ANSI C63.4:2014

CONCLUSION: The submitted sample was found to **COMPLY** with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Sep. 24, 2024	 Date: Sep. 24, 2024

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2407300216EM03	Original release	Sep. 24, 2024

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Portable Tablet Computer	
BRAND NAME	Lenovo	
MODEL NAME	TB311XU	
NOMINAL VOLTAGE	5Vdc (Adapter or host equipment) 3.9Vdc (Li-Polymer, battery)	
MODULATION TYPE	BT_LE	GFSK
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	FM	FM
	WLAN	DSSS, OFDM
	GPS/GALILEO/GLO NASS/BDS	BPSK
	GSM/GPRS/EDGE	GMSK, 8PSK
	WCDMA	BPSK/QPSK
	LTE	QPSK/16QAM/64QAM
OPERATING FREQUENCY	Bluetooth/BT_LE	2402MHz ~ 2480MHz
	FM	87.5MHz ~ 108MHz
	WLAN	2412 ~ 2462MHz for 11b/g/n(HT20/40) 5180 ~ 5240MHz, 5260 ~ 5320 MHz, 5500 ~ 5720MHz, 5745 ~ 5825 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT20)/ ac(VHT40) / ac(VHT80)
	GPS/GALILEO/GLO NASS/BDS	1559MHz ~ 1610MHz
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 1712.4MHz ~ 1752.6MHz(FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 706.5MHz ~ 713.5MHz (FOR LTE Band17)

		1850.7MHz ~ 1914.3MHz (FOR LTE Band25) 814.7MHz ~ 848.3MHz (FOR LTE Band26) 2572.5MHz ~ 2617.5MHz (FOR LTE Band38) 2498.5MHz ~2687.5MHz (FOR LTE Band41) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66) LTE Carrier Aggregation DL: CA_1A-8A CA_1A-18A CA_1A-19A CA_1A-1A CA_1A-20A CA_1A-26A CA_1A-28A CA_1A-38A CA_1A-3A CA_1A-40A CA_1A-41A CA_1A-5A CA_1A-7A CA_1C CA_20A-38A CA_20A-40A CA_28A-28A CA_28A-38A CA_28A-40A CA_28A-41A CA_28A-66A CA_2A-28A CA_2A-2A CA_2A-4A CA_2A-5A CA_2A-66A CA_2A-7A CA_2C CA_38A-38A CA_38C CA_3A-28A CA_3A-18A CA_3A-19A CA_3A-20A CA_3A-38A CA_3A-3A CA_3A-40A CA_3A-41A CA_3A-5A CA_3A-7A CA_3A-8A CA_3B CA_3C CA_40A-40A CA_40C
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		CA_41A-41A CA_41C CA_4A-28A CA_4A-4A CA_4A-5A CA_4A-7A CA_5A-40A CA_5A-66A CA_5A-7A CA_66A-66A CA_66C CA_7A-20A CA_7A-28A CA_7A-66A CA_7A-7A CA_7A-8A CA_7B CA_7C CA_8A-38A CA_8A-40A CA_8A-41A LTE Carrier Aggregation UL: CA_3C CA_7C CA_38C CA_40C CA_41C
HW VERSION	TB311XU	
SW VERSION	TB311XU_RF01_20240921	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB cable1: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable2: non-shielded cable, with w/o ferrite core, 1.0 meter	
ACCESSORY DEVICES	Refer to note as below	

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3. List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery 1	N/A	Zhejiang Sunwoda Electronic Co., Ltd.	L24D1P32	Nominal Energy: 19.55Wh, Typical Energy: 19.95Wh
Battery 2	N/A	Ningde Amperex Technology Limited	L24D1P32	Nominal Energy: 19.55Wh, Typical Energy: 19.95Wh

AC Adapter 1	Salcomp	Salcomp (Shenzhen) Co., Ltd	MC-201L (US)	AC Input: 100-240V~, 50/60Hz, 0.7A DC Output: 5.0Vdc 3.0A 15W 10Vdc 2.0A 20W 12Vdc 1.67A 20W
AC Adapter 2	Aohai	Jiangxi Jian Aohai Technology Co., Ltd.	MC-201L (US)	AC Input: 100-240V~, 50/60Hz, 0.7A DC Output: 5.0Vdc 3.0A 15W 10Vdc 2.0A 20W 12Vdc 1.67A 20W
USB Cable 1 (support unit)	Saibao	Saibao (Jiangxi) Industrial Co., LTD	SLQ-A263A	Signal Line, 1.0meter
USB Cable 2	Jieye	Jiangxi Jieye Electronics Co., LTD	JY-C03-422	Signal Line, 1.0meter
Earphone (optional)	Lenovo	N/A	E310	N/A
Pen(optional)	Lenovo	N/A	passive pen	N/A

1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B		
Standard Section	Test Item	Result
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance
	Radiated Emission Test (Above 1GHz)	Compliance

*Test Lab Information Reference

Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	±2.70dB
Radiated emissions	30MHz~1GHz	±4.98dB
	1GHz ~6GHz	±4.70dB
	6GHz ~18GHz	±4.60dB
	18GHz ~40GHz	±4.12dB

1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM850 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + Front Camera On + SIM + sample1 + earphone + TF Card
2	WCDMA B5 Idle + Adapter 2 + USB cable 2 + BT Idle + WIFI Idle (5G) + Back Camera On + SIM + sample1 + earphone + TF Card
3	LTE B5 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + FM + SIM + sample1 + earphone + TF Card
4	LTE B12 Idle + Adapter 2 + USB cable 2 + BT Idle + WIFI Idle (5G) + MPG4 + SIM + sample1 + earphone + TF Card
5	LTE B13 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + SIM + sample1 + earphone + TF Card
6	LTE B17 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (2.4G) + Notebook to EUT + SIM + sample1 + TF Card
7	LTE B26 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (5G) + TF Card to Notebook + SIM + TF Card + sample1
8	Powered by battery + BT Idle + WIFI Idle (5G) + SIM + sample1 + TF Card
9	worse of 1-8 + sample2
10	worse of 1-8 + sample3
11	worse of 1-8 + sample4

Conducted emission test	
1	GSM850 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + Front Camera On + SIM + sample1 + earphone + TF Card
2	WCDMA B5 Idle + Adapter 2 + USB cable 2 + BT Idle + WIFI Idle (5G) + Back Camera On + SIM + sample1 + earphone + TF Card
3	LTE B5 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + FM + SIM + sample1 + earphone + TF Card
4	LTE B12 Idle + Adapter 2 + USB cable 2 + BT Idle + WIFI Idle (5G) + MPG4 + SIM + sample1 + earphone + TF Card
5	LTE B13 Idle + Adapter 1 + USB cable 1 + BT Idle + WIFI Idle (2.4G) + SIM + sample1 + earphone + TF Card
6	LTE B17 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (2.4G) + Notebook to EUT + SIM + sample1 + TF Card
7	LTE B26 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (5G) + TF Card to Notebook + SIM + TF Card + sample1
8	worse of 1-7 + sample2
9	worse of 1-7 + sample3
10	worse of 1-7 + sample4

NOTE:

1. For conducted emission test, Pre-scan all mode, mode 10 was the worst case and only this mode was presented in this report.
2. For radiated emission test, Pre-scan all mode, test mode 10 was the worst case and only this mode was presented in this report

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

FOR ALL TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad L440	R90FTFKP	N/A
2	Micro SD	SAM SUNG	N/A	N/A	N/A
3	Universal radio communication tester	Rohde&Schwarz	CMW500	N/A	N/A
4	Bluetooth	FAP00	H6080	12098	N/A
5	Wireless AP	ABOCOM	WR224GR	060500749P	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Line: Shielded, Detachable 1m;

2 EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 A CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 B CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.19,24	Jun.18,26
EMI Test Receiver	Rohde&Schwarz	ESR3	102749	Mar.28,24	Mar.27,26
ELEKTRA test software	Rohde&Schwarz	ELEKTRA	NA	N/A	N/A
LISN network	Rohde&Schwarz	ENV216	102640	Mar.28,24	Mar.27,26
CABLE	Rohde&Schwarz	W61.01	N/A	Apr.27,24	Apr.26,25
CABLE	Rohde&Schwarz	W601	N/A	Apr.27,24	Apr.26,25

NOTE: 1. The test was performed in CE shielded room.

2.1.3 TEST PROCEDURES

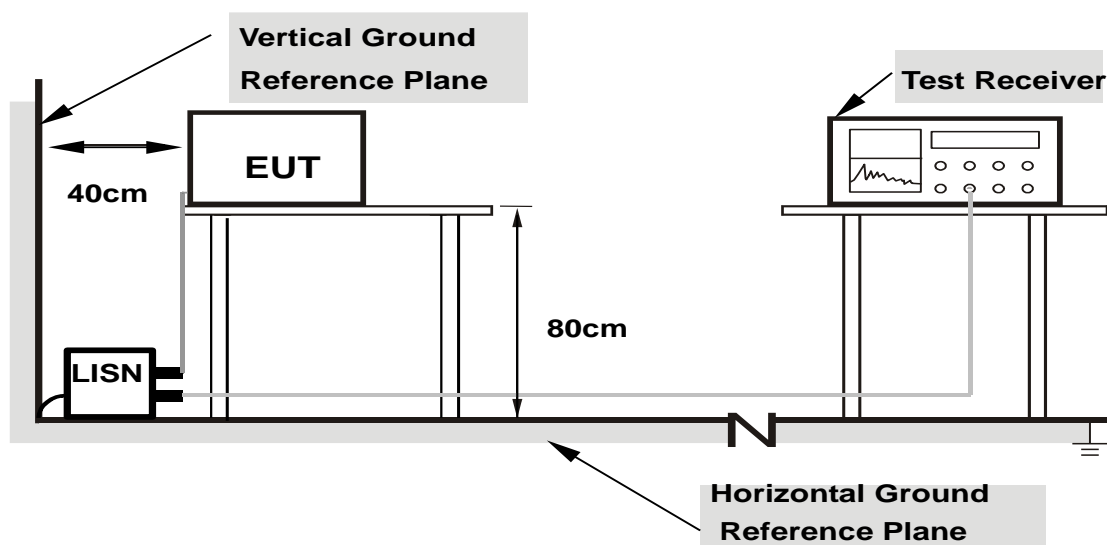
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

2.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

2.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manua

2.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl xie

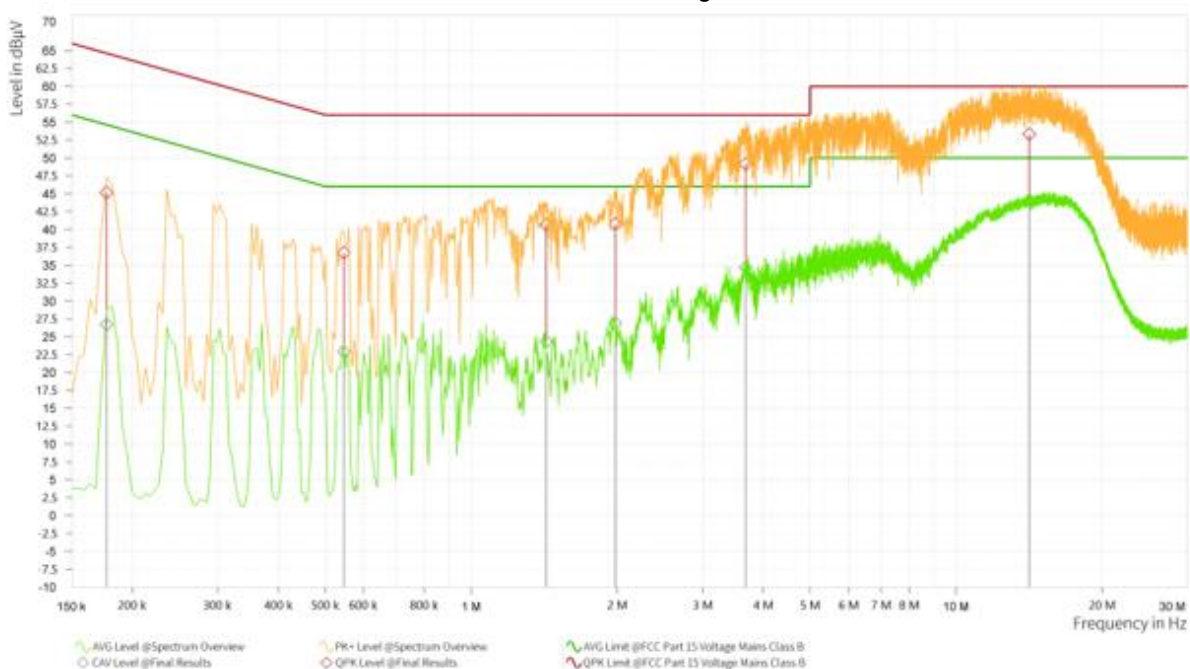
R _g	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.186	45.72	64.21	18.49	25.02	54.21	29.19	12.17	L1	9.000
1	0.537	39.82	56.00	16.18	21.14	46.00	24.86	11.75	L1	9.000
1	1.487	39.83	56.00	16.17	21.52	46.00	24.48	11.75	L1	9.000
1	3.053	42.09	56.00	13.91	26.17	46.00	19.83	11.77	L1	9.000
1	5.370	45.01	60.00	14.99	30.84	50.00	19.16	11.79	L1	9.000
1	16.701	50.64	60.00	9.36	40.48	50.00	9.52	11.85	L1	9.000

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



TEST VOLTAGE		Input 120 Vac, 60 Hz				Detector Function & Resolution Bandwidth		Quasi-Peak (QP) / Average (AV), 9 kHz		
ENVIRONMENTAL CONDITIONS		26deg. C, 51%RH				TESTED BY		Carl xie		
R _g	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.177	45.18	64.63	19.45	26.72	54.63	27.91	12.22	N	9.000
1	0.546	36.74	56.00	19.26	22.95	46.00	23.05	12.77	N	9.000
1	1.428	40.67	56.00	15.33	24.31	46.00	21.69	12.73	N	9.000
1	1.982	40.78	56.00	15.22	26.87	46.00	19.13	12.74	N	9.000
1	3.683	49.16	56.00	6.84	34.67	46.00	11.33	12.75	N	9.000
1	14.168	53.35	60.00	6.65	44.06	50.00	5.94	12.82	N	9.000

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 3 meters (dB μ V/m)		
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B
30-88	49	40
88-216	53.5	43.5
216-960	56	46
960-1000	59.5	54
Above 1000	Avg: 59.5 Peak: 79.5	Avg: 54 Peak: 74

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 4. QP detector shall be applied if not specified.

2.2.2 TEST INSTRUMENTS

Frequency range below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.19,24	Jun.18,26
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.24,22	Nov.23,25
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Dec.26,23	Dec.25,25
EMI Test Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
CABLE	R&S	W13.01	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.19,24	Jun.18,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.24,22	Nov.23,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.21,24	Aug.20,26
EMI Test Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
CABLE	R&S	W13.01	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

NOTE: 1. The test was performed in 3m chamber.
2. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2.2.3 TEST PROCEDURE

<Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
5. $\text{Margin value} = \text{Emission level} - \text{Limit value}$.

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

NOTE:

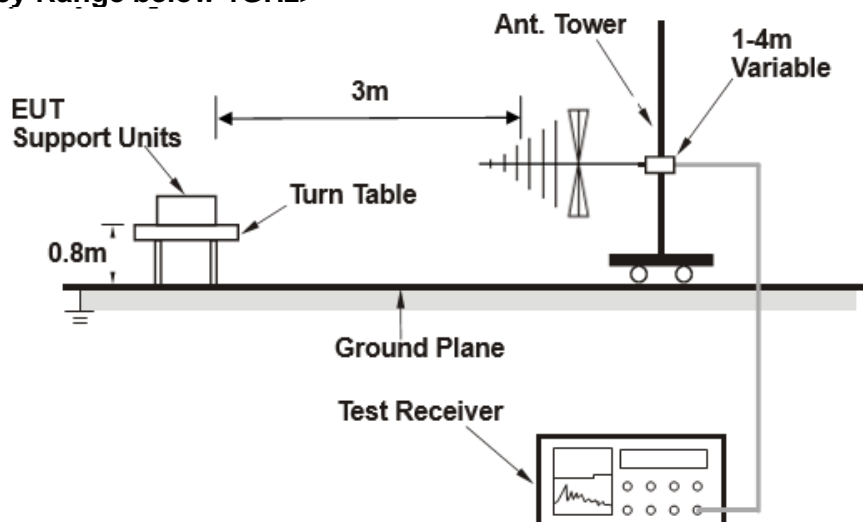
- . The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- . The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.
- . For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
- . $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
- . $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
- . $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier)
- . $\text{Margin value} = \text{Limit value} - \text{Emission level..}$

2.2.4 DEVIATION FROM TEST STANDARD

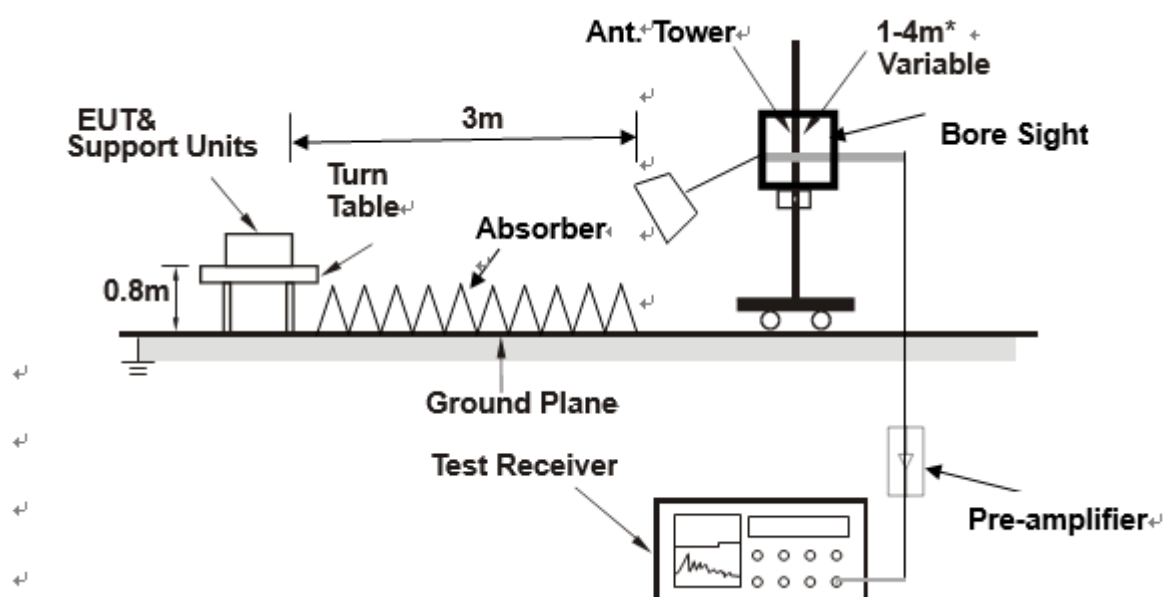
No deviation.

2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

depends on the EUT height and the antenna 3dB bandwidth both, refer to section 7.3 of CISPR 16-2-3.

2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

2.2.7 TEST RESULTS

Acceleromete alternative worst case:

TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

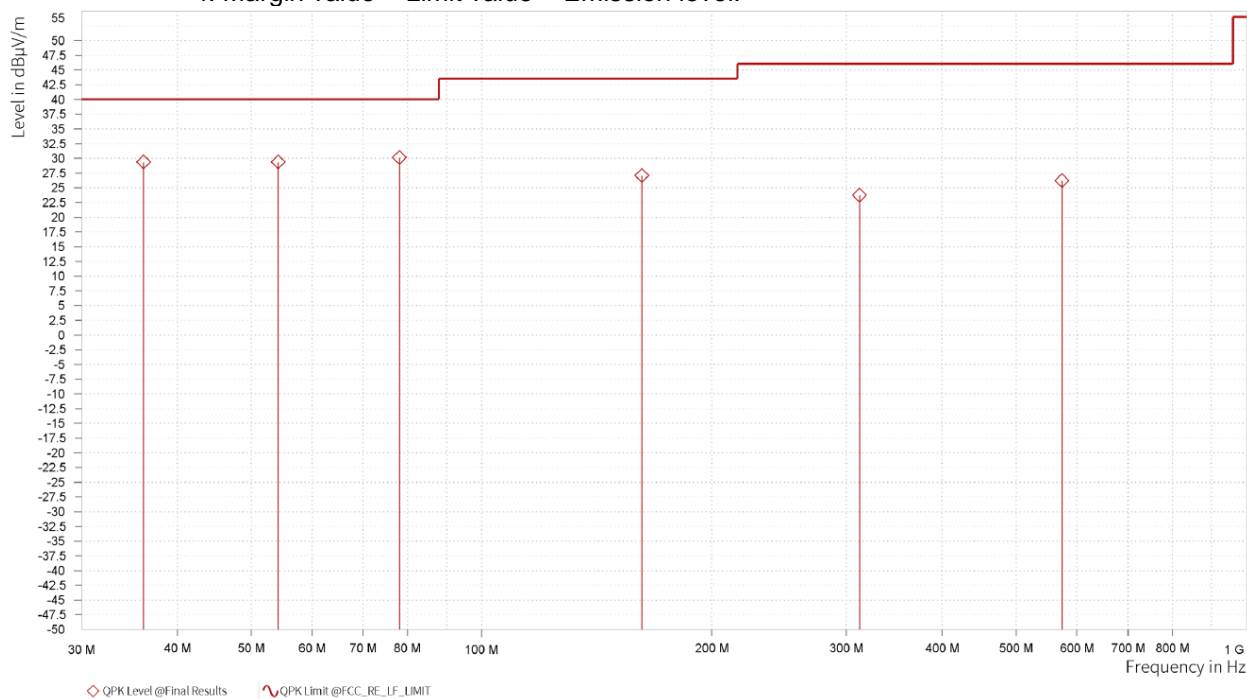
Rg	Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	36.143	29.36	40.00	10.64	-6.00	H	359.1	1.00	120.000
1	54.196	29.34	40.00	10.66	-3.94	H	357.8	1.00	120.000
1	78.123	30.12	40.00	9.88	-10.94	H	210.2	2.00	120.000
1	161.974	27.06	43.50	16.44	-8.51	H	286.6	2.00	120.000
1	311.839	23.72	46.00	22.28	-1.22	H	72.2	1.00	120.000
1	573.901	26.22	46.00	19.78	2.16	H	53.5	2.00	120.000

REMARKS: 1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)- Amplifier Gain

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission level.



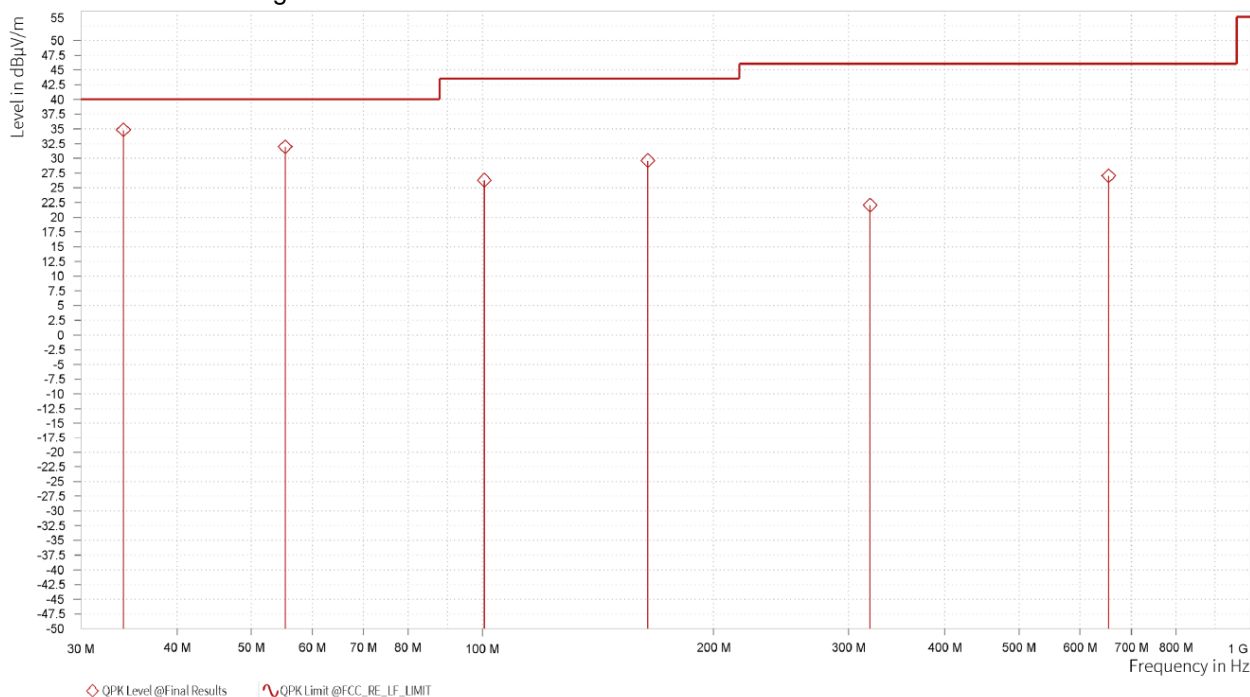
TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70% RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak , 120 kHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	34.096	34.81	40.00	5.19	-8.38	V	229.9	1.00	120.000
1	55.328	31.94	40.00	8.06	-5.89	V	153.4	1.00	120.000
1	100.541	26.27	43.50	17.23	-6.11	V	1	2.00	120.000
1	164.183	29.58	43.50	13.92	-7.95	V	310	1.00	120.000
1	319.922	22.01	46.00	23.99	-0.94	V	229.9	1.00	120.000
1	653.979	27.00	46.00	19.00	2.77	V	1	1.00	120.000

REMARKS:

1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission level.

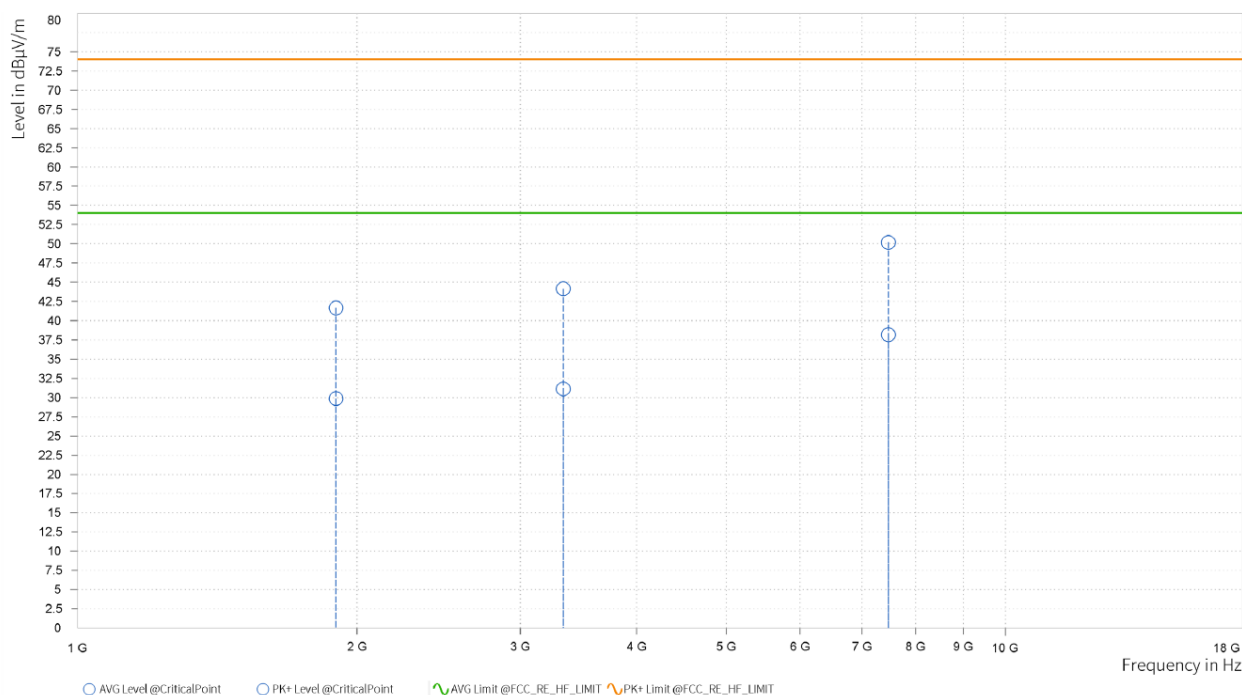


TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,898.000	41.67	74.00	32.33	29.85	54.00	24.15	4.21	H	312.5	1.50
1	3,337.500	44.14	74.00	29.86	31.11	54.00	22.89	7.37	H	359.1	1.50
1	7,479.500	50.21	74.00	23.79	38.17	54.00	15.83	14.20	H	359.1	1.50

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
 4. Only emissions significantly above equipment noise floor are reported.

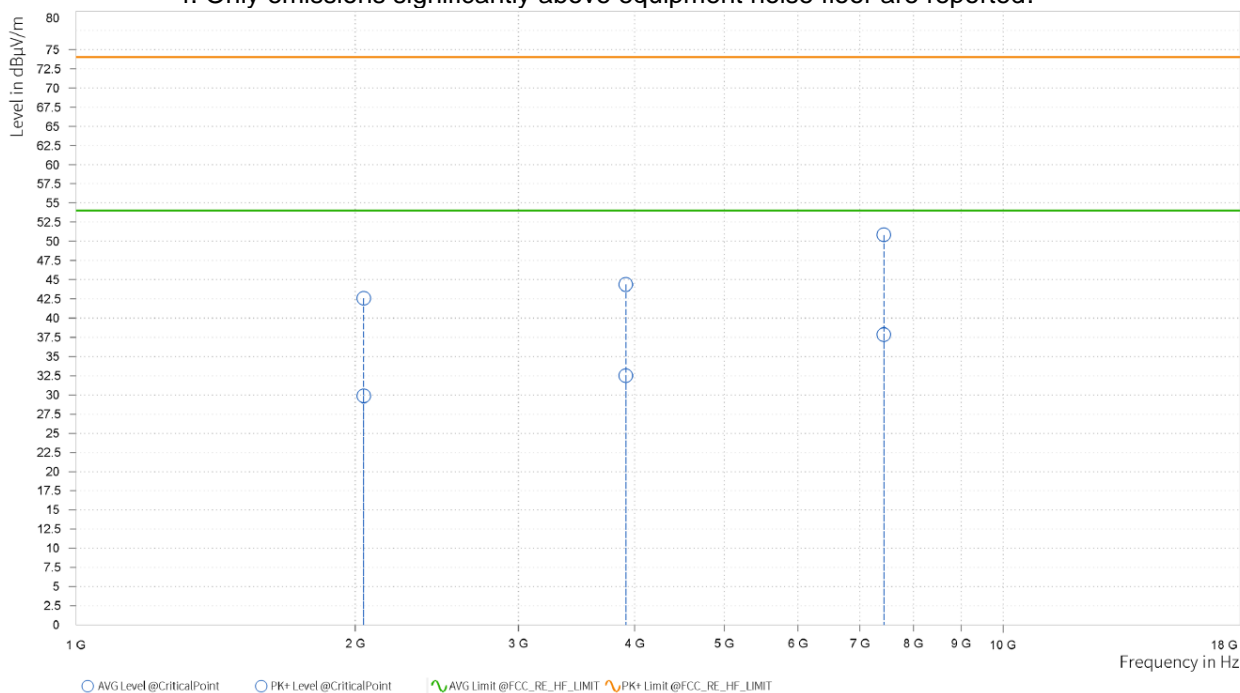


TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,042.500	42.59	74.00	31.41	29.87	54.00	24.13	4.91	V	172.6	1.50
1	3,916.000	44.38	74.00	29.62	32.51	54.00	21.49	8.79	V	359.1	1.50
1	7,430.000	50.85	74.00	23.15	37.87	54.00	16.13	14.22	V	4.9	1.50

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
 4. Only emissions significantly above equipment noise floor are reported.



3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

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