

FCC

TEST REPORT

Prepared for :

PURISM

One Market Street, 36th Floor, San Francisco, CA 94105, USA

Product: NOTEBOOK

Trade Name: Purism

Model Name: Librem L14v1-01

Date of Test: Feb. 20, 2021 - Feb. 25, 2021

Date of Report: Feb. 25, 2021

Report Number: HK2101270313-1ER

Prepared By :

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TEST REPORT VERIFICATION

Applicant : PURISM
Address : One Market Street, 36th Floor, San Francisco, CA 94105, USA
Manufacturer : PURISM
Address : One Market Street, 36th Floor, San Francisco, CA 94105, USA
EUT Description : NOTEBOOK
(A) Model No. : Librem L14v1-01
(B) Serial Model : N/A
(C) Power Supply : DC19V 3.42A From Adapter with AC100-240V, 50/60Hz, 1.5A or
DC7.6V From Battery

Standards..... FCC Part 15 Subpart B
ANSI C63.4:2019

This device described above has been tested by HUAKE, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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Test Result..... **Pass**

Date of Test: Feb. 20, 2021 - Feb. 25, 2021

Testing Engineer:

Gary Qian

(Gary Qian)

Technical Manager:

Eden Hu

(Eden Hu)

Authorized Signatory:

Jason Zhou

(Jason Zhou)

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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2021/02/25	Jason Zhou

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part 15 Subpart B ANSI C63.4:2019	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

DRAFT

1.1 TEST FACILITY

Shenzhen HUAK Testing Technology Co., Ltd.

Add. : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement :

Measurement Frequency Range	Uncertainty	NOTE
150 KHz ~ 30MHz	$\pm 2.71\text{dB}$	

B. Radiated Measurement :

Measurement Frequency Range	Uncertainty	NOTE
30MHz ~ 1000MHz	$\pm 3.90\text{dB}$	
1GHz ~6GHz	$\pm 4.28\text{dB}$	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	NOTEBOOK	
Model Name	Librem L14v1-01	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a NOTEBOOK.	
	Operating frequency:	N/A
	Connecting I/O port:	N/A
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage	
Power Rating	DC19V 3.42A From Adapter with AC100-240V, 50/60Hz, 1.5A or DC7.6V From Battery	

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Working
Mode 2	Working

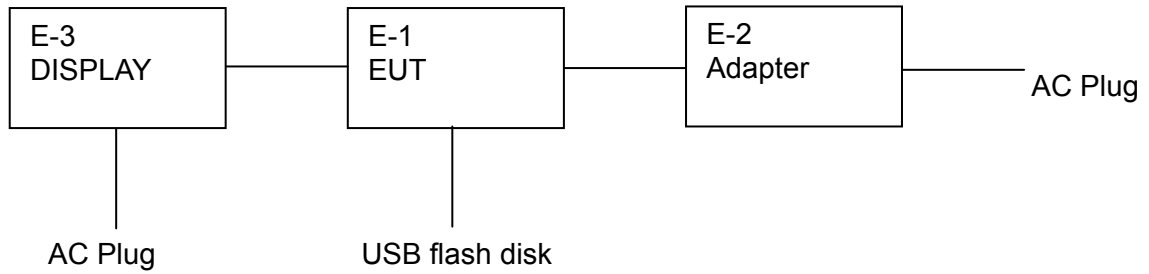
For Conducted Test	
Final Test Mode	Description
Mode 1	Working
Mode 2	N/A

For Radiated Test	
Final Test Mode	Description
Mode 1	Working
Mode 2	Working

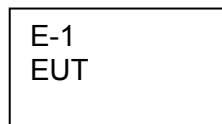
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2.3 DESCRIPTION OF TEST SETUP

Mode 1:



Mode 2:



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2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	NOTEBOOK	Purism	Librem L14v1-01	N/A	EUT
E-2	Adapter	N/A	FSP065-RBBN3	N/A	
E-3	DISPLAY	DELL	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Jun. 18, 2020	1 Year
2.	Receiver	R&S	ESR-7	HKE-010	Jun. 18, 2020	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 18, 2020	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Jun. 18, 2020	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 18, 2020	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Jun. 18, 2020	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	Jun. 18, 2020	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Jun. 18, 2020	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Jun. 18, 2020	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Jun. 18, 2020	1 Year
11.	Pre-amplifier	EMCI	EMC05184 5SE	HKE-015	Jun. 18, 2020	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Jun. 18, 2020	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Jun. 18, 2020	1 Year
14.	Power Sensor	Agilent	E9300A	HKE-086	Jun. 18, 2020	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 18, 2020	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Jun. 18, 2020	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Jun. 18, 2020	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Jun. 18, 2020	1 Year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

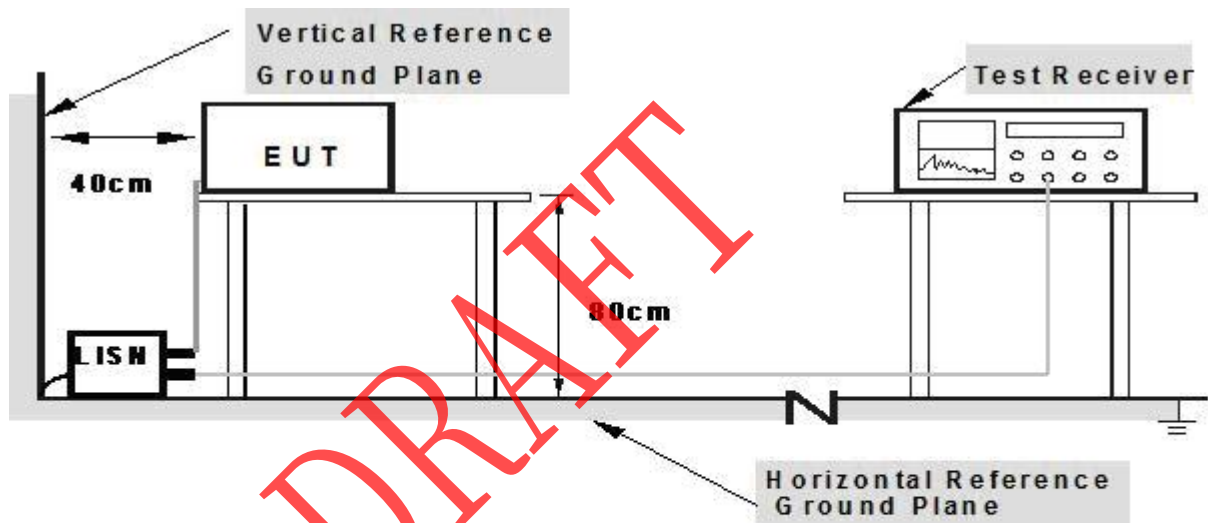
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 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 cm from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

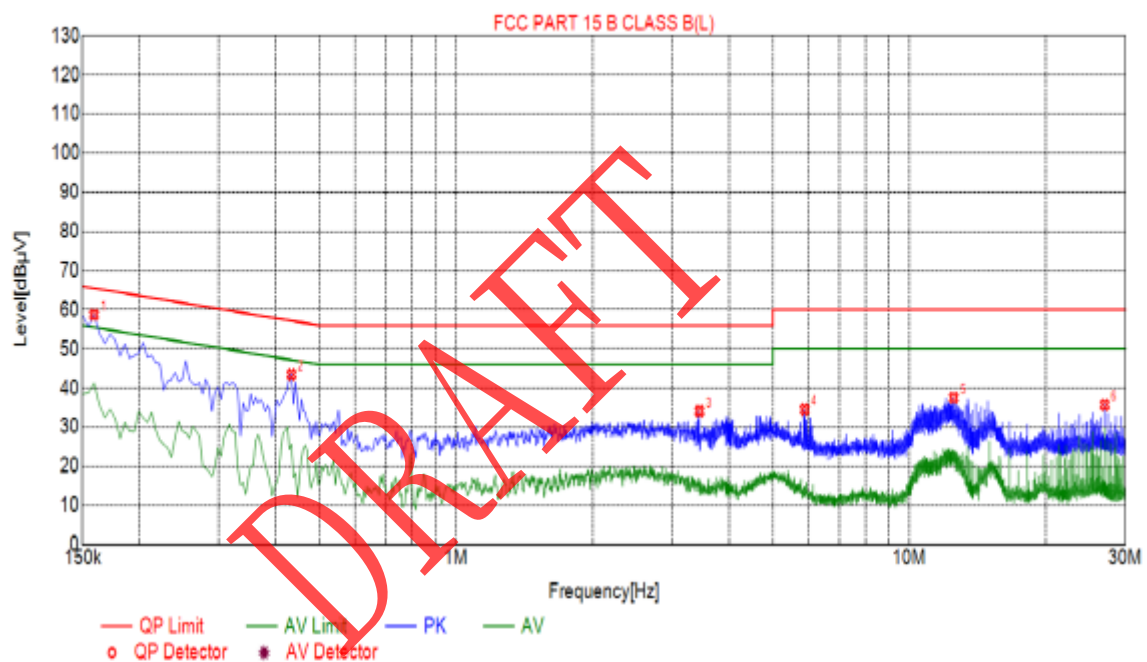
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.5 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.
as below:

EUT :	NOTEBOOK	Model Name. :	Librem L14v1-01
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2021-02-23
Test Mode :	Mode 1	Phase :	L
Test Voltage :	DC19V From Adapter		



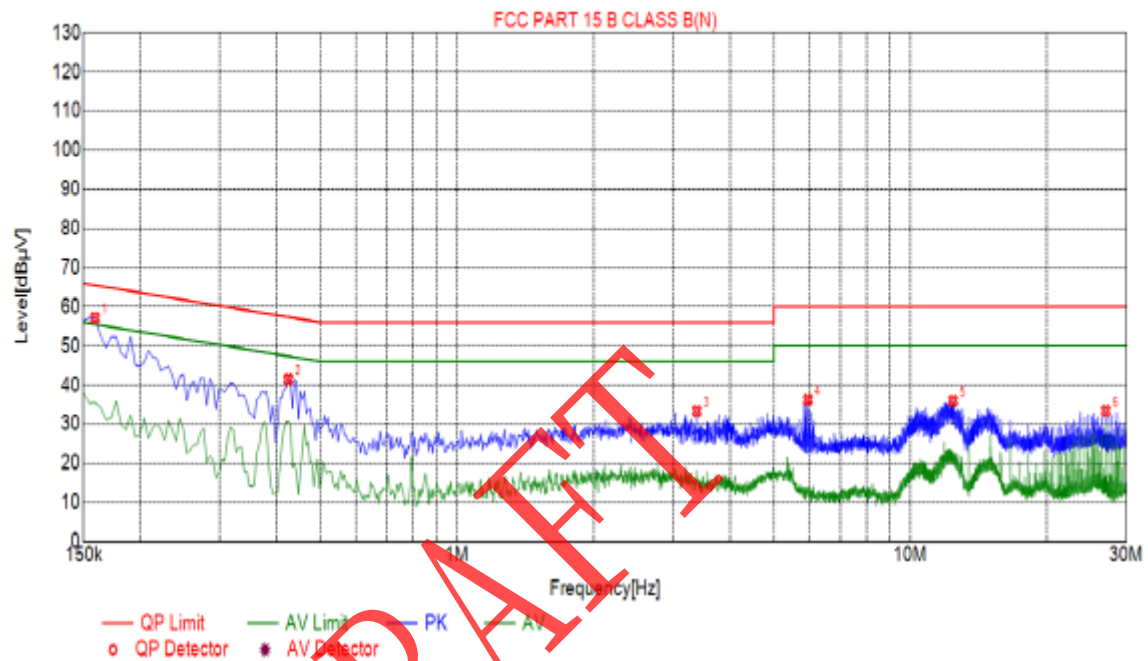
Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1590	58.73	20.01	65.52	6.79	38.72	PK	L
2	0.4335	43.45	20.05	57.19	13.74	23.40	PK	L
3	3.4440	34.09	20.25	56.00	21.91	13.84	PK	L
4	5.8785	34.49	20.24	60.00	25.51	14.25	PK	L
5	12.5295	37.49	19.98	60.00	22.51	17.51	PK	L
6	26.9970	35.73	20.26	60.00	24.27	15.47	PK	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

EUT :	NOTEBOOK	Model Name. :	Librem L14v1-01
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2021-02-23
Test Mode :	Mode 1	Phase :	N
Test Voltage :	DC19V From Adapter		



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1590	57.17	20.01	65.52	8.35	37.16	PK	N
2	0.4245	41.43	20.04	57.36	15.93	21.39	PK	N
3	3.3810	33.36	20.24	56.00	22.64	13.12	PK	N
4	5.9460	36.25	20.23	60.00	23.75	16.02	PK	N
5	12.4260	35.99	19.98	60.00	24.01	16.01	PK	N
6	27.0060	33.43	20.26	60.00	26.57	13.17	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

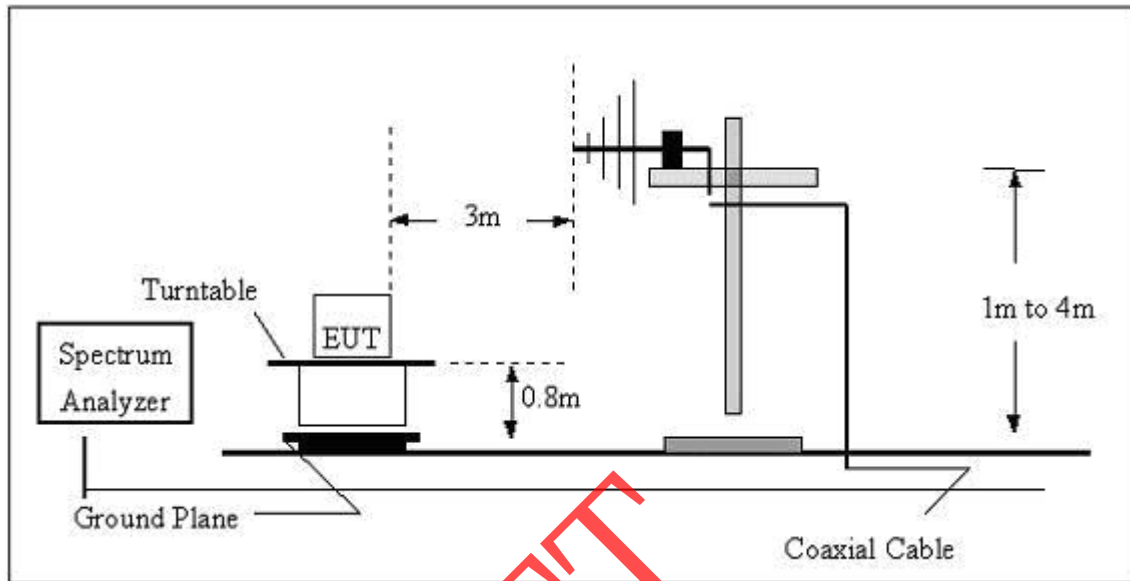
- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

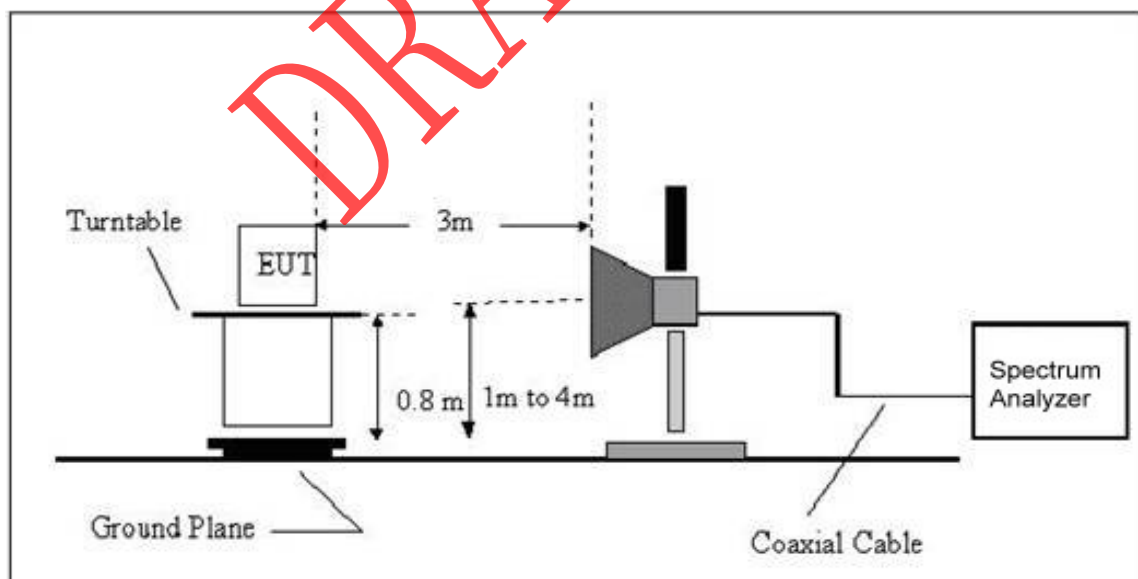
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

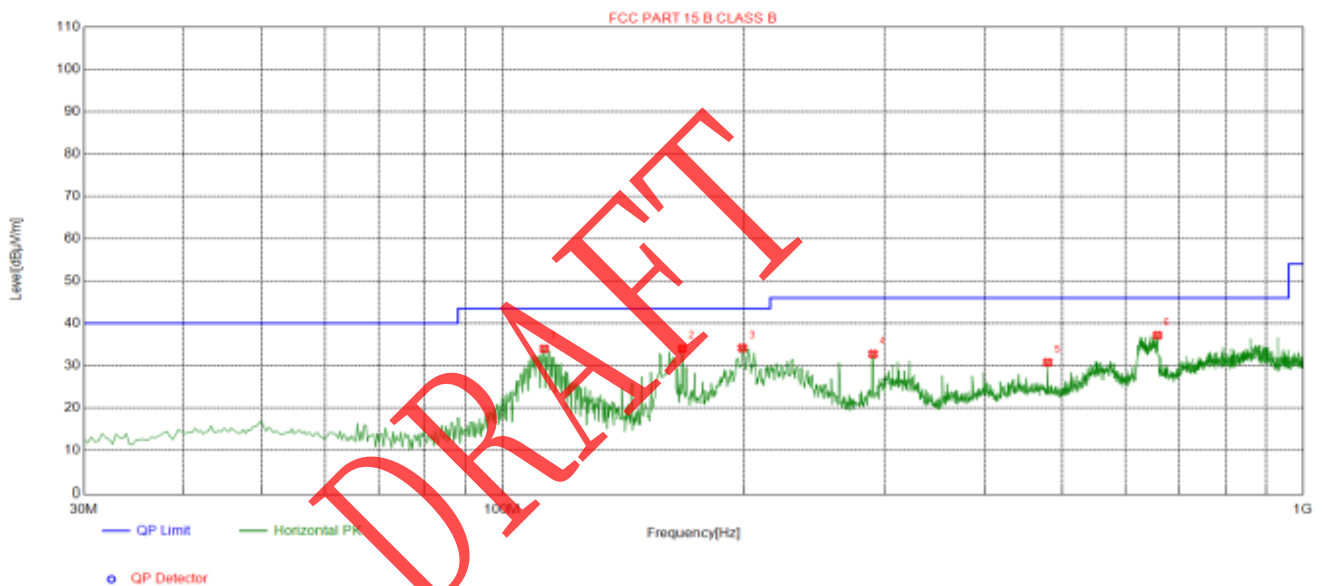
The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.
as below:

EUT :	NOTEBOOK	Model Name :	Librem L14v1-01
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2021-02-23
Test Mode :	Mode 1	Polarization :	Horizontal
Test Power :	DC19V From Adapter		

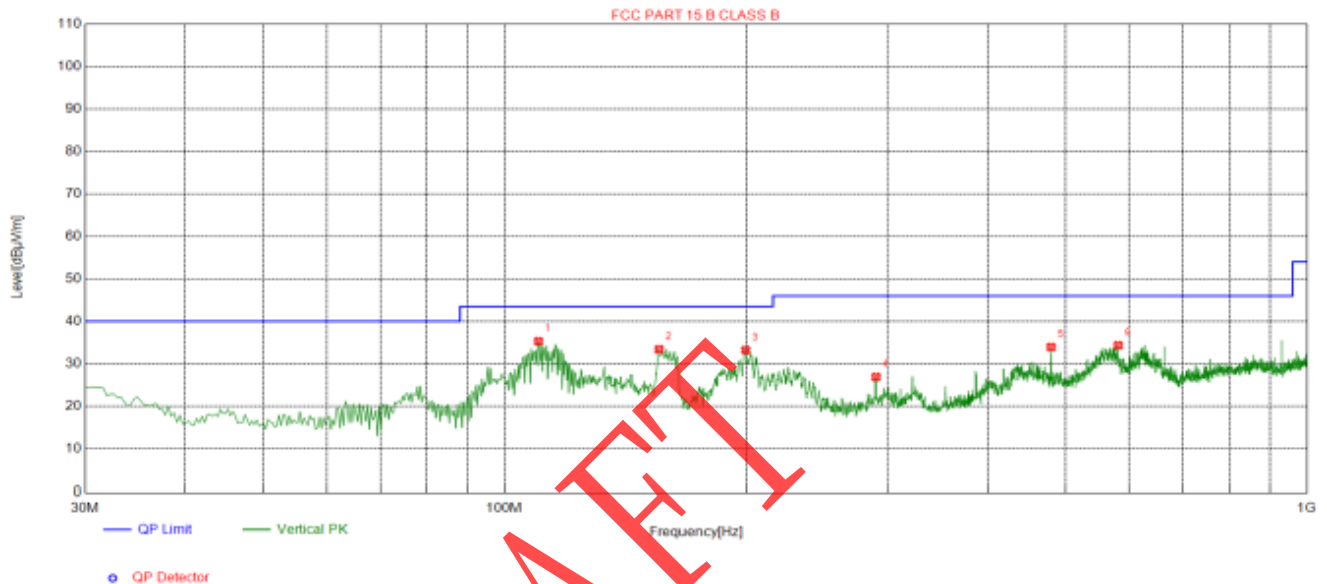


Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	112.8009	-15.90	49.87	33.97	43.50	9.53	100	269	Horizontal
2	167.7859	-17.50	51.48	33.98	43.50	9.52	100	52	Horizontal
3	199.4832	-15.11	49.25	34.14	43.50	9.36	100	34	Horizontal
4	290.3701	-12.84	45.56	32.72	46.00	13.28	100	283	Horizontal
5	479.9066	-8.44	39.17	30.73	46.00	15.27	100	269	Horizontal
6	658.1227	-5.31	42.45	37.14	46.00	8.86	100	129	Horizontal

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

EUT :	NOTEBOOK	Model Name :	Librem L14v1-01
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2021-02-23
Test Mode :	Mode 1	Polarization :	Vertical
Test Power :	DC19V From Adapter		



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	110.2134	-15.47	50.76	35.29	43.50	8.21	100	315	Vertical
2	155.8186	-18.52	51.92	33.40	43.50	10.10	100	124	Vertical
3	199.8066	-15.08	48.29	33.21	43.50	10.29	100	72	Vertical
4	290.3701	-12.84	39.74	26.90	46.00	19.10	100	227	Vertical
5	479.9066	-8.44	42.37	33.93	46.00	12.07	100	186	Vertical
6	581.7906	-6.62	40.96	34.34	46.00	11.66	100	323	Vertical

Final Data List

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

EUT :	NOTEBOOK	Model Name :	Librem L14v1-01
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2021-02-24
Test Mode :	Mode 1		
Test Power :	DC19V From Adapter		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1220.12	57.88	-11.37	46.51	74	-27.49	peak
1871.66	57.28	-15.38	41.9	74	-32.1	peak
2568.27	56.15	-8.62	47.53	74	-26.47	peak
3829.88	57.17	-6.17	51	74	-23	peak
4757.88	55.91	-4.52	51.39	74	-22.61	peak
4952.41	56.65	-5.64	51.01	74	-22.99	peak

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1159.13	57.83	-12.37	45.46	74	-28.54	peak
1204.32	56.74	-10.25	46.49	74	-27.51	peak
2755.87	57.86	-8.49	49.37	74	-24.63	peak
3246.44	58.37	-5.24	53.13	74	-20.87	peak
4916.32	55.91	-5.66	50.25	74	-23.75	peak
5945.87	57.32	-6.93	50.39	74	-23.61	peak

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

4. EUT TEST PHOTO

Conducted Emission



Radiated Emission



ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

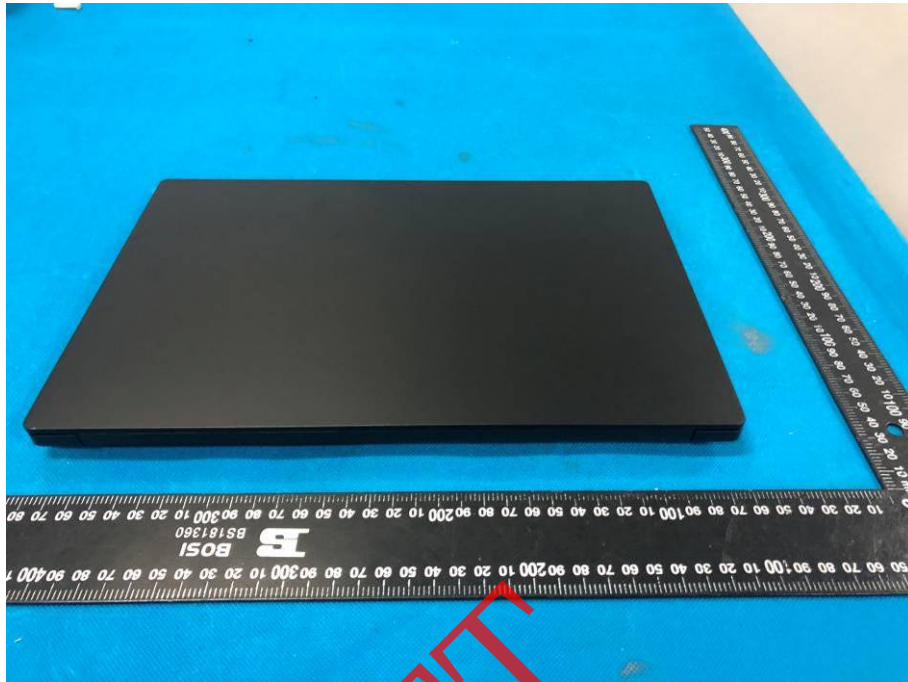


Photo 6



Photo 7

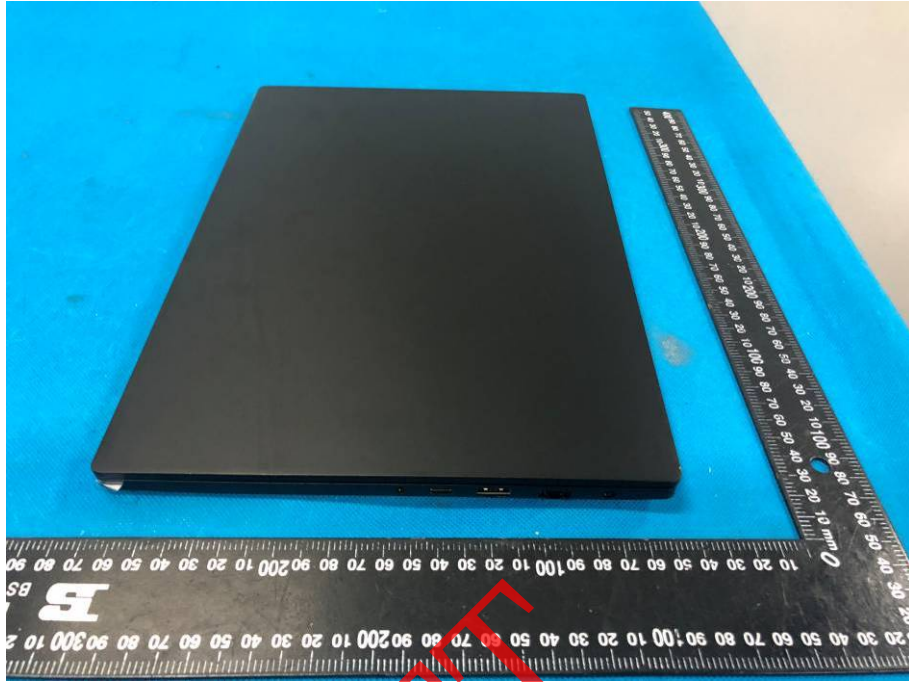


Photo 8



Photo 9

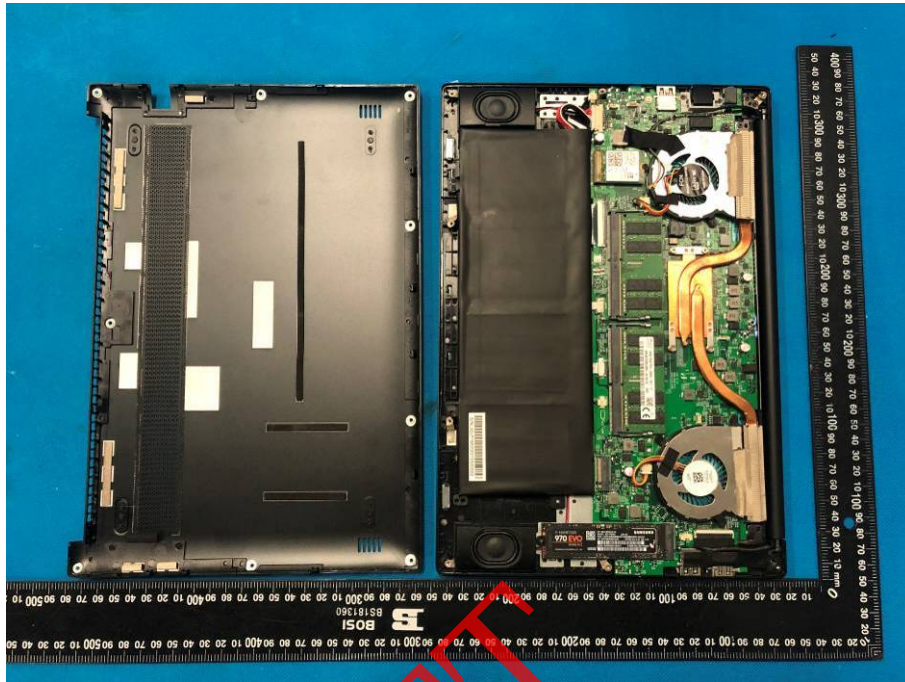


Photo 10

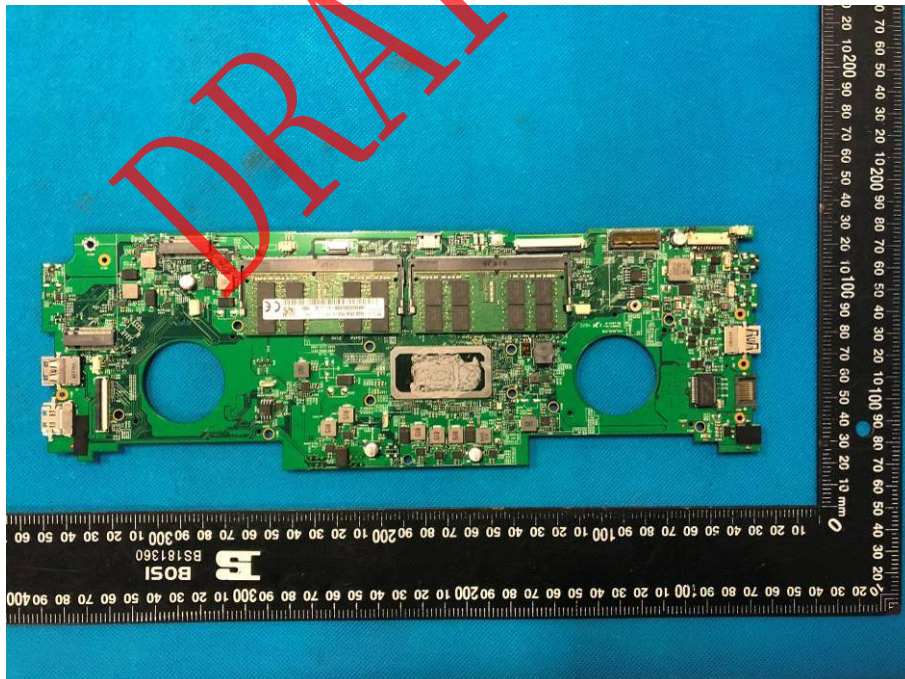


Photo 11



Photo 12

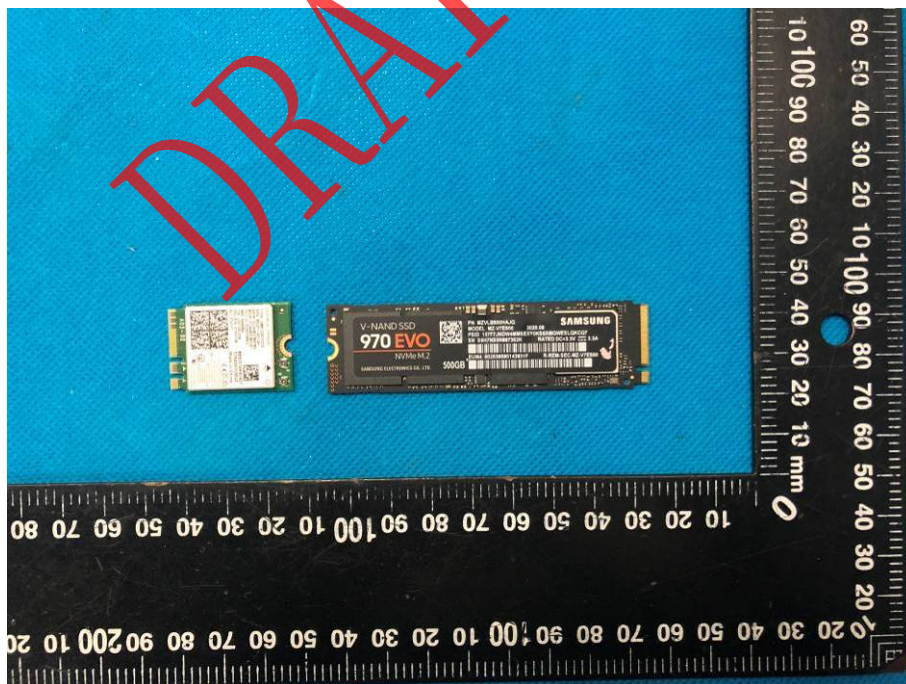


Photo 13

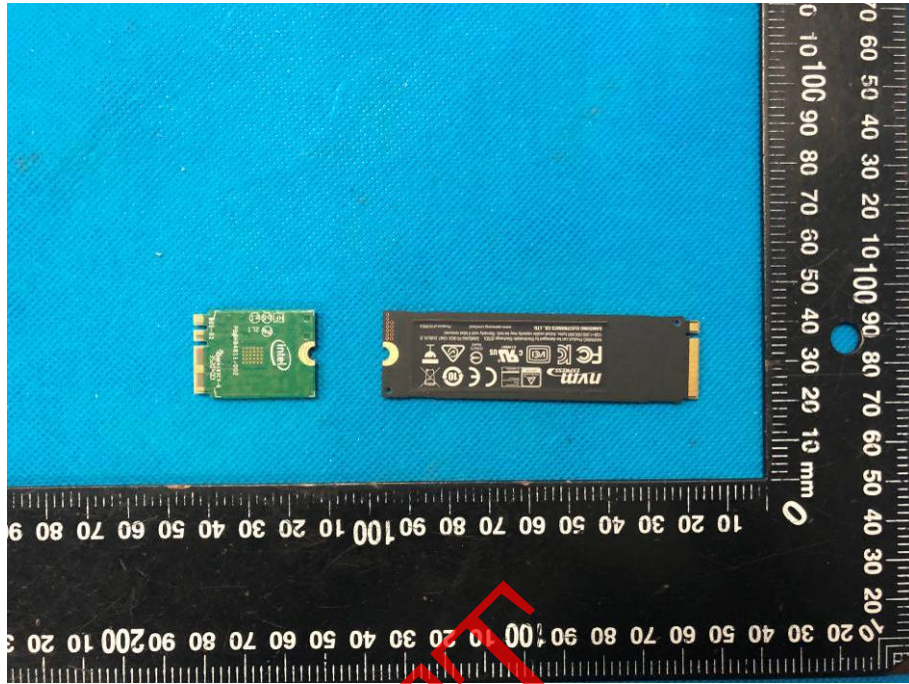


Photo 14



.....End of Report.....