

RF Exposure Evaluation Report

APPLICANT : Lenovo (Shanghai) Electronics
Technology Co., Ltd.

EQUIPMENT : Lenovo smart Display

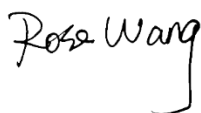
BRAND NAME : Lenovo

MODEL NAME : Lenovo CD-17302F

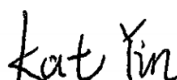
FCC ID : O57CD17302F

STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

We, Sporton International (Kunshan) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Reviewed by: Rose Wang / Supervisor



Approved by: Kat Yin / Manager



Sporton International (Kunshan) Inc.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA962620	Rev. 01	Initial issue of report	Sep. 05, 2019



1. Administration Data

1.1. Testing Laboratory

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

Testing Laboratory		
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.	FCC Designation No.	FCC Test Firm Registration No.
	CN1257	314309

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

Manufacturer	
Company Name	Lenovo PC HK Limited
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong P.R. China

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Smart Display 7
Brand Name	Lenovo
Model Name	Lenovo smart Display
FCC ID	O57CD17302F
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.5GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5850 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	Lenovo CD-17302F_V01
SW Version	15.42.0+mt8167s_xl_prod.1.1.0.5800915
Antenna Type / Gain	Bluetooth: PIFA Antenna / -1.52 dBi WLAN: PIFA Antenna / -1.50 dBi
Antenna Type / Gain	PIFA Antenna 5150 MHz ~ 5250 MHz: -1.81 dBi 5250 MHz ~ 5350 MHz: -1.90 dBi 5470 MHz ~ 5725 MHz: -1.62 dBi 5725 MHz ~ 5850 MHz: -1.74 dBi
EUT Stage	Production Unit
Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

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.

**3. Maximum RF average output power among production units****<Bluetooth>**

Mode	Maximum Average Power (dBm)
Bluetooth BR/EDR	11.0
Bluetooth LE	7.0

<WLAN 2.4GHz>

Mode	Maximum Average Power (dBm)
802.11b	21.5
802.11g	18.5
802.11n-HT20	17.0

<WLAN 5GHz Mode>

Mode		Maximum Average Power (dBm)
WLAN 5.2GHz	802.11a	20.5
	802.11n-HT20	18.5
	802.11ac-VHT20	18.5
	802.11ac-VHT40	18.5
	802.11ac-VHT80	16.5
WLAN 5.3GHz	802.11a	20.5
	802.11n-HT20	18.5
	802.11ac-VHT20	18.5
	802.11ac-VHT40	18.5
	802.11ac-VHT80	16.5
WLAN 5.5GHz	802.11a	20.5
	802.11n-HT20	18.5
	802.11ac-VHT20	18.5
	802.11ac-VHT40	18.5
	802.11ac-VHT80	16.5
WLAN 5.8GHz	802.11a	20.5
	802.11n-HT20	18.5
	802.11ac-VHT20	18.5
	802.11ac-VHT40	18.0
	802.11ac-VHT80	16.0



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20.0 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/mW ²)	Limit (mW/mW ²)
WLAN 5.2GHz	5180.0	-1.81	20.50	18.69	0.074	73.961	0.015	1.000
WLAN 5.3GHz	5260.0	-1.90	20.50	18.60	0.072	72.444	0.014	1.000
WLAN 5.5GHz	5500.0	-1.62	20.50	18.88	0.077	77.268	0.015	1.000
WLAN 5.8GHz	5745.0	-1.74	20.50	18.76	0.075	75.162	0.015	1.000
WLAN 2.4GHz	2412.0	-1.50	21.50	20.00	0.100	100.000	0.020	1.000
Bluetooth	2402.0	-1.52	11.00	9.480	0.009	8.872	0.002	1.000

Note:

1. For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.
2. In the above table have assessed WLAN 2.4GHz and WLAN 5GHz by referring to their maximum direction gain and maximum output power.
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
4. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band
5. WLAN5GHz and WLAN2.4GHz can't transmit simultaneously with Bluetooth.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.