

Maximum Permissible Exposure Evaluation

FCC ID: A5MCAMERAR1

1. Client Information

Applicant	:	Lenovo (Beijing) Limited
Address	:	No.6, Chuang Ye Road Shangdi Information Industry Base, Haidian District, Beijing 100085, P.R. China
Manufacturer	:	Lenovo (Beijing) Limited
Address	:	No.6, Chuang Ye Road Shangdi Information Industry Base, Haidian District, Beijing 100085, P.R. China

2. General Description of EUT

EUT Name	:	Lenovo Smart Camera	
Models No.	:	R1	
Model Difference	:	N/A	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
	:	Number of Channel:	802.11b/g/n(HT20):11 channels 802.11n(HT40): 7 channels
	:	RF Output Power:	802.11b: 16.15 dBm 802.11g: 14.90 dBm 802.11n (HT20): 13.75 dBm 802.11n (HT40): 12.20 dBm
	:	Antenna Gain:	2 dBi PIFA Antenna
	:	Modulation Type:	802.11b: CCK, QPSK, BPSK 802.11g/n: OFDM
	:	Bit Rate of Transmitter:	802.11b:11/5.5/2/1Mbps 802.11g:54/48/36/24/18/12/9/6 Mbps 802.11n: up to 135Mbps
	:		
Power Supply	:	USB DC 5V from AC/DC Adapter(A18A-050100U-US2): Input: AC 100-240V, 50/60Hz, Max 0.2A. Output: DC 5V, 1A.	
Software Version	:	N/A	
Hardware Version	:	N/A	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

More test information about the EUT please refer the RF Test Report.

MPE Calculations for WiFi

1. Antenna Gain:

PIFA Antenna: 2Bi.

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna

4. Test Result:

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11b	1	2412	15.72	16±1	17	2	20	0.0158
		2437	16.15	16±1	17	2	20	0.0158
		2462	15.89	16±1	17	2	20	0.0158
802.11g	1	2412	14.19	14±1	15	2	20	0.0100
		2437	14.90	14±1	15	2	20	0.0100
		2462	14.88	14±1	15	2	20	0.0100
802.11n (HT20)	1	2412	13.34	13±1	14	2	20	0.0079
		2437	13.75	13±1	14	2	20	0.0079
		2462	13.11	13±1	14	2	20	0.0079
802.11n (HT40)	1	2422	11.97	12±1	13	2	20	0.0063
		2437	12.20	12±1	13	2	20	0.0063
		2452	12.18	12±1	13	2	20	0.0063

Note:

(1) N_{TX}= Number of Transmit Antennas

(2) RF Output power specifies that Maximum Conducted Peak Output Power.

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For 802.11b/g/n (2412~2462 MHz)

MPE limit S: 1 mW/ cm²

The MPE is calculated as **0.0158mW / cm²** < limit 1 mW / cm². So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

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