RF Exposure Evaluation declaration

Product Name	Smart Door Lock
Model No.	DL101
FCC ID	MSQ-DL101

Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

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The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
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1. RF Exposure Evaluation

1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula
Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm^2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.
The temperature and related humidity: 18℃and 78％ RH.

1.3. Test Result of RF Exposure Evaluation

Product : Smart Door Lock
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS

RF Exposure_Zigbee

Maximum Conducted output power	8.21dBm
Antenna gain	0.93dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
6.6222	0.001632

RF Exposure_NFC

Field strength is converted into Pout (dBm)

Radiated Power @3m (dBuV/m)	Distance (m)	Antenna Gain (dBi)	Maximum conducted output power (dBm)
43.71	3	0	-51.52

Note: $P = \frac{(Ed)^2}{30G}$

Calculating power density (Pd)

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
0.000007047	0.000000001

Pd = (Pout*G)/(4*pi*r^2)

Power density is much lower than the limit (1 mW/cm^2).

Total Power Density

Power Density (**Zigbee**) (mW/cm^2)	Power Density (**NFC**) (mW/cm^2)	Total Power Density (**Zigbee** + **NFC**) (mW/cm^2)	Limit (mW/cm^2)
0.001632	0.000000	0.001632	1

Note:

The Formula of calculated the MPE is : CPD1/LPD1 + CPD2/LPD2+.....etc.<1

CPD = Calculation power density

LPD = Limit of power density