

# RF Exposure Evaluation Report

## 1 RF EXPOSURE

Product Name: Projector

Model No.: XH269, XH269PRO, XH269MAX, XH269ULTRA, XH500, XH500PRO, XH500MAX, XH500ULTRA, K4, K5, K6, K8, K9, H5, H6, H8, T5, T6, T8

FCC ID: 2BPVL-XH269

## 2. RF Exposure Evaluation

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

### 2.1 LIMITS

According to FCC Part1.1310: 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 part1.1307(b)

Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz)                           | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (i) Limits for Occupational/Controlled Exposure |                               |                               |                                     |                          |
| 0.3–3.0   | 614                           | 1.63                          | *(100)                              | ≤6                       |
| 3.0–30  | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | <6                       |
| 30–300  | 61.4                          | 0.163                         | 1.0                                 | <6                       |
| 300–1,500                                       |                               |                               | f/300                               | <6                       |
| 1,500–100,000                                   |                               |                               | 5                                   | <6                       |

(ii) 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 <sup>2</sup> ) | <30 |
| 30–300        | 27.5  | 0.073  | 0.2                    | <30 |
| 300–1,500     |       |        | f/1500                 | <30 |
| 1,500–100,000 |       |        | 1.0                    | <30 |

F= Frequency in MHz Friis Formula

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$  Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE. 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.

## 2.2 EUT RF EXPOSURE EVALUATION

BT/WIFI ANT: 0.9dBi; 5GWIFI ANT:1.81dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

The Max Conducted Peak Output Power data refer to report DACE250513016RL001 & DACE250513016RL002

| BT-3-DH5 worst mode and channel: |                |                             |                             |                            |  |                             |
|----------------------------------|----------------|-----------------------------|-----------------------------|----------------------------|--|-----------------------------|
| Test channel (MHz)               | PK Power (dBm) | Maximum tune-up Power (dbm) | Maximum tune-up Power (dbm) | Maximum tune-up Power (mW) | Calculated value (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
| 2402                             | 1.40           | 2.0±1                       | 3.0                         | 1.995                      | 0.0005                                 | 1.0                         |

Remark:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (1.995 \cdot 1.23) / (4 \cdot 3.1416 \cdot 20 \cdot 20) = 0.0005$ ,  $G = 10^{\text{gain}/10} = 1.23$

WIFI worst mode and channel:

| Test channel (MHz) | PK Power (dBm) | Maximum tune-up Power (dbm) | Max.MIMO tune-up Power(dbm) | Max.MIMO tune-up Power(mW) | Calculated value (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
|--------------------|----------------|-----------------------------|-----------------------------|----------------------------|--|-----------------------------|
| 802.11n--5240      | 7.31           | 8±1                         | 9.0                         | 7.943                      | 0.0024                                 | 1.0                         |
| 802.11a--5825      | 10.30          | 11±1                        | 12.0                        | 15.849                     | 0.0048                                 | 1.0                         |

Remark:  $5.2G - P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (7.943 \cdot 1.5171) / (4 \cdot 3.14159 \cdot 20 \cdot 20) = 0.0024$ ,  $G = 10^{\text{gain}/10} = 1.5171$

$5.8G - P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (15.849 \cdot 1.5171) / (4 \cdot 3.14159 \cdot 20 \cdot 20) = 0.0048$ ,  $G = 10^{\text{gain}/10} = 1.5171$

### RF Exposure Evaluation simultaneous transmission operations:

According to 865664D02 2.2 d) 1):

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits :

| Simultaneous transmission mode | The sum of the ratios | SUM    | Limit |
|--------------------------------|-----------------------|--------|-------|
| BT+5GWIFI                      | 0.0005+0.0048         | 0.0053 | 1.0   |

Conclusion:  $0.0053 < 1.0$ , So there is no SAR requirement

NOTE: EUT BT & wifi module is more than 20cm away from the human body.

### Conclusion:

the sum of the ratios is less than the limit value of 1.0, so there is no SAR requirement.