

RF EXPOSURE EVALUATION

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)

FCC ID: 2BFIZ-L007CM

EUT Specification

| EUT | PROJECTOR |
|-----------------------------------|--|
| Frequency band (Operating) | <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz <input checked="" type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz BLE |
| Device category | <input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____ |
| Exposure classification | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²) |
| Antenna diversity | <input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity |
| Max. output power | BLE: -1.23dBm (0.0008W) BDR&EDR: 1.15dBm (0.0013W) 2.4G WiFi: 20.12dBm (0.1028W) 5.1G WiFi: 12.20dBm (0.0166W) 5.8G WiFi: 21.76dBm (0.1500W) |
| Antenna gain (Max) | BT: 1.21 dBi 2.4G WiFi: ANT1: 1.58 dBi; ANT2: 1.58 dBi 5.1G WiFi: ANT1: 2.77 dBi; ANT2: 2.77 dBi 5.8G WiFi: ANT1: 3.97 dBi; ANT2: 3.97 dBi |
| Evaluation applied | <input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation |

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 |
|--|------------------------------|------------------------------|------------------------------------|--------------|
| (A) Limits for Occupational/Control Exposures | | | | |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100000 | -- | -- | 5 | 6 |
| (B) Limits for General Population/Uncontrol Exposures | | | | |
| 300-1500 | -- | -- | F/1500 | 6 |
| 1500-100000 | -- | -- | 1 | 30 |

Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

P_d = Power density in mW/cm^2

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

Measurement Result

2.4GHz WiFi

ANT 1 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits (mW/cm^2) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/cm^2) | |
| 802.11n (HT20) | 2437 | 18.82 | 18.82±1 | 19.82 | 1.58 | 0.0275 | 1 |

ANT 2 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits (mW/cm^2) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/cm^2) | |
| 802.11n (HT20) | 2437 | 20.12 | 20.12±1 | 21.12 | 1.58 | 0.0370 | 1 |

MIMO worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits (mW/cm^2) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|------------------------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/cm^2) | |
| 802.11n (HT20) | 2437 | 22.53 | 22.53±1 | 23.53 | 1.58 | 0.0645 | 1 |

5.1GHz WiFi

ANT 1 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|------------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11ac (VHT20) | 5180 | 11.72 | 11.72±1 | 12.72 | 2.77 | 0.0070 | 1 |

ANT 2 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11a | 5240 | 12.20 | 12.20±1 | 13.20 | 2.77 | 0.0079 | 1 |

MIMO worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|------------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11ac (VHT40) | 5230 | 14.60 | 14.60±1 | 15.60 | 2.77 | 0.0137 | 1 |

5.8GHz WiFi

ANT 1 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11a | 5745 | 17.21 | 17.21±1 | 18.21 | 3.97 | 0.0329 | 1 |

ANT 2 worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11n (HT40) | 5755 | 21.76 | 21.76±1 | 22.76 | 3.97 | 0.0937 | 1 |

MIMO worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|-----------------------|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | (mW/cm ²) |
| 802.11n (HT40) | 5755 | 22.72 | 22.72±1 | 23.72 | 3.97 | 0.1169 | 1 |

BLE worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits (mW/cm ²) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|--|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | |
| BLE(1M) | 2402 | -1.23 | -1.23±1 | -0.23 | 1.21 | 0.0002 | 1 |

BT worst case:

| Operating Mode | Channel Frequency | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits (mW/cm ²) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|------------------------|--|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBi) | (mW/ cm ²) | |
| 8DPSK | 2441 | 1.15 | 1.15±1 | 2.15 | 1.21 | 0.0004 | 1 |

Note: 2.4G WiFi MIMO+5.1G WiFi MIMO+5.8G WiFi MIMO+ BLE+BDR&EDR simultaneous:

$$(0.0645+0.0137+0.1169+0.0002+0.0004)/1=0.1957/1=0.1957 < 1$$

Test Result: Pass