# Appendix E. RF Exposure Evaluation

The BT/WiFi 8265NGW and 60GHz SNAP (EJE-WB0104) are also integrated in this host, when the host insert to the 60GHz charging cradle (FCC ID: EJE-SBC001), the 60GHz feather of host device will be turn on and transmission, in such users scenarios which the device will keep away 20cm distance from human body. Therefore, additional evaluate MPE of the WWAN, BT/WiFi and 60GHz simultaneous transmission analysis is necessary.

## 1. 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/f2) | 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/f2) | 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 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

# 2. RF Exposure Evaluation

## 2.1 Standalone Power Density Calculations for FCC ID: EJE-EM7455D2.

| Band | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm^2) | Limit (mW/cm^2) | Power Density / Limit |
|---|---|---|---|---|---|---|---|---|---|
| WCDMA Band II | 1852.4 | 2.51 | 24.00 | 26.51 | 0.447713 | 447.713304 | 0.089115 | 1 | 0.089115 |
| WCDMA Band IV | 1712.4 | 2.07 | 24.00 | 26.07 | 0.404576 | 404.575892 | 0.080529 | 1 | 0.080529 |
| WCDMA Band V | 826.4 | -0.36 | 24.00 | 23.64 | 0.231206 | 231.206479 | 0.046020 | 0.550933 | 0.083532 |
| LTE Band 2 | 1850.7 | 2.51 | 24.00 | 26.51 | 0.447713 | 447.713304 | 0.089115 | 1 | 0.089115 |
| LTE Band 4 | 1710.7 | 2.07 | 24.00 | 26.07 | 0.404576 | 404.575892 | 0.080529 | 1 | 0.080529 |
| LTE Band 5 | 824.7 | -0.19 | 24.00 | 23.81 | 0.240436 | 240.436280 | 0.047858 | 0.549800 | 0.087045 |
| LTE Band 7 | 2502.5 | 0.76 | 23.00 | 23.76 | 0.237684 | 237.684029 | 0.047310 | 1 | 0.047310 |
| LTE Band 12 | 699.7 | -1.71 | 24.00 | 23.32 | 0.169434 | 169.433780 | 0.033725 | 0.466467 | 0.072299 |
| LTE Band 13 | 779.5 | -0.68 | 24.00 | 26.51 | 0.214783 | 214.783047 | 0.042751 | 0.519667 | 0.082267 |
| LTE Band 25 | 1850.7 | 2.51 | 24.00 | 26.51 | 0.447713 | 447.713304 | 0.089115 | 1 | 0.089115 |
| LTE Band 26 | 814.7 | -0.19 | 24.00 | 23.81 | 0.240436 | 240.436280 | 0.047858 | 0.549800 | 0.087045 |
| LTE Band 41 | 2498.5 | 1.41 | 23.00 | 24.41 | 0.276058 | 276.057786 | 0.054948 | 1 | 0.054948 |

## 2.2 Standalone Power Density Calculations for FCC ID: EJE-WB0104.

| Band | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm^2) | Limit (mW/cm^2) | Power Density / Limit |
|---|---|---|---|---|---|---|---|---|---|
| Bluetooth | 2402.0 | -0.73 | 11.50 | 10.77 | 0.01194 | 11.939881 | 0.002377 | 1 | 0.002377 |
| 2.4GHz WLAN | 2412.0 | 1.18 | 18.00 | 19.18 | 0.082794 | 82.794216 | 0.016480 | 1 | 0.016480 |
| 5GHz WLAN | 5180.0 | 2.18 | 16.50 | 18.68 | 0.073790 | 73.790423 | 0.014688 | 1 | 0.014688 |
| SNAP | 60480.0 | | | -1.08 | 0.000780 | 0.779830 | 0.000155 | 1 | 0.000155 |

## 2.3 Standalone Power Density Calculations for FCC ID : EJE-SBC001.

| Band | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm^2) | Limit (mW/cm^2) | Power Density / Limit |
|---|---|---|---|---|---|---|---|---|---|
| SNAP | 60480.0 | | | -2.65 | 0.000543 | 0.543250 | 0.000108 | 1 | 0.000108 |

### 2.4 Collocated Power Density Calculation

| FCC ID: EJE-EM7455D | FCC ID: EJE-WB0104 | | | FCC ID : EJE-SBC001 | Σ(Power Density / Limit) |
|---|---|---|---|---|---|
| WWAN Maximum Power Density / Limit | Bluetooth Power Density / Limit | 2.4GHz / 5GHz WLAN Maximum Power Density / Limit | SNAP Power Density / Limit | SNAP Power Density / Limit | |
| 0.089115 | 0.002377 | 0.016480 | 0.000155 | 0.000108 | 0.108235 |

**Note:**

1. For FCC ID: EJE-EM7455D2:
   (a) WWAN,Bluetooth,2.4GHz WLAN and SNAP can transmit simultaneously
   (b) WWAN,Bluetooth,5GHz WLAN and SNAP can transmit simultaneously
2. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)].
3. Considering all antenna collocation of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of all collocated transmitters is compliant

## Conclusion:

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