For Maximum Permissible Exposure (MPE) evaluation of the base unit, the maximum power density at 20 cm from this mobile transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65 and meet the requirement listed in KDB447498.

For the 2.4GHz AC1600 WiFi Router of tested model: VNT846, the measured powers among all the measured channels were within its production tolerance: +16.5 dBm (Minimum) and +25.5 dBm (Maximum). The antenna gain of VNT846 (Antenna 0) is 2.0 dBi = 1.58 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Activated at B mode with SISO function:

The Conducted Power = 25.5 dBm
= 354.8 mW

The Conducted Power source-based time-averaging output power
= (354.8 * 1.000) mW
= 354.81 mW

The power density at 20cm = 354.81 *1.58/ $4\pi R^2$
= 0.1119 mW cm^{-2}

Activated at G/NHT20/NHT40 mode with MIMO function:

The Conducted Power = 25.5 dBm
= 211.836mW

The Conducted Power source-based time-averaging output power
= (211.836* 1.000) mW
= 211.836 mW

The power density at 20cm = 211.836 *1.58/ $4\pi R^2$
= 0.0666 mW cm^{-2}

For the 2.4GHz AC1600 WiFi Router of tested model: VNT846, the measured powers among all the measured channels were within its production tolerance: +16.5 dBm (Minimum) and +25.5 dBm (Maximum). The antenna gain of VNT846 (Antenna 1) is 2.0 dBi = 1.58 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Activated at B mode with SISO function:

The Conducted Power = 25.5 dBm
= 354.8 mW

The Conducted Power source-based time-averaging output power
= (354.8 * 1.000) mW
= 354.81 mW

The power density at 20cm = $354.81 * 1.58 / 4\pi R^2$
= $0.1119\ mW\ cm^{-2}$

Activated at G/NHT20/NHT40 mode with MIMO function:

The Conducted Power = 25.5 dBm
= 211.836mW

The Conducted Power source-based time-averaging output power
= (211.836* 1.000) mW
= 211.836 mW

The power density at 20cm = $211.836 * 1.58 / 4\pi R^2$
= $0.0666\ mW\ cm^{-2}$

For the 5.0GHz AC1600 WiFi Router of tested model: VNT846, the measured powers among all the measured channels were within its production tolerance: +18.0 dBm (Minimum) and +23.3 dBm (Maximum). The antenna gain of VNT846 (Antenna 2) is 2.0 dBi = 1.58 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Activated at A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 with MIMO function:

The Conducted Power = 25.5 dBm
= 211.9mW

The Conducted Power source-based time-averaging output power
= (211.9* 1.000) mW
= 211.9 mW

The power density at 20cm = $211.9 * 1.58 / 4\pi R^2$
= 0.0666 mW cm^{-2}

For the 5.0GHz AC1600 WiFi Router of tested model: VNT846, the measured powers among all the measured channels were within its production tolerance: +18.0 dBm (Minimum) and +23.3 dBm (Maximum). The antenna gain of VNT846 (Antenna 3) is 2.0 dBi = 1.58 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Activated at A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 with MIMO function:

The Conducted Power = 25.5 dBm
= 211.9mW

The Conducted Power source-based time-averaging output power
= (211.9* 1.000) mW
= 211.9 mW

The power density at 20cm = $211.9 * 1.58 / 4\pi R^2$
= 0.0666 mW cm^{-2}

For the 5.0GHz AC1600 WiFi Router of tested model: VNT846, the measured powers among all the measured channels were within its production tolerance: +18.0 dBm (Minimum) and +23.3 dBm (Maximum). The antenna gain of VNT846 (Antenna 4) is 2.0 dBi = 1.58 (num gain) and its maximum source-based time-averaging duty factor is 100.0% (1 x100%). From these data and its operating configuration – Mobile device, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

Activated at A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 with MIMO function:

The Conducted Power = 25.5 dBm
= 211.9mW

The Conducted Power source-based time-averaging output power
= (211.9* 1.000) mW
= 211.9 mW

The power density at 20cm = $211.9 * 1.58 / 4\pi R^2$
= 0.0666 mW cm^{-2}

Per KDB 447498 D01 v06, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0.

The MPE ratio for AC1600 WiFi Router can be calculated as follow:

For 2.4GHz part:

SISO for B mode through ANT0:
= The power density at 20cm / MPE limit
= 0.1119 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.1119

MIMO for G/NHT20/NHT40 mode through ANT0:
= The power density at 20cm / MPE limit
= 0.0666 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.0666

SISO for B mode through ANT1:
= The power density at 20cm / MPE limit
= 0.1119 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.1119

MIMO for G/NHT20/NHT40 mode through ANT1:
= The power density at 20cm / MPE limit
= 0.0666 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.0666

For 5.0GHz part:

MIMO for A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 mode through ANT2:
= The power density at 20cm / MPE limit
= 0.0666 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.0666

MIMO for A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 mode through ANT3:
= The power density at 20cm / MPE limit
= 0.0666 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.0666

MIMO for A/NHT20/NHT40/ACHT20/ACHT40/ACHT80 mode through ANT4:
= The power density at 20cm / MPE limit
= 0.0666 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.0666

The sum of the MPE ratios for all simultaneous transmitting antennas:

2.4GHz SISO with ANT0 and 5.0GHz MIMO with ANT2+3+4
= 0.1119 + (0.0666*3)
= 0.21099

2.4GHz SISO with ANT1 and 5.0GHz MIMO with ANT2+3+4
= 0.1119 + (0.0666*3)
= 0.21099

2.4GHz MIMO with ANT0+1 and 5.0GHz MIMO with ANT2+3+4
= 0.0666*5
= 0.333

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0, simultaneous transmission MPE test exclusion will be applied.

Conclusion

In frequency range of 1,500 - 100,000MHz, the MPE limit is 1.0 $mWcm^{-2}$ for general population and uncontrolled exposure. As simultaneous transmission MPE test exclusion is applied and the measured power density at 20cm from all the standalone transmissions is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structures and body of the user or nearby persons.

The following RF exposure statement is proposed to be included in the user manual:

“ FCC RF Radiation Exposure Statement
Caution: To maintain compliance with the FCC’s RF exposure guidelines, place the base unit at least 20cm from nearby persons.”