

FCC ID: QMH-CL3239

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to KDB447498 D01 General RF Exposure Guidance V06

The 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- f(GHZ) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

WIFI:

Antenna Type : FPCB Antenna

Antenna Gain: 1 dBi

| Modulation | Channel Freq. (GHz) | Conduct ed power (dBm) | Conducte d power (mW) | Tune-up power (dBm) | Max tune-up power (dBm) | Max tune-up power (mW) | Distance (mm) | Result calculation | 10-g SAR Exclusion threshold | SAR test exclusion |
|--------------|---------------------|------------------------|-----------------------|---------------------|-------------------------|------------------------|---------------|--------------------|------------------------------|--------------------|
| 802.11b | 2.412 | 11.7 | 14.791 | 11±1 | 12 | 15.849 | <5 | 4.92287 | 7.50 | YES |
| | 2.437 | 11.8 | 15.136 | 11±1 | 12 | 15.849 | <5 | 4.94832 | 7.50 | YES |
| | 2.462 | 11.5 | 14.125 | 11±1 | 12 | 15.849 | <5 | 4.97364 | 7.50 | YES |
| 802.11g | 2.412 | 9.4 | 8.710 | 9±1 | 10 | 10.000 | <5 | 3.10612 | 7.50 | YES |
| | 2.437 | 9.5 | 8.913 | 9±1 | 10 | 10.000 | <5 | 3.12218 | 7.50 | YES |
| | 2.462 | 9.6 | 9.120 | 9±1 | 10 | 10.000 | <5 | 3.13815 | 7.50 | YES |
| 802.11n HT20 | 2.412 | 8.9 | 7.762 | 9±1 | 10 | 10.000 | <5 | 3.10612 | 7.50 | YES |
| | 2.437 | 9.2 | 8.318 | 9±1 | 10 | 10.000 | <5 | 3.12218 | 7.50 | YES |
| | 2.462 | 9.3 | 8.511 | 9±1 | 10 | 10.000 | <5 | 3.13815 | 7.50 | YES |
| 802.11n HT40 | 2.422 | 8.6 | 7.244 | 8±1 | 9 | 7.943 | <5 | 2.47239 | 7.50 | YES |
| | 2.437 | 8.9 | 7.762 | 8±1 | 9 | 7.943 | <5 | 2.48003 | 7.50 | YES |
| | 2.452 | 8.5 | 7.079 | 8±1 | 9 | 7.943 | <5 | 2.48766 | 7.50 | YES |

For transmit function operating at 433.912MHz.

Antenna Type : Cable Antenna

Antenna Gain: 1dBi

Modulation Type: ASK

The worst-case peak radiated emission for the EUT is 59.4dBµV/m at 3m in the frequency 433.912MHz

The EIRP = E (dBµV/m) + 20log(D) - 104.8= -35.85dBm

where D is the measurement distance in meters.

The ERP = EIRP – 2.15 = -38.01 dBm

which is within the production variation.

| Modulation | Channel Freq. (GHz) | Conduct ed power (dBm) | Conducte d power (mW) | Tune-up power (dBm) | Max tune-up power (dBm) | Max tune-up power (mW) | Distance (mm) | Result calculation | 10-g SAR Exclusion threshold | SAR test exclusion |
|------------|---------------------|------------------------|-----------------------|---------------------|-------------------------|------------------------|---------------|--------------------|------------------------------|--------------------|
| ASK | 0.4339 | -38.01 | 0.000 | -38±1 | -37 | 0.000 | <5 | 0.00003 | 7.50 | YES |

Refer to FCC KDB 447498D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g SAR, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

| Mode | Position | P _{max} (dBm) | P _{max} (mW) | Distance (mm) | f (GHz) | x | Estimated SAR (W/Kg) |
|---------|-----------|---------------------------|--------------------------|------------------|------------|-------|-------------------------|
| Wi-Fi | Extremity | 12 | 15.849 | 5 | 2.480 | 18.75 | 0.266 |
| 433.912 | Extremity | -37 | <0.001 | 5 | 2.480 | 18.75 | <0.001 |

Conclusion:

For the max result: $4.923 < 7.5$ for 10-g SAR, so stand-alone SAR is not required.

and $0.266\text{W/kg} + 0.001\text{W/kg} = 0.267\text{W/kg} < 4.0\text{W/kg}$ for 10-g extremity SAR, so simultaneous transmission SAR is compliance.

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Signature:

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