

INTERTEK TESTING SERVICES

RF Exposure

The equipment under test (EUT) is a Smart Speaker (Model: 36025341, Brand: onn., FCC ID: Z8M-ONNSS) with Bluetooth (BR/EDR) function operating in 2402-2480MHz, Bluetooth LE function operating in 2402-2480MHz, 2.4G Wi-Fi function operating in 2412MHz~2462MHz, 5G Wi-Fi function operating in 5150MHz~5250MHz, 5250MHz~5350MHz, 5470MHz~5725MHz, 5725MHz~5850MHz, and Thread function operating in 2402MHz~2483.5MHz. The EUT is powered by DC 5.0V, 3.0A from adapter. For more detail information pls. refer to the user manual.

The maximum & minimum conducted output power for the EUT is within the production variation.

Bluetooth (BR/EDR)

Antenna Type: Internal antenna.

Antenna Gain: 6.48dBi.

Modulation Type: GFSK, $\pi/4$ -DQPSK, 8DPSK

The normal radiated output power (e.i.r.p) is: 15dBm (tolerance: +/-2dB).

The normal conducted output power is 8.52dBm (tolerance: +/-2dB).

The maximum conducted output power for the EUT is **9.67dBm** at the frequency 2.48GHz DH5 mode which is within the production variation.

The minimum conducted output power for the EUT is **8.9dBm** in the frequency 2.402GHz 2DH5 mode which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 15dBm+2dB= 17dBm = 50mW

Max ERP= 50/1.64 = 30.5mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The ERP threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the ERP at 20cm from the transmitter is lower than the ERP threshold, the compliance to the RF exposure can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

FCC ID: Z8M-ONNSS

BLE

Antenna Type: Internal antenna.

Antenna Gain: 6.48dBi.

Modulation Type: GFSK

The normal radiated output power (e.i.r.p) is: 14dBm (tolerance: +/-2dB).

The normal conducted output power is 7.52dBm (tolerance: +/-2dB).

The maximum conducted output power for the EUT is **7.20dBm** at the frequency 2.48GHz GFSK mode which is within the production variation.

The minimum conducted output power for the EUT is **6.82dBm** in the frequency 2.402GHz GFSK mode which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 14dBm+2dB= 16dBm = 39.8mW

Max ERP= 50/1.64 = 24.9mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The ERP threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the ERP at 20cm from the transmitter is lower than the ERP threshold, the compliance to the RF exposure can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

2.4G WIFI

Antenna Type: Internal antenna.

Antenna Gain: 5.32dBi.

The normal radiated output power (e.i.r.p) is: 29dBm (tolerance: +/-3dB).

The normal conducted output power is 23.68dBm (tolerance: +/-3dB).

The maximum conducted output power for the EUT is **26.54dBm** at the frequency 2.437GHz 802.11g mode which is within the production variation.

The minimum conducted output power for the EUT is **21.8dBm** in the frequency 2.412GHz 802.11b mode which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 29dBm+3dB= 32dBm = 1584.9mW

Max ERP= 1584.9/1.64 = 966.4mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The ERP threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the ERP at 20cm from the transmitter is lower than the ERP threshold, the compliance to the RF exposure can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

5G WIFI

Antenna Type: Internal antenna.

Antenna Gain: 7.5dBi.

The normal radiated output power (e.i.r.p) is: 21dBm (tolerance: +/-3dB).

The normal conducted output power is 13.5dBm (tolerance: +/-3dB).

The maximum conducted output power for the EUT is **16.34dBm** at the frequency 5.825GHz 802.11ac20 mode which is within the production variation.

The minimum conducted output power for the EUT is **12.71dBm** in the frequency 5.420GHz 802.11ac20 mode which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 21dBm+3dB= 24dBm = 251mW

Max ERP= 251/1.64 = 156.9mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The ERP threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the ERP at 20cm from the transmitter is lower than the ERP threshold, the compliance to the RF exposure can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Thread

Antenna Type: Internal antenna.

Antenna Gain: 4.45dBi.

The normal radiated output power (e.i.r.p) is: 9dBm (tolerance: +/-2dB).

The normal conducted output power is 4.55dBm (tolerance: +/-2dB).

The maximum conducted output power for the EUT is **5.34dBm** at the frequency 2.480GHz which is within the production variation.

The minimum conducted output power for the EUT is **4.99dBm** in the frequency 2.402GHz 802.11ac20 mode which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 9dBm+2dB= 11dBm = 12.6mW

Max ERP= 12.6/1.64 = 7.9mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The ERP threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the ERP at 20cm from the transmitter is lower than the ERP threshold, the compliance to the RF exposure can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Simultaneous Transmission

For Simultaneous transmitting of Bluetooth and WIFI transmitter. According to KDB 447498 D04:

For BT and 2.4G WiFi:

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = $30.5\text{mW}/3060\text{ mW} + 966.4\text{mW}/3060\text{mW} = 0.326 < 1$

For BT and 5G WiFi:

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = $30.5\text{mW}/3060\text{ mW} + 156.9\text{mW}/3060\text{mW} = 0.06 < 1$

Since the sum of the ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0 , the EUT is considered to satisfy RF exposure compliance for simultaneous transmission operations.

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

“FCC RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”