

INTERTEK TESTING SERVICES

Analysis Report

The equipment under test (EUT) is a Transmitter. The EUT was powered by a 3 x 1.5VDC new battery. For more detail information pls. refer to the user manual.

For BT (4.0) function and operating frequency is 2402-2480MHz:

Modulation Type: GFSK.

Antenna Type: Integral antenna

Antenna Gain: 0.5dBi

The nominal conducted output power is 0dBm (Tolerance: +/- 3dB)

The granted FCC ID is QOQBLE112

According to the KDB 447498 and granted record:

The maximum peak conducted output power for the EUT is 2.59dBm in the frequency 2480MHz which is within the product variation.

The minimum peak conducted output power for the EUT is 1.94dBm in the frequency 2402MHz which is within the production variation.

The maximum conducted output power specified is 3dBm = 2.0mW

The source-based time-averaging conducted output power
= $2.0 \times \text{Duty cycle}$ mW = 2.0 mW

The SAR Exclusion Threshold Level:

= $3.0 \times (\text{min. test separation distance, mm}) / \sqrt{\text{freq. in GHz}}$

= $3.0 \times 5 / \sqrt{2.480}$ mW

= 9.5 mW

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

Transmitter Duty Cycle Calculation

The EUT transmit continuously during the test, the duty cycle is 1.

This requirement is according to KDB 865664 D02

For 915MHz Transmitter function and operating frequency is 915MHz

Modulation Type: GFSK

Antenna Type: Integral antenna

Antenna Gain: -0.5dBi

The Peak nominal radiated emission power (e.r.p) specified: -22.04dBm (Tolerance: +/- 3dB)

The Peak nominal conducted output power specified: -19.39dBm (Tolerance: +/- 3dB)

According to the KDB 447498:

The maximum radiated emission for the EUT is 75.34dBμV/m at 3m in the frequency 915MHz

$$= [(FS \cdot D)^2 / 30] - 2.15$$

= -22.04dBm which is within the production variation.

The maximum conducted output power specified is -16.39dBm = 0.02mW

The source-based time-averaging conducted output power

$$= 0.02 \cdot \text{Duty cycle mW} = 0.02 \text{ mW}$$

The SAR Exclusion Threshold Level:

$$= 3.0 \cdot (\text{min. test separation distance, mm}) / \sqrt{\text{freq. in GHz}}$$

$$= 3.0 \cdot 5 / \sqrt{0.915} \text{ mW}$$

$$= 15.7 \text{ mW}$$

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

Transmitter Duty Cycle Calculation

The EUT transmit continuously during the test, the duty cycle is 1.

This requirement is according to KDB 865664 D02

For both BT4.0 and 915MHz Transmitter are simultaneous transmissions estimated

According to the KDB 447498:

When both BT4.0 and 915MHz Transmitter are simultaneous transmissions, the maximum peak conducted output power for BT4.0 is 3.0dBm.

In the simultaneous transmissions, BT4.0's estimated SAR values:
= (max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm) * [sqrt(freq. in GHz)/7.5] W/kg
= 2.0 / 5*[sqrt (2.480) / 7.5] W/kg
= 0.084 W/kg

When both BT4.0 and 915MHz Transmitter are simultaneous transmissions, the maximum conducted output power for 915MHz Transmitter is -16.39dBm.

In the simultaneous transmissions, 915MHz Transmitter's estimated SAR values:
= (max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm) * [sqrt(freq. in GHz)/7.5] W/kg
= 0.02 / 5*[sqrt (0.915) / 7.5]
= 0.0005 W/kg

Sum of 1-g SAR of all simultaneously transmitting antennas in an operating mode:

WIFI's estimated SAR values + 915MHz Transmitter's estimated SAR values
= 0.084 + 0.0005 W/kg
= 0.0845 W/kg

The simultaneous transmissions SAR Evaluation: ≤ 0.4 W/kg

This requirement is according to KDB 865664 D02