

INTERTEK TESTING SERVICES

Analysis Report

The equipment under test (EUT) is a iFIT SmartBeat model IFAHR119 with Bluetooth function operating in 2402-2480MHz, and ANT+ function operated in single frequency 2457MHz. The EUT is powered by a DC 3.8V, 70mAh, rechargeable Li-ion battery which can be charged by its own dedicated charger. The charger needs an external USB port to provide it with DC 5V input. The EUT can't transmit when charging. For more detail information pls. refer to the user manual.

BLE function:

Modulation Type: GFSK

Bluetooth Version: BLE 4.2(single mode)

Antenna Type: Integral Antenna

Antenna Gain: 1.57dBi

The nominal conducted output power specified: -8.07dBm (Tolerance: +/-2.5dB)

The nominal radiated output power specified: -6.5dBm (Tolerance: +/-2.5dB)

According to the KDB 447498:

The maximum radiated emission for the EUT is 90.0 dB μ V/m at 3m in the frequency 2.402GHz = $[(FS \cdot D)^2 / 30]$ mW
= -5.2 dBm which is within the production variation

The minimum radiated emission for the EUT is 86.6 dB μ V/m for at 3m in the frequency 2.480GHz = $[(FS \cdot D)^2 / 30]$ mW
= -8.6 dBm which is within the production variation

The maximum conducted output power specified is -5.57dBm = 0.28mW
The source- based time-averaging conducted output power
= $0.28 \cdot \text{Duty cycle}$ mW \leq 0.28 mW (Duty Cycle \leq 100%)

The SAR Exclusion Threshold Level:
= $3.0 \cdot (\text{min. test separation distance, mm}) / \text{sqrt}(\text{freq. in GHz})$
= $3.0 \cdot 5 / \text{sqrt}(2.480)$ mW
= 9.53 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.

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ANT+ function:

Modulation Type: GFSK

Antenna Type: Integral Antenna

Antenna Gain: 1.57dBi

The nominal conducted output power specified: -8.07dBm (Tolerance: +/-2.5dB)

The nominal radiated output power specified: -6.5dBm (Tolerance: +/-2.5dB)

According to the KDB 447498:

The maximum radiated emission for the EUT is 91.2dB μ V/m at 3m in the frequency 2.457GHz = $[(FS \cdot D)^2 / 30]$ mW
= -4.0 dBm which is within the production variation

The maximum conducted output power specified is -5.57 dBm = 0.28mW
The source-based time-averaging conducted output power
= 0.28 * Duty cycle mW \leq 0.28 mW (Duty Cycle \leq 100%)

The SAR Exclusion Threshold Level:
= 3.0 * (min. test separation distance, mm) / sqrt(freq. in GHz)
= 3.0 * 5 / sqrt(2.457) mW
= 9.57 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.

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Simultaneous Transmissions Evaluation

When an antenna qualifies for the standalone SAR test exclusion of KDB 447498 clause 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$, for test separation distances ≤ 50 mm; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

BLE function:

$$[0.28\text{mW}/5\text{mm}] \cdot [\sqrt{f(2.48)/7.5}] = 0.012\text{W/kg}$$

ANT+ function:

$$[0.28\text{mW}/5\text{mm}] \cdot [\sqrt{f(2.457)/7.5}] = 0.012\text{W/kg}$$

Conclusion:

Simultaneous transmission SAR measurement is not required because the both BLE and ANT+ antennas estimated 1-g SAR is $<0.4\text{W/kg}$.