Analysis Report

The Equipment Under Test (EUT), is a 2.4GHz Bluetooth Classic and Bluetooth BLE (1Mbps) Transceiver for a Bluetooth headset. For the Bluetooth Classic mode, the sample supplied operated on 79 channels, normally at 2402 – 2480MHz. The channels are separated with 1MHz spacing. For the Bluetooth BLE (1Mbps) mode, the sample supplied operated on 40 channels, normally at 2402 – 2480MHz. The channels are separated with 2MHz spacing.

The EUT is powered by 5.0VDC. After switching on the EUT, it can be paired up with a smartphone and will be used to play different sound based on the sound received from the paired smartphone.

Maximum Antenna Gain (Left Antenna): 1.02dBi
Maximum Antenna Gain (Right Antenna): 2.43dBi

Left Antenna
Conducted (Peak) Power Range: 3dBm to 8dBm

Right Antenna
Conducted (Peak) Power Range: 4dBm to 9dBm

According to the KDB447498 D01 v06:

Conducted Power (Maximum of Left Antenna) = 8 dBm (6.267888 mW)
Conducted Power (Maximum of Right Antenna) = 9 dBm (7.890804 mW)

The SAR Exclusion Threshold Level:
= 3.0 * (min. test separation distance, mm) / sqrt(freq. in GHz)
= 3.0 * 5 / sqrt (2.480) mW
= 9.53 mW

Since the above conducted output power is well below the SAR Exclusion threshold level, so the EUT is considered to comply with SAR requirement without testing.

Simultaneous Transmission SAR exclusion considerations

Since the Left and Right transmitters of this device may operate simultaneously, simultaneous transmission analysis is required. Per KDB447498 D01 v06, simultaneous transmission SAR test exclusion can be applied when the sum of 1-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (≤ 1.6W/kg). When the standalone SAR test exclusion is applied, the standalone 1-g SAR must be estimated according to the following equation,

$$\text{Estimated SAR} = (\sqrt{F(GHz)}/7.5)x(P\max/TD)$$

where
F(GHz) is the RF channel transmit frequency in GHz
Pmax is the max. power of channel, including tune-up tolerance, mW
TD is the min. test separation distance, mm

For Left Antenna,

Maximum Time-averaged Conducted Power of this device = 6.267888 **mW (8dBm)**

Therefore, the Estimated SAR will be determined as follow,

$$\text{Estimated SAR} = (\sqrt{F(GHz)}/7.5)x(P\max/TD)$$
$$= \textbf{0.2632181 W/kg}$$

where *Pmax* = 6.267888 mW, *TD* = 5 mm and *F(GHz)* = 2.480 GHz

For Right Antenna,

Maximum Time-averaged Conducted Power of this device = 7.890804 **mW (9dBm)**

Therefore, the Estimated SAR will be determined as follow,

$$\text{Estimated SAR} = (\sqrt{F(GHz)}/7.5)x(P\max/TD)$$
$$= \textbf{0.3313720 W/kg}$$

where *Pmax* = 7.890804 mW, *TD* = 5 mm and *F(GHz)* = 2.480 GHz

Simultaneous Transmission Analysis

Left Antenna SAR (W/kg)	Right Antenna SAR (W/kg)	Σ SAR (W/kg)	Simultaneous SAR Required
0.2632181	0.3313720	0.5945902	No

Conclusion
Since the above summed SAR result for all simultaneous transmission conditions were below the SAR limit (1.6 W/kg), SAR evaluation for simultaneous transmission configuration is not required.