Analysis Report

The Equipment Under Test (EUT) is a Tablet, equipped with keyboard, headphone, WiFi, Bluetooth, SD, HDMI and USB Interface. For WiFi, the EUT operates in a frequency range from 2412MHz to 2462MHz at 802.11b,g,n HT20 (11 channels with 5MHz spacing) while from 2422MHz to 2452MHz at 802.11n HT40 (7 channels with 5MHz channel spacing). For Bluetooth 4.0 BLE, the EUT occupies a frequency range from 2402MHz to 2480MHz (40 channels with channel spacing of 2MHz). The EUT is powered by an external AC/DC adaptor (5VDC output) or/and internal 3.7VDC (2x 3.7V rechargeable battery). The adaptor accepts 100-240VAC. The applicant declared that only WiFi 2.4GHz band and Bluetooth 4.0 BLE functions are used in this product. GPS, FM, NFC, Bluetooth 3.0 features will not be used in this product.

WiFi 802.11b, 802.11g, 802.11n (HT20):
2412MHz – 2462MHz, 11 channels, 5MHz spacing

WiFi 802.11n (HT40):
2422MHz – 2452MHz, 7 channels, 5MHz spacing

Bluetooth 4.0 BLE:
2402MHz – 2480MHz, 40 channels, 2MHz spacing

Antenna Type: Internal integral antenna
Antenna Gain: 0dBi

Operating mode	Nominal Radiated Field Strength	Production Tolerance	Modulation Type
802.11b	100.6dBµV/m at 3m	+/- 3dB	DSSS
802.11g	100.2dBµV/m at 3m	+/- 3dB	OFDM
802.11n (HT20)	99.2 dBµV/m at 3m	+/- 3dB	MCSn (n=1 to 7)
802.11n (HT40)	96.1 dBµV/m at 3m	+/- 3dB	MCSn (n=1 to 7)
Bluetooth 4.0 BLE	88.4 dBµV/m at 3m	+/- 3dB	GFSK

According to the KDB 447498:

For WiFi:
Based on the Maximum allowed field strength of production tolerance was 103.6dBμV/m at 3m in frequency 2.462GHz, thus;

The EIRP = [(FS*D) ^2*1000 / 30] = 6.873mW

Conducted power = Radiated Power (EIRP) – Antenna Gain
So;
Conducted Power = 6.873mW.

The SAR Exclusion Threshold Level:
= 3.0 * (min. test separation distance, mm) / sqrt(freq. in GHz)
= 3.0 * 5 / sqrt (2.462) mW
= 9.56 mW

For Bluetooth 4.0 BLE:
Based on the Maximum allowed field strength of production tolerance was 91.4dBμV/m at 3m in frequency 2.480GHz, thus;

The EIRP = [(FS*D) ^2*1000 / 30] = 0.414mW

Conducted power = Radiated Power (EIRP) – Antenna Gain
So;
Conducted Power = 0.414mW.

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 WiFi and Bluetooth transmitters of this device may operate simultaneously, simultaneous transmission analysis is required. Per KDB 447498, 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 WiFi operation,

Maximum Time-averaged Conducted Power of this device = 6.873 mW

Therefore, the Estimated SAR will be determined as follow,

$$\text{Estimated SAR} = (\sqrt{F(GHz)}/7.5)x(P\max/TD)$$
$$= 0.288 \text{ W/kg}$$

where *Pmax* = 6.873 mW, *TD* = 5 mm and *F(GHz)* = 2.462 GHz

For Bluetooth 4.0 BLE operation,

Maximum Time-averaged Conducted Power of this device = 0.414 mW

Therefore, the Estimated SAR will be determined as follow,

$$\text{Estimated SAR} = (\sqrt{F(GHz)}/7.5)x(P\max/TD)$$
$$= 0.0174 \text{ W/kg}$$

where *Pmax* = 0.414mW, *TD* = 5 mm and *F(GHz)* = 2.480 GHz

Simultaneous Transmission Analysis

WiFi SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Simultaneous SAR Required
0.288	0.0174	0.3054	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 are not required.