

Standalone SAR test exclusion considerations: BT(Module 1)

Date: September 30, 2019

RF feature	Mode	Transmitting Frequency(MHz)	Test separation distance (mm) ^{Note1}	ANT Gain (dBi)	Max. power with tune-up tolerance (dBm) ^{Note2}	Max. power with tune-up tolerance (mW)	Power thresholds	SAR test exclusion thresholds
BT	1Mbps	2480.00	43.5	-0.13	8.00	6.3096	0.23	3.00
BT	2,3Mbps	2480.00	43.5	-0.13	4.00	2.5119	0.09	3.00
BT LE	1Mbps	2480.00	43.5	-0.13	4.00	2.5119	0.09	3.00

Note1. The minimum separation distance between antenna and user is 43.5mm. Refer to the attestation letter.

Note2. Please refer to the operation description for Max.tune-up power.

KDB 447498 D01 clause 4.3.1 Step 1) SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances ≤ 50 mm

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \cdot \left[\sqrt{f(\text{GHz})} \right] \leq 3.0 \text{ for } 1\text{g SAR and } \leq 7.5 \text{ for } 10\text{g extremity SAR}$$

Sample Calculation

$$= \left[\left(\frac{6.3096\text{mW}}{43.5\text{mm}} \right) \right] \times \left[\sqrt{2.48\text{GHz}} \right] = 0.23$$

Note. The calculation result was rounded to two decimal place for comparison.

Conclusion : SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required

Standalone SAR test exclusion considerations: BT(Module 2)

Date: September 30, 2019

RF feature	Mode	Transmitting Frequency(MHz)	Test separation distance (mm) ^{Note1}	ANT Gain (dBi)	Max. power with tune-up tolerance (dBm) ^{Note2}	Max. power with tune-up tolerance (mW)	Power thresholds (mW)	SAR test exclusion thresholds(mW) at separation distance of 50 mm
BT	1Mbps	2480.00	54.1	-0.05	17.00	50.1187	42.46	95.56
BT	2,3Mbps	2441.00	54.1	-0.05	4.50	2.8184	41.08	95.56

Note1. The minimum separation distance between antenna and user is 54.1mm. Refer to the attestation letter.

Note2. Please refer to the operation description for Max.tune-up power.

KDB 447498 D01 clause 4.3.1 Step 2-2) SAR test exclusion thresholds for 1500MHz to 6GHz at test separation distances > 50 mm

[Threshold at 50 mm + (test separation distance - 50 mm) X 10] mW

Sample Calculation

$$= [1.46 + (54.1\text{mm} - 50\text{mm} \times 10)] = 42.46$$

Note. The calculation result was rounded to two decimal place for comparison.

Conclusion : SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required

Simultaneous transmission SAR test exclusion considerations

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▪ Worst case for simultaneous operations: **BT(Module0) + BT(Module1)**

RF feature	Mode	Transmitting Frequency(MHz)	Test separation distance (mm)	ANT Gain (dBi)	Max. power with tune-up tolerance (dBm)	Max. power with tune-up tolerance (mW)	Estimated SAR value(W/kg)	Sum of estimated SAR value(W/kg)	Requirement (W/kg)
BT(Module 0)	1Mbps	2480.00	43.5	-0.13	8.00	6.3096	0.03	0.43	1.60
BT(Module 1)	1Mbps	2480.00	54.1	-0.05	17.00	50.1187	0.40		

Note. The measurement results comply with the limit per Part 2.1093.

KDB 447498 D01 clause 4.3.2

b) When an antenna qualifies for the standalone SAR test exclusion of 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:

1) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$,

for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is $> 50 \text{ mm}$.

Sample Calculation

Standalone SAR value(W/kg)= $[(6.3096\text{mW} / 43.5\text{mm})] \times [\sqrt{2.48\text{GHz} / 7.5}] = 0.03$

Sum of estimated SAR value(W/kg)= $0.03 + 0.40 = 0.43$

Conclusion : SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required