RF Exposure evaluation

Product Name	:	Bluetooth Wireless 2D Barcode Scanner
FCC ID	:	2A5HC-U2-B
Test Standard	:	KDB447498D04 General RF Exposure Guidance v01

According to 447498 D04 Interim General RF Exposure Guidance v01

$$P_{\text{th}}\,(\text{mW}) = ERP_{20\,\text{cm}}\,(\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B. 1)}$$

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \quad \text{(B. 2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,\text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

BLE

Ant gain = 3 dBi

MAX output power : -7.464dBm@2442MHz

ERP=-7.464+3-2.15=-6.614dBm

WORSE CASE:

10^-0.6614=0.218mW < 2.715 mW

2.4G

eirp = pt x gt = $(EXd)^2/30$

where:

pt = transmitter output power in watts,

So

pt = $(EXd)_2/30$ x gt

Ant gain = 3 dBi [0.85dBd(1.22)]

Field strength = 94.78 dBμV/m @3m

So Pt={ $[10_{(94.78\ /20)}/10_6$ x3$]_2/30$}x1000 mW =0.9078mW<2.715mW

So ERP=0.9078x1.22=1.11<2.715mW

Then SAR evaluation is not required