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RF Exposure Evaluation

FCC ID: 2ATEU-YB010051

REQUIREMENT

KDB447498 D01 General RF Exposure Guidance v06, Clause 4.3.1(a)

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$

Where

-f(GHz) is the RF channel transmit frequency in GHz

-Power and distance are rounded to the nearest mW and mm before calculation

-The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

-The exposure safety distance is less than 5mm.

TEST RESULT

☒ **Passed**

☐ **Not Applicable**

BLE

Test mode	Channel Frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up tolerance Power (dBm)	Max. Tune up tolerance Power (mW)	Calculating data	Limit	Results
GFSK_1M	2402	0.55	0.55 ± 1	1.43	0.44	3.00	Pass
	2440	0.44	0.44 ± 1	1.39	0.43		
	2480	0.18	0.18 ± 1	1.31	0.41		
GFSK_2M	2402	0.52	0.52 ± 1	1.42	0.44		
	2440	0.44	0.44 ± 1	1.39	0.43		
	2480	0.14	0.14 ± 1	1.30	0.41		

NFC

Antenna Gain=0dBi(Numeric 1.0), $\pi=3.14$

Frequency	Max. Measured Power (dBm)	Max. Tune up tolerance Power	Max. Tune up tolerance Power	Calculati ng data	Limit	Results
MHz	dBm	(dBm)	(mW)	0.0023	3.00	Pass
13.56	-11.15	-11.15 ± 1	0.097			

According to the follow transmitter output power (P_t) formula:

$$P_t = (E \times d)^2 / (30 \times g_t)$$

P_t =transmitter output power in watts

g_t =numeric gain of the transmitting antenna (unitless)

E =electric field strength in V/m

d =measurement distance in meters (m)

According to the formula described above:

$$E_{max} = 83.90 \text{ dBuV/m} = 0.016 \text{ V/m}, d = 3\text{m}, g_t = 1.0$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.016 \times 3)^2 / (30 \times 1.0) = \mathbf{0.0000768W} = \mathbf{0.0768mW} = -11.15 \text{ dBm}$$

Note:

1. Only the worst case recorded.
2. The 2.4G BLE and NFC can transmit simultaneously and

$$\text{MPE Ratio (BLE+NFC)} = 0.44/3 + 0.0023/3 = 0.147 < 3$$

and it satisfy the RF exposure requirements for simultaneous transmission that the sum of the MPE radios < 3

*****THE END*****