

FCC RF Exposure

Applicant : Nebula Electronic Technology Corporation
Address : Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong
New Area, Shanghai
Product Name : Bluetooth module
Brand Mark : N.E.T
Model : BT638-2
Series model : N/A
FCC ID : 2BAMT-BT638-2
Report Number : BLA-EMC-202506-A7802
Date of Receipt : Jun. 19, 2025
Date of Test : Jun. 19, 2025 to Jun. 27, 2025
47 CFR Part 15, Part1.1307
Test Standard : 47 CFR Part 15, Part2.1093
KDB447498D04 General RF Exposure Guidance v01
Test Result : Pass

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Review by: Xavier

Approved by:

Issued Date: Jun. 27, 2025



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Revise Record

Version No.	Date	Description
01	Jun. 27, 2025	Original

1 General information

1.1 General information

Applicant	Nebula Electronic Technology Corporation
Address	Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong New Area, Shanghai
Manufacturer	Nebula Electronic Technology Corporation
Address	Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong New Area, Shanghai
Factory	Nebula Electronic Technology Corporation
Address	Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong New Area, Shanghai

1.2 General description of EUT

Product Name	Bluetooth module
Model No.	BT638-2
Operation Frequency	2402MHz-2480MHz
Modulation Type	GFSK
Rate data	1Mbps, 2Mbps
Channel Spacing	2MHz
Number of Channels	40
Antenna Type	PCB antenna
Antenna Gain	-6.13dBi (Provided by customer)
Power supply	DC 3.3V
Hardware Version	V1.0
Software Version	V1.0

Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2 RF Exposure Compliance Requirement

2.1 Standard Requirement

According to 447498 D04 Interim General RF Exposure Guidance v01

Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

2.2 Limits

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

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).

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

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

2.3 Result

$$EIRP = p_t \times g_t = (E \times d)^{2/30}$$

Where:

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)

$$\text{Spot} = (E \times d)^{2/30} \times g_t$$

Separation distance = 0.5cm

Ant gain = -6.13dBi

For BLE 2M(Worst case):

Max Output power = 0.023dBm @ 2480MHz

$$ERP = 0.023\text{dBm} - 6.13\text{dBi} - 2.15 = -8.257\text{dBm} = 0.149\text{mW}$$

because conducted Max Output power > ERP

So, conducted Max Output power = 0.023dBm = 1.005mW < 2.717mW

Comply with RF exposure exemption limit.

----END OF REPORT----

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