

TEST REPORT

Product Name : Bluetooth module for LoudBoxes
Brand Mark : N/A
Model No. : Q21
FCC ID : 2A8Q5-ALMQ21LB
Report Number : BLA-EMC-202209-A8602
Date of Sample Receipt : 2022/10/3
Date of Test : 2022/10/3 to 2022/10/18
Test Standard : KDB447498D04 General RF Exposure
Guidance v01
Test Result : Pass

Prepared for:

Shenzhen ALM-IoT Technology Ltd.

R303, Building 18, ZHX Innovation Industrial City, No.11 Gan Li Rd., Jihua St.,shenzhen.

Prepared by:

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Date:

2022/10/19



REPORT REVISE RECORD

Version No.	Date	Description
00	2022/10/19	Original

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1 GENERAL INFORMATION

Applicant	Shenzhen ALM-IoT Technology Ltd.
Address	R303, Building 18, ZHX Innovation Industrial City, No.11 Gan Li Rd., Jihua St.,shenzhen.
Manufacturer	Shenzhen ALM-IoT Technology Ltd.
Address	R303, Building 18, ZHX Innovation Industrial City, No.11 Gan Li Rd., Jihua St.,shenzhen.
Factory	Shenzhen ALM-IoT Technology Ltd.
Address	R303, Building 18, ZHX Innovation Industrial City, No.11 Gan Li Rd., Jihua St.,shenzhen.
Product Name	Bluetooth module for LoudBoxes
Test Model No.	Q21

2 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V1.0
Software Version	V1.0
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK, pi/4DQPSK,8DPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Internal Antenna
Antenna Gain:	2dBi (Provided by the customer)

3 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province,
China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

4 RF EXPOSURE COMPLIANCE REQUIREMENT

4.1 RF EXPOSURE COMPLIANCE REQUIREMENT

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.

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

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

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

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10((dBuV/m)/20)/106$

d = measurement distance in meters (m)---3m

$$S_{opt} = (EXd)^{2/30} \times g_t$$

Ant gain = 2 dBi

Max Output power = 1.51dBm @ 2402MHz

$$ERP = 1.51dBm + 2dBi - 2.15 = 1.36dBm$$

So

ERP is worse case

$$10^{0.1366} = 1.367 \text{ mW} < 3060 \text{ mW}$$

Comply with RF exposure exemption limit.

----END OF REPORT----

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