



RF EXPOSURE EVALUATION REPORT

APPLICANT : BDE Technology Co., Ltd
PRODUCT NAME : BDE Low Power, Long Range Sub-1G Module
MODEL NAME : BDE-RFM216
BRAND NAME : BDE
FCC ID : 2ABRUBDRFM216
STANDARD(S) : 47CFR 2.1091
: KDB 447498
RECEIPT DATE : 2019-08-05
TEST DATE : 2019-09-02 to 2019-09-10
ISSUE DATE : 2019-09-26

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REPORT No. : SZ19070302S01

Change history		
Version	Date	Reason of changed
1.0	2019-09-10	Original



1. Technical Information

Note: Provide by manufacturer.

1.1 Applicant and Manufacturer Information

Applicant:	BDE Technology Co., Ltd
Applicant Address:	Innovation Building C1-1105, 182 Science Ave, Science City, Guangzhou, China
Manufacturer:	BDE Technology Co., Ltd
Manufacturer Address:	Innovation Building C1-1105, 182 Science Ave, Science City, Guangzhou, China

1.2 Equipment under Test (EUT) Description

EUT Name:	BDE Low Power, Long Range Sub-1G Module
Hardware Version:	1.0
Software Version:	1.0
Frequency Bands:	WB-DSSS: 903MHz - 927MHz FHSS(5kbps, 50kbps): 902.2MHz - 927.8MHz FHSS(200kbps): 902.4MHz - 927.6MHz
Modulation Mode:	2-GFSK
Antenna Type:	External PCB antenna
Antenna Gain:	2.67 dBi

Note:

All data rates supported by the EUT has been evaluated, but only the worst case(30kbps) is presented in this report.



1.3 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	1.0	1.0

1.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title	Method determination /Remark
1	47 CFR§2.1091	Radio Frequency Radiation Exposure Evaluation: mobile devices	No deviation
2	KDB 447498 D01v06	General RF Exposure Guidance	No deviation



2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

GENERAL POPULATION / UNCONTROLLED EXPOSURE

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz* = Plane-wave equivalent power density



3. RF Output Power

<WB-DSSS>

Channel	Frequency (MHz)	Average power (dBm)
		GFSK
0	903	14.93
12	915	14.78
24	927	14.25
Tune-up Limit		15.00

<FHSS>

Channel	Frequency (MHz)	Average power (dBm)
		5kbps
0	902.2	15.35
64	915.0	15.26
128	927.8	15.24
Tune-up Limit		16.00

Channel	Frequency (MHz)	Average power (dBm)
		50kbps
0	902.2	15.29
64	915.0	15.21
128	927.8	15.21
Tune-up Limit		16.00

Channel	Frequency (MHz)	Average power (dBm)
		200kbps
0	902.4	15.32
32	915.2	15.22
63	927.6	15.20
Tune-up Limit		16.00



4. RF Exposure Evaluation

➤ **Standalone transmission evaluation:**

Bands	Frequency (MHz)	Maximum Tune-up Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Power density (mW/cm ²)	Limit for MPE (mW/cm ²)
915MHz	902.4	16.0	2.67	73.62	0.015	0.6

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

$$\text{Power Density} = \text{EIRP}/4\pi R^2$$

Where: EIRP = P+G

P = Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)

➤ **Simultaneous transmission evaluation:**

There is only one 915MHz module in this device, therefore simultaneous transmission evaluation is not required.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

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