



# RF EXPOSURE EVALUATION REPORT

**APPLICANT** : Shenzhen Jimi IOT Co., Ltd  
**PRODUCT NAME** : Container GPS Tracker  
**MODEL NAME** : CT10  
**BRAND NAME** : N/A  
**FCC ID** : 2AMLFCT10  
**STANDARD(S)** : 47CFR 2.1091  
KDB 447498  
**ISSUE DATE** : 2018-10-16

Reviewed by:                     Gan Yueming                      
Gan yueming (Reviewer)

Approved by:                     Peng Huarui                      
Peng Huarui (Supervisor)

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Version No.	Date	Description
1.0	2018-10-16	Original

Tested By	
Test engineer:	Su Jinhai



# 1. Technical Information

**Note:** Provide by manufacturer.

## 1.1 Applicant and Manufacturer Information

<b>Applicant:</b>	Shenzhen Jimi IOT Co., Ltd
<b>Applicant Address:</b>	4/F, Building C, Gaoxinqi Industrial Park, Liuxian 1st Road, No.67 Xin'an Street, Bao'an District, Shenzhen, China
<b>Manufacturer:</b>	Shenzhen Jimi IOT Co., Ltd
<b>Manufacturer Address:</b>	4/F, Building C, Gaoxinqi Industrial Park, Liuxian 1st Road, No.67 Xin'an Street, Bao'an District, Shenzhen, China

## 1.2 Equipment Under Test (EUT) Description

<b>EUT Type:</b>	Container GPS Tracker
<b>Hardware Version:</b>	V2.0
<b>Software Version:</b>	NFC117_V0003_20180705
<b>Frequency Bands:</b>	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~1907.6 MHz WCDMA Band V: 826.4 MHz ~846.6 MHz
<b>Modulation Mode:</b>	GPRS: GMSK EDGE: 8PSK WCDMA: QPSK
<b>Antenna Type:</b>	Monopole Antenna
<b>Antenna Gain:</b>	824~960MHZ: 0.6dBi , 1710~2170MHZ: 0dBi

## 1.3 Photographs of the EUT

### 1. EUT front view



### 2. EUT rear view





### 1.3.1 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#	V2.0	NFC117_V0003_20180705

## 1.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1091	Radio frequency Radiation Exposure Evaluation: mobile devices
2	KDB 447498 D01v06	General RF Exposure Guidance



## 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 <sup>2</sup> )	Averaging time (minutes)
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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. Measurement of RF Output Power

<GSM Conducted Power>

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	TX Channel	128	189		251	128	189	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GPRS 1 Tx slot	31.86	31.92	31.98	32.50	22.86	22.92	22.98	23.50
GPRS 2 Tx slots	29.64	29.76	<b>29.86</b>	30.50	23.64	23.76	23.86	<b>24.50</b>
GPRS 3 Tx slots	27.54	27.72	27.86	28.50	23.28	23.46	23.60	24.24
GPRS 4 Tx slots	25.31	25.49	25.62	26.50	22.31	22.49	22.62	23.50
EDGE 1 Tx slot	25.43	25.66	25.81	26.50	16.43	16.66	16.81	17.50
EDGE 2 Tx slots	25.03	25.24	25.40	26.00	19.03	19.24	19.40	20.00
EDGE 3 Tx slots	23.46	23.41	23.53	24.00	19.20	19.15	19.27	19.74
EDGE 4 Tx slots	20.78	20.98	21.15	22.00	17.78	17.98	18.15	19.00

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	TX Channel	512	661		810	512	661	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GPRS 1 Tx slot	29.41	29.25	29.56	30.50	20.41	20.25	20.56	21.50
GPRS 2 Tx slots	27.39	27.18	26.93	28.00	21.39	21.18	20.93	22.00
GPRS 3 Tx slots	<b>25.78</b>	25.52	25.22	26.50	21.52	21.26	20.96	<b>22.24</b>
GPRS 4 Tx slots	23.66	23.41	23.17	24.50	20.66	20.41	20.17	21.50
EDGE 1 Tx slot	24.73	24.71	24.78	25.50	15.73	15.71	15.78	16.50
EDGE 2 Tx slots	24.39	24.41	24.51	25.50	18.39	18.41	18.51	19.50
EDGE 3 Tx slots	22.37	22.23	22.36	23.00	18.11	17.97	18.10	18.74
EDGE 4 Tx slots	19.47	19.37	19.57	20.50	16.47	16.37	16.57	17.50

<Time slot consignations>

No. of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle	1:8.3	1:4.15	1:2.77	1:2.08
Correct Factor	-9.03dB	-6.02dB	-4.26dB	-3.01dB

**Note:** According to KDB 447498, maximum source-based time-average power will be used for calculating MPE, therefore GPRS 2TX slots of GSM850 and GPRS 3TX slots of GSM1900 are selected to be calculated.



<WCDMA Conducted Power>

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	RMC 12.2Kbps	21.67	21.66	<b>21.73</b>	22.50

Band		WCDMA Band V			Tune-up Limit (dBm)
TX Channel		4132	4182	4233	
Rx Channel		4357	4407	4458	
Frequency (MHz)		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	21.56	<b>21.59</b>	21.53	22.50





## 4. RF Exposure Evaluation

### Standalone transmission MPE evaluation

Bands	Frequency (MHz)	Maximum Tune-up Limit (dBm)	Antenna Gain (dBi)	EIRP (mW)	Power density (mW/cm <sup>2</sup> )	Limit for MPE (mW/cm <sup>2</sup> )
GSM850	848.8	30.50	0.6	1288.25	0.256	0.566
GSM1900	1850.2	26.50	0	446.684	0.089	1.0
WCDMA Band II	1907.6	22.50	0	177.828	0.035	1.0
WCDMA Band V	836.4	22.50	0.6	204.174	0.041	0.558

**Note:**

MPE calculation method

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

Where: EIRP = P+G

P = Average Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)



## Annex A General Information

### 1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
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### 2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
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