



# **CC2540 BLE USB Dongle Hardware Specification**

**Version 1.0**

Shenzhen RF-star Technology Co., Ltd.

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## 1 Parameters

Items	Test Conditions	Parameter	Unit
Product Name	-	USB DONGLE	
Freq. range	-	2402 ~ 2480	MHz
Input plug type	-	Standard USB 2.0	
Power Supply	USB	5.0	V
Power Consumption	Max. Tx Power 4 dBm	35 (Peak)	mA
	Rx	19.6 (Peak)	mA



## 2 Packaging Size and Pins

### 2.1 Packaging Size

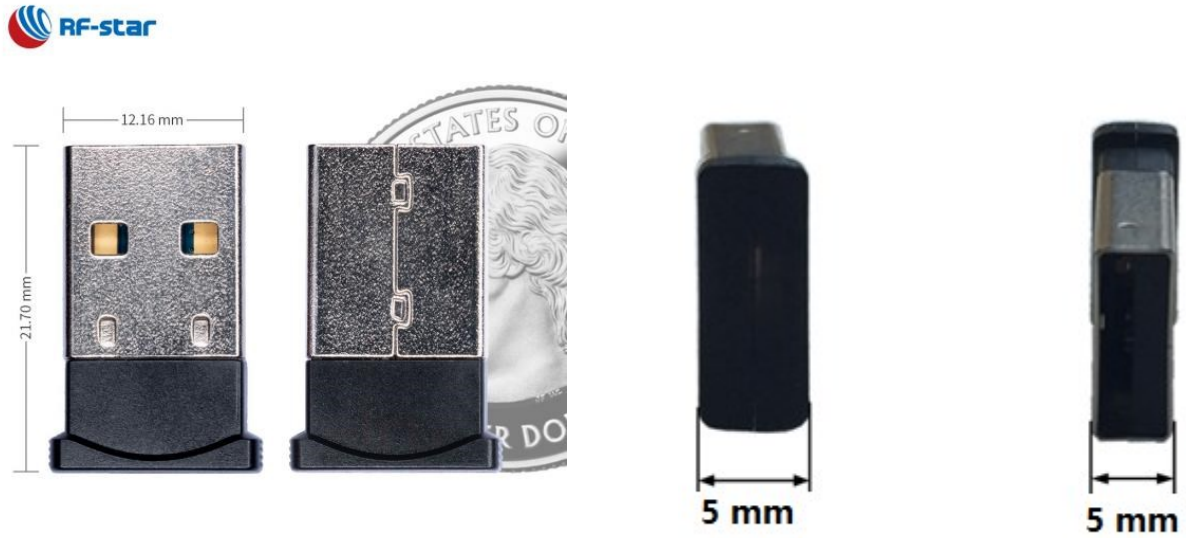


Figure 1. Packaging of USB DONGLE

### 2.2 Pins

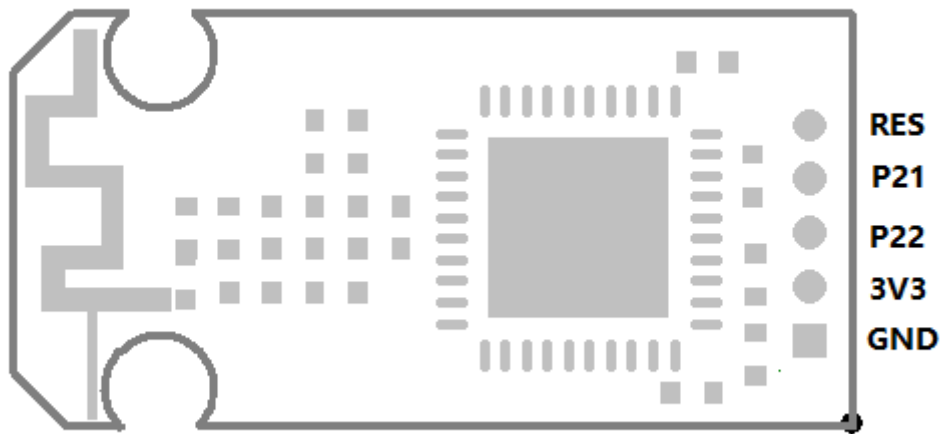


Figure 2. Pins of USB DONGLE

### 3 RF Test

#### 3.1 Frequency Range

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

Frequency Range
2402 MHz ~ 2480 MHz

#### 3.2 Tx Power

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

Center Frequency (MHz)	Tx Power (dBm)	Power Range (dBm)
2402	3.3	>2.5
2440	3.42	
2480	2.96	

#### 3.3 Frequency Offset

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

Center Frequency (MHz)	Frequency Offset (KHz)	Offset Range (KHz)
2402	12.3	±40 KHz
2440	12.3	
2480	12.3	

#### 3.4 Receiving Sensitivity (High Gain Mode, Packet Loss Rate FER = 1%)

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K, Smart RF studio.

Center Frequency (MHz)	Receiving Sensitivity (dBm)	Sensitivity Range (dBm)
2402	-87	< -85
2440	-88	
2460	-89	
2480	-86	

## 4 Test Parameters of Key Certificates

### 4.1 CE Out-of-Band Spurious Limit of Conducted Harmonic

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

According to CE Standard EN300328 V1.8.1.

Band	Frequency (MHz)	Level (dBm)	Standard	Unit
	Record (Max)	level /dBm	EN300 328 Spec	RBW / VBW
30 MHz ~ 47 MHz	32	-44	-36	100k / 300k
47 MHz ~ 74 MHz	64	-68	-54	100k / 300k
74 MHz ~ 87.5 MHz	75	-57	-36	100k / 300k
87.5 MHz ~ 118 MHz	96	-66	-54	100k / 300k
118 MHz ~ 174 MHz	128	-53	-36	100k / 300k
174 MHz ~ 230 MHz	192	-65	-54	100k / 300k
230 MHz ~ 470 MHz	256	-60	-36	100k / 300k
470 MHz ~ 862 MHz	480	-71	-54	100k / 300k
862 MHz ~ 1 GHz	7215	-61	-36	100k / 300k
1 GHz ~ 2.36 GHz	7350	-42	-30	1M / 3M
2.5235 GHz ~ 12.75 GHz	7440	-58	-30	1M / 3M

### 4.2 FCC Out-of-Band Spurious Limit of Conducted Harmonic

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

According to FCC Standard part 15.247.

Carrier Frequency (MHz)	Harmonic Frequency (MHz)	FCC requirements: <-41.2 dBm	
		Actual Measurement (dBm)	Allowance (dB)
2402	4810	-52.5	11
	7215	-60.4	19
	9620	-63.1	22
2440	4880	-55.8	14
	7320	-61.7	20
	9760	-60.5	19
2480	4960	-55.3	14

	7440	-64.5	23
	9920	-67.2	26

### 4.3 Test Results of FCC and CE Radiation Spurious

Test conditions:

VDD = 3.3 V, TA = 25 °C, frequency = 2405 MHz / 2440 MHz / 2480 MHz, RBW = 100 K, VBW = 300 K.

According to FCC Standard part 15.247 and CE Standard EN300328 V1.8.1.

Requirements: Peak Detector <74 dBuV/m @ 3 m, Average Detector <54 dBuV/m @ 3 m.

Carrier Frequency (MHz)	Harmonic Frequency (MHz)	Peak (dBuV)	
		Peak Detector	Average Detector
2402	4810	62.5	48.6
	7215	64.7	46.9
	9620	63.2	48.5
2440	4880	61.4	49.1
	7320	62.5	46.8
	9760	63.4	46.9
2480	4960	61.7	46.3
	7440	63.8	47.2
	9920	65.3	47.6

## 5 Antenna Gain Pattern

### 5.1 Antenna Information

Antenna type: PCB antenna

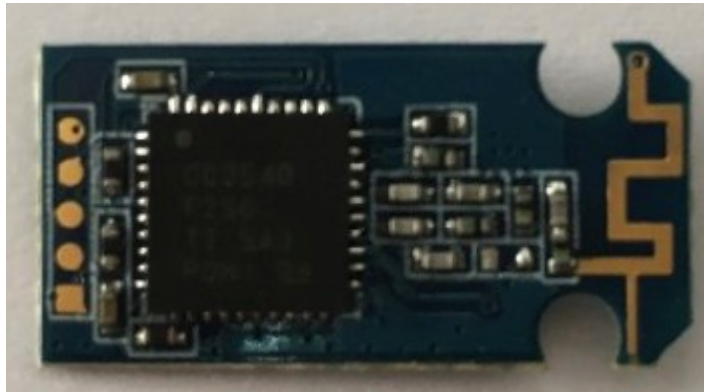


Figure 3. Antenna Picture of USB DONGLE

### 5.2 Antenna Radiation Pattern



Figure 4. Antenna Radiation Pattern of USB DONGLE

### 5.3 Antenna Radiation Gain

Radiation Pattern			
Plane	Frequency (MHz)	Max. Value (dB)	Average (dB)
ZX	2400	0.22	-3.47
	2450	0.22	-3.71
	2500	0.03	-3.86
ZY	2400	0.97	-2.33
	2450	1.06	-2.15
	2500	0.85	-2.17



<b>XY</b>	2400	-0.62	-4.55
	2450	-0.83	-4.74
	2500	-0.32	-4.66



## 6 Application, Implementation, and Layout

### 6.1 Block Diagram

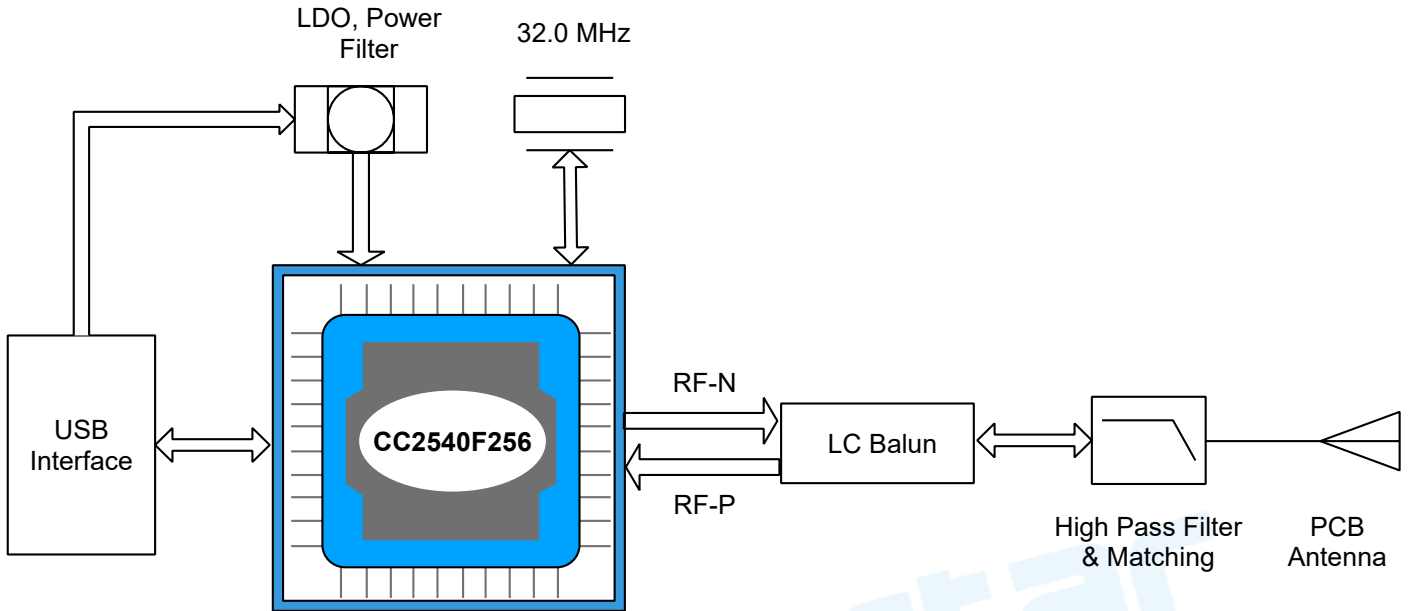


Figure 5. Block Diagram of RF-BM-S01

### 6.2 Schematic Diagram

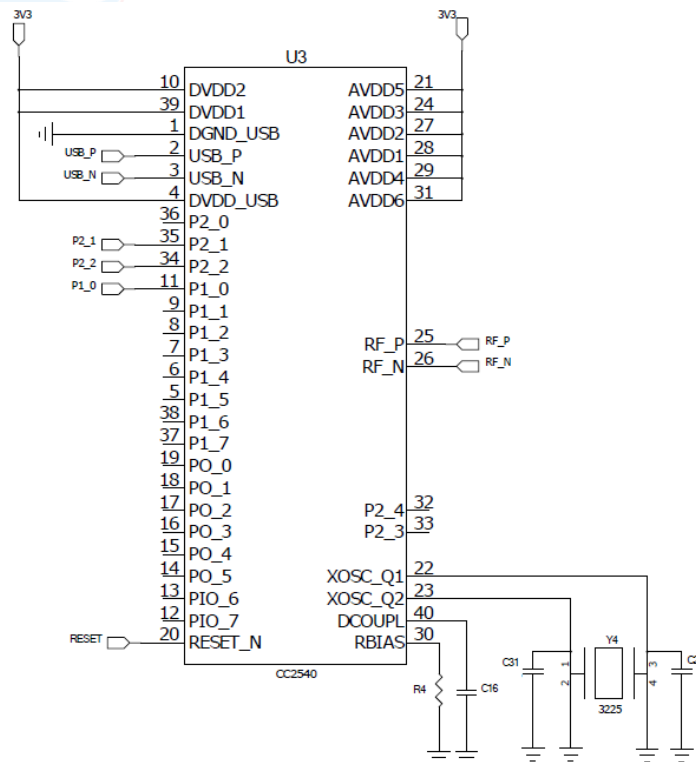


Figure 6. Schematic Diagram of USB DONGLE

## 7 Electrostatics Discharge Warnings

The module will be damaged by the discharge of static. RF-star suggests that all modules should follow the 3 precautions below:

1. According to the anti-static measures, bare hands are not allowed to touch modules.
2. Modules must be placed in anti-static areas.
3. Take the anti-static circuitry (when inputting HV or VHF) into consideration in product design.

Static may result in the degradation in performance of the module, even causing the failure.



## 8 Certification

### 8.1 FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Identifier: Q9DBT101

**CCIS** Shenzhen Zhongjian Nanfang Testing Co., Ltd.  
Report No: CCIS14118091302

#### FCC REPORT

**Applicant:** Anuba Networks, Inc.  
**Address of Applicant:** 1344 Crossman Ave. Sunnyvale, CA 94080-1113, USA  
**Equipment Under Test (EUT)**  
**Product Name:** Anuba BT-101 Location Beacon  
**Model No.:** ARBT0101  
**FCC ID:** Q9DBT101  
**Applicable standards:** FCC CFR Title 47 Part 15 Subpart B  
**Date of sample receipt:** 04 Nov., 2014  
**Date of Test:** 05 Nov., to 13 Nov., 2014  
**Date of report issued:** 14 Nov., 2014  
**Test Result:** PASS<sup>1</sup>  
<sup>1</sup>In the configuration tested, the EUT complied with the standards specified above.



**Laboratory Manager**  
This report shows the results of the factory control test on one sample. The results contained in this test report do not relate to other samples of devices, or to other devices, and do not represent the use of the FCC product certification mark. The manufacturer should ensure that all products in same production are in conformity with the product sample tested in this report.  
This report may only be reproduced and distributed in the form printed in this report or in any compilation other than that detailed in the report. The manufacturer must ensure that the system complies with all relevant standards.  
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Figure 7. FCC Certificate

### 8.2 CE

CE Verification No.: CCISE170703101V

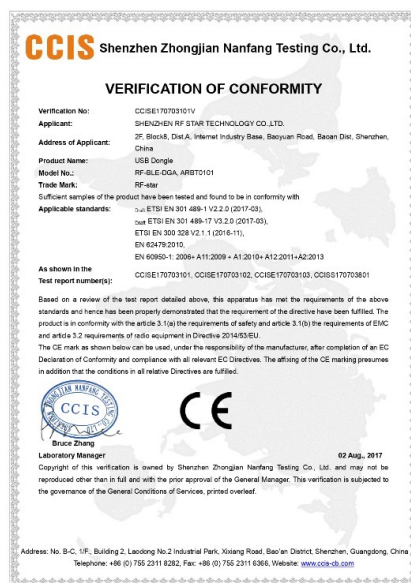


Figure 8. CE Certificate

### 8.3 RoHS

RoHS Report No.: CSC1403200001CHEM

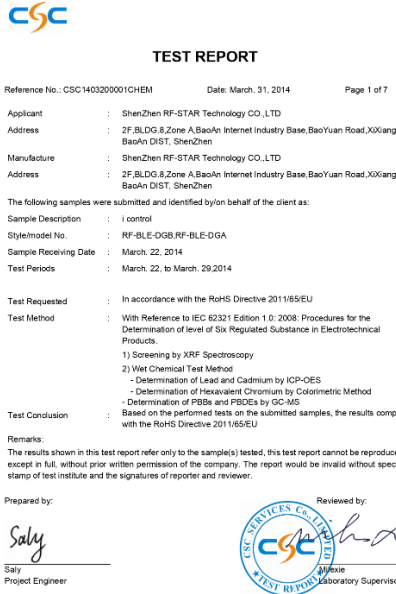


Figure 9. RoHS Certificate

### 8.4 IC

IC Verification ID: CCIS14110091401V



Figure 10. IC Certificate

## 9 Revision History

Date	Version No.	Description
2017.02.20	V1.0	The initial version is released.
2023.05.26	V1.0	Update the company address.

Note:

1. The document will be optimized and updated from time to time. Before using this document, please make sure it is the latest version.
2. To obtain the latest document, please download it from the official website: [www.rfstariot.com](http://www.rfstariot.com) and [www.szrfstar.com](http://www.szrfstar.com).



## 10 Contact Us

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