

# PAU04

## Zigbee NCP Dongle



### Introduction

NCP stands for Network Co-processor. By adding a Wireless Gecko (EFR32™) System on Chip (SoC) in NCP mode to their system, Customers can implement a Connect-based wireless application that leverages the EFR32 Radio feature set.

The "Cygwin" application is a tool for Philio RD testing. The purpose of this manual is to help user be familiar with the functionality of the application, and operate the user interface. This tool is for Zigbee product, some concept of the Zigbee network, or the specification of the Zigbee command, please refer to the Zigbee API (<https://docs.silabs.com/zigbee/latest/af/group-appframework>) first.

Following subjects will describe these scopes: Installation Start Joining network leave network Control Plugin On / Off

### Specifications

Operating Voltage	DC5V 0.3A
Surface	USB 2.0 Type A
Operating Temperature	-20°C - 55°C (85% humidity)
Storage Temperature	-30 C ~ 85°C
RF Range (distance)	Minimum 40M in door and 100M in outdoor, line of sight
Frequency Range	2405MHz~2480MHz(EU) (US/Canada)(TW/JP)
RF Power	+8dBm
Software version	Zigbee 3.0 ezsp ver 0x08, stack type 0x02, stack ver. [6.10.3 GA build 297]
Dimension	63.45 (L) x 20 (W) x 10 (H) mm
Weight	8.8g
Location	Indoor use; IP20
FCC ID	RHHPAU04

\*\* Specifications are subject to change and improvement without notice.

### Troubleshooting

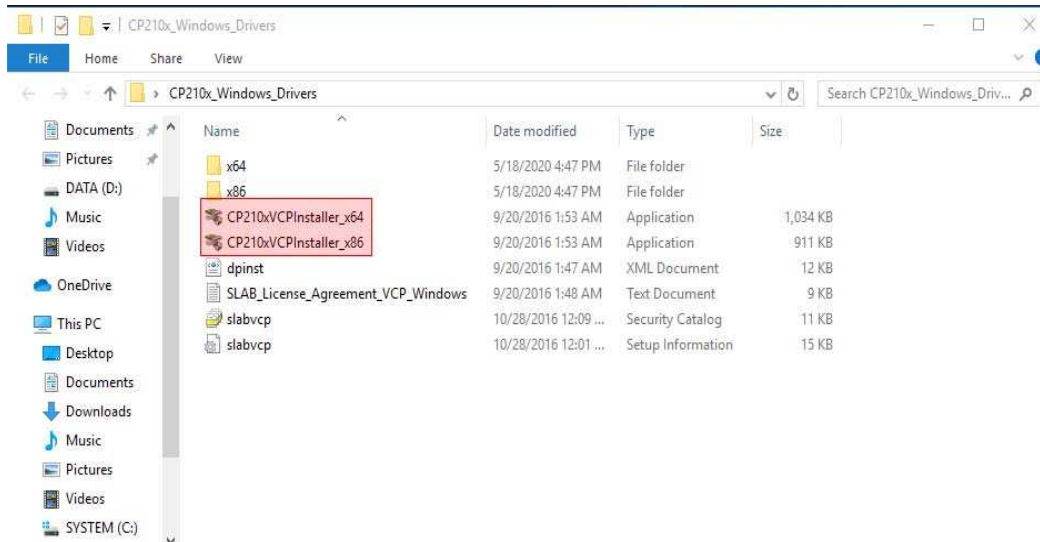
Symptom	Cause of Failure	Recommendation
The device can not join to Z-Wave™ network	The device may in a Z-Wave™ network.	Exclude the device then include again.

For Instruction to [http:// www.philio-tech.com](http://www.philio-tech.com)



## 1. Installation

The dongle need the PC driver. Please extract the "CP210x\_Windows\_Drivers". There is a CP210xVCPInstaller\_x64.exe file.



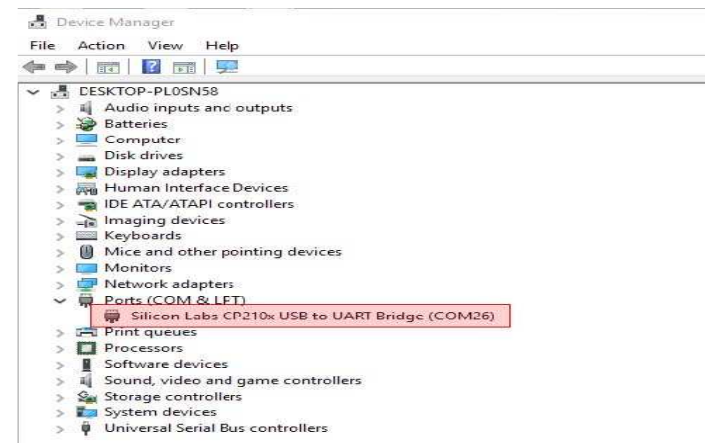
Install the driver.



Select "I accept this agreement" and click "next".

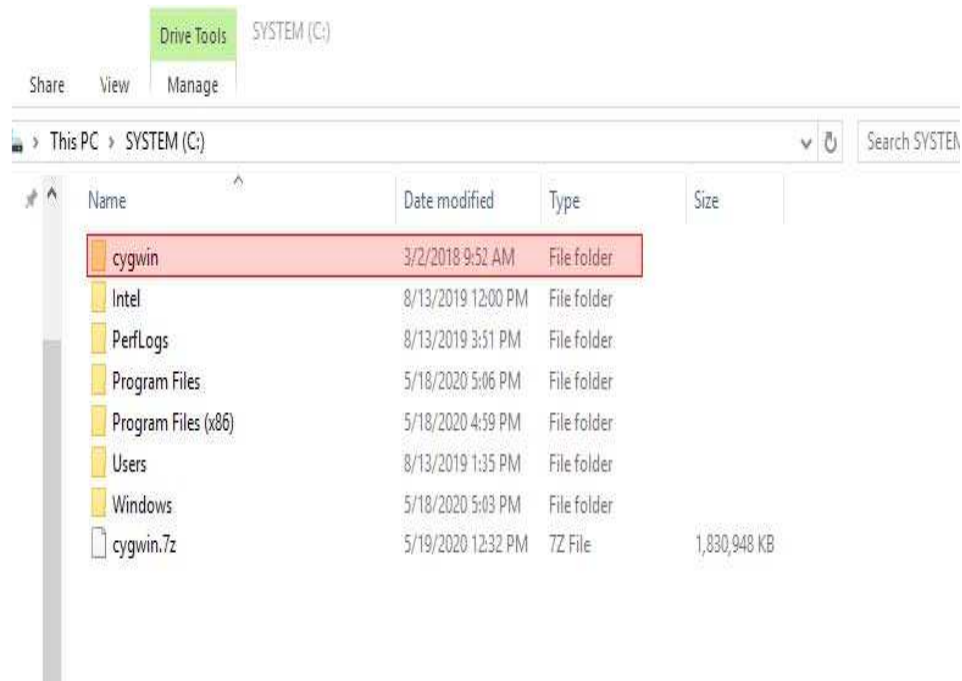


Finish installation.



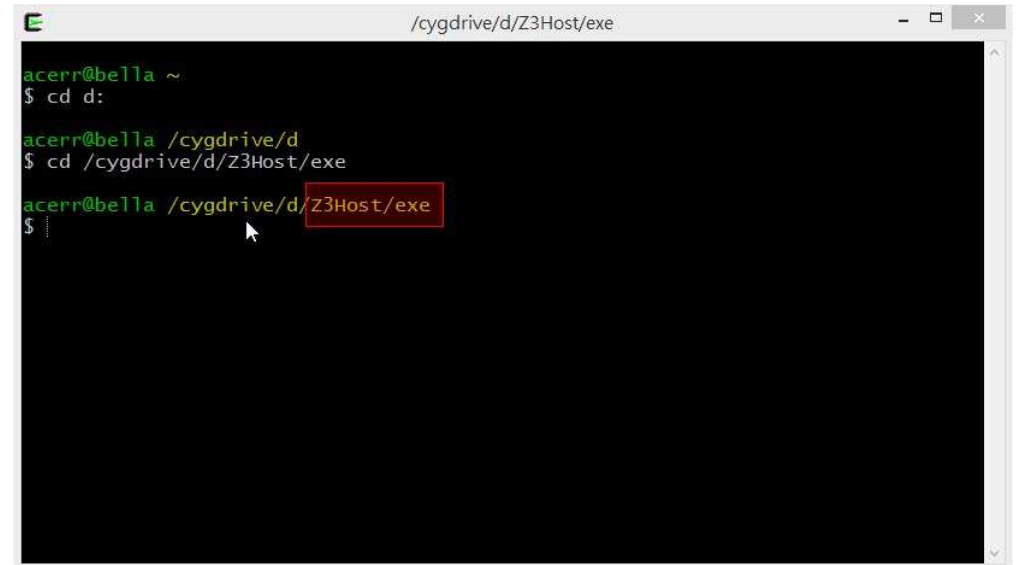
## 5. Install Application

Extract the "Cygwin.7z" to the C disk.

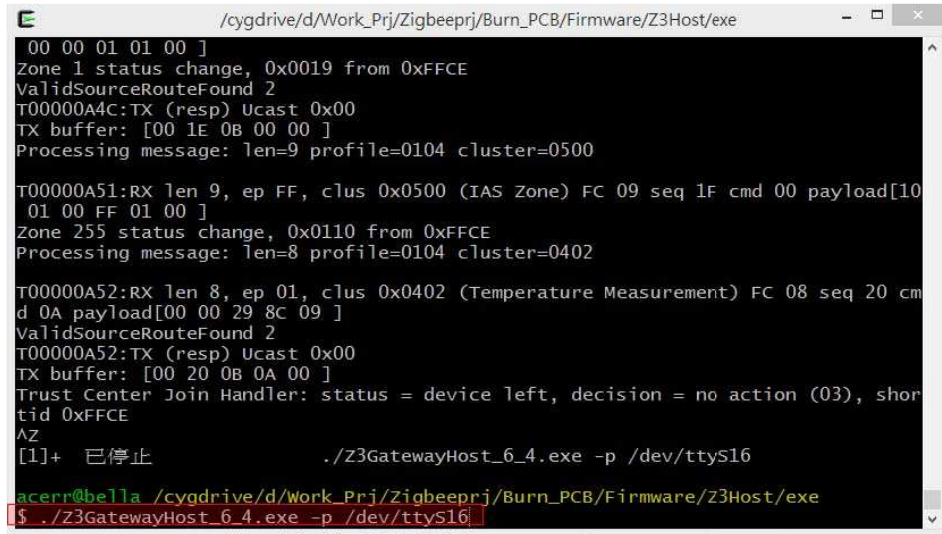


## 6. Start

Please extract the "Z3Host.7z". Insert the USB dongle, and open "Cygwin". Please move it to "Z3Host/exe" file.



Execute instruction “./Z3GatewayHost\_6\_4.exe -p /dev/ttyS16” /dev/ttyS16 → Dongle Comport

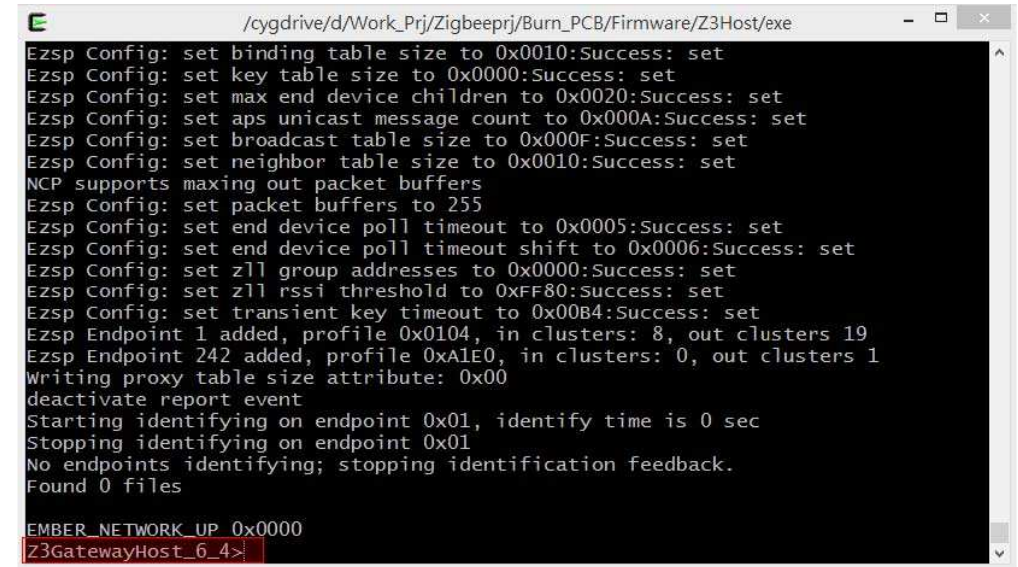


```
/cygdrive/d/Work_Prj/Zigbeeprj/Burn_PCB/Firmware/Z3Host/exe
00 00 01 01 00 ]
Zone 1 status change, 0x0019 from 0xFFCE
ValidSourceRouteFound 2
T00000A4C:TX (resp) Ucast 0x00
TX buffer: [00 1E 0B 00 00 ]
Processing message: len=9 profile=0104 cluster=0500

T00000A51:RX len 9, ep FF, clus 0x0500 (IAS Zone) FC 09 seq 1F cmd 00 payload[10
01 00 FF 01 00 ]
Zone 255 status change, 0x0110 from 0xFFCE
Processing message: len=8 profile=0104 cluster=0402

T00000A52:RX len 8, ep 01, clus 0x0402 (Temperature Measurement) FC 08 seq 20 cm
d 0A payload[00 00 29 8c 09 ]
ValidSourceRouteFound 2
T00000A52:TX (resp) Ucast 0x00
TX buffer: [00 20 0B 0A 00 ]
Trust Center Join Handler: status = device left, decision = no action (03), shor
tid 0xFFCE
^Z
[1]+ 已停止                  ./Z3GatewayHost_6_4.exe -p /dev/ttyS16
acerr@bella /cygdrive/d/Work_Prj/Zigbeeprj/Burn_PCB/Firmware/Z3Host/exe
$ ./Z3GatewayHost_6_4.exe -p /dev/ttyS16
```

Successful execution when seeing “Z3GatewayHost\_6\_4>”



```
/cygdrive/d/Work_Prj/Zigbeeprj/Burn_PCB/Firmware/Z3Host/exe
Ezsp Config: set binding table size to 0x0010:Success: set
Ezsp Config: set key table size to 0x0000:Success: set
Ezsp Config: set max end device children to 0x0020:Success: set
Ezsp Config: set aps unicast message count to 0x000A:Success: set
Ezsp Config: set broadcast table size to 0x000F:Success: set
Ezsp Config: set neighbor table size to 0x0010:Success: set
NCP supports maxing out packet buffers
Ezsp Config: set packet buffers to 255
Ezsp Config: set end device poll timeout to 0x0005:Success: set
Ezsp Config: set end device poll timeout shift to 0x0006:Success: set
Ezsp Config: set zll group addresses to 0x0000:Success: set
Ezsp Config: set zll rssi threshold to 0xFF80:Success: set
Ezsp Config: set transient key timeout to 0x00B4:Success: set
Ezsp Endpoint 1 added, profile 0x0104, in clusters: 8, out clusters 19
Ezsp Endpoint 242 added, profile 0xA1E0, in clusters: 0, out clusters 1
Writing proxy table size attribute: 0x00
deactivate report event
Starting identifying on endpoint 0x01, identify time is 0 sec
Stopping identifying on endpoint 0x01
No endpoints identifying; stopping identification feedback.
Found 0 files

EMBER_NETWORK_UP 0x0000
Z3GatewayHost_6_4>
```



Execute instruction “plugin network-creator form 1 0xAAAA 8 22” to creator new network.

1 → Whether or not to form a centralized network.

0xAAAA → PanID of the network to be formed.

8 → Tx power of the network to be formed.

22 → channel of the network to be formed.

```
in (server) cluster: 0x0019 (Over the Air Bootloading)
in (server) cluster: 0x001A (Power Profile)
out(client) cluster: 0x0020 (Poll Control)
out(client) cluster: 0x0300 (Color Control)
in (server) cluster: 0x0300 (Color Control)
out(client) cluster: 0x0400 (Illuminance Measurement)
out(client) cluster: 0x0402 (Temperature Measurement)
out(client) cluster: 0x0405 (Relative Humidity Measurement)
out(client) cluster: 0x0406 (Occupancy Sensing)
out(client) cluster: 0x0500 (IAS Zone)
out(client) cluster: 0x0702 (Simple Metering)
out(client) cluster: 0x0B01 (Meter Identification)
out(client) cluster: 0x0B03 (Appliance Statistics)
out(client) cluster: 0x0B04 (Electrical Measurement)
out(client) cluster: 0xFC01 (Configuration Cluster)
out(client) cluster: 0xFC02 (MFLIB Cluster)
ep 242 [endpoint enabled, device enabled] nwk [0] profile [0xA1E0] devId [0x0061]
] ver [0x00]
out(client) cluster: 0x0021 (Green Power)
Nwk cnt: 1
nwk 0 [Primary (pro)]
  nodeType [0x01]
  securityProfile [0x05]
Z3GatewayHost_6_4>plugin network-creator form 1 0xAAAA 8 22
```

Successful execution will see “EMBER\_NETWORK\_UP” as below.

```
out(client) cluster: 0x0400 (Illuminance Measurement)
out(client) cluster: 0x0402 (Temperature Measurement)
out(client) cluster: 0x0405 (Relative Humidity Measurement)
out(client) cluster: 0x0406 (Occupancy Sensing)
out(client) cluster: 0x0500 (IAS Zone)
out(client) cluster: 0x0702 (Simple Metering)
out(client) cluster: 0x0B01 (Meter Identification)
out(client) cluster: 0x0B03 (Appliance Statistics)
out(client) cluster: 0x0B04 (Electrical Measurement)
out(client) cluster: 0xFC01 (Configuration Cluster)
out(client) cluster: 0xFC02 (MFLIB Cluster)
ep 242 [endpoint enabled, device enabled] nwk [0] profile [0xA1E0] devId [0x0061]
] ver [0x00]
out(client) cluster: 0x0021 (Green Power)
Nwk cnt: 1
nwk 0 [Primary (pro)]
  nodeType [0x01]
  securityProfile [0x05]
Z3GatewayHost_6_4>plugin network-creator form 1 0xAAAA 8 22
NWK Creator Security: Start: 0x00
NWK Creator: Form. Channel: 22. Status: 0x00
NWK Creator: Form: 0x00
EMBER_NETWORK_UP 0x0000
Z3GatewayHost_6_4>
```

## 7. Joining Network

Execute instruction “plugin network-creator-security open-network”

```

nwk 0 [Primary (pro)]
nodeType [0x01]
securityProfile [0x05]
Z3GatewayHost_6_4>plugin network-creator form 1 0xAAAA 8 22
NWK Creator Security: Start: 0x00
NWK Creator: Form: Channel: 22. Status: 0x00
NWK Creator: Form: 0x00
EMBER_NETWORK_UP 0x0000
Z3GatewayHost_6_4>plugin network-creator-security
Wrong number of args
Usage:
<int>: 123 or 0x1ABC
<string>: "foo" or {0A 1B 2C}

plugin network-creator-security... -
clear-joining-link-keys - Clear all of the joining link keys stored in the stack.
close-network - Close the network for joining.
open-network - Open the network for joining.
open-with-key - Open the network that would only allow the node with specified EUI and ...
set-joining-link-key - Set the link key that a specific joining device will use when joining ...
Z3GatewayHost_6_4>plugin network-creator-security open-network

```

Successful execution will see “Device Announce” as below. \*The Device Announce is short id of the device.

```

tid 0x4088
Z3GatewayHost_6_4>
Z3GatewayHost_6_4>
Z3GatewayHost_6_4>
Z3GatewayHost_6_4>plugin network-creator-security open-network
NWK Creator Security: Open network: 0x00
Z3GatewayHost_6_4>Ezsp Policy: set Trust Center Policy to "Allow preconfigured key joins":Success: set
pJoin for 180 sec: 0x00
NWK Creator Security: Open network: 0x00
Trust Center Join Handler: status = UNsecured join, decision = use preconfigured key (00), shortid 0x4088
Processing message: len=12 profile=0000 cluster=0013
RX: ZDO, command 0x0013, status: 0x00
Device Announce: 0x4088
Incoming ZDO, Cluster: 0x0013
Svc Disc: Starting discovery for cluster 0x0500
Svc Disc: Waiting 2 sec for discovery to complete
Processing message: len=5 profile=0000 cluster=8006
Svc Disc: Match NOT found from 0x4088.
Processing message: len=7 profile=0104 cluster=0006
t00000C06:RX len 7, ep 01, clus 0x0006 (on/off) FC 08 seq 00 cmd 0A payload[00 0

```

## 8. Leave Network

Device leave message is from device. If device leave network success, dongle will receive “device left” and “shortid” as below.

```

/cygdrive/d/Work_Prj/Zigbeeprj/Burn_PCB/Firmware/Z3Host/exe
T00000DCC:TX (CLI) Ucast 0x00
TX buffer: [01 01 00 ]
Z3GatewayHost_6_4>Processing message: len=5 profile=0104 cluster=0006

T00000DCC:RX len 5, ep 01, clus 0x0006 (On/off) FC 08 seq 01 cmd 0B payload[00 0
0 ]
Processing message: len=7 profile=0104 cluster=0006

T00000DCD:RX len 7, ep 01, clus 0x0006 (On/off) FC 08 seq 06 cmd 0A payload[00 0
0 10 00 ]
ValidSourceRouteFound 2
T00000DCD:TX (resp) Ucast 0x00
TX buffer: [00 06 0B 0A 00 ]
Processing message: len=18 profile=0104 cluster=0702

T00000DD0:RX len 18, ep 01, clus 0x0702 (Simple Metering) FC 08 seq 07 cmd 0A pa
yload[00 00 25 78 00 00 00 00 00 00 04 2A 00 00 00 ]
ValidSourceRouteFound 2
T00000DD0:TX (resp) Ucast 0x00
TX buffer: [00 07 0B 0A 00 ]

Z3GatewayHost_6_4>
Z3GatewayHost_6_4>Trust Center Join Handler: status = device left, decision = no
action (03), shortid 0x4088
```

## 9. Control Plug on/off

Execute instruction “zcl on-off on” and “send 0x4088 01 01”.

zcl on-off on → Control device turn on or turn off.

send 0x4088 01 01 → Send packet to shord id “0x4088” and “The endpoint to send the message from” and “The endpoint to send the message to”.

```

/cygdrive/d/Work_Prj/Zigbeeprj/Burn_PCB/Firmware/Z3Host/exe
ontimedoff - Command description for OnWithTimedOff
toggle - Command description for Toggle
Z3GatewayHost_6_4>zcl on-off on
Msg: clus 0x0006, cmd 0x01, len 3
buffer: 01 00 01
Z3GatewayHost_6_4>send 0x4088 01 01
T00000D66:TX (CLI) Ucast 0x00
TX buffer: [01 00 01 ]
Z3GatewayHost_6_4>Processing message: len=5 profile=0104 cluster=0006

T00000D67:RX len 5, ep 01, clus 0x0006 (On/off) FC 08 seq 00 cmd 0B payload[01 0
0 ]
Processing message: len=7 profile=0104 cluster=0006

T00000D68:RX len 7, ep 01, clus 0x0006 (On/off) FC 08 seq 04 cmd 0A payload[00 0
0 10 01 ]
ValidSourceRouteFound 2
T00000D68:TX (resp) Ucast 0x00
TX buffer: [00 04 0B 0A 00 ]
Processing message: len=18 profile=0104 cluster=0702

T00000D6A:RX len 18, ep 01, clus 0x0702 (Simple Metering) FC 08 seq 05 cmd 0A pa
yload[00 00 25 78 00 00 00 00 00 00 04 2A 00 00 00 ]
ValidSourceRouteFound 2
```



## FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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 Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## Disposal



This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

[www.philio-tech.com](http://www.philio-tech.com)

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## Warning

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new once, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.