

## 2.4GHz ISM Band ZigBee®/IEEE 802.15.4™ RF Modules NT2400R56-2 Series

### Overview

The NT2400R56-2 series is 2.4GHz ISM band RF modules that are ideal for ZigBee® topologies and IEEE Std 802.15.4™ applications.

The NT2400R56-2 series incorporates a UZ2400 transceiver IC from Uniband Electronic Corporation and a 78K0R Microcontroller from Renesas Electronics Corporation with an NEC TOKIN's own PCB Trace Antenna.

It delivers about 100m of peer-to-peer range (at 0 dBm, under the outdoor range) and a larger range using ZigBee®/mesh or Ad-hoc topologies. Two types of PCB Trace Antennas are used. One is small mono-pole(A) and the other is omni-directional radiation(C).

The NT2400R56-2 series has enough memory (256 KB flash memory) for ZigBee® PRO Stack and Application Profiles. In addition, it has a lot of ADC inputs and I/O ports. Because of the wide operating range, it is suitable for battery applications.



NT2400R56-2A

NT2400R56-2C

### Features

- ◆ 2.4GHz ISM band for worldwide deployment
- ◆ ZigBee®/IEEE 802.15.4™ network topology-compliant
- ◆ Integrated PCB Trace Antenna
- ◆ 1.8V to 3.6V Operating Voltage Range
- ◆ 10-bit ADC (8 inputs)
- ◆ Digital I/O (42 ports)
- ◆ CE, FCC, and the Radio Law of Japan Certified

### Applications

- ◆ Smart Meter
- ◆ Remote Control
- ◆ Home Network
- ◆ Health Care
- ◆ Building Automation

Note1: The readily available development tools are as follows.

- ZigBee® PRO Software Development Kit from Skyley Networks Inc.
- ZigBee® Network Development Platform from TESSERA TECHNOLOGY INC.

Note2: ZigBee® is a registered trademark of the Zigbee Alliance. 802.15.4™ is a trademark of the IEEE.



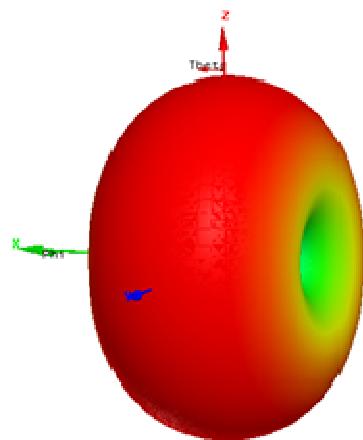
- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC TOKIN for updated product data.
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## Specifications

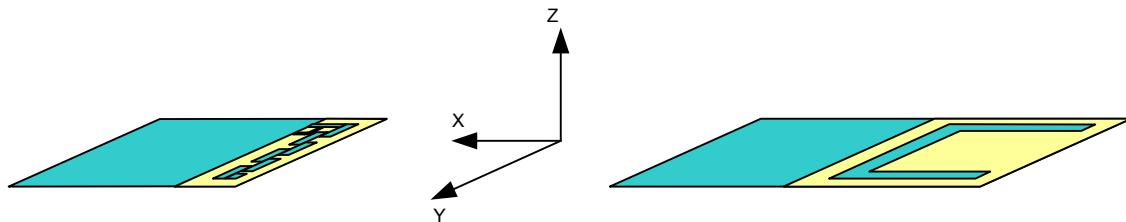
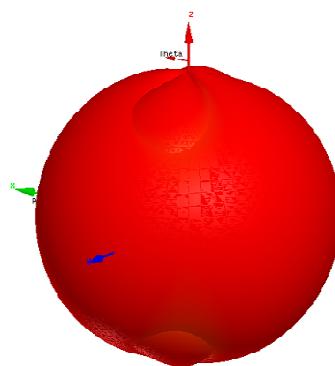
Model	NT2400R56-2A	NT2400R56-2C						
RF Compliant	IEEE Std 802.15.4™ – 2006, ZigBee® PRO							
Frequency Band	2400MHz – 2483.5MHz(16 channels)							
Interference Immunity	Direct Sequence Spread Spectrum (DSSS)							
Transmit Power	Typ. 1.2 mW/MHz (0 dBm)							
Data Rate	250 kb/s							
Indoor / Throw Wall Range	40m (vary according to the environmental conditions)							
Outdoor / RF Line-of-Sight Range	100m (vary according to the environmental conditions)							
Supply Voltage	20MHz:2.7~3.6VDC, 5MHz:1.8~3.6VDC (Write operation of Flash:2.7~3.6VDC)							
Supply Current	<table border="0"> <tr> <td>Transmit Mode</td> <td>Typ. 30.5mA @ 3VDC:20MHz, 25.4mA @ 3VDC:5MHz</td> </tr> <tr> <td>Receive Mode</td> <td>Typ. 27.7mA @ 3VDC:20MHz, 22.6mA @ 3VDC:5MHz</td> </tr> <tr> <td>Power-down Mode</td> <td>&lt; 1.6 uA @ 25°C</td> </tr> </table>	Transmit Mode	Typ. 30.5mA @ 3VDC:20MHz, 25.4mA @ 3VDC:5MHz	Receive Mode	Typ. 27.7mA @ 3VDC:20MHz, 22.6mA @ 3VDC:5MHz	Power-down Mode	< 1.6 uA @ 25°C	
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Receive Mode	Typ. 27.7mA @ 3VDC:20MHz, 22.6mA @ 3VDC:5MHz							
Power-down Mode	< 1.6 uA @ 25°C							
Ambient Temperature Range		-20°C ~ +80°C						
Microcomputer	16bit 78K0R/KE3 uPD78F1146AF1 256KB Flash 12KB RAM							
CPU Clock	Max. 20MHz (Max. 5MHz @ 1.8VDC)							
I/F Connector	DF17(2.0)-060DP-0.5V (57) (HIROSE ELECTRIC CO., LTD)							
Digital I/O	42							
ADC Inputs	8 (10-bit ADC)							
PCB Antenna	<table border="0"> <tr> <td>Type</td> <td>Small mono-pole</td> <td>Omni-directional radiation</td> </tr> <tr> <td>Maximum Gain</td> <td>+2.7 dBi</td> <td>+1.4 dBi</td> </tr> </table>	Type	Small mono-pole	Omni-directional radiation	Maximum Gain	+2.7 dBi	+1.4 dBi	
Type	Small mono-pole	Omni-directional radiation						
Maximum Gain	+2.7 dBi	+1.4 dBi						
Dimension	30 × 48 × 3.2 mm (excluding connector.)	30 × 80 × 3.2 mm (excluding connector)						
Weight	5.0 g	6.2 g						
Regulatory Approvals	CE, FCC, Radio Law of Japan(TELEC)							

### Antenna radiation patterns

NT2400R56-2A



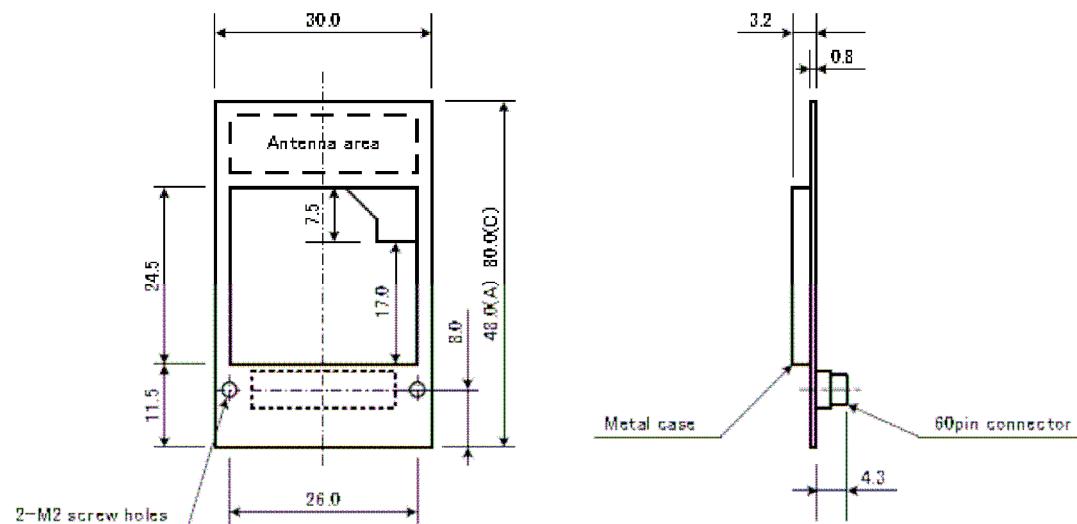
NT2400R56-2C



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## Shape and Dimension

[mm]



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.

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

This product is valid only when the device is sold to OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device.

## NECトーキン

Precautions

**!**

The names of the products and the specifications in this catalog are subject to change without notice for the sake of improvement. The manufacturer also reserves the right to discontinue any of these products. At the time of delivery, please ask for specifications sheets to check the contents before use.

Descriptions in this catalog regarding product characteristics and quality are based solely on discrete components. When using these components, be sure to check the specifications with the component in question mounted on the product.

The manufacturer's warranty will not cover any disadvantage or damage caused by improper use of the products that deviates from the characteristics, specifications, or conditions for use described in this catalog.

The products in this catalog are intended for use in ordinary electronic products. If any of these products are to be used in special applications requiring extremely high reliability, where product defects might pose a safety risk, please consult your NEC TOKIN representatives.

Through the manufacturer has taken all possible precautions to ensure the quality and reliability of its products, improper use of products may result in bodily injury, fire, or similar accident. If you have any questions regarding the use of the products in question, please consult your NEC TOKIN representatives.

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NEC TOKIN products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles) or any other weapons.

For customers in Japan

For products which are controlled items subject to the 'Foreign Exchange and Foreign Trade Law' of Japan, the export license specified by the law is required for export.

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NEC TOKIN Corporation

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[Partners]

- ZigBee® PRO Software Development Kit / Skyley Networks Inc.  
<http://www.skyley.com/>
- ZigBee® Network Development Platform / TESERA Technology INC.  
<http://www.tessera.co.jp/>

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