

BLE Module

Bluetooth® 5.0 low energy

EYWHANAWZ

Please note that this Users Manual should not be provided to end-users.

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EYWHANAWZ

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Control No.	Control name General Items
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1. Scope

This specification ("Specification") applies to the hybrid IC "EYWHANAWZ", a **Bluetooth®** 5.0 low energy module ("Product") manufactured by WHERE, Inc. ("WHERE")

2. Description

- a) Model Name : EYWHANAWZ
- b) Chip : Nordic nRF52832 (512kB Flash, 64kB RAM)
- c) Function : Radio frequency transceiver Module. Bluetooth®5.0 conformity.
- d) Application : BLE Mesh Network
- e) Structure : Hybrid IC loaded with silicon monolithic semiconductor
- f) Marking : QR code(including Part Number, Lot Number, BD address), Japan ID and FCC ID on PCB
- g) Country of origin : Japan
- h) Packaging : Packaging method: Tray + Box
Packaging Unit: 40 pieces
- i) Notes:
 - a. Japan Regulatory Information
 - 1) This Product is a radio system and obtained certification of construction type combined with the specific antenna.
 - 2) Please ensure that your product may label the following certification mark at easily viewable location. If your product is too small to have the label, you can place it in the instruction manual and package of your product. The mark diameter shall be easily legible.
 - 3) This product installs a radio system which has been approved as a radio station in a low power data communication system based on the Radio Law.
EYWHANAWZ : 001-A17160



R 001-A17160

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Control No.	Control name General Items
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b. FCC Regulatory Information

- 1) This device complies with the following standards:
 - Part 15 Subpart C
 - FCC ID: 2AV6HEYWHANAWZ
- 2) 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.
- 3) Please notify certified ID by either one of the following method.
 - Contains Transmitter Module FCC ID: 2AV6HEYWHANAWZ
 - Contains FCC ID: 2AV6HEYWHANAWZ
- 4) CAUTION: Any changes or modifications not expressly approved by the party responsible for compliance could void the use's authority to operate the equipment.
- 5) The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.
- 6) [CAUTION] To maintain compliance with FCC's RF exposure guidelines, use only the supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations. To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with minimum distance 20cm between the radiator and your body.
- 7) The Model EYWHANAWZ with 2400-2483.5MHz transmitter complies with Maximum permissible exposure limits for humans as called out in §1.1310. It is exempt from Maximum Permissible Exposure based on its operating frequency, and power density 0.00067mW/cm².
- 8) The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- 9) Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures. When installing this module to your final devices, please make sure to carry out all the necessary evaluations according to the applicable guidelines like follows:
 - for RF exposure: KDB 447498, KDB 996369 and any other relevant guidelines
 - for EMC: KDB 996369 D04 and any other relevant guidelines
- 10) This module can change the output power depending on the circumstances by the application software which is developed by module installer. Any end user cannot change the output power.
- 11) When you install this module to your final devices, please ensure that your final composite product complies with the applicable FCC rules in reference to a guidance in KDB 996369.

Control No.	Control name General Items
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c. BLUETOOTH QUALIFICATION

EYWHANAWZ is qualified as End Product category by Bluetooth SIG.

- Product Name: EXBeacon_2
- Model Number: EYWHANAWZ
- Declaration ID: D052585
- Referenced Qualified Designs: 125047 (End Product)
- Company: WHERE, Inc.
- Listing Date: 2020-10-28
- Specification Name: 5.0

d. Term of Warranty

WHERE warrants only that this Product is in conformity with this Specification for one year after purchase and shall in no event give any other warranty.

e. Items of the Specification

- 1) Any question arising from the Specification shall be solved in good faith through mutual discussion by the parties hereof.
- 2) The language of this "General items" is Japanese and this "General items" shall be interpreted by Japanese Any copies of translation is a reference purpose only and is not binding on both parties hereto.

Control No.	Control name Electrical characteristics
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DC Input Power Specifications

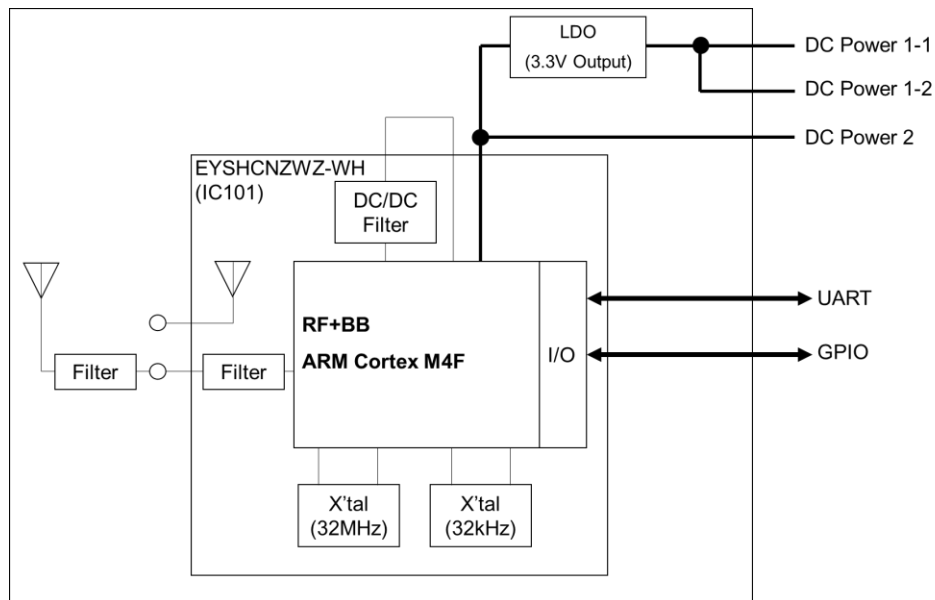
Symbol	Description	Min.	Typ.	Max.	Units
DC Power 1-1	CN351 Input Power though 5V AC adapter		5		V
DC Power 1-2	CN331 Input Power	4.5	5	10	V
DC Power 2	CN301 Input Power	2.7	3.0	3.3	V

RF Specifications

Symbol	Description	Min.	Typ.	Max.	Units
Fop	Operating frequencies	2402		2480	MHz
PLLchsp	PLL channel spacing		1		MHz
DfBLE1M	Frequency deviation @ BLE 1Msps		+/-250		kHz
DfBLE2M	Frequency deviation @ BLE 2Msps		+/-500		kHz
PRF	Maximum output power		4	6	dBm
PRFC	RF power control range		24		dB
PRFCR	RF power accuracy			+/-4	dB
PRF1	1st Adjacent Channel Transmit Power 1 MHz		-25		dBc
PRF2	2nd Adjacent Channel Transmit Power 2 MHz		-50		dBc
PRXMAX	Maximum received signal strength at < 0.1% PER		0		dBm
PSENS,IT,1M,BLE	Receiver sensitivity 1Msps BLE Ideal transmitter <=37bytes (0.1% BER)		-96		dBm
PSENS,IT,2M,BLE	Receiver sensitivity 2Msps BLE Ideal transmitter Packet length<=37bytes		-93		dBm

Control No.	Control name Circuit Schematic
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Block Diagram

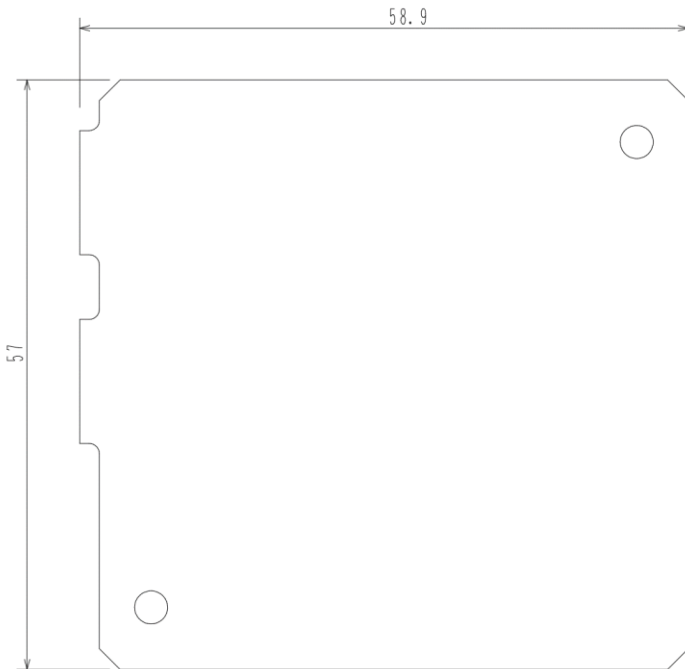


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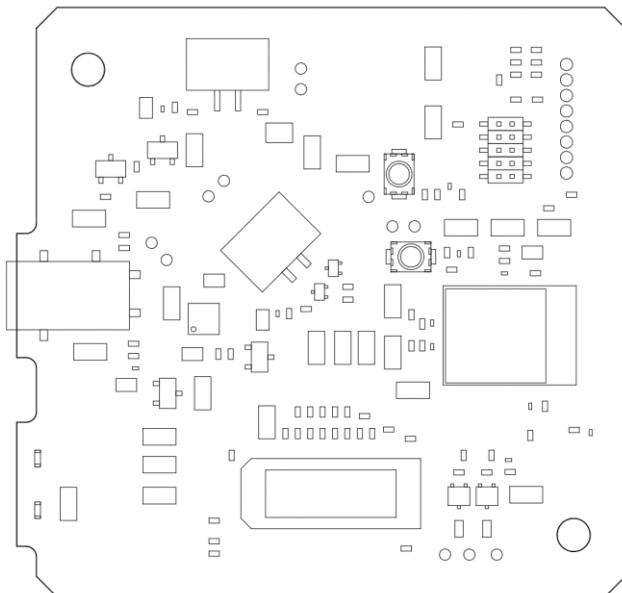
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Control No.	Control name Outline/Appearance
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Outline



Bottom View



Top View

Unit : (mm)

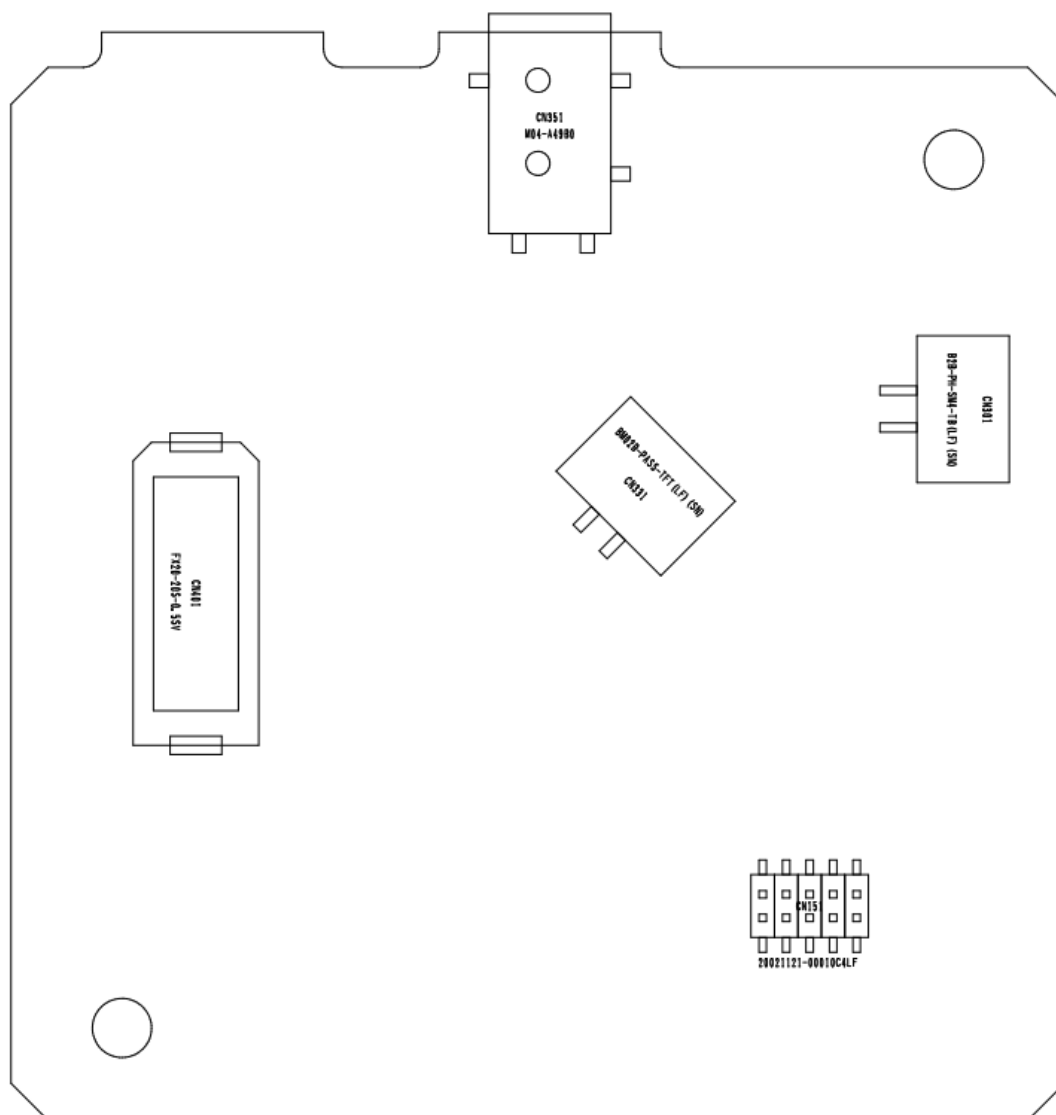
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Control No.	Control name Pin Layout
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Connector Descriptions

CN	Pin name	Pin function	Description
151	TEST CN1	Digital I/O	UART I/O and General purpose I/O pin.
301	DC Power 2	Power/GND	Power supply pin.
331	DC Power 1-2	Power/GND	Power supply pin.
351	DC Power 1-1	Power/GND	Power supply though 5V AC adapter.
401	TEST CN1	Digital I/O	General purpose I/O pin.



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Control No.	Control name Pin Layout
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CN401 Pin Descriptions

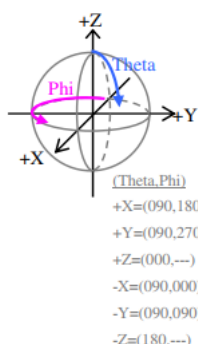
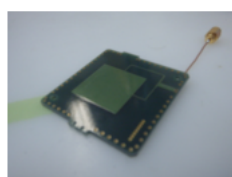
Pin	Pin name	Pin function	Description
1	GND	Ground	Ground pin. (0 V)
2	+3.3V_LDO	Power	Output from 3.3 V LDO
3	P0.11	Digital I/O	General purpose I/O pin
4	SWDIO	Digital I/O	Serial Wire Debug I/O for debug and programming
5	SWDCLK	Digital input	Serial Wire Debug clock input for debug and programming
6	P0.14	Digital I/O	General purpose I/O pin
7	P0.15	Digital I/O	General purpose I/O pin
8	P0.17	Digital I/O	General purpose I/O pin
9	P0.28	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
10	GND	Ground	Ground pin. (0 V)
11	GND	Ground	Ground pin. (0 V)
12	NC	Not Connected	-
13	+3.0V	Power	Output from 3.3 V LDO
14	+3.0V	Power	Output from 3.3 V LDO
15	NC	Not Connected	-
16	CN351 / CN331	Power	Output from CN351 or CN331
17	CN351 / CN331	Power	Output from CN351 or CN331
18	NC	Not Connected	-
19	NC	Not Connected	-
20	GND	Ground	Ground pin. (0 V)
LA1	NC	Not Connected	-
LA2	NC	Not Connected	-

Control No.	Control name Antenna Data example
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1, 2400MHz

Measured in Satimo Stargate system at TAIYO YUDEN R&D CENTER.

Appearance and coordinates definition



Measurement data of antenna

Frequency [MHz]	@ 2400
Peak gain	[dBi]
3-plane	TX-H 0.2
	TX-V 0.2
	Plus(H,V) 0.2

(Up-half)

Average gain**	[dBi]
XY-plane	TX-H -8.9
	TX-V -11.2
YZ-plane	TX-H -9.7
	TX-V -4.3
ZX-plane	TX-H -5.5
	TX-V -6.0
3-plane	TX-H -7.6
	TX-V -6.3

**The value is average value in 1 round of each inclination direction angle.

Phi=Horizontal polarization, Theta=Vertical polarization

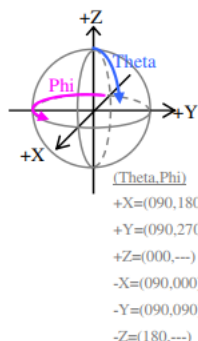
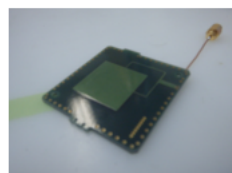
LC=Left-handed circular polarization, RC=Right-handed circular polarization

Efficiency [dB]	-3.8
VSWR [:1]	1.1

2, 2450MHz

Measured in Satimo Stargate system at TAIYO YUDEN R&D CENTER.

Appearance and coordinates definition



Measurement data of antenna

Frequency [MHz]	@ 2450
Peak gain	[dBi]
3-plane	TX-H 0.9
	TX-V 0.9
	Plus(H,V) 0.9

(Up-half)

Average gain**	[dBi]
XY-plane	TX-H -9.2
	TX-V -10.9
YZ-plane	TX-H -4.9
	TX-V -7.2
ZX-plane	TX-H -7.4
	TX-V -4.3
3-plane	TX-H -6.8
	TX-V -6.7

**The value is average value in 1 round of each inclination direction angle.

Phi=Horizontal polarization, Theta=Vertical polarization

LC=Left-handed circular polarization, RC=Right-handed circular polarization

Efficiency [dB]	-3.8
VSWR [:1]	1.4

Control No.	Control name Antenna Data example
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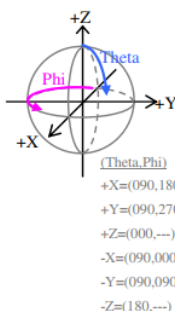
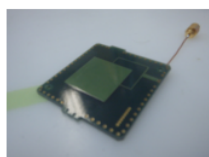
3, 2500MHz

Measured in Satimo Stargate system at TAIYO YUDEN R&D CENTER.

Measurement data of antenna

Frequency [MHz]	@2500
Peak gain	[dBi]
3-plane	TX-H 0.0
	TX-V 0.0
	Plus(H,V) 0.0

Appearance and coordinates definition



(Up-half)

Average gain**	[dBi]
XY-plane	TX-H -9.0
	TX-V -11.2
YZ-plane	TX-H -6.3
	TX-V -5.8
ZX-plane	TX-H -5.3
	TX-V -6.4
3-plane	TX-H -6.6
	TX-V -7.2

**The value is average value in 1 round of each inclination direction angle.

Phi=Horizontal polarization, Theta=Vertical polarization

LC=Left-handed circular polarization, RC=Right-handed circular polarization

Efficiency [dB]	-4.0
VSWR [:1]	1.3