ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

USERS MANUAL

NEXAWAVE HUB

Model EWG-01

Doc. # WI 6002.117 Rev. 05 | July 2025

TUNNELS | HYDROELECTRIC | CONSTRUCTION | STRUCTURAL | METRO & RAIL | BRIDGES | MINING

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CONTENT

IMPORTANT NOTE

Please read the following cautions carefully before using the wireless system:

- **Battery and Power Supply**: Always place the internal batteries (2 x 3.6 V) and the 12V external power supply into the gateway before use.
- **Correct Polarity**: Ensure correct polarity of batteries and the external power supply before connecting.
- **Do Not Power On Without Batteries**: Do not switch power ON without placing the internal batteries in the Gateway.
- **Set Scan Interval and Next Scan Time Simultaneously**: During the configuration of the Gateway, always set the scan interval and next scan time simultaneously every time whenever required to avoid any time lag during scanning.
- **Battery Specifications**: Always use 3.6V lithium batteries suitable for -40°C operating temperatures. (Refer to Section 10 for a recommendation of Batteries)

1 INTRODUCTION

1.1 Wireless network

Wireless sensors are vital in monitoring construction sites, large structures and landslide areas. They are extensively used in applications where geotechnical and other sensors are used for data collection and transfer it to a central server for access by multiple users. Encardio Rite offers an innovative network solution that allows real-time monitoring of geotechnical and structural sensors in challenging conditions with reliable data transfer without any delay.

In Encardio Rite's comprehensive wireless monitoring system, the sensors are seamlessly integrated into a long-range, low-power radio frequency (RF) network via suitable nodes, connecting them to a gateway. This efficient setup allows the sensors to transmit recorded data to the gateway via the RF network with utmost reliability. Subsequently, the gateway effortlessly uploads the collected data from the sensors to a central or cloud server.

The system operates on ISM sub 1 GHz operating frequency bands adjustable to requirement of each territory. The system can be adjusted to different frequency bands; for example: .

India	865 – 868 MHz
Europe	868 MHz
USA/Canada/Singapore/Australia	915 MHz

A detailed reference for frequency bands allowed in different Countries is available at:

https://www.thethingsnetwork.org/docs/lorawan/frequencies-b-coyuntry.html

1.2 Conventions used in this manual

WARNING! Warning messages calls attention to a procedure or practice that if not properly followed could possibly cause personal injury.

CAUTION: Caution messages calls attention to a procedure or practice, that if not properly followed may result in loss of data or damage to equipment.

NOTE: Note contains important information and is set off from the regular text to draw the users' attention.

1.3 How to use this manual

This users' manual is intended to provide you with sufficient information for making optimum use of Gateways in your applications.

To make the manual more useful we invite valuable comments and suggestions regarding any additions or enhancements. We also request to please let us know of any errors that are found while going through the manual.

NOTE: Installation personnel must have a background of good installation practices and knowledge of fundamentals of geotechnics. Novices may find it very difficult to carry on installation work. The intricacies involved in installation are such that even if a single essential but apparently minor requirement is ignored or overlooked, the most reliable of instruments will be rendered useless.

2 GENERAL DESCRIPTION

2.1 Gateway

The Encardio Rite model EWG-01 NexaWave Hub is gateway used as a main networking hardware, which uploads data gathered from all the geotechnical sensors connected to suitable nodes, to the remote server.

The gateway enabled with wireless network provides reliable data transfer over long distances, without any delay. It is a rugged outdoor unit (IP66) specifically designed for long-term monitoring in harsh environments. By enabling continuous data logging and real-time monitoring, it plays a crucial role in providing early warnings for potential failures, allowing ample time for corrective actions or even safe evacuation if required.

One of the notable advantages of the wireless system is its ability to eliminate the need for extensive cable installations. This proves particularly beneficial in areas where sensors are spread over a wide geographical range, making cable routing both challenging and risky. Additionally, stakeholders have round-the-clock access to the collected data, ensuring constant availability and collaboration.

Furthermore, through the implementation of our cloud-hosted data management and configuration software, the system can be tailored to automatically generate reports and trigger alerts via SMS or email whenever readings surpass pre-defined alert thresholds. This intelligent automation streamlines operations and enhances responsiveness.

NexaWave Hub features

- Design, configuration and supervision of entire wireless sensor network.
- Data collection from various sensors in the network.
- Synchronise the clock of whole network.
- Remote access of the nodes through appointment.
- Processing of collected data to remote FTP server through cellular network.

2.2 System components

Provided by Encardio-rite

- NexaWave Hub (EWG-01) with RF antenna and cellular antenna
- Mounting accessories for installation on wall or pole (as ordered), consisting of installation plate, , fasteners and brackets and bracket to install antenna
- RS-232 Bluetooth modem/USB to RS-232 FTDI cable
- Android Smartphone with Application software
- Application software for Windows

To be arranged by Client

- Laptop
- Activated data SIM card - 1 no.
- D-Cell Li-SOCl2 3.6 V 14 Ah batteries (Non Rechargeable) – 2 no.
- Power supply unit 9-30 V, 1 A (12 V, 1 A power supply easily available can be used) – 1 no.
- Tools required for mounting the device

3 TECHNICAL SPECIFICATION

Basic			
Internal Battery	2X3.6V Li-Ion Battery (D-cell ER34615M)		
External Power	9-30V 1A Standard adaptor or EBS-01(available on order)		
Operating Current	150 mA (maximum)		
Dimension	210X178X92 (LXWXH) without antenna 270X178X92 (LXWXH) with antenna		
Weight	0.915 Kg (Without Battery) 1.12 Kg (With Battery)		
Storage	SD card 16GB expandable up to 32GB		
Enclosure			
Material	ASA+PC		
IP Rating	IP-66		
Fire Proof	Approved		
Protocol			
ER Protocol	Proprietary Encardio Protocol		
Radio			
LoRa Chipset	SX1276		
Frequency	EU	US	ROA
	863-870 MHz	902-928 MHz	920-928 MHz
Transmit Power	863-870 MHz (EU)	902-928 MHz(US)	920-928 MHz (ROA)
	14 dBm	20 dBm	20 dBm
Data Rate	810 bps		
Receiver Sensitivity	-132 dBm		
Transmission Distance	(1 ~ 15 Km)*		
Antenna (LoRa)	Fiber Glass Antenna Omni directional (3 dBi)		
Cellular			
4G Modem	ELS-61-AUS/ ELS-61-EU/ ELS-61-US (Thales) EG-25G (Quectel)		
Antenna	Stub Antenna (3 dBi) External Whip Antenna (5 dBi)		

*800 m in urban areas

4 PRE-INSTALLATION PREPARATIONS

4.1 Pre-installation checks

- Before installation please check the gateway for any physical damage.
- Open the gateway box to check if the internal wirings are intact.

4.2 Selecting location for Gateway

Selecting the correct locations for the Gateway and Node is essential, especially if more than one Node is installed at the site and connected to a single gateway.

The initial task involves placing the Gateway in a position where it has a clear line of sight to all installed Nodes or, at the very least, to most of the Nodes. The optimal placement should be decided on-site. It is advisable to ensure a robust connection between the Gateway and the Node to achieve optimal performance, ideally with a signal strength exceeding -100 dBm. It's important to emphasize that stronger signal strength will yield superior results.

Selecting the correct locations for the Gateway and Node is essential, especially if more than one Node is installed at the site and connected to a single gateway.

The initial task involves placing the Gateway in a position where it has a clear line of sight to all installed Nodes or, at the very least, to most of the Nodes. The optimal placement should be decided on-site. For best results, the link between the gateway and the Node should be strong, preferably better than -100 dBm. Please note, the stronger the link, the better the results. **When mounting the gateway's antenna, it's crucial to position it at least 6 feet (1.8 meters) away from any surface, including roofs, hills, or walls. This clearance helps ensure optimal signal propagation and minimizes interference.** It is advisable to ensure a robust connection between the Gateway and the Node to achieve optimal performance, ideally with a signal strength exceeding -100 dBm. It's important to emphasize that stronger signal strength will yield superior results.

4.3 Setting up the Gateway & Nodes

It is recommended that the setting up and configuration of nodes and gateway is done before mounting the nodes and gateway at respective installation location.

The gateway configuration needs to be done before nodes. Configuration of gateway is discussed in Section-5 of this manual. For setting up and configuring the nodes and wireless tilt meters, please refer to respective User's Manual.

5 CONFIGURING GATEWAY

5.1 Gateway setup

- Remove the screw protection cover as shown in figure 5-1. Unscrew the gateway cover using appropriate screw driver and open the gateway cover. Description of each part of the gateway is given in the figure 5-2.

Figure 5-1

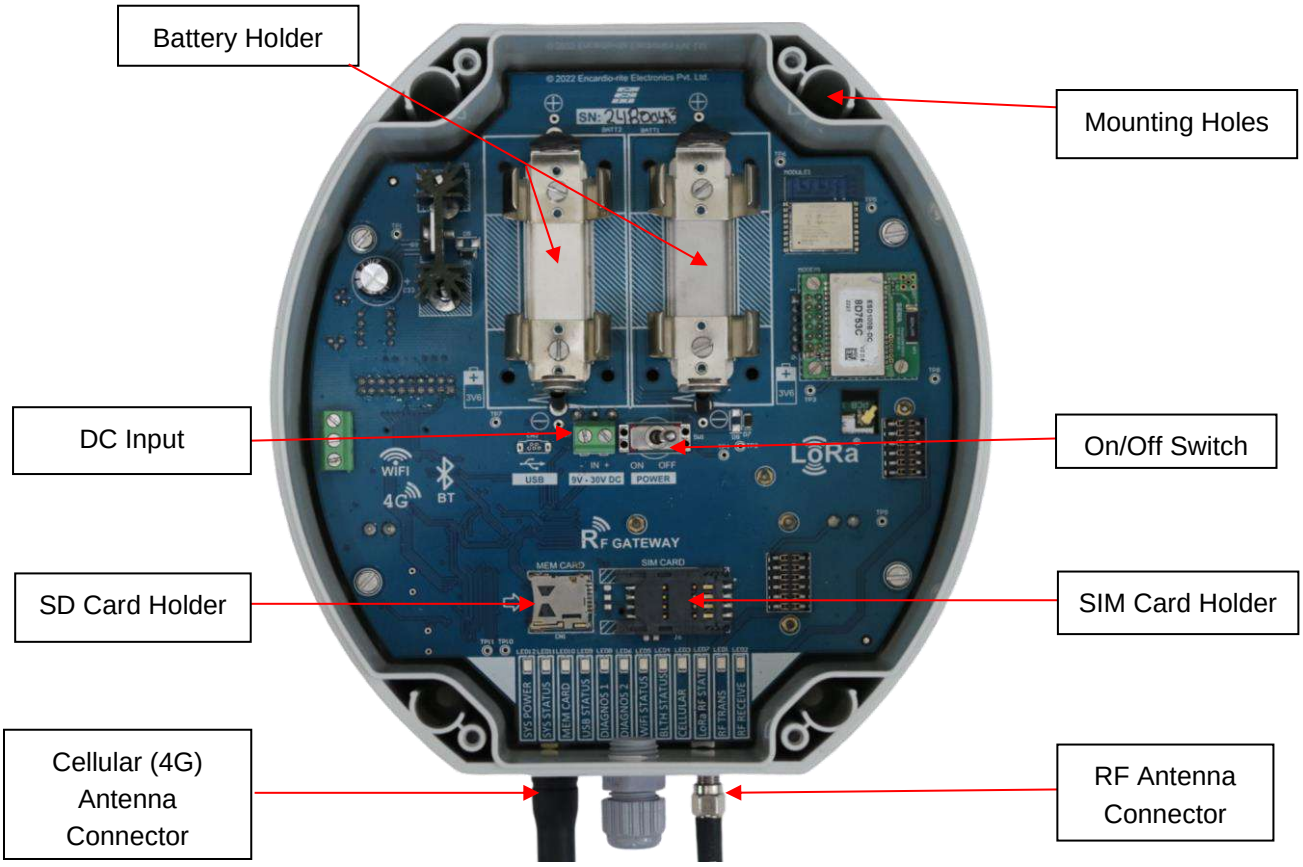


Figure 5-2

- Connect both the antenna's (cellular and RF) provided with the supply to their respective antenna adaptor as shown in figure 5-3.

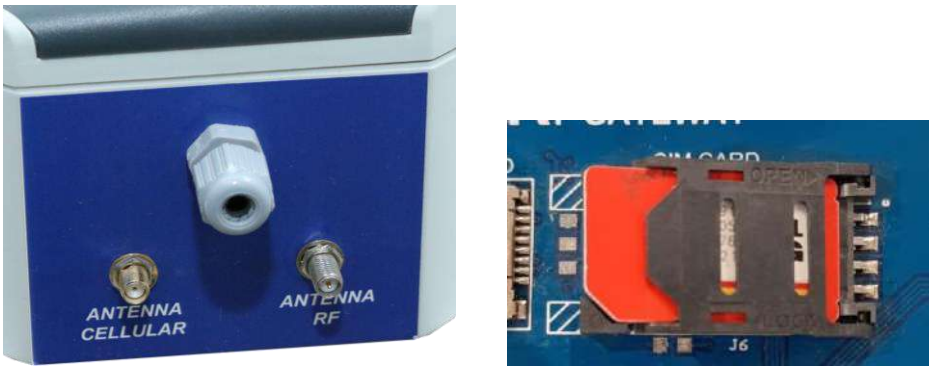


Figure 5-3

- Insert the SIM card into SIM card holder. Lock the SIM holder after inserting the SIM.
- The gateway is normally supplied with a 32 GB CD card. Check that the SD card is available and is fixed properly. If it is not available, please insert a 32 GB/64 GB SD card in the SD card holder.

5.2 Battery Installation

- Align the positive (+) side of the batteries with the + indicator in the battery holder.
- Slide the positive end of the battery inside the compartment first. Installing the positive end first allows the battery to slide into the compartment more easily. Just push the positive end of the battery into the lever, flattening it down into the holder. Apply a bit more pressure, if necessary, to snap the negative end of the battery securely into place.
- Check for any looseness in the positive and negative clip terminals of the holder. If they are loose, press them down to ensure proper contact with the battery.
- Connect any standard DC power adaptor (9-30 V, 1 A) into "DC Input". Alternatively, if required, Encardio Ritemake solar battery charger can also be used (available against order).
- Switch on the gateway. After power up, wait for 1 minute as during this time gateway performs internal operations.

5.3 Connecting to phone through Bluetooth

- Install the apk file (provided with the supply) for "EWA-01" app on the phone. App shortcut will be available in the list of application software, as shown in Figure 5-4.
- Open the application, allow all the permissions required for proper functioning and then close the application.

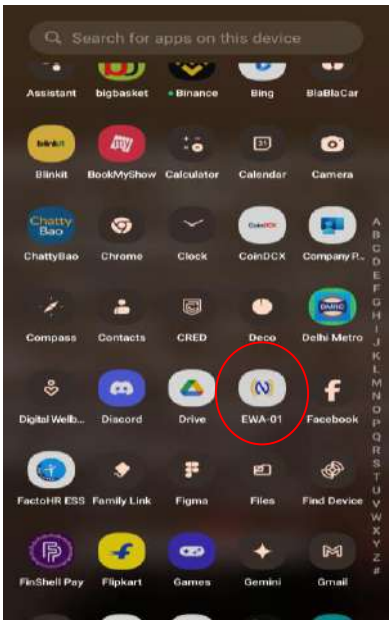


Figure 5-4

- Go to android phone's settings, select Bluetooth settings.
- Turn ON the Bluetooth and click on "SCAN" button. Phone will show the list of Bluetooth devices found. Find the EWG-01 serial number and select it for pairing the phone with gateway.
- Once pairing button is pressed it will ask to enter passkey for authentication. Enter pairing code "698269/6982698076" and then press OK.
- On successful authentication, it will show that device is paired. Now phone is paired with gateway.
- Open the "EWA-01" apk. It will show the list of paired gateways. Select the gateway just paired from the list as shown in figure 5-5.

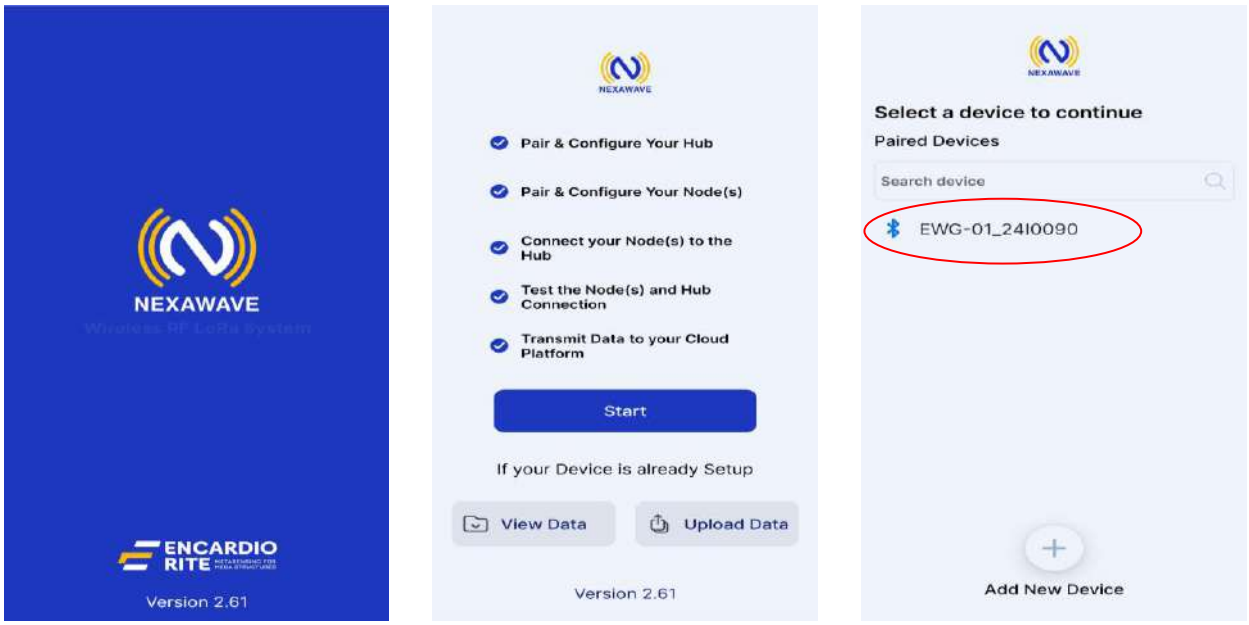
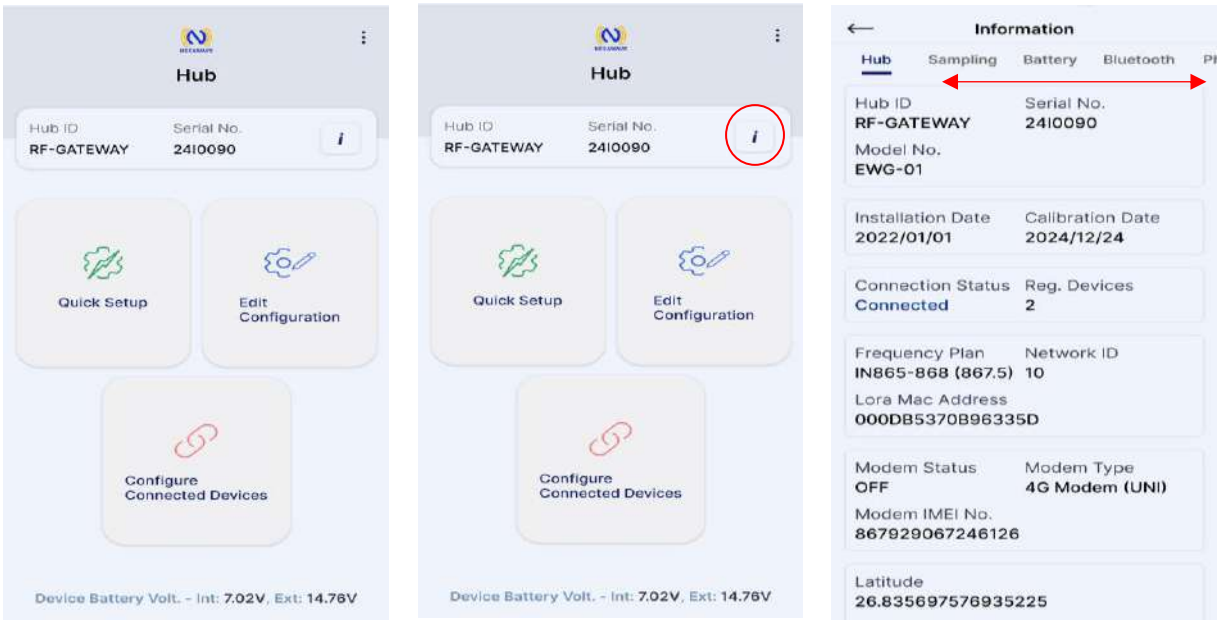


Figure 5-5

- It will take you to the home screen of the gateway, as shown in Figure 5-6(a). Clicking on the 'i' button (Figure 5-6(b)) will open the information window. Within this window, you can scroll to view information about the HUB, sampling, battery, Bluetooth, and the phone (Figure 5-6(c)).



(a) Home screen (b) (c)

Figure 5-6

5.4 Gateway LED'S Status

LED Name	Status	Action
SYS POWER	**Blink** **Description** 1 times Battery Low 2 times Running on internal Battery 3 times Running on external power	Replace the battery immediately if LED start toggling 1 times.
MEM CARD	**Blink** **Description** 1 times Memory card not mounted 2 times Memory card mounted	Mount the memory card properly
BLTH STATUS	**Blink** **Description** OFF Bluetooth not mounted 1 times Bluetooth not configured 2 times Bluetooth configured 3 times Bluetooth not connected 4 times Bluetooth connected	
CELLULAR	**Blink** **Description** OFF Modem off 1 times Modem on 2 times Performing TEST FTP 3 times Processing Commands 4 times Processing reply commands 6 times Uploading the data to FTP server	
LoRa RF STATUS	Blink continuously during RF communication	
RF TRANS	Blink continuously during RF transmission	
RF RECEIVE	Blink continuously during RF reception	

5.5 Quick Setup

On the home screen, click on "QUICK SETUP" to configure the HUB. This simple five-step process guides you through the setup. A brief, step-by-step guide is provided below:

Step 1: Set the Configuration, (As shown in Figure 5-7)

- **Hub ID:** Input "Hub-ID" of their choice. Try to input some meaningful ID so that it becomes convenient for other users also.
- **Installation Date:** Click on the "Calendar Icon" to enter the installation date of the gateway.
- **Frequency Plan:** Select the "Frequency Plan" from the drop down. This depends on the installation location, to comply with the local regulations. User can select the region and associated frequency by tapping on the search icon.
- **Network ID:** User can select any of the Network ID from the "Network ID" drop-down menu. It is important to remember that the network ID should remain consistent throughout the entire network, including all nodes and the gateway. Note down the configured Gateway Network ID as it will be necessary for node configuration.
- **Location:** For setting Latitude and Longitude of respective installation location:
  - If user knows the installation location coordinates, enter the Latitude and Longitude information manually.
  - If user does not know the installation location coordinates, select the button "Select on map" for automatic location setup. This needs to be done at the installation site location only. Ensure that

the internet connectivity is there in the phone during this process.

- **Device Date & Time:** To set the RTC (date and time) of hub, click on the "Calendar" and "Clock" icons given in line with "Hub date" and "Hub time". Click on the "Update Date/Time" tab to save it. To synchronize the hub RTC with Phone's RTC, click on the "Sync with phone" tab. Make sure that the Phone's RTC is up to date and correct.
- Click on the Save & Next button to move step-2.

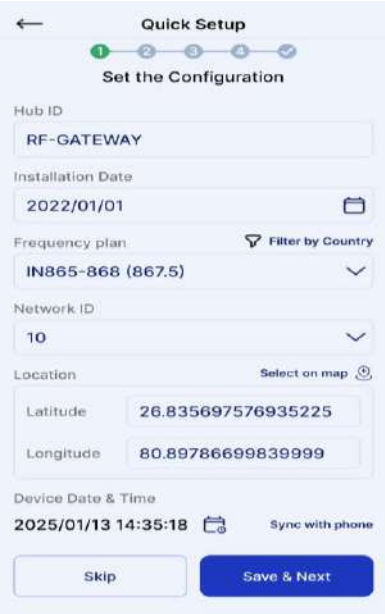


Figure 5-7

Step 2: APN & FTP to upload data (As shown in Figure 5-8)

This screen is to set the FTP parameters required for uploading the data to a remote FTP server. Fill in all the parameters correctly, then click the Save & Next button to move the step-3.

Figure 5-8

Step 3: Test the Modem signal (As shown in Figure 5-9)

- To check the signal strength of the 4G network at the installed location click on the "Test Signal" button. Please do not forget to turn off the modem through the same button which will turn into "Stop Test" after turn on action.

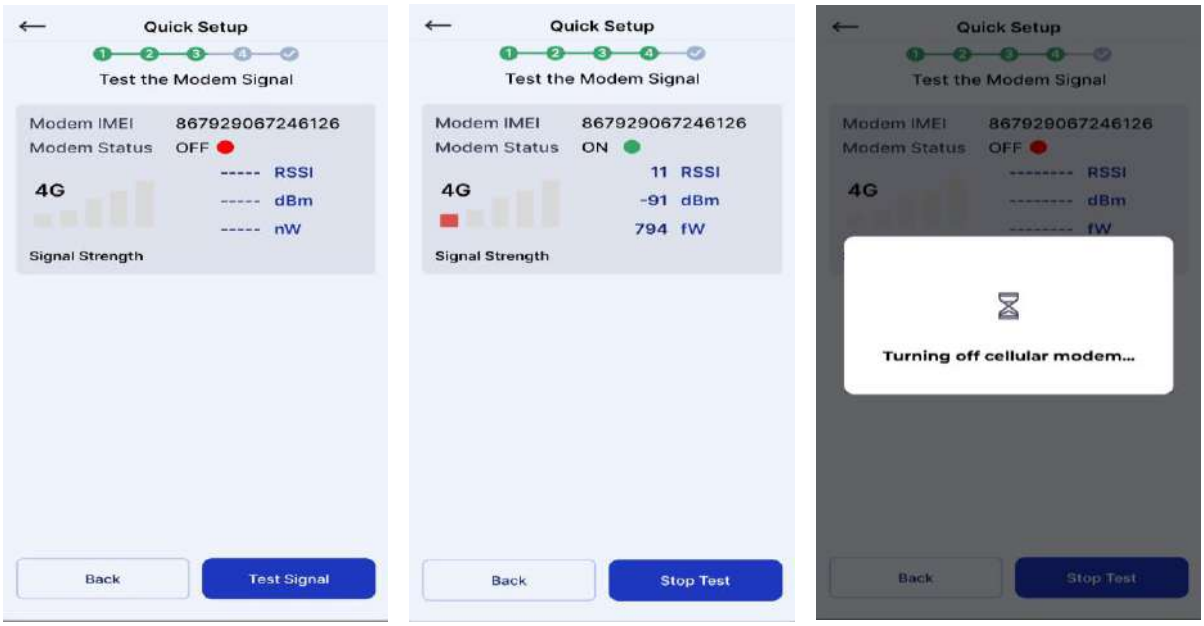


Figure 5-9

Step 4: Test the FTP (As shown in Figure 5-10)

- User can verify whether entered FTP parameters are correct or not. To do so user can hit the "Run FTP Test" button as shown in the figure 5-10. In this case gateway will try to connect to the server and upon successful connection it will upload a "TEST FTP" file which can be seen at the server.

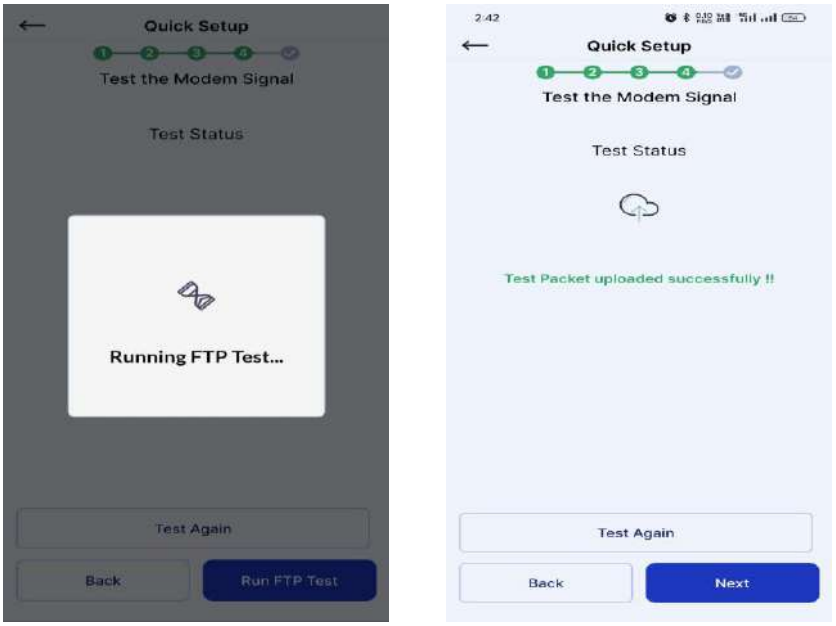


Figure 5-10

Step 5: Set the Schedule (As shown in Figure 5-11)

- Set the scan interval, i.e. how frequently user wants to scan the data from the nodes. The scan interval must be greater than 3 minutes. Scan interval also depends on the number of nodes connected and their types. Set the scan interval and press "Save and Scan ON".

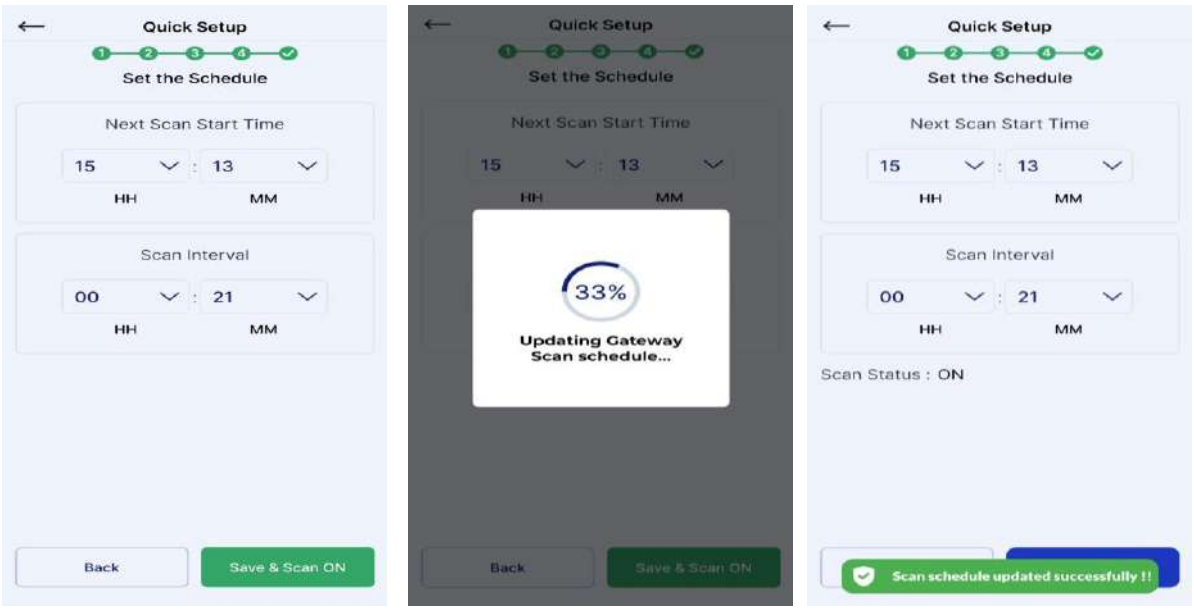


Figure 5-11

- The Quick setup is over now, Click on Back to Setup Home.

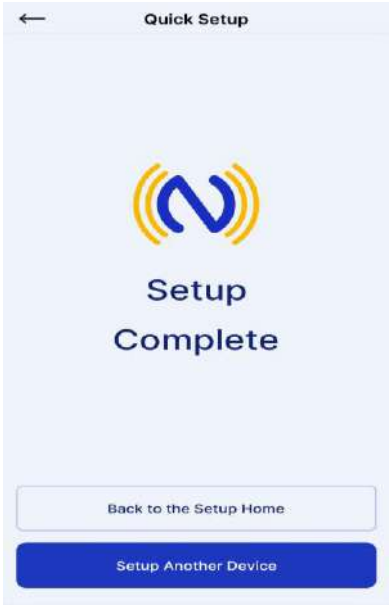


Figure 5-12

5.6 Edit configuration

- In the home screen, click on "Edit Configuration". Here, the user can edit the details filled in the Quick Setup process.

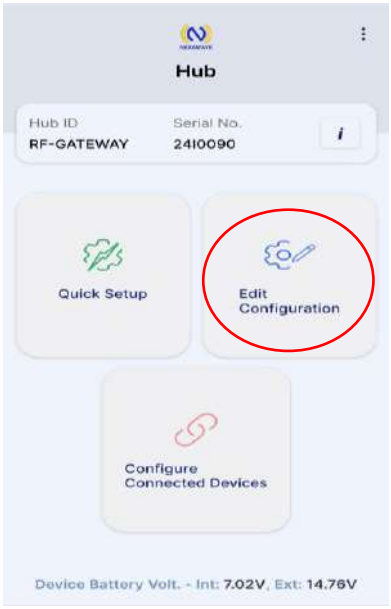


Figure 5-13

- On clicking "Edit configuration," the user would typically be taken to a new window that provides a summary of the key configuration details of the hub, including its identification, installation date, communication parameters, and location information. It allows the user to review these settings and potentially make changes using the "Edit" button.

Figure 5-14

- By scrolling left on same window there is system setup window. This window allows the user to customize the device's data logging behaviour and configure its cellular communication settings.

Figure 5-15

- Logging: This section deals with the device's logging functions.

Next Scan Start Time: Sets the time when the next data collection scan will begin.

Scan Interval: Specifies the time interval between data scans.

Scan Status: A toggle switch to enable or disable the scanning process.

- Cellular Settings: This section configures the device's cellular connectivity.

FTP for two-way communication: Sets the FTP server address and port for two-way data exchange.

Figure 5-15

FTP to upload data: Sets the FTP server address and port for uploading data only.

Figure 5-15

APN: Specifies the Access Point Name used for cellular data connection.

Update: A button to save any changes made to the cellular settings.

- **Buttons:**

Test Modem Signal: This button likely initiates a test to check the strength and quality of the device's cellular signal.

Run FTP Test: This button performs a test connection to the configured FTP server to verify communication.

5.7 Configure connected devices

With this feature, the user can perform hub-to-node communication and configure any other node in the same network from the Hub. It allows users to modify specific node parameters. In a network where all nodes are connected to the hub, users can conveniently configure these parameters from hub in the network by connecting it through an Android phone.

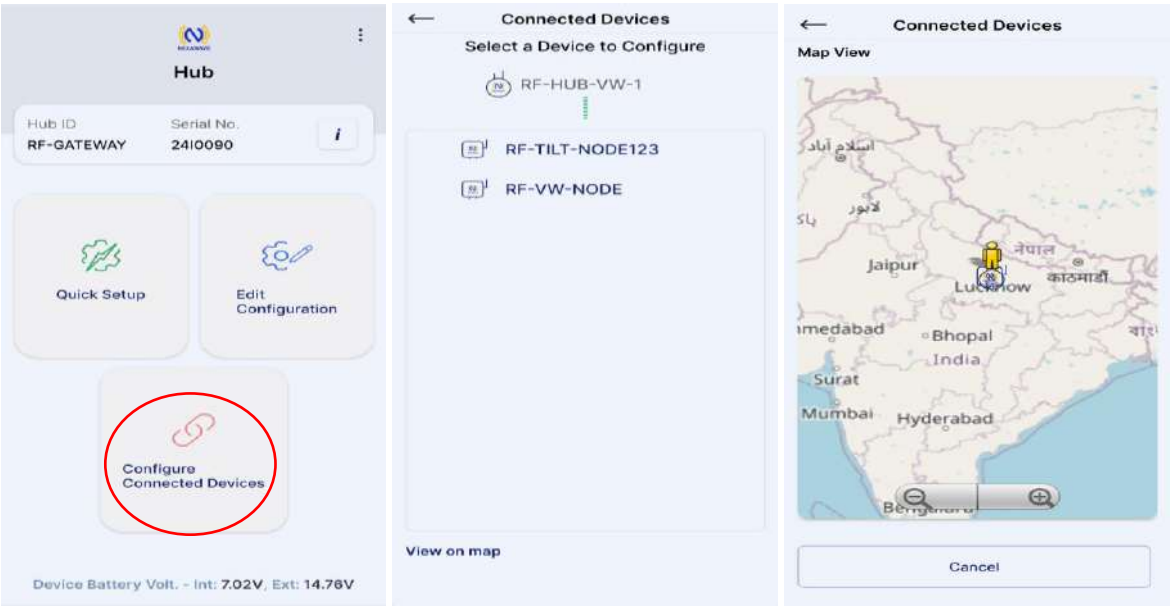

Hub
Hub ID
RF-GATEWAY
Serial No.
2410090
Quick Setup
Edit Configuration
Configure Connected Devices
Device Battery Volt. - Int: 7.02V, Ext: 14.76V
Connected Devices
Select a Device to Configure
RF-HUB-VW-1
RF-TILT-NODE123
RF-VW-NODE
View on map
Connected Devices
Map View
Jaipur
Bhopal
India
Surat
Mumbai
Hyderabad
Cancel

Figure 5-16

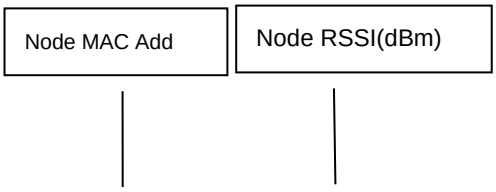
6 DATA FORMAT

6.1 Upload data

Data uploaded to the FTP server is in the below format.

The initial lines provide the header information for both the Gateway and Nodes, followed by the visible data. visible data.

000DB539066F397B,-59,"GATEWAYID","GATEWAYSN","DATE/TIME","BATTV(INT)","BATTV(EXT)"



000DB532198E3168,-77,"GATEWAY ID","GATEWAY SN","DATE/TIME","BATTV(INT)","BATTV(EXT)"

000DB532198E314C,-20,"NODE ID","DATE/TIME","BATTV(INT)","BATTV(EXT)","AXIS-X(deg)","AXIS-Y(deg)","AXIS-Z(deg)","DIST(mtr)","TEMP(deg C)"

000DB532198E3168,-77,"24B0043","24B0043","2024/05/21 15:04:52",7.33,14.42

000DB532198E314C,-26,"24D0060C","2024/05/2115:04:01",7.20,0.00,1.2865,1.0234,-84.8297,0.4981,27.26

6.2 SD card data

SD card data is in the same format as upload data.

000DB532198E3168,-77,"GATEWAY ID","GATEWAY SN","DATE/TIME","BATTV(INT)","BATTV(EXT)"

000DB532198E314C,-20,"NODE ID","DATE/TIME","BATTV(INT)","BATTV(EXT)","AXIS-X(deg)","AXIS-Y(deg)","AXIS-Z(deg)","DIST(mtr)","TEMP(deg C)"

000DB532198E3168,-77,"24B0043","24B0043","2024/05/21 15:04:52",7.33,14.42

000DB532198E314C,-26,"24D0060C","2024/05/2115:04:01",7.20,0.00,1.2865,1.0234,-84.8297,0.4981,27.26

7 INSTALLATION PROCEDURE

Sites being different from each other must be properly surveyed to determine the best place for mounting the gateway. Generally, the gateway should be in line of sight of all the nodes and if this is not possible in line of sight with most of the nodes. In a hilly region, the best place to mount a gateway may be a portable cabin from where all the nodes are visible.

A good place to mount the gateway maybe on a mast on the tallest building in the neighbourhood. To achieve better coverage/transmission of data, it is recommended that the gateway (antenna) be mounted at the site as high as practicably possible.

7.1 Wall mounting

Gateway box is provided with mounting holes. To install the Gateway on pole, fix the gateway mounting plate provided with the supply to the gateway box. Fix the pole mounting bracket to the pole. Fix both the antenna at the top of the pole using antenna mounting bracket as shown in the figure below.

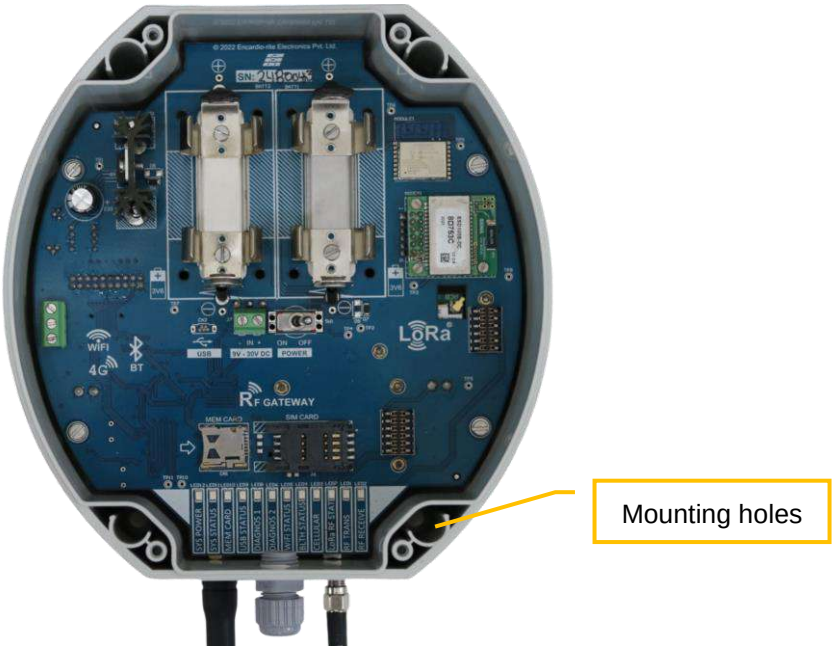


Figure 7-1 Gateway mounting holes details

7.2 Mast mounting

Mounting the gateway on a tall mast is a good solution to achieve better height. Extra precaution must however be taken for protection of the equipment.

Type of mast to be used for any application depends on the site conditions. Mast maybe a small pole mounted to the roof of any structure or a tall pole in an open field structured on a strong foundation. If required, the mast maybe supported with guy wires.

Once a stable mast is ready the gateway can be fixed on it using suitable clamps and the mounting plate. A typical installation photograph is shown in figure -2 for reference. A protection box may be provided, depending on site requirement.

NOTE: Mast, mounting accessories, protection cover and necessary civil work is in the scope of the client.

Installation may have to be improvised or tailor made depending upon site conditions.

Figure 7-2 Gateway mounted on mast

NOTE: Depending on the type of antenna used, cellular and RF antenna can be either installed over the mounting bracket fixed on pole, or can be directly mounted on the respective connecters provided at the bottom of gateway.

The figure 7-1, the cellular antenna is fixed at the bottom of gateway, while the RF antenna is mounting on the mounting bracket fixed on pole.

8 TROUBLESHOOTING

If the gateway is not connecting to the internet automatically, please follow these troubleshooting steps:

- Verify that all deployment steps have been executed accurately, giving particular focus to the cabling. It is crucial to confirm that the gateway has been appropriately connected before powering it on. Incorrect cabling can result in the gateway booting up without network connectivity or a SIM card.
- Attempt to reboot the gateway using the ON/OFF switch. After the reboot, check if the gateway successfully establishes an internet connection.
- Verify that the 4G antenna is securely and properly connected. Ensure that the antenna connecting cable is undamaged and correctly attached.
- If the above steps do not resolve the issue, please refer to the user manual for further guidance or contact ER for additional assistance.

Unable to connect Gateway over Bluetooth

- Android phone's Bluetooth may not be enabled.
- Bluetooth modem may be out of Bluetooth range from android phone.
- Bluetooth modem may not be paired with android phone.
- Check Bluetooth modem baud rate settings. It must be configured for 115200 and hardware flow control should be OFF.
- Turn OFF the Node and then turn ON again.
- Remove the power from node, wait for 30 seconds and then connect the power again. Now try to connect.

Unable to communicate with Nodes

- Check the antenna for loose connection.
- Antenna to RF modem connecting cable may be damage.
- Antenna itself may be damaged try with another antenna.

9 SAFETY AND WARNING

9.1 Operation Safety

- Before taking any action, please read the users manual carefully,.
- Ensure that all the procedures and installations are correctly carried out.
- The case and mountings should be grounded, where practicable.
- This product has been designed to meet a certain water-proof level. However, it becomes vulnerable to water ingress when the lid screws are not tightened properly, or if the cable gland has not been sealed properly.
- This product must not be disassembled under any circumstances. If done, it will void the warranty and may leave the product in a dangerous state.

9.2 Battery caution & warning

- To install the battery into a holder, please follow the "+" (positive) and "-" (negative) signs carefully. Wrong orientation of a battery could potential cause unit damage.
- If battery is incorrectly replaced, there may be danger of explosion.
- Use only with the type recommended by the manufacturer. Observe any warnings specified by the battery manufacturer.
- The battery has a relatively high capacity, so please take special care during storage and usage.
- When disposing of the batteries please contact your local authorities or dealer and ask for the correct method of disposal.
- When disconnecting the battery, please take special care not to apply excessive force, otherwise the battery holder and the nearby circuitry can get damaged.

If the above safety precaution and warnings are not followed, the manufacturer cannot be held responsible for any damage and injury caused to the users.

10 WARNING RADIATION EXPOSURE

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

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.

Note: 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 or more 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 equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Antenna Specification: 4.44dBi

11 ENVIRONMENTAL RESPONSIBILITY DECLARATION

Encardio Rite Group ("**Encardio**") is committed to ensuring full compliance with environmental responsibilities under all applicable Indian environmental statutes, collectively referred to herein as the **"Law(s)"**. This declaration is applicable to all products manufactured and marketed by Encardio.

1. **Scope:** This declaration binds and guides every stakeholder involved in the product's lifecycle including individuals, institutions, organizations, or entities hereinafter referred to collectively as the **"User(s)"**.
2. **Waste Segregation and Handling:** All Users are required to manage the product and any waste generated from its use in accordance with the law, including proper segregation of waste at the source into biodegradable, recyclable, and hazardous categories; authorized disposal of all end-of-life products, electronic components, batteries, and packaging materials only through government-authorized collection, recycling, or refurbishing systems; and ensuring that products bearing the crossed-out wheeled bin symbol are not mixed with general household or municipal waste streams.
3. **E-Waste Disposal and Battery Waste Management:** All electronic and electrical equipment and components manufactured or sold by Encardio must be disposed of only through authorized recycling or refurbishing facilities as per applicable law, ensuring no harm to human health or the environment; users shall ensure that all used items are returned to designated collection points and shall also maintain proper documentation and adhere to return, reporting, or record-keeping obligations; products nearing end-of-life must not be discarded along with general household waste, as improper disposal of e-waste may lead to toxic chemical release and pollution.
4. **Plastic Waste Management:** Users must not discard plastic components or packaging into unsorted municipal waste; instead, they should separate and hand over such plastic waste to authorized waste processors and ensure that no banned plastic items, as notified under law, are used or circulated.
5. **Industrial and Hazardous Waste:** If the User operates any facility where industrial, hazardous, or biomedical waste may arise due to the installation, maintenance, or testing of the product, all necessary consents and permits must be obtained and renewed from competent authorities; adequate protective measures must be taken to ensure no harm is caused to the environment or human health; and such waste must be stored, treated, and disposed of in accordance with the law.
6. **Pollution Control:** Users operating manufacturing, repair, or testing premises must not emit air or water pollutants beyond prescribed limits, must operate only after securing applicable consents under the law, and must maintain environmental records and submit reports as required
7. **Record Keeping and Reporting:** All Users associated with Encardio must maintain comprehensive records of production, sales, collection, and disposal in accordance with applicable Law(s) and submit timely reports to regulatory authorities.
8. **Contact and Support:** Encardio urges all Users to act responsibly and support sustainable environmental practices by adhering to this declaration and the Law. For safe disposal and further compliance assistance, Users are encouraged to contact their local municipal waste authorities, or authorized recyclers. Non-compliance with the above obligations may constitute a violation of Indian environmental laws and attract penalties under the relevant Law(s). Users can contact Encardio at:

Contact Number: +91 522 2661039-42

Website**:** https://www.encardio.com/

12 RECOMMENDATION OF BATTERIES FOR DATALOGGERS

We recommend to use any of the following batteries in all Encardio-rite products (Dataloggers, Wireless Nodes and Gateway). These batteries can be sourced locally.

SN	Manufacturer	Mfr Part No.	Battery type	Datasheet	Photo	Example Links to buy
1	ACT	ER34615M	LI-SOCL2 (Power Type)	https://actsales04.en.ec21.com/ACT_ER34615M_3.6volts_Lithium_Battery--8201912_8271376.html		actsales
2	SAFT	LSH 20	LI-SOCL2 (Power Type)	https://www.saft.com/products-solutions/products/ls-lsh-lsp?text=&tech=84&market=&brand=764&sort=newest&submit=Search		Digikey Atbatt.com Potensa Batteryexperts.com

3	SAFT	LSH 20 HTS	LI-SOCL2 (Power Type)	https://www.saft.com/products-solutions/products/ls-lsh-lsp?text=&tech=84&market=&brand=764&sort=newest&submit=Search		Tteckai.com indiamart patareid Aliexpress.com globalbat
4	Ultra Life	ER34615M	LI-SOCL2 (Power Type)	https://www.ultralifeindia.com/wp-content/uploads/2020/01/TDS_ER34615M.pdf		mouser
5	FANSO	ER34615M	LI-SOCL2 (Power Type)	https://www.texim-europe.com/product/battery-and-power-supplies/batteries/primary-batteries/lithium-li-socl2/detail/er34615m-fso		texim-europe tme.com ecocell.com batterydirect.com
6	RAMWAY	ER34615M	LI-SOCL2 (Power Type)	http://en.ramwaybat.com/product_46/		Alibaba.com Lazada zgqjnyw.mobi

7	Bex Batteries	ER34615M	LI-SOCL2 (Power Type)	batteryExperts		batteryExperts
8	PKCELL	ER34615M	**LI-SOCL2 (Power Type)**	Pkcellpower.com		Pkcellpower.com electronicworld Amazon Alibaba
9	HCB	ER34615M	LI-SOCL2 (Power Type)	https://www.enhcb.com/products/li-socl2-lithium-thionyl-chloride-cylindrical-battery/		Enhcb.com
10	FORTE	ER34615M	LI-SOCL2 (Power Type)	Fortebattery		Fortebattery zinchu ozon

11	EVE	ER34615M	LI-SOCL2 (Power Type)	https://microchip.ua/battery/er34615m.pdf		Jm.pl repairnspares
12	TekCell	ER34615M	LI-SOCL2 (Power Type)	https://www.tme.eu/Document/69a4b065e0660fedf2cdae1c1c0fb8d4/BAT-ER34615M.pdf		tme