# Setting up Gateway (BEAM-GW)

This page explains the process of setting up the ACKCIO BEAM gateway device.

# Installation

The gateway can be directly affixed to a flat surface using M4 screws. However, for more sophisticated mounting scenarios, we recommend using the gateway bracket. The gateway bracket can be used to easily mount the gateway on flat surfaces, on pipes using U-bolts, or in other complicated settings. (One of our clients hung it using cable ties as well!)

If you are using the bracket, first fix the gateway device to the bracket using M4 screws and nuts as shown below.



Four screws/nuts to attach the gateway to the bracket

Fix the gateway antenna and the cellular antenna to the bracket as shown below. Note that the Gateway has two identical ports at the bottom for GPS and Cellular (GSM) antennas. Therefore, please connect the cellular antenna to the correct port which is the GSM port.



Gateway antenna & Cellular (GSM) antenna positioning - left and right respectively

# Setting up the Gateway

# **Gateway Settings**

- 1. Connect a 12V DC power supply to the gateway. Ensure the polarities are affixed correctly while the power supply is connected. The power supply can be a 12V DC power adapter or a 12V solar panel power setup.
- 2. Switch on the gateway by putting the power switch to ON position.
- 3. Once the gateway turns on, you will see RF LED (Radio Signal) stays steady. RPI LED will be on for about 1~2 minutes later. Do not switch off gateway while RPI LED is solid. RPI LED will be in blinking status for about 4 minutes afterwards.
- 4. Once the Gateway is booted up, connect the Gateway to your laptop using a micro-USB to LAN adaptor.

Open any browser on you PC and visit <u>http://beam.local</u> On the below shown screen enter the

Username: admin

Password: adminadmin (or) admin123

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Login	-9
English (United States)	
Forgot your password?	

Click the (Gear Icon) settings button for Gateway setting configuration.

ACKCIO										٥
Projects				<b>▼</b> ♀ +	Map (FTP-LoadTest)					
Name		No of Nodes	Client Neme 0	Action						
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Node Summary (FTP-	LoadTest)									
Node Ba	0×. :	Node	Sampling Rate (mins)		Dettery	*10		Last Updated		Export
		VW-81-4000	17					2020/03/26 13:49:30		2
		AN-54-5A05	12					2020/03/06 09/211:30		2
		DG-##77	12					2020/05/03 13:30:30		6
		00-0617						2120/03/09 (18:40.29		2
		DG-590A	8/					2120/04/25 09:45:32		2
Sensor Summary (FT	P-LoadTest)									
Benkor G	lede		Bensor Type		Channel Type		Last Reading		Recent Readings	
4000-	S1.		Vibrating Wire		Temperatura B		10340 D 45535 %		$\sim$	
5405-1	11 1		CurrentSonp		A B Tamposture		-0.0216 mV 12.5 mV -1714-2858 D		$\sim$	
1			RS45-GEODÁGE Inchanatar		A B C		5000 2563.78 3006.5299		2	

### Date

Select the time zone with respect to your country and click on "Sync" icon to sync with computer date and time. Click Save button afterwards.



### Radio

Select the country and set the "Frequency" accordingly. Afterwards set the transmission power. Refer to the following link to get your country frequency. https://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country.html

ΑCKCIO		Radio		×		🔮 🌣 G
Date	··· Gate	3			ernet (Wi-Fi)	• …
PC Date: 20/04/2020 23:01:54	Last Ac		Singapore - 920 to 923 MHz	*	ι	
Date Format: dd/mm/yyyy hh:mm:ss		Prequency	921	0	E	00
	<u> </u>	Transmission Power	8	0	Date & Time	
	Activ	n			Search:	Ø
CPU Memory	Disk			Save	Description	
Radio	0	-		_		
Prequency: 921 MHz Range: Singapore - 920 to 923 MHz Transmission Power: 8 dbm						
Network						
WI-FI SSID: Ackcio_Beam	Show	ng 0 to 0 of 0 entries				Previous Next >

### Internet

Select either LAN or Cellular.

If **Cellular** is selected, choose your respective country and Service provider from the search bar. The APN, Username & Password based on the configuration will be automatically set. Once configuration is done, you can click on little world icon to test signal strength. You may also tick the check box on "Enable Internet Always" if you want to enable Internet permanently.

			Internet Settings		×		
Date		Gatev	internet octaings		l er	net (Wi-Fi)	• …
PG Date: 21/04/2020 09:40:39 Time Zone: Singapore Standard Time Date Format: dd/mm/yyyy hh.mm.ss		Last Act System	Internet Mode APN Search APN	LAN      Celtular      WI-FI      Countries/Service provider/APN		0	
CPU Memory	Disk	Activi	Username Password	<ul> <li>Enable internet always</li> </ul>	R R	Search:	0
Radio Prequency: 921 MHz Range: Singapore - 920 to 923 MHz Transmission Power: 8 dbm					Save		
Network							
WI-FI SSID: Ackclo_Beam		Showing	0 to 0 of 0 entries			¢ Pr	evious Next >

Cellular option for Internet

## **Upload Mode**

Out of the three upload modes, API, FTP, ACKCIO Cloud one could select either one or many modes to upload the data.

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Date		Gateway	Upload Mode	$\odot$	Internet (Wi-Fi)	• ••
PC Date: 21/04/2020 09:45:13 Time Zone: Singapore Standard Time		Last Activity: 12/04/2020 14:49:0 System on Since: 12 hours, 35 n	Mode: API API URL: https://api-albusmobile-dev.	azurewebsites.n	Data Communed (Byses)	
Date Format: dd/mm/yyyy hh:mm:ss					25/09/2020 Date &	00.00:00 Time
CPI Memory D	iek	Activity			Search:	
		Date	<ul> <li>Activity</li> </ul>		Description	
Radio			No	data available in tat	ble	
Frequency: 921 MHz						
Range: Singapore - 920 to 923 MHZ Transmission Power: 8 dbm						
Network						
Wi-Fi SSID: Ackcio_Beam		Showing 0 to 0 of 0 entries				< Previous Next >

Upload data to an API

Enter the relevant link to which the data needs to be pushed as shown in Diagram below (1)

### Upload data to a FTP server/SFTP server

Enter the respective URL, Port, Username and password if any, and the folder to which the data needs to be pushed as shown in the diagram below. (2)

Select ACKCIO CLOUD mode if you are setting up project at Ackcio Cloud by entering the Ackcio Key.

п асксіо		Upload Mode		×		🔮 🌣 G
Date	G	ate Upload Mode	I API I FTP I Ackcio Cloud	te	ernet (Wi-Fi)	• …
PC Date: 21/04/2020 09:46:54 Time Zone: Singapore Standard Time Date Format: dd/mm/yyyy hh.mm:ss	5		HTTPS:// •	(2) †4		
	3		SFTP *	() t <sub>1</sub>	Date & Time	
CPU Memory	Disk A	Ctiv Port	22		Search:	Ø
		Password		\$	Description	
Radio Frequency: 921 MHz		Folder				
Range: Singapore - 920 to 923 MHz Transmission Power: 8 dbm		Ackcio Cloud	Enable new file creation			
Network		3 🛶 Ackcio Key				
WI-FI SSID: Ackclo_Beam		Show		Save	< Previ	ous Next >

## **Activity Grid**

The activity grid will depict the key functionalities and changes that are conducted in the gateway where one could see information with related to the changes that are made.

Using the red circled export icon in the below shown diagram one could can export the gateway logs.

Activity		Search:
Date	<ul> <li>Activity</li> </ul>	Description
2020/04/08 08:08:45	Sampling Rate	Node : 5de1 7 Minutes
2020/04/08 08:08:45	Sampling Rate	Node : 5de1 7 Minutes
2020/03/28 09:13:05	Sampling Rate	Node : 5de1 5 Minutes
2020/03/28 09:13:05	Sampling Rate	Node : 5de1 5 Minutes
2020/03/26 20:09:42	Data Upload	FTP Failure due to connectivity issue
2020/03/26 20:09:42	Data Upload	API Failure due to external server error
2020/03/26 20:07:47	Data Upload	FIP Failure due to connectivity issue
Showing 1 to 10 of 17 entries		<pre>     Previous 1 2 Next &gt; </pre>

### **Remote Access**

If the gateway needs to be accessed remotely using a dynamic DNS, it could be done by providing the details requested, as shown below. Once they are provided the gateway could be remotely accessed via the dynamic DNS. Also, during this procedure, it is necessary to make sure that the gateway has the internet connection.

RACKCIO	Disk	Ren	note Access		0	-		¢ G
		,	Remote Access	• ON OFF		Description Node : mk89		
Radio Frequency: 917 MHz			Server Username	www.no-lp.com ackclo	~	Nodel: mk90 2 Minute Nodel: 4r661 2 Minute	8	
Range: Singapore - 920 to 923 MHz Transmission Power: 14 dbm			Password/Key		Ø			
Network			Hostname	demo-gateway.xxxx				
WI-FI SSID: Ackcio_Beam123		Showin			Save		c Previous 1. No	ext >
Power			CPU terr	nperature		Remote Access	Software	
2 11.5 <b>11.5 24052020 07.55.00</b> 24052020 07.25.00 Date &	02/05/2020 10 40 • Time	200	(i) aug 50 75052020 0755.00	2ed5d000 00/06/000 10:17:08 10:48:08 Date & Time	09/06/2	Server: Remote access turned of	Daemon: 4.8.200427 Bearn: 4.2.191204 Snape: 4.20.05.07	

The Remote access configuration steps are explained below.

- 1. Set up a free host name and an account using one of five given dynamic dns providers, using the web browser.
- 2. Once the hostname and the account information are received, go to the remote access tile and access the model. and then type in the information regarding the hostname, account username, and password.
- 3. Upon save, the ddclient file in the back-end will be configured automatically based on what the user saves in that model and ddclient will set up the remote access.
- 4. The user will now be able to type in their custom hostname in the search bar and access the gateway via said hostname instead of ip.

### Software

You can find current firmware & software version in this section. by uploading the software package provided by Ackcio one could update Gateway software when necessary. The steps of the installation process will be shown accordingly.

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CPU Memory Dis	k Activi	Package No package selected	Search	<b>x</b>
Radio				
Frequency: 921 MHz Range: Singapore - 920 to 923 MHz Transmission Power: 8 dbm			Install	
Network				
Wi-Fi SSID: Ackclo_Beam	Showing 0 to	0 of 0 entries		< Previous Next >
Power		CPU temperature	Remote Access	Software ···
Sector 200 13.16.00 00.042020 18.20.00 Date & Time	05042020 13 19 00	25032620 13 10 00 03.042020 19.20 00 00.042020 13 19.00 Date & Time	Server: Remote access turned of	Daemon: 4.7.200324 Beam: 4.2.191204 Snape: 4.20.02.29

That brings the end to the Gateway Settings.

# Setting up with ACKCIO cloud

To kick start log in to Ackcio Cloud with your registered account.

Connect your PC to internet LAN. Click on the following link to login Ackcio Cloud online portal with your registered account. <u>https://live.ackcio.com</u>

1. Procedure for adding Nodes (i) Initially add all Nodes before creating Project.

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g Dathard						
El Devine -	Projects					Map
EB Chan	Name	No of Devices	Manager	Client Name	Edit	Map Satelline
Q Detup	Demo Test	2	Demo User	Ackcio Demo	/	Calleria Million Calleria Million
E3 Report	Setup Test	1	Demo User	Ackos Demo	/	
4.0m ×	Data Test	2	Deno User	Ackob Demo	/	And
	Device Summary Sensor Summary				No Pr	yet b sekcted
					No Pr	yect is selected

(ii) Expand the Devices list at the side menu by clicking the arrow mark. Then, Click on + button. **Device ID** (**Mac ID**): the first 4 digits found on the sticker of the device **Device Name**: Name the node as per your preference.(Ex: Your device location or sensor). No of **Channels**: Select either **1,4 or 8** based on the device channels (ports). **0** is for Relay Node. **Device Type**: Select Node type based on your Node. After filling up the device information, click "Save" button.

		Add Device		×	💮 Umrah 🛛 Log Out 🕞
C Devices Setup C Expet L Uses Alet	Device List  Show 10 + entries  Device Id  Showing 0 to 0 of 0 entries	Device Id : Device Name : No of Sensors supported : Device Type :	Zero Not Defined		Search: Device type  Action  Action  Action  Action  Action  Next >
	Add Device Dev Device No of Ser supp Device	ice Id 53 Name VW3 nsors One orted Vib	S1-53 e rating Wire Node		
2					Save

(iii) You will see the prompt and added device information under "Device list" section.

Device List				
Show 10 entries				Search 18
Device Id	Project Name	Device Name	Device type	Action
53	Setup Text	VWS1-83-A	Vibrating Wire Node	/ 1
Showing 1 to 1 of 1 entries (Ritered from 52 total entries)				4 Presibus

(iv) Repeat above steps to add additional Nodes.

2. Procedure to create a new Project.

Click on "Setup" at side menu.

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Dashboard	Project						
Setup	Name		Start Date	dd MMM yyyy			
LS Users	Client		Location	Lat:	Long:		1
Alen	Frequency						
	User - Project Co	ontroller					
	User - Project En	gineer					
	Project Engineer						
	User - Guest						

3. Input the requested information as per instructed below

- Name, Client, Frequency, Start Date and Location (click on pencil icon to input the location).
- **Project Controller** field: mandatory.
- **Gateway** field: Select your respective Gateway ID(s) by clicking on text box.
- **Device** field: Click in text box, you will see the Node(s) which you have already added previously. Please select accordingly. (Multiple selection)
- Sensor field: Select the respective sensor types. (Multiple selection)

Click Next.

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B Dense A	Project					
• site	Name	Seta Test	Burt Date	03 Apr 2019		
Of man	Clert	Acress Pre Ltd	Location	Lat. 1 250525	Long 101 70668	
A 100 1	Frequency	101				
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	User - Project Engineer					
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	Guest User					
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	Gateway	a Serie Connector				
	Device					
	Device					
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4. You can set the desired "Sampling Rate" at this page for all the nodes. Click Next.

						🛞 Demo User L
Device &	& Channels					¥¥
	Device	Device	Name	Sampl	ing Rate	Locat
•	53	VW91-53-A	5		Lat: 1.299454 Long: 103.785877 🖉	0 8:
			Previous	Neit		

- 5. For the Alert, please enable at least one channel (either email or message)
- 6. Click "Setup" to complete the project creation.

II Contrard CR Centure Allert © Tatus		
Copyrt Name Email Phone No	Enable Email	Enable Message
A User   Demo User  demo@ackido.com  d656100452		2
Aurt Mobashir mobashir@u.rus.edu		
Showing 1 to 2 of 2 entres		

7. Click on Dashboard at the side menu, you can now see newly created project. If you want to edit the project, click on pencil button.

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S Dashboard						
El Devices	Projects					Map (Setup Test)
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ACKCIO									🛞 Amvininter Leg Dat B
In Device	> Projects						(	0	Мар
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Ø 5x8491		Setup Text		4	Ackcio Pte Ltd		/ 🛛 🛙		Oops! Not available in offline mode.

9. Once "Step.8" is done, please refer to Node Manual (Analogue or Vibrating Wire) to commission the nodes.

10. After you have commissioned all the nodes, go to "Online" dashboard, click on your project, you will now be able to see your Nodes under "Device Summary" Section.

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4									
> Pro	ojects					Map (Setup Test)			
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De	evice Summary (Se Device State	tup Test)	nico	Sampling Rate (mins)	Battery	Garge	Kerner Manager University Kerner University Kontensen	Hey dec Kitte Dauge	Terresof Use Report of Vice
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# Setting up with Third Party Services

Open your favourite browser, and visit <u>http://192.168.0.10</u>. Thereby enter the credentials. Username: *admin* 

Password: adminadmin

## **Creating a Project**

1. Click "+" icon next to the Projects to create new project. 2. Refresh (or) Click on "Sync Projects" icon if you need to refresh the project or sync with a cloud project (if any). 3. Import/Export Project Configuration if you have any previous saved project configuration file. Please refer to this link for more information.

ACKCIO					j	8	2 (	j							9	٥
Projects						+	φ +		Map (H	uffle Pu	ff)					
Name	• No of M	lodes 0	Client N	lame	0	Action	e.		Мар	Satellite	1					113
Huffle Puff	1		Ackcio P	te Ltd	1	2	i ±									
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Node Summary (	Huffle Put	ff)									8661					
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Node State		Node	ଁଁ	ampling Ra	te (mins)			Battery			RSSI	Las	t Updated		Export	

Input **Name, Client, Start Date and Location** with respect to the project that is about to be created. (click on pencil icon to input the location).

Dashboard / Setup							
Project							
Name			Start Date	dd	/mm/yyyy		
Client			Location	LA	ιΤ:	LONG :	
Nodes							
Node							
√ode List							
Show 10 * entries					Searc	h.	
Node ID	^	Project Name	Node Name	0	Node Type	0	Action

#### **Creating a Node**

To add Nodes, click on the "+" icon next to "Nodes" section. Input credentials and save. **Node Type**: Select the type of your node accordingly.

Node ID: Enter the unique ID provided in the sticker, on top of the Node.

**Node Name**: Name it according to your device location or sensor as per your preference. \*\*Repeat above steps to add additional Nodes.

🖗 АСКСІО		Add Node			- X <sup>-</sup>			٩	\$
Dashboard / Setup									
Project		Node Type	BEAM-VW-S1		٣				
Name	Slytherin	Node ID	p09j			)20			
Client	Severus Snape	Node Name	TestNode2			3.877674	LONG : 151.2535	6	
Nodes					Save				+
Node									
Node List									
Show 10 + entries						Se	arch		
successfully Node ID		Project Name		Node Name		Node Type	0 A	ction	

You can now see the Node(s) that you have just added in the "**Node List**" section. On Node text field, please select your Nodes. (You can select multiple Nodes.)

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	Correlas onapo			L	LAT. 33.01101	LONG . 101.2	2042	
lodes								
Node	× 4ddd							
ada Liat								
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Show 10 * entries	^	Project Name	Node Name		Sea Node Type	orch:	Action	
Show 10 * entries Node ID 4ddd	^	Project Name	Node Name 4ddd		Sea Node Type BEAM-VW-S1	irch:	Action	

Click on the "Next" button afterwards. You will be navigated to the sensor Nodes and sensors page.

🖗 ackcio 🖡			👙 🌣 G
Dashboard / Setup / Summary			
Nodes & Sensors	0		
4ddd 4ddd Node Type : BEAM-VW-S1 Location :	Sensor Code : 3e44 Location : Type : Vibrating Wire Mode : Sweep A - 450 to 1200 Hz	<ul> <li>Reading Type : A Unit Type : Frequency</li> <li>Base Reading :</li> </ul>	<b>4</b> ⊻ <b>■</b>
Sampling Rate : 15		Reading Type : Temperature Unit Type : Ohms Base Reading :	Σ
	6	Reading Type : B Unit Type : Pulse Base Reading :	Σ
		IR) -) 🖕	: 
	Previous Setup		

On this screen, you will see all the added Nodes to the project on the left pane.

- 1. Click on arrow icon to expand selected Node information.
- 2. You can set a preferred "Sampling Rate (in mins)" at this page for your node.
- 3. Input the corresponding **Sensor Code**, **Type and Mode**.
- 4. You can set an equation by clicking this icon.
- 5. You can enable the wireless mesh, if necessary.

6. If you wish to add virtual channel, click +. Click the "Setup" button to complete the Project Creation.

Upon successful project creation, the system will take you to the "**Main**" screen and you will see newly created project. If you want to edit the project, you can do so by clicking pencil icon.

ACKCIO				👙 🌣 🗄
Projects T	¢ +	Map (Slytherin)		
Name         No of Nodes         Client Name         Action           Stytherin         1         Severus Snape         Image: Client Name         Image: Client Nam	n ∎⊥	Map Satellite		::
			Ŷ	
		Google		Hap data ©2020   Terms of Use
Node Summary (Slytherin)				
Node State O Node O Sampling Rate (mins) O	Batte No project data	ry CRSSI is available	C Last Updated	© Export

Next step, please refer to respective Node Manuals to commission the nodes.

After you have commissioned all the nodes, log in and click on your project, you will now be able to see your Nodes under "**Node Summary**" Section and sensor details under "**Sensor Summary**".

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FTP-LoatTell		21	Achein		/ 2 B ±						
orderign Thang		2	jack dark	als	∕Ø∎⊥			You are	offline quarter to used the map		
ummary (FTP-Loa	adTest)										
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		VW-S1-4000		- 12		٥	•		2020/03/25 13:49:30		2
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		00-0817		87		8	•		2120/03/09 08:40 29		Ø
		AN-54-550D		2./			•		2020/03/31 11:48:29		Ø
		DG-590A		67			•		2020/04/28 09:45.32		Ø
Summary (FTP-L	oadTest)										
Bensor Code			Bensor Typ	pa		Channel Type		Last Reading		Recent Readings	
4000-51			Vibrating W	ire		Temperature B		10340 D 40535 %		~	
5A05-81			Current Los	në.		A B Temperature		-0.0216 mV 12.5 mV -1714-2858 D			
3			RS485-GEOGAGE V	nchomater		A B C		3003 2563.78 3004.8295			
6			MB485-GEOGAGE P	n Ciriomadan		A B C		5000 2563.78 3006.8299	Activate Go to Sett	e Wi <u>ndow</u> s ings to activate	e Window
Ŧ			RS485-GEOGAGE Y	ncinomater		A B C		5000 2563.78 3006.5259			

# **Normal Operating Status of the Gateway**

- 1. You should see (RPI, NET, RF LEDs) of the gateway should remain off most of the time.
- 2. WF LED will be solid all the time unless you turn it off. (You can turn off/on WF by pressing and holding FUNC button more than 5 seconds)
- 3. The RPI & RF LEDs will blink every 5 seconds.
- 4. The NET LED will blink if the Internet mode has been set to CELLULAR and when there is Internet activity (e.g., real-time data uploading to a server via FTP or API). Afterwards, the LED will turn off until next internet activity.

# **Turning off the Gateway**

# Turning off using the device

- 1. Press and hold the FUNC button for more than 10 seconds. You will see that the RPI, NET, WF LEDs will be turned off.
- 2. RF LED may continue to blink every 5s which is normal.
- 3. Put the power switch to off position. RF LED will be turned off at this stage too.

# Turning off / Reset using the dashboard

The gateway could be reset/brought to the initial status by clicking the "Restore" button on gateway activity module. Yet it should be done attentively as all the data and configurations may loose and it may need a Re - configuration.

Also its necessary to note that upon the System restart button click, the gateway would restart and upon the shutdown button the gateway device would shutdown.

Factory Settings	Restore	
System	Restart	
System	Shut down	

#### **FCC Caution:**

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.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction

with any other antenna or transmitter.

2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.

3. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.