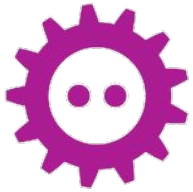
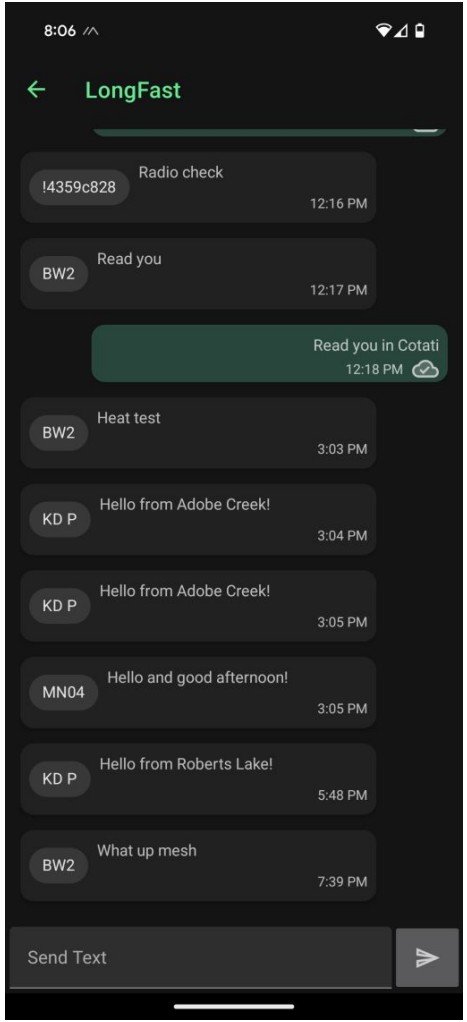


FOSDEM

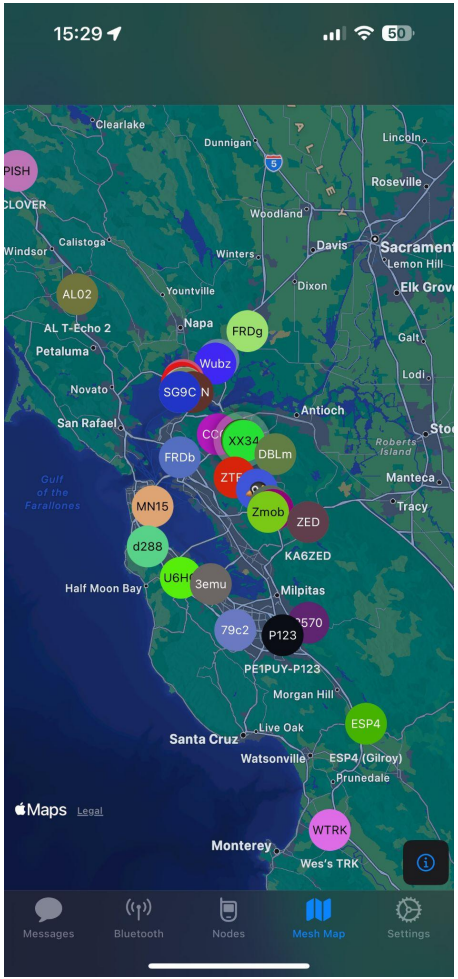
MESHTASTIC

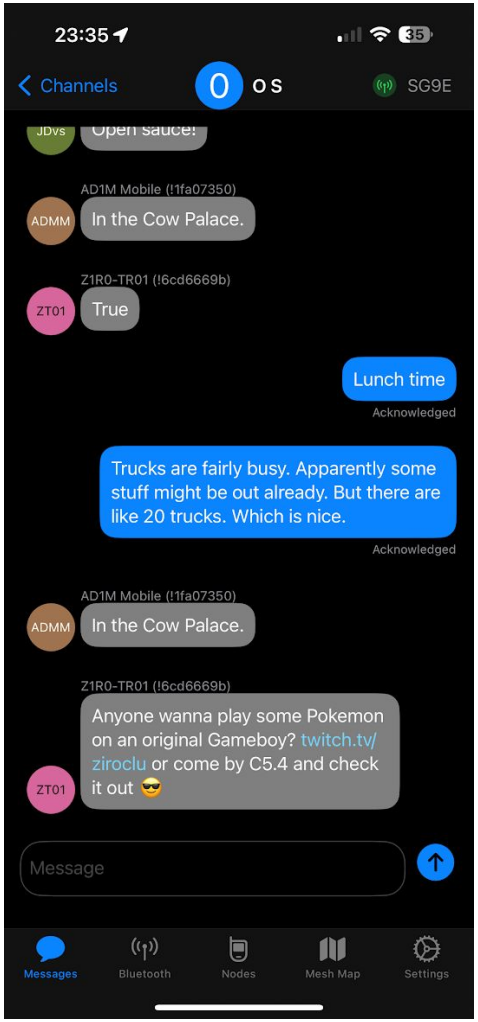
An open source, off-grid, decentralized, mesh network built to run on affordable, low-power devices

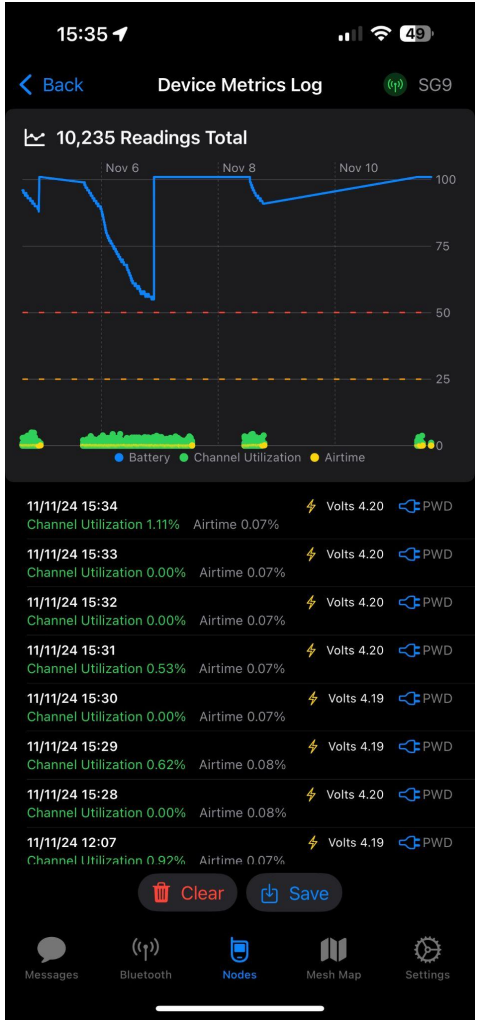
2025-02-01 / Presented by Thomas Göttgens / DG1KTG | Slides originally by Jon Davis / KJ6FNQ

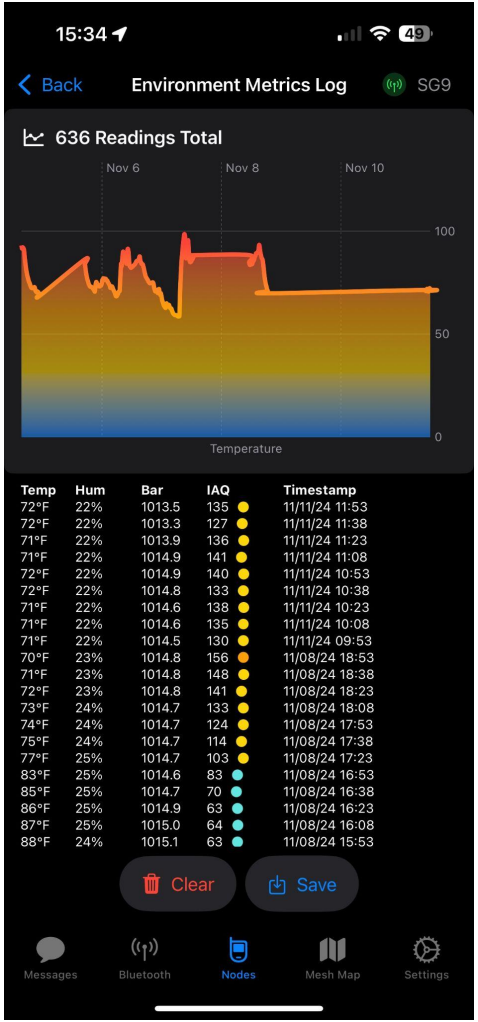

8:06
LongFast
!4359c828
Radio check
12:16 PM
BW2
Read you
12:17 PM
Read you in Cotati
12:18 PM
BW2
Heat test
3:03 PM
KD P
Hello from Adobe Creek!
3:04 PM
KD P
Hello from Adobe Creek!
3:05 PM
MN04
Hello and good afternoon!
3:05 PM
KD P
Hello from Roberts Lake!
5:48 PM
BW2
What up mesh
7:39 PM
Send Text


23:36
3D
SUNNYDALE
ScyB
SaucyBoy
K6TE
AD1M Mobile
SF-H
OfficiallyJK
K6MR
Ko6cnt Mobile
sctg
scoutg-node-1
Maps
Legal
Messages
Bluetooth
Nodes
Mesh Map
Settings


15:29
Clearlake
Lincoln
Roseville
Woodland
Davis
Sacramento
Dixon
Elk Grove
Galt
Lodi
Yountville
Napa
Petaluma
Novato
San Rafael
Antioch
Manteca
Tracy
Milpitas
Half Moon Bay
Morgan Hill
Live Oak
Santa Cruz
Watsonville
Prunedale
Monterey
AL02
AL T-Echo 2
FRDg
Wubz
SG9C N
XX34
DBLm
FRDb
Zmob
ZED
KA6ZED
MN15
d288
3emu
79c2
P123
PE1PUY-P123
ESP4
ESP4 (Gilroy)
WTRK
Wes's TRK
Maps
Legal
Messages
Bluetooth
Nodes
Mesh Map
Settings


23:35
Channels
0
OS
SG9E
AD1M Mobile (!1fa07350)
In the Cow Palace.
Z1R0-TR01 (!6cd6669b)
True
Lunch time
Acknowledged
Trucks are fairly busy. Apparently some stuff might be out already. But there are like 20 trucks. Which is nice.
Acknowledged
AD1M Mobile (!1fa07350)
In the Cow Palace.
Z1R0-TR01 (!6cd6669b)
Anyone wanna play some Pokemon on an original Gameboy? twitch.tv/ziroclu or come by C5.4 and check it out
Message
Messages
Bluetooth
Nodes
Mesh Map
Settings


15:35
49
Back
Device Metrics Log
SG9
10,235 Readings Total
Nov 6
Nov 8
Nov 10
100
75
50
25
0
Battery
Channel Utilization
Airtime
11/11/24 15:34
Volts 4.20
PWD
Channel Utilization 1.11%
Airtime 0.07%
11/11/24 15:33
Volts 4.20
PWD
Channel Utilization 0.00%
Airtime 0.07%
11/11/24 15:32
Volts 4.20
PWD
Channel Utilization 0.00%
Airtime 0.07%
11/11/24 15:31
Volts 4.20
PWD
Channel Utilization 0.53%
Airtime 0.07%
11/11/24 15:30
Volts 4.19
PWD
Channel Utilization 0.00%
Airtime 0.07%
11/11/24 15:29
Volts 4.19
PWD
Channel Utilization 0.62%
Airtime 0.08%
11/11/24 15:28
Volts 4.20
PWD
Channel Utilization 0.00%
Airtime 0.08%
11/11/24 12:07
Volts 4.19
PWD
Channel Utilization 0.92%
Airtime 0.07%
Clear
Save
Messages
Bluetooth
Nodes
Mesh Map
Settings

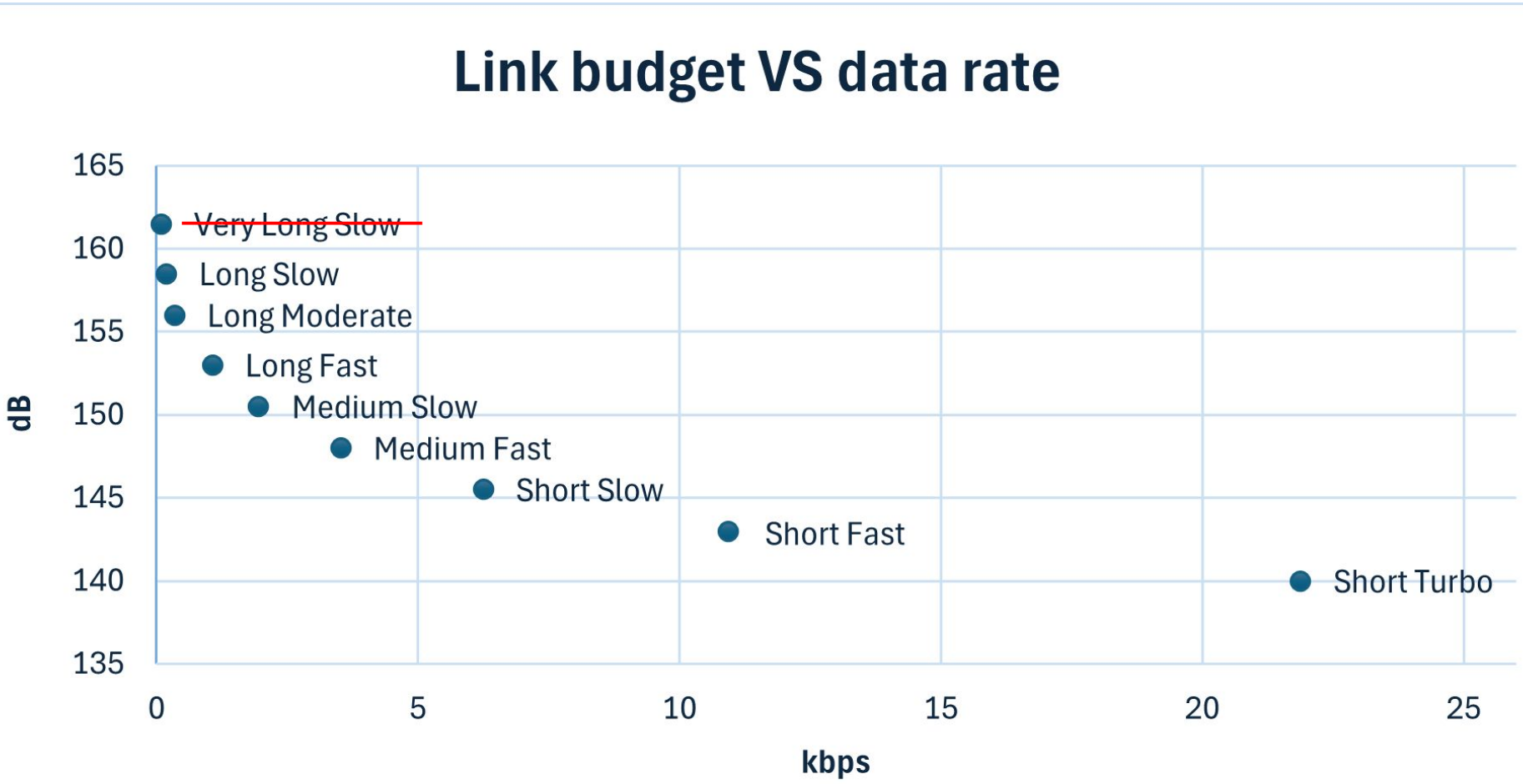

15:34
49
Back
Environment Metrics Log
SG9
636 Readings Total
Nov 6
Nov 8
Nov 10
100
50
0
Temperature
Temp Hum Bar IAQ Timestamp
72°F 22% 1013.5 135 11/11/24 11:53
72°F 22% 1013.3 127 11/11/24 11:38
71°F 22% 1013.9 136 11/11/24 11:23
71°F 22% 1014.9 141 11/11/24 11:08
72°F 22% 1014.9 140 11/11/24 10:53
72°F 22% 1014.8 133 11/11/24 10:38
71°F 22% 1014.6 138 11/11/24 10:23
71°F 22% 1014.6 135 11/11/24 10:08
71°F 22% 1014.5 130 11/11/24 09:53
70°F 23% 1014.8 156 11/08/24 18:53
71°F 23% 1014.8 148 11/08/24 18:38
72°F 23% 1014.8 141 11/08/24 18:23
73°F 24% 1014.7 133 11/08/24 18:08
74°F 24% 1014.7 124 11/08/24 17:53
75°F 24% 1014.7 114 11/08/24 17:38
77°F 25% 1014.7 103 11/08/24 17:23
83°F 25% 1014.6 83 11/08/24 16:53
85°F 25% 1014.7 70 11/08/24 16:38
86°F 25% 1014.9 63 11/08/24 16:23
87°F 25% 1015.0 64 11/08/24 16:08
88°F 24% 1015.1 63 11/08/24 15:53
Clear
Save
Messages
Bluetooth
Nodes
Mesh Map
Settings

Presets

We have eight LoRa radio presets. These are the most common settings and have been proven to work well:

Channel setting	Alt Channel Name	Data-Rate	SF / Symbols	Coding Rate	Bandwidth	Link Budget
Short Range / Turbo	Short Turbo	21.88 kbps	7 / 128	4/5	500[1]	140dB
Short Range / Fast	Short Fast	10.94 kbps	7 / 128	4/5	250	143dB
Short Range / Slow	Short Slow	6.25 kbps	8 / 256	4/5	250	145.5dB
Medium Range / Fast	Medium Fast	3.52 kbps	9 / 512	4/5	250	148dB
Medium Range / Slow	Medium Slow	1.95 kbps	10 / 1024	4/5	250	150.5dB
Long Range / Fast	Long Fast	1.07 kbps	11 / 2048	4/5	250	153dB
Long Range / Moderate	Long Moderate	0.34 kbps	11 / 2048	4/8	125	156dB
Long Range / Slow	Long Slow	0.18 kbps	12 / 4096	4/8	125	158.5dB
~~Very Long Range / Slow~~	~~Very Long Slow~~	~~0.09 kbps~~	~~12 / 4096~~	~~4/8~~	~~62.5~~	~~161.5dB~~

1: Short Turbo is the fastest preset and the only one with 500 kHz bandwidth. It is not legal to use in all regions due to this wider bandwidth.


Link budget VS data rate
165
160
155
150
145
140
135
dB
Very Long Slow
Long Slow
Long Moderate
Long Fast
Medium Slow
Medium Fast
Short Slow
Short Fast
Short Turbo
0
5
10
15
20
25
kbps

Offgrid

BE DISASTER AWARE

SEPTEMBER IS NATIONAL PREPAREDNESS MONTH

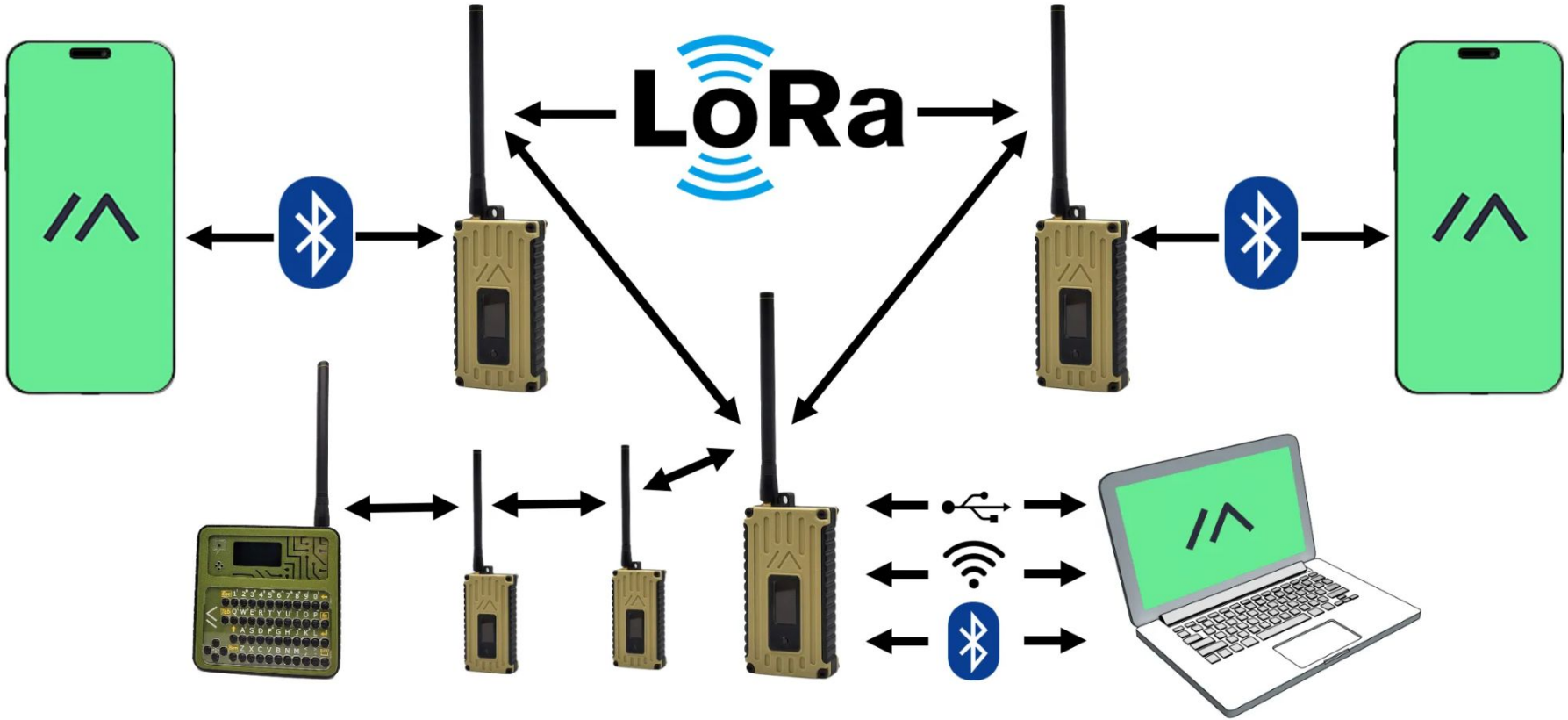
TAKE ACTION TO PREPARE

FEMA

AMERICA'S PrepareAthon!

Ready

Decentralized Mesh Network

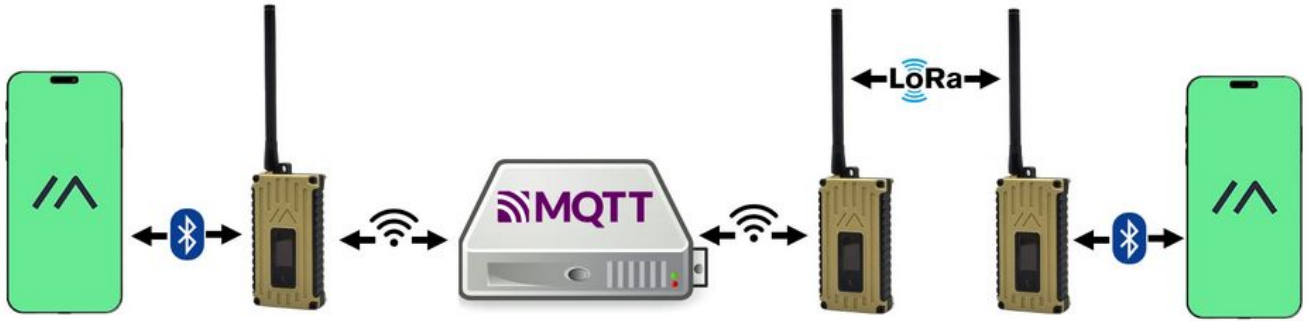


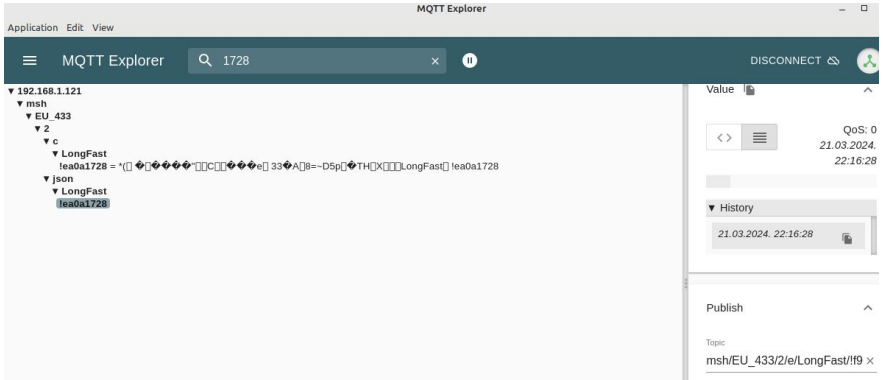
LoRa = Long Range, Low Power Radio

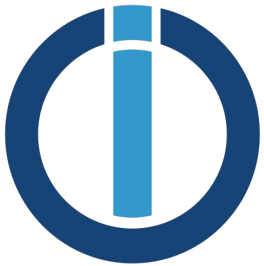
Max Hops

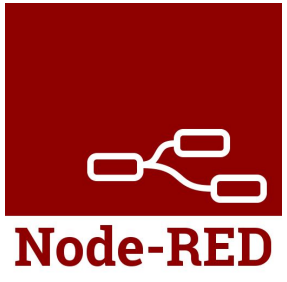
Maximum number of hops. This can't be greater than 7. Default is 3 which should be fine for most applications. ***Really, 3 is fine.***

MQTT | Integrations



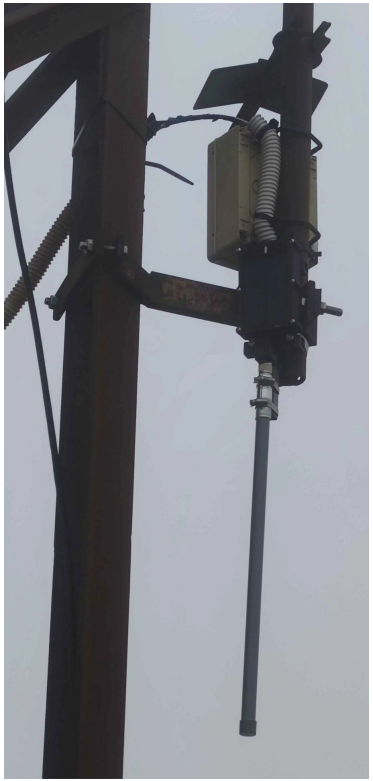






Roles

Device Role	Description	Best Uses
CLIENT	App connected or stand alone messaging device.	General use for individuals needing to communicate over the Meshtastic network with support for client applications.
CLIENT_MUTE	Device that does not forward packets from other devices.	Situations where a device needs to participate in the network without assisting in packet routing, reducing network load.
CLIENT_HIDDEN	Device that only broadcasts as needed for stealth or power savings.	Use in stealth/hidden deployments or to reduce airtime/power consumption while still participating in the network.
TRACKER	Broadcasts GPS position packets as priority.	Tracking the location of individuals or assets, especially in scenarios where timely and efficient location updates are critical.
LOST_AND_FOUND	Broadcasts location as message to default channel regularly for to assist with device recovery.	Used for recovery efforts of a lost device.
SENSOR	Broadcasts telemetry packets as priority.	Deploying in scenarios where gathering environmental or other sensor data is crucial, with efficient power usage and frequent updates.
TAK	Optimized for ATAK system communication, reduces routine broadcasts.	Integration with ATAK systems (via the Meshtastic ATAK Plugin) for communication in tactical or coordinated operations.
TAK_TRACKER	Enables automatic TAK PLI broadcasts and reduces routine broadcasts.	Standalone PLI integration with ATAK systems for communication in tactical or coordinated operations.
REPEATER	Infrastructure node for extending network coverage by relaying messages with minimal overhead. Not visible in Nodes list.	Best positioned in strategic locations to maximize the network's overall coverage. Device is not shown in topology.
ROUTER	Infrastructure node for extending network coverage by relaying messages. Visible in Nodes list.	Best positioned in strategic locations to maximize the network's overall coverage. Device is shown in topology.



Range Tests

Ground to Ground | Ground to Air

Current Ground Record: 331km

- **Range:** 331km (205 miles)
- **Record Holders:** *MartinR7* & *alleg*
- **Source:** reddit

Modem Settings

Default Very Long Slow

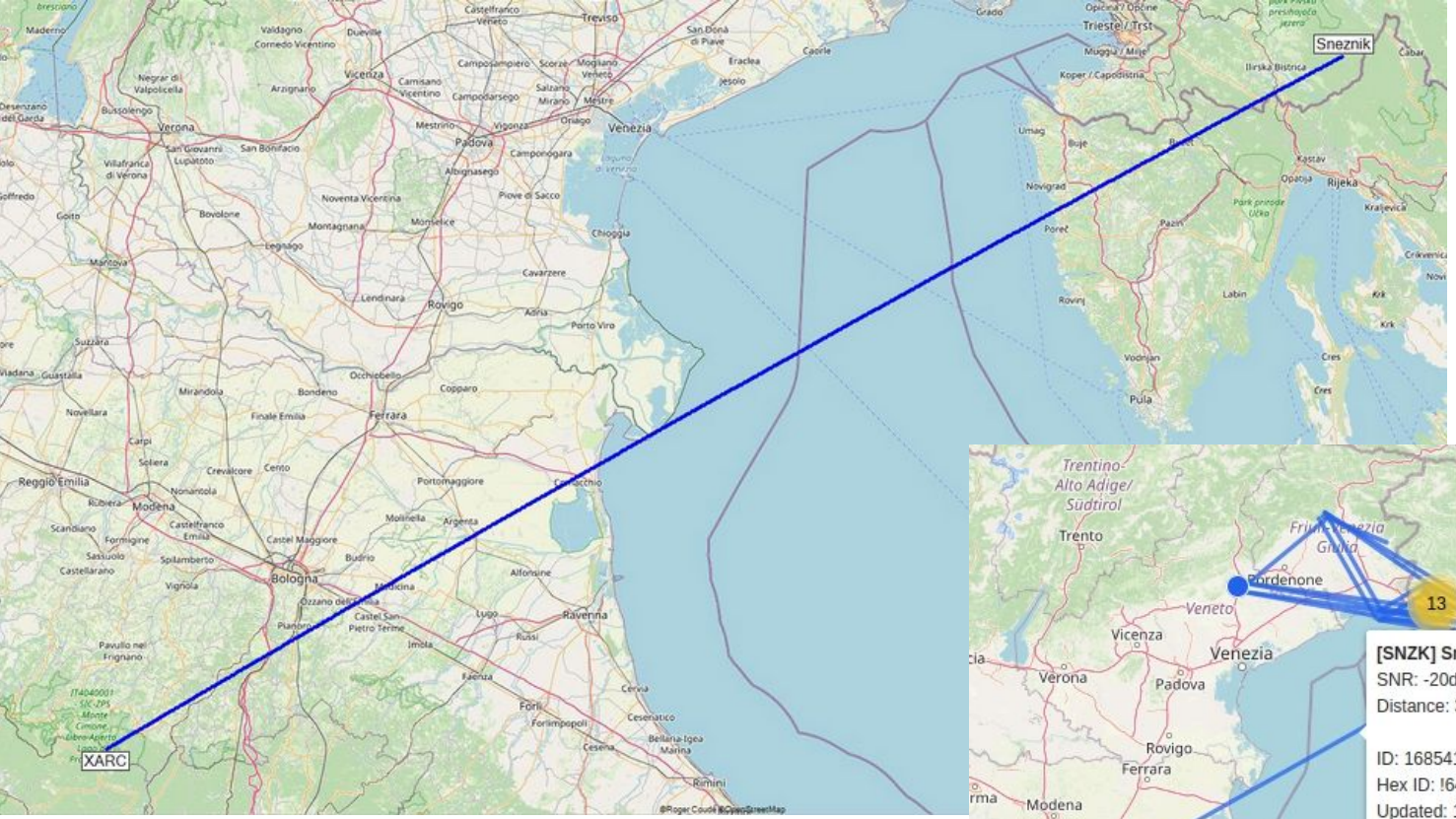
- **Frequency:** 868MHz
- **Bandwidth:** 62.5
- **Spread Factor:** 12
- **Coding Rate:** 4/8

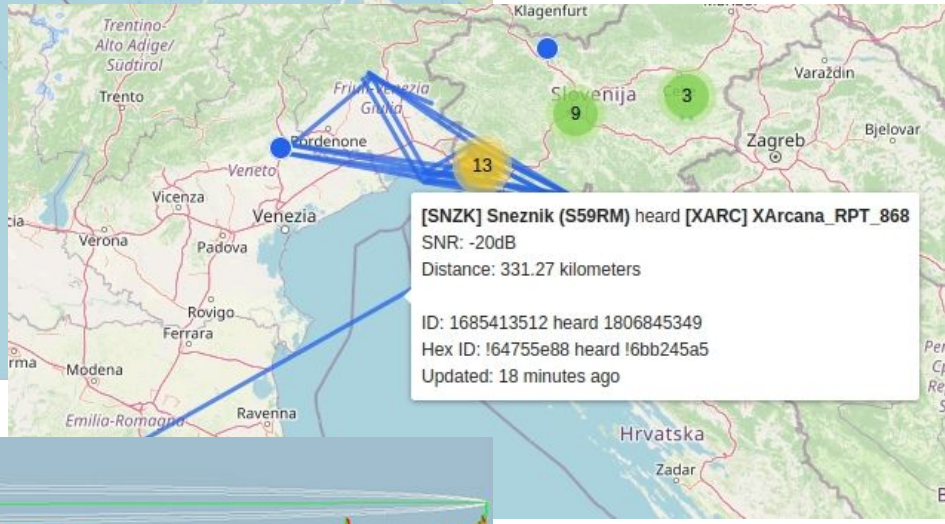
Node A

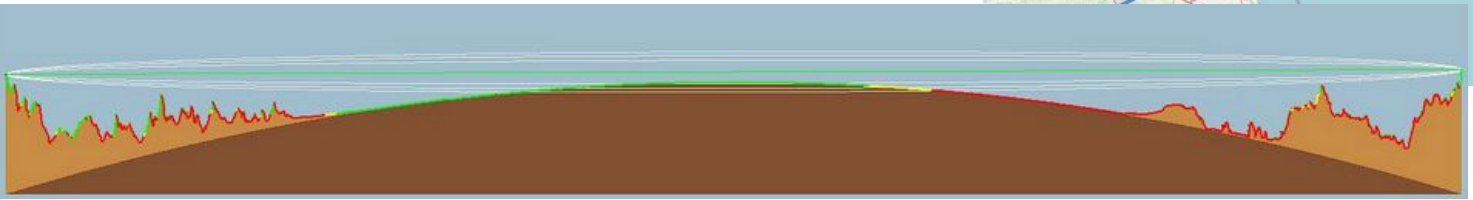
- **Device:** RAK4631 Core+RAK19003+RAK1906+INA219
- **Firmware Version:** 2.3.6
- **Antenna:** 55cm collinear 868mhz (AliExpress)

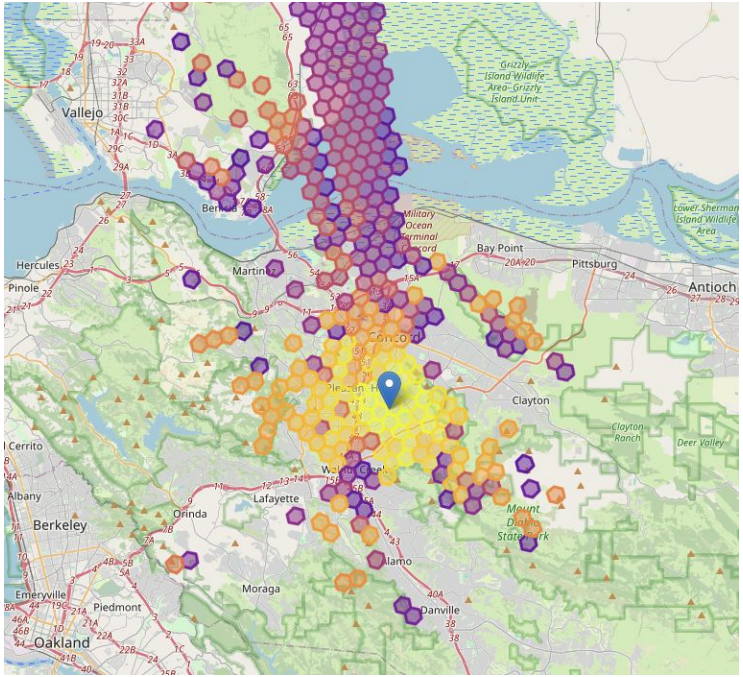
Node B

- **Device:** RAK4631 Core+RAK19003+RAK1901
- **Firmware Version:** 2.4.2
- **Antenna:** RAKARJ17

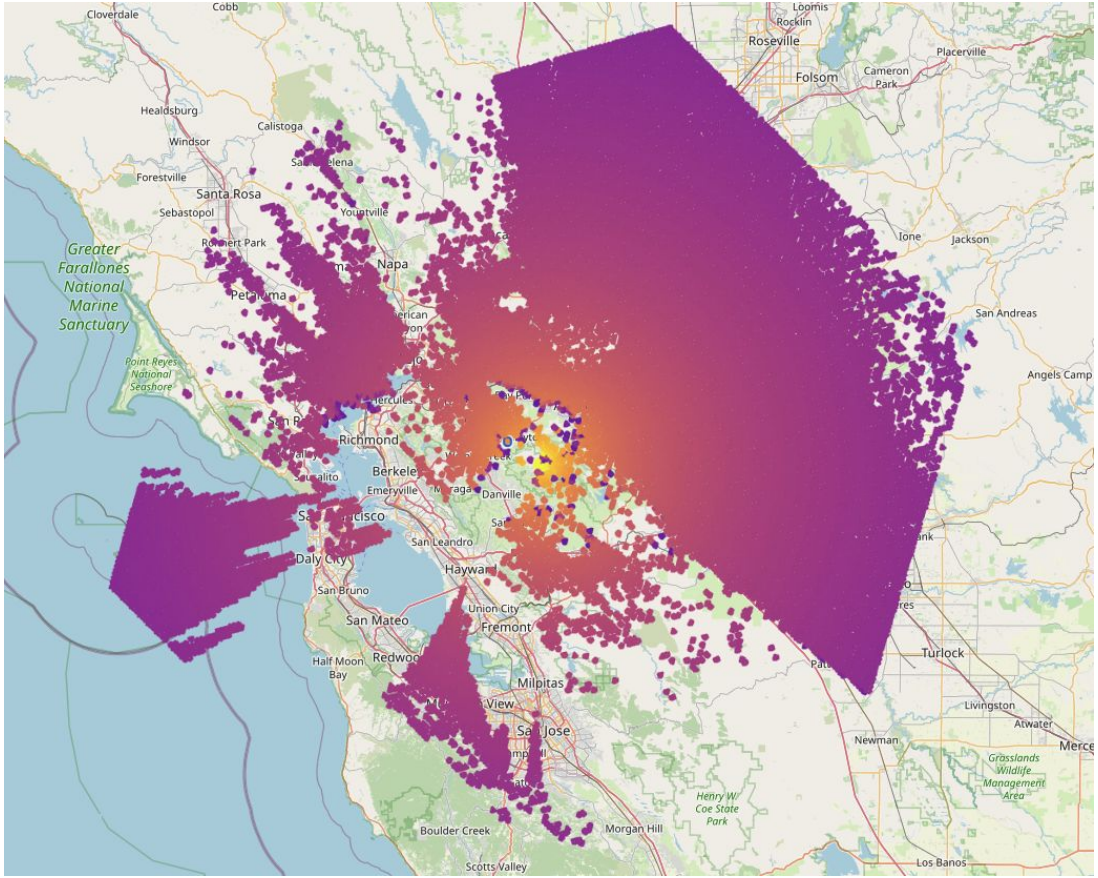

Sneznik
XARC
Venezia
Padova
Verona
Rovigo
Ferrara
Ravenna
Bologna
Modena
Trieste / Trst
Rijeka
Pula
Zagreb


13
9
3
Pordenone
Udine
Venezia
Padova
Vicenza
Verona
Rovigo
Ferrara
Modena
Ravenna
Trento
Klagenfurt
Slovenija
Zagreb
Varaždin
Bjelovar
Hrvatska
Zadar
[SNZK] Sneznik (S59RM) heard [XARC] XArcana_RPT_868
SNR: -20dB
Distance: 331.27 kilometers
ID: 1685413512 heard 1806845349
Hex ID: !64755e88 heard !6bb245a5
Updated: 18 minutes ago





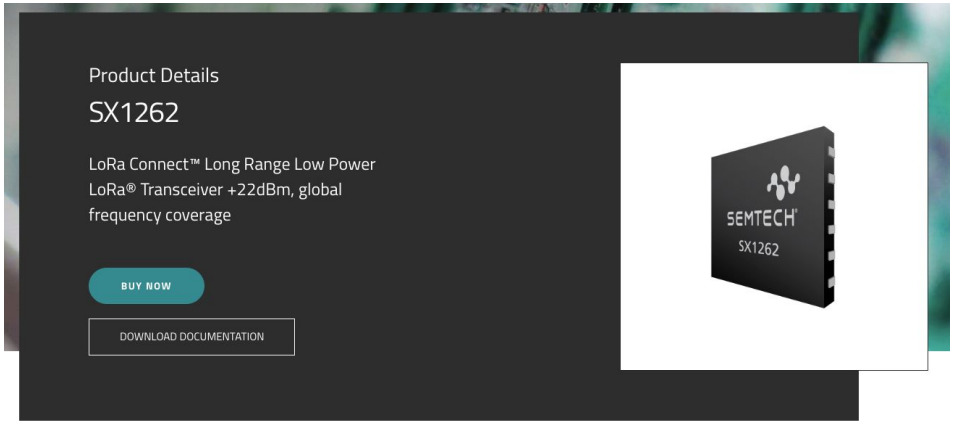
Walnut Creek
Vs
Mt Diablo



https://site.meshtastic.org/

Low Power

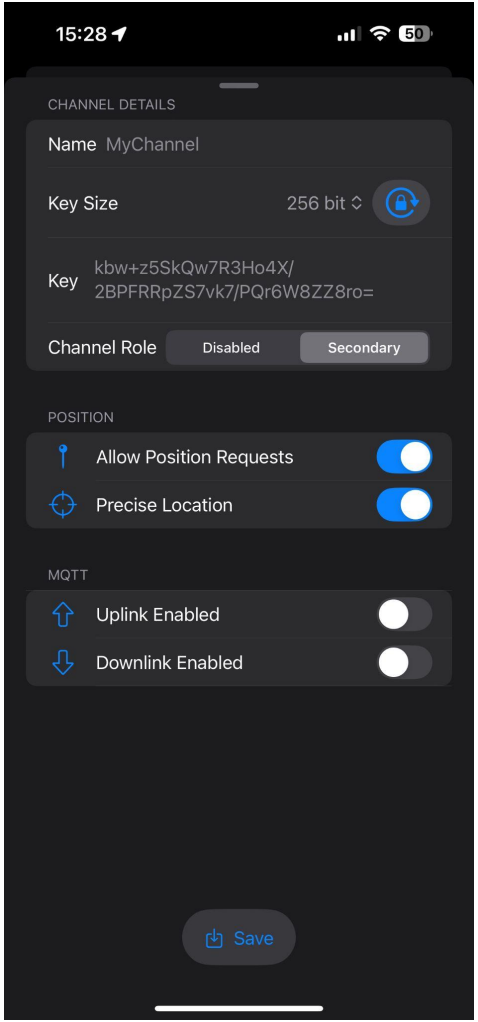
- **868 MHz SRD band (+27dBm)**
- 433 MHz ISM band (+10dBm)
- 2,4 GHz ISM Band (+10dBm)
- Long Fast: 433,875 / 869,525MHz
- Most Radios: 22dBm / 160mW
- SX1262 uses 4mA active receive

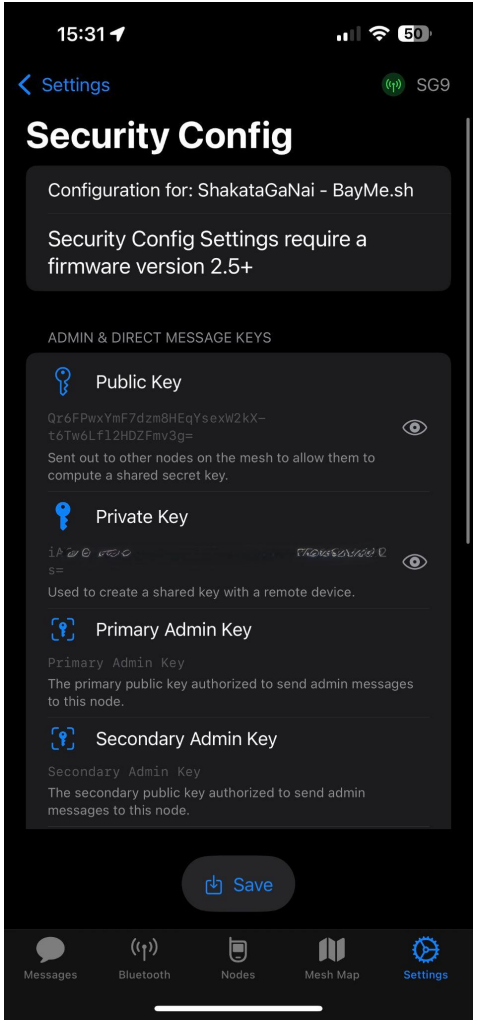


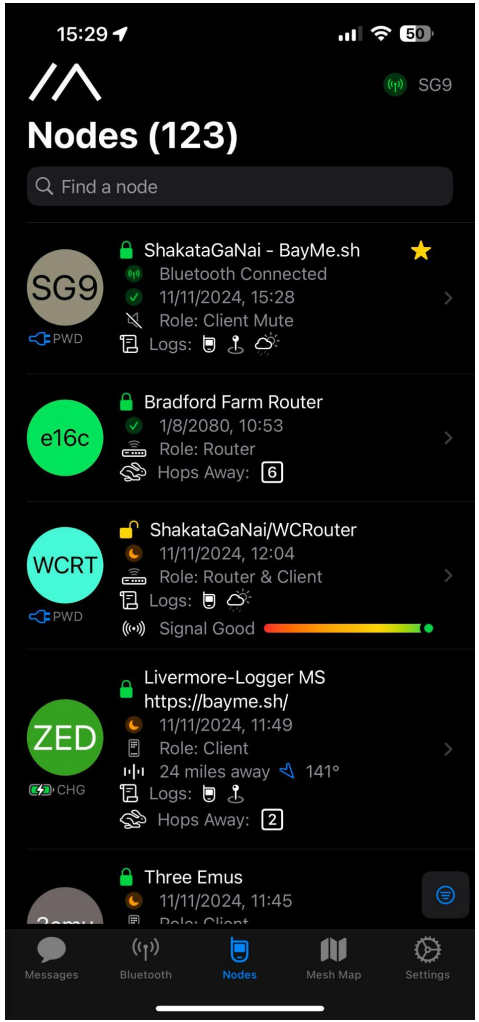
Which Frequency to use

433.05 MHz	434.79 MHz	433.92 MHz	1.74 MHz	**A**	only in Region 1, subject to local acceptance	Amateur service & radiolocation service	With provisions of footnote 5.280
2.4 GHz	2.5 GHz	2.45 GHz	100 MHz	**B**	Worldwide	Fixed, mobile, radiolocation	Amateur & amateur-satellite service

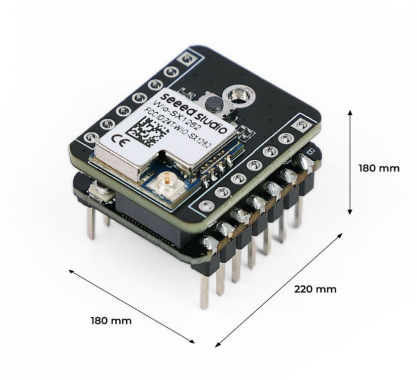
Frequency	Duty cycle	Channel spacing	ERP
863.0–865.0 MHz	100% (wireless audio)		10 mW
863.0–865.6 MHz	0.1% or LBT+AFA		25 mW
863.0–868.0 MHz *			25 mW wideband up to 1 MHz (data only)
865.0–868.0 MHz	1% or LBT+AFA		25 mW
865.0–868.0 MHz *	0.1% or LBT+AFA	4 frequencies	2 W (RFID only)
865.0–868.0 MHz *	10% (access points), 2.5% (other devices)	4 frequencies	500 mW (data only, power control required)
868.0–868.6 MHz	1% or LBT+AFA		25 mW
868.6–868.7 MHz	1% (alarms)	25 kHz	10 mW
868.7–869.2 MHz	0.1% or LBT+AFA		25 mW
869.2–869.25 MHz	0.1% (social alarms)	25 kHz	10 mW
869.25–869.3 MHz	0.1% (alarms)	25 kHz	10 mW
869.3–869.4 MHz	1% (alarms)	25 kHz	10 mW
869.4–869.65 MHz	10% or LBT+AFA	25 kHz	500 mW
869.65–869.7 MHz	10% (alarms)	25 kHz	25 mW
869.7–870.0 MHz	100% (voice communication)		5 mW
	1% or LBT+AFA		25 mW


15:28
CHANNEL DETAILS
Name MyChannel
Key Size 256 bit
Key kbw+z5SkQw7R3Ho4X/ 2BPFRRpZS7vk7/PQr6W8ZZ8ro=
Channel Role Disabled Secondary
POSITION
Allow Position Requests
Precise Location
MQTT
Uplink Enabled
Downlink Enabled
Save


15:31
Settings
SG9
Security Config
Configuration for: ShakataGaNai - BayMe.sh
Security Config Settings require a firmware version 2.5+
ADMIN & DIRECT MESSAGE KEYS
Public Key
Qr6FPwxYmF7dzm8HEqYsexW2kX-t6Tw6Lfl2HDZFmv3g=
Sent out to other nodes on the mesh to allow them to compute a shared secret key.
Private Key
Used to create a shared key with a remote device.
Primary Admin Key
Primary Admin Key
The primary public key authorized to send admin messages to this node.
Secondary Admin Key
Secondary Admin Key
The secondary public key authorized to send admin messages to this node.
Save
Messages
Bluetooth
Nodes
Mesh Map
Settings

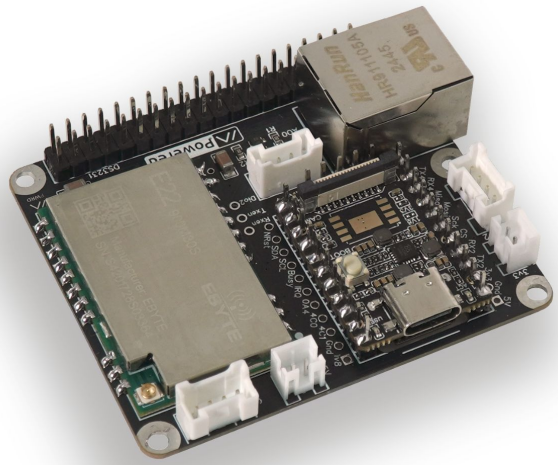

15:29
SG9
Nodes (123)
Find a node
SG9
PWD
ShakataGaNai - BayMe.sh
Bluetooth Connected
11/11/2024, 15:28
Role: Client Mute
Logs:
e16c
Bradford Farm Router
1/8/2080, 10:53
Role: Router
Hops Away: 6
WCRT
PWD
ShakataGaNai/WCRouter
11/11/2024, 12:04
Role: Router & Client
Logs:
Signal Good
ZED
CHG
Livermore-Logger MS https://bayme.sh/
11/11/2024, 11:49
Role: Client
24 miles away 141°
Logs:
Hops Away: 2
Three Emus
11/11/2024, 11:45
Messages
Bluetooth
Nodes
Mesh Map
Settings

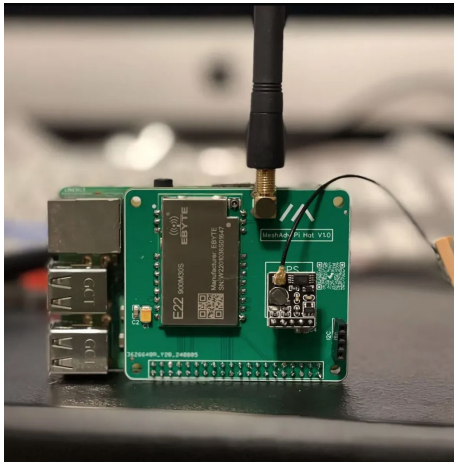
Commodity Hardware

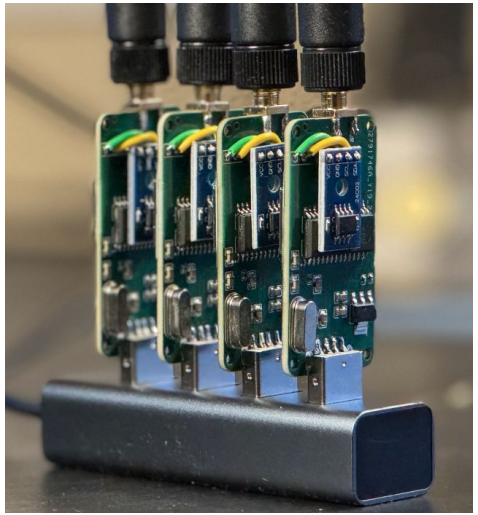


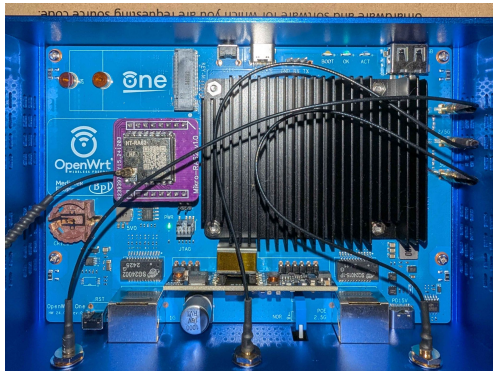
Standalone Hardware

SBC Hardware

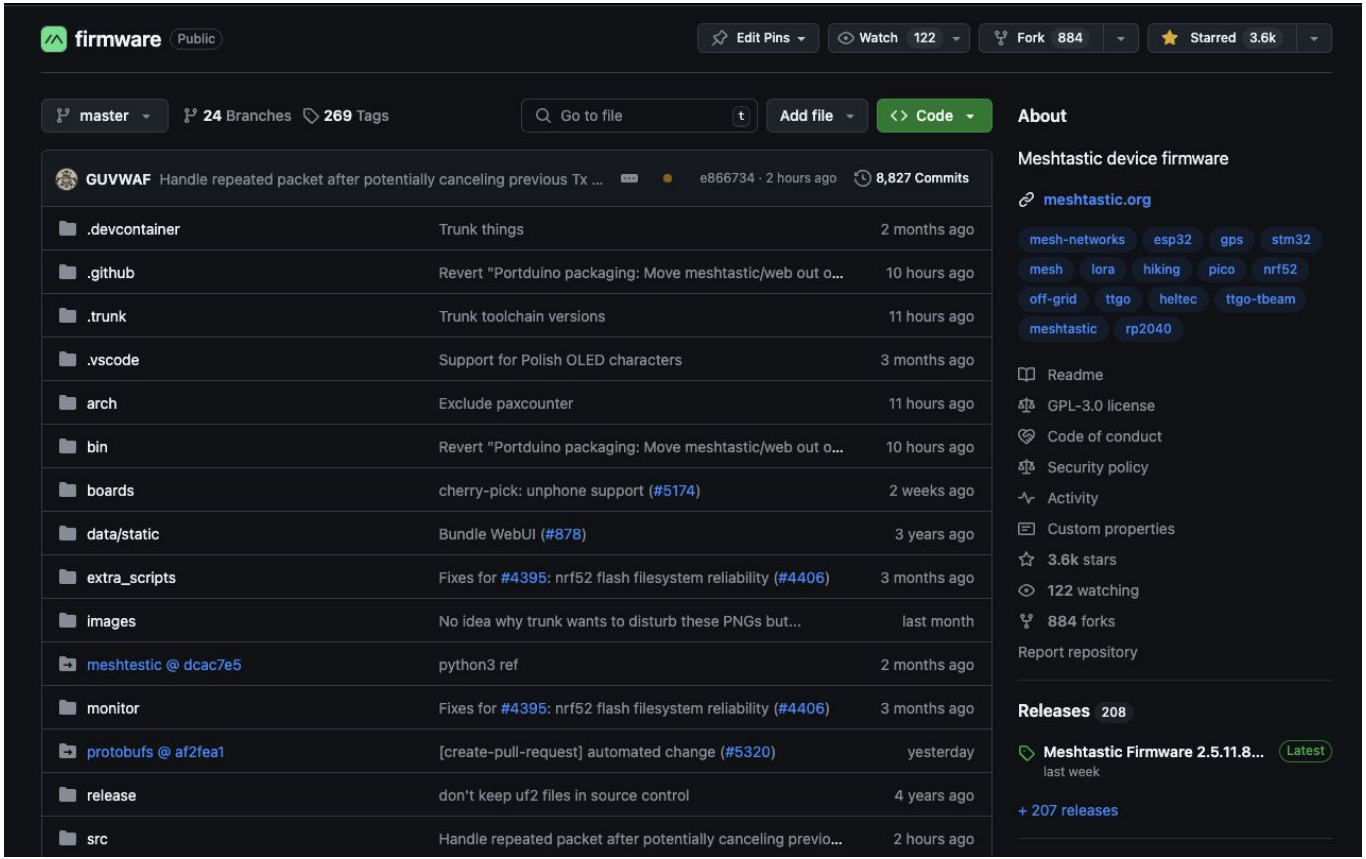








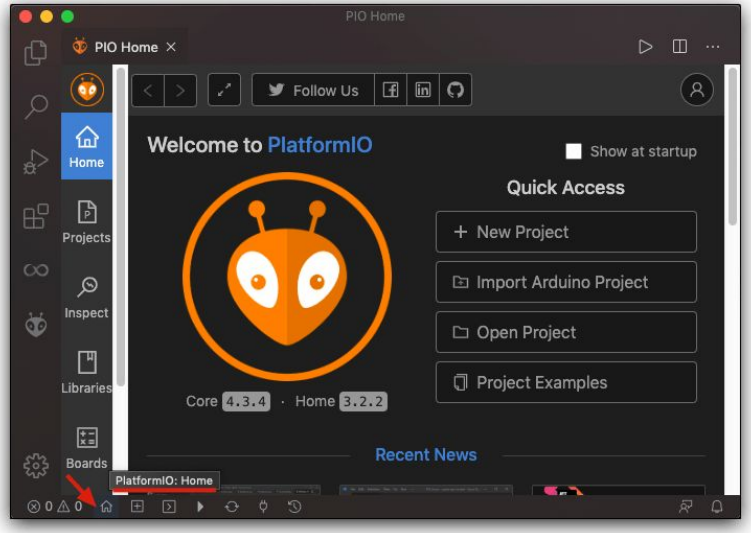
Open Source

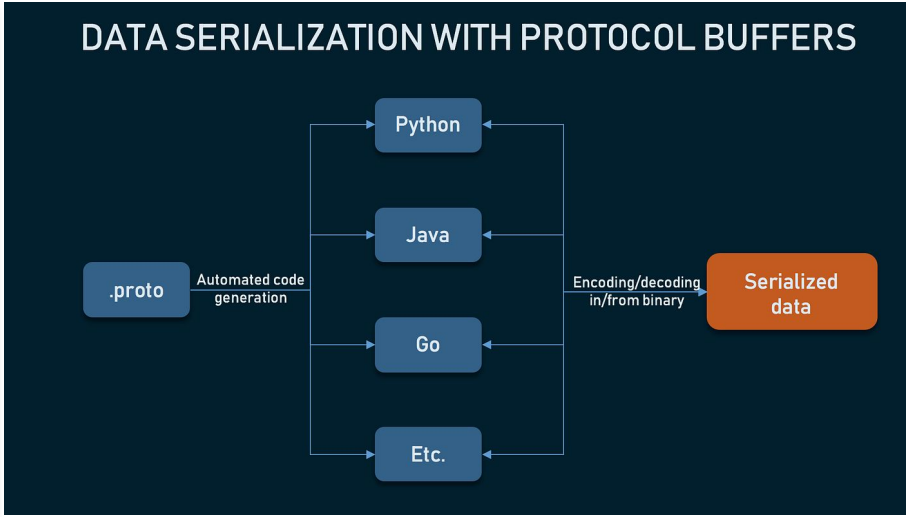

firmware
Public
Edit Pins
Watch 122
Fork 884
Starred 3.6k
master
24 Branches
269 Tags
Go to file
t
Add file
Code
GUVWAF Handle repeated packet after potentially canceling previous Tx ...
e866734 · 2 hours ago
8,827 Commits
.devcontainer Trunk things 2 months ago
.github Revert "Portduino packaging: Move meshtastic/web out o... 10 hours ago
.trunk Trunk toolchain versions 11 hours ago
.vscode Support for Polish OLED characters 3 months ago
arch Exclude paxcounter 11 hours ago
bin Revert "Portduino packaging: Move meshtastic/web out o... 10 hours ago
boards cherry-pick: unphone support (#5174) 2 weeks ago
data/static Bundle WebUI (#878) 3 years ago
extra_scripts Fixes for #4395: nrf52 flash filesystem reliability (#4406) 3 months ago
images No idea why trunk wants to disturb these PNGs but... last month
meshtestic @ dcac7e5 python3 ref 2 months ago
monitor Fixes for #4395: nrf52 flash filesystem reliability (#4406) 3 months ago
protobufs @ af2fea1 [create-pull-request] automated change (#5320) yesterday
release don't keep uf2 files in source control 4 years ago
src Handle repeated packet after potentially canceling previo... 2 hours ago
About
Meshtastic device firmware
meshtastic.org
mesh-networks esp32 gps stm32
mesh lora hiking pico nrf52
off-grid ttgo heltec ttgo-tbeam
meshtastic rp2040
Readme
GPL-3.0 license
Code of conduct
Security policy
Activity
Custom properties
3.6k stars
122 watching
884 forks
Report repository
Releases 208
Meshtastic Firmware 2.5.11.8...
Latest
last week
+ 207 releases

Development and inner workings

PortNums should be assigned by the following ranges:

Portnum	Usage
0-63	Core Meshtastic use, do not use for third party apps.
64-127	Registered 3rd party apps, send in a pull request that adds a new entry to portnums.proto to register your application
256-511	Use one of these portnums for your private applications that you do not want to register publicly





Module Configuration

Modules are included in the firmware and allow users to extend the functionality of their mesh or device.

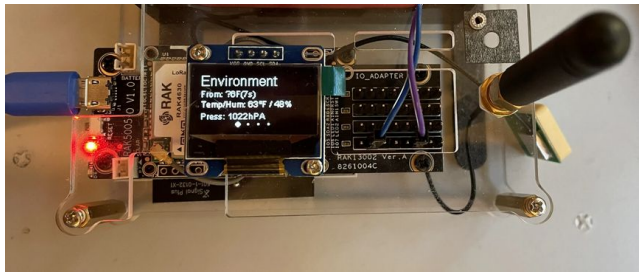
Name	Description
Ambient Lighting	Adjust the brightness of NCP5623 I2C RGB LEDs
Audio	Enable Support for Codec2 Voice Comms on certain devices.
Canned Message	Set a number of predefined messages to send out directly from the device with the use of an input device like a rotary encoder.
Detection Sensor	Configure a GPIO pin to be monitored for specified high/low status and send text alerts.
External Notification	Incoming messages are able to alert you using circuits you attach to the device (LEDs, Buzzers, etc).
MQTT	Forward packets along to an MQTT server. This allows users on the local mesh to communicate with users on another mesh over the internet.
Neighbor Info	Send info on 0-hop neighbors to the mesh.
Paxcounter	Count the number of BLE and Wifi devices passing by a node.
Range Test	Send messages with GPS location at an interval to test the distance your devices can communicate. Requires (at least) one device set up as a sender and one as a receiver. The receiver(s) will log all incoming messages to a CSV.
Remote Hardware	Set and read a GPIO status remotely over the mesh.
Serial Module	Send messages across the mesh by sending strings over a serial port.
Store & Forward	Stores messages on a device for delivery after disconnected clients rejoin the mesh.
Telemetry	Attach sensors to the device and transmit readings on a regular interval to the mesh.
Traceroute	Track which nodes are used to hop a message to a certain destination.

Telemetry

The Telemetry Module provides four types of data over the mesh: Device metrics (Battery Level, Voltage, Channel Utilization and Airtime) from your Meshtastic device, Environment Metrics, Air Quality Metrics, and Power Metrics.

Supported sensors connected to the I2C bus of the device will be automatically detected at startup. The Environment Telemetry, Air Quality, and Health Telemetry modules must be enabled for them to be instrumented and their readings sent over the mesh.

Health metric sensors (Heart rate, Oxygen Saturation and body temperature) are included in the firmware for remote monitoring of animal health, but are disabled by default.

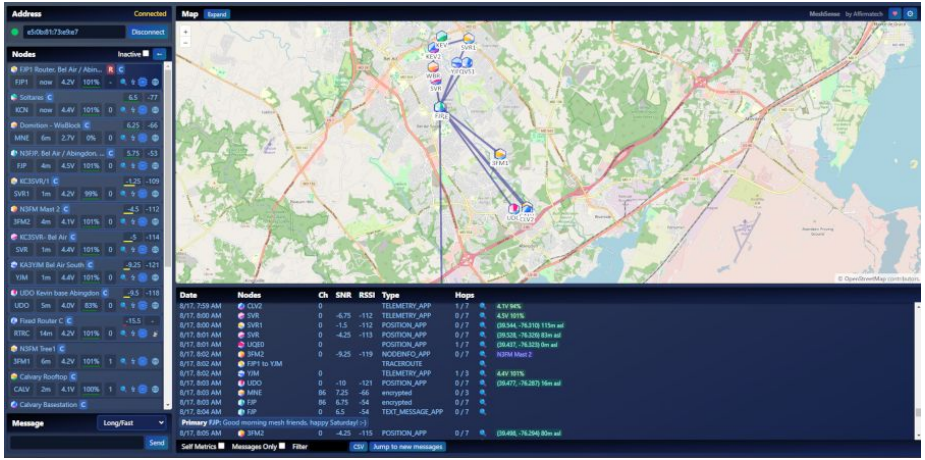


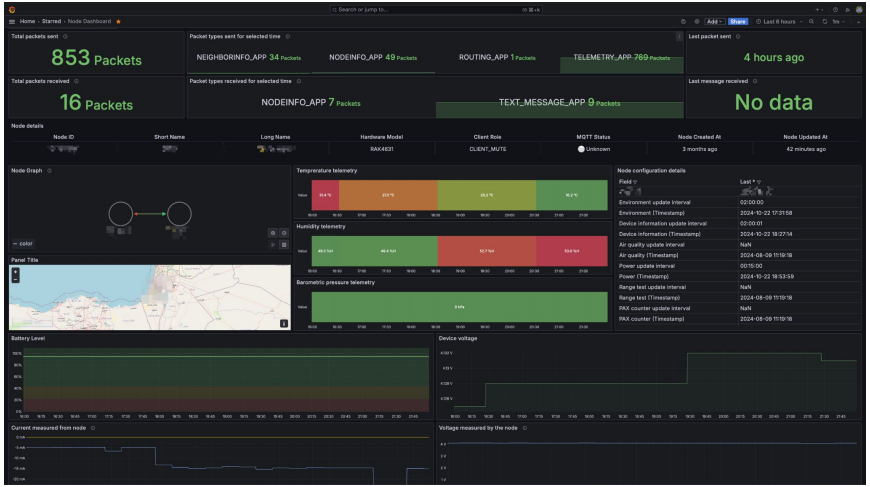
Currently Supported Sensor Types

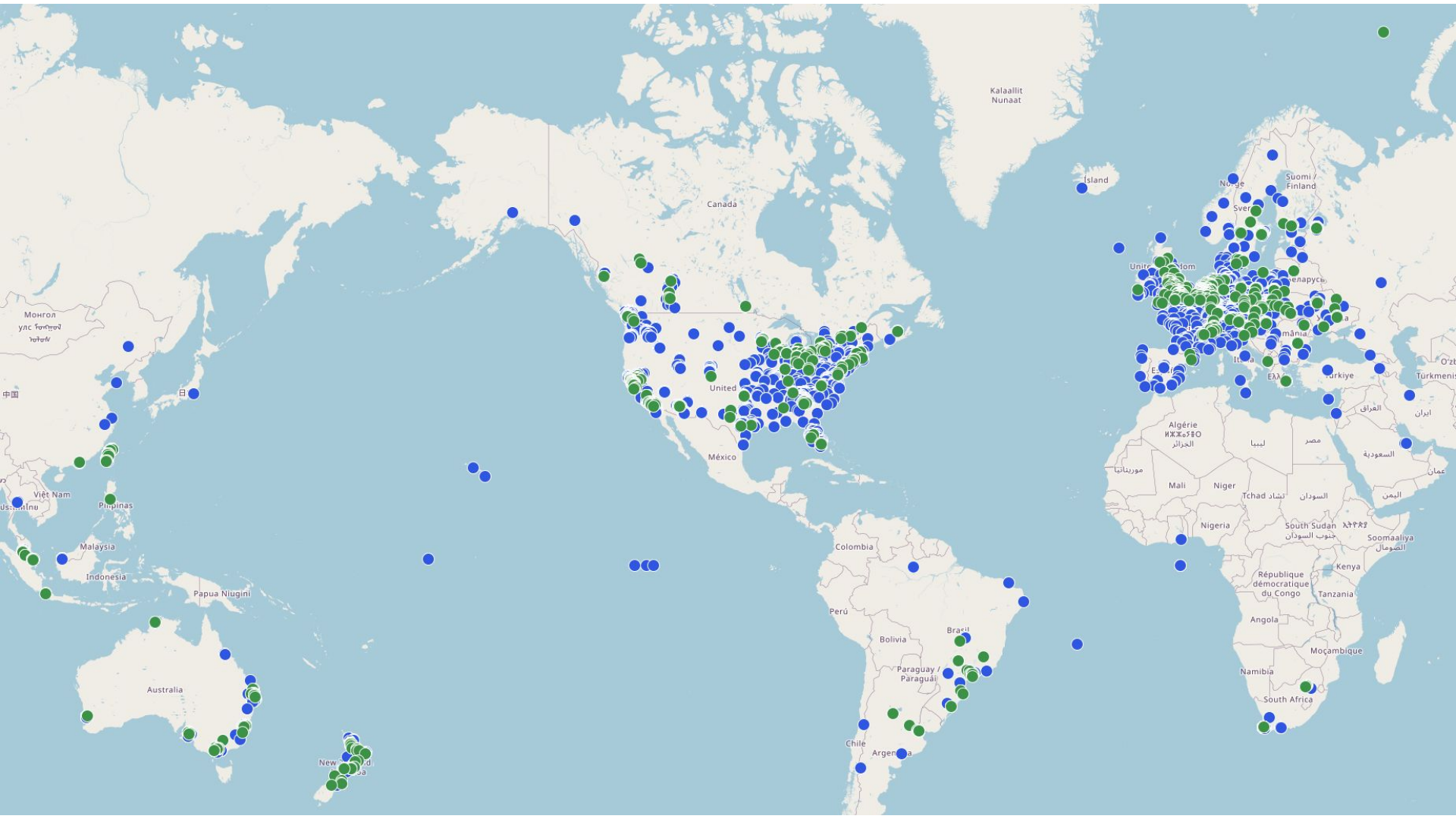
Sensor	I²C Address	Data Points
BMP085	0x76, 0x77	Temperature and barometric pressure
BMP180	0x76, 0x77	Temperature and barometric pressure
BMP280	0x76, 0x77	Temperature and barometric pressure
BME280	0x76, 0x77	Temperature, barometric pressure and humidity
BME68x	0x76, 0x77	Temperature, barometric pressure, humidity and air resistance
MCP9808	0x18	Temperature
INA260	0x40, 0x41, 0x43	Current and Voltage
INA219	0x40, 0x41, 0x43	Current and Voltage
INA3221	0x42	3-channel Current and Voltage
LPS22	0x5D, 0x5C	Barometric pressure
SHTC3	0x70	Temperature and humidity
SHT31	0x44	Temperature and humidity
PMSA003I	0x12	Concentration units by size and particle counts by size
DFROBOT_LARK	0x42	Temperature, barometric pressure, humidity, wind direction, wind speed
MAX30102	0x57	Heart Rate, Oxygen Saturation, and body temperature
MLX90614	0x5A	Body temperature


Total nodes in mesh
321 nodes
Active nodes in the last 30 minutes
19 nodes
Nodes naming status
Unnamed
92 nodes
Named
229 nodes
MQTT Node status
Offline
5
Online
9
Total packets sent
30315 Packets
Data sent on mesh in last hour
55.0 MiB
Channel Utilization (CHUtil)
Duty Cycle (AirUtilTX)
Top channel utilizers
Packet types for selected time
The configured max hops for each client
Node Graph
General Information

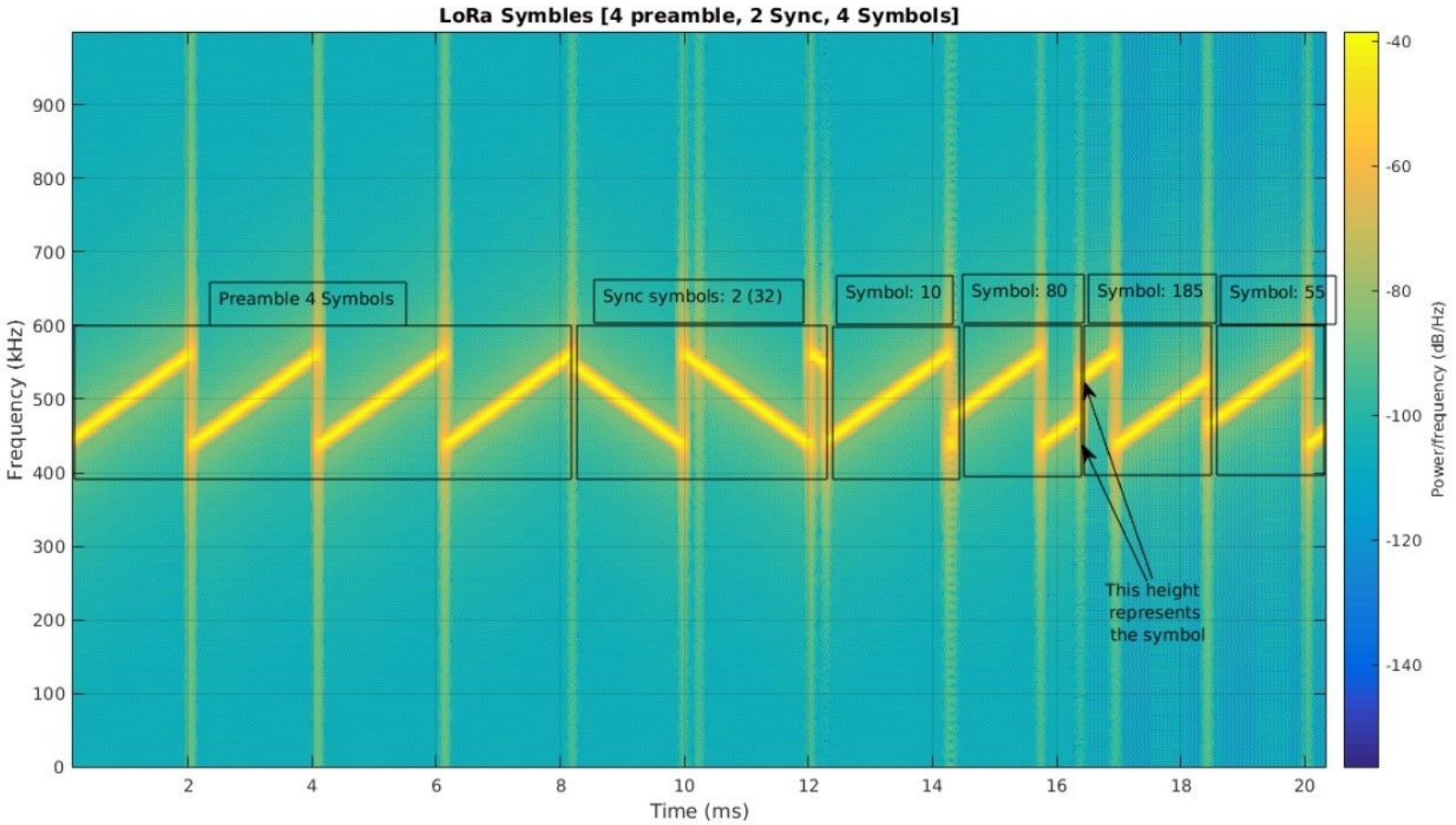

Meshtastic Devices
WisMesh Hub Temperature
WisMesh Hub Humidity
WisMesh Hub Battery Voltage
WisMesh Hub Battery Level
WisMesh Indoor Temperature
WisMesh Indoor Humidity
WisMesh Indoor Barometer
WisMesh Indoor Light
WisMesh Indoor IAQ
WisMesh Indoor PM 1.0
WisMesh Indoor PM 2.5
WisMesh Indoor PM 10
WisMesh Pocket Battery Voltage
WisMesh Gateway Battery Voltage
Locations
Hub
Indoor
Gateway
Pocket

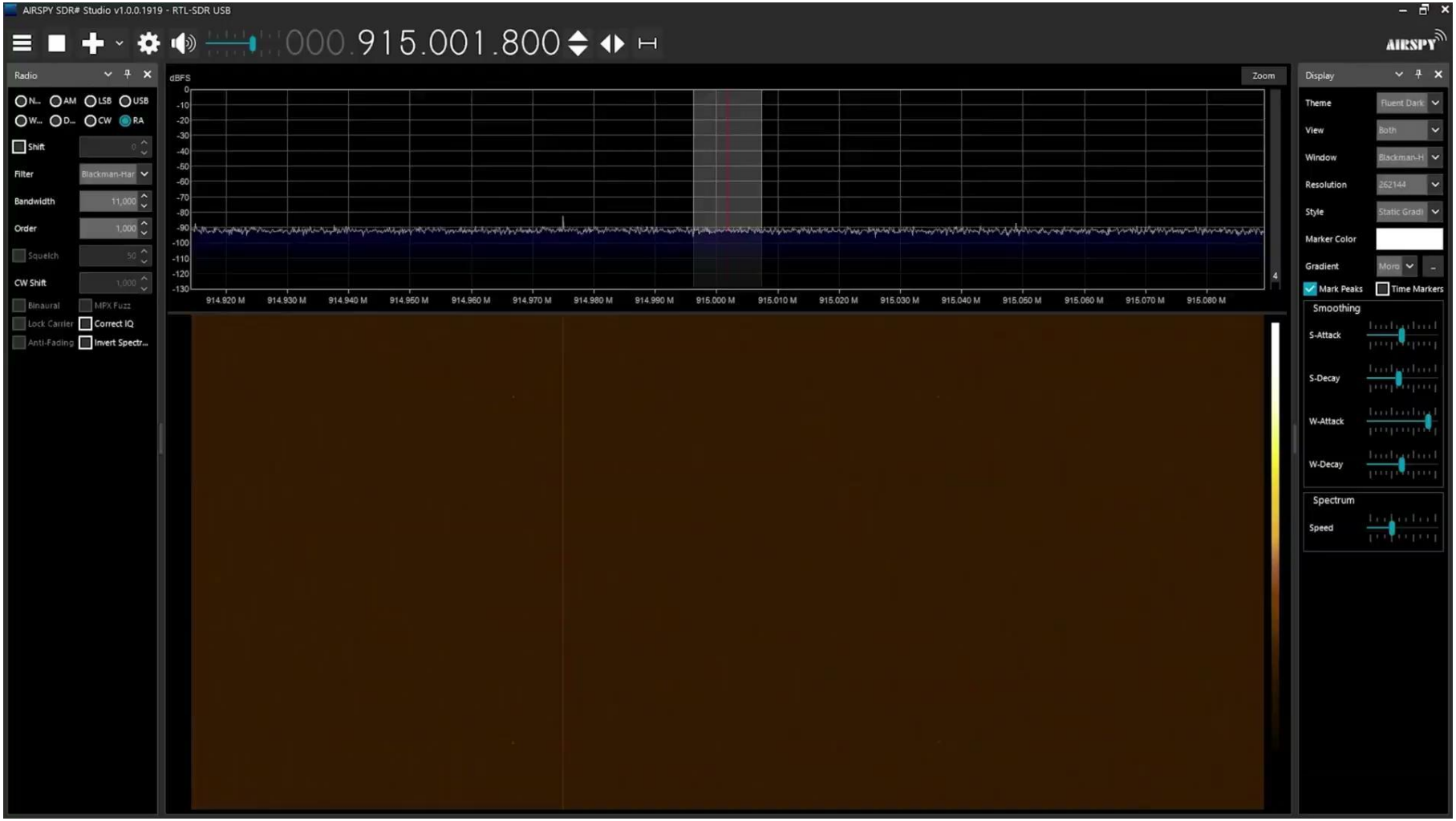

Address
Connected
Disconnect
Nodes
Map
Message
Long/Fast
Send


Total packets sent
853 Packets
NEIGHBORINFO_APP 34 Packets
NODEINFO_APP 49 Packets
ROUTING_APP 1 Packets
TELEMETRY_APP 769 Packets
Last packet sent
4 hours ago
Total packets received
16 Packets
Packet types received for selected time
NODEINFO_APP 7 Packets
TEXT_MESSAGE_APP 9 Packets
Last message received
No data
Node details
Node Graph
Temperature telemetry
Humidity telemetry
Barometric pressure telemetry
Node configuration details
Battery Level
Device voltage
Current measured from node
Voltage measured by the node


Kalaallit Nunaat
Ísland
Canada
United
México
Colombia
Perú
Bolivia
Paraguay / Paraguái
Chile
Argentina
Suomi / Finland
Algérie
Mali
Niger
Nigeria
Tchad
South Sudan
Kenya
Tanzania
Angola
Namibia
South Africa
Moçambique
Soomaaliya
Türkiye
Việt Nam
Malaysia
Indonesia
Papua Niugini
Australia

Other: LoRa CSS




AIRSPY SDR# Studio v1.0.0.1919 - RTL-SDR USB
000.915.001.800
AIRSPY
Radio
N...
AM
LSB
USB
W...
D...
CW
RA
Shift
Filter
Blackman-Har
Bandwidth
11,000
Order
1,000
Squelch
50
CW Shift
1,000
Binaural
MPX Fuzz
Lock Carrier
Correct IQ
Anti-Fading
Invert Spectr...
dBFS
Zoom
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
914.920 M
914.930 M
914.940 M
914.950 M
914.960 M
914.970 M
914.980 M
914.990 M
915.000 M
915.010 M
915.020 M
915.030 M
915.040 M
915.050 M
915.060 M
915.070 M
915.080 M
Display
Theme
Fluent Dark
View
Both
Window
Blackman-H
Resolution
262144
Style
Static Gradi
Marker Color
Gradient
Mono
Mark Peaks
Time Markers
Smoothing
S-Attack
S-Decay
W-Attack
W-Decay
Spectrum
Speed

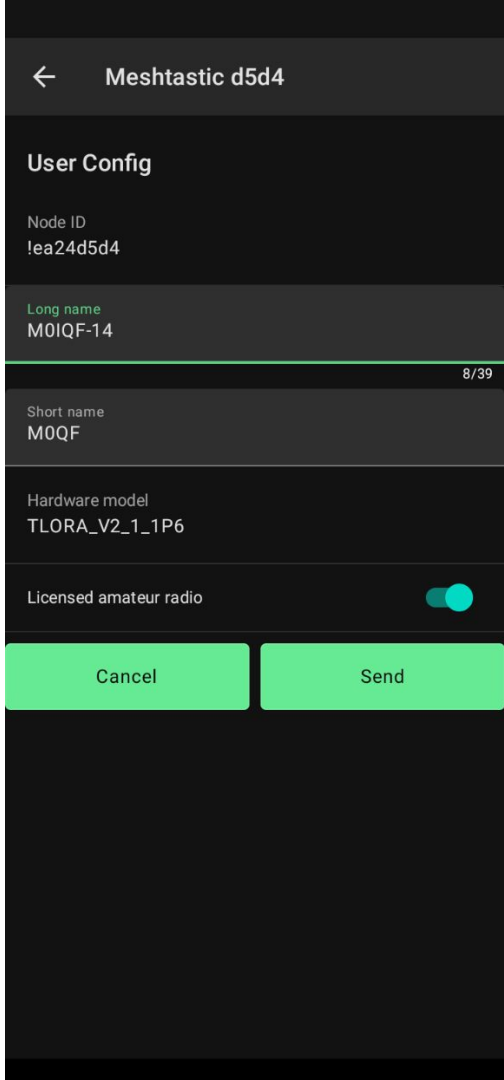
Ham Mode

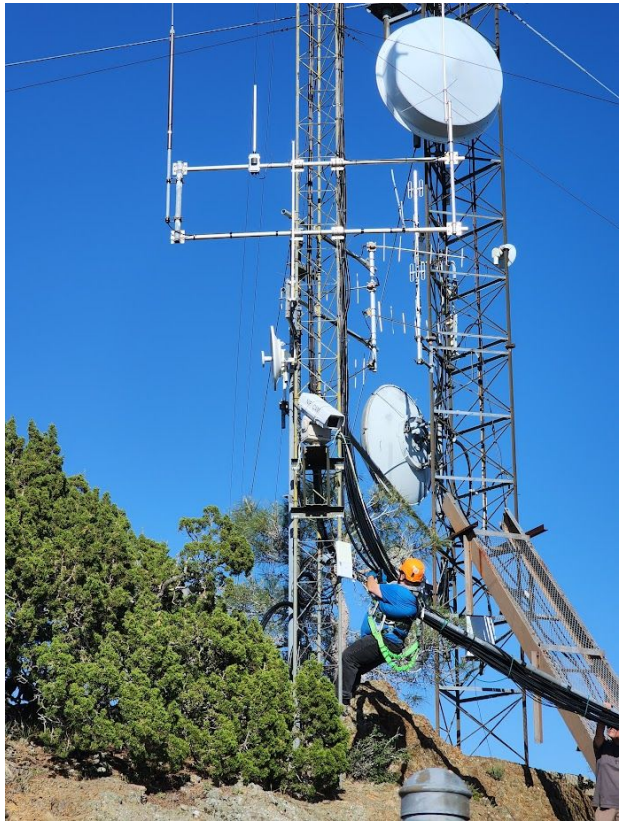
Pros

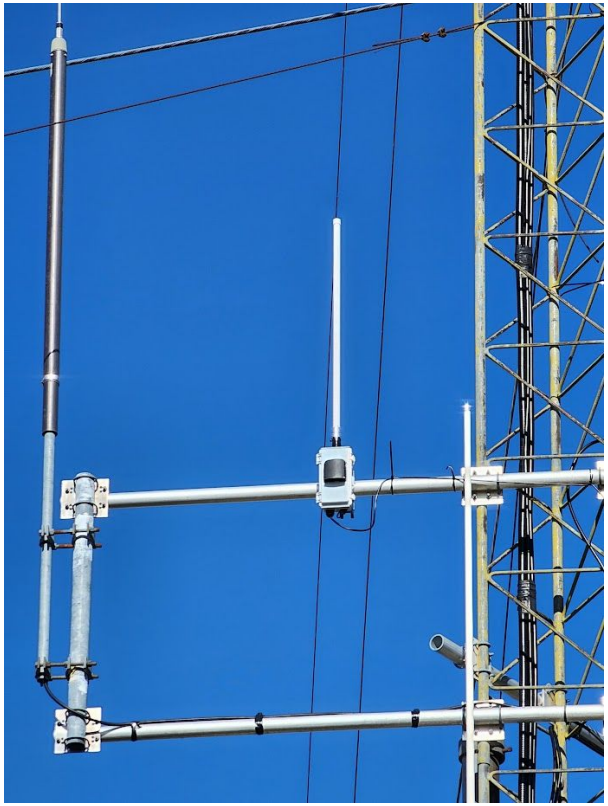
- Up to 10W transmit power, depending on license class and country
- Higher gain antennas

Cons

- Can’t join the default Mesh (You will not see others if you use this mode)
- Not allowed to route or forward messages for non-HAM’s
- No Channel or DM encryption
- Your call sign will be publicly transmitted once every 10 minutes

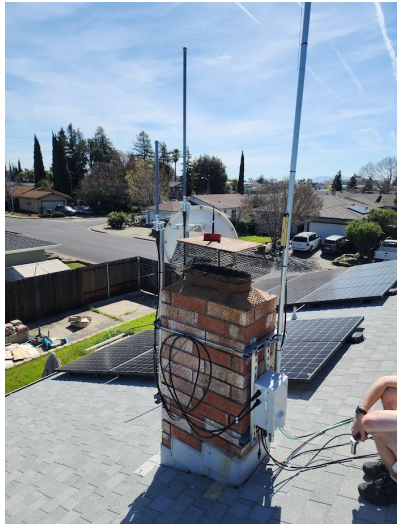






Vaca & Mt Diablo - Compliments of Trevor KG6MDW


SANTA CLARA
LILYGO
meshtastic.org




Do you code?
Meshtastic is open source!
MESHTASTIC

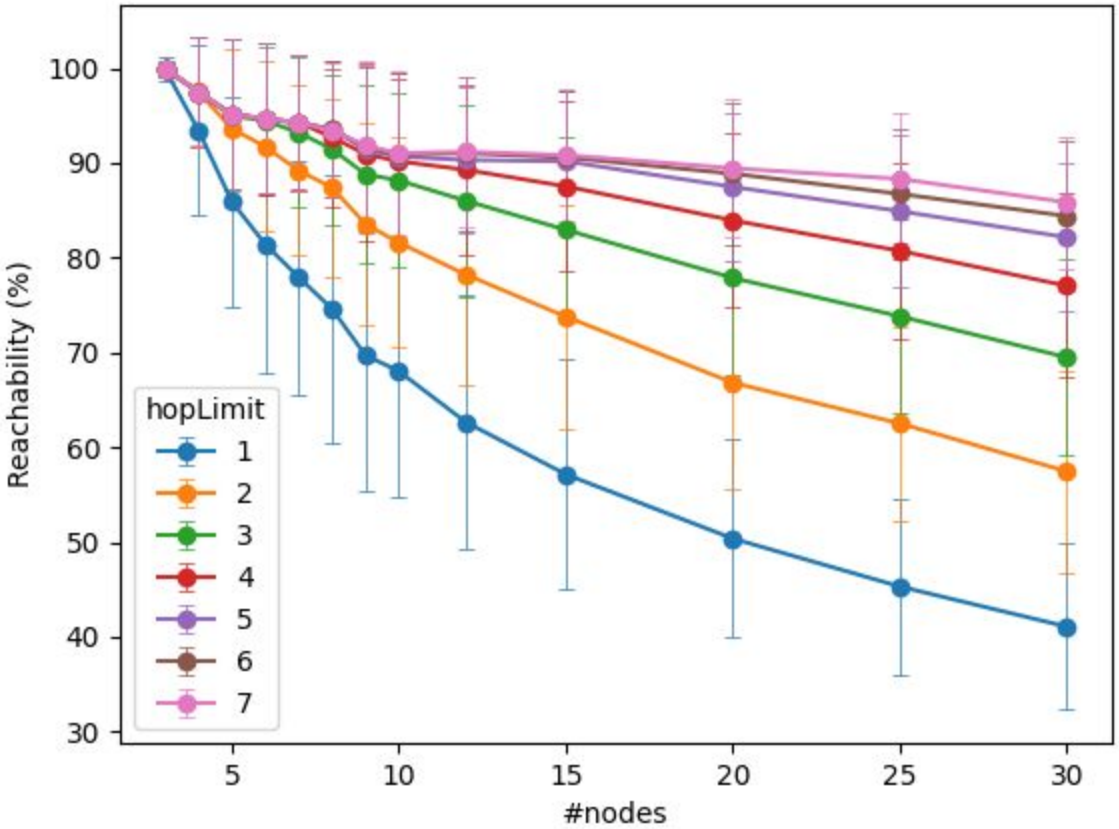
Any Questions?

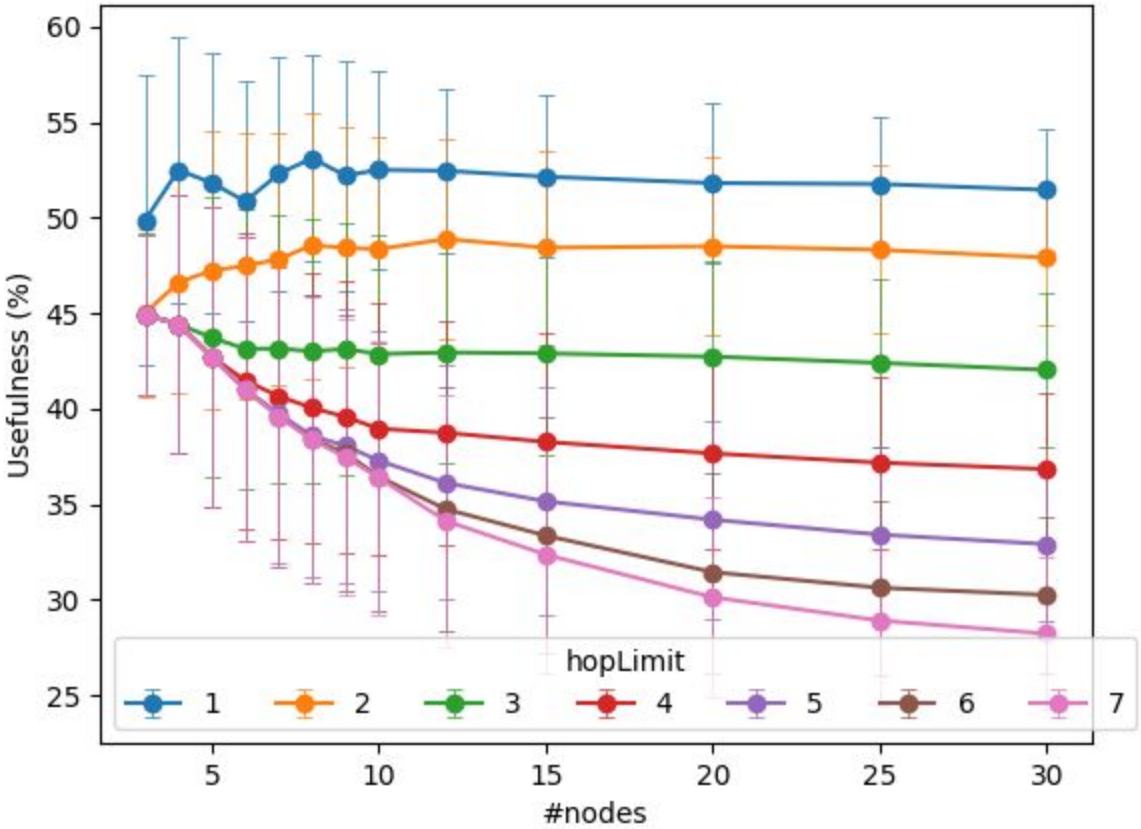
Thank you for listening!

Meshtastic Homepage:

meshtastic.org

Visit our stand in the AW building.


Reachability (%)
100
90
80
70
60
50
40
30
5
10
15
20
25
30
#nodes
hopLimit
1
2
3
4
5
6
7


Usefulness (%)
60
55
50
45
40
35
30
25
5
10
15
20
25
30
#nodes
hopLimit
1
2
3
4
5
6
7

- What is meshtastic (walky)
- What does it look like
- Metrics
- Speeds
- “Off grid” aka Use case
- Decentralized - no registration, lora/relay/mesh/hops, range
- Low power - both radio and broadcast. 30dbm in US. 915mhz ISM 33cm - exact frequency math. 22dBm/160mW . Sx1262 4.2ma active receive - global. Encryption. ham.
- Commodity
- Open source
- Other technical details and FAQs?
    - Public Mesh map
    - Chirp Spread Spectrum. LoraWAN. Ham mode.
- Recommended hardware
- BayMe.sh