



$$e = \sum_{n=0}^{\infty} \frac{1}{n!} = \lim_{n \rightarrow \infty} \left( \frac{1}{0!} + \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{n!} \right)$$

# LandRake-MIMO-Mesh Radio



With MIMO High Throughput OFDM (HT-OFDM) and Dual Channels x Dual Polarization Mobile Mesh Network technology, this radio is a high capacity Mobile Mesh node for 5GHz ISM band wireless deployment as Mesh Network.

There are 14 channel BWs:

(2.5/3/3.5/4/5/6/7/8/10/15/20/30/40/52 MHz) can be selected easily by software. This feature provides the flexibility of deployment channel plan in high density city area.

Compare to the traditional Single Channel Mesh Network, the Dual Channels Mobile Mesh Network design makes the Mesh Network working better and more efficiency because of below advantages.

1. Reduce the Co-channel interferences,
2. Better efficiency and throughput after multi-hops repeating.
3. Shorter latency for the Mesh Network.
4. More possibilities of the deployment plan with different antenna design for different applications and environments.

It's also an excellent solution for mining, transportation, disaster response operations and military operation in harsh outdoor environments.

## Features:

- 4X4 MIMO HT-OFDM Mesh Radio
- Self-healing & Self-forming Mesh
- Dual Channels x Mobile Mesh Network
- High Efficiency in Multi-hops Repeat
  - Low Throughput dropped ( $\geq 100$  Mbps @ 10 hops)
  - Short Latency increased ( $\leq 15$  ms @ 10 hops)
- Network Architecture:
  - P-T-P: 1+0 / 2+0 / 1+1
  - P-T-MP
  - Ring (Redundant)
  - Mobile MESH
- Fast Seamless Roaming
- High Speed up to 180km/hr
- IEC61000-4-5 Surge Protection
- IP-68 Water & Dust Resistant

## Product Highlights

- ◆ **4x4 MIMO HT-OFDM with dual channels Mobile Mesh**  
Radios implement 4x4 MIMO HT-OFDM with two independent channels and the unique mesh network algorithm. That can makes the radios switching fast between the dual channels and keep finding the best path for data transmission, to realize the seamless Mobile Mesh roaming with high efficiency -- higher capacity and shorter latency.
- ◆ **Self-healing & self-forming Mesh Protocol**  
Automatic configuration and routing enables the mesh networks to be self-forming and self-healing.
- ◆ **Pure and Simple Mobile Mesh Network**  
ATHN(V)3011-27 supports a pure and simple Mesh network, each mesh node in the Mobile Mesh network is equal to each other. One mesh node operation mode for easy configuration
- ◆ **Frequency Redundant for P-T-P link**  
When the 4x4 Mesh radio deployed as PTP link, RF2 and RF1 can worked as Frequency redundant. When RF1 getting worse or failed, RF2 can replace the RF1 for data transmission.



For rapid deployment, temporary networks or resilient fixed infrastructures, no more power supply constraint!



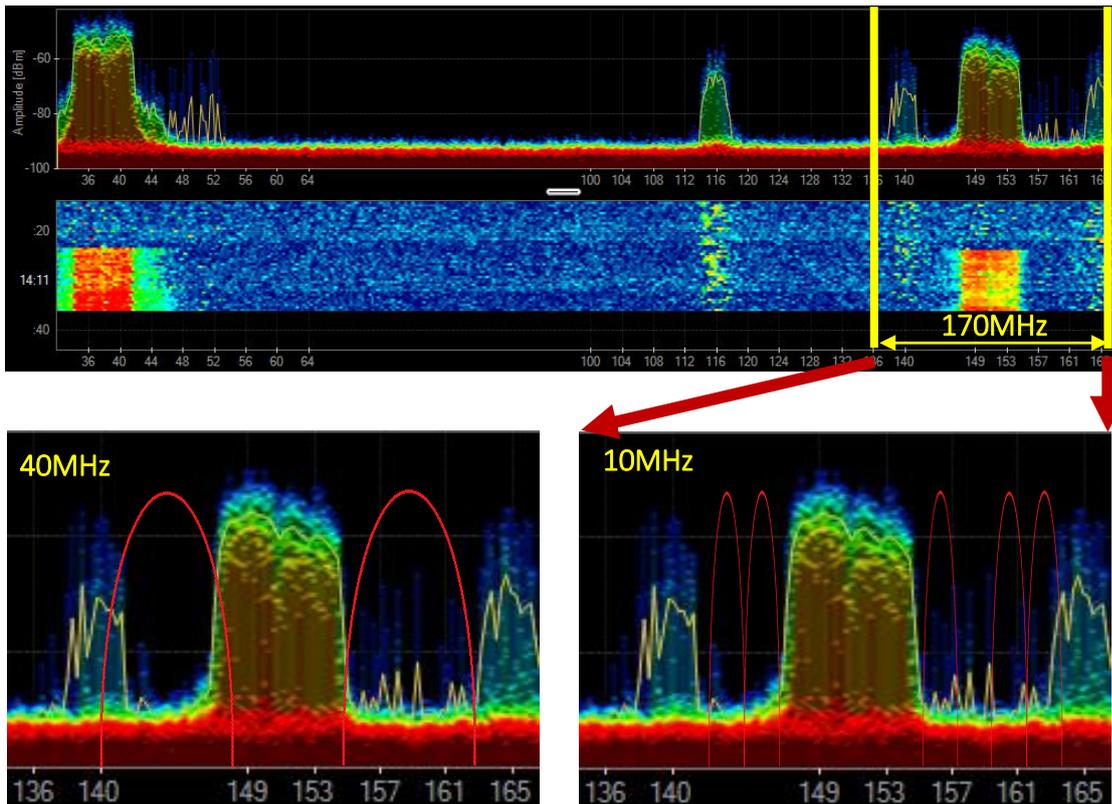
Dual channels Mobile Mesh Network for the military vehicles team



## True Value of narrow bandwidth with high spectral efficiency

1. More effective non-overlapping channels for flexible channel Plan
2. More total assumption capacity due to more effective narrow band channels in limited clear band without interferences.

Example: In a 170MHz available range with other interference source



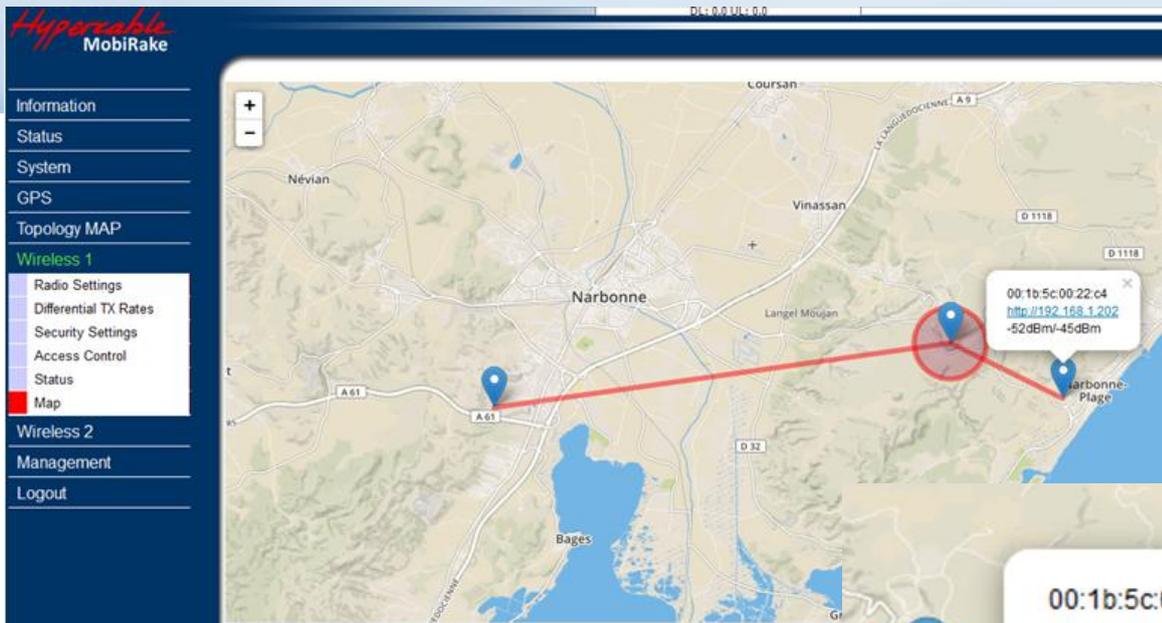
**40 MHz** channel BW: **1 x effective channel** without interference only, total throughput < 300Mbps.

**10 MHz** channel BW: **6 x effective channels** without interferences, each channel offers 50Mbps TCP throughput. Total throughput about 300Mbps

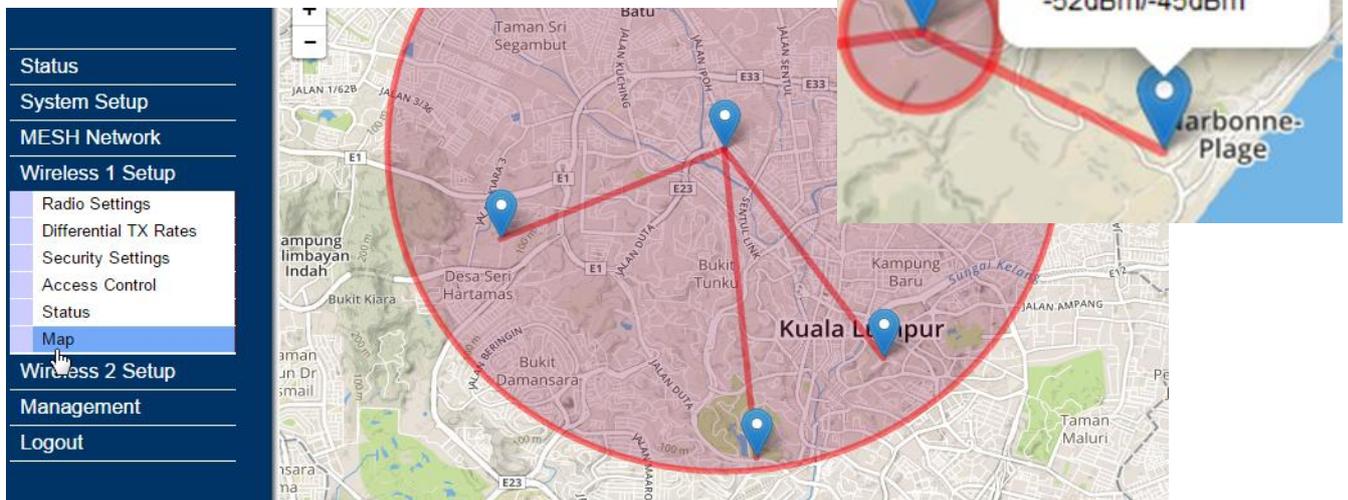
**2.5 MHz** channel BW: **24 x effective channels** without interferences, each channel offers 12Mbps TCP throughput. Total throughput about 300Mbps.

Channel BW (MHz)	2.5	3	3.5	4	5	6	7	8	10	15	20	30	40	52	
Real TCP throughput (Mbps)	12	14	17	20	25	30	35	40	51	77	104	158	215	268	
Application area	Valuable spectrum				Crowded urban						Rural				

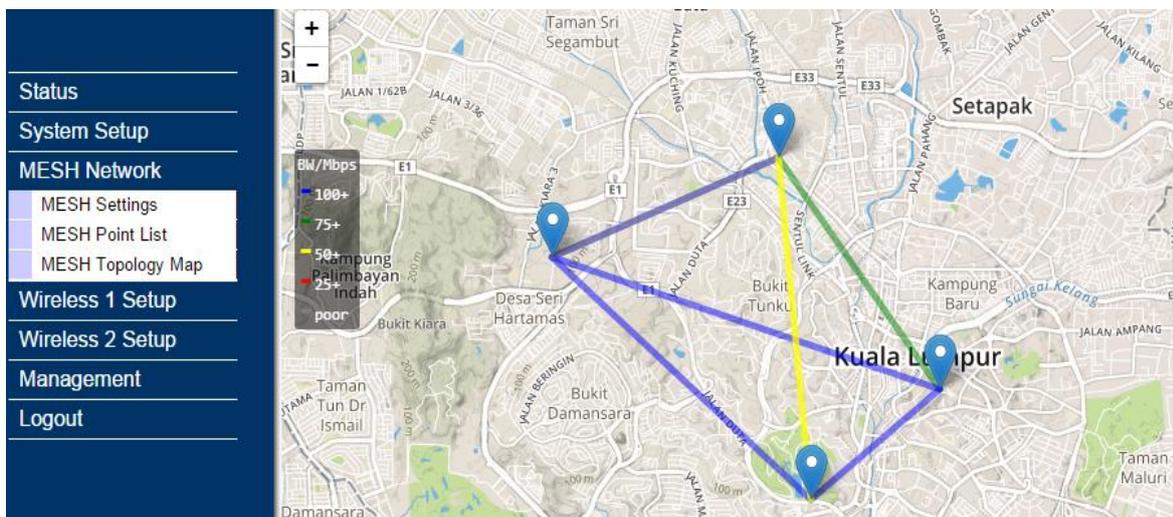
Channel BW & TCP throughput list table.



Map of Wireless 1(Channel A) – includes IP / MAC address and RSSI info of each node



Map of Wireless 1(Channel A) – includes IP / MAC address and RSSI info of each node



Map of the whole Mesh Topology – includes IP / MAC address and data rate info of the live link

RADIO SPECIFICATIONS								
Frequency range	4.920 ~ 6.075 GHz Optional : 4.800 ~ 5.000 GHz and WiFi AP2.4 GHz embedded							
Channel Band Width	2.5 / 3 / 3.5 / 4 / 5 / 6 / 7 / 8 / 10 / 15 / 20 / 30 / 40 / 52 MHz							
Frequency Stability	± 2 ppm							
Modulation	MIMO HT-OFDM							
MCS Index	IEEE 802.11an / HT20				IEEE 802.11an / HT40			
	Data Rate (Mbps)		Tx Output Power (dBm)	Rx Sensitivity (BER 1 <sup>E</sup> 10 <sup>-6</sup> )	Data Rate (Mbps)		Tx Output Power (dBm)	Rx Sensitivity (BER 1 <sup>E</sup> 10 <sup>-6</sup> )
	GI=800ns	GI=400ns			GI=800ns	GI=400ns		
MCS8	6.5/13	N/A	27(±1.5)	-94/-92 dBm	13.5/27	15/30	27(±1.5)	-92/-90 dBm
MCS9	13/26	N/A	27(±1.5)	-92/-90 dBm	27/54	30/60	27(±1.5)	-89/-87 dBm
MCS10	19.5/39	N/A	26(±1.5)	-90/-87 dBm	40.5/81	45/90	26(±1.5)	-87/-83 dBm
MCS11	26/52	N/A	25(±1.5)	-87/-84 dBm	54/108	60/120	25(±1.5)	-84/-81 dBm
MCS12	39/78	N/A	24(±1.5)	-84/-81 dBm	81/162	90/180	24(±1.5)	-81/-79 dBm
MCS13	52/104	N/A	23(±1.5)	-80/-77 dBm	108/216	120/240	23(±1.5)	-78/-75 dBm
MCS14	58.5/117	N/A	23(±1.5)	-78/-75 dBm	121/242	135/270	23(±1.5)	-76/-73 dBm
MCS15	65/130	N/A	23(±1.5)	-76/-73 dBm	135/270	150/300	23(±1.5)	-74/-72 dBm
INTERFACES								
Wireless Interface : 4 x N-type Female Connectors								
10/100/1000 Base-T RJ-45 port with M25 Cable Gland								
MANAGEABILITY								
Management and Setup	Web-based (Chrome / IE 9.0 or later)							
SNMP agents	MIB II							
Protocol	TCP/IP, IPX/SPX, NetBEUI							
Network Architecture	PTP (1+0 / 2+0 / 1+1) / PTMP / Ring / Mesh							
Antenna Alignment	WEB GUI Local / Remote Information							
Radio Locator	GPS coordinates and internet map database							
Security								
Data Encryption	WPA-PSK / WPA2-PSK							
Advanced Security	MAC access control / Disable SSID / Proprietary protocol							
ENVIRONMENT								
Operating Temperature	-30~60 °C							
Storage Temperature	-30~70 °C							
Humidity	95% non-condensing							
POWER SUPPLY & CONSUMPTION								
Power Supply : AC 100-264V, 50-60Hz convert to DC 48V Adapter (Max. 45Watts) with 48VDC POE								
Power Consumption : 16Watts (typical) / 19 Watts (Max.) @ DC 48V								
DC 10~30V optional for vehicle radio version								
PHYSICAL								
Dimension	259 (L) * 250 (W) *75 (H) ; mm							
Weight	1.8 Kg							
WARRANTY								
1 YEAR								
ORDERING INFORMATION								
LRHN3011-27	4.920~6.075 GHz 0.5 W Outdoor 4x4 MIMO HT-OFDM Mobile Mesh radio, 14 software selectable channel BW.							
LRHNV3011-27	4.920~6.075 GHz 0.5 W Outdoor 4x4 MIMO HT-OFDM Mobile Mesh Vehicle radio, 14 software selectable channel BW							
LRHN3011-35	4.920~6.075 GHz 3 W Outdoor 4x4 MIMO HT-OFDM Mobile Mesh radio, 14 software selectable channel BW							
LRHN3011S-25	4.920~6.075 GHz 0.3 W Integrated 4x4 MIMO HT-OFDM Mobile Mesh radio, 14 software selectable channel BW.							
LRHNV3011S-25	4.920~6.075 GHz 0.3 W Integrated 4x4 MIMO HT-OFDM Mobile Mesh Vehicle radio, 14 software selectable channel BW.							
LRPW3011S-117	4.920~6.075 GHz 0.3 W Integrated 4x4 MIMO HT-OFDM Mobile Mesh PWS ; 14.8V / 17.5AH Li-ion Battery integrated							



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 WEB : [www.e-rake.us.com](http://www.e-rake.us.com)

WIRELESS MOBILE MESH NETWORKS

$$e = \sum_{n=0}^{\infty} \frac{1}{n!} = \lim_{n \rightarrow \infty} \left( \frac{1}{0!} + \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{n!} \right)$$

# SkyMesh Mobile Series

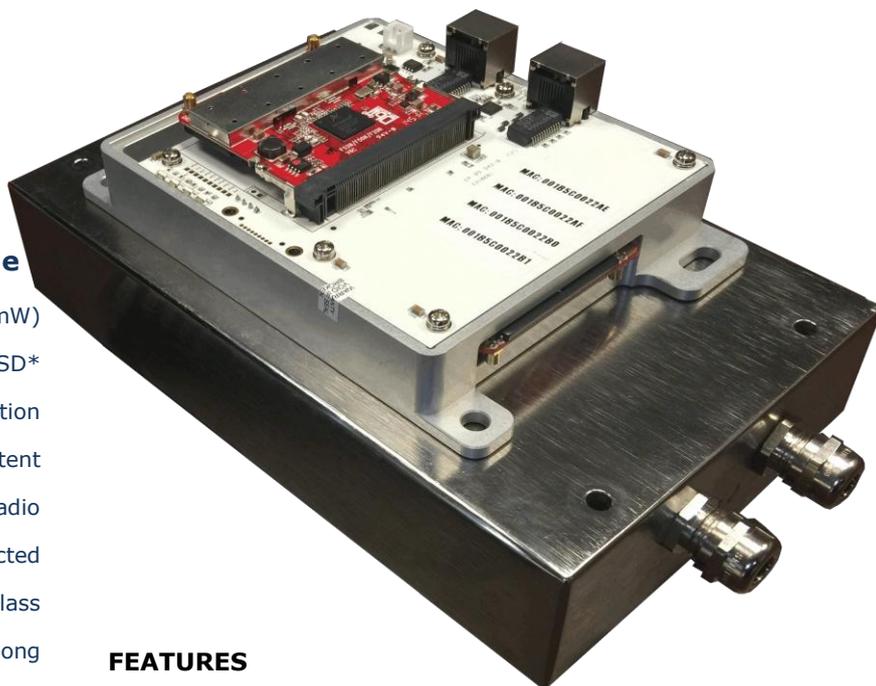
Wireless Base Station and CPE  
 For Sky and Land Mesh 4x4 Ethernet link

## SkyMesh 4x4 PCB

### Xtreme Robustness

#### 802.11 a/n 28dBm 5GHz Military Grade

SkyMesh PRO is a high powered 4 x 28 dBm (600mW) 802.11a/n MIMO 4x4 integrated Lightning & ESD\* protected band device with robust surge protection capabilities built-in by default. It employs a patent architecture that integrates the protection for the Radio Frequency (RF) antenna port. Power is also be protected with the SafeSurge PRO. Output power and best in class receive sensitivity and gain are designed wFh long distance outdoor wireless networks in mind (PtP and PtMP). Skymesh PRO card is also FCC and CE approved for the 5GHz band.



#### FEATURES

##### Transmitter Characteristics (Tx)

Data Rate: MCS0, MCS3, MCS7, MCS15  
 802.11 a/n: 28 dBm, 25 dBm, 20 dBm, 20 dB

##### Receiver Characteristics (Rx)

Data Rate : MCS0, MCS3, MCS7, MCS15  
 802.11 a/n : -96 dBm, -91 dBm, -77 dBm, -77 dBm

##### Specification

- RF connector : 4 MMCX Plug
- Dimensions - Weight : 6 cm X 5.4 cm x 0.73 cm
- Operating Frequencies : 4.9-6GHz a/n
- Operational Temperature : -40C to +70C
- Power Consumption : 20 Watts (Peak)
- Power supply : 10/18 VDC
- Humidity : 0% to 95% (non-condensing)
- MAC Chipset Atheros : AR9220
- OS Compatibility : MobiRake
- Included Accessories : 15cm ground wire, 2 screw (3mm length), power cable 20cm.
- Bandwidth control : 2.5/3/3.5/4/5/6/7/8/10/15/20/30/40/52 MHz
- Power offset : 5 dBm
- Warranty : Limited Lifetime Warranty

#### Product Highlights

- **Proprietary design**

SkyMesh uses proprietary design, With MIMO High Throughput OFDM (HT-OFDM) and Dual Channels Mobile Mesh Network technology, this radio is a high capacity Mobile Mesh node for 5GHz ISM band wireless deployment. Compare to the traditional Single Channel Mesh Network, the Dual Channels Mobile Mesh Network design makes the Mesh Network working better and more efficiency.

- **RF Port "Lightning" Protection (Built-in)**

ESD Handling Over 14kV\*

Surge Handling 8/20uS (10kA)\*

The mini PCI card should be properly grounded with the supplied cable to achieve this level of protection.

- **Proprietary Antennas**

SkyMesh uses special base station antennas design with polarization RHCP & LHCP + Brewster angle and 16 -19 -22 dB gain, panel antenna choice for LanRake design. For Hybrid use with SkyMesh, Drones Mobile CPE for Sky and Land use Omnidirectional Diversity antenna 10 dB gain with V and H polarization and 3 dB gain dual polarization RHCP and LHCP