



# 60 GHz and you


Use cases and topics

# Why 60 GHz

---

- Small Beamwidths
- High bandwidth
- Point to Point and Point to Multipoint
- WISP cell sizes are shrinking
- Allows WISPs to do “small cell”





## Uses

---

- Building connectivity
- IoT
- Events
- Free up spectrum
- Hybrid networks

# Ideas

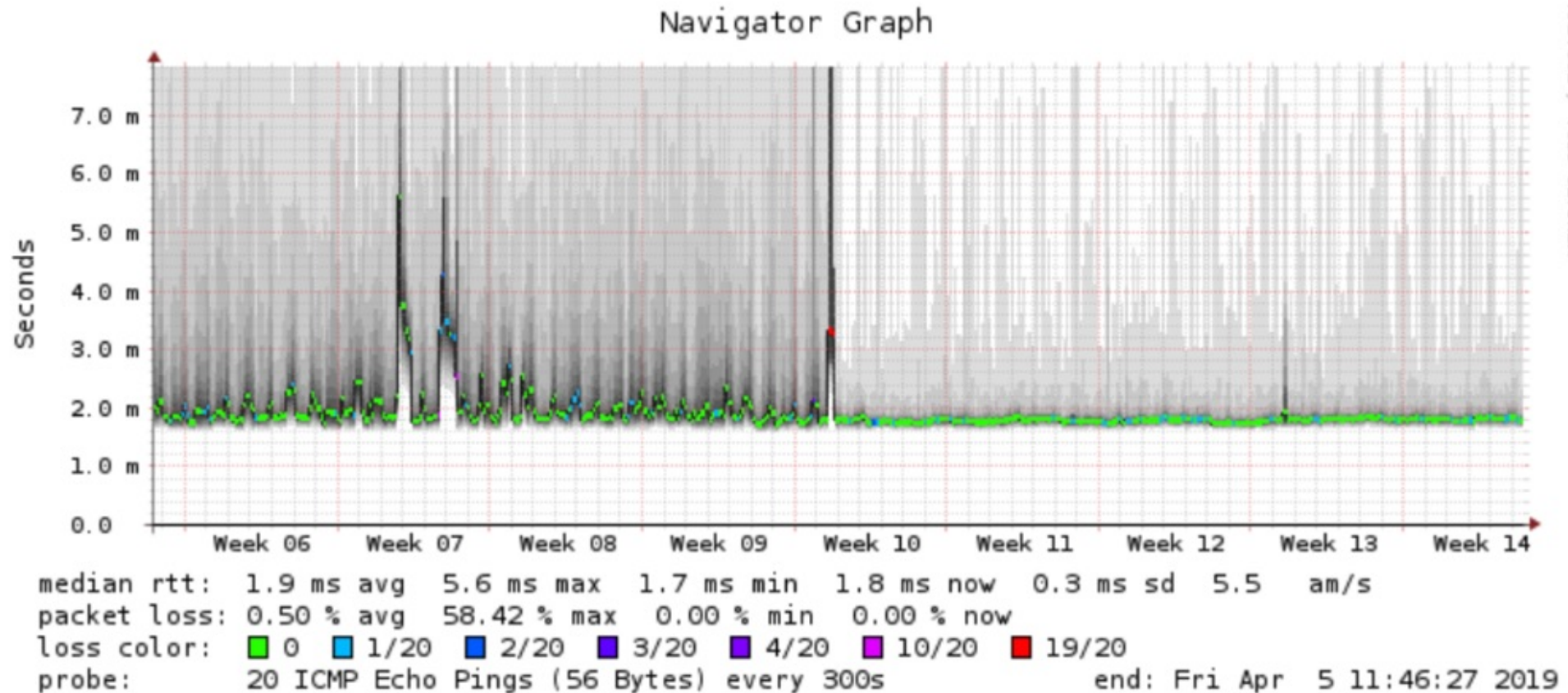
- Fiber rings to pole
- Distribution from pole
- 60GHZ can allow layered services
  - 60 GHZ for point to point for high bandwidth clients or small cells without fiber
  - 5GHZ for point to multipoint
  - 2.4 GHZ for mobile or IoT



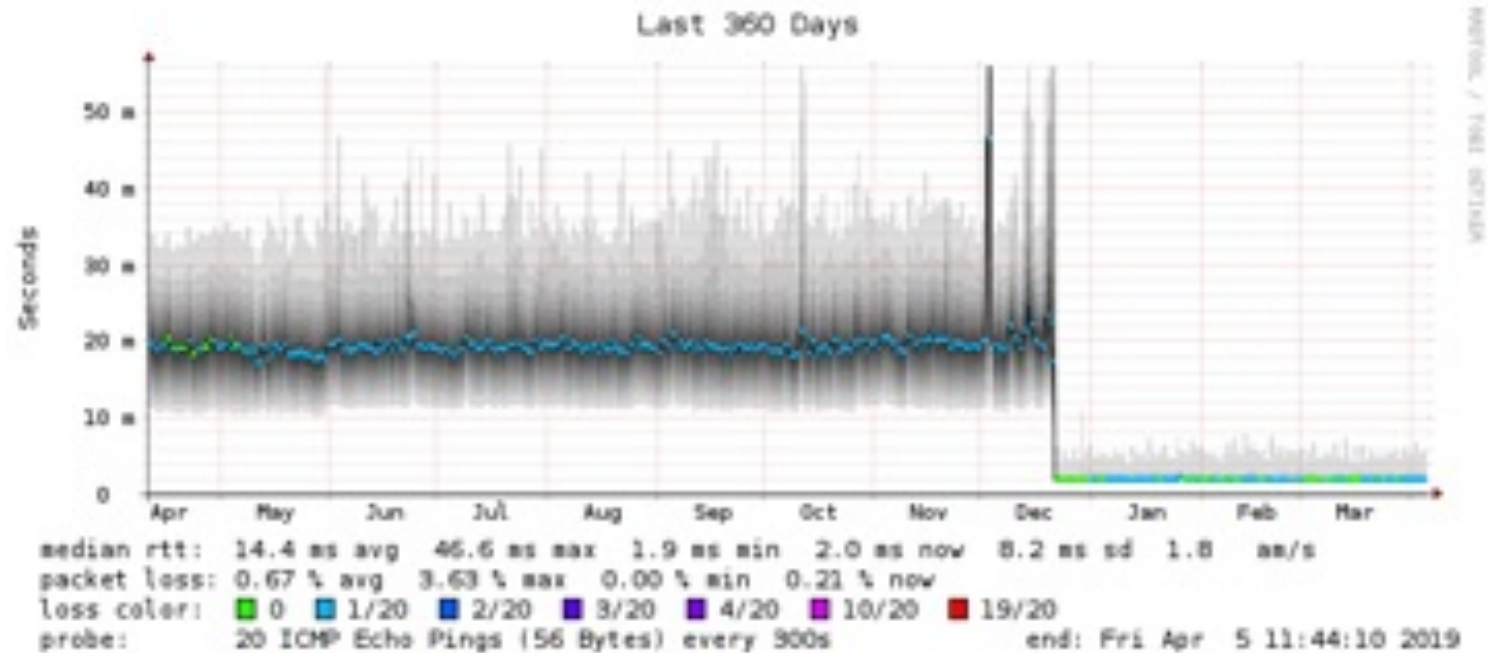
# Justin Miller - VaSkywire

- Fiber Fixed Wireless ISP Focused on MDUs
- 60GHZ to branch off fiber pops
- 5GHZ would see several hundred SSIDS.
- 60GHZ allows better latency and mitigates interference
- 58 LHG radios deployed
- 38 WAP60s

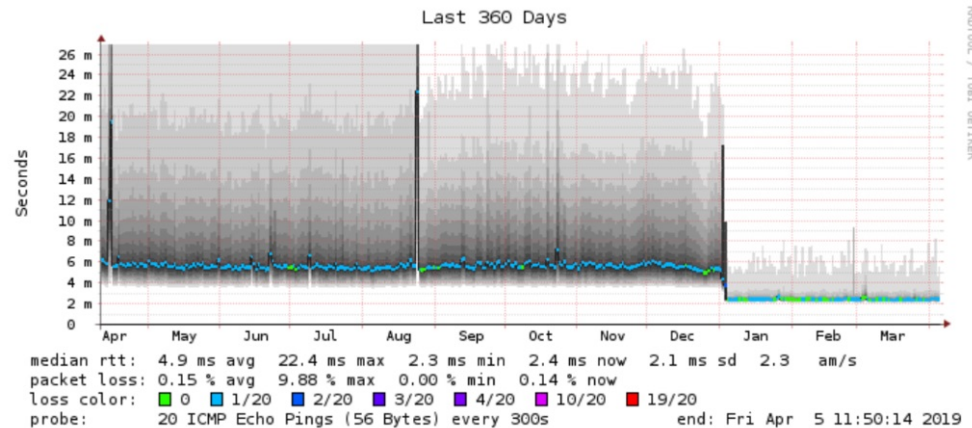
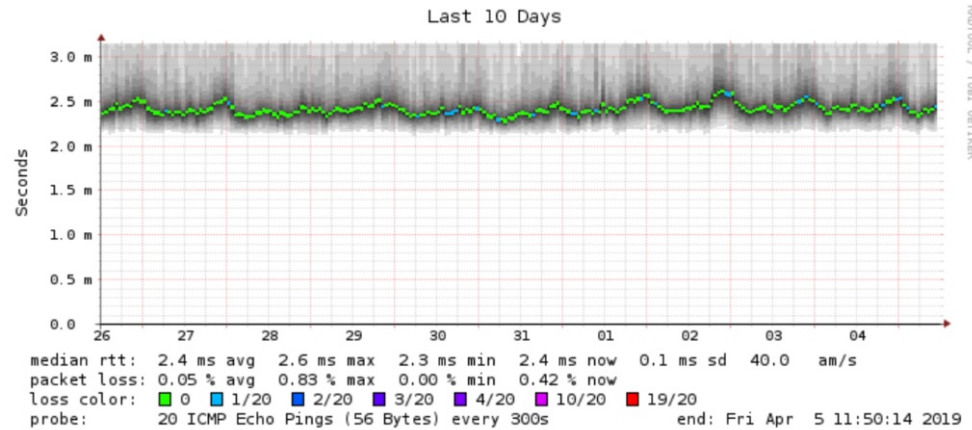
# Moving from 5GHZ to 60GHZ



# Moving from 5GHz to 60GHz



# Moving from 5GHz to 60GHz



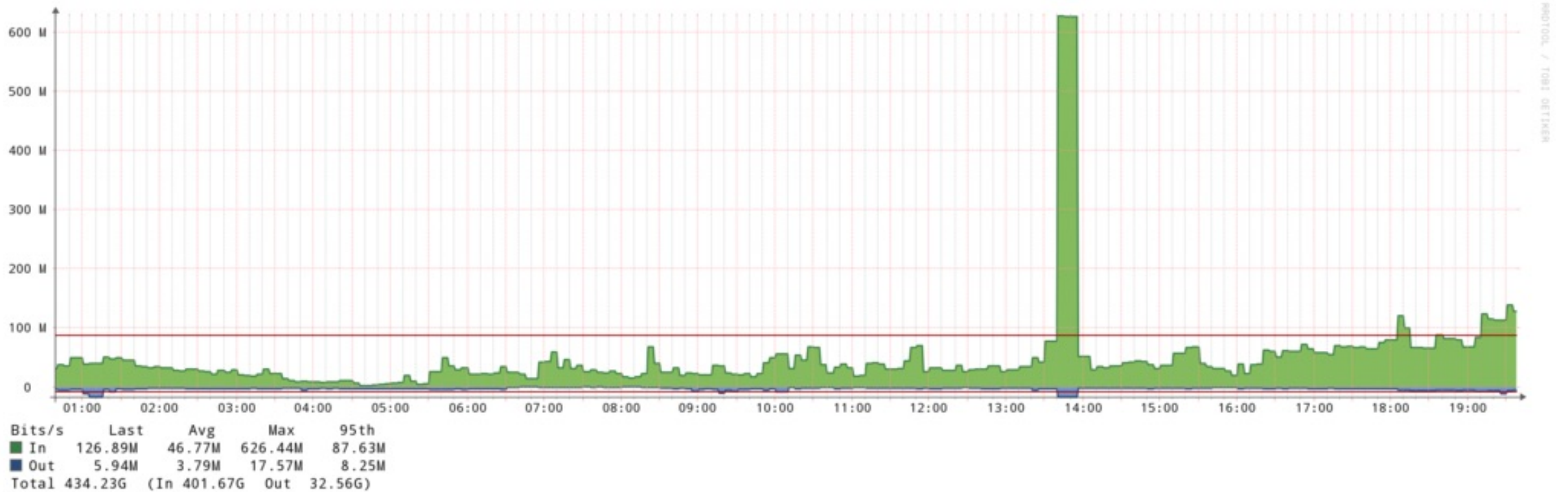


# The 5<sup>th</sup> Channel

---

```
13:32:08 [rundeck@ 1] [NORMAL]          connected: yes
13:32:08 [rundeck@ 1] [NORMAL]          frequency: 66000
13:32:08 [rundeck@ 1] [NORMAL] remote-address: 24:18:1D:5F:60:41
13:32:08 [rundeck@ 1] [NORMAL]          tx-mcs: 8
13:32:08 [rundeck@ 1] [NORMAL]          tx-phy-rate: 2.3Gbps
13:32:08 [rundeck@ 1] [NORMAL]          signal: 80
13:32:08 [rundeck@ 1] [NORMAL]          rssi: -54
13:32:08 [rundeck@ 1] [NORMAL]          tx-sector: 45
13:32:08 [rundeck@ 1] [NORMAL] tx-sector-info: right 0.6 degrees, up 0.6 degrees
13:32:08 [rundeck@ 1] [NORMAL]          distance: 1077.17m
```

# Throughput





# Puerto Rico

---

Thanks Angel Doel Muniz

## 2.3 Gbps baby

<input checked="" type="checkbox"/> Connected	
Frequency:	64800
Remote MAC:	24:18:1D:92:0B:E0
Signal:	80
MCS:	8
PHY Rate:	2.3 Gbps
RSSI:	-54 dB
TX Sector:	61
RX Sector:	96
Distance:	363.89 m

# Things you need to know about 60 GHz



Affected by oxygen absorption



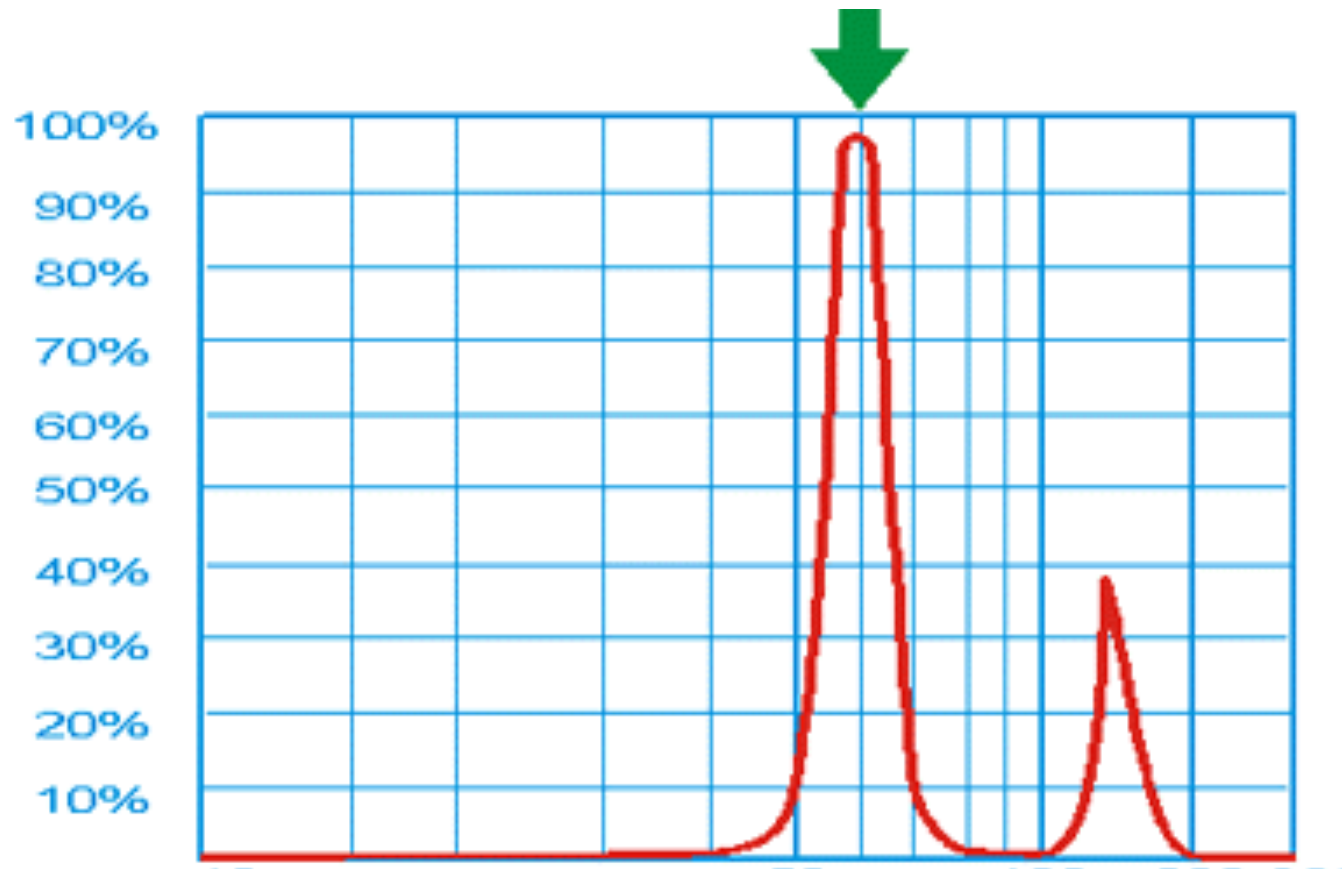
Beam is wide enough to tune in well but  
small enough for close mounting



Stable mounts are key

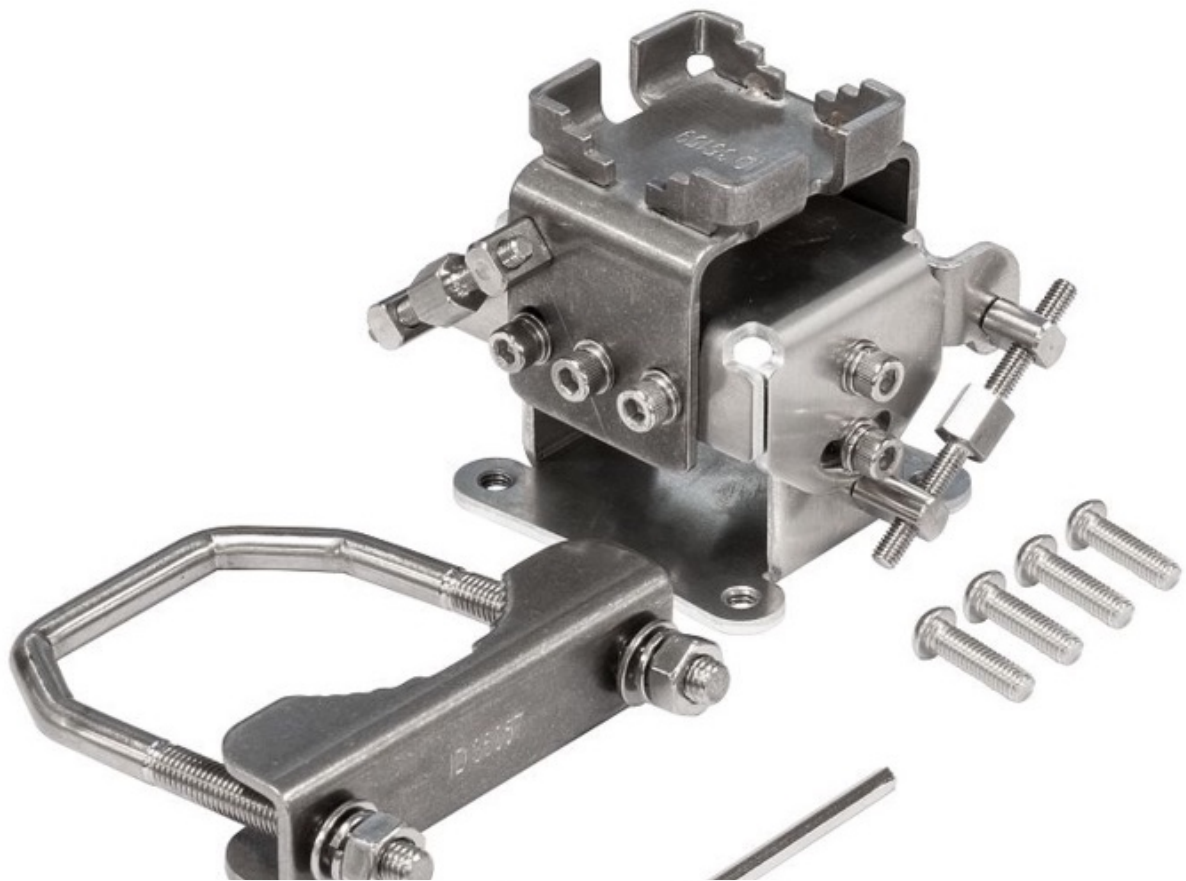


Unlicensed in US



## Oxygen Absorbption

- Closer you get to channel 70 the more attenuation you get due to oxygen absorbtion



# Mounting



The future

- 802.11ay
- Channel bonding
- Multi-gigabit
- 68ghz channel





## About us

- Justin Miller
- Justin Wilson
- [Thebrotherswisp.com](http://Thebrotherswisp.com) , Slack, Facebook



Questions – Thanks  
for all the pics  
everyone

