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

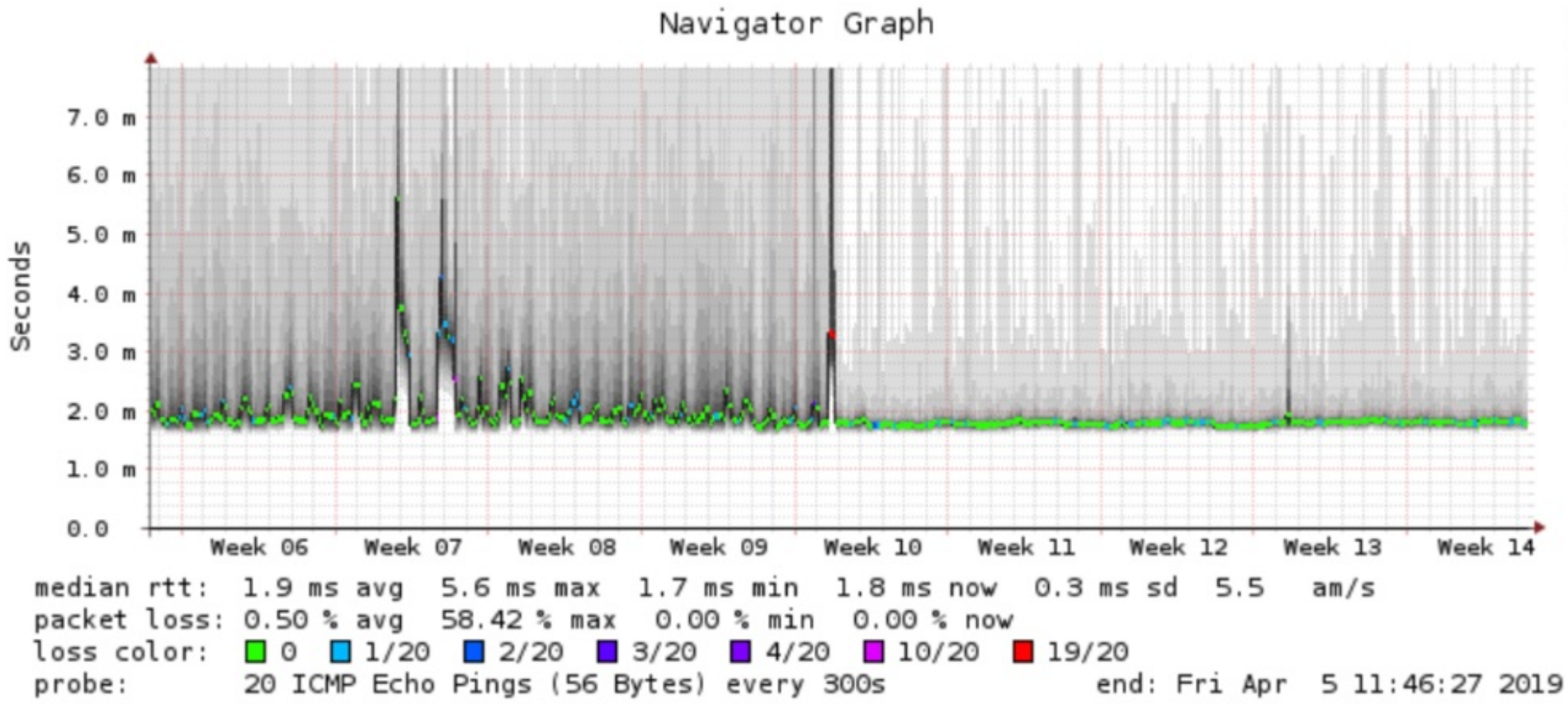
Ideas

- 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

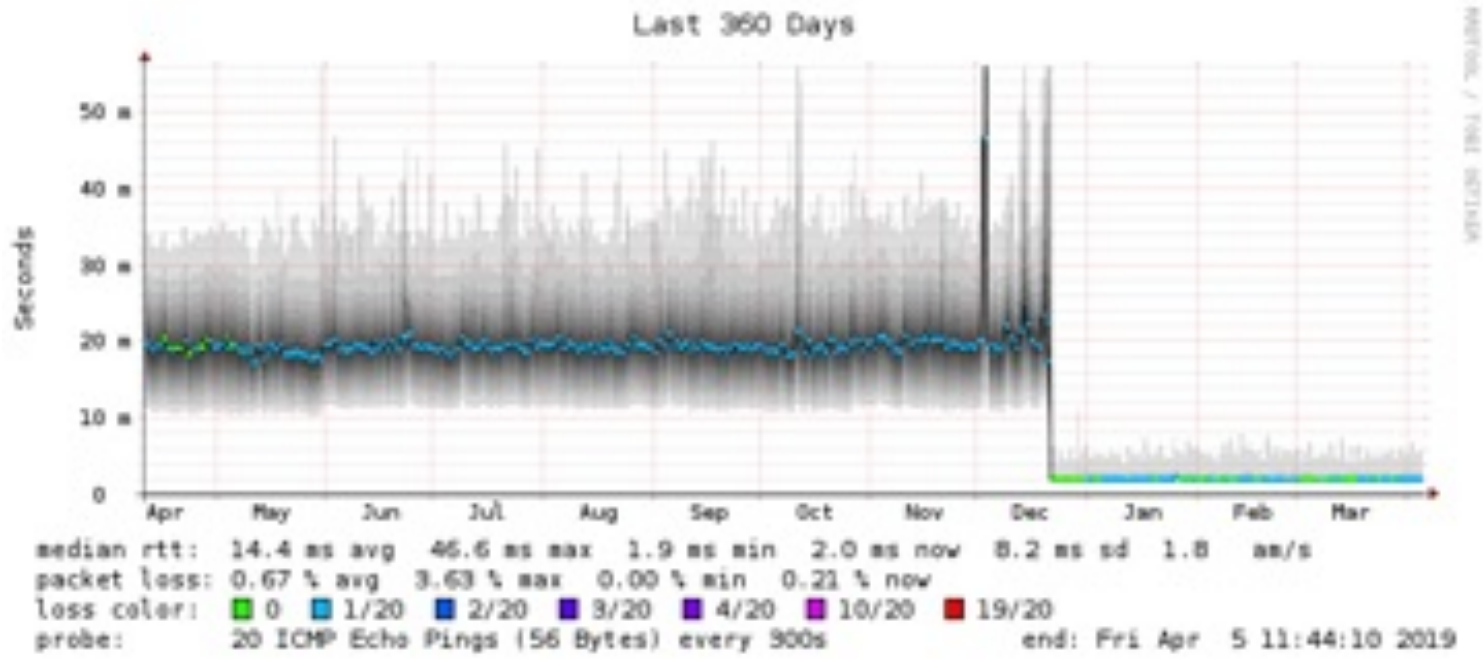
Justin Miller - VaSKywire

- 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

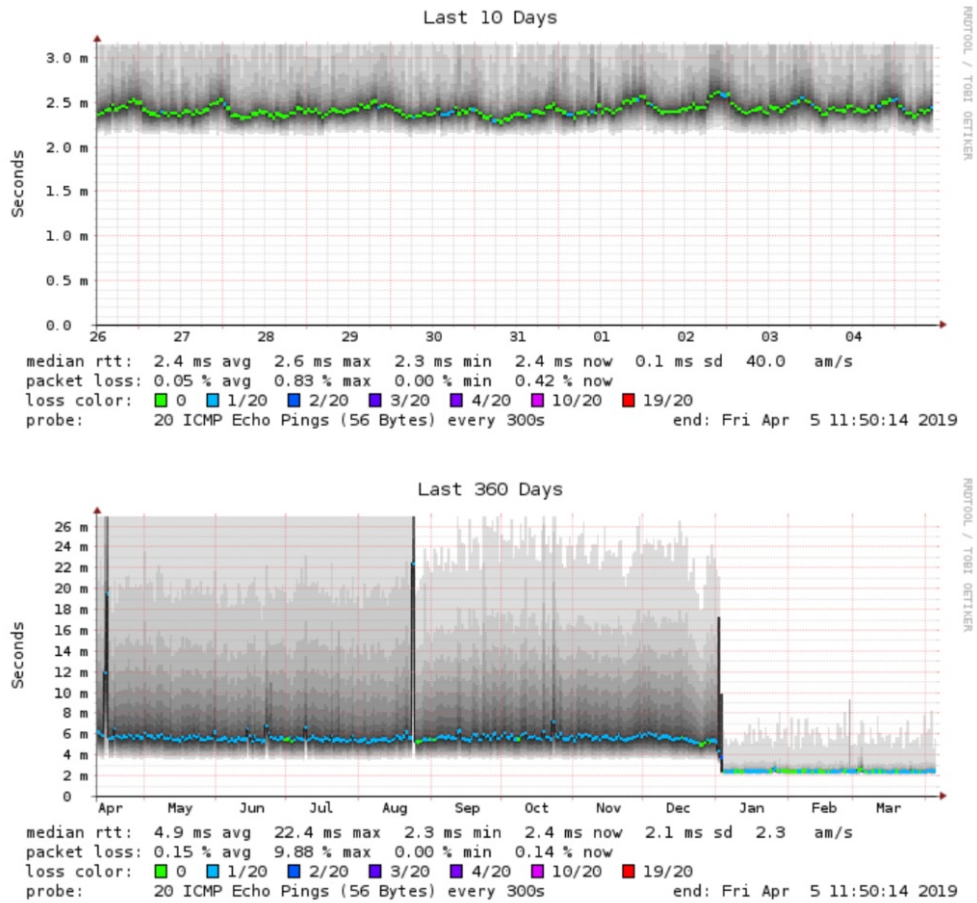
Moving from 5GHZ to 60GHZ



Moving from 5GHZ to 60GHZ



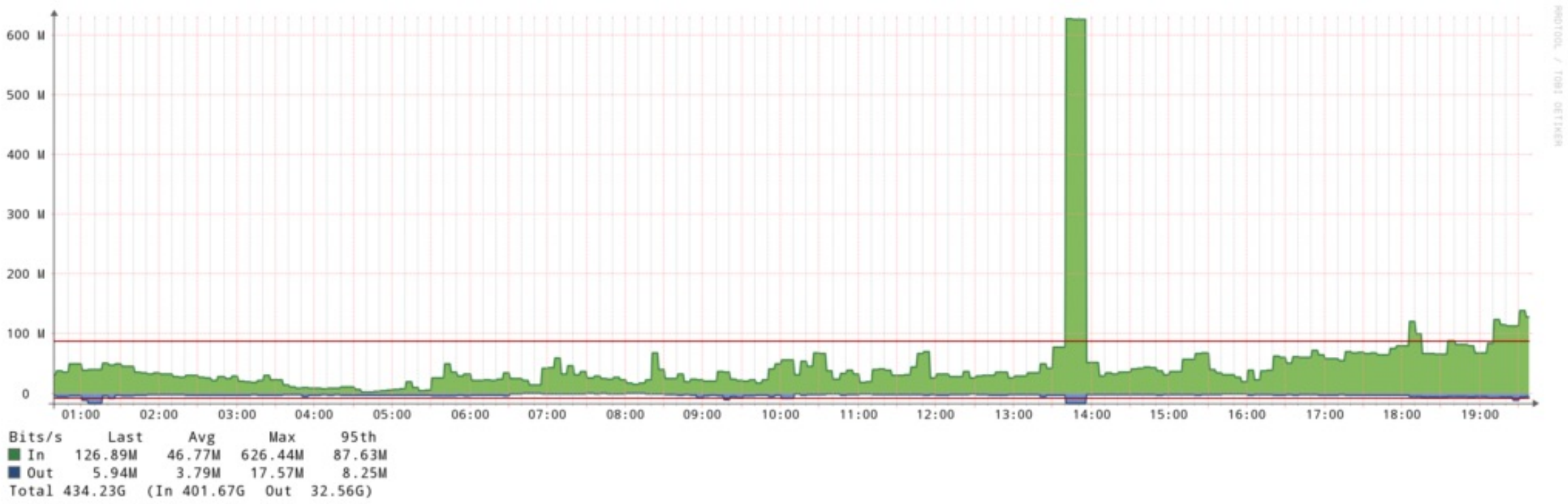
Moving from 5GHZ to 60GHZ



The 5th 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
```

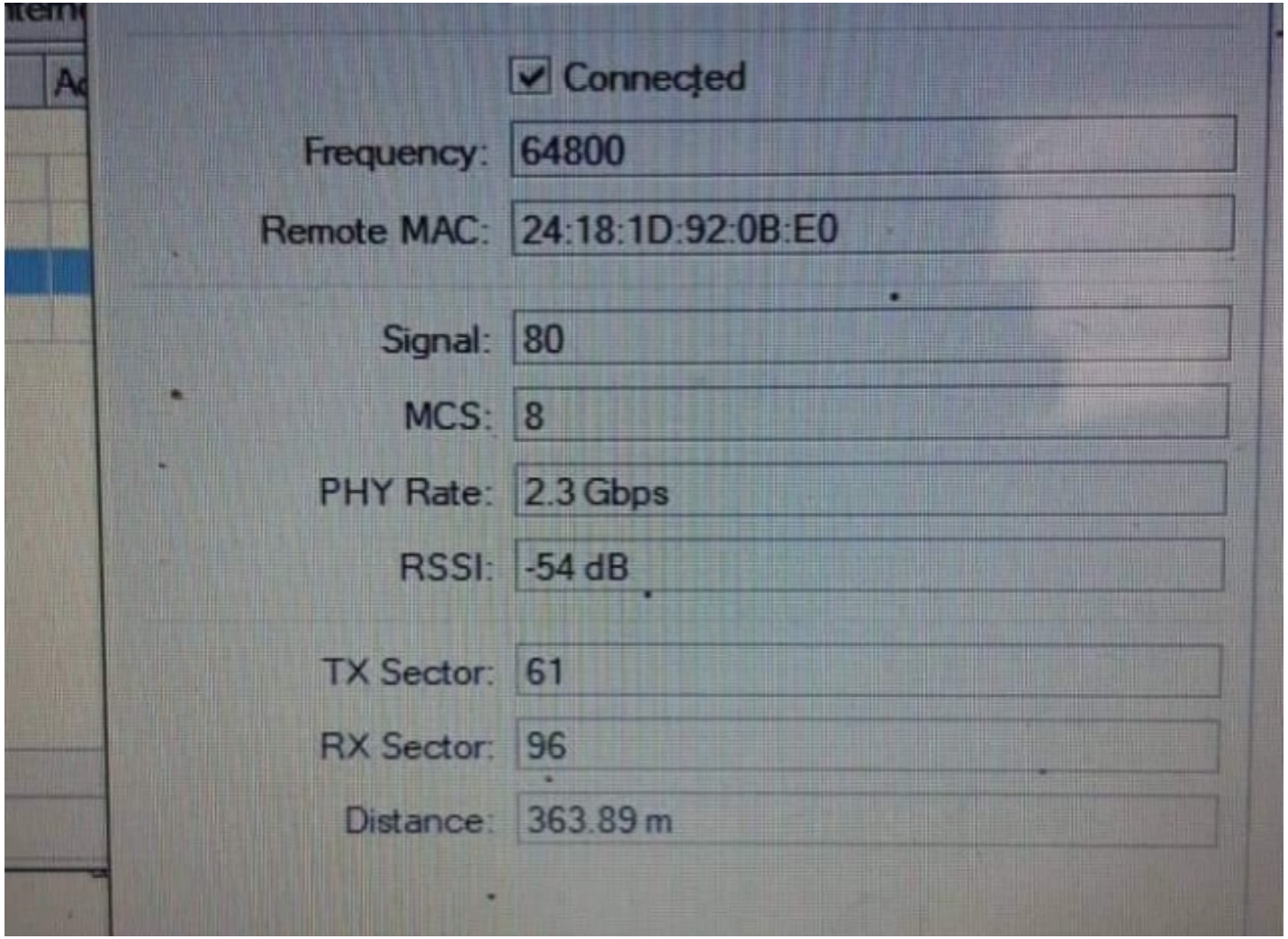
Throughput


600 M
500 M
400 M
300 M
200 M
100 M
0
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Bits/s Last Avg Max 95th
In 126.89M 46.77M 626.44M 87.63M
Out 5.94M 3.79M 17.57M 8.25M
Total 434.23G (In 401.67G Out 32.56G)

Puerto Rico

Thanks Angel Doel Muniz

2.3 Gbps baby


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

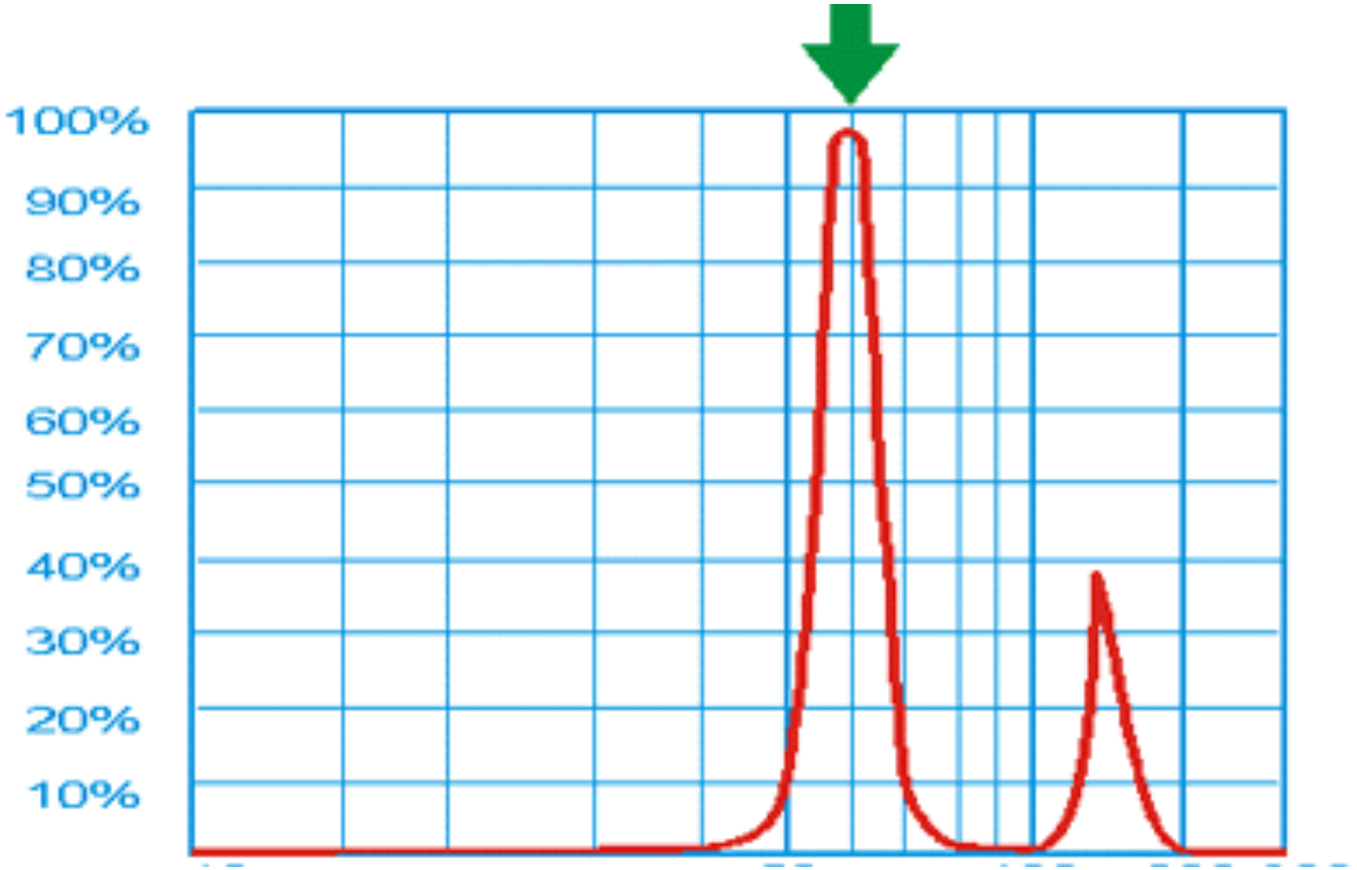
Things you need to know about 60 GHZ

Affected by oxygen absorption

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

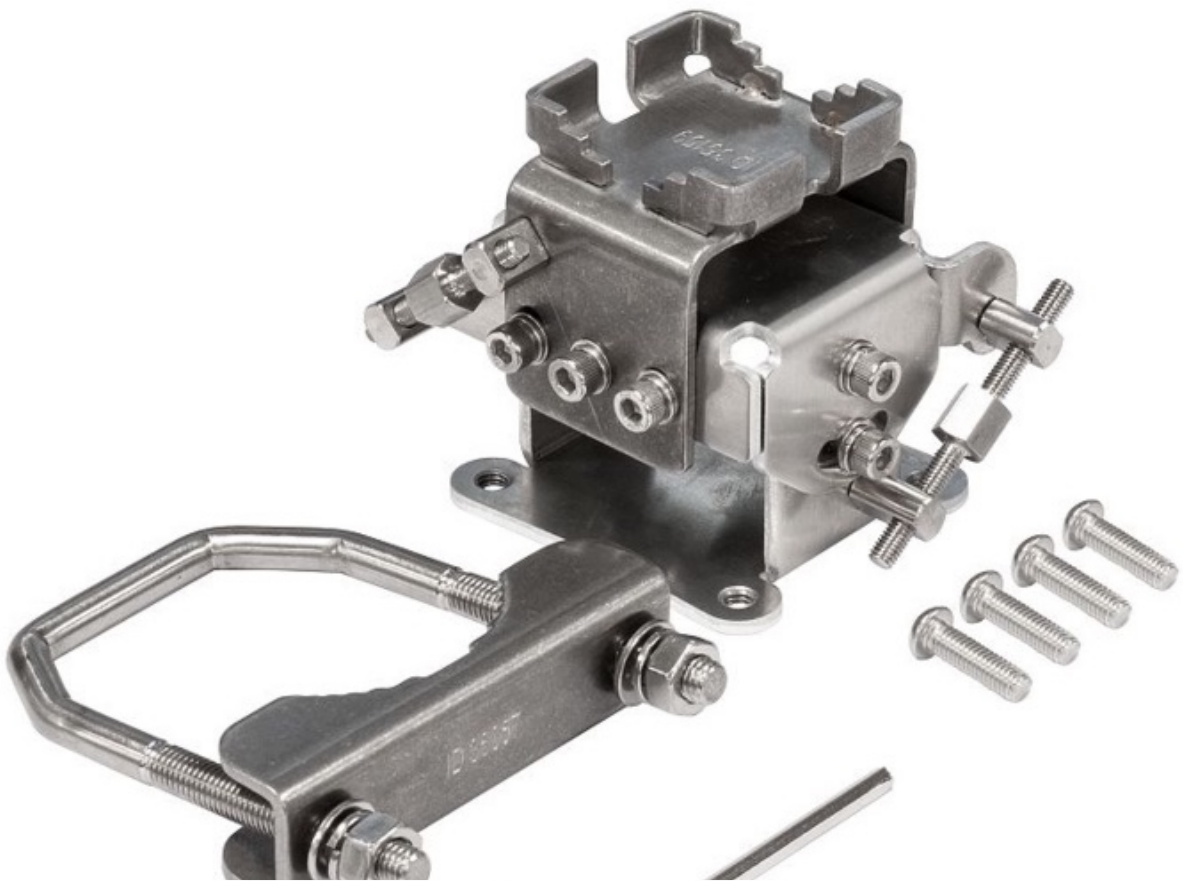
Stable mounts are key

Unlicensed in US



Oxygen Absorbtion

- 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 , Slack, Facebook

Questions – Thanks for all the pics everyone