COMMSCOPE®

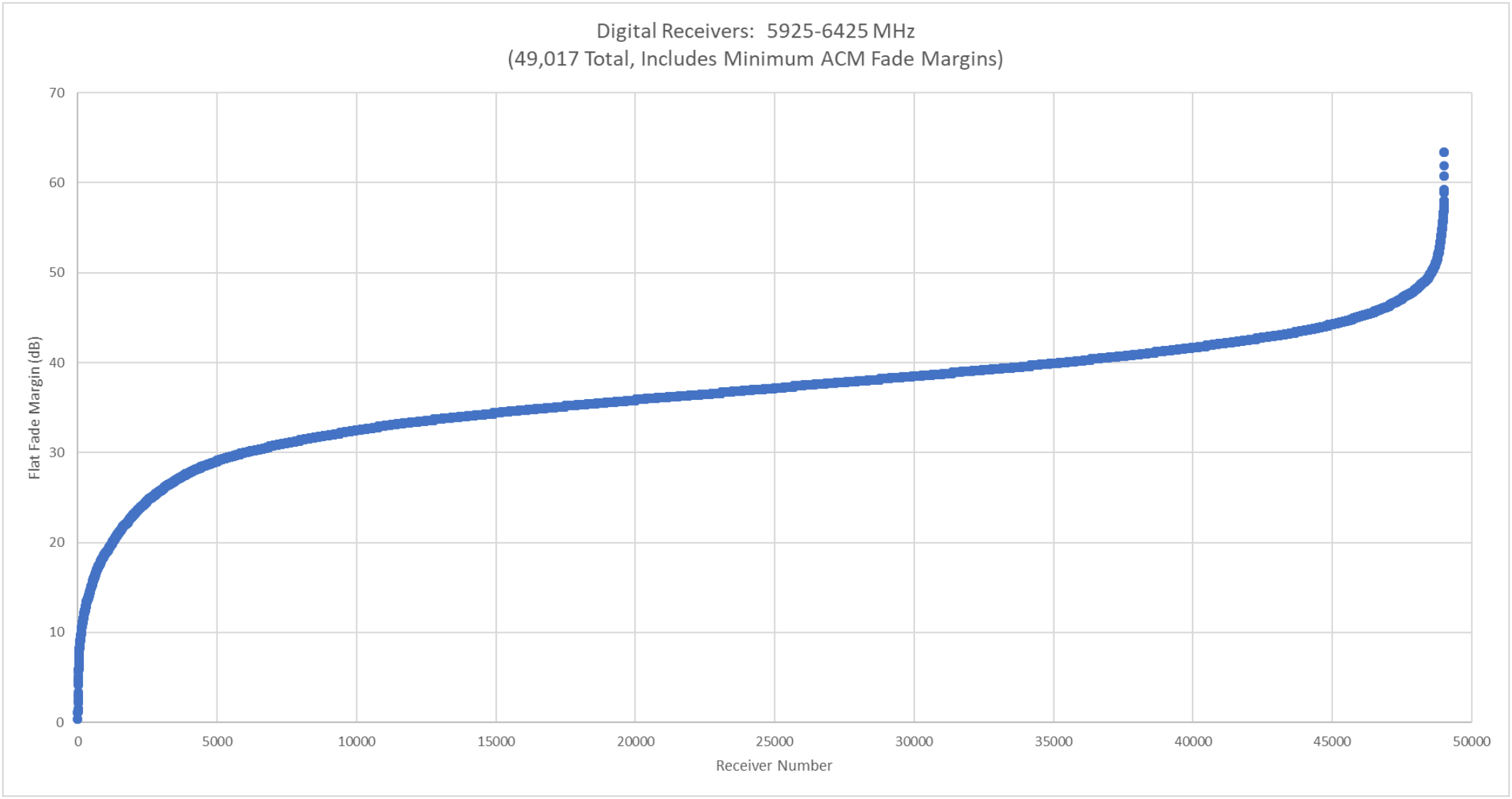
# Some Data Details…

# 2.1 GHz Link Relocation Cost Data

| CTIA SPECTRUM CLEARINGHOUSE, LLC DATA<br>As of December 31, 2016 | | |
|---|---|---|
| Category | Totals 7/1/16 – 12/31/16 | Lifetime Totals* |
| Links Relocated | 2 | 1754 |
| Aggregate Amount Paid | $408,595 | $324,474,720 |
| Average $/Link | $204,298 | $184,991 |

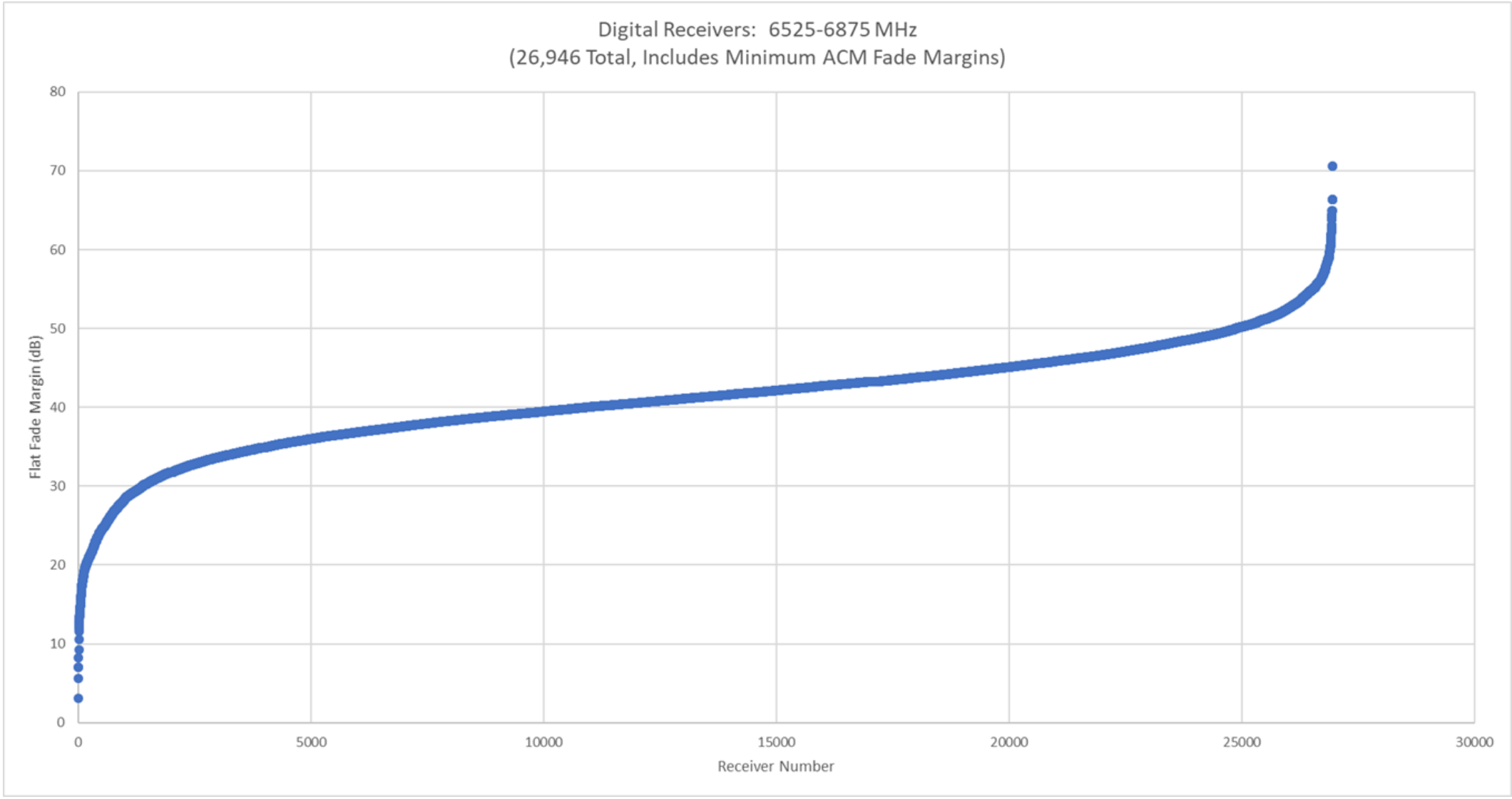
# Fade Margin Data:  5925-6425 MHz

Median = 37 dB



# Fade Margin Data:  6525-6875 MHz

Median = 41 dB



# PATH DESIGN CONSIDERATIONS | FREQUENCY OPTIONS

## Common Microwave Bands

**6.1 GHz**
(5.925 – 6.425)

**6.7 GHz**
(6.525 – 6.875)

6 GHz

**11 GHz**
(10.7 – 11.7)

**18 GHz**
(17.7 – 19.7)

**23 GHz**
(21.2 – 23.6)

## Other Options

**Lease Spectrum**
(24, 28 and 38 GHz)

**70/80 GHz**
"lightly licensed"

**7 and 13 GHz**
(only in some areas)

**5.8 and 60 GHz**
(unlicensed)

**4.9 GHz**
(public safety)

# WinnForum 6 GHz Multi-Stakeholder Support

Presented by Mark Gibson, Commscope

WInnForum Chief Regulatory Officer

17 July 2019

# About the WInnForum

- **Established in 1996**
- **The Wireless Innovation Forum is a nonprofit "mutual benefit corporation" dedicated to:**
  - *…"advancing technologies supporting the innovative utilization of spectrum and the development of wireless communications systems, including essential or critical communications systems"*
- **The Forum is a member driven standards development organization that:**
  - Brings together groups of leading organizations
  - Across multiple market segments around the world
  - At all levels of the wireless value chain
  - Collaborate in advocating for the innovative use of spectrum
  - Advancing radio technologies that support essential or critical communications worldwide.
- **Incorporated in California as a Non-profit Mutual Benefit Organization**
- **Registered with the US Government as a Standards Development organization under the National Cooperative Research and Production Act of 1993, as amended by the Standards Development Advancement Act of 2004**

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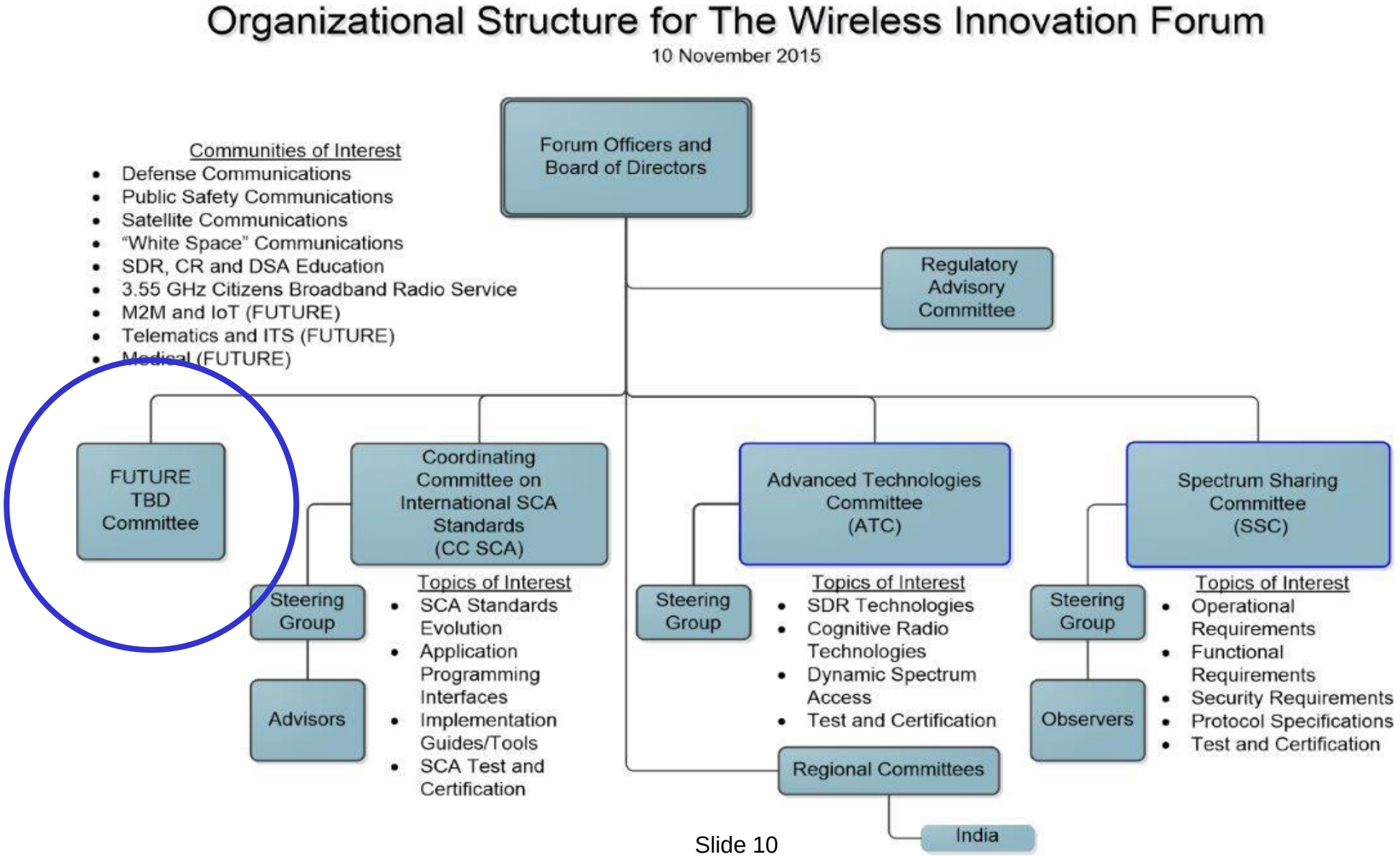
# How we Started the Spectrum Sharing Committee

- **July 2013: Multi-stakeholder Group originally proposed in comments to the FCC regarding the Public Notice on the TAC White Paper and Recommendations for Improving Receiver Performance**
- **December 2013: Group further elaborated in the Forum Comments to the FCC regarding Licensing Models and Technical Requirements in the 3550-3650 Band**
- **June 2014: Formation of the group identified in the Forum's FY2015 Operations Plan**
- **July 2014: Additional Elaboration provided in the Forum's comments to the FCC regarding the Further Notice of Proposed Rulemaking in the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band**
- **October 2014: Initial Formation Meeting held in Washington. DC**
- **December 2014: Second formation meeting held in Washington. DC**
- **January 2015: Final formation meeting held in McLean, VA**

# CBRS Standards Development Within the Forum: 250+ Participants, 60+ Organizations

# Forum Structure



# Why is Multi-stakeholder Support is Needed

- **The FCC asked about possible roles and activities that a multi-stakeholder organization could contribute to make 6 GHz spectrum available for unlicensed uses.**
- **WInnForum members have expertise in all relevant areas, with representatives from many of the same companies that are potentially affected as incumbents or new entrants (or both).**
- **WInnForum members recognize the desire for rapid new unlicensed deployments.**
- **The existing WInnForum framework can help quickly reach convergence in areas of contention to protect incumbents and allow for rapid deployment of new unlicensed systems.**
- **This is not like CBRS**
  - CBRS required significant time to develop standards and procedures to satisfy complex and classified government operations
  - AFC concept as proposed is much lighter weight, doesn't require new standards, and exists to protect incumbents whose operations are fully transparent through existing databases
- **A multi-stakeholder approach is much more efficient, effective and expeditious than exchanging technical ex parte filings at the FCC.**

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# Possible Areas of Collaboration

- **Propagation models**
  - Identifying models available for the use cases
  - Developing hybrid approach
  - Possible measurement program(s) to verify
- **Additional losses**
  - Clutter
  - Building penetration
  - Measurement(s)
- **Interference protection criteria**
  - Identifying various criteria (e.g., C/I, C/N, T/I, Threshold Degradation) and relative merits of each
  - Determining when and how to apply
- **Security**
  - Identify the options
  - Identify needs and use cases (i.e., radio-AFC)
- **Data**
  - Data sources/databases
  - Accuracy
- **AFC framework**
  - How to apply technical considerations to AFC calculations
  - Device registration
  - Standardized algorithms
  - Feedback control (open/closed loop)
  - Device location & accuracy
  - Interference calculation
  - Aggregation
  - Data update intervals
  - RLAN duty cycles
  - International extensions
- **Interference determination, reporting and mitigation**
  - How identify and report when interference is occurring
  - How to address in context of AFC
  - How to interface with FCC's Enforcement Bureau
- **AFC testing and certification**
  - Development of test specs and plans for above
  - Identify test lab(s)
- **Policy**
  - Identification of policy-related issues

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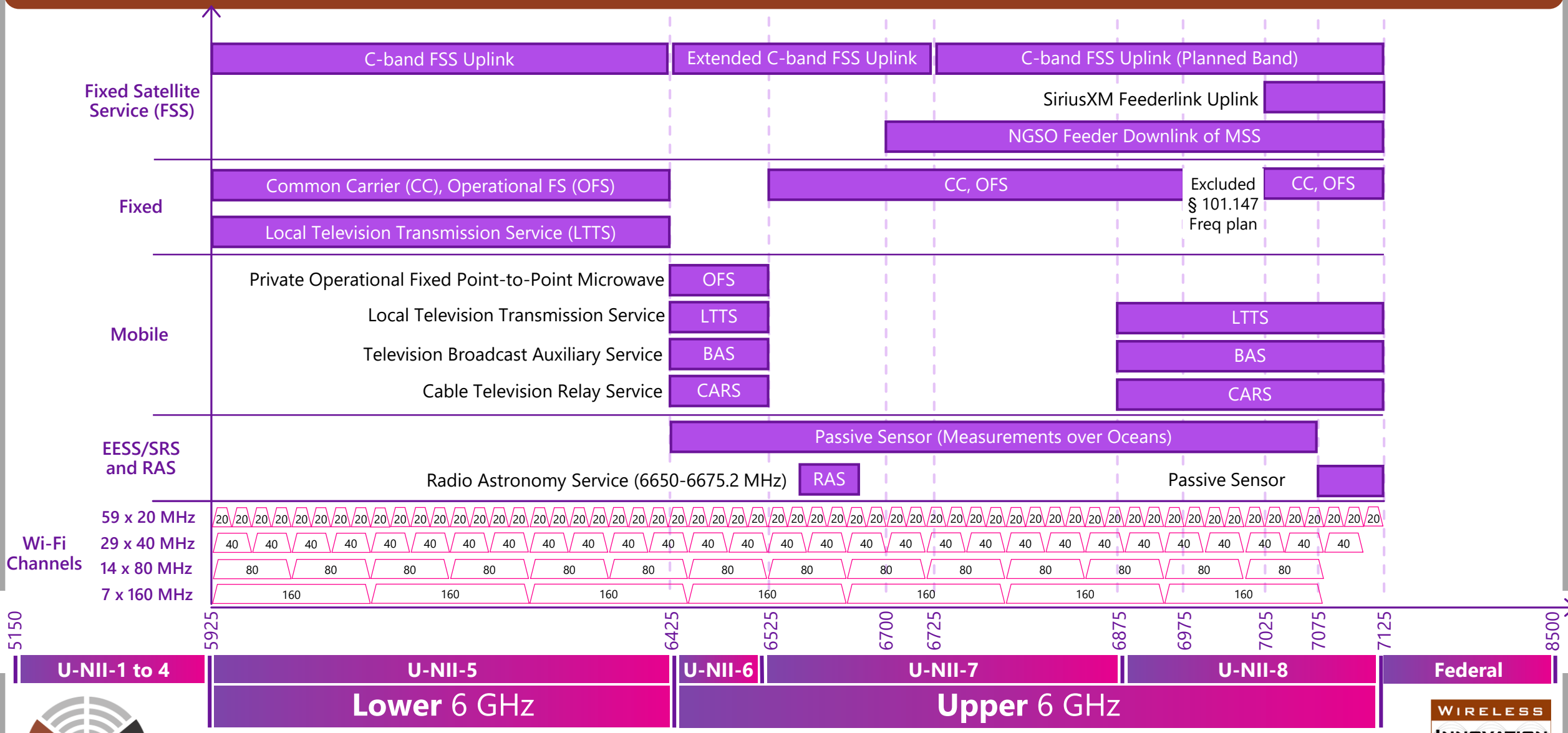
# *Thank You*

# BACKUP STUFF

# 6 GHz Band

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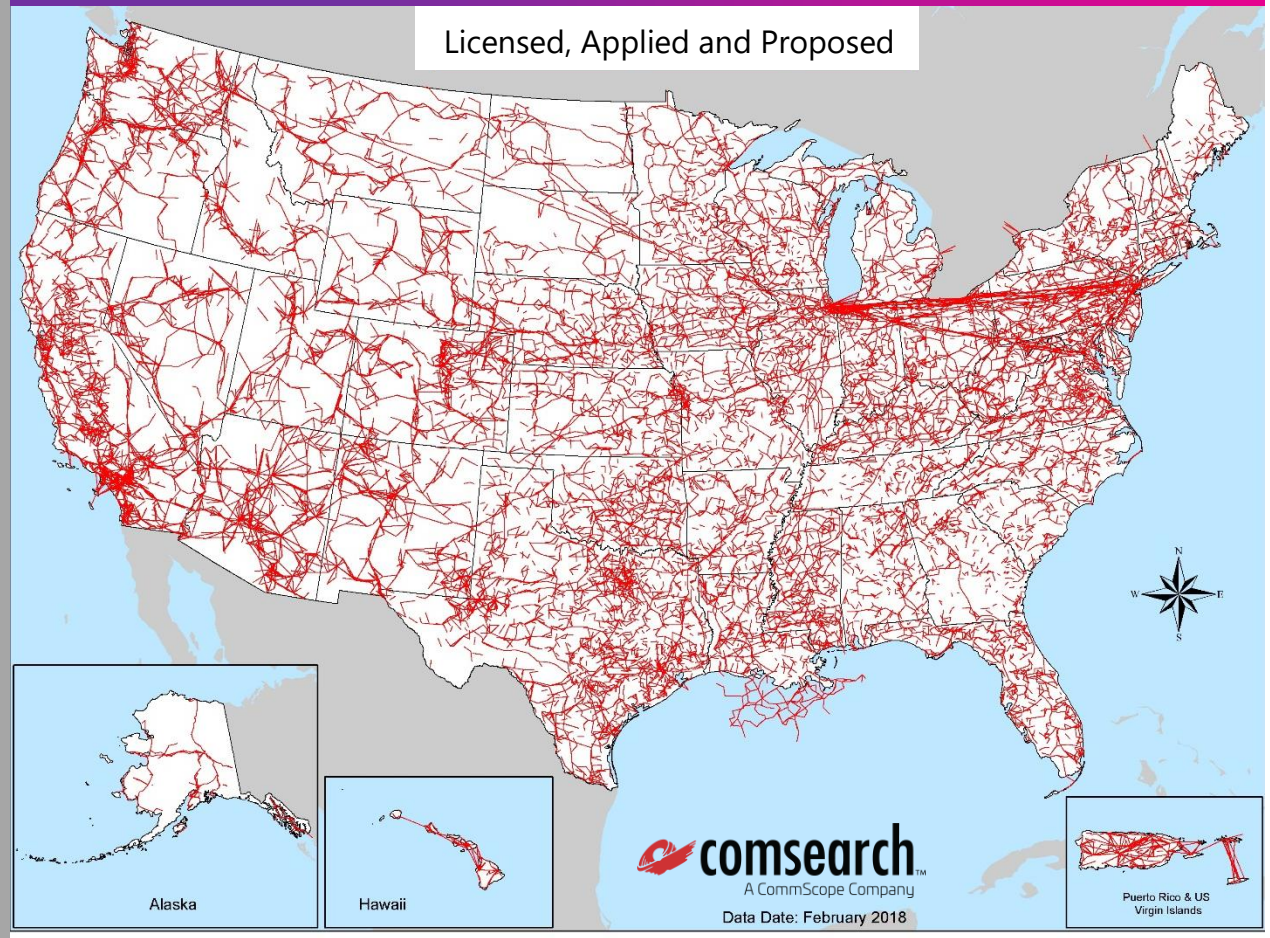
# Microwave Links

## Lower 6 GHz Microwave Paths




## Upper 6 GHz Microwave Paths