

6 GHz Band Multi-stakeholder Workshop

17 July 2019



Goals

“Explore the technical requirements ... from the perspective of both the incumbents and the prospective new unlicensed entrants to the band.”

“The focus of the workshop is technical, not policy, and the workshop presentations and summary may be provided to the FCC for consideration”.

Agenda

8:00-9:00	Registration	11:30-12:00	Additional Presentations (TBD)
9:00-9:15	Welcome and Introductions <ul style="list-style-type: none">• Agenda Review• Ground rules for participation	11:45-12:45	Lunch
9:15-10:15	Incumbent Presentations (10 Minutes Each) <ul style="list-style-type: none">• Presentation by Neeti Tandon, AT&T• Presentation by Patrick Welsh, Verizon• Presentation by George Kizer, Fixed Wireless Communications Coalition• Presentation by Brett Kilbourne, UTC• Presentation by Louis Peraertz, WISPA	12:45-1:00	WinnForum's views, presented by Mark Gibson, CommScope and Chief Regulatory Officer of the Wireless Innovation Forum
10:15-10:30	Break	1:00-2:45	Roundtable Discussion, topics to include: <ul style="list-style-type: none">• Propagation models• Interference protection criteria• Margins• Security• Interference determination, reporting and mitigation• Testing and certification
10:30-10:45	3GPP Input Presented by Kumar Balachandran, Ericsson	2:45-3:00	Conclusions and next steps
10:45-11:30	Vendor Presentations <ul style="list-style-type: none">• Presentation by Doug Davies, Nokia• Presentation by Kumar Balachandran, Ericsson• Presentation by Kurt Schaubach, Federated Wireless• Presentation by Ariful Hannan, CommScope		

Ground Rules

This is a workshop

- Ask questions
- Engage in discussion

Discussion should focus on understanding requirements

- Not establishing policy
- Not defining technical solutions

Everyone has an equal voice

Areas of contention, if any, will be captured in a “parking lot” for later discussion

Plan for the day

- WinnForum Staff will capture key takeaways from each presentation and consolidate over lunch
- These can then be used as a baseline for this afternoon’s roundtable

Organizations present at today's workshop

AT&T*

Cisco

CommScope*

Ericsson*

Entergy

Federated Wireless*

Fixed Wireless Communications Coalition

Google*

Micronet

Nokia*

NRECA

Sony*

Utilities Telecommunications Council

Verizon*

WISPA*

**denotes WinnForum member organization*



Summary Notes from Workshop (1 of 2)

100,000 fixed wireless links currently deployed under Part 101

- 20 billion dollar plus capex investment
- Many of these systems are “critical infrastructure”
- Fiber is not a good solution in all cases. Microwave is used in urban and suburban areas as well as fiber.

Desire of incumbents is to ensure reliability of ALL existing services

- Need 5 or 6 “9’s” availability of existing links
 - Especially true for critical infrastructure systems
 - Requires positive control of frequency assignment
- Need FCC endorsement of independent certification and testing model
- Need to have an interference resolution and enforcement process

Proposed “low power” is relatively high and may cause interference

- Location of unlicensed transmitters will be critical in understanding potential for harmful interference, including height
 - May require professional installation of unlicensed equipment
- Understanding the path loss model between unlicensed users and incumbents is critical and not easy
 - Current studies are not in agreement
 - Needs to include understanding of antenna radiation patterns and Fresnel zones
 - Needs to include understanding of multi-path fading
 - Need to include some understanding of cumulative/aggregate interference for each fixed service user,
 - Needs to include a study of temporal effects
 - Which may be used to establish “exclusion zones”
 - Which may be tied to “time of day” with long term and short-term fading

Summary Notes from Workshop (2 of 2)

If the goal is to ensure protection of all existing services, then there is a need AFC to cover the entire band and include indoor

- Need AFC to have active role in managing interference
- May need to coordinate between AFC entities
- Need AFC to be technology neutral, to accommodate all potential unlicensed technologies
 - 3GPP NR-U, WiFi, other, etc.
- Need AFC to ensure protection from adjacent channel interference
- Need to ensure AFC cannot be hacked and turned into denial of service for critical infrastructure
- Note: many required AFC features already implemented under Part 96
 - Requirements are significant relaxed for what is required for Part 96, but need to keep device registration with aggregation of interference and/or exclusion zones concepts

Need a multi-stakeholder group to coordinate on these items

- All stakeholders need to have a seat at the table

Parking Lot Items

**Are all incumbent links protected or
“majority” of links protected**

Coordinate with 5 GHz UNII rules

Segmentation of the band

- FDD versus TDD

International Harmonization

**If there are multiple AFC technical
solutions, is coordination between
them required**

Who will be doing the testing

Work Items Collaboration – Focus on Technical Reports for Now

1. Interference Protection, with possible topics of:

1. Propagation models
 1. Identifying models available for the use cases
 2. Developing hybrid approach
 3. Possible measurement program(s) to verify
 4. Additional losses
 1. Clutter
 2. Building penetration
 3. Measurement(s)
2. Interference protection criteria
 1. Identifying various criteria (e.g., C/I, C/N, T/I, I/N) and relative merits of each
 2. Determining when and how to apply
 3. Adjacent Channel Interference
3. Spectrum occupancy determination
 1. Incumbent data sources/databases accuracy
 2. Unlicensed devices

2. Security

1. Threat Assessment



3. AFC Requirements for Incumbent Protection, with possible topics of:

1. How to apply technical considerations to AFC calculations
2. Device registration
3. Standardized algorithms
4. Feedback control (open/closed loop)
5. Device location & accuracy
6. Interference calculation
7. Aggregation
8. Data update intervals
9. RLAN duty cycles
10. International extensions
11. Interference determination, reporting and mitigation
 1. How identify and report when interference is occurring
 2. How to address in context of AFC
 3. How to interface with FCC's Enforcement Bureau
12. AFC testing and certification
 1. Development of test specs and plans for above
 2. Identify test lab(s)

4. Plenary Function

1. Identification of policy-related issues

Next steps

Post presentations from this workshop online

Publish the summary results and proposed work items

Recommendation to the Board to form of a new 6 GHz committee

- Mission: Study and specify the operation of a 6 GHz AFC
- ACTION: Lee to draft a charter to send to be sent to the 6 GHz Ad-Hoc Committee
- Ad-hoc Committee to send to the Board for approval
- ACTION: Mark to identify group chairs

Press release announcing new committee

Work Plan

- Weekly/Bi-weekly GTM
- Face to Face meeting in September at Ericsson?