

April 12, 2018

Ex Parte

Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

*Re: Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz,
GN Docket No. 17-183*

Dear Ms. Dortch:

On April 10, 2018, representatives from Apple Inc., Broadcom Corporation, Cisco Systems, Inc., Facebook, Inc., Google LLC, Hewlett Packard Enterprise, Intel Corporation, Microsoft Corporation, and Qualcomm Incorporated met with Rachael Bender, Legal Advisor to Chairman Pai. Separately, we met with Michael Scurato, Legal Advisor to Commissioner Clyburn; April Jones, Policy Analyst and Special Assistant to Commissioner Clyburn; and Joseph Kerins, Law Clerk to Commissioner Clyburn. On April 11, representatives from the above companies also met separately with Commissioner O’Rielly and his Legal Advisor Erin McGrath, Commissioner Carr and his Legal Advisor Will Adams, and Umair Javed, Legal Advisor to Commissioner Rosenworcel. A complete list of participants in these meetings is attached to this letter.

In these meetings, we discussed the attached presentation addressing filings by satellite and fixed-wireless companies operating in the 6 GHz band. A comprehensive written response to the recent filings by fixed-wireless companies is forthcoming.

Pursuant to the FCC’s rules, I have filed a copy of this notice electronically in the above referenced docket. If you require any additional information, please contact the undersigned.

Sincerely,



Paul Margie
*Counsel to Apple Inc., Broadcom
Corporation, Facebook, Inc., Hewlett
Packard Enterprise, and Microsoft
Corporation*

Enclosures

cc: meeting participants

MEETING ATTENDEES

April 10, 2018

Michael Scurato, Legal Advisor to Commissioner Clyburn
April Jones, Policy Analyst and Special Assistant to Commissioner Clyburn
Joseph Kerins, Law Clerk to Commissioner Clyburn

Rachael Bender, Legal Advisor to Chairman Pai

Mark Neumann (Apple Inc.)
Chris Szymanski (Broadcom Corporation)
Mary Brown (Cisco Systems, Inc.)
Robert Pepper (Facebook, Inc.)
Austin Schlick (Google LLC)
Chuck Lukaszewski (Hewlett Packard Enterprise)
Peter Pitsch (Intel Corporation)
David Horne (Intel Corporation)[†]
Paula Boyd (Microsoft Corporation)
John Kuzin (Qualcomm Incorporated)
Paul Margie (Harris, Wiltshire & Grannis LLP)
Paul Caritj (Harris, Wiltshire & Grannis LLP)

April 11, 2018

Commissioner Carr
Will Adams, Legal Advisor to Commissioner Carr

Commissioner O’Rielly
Erin McGrath, Legal Advisor to Commissioner O’Rielly

Umair Javed, Legal Advisor to Commissioner Rosenworcel

Mark Neumann (Apple Inc.)
Chris Szymanski (Broadcom Corporation)
Mary Brown (Cisco Systems, Inc.)
Robert Pepper (Facebook, Inc.)^{*}
Megan Stull (Google LLC)
Bret Wincup (Hewlett Packard Enterprise)
Peter Pitsch (Intel Corporation)
Paula Boyd (Microsoft Corporation)
John Kuzin (Qualcomm Incorporated)
Paul Margie (Harris, Wiltshire & Grannis LLP)
Paul Caritj (Harris, Wiltshire & Grannis LLP)

* Did not attend meetings with Commissioner O’Rielly or Umair Javed.

[†] Participated telephonically.

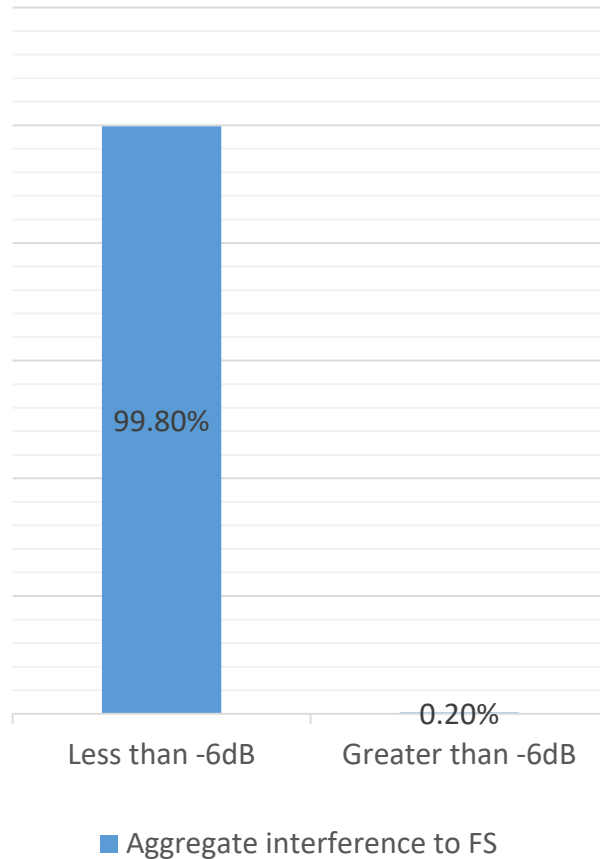
Unlicensed Operations in the 6 GHz Band: Advancing to the NPRM

April 10, 2018

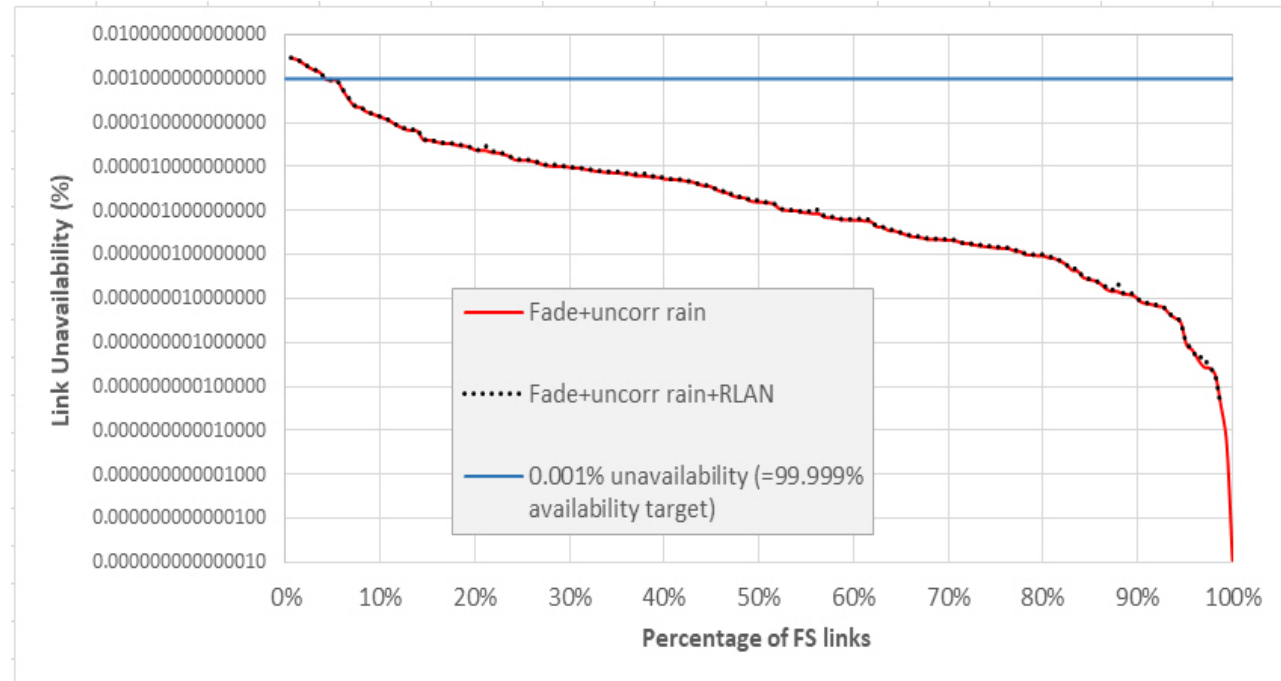
Overview

- Thank you for addressing the growing unlicensed spectrum crisis by considering unlicensed operations in the 6 GHz band.
- To advance this process, our coalition worked with RKF Engineering to produce a comprehensive analysis which we submitted in January.
- Recently, several FSS and FS incumbents responded to the study.
- We're here today to address those responses.
- Further analysis reconfirms the RKF study's conclusion: the band can support sharing without risking harmful interference to incumbents.

Fixed Service Analysis Review



Detail on the 0.20% Corner Cases:
FS Link unavailability for only worst-case links with
and without RLAN interference



Results: FS availability and quality of service will stay within the existing availability design margin even for worst-case scenarios.

Responses to Fixed Service Incumbents

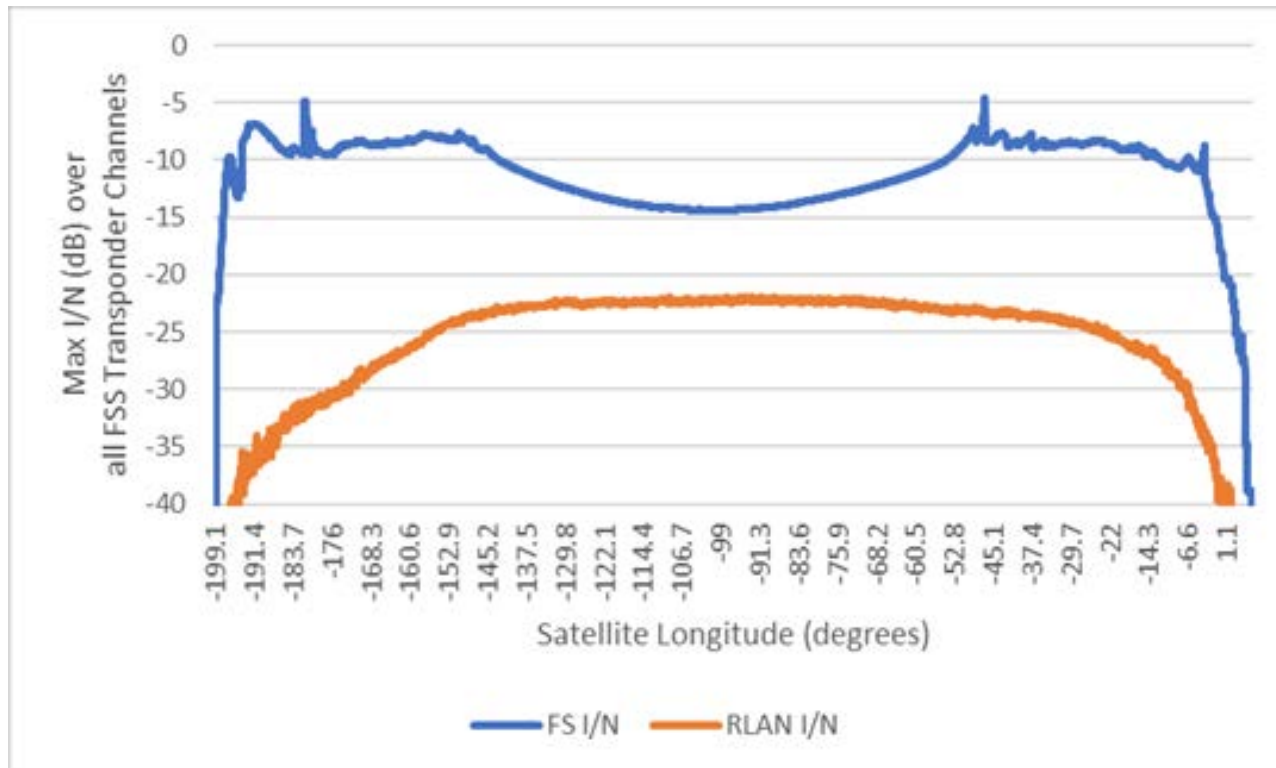
- Incumbents focus their concern on situations where RLANs will operate in the main beam of an FS link.
- RKF's report demonstrated that this situation will be extremely rare.
 - FS incumbents' recent complaints about RKF's report are misplaced.
 - This presentation will discuss our responses to the main issues raised by FS incumbents and show that the RKF report's conclusions remain correct.
- Furthermore, even in the rare instances when a RLAN device operates within the main beam of a FS link, it will not necessarily cause harmful interference.
 - If, however, the Commission determines that it must protect incumbents in this situation, the record contains examples of mitigation techniques that can resolve these rare occurrences.
 - An NPRM is the proper venue to decide if such a mechanism is necessary.
- FWCC's simulation is deeply flawed and unreliable, as discussed in greater detail with OET.

Main-beam RLAN Operation will be Extremely Rare

- RKF demonstrated that instances where RLANs operate in the main beam of an FS link will be extremely rare.
- The recent FS letters' criticisms of RKF's analysis of rarity are misplaced.
 1. Statistical analysis
 2. Modeling RLAN-FS interference models
 3. Multipath fading
 4. Path loss, clutter, and building entry loss
 5. Antenna patterns and FS modeling
 6. Simultaneous RLAN transmission assumptions
 7. Outdoor RLAN transmissions and EIRP assumptions
 8. RLAN and FS channelization

Fixed Satellite Service Analysis Review

Max I/N (over FSS transponder channels) due to RLAN and FS transmitters in 5,925-6,425 MHz to satellites across the visible geosynchronous orbital slots



Responses to Fixed Satellite Service Incumbents

Intelsat/SES:

- Intelsat/SES fail to address the most important point of the RKF analysis – that unlicensed would not add in a meaningful way to the interference FSS already receives from FS deployments.
- Intelsat/SES's specific criticisms of RKF are incorrect: (1) Gain-to-Noise Temperature value; (2) RLAN device usage assumptions; (3) Propagation models and terrain effects; and (4) Population density figure.

• Sirius XM:

- Sirius XM, unlike Intelsat/SES, fails to provide any technical basis for their assertions, rendering their claims unreliable.
- The central assertion is that RKF's analysis doesn't apply to satellite radio. But Sirius XM—an FSS service—fails to identify why RKF's overall FSS analysis does not apply.
- It cannot be because of the unpredictable position of Sirius XM receivers because the 6 GHz band is used for uplink and not downlink.
- RKF's aggregate-interference approach addresses Sirius XM's concerns because of the system's use of very wide uplink beams with nearly full-CONUS coverage.

The Goal of the RKF Study

- Commenters mischaracterize the RKF study.
- The study evaluates feasibility of nationwide RLAN deployment in 6 GHz using the UNII rules as a baseline to quantify the probability of interference without mitigation.
 - It does not evaluate potential interference mitigation techniques, but explicitly recognizes that they should be considered.
 - When the errors in the FS interests' filings are accounted for, the RKF study has succeeded in demonstrating feasibility.
- The FCC should address appropriate mitigation rules in an NPRM—the RKF study does not propose that the FCC should ignore this important step.
 - There are several techniques to deal with the different interference scenarios in the sub-bands or in geographic areas, or even for particular service categories.
 - The coalition has provided candidate mitigate techniques on the record, and discussed potential tools that can protect incumbents from harmful interference.

Thank you