HWG | HARRIS, WILTSHIRE & GRANNIS LLP

January 20, 2015

Ex Parte

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

Re: Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13-49

Dear Ms. Dortch:

On January 15, 2015, (1) Marc Goldburg, George Ivanov, and Aparna Sridhar (via telephone) of Google Inc., and I met with Commissioner Ajit Pai and Brendan Carr, Legal Advisor for Commissioner Pai; and (2) Mr. Goldburg, Mr. Ivanov, Ms. Sridhar (via telephone), Patricia Paoletta of Harris, Wiltshire & Grannis LLP, and I met with Erin McGrath, Legal Advisor for Commissioner O'Rielly. On January 16, 2015, (1) Mr. Goldburg, Mr. Ivanov, Ms. Sridhar (via telephone), and I met with Renee Gregory, Legal Advisor for Chairman Wheeler; and (2) Mr. Goldburg, Ms. Sridhar (via telephone), and Ms. Paoletta met with Mindel De La Torre, Chief of the International Bureau. In each of these meetings, we discussed the above-referenced proceeding and the attached presentation.

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

Sincerely,

Paul Margie
Counsel to Google Inc.

cc: meeting participants

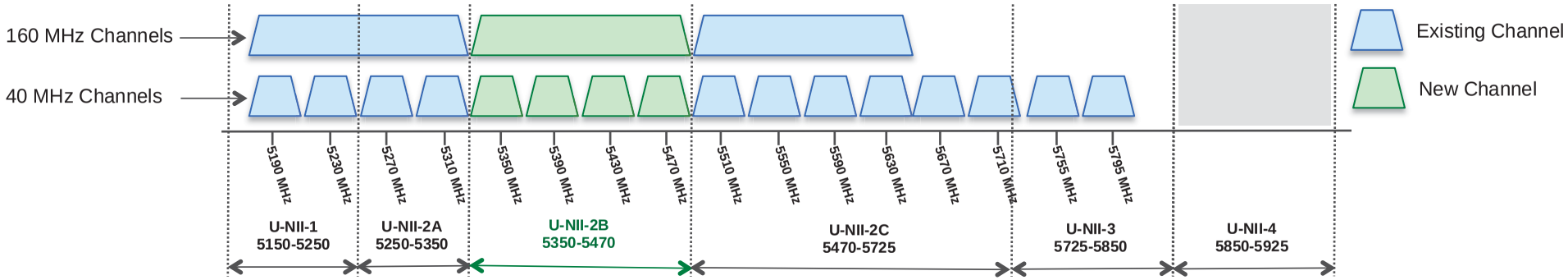
Unlicensed Use in 5350-5470 MHz (U-NII-2B)

Adding multiple Gigabits-per-second of unlicensed capacity while protecting incumbent operations

15 January 2015

The Opportunity

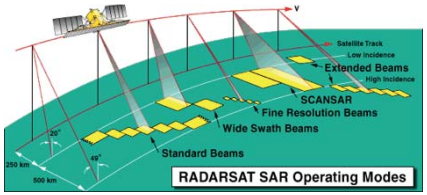
- Increase usable 5 GHz unlicensed spectrum by 120 MHz or 21%
  - benefits for residential and commercial use cases (enterprise, public spaces, etc.)
- Sample Impacts: substantial increase in Wi-Fi capacity
  - 33% increase in 40 MHz channels at hundreds of Mbps each (~2 Gbps total 802.11n increase)
  - 50% increase in 160 MHz channels at Gbps each (~4 Gbps total 802.11ac increase)

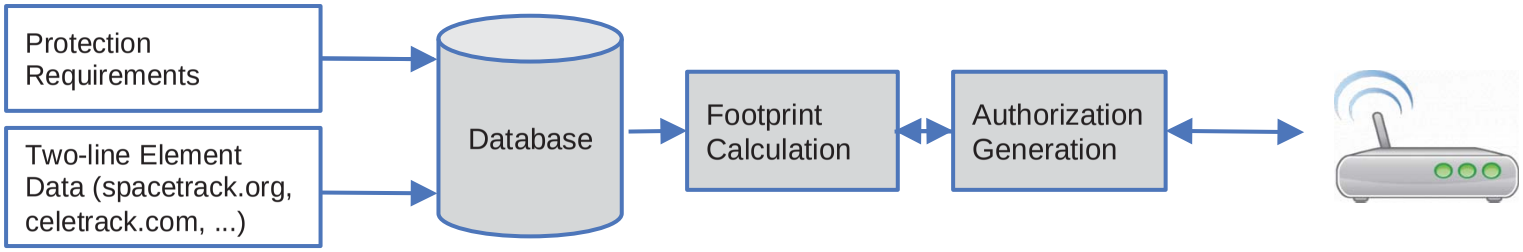


  - U-NII-4 (5850-5925 MHz) not addressed here, but will eventually add important capacity, too

Protecting Incumbents: Earth Exploration Satellite Services (EESS)

- Operated by Canada and France; others are customers for their imagery, including USA
- Low earth orbit and accurately known ground tracks make protection practical
  - Basic principle: proactively disable unlicensed devices to avoid interference with EESS
    - calculate EESS ground track using publically available “two-line element data”
    - calculate large EESS protection area around each point along ground track
    - authorize in-band unlicensed operations only at times & locations where harmful interference cannot occur
  - A more dynamic version of the approach taken in TV Whitespace





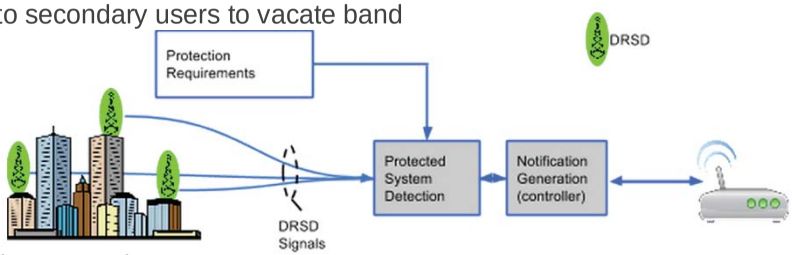
Protecting U-NII-2B Incumbents: Federal Radar Users

Air

Sea

Earth

- Characterized by occasional use in unpredictable locations with incompletely known waveforms
- Protected in other 5 GHz bands (U-NII-2A & 2C) by Dynamic Frequency Selection (DFS)
  - o With DFS, unlicensed devices detect incumbents and shift to different frequency
- DFS has weaknesses and is not the correct approach in U-NII-2B
  - o U-NII-2B incumbents stealthier, more difficult to detect than U-NII-2A & 2C incumbents
  - o High false detection rate reduces utility of spectrum for consumers, will reduce investment
  - o Adds cost to devices, possibly substantial, leading to reduced uptake
- Alternative approach: network of Dedicated Radar Signal Detectors (DRSDs)
  - o Small number of sensitive, well-sited DRSDs per metropolitan area (tens per metro expected)
  - o Less prone to false detections, more likely than DFS to sense incumbents and at greater range
  - o Protection requirements can be updated over time, professionally managed for reliability and performance
  - o "Push" notifications to secondary users to vacate band



  - o Google developing demonstration system now

Suggestions to Accelerate Availability & Adoption

- Shift discussion from “study sharing” to “share”
- Focus initially on what can be achieved within the USA
- Be open to new approaches, base decisions on demonstrated performance
- Set protection criteria to protect incumbents’ needs while retaining secondary utility