



National Cable & Telecommunications Association

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September 23, 2013

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 September 19, 2013, representatives of the National Cable & Telecommunications Association (“NCTA”) and NCTA member companies met with the Office of Engineering and Technology to discuss the above-referenced proceeding. A list of meeting participants is attached hereto.

During this meeting, we reiterated the cable industry’s support for expanding Wi-Fi access in the 5 GHz band as quickly as possible to help meet rapidly increasing demand for metropolitan Wi-Fi networks and other wireless broadband services. In particular, we noted our agreement with the Department of Defense’s (“DOD”) recent conclusion that DOD’s decision not to relocate telemetry services to the U-NII-1 band “leave[s] the band available for Wi-Fi consideration.”¹ We also reviewed the attached analysis illustrating that expanded Wi-Fi access in U-NII-1 will co-exist with Globalstar’s feeder links in this band.

¹ See letter from Karl Nebbia, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration to Julius Knapp, Chief, Office of Engineering and Technology, GN Docket No. 13-185, at Exhibit 1 (July 22, 2013) (letter from DOD Chief Information Officer Teresa Takai to Lawrence Strickling, Assistant Secretary for Communications and Information, National Telecommunications and Information Administration (July 17, 2013)).

Ms. Marlene H. Dortch

September 23, 2013

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Pursuant to the Commission's rules, a copy of this notice is being filed electronically in the above-referenced docket. If you require any additional information, please contact the undersigned.

Sincerely,

/s/ Rick Chessen

Rick Chessen

Attachments

CC: meeting participants

List of Meeting Participants

Office of Engineering and Technology

Julius Knapp
Geraldine Matise
Mark Settle
Ira Keltz
Karen Rackley
Aole Wilkins
Navid Golshahi
Renee Gregory
Bryant Wellman

Rick Chessen (NCTA)
Andy Scott (NCTA)
David Don (Comcast)
Terri Natoli (Time Warner Cable)
Barry Ohlson (Cox)
Peter Corea (Cablevision)
Rob Alderfer (CableLabs) *
Dirk Grunwald (University of Colorado) *
Paul Margie (Wiltshire & Grannis)
Rob Carter (Wiltshire & Grannis)

* participated via telephone

5 GHz UNII-1 Coexistence Analysis

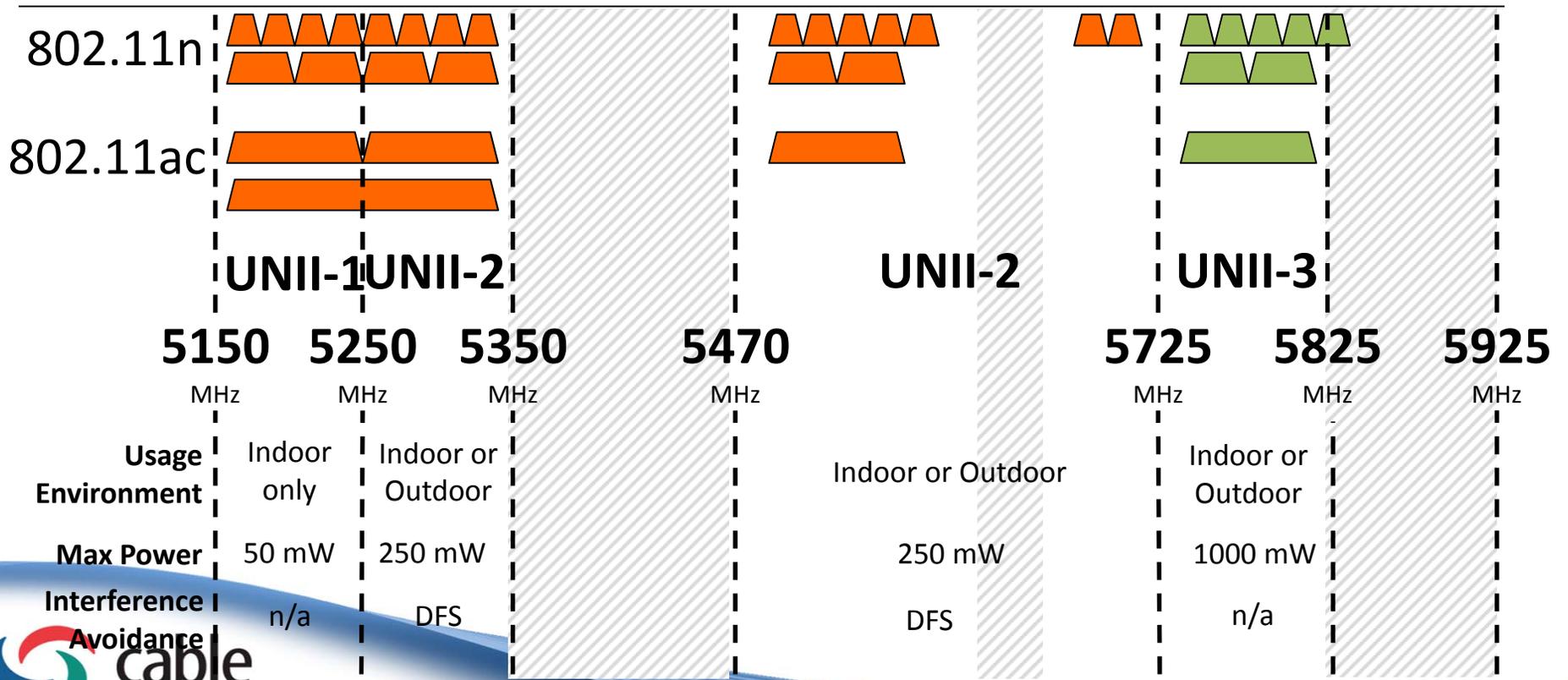
Expanding Wi-Fi Use



Current 5 GHz Wi-Fi Band

 Rules prevent widespread commercial deployment

 Rules allow commercial deployment



Analytic Context

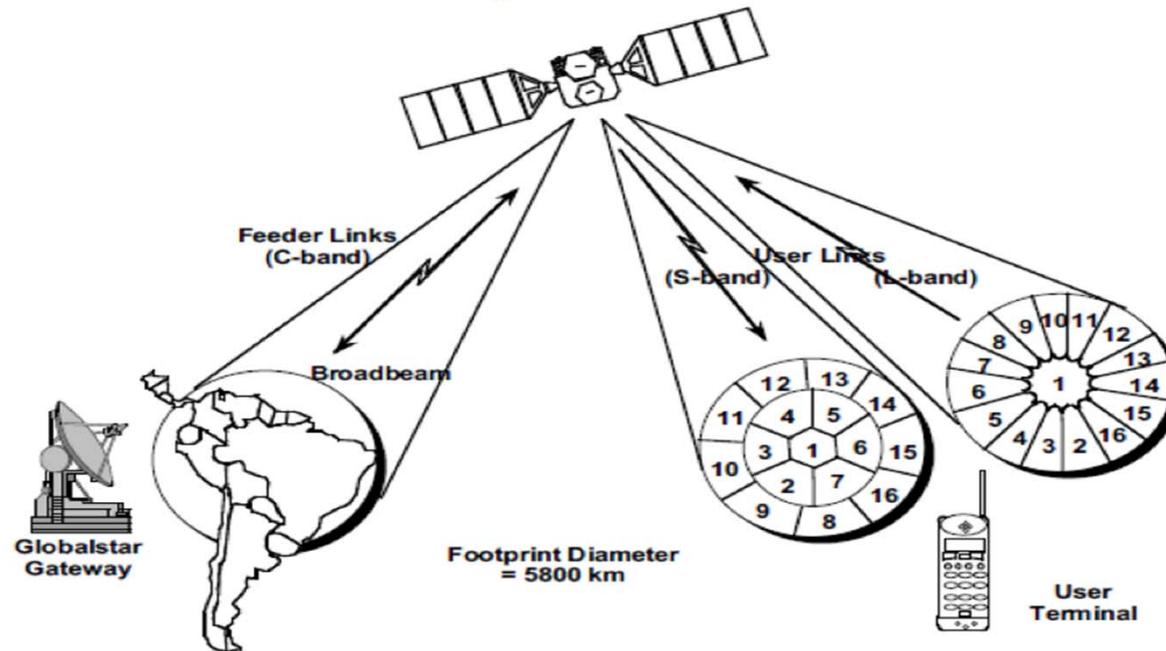
- UNII-1 is important to Wi-Fi
- Globalstar is the only MSS user of UNII-1, and submitted flawed analysis of coexistence
- CableLabs, University of Colorado investigated Globalstar's findings
 - Full analysis included with NCTA's 5 GHz reply comments

Summary of Findings

- Globalstar makes a variety of errors that overstate interference risk
- Appropriate methodology and assumptions demonstrate that there is very little risk to Globalstar's systems from expanding Wi-Fi access in UNII-1

Globalstar System Architecture

Globalstar Footprint Patterns



Globalstar System Architecture

- Key points:
 - Non-geostationary system
 - Only 'feeder links' use UNII-1 (uplink only)
 - 4 US Earth stations
 - Satellites are bent pipe
 - Tx power is much greater on uplink than downlink

Globalstar's Methodology

- Determine how aggregate power of Wi-Fi impacts noise level at the satellite
 - A single link analysis
 - Characterized in terms of number of APs required to breach noise floor
- Relevant noise level based on generic ITU recommendation
 - Does not account for Globalstar system characteristics, including bent pipe nature

Globalstar's Analytic Errors

- Flawed analysis driven by the following errors:
 - All APs will point directly at satellite
 - Satellite will be directly overhead of all APs simultaneously
 - All APs will have direct line of sight to satellite
 - All APs will have 100% duty cycle
 - No channelization within UNII-1
 - All APs will transmit at maximum allowed power

➤ None of the above is accurate

Only A Whole System Analysis is Appropriate

- Bent pipe system means end-user performance is the relevant metric
- Quantified as the carrier-to-noise ratio (C/N)

$$\frac{C}{N_o} = \frac{1}{\left[\frac{1}{\left(\frac{C}{N_{UP}} \right)} + \frac{1}{\left(\frac{C}{N_{DN}} \right)} \right]}$$

Limiting Link is the Downlink

- Note that the C/N is 76x better in the uplink than the downlink

Globalstar System Link Budget

<u>Gateway to Satellite</u>		<u>Satellite to User Terminal</u>	
UL freq.	5.20E+09	DL freq.	2.49E+09 Hz
lambda	0.0577	lamda	0.1203 m
Gateway EIRP	36.4	Sat EIRP	1.1 dBw
other losses	7.9	other losses	1.4 dB
zenith path loss	-169.78	nadir path loss	-163.39 dB
G/T	-29.6	G/T	-26 dB
C/N	-3.17	C/N	-21.98 dB
Eb/No	23.92	Eb/No	5.11 dB

Doing the Math

- Step 1: Determine the system C/N

$$\left(\frac{C}{N}\right)_o = \frac{1}{\left[\frac{1}{(0.4817)} + \frac{1}{(0.006335)}\right]}$$

$$\left(\frac{C}{N}\right)_o = 0.006252 \text{ or } \underline{-22.04 \text{ dB}}$$

Note that this is approximately equal to C/N (down)

Doing the Math

- Step 2: Add noise to uplink to simulate Wi-Fi
 - Reducing C/N (up) by 4.45 dB would mean:

$$\left(\frac{C}{N}\right)_o = \frac{1}{\left[\frac{1}{(0.1729)} + \frac{1}{(0.006335)}\right]}$$

$$\left(\frac{C}{N}\right)_o = 0.006111 \text{ or } \underline{-22.1388 \text{ dB}}$$

This leads to a change of less than 0.1 dB in the system C/N, which is likely to be imperceptible to end users.

Doing the Math

- Step 3: How many APs would it take to change the system C/N by an imperceptible amount?
 - It may take nearly 2 billion APs, all operating outdoors at 250 mW, to cause a 0.1 dB change to Globalstar's system C/N
 - Other Wi-Fi deployment parameters would yield different results, but results suggest hundreds of millions or billions of APs would be needed for 0.1 dB change in all cases
 - Illustrative model included in paper outlines full set of inputs and results

Summary and Caveats

- Billions of APs may be required to change Globalstar's C/N by less than 0.1 dB
- Numeric results are illustrative, and may even overstate interference risk
 - Analysis corrected some, but not all of Globalstar's assumptions
 - APs may transmit below maximum allowed power