



October 15, 2014

**FILED ELECTRONICALLY**

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street N.W.  
Washington, D.C. 20544

**Re: Notice of *Ex Parte* Presentation – GN 12-354**  
***Amendment of the Commission’s Rules with Regard to Commercial Operations in the***  
***3550-3650 MHz Band***

Dear Ms. Dortch:

On October 10, 2014, representatives of the Satellite Industry Association (“SIA”) met with a number of Commission staff to discuss satellite industry’s views on GN Docket No. 12-354, the Commission’s proposal to amend its rules to authorize the deployment of small wireless cell sites utilizing the 3.5 GHz band (the “Small Cells FNPRM”). The written presentation used by the SIA representatives in the meetings is included as an attachment to this submission.

Commission personnel participating in the meeting were: John Leibovitz, Brian Regan, Wayne Leighton, Eliot Maenner, Joyce Jones, Chris Helzer, Paul Powell, and Stephen Buenzow of the Wireless Telecommunications Bureau; Robert Nelson, Jose Albuquerque, and Chip Fleming of the International Bureau; and Robert Pavlak of the Office of Engineering and Technology.

The SIA representatives in attendance were: Sam Black, Satellite Industry Association; Susan Crandall and Alex Epshteyn, Intelsat; Scott Kotler, Lockheed Martin; Daniel Mah and Pascale Dumit, SES; and Karis Hastings, SatCom Law LLC (representing SES).

The SIA representatives noted that there is no dispute about the importance of protecting incumbent users, including satellite networks operating both in the 3600-3700 MHz band and systems in the adjacent 3700-4200 MHz band. However, implementation of the necessary protection presents significant practical issues that must be resolved before new CBRS devices can be introduced. For example, SIA noted that Comsearch has pinpointed a number of open questions regarding how interference issues would be resolved, the role of the SAS, the responsibilities and liabilities of various parties relating to identifying and mitigating

interference, and avoiding conflicts of interest if interferers are the customers of the SAS provider.<sup>1</sup>

SIA remarked that the challenges of addressing interference have been highlighted in the Commission's Technological Advisory Council ("TAC"). At a recent meeting, TAC member Lynn Claudy of the National Association of Broadcasters commented on the difficulty of making sure "that what a database manager says to do is actually being done by the transmitters it supposedly is controlling."<sup>2</sup> Similarly, TAC Chairman Dennis Roberson of the Illinois Institute of Technology observed: "That you know that there is interference is one thing. The ability to cause that interference to go away is quite another."<sup>3</sup> SIA emphasized that these fundamental enforcement problems would become even more complex if CBRS user devices are not directly in contact with the SAS, creating a daisy chain for relaying instructions to transmitters that may be causing interference.

SIA also pointed to the interference issues that have arisen in the 5 GHz band and have proven to be very challenging to resolve. In particular, SIA cited comments made by Mary Brown, director-government affairs at Cisco, at the Mobile Future Forum that ten years into sharing in the 5 GHz band, there is no mechanism for addressing what happens when interference problems occur.<sup>4</sup>

SIA noted that even if the role of the SAS is limited to enforcing static protection zones to prevent interference to FSS and other incumbents, it will need to have capabilities that go well beyond those of the TV White Spaces database. For example, robust security of devices and communications is necessary to avoid unauthorized alteration that could lead to interference, as occurred in the 5 GHz band. In addition, accurate, current geolocation information regarding CBRS devices will be critical, but a number of commenters have indicated that the proposals in the Small Cells FNPRM for 50 meter horizontal accuracy and 3 meter vertical accuracy cannot be feasibly implemented. SIA stated that the vertical positioning of a CBRS device is particularly important to assessing interference potential but also appears to be the most difficult to determine.

In this discussion, SIA emphasized that the fact that CBRS devices will be portable significantly increases the complexity of managing interference. SIA noted that Google has suggested that SIA's concerns regarding device mobility are exaggerated, since most CBRS devices will be fixed access points and will have to re-register and be authorized again even if

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<sup>1</sup> Comsearch Reply Comments, GN Dkt No. 12-354 at 5 (Aug. 15, 2014).

<sup>2</sup> Communications Daily, Sept. 24, 2014, at 1.

<sup>3</sup> *Id.* at 2.

<sup>4</sup> Communications Daily, Sept. 30, 2014, at 2.

they are moved.<sup>5</sup> SIA responded that the Google discussion begs the question of how a CBRS device will know whether it has been moved and needs to be reauthorized, given the limitations of current geolocation technology cited by Google and others.<sup>6</sup>

SIA argued that if the SAS is calculating separation distances itself, rather than applying set limits, implementation will be exponentially more complicated. SIA noted that Google has downplayed the challenges of managing CBRS devices, observing that even if 10 million CBRS devices were deployed within the first 3 years, that would average out to a registration rate of only one every ten seconds.<sup>7</sup> SIA explained, however, that it is not concerned about whether the database can successfully register 10 million devices, but whether it can accurately calculate the aggregate interference to thousands of co-frequency and adjacent band FSS earth stations from the constantly-changing subset of those CBRS devices that is active at any given moment. SIA emphasized that allowing multiple SAS databases to manage devices would make interference prevention still more difficult.

The SIA representatives urged the Commission immediately to lift the freeze on deployment of additional FSS earth stations in the 3600-3650 MHz band, arguing that the freeze is fundamentally inconsistent with both the primary status of FSS and the concept of spectrum sharing. SIA observed that there is no technical obstacle to be overcome – an SAS that can successfully manage CBRS devices can accommodate introduction of new FSS earth stations, just as it will be able to adapt to changes in primary Department of Defense operations in the band. SIA noted that Julius Knapp, OET Chief, has highlighted the importance of allowing incumbent systems to continue to evolve and develop after sharing is introduced, stating at TAC that “the concern for the incumbent is they’re locked in forever and nobody wants to be in that situation;” thus, a key question is how you share but “still provide the freedom for the incumbent service to grow and make changes.”<sup>8</sup>

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<sup>5</sup> See Reply Comments of Google Inc. on the Further Notice of Proposed Rulemaking, GN Dkt No. 12-354 at 22 (Aug. 15, 2014).

<sup>6</sup> See *id.* at 25-26 (footnotes omitted):

The FCC’s inquiry into indoor location accuracy in the 911 context demonstrates that 50-meter horizontal accuracy is not technologically reasonable today, and the 3-meter vertical accuracy requirement even less so. . . . Although some emerging technologies have shown promise in tests, none can comprehensively meet a 50 meter/3 meter requirement today. This is equally true for the 3.5 GHz band, and perhaps even more so because 3.5 GHz devices will generally not include the large variety of receiver and transmitter bands that are available in cell phones to assist with geolocation.

<sup>7</sup> See *id.*, Declaration of Preston Marshall, Ph.D., at 9.

<sup>8</sup> Communications Daily, Sept. 24, 2014, at 2.

The SIA representatives emphasized that most commenters addressing the issue oppose extension of the CBRS framework to the 3650-3700 MHz band. Furthermore, because of differences in usage among bands and in different jurisdictions, SIA reiterated that any action taken by the Commission domestically in the 3550-3650 MHz band should not dictate the United States' position on the entire C-band at the 2015 World Radiocommunication Conference.

A copy of this notice and attachment is being e-mailed to the Federal Communications Commission staff identified below. Please contact Sam Black if you have any questions.

Respectfully submitted,

/s/

SATELLITE INDUSTRY ASSOCIATION

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Attachment  
cc (via e-mail):  
Jose Albuquerque  
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Wayne Leighton  
Eliot Maenner  
Robert Nelson  
Robert Pavlak  
Paul Powell  
Brian Regan



# Small Cells Sharing with the Fixed Satellite Service in the 3550-3650 MHz Band

October 10, 2014



# SIA MEMBER COMPANIES

- artel** Connect with Confidence™
- AIRBUS** DEFENSE & SPACE
- ATK**
- BOEING**
- CISCO**
- COBHAM**
- COMTECH** EF DATA
- DigitalGlobe**
- DIRECTV**
- DRS** TECHNOLOGIES A Finmeccanica Company
- ECHOSTAR**
- ENCOMPASS** GOVERNMENT SOLUTIONS
- eutelsatamerica** communications via satellite
- GLOBECOMM**
- Glowlink**
- HARRIS** CAPROCK
- inmarsat**
- INTELSAT**
- iridium**
- EXELIS** KRATOS
- LIGHTSQUARED**
- LOCKHEED MARTIN**
- MARSHALL COMMUNICATIONS**
- MTN** NewSat GOVERNMENT Global Satellite Solutions
- THE VALUE OF PERFORMANCE. NORTHROP GRUMMAN**
- Orbital** Innovation You Can Count On®
- Panasonic** Panasonic Avionics Corporation
- Raytheon**
- ROW**
- SES**
- SSL** Space Systems/Loral
- TCS** TeleCommunication Systems Enabling Convergent Technologies®
- Telesat** TRUSTCOMM™
- UltiSat** VENCORE
- Viasat**
- XTAR**

# Overview



1. C-band satellite services are critical to national and global infrastructure and must remain viable
2. Interference protection criteria for FSS should be consistent with ITU recommendations
3. The SAS needed to enforce interference protection criteria must be fully validated and tested before commercial deployment
4. The Commission should establish a multi-stakeholder group to advise on the open issues
5. In the meantime, the Commission should lift the freeze on new 3.5 GHz earth stations
6. The domestic 3.5 GHz proposal should not apply to other spectrum or drive the U.S. position at WRC-15

# Protecting C-band FSS Is Essential



- Commenters agree that CBRS must not:
  - disrupt co-frequency FSS networks in 3550-3650 MHz OR
  - interfere with ubiquitous conventional C-band operations above 3700 MHz
- Broad agreement on aggregate I/N at the victim receiver as starting point for interference protection
- SIA has proposed I/N criteria consistent with ITU recommendations:
  - Aggregate, long-term co-frequency I/N of -10 dB (6%  $\Delta T/T$  for co-primary sharing)
  - Aggregate, long-term adjacent band I/N of -20 dB (1%  $\Delta T/T$  for secondary sharing)
  - Adjustment of -3 dB to account for other interference sources
- 3.5 GHz proponents have not proposed or justified different criteria, but instead dispute the separation distances implied by such protection criteria
- In fact, differences in calculated separation distances reflect the many variables involved, such as power levels, the surrounding terrain, relative antenna orientation, out-of-band emission masks, etc.

# Ensuring FSS Protection



- Before any CBRS deployments are authorized:
  - an SAS must be developed and validated to demonstrate its effectiveness in preventing interference to FSS networks under real-world conditions
  - proven, reliable enforcement mechanisms must be in place
- The Commission should reject requests for a transition approach:
  - if the SAS is incapable of protecting PAL operations from GAAs, it cannot be relied on to protect primary FSS and DoD incumbents from CBRS operations

# Practical Challenges



- Applying simple protection zones for FSS earth stations will require:
  - accurate, current geolocation information for CBRS devices
  - robust security of the database and communications
  - preventing unauthorized alteration of CBRS devices
- A dynamic SAS that would allow CBRS operations within those zones will add significant complexity, requiring the ability to:
  - calculate aggregate interference
  - in real time
  - from a constantly changing set of active terminals
  - to thousands of co-frequency and adjacent band FSS earth stations
- CBRS devices will also have to communicate constantly with the SAS outside the 3.5 GHz band
  - must be required and frequent
  - what are the bandwidth requirements?
  - what is the impact on the rest of the device?

# Next Steps



- The Commission should convene a multi-stakeholder advisory group to advise it on these issues:
  - incumbents including FSS must have full participation rights
  - forum and procedures must be neutral, fair and transparent
- In the meantime, the FCC should lift the freeze on the deployment of additional 3.5 GHz FSS earth stations
  - permitting new earth stations is consistent with the primary status of FSS in the band and will give FSS earth station operators much needed flexibility
  - parties recognize that a robust SAS can accommodate changes in incumbent use
  - the international-only restriction will continue to limit FSS deployment

# The CBRS Framework Should Not Be Extended Beyond the 3.5 GHz Band



- Most parties oppose applying the untested CBRS regime to the 3.65 GHz band:
  - introducing a new regulatory overlay would complicate the existing sharing structure and strand CII investment
  - using the immediately adjacent band for CBRS would increase risks to thousands of C-band earth stations
- Because spectrum usage varies widely from country to country and band to band, the CBRS proposal should not drive U.S. positions on C-band issues at WRC-15



For more information, please contact:

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202-503-1560 or [www.sia.org](http://www.sia.org)

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