



3.65 GHz Band: Unlocking Its Potential

Presented by the WCAI 3.65 GHz Working Group
Wednesday, November 18, 2009





About WCAI

- Leader in WiMAX spectrum policy and coordination in the United States
 - Led the 2.5 GHz rebanding effort at the FCC
 - Developed industry standard coordination matrix for the 2.5 GHz band
 - Shaped the 3.65 GHz band rules





3.65 GHz Working Group

○ Purposes

- Develop a coordination matrix to mitigate harmful interference among operators
- Promote coordination between suppliers and operators
- Address regulatory issues within the band



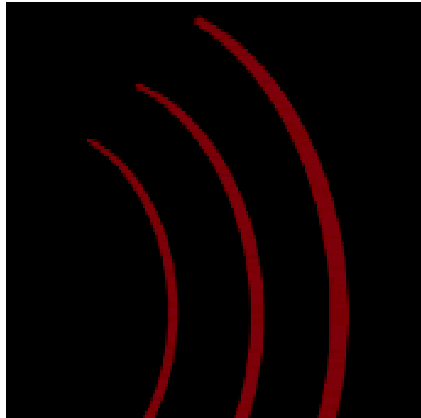
Paul Sinderbrand

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Partner

Wilkinson Barker Knauer





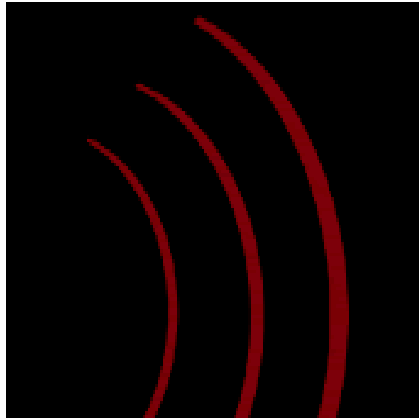
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The 3.65 GHz Band: Unlocking Its Potential

Paul J. Sinderbrand

WCAI Webinar

November 18, 2009



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3.65 GHz – A Brief History

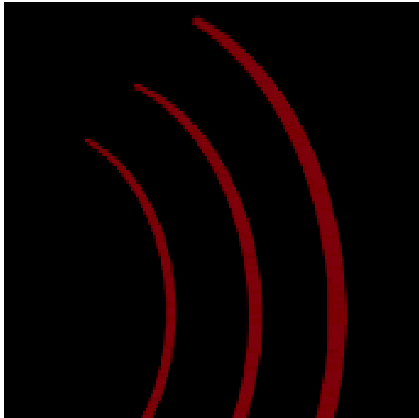
- Historically allocated for radiolocation services
- In 1984, 3625-3700 MHz allocated for FSS downlink (Extended C-Band).
- Starting in 1998, FCC began long, convoluted move to reallocate spectrum for commercial use.
- In March 2005, FCC reallocates 3650-3700 MHz for commercial fixed and mobile use on a “licensed lite” basis, subject to rules designed to protect remaining incumbents and promote sharing among non-exclusive licensees

The Core Documents

- March 2005: FCC adopts Report and Order that sets forth most of current rules.
- June 2007: FCC adopts MO&O On Reconsideration reaffirms rules adopted in 2005, with one significant change.
- November 2007: WTB issues Public Notice setting forth procedures for securing non-exclusive license and filing required station registrations.



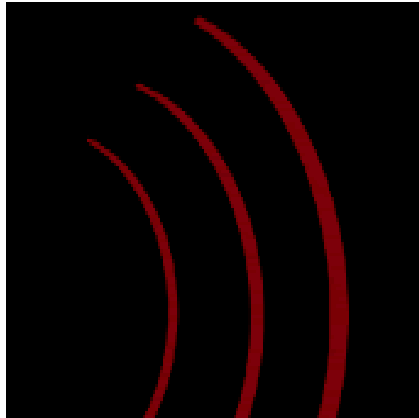
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An Overview Of The Rules

- Fixed or mobile use
- Equipment requirements
 - “Unrestricted CBP” avoids co-frequency interference with devices using all types of CBP and can use all 50 MHz
 - “Restricted CBPs” only avoid co-frequency interference with devices using same protocol, and are limited to lower 25 MHz
- Light Licensing
 - Unlimited number of easily obtained non-exclusive nationwide licenses
 - Individual base and fixed stations must be registered with and accepted by FCC before use
 - Ongoing cooperation requirement left specifics of interference mitigation to the industry
- Environmental, Historic, RF Rules



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Intra-Service Interference Protection

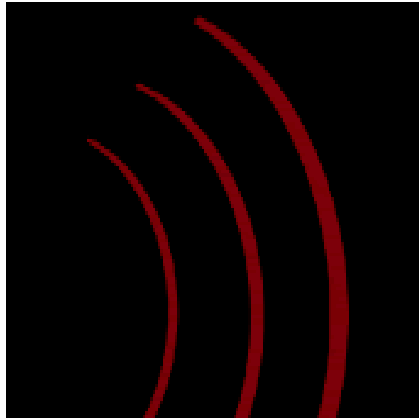
- No licensee entitled to interference protection from another, even if first to deploy
- Must consult database prior to registration and make “every effort to ensure that [contemplated location and parameters] will minimize the potential to cause and receive interference”
- Licensees suffering or causing harmful interference “are expected to cooperate and resolve this problem by mutually satisfactory arrangements”

Power Limits

- Intended by FCC to promote intraservice sharing and avoid interservice interference
 - Base and fixed stations limited to 25 watts/25 MHz EIRP, with peak EIRP power density limited to 1 Watt in any one-megahertz slice of spectrum.
 - Special rules for smart antennas
 - Mobile and portable stations limited to 1 watt/25 MHz EIRP, with peak EIRP density limited to 40 milliwatts in any one-megahertz slice of spectrum.



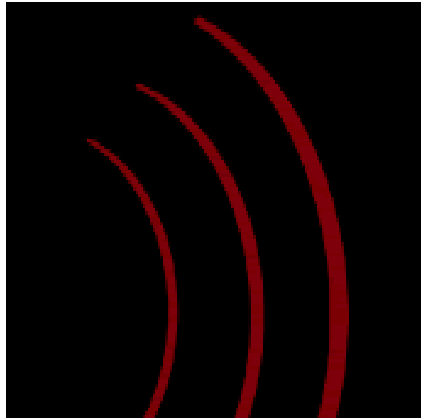
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Inter-Service Coordination

- Gov't radiolocation 80 km coordination zones
 - Requests to register base or fixed stations within 80 km of Federal radiolocation stations at St. Inigoes, MD, Pascagoula, MS, and Pensacola, FL are only be placed in an “Accepted” status upon successful coordination by the FCC with NTIA
- Fixed Satellite Service 150 km exclusion zones
 - No base or other fixed stations within 150 km of certain grandfathered non-government FSS earth stations absent agreement of earth station licensee
 - At request of 3.65 GHz licensee, FSS licensee “must negotiate in good faith with that terrestrial licensee to arrive at mutually agreeable operating parameters to prevent unacceptable interference” within the 150 km exclusion zone.



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Protection Zones: 3650 to 3700 MHz



Small dark gray circles = Federal Government stations
Large light gray circles = Grandfathered FSS stations
Not displayed, Guam FSS stations

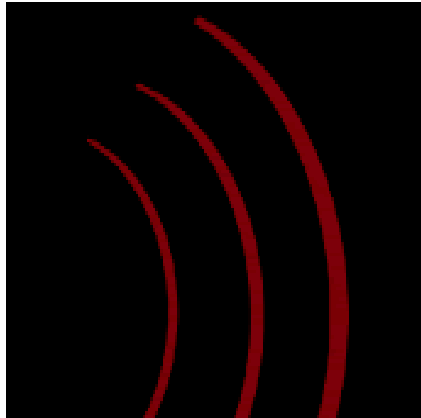
Federal Communications Commis
Office of Engineering And Techno

Licensing To Date

- Licensing started 11/15/2007
 - Over 1100 Licensees
 - Many have no registrations
 - Over 5400 base and fixed stations registered



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THANK YOU!

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VP of Corporate Development and General Counsel

KeyOn Communications



Regulatory Framework Offers Several Advantages

- Up to 50MHz of spectrum with good propagation characteristics
- Well-suited for independent operators
 - Low costs
 - Transparency
 - Obligation to cooperate
 - Multiple protocols (restricted and unrestricted)



Restricted Contention Protocol requirement has been a catalyst

The 3.65GHz Opportunity



Restricted Contention Protocol leverages efforts in 2.3, 2.5 and 3.5 GHz bands - WiMAX



- **Increased capacity and greater spectral efficiency**
- **Carrier Grade performance and QoS for advanced services**
- **The utilization of an international standards-based protocol (802.16d and 802.16e)**
 - Multiple vendors
 - Economies of Scale
 - Viable business models
- **Early results are encouraging**
 - Over 1000 Nationwide Licensees
 - Fixed/nomadic services
 - Deployment in a variety of environments/customers

How do we parlay the successes?

Utilize the WCA to speak on behalf of the industry



- **Track record of facilitating industry solutions**
 - Regulatory
 - Inter-Carrier
- **Topics for discussion**
 - The upper 25MHz
 - Power limitations
 - Roaming/Hand-offs
 - Contribute to the ecosystem and expand the viability

Provide Solutions, Not Suggestions



Harry Perlow

WCAI Engineering Committee Chair

Clearwire





Opportunity: 3650 - 3700 MHz in the United States

WCAI

Harry Perlow

November 18th, 2009





The FCC's 3650 MHz Goals

- Protect existing users - Extended C and C band satellite, DoD and Navigation radar
- Promote rapid, inexpensive Operator deployments
- Minimize contention problems in congested areas
- Promote efficient use of spectrum
- Make certain the Spectrum is utilized



Past Performance is an Indication of Future Results

- As WCAI accomplished at 2.5 GHz after successfully rewriting the Rules, we developed and promoted “Best Practices”:
 - Band Plan channelization
 - Interference Mitigation Techniques for systems that cannot synchronize
 - Synchronization plan
 - All operators, educators and manufacturers signed on to the plan.
- The Challenges at 3650 – 3700 MHz are different in nature, but are achievable using similar WCAI processes and expertise.
- So, what are the Questions?



3650 - 3700 MHz Questions

- Can we develop an adequate plan for additional authorized power on a non interfering basis?
 - Base Station: 1 watt/MHz EIRP and Device 16dBm/EIRP
- Will it work everywhere?
- Can Power levels can be raised with sound engineering practices?
 - How many C Band earth Stations are Licensed and can be protected?
 - Locations, Protection Plan and Interference Mitigation techniques for the C band operations, 3700 – 4200 MHz Band, need to be developed.
 - Protecting extended C Band operations has already had successes.
 - Interference Consents have been granted and some extended C Band operations have been de-commissioned.
 - DoD : We will need data, and that's where WCAI has a successful track record with NTIA and FAA
 - What else?



3650 -3700 MHz Next Steps

- Establish a WCAI Task Force.
- Operators and Manufacturers guided by Regulatory, Operational and Technical expertise.
- Define all the challenges.
- Develop consensus solutions.
- Execute



Thank You

Opportunity: 3650 - 3700 MHz

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Thank You!

If you are interested in more information on WCAI's [3.65 GHz Working Group](#), please contact Susan at susan@wcai.com or call (202) 452-7823.

