

Satellite C-Band Spectrum: supporting the Broadcasting Industry

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Services provided by satellites

C Band

- Cable video distribution (e.g., SES-6 video neighborhood)
- OU video distribution (e.g., SES-6, SES-4, NSS-7)
- VSAT networks (e.g., SES-4, NSS-7)
- GSM Backhaul (e.g., SES-4, NSS-7)

Ku Band

- DTH services (e.g., SES-6/AMC-3/AMC-4)
- Aeronautical and maritime connectivity (e.g., SES-4/SES-6/AMC-3/AMC-4)
- GSM backhaul (e.g., SES-4/SES-6/AMC-3/AMC-4)
- VSAT networks (e.g., SES-4/SES-6/AMC-3/AMC-4)

Ka Band

- Satellite broadband
- GSM/4G backhaul
- Potentially DTH in the near future.
- Aeronautical and maritime connectivity

Terrestrial interference in C-band

Issue

- ▲ WRC-15 Agenda Item 1.1 will consider additional spectrum generally for International Mobile Telecommunications (IMT) and other mobile broadband applications
 - Numerous input documents to the ITU already seek consideration of C-band

- ▲ The problem is that such use is not compatible with the existing operations in C-band, including FSS, radar systems and fixed point-to-point links

- ▲ In particular, C-band is heavily used by FSS systems around the world, and its use is continuing to grow
 - Around 170 C-band satellites are in geostationary orbit today (represents about USD 50 billion of in orbit investment.
 - 32 of these satellites cover Latin America
 - There is substantial ongoing investment in C-band satellite capacity worldwide:
 - At least 52 satellites with C-band payloads have been launched in 2007-2012, representing \$12-15 billion in investment
 - At least 35 satellites with C-band payloads are under construction and are scheduled to be launched in 2012-2015, representing \$9-10 billion in investment

- Just in the last few months, at least 4 new satellites have been launched in Brazil in C band (C3, AMZ-3, SES-6, Anik-G1). Licenses are for 15 years

- Anatel will auction 4 new positions in 2013 and they have 4 positions available with C band spectrum (87 West, 77.5 West, 48 West and 10 West). Licenses are for 15 + 15 years.

Key Services Supported by C-band Satellites

▲ Media Distribution

- C-band is used to distribute media content around the world, including, e.g.
 - Cable distribution to 7038 cable headends around the United States, serving 60 million U.S. households
 - In 2010, 18.7 million cable homes in Latin America served by SES C-band satellites
 - **20 million receive-only C-band television dishes in Brazil alone**

▲ Media Contribution

- Special events coverage (e.g. Olympics)
- Satellite news gathering

▲ Feeder Links for mobile-satellite services (MSS)

- Supporting public safety and emergency relief missions around the world.

▲ Rural and remote communications

- Internet and basic connectivity in remote areas (remote villages, external territories, maritime platforms, etc.)
- Cellular backhaul applications

▲ Mobility

- 3510 C-band Earth Stations on Vessels (ESVs) in 2012, providing video distribution, Internet and mobile backhaul services

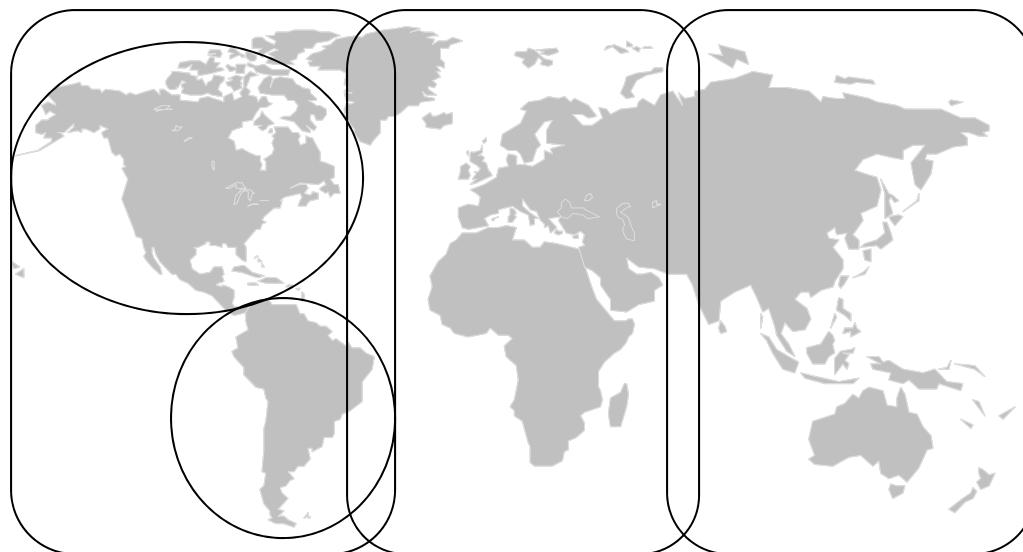
▲ Other C-band services, including

- Disaster recovery and emergency preparedness
- Tracking, Telemetry & Command (TT&C) for many satellite systems in other frequency bands, for example, for launches

Cable TV is a USD 550 billion industry, depending heavily on C band satellites for distribution to cable headends globally.

Unique Attributes of C-Band Satellite Services

- ▲ C-band satellite services cannot easily be replicated at other satellite bands or via terrestrial means
 - Geographic reach. C-band easily covers entire continents and oceans and offers an economically viable way of providing intercontinental and global communications
 - Smaller or hard-to-reach markets and low density regions are covered as easily as metropolitan areas
 - Particularly ideal for point-to-multipoint applications (broadcast, widely-dispersed networks), and remote/rural deployment
 - Resistance to rain-fade
 - C-band is less susceptible to signal interruptions from heavy rains than higher bands (Ku, Ka), making it better suited for tropical or high-rain areas at high availabilities



Sharing between FSS and BWA/IMT is not feasible

- ▲ ITU studies have concluded that protection distances of between **51 – 430 km** are necessary to allow co-frequency sharing between BWA/IMT systems and FSS earth stations
 - Adjacent band protection distances to avoid LNB overload of FSS receivers are between **10 – 31 km**
 - Considering that a typical city has a radius of 15 to 30 km, sharing between BWA/IMT systems and FSS receive earth stations is not realistic
 - See Reports ITU-R M.2109 & S.2199
- ▲ Government, strategic, and commercial FSS services in the C-band will suffer:
 - Signal delays; Synchronization loss; Blackout periods; Blackout areas; Total loss of transmission
 - Many countries – Bolivia, Hong Kong, Indonesia, Fiji, to name a few – have experienced interference when deploying BWA systems in C-band
 - WiMAX testing led to 30% of TV households in Bolivia missing some of World Cup 2006
 - Similar testing in Hong Kong led to 300,000 households across Asia to lose their TV service

Sharing between FSS and BWA/IMT is not feasible

- ▲ Sharing is exasperated by a large number of receive only earth stations already deployed – many are unregistered
 - Shielding, for example, requires knowing where all earth stations are
 - Further, site shielding is expensive and infeasible on a regional or worldwide basis



WRC-15 Agenda item 1.1 & C-band

Possible solutions?

- ▲ Clearly there is a strong demand for terrestrial mobile broadband communications
- ▲ However, it is important to balance that demand with the need for countries and citizens to have access to other means of communications as well, such as critical satellite services in C-band
- ▲ Many other frequency bands are available for IMT, and more desirable from a coverage perspective:
 - 410-430 MHz – Cost effective
 - 450-470 MHz – Cost effective and widely favored
 - 470-806 MHz – Cost effective and widely favored
 - 806-862 MHz – Cost-effective and widely favored
 - 2500-2690 MHz – UMTS extension band, well-suited to offering these services
 - 3300-3400 MHz – Similar to 3400 MHz+ but less impact to C-band satellite services
- ▲ The WRC-15 studies are now starting → Satellite sector will push to maintain the ability to use C-band for satellite services!

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Obrigado
Thank you!

A simple black curved line, resembling a wide smile or a decorative flourish, positioned below the text.