Preserving Satellite Spectrum for Mission-Critical Communications:

WRC 2015 and The Future

David Hartshorn
Secretary General
GVF
WRC-07 & AI 1.4: No Global ID of C-band for IMT But…

In/Out-of-Band Interference When Introduced in Some Opt-in Countries

Was considered at ITU WRC-07

<table>
<thead>
<tr>
<th>3.4</th>
<th>3.5</th>
<th>3.6</th>
<th>3.7</th>
<th>3.8</th>
<th>3.9</th>
<th>4.0</th>
<th>4.1</th>
<th>4.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ext. C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Std. C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Broadband Wireless Access (BWA), WiMax, FWA, ....

Future mobile phone networks (IMT Advanced, 4G, ....)

Additional Band (FSS, MSS feederlinks, etc.)

Band commonly used by FSS satellites
The Escalation of Wireless Interference:

Overdrive of LNB

Intermodulation products

Wireless carrier

Distortion of Received FSS Spectrum by Wireless Signal

Interference is Unavoidable...
Exclusion Zones: A Viable Solution?

New Report ITU-R [FSS-IMT C-BAND DOWNLINK] - Sharing studies between International Mobile Telecommunication-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands in the WRC study cycle leading to WRC-15

Calculated exclusion zone around Florida showing a distance separation of 57.1 km to 87.1 km, depending on direction, to counter interference from a single IMT base station.
Shielding - An Interference-Mitigation Solution?

Source: WiMAX Forum

Impossibly Costly, Time-Consuming and Ineffective for C-band Earth Stations, including Millions of Receive-Only Terminals
Tremendous industry excitement in mid-1990s surrounding low cost, rural opportunities worldwide WLL forecasts, some projecting over 1.5B subscribers by 2002, significantly overestimated subscriber levels, time-to-market, and consumer demand WLL technology was largely overtaken by 2G cellular services Multiple standards and platforms increased equipment price Regulatory issues extended anticipated timeframe for commercial deployment

- WiMAX forecasts were overly optimistic
- WiMAX customers were approx. 1M subscribers in 2007 compared to some 15M+ average of 15 forecasts
- There were several potential obstacles for large-scale commercial success:
  - Consumer interest
  - Equipment costs
  - Regulatory issues
  - Competition from other advanced terrestrial wireless and fiber technologies
WRC-15 Agenda Item 1.1: The C-band Stakes … and Stakeholders

The Issue

Agenda Item 1.1 considers additional spectrum for IMT mobile broadband applications…

Including 3400-4200 MHz

The Problem

The need for additional spectrum is vastly overstated and such use is still incompatible with the existing C-band operations, including radar, point-to-point and other links.

The Response

IGOs, NRAs & Satellite Users Representing Billions in Economic Impact and Immeasurable Social Benefits Are Standing Together Again to Preserve C-band Spectrum
MAJOR SECTORS ARE ASKING ADMINISTRATIONS TO PROTECT 3.4 – 4.2 GHz FOR SATELLITE SERVICES

- Widely used by major user groups
- Provides the wide geographic coverage necessary for hundreds of millions of users
- Numerous cases of harmful interference (and loss of TV signals) have been caused by terrestrial mobile services in C-band
- Extremely reliable, even in rainy regions
- Cannot be replaced by bands with narrower beams and different propagation characteristics such as Ku- and Ka-bands
- Support users’ requirement to maintain satellite service availability 3.4 - 4.2 GHz

**BROADCASTING**
- Hundreds of millions of households depend on C-band for tv programming, including events such as the World Cup and the Olympics
- Billions of dollars invested in by the broadcasting sector

**METEOROLOGICAL**
- The World Meteorological Organisation uses C-band for vital public safety functions
- Applications support by C-band supported services include disaster relief, water management, and agricultural programmes

**AVIATION**
- The safety of hundreds of millions of airline passengers is enabled by C-band satellite services
- Civil Aviation networks require the very high reliability provided via C-band satellite

**MARITIME**
- To ensure the safety of maritime operations, GMDSS distress and safety communications rely on the C-band for Inmarsat feeder links

**HUMANITARIAN**
- Nearly 50 of the world’s largest humanitarian organisations depend on C-band
- Education, health, and disaster response are among the many applications supported by C-band
MEVA Regional Communications C-band Satellite Network in the Caribbean

- Critical Aeronautical and Meteorological Information
- High Reliability Essential for Aviation Operations
- Introduction of IMT Would Place Critical Communications At Risk
- Countries cannot afford equipment change-out or modification

ICAO Supports NOC for Aeronautical Spectrum and FSS Bands Used to Support Aeronautical Communications
Brazilian Contribution at CITEL Meeting (OEA/Ser.L/XVII.4.2 CCP.II-RADIO/doc. 974/06):

- No Better Band to Address Rain Attenuation
- Exclusion Zones Unworkable
- Developing Countries Can’t Afford Equipment Changeout
“No allocations of spectrum to support mobile broadband systems, IMT or RLAN, should be made in space service science bands unless acceptable sharing criteria and conditions are developed.

“... the main frequency bands of concern to SFCG member agencies are [among others]: the 3400 – 4200 MHz band used for Galileo Data Distribution Network and the dissemination of meteorological data by systems like EUMETCast, CMACast, and GEONETCast...”
# Meteorological Data Retransmission Services

- **EUMETCast Americas**  
  *Satellite:* SES-6  
  *Frequency:* 3.803 GHz

- **EUMETCast Africa**  
  *Satellite:* EUTELSAT 5 West A  
  *Frequency:* 3.7317570 GHz

- **EUMETCast Europe**  
  *Satellite:* EUTELSAT 10A  
  *Frequency:* 11.2625 GHz

- **CMACast**  
  *Satellite:* Asiasat 4  
  *Frequency:* C-band

- **GEONETCast Americas**  
  *Satellite:* IS-9  
  *Frequency:* 3.840 GHz

- **HIMAWARIICast**  
  *Satellite:* JCSAT 2A & 2B  
  *Frequency:* 4.148 GHz

- **Nat’l Weather Service**  
  *Satellite:* SES-1  
  *Frequency:* 4.040 GHz
### WRC-15 Agenda Item 10: “IMT above 6 GHz”: Summary of regional positions

Every world region has indicated candidate bands above 31GHz

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>APT</th>
<th>CITEL</th>
<th>CEPT</th>
<th>RCC</th>
<th>ASMG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>31.8 – 33.0 GHz</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From</td>
<td>To</td>
<td>From</td>
<td>To</td>
<td>From</td>
<td>To</td>
</tr>
<tr>
<td>25.25</td>
<td>25.5</td>
<td>25.25</td>
<td>25.5</td>
<td>24.5</td>
<td>27.5</td>
</tr>
<tr>
<td>31.8</td>
<td>33.4</td>
<td>31.8</td>
<td>33.0</td>
<td>31.8</td>
<td>33.0</td>
</tr>
<tr>
<td>39</td>
<td>47</td>
<td>39</td>
<td>47</td>
<td>39</td>
<td>47</td>
</tr>
<tr>
<td>47.2</td>
<td>50.2</td>
<td>47.2</td>
<td>50.2</td>
<td>47.2</td>
<td>50.2</td>
</tr>
<tr>
<td>50.4</td>
<td>52.6</td>
<td>50.4</td>
<td>52.6</td>
<td>50.4</td>
<td>52.6</td>
</tr>
<tr>
<td>66</td>
<td>76</td>
<td>66</td>
<td>76</td>
<td>66</td>
<td>76</td>
</tr>
<tr>
<td>81</td>
<td>86</td>
<td>81</td>
<td>86</td>
<td>81</td>
<td>86</td>
</tr>
</tbody>
</table>

- **66-71 & 71-76 GHz**
  - Supported by all regions with an established position
  - Supported by most regions

- **81–86 GHz**
  - At least 1.2 GHz contiguous spectrum available for global harmonization

At least 1.2 GHz contiguous spectrum available for global harmonization

- **31.8 – 33.0 GHz**
  - Supported by all regions with an established position
  - Supported by most regions

- **66-71 & 71-76 GHz**
  - Supported by all regions with an established position
  - Supported by most regions

- **81–86 GHz**
  - At least 1.2 GHz contiguous spectrum available for global harmonization

By implication, above 31GHz

- **31.8 – 33.0 GHz**
  - Supported by all regions with an established position
  - Supported by most regions

- **66-71 & 71-76 GHz**
  - Supported by all regions with an established position
  - Supported by most regions

- **81–86 GHz**
  - At least 1.2 GHz contiguous spectrum available for global harmonization

By implication, above 31GHz
There is Still Plenty of Spectrum Available to be Licensed

The Wireless Industry Can Better Use the Spectrum It Already Has
Major New Bands Are Not Yet Licensed (e.g. 700 MHz, 2.6 GHz)

Region 2

Additional Wireless Spectrum Is Coming Online… Without the Need for a Global IMT Identification
Concluding Thoughts

- Wireless Industry Wants…
  - C-band
  - Removal of Interference Protections, Plus
  - Bands Above 6 GHz (Agenda Item 10)

- For Nations that Seek To Permit IMT Deployments at C-band, the WRC-07 Footnote Remains Available

- At WRC-15 Please Support:
  - NOC on Agenda Item 1.1
  - For Agenda Item 10, and in Preparation for WRC-19
    Only Sharing Studies of Non-FSS Bands > 31 GHz
For More Information…

www.satellite-spectrum-initiative.com

Thank You!