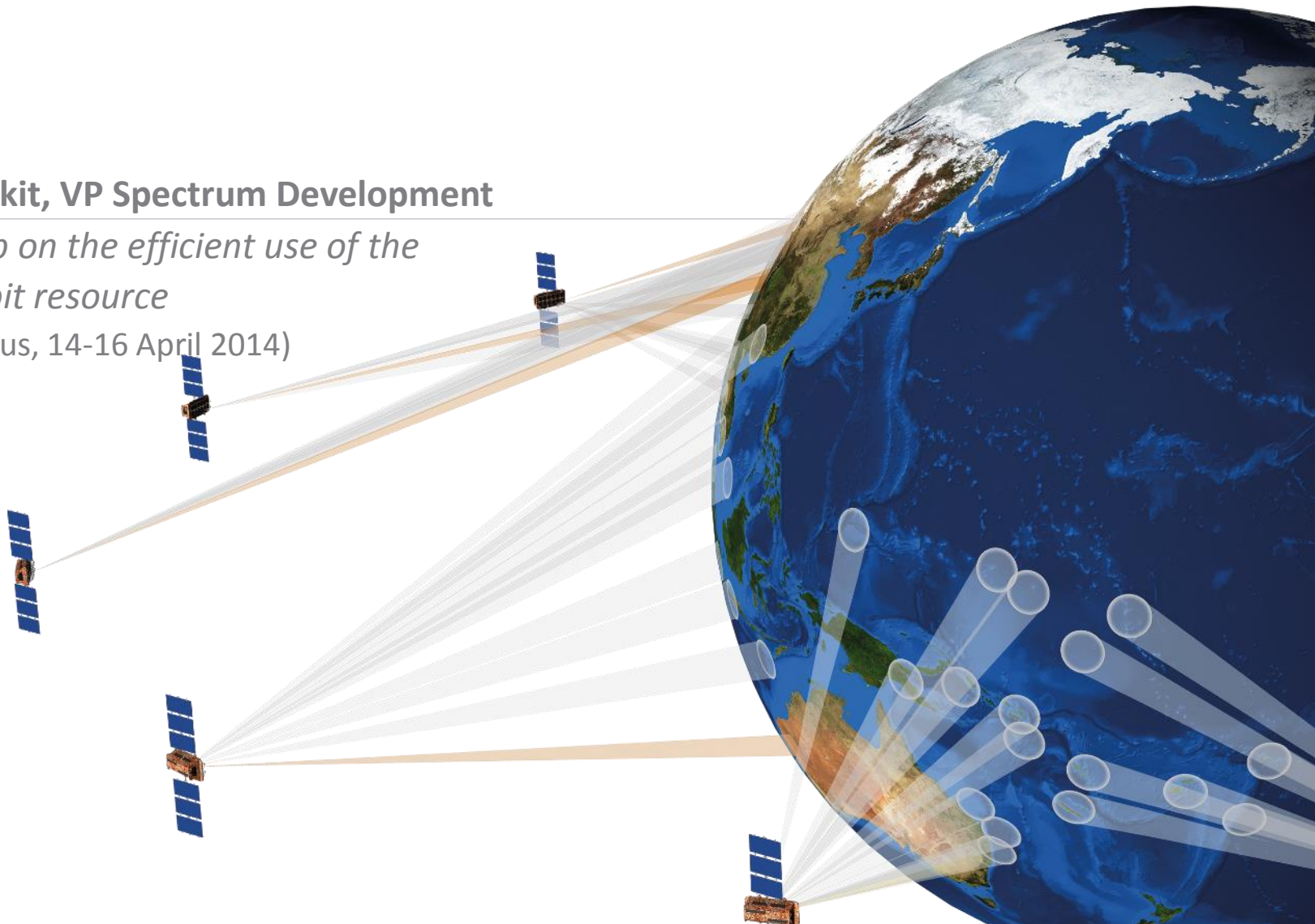


Future Improvements to the ITU Framework

Hazem Moakkit, VP Spectrum Development

*ITU Workshop on the efficient use of the
spectrum/orbit resource*

(Limassol, Cyprus, 14-16 April 2014)



- The past few years have witnessed a dramatic revolution in telecommunications
- This has put **greater demand** on spectrum
- There is a greater emphasis on **mobility**
- The explosion of the Internet brought many **new players**
- Yet, the **existing framework are quite dated** and do not represent the pressing telecommunications needs
- The current regulatory frameworks impede the satellite industry from fully contributing to telecommunications revolution

1

Gap between notified parameters and what is actually implemented

2

Mobility & ESOMPs

3

Harmonization of satellite spectrum allocations

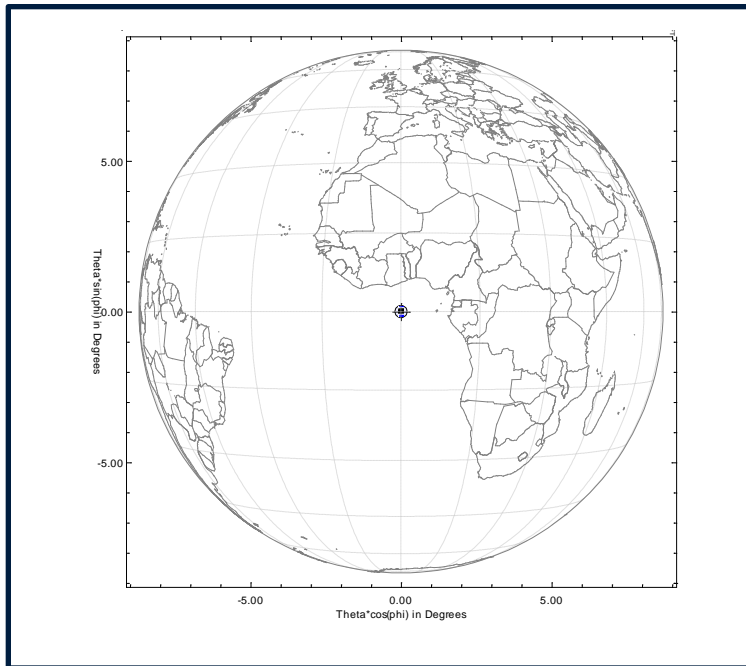
Gap between notified parameters and what is actually implemented

Use of global beams in Ka filings

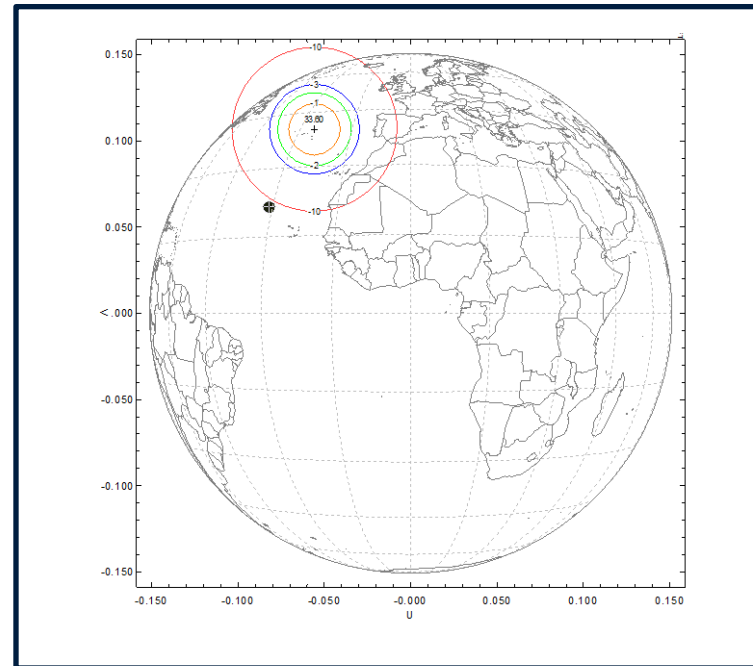
- Majority of FSS satellite filings now use global and/or steerable beams
- In certain instances, it is justified to notify global beams, but not always
- Yet, implemented satellite networks rarely use global beams
- However, during coordination, we assume that global beams are in fact fully implemented
- Coordination discussions are often based on the protection of hypothetical global beams rather than what is actually implemented

The gap between notified networks and what is actually implemented

Notified



Reality



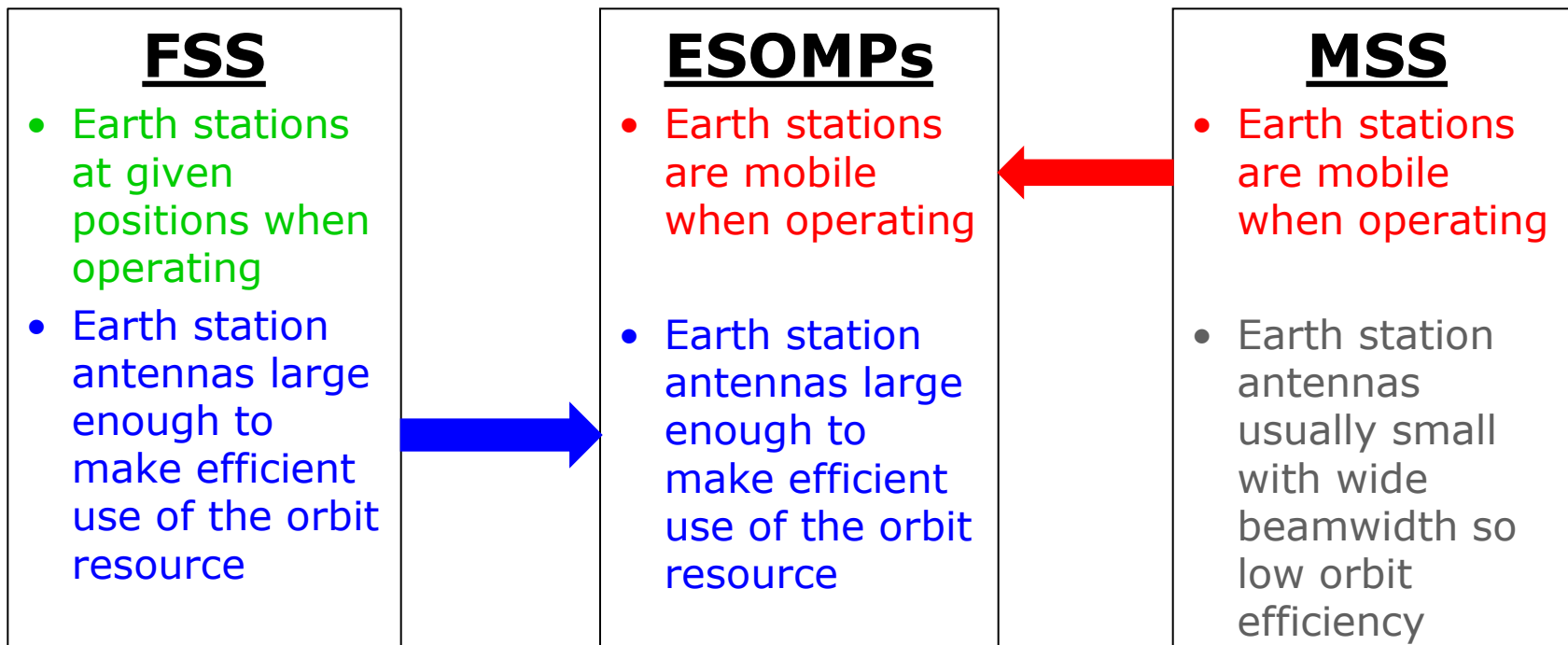
Discrepancy between what is notified and what is actually implemented leads to inefficient use of resources

Mobility in the FSS

- People expect to be connected anywhere and all the time
- Earth Stations on Mobile Platforms (ESOMPs) provide an answer to this requirement
- ESOMPs have been tested and proven over the years – they employ state-of-the-art technology
- Current definitions/classifications do not accurately reflect the status quo of technology
- Maybe it is time for a new class of service....?

Why are we addressing ESOMPs

- Earth Stations On Mobile Platforms (ESOMPs) do not fit the traditional FSS/MSS categories of service of the ITU:



- Challenge is to ensure that ESOMPs do not cause more interference than conventional FSS earth stations while providing the required mobility

ESOMPs are not conventional MSS terminals

ESOMPs are typically like this ...



and *not* like this



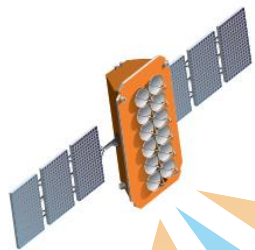
- Relatively small antenna diameter
 - Typically less than 3 meters for ships and less than 1 meter for aircraft and land vehicles
- Equipped with tracking mechanism
 - Must be designed to cope with the dynamic characteristics of the platform on which they will operate
 - Guaranteed pointing error (e.g., 0.2°) under normal platform movement conditions
- Automatic shut-off mechanisms to prevent interference-causing transmissions if mispointing occurs
 - Cease transmissions within fraction of a second (e.g., 100 mS) if pointing error exceeds a certain value (e.g., 0.5°). Not restart transmissions until pointing error returns to normal.
- Effective network control that ensures transmissions from non-performing ESOMPs are stopped immediately

ESOMPs with both GSO and NGSO satellites

- Initial focus on Ka-band ESOMPs was for use with GSO satellite networks as no NGSO Ka-band satellites were operational
 - Main considerations with GSOs are maintaining good orbit-spectrum efficiency
 - Typically Ka-band GSO ESOMPs can operate in a 2° orbit spacing environment
- NGSO satellites have now been launched and they will provide service to ESOMPs.
- Typically ESOMPs developed for GSO applications will work with NGSO satellites with minor modifications.
- ESOMPs are particularly well suited to NGSO systems because the tracking mechanism is already required even for FSS NGSO terminals in order to track the moving satellites. So little additional cost to account for the movement of the platform (depending on the platform type).

O3bMaritime Supported Solutions

10 Steerable Customer Beams Per Satellite



Cruise Industry

Super & Mega Yachts

Fleet Support & Humanitarian Relief



Debut of O3bMaritime Service on the *Allure of the Seas* and the *Oasis of the Seas*



- The lines between FSS and MSS are blurring – this is a common theme that regulators face in many areas in telecommunications
- Operating ESOMPs under 4.4 is not a long-term solution – It is much better to coordinate the *actual technical characteristics* of the ESOMP transmissions to be certain that interference levels are acceptable (not “harmful”, which is all that is guaranteed under 4.4)

4.4 Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations.

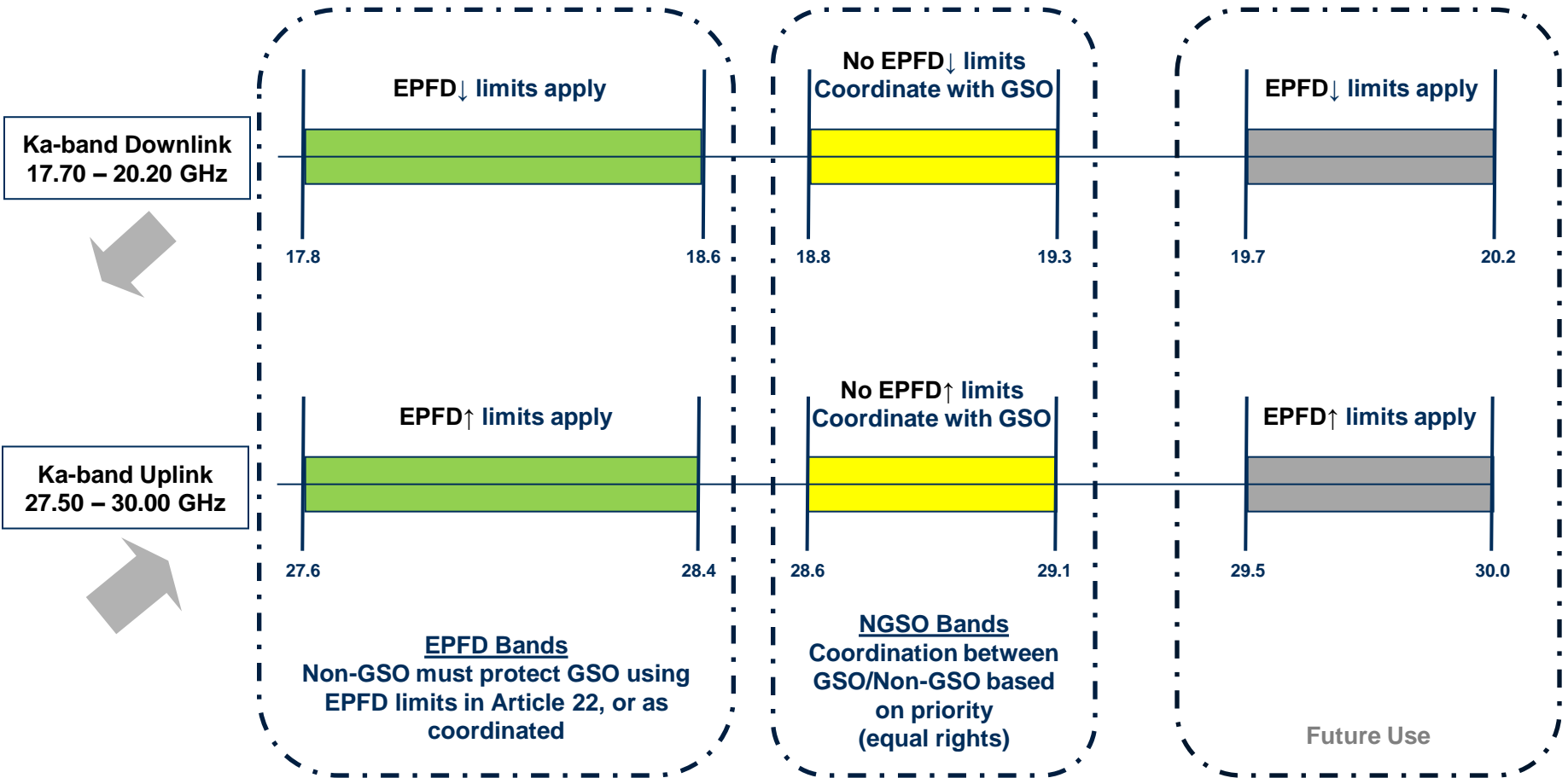
- The ITU Radio Regulations should keep up with advancement in technology – otherwise, it risks circumvention by regional bodies

Harmonization of Satellite Spectrum Allocations in Ka band

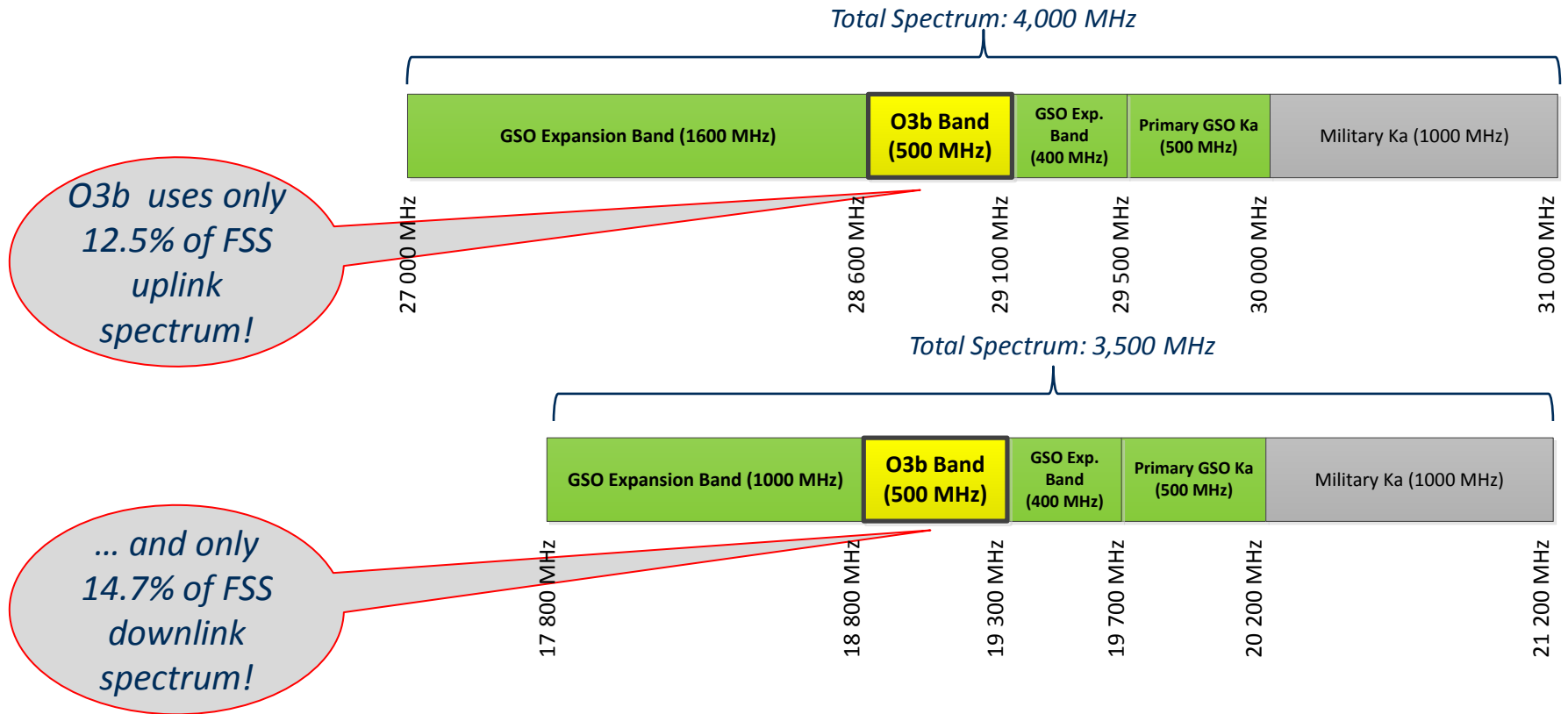
Ka band spectrum allocations around the world

- The satellite telecommunications industry is global by nature
- NGSO satellite in particular are designed to operate globally using the same frequencies
- Harmonization creates design synergies and allows for economies of scale
- As such, harmonized spectrum is a prerequisite for the success of such global systems
- However, many countries deviate from the ITU table of spectrum allocations
- Also, some countries choose not follow the ITU Rules and Regulations

O3b Frequency Plan



Spectrum subject to RR9.11A vs. overall Ka spectrum (R2/R3)



- Spectrum coordinated under RR9.13 represents a small fraction of the Ka spectrum available to GSO satellites
- As such, conformity with the ITU table of allocations is essential to ensure access to these 500 MHz subject to RR 9.11A

- Satellites play an integral role in the global telecommunications infrastructure
- Satellite play a critical role in bridging the digital divide and in connecting the world
- Satellites enable other forms of telecommunications
- We all stand to benefit from harmonized spectrum allocations



Networks

Fiber Speed. Satellite Reach.