WRC-15: Decisions & Implications

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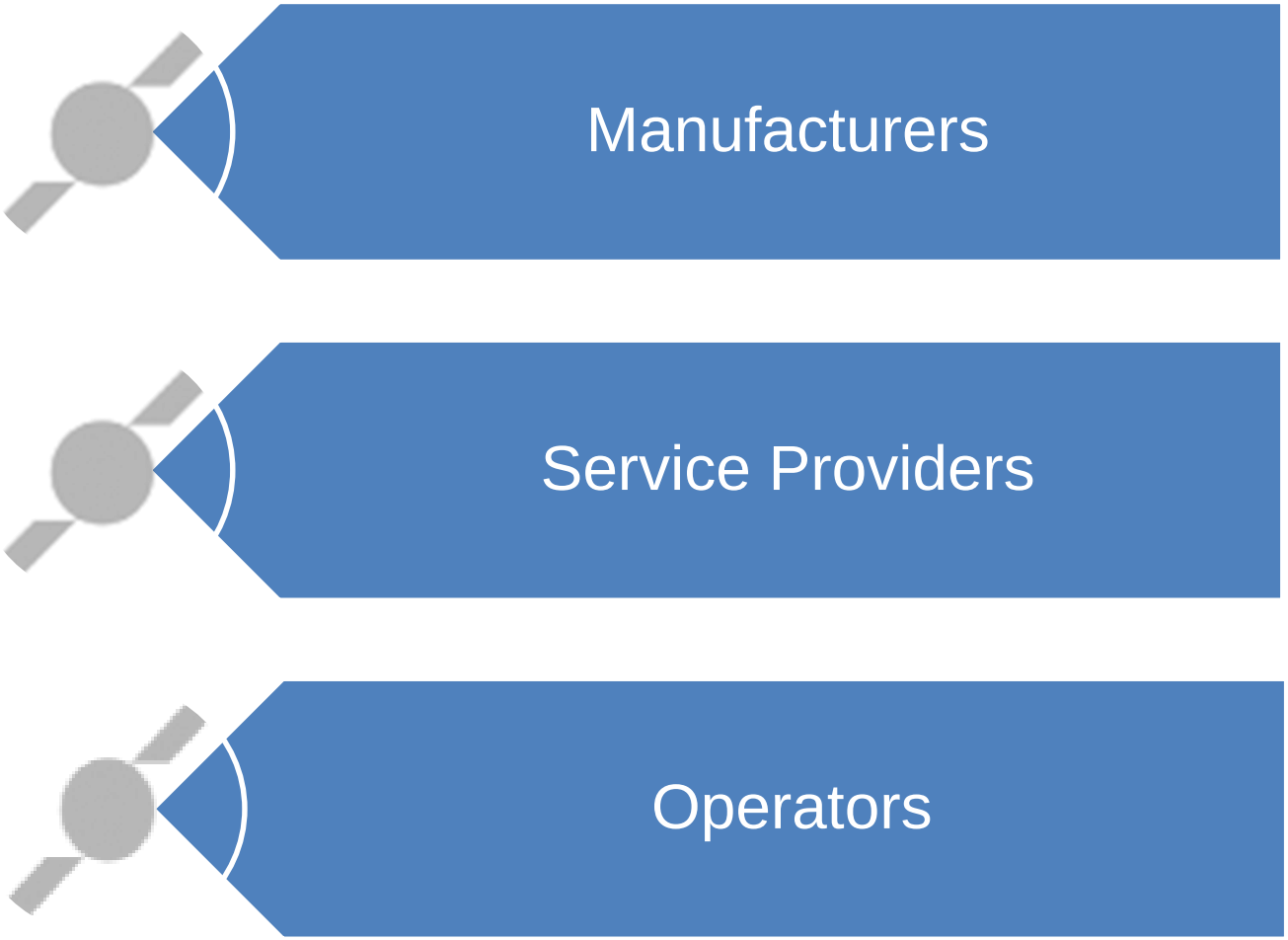
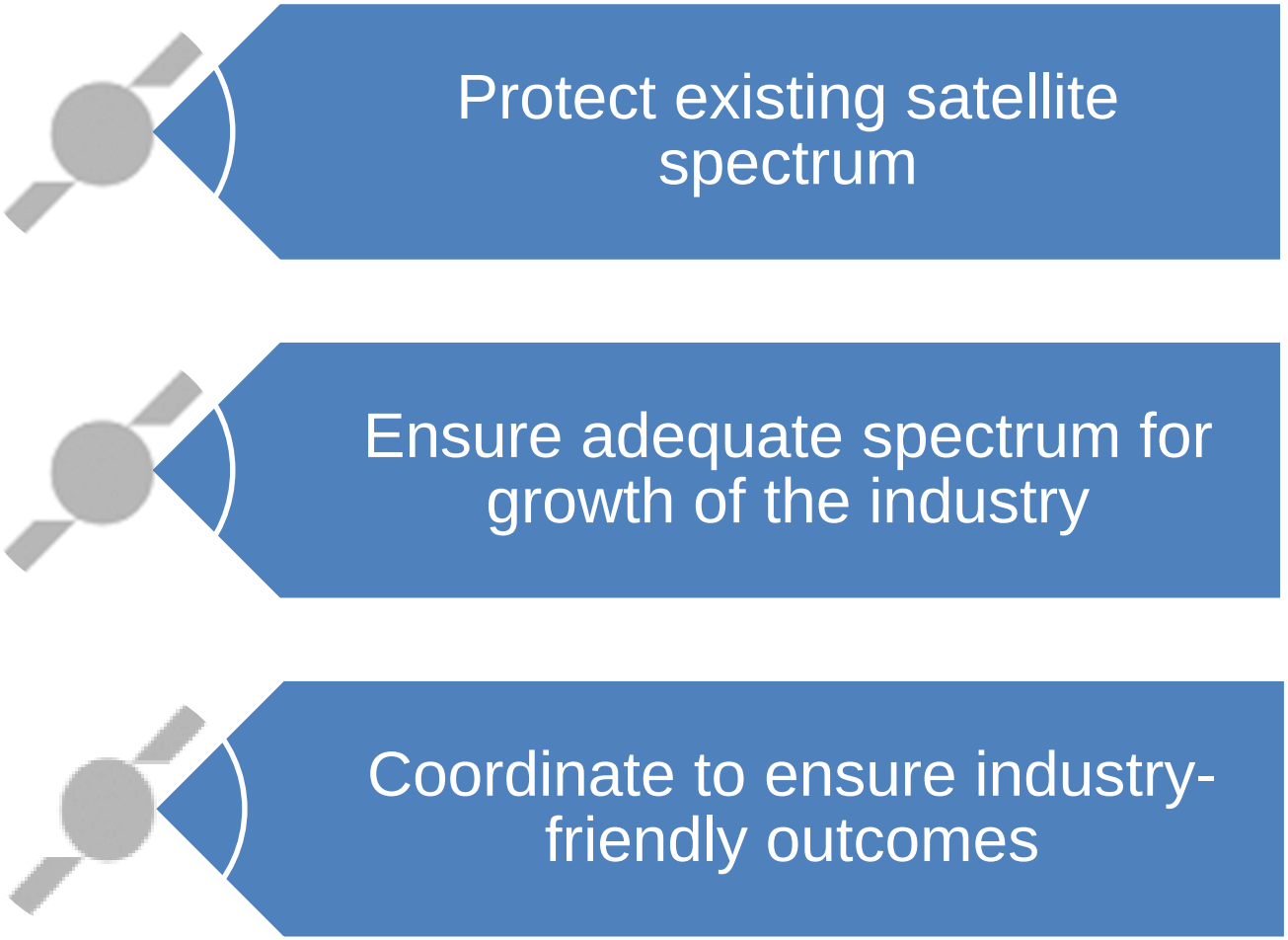
Acknowledgements: SIG

Who We Are



Why We Are Involved in Spectrum



AI 1.1: Terrestrial Mobile Broadband (1)

Goal

Protect satellite services in:

1467-1492 MHz

1518-1559 MHz

3400-4200 MHz

4500-4800 MHz

5850-6425 MHz

Outcome

No global identification for terrestrial mobile broadband applications (IMT) from FSS/MSS bands; Regions 1 & 2 identified 3.4-3.6 GHz. Country footnotes regime remains for 3.4-3.6 in Region 3, and new footnote for 3.6.-3.7 for a few countries in Region 2.

Potential for continued out-of-band interference above 3.6 GHz, and below 1518 MHz (1492 – 1518 identified for IMT).

Continued pressure for IMT above 3.6 GHz

AI 1.1 Terrestrial Mobile broadband-Services (1)

C-band provides reliable communications across sectors

Banking

- Connecting bank branches, **ATM networks**, and **trading platforms**
- **1.1 million ATMs** in APAC service **1.8 billion people**
- **75000 VSAT** sites in Indonesia **enable 15 million ATM transactions** a day

Mobile Backhaul

- **Backhaul for mobile** networks in rural areas
- **2.9 billion people** in rural Africa and Asia
- **6-15 million mobile subscribers** in Indonesia

Oil and Gas

- Losing C-band connection for one day on a platform can cause losses of **$15 million**
- **6.9 billion barrels** are extracted every year in tropical regions
- Reliable connectivity for **exploration, extraction** and **monitoring**

Maritime

- **50,000 merchant** vessels and cruise ships trading internationally
- **Connectivity** for trans-oceanic shipping and cruises
- **12,000** maritime C-band terminals are currently in use

Broadcasting

- Broadcast distribution to terrestrial network and end-users
- C-band protects TV audience of **140 million users** in Africa from service disruption due to rain fade
- Helps **distribute 372 TV channels** across Africa

AI 1.1 Terrestrial Mobile broadband-Services (2)

C-band provides reliable communications across sectors

Meteorological

- Distributes operationally and time critical **meteorological data**
- C-band is central to the operation of **meteorological networks** in tropical and remote areas
- Distribution of forecast data via C-band allows populations to prepare for **adverse weather** events

Health

- **Tele-medicine**, connectivity for hospitals and medical centres
- **150,000 people** treated every year in India alone with the support of C-band
- **2.3 billion people** in rural areas across Asia have limited access to adequate healthcare facilities

Humanitarian

- Connectivity for **field offices**, programme deployment, **disaster management** in remote and tropical areas
- Humanitarian agencies target **70 million people** every year
- C-band facilitates the delivery of $3.2 billion of **humanitarian aid** to Sub-Saharan Africa

Government

- **E-governmen**t, connection for local and regional, specially in remote regions
- E-government solutions facilitate efficient delivery of **services to underserved areas** across Asia and Africa
- In Nigeria government network projects using C-band are estimated to generate cost savings of **$70 million** per year

AI 1.1 Terrestrial Mobile broadband C-band (1)

Claim

Growth in IMT systems demands more spectrum.

Counterpoints

- < 50% of current IMT spectrum is utilised.
- Forecasting model is flawed.
- Traffic density estimate 100 times too high.[1]
- Economic analyses of the benefits of mobile broadband are flawed.[2]

1: LS telcom (2014)

2: VVA (2015)

AI 1.1 Terrestrial Mobile Broadband C-band (2)

Claim

Ka- and Ku-band could accommodate C-band services.

Counterpoints

- GSMA studies on this rely on
  - Untenable availability assumptions, and
  - Limited service types
- Satellite industry has invested over $9bn in C-band
- National satellite programs have just been launched or are in development in C-band

AI 1.1 Terrestrial Mobile broadband C-band (3)

Claim

IMT and FSS could coexist

Counterpoints

- JTG studies show **significant** interference to FSS **for all kinds of scenarios**
- Macro IMT cells need 100s of kilometres in-band separation…
- … and 10s of kilometres adjacent-band
- Even 80 MHz guardband needs 20km minimum
- Numerous real cases of interference from deployment of wireless systems in C-band

AI 1.1 Terrestrial Mobile broadband C-band (4)

Claim

Studies show IMT would bring significant economic benefits

Counterpoints

- Studies present an incomplete and inaccurate analysis by failing to consider the impacts on existing users and operators and by overestimating reallocation benefits for mobile operators

- Quantification of benefits is biased due to the use of unproven technical solutions and to the presence of inaccurate assumptions

Notification of typical earth stations in the FSS (AI 9.2)

Goal

Investigate and address the notification of typical earth stations in the fixed-satellite service (FSS)

Outcome

No agreement at WRC to establish a procedure whereby an administration can notify and have recorded in the Master Register the deployment of numerous earth stations used for very small antenna type applications (e.g. TVROs, VSAT, DTH) in the FSS to obtain a measure international recognition

Conference recommended as subject for study in next WP4A cycle.

Notification of typical earth stations in the FSS (AI 9.2)

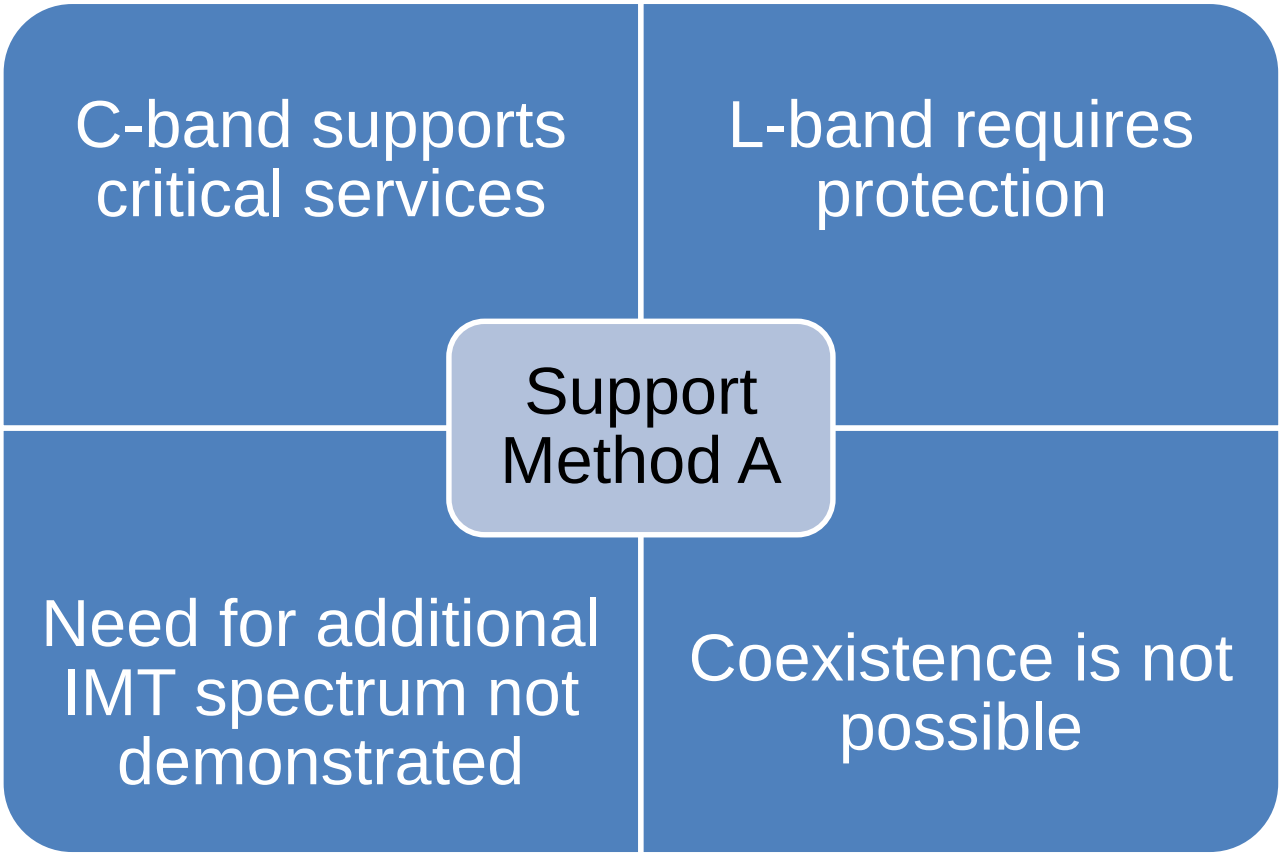
Background

- Section 3.2.3.8 of the Director's Report advised that the Conference may wish to further investigate and address the notification of 'typical earth stations' in the FSS.
- The report noted that concept of a 'typical earth station' in the FSS is not defined in the Radio Regulations but it is widely used.
- It would allow administrations to submit a notice to the Bureau for the notification and recording of multiple earth stations when specific locations are unknown, with a dedicated status.
- Many millions of TVROs/VSATs, which have been taken into account during satellite network coordination, do not receive international recognition
- International recognition allows the taking into account of existing operations in bands for which new services are being considered for identification

GVF supported

- GVF supported the development of a process to enable administrations to notify and record in the Master Register the deployment of ubiquitous FSS earth stations for the purposes of international recognition

AI 1.1 Terrestrial Mobile broadband: GVF Position



AIs 1.6.1 and 1.6.2: Additional Primary FSS allocations (1)

Goal

Additional FSS spectrum in Regions 1, 2 and 3 between 10GHz and 17GHz to address existing shortage / imbalances.

Outcome

Primary allocations for FSS in, with significant restrictions in uplink

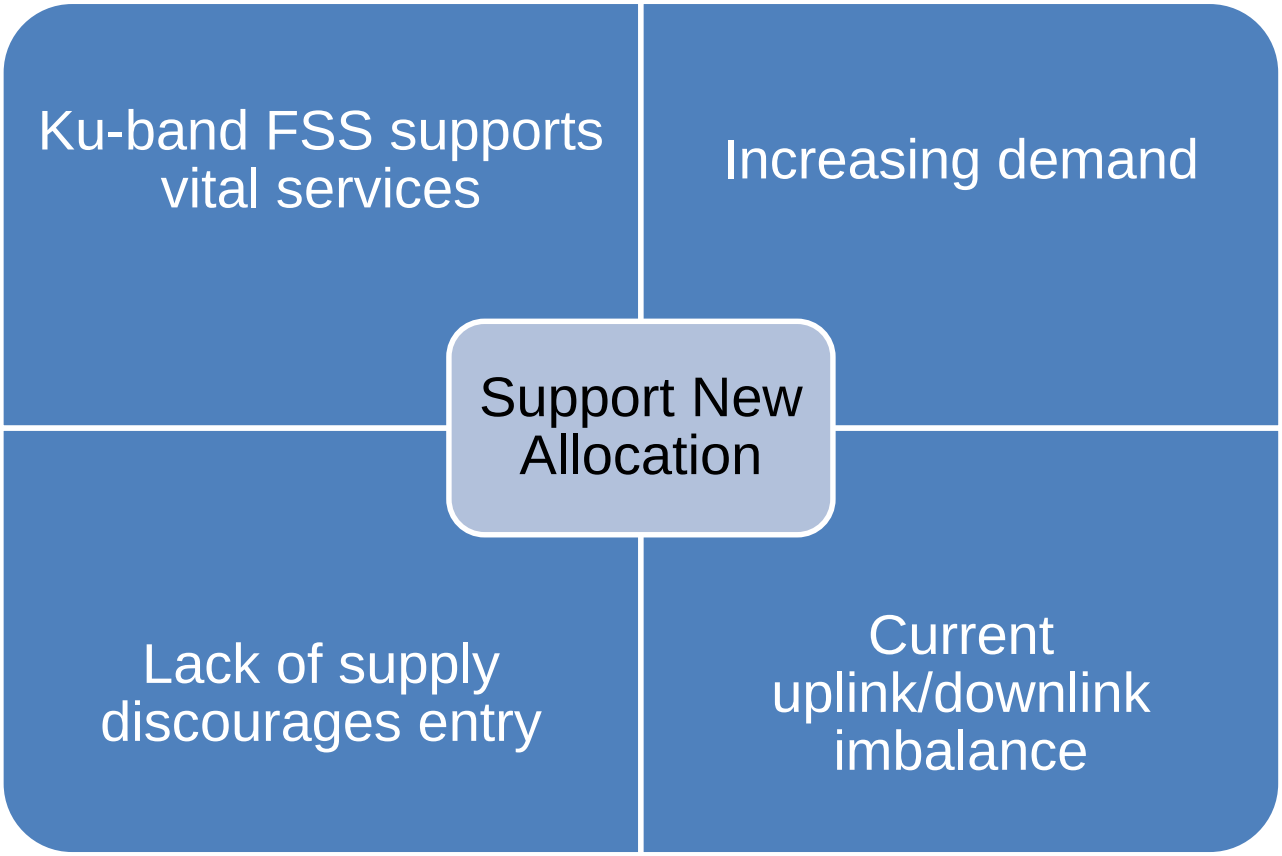
Region	1	2	3
Down	13.4-13.65	X	X
Up	14.5-14.75	14.5-14.75	14.5-14.8

AIs 1.6.1 and 1.6.2: Additional FSS allocations (2)

Unplanned Ku-band FSS extensively used

distribution of TV programs	direct to home	contribution
SNG	VSAT networks	governmental use
broadband networks	internet services	backhaul links

AIs 1.6.1 and 1.6.2: Additional FSS allocations GVF Position



AI 1.8: Earth Stations On-board Vessels (ESVs)

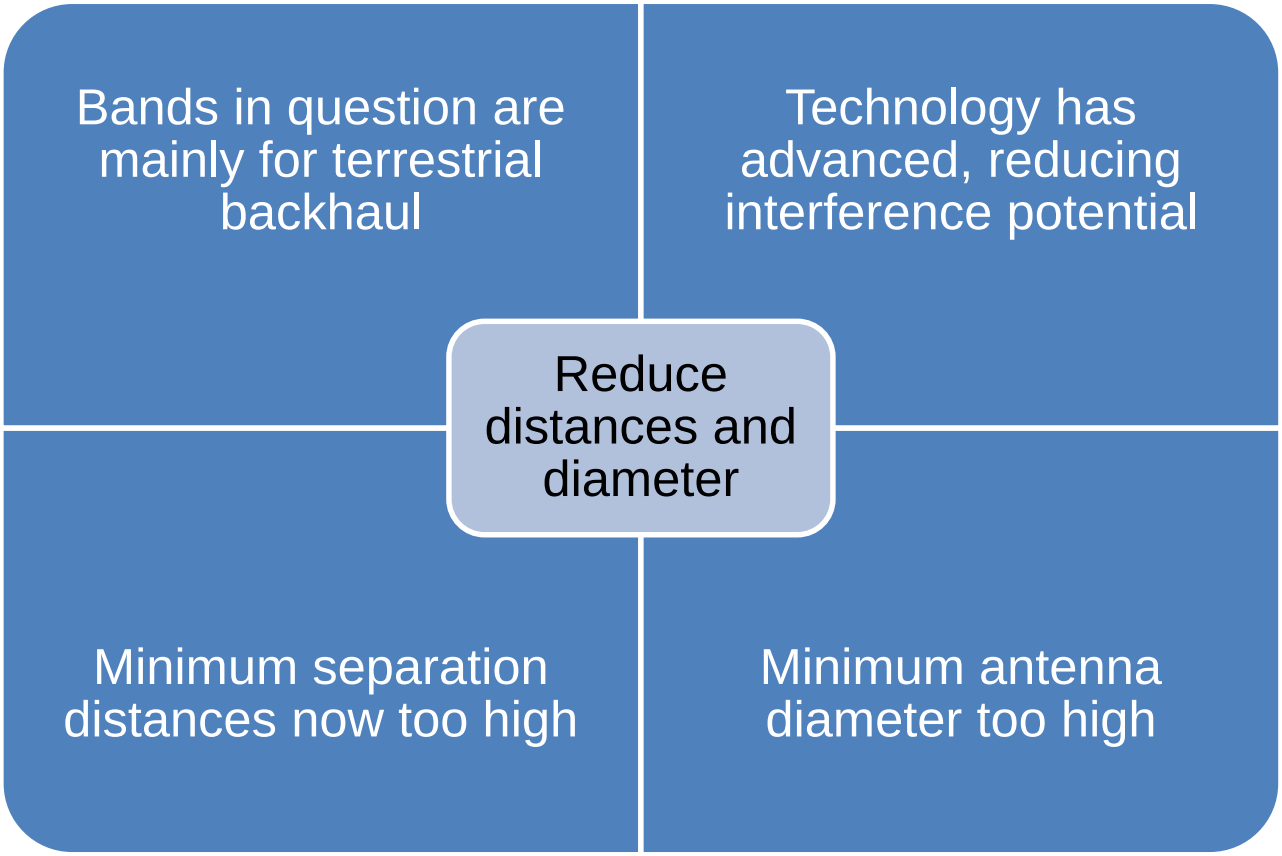
Goal

Facilitate C- and Ku-band spectrum for ESVs

Outcome

- Reduce minimum ESV antenna diameter constraint for C-band (from 2.4 to 1.2m)
- No reduction in protection distances for ESVs (actual a slight increase for C-band, from 300 to 330 km)

AI 1.8: Earth Stations On-board Vessels (ESVs) GVF Position



AI 9.2 Director's Report: ESOMPs

Goal

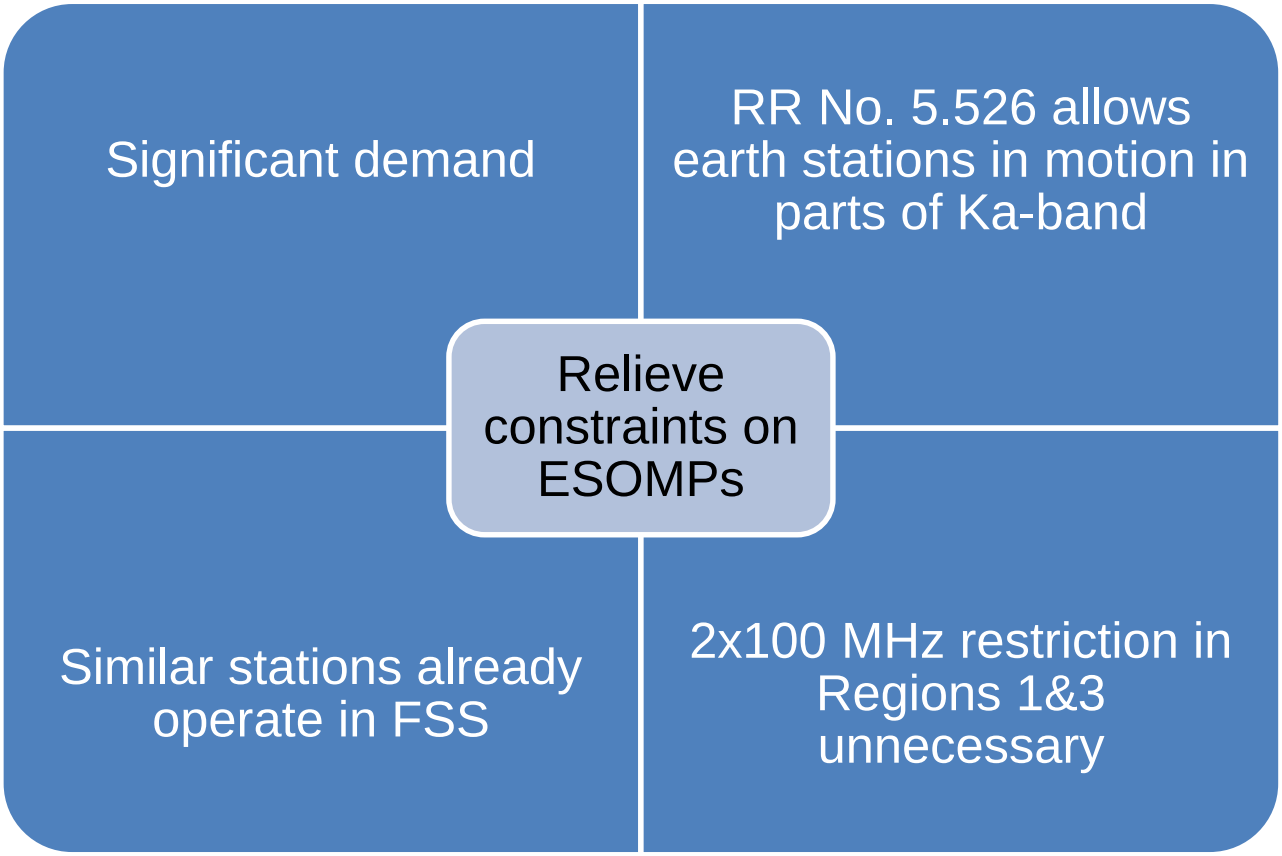
Facilitate operation of earth stations on mobile platforms (ESOMPs)

Outcome

- Remove limitation to 2x100 MHz in Regions 1 and 3
- Allow ESOMPs to operate in 19.7-20.2/29.5-30 GHz with appropriate requirements to ensure FSS compatibility

AI 9.2: Director's Report: ESOMPs

GVF Position



AI 10: Agenda Item for WRC19

Goal

Protect satellite services in the band 6 GHz to 100 MHz

Outcome

- No Sharing studies in telecom satellite bands <31 GHz except 24.65-25.25 (i.e. Ka-BSS uplink band as allocated in WRC-12).
- 24.5 – 27.5 identified for study includes earth exploration-satellite service and space research bands
- Sharing studies above 31 GHz limited to bands where there is already some consensus
- Continued Pressure for IMT “Sharing” in Upper Bands

AI 10: The Satellite Contribution

Today satellites already provide:

- Mobile backhaul
- Push data services
- Linear & non-linear TV
- Converged media
- Broadband services
- Many M2M services

By 2020-2025

Over 100 High Throughput Satellite (HTS) systems in orbit delivering *Terabits of Connectivity* across the world using Ku & Ka bands

Satellites provide cyber-resilience & data connectivity backup

AI 10:Considerations for a new Agenda Item for WRC19

What was proposed:

"to consider identification to IMT … between [6 GHz to 100 GHz]"

Shouldn't repeat AI 1.1

Divisive! Resource-intensive! Multiple incumbent users!

Should be realistic

Don't study bands where sharing is clearly not possible!

Should build consensus

Focus on bands where regions <u>are already broadly aligned</u>

Incumbent users between 6Ghz - 31GHz

- **Fixed Services**
- **Satellite FSS/ BSS/ MSS**
- **Space Research**
- **Radar**
- **Defense**

Satellite signals travelling from and to 40,000 km away are not compatible with powerful single or multiple / aggregate terrestrial mobile signals

AI 10: Regional Positions During WRC-15

Every world region has indicated candidate bands above 31GHz

31.8 – 33.0 GHz	**At least 1.2 GHz contiguous spectrum available for global harmonization**
66-71 & 71-76 GHz	**Supported by all regions with an established position**
81–86 GHz	**Supported by most regions**

APT

From	To
25.25	25.5
31.8	**33.4**
39	47
47.2	50.2
50.4	52.6
66	**76**
81	**86**

CITEL

From	To
10	10.45
23.15	23.6
24.25	27.5
27.5	29.5
31.8	**33**
37	40.5
45.5	47
47.2	50.2
50.4	52.6
59.3	**76**

CEPT

From	To
24.5	27.5
31.8	**33.4**
40.5	43.5
45.5	48.9
66	**71**
71	**76**
81	**86**

RCC

From	To
25.25	27.5
31.8	**33.4**
39	40.5
40.5	41.5
45.5	47.5
48.5	50.2
50.4	52.6
66	**71**
71	**76**
81	**86**

ASMG

From	To
Above 31GHz	
&	
BY IMPLICATION	
66	**71**
71	**76**
81	**86**

AI 10: GVF Position (1/3)

Frequency Bands allocated to Satellite **below** 31GHz

- GVF opposed sharing studies in view of IMT/5G identification in satellite bands below 31GHz allocated to FSS/MSS/BSS. These bands are extensively used by FSS/MSS/BSS satellite services, including high-throughput connectivity and broadband to end user FSS/MSS/BSS satellite services, representing ca. US$100 billion of existing and planned investments

- The 25 GHz range for earth exploration-satellite service and space research must remain available both for present and future deployment

AI 10: GVF Position (2/3)

Frequency Bands allocated to Satellite **below** 31GHz

- There are a number of bands allocated to FSS above 31 GHz, for which satellite operators are developing future HTS satellites in order to meet ever-increasing demand for broadband satellite services. It is also noted that Radio Regulations No 5.516B identifies a number of bands above 31 GHz for use by high-density applications in the fixed-satellite service, and as such, GVF does not support having these bands identified for studies under a future WRC-2019 for 5G/IMT 2020

- Bands above 31 GHz will be needed for satellite systems, but GVF does not oppose ITU-R sharing studies provided:
  - there are alternative candidates,
  - a balance of needs of future terrestrial and satellite systems would be assured, and
  - sustainable and viable access in the long-term to satellite services would be enabled in these frequency bands.

AI 10: GVF Position (3/3)

Frequency Bands allocated to Satellite **Above** 31GHz continued

- GVF could support proposals to study the bands 59-66 GHz, 66-71 GHz, 71-76 GHz and 81-86 GHz for which it seems to be worldwide agreement to study (these bands have been supported by regional groups) and could provide wide largely unconstrained bandwidth for 5G/IMT

- Furthermore at around 60 GHz (and frequencies above), oxygen absorption is such that it would facilitate the possibility of sharing the same band between services

Non-Satellite Frequency Bands **above** 31GHz

- GVF supports proposals for sharing studies in bands not already allocated to FSS, BSS or MSS and specifically supports the band 31.8-33.4 GHz for which there seems to be worldwide agreement to study as it is currently supported by regional groups

Summary of GVF positions going into WRC-15

AI	Conclusion
1.1	Addition mobile allocation threatens critical services in spite of unproven need
1.6	Additional Ku band spectrum will protect the long term development of key services and connectivity
1.8	Changes proposed take advantage of advances ESV technology since WRC-07 which reduce the risk of interference to other services
9.2	remove constraints on ESOMPs in 19.7-20.2/29.5-30 GHz, subject to appropriate technical constraints to ensure compatibility
10	No Sharing studies in satellite bands below 31 GHz and sharing studies above 31 GHz should be limited to bands where there is already some consensus

Thanks, Discussion

Bibliography

[1] LS telcom (2014), Mobile spectrum requirements estimates: getting the inputs right. Available from http://satellite-spectrum-initiative.com/files/Mobile%20Spectrum%20Forecast%20final%20report%20v106%5B1%5D.pdf

2 VVA (2014), Analysis of the economic impact of the usage of C-band – Facts vs Fiction. Available from http://www.vva.it/en/eventimedia/2015/10/28/3142