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GSC Lunchtime Sessions

CEPT

WRC-19 Agenda Items:
1.5, 1.13, 10

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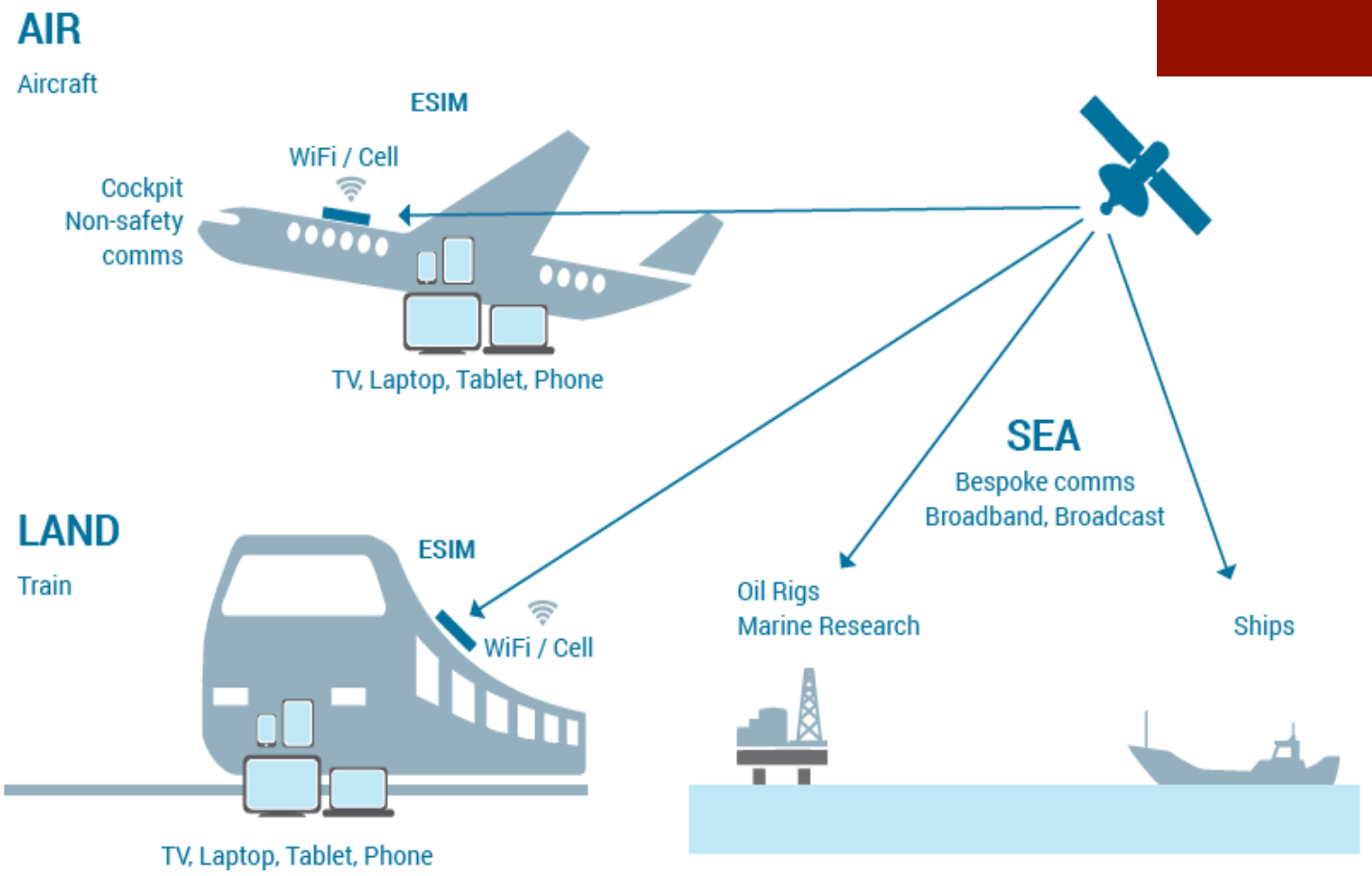
GSC Position
Agenda Item 1.5
ESIMs



Optimizing the Use of Existing Satellite Spectrum to meet growing demand for new satellite services

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AI 1.5 ESIMs in the FSS Ka-band

Resolution 156 adopted at WRC-15
Recognizes the need for global broadband mobile-satellite communications

→ ESIMs communicating with FSS space stations →

AI 1.5 (Resolution 158)
Regulated operation of ESIMs to meet increasing demand for mobility applications

GSC Position:

Establish provisions for aeronautical, maritime, land ESIM operations within GSO FSS networks at 17.7-19.7 GHz & 27.5-29.5 GHz, with technical & regulatory protection mechanisms for the FSS, FS, MSS & EESS operations

AI 1.5: ESIMs in the FSS Ka-Band

Market demand for satellite mobility applications is booming!

Aeronautical Market:

- 100+ commercial airlines offer IFC = a $40B opportunity for airlines by 2035
- 8200+ commercial aircraft connected
- Connecting passengers. Reducing fuel consumption & delays. Improving route planning

Maritime Market:

- 20000 VSAT enabled vessels (75000 by 2028)
- Drivers: crew & passenger connectivity, more sensors/applications for operational vessel monitoring, route planning & vessel tracking, autonomous vessels

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AI 1.5 ESIMs in the FSS Ka-band

- **Proposals from regional groups: CITEL (doc 11); RCC (doc 12); CEPT (doc 16); APT (doc 24); ATU (doc 46); ASMG (doc 29) + various multi-country and individual country proposals**
- **Common elements:**
  - ⇒ General support for new Resolution to address ESIM in 17.7-19.7 GHz & 27.5-29.5 GHz
  - ⇒ Operation of ESIM within envelope of GSO FSS network characteristics & verification of compliance with envelope by BR (based on CR/C or notified network data)
  - ⇒ 70km off-shore distance for maritime ESIM in which prior agreement from coastal state is needed to operate
  - ⇒ Sharing between GSO ESIMs & non-GSO FSS or non-GSO MSS feeder links to be based on existing coordination procedures

Some elements still need to be resolved

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AI 1.5 - ESIMs
Elements to be resolved, 1

1/ Technical requirements for A-ESIM (pfd limit values, possible altitude limit)

- GSC supports “Option 1” pfd limits (based on results of sharing studies with terrestrial services, including 5G)
- Altitude limit is not necessary, provided Option 1 pfd limits are adopted & notifying administrations provide a commitment of compliance.
- **GSC has major concerns with feasibility for BR to run compliance check with pfd limit. Compliance should be a condition of ESIM authorization.**

2/ Reference bandwidth for ESIM EIRP limits (1 MHz reference bandwidth or 14 MHz reference bandwidth)

- GSC supports 14 MHz reference bandwidth: smallest bandwidth for terrestrial service receivers. Hence the EIRP limit towards the horizon for M-ESIM is 24.44 dB(W/14 MHz). A-ESIM pfd limit should be expressed in 14 MHz reference bandwidth to avoid unnecessarily restrictive limits on A-ESIM operation.

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AI 1.5 - ESIMs
Elements to be resolved, 2

3/ Conditions for sharing with non-GSO FSS and non-GSO MSS feeder links

- GSC supports inclusion ESIM power limits only in 27.5-28.6 GHz, coordination under 9.11A in 28.6-29.5 GHz

4/ Annex 3 guidelines (possible inclusion of guidelines to the Resolution)

- Annex 3 is unnecessary: ideas already clearly defined in main body of Resolution.

5/ Status of the protection limits for terrestrial services (Annex 2 of the Resolution)

- Maritime & aeronautical ESIMs meet pfd limits/minimum off-shore distance, to avoid unacceptable interference to the terrestrial services operating in accordance with the Radio Regulations within line-of-sight and on a co-frequency basis
- Compliance with these limits should be a necessary and sufficient condition for ESIM to meet its requirements with respect to terrestrial services

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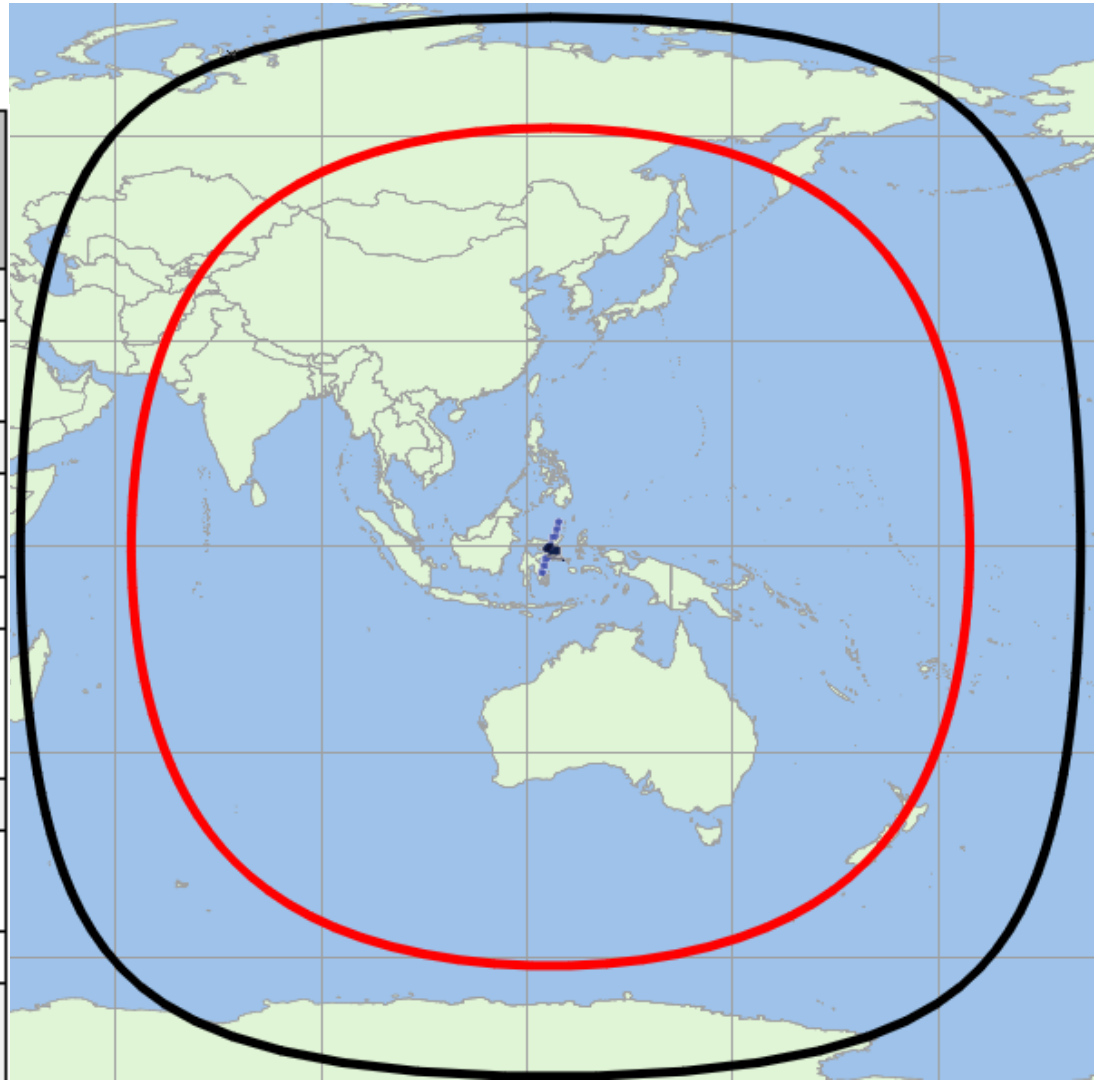
AI 1.5 ESIMs in the FSS Ka-band

STUDY ASSUMPTIONS:
AI 1.13 in 26 GHz vs ESIM in 28 GHz

AI 1.13 26 GHz STUDIES MS INTERFERNECE INTO FSS		AI 1.5 OPTION 2 PFD MASK ESIM (FSS) INTO MS
Methodology		
Type of interference evaluation method	Statistical (Monte Carlo) ITU-R M.2101	Worst-case (deterministic)
Technical and operational characteristics		
Network loading factor	20%	ESIM duty cycle not considered
TDD activity factor	BS:80%, UE:20%	
UE body loss	4 dB	Not considered
Antenna pointing	BS antenna beam not pointed toward the horizon	BS antenna beam pointed towards horizon
Propagation model		
Clutter loss	ITU-R P.2108 (up to 20-30 dB)	0 dB clutter loss
Polarisation loss	3 dB	0 dB
TOTAL INTERFERENCE REDUCTION CONSIDERED	>20 dB	>20 dB APPLICABLE, BUT NOT CONSIDERED

20 degree elevation limitation (red)



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GSC Position
Agenda Item 1.13 - IMT

ISSUE

Identification of frequency bands, among candidate bands listed in Resolution 238, for future development of IMT

… while preserving access to satellite spectrum for existing & future users

Frequency band(s)	Band(s) CPM Report
24.25-27.5 GHz	A
31.8-33.4 GHz	B
37-40.5 GHz	C
40.5-43.5 GHz	D & E
45.5-47.2 GHz	F & G
47.2-50.2 GHz & 50.4-52.6 GHz	H & I
66-71 GHz	J
71-76 GHz & 81-86 GHz	K & L

Total: 33.25 GHz

AI 1.13
Additional spectrum for IMT

- **A huge amount of spectrum has been studied**
- **More than enough to find 'more spectrum' for IMT**
- **New identifications should only be made against certain key principles**

GSC Principles

- Consider ONLY bands of Res. 238 (WRC-15)
- Harmonisation of spectrum is key
- IMT identification with reasonable sharing conditions between IMT & satellite services

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AI 1.13: Additional spectrum for IMT

The GSC recommends IMT identifications at WRC-19 stay within:

- **26 GHz:** 24.25-27.5 GHz globally (3.25 GHz)
- **40 GHz:** 37-40 GHz in Region 2 and 40.5-43.5 GHz in Regions 1 and 3 (3 GHz)
- **66 GHz:** 66-71 GHz globally (5 GHz)

⇒ with reasonable sharing conditions & measures to ensure co-existence between IMT & satellite services:

- Power / pointing conditions on IMT base stations to protect FSS receivers, with no undue constraints on IMT
- Assistance to administrations in defining measures for future FSS earth station deployment

<u>11.25 GHz</u> above 24 GHz for IMT in each ITU-R Region

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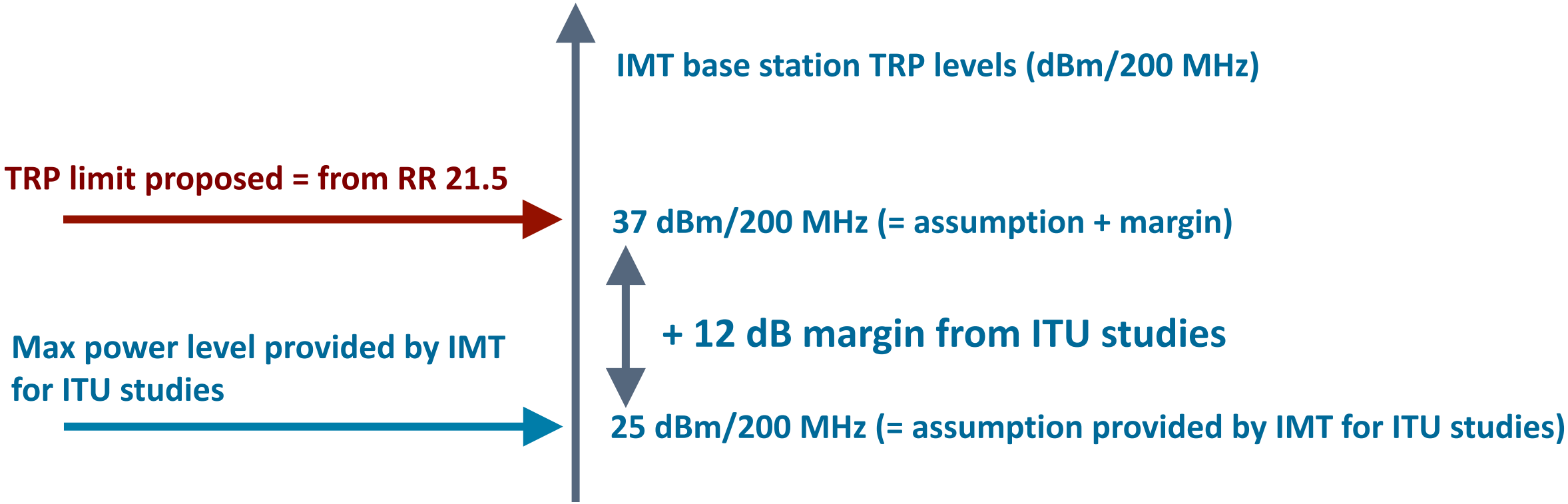
AI 1.13: Additional spectrum for IMT

Proposed power and pointing conditions for IMT base stations do not put undue constraints on IMT

Max power level provided by IMT, TRP limit proposed and RR 21.5



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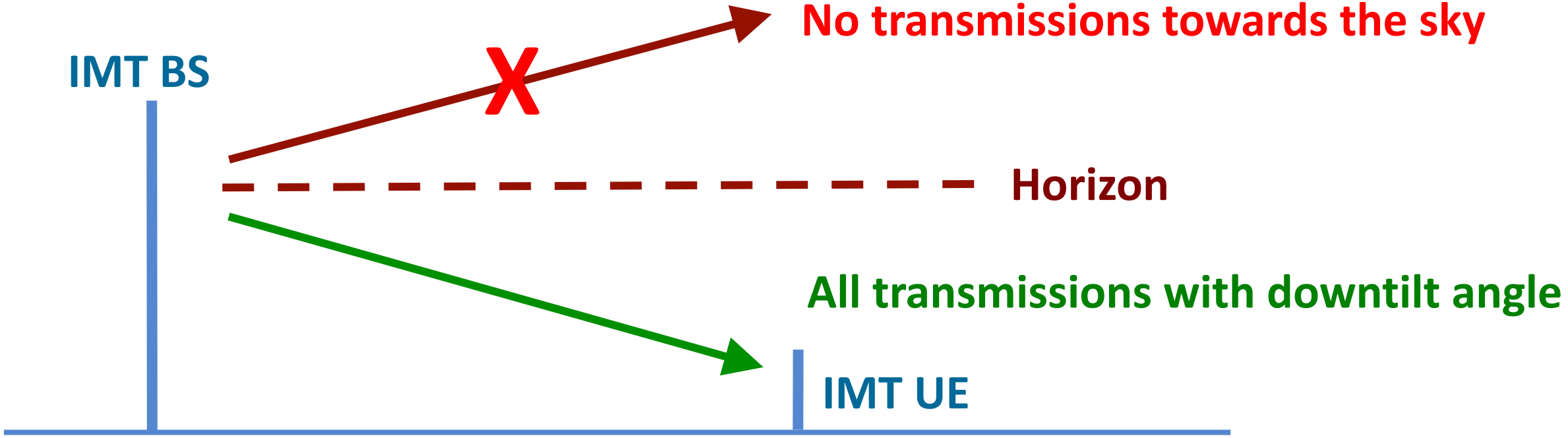
AI 1.13: Additional spectrum for IMT

Proposed power + pointing conditions for IMT base stations do not put undue constraints on IMT

IMT base stations all transmit below horizon, with a downtilt angle



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AI 1.13: Additional spectrum for IMT

	37-39.5 GHz	39.5-40 GHz	40-40.5 GHz	40.5-42 GHz	42-43.5 GHz
Region 1		HDFSS			
Region 2			HDFSS		
Region 3			HDFSS		

	37-39.5 GHz	39.5-40 GHz	40-40.5 GHz	40.5-42 GHz	42-43.5 GHz
Region 1	No Change			IMT	
Region 2	IMT			No Change	
Region 3	No Change			IMT	

⇒ Bands should not be identified for IMT in a Region where it is not intended for use by IMT

⇒ Global economies of scale for IMT equipment can be achieved through identification of 3 GHz of spectrum for IMT in each ITU Region

⇒ There is no need for a global 6 GHz wide band for IMT

Handsets used today are can already support multiple frequency bands AND can accommodate regional band differences

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GSC Position
Agenda Item 10
(C-Band)

Crucial Issue

- **Can IMT replace the services that will be displaced?**
- **Do alternatives exist to provide these services?**

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C-band satellite applications

Video Distribution

C-band is used to deliver high quality content via cable and other distribution networks to hundreds of millions of viewers and directly to tens of millions

Banking

C-band is crucial where service level agreements set high reliability requirements.

75,000 antennas use C-band to dispense $400 million per day from Indonesian ATMs alone

Oil & Gas, Mining and Resources

C-band supports mission-critical operations in remote areas

Mobile Networks

C-band offers reliable backhaul for mobile networks in remote areas and provides capacity for large regions.

In Indonesia between 6 and 15 million mobile subscribers are served via C-band, representing a total market value of up to $558 million

Air Navigation, Flight Tracking, Meteorology

C-band is used for networks which require wide coverage and very high reliability

Maritime

Global C-band coverage is crucial for vessels operating in remote regions or on long routes and for Safety of Life at Sea services. C-band is also of increasing importance for large vessels

Telemedicine

C-band supports the remote delivery of healthcare services, reaching otherwise underserved rural populations.

150,000 people a year are treated with the support of C-band in India alone

E-government

C-band solutions facilitate efficient delivery of services to underserved and unserved areas across Asia Pacific

Humanitarian Programmes

C-band offers connectivity for field offices, programme deployment and disaster management in remote areas

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GSC Position
Agenda Item 1.10
(6-24 GHz)

Issue

- Can IMT replace the services that will be displaced?
- 33 GHz has just been studied, should even more spectrum for IMT really be studied?

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AI 10 Proposals for IMT in 6-24 GHz

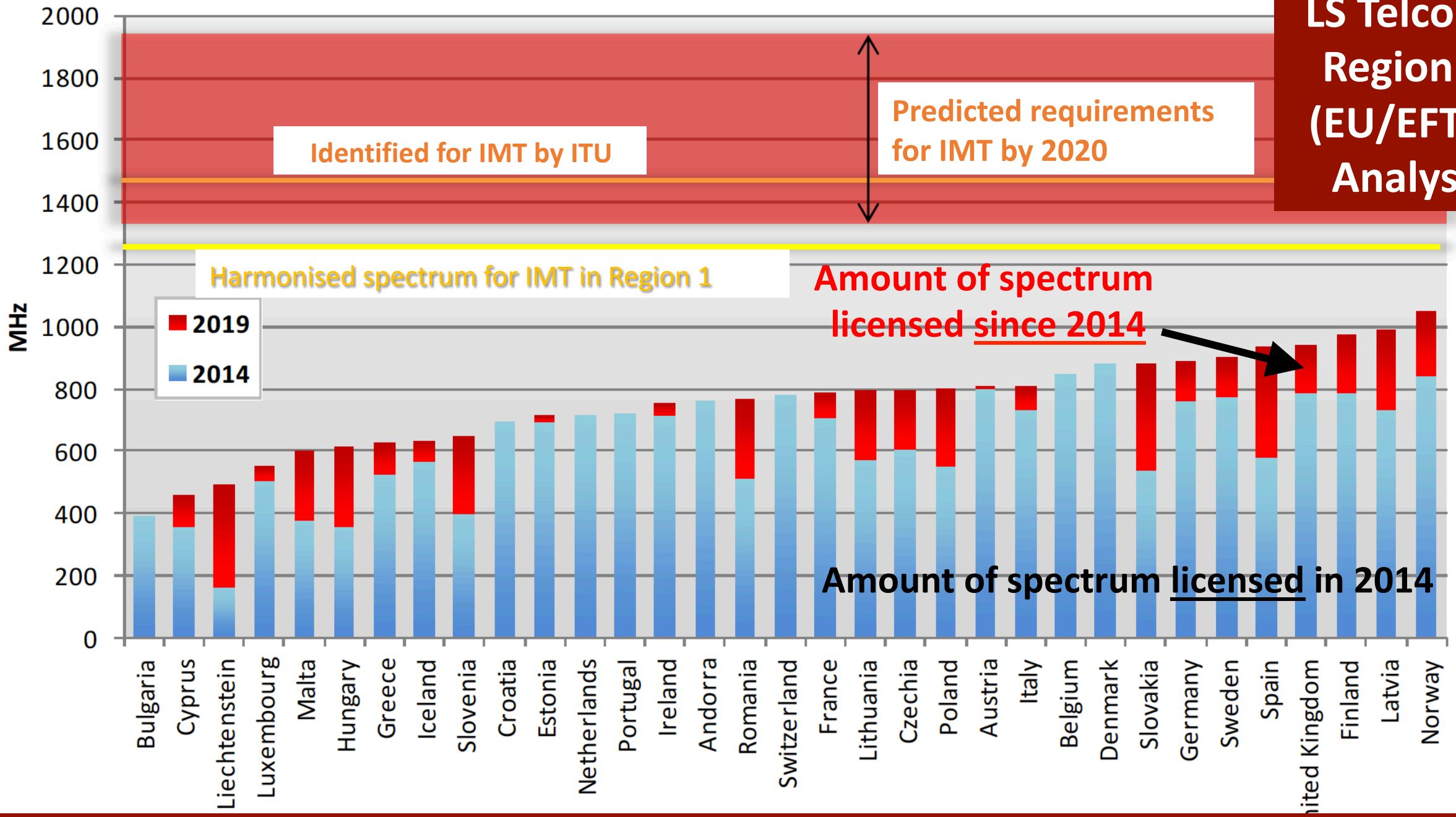
The GSC is of the view that there is no need for any additional spectrum to be identified for IMT:

- WRC-19, under AI 1.13, is expected to identify **many GHz** of new spectrum for IMT
- **Significant** amount of unlicensed or unused spectrum is **already** identified for IMT –
  ⇒ Around the world, less than 50% of available spectrum is licensed
- **6-24 GHz range covers core bands for the satellite industry:** C-, X, Ku- and Ka-band
  ⇒ Many satellites operate in these bands => heavily used for applications e.g. broadcasting DTH, VSAT, SNG, broadband, security, etc.

Any identification of IMT in the 6-24 GHz range will:

- Interfere with existing satellite services
- Negatively impact existing investments
- Harm competition by limiting the ability of satellite operators to meet the growing demands of satellite users, including government

LS Telcom: Region 1 (EU/EFTA) Analysis



Less than 50% of licensed spectrum is actually being used by IMT today

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Thank you!