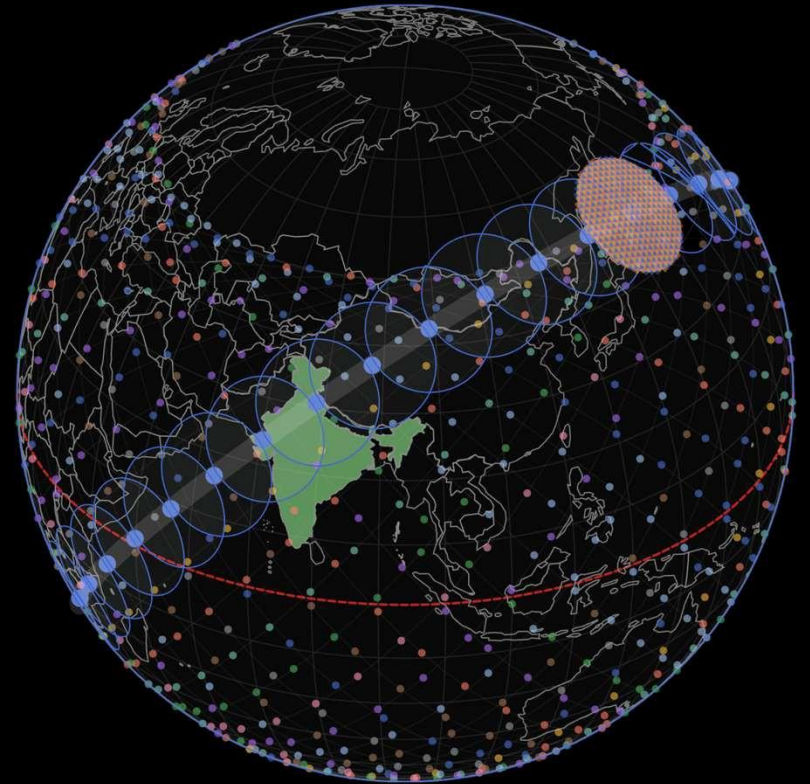


# Direct-to-Device: From Pilot to Policy

Integrating Satellite into 5G – Road  
to 6G

India Space Policy Conference, New Delhi

23 July 2026



# Why 3GPP?



~ 2000 \$

~ 200 \$



- 3GPP began standardizing NTN in 2017
  - Main objective: **Integrate satellite access in mass-market chipsets for regular smartphones**
- 3GPP NTN enables the seamless integration of satellite & terrestrial networks
- 3GPP NTN realizes a global standard for satellite communications by rather small enhancements to the ubiquitous 5G standards, which enables cost-effective chipsets supporting both terrestrial and satellite communications
- 3GPP provides NTN solutions for both direct connectivity from satellites to handheld devices (“satellite D2D”) and direct connectivity from satellites to high-gain devices with directive antennas (“satellite broadband”)

**Note:** 3GPP will define NTN bands only where regulations allow satellite usage (“3GPP follows regulations”)

The first 3GPP NTN operating bands are defined in S-band and L-band (2 GHz & 1.6 GHz)

- NTN operating bands are defined in Ka-band (20/30 GHz)
- Small additions to the operating bands in S-band and L-band

- NTN operating bands are defined also in Ku-band (12/14 GHz)
- NTN operating bands are defined in practically all MSS spectrum below 3 GHz (close to 100 MHz in total)

From 2017  
(Rel-15/16)

2022  
(Rel-17)

2024  
(Rel-18)

End of 2025  
(Rel-19)



First studies towards possible solutions for integrating satellite in the 3GPP standards

- All 5G bands will likely be defined as 6G bands
- New proposals to add NR NTN in terrestrial mobile



“Satellite D2D”

“Satellite broadband”

↑ Uplink (Earth-to-space)  
↓ Downlink (space-to-Earth)

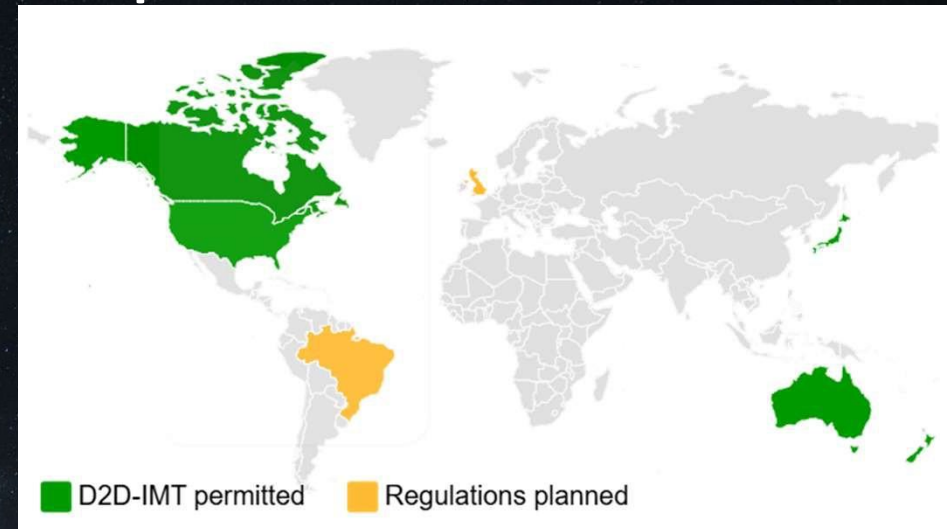
US  
↓  
EU  
↓

1 5 10 15 20 25 30 35 40 45 50 GHz



# National and regional developments for D2D in terrestrial mobile spectrum

- Americas
  - US: [Supplementary Coverage from Space \(SCS\)](#)
  - Canada: [Supplementary Coverage from Space \(SMCS\)](#)
  - Brazil: [Regulatory Sandbox](#) to allow D2D-IMT trials for a two-year period (2024-2026).
- Europe
  - UK: [Satellite direct to device services in Mobile spectrum bands](#)
  - EU has initiated working on D2D regulatory framework
- Asia-Pacific
  - Australia: [IMT satellite direct-to-mobile service](#)
  - Japan: [adopted regulations](#) for satellite D2D systems in the 2 GHz band
- Africa
  - Tanzania: the first country in Africa to introduce measures for D2D satellite services, publishing its [framework](#) in July 2025



## In all these national regulations

- D2D service has a lower regulatory status compared to terrestrial mobile service, operating on non-protection non-interference basis
- SNO-MNO partnership is required/recommended to provide D2D in MS spectrum

# Satellite D2D main use cases

D2D (Direct to Device) refers to direct satellite communication in Low Earth Orbit (LEO) or Geostationary Orbit (GEO) to devices (particularly cellphones/smartphones)—just like they would connect to a terrestrial base station.



## Consumer connectivity

- Existing terrestrial users traveling into uncovered areas (adventurers, mountaineers, sailing, ...)



## Industrial service continuity

- Service continuity for B2B/IoT: connectivity anywhere for automotive, utilities, agriculture, etc.



## Public safety resilience

- Resilience for public safety and national security in case of natural or man-made disasters impacting terrestrial networks

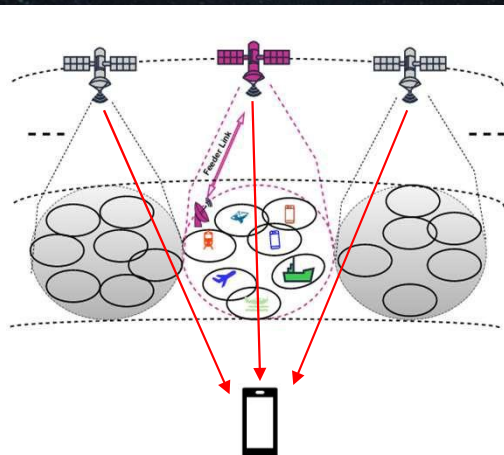
First use case to be addressed in standardization and commercially

# Protection of terrestrial IMT from DC-MSS-IMT

Define proper regulatory measures (pfd/epfd limits) based on IMT protection criterion and considering aggregate interference from multiple satellites in DC-MSS-IMT systems

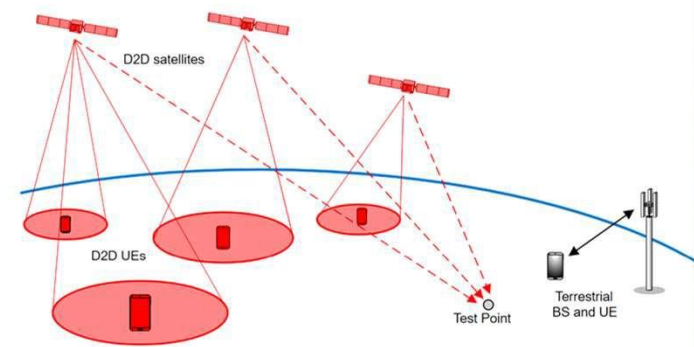
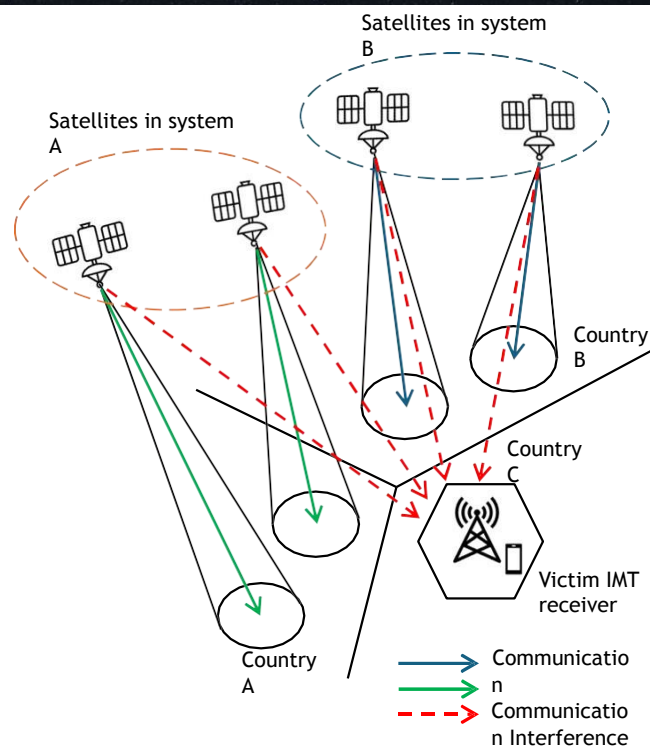
Consider multi-system aggregation factor to include aggregate interference from multiple DC-MSS-IMT systems serving different countries when defining regulatory measures per system

Need for having a compliance verification methodology and process by ITU to check the compliance of DC-MSS-IMT systems with the limits



Identify the maximum tolerable interference to avoid harmful interference to IMT based on IMT protection criterion

**Define regulatory measure (pfd/epfd limits) for protection of IMT**



Source: [Analysing the PFD from D2D Systems using Visualyse Professional](#)



**ERICSSON**