

The Blueprint for Global Connectivity: Decoding WRC-27 Agenda Item 1.13

Regulatory and
Technical Frameworks
for Direct Connectivity
between Mobile-
Satellite Services and
IMT (DC-MSS-IMT)



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Executive Synthesis of WRC-27 Agenda Item 1.13

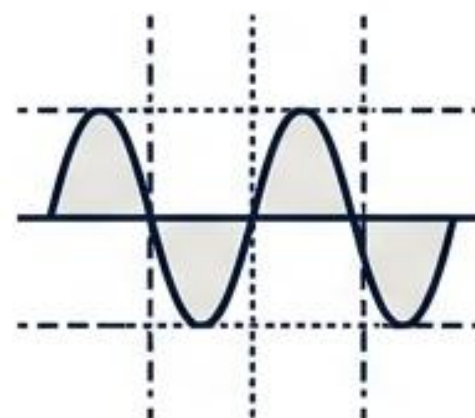
01



The Objective

Complement terrestrial IMT networks using Mobile-Satellite Service (MSS) space stations connecting directly to standard International Mobile Telecommunications (IMT) user equipment (UE).

02



The Scope

Comprehensive spectrum sharing and compatibility studies focusing on the 694 MHz to 2.7 GHz frequency range.

03



The Core Challenge

Coexistence. Managing cross-border satellite signal spillover and establishing Power Flux-Density (pfd) limits to protect incumbent terrestrial and space services.

The DC-MSS-IMT Paradigm Shift

Traditional MSS



Legacy satellite services require specialized, proprietary hardware and dedicated spectrum.

DC-MSS-IMT



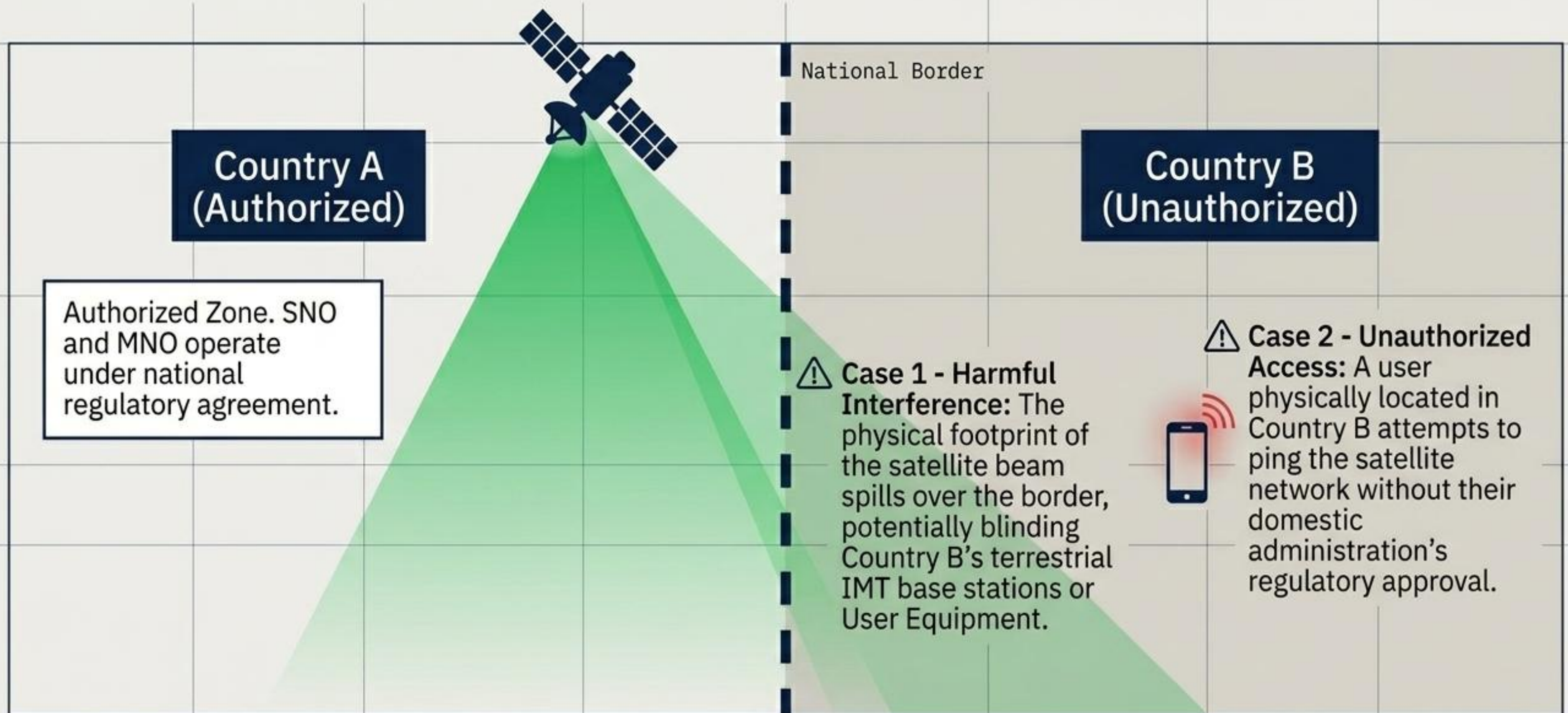
DC-MSS-IMT utilizes existing, unmodified IMT User Equipment (UEs). The innovation relies on utilizing existing IMT frequency bands from space to provide rural coverage, disaster resilience, and ubiquitous connectivity without hardware changes.

The Operational Ecosystem Requires Symbiotic Partnership

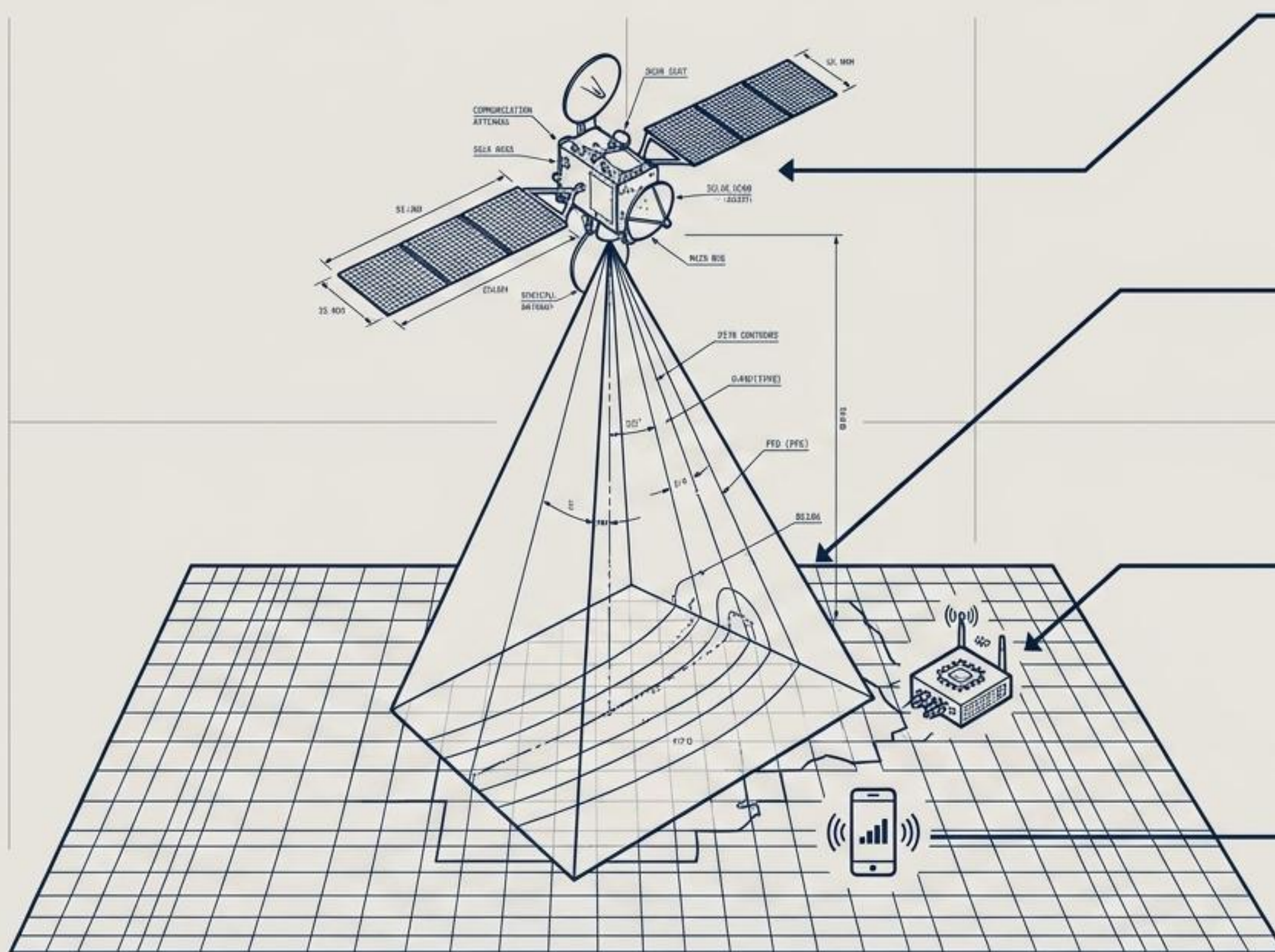


CENTRAL INSIGHT: The draft text treats satellites essentially as “towers in space” that temporarily utilize the MNO’s domestically licensed spectrum within a clearly defined geography.

The Geography of Interference: Cross-Border Friction



The Technical Mitigation Toolkit



DATA CARD 1

Space/RF Level

Sidelobe suppression and precise beamwidth control to physically restrict signal spillover.

DATA CARD 2

Operational Level

Selective cell activation and elevation angle control dynamically triggered near national borders.

DATA CARD 3

Network Level

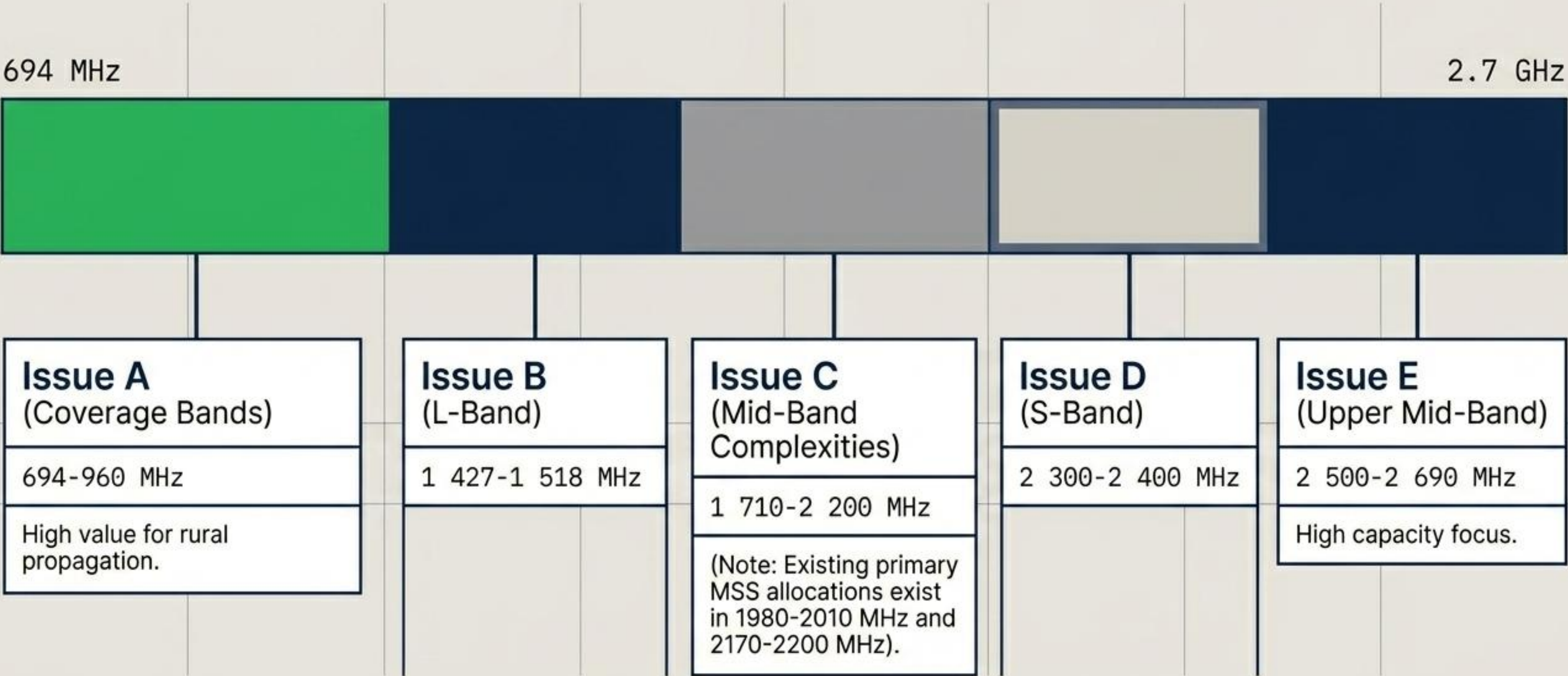
Implementation of strict Power Flux-Density (pfd) limits to ensure signals remain below interference thresholds.

DATA CARD 4

Protocol Level

Cryptographic user authentication (AKA protocols) and unique user identification (IMSI/IMEI) to completely block unauthorized Case 2 access.

Scope of ITU-R Studies: The Studied Spectrum Landscape



Compatibility Study Insights and Incumbent Conflicts



Space Research Service (SRS)

Highly vulnerable during deep-space probe LEOP phases. Interference in 2110-2120 MHz exceeds acceptable thresholds by up to 30 dB.



Mobile Service (non-IMT)

Unacceptable interference limits exceeded by 31-37 dB. Requires geographical separation distances exceeding 400 km.



Opposite Direction Transmissions

Neighboring regions utilizing reverse uplink/downlink band plans (e.g., Region 1 vs. Region 2 in the 1.9 GHz band) are fundamentally incompatible for simultaneous use.



Downlink Focus

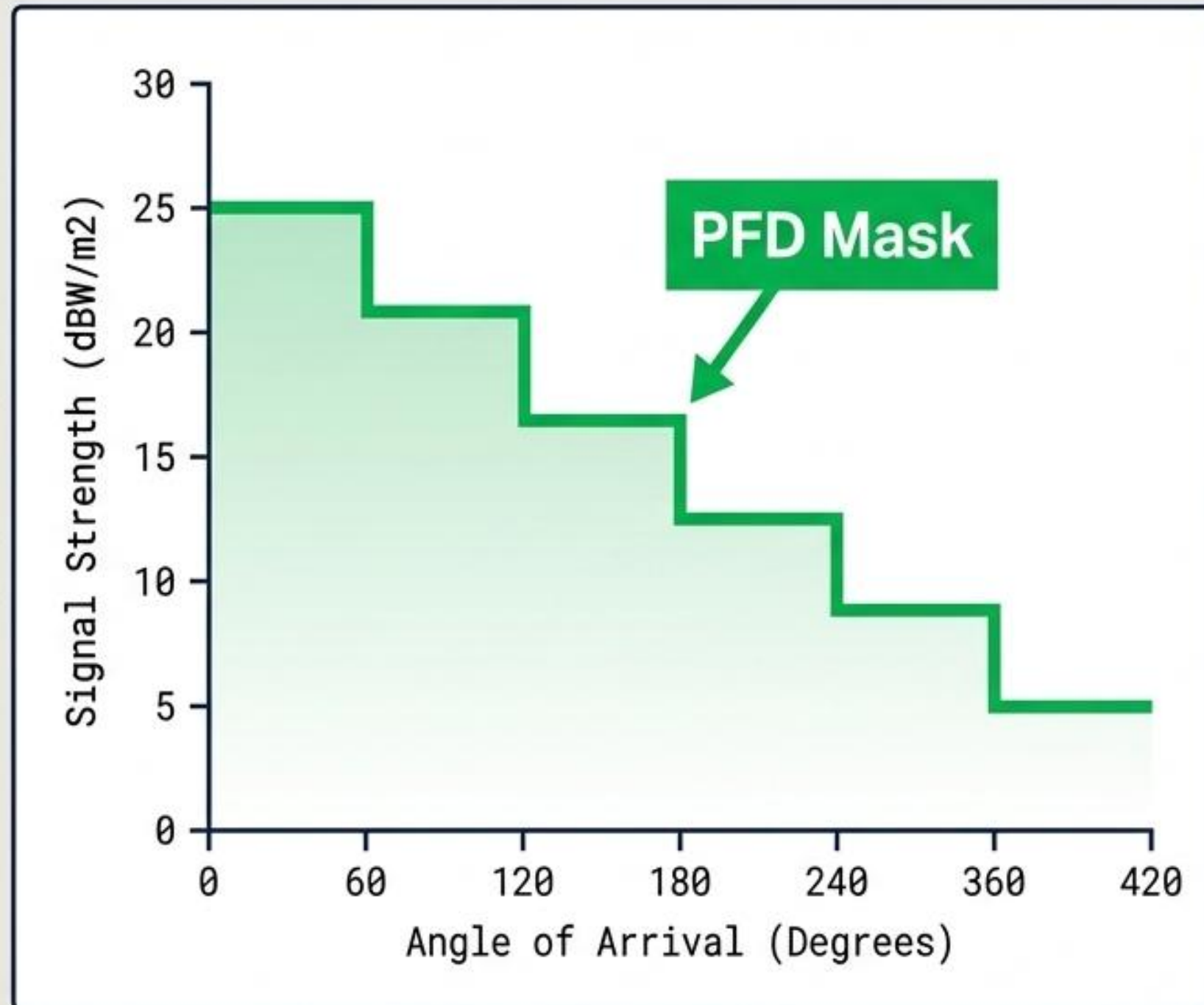
Because UEs are unmodified, the uplink interference environment remains unchanged; studies strictly focus on satellite space-to-Earth downlink compatibility.

The Regulatory Pathways: Comparing the Proposed Methods

Method 1	Method 2	Method 3
No Change (NOC) Suppress Resolution 253. No new frequency allocations to the Mobile-Satellite Service.	Secondary Allocation Allocates MSS on a secondary basis. Subject to strict pfd limits via draft Resolution [A113]. Cannot claim protection from, nor cause interference to, primary services.	Primary Allocation Proposed in specific bands. Includes conditions explicitly explicitly stating DC-MSS-IMT shall not claim protection from existing mobile services, governed by new Resolution framework.

Drafting the Resolution:

PFD Limits and Incumbent Protection



Concept

To legally enact Methods 2 or 3, Satellite Network Operators must commit to firm, actionable, and measurable Power Flux-Density (pfd) limits.

Application

These masks ensure that satellite downlink transmissions do not blind terrestrial base stations or overwhelm existing broadcasting services.

Specific Clause

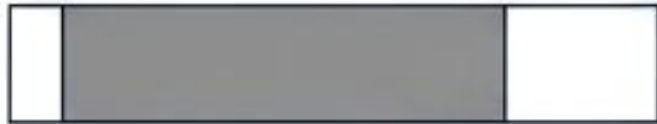
The draft Resolution establishes hard coordination thresholds (e.g., protecting the GE06 Agreement in the 470-862 MHz range) unless explicit agreement is reached between administrations.

Regulatory Breakdown: Sub-1.5 GHz Coverage Bands

694-960 MHz 	Issue A	Evaluates Methods A1 (NOC) and A2 (Secondary/Primary). Key regulatory focus is protecting existing broadcasting (GE06) and aeronautical radionavigation services. PFD limits are the primary enforcement mechanism.
1 427-1 518 MHz 	Issue B	Evaluates Methods B1 (NOC) and B2 (Secondary/Primary). Proposals heavily focus on secondary allocations to guarantee the protection of incumbent terrestrial mobile services.

Regulatory Breakdown:

1.7 GHz - 2.7 GHz Capacity Bands



1.7-2.2 GHz

Issue C

Highly complex regulatory environment. Some bands (e.g., 1980-2010 MHz) already possess global Primary MSS allocations. Resolution [A113] specifically targets bands with opposite transmission directionality.



2.3-2.4 GHz

Issue D

Evaluates D1 (NOC) and D2 (Secondary/Primary) to protect existing Mobile Service.



2.5-2.69 GHz

Issue E

Key focus on protecting adjacent passive bands and Radio Astronomy (2690-2700 MHz). Requires strict epfd compliance methodologies.

The Chain of Accountability: Managing Interference

Notifying Admin (SNO's Regulator)	Authorizing Admin (MNO's Regulator)	SNO	MNO
Legally responsible for eliminating cross-border interference. Must force the SNO to take immediate corrective action.	Verifies that the domestic MNO complies with all regulatory obligations within its own borders.	Implements technical beam management, radiation pattern control, and power flux-density adherence.	Manages end-to-end service, user billing, data confidentiality, and designs the specific terrestrial/satellite service coverage areas.

Synthesis: The “Authorized Connectivity” Architecture

[Domestic MNO Spectrum License]

+

[SNO Space Segment Capability]

+

[Mutual Administration Agreement]

+

[Strict PFD Limits & User Authentication]

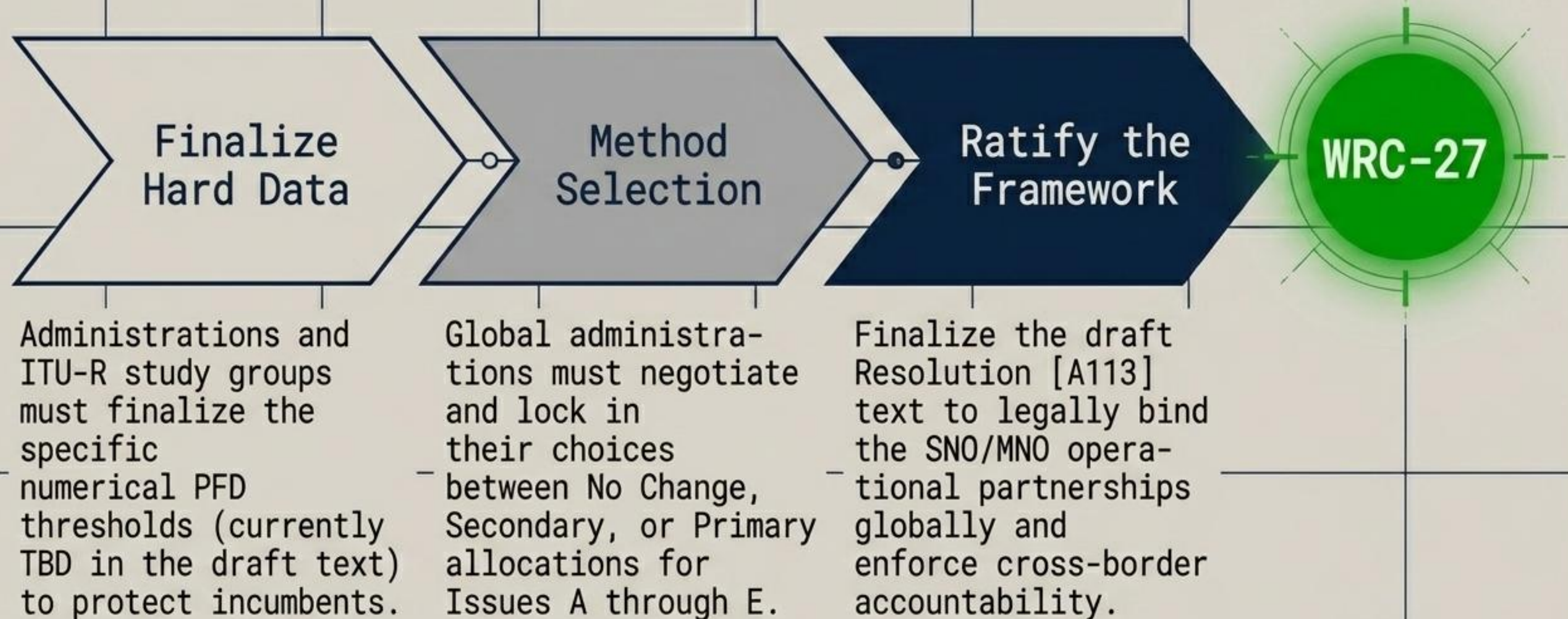
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[= Safe, Complementary DC-MSS-IMT Ecosystem]

INSIGHT:

If any single pillar of this architecture is missing or fails, the direct-to-device service is legally and technically unauthorized.

Looking Ahead: The Roadmap to WRC-27



*Thank
You!*



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