Qualcomm

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5G from space: The next frontier for global connectivity

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5G NTN

IMT-2020-Sat candidate technologies

Support a broad range of use cases with 5G non-terrestrial networking

5G Advanced will further enhance the non-terrestrial networks (NTN) foundation

5G NR-NTN

Complementing terrestrial networks in underserved areas

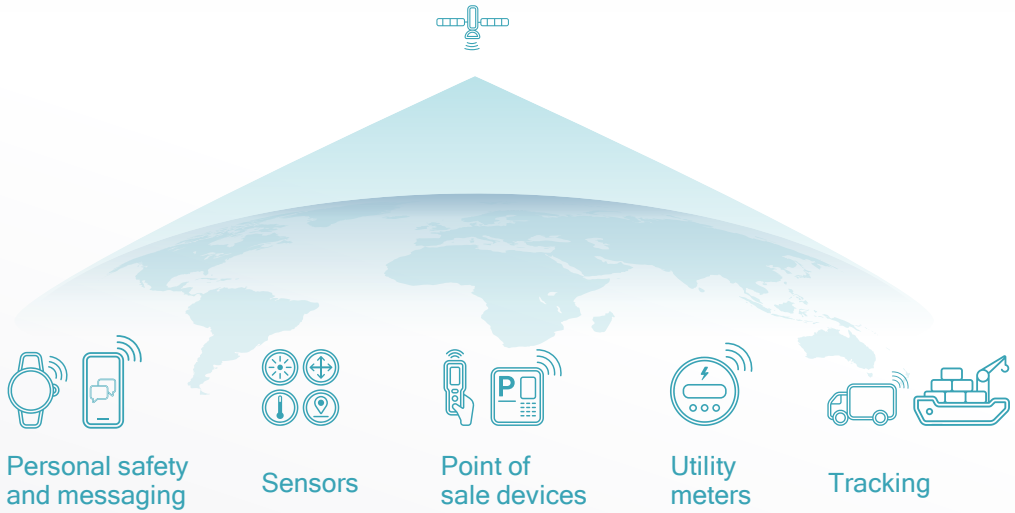
Rel-17+ NR-NTN
GEO / MEO / LEO

Mobile broadband | Automotive | Mobile compute | Satellite backhaul | Fixed wireless access

5G IoT-NTN

Expanding addressable market for the 5G massive IoT

Rel-17+ NB-IoT
GEO / MEO / LEO



Personal safety and messaging | Sensors | Point of sale devices | Utility meters | Tracking

Leveraging cellular for non-terrestrial communication

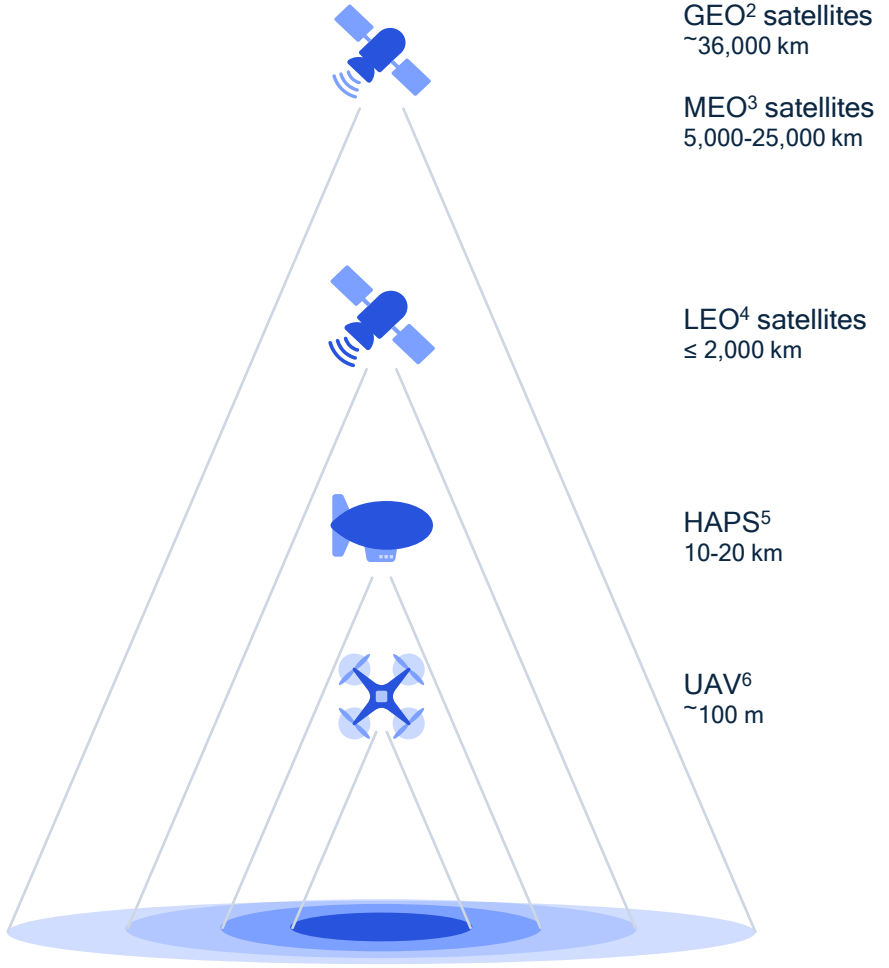
5G Rel-15
Study focused on deployment scenarios and channel models

5G Rel-16
Study focused on adapting 5G NR to support NTN

5G Rel-17
Projects focused on satellites for eMBB & IoT[1] and HAPS/UAV

5G Rel-18+
Further enhancements for UAV, HAPS, and satellites

6G
Continued evolution of 5G NTN & NTN IOT into the 6G era, depending on ecosystem status at that time



1 eMTC and NB-IoT; 2 Geostationary; 3 Medium Earth Orbit; 4 Low Earth Orbit;
5 Unmanned Aerial Vehicles; 6 High Altitude Platform Station;

WRC-27 Mobile Satellite Service Agenda Items

- Triggered by the ubiquitous connectivity goal of UN sustainable development, there is growing demand for mobile satellite service.

WP 4C leads
WP 5D,4B and others contribute

WRC-27 AI1.12
MSS allocation for Low-data-rate NGSO mobile satellite system

Frequency bands:
1 427-1 432 MHz (s-to-E),
1 645.5-1 646.5 MHz (s-to-E) (E-to-s),
1 880-1 920 MHz (s-to-E) (E-to-s),
2 010-2 025 MHz (s-to-E) (E-to-s)

Potential Technology:
3GPP IoT NTN
Proprietary satellite access tech

WP 4C leads
WP 5D,4B and others contribute

WRC-27 AI1.13
MSS allocation in IMT bands for direct connectivity to complement the terrestrial IMT network coverage

Frequency bands:
the frequency bands between 694/698 MHz to 2700 MHz range with terrestrial IMT deployment in M.1036

Potential Technology:
3GPP LTE, 5G NR
3GPP LTE NTN, NR NTN

WP 4C leads
WP 5D,4B and others contribute

WRC-27 AI1.14
Additional allocation to mobile satellite system

Frequency bands:
2 010-2 025 MHz (E-to-s) in R1&R3
2 160-2 170 MHz (s-to-E) in R1&R3
2 120-2 160 MHz (s-to-E)

Potential Technology:
3GPP NR NTN
Proprietary satellite access tech

WRC-27 AI1.13: Key Issues

Regulatory

International Water:

- Coverage overage outside national territories underscores differing national priorities and the necessity of international consensus.

Authorized Satellite Footprint:

- MSS space station Tx may also project towards the neighboring country which may or may not have authorization
- Relevance to WRC-27 AI1.5 limit the unauthorized operations of NGSO earth stations in the FSS and MSS

Protection to IMT

Multiple options:

- Alternative 1: Pfd per satellite
- Alternative 2: Aggregate pfd per system
- Alternative 3: Epfd per system and aggregate epfd for multiple systems

Band List

Direction (for FDD)	
Mobile station transmitter (MHz)	Base station transmitter (MHz)
807-849	852-894
880-915	925-960
832-862	791-821
698-716 **776-798**	716-746 746-768
698-748	753-803
1 427-1 470	1 475-1 518
1 920-1 980	2 110-2 170
1 710-1 785	1 805-1 880
1 850-1 920	1 930-2 000
1 710-1 780	2 110-2 180
2 000-2 020	2 180-2 200
2 305-2 320[1]	2 345-2 360
2 500-2 570	2 620-2 690

Mobile station transmitter (MHz)	**Base station transmitter (MHz)**
-	1 880-1 920
2 010-2 025	-

WRC-27 AI1.13: WP5D and WP4C Joint Session (Oct 2024)

Focus on the clarification of roles/responsibilities between Working Parties 4C and 5D

Roles/Responsibilities		Working Parties		Timeline due date for deliverables
		WP 4C	WP 5D	
1	Description of operational concepts/functionality of direct connectivity between space stations and IMT user equipment	✓		April/May 2025
2	Technical/Operational characteristics of MSS for direct connectivity between space stations and IMT user equipment	✓		April/May 2025
3	Decision on which frequency bands and arrangements to be studied	✓		October 2024
4	Technical/Operational characteristics of terrestrial IMT networks to be used for sharing and compatibility studies		✓	October 2024 (could be extended to February 2025)
5	Sharing and compatibility studies with the incumbent services	✓		April/May 2026
6	Develop the regulatory considerations (measures) e.g., corresponding regulatory limits to protect terrestrial IMT systems for inclusion on the draft CPM text taking into account the comments from WP 4C where applicable		✓	October 2026 (before WP 4C meeting #36). Preliminary results (limits) to be developed by the end of 2025
7	Development of draft CPM text	✓		October 2026
8	Development of Reports/Supporting Materials	✓		

Thank you

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