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Communications, Space &
Technology Commission

Enabling Innovation in Wireless Spectrum: CST Journey

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UK Spectrum Policy Forum Plenary meeting, 2023





- About CST
- National Radio Spectrum Initiatives
- Innovative Spectrum Regulatory Frameworks
- Promoting the Spectrum Use & the NTN Program

CST is the communication, space, and technology, sectors regulator and spectrum manager in Saudi Arabia.



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Vision



A connected nation for a thriving digital economy

Mission



We **protect** consumers, **promote** investment, and safeguard competition in order to ensure reliable communications services and innovative digital technologies.

National Spectrum Strategy 2025

Vision:

Unlock the potential of radio-communication in KSA for a smarter and safer future

Mission:

Offer all users the access to spectrum they need to innovate and grow by managing the spectrum effectively and efficiently in close collaboration with our stakeholders

Guiding principles:

Future orientation

We are forward-looking in our policies to anticipate future needs and cater for tomorrow's demand while protecting spectrum predictability



Efficiency

We proactively identify opportunities to Optimize Spectrum Use, maximize the value it generates, and streamline our way of working



Engagement

We build "win-win" relationships with our stakeholders and increase collaboration within the ecosystem to shape together a 'One KSA voice'



Latest Regulations

Spectrum Outlook for Commercial and Innovative Use of Spectrum



Non-Terrestrial Network (NTN)



Electromagnetic Fields



Allocations and Use Regulations for IMT Bands



Frequency Allocation and Use Regulations for Wireless Links

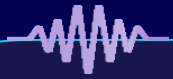


Wireless Local Area Networks (WLAN / WiFi)



< 23 GHz

Of newly available spectrum for commercial use in kingdom



Flexible Spectrum management become more necessary, given the **huge demand** from different wireless technologies across different sectors, and to maximize the socioeconomic impact of the spectrum.

To do that, Spectrum Managers need to:

Follow technology updates in different sectors.



Enable spectrum sharing between applications and radio services.



Enable data- driven Spectrum management approach.



4.0 – 4.2 GHz

- Targeting Vertical Industry for localized IMT (5G) services
- Different class licenses to fit different needs
- Geographically governed licensing

6 GHz

- Standard Power Wi-Fi (4W)
- Allowing outdoor operations through Dynamic Spectrum Access (DSA) mechanisms (i.e.. AFC)

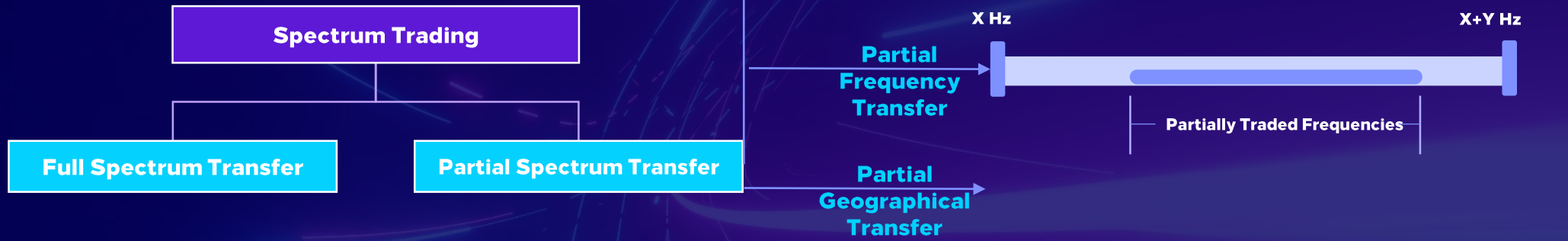
28 GHz

- Fixed Point-to-Point and Point-to-Multipoint Links (access or backhaul, including IAB) based on 5G technology



Sandbox will be needed to enable the new services

Spectrum Trading



Full Spectrum Transfer

Full transfer of frequencies from one user to another for the full remaining term of the license



Partial Spectrum Transfer

Transfer of a part of the license's allocated frequencies, a defined sub-national geographical coverage area, or the remaining period of a license term from one user to another

Permitted Spectrum For Trading

IMT

Satellite Mobile

Maritime



Evolution of wireless connectivity and networks is progressing as wireless infrastructure is being deployed beyond the Earth surface. CST has a long-term plan to enable NTN technologies and facilitate the roadmap to 6G technologies.



Partners

Overview

Not-to-scale

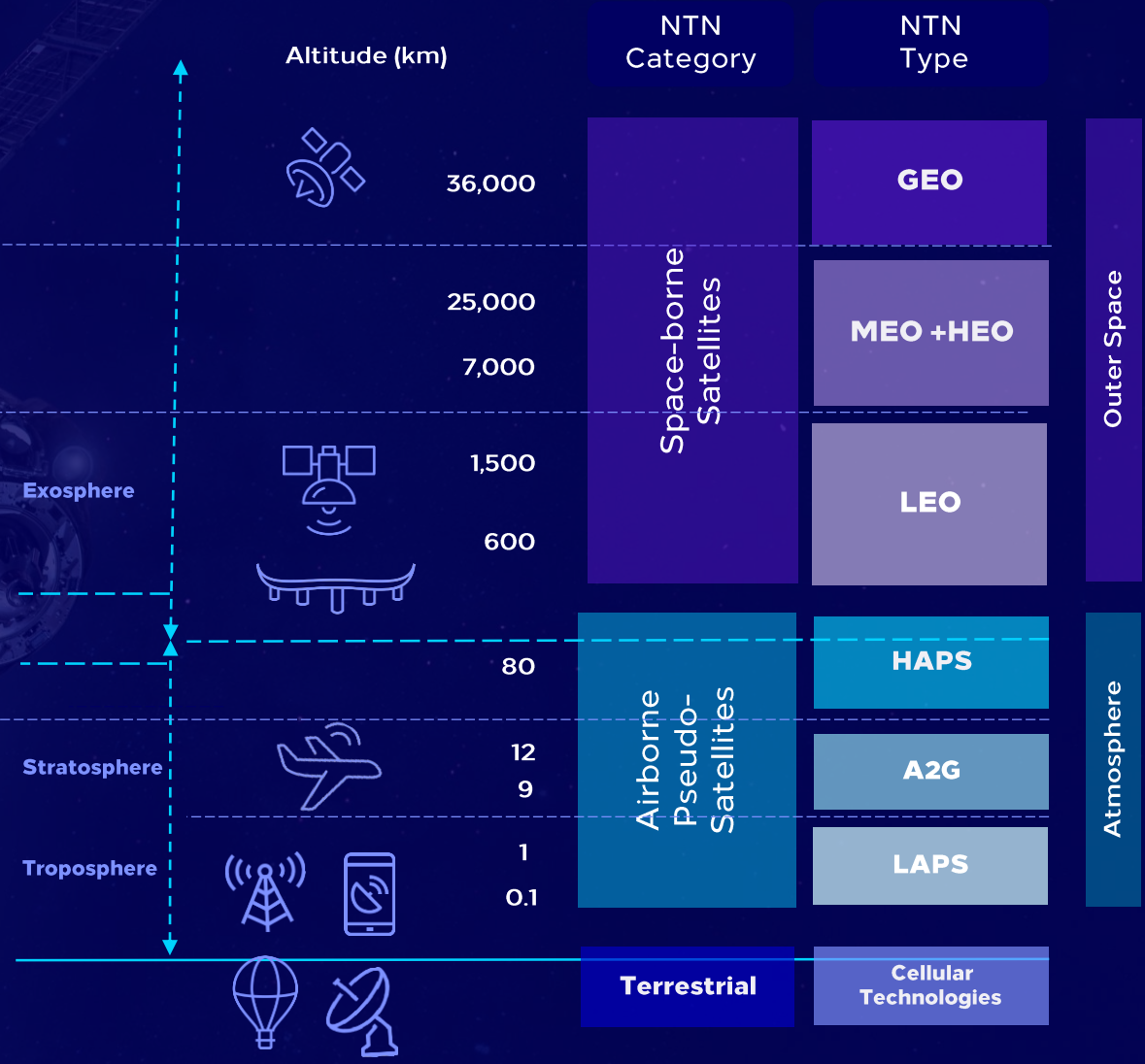
Non-Terrestrial Network (NTN)

is an umbrella for any network that involves non-terrestrial objects.

is a family of Space-borne and Air-borne Objects.

elements and components are evolving to become an integral part of the future 6th Generation wireless network topology.

uses cases span from connecting the unconnected through providing broadband access, NB-IoT applications, delivering connectivity for disaster recovery and emergency cases, creating hotspot areas for temporary events.



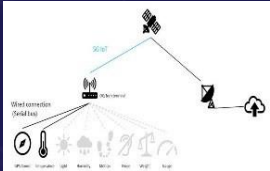
NTN Trials




GEO IoT Satellite





LEO IoT Satellite



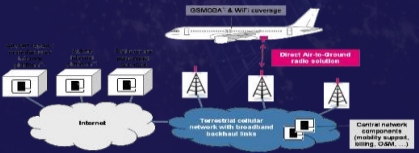





LEO Satellite Broadband & backhauling



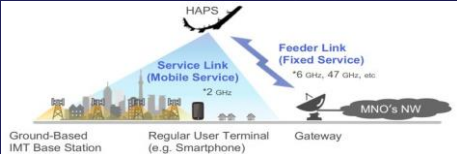





Air-to-Ground (A2G)





High Altitude Platform Systems (HAPS)





Hybrid Non Terrestrial Network





NTN Regulations



OfCOM issued a report about supporting Hybrid topologies

OfCOM consulted about regulating the new LEO mega constellation satellites.



FCC issued regulations for LEO constellation satellites.

FCC Started issuing the mega constellation satellites licenses.



ITU is addressing the importance of regulating the LEO constellation.



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Designing the new NTN regulation framework in Q2 – 2022.

Public consultation for NTN regulation is published in Q3 – 2022.

NTN regulation is published in Q4 – 2022.

In Collaboration with Space Experts



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Regulations for
Provisioning of
Operation
Services of (NTN)

Regulations for
Provisioning of
Telecommunication
Services over (NTN)

Regulation for
Registration of
Telecommunication
Space
Stations

International Outreach

CST hosted and participated in several meetings to enable the "TERRESTRIAL AND NON-TERRESTRIAL NETWORKS"

CST participated in several international conferences in 2022 to accelerate the growth of the NTN globally.



+ 85
Speakers

+ 60
Organizations

+ 10
Regulators

+ 130
Countries

HOST



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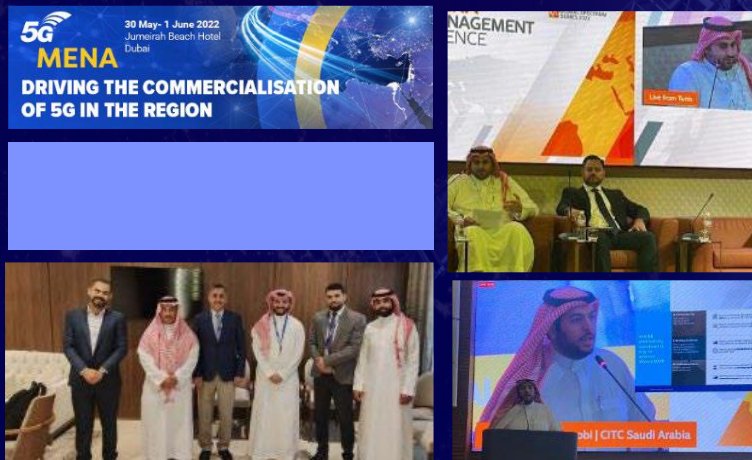


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MWC 2022- Panel Discussion
Non-Terrestrial Networks: Next
Evolution of Wireless Connectivity



NTN Auction Overview

CST held an auction for the 2100 MHz band to support NTN technologies in the Kingdom

Spectrum Blocks (in MHz)



Qualified Bidders

01

02

03

04

Cooperation With

Technologies

Air-To-Ground (A2G)

Mobile Satellite Service (MSS)

IoT through Satellite (MSS-IoT)

Hybrid 5G Connectivity (MSS/CGC)

Auction Timeline

-
- October 2021 ▶ Auction preliminary consultation
 - June 2022 ▶ Memorandum for consultation
 - September 2022 ▶ Final Memorandum
 - November 2022 ▶ Hold the auction

Winner of 2x Blocks

IEEE COMPETITION



It is a global competition that solicits innovative ideas and aspects of the NTN for Beyond fifth-generation (B5G) and 6G networks by submitting a “magazine-style” paper.

The competition was organized by the IEEE Future Networks Initiative and sponsored by CST, As part of the CST NTN program



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IEEE
INGR)
International Network
Generations Roadmap

IEEE
Connecting the
UNCONNECTED[™]
An IEEE Future Networks Program

IEEE
**Future
NETWORKS**[™]

Competition in Figures



28

**Papers
submitted**



+100

Participants



17

Countries



34

**Universities and
research centers**

What is next?

Space Outlook

CST is planning to publish the kingdom's Outlook on the use of space & satellite services and how to enable them in terms of radio spectrum.

Updating Space Radio Spectrum Regulatory Framework

CST is redrafting all space spectrum regulatory framework including application forms, licensing templates guidelines, and policies

Enable Technology Trends

CST is aiming to enable different technologies, conduct trials in the kingdom.

Thank you

