September 5, 2017

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: Ex Parte Presentation, *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177; IB Docket No. 15-256; RM-11664; WT Docket No. 10-112; IB Docket No. 97-95.

Dear Ms. Dortch,

On August 31, 2017, representatives from CTIA and our member companies met with Erin McGrath of the Office of Commissioner Michael O'Rielly and, separately, with staff from the Wireless Telecommunications Bureau, Office of Engineering and Technology, and International Bureau to discuss the above-captioned proceedings. A full list of meeting participants is attached to this filing.

During the meetings, and consistent with the attached presentation, CTIA explained that the United States leads the world in the deployment and adoption of 4G wireless services and that next-generation 5G wireless services hold the promise of unlocking even greater benefits to consumers, businesses, and the U.S. economy by providing much faster speeds and enough bandwidth to support the Internet of Things.[1] CTIA noted that ever-increasing consumer use of 4G, and soon 5G, mobile broadband is placing tremendous demands on wireless providers, which must not only add spectrum capacity but must also expand the physical networks needed to accommodate that demand.

[1] *See Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities*, Accenture Strategy (Jan. 2017), https://www.ctia.org/docs/default-source/default-document-library/how-5g-can-help-municipalities-become-vibrant-smart-cities-accenture.pdf; *see also Wireless Connectivity Fuels Industry Growth and Innovation in Energy, Health, Public Safety, and Transportation*, Deloitte and CTIA (Jan. 2017), http://www.ctia.org/docs/default-source/default-document-library/deloitte_20170119.pdf.

CTIA applauded the Commission for taking a critical first step in unlocking high-band spectrum to enable these benefits. In particular, we highlighted the careful balance the Commission created in the *Spectrum Frontiers Order* to allow for rapid and flexible deployment of 5G services in the 28 GHz and 37/39 GHz bands while also permitting use and expansion of satellite services. The licensing framework adopted for those bands was fully vetted and provides flexibility for Fixed Satellite Service ("FSS") providers. The wireless industry is undergoing 5G trials and developing deployment plans based on the compromise framework established by the Commission. CTIA therefore urged the Commission to reject requests to revisit the licensing and technical framework or to impose additional limitations on terrestrial mobile deployment in these bands.

CTIA also discussed the recently filed Roadmap for High Band Spectrum ("Roadmap"), which was developed by CTIA and its members after close study of the existing spectrum allocations in the millimeter wave bands.[2] The Roadmap, which is detailed in the attached presentation, sets forth a path for the Commission to supplement the initial spectrum outlays in the 28 GHz and 37/39 GHz bands with additional spectrum for both terrestrial and satellite use, including significant blocks of spectrum to facilitate 5G mobile broadband networks and services. Importantly, it also provides a path for satellite interests seeking access to high band spectrum, in addition to that made available under the Commission's flexible framework adopted in the *Spectrum Frontiers Order*. The Roadmap thus presents a balanced approach that will enable innovation for both terrestrial mobile wireless and satellite to the ultimate benefit of consumers

Pursuant to Section 1.1206 of the Commission's rules, a copy of this letter is being filed in ECFS and provided to the Commission participants. Please do not hesitate to contact the undersigned with any questions.

Sincerely,

/s/ Scott K. Bergmann

Scott K. Bergmann
Vice President, Regulatory Affairs

[2] *See* Letter from Scott K. Bergmann, CTIA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177, *et al.* (filed July 14, 2017).

Attachments

cc: Erin McGrath
Julius Knapp
Don Stockdale
Tom Sullivan
Jose Albuquerque
Simon Banyai
Chip Fleming
Stephanie Goldberg
Michael Ha
Dante Ibarra
Michael Mullinix
Robert Nelson
Charles Oliver
John Schauble
Catherine Schroeder
Blaise Scinto
Dana Shaffer
Joel Taubenblatt

August 31, 2017 Meeting Participants – Office of Commissioner Michael O'Rielly

FCC Office of Commissioner Michael O'Rielly

Erin McGrath

CTIA

Scott Bergmann
Kara Romagnino Graves

August 31, 2017 Meeting Participants – Wireless Bureau, International Bureau, and OET

FCC Wireless Telecommunications Bureau

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Dana Shaffer
Joel Taubenblatt
Blaise Scinto
John Schauble
Simon Banyai
Stephanie Goldberg
Charles Oliver
Catherine Schroeder

FCC Office of Engineering and Technology

Julius Knapp
Michael Ha

FCC International Bureau

Tom Sullivan
Jose Albuquerque
Robert Nelson
Chip Fleming
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Paul Anuszkiewicz
Scott Bergmann
Kara Romagnino Graves
Jennifer Oberhausen
Tom Dombrowsky (DLA Piper, for CTIA)
Edward ("Smitty") Smith (DLA Piper, for CTIA)

CTIA Members

Stacey Black, AT&T
Gardner Foster, Sprint
Cody Hogan, T-Mobile
Charla Rath, Verizon

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Spectrum Frontiers Roadmap

01 Positioning the U.S. to Win the Global Race for 5G Leadership

The Wireless Industry Powers Our Economy

CREATING NEW AMERICAN JOBS AND OPPORTUNITIES

> The wireless industry adds $400B annually to our economy.

The Brattle Group
MAY 2015

4.6 M
JOBS

American jobs rely directly or indirectly on the wireless industry.

JOB MULTIPLIER

6.5 jobs are created every time the wireless industry employs **one** person.

44%
MORE PAY

Wireless jobs pay better than the average job.

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5G Opportunity

ACCENTURE FORECASTS JOBS AND GROWTH

$275 BILLION

New Wireless Investment

3 MILLION

New Jobs

$500 BILLION

Contribution to GDP

5G Global Race

KEYS FOR U.S. LEADERSHIP

SOUTH KOREA has announced 5G trials at the 2018 Winter Olympics

JAPAN plans to have 5G at the 2020 Summer Olympics in Tokyo

CHINA starting buildout in major cities in 2018; full commercial deployment by 2020

THE EUROPEAN UNION has committed 700M Euros to 5G R&D

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02

CTIA High Band Spectrum Roadmap

High Band Roadmap Takeaway

THE GOALS

- Maintain balanced sharing framework adopted in 2016 Spectrum Frontiers Order
- At least 15 gigahertz of additional spectrum
- In large contiguous blocks
- For licensed terrestrial mobile broadband

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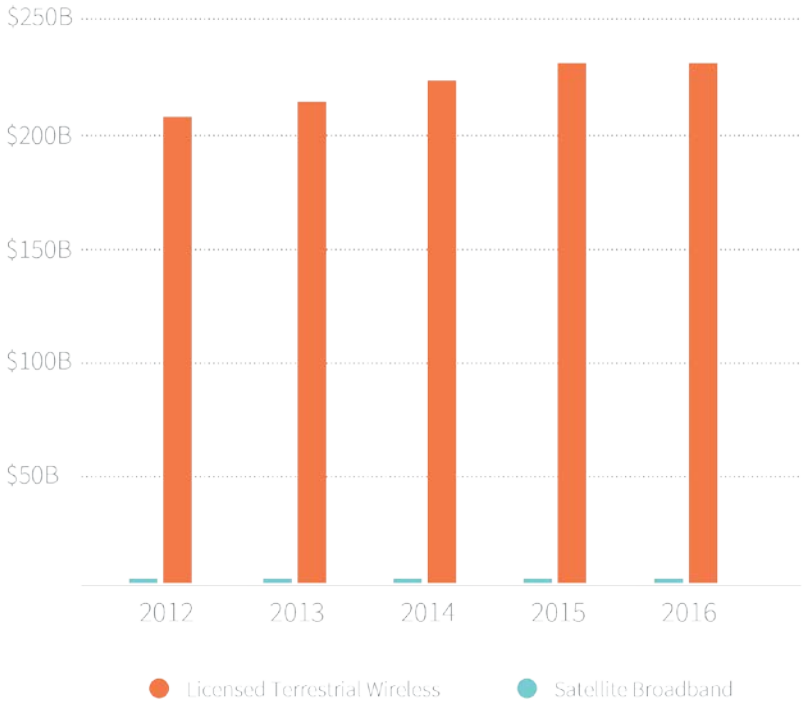
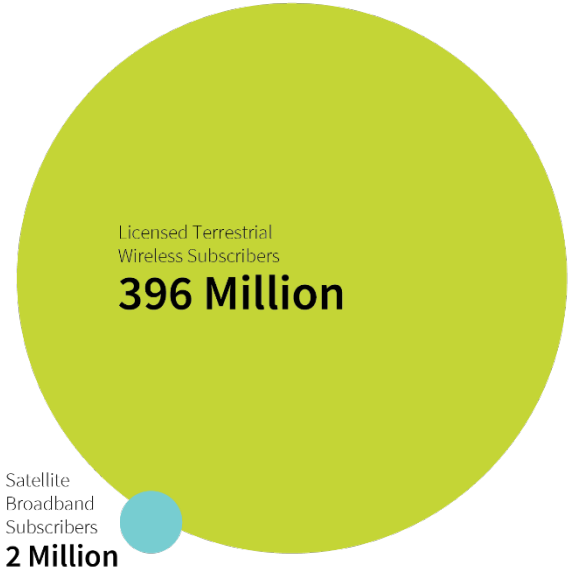
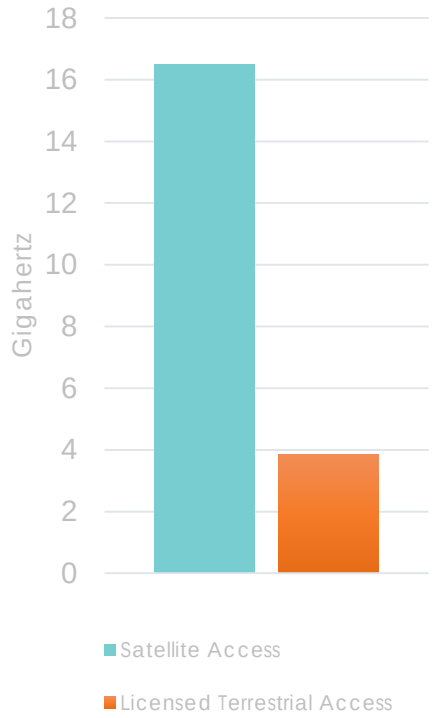
Terrestrial and Satellite: Side by Side



REVENUE



SUBSCRIBERS



SPECTRUM

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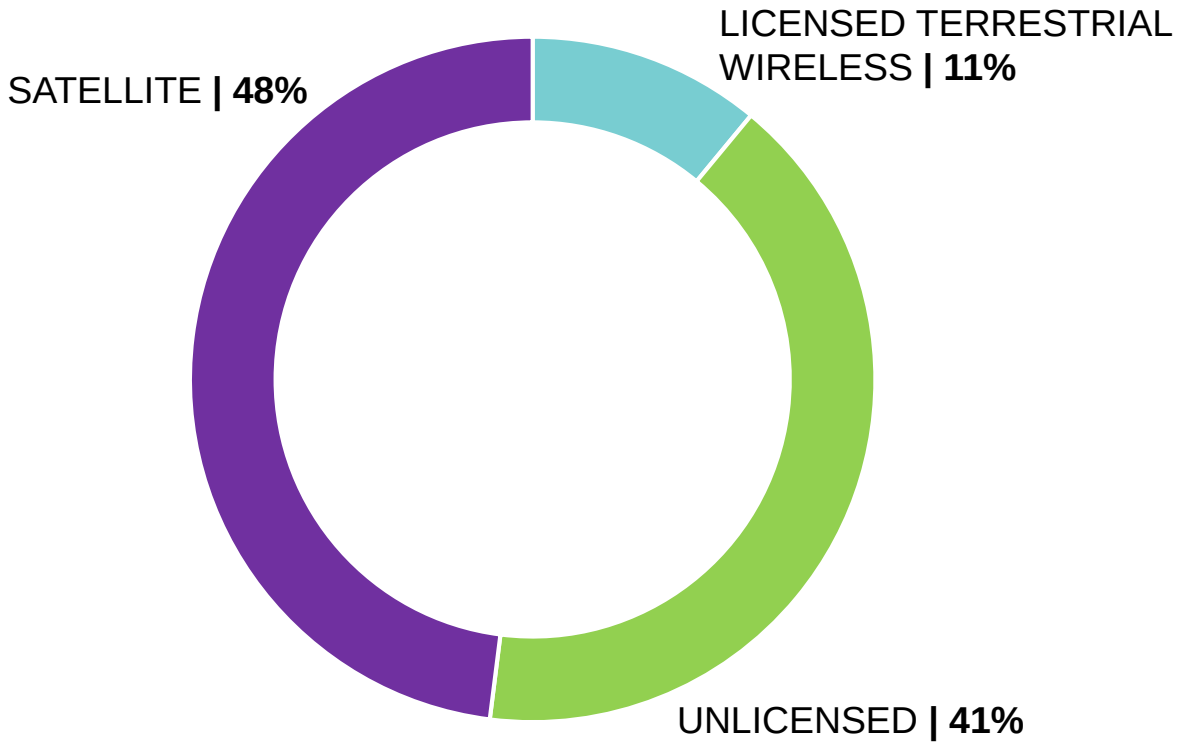
High Band Roadmap Takeaway

THE GOALS

- Licensed terrestrial use is key to our global wireless leadership
- Satellite has access to 4 times more high band spectrum than terrestrial mobile
- Unlicensed has access to 3 times more high band spectrum than licensed



High Band Roadmap

BUILDING BLOCKS FOR 5G

REALIZE THE PROMISE OF THE SPECTRUM FRONTIERS ORDER

- Retain the balanced framework for terrestrial and satellite providers
- Create an investment-friendly licensing scheme for the 37-37.6 GHz band
- Bring these bands to auction by 2018

DELIVER SIGNIFICANT ADDITIONAL SPECTRUM TO FACILITATE 5G

- Harness bands identified by the FCC and internationally
- Create large contiguous and complementary blocks of spectrum

LEVERAGE ECONOMIES OF SCALE

- Harness the rapidly developing equipment market
- Enable use of an integrated radio across multiple bands
- Enable efficient use of spectrum

High Band Roadmap

BALANCED APPROACH

CREATE A MORE EQUITABLE ALLOCATION OF HIGH BAND SPECTRUM

- Satellite Allocation: 19.75 GHz
- Terrestrial Allocation: 19.55 GHz
- Unlicensed: 14 GHz

AFFORD SATELLITES EXTENSIVE ACCESS TO HIGH BAND SPECTRUM

- Exclusive use of 40-42 GHz and 81-86 GHz
- Shared use of other Spectrum Frontiers bands under Part 30 rules

PROVIDE SIGNIFICANT OPPORTUNITIES FOR SATELLITE USE

- Access to interference-protected spectrum through auctions and non-auction mechanisms
- Able to compete with terrestrial wireless services
- Able to offer service, including to rural areas

03

Finishing the Job on the FCC's 2016 Order

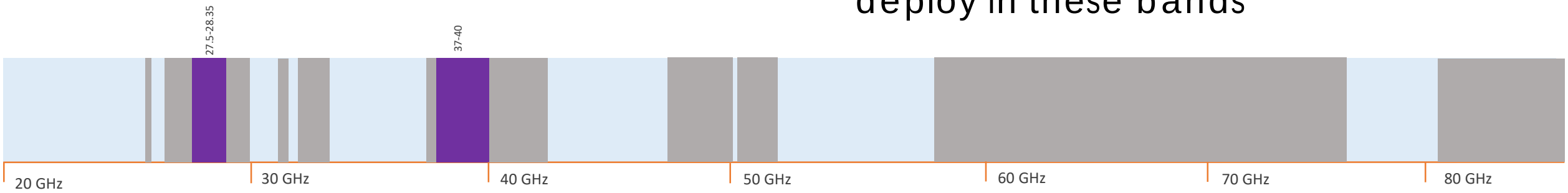
Bands: 28 GHz / 37-40 GHz

THE GOAL

- Auction 27.5-28.35 GHz and 37-40 GHz bands by no later than December 31, 2018

THE RATIONALE

- Key bands for initial 5G deployment
- Existing licenses cover 75% of population
- Wireless companies actively undergoing trials and moving to deploy in these bands



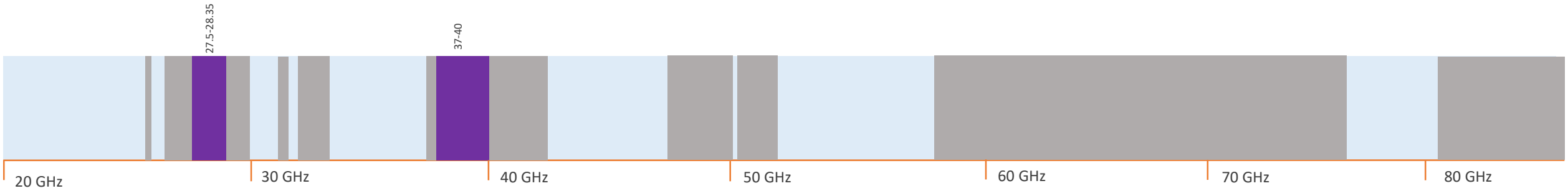
Bands: 28 GHz / 37-40 GHz

REJECT SUGGESTIONS TO MODIFY THE LICENSING FRAMEWORK

Limits on new satellite earth stations were fully vetted and provide flexibility for FSS providers

Requests by the satellite industry for protection from aggregate interference were properly rejected

Limits on terrestrial deployments would artificially limit the flexibility needed to provide mobile broadband services



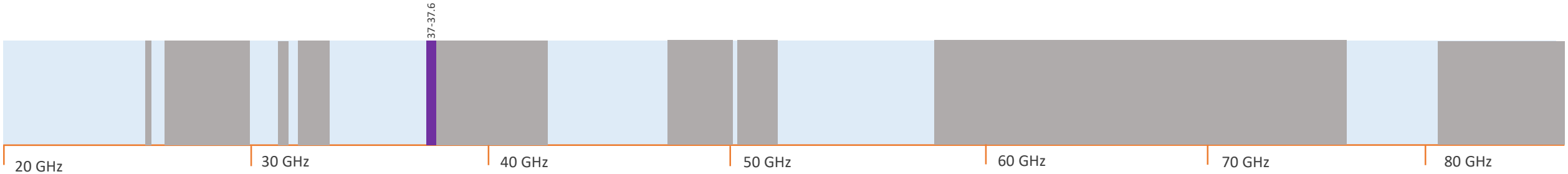
Band: 37-37.6 GHz

THE GOAL

- Modify 37-37.6 GHz licensing scheme to allow for exclusive use with coordinated sharing solely between federal and non-federal users

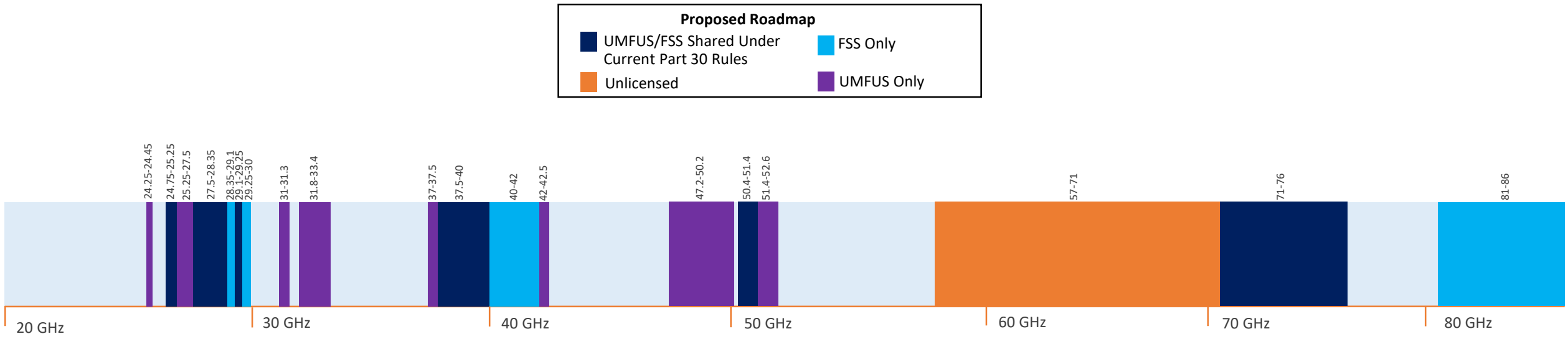
THE RATIONALE

- Contiguous band = more value at auction
- Greenfield spectrum presents a number of opportunities
- Balances sharing and exclusive use



04 Roadmap for American Leadership in 5G

Spectrum Frontiers Roadmap



Contiguous Blocks of Spectrum

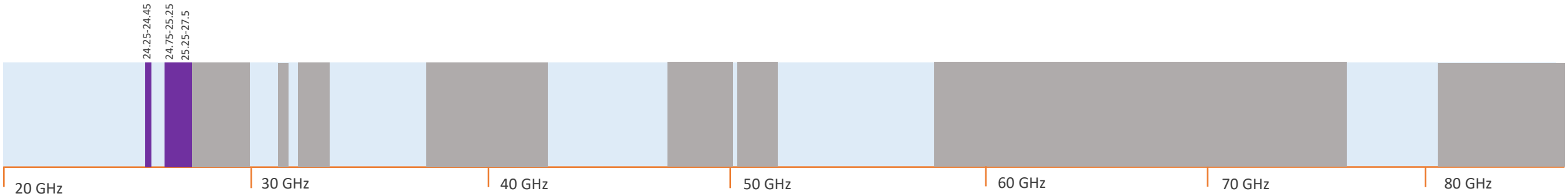
24-28 GHz BAND

THE GOAL

- Along with 28 GHz, creates a 4 gigahertz nearly contiguous block for licensed terrestrial mobile use in the 24 GHz (24.25-24.45 GHz, 24.75-25.25 GHz) and 26 GHz (25.25-27.5 GHz) bands

THE RATIONALE

- 24 GHz band has existing terrestrial mobile allocation
- Adding 26 GHz has support in the record and internationally, and can help grow 28 GHz band that wireless carriers are already aggressively exploring for 5G



Contiguous Blocks of Spectrum

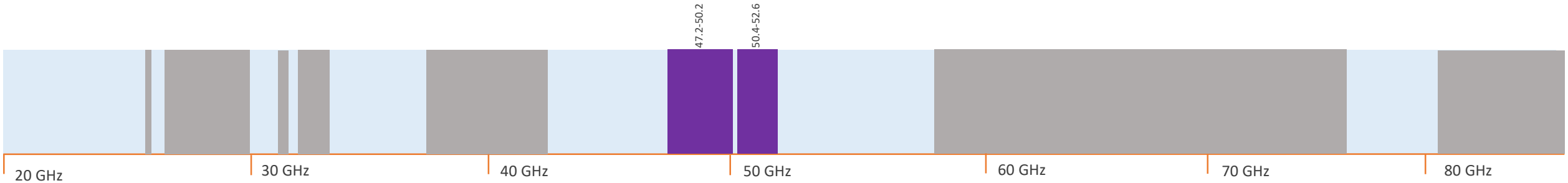
47 & 50 GHz BAND

THE GOAL

- Create 5-gigahertz nearly contiguous block by allowing terrestrial licensed use of 47.2-50.2 and 50.4-52.6 GHz bands

THE RATIONALE

- Bands being studied internationally for mobile use
- Enable satellite deployment by allowing satellite feeder links in 50.4-51.4 GHz portion on a non-interfering basis



Complementary Blocks of Spectrum

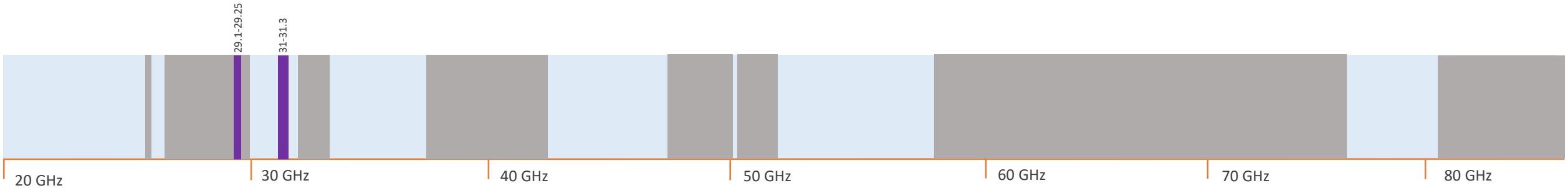
29 & 31 GHz BANDS

THE GOAL

- Allow mobile broadband in 29.1-29.25 GHz and 31-31.3 GHz bands under rules consistent with other LMDS bands

THE RATIONALE

- Leverages economies of scale and enables efficient spectrum use



Complementary Blocks of Spectrum

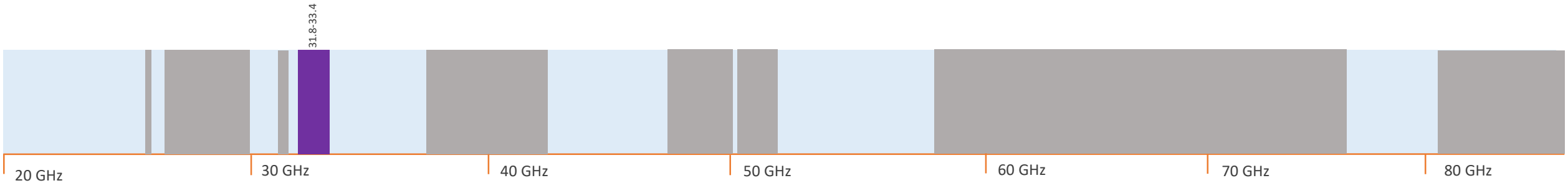
32 GHz BAND

THE GOAL

- Allow terrestrial licensed, exclusive use of 31.8-33.4 GHz band by adding a primary, non-federal, fixed and mobile allocations
- Protect radio astronomy use

THE RATIONALE

- Possible global harmonization (WRC-15 study item; potential WRC-19 mobile allocation)
- Strong record support for allocating this valuable, underused band



Complementary Blocks of Spectrum

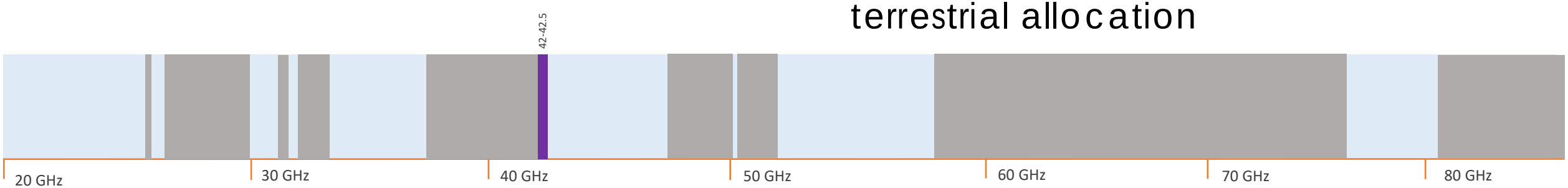
42 GHz BAND

THE GOAL

- Allow terrestrial licensed, fixed and mobile use of 42-42.5 GHz band

THE RATIONALE

- Along with the 37-40 GHz band, creates 3.5 gigahertz of spectrum that can be accommodated into a single radio
- Being studied internationally for 5G and has primary fixed and mobile terrestrial allocation



Balanced Approach

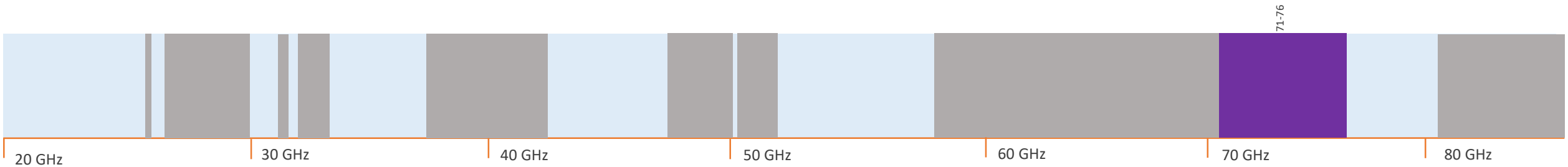
70 GHz BAND

THE GOAL

- Allow shared access to 71-76 GHz for terrestrial licensed and FSS use under existing Part 30 rules

THE RATIONALE

- Existing primary allocations for both terrestrial (mobile and fixed) and FSS
- Provides additional 5 gigahertz for contiguous spectrum for mobile broadband and supplementary FSS downlink spectrum



Exclusive Satellite Access

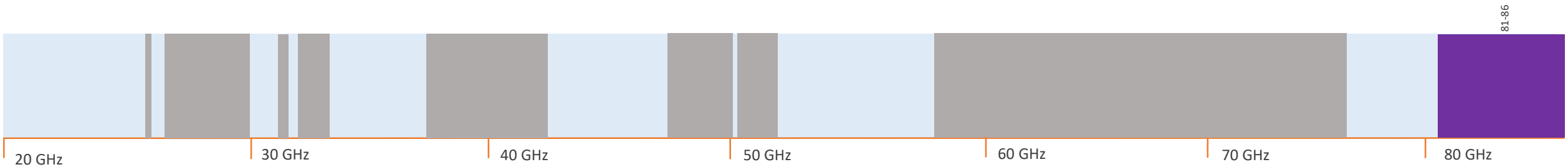
80 GHz BAND

THE GOAL

- Explore the 81-86 GHz band for exclusive use for satellite uplinks
- Grandfather existing terrestrial uses

THE RATIONALE

- Provides exclusive spectrum for satellite uplinks in an existing FSS allocation
- Has existing database for sharing with grandfathered terrestrial operations
- Path loss similar to 50 GHz band and should be optimal for small user earth station antennas

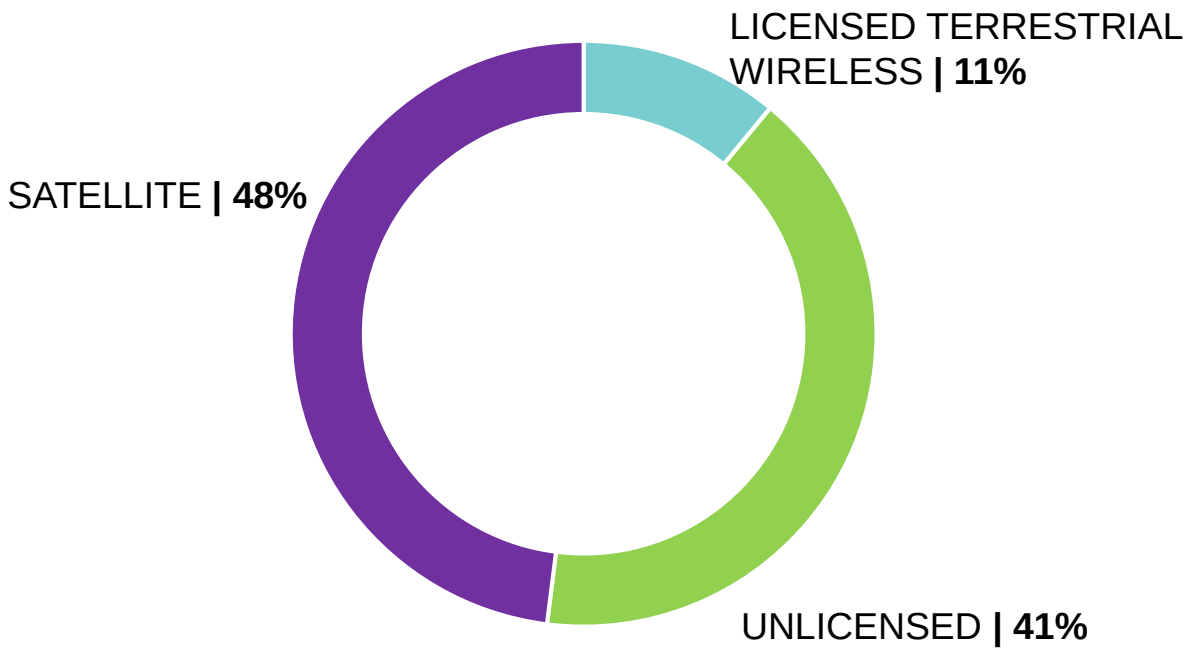


05

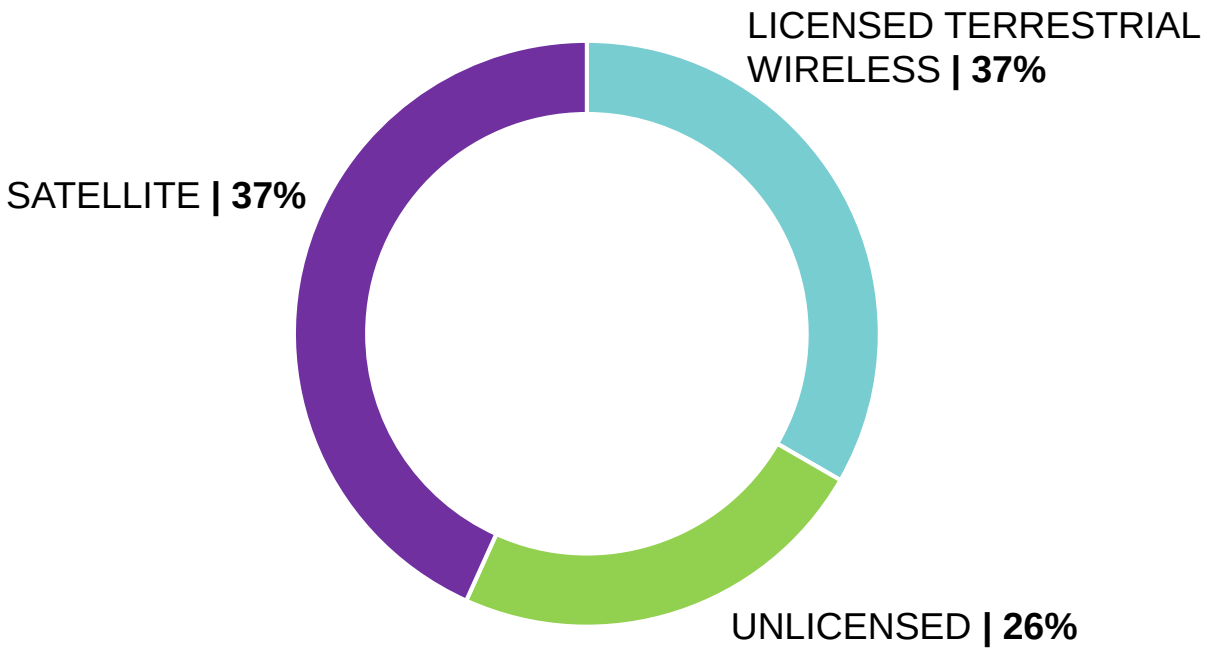
A Balanced Approach Benefiting All Stakeholders

High Band Roadmap Takeaway

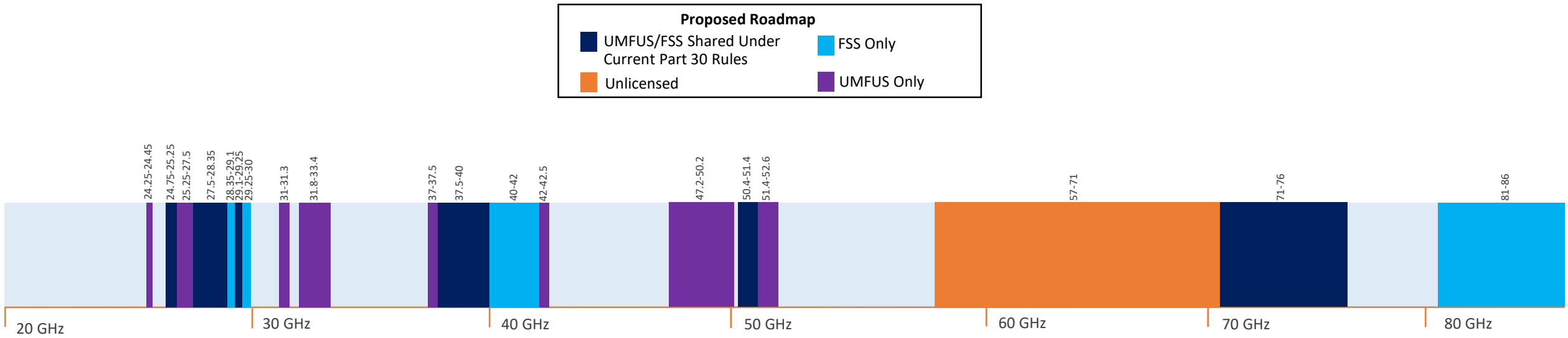
CURRENT HIGH BAND DISTRIBUTION



PROPOSED HIGH BAND DISTRIBUTION



Spectrum Frontiers Roadmap



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