RADIO SPECTRUM MANAGEMENT

RSM 5G Workshop

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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New Zealand Government

Agenda:

- Introduction
- 5G overview
- Existing spectrum bands used for cellular and fixed wireless
- Candidate bands considered for 5G
- 5G timeframe
- Open discussion

What do we want to achieve

Developing a strategy/roadmap for 5G

1. Understand industry plans and business needs

2. Develop a strategy by considering industry's input and RSM's general objectives

3. Develop a work plan

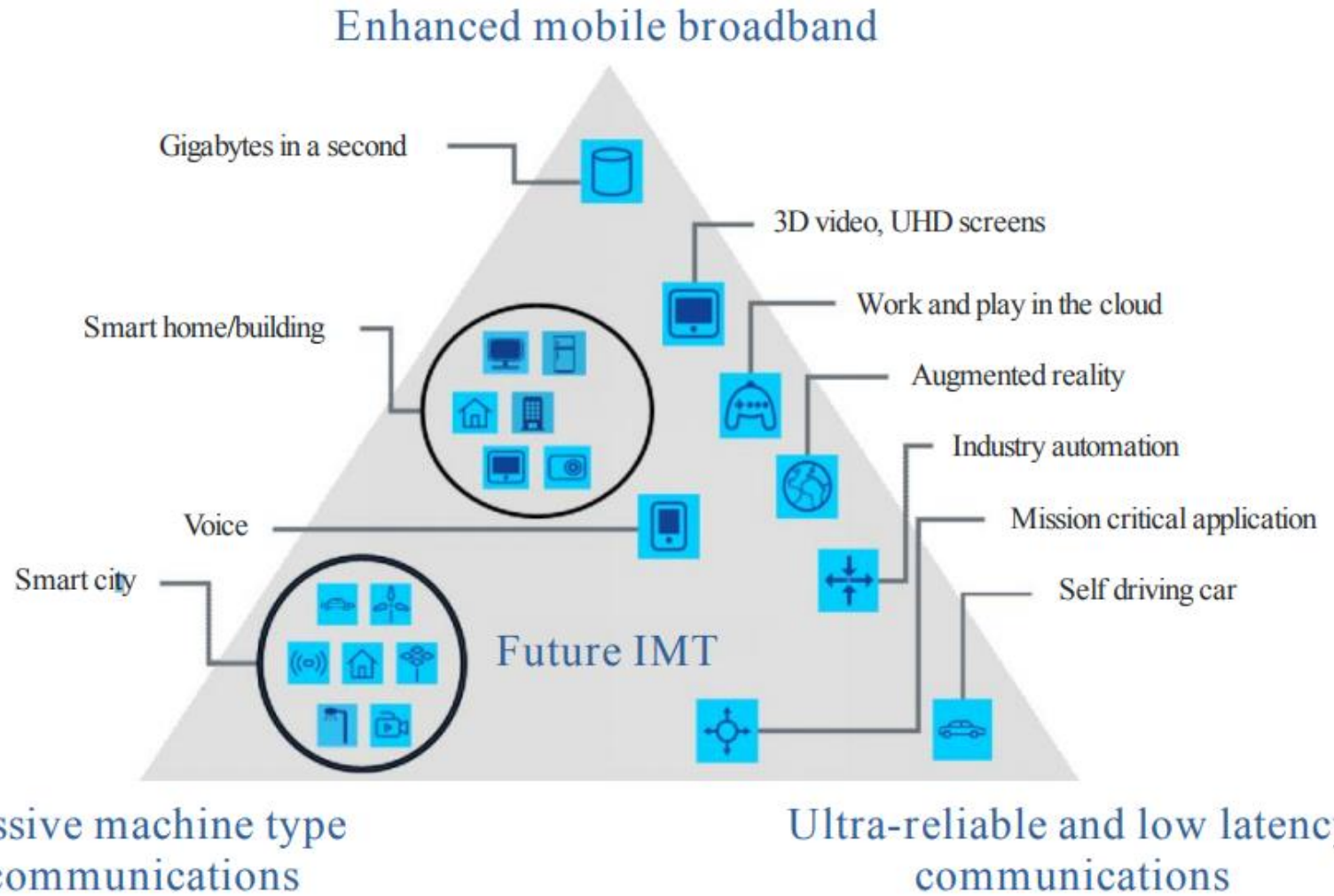
The cellular mobile generations

5G overview

"…the jump from 3G to 4G was kind of an evolution… but 5G in combination with 4G is more of a truly technological revolution"

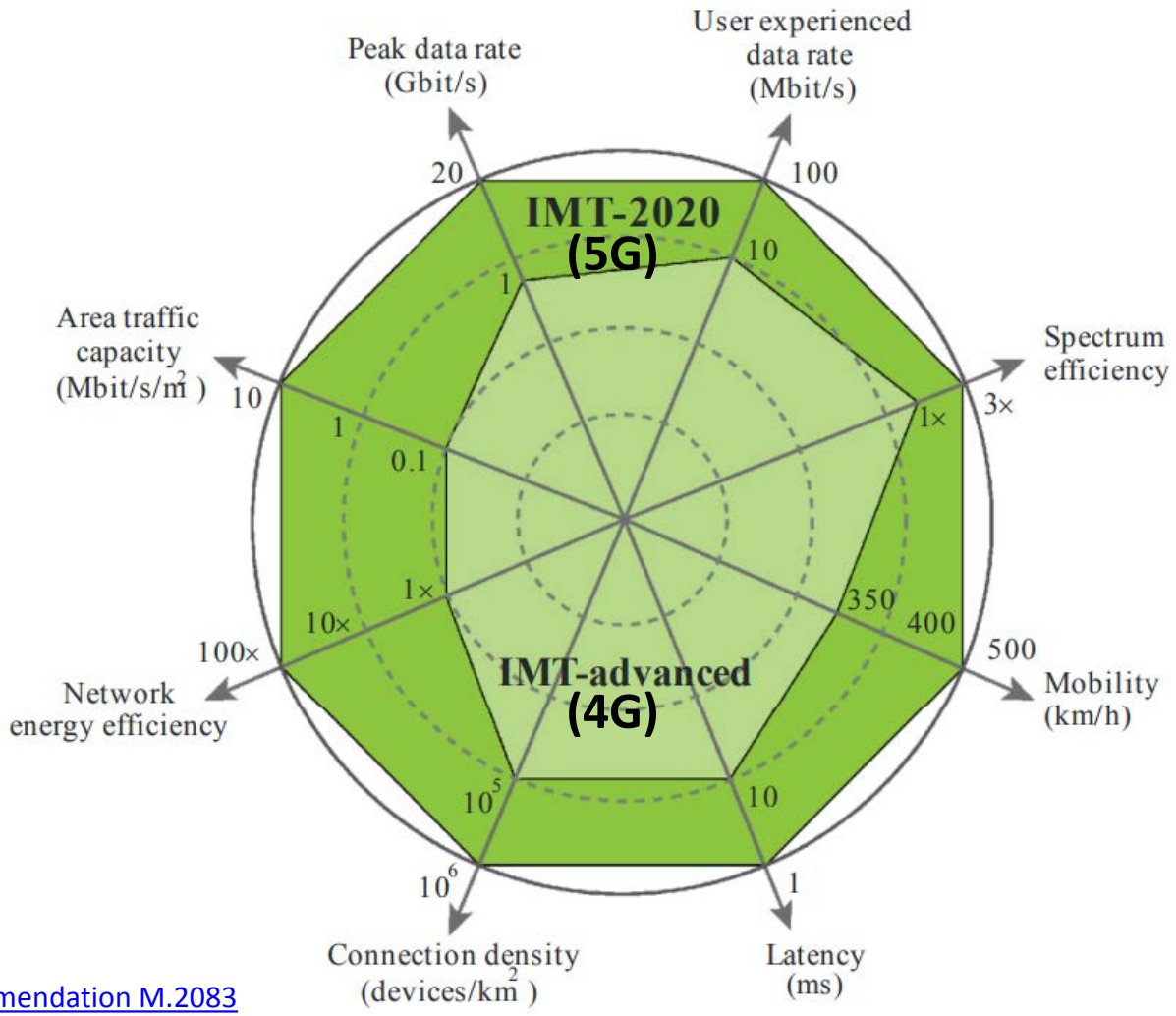
Gunther Oettinger
European Commissioner for the Digital Economy (2016)

Usage scenarios



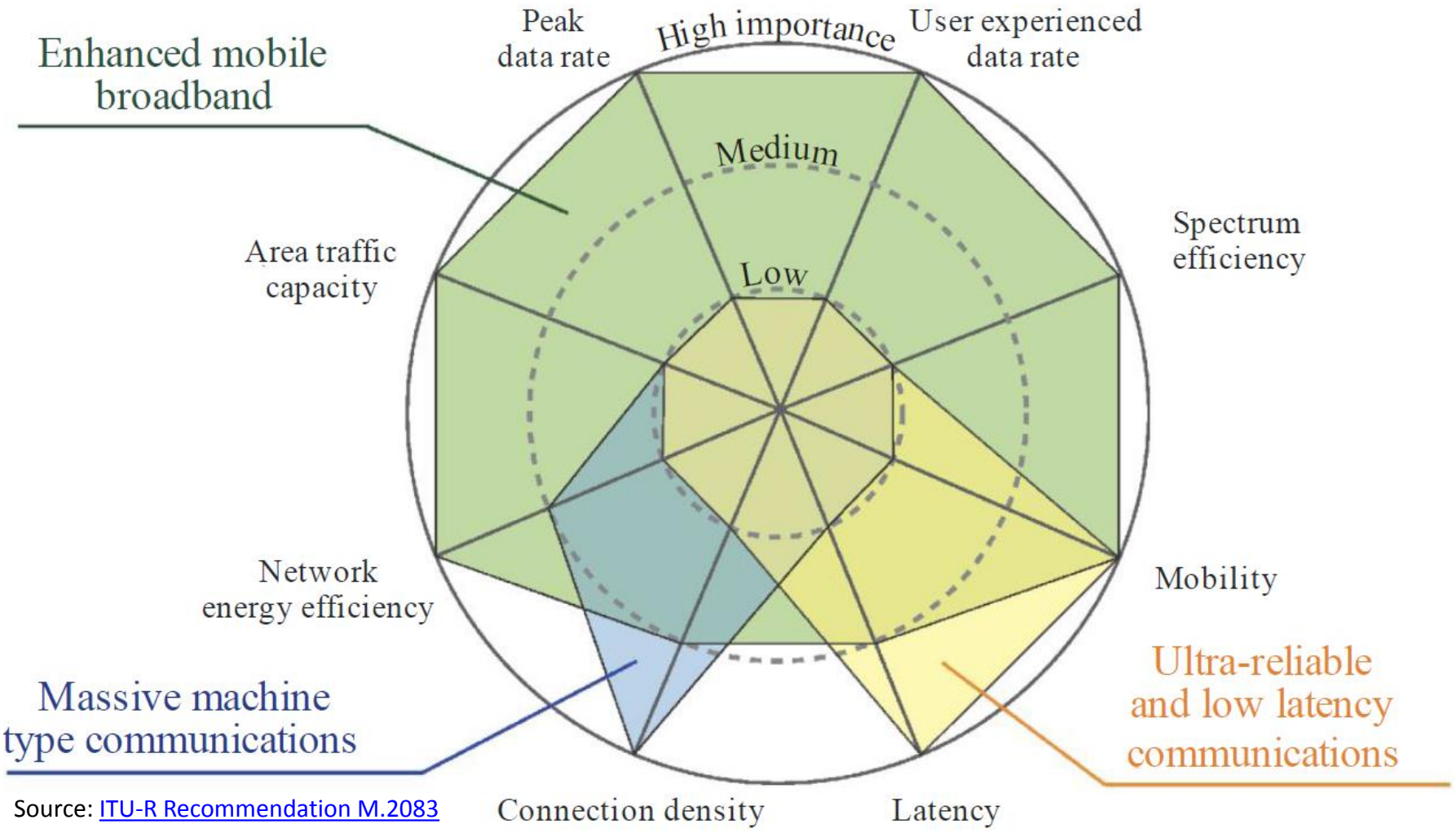
Source: ITU-R Recommendation M.2083

Key capabilities



Source: [ITU-R Recommendation M.2083]

Importance of Key capabilities in different usage scenarios



Source: ITU-R Recommendation M.2083

Evolution and relationship with 4G

1. The minimum technical requirements defined by ITU-R could be met by enhancing 4G systems

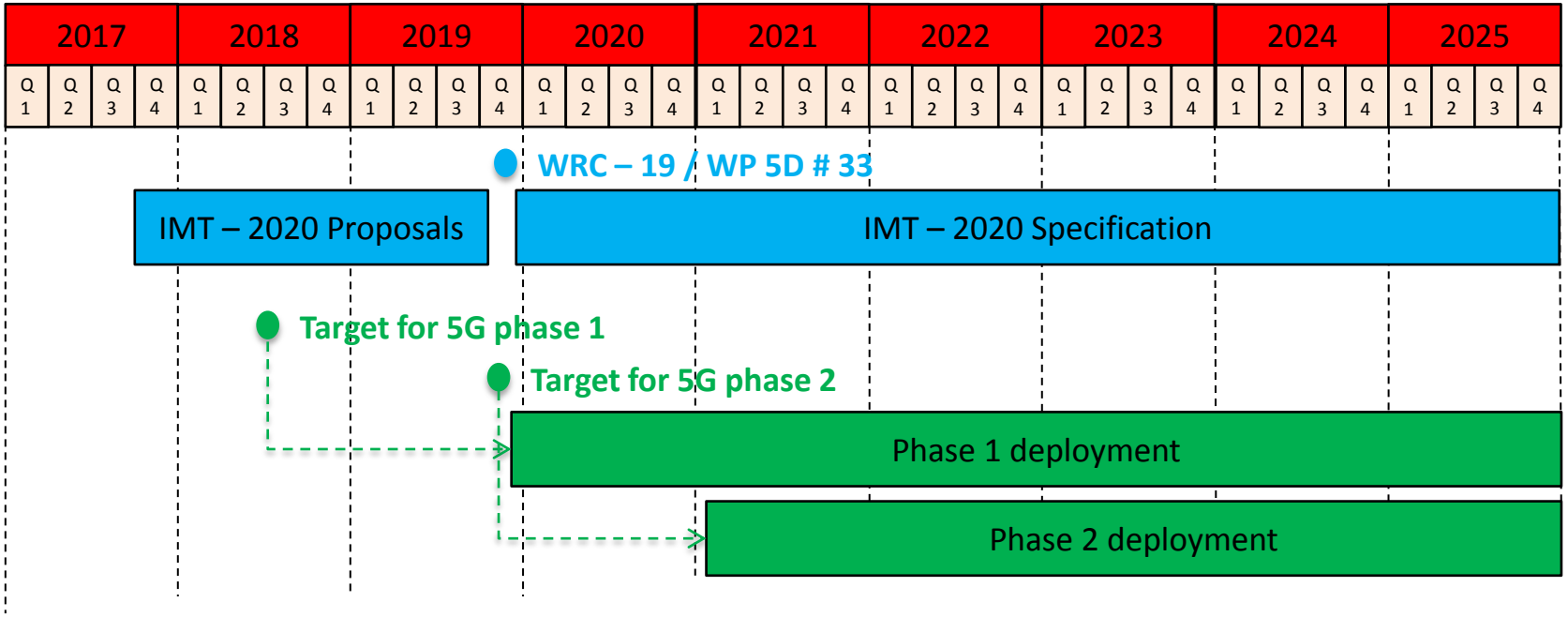
2. 5G phase one, non standalone. Uses 4G for control plane.
   - Expected release date: June 2018

3. 5G phase two, standalone.
   - Expected release date: Dec 2019

4. Interoperability of 4G and 5G systems after deployment

Notable dates

(Specifications and deployment)



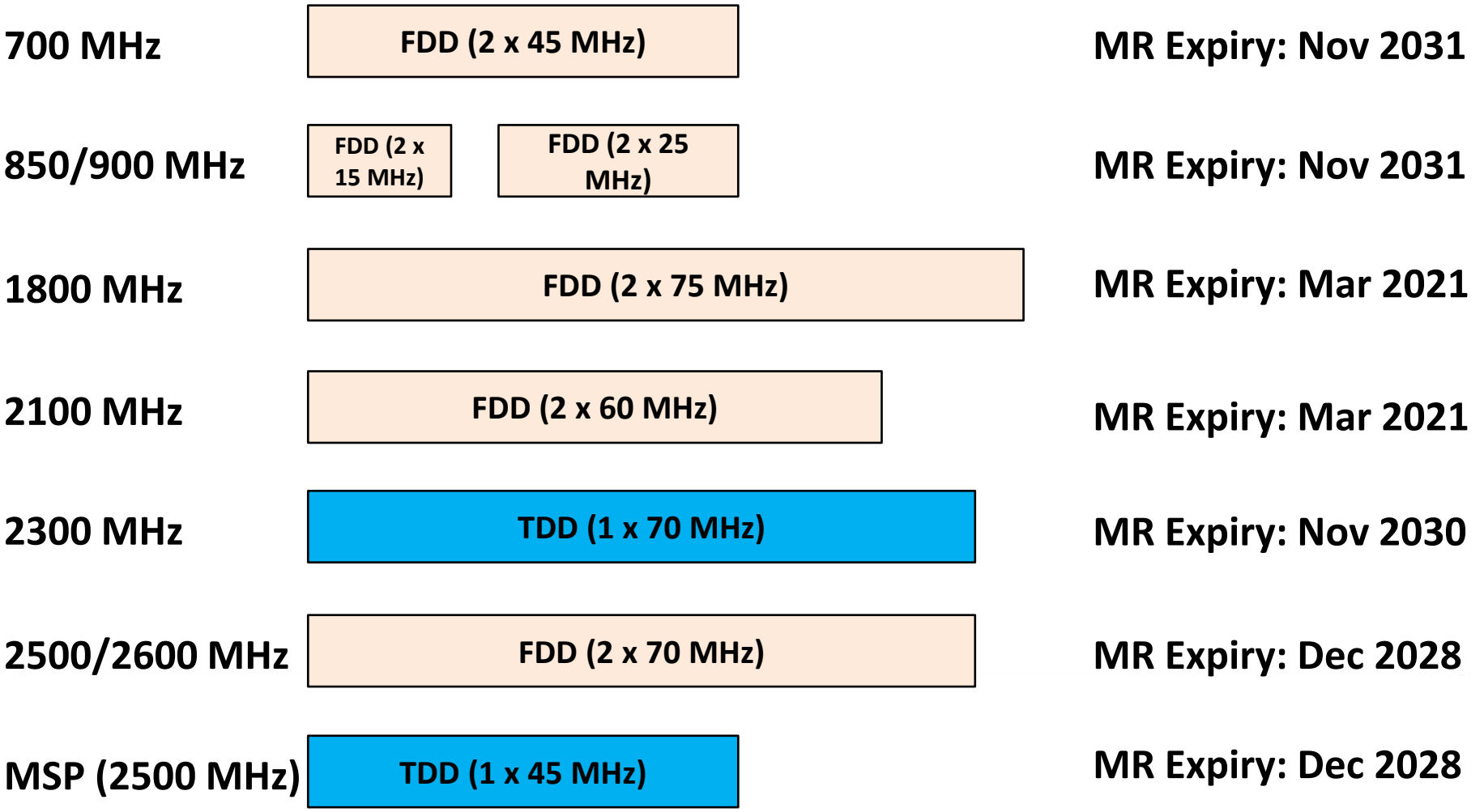
Spectrum Requirements

(Specified by ITU-R recommendation for enhanced mobile broadband case)

- Aggregated system bandwidth requirement is at least 100 MHz
- The Radio Interface shall support bandwidths up to 1 GHz for operation in higher frequency bands (above 6 GHz)

Existing bands used for cellular or fixed wireless

Existing bands in NZ



Candidate bands considered for 5G

New candidate bands with highest chance of international harmonized use for IMT

The main bands internationally being considered for early deployment of 5G:

- 3.5 GHz
- Millimetre wave bands in 26/28 GHz*

Other IMT bands which could be used for 5G:

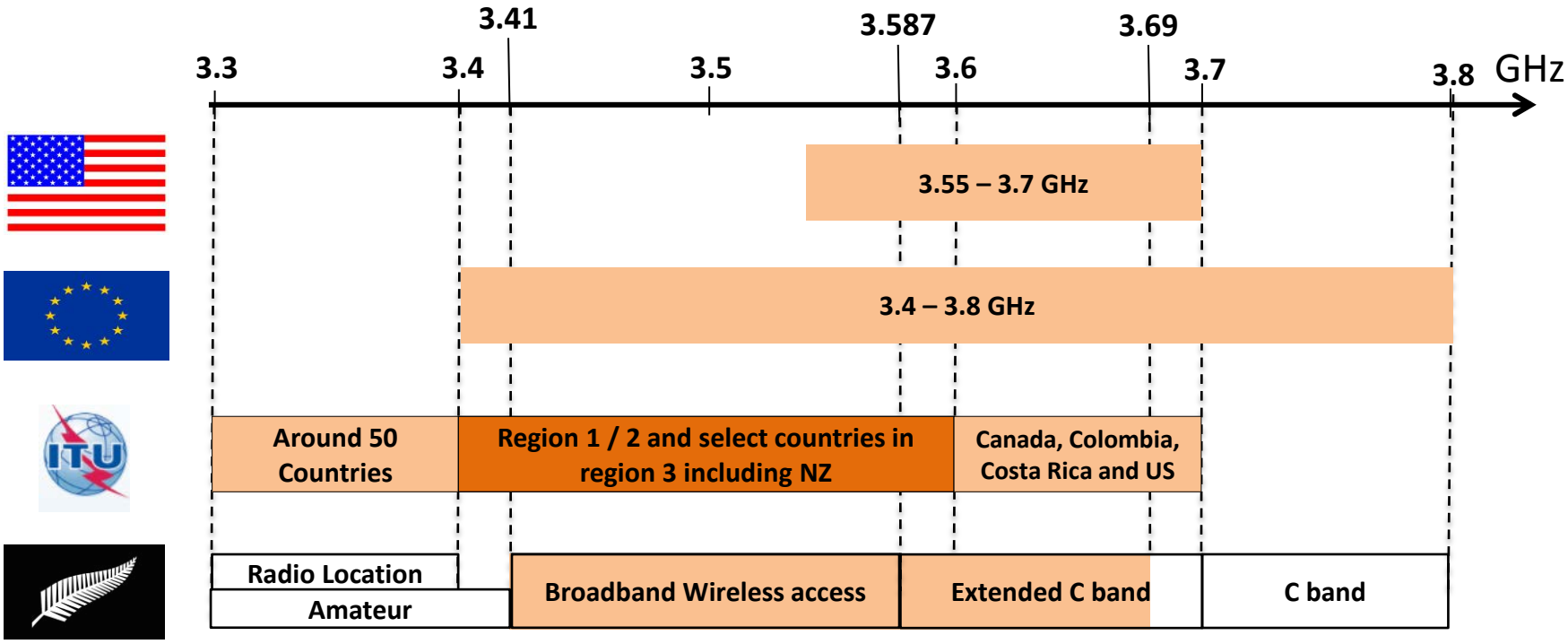
- L band (1427 – 1518 MHz)
- 600 MHz

* 26 GHz band (24.25-27.5 GHz) is one of the bands considered in WRC -19 AI 1.13 for the future development of International Mobile Telecommunications. Other bands also considered are: *31.8-33.4 GHz, 37-40.5 GHz, 40.5-42.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47-47.2 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz, 81-86 GHz*

3.5 GHz Band

International allocation of 3.5 GHz band for IMT use

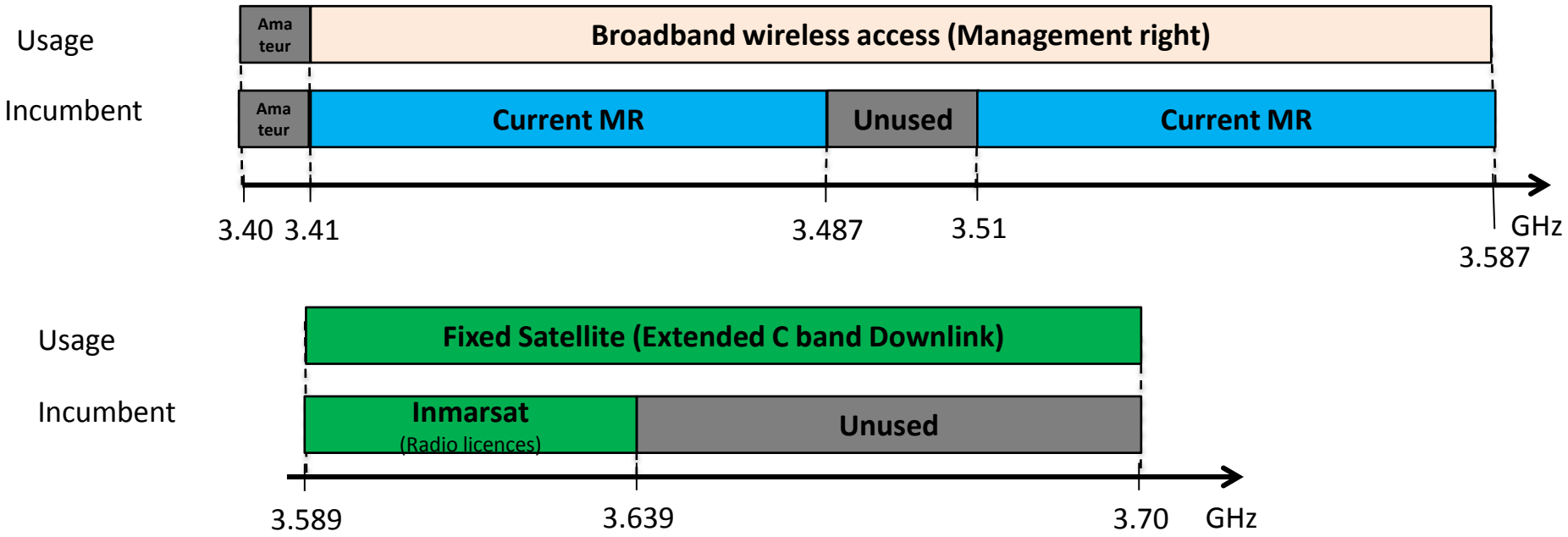
The range 3.3 – 3.8 GHz is being considered. The exact range is still under debate in 3GPP



Allocated / planned for IMT

3.5 GHz band New Zealand current situation

- MRs in 3410 – 3487 / 3510 – 3587 MHz expire in Oct 2022. Incumbents will not be given renewal offers
- In Jan 2017 RSM informed Inmarsat that their receive licence will terminate in Oct 2022

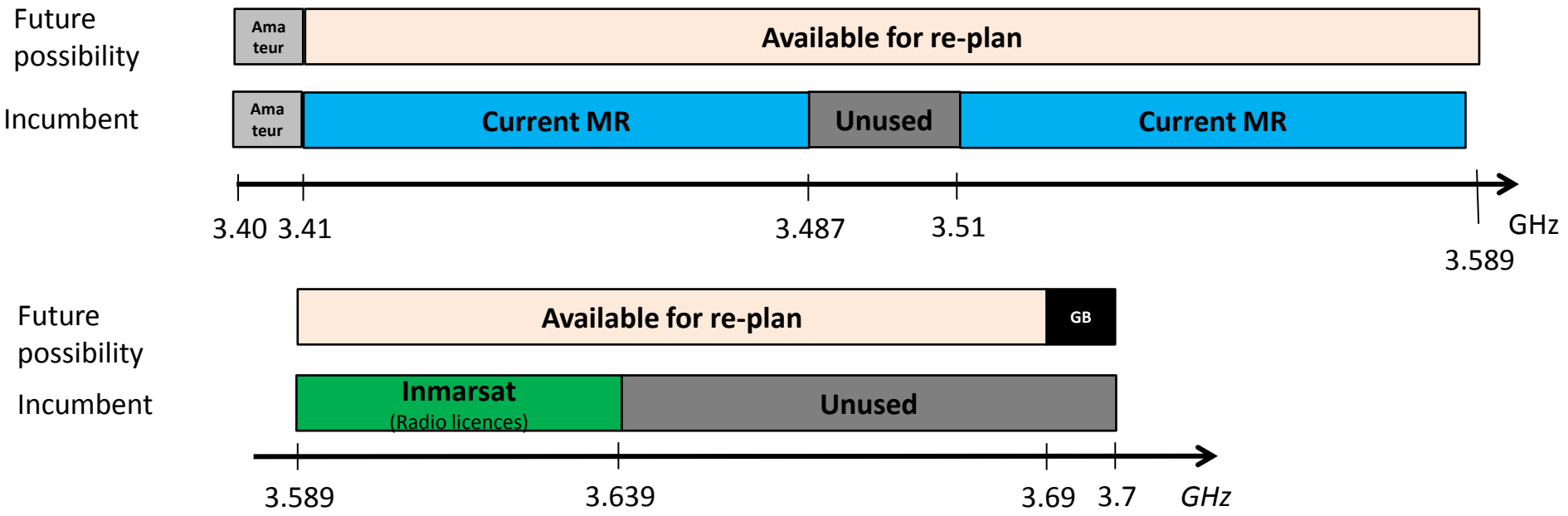


Management right bands Incumbents:

- Crown: 2 x 14 MHz
- Vodafone: 2 x 28 MHz
- Connecta: 2 x 7 MHz
- Spark: 2 x 7 MHz
- Kordia: 2 x 21 MHz

3.5 GHz band New Zealand future possibilities

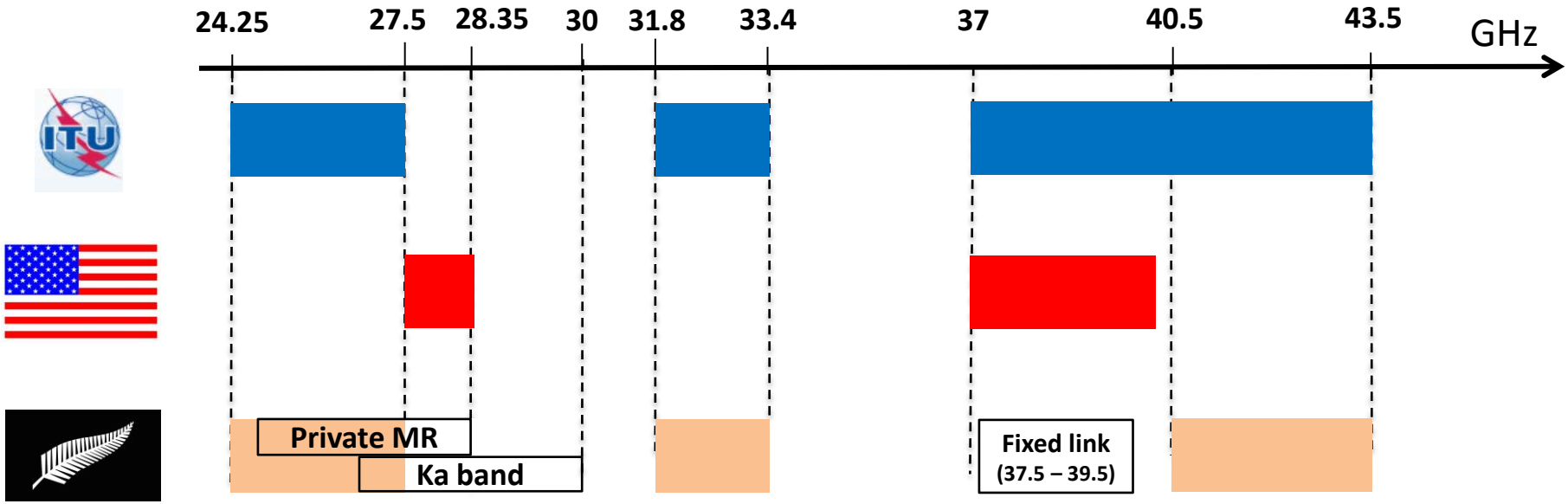
- The range of 3.41 – 3.69 GHz could be considered for IMT post Oct 2022



mm Wave Bands

International situation of allocation of mm wave bands to IMT (24 – 44 GHz)

- Multiple bands under consideration

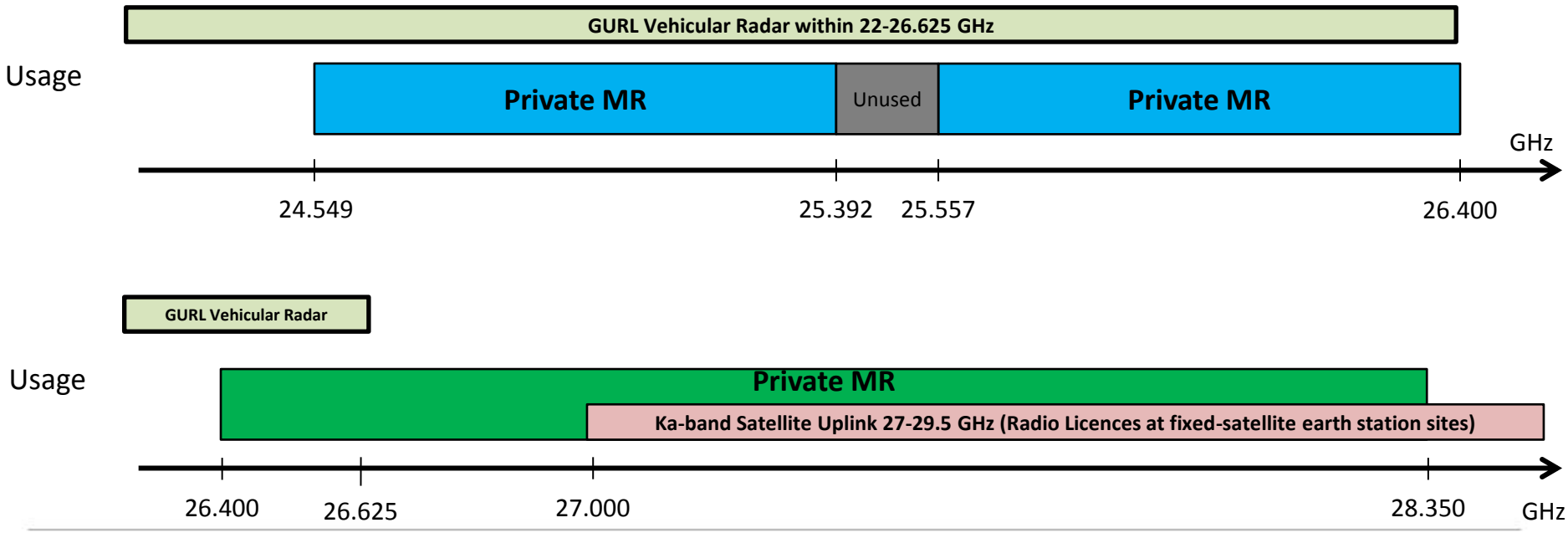


WRC -19 AI 1.13: to consider identification of frequency bands for the future development of International Mobile Telecommunications. Other bands considered above 44 GHz are *45.5-47 GHz, 47-47.2 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz, 81-86 GHz*

New Zealand's preliminary position for WRC–19 AI 1.13

26 / 28 GHz New Zealand current situation

- MRs in 24.549 – 26.4 GHz expire in Oct 2022. Decision on the future of the band pending
- MRs in 26.4 – 28.35 GHz expire in Jan 2018. These MRs are not subject for renewal
- In Jan 2017 RSM informed the satellite uplink licence holders in the range of 27 – 28.35 GHz that the licences granted after Jan 2018 (Expiry of MRs) will have an expiry date of Jan 2020.

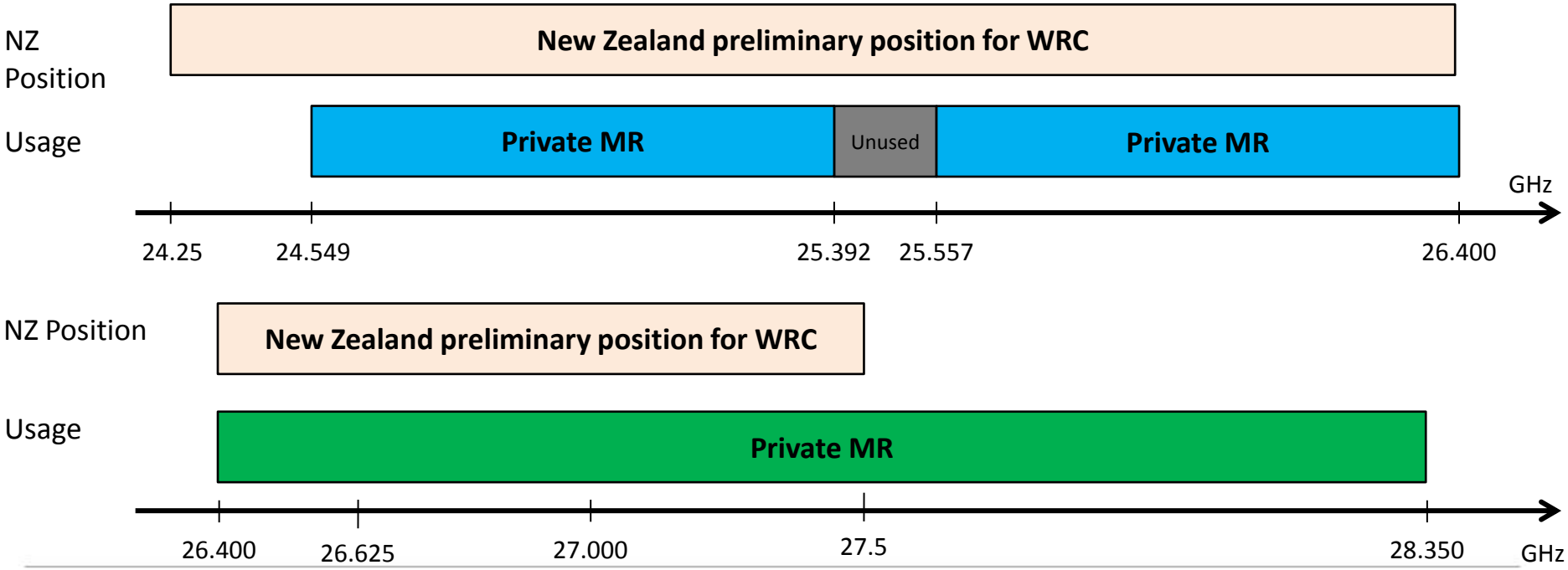


Management right band Incumbents:
- Vodafone: 2 x 336 + 2 x 339 MHz
- Kordia: 2 x 168 MHz

Management right band Incumbents:
- Vodafone: 1 x 1.95 GHz

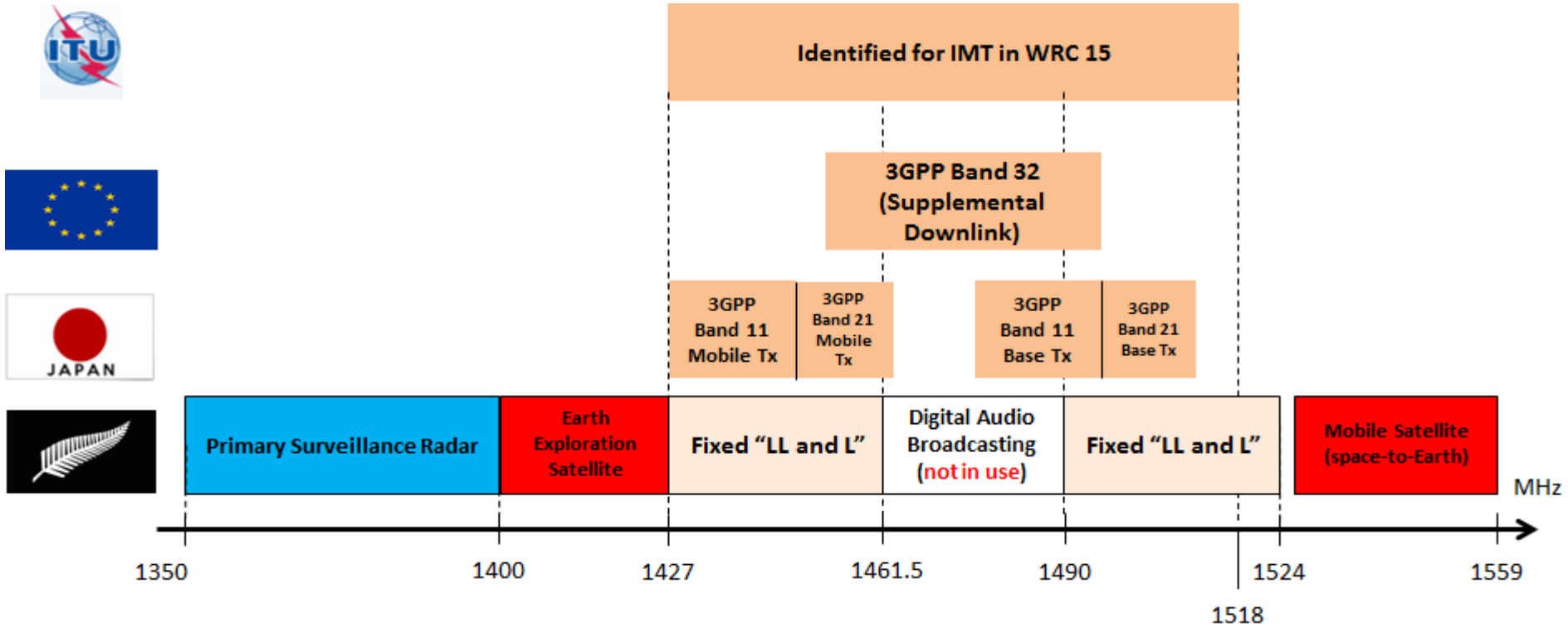
26 / 28 GHz New Zealand future possibilities

- The range of 24.25 – 27.5 GHz is New Zealand's preliminary position for WRC–19 AI1.13



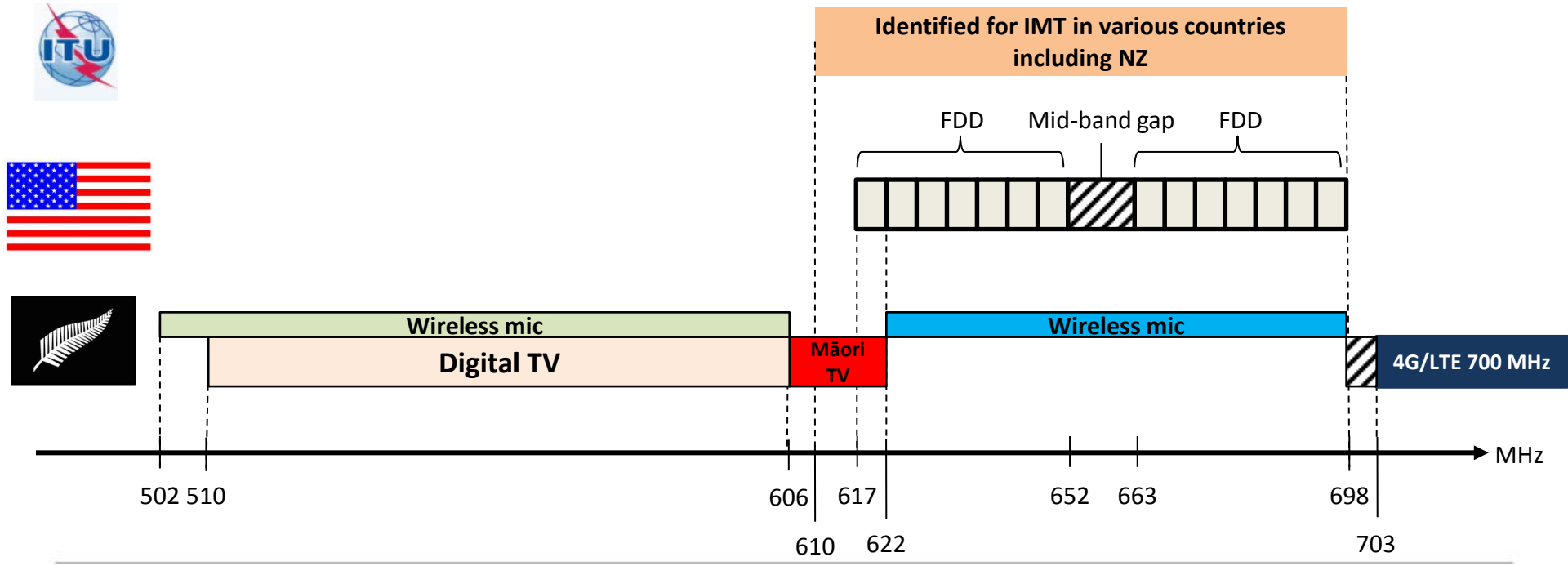
L-band (1427-1518 MHz)

A few options on the table but no clear winner



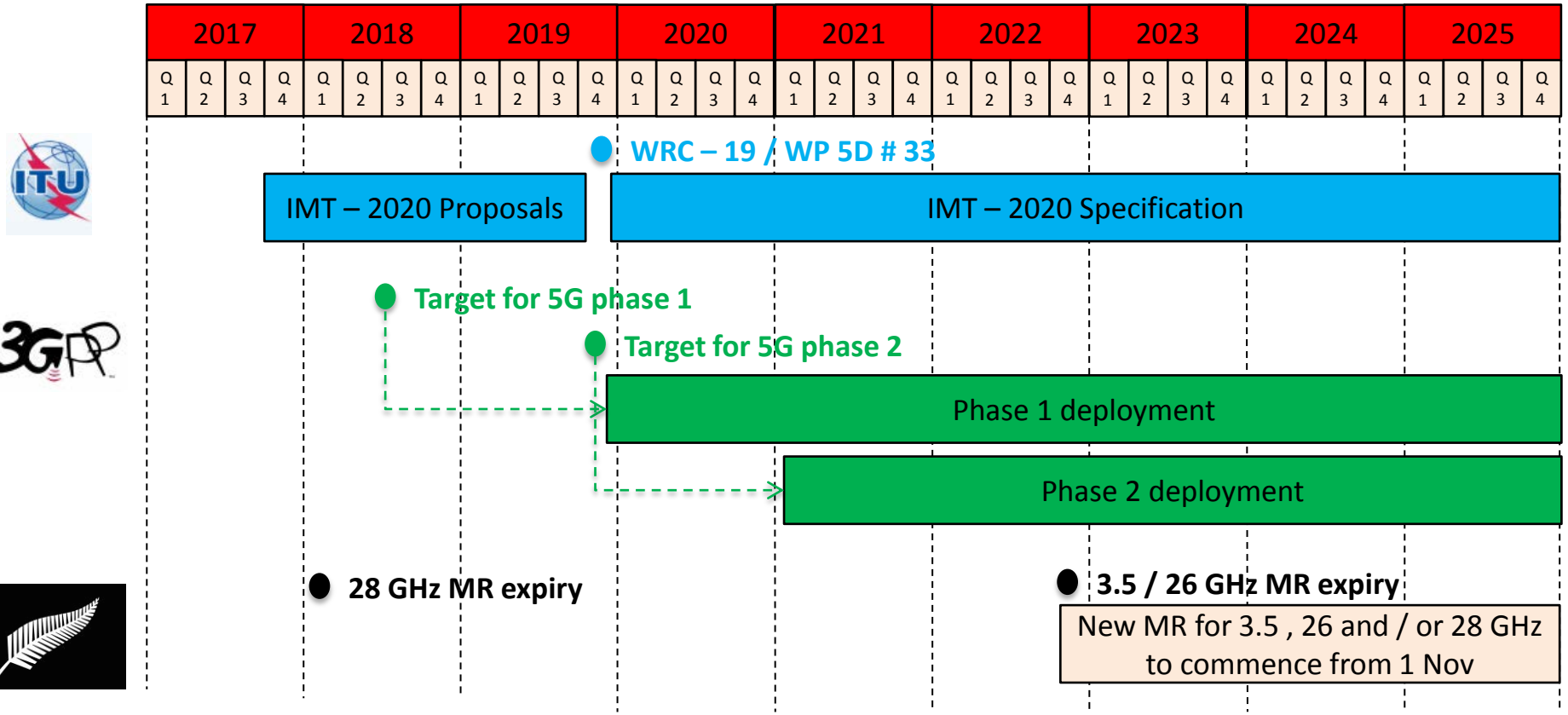
600 MHz band

- In April (2017) the US completed a reversed “incentive” auction for 600 MHz
- Opportunity for New Zealand to think about the future of band



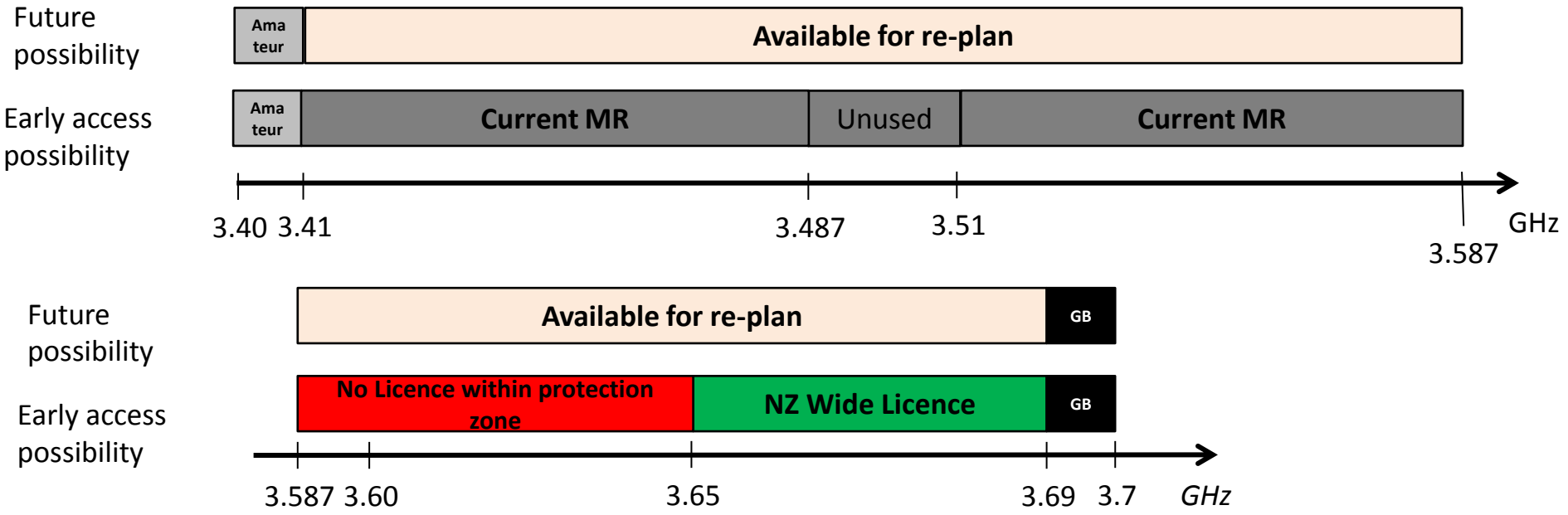
5G timeframe

Notable dates



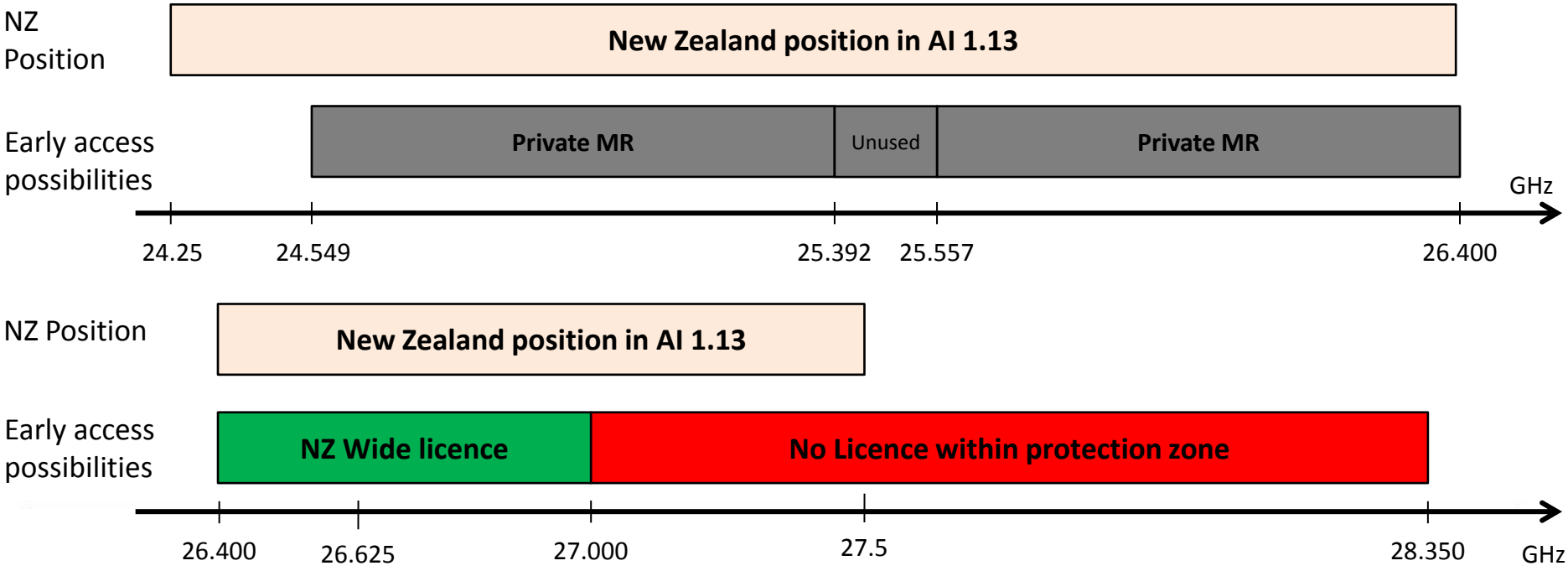
Early access possibilities in 3.5 GHz band

- Early access is possible in the range of 3.587 – 3.69 GHz
- To protect the current satellite incumbent, early access would not be possible within a defined protection zone around the satellite earth station



Early access possibility in 26 / 28 GHz

- Early access is possible in the range of 26.4 – 28.35 GHz after Jan 2018
- To protect the current satellite incumbent, early access would not be possible within a defined protection zone around the satellite earth station



…TIME FOR QUESTIONS & DISCUSSION

Timeframes?

Bands?

Early access?

Scope of the formal consultation?

Non-spectrum issues concerning 5G?

Government-Industry collaboration?

Closing remarks and next steps

Next Steps

- Draft formal consultation document
- Brief incoming Minister
- Formal public consultation
- Analyse responses and develop strategy
- Release 5G strategy document
- Cabinet approval for individual band allocation processes