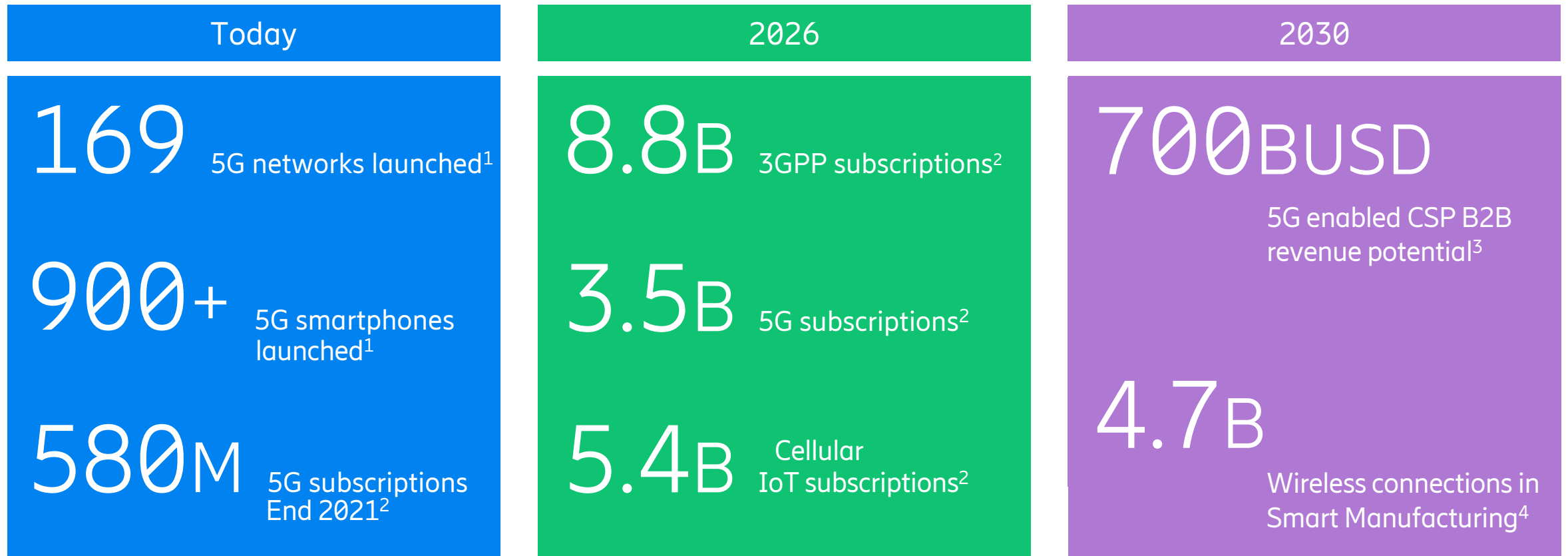


Status of IMT implementation in the L-band

Håkan Ohlsén, Ph.D.
Standards & Industry - APAC
Ericsson Group Function Technology

2021-10-19

Leveraging 5G—global scale, global momentum



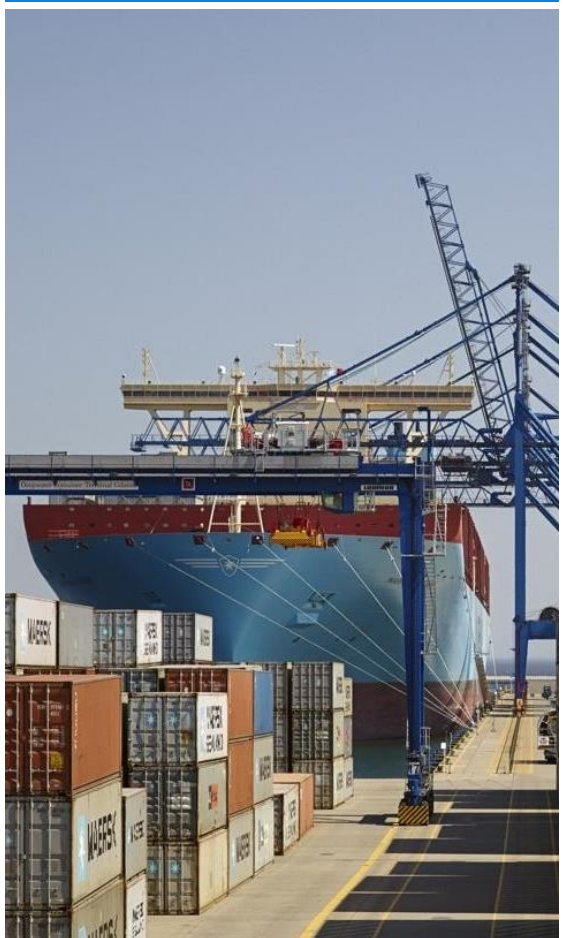
3GPP 5G drives scale and innovation for consumers and enterprises

¹ GSA Aug 21; ² Ericsson; ³ Ericsson & Arthur D Little; ⁴ ABI Research

Industries are digitalizing now



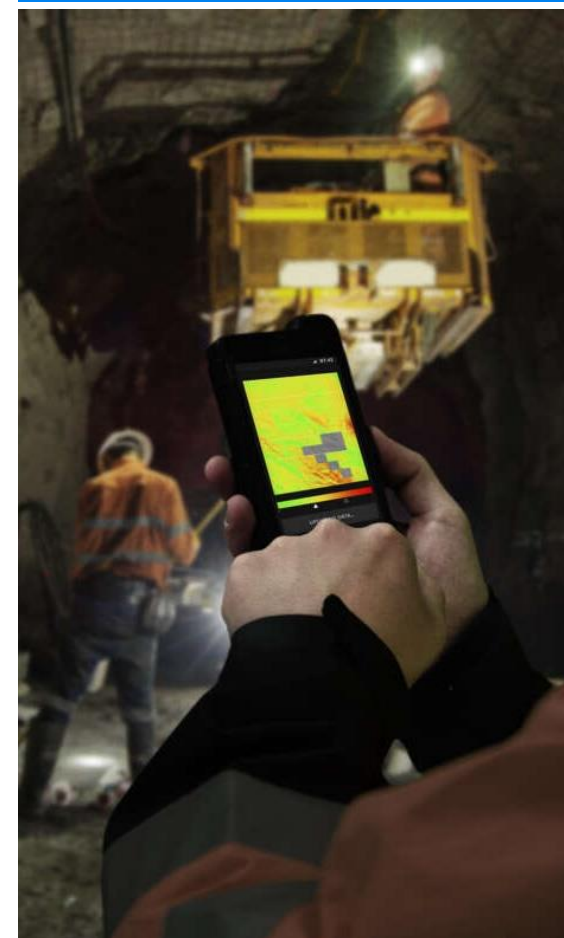
Ports



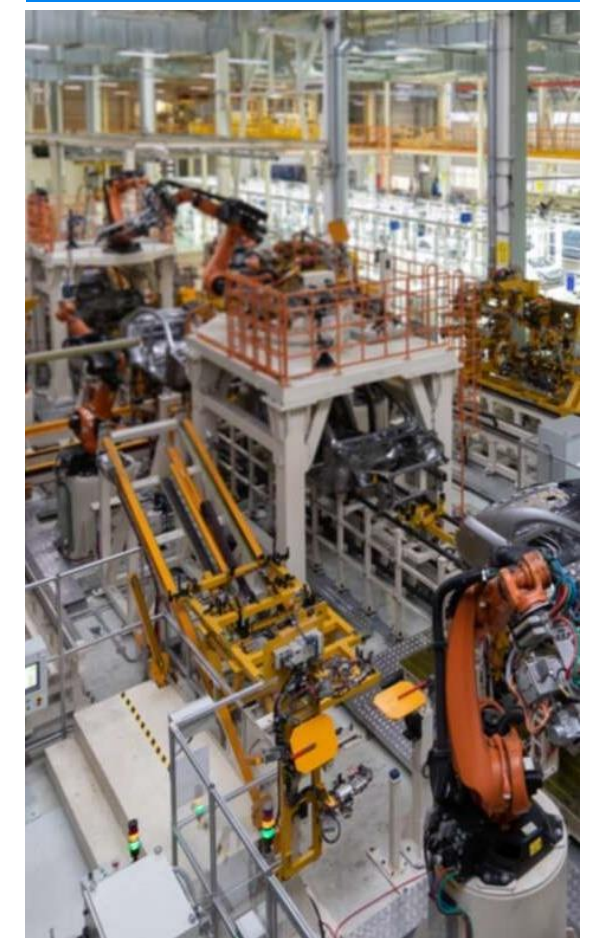
Airports



Mines



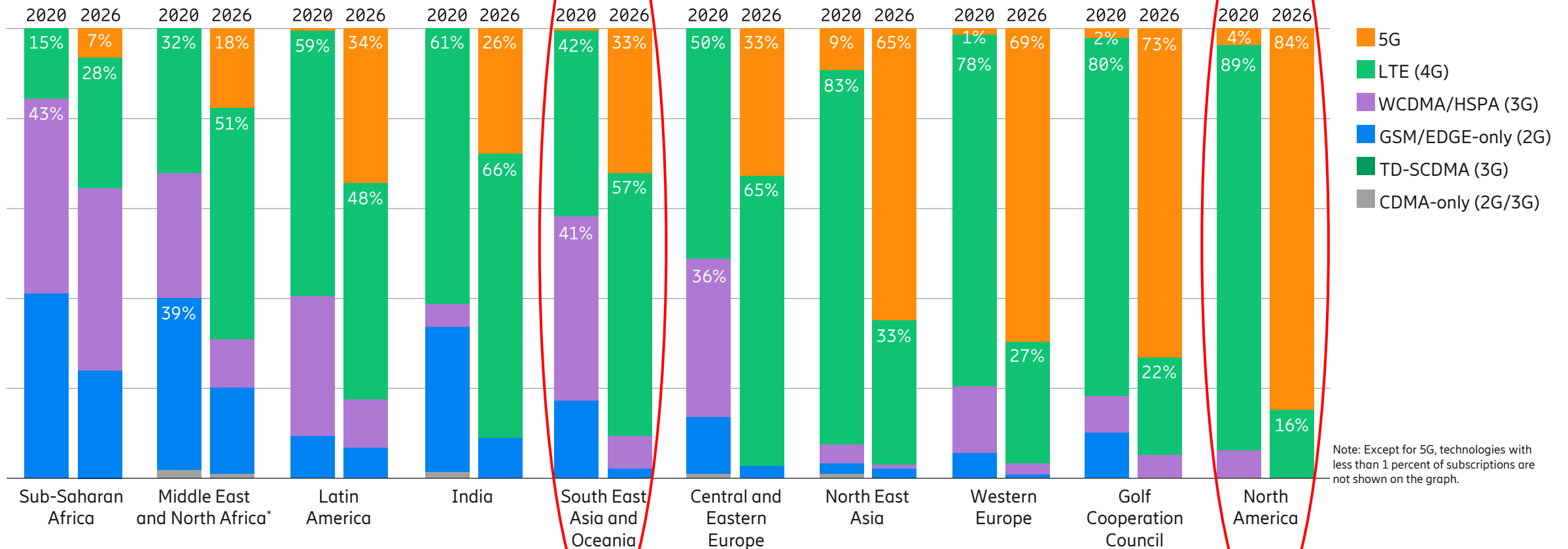
Factories



Large percentage 5G subscriptions by 2026



Mobile subscriptions by region and technology (percent)



Note: Except for 5G, technologies with less than 1 percent of subscriptions are not shown on the graph.



WRC-15 outcome of terrestrial IMT identifications in the 1427 – 1518 MHz band



Region 2	
1427 – 1518 MHz	Region 2

Region 1	
1427 – 1452 MHz	Region 1
1452 – 1492 MHz	53 in Africa & ASMG (16 not)
1492 – 1518 MHz	Region 1
Existing ECC Decisions for MFCN SDL in Europe in 1452 – 1492 MHz	

Region 3	
1427 – 1518 MHz	Region 3
Existing usage; Japan 1427.9-1510.9 MHz	

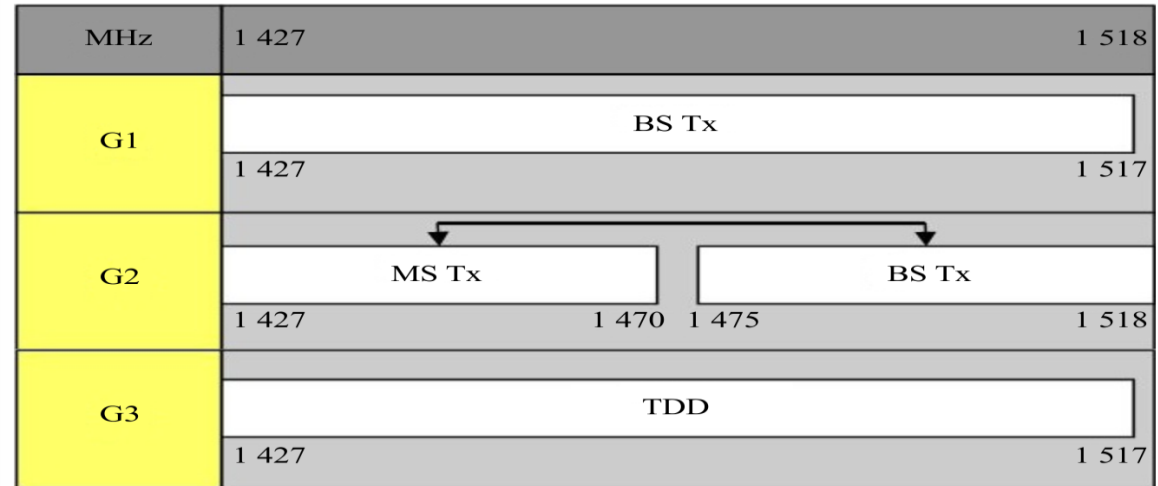


ITU Radio Regulations and Recommendation M.1036-6



1 400-1 427		
EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY		
SPACE RESEARCH (passive)		
5.340 5.341		
1 427-1 429		
SPACE OPERATION (Earth-to-space)		
FIXED		
MOBILE except aeronautical mobile 5.341A 5.341B 5.341C		
5.338A 5.341		
1 429-1 452	1 429-1 452	
FIXED	FIXED	
MOBILE except aeronautical mobile 5.341A	MOBILE 5.341B 5.341C 5.343	
5.338A 5.341 5.342	5.338A 5.341	
1 452-1 492	1 452-1 492	
FIXED	FIXED	
MOBILE except aeronautical mobile 5.346	MOBILE 5.341B 5.343 5.346A	
BROADCASTING	BROADCASTING	
BROADCASTING-SATELLITE 5.208B	BROADCASTING-SATELLITE 5.208B	
5.341 5.342 5.345	5.341 5.344 5.345	
1 492-1 518	1 492-1 518	1 492-1 518
FIXED	FIXED	FIXED
MOBILE except aeronautical mobile 5.341A	MOBILE 5.341B 5.343	MOBILE 5.341C
5.341 5.342	5.341 5.344	5.341
1 518-1 525	1 518-1 525	1 518-1 525
FIXED	FIXED	FIXED
MOBILE except aeronautical mobile	MOBILE 5.343	MOBILE
MOBILE-SATELLITE (space-to-Earth) 5.348	MOBILE-SATELLITE (space-to-Earth) 5.348	MOBILE-SATELLITE (space-to-Earth) 5.348
5.348A	5.348A	5.348A
5.348B 5.351A	5.348B 5.351A	5.348B 5.351A
5.341 5.342	5.341 5.344	5.341

Frequency arrangements for IMT in 1427-1518 MHz



M.1036-04

Note 1: With respect to IMT in the frequency band 1 492-1 518 MHz and the MSS in the frequency band 1 518-1 525 MHz, ITU-R studies are being conducted in accordance with Resolution 223 (Rev.WRC-15) to provide possible technical measures to facilitate adjacent band compatibility. The implementation of the frequency arrangements and the text of this Note may need to be reviewed and revised taking into account the results of these studies, which are intended to be included in ITU-R Reports and ITU-R Recommendations, as appropriate.

Based on the current results of these ongoing studies, one of a number of possible measures to facilitate adjacent band compatibility, is for administrations to consider additional frequency separation below 1 518 MHz at the upper part of G1, G2, or G3 (e.g. a total separation of different values up to 6 MHz). Moreover, when implementing these frequency arrangements, administrations are also encouraged to take into account the results of the compatibility studies, e.g. in order to address IMT-MSS coexistence in certain areas (around seaports and airports, etc.).

Background for Europe on L-band



- **ECC Decision (13)03; “The harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)”**
- Approved 8 November 2013, Amended 02 March 2018
 - In 2002 the 1452-1479.5 MHz was assigned to terrestrial audio broadcasting systems (T-DAB).
 - In 2003 the 1479.5-1492 MHz was assigned to S-DAB
 - In 2010 a study started leading to ECC Report 188 suggesting to use the range for mobile SDL while adapting to specific national circumstances
- **ECC Decision (17)06; “The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)”**
- Approved 17 November 2017, Corrected 2 March 2018
 - CEPT Report 65 was approved recommending frequency arrangement for downlink-only.
 - On EESS in Res 750 (WRC-15/19) and RAS in ITU-R RA.769 below 1427 MHz and MSS above 1518 MHz in Res 223 (WRC-15/19).
 - The range to be made available for MFCN SDL based on least restrictive technical conditions (LRTC)

3GPP arrangements specified for 1427 – 1518 MHz) ≡

- Band 32 = 1452 – 1496 MHz (SDL 44 MHz, LTE only)
- Band 75 = 1432 – 1517 MHz (SDL 85 MHz, LTE + NR (BW 5-50MHz))
- Band 76 = 1427 – 1432 MHz (SDL 5 MHz, LTE + NR)

- Band 50 = 1432 – 1517 MHz (TDD 85 MHz, LTE + NR (BW 5-80MHz))
- Band 51 = 1427 – 1432 MHz (TDD 5 MHz, LTE + NR)

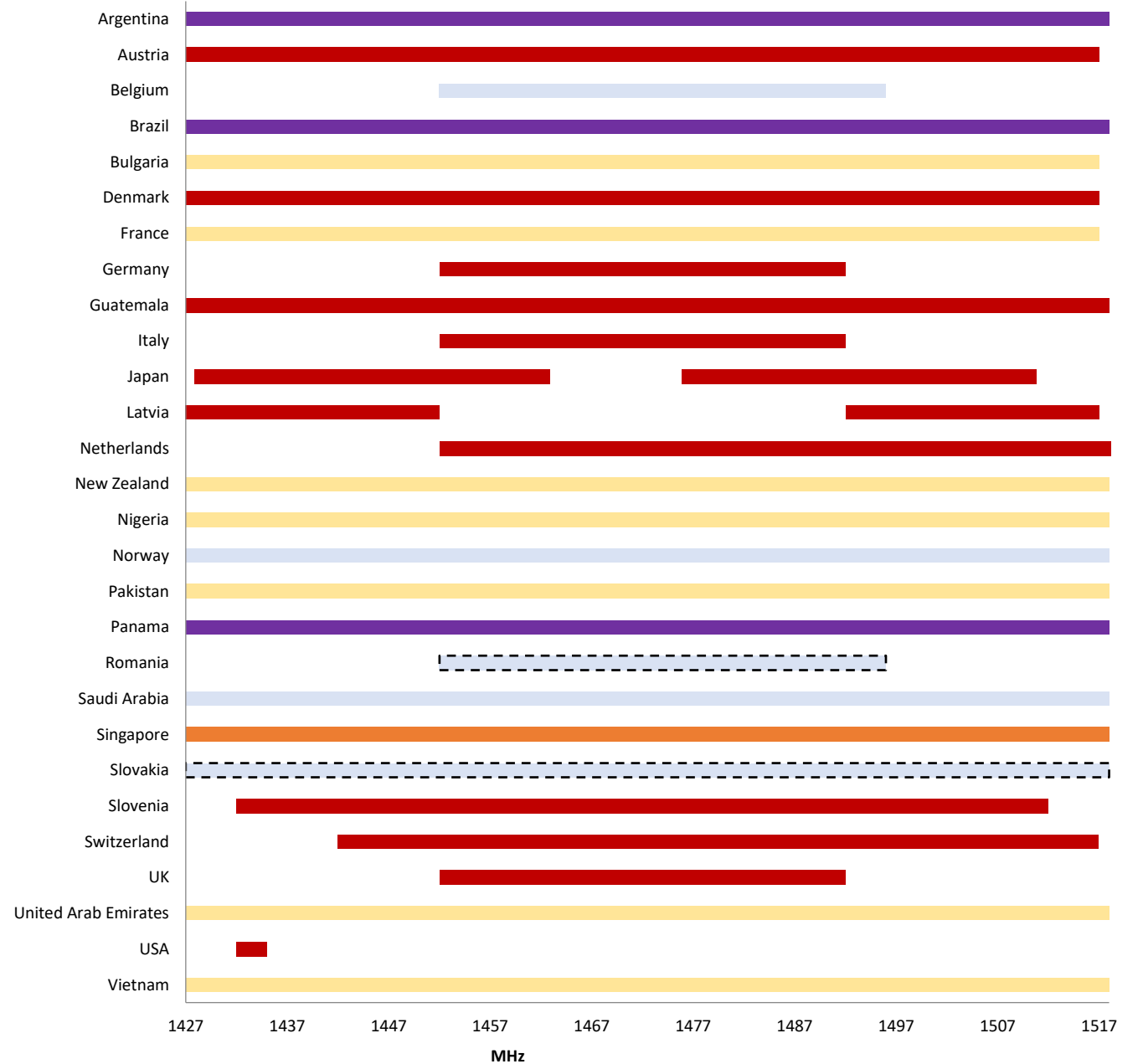
- Band 11 = 1427.9 – 1447.9 / 1475.9 – 1495.9 (FDD 2x20 MHz, LTE only)
- Band 21 = 1447.9 – 1462.9 / 1495.9 – 1510.9 (FDD 2x15 MHz, LTE only)
- Band 74 = 1427 – 1470 / 1475 – 1518 MHz (FDD 2x43 MHz, LTE + NR (BW 5-20MHz))



Global Status

- Assigned *
- Planned assignment*
- Considering/consulting on options
- Temporarily assigned to test/trial
- Reserved for future assignment (public networks)
- Precise range to be confirmed

* Nationwide or regional individual licensing for public mobile or FWA networks



Ecosystem development of the L-band (1427 – 1518 MHz)



GSA information;

Band 32 – LTE devices = 298

Band 32 – 5G devices = 294

Bands 11/21/74/75/76 or 50/51 = **nothing listed yet, but GSA has started investigating**

Licences awarded in 12 countries;

Austria, Denmark, Germany, Guatemala, Italy, Japan, Latvia, Netherlands, Slovenia, Switzerland, UK, USA.

Auctions planned for 5 countries;

Belgium, Norway, Romania, Saudi Arabia, Slovakia.

Infrastructure equipment exist and is also being designed. SDL combinations with UL bands needed

ASMG Chairman Tariq Al Awadhi
ASMG = TDD Band 50/51





L-band allocation to mobile operators in Japan



Number of LTE Radio Base Stations (as of March 2020)

Docomo	30,187
KDDI	11,000
SoftBank	9,580



Band 21

Apple, Samsung, Sharp, Sony

Band 11

Apple, HTC, Sharp, Sony

Band 11

Apple, HTC, Huawei, LG, Sharp, Sony, ZTE,

Summary & Some Considerations on L-band



- 5G is taking off with ever-fast speed—3.5 billion 5G subscribers in 2026
- 5G is the pillar for digital transformation, enhanced mobile broadband, and FWA
- 5G will continue to contribute to GDP growth, new businesses and use cases with new jobs

- Three options available for 1427-1518MHz (L-band); supplemental downlink SDL, FDD and TDD.
- Opportunity for “deep coverage”; SDL - complement combined with other bands 800MHz/2GHz, FDD - new band with good UL performance, TDD - flexible UL/DL ratio but with synch requirements
- Ecosystem is growing for SDL, FDD sofar only in Japan but with good ecosystem, TDD on its way in ASMG countries
- Take into account national needs for usage considering current situation of 4G/5G and future

Consider the L-band in ASEAN countries on a regional basis seeking harmonization to maximize the benefits of economies of scale and avoid cross-border issues.

