


5G SPECTRUM STRATEGY

AUGUST 2017

The background of the slide features a stylized, glowing image of The Flash superhero in his red and yellow suit, running forward with a determined expression. The lighting is dramatic, with horizontal streaks of light behind him, suggesting speed and motion. The overall color palette is dominated by reds, yellows, and blacks.

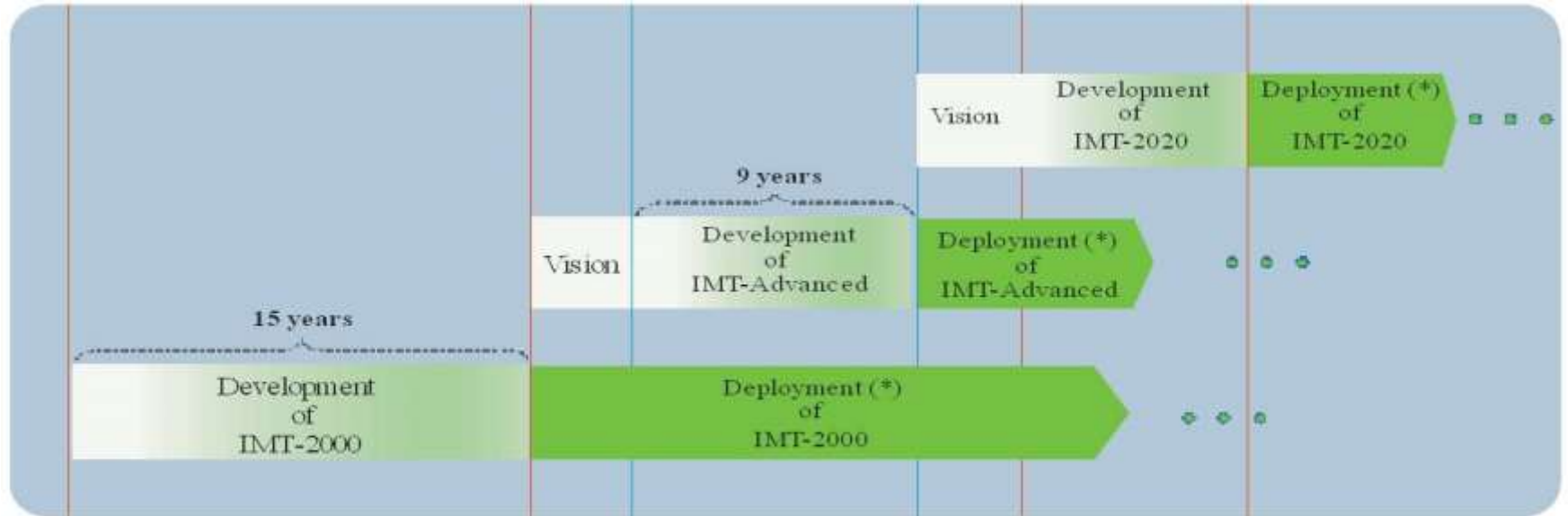
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Chair, ITU-R WP5D SWG PPDR
Chair, AWG Task group on PPDR
Director and Head of International
Spectrum Motorola Solutions Inc.

What is 5G

5G, (short for fifth generation) is the new mobile broadband technology that is in the early stages of development and likely to be in place in the coming years. In the ITU terminology it is called IMT-2020. ITU has invited candidate technologies for IMT-2020 and based on the evaluation process, the official standard will be selected and released around 2019-20

	1G	2G	3G	4G	5G
RAN	AMPS,NMT,TACS	GSM/GPRS, DAMPS, cdmaOne	WCDMA/CDMA2000/ EVDO/HSPA+	OFDMA,/MIMO	??, CloudRAN, Massive MIMO, mmWave
CORE	Circuit Switched	Circuit Switched	Circuit & Packet Switched	Fully IP	Fully IP, Virtualised
User Svcs	Analogue Voice Phone calls	Digital Voice Phone calls, SMS, Packet Data	Digital Voice Phone calls, Mobile Internet	Mobile Broadband Services, Internet. Video , TV,	Enhanced Mobile Broadband, Video , M2M, Voice???
UE	Voice phones		Voice & Data phones Smartphones		Smartphones, Tablets Sensors, autonomous vehicles, Wearbles,??
	1980's	1990's	2000's	2010's	2020's

Time lines for development of 5G – IMT2020



ITU
1985 Adopted
FPLMTS

2000
IMT-2000
Rec. ITU-R
M.1457

2003
Vision
Rec. ITU-R
M.1645

2012
IMT-Advanced
Rec. ITU-R
M.2012

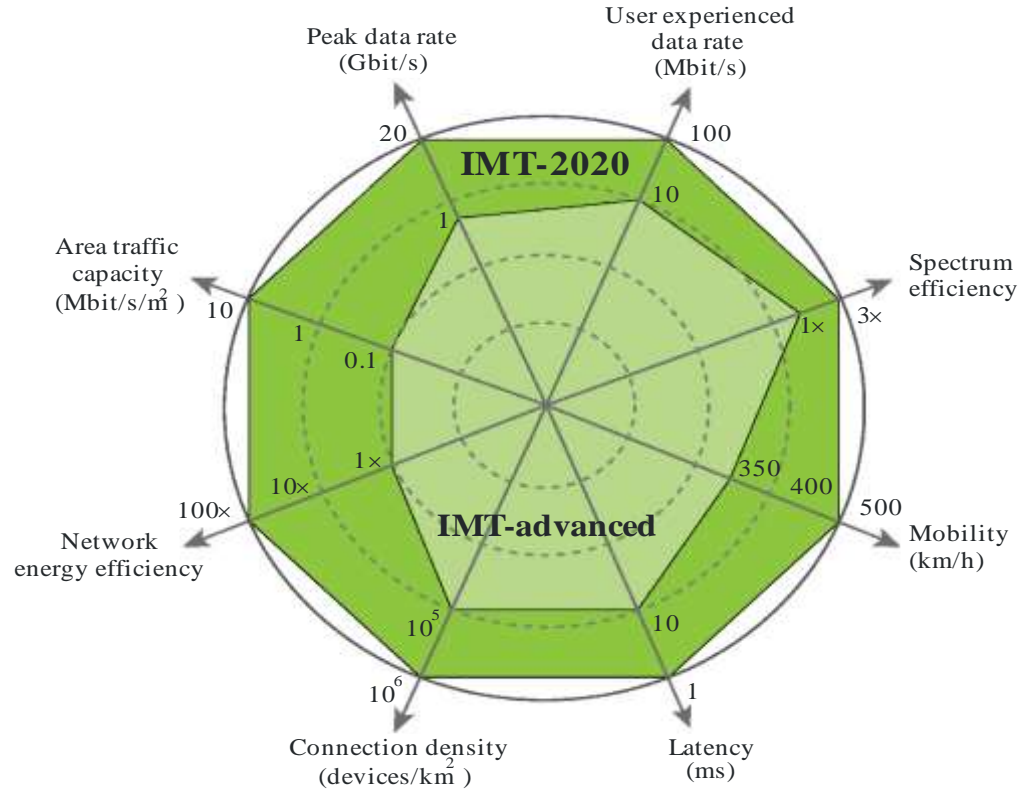
2015
IMT-2020
Vision

2020
IMT-2020



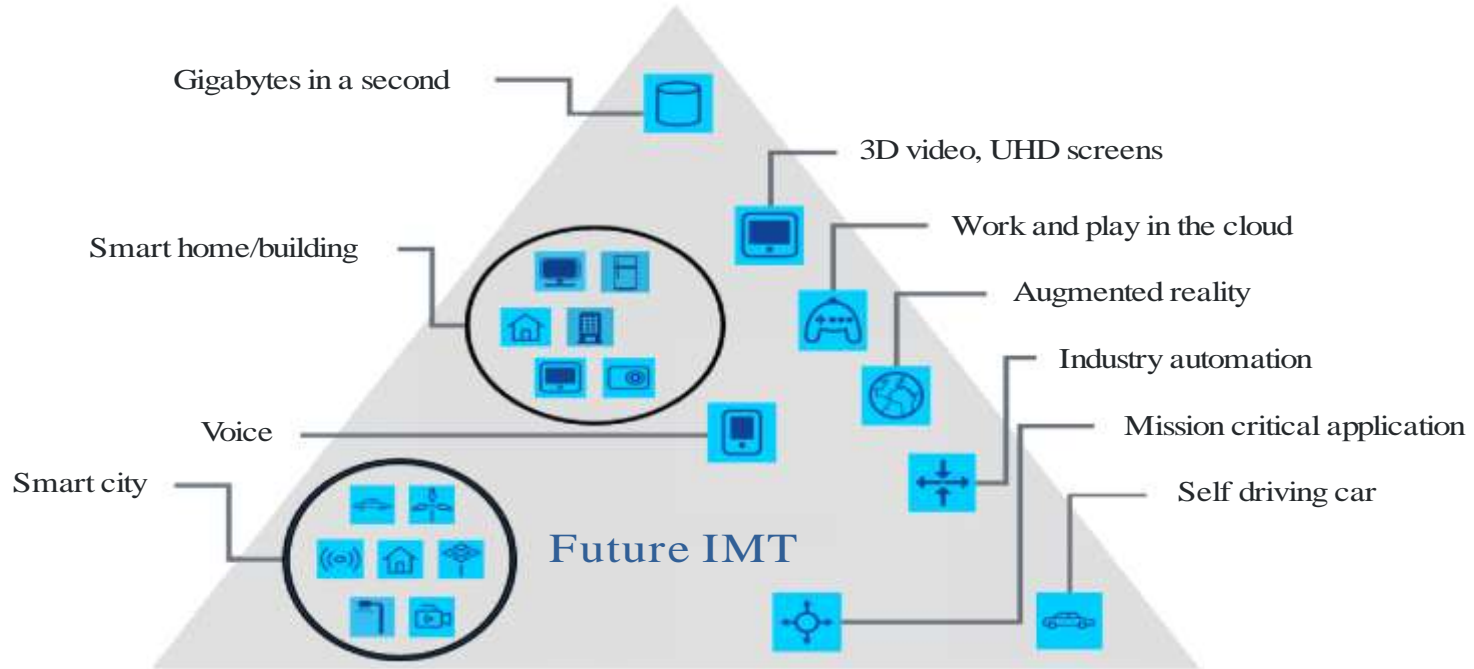
Goals for 5G

- 100 times higher system capacity;
- 10-100 times increase in data rates;
- User data rates of 100 MBPS
- Peak data rate of 20 GBPS
- connectivity enablement for 100-times more devices
- latency reduced to 1 millisecond from 5 ms;
- 100 x Network energy efficiency



5G use cases

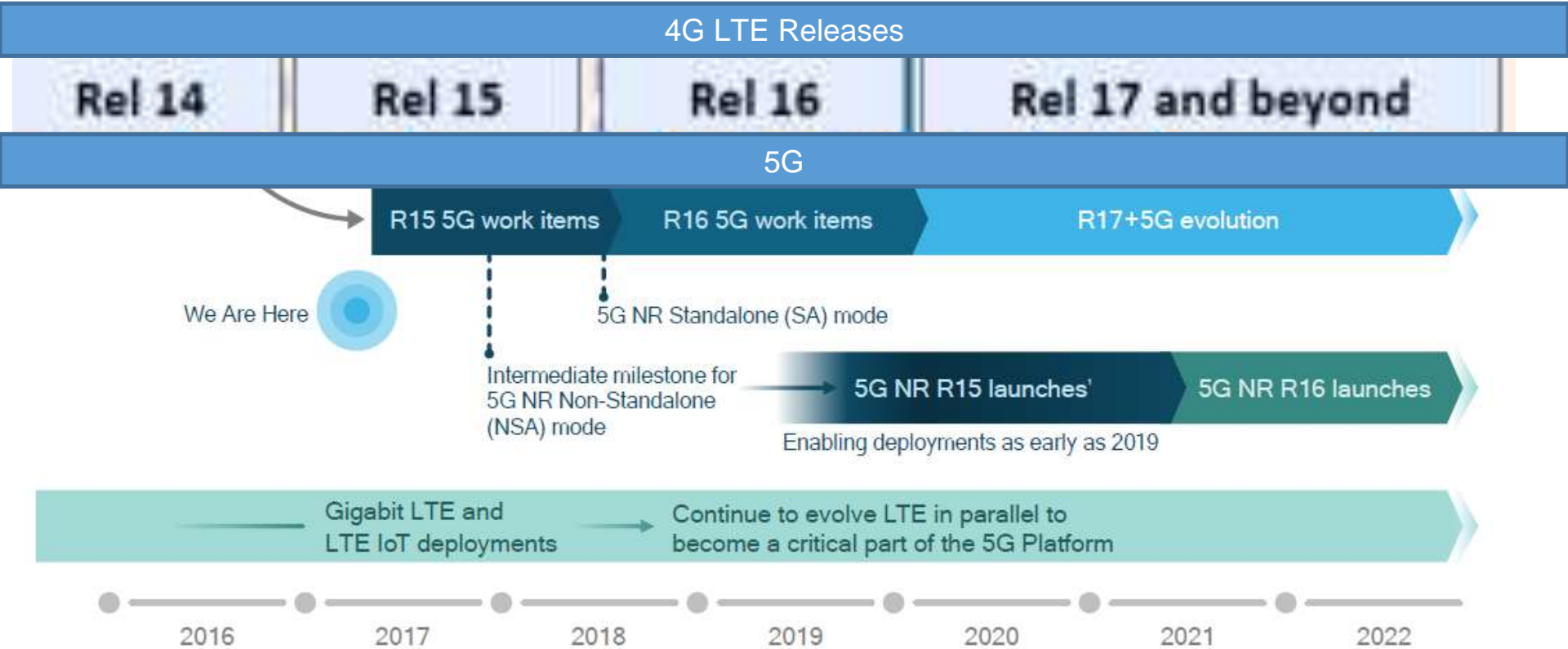
Enhanced mobile broadband



Massive machine type
communications

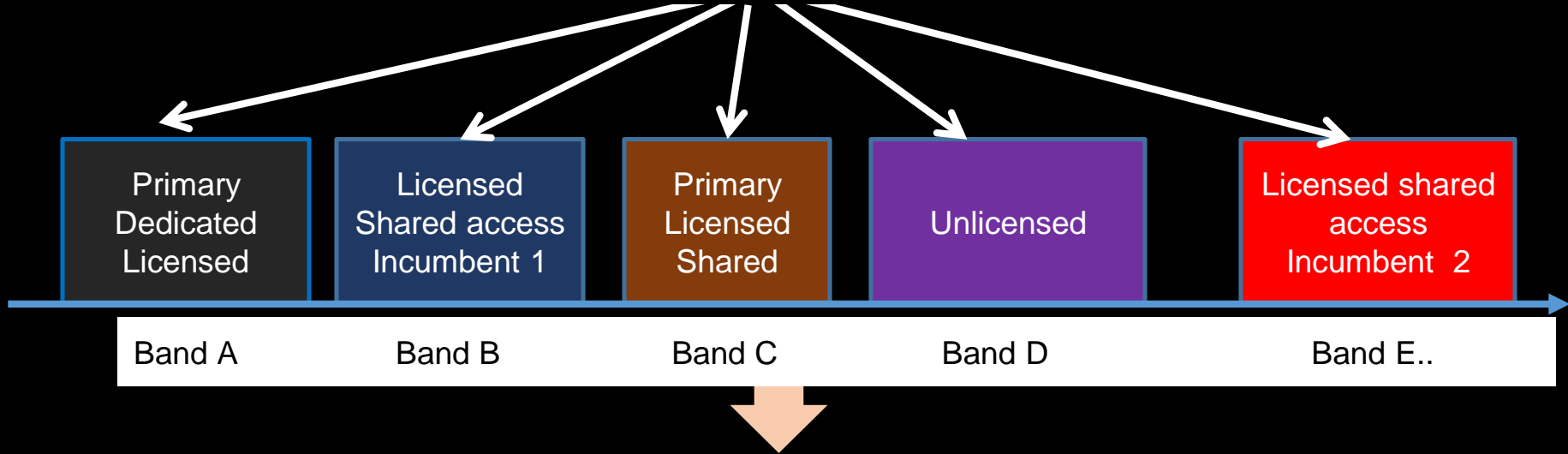
Ultra-reliable and low latency
communications

5G Technology Development by 3GPP



Spectrum Regulation for 5G will be Different

MULTIPLE SPECTRUM BANDS WITH DIFFERENT REGULATORY MODELS



“Toolbox” of different spectrum categories will be required for 5G

Role of Different Bands in 5G

URBAN



SUBURBAN



RURAL



24-70 GHz
Typical Bandwidth ~1 GHz

**HOTSPOT / CAPACITY
LAYER**

C Band

**CAPACITY
LAYER**

Below 3 GHz

**BASIC COVERAGE
LAYER**

C-Band and 24-40 GHz are expected to be Global 5G Bands

C Band (3400-3600 MHz) will be the first Global 5G Band

✓ Americas

✓ EU

✓ MEA

✓ Asia Pac



Americas

28.37/39/66 GHz

EU

26 GHz

Japan

30-50 GHz

Korea

28/38

24-40 GHz Bands are likely to be the initial 5G bands above 6 GHz

IMT BASIC COVERAGE BANDS

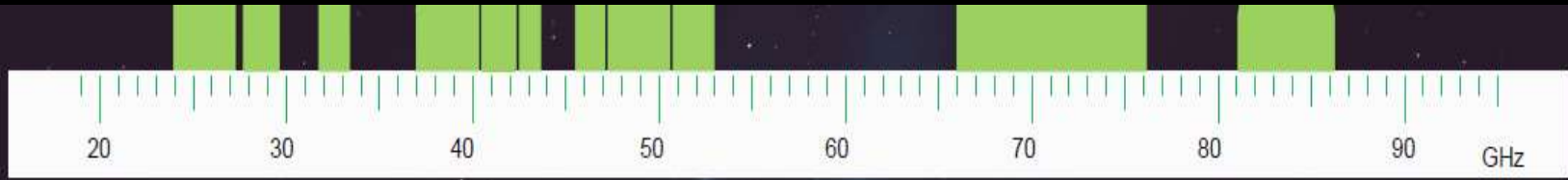
Band	Region 1	Region 2	Region 3
450 MHz	450-470 MHz	450-470 MHz	450-470 MHz
700 MHz	698-790 MHz	698-806 MHz	698-806 MHz
800 /900 MHz	790-960 MHz	806-960 MHz	806-960 MHz
1400 MHz	1427-1518 MHz	1427-1518 MHz	1427-1518 MHz
2GHz	1710-2170 MHz	1710-2150 MHz	1710-2170 MHz
2.6 GHz	2500-2690 MHz	2500-2690 MHz	2500-2690 MHz

Below 3 GHz

**BASIC COVERAGE
LAYER**

WRC -19 will consider 24-86 GHz bands for 5G

Group	WRC-19 Agenda Item 1.13 Bands
Group 30	24.25 GHz – 27.5 GHz
Group 40	37 – 43.5 GHz
Group 50	45.5 – 50.2 GHz/50.4 – 52.6 GHz
Group 60	66 – 76 GHz
Group 80	81 – 86 GHz



24-40 GHz Bands are likely to be the initial 5G bands above 6 GHz

Questions

