



# NDIA ATC Meeting Commercial Liaison Report

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# AGENDA

- News (Mergers/Acquisitions/Spin Offs/Announcements)
- Advancing Instrumentation in the 5G Era
- PXI, VXI, AXIe, LXI Refresh

# News

- Rohde & Schwarz -July 1, 2017 announced Andreas Pauly, as executive VP of the Test and Measurement Division. He was also appointed to the board of directors.
- Avera - May 18, 2017 announced a strategic partnership with MaxEye Technologies to distribute MaxEye's digital video and audio signal-generation toolkits.
- Keysight Technologies - Jan 30 , 2017 purchased Ixia in a move to expand its software-centric business.
- Remcom - May 11, 2017 announced a partnership with P3 group GmbH to provide a comprehensive solution for test and measurement combined with EM modeling and simulation.
- Infinite Electronics Inc. -May 2, 2017 , a supplier of engineering-grade wired and wireless connectivity products, has acquired Smiths Interconnect's Microwave Telecoms business (SMT) from Smiths Group plc.
- Keysight Technologies Inc. and Spreadtrum Communications - April 27, 2017 - announced a joint Innovation Center, located in Shanghai.
- Analog Devices - Mar 30, 2017 announced the acquisition of OneTree Microdevices Inc. a supplier of mixed-signal solutions for cable access.

# Trends in Test

- **Reconfigurable Instrumentation**
  - Test systems are reconfigured for many reasons – from adapting to new test requirements to accommodating instrument substitutions during calibration and repair cycles.
- **Optimizing Test Organizations**
  - Transforming a test organization into a strategic asset requires commitment to a long-term phased approach from creating standard test platforms to building a data infrastructure to improving decision making.
- **Software-Centric Ecosystems**
  - The software-centric nature of technology can transform the capability of automated test systems to help drive increased levels of productivity and collaboration.
- **Managed Test Systems**
  - As Moore’s law continues to influence the performance of test systems, new data and communication technologies help test managers optimize their test systems to lower the cost of test.
- **Driven by Necessity**
  - Safety regulations and software are pushing hardware-in-the-loop testing to the forefront of transportation manufacturing in an increasingly software-driven world.

# From 1G to 5G

How Moore's Law is Advancing  
Instrumentation in the 5G Era



# The Proliferation of Wireless Adds Complexity

AMPS

GSM through EDGE

UMTS through HSPA+

LTE

5G

802.11-1997

802.11a/b

802.11g

802.11n

802.11p

802.11ac

802.11ad

802.11ax

Bluetooth

Bluetooth Extended Data Rate (EDR)

Bluetooth High Speed (HS)

Bluetooth Low Energy (LE)

1980

1990

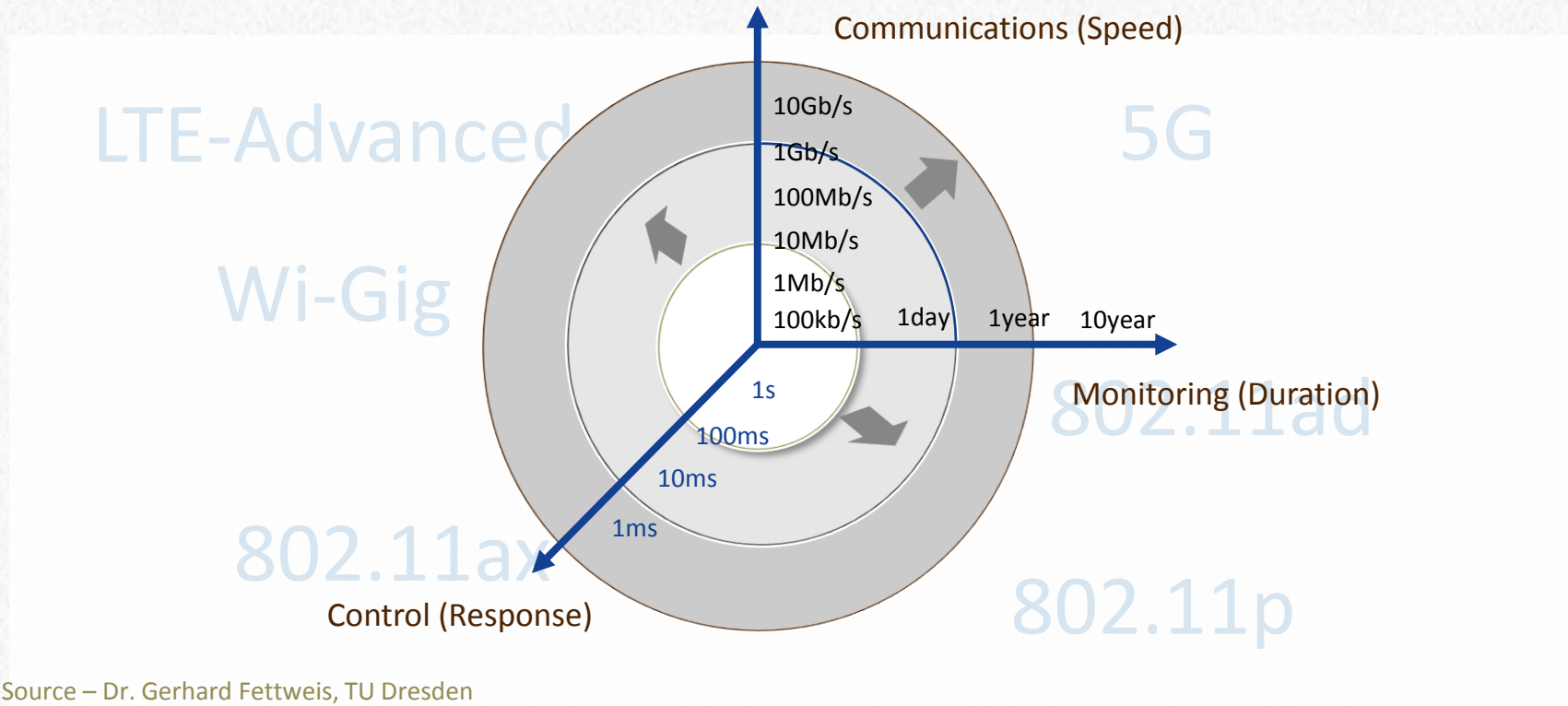
2000

2010

2020



# The Next Frontier of Wireless



# FCC Embraces mmWave

FCC issued a Notice of Proposed Rule Making (NPRM) that proposes new flexible service rules among the 28 GHz, 37 GHz, 39 GHz, and 64-71 GHz bands.

## Bands Above 24 GHz for Possible Mobile Use

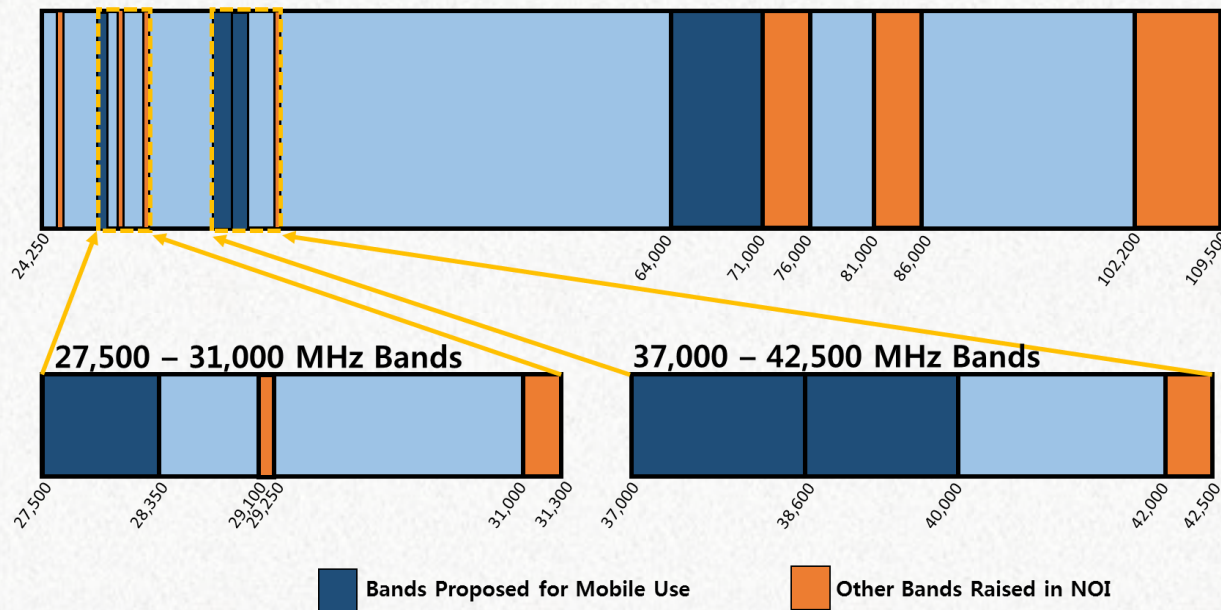


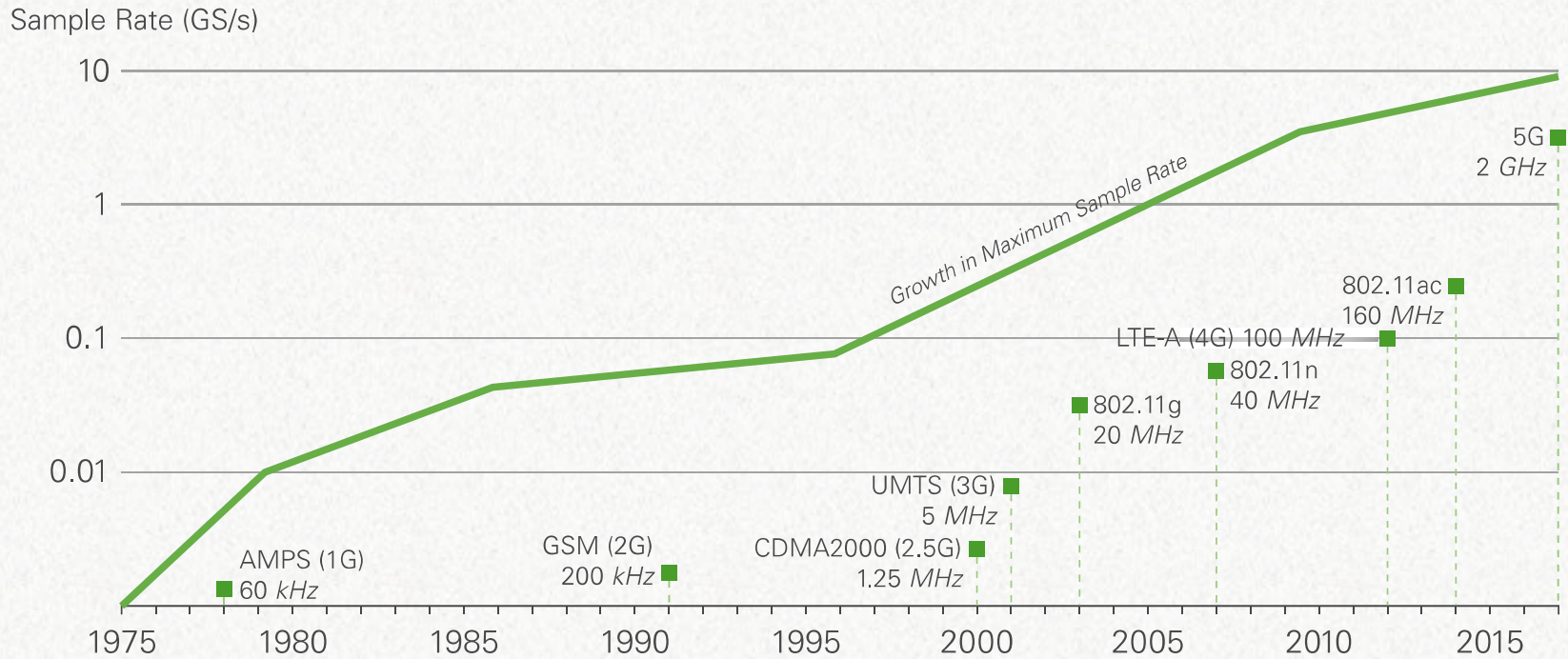
Image Source: FCC 15-138, Page 12, Oct 23, 2015

<https://www.fcc.gov/document/fcc-promotes-higher-frequency-spectrum-future-wireless-technology-0>

Oct 23, 2015

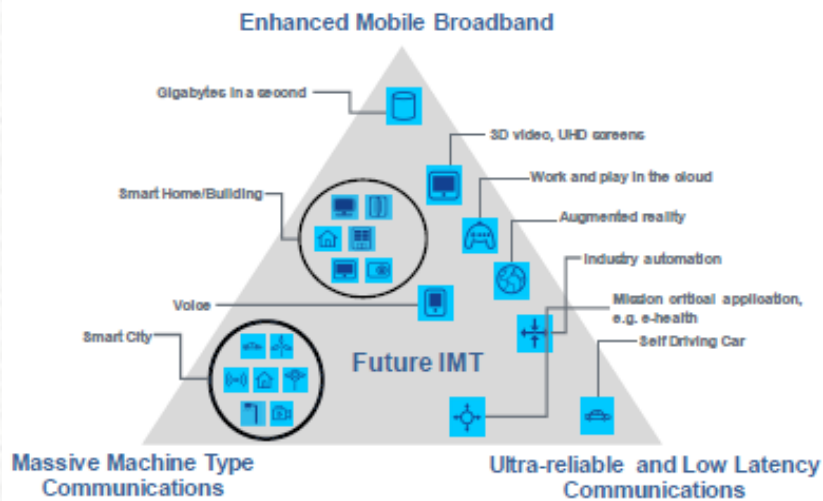


# From 1G to 5G

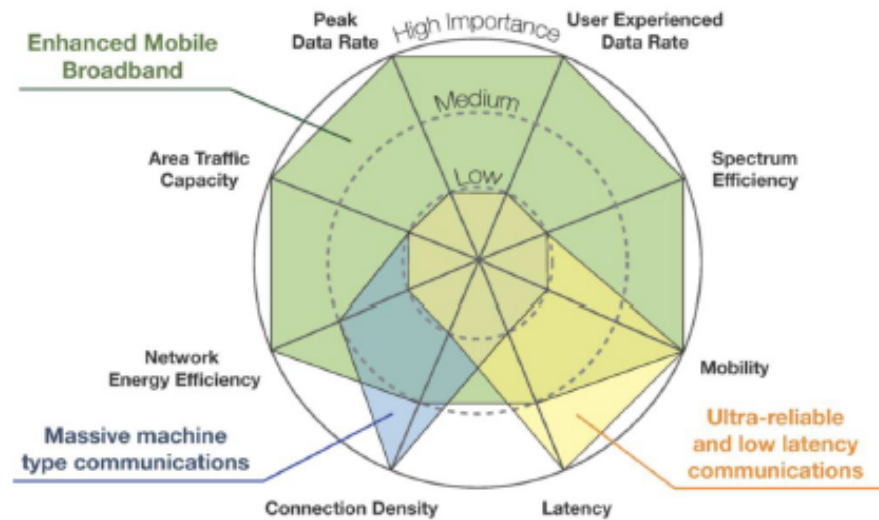


# 5G Defined | 3 Use Cases, 8 Key Capabilities

## ITU-R vision for IMT\*2020 and beyond



**Three use case categories**



**Eight Key Capabilities**

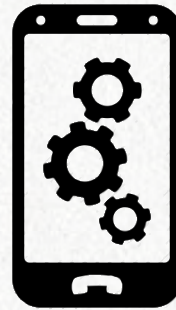
“Framework and overall objectives of the future development of IMT for 2020 and beyond”

# Specific Challenges for the Wireless Test



## Economic

- Wireless is almost free
- Lower Cost of Test
- Lower CapEx Budgets



## Technological

- More radios on device
- More RF ports - MIMO
- New wireless standards
- Frequencies to mmWave



## Organizational

- Increasingly multinational
- Push to standardization
- Parallel test is difficult

## Quote on progress of 5G

- James Kimery, at NI, “ the world’s telecommunication infrastructure companies, silicon providers, service operators, and test-and-measurement companies finalize the specifications, conduct field trials, and begin the commercialization process.”
- Dr. Li-Ke Huang, at Cobham Wireless, “ 5G will not be a single wireless technology like its predecessors. It will, in fact, comprise a number of different services being delivered to the end user across multiple access technologies and multilayer networks.”

# VXI & PXI Refresh



- VXI Bus Consortium:
  - 13 Members
  - > 1500 Products
  - 394 Mfg. ID's issued
  - VXI 4.0
  - <http://www.vxibus.org>
    - Products at <http://vxibus.org/products.html>
- PXI Systems Alliance (PXISA):
  - 68 Members (10/2/2015)
  - PXI-7: PXI Multicomputing HW Spec, Rev 1.0
  - PXI -8: PXI Multicomputing SW Spec ,Rev 1.0
  - PXI-9: PXI & PXI Express Trigger Management Spec ,Rev 1.0
  - [www.pxisa.org](http://www.pxisa.org)



# AXIe & LXI Refresh



- AXIe Consortium:
  - 11 Members (10/2/2015)
  - 29 Products (10/2/2015)
  - AXIe 1.0 Base Arch Spec, Rev 2.0
  - AXIe 2.0 Base Software Spec, Rev 1.0
  - AXIe 3.1: Semiconductor Test Extension, Rev 1.0
  - AXIe-0: Low Cost Instrumentation and Switch Architecture
  - AXIe Wide PCI Express available soon
  - [www.axistandard.org](http://www.axistandard.org) for overview presentation



LAN eXtensions for Instrumentation

- LXI Consortium
  - 53 Members (10/2/2015)
  - 2728 products(10/2/2015)
  - LXI 1.4 (Core + 7 Extended Functions)
  - LXI Consortium Releases the LXI Reference Design
    - This “technical blueprint” will help vendors design and implement LXI interfaces into their instrumentation more quickly.
  - Study to investigate LXI Security Areas
  - <http://lxistandard.org>

Questions/Discussion?