MCS TaaSTing

Mission Critical Services (MCS) Certification

- MCS certification Chicken or the Egg issue
  - No MCS Testing equipment ⇔ no certification programs ⇔ jeopardized customers confidence ⇔ demand for testing equipment in a "niche market"
- Meanwhile…
  - "MCPTT aligned"
  - 3GPP ready….
  - "Certified in the Plugtest"
  - Avalailable in –your MCS network- app store
  - 1st in the certification
  - Public Safety Grade
- How am I supposed to write my RFI/RFQ?
- How am I supposed to write my tender response?

MCS Certification: Why it's More Important Than Ever

- First flagship projects deploying MCS solutions
- Std. compliance & interop ⇔ innovation and competition
  - Avoid vendor lock-in from the very beginning
- More certification needs
  - Much quicker release cycles than in PMR world
  - More stakeholders and relationships
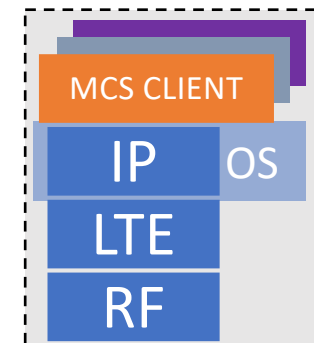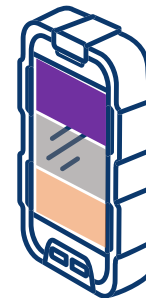
All-in-one COTS LTE device to be certified
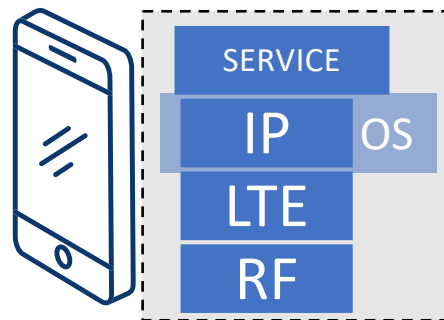
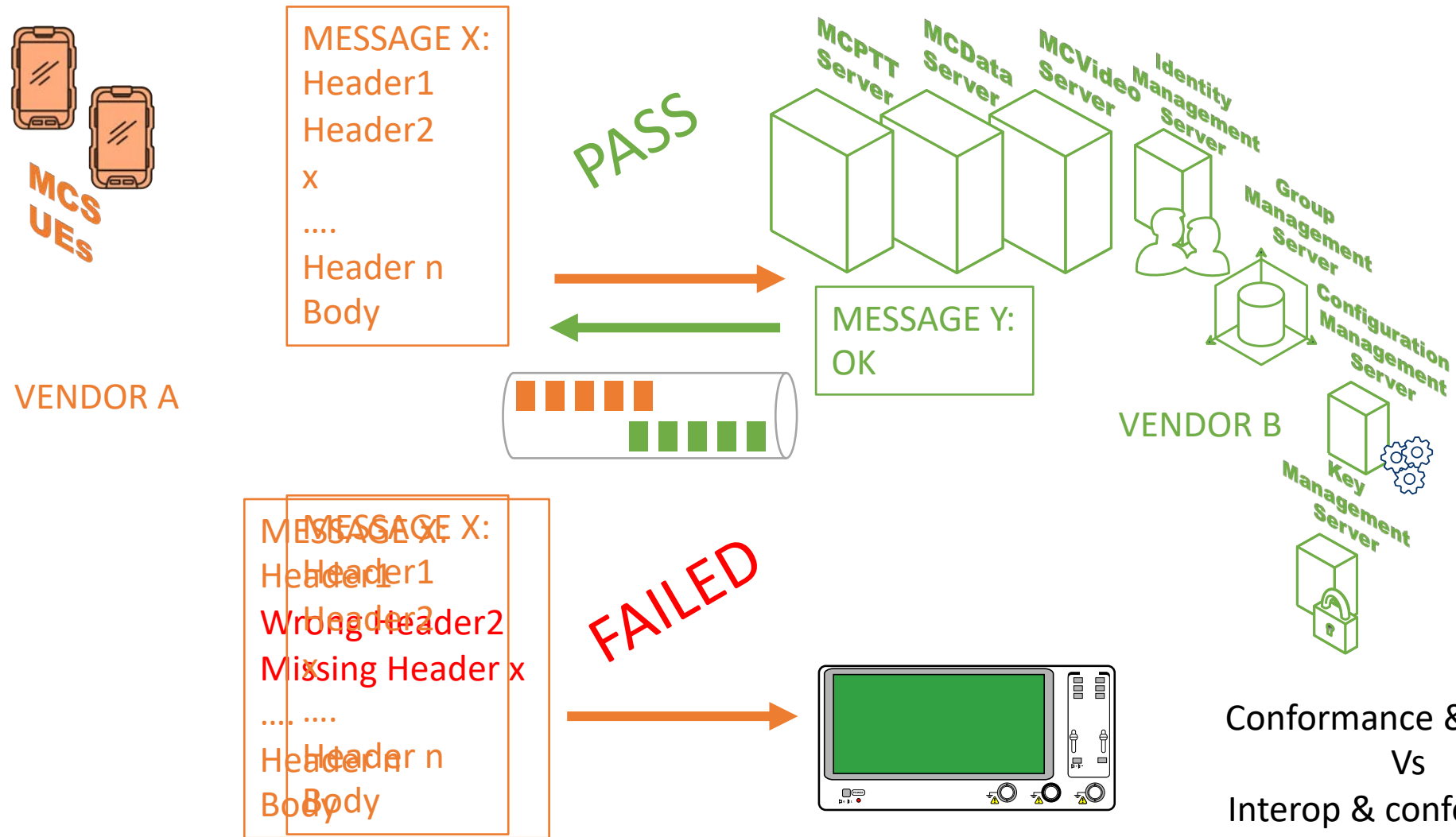**MCS UE vendor A**
+
MCS Client from vendor B/C/D

vs.

Background: different kind of Testing and Certification

- Interoperability

- Conformance

- Performance

- Field test

Interop and Conformance

MCS UEs

VENDOR A

MESSAGE X:
Header1
Header2
x
....
Header n
Body

PASS

MESSAGE Y:
OK

MCPTT Server
MCData Server
MCVideo Server
Identity Management Server
Group Management Server
Configuration Management Server
Key Management Server

VENDOR B

MESSAGE X:
Header1
Wrong Header2
Missing Header x
....
Header n
Body

FAILED

Conformance & Interop
Vs
Interop & conformance

How does conformance certification usually work ?

3GPP Core
Test Specs

3GPP RAN5
Test Cases

RAN5_SIG

MCC TF160

TC prose specification

TC TTCN3 implementation

Test Equipment

GCF

PTCRB

Certification Program
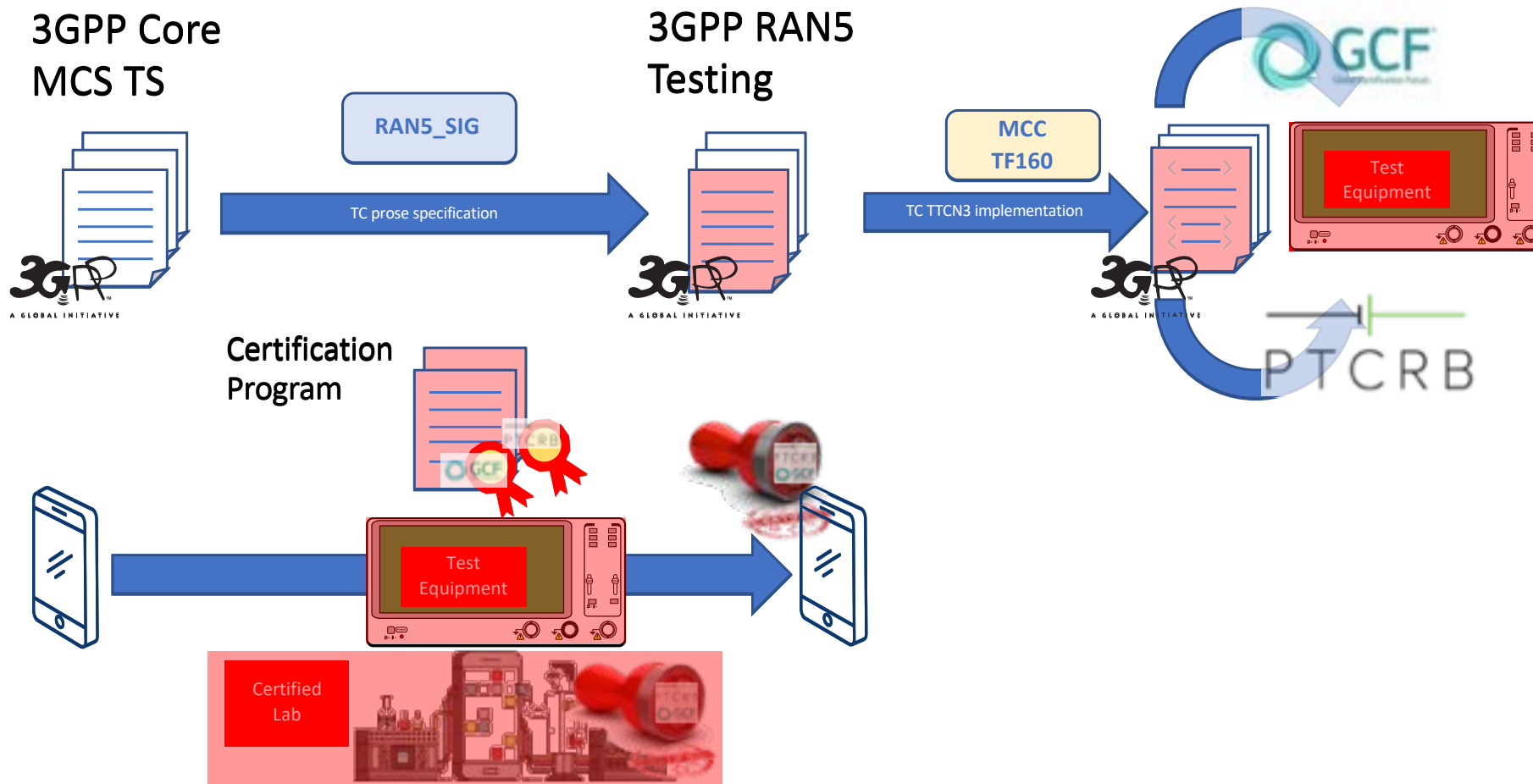
Certified Lab
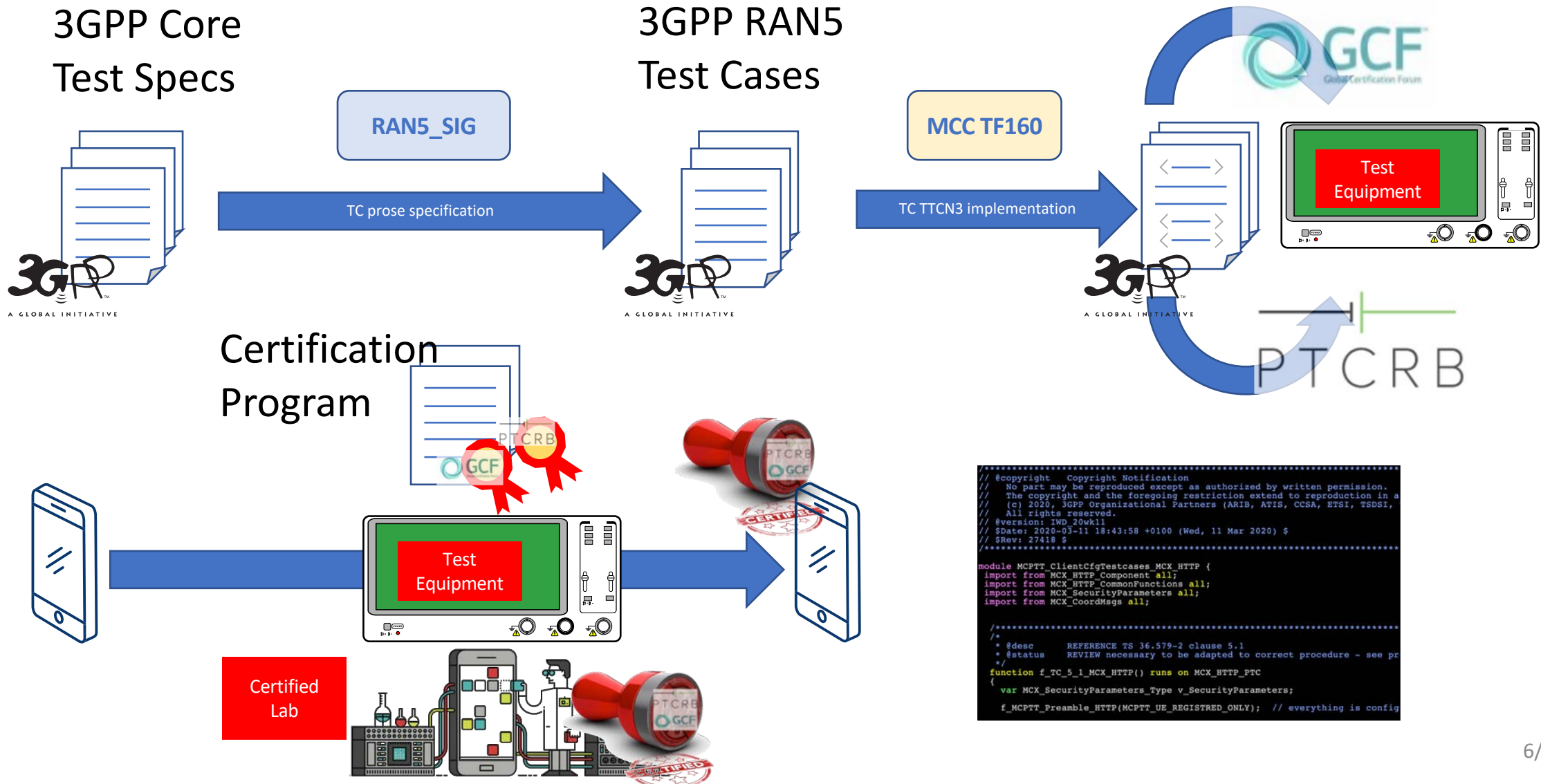
Test Equipment

MCS Conformance testing: status (2019)

- No certified MCS test equipment
  - RAN5 TS (MCPTT/MCData/MCVideo Rel 14) ongoing
  - Full TTCN3 completion & verification pending

- Users' demand pushing….
  - ….but economy of scale and 5G activity delaying the availability

- Early initiatives in certification programs
  - GCF-TTCA-JTF => MCS WI

MCS Conformance testing: status (2019)

3GPP Core MCS TS

3GPP RAN5 Testing

RAN5_SIG

TC prose specification

MCC TF160

TC TTCN3 implementation

Test Equipment

GCF

PTCRB

Certification Program

Test Equipment

Certified Lab

NIST funding opportunity came to help!

Project description

EXECUTIVE SUMMARY

- **Federal Agency Name:** National Institute of Standards and Technology (NIST), United States Department of Commerce (DoC)

- **Funding Opportunity Title:** NIST Public Safety Innovation Accelerator Program – Mission Critical Voice Test Equipment

- **Announcement Type:** Initial

- **Funding Opportunity Number:** 2019-NIST-MCVTE-01

- **Catalog of Federal Domestic Assistance (CFDA) Number:** 11.609, Measurement and Engineering Research and Standards

- **Dates:** Electronic applications must be received at grants.gov no later than 11:59 p.m. Eastern Time, Friday, July 19, 2019. Applications received after this deadline will not be reviewed or considered. Paper applications will not be accepted.

- **Funding Opportunity Description:** The NIST Public Safety Innovation Accelerator Program: Mission Critical Voice Test Equipment (PSIAP-MCVTE) is seeking applications from eligible applicants for activities to produce equipment and code required to test communications devices, based on 3rd Generation Partnership Project (3GPP) standards, for mission critical push-to-talk technology (MCPTT) and related public safety features such as Mission Critical Data (MCData) and Mission Critical Video (MCVideo).

- **Anticipated Amounts:** In FY2019, NIST anticipates funding awards in the range of approximately $500,000 to $2,000,000 per year with project performance periods of up to 2 years. Total funding for this program is anticipated to be approximately $12,000,000.

- **Funding Instrument:** Cooperative agreement.

- **Eligibility:** This NOFO is open to all non-Federal entities. Eligible applicants include institutions of higher education, non-profit organizations, for-profit organizations, state and local governments, Indian tribes, hospitals, foreign public entities, and foreign governments. Please note that individuals and unincorporated sole proprietors are not considered "non-Federal entities" and are not eligible to apply under this NOFO. Although Federal entities are not eligible to receive funding under this NOFO, they may participate as unfunded

FUNDING OPPORTUNITY (NOFO) -
NIST Public Safety Innovation Accelerator Program - Mission Critical Voice Test Equipment

Ref: https://www.nist.gov/news-events/news/2020/01/pscr-awards-over-6m-rd-supporting-mission-critical-voice-test-equipment

Project Description

KEY FACTS

Project lifetime: **Dec 2019-Dec 2021**

7 Partners led by UPV/EHU
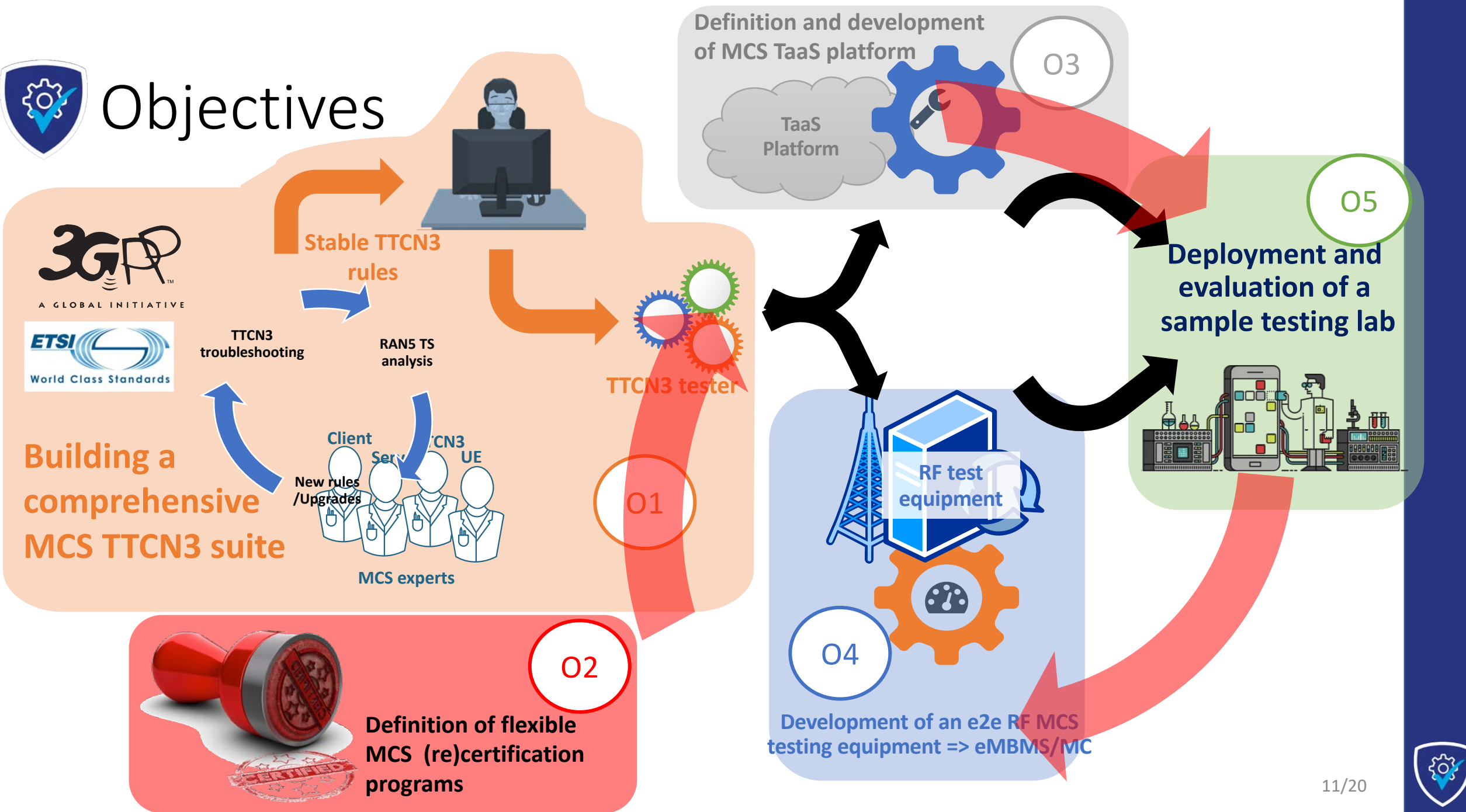
3.6 MUSD

Targeting two commercial solutions

Ref: https://www.nist.gov/news-events/news/2020/01/pscr-awards-over-6m-rd-supporting-mission-critical-voice-test-equipment

Objectives

Building a comprehensive MCS TTCN3 suite

Stable TTCN3 rules

TTCN3 troubleshooting

RAN5 TS analysis

New rules /Upgrades

Client
Server
TTCN3 UE

MCS experts

TTCN3 tester

O1

O2

Definition of flexible MCS (re)certification programs

Definition and development of MCS TaaS platform

TaaS Platform

O3

O5

Deployment and evaluation of a sample testing lab

RF test equipment

O4

Development of an e2e RF MCS testing equipment => eMBMS/MC

Expected outcomes at the end of the Project

- Enhanced / troubleshooted RAN5 TC
- Complete TTCN3 code
- TTCN3 tester capable of validating the test cases
- TaaS **commercial** service providing remote access to the tester
- RF capable **commercial** product
- Global Certification programs
- Testing Lab procedures and experience
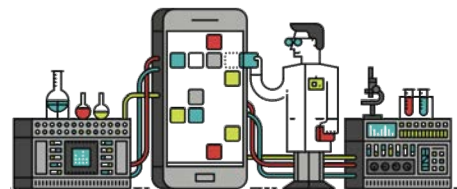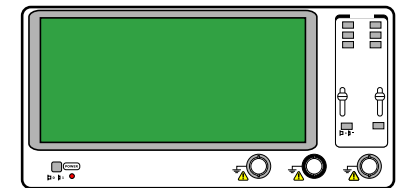
3GPP Test Models

- 3GPP RAN5 defines the testing procedures and reference pints to be tested
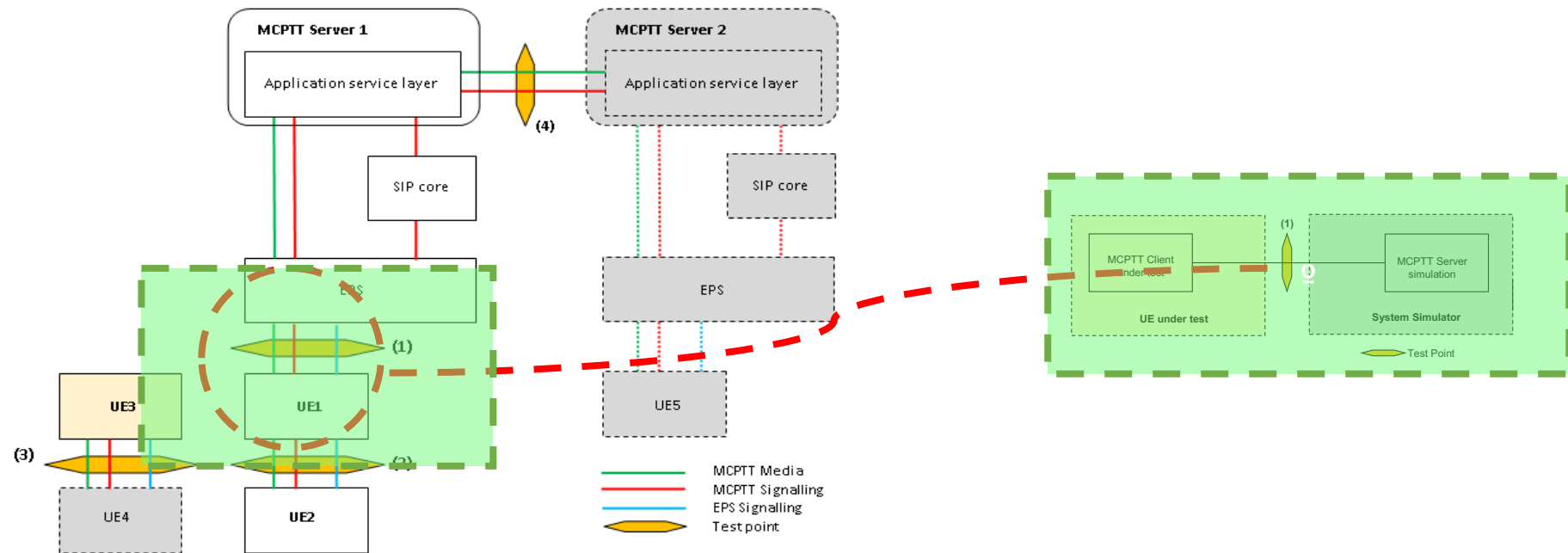
- Also the so called testing models

3GPP Test Models

Uu model vs IP model

Traditional telco equipment
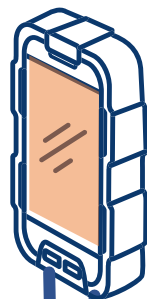From LTE Phy to MCS
Complex/Expensive
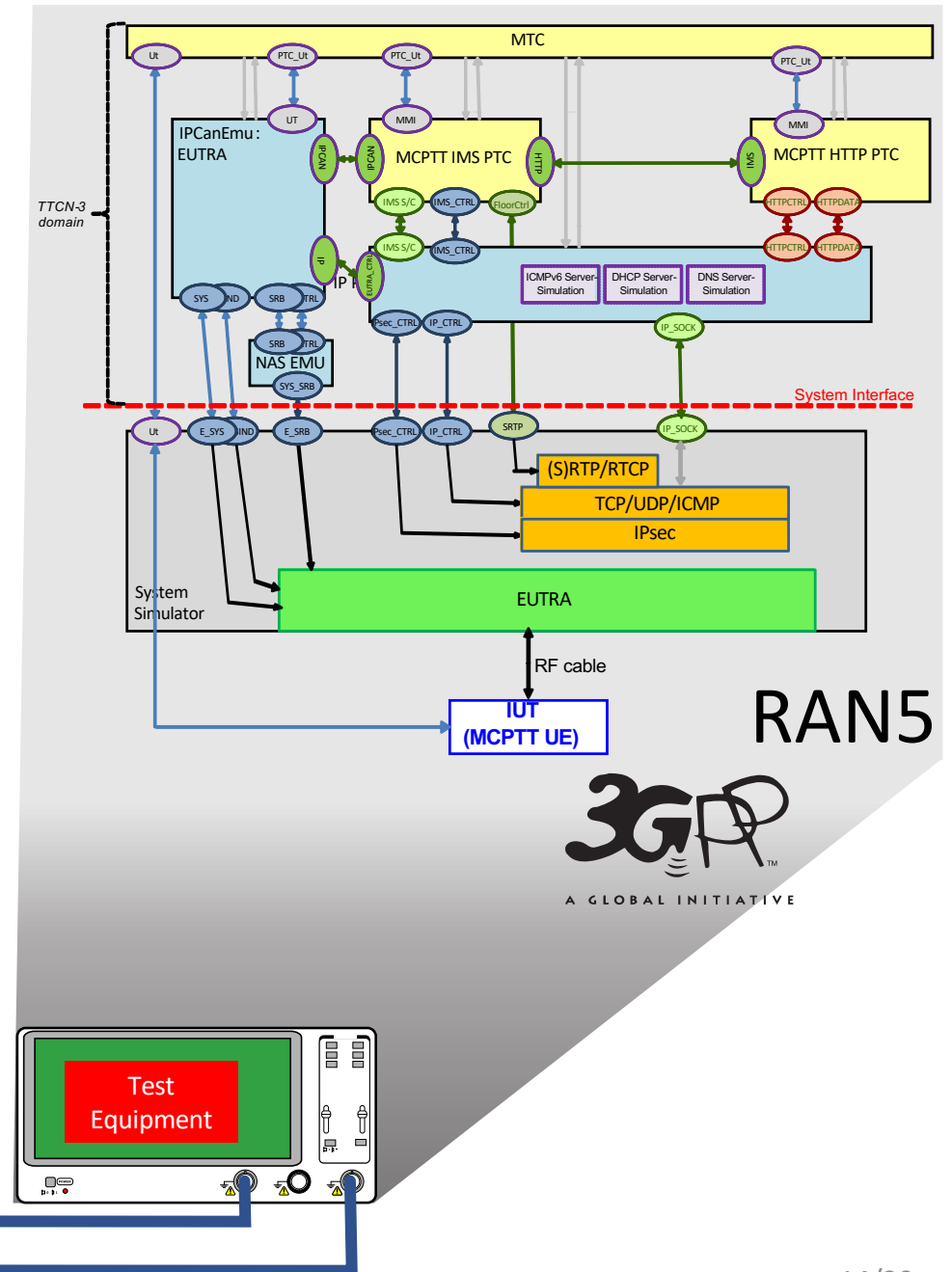 Traditional testers manufacturers
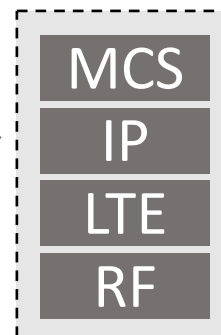 Economy of scale

MCS UE vendor A
+
MCS Client vendor X

RAN5

MCS CLIENT
IP | OS
LTE
RF

Uu
Reference Point

MCS
IP
LTE
RF

Test Equipment

CERTIFICATION
SCOPE

14/20
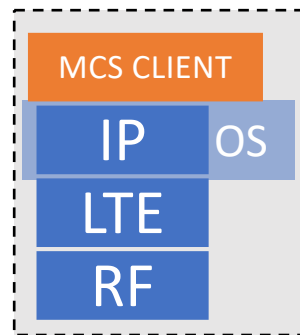
3GPP Test Models

Uu model vs IP model
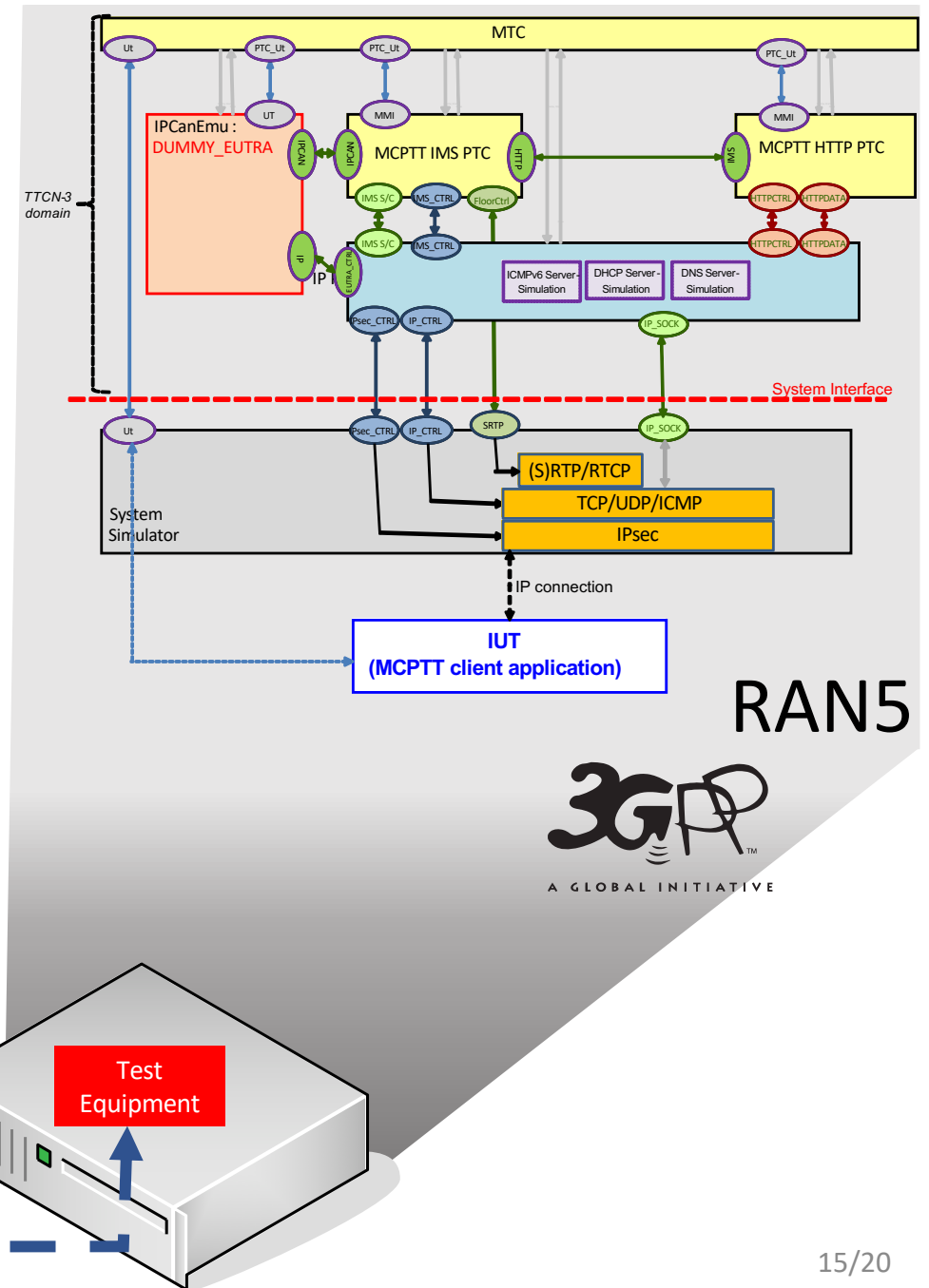
OTT testing
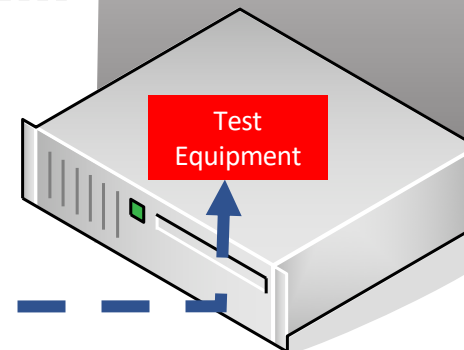
Can not guarantee LTE MC features
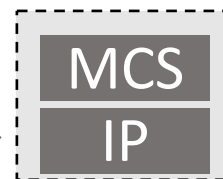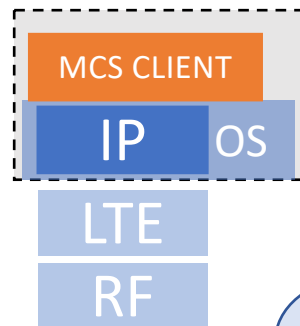
eMBMS/MC QCI?

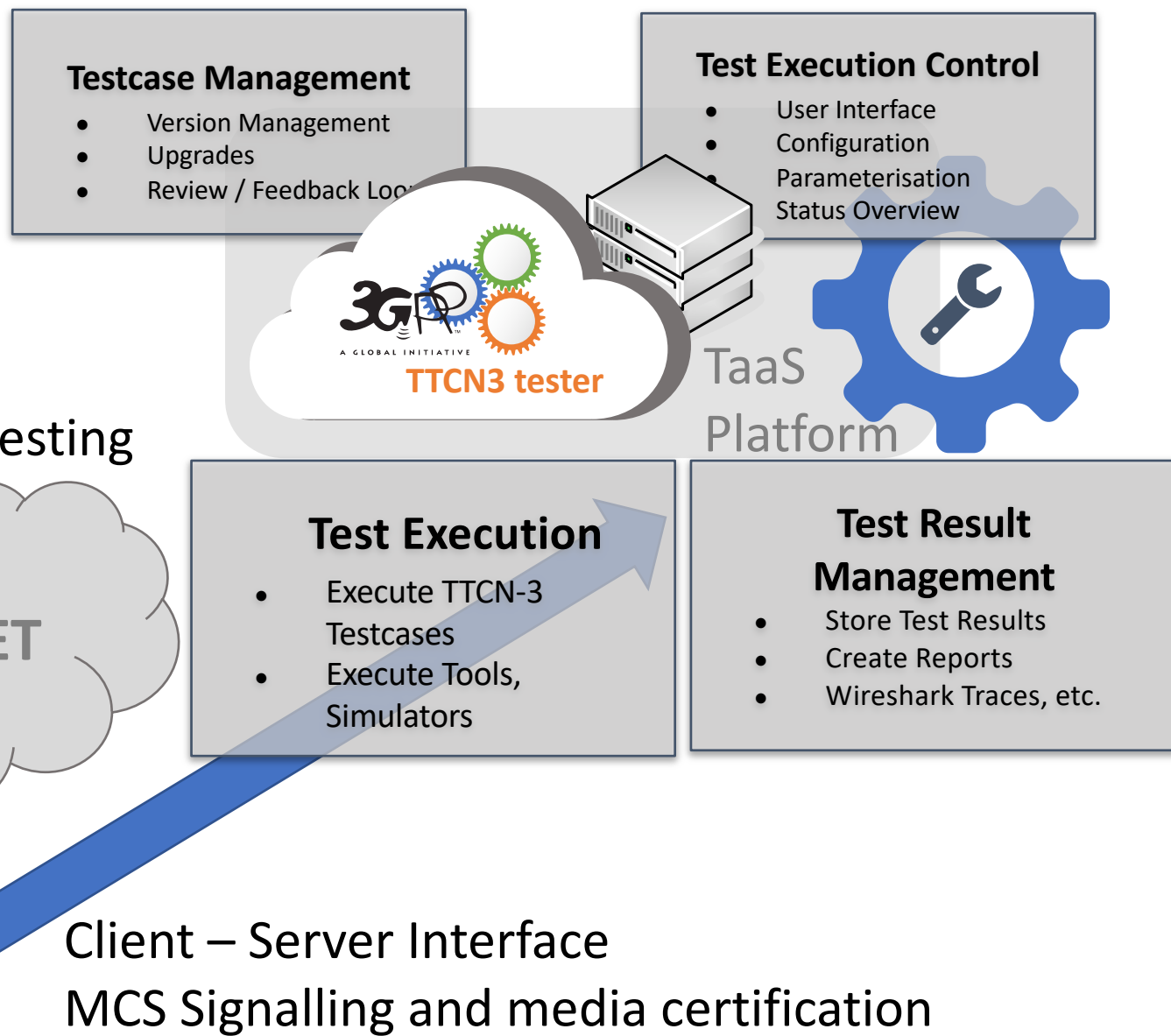KPIS/Integration with UE?

MCS UE vendor A

+

MCS Client vendor X

CERTIFICATION SCOPE

RAN5

IP Model and TaaS

Testing as a Service
(pre)certification purposes
Foster continuous SW integration/testing

MCS UE vendor A
+
MCS Client vendor X

INTERNET

Testcase Management
- Version Management
- Upgrades
- Review / Feedback Loop

Test Execution Control
- User Interface
- Configuration
- Parameterisation
- Status Overview

TTCN3 tester

TaaS
Platform

Test Execution
- Execute TTCN-3 Testcases
- Execute Tools, Simulators

Test Result Management
- Store Test Results
- Create Reports
- Wireshark Traces, etc.

MCS CLIENT

IP OS

LTE

RF

Client – Server Interface
MCS Signalling and media certification

16/20

MCS TaaSting 1.5 Model

IMS IPCAN-like model

Intermediate Uu ⇔ IP model

MCS testing + RF capable

MC features

    MC QCIs

MCS UE vendor A   eMBMS bearer handling

    +

MCS Client vendor X

TESTING
SCOPE

MCS CLIENT

IP | OS

LTE

RF

MCS

IP

LTE

RF

Test
Equipment

MC LTE

TS 34229-4   RAN5

3GPP
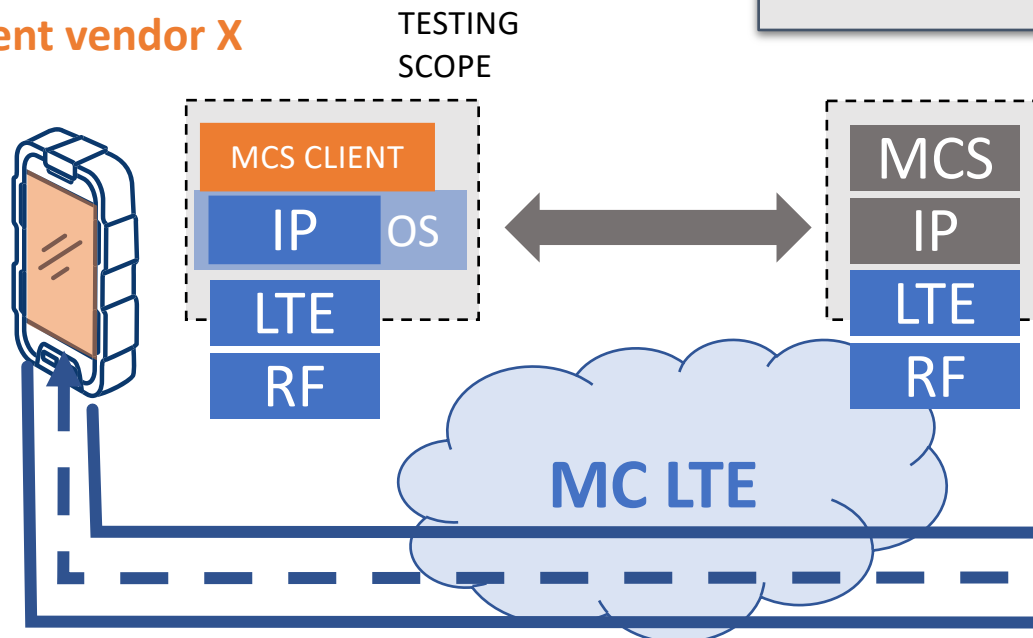A GLOBAL INITIATIVE
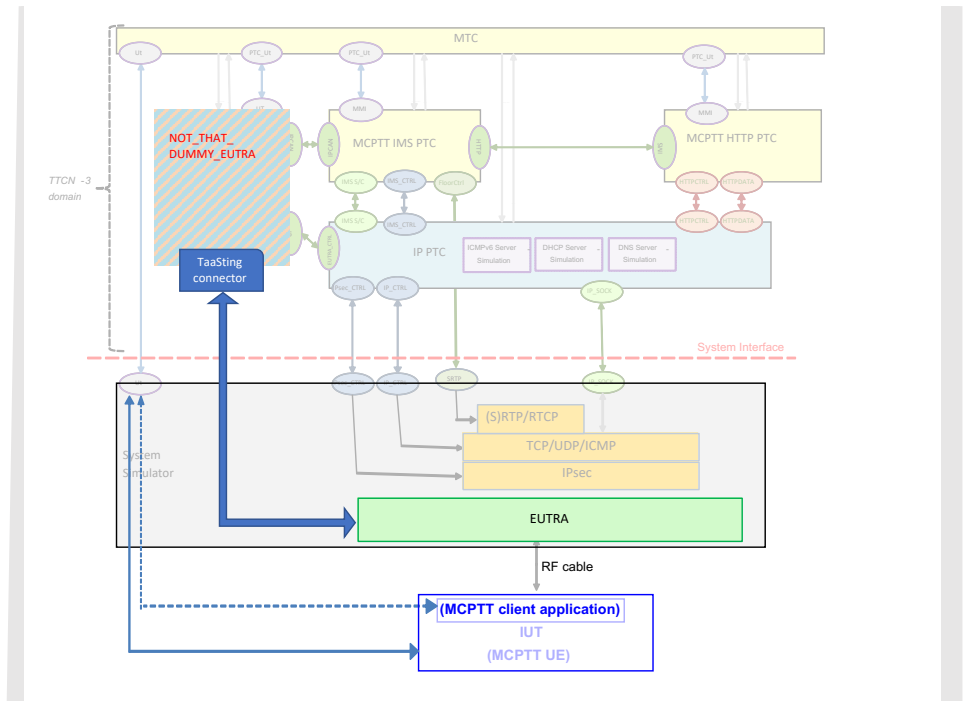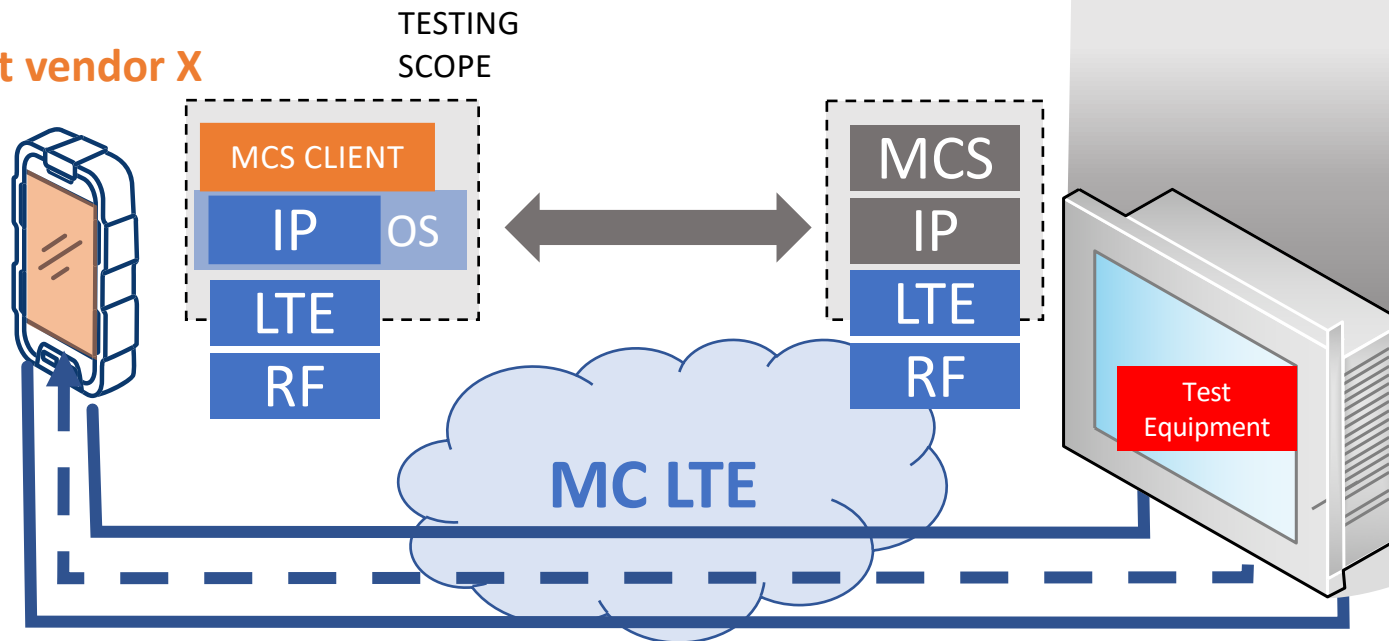
RF Capable Tester

1.5 Model
TTCN3 MCS tester + MC LTE features
Remote controlling / synching

MCS UE vendor A
+
MCS Client vendor X

Testcase Management
- Version Management
- Upgrades
- Review / Feedback Loop

Test Execution Control
- User Interface
- Configuration
- Parameterisation
- Status Overview

TTCN3 tester

TaaS Platform

Test Execution
- Execute TTCN-3 Testcases
- Execute Tools, Simulators

Test Result Management
- Store Test Results
- Create Reports
- Wireshark Traces, etc.

TESTING SCOPE

MCS CLIENT	
IP	OS
LTE	
RF	

MCS
IP
LTE
RF

MC LTE

Synching
Off-loading
Remote Control

INTERNET

Test Equipment

Testcase Management
- Version Management
- Upgrades

Test Execution Control
- User Interface
- Configuration
- Parameterisation
- Status Overview

TTCN3 tester

Test Execution
- Execute TTCN-3 Testcases
- Execute Tools, Simulators

Test Result Management
- Store Test Results
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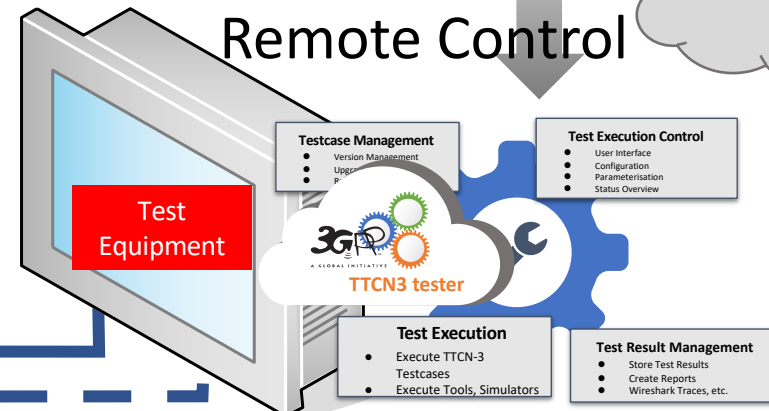
CURRENT STATUS (Q2'20)

- RAN5 GAP analysis

- Enchanced TTCN3 MCPTT rules
  - Intensive troubleshooting with TF160
    - Feedback to RAN5 (RAN5#87-e)

- First TCCN3 tester developed
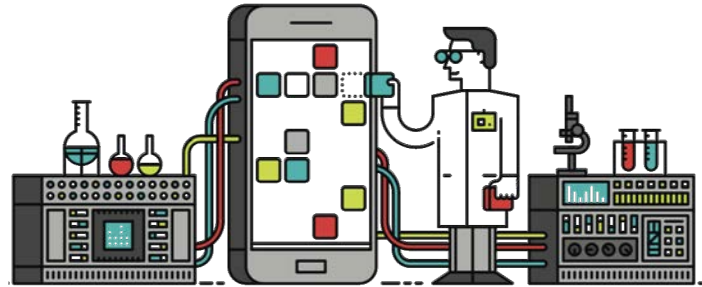 - First RAN5 TCs verified

- TaaS platform… following

MCS TaaSTing

MCS Platform

Testing as a Service

Device Evolution

Device with Embedded
Software

Device with Operating System
and pre-installed Apps

Functionality determined
by the device

Functionality
determined by Apps

Amount of Software

Limited Extensibility by
Third Parties

Extensibility by Third
Party Apps

Limited Update /
Upgrade Capabilities

Remote Upgrades /
Updates Capabilities
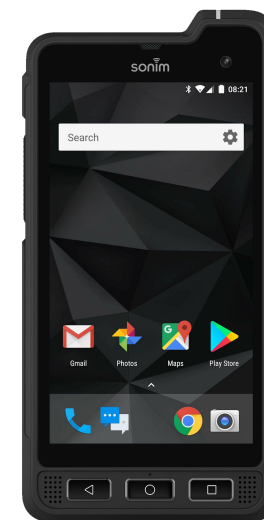
Software Development Lifecycles

Lifecycles are much short

Example: Mobile Phones

Yearly Hardware Releases

Monthly Security Updates

Weekly / Daily Application Updates
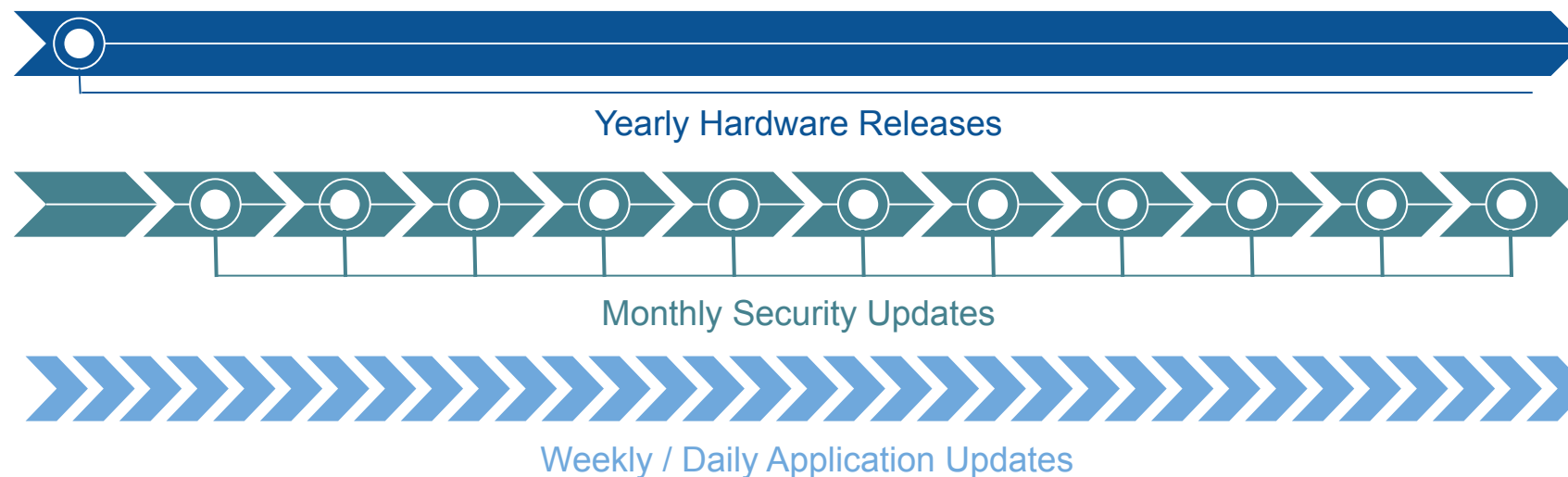
→ **Fast, Easy Accessible and Efficient Standard Verification**

Goals

Accelerate Development

Enable Verification

Easy Access

Easy to Maintain

Always up-to-date

MCS Testing as a Service

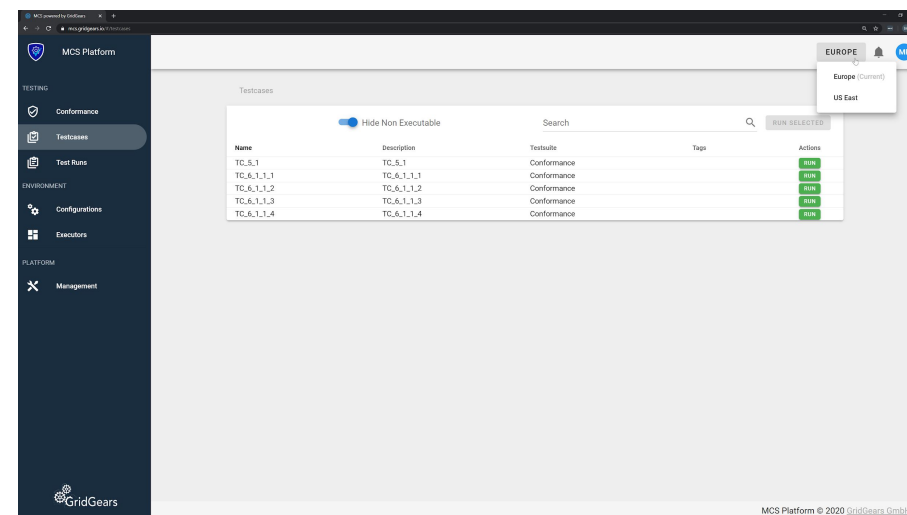# MCS TaaS Platform

Generic Extensible Platform

Modular Platform

Cloud-based

Web User Interface

3GPP RAN5 Test Cases

Support Multiple Stakeholders

Who are the stakeholders ?

Users

Implicit interest in technical standards
just want equipment that works

Buyers

Want the users to be safe
Extensible, interoperable and future-proof solutions

Testing Houses

Provide certifications
Verify that solutions follow standards

Vendors

Provide great solutions
Sell their solutions and products

Vendor Use Cases

Use Case #1: Support Development
Simulators, Tools and Free Testing

Use Case #2: Support Preparation for Certification / Pre-Certification
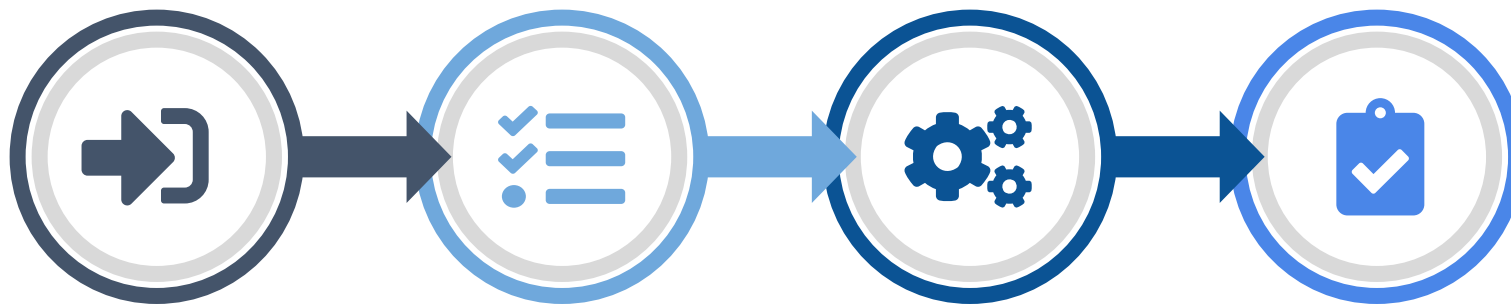Optimal Preparation & Pre-Certification (RAN5 Test cases)

Use Case #3: Support Lifecycle
Regression Testing, Integration into Build Environment

Development Support

Login
- *Web Interface*
- *Available Anywhere*
- *Always Available*
- *No Booking Needed*

Choose Tests
- *Specific Test Cases*
- *Search by Feature*
- *Free Testing*
- *Create Custom Testruns*

Configuration
- *Test Parameters*
- *Multiple Environment Configurations*
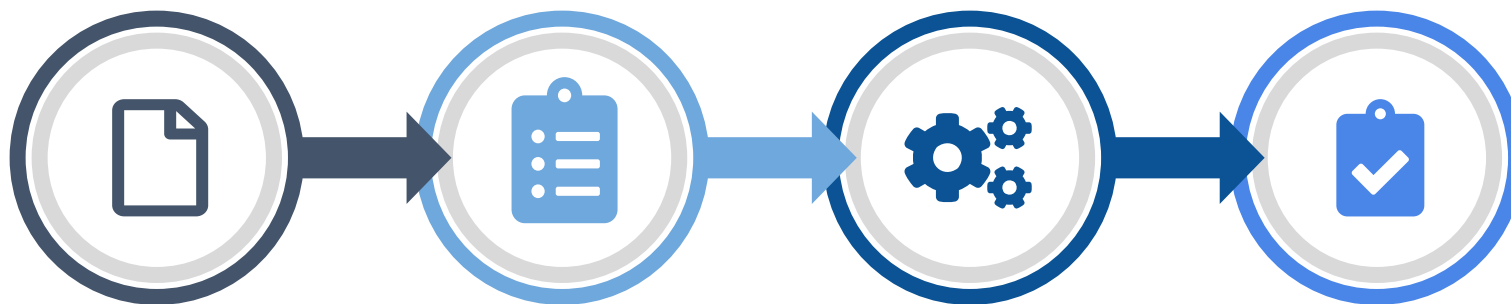- *Presets*
- *Store / Reuse*

Verification
- *Fast Feedback*
- *Report Generation*
- *Test Results*

(Pre-) Certification Preparation

PICS

- *Protocol Implementation Conformance Statement*

Preview Test Cases

- *Automatic Test Case Selection*
- *Official RAN5 Test Cases*

Configuration

- *Test Parameters*
- *Multiple Environment Configurations*
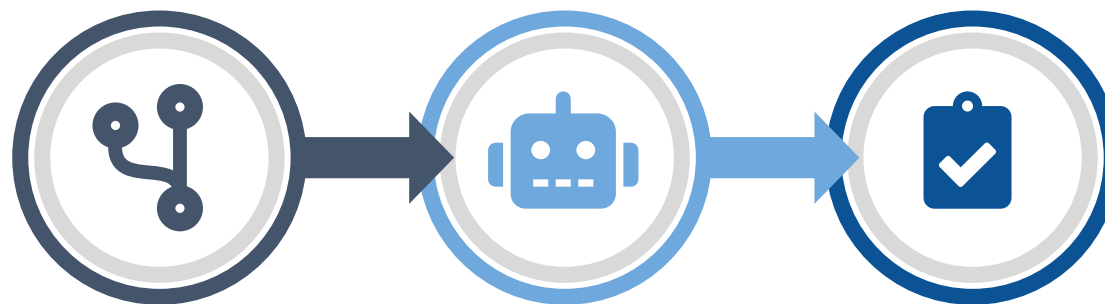- *Presets*
- *Store / Reuse*

Verification

- *Level of Conformance*
- *Indicator of Certification Readiness*
- *Reports*

Lifecycle Integration

Code Change

- *Automatic Hook*
- *Multiple Triggers*
- *Time-/Event-based*
- *Continuous Integration*

Automatic Execution

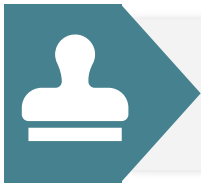- *Automatically Run Test Cases*
- *"Regression Testing"*

Reports

- *Notification on Test Failures*
- *Immediate Feedback*

Testing Houses Use Cases

Use Case #1: Certification Process
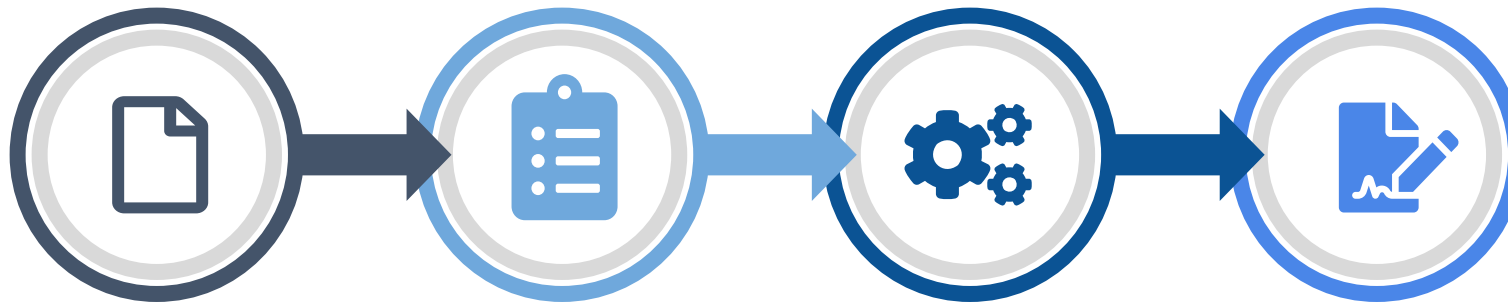Digital Signature, Automatic Document Generation

Use Case #2: (Remote) Support
Support Certification Preparation

Certification Process

PICS

- *Protocol Implementation Conformance Statement*

Preview Test Cases

- *Automatic Test Case Selection*
- *Official RAN5 Test Cases*
- *Versioning (Releases)*

Configuration

- *Test Parameters*
- *Your Environment*
- *Presets*
- *Store / Reuse*

Certification Report

- *Document Generation*
- *Digital Signature*
- *Test Case Report*
- *Summary*

Support / Certification Preparation

Support

- *Provide (Remote) Support*
- *Trial Certification Runs*

Analysis Tools

- *Network Traces*
- *Log Viewers*

Preparation

- *Prepare Configuration*
- *Prepare Multiple Environments*
- *Efficient Certification Process*

Buyers' Benefits

Benefit #1: Procurement
Verification of Solution (3rd Party Test Cases)

Benefit #2: Standard-conform Solution
Extensible, Interoperable, Future-proof

Benefit #3: Operations
Limiting Risk of Updates

MCS Platform - Summary

3GPP RAN5 Test Cases

01 Execution of 3GPP RAN5 Test Cases incl. different testing models.

3 Key Points

Enable Verification

03 Easy access and execution to verify standard conformity.

Accelerate Development

02 Integration into development lifecycle and free testing.

Next Steps

Provide us your Feedback and Feature Requests

Official Early Access Program

03
2021

Agile Roadmap based on Feedback and Inputs

Driven by Stakeholders

12
2020

Beta Release

Many More Features

09/10
2020

MCX Plugtests

Development

16/18
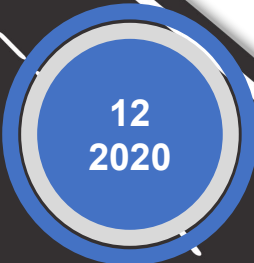
Users' Benefits

MCS TaaSTing Project

3GPP RAN5 Test Cases

MCS Platform

Vendors

Testing Houses

Buyers

Equipment That Just Works

Q & A