

Webinar series: 5G Device Testing Journey

# MAKING LAB TESTING MORE REALISTIC WITH R&S®CM360<sup>0</sup>

Manish Chibba  
Product Manager – CMX500

**ROHDE & SCHWARZ**

Make ideas real



# Agenda

- ▶ Challenges
- ▶ Solution
- ▶ Demo
- ▶ Summary

**FIELD-TO-LAB**

Deploy devices with confidence

CM360



# CHALLENGES

1. Cellular Module does not connect, when shipped to another country

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2. Ensure functional device KPIs are met with MNO specific settings

**SCG Addition** Success rate

Reliability under **Roaming** conditions

**Throughput** under varying Radio conditions

Successful **calls & handovers** during mobility

LTE/NR **Carrier Aggregation**

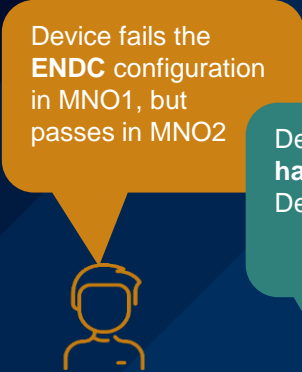
# CHALLENGES

1. Cellular Module does not connect, when shipped to another country
2. Assure functional device KPIs are met with MNO specific settings
3. Benchmark multiple devices or HW/SW revisions of devices

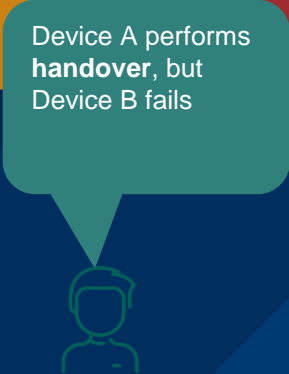
	Throughput	IMS Call	Handovers
Device A	IP – 1.5 Gbps Mac – 1.62 Gbps	Setup Time - 5 ms	90% success
Device B	IP – 1.35 Gbps Mac – 1.58 Gbps	Setup Time - 3.6 ms	83% success
Device C	IP – 1.43 Gbps Mac – 1.58 Gbps	Setup Time - 3.9 ms	87% success
Device D	IP – 1.39 Gbps Mac – 1.42 Gbps	Setup Time – 4.7 ms	79% success

# CHALLENGES

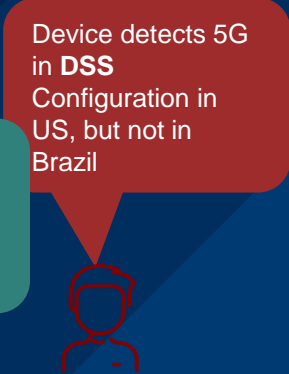
1. Cellular Module does not connect, when shipped to another country
2. Assure functional device KPIs are met with MNO specific settings
3. Benchmark multiple devices or HW/SW revisions of devices
4. Reproduce specific issues seen during field trials



Device fails the **ENDC** configuration in MNO1, but passes in MNO2



Device A performs **handover**, but Device B fails



Device detects 5G in **DSS** Configuration in US, but not in Brazil

# CHALLENGES

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4. Reproduce specific issues seen during field trials

# SOLUTION



## FIELD-TO-LAB

Deploy devices with confidence

**SOLUTION TO ADDRESS THE CHALLENGES**



# HOW TO RECORD FIELD CONDITIONS?



## R&S QualiPoc

- Android App
- Captures 4G/5G, IMS, App, GPS data into one log
- Create user experience tests
- Qualcomm, Samsung chipset support



## R&S ROMES

- Drive test software
- Supports Network scanners & Mobile phones
- Captures all Radio & user activities on phone
- Qualcomm, Samsung chipset support



## Chipset logs

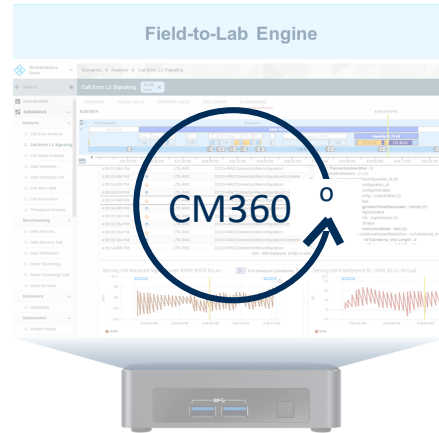
- Diagnostic logs collected directly from chipset
- Need access to diagnostic ports and space to store the logs
- Need chipset logging tools
- Only 4G/5G logs



## Other tools

- Other tools used to capture drive test data
- Functionality similar to QualiPoc or ROMES

# MAKE ANY 5G TEST ON CMX500 MORE REALISTIC



**T-Mobile Network Config**

**Roaming** configs around lake Konstanz

**Call failure** issues – drive tests in Mexico

**Regression tests** on new firmware/software



## CMX F2L Device verification Test cases

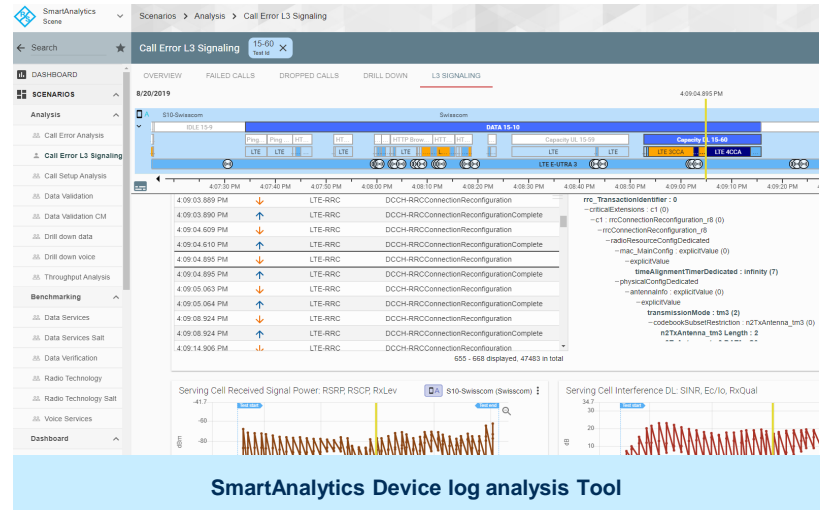
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## Field-to-Lab Engine

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## Contents



SmartAnalytics Device log analysis Tool

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NUC - PC



## ► NUC – PC

- Portable PC (11cm x 11cm), LAN & WIFI access
- Hosts SmartAnalytics and has large memory to process large field logs

## ► SmartAnalytics

- Web-based field log analysis tool
- Multiple views to guide and highlight problematic events
- Native support of chipset logs & QualiPoc logs

## ► Field-to-Lab Engine

- Intelligent algorithms to extract Network & Signaling configuration from field logs
- Directly generates CMX500 CMsquares configurations/scripts

## ► F2L Device verification Test package

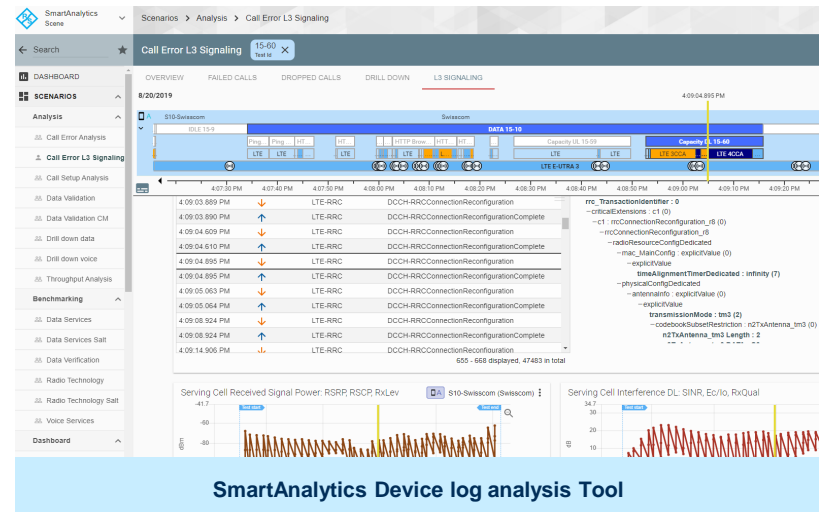
- Ready-to-use test package for device KPI verification
- Works readily with configurations generated from field
- Reports user friendly device KPI statistics

## CMX F2L Device verification Test cases

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## Field-to-Lab Engine

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NUC - PC



# USER WORKFLOW

Field logs



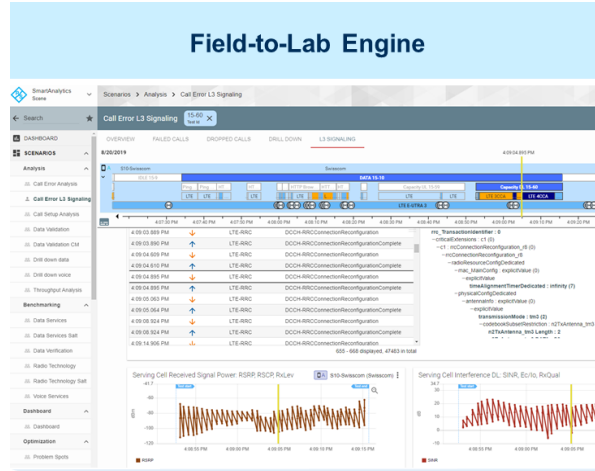
Qualcomm

QualiPoc

ROMES

CMX msglog

Analyze & Filter the data to re-create



User on NUC PC

Execute on Test Equipment in Lab

Cell Info	Broadcast	OTA Signaling	RSRP
PLMN, Band, MIMO, ...	MIBs & SIBs	RRC, NAS, IMS	✓

Test Scripts / Network Config

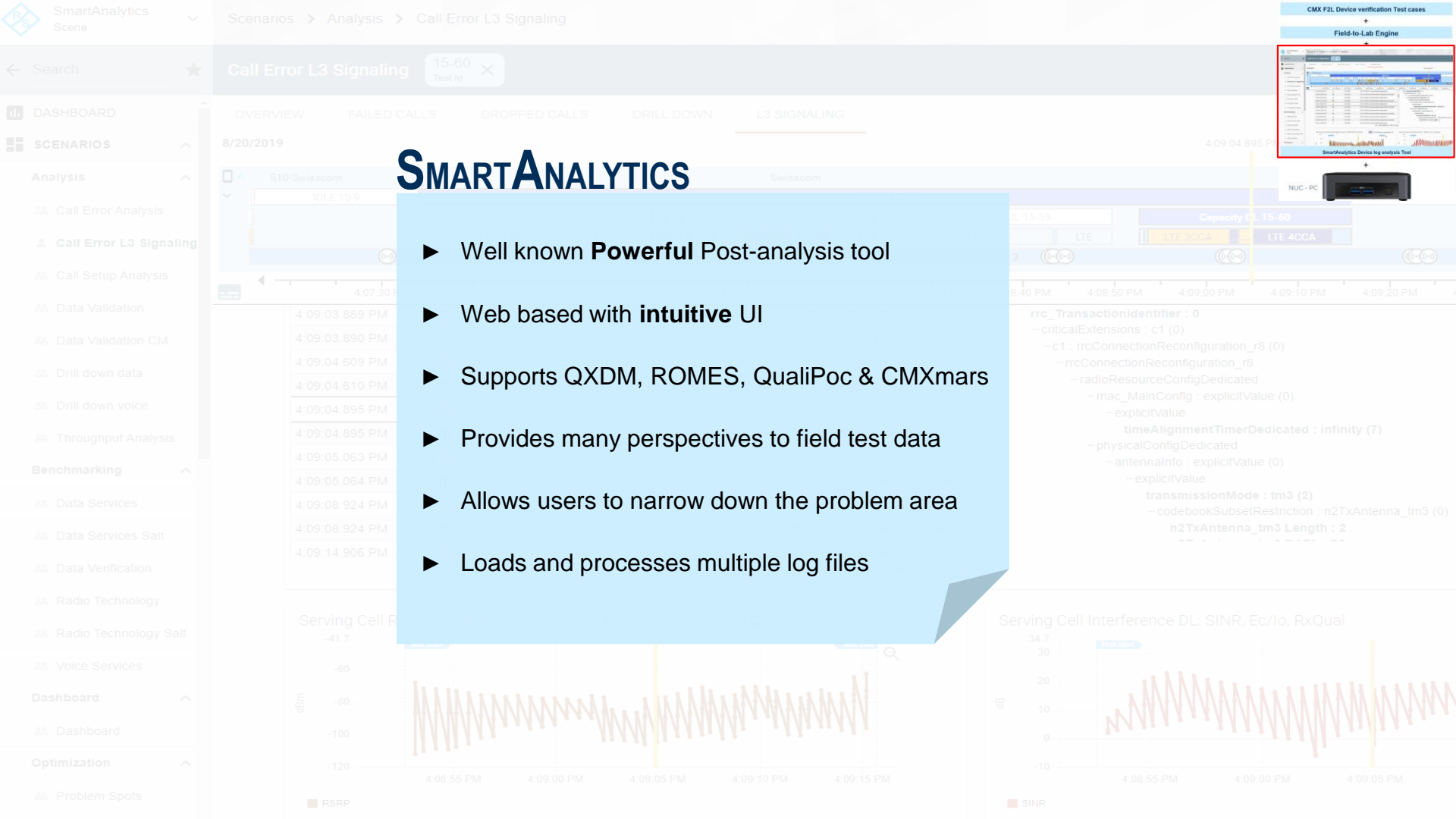


CMX F2L Device verification Test cases

User on CMX



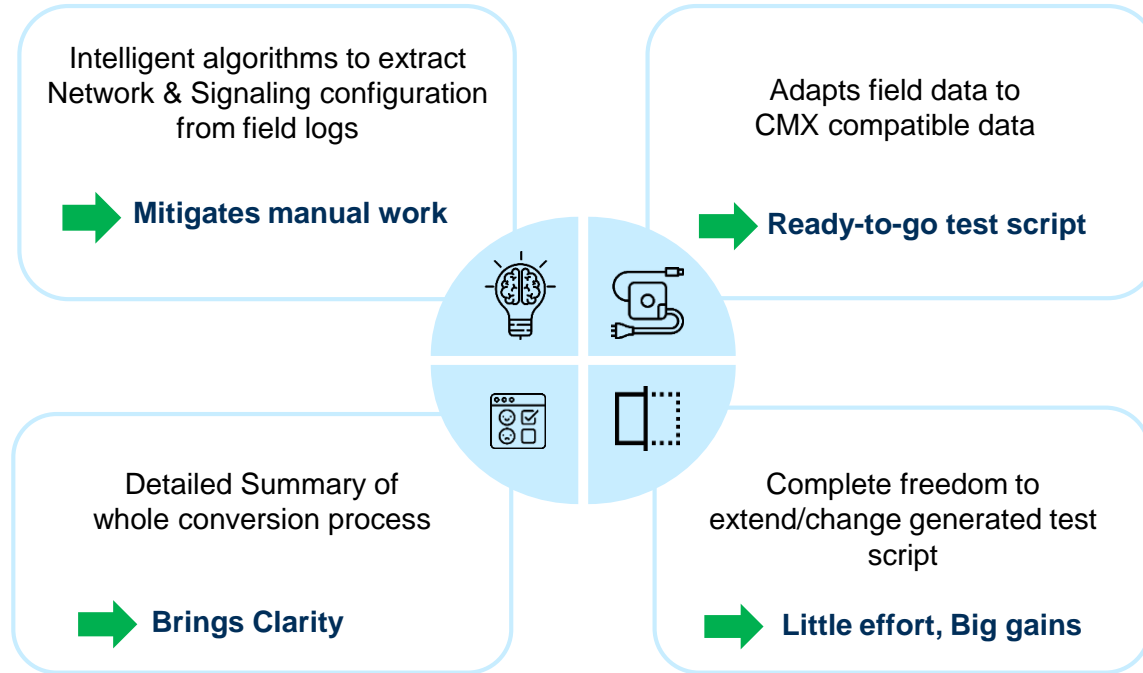
Rohde & Schwarz



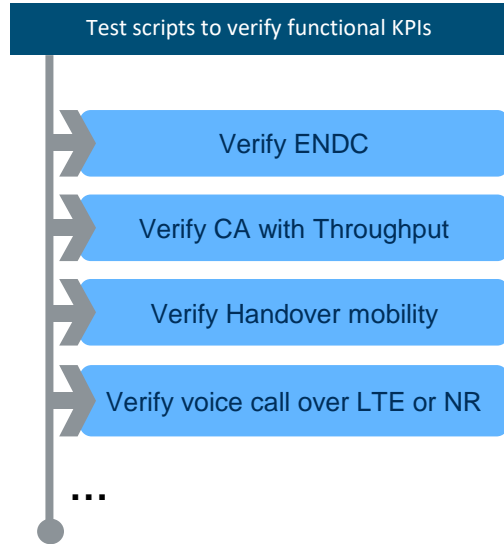
# SMARTANALYTICS

- ▶ Well known **Powerful** Post-analysis tool
- ▶ Web based with **intuitive** UI
- ▶ Supports QXDM, ROMES, QualiPoc & CMXmars
- ▶ Provides many perspectives to field test data
- ▶ Allows users to narrow down the problem area
- ▶ Loads and processes multiple log files

# CUSTOMER BENEFITS - FIELD-TO-LAB ENGINE

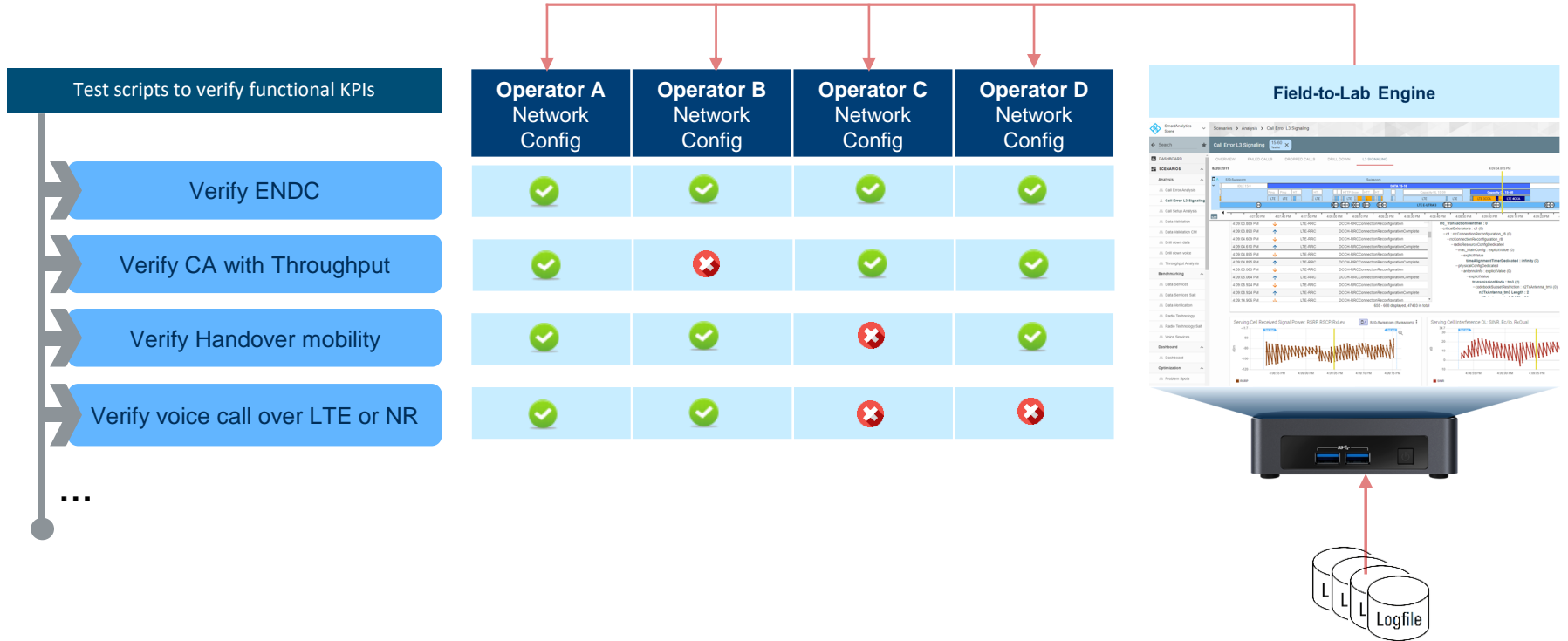


# F2L DEVICE VERIFICATION PACKAGE





# F2L DEVICE VERIFICATION PACKAGE



## ▶ Reduce Drive tests – Save time & costs

- Bring field conditions into lab
- Detect problems early and accelerate Time-to-Market

## ▶ Deploy devices with confidence

- Verify major functional KPIs with different MNO settings
- readymade & extendable test scenarios

## ▶ Easy check on device revisions

- Repeatable tests verify regressions in new HW or SW builds

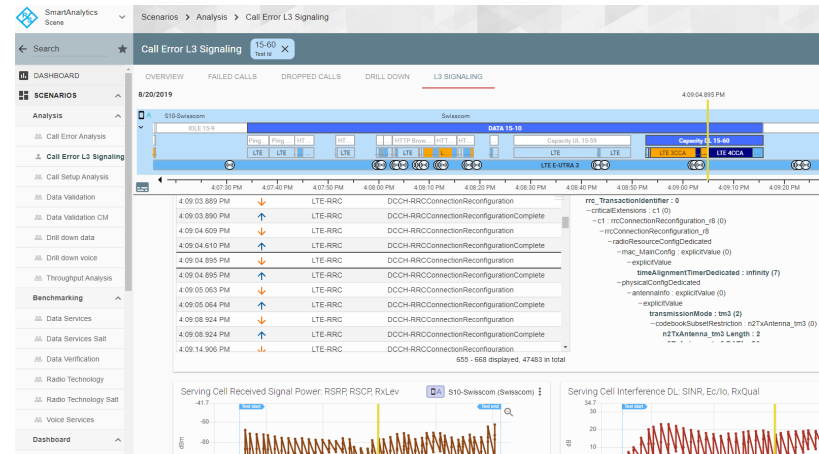


## CMX F2L Device verification Test cases

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## Field-to-Lab Engine

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## SmartAnalytics Device log analysis Tool

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NUC - PC



**DEMO**





Turn key Solution enabling Field-to-Lab for 5G

**THANK YOU**