



Fujitsu & Keysight Joint Interoperability Test



Introduction



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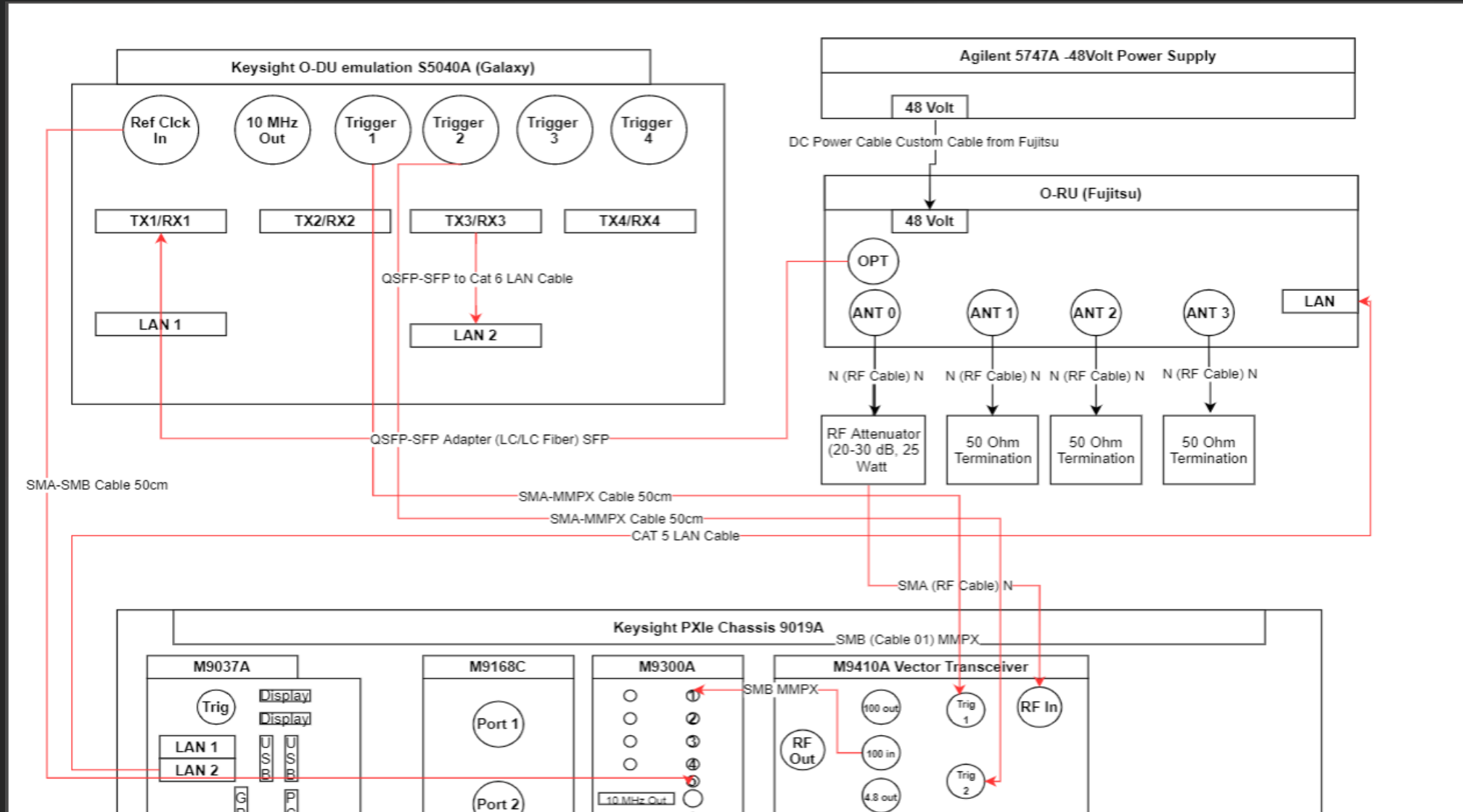
Ingo Nickeleit

Technical Consultant at Keysight

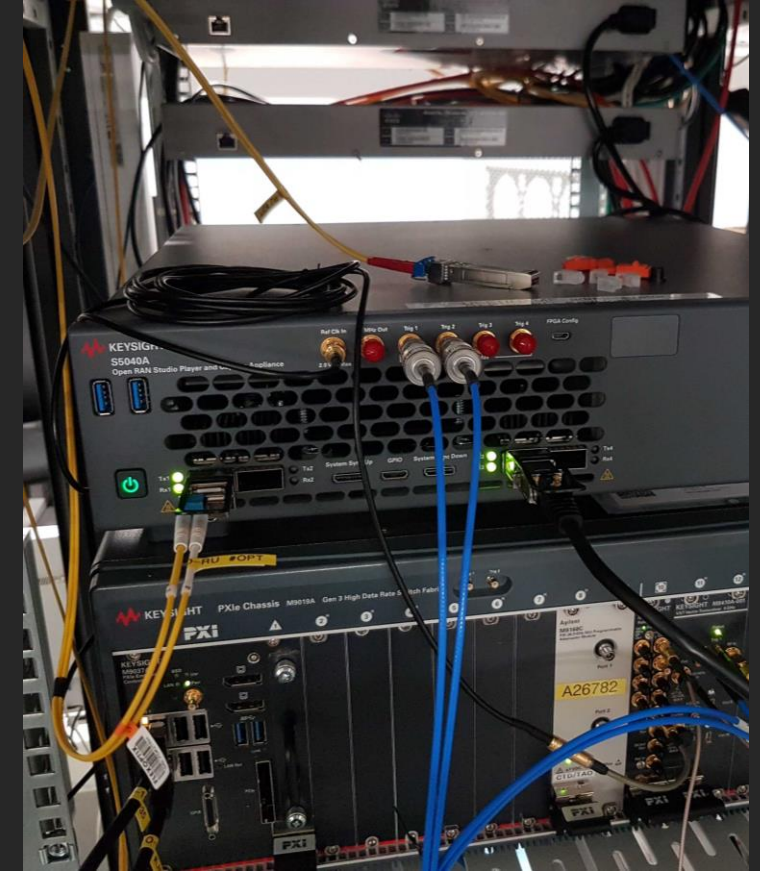
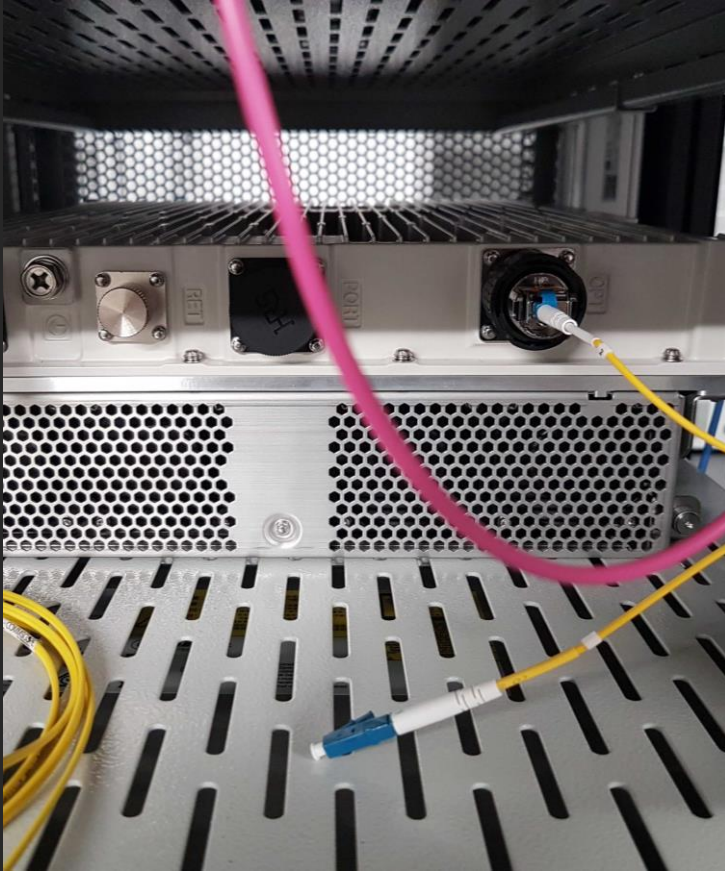
ingo_nickeleit@keysight.com



Test Environment and Configuration



Topology for Live Demo

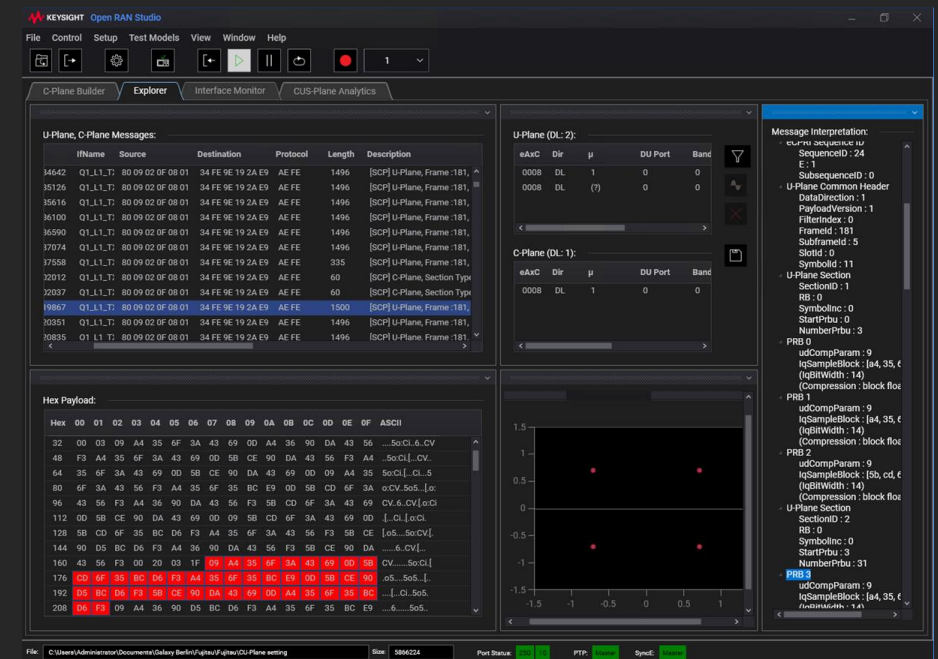
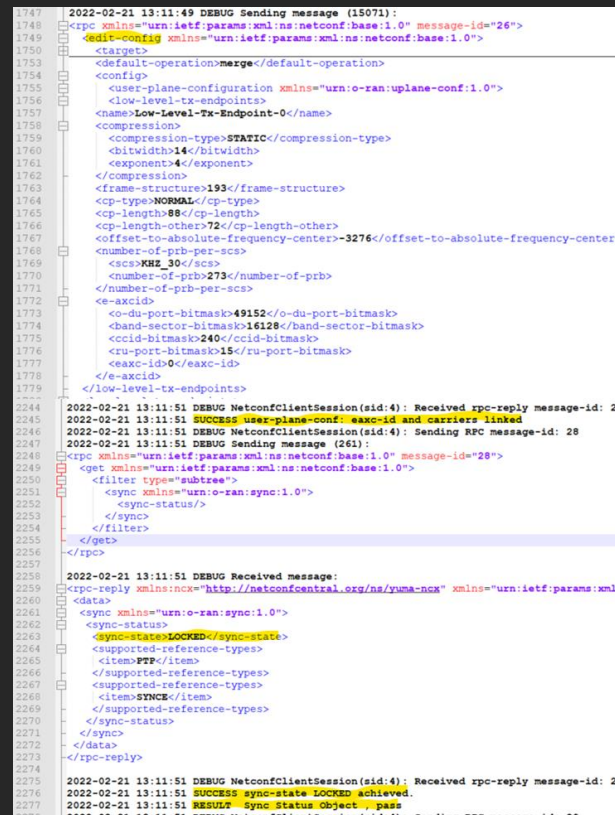
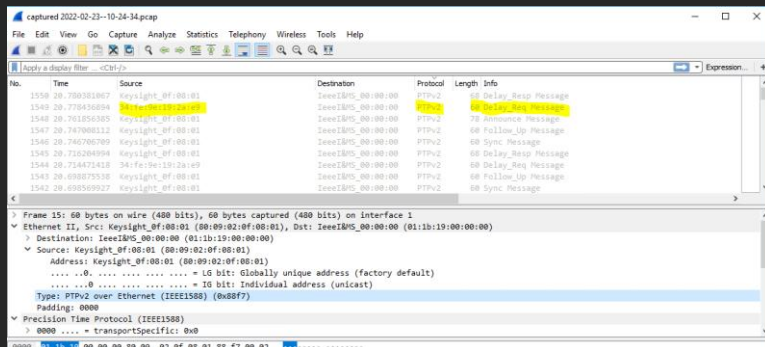
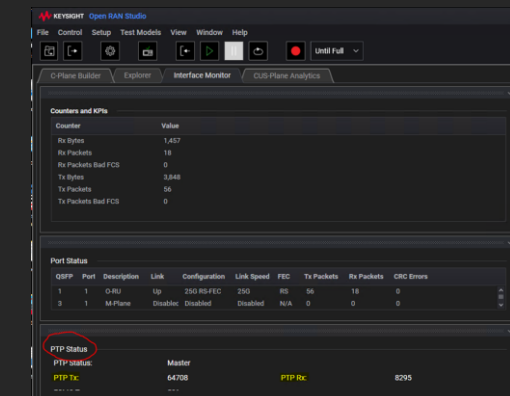


Test Purpose

- ✓ O-RAN Fronthaul configuration between O-DU emulator and O-RU
 - S-Plane – Configuration and verify the functional test of RU using ITU-T G8275.1 synchronization.
 - M-Plane – Configuration and verify operation after standard start-up
 - C/U- Plane – Configuration and verify eCPRI protocol
- ✓ O-RAN Fronthaul conformance and IoT Test
 - C/U Plane – To validate RF performance and timing of 5G NR signals
 - M-Plane – To validate fault management and alarm notification
- ✓ Hardware – to validate PTP/Sync loss in M-plane and alarm indicators on RU

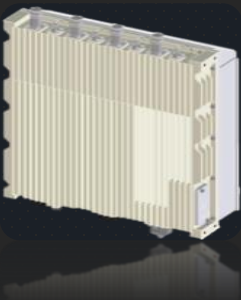
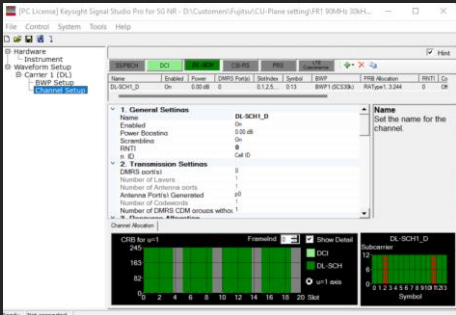
Test Procedure & Result/ Live Demo

✓ O-RAN Fronthaul configuration between O-DU emulator and O-RU



Test Procedure & Result/ Live Demo

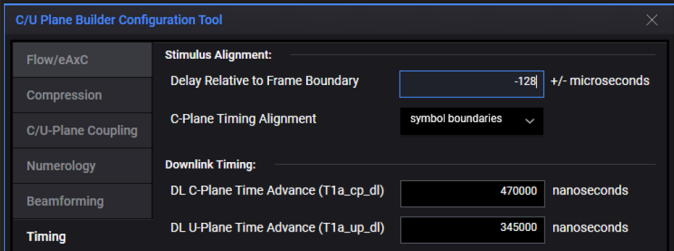
✓ RF Conformance Test



Test Procedure & Result/ Live Demo

✓ O-RAN Fronthaul conformance and IoT Test

✓ Hardware



```
1716 2022-02-23 12:12:30 DEBUG NetconfClientSession(sid:4): Received rpc-reply message-id: 59
1717 2022-02-23 12:12:30 INFO Waiting for Supervision Notification {urn:o-ran:supervision:1.0}supervision
1718 2022-02-23 12:12:39 DEBUG Received message:
1719 <notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
1720 <eventTime>2022-02-23T19:13:17Z</eventTime>
1721 <sync-state-change xmlns="urn:o-ran:sync:1.0">
1722 <sync-state>UNLOCKED</sync-state>
1723 </sync-state-change>
1724 </notification>
1725
1726 2022-02-23 12:12:54 DEBUG Received message:
1727 <notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
1728 <eventTime>2022-02-23T19:13:31Z</eventTime>
1729 <alarm-notif xmlns="urn:o-ran:fm:1.0">
1730 <fault-id>1203</fault-id>
1731 <fault-source>37L4C-RRU</fault-source>
1732 <affected-objects>
1733 <name>37L4C-RRU</name>
1734 </affected-objects>
1735 <fault-severity>MAJOR</fault-severity>
1736 <is-cleared>false</is-cleared>
1737 <fault-text>Fronthaul Synchronization Error</fault-text>
1738 <event-time>2022-02-23T19:13:31+00:00</event-time>
1739 </alarm-notif>
1740 </notification>
1741
1742 2022-02-23 12:12:54 DEBUG NetconfClientSession(sid:4): Received notification : {urn:o-ran:fm:1.0}a
1743
1744 2022-02-23 12:12:54 SUCCESS Fault Alarm Notification Received from RU
1745 2022-02-23 12:12:54 RESULT Subscription to Notification , pass
1746 2022-02-23 12:12:54 RESULT O-RU Alarm Notification Generation , pass
1747 2022-02-23 12:12:54 RESULT Retrieval of Active Alarm List , pass
```

f_5g_du_11s@5G_DU:~\$ du -ifstat ptp

DU interface status information

Time : 2022/02/23 19:21:53

S-plane information

Current S-plane Port Number	: Not Available
PTP Domain Number	: 24
PTP Multicast Mac Address	: 01-1B-19-00-00-00
PTP Accepted CLK Class	: Less than 7
Current PTP Clock Class	: 0
PTP Lock State	: Unlocked
PTP Status	: FreeRun
SyncE Lock State	: Unlocked

f_5g_du_11s@5G_DU:~\$ du -stat

DU status information

Time : 2022/02/23 19:22:14

Restart cause	: Supervision-Watchdog
Hardware State	: Description
administrative	: Unlocked
operational	: Enabled
usage	: idle
availability	: Degraded
energysaving	: Awake

Extended State

LED1 state	: Red Blinking
LED2 state	: Green On
Temperature state	: 41 degrees Celsius

Fault State : Major

Fault Active List

Software fault	: None
Initialization failure	: None
Fronthaul Synchronization Error	: Active
Module Clock fault	: None
Fronthaul faulty by Port1	: None
PS ALM	: None
Unit out of order	: None
RF module fault	: None
TX out of order	: None
RX out of order	: None
ANI port abnormal	: None
Temperature too low	: None
Unit dangerously overheating	: None
No FAN detected	: None
FAN ps alarm	: None
Cooling FAN broken FAN1	: None
Cooling FAN broken FAN2	: None
Cooling FAN broken FAN3	: None
Cooling FAN broken FAN4	: None
Cooling FAN broken FAN5	: None
SFP Error	: None
SFP Fail Safe	: None
RISG PS alarm	: None
TX Sleep	: None
TX OFF	: None
TEST Mode	: None
Forced alarm	: None

Stop RF transmission by SyncE/PTP : Active

Cause of Stop

Clock quality of SyncE is low	: Active
Clock quality of PTP is low	: Active
PTP state is UnLock	: Active

Thank you