Manufacturing Test Plan
For 5G SDX62 ODU
(Foxconn B01W009.08)
Rev. 1.5

Content

1. Revision History

Version	Date	Author	Modification Comments
0.1	2023/10/19	Harrison Wang	Initial Draft
0.2	2023/10/26	Rich Lee	Update block diagram
0.3	2023/10/26	Josh Huang	Update FW version to AOD523-AC.1.3.02.34_231024
0.4	2023/11/1	Harrison Wang	Modify FT1 station
0.5	2023/11/4	Harrison Wang	Rename FT1/FT2 to FT3/FT4 Remove FT4 shielding-box Update FT3 testplan
0.6	2023/11/11	Harrison Wang	Remove WLAN MAC and OBA WLAN test
0.7	2023/11/13	Josh Huang	DL: add fastboot commands to download images
0.8	2023/11/17	Rich Lee	Change product picture
0.9	2023/11/19	Josh Huang	OBA: update Web UI picture and signal LED check
1.0	2023/11/20	Harrison Wang	Modify QCN-backup from PT3 to PT2 in the flow chart
1.1	2023/11/20	Aaron Kao	Update PT3 test items
1.2	2023/11/22	Josh Huang	Update FW version to AOD523-AC.1.3.02.33_230920
1.3	2023/11/23	Harrison Wang	Optimize the antenna test Remove WLAN in the diagram OBA remove WLAN function
1.4	2023/11/28	Rich Lee	Swap test station OBA and leakage
1.5	2023/11/29	Harrison Wang	Modify PT3 drawing and OBA equipment list

2. Purpose

The purpose of this document is to describe the manufacturing test plan for the 5G ODU of B01W009.08. This document is a confidential document of Foxconn.

3. Definition

DUT   Device under test
LTE   Long-Term Evolution technology
WAN   Wide Area Network
AOI   Automatic Optical Inspection
RF   Radio Frequency
ATE   Automatic Test Equipment
MAC   Media Access Controller
OBA   Out of Box Audit
L/M/H   Low/Middle/High
BW   Bandwidth
OP   Operator
PSN   Product Serial Number
TBD   To be defined

4. System Block Diagram
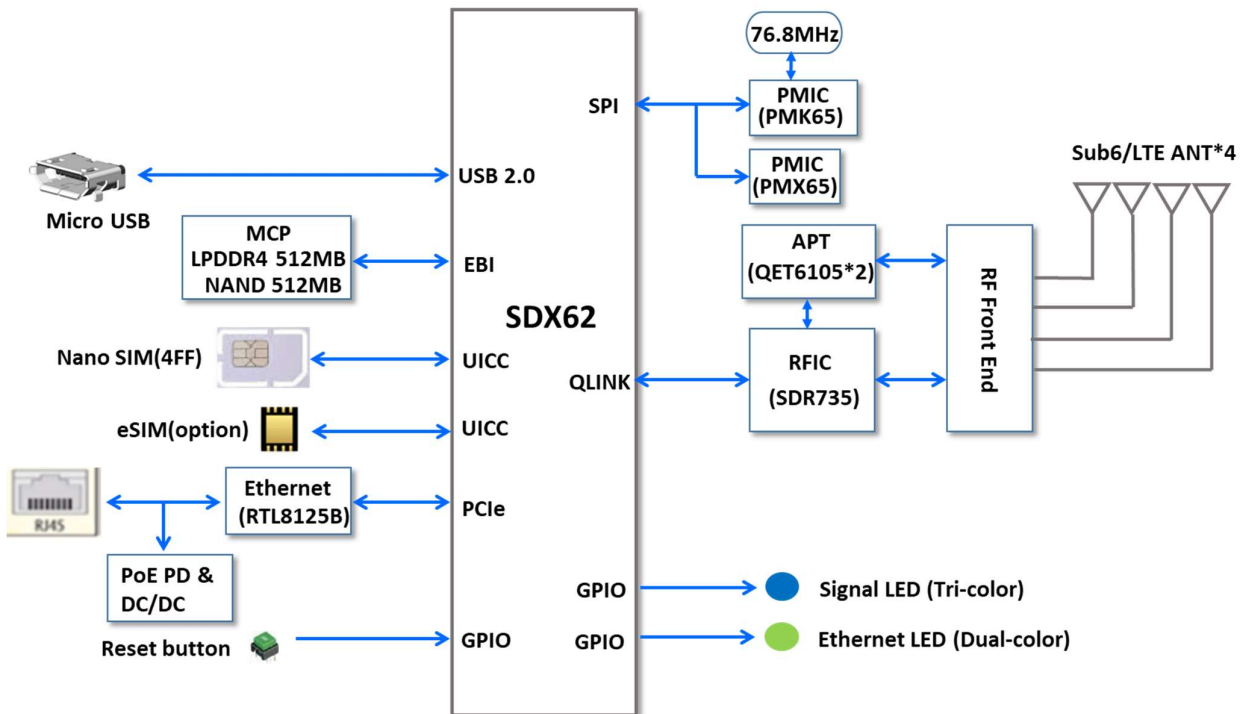
5. Feature Summary

Technology / Bands

- 5G Sub-6GHz Band:

  - DL 4x4 MIMO Band: n1/n3/n78
  - DL 2x2 MIMO Band: n5/n8/n40
  - UL 2x2 MIMO Band: n78
  - FDD Band: n1/n3/n5/n8
  - TDD Band: n40/n78

- LTE Bands:
  - DL 4x4 MIMO Band: B1/B3
  - DL 2x2 MIMO Band: B5/B8/B40
  - FDD Band: B1/B3/B5/B8
  - TDD Band: B40

Hardware interface
- One 2.5G RJ-45 PoE LAN port
- LEDs:
  - One tri-color signal status LE
  - One tri-color signal status LE

- One 4FF format Nano SIM card slot
- One reset to default button

Physical & Environment Specification
- IP67 Waterproof and dustproof grade
- Operating under wind rating 60 meter/sec which is compliant to GR-487-CORE
- 15.4W PoE PSU 56V/0.275A, 100-240VAC
- Operating temperature: -30 ~ 55℃

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6. Manufacturing Test Flow

The manufacturing test process will describe the whole function test item.

ASSY1
- All Thermal Gel
- All Shielding

DL
- SFIS Link data
- Download SW

PT1
- SFIS Link data
- Check SW Version
- Check HW ID
- Check customer ID
- Check secure boot
- Check PSN
- SIM Card Test
- SIM Card Test (remove & insert)
- Reset key test
- PHY Link speed test (2.5G)
- Ethernet LED Test
- Status LED test

PT2
- SFIS Link data
- Check SW Version
- Check HW ID
- Check PSN
- 4G/5G Non- signaling Calibration
- Backup QCN

A

A → **PT3**
- SFIS Link data
- Check SW Version
- Check HW ID
- Check PSN
- 4G/5G Non-signaling verification Test
- PHY Link speed test(1G)
- Ethernet LED Test

ASSY2
- Heatsink assembly
- LTE/NR5G Antenna and enclosure assembly

B

B → **FT3** → **FT4** → **C**

FT3:
- SFIS Link data
- Check SW version
- Check PSN
- Verify 5GNR/LTE antenna

FT4:
- SFIS Link data
- Check SW version
- Check PSN
- Write IMEI
- SIM Card Test
- SIM Card test (remove & insert)
- Reset Key
- PHY Link speed test (2.5G)
- Ethernet LED Test
- Status LED Test
- Write DSN
- Write Ethernet MAC
- Change Customer ID
- Check Customer ID
- Set to ONLINE mode
- Sync data to flash

C → **RC** → **Leakage** → **OBA Test** → **D**

RC:
- SFIS Link data
- Reset to Factory default
- Change to Normal Mode
- Check SW version
- Check HW ID
- Check PSN
- Check IMEI
- Check Customer-ID
- Check secure boot
- Check Ethernet MAC
- Check DSN
- Check ONLINE mode
- Check Normal Mode
- Ping device

Leakage:
- IP 67 Test

OBA Test:
- SIM test
- Record IMEI from GUI
- Record SW and HW version from GUI
- Check LAN connection speed (1G)
- LTE-connection test
- Record connection info
- Reset to default (from GUI)

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7. Test Block Diagram and Test Item Description
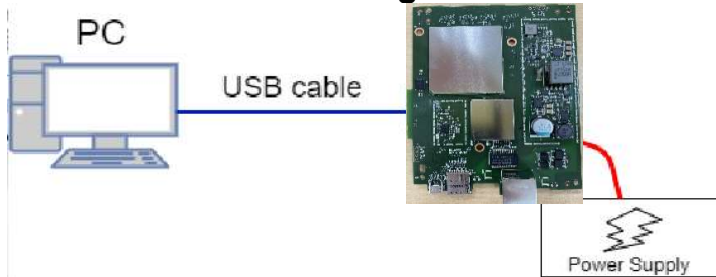
7.1 DL Description

7.1.1 Test Block Diagram

7.1.2 DL Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
USB Cable	1	U-GREEN	Micro-USB	1.8m
DL Fixture	1	ODM customized	DL Fixture	
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	1	Compscope	CAT 5/CAT6 2m	
Scanner	1	Honeywell	1950	

7.1.3 Test Items and Specs

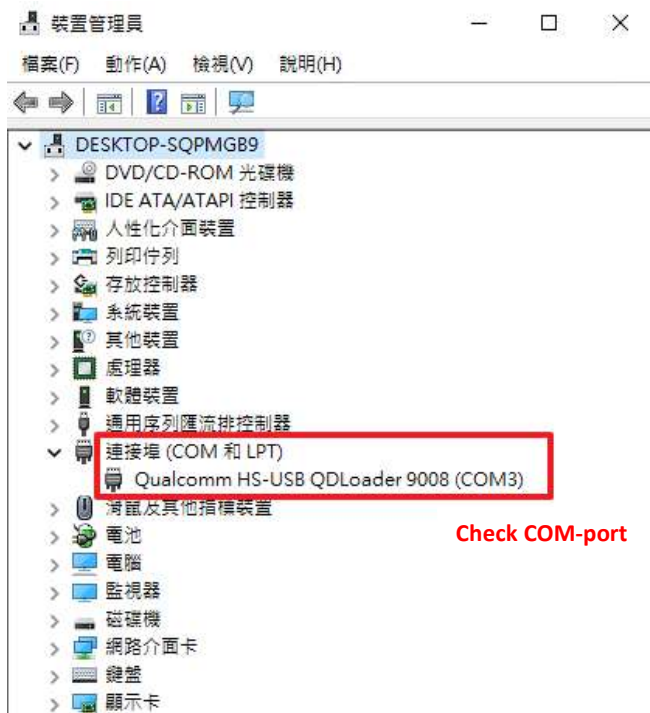**Download FW using QFIL**

1. Setup Download ENV

    (1) Connect USB to DUT

    adb root

    adb shell
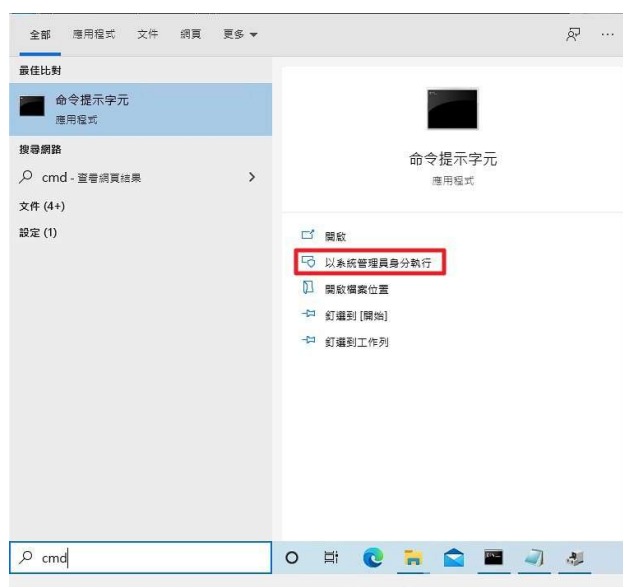
    / # sys_reboot edl

2. Download FW

---

(1) Check if there is a device, **Qualcomm HS-USB QDLoader 9008**, in device manager.

(2) Open CMD as administrator

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(3)   Check if QPST is installed, enter to QPST folder path

EX : C:\Program Files (x86)\QUALCOMM\QPST\bin\

(4)   Use QFIL to upgrade B01W009 MFT images
       //Example: COM port of 9008 is **25**,
       FW path is D:\test\FW_1.2.03.10 (depend on your PC-path and FW version)
QFIL.exe -Mode=3 -downloadflat -COM=25 -
Programmer=true;"D:\test\FW_1.2.03.10\prog_firehose_lite.elf" -
READBACKMODE=3 -DEVICETYPE="nand" -SWITCHTOFIREHOSETIMEOUT=50
-RESETTIMEOUT=500 -RESETDELAYTIME=5 -
MaxPayloadSizeToTargetInBytes=true;49152 -VALIDATIONMODE=0 -
ENABLEMULTISIM=true -SPCCODE="000000" -searchpath="D:\test\FW_1.2.03.10"
-reset -RESETAFTERDOWNLOAD=true -ERASEALL=true -
Rawprogram=rawprogram_nand_p4K_b256K.xml -Patch=patch_p4K_b256K.xml

   (Need to select "Erase All Before Download" and "Reset After Download")

(5)   After download completed, it will display "Download Succeed"
       and "Finish Download"

(6)   Wait 60sec. for DUT reboot

(7)   Check "ping 192.168.1.1" is OK

(8)   ETH CFG check

   adb shell "ls /etc/data/dsi_config.xml -al"

   -rwxr-xr-x 1 radio radio 36174 Jun 29 2023
   /etc/data/dsi_config.xml

Criteria: If file size is 36174, then pass, else to adb shell "freset 2"

(9) Power-off

Download FW using fastboot

1.Setup Download ENV

    (1)Press reset button

    (2)Power on DUT

    (3)Wait for 5 seconds

    (4)Release reset button

    (5)Check if DUT enter fastboot mode

       Command: fastboot devices

```
C:\ 命令提示字元
D:\>
D:\>
D:\>
D:\>
D:\>
D:\>fastboot devices
8f9084b6        fastboot

D:\>
```

2.Start to download images

    (1) Change to FW image directory.

        Example: cd D:\OD523_1.3.02.33_MFT_Airtel

    (2) Run below commands to download FW

        fastboot flash fwinfo fwinfo_mft.bin

        fastboot flash sbl xbl.elf

        fastboot flash tz tz.mbn

        fastboot flash tz_devcfg devcfg_low_ddr.mbn

        fastboot flash xbl_config xbl_config.elf

        fastboot flash xbl_ramdump xbl_ramdump.elf

        fastboot flash multi_image multi_image.mbn

        fastboot flash multi_image_qti multi_image_qti.mbn

        fastboot flash aop aop.mbn

        fastboot flash qhee hyp.mbn

        fastboot flash abl perf\abl.elf

        fastboot flash ipa_fw perf\ipa_fws.elf

fastboot flash uefi uefi.elf

fastboot flash boot perf\boot.img

fastboot erase system

fastboot flash system perf\sysfs.ubi

fastboot erase modem

fastboot flash modem NON-HLOS.ubi

fastboot flash vendor vendor_AIRT.img

fastboot flash sec sec.elf

fastboot reboot

(3) Wait for 60 seconds until DUT boot up

(4) Check if "ping 192.168.1.1" is OK

(5) ETH CFG check

adb shell "ls /etc/data/dsi_config.xml -al"

-rwxr-xr-x 1 radio radio 36174 Jun 29 2023 /etc/data/dsi_config.xml

Criteria: If file size is 36174, then pass, else to adb shell "freset 2"

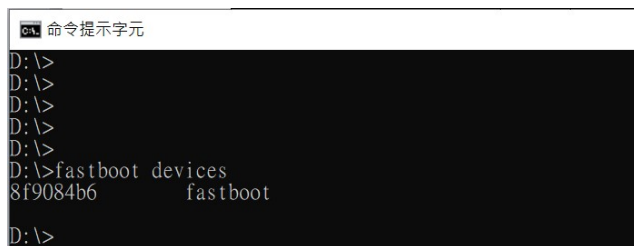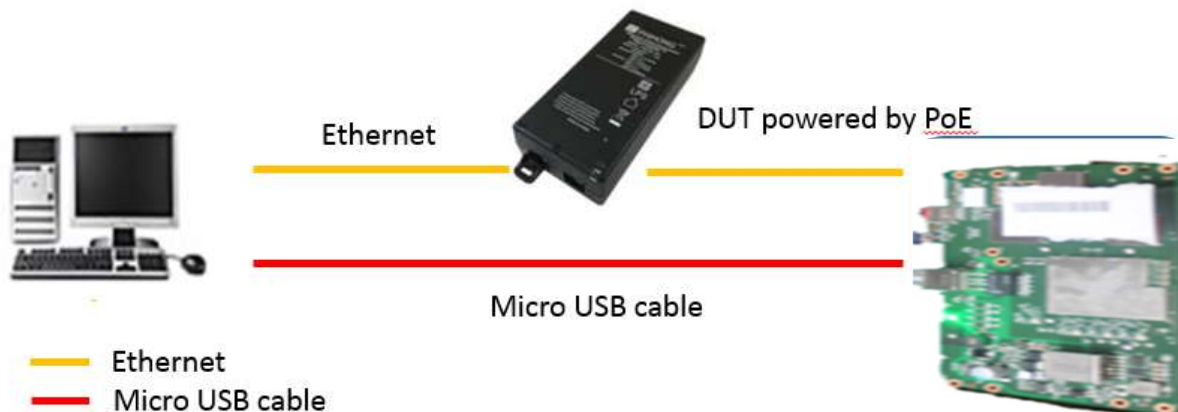(6) Power-off

7.2 PT1 Description
7.2.1 Test Block Diagram

7.2.2 PT1 Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
USB Cable	1	U-Green	Micro USB Cable 1.8m	USB 2.0
DC power Supply	1	ScientFic	PSD7303A	
PoE Power Adapter	1	Wisepower	JPI-542AW	Rework to DC in
Ethernet cable	2	Compscope	CAT 5/CAT6 2m	
Test SIM	1		Nano SIM	
5G PCIE Ethernet card or 5G USB to Ethernet dongle	1	Asus	XG-C100C - ASUS	Ethernet speed better than 2.5G
Scanner	1	Honeywell	1950	

7.2.3 Test Items and Specs

7.2.3.1 Check SW version
adb root
adb shell "cat /sys/class/oem/sw/apps_ver"
The return value is AOD523-AC.1.3.02.33_230920

7.2.3.2 Check HW ID
adb shell "cat /sys/class/oem/hw/hw_ver"

Return value should be 2.2 (1 : main board version, 2: module version)

7.2.3.3 Check MFT Mode
adb shell "upgrade -g mft"
Return value should be 1

7.2.3.4 Check Customer ID
adb shell "fx-at-cm at^customer?"

Return value should be 7 (Airtel)

0: General

4: Jio

7: Airtel

7.2.3.5 Check secure boot status

adb shell "cat /sys/class/oem/sw/secure_boot"
Return value should be 1
1: on (enabled)

0: off (disabled)

7.2.3.6 Write PSN

adb shell "echo FIODYYYYMMxxxxxxxx > /foxfact/PSN" (example format)

7.2.3.7 SIM Card Test

adb shell "fx-at-cm at+cpin?"
The return value should be "+CPIN: READY"

7.2.3.8 SIM Card – IMSI Test

adb shell "fx-at-cm at+cimi"
The return value is "001010123456789" (example)

7.2.3.9 Remove SIM

Remove SIM-card from SIM-slot

7.2.3.10 Check SIM card status (removed status)

adb shell "fx-at-cm at+cpin?"
+CME ERROR: SIM not inserted
adb shell "fx-at-cm at+cimi"
ERROR

7.2.3.11 Insert SIM card and check status again (insert status)

adb shell "fx-at-cm at+cpin?"
The return value is +CPIN: READY
adb shell "fx-at-cm at+cimi"
The return value is "001010123456789" (example)

7.2.3.12 Reset Key

adb shell "fx_send_data 0xc8 0x19 0x00 0x01"
Start key test daemon , return value should be 0xc8 19 00 01
Press Reset Key 1s
adb shell "fx_send_data 0xc8 0x19 0x01"
The return value is 0xc8 19 01 01 00 00 **02** for reset key press

7.2.3.13 PHY Link Speed Test**(2.5G)**

adb shell "ethutils -s"
The return value is "Speed: 2500Mb/s"

7.2.3.14 Ethernet LED Test

The color of the Ethernet LED is green.
Check LED color is green with eye.

7.2.3.15 Status LED Test

adb shell "fx_send_data 0xc8 0x05 0x50 0x0 0x1" (**Red**)
Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
The LED is **Red**

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adb shell "fx_send_data 0xc8 0x05 0x50 0x1 0x1" (Green)
Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
The LED is Green

adb shell "fx_send_data 0xc8 0x05 0x50 0x2 0x1" (Blue)
Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
The LED is Blue

adb shell "fx_send_data 0xc8 0x05 0x51" (OFF)
Check LED status, return value is 0xc8 0x05 0x51 0x01 for success
The LED is disable

7.2.3.16 Check if device is under FTM mode
 adb shell "fx-at-cm at+cfun?"
 The return value should be 5
(If CFUN not 5, set to 5 and check again

adb shell "fx-at-cm at+cfun=5"
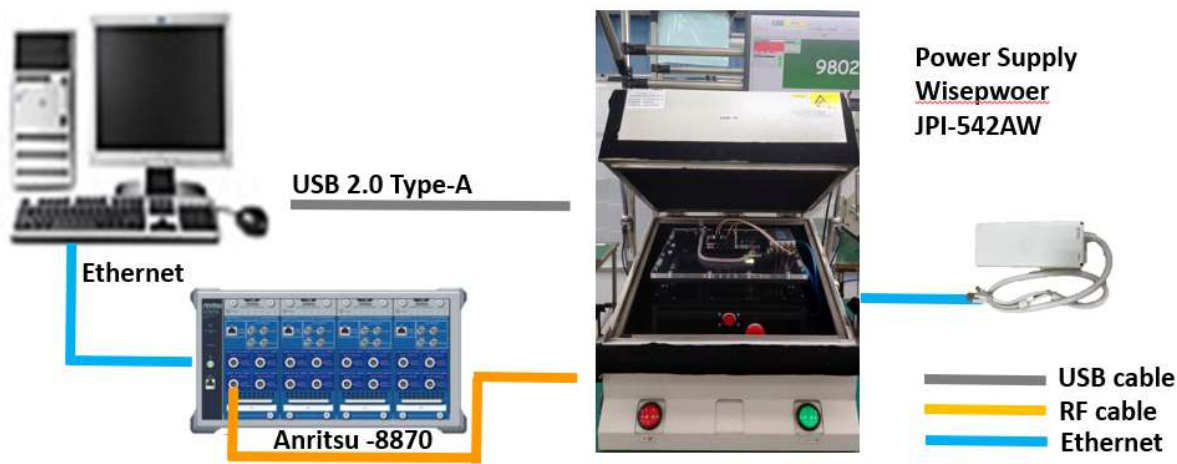
check FTM mode again

adb shell "fx-at-cm at+cfun?")

7.2.3.17 Power off

7.3 PT2 Description
7.3.1 Test Block Diagram

Purpose is calibration RF TX1/2 and RX 0/1/2/3 path of PCBA. Then it also verify cross-pole antenna path.

7.3.2 PT2 Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	2	Compscope	CAT 5/CAT6 2m	
Shielding Box	1	Charter	AD55-55-51	600 x 630 x 500mm
RF Cable	5	woken	0.5-6GHz	Thru-loss<1.3dB/m, 18GHz
Anritsu 8870A	1	Anritsu		
USB Cable	1	U-Green	micro-USB Cable 1.8m	
RF splitter	1	woken	0120A04056002D 0.6~6GHz - WOOKEN	
RF-attenuator 10dB	4	woken	WK0802-10 - WOOKEN	up to 6GHz
Scanner	1	Honeywell	1950	

7.3.3 PT2 Test Items and Specs

7.3.3.1 Check SW version
adb root
adb shell "cat /sys/devices/virtual/oem/sw/apps_ver"

The return value is AOD523-AC.1.3.02.33_230920

7.3.3.2 Check HW ID
adb shell "cat /sys/class/oem/hw/hw_ver"

7.3.3.3 Check PSN
adb shell cat /foxfact/PSN

7.3.3.4 Check if device is under FTM mode
adb shell "fx-at-cm at+cfun?"

Return value should be 5

7.3.3.5 Non-signaling calibration for 5G(Sub-6)、4G(LTE)

Folder Name: B01W009T02_Calibration_Tree_V02

Mode	Band

5G	n1/3/5/8/40/78
4G	B1/3/5/8/40

7.3.3.6 Backup QCN

Backup this xqcn file to server for each board

When the DUT do the calibration, program will reserve the cal-data in the path as follows

Backup .xqcn file to the server and the unique file name can be linked to the unique board.

C:\Qualcomm\QDART\Temp**hwid896_bid0_pid255_reference.xqcn**
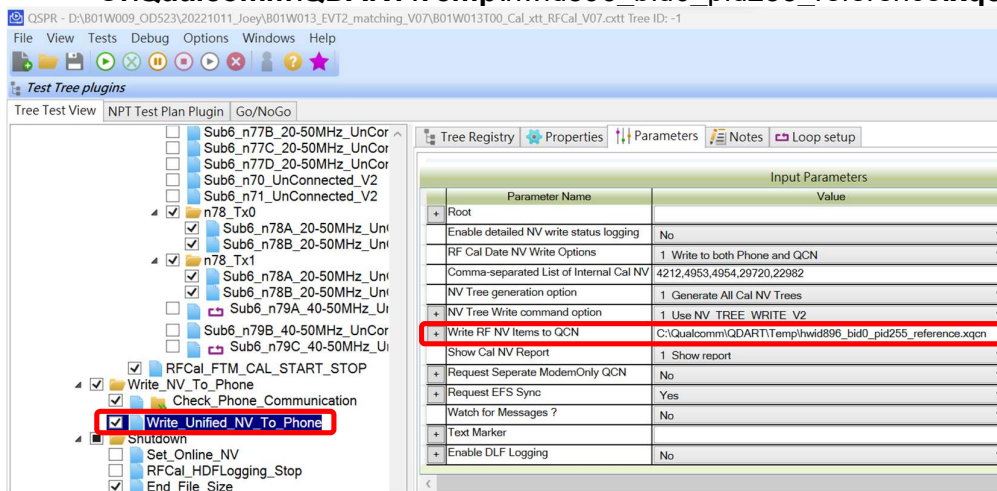
If calibration pass, please backup xqcn for each time.

The xqcn file in the temp will be covered for every calibration.
Before you do next board, you have to backup first.

7.3.3.7 Power Off

7.4 PT3 Description
7.4.1 Test Block Diagram

7.4.2 PT3 Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	1	Compscope	CAT 5/CAT6 2m	
Shielding Box	1	Charter	AD55-55-51	600 x 630 x 500mm
RF Fixture	1	Foxconn		
RF Cable	5	woken	0.5-6GHz	Thru-loss<1.3dB/m, 18GHz
Anritsu 8870A	1	Anritsu		
USB Cable	1	U-Green	Micro USB Cable 1.8m	
RF splitter	1	woken	0120A04056002D 0.6~6GHz - WOOKEN	
RF-attenuator 10dB	4	woken	WK0802-10	up to 6GHz
Scanner	1	Honeywell	1950	

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7.4.3 PT3 Test Items and Specs

7.4.3.1 Check SW version

adb root

adb shell "cat /sys/devices/virtual/oem/sw/apps_ver"

The return value is AOD523-AC.1.3.02.33_230920

7.4.3.2 Check HW ID

adb shell "cat /sys/class/oem/hw/hw_ver"

The return value is 2.2

7.4.3.3 Check PSN

adb shell cat /foxfact/PSN

7.4.3.4 Check if device is under FTM mode

adb shell "fx-at-cm at+cfun?"

The return value is 5

7.4.3.5 Non-signaling verification for 5G(Sub-6)、4G(LTE)

File Name: B01W009T02_NR5G_LTE_v3_221222

The Sub-6/LTE test-item and criteria depend on the latest release.

Mode	Band	Class	3GPP Standard	MFG Spec.
5G	n1/n3/n5/n8/n40/n78	3	23+3/-4	23+/-2.7
LTE	B1/B3/B5/B8/B40	3	23+3/-4	23+/-2.7

Test Item (LTE)	Condition	MFG LSL Spec	MFG USL Spec	Units
ACLR	E-Utra L		-29.2	dB
	U-Utra1 L		-32.2	dB
	U-Utra2 L		-35.2	dB
	U-Utra2 U		-35.2	dB
	U-Utra1 U		-32.2	dB
	E-Utra U		-29.2	dB
Carrier Leakage			-24.2	dBc
Frequency Error ppm		-355.5	355.5	Hz
IQ Offset			-22.9	dB
Reference Sensitivity			Follow 3gpp	dB
SEM	-(10-15) MHz		-23.5	dB
	-(5-10) MHz		-11.5	dB
	-(1-5) MHz		-8.5	dB
	-(0-1) MHz		-16.5	dB

	+(0-1) MHz		-16.5	dB
	+(1-5) MHz		-8.5	dB
	+(5-10) MHz		-11.5	dB
	+(10-15) MHz		-23.5	dB
EVM	Data EVM		17.5	pct
	RS EVM		17.5	pct

Test Item（5G-NR）	Condition	MFG LSL Spec	MFG USL Spec	Units
ACLR	Power Class 3	NA	30	dB
Frequency Error		-350	+350	Hz
In-band Emission		-17.3/-27.2	NA	dBm
Carrier leakage		-25	-999	dB
EVM		NA	17.5	%
OBW			100	MHz
EstimatedSensitivity	Sensitivity	Follow 3gpp		dBm
Rx AGC		-65	-55	dB
SEM	-100.0 to -105.0 MHz		-25	dB
	-5.0 to -100.0 MHz		-13	dB
	-1.0 to -5.0 MHz		-10	dB
	0 to -1.0 MHz		-24	dB
	0 to +1.0 MHz		-24	dB
	+1.0 to +5.0 MHz		-10	dB
	+5.0 to +100.0 MHz		-13	dB
	+100.0 to +105.0 MHz		-25	dB

7.4.3.6 Switch to Online mode
adb shell "fx-at-cm at+cfun=1"
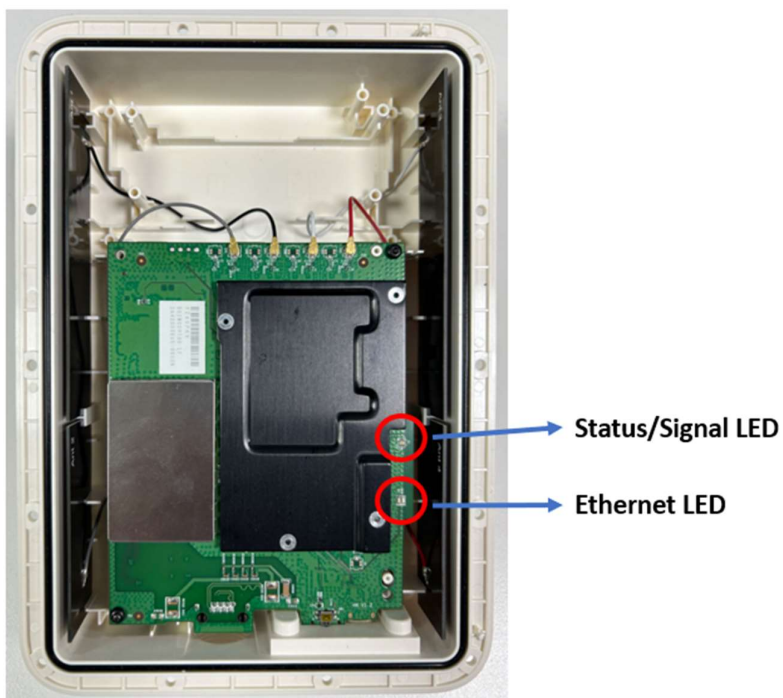
The return value is at+cfun=1

7.4.3.7 PHY Link Speed Test(1G)
adb shell "ethutils -s"
The return value is Speed: 1000Mb/s

7.4.3.8 Ethernet LED Test (**1G**)
Check the color of the Ethernet LED is **orange**.

7.4.3.9 Power Off

7.5 FT3 Description

7.5.1 Test Block Diagram
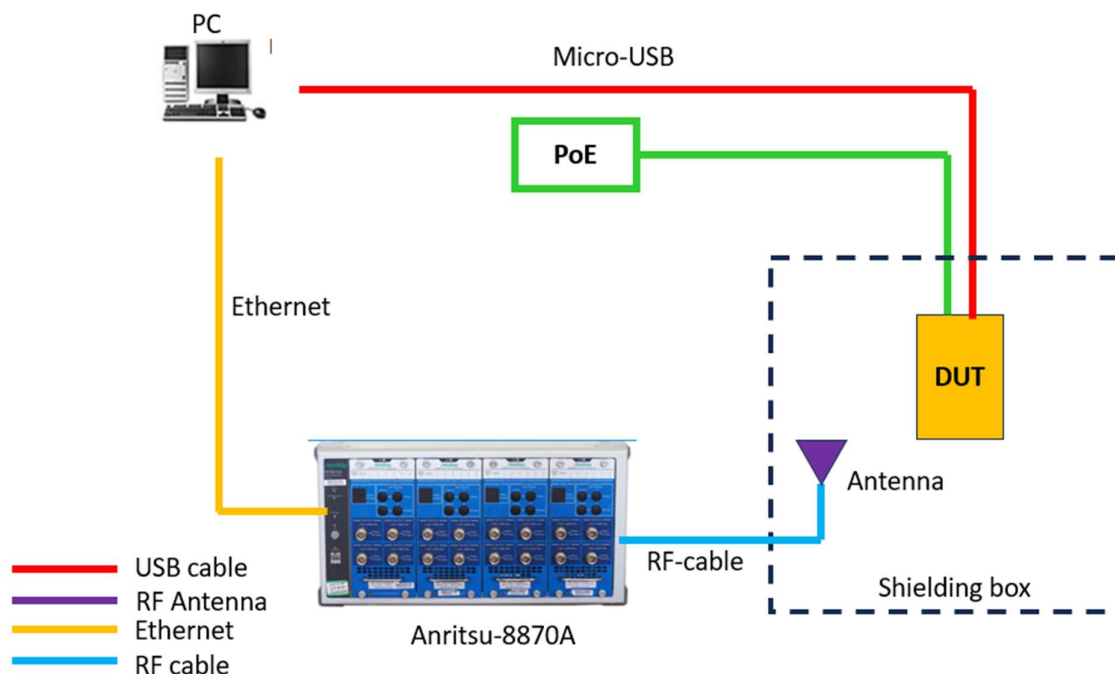
7.5.2 FT3 Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
Shielding Box	1	Foxconn		
Anritsu MT8820A	1	Anritsu	MT8870A	
RF Cable	3	Woken	0.5-6GHz	
LTE antenna	1		0.7-2.7GHz	
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	1	Compscope	CAT 5/CAT6 2m	
USB Cable	1	U-Green	Micro USB Cable 1.8m	

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7.5.3 FT3 5G-NR/LTE antenna test

7.6.3.1 Check SW version
adb root
adb shell "cat /sys/class/oem/sw/apps_ver"
The return value is AOD523-AC.1.3.02.33_230920

7.6.3.2 Check PSN
adb shell "cat /foxfact/PSN"

7.6.3.3 Verify 5G-NR/LTE antenna
Use "Anritsu-8870A" to test in B1
Verify TX1/RX0/RX1/RX2/RX3 RSSI respectively
Run test plan: B01W009_08_TestPlan_1121

Path \ Spec	M-Channel	Frequency (MHz)	Spec	
			Max.	Min.
ANT8_Tx1 Power	18300	1950	29	19
ANT8_Rx0 RSSI	300	2140	-50	-68
ANT1_Rx1 RSSI	300	2140	-50	-68
ANT5_Rx2 RSSI	300	2140	-50	-68
ANT6_Rx3 RSSI	300	2140	-50	-68

Path \ Spec	L-Channel	Frequency (MHz)	Spec	
			Max.	Min.
ANT8_Tx1 Power	18050	1925	29	19
ANT8_Rx0 RSSI	50	2115	-50	-68
ANT1_Rx1 RSSI	50	2115	-50	-68
ANT5_Rx2 RSSI	50	2115	-50	-68
ANT6_Rx3 RSSI	50	2115	-50	-68

Path \ Spec	H-Channel	Frequency (MHz)	Spec	
			Max.	Min.
ANT8_Tx1 Power	18550	1975	29	19
ANT8_Rx0 RSSI	550	2165	-50	-68
ANT1_Rx1 RSSI	550	2165	-50	-68
ANT5_Rx2 RSSI	550	2165	-50	-68

ANT6_Rx3 RSSI	550	2165	-50	-68

MP just test M-Channel,
Continue to optimize the test and criteria

7.6 FT4 Description

7.6.1 Test Block Diagram
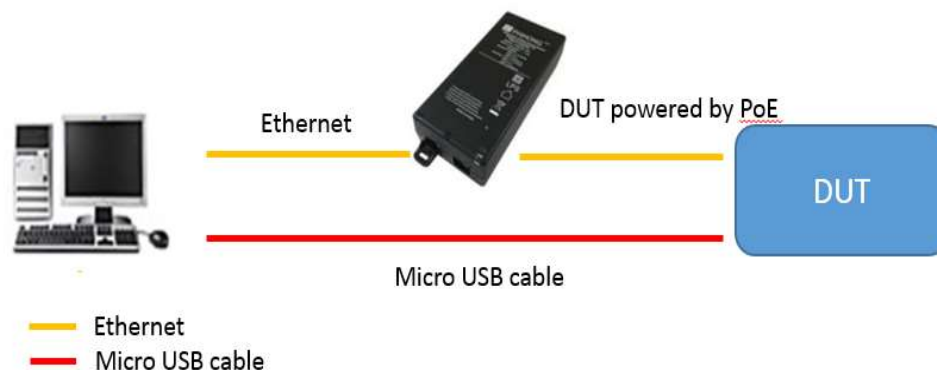
7.7.2 FT4 Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	Office/Excel CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
Shielding Box	1	Charter	AD55-55-51	600 x 630 x 500mm
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	1	Compscope	CAT 5/CAT6 2m	
USB Cable	1	U-Green	micro USB Cable 1.8m	USB 2.0
Scanner	1	Honeywell	1950	

7.6.3 Test Items and Spec

7.7.3.1 Check SW version
    adb root
    adb shell "cat /sys/class/oem/sw/apps_ver"
The return value is AOD523-AC.1.3.02.33_230920
7.7.3.2 Check PSN
    adb shell cat /foxfact/PSN

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7.7.3.3 Write IMEI
> adb shell "fx_send_data 0x27 0x26 0x02 0x08 0x3A 0x35 0x97 0x01 0x74 0x49 0x68 0x79"
> IMEI = 353791047948697

7.7.3.4 Check IMEI
> adb shell "fx_send_data 0xcc 0x63 0x26 0x02" or
> adb shell "fx-at-cm AT^GETIMEI"
> This command will check IMEI in foxNV and NV
> **0xcc 63 01 08 3a 35 97 01 74 49 68 79 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00**

7.7.3.5 SIM Card Test
> adb shell "fx-at-cm at+cpin?"
> The return value should be "+CPIN: READY"

7.7.3.6 SIM Card – IMSI Test
> adb shell "fx-at-cm at+cimi"

7.7.3.7 Remove SIM
> Remove SIM-card from SIM-slot

7.7.3.8 Check SIM card status (removed status)
> adb shell "fx-at-cm at+cpin?"
> +CME ERROR: SIM not inserted
> adb shell "fx-at-cm at+cimi"
> ERROR

7.7.3.9 Insert SIM card and check status again (insert status)
> adb shell "fx-at-cm at+cpin?"
> The return value is +CPIN: READY
> adb shell "fx-at-cm at+cimi"
> The return value is "001010123456789" (example)

7.7.3.10 Reset Key
> adb shell "fx_send_data 0xc8 0x19 0x00 0x01"
> Start key test daemon , return value should be 0xc8 19 00 01
> **Press Reset Key 1s**
> adb shell "fx_send_data 0xc8 0x19 0x01"
> The return value is 0xc8 19 01 01 00 00 **02** for reset key press

7.7.3.11 PHY Link Speed Test (2.5G)
> adb shell "ethutils -s"

7.7.3.12 Ethernet LED Test
> The color of the Ethernet LED is green.

7.7.3.13 Status LED Test
> adb shell "fx_send_data 0xc8 0x05 0x50 0x0 0x1" (Red)
> Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
> adb shell "fx_send_data 0xc8 0x05 0x50 0x1 0x1" (Green)
> Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
> adb shell "fx_send_data 0xc8 0x05 0x50 0x2 0x1" (Blue)
> Check LED status, return value is 0xc8 0x05 0x50 0x01 for success
> adb shell "fx_send_data 0xc8 0x05 0x51" (Off)
> Check LED status, return value is 0xc8 0x05 0x51 0x01 for success

Status signal LED status

Ethernet LED

7.7.3.14 Write Ethernet MAC
   Write Ethernet MAC
   adb shell "ethutils -w xx:xx:xx:xx:xx:xx"
7.7.3.15 Write DSN
   Write DSN
   adb shell "echo SFMRYYYYMMxxxxxxxx > /foxfact/DSN"
7.7.3.16 Check Customer ID
   Check if customer is 7
   adb shell "fx-at-cm at^customer?"
   The return value is at^customer?
             ^CUSTOMER: 7
7.7.3.17 If Customer-ID is not correct, change Customer-ID
   Check customer-ID to be 7(7.7.3.16).
   If not, change Customer-ID to be 7.
   After customer-ID change successfully, ODU will reboot automatically.
   adb shell "fx-at-cm at^customer=7"
   at^customer=7
   OK
    0： the customer is GEN
    1： the customer is DCM (TBD)
    2： the customer is SBM (TBD)
    3： the customer is KDDI (TBD)
    4： the customer is JIO
    7： the customer is Airtel

7.7.3.18 Check Customer ID (check 7.7.3.17 modification successfully)
        If 7.7.3.16 is correct, not necessary to do this step again)
        Check if customer is 7
        adb shell "fx-at-cm at^customer?"
        at^customer?
        AT^CUSTOMER: 7

7.7.3.19 Sync data to flash

adb shell "sync"
wait 2 seconds
adb shell "sync"
wait 2 seconds

7.7 RC Description

7.7.1 Test Block Diagram

7.7.2 RC Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
PoE Power Adapter	1	Wisepower	JPI-542AW	
Ethernet cable	1	Compscope	CAT 5/CAT6 2m	
USB Cable	1	U-Green	micro USB Cable 1.8m	USB 2.0
Test SIM card	1		Nano SIM	
5G PCIE Ethernet card or 5G USB to Ethernet dongle	1	Asus	XG-C100C - ASUS	Ethernet speed better than 2.5G

7.7.3 Test Items and Spec

7.8.3.0 Load default (factory reset)
adb root
adb shell "freset 2"
This command do not have return value, after issue this command, DUT will reboot automatically.

Then wait for 60 seconds.
adb shell "pidof atfwd_daemon"
This command is used to check if "Reset to Default" completed.
If a value return, "Reset to default" is completed.

```
D:\>adb shell "freset 2"
Succeed1rm: can't remove '.' or '..'
rm: can't remove '.' or '..'
Set efs2_erase_flag running flag value (1) successfully!

D:\>adb shell "pidof atfwd_daemon"

D:\>adb shell "pidof atfwd_daemon"

D:\>adb shell "pidof atfwd_daemon"
3768

D:\>
```

7.8.3.1 Change to Normal mode (Change DUT from MFT to Normal Mode)
adb shell "upgrade -s mft 0"
The return value is

```
C:\Users\dkc89>adb shell "upgrade -s mft 0"
Write MFT mode flag 0 at 0 block of fwinfo
Write MFT mode flag 0 at 1 block of fwinfo
Write MFT mode flag 0 at 2 block of fwinfo
Write MFT mode flag 0 at 3 block of fwinfo
Set mft enable running flag value (0) successfully!
```

7.8.3.2 Check SW version
adb shell "cat /sys/class/oem/sw/apps_ver"
The return value is AOD523-AC.1.3.02.33_230920

7.8.3.3 Check HW ID
adb shell "cat /sys/class/oem/hw/hw_ver"

Return value should be 2.2 (1 : main board version, 2: module version)

7.8.3.4 Check PSN
adb shell cat /foxfact/PSN

7.8.3.5 Check IMEI
adb shell "fx_send_data 0xcc 0x63 0x26 0x02" or
adb shell "fx-at-cm AT^GETIMEI"
This command will check IMEI in foxNV and NV
0xcc 63 01 08 3a 35 97 01 74 49 68 79 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

7.8.3.6 Check customer ID
Check if customer is 7
adb shell "fx-at-cm at^customer?"
at^customer?
^CUSTOMER: **7**
0： the customer is GEN
1： the customer is DCM (TBD)
2： the customer is SBM (TBD)
3： the customer is KDDI (TBD)
4： the customer is JIO
7： the customer is Airtel

7.8.3.7 Check Ethernet MAC
Check Ethernet MAC
adb shell "ethutils -r"

7.8.3.8 Check SSID
Check SSID: ALODCPE_XXXXXX, XXXXXX is last 8 digits of serial number
adb shell "cat /foxusr/broker/deviceWIFI.cfg | grep SSID_0_SSID"

7.8.3.9 Check ACS URL
  adb shell "cfg -v ACSSERVERURL"
  Return value should be http://testacs.airtelbroadband.in:8103
7.8.3.10 Check DSN
  adb shell "cat /foxfact/DSN "
  SFMRYYYYMMxxxxxxxx

7.8.3.11 Check secure boot status

  adb shell "cat /sys/class/oem/sw/secure_boot"
  Return value should be 1
  1: on (enabled)
  0: off (disabled)

7.8.3.12 Check if **ONLINE** mode
  adb shell "fx-at-cm at+cfun?"
  return value is +CFUN: 1 -> Pass
7.8.3.13 Check **Normal** Mode
  adb shell "upgrade -g mft"
  Return value should be 0
7.8.3.14 Ping device
  Please ping 192.168.1.1 with only Ether-port on 5sec

7.8 Leakage Test Description

The principle is vacuum from device interior air and when reach to certain pressure P0 (-10 K Pa) and monitor pressure changed after certain time T seconds. According to the pressure changed (P0-P1) to justify air leakage performance.

7.8.1 Test Block Diagram

The principle is vacuum from device interior air and when reach to certain pressure P0 (-10 K Pa) and monitor pressure changed after certain time T seconds. According to the pressure changed (P0-P1) to justify air leakage performance.
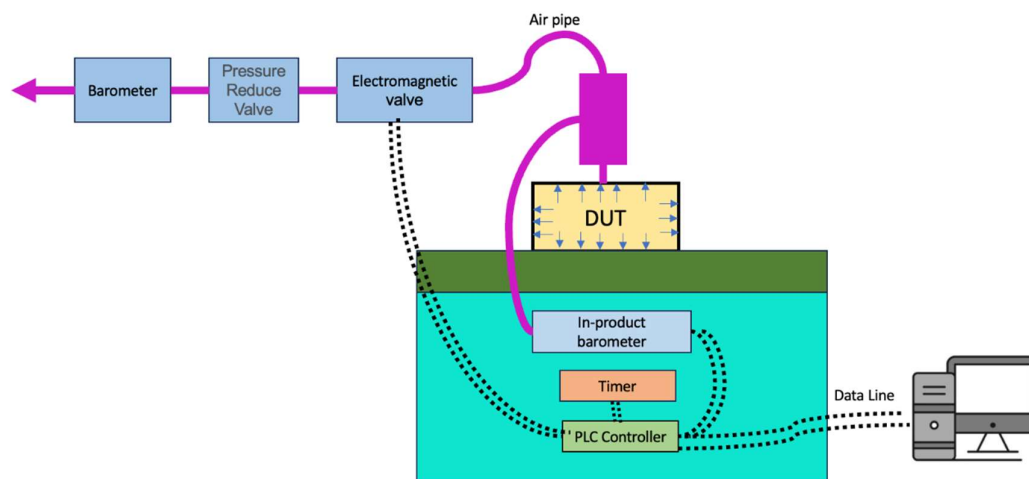
7.8.2 Leakage Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
PC	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
Air leakage equipment	1	Airproof	IPX8-PV-R4-ST	
Scanner	1	Honeywell	1950	

7.8.3 Test Items and Spec

7.9.3.1 Connect to air leakage equipment.

7.9.3.2 Open air pump to reach pressure -10K pa

7.9.3.3 Keep pressure during 30~50 seconds.

7.9.3.4 Read pressure gauge after stabilization time: 10 seconds.

Criteria: Air pressure can sustain certain time and pressure changed within specified range -00.300KPa, then pass.

7.9 OBA Test Flow

```
Connect to       SIM        Check        Record SW     Check LAN     Reset to
CMW500 or   →    Test   →    IMEI and  →  and HW    →   connection →  Default
MT8820C                      MAC          version       speed (1G)
```
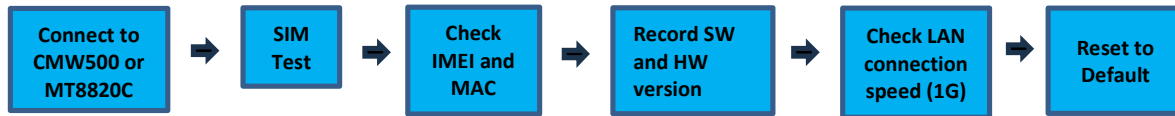
7.9.1 LTE Connection Test Architecture
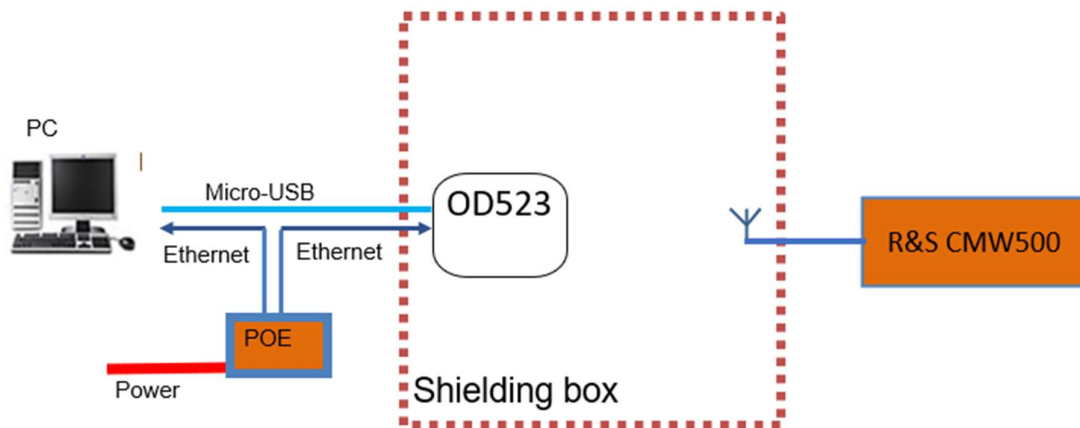
7.9.2 OBA Test Equipment list

Equipment Name	Qty	Vendor	Type	Remark
Personal Computer	1	HP	HP elite Disk 800 G4 SFF PC OS win 10	CPU: 3.0GHz or above, RAM: 4G or above, 1G Ethernet Network Interface
PoE Power Adapter	1	WISEPOWER	JPI-542AW	Power Supply
SIM	1			Test-SIM
Fix-fixture	1			To fix device position
Ethernet cable	2	Compscope	CAT 5/CAT6 2m	Ethernet cable

R&S CMW500	1	R&S	Emulator	R&S CMW500
USB Cable	1	U-Green	Micro USB Cable 1.8m	USB 2.0
Shielding box	1	Foxconn		
RF Cable	2	woken	0.5-6GHz	Thru-loss<1.3dB/m, 18GHz

7.9.3 SIM Test

7.9.3.1 Insert 4G test SIM card to DUT

7.9.3.2 Connect POE to DUT with Ethernet-cable

7.9.3.3 Connect POE to PC with Ethernet-cable

7.9.3.4 Connect to Anritsu MT8820C or R&S CMW500(Air-Link)

7.9.3.5 Login Web UI of DUT

   IP: https://192.168.1.1/

   Login password: admin

7.9.3.6 You can see "mark" of 4G signal and data connection icon (earth icon)
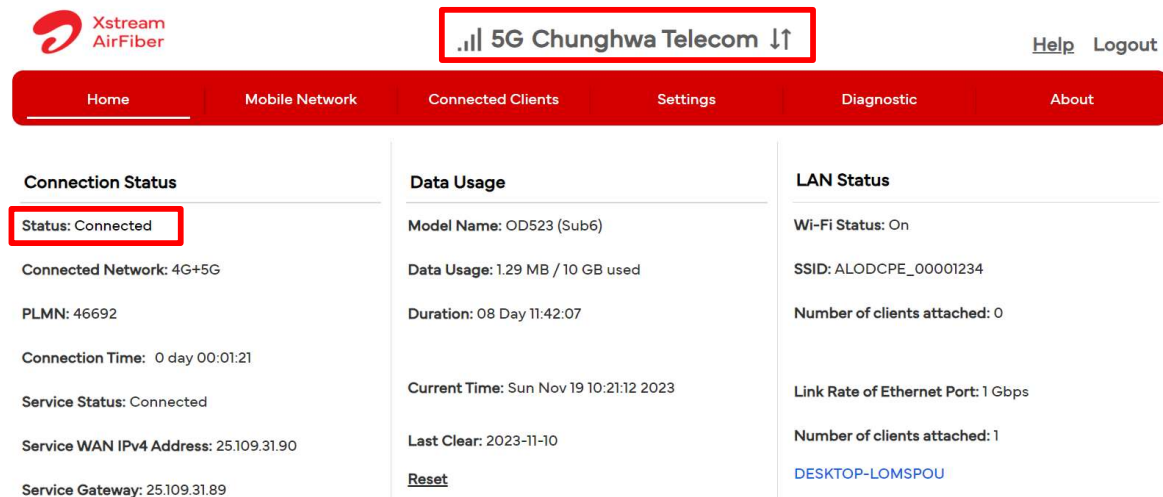
7.9.3.7 Check status is connected (If SIM is fail, status show no SIM)

  => If the status is wrong, please record and reset to default.

  => After "reset set to default" the status is wrong and define the display is failed

7.9.3.8 Please copy and save this homepage for each DUT

  Please see the figure as follows

Please Copy and Save this homepage

7.9.4 Check IMEI

7.9.4.1 Record the IMEI

Please see the figure as follows

7.9.5 Record Software version and Hardware version

7.9.5.1 Record the IMEI and LAN-MAC address
7.9.5.2 Hardware version is V2.2
Please see the figure as follows

7.9.6 Check the LAN connection (with PC)

Please check the Ethernet connection with 1Gbps

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7.9.7 LTE Connection Test

7.9.7.1 DUT Connect to Anritsu-8820C or R&S-CMW500 or Femtocell (Softbank J18B134.01)
7.9.7.2 Record band connection status from GUI
Please see the follows

LTE connection condition:

Test Band	Bandwidth	Channel
LTE (B1)-FDD	10M	300(DL)/18300(UL)

LED Status
When ODU connect to 5G NSA or 5G SA.
   RSRP >= -100dBm, LED display green
   RSRP < -100dBm, LED display Yellow
   No network, LED : Red Color

When ODU connect to 4G.
   Only 4G connected, LED display blue always.
   No network, LED : Red Color

Please record band connection status

7.9.8 Reset to Default Test

7.9.8.1 Reset to default from GUI
Enter GUI https://192.168.1.1
Enter Password: admin

Wait to reboot

7.9.8.2 After device boot up, check if previous modifications are changed to default values (Wait 60sec)