

VVDN_ESOM

8-07-2022

VVDN QCS 610 EVK User Guide



Revision History:

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Table of Contents

1. Introduction	5
2. QCS610 + Carrier Board	5
2.1 Power Source Selection	6
3. Debug Console (Micro B)	6
4. USB 3.1 Type -C	7
5. UART Console setup	7
6. Powering up the system	9
7. ADB setup:-	11
8. DC Power Jack Details	12
9. QDL & FASTBOOT Flashing Guide (Linux)	13
10. Expansion Header details (H7)	17
11. Mini PCIe Connector Details (J11)	18
12. Performance validation of interfaces	19
12.1 Ethernet	19
12.2 Wi-Fi	20
12.3 Bluetooth	23
12.4 IMX462 Camera Board Connection to QCS610 EVK	25
12.4.1. Prerequisites	26
12.4.2. Steps for validating camera sensor - Using Recording pipeline	26
12.4.3. Steps for validating camera sensor - Using streaming pipeline	27
12.4.3.1. Streaming over USB	27
12.4.3.2. Streaming over Network	28
12.4.3.3. Streaming over HDMI Display	30
13. Interface Validation Summary	32
13.1 Ongoing developments	32
13.2 Known bugs	32

List of Figures

1.	Introduction	5
2.	QCS610 + Carrier Board	5
2	2.1 Power Source Selection	6
3.	Debug Console (Micro B)	6
4.	USB 3.1 Type-C	7
5.	UART Console setup	7
		3



6. Powering up the system	9
7. ADB setup:-	11
8. DC Power Jack Details	12
9. QDL & FASTBOOT Flashing Guide (Linux)	13
10. Expansion Header details (H7)	17
11. Mini PCIe Connector Details (J11)	18
12. Performance validation of interfaces	19
12.1 Ethernet	19
12.2 Wi-Fi	20
12.3 Bluetooth	23
12.4 IMX462 Camera Board Connection to QCS610 EVK	25
12.4.1. Prerequisites	26
12.4.2. Steps for validating camera sensor - Using Recording pipeline	26
12.4.3. Steps for validating camera sensor - Using streaming pipeline	27
12.4.3.1. Streaming over USB	27
12.4.3.2. Streaming over Network	28
12.4.3.3. Streaming over HDMI Display	30
13. Interface Validation Summary	32
13.1 Ongoing developments	32
13.2 Known bugs	32



1. Introduction

This document contains information about the powering-up steps required for the VVDN QCS610 development board.

2. QCS610 + Carrier Board

A 12V DC adaptor is required to power the QCS610 development board (minimum 1A current is required)



Figure 1: QCS610 SOM + Carrier Board



2.1 Power Source Selection

Below figures shows the switch position options for DC Power and Battery Power selection.



Figure 2: Position of Switch



Figure 3: Positioning of Switch (SW2)

3. Debug Console (Micro B)

Connect USB Micro -B cable to the J13 port of the board and PC to get the UART console.





Figure 4: Micro-B (J13)

4. USB 3.1 Type -C

Connect Type -C cable to the USB 3.1 Type C port of the board and PC to get adb console.



Figure 5: USB 3.1 Type-C (J9)

5. UART Console setup

UART Console can be obtained either using minicom or picocom.

Using minicom-

• Run "minicom -s" in the PC and make the minicom settings from "Serial port setup" option. Refer the image attached below:



A - 5	Serial Device	: /dev/ttyUS80
8 · Loci	file Location	: /var/lock
6 - 64	Tout Program	
E · E	ips/Par/Bits	1 115200 BN1
F - Hard	ware Flow Contro	ι : Να
G - Soft	tware Flow Contro	t : Yes
Chang	e which setting?	
1	Screen and keybo	and 1
	Save setup as df	
	Exit	
1	Exit from Minico	n
	States and the states of the states	

Figure 6: Console settings in minicom

• After making the proper settings run the command "*minicom -D/dev/tty<device_node>*" in the laptop to get the board console.

For example : minicom -D /dev/ttyUSB0

Check the print by running the command "dmesg | grep tty | tail -1" as shown below



Using picocom-

• Use the command "*picocom -b 115200 /dev/tty<device_node>*" in the laptop to get the board console.

For example : picocom -b 115200/dev/ttyUSB0.

picocon vi.7	-CHN:/home/vvdn/Husic# picocom -b 115200 /dev/ttyUSB0
port is flowcontrol baudrate is parity is databits are escape is local echo is notrit is notock is send cnd is receive_cnd is enap is enap is	<pre>: /dev/ttyUSB0 : none 1 15200 i none : 0 : 0 : 0 : n0 : n0 : n0 : n0 : n0 :</pre>
Terminal ready	





6. Powering up the system

Below are the steps needed for setting up the system

- 1. USB 3.1 type-C cable, connect the board and PC for ADB shell
- 2. Micro-B cable, connect the board and PC for Debug Console
- 3. 12V DC adapter to the DC jack for Power

4. Once the Red LED (D67) is ON ,Press the Phone ON button (SW4) (QCS610 has multiple power On events like USB In , CBL_PWR# etc... depends on that the board may auto power On)



Figure 8: Connections

• Press the phone ON switch shown below to power on QCS610 SOM board or by simply connecting the type-C cable itself the SOM board will power ON.





Figure 9: Phone ON Switch

• After powering the SOM board, booting starts and the booting logs can be seen in picocom/minicom terminal.



Figure 10: Logs - Booting

After booting at the login screen, enter "**root**" as the username and "**oelinux123**" as password. The image below shows the obtained console and login screen.

1	17-8714931	sh6150-asoc-and socigcon,msm-aedia-aprigcon,obcore-audioisoundi	ASOCI no source widget found for MIC BIAS3
E .	17.802511]	sh6158-asoc-and ancigcon,mam-audio-aprigcon,obcore-audio:sound:	ASoci Falled to add roote MIC BIAS3 -> direct -> TX DMIC2
ŧ.	17.6945651	[drm-dp] dp aux end flfg tx: aux err: DP AUX ERR TOUT	
ŧ.	17.981438]	sn0158-asoc-and soc:gcom.msm-audio-aprigcom.gbcore-audio:sound:	ASoC: no sink widget found for MIC BIAS3
È -	17.912264	sm6158-asoc-and soc:gcon,msm-audto-apr:gcon,g6core-audto:sound:	ASof: Failed to add route Digital Mic2 -> direct -> MIC BIAS3
6	17,925294]	sm0158-asoc-snd soc:gcon,msm-audio-apr:gcon.gbcore-audio:sound:	ASoC: no source widget found for MIC BIASI
E.	17.936517	sm0150-asoc-and soc:qcom,msm-audio-apr:gcom,gocore-audio:sound:	ASOC: Failed to add route MIC BIAS3 -> direct -> TX DMIC3
Ē.	17,948881	sn6158-asoc-and soc:gcon,man-audio-aprigcon,g6core-audio:sound:	ASoCI no sink widget found for MIC BIAS3
E.	17,959744]	[drn-dp] dp_aux_cnd_flfo_tx: aux err: DP_AUX_ERR_TOUT	
t -	17,966058]	sn6158-asoc-and soc:qcon,nam-audio-apr:qcon,q6core-audio:sound:	ASoC: Failed to add route Digital Mic3 -> direct -> MIC BIAS3
t I	17.979251	sn6158-asic-snd socigcon,nsm-audio-aprigcon,g6core-audio:sound:	ASOC: no sink widget found for IN1_HPHL
Ε.	17,990036	an6150-asoc-and soc:gcon,man-audio-apr:gcon,g6core-audio:sound:	ASOC: Failed to add route HPHL_DUT -> direct -> INI_HPHL
E	18.662475]	sn6150-asoc-snd socracon,msm-audio-aprigcom,obcore-audio:sound:	ASOC: no sink widget found for IN2_HPWR
E -	18.813228]	sn6158-asoc-snd soc:qcom,mem-audio-apr:qcom,q6core-audio:sound:	ASoci Failed to add route HPHR_OUT -> direct -> IN2_HPHR
E.	18,825496]	[drm-dp] dp_aux_cnd_flfo_tx: aux_err: DP_AUX_ERR_TOUT	
£	18,631997]	sh6158-asoc-snd soc:qcon,msn-audio-apr:qcon,q6core-audio:sound;	ASoI: no sink widget found for IN3_AUX
E	18,042669]	sn0158-asoc-snd soc:qcom,msn-audio-apr:qcom,q0core-audio:sound:	ASoC: Failed to add route AUX_OUT -> direct -> IN3_AUX
£	18.854958]	sm0158-asoc-snd soc:qcom,Asm-audio-apr:qcom,q6core-audio:sound:	ASoC: no source widget found for ADC1_DUTPUT
£	10.8661531	sh6150-asoc-snd soc:gcom,Asm-audin-apr:gcom,g6core-audio:sound:	ASoC: Falled to add route ADC1_OUTPUT -> direct -> TX SWE_ADC0
E .	16,879146]	sho150-asoc-snd soc:qcom,hsm-audlo-apr:qcom,obcore-audlo:sound:	ASOC: no source widget found for ADC2_DUTPUT
₽	16.698381]	[dra-dp] dp_aux_end_fifo_tx: aux err: DP_AUX_ERR_TOUT	성상 방송 전 가슴 것 것 같아요. 안전에 대답한 것 같아요. 그는 여기는 가슴다
F	18.896649	shelse asoc and socidcow.wsk audia apridcow.decore audio:soundi	ASOCI Failed to add route ADC2_DUTPUT >> direct >> TX_SHM_ADC2
{	18.109975	shels8-asoc-snd socigcon, hsm-audio-aprigcon, gbcore-audio:soundi	ASOLI NO SINK WINDEL FOUND FOR SPERILEFT IN
£.	18,121007	sh0150-asoc-and socidcon.nsn-audio-apridcon.obcore-audio:soundi	ASOLI Failed to add route WSA_SPK1 GUT -> direct -> SpkrLert IN
£	38,134073	shoise-asoc-and socidcow/wak-andio-ablidcow/opcole-andio:sound:	ASOCT no sink widget found for SpkrRight IN
E .	18.145191	shoisd-asoc-and socidcon, Man-audio-aprigcon, obcore-audio:sound:	ASOLI FALLED to and route WSA_SPKJ OUT -> direct -> spkrktght in
6	18.158156]	[drn-dp] dp aux chd firo tx; aux err: DP AUX ERR TOUT	
	start.	ing save/nestore sound card stat[e	
E.	10,3142961	shoise-asoc-sho sociocon, hsh-audio-aprilocon, decore-audio: sound:	sound card shoiso lap-sho-card registered
ŧ.	18,3108421	type=1400 audit(1035325424.0321251)) avc: deniea 1 getattr j to	r pla=332 comme systemo-journal scontext=system_uisystem_risyste
£.	18.3253341	shoise-asoc-sho sociecon, Hsn-audio-aprigcon, gocore-audio sound	spergeon, Ash-audio-aprigeon, gheare-audio: sound supply pa-vadio r
	TO: 34/Det[chha-fune anner(199935245Are)t:tot): axe: menter / iean h	tersaz come systeme-journat name: invocation.aise-restore.servo
utz.	Linex fell	reference stack distro with debug capabilities. 1430 qcs610 odk	-64 ttyminb
	Constanting starts		
qcsi	10-00K-64	login: root	
031	swords		
	-		

Figure 11: Console and Login Screen

7. ADB setup:-

Connect the USB 3.1 Type C cable, **wait for few seconds after the boot up** and then open the terminal and enter the below commands for getting into adb shell.

- 1. adbroot
- 2. adb shell

The figure below show the obtained terminal and login

```
vvdn@5955--SW--CHN:~$ adb wait-for-device
vvdn@5955--SW--CHN:~$ adb devices
List of devices attached
4b108fd3 device
vvdn@5955--SW--CHN:~$ adb root
vvdn@5955--SW--CHN:~$ adb shell
/ #
/ #
```

Figure 12: Terminal showing ADB



8. DC Power Jack Details

Manufacturer: - CHUFON TECHNOLOGY CO., LTD (C-TEK) Part Number: - C020083-02



Dimensions are in mm



Figure 13: DC Power Jack Details



2.

9. QDL & FASTBOOT Flashing Guide (Linux)

The QCS610 Device can be flashed using QFIL (initial full flashing) or using Fastboot.

9.1 QDL Flashing Steps (Linux):-

- 1. Install below packages
 - sudo apt-get install libxml2-dev libudev-dev
 - Clone qdl source code and compile
 - git clone https://git.linaro.org/landing-teams/working/qualcomm/qdl.git
 - cd qdl
 - make (A binary named 'qdl' will be compiled in the cloned folder)

firehose.c	LICENSE	patch.c	patch.o	program.h	qdl	qdl.h	README	sahara.o	ufs.h	util.c
firehose.o	Makefile	patch.h	program.c	program.p	qdl.c	adl.o	sahara.c	ufs.c	ufs.o	
adevi8@ESOM	:~/VVDN_ES	OM/QFIL/q	dls	Programa	1992.00	and the				

3. Copy the 'qdl' binary to the folder where the QFIL images are located.

and the second se						
cmnlib.mbn	storsec.mbn	userdata 11.ing	userdata_26.ing	userdata_40.ing	userdata_SS.tmg	userdata_6.ing
devcfg.nbn	system 18.ing	userdata 12.1mg	userdata 27.1ng	userdata 41.ing	userdata 56.tng	userdata 70.ing
dspso.btm	system 11.ing	userdata 13.ing	userdata 28.ing	userdata 42.ing	userdata 57.tmg	userdata 71.1mg
dtbo.trig	system 12.ing	userdata 14.ing	userdata 29. ing	userdata 43.ing	userdata 58.tmg	userdata 72.ing
apt backup8.bin	system 1.ing	userdata 15.1mg	userdata 2.1mg	userdata 44.ing	usecdata 59.1mg	userdata 7.ing
gpt main0.bin	system Z.ing	userdata 16.ing	userdata 38.ing	userdata 45.ing	userdata 5.1ng	userdata 8.ing
hyp.nbn	system 3.ing	userdata 17.1mg	userdata 31.ing	userdata 46.tmg	userdata 60.thg	userdata 9.1mg
kn4.nbn	system 4.ing	userdata 18.ing	userdata 32. Log	userdata 47.ing	userdata 61.tmg	xbl config.elf
NON HLOS.bin	system 5.ing	userdata 19.1mg	userdata 33. ing	userdata 48.1mg	userdata 62.1mg	xbl.elf
patch0.xml	system 6.ing	userdata 1.ing	userdata 34.1mg	userdata 49.ing	userdata d3.ing	
persist 1.ing	system 7. ino	userdata 20.1mg	userdata 35.1mg	userdata 4.1ng	userdata 64.tmp	
adeviseESON: -/m	on gftl/enncs				and the second s	
	cmnlib.mbn devcfg.mbn dspso.btm dtbo.ing egpt_backup0.bin gpt_man0.bin hyp.mbn kA4.mbn MON.HLOS.bin patch0.xml persist_1.ing adevia@ESOM:~frg	cmnlib.mbn storser.mbn deverg.mbn system_18.ing dspso.bin system_11.ing dtbo.ing system_12.ing spt_backup0.bin system_2.ing hyp.mbn system_3.ing kn4.mbn system_3.ing kn4.mbn system_3.ing kn4.mbn system_6.ing patch0.xml system_6.ing persist_1.ing system_7.ing adeviagESONt-fermes	cmllb.nbn storsec.nbn userdata_11.ing devcfg.nbn system_18.ing userdata_12.ing dspso.btn system_11.ing userdata_13.ing dtbo.lng system_12.ing userdata_14.ing userdata_14.ing userdata_15.ing gspt_main8.bin system_3.ing userdata_18.ing hyp.nbn system_3.ing userdata_18.ing www.HoS.bin system_4.ing userdata_18.ing patch6.xnl system_6.ing userdata_19.ing patch6.xnl system_7.ing userdata_10.ing persist_1.ing system_7.ing userdata_20.ing userdata_20.ing	cmllb.nbn storsec.nbn userdata_11.ing userdata_26.ing devorg.nbn system_18.ing userdata_12.ing userdata_27.ing dspso.btn system_11.ing userdata_13.ing userdata_28.ing dtbo.ing system_12.ing userdata_14.ing userdata_29.ing userdata_15.ing userdata_20.ing userdata_30.ing system_3.ing userdata_18.ing userdata_30.ing kn4.nbn system_4.ing userdata_18.ing userdata_31.ing kn4.nbn system_4.ing userdata_18.ing userdata_31.ing userdata_18.ing userdata_33.ing userdata_18.ing userdata_33.ing userdata_10.btn system_4.ing userdata_19.ing userdata_31.ing kn4.nbn system_6.ing userdata_10.ung userdata_34.ing patch0.xnl system_7.ing userdata_20.ing userdata_35.ing userdata_20.ing userdata_35.ing userdata_35.ing	cmnlib.nbn storsec.nbn userdata_11.ing userdata_26.ing userdata_40.ing devorg.nbn systen 10.ing userdata_12.ing userdata_27.ing userdata_41.ing dspso.bin systen 11.ing userdata_12.ing userdata_27.ing userdata_21.ing dtbo.ing systen 11.ing userdata_14.ing userdata_27.ing userdata_41.ing upt backup0.bin systen 1.ing userdata_15.ing userdata_20.ing userdata_43.ing gpt nainb.bin systen 2.ing userdata_15.ing userdata_20.ing userdata_43.ing upt.nbn systen 3.ing userdata_17.ing userdata_31.ing userdata_44.ing wserdat_10.bin systen 3.ing userdata_18.ing userdata_31.ing userdata_44.ing wserdat_3.ing userdata_17.ing userdata_31.ing userdata_46.ing kn4.nbn systen 3.ing userdata_18.ing userdata_31.ing userdata_47.ing wserdat_3.userdat_19.ing userdata_19.ing userdata_31.ing userdata_49.ing userdata_31.ing userdata_31.ing userdata_49.ing patch0.xnl <t< td=""><td>Cmnlib.nbnstorset.nbnuserdata_11.inguserdata_26.inguserdata_40.inguserdata_55.ingdevorg.nbnsystem 18.inguserdata_12.inguserdata_27.inguserdata_41.inguserdata_56.ingdspso.binsystem 11.inguserdata_13.inguserdata_28.inguserdata_41.inguserdata_57.ingdtbo.ingsystem 12.inguserdata_14.inguserdata_29.inguserdata_41.inguserdata_57.inguserdata_10.binsystem 1.inguserdata_15.inguserdata_20.inguserdata_44.inguserdata_59.ingupt_backup0.binsystem 1.inguserdata_15.inguserdata_20.inguserdata_44.inguserdata_59.ingupt_backup0.binsystem 3.inguserdata_17.inguserdata_31.inguserdata_46.inguserdata_56.inghyp.nbnsystem 4.inguserdata_13.inguserdata_33.inguserdata_47.inguserdata_60.ingkM4.nbnsystem 5.inguserdata_13.inguserdata_33.inguserdata_47.inguserdata_62.ingpatch0.xnlsystem 6.inguserdata_1.inguserdata_34.inguserdata_63.inguserdata_62.inguserdata_10.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_63.ingpatch0.xnlsystem 7.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_20.inguserdata_20.inguserdata_35.inguserdata_44.inguserdata_64.inguserdata_1.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_64.ing</td></t<>	Cmnlib.nbnstorset.nbnuserdata_11.inguserdata_26.inguserdata_40.inguserdata_55.ingdevorg.nbnsystem 18.inguserdata_12.inguserdata_27.inguserdata_41.inguserdata_56.ingdspso.binsystem 11.inguserdata_13.inguserdata_28.inguserdata_41.inguserdata_57.ingdtbo.ingsystem 12.inguserdata_14.inguserdata_29.inguserdata_41.inguserdata_57.inguserdata_10.binsystem 1.inguserdata_15.inguserdata_20.inguserdata_44.inguserdata_59.ingupt_backup0.binsystem 1.inguserdata_15.inguserdata_20.inguserdata_44.inguserdata_59.ingupt_backup0.binsystem 3.inguserdata_17.inguserdata_31.inguserdata_46.inguserdata_56.inghyp.nbnsystem 4.inguserdata_13.inguserdata_33.inguserdata_47.inguserdata_60.ingkM4.nbnsystem 5.inguserdata_13.inguserdata_33.inguserdata_47.inguserdata_62.ingpatch0.xnlsystem 6.inguserdata_1.inguserdata_34.inguserdata_63.inguserdata_62.inguserdata_10.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_63.ingpatch0.xnlsystem 7.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_20.inguserdata_20.inguserdata_35.inguserdata_44.inguserdata_64.inguserdata_1.inguserdata_20.inguserdata_35.inguserdata_64.inguserdata_64.ing

- 4. Switch on the device and connect the C type USB cable to it.
- 5. Check the device availability in the terminal using the command:
 - adb devices

0

0

vvdn@vvsa-Lat List of devid 4a909a4b	itude-3400:-\$ adb devices es attached device
vvdnavvsa-Lat	1 tude= 3400 t+5
lsusb	
vvdn@vvsa-Latitu	de-3400:~\$ lsusb
Bus 882 Device 8	01: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 0	02: ID 0c45:671e Microdia
Bus 001 Device 0	35: ID 0403:6015 Future Technology Devices International, Ltd Bridge(I2C/SPI/UART/FIFO)
Bus 001 Device 0	36: ID 05c6:901d Qualcomm, Inc.
Bus 001 Device 0	03: ID 8087:0aaa Intel Corp.
Bus 001 Device 0	01: ID 1d6b:0002 Linux Foundation 2.0 root hub

- 6. Now open terminal and type the following commands:
 - adb root
 - adb reboot edl

(Now the device will be in EDL mode (9008) and the flashing process will begin)



8.

vvdn@vvsa-Latitude-3400:~\$ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 002: ID 0c45:671e Microdia
Bus 001 Device 035: ID 0403:6015 Future Technology Devices International, Ltd Bridge(I2C/SPI/UART/FIFO)
Bus 001 Device 036: ID 05c6:901d Dualcomm. Inc.
Bus 001 Device 003: ID 8087:0aaa Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
vvdn@vvsa-Latitude-3400:~S adb root
restarting adbd as root
vvdn@vvsa-Latitude-3400:~S adb reboot edl
vvdn@vvsa-Latitude-3400:~S lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 002: ID 0c45:671e Microdia
Bus 001 Device 035: ID 0403:6015 Future Technology Devices International Ltd Bridge(T2C/SPI/UART/FIFO)
Bus 001 Device B38: ID 85c6:9008 Dualcomm, Inc. Gobi Wireless Modem (ODI mode)
Bus 001 Device 003: ID 8087:0aaa Intel Corp.
Bus 001 Device 001: ID 1466:0002 Linux Foundation 2.0 root bub

- 7. Run the below command from the flat build folder (the folder in which the qdl and qfil binaries are located):
 - For QCS610:

sudo ./qdl --debug --storage emmc prog_firehose_ddr.elf

rawprogram_unsparse0.xml patch0.xml

(Now the linux system will be in waiting mode for the EDL device)





9.2 FASTBOOT STEPS :-

Power on the device and after the device booting is completed enter the below commands from terminal.

1. extract the tar file

\$ tar -xf ESOM_fastboot_img.tar.gz

\$ cd Esom_fastboot

vkchlt0459@7870--VISW--KOCHI1:-\$ cd Esom_fastboot/ vkchlt0455@7870--VISW--KOCHI1:-/Esom_fastboot\$

\$ adb root



\$ adb reboot bootloader

Check device is coming to fastboot mode or not using :

\$ fastboot devices



\$ fastboot flash abl ./abl.elf

\$ fastboot flash boot./boot.img

\$ fastboot flash dtbo./dtbo.img

\$ fastboot flash system.img

\$ fastboot flash persist ./persist.img

\$ fastboot flash userdata ./userdata.img

\$ fastboot reboot



жı

IK 2

: unable to connect for root: no devices/emulators f or: no devices/emulators found or: no devices/emulators found	faund
<pre>yet reported max download size of 805306368 bytes iing 'abl' (148 KB) r [0.000s]</pre>	
ting 'abl' / [0.007s] ished, total time: 0.016s	
<pre>get reported max download size of 885386366 bytes fing 'boot_a' (12658 KB) f [0.3265] ting 'boot_a'</pre>	
<pre>([0.109s] ished, total time: 0.435s set reported max download size of 005306368 bytes</pre>	
fing 'dtba' (2969 KB) /[0.006s] ting 'dtba'	
r [0.037s] ished. total time: 0.123s	
set reported max download size of 685306368 bytes sing 'system a' f [0.0885] ling 'system a' (516838 60)	

DKAY [15.881s] writing 'system a'... DKAY [0.000s] finished. total time: 15.959s

target reported max download size of 805306368 bytes

After flashing is successfully completed you will get this log as finished.

target reported max download size of 885386368 bytes sending 'persist' (4252 KB) ... OKAY [0.1185] writing 'persist' OKAY [0.038s] finished, total time: 0.156s target reported max download size of 805306368 bytes erasing 'userdata'... OKAY [0.0705] sending 'userdata' (135785 KB)... OKAY [3.1685] writing 'userdata'.... OKAY [0.060s] finished. total time: 3.238s rebooting... finished. total time: 0,050s vkchlt0455@7070--VISN--KOCHIl:-/Eson_fastboot\$

After flashing, restart the device.



9.3 QFIL Flashing (using Windows PC)

QFIL is a Windows-based image flashing tool and must be used when the developer uses Windows for flashing the device.

For QFIL please refer to the Document "QCS610/QCS410 Linux Platform Development Kit Software guide."

Ref ID: 80-PL631-200 (section 2.4.2.2)

10. Expansion Header details (H7)



EXPANSION HEADERS

All these signals are coming under 1.8V IO level.

Pullups are present in Carrier board (1.8V) for (CB_GP_I2C0_SCL, CB_GP_I2C0_SDA) and this I2C is already connected to Audio Codec in carrier board.



11. Mini PCIe Connector Details (J11)

Manufacturer = TE Connectivity

P/N = 1775862-2



Mini PCIe connector is an expansion option to add LTE feature to the carrier board. This can directly support EC25 LTE module from Quectel.

The Power "GSM_3V3" can source up to 3A current.

QCS610 can communicate to the Mini PCIe module through the USB2.0 interface.

The Signals EC25_USIM_DATA , EC25_USIM_CLK & EC25_USIM_RESET signals are for SIM card interface (J12).



A0-06

12. Performance validation of interfaces

The section covers the performance validation procedure and test results of major interfaces

12.1 Ethernet

12.1.1 IPERF Test

The LAN data rates are performed using the IPERF tool.

Iperf is a tool for network performance measurement. The device and PC can be used as either client or server and perform the test.

The test procedures are as follows,

1 2.1.1.1 Device as Server

- On Device enter the command **iperf3-s**
- On PC enter the command iperf3 -c <board ip> -t 60
- Then the data rate as shown below



12.1.1.2 Device as Client

- On PC enter the command iperf3 -s
- On Device enter the command iperf3 -c <laptop ip> -t 60
- Then the data rate as shown below

	66.94	1243-347843VI	5.00 mm #	ochill: \$ tpe	erta -s	
-54	erve	r listening or	5201			
				***********	*********************	
A	ccep	ted connection	from	192.168.1.1	0, port 42157	
T	51	local 192.168	1.1.5	port 5201 com	nnected to 192.168.1.10 port 42158	
Εř.	IDI	Interval		Transfer	Bitrate	
Ŧ.	51	0.00-1.00	sec	106 MBytes	886 Mbtts/sec	
Ť	51	1.00-2.00	sec	112 MBytes	941 Mblts/sec	
Ŧ	51	2.00-3.00	Sec	112 MBytes	941 Mbits/sec	
Ť	51	3.00-4.00	Sec	112 MBytes	941 Mbits/sec	
Ŧ.	51	4.00-5.00	540	112 MBytes	941 Mbits/sec	
Ŧ.	51	5.00-6.00	sec	112 MBytes	941 Mbits/sec	
Ť	- 51	6.00-7.00	Sec	112 MBytes	941 Mbits/sec	
Ť	51	7.00-0.00	sec	112 MBytes	941 Mbits/sec	



12.1.2 Streaming over Ethernet

• Run the following command in the device debug console or adb shell

gst-launch-1.0 -e qtiqmmfsrc name=qmmf ! video/x-raw\(memory:GBM\), width=1920, height=1080, framerate=30/1,format=NV12 ! omxh264enc target-bitrate=600000 control-rate=3 min-quant-iframes=25 min-quant-p-frames=25 max-quant-i-frames=36 max-quant-p-frames=36 intervalintraframes=149 num-ltr-frames=1 ! video/x-h264, profile=high ! h264parse config-interval=1 ! mpegtsmux name=muxer ! queue ! tcpserversink port=8900 host=x.x.x.x

"host=x.x.x.x", the IP address must be the same as configured for the device.

• Start VLC-Media-Player on PC

Open VLC media play and please turn off the Windows Firewall! Go to "Media" —> "Open Network Stream". Enter "tcp://127.0.0.1:8900" for network URL

Note: Make sure the device(board) and host(PC) are in the same network

12.2 Wi-Fi

12.2.1 Wi-Fi Client mode

To verify the connectivity while device is in station mode, Execute the following commands.

• ScanNearby Acess Point

iw wlan0 scan

• Connect with AP and get IP address by using **below command** Write SSID and password in/etc/misc/wifi/wpa_supplicant.conf file.

killall wpa_supplicant # killall dhcpcd # wpa_supplicant -Dnl80211 -iwlan0 -c /etc/misc/wifi/wpa_supplicant.conf -dddd # dhcpcd -i wlan0

• Check the IP address

ifconfig wlan0

• Check the Internet connection by pinging to the google

ping 8.8.8.8

12.2.2 Wi-Fi AP Mode

• Execute the following commands to check hostapd:



ps | grep hostapd 2345 /etc/misc/wifi/hostapd . conf

• Execute the following commands in one Terminal

interface=softap0

pkill -9 wpa_supplicant

hostapd /etc/misc/wifi/hostapd-open.conf -dddd &

• Execute the following commands in another terminal

ifconfig wlan0 192.168.43.1 netmask 255.255.255.0 up # pkill
-9 dnsmasq
dnsmasq -i wlan0dhcp-range=192.168.43.10,192.168.43.100,12hdhcp
easefile=/data/dnsmasq_d.lease

- Use phone to connect this Wi-Fi named: AndroidAPsdmsteppe
- Excecute the following command to check the status of hostapd

12.2.3

#hostapd_cli -i wlan0 Streaming over Wi-Fi

• Run the following command in the device debug console or adb shell

gst-launch-1.0 -e qtiqmmfsrc name=qmmf ! video/x-raw\(memory:GBM\), width=1920, height=1080, framerate=30/1,format=NV12 ! omxh264enc target-bitrate=600000 control-rate=3 min-quant-iframes=25 min-quant-p-frames=25 max-quant-i-frames=36 max-quant-p-frames=36 intervalintraframes=149 num-ltr-frames=1 ! video/x-h264, profile=high ! h264parse config-interval=1 ! mpegtsmux name=muxer ! queue ! tcpserversink port=8900 host=x.x.x.x

"host=x.x.x.", the IP address must be the same as configured for the device.

• Start VLC-Media-Player on PC

Open VLC media play and please turn off the Windows Firewall! Go to "Media" —> "Open Network Stream". Enter "tcp:/ 127.0.0.1:8900" for network URL

Note: Make sure the device(board) and host(PC) are in the same network

21



12.2.4 IPERF Test

12.2.4.1 Device as Server

- On Device enter the command **iperf3-s**
- On PC enter the command **iperf3 -c <board ip> -t 60** Then the data rate as shown below

/ # 100TE3 -8	
Server listening on 5201	
Acceptud connection from	192.160.43.91, part 41004
[3] local 192.108.43.1	port 5281 connected to 192.168.48.81 port 43886
[1D] Interval	Tranafay Bandaldth
51 0.00-1.00 Sec	4.12 Maytes 34 6 Mhits/and
1 51 1.00.2.00 Sec	3.57 MByles 25.9 Mults/sec
1 51 3.0H 2.60 Sec	4.20 Buyton 35.2 Buttshine
[5] 3:00 4.00 Sec.	4:00 PHYtes 340:7 Phils/sec
5 51 4-86-5.60 sec	4.42 MBytes 37.1 Milts/nec
1 51 5.00 6.00 Sec	4.00 MBytes 35.6 Moits/sec
51 6.06-7.00 sec	4.53 Milyten 28.0 Mitth/nec
31 7,00-8,00 Sec	4.10 PBytes 34.9 PDits/Sec
(5) 3.00.0:00 sec	4:37 HEyron 36.4 Hittsford
[5] 3.00-10.00 sec	4:19 BBytes 39.2 Molts/sec
51 10.00-10.07 sec	100 KBytes 53.0 Mbits/asc
[10] Interval	Transfer Bandicalith
1 51 0.000 38 03 Sec	W.HW Wyten W.DW With/sec sender
5 0.08 10.03 SHE	42.6 MBytma .23.6 Mbits/000 Feedlynt

While connecting the antenna

12.2.4.2 Device as Client

- On PC enter the command **iperf3 -s**
- On Device enter the command iperf3 -c <laptop ip> -t 60
- Then the data rate as shown below

vachi	1045987878	SHK	OCHII:-/Deskt	bp/5W/WV00 E550 1	/FCC_Cettifications iperf3 +:
Serve	r listening on	5201			
Acces	ted connection	from	192.108.43.1	, port 38236	
Ţ 51	local 192.168	,43.9	1 port 5201 c	onnected to 192.1	68.43.1 port 38236
[ID]	Interval		Transfor	Bitrate	
[5]	0.08-1.00		2.31 MBytes	19.4 Mbits/sec	
[5]	1.00-1.00		2.46 MByLes	20,6 Mbils/sec	
5.1	2,80 3.00	3-0-C	2.58 MByten	21.7 Hbits/sec	
1 51	3.86-4.88	5-8C	1.44 MBytes	12.1 Mbits/sec	
1 51	4.08-5.00	sec	1.32 Molyten	11.1 Moits/sec	
1 51	5,00.6,00		1.36 Møyten	11.4 Hbits/sec	
1 31	6.00-7.00	380	2.75 MBytes	23.1 Hbits/sec	
1 51	7.06-6.08	sec	2.33 Maytes	19.5 Hbits/sec	
5 31	8.00-9.00	6.00	1.14 MBytes	9.59 Mbits/sec	
1 51	9.00-10.00	sec	716 KBytes	5.88 Mbits/sec	
51	18.96-18.38	sec	388 KBytes	8 IB Mbits/sec	
T TD1	Interval		Transfor	Bitrate	
51	0.00-10.38		18.8 Möytes	15.2 Mbits/sec	receiver

While connecting the antenna



12.3 Bluetooth

12.3.1 Bluetooth Generic Access Profile (GAP)

• Before running btapp, run the btproperty in the background (run only once at the beginning

btproperty & btapp

• After running btapp, type gap_menu and press Enter. gap_menu

***************************************	*************************************
vien	u

enable
disable
inquiry
cancel_inquiry
pair <space><bt_address><space><transport> eg. pair 00:11:22:33:44:55</transport></space></bt_address></space>
0(auto)/1(BREDR)/2(BLE)
unpair <space><bt_address> eg. unpair 00:11:22:33:44:55</bt_address></space>
inquiry_list
bonded_list
get_state
get_bt_name
get_bt_address
set_bt_name <space><bt name=""> eg. set_bt_name MDM_Fluoride</bt></space>
<pre>set_scan_mode<space><scan (range="" 0-2)="" mode="" value=""> eg. set_scan_mode 00-</scan></space></pre>
BT_SCAN_MODE_NONE,1- BT_SCAN_MODE_CONNECTABLE, 2-
BT_SCAN_MODE_CONNECTABLE_DISCOVERABLE
set_afh <space><afh_host_channel_classification> eg. set_afh 112233445566778899f0</afh_host_channel_classification></space>
send_hci_cmd <space><hci_cmd> eg. send_hci_cmd 01,04,05,33,8b,9e,0a,00 - For Inquiry</hci_cmd></space>
main_menu

12.3.2 Enable Bluetooth

After running btapp, input "enable" and press "Enter"enable

enable killall: wcnssfilter: no process killed killall: btsnoop: no process killed killall: qcbtdaemon: no process killed /bin/sh: qcbtdaemon: not found /data/vendor/ssrdump is created diag: Unable to get remote processor info. Continuing with just the local processor Load Audio HAL started BT State is ON



12.3.3 Start inquiry

After running enable, type inquiry and press Enter to start inquiry.

inquiry

Inquiry Started Device Found details: Found device Addr: 50:29:f5:ee:7d:ca Found device Name: Realme 2 Pro Device Type is: 1 Device Found details: Found device Addr: 50:2f:9b:ce:91:3f Found device Name: 7881--VISN--KOCHI1 Device Type is: 1 Inquiry Stopped automatically

To cancel inquiry, issue the following command while the inquiry in progress: cancel_inquiry

12.3.4 Check the inquiry list

After running inquiry, type inquiry_list and press Enter to check the list. inquiry_list

12.3.5 Pair outgoing SSP

• Use the following command to pair outgoing SSP

pair<bd_address>

• To accept or reject the outgoing pairing for the following example (pair e4:ba:d9:10:00:c9), type Yes or No and press Enter.

pair 50:29:f5:ee:7d:ca 0 Auto select in the stack ACL state:0 change with reason 00 for device: 50:29:f5:ee:7d:ca

BT pairing request::Device Realme 2 Pro::Pairing Code:: 716151

** Please enter yes / no ** yes



To unpair the device, issue the following command- unpair<space><bt_address>

unpair 50:29:f5:ee:7d:ca

12.3.6 Check the bonded list

• After running btapp, type bonded_list and press Enter to check the bonded list:

• Disconnect bonded, type disable and press Enter disable:

```
disable
current State = 1, new state = 0 killall:
qcbtdaemon: no process killed killall:
wcnssfilter: no process killed
BT State is OFF
```

• To exit from btapp, navigate to the main menu and enter the following command:

exit BT is Already OFF, Just exiting APP Killed # |

12.4 IMX462 Camera Board Connection to QCS610 EVK





Please refer to "VVDN_IMX462_CAMERA BOARD_DATASHEET_A1" for Camera connection details.

Below are the steps for validating the Camera Capturing and Playback on the device. All the commands shown below need to be executed on the device debug console/ADB.

12.4.1. Prerequisites

• Disable rootfs write-protect

```
adb root
adb remount
adb disable-verity
adb reboot
adb wait-for-device
adb root
adb shell mount -o remount,rw,exec /
```

- Software Installed VLC (on PC).
- Pre Configuration for camera working properly

adb shell mkdir -p /etc/camera adb shell touch /etc/camera/camxoverridesettings.txt adb shell "echo IFEDualClockThreshold=600000000 >> /etc/camera/camxoverridesettings.txt"

- Run adb reboot to reboot the device.
- Set up the GStreamer environment: (requires on every session)

adb shell source/etc/gstreamer1.0/set_gst_env.sh

12.4.2. Steps for validating camera sensor - Using Recording pipeline

Single H264/H265 stream encoding with MP4 file dump

• Run below GStreamer pipeline for 1080p video recording on device.

\$ gst-launch-1.0 -e qtiqmmfsrc name=camsrc ! video/x-raw\(memory:GBM\), format= ?gst-launch-1.0 -e qtiqmmfsrc name=camsrc camera=1 ! video/x-raw\(memory:GBM\), format= NV12,width=3840,height=2160,framerate=30/1 ! queue ! omxh264enc ! queue ! h264parse ! mp4mux ! queue ! filesink location="/data/mux_cam0.mp4"



12.4.3. Steps for validating camera sensor - Using streaming pipeline

12.4.3.1. Streaming over USB

• Run below tcp port forwarding command in the PC terminal where the device is connected over USB.

adb forward tcp:8900 tcp:8900

• Run the following command in the device debug console or adb shell

\$ gst-launch-1.0 -e qtiqmmfsrc name=qmmf ! video/x-raw\(memory:GBM\), width=1920, height=1080, framerate=30/1,format=NV12 ! omxh264enc target-bitrate=600000 control-rate=3 min-quant-i-frames=25 min-quant-p-frames=26 max-quant-p-frames=36 interval-intraframes=149 num-ltr-frames=1 ! video/x-h264, profile=high ! h264parse config-interval=1 ! mpegtsmux name=muxer ! queue ! tcpserversink port=8900 host=127.0.0.1

• For taking live stream in PC, install video player app and take network stream from below link tcp://127.0.0.1:8900



Single Camera streaming over USB

Dual camera streaming over USB

Dual n/w stream test:

Device:



- source/etc/gstreamer1.0/set_gst_env.sh
- gst-launch-1.0 e qtiqmmfsrc name=camsrc0 camera=0 ! "video/x-raw(memory:GBM),format=NV12,width=1920,height=1080,framerate =30/1" ! queue ! omxh264enc control-rate=2 target-bitrate=6000000 interval-intraframes=30 loop-filter-mode=0 ! video/x-h264,width=1920,height=1080,profile=high ! h264parse config-interval=1 ! queue ! tcpserversink port=8900 host=127.0.0.1 \ qtiqmmfsrc name=camsrc1 camera=1 ! "video/x-raw(memory:GBM),format=NV12,width=1920,height=1080,framerate =30/1" ! queue ! omxh264enc control-rate=2 target-bitrate=6000000 interval-intraframes=30 loop-filter-mode=0 ! video/x-raw(memory:GBM),format=NV12,width=1920,height=1080,framerate =30/1" ! queue ! omxh264enc control-rate=2 target-bitrate=6000000 interval-intraframes=30 loop-filter-mode=0 ! video/x-h264,width=1920,height=1080,profile=high ! h264parse config-interval=1 ! queue ! tcpserversink port=8901 host=127.0.0.1

PC:

- adb forward tcp:8900 tcp:8900
- adb forward tcp:8901 tcp:8901

PC:

- ffplay tcp://127.0.0.1:8900
- ffplay tcp://127.0.0.1:8901



Dual Camera streaming over USB

12.4.3.2. Streaming over Network

• Run the following command in the device debug console or adb shell

gst-launch-1.0 -e qtiqmmfsrc name=qmmf ! video/x-raw\(memory:GBM\), width=1920, height=1080,



framerate=30/1,format=NV12 ! omxh264enc target-bitrate=600000 control-rate=3 min-quant-i-frames=25 min-quant-p-frames=25 max-quant-i-frames=36 max-quant-p-frames=36 intervalintraframes=149 num-ltr-frames=1 ! video/x-h264, profile=high ! h264parse config-interval=1 ! mpegtsmux name=muxer ! queue ! tcpserversink port=8900 host=x.x.x.x

"host=x.x.x.x", the IP address must be the same as configured for the device.

• Start VLC-Media-Player on PC

Windows :

Open VLC media play and please turn off the Windows Firewall! Go to "Media" \rightarrow "Open Network Stream". Enter "tcp://127.0.0.1:8900" for network URL.

Ubuntu :

vlc -vvv tcp://x.x.x.x8900

Note: Make sure the device(board) and host(PC) are in the same network segment!



Single Camera streaming over Network

Dual Camera Streaming through WiFi or Ethernet

- source/etc/gstreamer1.0/set_gst_env.sh
- gst-launch-1.0 -e qtiqmmfsrc name=camsrc0 camera=0 ! "video/xraw(memory:GBM),format=NV12,width=1920,height=1080,framerate =30/1" ! queue ! omxh264enc control-rate=2 target-bitrate=6000000 interval-intraframes=30 loop-filter-mode=0 ! video/x-



 $\label{eq:h264} h264, width=1920, height=1080, profile=high ! h264 parse config-interval=1 ! queue ! tcpserversink port=8900 host=<$HOST_IP> \ qtiqmmfsrc name=camsrc1 camera=1 ! "video/x-raw(memory:GBM), format=NV12, width=1920, height=1080, framerate =30/1" ! queue ! omxh264 enc control-rate=2 target-bitrate=6000000 interval-intraframes=30 loop-filter-mode=0 ! video/x-h264, width=1920, height=1080, profile=high ! h264 parse config-interval=1 ! queue ! tcpserversink port=8901 host=<$HOST_IP>$$



Dual Camera streaming over Network

12.4.3.3. Streaming over HDMI Display

Start the weston

- Run the following command to check if Weston is running /# ps | grep weston
- Ensure that the external display monitor (1080p) is connected via HDMI.
- Set up the environment variable requires on every session

```
export XDG_RUNTIME_DIR=/run/user/root
```

Run the following command in the device debug console or adb shell

```
$ gst-launch-1.0 -e qtiqmmfsrc name=camsrc camera=0 ! video/x-
raw\(memory:GBM\),format=NV12,width=1920,height=1080,framerate=30/1 ! queue ! waylandsink
sync=false enable-last-sample=false fullscreen=true
```





Single Camera streaming over HDMI Display

Multi-stream playback

• Stream over two pipelines

\$ gst-launch-1.0 -e qtiqmmfsrc name=camsrc0 camera=1 ! video/x-raw\(memory:GBM\), format=NV12, width=1920,height=1080,framerate=30/1 ! queue ! waylandsink name=d1 x=45 y=300 width=864 height=486 qtiqmmfsrc name=camsrc1 camera=0 ! video/x-raw\(memory:GBM\), format=NV12, width=1920,height=1080,framerate=30/1 ! queue ! waylandsink name=d2 x=1000 y=300 width=864 height=486



Dual Camera streaming over HDMI Display



13. Interface Validation Summary

Following interfaces are validated on QCS610 EVK,

- 1. UART Console(USB 2.0 Micro-B)
- 2. USB 3.1 Type-C
- 3. Ethernet
- 4. Wi-Fi
- 5. Bluetooth
- 6. Camera Connectors
- 7. Mini PCIe Connector
- 8. Micro-SD Card
- 9. USB2.0Type-A
- 10. HDMI

13.1 Ongoing developments

- Audio Codec
- LCD Module

13.2 Known bugs

HDMI - Weston Stability Issue



The QC610-410EVK contains FCCID: 2A8AKQC610-410EVK. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Caution: Any changes or modifications not expressly approved by VVDN void the user's authority to operate the equipment.

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.