DRRU-R428 User Manual

Content

1. Radio Setup

1.1. Radio Interface

Please find Table 3-1 for interface definitions shown in the figure below:

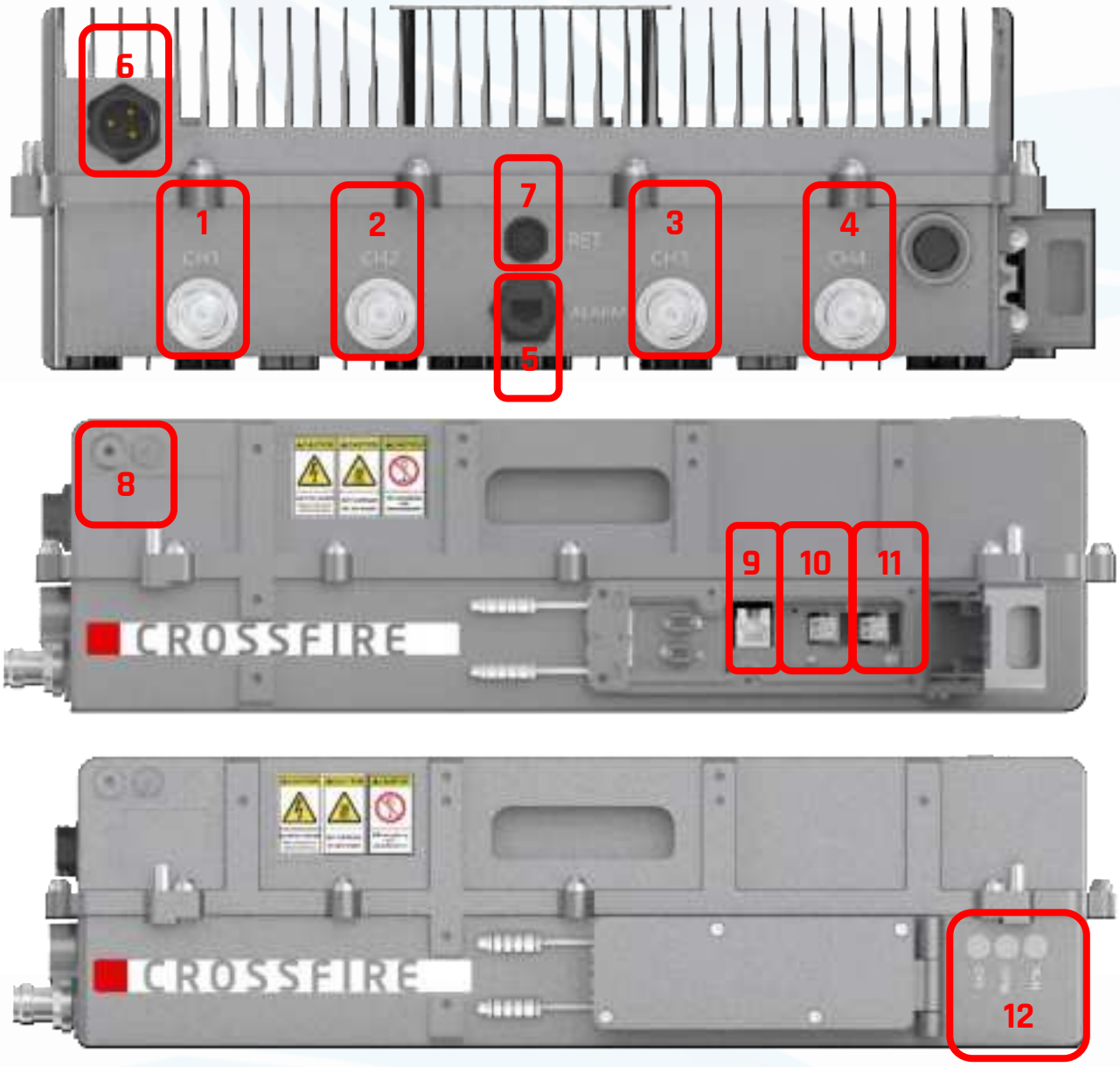


Table 1-1 Interface definition

Index Number	Port Name	Description	Remarks
1	CH1	Duplex DL/UL RF Port 1	Connect to antenna
2	CH2	Duplex DL/UL RF Port 2	
3	CH3	Duplex DL/UL RF Port 3	
4	CH4	Duplex DL/UL RF Port 4	
5	ALARM	External Alarm Port	
6	POWER	Power Socket Interface	
7	RET	Reserved	
8	GND	Grounding	
9	DEBUG	Maintenance Interface	GUI: https://10.7.3.200 default
10	OPS	OP Port for Previous Uint	Connect to DU/PTP Switch
11	OPM	OP Port reserved for Cascade	
12	LED	LED Indicator of OP & System	

* Please use 10G port & SFP+ module

See Indicator Status and indication in the table below:

Table 1-2 **OPS/OPM** OPTICAL INDICATOR

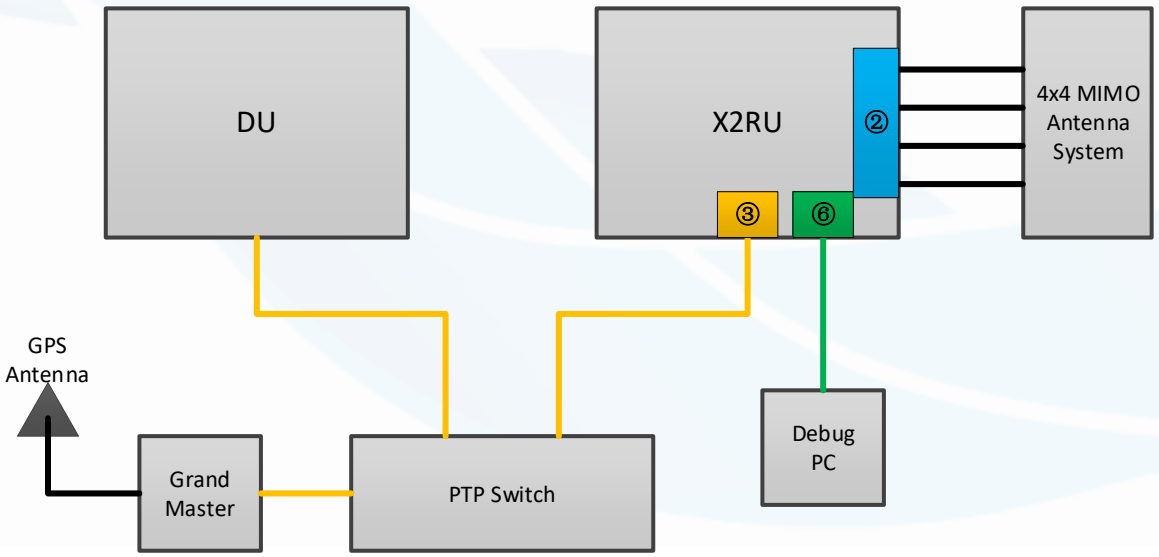
Optical Indicator	Description
Green	Normal
Red	The optical link is not synchronized.
N/A	Optical module is not plugged in

Table 1-3 SYSTEM **RUN** INDICATOR

Status Indicator	Description
Flash Green	Element is working without an alarm
Solid Green	Software is crashed, but it will reboot automatically in 3 mins
Flash Red	Element is working but with alarm
Solid Red	Software is crashed (with alarm), but it will reboot automatically in 3 mins
Flash Orange	Software is upgrading
Solid Orange	Element is booting

1.2. Typical Connection

The Picture below shows the typical connection of X2RU in an ORAN application.



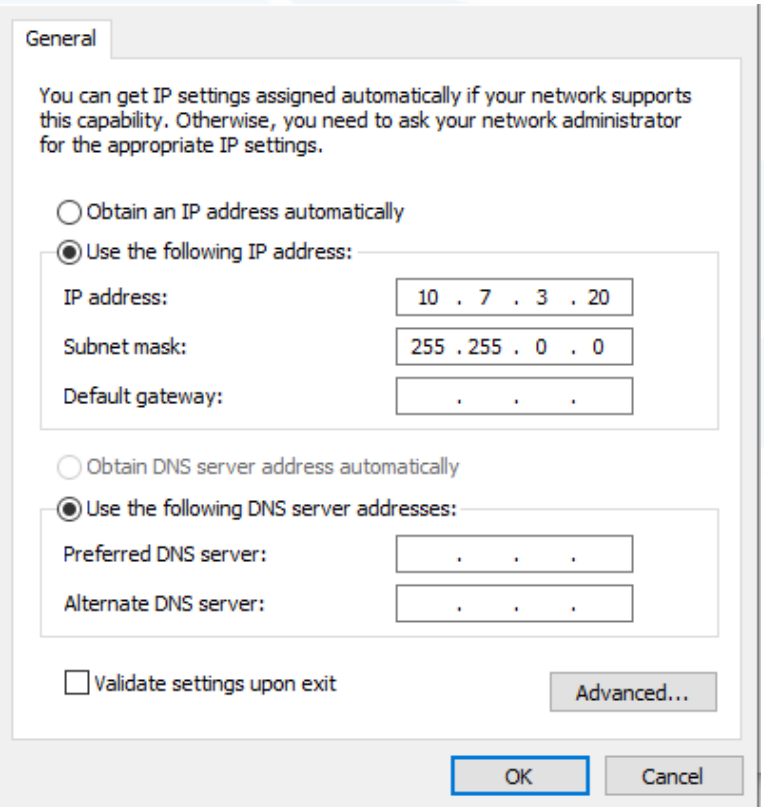
Note: Please use 10G port & SFP+ module for DU and X2RU.

SFP+ Recommendation:

Type	Status
FTLX8573D3BTL	Validated

2. Radio Login

Currently X2RU uses local debug Ethernet port for radio O&M. It's using a fixed IP address of 10.7.3.200. To login the radio, please confirm the PC IP address is accessible for the radio. Picture below shows an example.



2.1. Enable GUI with back door

For the latest version, GUI will be disabled for safety considerations, all configurations will be pushed from M-Plane. In this case, it's very inconvenient for radio IOT and debug. A back door can be used to enable the GUI, please follow the steps below for this function:

Step #1 - Open windows command console and use command:

ssh dasUser@10.7.3.200

Step #2 - Enter password:

CF!DasUser@sw1

Step #3 - Use the blow command in the console:

touch /tmp/boa.txt

Step #4 - Wait for 3 minutes for obtaining GUI authority

2.2. OMT Login

Please enter https://10.7.3.200 in an internet browser to visit the web GUI.

At login page, use the credentials shown below:

User	admin
Password	admin

2.3. Console login

At the current integration stage, sometimes it would require console access to debug or monitor the radio. Please use any SSH tools to login the radio console via dasUser@10.7.3.200.

Password: CF!DasUser@sw1

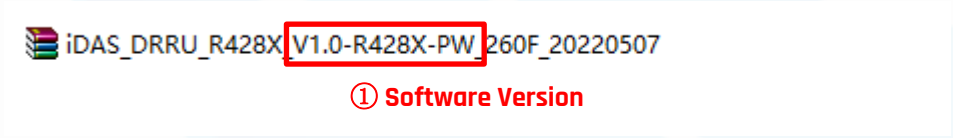
The login might be denied for the first time, please try with the credential again.

3. Upgrade

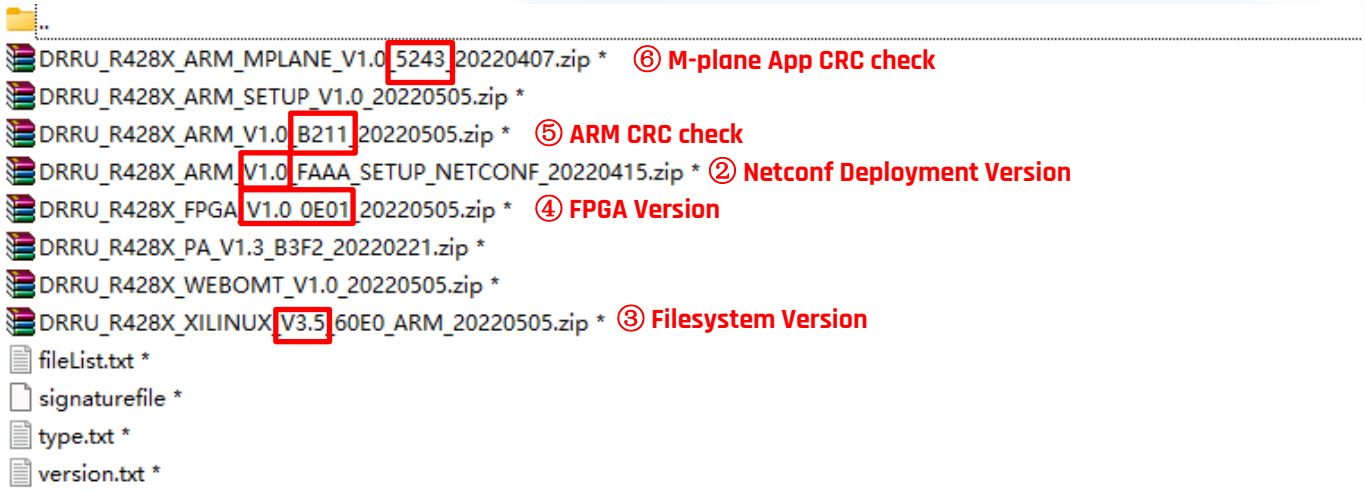
3.1. Firmware Version Check

Firmware version info is in the page Maintenance -> Engineering and Settings >LAN Connectivity, you may follow the red indicator shown in the pictures below.

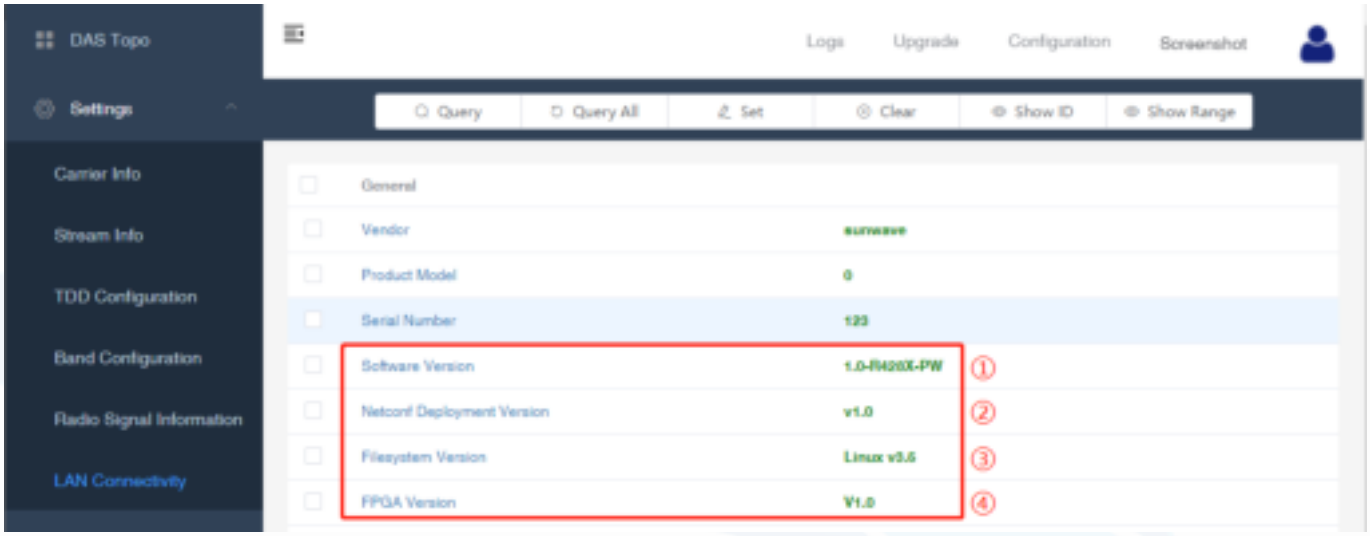
1) Take the following firmware program as an example, the version number is shown in the following image:

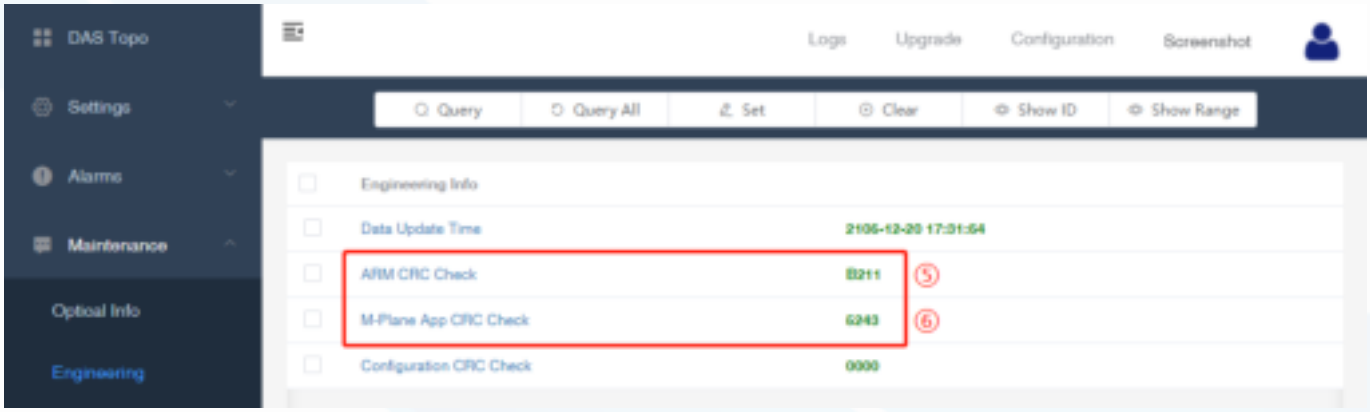


2) Decompress the package of the firmware program to see the version numbers and CRC of other programs, such as ARM, PA, and SETUP_NETCONF.



3) The version number and CRC (①~⑥) in the above firmware program can correspond to the display in OMT one by one, as shown in the following figures:





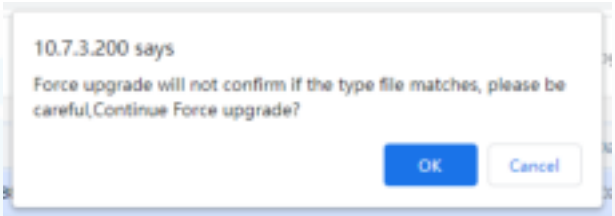
Then click on the Button “Query all” shown in the picture with blue mark. The CRC information for the firmware currently in use will appear in the box marked with red. Note ① to ⑥ in the following figure show the firmware information of the current device. You can compare the firmware information with the software package to check whether the firmware is up to date or confirm the upgrade result.

3.2. Upgrade with a new load

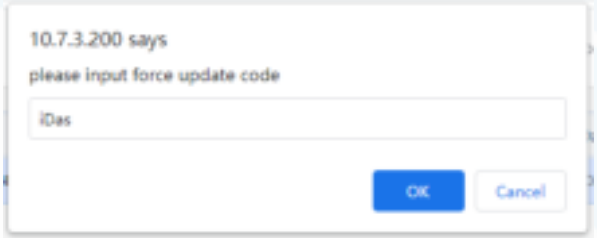
Click on the Upgrade button shown in the main page below.

After enter the upgrade page, click on the “Upload” button shown below; a file will be asked, select the package to upgrade the radio. After the package has been selected and uploaded, Select the firmware to be upgraded according to Step ③, and click “forced upgrade” to upgrade the firmware.

A warning will show up as shown below, click the OK button.



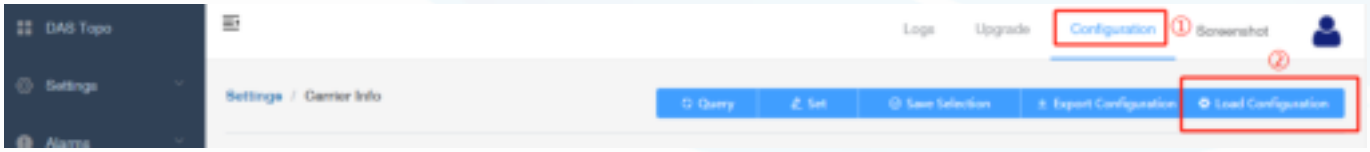
A password then will be asked for “Force Upgrade”, enter “iDas” and confirm.



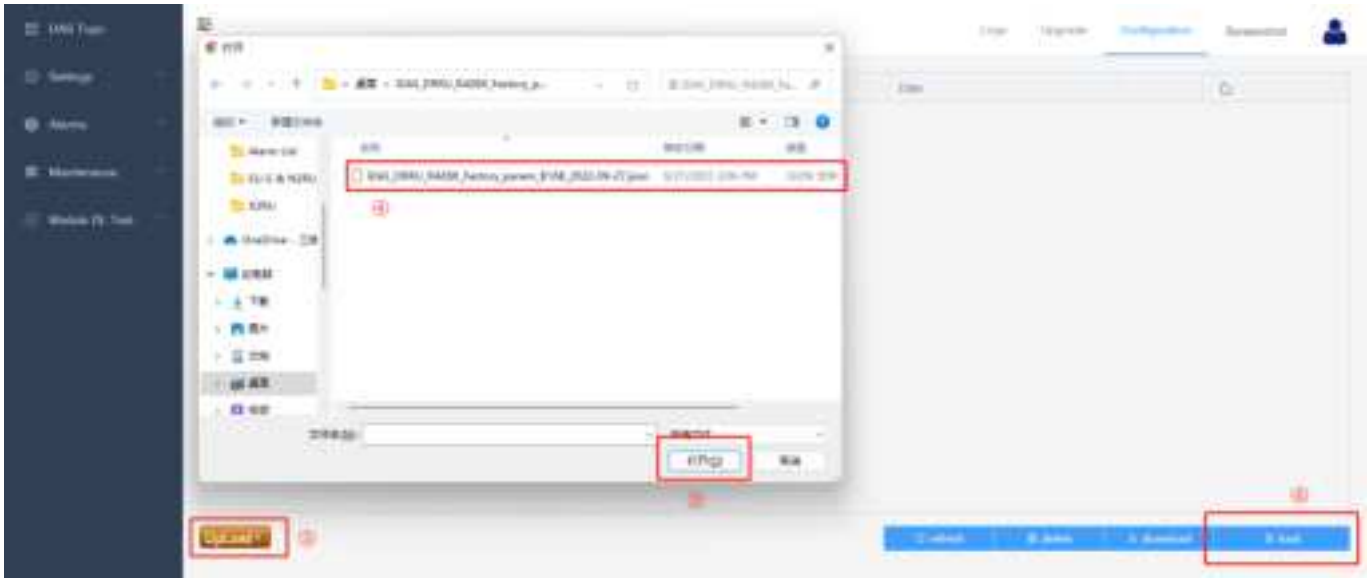
When you see the message shown below, upgrade has been completed and the radio is going for a reboot. Please wait until the radio boot up running with the new firmware.

3.3. Load Configuration (If Needed)

Click on the button Configuration --> Load Configuration shown in the main page below;



Click upload button to upload the configuration file;



If it is loaded sssssssssuccessfully, there will be a prompt window.

4. Carrier Configuration

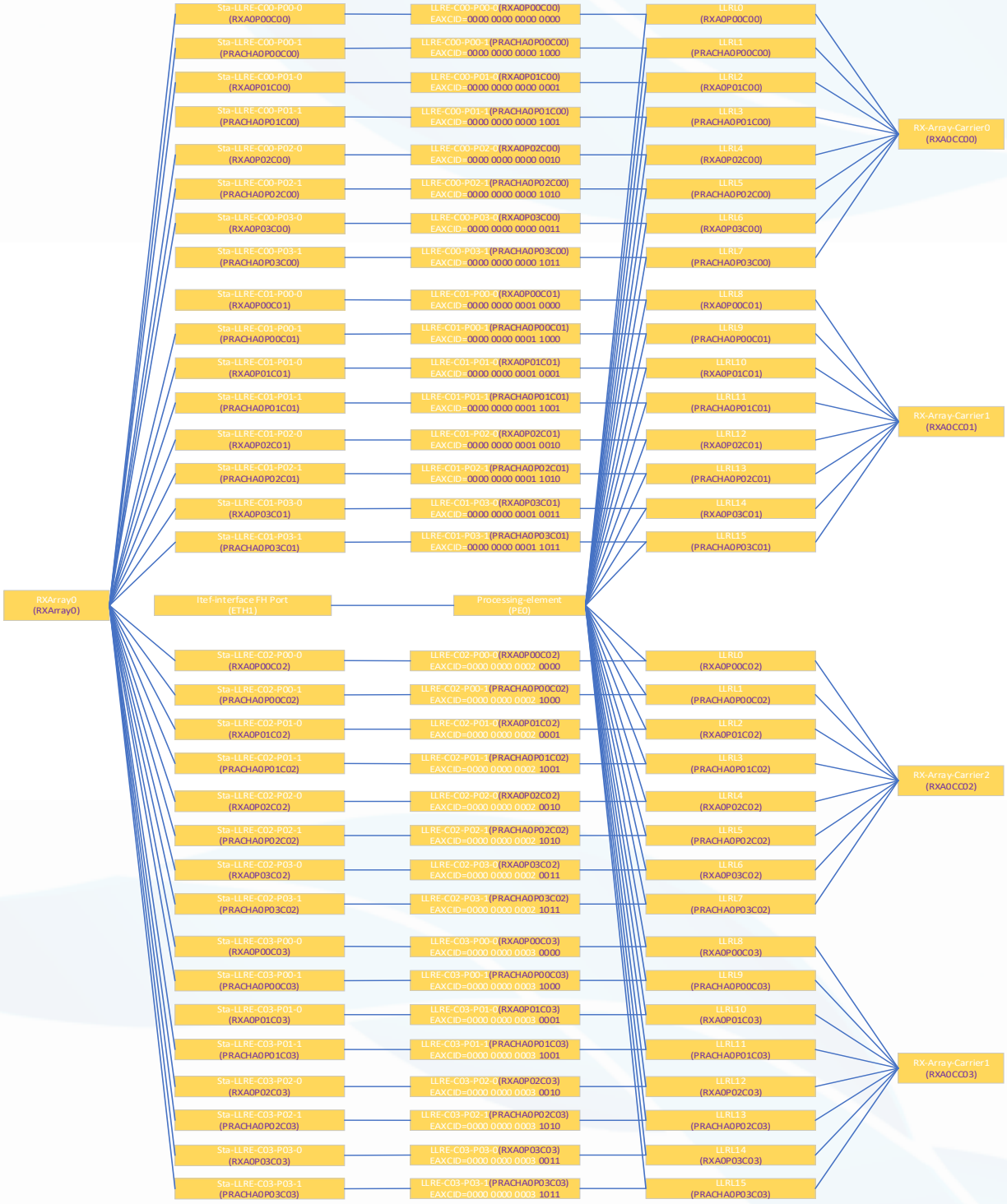
4.1. Power Conversion Factor

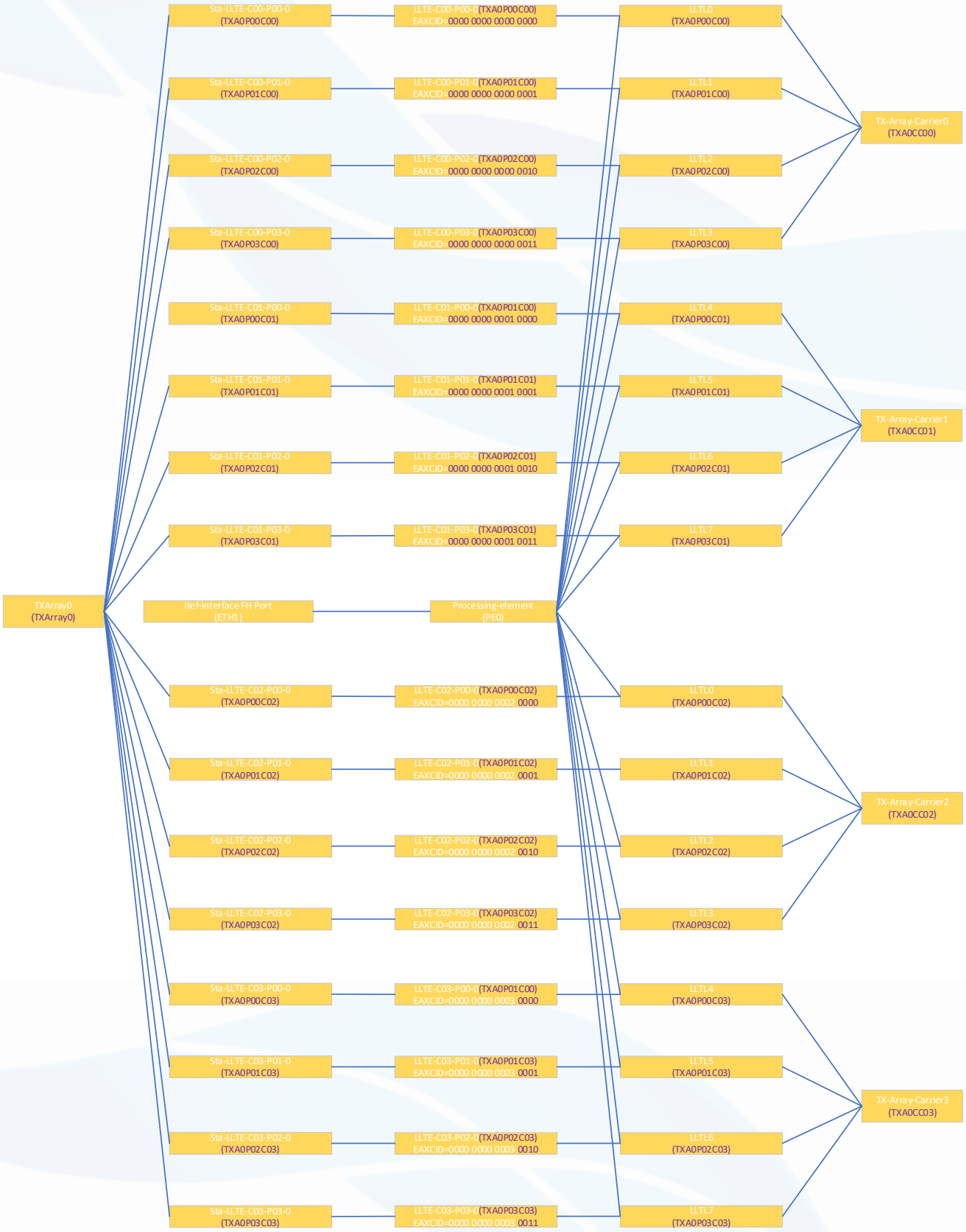
Expected DL Digital IQ Input Power to RU in dBFS for Max Rated TX Output Power at the antenna port.

RE ave Power(dBFS)：-13.7

4.2. eAxC Configuration

eAxC configuration is pre-defined as shown below:

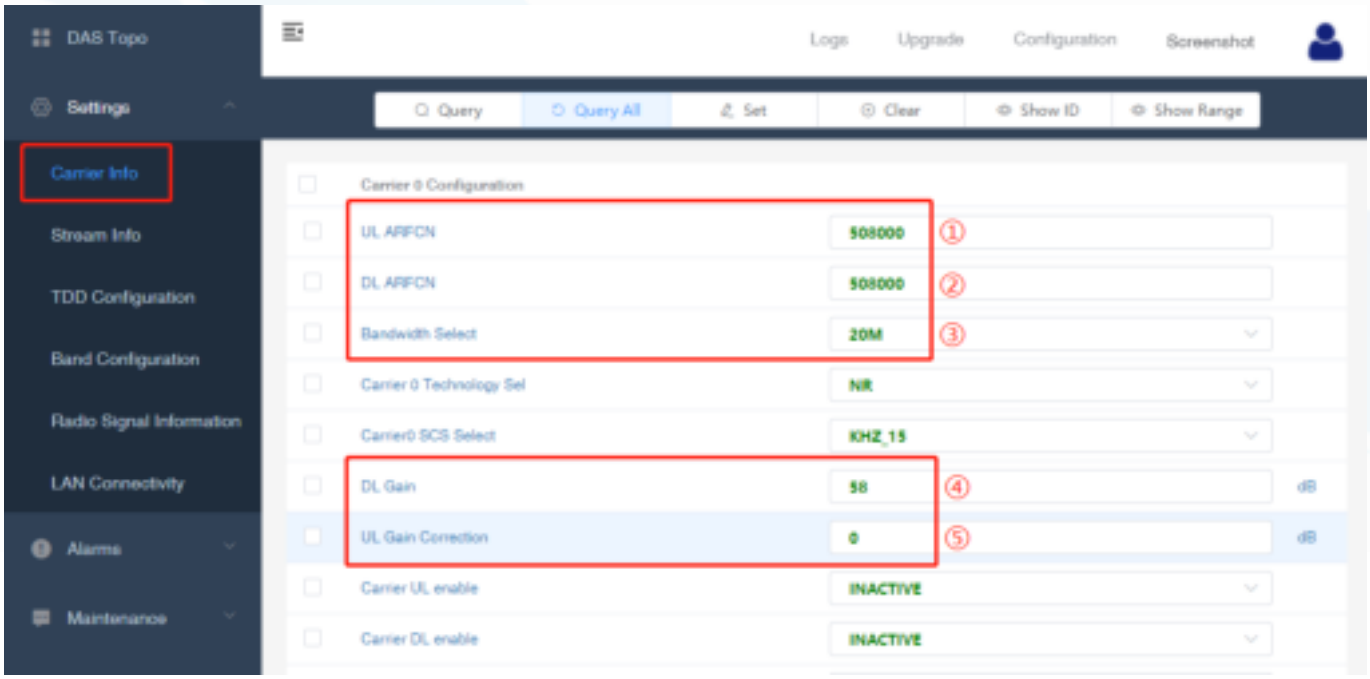




While there are still some parameters currently needs to be configured though the web OMT.

4.3. Bandwidth & Center Frequency

Carrier Configuration can be found in page “Settings -> Carrier Info”.



You may find same carrier settings pattern for C0, C1, C2 and C3, here we take C0 as an example.

- **Frequency**

  Please use the ARFCN of the carrier instead of the center frequency for the GUI. After the ARFCN is set, frequency info can be confirmed in the Carrier information section as shown in the boxes numbered ① and ② the picture above.

- **Bandwidth**

  Bandwidth for the corresponding carrier, Bandwidth is selectable among 5M/10M/15M/20M.

- **DL Gain**

  The device can tune the device downlink output power by configuring the DL Gain parameter.

  If the carrier is not used, please set this value to -50.

  Calculation algorithm:

  Antenna Output Power = DL_Max_Power(C0) + DL_Max_Power(C1)
  + DL_Max_Power(C2) + DL_Max_Power(C3) ;

  DL_Max_Power(Cn) = 46 dBm + (DL Gain(Cn) – 58 dB) , (n = 0~1) ;

  Rated Antenna Output Power = 46 dBm;

  Rated DL Gain = 58 dB;

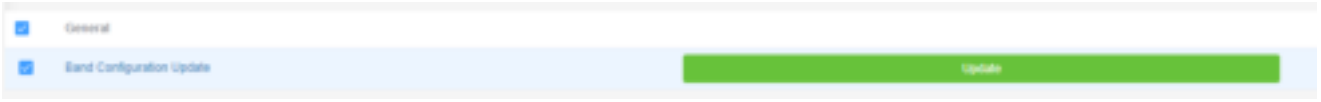
CC Num	CC 0 DL Gain/dB	CC 1 DL Gain/dB	CC 2 DL Gain/dB	CC 3 DL Gain/dB	Antenna Output Power /dBm
1	58	-50	-50	-50	46
1	55	-50	-50	-50	43
2	55	55	-50	-50	46
2	52	52	-50	-50	43
3	53	53	53	-50	46
3	50	50	50	-50	43
4	52	52	52	52	46
4	49	49	49	49	43

- **UL Gain Correction**

Please set it to 0 for this version. Not used currently.

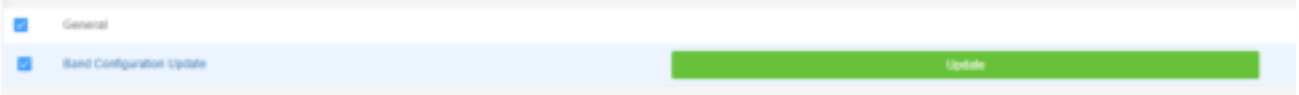
Please confirm the checkbox status for the parameters before 'Set' is clicked, otherwise it will not be applied.

After the carrier information is set, update button needs to be click to apply the modification, it's located at the bottom of the GUI. Update button shall turn green after the click, if the button turns red, indicates error is detected in the carrier settings.



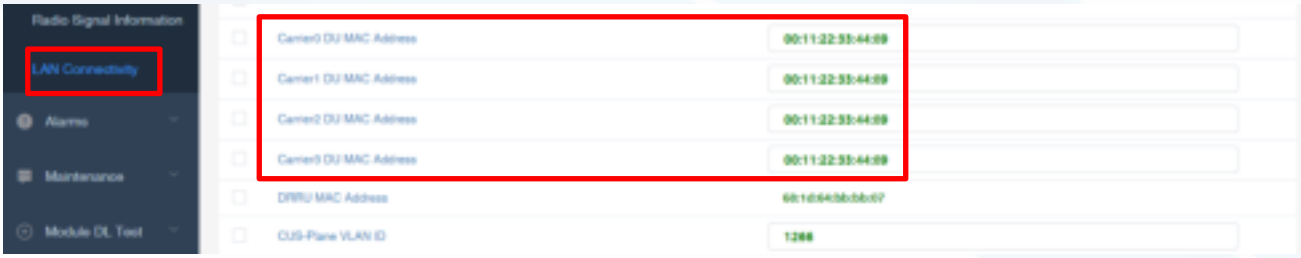
4.4. Carrier Enable

Carriers can be enabled and locked by enter ACTIVE or INACTIVE in the field shown above. If the carrier is not used, please Set it to INACTIVE. Update needs to be clicked to apply after these parameters are changed.



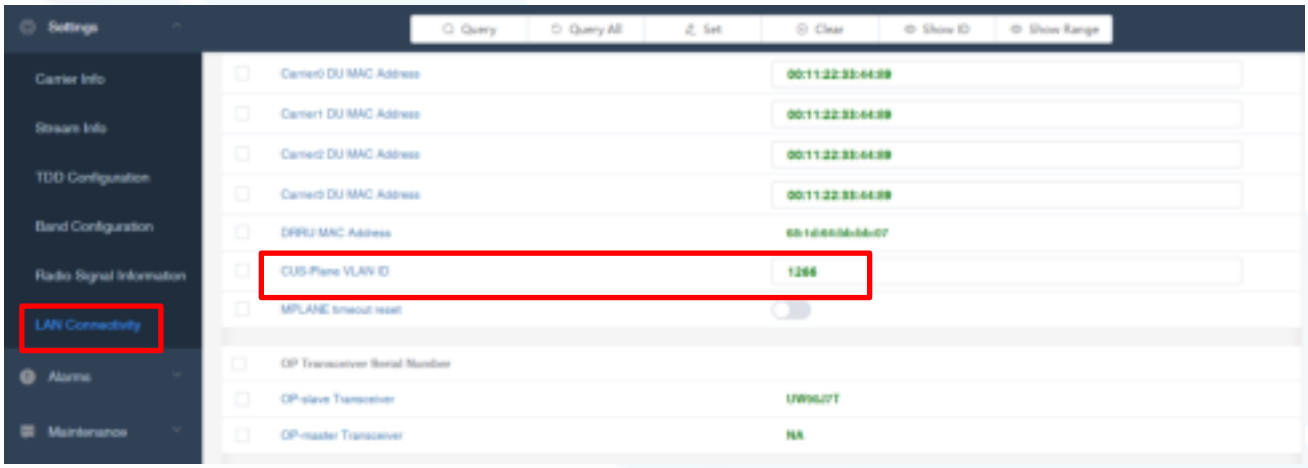
4.5. DU MAC Address

DU MAC address can be set at GUI page Setting ->LAN Connectivity.

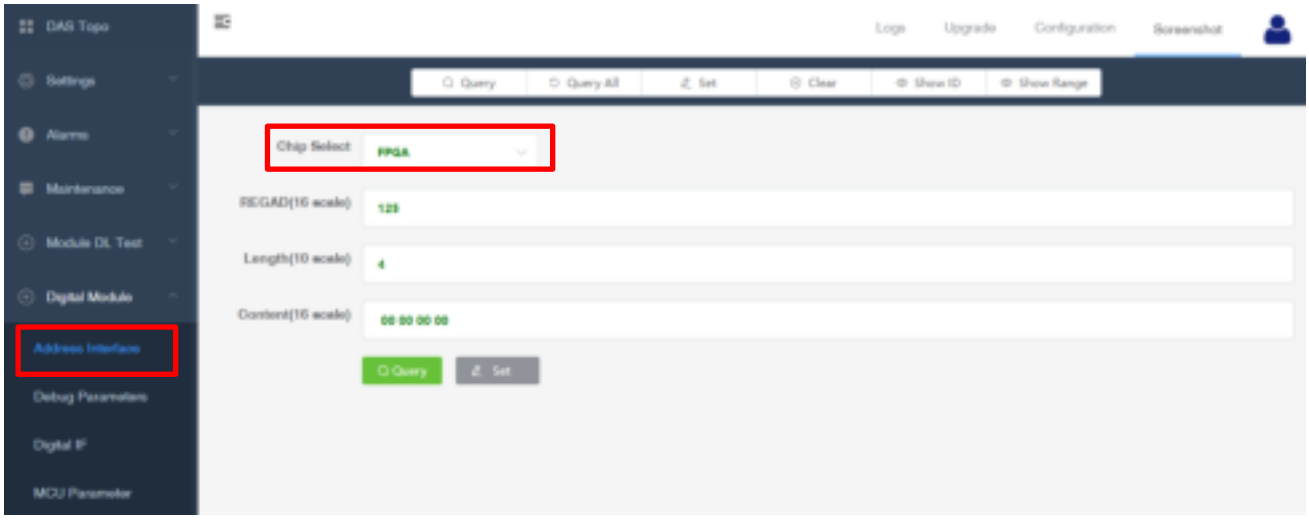


4.6. CUS-Plane VLAN ID

CUS-Plane VLAN ID can be set at GUI page Setting ->LAN Connectivity.



4.7. Register Access



Step #1 – Enter factory mode (please refer to section 4.6) .

Step #2 – Enter page “Digital Module -> Address Interface”.

Step #3 – Select ‘FPGA’ for “Chip Select” field.

Step #4 – Enter Register Address, length (always set to 4) .

Step #5 – Click ‘Query’ for current value shown in Content field and ‘Set’ to apply the new value after the modification.

4.8. Dual Carrier considerations

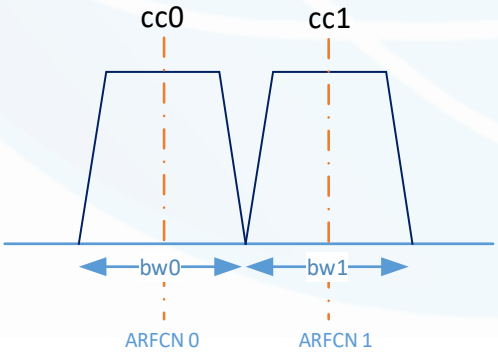
Some extra considerations are needed when 2 carriers are used:

1) Frequency

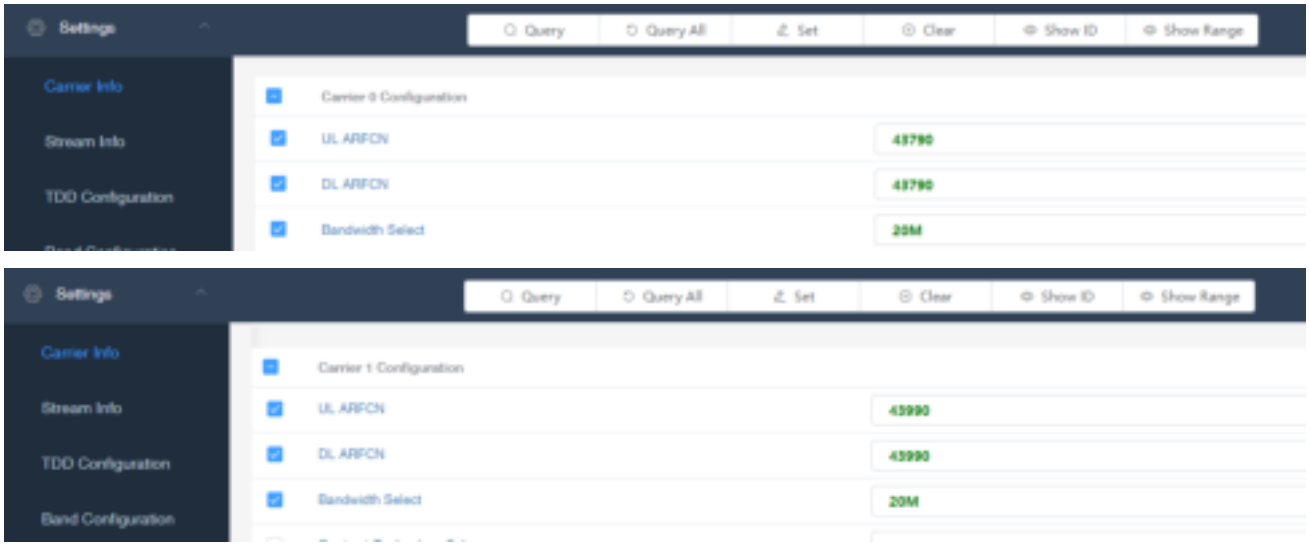
When 2 carriers are used, frequency settings on the GUI are independent for the two carriers.

But special care must be taken to be avoid of carrier overlapping.

Frequency(ARFCN1) – Frequency(ARFCN0) >= (Bw0 + Bw1) /2



For frequency settings, please find the parameters shown in the snap shot below:



2) Gain settings

- The device can define the device downlink output power by configuring the DL Gain parameter on the OMT. Take C0 carrier as an example, the corresponding relationship between downlink output power and DL Gain is shown as follows:

  46 dBm + (DL Gain(C0) – 58 dB) = DL Max Power(C0)

  Note: 58dB is the rated gain of the equipment, and 46dBm is the rated downstream output power of the equipment.

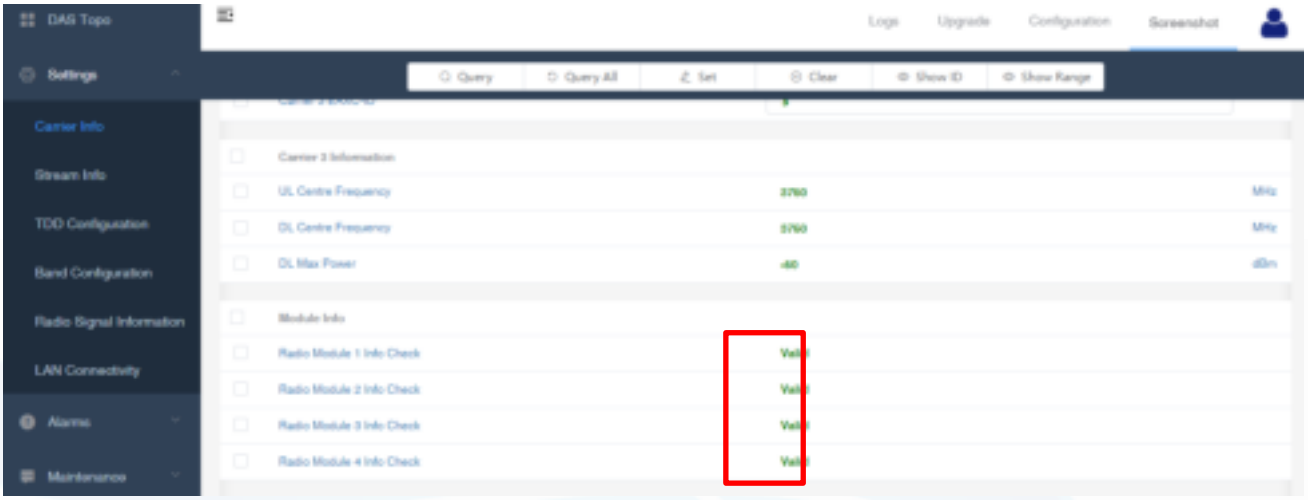
- When 2 carriers are used, for DL 2 carriers will share the rated output power of 46dBm.

  The restriction is:

  Max_Power(C0) + Max_Power(C1) <= 46 dbm

  You may change the DL gain settings for carrier 0 and 1 to satisfy the equation shown above. To query the DL Max Power, please find below section in Carrier Configuration Page.

With correct configurations, the module info will show valid in query after “Update” button is clicked.



5. Status Monitor

5.1. PTP Status monitor

1) PTP status

PTP status can be found in the page Settings -> Radio Signal Information, green light indicates good PTP status.

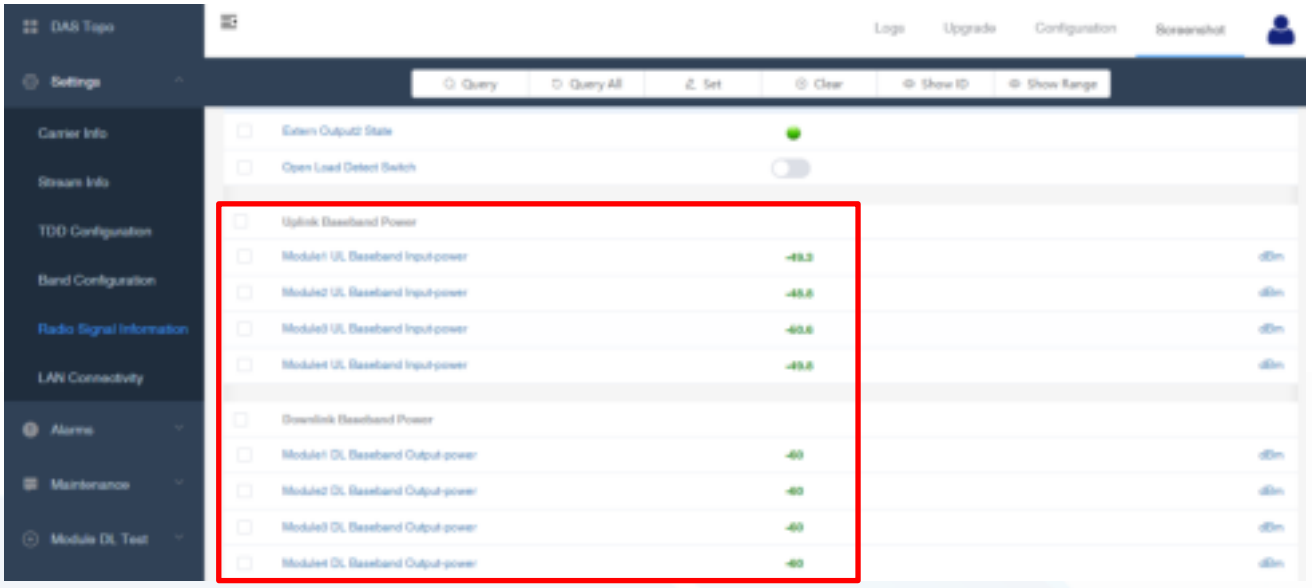
5.2. Power monitor

1) Antenna Power

Antenna input/output power can be found in page “Settings -> Radio Signal Information”.

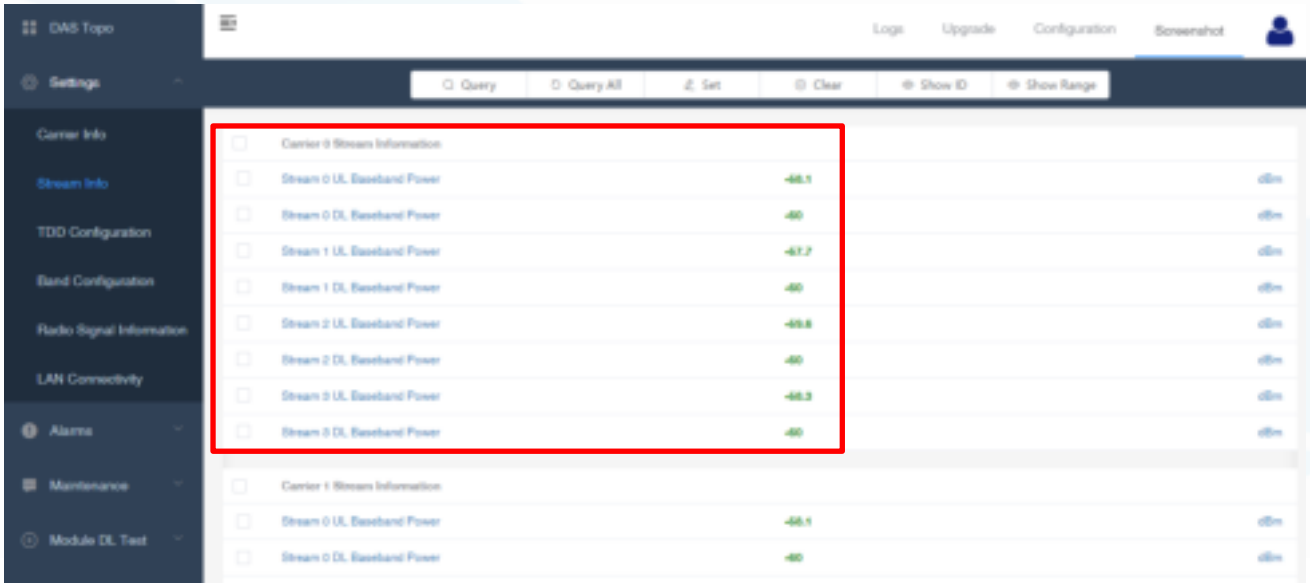
2) Antenna Baseband Power

Antenna baseband power Transmitted/Received at antenna can be checked from GUI at page Settings -> Radio Signal Information. Baseband power is shown in dBm.



3) Carrier Power

Carrier power can be found in page “Settings -> Stream Info”.

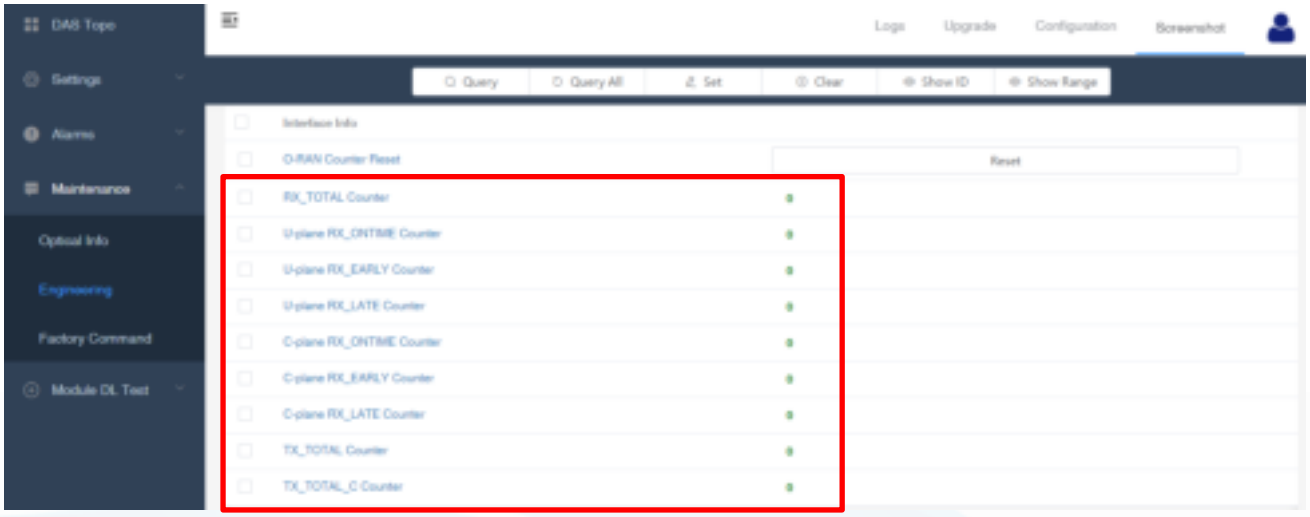


Picture above shows the UL/DL baseband power of carrier0 in dBm.

5.3. Counters

1) eCPRI Counters

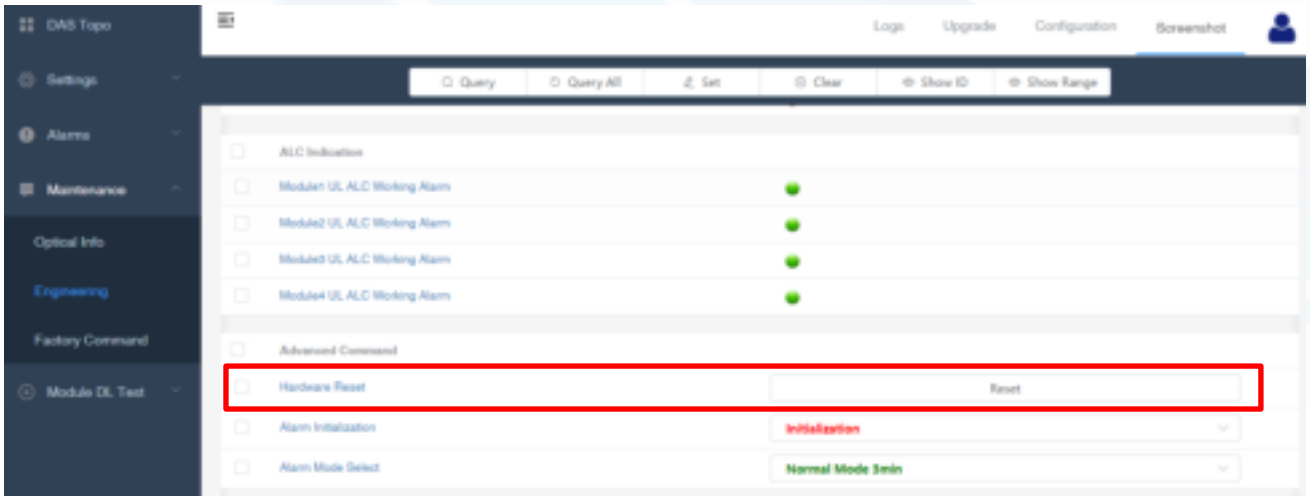
Number of U-plane packets and C-plane packets can be monitored at GUI page Maintenance -> Engineering.



6. Maintenance Tools

6.1. Manual reset equipment

The device supports manual reset on the OMT, you can find the Hardware reset button at GUI page Maintenance -> Engineering.



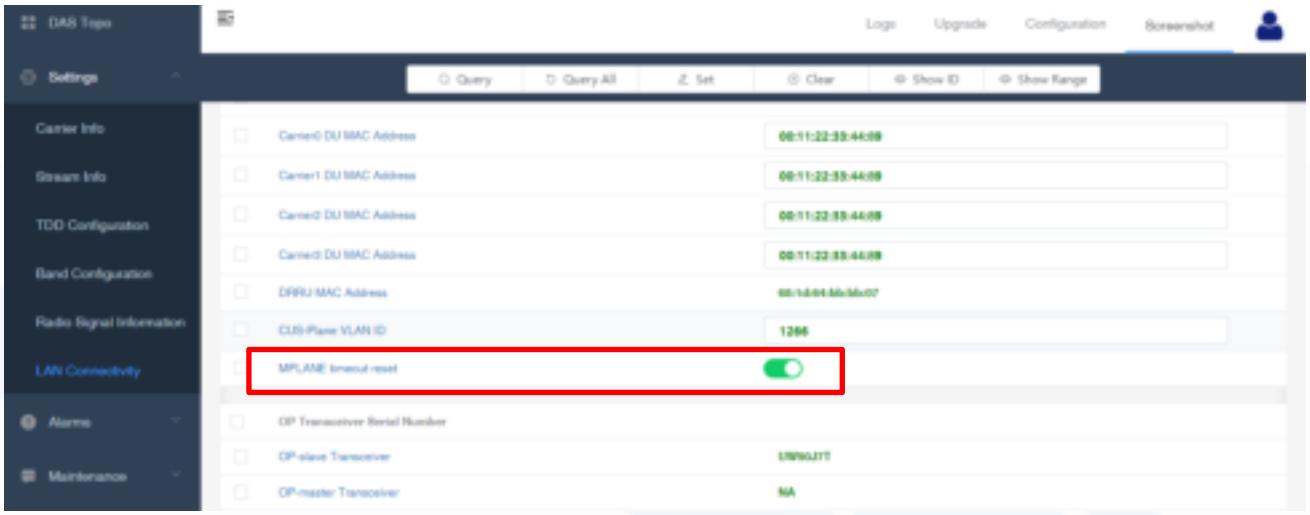
6.2. MPLANE Timeout Reset

1) If the MPLANE Timeout Reset button is enabled

Within 24 hours after the device is started, if the CMS platform is not successfully connected, the device will actively Reset at an hour interval. If the CMS is successfully connected once and no reset operation is performed, the CMS stops detecting the connection and does not trigger the 24-hours automatic reset mechanism.

2) If the MPLANE Timeout Reset button is disabled

The device does not detect the connection to the CMS platform and does not Reset the device. Therefore, if the device is being debugged, you are advised to disable the switch.



FCC Warning:
This device must be professionally installed.
Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 358.5cm between the radiator & your body.

NOTE: Only authorized person can enter the area where the antenna is installed. And the person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program.