

BC95-D UEMonitor

User Guide

NB-IoT Module Series

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About the Document

History

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1 Introduction

This document mainly introduces how to use the UEMonitor tool to view logs via a debug port for the Quectel BC95-D module on Window 7 system.

2 Tool Installation

Customers need to install the “Microsoft .NET Framework” (4.5.2 version or later) on PC before installing the UEMonitor.

2.1. Microsoft .NET Framework Installation

Step 1: Double-click “microsoft.net framework 4.5.2.exe” to install the “Microsoft .NET Framework”.

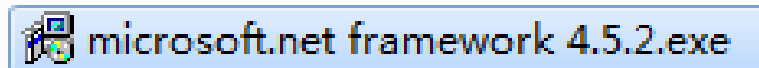


Figure 1: Microsoft .NET Framework Installation Package

Step 2: Wait until the following window comes up, and then click “I have read and accept the license terms.” and “Install” as shown below.

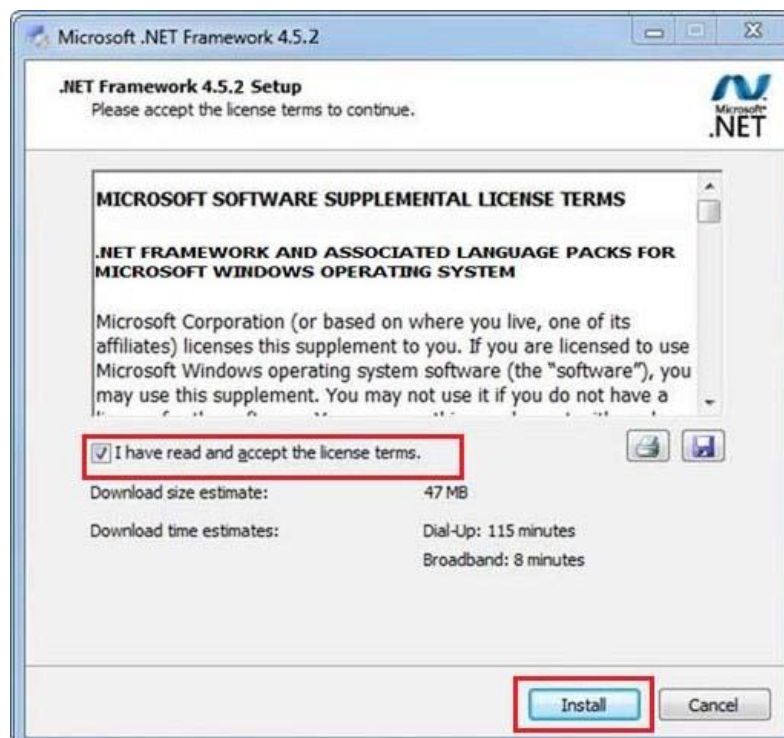


Figure 2: License Agreement for Microsoft .NET Framework Installation

Then please wait for the program to install.

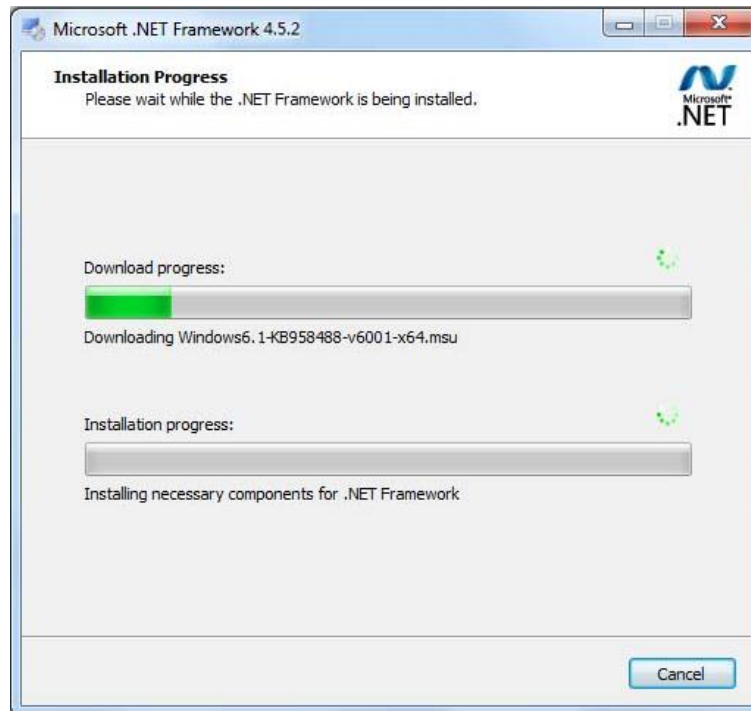


Figure 3: Microsoft .NET Framework is Installing

Step 3: Click “**Finish**” to accomplish installation.

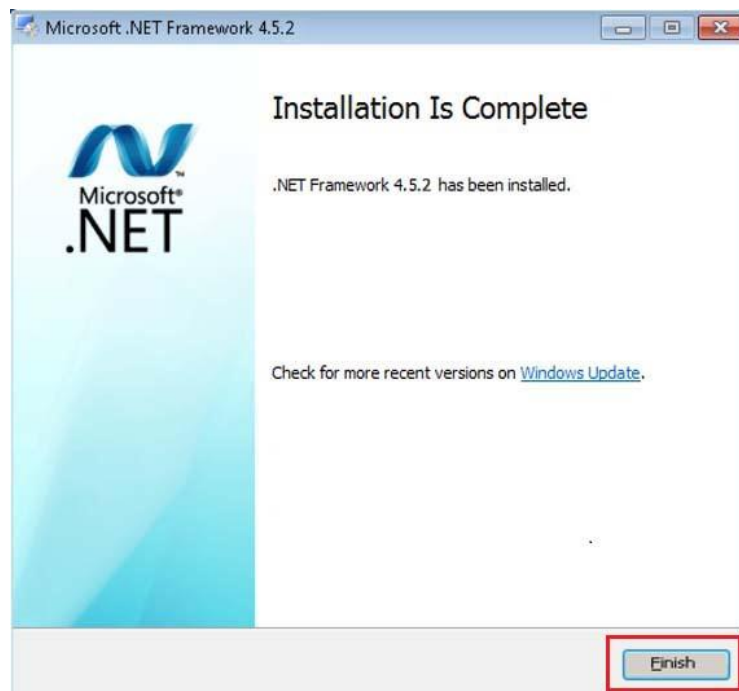


Figure 4: Microsoft .NET Framework is Successfully Installed

2.2. UEMonitor Installation

Step 1: Double-click the installation package, and then the installation interface shown as below will pop up. Click “**Next**” and wait during the installation.

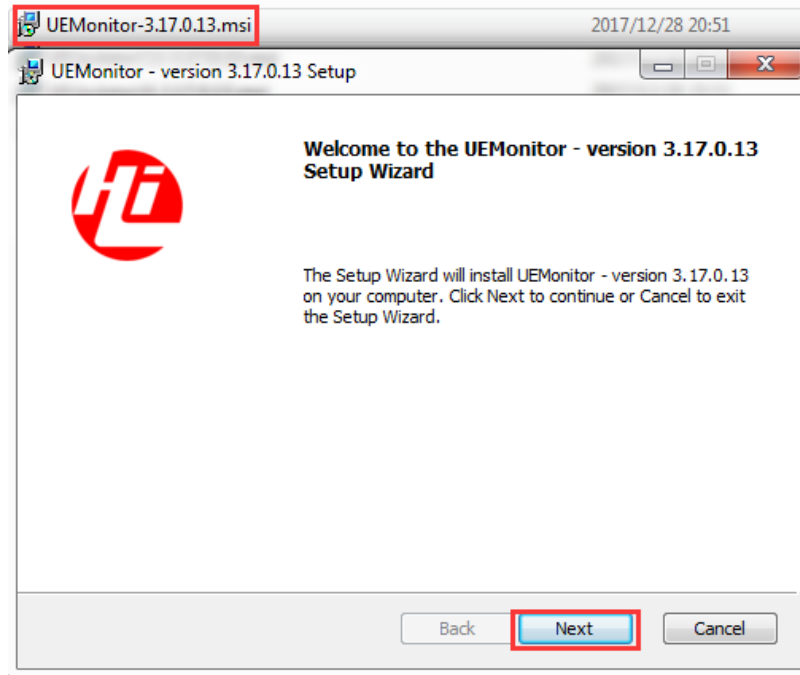


Figure 5: UEMonitor Setup Interface

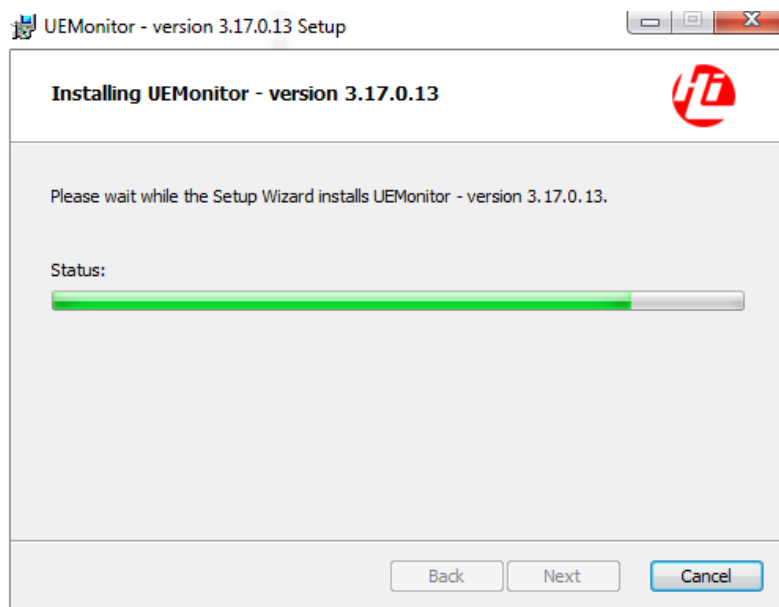


Figure 6: Installing UEMonitor

Step 2: Click “**Finish**” to finish the installation.

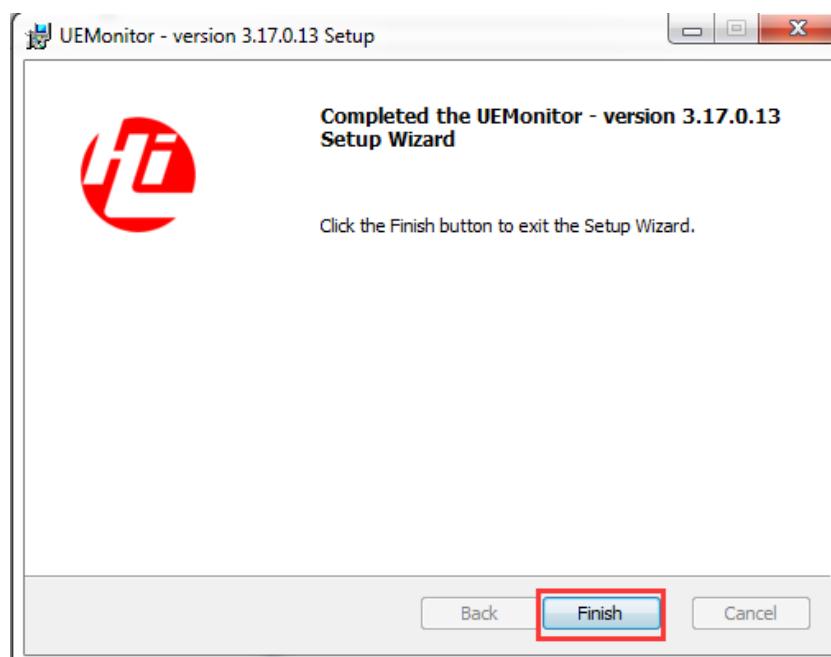


Figure 7: Installation is Completed

Step 3: After installation, the following icon will be shown on the desktop.



Figure 8: UEMonitor Desktop Icon

3 Capture Logs

This chapter mainly introduces how to use the UEMonitor tool to capture logs.

Step 1: Open the tool, and then the main interface will be shown as below.

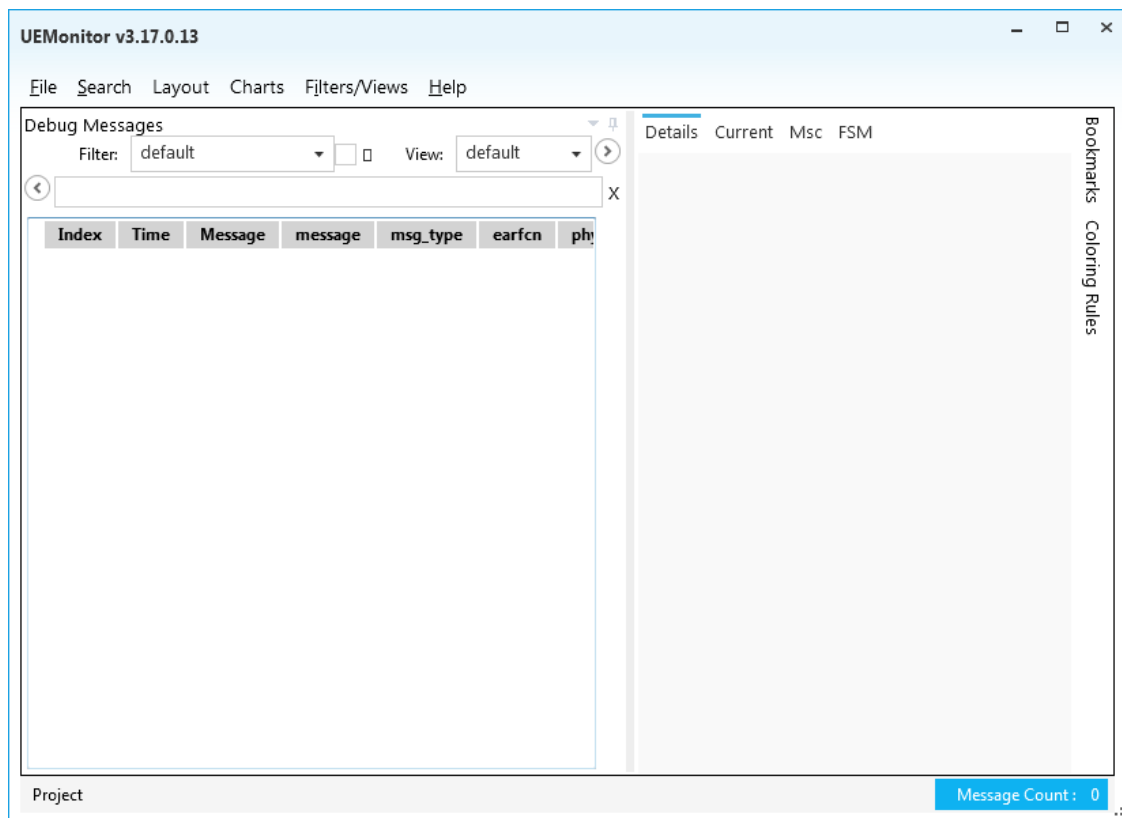


Figure 9: Main Interface of UEMonitor

Step 2: Create a new project by clicking “**New Project**” in the drop-down list of “**File**” and choose “**From UE debug port**”.

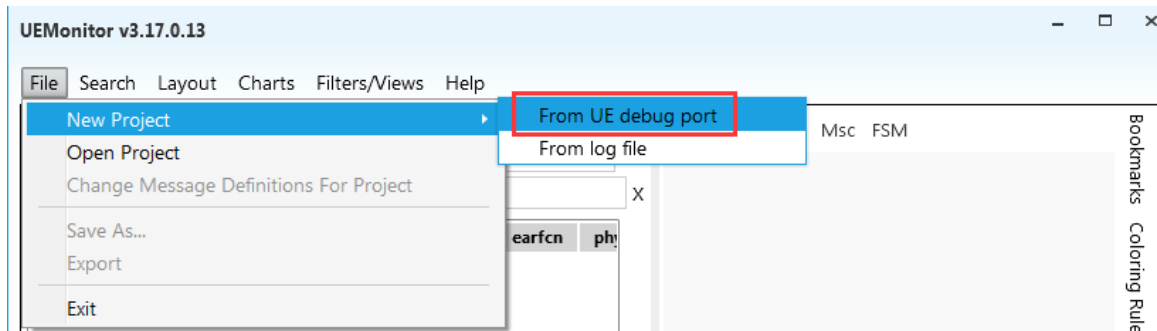


Figure 10: Create a New Project

Step 3: Select a debug port and choose the .fwpkg or .xml file in the firmware package.

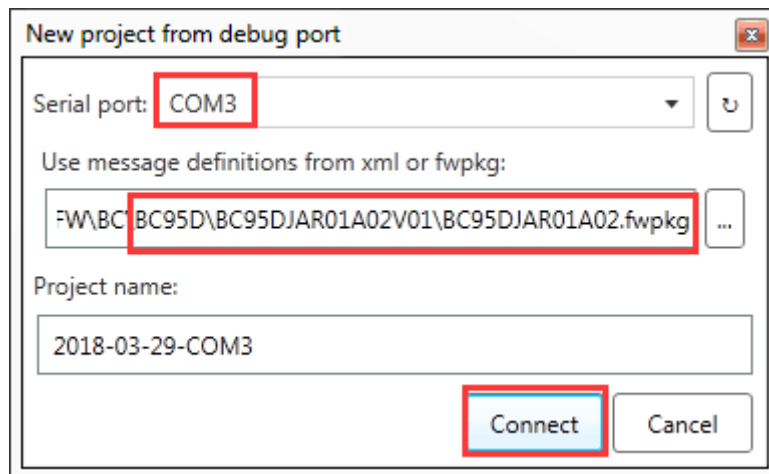


Figure 11: Select a Debug Port and Use Message Definitions

Then click “**Connect**”, and the log information can be viewed from the interface.

NOTES

1. The logs will be automatically saved into “C:\Users\xxx\Documents\UEMonitor\Projects” path.
2. Please note that the module should be powered on before connection.

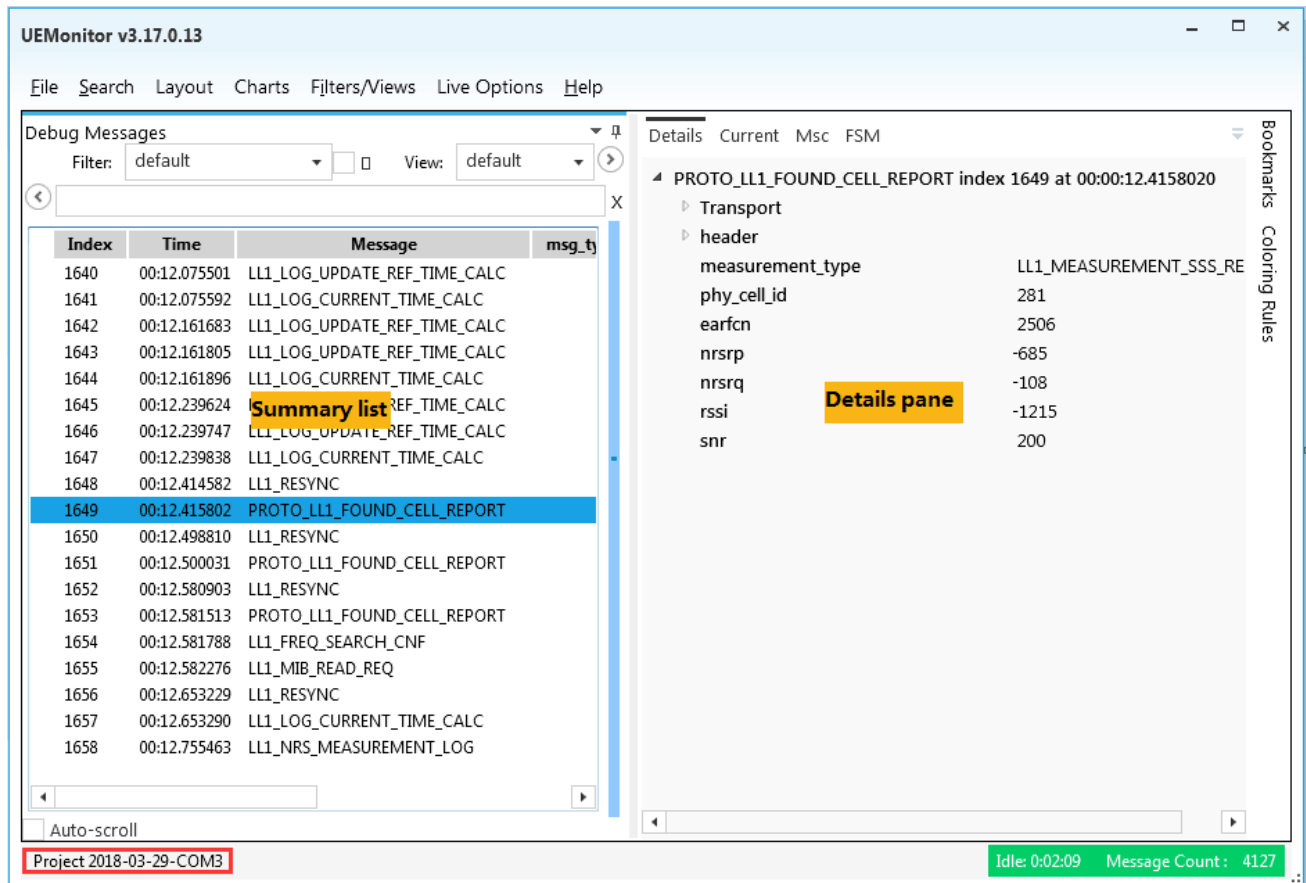


Figure 12: Log Information and Project Name Shown after Connection

4 Description of Filters and Summary List

By default, the summary list shows all the messages in the logs. And a "filter" can be used to enable the display of only a subset of a message.

As illustrated in the figure below, applying the filter "**ll1_nrs_measurement_log.snr>150**" shows only the "**LL1_NRS_MEASUREMENT_LOG**" messages with an SNR greater than 150.

The blue areas in the map on the right side of the display show where these messages appear in the overall logs. The green bar indicates how much of the total logs is spanned by the messages in the summary list. Customers can click anywhere on the map to move to that part of the log, and use page-up/down and cursor-up/down to navigate by smaller amounts.

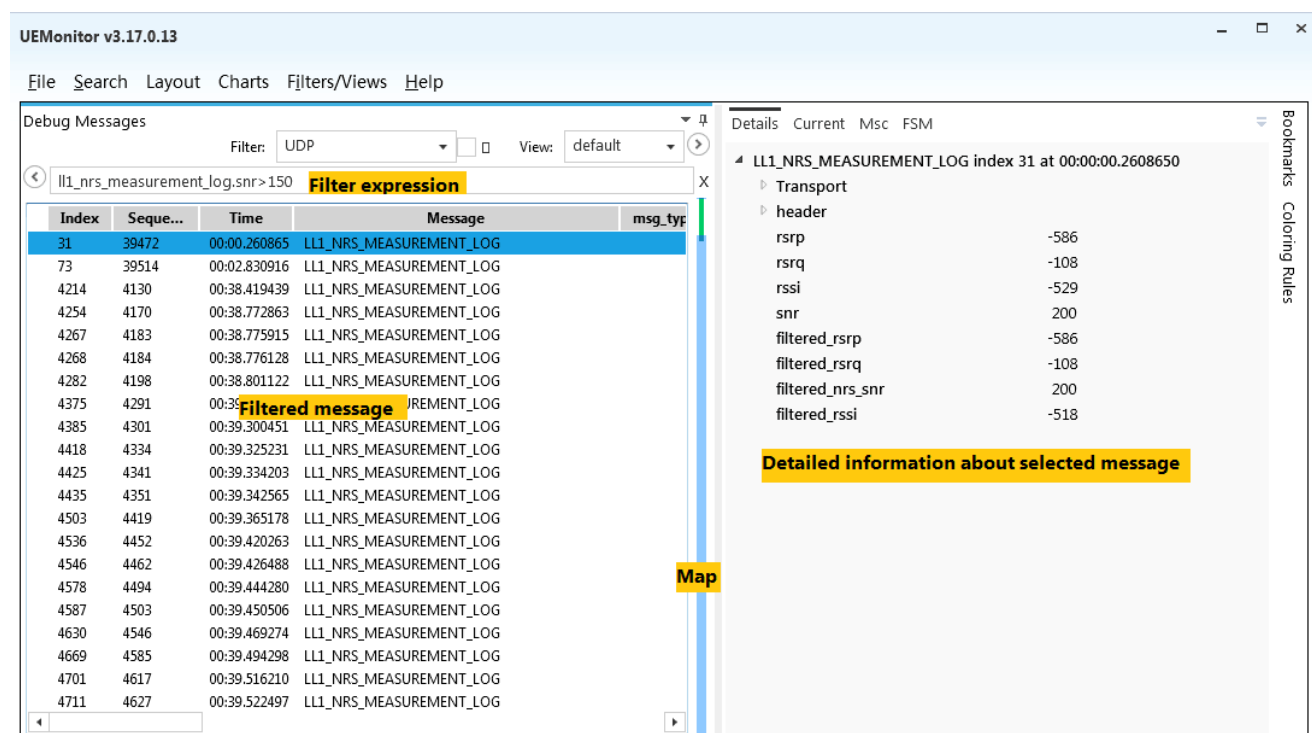


Figure 13: Applying a Filter

4.1. Filter Types

A number of different expression types can be used in a filter:

- An expression such as "**LL1**" will match all messages that include the substring "**LL1**" within the message name.
- An expression such as "**ll1_log_current_time_calc.hfn_ref == 755**" applies a logical test to a particular message field. In such case, the filter matches "**ll1_log_current_time_calc**" message where the "**hfn_ref**" field is equal to 755. The operators that are currently understood are **==**, **!=**, **>**, **<**, **>=** and **<=**.
- For enumerated types, the name of the value can be used instead of a number, e.g. "**proto_ll1_serving_cell_measurement_ind.header.dest == LAYER_PROTO**". The strings **true** and **false** can be used for Boolean fields.
- An expression such as "***.rssi**" will match all messages that contain an "rssi" field at the top level of the structure. "****rssi**" (double asterisk) can be used to match messages that contain an "rssi" field at any level of the structure.
- The logical operators **&&**, **||**, and **!** along with brackets may be used to combine and group individual expressions into a larger query. For example: **LL1 || (*.rssi>=100)**.

For UEMonitor v3.17.0.13, it is possible to filter text fields using the following operators:

- **eq** searches for an exact match.
- **ne** searches of a mismatch.
- **~** searches for a substring.
- **!~** searches for messages that do not match the substring.

For example: **application_report.message ~ "power"**

NOTE

The filter function is still in the development stage and subject to change.

4.2. Save and Reuse Filters

Filters can be saved or loaded by right-clicking on the filter-expression box, and filters are shared between projects.

Filters can also be quickly created by right-clicking on a field or message name in the details pane through selecting **"Apply as new filter"**.

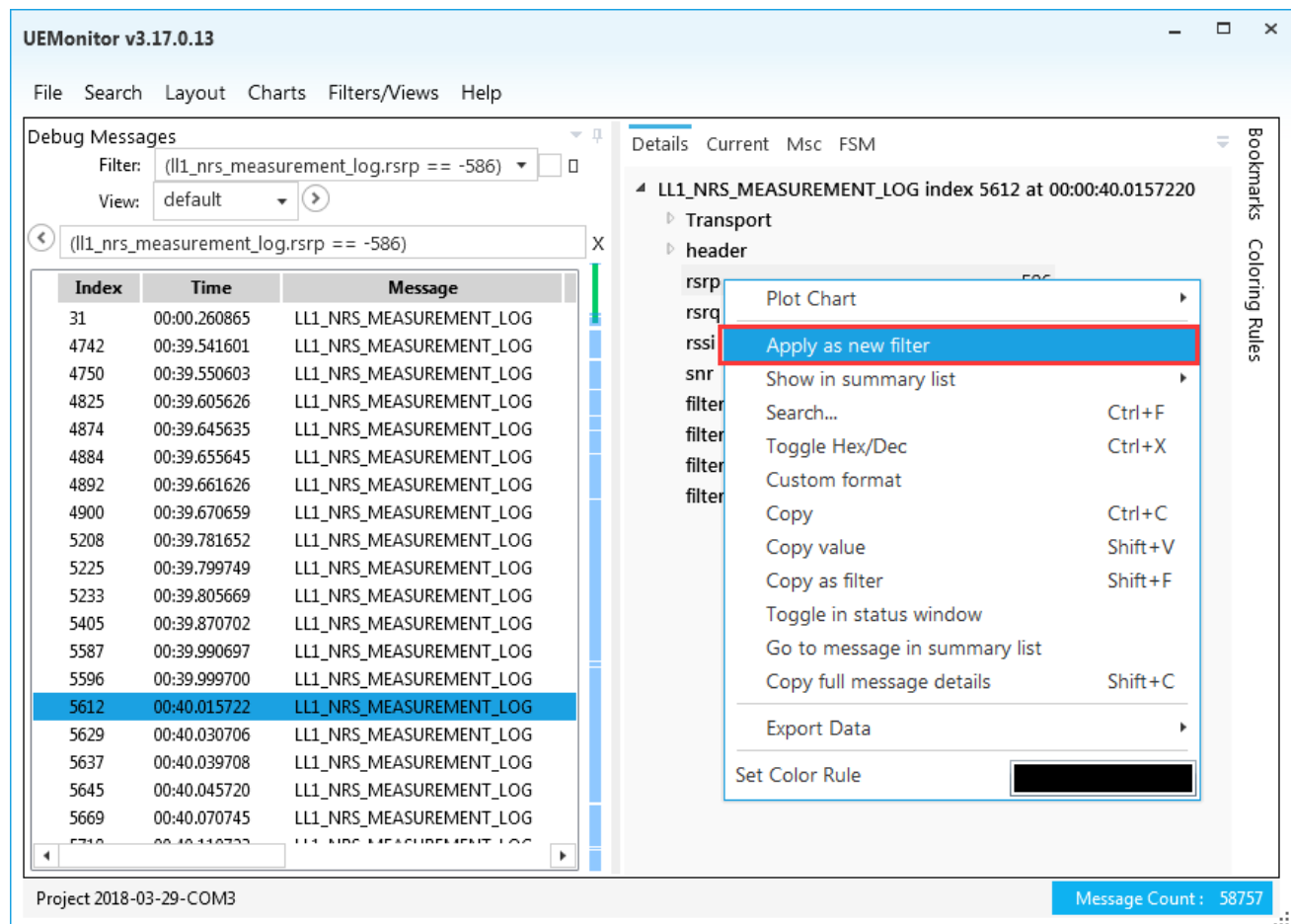


Figure 14: Apply as New Filter

4.3. Set Common Summary List Display

In the Debug Messages pane, right-click anywhere and then click **"Add common field..."** option to add some public information to the pane.

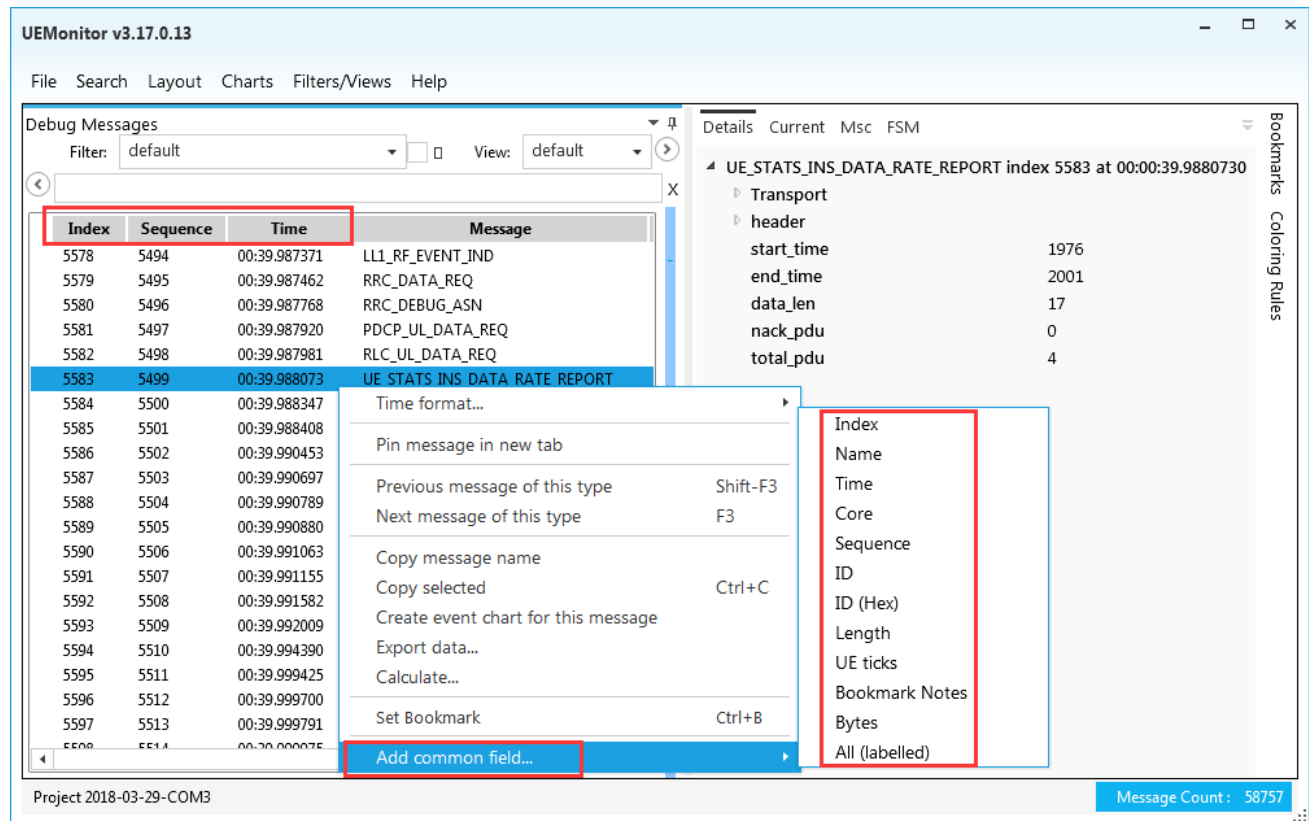


Figure 15: Set Common Summary List Display

4.4. Customize a Summary List Display

The summary list uses a column-based tabular view. Standard columns may be selected or removed by right-clicking on the header row.

Message fields may also be added to the summary display by right-clicking on a field in the details pane and selecting **"Show in summary list"**. Column layouts may be saved for later-reuse by right-clicking towards the right side of the header row and selecting one of the template-management options. An example of adding the "rsi" column is shown below.

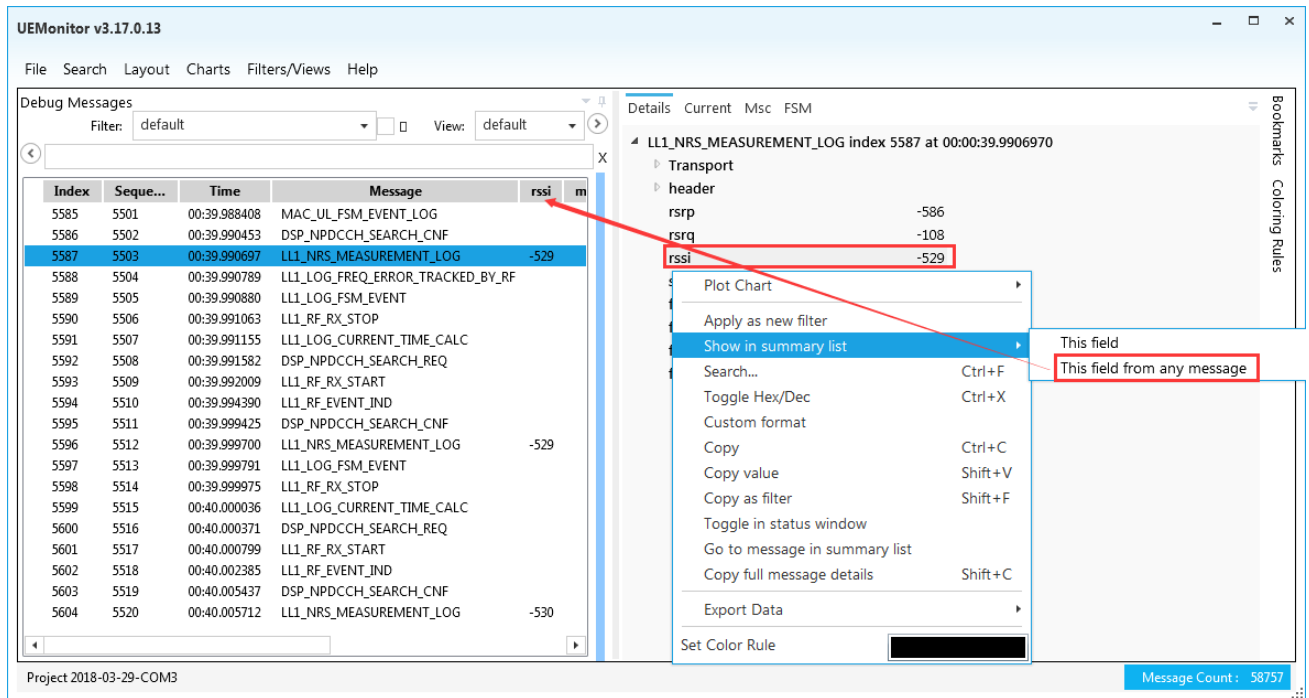


Figure 16: Adding "rssi" to the Summary Display

NOTE

The function of customizing a summary list display is still in the development stage and subject to change.

5 View Logs

5.1. Module Boot

After the module is powered on, the USIM card will be initialized, and related logs can be viewed by filtering keywords such as "USIM_READ" and "BOOT".

The screenshot shows the UEMonitor v3.17.0.13 interface. The 'Debug Messages' panel on the left displays a list of messages. The 'Details' panel on the right shows the structure of the selected message, 'USIM_READ_PART_1_DATA_CNF index 1320 at 00:00:14.1139060'. The 'card_present' field is highlighted with a red box.

Index	Sequence	Time	Message
85	1	00:07.391000	LOG_BOOTUP_LOG
448	364	00:13.664290	USIM_READ_PART_1_DATA_REQ
1320	1236	00:14.113906	USIM_READ_PART_1_DATA_CNF

Details of USIM_READ_PART_1_DATA_CNF index 1320 at 00:00:14.1139060:

- Transport
- header
 - card_present: true
 - admin_data: [0,0,0,2]
- imsi
- eps_loci
- eps_nas_security_context
- ehplmn_list
- fplmn_list
- access_class: [2,0]
- last_rplmn_selection_indication: 1
- hpplmn_timer_value: 255
- oplmn_list
- uplmn_list
- nas_config
- apn_control_list

Figure 17: Logs about Module Boot

5.2. Network Searching

Once the module is initialized, the network searching process begins. Customers can judge if the module has found the cell by filtering the keywords such as "CELL_SUIT" and "CELL_SELECT".

UEMonitor v3.17.0.13

File Search Layout Charts Filters/Views Help

Debug Messages

Filter: View: default

CELL_SUIT||CELL_SELECT||NAS_MSG

Index	Seque...	Time	Message	msg_type
1644	1560	00:22.372503	RRC_CELL_SELECT_REQ	
4264	4180	00:38.774846	RRC_DBG_CELL_SUITABILITY	
4265	4181	00:38.775609	LL1_CELL_SELECT_REQ	
4270	4186	00:38.776403	LL1_CELL_SELECT_CNF	
4315	4231	00:38.813726	RRC_CELL_SELECT_CNF	
4318	4234	00:38.814367	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_REQ
4607	4523	00:39.453527	NAS_DBG_NAS_MSG	L3_EMM_ID_REQ
4608	4524	00:39.453649	NAS_DBG_NAS_MSG	L3_EMM_ID_RSP
4797	4713	00:39.574102	NAS_DBG_NAS_MSG	L3_EMM_AUTH_REQ
5577	5493	00:39.986791	NAS_DBG_NAS_MSG	L3_EMM_AUTH_RSP
6301	6217	00:40.665868	NAS_DBG_NAS_MSG	L3_EMM_SECURITY_MODE_CMD
6312	6228	00:40.671697	NAS_DBG_NAS_MSG	L3_EMM_SECURITY_MODE_COM...
6513	6429	00:40.804174	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_ACCEPT
6518	6434	00:40.805608	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_COMPLETE
7116	7032	00:41.331945	NAS_DBG_NAS_MSG	L3_EMM_INFORMATION
9166	9082	00:43.459813	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
9176	9092	00:43.462438	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
9391	9307	00:43.660070	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
12030	11946	00:46.445470	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
14723	14639	00:49.453588	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
17799	17715	00:52.447057	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
20490	20406	00:55.447790	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
38298	38214	01:13.975835	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
38859	38775	01:14.749395	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
58214	58130	01:35.473424	RRC_DBG_CELL_SUITABILITY	
58241	58157	01:35.484807	RRC_CELL_SELECT_IND	

Details Current Msc FSM

LL1_CELL_SELECT_CNF index 4270 at 00:00:38.7764030

Transport

header

earfcn	13136
phy_cell_id	150
success	true

Project 2018-03-29-COM3

Message Count : 58757

Figure 18: Logs about Network Searching

5.3. EPS Attachment

Entering "NAS_MSG" in the filter box can view the relevant information about the NAS layer of the module.

UEMonitor v3.17.0.13

File Search Layout Charts Filters/Views Help

Debug Messages

Filter: View: default

Index	Seque...	Time	Message	msg_type
1644	1560	00:22.372503	RRC_CELL_SELECT_REQ	
4264	4180	00:38.774846	RRC_DBG_CELL_SUITABILITY	
4265	4181	00:38.775609	LL1_CELL_SELECT_REQ	
4270	4186	00:38.776403	LL1_CELL_SELECT_CNF	
4315	4231	00:38.813726	RRC_CELL_SELECT_CNF	
4318	4234	00:38.814367	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_REQ
4607	4523	00:39.453527	NAS_DBG_NAS_MSG	L3_EMM_ID_REQ
4608	4524	00:39.453649	NAS_DBG_NAS_MSG	L3_EMM_ID_RSP
4797	4713	00:39.574102	NAS_DBG_NAS_MSG	L3_EMM_AUTH_REQ
5577	5493	00:39.986791	NAS_DBG_NAS_MSG	L3_EMM_AUTH_RSP
6301	6217	00:40.665868	NAS_DBG_NAS_MSG	L3_EMM_SECURITY_MODE_CMD
6312	6228	00:40.671697	NAS_DBG_NAS_MSG	L3_EMM_SECURITY_MODE_COMPLETE
6513	6429	00:40.804174	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_ACCEPT
6518	6434	00:40.805608	NAS_DBG_NAS_MSG	L3_EMM_ATTACH_COMPLETE
7116	7032	00:41.331945	NAS_DBG_NAS_MSG	L3_EMM_INFORMATION
9166	9082	00:43.459813	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
9176	9092	00:43.462438	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
9391	9307	00:43.660070	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
12030	11946	00:46.445470	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
14723	14639	00:49.453588	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
17799	17715	00:52.447057	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
20490	20406	00:55.447790	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
38298	38214	01:13.975835	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
38859	38775	01:14.749395	NAS_DBG_NAS_MSG	L3_ESM_DATA_TRANSPORT
58214	58130	01:35.473424	RRC_DBG_CELL_SUITABILITY	
58241	58157	01:35.484807	RRC_CELL_SELECT_IND	

Details Current Msc FSM

NAS_DBG_NAS_MSG index 4318 at 00:00:38.8143670

Transport

header

direction UL_PDU

msg_type L3_EMM_ATTACH_REQ

len 58

data [7,65,113,11,246,84,240,16,12,0,0,8,164,0,0,18,2,1,208,4,6,0,0,22,0,82,84,240,16,0,33,07-41-71-08-F6-54-F0-10-8F0-70-00-00-08-A4-00-00-1D0-7B-00-0A-80-00-0A-00-CF0-10-00-21-F5-E0-C1-6A-0]

Additional Info

0741710BF654F010800101C
00120201D031D07B000A80
0100021F5E0C16A01055E01

Project 2018-03-29-COM3 Message Count: 58757

Figure 19: Logs about NAS Layer

5.5. Radio Layer Information

Entering "**asn**" in the filter box can view the relevant information about the radio layer of the module.

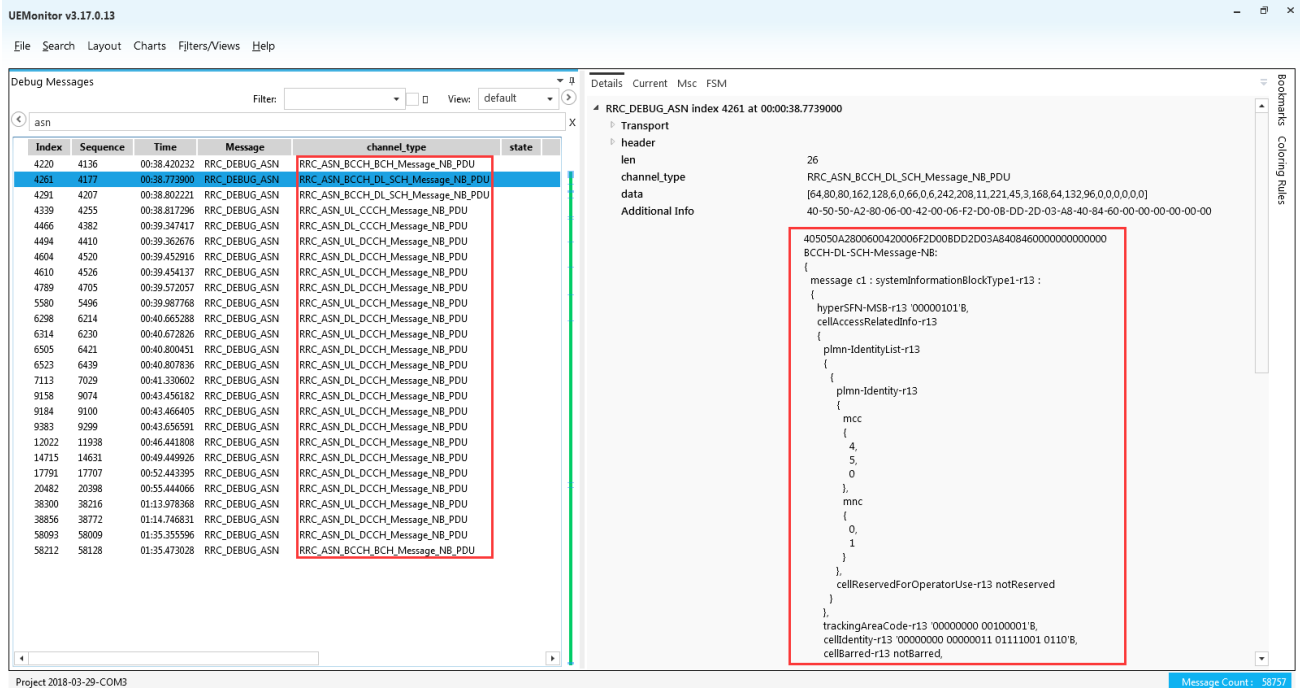


Figure 21: Logs about Radio Layer