Intel Model 7260M2NA and 7262M2WW

User Guide

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Revision History

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1.0	Initial version of the document	17-Dec-2012
1.1	Revise to add model 7260M2NA	Nov 2014
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1 Introduction

This document provides a brief description of the NGFF Carrier Board development kit. Including:

- Hardware interfaces with FIH board
- NGFF Carrier Board User Guide V2.0

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2 Software Framework

2.1 Driver Installation

2.1.1 General Considerations

The two different test and debug configurations always require a Win PC where up to five different drivers must be installed accurately.

This are:

1. the Intel High Speed Modem Driver (ecm200),
2. the Comneon High Speed Modem Driver,
3. the Prolific serial to USB driver (part of the flash tool folder),
4. the Flash USB driver (part of the flash tool folder) and
5. the FTDI diver.

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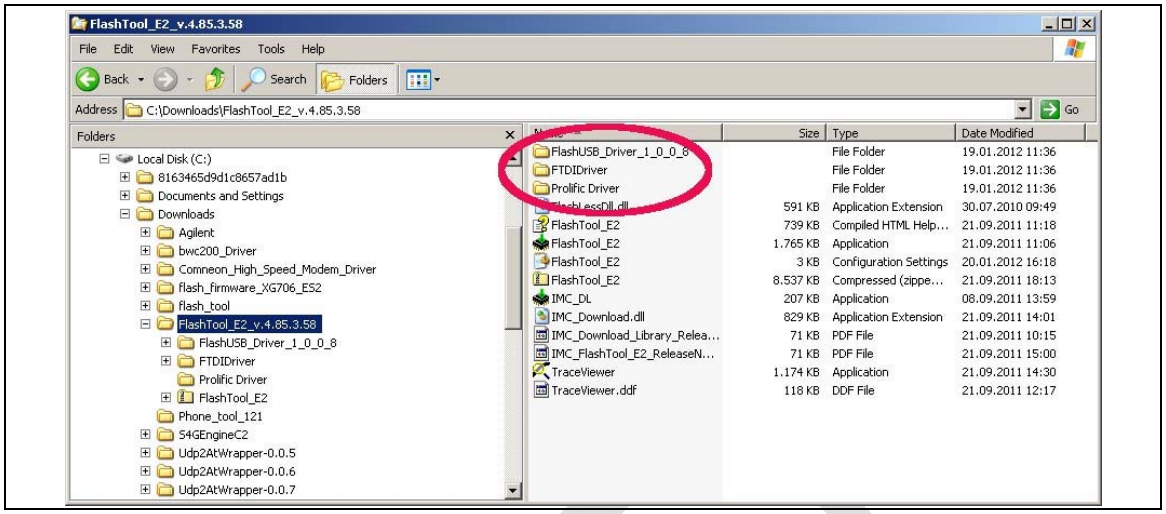

Figure 1. Location of the Prolific serial to USB driver, the Flash USB driver and the FTDI diver within the flash tool folder.

Pls note that Win does not always complain if the drivers 4 to 5 are not installed. If one of these drivers is missing flashing problems are occurring.

The ARM software and LTE firmware releases are linked to individual driver revision numbers that were used for release testing. They were typically published together with the ARM software and the LTE firmware here:

http://wiki.imu.imc.local/XG716_LTE_CV_Setup_versions

The latest drivers can be found here:

\\musdsara001.imu.imc.local\SW_builds\xmm6360\tools

Or if something is missing here:

\\musdsara001.imu.imc.local\SW_builds\xmm7060\Release\Tools

Which is similar to

M:\Software\XMM7060_tools at IMC DRS

Flash Tool :

\\musdsara001.imu.imc.local\SW_builds\xmm6360\tools\flashtool

Socmondll :

\\musdsara001.imu.imc.local\SW_builds\xmm7060\Release\Tools\Socmondll\socmondll_100.150.001.dll

2.1.2 Intel High Speed Modem Driver (ecm200)

- Take the recommended driver, see Subsec. 2.1.1, (folder e.g. WMC_ecm200_3.61.0) and follow the instructions from the installation wizard.
- Enable the IP forwarding: run the sriptenable_ip_forwarding.reg from:

\\musdsara001.imu.imc.local\SW_builds\xmm7060\Release\Tools\Intel_High_Speed_Modem

Hint: Copy the file to the local PC and then run it with root privileges.

Now connect the cable to the USB-HS connector.

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Win XP asks now it's typical questions and gets the common answers see below. Win 7 does not ask and loads the driver automatically.

Figure 2. Use the already installed driver.

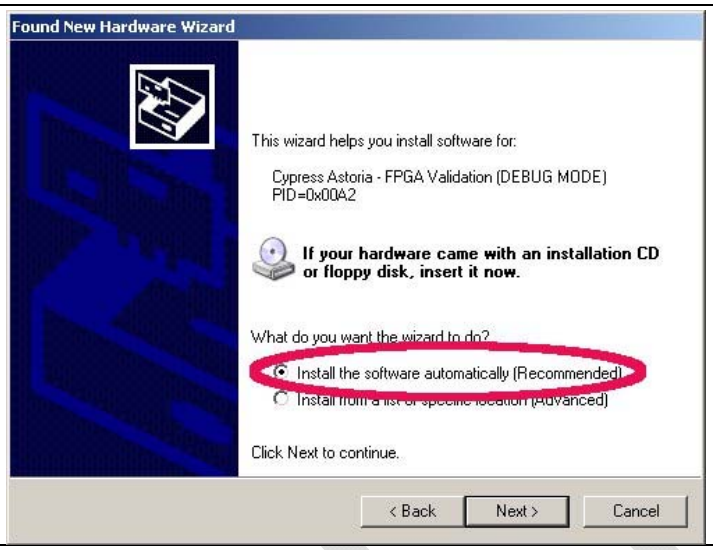

Figure 3. Install the driver again.

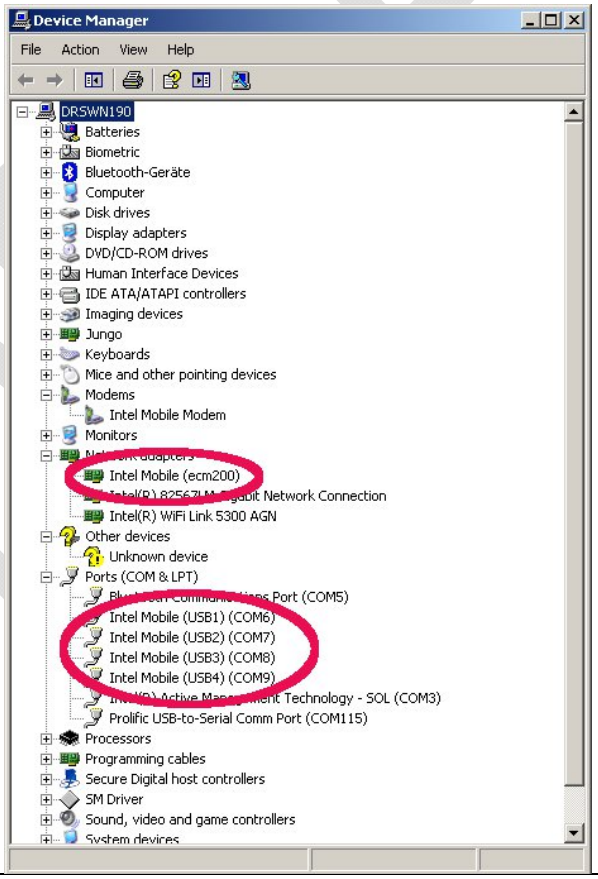

Figure 4. The network modem and four COM ports are now appearing at the device manager.

- Now open the network manager and configure the network settings of the modem.

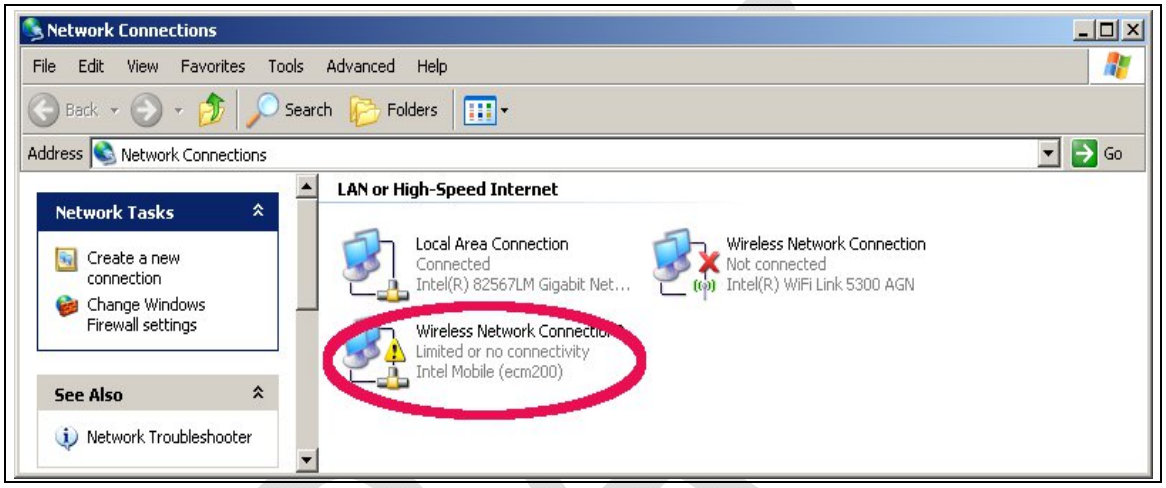

Figure 5. Open the network connections dialog. Win XP : Start:Settings:NetworkConnectios. A new network device did pop up. It is not yet connected.

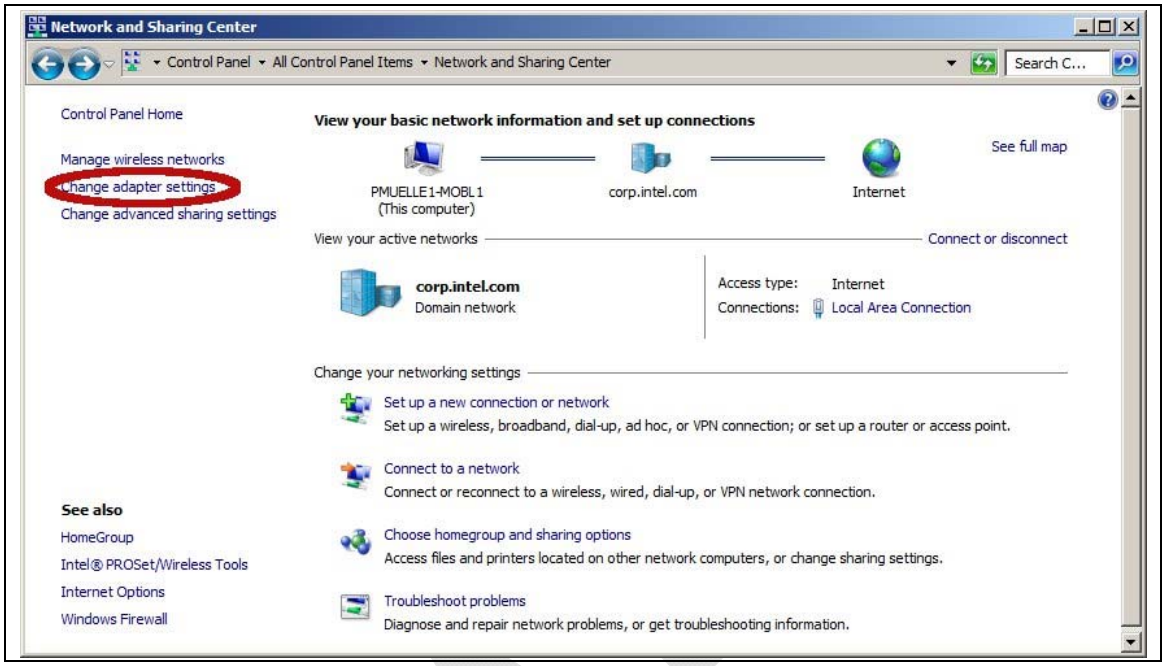

Figure 6. On Win7: Select "Start:Control Panel:Network and Sharing Center" followed by "Change adapter settings".

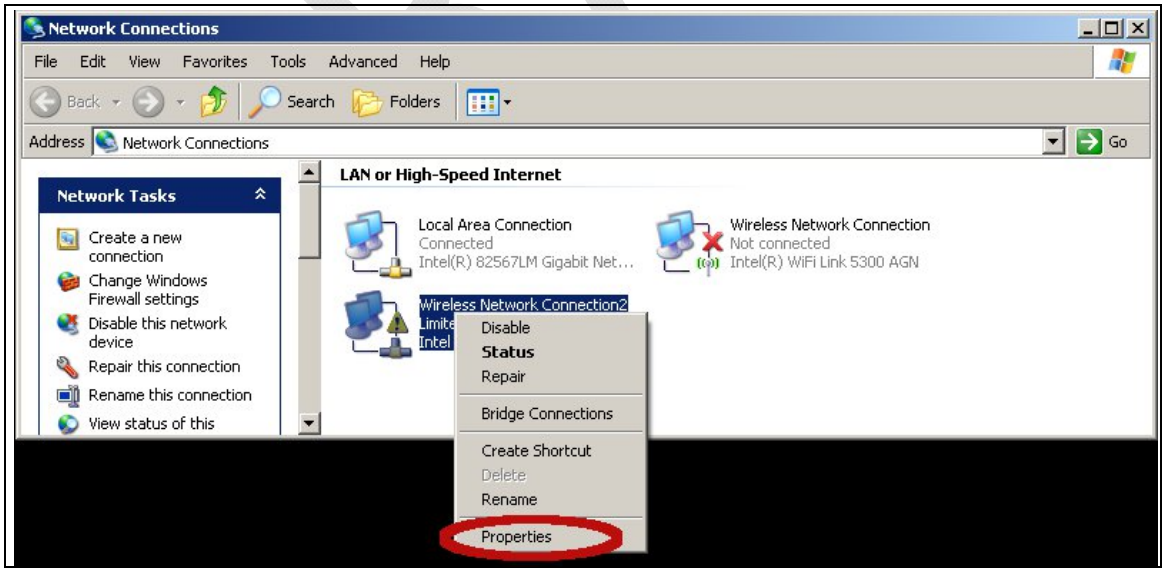

Figure 7. Open the properties dialog of the new network device (right click).

2.1.2.1 Client offset configuration.

This must be done before the IP settings. If the order is flipped the IP settings get lost.

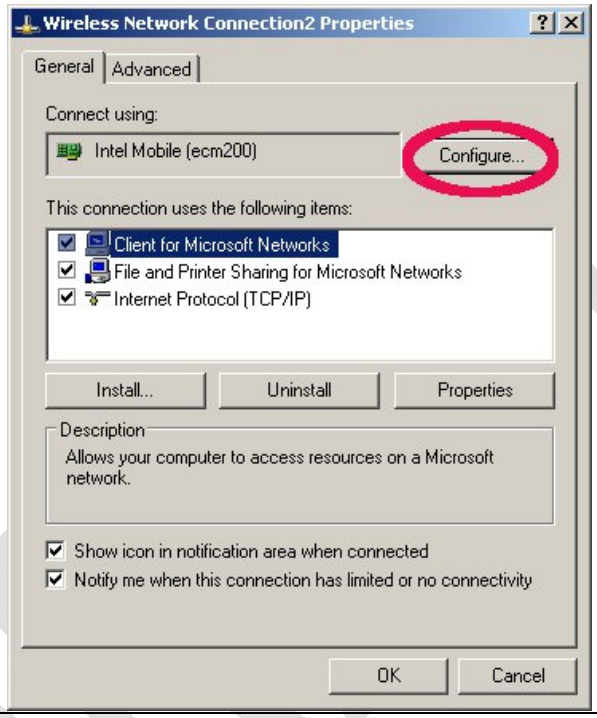

Figure 8. Select the configuration dialog.

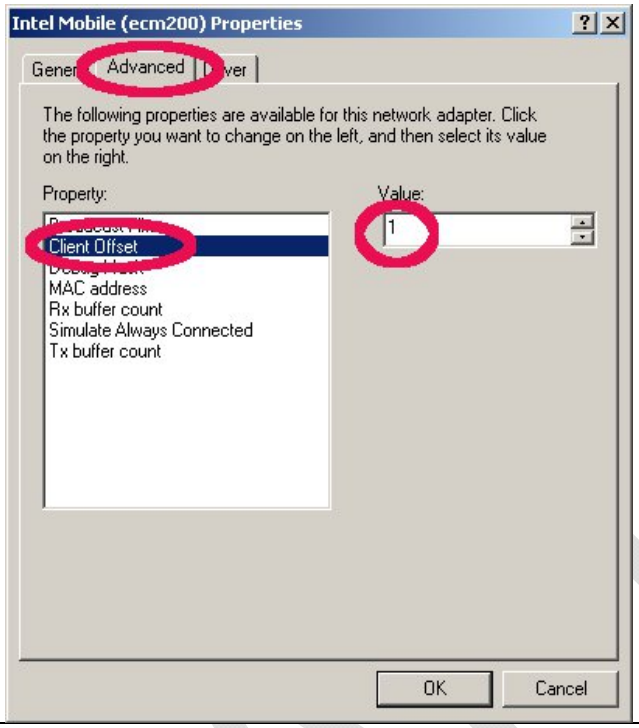

Figure 9. Set the client offset to 1 and press "OK".

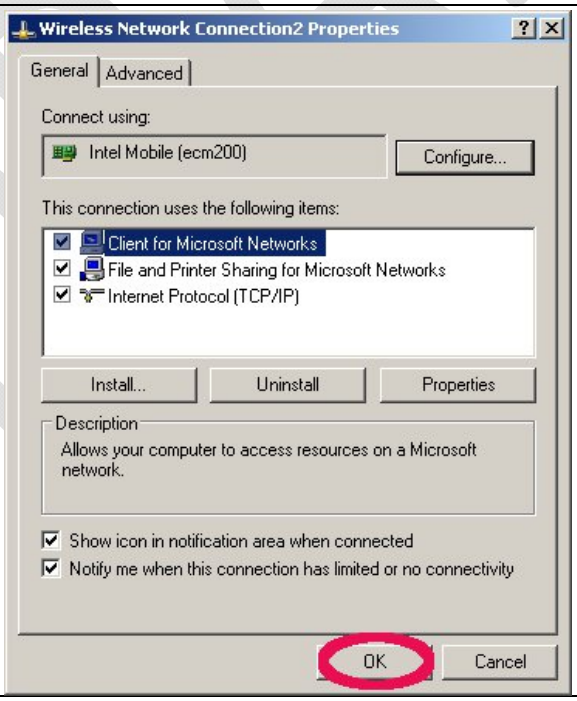

Figure 10. Press "OK" to save these settings. Otherwise these settings get lost.

2.1.2.2 Static IP Address Configuration

- The given example IP number at Figure 12 is for a simplified test and debug setup, see **Error! Reference source not found.**, where the octave or java client runs on the Win PC that also carries all necessary Win drivers and is connected to the DUT. The ecm200 driver runs in a subnet that is only visible from this PC.
- The complete setup, see **Error! Reference source not found.**, consists of test PCs that were provided together with recommended IP settings for the ecm200 driver. The static route settings were set typically IT system wide.
- In case two PCs were used to run the tests, a test PC with the drivers and a desktop PC that carries the Octave or the Java client a static route must be set at

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the desktop PC. The example below helps to find proper static route settings:

test PC with static IP: 10.1.0.126

ecm200 client at test PC with IP: 172.16.126.1 (client offset set to 1)

run as root at the PC where the Octave is running on.

route print #read out route settings

route add 172.16.126.0 mask 255.255.255.0 10.1.0.126

—test the configuration:

ping 172.16.126.1 #response from the ecm200 driver

ping 172.16.126.2 #response from the booted LTE-IP block (L1CC)

- Reopen the Network Connection Properties Dialog.

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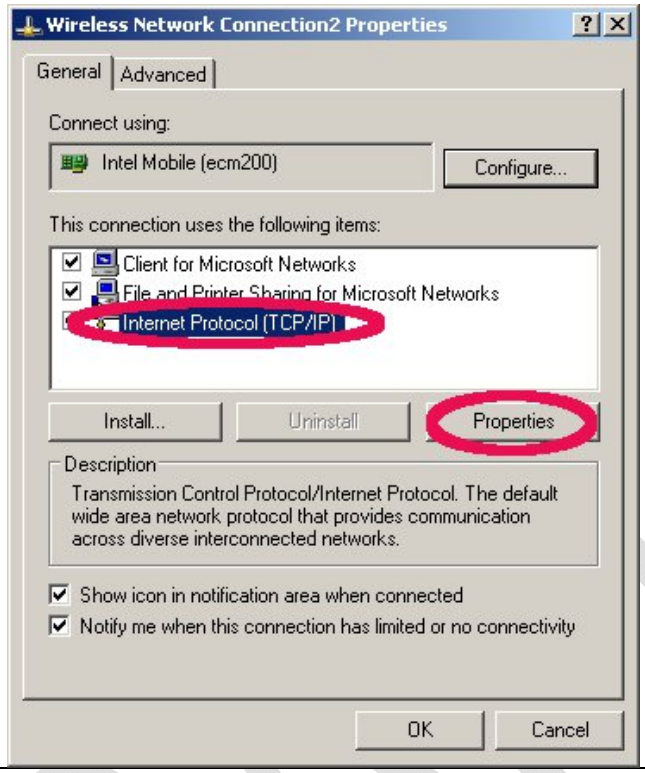

Figure 11. Open the Internet Protocol TCP/IP settings.

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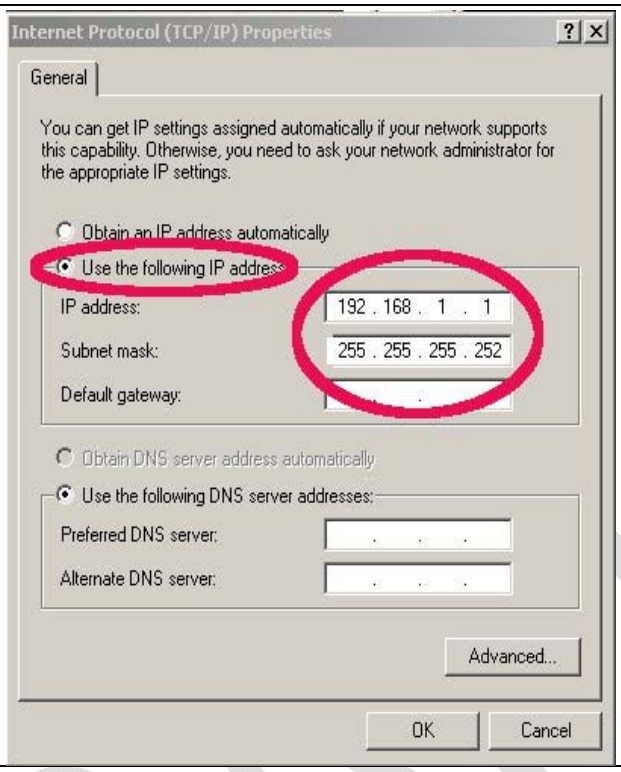

Figure 12. Set the static Network IP and press OK.

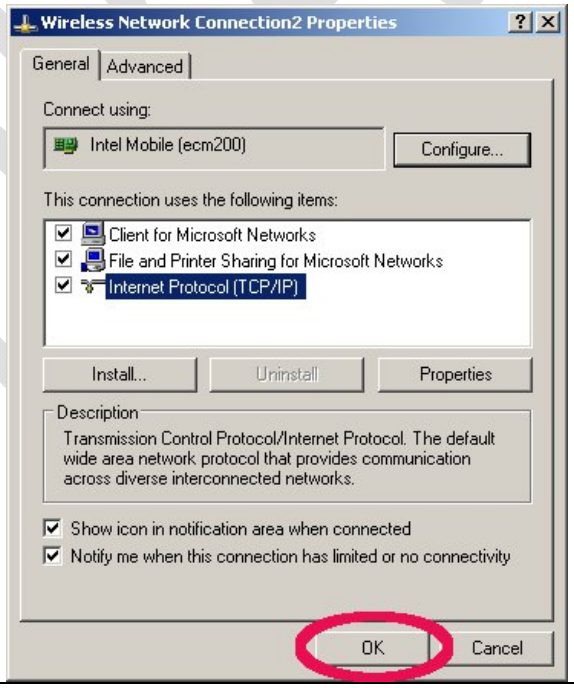

Figure 13. To close the properties dialog and save the settings press "OK".

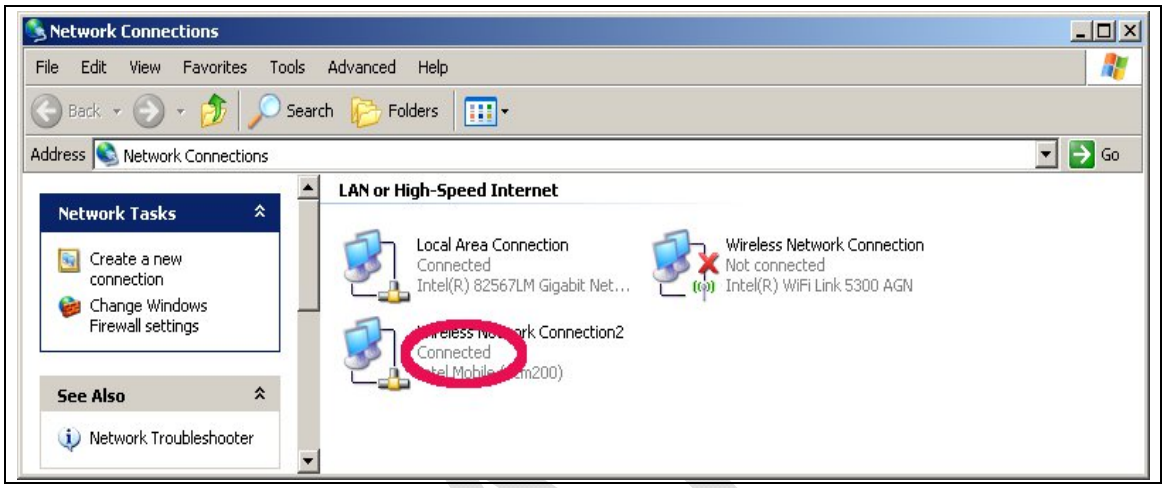

Figure 14. Congratulations. Your ecm200 driver and its IP connection are now properly configured.

- If desired it is now also possible to rename the network device from "Wireless Connection2" to something more convenient e.g. ecm200 + IP address.

2.1.3 Comneon High Speed Modem Driver

- Take the recommended driver,
- \\musdsara001.imu.imc.local\SW_builds\xmm6360\tools\usb_drivers

  See also SMS02534274: - Please use 3.46

version and not WMC_comneon2_3.55.0, see Subsec. 2.1.1, (folder Comneon_High_Speed_Modem_Driver) and follow the instructions from the installation wizard.

- Now connect the cable to the USB-HS connector.
- Win XP asks now it's typical questions again and gets the common answers, see below. Win 7 does not ask and loads the driver automatically.

Figure 15. Use the already installed driver.

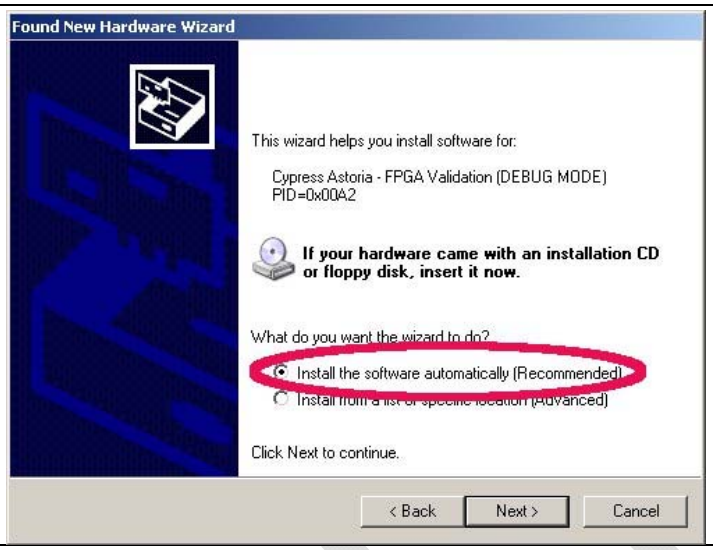

Figure 16. Install the driver.

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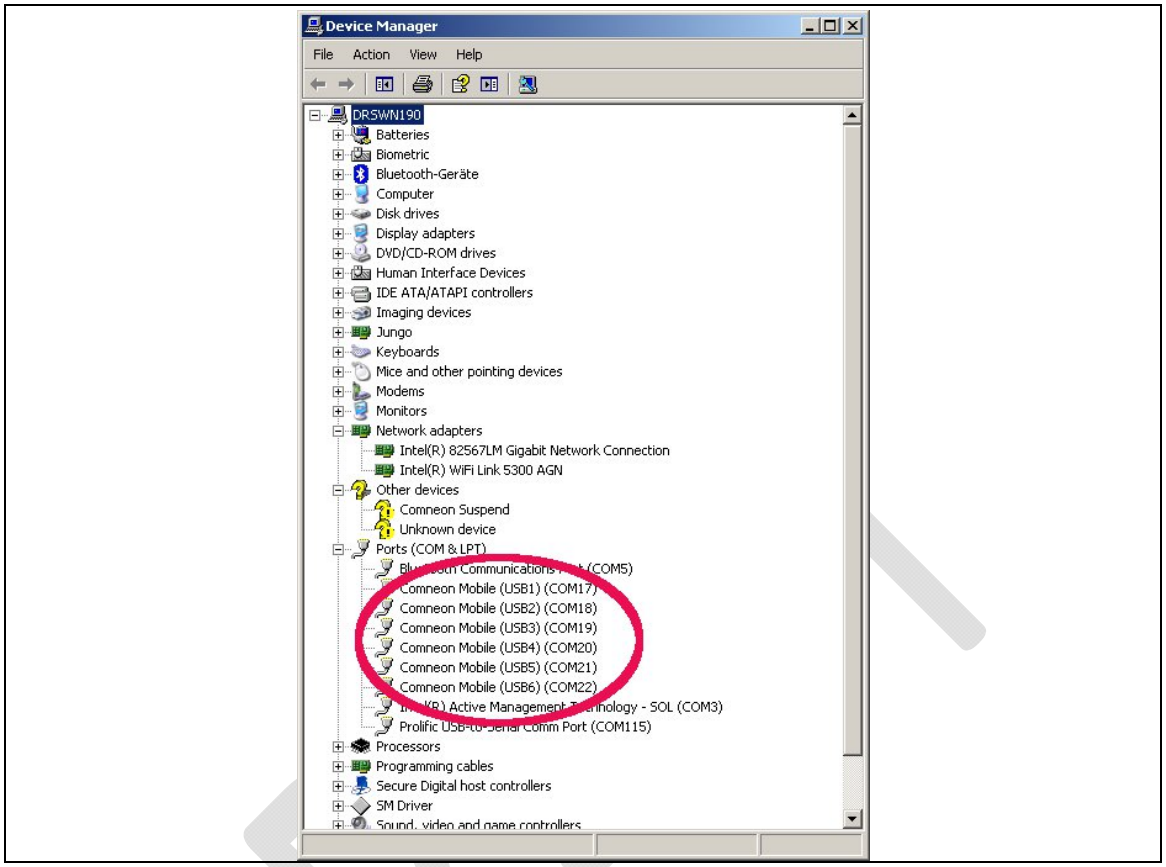

Figure 17. Comneon suspend and six COM ports are now appearing at the device manager.

- Congratulations, your driver installation has finished successfully.

2.1.4 Flash USB driver and FTDI Driver

These drivers are mandatory to flash new ARM software and LTE firmware images at the modem board. Take the recommended

drivers, see Subsec. 2.1.1, (flash tool subfolder) and follow the instructions from the installation wizards.

Note: If this drivers are not installed correctly instabilities at the flash process are occurring without substantial error information from Win XP or Win 7.

2.1.5 Prolific Serial to USB Driver

The Prolific driver is mandatory to access all modem board UART (USIF) ports. Take the recommended driver, see Subsec. 2.1.1, (folder Prolific Driver) and follow the instructions from the installation wizard.

Connect the USB cable to the desired USIF port and check that the COM port appears correctly in the Win device manager. (Win:Settings:Control Panel:System Properties:Hardware:Device Manager. This is quite similar to find at Win XP and Win 7.)

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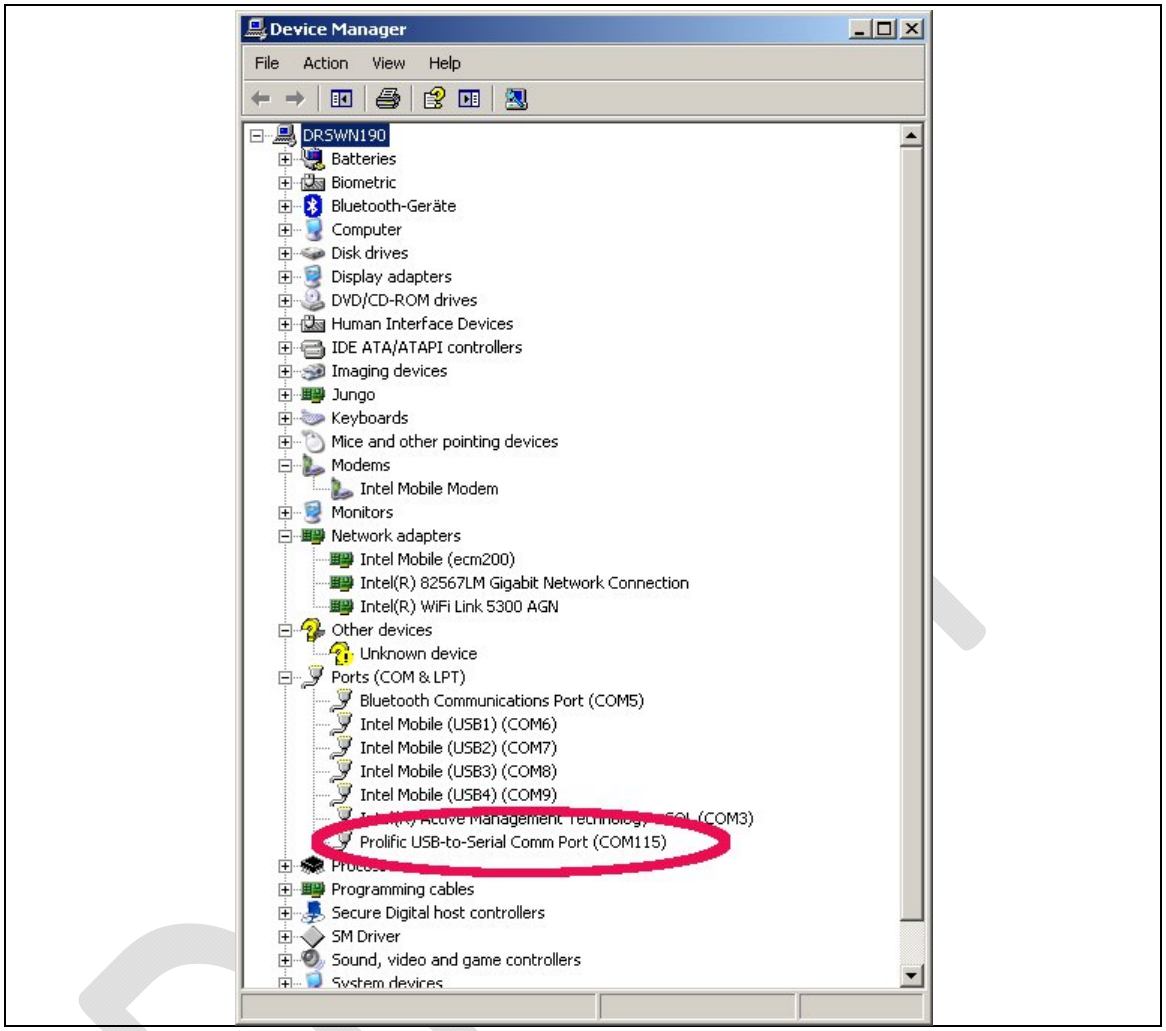

Figure 18. USIF1 Device Manager Prolific USB-to-Serial COM Port

2.2 LTE debug UART configuration

After the preliminary setting, run any AT terminal application (e.g. HyperTerminal) on your PC's communication port, with the following settings.

Table 1. Terminal Port Settings

Data rate	115200 bps
Data Bits	8
Parity	N
Stop Bits	1
Flow Control	HW

- on UNIX xterm use this with uucp:

```
%docing station serial port, uucp

chown uucp /dev/ttyUSB0

cu -l /dev/ttyUSB0 -s 115200
```

- If putty http://www.putty.org is used this looks like this:

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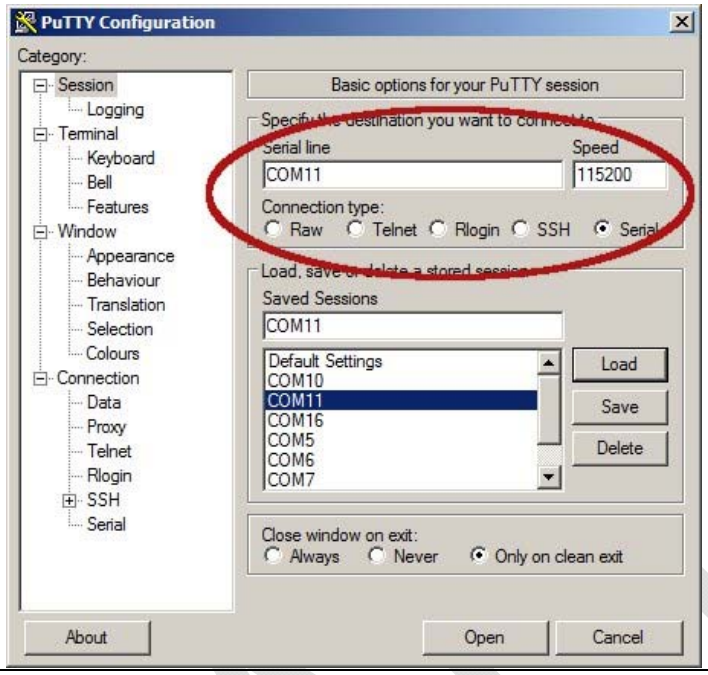

Figure 19. Putty configuration.

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2.3 System Trace Box

2.3.1 Setup and Configuration

2.3.1.1 Entering AT Commands

The AT commands mentioned below must be sent to the COM port that corresponds to the

- Intel Mobile (USB3) COM port in case the ecm 200 driver is used or
- to the COM port that corresponds to the Comneon High Speed Modem, see **Error! Reference source not found.**.

The COM port that corresponds to the USIF-1 USB port, see **Error! Reference source not found.** may also work.

The udp2AT server can be used to enter local AT commands from remote locations, see Subsec. **Error! Reference source not found.**.

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2.3.1.2 Board Configuration and required AT Commands

- Reset the board in a way that is booting from the flash
- Enable tracing using: at+xsystrace=0,"lte_l1_sw=4"
- Reset the board again in a way that is booting from the flash
- Now the initialization at commands to switch to Service Mode (that is the mode to use RCTTH) can be sent if needed:

  —ARM for Inc2.8: ‘at@ecal:’ ’at@ecal_init():’

  —ARM for Inc3.0: ‘at@ephy:smon()’
- **Note**: Please check with the provider of the ARM image which commands are valid for the actual build!!!

- The AT commands below are mandatory to enable tracing:

  a. Enable tracing at all sources: at+trace=1;

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b. Route traces through UE's "OCT-Block", which creates the ISTP format: at+xsio=3;

c. Select the traces from specific sources, use at+xystrace command. For example, to configure the traces from specific to select ONLY the 3g_sw traces: at+xsystrace=0,"3g_sw=1",,"oct=4"

d. make sure your SIM is not waiting for entering a PIN: at+cpin? If it is, send the PIN at at+cpin=<sim pin number>

e. make sure, the 3G protocol stack is sending traces: at+cops=0; (this command triggers the phone to (re-)register to the network)

2.3.2 Connecting the UE

6. Connect the UE to the PC as described in section **Error! Reference source not found.**.

7. Find the com-port in which UE is connected using

7. Find the com-port in which UE is connected using comtest tool. Run the command comtest –l. It will list the ports. Carefully evaluate the port for tracing and port for control.

8. To check whether PC is connected to UE properly, try connecting the control port with the terminal emulator and send “AT” command, If the response is OK, UE is connected successfully. This can be done via AT Console in SystemTraceTool.

9. Send the below AT commands:

   a. Enable tracing at all sources: at+trace=1;

   b. Route traces through UE's "OCT-Block", which creates the ISTP format: at+xsio=3;

   c. Select the traces from specific sources, use at+xystrace command. For example, to configure

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the traces from specific to select ONLY the 3g_sw traces: at+xsystrace=0,"3g_sw=1",,"oct=4"

d. make sure your SIM is not waiting for entering a PIN: at+cpin? If it is, send the PIN at at+cpin=<sim pin number>

e. make sure, the 3G protocol stack is sending traces: at+cops=0; (this command triggers the phone to (re-)register to the network)

2.4 AT Commands Examples

After the preliminary setting, run any AT terminal application (e.g. HyperTerminal) on your PC's communication port, with the following settings

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Table 3. Terminal Port Settings

Data rate	115200 bps
Data Bits	8
Parity	N
Stop Bits	1
Flow Control	HW

AT Command to check ARM Software version

Table 4. AT Commands to check ARM software version

Command sent by DTE	Response of DCE	Description
at+xgendata		The device will reply with the running ARM software version

Register on the network (GSM/UMTS)

Table 5. AT Commands to Register on the Network

Command sent by DTE	Response of DCE	Description
AT+XRAT=1,2		select radio access technology: 1=GSM/UMTS Dual mode; 2=UMTS
	OK	
AT+COPS=0		Register the phone on the network
	OK	
AT+CREG?		Verify registration
	+CREG: 0, 1 OK	
AT+COPS?		
	+COPS: 0,0,"AT&T",0	Read operator name

Incoming Voice Call

Table 6. AT Commands for an Incoming Call

Command sent by DTE	DCE Response	Description
ATA		
	OK	

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Outgoing Voice Call

Table 7. AT Commands for an Outgoing Call

Command sent by DTE	DCE Response	Description
AT		
	OK	
AT+CLIP=1		Activation of Caller line ID presentation
	OK	
ATD+862161019000;		Outgoing voice call
	OK	Voice call is accept from network
ATH		Hang up
	OK	

SMS Management

Table 8. AT Commands for SMS Management

Command sent by DTE	DCE Response	Description
AT+CMGF=1	OK	Set the text mode as the format that will be used. To be set before of the first operation
AT+CMGF=0	OK	Set the PDU mode as the format that will be used. To be set before of the first operation
AT+CMGS="0171112233"<CR> "This is the text"<ctrl-Z>	CMGS: <mr>[,<scts>]	
if PDU mode (+CMGF=0): +CMGS=<length><CR>PDU is	CMGS: <mr>[,<ackpdu>]	
given<ctrl-Z/ESC>	OK or CMS ERROR: <error>	
Test command AT+CMGS=?	OK	

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3 Test Cases

3.1 Protocol Test (CMW500)

Figure 20. CMW 500

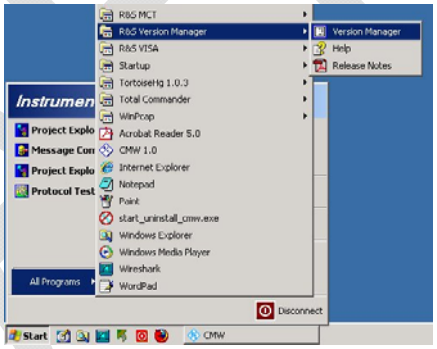
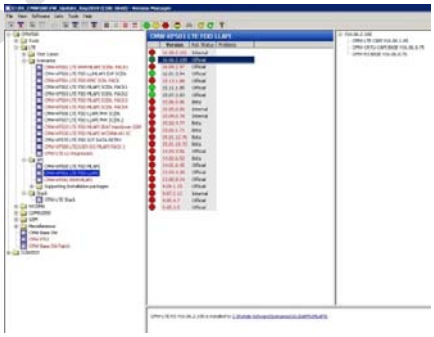
In general it needs to be checked that CMW500 setup are identically to the reference. The components to be checked are :

- The test scenario configurations (xml files) and
- The firmware versions for the tester hardware itself.

3.1.1 CWM 500 Firmware

The firmware version can be checked and maintained in the R&S Version Manager. Basic information on software update and installation with the R&S Version Manager is given in the "R&S

CMW500 Protocol Testing" quick start guide (1202.3857.62). The R&S Version Manager help provides more details on R&S Version Manager functions and handling of software units. This document assumes that all required software units can be installed by the user.

The R&S Version Manager can be opened via the START menu:	
Once opened there are two ways to verify similarity of firmware versions: by hand via stepping through the license options or by exporting the firmware (software status). The picture shows the version manager with the stepping through each firmware license:	

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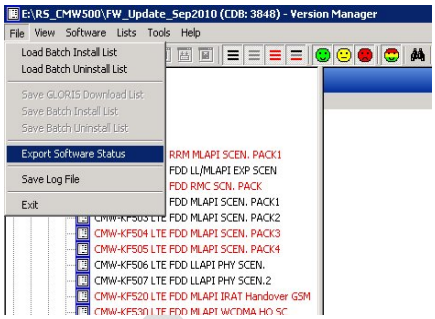
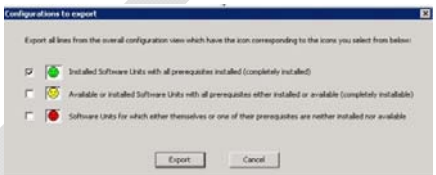
The next picture shows the menu from which the status export can be called:	
After this a pop-up window appears with three possible choices. Only the top one has to be selected as shown in the picture: After this the location of the status export file needs to be chosen. Once done the file can be compared to the reference file which is located under: ..\version\lab2\lab2_cfg.html	

3.1.2 Test Scenario

The test scenario **ml_002 EPS - Bearer Setup** is used for this setup and is contained by the SW option **KF500 with MLAPI Example Scenarios**.

The path to the configuration directory is following:

c:\Rohde-Schwarz\Scenarios\16.6_callSetup_1\APPL\MLAPI\LTE_SAMPLE_SCN\1.0\ml_002\msg

The directory “msg” is part of the CDK delivery and contains several xml files. It has to be noted that the xml version of the xml files needs to be compliant to the installed tester firmware.

Otherwise strange errors occur during test case execution!

http://www2.rohde-schwarz.com/en/products/test_and_measurement/mobile_radio/CMW500-|-Demo-|-48-|-5420.html

3.1.3 AT Commands

Network attach in CallBox Mode, LTE band 7.

at+xact=6,2,1,107

at+cgdcont=1,"IP",”www.rohde-schwarz.com”

This gives OK if the SIM cart is inserted accurately.

at+cops=1,2,"00101",7

3.1.4 The Data Application Unit

Install the Data Application Unit

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The Data Application Unit (DAU) package has to be installed on the CMW.

In case the DAU hardware is populated, the software (SW) should already be installed as well. Check this in "**Setup→SW/HW-Equipment→Installed software**".

Before installation:

- Terminate the CMW BaseSW application – close the window with ‘X’
- In the task manager kill the process "ComponentEnvironmentServer_2.5.exe".

Installation:

- Install the DAU-SW package "**SetupCMW_DAU_Support (Release)-V1.0.15.22**" directly on the CMW.
- Reboot the CMW device.

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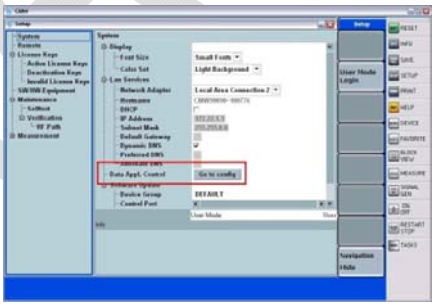
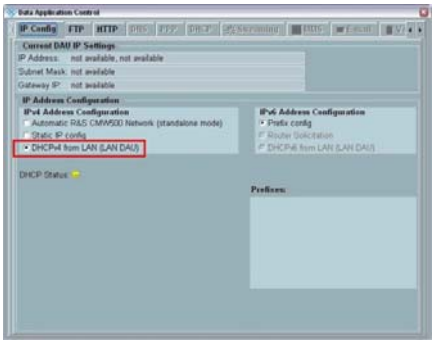
Activate DHCP in Data Application Control

After complete startup of the CMW BaseSW application, follow the steps below to configure the DAU for DHCP:

Make sure your Router is connected to the "LAN DAU" ETH port at the back side of the CMW. Open the **SETUP** menu on the right side.	
Open the DAU configuration via menu: **Data Appl. Control → Go to config**	
Configure the DAU to use DHCP As shown on the screenshot, choose last check mark **DHCPv4 from LAN (LAN DAU)** for IPv4 Address Configuration Close the CMW BaseSW (ALT + F4) and start it again afterwards by a DoubleClick on the desktop link "**CMW 1.0**" After the restart, check the "DHCP Status" in the same window. A green light indicates that the DAU could acquire an IPv4 address via DHCP.	

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Switching UPC from PPC (SUW) to DAU

In order to let the scenario use the UPC (=Uplane Control) on the DAU (and not as per default on the PPC), two XML files have to be replaced in the topology:

- sequencer.xml,
- pipe.xml

Copy these two files to **C:\Rohde-Schwarz\Scenarios\16.6\APPL\MLAPI\rstopology\LTE**.

NOTE:

It is recommended to make a back-up of the original files before.

Start the LTE scenario

Start the LTE scenario now.

During the Default EPS Bearer Setup the UE will get an IP address which was acquired by the DAU before.

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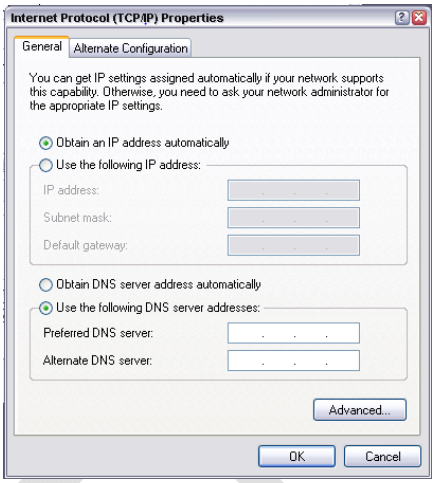
Manual DNS settings

On the LTE host which connects to the internet, the DNS server has to be configured manually, because the DAU does not yet support automatic DNS provisioning (ask your IT).

In case of a LTE notebook adapter, the DNS server will be configured on the IP properties pane:



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4 Regulatory Notice

Japanese Radio Law and Japanese Telecommunications Business Law Compliance.

This device is granted pursuant to the Japanese Radio Law (電波法)

and the Japanese Telecommunications Business Law (電気通信事業法)

This device should not be modified (otherwise the granted designation number will

become invalid)

Manual Information to the End User :

The OEM integrator has to be aware the end user manual shall include all required regulatory information/warning as show in this manual.

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5 Abbreviations / Terminology

A	
A-GPS	Assisted-GPS (Global Positioning System)
AP	Application Processor
B	
BB	Baseband
C	
CMOS	Complementary Metal Oxide Semiconductor
CN	Comneon
D	
DigRF v4	Digital RF interface v4 (rmainly used for 4G)
DigRF 3.09	Digital RF interface v3 for (mainly used for 2G/3G)
E	
ETM	Embedded Trace Macrocell
ESD	Electrostatic discharge
F	
fps	Frames Per Second
G	
GPIO	General purpose input/output
GSM	Global System for Mobile Communications
H	
USB-HS	High Speed. USB2.0 (480MBit/sec)
I	
J	
JPEG	Joint Photographic Experts Group
JTAG	Joint Test Action Group

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L	
LDO	Low dropout (regulator)
LED	Light-emitting diode
M	
MIPI	Mobile Industry Processor Interface
MMC(I)	Multimedia Card (Interface)
MPU	Microprocessor unit
O	
P	
PA	Power Amplifier
PCL	Port Control Logic
PMU	Power Management unit
PTI	Parallel Trace Interface
S	
SD-Card	Secure Digital Card
SMT pin header	Surface Mount Technology pin header
SPI	Serial Peripheral interface
S4G	SMARTi™ 4G
ST MIPI	System Trace MIPI
STT	System Trace Tool
SVB	System verification board
SW	Software
T	
TAP	Test Access Port
TCU	Test Control Unit
U	
USB	Universal Serial Bus
USIF	Universal Serial Interface

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Appendix A Definitions/Explanations

Eval Board	special processor socket board for X-GOLD™ 716 component verification
Lauterbach	Supplier of Debug and Trace environment for X-GOLD™ 716 (e.g. JTAG, ETM7/11, ST MIPI)
Modem board	Main part of XMM™ 7160 platform hardware (see **Error! Reference source not found.**)
XMM™ 7160	Project name of Intel platform with key component X-GOLD™ 716
RF- Engine	RF part of platform (RF-transceiver, Power amplifiers, LNA, Filter bank, antenna switch etc.).
SMARTi™ 4G	Intel RF-transceiver for 2G/3G/4G
Janus board	Board with SMARTi™ LU and SMARTi™ UE2
Carrier board	SMB needs a carrier board for operation

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Appendix B Regulatory Statements

USA FCC Radio Frequency Exposure

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. The wireless adapter meets the Human Exposure limits found in OET Bulletin 65, supplement C, 2001, and ANSI/IEEE C95.1, 1992. Proper operation of this radio according to the instructions found in this manual will result in exposure substantially below the FCC's recommended limits.

The following safety precautions should be observed:

- Do not touch or move antenna while the unit is transmitting or receiving.
- Do not hold any component containing the radio such that the antenna is very close or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; this behavior may cause damage to the radio.
- Use in specific environments:
    - The use of wireless adapters in hazardous locations is limited by the constraints posed by the safety directors of such environments.
    - The use of electronic devices equipped with wireless adapters on airplanes is governed by rules for each commercial airline operator.
    - The use of wireless adapters in hospitals is restricted to the limits set forth by each hospital.

Explosive Device Proximity Warning

Warning: Do not operate a portable transmitter (including this wireless adapter) near unshielded blasting caps or in an explosive environment unless the transmitter has been modified to be qualified for such use.

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Use On Aircraft Caution

Caution: Regulations of commercial airline operators and the FCC may prohibit airborne operation of certain electronic devices equipped with radio-frequency wireless devices (wireless adapters) including cellular devices because their signals could interfere with critical aircraft instruments.

The Wireless Adapter and Your Health

The wireless adapter, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by the wireless adapter, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. The wireless adapter operates within the guidelines found in radio frequency safety standards and recommendations. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature. In some situations or environments, the use of the wireless adapter may be restricted by the proprietor of the building or responsible representatives of the applicable organization. Examples of such situations may include:

- Using the wireless adapter on board airplanes, or
- Using the wireless adapter in any other environment where the risk of interference with other devices or services is perceived or identified as being harmful.

If you are uncertain of the policy that applies to the use of wireless adapters in a specific organization or environment (an airport, for example), you are encouraged to ask for authorization to use the adapter before you turn it on.

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REGULATORY INFORMATION

USA - Federal Communications Commission (FCC)

No configuration controls are provided for Intel® wireless adapters allowing any change in the frequency of operations outside the FCC grant of authorization for U.S. operation.

- Intel® wireless adapters are intended for OEM integrators only.
- If Intel® wireless adapters are to be co-located with any other transmitter additional testing and/or approval by the FCC will be required.

This wireless adapter complies with Part 15 of the FCC Rules. Operation of the device is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference that may cause undesired operation.

Class B Device Interference Statement

This wireless adapter 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 wireless adapter generates, uses, and can radiate radio frequency energy. If the wireless adapter is not installed and used in accordance with the instructions, the wireless adapter may cause harmful interference to radio communications. There is no guarantee, however, that such interference will not occur in a particular installation. If this wireless adapter 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 taking one or more of the following measures:

- Reorient or relocate the receiving antenna of the equipment experiencing the interference.
- Increase the distance between the wireless adapter and the equipment experiencing the interference.
- Connect the computer with the wireless adapter to an outlet on a circuit different from that to which the equipment experiencing the interference is connected.

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- Consult the dealer or an experienced radio/TV technician for help.

NOTE: The adapter must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Any other installation or use will violate FCC Part 15 regulations.

Canada – Industry Canada (IC)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil se conforme aux normes Canada d'Industrie de RSS permis-exempt. L'utilisation est assujetti aux deux conditions suivantes: (1) cet appareil ne peut pas causer d'interférences, et (2) cet appareil doit accepter des interférences , y compris des interférences qui peuvent causer desopérations non désirées de l'appareil.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Selon les règlements de Canada d'Industrie, cet émetteur de radio peut seulement fonctionner en utilisant une antenne du type et de gain maximum (ou moindre) que le gain approuvé pour l'émetteur par Canada d'Industrie. Pour réduire lesinterférences radio potentielles avec les autres utilisateurs, le type d'antenne et son gain devraient être choisis de façon à ce que la puissance

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isotrope rayonnée équivalente(P.I.R.E.) ne soit pas supérieure à celle qui est nécessaire pour une communication réussie.

Safety Approval Considerations

This device has been safety approved as a component and is for use only in complete equipment where the acceptability of the combination is determined by the appropriate safety agencies. When installed, consideration must be given to the following:

- It must be installed into a compliant host device meeting the requirement of UL/EN/IEC 60950-1 2nd edition including the general provisions of enclosure design 1.6.2 and specifically paragraph 1.2.6.2 (Fire Enclosure).
- The device shall be supplied by a SELV source when installed in the end-use equipment.
- A heating test shall be considered in the end-use product for meeting the requirement of UL/EN/IEC 60950-1 2nd edition.

INFORMATION FOR OEMs and HOST INTEGRATORS

The guidelines described within this document are provided to OEM integrators installing Intel® wireless adapters in notebook and tablet PC host platforms. Adherence to these requirements is necessary to meet the conditions of compliance with FCC rules, including RF exposure. When all antenna type and placement guidelines described herein are fulfilled the Intel® wireless adapters may be incorporated into notebook and tablet PC host platforms with no further restrictions. If any of the guidelines described herein are not satisfied it may be necessary for the OEM or integrator to perform additional testing and/or obtain additional approval. The OEM or integrator is responsible to determine the required host regulatory testing and/or obtaining the required host approvals for compliance.

- Intel® wireless adapters are intended for OEMs and host integrators only.
- The Intel® wireless adapter FCC Grant of Authorization describes any limited conditions of modular approval.
- The Intel® wireless adapters must be operated only within countries that have been approved for operation.

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- Changes or modification to Intel® wireless adapters by OEMs, integrators or other third parties is not permitted. Any changes or modification to Intel® wireless adapters by OEMs, integrators or other third parties will void authorization to operate the adapter.

Simultaneous Transmission of Intel® Wireless Adapters with Other Integrated or Plug-In Transmitters

Based upon FCC Knowledge Database publication number 616217 https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=33240&switch=P, when there are multiple transmitting devices installed in a host device, an RF exposure transmitting assessment shall be performed to determine the necessary application and test requirements. OEM integrators must identify all possible combinations of simultaneous transmission configurations for all transmitters and antennas installed in the host system. This includes transmitters installed in the host as mobile devices (>20 cm separation from user) and portable devices (<20 cm separation from user). OEM integrators should consult the actual FCC KDB 616217 document for all details in making this assessment to determine if any additional requirements for testing or FCC approval is necessary.

5.1.1 Information To Be Supplied to the End User by the OEM or Integrator

The following regulatory and safety notices must be published in documentation supplied to the end user of the product or system incorporating the Intel® wireless adapter, in compliance with local regulations. Host system must be labeled with "Contains FCC ID: XXXXXXXX", FCC ID displayed on label.

The Intel® wireless adapter must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Intel Corporation is not responsible for any radio or television interference caused by unauthorized modification of the devices included with the wireless adapter kit or the substitution or attachment of connecting

cables and equipment other than that specified by Intel Corporation. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Intel Corporation and authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user failing to comply with these guidelines.

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