1. **Requirements:**
2. Computer in the front room will work however, for the Cohda scripts to run, the GPS antennae need to see the sky. Maybe you can use the computer that I use in the lab for this as it is next to a window. Moreover, I already have a remote connection setup with this computer, with that I can support you anytime with added ease.
3. IP Address for RSU as well as corresponding CVCP if we want to forward the over-the-air messages to CVCP.
4. A Cohda OBU connected to some computer (we already have a few in the lab), so that we can do the end-to-end test.
5. We will require a network switch if we want to access both RSU as well as the OBU from the same computer.
6. If the RSU and the OBU are not on the same subnet, a secondary IP address needs to be assigned to the computer that we are using to access these devices, following instructions here: <https://www.garron.me/en/linux/add-secondary-ip-linux.html> (We can do this over zoom/team-viewer)
7. **RSU:**
8. Obtain the serial number of the Cohda RSU. The serial number is located on a label that is on a side of the RSU. This serial number is the same as the MAC address of the device and will be used to obtain the IPv6 address of the RSU using the online tool which is available here: <http://www.sput.nl/internet/ipv6/ll-mac.html>
9. PoE Connecter:
   1. if using new generation PoE (the one with only two ports), connect the data port of the PoE connector to the computer (or network switch if accessing OBU and RSU simultaneously) being used to setup the RSU. Connect the power port of the PoE to the RSU.
   2. If using the old generation PoE (the one with multiple port), any available port (except uplink port) can be used to connect to the RSU and the computer (or network switch if accessing OBU and RSU simultaneously).
10. Rest the RSU gently on its antennae near the window so that the GPS antenna sees the sky (or at least a part of it).
11. Get the name of the ethernet interface of the computer that we are using to communicate with the RSU by using following command in a terminal on the computer:

ifconfig

1. Once the RSU is powered on, try to ping it using its IPv6 address using following command

ping6 <IPv6 address of RSU>%<computer’s ethernet interface name>

1. If the ping test is successful, SSH into the RSU using following command

ssh rsu@<IPv6 address of the RSU>%<computer’s ethernet interface name>

1. The password for rsu user is rsuadmin
2. Once SSH’ed into the RSU, get the root privilege by entering following command (let’s call this terminal RSU terminal)

sudo su

1. Edit the setup script in the external computer before copying to the RSU, to be sure the desired IP addresses is correct:
2. Change SUT\_IPV4\_ADDR to be the RSU IPv4 address. And WSMFWDRX\_\*\_DESTIP be the IPv4 address of CVCP for all \*.
3. If using any RSU to act like an OBU, in the setup script, add following lines (after WSMFWDRX\_1\_PSID) to enable the forwarding of SPAT (for test purpose only). PSIDs of other messages can also be added in similar fashion.

WSMFWDRX\_2\_DESTIP="10.12.6.108"

WSMFWDRX\_2\_DESTPORT="10002"

WSMFWDRX\_2\_PSID="0x8002"

1. Now open another terminal in the computer (let’s call this terminal as the computer terminal) and go to the directory where the setup script is stored. Once in this directory, execute the following command to copy the script into the RSU:

scp <filename of the setup script> rsu@[<IPv6 address of the RSU>%<name of ethernet interface of the computer>]:/home/rsu/.

1. Now the setup script will be copied to the /home/rsu folder. We need to copy the file to /mnt/src folder on the RSU. Come back to the RSU terminal, and execute the following command:

cp /home/rsu/<filename of the setup script> .

1. Redirect to the correct directory where the script will be stored, by using following command:

cd /mnt/src

1. Check if the scripts are copied to this folder by entering following command:

ls -als

1. Once the script is copied to the /mnt/src folder on the RSU, allow it to run as an executable by entering following command

chmod 777 <filename of the setup script>

1. After permissions are given, simply run the script. When the script is run it asks user’s permission to set the IPv4 address. Press y followed by return at the prompt.
2. Now the RSU will restart and new IPv4 address will be assigned. Verify using ping test to the assigned IPv4 address. The ping test can also be used to see if the RSU is started.
3. After RSU starts responding to the ping test, ssh using IPv4 address and credentials used earlier. For example:

ssh rsu@<IPv4 address>

1. After the RSU restarts, go to the /mnt/src directory, and rerun the script once again (with route privileges. This time press n at the prompt for permission to change the IPv4 address.
2. **OBU:**
3. Connect the OBU to a power source
4. Connect the ethernet port of the OBU to a computer (or network switch if accessing OBU and RSU simultaneously). We need to be careful not to connect the ethernet port of the OBU to any of the PoE connectors, as this may make the ethernet port of the OBU unusable.
5. Obtain the serial number of the Cohda OBU. The serial number is located on a label that is on the back side of the OBU. This serial number is the same as the MAC address of the device and will be used to obtain the IPv6 address of the OBU using the online tool which is available here: <http://www.sput.nl/internet/ipv6/ll-mac.html>
6. Make sure to expose the GPS/DSRC antennae of the OBU to the sky.
7. Get the name of the ethernet interface of the computer that we are using to communicate with the OBU by using following command in a terminal on the computer:

ifconfig

1. Once the OBU is powered on, try to ping it using its IPv6 address using following command

ping6 <IPv6 address of OBU>%<computer’s ethernet interface name>

1. If the ping test is successful, SSH into the OBU using following command

ssh user@<IPv6 address of the OBU>%<computer’s ethernet interface name>

1. The password for user user is user
2. Once SSH’ed into the OBU, get the root privilege by entering following command (let’s call this terminal OBU terminal)

sudo su

1. Redirect to the correct directory where the script will be stored, by using following command:

cd /mnt/src

1. Now open another terminal in the computer (let’s call this terminal as the computer terminal) and go to the directory where the setup scripts and firmware image are stored. Once in this directory, execute the following command to copy the contents of this folder into the OBU:

scp \* user@[<IPv6 address of the OBU>%<name of ethernet interface of the computer>]:/home/user/.

1. Now the contents of the will be copied to the /home/user folder in the OBU. We need to copy the contents to the /mnt/src folder on the OBU. Come back to the OBU terminal and execute the following command for each file that was copied from the computer (including firmware image and setup scripts.:

cp /home/user/<filename> .

1. Once the content is copied to the /mnt/src folder on the OBU, allow it to run as an executable by entering following command

chmod 777 <filename>

1. Execute the rc.local script to change the firmware to the RSU firmware.
2. After the execution, wait for 5-6 minutes till the firmware is changed. The ping test can be used to test if the firmware upgrade is complete.
3. After the firmware is changed, run the setup script with root previleges. When the script runs, it asks user’s permission to set the IPv4 address. Press y followed by return at the prompt.
4. Now the OBU will restart and new IPv4 address will be assigned. Verify using ping test to the assigned IPv4 address. The ping test can also be used to see if the OBU is started.
5. After OBU starts responding to the ping test, ssh using IPv4 address and credentials used earlier. For example:

ssh OBU@<IPv4 address>

1. After the OBU restarts, go to the /mnt/src directory, and rerun the script once again with root privileges. This time press n at the prompt for permission to change the IPv4 address.
2. **Test scripts:**

The test scripts are located in the mmitss repository – develop branch. The path to the test script is /src/mrp/rsu\_interface