1   CITY SCAPE TEST SUITE – USER MANUAL

1.1   OVERVIEW

City Scape Test Suite application enables an end-to-end offline validation of spectrum station setup using the City Scape Spectrum software. The test suite allows users to configure RF Sensor parameters offline and thereby capturing the desired spectrum data locally without having to connect to the azure backhaul. To view the scan data plots, users require to use Windows-CityScapePSDFilePlotter.

1.2   GETTING STARTED

To start using City Scape Test Suite application, please follow the below instructions on the test PC:

1.2.1   Pre-Requisites

1. Visual Studio 2013 redistributable is required to run the Spectrum Observatory software on the test PC. Download the software from here: http://www.microsoft.com/en-us/download/details.aspx?id=40784
2. Download the City Scape Spectrum Software from here: https://www.dropbox.com/s/41hu3etnxcnr5yg/ImporterSetup.msi?dl=0
3. Open the ImporterSetup.MSI and follow the onscreen instructions to complete the installation

4. Download City Scape Test Suite Application from here:
   https://www.dropbox.com/s/fhfi304ea1c2gpn/CiytScapeTestSuite.zip?dl=0
5. Unzip the City Scape Test Suite Application to a known folder on the local drive
6. Install Ettus UHD software on the test PC from here:
   http://files.ettus.com/binaries/uhd_stable/uhd_003.008.005-release/uhd_003.008.005-release_Win64_VS2013.exe
7. Make sure the USRP device is setup correctly as suggested in the City Scape Deployment Guide
8. It is recommended to setup the device IP address as 192.168.10.2
9. Plug the test PC to the device directly and test the connection using ping command
10. Run the usrp commands as below:
    <install-path>\bin\uhd_find_devices.exe
    <install-path>\bin\uhd_usrp_probe.exe
11. If USRP commands successfully completed, the test PC is ready for tests

1.2.2   Launching the City Scape Test Suite Application
1. Browse to the City Scape Test Suite folder location and locate CityScapeTestSuite.exe application
2. Open the application to see the user interface
3. To load the values, click on the 'Load From File…" button and choose stationConfiguration.dsos file from City Scape Test Suite application folder.

1.2.3   Save Scanner Configuration Changes (dsos)
1. Launch the City Scape Test Suite Application
2. For eg: Update Start and Stop Frequency values
3. Click on 'Save As…" button
4. Browse to C:\SpectrumData\Settings folder and save file with name 'stationConfiguration.dsos'. Please note, file name of scanner configuration file to be exactly as given. If there is a file already present, overwrite it or rename the existing file to a different one.

1.3   BEGIN TESTS
1. Stop the Scanner Service. To stop the scanner service, use either task manager to kill the service or use the command below from an elevated cmd window:
   taskkill /F /IM Microsoft.Spectrum.Scanning.Service.exe
2. Launch City Scape Test Suite Application
3. Make necessary changes to the settings
4. Save Scanner Configuration Changes to dsos file
5. Start the Scanner Service. Start the service from task manager.

At any point, scanner service can be stopped to start another scan with new configuration settings. The tests can be repeated any number of times. It is highly recommended to stop and start the scanner in between the configuration changes.

1.4   PLOTTING OF DATA
Please download and follow the instructions mentioned at the link here:

Distribution for Windows (if you don't want to figure out dependencies):
https://www.dropbox.com/s/26gr5uh0f8t3adh/Windows-CityScapePSDFilePlotter.zip?dl=0

Source codes (If you want to actually modify the program or run on non-WIndows machines):
https://github.com/city-scape/CityScape_Raw_Data_Decoder/blob/master/python/GUI_Example/CityScapePSDPlotter.py
https://github.com/city-scape/CityScape_Raw_Data_Decoder/blob/master/python/psdFile_pb2.py

(You need to download both CityScapePSDPlotter.py and psdFile_pb2.py and place them in a same directory.)

1.4.1 Installation

1. **Distribution for Windows (if you don't want to figure out dependencies):**
    Download and extract the zip file. Run CityScapePSDPlotter.exe to execute the program.

2. **Using Python Source codes:**

    1. Install the following dependencies.
       - Python 2.7
       - Protobuf Python binding (python-protobuf)
       - MatPlotLib
       - NumPy
       - SciPy
    2. Place both CityScapePSDPlotter.py and psdFile_pb2.py in a same directory.
    3. Using CLI (bash, tcsh, cmd.exe, etc), go to the directory where the python files are located.
    4. Run "python CityScapePSDPlotter.py" to execute the program. (Alternatively, you can use chmod +x CityScapePSDPlotter.py to make it an executable file if you are using Linux of Mac.)

1.4.2 Usage

1. When you launch the program, it will open a file dialogue. Navigate to where the aggregate PSD file is located, and open the file. (fig.1)
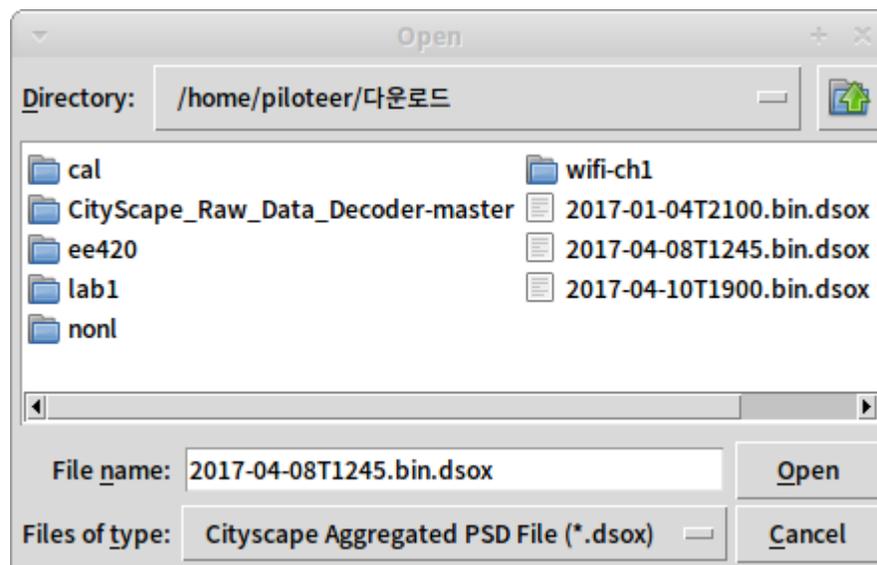

Fig. 1 : File Open Dialogue.

2. Give the program some time to process the file. It is somewhat slow on Windows, but if the file is small enough (5 - 10 min), it won't take too long. (fig .2)
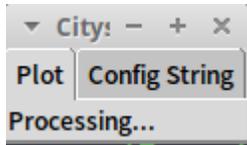
Fig.2: PSD Plotter application, processing the data.

3. Once the program is ready, it will display a summary of the station configuration and prompt you to input start & stop frequency, and y-axis range of the plot (default: -140 to 0 dBm/bin). Set the values, and click the "Plot" button below to generate a plot. (Fig.3 / 4)
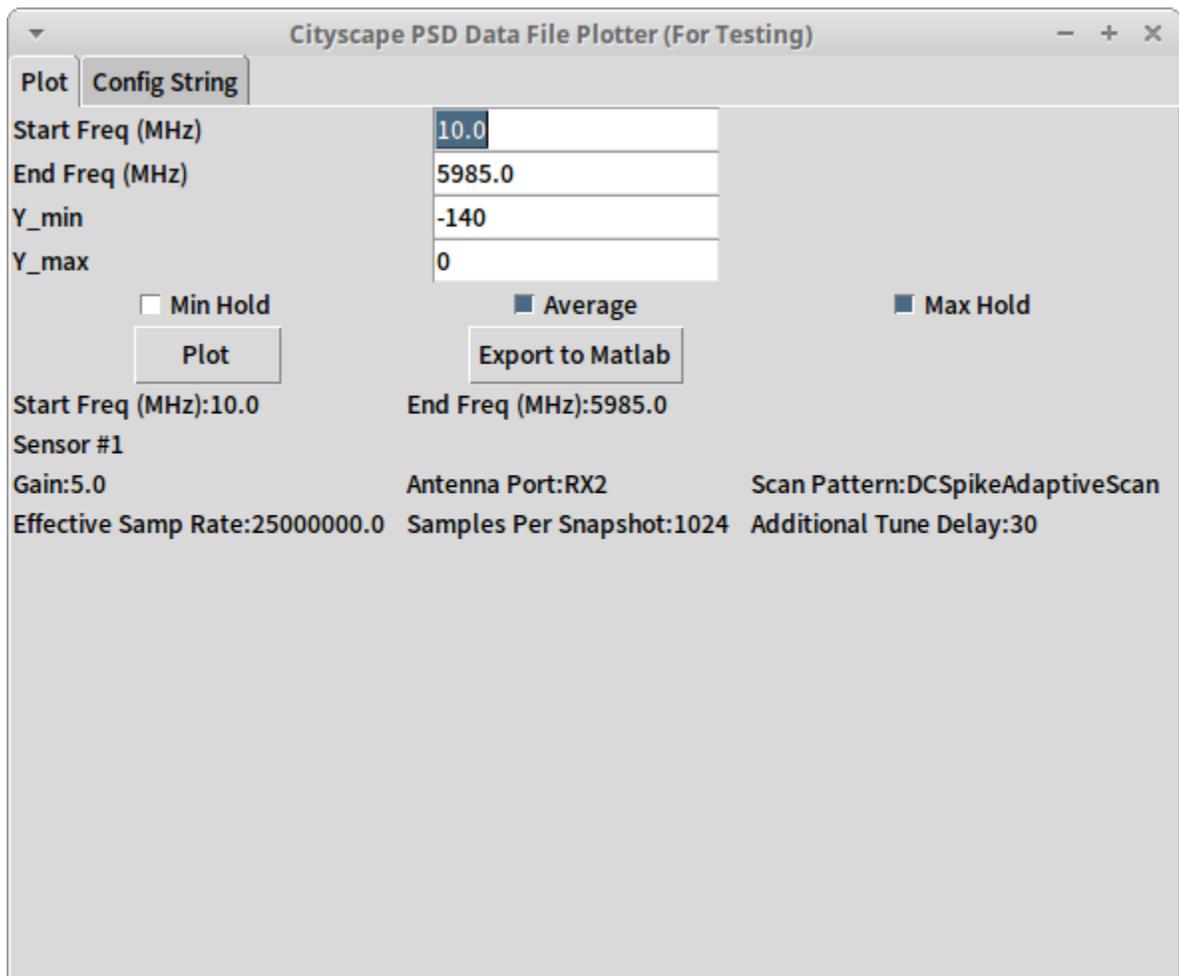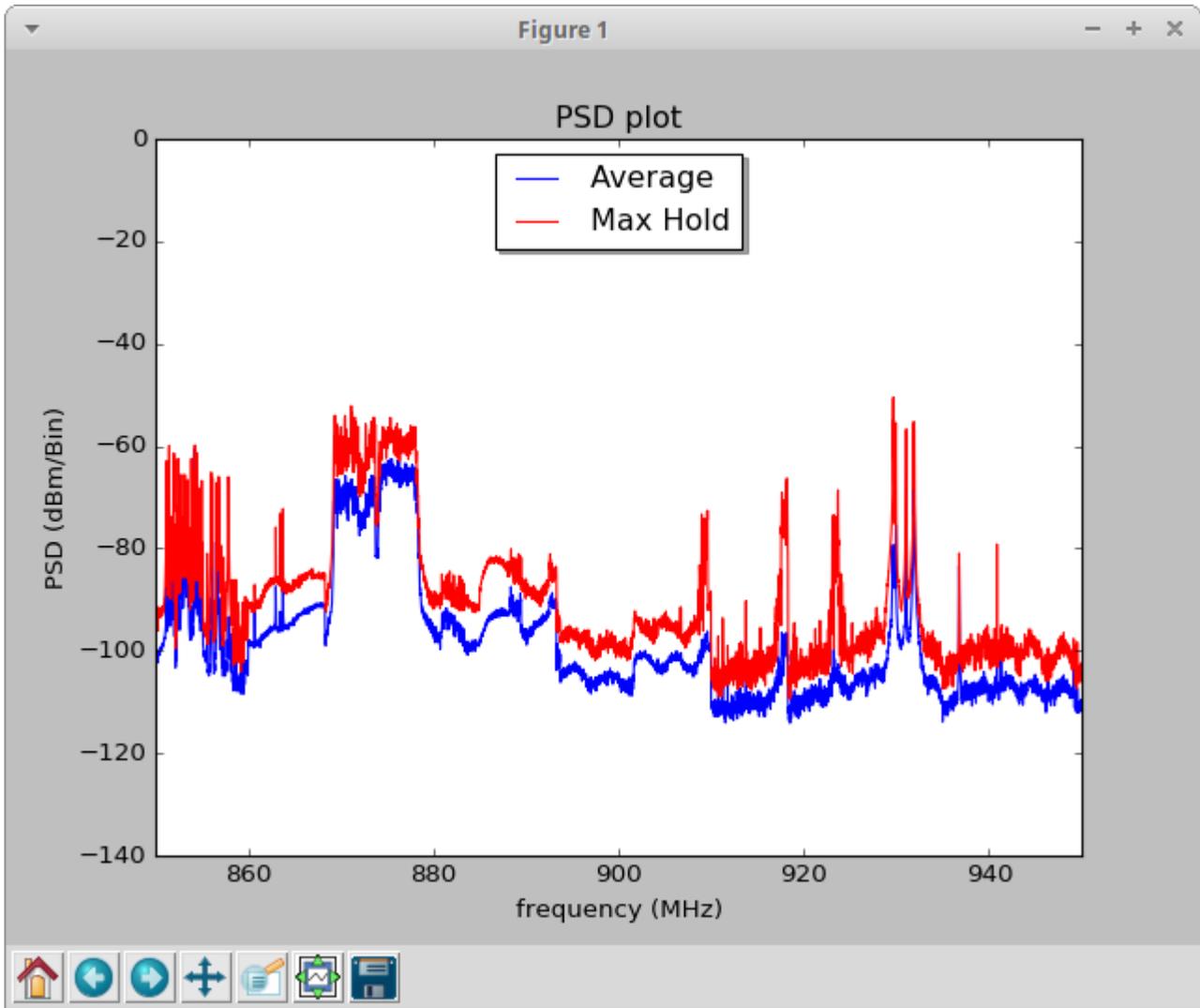

Fig.3 : PSD Plotter application, ready to plot.

Fig. 4 : A PSD Estimate plot, generated using the plotter.