

Audio and communication services for live events



TUTORIAL

Import RF Explorer scans into Shure Wireless Workbench[™] 6

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diogo@piamp.com * +34 617 663 677 * piamp.com

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1. Introduction

Wireless WorkbenchTM 6 (WWB6) is a Shure software tool which permits importing RF spectrum scan files in order to coordinate wireless audio systems and calculate inter-modulation.

This files are generated by Shure scanners and wireless receivers, or other scanner manufacturers as long as the file formatting is compatible.

RF Explorer (RFE) is a very economic RF spectrum analyzer able to export its scans as .csv (comma separated value) text files.

With a little trickery is possible to adapt the fields and the data in this file allowing it to be read and plotted in WWB6. Producing a compatible .csv in the goal of this tutorial.

2. Versions

Software and Firmware versions used during this tutorial:

- . Windows 7 Professional SP1 64 bits
- . RF Explorer Firmware v01.12
- . RF Explorer Client v1.11.1311.4
- . Shure Wireless Workbench[™] Version: 6.10.2.7



3. CSV file parameters supported by WWB6

According to the WWB6 help system, the supported data format for scan files is (frequency, amplitude) with the following arrangement:

470.100, -42.1 470.226, -62.3 470.385, -65.7

We can observe that WWB6 requires the decimals separated by a point and the two fields separated by a comma.

With RFE default configuration, the exported file would have the following format:

470,100,-42,10 470,226,-62,30 470,385,-65,70

Such a file is impossible to load into WWB6, so this message would show up:





4. CSV file parameters in RF Explorer

In order to get a compatible file, my first step would be to change the "*CSV field separator*" field in the Configuration tab in RFE. Change it from comma to semicolon for example.

<u> </u>	ce		▼ Load Si	ave Del		
pectrum Analyzer	Waterfall	Remote Screen	Configuration	Report		
COM Port						
COM8 - * 50	- 00000					
Connect	Disconnect					
Configuration files	and folders					
						-
Default Output d	ata file path: C:	Users \Diogo \Docun	nents\RFExplorer			<u>à</u>
Report file: C:\U	ers\Dioge\AppBut	-\Roaming\RFExplo	orer\RFExplorerClient	report 20141028.log	Open Log	
CSV field separat	Semicolon (:)					
	Demicolori ()					
Calibration						
Calibration	HZ) 780 0	100				
Calibration REFERENCE (M	Hz) 780,0	100				
Calibration REFERENCE (M	Hz) 780,0 Calibra	ate				
Calibration REFERENCE (M	Hz) 780,0 Calibra	ate				
Calibration REFERENCE (M	Hz) 788,0 Calibra	ate				
Calibration REFERENCE (M	Hz) <u>780,0</u> Calibra	ate				

This step will allow us to differentiate the decimal from the field separator in the exported file.

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5. Export Single Signal CSV in RF Explorer

Before exporting a sweep curve from RFE it is imperative that only one trace is shown on screen. I usually use the average plot.



Once exported, via **File>Export Single Signal CSV as...** the file would look something like this in a text editor like Windows *Notepad*:

RFExplorer_SingleSweepData_2014_10_29_10_30_59.csv - Notepad) X	3
File Edit Format View Help		
<pre>#70,000; -101,42 473,750; -99,73 477,500; -87,81 481,250; -87,67 485,000; -78,08 488,750; -81,85 492,500; -86,52 496,250; -92,81 500,000; -95,34 503,750; -94,74 507,500; -82,62 511,250; -79,41 515,000; -84,75 522,500; -90,35 526,250; -95,67 530,000; -97,12 533,750; -83,52 537,500; -88,01 541,250; -95,65 545,000; -99,15 548,750; -88,31 552,500; -83,62 556,250; -81,87 560,000; -99,24</pre>		+
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6. Replacing characters in a text editor

Once in *Notepad*, using the menu **Edit>Replace...** change the commas for points and the semicolons for commas with the button **Replace All**.

RFExplorer_SingleSv	weepData_2014_10_29_10_30_59.csv - Notepad	- - X	
File Edit Format 470,000; -101,42 473,750; -99,73 477,500; -87,81 477,500; -87,81 481,250; -87,67 485,000; -78,08 488,750; -81,85 492,500; -86,52 496,250; -92,81 500,000; -95,34 503,750; -94,74 507,500; -82,62 511,250; -79,41 515,000; -78,33 518,750; -84,75 522,500; -90,35 526,250; -95,67 530,000; -97,12 533,750; -83,52 537,500; -88,01 541,250; -95,65 545,000; -99,15 548,750; -88,31 552,500; -83,62 556,250; -81,87 560,000; -99,24	View Help Replace Image: Second s		
<		۴.,	11

Save the file as it should already be compatible with WWB6.



7. Import edited CSV into WWB6

In the *Frequency Coordination* tab in Shure's WWB6, click on **Change Scan Data...** in the sidebar. An import window should open allowing us to import up to four scans.

Plotted in green is our RF Explorer capture, in blue a scan from a few months ago using Shure AXT600 Spectrum Manager. The red bars are the exclusions I defined as DTV channels for Barcelona.



As you can see resolution is not great, but take into account that our start frequency was 470 and stop frequency 890MHz, accounting for a 420MHz *span*.

With such a frequency span the *Sweep Step* is 3.75Mhz. If a DTV channel (in Europe) takes up to 8Mhz, this resolution only allows up to 3 samples per channel...





8. Window parameters in RF Explorer

To improve resolution my strategy is to capture smaller frequency spans with RFE, export those files and then combine them in a single .csv.

For instances, with an 112MHz *span*, we can observe a 1MHz *Sweep Step*, providing us with more resolution; this way we can cover the 470 to 918Mhz band in four steps:



Once captured, I'll drag these files to a folder close to my C drive zroot, C:\csv>

🚱 🔍 🔻 🕨 Diogo 🕨 My Documents 🕨 R	FExplorer		- - €	Search RFE 🔎
File Edit View Tools Help				
Organize 🔻 🎒 Open Share with 💌	E-mail Burn New folder			• 🔟 🔞
🌗 Inventor Server SDK ACAD 2014 🧹	Name	Date modified	Туре	Size
🐌 iZotope	RFExplorer_SingleSweepData_2014_10_29_12_15_59.csv	29/10/2014 12:16	CSV File	2 KB
Jo iZotope Alloy Presets	RFExplorer_SingleSweepData_2014_10_29_12_16_14.csv	29/10/2014 12:16	CSV File	2 KB
LA-Net Man Sessions	RFExplorer_SingleSweepData_2014_10_29_12_16_23.csv	29/10/2014 12:16	CSV File	2 KB
Lawo	RFExplorer_SingleSweepData_2014_10_29_12_16_50.csv	29/10/2014 12:16	CSV File	2 KB
📙 moleskine	RFExplorer_SweepData_2014_10_28_19_07_50.rfe	28/10/2014 19:07	RF Explorer data fil	874 KB
🌗 My CamStudio Temp Files	KFEXPIORE_SWEEPData_2014_10_29_10_33_26.ffe	29/10/2014 10:33	RF Explorer data fil	4.411 KB
My CamStudio Videos				
My Drawings				
My Tresors				
Normad Factory				
Restol PVR				
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3 RF Explorer				
🖟 RFExplorer				
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Shure				
4 items selected State: 30 Date modified: 29/	Shared Size: 7,02 KB Shared with: Homegroup 10/201412:16 Date created: 29/10/201412:16 Shared with: Homegroup			

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9. Merging CSV files using Windows command prompt

Open a Windows command line prompt, and call the folder with the four files:

cd c:\csv

Merge them with the command:

```
copy *.csv newname.csv
```

Administrator: C:\Windows\system32\	cmd.exe	۲
Microsoft Windows [Version 6 Copyright (c) 2009 Microsoft	.1.7601] Corporation. All rights reserved.	^
C:\Users\Diogo>cd c:\csv		ш
c:\csv>copy *.csv UHF4files. RFExplorer_SingleSweepData_2	csv 014_10_29_12_31_39.csv	
RFExplorer_SingleSweepData_2 RFExplorer_SingleSweepData_2 PEFxplorer_SingleSweepData_2	014_10_29_12_31_51.csv 014_10_29_12_32_00.csv 014_10_29_12_32_10.csv	
1 file(s) copied.	017_10_67_12_32_11.030	
c:∖csv>dir Volume in drive C is SSD Volume Serial Number is 680	7-6078	
Directory of c:\csv		
29/10/2014 12:43 (DIR) 29/10/2014 12:43 (DIR)		
29/10/2014 12:31	1.820 RFExplorer_SingleSweepData_2014_10_29_12_31	
29/10/2014 12:31	1.804 RFExplorer_SingleSweepData_2014_10_29_12_31_	
51.csv 29/10/2014 12:32	1.818 RFExplorer_SingleSweepData_2014_10_29_12_32	
00.csv 29/10/2014 12:32	1.822 RFExplorer_SingleSweepData_2014_10_29_12_32	
11.csv 29/10/2014 12:43	7.265 UHF4files.csv	
5 File(\$) 2 Dir(\$) 73.	528.745.984 bytes free	
c:\csv>_		
		-

Open the merged file in *Notepad*, replace the commas and the semicolons and make sure no extra characters or blank line is present. Usually I have to delete a small arrow in the last line.

If everything is OK our new plot with about four times more resolution should be compatible with WWB6. Here it is overlapped with the first one.



