

## **FOH Sept 2009 Road Test 2 Kaltman**

### **Title/Headline: Kaltman Creations IW1800**

**Pic: TK**

**Cap: Kaltman Creations IW1800 is a PC-based RF spectrum analyzer — in other words, a “white space finder.”**

**Byline: By Dave Stevens**

Unless you've been living in a cave somewhere for the last year or so, chances are you've at least heard about and probably have been impacted in some way by the changing regulatory landscape for wireless mics and monitoring systems.

Back in the days of yore, using wireless was less complex than it is now. There wasn't the variety of over-the-air TV offerings. Venues were smaller and not housed together in complexes, or used in the density that many urban areas endure in the present day. Chances are wherever you worshipped had only a minimal sound system and not a production that would rival most commercial broadcasts. The theater folks have dealt with multiple radio units for several years, but only over the last decade or so have concert sound reinforcement types managed an increasingly crowded spectrum.

Back in the day, we'd wire up a couple of radio mics, perhaps a guitar rig or two, and call it a done deal. These days it seems nearly everything that is practical to have wireless, we make wireless - and even some things that aren't so practical. In the theatrical, broadcast and production show worlds the use of radio equipment is off the hook.

Gone are the days when you can just poke around and hope to find a slice of clear air in which to park your mics or in ear packs. These days, you need basic knowledge of how the gear works and how best to integrate it into a crowded spectrum.

At our show (Cirque du Soliel's *KA* at the MGM Grand in Las Vegas) we coordinate not only the 181 UHF carriers (frequencies) that are used on our

show but an additional 100 plus as used in other venues on the property as well as coordinating with outside artists coming into our arena.

The person for whom this responsibility lies is the lead RF tech, CJ Hermann. CJ employs the latest in tools and technology to maintain the show, from high end spectrum analyzers to comprehensive software that plots frequency coordination. CJ not only deals with the usual wireless mics and musician ear packs, but also a variety of other devices including an extensive radio communications system and an IFB and “listen only” radio comm systems.

While we have the budget to operate an elaborate monitoring environment, most people don't. One of the greatest tools for determining where best to locate your radio gear in terms of frequencies, particularly in this ever-changing environment, is a radio frequency spectrum analyzer (SA).

A high end SA comes at a significant cost, as well as a steep learning curve. Most people need something less expensive and easier to use. That's where a new crop of low-cost, use-right-out-of-the-box devices come into play.

Recently CJ and I have been supplementing our current tools with the Kaltman Creations Invisible Waves IW1800 PC based radio spectrum analyzer. We've found it to be a good tool to supplement our test environment. I think it's a good value for the average user of wireless audio gear: The Invisible Waves works in the same way a traditional audio analyzer works for sound, except this displays radio frequencies.

The hardware is packaged well, easy to set up and configure, and portable. It can be operated on an included battery if required. The hardware is a modified Winradio G305 series receiver, but it's not the hardware that makes this package useful for the typical sound person. In this case, it's all about the software.

Kaltman Creations has taken an existing hardware design and engineered software geared toward sound reinforcement users. The included Invisible Waves software and documentation allow even a novice user to get up to speed shortly and start making informed decisions about frequency coordination.

We installed the software and drivers on a nearly five-year-old Pentium III laptop running Windows XP Pro SP3. The system found the hardware, we started the program, entered the serial number and we were ready to start measuring.

When the software first starts, there aren't many options available in the menu. As the program relies on right mouse clicks, one would be wise to read the manual prior to installing the drivers and software.

While the software is for the most part intuitive to use, unless you know how to access some of the features not found in the menu, you won't be able to get the most out of the software. Reading the manual is particularly necessary if you've never used an RF spectrum analyzer before.

There is enough information to guide you to making your first measurements. In the control panel you define your sweep range and activate the sweep, and you've made your first measurement. That measurement is going to show you the congestion in that area, but won't necessarily get you closer to plotting frequencies for your devices. There is a zoom function called "ROI" or Regions of Interest that allows you to look closer at a particular part of the sweep.

While you can use the Invisible Waves analyzer in a basic form to see problem areas in portions of the spectrum, the value of this tool increases when configured for a specific event or group of radio devices. There are profiles and preferences that allow you to configure the tool, specific to your environment, as well as recommending frequencies based on the current state of the spectrum, using parameters you define, specific to the gear you are using. You are able to easily store these parameters for later recall or to define base settings for shows or groups of devices. This allows you to rapidly repeat measurements of the same equipment in various locations. For example, on a tour where you have the same gear everyday, but are also in different venues every day, you can use the profiles to speed up frequency plotting.

One such example is a display window called "Monitored Frequencies." The user can configure the software to monitor 10 frequencies in a bar graph form. These frequencies can be titled with meaningful names instead of frequency numbers, which makes it easier to keep an eye on specific channels.

Instead of seeing the meter as 473.350MHz, for example, you can define it however you wish. You could call it “Lead Vocal.” The color of the bar is set by an alert threshold that is adjustable in the preferences. The bar is green in color when above the threshold, red when below. It could also be used in a crowded environment to alert you to problematic frequencies. For example, if there was a meeting in the next ballroom that had some frequencies that might interfere with you, you could set the alert to those freqs and know when the signal was getting strong enough to impact your event (Although I don’t know if Kaltman had this in mind when designing the program, it was something we discovered while using the tool).

The data in the Monitored Frequencies window (as well as the data in the other main data windows) can be exported to either the system clipboard, file, or printer as a BMP, JPG, PNG, Metadata or text/data.

Another feature that could be specific to your application or event is what the program calls the “White Spaces and Optimal Transmitter Locations.” I think it should have been called “Hey, where can I put my stuff?”

You’ll need three pieces of info to use this feature. You’ll need to determine what the threshold is — for example, your noise floor, or a signal level you find acceptable to use, as the basis for the calculations. You’ll also need the bandwidth that your device uses, plus the minimum required spacing for your devices.

Based on your parameters and current conditions in the spectrum at your location, the software will plot recommended frequencies for your devices. The software is capable of plotting 24 frequencies, as long as there is available spectrum.

The downside to this approach is that not all devices have the same bandwidth or band guard, so using different devices could require multiple passes. Additionally, not all devices are able to operate over various bands, so in some applications a traditional intermodulation calculation might be a more appropriate approach.

For many users, though, particularly those with either one brand of gear operating in the same block or users in less congested areas, this feature will easily assist them in coordinating radio frequencies.

All in all, Kaltman Creations Invisible Waves package will reduce the effort required by users to deploy wireless solutions in an ever-changing environment. While it won't replace the need for top line radio spectrum analyzers for power users, those users could benefit from adding the device to the quiver of tools used by today's radio engineers.

**IW1800 MSRP \$1,495**

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