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To: FCC OET Staff  
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When the CWMU learned about a meeting with the FCC to discuss technical issues around the database and the 30-day requirement, and knowing that I'd already heard concerns on this issue from the field, I posed these questions to the production managers in the nonprofit theatre field:

- Why can't a theatre know its needs that far in advance?
- How close can it come to an approximation?
- What is likely to change: The number of devices/frequencies? Or will the changes involve just moving from one frequency to another in the same general range?
- Where does the equipment come from (owned by the theatre, brought by a touring company, rented locally)?
- How many adjustments would be likely within the 30-day period (e.g., is it something that is worked out on paper and then a final plan could be submitted, or does it require trial and error with changes after each rehearsal)?
- What type of frequency coordination is currently used (with TV stations or others)?

I received responses from approximately 47 theatres across the country in both large and small cities. All of them said that identifying exactly how many wireless devices and which specific frequencies they'd need 30 days out from use is not possible.

Here are some specific examples to illustrate the difficulties:

**Seattle, WA:** We bought our new system 2 years plus ago when the cell phone frequency auction took place. What we primarily need to know is what the safe harbor frequencies will be. I am concerned that I may have to pay a lot more money to work into these safe harbors. We run a system of over 60 RF devices on a daily basis and over \$500,000 in investment in these systems.

**Syracuse, NY:** We typically do know our needs for a musical that far in advance. However, there are often last minute changes or adds that may or may not related to the show that will be mounted in 30 days. Our schedule does not allow us to load in and test 30 days before we need the equipment. We occasionally have needs for sets of wireless use in both theatres simultaneously. Sometimes the need is discovered in rehearsal and may be for the show that is not scheduled to have a wireless system being used. 2 wireless units off. Depending on the situation, all of the above. We will typically load a wireless system in and end up shifting frequencies because of interference (whether within our complex or from outside). We do typically stay in the same range. Occasionally we may end up adding a unit to cover another character or an instrument that now needs to be played and picked up with a wireless transmitter (both Big River and Rent had that happen during the rehearsal process). Not mentioned is the fact that occasionally a unit goes down and we will have to replace it with another (perhaps in a different frequency range).

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**Dallas, TX:** Theater is fluid by nature. Especially during production, the design/direction will change constantly up until opening. As the show changes so does the nature of the support systems including wireless microphones and wireless comm.

**Palo Alto, CA:** The short answer is that the needs of the play change and evolve over the course of rehearsal. Occasionally this leads to adding additional transmitters (to an instrument, for example). This is especially true for companies like ours that specialize in world premiers. There is a lesser point, as well, particular to companies that are not in residence in their theater year round, which is a proper site survey of interference can't be done until three to four days before the devices go into use. In practice the frequencies we try to avoid rarely change, so there may be some leeway on this point, but at the moment we are scanning the available frequencies for each device at the time of load-in and fine tuning them for optimal reception. It certainly requires a little bit of trial and error. Until a microphone is in play, in the building, with all the other microphones in the show, it's difficult if not impossible to say, "Yes, this unit will only operate at this specific frequency." That said, I see no reason why a very well thought out plan couldn't be submitted prior to the 30-day window and then after a period of a couple days work in the theater we could resubmit and finalize our adjustments.

**San Diego, CA:** Working in the middle of a large public park, where numerous users of wireless come and go on a daily basis, we cannot rely on a clean and stable RF environment. We scan the local environment using our Wireless manufacturer's software, and then also run our numbers through a frequency co-ordination database, which tells us what frequencies will interfere with each other based on harmonics. In other words, we have to first find the available frequencies (ie, not inhabited by TV, other venues, etc.) and then we have to determine which of those available frequencies will not interfere with each other. At the height of our summer season, we could be using up to 60-70 channels of RF, that takes a lot of careful work to co-ordinate. On top of that, we have to deal with itinerant RF users that may enter our locale for a special event, which means we need to find even more usable frequencies.

**Chicago, IL:** Our productions start rehearsals just short of 4 weeks before we start technical rehearsals of a play. It is in this rehearsal period, frequently for a new play, that the details for the sound design are worked out. The need for mics is therefore developed as the director creates the production in the rehearsal hall. During this rehearsal process we encourage the director to use the freedom to try out new things, to experiment with different ideas, to discover where to place actors in the space, how their characters react to others, how lines are delivered and often, in a new play, will work with the playwright to change the lines themselves.

It is because of this experimentation in the rehearsal process that the sound department needs the freedom to add, and actually more often in our theater, to cut, the use of mics. An actor may be blocked in a small room in the set that the sound has a hard time escaping. The director may want to try an actor "whispering" his lines for the effect, but still wants the actors to be heard. Often the director may want to add reverb or some other element to the voice to give it perhaps an otherworldly quality. For example, we are creating a ghostly effect for a character in the play we currently have running.

Our style tends not to mic for amplification alone, which might be required in a theatre which produces a lot of musicals. Our space is smaller and somewhat acoustically pure, so we tend to mic to create an effect; it is these very effects that are discovered both in the rehearsal hall and in the theater when we start the process of technical rehearsals. So unlike a scripted musical, where the number of characters/actors is known well in advance, our need to mic is a "discovered" need.

To prepare for this possibility we keep a small number of programmable wireless mics in our inventory, to be used when a production warrants it. I also keep a few channels in a portable rack to be used for events that require amplification, generally artistic or marketing events, or meetings where the speakers are to be recorded. Although I generally use the same frequencies,

**Philadelphia, PA:** Plus or minus about 5 devices, depending on the needs or the text versus the vision of the director. So my only real questions in return to you are, have the frequencies originally told to us that were safe to use no longer that? When do they expect the database to go live? And, can you direct me to information detailing the full procedures of operating as user of Part 15?

**Houston, TX:** Because making live performances is a highly dynamic process throughout each stage of the production: pre-production, rehearsals, technical rehearsals, and performances. The equipment we use and how we use it change constantly through each stage as the production evolves. If an actor is sick in the middle of the show run, and needs a microphone for reinforcement, for example, sometimes we have less than an hour's notice. Even if we know that we will be using a mic throughout the run of a show (which for us generally lasts a little more than a month), we very rarely are able to determine most of what we'll need so far in advance. The first rehearsal for our shows, as for many performing arts organizations, begin well into the 30 day advance note timeframe. The director, actors, and sound designer simply can't know what the all wireless needs are going to be until the play has been thoroughly explored in rehearsal. To give you a point of reference the time between end of rehearsal and first preview in most LORT theatres ranges between 2 and 6 days. Theatre thrives on being able to make decisions throughout the entire process— an idea may come late into the preview process that involves using a wireless frequency. In many situations, before rehearsals begin, we can be prepared to submit frequency information for wireless channels we think we may need based on pre-production planning, which would happen before the 30 day period. If we discover this during the rehearsal process, we would be able to submit 1 to 2 weeks in advance. For changes made during tech rehearsals and performances, we wouldn't even be able to submit information 24 hours in advance. **The biggest concern is that approximating needs for a production with this sort of time scale is going to lead to over-registering, so every organization that uses wireless is going to register many more frequencies than they will probably actually use, in order to have some in reserve in case they are needed.** This will wreak havoc on coordinating the already precious frequencies available to us and those that we share them with. It is important to remember, 30 days before the information would need to be submitted, rehearsals haven't even started yet. Getting to the trial-and-error stage, where frequencies are tested in the space doesn't even happen until a few days before tech rehearsals begin (so we can factor in all aspects— how the stage affects the antenna coverage, how the actors, or beltpacks themselves, are spaced, etc...) Currently, finding wireless frequencies is fairly easy with proper care and setup, and with guidance from software tools provided by the two equipment companies we generally use, Shure and Sennheiser. With most of our setups and requirements, we use under 10 wireless frequencies, so troubleshooting intermodulation (interference caused by how the 'good' frequencies themselves interact with each other) and finding dead zones is not as complicated as when we are using upwards of 30 channels. In the latter case, adjustments would be constant, changing antenna placement and frequencies, but mainly for the few days before tech rehearsals. The frequency map could indeed be worked out on paper, but when the changes are able to be made, they would have to be made immediately— we would not be able to submit updated frequency information within any sort of time frame. So, because of that, I worry that organizations will also over-register frequencies so they have some troubleshooting room as well, making frequency crowding even worse. I do also wish to add that I do not like the idea of having frequencies all listed in a database. I admit I do not know yet all of the details, but it seems, at its most benign, a good target for pranksters. How public is this database?

**New York, NY:** We create new works, new plays. We don't start our rehearsal process until 3.5 weeks before we step in the theater. Though a plan may be in place it is always subject to change. We rent the gear for our productions so if we have wireless microphones in them we do not get our wireless microphones until the week before we are in the theater.