6 TIPS FOR TACKLING OUTDOOR AUDIO

Performance traits and installation application help to determine the best speakers for each outdoor installation and the path toward quality sound. **BY BILL KIELTYKA**



PHOTO COURTESY OF CANTARA

HOME AUDIO systems are no longer confined within the walls of the home itself. In recent years especially, integration system design has extended outside, essentially giving installers and end users an additional zone to their home listening options. But there's also a catch. The toughest residential environment to achieve great sounding audio is outdoors. The only bass reinforcement and sound containment are an infinite "floor," for instance, with maybe one or two walls that terminate in an infinite anechoic space, and no ceiling. Add to that technical challenge, of course, that this environment is usually noisy with the surrounding sound of AC units, traffic, waterfalls, pool pumps and loud children competing with the sound from the speakers.

Treating the great outdoors like an indoor area that just needs the added weather-resistant enclosures is a big mistake. Over the past 25 years the audio industry has learned a great deal about what it takes to produce a quality listening experience in outdoor spaces, including both residential and commercial applications. Based on lessons learned from these many years of experience and problem solving, here are six recommendations to improve the quality of your next outdoor audio system:

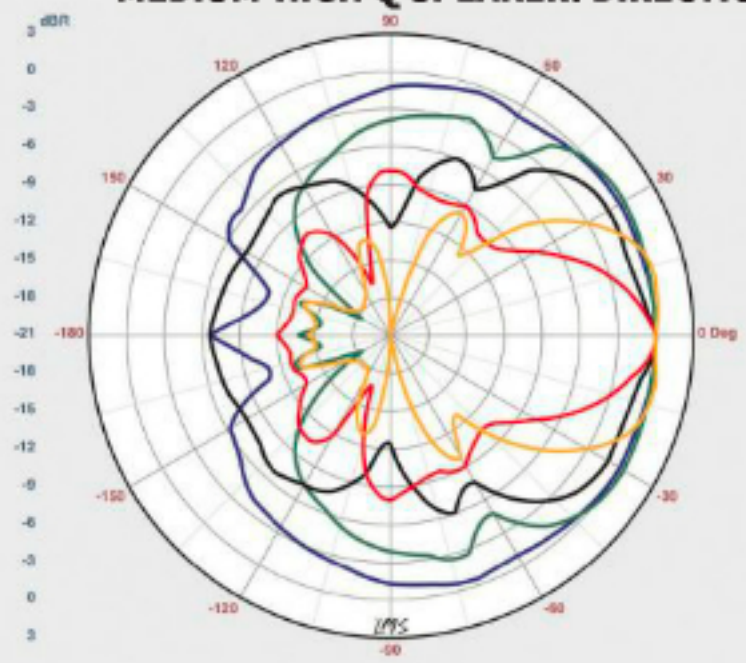
1. IDENTIFY SOUND ZONES: If the outdoor space to be filled is large, talk to the homeowner to get an idea of what kinds of activities are likely to be common in various areas of the yard. For example imagine a scenario where adults are sitting around an outdoor dining table engaged in conversation while at the same time teens are engaged in horseplay in the pool. The desired sound volume for each of those areas is very different and needs to be planned for (later in this article we will discuss how). The important thing here is to understand the customer's outdoor listening needs before setting a system design.

2. MIND YOUR SPEAKER Q's: "Q" is an engineering term for describing directivity and it is an important thing to understand and consider before designing an outdoor audio system. The directivity factor (Q) is a simple way to describe the radiated sound from loudspeakers. A higher Q speaker is more directional than a lower Q speaker.

Fully horn-loaded PA speakers, for example, are very high Q and not usually appropriate for residential use; they may play very loud, but anyone on-axis with the speaker, especially in the nearfield, will get blasted with sound while off-axis listeners will hear poor sound. Speakers with horn-loaded tweeters or speakers that are set back from the front of the enclosure will be medium-high Q; front-firing speakers with drivers flush with the baffle are medium-low Q; and omnidirectional speakers are low Q, and as the name implies, the least directional type. An omnidirectional speaker system can be described as having the same Q wherever you are located.

Measuring Speaker Directivity Factors (Q)

MEDIUM-HIGH Q SPEAKER: DIRECTIONAL 'SPOTLIGHT'

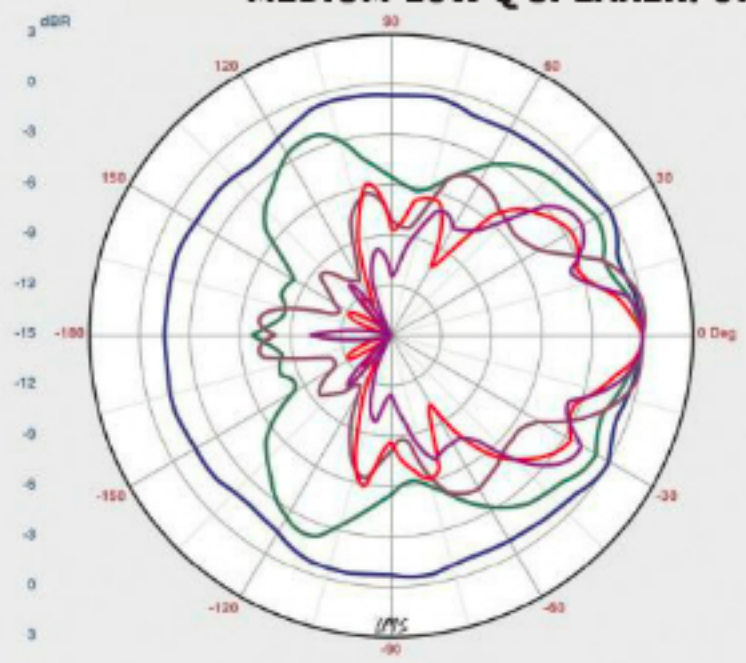


Ratio vs. Angle

Curve	Freq	BW	Q	DI
	500.00	294	1.2	0.9
	1.00K	217	1.7	2.2
	2.00K	109	3.3	5.2
	4.00K	49	7.4	8.7
	8.00K	73	4.9	6.9

Medium-High Q speakers tend to be "spotlight style," meaning anyone more than 30 degrees off-axis is going to hear dull, poor sound. Seven to 10 feet spacing is recommended between speakers.

MEDIUM-LOW Q SPEAKER: OK OFF-AXIS

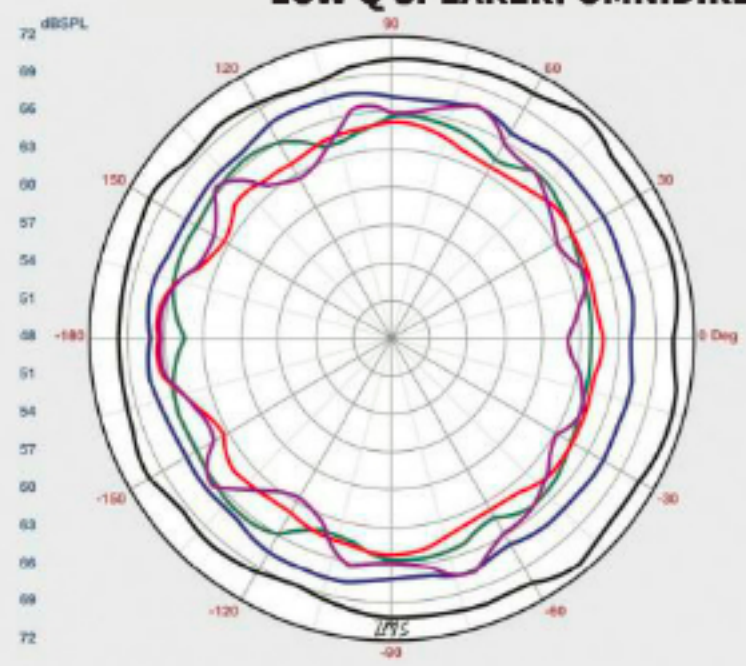


Ratio vs. Angle

Curve	Freq	BW	Q	DI
	500.00	360	1.0	0.0
	1.00K	153	2.3	3.7
	2.00K	145	2.5	3.9
	4.00K	100	3.6	5.6
	8.00K	95	3.8	5.8

Listeners who are more than 40 degrees off-axis to Medium-Low Q speakers will still hear reasonably well-balanced, tonally correct audio. Recommended speaker spacing is 8 to 12 feet.

LOW Q SPEAKER: OMNIDIRECTIONAL



SPL vs. Angle

Curve	Freq	BW	Q	DI
	500.00	360	1.0	0.0
	1.00K	360	1.0	0.0
	2.00K	360	1.0	0.0
	4.00K	360	1.0	0.0
	10.00K	360	1.0	0.0

These omnidirectional speakers will generally sound the same at any angle. Recommended speaker spacing is 12 to 15 feet apart.

Legend: 500Hz, 1.0kHz, 2kHz, 4kHz, 8kHz

The graphs to the left show directivity of medium-high Q, medium-low Q and low Q speakers. There is something interesting to note here: All of them are omnidirectional below about 2kHz, so don't fool yourself about limiting sound incursion into adjacent properties with "directional" speakers.

Medium-High Q speaker: The drivers in this "spotlight-style" speaker are set back about an inch from the front of the housing. This speaker starts beaming above 4kHz (red curve), meaning that anyone who is 30 or more degrees off-axis is going to hear dull, poor sound.

Medium-Low Q speaker: This is a typical monopole speaker whose drivers are more or less flush with the baffle. Listeners more than 40 degrees off-axis will hear reasonably well-balanced, tonally correct sound.

Low Q speaker: This speaker is essentially omnidirectional, meaning it sounds the same at any angle.

3. EVEN COVERAGE IS THE KEY: The best outdoor sound is that which is evenly distributed through each of the zones whereby both on- and off-axis listeners in a given area hear the same quality of sound at the same volume. In order to achieve that ideal you need to consider the speaker's Q. The more directional the speakers, the more of them you most likely will need. As a general guideline, low Q omnidirectional speakers will give good, even coverage with approximately 12 to 15 feet of spacing; medium-low Q speakers roughly eight to 12 feet; and medium-high Q speakers seven to 10 feet of spacing between speakers if the listening distance from the speakers is equal to the spacing between them.

One consequence of "beamy" high to medium-high Q speakers is that they are intrusive on conversation and annoying to listen to when close by. The lower the Q of the speaker, the more "comfortable" it will be when positioned close to listeners. If the speakers need to be placed close, as is often the case in residential installations, use the lowest Q speaker available. If that isn't an option, position products like high Q speakers as far from gathering areas as possible, particularly conversation areas. ▶▶

4. CONSIDER MONO: If the installation is a simple deck or patio with one pair of speakers, stereo may be fine. But mono is the better choice for larger outdoor audio systems, as it will deliver a more uniform soundfield throughout an area.

5. CONSIDER 70 VOLT: The first item in this discussion examined the potential need for configuring different volume levels in different zones. One way is to use a separate amplifier for each zone with independent volume control. The problem with this solution is that driving multiple 8-ohm speakers with these amps may cause low impedance problems, and this opens up more issues with the headaches associated with series/parallel wiring.

The alternative is to use an amplifier with 70-volt output and use transformers on each speaker. Choose purpose-designed transformers that have multiple wattage taps so that different wattages and volume levels can be assigned each speaker. For example, in that dining/conversing vs. pool playing scenario dealers could use 4-watt taps for each dining area speaker and 32-watt taps for the pool speakers. Assuming the same model of speaker was deployed in both areas, the pool speakers would play 9dB louder. In this installation scenario dealers can get creative and "sculpt" the sound throughout an area by carefully choosing wattage taps.

Some outdoor speakers come with single tap transformers. While this is useful for running many speakers off a single amplifier, they do not allow volume sculpting. Given the flexibility of multiple taps it is preferable to choose outdoor speakers with multi-tap transformers built-in to provide the freedom to exercise design creativity.

6. CONSIDER THE ENVIRONMENT: The less protected a speaker is from the elements and other hazards, the better quality the speaker needs to be. Speakers that will be in sheltered locations can be of the "weather-resistant" variety. But speakers that will be placed out in the open need to be higher quality "weatherproof" models.

Speakers placed near pools need to use enclosure, cone and surround materials that can stand exposure to chlorine. Years ago both dealers and manufacturers found out the hard way that foam and even butyl rubber surrounds deteriorate in chlorine-rich environments. Look for speakers with formulated rubber surrounds for use in pool areas to prevent premature speaker failure and costly service calls. Fertilizers can also deteriorate surrounds, so check the specs of candidate speakers for specific reference to fertilizer tolerance.

Speakers that are likely to encounter garden tools and weed whackers also need to be carefully chosen. Many, if not most, of outdoor speakers — particularly bargain models — use painted enclosures that will chip, peel or show scuff marks. Look for enclosures that are fabricated from "color-through" resins or anodized metal. CE Pro

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