CORNING

Keep your customers **connected**

What facilities managers need to know about indoor cellular

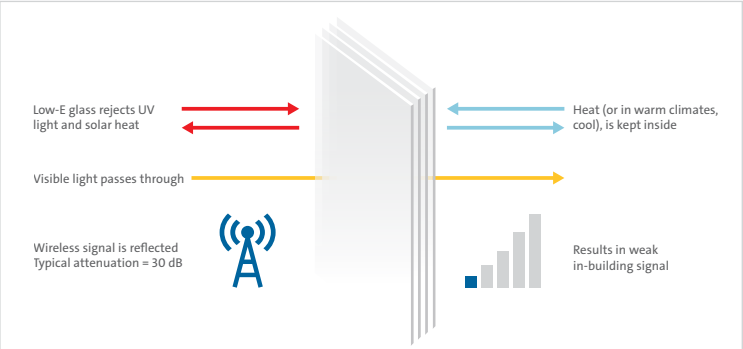
Today's businesses expect great wireless mobility anytime, anywhere, in the spaces they lease or own. What does that mean for facilities managers? Wireless services are now the fourth utility – something no tenant is willing to do without. It's critical for you to understand the factors that could affect service and how you can plan ahead to keep your customers happy.

Opportunities ahead

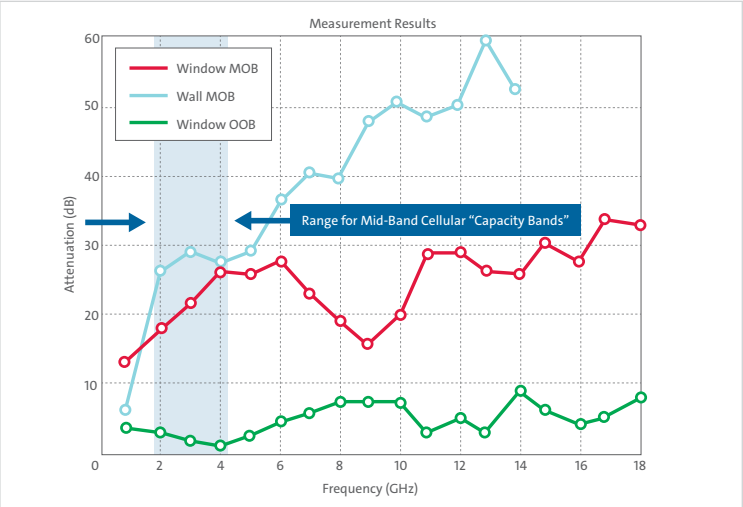
Energy-efficient materials and techniques used in new construction and remodeling can increase your tenants' comfort while saving up to 17 percent in utilities costs for HVAC. This savings, however, comes with a trade-off, a decrease in cellular signal strength. In the past, outdoor cellular signals entered buildings through the windows. Newer, energy-efficient windows have a molecular coating of tin, silver, or zinc that keeps heating and cooling inside but blocks outdoor cellular signals.

In fact, the "capacity bands" that mobile operators prefer to use for indoor cellular service lose up to 25 db of signal because of energy-efficient glass. The losses are expected to be even higher in the bands planned for their 5G offerings.

Low-E Windows and Wireless Signal Inside LEED-Certified Buildings



Loss Measurements Study of Energy-Efficient Buildings



Modern Office Building = MOB
Old Office Building = OOB

Radio Propagation into Modern Buildings: Attenuation Measurements in the Range from 800 MHz to 18 GHz. IEEE. (IEEEVTS Vehicular Technology Conference. Proceedings).10.1109/VTCFall.2014.6966147

Deliver reliable signal

Avoid the losses energy-efficient windows cause by delivering cellular signals to your tenants from inside the building. A variety of systems, from small cells to DAS, provide flexible options to enable consistently reliable, 5-bar service for any building size or design.

Plan for a successful future

By asking the right questions upfront and taking your tenants' wireless cellular needs into account as part of your overall construction plan, you can be sure they'll have the reliable connectivity they demand.

Where to start

- Assume that any new construction or remodeling will use energy-efficient materials that will block the "outside → in" delivery of cellular signals.
- Know that 5-bar service typically requires a consistent signal level of -95 dBm or better throughout the building.
- Remember: Even if your building currently has a strong signal, it will gradually be cut off as the windows are replaced during a remodel.
- Energy-efficient materials reduce utilities costs – based on building twin models, you can project energy savings of 10 to 17 percent.

Building cellular signal into your remodel or new construction gives customers the strong, reliable connectivity they need.

What's next

Collaborate with your telecom team to build an indoor cellular solution into your budget for both new construction and remodeling.

- Treat cellular as a fourth utility to protect it from cost-cutting in the event of overruns.
  - Ask your leadership: "Would you open a building without a water supply?"
- When leasing space, engage a cellular systems integrator to measure and report on service throughout the space.
  - If service doesn't meet a 5-bar signal level, negotiate with the owner to resolve the signal problem as part of the contract prior to occupying the space.

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To learn more about indoor cellular solutions for energy-efficient buildings,

contact your Corning Sales Representative or visit **corning.com/wireless**

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