The FCC fined Marriott International Inc. $600,000 for intentionally interfering with guests' personal Wi-Fi hotspots at the Gaylord Opryland Hotel and Convention Center in Nashville, Tenn.

Status of Exclusive Internet Providers in Question

BY AMBER JOHNSON

In the wake of a series of crackdowns on venues found to be blocking personal Wi-Fi hotspots, the meetings and conventions industry is still grappling with the implications of the Federal Communications Commission's position that no entity can interfere with the personal wireless access point of another. But even though millions of dollars in fines have been levied so far, a glance through randomly selected venue and show materials offers little indication that a sweeping change in policies and attitudes has taken place. Numerous venues still flout the FCC's position by claiming to require the use of an exclusive Internet provider while on the premises or by warning that the use of personal hotspots is prohibited, despite the FCC's advisories on the matter.

For a variety of reasons debated by advocates and foes, it has been common practice in convention and conference centers for in-house Internet providers to block visitors from connecting to their own personal hotspots. While network administrators say the reason is to preserve the security and quality of the building's own Wi-Fi structure, critics say it is to force exhibitors and attendees to use the sometimes exorbitantly priced in-house provider. Regardless, the FCC says it's illegal, and its enforcement division has spent the past 18 months handing out penalties to companies it found engaging in the practice.

The controversy over the right to connectivity came to the forefront in October 2014, when the FCC announced it had fined Marriott International Inc. $600,000 for intentionally interfering with guests' personal Wi-Fi hotspots at the Gaylord Opryland Hotel and Convention Center in Nashville, Tenn. More fines followed, with convention center technology providers including Smart City Networks and M.C. Dean each being slapped with fines exceeding $700,000. The Hilton hotel brand was also fined $25,000 for not cooperating sufficiently with an FCC investigation into its Wi-Fi practices, and FCC officials say they are just getting warmed up.

Giants like Google and Microsoft lined up across the battle line from the Hospitality and Lodging Association, each leveraging a significant following to apply pressure on the FCC to redouble or rescind its position. Citing open airwaves legislation first drafted in 1934, the FCC has been unwavering.

"In the 21st Century, Wi-Fi represents an essential on-ramp to the Internet," FCC officials said in a statement. "Personal Wi-Fi networks, or 'hot spots,' are an important way that consumers connect to the Internet. Willful or malicious interference with Wi-Fi hot spots is illegal. The Enforcement Bureau has seen a disturbing trend in which hotels and other commercial establishments block wireless consumers from using their own personal Wi-Fi hot spots on the commercial establishment's premises. As a result, the bureau is protecting consumers by aggressively investigating

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FCC REGULATIONS

Section 333 of the Communications Act provides that "No person shall willfully or maliciously interfere with or cause interference to any radio communications of any station licensed or authorized by or under this Act or operated by the United States Government."

Regarding equipment designed to interfere with signals, the Act states, "Federal law prohibits the operation, marketing, or sale of any type of jamming equipment, including devices that interfere with cellular and Personal Communication Services (PCS), police radar, Global Positioning Systems (GPS), and wireless networking services (Wi-Fi)."

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and acting against such unlawful intentional interference."

According to Ian Framson, CEO and founder of Trade Show Internet, blocking access to hotspots has always been illegal, and his company has filed many complaints about such interference with the FCC, including the one that resulted in the $750,000 fine last year against Smart City. In years past, complaints like his garnered little attention from FCC officials, but a change in leadership in 2014 prompted the agency to begin taking a strong stance against the practice.

Intentional Signal Blocking

As a provider of Internet services for exhibitors, Trade Show Internet and companies like it use a variety of technologies to create independent connectivity in venues, from kits that use cellular signals to those that rely on satellite. For those accessing hotspots using cellular signals, venues can block access by intercepting a device's attempts to connect to the network. Equipment in the venue bounces the device's signal back to it, creating something called a deauthentication packet. It also creates an endless loop in which the device is trying to connect but cannot. To detect such jamming efforts, Framson's company uses routers that log deauthentication packets received, and it has routinely reported venues to the FCC for years, he said.

Companies punished by the FCC have defended the legality of their actions, citing the need to protect building visitors from hackers and their responsibility to provide a network that is not crowded, and as such degenerated, by multiple concurrent signals. Even so, they have agreed to acquiesce to the demands of the FCC, though numerous venue Web sites still refer to Internet suppliers as "exclusive providers." Smart City, for example, which serves 35 venues around the country, is still listed by most of them as the only firm able to provide Internet connectivity at events. The I-X Center in Cleveland and the Baltimore Convention Center have published material stating that the use of personal hotspots or outside Internet services is prohibited in the facilities or against the license agreement for the space, despite the FCC's position that they cannot prevent building visitors from using them.

Some exhibitors have intensive technology needs that require the kind of robust network that in-house providers can supply, and venues often offer exclusivity in exchange for equipment and infrastructure upgrades by providers to the building's technology offerings. But Framson thinks the telecommunications business is destined for a fair amount of upheaval when 5G service becomes commonplace, as he believes it will be hardy enough to handle most exhibiting requirements. All Internet vendors, in-house and otherwise, will need to price their services competitively, he said, if they want to stay in business. Some venues, such as the San Jose McEnery Convention Center, are jumping out ahead of the curve with free Wi-Fi on state-of-the-art networks, an offering that ups the ante in an industry where organizers and exhibitors can pay six figures for service.

The playing field for Internet service might be leveled by the FCC's new attention toward jamming activities, but there are other, less publicized, ways that venues can manipulate the cellular services exhibitors need for hotspots. Framson said indirect interference can happen through the venues' contracts for its distributed antenna systems (DAS), which can take cell service for one provider or all providers off-line easily. Simply put, many event facilities in the country have what is essentially an internal cellular tower that boosts signals for people inside the building. Individual cell companies must negotiate with each venue to have the signal boosted for its customers, and there is no industry standard for what those costs are.

Built of concrete and rebar, many convention centers rely on DAS technology for reliable cellular signals. If a cellular service provider will not pay the stated price to access the system, then their service for customers is likely to stop at the door of the venue. For example, in a long-running conflict with Verizon, Framson said, the Jacob K. Javits Center in New York City would not add Verizon to its DAS network. The cellular company has positioned towers across the street from the venue and pointed them in its direction, but Verizon users are likely to pick up a cell signal in only a few areas on the venue's main level. As such, anyone counting on a Verizon hotspot would likely have difficulty connecting as long as the stalemate over the DAS network is in place.

Those DAS networks can be incorporated facility-wide or in specific areas, such as ballrooms, lobbies or meeting areas. For that reason, Framson advises exhibitors planning to use cellular hotspots to contact the venue and ask where the DAS network is deployed and for which cellular providers. "If the Wi-Fi provider also handles the DAS, you have a potential conflict of interest," Framson said, "because if you see hotspots and know they are coming through the DAS, you could take the service offline and confine exhibitors to the in-house provider."

Little has been said publicly about Wi-Fi jamming and FCC enforcement since M.C. Dean was fined $718,000 in November 2015 for blocking Wi-Fi in the Baltimore Convention Center. Will Wiquist, deputy press secretary for the FCC, could not comment on the existence of additional complaints or the status of any ongoing investigations, though he confirmed that M.C. Dean received the last fine levied and that any future actions would be revealed via press release.

For his part, Framson continues to speak out about the unfair monopolization that signal interference creates. "Consumers have always had the right to deploy their own cellular hotspots and have their own networks operating on the unlicensed spectrum," he said. "Anyone saying they can't is being intentionally deceptive and trying to instill fear and uncertainty to get business. nd that's a business model that is dying."

WHAT TO DO IF YOU SUSPECT WI-FI BLOCKING

If you have reason to believe your personal Wi-Fi hot spot has been blocked, you can file a complaint with the FCC. To do so, visit www.fcc.gov/complaints, or call 1-888-CALL-FCC.

When contacting the FCC, you are encouraged to provide as much detail as possible regarding the potential Wi-Fi blocking, including the date, time, location and possible source.

THE MISSION OF THE FEDERAL COMMUNICATIONS COMMISSION

The Federal Communications Commission (FCC) regulates interstate and international communications by radio, television, wire, satellite and cable in all 50 states, the District of Columbia and U.S. territories. An independent U.S. government agency overseen by Congress, the FCC is the United States' primary authority for communications laws, regulation and technological innovation.

In its work facing economic opportunities and challenges associated with rapidly evolving advances in global communications, the agency capitalizes on its competencies in promoting competition, innovation and investment in broadband services and facilities supporting the nation's economy by ensuring an appropriate competitive framework for the unfolding of the communications revolution, encouraging the highest and best use of spectrum domestically and internationally, revising media regulations so that new technologies flourish alongside diversity and localism, and providing leadership in strengthening the defense of the nation's communications infrastructure.

The commission is organized into bureaus and offices based on function. The Enforcement Bureau (EB) is the primary FCC unit responsible for enforcing the provisions of the Communications Act, the Commission's rules, orders and various licensing terms and conditions. EB's mission is to investigate and respond quickly to potential unlawful conduct to ensure (1) consumer protection in an era of complex communications; (2) a level playing field to promote robust competition; (3) efficient and responsible use of the public airwaves; and (4) strict compliance with public safety-related rules.

Virtual Reality: Not Just for Video Games Anymore

VR MAKES WAVES AT CONVENTIONS AND TRADE SHOWS AROUND THE WORLD

BY JESSICA ABLAMSKY

What if you could explore the site of your next convention without booking a plane ticket or offer virtual attendance to general sessions and exhibits?

Fortunately for the tradeshow and convention industry, that day has nearly arrived. Technical advances in virtual reality have finally made possible a long awaited promise—full immersion in a digital world.

VR is not just for video games. Although the VR industry is still in its infancy, the technology is already being applied to a wide range of businesses and making a splash at conventions in the U.S. and around the world.

What is VR?

Virtual reality uses computers to simulate a three-dimensional world that can be interacted with in a realistic way. It tricks the brain into thinking an experience is actually happening, a concept known as "presence."

"The mind will think it's real when there is a proper mix of audio, video and various other sensory information," said Prithvi Kandanda, CEO and co-founder of Ease VR, a startup that offers analytics for virtual reality. "If there is any mismatch, the mind will immediately know that this is not real."

Full immersion in a digital world is the real promise of VR, and it has been achieved by pricey systems like Oculus Rift.

But immersion comes at a cost. Like other VR systems, users may experience dizziness, disorientation and other symptoms and are warned to ease into VR by starting out with a few minutes at a time and gradually increasing.

The Hype

Virtual reality sales will reach $2.86 billion this year and $40.26 billion by 2020, according to SuperData Research Inc., a market research firm.

Virtual Reality has evolved, making the technology more immersive at a lower price point than ever before, according to Danfung Dennis, the CEO and founder of ConditionOne, a company that develops VR films.

"Advances in high-resolution mobile screens, low latency tracking, and optics and huge increases in computing power make VR a technology that creates a strong sense of presence—a feeling that you are actually there—possible outside of university research labs and high-end training simulations," Dennis said. "We now all have the key ingredients for VR in our pocket—the Smartphone."

Options for experiencing VR content include low-end viewers like the popular Google Cardboard, which retails for about $20, and higher-end headsets like Samsung Gear VR for $99.99 and Sony Playstation VR for $399.99. VR megastar Oculus Rift requires powerful computers with packages that start at approximately $1,500.

VR on the Convention Circuit

Virtual reality is a natural fit for the tourism industry, which is using the technology to promote destinations to business clientele and tourists.

The Utah Office of Tourism recently partnered with ConditionOne to create VR content for travel sector industry events, according to Jay Kinghorn, director of communications and digital strategy for the Utah Office of Tourism.

The videos show off rock spires in Bryce Canyon National Park, Navajo traditional dancers at Monument Valley and other attractions using Samsung Gear headsets. The bison appeared so real that many people reached out to touch them, Kinghorn said.

Utah's virtual content was intended as an enhancement to one-on-one conversations between marketers and potential leads, but it also attracted additional visitors "just to see what the buzz was all about," he added.

The Las Vegas Convention and Visitors Authority, which operates the Las Vegas Convention Center and Cashman Center, recently released a user-friendly VR app known as Vegas VR. Vegas VR shows off major attractions in the City of Lights, and content was created in-house using a 360-degree camera.

The app, which was debuted at ITB Berlin, a travel trade show, can be viewed with a Smartphone, Google Cardboard, Oculus Rift and other virtual reality viewers.

"The smiles that you see on people's faces are really entertaining," said Courtney Fitzgerald, brand public relations manager for LVCVA. "We were at a conference in Brazil. There was a line all the way across the floor waiting to test the virtual reality."

The content was originally intended for tourists, but the response from business clientele, including meeting and convention planners, has been overwhelmingly positive, Fitzgerald said. The app allowed them to be instantly transported from the convention floor to the city's most exciting attractions and helped give them the information they need when planning business destinations.

Exhibit houses are also excited about the potential for virtual reality.

Catalyst Exhibits, a full-service exhibit house in Chicago, is creating a virtual lab for a company that sells medical equipment, and it also created a virtual reality game to market an Internet security product from RSA, said Jordan Stocker, digital marketing manager for Catalyst Exhibits.

"RSA had a line for that game throughout the entire show," Stocker said. "They had great feedback in getting their message across."

A virtual reality game can take one to two months to create, but the right team can get it done in two weeks, Stocker added.

Virtual reality was also showcased at an event presented by AASA, the School Superintendents Association, to demonstrate how the technology could be used to help teach children who are not in the classroom, said Dave Weil, vice president of event services for SmithBucklin, an association management and services company in Chicago.

If virtual reality catches on, he foresees a future where events can be planned in VR and event attendance can be expanded through physical and virtual attendance.

The technology could be a powerful tool for sales, because instead of handing out brochures, sales teams could walk potential sponsors through available space to demonstrate the value the coffee break room and other costly locations.

"It's something that we're educating ourselves about, but we can envision the possibilities," Weil said. "It's something that we're going to be watching pretty closely."

Virtual reality uses computers to simulate a three-dimensional world.

THE HISTORY OF VIRTUAL REALITY

Anyone who played video games in the '90s knows that virtual reality is not new.

The technology stretches back to at least 1929, according to the Virtual Reality Society, with the first commercial flight simulator, a machine that helped train pilots by mimicking the experience of actual flight.

Like many fantasies made real, modern VR and its high-tech headsets were perhaps first imagined in science fiction. Published in 1935, *Pygmalion's Spectacles* by Stanley G. Weinbaum features goggles that allow the wearer to experience a fictional world through sight, sound, taste and smell.

A similar concept was used to create the Sensorama, an arcade-style cabinet developed in the mid-1950s by cinematographer Morton Heilig. The Sonsorama used a 3-D display, stereo speakers, fans, smell generators and a vibrating chair to immerse people in his films.

The first VR mounted display was patented in 1960, with more advanced headsets developed throughout the 1960s. But the name "virtual reality" was not coined until 1987.

A series of virtual reality products were released in the 1990s, including video arcade games and 1995's Nintendo Virtual Boy, a 3-D gaming console that was a commercial failure.

In 1993, video game giant Sega announced a VR headset for Sega Genesis that it never released due to technical difficulties.