

IWCE 2019 Takes The Pulse Of A Dynamic Wireless Market

by Kevin Parmenter, Contributor, How2Power.com

Billed as the critical communications technology event of the year, the International Wireless Communications Expo (IWCE 2019), which was held March 4-8, 2019 at the Las Vegas Convention Center, focused on wireless communications for public safety and other mission critical applications. It was my privilege to attend this show, which is both expo and conference, to learn more about this fast growing and changing marketplace, and how trends in wireless communications may impact developments in the power supply world. In addition to providing a forum for showing the latest advances in wireless communications equipment, the IWCE 2019 exhibition also provided a view of the diverse power product vendors who support this industry.

Industry Issues, Trends And Market Forces

To get a sense of this conference's scope in terms of subject matter, it helps to take a look at the conference tracks:

- 911 & Emergency Communications
- FirstNet & Public Safety Broadband
- Connectivity
- Cybersecurity
- Disaster Comms
- Interoperability & Interworking
- Network Infrastructure
- Planning and Preparation
- Push-to-Talk & Future of Voice
- Smart Cities & Critical Infrastructure
- Transformative Tech.



These topics give some insights into which segments of the wireless communications market are being addressed and what some of the underlying issues are.



The wireless communications market used to be just land mobile radio. However, today it means so much more and you need to attend an event like IWCE to grasp how big this market is. At IWCE 2019, the traditional players were present as well as some interesting emerging companies. A key takeaway from IWCE is that this market is seemingly at a crossroads between traditional analog narrow band FM and the newer DMR (or Digital Mobile Radio), P25 APCO and even LTE, using the cellular system for mission critical fire, EMS, and police communications.

The industry faces another crossroads as customers are deciding between traditional infrastructure—i.e. building their own proprietary systems—and using ATT FirstNet or Verizon LTE coverage to augment or even replace these proprietary systems. Both of these organizations are investing tens of billions of dollars in

infrastructure. I was able to sit in on many debates and sessions discussing these issues. Unlike many events in our industry there were even training and certification sessions available for IWCE attendees. These were either installation- or skills-related certifications or certifications on various kinds of test equipment.

Of course, this market has much in common with other markets. The RF and wireless business is simply booming across the board and reliable power is needed for it to work. Moreover, the installations and operating conditions dictate the utmost in reliability and quality—at or near automotive levels. Keep in mind that many of the installations are in automotive environments and/or shelters on mountaintops which are difficult to reach for service. Interestingly, while the status of GaN semiconductors is still a subject of much discussion in the power electronics industry, the debate on GaN in RF power has been settled—many products at IWCE are currently using GaN devices in the RF stages. But soon the novelty will wear off in the power electronics field too and we will just be using GaN devices in power designs without giving it much thought.

We all know that capabilities and futureproofing are top of mind issues for customers. For many suppliers in this field, the key differentiator is software for future proofing and expanding capabilities. As in the rest of the industry, hardware is becoming a commodity in wireless and SDR or software defined radio is taking over. Also we can't forget cost, and in wireless communications it's the total cost of ownership that needs to be considered. But of course government agencies must use the lowest bidder and sometimes this comes into conflict with seeking lowest total cost of ownership. Naturally, the subject of cost comes into play when specifying the power supply—more on this shortly.

Inside The Expo

The exhibitors at IWCE 2019 spanned the range of antenna suppliers, radio and ancillary equipment, cabling, shelters and more. Somewhere in that mix was an assortment of power-related products which included batteries/battery packs and other power sources like solar, battery chargers and battery management systems, and various power supplies including ac-dc supplies, UPSs, and dc-dc converters. Some of the companies, particularly the power supply vendors, appeared to be highly specialized. I have compiled a list of these exhibitors in the table below. Reading through this list offers a sense of how wide ranging the requirements are for power supply-related hardware in this industry.

The expo also had a plethora of test equipment suppliers with the latest instrumentation to measure all the capabilities of the communications equipment as well as the ability to sweep the frequency response and various attributes of transmission lines and antenna systems, cavity and other filters and more.

Some of the newer equipment for communications analysis can demodulate the P25 and DMR signals and provide a complete array of analysis of all the communications equipment capabilities.



With test instruments, as with most things, the level of functionality and performance often comes down to cost. In the beginning there is price and in the end there is cost—meaning total cost of ownership. This issue pulls me back to the subject of power supplies and a recent experience I had with a communications application.

When The Power Supply Isn't Up To The Mission

I was asked if I could repair a mission critical system that allows 24 x 7 communications between two government agencies—that's about all I can say about the purpose of the system. But suffice it to say that very important people wanted this system operational as quickly as possible.

The system was gorgeous in RF construction and design—a work of art and the cabling alone probably cost tens of thousands of dollars. It was a treat to work on it and reminded me of working on older HP equipment, which similarly was a work of art.

So, what type of power supply would you think would be chosen to power this *expensive, mission critical* system? If you guessed the lowest-priced ATX power supply, you would be correct. Moreover, this ATX supply was only used for the 12-V rail and all the others were simply capped off.

Keep in mind that this kind of power supply has been cost reduced so much that if you bring in a coupon from the Sunday paper to the Fry's Electronics where I live, you can get a free ATX power supply with any purchase. I doubt anyone worked that hard to cost down the RF Teflon cables and connectors in this system!

This ATX supply failed in the usual fashion. The design of the power supply needed minimum loading so a 7-W resistor was bolted to the side of the metal case of the power supply simply acting as a current-to-heat converter. This added heat that the system didn't need, and caused the bearings in the ATX fan to fail, which in turn produced more heat and so on, until eventually the power supply failed.

My solution in this case was to obtain a commercial power supply rated for the latest industrial safety and emissions standards with a seven-year warranty (it needed no minimum load, was 15% more efficient and needed no fan). Minor re-drilling of the mounting plate was needed—plenty of room was available— and the system was back in service in 24 hours. That was fine for this particular customer, though this delay would often be considered too slow in many mission critical communications systems.

An easy takeaway from my story is that the even designers of the best engineered high-reliability systems can overlook or underestimate the true power requirements of their systems, failing prey to cost driven bad decisions. But perhaps by attending a show like IWCE, and meeting some of the power specialists in the field, they can learn enough to avoid mistakes such as integrating lowest cost, mass-produced power supplies into their mission critical applications.

And broadly speaking, if your work is involved in any way with wireless communications systems and equipment, you won't want to miss IWCE 2020. This conference and expo will help inform you of the issues, trends and developments that can help you maintain a competitive edge in your field.

Table. Exhibitors of batteries, battery chargers, power supplies and related products at IWCE 2019.

Company	Description per the expo website
Advanced Battery Systems Booth: 3167 http://www.absbattery.com	Advanced Battery Systems is a leader in the motive and back-up power field. We have over 25 years' experience providing UPS systems, generators, industrial power backup systems, batteries, and accessories.
Astron Booth: 1519 http://www.astroncorp.com	Astron Corporation was founded in 1976 and is a premier manufacturer of linear power supplies with a full line ranging from 3 to 70 A, switching power supplies and dc-dc converters. Astron is located in Irvine, CA and distributes worldwide.
Cadex Electronics Booth: 828 http://www.cadex.com	Cadex Electronics has been manufacturing advanced battery test equipment for 30 years. We understand batteries and their importance to users. This is why Cadex battery test equipment and chargers have earned the trust of mobile equipment users worldwide.
CXD Science & Technology	Founded in 2002, Shenzhen CXD engages in provision of

<p>Booth: 1212 http://www.cxd-radio.com</p>	<p>wireless communication solutions as well as R&D, production, sales and services for advanced accessories. The products include radio earphones, speaker mics, battery packs and chargers. The R&D of CXD occupies 20% of its total number of employees. The team, including a group of young and middle-aged masters, bachelors and other researchers, is one of the high-tech talent teams with the strongest R&D strength in radio accessories area in China.</p>
<p>DuraComm Booth: 1028 http://www.duracomm.com</p>	<p>Ac-dc switch mode power supplies, battery management and charging systems. Telecom, LMR, DAS, industrial, IOT power systems. Wide variety of desk top, rack mount, DIN mount, and OEM modules. Power systems including distribution and integrated battery back up. Battery back-up systems including low voltage disconnect and smart chargers. Full line of dc-dc converters and dc-ac inverters. OEM and private label producers. Specialize in rapid prototyping and economical custom solutions.</p>
<p>ICT Booth: 1236 http://www.ictcorporate.com</p>	<p>ICT has been providing dc power products since 1986 for the wireless communications industry including land mobile radio, site equipment power, and mobile power conversion markets. Our dc power supplies, fault tolerant systems, dc converters, battery chargers, power inverters, dc backup systems, and Ethernet-enabled intelligent power supplies and dc distribution products are used in first responder dispatch centers, tower and communications sites, remote power systems and fleet vehicles around the world.</p>
<p>Lind Electronics Booth: 846 http://www.lindelectronics.com</p>	<p>Lind Electronics builds ruggedized dc-dc adapters for notebook computers, tablet PCs, and portable printers and have an extensive line of battery saving shut down timers. Lind Electronics specializes in custom power solutions and custom cables.</p>
<p>Mission Critical Energy Booth: 3337 http://www.missioncriticalenergy.com</p>	<p>Mission Critical Energy is a provider/integrator of off-grid electrical generating Superwind Micro Wind Turbines, FlexSCADA Remote Monitoring, Sensors & Control, and ZeroDT surge protection. We serve Remote Customers - worldwide, and we are decade long standard in security, WISPs, oil & gas, mining, telcom, rail industries & DHS/DOD. Proven technologies supported by our knowledgeable off-grid professionals! Celebrating over 15 years of providing power in harsh & hostile environments.</p>
<p>OSI Batteries Booth: 755 http://www.osibatteries.com</p>	<p>A full line replacement battery company for over 40 years, OSI Batteries is truly your one source for all your replacement battery needs. Offering thousands of replacement battery options for almost any kind of equipment, we support all types of businesses and government agencies in communications, industrial and medical industries. Our team delivers personalized one-on-one customer service and stands behind every order. Conveniently order by phone, by email, or by the web - OSI makes battery buying easy!</p>
<p>Newmar</p>	<p>Offering the most extensive line of dc power products</p>

<p>Booth: 1046 http://www.newmartelecom.com</p>	<p>with an earned reputation of high reliability and quality in powering wireless networks in broadband, public safety DAS, microwave, cellular and land mobile applications. 12, 24, and 48-V dc power solutions include with UL certified power enclosures that meet NFPA 1221 requirements, rectifiers, power supplies, dc converters, inverters, distribution panels, dc power conditioners, and installation accessories.</p>
<p>Power Products Booth: 947 http://www.powerproducts.com</p>	<p>Power Products is the leading supplier of batteries, chargers, and audio accessories for two-way radios. For the past 25 years we have provided customers with exceptional quality and unmatched service. Our battery assortment includes models for all popular radio brands, as well as intrinsically safe and ultra-high capacity lithium-polymer models. Visit us at booth 947 to see our innovative single and multi-unit in-vehicle charging solutions, plus the latest in battery options for two-way radios.</p>
<p>Polar Power Booth: 3652 https://polarpower.com/about-us/</p>	<p>We design and manufacture power and cooling systems for targeted market applications. In particular, we offer dc power systems, dc hybrid power systems, and dc solar hybrid power systems for telecommunications, military, renewable energy, marine, automotive and oil field applications. Our solutions provide reliable and low-cost energy for applications that do not have access to the utility grid or will continue to power applications in the event of utility grid failure.</p>
<p>Richcom Power Booth: 3624 http://www.richcompower.com</p>	<p>Richcom Power is a global leader in the design, manufacture and sales of batteries and chargers for two way radios and portable devices. We specialize in high capacity, long life batteries that excel at temperature extremes. Richcom Power, Booth 3624, will be exhibiting new products for Motorola, Kenwood, ICOM and Harris radios along with our new integrated Passive State of Health battery management system.</p>
<p>Samlex America Booth: 1153 http://www.samlexamerica.com</p>	<p>Samlex America is an experienced power conversion manufacturer. Over 200 production models available including pure sine wave inverters, modified sine wave inverters, dc-dc converters, battery chargers, power supplies, alternative energy products and other power conversion solutions. Innovative product design and strict quality control are backed by before and after sale service.</p>
<p>Tripp Lite Booth: 3755 http://www.tripplite.com</p>	<p>Tripp Lite provides the complete solution, including UPS systems, PDUs, rack enclosures, cooling, cables, charging stations, surge protectors, switches, inverters and display mounts. Our Chicago-based technical support team is ready to assist you. With over 90 years of quality products and service, Tripp Lite is a brand you can trust.</p>

About The Author



Kevin Parmenter is an IEEE Senior Member and has over 20 years of experience in the electronics and semiconductor industry. Kevin is currently director of Field Applications Engineering North America for Taiwan Semiconductor. Previously he was vice president of applications engineering in the U.S.A. for Excelsys, an Advanced Energy company; director of Advanced Technical Marketing for Digital Power Products at Exar; and led global product applications engineering and new product definition for Freescale Semiconductors AMPD - Analog, Mixed Signal and Power Division.

Prior to that, Kevin worked for Fairchild Semiconductor in the Americas as senior director of field applications engineering and held various technical and management positions with increasing responsibility at ON Semiconductor and in the Motorola Semiconductor Products Sector. Kevin also led an applications engineering team for the start-up Primarion where he worked on high-speed electro-optical communications and digital power supply semiconductors.

Kevin serves on the board of directors of the [PSMA](#) (Power Sources Manufacturers Association) and was the general chair of APEC 2009 ([the IEEE Applied Power Electronics Conference](#).) Kevin has also had design engineering experience in the medical electronics and military electronics fields. He holds a BSEE and BS in Business Administration, is a member of the IEEE, and holds an Amateur Extra class FCC license (call sign KG5Q) as well as an FCC Commercial Radiotelephone License.