



DEMC 2020 – Speakers and Synopses

Monday 10th February – Registration 08:30-09:15

09:30 – 10:00	Topic	Synopsis
Welcome from R&S and Introduction by Michael Derby – Secretary of EMCTLA		
10:00 - 11:00		
Lee Hill – Silent Solutions	The 5 EMC things they didn't put in your education	Lee will share a few simple and profound observations from over 25 years of teaching professional and university EMC courses in the US, Europe, and Asia.
11:30 - 12:30		
Lee Hill – Silent Solutions	Common-mode current, ground loops, and LF signal integrity	Most electrical engineers did not learn about ground, ground loops, or common-mode current during their university studies. Yet the primary goal of most EMC regulatory emissions and immunity tests is to either measure or induce a common-mode current out of or into an electronic system in the presence of something called a “ground plane”! During this presentation, Lee will present intuitive ways to define grounds and common-mode current. He will also model, demonstrate, and measure common-mode currents using a spectrum analyser, a noisy digital product, a current probe, and an oscilloscope. The black magic of EMC will disappear after Lee’s presentation clearly and logically explains some of EMC’s most poorly-understood phenomenon.
Mark Emery & Alastair Ruddle - MIRA	Emerging Topics in Automotive EMC: Standardisation Developments and Risk-Based Systems Engineering	The range and complexity of technologies that are now being deployed in modern vehicles are increasing at an unprecedented rate. These developments are driving changes in automotive EMC standardisation and legislation, as well as in related engineering approaches. This session will outline the current status and planned developments of the relevant automotive CISPR & ISO standards, along with the impact the recent introduction of UNECE Regulation 10.06 has upon component sub-system and vehicle manufactures. In addition, the benefits of more robust systems engineering practices and a risk-based approach for meeting the challenges of future automotive EMC engineering will be discussed

<p>Michael Derby – ACB & Charlie Blackham – Sulis</p>	<p>FCC Rules and Requirements for electrical and radio equipment</p>	<p>Regulatory Approvals for the USA with the FCC; including Certification of Radio Transmitters and sDoC of electronic equipment.</p> <ul style="list-style-type: none"> • Understanding the FCC requirements for compliance in the USA • Certification and sDoC authorisations • Testing and test lab requirements • Labelling and documentation • Applications to a Certification Body • Radio modules and installing radio modules • Making changes to devices already approved
<p>James Pawson – Unit 3 Compliance</p>	<p>“We Need To Talk About Ground”</p>	<p>Bring your shovel as we dig into the most commonly misunderstood field of EMC design... GROUND</p> <p>The one topic that comes up again and again in the field of EMC design and problem solving is the concept of ground and the misconceptions around it. What is it? Where is it? Should I split it? Should I star it? Is it actually green and yellow?</p> <p>Our circuits are literally built on top of it, yet it receives little attention in our schematics, reduced to a handful of triangles or a few lines. This simple piece of copper often holds the key to the EMC performance of the products we design.</p> <p>Returning to Demystifying EMC after a popular presentation last year, James will equip you with the tools** you need, guide you into terra incognita, dig into the myths and misunderstandings, and hopefully give you a good “grounding” in the subject.</p> <p>** Shovel not included. Significant risk of further puns.</p>
<p>Gunter Pfeifer – Rohde & Schwarz</p>	<p>Overcoming mmWave Device Testing Challenges for 5G NR</p>	<p>5G NR in the sub 6 GHz frequency range (FR1) can be seen as a natural evolution of LTE to achieve higher bandwidth and more flexibility on the physical layer in order to realize all the new and additional use cases defined for a next generation mobile network. The real technical challenge,</p>

		however, comes with 5G mmWave (FR2), which opens up a new level of complexity in device development. mmWave frequencies imply measurement challenges that call for new testing approaches. We take a closer look at the major challenges mmWave brings and discuss innovative test solutions.
13:30 – 14:30		
Lee Hill – Silent Solutions	How probes help us to see and fix noise problems	This session will share the secrets to uncovering the most elusive regulatory and functional noise problems. During this talk Lee will discuss and demonstrate a number of noise near-field probes, current probes, voltage probes, and noise injectors. Along with each demonstration, he will discuss the theory of operation of each probe and how to interpret the results of real-life noise measurements. Throughout his presentation Lee will encourage audience participation and live questions. You won't want to miss this practical session packed with recommendations on practical tools and techniques.
Steve Hayes – Element Materials	Conformity Challenges with Wireless Technologies in Vehicles	More and more wireless technologies are being integrated into vehicles which adds to the complexity of the approval of the both the vehicle and the wireless device itself. This presentation will review the complexities of this and discuss what needs to be considered by manufacturers and integrators of wireless devices as OEM and aftermarket products such that they meet the products regulatory requirements, focusing on EMC related issues.
Naseef Mahmud – Rohde & Schwarz	OTA testing method for RED, coexistence and EM interference in Automotive	Future vehicles will be electrified, autonomous and connected. Wireless technologies aim to tackle some of the biggest challenges of the transportation industry in the areas of safety, mobility and environment. The ability of a connected vehicle to communicate directly with other vehicles and/or with infrastructure is a key element of integrating the vehicle into a smarter and safer environment. This allows vehicles to gather and transmit information that will lead to fewer accidents, less traffic and greater energy efficiency. To realize these goals, a car platform must integrate radio equipment (i.e. transceivers) in a manner that allows high performance levels for each radio component while ensuring proper coexistence and immunity from other RF sources and at the same time, maintain spurious-free transmissions. Since the new Radio Equipment Directive (RED) entered into force in June 2017, the definition of radio equipment does not allow treatment of in-built radio functionality, separate from the main

		equipment. The current issue facing car manufacturers is the lack of standards and procedures defining the set of minimum performance requirements. In this presentation, a list of relevant performance indicator parameters is considered and the corresponding over-the-air (OTA) test methodology will be discussed.
Ben Mercer –UL	Test & Compliance for mmWave Technology	Wedged between microwave and infrared, the mmWave spectrum can be utilised for high-speed wireless communications as seen with the latest 802.11ad Wi-Fi standard (operating at 60 GHz). Discover how advances in the test and measurement industry allow you to meet the increasingly stringent regulatory requirements in this field.
Tamara Monti – Dassault Simulia	Simulations for Drivetrain Electrification	Designing electric drivetrains involves a number of different aspects: <ul style="list-style-type: none"> - Motor and battery performance need to be optimized. - The weight of the cable harness needs to be minimized without compromising the signals transmitted through the harness. - Electromagnetic compatibility (EMC) in the form of radiated and conducted emissions needs to be studied. This needs to be done on the component level as well as the system level, since the electromagnetic noise created by a component itself can differ greatly from the noise created by the same component once integrated with the rest of the car. - Last but not least, human exposure to electromagnetic fields also need to be considered and compliance with a number of standards needs to be demonstrated.
15:00 – 16:00		
Lee Hill – Silent Solutions	EMC Troubleshooting Case history: the unhappy motorcycle speedometer.	At home Lee enjoys riding motorbikes. At work, Lee tells the story of how he fixed what had been a very challenging functional noise problem in a new motorcycle speedometer. Lee will use this actual case history to illustrate how any engineer can use “the noise model” to understand, troubleshoot, and solve any practical regulatory or functional noise problem.
Nick Wright – EMC Partner	Electric Vehicles and Charging station testing. EMC testing and safety testing	An annually increasing number of vehicles emit increasing amounts of CO ₂ . Electric vehicles could be part of a solution to meet climate objectives. This can only work if sufficient charging facility are available. Any charging

		station connected to the public power supply has to be tested for EMC and safety at both the public main input and the vehicle output (AC or DC). Conformity assessment follows International Electrotechnical Commission (IEC) regulations. But the nature of the problem prompted the United Nations to issue standards with a global reach. There are reported issues with high current DC fast chargers that can lead to problems when testing with standard IEC compliant test systems. Join us to discover more
Michael Derby – ACB & Charlie Blackham – Sulis	Radio Equipment Directive (RED), compliance for radio enabled equipment	Regulatory Approvals for the EU using the Radio Equipment Directive (RED) <ul style="list-style-type: none"> • Understanding the RED and compliance approach • DoC, manufacturer and economic operators • Testing and test lab requirements • Labelling and documentation • Applications to a Notified Body • Radio modules and installing radio modules • Making changes to devices already CE Marked
Nick Wainwright – Eurofins E&E	Keep Calm and CE Mark - Your BREXIT Survival Guide (Part 2)	The UK's future relationship with the EU and its Single Market remains undecided and, along with it, the regulatory framework in which manufacturers and the supply chain will operate. With several outcomes still possible, each with its own implications, there is considerable uncertainty within industry as to how best to prepare. This presentation will clarify the latest BREXIT position, the likely implications for the regulatory process and the best course of action for the whole supply chain.
Martin Wiles – Albatross Projects	On the suitability of EMC anechoic chambers in the frequency range 9KHz-30MHz with loop antennas	New basic EMC standards CISPR 16-1-4, 16-1-5 and 16-1-6 and also CISPR 16-2-3 are being finalised for radiated emissions measurements below 30MHz using magnetic loops. This paper explores the feasibility of using and validating existing anechoic chambers under these conditions. The work has direct implications for the automotive industry as well as other product groups.
16:00 – 16:30		
Panel Q&A Session		