EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Metering and AMI Interest Group

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Webcast Meeting

February 4th, 2014

Agenda

- Update on Meter EMC – 2 to 150KHz range (Dennis Symanski)
- AMI-to-OMS Integration (Dr. Gerald Gray)
- Open App Platforms (forward-looking metering research)
- Meter Safety Standards (ANSI update)
  - Scott Weikel, ANSI C12.1 subcommittee chairman (Elster Metering)
- Open Discussion
  - Member interests and needs
  - Member projects and findings

Solid State Meter EMC

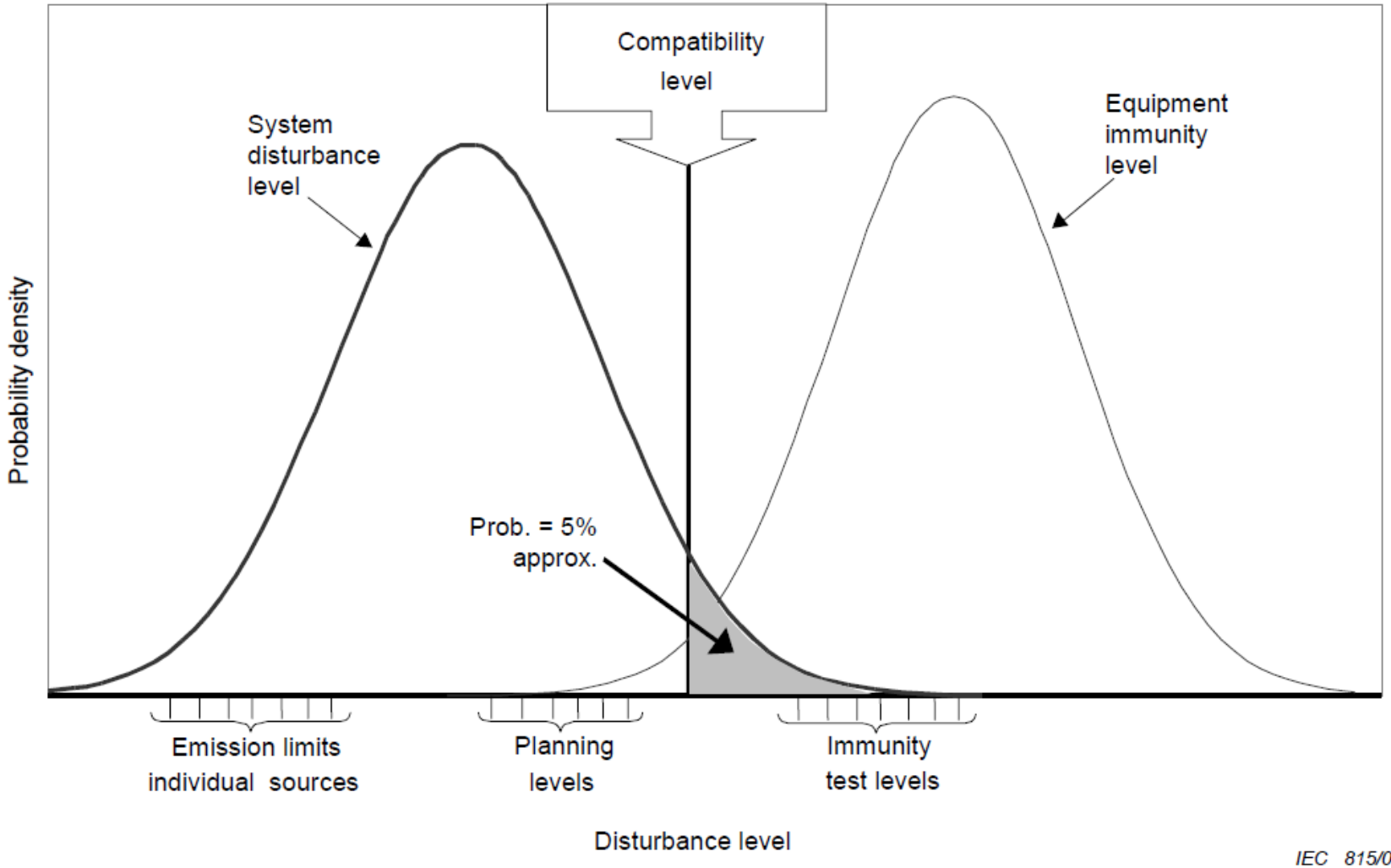
Conducted Noise Sensitivity in the 2-150KHz Range

New Draft IEC Standard 61000-4-19

Current Situation

- Digital meters in Europe have experienced substantial errors when PV inverters are nearby
- Limited standardization of power line voltage & current in the 2 kHz to 150 kHz frequency range.
- No conducted differential mode “immunity” requirements exist
- No conducted differential mode “emission” requirements exist

Electromagnetic Compatibility



Sources of 2 kHz to 150 kHz Noise

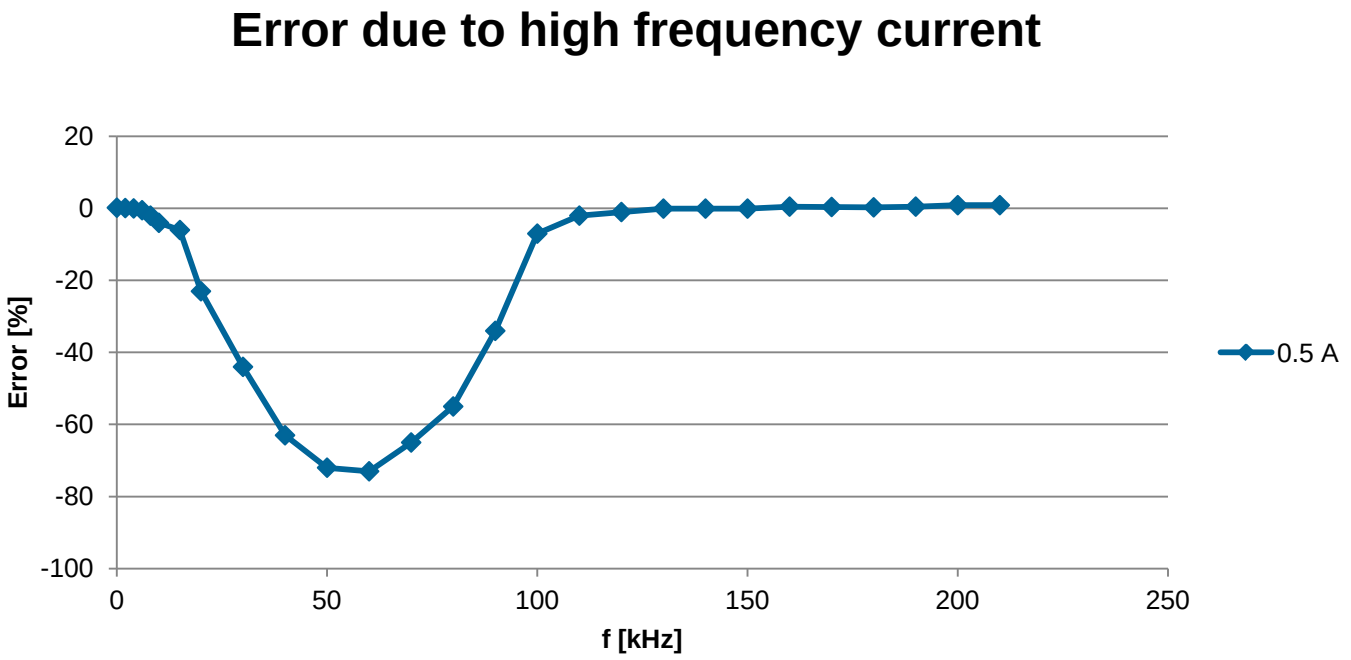
- Digital Meters
- Fluorescent Lamps
- Photovoltaic Inverters
- Variable Frequency Drives
- Uninterruptible Power Supplies
- Switched Mode Power Supplies

Filtering for these frequencies is expensive and due to lack of regulation, not necessary

Victims of 2 kHz to 150 kHz Noise

- Digital Meters
  - Registered only part of the energy flowing through meter
- Touch-Dimmer Lamps
  - Unintentional switching on/off
- Street Lighting
  - Unintentional switching on/off
- Traffic Lights
  - Loss of function
- Alarm Systems
  - Loss of function
- Household Appliances
  - Self restart of appliance

How Big is the Digital Meter Error Problem?



AMI-to-OMS Integration

Reducing the Distance to Interoperability

Common Challenges in Standardization	How Can EPRI Help?
Requirements Not Reflected in Standards	Standards Acceleration, Direct Contributions
Lack of Industry Awareness	Whitepapers, Informational Webcasts
Lack of Utility Demand for the Standard	Internal Awareness, RFP Language
No Time Allowed for Implementation in Products	Tracking and Monitoring of Progress
Lack of Clarity of the Standard, Consistent Application	Interoperability Testing
No Certification	Development of Test Scripts, Test Harnesses
No Field Experience or Standards Revision	Demonstration Projects, Tracking and Compilation

AMI to OMS Integration

Problem:

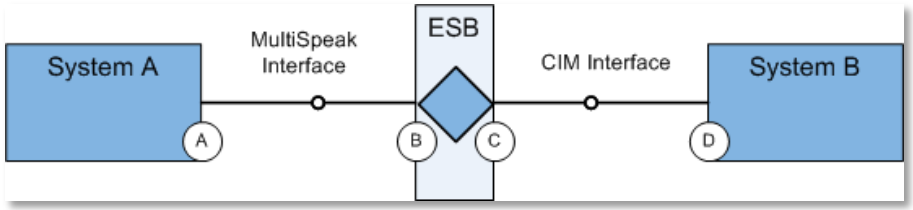
- Utilities: See a gap/need
- SDOs: See the work as completed
- Some utilities are ahead of the integration curve
  - Some proprietary solutions, some standards-based
    - e.g. Using the Common Information Model (CIM) at the ESB
  - Lessons learned about “blue sky” vs. storm condition operation

The Goal

- Combine lessons learned with standards to advance the state of the art
- Specific guidance for vendors

AMI-OMS: Current Art

- Both CIM and MultiSpeak provide standards, services, and guidance
  - MultiSpeak 3
  - MultiSpeak 4.1.x
  - MultiSpeak 5 (draft)



- IEC 61968-9 Meter Reading and Control 1st Edition
- IEC 61968-9 Meter Reading and Control 2nd Edition
- IEC 61968-100 Application Integration at Electric Utilities
- EPRI - Common Information Model (CIM)-MultiSpeak Harmonization 2nd Edition - Product ID: 1026585

AMI-OMS: Challenges and Opportunities

- Vendor support has been slow
  - MultiSpeak 3 / IEC 61968-9 1st Edition
  - some inter-op testing
  - No harmonization inter-op other than the EPRI lab
- To be fair:
  - MultiSpeak 4.1.x
  - IEC 61968-9 2nd Ed / IEC 61968-100 “just” published
- Actions:
  - Explore the use cases – do these standards hit the mark?
  - Get feedback from utility stakeholders (bi-weekly calls)
  - Develop reference guidance documentation
  - Feed into test harness development

AMI Devices as Open App Platforms

AMI Systems Research

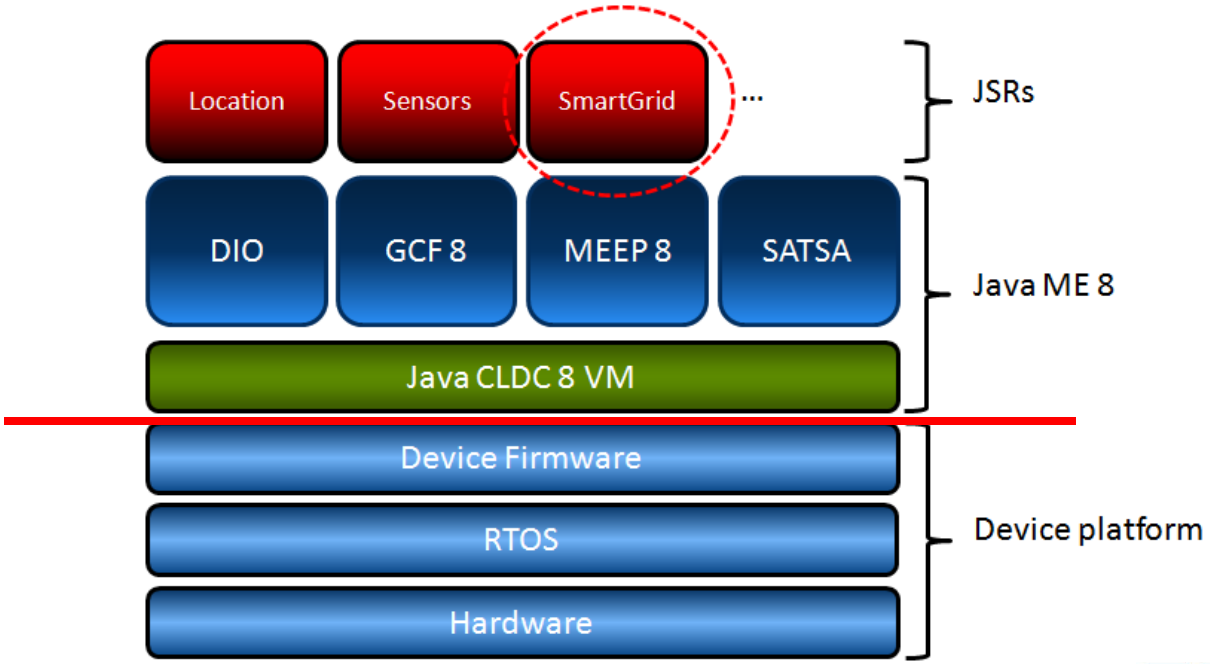
System Devices as Open Platforms

- Making AMI systems more flexible and available to the utility to enhance, manage and evolve as needed
- Enabling consistent behavior across diverse meter brands and communication networks

AMI Systems Research

Enabling Smart Grid Devices as Platforms

- Facilitated a focus group through 2013
- Three utilities, two meter manufacturers, Oracle corp (Java)
- Building toward a demonstration with multiple platforms from multiple vendors
- Contribute into appropriate standards organization going forward



Update on ANSI C12 Meter Safety Activities

Scott Weikel

ANSI C12.1 Subcommittee Chairman
(Elster Metering)

Open Discussion