

# **Electromagnetic Interoperability Issues Working Group (EMIIWG) Charter**

## **Renamed as the EMII Sub Group (EMIISG)**

**Initially generated in November 2015**

**Updated 12/14/2020**

### **SCOPE:**

This Working Group (WG) will continue to investigate enhancing the immunity of Smart Grid devices and systems to the detrimental effects of natural and man-made electromagnetic interference, both radiated and conducted. The focus is to address these electromagnetic compatibility (EMC) issues and to develop recommendations for the application of standards and testing criteria to ensure EMC for the Smart Grid, with a particular focus on issues directly related to interoperability of Smart Grid devices and systems. These issues include, but are not limited to: impacts, avoidance, generation and mitigation of and immunity to electromagnetic disturbances, which can cause interference. With the Smart Electric Power Alliance (SEPA) focus on interoperability, the Working Group effort generally does not encompass a review of general electromagnetics and electric power related issues, such as power quality. These topics are being addressed in different standards development groups outside the SEPA, such as by the technical committees in the International Electrotechnical Commission (IEC).

### **GOALS:**

EMC is necessary to some degree for all electrical or electronic devices in order to maintain reliability and performance quality, to provide immunity to undesired signals, to reduce interference caused to other electronics, and to enhance safety. Also, EMC is an ongoing process that must evolve as the technology evolves. Within this broad application space, the primary goal for this Working Group continues to be identifying and focusing on the critical parts of the Smart Grid and developing a strategy to implement effective EMC, including appropriate standards, testing needs and conformity assessment. The particular focus on these issues directly affects interoperability of Smart Grid devices and systems. This strategy should provide for growth and change as the Smart Grid evolves.

The approach is to work with power industry utilities, manufactures of Smart Grid devices, EMC experts, standards development organizations (SDOs), and other stakeholders. This is in addition to the SGIP PAPs and WGs, in order to identify, evaluate, and/or initiate development of the appropriate EMC standards and testing criteria to improve the interoperability of the various Smart Grid devices, their communications protocols, and installed systems.

### **ACTIVITIES:**

The Working Group shall build on its past SEPA work and publications to develop and update a detailed work plan with timelines for the completion of a set of recommendations as the work in SEPA evolves. The recommendations of the Working Group shall be targeted for presentation to SEPA, its committees and key stakeholders in the Smart Grid technical community. The following activities shall be considered in this plan.

1. Review the existing state of EMC of the power grid and associated systems, including current and proposed Smart Grid enhancements. Not enough public information; no utilities are on the WG and hence we do not have a channel for the information needed. **This charter activity is on hold**
2. Evaluate the electromagnetic phenomena issues according to their potential impact on Smart Grid reliability. The priorities set should consider the extent and severity of possible failures and the availability requirements for the relevant communication interfaces as defined in NISTIR 7628. **Covered in 2016 white paper and hence is completed**
3. Evaluate potential impacts of high power electromagnetic threats [HEMP (High-altitude Electromagnetic Pulse), IEMI (Intentional Electromagnetic Interference) and Geomagnetic Storms] on Smart Grid electronics and identify assessment techniques, protection (immunity) methods and test standards that support this effort. Subject is covered in annexes and in the main text in all white papers and hence it not considered for stand-alone document. **This charter activity is completed**
4. Participate in the ANSI/NEMA standardization process of the Interoperability Process Reference Manual (IPRM) to ensure that EMC clauses continue to be identified and remain relevant. Completed by adding an EMC clause in the published version of the Manual which is now a NEMA Standards Publication SG-IPRM 1-2016: “Smart Grid Interoperability Process Reference Manual” **This charter activity is completed.**
5. Consider the need, and if appropriate the nature, of a conformity assessment program for EMC for coordination with the SGIP Smart Grid Testing and Certification Committee in their support of emerging and existing Smart Grid test programs. This has been identified as the next whitepaper topic. However at present there is a need to find those outside the core EMIIWG members to work on this subject. **This charter activity is at risk without CA skilled volunteers. Our group to determine if a CA program is possible.**
6. There are several EMC tests that are important to ensure that electronic equipment can operate while transferring Smart Grid data. Each will require a specific test setup of the Smart Grid device to be tested. This calls for developing detailed test plans and formalizing the test setup for each test as such devices have to be operated simulating their normal use. Covered in the 2017 white paper. **This charter activity is completed**
7. For all of the tests noted above, the WG will determine if a general guide for product EMC performance during and after each test would be sufficient to qualify the device to meet the challenge of the electromagnetic environment where it is installed. Covered in the 2018 white paper. **This charter activity is completed**
8. Since various communications protocols are being used in SGIP, this adds another layer of test planning when performing EMC tests normally focused only on the main operation of the device itself. The WG will request help in this added complexity to adequately assess the device operation for the tests identified above. **This charter topic is essentially complete in late 2020 and has been submitted to the Test and Certification Committee for their comments.**

9. Suggest how to deal with specific installations where there are closely spaced clusters of Smart Grid devices (e.g. SG meters) that interact with each other both from emission and immunity perspectives. This is an issue for EMC committees in general and is not specific to Smart Grid applications, although there are cases in the Smart Grid. **This charter activity is held in abeyance (like RTUs as a system-level issue)**

10. Propose strategic recommendations to achieve EMC of Smart Grid systems, beginning with the highest priority categories. These recommendations should reflect a long-term strategy to maintain EMC as the Smart Grid evolves. This is covered in the 2019 whitepaper. **This charter item is completed**

The Working Group will reach out for additional experts and coordination with SEPA committee members to accomplish its goals, which are intended to increase the sustainability of Smart Grid devices and systems.

## REFERENCES

Here are the links to the white papers noted above for the years 2016, 2017, 2018, and 2019

1. "Evaluation of the Electromagnetic Phenomena Issues on Smart Grid Reliability", 21 Feb 2016-2017  
<https://sepapower.org/resource/evaluation-electromagnetic-phenomena-issues-smart-grid-reliability/>
2. "EMC Test Setups for Smart Grid Devices", 3 Nov 2017  
<https://sepapower.org/resource/emc-test-setups-smart-grid-devices/>
3. "Guide for Products tested for EMC performance", 7 November 2018  
<https://sepapower.org/resource/guide-for-products-tested-for-emc-performance/>
4. "Smart Grid Strategic EMC Recommendations for the Future", August 2019  
<https://sepapower.org/resource/smart-grid-strategic-emc-recommendations-for-the-future/>