

CEA-2045 Field Demonstrations Project Description

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Technical Update, June 2014

EPRI Project Manager

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ABSTRACT

This document describes the goals and plan for the EPRI CEA-2045 Field Demonstration project. This project is a collaborative research activity designed to assess the new Consumer Electronics Association CEA-2045 standard. This standard defines a modular port interface that is intended to be incorporated into end-use load devices to support demand response (DR) and remote management.

The intent of the CEA-2045 standard is to make it practical for end-device manufacturers to mass produce retail-viable “DR-Ready” end devices, at minimal upfront cost, that could be compatible with DR programs everywhere. It also is intended to avoid the need for utility truck-rolls and electricians by being simple enough that consumers could plug in communication modules without assistance.

The CEA-2045 Field Demonstration project is a comprehensive assessment of this new standard. Participating utilities are fielding various end devices and connecting them into existing and new DR programs to evaluate performance and compatibility of the standard against a wide range of program requirements. Consensus functional requirements for end-use devices are being developed and shared with manufacturers who are producing the CEA-2045 based products for field installation and testing. Communication system providers are being engaged to produce plug-in communication modules needed to connect and test.

The project, which is described in detail in this report, is a three-year initiative providing opportunity for manufacturers to design and manufacture products; safety certifications to be obtained; installations to be made; and data to be gathered and analyzed.

Keywords

ANSI/CEA-2045

Demand response ready

Communication

Smart grid

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INTRODUCTION

In February 2013, the Consumer Electronics Association (CEA) released a standard that defines a modular socket/port interface. As illustrated in Figure 1-1, the modular port is intended for application on end-use devices to enable demand response, automation, and remote management. Although illustrated here on a water heater, the CEA-2045 interface is intended for use on any end-use device for which demand response is of interest. The CEA-2045 standard has been described in detail in EPRI report 3002004020, Introduction to the CEA-2045 Standard, EPRI, Palo Alto, CA 2014.



Figure 1-1
Modular Communication Interface Concept

CEA-2045 is envisioned to enable DR-Readiness of mainstream product models, not just high-end or specialty models. In other words, ideally all models of a given product type would have built-in DR-Readiness, and would have latent capability to provide DR services, whether or not the consumer was looking for these capabilities at the time of purchase. The common motivation for a modular approach to DR-Ready products is threefold:

1. To allow the end-use device to work with any communication system. This is important given the wide range of communication technologies that are being employed by consumers, utilities, and demand response aggregators worldwide. Manufacturers of the

target end-use devices require mass-production of common designs which can be sold and moved anywhere. This flexibility is illustrated in Figure 1-2.

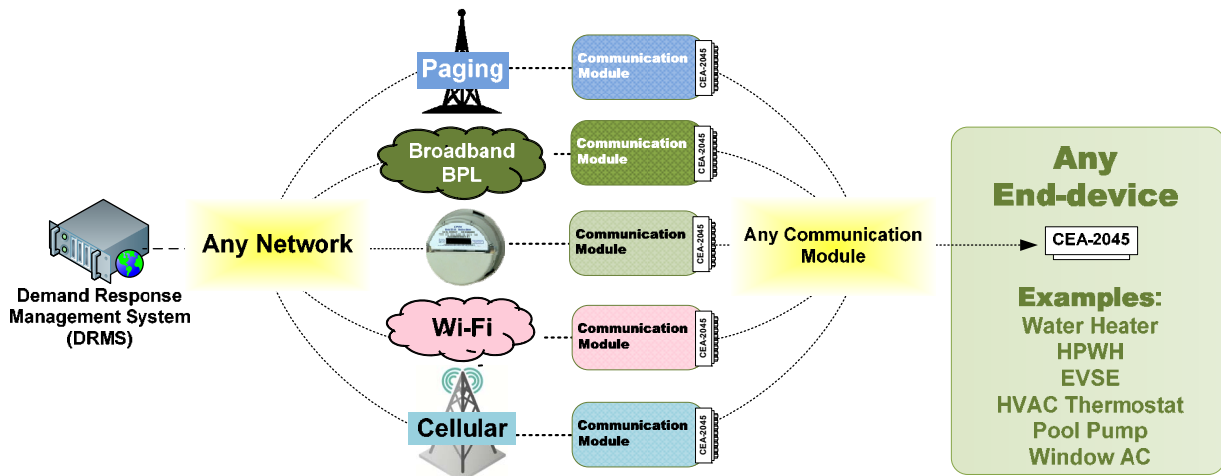


Figure 1-2
Example Use of CEA-2045 to Support Different Communication Networks

2. To allow the communication technology to change over the service life of the end-device. This is particularly important for long-life products, such as those often employed for demand response. These devices may serve for 20 or 30 years, whereas communication technologies are evolving much more rapidly.
3. To avoid upfront cost and complexity. Presently, participation rates in DR programs is very low (single digit percentages), meaning that most products go to the landfill having never been enrolled. Although increases in participation are expected, these increases may require many years to materialize, making upfront cost avoidance a need for the foreseeable future. Many years may pass between initial product purchase and the decision to enroll in a DR program.

Research Questions Regarding a Modular Interface

Prior industry activities, conducted by EPRI, USNAP Alliance, and NIST, identified use cases and functional requirements for a modular interface, described concept designs, and conducted laboratory interoperability testing. This research included the participation of end-device manufacturers and communication technology providers. Many of these companies developed prototype designs and participated in utility-hosted interoperability workshops. A high degree of interoperability was observed in these workshops, leaving both utility and manufacturer participants interested in seeing the technology carried forward.

The Consumer Electronics Association’s development and release of the CEA-2045 standard advanced the modular concept, but several research questions remain:

- Can the degree of interoperability seen in prior lab testing be extended to the range of target end-devices and real DR programs that exist?
- Can a single end-device design actually be produced that will work in these diverse programs?
- Can safety certifications be obtained when the “DR module” is an add-on?

- Can diverse communication technologies be successfully packaged in these modular forms?
- Can these communication modules perform well given the power available, the space available, and the proximity to the end device?
- Do a significant number of utilities support a modular approach to communication connectivity?
- Are a sufficient number of end-device makers willing to make products with an open standard port on them?
- Are communication technology providers willing to make modular versions of their communication devices?
- What are the mechanisms by which an end-device maker could be justified (economically speaking) in adding these DR-Ready capabilities to their mainstream products?
- Are changes needed in the CEA-2045 standard in order to make it usable?

The CEA-2045 Field Demonstration project is intended to answer these research questions.

Field Demonstration Project Goals

- Thoroughly assess the CEA-2045 standard, seeking to determine the extent to which the basic features of interoperability and consumer self-installability are (or are not) achieved
- Provide an effective mechanism for utility collaboration, allowing for the development of consensus requirements, or else recognizing and documenting why such common requirements cannot be reached
- Serve as a single point of contact for end-device manufacturers with utilities, so that there is consistency in what is asked and, to the extent possible, a more viable path forward in terms of mass-producible designs
- Field test in diverse scenarios with a common design for each product, including different demand response program types
- Directly engage communication technology partners to produce compatible modules, working together to eliminate the chicken-and-egg issue that naturally exists when a modular approach is considered
- Attempt, at least for some end-device types, to obtain safety certifications to determine what issues might impede such certifications in the future
- Assess product compatibility with both existing and emerging communication systems

2

PROJECT PHASES

Each utility demonstration will be carried out on individual timelines, driven by the availability of the chosen end-devices, the availability of the requisite communication modules, and the readiness of the utility to deploy. Because of this, learning will be staggered throughout the project.

For each demonstration, the primary phases are the same, as represented in the flowchart of Figure 2-1.

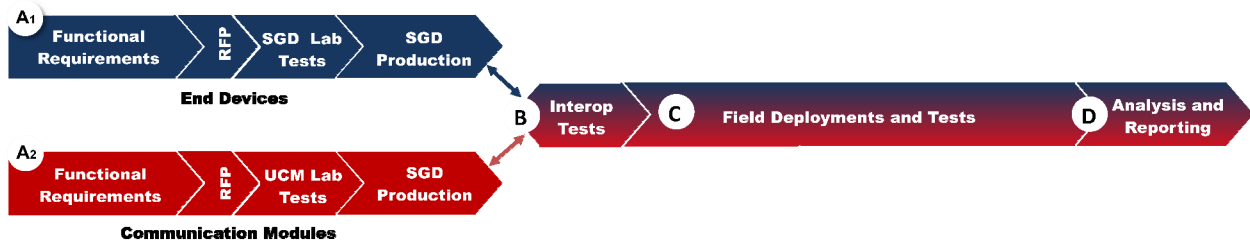


Figure 2-1
Phases Associated with Each Utility Demonstration

Phase A, Procurement and Verification of Equipment

The process begins with two parallel activities: (A1) procurement of end-devices and (A2) procurement of communication modules. These two activities then come together for integration testing prior to deployment. During this first phase, EPRI and participating utilities will collaborate to develop requirements that will serve as specifications for end-device manufacturers as they design equipment. When the first prototypes are available, EPRI will perform lab tests to ensure the equipment conforms to the CEA-2045 standard and meets utility requirements.

Phase B, Interoperability Testing

After each end device and communication module type are tested separately, they will be connected to one another and evaluated, in the same configuration as they are intended to be deployed in the field. These tests will be performed with the intention that the equipment will integrate easily at utility and customer sites and operate properly in the field.

Phase C, Field Deployments and Testing

After the equipment is tested in a controlled laboratory environment, the units will be delivered to each host utility. Utilities will deploy the equipment in the field, in customer homes or other facilities such as utility laboratories. In addition to the CEA-2045 based equipment (appliances and modules), EPRI will provide each participant with a data acquisition system (sniffer) to passively monitor and log communications between the communication module and the end device. The equipment will be deployed under different DR program scenarios, meaning that the messages communicated across the CEA-2045 port may differ between utilities. EPRI will work with each host to determine the field test procedures.

Phase D, Analysis and Reporting

Throughout the project, EPRI will be documenting the interoperability results and collecting information about the experiences of each utility. These findings will be documented and disseminated to project members. In some cases, information will be provided to equipment suppliers, the CEA-2045 R7.8 working group, and the USNAP Alliance in order to advance the state of the industry. The field test procedures and the data collected during the field deployment will be used to evaluate the performance of the equipment in the field.

3

DEVELOPING CONSENSUS END-DEVICE REQUIREMENTS

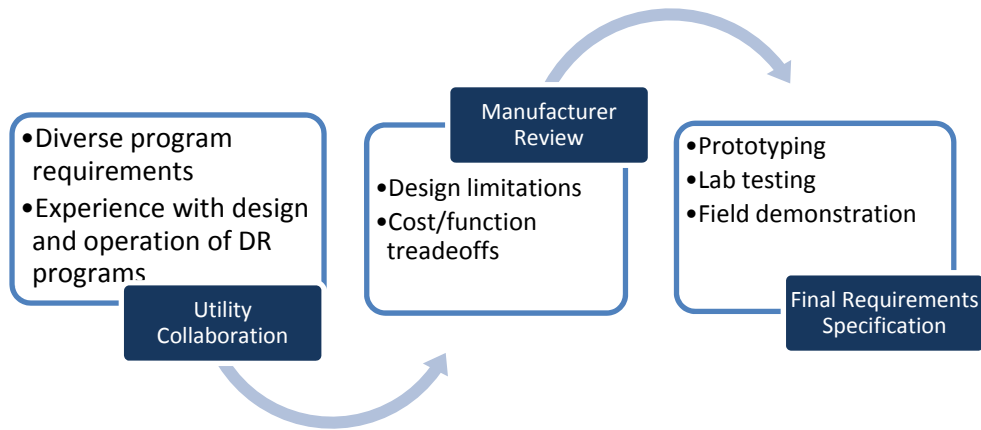
The CEA-2045 standard provides guidelines to enable an end device (referred-to as an SGD) and a communication module (referred-to as a UCM) to connect and communicate with one another. For demand response programs, it is important to know what each SGD type will do in response to the control information received. However, it is outside the scope of the CEA-2045 standard to dictate these responses, because the standard is limited to defining how the communication is handled. It is envisioned that end-device responses will be established by a certification process (on a per-type basis) and/or by appliance standards set in place by manufacturer groups or federal/state standards.

During the carrying-out of this demonstration project, the certification processes and mandates are not in place, so it is necessary for the project team to establish consensus functional requirements for each end-device type. This ensures that the end devices respond in a predictable and desirable manner when specific DR events are called.

A broad range of demand response program types will be represented in the project. This is expected to include price-based response (e.g. TOU, CPP), emergency curtailment, traditional cycling, direct load control, and advanced regulation services such as up/down regulation. A given demand response program may use only a few of the supported functions in a given product, but the product must support the full set. It will be a notable success if the same DR-Ready product could be mass produced and yet meet the unique demand response needs of each region.

Some utilities will be looking for ways to continue using existing DR programs (and networks) to manage new DR- Ready equipment, while others will be designing new programs to take advantage of the capabilities of DR-Ready equipment.

As outlined in Figure 3-1, these functional requirements are being developed through a collaborative process, looking at both present and planned utility demand response needs. This process is improved as the number of participating utilities increases. Ideally, the final requirements will be representative of the needs of the utility industry as a whole. This is one of the most attractive aspects of the project from the manufacturer's perspective: the opportunity to have a single discussion thread with a collective group of utilities and to identify how one product design might work for the mass market.



**Figure 3-1
Process for Developing Requirements for CEA-2045 End-Devices**

The requirements for each end device type will be developed through working groups comprised of utilities that are interested in that particular end device type. The objective of each working group is to develop a document that details the mechanical, electrical, safety, and functional (response) requirements for the product. In addition, the specifications will identify the specific CEA-2045 messages that must be used to support the required functions.

The consensus utility requirements will then be reviewed with end-device makers for each product type. This allows the process expertise of the manufacturers and the design impact (cost) to be identified. Improved functional responses may be suggested, and techniques that minimize cost impact may be identified through this process. The resulting documents will be published and used for the procurement of products for the field testing.

As indicated in Table 3-1, the requirements documents will be produced first in a draft form, utilized for the initial build and testing, then later revised if needed, based on the learning from the field testing. These documents will be made available to the USNAP Alliance to aid in their work to develop certification requirements.

**Table 3-1
Planned End-Device Specification Documents**

Product Type	Initial Draft Requirements	Final Requirements
Resistive Water Heater	<i>DR-Ready Domestic Water Heater Specification: Preliminary Requirements for CEA-2045 Field Demonstration.</i> EPRI, Palo Alto, CA: 2014. 3002002710	To be developed
Heat Pump Water Heater	<i>DR-Ready Heat Pump Water Heater Specification: Preliminary Requirements for CEA-2045 Field Demonstration.</i> EPRI, Palo Alto, CA: 2014. 3002002719	To be developed
Thermostat	<i>DR-Ready Programmable Thermostat Specification: Preliminary Requirements for CEA-2045 Field Demonstration.</i> EPRI, Palo Alto, CA: 2014. 3002002711	To be developed
EVSE	<i>DR-Ready Electric Vehicle Service Equipment Specification: Preliminary Requirements for CEA-2045 Field Demonstration.</i> EPRI, Palo Alto, CA: 2014. 3002002712	To be developed
Pool Pump Timer	TBD. Product ID has not yet been assigned.	To be developed
Packaged Terminal Air Conditioners	TBD. Product ID has not yet been assigned.	To be developed

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DR-READY END DEVICES

Following the development of requirements, the project team will select a manufacturer to provide each product type. Although it is possible for multiple manufacturers to be engaged, the intention of the project is to select just one for each end-device type. The reason for this is so that the field demonstrations will provide a direct assessment of the ability for one product to work successfully in all the DR programs. It is important to assess this aspect of the CEA-2045 interface in terms of enabling mass-production.

EPRI and the project team will solicit proposals from candidate manufacturers based on the requirements. These proposals will be for the manufacture and provision of the total quantity of units needed to support the field demonstrations. The product features and functionality described in the proposals may or may not support 100% of the requested functionality. The project team will select a vendor from among the proposals received. EPRI will order the total number of units; test them as described later in this document, and ship to the hosting project participants in preparation for field testing.

5

COMMUNICATION MODULES

To carry out this assessment, communication technologies must be packaged in the CEA-2045 module form factors. This will require a significant effort by the companies that provide communication equipment. In most cases, new circuit board layouts will be needed, and in all cases, additional firmware will be needed in order to support the CEA-2045 serial interface.

The quality of this project is improved as the range of communication technologies broadens. Diversity of manufacturer, protocols, and physical media allow for a better measure of the degree of interoperability achieved by the standard.

The project is designed such that the utilities are working together to specify and procure the end-use devices. However, the acquisition of the communication modules is being carried out by each host participant independently. This approach was taken for several reasons:

1. Utilities have a close relationship with their communication technology partners. The utility is the customer, and the organizations are generally accustomed to working together.
2. Although one appliance must work in all regions (so that it could be mass produced), it is possible that communication systems and modules are tailored to meet the specific demand-response needs of each utility.
3. Some communication technologies being considered may also be in use by the utility for other purposes such as AMI, SCADA, or field force communication. The discussion regarding the use of these technologies for demand response purposes may also involve these other uses, and how the two interact.

Communication Partner Engagement by Host Utilities

Each utility that is participating as a host is responsible to select and engage the communication technology partner(s) of their choice to develop the CEA-2045 communication modules and system support needed to carry out the demonstration.

In some cases, the selected partner may be a load-managing company that has already independently developed a CEA-2045 module. In this case, the process is simpler but the utility may have less control over how the DR system functions and what use cases it can support. In other cases, the utility may reach out to a communication technology partner who does not have a compatible module and engage them in the process. In either case, the responsibility to procure the modules and system support for field demonstration is the utility.

Some utilities may want to evaluate multiple communication technologies. For example, a utility may wish to evaluate how these new DR-Ready appliances can be added into an existing load control program and work alongside other products that are controlled by a switch. The same utility may also wish to evaluate a 2-way AMI, cellular, or internet-based technology that is being considered for future use.

Although the general process for acquiring communication modules will be individual, the project participants will communicate regularly on this topic and will stay abreast of the status of

one another's activity. In some cases, multiple utilities may elect to approach a communication technology provider together. To the extent that this occurs, EPRI will support the development of a collective functional specification for how that system might meet the needs of the group.

Additional EPRI-Provided Communication Devices

The primary focus of the project will be based on the utility-identified communication modules described in the preceding section. These will enable products to be introduced into real existing and planned demand response systems and tested alongside other products. More diversity of communication technologies adds to the quality of the project in terms of assessing the sufficiency of the CEA-2045 standard to meet industry needs. EPRI will add to this diversity by producing a fully open standards-based module.

OpenADR 2.0b Wi-Fi Module

This module will be a Wi-Fi device, intended to connect to existing consumer-provided broadband systems. The module will utilize the OpenADR 2.0b protocol and will be compatible with an open-source OpenADR2.0b server that EPRI has produced and posted on SourceForge.

This module will be made available at cost to host-level participants in the project. This might be used in addition to other communication technologies in order to enable the utility to change communication systems midway through their field testing in order to assess the practicality of converting from one system to another.

The functional requirements for this communication module will be developed by EPRI and published. This will include the selected mapping from the OpenADR 2.0b protocol to the CEA-2045 commands. A third-party will be engaged to manufacture the product, but EPRI will have full rights to the design and will be able to make it available as a reference design following the project.

6

TECHNICAL SUPPORT AND MEMBER RESOURCES

The CEA-2045 standard was released in 2013 and there is little industry experience with its use at the present time. Manufacturers need tools and resources to aid in their development and utilities need methods and tools to aid in their assessment of products.

This project is supporting this need in several ways. To assist manufacturers with their new product designs, EPRI will provide support in the form of technical support and software/hardware tools. The technical support will be provided to the selected end-device manufacturers and all communication module developers selected by participating utilities. It will include general training on the CEA-2045 standard, education regarding utility functional response expectations, and serving as a conduit to the CEA R7.8 working group to carry manufacturer comments back to the standards organization.

CEA-2045 Simulation Software

The CEA-2045 Simulator is a desktop application developed to test the link and application layers of either an end device or communication module as illustrated in Figure 6-1.

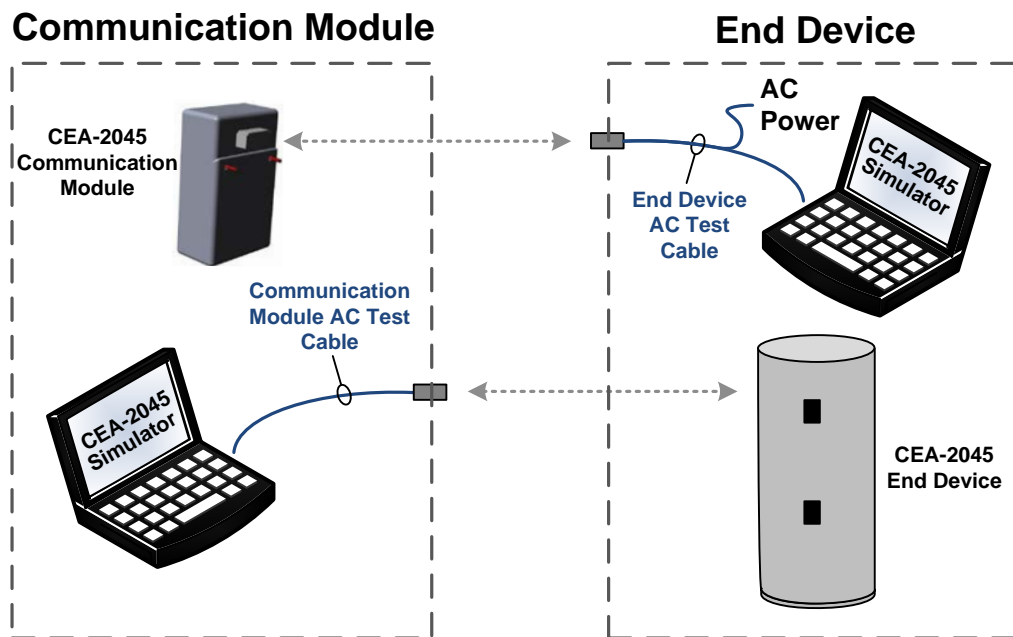


Figure 6-1
CEA-2045 Simulator Tool

Manufacturers of equipment will be able to use these tools to aid in product design and development. For example, a maker of a communication module could plug their device into a test cable and communicate with the PC tool as if that tool were an appliance. Similarly, a maker of an appliance could plug their product into a different test cable and communicate with the PC tool as if it were a communication module. The test cables are depicted in Figure 6-2.

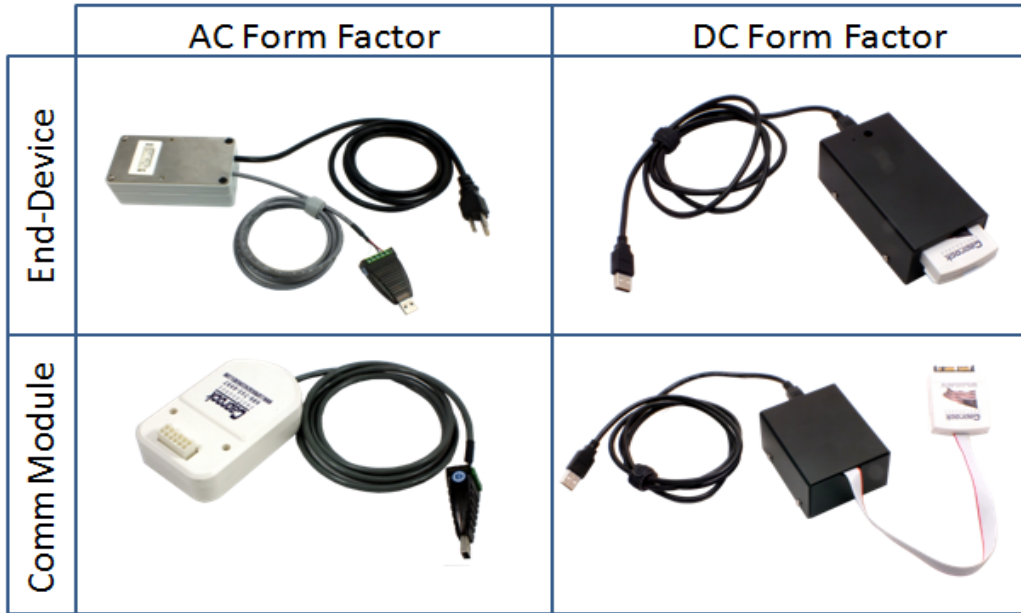


Figure 6-2
Test Cables

The software will present a user interface, as illustrated in Figure 6-2, through which the operator can test a wide range of scenarios. It will also provide a simple scripting capability that will allow a user to setup automated tests that run unattended and compile results in data files.

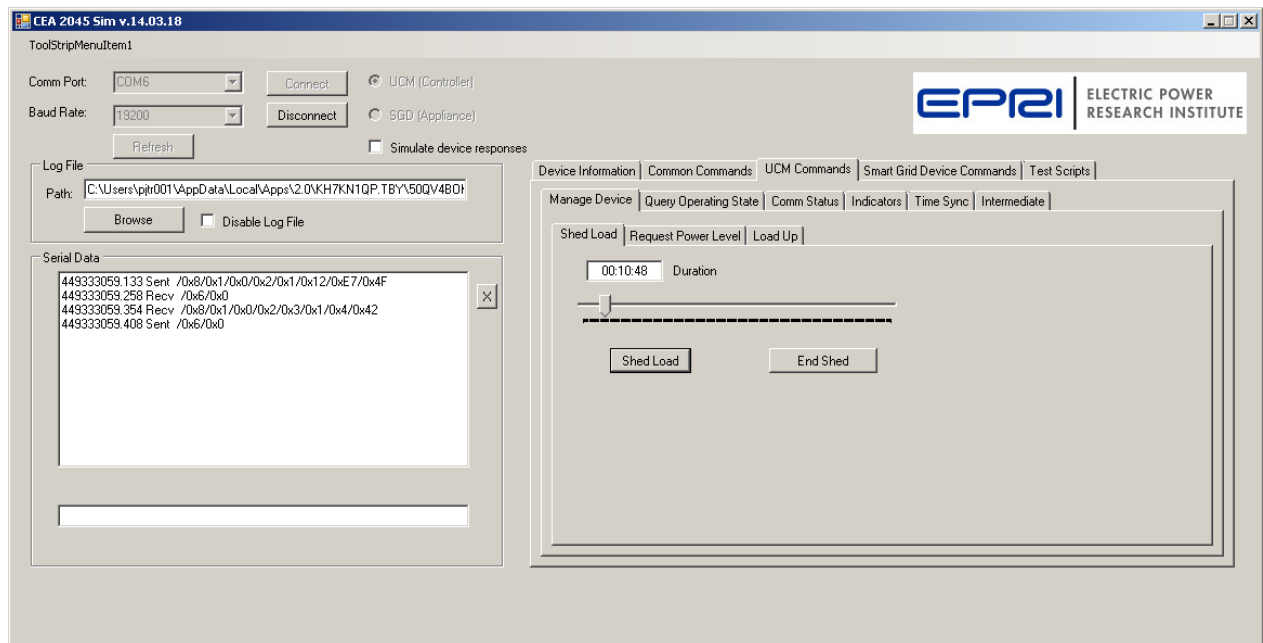


Figure 6-3
CEA-2045 Simulator User Interface

This software, including source code and test scripts, is being coordinated with the USNAP Alliance for potential use in device certification testing going forward.

7

LABORATORY PRE-CHECK AND INTEROPERABILITY TESTING

Prototype Pre-Check

EPRI will take receipt of early prototypes of products from manufacturers who are involved in the field demonstrations and will perform laboratory testing on these prototypes. The purpose of this testing is to accelerate the development of the products and to provide the manufacturer with early feedback regarding the design and behavior of their device.

These products are not expected to be considered “final,” but rather incomplete, and not yet debugged. The issues noted will be documented and provided back to the manufacturer privately.

In addition to aiding the manufacturer, this pre-check will be used to refine the EPRI test tools and test procedures in preparation for the next step.

Final Interoperability Testing

Prior to field deployment and testing all devices, and each combination of communication technology and end device, will be evaluated in a laboratory environment. The primary purpose of this testing is to identify any interoperability problems early and to streamline the field commissioning and testing processes.

Another purpose for the laboratory pre-check is to ensure that all interoperability problems are captured and the required corrections documented. For example, if two companies interpret the CEA-2045 standard differently, and implement a certain part differently, then their products may not connect and work properly. It is not sufficient for these two companies to discuss the issue and resolve it privately because this does not eliminate whatever ambiguity in the standard led to the issue in the first place.

During the lab pre-check and interoperability testing, each product (both end devices and communication modules) will be tested against a reference software. In addition, each combination of communication module and end device that will be field tested will be tested together for interoperability. All issues that are identified will be documented and presented to the CEA R7.8 working group along with recommendations to correct the issue.

8

FIELD TESTING

Each host participant will deploy, by default, 10 units of each product type that they choose to deploy. This quantity was selected in order to cover a range of field conditions, including weak signal or noisy environments from a communication perspective. It also allows for the engagement of a range of customer types, including some that are highly technical and others that are not.

Some host participants may elect to field a larger quantity immediately or shortly after seeing how the initial 10 units perform. To the extent that this occurs, it is a benefit to the project in terms of overall learning. To the extent that it is allowed, EPRI will work with these participants to track results and disseminate these findings back to the collaborative group.

Field Test Plans

EPRI will work with each host participant and their communication technology partners to document a field test plan. These plans will identify the range of demand response event types that will be tested, the expected results, the number of events, and the planned duration of testing. The test plan will ensure that the mechanisms that are needed to capture results and determine the success or failure of the testing are in place.

EPRI will provide each host with instructions to install and operate the equipment. The deployment plan will also include a data collection plan for quantifying the customer experience related to the installation of communication modules.

Field Monitoring System

To aid host participants with field performance assessment, EPRI will develop a field monitoring system. Each host participant will receive one of these systems for each end-device type that they are fielding. Because of aesthetics, hosts may elect to keep these systems in their laboratories or to use on a time-limited basis at field sites in order to test system performance without imposing on customers. As illustrated in Figure 8-2, this system will have two main parts:

1. A passive “sniffer” hardware that is inserted between a communication module and an end device to capture the communications being passed between the two
2. A central database that stores the data and makes it available to members.

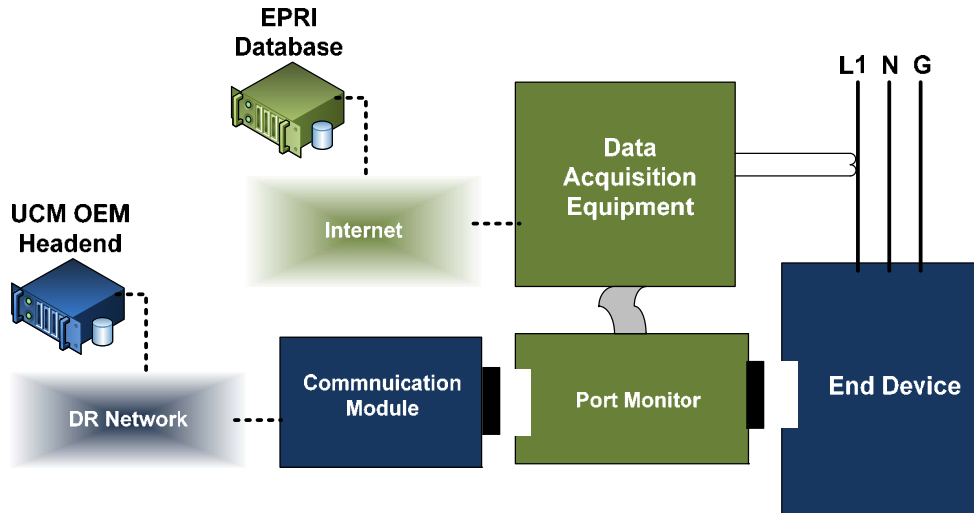


Figure 8-1
Data Acquisition System

In addition to passively monitoring the CEA-2045 communications, the data acquisition system also has the ability to monitor the power consumption of the end device via a clamp-on current sensor. The communications and energy consumption data are time stamped and stored in the same database for response verification purposes.

Assessing the Customer Experience

This project will include a direct assessment of the customer experience in terms of receiving and installing communication modules. At a limited number of sites, and with willing hosts and customers, the process from customer receipt of a communication module, through install, and enrollment/connection in a DR system will be captured. Videographers will capture the experiences and will provide members with an important data-point in terms of assessing the customer aptitude to self install communication systems. Some communication technologies may be simpler to commission than others.

9

ANALYSIS AND FINAL REPORTING

As field testing is carried out, the results will be analyzed and documented. This includes the findings regarding the basic claims of the CEA-2045 standard:

1. An end device can successfully interoperate with a wide range of demand response communication systems.
2. Customers can self-install communication modules without requiring a truck-roll or the assistance of an electrician.

A final report will be produced that rolls up the findings from each field demonstration, providing a broad view of the results and shedding light on the potential for mainstream retail compatibility of DR-Ready products enabled by this interface.

This report will include a function-by-function assessment of the compatibility (or lack thereof) of the CEA-2045 standard with the various demand response program aspects represented in the project. Part of the value for each utility participating is ensuring that their particular needs are represented in the standard and supported properly.

The report will also include an assessment of the performance levels observed in the field experiments. One benefit of a field demonstration over a lab assessment is that real noise levels and signal strengths are experienced. For example, the effects on RF signal propagation of a water heater tank nearby will be present and evaluated. In this way, the final conclusions will provide an accurate view of the compatibility of real devices in real field scenarios for the communication technologies that utilities are planning to use.

10

INDUSTRY COORDINATION AND ACCELERATION

On behalf of project participants, EPRI will be serving as a point of contact with a variety of industry organizations that are relevant to the CEA-2045 standard and its evaluation.

Consumer Electronics Association

EPRI will maintain membership in the CEA R7.8 standards organization, of which Working Group 1 (WG1) is responsible for the CEA-2045 standard. EPRI will track issues as they are identified by the project members and participating vendors, document recommended changes, and contribute these to the CEA-2045 WG1.

The CEA R7.8 WG1 remains active at the present time and is actively managing the 2045 standard. This field demonstration project is serving as a key point of feedback to this standards group, helping them to understand gaps and ambiguities in the initial release document and helping to identify any additional functionality that utilities require in order for the standard to meet their needs.

Air-Conditioning, Heating, and Refrigeration Institute (AHRI)

AHRI is the trade organization for manufacturers of HVAC systems, water heaters, and other end-use devices that are central to load management applications. AHRI is developing a draft specification for next-generation HVAC equipment, which will include variable-speed capabilities and communication interfaces. A working group has been formed to focus on the communication aspects of this standard. In coordination with the Consortium for Energy Efficiency (CEE), EPRI is representing the needs of the utility industry in this forum, including the use of the CEA-2045 modular interface to enable compatibility with the wide range of demand response systems that are needed to serve market needs.

USNAP Alliance

The USNAP Alliance proposes to serve as the interoperability testing certification authority (ITCA) for the CEA-2045 standard. The existence of a healthy and well-funded ITCA is critical to the success of any standard. Long-term, the funding for such an organization will come from manufacturers who are paying members or who pay to submit products for certification testing. At the present time, however, utility participation is also needed to support the development of the certification processes and to point potential manufacturers to that organization. All project members will be encouraged to join the USNAP Alliance. EPRI continues to coordinate project activities with the USNAP Alliance and will be contributing the test tools and software that are developed as part of the project.

Association of Home Appliance Manufacturers (AHAM)

The Association of Home Appliance Manufacturers is the trade organization for manufacturers of a wide range of consumer white goods. AHAM and several of its members were actively involved in the development of the CEA-2045 standard and constituent elements. AHAM also

works closely with the Environmental Protection Agency (EPA) in regard to EnergyStar criteria. In recent years, this has included the development of criteria for “connected” appliances.

Through this project, EPRI provides ongoing coordination with the EPA in this regard. Although no AHAM-related products are initially planned for this field demonstration project, it is possible that they will become involved during the course of the work.

NIST Home to Grid Domain Expert Working Group

The NIST Home to Grid Domain Expert Working Group (H2G DEWG) is an open forum of experts focused on identifying needs and advancing the state of the industry in terms of getting consumer devices and premises effectively interacting with power systems. This group played a key role in the 2010 to 2012 timeframe in the development of the CEA-2045 standard. The H2G DEWG continues to perform work in this area and identifies new functional interests that could impact the CEA-2045 standard going forward. EPRI participates in the H2G DEWG and represents the needs and findings of this field demonstration in that forum on behalf of the participants.

IEC / ISO JTC1

The IEC/ISO JTC1 is actively pursuing the international standardization of the CEA-2045 specification. This field demonstration project is supporting this activity and helping to provide answers to questions as they are raised by the working group.

EchoNet Consortium

The EchoNet Consortium is a Japan-centric group of manufacturers and other stakeholders that developed and manage the EchoNet family of standards. These standards, which originated with a focus on home automation, define a modular interface that is similar to CEA-2045. Through this field demonstration project, EPRI is serving as the liaison between the EchoNet Consortium and the CEA R7.8 WG1. In this capacity, EPRI presented a formal request to the CEA to add support for transparent pass through of the EchoNet Lite protocol over the CEA-2045 interface. This request was approved in early 2014 and is reflected in the first addendum to the CEA-2045 standard.

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