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OEM/SAE International Standards Consolidated Comments

Additional submitted attachment is included below.

OEM/SAE International Standards Consolidated Comments to CEC VGI Communications Standard Workshop 7 Dec 2016

Represented Automaker: Fiat-Chrysler Automobiles (FCA) and Chair of the SAE International Standards for the "Hybrid Communication and Interoperability Task Force" and active member of the "ISO TC22/SC31/JWG1 V2G CI" that is the Joint Working Group (JWG) updating ISO/IEC 15118 ED 2

Note: Other technical specialist comments are included along with other OEMs but none are able to obtain Logo approval in this additional week allowed to comment on this Docket: 16-TRAN-01.

The intent of this submission is to not deviate from the OEM consolidated response #214793 submitted to the CEC on Dec 14, 2016 wherein the OEMs support the initiation of a Standards Technical Working Group and more emphatically state that a standard EVSE communications protocol is not the barrier to VGI implementation, that the real need is access to revenue generating contractual VGI programs to justify the investment by stakeholders. FCA supports these stated positions.

The purpose of these comments is to provide added detail and clarification on the following:

Part 1: Clarify the definition and differentiation between the terms EVSE and Charger which has implications on the understanding of how the standards are applied; and to address the variations and implications of Pricing, Payment, and Billing functions within the SAEJ2847 and ISO/IEC 15118 standards.

Part 2: Need to conduct a Standards Technical Working Group that focuses on the development of a VGI interface and communications architecture that includes Distributed Energy Resource (DER) integration and that provides the framework for evaluation and understanding of the technical attributes of SAE J2847 for VGI, and technical understanding of how ISO/IEC 15118 is applied. Table and Figure 1 are used to illustrate this.

Part 3: Provides an alternative standard to what is being proposed; that is based upon US Smart Grid Architecture, Practices and Tariffs; and which has been developed over the past 10 years with direct participation by US Utilities and all global automakers. Figure 2 is used to illustrate how this standard relates to the other SAE standards for a complete suite.

Part 1: Definitions that require clarification

1. The terms Charger and EV Supply Equipment (EVSE) are being used interchangeably but in fact have different roles in the electric vehicle charging control process. between the PEV and the EVSE versus the PEV and the DC Charger
    a. Role of the PEV with the EVSE for AC charging: With AC charging the charger is *on the* vehicle and commonly referred to as an On-Board Charger Module (OBCM). Consequently, for AC charging (focus of most of the VGI use cases and public infrastructure deployments), the essential role of the EVSE is that of a 'safe connection facilitator' or a glorified contactor with GFCI capability – nothing more. Charging is controlled by the vehicle to the limits of the circuit. The EVSE only provides safe transfer of power from the grid to the vehicle using SAE J1772 analog communications or PWM over the pilot wire.
    b. Role of the PEV with the Charger for DC Charging: With DC charging, the charger is off-board and integrated into the DC Charger, the OBCM (on the vehicle) is bypassed. DC Charging requires communications between the PEV and the Off-Board Charger. The charging is controlled by the vehicle through direct closed loop communications with the DC off-board charger using DIN SPEC 70121:2014 communications (Application for US Combined Charging Systems).
2. Price, Payment and Billing System
    a. The assigned commissioner ruling states "The utilities should conform their specific infrastructure, pricing, or incentive programs and supporting communications, metering, and billing system to the latest release of the ISO Standard based on the utilities' proposed deployment schedules.", however some of these elements are outside the scope of 15118 and it is not clear how a utility can insure any of this conforms using 15118 for the following reasons.
        i. Pricing from the utilities, such as Real Time Pricing, Critical Peak Pricing, Time of Use pricing, and energy market or transactive energy pricing, is the primary basis for smart or managed charging, providing this information to PEV Drivers is needed for determining the optimal cost and time to charge. Pricing is affected by grid conditions, demand, source, and supply; and can change dynamically hour to hour. This information is needed to be able to plan charging in terms of the PEV driver's preferences and the vehicle's needs. Pricing for electricity may not be the basis for cost of charging to the PEV driver in many non-residential scenarios, but is always relevant to the

customer who owns the meter who will expect PEV drivers to charge accordingly. Utilities are revamping their pricing tariffs to better reflect the actual cost of electricity on a real-time basis, and will be a core factor in the VGI architecture and communications structure; and with its effect on energy usage behavior will be critical to optimizing VGI load management processes. Payment and billing system is the customer authentication, authorization, and back end clearing house processes for billing for the cost of charging. It is virtually irrelevant to the process of managed charging for VGI load management services. Payment is only relevant in a limited number of use cases such as public charging and should not be a function of the EVSE or DC Charger, but of a secure back-office server designed for customer processing and billing.

ii. ISO/IEC 15118 and DIN SPEC 70121:2014, (used for all US DC Chargers and PEVs with the Combined Charge System (CCS)), is more about Payment, **not** Pricing that includes any acknowledgement back to the utility on the actual energy session period, based on price, DR, power level and other factors critical to grid load balancing. Because of this it is not clear nor understood how ISO/IEC 15118 adequately supports any variable for the pricing function and information processing requirements for VGI load management during the charging session.

b. SAE J2847 uses the IEEE 2030.5 (SEP2.0) Price Function supports all the US type of Utility rates and is compliant for achieving the VGI principles and meeting VGI technical criteria. Payment functions are supported in IEEE2030.5 and can be implemented by any service provider back-office.

Part 2: Encourage the CEC and CPUC to do the following:

1. FCA fully supports the implementation of an interoperable PEV infrastructure, and recommend the California regulatory agencies do not mandate any standard at this time without appropriate due diligence driven by a sound collaborative process similar to Rule 21 process.
2. FCA is opposing any legislation and/or regulation of only one solution between the PEV and EVSE that imposes unnecessary cost to the EVSE and limits the development of future applications including telematics and other protocols; and take strong exception to the specific request made in another comment filed to this Docket: 16-TRAN-01 log, TN # 215105 specifically *prohibiting* the inclusion of IEEE 2030.5 (referred to also as SEP2.0); IEEE 2030.5 is the *only* protocol *today* that

enables all of the VGI and smart inverter communications that meet utility end to end cybersecurity requriements as specified in NISTIR 7628 and the NIST NA Smart Grid Architecture.

3. Insist that any of the use cases and features for communication within the IEEE 2030.5 standard can be applied wherever applicable and should not be restricted just as AC or DC or Wireless charging, is offered openly, and without restrictions to vehicle customers.
4. Provide a progression of programs that build on existing Smart Energy Protocol 1.x (SEP1.x) use cases. Consider implementing this for three price programs including Time of Use, Critical Peak and Real Time Pricing and metering functions, which have been included in IEEE2030.5. This will be for planning energy sessions. Further, implement Demand Response Load Control programs for adjusting loads when issues still arise due to frequency, voltage and temperature variations in local areas.
5. Add functionality for optimized charging including FlowReservation that handshakes the Time Charge Is Needed (TCIN) with Energy and Power desired between the utility and vehicle for the charge session. DER (Smart Inverter Functions) and DER Interconnection specified in SAE J3072 which are not supported by ISO/IEC15118. DER and FlowReservation include the required acknowledgements from the vehicle back to the utility and can dynamically adjust the load on the grid during the session.
6. Do not mandate any protocol requirements against AC EVSE and instead define an architecture, that defines the EVSE as an internet and communication bridge node, which allows future VGI protocols to be added without modification to the EVSE. This has been demonstrated by the success of the mobile phone, which supports new protocols and different applications every day without modification to the WiFi, Cellular or Bluetooth Infrastructure.
7. If CEC or CPUC are compelled to define a single solution set at this time, then we identify and support one International Standard (SAE J2847™) based upon IEEE2030.5, which can be deployed over any physical media, including HP-GP to the EVSE and directly from the PEV to the Utility over Cellular, WiFi or any future Wireless Technology. This meets 100% of the utility and customer needs and is fully compliant with all current CA rulings and regulations including Federal NIST architecture and security criteria. It also provides the means for local Energy Management within a home or business or any public location for a multitude of

loads in addition to vehicles. Finally, it can be used to fully support the CPUC's Demand Response (DR) and DER (Rule 21) initiatives. This standard and the interaction to use cases, protocol and interoperability is shown in Figure 2 at the end of this document.

Part 3: The represented OEMs and Utilities:

1. Fully support the implementation of the international standard SAE J2847™ for AC, DC and Wireless Power Transfer (WPT) and vehicle to grid communication in the USA;
    a) J2847 includes messages and signals generated from the Use Case requirements from J2836™, launches into the overall system requirements, various wired and wireless protocols and security in J2931, interoperability in J2953 and the DER interconnect requirements for an on-board inverter in J3072 which is fully compliant with CA Rule 21 communications and advanced inverter functions. This effectively enables every PEV equipped with bidirectional power AC inverter to be a smart inverter and will meet the utility interconnection requirements. CEC 14-086 project in which both EPRI (Prime) and Fiat Chrysler Automotive (As well as Honda R&D America) are participants will demonstrate this functionality – in 2017. SAE J3072 is an application layer protocol extension of IEEE 2030.5, which also is the basis for all J2847 AC charging communications, and enables all of the VGI use cases today. IEEE 2030.5 and J2847/1, J2836/1 and J2931/1 have been demonstrated on several DoE sponsored OEM / EPRI programs (five OEM programs to be precise, involving over 350 PEVs in operation).
    b) J2847 includes the communication for end-to-end vehicle to utility energy transfer, for planning and dynamic acknowledgement for the session, both prior to and during the event to optimize charging at home, Multi Family Dwellings, fleet, business and public locations using SEP2.0 while still meeting the customer expectations and avoiding cost to the utility and customer that Demand Charges may impose by balancing loads with energy available

c) J2847 and IEEE 2030.5 have been implemented and field tested at CA IoU's; and the DER and Local DER Interconnection is a current CEC project

2. FCA will gradually fit their production vehicles with the additional features in J2847 as the PEV population increases, as load balancing is more prevalent with extended range vehicles and as higher power charging levels are available;

3. We understand the technology development is at such a quick pace that it is too early to legislate a single communication standard

Tables and Figures:

			Included (capable)				
			Price	Payment	Billing	DRLC	DER
SAE J2847	AC L1	PEV	Yes	No	No	Yes	No
		EVSE	Yes	No	No	No	No
	AC L2	PEV	Yes	No	No	Yes	Yes
		EVSE	Yes	No	No	Yes	N/A
	DC L2	PEV	Yes	No	No	Yes	Yes
		EVSE	Yes	No	No	Yes	Yes
ISO/IEC 15118	AC L1	PEV	N/A	N/A	N/A	N/A	N/A
		EVSE	N/A	N/A	N/A	N/A	N/A
	AC L2	PEV	No	Yes	No	Yes	Limited**
		EVSE	No	Yes	No	No	N/A
	DC L2	PEV	No	Yes	No	Yes	Limited**
		EVSE	No	Yes	No	No	N/A
* Europe only has 230VAC (single phase or 400V three phase) AC L1 is not included in their options							
** Reverse power only							
N/A = Not Applicable							

Table 1

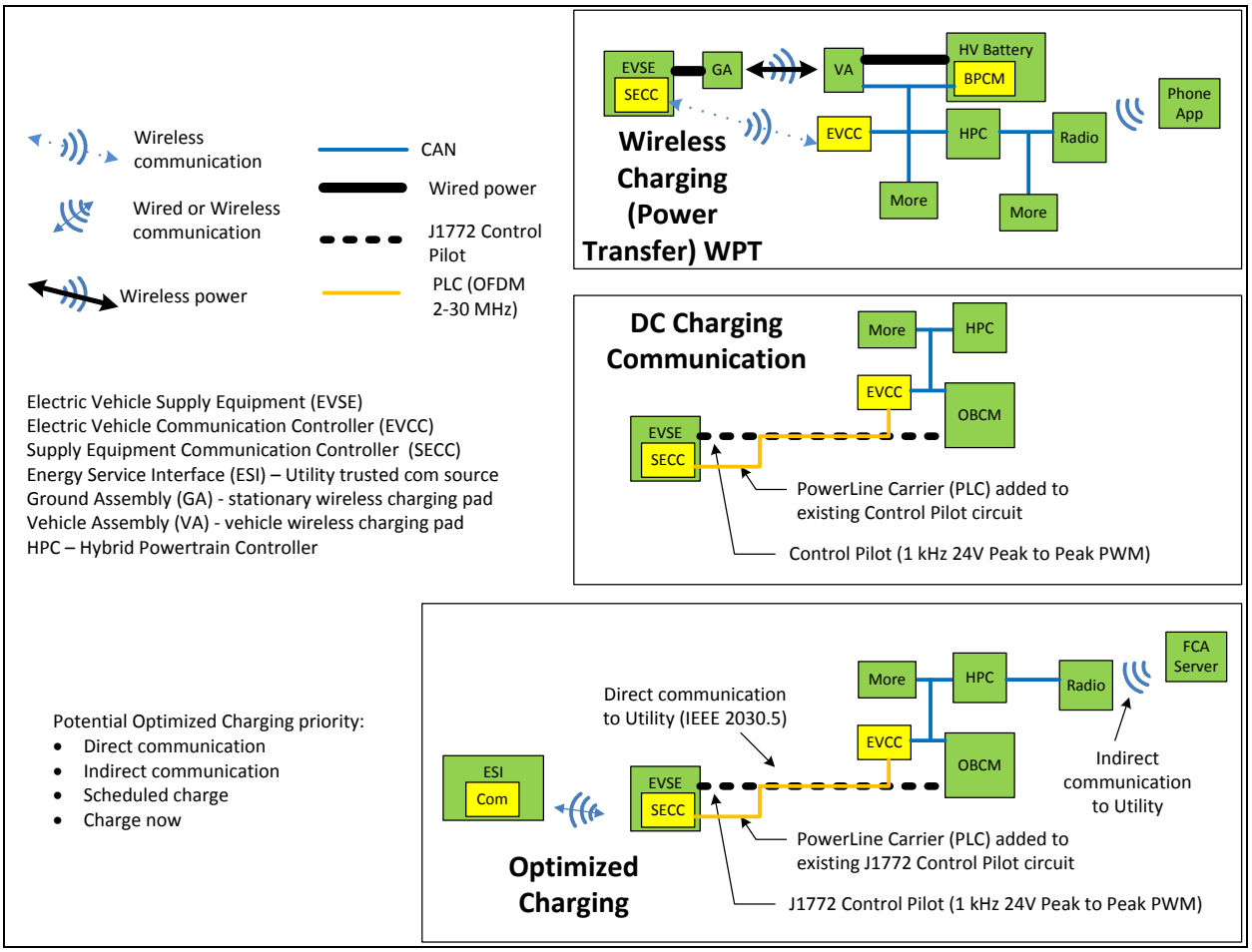

Figure 1 – Communication Diagram

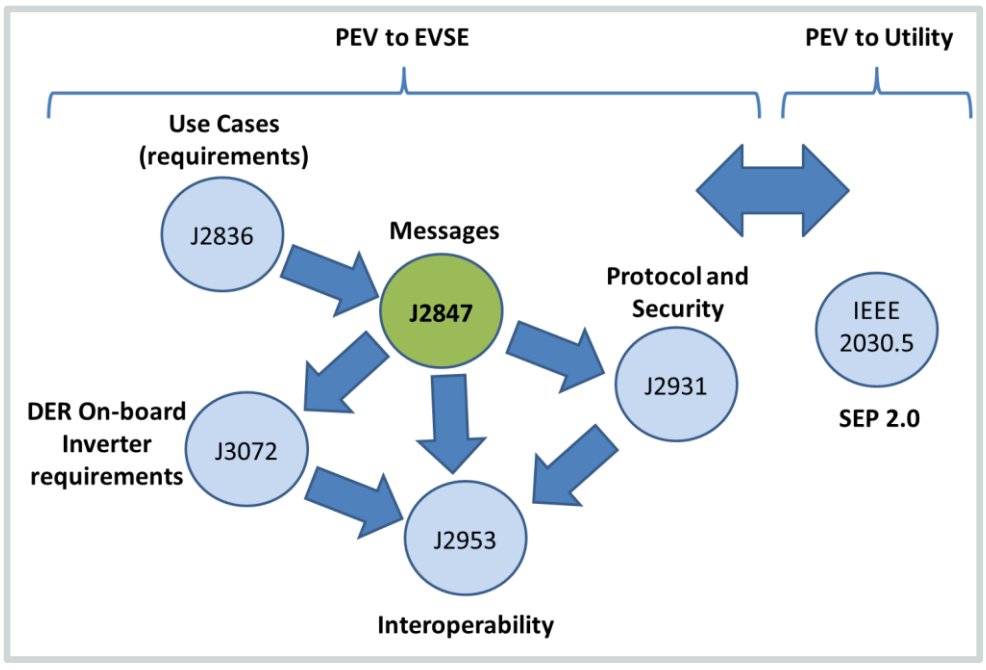

Figure 2 – J2847 Diagram