BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

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Application of Consumers Power Alliance; Public Citizen, Coalition of Energy Users; Eagle Forum of California; Neighborhood Defense League of California; Santa Barbara Tea Party; Concerned Citizens of La Quinta; Citizens Review Association; Palm Spring Patriots Coalition; Desert Valley Tea Party; Menifee Tea Party; Hemet Tea Party; Temecula Tea Party; Rove Enterprises, Inc.; Schooner Enterprises, Inc.; Eagle Forum of San Diego; Southern Californians for Wired Solutions to Smart Meters; and Burbank Action for Modification of D.08-09-039 and a Commission Order Requiring Southern California Edison Company (U338E) to File an Application for Approval of a Smart Meter Opt-Out Plan.	)	Application 11-07-020

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) RESPONSE TO ADMINISTRATIVE LAW JUDGE'S RULING SEEKING CLARIFICATION

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SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) RESPONSE TO ADMINISTRATIVE LAW JUDGE'S RULING SEEKING CLARIFICATION

I.

INTRODUCTION

Pursuant to the Administrative Law Judge's (ALJ) October 18, 2011 Ruling Seeking Clarification (Ruling), Southern California Edison Company (SCE) submits the following responses to the eleven questions included in the Ruling. SCE and SCE's meter vendor, Itron, have collaborated in responding to the Ruling. The data provided in this response will vary for individual meters but, taken as a whole, is representative of the salient operational characteristics of the Edison SmartConnect system.

Consistent with the specific responses to the ALJ's questions, the fundamental characteristics of SCE's meter operation and radio-frequency (RF) signal generation are as follows:

1. The Edison SmartConnect meters operate throughout the day and communicate with the SmartConnect network. Each RF signal provides communication that is measured in milliseconds, and the total aggregate transmission time for each meter is a very small fraction of the day.
2. RF exposures from smart meters are similar or weaker in strength than those from other common devices, such as Wi-Fi networks, baby monitors, and cordless phones.
3. The Edison SmartConnect meters comply with Federal Communications Commission (FCC) regulations by wide margins. In addition, the Electric Power Research Institute (EPRI) published a report in December 2010, which provides more exhaustive technical analysis of smart meter RF emissions and is a recommended reference for further information.[1]

II.

RESPONSES TO RULING QUESTIONS

Question 1:

What is an average duration (in seconds) that a residential smart meter transmits in a 24-hour period?

SCE Response of Question 1:

The Itron OpenWay® residential meter's average transmit duration is 62.9 seconds in a 24-hour period. This consists of an average of 53 seconds of transmission time for the Radio Frequency

[1] Available on EPRI's website: "An Investigation of Radio Frequency Fields Associated with the Itron Smart Meter," December 2010 #1021126

Local Area Network (RF LAN) radio (*e.g.*, scheduled reads, unscheduled activities, and network overhead), and 9.9 seconds for the ZigBee radio (*i.e.*, idle meter with no HAN devices connected).

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 1a:

How is this average computed or measured?

SCE Response to Question 1a:

The RF LAN duration was derived from empirical data collected using a large, representative Itron OpenWay meter deployment sample. The total transmit time for the sample of over 6,800 meters was collected and the average was calculated. The 24-hour period was representative of normal network operations with daily reads, unscheduled events (*e.g.*, alarms, alerts, interactive reads, etc.), as well as representative of firmware downloads and network overhead.

The sample ZigBee data is based on measurements taken in Itron labs. Itron has estimated a maximum transmission time of 864 seconds for the ZigBee radio based on up to 8 devices being attached to a single meter. Current deployments are typically zero or one device per meter, which results in an average ZigBee transmission time of 9.9 seconds.

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 2:

How many times in total (average and maximum) is a smart meter scheduled to transmit during a 24-hour period?

SCE Response to Question 2:

SCE has three to four scheduled transmissions from each residential meter in a 24-hour period. In addition, meters transmit signals amongst each other to keep track of its communication paths and topology. The average and maximum transmissions are listed in Table 1 below.

Table 1:
Residential Smart Meter Radio Transmission Statistics (24-hour period)

	Average Daily Number of Transmissions	Average Daily Transmission Time	Maximum Daily Transmissions[2]	Maximum Daily Transmission Time
RF LAN Radio	1,268	53 seconds	25,916	68.3 minutes[3]
ZigBee Radio	5,768	9.9 seconds	No change as currently deployed	No change as currently deployed

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 2a:

How many of those times (average and maximum) are to transmit electric usage information?

SCE Response to Question 2a:

SCE typically schedules an average of two and a maximum of three reads for electric usage data in a 24-hour period for residential meters.

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

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[2] Only a small percentage of the meter population will transmit near the maximum value. 97% of the meters in this data sample transmitted fewer than 2,500 times in a 24-hour period.

[3] *See* EPRI Report, "An Investigation of Radio Frequency Fields Associated with the Itron Smart Meter," December 2010 #1021126 [Figure 12-6, Section 12-8].

Question 2b:

How many of those times (average and maximum) are for other purposes? What are those other purposes?

SCE Response to Question 2b:

SCE schedules one read in a 24-hour period to support system performance and diagnostics.

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 2c:

Please specify number of times (average and maximum) by type/category of transmission?

SCE Response to Question 2c:

A detailed analysis of the type and category of transmissions has not been completed. However, on average, 10% of transmissions are for meter data (scheduled and/or on-demand) and 90% of transmissions are for network command and control (synchronization, security, data integrity and self-healing).

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 3:

Under what scenarios does a meter transmit outside of the daily schedule, *i.e.*, unscheduled transmission such as on-demand read, tamper/theft alert, last gasp, firmware upgrade etc.?

SCE Response to Question 3:

Unscheduled transmissions may occur for on-demand meter reads (each event generates one downstream and one upstream packet),[4] tamper/theft alerts (each event generates one upstream packet), "last gasp" alerts (each meter sends SCE three last gasp messages during a power outage), and firmware downloads (typically performed once per year and expected to add approximately 2% additional network command and control).

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 4:

Typically, how much of the communication between the customer's meter and the utility is unscheduled vs. scheduled?

SCE Response to Question 4:

Approximately 90% of the communications between customers' meters and the utility is based on scheduled data requests, and 10% of communications are for unscheduled data requests.

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

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[4] "Packets" are requests and responses. An upstream packet is a packet sent to the Utility, and a downstream packet is a packet going to the meter.

Question 5:

Are there any other factors that go into determining duration and/or frequency of meter transmissions (*e.g.*, if a meter can't access the network when it's trying to send data, type of a meter etc.)? If yes, please identify these factors.

SCE Response to Question 5:

Yes. When meters first join the network, the meters go through a sequence of up to three discovery phases to find the network and neighboring devices. During the first two phases, the meter may transmit up to 255 seconds. During the third phase, if the meter has not yet joined the network, the meter may transmit once per hour, up to 25 seconds per day. Once the meter has joined the network, the meter will transmit consistent with the information included in the response to Question 1.

Prepared by Simon Pontin, Chief Technology Officer, Itron

Question 6:

What is the amount of RF emission at the source when a meter is transmitting data (instantaneous maximum peak level, averaged over 30 minutes)?

SCE Response to Question 6:

The instantaneous maximum peak level, averaged over 30 minutes for the RF LAN radio, is 21.0 milliWatts. For the ZigBee radio, the instantaneous maximum peak level, averaged over 30 minutes, is 2.3 milliWatts. In addition, the total transmitted power for the OpenWay meters is listed below.

RF LAN Radio:

- Conducted Transmitted Power: 267.3 milliWatts
- Antenna Gain: 1.66 times (2.2 dB)

- Total instantaneous Transmitted Power: 443.7 milliWatts

ZigBee Radio:

- Conducted Transmitted Power: 82.6 milliWatts
- Antenna Gain: 2.75 times (4.4 dB)
- Total instantaneous Transmitted Power: 227.5 milliWatts

Prepared by Simon Pontin, Chief Technology Officer, Itron

Question 7:

Does the amount of RF emission vary depending on duration of transmission/volume of data being sent? For example, are RF emissions higher when there is a larger volume of data to be transmitted?

SCE Response to Question 7:

No. The transmitted power is fixed at the levels as shown in the response to Question 6.

Prepared by Simon Pontin, Chief Technology Officer, Itron

Question 8:

Are there any other factors that impact the amount of RF emissions? If so, please identify the factor(s) and its impact on RF emissions.

SCE Response to Question 8:

No. The factors that impact RF emissions are discussed in the previous responses.

Prepared by James Cherrie, Director, Edison SmartConnect Deployment

Question 9:

Is there RF emission when the meter is not transmitting? If yes, what is the amount of RF emission?

SCE Response to Question 9:

Yes. Although the smart meters' RF antennas will not generate RF signals when the meter is not transmitting, like all solid state electronic devices (*e.g.*, televisions, computers, DVD players, etc.), smart meters create low-level, incidental RF fields due to processor clock signals and power supplies. These types of unintentional emissions have limits set by the FCC in the Code of Federal Regulations, Title 47, Part 15 (47 CFR 15), Subpart B, Class B Devices. Itron's products are tested and validated to be compliant with these FCC requirements.

Prepared by Simon Pontin, Chief Technology Officer, Itron

Question 10:

Is there a difference in the amount of RF emissions for a wireless smart meter with the radio off and a smart meter with the radio out? If yes, what is that difference and how is it calculated?

SCE Response to Question 10:

No. The smart meter's radio does not transmit when it is turned off. The low-level unintentional RF fields from the meter's solid state electronics will remain virtually unchanged with the radio turned off or removed.

Prepared by Simon Pontin, Chief Technology Officer, Itron

Question 11:

Is there a difference in the amount of RF emissions for a wireless smart meter with the radio off and an analog meter? If yes, what is that difference and how is it calculated?

SCE Response to Question 11:

Yes. Smart meters are solid state electronic devices and analog meters are electro-magnetic devices. Thus, their RF emissions would likely be different. To SCE's knowledge, no study has been undertaken to determine the actual difference in RF emissions. However, both devices do comply with the same FCC regulations: Code of Federal Regulations, Title 47, Part 15 (47 CFR 15), Subpart B, Class B Devices.

Prepared by Simon Pontin, Chief Technology Officer, Itron

III.

CONCLUSION

SCE respectfully submits this response pursuant to the ALJ's October 18, 2011 Ruling Seeking Clarification.

Respectfully submitted,

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