

Some Thoughts on the Proposed ENERGY STAR Telephony Test Procedures

Definitions

A generic definition for a **Telephone** has been added. An explicit statement is made that the term applies to VoIP, Analog, and Cellular telephones and to Answering Systems and Combination Units.

New definitions have also been added for Analog Telephone (connects to an RJ11 jack), IP, VoIP, and VoIP Telephone.

The Corded Telephone and Cellular Telephone definitions no longer have an explicit statement that they are not covered by the specification.

The corded telephone definition does explicitly say that it also covers corded telephones with integrated answering systems, although cordless phones with integrated answer systems are treated as a separate category (Combination Units).

There are several new **Operational Mode** definitions.

The term **Partial On (Sleep) Mode** replaces Standby Mode and refers to when the phone is connected to ac power with fully charged batteries (if applicable) and is capable of making or receiving a call (e.g., connected to the telephone line or Internet) but is on hook.

The term **On Mode** replaces Active Mode but has several sub modes:

Idle Mode is used to describe the condition in which the phone is connected to ac power and is off hook receiving dial tone. This is likely to be a source of confusion since the term Idle State is traditionally used in telephony to mean the phone in on hook.

Operation Mode is used to describe the condition where the phone is connected to ac power and transmitting or receiving voice signals, including playing and recording answering system messages.

Charging Mode, as the name implies, is when the phone is connected to ac power and charging a battery. Presumably the phone is on hook, although that is not explicitly stated.

There is also a definition for **Off Mode** to describe the condition where the phone is connected to ac power but not in a Partial On (Sleep) Mode or one of the On Mode states. This evidently means the phone is not connected to the phone line or the Internet.

All of these Operational Mode definitions are drawn from a naming structure described in proposed standard IEC 62542.

Since coverage for VoIP Telephones is being added, there are several new definitions under the category of **VoIP System Equipment**.

These definitions include **Session Initiation Protocol (SIP)**, **Power over Ethernet (PoE)**, and **Power Sourcing Equipment (PSE)**. PSE is the equipment that provides PoE. Since SIP is the only VoIP protocol mentioned, this document seems to exclude other VoIP protocols such as Megaco, H.323, etc. I am not that familiar with all of the protocols currently being used for VoIP services. Is this an issue?

The definition for **External Power Supply (EPS)** indicates it is "designed to convert line voltage ac input from the mains to lower dc voltage(s)." While some EPS do provide a dc output voltage, many of those

used in telephony provide an ac output voltage instead. Thus “lower dc voltage(s)” needs to be changed to “lower ac or dc voltage(s).”

Finally, the concept of a **Product Family** is introduced with examples being given of products that only vary from one another in terms of their color or housing. During the last few months of last year when companies could still make direct submissions on products for approval, I put together an argument that says Product Families should also include multi-handset telephone families where the family consists of one base unit with its cordless handset and N-1 additional handsets, each with its own charging unit, to form an N handset system. Obviously the base unit with its handset must meet the energy usage requirement for that configuration and each of the additional handset with charger units must meet its energy usage requirement. But there is no sense in having to make separate submittals for 3, 4, 5, etc. handset systems where each of the additional handsets are identical. I want to see this explicitly added as an example of a Product Family.

Products Covered

The elimination of the explicit statement that corded telephones and cellular telephones are not covered by this specification seems to imply that they can be included. This makes sense for corded telephones that connect to ac power, including those with integrated answering systems. The test procedures for them would be the same as for cordless phones or cordless combination units. Could they also be intending to apply this specification to cellular phones? The only test for “analog” phones is to measure power consumption with a fully charged battery and the phone on hook. I suppose that could be applied to cell phones as well. We need to get both of these points clarified, and if it applies to cell phones, we have a lot of additional affected parties who need to be made aware of it. [Note: EPA stated during the 10/4/2011 that cell phones are not to be included in the Telephony Program. Instead, they are being included under the Battery Charger Program.

Test Conditions

Clause 2 of the document says the test procedures in Sections 4-6 apply to all products, while those in Section 7 apply to VoIP phones and those in Section 8 apply to VoIP phones “with computer connectivity.” There is no definition of exactly what this term means.

Section 4 references IEC 62301, 2nd Ed and says the test setup and test equipment shall comply with it unless otherwise noted. I guess we all need to go buy that document. This section covers standard items like the voltage and frequency of the ac power source used, environmental test conditions, power meters, and measurement accuracy.

The document raises a concern about PoE power meters and whether they have sufficient accuracy for the tests. The required measurement uncertainty is to be less than 5% (or 0.1 W for values less than 0.5 W), at the 95% confidence level. Note that this means the uncertainty requirement changes from 0.1 W at 0.5 W to 0.03 W at 0.6 W. It only gets back to an allowance of at least 0.1 W for values that are 2.0 W or higher. And these constraints apply for conventional AC power meters as well as PoE power meters. Also, there are no specific instructions about how to determine whether the criteria is being met at the 95% confidence level. Does test equipment have specifications on the confidence level of their results?

Section 5, which applies to all products, indicates that all batteries are to be fully charged at the beginning of the test and are to remain in place throughout the test. A question is raised as to whether the infrastructure requirements for testing VoIP phones are likely to place an undue burden on test houses.

The equipment is supposed to be allowed to stabilize for 5 minutes after all connections are made before beginning the testing.

For PoE measurements, the requirement is to report the average reading if “the difference in power between any of the seven readings and their average is less than 10% of the average value.” I expect what they really mean is to report the average value if the difference between **each** of the readings and the average is less than 10% of the average. Example: suppose the readings are 2.0, 2.2, 2.4, 2.5, 2.6, 2.8, and 3.0. The average value is 2.5 and 10% of the average value is .25. So 3 of the 7 readings are within 10% of the average value. But has the system settled down to a stable value? The next part of the PoE procedure does say that if the difference between any of the 7 readings and the average is greater than or equal to 10% of the average (4 cases of this in the above example), then additional measurements are to be taken until the criteria is met. This supports my contention that the first statement is wrong.

For non PoE equipment tested using an AC power meter, the requirement is to simply sample at a rate of 1 reading per second or greater and to report the average value over a 1 minute period. There is nothing mentioned about checking to make sure a stable reading is being obtained and that a continued drift in values as illustrated above is not present.

Section 6 covers the actual measurements to be made for all phones.

Subsection 6.1 is labeled “Unit Under Test (UUT) Preparation”. Step 4 says to verify there is a dial tone, and step 5 says to use the speaker if a phone has no handset, but to turn the volume down so that the dial tone is barely audible in order to “limit the impact of the speaker on the testing conditions.” Step 6 then talks about measuring the ac power input voltage and frequency. Are these preliminary voltage and frequency measurements to be made with the phone off hook drawing dial tone? That seems to be the implication, but read the following.

Subsection 6.2 deals with measuring the Partial On Mode Power. This this is the old Standby Power measurement. The directions clearly indicate the phone is to be on hook and the speakerphone is not to be activated. This is also the only test specified for non VoIP phones. So, is the new procedure for cordless phones that connect to telephone lines essentially the same as the existing procedure? That is, an on-hook test with a fully charged battery? And are we to report power usage on hook while also reporting input ac voltage and frequency measured off hook drawing dial tone. I don’t think it will any difference in the values, but it certainly seems inconsistent.

Section 7 covers test procedures for VoIP phones and requires an additional measurement in the Idle Power mode (i.e., with the phone off hook and receiving dial tone). A note is included about dial tone perhaps not lasting for the duration of the test and asking if measuring energy consumption during a representative conversation might be more suitable. My guess is that the energy consumption in all off-hook modes, whether the phone is receiving dial tone, a conversation is taking place, or the phone is just off hook on a silent line, is going to be about the same. Would someone who is closer to actual product design care to comment on this?

I also have to ask why it is important to measure the power with the phone in some off hook mode for a VoIP phone but not for “analog” phones (e.g., corded, cordless, answering systems and combo units).

Section 8 requires measuring the power consumption of “VoIP Phones with Computer Connectivity” by connecting the phone to a personal computer, making sure the computer recognizes the presence of the phone, and then making the measurement with the phone on hook. I frankly don’t understand the point of this measurement. Perhaps someone else can explain it.

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October 09, 2011