

Hello All,

As always, please send any questions about the reading assignment directly to me at [oldtimetelephones@goeaston.net](mailto:oldtimetelephones@goeaston.net). I will bundle questions if necessary, repeat the questions, and give answers in an e-mail to the TCI List Server before moving on to the next reading assignment. This way everyone will benefit from these questions and answers. By sending questions directly to me, we will avoid unnecessary clutter on the List Server. Previous reading assignments, notes, questions, and answers are available in the TCI Library at <http://www.telephonecollectors.info/index.php/telephony101> (this is a new URL, but the old one will eventually get you there).

Please read the rest of Chapter 22, from the top of page 214 through 216. In this final reading, you will learn about federal regulations and the mysterious ringer-equivalent number (REN) – and find a table of REN values for many of the older phones that are popular with collectors.

I realize that page 214 is a little hard to read, but it will be easier for me to explain the regulations informally than it was in a book where I had to worry a little about precise statements and liability. In 1975, new FCC rules for telephones created two problems for collectors like us: (1) you weren't supposed to connect an old phone to the public telephone network, and (2) you weren't supposed to repair a phone that was on the public telephone network. Of course there was some fine print associated with each of these, but that was about it.

In the regulation, the FCC had defined a time window (October 17, 1977, to July 1, 1979) during which they let telcos install older phones, but after the window closed the telcos had to install equipment (presumably new) that had gone through the new registration process. The purpose of the window was to allow telephone companies to use up their inventory of older equipment. The rule was written in such a way that you could leave an older phone connected to the line indefinitely, but once you disconnected it, tough crackers.

In 2001 the FCC transferred a lot of its telephone rules to an industry committee for incorporation in an industry standard. Privatization, it was called. At that time I was still working for a federal regulatory commission (nuclear) so I understood regulations and industry committees. And I knew it was a lot easier to get a standard changed than to get a regulation changed. I believed that if I, as a public citizen, asked the new committee for a change in the new standard, before they got too organized and developed attitudes, they might give me a fair hearing. They did.

I asked the committee to remove the language about the window from the standard so that old phones could be connected at any time. The window had served its purpose and was no longer needed. After about 18 months of consideration, they did it, and the committee went further to change definitions in a way that is favorable to collectors. Further, the old rule that restricted repair to the manufacturer or their authorized agent was simply dropped. I didn't have anything to do with that – it just happened with the transfer from FCC to the committee.

In the old rule and the new standard there is a requirement that all of the ringers on a line, taken together with their condensers, should not have such low impedance that they would suck all the juice out of the line. The limit was put at 1,400 ohms.

Let's digress for a moment. Suppose you have two resistors, each of which has a resistance of 100 ohms. If you put them in series (end to end), the total resistance would be 200 ohms. However, if you put them in parallel (side by side) the total resistance would be 50 ohms. Just think of garden hoses. If you connect two of them in parallel, twice as much water flows (half the flow resistance). It's the same with resistors.

Now suppose you have 5 ringers (including their condensers), each of which has an impedance of 7,000 ohms. Hook them all in parallel, and the total impedance is 1,400 ohms (7,000 divided by 5). If we say that a ringer with an impedance of 7,000 ohms has a ringer equivalent number of 1, then you can connect more than 5 of them to the line without going below the 1,400-ohm limit. Thus the ringer equivalence number is defined as

$$\text{REN} = 7,000 \text{ ohms} / (\text{impedance of ringer and condenser}).$$

Because the actual impedance of the ringer-condenser combination is in the denominator, the bigger the impedance, the smaller the number. Small REN values are good. I measured the REN values for a bunch of old phones and put the results in Table 22-1 on p. 216. It's a handy table.

Finally you will see a regulation that actually outlaws the old untwisted quad wiring that you could find at hardware stores.

By the way, there is a **typographical error** near the middle of page 216 where the word "premise" should be "premises." Please mark the correction in your book – and please let me know if you find any other errors.

If there are any questions about this final reading assignment, just let me know and I will try to answer them on the TCI list server.

Ralph