NEW ISSUES IN TELECOMMUNICATIONS

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Abstract

There are two new issues that are currently causing concern in telecommunications. These issues are the introduction of pure optic systems for transmission and switching and the Federal Communications Commission (FCC) edict that wireless network operators must provide a precise location of wireless emergency E-911 callers.

OPTICAL NETWORKS

Optical transmission equipment has been deployed in telecommunications for well over 15 years. This equipment has been used primarily to interconnect telephone central offices. Fiber-optic cables are currently the technology of choice when inter-office capacity is increased. At the fiber-optic cable terminal, signals on these cables are converted from optical to electrical for processing by switching equipment. The signals are then converted back to optical for transmission to the next central office.

The current network issue is that optical switching equipment has reached the point where it is considered practical for central office deployment. This means that networks between central offices may be operated on a pure optical basis. The network between the central office and the user or customer is expected to remain electrical for the near future.

Standards for the new optical switching equipment are being actively worked upon in ANSI committee T1X1.5. The accuracy of the clocks that will control the new optical equipment has yet to be determined. The concern of network operators is that new, higher performing, clocks may be required.

WIRELESS E-911 SERVICE

E-911 is a standard feature of the wireline telecommunications network. Network operators provide the Public Safety Answering Point (PSAP) the location of E-911 callers from a database showing where the callers line was installed. The timing provided at PSAPs is not very precise. In most cases, timing it is obtained from a WWVB signal. This is sufficient to meet the legal timing stamping of received calls.

Currently when an E-911 call is received from a wireless caller, the caller must verbally tell the PSAP where they are. In many cases they simply do not know where they are or are unable to coherently give the information. To overcome this scenario, the FCC has

prescribed that the wireless network operator must locate the caller and pass that information to the PSAP. There are several, highly contentious, proposals to provide the location information. One solution is to place a GPS receiver in the handset. Another is to use equipment in the base stations of the wireless network itself to locate the caller. There are two variations of the GPS in the handset solution. One uses GPS autonomously. The other uses GPS in conjunction with network-based equipment.

The time frame for initial implementation of a wireless solution is October 1, 2001 or an interval after the PSAP request for implementation. The two solutions have different time deadlines. The time schedule for the GPS in the handset solution is by October 1, 2001 all new service activations must have the feature. By December 1, 2005 the network operator must have made a good faith effort to have all handsets equipped with the feature.

The time schedule for the network based solution is six months after the PSAP has requested it, the network operator must provide Automatic Location Identification (ALI) for 50% of the calls. Eighteen months after the request, ALI must be provided for all calls.

The mandated ALI accuracy is different for the two solutions. The GPS in the handset solution must be accurate to 50m for 67% of the calls and to 150m for 95% of the calls. The network-based solution must be accurate to 100m for 67% of the calls and to 300m for 95% of the calls.

Most areas are served by more than one wireless network. There will probably be price differences between the solutions offered. The customer will decide if economics or being found quickly in an emergency is more important.

HUGO FRUEHAUF (Zyfer, Inc.): Realizing that the network solution is going to be more difficult to get accuracy, why aren't the specs the same for everybody? Why is it that the GPS guys just have the same specs?

ED BUTTERLINE (Symmetricom): One can only ask the FCC that question. I can give my personal thoughts on it, but they would be strictly my personal thoughts. The FCC has edicted thus and so, thou shalt be twice as accurate if you have decided as a carrier to go to the GPS in the handset. Then if you have decided I'm going to put some software, maybe even some locator boxes at every bay station to locate you, I don't know. It is a very contentious issue, and I can't comment on that.

MICHAEL GARVEY (Datum): Maybe these are obvious questions. GPS is not very reliable indoors, number one. And number two, suppose you have a receiver, a cell phone that is used to working in a network that does location within the network? Then you roam to a different situation where there is the expectation that it gets a GPS-derived position. Has the FCC addressed that?

BUTTERLINE: I'm not sure what they've done in that regard. I will comment just a little bit on GPS not working inside. I know one of the suppliers of a proprietary GPS in a handset solution and realize that the solutions are proprietary that are being proposed. They would say, gee whiz, if I had to make a E911 call standing here in this room, inside, my system would locate me to better than 50 meters. And you say, how can that be? You know if you had a handheld GPS system and you said "Tell me where I am?" you are not going to get a fix here in this room. But there are GPS signals that can make it into this room—certainly not four at a time to give you a precision fix. But the proprietary solution of one of the suppliers that has been demonstrated says I can do it indoors, and do it to a high degree of accuracy; and I will probably exceed the FCC's requirements. Proprietary solution; I can't go any more than that.

MATTHEW LONG (NRL): For the network solution, I was wondering if you could add a little more information about the direction-finding process that is used to locate the software user, and what kind of equipment would added to the typical cell site? I understand cell sites are a bit larger than the area that we are talking about.

BUTTERLINE: I can't give you a lot of information. I am sort of acting as a reporter on this. It is mainly because I want to keep a certain amount of distance. These are all proprietary solutions that are being proposed by various suppliers and equipment to the wireless telephone industry. They are very contentious, as my system is better than your system is better than his system. I understand that there would be certain equipment added to space stations that would allow them to get a fix to the FCC-required degree of location accuracy. Beyond that, I don't know. Realizing that CDMA systems have a GPS in every site, so how much more do they need? I don't know.

JEREMY ELSON (UCLA): So an interesting difference between these two systems, I think, is that if there is GPS in the handset, it is the user that knows where it is, whereas the network-made solutions know where you are. So there are some obvious privacy implications to anything that always knows where the user is. I am wondering if that came up at all in the GPS solution. The user theoretically has some control over when it sends location information back. Whereas in the network-made solution, the network knows where you are, whether you like it or not.

BUTTERLINE: That is a very good question. I think initially when this was proposed, when

the FCC came out with their requirements, it was strictly intended that to be a safety-of-life kind of thing. Manufacturers of wireless telephony equipment come up with a solution to do it; we are not going to tell you how to do it. Lately, one hears stories that people have gotten quite creative with this approach and will be keeping track of where you are. To the point of being able to send you a little message that says "We're having a big special over at Joe's Market today; you're only a quarter mile away, why don't you stop by and mention Code 10, and you'll get an extra discount?" That's a very contentious issue. It may very well be a way of the wireless network operator recapturing the cost of implementing this location service. I don't know, but it's a very interesting thing and the privacy issue is real.