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John Muleta, Chief
Wireless Telecommunications Bureau
Federal Communications Commission
Washington, D.C. 20554

Re: Request for ruling or interpretation:
Congestion control of wireless calls, Docket 94-102

Dear Mr. Muleta:

As the Commission knows well, catastrophic or disruptive events such as earthquakes or power outages can trigger sufficiently high volumes of emergency calls to overwhelm 9-1-1 networks. Such "spikes" in calling can originate with both wire and wireless phones, but the latter are particularly susceptible to the combination of mobile witnesses who encounter critical incidents and who are motivated to report these (as "Good Samaritans") to emergency authorities.

For many years, wire telephone providers and Public Safety Answering Points ("PSAPs") have engaged in "sizing" of their respective network segments so as to minimize or contain the effects of "mass calling," as described in the attached report from Roger Hixson, Technical Issues Director of the National Emergency Number Association ("NENA"). For a number of reasons, this form of "congestion control" has not been adopted in many wireless networks.

The purpose of this letter is to request, on NENA's behalf, an interpretation of Section 20.18(b) of the Rules that will allow wireless carriers who wish to practice mass call containment to do so without fear of violating FCC regulations. Section 20.18(b) reads:

Basic 911 Service. Licensees subject to this section must transmit all wireless 911 calls without respect to their call validation process to a Public Safety Answering Point, or, where no Public Safety Answering Point has been designated, to a designated statewide default answering point or appropriate local emergency authority pursuant to Sec. 64.3001 of this chapter, provided that "all wireless 911 calls"

is defined as “any call initiated by a wireless user dialing 911 on a phone using a compliant radio frequency protocol of the serving carrier.”

NENA believes, and asks the FCC to affirm or declare, that the injunction to “transmit all wireless 911 calls” is reasonably read to mean the passing of these calls into the trunks represented by the arrow at B in the diagram at the second page of Mr. Hixson’s report. These trunks function, under the responsibility of the wireless carrier, to connect the Mobile Switching Center (“MSC”) to the Selective Router (“SR”) at the demarcation between the wireless and wire networks. Thus, we maintain, the wireless carrier discharges its obligations under subsection (b) when it employs -- to the limit of their capacities -- the MSC-to-SR links.

While it might be more logical and ultimately more effective to attempt mass calling controls earlier than the B point in the diagram -- for example at A -- we have little information or experience concerning such methods.

Our request for your interpretation of the rule, then, is confined to the situation discussed at B(3) on page 3 of the Hixson report. We are not asking the FCC to answer the questions posed at B(1) or B(2). These are under discussion at the Emergency Services Interconnection Forum (“ESIF”), an industry-public safety collaboration convened jointly by NENA and the Alliance for Telecommunications Industry Solutions (“ATIS”). However, the Commission’s response to our request will facilitate the continuing work of ESIF on the broader issues of congestion control.

The history of wireless 9-1-1 at the Commission supports our interpretation. Section 20.18(b) dates from the reconsideration of the initial Report and Order adopting emergency call obligations for wireless carriers and PSAPs.¹ There, the Commission concluded:

Based upon this record, it appears that the technically feasible and most practical options are to forward either *all* 911 calls, or *only* those that have been validated. This is in fact the position of many in the wireless industry. Given this choice, we find that the public interest would clearly be better served by requiring covered carriers to forward all 911 calls. As we noted in the *E911 First Report and Order*, one of the Commission's statutory mandates under the Communications Act is “promoting safety of life and property through the use of wire and radio communication.”²

The focus at the time of the rule’s adoption was on the phrase “without respect to their call validation process,” based on the Commission’s belief that procedures seeking to verify

¹ Memorandum Opinion and Order, 12 FCC Rcd 22665 (1997).

² Order, at ¶33. *See also*, 11 FCC Rcd at 18681 (para. 8); Section 1 of the Communications Act, 47 U.S.C. § 151.

subscriber status were impeding the delivery of vital communications. The application of a non-discriminatory method of “sizing” calls from customers and non-subscribers alike was simply outside the policy calculus that led to Section 20.18(b), and therefore not meant to be proscribed by the new rule.

As described at the opening of the Hixson report , call containment through trunk sizing or other methods is closely related to “grade of service” measurements such as the P.01 criterion commonly used in wire networks. The Commission’s initial reluctance to regulate in this area dates from the original Report and Order of July, 1996:

As discussed in a previous Section, we agree with the parties that contend that Federal standards regarding grade of service for 911 service are not warranted at this time. The nature of the issue requires a level of expertise and consultation among the parties that can best be achieved through discussions and proceedings of standard-setting bodies, which the parties indicate are already in progress. In addition, requiring a grade of service for 911 calls which is superior to the current grade of service may require the implementation of special technologies, especially call priority. Therefore, we conclude that the interested parties should develop standards by mutual agreement or by submission to standard-setting bodies.³

This conclusion, which was not changed on reconsideration, would be inconsistent with an absolutist interpretation of Section 20.18(b) that did not allow wireless carriers to manage unpredictable call spikes by the kind of trunk sizing discussed in the Hixson report.

In short, the history of the wireless E9-1-1 rules, coupled with the present reality that mass calling about localized emergencies can affect public safety communications across much wider areas, suggests the prudence of the interpretation we request here. To repeat, we ask only that the FCC reassure wireless carriers that Section 20.18(b) does not preclude reasonable decisions about sizing of wireless MSC-to-SR trunks and other methods of call containment within their networks.

Should the Commission wish to anticipate other methods of mass call containment -- such as the A option in the Hixson report -- and rule that these, too, are acceptable under Section 20.18(b), NENA would welcome the additional clarification.

Sincerely,

James R. Hobson
Counsel for NENA

³ 11 FCC Rcd 18676, at ¶124.

Reasons to Manage Call Congestion

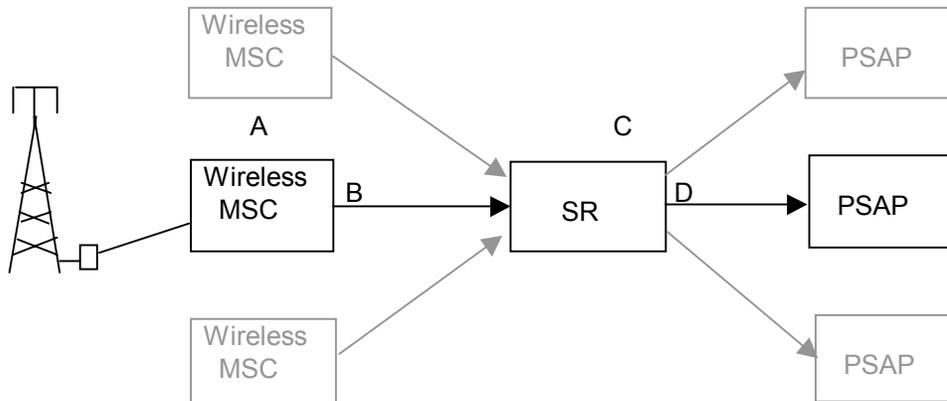
The overall E 9-1-1 network is designed to give equal probabilities of call delivery to all callers, irrespective of what type of caller they are - ILEC, CLEC, or wireless. This can only be accomplished if all sources of calls receive equal treatment from origination to completion, by similar network and switching design. Historically, this is done through trunk group sizing, based on busy hour probability of completion methods. This is often labeled P.01 sizing, meaning that the trunk group sizing is based on that quantity that will allow 99 out of every 100 calls to be completed in the busiest hour, over a period of monthly measurement.

If this were not done by all parties involved, some callers would have a better chance of call completion than others. So, a standard objective for network sizing, adhered to by all parties to E 9-1-1 service, is the key to equal service levels with currently available methods.

During mass calling situations, one or a few tower sectors can be inundated with wireless 9-1-1 calls. This would fill up the large trunk group, and disallow any calls in other areas and Counties to get through for the duration of the mass calling event. On the other hand, if smaller County-specific trunk groups are used, the multiple calls for the specific tower sectors are primarily directed to only one of the County trunk groups. The rest operate as normal, and no single County is restricted to a no-calls condition.

Options for Congestion Control

Refer to the simplified E 9-1-1 voice network diagram below. Each option point is referenced by letter.



A - Congestion Management at the MSC switch

Status: not known to be available at present

Wireless originating switches could contain software to limit the number of calls allowed to be placed into the E 9-1-1 network from a set of towers or tower sectors. If these sets of sectors corresponded to those sector coverage areas related to a given County or PSAP, the MSC would have the ability to limit mass calling impacts into the E 9-1-1 systems. This would be similar to capabilities in the wireline network used to control mass calling, which notably is done at the originating end of the network. If the MSCs had this capability, it would significantly help in enabling the use of multi-County trunk groups from MSC to SR, since software screening control of call quantities would take the place of the smaller sized trunk groups that enable congestion control now.

B - Congestion Management by MSC - SR trunk group sizing

Status: available and in use

This is the technique used by all wireline carriers and many of the wireless carriers today. Typically, carriers or their agents analyze call volumes over time, and use the engineering process to size, or adjust size of, the originating trunk group to P.01 service levels. This provides equal levels of access across all types of carriers and their end offices. In conjunction with P.01 sizing of the SR to PSAP trunk group, the

overall 9-1-1 system then provides equal probability of call completion to all callers.

Typical wireless carrier arguments against this technique include:

1) *Wireline P.01 sizing doesn't apply to wireless - wireless is different.* P.01 network engineering is not unique to wireline - it is a general network design method. Wireless is different in terms of what is known as peakedness; how quickly and to what degree mass calling occurs. However, network engineering and sizing methods have allowances for different peakedness factors. It is likely that wireless calling differs in this way, just requiring a different statistical table to be used for trunk group sizing. This could be verified, if we could ever get past the other two typical arguments below.

2) *We don't know how many calls are involved, so we can't size trunk groups to P.01 standards.*

Reality - the CLECs had/have the same situation. The need is to accomplish P.01 by active monitoring of call volumes over time. Make an educated judgement, then adjust.

3) *The FCC says we are to 'send all calls' to the PSAP.*

The FCC was talking about carriers accepting and passing forward (into the PSAP's portion of the E9-1-1 systems) all wireless 9-1-1 calls from the callers, especially from nonregistered phones. Also, we doubt that the FCC was saying that wireless calls should be treated any differently for probability of call completion than all other 9-1-1 calls. This issue continues to be a problem, and we are asking the FCC to clarify its meaning. FCC personnel have verbally verified to NENA representatives that they did not intend to cause differences in call completion probabilities. NENA believes the wording was meant to indicate that wireless carriers should send all calls into the PSAP's E9-1-1 system, ie, into the trunk group feeding the Selective Router, since the FCC views the PSAP as responsible for the E9-1-1 system components from Selective Router (and data base systems, including ALI servers) on to the physical PSAP equipment.

C - Congestion Management at the Selective Router

Status: proposed and testable, but would require software changes in all Selective Router switches (at least 440 nationally)

D - Congestion Management via SR-PSAP trunk group sizing

Status: available and in use

Separate wireless trunk groups allow limiting of concurrent calls into the PSAP, but are cost intensive and require additional SR trunk ports and PSAP equipment, as compared to other choices. These trunk groups should also be sized based on P.01 approaches.

Overall P.01 sizing of combined wireline-wireless trunks can also limit concurrent call volumes, but can have the danger of being overwhelmed by wireless calls in a wireless mass calling situation. This can disallow delivery of wireline calls during the mass calling period.

The need for separate wireless PSAP trunk groups is dependent on the presence or absence of proper congestion control methods in the originating part of the network, overall wireless call volumes, and the degree of impact of mass calling situations, for the characteristics of a given wireless service area. These conditions change over time, as wireless calling builds from low levels to higher quantities.

Summary

In 9-1-1 system design and engineering, call congestion management is best accomplished as close to the call source as possible. This is true for wireline; it is true for wireless for the same reasons. The best currently available choice is B (MSC trunk group sizing), although it is not always accepted by the wireless carrier, often using the (incorrect in NENA's view) interpretation of the 'all calls rule' in FCC documentation. A more effective and possibly an overall less expensive approach would be option A (MSC software methods), but there are no known plans to provide this in the MSC switch types.

Roger Hixson
Technical Issues Director
NENA
March, 2004