



# Evaluation of Short-Term Interim Techniques for Multimedia Emergency Services

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# Objective

- Emergency Services community & individuals with disabilities want text based communications with emergency services
  - Long term Multimedia Emergency Services (MMES) solution in development in 3GPP
  - Long term MMES solution will take years to develop and implement
  - Interim solution needed before availability of long term MMES solution
- Interim solution supporting text based emergency communications for individuals with disabilities needed as soon as possible



# Purpose & Scope

- Purpose
  - Investigate options for interim solution supported by existing wireless networks and PSAPs
- Scope
  - Minimal impacts to wireless network infrastructure, mobile devices, and emergency services systems (e.g., PSAPs)
  - Utilize existing technologies
    - LTE and IMS are out of scope



# Techniques Evaluated

- Instant Messaging (IM)
- Video American Sign Language (ASL)
- Real-time Text (RTT) End-to-End
- RTT with TTY
- SMS to 9-1-1
- Voice Emergency Call then SMS
- TTY Emulation
- National SMS Relay Center
- Video Relay Service
- IP Based Relay Service

# Evaluation Criteria

| Analysis Criteria   | Definition   | Definition of Analysis Color Coding   |  |  |
|---|--|---|--|--|
|   |  | Red   | Yellow                                 | Green  |
| <b>Real-time communication</b>  | Is the multimedia communications between the end user and emergency services conducted in real-time or does queuing, store-and-forward, or other such techniques occur?                | Communications with extensive delays due to queuing, store-and-forward, or other delays occur | Communications with appreciable delays | Communications with no noticeable delay                |
| <b>End user location determination</b>  | Does the potential technique support end user location determination or does the end user have to provide their location during the multimedia communications with emergency services? | End user has to provide their location  | N/A                                    | Potential technique can determine end user location    |
| <b>Reliability</b>  | How is reliable is the potential technique?  | Little to no reliability  | High reliability but could fail        | Supports telco grade of five 9's reliability (99.999%) |
| <b>Security</b>   | Are the communications between end user and emergency services secure and protected against false messages, altered messages, man-in-the-middle attacks, etc?                          | No security capabilities  | Limited security capabilities          | Extensive security capabilities                        |
| <b>Maintaining association between end user and PSAP call taker when end user is mobile</b> | Does the technique maintain the association of multimedia emergency services between the end user and the PSAP call taker when the end user is mobile?                                 | Communications may not stay with the same call taker.   | N/A                                    | Communications stays with the same call taker.         |

# Evaluation Criteria (Continued)

| Analysis Criteria   | Definition   | Definition of Analysis Color Coding   |  |  |
|---|--|---|--|--|
|   |  | Red   | Yellow   | Green  |
| <b>Pre-registration with emergency services required?</b>       | Does the user need to be known in advance to emergency services per a pre-registration function? | No service is enabled to the end user without a pre-registration                                      | N/A  | No pre-registration is required. No action required by wireless operator or emergency services |
| <b>Impact to PSAP systems</b>                                   | What is the impact to the existing PSAP systems and the associated call takers?                  | New capabilities required in PSAP systems.  | Capabilities existing in current PSAP systems but training of PSAP call takers may be required   | No impact to PSAP systems  |
| <b>Impact to wireless operators networks</b>                    | What is the impact to the existing wireless operator networks?                                   | New network components and/or new interfaces required   | Supported by existing network components and interfaces. Network engineering may be needed for additional traffic load.                  | No impact to wireless operator networks  |
| <b>Impact to end user</b>                                       | Are new handsets and/or applications required?   | New handsets required   | New application on smart phone required  | Existing handset supports technique  |
| <b>Migration impact to end user for transition to long term</b> | What are the migration impacts from the short term technique to the long term solution?          | End user will have to use a different technique for the long term multimedia emergency communications | End user could use the same technique but a new version of the application may be require and there may be changes to the user interface | Long term solution will be the same to the end user  |

# Side-by-Side Comparison

| Analysis Criteria  | Instant Messaging | Video ASL | RTT End-to-End | RTT with TTY | SMS to 9-1-1 | Voice Emergency Call then SMS | TTY Emulation | National SMS Relay Center | Video Relay Service | IP Based Relay Services |
|--|-------------------|-----------|----------------|--------------|--------------|-------------------------------|---------------|---------------------------|---------------------|-------------------------|
| Real-time communication  | Note 1            |           |                |              |              |                               |               |                           |                     |                         |
| End user location determination  |                   |           |                |              |              |                               |               |                           |                     |                         |
| Reliability  |                   |           |                |              |              |                               |               |                           |                     |                         |
| Security   |                   |           |                |              |              |                               |               |                           |                     |                         |
| Maintaining association between end user and PSAP call taker when end user is mobile |                   |           |                |              |              |                               |               | Note 2                    | Note 2              | Note 2                  |
| Pre-registration with emergency services required?                                   |                   |           |                |              |              |                               |               |                           |                     |                         |
| Impact to PSAP systems   | Note 3            | Note 3    | Note 3         |              | Note 3       | Note 3                        |               |                           |                     |                         |
| Impact to wireless operators networks  |                   |           | Note 4         | Note 4       |              |                               |               |                           |                     |                         |
| Impact to end user   | Note 5            | Note 5    | Note 5         | Note 5       |              |                               | Note 6        |                           |                     |                         |
| Migration impact to end user for transition to long term                             |                   |           |                |              | Note 7       | Note 7                        |               | Note 7                    |                     |                         |





# Potential Interim Techniques

- Relay services such as Video Relay Center & IP Based Relay Center are potential interim techniques
  - Minimal impact to mobile devices, wireless network infrastructure, & PSAPs
  - Some development at relay centers may be required
- While SMS has significant limitations, National SMS Relay Center and Voice Emergency Call with SMS are potential interim techniques for further evaluations **if an SMS based solution is required.**
  - Same inherent issues and limitations as described in 4G Americas Texting to 9-1-1 White Paper, October 2010
  - Not all deployed mobile devices support the Voice Emergency Call then SMS technique
    - Currently under trial in Canada
  - Minimal impact to mobile devices, wireless network infrastructure, & PSAPs
  - Some development at relay centers may be required



# Not Viable Interim Techniques

- SMS to 9-1-1 (direct) **not** recommended interim technique
  - Issues and limitation documented in 4G Americas Texting to 9-1-1 white paper published October 2010
  - Modifications at PSAPs required
- RTT End-to-end & RTT then TTY **not** feasible interim technique
  - 3GPP standards for RTT require IMS
  - Modifications at PSAPs required for RTT End-to-end



# Not Viable Interim Techniques

- Instant Messaging (IM) **not** a viable interim technique
  - Existing IM services proprietary
  - Existing 3<sup>rd</sup> party IM services do not support emergency sessions → development required
  - PSAP modification required
  - PSAPs would need to interface to multiple IM services



# Not Viable Interim Techniques

- Video ASL **not** a feasible interim technique
  - PSAP upgrades required
  - Proficiency in ASL not a common PSAP call taker skill
- TTY Emulation **not** a viable interim technique
  - Handset development required
  - New handsets required
  - Prototypes unable to comply with FCC requirements for error rate



# Conclusions

- Potential interim techniques have been identified, but all have limitations which have to be acknowledged
  - Video Relay Center
  - IP Based Relay Center
  - National SMS Relay Center
  - Voice Emergency Call then SMS
- Subscribers need education on limitations and restrictions of any selected interim technique



# Conclusions

- None of the short-term techniques for multimedia emergency services can be supported without a major development effort. The implementation of any short-term interim techniques for multimedia emergency services will require time and resources to develop and deploy. Also, the issue of funding for the development and deployment of any short-term technique also needs to be addressed.
- Interim solutions could take a great deal of time to implement
- Current Multimedia Emergency Services (MMES) standards efforts provide the long term solution



**THANK YOU**

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