

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Study on Non-Voice Emergency Services (Release 11)



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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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- x the first digit:
 - 1 presented to TSG for information;
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Introduction

Non-voice communication such as text messages and instant messaging via wireless devices has been very successful and continues to expand. Many consumers assume that they can utilize these types of non-voice communications as mechanisms to communicate with emergency services whenever emergency assistance is required. Such mechanisms currently do not exist. The Emergency Services community has a desire to have multimedia emergency services supported with the same general characteristics as emergency voice calls.

Currently, TS 22.101 service requirements for emergency calls (with or without the IP Multimedia Core Network) are limited to voice media. The Non-Voice Emergency Services is intended to be an end-to-end citizen to authority communications. The Non-Voice Emergency Services could support the following examples of non-voice communications to an emergency services network:

- 1) Session based text messages (which does not include SMS) from citizen to emergency services
- 2) Session based and session-less instant messaging type sessions with emergency services
- 3) Multi-media (e.g., pictures, video clips) transfer to emergency services either during or after other communications with emergency services.
- 4) Real-time video session with emergency services

In addition to support the general public, this capability would facilitate emergency communications to emergency services by individuals with special needs (e.g., hearing impaired citizens).

NOVES does not preclude the support of specialized emergency services and devices designed for the special needs communities. The requirements defined for the support of specialized emergency services and devices for the special needs communities may differ from the NOVES requirements.

NOVES as defined in this document focuses on Next Generation Network (NGN) technology and does not include legacy messaging services, such as Short Messaging Service (SMS). In addition, NOVES only supports human initiated devices.

Note: While text messaging is expected to remain popular, the underlying technology will shift from legacy SMS to IP-enabled messaging (including various forms of instant messaging (IM)) to support NOVES. Increasingly, both smart phones and feature phones support multiple technologies for text messaging. It is important not to confuse a specific underlying technology such as SMS with functionality such as text messaging.

1 Scope

Non Voice Emergency Services will be applicable to GPRS (GERAN, UTRAN) and to EPS (GERAN, UTRAN, E-UTRAN and non-3GPP).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

Next Generation Emergency Service: An IP-based emergency service.

Non-Voice Emergency Services (NOVES): NOVES are next generation emergency services with media other than, or in addition to, voice that utilize trusted applications in support of non-voice communications between citizens and emergency authorities. NOVES provides secure transport of messaging and media content, and location information of the reporting device to emergency authorities, in addition to providing two-way voice emergency communications between citizens and emergency authorities (e.g. - PSAPs). NOVES does not preclude the support of specialized emergency services designed for the special needs communities including non-support of two-way emergency voice communications.

Session based NOVES: Session based NOVES are next generation emergency services using real-time session-based text and multi-media.

Non Session based NOVES: Non-session based NOVES are next generation emergency services using a combination of media types such as text messaging, graphics, animation, audio and video etc.

NOVES Device: A NOVES device is a next generation end user device (e.g.- wireless LTE device) that utilizes trusted applications to provide secure transport of messaging and media content, and location information of the reporting device to the emergency authorities, in addition to two-way voice communications between citizens and emergency authorities (e.g.- PSAPs). A NOVES device does not preclude the support of specialized emergency devices designed for the special needs communities including non-support of two-way emergency voice communications.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

NOVES	Non-Voice Emergency Services
PSAP	Public Service Answering Point

4 Use cases

4.1 Use case 1 Session Based Text Message to Emergency Services

4.1.1 Short Description

Steve is a wireless services user with a NOVES device. In an emergency situation, Steve decides to use Non-Voice Emergency Services to send a message to the PSAP.

4.1.2 Actors

Steve – NOVES device user.

Carol – PSAP call taker.

4.1.3 Pre-Conditions

Steve's NOVES device supports NOVES messaging. The PSAP for which Carol works is configured to receive NOVES messages during an emergency session.

4.1.4 Post-Conditions

The NOVES message originated by Steve was delivered to Carol at the PSAP.

4.1.5 Normal Flow

- 1) Steve already has his NOVES device turned on.
- 2) Steve encounters an emergency situation and decides to use Non-Voice Emergency Services to send a message to the PSAP.
- 3) Steve composes a NOVES message describing the emergency, and initiates a NOVES session with emergency services using the NOVES address that has been assigned to NOVES.
- 4) Based upon Steve's location, the NOVES message and Steve's current location is sent to the appropriate PSAP which services that location. As part of the processing of this initial Non-Voice Emergency Services message, a session has been established so that subsequent related messages from either end can be identified as a continuation of a sequence of an interactive message exchange.
- 5) Carol is a PSAP call taker and receives the NOVES message from Steve.
- 6) Carol sends a NOVES message back to Steve with questions about his emergency and Steve responds with another NOVES message back to Carol with his responses. This step may repeat several times.
- 7) Carol determines that dispatching an Emergency Response team is warranted and dispatches the Emergency Response team to Steve's location.

- 8) Carol sends a NOVES message to Steve advising him that help is on the way. Subject to the capabilities of the NOVES technology, Carol may receive a delivery/read confirmation response.
- 9) Carol invokes the PSAP process for completion of the NOVES messaging exchange.

4.1.6 Alternative Flows

Steve may be mobile during this emergency. Consequently, between steps 6 & 7 above, Carol may initiate a location determination request to obtain Steve's most current location information. Additionally, Carol may initiate an automated location determination function to periodically provide her with Steve's current location so that we can redirect the Emergency Response team appropriately.

4.1.7 Exceptions

Steve's NOVES device may not beep or make noise when a NOVES message from the PSAP is received subject to the user configuration of the device (e.g. Steve is hiding from an intruder).

4.2 Use case 2 Multimedia Telephony communication with real time text to Emergency services

4.2.1 Short Description

John is a Multimedia Telephony communication user with a mobile device with Real Time Text capability. Being hard of hearing, he decides to use Non-Voice Emergency Services to call the PSAP for a health problem.

4.2.2 Actors

John, Multimedia Telephony communication user

Mary, PSAP call taker

4.2.3 Pre-Conditions

The PSAP and John's device have NOVES capability.

4.2.4 Post-Conditions

John's call reached correctly by the PSAP which exchanged in voice and text the good information of John's emergency situation.

4.2.5 Normal Flow

- 1) John encounters a health emergency situation and decides to use Non-Voice Emergency Services to call the PSAP.
- 2) John invokes NOVES communication on his device with Real Time Text capabilities and initiates a NOVES session with emergency services. The NOVES message and John's current location are sent to the appropriate PSAP which services that location.
- 3) Mary is a PSAP call taker and receives the call from John.
- 4) John passes on his message with his voice.
- 5) Note: Mary may access to supplementary health information provided by 3rd party.
- 6) Mary answers John in real-time text and the message displays real time, letter by letter on the screen of John's mobile device.

- 7) If John has problem with his voice, he can use too the Real Time Text function to express its needs or give a complicated address.
- 8) Mary launches the procedure for emergency services support the John's case.
- 9) John has been reassured in real-time that his demand has been taken into account and can wait the emergency services in good conditions.

4.2.6 Alternative Flows

In certain more complex situations and if the PSAP knows the signs language, John can activate the video media (on the place of the RTT) and to express himself in signs language or show the emergency problem with the camera (fire, water, ...).

4.2.7 Exceptions

NA

4.3 Use case 3 Emergency Communication to PSAP with the Addition of Media

4.3.1 Short Description

A NOVES call establishes a voice communication with a PSAP to report an emergency situation. The communication includes the transmission of media of an emergency situation to the PSAP using a NOVES device.

4.3.2 Actors

Bob is the emergency caller and Carol is the PSAP call taker receiving the emergency communication.

4.3.3 Pre-Conditions

The emergency communication and the transmission of media of an emergency situation will be sent to a PSAP using a NOVES device.

In addition, the transmission of media of an emergency situation may be sent to a PSAP either in the same session utilizing the same network address as was established for the voice communication, or in a separate session that utilizes network addressing separate from the network address that was established to route the voice communication to the PSAP. Depending on local regulations, the separate network address provided for subsequent media transmission after an emergency call has completed may or may not also result in an emergency call.

Note: The PSAP shall have the capability to attribute all emergency sessions and media content to the originating device.

Note: Emergency sessions should be prioritized over non-emergency sessions by the network. Media content shall utilize the same priority mechanisms as next generation emergency voice services.

4.3.4 Post Conditions

Carol continues the voice communication with Bob while she reviews the media content that was transmitted to her using a NOVES device. With this information she is able to provide support to Bob as well as dispatch the necessary emergency response units.

Any short term storage or retention of the media content is the responsibility of the PSAP system. The pictures that were transmitted to Carol are not to be stored in the transport network

4.3.5 Normal Flow

- 1) Bob initiates a NOVES session to establish a voice communication to report an emergency situation
- 2) As Bob is describing the emergency situation to Carol, she asks him if he can send media of the site
- 3) Bob creates the media with the same NOVES device that he used to initiate the voice communication
- 4) Bob creates the media while the voice communication with Carol continues
- 5) Based upon information available to Bob, he then immediately uses the original communication session to forward the media to Carol using his NOVES device.

4.3.6 Alternative Flow

- 1) Bob initiates a NOVES session to establish a voice communication to report an emergency situation
- 2) As Bob is describing the emergency situation to Carol, she asks him if he can send media of the site
- 3) Bob creates the media with the same NOVES device that he used to initiate the voice communication
- 4) Bob creates the media while the voice communication with Carol continues
- 5) Based upon information available to Bob, then immediately establishes a separate communication session to forward the media to Carol using his NOVES device.

4.3.7 Exceptions

TBD

4.4 Use case 4 Delayed Transmission of Media of an Emergency Situation Associated with Voice Communications to a PSAP

4.4.1 Short Description

Bob is a wireless services user with a NOVES device. In an emergency situation, for example, Bob saw a house on fire, and he decides to use both Voice Emergency Service and Non-Voice Emergency Service to the PSAP to exactly describe the fire situation in order for the PSAP to take proper actions.

4.4.2 Actors

Bob is the emergency caller and Carol is the PSAP call taker receiving the emergency communication.

4.4.3 Pre-Conditions

Bob's NOVES device supports both Voice Emergency call and NOVES media. The PSAP for which Carol works is configured to be capable of receiving both voice emergency call and NOVES media.

After Bob completes a voice communication with a PSAP to report an emergency situation, he waits a while and then creates media of the emergency site and transmits the media to the PSAP using a NOVES device. The media should be routed to the same PSAP that had received the previous emergency voice call. The media should be transmitted by the emergency caller to the PSAP in a timeframe that is reasonably associated with the duration of the emergency situation. As the media is received at the PSAP, it must be associated with the voice communication that Bob made to report the emergency situation. Location information of the emergency caller (i.e., the GPS location coordinates) may be sent with the transmission of the media.

Note: The PSAP shall have the capability to attribute all emergency sessions and media content to the originating device.

Note: Emergency sessions should be prioritized over non-emergency sessions by the network. Media content shall utilize the same priority mechanisms as next generation emergency voice services.

4.4.4 Post Conditions

As the media is received at the PSAP, it is associated with the earlier voice communication that Bob made to report the emergency situation. The media is handed off to Carol, as the PSAP operator handling this emergency situation. After Carol reviews the media that was transmitted, she is then able to dispatch additional emergency response team.

Short term storage or retention of the media content is the responsibility of the PSAP system. The media content that was transmitted to Carol are not to be stored in the transport network

4.4.5 Normal Flow

- 1) Bob already has his NOVES device turned on.
- 2) Bob encounters a fire accident of a house and decides to use Emergency Services asking for help.
- 3) Bob first makes an Emergency voice call. Based upon Bob's location, the voice call is routed to the appropriate PSAP which serves that location.
- 4) Carol is a PSAP call taker and answers the emergency call. During the emergency voice call, Carol asks Bob to send a picture about the latest situation about the fire.
- 5) Later on after Bob finished the voice emergency call, he takes a picture about the fire and composes a NOVES message with this picture describing the emergency, and initiates a NOVES session with emergency services .
- 6) Based upon network processing, the NOVES message is sent to the same PSAP as the previous voice emergency call.
- 7) Carol can send a NOVES message back to Bob for more information of his emergency and Bob responds with another NOVES message back to Carol with his responses. This step may repeat several times. Alternatively, Carol can call back to Bob advising him that help is on the way.
- 8) According to the fire situation from the picture and other information Bob provides, Carol determines that dispatching an Emergency Response team is warranted and dispatches the Emergency Response team to Bob's location.
- 9) Carol invokes the PSAP process for completion of the NOVES message exchange.

4.4.6 Alternative Flows

When receiving the emergency call from Bob in step 4, besides asking Bob to send a picture about the latest situation about the fire, Carol can also provide Bob with instructions (e.g., destination address, a reference number to link media to the voice call) for the further NOVES media from Bob.

In addition, Bob may be mobile during this emergency and the PSAP to which Bob makes the emergency voice call can also deal with NOVES media. Consequently, between steps 4 & 5 above, the NOVES media should be able to be routed to the same PSAP receiving the emergency voice call. If the NOVES media is routed to another PSAP, this PSAP will communicate with the PSAP receiving the emergency voice call and forward this NOVES media to the previous PSAP.

NOTE: The communications between PSAPs are out of 3GPP scope.

4.4.7 Exceptions

TBD

4.5 Use case 5 Transmission of Media in a Non-Voice Interaction with a PSAP

4.5.1 Short Description

Reporting details of an emergency situation where no voice communications is initiated but media of the emergency site is transmitted to the PSAP using a NOVES device.

4.5.2 Actors

Bob is the emergency reporter and Carol is the PSAP operator.

4.5.3 Pre-Conditions

To report details of an emergency situation Bob creates media of the emergency site and transmits the media to the PSAP using a NOVES device. The transmission of media could be the initial report of an emergency situation, or additional information linked to an earlier reported emergency situation. Location information of the emergency caller (i.e., the GPS location coordinates) must be sent with the transmission of the media.

Emergency sessions should be prioritized over non-emergency sessions by the network. Media content shall utilize the same priority mechanisms as next generation emergency voice services.

4.5.4 Post Conditions

As the media is at the PSAP, it is associated with a specific emergency situation. The media is handed off to Carol, as the PSAP operator handling this emergency situation. After Carol reviews the media that was transmitted, she is then able to dispatch additional emergency response units.

Short term storage or retention of the media content is the responsibility of the PSAP system. The media content that was transmitted to Carol are not to be stored in the transport network

4.5.5 Normal Flow

- 1) Bob identifies an emergency situation
- 2) Bob has prior knowledge of how to transmit media of an emergency site to a PSAP.
- 3) Bob creates the media of the emergency site
- 4) He then forwards the media of the emergency site to the PSAP using his NOVES device.
- 5) At the PSAP the media is associated with a specific emergency situation.

4.5.6 Alternative Flows

Bob may be mobile during this emergency and the PSAP should associate the received media with the earlier reported emergency when the reported media is the additional emergency information. Consequently, between steps 4 & 5 above, the NOVES media should be able to be routed to the PSAP receiving the initial emergency report. If the NOVES media is routed to another PSAP, this PSAP will communicate with the PSAP receiving the initial emergency report and forward this NOVES media to the previous PSAP.

NOTE: The communications between PSAPs are out of 3GPP scope.

4.5.7 Exceptions

When a PSAP has policies that allow media to be sent independently of a conversational emergency call, the PSAP may encounter situations where the independent media can not be correlated with an emergency incident. Some examples are:

- If the NOVES user recorded media at the location of the incident, and then moved prior to sending the media, the PSAP may assume the incident occurred at the incorrect location since the location reported is where the NOVES caller is currently located.

- If the NOVES user previously made an emergency call using another device and then sent additional media using a NOVES device, the PSAP may not be able to correlate the additional media with the reported incident if the caller identity is different when using different devices.

4.6 Use case 6 Communication with PSAP when voice is inappropriate

4.6.1 Short Description

Steve encounters a hostage situation where the use of a Voice call would endanger himself and others, Steve is able to silently use Non-Voice Emergency Services to send a message to the PSAP. For example, the silent establishment of NOVES Media could either be made with key pad tones and ring tones being disabled or by ensuring that PSAP will not confirm with call back therefore avoiding a ringing incoming call alert. Or the handset does not audibly alert when receiving text messages from the PSAP, PSAP callbacks receive special treatment such as immediate display, silent announcement, etc.)

4.6.2 Actors

Steve, NOVES user

Carol, PSAP call taker

4.6.3 Pre-Conditions

Steve has a UE which supports NOVES.

The PSAP has NOVES capabilities.

Network supports NOVES

4.6.4 Post-Conditions

Steve's call was routed correctly to the PSAP,

4.6.5 Normal Flow

- 1) The communication is initiated by Steve.
- 2) Carol is a PSAP call taker and receives the NOVES message from Steve.
- 3) Carol sends a confirmation NOVES message back to Steve possibly with questions about his emergency This step may repeat several times.
- 4) Carol determines that dispatching an Emergency Response team is warranted and dispatches the Emergency Response team to Steve's location.

NOTE 1: If Steve is mobile during this emergency situation, between above two steps, all the NOVES messages should be able to be routed to the same PSAP and Carol may also initiate a location discovery process to obtain Steve's current location periodically so that she can redirect the Emergency Response team appropriately. If the NOVES message is routed to another PSAP, this PSAP will communicate with the PSAP receiving the previous emergency message and forward this NOVES message to the previous PSAP.

NOTE 2: The communications between PSAPs are out of 3GPP scope.

- 5) Carol sends a NOVES message to Steve advising him that help is on the way. Subject to the capabilities of the NOVES technology, Carol may receive a delivery/read confirmation response.
- 6) Carol invokes the PSAP process for completion of the NOVES messaging exchange.

4.6.6 Alternative Flows

TBD

4.6.7 Exceptions

TBD

4.7 Use case 7 Menu / Short Cut service

4.7.1 Short Description

Steve encounters an Emergency situation where time or situation does not allow him to make a voice call or type a message. Steve initiates a NOVES Emergency Call (e.g. by use of a menu / short cut as described in TS22.101), with a user pre defined message which may also have location information provided.

4.7.2 Actors

Steve, NOVES user

Carol, PSAP call taker

4.7.3 Pre-Conditions

Steve has a UE which supports NOVES.

The PSAP has NOVES capabilities.

Network supports NOVES

4.7.4 Post-Conditions

Steve's call was routed correctly to the PSAP,

4.7.5 Normal Flow

- 1) Steve initiates a NOVES Emergency Call with a user pre-defined message.
- 2) Carol is a PSAP call taker and receives the NOVES message from Steve.
- 3) Carol determines from the message and/or multimedia that dispatching an Emergency Response team is warranted and dispatches the Emergency Response team to Steve's location.
- 4) Carol sends a NOVES message to Steve advising him that help is on the way. Subject to the capabilities of the NOVES technology, Carol may receive a delivery/read confirmation response.
- 5) Carol invokes the PSAP process for completion of the NOVES messaging exchange.

4.7.6 Alternative Flows

TBD

4.7.7 Exceptions

TBD

4.8 Use case 8 Texting application communication to emergency services with one-way RTT

4.8.1 Short Description

John is a NOVES user with a mobile device having Real Time Text capability. John is accidentally caught in a convenience store robbery where the robbers have locked the doors, are holding up the store clerk, and John is hiding in the store and cannot talk to emergency service. John puts his phone into silent mode and initiates a Text Messaging session to the PSAP.

4.8.2 Actors

John, NOVES user

Mary, PSAP call taker

4.8.3 Pre-Conditions

John has a NOVES wireless device which supports the Real Time Text function with T.140 codec (RFC 4103).

The PSAP operator has a platform IP receiving the VoIP calls with SIP protocol, NOVES compatible.

4.8.4 Post-Conditions

John's call was routed correctly to the PSAP, and the two parties exchanged text messaging to convey an accurate description of John's emergency situation.

4.8.5 Normal Flow

- 1) John is in a convenience store when two robbers come in and hold up the store clerk. He hides in the store, and decides to use Non-Voice Emergency Services to send a text message to the PSAP.
- 2) John invokes NOVES communication on his device using his standard messaging application, with destination set to whatever the appropriate Emergency Center access number is. Upon detection of said emergency destination, the messaging application switches to Real Time Text (RTT) capabilities and initiates a NOVES session with the PSAP.
- 3) Mary is a PSAP call taker and receives the message from John. Every character, and possibly every button press that John types, (including backspaces, SEND keypress, or other editing characters), is transmitted to the PSAP one at a time, letter by letter on the screen of Mary's mobile device.
- 4) Mary answers John using standard messaging protocols, i.e., NOT Real Time Text, to avoid confusion on John's end.
- 5) When John's device receives the response from Mary, it automatically suppresses beeps and other audible alerts that would normally be generated during a text messaging session.
- 6) Once Mary has fully comprehended John's emergency situation, she dispatches the appropriate response team to the site of the robbery
- 7) John is reassured that his emergency situation has been recognized, and the appropriate response team is being dispatched.

4.8.6 Alternative Flows

- 1) Instead of John's preferred messaging application switching to RTT mode when the PSAP is detected as the recipient, John's device uses the messaging application John has initially used. .
- 2) John's device does not suppress audible alerts without the user's consent when receiving responses from Mary.

4.8.7 Exceptions

TBD

4.9 Use case 9. Differentiating Emergency Experiences and Adding Media to a Text-Initiated Emergency Call

4.9.1 Short Description

- 1) During an emergency call initiated by the user as text, either the PSAP call taker or the user may wish to add additional media, such as an audio or video stream. For example, based on a text description of the situation, a call taker may want to add an audio stream to be able to hear what is happening. Because the user initiated the call as text, the user should be aware of the addition of other media, and should be able to permit or deny the addition.
- 2) The user experience when initiating a text emergency communication should be different from that of casual text communications. This can reduce accidental or casual-prank emergency communications. This also reduces the potential for user surprise if subsequent emergency behaviours occur (such as additional media are transmitted, handset enters "emergency mode", handset does not audibly alert when receiving text messages from PSAP, PSAP callbacks receive special treatment such as immediate display, silent announcement, etc.)
- 3) The text messaging session between the emergency caller and PSAP has the following characteristics:
- 4) The user initiates a text message using an emergency recipient, e.g., "112", "911", etc.
- 5) The device indicates in some fashion that an emergency text communication has been initiated. The specifics of this are not for standardization and may be determined in part by the vendor, operator, or other entity. As an illustrative example of some possibilities, the border of the text message window could turn red or the window colors could be inverted; a phrase such as "Emergency" could appear above or below the text message window.
- 6) The device should avoid drawing attention to the user (e.g., not make externally-audible noise or flash).
- 7) Since a text message initiated the emergency session, text may remain the primary communication, but additional media types supported by the device and the PSAP may be used in the session. The user should be made aware when additional media is requested by the PSAP, and be able to permit or deny it (possibly with a timeout after which the media is added). The user should also be able to initiate additional media streams.
- 8) As is the case with many legacy devices, the concept of an "emergency mode" may be part of the user experience in NOVES. On recognition of an emergency communication, the device may enter a state in which certain emergency-related events or handling may occur. The device might remain in this state for a period of time following the emergency session (although the user should be able to terminate it). For example, the device may prohibit some features, and may give special handling to an incoming call or text from the PSAP or responder.

4.9.2 Actors

Bob is the emergency caller and Carol is the PSAP call taker receiving the emergency communication.

4.9.3 Pre-Conditions

- 1) The PSAP supports NOVES and supports multiple media streams.
- 2) The user device and the wireless network support NOVES.
- 3) The device recognizes emergency text session initiation (as different from non-emergency text).
- 4) As specified by the underlying protocols, the device and the PSAP exchange capabilities so that both endpoints know which additional media types can be supported.

4.9.4 Post Conditions

The emergency caller used messaging services to communicate with a PSAP call taker, possibly with additional media streams or transmissions as well. At the conclusion of the call, the caller or call taker terminates the emergency session.

4.9.5 Normal Flow of Messaging Service – text session with emergency indication

- 1) Bob uses his mobile phone to initiate an emergency text message to report an emergency situation. Bob may or may not be speech- or hearing- impaired, and may or may not be in an emergency situation in which it would be dangerous to make a voice call (e.g., an armed robbery in a convenience store where Bob is a customer).
- 2) The device provides positive indication of an emergency session, per "Short Description" item 0 immediately above. Since Bob is reporting an emergency, he is reassured by this confirmation.
- 3) The text session is routed to Carol at a local PSAP.
- 4) Carol sends a message back to Bob, asking questions, and Bob responds. Bob's device does not beep, make noise, flash, or otherwise draw attention when the response from the PSAP is received.
- 5) Carol decides that dispatching an Emergency Response team is warranted, and sends a response team to Bob's location.
- 6) Carol sends a message to Bob advising that help is on the way.
- 7) The device enters "emergency mode" during or following the emergency session, per "Short Description" item 0 immediately above.

4.9.6 Normal Flow – User accidentally initiates emergency text message

- 1) Bob initiates a text message to an emergency recipient.
- 2) Per "Short Description" item 0 immediately above, the device indicates that an emergency session has been initiated.
- 3) Bob realizes his mistake and terminates the session. (Any special handling of abandoned sessions is out of scope of this use case.)

4.9.7 Normal Flow – PSAP adds audio or video

- 1) Steps 1-7, same as "Text session with emergency indication" immediately above, with the following additional steps occurring at any point after step 3:
- 2) On reading Bob's initial or a subsequent text, Carol determines that having additional media, such as an audio or video stream, would be helpful.
- 3) Carol attempts to add an audio or video feed.
- 4) The device asks Bob for permission to transmit audio or video.
- 5) Bob presses "OK".
- 6) The device starts transmitting audio and/or video.
- 7) Carol listens to the audio and/or watches the video to assist in assessing the situation. Carol may bridge a responder into the stream if warranted.
- 8) Bob and Carol continue to exchange text messages.

4.10 Use case 10 Multimedia Telephony communication mainly in Sign Language to Emergency services

Note: Three way calling in an emergency call is not supported when initiated from the emergency caller.

4.10.1 Short Description

Agnes is a Multimedia Telephony communication user with a mobile device with MMTEL capability (Video, Audio and Real-Time Text). Being deaf and preferring sign language communication, she has her service set up so that a Sign Relay service is invoked as a three party call participant in emergency service calls and in calls to audio-only phones. That service translates between sign language and spoken language. She has seen an accident and wants to use Non-Voice Emergency Services to call the PSAP to report.

4.10.2 Actors

Agnes, Multimedia Telephony communication user

Mary, PSAP call taker

Tuula, Sign language interpreter in the relay service.

4.10.3 Pre-Conditions

The PSAP has NOVES capability.

4.10.4 Post-Conditions

Agnes' call reached correctly the PSAP with all three media. The relay service was invoked with priority. All three media are exchanged between all three parties. The main interaction is that Agnes and the relay service interpreter Tuula interact in Sign Language, and Tuula and the PSAP call taker Mary interact in Speech. The video connection is very useful addition for Mary to assess the situation, and the text connection is important for interchange of information requiring exact spelling, such as addresses, medicine names etc. Audio from the place of the accident is also sometimes a valuable additional source of information for Mary.

4.10.5 Normal Flow

- 1) Agnes encounters an accident emergency situation and decides to use Non-Voice Emergency Services to call the PSAP.
- 2) Agnes invokes NOVES communication on his device with Video and Real Time Text capabilities and initiates a NOVES session with emergency services and the sign relay service simultaneously in a three-party fashion.
- 3) Mary is a PSAP call taker and receives the call from Agnes.
- 4) Tuula is in the sign relay service translating between sign language and speech.
- 5) Mary can see Agnes and whatever she is asked to show.
- 6) Any real-time text information is conveyed between all three parties.
- 7) Mary answers Agnes mainly in speech but occasionally in real-time text.
- 8) Mary launches the procedure for emergency services support Agnes' case.
- 9) Agnes has been reassured in real-time that the accident she saw has been taken into account and can be sure that the emergency services take care of the case.

4.10.6 Alternative Flows

In certain situations the PSAP call taker may know sign language. Agnes can then express herself in sign language or show the emergency problem with the camera directly to Mary in the PSAP, and complement with information in the real-time text medium as need arise.

4.10.7 Exceptions

NA

5 High level Service Aspects

5.1 General

5.1.1 Accessibility

Various scenarios of service accessibility are possible, and will be determined by regulations in each country. In some countries it is known already that NOVES would be available to everyone without subscription. In some other countries it is unlikely, at least in the near term, that non-voice emergency services would be available to all subscribers..

Possible requirements

- *Access to non-voice emergency services should be available to all subscribers, or selected subscriber groups, as required by local regulators.*
- *The user may need to subscribe to non-voice emergency services, as required by operators and/or local regulations.*

5.1.2 Location services

In many countries, the provision of positioning information to the PSAP during an emergency voice call is required by regulation.

5.1.3 Limited Service Mode

3GPP specifications enable emergency voice calls to be made without a valid subscription. Many countries have moved away from this being a regulatory requirement, but in some countries a valid subscription is still not required to make an emergency voice call.

Provision of non-voice emergency services without a valid subscription may be problematic and could require changes to 3GPP specifications and networks. It is also possible that access to non-voice emergency services without a valid subscription would lead to mis-use of the service, such as testing stolen phones and denial of service attacks on the PSAP and networks, and could be problematic for PSAPs (anonymity).

It is expected that NOVES in limited service mode would not be a requirement.

5.1.4 Charging

Local regulations usually require that emergency calls are free of charge and the same will probably apply to NOVES. Call records should allow for charging if it is required.

Possible requirements

- *Detailed records should be generated.*

5.2 Security, reliability, and priority handling considerations

5.2.1 Security

Spoofing is a potential security risk.

PSAP operators currently use real time communication with the person requesting help to assess the situation. If a message is sent from a known or registered subscriber, rather than an anonymous source, then the confidence level of the PSAP operator can be increased.

Possible requirement

- *The PSAP should know that the non-voice emergency media is from an authenticated device.*
- *Non repudiation*

5.2.2 Performance requirements

NOVES should provide a high level of reliability in delivery of the message to the PSAP.

5.2.3 Prioritization

NOVES should generally be prioritized higher than the equivalent non emergency service.

3GPP standards should include possibilities for prioritization but it is up to regulatory requirements if they are used or not.

5.3 Routing considerations

Two possible scenarios are that PSAPs handle voice and non-voice emergency calls, or separate PSAPs are established for non voice emergency services. In the case of eCall, some EU Member States will implement eCall with existing PSAP infrastructures whereas others will have dedicated eCall PSAPs. The same Calling Party ID would be attached to all media components so that the PSAPs can associate one caller to one incident.

It is not expected that media would have to be routed to multiple PSAPs.

It will be necessary to associate multiple non-voice emergency media and possible associated voice calls as one “session”. For example, a series of text messages could be in the dialogue which would have to be associated with the same NOVES device and the same PSAP call taker.

Possible requirements

- *The originating or emergency services network shall provide a mechanism to route non-voice emergency media to the NOVES capable PSAP according to the capability of PSAP and the requested type of emergency service, subject to local regulators/authorities.*
- *The originating or emergency services network should be able to route non-voice emergency media to the same PSAP as voice calls, or to a different PSAP, as required by local regulators/authorities.*
- *The system shall provide a mechanism to associate multiple non-voice emergency media and possible associated voice calls together.*

5.4 Roaming considerations

It would be desirable for subscribers who need NOVES to have access to these services when roaming. It is not known whether local regulations would require that NOVES are provided to incoming roaming subscribers.

An NOVES message sent from a NOVES device in a visited network should not go to the Home Network as the NOVES message could not then be routed to a local PSAP in the visited country. Any mechanism to intercept NOVES messages in the visited network and route them to a local PSAP may be costly to implement and may lead to problems in border areas.

If NOVES is not available in a visited network, then the user should be notified.

A SIP based text message could be addressed by the handset to a different address than a normal text message. Further consideration is required.

Possible requirements

- *when the NOVES device is roaming, NOVES data and/or messages should be routed directly to the visited network.*
- *If NOVES is available in a visited network, then the user should be notified.*

5.5 Hand-over considerations

There can be scenarios where an emergency service available in an access network may not be possible after handover in a different access network, including e.g. non-3GPP access network.

If a NOVES call has multiple media, the call remains active as long as one media (e.g. real time text) is usable.

If NOVES service is lost, voice should be available as fallback.

5.6 PSAP boundary considerations

It is expected that NOVES would be equivalent to emergency voice calls in this respect. All non-voice emergency media types should go to the PSAP associated with the user's location at the beginning of the non-voice emergency session. It is expected that the original PSAP will coordinate with PSAPs of other regions if necessary.

5.7 Multiple media considerations

The system should allow the PSAP to attribute all non-voice emergency media types to the originating NOVES device. Even if communication streams are routed to different PSAPs, it will be necessary to attribute everything to the same originating NOVES device for avoidance of risk that the PSAP assumes multiple incidents.

5.8 Call-back considerations

If a PSAP receives a NOVES communication, the PSAP in some cases may want to establish a callback communication with different media to the person to assess the incident. In some cases a voice call back would not be appropriate, for instance if the user is hearing impaired, or the user is in a situation where s/he can not speak.

The PSAP will have to at least acknowledge receipt of an NOVES communication and should preferably be able to communicate bilaterally in the same media associated with initial services invoked.

In the case of a media communication, a voice callback may be adequate.

Possible requirements

- *3GPP specifications should allow for the PSAP to respond to the NOVES device using the same media type, subject to capabilities of the PSAP.*
- *3GPP specifications should allow for the PSAP to make a voice call to the originating NOVES device, subject to its capabilities, if emergency callback is already provided.*

5.9 Load impact considerations

5.9.1 Large scale emergency

The network operator should manage non-voice emergency traffic overload in the same way as emergency voice traffic overload.

5.9.2 Malicious use

Filtering is sometimes applied to voice emergency calls, in that the caller hears a recorded message asking him to call another number if the situation is not an emergency. Something similar may be applied to non-voice emergency services. Note this may be performed in the PSAP and not in the 3GPP network.

All non-voice emergency service attempts may be logged and that data made available to PSAP, if required by regulation.

6 MMI Aspects

NOVES does not include support of non-human initiated devices.

7 Charging Aspects

See clause 5.1.4.

8 Security Aspects

NOVES are next generation emergency services that utilize trusted applications in support of non-voice communications between citizens and emergency authorities using real-time session-based text and multi-media messaging. NOVES supports location determination of the reporting device and location transport in a manner similar to next generation emergency voice communications, in addition to providing two-way voice emergency communications between citizens and emergency authorities (e.g. - PSAPs). Delivery of location information to PSAPs must be protected against unauthorized disclosure and alteration.

Protection against unauthorized disclosure and alteration of NOVES data which is not provided by the origination network cannot be attested to or vouched for by the network operator.

See also clause 5.2.

9 Conclusion

NOVES is a part of the over-all Next Generation emergency service environment. There will be significant impacts to the entire emergency services system resulting from the changes in networks and devices as described in this document. It is expected that end user devices and origination networks will ultimately evolve, and that the next generation emergency services solution will allow this evolution to take place over time. Many systems in the emergency services network must eventually change. New end-to-end messaging relationships must be established.

The next generation emergency services requirements identified in Section 10 are focused on session based non-voice-initiated emergency service requests. A significant portion of the use cases that were used to develop these requirements are based on wireless communication services. It is therefore recommended that these requirements are included in TS22.101.

Non-session based NOVES was considered in this study, however it was decided that a session based NOVES solution was the best path forward for a faster standardisation and roll out of next generation emergency services. Non-session based NOVES may be considered for standardisation at a later stage.

10 List of requirements for non-voice emergency services

The section defines the requirements for NOVES that are necessary to support use cases identified in Section 4.

10.1 End-to-End General Requirements

- NOVES is not a subscription service except where subject to regional regulatory requirements. Access to NOVES should be available to all users utilizing NOVES capable devices.
- Entities which support the use of NOVES shall support citizen initiated two-way emergency communications between citizens and emergency authorities.
- NOVES may support real-time session-based text and multi-media messaging (e.g., file transfer of pictures or pre-recorded video clips), real-time video services, and supplementary real-time audio (e.g., background sound).
- An originating network or end user device may support some or all media types, and support of any specific media by an origination network or end user device may be subject to regional regulatory requirements.
- NOVES shall support, subject to regional regulatory requirements, text-based messaging utilizing REAL-TIME TEXT (RTT) [RFC4103] and Session Initiation Protocol (SIP) for Instant Messaging and Presence Leveraging Extensions SIMPLE (session-mode) [RFC4975, RFC4976].

Note: Support of XMPP and pager-mode should be considered as a future study item.

- NOVES is an enhancement to next-generation emergency capabilities. Because not all networks, devices, and PSAPs will be enhanced at the same time, a mechanism must be developed to inform users if NOVES is available and hence can be used to report an emergency. It is desirable for users to be informed before attempting to make a NOVES call.
- Subsequent NOVES media, sent after the initial emergency session has ended, may if possible and if required by regional regulators be sent to the same PSAP for correlation with the initial emergency session.
- Delivery of location information to PSAPs associated with a NOVES session should be protected against unauthorized disclosure and alteration in a similar manner to next generation voice emergency services. NOVES data not provided by the origination network cannot be attested to or vouched for by the network operator.

10.2 NOVES Device Requirements

- A NOVES device shall also be voice capable.
- A NOVES device shall be capable of detecting an emergency service request (e.g. in a similar manner as an NG 911 voice call) and marking it for the benefit of the serving network.
- A NOVES device shall be able to receive a voice call from a PSAP.
- If NOVES are supported in the visited network, the NOVES device shall be able to download available destinations (e.g. – dial string, service URN) for emergency call detection.
- A NOVES device shall support NOVES by utilizing an application that is trusted to adhere to security and other requirements in providing real-time session-based messaging and multi-media content.
- A NOVES device shall be pre-loaded with at least one application suitable for non-voice emergency services.
- Once a device is aware that a NOVES session has been initiated, the device should (subject to user configuration) avoid drawing unnecessary attention to the user (e.g., playing audible tones or flashing brightly) and should confirm this to the user in as private a manner as is reasonable, such as using text on the screen or audio if headphones are already connected. Behavior in an emergency text situation may need to be different relative to the normal configuration.

- When roaming, an NOVES device shall originate NOVES using the same network (e.g., home or visited) in a manner similar to next generation emergency voice communications.
- The NOVES device should clearly differentiate emergency text sessions from non-emergency text sessions on the user display.
- The NOVES device should be able to deliver recorded media in a form that allows progressive playback. (It is desirable that all pre-recorded media sent during an emergency be progressively viewable.)
- When adding additional media to an existing session, the user must be made aware when additional media is requested by the PSAP, and must be able to permit or deny it.

10.3 Origination Network Requirements

When NOVES is enabled by the origination network:

- It shall be possible to authenticate the end user device subject to regional regulatory requirements.
- It shall be possible to provide integrity protection, and/or privacy for NOVES similar to what will be provided for next generation voice emergency services.
- NOVES shall be capable to transport location information to the PSAP in the same manner as next generation voice emergency services
- The origination network shall provide a capability to enable a NOVES device to obtain local emergency numbers or other emergency address(es) (e.g., destination address).
- NOVES shall be provided in the same network (e.g., home or visited) in a manner similar as for next generation emergency voice services.
- NOVES should provide a high level of reliability and low delay in the delivery of a message, and therefore should avoid the use of store-and-forward mechanisms.
- NOVES shall utilize the same priority mechanisms as next generation emergency voice services. Emergency sessions should be prioritized over non-emergency sessions by the network.
- Detailed log records of the NOVES session should be generated by the origination network in a similar manner to next generation emergency voice calls. Note: Media is not required to be logged in the origination network.
- For NOVES, any kind of emergency numbers, emergency SIP and TEL URIs, and special indications for emergency sessions within the SIP signaling shall be supported in the same manner as next generation voice emergency services.
- In cases where a NOVES device can't detect an emergency service request, the emergency session should still be detected and supported by an origination network that supports NOVES.
- All emergency media content shall be carried with an indication of the source, in a similar manner as for emergency voice calls.
- During an emergency session, the Origination Network shall deliver subsequent NOVES media content to the same Emergency Services IP Network or PSAP as the initial media and call setup signaling at the beginning of the non-voice emergency session.
- The Origination Network shall be responsible for routing NOVES messages to the appropriate Emergency Services IP Network or PSAP.

Annex A: Emergency Services IP Network Requirements (informative)

NENA requirements for the emergency services IP network addressing NOVES emergency services capabilities at the PSAP. These requirements are intended to be compatible with the requirements in the NENA next generation emergency services i3 Technical Requirements Document.

Note: NENA requirements for the Emergency Services IP Network are applicable to North America and Emergency Services IP Network requirements may be varied according to regional regulations and operator policies.

- In NOVES situations, the Emergency Services IP Network shall provide a capability to route to a default PSAP when the local PSAP cannot be determined.
- Within an Emergency Services IP Network, all NOVES attempts shall be logged and the data made available to the PSAP.
- Emergency Services IP Networks shall be able to direct NOVES messages to an appropriate alternate destination if the situation is not an emergency.
- During an emergency session, the Emergency Services IP Network must deliver subsequent NOVES media content to the same PSAP as the initial media and call setup signaling at the beginning of the non-voice emergency session.
- The Emergency Services IP Network shall have the capability to associate all emergency sessions and media content with the originating caller.
- The PSAP shall be able to acknowledge setup of the NOVES session back to the originating caller.
- The Emergency Services IP Network shall be responsible for routing NOVES messages to the appropriate PSAP.
- Within an Emergency Services IP Network, it shall be possible to associate non-voice messages and voice calls from the same caller together.
- Detailed log records of a NOVES session should be generated by an Emergency Services IP Network.
- The Emergency Services IP Network shall be responsible for any logging of multi-media that may be needed for post processing.

Annex B: European specific requirements

The following are additional requirements which are specifically for Europe:

When caller's identity would be barred because of privacy reasons - this needs to be overridden (European legal requirement, Privacy Directive).

When location information would be barred because of privacy reasons - this needs to be overridden (European legal requirement, Privacy Directive).

It must be possible to reroute to a secondary PSAP on manual initiation from the first PSAP e.g. in case of an imminent emergency in the primary PSAP. This secondary PSAP may be located in a neighbouring country. (Potential operational need related to Universal Service Directive).

Network and Service providers should indicate uncertainties and inaccuracy in the location information they provide to the PSAP considering the capabilities of the device and network (Potential operational need).

PSAP may request Network and Service providers to stop conveying calls or messages from a particular destination to a particular PSAP (National requirement).

Annex C: Change history

Change history											
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	Work Item
SP-51	SP-110173	S1-110094	22.871	0001	-	Rel-11	F	NOVES use case caveats when sending independent media	11.0.0	11.1.0	FS_NOVES
SP-51	SP-110173	S1-110316	22.871	0002	1	Rel-11	C	Comments on Noves	11.0.0	11.1.0	FS_NOVES
SP-51	SP-110173	S1-110313	22.871	0003	-	Rel-11	C	NOVES European aspects	11.0.0	11.1.0	FS_NOVES
SP-52	SP-110377	S1-111428	22.871	0004	2	Rel-11	B	Introduction of Non-Voice Emergency Services (NOVES)	11.1.0	11.2.0	FS_NOVES
SP-53	SP-110577	S1-112349	22.871	0005	1	Rel-11	B	FS_NOVES: Associate delayed transmitted media	11.2.0	11.3.0	FS_NOVES