

Keysight E6951A PSAP Emulator

User Guide

Notices

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Introduction

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eCall and eCall Test Solution

Emergency Call (eCall) and ERA-GLONASS are European Union and Russian Federation initiatives respectively that combine mobile communication and satellite positioning to provide rapid assistance to passengers in the event of a collision.

An integrated In-Vehicle System (IVS) is a key element in the automobile, triggering an emergency call automatically to the Public Safety Answering Point (PSAP), or manually by the passengers. Once a voice connection is established, the IVS transmits essential data – the Minimum Set of Data (MSD), including the vehicle location and direction of travel – which enables the response team to reach the accident site as soon as possible.

The IVS module generally consists of a computer that continuously monitors the crash sensors and vehicle position via satellite receivers; while an in-band modem establishes a voice connection to enable data transmission to nearest PSAP when triggered. A microphone and speaker system enables the driver or passenger to communicate with the PSAP operator.

Each of the components plays an important role, hence they need to be tested for functionality in a real world environment to ensure overall system performance.

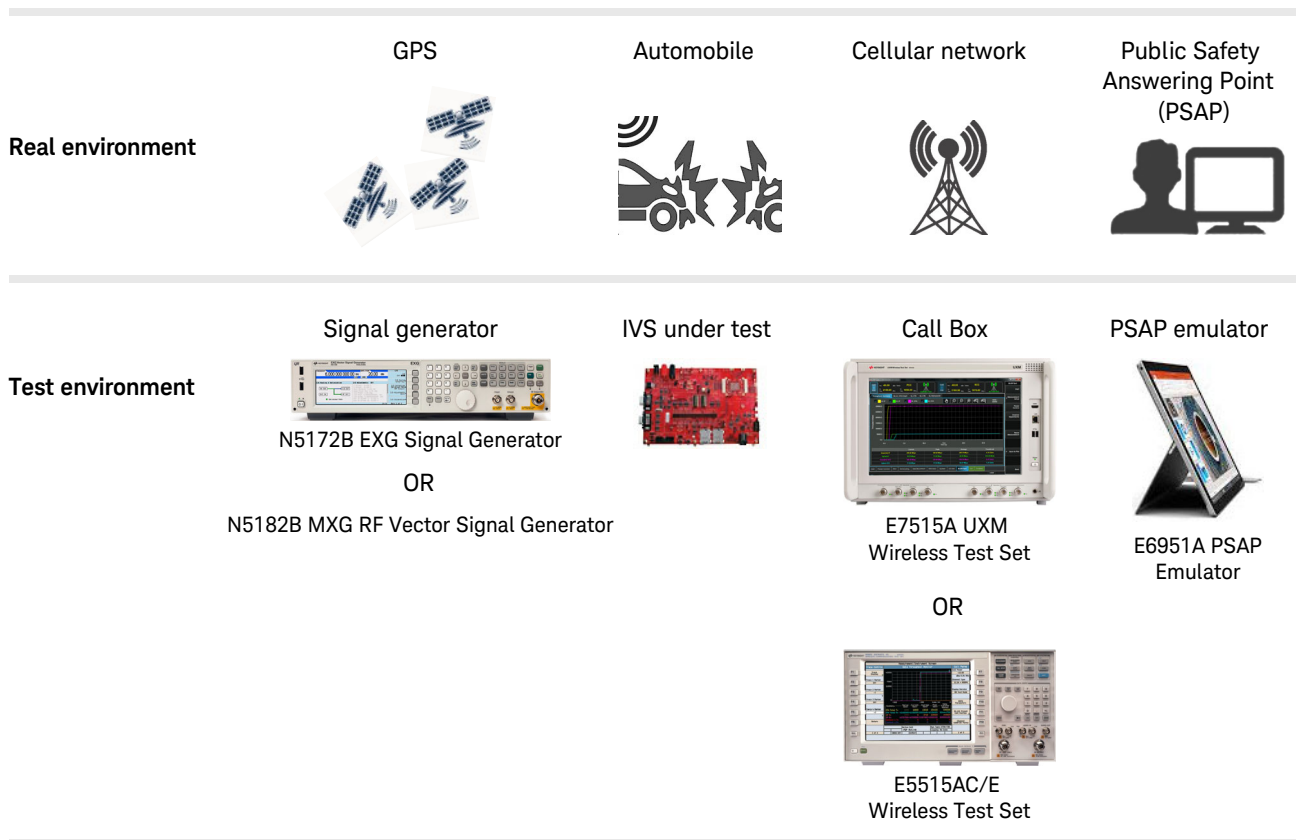
The Keysight E6951A eCall/ERA-GLONASS Reference Solution performs the necessary end-to-end functional and standard-compliance conformance testing of the IVS modules, with an optional audio performance analysis.

In the eCall test environment ([Figure 1](#)), a signal generator provides GNSS coordinates, simulating what the GPS does in the real environment. The IVS represents the vehicle, while a wireless test set is used to emulate a cellular network in the real world cellular network.

As part of the eCall test environment, the E6951A PSAP Emulator does the following:

- Controls the call box to emulate a cellular network and the signal generator to provide the GNSS coordinates.
- Simulates a PSAP to respond to the IVS under test and decode MSD data.
- Verifies that the IVS modem is able to trigger an emergency call, send raw MSD data and establish a voice connection with the PSAP.

Figure 1 eCall test environment



For information about the Keysight instruments, see:
www.keysight.com/find/uxm
www.keysight.com/find/E5515C
www.keysight.com/find/N5172B

eCall Test Configurations

The following examples show the instrument setup and communications paths for various eCall test configurations using the E6951A PSAP Emulator and the following Keysight test instruments:

- E7515A UXM Wireless Test Set or
- E5515C/E Wireless Communications Test Set, and
- N5172B EXG RF Vector Signal Generator or
- N5182B MXG X-Series RF Vector Signal Generator

Test Setup 1 (Figure 2)

In this configuration, the E6951A PSAP Emulator is running externally. This requires a LAN connection to the E7515A UXM call box.

With the E7515A UXM, the audio is transferred via the LAN connection. The E7515A UXM does not provide analog audio IN/OUT. If required, this connection can be made using a USB audio module.

The IVS serial control is an optional mechanism to communicate with the IVS module to initiate an emergency call. The E6951A PSAP Emulator will monitor the connected call box (E7515A UXM or E5515C/E) for incoming calls independently of how that call is established.

Test Setup 2 (Figure 3)

If using the E5515C/E call box, an audio connection between the PC sound card to the audio in/out BNC ports is required.

A USB audio module can also be optionally used with the E5515C/E audio path to avoid audio level calibration issues e.g. variability with PC sound cards input/output levels.

Test Setup 3 (Figure 4)

The E6951A PSAP Emulator can also run on the E7515A UXM PC (Windows 7). In this case there is still a need for an external LAN connection for communication to the signal generator, and an optional USB connection to control the IVS.

Test Setup with Audio Quality Testing (Figure 5)

It is also possible to perform audio quality testing of the eCall using the Keysight U8903B Audio Analyzer. This requires an analog audio path connection between the E7515A UXM or the E5515C/E call box. The E5515C/E can be connected directly to the U8903B using the existing analog audio In/Out ports.

Figure 2 E6951A PSAP Emulator and E7515A UXM configuration

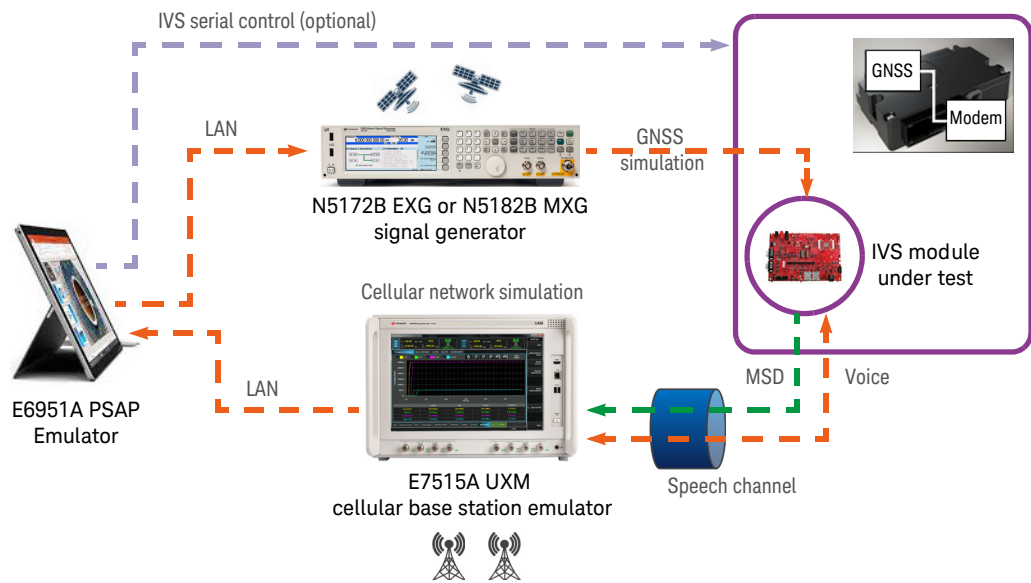


Figure 3 E6951A PSAP Emulator and E5515C/E configuration

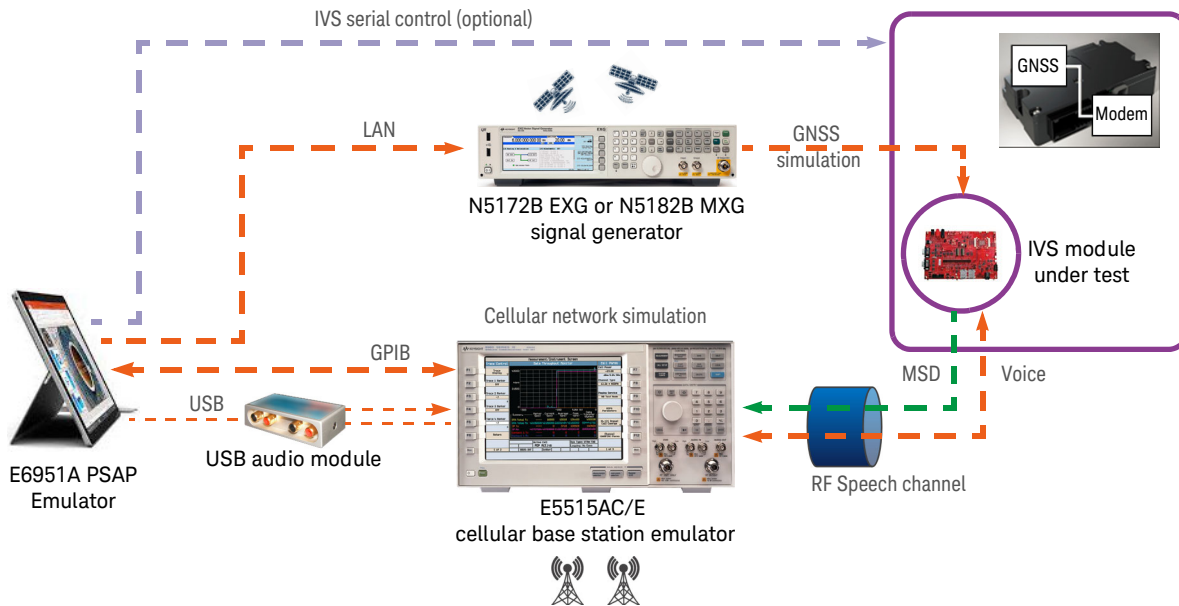


Figure 4 E6951A PSAP Emulator running on E7515A UXM

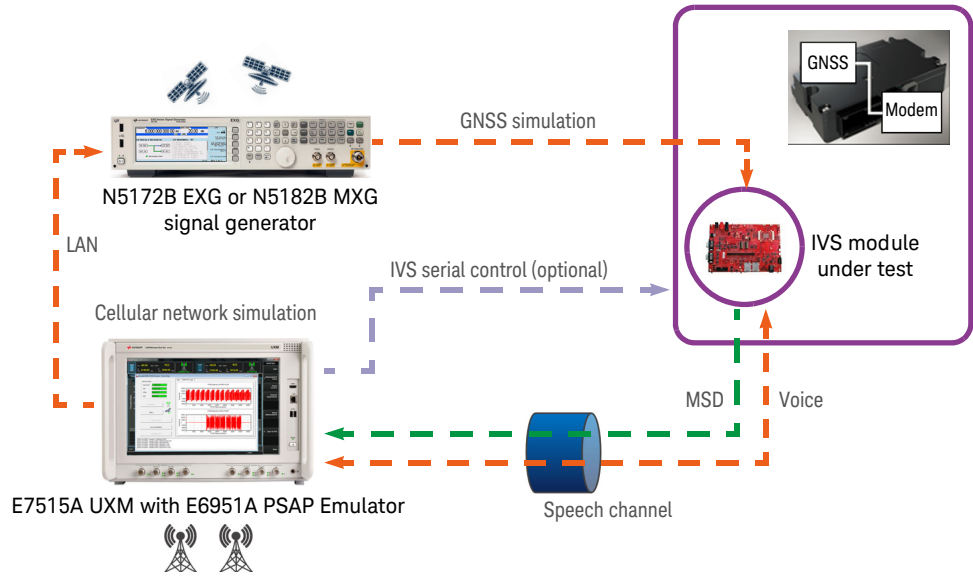
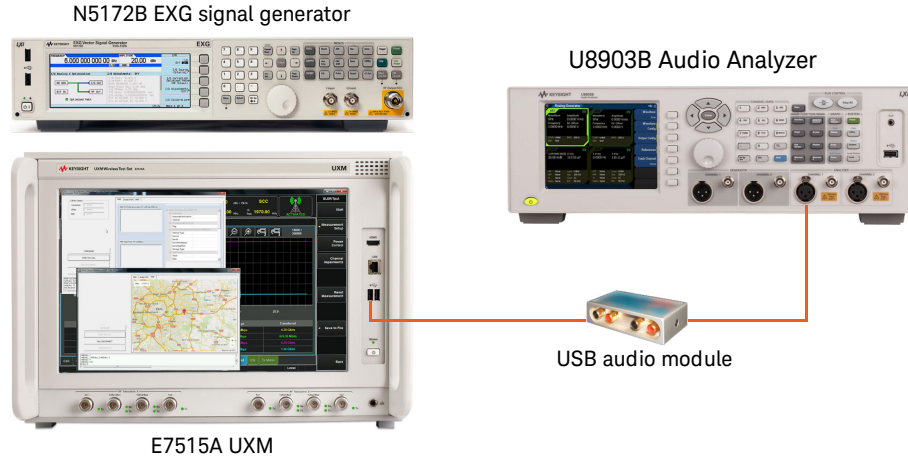


Figure 5 IAudio quality testing with U8903B



Live Network Setup

The E6951A PSAP Emulator may also be used in conjunction with a commercial mobile phone with an active cellular connection in a live network environment. This will test the IVS module using a real cellular network in place of the network emulators such as the UXM.

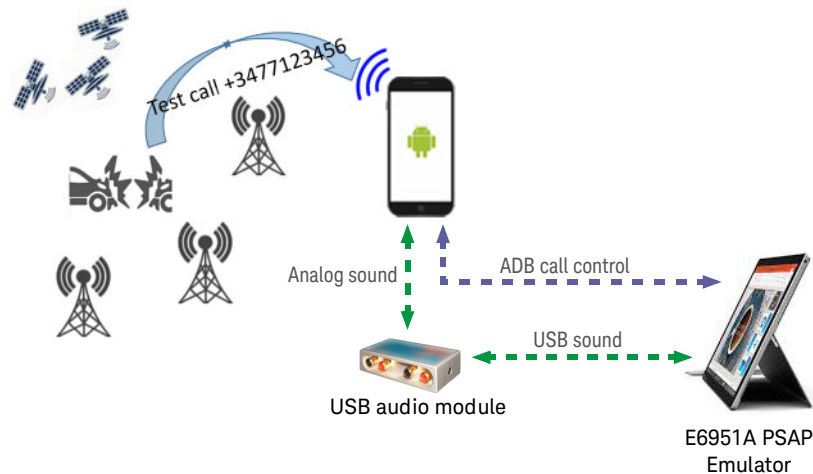
CAUTION

In this configuration, only non-emergency “Test” calls can be used, otherwise the cellular network would route the eCall to a real PSAP!

The main difference between a real eCall and a “Test” eCall is the setting of the eCall Flag which routes the emergency call to the real PSAP and the Emergency Services (i.e. the responsibility of network signaling and routing). The functionality of the IVS module can be tested using this test call method to ensure the module operates as designed after an event. Testing for correct setting of the eCall Flag by the IVS module should be done in a controlled environment using a Network Emulator.

The live network setup uses a commercial Android mobile phone to “connect” the eCall and the phone’s analog audio connections to pass the MSD audio data to and from the E6951A PSAP Emulator. Android Debug Bridge (ADB) over a USB connection is used to detect and control the call state e.g. auto-answer and re-dial. For details, see [Live Network Setup](#) on page 35.

Figure 6 E6951A PSAP Emulator in live network setup



Introduction

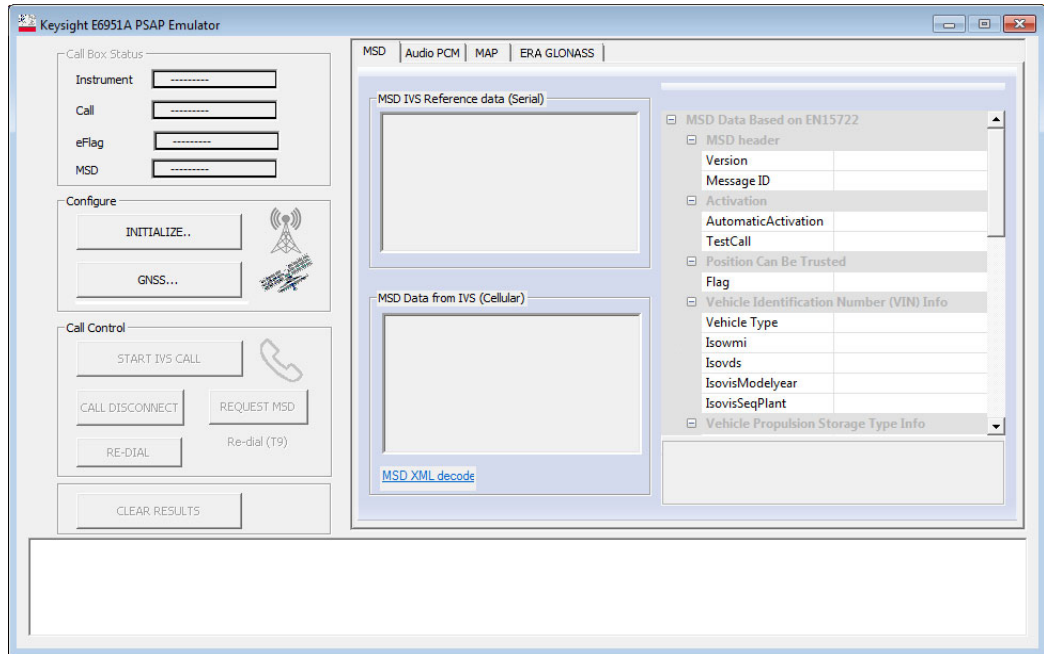
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E6951A PSAP Emulator Window

Launch the E6951A PSAP Emulator by clicking its icon on the desktop.

Figure 7 E6951A PSAP Emulator



Initializing E6951A PSAP Emulator

If using the E5515C/E in the eCall test setup, set the input and output voltage levels as described below, before initializing the E6951A PSAP Emulator.

The E6951A PSAP Emulator uses Real Time Vocoder to generate and receive and send audio to/from the selected call box. However, since the connection type is not under the control of the E6951A PSAP Emulator, the user must configure the appropriate input and output voltage levels to suit the connection configuration (USB via the optional USB audio module, or a direct audio line-in/out to the sound card of a PC). For example, an external USB sound card may expect and input an audio voltage level of 2 V, while a direct analog connection to a PC sound card may only expect to be driven at ~200 mV.

Call Setup Screen			
Voice Call	Voice Call Information		Call Params
ANR Setup	ANR Information ANR Source: Echo Speech Echo Loopback Delay: 0.50 s ANR RAB: 12.2k Voice		Cell Power Off
Real-Time Vocoder Params	Real-Time Vocoder Headroom Information Speech Headroom: 0.00 dB		Channel Type 12.2k RAB
	Real-Time Vocoder Parameters	Value	Paging Service RB Test Mode
	Expected Audio In Peak Voltage	2.000 V	HSPA Parameters
	Maximum Audio Out Peak Voltage	0.000 V	
	Voice Activity Detection State	Off	34,121 Preset Call Configs
Send TF Subset	ANR Voice Activity Detection Algorithm	Option 1	
	Operating Mode	Normal	Channel (UARFCN) Params
	Calibration Type	Audio Out Path	
Close Menu	Audio Out Frequency	1.000 kHz	
	Active Cell	Sys Type: UTRA FDD	
	Idle	Logging: Idle	
	IntRef	Offset	1 of 3

Initialize E6951A PSAP Emulator

This configures the connections to the call box (E7515A UXM or E5515C/E) in the eCall test setup.

- 1 Click the **INITIALIZE** button to display the Initialize dialog box (Figure 8). The settings are described in Table 1.

When initialization is completed, the E6951A PSAP Emulator attempts to establish a SCPI and/or a LAN connection with specified call box. The **Call Box Status** panel at the top left of the window (Figure 7) will show the connection status.

If the connection is successful, the E6951A PSAP Emulator will now be monitoring the call box for incoming emergency calls.

The call box will be configured to have a speech codec of AMR (Adaptive Multi Rate) Full Rate and to use the Real Time Vocoder (RTV) capability*.

- 2 *Optional:* Also change the 2G (GSM/GPRS) codec to Full Rate speech on the call box after the E6951A PSAP Emulator connection has been made.

* RTV capability is separately licensed for each instrument type.

Figure 8 Initializing E6951A PSAP Emulator

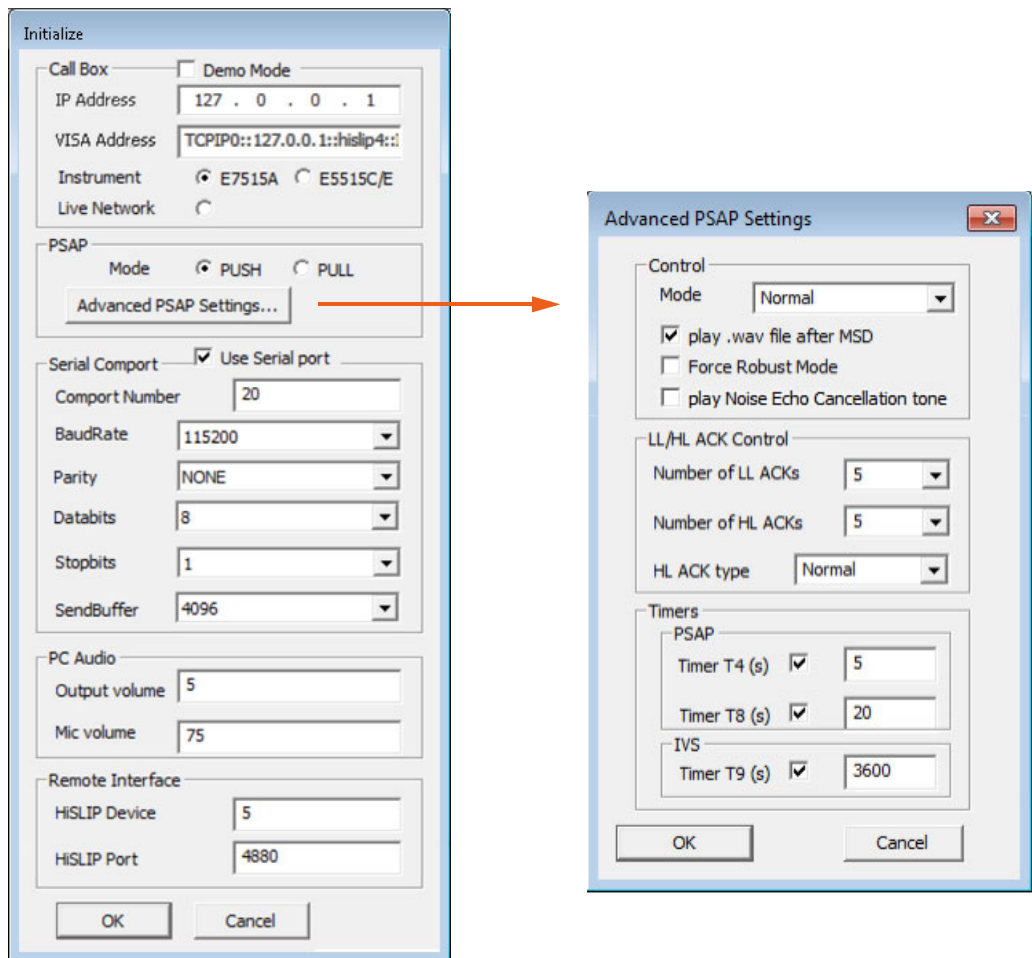


Table 1 Initialize

Option	Description
Call Box	
IP address	IP address of the E7515A UXM only. Defaults to local Host 127.0.0.1.
VISA Address	(SCPI) address of the call box. Can be either of the following: <ul style="list-style-type: none"> LAN based for E7515A UXM e.g. TCP0::127.0.0.1::HISLIP4::INSTR GPIB for E5515C/E e.g. GPIB0::14::INSTR
Instrument	Specify test setup with a call box, either E7515A UXM or E5515C/E;
Live Network	or using a Live Network.
PSAP	
Mode	Selects which endpoint initiates the synchronisation exchange. PUSH – PSAP sends the initial sync tone. PULL – IVS sends the initial sync tone. See Advanced PSAP Settings .
Serial Comport	
Use Serial Port	Enables the use of the serial port. When enabled, the serial port is used to communicate with the IVS to initiate an emergency call.
Comport Number	PC port number as shown in the Windows Device Manager Ports setting.
Baud Rate	Specify the settings for the selected serial port.
Parity	
Databits	
Stopbits	
SendBuffer	
PC Audio	(E5515C/E only)
OUTPUT VOLUME	Level of audio output to the selected speaker device. Range is 0 to 100%.
MIC VOLUME	Expected input level of the received audio. Range is 0 to 100%.
Remote Interface	
HiSLIP Device	Settings for HiSLIP device, if using the remote control interface API.
HiSLIP Port	See Commands for Remote Control Interface on page 58 for the SCPI commands that can be used to control the application.

Table 2 Advanced PSAP Settings

Option	Description
Control	
Mode	<ul style="list-style-type: none"> ▪ Normal – Normal PSAP operation. ▪ Inhibit SEND MSD – The SEND_MSD command from the PSAP server is not sent. This is used to satisfy ETSI TS 103.412 test case 7.1.1.34. ▪ Request all RVs – Force all eight Redundancy Versions (RV 0..7) to be sent. This is achieved by sending LL NACK for RV 0 through 6. This is to satisfy ETSI TS 103.412 test case 7.1.1.36. It is recommended to use Robust Mode for this test case to ensure that timer T7 expires.
Play .wav file after MSD	<p>Once the MSD (Minimum Set of Data) is successfully exchanged, the IVS module may revert to an audio voice call for communication with the PSAP operator.</p> <p>Select this option to play a wav file to test the audio path. (PSAPdefaultPlayback.wav in the same folder as Keysight.Psap.exe). This file can be replaced to customize the playback. Ensure that you use a standard mono .wav file with a sample rate of 8000 bps.</p>
Force Robust Mode	Override the optimum modulator mode and force to robust mode (as opposed to the possible fast mode).
Play Noise Echo Cancellation tone	<p>Play the NECtone.wav tone (in the same folder as Keysight.Psap.exe) before sending the initial SYNC tone. This example .wav file contains a 2.1 kHz tone of duration 300 mS.</p> <p>To play a different frequency or duration, this file can be replaced. Ensure that you use a standard mono .wav file with a sample rate of 8000 bps.</p>
LL/HL ACK Control	
Number of LL ACKs	Maximum number of Low Level ACKs to be sent.
Number of HL ACKs	Maximum number of High Level ACKs (sometimes call Application Level ACKs) to be sent.
HL ACK Type	<ul style="list-style-type: none"> ▪ Normal Positive Acknowledgement – Standard HL ACK of correctly received MSD. ▪ Call Clear – HL ACK of MSD with bit 2 of the HL ACK data field set to request the IVS to clear down the current call.

Table 2 Advanced PSAP Settings

Option	Description
Timers	<i>(See EN 16062 Appendix A)</i>
PSAP	<ul style="list-style-type: none"> ▪ Timer T4 – PSAP wait for INITIATION signal period. <ul style="list-style-type: none"> ▪ START: T4 starts as soon as the PSAP eCall modem has answered the call. ▪ STOP: T4 stops when the PSAP eCall modem detects an INITIATION signal sent by the IVS. ▪ EXPIRY: Connect the audio path. ▪ Timer T8 – PSAP MSD maximum reception time. <ul style="list-style-type: none"> ▪ START: T8 starts as soon as the PSAP starts sending the SEND MSD signal. ▪ STOP: T8 stops when the PSAP eCall modem receives a valid MSD (reception being acknowledged by sending an LL ACK). ▪ EXPIRY: Connect the audio path.
IVS	<ul style="list-style-type: none"> ▪ Timer T9 – IVS NAD minimum network registration period. <ul style="list-style-type: none"> ▪ START: T9 starts as soon as the IVS-NAD clears down a call. ▪ STOP: T9 is uninterruptable; until T9 expires the IVS-NAD remains registered on the serving network, and remains available to receive calls from the PSAP and rescue workers. ▪ EXPIRY: Upon expiry of T9 the IVS-NAD may deregister from the serving network. <p>NOTE: While the T9 timer is active, it is possible for the PSAP to re-dial the IVS and for the IVS module to automatically answer the call.</p>

Configuring GNSS Emulation

The GNSS emulation is entirely independent of the PSAP service and as such can be started, stopped or re-configured at any time. (This may of course have an impact on the ability of the IVS to provide an accurate location via the simulated MSD data exchange.)

The E6951A PSAP Emulator supports the N5182B MXG X-Series RF Vector Signal Generator and the N5172B EXG RF Vector Signal Generator.

Two modes of operation are supported:

- Real Time operation based on scenario files (.ags).
A preconfigured scenario file may be used, or you can select the **Custom** option to enter parameters for creating a custom scenario.
- Basic single or multi-satellite waveform playback.
A waveform file (.wfm) may be downloaded directly to the ARB memory to simulate the GNSS signal.

Note the following requirements:

- To use Real Time mode, the instrument option 660 must be installed.
- Waveform files are typically very large; for example, ~370 MB for a GPS file of duration 35 seconds at a minimum sampling rate of 2.16 MHz. This requires the extended ARB memory depth option for the EXG signal generator (E5172B-022) to accommodate the typical 30–45 second cold start Time to First Fix (TTFF) for GNSS receivers.

Configuring GNSS emulation:

- 1 In the E6951A PSAP Emulator window, click the **GNSS** button to change the settings (Table 3).
- 2 Click **Start** when completed.

The scenario or waveform file will be loaded onto the signal generator and the specified settings applied.

Waveform files are typically very large and may take several minutes to load. The instrument must have enough ARB memory available for the waveform upload.

On successful completion, the GNSS state is indicated by the satellite icon.



GNSS off.



Scenario or waveform loaded, RF OFF.



Scenario or waveform loaded, RF ON.

Table 3 GNSS settings

Option	Description
IO Config	
IP Address	IP address of the signal generator.
RF Frequency (GHz)	RF frequency of the transmitted GNSS signal.
RF Amplitude (dBm)	RF amplitude of the transmitted GNSS signal.
RF State	Turns the RF output signal ON or OFF.
Scenario selection	
GNSS File	<p>Select the file type from the drop-down list if necessary (.ags for scenario file or .wfm for waveform file), then select the file.</p> <ul style="list-style-type: none"> ▪ If Real Time mode is available: Select a preconfigured GNSS scenario file. ▪ If Real Time mode is not available: Select the waveform file that will be used to simulate the GNSS signal. <p>Additional scenarios or waveform files can be generated using Keysight's N7609B Signal Studio Software. (Visit www.Keysight.com/find/N7609B.)</p>
Custom	<p>If Real Time mode is available, you can select Custom to enter your own parameters for creating a custom scenario.</p> <p>The scenario file will be dynamically constructed and copied to C:/Temp/PSAPcustom.ags.</p>

Starting an eCall

Once the E6951A PSAP Emulator has been initialized and the optional GNSS scenario emulation is running, the system is ready to receive incoming emergency calls.

An eCall session is always an IVS-initiated event and can either be started directly from the IVS or via the **Start IVS Call** button (enabled using the [Use Serial Port](#) option) on the E6951A PSAP Emulator.

When enabled, **Start IVS Call** starts the session via AT commands sent over the serial port to the IVS. The AT commands are defined in the `ATcommands.txt` file (in the same folder as `Keysight.Psap.exe`). The default AT commands are:

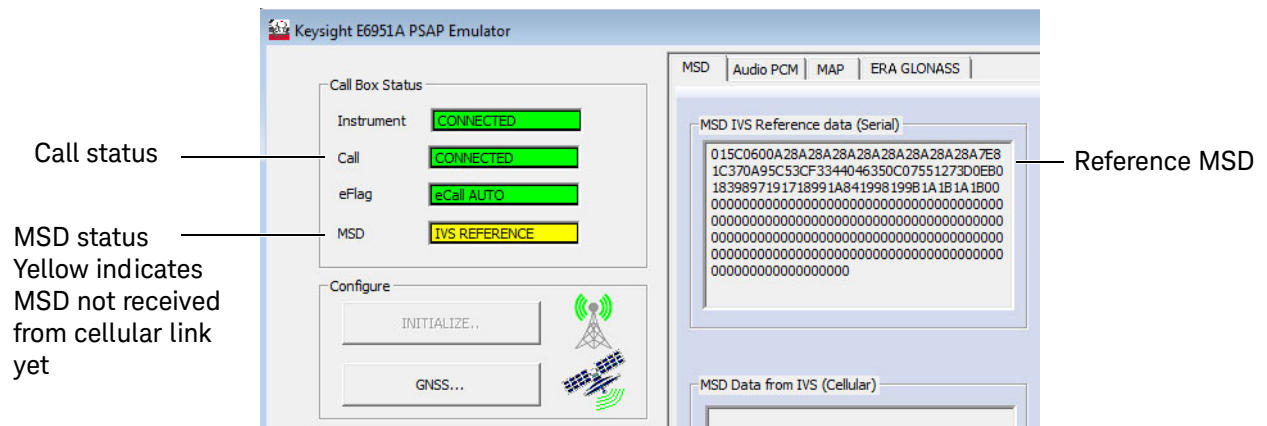
```
INIT:<user defined>
MSDGET:at+kecallmsd=0
MSDSET:<currently unused>
DIALPUSH:at+kecall=0,"112",1,1
DIALPULL:at+kecall=0,"112",1,0
```

The following describes the process when using Start IVS Call to start an eCall session.

- 1 Click the **Start IVS Call** button.
- 2 The contents of the `INIT` (if defined) and the `MSDGET at` commands are sent to the IVS. The `MSDGET at` command extracts the reference MSD data via the serial port, if available, for comparison with the MSD received via the subsequent cellular communication.
- 3 If the reference MSD is successfully received, it is displayed as shown in [Figure 9](#).
- 4 The next AT command is sent to the IVS to initiate the emergency call. Either the `DIALPUSH` or `DIALPULL` command is sent, depending on the mode selected during initialization.

For example, if the `DIALPULL` command `at+kecall=0,"112",1,0` is sent, a 10 second call start timer is started and the E6951A PSAP Emulator monitors the call box for a call. If a call is successfully established, the **Call** status will show **CONNECTED**.

Figure 9 Call and MSD status



Reading the eFlag

Once a call is successfully established the eFlag is read from the call box.

The eFlag is the content of the Over the Air Layer 3 Call Control Setup message (3GPP 24.008 section 10.5.4.33) and is expected to have either bit 6 or bit 7 of the Service Category message set as described below.

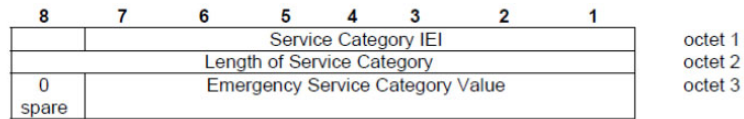
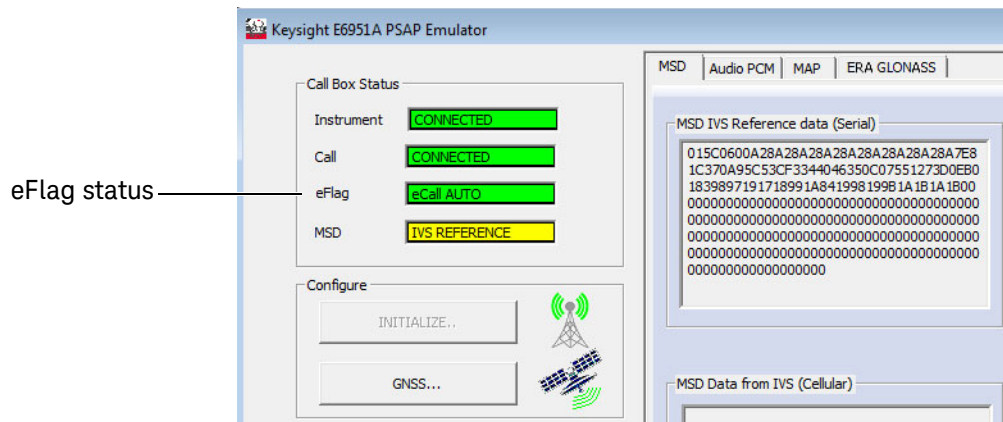


Figure 10.5.118d/3GPP TS 24.008 Service Category information element

Table 10.5.135d/3GPP TS 24.008: Service Category information element

Emergency Service Category Value (octet 3)	
The meaning of the Emergency Category Value is derived from the following settings (see 3GPP TS 22.101 [8] clause 10):	
Bit 1	Police
Bit 2	Ambulance
Bit 3	Fire Brigade
Bit 4	Marine Guard
Bit 5	Mountain Rescue
Bit 6	manually initiated eCall
Bit 7	automatically initiated eCall
Bit 8	is spare and set to "0"

If an eCall is established but neither of the eCall bits are set during the call establishment then the eFlag status will show **Emergency Call**, otherwise a successful setting will display **eCall AUTO** or **eCall MANUAL**.



MSD Exchange and Decoding

After the eCall has been established the E6951A PSAP Emulator will either initiate or respond, depending on the PUSH/PULL mode setting, to the encoded audio signals from the IVS in order to initially sync and then perform the data exchange and verification of the received data.

The status of the MSD exchange can be monitored in two ways.

- The PSAP LOG EVENT status display at the bottom of the E6951A PSAP Emulator window. The **sample:** field is measured in audio samples (at 8000 samples per second) relative to the start of the audio data exchange.

```
PSAP LOG EVENT <sample:3520> CONTROL SYNC
PSAP LOG EVENT <sample:6720> CONTROL SYNC
PSAP LOG EVENT <sample:6720> CONTROL LOCK
PSAP LOG EVENT <sample:7680> SENDING START
PSAP LOG EVENT <sample:22880> SENDING MSD SYNC
PSAP LOG EVENT <sample:32800> MSD RECEIVED
```

- A **Diagnostic.txt** file, which is created and overwritten on every call and is saved in the E6951A **AppData** folder e.g.
C:\Users\instrument\AppData\Roaming\Keysight\E6951A

Example 1 Example content of a successful eCall

NEW CALL started at Tue Oct 11 09:25:06 2016

```
[PSAP] configure: LLacks 5, HLacks 5, robustMode FALSE, controlMode 0, HLAckType 0
09:25:06 : [PSAP] reset receiver
09:25:06 : [PSAP] reset transmitter
09:25:06 : [PSAP] sync detected; delay: -84; npeaks: +5; sign: +552, Pos.sign: +552,
Neg.sign: -538 (regular sync)
09:25:06 : [PSAP] sync detected; delay: -84; npeaks: +5; sign: +545, Pos.sign: +545,
Neg.sign: -531 (regular sync)
09:25:06 : [PSAP] sync locked, starting control message detection
09:25:07 : [PSAP] received SEND (metric: 97), initiating START trigger
09:25:07 : [PSAP] reset receiver
09:25:07 : [PSAP] sending START
09:25:07 : [PSAP] sending START
09:25:08 : [PSAP] sending START
09:25:08 : [PSAP] sending START
09:25:08 : [PSAP] sync detected; delay: -85; npeaks: +5; sign: +504, Pos.sign: +504,
Neg.sign: +0 (regular sync)
09:25:08 : [PSAP] fast modulator chosen (metric: 2075)
09:25:09 : [PSAP] sending NACK
09:25:09 : [PSAP] sending NACK
09:25:09 : [PSAP] sending NACK
09:25:10 : [PSAP] MSD successfully received; redundancy versions: 0
09:25:10 : [PSAP] sending ACK
09:25:10 : [PSAP] HLACK data received from control
09:25:10 : [PSAP] sending HLACK; data: 0x00
09:25:10 : [PSAP] sending HLACK; data: 0x00
09:25:11 : [PSAP] sending HLACK; data: 0x00
```

```
09:25:11 : [PSAP] sending HBLACK; data: 0x00
09:25:11 : [PSAP] sending HBLACK; data: 0x00
```

Request MSD

Once an eCall has been activated and the MSD data has been successfully exchanged, it is possible to request a transmission of MSD data by clicking the **REQUEST MSD** button (Figure 10). This is used to execute the ETSI TS 103 412 Test case 7.1.1.33 “MSD transfer request while eCall conversation in progress”.

MSD Decodes

The MSD (Minimum Set of Data) is extracted from the audio tones and displayed in its ASN.1 packed form and decoded form on the **MSD** tab (Figure 10). To view the decoded MSD data in XML format, double-click the **MSD XML decode** link. The most recent MSD decode file (**PSAPmsd.xml**) can be found in the folder **C:\Users\instrument\AppData\Roaming\Keysight\E6951A**. An example is shown in Figure 11.

To see a description of a decoded field, click on the field name. For additional information on the range of values for each of the fields, see the EN15722 specification available from www.cen.eu.

Figure 10 MSD display

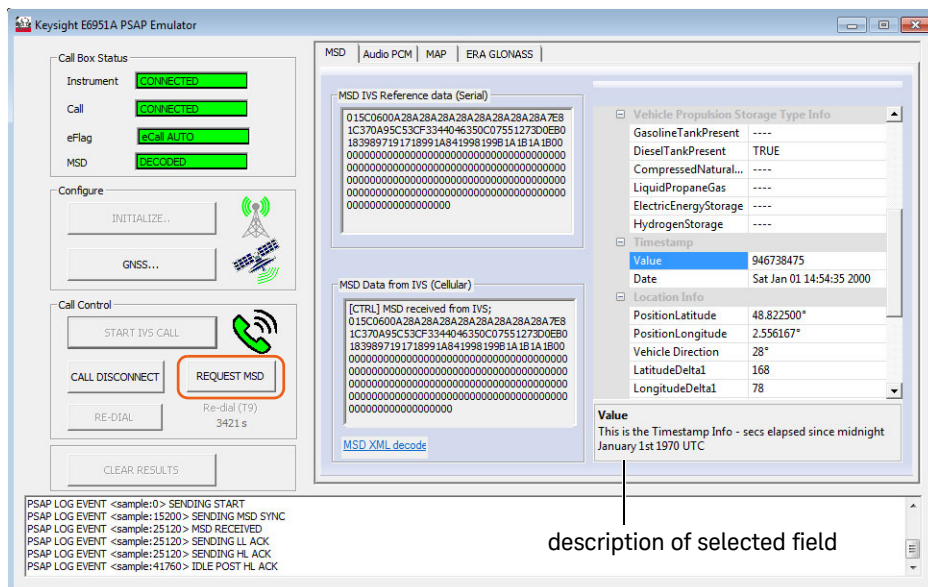


Figure 11 MSD data in XML format

```

PSAPmsd.xml - Notepad
File Edit Format View Help
<ECallMessage>
  <msdVersion>1</msdVersion>
  <msd>
    06 00 A2 8A 28 A2 8A 28 A2 8A 28 A2 8A 28 A7 E8
    1C 37 0A 95 C5 3C F3 34 40 46 35 0C 07 55 12 73
    D0 EB 01 81 80 82 00 83 88 78 00 80 04 62 00 00
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
    00 00 00 00 00 00 00 00 00 00 00 00
  </msd>
</ECallMessage>
<MSDMessageV1>
  <msdStructure>
    <messageIdentifier>1</messageIdentifier>
    <control>
      <automaticActivation><true/></automaticActivation>
      <testCall><false/></testCall>
      <positionCanBeTrusted><false/></positionCanBeTrusted>
      <vehicleType><passengerVehicleClassM1/></vehicleType>
    </control>
    <vehicleIdentificationNumber>
      <isowmi>:::</isowmi>
      <isovds>:::</isovds>
      <isovisModelyear></isovisModelyear>
      <isovisSeqPlant>:::</isovisSeqPlant>
    </vehicleIdentificationNumber>
    <vehiclePropulsionStorageType>
      <gasolineTankPresent><false/></gasolineTankPresent>
      <dieselTankPresent><true/></dieselTankPresent>
      <compressedNaturalGas><false/></compressedNaturalGas>
      <liquidPropaneGas><false/></liquidPropaneGas>
      <electricEnergyStorage><false/></electricEnergyStorage>
      <hydrogenStorage><false/></hydrogenStorage>
    </vehiclePropulsionStorageType>
    <timestamp>946738475</timestamp>
    <vehicleLocation>
      <positionLatitude>175761000</positionLatitude>
      <positionLongitude>9202200</positionLongitude>
    </vehicleLocation>
    <vehicleDirection>14</vehicleDirection>
    <recentVehicleLocationN1>
      <latitudeDelta>168</latitudeDelta>
      <longitudeDelta>78</longitudeDelta>
    </recentVehicleLocationN1>
    <recentVehicleLocationN2>
      <latitudeDelta>-24</latitudeDelta>
      <longitudeDelta>-42</longitudeDelta>
    </recentVehicleLocationN2>
    <numberOfPassengers>3</numberOfPassengers>
  </msdStructure>
  <optionalAdditionalData>
    <oid>1.4.1</oid>
    <data>70 F6 01 00 08 C4 00</data>
  </optionalAdditionalData>
</MSDMessageV1>
<ERAGLONASSAdditionalData>
  <crashSeverityASII15>123</crashSeverityASII15>
  <diagnosticresults>
    <batteryFailure><true/></batteryFailure>
  </diagnosticresults>
  <crash>
    <crashRear><true/></crashRear>
    <crashRollover><false/></crashRollover>
  </crash>
</ERAGLONASSAdditionalData>
Ln 43, Col 48

```

For additional information on the range of values for each of the fields, see the EN15722 specification available from www.cen.eu.

Re-dialing

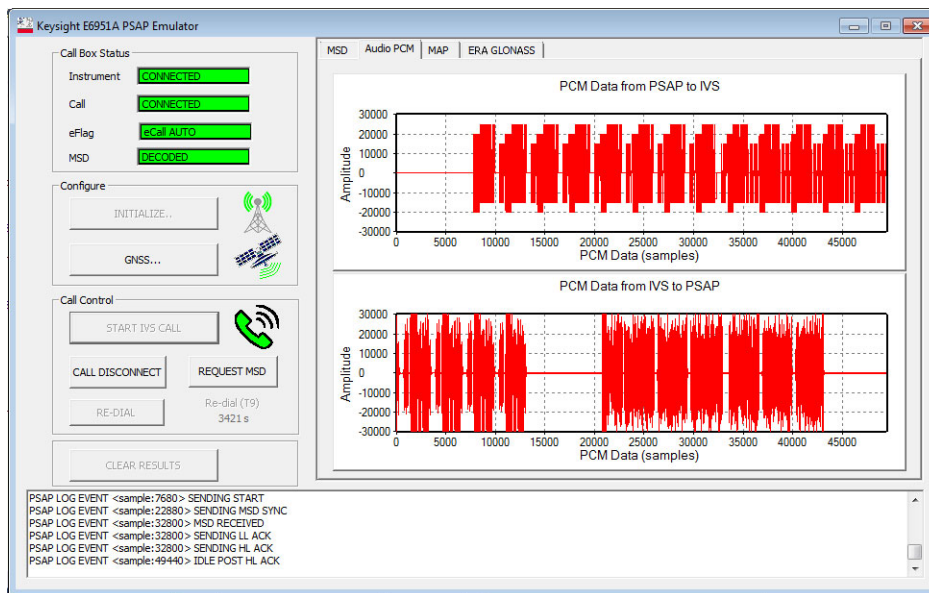
Once an eCall has been made and disconnected, the IVS module starts timer T9 (default 3600 seconds). While this timer is active, clicking the **RE-DIAL** button will re-dial the IVS to exchange MSD and establish audio. The IVS should auto answer the incoming call during this period (EN 16062 section 7.10).

The screenshot displays the Keysight E6951A PSAP Emulator software interface. On the left, the 'Call Box Status' section shows 'Instrument' as CONNECTED, 'Call' as CONNECTED, 'eFlag' as eCall AUTO, and 'MSD' as DECODED. Below this are 'Configure' buttons for 'INITIALIZE..' and 'GNSS...', and 'Call Control' buttons for 'START IVS CALL', 'CALL DISCONNECT', 'REQUEST MSD', and 'RE-DIAL'. A 'Re-dial (T9) 3200 s' label is positioned near the RE-DIAL button. On the right, the 'MSD' tab is active, showing 'MSD IVS Reference data (Serial)' and 'MSD Data from IVS (Cellular)'. The 'MSD Data from IVS (Cellular)' section contains a log entry: '[CTRL] MSD received from IVS; 015C0600A28A28A28A28A28A28A28A28A28A7E8 1C370A95C53CF3344046350C07551273D0EB0 1839897191718991A84199819981A1B1A1B00' followed by several lines of zeros. A text label 'T9 timer countdown' with a line pointing to the 'RE-DIAL' button is located to the left of the interface.

Viewing Audio Data

The audio data exchange between the PSAP and IVS is displayed in graphical form in the **Audio PCM** tab.

Figure 12 Audio data display



This example shows a PUSH mode exchange, that is, the IVS initiates the sync procedure. The audio data for each eCall is saved in the E6951A **AppData** folder e.g. **C:\Users\instrument\AppData\Roaming\Keysight\E6951A** and can be replayed and analyzed if required.

The files are saved in mono with a sampling rate of 8000 bps:

- **audiofile_IVStoPSAP.wav** for IVS to PSAP audio
- **audiofile_PSAPtoIVS.wav** for PSAP to IVE audio

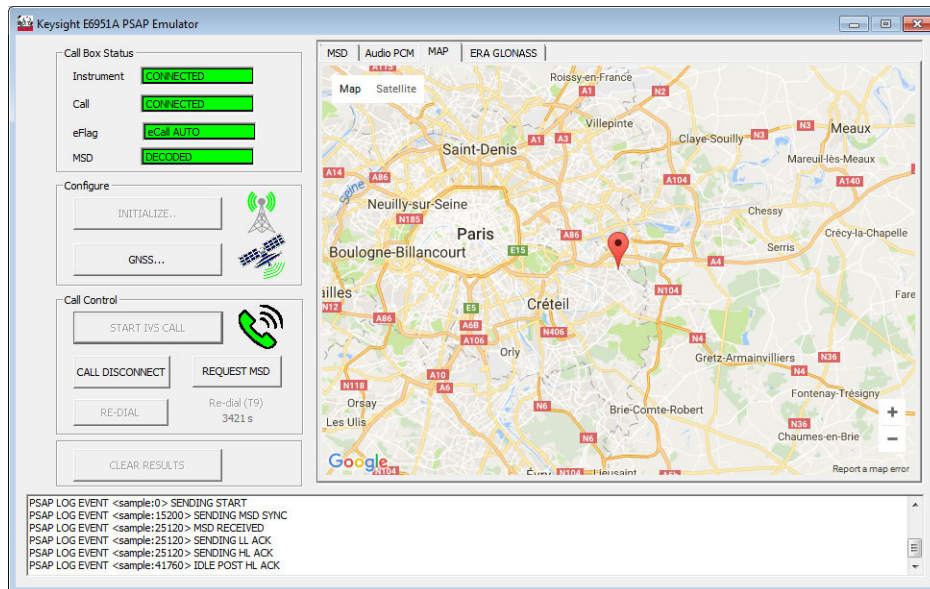
After a successful MSD decode the E6951A PSAP Emulator will revert to audio speech mode and will either allow the user to communicate with real time live audio to the IVS, or play a .wav file to test the audio path (see **Play .wav file after MSD** on page 19).

Viewing the Location on the Map

The latitude and longitude data in the decoded MSD is presented in numerical form (Figure 10) and can also be viewed on a map (Figure 13), if an internet connection is available and active.

Zoom controls are provided and the display can be compared with the expected GNSS location configured and emulated by the GNSS signal generator.

Figure 13 Map display



ERA-GLONASS Extensions

Emergency Road Assistance (ERA)-GLONASS is a service provided by the Russian Federation. It is harmonized with the European eCall system but also provides additional capability such as a backup channel for MSD transfer using SMS and MSD content extensions for additional detail on crash information and vehicle diagnostics.

The ERA-GLONASS features are optional on the E6951A PSAP Emulator, requiring a separate license (E6951A-2FP/TP).

Once licensed, you can do the following:

- [Configure and Send SMS](#)
- [View MSD Extensions for ERA-GLONASS](#)

Configure and Send SMS

In accordance with the GOST R 54619 EGTS (ERA-GLONASS Telematics Standard), either Command or Parameter control messages can be constructed and sent to the IVS. This is configured from the **ERA-GLONASS** tab ([Figure 14](#)).

- 1 Under **SMS config**, select the **Action**:
 - Command
 - Parameter Add
 - Parameter Remove
 - Parameter Request
 - Parameter Set
- 2 The available command codes for the selected action will be provided. Select the **Command Code** from the drop-down list.
- 3 Enter additional settings for the selected action, if any.
- 4 Once configured, click the **Send SMS** button.

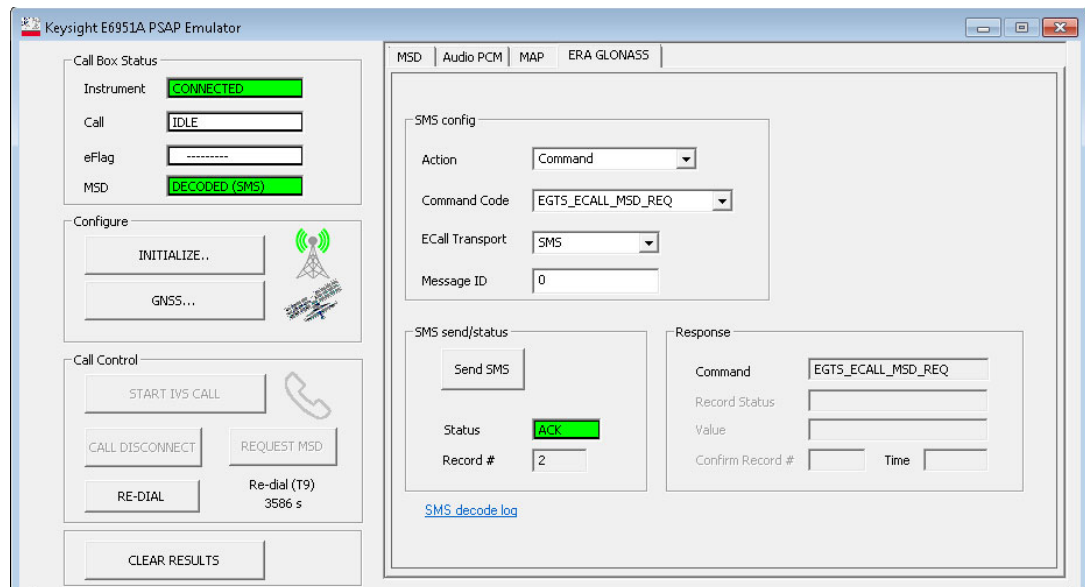
This will create and send the message to the connected instrument (E7515A or E5515C) and then onwards to the IVS (Circuit Switched delivery is used as Packet Services may be unavailable).

The status of the SMS message send is displayed along with the EGTS Record number of the message, which is useful for matching against the SMS Response message.

Each EGTS SMS message should receive a response message to acknowledge the request. Once an SMS message is sent, a 30-second timer is started and will display **Expired** if no SMS Response message was received.

Note that this response is not the CP/RP_ACK as defined in 3GPP TS 23.040 for the message sent from the PSAP, but an entirely separate SMS message sent from the IVS.

Figure 14 SMS setup



To view a log of the SMS message exchange, click the **SMS decode log** hyperlink. This opens the log file **PSAPsms.txt** stored in the instrument's AppData folder (e.g. C:\Users\instrument\AppData\Roaming\Keysight\E6951A).

View MSD Extensions for ERA-GLONASS

The ERA-GLONASS MSD extensions are only displayed only if a suitable license is installed and the Optional Additional Data (OID) is included in the MSD by the IVS. According to the ERA-GLONASS specification GOST_33464-2015 Appendix C.6.1, the OID field has a value of 1.4.1 for version 1, while Appendix C.8.1 specifies 1.4.2 will be used for version 2. These OID values are required to enable the decoding of the following optional elements – Crash Severity, Diagnostic Results, and Crash Information; and for version 2, the additional Coordinate System Type.

Figure 15 shows the additional information displayed on the MSD tab.

Figure 15 ERA-GLONASS MSD extensions

Optional Additional Data	
OID	1.4.2
Content	ERA GLONASS (V2)
ERA GLONASS Based on GOST 33464-2015	
Crash Severity	
Crash Severity ASI15	123
Diagnostic Results	
Mic connection fail...	----
Mic failure	----
Right speaker failure	----
Left speaker failure	----
Speakers failure	----
Ignition line failure	----
UIM failure	----
Status indicator fail...	----
BatteryFailure	TRUE
Battery voltage too l...	----
Crash Sensor failure	----
SW image corruption	----
Common module i...	----
GNSS receiver failure	----
RAIM problem	----
GNSS antenna failure	----
Common Module F...	----
Events memory ove...	----
Crash profile memo...	----
Other critical falure	----
Other non critical fa...	----
Crash Information	
Front	----
Left	----
Right	----
Rear	TRUE
Rollover	FALSE
Side	----
Front or side	----
Another type	----
Coordinate System	
Sytem Type	pz90

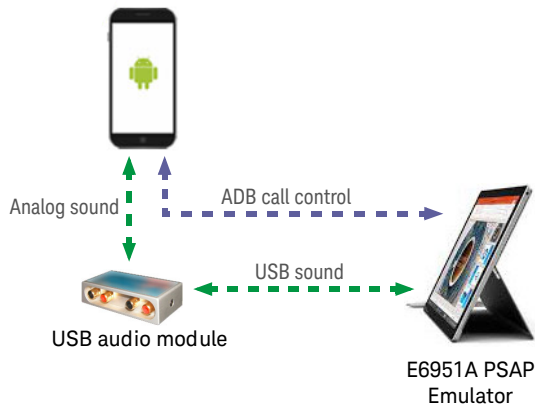
Live Network Setup

Overview	36
Set Up ADB for Call Control over USB	37
Set Up Audio Connections	40

Overview

Live Network mode requires an analog audio and USB connection to an Android mobile phone. Android Debug Bridge (ADB), part of the Android SDK from Google, is used for call control over the USB connection. Default ADB commands are provided in the `adbConfig.xml` file in `C:\Program Files(x86)\Keysight\E6951A`.

Android versions 4.4.2 (KitKat), 5.1 (Lollipop) and 6.0.1 (Marshmallow) have been verified to work with these default ADB commands. Later versions of Android such as 7.0 (Nougat) may need modification to these commands to answer calls.



Set Up ADB for Call Control over USB

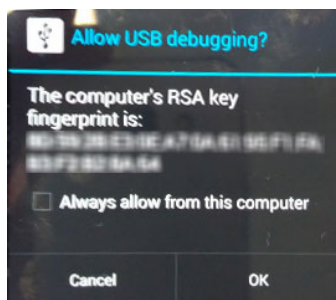
- 1 Install ADB¹ on the PC running the E6951A PSAP Emulator.
- 2 Specify the path to `adb.exe` in `adbConfig.xml`.

Example 2 Settings in `adbConfig.xml`

```
<adbSettings>
  <path>C:\<USER PATH>\adb.exe </path>
  <callMonitor> shell dumpsys telephony.registry </callMonitor>
  <callAnswer> shell input keyevent KEYCODE_CALL </callAnswer>
  <callStart> shell am start -a android.intent.action.CALL -d
tel:NUMBER </callStart>
  <callEnd> shell input keyevent KEYCODE_ENDCALL </callEnd>
</adbSettings>
```

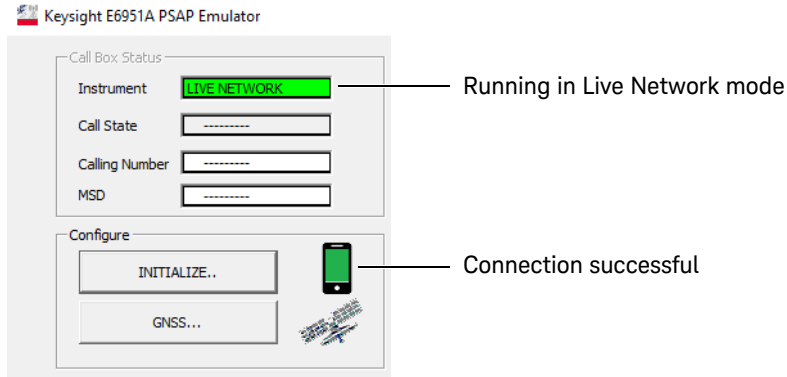
- 3 Enable Developer mode on the Android mobile phone to allow ADB communication. This only needs to be done once.
 - a Find the **Settings > Developer options** configuration screen on the Android device.

If the Developer options screen is not visible, select **Settings > About device** and tap the **Build number** seven times.
 - b Enable **USB Debugging** from the Developer options.
 - c In Android 6.0.1, also enable **USB Debugging** in the Security Settings. This allows granting of permissions and simulating input.
- 4 When ADB first attempts to connect, it will ask for authentication. **Select Always allow from this computer** and tap **OK**.



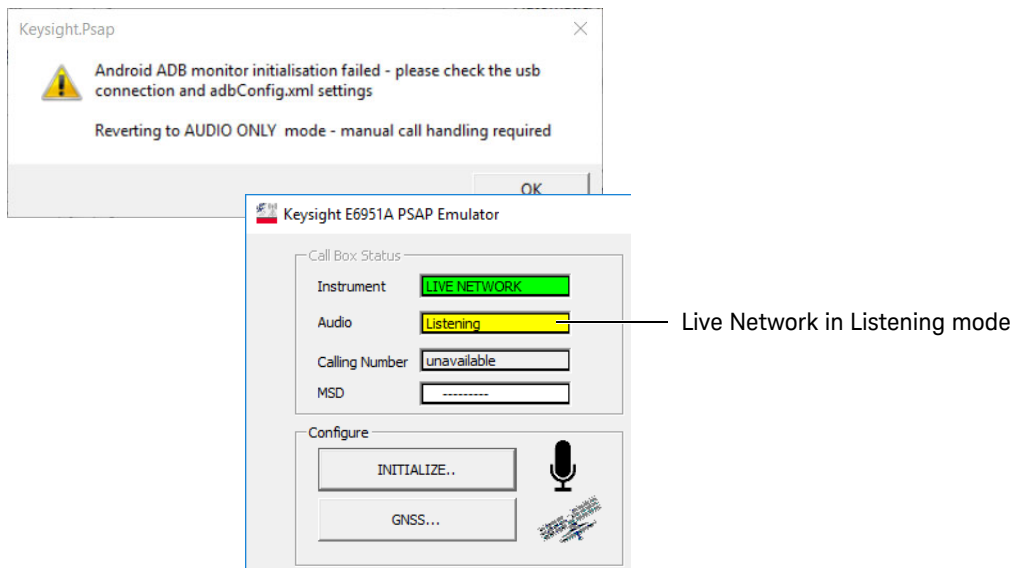
1. ADB can be downloaded from adbshell.com/upload/adb.zip.

The E6951A PSAP Emulator window will show the live network status. Incoming calls will now be auto answered, and re-dials to the last incoming number can be made.



If ADB Initialization Fails

If ADB initialization fails, the E6951A PSAP Emulator reverts to a basic “listening mode” with no automatic call control but will detect (push mode) or generate (pull mode) eCall audio tones and perform MSD decodes, if the audio connections to the mobile phone are in place.



In this mode of operation, it is recommended that timer T4 (initial call establishment sync period) be disabled since without a working ADB interface, there is no mechanism to detect the call start.

Troubleshooting ADB Initialization Failure

Try the following:

- 1 Check that the path to `adb.exe` is set correctly in `adbConfig.xml`.
- 2 Check that ADB can detect the mobile phone: Start a Windows Command prompt and enter `adb.exe devices`. This will list any USB connected devices.
- 3 Authenticate the device and/or enable the Developer options on the mobile phone if needed (as described on [page 37](#)).
- 4 Stop the ADB server (enter command `adb.exe kill-server`) to force re-authentication.

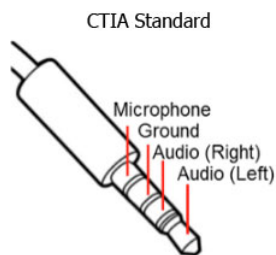
Set Up Audio Connections

To decode the eCall MSD, the E6951A PSAP Emulator must be able to receive and generate the in channel audio tones to the IVS. In Live Network mode this audio connection utilizes the Windows PC audio interface, via a USB sound card or analog line in/out to the audio connector of the Android mobile phone.

- Connect the mobile phone's microphone input to the PC audio output.
- Connect the mobile phone's speaker output to the PC microphone input.

Note that the mobile phone's microphone connection outputs a DC voltage of ~150 mV to power the external microphone, so it cannot be directly connected to the PC's analog speaker output. It is possible to connect to a line-in/out connector on a desktop PC but this is typically unavailable on a laptop, so a USB sound card connection is recommended.

The 3.5 mm, 4-pole TRRS (Tip Ring Ring Sleeve) audio connector for an Android mobile phone is typically wired as per the CTIA standard shown below.



The E6951A PSAP Emulator audio connections require a crossover i.e. PC audio-out to the mobile phone microphone and PC audio-in to the mobile phone speaker (audio-out). This typically requires an audio splitter cable and a connection to either a USB sound card¹ or analog audio line-in/out.

For details, refer to the following:

[USB Sound Card](#)

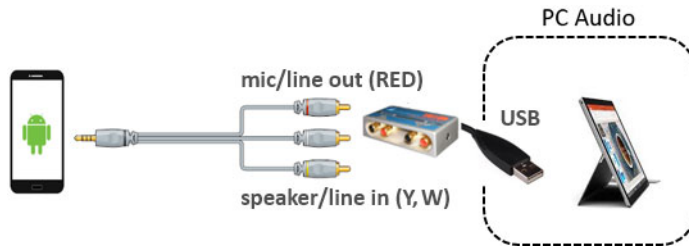
[Line In/Out Connection](#)

[Headset for Voice Communications](#)

1. Recommended sound card: www.acoustics-engineering.com/html/triton.html

USB Sound Card

Figure 16 USB sound card configuration



Requires audio splitter cable 3.5 mm 4-pole to phono

Set Audio Levels

The USB soundcard has a much wider range of input and output voltages (0-2 V) than those used by a mobile phone (0-300 mV), therefore scaling is required.)

- 1 Make sure that the mobile phone audio level is set to maximum.
- 2 In the E6951A PSAP Emulator, click **INITIALIZE** to set the PC Audio levels. [Table 4](#) shows suggested levels.

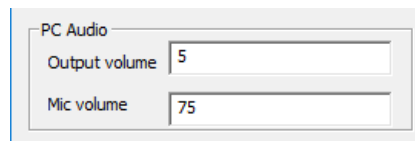


Table 4

Typical/Expected mobile phone level	Voltage (mV)	E6951A PSAP Emulator suggested settings (%)
Speaker/output	300	5
Microphone/input	100	75

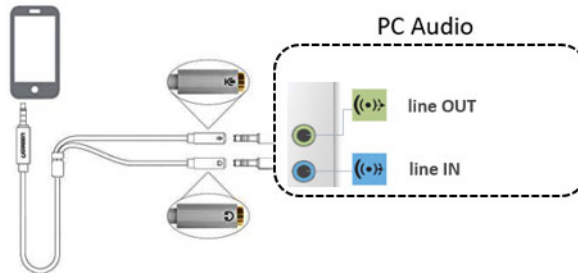
The levels depend on the characteristics of the sound card, so adjust them accordingly.

- 3 In Windows, set the selected speakers and microphone as the **Default Device**. Monitor the Windows sound levels and verify that the speaker output and microphone input levels are not saturating.



Line In/Out Connection

Figure 17 Line in/out connection



Requires 3.5 mm, 4-pole male to 2 dual 3.5 mm splitter

Set Audio Levels

Set the line in/out levels to match the mobile phone's expected range.

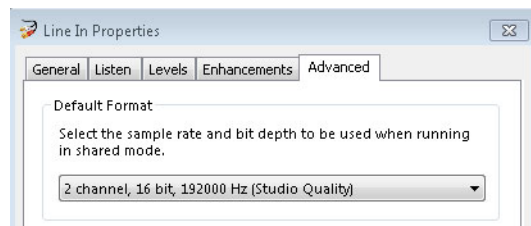
- 1 Make sure that the mobile phone audio level is set to maximum.
- 2 In the E6951A PSAP Emulator, click **INITIALIZE** to set the PC Audio levels. [Table 4](#) shows suggested levels.

Table 5

Typical/Expected mobile phone level	Voltage (mV)	E6951A PSAP Emulator suggested settings (%)
Speaker/output	300	60
Microphone/input	100	10

The levels depend on the characteristics of the hardware, so adjust them accordingly.

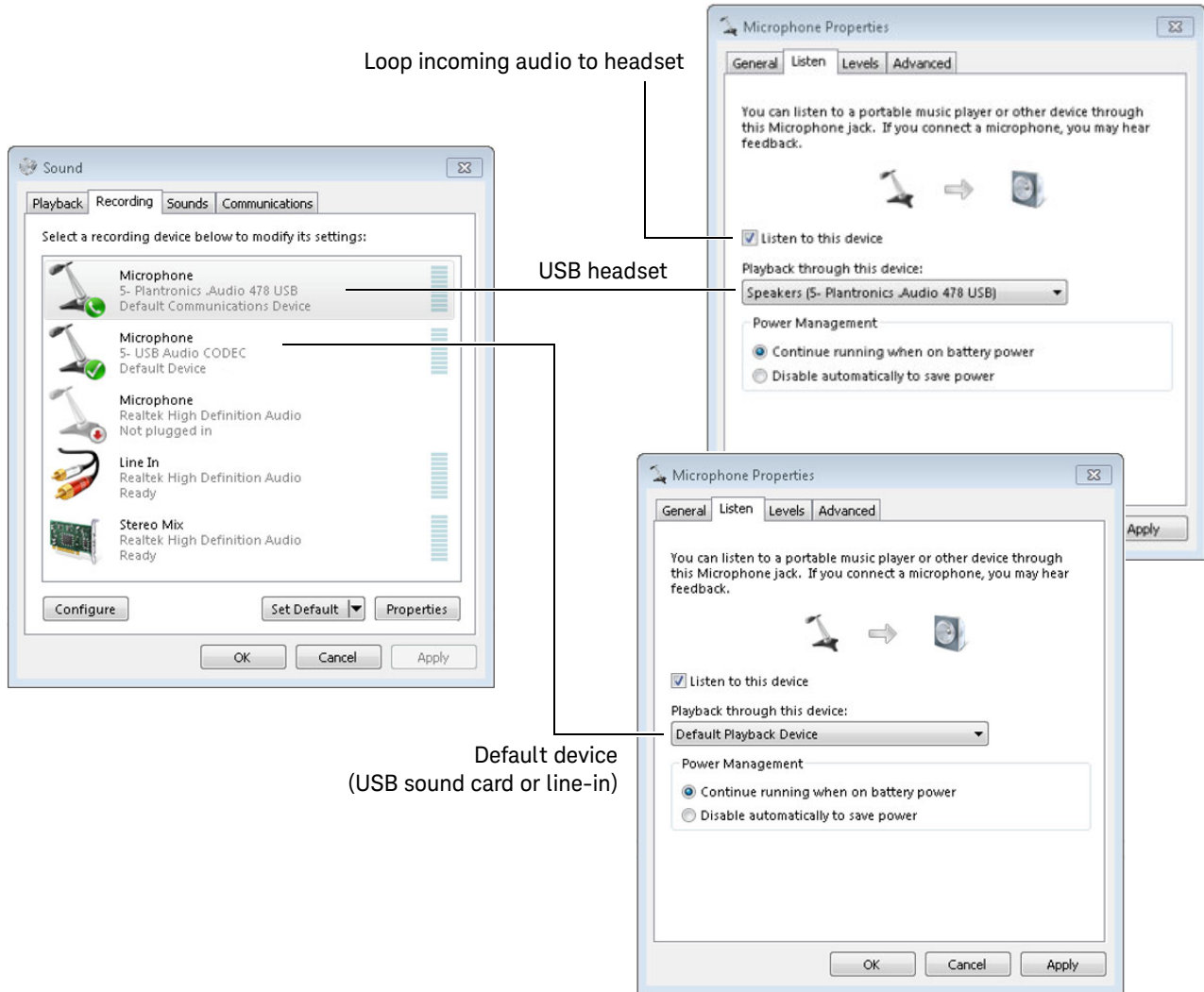
- 3 In Windows, set the line-In performance to the maximum possible.



Headset for Voice Communications

To test full end-to-end audio communication i.e. including voice after the MSD has been exchanged, a USB headset can be connected to the PC running the E6951A PSAP Emulator.

In Windows, configure the default device (USB sound card or line-in) and the USB headset microphone “listen to” audio paths as shown below:



Live Network Setup

Keysight Test Automation Platform (TAP)

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Set Up eCall/ERA-GLONASS Automation	47
Run eCall/ERA-GLONASS Test Cases	53

Introduction

The Keysight Test Automation Platform (TAP) is a generic test automation platform where test sequences and test plans can easily be created. Simple flow operations such as If, While, and Loop are supported. Execution speed is key and analysis tools for visualizing and optimizing test-flow are available. Test steps, instrument/DUT drivers, and result storage are all provided as plugins. For more information, visit www.keysight.com/find/TAP.

eCall and ERA-GLONASS test automation are also built around TAP as plugins. All TAP functionality can be used with the eCall and ERA-GLONASS plugins. TAP will run the test cases and publish the results in .txt, .csv or graph format.

To set up TAP for eCall/ERA-GLONASS automation, the following software components are required:

- Keysight E6951A PSAP Emulator 2.0
- Keysight KS8400A TAP version 7 or later
- e-Call TAP plugin (KS8205A-1FP) or ERA-GLONASS TAP plugin (KS8205A-2FP)
- Microsoft .NET v4.5.2 or later

Figure 2 on page 9 shows the E6951A PSAP Emulator and instrument configuration. Install TAP and the plugins with their licenses on the PC running the E6951A PSAP Emulator.

An audio adapter cable* is required for conformance testing especially when test cases involve voice connections.



Connect the audio cable to any USB port on the PC. The speaker/microphone input is from the IVS.

* UGREEN Sound Adapter is recommended.

Set Up eCall/ERA-GLONASS Automation

[Install TAP and Plugins](#)

[Set Up E6951A PSAP Emulator](#)

[Set Up TAP for eCall/ERA-GLONASS Automation](#)

Software Licensing

Download the software and obtain the software licenses following the instructions provided.

Software licenses are unique to the PC that the software will be running on, based on the PC's host ID. If you have a transportable license, then the license can be moved from one host PC to another, without the need to contact Keysight. (Transportable licenses are identified by a **T** in the license number, for example, K8205A-1**T**P for the eCall plugin.)

Register or sign in with your profile at www.keysight.com/find/softwaremanager to obtain any software updates and/or new licenses using your entitlement details. When you receive the license files, install them using the Keysight License Manager.

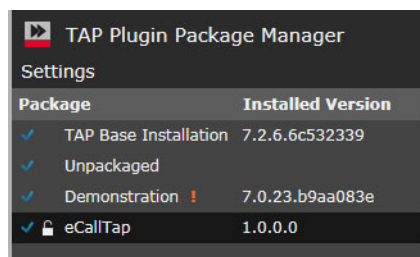
Licenses for the eCall/ERA-GLONASS plugins are as follows:

- eCall plugin license K8205A-1FP or K8205A-1TP (transportable)
- ERA-GLONASS plugin license K8205A-2FP or K8205A-2TP (transportable)

Install TAP and Plugins

- 1 Install TAP and the eCall/ERA-GLONASS plugins on the PC running the E6951A PSAP Emulator.
- 2 Launch TAP. From the **Tools** menu, select **Plugin Package Manager** to install the plugins.
- 3 Use Keysight License Manager to install the licenses.

Once the licenses are installed, the TAP Plugin Package Manager should show the corresponding plugin with an unlocked icon.



Set Up E6951A PSAP Emulator

- 1 Launch E6951A PSAP Emulator and click the **INITIALIZE** button to display the Initialize dialog box.

The screenshot shows the 'Initialize' dialog box with the following settings:

- Call Box:** Demo Mode (unchecked), IP Address: 127.0.0.1, VISA Address: TCPIP0::127.0.0.1::hislip4::, Instrument: E7515A (selected), Live Network (unchecked).
- PSAP:** Mode: PUSH (selected), PULL (unchecked), Advanced PSAP Settings... button.
- Serial Comport:** Use Serial port (checked), Comport Number: 7, BaudRate: 115200, Parity: NONE, Databits: 8, Stopbits: 1, SendBuffer: 4096.
- PC Audio:** Output volume: 0, Mic volume: 0.
- Remote Interface:** HiSLIP Device: 5, HiSLIP Port: 4880.

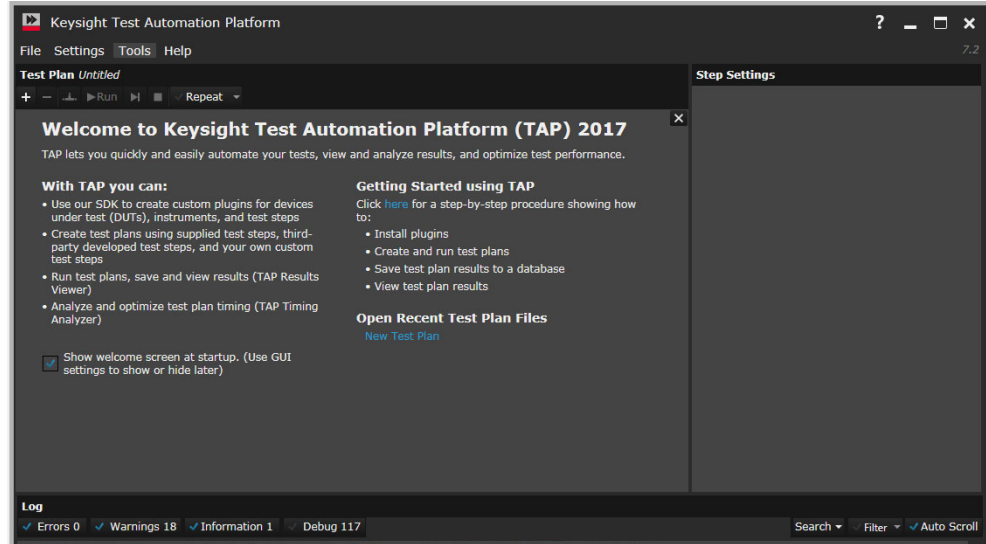
- a Enter the **Call Box** settings.
- b Deselect the **Use Serial port** option.
- c Enter the **Remote Interface** settings.
- d Click **OK** to save.

The E6951A PSAP Emulator is now ready for automated testing.

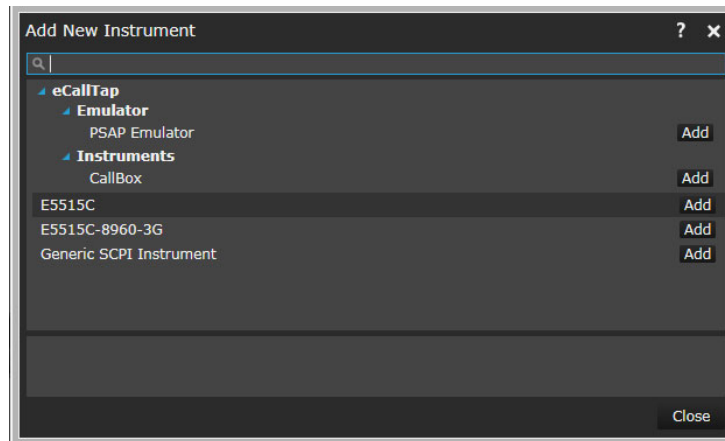
- 2 Click the **GNSS** button to enter the GNSS settings. (See [Configuring GNSS Emulation](#) on page 21 for more information.)

Set Up TAP for eCall/ERA-GLONASS Automation

- 1 Launch TAP.

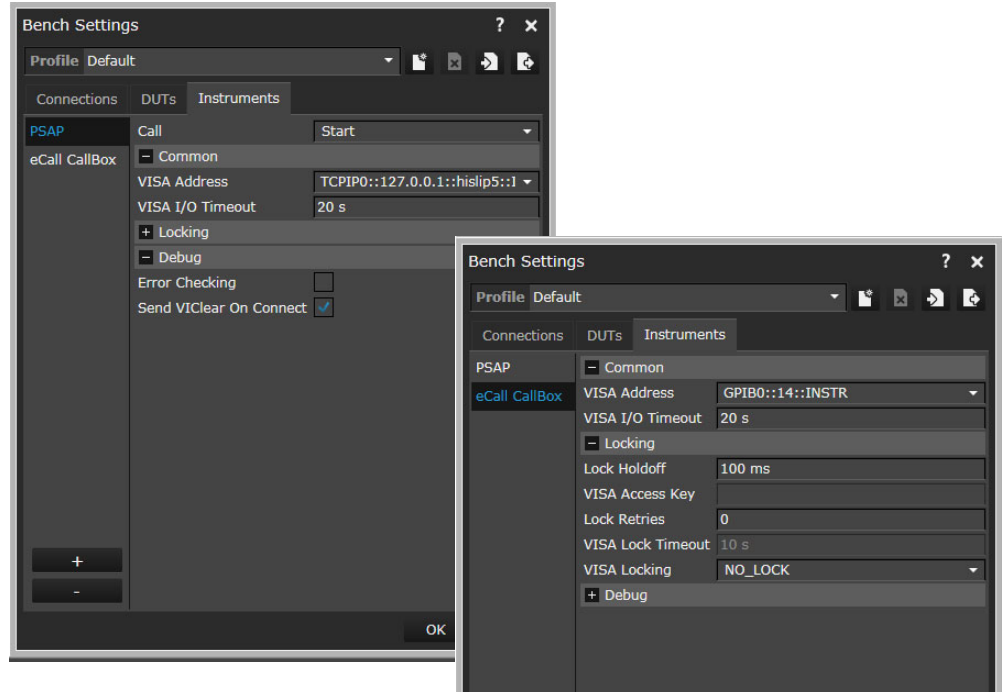


- 2 From the **Tools** menu, select **Bench > Instrument**. Click **Add** to add the PSAP Emulator and CallBox.

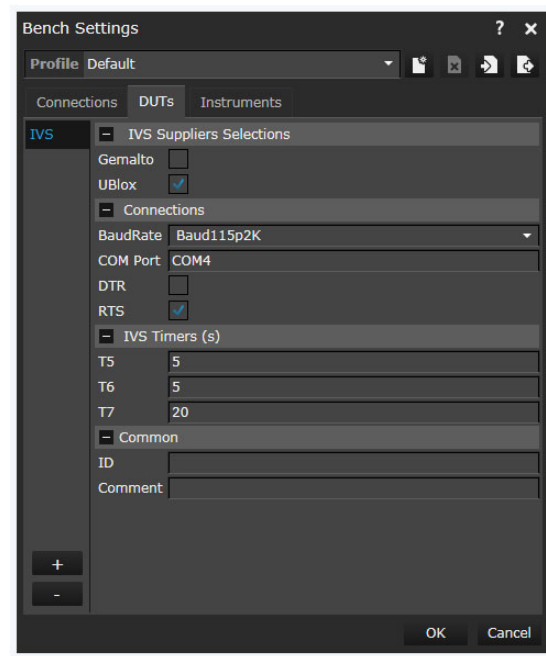


- 3 Click **Close**.

The PSAP Emulator and CallBox settings will be displayed on the **Instruments** tab.



- 4 Click the **DUTs** tab to set up the IVS. Select the IVS supplier and enter the connection parameters. Then click **OK**.



If you are using an IVS module other than Gemalto or UBlox, you will need to modify the `IVS.xml` file (located in the TAP installation folder, e.g. `C:\Program Files X86\Keysight\TAP\`).

The `IVS.xml` file ([Example 3](#)) contains the AT commands for the IVS module being tested. Modify the Command elements as required for your IVS module, but do not change the Function elements which allow the plugin to read the correct commands to control the IVS.

For example, an Auto Triggered e-Call for UBlox uses the following:

```
<ATCommand>
  <Function>"Start Auto Triggered eCall"</Function>
  <Command>"AT+CECALL=3"</Command>
</ATCommand>
```

However, Gemalto IVS requires command `ivs=ecall,3` for this function. The replacement for the command will be as follows:

```
<ATCommand>
  <Function>"Start Auto Triggered eCall"</Function>
  <Command>"ivs=ecall,3"</Command>
</ATCommand>
```

Example 3 xml file for UBlox module

```

<IVS>
  <ATCommand>
    <Function>"Start eCall"</Function>
    <Command>"ATD112"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"Start Auto Triggered eCall"</Function>
    <Command>"AT+CECALL=3"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"Start Manually Triggered eCall"</Function>
    <Command>"AT+CECALL=2"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"Start Test eCall"</Function>
    <Command>"AT+CECALL=0"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"eCall Without Registration Restriction"</Function>
    <Command>"AT+UECALLSTAT=2"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"eCall Set Inband Modem"</Function>
    <Command>"AT+UECALLDATA=4,1"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"eCall Auto Triggered with MSD"</Function>
    <Command>"AT+UECALLDATA=1,1, "02251c0689b2d478e30a51468e65a0800457f04a58d2811108
  </ATCommand>
  <ATCommand>
    <Function>"eCall Manually Triggered with MSD"</Function>
    <Command>"AT+UECALLDATA=1,1, "02251c0409b2d478e30a51468e65a0800457f04b0ff0831fff
  </ATCommand>
  <ATCommand>
    <Function>"eCall Test Number Triggered with MSD"</Function>
    <Command>"AT+UECALLDATA=1,1, "02251c0509b2d478e30a51468e65a0800457f04a58d1b37ff
  </ATCommand>
  <ATCommand>
    <Function>"Deregister from network"</Function>
    <Command>"AT+COPS=2"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"eCall only with Registration Restriction"</Function>
    <Command>"AT+UECALLSTAT=1"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"Auto Registration to network"</Function>
    <Command>"AT+COPS=0"</Command>
  </ATCommand>
  <ATCommand>
    <Function>"Reset IVS module"</Function>
    <Command>"AT+CFUN=16"</Command>
  </ATCommand>
  . . .

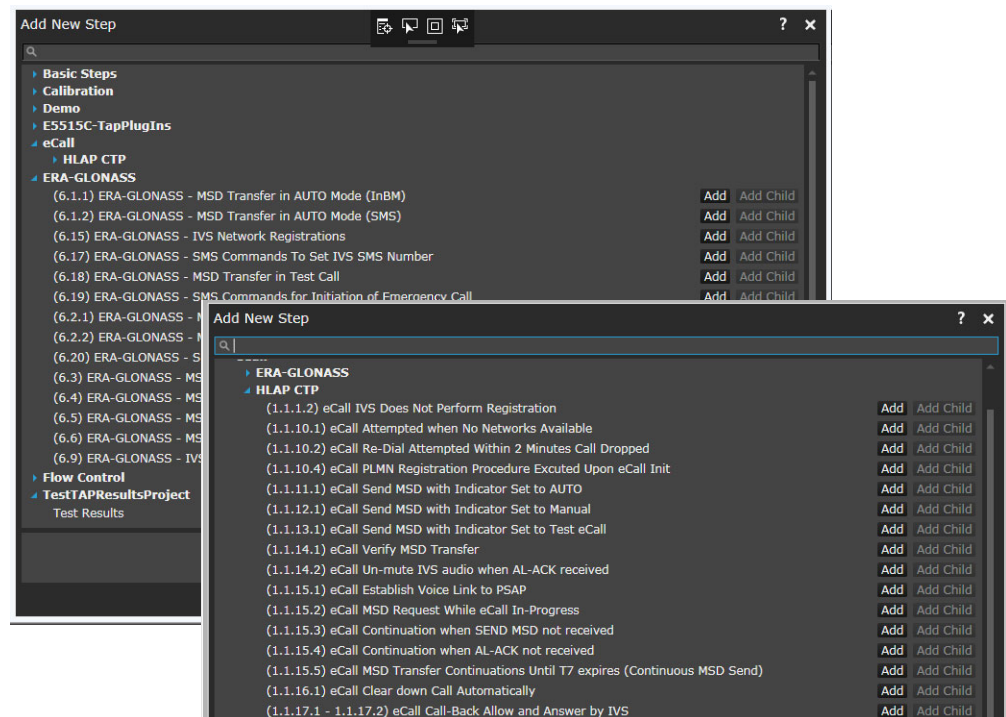
```

Run eCall/ERA-GLONASS Test Cases

To run the test cases:

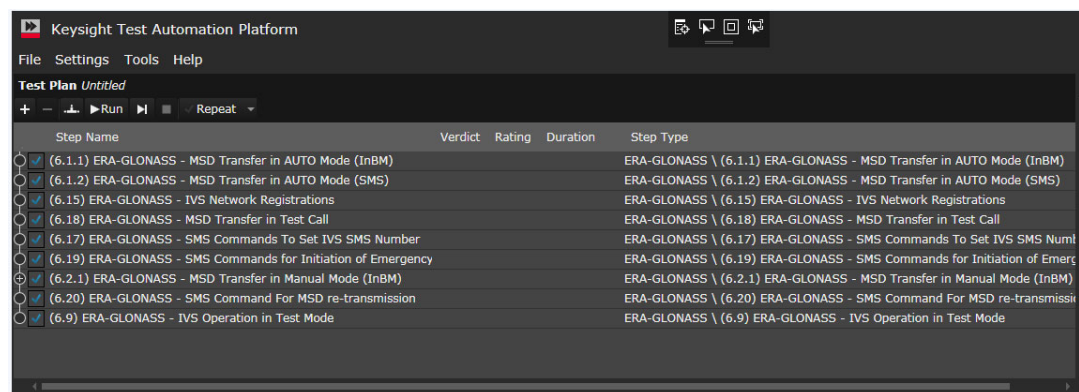
- 1 From the TAP main window, click **+** to add test steps.

The supported test cases are shown. (See [Supported Test Cases](#) for the lists.)



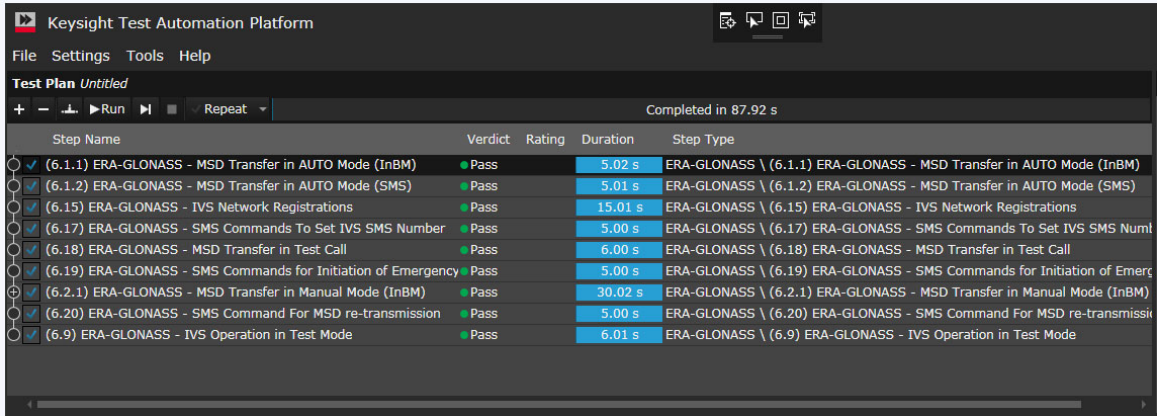
- 2 Click **Add** for the test cases you want to include in the test sequence. Then click **Close**.

- 3 Tap **Run** to run the test cases.



Keysight Test Automation Platform (TAP)

The test results are displayed on-screen and also saved to a text file in C:\Program Files (x86)\Keysight\TAP\Results.



Supported Test Cases

The following tables list the supported eCall and ERA_GLONASS test cases. The test cases are documented in DOC-ETSI_TS 103 412 V1.1.1 for eCall and GOST_R_55530 for ERA_GLONASS.

Table 6 Supported eCall test cases

Test Case	Description
HLAP CTP 1.1.2.1	e-Call automatically activated
HLAP CTP 1.1.2.2	Automatically triggered e-Call in progress was not disconnected upon a new e-Call trigger
HLAP CTP 1.1.3.1	e-Call manually activated
HLAP CTP 1.1.3.2	Manually triggered e-Call in progress was not disconnected upon a new eCall trigger
HLAP CTP 1.1.4.1	Test e-Call activated
HLAP CTP 1.1.5.1	Network registration
HLAP CTP 1.1.6.1	Mute IVS and vehicle audio
HLAP CTP 1.1.7.1	Set-up TS12 call with e-Call identifier (flag) set to 'automatic'
HLAP CTP 1.1.8.1	Set-up TS12 call with e-Call identifier (flag) set to 'manual'
HLAP CTP 1.1.9.1	Test for set-up TS11 call to test number
HLAP CTP 1.1.10.1	e-Call is attempted when no networks are available (limited service condition)
HLAP CTP 1.1.10.2	Re-dial attempt completed within 2 minutes after e-Call is dropped
HLAP CTP 1.1.10.3	Duration of e-Call Initiation signal
HLAP CTP 1.1.11.1	Send MSD with indicator set to 'Automatically Initiated e-Call' (AleC)
HLAP CTP 1.1.12.1	Send MSD with indicator set to 'Manually Initiated e-Call' (MleC)
HLAP CTP 1.1.13.1	Send MSD with indicator set to 'Test Call'
HLAP CTP 1.1.14.1	Verify MSD transfer
HLAP CTP 1.1.14.2	Un-mute IVS audio when AL-ACK received
HLAP CTP 1.1.15.1	Establish voice link to PSAP
HLAP CTP 1.1.15.2	MSD transfer request while e-Call conversation in progress
HLAP CTP 1.1.15.3	Call continuation when SEND MSD request not received (T5 expired)
HLAP CTP 1.1.15.4	Call continuation when AL-ACK not received (T6 expired)
HLAP CTP 1.1.15.5	MSD is transferred continuously until T7 expires and IVS reconnects loudspeaker and microphone on its expiry
HLAP CTP 1.1.16.1	Clear down call automatically

Table 6 Supported eCall test cases (continued)

Test Case	Description
HLAP CTP 1.1.17.1	Call-back allowed by IVS
HLAP CTP 1.1.17.2	Call-back answered by IVS
HLAP CTP 1.1.17.3	MSD transfer occurs upon PSAP request during call-back
HLAP CTP 1.1.1.2	IVS does not perform registration after power-up
HLAP CTP 1.1.10.4	Verify that PLMN registration procedure is executed upon initiating an e-Call

Table 7 Supported test cases for ERA-GLONASS

Test Case	Description
ERA 6.1.1	MSD Transfer in AUTO mode (InBm)
ERA 6.1.2	MSD Transfer in AUTO mode (SMS)
ERA 6.2.1	MSD Transfer in MANUAL mode (InBm)
ERA 6.2.2	MSD Transfer in MANUAL mode (SMS)
ERA 6.3	MSD Vehicle Location Check
ERA 6.4	MSD Expected Last Know Vehicle Location Checks
ERA 6.5	MSD Valid Location Data
ERA 6.6	MSD Contains Direction Data
ERA 6.9	IVS Operation in Test Mode
ERA 6.15	IVS Network Registrations
ERA 6.17	SMS Command for Setting IVS SMS Number
ERA 6.19	SMS Command for Initiation of Emergency Call
ERA 6.20	SMS Command for MSD re-transmission

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Commands for Remote Control Interface

The E6951A PSAP Emulator has a remote control interface API. Refer to the following tables for the syntax of the SCPI commands that can be used to control the application.

- INITialize subsystem
- GNSS subsystem
- CALL subsystem
- CLEAR subsystem
- INSTRument subsystem
- MSD subsystem
- GLONass subsystem

Table 8 INITIALize subsystem

command	setting	query	parameter	range	default
INITIALize:					
START	yes	no	<none>		
INITIALize:CBox					
IPADress	yes	yes	quoted string	0..255 chars	"127.0.0.1"
VISAAddress	yes	yes	quoted string	0..255 chars	"TCPIP0::127.0.0.1::hislip4::INSTR"
INSTrument	yes	yes	enumeration	E7515A;E5515C;LIVE	E7515A
INITIALize:PSAP					
MODe	yes	yes	enumeration	push; pull	push
INITIALize:PSAP:CONTRol					
SMODe	yes	yes	enumeration	normal; inhibit; rvreq	normal
WAVE	yes	yes	boolean	1(true); (0>false	1
ROBust	yes	yes	boolean	1(true); (0>false	0
INITIALize:PSAP:ACKControl					
NLLACK	yes	yes	integer	0..5	5
NHLACK	yes	yes	integer	0..5	5
HLACK	yes	yes	enumeration	normal; callclear	Normal
INITIALize:PSAP:TIMER					
T4	yes	yes	integer	0..20	5
T4ENable	yes	yes	boolean	1(true); (0>false	1
T8	yes	yes	integer	0..100	20
T8ENable	yes	yes	boolean	1(true); (0>false	1
T9	yes	yes	integer	0..45000	3600
T9ENable	yes	yes	boolean	1(true); (0>false	1
INITIALize:SERial:					
USED	yes	yes	boolean	1(true); (0>false	1
PORT	yes	yes	integer	0.100	<none>
BAUD	yes	yes	enumeration	1200; 2400; 9600; 19200; 115200	115200
PARity	yes	yes	enumeration	none; even; odd	none
DATABits	yes	yes	integer	6, 7, 8	8
STOPbits	yes	yes	enumeration	1, 1.5, 2	1
SENDbuffer	yes	yes	enumeration	255; 512; 1024; 2048; 4096	4096

Table 8 INITIALize subsystem (continued)

command	setting	query	parameter	range	default
INITIALize:PCAUdio:					
OUTVolume	yes	yes	integer	0.100	50
INVVolume	yes	yes	integer	0.100	50

Table 9 GNSS subsystem

command	setting	query	parameter	range	default
GNSS:					
START	yes	no	<none>		
GNSS:IOConfig:					
IPADress	yes	yes	quoted string	0..255 chars	"127.0.0.1"
FREQency	yes	yes	integer	0..6000000000	1575420000 (Hz)
AMPLitude	yes	yes	float	-10..-140	-130 (dBm)
STATe	yes	yes	boolean	1(true); (0>false	0
GNSS:FILE:					
MODE	yes	yes	enumeration	file; custom	file
FNAME	yes	yes	quoted string	0..255 chars	"20140103_Vehicle.ags"
GNSS:FILE:CUSTom					
LATitude	yes	yes	float	-90..+90	55.948484
LONGitude	yes	yes	float	-180..+180	-3.198899
ALTitude	yes	yes	float	0..1000000	0
STIME	yes	yes	quoted string	0..255 chars	Current time
ALManac	yes	yes	quoted string	0..255 chars	"20140103_GPS.alm"
DURATION	yes	yes	integer	0..3600	300
SYSTEM	yes	yes	enumeration	gps; glonass; galileo	gps

Table 10 CALL subsystem

command	setting	query	parameter	range	default
CALL:					
START	yes	no	<none>		
END	yes	no	<none>		
REDial	yes	no	<none>		
RMSD	yes	no	<none>		
STATus?	no	yes	enumerated	idle;connected;error	idle
EFLag?	no	yes	enumerated	manual; auto; emergency; invalid; other	other

Table 11 CLEAR subsystem

command	setting	query	parameter	range	default
CLEAR	yes	no	<none>		

Table 12 INSTRument subsystem

command	setting	query	parameter	range	default
INSTRument:					
STATus?	no	yes	enumeration	none; connected; error	none

Table 13 MSD subsystem

command	setting	query	parameter	range	default
MSD:					
STATus?	no	yes	enumeration	empty; decoded; smsdecoded; error	
VERSion?	no	yes	integer	0..2	
MSGid?	no	yes	integer	0..255	
AUTO?	no	yes	boolean	1(true); (0>false	
TEST?	no	yes	boolean	1(true); (0>false	
PTRusted?	no	yes	boolean	1(true); (0>false	
PASSengers	no	yes	integer	0..255	

Table 13 MSD subsystem (continued)

command	setting	query	parameter	range	default
MSD:VIN:					
TYPe?	no	yes	quoted string	0..255 chars	
WMI?	no	yes	quoted string	0..255 chars	
VDS?	no	yes	quoted string	0..255 chars	
MODel?	no	yes	quoted string	0..255 chars	
SEQPlant?	no	yes	quoted string	0..255 chars	
MSD:PROPulsion:					
GASoline?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
DIESel?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CNATuralgas?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
LPRopanegas?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
EESStorage?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
HYStorage?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
OTHERstorage?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
MSD:TIMestamp:					
FORMatted?	no	yes	quoted string	0..255 chars	
VALue?	no	yes	float	0.. 4294967295	
MSD:LOCation:					
LATitude?	no	yes	float	-1000..1000	
LONGitude?	no	yes	float	-1000..1000	
DIRection?	no	yes	integer	0..360	
LAD1?	no	yes	integer	-512..511	
LOD1?	no	yes	integer	-512..511	
LAD2?	no	yes	integer	-512..511	
LOD2?	no	yes	integer	-512..511	
MSD:ADDitional:					
PRESent?	no	yes	boolean	1(true); (0>false	
OIDVersion	no	yes	quoted string	0..255 chars	
ADATa	no	yes	quoted string	0..255 chars	
RAW	no	yes	quoted string	0..255 chars	

Table 13 MSD subsystem (continued)

command	setting	query	parameter	range	default
MSD:GLONass:					
PRESent?	no	yes	boolean	1(true); (0>false	
CSVPresent?	no	yes	boolean	1(true); (0>false	
CSVerity?	no	yes	integer	0..2047	
MICXtion?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
MICFailure?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
RSPeaker?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
LSPeaker?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
SPEAker?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
IGNition?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
UIM?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
STATus?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
BATFailure?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
BATVoltage?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CSEnsor?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
SWIMage?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CMI?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
GNSReceiver?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
RAIM?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
GNSAntenna?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CMFailure?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
EMOVerflow?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
OCRitical?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
ONCRitical	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRFRont?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CFLeft?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRRight?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRRear?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRROllover	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRSide	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CRFSide?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CROther?	no	yes	enumeration	notpresent; presenttrue; presentfalse	
CORDsystem?	no	yes	enumeration	UNKN (unknown),WGS84 ,PZ90	

Table 14 GLONass subsystem

command	setting	query	parameter	range	default
GLONass:SMSConfig:					
ACTion	yes	yes	enumeration	command; add; remove; request; set	command
CCODE	yes	yes	enumeration	Raw; test; configreset; setauthcode; restart; ecallrequest; msdrequest; dereg	ecallrequest
PCODE	yes	yes	integer	0..57 (see Table 15)	29 (egts_sms_fallback_number)
ECType	yes	yes	enumeration	manual; automatic	manual
MSGid	yes	yes	integer	0..255	0
ECTRansport	yes	yes	enumeration	any; voice; sms	any
ECTMode	yes	yes	enumeration	stoptest; starttest	stoptest
IVALue	yes	yes	integer	0..65535	
BVALue	yes	yes	boolean	1(true); (0>false	
SVALue	yes	yes	quoted string	0..255 characters	""
GLONass:SMSSend:					
SEND	yes	no	none		
STATus?	no	yes	enumeration	idle; ack; nack; reject	
RECOrd?	no	yes	integer	0..65535	
GLONass:SMSResponse:					
RSTATus?	no	yes			
CRECOrd?	no	yes	integer	0..65535	
CCODE?	no	yes	integer	0..57 (see Table 15)	
IVALue?	no	yes	integer	0..65535	
BVALue?	no	yes	boolean	1(true); (0>false	
SVALue?	no	yes	quoted string	0..255 characters	
Note that the returned parameter in the IVALue/BVALue/SVALue fields is dependent on the returned CCODE and GOST R 54619. For example, EGTS_UNIT_IMEI will return a string (SVALue) but EGTS_UNIT_ID will return an integer (IVALue).					

Table 15 Parameter code values and payload types

Parameter code	Value	Type
EGTS_RADIO_MUTE_DELAY	0	IVALue
EGTS_RADIO_UNMUTE_DELAY	1	IVALue
EGTS_GPRS_APN	2	SVALue
EGTS_SERVER_ADDRESS	3	SVALue
EGTS_SIM_PIN	4	IVALue
EGTS_INT_MEM_TRANSMIT_INTERVAL	5	IVALue
EGTS_INT_MEM_TRANSMIT_ATTEMPTS	6	IVALue
EGTS_TEST_REGISTRATION_PERIOD	7	IVALue
EGTS_TEST_MODE_END_DISTANCE	8	IVALue
EGTS_GARAGE_MODE_END_DISTANCE	9	IVALue
EGTS_GARAGE_MODE_PIN	10	IVALue
EGTS_ECALL_TEST_NUMBER	11	SVALue
EGTS_ECALL_ON	12	BVALue
EGTS_ECALL_CRASH_SIGNAL_INTERNAL	13	IVALue
EGTS_ECALL_CRASH_SIGNAL_EXTERNAL	14	IVALue
EGTS_ECALL_SOS_BUTTON_TIME	15	IVALue
EGTS_ECALL_NO_AUTOMATIC_TRIGGERING	16	BVALue
EGTS_ECALL_ASI15_THRESHOLD	17	IVALue
EGTS_ECALL_MODE_PIN	18	IVALue
EGTS_ECALL_CCFT	19	IVALue
EGTS_ECALL_INVITATION_SIGNAL_DURATION	20	IVALue
EGTS_ECALL_SEND_MSG_PERIOD	21	IVALue
EGTS_ECALL_AL_ACK_PERIOD	22	IVALue
EGTS_ECAL_MSD_MAX_TRANSMISSION_TIME	23	IVALue
EGTS_ECALL_NAD_DEREGISTRATION_TIMER	24	IVALue
EGTS_ECALL_DIAL_DURATION	25	IVALue
EGTS_ECALL_AUTO_DIAL_ATTEMPTS	26	IVALue
EGTS_ECALL_MANUAL_DIAL_ATTEMPTS	27	IVALue
EGTS_ECALL_MANUAL_CAN_CANCEL	28	BVALue
EGTS_ECALL_SMS_FALLBACK_NUMBER	29	SVALue
IGNITION_OFF_FOLLOW_UP_TIME1	30	IVALue
IGNITION_OFF_FOLLOW_UP_TIME2	31	IVALue

Table 15 Parameter code values and payload types (continued)

Parameter code	Value	Type
EGTS_CRASH_RECORD_TIME	32	IVALue
EGTS_CRASH_RECORD_RESOLUTION	33	IVALue
EGTS_CRASH_PRE_RECORD_TIME	34	IVALue
EGTS_CRASH_PRE_RECORD_RESOLUTION	35	IVALue
EGTS_TRACK_RECORD_TIME	36	IVALue
EGTS_TRACK_PRE_RECORD_TIME	37	IVALue
EGTS_TRACK_RECORD_RESOLUTION	38	IVALue
EGTS_GNSS_POWER_OFF_TIME	39	IVALue
EGTS_GNSS_DATA_RATE	40	IVALue
EGTS_GNSS_MIN_ELEVATION	41	IVALue
EGTS_VEHICLE_VIN	42	SVALue
EGTS_VEHICLE_PROPULSION_STORAGE_TYPE	43	IVALue
EGTS_VEHICLE_TYPE	44	SVALue
EGTS_UNIT_ID	45	IVALue
EGTS_UNIT_IMEI	46	SVALue
EGTS_UNIT_RS485_BAUD_RATE	47	IVALue
EGTS_UNIT_RS485_STOP_BITS	48	IVALue
EGTS_UNIT_RS485_PARITY	49	IVALue
EGTS_UNIT_HOME_DISPATCHER_ID	50	IVALue
EGTS_SERVICE_AUTH_METHOD	51	IVALue
EGTS_SEVER_CHECK_IN_PERIOD	52	IVALue
EGTS_SEVER_CHECK_IN_ATTEMPTS	53	IVALue
EGTS_SERVER_PACKET_TOUT	54	IVALue
EGTS_SERVER_PACKET_RETRANSMIT_ATTEMPTS	55	IVALue
EGTS_UNIT_MIC_LEVEL	56	IVALue
EGTS_UNIT_SPK_LEVEL	57	IVALue

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