

TELIT Solution for eCall Testing Application Note

80000NT10046a r3 – 2011-09-21



APPLICABILITY TABLE

PRODUCT
GE864-QUAD AUTOMOTIVE V2
GE864-GPS
GL865-QUAD



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1. Introduction

The present note doesn't cover exhaustively the eCall Service, for that purpose there are dedicated Standard Technical Specifications, its purpose is to provide the reader with basic information concerning the argument with a particular focus on the job developed by TELIT regarding the Service.

1.1. Scope

The purpose of this document is to describe the eCall Test Architecture developed by TELIT to test its own IVS Data modem implementation. This feature is provided by TELIT modules having the official general software release starting from: 10.00.004.

1.2. Audience

This document is intended for users who are interested about the implementation of an In-Vehicle System and use the PSAP Support, provided by TELIT, for test purposes.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
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Alternatively, use:

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For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<http://www.telit.com>

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.



Telit appreciates feedback from the users of our information.

1.4. Related Documents

- [1] 3GPP TS 26.267
- [2] Telit AT Commands Reference Guide, 80000ST10025a
- [3] prEN 16062, February 2010 CEN
- [4] prEN 15722, February 2010 CEN

1.5. Document History

Revision	Date	Changes
0	2011-03-08	First issue.
1	2011-05-17	Added T3, T5, T6, T7 on fig. 3.
2	2011-07-19	Added products into “Applicability Table” and modified chapter 1.1.
3	2011-09-21	Modified chapter 3.2.

1.6. Abbreviations and acronyms

ASN1	Abstract Syntax Notation One
DTE	Data Terminal Equipment
IVS	In-Vehicle System
LAB	Laboratory
MSD	Minimum Set of Data
PSAP	Public-Safety Answering Point
SIP	Session Initiation Protocol



The following chapters introduce the TELIT eCall Test Architecture and point out the PSAP Service that can be offered to the Customers those are developing IVS applications. Because of TELIT Architecture is still under tune up to improve its performances, the present document could be subject to revisions.

2.1. AT Commands to manage eCall

Before describing the TELIT eCall Test Architecture, let's analyze the proprietary AT commands implemented by TELIT to create an MSD data block and manage an eCall.

The operations are manually carried out through AT commands [2] entered by an operator. In this chapter, we don't care about PSAP side. Next pages will take in charge it.

Let's suppose that an operator enters the AT commands on DTE, fig. 2, and monitors the unsolicited messages that will be displayed on it, refer to fig. 3, [4].

AT#CPUMODE=3	sets the IVS Data modem at the maximum speed.
AT#TESTNUM=0,<number>	enter eCall test number and its index.
AT#MSDSEND	enter codified MSD data (compliant with ASN.1 language)
>... codified MSD data....	
AT+CECALL=0;	establish eCall using eCall test number index.
AT#MSDPUSH	PUSH mode is activated, refer to fig. 3 [3], fig. 9: INITIATION msg is sent to PSAP Link Layer to synchronize the Up Link and wake up the PSAP Application. In response, PSAP Application sends back SEND MSD msg to require the MSD data.
#ECALLEV:0	unsolicited msg indicates that the Down Link is synchronized ¹ and the MSD request msg is received.
#ECALLEV:1	unsolicited msg indicates that MSD data has been successfully received by PSAP.
#ECALLEV: 2, data	unsolicited msg asks to IVS data modem to accomplish some actions. The actions are codified by data argument, e.g.: clear down the call.

It should be clear that manual MSD data coding is a boring job, especially if it needs to be repeated throughout different test sessions. To simplify this activity TELIT MSD Support has been developed to create automatically a text file holding codified MSD data. After that, the AT#MSDSEND command can be substituted with a "send text" command to transfer the MSD data text file previously created, e.g.: "send text" is the command provided by HyperTerminal application to send text file to the module.

¹ #ECALLEV:16 means that the synchronization between IVS and PSAP is lost. It can happen in any phase of transmission.



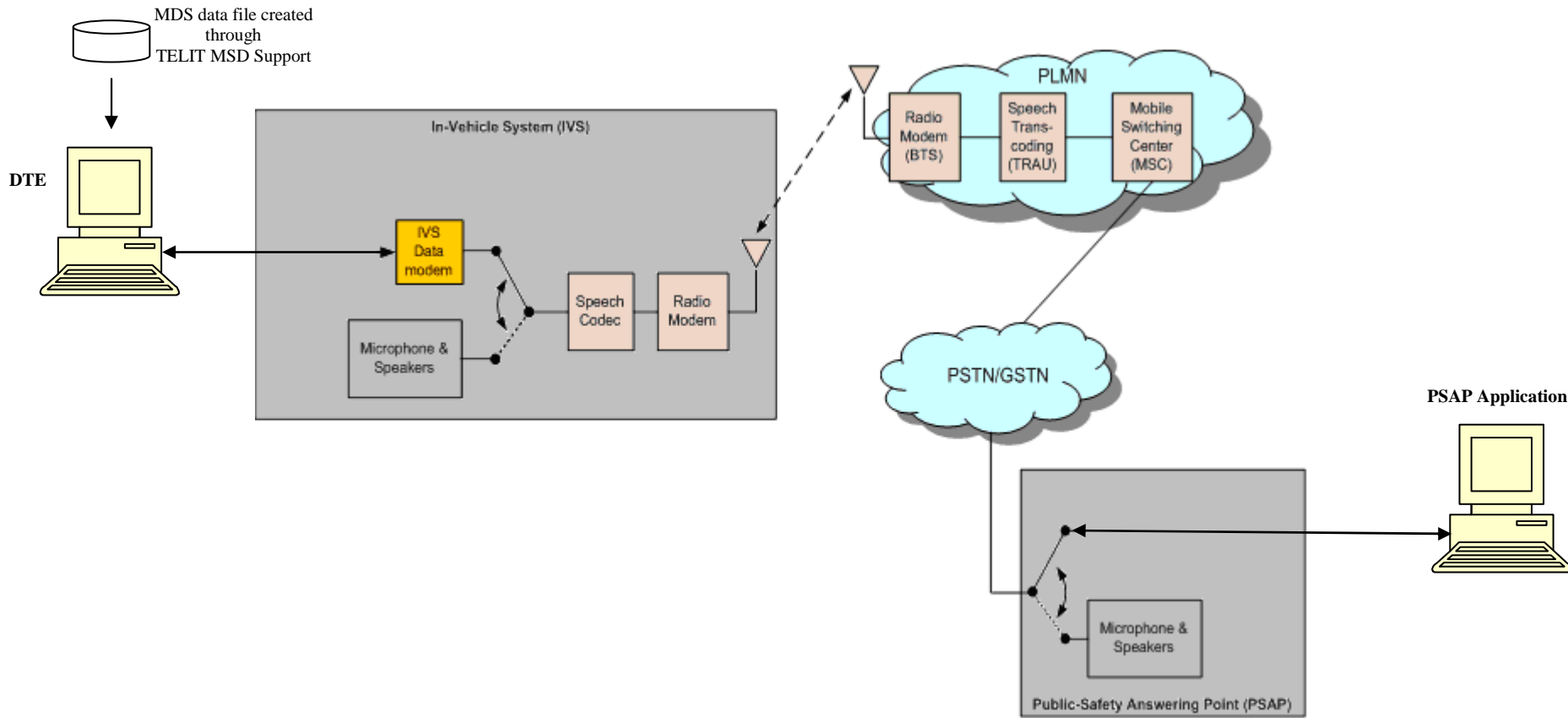


fig. 2: Towards TELIT eCall Test Architecture



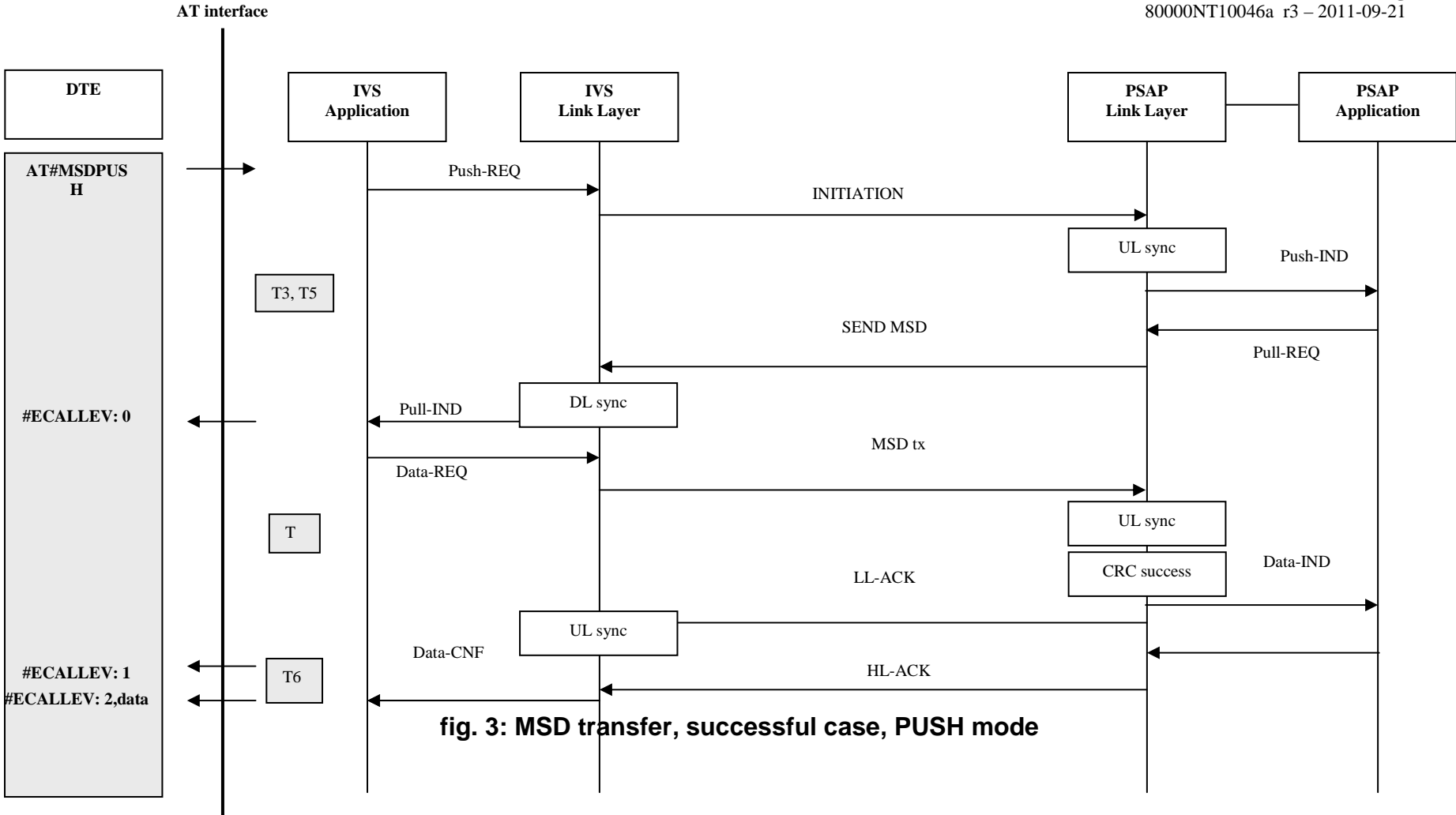


fig. 3: MSD transfer, successful case, PUSH mode



3. TELIT eCall Test Architecture

The DTE showed on fig. 4 runs the following two applications:

- MDS Support application to generate the MSD text file,
- HyperTerminal session, or some other equivalent application, to send the AT commands and the MSD text file to the module.

The module engine interprets the entered commands and manages the IVS Data Modem in accordance with them, additionally displays on DTE the unsolicited msg coming back from the PSAP side, fig. 3. For detailed info about T3, T5, T6, T7, refer to [3] (Annex A, Table of timings).

The module establishes a voice call using the PSAP phone number. On the receiving side, there is an ISDN BRI PSTN Gateway connected to the LAB Ethernet network. The ISDN Gateway converts the ISDN protocol present on its input to a VOIP protocol.

When the IVS Data Modem transmitter is connected to the Speech encoder (fig. 4 - uplink), the packets running on the LAB Ethernet network, belonging to the call in progress, hold codified MSD data². If the IVS Data Modem transmitter is not connected to the Speech encoder (it means that the speech out is connected) the packets hold voice. The voice aspect of the call isn't managed by the current TELIT PSAP implementation.

The interaction among Gateway, PSAP and PABX can be briefly summarized as follows: Let's suppose both Gateway and PSAP are registered on PABX. In addition, a calling phone number filter is activated on the PABX.

- The Gateway receives an entering call (indicating information about the used codec) and forwards it to the PABX;
- The PABX checks if the call must be forwarded to the PSAP, let's suppose that the call is for the PSAP;
- If both PSAP and entering call are using the same codec the connection between PSAP and Gateway is accomplished: a real time voice channel is set up. The received codified MSD data block is stored on the PSAP data base. Using a simple interface, the user can read the received MSD data blocks.

Using the TELIT eCall architecture an operator can create codified MSD data block, send it to the PSAP and read the codified MSD data on the PSAP data-base in order to evaluate if the MSD created and the MSD received are the same.

² In the meantime PSAP can send commands on downlink (full duplex).



3.1. MSD Support

TELIT MSD Support is a web application that helps the user to arrange and create codified MSD data through a user friendly interface and store it on an MSD text file.

Firstly, the MSD data block is arranged and then is codified using the ASN.1 language. The block can hold a maximum of 140 bytes, includes vehicle location information, time stamp, number of passengers, Vehicle Identification Number (VIN) and other relevant accident information.

The fig. 5 shows the main page of the web application. On the right side, there is the information that the user enters to arrange the MSD data. When all information is entered, the user pushes the “create MSD” button and entered information is coded and displayed on the lower box. The codified MSD data block can be saved on a text file using the “Save” button. To get detailed information about the MSD data meaning refer to [4].



3.2. PSAP Data Base Interface

TELIT PSAP Data Base Interface is a web application that enables the user to read the MSD data block stored on the PSAP Data Base.

The fig. 6 shows the main page of the PSAP Data Base Interface:

- Last Call: date and time of the last call.
- Phone Number: calling number.
- Total: total calls related to the calling number.
- MSD Received: MSD successfully received / Percentage of successful calls.

To display the Main parameters page, fig. 7, click on the calling number:

- Call Id: progressive number.
- Duration: time information about the call.
- Timers: for internal purposes only.
- Caller: calling number.
- MSD: codified MSD data.

To display the Details page, fig. 8, click on “Open Details” button:

- Map: indicates the location where is happened the incident car.
- Id:... the box on the upper right corner shows the MSD data in readable format.
- Raw MSD: the box on the lower left corner shows the codified MSD data.
- PSAP Log Mess. the box on the lower right corner shows the PSAP log used during test sessions.



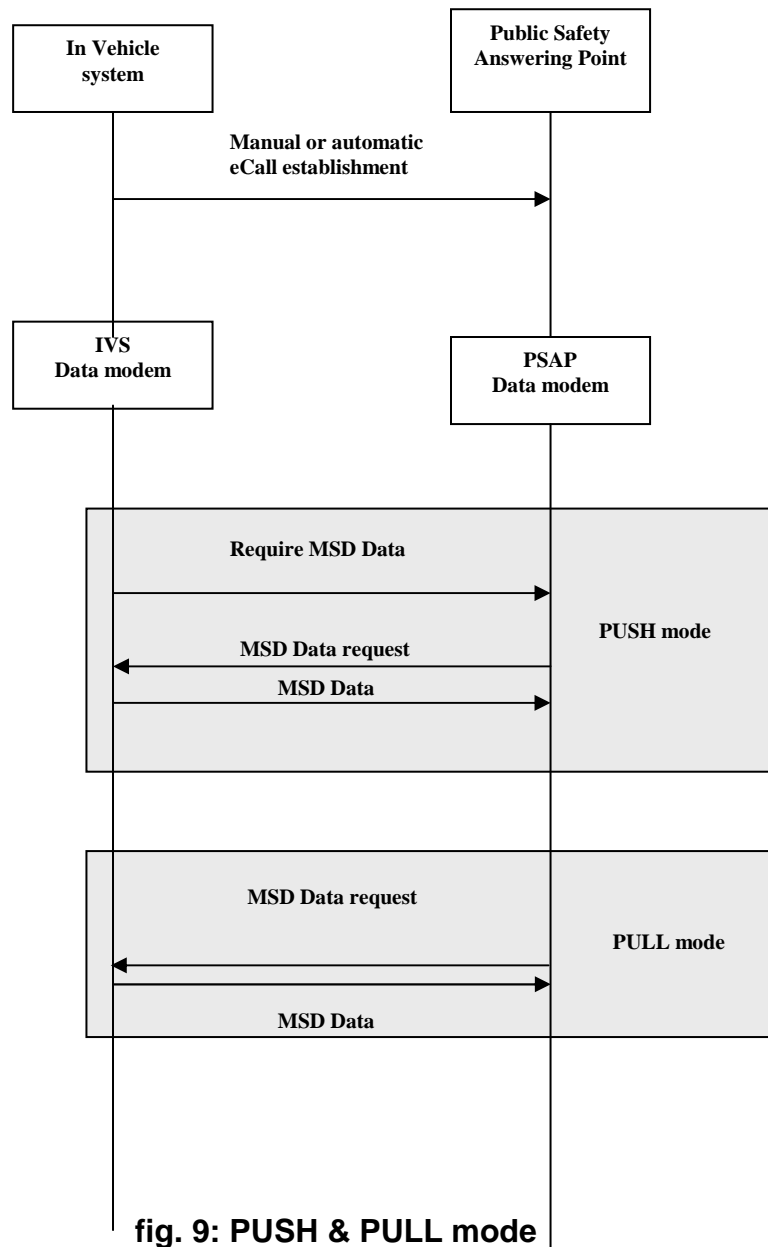
PSAP Data Base Interface

Last Call	Phone Number	Total	Msd Received	
2011-02-22 13:52:35	335151	9582	9314	97.3%
2011-02-15 13:32:46	40419	134	1	0.8%
2011-02-15 12:17:34	335151	40	33	82.5%
2011-02-09 11:19:18	3351509	16	14	87.5%
2011-02-07 17:14:23	60	41	0	0%
2011-02-04 09:14:54	346585197	353	327	92.7%
2011-02-03 15:11:20	338745278	110	106	96.4%
2011-01-26 17:52:50	7933579	7	5	71.5%
2011-01-26 17:25:16	79234531	1	1	100%
2011-01-26 16:37:33	arnymis	4	4	100%
2011-01-26 15:28:03	1191470	3	2	66.7%
2010-12-28 11:12:47	79575856	1	1	100%
2010-12-23 18:30:10	13801421	14	7	50%
2010-12-21 17:24:06	57	13	0	0%
2010-12-20 15:16:35	PSA calls	27	3	11.2%
2010-12-14 15:09:08	33458761	49	48	98%
2010-12-02 11:11:35	33458762	194	190	98%
2010-12-01 12:35:03	387762	50	49	98%
2010-11-24 14:18:56	787207145	1	0	0%
2010-11-19 03:18:08	33514719	1115	1075	96.5%
2010-11-16 18:15:20	34660087	24	19	79.2%
2010-11-04 14:59:33	328433450	246	200	81.4%
2010-09-20 18:29:30	32033786	246	82	33.4%
2010-09-15 15:49:17	103	62	0	0%
2010-09-15 14:17:13	6002	2	0	0%
2010-09-08 15:26:33	335151	1953	1851	94.8%
2010-09-06 18:29:34	34801803	102	57	55.9%
2010-08-24 16:21:06	334133145	2	1	50%
2010-07-28 15:59:47	79987740	9	9	100%
2010-07-26 15:34:11	02	1	0	0%
2010-05-26 09:22:06	34056935	7	7	100%
2010-05-20 15:26:34	7979wn	61	52	85.3%
	All	14470	13458	93.1%

fig. 6: Main page of PSAP Data Base interface



As stated on Technical Specification [1] the eCall Service shall support the following two operative modes: PUSH and PULL. In the PUSH mode the MSD data is pushed by the IVS Data modem, in the PULL mode the MSD data is required by the PSAP Data modem, an explanatory simplified handshake is showed by fig. 9.



4. TELIT PSAP Customer Support

The previous chapters illustrate the eCall architecture developed by TELIT to test its MSD Data modem implementation. This architecture can be shared with customers in order to give them the possibility to test and evaluate their IVS applications, refer to fig. 10. To avoid simultaneous phone-calls towards the single ISDN line, each customer has an agreed PSAP calling time slot.

The PSAP data-base, provided by the current TELIT Architecture, is not accessible by external LAB Ethernet Network client systems. That means a customer can't get its MSD Data from PSAP server, can only write it.



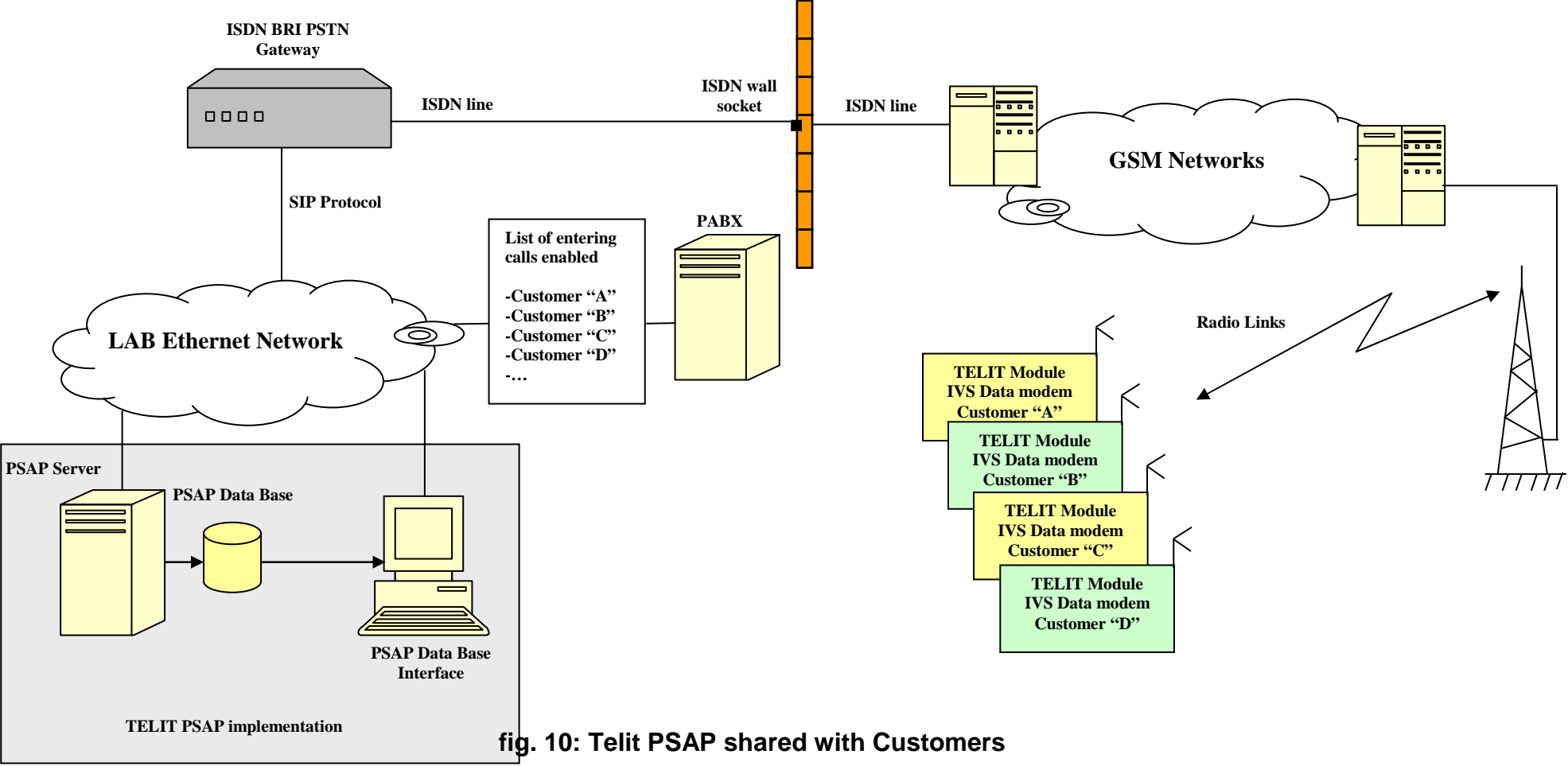


fig. 10: Telit PSAP shared with Customers

