



## Avaya Solution & Interoperability Test Lab

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# Application Notes for Interconnection of the British Telecom ITS Platform with an Avaya-Tenovis Integral I33/I55 via PRI and QSIG - Issue 1.0

### Abstract

These Application Notes describe the interconnection of the British Telecom (BT) ITS Platform with an Avaya-Tenovis System "Integral 33/55" (I33/I55) via a Primary Rate Interface (PRI) and using the QSIG protocol for signaling. Interoperation of the two systems allows basic calls and supports a number of Supplementary Services.

Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

# 1. Introduction

These Application Notes describe the interconnection of the British Telecom (BT) ITS platform with an Avaya-Tenovis System "Integral 33/55" (I33/I55) via a Primary Rate Interface (PRI) and using the QSIG protocol for signaling.

The BT ITS platform is designed for trading floors. It supports up to 3000 turrets as their desktop equipment. The ITS voice platform supports a wide range of features including voice distribution and conferencing through the public network, connected to Private Automatic Branch eXchanges (PABX), turrets and other voice systems. The ITS conferencing enables users to connect to any incoming or outgoing call, at the push of a button, without the need to be introduced by another user.

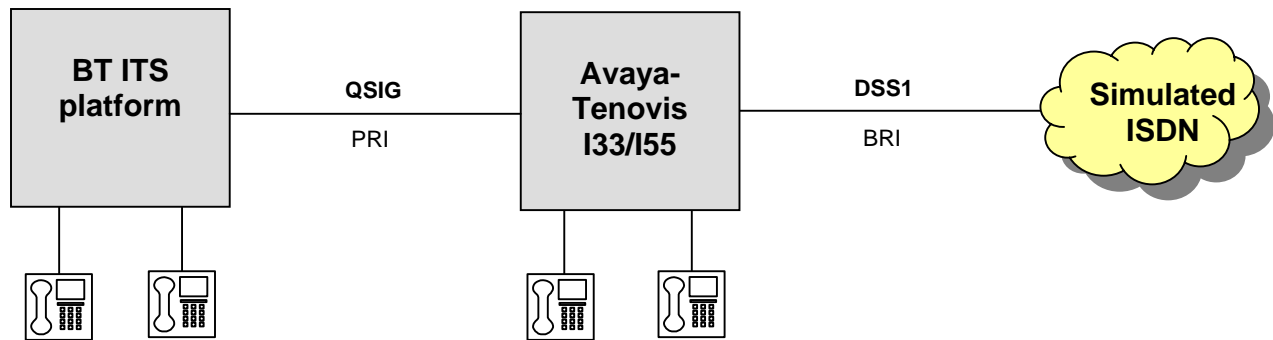
QSIG is an ISDN-based, internationally standardized signaling protocol for use in corporate or enterprise voice or integrated services networks, typically between Private Automatic Branch eXchanges (PABX). QSIG is used for the establishment and release of calls (basic services) and for the control of a large number of supplementary services. QSIG is specified in Ecma standards, in particular ECMA-143 (call control in support of basic services), ECMA-165 (generic functional protocol for the support of supplementary services), and a number of Standards specifying individual supplementary services. These standards are also published by ISO/IEC, e.g. ISO/IEC 11572 for basic calls or ISO/IEC 11582 for the Generic functional protocol.

The Primary Rate Interface (PRI) used in this case operates at 2 Mbit/s and offers 30 B-channels with 64 kbit/s each, for voice or integrated services applications and a D-channel with 64 kbit/s for signaling.

The interoperation of the two systems includes basic calls in both directions and with the ISDN (Integrated Services Digital Network) as well as the following supplementary services:

- Calling / Connected Line Identification Presentation as part of basic calls,
- Calling / Connected Name Identification Presentation,
- Call Transfer,
- Call Diversion (Call Forwarding unconditional, on busy and on no reply), and
- Message Waiting Indication.

Figure 1 shows the interconnection of the BT ITS platform with an Avaya-Tenovis I33/I55 via a PRI using QSIG signaling as described above. The Avaya-Tenovis I33/I55 has access via a Basic Rate Interface (BRI) with two 64 kbit/s B-channels and a 16 kbit/s D-channel for signaling to the Integrated Services Digital Network (ISDN). The signaling protocol is the Digital Subscriber Signalling System 1 (DSS1) specified by ITU-T Recommendations Q.921 and Q.931.



**Figure 1: Interconnection of the BT ITS platform with an Avaya-Tenovis I33/I55**

## 2. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

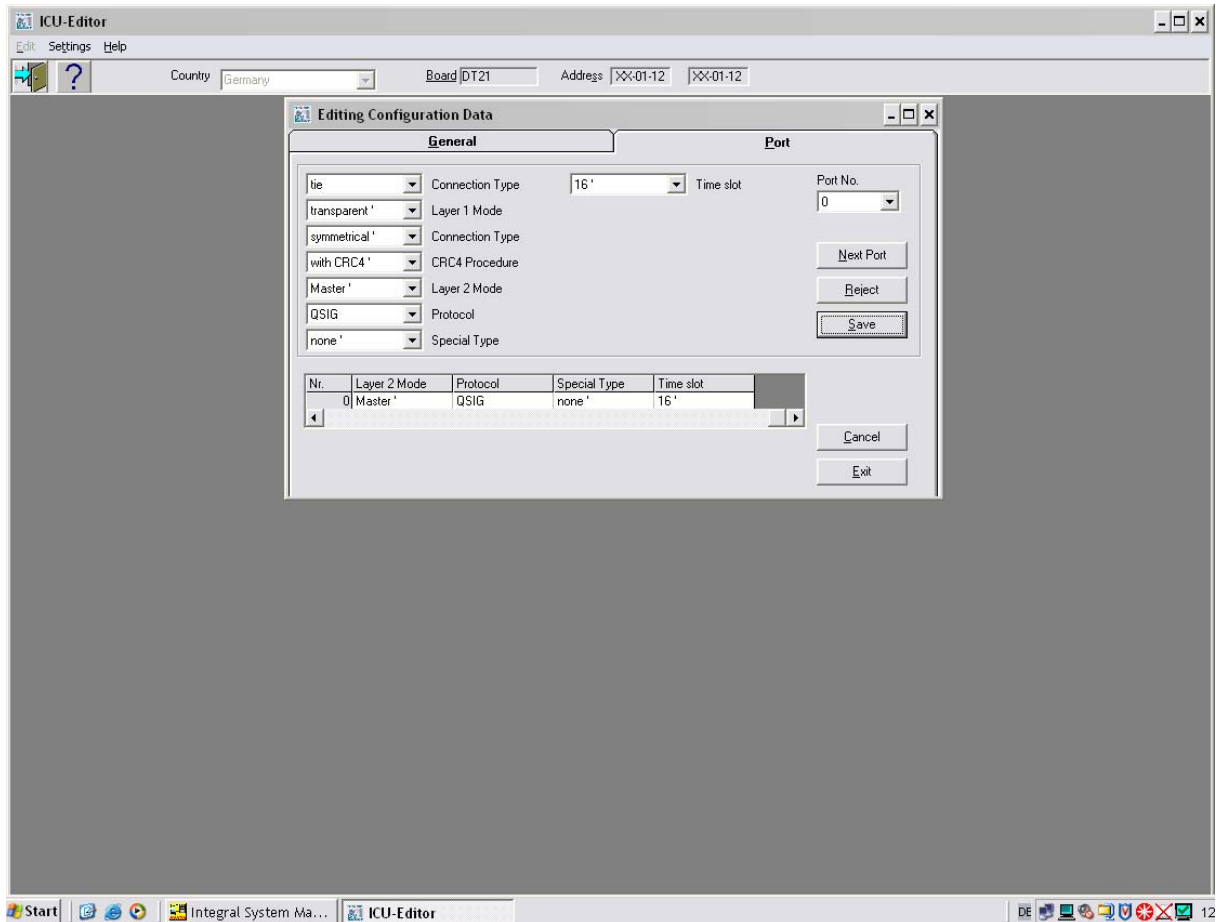
- Avaya-Tenovis I33/I55 with software release E070v08.1.3.
- The Avaya-Tenovis I33/I55 requires at least one Digital Line Card (DT21) board providing the system with the necessary PRI for the interconnection.
- For access to the ISDN a Universal Interface Platform (UIP) board is used providing the I33/I55 with (a) Basic Rate Interface(s) (BRI).
- BT ITS p31 platform with software release 12.1.

## 3. Configure the Avaya-Tenovis I33/I55

The configuration of the Avaya-Tenovis I33/I55 is done by means of the Integral Service Manager (ISM) which is running on the service PC connected to the system.

For the interconnection with the BT ITS p31, standard QSIG configuration according to the following major settings is to be used. The I33/I55 is the "QSIG Master" and the BT ITS p31 is "Slave". This is done by means of the ICU-Editor within the ISM by selecting "PABX-Administration", "Module", "Module View" (Module 1), the appropriate board (DT21), and SW Exchange Config Data / Change Data:

- General:
  - Call Reference Length: 2
  - First/Last Channel: 0/0
- Port:
  - Connection Type: tie
  - Layer 1 Mode: transparent
  - Connection Mode: symmetrical
  - CRC4 Procedure: with CRC4
  - Layer 2 Mode: Master
  - Protocol: QSIG
  - Time slot: 16



Using the Transparent Console (TCO) of the ISM and by means of MML (Man Machine Language) the following is to be set:

- QSIG protocol version: 0
- Port (AO) type: PRN = Primary Rate Network QSIG

Additionally, for compatibility reasons with the BT ITS platform the following settings (to be set also with MML in tasks ANLM {system supplementary services} and AOLM {port supplementary services}) are required in the I33/I55:

- QIS = QSIG Protocol-Version "ISO modified"
- PRE = Path Reservation
- CRF = Connection Retention Flag
- QPR = QSIG Path Replacement
- QMS = QSIG Message Segmentation

## 4. Configure the BT ITS Platform

The configuration of the BT ITS platform is done via the ITS profile management software. The ITS profile management software runs on a server connected to the BT ITS platform.

A QSIG PRI interface is used to connect both systems (BT ITS platform and Avaya-Tenovis I33/I55) together. The configuration of the BT QSIG interface is done via the ITS profile management software. Below a list of important settings when connecting the BT ITS platform with an Avaya-Tenovis I33/I55:

- Call Reference length: 2
- Master / Slave End: Slave
- QSIG Operation Mode: ECMA/ISO
- Multiframe CRC4: On
- Reindex Channels: No

## 5. Interoperability Compliance Testing

Interoperability compliance tests were carried out using a mutually agreed test plan covering supported QSIG features. For the tests a BT ITS p31 platform was interconnected with the I33/I55.

### 5.1. General Test Approach

Interoperability compliance tests were performed manually and covered incoming and outgoing basic calls in both directions and with the ISDN as well as the following supplementary services:

- Calling / Connected Line Identification Presentation as part of basic calls,
- Calling / Connected Name Identification Presentation,
- Call Transfer,
- Call Diversion (Call Forwarding unconditional, on busy and on no reply), and
- Message Waiting Indication.

### 5.2. Test Results

All tests regarding QSIG signaling and compatibility between the Avaya-Tenovis I33/I55 and the BT ITS p31 platform were successful.

## 6. Verification Steps

To verify that the solution was properly configured, the following steps can be taken:

- After establishing the physical connection, check whether basic calls are possible between the two systems. Then continue to check the more complex supplementary services.
- In case of problems, protocol tracing and analysis tools may be used to check whether layer 1, layer 2, layer 3, i.e. QSIG signaling, of the interface work properly. The BT ITS platform provides such an internal tool (as part of the ITS profile management software). On the I33/I55 side an IDM (ISDN D-channel Monitor) could be used.

## 7. Support

The BT customer support hotline is: +44 1932 787878.

## 8. Conclusion

These Application Notes describe the configuration steps required for interconnecting a BT ITS platform with an Avaya-Tenovis I33/I55. The systems interoperated successfully.

## 9. Additional References

### 9.1. Documentation

- [BT ITS trading systems](#)
- [BT ITS platforms](#)
- [BT ITS p31 platform datasheet](#)

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