Avaya Solution & Interoperability Test Lab

Application Notes for Konftel 300 IP with Avaya Integral Enterprise - Issue 1.0

Abstract

These Application Notes document compliance testing the Konftel 300IP with Avaya IP and digital telephones controlled by Avaya Integral Enterprise. The Konftel 300IP communicates with Avaya Integral Enterprise via LAN and the VoIP Board or the new IP Media Resource Module (IPMR) using SIP (Session Initiation Protocol) and enables meeting or conference participants to simultaneously participate in a telephone conversation.

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

1. Introduction

The purpose of these Application Notes is to illustrate how the Konftel 300IP can be used within a telephone system consisting of Avaya IP and digital telephones controlled by Avaya Integral Enterprise. The Konftel 300IP functions as a SIP phone with two accounts which serve as separate line appearances, and contains a microphone and loudspeaker, which effectively extends the range from which the unit can be used to include an area of 30 square meters. Placed within a conference room, the Konftel 300IP enables all of the participants in the room to take part in a telephone conversation. The unit also performs echo cancellation to avoid feedback problems that might otherwise occur.

The Konftel 300IP has a keypad/display, shown in the figure below, which serves as a telephone keypad, as well as providing additional functions.

Figure 1: Konftel 300IP Keypad /Display

This document details the configuration used for compliance testing with Konftel 300IP with Avaya Integral Enterprise. The diagram (**Figure 2**) depicts the configuration used for compliance testing.

1.1. Interoperability Compliance Testing

The objective of the compliance testing done on the Konftel 300IP product was to verify that it is compatible with Avaya Integral Enterprise. This includes verifying that the essential Konftel 300IP features function properly when used with Avaya Integral Enterprise, and that Avaya Integral Enterprise features are not hindered by the interaction with the Konftel 300IP. Furthermore, Konftel 300IP's robustness was verified.

1.2. Support

Support for Konftel products is available at

- Web-based support: http://www.konftel.com/
- Email: info@konftel.com
- International help desk: +46 90706489
- North American help: +1 866 606 4728

2. Reference Configuration

The configuration that was used for testing consists of an Avaya Integral Enterprise including a VoIP board or an IPMR (IP Media Resource) module. The Avaya telephones and the Konftel 300IP were located at physically separate locations to ensure that sound from the test location could not be heard other than via the telephone connection. Note that the Konftel 300IP was able to operate solely from the power that it received from an Avaya C364T-PWR Ethernet switch (in the LAN) to which it was attached. The unit is also shipped with a power supply which can be used if Power over Ethernet is unavailable.

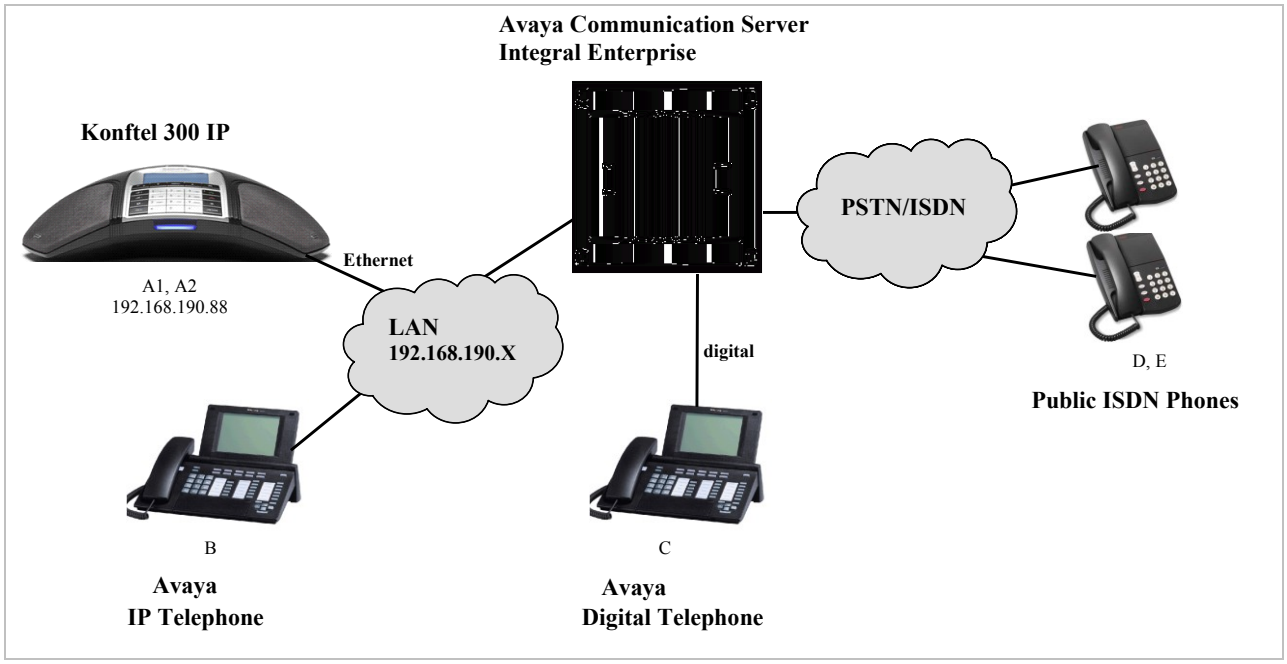

Figure 2: Test Configuration

The following table contains additional information about each of the telephone endpoints depicted in the Test Configuration diagram:

Diagram	Ext	Endpoint
A1	1319	Konftel 300 IP Account 1
A2	1317	Konftel 300 IP Account 2
B	1312	T3 IP
C	1500	T3.14
D	0 75009497	ISDN telephone
E	0 75056632	ISDN telephone

Table 1: Extensions Used for Testing

3. Equipment and Software Validated

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

Equipment	Software Version
Avaya S5500 (ACB) Integral Enterprise	IEEE5 (L050V00.2.0.1)
Avaya IPMR Module	IPMRSW15 (Sep 08, 2009)
Avaya VoIP Board	VOIPSW79 (Mar 05, 2009)
Avaya T3 IP Comfort Telephone	T542_0DE.a3i
Avaya T3.14 Comfort ISDN Telephone	T314_0DE.hxt
Avaya C364T-PWR	4.5.14
Konftel 300 IP	1.2.0

Table 2: Version Numbers of Equipment and Software

4. Configure the Avaya Integral Enterprise

The configuration and verification operations illustrated in this section were performed using the Avaya Integral System Management (ISM) tool on a service PC. Access to the system was via the LAN. The configuration of the interface to the PSTN/ISDN and the interfaces to the Avaya telephones are outside the scope of this document.

4.1. Configure Dial Plan

Launch ISM by selecting **Start → Programs → Integral 33 → ISM** and enter default username n1 and password p1. To open a connection to the Avaya Integral Enterprise click on Customer and enter the necessary parameters to connect:

Customer name
PABX: Integral Enterprise
Software version: IEE5
User name: EXPERT
Password: ACCESS
MML password: <password>
IP Address of the Ethernet interface of the system
Select Ethernet under TUX

Use the Transparent Console (TCO) of the ISM and the task WABE to configure the dial plan. Use the command **`akze:13,intern,2,v;`** followed by **`zids:<,2;`** to add a new entry, e.g. for a 4-digit extension number beginning with 13, covering the extension (1319 and 1317) used for the Konftel 300IP. The commands **`anzg;`** (show) and **`dwgr:2,v;`** (display dial group 2) are used to display the current assignments for dial group 2 as shown in **Figure 3**.

```
PROL<1:wabe;
Kommando in Bearbeitung !
WABE<akze:13,intern,2,v;
zids:<,2;
WABE<anzg;
WABE<dwgr:2,v;
                                                        03.08.09  16:55:25
Anzeigen der Wahlbewertungsdaten zu einer Wahlgruppe
====================================================
 Wahlgruppe   :  2
 Wahlverfahren:  Vorwahl

AKZ        Wahl   Bndl  AKZ  SA    Co. LCR   Vorwahlzu.      ext. LCR- RI- Num.
           selek. num.  Info Grup. Nr. Daten Ziff.      Sel- Belg Rout SA  Plan
                                       satz  folge      ekt. art  Flg  Flg
-------------------------------------------------------------------------------

0          EXTERN 4     -    -     -   -                0    INIT ROFF -   -
                                                           Amt ueber Erdtaste
13         INTERN -     2    -     -   -                0     -    -   -   -
20         INTERN -     1    -     -   -                0     -    -   -   -
21         INTERN -     1    -     -   -                0     -    -   -   -
22         INTERN -     2    -     -   -                0     -    -   -   -
23         INTERN -     1    -     -   -                0     -    -   -   -
24         INTERN -     1    -     -   -                0     -    -   -   -
25         INTERN -     1    -     -   -                0     -    -   -   -
26         INTERN -     1    -     -   -                0     -    -   -   -
27         INTERN -     1    -     -   -                0     -    -   -   -
28         INTERN -     1    -     -   -                0     -    -   -   -
29         INTERN -     1    -     -   -                0     -    -   -   -
40         INTERN -     2    -     -   -                0     -    -   -   -
41         INTERN -     1    -     -   -                0     -    -   -   -
...
```

Figure 3: Dial Plan Display Form

4.2. Configure Interface to Konftel 300 IP

Use the TCO of the ISM and the task AOGD to configure the interface. Use the command **`aoei:1319,...;`** (create extension 1319) followed by the necessary parameters for a digital telephone, which is the basis for IP and SIP phones (**Table 3**). Use the command **`dnei;`** to create the service telephony (TLP) and in addition the command **`cdec:`** to set the appropriate codec type, echo cancellation mode and codec mode for IP and SIP phones. **Figure 4** shows an example command sequence for that configuration. The command **`anzg:`** followed by the appropriate extension number (e.g. **`anzg:1319;`**) is used to display the current settings as shown in **Figure 5**. Once the account is registered the device IP address and active coder appear in the General Data list.

Parameter	Usage
Extension number	Enter the extension number to be assigned to the subscriber, e.g. 1319 or 1317.
Hardware address (HWA)	Enter the designation for the port to which the unit is (virtually) attached, e.g. 01-01-03-xx.
Type (AO-Type)	Enter the station type for a digital telephone, i.e. DITN.
Name	Enter the name of the user which is to be associated with the telephone.
Protocol	Enter the protocol and version to be used by a digital telephone, i.e. ETSI, 0.
Codec	Enter the codec type, echo cancellation mode, and codec mode to be used.

Table 3: Configuration - Konftel 300 IP Subscriber

```
PROL<praw:aogd;
AOGD<aoei:1319,01-01-03-29;
AOGD<aoty:DITN;
AOGD<alae;
AOGD<nako:...;
AOGD<prve:ETSI,0;
AOGD<agrp:1,,,,;
AOGD<uela:1,;
AOGD<exit;
AOGD<aoae;
AOGD<dnei:TLP;
AOGD<grda:2,1,0,0,1;
AOGD<cdec:1,on,n;
AOGD<dnzu:f;
AOGD<exit;
AOGD<aozu:f;
AOGD<exit;
```

Figure 4: Command Sequence for the Configuration of Konftel 300 IP Subscriber

```
PROL<1:aogd;
Kommando in Bearbeitung !

AOGD<anzg:1319;
================================================================================
                                                              03.08.09  17:18:51
Anschlussorgan
--------------
Rufnummer           : 1319
Steckplatz/HWA      : 01-01-03-29
AO-Typ              : DITN
================================================================================

Allgemeine ADS-Daten
--------------------
Name                        :
Kostenstelle                : 00000
Protokolle                  :
                               Protokoll | Version | faulty | busy 2| error
                               ----------+---------+--------+-------+------
                                ETSI     | 0       | AUS    | AUS   | AUS
Ueberlastprioritaet         : 0
SPWKGR. Amtszugriff         : 0
SPWKGR. COLISEE             : 0
DISA-Gruppe                 : 0
Haendlergruppe              : 0
Rufnr.zuord. HKZ u.QUE      :
Kategorie                   : -1
Wartefeld Maximum           : 0
Reservierte
Verbindungsspeicher         : 0
Dienstspeicher              : 2
AO-Zustand                  : IN BETRIEB
Service-Sperre              : sv-frei
Rufnummern-Sperre           : Aus
IP - Adresse                :
(V4)192.168.190.88:5060
Akt. Coder                  : g711alaw64k
Sichere Registrierung       : NEIN
================================================================================

Dienstdaten
-----------

                |     TLP      |     GEN      |              |              |
----------------+--------------+--------------+--------------+--------------+
Zustand         | FREI         | FREI         |              |              |
Wahlgruppe      | 2            | 2            |              |              |
Verkehrsgruppe  | 1            | 1            |              |              |
Umschaltegruppe | 0            | 0            |              |              |
Codewahlgruppe  | 0            | 0            |              |              |
LCR-Gruppe      | 0            | 0            |              |              |
Wahlabruf       | DEAKTIV      | DEAKTIV      |              |              |
Rueckausloesen  | DEAKTIV      | DEAKTIV      |              |              |
Coder           | g711alaw64k  | g711alaw64k  | init         | init         |
Codermode       | Normal       | Normal       |              |              |
Echounterdrueck.|  Ein         |  Ein         |              |              |
================================================================================

B-Kanal-Daten
-------------
Vergabekennung      :  -
Verhandlungskennung :  -

B-Kan- Buendel- Richtg  Zugr Zustd  |  B-Kan- Buendel- Richtg  Zugr Zustd
Nr.    nummer                       |  Nr.    nummer
-----------------------------------  |  -----------------------------------
1        -        -      -     F    |  2        -        -      -     F
```

```
Anzahl der belegbaren B-Kanaele: 2

Belegungsrichtung                   |  Zustand
----------------------------------  |  ---------------------------------
G - gehend                          |  B  - BELEGT
K - kommend                         |  D  - DEFEKT
W - wechselseitig                   |  EB - EDSS1 BELEGT
                                    |  ER - EDDS1 RESERVIERT
                                    |  F  - FREI
                                    |  G  - GESTOERT
Zugriffsrecht                       |  R  - RESERVIERT
----------------------------------  |  S  - SPERRZUSTAND
M - mit                             |  T  - DEFEKT/GESPERRT
O - ohne                            |  V  - BELEGT/GESPERRT
================================================================================
AOGD<;

AOGD<anzg:1317;
...
```

Figure 5: Konftel 300 IP Subscriber Display Form - General and Service Data

4.3. Allow Access to an External Line (PSTN/ISDN)

To be able to make external calls into PSTN/ISDN this feature must be enabled at a system level (ISM-TCO, task AALM) as well as for the extension (ISM-TCO, task AOLM). Select the extension (command **`aoau:`**, e.g. **`aoau:1319;`**) and use the command **`falm:`** followed by the acronym for the feature or supplementary service to be enabled (e.g. **`falm:AMT;`**). **Figure 6** shows an example command sequence to enable the necessary features / supplementary services for the Konftel 300 IP. To display the set of supplementary services assigned to an extension use the command **`aalm;`** as shown in **Figure 7**.

```
PROL<praw:aolm;
AOLM<aoau:1319;
AOLM<falm:amt,rults,rwlts,kon;
AOLM<falm:rzc,ank,rnu,mak;
AOLM:exit;
```

Figure 6: Supplementary Services assignment to an Extension

```
PROL<1:aolm;
Kommando in Bearbeitung !
AOLM<aoau:1319;
AOLM<aalm;
                                                          13.02.08  17:04:04
  AO-Nummer  AO - Leistungsmerkmale ( Dienst : TLP )
--------------------------------------------------------------------------------

 13 19        AMT   RUL   RULTS ARSTS ARR   AUF   CICL1 ANK   CIPL0 CWA
              EMU   API   RWLTS KON   RZN   RZC   ACO   ACOAT RNU   MAK
```

Figure 7: Supplementary Services assigned to an Extension

4.4. Configure the Integral Enterprise VoIP or IPMR board

The Integral System Management (ISM) is also used to configure the VoIP or IPMR board. Select pull down menu PABX Administration →Board → SW Exchange Config Data, enter the appropriate Board number and execute "Change data". General data, such as the board IP address are set under "General" (**Figure 8** below).

Note: The Packet size for both Coder types G.711 and G.729A has to be set to 20ms.

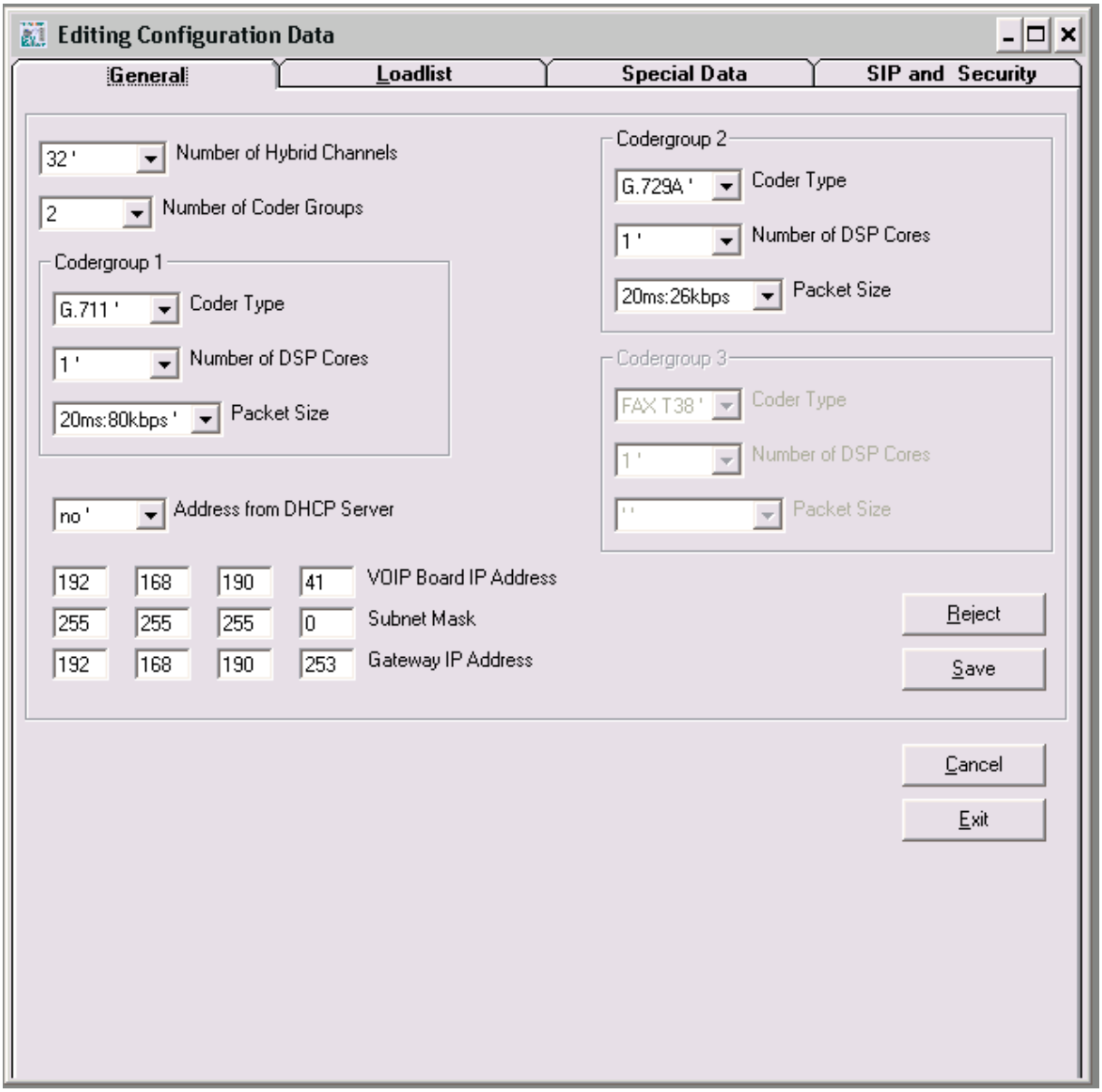

Figure 8: IPMR / VoIP board Configuration Data - General

All data in 'Special Data' (**Figure 9** below) can be the default values.

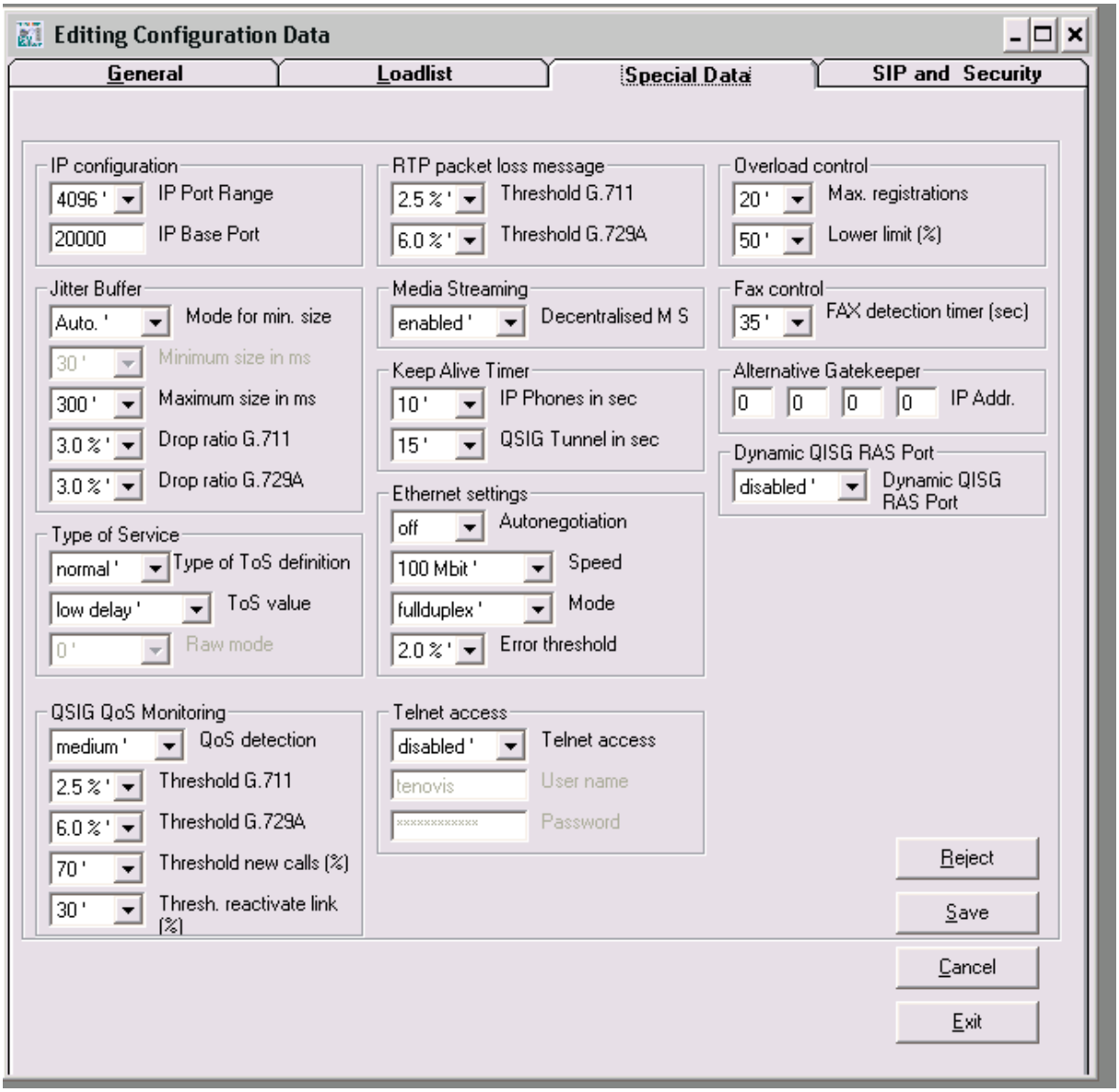

Figure 9: IPMR / VoIP board Configuration Data - Special Data

Under "SIP and Security", depending on the transport protocol to be used for SIP, the SIP Client UDP interface, SIP Client TCP interface, or SIP Client TLS interface respectively must be enabled (**Figure 10** below). If SRTP is to be used for media encryption, S-RTP encryption must be enabled. If SIP Client UDP and/or TCP Port are left at default (0), the default port 5060 will be assumed (5061 for TLS).

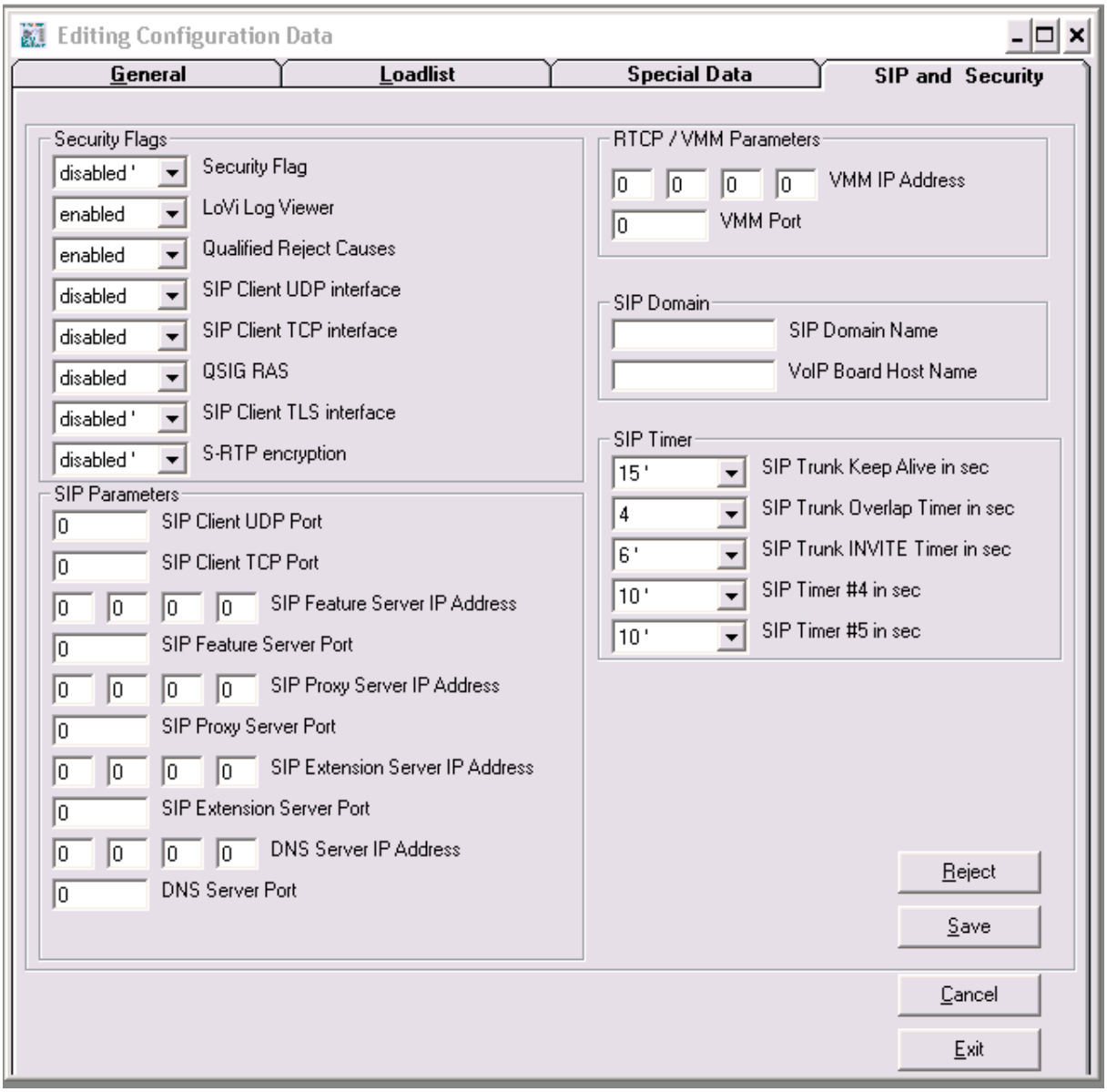

Figure 10: IPMR / VoIP board Configuration Data - SIP and Security

“Save” changes and ”Exit” the screen. Execute "Send new data" and "Reset board" to complete everything.

5. Configure the Konftel 300 IP

The Konftel 300IP can be assigned an IP address either manually, or via DHCP. Configuration via the keypad interface (see **Figure 1**) on the Konftel 300IP, using the following sequence.

- Press the "Menu" key.
- Select "Settings".
- Select "Advanced", and enter the administrator PIN when prompted (default 1234).
- Select "Network".
- Select either "DHCP" or "STATIC" followed by the IP address, Netmask and Gateway address to be assigned to the unit.

Once the Konftel 300IP has been assigned an IP address, the configuration procedure can be preformed either with the keyboard/display of the Konftel 300IP, or via Web browser, as illustrated by this section of the document.

To use a web browser, enter the IP address of the Konftel 300IP into the URI "Address" field of the browser, which causes the screen shown below to appear. Select "Admin" from the "Profile" drop-down menu, enter the administrator PIN (default 1234), and click "Login".

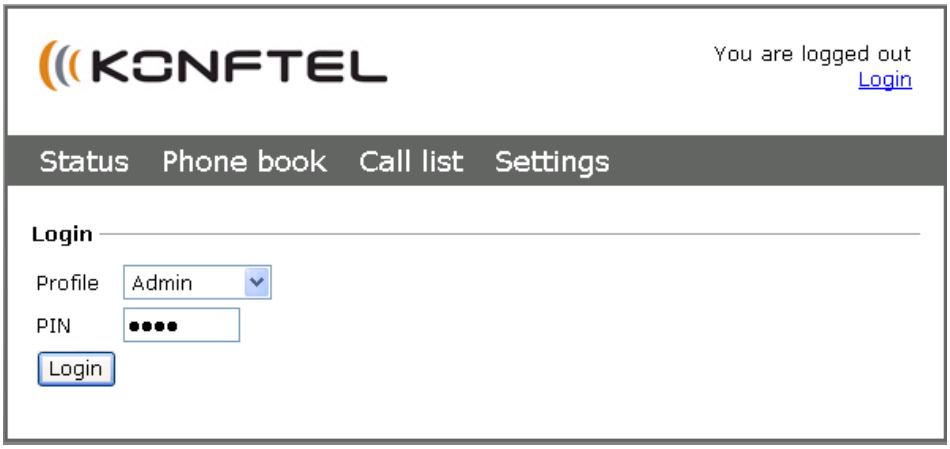

Figure 11: Konftel 300IP Login Screen

5.1. Configure SIP Accounts

Select the “Settings” tab from the top of the screen, and then “SIP” from row of the underlying set of tabs. Enter the parameters shown in the following table for each of the accounts.

Parameter	Usage
Enable account	Select the “Yes” radio button.
Account name	Enter a descriptive name for the account.
User	Enter the “User”, typically the extension number.
Registrar	Enter the IP address of the VoIP/IPMR board.
Proxy	
Realm	* to take the information from "Registrar" field
Authentication name	Enter the extension number of the “User”.
Password	Enter the “Password” which corresponds with the extension number.

Table 4: User Configuration Parameters

Depending on the Transport protocol to be used for SIP, select UDP, TCP, or TLS. If TLS is selected, some new fields "TLS settings" will appear which may be left at default.

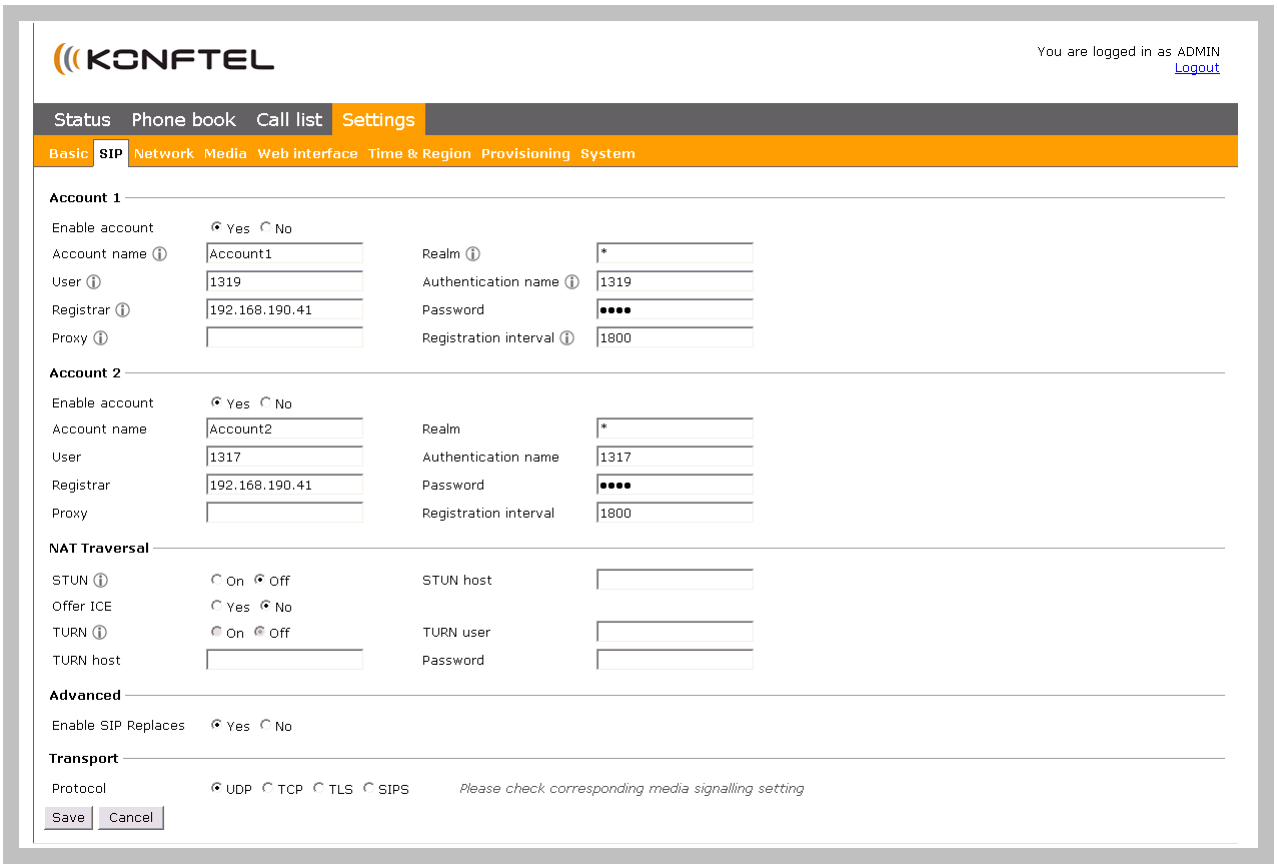

Figure 12: Konftel 300IP SIP Settings Screen

5.2. Configure Media Settings

Select the embedded "Media" tab from within the "Settings" tab. The codec selected by Konftel 300IP users is dependent on fidelity requirements and bandwidth availability. Most of the testing was done with the G.711Alaw codec, although other codec combinations were tested to ensure proper codec interoperation. The codec selection configured here must be compatible with the codecs configured for Avaya Integral Enterprise in **Figure 5**. Different priorities can be assigned to each codec. Click "Save" to complete the configuration sequence. SRTP may also be enabled under Media Settings - Security. Note that an IPMR board is required in the Integral Enterprise and that SRTP is only supported in conjunction with TLS. The DTMF signalling mode can be selected under DTMF. RFC 2833 is supported by the Integral Enterprise.

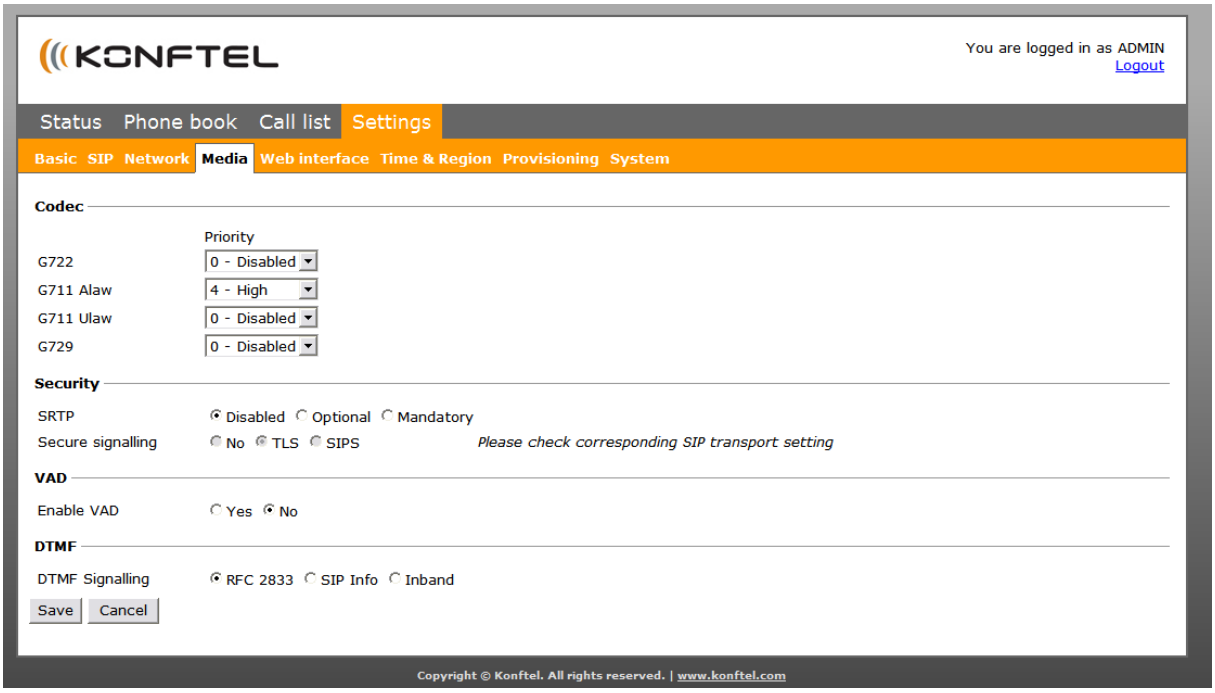

Figure 13: Konftel 300IP Media Settings Screen

6. General Test Approach and Test Results

The test method employed can be described as follows:

- Avaya Integral Enterprise was configured to support various local ISDN and H.323 IP telephones, as well as both the SIP accounts of the Konftel 300IP.
- The Konftel 300IP was configured to use its two SIP accounts to act as separate SIP telephone endpoints.
- Various telephony operations involving the Konftel 300IP and Avaya Integral Enterprise were performed manually.
- The SIP protocol exchanges were monitored with a protocol trace program to verify the correct protocol exchanges.

Due to the issue that, when using TCP and TLS as transport protocol for SIP, the Registration of the Konftel 300IP at the Integral Enterprise failed security tests, i.e. SIP via TLS and media via SRTP were not performed yet.

7. Verification Steps

- Verify that the Konftel 300IP web configuration site can be opened by a web browser after having assigned an IP address to the device.
- Verify that the Konftel 300IP can register and re-register with the VoIP or IPMR board of the Avaya Integral Enterprise.
- Verify that the Konftel 300IP can make and receive calls from both of its SIP account lines.
- Verify that the Konftel 300IP can make multiple simultaneous calls and toggle between those calls.
- Verify that the Konftel 300IP hold/retrieve feature is compatible with Avaya Integral Enterprise.
- Verify that the Konftel 300IP can create conferences manually.
- Verify that the Konftel 300IP can create multi-party conferences with up to five participants (including itself) using the Konftel 300IP “group conference” feature.
- Verify that the Konftel 300IP codec support is compatible with Avaya Integral Enterprise.
- Verify that the Konftel 300IP DTMF facility is compatible with Avaya Integral Enterprise.
- Verify that the Konftel 300IP is compatible with the direct IP-IP media streaming.
- Verify that the Konftel 300IP can operate from both its external power supply or from power that it received via its Power Over Ethernet connection.
- Verify that the Konftel 300IP can recover from interruptions to its Ethernet interface.
- Verify that the Konftel 300IP can use both UDP and TCP as transport protocols for SIP.
- Verify that the Konftel 300IP can use security features (encryption) such as TLS for SIP and SRTP for media.

Note:

- Due to the restriction in the Integral Enterprise of two connections per SIP account, a five-party conference can only be set up manually using both accounts of the Konftel 300 IP.
- Direct media streaming in not supported yet by the Integral Enterprise.
- Only UDP as transport protocol for SIP can be used.
- Using TCP or TLS, the Registration of the Konftel 300IP at the Integral Enterprise failed.
- Security tests, i.e. SIP via TLS and media via SRTP could therefore not be performed yet.

8. Conclusion

The Konftel 300IP can be used with Avaya Integral Enterprise to enable those present in a room to participate in a telephone conversation as long as media encryption is not required. The configuration described in these Application Notes has been successfully compliance tested.

9. Additional References

This section references documentation relevant to these Application Notes. The Avaya product documentation is available at http://support.avaya.com.

[1] *Installation and Administration of Konftel 300 IP*, Document Number 110047-61-001 Rev 2b, available at www.konftel.com/300ip

[2] *User Guide Konftel 300IP (English)*, available at www.konftel.com/300ip

Several Internet Engineering Task Force (IETF) standards track RFC documents were referenced within these Application Notes. The RFC documents may be obtained at: http://www.rfc-editor.org/rfcsearch.html.

[3] RFC 3261 - *SIP (Session Initiation Protocol)*, June 2002, Proposed Standard

[4] RFC 2833 - *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*, May 2000, Proposed Standard

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.