

**Speech and multimedia Transmission Quality (STQ);  
Perceptual Impact of End-to-End Delay and  
End-to-End Delay Variation on  
Fax-over-IP (FoIP) and Modem-over-IP (MoIP)**

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Reference

DTR/STQ-00147

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## Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Speech and multimedia Transmission Quality (STQ).

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## Introduction

Quality of Service (QoS) may be loosely defined as a measure of the end-user's perception of the ease of use and the accuracy of the facility being provided. QoS has always been an important measure of the performance of communications networks. In networks where the connectivity is fixed for the duration of particular communication it is relatively easy to define the maximum impairment produced in the individual elements making up the connection, such that their addition would still result in an acceptable service being provided.

In packet based networks, routing of individual data packets constantly varies. Due to the complexities and random nature of packet routing, any end-user transaction has the possibility of being completed via a very large number of links using varying technologies. This may result in the possibility of the end-user perception in terms of the distortion, delay, error rate, etc. changing from time to time during a particular transaction. End-to-end error-correcting techniques serve to reduce the perceived problems for data services but the quality of speech connections can be seriously impaired if network performance is not adequately controlled.

The above applies in particular for fax and modem connections as, different to speech calls, no loss of packets can be accepted and only moderate end-to-end delays are tolerable.

The electronic versions of the excel sheets related to the test case descriptions of clauses 5.3, 5.4 and 5.5 are contained in tr\_102719v010101p0.zip which accompanies the present document. They may be used for electronic processing of the test results.

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# 1 Scope

The present document addresses the analysis of the different requirements for reliable real-time modem and facsimile transmission over packet-based networks. The metrics for an evaluation of the overall MoIP and FoIP transmission quality are developed and proposed, and the various characteristics of the packet-based network, like network delay and its variation (jitter) and the effects of discarded packets (in the jitter buffer), with an emphasis on modem/facsimile transmission using different codecs are investigated in order to determine the margins of the network and media gateways and gateway parameters that enable a successful and reliable real-time modem/facsimile transfer over packet-based networks.

Emphasis is on the modem/facsimile transmission using different codecs and media gateways and gateways in order to determine the margins of the media gateways and gateway parameters that enable a successful and reliable real-time modem/facsimile transfer over packet-based networks.

In contrast to the original intention, a perceptual metrics could not be derived, since the results obtained indicate that there is not very much of a "grey zone" for the quality, but rather a "go / no-go" behaviour; the design of perceptual metrics can be considered as future work in this area.

The task of the STF 392 was separated in two steps; the first step was to define an extensive list of test conditions and the second step was to perform a selection of these test.

It is expected to have additional results available in a revision of the present document in the near future.

The material collected here can be used as a basis for future MoIP and FoIP tests.

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# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 2.1 Normative references

The following referenced documents are necessary for the application of the present document.

Not applicable.

## 2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ITU-T Recommendation. G.168 (2009): "Digital network echo cancellers".
- [i.2] ITU-T Recommendation V.152: "Procedures for supporting Voice-Band Data over IP Networks".
- [i.3] ITU-T Recommendation E.453: "Facsimile image quality as corrupted by transmission-induced scan line errors".
- [i.4] ITU-T Recommendation E.458: "Figure of merit for facsimile transmission performance".
- [i.5] ITU-T Recommendation P.862.1: "Mapping function for transforming P.862 raw result scores to MOS-LQO".

- [i.6] ITU-T Recommendation T.38: "Procedures for real-time Group 3 facsimile communication over IP networks".
- [i.7] ITU-T Recommendation H.248: "Gateway control protocol".
- [i.8] ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".
- [i.9] ITU-T Recommendation G.729: "Coding of speech at 8 kbit/s using conjugate-structure algebraic-code-excited linear prediction (CS-ACELP)".
- [i.10] ITU-T Recommendation V.17: "A 2-wire modem for facsimile applications with rates up to 14 400 bit/s".
- [i.11] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [i.12] ITU-T Recommendation V.32bis: "A duplex modem operating at data signalling rates of up to 14 400 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits".
- [i.13] ITU-T Recommendation V.34 "A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits".
- [i.14] ITU-T Recommendation V.90: "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**Packet Formation Time:** time required to fill a packet with real-time traffic, often also referred to as "packet size"

### 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AGCF	Access Gateway Control Function
AGF	Access Gateway Function
AGW	Access Gateway
BE	Best Effort
CPE	Customer Premises Equipment
CPN	Customer Premises Network
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
DSP	Digital Signal Processor
FoIP	Fax over IP
FoIP	Fax over IP
FOM	Figure Of Merit
GW	Gateway
IAF	Internet-Aware Fax
IBCF	Interconnect Border Control Function
I-BGF	Interconnection-Boader Control Function
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IP	Internet Protocol

ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
IWF	Inter-Working Function
JB	Jitter Buffer
LAN	Local Area network
MCF	Message Confirmation frame
MGCP	Media Gateway Control Protocol
MoIP	Modem over IP
NAPT	Network Address and Port Translation
NCL	Negotiated Codec List
NGN	Next Generation Network
NNI	Network Network Interface
PBX	Private Branch Exchange
PCMA	Pulse Code Modulation A-law
PCMU	Pulse Code Modulation $\mu$ -law
PES	PSTN Emulation Server
PESQ	Perceptual Evaluation of Speech Quality
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RACS	Resource and Admission Control Sub-System
RAGW	residential or access gateways
RG	Residential Gateway
RGW	Residential GateWay
RTP EF	Real Time Protocol Enhanced Functions
S/T	ISDN-Basic User Network Interface
SBC	Session Boarder Controller
SCL	Supported Codec List
SDP	Session Description Protocol
SGCF	Signalling Gateway Control Function
SIP	Session Initiation Protocol
TDM	Time Division Multiplex
TGCF	Trunking Gateway Control Function
TrGW	Transition Gateway
UDP	User Data Protocol
UDPTL	Facsimile UDP Transport Layer protocol
UE	User Equipment
UNI	User Network Interface
UNI	User Network Interface
VBD	Voice Band Data
VBD <sub>o</sub> IP	Voice Band Data over IP
VGW	Voice over IP Gateway
XDSL	x Digital Subscriber Line



## 4 QoS Tests in the NGN Architecture

### 4.1 Test configuration

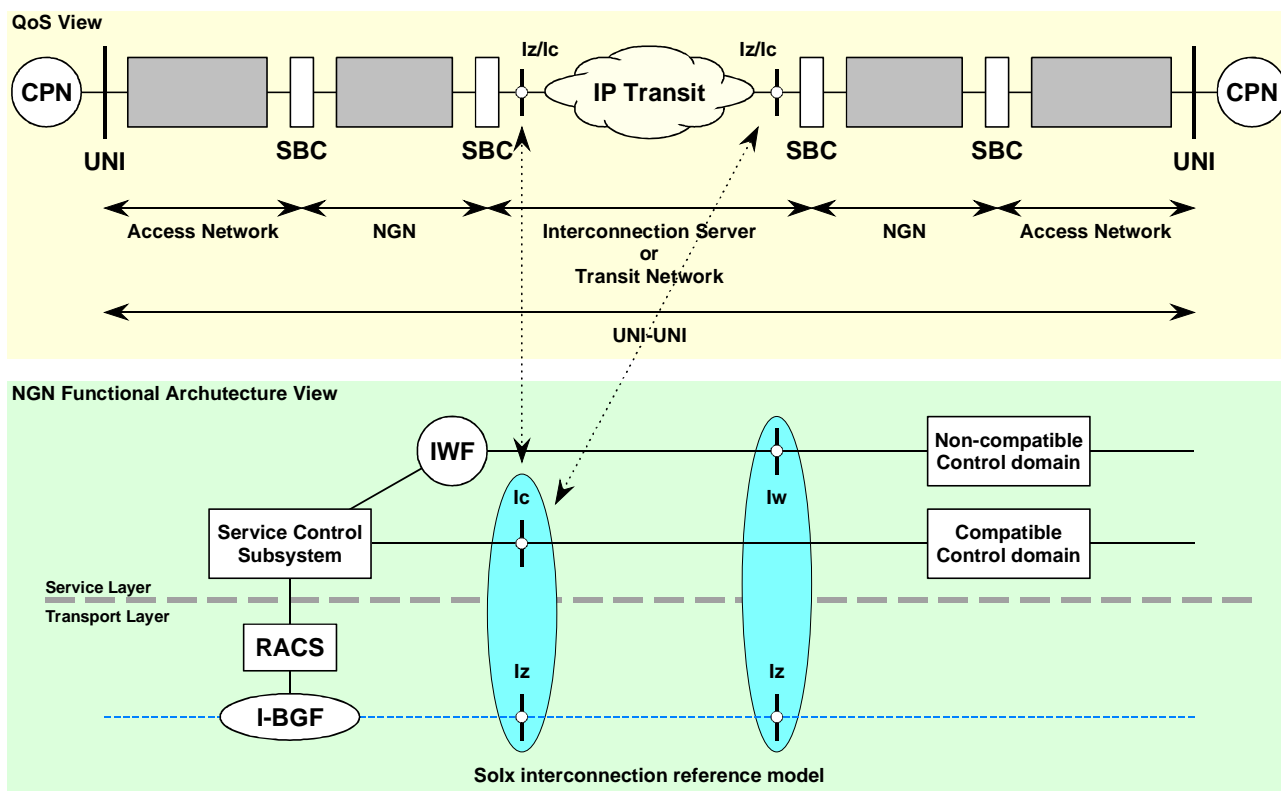


Figure 1: Test configuration in QoS and NGN functional architecture view

## 5 Test Concept and Description of Test Cases

The general approach of the tests described in this clause is the use of realistic elements where possible and simulation where needed. Fax and Modem devices are simulated by an industry provided simulation tool. This enables time efficient testing including scalable repetition of the same test cases and gives easy access to protocol contained QoS information. For the xDSL access sections preference was given to the use of real xDSL modems with different bandwidth settings over the simulation of delay and jitter. This approach helps to avoid discussions about a complex simulation taking into account all aspects of xDSL bandwidth limitation, prioritisation, registration traffic of additional terminals etc. The core IP network is an in-house testbed which does not add significant delay, jitter or packet loss.

NOTE: The exact values are still under investigation and the plan is to include them in a revision of the present document.

With an additional simulator delay, jitter and/or packet loss can be inserted in the core network if required by the test cases.

The tests were split into two parts: a selection of the test cases described in clause 5.3 were carried out at ZNIIS laboratories in Moscow, Russia and a selection of the test cases described in clauses 5.4 and 5.5 were carried out at Iskratel laboratories in Kranj, Slovenia.

Both test laboratories are using the IXIA simulator with different software application modules; IxVoice T.38 Test Library, [http://www.ixiacom.com/products/display?skey=ixv\\_t38](http://www.ixiacom.com/products/display?skey=ixv_t38) for the test cases described in clause 5.3 and IxVoice T1/E1/Analog Test Library, [http://www.ixiacom.com/products/display?skey=ixv\\_t1\\_e1\\_analog](http://www.ixiacom.com/products/display?skey=ixv_t1_e1_analog).

The electronic versions of the excel sheets related to the test case descriptions of clauses 5.3, 5.4 and 5.5 are contained in tr\_102719v010101p0.zip which accompanies the present document. They may be used for electronic processing of the test results.

## 5.1 General Settings for All Test Cases

The following clauses describe those settings that are common to ALL test cases.

NOTE: Electronic versions of Tables 1 to 11 can be found in Annex B of the present document.

### 5.1.1 Diffserv Prioritisation Settings

#### DIFFSERV

- TV Multicast (Downstream only) AF41 (=4)
- SIP AF41 (=4)
- RTP EF (=5)
- Internet BE (=0)
- Priority 7 is assigned only to network internal traffic (e.g. routing protocols)
- DSCP is transmitted transparently, for downstream it is trusted and will be mapped to layer 2, for upstream it is mistrusted, i.e. service based layer 2 prioritisation
- Network uses layer 2 prioritisation

### 5.1.2 Network Echo Canceller

It will be ensured that the network echo cancellers in both directions of transmission are rendered active prior to the execution of each test case. Ideally, the network echo cancellers should be compliant with ITU-T Recommendation. G.168 [i.1], the actual compliance of the echo cancellers will be stated in the test report.

### 5.1.3 De-Jitter Buffer

It will be ensured that the de-jitter buffers in both directions of transmission are rendered active in a dynamic mode prior to the execution of each test case. The actual settings of the de-jitter buffers and the algorithm type (if available) will be stated in the test report.

### 5.1.4 T.38 Options

Optional settings or operational modes according to ITU-T Recommendation T.38 [i.6] are not subject to the tests described herein; however the T.38 settings and modes actually used for the tests will be recorded by the respective test lab.

NOTE: The test equipment supports ITU-T Recommendation T.38 [i.6], also labelled as Edition 1 (currently, ITU-T is working on Edition 6).

### 5.1.5 Terminal Registration Messages

At all occasions where xDSL access devices are required for conducting the test cases an additional number of five SIP terminals will be connected to the xDSL device; these additional terminals will send registration messages at least every 60 seconds. This is to ensure more realistic test conditions with regard to delay and jitter caused in the access segments and will also take care of applications such as "IP Centrex".

## 5.1.6 Additional Channels

The parameters for test cases in the following clauses are meant to potentially produce additional impairments and to describe **additional** channels to be set-up beside the main Fax or Modem testing channel.

## 5.1.7 Number of Repetitions per Test Case

Each test case is repeated at least 5 times. In cases where an obvious variation of the transmission quality occurs more repetitions will be made as appropriate. The total number of repetitions will be stated in the test report.

## 5.2 Reference Delay Variation Tests

Prior to each test scenario as outlined in the following clauses a reference test is made in order to determine the critical delay variation value. For this purpose all impairments are removed from the access:

- The bandwidth of the xDSL devices is set to the maximum value.
- Only the fax or modem devices are connected to the access; all other devices are disconnected.
- The de-jitter buffers are de-activated.
- In the core network an impairment generator is inserted which produces selectable delay variation.
- The fax / modem connections are tested various times while the delay variation amplitude is increased in steps of 5 ms until no fax / modem connection is possible anymore.
- This test is repeated for all modems / codecs which are used for the test scenario.
- The xDSL bandwidth and the critical value of the delay variation amplitude are reported for reference purposes.

## 5.3 Fax Tests with T.38-Termination

### 5.3.1 Scenario F\_T38\_T38: T.38 to T.38 Fax Tests

Test variables for the T.38 to T.38 Fax Tests are given in Table 1 and also in the attached Excel file F\_T38\_T38.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 27 test cases for this test configuration.

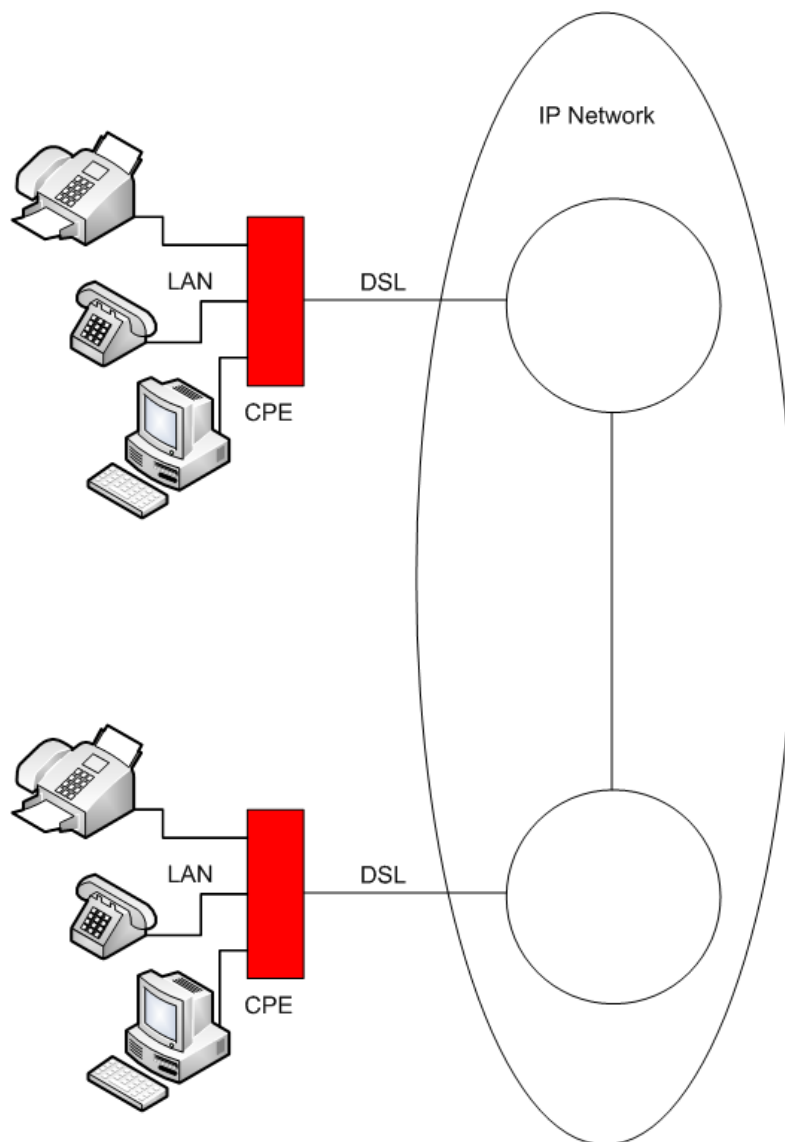


Figure 2: Call between two IMS FAX UE with additional data and voice traffic - Scenario F\_T38\_T38

<b>F_T38_T38_XX</b>	
TSS reference:	<b>T.38 [i.6]_T.38 [i.6] FAX G3 Tests</b>
Preconditions	<p>Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b>            Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b></p> <p>Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b>            Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b></p> <p>T.38 [i.6] version (side A): Edition 4 (2005)            T.38 [i.6] version (side B): Edition 4 (2005)</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b>            Number of Variation-sensitive channels - Data (side A): <b>VA_Channel_Data_A</b></p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Number of Variation-sensitive channels - Voice (side B): No channel            Number of Variation-sensitive channels - Data (side B): No channel</p> <p>Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b>            Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b></p> <p>Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b>            Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: 0 ms</p> <p>Modem Type: V.17 [i.10], 14,4 kbit/s</p> <p>FAX Error correction: Redundancy 1</p>
Comments:	

Table 1: Values for test scenario F\_T38\_T38, test cases F\_T38\_T38\_01 to 10

Parameter Name	Test # Parameter Values	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	2 048 kbit/s				x						
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										

Table 1 (continued): Values for test scenario F\_T38\_T38, test cases F\_T38\_T38\_11 to 20

Parameter Name	Test # Parameter Values	11	12	13	14	15	16	17	18	19	20
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	2 048 kbit/s	x							x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										

Table 1 (continued): Values for test scenario F\_T38\_T38, test cases F\_T38\_T38\_21 to 27

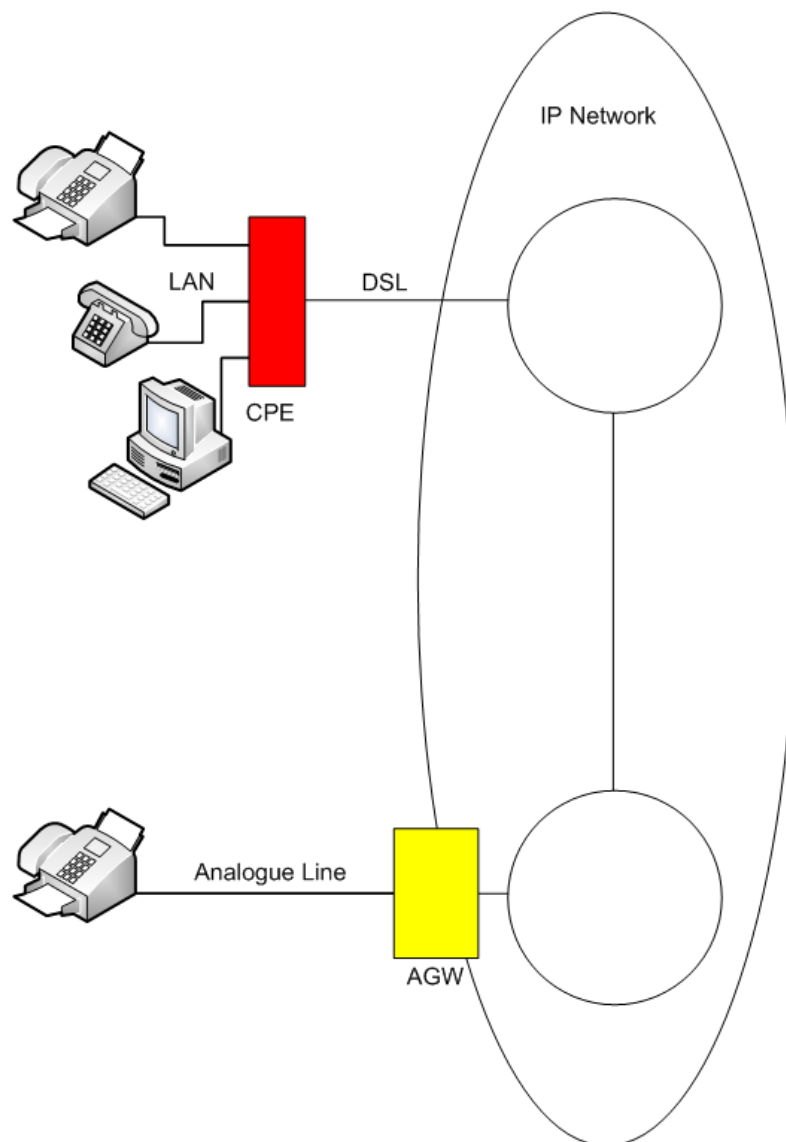
Parameter Name	Test #	21	22	23	24	25	26	27
	Parameter Values							
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s							
	256 kbit/s							
	384 kbit/s	x						
	512 kbit/s		x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s							
	256 kbit/s							
	1 024 kbit/s	x						
	8 192 kbit/s		x	x	x	x	x	x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s							
	256 kbit/s							
	384 kbit/s	x						
	512 kbit/s		x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s							
	256 kbit/s							
	1 024 kbit/s	x						
	2 048 kbit/s		x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x			x		
	Fixed - 150 ms			x			x	
	Fixed - 200 ms	x			x			x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x			x		
	Fixed - 150 ms			x			x	
	Fixed - 200 ms	x			x			x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x	x	x	x
	1_Channel	x						
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x						
	G.729 [i.9] A							
	no codec		x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x	x	x	x
	1_Channel	x						
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x						
	128 kbit/s		x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x						
	128 kbit/s		x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x						
	3 300 kbit/s		x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x						
	3 300 kbit/s		x	x	x	x	x	x



### 5.3.2 Scenario F\_T38\_A: T.38 to Analogue Fax Tests

Test variables for the T.38 to Analogue Fax Tests are given in Table 2 and also in the attached Excel file F\_T38\_A.xls. Test cases are named according to the scheme F\_T38\_A\_XX where XX refers to the test number in the xls file.

There is a total of 42 test cases for this test configuration.



**Figure 3: Call between IMS UE and AGW with additional data and voice traffic - Scenario F\_T38\_A**

<b>F_T38_A_XX</b>	
TSS reference:	<b>T.38 [i.6] Analogue FAX G3 Tests</b>
Preconditions	Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b> Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b>  T.38 [i.6] version (side A): Edition 4 (2005) T.38 [i.6] version (side B): Edition 4 (2005)  Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b> Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b>  Packet Formation Time: 20 ms  Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b> Number of Variation-sensitive channels - Data (side A): No channel  Variable for Codecs for Voice: <b>Codec_Voice_VA</b>  Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b> Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b>  Jitter Core: 0 ms  End-to-End delay Core: 0 ms  Modem Type: V.17 [i.10], 14,4 kbit/s  FAX Error correction: Redundancy 1
Comments:	

**Table 2: Values for test scenario F\_T38\_A, test cases F\_T38\_A\_01 to 10**

	Test #	1	2	3	4	5	6	7	8	9	10
<b>Parameter Name</b>	<b>Parameter Values</b>										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										

Table 2 (continued): Values for test scenario F\_T38\_A, test cases F\_T38\_A\_11 to 20

Parameter Name	Test # Parameter Values	11	12	13	14	15	16	17	18	19	20
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
Fixed - 200 ms					x	x	x	x	x	x	
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	3 300 kbit/s										
	No traffic	x	x	x	x	x	x	x	x	x	x

Table 2 (continued): Values for test scenario F\_T38\_A, test cases F\_T38\_A\_21 to 30

Parameter Name	Test # Parameter Values	21	22	23	24	25	26	27	28	29	30
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
Fixed - 200 ms	x										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	3 300 kbit/s										
	No traffic	x									

Table 2 (continued): Values for test scenario F\_T38\_A, test cases F\_T38\_A\_31 to 42

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40	41	42
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s												
	256 kbit/s		x			x							
	384 kbit/s	x		x			x						
	512 kbit/s				x			x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s												
	256 kbit/s		x			x							
	1 024 kbit/s	x		x			x						
	8 192 kbit/s				x			x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x			x		
	Fixed - 150 ms	x							x			x	
	Fixed - 200 ms		x	x	x	x	x			x			x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x			x		
	Fixed - 150 ms	x							x			x	
	Fixed - 200 ms		x	x	x	x	x			x			x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	x	x	x
	1_Channel	x				x	x						
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x						
	G.729 [i.9] A												
	no codec		x	x	x			x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic												
	64 kbit/s	x	x	x	x	x	x						
	128 kbit/s							x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic												
	128 kbit/s	x	x	x	x	x	x						
	3 300 kbit/s							x	x	x	x	x	x

### 5.3.3 Scenario F\_A\_T38: Analogue to T.38 Fax Tests

Test variables for the Analogue Fax to T.38 Fax Tests are given Table 3 and also in the attached Excel file F\_A\_T38.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 42 test cases for this test configuration.

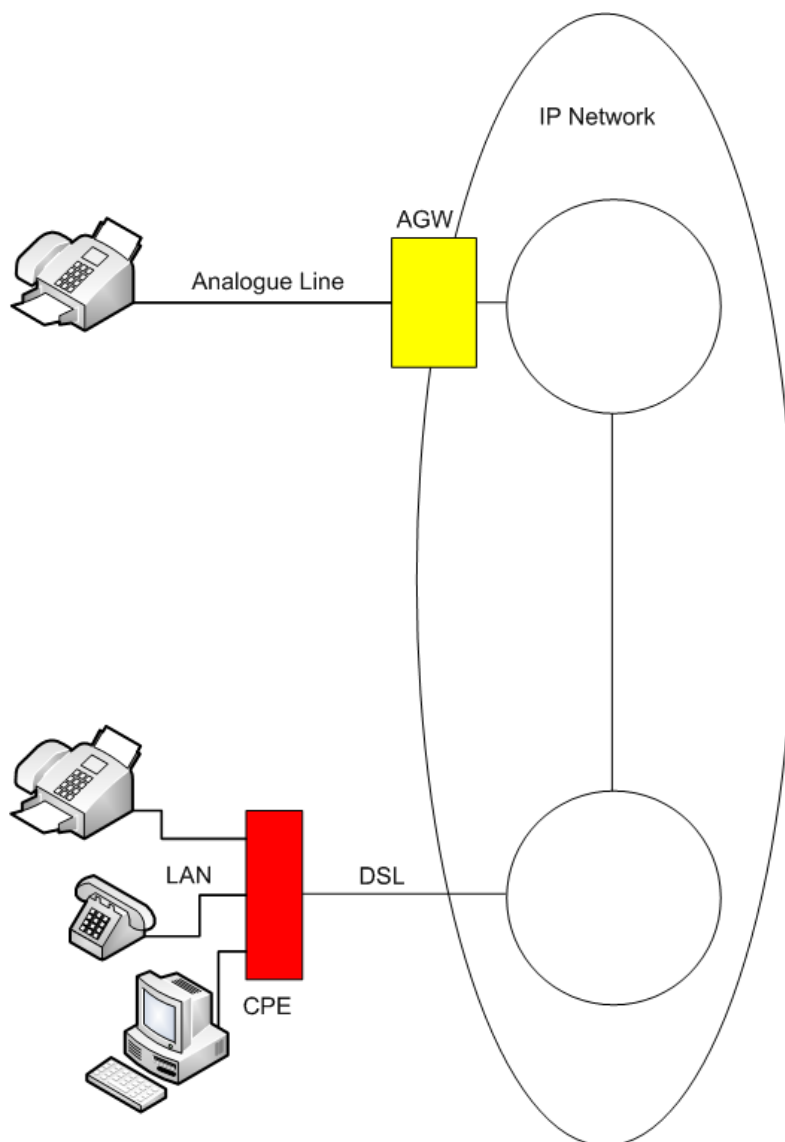


Figure 4: Call between AGW and IMS UE with additional data and voice traffic - scenario F\_A\_T38

<b>F_A_T38_XX</b>	
TSS reference:	<b>Analogue_T.38 [i.6] FAX G3 Tests</b>
Preconditions	Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b> Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b>  T.38 [i.6] version (side A): Edition 4 (2005) T.38 [i.6] version (side B): Edition 4 (2005)  Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b> Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b>  Packet Formation Time: 20 ms  Variable for Codecs for Voice: <b>Codec_Voice_VA</b>  Number of Variation-sensitive channels - Voice (side B): <b>VA_Channel_Voice_B</b> Number of Variation-sensitive channels - Data (side B): No channel  Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b> Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b>  Jitter Core: 0 ms  End-to-End delay Core: 0 ms  Modem Type: V.17 [i.10], 14,4 kbit/s  FAX Error correction: Redundancy 1
Comments:	

**Table 3: Values for test scenario F\_A\_T38, test cases F\_A\_T38\_01 to 10**

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	2 048 kbit/s				x						
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										

Table 3 (continued): Values for test scenario F\_A\_T38, test cases F\_A\_T38\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	2 048 kbit/s	x							x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										

Table 3 (continued): Values for test scenario F\_A\_T38, test cases F\_A\_T38\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	2 048 kbit/s				x					x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										



Table 3 (continued): Values for test scenario F\_A\_T38, test cases F\_A\_T38\_31 to 42

Parameter Name	Test # Parameter Values	31	32	33	34	35	36	37	38	39	40	41	42
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s												
	256 kbit/s		x			x							
	384 kbit/s	x		x			x						
	512 kbit/s				x			x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s												
	256 kbit/s		x			x							
	1 024 kbit/s	x		x			x						
	2 048 kbit/s				x			x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x			x		
	Fixed - 150 ms	x							x			x	
	Fixed - 200 ms		x	x	x	x	x			x			x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x			x		
	Fixed - 150 ms	x							x			x	
	Fixed - 200 ms		x	x	x	x	x			x			x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x						
	G.729 [i.9] A												
	no codec		x	x	x			x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	x	x	x
	1_Channel	x				x	x						
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic												
	64 kbit/s	x	x	x	x	x	x						
	128 kbit/s							x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic												
	128 kbit/s	x	x	x	x	x	x						
	3 300 kbit/s							x	x	x	x	x	x

## 5.4 Fax Tests with Analogue Termination

Scenarios which would require support of ITU-T Recommendation V.152 [i.2] have been omitted here since no testing capabilities have been made available at the time when the present technical report was produced.

### 5.4.1 Scenario F\_VGW\_VGW: VGW to VGW Fax Tests

Test variables for the VGW to VGW Fax Tests are given in Tabale 4 and also in the attached Excel file F\_VGW\_VGW.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 90 test cases for this test configuration.

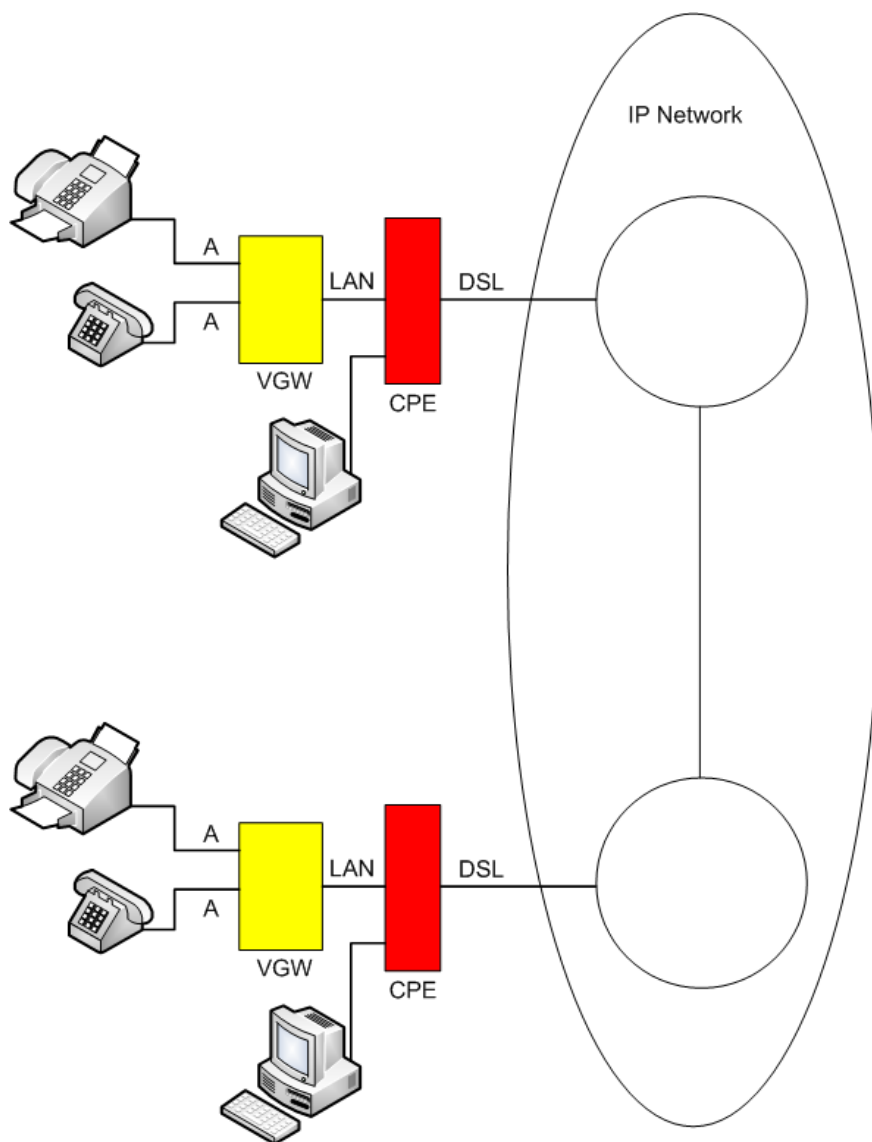


Figure 5: Call between two IMS VGW with additional voice and data traffic - Scenario F\_VGW\_VGW

<b>F_VGW_VGW_XX</b>	
TSS reference:	<b>VGW_VGW FAX G3 Tests</b>
Preconditions	<p>Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b>            Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b></p> <p>Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b>            Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b></p> <p>Variable for Codecs for Fax: <b>Codec_Fax_VA</b></p> <p>T.38 [i.6] version (side A): Edition 4 (2005)            T.38 [i.6] version (side B): Edition 4 (2005)</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b>            Number of Variation-sensitive channels - Data (side A): No channel</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Number of Variation-sensitive channels - Voice (side B): <b>VA_Channel_Voice_B</b>            Number of Variation-sensitive channels - Data (side B): No channel</p> <p>Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b>            Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b></p> <p>Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b>            Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE</b></p> <p>FAX Error correction: Redundancy 1</p>
Comments:	

Table 4: Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_01 to 10

Parameter Name	Parameter Values	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_21 to 30

Parameter Name	Test # Parameter Values	21	22	23	24	25	26	27	28	29	30
		Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s								
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_31 to 40

Parameter Name	Test # Parameter Values	31	32	33	34	35	36	37	38	39	40
		Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s							x	
	256 kbit/s		x			x			x		
	384 kbit/s	x		x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s							x			
	256 kbit/s		x			x			x		
	1 024 kbit/s	x		x			x			x	
	8 192 kbit/s				x						x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s							x			
	256 kbit/s		x			x			x		
	384 kbit/s	x		x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s							x			
	256 kbit/s		x			x			x		
	1 024 kbit/s	x		x			x			x	
	8 192 kbit/s				x						x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]							x	x	x	x
	T.38 [i.6]	x	x	x	x	x	x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic							x	x	x	x
	64 kbit/s	x	x	x	x	x	x				
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic							x	x	x	x
	128 kbit/s	x	x	x	x	x	x				
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic							x	x	x	x
	128 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic							x	x	x	x
	64 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x				
	V.34 [i.13], 33,6 kbit/s							x	x	x	x

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_41 to 50

Parameter Name	Test #	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	384 kbit/s			x			x				x
	512 kbit/s							x			
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	1 024 kbit/s			x			x				x
	8 192 kbit/s							x			
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	384 kbit/s			x			x				x
	512 kbit/s							x			
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	1 024 kbit/s			x			x				x
	8 192 kbit/s							x			
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel				x	x	x	x			
	1_Channel	x	x	x					x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x						x	x
	G.729 [i.9] A	x							x		
	no codec				x	x	x	x			
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel				x	x	x	x			
	1_Channel	x	x	x					x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x



Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_51 to 60

Parameter Name	Test #	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	384 kbit/s			x				x		x	
	512 kbit/s				x						x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	1 024 kbit/s			x				x		x	
	8 192 kbit/s				x						x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	384 kbit/s			x				x		x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	1 024 kbit/s			x				x		x	
	8 192 kbit/s				x						x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x	x	x	x			
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x	x	x	x			
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x			
	64 kbit/s								x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x			
	128 kbit/s								x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x			
	128 kbit/s								x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x			
	64 kbit/s								x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_61 to 70

Parameter Name	Test #	61	62	63	64	65	66	67	68	69	70
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s	x		x			x		x		
	384 kbit/s		x		x			x		x	
	512 kbit/s					x					x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s	x		x			x		x		
	1 024 kbit/s		x		x			x		x	
	8 192 kbit/s					x					x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s	x		x			x		x		
	384 kbit/s		x		x			x		x	
	512 kbit/s					x					x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s	x		x			x		x		
	1 024 kbit/s		x		x			x		x	
	8 192 kbit/s					x					x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x			x	x	x
	1_Channel	x	x				x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x				x	x			
	G.729 [i.9] A										
	no codec			x	x	x			x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel			x	x	x			x	x	x
	1_Channel	x	x				x	x			
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms										
		x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_71 to 80

Parameter Name	Test #	71	72	73	74	75	76	77	78	79	80
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s	x									
	384 kbit/s		x								
	512 kbit/s			x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s	x									
	1 024 kbit/s		x								
	8 192 kbit/s			x	x	x	x	x	x	x	x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s	x									
	384 kbit/s		x								
	512 kbit/s			x	x	x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s	x									
	1 024 kbit/s		x								
	8 192 kbit/s			x	x	x	x	x	x	x	x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x							x	x
	T.38 [i.6]			x	x	x	x	x	x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms			x			x			x	
	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms			x			x			x	
	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x	x	x	x	x	x
	1_Channel	x	x								
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x								
	G.729 [i.9] A										
	no codec			x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel			x	x	x	x	x	x	x	x
	1_Channel	x	x								
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x								
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	128 kbit/s			x	x	x	x	x	x	x	x
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s	x	x								
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	3 300 kbit/s			x	x	x	x	x	x	x	x
	3 300 kbit/s			x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s			x	x	x	x	x	x		
	V.34 [i.13], 33,6 kbit/s	x	x							x	x

Table 4 (continued): Values for test scenario F\_VGW\_VGW, test cases F\_VGW\_VGW\_81 to 90

Parameter Name	Test #	81	82	83	84	85	86	87	88	89	90
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s					x	x	x	x	x	x
	8 192 kbit/s	x	x	x	x						
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s					x	x	x	x	x	x
	8 192 kbit/s	x	x	x	x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variable for Codecs for Voice Codec_Voice_VA	no codec	x	x	x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s					x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	128 kbit/s	x	x	x	x						
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s					x	x	x	x	x	x
	3 300 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	64 kbit/s					x	x	x	x	x	x
	3 300 kbit/s	x	x	x	x						
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x					
	50 ms						x				
	100 ms							x			
	150 ms								x		
	200 ms									x	
Modem Type MODEM_TYPE	300 ms										x
	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

## 5.4.2 Scenario F\_VGW\_A: VGW to Analogue Fax Tests

Test variables for the VGW to Analogue Fax Tests are given Table 5 and also in the attached Excel file F\_VGW\_A.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 90 test cases for this test configuration.

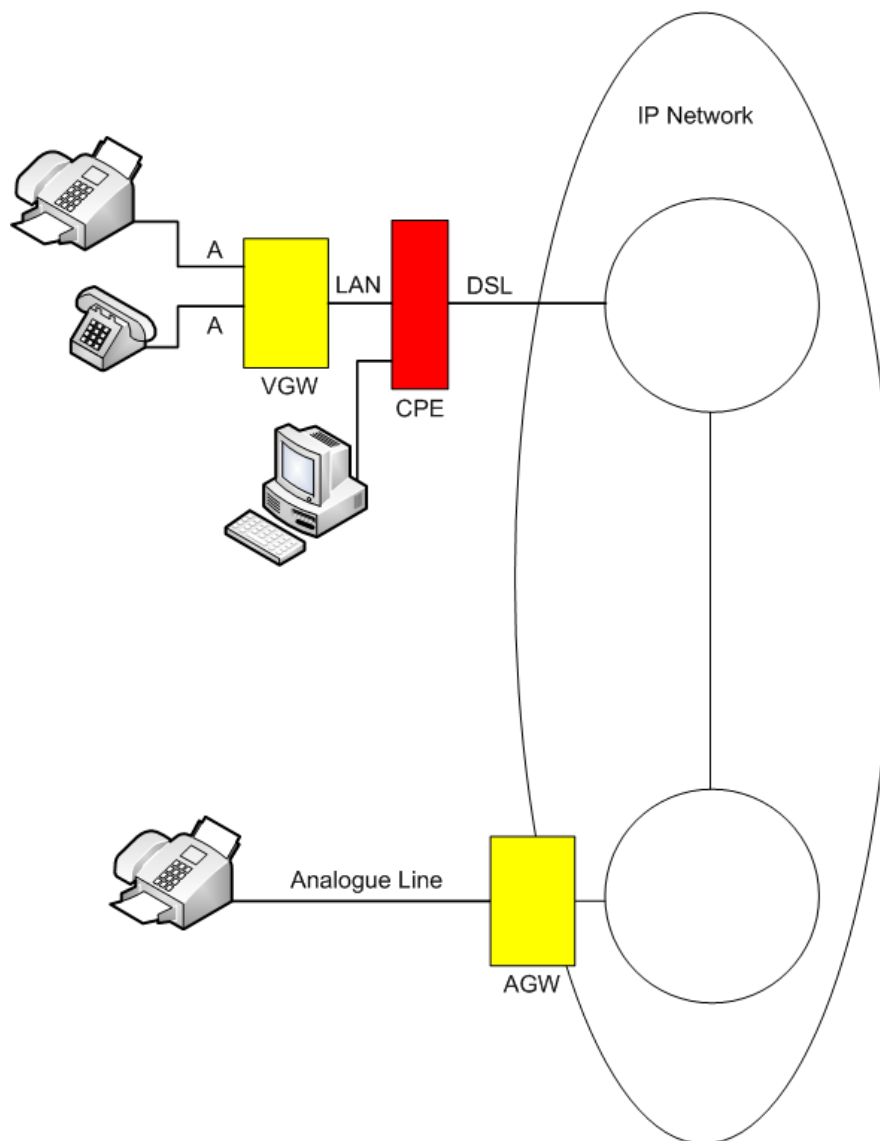


Figure 6: Call between IMS VGW with additional voice and data traffic and AGW - Scenario F\_VGW\_A

<b>F_VGW_A_XX</b>	
TSS reference:	<b>VGW_Analogue FAX G3 Tests</b>
Preconditions	<p>Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b>            Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b></p> <p>Variable for Codecs for Fax: <b>Codec_Fax_VA</b></p> <p>T.38 [i.6] version (side A): Edition 4 (2005)            T.38 [i.6] version (side B): Edition 4 (2005)</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b>            Number of Variation-sensitive channels - Data (side A): No channel</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b>            Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE</b></p> <p>FAX Error correction: <b>Redundancy_VA</b></p>
Comments:	

Table 5: Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_01 to 10

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x				x	x	x
	1_Channel					x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										



Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s							x			
	256 kbit/s		x			x			x		
	384 kbit/s	x		x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s							x			
	256 kbit/s		x			x			x		
	1 024 kbit/s	x		x			x			x	
	8 192 kbit/s				x						x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]							x	x	x	x
	T.38 [i.6]	x	x	x	x	x	x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic							x	x	x	x
	64 kbit/s	x	x	x	x	x	x				
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic							x	x	x	x
	128 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x				
	V.34 [i.13], 33,6 kbit/s							x	x	x	x

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_41 to 50

Parameter Name	Test #	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	384 kbit/s			x			x				x
	512 kbit/s							x			
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	1 024 kbit/s			x			x				x
	8 192 kbit/s							x			
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel				x	x	x	x			
	1_Channel	x	x	x					x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x						x	x
	G.729 [i.9] A	x							x		
	no codec				x	x	x	x			
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_51 to 60

Parameter Name	Test #	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side A) DSL_UP_Rate_A	Parameter Values										
	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	384 kbit/s			x				x		x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	512 kbit/s				x						x
	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	1 024 kbit/s			x				x		x	
Variable for Codecs for Fax Codec_Fax_VA	8 192 kbit/s				x						x
	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	T.38 [i.6]										
	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 200 ms	x	x	x	x	x	x	x			
	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	Fixed - 200 ms	x	x	x	x	x	x	x			
	No channel	x	x	x	x				x	x	x
Variable for Codecs for Voice Codec_Voice_VA	1_Channel					x	x	x			
	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	no codec	x	x	x	x				x	x	x
	No traffic	x	x	x	x	x	x	x			
	64 kbit/s								x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s								x	x	x
	No traffic	x	x	x	x	x	x	x			
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	128 kbit/s										
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE	300 ms										
	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_61 to 70

Parameter Name	Test #	61	62	63	64	65	66	67	68	69	70
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s	x		x			x		x		
	384 kbit/s		x		x			x		x	
	512 kbit/s					x					x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s	x		x			x		x		
	1 024 kbit/s		x		x			x		x	
	8 192 kbit/s					x					x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x			x	x	x
	1_Channel	x	x				x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x				x	x			
	G.729 [i.9] A										
	no codec			x	x	x			x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_71 to 80

Parameter Name	Test #	71	72	73	74	75	76	77	78	79	80
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s	x									
	384 kbit/s		x								
	512 kbit/s			x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s	x									
	1 024 kbit/s		x								
	8 192 kbit/s			x	x	x	x	x	x	x	x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x							x	x
	T.38 [i.6]			x	x	x	x	x	x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms			x			x			x	
	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms			x			x			x	
	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x	x	x	x	x	x
	1_Channel	x	x								
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x								
	G.729 [i.9] A										
	no codec			x	x	x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x								
	128 kbit/s			x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s	x	x								
	3 300 kbit/s			x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s			x	x	x	x	x	x		
	V.34 [i.13], 33,6 kbit/s	x	x							x	x

Table 5 (continued): Values for test scenario F\_VGW\_A, test cases F\_VGW\_A\_81 to 90

Parameter Name	Test #	81	82	83	84	85	86	87	88	89	90
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s					x	x	x	x	x	x
	8 192 kbit/s	x	x	x	x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]										
	G.729 [i.9] A										
	no codec	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s					x	x	x	x	x	x
	128 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s					x	x	x	x	x	x
	3 300 kbit/s	x	x	x	x						
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x					
	50 ms						x				
	100 ms							x			
	150 ms								x		
	200 ms									x	
	300 ms										x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

### 5.4.3 Scenario F\_A\_VGW: Analogue to VGW Fax Tests

Test variables for the Analogue to VGW Fax Tests are given in Table 6 and also in the attached Excel file F\_A\_VGW.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 90 test cases for this test configuration.

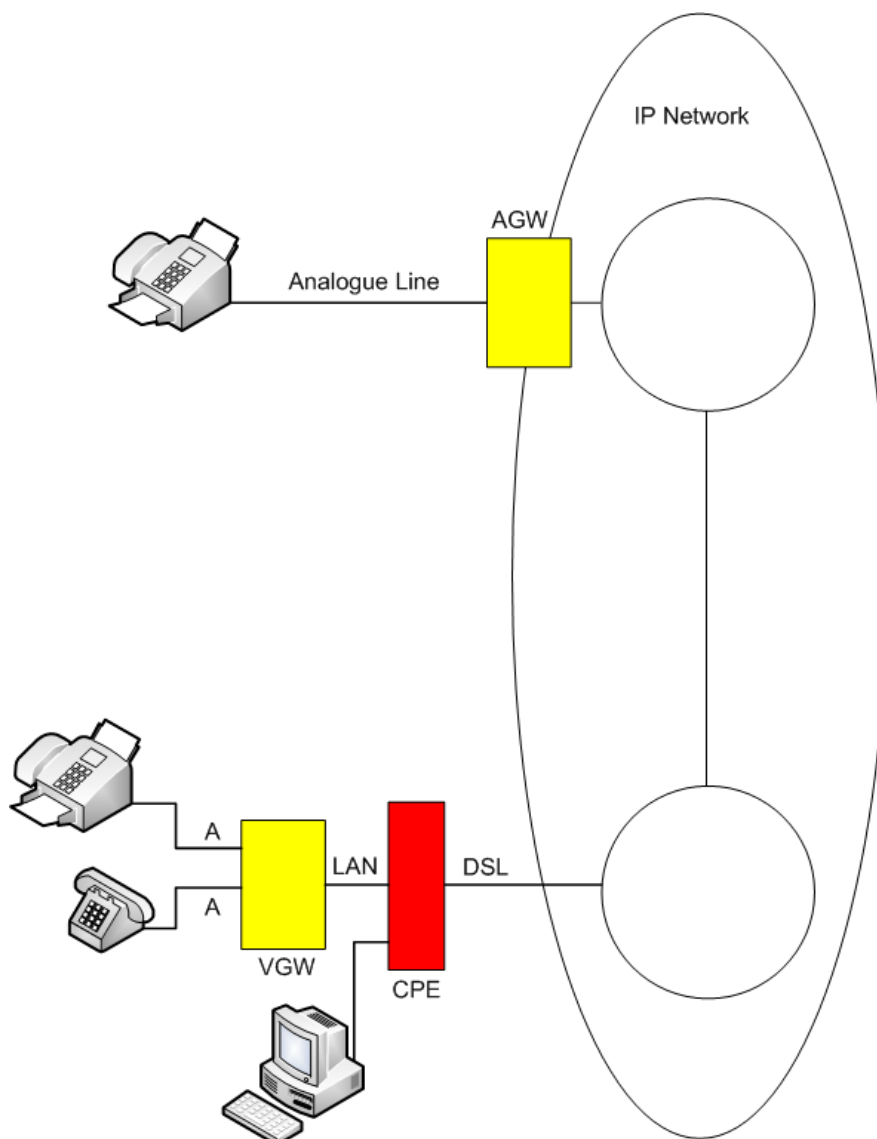


Figure 7: Call between AGW and IMS VGW with additional voice and data traffic - Scenario F\_A\_VGW



<b>F_A_VGW_XX</b>	
TSS reference:	<b>VGW_VGW FAX G3 Tests</b>
Preconditions	<p>Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b>            Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b></p> <p>Variable for Codecs for Fax: <b>Codec_Fax_VA</b></p> <p>T.38 [i.6] version (side A): Edition 4 (2005)            T.38 [i.6] version (side B): Edition 4 (2005)</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Number of Variation-sensitive channels - Voice (side B): <b>VA_Channel_Voice_B</b>            Number of Variation-sensitive channels - Data (side B): No channel</p> <p>Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b>            Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE</b></p> <p>FAX Error correction: Redundancy 1</p>
Comments:	

Table 6: Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_01 to 10

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	384 kbit/s			x				x			x
	512 kbit/s				x						
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x			x		
	256 kbit/s		x				x			x	
	1 024 kbit/s			x				x			x
	8 192 kbit/s				x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x	x			
	Fixed - 150 ms								x	x	x
	Fixed - 200 ms										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel						x	x	x		
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	384 kbit/s				x			x			
	512 kbit/s	x							x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s		x			x				x	
	256 kbit/s			x			x				x
	1 024 kbit/s				x			x			
	8 192 kbit/s	x							x		
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x						
	Fixed - 200 ms					x	x	x	x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]			x	x						x
	G.729 [i.9] A		x							x	
	no codec	x				x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x				x	x	x	x		
	1_Channel		x	x	x					x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]										
	T.38 [i.6]	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	
	1_Channel	x					x	x			x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s										

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s							x			
	256 kbit/s		x			x			x		
	384 kbit/s	x		x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s							x			
	256 kbit/s		x			x			x		
	1 024 kbit/s	x		x			x			x	
	8 192 kbit/s				x						x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]							x	x	x	x
	T.38 [i.6]	x	x	x	x	x	x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x	x	x	x
	Fixed - 150 ms	x									
	Fixed - 200 ms		x	x	x	x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	G.729 [i.9] A										
	no codec		x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	x
	1_Channel	x					x	x			
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic							x	x	x	x
	64 kbit/s	x	x	x	x	x	x				
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic							x	x	x	x
	128 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x				
	V.34 [i.13], 33,6 kbit/s							x	x	x	x

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_41 to 50

Parameter Name	Test #	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	384 kbit/s			x			x				x
	512 kbit/s							x			
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x			x				x		
	256 kbit/s		x			x				x	
	1 024 kbit/s			x			x				x
	8 192 kbit/s							x			
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x	x	x
	Fixed - 200 ms										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x						x	x
	G.729 [i.9] A	x							x		
	no codec				x	x	x	x			
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel				x	x	x	x			
	1_Channel	x	x	x					x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_51 to 60

Parameter Name	Test #	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	384 kbit/s			x				x		x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x				x					
	256 kbit/s		x				x		x		
	1 024 kbit/s			x				x		x	
	8 192 kbit/s				x						x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x	x	x	x			
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms								x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x	x	x	x			
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]						x	x			
	G.729 [i.9] A					x					
	no codec	x	x	x	x				x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x				x	x	x
	1_Channel						x	x	x		
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x			
	64 kbit/s								x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x			
	128 kbit/s								x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_61 to 70

Parameter Name	Test #	61	62	63	64	65	66	67	68	69	70
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s	x		x			x		x		
	384 kbit/s		x		x			x		x	
	512 kbit/s					x					x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s	x		x			x		x		
	1 024 kbit/s		x		x			x		x	
	8 192 kbit/s					x					x
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x								
	Fixed - 150 ms			x	x	x	x	x			
	Fixed - 200 ms								x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x				x	x			
	G.729 [i.9] A										
	no codec			x	x	x			x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel			x	x	x			x	x	x
	1_Channel	x	x				x	x			
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x



Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_71 to 80

Parameter Name	Test #	71	72	73	74	75	76	77	78	79	80
Bit rate for uplink (side B)	128 kbit/s										
DSL_UP_Rate_B	256 kbit/s	x									
	384 kbit/s		x								
	512 kbit/s			x	x	x	x	x	x	x	x
Bit rate for downlink (side B)	128 kbit/s										
DSL_DOWN_Rate_B	256 kbit/s	x									
	1 024 kbit/s		x								
	8 192 kbit/s			x	x	x	x	x	x	x	x
Variable for Codecs for Fax	G.711 [i.8]	x	x							x	x
Codec_Fax_VA	T.38 [i.6]			x	x	x	x	x	x		
Jitter Buffer Type/Size (side A)	Fixed - 100 ms			x			x			x	
JITTER_BUFF_T_S_A	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Jitter Buffer Type/Size (side B)	Fixed - 100 ms			x			x			x	
JITTER_BUFF_T_S_B	Fixed - 150 ms				x			x			x
	Fixed - 200 ms	x	x			x			x		
Variable for Codecs for Voice	G.711 [i.8]	x	x								
Codec_Voice_VA	G.729 [i.9] A										
	no codec			x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B)	No channel			x	x	x	x	x	x	x	x
VA_Channel_Voice_B	1_Channel	x	x								
Variation-insensitive packet traffic uplink (side B)	No traffic										
VA_Insens_Data_UL_B	64 kbit/s	x	x								
	128 kbit/s			x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B)	No traffic										
VA_Insens_Data_DL_B	128 kbit/s	x	x								
	3 300 kbit/s			x	x	x	x	x	x	x	x
End-to-End delay Core	0 ms	x	x	x	x	x	x	x	x	x	x
E2E_Delay_Core	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type	V.17 [i.10], 14,4 kbit/s			x	x	x	x	x	x		
MODEM_TYPE	V.34 [i.13], 33,6 kbit/s	x	x							x	x

Table 6 (continued): Values for test scenario F\_A\_VGW, test cases F\_A\_VGW\_81 to 90

Parameter Name	Test #	81	82	83	84	85	86	87	88	89	90
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s					x	x	x	x	x	x
	8 192 kbit/s	x	x	x	x						
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x	x	x	x	x	x	x
	T.38 [i.6]										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x								
	Fixed - 150 ms			x							
	Fixed - 200 ms	x			x	x	x	x	x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]										
	G.729 [i.9] A										
	no codec	x	x	x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	64 kbit/s					x	x	x	x	x	x
	128 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	128 kbit/s					x	x	x	x	x	x
	3 300 kbit/s	x	x	x	x						
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x					
	50 ms						x				
	100 ms							x			
	150 ms								x		
	200 ms									x	
	300 ms										x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s										
	V.34 [i.13], 33,6 kbit/s	x	x	x	x	x	x	x	x	x	x

### 5.4.4 Scenario F\_A\_A: Analogue to Analogue Fax Tests

Test variables for the Analogue to Analogue Fax Tests are given in Table 7 and also in the attached Excel file F\_A\_A.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 48 test cases for this test configuration.

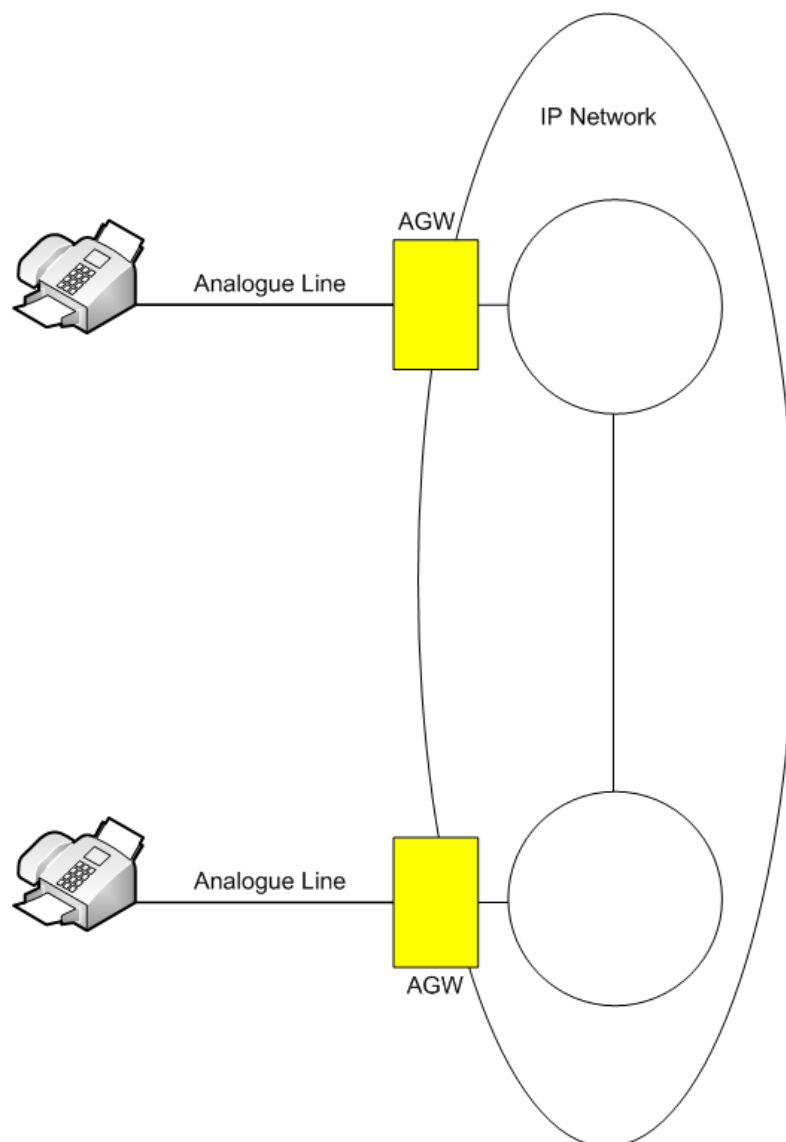


Figure 8: Call between two AGW - Scenario F\_A\_A

<b>F_A_A_XX</b>	
TSS reference:	<b>AGW_AGW FAX G3 Tests</b>
Preconditions	Variable for Codecs for Fax: <b>Codec_Fax_VA</b>  T.38 [i.6] version (side A): Edition 4 (2005) T.38 [i.6] version (side B): Edition 4 (2005)  Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b> Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b>  Packet Formation Time: 10 ms  Variable for Codecs for Voice: <b>Codec_Voice_VA</b>  Jitter Core: 0 ms  End-to-End delay Core: <b>E2E_Delay_Core</b>  Modem Type: <b>MODEM_TYPE</b>  FAX Error correction: <b>Redundancy_VA</b>
Comments:	

**Table 7: Values for test scenario F\_A\_A, test cases F\_A\_A\_1 to 10**

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
	Parameter Values										
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]								x	x	x
	T.38 [i.6]	x	x	x	x	x	x	x			
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20 ms / 200 ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20 ms / 200 ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
	Fixed - 200 ms										
End-to-End delay Core E2E_Delay_Core	0 ms	x							x		
	50 ms		x							x	
	100 ms			x							x
	150 ms				x						
	200 ms					x					
	300 ms						x				
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x	x	x			
	V.34 [i.13], 33,6 kbit/s								x	x	x
FAX Error correction Redundancy_VA	Redundancy 1	x	x	x	x	x	x	x	x	x	x
	Redundancy 2										
	Redundancy 3										

Table 7 (continued): Values for test scenario F\_A\_A, test cases F\_A\_A\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x	x	x						
	T.38 [i.6]					x	x	x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
	Fixed - 200 ms										
End-to-End delay Core E2E_Delay_Core	0 ms					x					
	50 ms						x				
	100 ms							x			
	150 ms	x							x		
	200 ms		x							x	
	300 ms			x							x
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s					x	x	x	x	x	x
	V.34 [i.13], 33,6 kbit/s	x	x	x	x						
FAX Error correction Redundancy_VA	Redundancy 1	x	x	x	x						
	Redundancy 2					x	x	x	x	x	x
	Redundancy 3										

Table 7 (continued): Values for test scenario F\_A\_A, test cases F\_A\_A\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]		x	x	x	x	x	x	x		
	T.38 [i.6]	x								x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
	Fixed - 200 ms										
End-to-End delay Core E2E_Delay_Core	0 ms		x							x	
	50 ms			x							x
	100 ms				x						
	150 ms					x					
	200 ms						x				
	300 ms							x			
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x								x	x
	V.34 [i.13], 33,6 kbit/s		x	x	x	x	x	x	x		
FAX Error correction Redundancy_VA	Redundancy 1										
	Redundancy 2	x	x	x	x	x	x	x	x		
	Redundancy 3									x	x

Table 7 (continued): Values for test scenario F\_A\_A, test cases F\_A\_A\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
	Parameter Values										
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]						x	x	x	x	x
	T.38 [i.6]	x	x	x	x	x					
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
	Fixed - 200 ms										
End-to-End delay Core E2E_Delay_Core	0 ms						x				
	50 ms							x			
	100 ms	x							x		
	150 ms		x							x	
	200 ms			x							x
	300 ms				x						
	400 ms					x					
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s	x	x	x	x	x					
	V.34 [i.13], 33,6 kbit/s						x	x	x	x	x
FAX Error correction Redundancy_VA	Redundancy 1										
	Redundancy 2										
	Redundancy 3	x	x	x	x	x	x	x	x	x	x

Table 7 (continued): Values for test scenario F\_A\_A, test cases F\_A\_A\_41 to 48

Parameter Name	Test #	41	42	43	44	45	46	47	48
	Parameter Values								
Variable for Codecs for Fax Codec_Fax_VA	G.711 [i.8]	x	x		x		x		x
	T.38 [i.6]			x		x		x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms			x	x	x	x	x	x
	Fixed - 150 ms	x	x						
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms			x	x	x	x	x	x
	Fixed - 150 ms	x	x						
	Fixed - 200 ms								
End-to-End delay Core E2E_Delay_Core	0 ms								
	50 ms								
	100 ms								
	150 ms			x	x	x	x	x	x
	200 ms								
	300 ms	x							
	400 ms		x						
Modem Type MODEM_TYPE	V.17 [i.10], 14,4 kbit/s			x		x		x	
	V.34 [i.13], 33,6 kbit/s	x	x		x		x		x
FAX Error correction Redundancy_VA	Redundancy 1			x	x				
	Redundancy 2					x	x		
	Redundancy 3	x	x					x	x

## 5.5 Modem Tests with Analogue Termination

Scenarios which would require support of ITU-T Recommendation V.152 [i.2] have been omitted here since no testing capabilities have been made available at the time when the present technical report was produced.

NOTE: Examples for analogue termination are elevator control systems, alarm monitoring systems, postage meters.

### 5.5.1 Scenario M\_VGW\_VGW: VGW to VGW Modem Tests

Test variables for the VGW to VGW Modem Tests are given in Table 8 and also in the attached Excel file M\_VGW\_VGW.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 102 test cases for this test configuration.

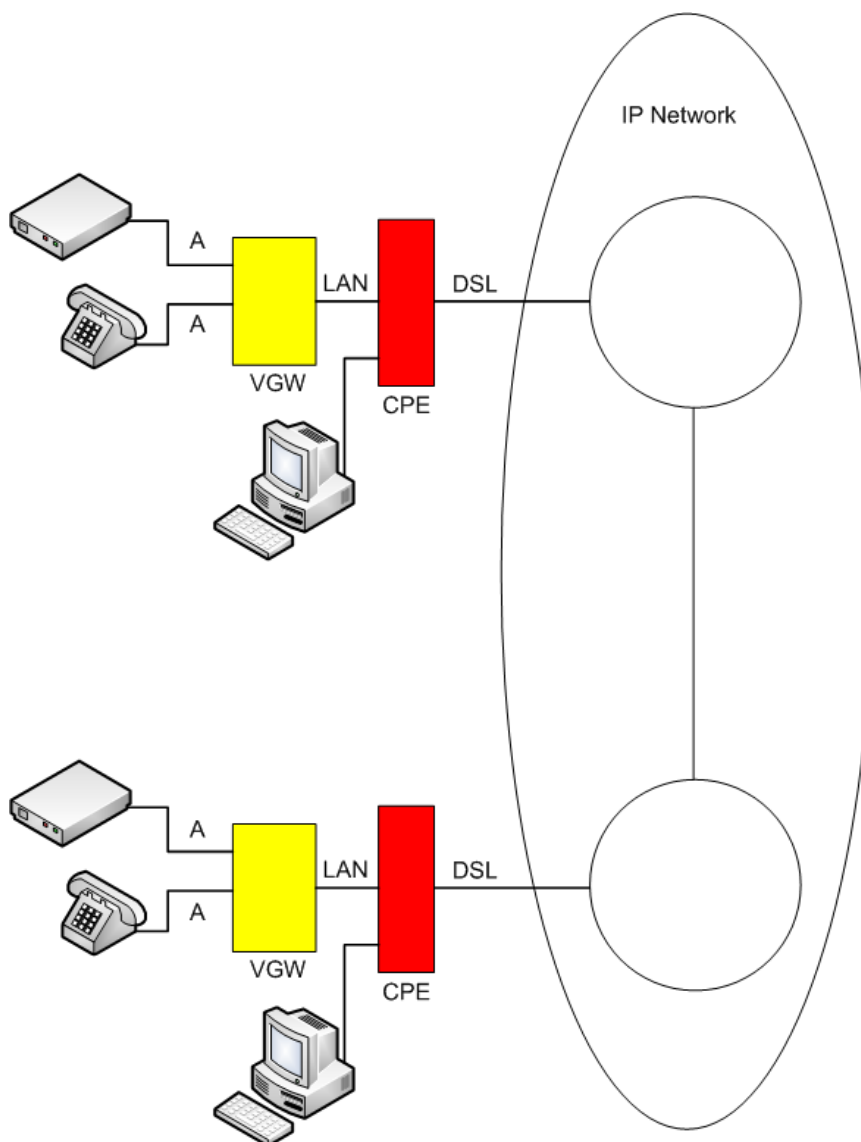


Figure 9: Call between two IMS VGW with additional voice and data traffic - Scenario M\_VGW\_VGW

<b>M_VGW_VGW_XX</b>	
TSS reference:	<b>VGW_VGW MODEM Tests</b>
Preconditions	<p>Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b>            Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b></p> <p>Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b>            Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b></p> <p>Variable for Codecs for Modem: G.711 [i.10]</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b>            Number of Variation-sensitive channels - Data (side A): No channel</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Number of Variation-sensitive channels - Voice (side B): <b>VA_Channel_Voice_B</b>            Number of Variation-sensitive channels - Data (side B): No channel</p> <p>Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b>            Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b></p> <p>Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b>            Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE_M</b></p>
Comments:	



Table 8: Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_01 to 10

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s				x						x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s				x						x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x			x	x	x	x
	1_Channel					x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]					x	x				
	no codec	x	x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x			x	x	x	x
	1_Channel					x	x				
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	384 kbit/s		x			x			x		x
	512 kbit/s						x				
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	1 024 kbit/s		x			x			x		x
	8 192 kbit/s						x				
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	384 kbit/s		x			x			x		x
	512 kbit/s						x				
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	1 024 kbit/s		x			x			x		x
	8 192 kbit/s						x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x	x			x	x
	1_Channel	x	x					x	x		
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x					x	x		
	no codec			x	x	x	x			x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel			x	x	x	x			x	x
	1_Channel	x	x					x	x		
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x		
	64 kbit/s									x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x		
	128 kbit/s									x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x		
	128 kbit/s									x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x		
	64 kbit/s									x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
Bit rate for uplink (side A)	128 kbit/s										
DSL_UP_Rate_A	256 kbit/s		x		x			x		x	
	384 kbit/s			x		x			x		x
	512 kbit/s	x					x				
Bit rate for downlink (side A)	128 kbit/s										
DSL_DOWN_Rate_A	256 kbit/s		x		x			x		x	
	1 024 kbit/s			x		x			x		x
	8 192 kbit/s	x					x				
Bit rate for uplink (side B)	128 kbit/s										
DSL_UP_Rate_B	256 kbit/s		x		x			x		x	
	384 kbit/s			x		x			x		x
	512 kbit/s	x					x				
Bit rate for downlink (side B)	128 kbit/s										
DSL_DOWN_Rate_B	256 kbit/s		x		x			x		x	
	1 024 kbit/s			x		x			x		x
	8 192 kbit/s	x					x				
Jitter Buffer Type/Size (side A)	Fixed - 100 ms	x	x	x							
JITTER_BUFF_T_S_A	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Jitter Buffer Type/Size (side B)	Fixed - 100 ms	x	x	x							
JITTER_BUFF_T_S_B	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Number of Variation-sensitive channels - Voice (side A)	No channel	x			x	x	x			x	x
VA_Channel_Voice_A	1_Channel		x	x				x	x		
Variable for Codecs for Voice	G.711 [i.8]		x	x				x	x		
Codec_Voice_VA	no codec	x			x	x	x			x	x
Number of Variation-sensitive channels - Voice (side B)	No channel	x			x	x	x			x	x
VA_Channel_Voice_B	1_Channel		x	x				x	x		
Variation-insensitive packet traffic uplink (side A)	No traffic										
VA_Insens_Data_UL_A	64 kbit/s	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B)	No traffic										
VA_Insens_Data_UL_B	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A)	No traffic										
VA_Insens_Data_DL_A	128 kbit/s	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B)	No traffic										
VA_Insens_Data_DL_B	64 kbit/s	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core	0 ms	x	x	x	x	x	x	x	x	x	x
E2E_Delay_Core	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
MODEM_TYPE_M	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_31 to 40

Parameter Name	Test # Parameter Values	31	32	33	34	35	36	37	38	39	40
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s	x						x			
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s	x						x			
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s	x						x			
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s	x						x			
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x			x	x	x	x			x
	1_Channel		x	x					x	x	
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x					x	x	
	no codec	x			x	x	x	x			x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x			x	x	x	x			x
	1_Channel		x	x					x	x	
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic				x	x	x	x	x	x	x
	64 kbit/s	x	x	x							
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic				x	x	x	x	x	x	x
	128 kbit/s	x	x	x							
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic				x	x	x	x	x	x	x
	128 kbit/s	x	x	x							
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic				x	x	x	x	x	x	x
	64 kbit/s	x	x	x							
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x							
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]				x	x	x	x	x	x	x

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_41 to 50

Parameter Name	Test # Parameter Values	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	384 kbit/s		x			x			x		
	512 kbit/s			x						x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	1 024 kbit/s		x			x			x		
	8 192 kbit/s			x						x	
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	384 kbit/s		x			x			x		
	512 kbit/s			x						x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	1 024 kbit/s		x			x			x		
	8 192 kbit/s			x						x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x			x	x	x	x	
	1_Channel				x	x					x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]				x	x					x
	no codec	x	x	x			x	x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x			x	x	x	x	
	1_Channel				x	x					x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	128 kbit/s										
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s										
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_51 to 60

Parameter Name	Test # Parameter Values	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	no codec		x	x	x			x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s										
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_61 to 70

Parameter Name	Test # Parameter Values	61	62	63	64	65	66	67	68	69	70
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x					
	384 kbit/s	x		x			x				
	512 kbit/s				x			x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x					
	1 024 kbit/s	x		x			x				
	8 192 kbit/s				x			x	x	x	x
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x					
	384 kbit/s	x		x			x				
	512 kbit/s				x			x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x					
	1 024 kbit/s	x		x			x				
	8 192 kbit/s				x			x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	no codec		x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x	x	x	x	x				
	128 kbit/s							x	x	x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s							x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	64 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s							x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s							x	x	x	x
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x				

Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_71 to 80

Parameter Name	Test # Parameter Values	71	72	73	74	75	76	77	78	79	80
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s									x	x
	8 192 kbit/s	x	x	x	x	x	x	x	x		
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s									x	x
	8 192 kbit/s	x	x	x	x	x	x	x	x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]										
	no codec	x	x	x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s									x	x
	128 kbit/s	x	x	x	x	x	x	x	x		
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic										
	128 kbit/s									x	x
	3 300 kbit/s	x	x	x	x	x	x	x	x		
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic										
	64 kbit/s									x	x
	3 300 kbit/s	x	x	x	x	x	x	x	x		
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	
	50 ms										x
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x								
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]			x	x	x	x	x	x	x	x



Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_81 to 90

Parameter Name	Test # Parameter Values	81	82	83	84	85	86	87	88	89	90
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s					x					
	256 kbit/s						x			x	
	384 kbit/s							x			x
	512 kbit/s	x	x	x	x				x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s					x					
	256 kbit/s						x			x	
	1 024 kbit/s	x	x	x	x			x			x
	8 192 kbit/s								x		
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s					x					
	256 kbit/s						x			x	
	384 kbit/s							x			x
	512 kbit/s	x	x	x	x				x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s					x					
	256 kbit/s						x			x	
	1 024 kbit/s	x	x	x	x			x			x
	8 192 kbit/s								x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x		
	1_Channel									x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]									x	x
	no codec	x	x	x	x	x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x		
	1_Channel									x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic					x	x	x	x	x	x
	64 kbit/s	x	x	x	x						
	128 kbit/s										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic					x	x	x	x	x	x
	128 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic					x	x	x	x	x	x
	128 kbit/s	x	x	x	x						
	3 300 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic					x	x	x	x	x	x
	64 kbit/s	x	x	x	x						
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms					x	x	x	x	x	x
	50 ms										
	100 ms	x									
	150 ms		x								
	200 ms			x							
	300 ms				x						
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s										
	V.32bis [i.12] 9,6 kbit/s										
	V.22bis [i.11] 2,4 kbit/s					x	x	x	x	x	x
	V.90 [i.14]	x	x	x	x						

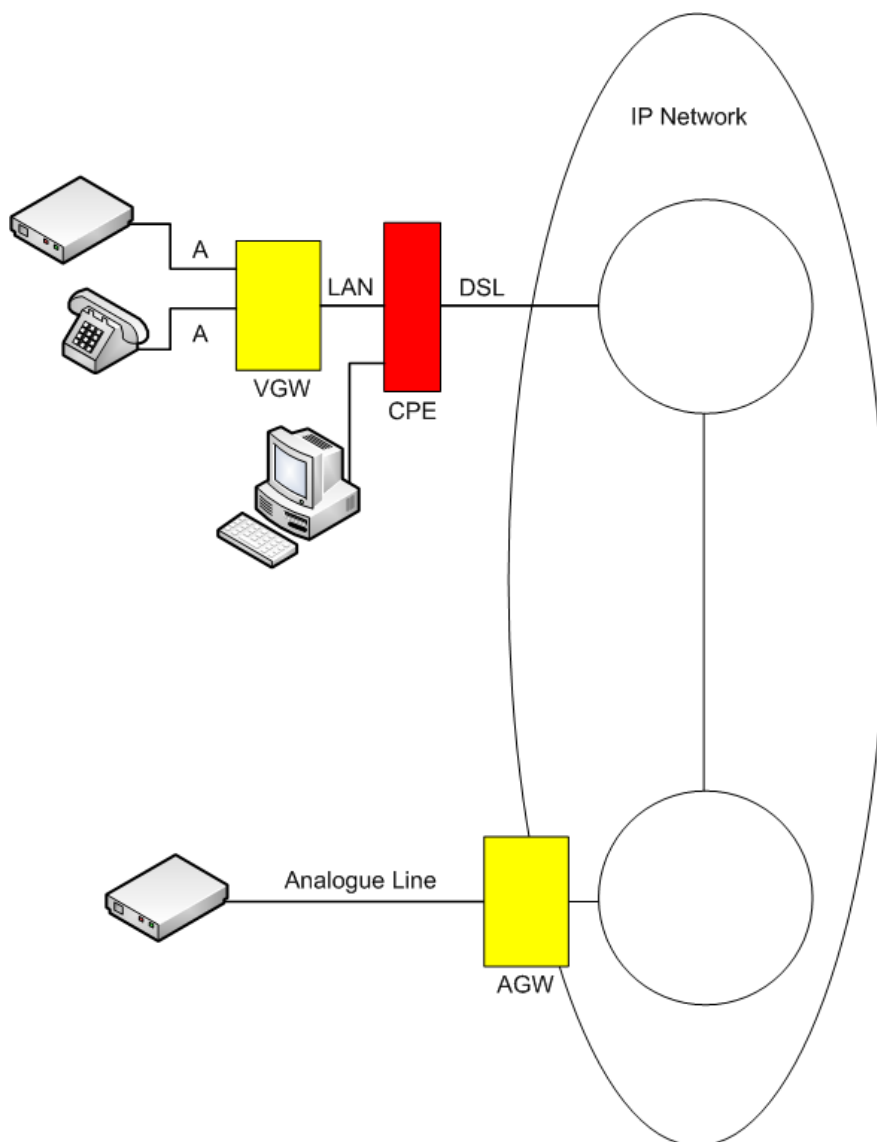
Table 8 (continued): Values for test scenario M\_VGW\_VGW, test cases M\_VGW\_VGW\_91 to 102

Parameter Name	Test #	91	92	93	94	95	96	97	98	99	100	101	102
	Parameter Values												
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	384 kbit/s			x			x			x			x
	512 kbit/s				x						x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	1 024 kbit/s			x			x			x			x
	8 192 kbit/s				x						x		
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	384 kbit/s			x			x			x			x
	512 kbit/s				x						x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	1 024 kbit/s			x			x			x			x
	8 192 kbit/s				x						x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x	x						
	Fixed - 200 ms							x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x	x						
	Fixed - 200 ms							x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x			x	x	x	x		
	1_Channel					x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]					x	x					x	x
	no codec	x	x	x	x			x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x			x	x	x	x		
	1_Channel					x	x					x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	64 kbit/s												
	128 kbit/s												
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	128 kbit/s												
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	128 kbit/s												
	3 300 kbit/s												
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	64 kbit/s												
	3 300 kbit/s												
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x	x	x
	50 ms												
	100 ms												
	150 ms												
	200 ms												
	300 ms												
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s												
	V.32bis [i.12] 9,6 kbit/s												
	V.22bis [i.11] 2,4 kbit/s	x	x	x	x	x	x	x	x	x	x	x	x
	V.90 [i.14]												

## 5.5.2 Scenario M\_VGW\_A: VGW to Analogue Modem Tests

Test variables for the VGW to Analogue Modem Tests are given in Table 9 and also in the attached Excel file M\_VGW\_A.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 102 test cases for this test configuration.



**Figure 10: Call between IMS VGW with additional voice and data traffic and AGW - Scenario M\_VGW\_A**

<b>M_VGW_A_XX</b>	
TSS reference:	<b>VGW_Analogue MODEM Tests</b>
Preconditions	<p>Bit rate for uplink (side A): <b>DSL_UP_Rate_A</b>            Bit rate for downlink (side A): <b>DSL_DOWN_Rate_A</b></p> <p>Variable for Codecs for Modem: G.711 [i.10]</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Number of Variation-sensitive channels - Voice (side A): <b>VA_Channel_Voice_A</b>            Number of Variation-sensitive channels - Data (side A): No channel</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Variation-insensitive packet traffic uplink (side A): <b>VA_Insens_Data_UL_A</b>            Variation-insensitive packet traffic downlink (side A): <b>VA_Insens_Data_DL_A</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE_M</b></p>
Comments:	

Table 9: Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_01 to 10

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s				x						x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x			x	x	x	x
	1_Channel										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]					x	x				
	no codec	x	x	x	x			x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	384 kbit/s		x			x			x		x
	512 kbit/s						x				
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	1 024 kbit/s		x			x			x		x
	8 192 kbit/s						x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel			x	x	x	x			x	x
	1_Channel	x	x					x	x		
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x					x	x		
	no codec			x	x	x	x			x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x		
	64 kbit/s									x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x		
	3 300 kbit/s									x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s			x							
	V.90 [i.14]	x			x			x		x	

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x		x			x		x	
	384 kbit/s			x		x			x		x
	512 kbit/s	x					x				
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x		x			x		x	
	1 024 kbit/s			x		x			x		x
	8 192 kbit/s	x					x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x			x	x	x			x	x
	1_Channel		x	x				x	x		
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x				x	x		
	no codec	x			x	x	x			x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic										
	128 kbit/s	x	x	x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s										
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE_M	300 ms										
	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s	x						x			
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s	x						x			
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x			x	x	x	x			x
	1_Channel		x	x					x	x	
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x					x	x	
	no codec	x			x	x	x	x			x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic				x	x	x	x	x	x	x
	64 kbit/s	x	x	x							
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic				x	x	x	x	x	x	x
	3 300 kbit/s	x	x	x							
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x							
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]				x	x	x	x	x	x	x



Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_41 to 50

Parameter Name	Test #	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	384 kbit/s		x			x			x		
	512 kbit/s			x						x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	1 024 kbit/s		x			x			x		
	8 192 kbit/s			x						x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x			x	x	x	x	
	1_Channel				x	x					x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]				x	x					x
	no codec	x	x	x			x	x	x	x	
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_51 to 60

Parameter Name	Test #	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	no codec		x	x	x			x	x	x	
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s										
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
Modem Type MODEM_TYPE_M	200 ms										
	300 ms										
	V.32bis [i.12] 14,4 kbit/s										
V.22bis [i.11] 2,4 kbit/s											
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_61 to 70

Parameter Name	Test #	61	62	63	64	65	66	67	68	69	70
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s		x			x					
	384 kbit/s	x		x			x				
	512 kbit/s				x			x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s		x			x					
	1 024 kbit/s	x		x			x				
	8 192 kbit/s				x			x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	no codec		x	x	x			x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic										
	64 kbit/s	x	x	x	x	x	x				
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s							x	x	x	x
	No traffic										
	128 kbit/s	x	x	x	x	x	x				
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s							x	x	x	x
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE_M	300 ms										
	V.32bis [i.12] 14,4 kbit/s							x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x				

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_71 to 80

Parameter Name	Test #	71	72	73	74	75	76	77	78	79	80
	Parameter Values										
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s									x	x
	8 192 kbit/s	x	x	x	x	x	x	x	x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]										
	no codec	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic									x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s	x	x	x	x	x	x	x	x		
	No traffic										
	128 kbit/s									x	x
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s	x	x	x	x	x	x	x	x		
	0 ms	x	x	x	x	x	x	x	x	x	
	50 ms										x
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE_M	300 ms										
	V.32bis [i.12] 14,4 kbit/s	x	x								
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]			x	x	x	x	x	x	x	x

Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_81 to 90

Parameter Name	Test #	81	82	83	84	85	86	87	88	89	90
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s					x					
	256 kbit/s						x			x	
	384 kbit/s							x			x
	512 kbit/s	x	x	x	x				x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s					x					
	256 kbit/s						x			x	
	1 024 kbit/s	x	x	x	x			x			x
	8 192 kbit/s								x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x	x	x	x	x		
	1_Channel									x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]									x	x
	no codec	x	x	x	x	x	x	x	x		
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic					x	x	x	x	x	x
	64 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s										
	No traffic					x	x	x	x	x	x
	3 300 kbit/s	x	x	x	x						
End-to-End delay Core E2E_Delay_Core	0 ms					x	x	x	x	x	x
	50 ms										
	100 ms	x									
	150 ms		x								
	200 ms			x							
Modem Type MODEM_TYPE_M	300 ms				x						
	V.32bis [i.12] 14,4 kbit/s										
	V.22bis [i.11] 2,4 kbit/s					x	x	x	x	x	x
	V.90 [i.14]	x	x	x	x						

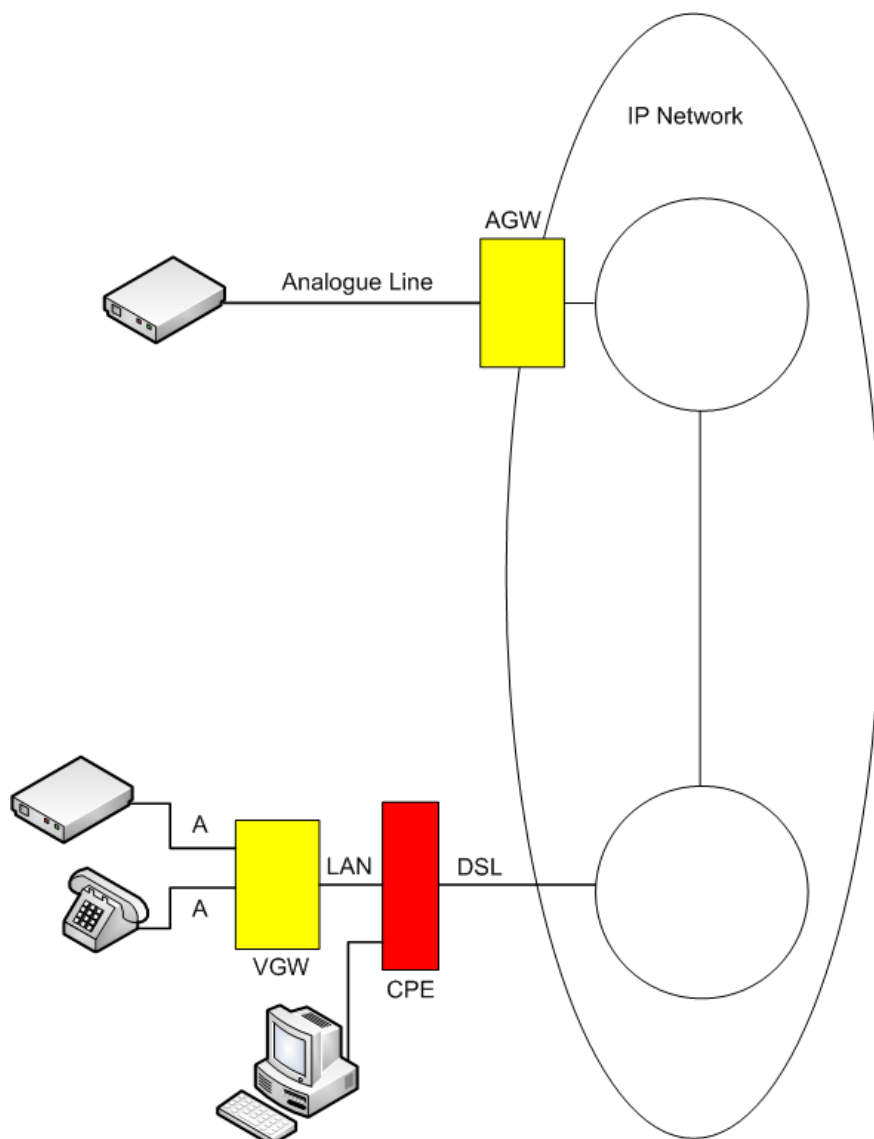
Table 9 (continued): Values for test scenario M\_VGW\_A, test cases M\_VGW\_A\_91 to 102

Parameter Name	Test # Parameter Values	91	92	93	94	95	96	97	98	99	100	101	102
Bit rate for uplink (side A) DSL_UP_Rate_A	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	384 kbit/s			x			x			x			x
	512 kbit/s				x						x		
Bit rate for downlink (side A) DSL_DOWN_Rate_A	128 kbit/s	x						x					
	256 kbit/s		x			x			x			x	
	1 024 kbit/s			x			x			x			x
	8 192 kbit/s				x						x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x	x						
	Fixed - 200 ms							x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x	x						
	Fixed - 200 ms							x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side A) VA_Channel_Voice_A	No channel	x	x	x	x			x	x	x	x		
	1_Channel					x	x					x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]					x	x					x	x
	no codec	x	x	x	x			x	x	x	x		
Variation-insensitive packet traffic uplink (side A) VA_Insens_Data_UL_A	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	64 kbit/s												
Variation-insensitive packet traffic downlink (side A) VA_Insens_Data_DL_A	128 kbit/s												
	3 300 kbit/s												
	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x	x	x
	50 ms												
	100 ms												
	150 ms												
	200 ms												
	300 ms												
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s												
	V.22bis [i.11] 2,4 kbit/s	x	x	x	x	x	x	x	x	x	x	x	x
	V.90 [i.14]												

### 5.5.3 Scenario M\_A\_VGW: Analogue to VGW Modem Tests

Test variables for the Analogue to VGW Modem Tests are given in Table 10 and also in the attached Excel file M\_A\_VGW.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 102 test cases for this test configuration.



**Figure 11: Call between AGW and IMS VGW with additional voice and data traffic - Scenario M\_A\_VGW**

<b>M_A_VGW_XX</b>	
TSS reference:	<b>VGW_VGW MODEM Tests</b>
Preconditions	<p>Bit rate for uplink (side B): <b>DSL_UP_Rate_B</b>            Bit rate for downlink (side B): <b>DSL_DOWN_Rate_B</b></p> <p>Variable for Codecs for Modem: G.711 [i.10]</p> <p>Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b>            Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b></p> <p>Packet Formation Time: 20 ms</p> <p>Variable for Codecs for Voice: <b>Codec_Voice_VA</b></p> <p>Number of Variation-sensitive channels - Voice (side B): <b>VA_Channel_Voice_B</b>            Number of Variation-sensitive channels - Data (side B): No channel</p> <p>Variation-insensitive packet traffic uplink (side B): <b>VA_Insens_Data_UL_B</b>            Variation-insensitive packet traffic downlink (side B): <b>VA_Insens_Data_DL_B</b></p> <p>Jitter Core: 0 ms</p> <p>End-to-End delay Core: <b>E2E_Delay_Core</b></p> <p>Modem Type: <b>MODEM_TYPE_M</b></p>
Comments:	



Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_01 to 10

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s				x						x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s	x						x			
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s				x						x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms										
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]					x	x				
	no codec	x	x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x			x	x	x	x
	1_Channel					x	x				
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_11 to 20

Parameter Name	Test #	11	12	13	14	15	16	17	18	19	20
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	384 kbit/s		x			x			x		x
	512 kbit/s						x				
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s			x							
	256 kbit/s	x			x			x		x	
	1 024 kbit/s		x			x			x		x
	8 192 kbit/s						x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms									x	x
	Fixed - 150 ms	x	x								
	Fixed - 200 ms			x	x	x	x	x	x		
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x	x					x	x		
	no codec			x	x	x	x			x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel			x	x	x	x			x	x
	1_Channel	x	x					x	x		
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x		
	64 kbit/s									x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x		
	3 300 kbit/s									x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_21 to 30

Parameter Name	Test #	21	22	23	24	25	26	27	28	29	30
	Parameter Values										
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x		x			x		x	
	384 kbit/s			x		x			x		x
	512 kbit/s	x					x				
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x		x			x		x	
	1 024 kbit/s			x		x			x		x
	8 192 kbit/s	x					x				
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms	x	x	x							
	Fixed - 150 ms				x	x	x	x	x		
	Fixed - 200 ms									x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x				x	x		
	no codec	x			x	x	x			x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x			x	x	x			x	x
	1_Channel		x	x				x	x		
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	64 kbit/s	x	x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	3 300 kbit/s	x	x	x	x	x	x	x	x	x	x
	No traffic										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]										

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	384 kbit/s			x			x			x	
	512 kbit/s	x						x			
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s				x						x
	256 kbit/s		x			x			x		
	1 024 kbit/s			x			x			x	
	8 192 kbit/s	x						x			
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms				x	x	x	x	x	x	
	Fixed - 150 ms										x
	Fixed - 200 ms	x	x	x							
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]		x	x					x	x	
	no codec	x			x	x	x	x			x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x			x	x	x	x			x
	1_Channel		x	x					x	x	
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic				x	x	x	x	x	x	x
	64 kbit/s	x	x	x							
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic				x	x	x	x	x	x	x
	128 kbit/s	x	x	x							
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s										
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
Modem Type MODEM_TYPE_M	200 ms										
	300 ms										
	V.32bis [i.12] 14,4 kbit/s	x	x	x							
V.22bis [i.11] 2,4 kbit/s											
	V.90 [i.14]				x	x	x	x	x	x	x

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_41 to 50

Parameter Name	Test #	41	42	43	44	45	46	47	48	49	50
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	384 kbit/s		x			x			x		
	512 kbit/s			x						x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s						x				
	256 kbit/s	x			x			x			x
	1 024 kbit/s		x			x			x		
	8 192 kbit/s			x						x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms										
	Fixed - 150 ms	x	x	x	x	x					
	Fixed - 200 ms						x	x	x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]				x	x					x
	no codec	x	x	x			x	x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x			x	x	x	x	
	1_Channel				x	x					x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x
	64 kbit/s										
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s										
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_51 to 60

Parameter Name	Test #	51	52	53	54	55	56	57	58	59	60
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	384 kbit/s	x		x			x		x		
	512 kbit/s				x					x	
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x		x			x
	1 024 kbit/s	x		x			x		x		
	8 192 kbit/s				x					x	
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms		x	x	x	x	x				
	Fixed - 150 ms							x	x	x	x
	Fixed - 200 ms	x									
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				x
	no codec		x	x	x			x	x	x	
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	
	1_Channel	x				x	x				x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x									
	64 kbit/s		x	x	x	x	x	x	x	x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic	x									
	128 kbit/s		x	x	x	x	x	x	x	x	x
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s										
	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE_M	300 ms										
	V.32bis [i.12] 14,4 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_61 to 70

Parameter Name	Test # Parameter Values	61	62	63	64	65	66	67	68	69	70
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s		x			x					
	384 kbit/s	x		x			x				
	512 kbit/s				x			x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s		x			x					
	1 024 kbit/s	x		x			x				
	8 192 kbit/s				x			x	x	x	x
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms							x			x
	Fixed - 150 ms	x							x		
	Fixed - 200 ms		x	x	x	x	x			x	
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]	x				x	x				
	no codec		x	x	x			x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel		x	x	x			x	x	x	x
	1_Channel	x				x	x				
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	64 kbit/s	x	x	x	x	x	x				
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s							x	x	x	x
	128 kbit/s	x	x	x	x	x	x				
	3 300 kbit/s							x	x	x	x
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	50 ms										
	100 ms										
	150 ms										
	200 ms										
	300 ms										
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s							x	x	x	x
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x				

Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_71 to 80

Parameter Name	Test #	71	72	73	74	75	76	77	78	79	80
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s										
	256 kbit/s										
	384 kbit/s										
	512 kbit/s	x	x	x	x	x	x	x	x	x	x
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s										
	256 kbit/s										
	1 024 kbit/s									x	x
	8 192 kbit/s	x	x	x	x	x	x	x	x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms			x			x				
	Fixed - 150 ms	x			x			x			
	Fixed - 200 ms		x			x			x	x	x
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]										
	no codec	x	x	x	x	x	x	x	x	x	x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x	x	x
	1_Channel										
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic										
	64 kbit/s									x	x
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s	x	x	x	x	x	x	x	x		
	No traffic										
	128 kbit/s									x	x
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s	x	x	x	x	x	x	x	x		
	0 ms	x	x	x	x	x	x	x	x	x	
	50 ms										x
	100 ms										
	150 ms										
	200 ms										
Modem Type MODEM_TYPE_M	300 ms										
	V.32bis [i.12] 14,4 kbit/s	x	x								
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]			x	x	x	x	x	x	x	x



Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_81 to 90

Parameter Name	Test # Parameter Values	81	82	83	84	85	86	87	88	89	90
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s					x					
	256 kbit/s						x			x	
	384 kbit/s							x			x
	512 kbit/s	x	x	x	x				x		
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s					x					
	256 kbit/s						x			x	
	1 024 kbit/s	x	x	x	x			x			x
	8 192 kbit/s								x		
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms					x	x	x	x	x	x
	Fixed - 150 ms										
	Fixed - 200 ms	x	x	x	x						
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]									x	x
	no codec	x	x	x	x	x	x	x	x		
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x	x	x	x	x	x		
	1_Channel									x	x
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic					x	x	x	x	x	x
	64 kbit/s	x	x	x	x						
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s										
	No traffic					x	x	x	x	x	x
	128 kbit/s	x	x	x	x						
End-to-End delay Core E2E_Delay_Core	3 300 kbit/s										
	0 ms					x	x	x	x	x	x
	50 ms										
	100 ms	x									
	150 ms		x								
Modem Type MODEM_TYPE_M	200 ms			x							
	300 ms				x						
	V.32bis [i.12] 14,4 kbit/s										
	V.22bis [i.11] 2,4 kbit/s					x	x	x	x	x	x
	V.90 [i.14]	x	x	x	x						

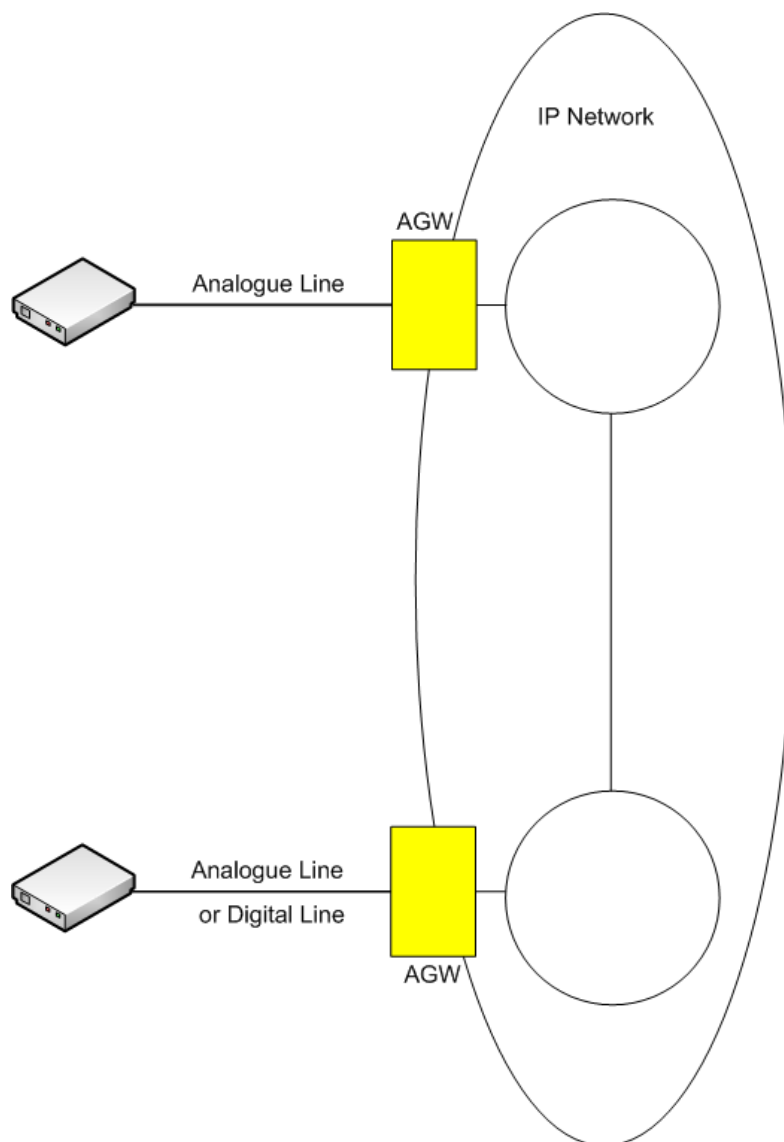
Table 10 (continued): Values for test scenario M\_A\_VGW, test cases M\_A\_VGW\_91 to 102

Parameter Name	Test # Parameter Values	91	92	93	94	95	96	97	98	99	100	101	102
Bit rate for uplink (side B) DSL_UP_Rate_B	128 kbit/s						x						
	256 kbit/s	x			x			x			x		x
	384 kbit/s		x			x			x			x	
	512 kbit/s			x						x			
Bit rate for downlink (side B) DSL_DOWN_Rate_B	128 kbit/s						x						
	256 kbit/s	x			x			x			x		x
	1 024 kbit/s		x			x			x			x	
	8 192 kbit/s			x						x			
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x							x
	Fixed - 200 ms						x	x	x	x	x	x	
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Fixed - 100 ms												
	Fixed - 150 ms	x	x	x	x	x							x
	Fixed - 200 ms						x	x	x	x	x	x	
Variable for Codecs for Voice Codec_Voice_VA	G.711 [i.8]				x	x					x	x	
	no codec	x	x	x			x	x	x	x			x
Number of Variation-sensitive channels - Voice (side B) VA_Channel_Voice_B	No channel	x	x	x			x	x	x	x			x
	1_Channel				x	x					x	x	
Variation-insensitive packet traffic uplink (side B) VA_Insens_Data_UL_B	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	64 kbit/s												
Variation-insensitive packet traffic downlink (side B) VA_Insens_Data_DL_B	128 kbit/s												
	No traffic	x	x	x	x	x	x	x	x	x	x	x	x
	3 300 kbit/s												
End-to-End delay Core E2E_Delay_Core	0 ms	x	x	x	x	x	x	x	x	x	x	x	x
	50 ms												
	100 ms												
	150 ms												
	200 ms												
	300 ms												
Modem Type MODEM_TYPE_M	V.32bis [i.12] 14,4 kbit/s												
	V.22bis [i.11] 2,4 kbit/s	x	x	x	x	x	x	x	x	x	x	x	x
	V.90 [i.14]												

### 5.5.4 Scenario M\_A\_A: Analogue to Analogue Modem Tests

Test variables for the Analogue to Analogue Modem Tests are given in Table 11 and also in the attached Excel file M\_A\_A.xls. Test cases are named according to the scheme F\_T38\_T38\_XX where XX refers to the test number in the xls file.

There is a total of 48 test cases for this test configuration



**Figure 12: Call between two AGW - Scenario M\_A\_A**

**NOTE:** It was suggested to include also V.90 to V.90 tests between Digital Lines at send and receive side. However, this had to be omitted due to technical restrictions in the test equipment.

<b>M_A_A_XX</b>	
TSS reference:	<b>AGW_AGW MODEM Tests</b>
Preconditions	Variable for Codecs for Modem: G.711 [i.10]  Jitter Buffer Type/Size (side A): <b>JITTER_BUFF_T_S_A</b> Jitter Buffer Type/Size (side B): <b>JITTER_BUFF_T_S_B</b>  Packet Formation Time: 10 ms  Variable for Codecs for Voice: <b>Codec_Voice_VA</b>  Jitter Core: <b>JITTER_Core</b>  End-to-End delay Core: <b>E2E_Delay_Core</b>  Modem Type: <b>MODEM_TYPE_M</b>
Comments:	

**Table 11: Values for test scenario M\_A\_A, test cases M\_A\_A\_01 to 10**

Parameter Name	Test #	1	2	3	4	5	6	7	8	9	10
	Parameter Values										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms										
	Fixed - 150 ms	x	x	x	x	x	x	x	x	x	x
Jitter Core JITTER_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	2 ms										
	10 ms										
	20 ms										
	50 ms										
End-to-End delay Core E2E_Delay_Core	0 ms	x							x		
	50 ms		x							x	
	100 ms			x							x
	150 ms				x						
	200 ms					x					
	300 ms						x				
Modem Type MODEM_TYPE_M	400 ms							x			
	V.32bis [i.12] 14,4 kbit/s	x	x	x	x	x	x	x			
	V.32bis [i.12] 9,6 kbit/s								x	x	x
	V.32bis [i.12] 4,8 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
V.90 [i.14]											



Table 11 (continued): Values for test scenario M\_A\_A, test cases M\_A\_A\_31 to 40

Parameter Name	Test #	31	32	33	34	35	36	37	38	39	40
	Parameter Values										
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms							x	x	x	x
	Fixed - 150 ms	x	x	x	x	x	x				
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms							x	x	x	x
	Fixed - 150 ms	x	x	x	x	x	x				
Jitter Core JITTER_Core	0 ms	x	x	x	x	x	x	x	x	x	x
	2 ms										
	10 ms										
	20 ms										
	50 ms										
End-to-End delay Core E2E_Delay_Core	0 ms						x				
	50 ms							x			
	100 ms	x							x		
	150 ms		x							x	
	200 ms			x							x
	300 ms				x						
Modem Type MODEM_TYPE_M	0 ms										
	2 ms										
	10 ms										
	20 ms										
	50 ms										
	400 ms					x					
V.32bis [i.12] 14,4 kbit/s	V.32bis [i.12] 9,6 kbit/s										
	V.32bis [i.12] 4,8 kbit/s										
	V.22bis [i.11] 2,4 kbit/s										
	V.90 [i.14]	x	x	x	x	x	x	x	x	x	x

Table 11 (continued): Values for test scenario M\_A\_A, test cases M\_A\_A\_41 to 48

Parameter Name	Test #	41	42	43	44	45	46	47	48
	Parameter Values								
Jitter Buffer Type/Size (side A) JITTER_BUFF_T_S_A	Dynamic 20ms/200ms	x	x	x	x	x	x	x	x
	Fixed - 150 ms								
Jitter Buffer Type/Size (side B) JITTER_BUFF_T_S_B	Dynamic 20ms/200ms	x	x	x	x	x	x	x	x
	Fixed - 150 ms								
Jitter Core JITTER_Core	0 ms	x	x	x					
	2 ms				x				
	10 ms					x			
	20 ms						x		
	50 ms							x	x
End-to-End delay Core E2E_Delay_Core	0 ms								
	50 ms								
	100 ms								
	150 ms			x	x	x	x	x	
	200 ms								
	300 ms	x							x
Modem Type MODEM_TYPE_M	400 ms		x						
	V.32bis [i.12] 14,4 kbit/s								
	V.32bis [i.12] 9,6 kbit/s			x	x	x	x	x	x
	V.32bis [i.12] 4,8 kbit/s								
	V.22bis [i.11] 2,4 kbit/s								
	V.90 [i.14]	x	x						

## 6 Quality Assessment Methodologies

Quality assessment and estimation of the perceptual impact of FoIP and MoIP on the actual transmission of Fax and Modem for the test cases defined in clause 5 is done by the following:

- Recording of all relevant transmission parameters in the Fax or Modem simulator, as far as they can be accessed, such as delay, delay variation, FOM, ECM errored frames, total transmission time, variances if more than one test run has been achieved for the individual test case.
- For Fax, inspection of received pages.

NOTE: A complete quality assessment methodology should include the two additional steps:

- a) a numerical algorithm in order to allow for a numerical ranking order of different tests; and
- b) consideration and discussion of the possible perceptual impact.

### 6.1 T.38 and Fax transmission tests

The test pages defined in Annex D are to be used, six criteria to be will be recorded:

- 1) Complete/incomplete transmission of page, received pages to be stored as tif files with test # as name.
- 2) Nominal bit rate of transmission.
- 3) Figure of Merit (FOM) as defined in ITU-T Recommendation E.458 [i.4]. There will be only one FOM value reported per Fax transmission, independent of the number of pages.

Maximum speed of a fax transmission in this context is to be understood as the achieved nominal transmission rate.

**Table 12: From ITU-T Recommendation E.458 [i.4] - Definition of Figure of Merit**

Transaction type	Complete	Maximum speed	Image quality
I	Yes	Yes	ERROR-FREE
II	Yes	Yes	ERRORED
III	Yes	Yes	SEVERELY ERRORED
IV	Yes	No	ERROR-FREE
V	Yes	No	ERRORED
VI	Yes	No	SEVERELY ERRORED
VII	No	Not applicable	Not applicable

NOTE 1: ERROR-FREE, ERRORED and SEVERELY ERRORED transactions are as defined in ITU-T Recommendation E.453 [i.3].

NOTE 2: If the transaction is incomplete, it is categorized as Type VII irrespective of the speed and image quality of the completed pages.

**Table 13: From ITU-T Recommendation E.453 [i.3] - Image quality categories**

<b>error-free page</b>	No degradation by network impairments
<b>errored page</b>	Information conveyed
<b>severely-errored page</b>	Part of information missing

- 4) Duration of transmission of test page in seconds.
- 5) Visual inspection of received page for visible errors and missing information.
- 6) In cases with additional voice channels, record the listening quality according to ITU-T Recommendation P.862.1 [i.5].

## 6.2 Modem transmission tests

Duration of transmission of test file, size 1 024 Byte.

In cases with additional voice channels, record the listening quality according to ITU-T Recommendation P.862.1 [i.5], as applicable.

## 6.3 Proposal of a Numerical Algorithm in order to allow for a Numerical Ranking Order of Test Results

For further study.

---

# 7 Results

This clause provides an overview of the tests which were made and which not and why not, conclusions based on test results, problems noticed during testing.

For simulation of fax machines and analog modems IxVoice test system was used. Some analog modem speed IxVoice did not support (V.32bis 4 800 bps and 2 400 bps). In this case U.S Robotics analog modems were used.

For tests with VGW were used two units:

- Iskratel ADSL modem with VGW functionality.
- Linksys SPA2102 VGW connected on Iskratel ADSL modem.

For simulation of IP cloud Spirent PacketSphere simulator was used.

NOTE: It is foreseen to revise the present document in the near future in order to include additional results.

In those cases where not all six lines are visible in the diagrams there are identical results for all 6 pages.

## 7.1 Results for Fax with T.38 -Termination

NOTE: Results will be provided in a revision of the present document.

## 7.2 Results for Fax with Analogue Termination

### 7.2.1 Scenario F\_VGW\_VGW

NOTE: Results will be provided in a revision of the present document.

#### 7.2.1.1 Low speed fax transmission using T.38 with DSL bandwidth variation and additional traffic on DSL link

If only fax traffic is performed, the transmission is reliable (no problems detected during transmission); FoM is 1 (maximum speed, no errors) at all tests.

If additional voice next to fax traffic is on VGW, problems appear at 128 kbps link speed. Fax traffic is unsuccessful, voice traffic is successful. Voice quality is poor. Average voice quality is 3,3 (calculated with PESQ).

#### 7.2.2 Scenario F\_VGW\_A

F\_VGW\_A tests were made between two faxes connected on analog port of one Voice gateway and one port on media gateway. Voice Gateway and media gateway used SIP protocol for call control.



### 7.2.2.1 Low speed (V.17) fax transmission using T.38 with DSL bandwidth variation and additional traffic on DSL link

Fax transmission is reliable (no problems detected during transmission). Time of fax transmission increases if network delay increases. No additional failures are noticed at high network delay. Greater redundancy does not have major influence on transmission time. FoM is 1 (maximum speed, no errors) at all tests.

### 7.2.2.2 High speed (V.34) fax transmission using G.711 with End-to-end delay variation and Redundancy variation

V.34 fax transmission is not supported at many devices (Linksys SPA2102, Iskratel VGW's, Fritzbox). It is expected this feature will be supported on newer versions of xDSL VGW's. We still search VGW which support V.34.

### 7.2.2.3 Fax transmission using Adaptive JB with End-to-end delay variation and Redundancy variation

V.34 fax transmission is unsuccessful if using adaptive Jitter buffer. For high speed (V.34) modem or fax jitter buffer should be fixed. In Iskratel devices, jitter buffer is always changed at fax or modem recognition from adaptive (lower delay) to fixed. Fax transmission is reliable when using T.38. Time of fax transmission increases if network delay increases.

### 7.2.2.4 Charts for selected Parameters

Tests #37 to 72 and tests 76 to 90 could not be conducted. Test #30 and test #35 did not transmit at all; reasons seems to be the low xDSL rates of 256 kbit/s in both cases.

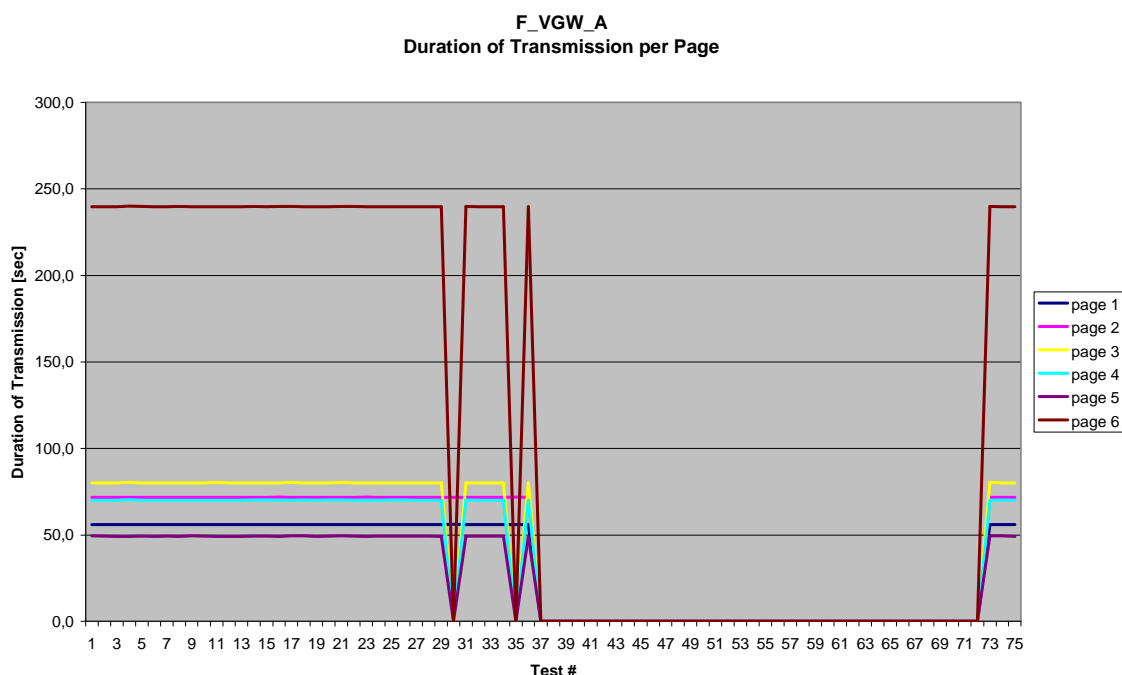
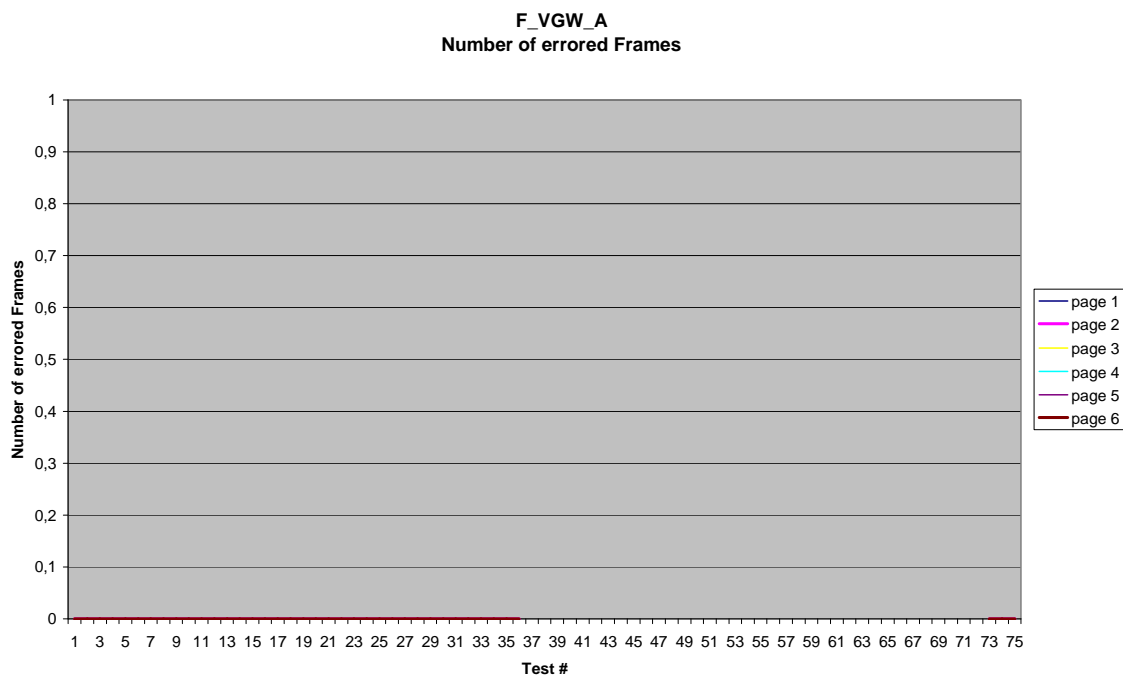
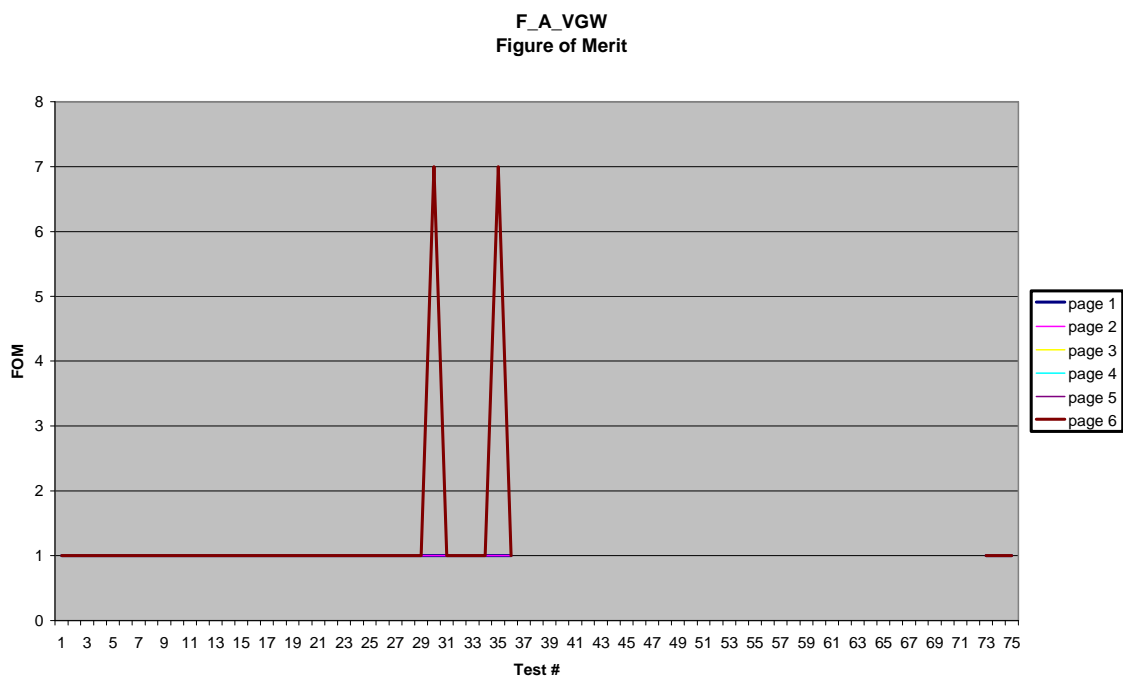


Figure 13: Duration of Transmission per Page



NOTE: All results are zero, therefore, no lines are visible in the figure.

**Figure 14: Number of errored Frames:**



**Figure 15: Figure of Merit**

### 7.2.3 Scenario F\_A\_VGW

F\_A\_VGW tests were made between two faxes connected on analog port of one Voice gateway and one port on media gateway. Voice Gateway and media gateway used SIP protocol for call control.

### 7.2.3.1 Low speed fax transmission using T.38 with DSL bandwidth variation and additional traffic on DSL link

Fax transmission is reliable (no problems detected during transmission). Time of fax transmission increases if network delay increases. No additional failures are noticed at high network delay. Greater redundancy does not have major influence on transmission time. FoM is 1 (maximum speed, no errors) at all tests.

### 7.2.3.2 High speed fax transmission using G.711 with End-to-end delay variation and Redundancy variation

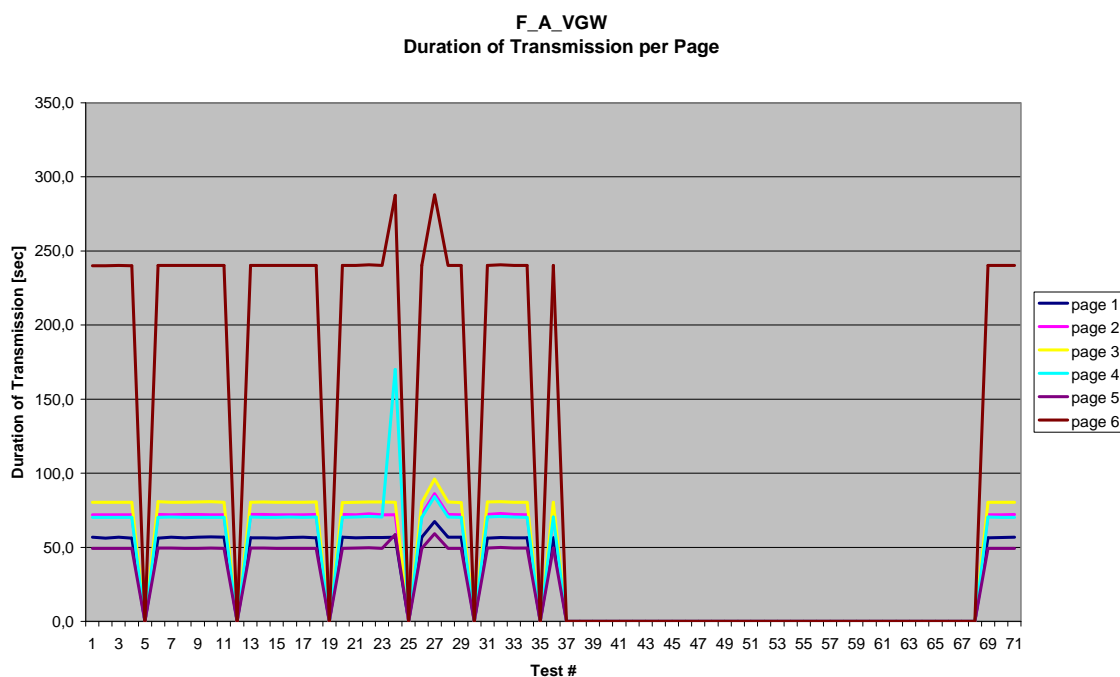
V.34 fax transmission is not supported at many devices (Linksys SPA2102, Iskratel VGW's, Fritzbox). It is expected this feature will be supported on newer versions of xDSL VGW's. We still search VGW which support V.34.

### 7.2.3.3 Fax transmission using Adaptive JB with End-to-end delay variation and Redundancy variation

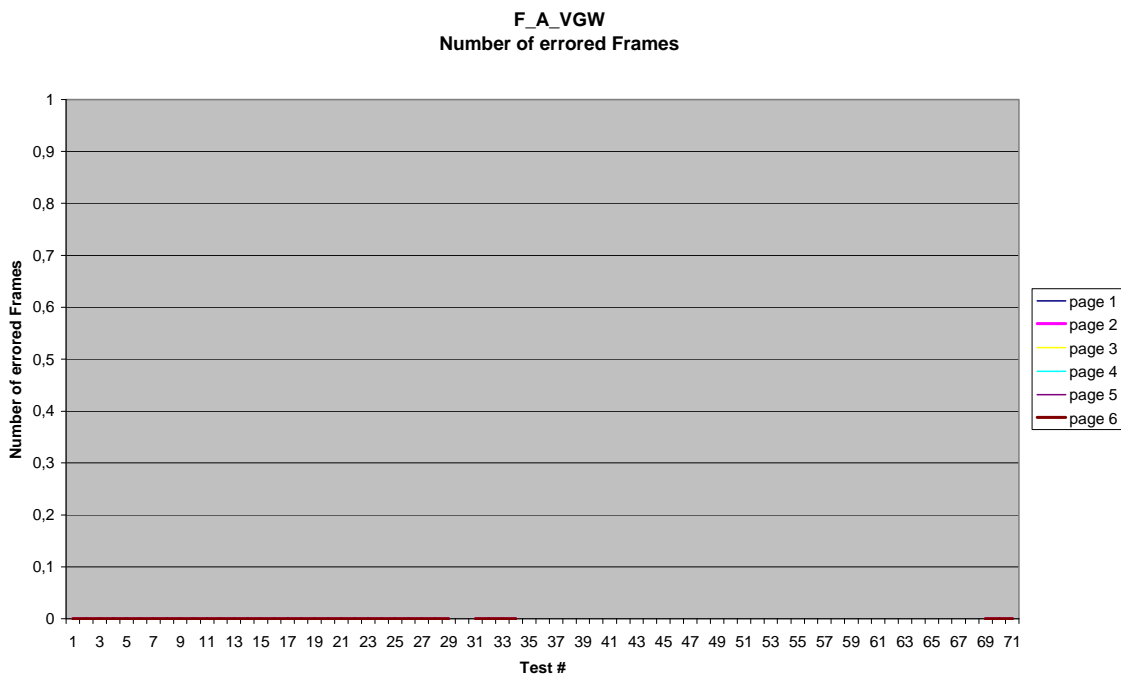
V.34 fax transmission is unsuccessful if using adaptive Jitter buffer. For high speed modem or fax jitter buffer should be fixed. In Iskratel devices is jitter buffer always changed at fax or modem recognition from adaptive (lower delay) to fixed. Fax transmission is reliable when using T.38. Time of fax transmission increases if network delay increases.

### 7.2.3.4 Charts for selected Parameters

Tests #20, 35, 37 to 72 and 76 to 90 could not be conducted. Tests #5, 12, 19 and 25 did not transmit at all; reasons seems to be the low xDSL rates of 128 kbit/s in three cases.

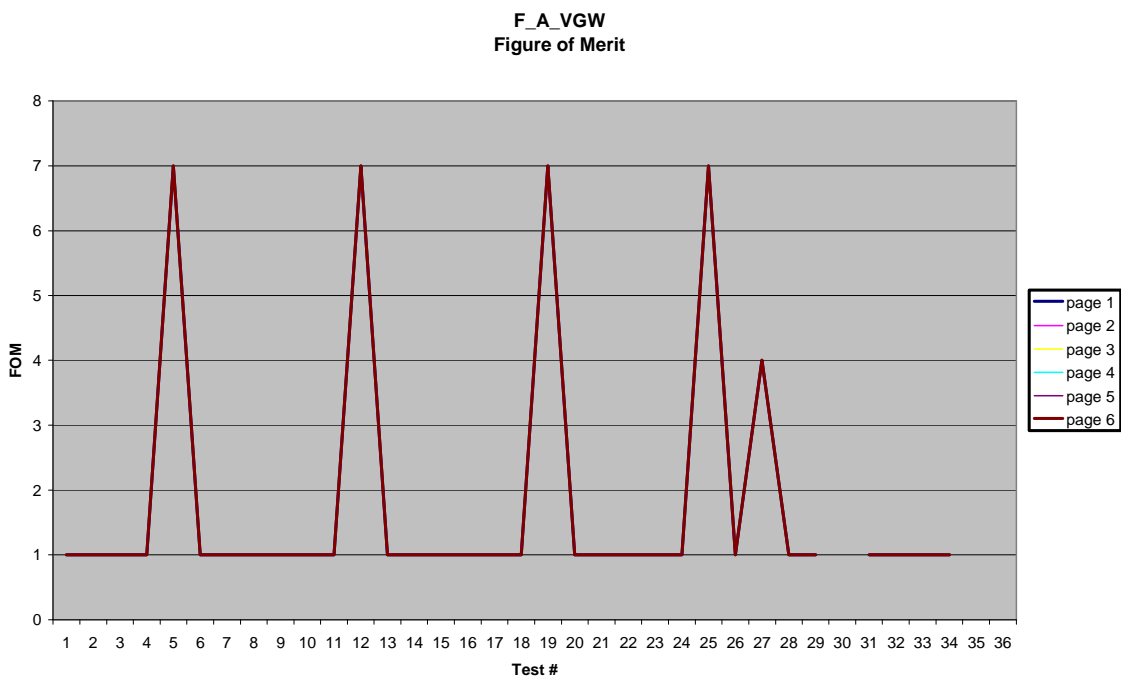


**Figure 16: Duration of Transmission per Page**



NOTE: All results are zero, therefore, no lines are visible in the figure.

**Figure 17: Number of errored Frames**



**Figure 18: Figure of Merit**

### 7.2.4 Scenario F\_A\_A

F\_A\_A tests were made between two faxes connected on analog ports of two media gateways. Media gateways used SIP and MGCP protocol for call control.

#### 7.2.4.1 Low speed fax transmission using T.38 with End-to-end delay variation and Redundancy variation

Fax transmission is reliable (no problems detected during transmission); Time of fax transmission increases if network delay increases; No additional failures are noticed at high network delay; Greater redundancy does not have major influence on transmission time. FoM is 1 (maximum speed, no errors) at all tests.

#### 7.2.4.2 High speed fax transmission using G711 with End-to-end delay variation and Redundancy variation

V.34 fax transmission is not supported at many devices (Linksys SPA2102, Iskratel VGW's, Fritzbox...); On Ipto TDM gateways is V.34 supported as modem data transfer. Sometimes is V.34 additionally detected as fax and speed lowered to V.17 and transferred using T.38. Fax transmission is not so reliable as at transfer using T.38. Fax speed varies from 14,4 kbps to 33,6 kbps. Time of fax transmission increases if network delay increases. Redundancy parameter should be additionally investigated because fax transmission is worse at high redundancy parameters (parameter in DSP to which we do not have influence).

#### 7.2.4.3 Fax transmission using Adaptive JB with End-to-end delay variation and Redundancy variation

V.34 fax transmission is unsuccessful if using adaptive Jitter buffer. For high speed modem or fax jitter buffer should be fixed. In Iskratel devices is jitter buffer always changed at fax or modem recognition from adaptive (lower delay) to fixed. Fax transmission is reliable when using T.38; Time of fax transmission increases if network delay increases.

#### 7.2.4.4 Charts for selected Parameters

Test #42 could not be conducted. Tests #36 trough #41, #44 and #48 did not transmit at all; they all were G.711 transmission attempts using V.34@33,6 kbit/s.

F\_A\_A  
Duration of Transmission per Page

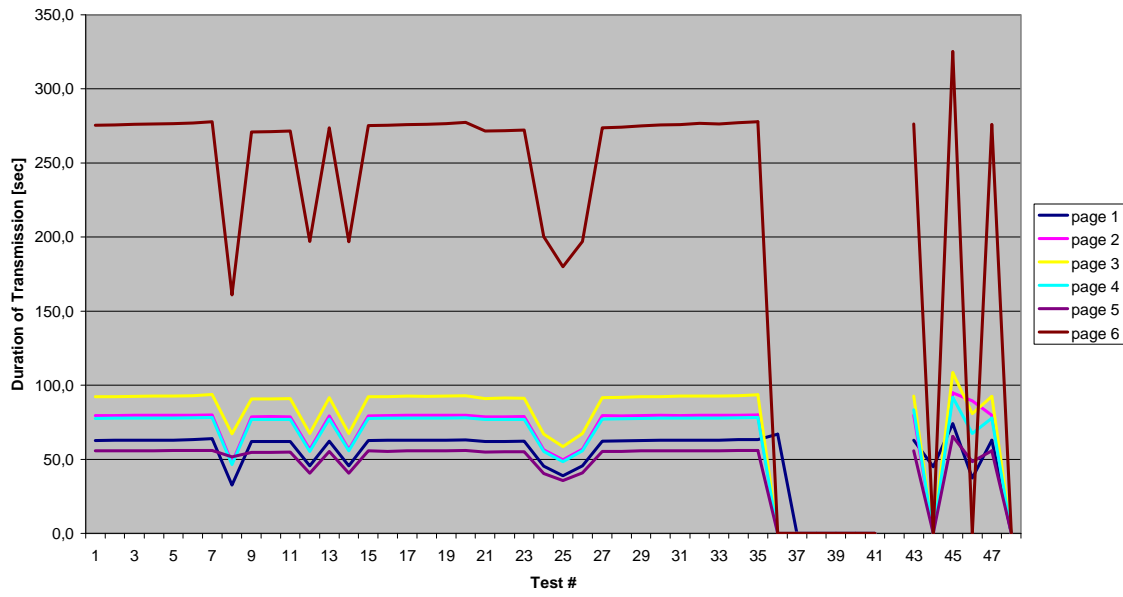


Figure 19: Duration of Transmission per Page

F\_A\_A  
Number of errored Frames

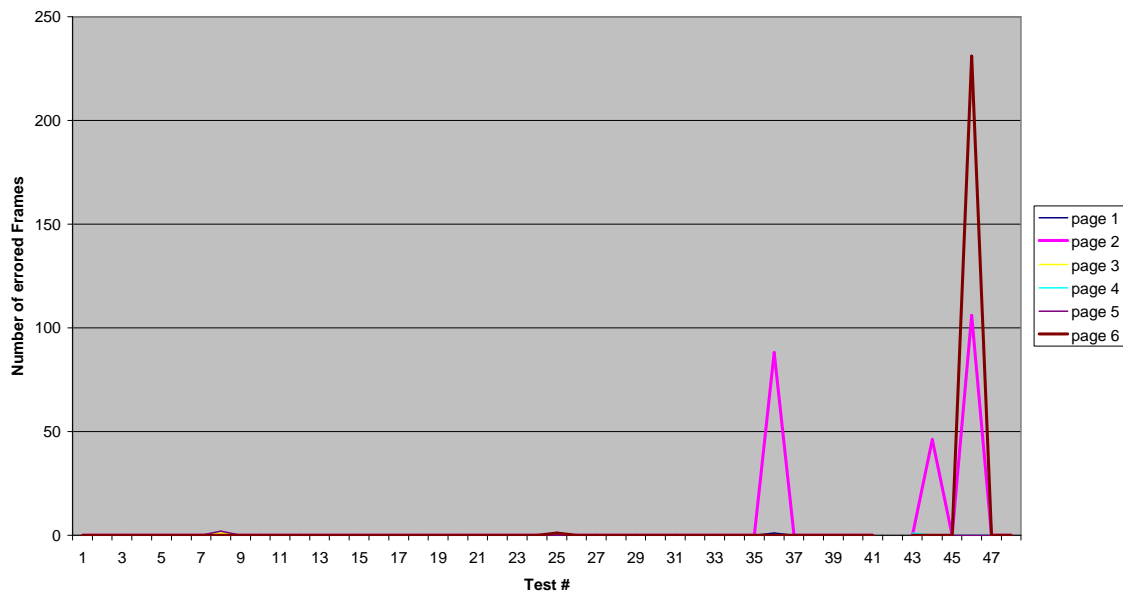


Figure 20: Number of errored Frames

F\_A\_A  
Figure of Merit

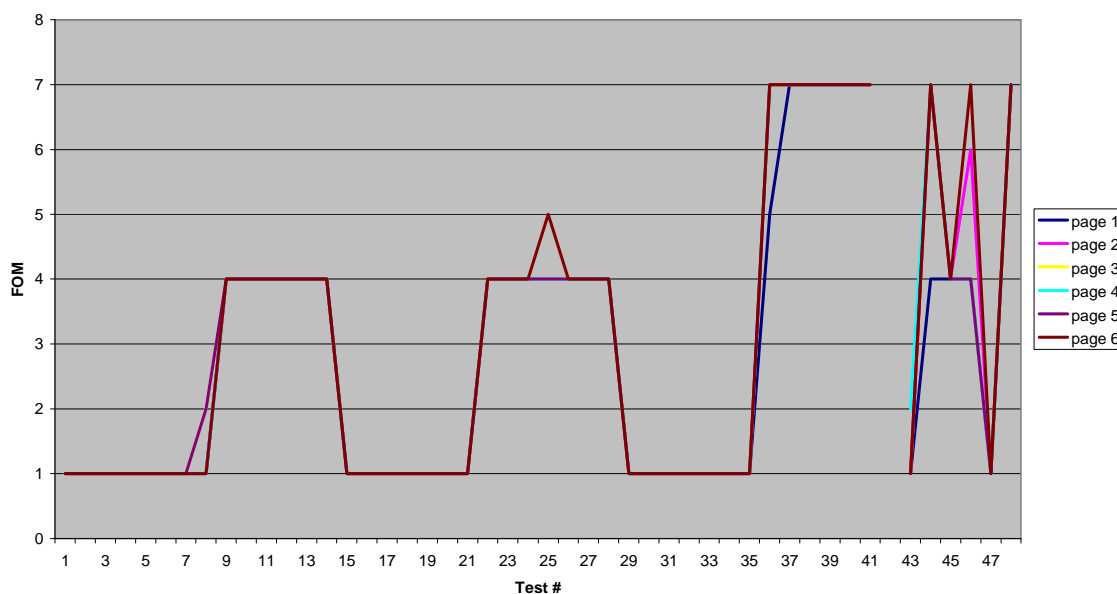


Figure 21: Figure of Merit

## 7.3 Results for Modem with Analogue Termination

No measurement of roundtrip delay is available for test cases with low speed modems. V.18 text modems are explicitly excluded from this project.

### 7.3.1 Scenario M\_VGW\_VGW

Tests M\_VGW\_VGW were delayed due to time problems.

#### 7.3.1.1 Analog modem V.32bis with DSL bandwidth variation and additional traffic on DSL link

Tests were made with Iskratel VGW where V.32bis at 14,4 kbps was possible. Modem connections were successful (also file transfer) at all DSL link speeds. Problems with voice and modem transmission appeared at all tests at 256/256 kbps link speed. Modem did not connect until voice traffic was performed. Test with V.90 between two analog ports cannot be made (one digital port should be used). Any modem connection with V.22bis with 2,4 kbps speed was not successful.

### 7.3.2 Scenario M\_VGW\_A

M\_VGW\_A tests were made between two analog modems connected on analog port of one Voice gateway and one port on media gateway. Voice Gateway and media gateway used SIP protocol for call control.

#### 7.3.2.1 Analog modem V.32bis with End-to-end delay variation

Any of tested VGW (Linksys SPA2102 and Iskratel VGW) or gateway did not support V.32bis with 14,4 kbps speed. Any connection was not successful. If speed was lower (9,6 kbps) modems connected successfully.

#### 7.3.2.2 Analog modem V.90 at with End-to-end delay variation

Any of tested VGW (Linksys SPA2102 and Iskratel VGW) did not support V.90 protocol. Any connection was not successful. We have had problems for many years with V.90 modems on VGW over DSL. Our chipset supplier has no intention to fix this.

Test with V.22bis modems were not performed till now.

### 7.3.3 Scenario M\_A\_VGW

M\_A\_VGW tests were made between two analog modems connected on analog port of one Voice gateway and one port on media gateway. Voice Gateway and media gateway used SIP protocol for call control.

#### 7.3.3.1 Analog modem V.32bis with End-to-end delay variation

Any of tested VGW (Linksys SPA2102 and Iskratel VGW) or gateway did not support V.32bis with 14,4 kbps speed. Any connection was not successful. If speed was lower (9,6 kbps) modems connected successfully.

#### 7.3.3.2 Analog modem V.90 at with End-to-end delay variation

Any of tested VGW (Linksys SPA2102 and Iskratel VGW) did not support V.90 protocol. Any connection was not successful. We have had problems for many years with V.90 modems on VGW over DSL. Our chipset supplier has no intention to fix this.

Test with V.22bis modems were not performed till now.

### 7.3.4 Scenario M\_A\_A

M\_A\_A tests were made between two analog modems connected on analog ports of two media gateways. Media gateways used SIP and MGCP protocol for call control.

#### 7.3.4.1 Analog modem V.32bis with End-to-end delay variation

Time of file transmission does not increase if network delay increases. Most reliable was V.32bis at 14,4 kbps; Modem connectivity transmission at this speed is reliable till 400 ms end-to-end core delay. At that delay problems with transmission of file was noticed.

#### 7.3.4.2 Analog modem V.90 at with End-to-end delay variation

There were problems with V.90 modems. Typical problems were lower connection speed, unsuccessful data transfer, and not repeatable results. Iskratel has Jitter buffer setting 60ms for data modem. If JB is higher results are worst. In any test for this STF V.90 modems did not connect with speed highest than 40 kbps in downstream (they should connect with 54 kbps in downstream) and 28,8 in upstream (they should connect with 31,2 kbps or 33,6 kbps).

---

## 8 Feedback from Discussions with the STF392 Steering Group and with Stakeholders

### 8.1 Predictions for tests not conducted based on the results achieved

This is for further study; however further test results are expected to be provide for a revision of the present document in the near future.

### 8.2 Additional Scenarios in the focus of stakeholders

After the project was launched, stakeholder identified new fields of interest in the context of FoIP and MoIP. Such options may lead to a revision of the present document.

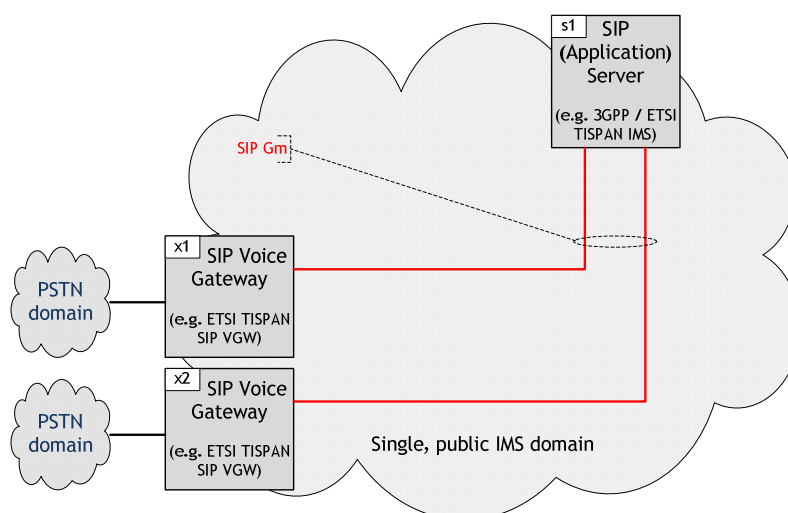


## Annex A: Use cases

In the following clauses the test scenarios which could potentially be used for testing the QoS of fax and modem connections are described.

### A.1 Scenario #1 - IMS-based PES scenario, intra-IMS call between two SIP gateways

The problem may be studied at the simplest network scenario of a pure IMS, single domain configuration. Figure A.1 illustrates the example of a single network domain, here with just IMS-based PES gateways (x1, x2). The outlined problem should be firstly solved for the simple case of such intra-IMS calls before looking at interconnection scenarios of multiple domains or private-to-public configurations.



**Figure A.1: IMS-based PES scenario, intra-IMS call between two SIP gateways**

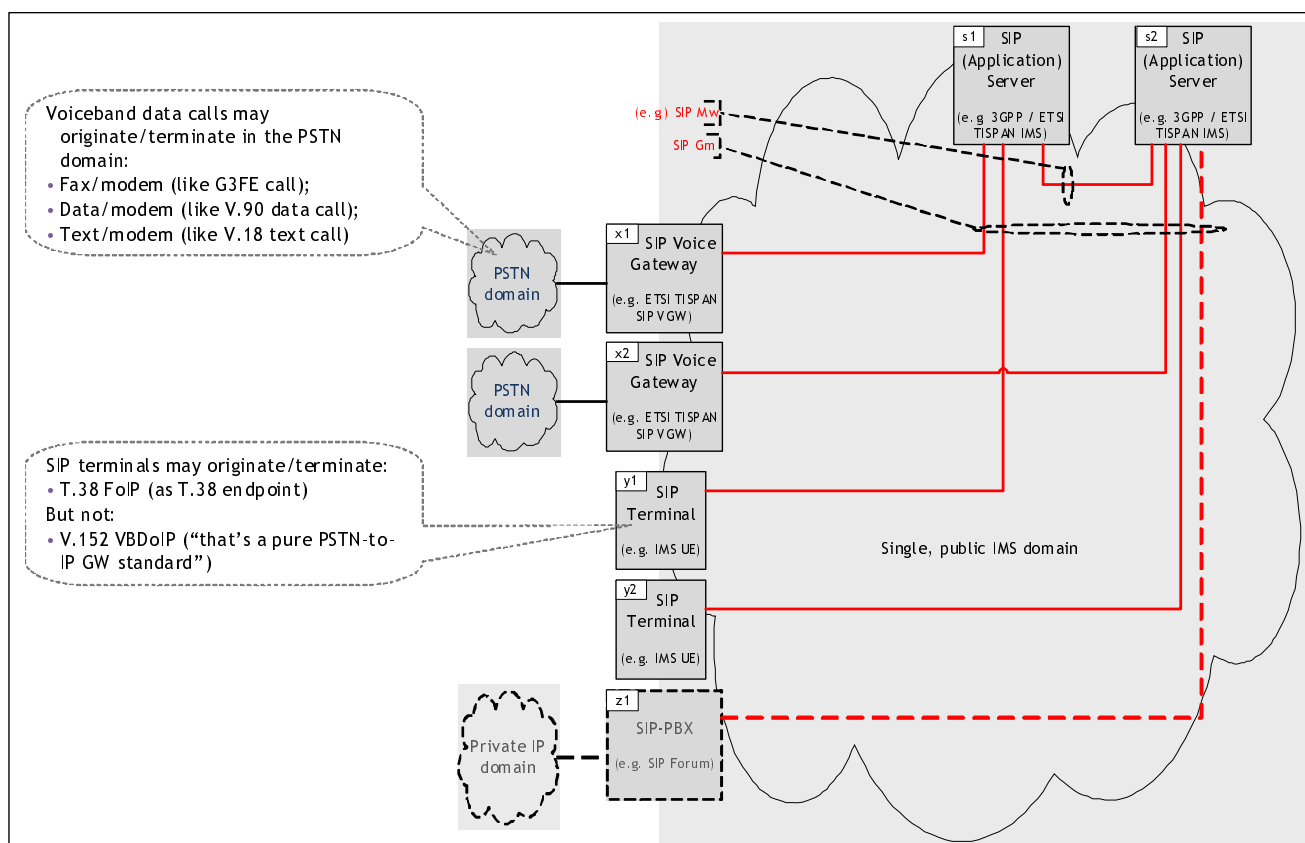
"Codec negotiation" (= indication & negotiation of media & bearer configurations) in IP network:

- just SIP/SDP at Gm.

### A.2 IMS & IMS-based PES scenarios, general intra-IMS call

#### A.2.1 Scenario #2.1 - IMS & IMS-based PES scenario, general intra-IMS call

Figure A.2 provides additional IMS equipment: e.g. because a T.38 fax call may origin/terminate in IP terminals directly. The peering to private IP networks via a SIP PBX (z1) is also indicated (but not discussed by this contribution).



**Figure A.2: Mix of SIP VGWs (IMS-based PES) & SIP UEs (IMS)**

A PSTN (access) domain is interconnected via SIP VGWs to the IMS domain in IMS-based PES solutions. PSTN modem calls originate/terminate in that PSTN domains (e.g. a SIP signalling session from x1 to x2 via s1 and s2). However, such a call may also terminate in an IMS UE (or even originate) if that IP terminal provides correspondent capabilities for handling modem-based VBD services (e.g. a SIP session from x1 to y2 via s1 and s2).

"Codec negotiation" (= indication & negotiation of media & bearer configurations) in IP network:

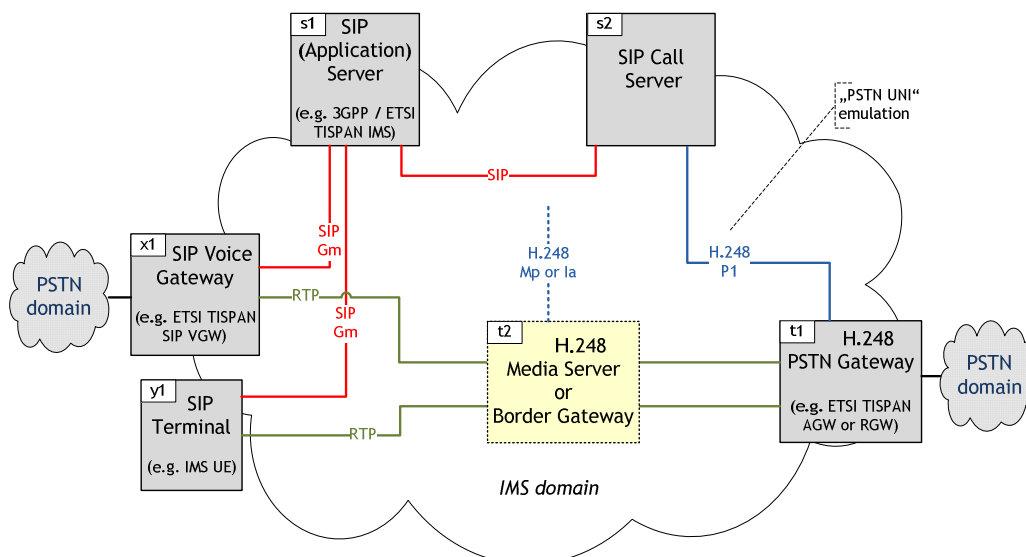
- other IMS SIP/SDP interfaces besides Gm.

## A.2.2 Scenario #2.2 - IMS & IMS-based PES scenario, intra-IMS call, unsuccessful negotiation

Figure A.3 depicts the case of possible unsuccessful negotiations (due to SCL limitations) between x1, y1 and t1.

Example: call between y1 (Offerer) and x1 (Answerer).

- device y1 provides ITU-T Recommendation T.38 [i.6] IAF capability, but of course not any support for ITU-T Recommendation V.152 [i.2] and non-V.152 VBD (due to IP terminal type)  
=>  $SCL_{y1} = \{ \text{VoIP audio codecs: } a_1, \dots, a_n \mid \text{FoIP: T.38/UDPTL} \mid \text{VBDolP: -} \}$
- SIP VGW x1 (or ITU-T Recommendation H.248 [i.7] RAGW t1) does not support ITU-T Recommendation T.38 [i.6], but ITU-T Recommendation V.152 [i.2] only  
=>  $SCL_{x1} = \{ \text{VoIP audio codecs: } a_1, \dots, a_m \mid \text{FoIP: -} \mid \text{VBDolP: ITU-T Recommendation V.152 [i.2] PCMA, ITU-T Recommendation V.152 [i.2] PCMU} \}$
- conclusion:  $NCL_{y1-x1}$  empty ( $SCL_{y1} \cap SCL_{x1}$ ) for PSTN modem emulation traffic.



**Figure A.3: IMS & IMS-based PES to PSTN UNI (intra-IMS call) - Unsuccessful E2E negotiations demand for an e.g. media server**

Possible solution:

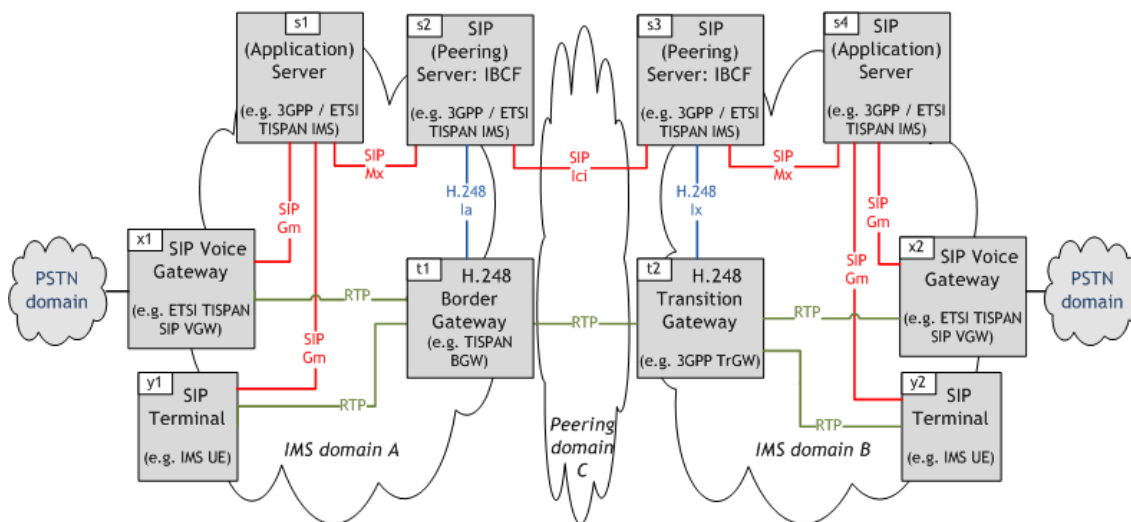
Option 1: IP media-path routed via (Mp-controlled) media server.

Option 2: IP media-path routed via (Ia-controlled) border gateway:

- media-aware mode with V.152-to-T.38 interworking (according Draft ITU-T V.IP2IP-VxF);
- NAPT-less mode in order to keep the single routing domain (of the single IMS provider domain).

### A.3 Scenario #3 - Inter-IMS call between two provider domains (IMS peering)

ITU-T Recommendation H.248 [i.7] border gateways (here: t1 and t2) are positioned in the IP media-path (bearer-path) when peering IMS provider domains (see Figure A.4). The codec negotiation via SDP Offer/Answer is subject of the Ici interface between providers. E.g. there could be an "end-to-end" negotiation via SIP between the SIP gateways x1 and x2.



**Figure A.4: Inter-IMS call between two provider domains**

"Codec negotiation" (= indication & negotiation of media & bearer configurations) in IP network:

- additional IMS SIP/SDP interfaces (here Ici);
- additional policy control (gateway control) interfaces for ITU-T Recommendation H.248 [i.7] based policy enforcement: here ITU-T Recommendation H.248 [i.7] Ia profile(s) for ETSI border gateway/routers and ITU-T Recommendation H.248 [i.7] Ix profile for 3GPP border gateway/routers (called Transition Gateway (TrGW)).

## A.4 Scenario #4 - IMS-PSTN UNI call

ITU-T Recommendation H.248 [i.7] residential or access gateways (RGW; AGW) may be located in the bearer-path between an IMS and PSTN domain (Figure A.4). The gateway location relates to PSTN UNI.

"Codec negotiation" (= indication & negotiation of media & bearer configurations) in IP network:

- IMS SIP/SDP interfaces.
- ITU-T Recommendation H.248 [i.7] RAGW profile (at P1) for ETSI RAGWs.

### A.4.1 Scenario #4bis - IMS-based PES to PSTN UNI (single IMS provider)

Figure A.5 illustrates a mix of scenario #1 and #4, under the condition that the IMS domain is operated by a single provider (thus, intra-IMS call scenario).

The capabilities (media, transport) of the media plane devices x1, y1 and t1 should allow the successful negotiation of end-to-end emulation services for PSTN modem calls. The supported capabilities may be abstracted by the concept of *Supported Codec Lists* (SCL; i.e. here  $SCL_{x1}$ ,  $SCL_{y1}$  and  $SCL_{t1}$ ). Successful negotiation means that the final *Negotiated Codec List* (NCL) provides at least one media configuration for PSTN modem call traffic.

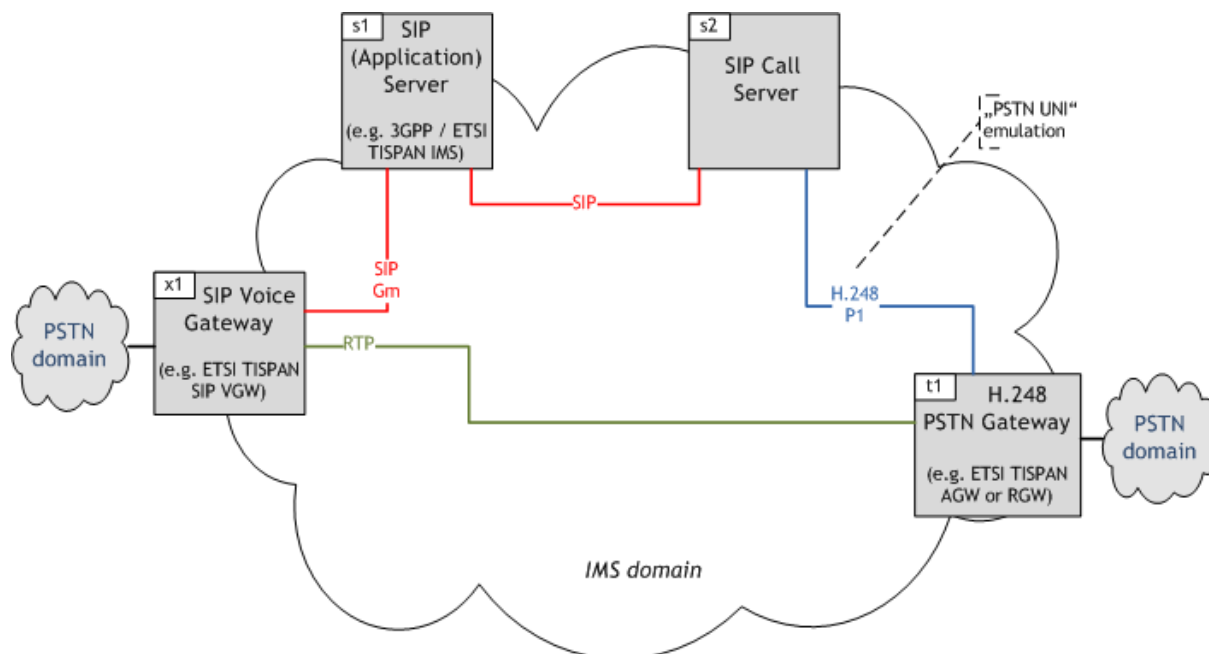


Figure A.5: IMS-based PES to PSTN UNI (intra-IMS call) - Successful negotiations possible

## A.5 Scenario #5 - IMS-PSTN NNI call

ITU-T Recommendation H.248 [i.7] trunking gateways (TGW) may be located in the bearer-path between an IMS and PSTN domain (Figure A.6). The gateway location relates to PSTN NNI.

"Codec negotiation" (= indication & negotiation of media & bearer configurations) in IP network:

- IMS SIP/SDP interfaces.
- H.248 TGW profile (at Mn).

## A.6 Scenario #6 - IMS-PSTN (general)

Figure A.6 provides a summary of the PSTN UNI & NNI interworking scenarios (#4 and #5). It may be reminded again that there are slightly different objectives concerning the termination of a PSTN modem call in a 3GPP user equipment versus TISPAN scenarios.

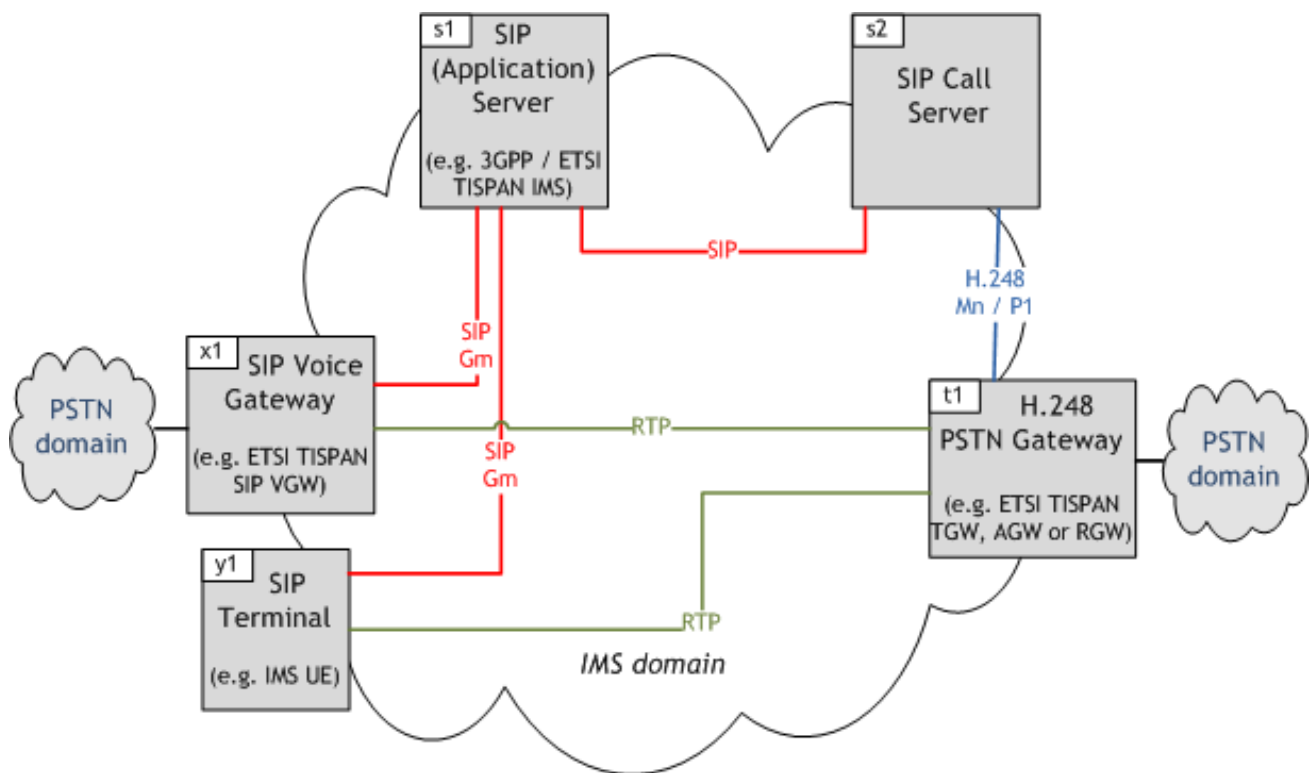


Figure A.6: Two use cases - (a) IMS-PSTN UNI call (= H.248 RAGW profile at P1);  
(b) IMS-PSTN NNI call (= H.248 TGW profile at Mn)

## A.7 Scenario #7 - PES-IMS call between two provider domains

ITU-T Recommendation H.248 [i.7] border gateways (here: t1 ) may ("not mandatory") positioned in the IP media-path (bearer-path) when connecting an IMS and PES network (see Figure 19). This scenario is not adding new aspects with regards to PSTN modem calls.

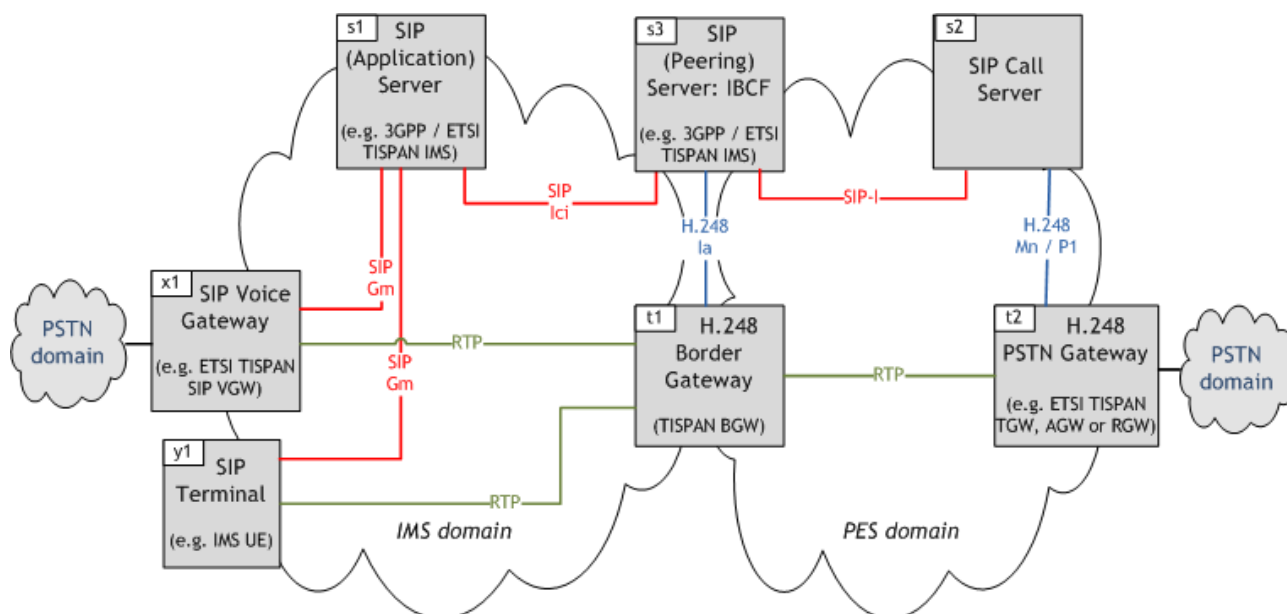


Figure A.7: PES-IMS call between two provider domains

## A.8 Scenario #8 - PES only

Figure A.8 illustrates a PES only configuration. There is not any native SIP/SDP interface here. This scenario is hence out of scope of SDP Offer/Answer procedures.

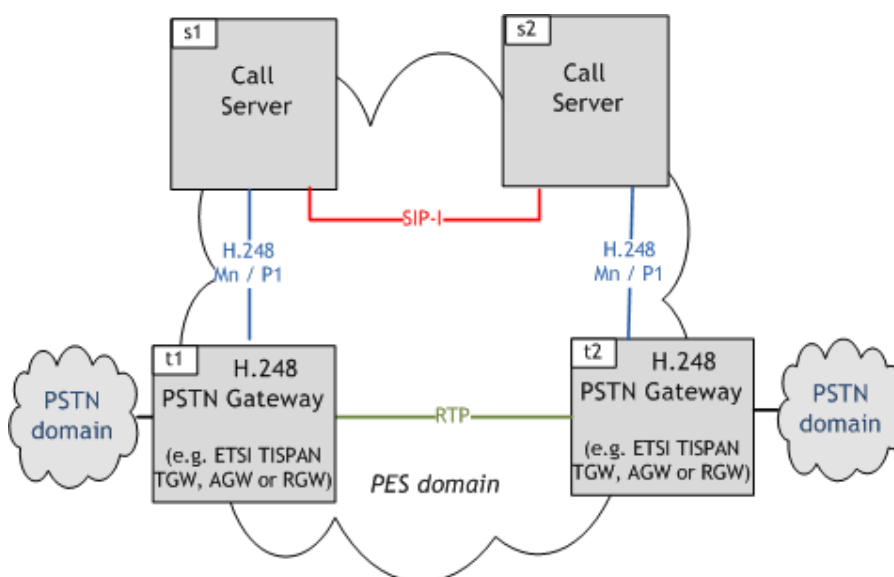


Figure A.8: PES-only call, single domain

## A.9 Scenario #9 - IMS-based PES scenario with AGCF between two AGCF gateways

Figure 21 illustrates a PES only configuration. There is not any native SIP/SDP interface here. This scenario is thus out of scope of SDP Offer/Answer procedures.

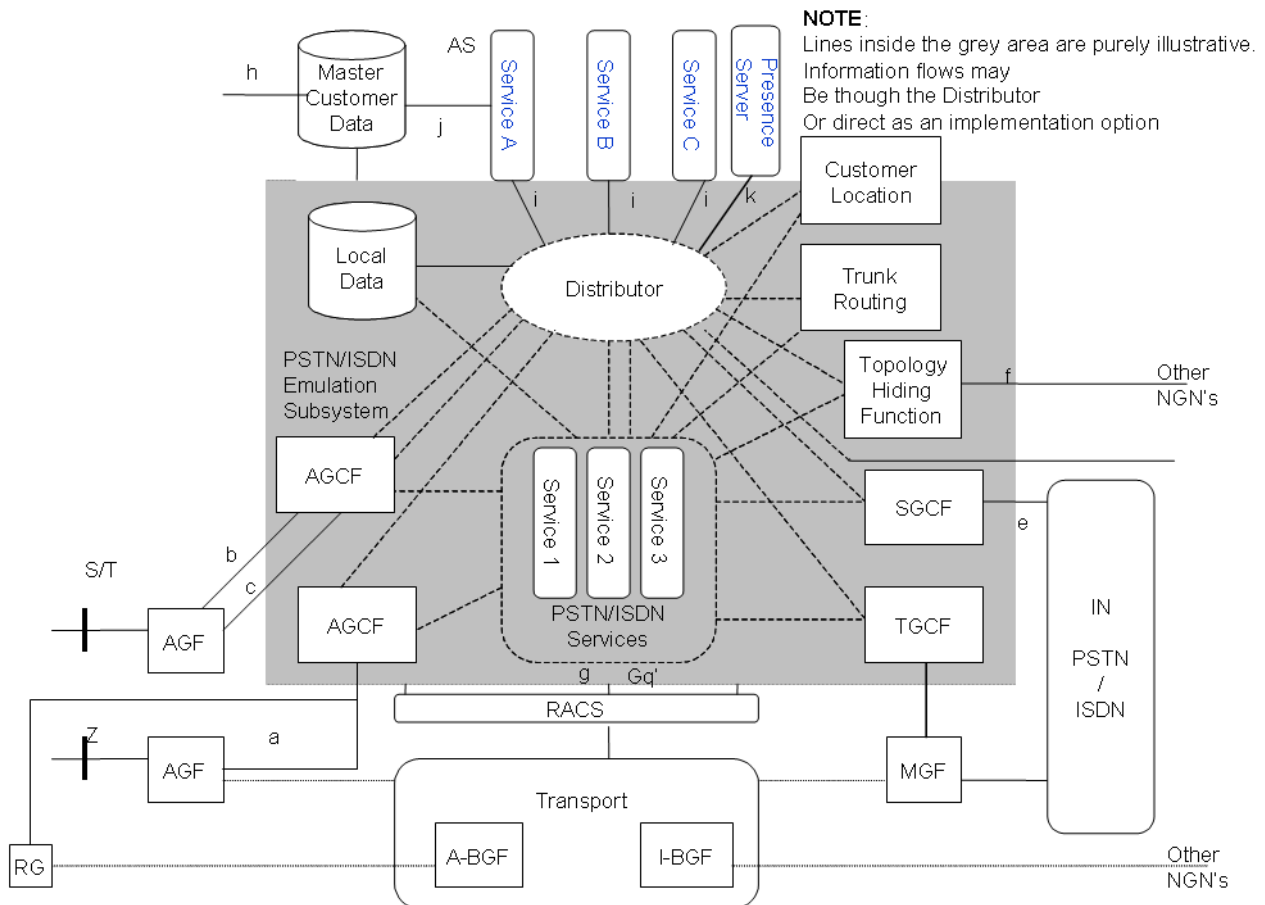


Figure A.9: IMS-based PES scenario with AGCF

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## Annex B: Bibliography

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## History

<b>Document history</b>		
V1.1.1	May 2011	Publication