ITU-D

- Workshop at NGN Lab Instrumentation; Protocols: SIP

- Workshop at NGN LabProtocols: H.248

- Workshop at NGN Lab interoperability aspects. SIP-ISUP SIP –I (ITU-T Rec. Q.1912.5 Profile C)

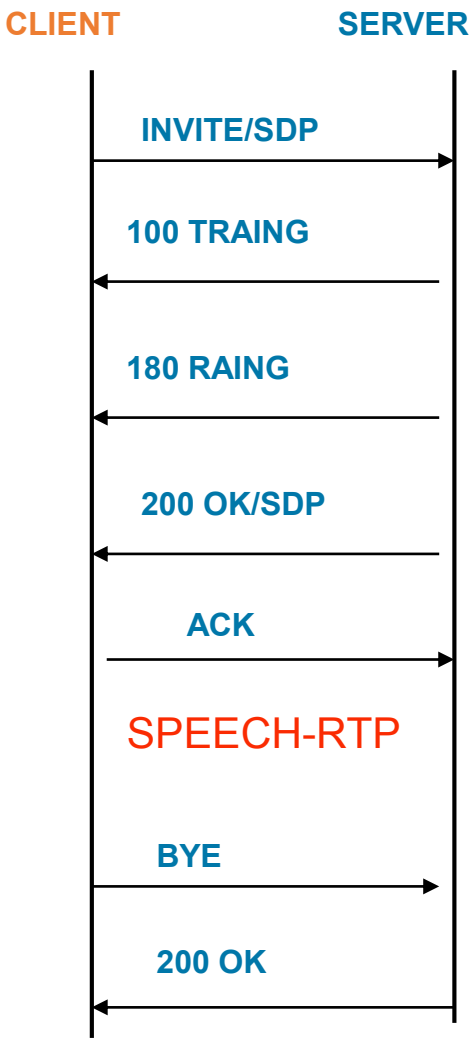
- Workshop at NGN Lab Voice Quality (PESQ ITU-T Rec. P.862)

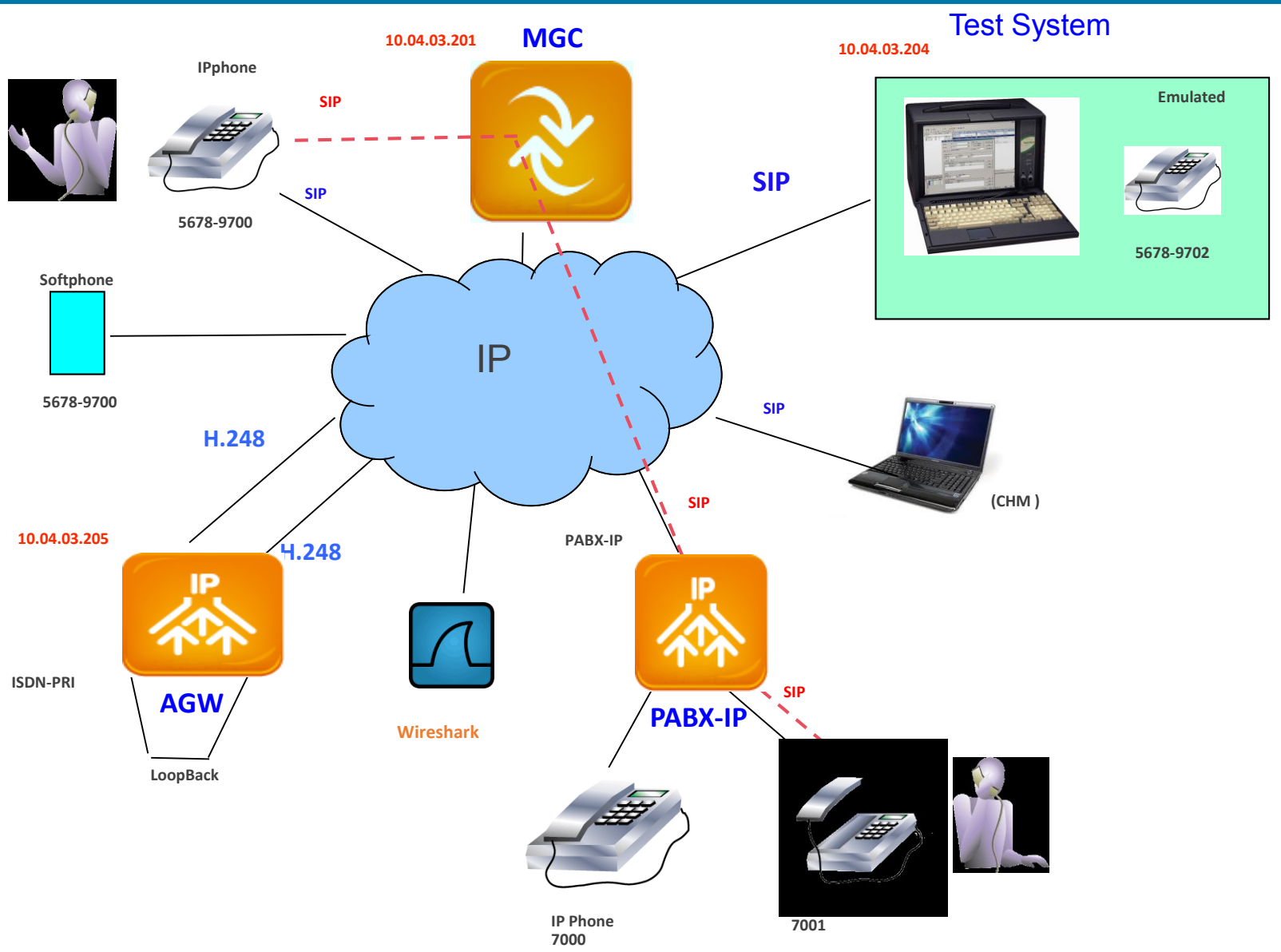
Tests will be run in two groups

- NGN network tests
- Tests with test equipment

NGN network tests

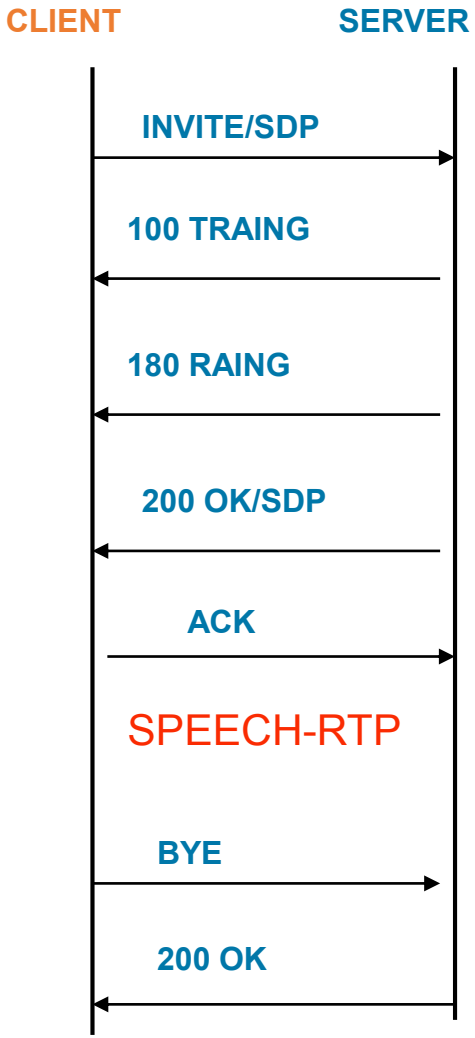
- NGN network call SIP protocol – Success Case
  - Subscriber A originates call
  - Subscriber B originates call
- NGN network call SIP protocol – Failure Case
  - Release: busy
  - Release: congested




Test System
10.04.03.201
MGC
10.04.03.204
IPphone
SIP
SIP
SIP
Emulated
5678-9700
5678-9702
Softphone
IP
5678-9700
SIP
H.248
(CHM)
SIP
10.04.03.205
H.248
PABX-IP
IP
IP
ISDN-PRI
AGW
Wireshark
PABX-IP
SIP
LoopBack
IP Phone
7000
7001

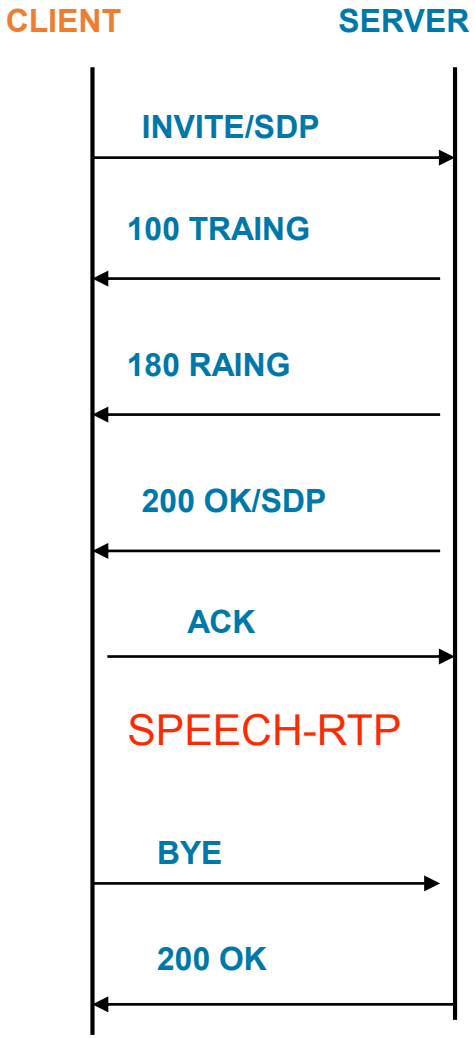
SIP protocol call using the network
Success Case – A originates

TEST-1	SUCCESS CASE Subscriber A originates
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber A originates call (soft phone) • SIP Protocol, using CODEC G.711 • From soft phone to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion, communication, and termination, involving NGN elements and correct codec negotiation	
Expected results: • Success completing call, talking and hanging up when subscriber A originates the call	



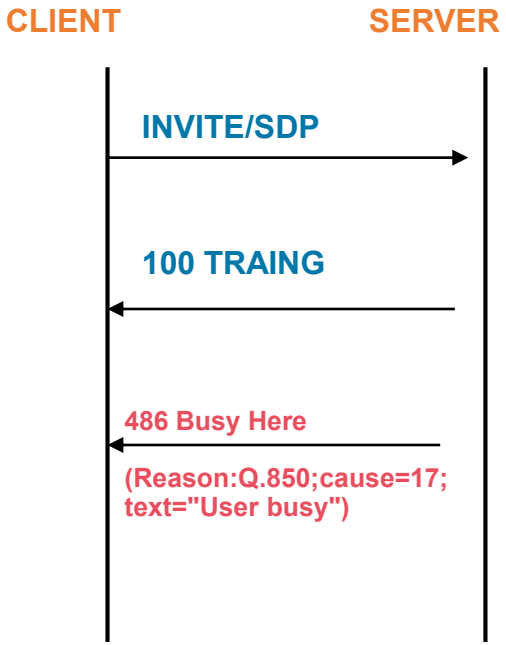
SIP protocol call using the network
Success Case – B originates

TEST-2	SUCCESS CASE Subscriber B originates
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber B originates call • SIP Protocol, using CODEC G.711 • From soft phone to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion, communication, and termination, involving NGN elements and correct codec negotiation	
Expected results: • Success completing call, talking and hanging up when subscriber B originates the call	



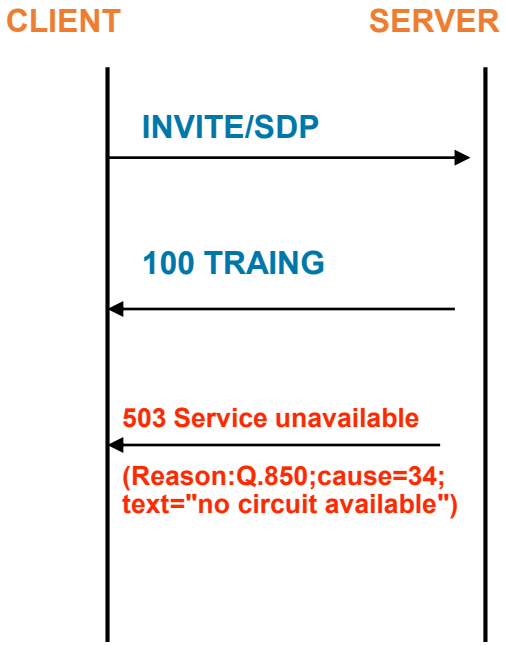
SIP protocol call using the network with Failure Case – B busy

TEST-3	FAILURE CASE B busy
Scope	Verify how system behaves when subscriber number changed
Procedure	• Originate Call to subscriber B, whose number must be busy • SIP protocol, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify if caller receives a busy tone and message 486 Busy Here • Verify correct mapping of referred causes (ITU reference – Q.850) in the respective SIP messages **(Reason:Q.850;cause=17;text="user busy")**	
Expected results on the caller's end: • Busy tone • Message 486 Busy Here	



SIP protocol call using the network with Failure Case – B congested

TEST-4	FAILURE CASE B congested
Scope	Verify how system behaves when receiving subscriber number is non-existent
Procedure	• Originate Call to subscriber B, whose number must be congested • SIP protocol, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Scope	
• Verify how system behaves when interfunctioning • Verify if caller receives an empty number tone and message 503 Service Unavailable • Verify correct mapping of referred causes (ITU reference - Q.850) in the respective SIP messages **(Reason:Q.850;cause=34;text="no circuit available")**	
Expected results on the caller's end: • Empty number tone **(Reason:Q.850;cause=34;text="no circuit available")**	

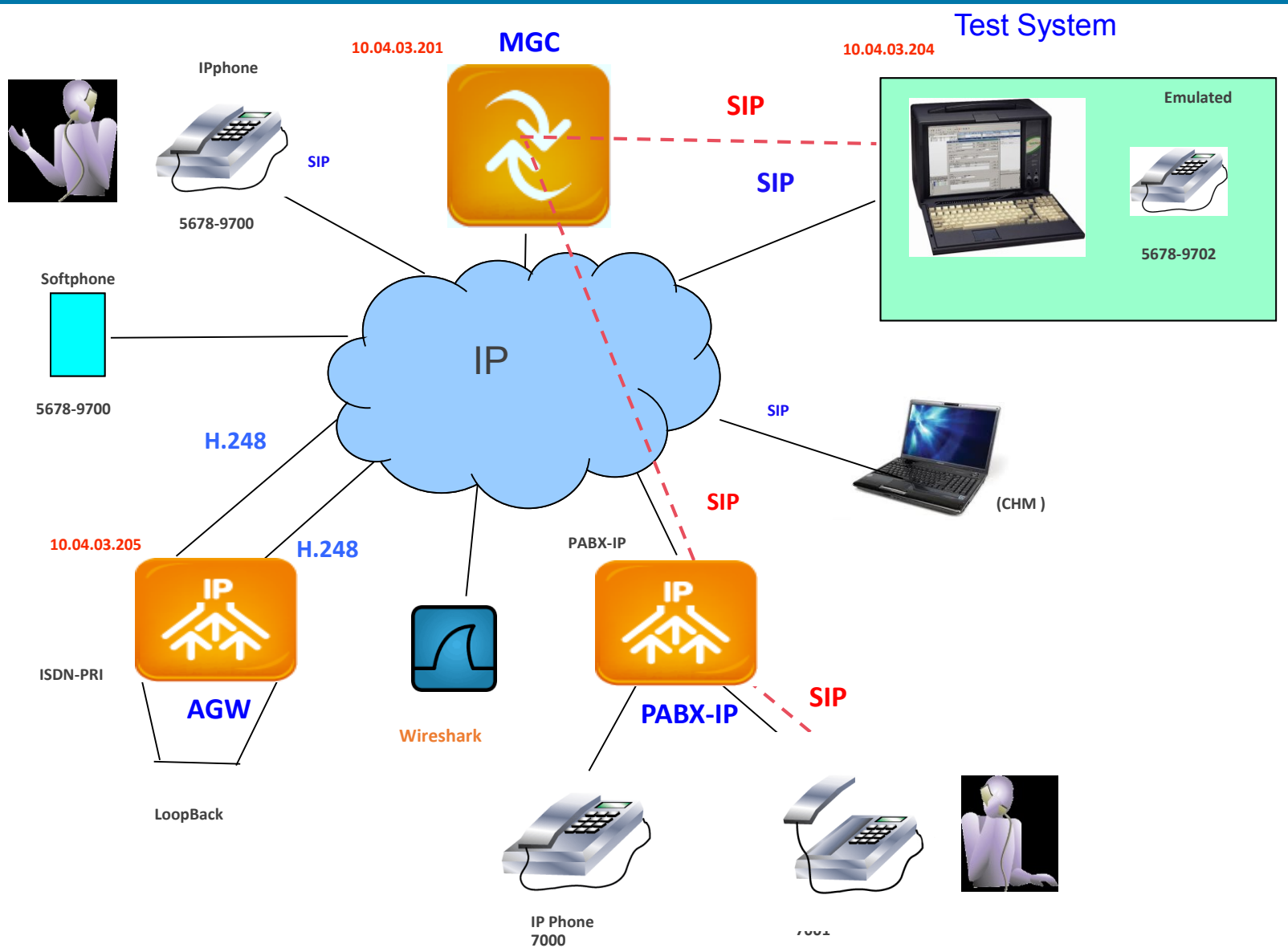


Tests with test equipment

- NGN network call SIP protocol – Success Case
  - Subscriber A originates call
  - Subscriber B originates call

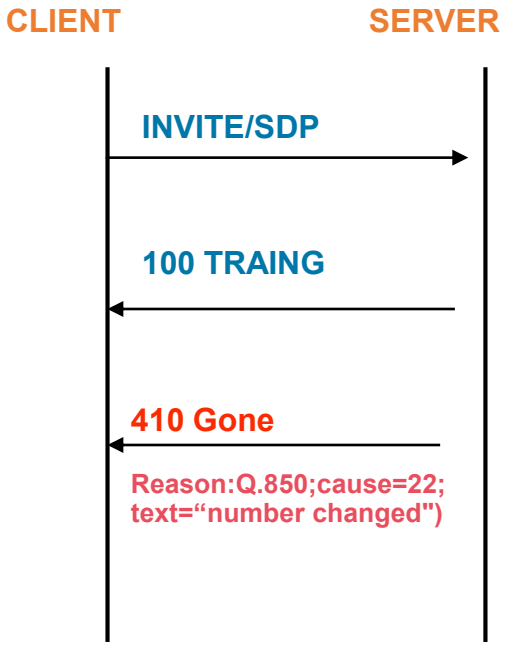
- NGN network call SIP protocol – Failure Case
  - Release: number changed

- Conformance Test ETSI TS 102 027-2 V4.1.1 (2006-07) – Methods for Testing and Specification (MTS); Conformance Test Specification for SIP (IETF RFC 3261);
  - SIP_CC_OE_CE_V_032
  - SIP_CC_OE_CR_V_010
  - SIP_CC_OE_CE_TI_003
  - SIP_MG_TE_V_013


Test System
10.04.03.201
MGC
10.04.03.204
IPphone
SIP
SIP
SIP
Emulated
5678-9700
5678-9702
Softphone
IP
5678-9700
H.248
SIP
(CHM)
SIP
10.04.03.205
H.248
PABX-IP
IP
IP
ISDN-PRI
AGW
Wireshark
PABX-IP
SIP
LoopBack
IP Phone
7000

SIP protocol call, Failure Case – B number changed

TEST-1	FAILURE CASE B number changed
Scope	Verify how system behaves when subscriber fails – 22 number changed
Procedure	Originate Call to subscriber B (number changed) SIP protocol, using CODEC G.711 From test equipment to IP phone Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify if caller receives a busy tone and message 410 Gone • Verify correct mapping of referred causes (ITU reference – Q.850) in the respective SIP messages **(Reason:Q.850;cause=22;text="number changed")**	
Expected results on the caller's end: • Busy tone • Message **410 Gone**	



- **Conformance Test:**

- **TPId: SIP_CC_OE_CR_V_010**

Status: Mandatory

Ref: RFC 3261

Purpose: Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, to give up the call, sends a CANCEL request.

- **Conformance Test:**

- **TPId: SIP_CC_OE_CE_V_032**

Status: Mandatory

Ref: RFC 3261

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Not Found (404 Not Found) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

- **Conformance Test:**

- **TPId: SIP_CC_OE_CE_TI_003**

Status: Mandatory

Ref: RFC 3261

Purpose: If an unreliable transport (UDP) is used, ensure that the IUT, when an INVITE client transaction is in the Calling state having already repeated its INVITE wait for a timer A set with a value of 2*T1 before sending it again.

- **Conformance Test:**

- **TPId: SIP_MG_TE_V_013**

Status: Mandatory

Ref: RFC 3261

Purpose: Ensure that the IUT on receipt of an INVITE request including headers set with short names, sends a Success (200 OK) response preceded optionally by informational (1XX) response.

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- Workshop at NGN LabProtocols: H.248

- Workshop at NGN Lab interoperability aspects. SIP-ISUP SIP –I (ITU-T Rec. Q.1912.5 Profile C)

- Workshop at NGN Lab Voice Quality (PESQ ITU-T Rec. P.862)

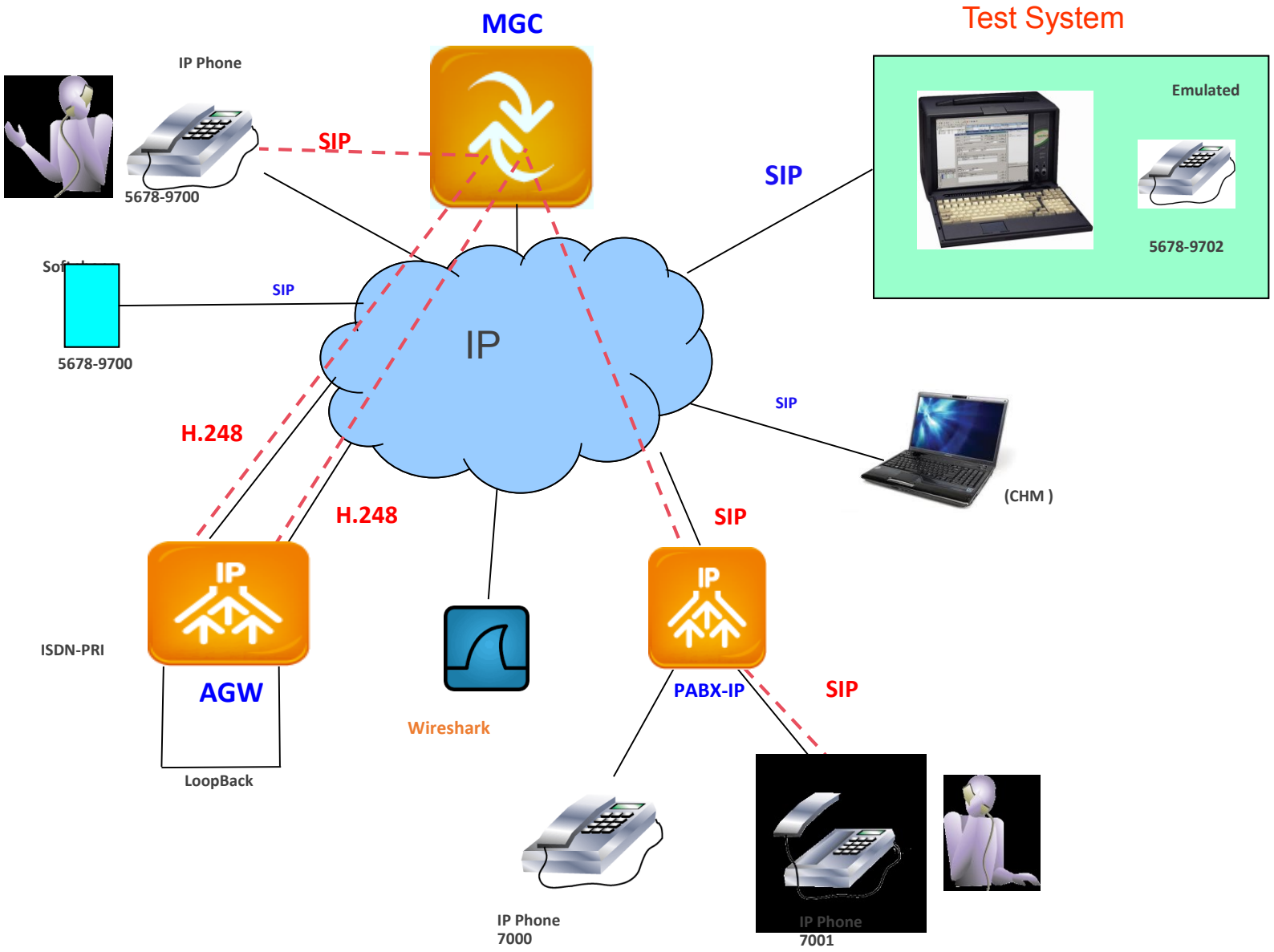
Four kinds of tests will be run:

- MGW alignment
  - Service Change

- NGN network call H.248 protocol – Success Case
  - Subscriber A originates call
  - Subscriber B originates call

- H.248 tests with RTP EVENTE

- NGN network call H.248 protocol – Failure Case
  - Release: busy
  - Release: non-existent


MGC
Test System
IP Phone
SIP
5678-9700
SIP
Emulated
5678-9702
SIP
IP
5678-9700
SIP
H.248
H.248
SIP
SIP
(CHM)
ISDN-PRI
AGW
LoopBack
Wireshark
PABX-IP
SIP
IP Phone
7000
IP Phone
7001

H.248 protocol signaling call Alignment

TEST-1	ALIGNMENT
Scope	Verify system behavior when starting up
Procedure	• Remove board and insert it again to verify how system behaves when starting up • Monitored via wireshark
Objective	
• Verify start up behavior of a new alignment between MGW and MGC, using the Service Change command	
Expected results: • Alignment successful	

H.248 protocol signaling call Success Case – A originates

TEST-2	SUCCESS CASE Subscriber A originates
Scope	Verify how system behaves when subscriber is free
Procedure	• Originate Call from IP phone subscriber • H.248 protocol, using CODEC G.711 • From IP phone to soft phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion, communication, and termination, involving NGN elements and correct codec negotiation.	
Expected results: • Success completing call, talking and hanging up when subscriber A originates the call	

H.248 protocol signaling call Success Case – B originates

TEST-3	SUCCESS CASE Subscriber B originates
Scope	Verify how system behaves when subscriber is free
Procedure	• Originate Call from IP phone subscriber • H.248 protocol, using CODEC G.711 • From IP phone to soft phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion, communication, and termination, involving NGN elements and correct codec negotiation.	
Expected results: • Success completing call, talking and hanging up when subscriber B originates the call	

H.248 protocol signaling call Success Case – DTMF Digits

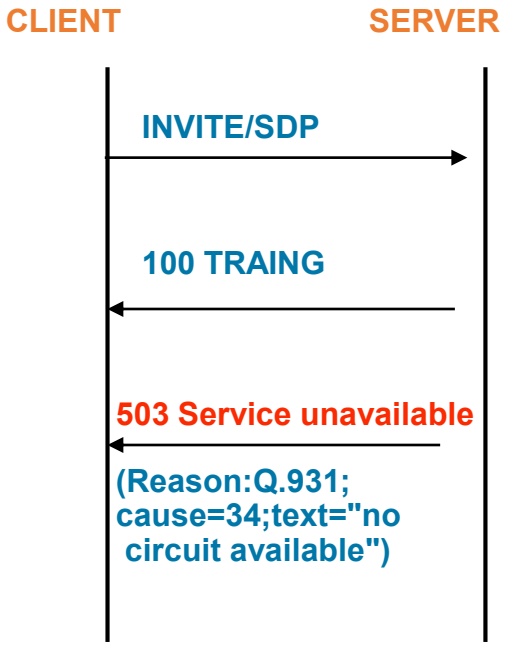
TEST-4	SUCCESS CASE DTMF Digits
Scope	Verify how system behaves when subscriber is free
Procedure	• Originate Call from IP phone subscriber • H.248 protocol, using CODEC G.711 • From IP phone to IP phone • Digits from 0 to 9 shall be input • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion, communication, and termination, involving NGN elements and correct codec negotiation • Verify digits in RTP events	
Expected results: • Success completing call, talking and hanging up when subscriber A originates the call Verify digits in RTP events	

H.248 protocol call
Failure Case – Subscriber B busy

TEST-5	FAILURE CASE Receiver must be busy
Scope	Verify how system behaves when receiving subscriber number is busy.
Procedure	• Originate Call to subscriber B, whose number must be busy • H.248 protocol, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify if caller receives a busy tone and the message Subtract , • Verify correct mapping of referred causes (ITU reference - Q.931) in the respective ISDN messages, cause 17. (Reason:Q.931;cause=17;text="user busy").	
Expected results on the caller's end: • Busy tone • Message CAUSE# 17 User busy	

H.248 protocol call using the network Failure Case – B congested

TEST-6	Failure Case B congested
Scope	Verify how system behaves when receiving subscriber number is non-existent
Procedure	• Originate Call to subscriber B, whose number must be congested • H.248 protocol, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify if caller receives an empty number tone and message 486 Busy Here , • Verify correct mapping of referred causes (ITU reference - Q.931) in the respective release messages **(Reason:Q.931;cause=34;text="no circuit available")**	
Expected results on the caller's end: • Empty number tone **(Reason:Q.931;cause=34;text="no circuit available")**	



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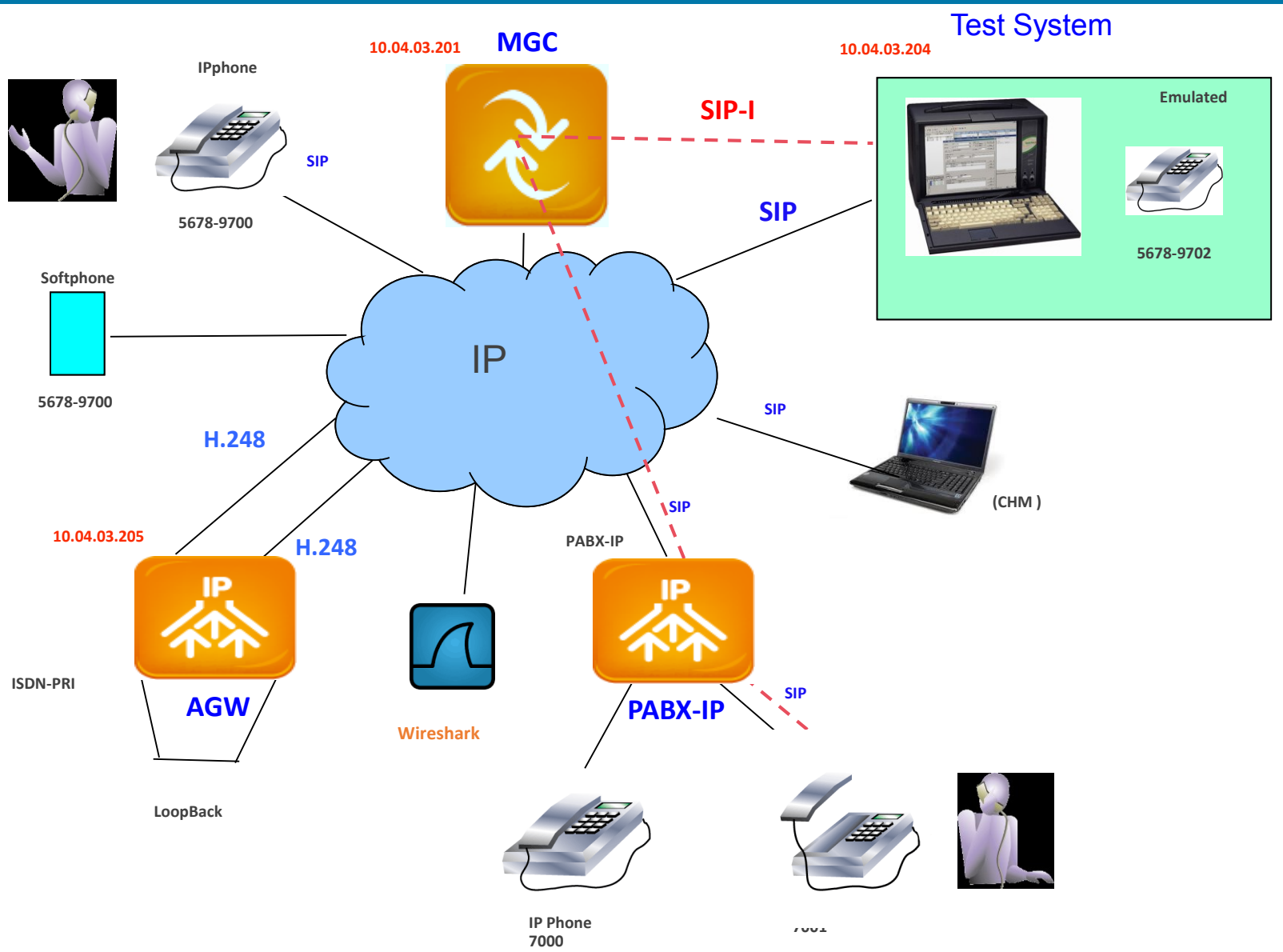
Tests with test equipment

NGN network call SIP-I protocol

- CODEC G.711A success case
  - Subscriber A originates call
  - Subscriber B originates call

- CODEC G.729A success case
  - Subscriber A originates call
  - Subscriber B originates call

- Failure Case
  - Release: busy
  - Release: congested


Test System
10.04.03.201
MGC
10.04.03.204
IPphone
SIP-I
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5678-9702
Softphone
IP
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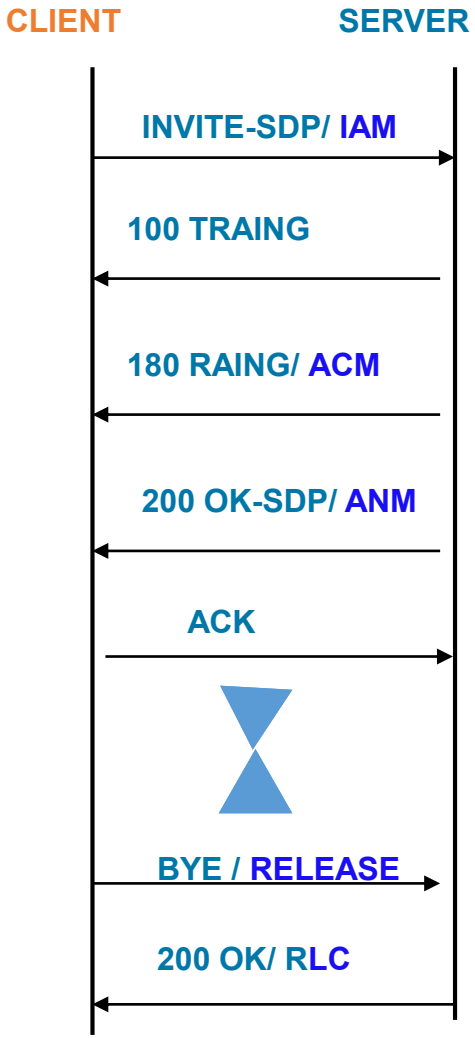
H.248
PABX-IP
IP
IP
ISDN-PRI
SIP
AGW
PABX-IP
Wireshark
LoopBack
IP Phone
7000

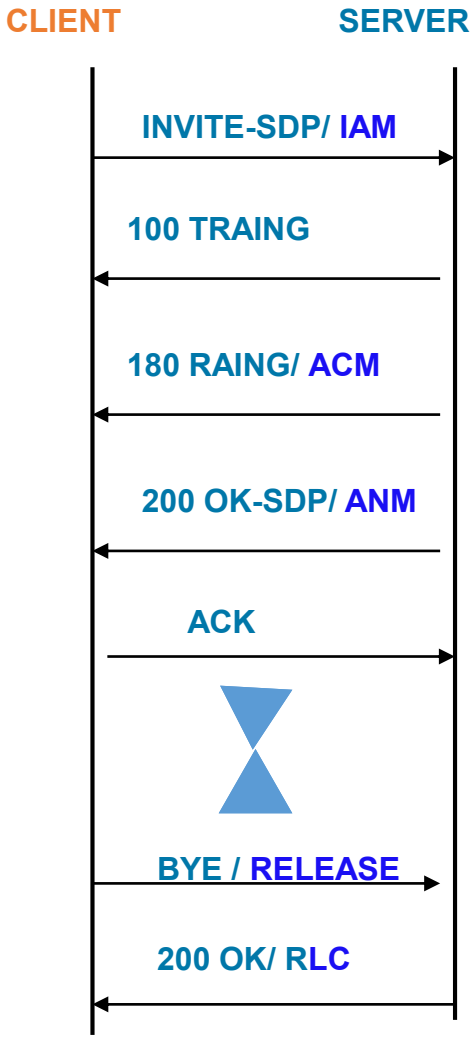
Signaling call SIP-I protocol – Success Case Subscriber A originates CODEC-G.711

TEST-1	SUCCESS CASE From A, CODEC-G.711
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber A originates a call • Protocol SIP-I, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion and termination, involving NGN elements	
Expected results: • Success completing call, correct codec negotiation and termination.	



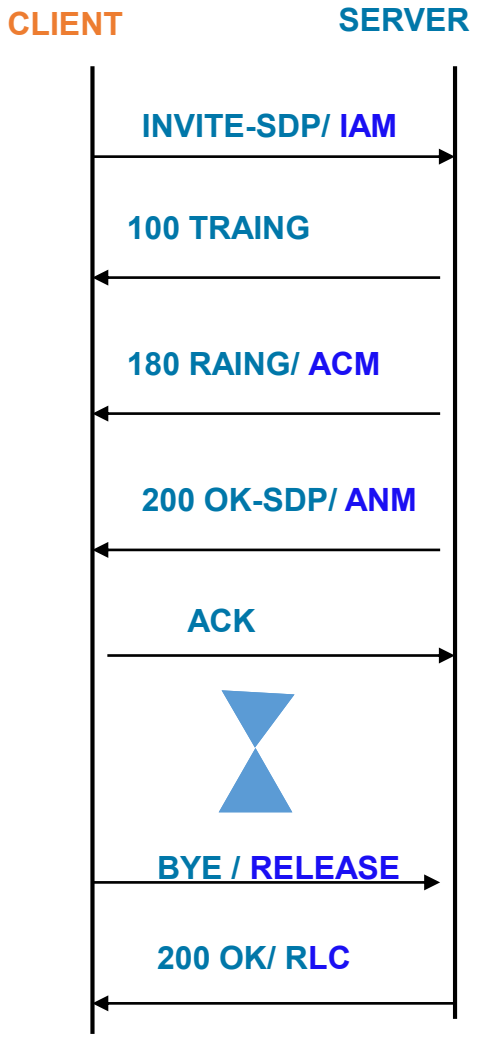
Signaling call SIP-I protocol – Success Case Subscriber B originates CODEC-G.711

TEST-2	SUCCESS CASE From A, CODEC-G.711
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber B originates a call • Protocol SIP-I, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion and termination, involving NGN elements	
Expected results: • Success completing call, correct codec negotiation and termination.	



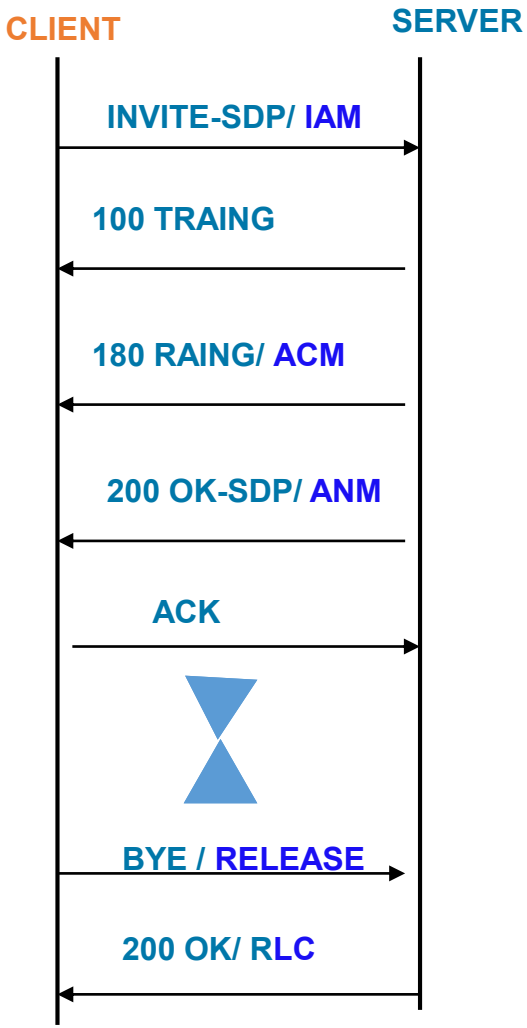
Signaling call SIP-I protocol – Success Case Subscriber A originates CODEC-G.729

TEST-3	SUCCESS CASE From A, CODEC-G.729
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber A originates a call • Protocol SIP-I, using CODEC G.729 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion and termination, involving NGN elements	
Expected results: • Success completing call, correct codec negotiation and termination.	



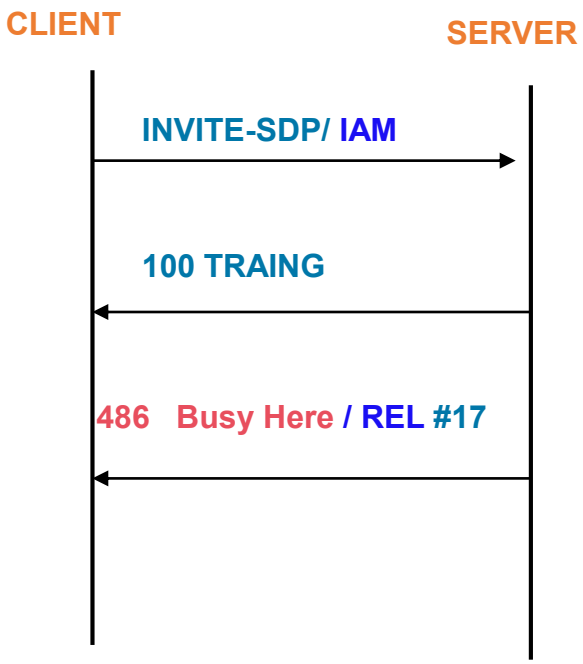
Signaling call SIP-I protocol – Success Case Subscriber B originates CODEC-G.729

TEST-4	SUCCESS CASE From B, CODEC-G.729
Scope	Verify how system behaves when subscriber is free
Procedure	• Subscriber B originates a call • Protocol SIP-I, using CODEC G.729 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify success of call completion and termination, involving NGN elements	
Expected results: • Success completing call, correct codec negotiation and termination.	



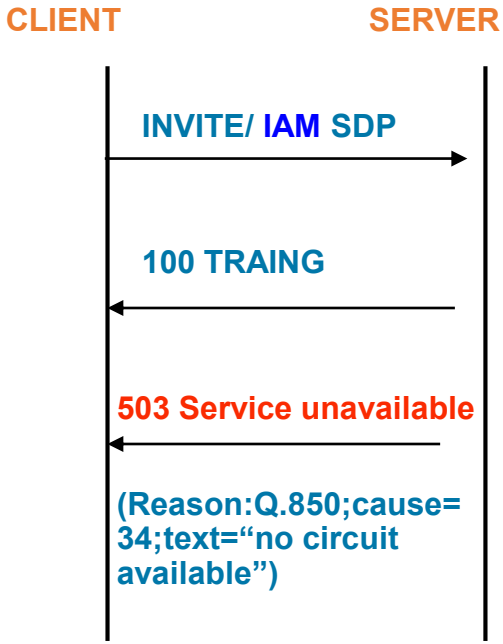
Signaling call SIP-I protocol
Failure Case – B Busy

TEST-5	FAILURE CASE B Busy
Scope	Verify how system behaves when receiving subscriber number is busy.
Procedure	• If making an IP phone call, test equipment must receive it • Protocol SIP-I, using CODEC G.711 • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify message 486 Busy Here • Verify correct mapping of referred causes (ITU reference – Q.850) in the respective SIP messages (Reason: Q.850;cause=17;text="user busy").	
Expected results: • Busy tone • Message 486 Busy Here / REL #17	



SIP-I protocol call
Failure Case – B congested

TEST-6	FAILURE CASE B congested
Scope	Verify how system behaves when receiving subscriber number is non-existent
Procedure:	• Originate call to subscriber B, whose number must be congested • SIP protocol, using CODEC G.711 • From test equipment to IP phone • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify if caller receives an empty number tone and message 486 Busy Here • Verify correct mapping of referred causes (ITU reference – Q.850) in the respective SIP messages **(Reason:Q.850;cause=34;text="no circuit available")**	
Expected results on the caller's end: • Empty number tone **(Reason:Q.850;cause=34;text="no circuit available")**	



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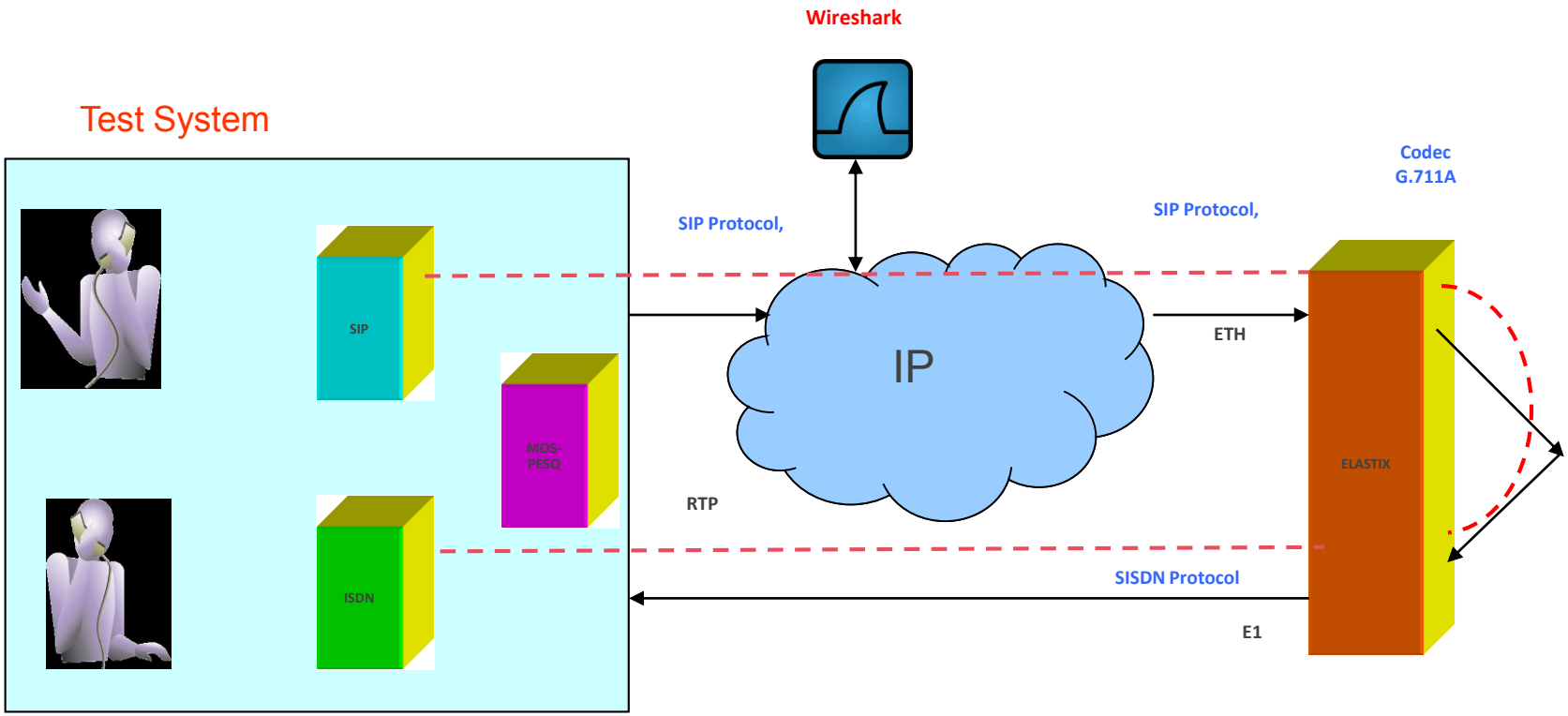
Two test cases will be run:

Case 1: VOICE calls (female and male sentences, SIP-ISDN protocol, using codec **G.711**

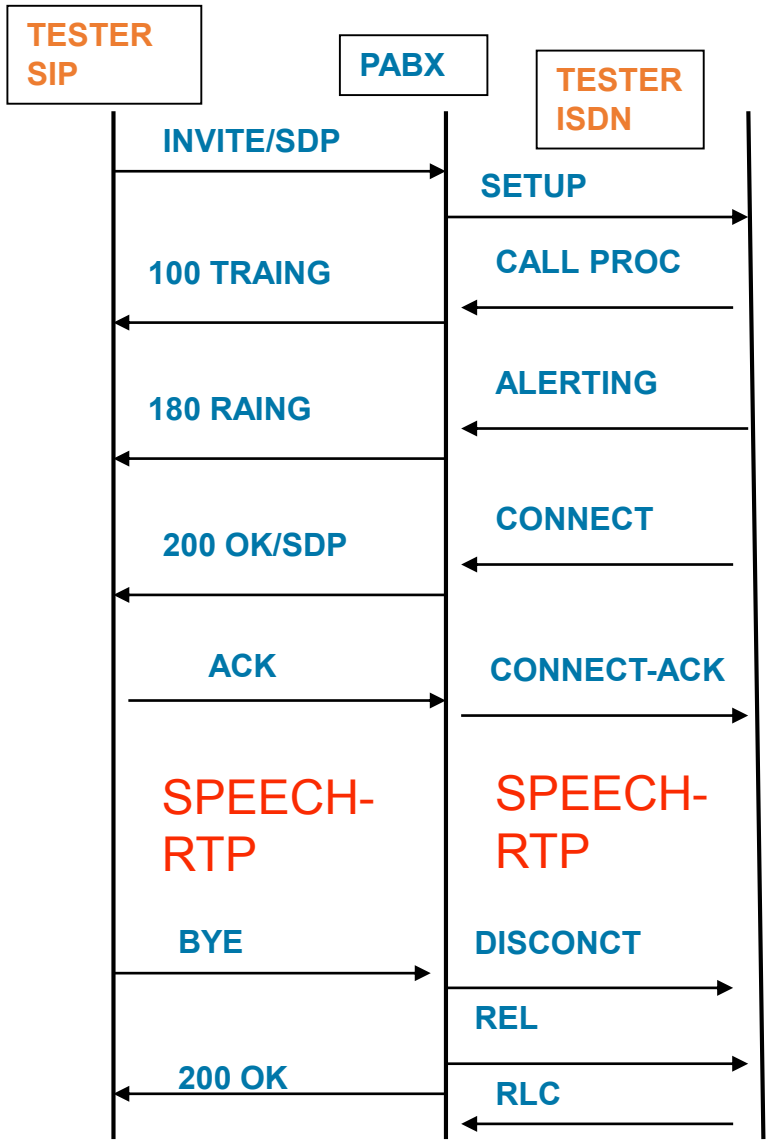
Case 1: VOICE calls (female and male sentences, SIP-ISDN protocol, using codec **G.729**



Perceptual Evaluation of SpeechQuality (PESQ) in standard P.862

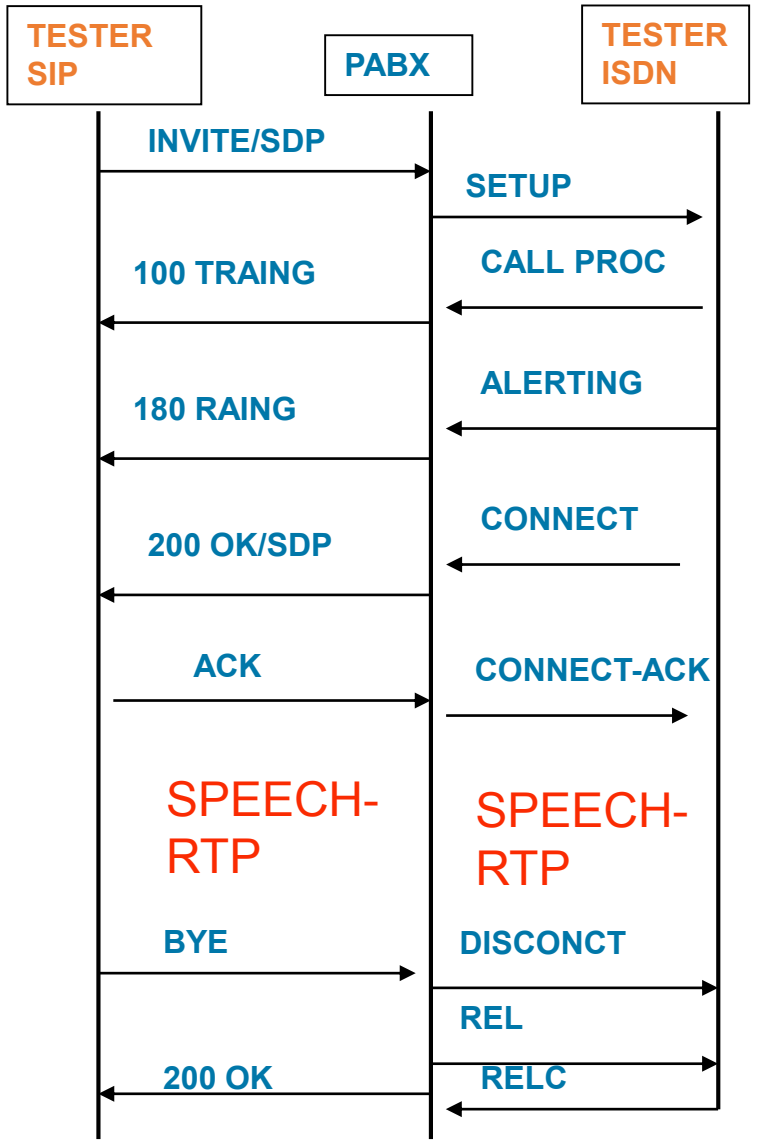
MOS Tests with CODEC G.711

TEST-1	MOS tests with CODEC G.711
Scope	Verify call completion and mos Mos measurements for codec G.711
Procedure	• Simultaneous SIP calls shall be made, originating from test equipment, with male and female sentences, to be received by the IP-PABX • The PABX-IP shall forward the calls to the ISDN route, to be answered by the test equipment • CODEC G.711 • From SIP test equipment, passing through the IP-PABX, to be received by the ISDN test equipment. • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify call completion • Verify results of MOS FROM MOS score • Verify packet loss jitter delay	
Expected Results: • Complete calls (without loss) • Mos SCORE within satisfactory standards	



MOS Tests with CODEC G.729

TEST-2	MOS tests with CODEC G.729
Scope	Verify call completion and mos Mos measurements for codec G.729
Procedure	• Simultaneous SIP calls shall be made, originating from test equipment, with male and female sentences, to be received by the IP-PABX • The PABX-IP shall forward the calls to the ISDN route, to be answered by the test equipment • CODEC G.729 • From SIP test equipment, passing through the IP-PABX, to be received by the ISDN test equipment • Monitored via wireshark
Objective	
• Verify how system behaves when interfunctioning • Verify call completion • Verify results of MOS FROM MOS score • Verify packet loss jitter delay	
Expected Results: • Complete calls (without loss) • Mos SCORE within satisfactory standards	



Thanks!

<<NomeNomeNome>>

<<Área (UA)>>

Converged Networks Corporate Department – DRC

Phone: (+55) 19 3705-XXXX

xxxxxxx@cpqd.com.br

*www.**cpqd**.com.br*