

NGN Interconnect: PSTN Transport Operational Test Manual

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Foreword

This NICC Document (ND) has been produced by NICC TSG Testing Specifications Working Group.

Introduction

This document forms an Operational Testing Manual [OTM] template that can be used by CPs as a basis for part of the testing requirements when interconnecting their Next Generation Network [NGN] to another CPs NGN.

It is one of a series of documents (ND1410-14) which form a complete testing process for NGN PSTN interconnect.

1 Scope

It has been agreed in NICC that CPs must take a responsible approach to testing. This can be achieved by ensuring that CPs who want to interconnect to other CPs follow an appropriate process of testing before that interconnect is put into service.

It is recommended that testing should consist of the following stages:

- Validation (prior to any interconnection) - ND1413 [8] *
- Integration (of model networks) - ND1414 [9] *
 - * Appropriate when an unknown combination of equipment is to be connected
- Operational (of live routes) - ND1410, ND1411 [2] and ND1412 [3]

This OTM should be used at the “operational” stage when interconnecting NGNs prior to “ready for service” or as part of the “ready for service” process.

It contains the minimum testing elements needed to test the physical media transport of an NGN interconnect between CPs, typically a VLAN (where it is to be used for media and signalling transport). It should be read in conjunction with the other OTMs, ND1411 [2] and ND1412 [3] to define a complete set of tests for that interconnect.

It should not be considered to be a complete set of tests that meet any particular CPs exact testing requirement and there may be tests which are unsuitable to particular connection. Consequently, CPs should view this OTM as a template from which their own test requirements should be designed by adding, removing or modifying tests as appropriate provided they are agreed with the other CP.

2 References

For the particular version of a document applicable to this release see [ND1610](#) [1].

2.1 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- | | | |
|-----|--------|--|
| [1] | ND1610 | Next Generation Networks, Release Definition |
| [2] | ND1411 | UK Interconnect - PSTN Signalling Operational Testing Manual |
| [3] | ND1412 | UK Interconnect - PSTN Services Operational Testing Manual |
| [4] | ND1612 | Generic IP Connectivity for PSTN/ISDN Service between UK Next Generation Networks |
| [5] | ND1017 | Interworking between Session Initiation Protocol (SIP) and UK ISDN User Part (UK-ISUP) |
| [6] | ND1613 | Management of NGN Interconnect: Transport Connectivity Layer |
| [7] | ND1701 | Recommended Standard for the UK National Transmission Plan |
| [8] | ND1413 | UK Interconnect - PSTN Validation Testing Manual |
| [9] | ND1414 | UK Interconnect - PSTN Integration Testing Manual |

3 Abbreviations

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

BGW	Border Gateway
CP	Communication Provider
EET	Equipment Engaged Tone
ICMP	Internet Control Message Protocol
NGN	Next generation Network
NICC	Network Interoperability Consultative Committee
OTM	Operational Test Manual
PSTN	Public Switch Telephony Network
RTCP	Real Time Control Protocol
VLAN	Virtual Local Area Network

4 Testing Requirements

4.1 Architecture

Within this document, reference is made to functions and interfaces. These functions and interfaces are described in detail in ND1612 [4]. Reference should be made to “Figure 1: Functional Architecture for PSTN / ISDN Generic Connectivity”.

Where a different architecture is used, test procedure should be adapted as appropriate.

4.2 Methodology

Test results sheets should be retained locally in line with normal document retention guidance.

Where any test does not produce acceptable responses, the reasons should be investigated, a remedy attempted and the test repeated. The number of times the test is repeated and reasons why should be noted.

If the above process does not produce acceptable responses testing officers should follow appropriate escalation procedures to the relevant support groups and commercial teams.

If an immediate resolution can not be found, a time limited waiver should be agreed between the parties to allow the testing to continue, and the interconnect to be placed in service (provided that the issue is not service affecting).

Reference should be made to ND1017 [5] for all tests.

4.3 Tests

All of the following tests should be completed in full.

Test Name		IP Path Connectivity and Alarming			
Test Number		VLAN 01			
Test Purpose		To verify the IP path to ensure BGW connectivity, typically checking for end to end packet delivery, connectivity ICMP ping tests, send and receive checks, trail connectivity tests and disconnect alarm tests. Additionally checking media resilience, path-disconnect and re-route			
Direction of Test		Bothway			
Test Preconditions and Assumptions		The BGWs have been connected to the common transport function and have been configured for service. The common transport function has been configured for service. Correct Optical/electrical signal are on iT4b on the BGWs. Automatic media ping tests/BFD link tests shows "link up" [1 Section 8.2]			
	Test Steps	Expected Results	Pass/Fail A-B	B-A	
1	Where enabled, perform manual ping tests at the media border function device, at least 1000 pings	All pings are successful, with the loss of no pings, sent counter incremented by at least 1000, received counter incremented by at least 1000, errored counter at zero			
2	Record the packets/bytes received, sent, dropped, errored counters on iT4b interfaces on peer media border function device	No packets or bytes lost or errored			
3	Monitor the edge session control function and the media border function to ensure no calls are on the VLAN	No calls on the VLAN, Packet/byte counters are stable			
4	Temporarily disable VLAN at the CP A end	Ensure an indication is raised at the CP B end in line with the timings shown in ND1612 [1] section 8			
5	Perform manual ping tests (if enabled) at the media border function device, at least 1000 pings. (Record the packets/bytes received, sent, dropped, errored counters on iT4b interfaces on peer media border function device.)	All pings are unsuccessful, with the loss of all pings. All packets or bytes lost			
6	Restore VLAN to in service state				
7	Carry out all test step above from the other CP				
Test clean up		Restore VLAN to service			
Conclusion & Observation					
Completed	<input type="checkbox"/>	Tick As Appropriate	Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Completed After Correction	<input type="checkbox"/>		Waiver Reference	<input type="text"/>	
Completed With Waiver	<input type="checkbox"/>		Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Not Completed	<input type="checkbox"/>				
Notes:					

Test Name	Resilience Of The Media Stream				
Test Number	VLAN 02				
Test Purpose	To verify the resilience of the media stream				
Direction of Test	Bothway				
Test Preconditions and Assumptions	Media VLAN able to accept calls				
	Test Steps	Expected Results	Pass/Fail		
			A-B	B-A	
1	Monitor the edge session control function and the media border function to ensure no calls/sessions are on the media VLAN	No calls on the VLAN Packet/byte counters are stable			
2	Set up voice call lasting a minimum of 60 seconds over the VLAN	Confirm there is end to end voice connectivity by speaking over the phone to the other end			
3	Disable VLAN at the CP A end	Confirm that an alarm or indication is raised at the CP B end in line with the timings shown in ND1612 [1] Section 8			
4	Ensure the voice call is terminated appropriately	Monitor the call			
5	Generate subsequent calls across the VLAN	Ensure subsequent calls are handled appropriately			
7	Generate a subsequent voice call across multi-path interconnect (if available) or single path interconnect	Ensure a subsequent voice call is completed for multi-path scenarios and EET is returned for single path			
8	Restore VLAN to service				
9	Carry out all test steps above from the other end				
Test clean up	Restore all VLANs to service				
Conclusion & Observation					
Completed	<input type="checkbox"/>	Tick As Appropriate	Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Completed After Correction	<input type="checkbox"/>		Waiver Reference	<input type="text"/>	
Completed With Waiver	<input type="checkbox"/>		Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Not Completed	<input type="checkbox"/>				
Notes:					
				Details Below	

Test Name	Bandwidth Management Function				
Test Number	VLAN 03				
Test Purpose	Verify Bandwidth Management Functionality – to limit the number of simultaneous calls				
Direction of Test	Bothway				
Test Preconditions and Assumptions	This test is valid only after the call testing in test 03 has been completed. Check for correct configuration of the bandwidth management function.				
	Test Steps	Expected Results	Pass/Fail		
			A-B	B-A	
1	Confirm that the bandwidth available on the VLAN is at the correct level				
2	At CP A, restrict the bandwidth on the media VLAN (using the bandwidth management function) to only allow a small number of ordinary PSTN calls (e.g. 3), allowance should be made for the emergency call bandwidth allocation [1, section 5]	These calls should be left in progress for the duration of this test			
3	Fill the available bandwidth with calls (e.g. 3 ordinary calls) taking into account any restrictions for emergency calls. This may require routeing data to ensure calls are routed to the right VLAN	Calls are successfully established			
4	Generate an emergency call	Call is successfully established			
5	Artificially restrict bandwidth further to the point where no bandwidth is available for emergency calls				
6	Generate an emergency call	Ensure the call fails and does not force an existing call to clear down			
7	Generate further ordinary calls from CP A	Ensure these call attempts fail with an appropriate message			
8	Generate further ordinary calls from CP B	Ensure these call attempts fail with an appropriate message			
9	Repeat test with A and B roles interchanged				
Test clean up	Clear all calls and restore bandwidth to original 'in service' level				
Conclusion & Observation					
Completed	<input type="checkbox"/>	Tick As Appropriate	Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Completed After Correction	<input type="checkbox"/>		Waiver Reference	<input type="text"/>	
Completed With Waiver	<input type="checkbox"/>		Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Not Completed	<input type="checkbox"/>				
Notes:					

Test Name		Quality of Service			
Test Number		VLAN 04			
Test Purpose		To verify the quality of PSTN/ISDN voice calls			
Direction of Test		Bothway			
Test Preconditions and Assumptions		Media VLAN able to accept calls			
	Test Steps	Expected Results	Pass/Fail		
			A-B	B-A	
1	Set up voice call from a PSTN 2 wire DEL lasting a minimum of 60 seconds over the VLAN				
2	Send a succession of long pings over the interface and check packet loss	No packets lost			
3	Basic audio test; listen in silence, hold conversation	Check for any noise on the line & confirm that conversation is acceptable			
4	Where bi-lateral agreement exists between parties CPs should also perform testing of the following: a) RTCP b) PESQ	N.B. Test procedures for these tests may found in ND1413 [8]			
Test clean up		Clear all calls			
Conclusion & Observation					
Completed	<input type="checkbox"/>	Tick As Appropriate	Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Completed After Correction	<input type="checkbox"/>		Waiver Reference	<input type="text"/>	
Completed With Waiver	<input type="checkbox"/>		Due to Problem With:	CP A <input type="checkbox"/>	CP B <input type="checkbox"/>
Not Completed	<input type="checkbox"/>				
Notes:					
Details Below					

History

Document History		
Version	Date	Milestone
1.3.1	16/09/09	Version TSG and CA approved