

Joint Test Report

For Interoperability Testing

Of the A Interface

Between Kapsch NSS (NSS 20) Release 4 And Nokia Siemens Networks BSS (BR10) Global IOT 9.2

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1 Executive Summary

Throughout the document NSN stands for 'Nokia Siemens Networks' and KCC stands for 'Kapsch CarrierCom'.

This test report summarizes the test results of the interoperability test (IOT) session between NSN and KCC at the A interface to evaluate the compatibility of the NSN BSS (BR10) and the KCC NSS (NSS20) Release 4 in a double vendor configuration within one GSM-R network..

The testing was carried out in the test labs of each company, the test labs being interconnected over the public Internet using RAD boxes, between 14th June 2011 and 28th of July 2011.

The results of the tests show that there are no interoperability issues when interconnecting these two GSM-R subsystems (with regards to the Test Scope outlined in chapter 4.1)

2 References

2.1 Applicable Documents

- [1] Network Vendors IOT Forum - IOT Methodology
- [2] Test Plan - Multi-Vendor IOT for GSM-R networks in mixed Configuration, Nokia Siemens Networks NSS (SR 14) And Kapsch BSS (V18)
or Kapsch NSS (NSS 20) And Nokia Siemens Networks BSS (BR10); Version 1.2

2.2 Standards

- [3] **3GPP TS 22.067** – enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 1
- [4] **3GPP TS 23.067** – enhanced Multi-Level Precedence and Pre-emption Service (EMLPP); Stage 2
- [5] **3GPP TS 42.068** – Voice Group Call Service (VGCS); Stage 1
- [6] **3GPP TS 42.069** – Voice Broadcast Service (VBS); Stage 1
- [7] **3GPP TS 43.068** – Voice Group Call Service (VGCS); Stage 2
- [8] **3GPP TS 43.069** – Voice Broadcast Service (VBS); Stage 2
- [9] **3GPP TS 44.068** – Group Call Control (GCC) Protocol
- [10] **3GPP TS 44.069** – Broadcast Call Control (BCC) Protocol
- [11] **3GPP TS 23.003** – Numbering, addressing and identification
- [12] **3GPP TS 24.008** – Mobile radio interface Layer 3 specification; Core network protocols; Stage 3
- [13] **3GPP TS 48.008** – Mobile Switching Centre - Base Station system (MSC-BSS) Interface Layer 3 Specification
- [14] **“EIRENE - Functional Requirements Specification, PSA167D005”**. Railway Radio Enhanced Network -UIC Project EIRENE.

[15] **“EIRENE - System Requirements Specification, PSA167D006”**. Railway Radio Enhanced Network - UIC Project EIRENE.

[16] **“ASCI options for Interoperability, A 01 T 0004 1”**. MORANE Project

3 Abbreviations

BSC	Base Station Controller
BSS	Base Station Sub-system
BTS	Base Transceiver Station
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
DCH	Dedicated Channel
eMLPP	enhanced Multi-Level Precedence and Pre-emption
EVEA	Enhanced Very Early Assignment
FA	Functional Addressing
FN	Functional Number
GCA	Group Call Area
GCH	Group Cannel
GCR	Group Call Register
GCRref	Group Call Reference
GID	Group Identity
HLR	Home Location Register
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IOT	Interoperability Test
LDA	Location Dependent Addressing
MS	Mobile Station
MSC	Mobile Switching Centre
NSS	Network Sub-system
OTDI	Originator to Dispatcher Information
PEC	Public Emergency Call
REC	Railway Emergency Call
SS	Service Subscriber
TCU	Transcoding Unit
VLR	Visitor Location Register
VBS	Voice Broadcast Service
VGCS	Voice Group Call Service

4 Overview

The A interface between NSN NSS and KCC BSS was already tested in the year 2000 as part of the MORANE project in France and Germany trial site. At that point in time the respective company names were 'Siemens' and 'Nortel Networks'

The MORANE acceptance tests confirmed successful interoperability of Basic GSM services and Rail services (ASCI features, Functional Addressing, UUIE...).

In the timeframe 2004 to 2006 an additional interoperability testing was successfully executed. This was , due to the fact that both vendors had developed new software versions for NSS and BSS

As both companies have developed new Software Releases for their NSS and BSS - it is necessary to repeat the already performed IOT.

This IOT test report describes the test results of the test cases described in the "Test Plan - Multi-Vendor IOT for GSM-R networks in mixed Configuration, Nokia Siemens Networks NSS (SR 14) And Kapsch BSS (V18) or Kapsch NSS (NSS 20) And Nokia Siemens Networks BSS (BR10); Version 1.2" for the GSM-R IOT 9.2 Tests (KCC BSS – NSS NSS)

4.1 Test Coverage

The following list summarizes the content.

- Basic and Supplementary GSM Services for voice and data (GSM regression)
- Handover scenarios
- Cell reselection scenarios
- Functional Addressing (FA)
- Location Dependant Addressing (LDA)
- Enhanced Multi-level Precedence and Pre-emption Service (eMLPP)
- Voice Group Call Service (VGCS)
- Voice Broadcast Service (VBS)
- Railway Emergency Call (REC)
- Originator to Dispatcher Information (OTDI)
- Late Entry

5 Test Session Details

This section details the location of the testing and the period over which the tests were performed, together with the personnel involved in the testing.

- Test Location: NSN: NSN-lab
KCC: KCC-lab
- Test session start date: 14th of June 2011
- Test session end date: 28th of July 2011

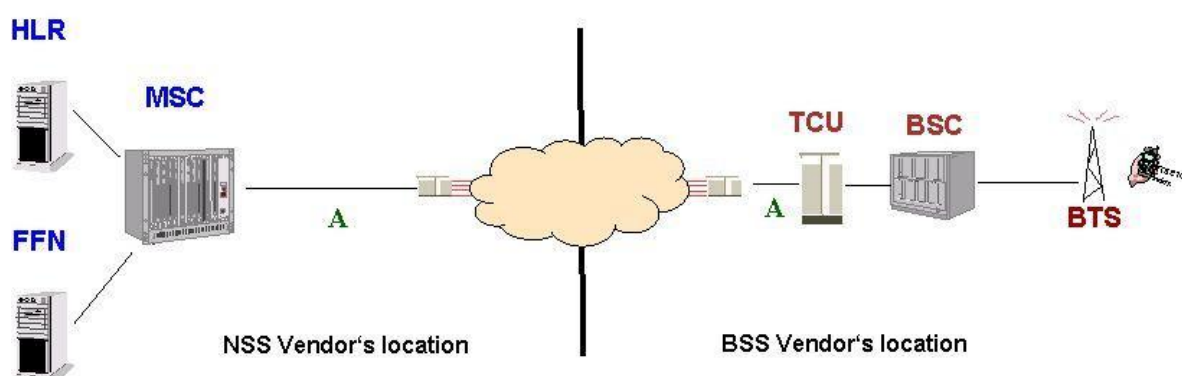
Personnel	NSN	KCC
Manager	Mrs. J.Herzog/E.Ganga	Mr. Ulrich Geier
Test Engineer	Mr. Mladen Kraljevic	Mr. Erich Seitz
Test Engineer	Mrs. Marijana Pendelin	

6 Test Configuration

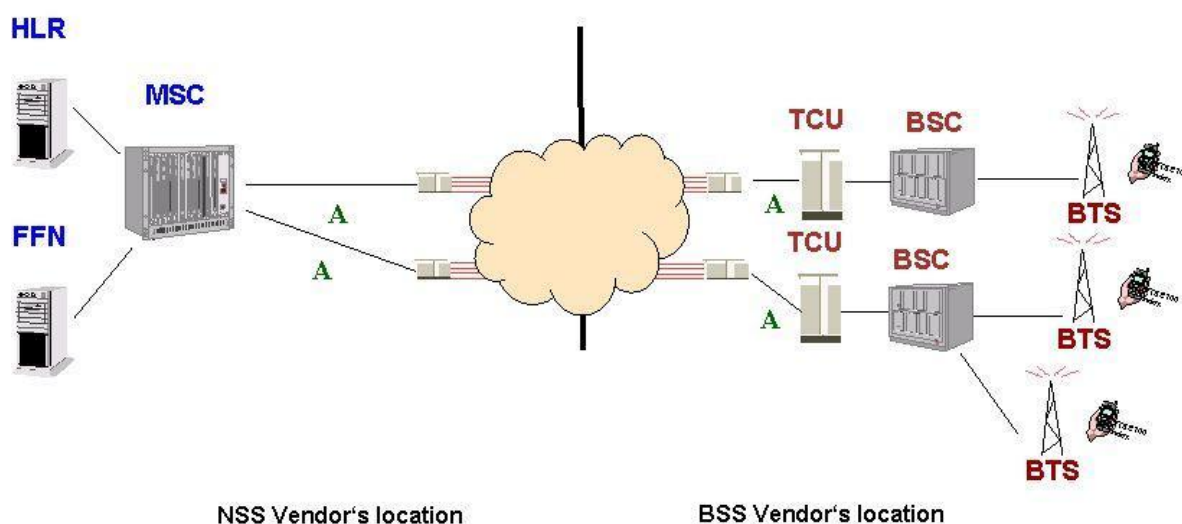
This section lists the test equipment necessary to perform the test cases detailed in this document, together with the network configurations that will be supported in this MV-IOT session. Also given are the agreed database values to be used during testing.

6.1 Network Configuration

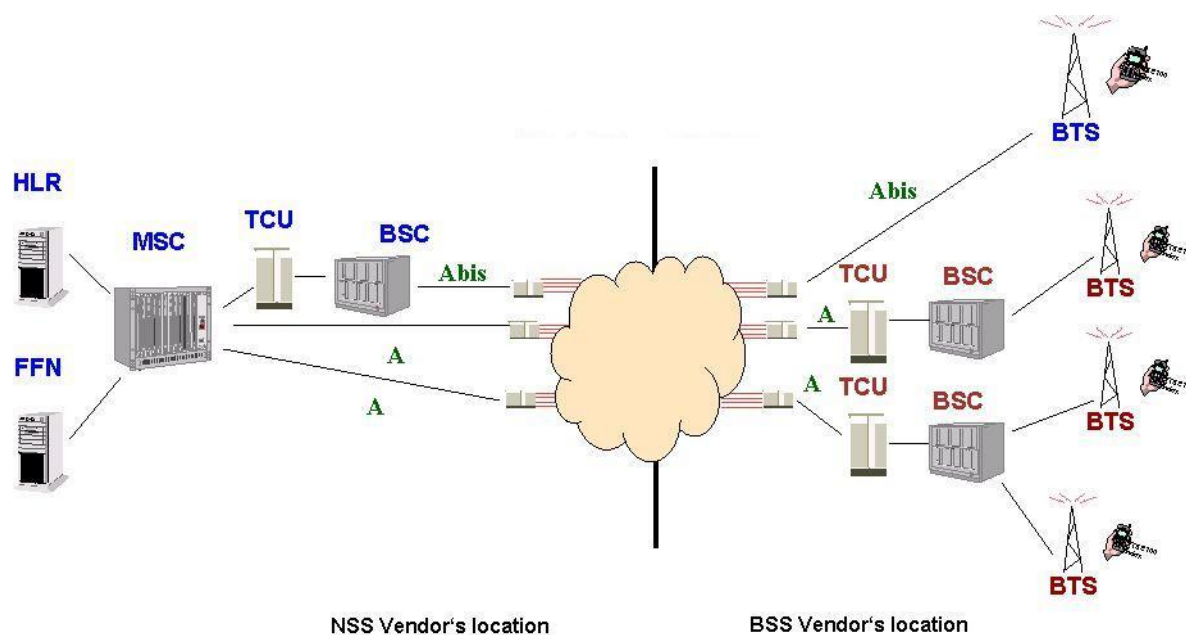
The diagram below shows the network configuration that was used to perform the tests during this IOT session.



Network Configuration 1



Network Configuration 2



Network Configuration 3

In all Network Configuration the monitoring was done on the I/F crossing the border.

In addition monitoring was done on the A-I/F if the Abis crosses the border and on additional Interfaces if explicitly required by the test case.

6.2 A Interface Configuration

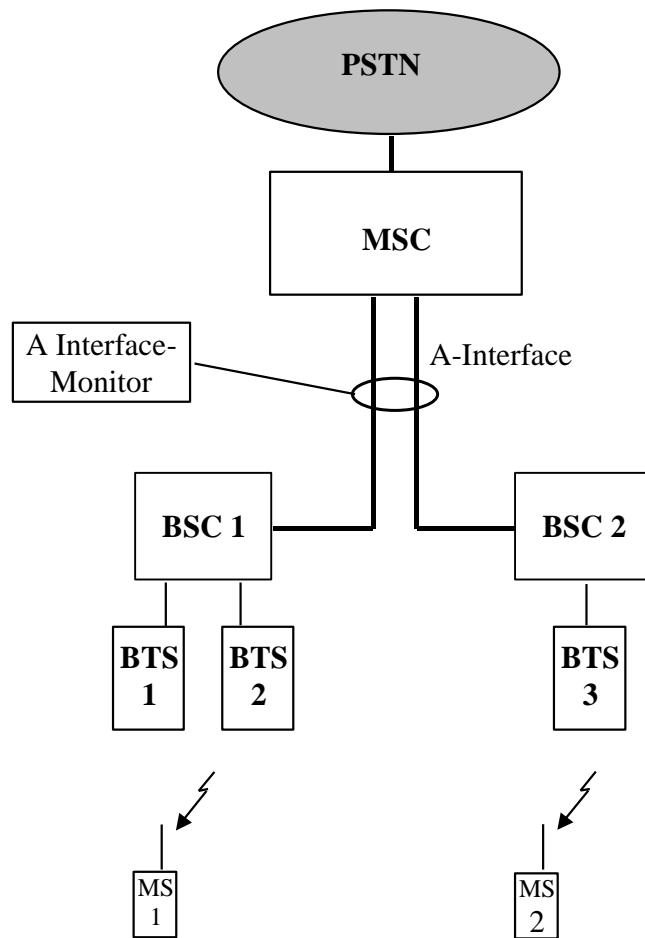


Figure 1: A interface configuration

6.3 Network Element Software Versions

The following software versions were used to perform the tests in this MV-IOT session:

Network Element	NSN	KCC
MSC/VLR/HLR/AC		NSS 20 (R4 Switch) PRODUCT: GMHU.200 LOAD: GMHU0.200 LAYER: BAS.23.0.BN LAYER: TL.22.0.BN LAYER: SHR.23.0.DH LAYER: GSM.20.0.CL LAYER: MSC.20.0.CL LAYER: HLR.20.0.DD LAYER: VSE.02.0.BG LAYER: WSP.01.0.CJ
BSS/TRAU	BR 10 (BR10_L2201)	

6.4 Terminal Software Versions

The following terminal software versions were used to perform the tests in this MV-IOT session:
(this includes Data Calls and mobile Dispatcher where applicable)

Vendor	SW-FW version
SAGEM	GPH940 BG2,1p
Windows PC (Terminal for Data Calls)	Windows 7

6.5 System Parameters

This section details the relevant database parameters, timer and retry counter values that were used in this MV-IOT session. These parameters are seen as those required in order to successfully set up the configuration for interworking.

6.5.1 Database Parameters

This section details the appropriate database parameters that were used during this IOT session. It should be noted that it may have been necessary to modify certain database parameters from these values in order to perform certain test cases.

Parameter	NSN Value	KCC Value
MCC / MNC / CC / NCC	-	234/13/44/55555
Global Title for MSC	-	
Global Title for VLR	-	
Global Title for HLR	-	
MSC point code	-	2061
BSC1 point code	8905	-
BSC2 point code	1000	
LACs CellIDs	60 (9001,9002, 9003) 65 (9302, 9502) 50 (1002)	36 (15972)
GCAs	-	44001
GCRefs	-	270,271,273, 274,399
IMSI and MSISDNs	-	234131174494591/ 445555874494 234131174495318/ 445555874495 234131174496962/ 445555874496 234131174497737/ 445555874497 234131174498726/ 445555874498 234131174499510/ 445555874499

BSS Parameters

	NSN Value	KCC Value
Logical Channel Configuration on the air interface		
Typical logical Channel Config. for 1-TRX cell	CBCCH (TS0) + PDCH (TS1) + TCH (TS2 to TS7)	CBCCH (TS0) + PDCH (TS1) + TCH (TS2 to TS7)
Handover and Cell Selection / Reselection		
Power budget HO margin	67 (+ 4 dB)	63 (+ 5 dB)
Level HO Threshold	-100 dBm (DL), -102 dBm (UL).	-95 dBm (DL), -95dBm (UL).
Quality HO Threshold	4	0.8
HO Margin Dist	N/A	-24 dB
	No high speed HO tests were performed	
Power Control and Transfer Mode		
Power Control	off	enabled
Discontinuous Transmission (DTX)	off	N/A

MSC Parameters

	NSN Value					KCC Value				
Parameters to Control the registry query (Registration, Authentication, Encryption)	Algorithm identifier: XOR Key value (K): 12345678901234567890123456789012 Key mask: 01020304050607080910111213141516					Algorithm identifier: XOR Key value (K): 12345678901234567890123456789012 Key mask: 01020304050607080910111213141516				
Mapping of MLPP and eMLPP levels	eMLPP category	Priorit y level	PCI	Queuing	PVI	eMLPP category	Priorit y level	PCI	Queuing	PVI
	no priority	14	FALSE	FALSE	FALSE	no priority	14	TRUE	FALSE	FALSE
	4	11	FALSE	FALSE	TRUE	4	7	TRUE	TRUE	TRUE
	3	9	FALSE	FALSE	TRUE	3	6	TRUE	TRUE	TRUE
	2	7	FALSE	FALSE	TRUE	2	5	TRUE	TRUE	TRUE

	1	5	TRUE	FALSE	TRUE	1	4	TRUE	TRUE	TRUE
	0	4	TRUE	FALSE	TRUE	0	3	TRUE	TRUE	TRUE
	A	2	TRUE	FALSE	FALSE	A	2	TRUE	TRUE	FALSE
	B	1	TRUE	FALSE	FALSE	B	1	TRUE	TRUE	FALSE
	emergency call	2	FALSE	TRUE	TRUE	emergency call	5	TRUE	TRUE	TRUE
EIRENE data										
Matrix	Standard Access matrix as it appears in EIRENE specification was used.									
EIRENE numbering plan (Functional Addressing / IN)	MobileCountryCode=262 MobileNetworkCode=02 CountryCode=49 NationalDestinationCode=172 RailwayAccessCode=049					MobileCountryCode=234 MobileNetworkCode=13 CountryCode=44 NationalDestinationCode=5555 RailwayAccessCode=044				
SIM card config.	MORANE FFFIS FOR GSM-R SIM CARDS V4.1									

6.5.2 Remote Interconnection Parameters

This section details the agreed parameters to be used for remote interconnection.

Parameter	NSN Value	KCC Value
RAD Box Type	ACE 3200	ACE 3100
Number of PWs	3	3
Number of Timeslots	5/8/6	5/8/6
Jitterbuffer	32 ms	32 ms

SIM	MSISDN on switch	IMSI	Basic Services	Comments
NA1	44 5555 874490	234 13 1174490639	Telephony, Fax TS62, VGCS, VBS	
NA2	44 5555 874491	234 13 1174491845	Telephony, Fax TS62, VGCS, VBS	
NA3	44 5555 874492	234 13 1174492116	Telephony, Fax TS62, VGCS, VBS	
NA4	44 5555 874493	234 13 1174493821	Telephony, Fax TS62,	

			VGCS, VBS	
NA5	44 5555 874494	234 13 1174494591	Telephony, Fax TS62, VGCS, VBS	
NA6	44 5555 874495	234 13 1174495318	Telephony, Fax TS62, VGCS, VBS	
NA7	44 5555 874496	234 13 1174496962	Telephony, Fax TS62, VGCS, VBS	
NA8	44 5555 874497	234 13 1174497737	Telephony, Fax TS62, VGCS, VBS	
NA9	44 5555 874498	234 13 1174498726	Telephony, Fax TS62, VGCS, VBS	
NA10	44 5555 874499	234 13 1174499510	Telephony, Fax TS62, VGCS, VBS	

SIM	Supplementary Services				
NA1	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA2	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA3	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA4	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA5	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA6	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA7	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA8	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA9	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
NA10	CW, CH, MTPY, CFU, CFB, eMLPP [0-4], CLIP, UUS1, FM				
SIM	Network	Name in Location	GC-Ids data filled	Function	MS-Type
NA1	KCC	MS A1	GID01 => GID06	Dispatcher	Sagem GPH
NA2	KCC	MS A2	GID01 => GID06	Dispatcher	Sagem GPH
NA3	KCC	MS A3	GID01 => GID06	GSM-R mobile	Sagem GPH

NA4	KCC	MS A4	GID01 => GID06	GSM-R mobile	Sagem GPH
NA5	KCC	MS A5	GID01 => GID06	GSM-R mobile	Sagem GPH
NA6	KCC	MS A6	GID01 => GID06	GSM-R mobile	Sagem GPH
NA7	KCC	MS A7	GID01 => GID06	GSM-R Mobile	Sagem GPH
NA8	KCC	MS A8	GID01 => GID06	GSM-R mobile	Sagem GPH
NA9	KCC	MS A9	GID02 => GID06	Dispatcher	Sagem GPH
NA10	KCC	MS A10	GID02 => GID06	Dispatcher	Sagem GPH

Group	Group Call Area	VGCS GID	VBS GID	VGCS-Priority	VBS-Priority	No Activity Timer (sec)
GID01	62701	399	399	0	0	60
GID02	62701	270	270	0	0	60
GID03	62701	271	271	1	1	60
GID04	62701	272	272	2	2	60
GID05	62701	273	273	3	3	60
GID06	62701	274	274	4	4	60

The SIM Card Supplier is Gemalto.

7 Test Case Results

Each test case is given one of the following Test Execution Status':

- **Passed (P)**

All parties agree that the test case has met all the requirements defined in the test case description.

- **Passed with a Comment (P*)**

All parties agree that the test case has met the requirements defined in the test case description, however a comment is included to clarify the behaviour witnessed during the test.

- **Failed (F)**

All parties agree that the test case has not met the criteria specified in the test case description.

Errors are classified using the following classes:

- **Blocking Problem (F-B)**

The continuation of the IOT session for the concerned test area is not possible unless an error classified as 'Blocking' has been fixed. The concerned test area can be the entire test session or one or more sections of the test plan.

- **Service Affecting Problem (F-S)**

An error classified as 'Service Affecting' describes a discrepancy from the relevant standards that has major impact on the functionality of the system.

- **Non-Service Affecting Problem (F-N)**

An error classified as 'Non-Service Affecting' describes a discrepancy from the relevant standards and can be evaluated from a protocol specific view only. If there is an impact on the functionality, it only represents a minor problem.

- **Not Performed (NP)**

The test case was not performed. In this case the non-execution cause must be given. The choices for this are:

- **Pending (NP-P)**

It was not possible to perform the test due to the failure of another test case.

- **Material Limitation (NP-M)**

It was not possible to perform the test due to the lack necessary equipment. This can be insufficient network elements, or lack of suitable test equipment.

- **Schedule Issue (NP-S)**

It was not possible to perform the test due to lack of time.

- **Trigger Unavailable (NP-T)**

It was not possible to perform the test due to the lack of a suitable trigger.

Total number of test cases: 76

7.1 Basic and Supplementary GSM Services

This test area covers a set of tests for basic and supplementary GSM voice and data services in a GSM-R system with NSN NSS and a BSS Providers BSS or vice versa.

This includes

- Location Update and Location Cancellation
- IMSI Attach and Detach
- Mobile Originated and Mobile Terminated Calls
- Data calls
- Subscription, Activation, Deactivation, Interrogation of supplementary services
- Call Hold, Call Waiting, CLIP, CLIR, notification of Call Forwarding
- Multi Party, MPTY
- Closed user Group, CUG
- Public emergency calls

Test Id	Description	TES	Remarks
IOT4_GSM1	Successful Location Update after MS Power On	P	NC1
IOT4_GSM15	Supplementary Service Call Hold	P	NC1
IOT4_GSM17	Supplementary Service Call Waiting	P	NC1
IOT4_GSM18	Supplementary Service CUG	P	NC1
IOT4_GSM19	Supplementary Service CLIP – MMC with Call Forwarding Unconditional	P	NC1
IOT4_GSM20	Supplementary Service CLIR	P	NC1
IOT4_GSM21	Supplementary Service MPTY	P	NC2
IOT4_GSM23	Establishment of several MMC Data calls with priority 1	P	NC1
IOT4_GSM26	Establishment of several PTP calls with different priorities	P	NC1
IOT4_GSM38	Public Emergency Call – With SIM	P	NC1
IOT4_GSM39	Public Emergency Call – Without SIM	P	NC1
IOT4_GSM40	Public Emergency Call – with TMSI and IMSI unknown in VLR	P	NC1

Number of test cases: 12

7.2 Cell reselection and handover.

This test area verifies the correct functioning of cell reselection and handovers for different services in different scenarios in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

This includes:

- Intra and Inter BTS cell reselection and handovers
- Intra LA and Inter LA cell reselection and handovers

for

- Cell reselection of MS in idle mode, listeners in VBS, VGCS calls and RECs
- Handovers for Point to Point calls, VBS and VGCS (HO of dedicated channel and group channel) calls and RECs.
- Uplink release management
- Cell reselection failures
- Handover failures

Test id	Title	TES	Remarks
IOT4_HO6	Inter BTS cell reselection of a VGCS listener	P	NC2
IOT4_HO16	Inter BTS handover of a point to point voice call	P	NC2
IOT4_HO17	Inter BTS handover of a circuit switched data call	P	NC2
IOT4_HO18	Inter BTS handover of a railway emergency call originator	P	NC2
IOT4_HO19	Inter BTS handover of a VGCS call uplink	P	NC2
IOT4_HO25	Inter BSC handover of a VGCS call uplink	P	NC2
IOT4_HO30	Ongoing point to point voice call in the destination cell preempted by a intra BTS handover inwards of a railway emergency call originator	P	NC2
IOT4_HO33	Ongoing point to point voice call in the destination cell preempted by a inter BTS handover inwards of a point to point voice call	P	NC2
IOT4_HO34	Ongoing point to point voice call in the destination cell preempted by a inter BTS handover inwards of a circuit switched data call	P	NC2
IOT4_HO45	Intra BTS handover failure of a railway emergency call originator	P	NC2
IOT4_HO51	Inter BTS handover failure of a VGCS call uplink	P	NC2
IOT4_HO52	Inter BTS handover failure of a VGCS dedicated channel	P	NC2

IOT4_HO59	Handover of a mobile dispatcher originator outside the GCA	P	NC2
IOT4_HO60	Handover of a mobile dispatcher originator to a different GCA within the same BSC	P	NC2
IOT4_ITAHO01	Inter BSC HO with preemption of radio resources in full loaded cell (BSC BSS Provider/BSC NSS PROVIDER)	P*	NC3 See below (1) See below (2)
IOT4_ITAHO02	InterBSC HO failure of a VGCS	P	NC3 See below (1)

Number of test cases: 15

- (1) Testcases were done twice by changing the roles between NSN-BSS and KCC-BSS in the testcase
- (2) The testcase requires two handover to happen. The first handover is successful. The second handover fails with "temp failure".
This is a timing issue, due to the buffering (32 msec jitter buffer on the RAD boxes), which causes Abis message to arrive too late at the BSC.
This is due to the specific geographical test configuration (distance between labs) and will not happen in standard configuration. The delay causing the problem is on the proprietary Abis I/F. A different behavior may be expected depending on the equipment supplier for the BSC/BTS. Messaging seen on the A-I/F was as expected.

7.3 Functional Addressing (FA)

This test area verifies the correct functioning of the FA service in a GSM-R system with NSS PROVIDERS NSS and a BSS Providers BSS.

This includes:

- Registration Management
- Calls to Functional Numbers
- Failure cases (e.g. registration failure, link failure)

Test Id	Description	TES	Remarks
IOT4_FA1	Registration of an FN Number	P	NC1
IOT4_FA2	Registration of an unknown FN fails	P	NC1
IOT4_FA3	Registration fails because of link failure	P	NC1
IOT4_FA4	Deregistration of an FN Number	P	NC1
IOT4_FA5	Deregistration of an FN fails	P	NC1

IOT4_FA6	Interrogation of an FA Number	P	NC1
IOT4_FA7	Interrogation of an FN fails	P	NC1
IOT4_FA8	FA Call - Successful Call	P	NC1
IOT4_FA9	FA Call – Call is not completed	P	NC1
IOT4_ITAFA 01	Forced Deregistration	P	NC1

Number of test cases: 10

7.4 Location Dependent Addressing (LDA)

This test area verifies the correct functioning of the LDA service in a GSM-R system with NSS PROVIDERS NSS and a BSS Providers BSS.

This includes:

- Successful LDA call, correct transfer of the Cell of Origination information
- Failure cases (e.g. LDA destination does not exist)

Test Id	Description	TES	Remarks
IOT4_LA1	Successful LDA Call - Verify the cell format is correct	P	NC2
IOT4_LA2	Unsucessful LDA Call - Call to invalid Short Code	P	NC2

Number of test cases: 2

7.5 Enhanced Multi-Level Precedence and Pre-emption Service (eMLPP)

This test area verifies the correct functioning of the eMLPP service in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

This includes:

- Pre-emption of P2P, VBS, VGCS, data calls by P2P, VBS, VGCS, data calls of higher priority and REC calls
- Assigning and handling of priorities to different resources and passing the priority information through the system.
- Interaction of eMLPP with handovers
- Failure scenarios

Test Id	Description	TES	Remarks
IOT4_eMLPP2	MS in VGCS call on DCH, pre-emption on Air IF by higher prio PtP call	P	NC1
IOT4_eMLPP5	MS in VBS call as originating MS Dispatcher, pre-emption on Air IF by higher prio PtP call	P	NC1
IOT4_eMLPP8	MS in VBS call as listener, pre-emption on Air IF by higher prio VBS call.	P	NC2
IOT4_eMLPP10	MS in VGCS call having the UL of the GCH, pre-emption on Air IF by higher prio VBS call.	P	NC2
IOT4_eMLPP12	MS in PEC, pre-emption on Air IF by higher prio VBS call.	P	NC2
IOT4_eMLPP14	MS in PtP call, pre-emption on MS by higher prio VGCS call (REC)	P	NC2
IOT4_eMLPP15	MS in VBS call as originator, pre-emption on Air IF by higher prio VGCS call (REC)	P	NC2
IOT4_eMLPP19	MS in data call, pre-emption on Air IF by higher prio VGCS call (REC)	P	NC1
IOT4_eMLPP20	MS in PtP call, pre-emption on Air IF by higher prio data call (4800 baud, transparent)	P	NC1

Number of test cases: 8

7.6 Voice Group Call Service (VGCS)

This test area verifies the correct functioning of the VGCS service in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

This includes:

- Uplink management between BSSs.
- Muting/Unmuting

Test Id	Description	TES	Remarks
IOT4_VGCS1	SS originates VGCS call	P	NC2
IOT4_VGCS3	MS Dispatcher originates VGCS call and takes it down with the kill Sequence	P	NC2
IOT4_VGCS4	SS originates VGCS call, leaves, rejoins and ends it.	P	NC2
IOT4_VGCS5	SS enters into VGCS broadcast area with ongoing VGCS call and is notified of it	P	NC2
IOT4_VGCS6	MS Dispatcher joins ongoing VGCS call	P	NC2
IOT4_VGCS13	Mute sequence for originating MS Dispatcher	P	NC2
IOT4_VGCS14	Unmute sequence for originating MS Dispatcher	P	NC2
IOT4_VGCS17	Parallel group calls are possible in the same cell.	P	NC1
IOT4_VGCS44	GID delivered correctly to terminating SS in SS originated VGCS call	P	NC1
IOT4_VGCS51	VGCS talker leaves GCA	P	NC1
IOT4_VGCS52	VGCS originator leaves GCA	P	NC1
ADD_SRS_1	Service Subscriber originates Voice Group (VGCS) Call, Joining Dispatcher, Mute and Un-Mute	P	NC2

Number of test cases: 12

7.7 Voice Broadcast Service (VBS)

This test area verifies the correct functioning of the VBS service in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

Test Id	Description	TES	Remarks
IOT4_VBS1	SS originates VBS call	P	NC3
IOT4_VBS2	SS originates prio0 VBS call	P	NC2
IOT4_VBS8	MS Dispatcher originates VBS call and takes down the call by disconnecting	P	NC3
IOT4_VBS9	MS Dispatcher originates VBS call and takes down the call with the kill sequence	P	NC3
IOT4_VBS10	MS Dispatcher joins ongoing VBS call	P	NC3
IOT4_VBS11	SS enters into VBS broadcast area with ongoing VBS call and is notified of it, SS joins the VBS call	P	NC3

Number of test cases: 6

7.8 Railway Emergency Call (REC)

This test area verifies the REC functionality including the acknowledgement functionality in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

Test Id	Description	TES	Remarks
IOT4_REC1	SS originates a REC	P	NC1
IOT4_REC3	SS accepts an incoming REC	P	NC2
IOT4_REC4	MS Dispatcher originates a REC	P	NC2
IOT4_REC8	REC in a GCA with a locked cell	P	NC2

Number of test cases: 4

7.9 Originator to Dispatcher Information (OTDI)

This test area verifies the correct functioning of the OTDI feature in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

This test will be performed using SAGEM MS as Mobile dispatcher. This only allow to show the functionality in the traces from protocol analyzers.

Test Id	Description	TES	Remarks
IOT4_OTDI 1	SS originates VGCS call, terminating MS dispatcher receives the OTDI	P	NC3
IOT4_OTDI 5	SS originates VGCS Immediate Setup 2 call, terminating MS dispatcher receives the OTDI	P	NC3

Number of test cases: 2

7.10 Late Entry

This test area verifies the correct functioning of the Late Entry feature in a GSM-R system with NSS Providers NSS and a BSS Providers BSS.

Test Id	Description	TES	Remarks
IOT4_LE 1	SS active in a PTOPI (P4) call move in a cell with ongoing REC call	P	NC3
IOT4_LE 2	Orig. SS active in a VBS (P4) call move in a cell with ongoing REC call	P	NC3
IOT4_LE 3	Orig. SS active in a VGCS (P4) call on GCH (talker) move in a cell with ongoing REC call	P	NC3

Number of test cases: 3

8 Conclusion

The IOT testing between NSN BR10 GSM-R architecture and KCC NSS 20 GSM-R (Release 4) architecture was successfully completed; all possible test cases were performed.

The results of the tests show that there are no interworking issues between the elements tested in this IOT session