Joint Test Report

For Interoperability Testing

Of the MAP&ISUP Interface

Between the Nokia Siemens Networks SR14 GSM-R (Release 99) NSS Subsystem

And the Kapsch NSS20 GSM-R (Release 4) NSS Subsystem

Global IOT 9.1

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0.1	09/12/2011	All	Initial draft	Erich Seitz
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1.7	24/05/2012	All	Editorial changes	Ecaterina Ganga

Table of Contents

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 MAP and ISUP interface to evaluate the compatibility of the NSN NSS SR14 GSM-R (Release 99) and the KCC NSS NSS20 GSM-R (Release 4) on interconnecting two GSM-R networks.

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 1st October 2011 and 15th of December 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 For Interoperability Testing Of the MAP&ISUP Interface Between the Nokia Siemens Networks SR14 GSM-R network and the Kapsch GSM 20 GSM-R network

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
GCRef 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 MAP and ISUP interface between NSN NSS and KCC NSS 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 test campaign was successfully executed. This was, due to the fact that both vendors had developed new software versions for both 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 For Interoperability Testing Of the MAP&ISUP Interface Between the Nokia Siemens Networks SR14 GSM-R network and the Kapsch GSM 20 GSM-R network” for the GSM-R IOT 9.1 Tests (KCC NSS – NSS NSS)

The purpose of this testing is to verify the correct implementation of the MAP and ISUP interface between the Nokia Siemens Networks SR14 architecture and the Kapsch GSM20 architecture.

Figure 1 shows the MAP interface protocol stack.

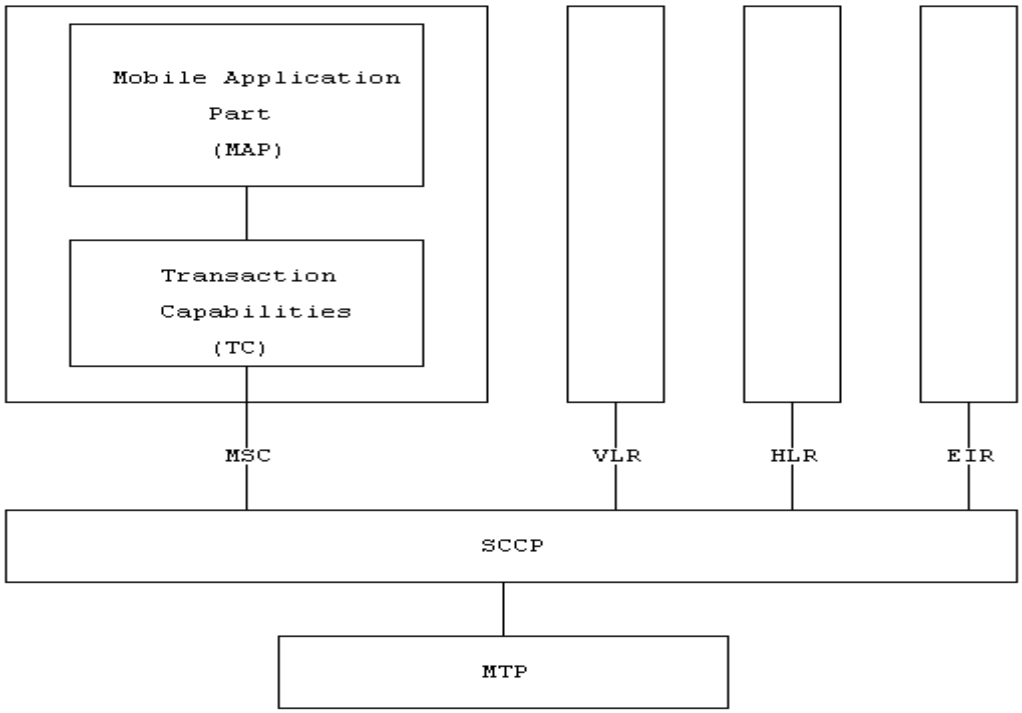


Figure 1: MAP Interface Protocol Stack

4.1 Test Coverage

The following list summarizes the content.

- VGCS basic handling
- REC basic handling
- eMLPP basic handling
- Functional addressing
- Forced deregistration
- OTDI
- Late Entry
- Class of registration
- Acknowledgement of high priority calls

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: 1st of October 2011
- Test session end date: 15th of December 2011

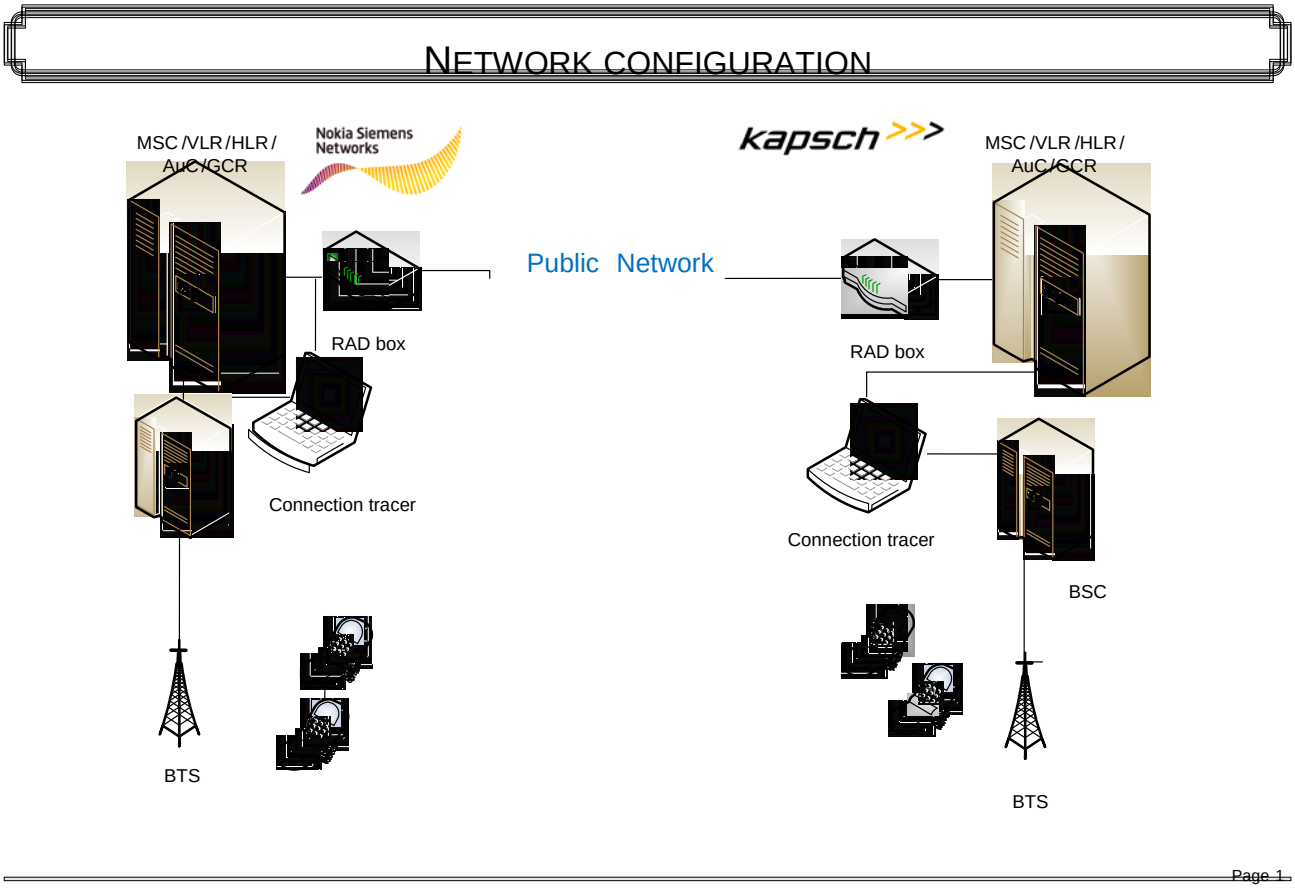
Personnel	NSN	KCC
Manager	Mrs. J. Herzog/E.Ganga	Mr. Ulrich Geier
Test Engineer	Mr. Mladen Kraljevic	Mr. Erich Seitz

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

6.2 Network Element Software Versions

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

Network Element	NSN	KCC

MSC/VLR/HLR/AC	SR 14_V6010_PP061 (Release 99 Switch with integrated test FNN)	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	BR10_L2201	V18, P&C2

Note:

For practical reasons NSN used a Functional Number Node FNN developed to be used in tests. This Test FNN is integrated into the NSN HLR. In such configuration the maximum FN length cannot be higher than 10 digits. That the Test FNN is limited to handle a reduced length of functional numbers does not have an impact on the quality of performed tests and their significance as proof of interoperability – the limitation has no real impact on the performed test .

The regular NSN FNN - the SCP of an IN based solution – has of course been exhaustively tested with the NSN MSC hardware and software used in the test. The external FNN supports the EIRENE specified FN length of 12 digits.

6.3 Terminal Software Versions

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

Vendor	SW-FW version
SAGEM	GPH940 BG2,1p

6.4 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.

6.4.1 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	262/02/49/172	234/13/44/5555
Global Title for MSC	491720399121	445555880001
Global Title for VLR	491720399120	445555880002
Global Title for HLR	491720399119	445555880003
MSC point code	6000	10170
BSC1 point code	8905	1816
BSC2 point code	-	-
LACs CellIDs	60 9002, 9004	36 2982, 15972
GCAs	62701	44002
GCRefs	270,271,273, 274,399	270,271,273, 274,399
IMSIs and MSISDNs	262021000000016/1000016 262021000000017/1000017 262021000000018/1000018 262021000000019/1000019 262021000000020/1000020 262021000000021/1000021 262021000000022/1000022 262021000000023/1000023	234131174490639/874490 234131174491845/874491 234131174492116/874492 234131174493821/874493 234131174494591/874494 234131174495318/874495 234131174496962/874496 234131174497737/874497 234131174498726/874498 234131174499510/874499

BSS Parameters

	NSN Value	KCC Value
Logical Chanel Configuration on the air interface		
Typical logical Chanel	CBCCH (TS0) + PDCH (TS1) +	CBCCH (TS0) + PDCH (TS1) +

Config. for 1-TRX cell	TCH (TS2 to TS7)	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

<table>
<tr><th></th><th>NSN Value</th><th>KCC Value</th></tr>
<tr><td>Parameters to Control the registry query (Registration, Authentication, Encryption)</td><td>Algorithm identifier: XOR
Key value (K): 12345678901234567890123456789012
Key mask: 01020304050607080910111213141516</td><td>Algorithm identifier: XOR
Key value (K): 12345678901234567890123456789012
Key mask:
01020304050607080910111213141516</td></tr>
<tr><td>Mapping of MLPP and eMLPP levels</td><td>
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<tr><th>eMLPP category</th><th>Priority level</th><th>PCI</th><th>Queuing</th><th>PVI</th></tr>
<tr><td>no priority</td><td>14</td><td>FALSE</td><td>FALSE</td><td>FALSE</td></tr>
<tr><td>4</td><td>11</td><td>FALSE</td><td>FALSE</td><td>TRUE</td></tr>
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<tr><td>emergency call</td><td>2</td><td>FALSE</td><td>TRUE</td><td>TRUE</td></tr>
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</td><td>
<table>
<tr><th>eMLPP category</th><th>Priority level</th><th>PCI</th><th>Queuing</th><th>PVI</th></tr>
<tr><td>no priority</td><td>14</td><td>TRUE</td><td>FALSE</td><td>FALSE</td></tr>
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<tr><td>A</td><td>2</td><td>TRUE</td><td>TRUE</td><td>FALSE</td></tr>
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<tr><td>emergency call</td><td>5</td><td>TRUE</td><td>TRUE</td><td>TRUE</td></tr>
</table>
</td></tr>
</table>

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	
Parameters for roaming		
Creation of mobile station routing number (MSRN) block	MSCID=491720399121 VLRISD=491720399120 HLRISD=491720399119	MSCID= 445555880001 VLRID= 445555880002 HLRID= 445555880003

6.4.2 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
Jitter buffer	32 ms	32 ms

Please find hereafter the parameter for the SIM Cards used (Supplier Gemalto) during the tests (same SIM Cards were used as for Phase 9.2 and 9.3)

KCC SIM Parameter:

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

NSN SIM Parameter:

SIM	MSISDN on switch	IMSI	Basic Services	Comments
NA1	49 172 0300016	262 02 1000000016	Telephony, Fax TS62, VGCS, VBS	
NA2	49 172 0300017	262 02 1000000017	Telephony, Fax TS62, VGCS, VBS	
NA3	49 172 0300017	262 02 1000000018	Telephony, Fax TS62,	

			VGCS, VBS	
NA4	49 172 0300018	262 02 1000000019	Telephony, Fax TS62, VGCS, VBS	
NA5	49 172 0300019	262 02 1000000020	Telephony, Fax TS62, VGCS, VBS	
NA6	49 172 0300020	262 02 1000000021	Telephony, Fax TS62, VGCS, VBS	
NA7	49 172 0300021	262 02 1000000022	Telephony, Fax TS62, VGCS, VBS	
NA8	49 172 0300022	262 02 1000000023	Telephony, Fax TS62, VGCS, VBS	
NA9	49 172 0300023	262 02 1000000024	Telephony, Fax TS62, VGCS, VBS	
NA10	49 172 0300024	262 02 1000000025	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	NSN	MS A1	GID01 => GID06	Dispatcher	Sagem GPH
NA2	NSN	MS A2	GID01 => GID06	Dispatcher	Sagem GPH
NA3	NSN	MS A3	GID01 => GID06	GSM-R	Sagem GPH

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

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 behavior 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.

7.1 VGCS basic handling

This test area verifies the VGCS functionality including talker change, killing sequence, roaming scenarios between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3_02	Subscriber initiated VGCS (Talker change, normal clear down of call)	P	P	
PH3_07	Dispatcher originated VGCS (Talker change, normal clear down of call)	P	P	
PH3_12	Subscriber initiated VGCS (Late Entry) (no talker change, normal clear down of call)	P	P	
PH3_13	Subscriber initiated VGCS (Abandon call/reject call) (no talker change, normal clear down of call)	P	P	

Number of test cases: 4

7.2 Railway Emergency Call (REC)

This test area verifies the REC functionality including the acknowledgement functionality between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
Ph3_47_REC_1	Subscriber initiated REC	P	P	
Ph3_48_REC_2	Subscriber initiated REC	P	P	
Ph3_50_REC_4	MS Dispatcher originates a REC	P	P	

Number of test cases: 3

7.3 Originator to Dispatcher Information (OTDI)

This test area verifies the correct functioning of the OTDI feature between GSM-R systems from NSN and Kapsch.

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

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3_78	Subscriber initiated REC, mobile dispatchers receive the OTDI (Dispatcher clears down call, kill sequence)	P*	P	See (3) below
PH3_79	Subscriber initiated REC, mobile dispatchers receive the OTDI (Orig on Anchor, Dispatcher clears down call, kill sequence)	P*	P	See (3) below

Number of test cases:2

(3) As stated in 6.2, the test configuration with integrated test FNN supports only FNs with a max of 10 digits (including CT and FC); therefore a shortened CT4 number was used for tests PH3_78 and PH3_79. (EIRENE would require 12 digits).,

7.4 Late Entry

This test area verifies the correct functioning of the Late Entry feature between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
Ph3+_21	Service subscriber active in a PtP call moves to a cell with an ongoing REC	P	P	
IOT4_LE 2	Orig. SS active in a VBS (P4) call move in a cell with ongoing REC call	P	P	
Ph3+_22	Orig. SS active in a VGCS (P4) call move in a cell with ongoing REC call	P	P	

Number of test cases: 3

7.5 eMLPP and MLPP test cases

This test area verifies the correct functioning of the eMLPP and MLPP functionality between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3_54	P2P preempted by VGCS – roamer is P2P originator	P	P	
PH3_55	P2P preempted by Railway Emergency Call	P	P	
PH3_59	VGCS preempted by Railway Emergency Call (VGCS)	P	P	
PH3_65	Correct priority is transmitted in VGCS call	P	P	
PH3_67	P2P call pre-empted by group call	F-N	F-N	See (1) below

Number of test cases: 5

Test case tests pre-emption on the ISUP-I/F between the two NSSs. This is not supported by the NSN-NSS. The real issue behind the preemption approach is to ensure with a likelihood close to 100% that resources are available for high priority calls, in particular REC. In contrast with the air interface, where resources due to available 4 MHz radio spectrum are limited, the E-interface can be configured freely with next to any capacity. There are always preemption mechanisms in place where they matter, like on air interface, but for the E interface NSN has opted for the alternative to configure sufficient capacity to practically eliminate the risk that any high priority call could be disturbed. Practical experience from GSM-R networks in operation since 2000, has proven that this configuration approach for the E interface is sufficient..

7.6 Functional addressing test cases

This test area verifies the correct behavior of the functional addressing functionality between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3_68	Verification of Functional Numbers previously registered in HPLMN (CT2/3/4)	P*	P	See (4) below
PH3_69	Registration of CT2 number while roaming	P*	P	See (5) below
PH3_70	Deregistration of CT2 numbers while roaming	P	P	
PH3_71	Mobile subscriber gets CT2 number with connect message	P	P	

Number of test cases: 4

(4) As stated in 6.2, the test configuration with integrated test FNN supports only FNs with a max of 10 digits (including CT and FC); therefore a shortened CT4 number was used (10 digits instead of 12 digits);

(5) As stated in 6.2, the test configuration with integrated test FNN supports only FNs with a max of 10 digits (including CT and FC); tests were limited to CT2 FN up to 10 digits (longest EIRENE CT2 number would require 11 digits).

7.7 Notification signals for forced deregistration

This test area verifies the correct behavior of the forced deregistration functionality between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3+_14	FM service supervisor in home PLMN executes a forced de-registration of roaming mobile (Both subscribers belong to same H PLMN)	P*	P	See (2) below
PH3+_16	FM service supervisor in home PLMN executes forced de-registration of a roaming subscriber FN (The subscribers belong to different H PLMN).	P*	P	See (2) below

Number of test cases: 2 (2) Please refer to 6.2. Forced deregistration is successful, but indication of the registered FN is not removed automatically from the MS, as the integrated test FNN does not send the NOTIFY to the deregistered MS, which would trigger the interrogation to remove the FN indication from the MS.

7.8 Class of Registration

This test area verifies the correct behaviour of the class of registration functionality between GSM-R systems from NSN and Kapsch.

Test Id	Description	NSN anchor	KCC anchor	Remarks
PH3+_19	Unsuccessful registration with train number (CT2 FC 10) because of wrong CoR (CT2 FC01 works)	P	P	
PH3+_20	Unsuccessful registration with Lead driver number (CT2 FC 01) because of wrong CoR (CT2 FC10 works)	P	P	

Number of test cases: 2

8 Conclusion

The IOT testing between NSN SR14 GSM-R (R99) architecture and KCC NSS GSM-R (R4) architecture was successfully completed; all possible test cases were performed.

Special issues concerning test configuration are described in 6.2.

Specific Implementation choice for preemption on E-Interface is described in 7.5.

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