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Metodološki zvezki, Vol. 8, 2011.

ANNEX-A: CALL FLOWS

A-1. TQoD

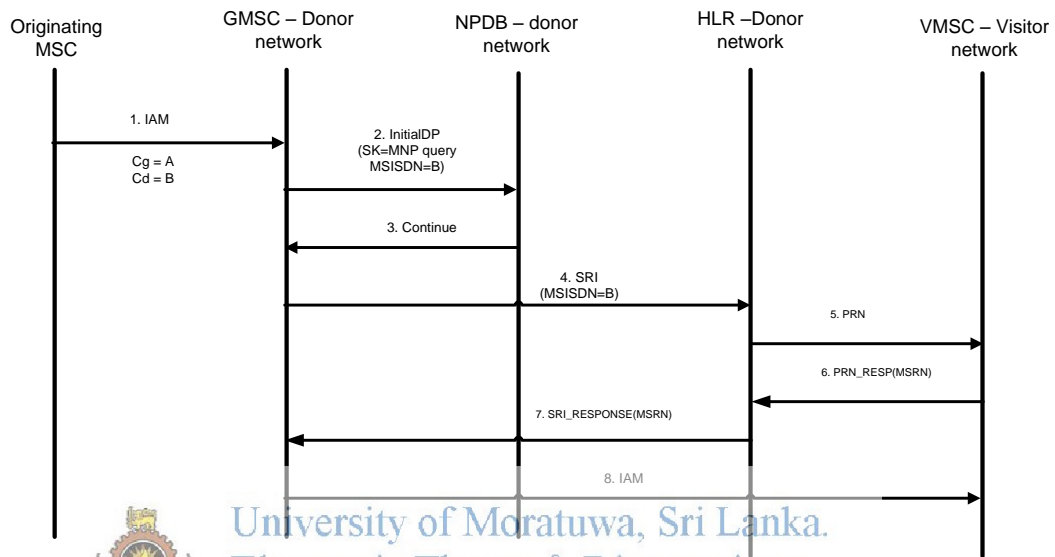### A-1.1. Terminating call to a non ported number

Figure A-1: Call flow – Terminating call to a non ported number (TQoD)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards number range holder (Donor) network.

2. GMSC of donor network is configured to trigger CAMEL "InitialDP" towards number portability database residing inside the network.

3. Number portability database identifies the number as non ported number and respond with CAMEL "Continue".

4. GSMC queries HLR by sending "SRI" to find the routing information for "B" party number.

5. HLR talks to visitor MSC and request MSRN by sending "PRN"

6. VMSC respond with MSRN

7. HLR returns the received MSRN in SRI_resp back to GMSC.

8. GMSC setup call with VMSC by dialing the MSRN.

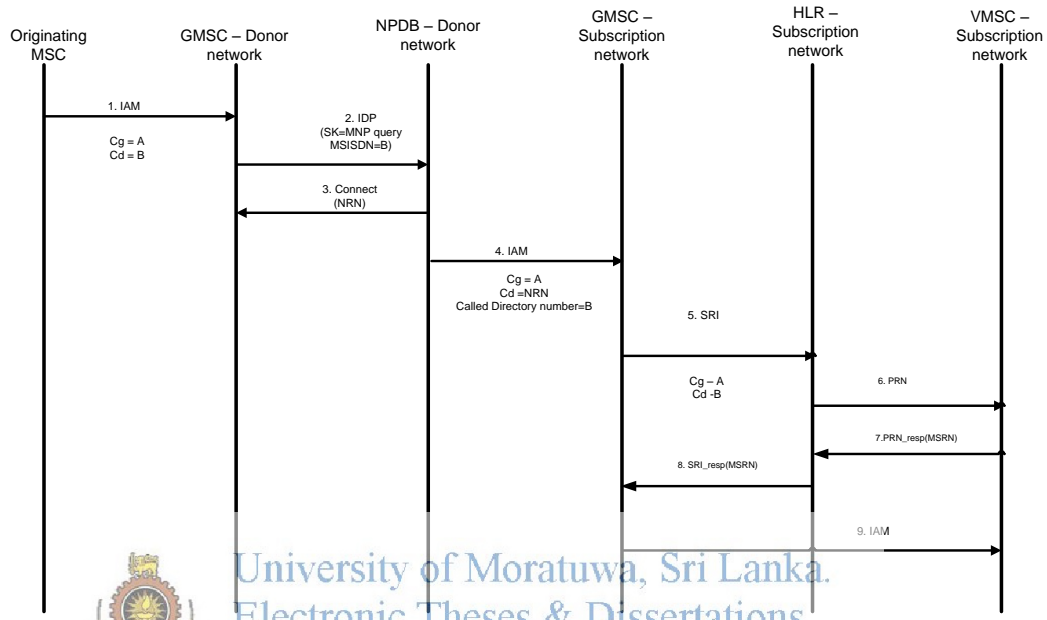## A-1.2. Terminating call to a ported number

Figure A-2 : Call flow – Terminating call to a ported number (TQoD)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards donor network.

2. GMSC of donor network is configured to trigger CAMEL "InitialDP" towards number portability database residing inside the network.

3. Number portability database identifies the number as ported number and respond with CAMEL "connect". Here call is connected to the Network Routing Number so that call can be routed to subscription network.

4. GMSC setup the call towards NRN and call will be routed to GMSC of subscription network.

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5. Since the call is terminated to a NRN, GSMC identify the number as ported in number and does not trigger number portability database, and directly queries HLR by sending "SRI" to find the routing information for "B" party number.

6. HLR talks to visitor MSC and request MSRN by sending "PRN"

7. VMSC respond with MSRN

8. HLR returns the received MSRN in SRI_resp back to GMSC.

9. GMSC setup call with VMSC by dialing the MSRN.

A-2. QoHR

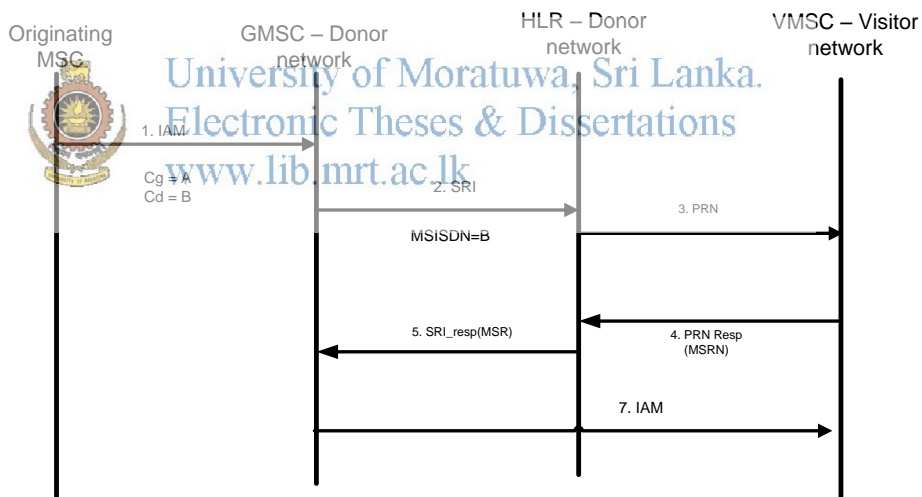### A-2.1. Terminating call to a non ported number

Figure A-3: Call flow – Terminating call to a non ported number (QoHR)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards donor network.

2. GMSC of Donor network will query HLR by sending "SRI" to find the routing information for B party number.

3. Since HLR contains an subscription entry for B number (i.e. Number is not ported)HLR talks to visitor MSC and request MSRN by sending "PRN"

4. VMSC respond with MSRN

5. HLR returns the received MSRN in SRI_resp back to GMSC.

6. GMSC setup call with VMSC by dialing the MSRN.

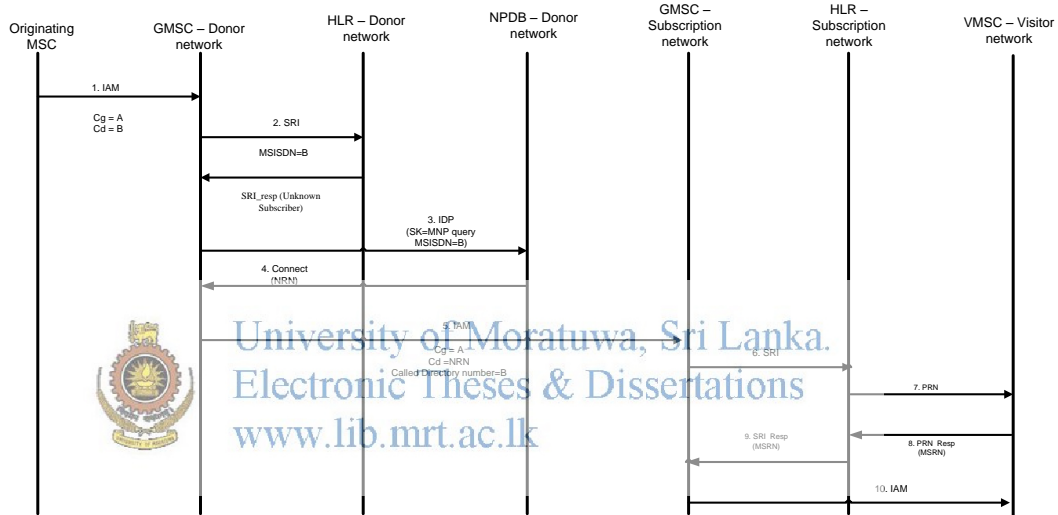## A-2.2. Terminating call to a ported number

Figure A-4: Call flow – Terminating call to a non ported number (QoHR)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards donor network.

2. GMSC of Donor network will query HLR by sending "SRI" to find the routing information for B party number.

3. Since there is no entry in HLR associated with B number HLR will return the SRI response with error code Unknown subscriber.

4. GMSC of donor network is configured to trigger CAMEL "InitialDP" towards number portability database residing inside the network if a SRI response contains "Unknown subscriber" error code.

5. Number portability database identifies the number as ported number and respond with CAMEL "connect". Here call is connected to the Network Routing Number so that call can be routed to subscription network.

6. GMSC setup the call towards NRN and call will be routed to GMSC of subscription network.

7. Since the call is terminated to a NRN, GSMC identify the number as ported in number and does not trigger number portability database, and directly queries HLR by sending "SRI" to find the routing information for "B" party number.

8. HLR talks to visitor MSC and request MSRN by sending "PRN"

9. VMSC respond with MSRN

10. HLR returns the received MSRN in SRI_resp back to GMSC.

11. GMSC setup call with VMSC by dialing the MSRN.

A-3. OQoD

A-3.1. Terminating call to a non ported number

Figure A-5: Call flow – Terminating call to a non ported number (OQoD)

1. Originating MSC triggers CAMEL "InitialDP" towards number portability database residing inside the network .

2. Number portability database identifies the number as non ported number and respond with CAMEL "continue". Therefore call is handled in normal procedure afterwards.

3. Originating MSC queries HLR by sending "SRI" to find the routing information for "B" party number.

4. HLR talks to visitor MSC and request MSRN by sending "PRN"

5. VMSC respond with MSRN

6. HLR returns the received MSRN in SRI_resp back to Originating MSC.

7. Originating MSC setup call with VMSC by dialing the MSRN.
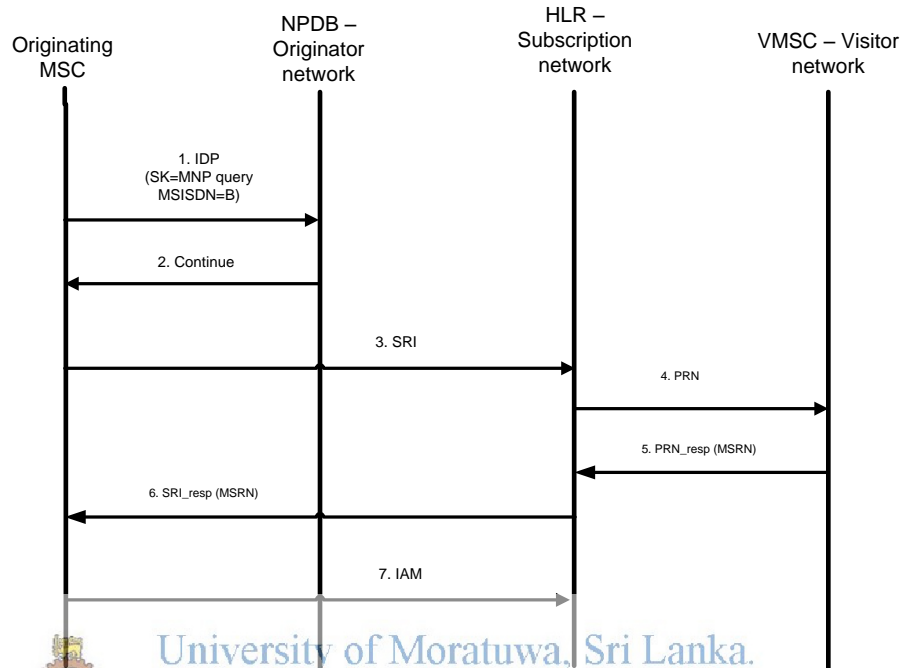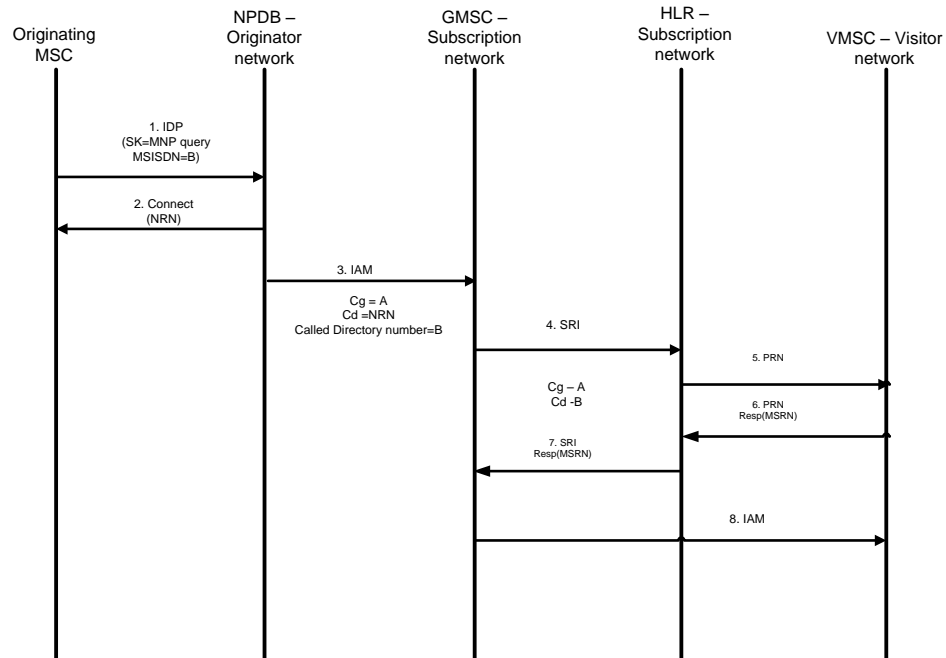
A-3.2. Terminating call to a ported number

Figure A-6: Call flow – Terminating call to a ported number (OQoD)

1. Originating MSC triggers CAMEL "InitialDP" towards number portability database residing inside the network .

2. Number portability database identifies the number as non ported number and respond with CAMEL "continue". Therefore call is handled in normal procedure afterwards.

3. Number portability database identifies the number as ported number and respond with CAMEL "connect". Here call is connected to the Network Routing Number so that call can be routed to subscription network.

4. Originating MSC setup the call towards NRN and call will be routed to GMSC of subscription network.

5. GMSC of subscription network will query HLR by sending "SRI" to find the routing information for B party number.

6. HLR talks to visitor MSC and request MSRN by sending "PRN"

7. VMSC respond with MSRN

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8. HLR returns the received MSRN in SRI_resp back to GMSC.

9. GMSC setup call with VMSC by dialing the MSRN.

A-4. Signaling Relay function

A-4.1. Terminated call to a non ported or ported in number (Direct/indirect routing)
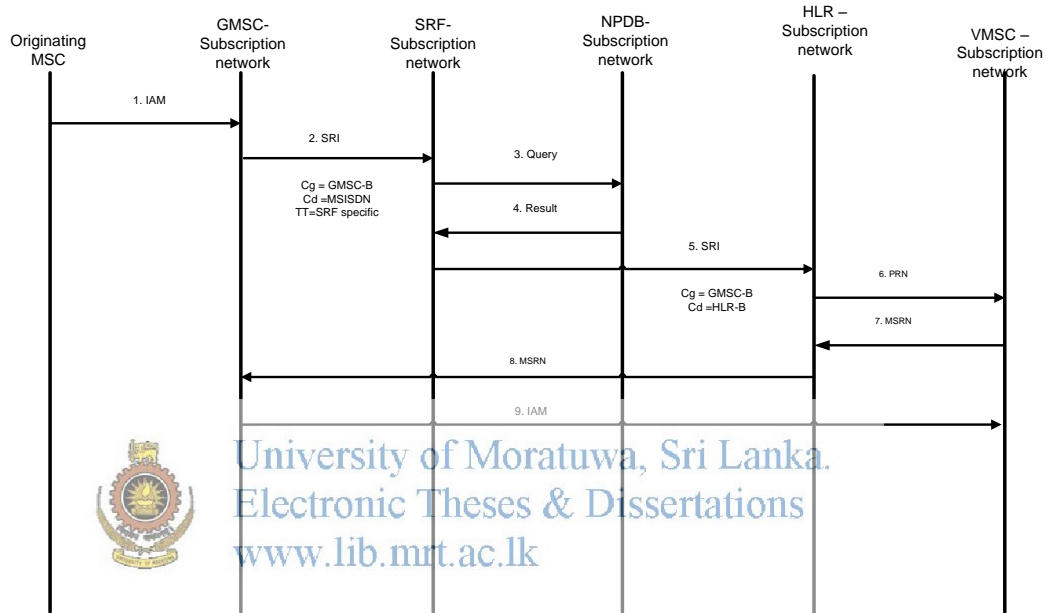
Figure A-7: Call flow – Terminating call to a non ported number (SRF)

1. From originating MSC call is setup to MSISDN of "B" party if B is non ported or to NRN if B is ported (After flow through SRF if direct routing is used), therefore ISUP "IAM" message routed towards donor network.

2. Gateway MSC will query HLR by sending "SRI" to find the routing information for B party number or NRN. Network nodes are configured to route the SRI request via Signaling Relay Function.

3. Signaling relay function queries the number portability database. The communication interface between Signaling relay function and Number portability interface is not standardized.

4. Number portability database identifies the number as non ported or ported in number and respond accordingly to the Signaling Relay Function.

5. Signaling Relay Function passes the SRI request to HLR without modifying the SCCP / TCAP parameters received in previous SRI from originating MSC.

6. HLR talks to visitor MSC and requests MSRN by sending "PRN"

7. VMSC respond with MSRN

8. HLR returns the received MSRN in SRI_resp back to originating MSC.

9. Originating MSC sets up the call with VMSC by dialing the MSRN.

A-4.2. Terminating Call to a ported number (Direct routing)
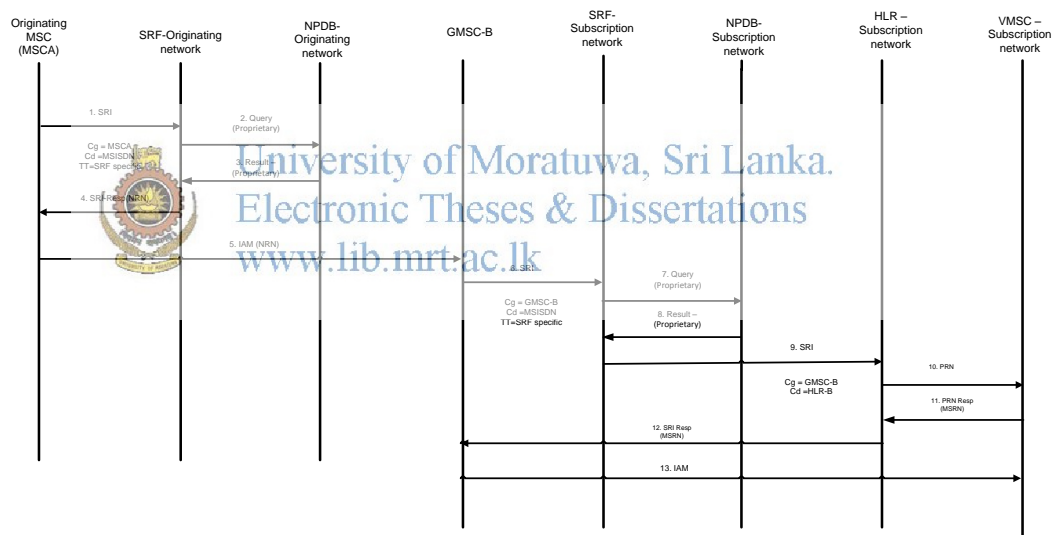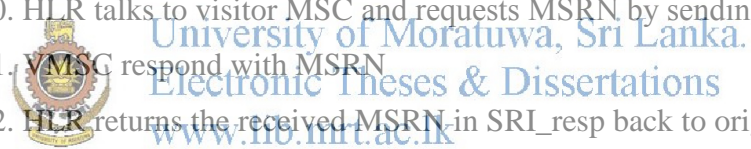

Figure A-8: Call flow – Terminating call to a ported number (SRF-Direct routing)

1. Originating MSC will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

2. Signaling relay function queries the number portability database over a proprietary interface.

3. Number portability database identifies the number as ported number and respond with NRN to identify the subscription network.

4. Signaling Relay Function passes the SRI response containing NRN.

5. Originating MSC modify the called party address to NRN and initiate the call

6. GMSC will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

7. Signaling relay function queries the number portability database over a proprietary interface.

8. Number portability database identifies the number as ported in number and respond accordingly.

9. Signaling relay function passes the SRI to own network HLR without modifying the SCCP/TCAP parameters.

10. HLR talks to visitor MSC and requests MSRN by sending "PRN"

11. VMSC respond with MSRN

12. HLR returns the received MSRN in SRI_resp back to originating MSC.

13. Originating MSC sets up the call with VMSC by dialing the MSRN.

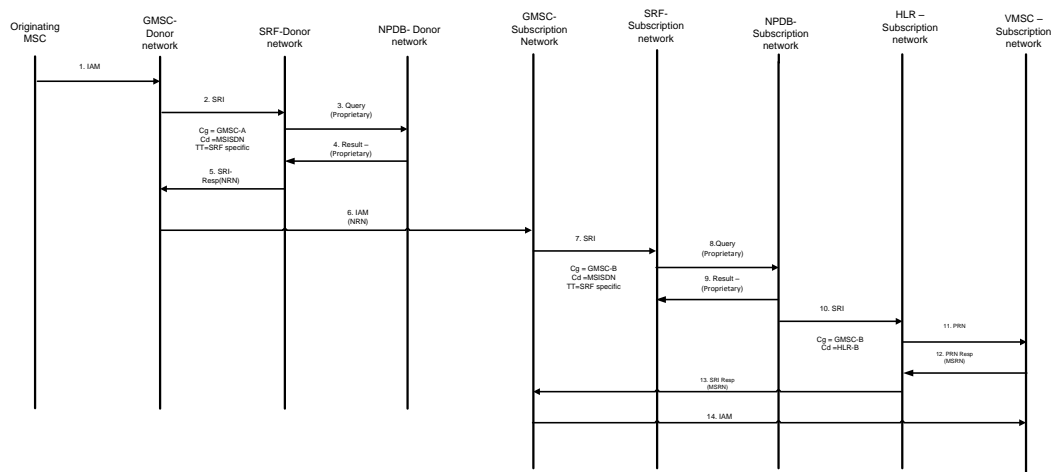## A-4.3. Terminating Call to a ported number (Indirect routing)

Figure A-9: Call flow – Terminating call to a ported number (SRF-indirect routing)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards donor network.

2. GMSC of donor network will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

3. Signaling relay function queries the number portability database over a proprietary interface.

4. Number portability database identifies the number as ported number and respond with NRN to identify the subscription network.

5. Signaling Relay Function passes the SRI response containing NRN.

6. GMSC of donor network modifies the called party address to NRN and route the call towards subscription network.

7. GMSC of subscription network will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

8. Signaling relay function queries the number portability database over a proprietary interface.

9. Number portability database identifies the number as ported in number and respond accordingly.

10. Signaling relay function passes the SRI to own network HLR without modifying the SCCP/TCAP parameters.

11. HLR talks to visitor MSC and requests MSRN by sending "PRN"

12. VMSC respond with MSRN

13. HLR returns the received MSRN in SRI_resp back to originating MSC.

14. Originating MSC sets up the call with VMSC by dialing the MSRN.

A-4.4. Terminating Call to a ported number (Indirect routing – related to subscription)
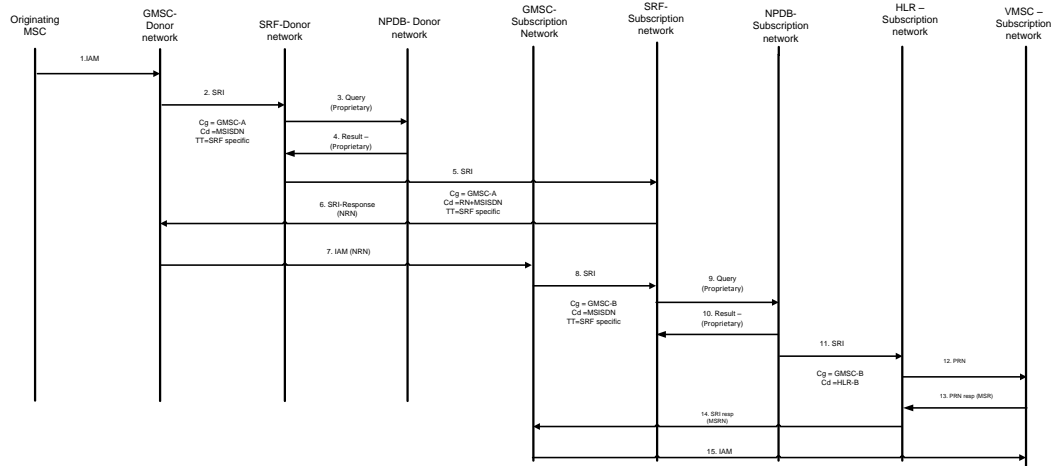
Figure A-10: Call flow – Terminating call to a ported number (SRF-indirect routing – related to subscription)

1. From originating MSC call is setup to MSISDN of "B" party, therefore ISUP "IAM" message routed towards donor network.

2. GMSC of donor network will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

3. Signaling relay function queries the number portability database over a proprietary interface.

4. Number portability database identifies the number as ported number and respond accordingly to identify the subscription network.

5. Signaling Relay Function relay the SRI request to Signaling relay of subscription network without modifying SCCP parameters of previous SRI.

6. Signaling relay function of subscription network identifies the number as ported in number and respond with NRN.

7. GMSC of donor network modifies the called party address to NRN and route the call towards subscription network.

8. GMSC of subscription network will query HLR by sending "SRI" to find the routing information for B party number. Network nodes are configured to route the SRI request via Signaling Relay function.

9. Signaling relay function queries the number portability database over a proprietary interface.

10. Number portability database identifies the number as ported in number and respond accordingly.

11. Signaling relay function passes the SRI to own network HLR without modifying the SCCP/TCAP parameters.

12. HLR talks to visitor MSC and requests MSRN by sending "PRN"

13. VMSC respond with MSRN

14. HLR returns the received MSRN in SRI_resp back to originating MSC.

15. Originating MSC sets up the call with VMSC by dialing the MSRN.

ANNEX –B: FORECASTS OF PORTING RATE

According to the mobile telephone user survey 40% of subscribers are expecting MNP services and will moved to a new service provider. For calculation of costs both 30% and 50% porting rates included in addition to 40% porting rate considering the facts that sample was selected based on Quota Sampling method and it does not represent a true random sample and confidence level and confidence interval of the survey outcome based on sample size.

It was assumed only 30% of subscribers who are willing to accept MNP will move to new service provider in the first year of MNP implementation due to lack of awareness and confidence on the service. Remaining 70% of subscribers distributed in to next 2 years, 60% in second year of MNP implementation and 10% in third year.

From 4th year of MNP implementation only 4% of total subscriber base assumed to utilize MNP services considering the prevailing churn rate and the possible improvements in service provider networks in terms of coverage, quality of services ,tariffs and supplementary services due to the increased pressure arises on service providers after MNP implementation.

Further it was assumed only 3% of subscribers will churn using MNP within the first year of fresh subscription and 4% in the second year and 5% year after. Further it was assumed 0.5% of subscribes will switch mobile service providers more than once.

Table B-1: Total number of porting, based on 30% porting rate assumption

	2015	2016	2017	2018	2019	2020
Number of Mobile connections in Sri Lanka - forecast [Based on GSMA intelligence]	26,718,984	28,484,834	30,126,528	31,669,417	33,149,389	34,596,187
Number of Mobile connections Additions (compared to previous year)	-	1,765,850	1,641,694	1,542,889	1,479,972	1,446,798
Expected number of porting	-	2,457,684	4,528,517	1,402,601	1,325,976	1,383,847
Cumulative expected number of porting	-	2,457,684	6,986,201	8,388,802	9,714,778	11,098,625
Number of subscribers porting more than once		12,288	34,931	41,944	48,574	55,493
Total porting		2,469,972	7,021,132	8,430,746	9,763,352	11,154,119
Porting %		9%	23%	27%	29%	32%

	2015	2016	2017	2018	2019	2020
Number of Mobile connections in Sri Lanka - forecast [Based on GSMA intelligence]	26,718,984	28,484,834	30,126,528	31,669,417	33,149,389	34,596,187
Number of Mobile connections Additions (	-	1,765,850	1,641,694	1,542,889	1,479,972	1,446,798

	2015	2016	2017	2018	2019	2020
compared to previous year)						
Expected number of porting	-	3,259,254	5,998,061	1,803,386	1,325,976	1,383,847
Cumulative expected number of porting	-	3,259,254	9,257,315	11,060,701	12,386,676	13,770,524
Number of subscribers porting more than once		16,296	46,287	55,304	61,933	68,853
Total porting		3,275,550	9,303,601	11,116,004	12,448,610	13,839,377
Porting %		11%	31%	35%	38%	40%

Table B-1 :Total number of porting, based on 40% porting rate assumption

Table B-3 : Total number of porting, based on 50% porting rate assumption

		2015	2016	2017	2018	2019	2020
Number of Mobile connections in Sri Lanka - forecast [Based on GSMA intelligence]		26,718,984	28,484,834	30,126,528	31,669,417	33,149,389	34,596,187
Number of Mobile connections Additions (compared to previous year)		-	1,765,850	1,641,694	1,542,889	1,479,972	1,446,798
Expected number of porting		-	4,060,823	7,467,605	2,204,171	1,325,976	1,383,847
Cumulative expected number of porting		-	4,060,823	11,528,429	13,732,599	15,058,575	16,442,422
Number of subscribers porting more than once			20,304	57,642	68,663	75,293	82,212
Total porting			4,081,127	11,586,071	13,801,262	15,133,868	16,524,634
Porting %			14%	38%	44%	46%	48%

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ANNEX-C: CALCULATION OF COST OF POST DIAL DELAY

Assumptions:

1. After dialing the number, Call Originator waits for recipient to answer the call. During the waiting time call originator does not involve in any useful work.

2. Only age group between 20 years and 70 years considered as workforce and only the population in workforce contributes in country's income. Per capita income [ref: Central bank report 2013] multiplied by the total population divided by work force population gives the average monetary value of a man day of a work force.

3. Number portability database always runs in optimum performance hence database query delay assumed to be 80ms.

Parameters:

1. Number portability database response delay   = 20 ms
2. HLR response and signaling transmission delays   =200 ms
3. CAMEL InitialDP response and signaling transmission
   delays(Distributed DB)   =   40 ms
4. CAMEL InitialDP response and signaling transmission
   delays(Centralized DB)   =   60 ms
5. IAM transmission and processing delay   = 100 ms

Table C-1: Extra signaling and trunk utilization under each MNP implementation architecture

	TQoD	OQoD	QoHR
SRI	No additional SRI	No additional SRI	one per terminated call to a ported number
IDP	For all terminated calls	For all originated calls to destination numbers in portability domain And One per terminated call, originated outside the portability domain	one per terminated call to a ported number
IAM	one per terminated call to a ported number	One per terminated call, originated outside the portability domain	one per terminated call to a ported number
DB queries	For all terminated calls	For all originated calls to destination numbers in portability domain And One per terminated call, originated outside the portability domain	one per terminated call to a ported number
Additional Trunk utilization	one per terminated call to a ported number	One per terminated call, originated outside the portability domain	one per terminated call to a ported number

Calculation of monetary value of a man day:

Per capita income(LKR) [CBSL report – 2013]	=	423,467
Total Population [CBSL report – 2013]	=	20,483,000
Work force population (Age 20-70 year)[CBSL report – 2013]	=	12,683,000

Per day production of a work force person = Per capita income X (work force population / Total population)

Per day production of a work force person (LKR)	= 1,873.89
Per hour production of a work force person (LKR)	= 78.07

Table C-2: Total cost caused by additional post dial delay per day – Distributed database (LKR)

	2016	2017	2018	2019	2020
TQoD| porting rate 30%	556,201	654,852	704,250	751,338	798,701
TQoD| porting rate 40%	568,369	689,328	744,810	791,899	839,262
TQoD| porting rate 50%	580,537	723,804	785,370	832,459	879,822
OQoD| porting rate 30%	510,244	539,652	567,289	593,800	619,716
OQoD| porting rate 40%	510,244	539,652	567,289	593,800	619,716
OQoD| porting rate 50%	510,244	539,652	567,289	593,800	619,716
QoHR| porting rate 30%	156,696	445,423	534,850	619,391	707,622
QoHR |porting rate 40%	207,802	590,224	705,204	789,745	877,975
QoHR |porting rate 50%	258,908	735,025	875,557	960,098	1,048,329

Table C-3: Total cost caused by additional post dial delay per day – Centralized database (LKR)

	2016	2017	2018	2019	2020
TQoD| porting rate 30%	642,683	746,318	800,400	851,982	903,738
TQoD| porting rate 40%	654,851	780,794	840,961	892,543	944,298
TQoD| porting rate 50%	667,020	815,271	881,521	933,103	984,859
OQoD| porting rate 30%	588,078	621,972	653,825	684,380	714,249
OQoD| porting rate 40%	588,078	621,972	653,825	684,380	714,249
OQoD| porting rate 50%	588,078	621,972	653,825	684,380	714,249
QoHR| porting rate 30%	164,158	466,634	560,319	648,886	741,318
QoHR | porting rate 40%	217,697	618,330	738,785	827,351	919,784
QoHR | porting rate 50%	271,237	770,026	917,251	1,005,817	1,098,250

Scope of Work

Implementation of Number portability database and MNP Signaling Relay function

1. Introduction
    1.1. Purpose of the document

    This document is intended to communicate the requirements of software solution to achieve implementation of Mobile number portability in Sri Lanka.

    1.2. Definitions, Acronyms And Abbreviations

        GSM- Global system for mobile communication
        HLR – home Location register
        IAM – Initial address message
        M3UA – MTP3 user adaptation
        MAP – Mobile Application Part
        MNP – Mobile Number Portability
        MSC – Mobile switching center
        NPDB – Number portability database
        NRN – Network Routing Number
        SCCP – Signaling connection control part
        SRF – Signaling relay function
        STP – Signaling transfer point
        TDM – Tie Division Multiplexing
        UMTS - Universal Mobile Telecommunications System

    1.3. overview

    Mobile number portability is a network function that allows mobile subscriber to switch services and or network service provider while retaining his/her mobile telephone number. Portability of mobile telephone connections from prepaid to post paid or vice versa can be considered be part of service portability within the network. Facilitating mobile subscriber movement between mobile telephone service providers is the most challenging in terms of technical implementation.

    Routing methods used in GSM/UMTS core network under MNP unavailable scenarios are severely impacted by mobile number portability as important routing decisions are made based on the called party address in IAM or SCCP messages carrying MAP "Send Routing Information".

    Different alternative routing procedures are being used by different operators across the globe to address the concerns. Specifically four methods listed below are globally accepted [3GPP TS 23.066].

5. Terminating call Query on Digit Analysis (TQoD)
6. Query on HLR Release (QoHR)
7. Originating call Query on Digit Analysis(OQoD)
8. Signaling Relay Function based solution. (SRF based)

2. Number portability database

2.1. Introduction

Figure D-1: Basic Message flow
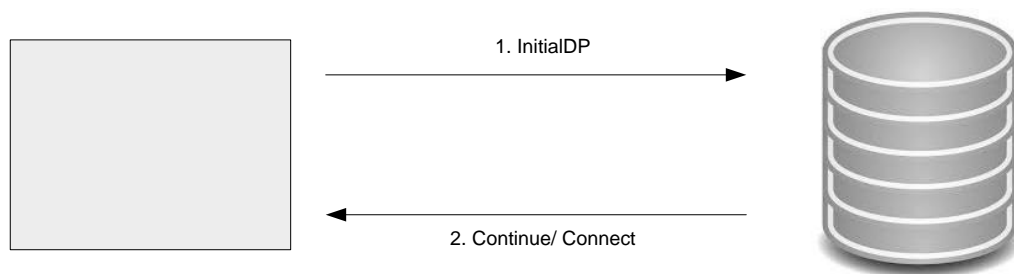
2.1.1. Number portability database should maintain the associated network routing number (NRN) against MSISDN for ported number.

2.1.2. Two options to be considered
 2.1.2.1. Centrally managed, Shared number portability database across all service providers
 2.1.2.2. Individually managed number portability database per each operator.

2.1.3. Integrate with operator MSC or STP over
    2.1.3.1. Sigtran M3UA
    2.1.3.2. TDM E1

2.1.4. Accept CAMEL InitialDP messages triggered from MSC towards NPDB.
2.1.5. Should accept only the defined CAMEL Service keys for MNP services.

2.1.6. Should support configuring MNP associated services keys via Administrator web interface.

2.1.7. Database lookup should be performed based on called party address in InitialDP.

2.1.8. If called party number is identified to be non ported , InitalDP should be responded with CAMEL continue message so that MSC will continue normal call handling procedures

2.1.9. If called party number os identified to be ported   InitalDP should be responded with CAMEL connect message so that MSC will route call towards subscription network of the ported number.

2.1.10. If CAMEL connect is used NRN associated with the ported MSISDN should be set as the called party number.

2.2. Number Provisioning

2.2.1. NPDB should provide an API to integrate 3rd party systems with NPDB for provisioning requirements

2.2.2. Addition, removal and modification of portability status of MSISDNs should be supported via provisioning interface.

2.2.3. Should be integrated with provisioning systems of all service providers

2.3. Number of records

2.3.1.Expected number of records to be supported in NPDB under each MNP implementation is mentioned below

	TQoD	QoHR	OQoD	MNP SRF - Direct routing	MNP SRF - indirect routing
Centralized NPDB	10,800,000	10,800,000	10,800,000	10,800,000	10,800,000
Individual NPDB					
Operator 1	4,000,000	4,000,000	10,800,000	10,800,000	5,700,000
Operator 2	2,400,000	2,400,000	10,800,000	10,800,000	4,500,000
Operator 3	2,400,000	2,400,000	10,800,000	10,800,000	4,500,000
Operator 4	1,000,000	1,000,000	10,800,000	10,800,000	3,450,000

Operator 5	1,000,000	1,000,000	10,800,000	10,800,000	3,450,000

    2.3.2.   System should be designed to handled 20% more number of entries without hardware or software modifications

    2.3.3.   System should be design in a scalable manner for easy capacity enhancements by adding hardware resources with no or minimum software changes.
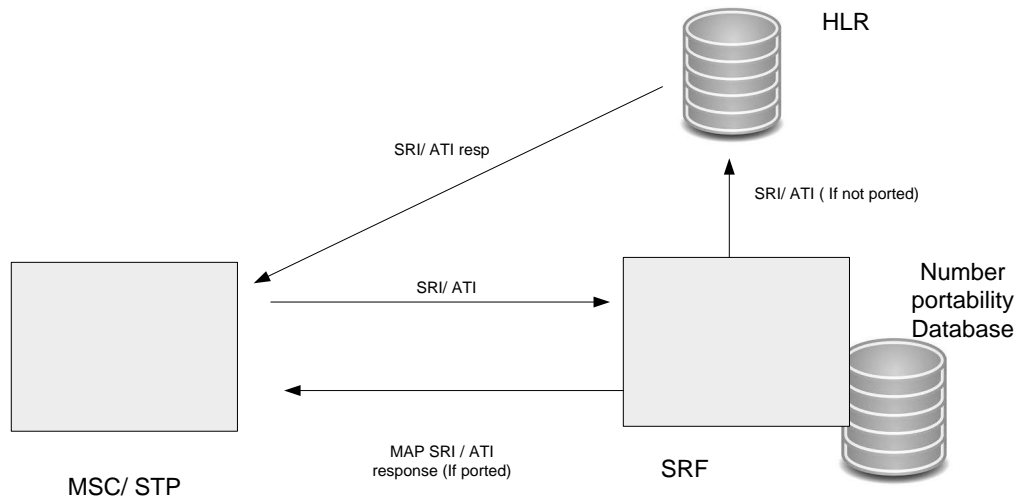
2.4. Capacity

    2.4.1.Expected number of queries per second to be supported in NPDB under each MNP implementation is mentioned below

	TQoD	QoHR	OQoD	MNP SRF - Direct routing	MNP SRF - indirect routing
Centralized NPDB	2,500	2,500	2,500	2,500	2,500
Individual NPDB					
Operator 1	1,000	1,000	2,500	2,500	1,250
Operator 2	650	650	2,500	2,500	1,000
Operator 3	650	650	2,500	2,500	1,000
Operator 4	250	250	2,500	2,500	1,000
Operator 5	250	250	2,500	2,500	1,000

2.5. In case of MNP implementation using SRF vendor if free to use any communication interface between SRF and NPDB.

2.6. System should be designed to handled 20% more number of entries without hardware or software modifications

2.7. System should be design in a scalable manner for easy capacity enhancements by adding hardware resources with no or minimum software changes.

3. Signaling Relay function (SRF)

Figure D-2: SRF message flow

HLR

SRI/ ATI resp

SRI/ ATI (If not ported)

Number
portability
Database

SRI/ ATI

MAP SRI / ATI
response (If ported)

SRF

MSC/ STP

3.1. All MAP SRI and ATI messages will be routed via SRF.

3.2. Separate translation type (TT) will be used to route messages towards SRF from network nodes.

3.3. SRF should be capable of modifying the translation type when the messages are routed back to the network.

3.4. SRF should support routing messages to network nodes based on below parameters
   3.4.1. Called party address
   3.4.2. Translation type
   3.4.3. MAP operation code

3.5. Routing rules defined inside SRF should support setting below parameters in signaling messages
   3.5.1. OPC
   3.5.2. DPC
   3.5.3. Calling party address
   3.5.4. Called party address
   3.5.5. Translation type

3.6. For all receiving SRI messages SRF should query number portability database to identify whether the destination number is ported.

3.7. If the number is identified to be ported, SRF should respond to SRI so that call will be routed towards subscription network.

3.8. MAP ATI messages should be routed to the HLR of own network if number is identified to be non ported

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3.9. MAP ATI should be routed to relevant HLR/ SRF of other network (Based on direct / indirect routing used) if number is identified to be ported.

3.10. Implementation should comply with 3GPP TS 23.066 specification.

4. Redundancy

   4.1. Proposed solution should address the redundancy in terms of hardware and software design.

   4.2. Geographical redundancy can be proposed as an option.

5. Admin interface

   5.1. Solution should include comprehensive web interface for system administrators

   5.2. All the configuration options should be available to perform via Admin interface.

   5.3. Should support role based login account creation

   5.4. Should support defining different user roles and create role based user accounts

6. Hardware requirements

   6.1. Should provide list of hardware required for deployment of solution

   6.2. Should mention hardware requirements separately for each of the below options.

       6.2.1.1.   Centralized shared database among all operators

       6.2.1.2.   Operator managed databases

           6.2.1.2.1.   Operator1

           6.2.1.2.2.   Operator2

           6.2.1.2.3.   Operator3

           6.2.1.2.4.   Operator 4

           6.2.1.2.5.   Operator5

       6.2.1.3.   MNP SRF

7. Pricing proposal

   7.1. Pricing (rough estimation) for below options should be provided separately per each option.

      7.1.1. Number portability database

       7.1.1.1.   Centralized shared database among all operators

       7.1.1.2.   Operator managed databases

           7.1.1.2.1.   Operator1

           7.1.1.2.2.   Operator2

           7.1.1.2.3.   Operator3

           7.1.1.2.4.   Operator 4

           7.1.1.2.5.   Operator5

       7.1.1.3.   MNP SRF

       7.1.1.4.   Annual maintenance fee

       7.1.1.5.   Annual maintenance fee for operating and managing shared , centralized database

7.2. Should indicate the annual maintenance fee per each option.

7.3. On centralized number portability database option, vendor may manage the entire service.

ANNEX-E: COMPARISON OF CALL CHARGES

According to the results of the survey average monthly bill of a post paid subscriber is around LKR 490 and the average bill of a pre paid subscriber is around LKR 335. After removing taxes usage charges per post paid subscriber per month is around LKR 380 and that of pre paid subscriber is around LKR 260 per month.

A comparison of usage charges applicable on an average post paid subscriber across mobile telephone service providers is mentioned in Table E-1.

Assumptions:

Service usage: Only Voice calls and SMS

Usage:

Voice calls (within the network) – 175 minutes / month

Voice calls (out side the network) – 85 minutes / month

SMS (within the network) – 50 / month

SMS (Outside the network) – 25 / month

Table E-1 : Comparison of usage charges – post paid

Service provider	Package name	Usage charge - LKR
Dialog	i250 Package	413.75
Mobitel	Value 50	373.75
Etisalat	Talk 100	363.75
Airtel	VIP150	406.25
Hutch	Post Paid Lite	363.75
Average		*384.25*
Standard deviation		*19.97*

As Table E-1 depicts there is a difference on total payable amount by average post paid service user between some service providers.

A comparison of usage charges applicable on an average pre paid subscriber across mobile telephone service providers is mentioned in Table E-2

Assumptions:

Service usage: Only Voice calls and SMS

Usage:

Voice calls (within the network) – 125 minutes / month

Voice calls (out side the network) – 60 minutes / month

SMS (within the network) – 50 / month

SMS (Outside the network) – 25 / month

Table E-2 : Comparison of usage charges – post paid

Service provider	Usage charge - LKR
Dialog	256.25
Mobitel	261.25
Etisalat	263.75
Airtel	258.75
Hutch	263.75
Average	260.75
Standard deviation	*2.59*

Unlike in post paid scenario the charges applicable across mobile service providers on pre paid services are more or less equal.

ANNEX –F: QUESTIONNAIRE

Name (Optional).. Age : .... (Years)

1. Does your mobile telephone supports dual SIM facility? ☐ Yes   ☐ No
2. Do you use multiple SIMs? ☐ Yes ☐ No
3. Mobile telephone connection details

SIM1

a) Network Service provider ?

☐ Dialog   ☐ Mobitel ☐ Etisalate ☐ Airtel   ☐ Hutch

b) Mode of payment?

☐ Prepaid (Card connection) ☐ Post paid (Monthly bills)

c) Who pays your mobile phone bill?

☐ Myself, Parents or guardian ☐ My employer(Company)

d) How much you spend monthly on your mobile telephone bills (LKR)

☐ Below Rs.300.00   ☐ between Rs.300.00 - Rs.600.00   ☐ above Rs.600.00

e) How satisfied are you with quality of services offered by service provider?

☐ Excellent ☐ Good ☐ Moderate ☐ Bad ☐ Extremely bad

f) The Network coverage is available on almost all places I frequently visit?

☐ Yes   ☐ No

g) Relative to other service providers the call charges are?

☐ Too high ☐ High ☐ almost same ☐ Low ☐ Too low

h) The supplementary services (ex: Mobile TV, Missed call alert)offered by service

provider

☐ Adequate to full fill my requirements ☐ Not adequate to full fill my

requirements

i) How many years have you been using this mobile telephone connection? ....

(years)

j) Are you proud to be served by this service provider?

☐ Yes ☐ Neutral ☐ No

k) How frequently you make calls via this SIM? (per day)

☐ Below 5 ☐ Below 10 ☐ Below 25 ☐ More than 25

l) How frequently you receive calls to this SIM? (per day)

☐ Below 5 ☐ Below 10 ☐ Below 25 ☐ More than 25

SIM2

m) Network Service provider ?

☐ Dialog ☐ Mobitel ☐ Etisalate ☐ Airtel ☐ Hutch

n) Mode of payment?

☐ Prepaid (Card connection) ☐ Post paid (Monthly bills)

o) Who pays your mobile phone bill?

☐ Myself, Parents or guardian ☐ My employer(Company)

p) How much you spend monthly on your mobile telephone bills (LKR)

☐ Below Rs.300.00 ☐ between Rs.300.00 - Rs.600.00 ☐ above Rs.600.00

q) How satisfied are you with quality of services offered by service provider?

☐ Excellent ☐ Good ☐ Moderate ☐ Bad ☐ Extremely bad

r) The Network coverage is available on almost all places I frequently visit?

☐ Yes ☐ No

s) Relative to other service providers the call charges are?

☐ Too high ☐ High ☐ almost same ☐ Low ☐ Too low

t) The supplementary services (ex: Mobile TV, Missed call alert)offered by service provider

☐ Adequate to full fill my requirements ☐ Not adequate to full fill my requirements

u) How many years have you been using this mobile telephone connection? …………
(years)

v) Are you proud to be served by this service provider?

☐ Yes   ☐ Neutral   ☐ No

w) How frequently you make calls via this SIM? (per day)

☐ Below 5   ☐ Below 10   ☐ Below 25   ☐ More than 25

x) How frequently you receive calls to this SIM? (per day)

☐ Below 5   ☐ Below 10   ☐ Below 25   ☐ More than 25

4. Are you seriously considering moving to another mobile service provider? ☐ Yes   ☐ No

5. If you were given a chance to keep existing mobile number and move to another service provider, will you move? ☐ Yes   ☐ No

6. If so which connection? ☐ SIM1   ☐ SIM2   ☐ Both

7. If so are you willing to pay Rs. 100.00 per month for that service? ☐ Yes   ☐ No

    a. If answer for above question is "No", are you willing to pay Rs. 50.00 per month for that service? ☐ Yes   ☐ No

    b. If answer for above question is "Yes", are you willing to pay Rs. 200.00 per month for that service? ☐ Yes   ☐ No

8. What do you think about the necessity of introducing a service to keep mobile number with you while moving to another service provider?

☐ Extremely necessary ☐ Very necessary ☐ somewhat necessary ☐ Not at all necessary

9. When do you think that this service should be introduced in the mobile telecommunications market?

☐ Immediately   ☐ Within 6 months   ☐ Within 1 year   ☐ Within 2 years   ☐ After 2 years

10. Why did you select new service provider? (mark all applicable choices)

☐ Low call charges   ☐ Better service   ☐ Better coverage   ☐ Offers and raffle draws
☐ Supplementary services   ☐ other……………………………………………………………..
(Please mention)

11. Do you have any experience of changing your mobile telephone number? ☐ Yes ☐ No

12. How many contacts are there in your address book?

☐ Below 100 ☐ below 200 ☐ below 500 ☐ More than 500

13. What is your monthly income level? (LKR)

☐ Below Rs 30,000 ☐ Below Rs 50,000 ☐ Below Rs 100,000 ☐ Above Rs 100,000

14. What is your highest education qualification?

☐ GCE O/L ☐ GCE A/L ☐ Diploma ☐ Bachelor's degree ☐ Post graduate

15. Is (or was) your job directly related to the telecommunication service? ☐ Yes ☐ No