Poste mobile

Rome, 9 August 2012
Prot. PM/589/2012

Body of European Regulators for Electronic Communications (BEREC)

E-mail sent to the address pm@berec.europa.eu

Subject: Response to the draft report for public consultation on "Guidelines on the application of Article 3 of the Roaming Regulation – Wholesale Roaming Access"

PosteMobile wants to provide its response to the public consultation on draft report related to "Guidelines on the application of Article 3 of the Roaming Regulation – Wholesale Roaming Access".
You can find below PosteMobile contribution on the public consultation (Annex 1).

PosteMobile remains at your disposal for any possible further clarification and encourages the European Commission to send any communication to the attention of Mr Giovanni Maria Lione, Miss. Angela Martini (giovannimaria.lione@postemobile.it; angela.martini@postemobile.it).

Best regards.

PosteMobile S.p.A
Giovanni Maria Lione
Head of Legal, Regulatory and Security Department

PosteMobile S.p.A.
Società con unico azionista
Via Aurelia, 866 - 00165 Roma
T (+39) 06 9667 4848 F (+39) 06 9667 4997
C.F. e P.I 05874351007 - Cap. Soc. € 32.561.188 i.v.
Registro Imprese di Roma, REA 995573
www.postemobile.it

Gruppo Postaitaliane

BEREC's public consultation on

BEREC Guidelines on the application of Article 3 of the Roaming Regulation - WHOLESALE ROAMING ACCESS

Submission by PosteMobile S.p.A.

***

PosteMobile, in person of Mr. Giovanni Maria Lione, Head of Legal, Regulatory and Security Department, welcomes the opportunity to contribute to "Berec's public consultation on "BEREC Guidelines on the application of Article 3 of the Roaming Regulation - WHOLESALE ROAMING ACCESS" pursuant to art. 3 of Regulation 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (hereinafter: "Regulation").

COMPANY DESCRIPTION

PosteMobile is a subsidiary of the Poste Italiane Group, operating in Italy as Mobile Virtual Network Operator (hereinafter "MVNO"). It is active since 2007 by virtue of a wholesale access agreement signed with a domestic mobile network operator (hereinafter "MNO").

PosteMobile provides traditional mobile communication services (e.g. voice, data and sms) to end users at competitive rates, but differs from other mobile operators by offering a range of distinctive services (so called "SEMPLIFICA"), such as, for example, mobile banking and mobile payment services. SEMPLIFICA M-finance and M-payment services have been implemented in order to be necessary integrated with Banks/Financial Institution's service portfolio[1].

As of today, PosteMobile is the leading MVNO in Italy with a market share of 56,8% of all mobile virtual lines, while the following (Fastweb) has a market share of 14,4%. Its market share in the mobile market amounts to ~2,3%[2] with around 2,2 millions SIM Cards as at 1 Q 2012. These figures are evidence of the success awarded by customers to the services, traditional and innovative, offered by PosteMobile.

[1] PosteMobile manages "intelligent network" components and IT resources (VAS platforms and BSS systems).
[2] Source: Agcom's Quarterly Telecommunications Observatory" (1 Q 2012) available at http://www.agcom.it/Default.aspx?message=contenuto&DCId=619

PosteMobile is planning to invest in network infrastructures in order to exploit all the advantage of a Full MVNO business model, but the final choice will not be independent from the national and European regulatory decisions.

*****

1. PROVISION OF SERVICE (GUIDELINE 1)

Q1. Do you agree with BEREC's interpretation of the Regulation concerning timing of provision of service?

We agree with Berec's position. Article 3 of the Regulation, and all related access obligations, are in force as from July 1st, 2012 and, therefore, from that date MNOs are obliged to meet reasonable wholesale access requests. The fact that the obligation for a reference offer ("RO") is binding only from January 1st, 2013 is irrelevant. The RO requirement was established in the interest of access seekers, not of MNOs, therefore the latter have no title to delay the validity of the access just because the RO provision is not operational yet.

Additionally we believe that the last sentence of the Guideline 1 should be modified as follows: "*Existing access agreements, to the extent that they deal with regulated roaming services, **should** be updated from 1 July 2012*". This is to avoid delaying tactics that otherwise could imply a not to correct implementation of Article 3,5 of the Revised Regulation.

3. REQUIREMENT TO SUPPLY SERVICES; BASIS OF PRICING (Guidelines 2, 12)

Q2. Do stakeholders agree with BEREC's approach to mandatory and optional resale access services and to its approach to pricing?

Although we appreciate BEREC's intent to clarify the provision at stake, we have reservations about the distinction drawn amongst services falling within and outside the regulated caps.

According to Article 3,3 of the Regulation, regulated caps apply to any wholesale service and components which are "necessary" to provide regulated roaming services to customer. The term "necessary" must be interpreted in the way that the direct wholesale access must comprise all services permitting access seekers to reasonably set up a business and compete in the market, irrespective of their alleged wholesale or retail nature (such a distinction may be arbitrary and in any case it is not relevant for the purpose of the application of the regulated caps).

By contrast, the services excluded from the above, to be therefore subject to "fair and reasonable prices", are only the ones relating to "wholesale resale access" pursuant to the definition laid down by article 2,2(q) of the Regulation. In other words, such additional services concern the case when regulated roaming services are provided via a resale contract with a provider different from the visited network. Again, the identification of such services does not depend on their wholesale or retail nature.

The above distinction is set forth by the Regulation and therefore it is not possible to propose different criteria to identify which services are subject to caps or fair/reasonable prices respectively. Instead, the distinction proposed in the draft Guidelines appears inconsistent with the Regulation and would also give to MNOs an easy opportunity to challenge their application in front of the national courts.

Therefore, all services potentially caught by Guidelines 2 under (a), (b) and (c) should be provided at regulated prices (caps) because they must be considered necessary for the provision of regulated roaming services pursuant to Article 3(3) of the Regulation. For a matter of clarification, a (non-exhaustive) list of mobile access services and information to be included in the Reference Offer and to be provided at regulated terms is indicated herein-below at Q16 (with reference to Guideline 22).

Berec should also consider, in this respects, that wholesale roaming caps include a share of marketing, sales and commons costs according to the assessment of costs made in December 2010[3] that there is still a huge "margin of improvements" between the new wholesale roaming caps and the total wholesale costs effectively incurred by the MNOs that generates extra profits for them.

As regards services which are not commonly covered by the roaming business practices, but which access seekers will need to purchase from MNOs, for reasons of practicality or economy, we share BEREC's view whereby such services should be provided at fair and reasonable prices.

4. IDENTITY OF ACCESS SEEKERS (Guideline 4)

Q3. How would your business be affected if the right for direct wholesale roaming access applies to hub aggregators for the purpose of supply of regulated roaming services to EEA customers? How could a distinction between access for such purposes and access for purposes unconnected with the Roaming Regulation be applied in practice?

3 International Mobile Roaming Regulation BEREC Report (BOR 10/58)

As confirmed by recital 27 of the Regulation, hub aggregators are fully and directly caught by the Regulation:

- on one side, they are entitled to benefit to direct wholesale access from MNOs;
- on the other, they are subject to the obligation of wholesale resale access vis-à-vis access seekers.

Therefore, there is no need to clarify the status of hub aggregators under the Regulation by referring to specific legal theories, for instance via the argument of constructive refusal.

In this respect, the definition of "roaming customers" under article 2 of the Regulation shall not be interpreted in so a strict way so as to exclude midmen, intermediaries or resellers: this could not be the scope of a discipline intending to expand, and not restrict, competition amongst operators and choices for consumers. A restrictive interpretation would therefore be in breach of the Regulation.

Excluding hub aggregators from the ambit of application of the Regulation (under both the aspect of access seekers and wholesale reseller) would dramatically affect the concrete possibility of the new discipline to inflate competition into the market: on one side, hub aggregators are essential for MVNOs and competitive access seekers, because it will be impossible for a new entrant to start from scratch a plurality of direct roaming agreements. On the other side, if the hub aggregators would be allowed to set a mark-up to the buyers, then the competitive advantage (for the new entrants and the consumers) will be vanished.

5. REFUSAL OF REQUESTS (Guideline 5)

Q4. Do you agree with BEREC's general approach to refusal of requests? Do you have any specific suggestions on how the guidance in this area could be strengthened so as to deter refusals on spurious grounds while not constraining the right of MNOs to refuse to provide on the basis of careful objective justification?

We share the concerns of BEREC as we fear that, without a clear and detailed discipline laid down by the Guidelines, MNOs will likely refuse access on the basis of spurious grounds. However we believe that BEREC's guidelines could be strengthened by making clearer, in general terms, that commercial, capacity and investments issues may not be invoked by MNOs to refuse access. We consider that a list of potential spurious arguments for abusive refusal should be set forth in Guideline 5 rather than Guideline 8 (as it is now). At the same time, we do not expect that any

special certification or specific proof should be requested to new entrants, since the existing licensing regime already ensures strong and sufficient safeguard for existing MNOs. On the contrary, requiring additional certifications or special testing (e.g. beyond the standard testing recommended by GSMA, see below) could result in abusive barriers.

Since roaming management is mainly based on minor network implementations and minor commercial issues to be exchanged, agreed and settled (and the effort has been reduced thanks to the GSMA work on standardizing the roaming relations both technically and commercially) we believe that there should not be refusal other than serious technical issues.

In Exibit 1, we enclose a public document of the GSMA on the Roaming Database, Structure and Updating procedure (http://www.gsma.com/newsroom/wp-content/uploads/2012/03/ir2163.pdf)), that clearly lists all information needed to set up a new roaming relation or to modify an existing one. We believe that such document represents an almost exhaustive list of basic requirements that MNOs should expect from new access seekers, and any additional information or similar should be regarded as a mean to postpone the fulfilment of the existing obligation stemming from the roaming regulation.

In addition, we suggest the creation of a monitoring mechanism allowing to verify how many roaming agreements are put in place by MNOS, whether with intra-group companies, alliances partners, other MNOs and MVNOs. In principle, the same efforts in terms of quantity of new contractual relations should be expected by MNOs when requested to open a roaming relation with a new access seeker/MVNO.

6. RESALE ACCESS SERVICES PROVIDED TO UNDERTAKINGS WHOSE RETAIL SERVICES ARE OTHERWISE HOSTED ON OTHER NETWORKS (Guideline 6)

Q5. Do stakeholders consider that further Guidelines should be developed to deal with the issue of requests for wholesale resale roaming access from market players whose retail services are otherwise hosted on other networks? If so, please provide examples of commercially credible retail services which could be operated in this manner.

We believe that this possibility should not be excluded or prevented.

7. RESALE OF UNREGULATED ROAMING SERVICES (GUIDELINE 13)

Q6. Do you agree with BEREC's views on resale access to unregulated services?

We agree in principle with the position of BEREC.

8. FAIR AND REASONABLE CHARGES (GUIDELINES 19 & 20)

Q7. Do you agree with BEREC's general approach to fair and reasonable prices? Do you consider that other general principles should be articulated?

We agree on the general approach. However, when benchmarks and recognised market prices practices exist, then BEREC should publish and recommend them as terms of references.

As regards the services to be covered by the regulated wholesale access price, they should be at least the same provided by the GSMA members and might include regulated roaming services (voice, data, sms IOT) without any additional set-up/monthly fee and/or any additional service fee (in percentage on outbound IOT) and/or any transaction fee (in addiction on cdr).

As regards the additional services to be provided "at fair conditions" in case of wholesale roaming resale access (article 4,3 second par., of the Regulation), they may be only strictly related to interworking/connectivity services needed to interconnect MVNO to HUB/Hosting networks.

PosteMobile would also like to stress the importance to introduce a non-discrimination principle under which any MNO operator would apply equivalent conditions in equivalent circumstances to ARPs (and similarly it would provide services and information to others under the same conditions and of the same quality as it provides for its own services, or those of its subsidiaries or partners).

PosteMobile therefore believes that it would be necessary to introduce this concept in the Guidelines, with also a specific remind that the NRA should be able to apply Price Tests in order to specifically verify the application of the non-discrimination principle with regard to other alternative roaming providers and its own commercial departments.

With regard to the principles indicated in Guideline 19, a further criterion should be added. In order to verify whether the resulting prices are effectively fair and do not affect the capability the access seekers to compete, NRAs should also consider the overall increase, on Unit/minute basis, of the costs caused by the additional fair and reasonable charges. If such increase is beyond 10% of the regulated caps on unit/minutes/basis, then there should be a presumption that such additional costs are not fair.

Q8. Do you agree with BEREC's proposed basis of charging for resale of incoming roaming voice calls?

PosteMobile agrees in principle with the position of BEREC, nevertheless PosteMobile fears that a generic "fair and reasonable" principle would not prevent home MNO to get undue profits upon regulated MTR payed by home MNO to the visited network

Q9. Do you agree with BEREC's proposed basis for resale charges for termination of outgoing SMS?

PosteMobile strongly agrees with the following Berec's statement "*A fair and reasonable charge for termination of outgoing roaming SMS shall take account of income received by the MNO for termination of incoming roaming SMS received by customers of the reseller*" (Guideline 20).

Moreover, PosteMobile highlights that the estimated "median" wholesale costs for incoming and outgoing sms, including sales and common costs, according to the assessment of costs made by Berec in December 2011, is largely lower compared to regulated wholesale caps (respectively 0,27 ecent/sms for outgoing SMS and 0,34 ecent/sms for incoming SMS).

So, in PosteMobile view, it should not be allowed to charge any addidional fee for the termination of outgoing sms. Anyway, in that case, 0,5 ecent/sms would represent not a glitch, but a large estimate of the cost of termination an incoming SMS, according to Berec's latest assessment.

9. SERVICE LEVEL AGREEMENTS AND GUARANTEES (GUIDELINE 23)

Q10. Do you have any comments on BEREC's approach to service level agreements and guarantees or on the regular monitoring of service levels?

PosteMobile agrees with BEREC's approach to service level agreements and guarantees or on the regular monitoring of service levels.

In this respect, it would be of paramount importance the introduction of a principle of non-discrimination under which MNO operators apply equivalent conditions in equivalent circumstances to other alternative roaming providers and provides services and information to others under the same conditions and of the same quality as it provides for its own services, or those of it subsidiaries or partners.

Therefore PosteMobile agrees that it's important that MNO supply a report showing the quality levels achieved in respect of services provided to each of the following:

- the access seeker in question;
- all access seekers in aggregate
- the MNO itself

In view of a detailed list of SLAs, it might be very useful to refer to the GSMA document on Roaming Database, Structure and Updating procedure (Exibit 1) explaining how the most important data related to international roaming can be propagated among GSMA Members. Besides the full list of information (technical and commercial) the document provides in Annex B at page 30 the update schedule for the GSM Association Roaming Database with a clear explanation of the different level of importance of each change or update.

The document is to be intended as a recommendation for Members to respect minimum schedules to ensure all roaming partners around the world are able to implement such changes. For instance, while updates regarding technical information should be sent 3 months before the change takes place as such changes are critical for ensuring roaming is not affected, many other changes are to be sent one ore more weeks. We assume that this intervals are set to cover all operators, and specially to ensure that all Members have a reasonable time to implement all changes, therefore this scheme might work as well as a basis for setting SLAs. Furthermore we believe that in EU such intervals are quite light and should be therefore be stricter to ensure that no discrimination is admissible towards new access seekers.

6.3 UPDATE INTERVALS SCHEME

The intervals for updating of information are described in the following schema:

Section Id	Section Name	Element (if needed)	Impact	Update
1	Organization information		Administrative only	
2	Network		Critical	3 months before
3	Network Information		Critical	3 months before
4	Routing Information		Critical	3 months before
5	International SCCP GW		Critical	3 months before
6	Domestic SCCP GW		Critical	3 months before
7	SCCP Protocol available at PMN		Normal	1 week
8	SUBSCRIBER IDENTITY AUTHENTICATION		Normal	1 week

9	Test Numbers Information		Medium. Maintenance usage	1 month before
10	MAP Interworking Specifically for Roaming		Normal. Critical for new version introduction	3 months before
11	MAP Optimal Routing of mobile-to-mobile calls		Normal	1 week
12	Inter-Operator SMS Enhancement		Normal	1 week
13	Network Elements Information		Medium	4 weeks before
14	USSD Information		Normal	1 week
15	CAMEL Information		Critical	3 months before
16	Packet Data Services Information		Critical	2 months before
17	IP-Roaming and IP-Interworking Information		Critical	2 months before
18	MMS Interworking Information		Critical	3 months before
19	WLAN Information		Critical	3 months before
20	Numbering Information		Normal	1 week
21	Contact Information		Critical for troubleshooting Normal for other contacts	3 months before 1 week
22	Roaming HUB Info		Critical	3 months before
23	Hosted Networks		Critical	45 days before

10. INTEROPERABILITY, INTERFACES AND PROTOCOLS (GUIDELINE 25)

Q11. Please set out your views on what the "accepted standards and methods" are. Is there any action which BEREC could usefully take to promote further useful standardisation?

International roaming standards in Europe are normally laid down by the GSMA, therefore BEREC should make sure that's such standards are opened and accessible by access seekers of any kind, including MVNOs, when this is necessary. This may imply full and non-discriminatory access to Permanent Reference Documents (so called PRDs) issued by the GSMA to standardise the technical and commercial aspects of roaming relations (IR, TADIG; BARG; etc).

This is necessary due to the strict dependence of the roaming business on the rules and practices standardized by the GSMA. It is necessary to note that MNOs participating to GSMA meetings have no incentive to speed up the standardization of technical decoupling solutions suitable for a potential competitor that could enter into the market and gain market shares in a declining market (in terms of revenues). As a consequence, Berec should consider whether MVNOs can be admitted to participate to the elaboration of such rules, in quality of members after the possibility to gain access to STIRA agreements. This is necessary because MNOs participating to GSMA meetings, could define technical rules in order to use their oligopolistic position ("constructive refusal to

deal"), pushing out of the market ARPs (for instance, by delaying the standardization of innovative and pro-comeptitive solutions).

In addition, roaming best practices applicable amongst GSMA members should be extended also to MVNOs, such as:

- Accounting, invoicing and settlement (wholesale);
- Billing (retail);
- Fraud management.

In light of the strict dependence of the roaming business on the rules and practices standardized by the GSMA, BEREC should recommend that MVNOs be allowed to participate to the elaboration of such rules.

11. FRAUD PREVENTION (GUIDELINE 30)

Q12. Do you consider that the Guidelines should include specific provisions on fraud prevention in addition to the generic statements in the draft?

This issue should be solved by applying standardised procedures, also in compliance with GSMA practices (see our reply to Q11) made accessible also to MVNOs.

12. RESTRICTIONS ON CONDUCT OF BUSINESS (Guideline 32)

Q13. Do you consider that BEREC should provide more detailed guidance on restrictions of conduct of business? In particular, would it be useful to include an indicative list of generally unacceptable restrictions in the Guidelines.

PosteMobile believes that access seekers should not be hindered from conducting their business as they see fit, within the constraints of the law.

It is difficult to provide an exaustive list of unacceptable restriction and PosteMobile believes, in any case, that it is better to set a general principle, rather than a "black list" of unacceptable constraints that could result no to be exhaustive. For example it should not be permitted to MNOs to impose unilaterally a Fair Usage Policy to the MVNO roaming customers

In any case, we do not share Berec's statement whereby "*In order to deliver service efficiently, access providers are entitled to request information on expected volumes or, in the absence of such*

information, impose maxima for volumes or intensity of utilisation". Fact is, volume caps imposed on access seekers are just instruments to limit their growth and expansion, with the aim to discriminate potential competitors such as MVNO and reduce them to resellers level.

Q14. Do you consider that any current practical "permanent roaming" applications should be considered as an "unfair use" of roaming wholesale access agreements? If so, please explain why and also how you would propose to distinguish between "fair" and "unfair" uses of permanent roaming. Would a distinction based on the phone number of the roaming MSISDN be relevant and applicable?

We agree with BEREC's approach. No need for the time to take action about potential permanent roaming issues.

Permanent roaming is a world trend, see the following MoU agreements signed in Juy 2012 by majors MNOs (including KPN, Vimpelcom and Telefonica) with the aim to develop M2M solutions for big corporations http://www.tmcnet.com/usubmit/2012/07/10/6425452.htm . The scope of the MoU is, *inter alia*: "*The goal of the global alliance is to create efficiencies for manufacturers and enhance the end user experience by enabling delivery of a global product with a single SIM, eliminating roaming costs in the countries of participating operators*".

13. UNREASONABLE BARRIERS TO ENTRY (GUIDELINE 33)

Q15. Do you consider that the Guidelines need further detail concerning anti-competitive provisions which must not be included in the Reference Offer or supply contract?

The Guidelines should include an indicative list of potential anticompetitive clauses such as:

- expiration dates
- periodical renegotiations
- unusual bank guarantee and performance bonds
- minimum purchase volumes
- bundling of services to be purchased
- bundling of roaming agreements in other countries
- exclusivity clauses

We firmly oppose the possibility that anti-competitive clauses may be acceptable "*if there is exceptional justification*". The Guidelines should not open the door to the idea that, under some circumstances, anticompetitive clauses are legitimate. If an anticompetitive clause may be exceptionally justified under general competition rules, this is a matter of evaluation for the competent antitrust authority or NRA.

14. OTHER ISSUES

Q16. Do you consider that the Guidelines should cover additional issues or that the draft guidance on issues already covered should be further developed?

Prioritisation (Guideline 7)

BEREC should make clear that, in the matter of prioritisation, non-discrimination is both external (other access seekers) and internal (MNO's departments).

BEREC should explicitly make clear that, whatever prioritisation occurs, the maximum time limits for the supply of the access service cannot be exceeded pursuant to Article 3(5) of the Regulation.

Reference Offer (Guidelines 22)

The Guidelines should indicate a non-exhaustive list of services to be included in the RO, in order to reduce the room for disputes and delaying strategies. Such list should

The RO should confirms the non-discrimination principle under which MNO operators apply equivalent conditions in equivalent circumstances to other alternative roaming providers, and provides services and information to others under the same conditions and of the same quality as it provides for its own services, or those of it subsidiaries or partners.

In addition, in order to allow effective functioning of separate sales roaming market introduced by RR, it should be clear that all wholesale roaming requests must be processed independent of the specific kind of structural solution (dual IMSI, single IMSI, LBO) that MVNO wants to use.

The following items should be at least included in the RO:

a) list of networks elements (HLR/VLR/MSC) and associated facilities;
b) list of technical interfaces and protocols in order to guarantee effective interoperability;
c) synchronizations activities of technical interfaces, network elements and associated facilities between MNOs networks and alternative roaming providers;

d) condition for access to information systems or databases for pre-ordering, provisioning, testing, maintenance and billing activities;
e) appropriate software systems encompassing the necessary operational support;
f) number portability procedures or other systems able to support the same functionalities;
g) economic conditions with a clear disaggregation of cost components underlying the services provided for each feature, function and facility listed above (with a distinction of per minute charges from one-off fees);
h) service levels agreements (SLA) and lead time for responding to requests for supply of services and facilities;
i) penalties provided for failure to meet pre-ordering, provisioning, testing, maintenance (fault repair) and billing contract terms;

The Guidelines should recommend that RO includes the standard draft agreement as indicated by art. 3 of Regulation, thus specifying that any other technical or economic condition not specified and not requested cannot be charged to the alternative roaming provider. With the aim to avoid an increase in structural and opportunistic constraints for the alternative roaming providers, it is necessary that RO will be sufficiently unbundled so that the beneficiary does not have to pay for network elements or facilities which are not necessary for the supply of its services (ie. so called tying effect);

Q17. Do you have any other comments on the draft Guidelines?

We have the following further comments.

Accessibility of GSMA services and practices

In order to avoid constructive refusal, delay or dilatory tactics based on alleged technical reasons, BEREC should recommend and encourage GSMA to make accessible to MVNOs, at fair and non-discriminatory conditions, the same operational services provided to its members in relation to roaming agreements.

Here below we report a list of such services developed by GSMA and currently available only for members, that will be essential for MVNOs launching international roaming services:

- access to the Infocentre: the GSMA offers to its members access this shared database listing technical and contact information needed for the establishment, testing and maintainance of

(unilateral or multilateral) roaming agreements. Access to this database facilitates and improves the management of roaming by MNOs and constitutes a crucial resource to streamline the processes required to offer roaming services. In a simplified way, the GSMA Infocentre offers a one-stop shop that helps MNOs in a very complex scenario where many agreements are constantly monitored and managed. Lacking access to this database, each single operator should engage in a heavily time consuming activity to create, update and maintain all information needed to ensure roaming is effectively in place. Furthermore, the database mitigates the risks of erroneous technical and commercial misinformation being spread amongst roaming partners, to the detriment of an efficient operational stream. Therefore access to such information as a single database, as well as respect of the very same time constraint for updates and modifications should be granted to those actors seeking roaming access from any MNO member of the GSMA.

- Possibility to use GSMA network coverage maps in order to reduce customer service operation costs useful for reaching directly end-user customer before they travel. The coverage service provides members of the GSMA with the facility to display their coverage information on the hugely popular Mobile World Live web site which receives over 1.2 million site visits per year and 10 million page views.
- Access to TAP service that represents the process that allows a visited network operator to send billing records of roaming subscribers to their respective home network operator. TAP3 is the latest version of the standard and will enable billing for a host of new services that networks intend to offer their customers. Such new version includes new Internet driven information services, new levels of fraud and security protection as well as new international prepaid roaming services.
- Possibility to use the Rejects and Returns process in order to improve rejects handling. This is because in some cases erroneous call event details are rejected, resulting in loss of revenue to operators. The new Rejects & Returns process available for the GSMA member deals with this problem by providing an automated, standardised method for handling erroneous TAP files.
- Opportunity to use the tap testing toolkit. In particular, the testing toolkit is a user-friendly interactive windows application developed by the GSM Association (GSMA) that has been developed to provide assistance in the testing required prior to launching roaming with a new roaming partner and when upgrading billing systems.
-

Lack of reciprocity with non- European MVNOs

PosteMobile acknowledges that when trying to enter international roaming markets outside EU, it won't rely on the mandatory access rules granted by the Regulation. However, extra-European companies will be allowed to enter the European market, thanks to the Regulation. This lack of reciprocity should be addressed by Berec, which should alert the European Commission about this issue.

Berec should also consider whether European MVNO subsidiaries of extra-European operators are extending the benefit of the Regulation also to consumers using non EU-IMSI and numbering. Also in this case, the lack of reciprocity should be addressed.

*****

PosteMobile is available for any further clarification or in-depth analysis and encourages Berec to send any communication to the attention of Mr. Giovanni Maria Lione (giovannimaria.lione@postemobile.it) and Angela Martini (angela.martini@postemobile.it).

Roaming Database, Structure and Updating Procedures
6.3
March, 2011

This is a binding permanent reference document of the GSM Association.

Security Classification – NON-CONFIDENTIAL GSMA Material

Table of Contents

1 INTRODUCTION

1.1 Scope of document

In order to have a common and easy overview of the most important data related to International Roaming, a database for storing this data has been created.

1.2 Glossary

Term	Meaning
APN	Access Point Name
ASN	Autonomous System Number
CAMEL	Customized Applications for Mobile networks using Enhanced Logic
CAP	CAMEL Application Part
CC	Country Code
CCITT	International Telegraph and Telephone Consultative Committee
DNS	Domain Name Service
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standards Institute
GPRS	General Packet Radio Service
GSMA	GSM Association
GRX	GPRS Roaming Exchange
GSN	GPRS Support Node
HQ	Headquarters
IMSI	International Mobile Station Identity
IP	Internet Protocol
MAP	Mobile Application Part
MCC	Mobile Country Code
MGT	Mobile Global Title
MNC	Mobile Network Code
MSC	Mobile Services Switching Centre
MSISDN	Mobile Subscriber ISDN Number
NC	Network Code
NDC	National Destination Code
PC	Point Code
PMN	Public Mobile Network
RAEX	Roaming Agreement EXchange
RILTE	Roaming in Long Term Evolution
SCCP	Signalling Connection Control Part
SMSC	Short Message Service Centre
SS7	Signalling System no. 7

2 STRUCTURE OF THE DATABASE

The following information is stored in the GSM Association Roaming Database for each MNO, (Mobile Network Operator):

- Organization Information:
- The Organization Name
- The Operators home country in abbreviated format
- Information for each Network(s), Roaming Hubbing and Hosted Network belonging to the Organization including:
- The TADIG code used by the operator according TD.13
- The technology and the frequency of the operator
- Network Information
- Numbering Information
- International and Domestic SCCP GW information
- Type of SCCP protocol available at PMN
- Information about Subscriber Identity Authentication
- The test number available at PMN for service testing
- The information concerning introduction of MAP, a list of the Application Context with the current version and the time planned for changing to the next higher version
- Addresses of network elements with Time Zone information
- Information about USSD availability and the supported phase
- CAMEL Application Part (CAP) version
- Information associated with GPRS network identifiers, such as APN operator identifier, list of test APNs, Data Service supported with Class Capabilities etc
- Information associated with IP Roaming and IP interworking towards the GRX provider, such as DNS IP addresses/names (primary and secondary), IP address range(s), AS Number etc. of the PLMN
- MMS Inter-working and WLAN Information
- Detailed numbering information where needed
- Information about contact persons listed by service and troubleshooting contacts
- Roaming Hubbing
- Information related to Roaming Hub(s) in use by the PMN in terms of technology used
- Hosted Network
- Information about any type of hosted network including non terrestrial and satellite. Available information are: TADIG code and numbering of the network nodes
- Information for LTE Roaming

3 REPORTS

Three types of reports are available:

3.1 Partial Report 1 – with the following information:

- The name of the operator
- The home country of the operator
- The E.164 CC + NDC
- The E.212 MCC + MNC
- The E.214 MGT
- This is the data relevant for all Visiting MSC/VLRs.

3.2 Partial Report 2 – with the following GPRS/IP-Roaming & IP-Interworking:

- APN operator identifier
- DNS IP address (primary)
- DNS IP address (secondary)
- Inter PLMN GSN backbone IP address range(s) and ASN.
- ASN assigned to operator

Note: Production of this report has yet to be agreed with the GSM Association.

3.3 Full Report 3 – including all the data stored for the PLMN

4 PROCEDURES FOR UPDATING THE DATABASE

When data for a PLMN changes, or when a new PLMN is introduced, the procedures for updating the Roaming Database and for distributing the information to the other PLMNs are as follows:

1. The PLMN sends the updating information to the GSM Association Headquarters (GSMA HQ) together with possible information on the date for the change. For this purpose the form given in Annex A shall be used.
   In case of a new PLMN: all fields shall be filled in.

   In case of a change in data for an already registered PLMN: only name of the operator and the changed data shall be filled in.

   Annex B defines the procedures and timescales for a PLMN to send information about a change of data to the GSM Association
2. The GSM Association Headquarters updates the relevant parts of the database.
3. The GSM Association Headquarters can distribute details of the changes to all the PLMN operators.

   Annex B defines the procedures and timescales for the GSM Association Headquarters to distribute update information to GSM Association Members
4. Headquarters – the IR.21 information for each operator is available on the GSM Association's Infocentre database. A nominated contact from each PLMN operator can make changes to update the information on this database for their respective network only.

   Note: The "Miscellaneous Roaming Info" section should be used to identify the fields where changes have been made, with details of the date when they will become effective.
5. The GSMA HQ - will investigate to ensure that whenever any change is made by a PLMN operator to the IR.21 database on the Infocentre, all the other PLMN operators will receive automatic notification that a change has been made to that operator's IR.21 information. Details of the actual change will not be included in

this notification. The other PLMN operators can then either view the change detail by accessing the IR.21 database on the Infocentre, or directly contacting the respective PLMN operator.

The required time schedule for updating the database is specified in Annex B.

5 ANNEX A

Updating of the GSM Association roaming database

GSMA Roaming Database

IR.21 Data

[Space blank for logo positioning, centred]

Effective Date of Change:	DD-MM-YYYY

ORGANISATION INFORMATION

Section ID: 1 (Mandatory)

Organisation Name:[1]	<Organisation Name>
Country:	<XXX>

1 Maximum 128 chars. This field is only used for administrative purposes, however, it must always be filled in order to identify the operator.

History of Changes

Date of Change	Section ID	*TADIG Code*	Description
YYYY-MM-DD			
YYYY-MM-DD			
YYYY-MM-DD			
YYYY-MM-DD			

NETWORK

Section ID: 2 (Mandatory, Repeating)

TADIG Code:	XXXYY *(Fill with TADIG Code Associated to the Network. See TD.13)*

Network Type:	*Choose between "*Terrestrial" or "Non-Terrestrial"

List of Technologies	

List of Frequencies:	

NETWORK INFORMATION

Section ID: 3 (Mandatory)
The following information refer to the network identified by TADIG Code: XXXYY
RAEX Version: YYYY

ROUTING INFORMATION

TADIG Code: XXXYY
Section ID: 4 (Mandatory)

CCITT E.164 Number series	**Country Code (CC)**	**National Destination Code (NDC)**	***SN Range Start***	***SN Range Stop***	***Primary International DPC[2]***	***Secondary International DPC[3]***
MSISDN Number Range(s):						

Network Nodes Global Title Number Range(s):						

MSRN Number Range(s):						

E. 212 Number series:	**Mobile Country Code**	**Mobile Network Code**

[2] Primary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"

[3] Secondary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"

	(MCC)	(MNC)

E. 214 Mobile Global Title (MGT)	Country Code of MGT (CC)[4]	Network Code of MGT (NC)

Does Number Portability apply?	

List of E.164 Number Ranges due to Number Portability	CC	NDC	*SN Range Start*	*SN Range Stop*

Additional Information:	

INTERNATIONAL SCCP GATEWAY

TADIG Code: XXXYY
Section ID: 5 (Mandatory)

International SCCP Carrier List	
SCCP Carrier Info	
SCCP carrier Name:	
DPC List	
DPC Info	
Signature:	
Type:	
International DPC:	
Comments:[5]	

DOMESTIC SCCP GATEWAY

TADIG Code: XXXYY
Section ID: 6 (Conditional)

Section Not Applicable

Or

Domestic SCCP Carrier List	
SCCP Carrier Info	
SCCP carrier Name:	
DPC List	
DPC Info	
Signature:[6]	
Type:[7]	

4 identical to the E.164 Country Code. Additional information due to Number Portability is included in the "Number Information" field of the "Miscellaneous Information" table

5 To provide more information about the specific DPC used (i.e. primary, secondary)

6 Maximum 20 letters. This field is only needed for information and may be omitted.

Domestic DPC:	
Comments:[8]	

SCCP PROTOCOL AVAILABLE AT PMN FOR CONNECTION FOR INTERNATIONAL SS7 ROAMING

TADIG Code: XXXYY
Section ID: 7 (Optional)

Section Not Applicable

Or

SCCP Protocol available at PMN	Availability (Yes/No)
ETSI (ITU):	
ANSI:	

SUBSCRIBER IDENTITY AUTHENTICATION

TADIG Code: XXXYY
Section ID: 8 (Mandatory)

Authentications	Performed (Yes/No)
Authentication performed for Roaming subscribers at the commencement of GSM service[9]	
Authentication performed for roaming subscribers in case of GPRS[10]	

A5 Cipher Algorithm version in use	

7 ISC, MSC, Stand-alone SCCP etc. Maximum 20 letters. This field is only needed for information and may be omitted

8 To provide more information about the specific DPC used (i.e. primary, secondary)

9 Write YES if authentication is performed as described within the current version of SG.15 under section Subscriber Identity Authentication/ Roamed Subscriber. Otherwise write NO

SG.15 v 3.0.0 says in section 2.2 Roamed Subscribers:

For roamed subscribers (at the commencement of GSM service) authentication is to be performed at every occasion of:-

a) Network access using IMSI

b) Location updating involving VLR change

c) Network access for at least 1 in x mobile originated and terminated call set-ups (incl. SMS). The value of x will be defined in the roaming agreements and should be less than 10

d) Supplementary service operation outside call

e) Cipher key sequence number mismatch

If GPRS is supported, authentication is also to be performed at every occasion of:-

a) GPRS attach

b) routing area updating involving SGSN change

c) PDP context activation

d) P-TIMSI signature mismatch, if P-TMSI signature is used

e) P-TMSI signature not inserted in a Attach Request or Routing Area Update Request

10 Write YES if authentication is performed as described within the current version of SG.15 under section Subscriber Identity Authentication/ Roamed Subscriber if GPRS is supported. Otherwise write NO. If GPRS is not supported fill in N/A

Test Numbers Information

TADIG Code: XXXYY
Section ID: 9 (Optional)

Section Not Applicable

Or

Number Type	Test Number	*Location*	*Comments*

MOBILE APPLICATION PART (MAP)

TADIG Code: XXXYY
Section ID: 10 (Mandatory)

Interworking Specifically for Roaming				
Application Context Name	**Current Version in**			***Comment***
	Inbound Roaming		**Outbound Roaming** [11]	
	MSC/VLR	**SGSN**		
networkLocUp		N/A		
roamingNumberEnquiry		N/A		
InfoRetrieval				
subscriberDataMng				
networkFunctionalSs		N/A		
mwdMngt				
shortMsgMT-Relay (shortMsgRelay in v1)				
shortMsgMO-Relay (shortMsgRelay in v1)				
ss-InvocationNotification		N/A		
subscriberInfoEnquiry				
gprsLocationUpdate	N/A			
locationCancellation				
msPurging				
reset				
networkUnstructuredSs		N/A		
Reporting		N/A		
callCompletion		N/A		
istAlerting		N/A		
serviceTermination		N/A		
locationSvcGateway	N/A	N/A		
mm-EventReporting		N/A		
authenticationFailureReport				
imsiRetrieval		N/A		
gprsNotifyContext	N/A			
gprsLocationInfoRetrieval	N/A			
failureReport	N/A			
secureTransportHandling				

11 The term "Outbound Roaming" denotes any one of the following nodes that is located in the home PLMN only: HLR, gsmSCF, SMS-IWMSC, SMS-GMSC.

MAP OPTIMAL ROUTING SECTION

TADIG Code: XXXYY
Section ID: 11 (Optional)

Section Not Applicable

Or

MAP Optimal Routing of mobile-to-mobile calls				
Application Context Name	**Current Version in**			***Comment***
	(V)MSC[12]	**GMSC**	**HLR**	
CallControlTransfer			N/A	
LocationInfoRetrieval[13]	N/A			

MAP INTER OPERATOR SMS ENHANCEMENT

TADIG Code: XXXYY
Section ID: 12 (Optional)

Section Not Applicable

Or

Inter-Operator SMS Enhancement				
Application Context Name	**Current Version in**			***Comment***
	SMS-IWMSC	**SMS-GMSC**	**HLR**	
shortMsgGateway	N/A			
shortMsgAlert		N/A		

12 The MSC is acting as a VMSC for a roaming subscriber for ORLCF; see sub-clause 4.2 of 3GPP TS 23.079 for more information.

13 The "locationInfoRetrieval" application context is only valid for inter-PLMN signalling in Optimal Routeing of mobile-to-mobile calls; otherwise it is only intra-PLMN. Note that the dialogue initiator is a GMSC which is integrated with the calling subscriber's MSC/VLR (and obviously the dialogue responder is the called subscriber's HLR, which is in the called subscriber's HPLMN).

NETWORK ELEMENTS INFORMATION

TADIG Code: XXXYY
Section ID: 13 (Mandatory)

Node Type	Node ID	GT Address or GT Address Range	*IP Address or IP Address Range*	*Vendor Info*	*Sw/Hw Version*	*Dual Access*[14]	*Location*	UTC Time Offset	*DST*[15] *Start*	*DST End*

USSD INFORMATION

TADIG Code: XXXYY
Section ID: 14 (Optional)

Section Not Applicable

Or

USSD capability available?[16]	
Supported phase: [17]	

CAMEL INFO

TADIG Code: XXXYY
Section ID: 15 (Conditional)

Section Not Applicable

Or

gsmSSF/MSC

14 Dual Access information for testing purposes

15 Indication if Daylight Savings Time (DST) is observed. Insert Start and End date for DST (mm/dd/year).

16 Yes means USSD capability is supported including all of case a), section 5.1.2, 3GPP TS 22.090 / GSM 02.90.

17 The field is mandatory, where USSD capability is available.

Phase 1 only support mobile initiated operation (pull operation)

Phase 2 support for network initiated operation (pull and push operation).

CAP Version supported[18] Inbound	*Planned Version*	*Planned Date:*
CAP Version supported[19] Outbound	***Planned Version***	***Planned Date:***

CAMEL Functionality Information			
Service name	**SK**	**CAP Version**	**SCP GT Address(es)**
CAMEL re-Rouitng Numbering Information			
List of numbers used for re-routing purposes[20]			

CAPv4 Partial Implementations[21]		
CAMEL Phase 4 CSIs:	**Supported (Yes/No)**	***Planned Date:***
O-CSI		
D-CSI		
VT-CSI		
MT-SMS-CSI		
Functionalities:	**Supported (Yes/No)**	***Planned Date:***
Initiate Call Attempt		
Split Leg		
Move Leg		
Disconnect Leg		
Entity Released		
DFC With Argument		
Play Tone		
DTMF Mid Call		
Charging Indicator		
Alerting DP		
Location At Alerting		
Change Of Position DP		
OR Interactions		
Warning Tone Enhancements		
CF Enhancements		

gsmSSF/SGSN		
CAP Version supported[22]	***Planned Version:***	***Planned Date:***

CAPv4 Partial Implementations[23]		
CAMEL Phase 4 CSIs:	**Supported (Yes/No)**	***Planned Date:***
MT-SMS-CSI		
MG-CSI		

18 For information: some operators may restrict the use of CAMEL on specific PLMNs.

19 For information: some operators may restrict the use of CAMEL on specific PLMNs.

20 To provide information of Re Routing CAMEL number for troubleshooting

21 To be completed only if CAP version 4 is supported.

22 For information: some operators may restrict the use of CAMEL on specific PLMNs

23 To be completed only if CAP version 4 is supported.

CAPv4 Partial Implementations[23]		
CAMEL Phase 4 CSIs:	**Supported (Yes/No)**	***Planned Date:***
PSI Enhancements		

PACKET DATA SERVICES INFORMATION

TADIG Code: XXXYY
Section ID: 16 (Conditional)

Section Not Applicable

Or

List of APN Operator Identifiers	
APN Operator Identifier[24]	

List of APNs available for testing and troubleshooting

APN WEB List				
APN Credential			***ISP DNS IP address (primary)***	***ISP DNS IP address (secondary)***
APN	**Username**	**Password**		

APN WAP List					
APN Credential			***WAP Gateway IP Address***	***WAP Server URL***	***WAP Port***
APN	**Username**	**Password**			

APN MMS List				
APN Credential			***WAP Gateway IP address for MMS***	***Messaging Server URL***
APN	**Username**	**Password**		

GTP Version[25]	
SGSN:	
GGSN:	

List of Data Services supported	
Data Service	***Multislot Class Capability***[26]

Multiple PDP Context Support[27]	
Supported or Not Supported	
Number of simultaneous Primary PDP context	

24 APN Operator Identifier used for GGSN resolution. The last three labels of the APN Operator Identifier must be in the form: MNC.MCC.GPRS

25 The highest GTP version which operators support. (e.g.: R97 and R98: ver.0, R99 and after R99 : ver.1)
It is recommend that GTPver1 be supported from 00:00:00 1st January 2005, otherwise while GTPver0 only is supported by a network that network should apply the configuration defined in IR.34.

26 Maximum Multislot class capability available

27 If Yes please indicate how many simultaneous Primary PDP context are supported by the network

IP - ROAMING AND IP - INTERWORKING INFORMATION

TADIG Code: XXXYY
Section ID: 17 (Conditional)

Section Not Applicable

Or

List of All IP address ranges used by PLMN for connection to Inter-PLMN IP backbone[28]	**IP Address Range**

Any *additional* MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routeing Area Identity (RAI) in GTP messaging from SGSNs[29]	**MCC (3 digit)**	**MNC (2 or 3 digit)**

List of Autonomous System Numbers	**ASN[30]**

List of PLMN authoritative DNS server IP addresses and names[31]	**IP address**	**DNS Name**

List of PLMN local caching DNS server IP addresses and names[32]	***IP address***	***DNS Name***

28 IP addresses or IP address range(s) of all operator's nodes that connect to the inter-PLMN IP backbone network known as the "GRX" e.g. GGSNs, SGSNs, MMSCs, AAA Servers/Proxies, DNS Servers etc. This information is used for firewall and Border Gateway configuration (see PRD IR.34).

29 Provide the details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any SGSN in the VPMN to the GGSN in the HPMN, in the Create PDP Context Request and Update PDP Context Request GTP messages. If only the MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank.

30 The Autonomous System Number (ASN) is a 16 bit integer that every PLMN must assign to their IP network that is seen as one Autonomous System (AS). The ASN enables the exchange of exterior routing information between neighbouring Autonomous Systems. This can be either a private ASN (64512 through to 65535) or public ASN.

31 IP address(es) and name(s) of DNS server(s) that are authoritative DNS server(s) i.e. DNS servers that answer DNS requests/queries from local caching DNS servers. Note that DNS hostname(s) given in this field should match the actual name(s) configured in the operator DNS server(s) (this is to avoid conflict with the NS records in the Root DNS and operator DNS servers).

32 IP address(es) and name(s) of DNS server(s) that are local caching DNS server(s) i.e. DNS server(s) that send DNS requests/queries in order to resolve domain names on behalf of e.g. SGSN, MMSC etc. Note that DNS hostname(s) given in this field should match the actual name(s) configured in the operator DNS server(s) (this is to avoid conflict with the NS records in the Root DNS and operator DNS servers).

IP address that responds to ping/traceroute:[33]	

List of GRX Providers	**GRX Provider**

33 Pingable and traceroutable IP address of a node within the operator's AS. Maximum size for ping is 64 bytes. Minimum time interval for pinging is 1 hour.

MMS INTERWORKING INFORMATION

TADIG Code: XXXYY
Section ID: 18 (Optional)

Section Not Applicable

Or

MMS Element Data						
Domain name of MMSC	**IP Address Range for MMSC[34]**	**Max. size of MMS allowed**	**Delivery Report allowed? (Yes/No)**	**Read Report allowed? (Yes/No)**	**IP address(es) of Incoming MTA**	**IP address(es) of Outgoing MTA**
List of MMS IW Hub Provider		**MMS IW Hub Provider Name**			**MMS IW Hub Provider GT Address**	

MMS Element Data						
Domain name of MMSC	**IP Address Range for MMSC**	**Max. size of MMS allowed**	**Delivery Report allowed? (Yes/No)**	**Read Report allowed? (Yes/No)**	**IP address(es) of Incoming MTA**	**IP address(es) of Outgoing MTA**
List of MMS IW Hub Provider		**MMS IW Hub Provider Name**			***MMS IW Hub Provider GT Address***	

34 IP addresses or IP address range(s) of MMSC that give onto the inter-PLMN backbone. This information is used for firewall and Border Gateway configuration

WLAN INFORMATION

TADIG Code: XXXYY
Section ID: 19 (Optional)

Section Not Applicable

Or

List of RADIUS server/ RADIUS proxy IP address(es)	IP Address

List of IP address range(s) used for WLAN roaming[35]	IP Address Range

List of WLAN Service Brand[36]	Brand Name	Realm

LTE ROAMING INFORMATION

TADIG Code: XXXYY
Section ID: 20 (Conditional)

MAP ITW	
Diameter:	
IP addresses of the Diameter Edge Agent[37]	[List/Range/Subnetmask of IP addresses]
S6a:[38]	
Is S6a supported without IWF?	[Yes/No]
Hostnames for HSS, MME in the form which they are used in the Diameter-Origin and Diameter-Destination, Host and Realm AVPs	
Is IWF available to allow support of inter-PMN MAP	[Yes/No]

35 "Subnet IP address range(s) in the form of x.x.x.x/n to which the RADIUS server/proxy IP address also belongs".

36 Brand name of the Home WO WLAN service seen by the end user in the web based login page. The brand name can be used to mask the realm from the end user in web based login pages e.g. by utilizing a dropdown box into realm known by the network. This enables an operator to change its roaming realm with reduced impact to the user experience. If the operator has multiple roaming realms they have to be mapped one-to-one to brand names.

37 **GSMA PRD IR.88 specifies 6 deployment examples for Diameter Edge Agent. This entry shows Edge Agent IP addresses if deployment example 1-4 is used, and shows Diameter Agent outsourced to IPX for deployment example 5 and 6.**

38 Support of S6a (with or without IWF) is a requirement for full LTE roaming

interface for connection towards HSS?	
Is IWF available to allow support of inter-PMN MAP interface for connection towards MME?	[Yes/No]
S6d:	
Is S6d used for legacy SGSN?	[Yes/No]
S8:	
Is GTP Interface available?	[Yes/No]
Is PMIP Interface available?	[Yes/No]
S9:	
Is S9 used?	[Yes/No]

SMS ITW	
SMS Delivery mechanism	
SMS over IP	[Yes/No]
SMS over SGs	[Yes/No]

Voice ITW	
IMS/CSFB/other	

Roaming Retry[39]	
Is Roaming Retry supported?	[Yes/No]

Home PMN Information For LTE Roaming Agreement Only	
Is LTE-only roaming supported?	[Yes/No]

Visited PMN Information For LTE Roaming Agreement Only	
Is LTE-only roaming supported?	[Yes/No]

Home PMN Information For 2G/3G Roaming Agreement Only (See footnote[40] for scenario 1, and footnote[41] for other scenarios)	
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]

Visited PMN Information For 2G/3G Roaming Agreement Only (See footnotes for Home PLMN entry for the details of scenarios)	
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]

Home PMN Information For 2G/3G and LTE Roaming Agreement (See footnote[42] for scenarios)	
Scenario 1 supported?	[Yes/No]
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]
Scenario 4 supported?	[Yes/No]

Visited PMN Information For 2G/3G and LTE Roaming Agreement (See footnote[43] for scenarios)

39 Roaming Retry is required for CSFB, as defined in 3GPP TS 23.272

40 **Scenario 1 is same as legacy GPRS roaming.**

41 **Scenario 2 and 3 are described in GSMA PRD IR.88 Section 4.2.2.1 "2G/3G Roaming Agreement Only"**

42 **All Scenarios are described in GSMA PRD IR.88 Section 4.2.2.2"4.2.2.2 2G/3G and LTE Roaming Agreement"**

43 **All Scenarios are described in GSMA PRD IR.88 Section 4.2.2.2"4.2.2.2 2G/3G and LTE Roaming Agreement"**

Scenario 1 supported?	[Yes/No]
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]
Scenario 4 supported?	[Yes/No]

CONTACT INFORMATION

TADIG Code: XXXYY
Section ID: 21 (Mandatory)

List of Roaming Troubleshooting Contact Information				
Troubleshooting Office Information Item				
Location				
Office Time Zone in UTC[44]				
Office Hours	**Week Day(s)**	**Start Time**	**End Time**	
	Mon, Tue, Wed			
	Thu, Fri			
Main Contact for Troubleshooting (Office Hours)	**Team Name**	**Tel.**	**Fax**	**Email**
Escalation Contact for Troubleshooting	**Person Name**	**Tel.**	**Fax**	**Email**
24 x 7 Troubleshooting Contact (Out of Office Hours)	**Team Name**	**Tel.**	**Fax**	**Email**

Troubleshooting Office Information Item				
Location				
Office Time Zone in UTC				
Office Hours[45]	**Week Day(s)**	**Start Time**	**End Time**	
Main Contact for Troubleshooting (Office Hours)	**Team Name**	**Tel.**	**Fax**	**Email**[46]

Escalation Contact for Troubleshooting	**Person Name**[47]	**Tel.**	**Fax**	**Email**

24 x 7 Troubleshooting Contact (Out of Office Hours)	**Team Name**[48]	**Tel.**	**Fax**	**Email**

Additional Contacts					
SCCP Inquiries and ordering of SS7 Routes	**Person Name**	**Tel.**	**Fax**	**Email**	

[44] Office Time zone relative to GMT/UTC (± hrs).
[45] Normal office hours e.g. Mon-Sat 08:00 to 17:00.
[46] Generic e-mail addresses are recommended, e.g. roamingsupport@operator.com
[47] Contact for escalating roaming faults as per PRD IR.78.
[48] Contact for roaming troubleshooting out of office hours. Can be the same as Main Contact for Troubleshooting.

	Person Name	Tel.	Fax	Email
Roaming Coordinator				

	Person Name	Tel.	Fax	Email
IREG Tests				

	Person Name	Tel.	Fax	Email
TADIG Tests				

	Person Name	Tel.	Fax	Email
CAMEL Tests				

	Person Name	Tel.	Fax	Email
GPRS Contact				

	Person Name	Tel.	Fax	Email
Contact Person(s) (in PMN) for GRX connectivity				

	Person Name	Tel.	Fax	Email
Contact person (in PMN) to verify authority of a GRX provider to add/modify data in Root DNS				

	Person Name	Tel.	Fax	Email
Contact person(s) for IW MMS				
Contact person(s)	**Person Name**	**Tel.**	**Fax**	**Email**

for IW SMS					

Contact person(s) for WLAN	**Person Name**	**Tel.**	**Fax**	**Email**	

Other Contacts					
Job Title	**Person Name**	**Tel.**	**Fax**	**Email**	

IR21 Distribution Email Address	**Email**

HOSTED NETWORKS

TADIG Code: XXXYY
Section ID: 23 (Optional, Repeating)

Section Not Applicable

Or

List of Hosted Network Data						
Hosted Network Data						
Network Name:						
Country:						
TADIG Code						
Network Type		*Choose between "*Terrestrial" or "Non-Terrestrial"				
List of Hosted Network Nodes						
Node Type	**GT (E.164) Address(es)**	***IP Address(es)***	**MSRN Range(s)**			
			CC	**NDC**	***SN Range Start***	***SN Range End***

Hosted Network Data						
Network Name:						
Country:						
TADIG Code						
Network Type		*Choose between "*Terrestrial" or "Non-Terrestrial"				
List of Hosted Network Nodes						
Node Type	**GT (E.164) Address(es)**	***IP Address(es)***	**MSRN Range(s)**			
			CC	**NDC**	***SN Range Start***	***SN Range End***

6 ANNEX B

6.1 UPDATE SCHEDULE FOR THE GSM ASSOCIATION ROAMING DATABASE

The general updating procedures for information in the Roaming Database are described in section 4 of this document. The following schedule shall detail these procedures with regard to the single parts of information.

The different fields contained in the database are of different importance to the operation of the GSM networks. Hence, the time schedule of sending the information about a change of data to the GSMA HQ and the delay until this information is distributed to the other GSM Association members may depend upon the single case.

Details of any changes will be sent via email according notification functionalities.

6.2 UPDATE INTERVALS

The intervals for updating of information shall be as follows:

6. Name of Operator/Operator's Home Country (abbreviated):

   Impact:

   Changes to a name of the operator are only critical to the administrative parts of GSM relationships. New operators joining the GSM Association should be introduced as soon as possible.

   Update to GSMA HQ:

   As soon as possible with date when the change will be valid or the new member will start service?

   Distribution from GSMA HQ to GSM Association members:

   With next full update (if before date of change), otherwise at least 2 weeks before change.

7. E.164 CC+NDC of the MSISDN:

   Impact:

   Information critical to operation of International Roaming connections. New or changed data have to be implemented in the switches.

   Update to GSMA HQ:

   3 months before change takes place.

   Distribution from GSMA HQ to GSM Association members:

   Within 1 week.

8. E.212 MCC+MNC of the IMSI:

   Impact/Update to GSMA HQ/Distribution to GSM Association members:

   Similar to item 2.

9. E.214 CC+NC of the Mobile Global Title (MGT):

   Impact/Update to GSMA HQ/Distribution to GSM Association members:

   Similar to item 2.

10. International SPC of the International Gateway SCCP Node(s) connected:

    Impact:

Critical if one or both GSM networks have gateways with ISPC and direct access to the international SS7 network. Otherwise in the responsibility of the international fixed network operators.

Update to GSMA HQ:

3 months before change takes place.

Distribution from GSMA HQ to GSM Association members:

Within 1 week.

11. Signature of the International Gateway SCCP Node(s) connected:

Impact:

Only for administrative reasons.

Update to GSMA HQ:

As soon as possible with date when the change will be valid.

Distribution from GSMA HQ to GSM Association members:

With next full update (if before date of change), otherwise at least 2 weeks before change.

12. Exchange Type of the International Gateway SCCP Node(s) connected:

Impact/Update to GSMA HQ/Distribution to GSM Association members:

Similar to item 6.

13. Initial/Subsequent Access Solution(s) to the International SS7 Network:

Impact:

For information only. Details exchanged under items 5,6,7.

Update to GSMA HQ:

As soon as possible with date when the change will take place.

Distribution from GSMA HQ to GSM Association members:

With next full update (if before date of change), otherwise at least 2 weeks before change.

14. (GPRS information) IP based services information:

Impact:

Information critical to operation of International Roaming connections. New or changed data to be implemented on the PLMN operator’s GPRS network or the GPRS root DNS server where relevant.

Update to GSMA HQ:

It is recommended to inform the affected operators 2 months before change, but at least 1 month before.

Distribution from GSMA HQ to GSM Association members:

Within 1 week.

15. Date of Introduction of White Book SCCP:

Impact:

Critical to operation with regard to compatibility aspects.

Update to GSMA HQ:

3 months before date of introduction in order to allow for agreements between the affected GSM networks.

Distribution from GSMA HQ to GSM Association members:

Within 1 week.

16. Date of Introduction of First MAP Version 2 Operation (to be filled at the discretion of PLMN Operators):

    Impact:

    Less critical to operation, however necessity for coordination.

    Update to GSMA HQ:

    As soon as possible, 3 month before first date of operation recommended.

    Distribution from GSMA HQ to GSM Association members:

    With next full update (if before date of first introduction), otherwise at least 6 weeks prior to first introduction.

17. Additional Data (Contact Names, Comments, and so on.):

    Impact:

    Contact names critical to negotiations between the operators. Other miscellaneous information dependent on single case.

    Update to GSMA HQ:

    For contact names and addresses as soon as possible with date when the change will be valid. For other information left up to the operator.

    Distribution from GSMA HQ to GSM Association members:

    Within 1 week for contact names and addresses, for other information according to the request of the operator.

18. SMS GT addresses:

    Impact:

    Information critical to operation of International SMS Interworking connections. New or changed data have to be implemented in the switches.

    Update to GSMA HQ:

    At least 4 weeks in advance, with date when the change will be valid.

    Distribution from GSMA HQ to GSM Association members:

    As soon as possible after the update has been made.

6.3 UPDATE INTERVALS SCHEME

The intervals for updating of information are described in the following schema:

Section Id	Section Name	Element (if needed)	Impact	Update
1	Organization information		Administrative only	
2	Network		Critical	3 months before
3	Network Information		Critical	3 months before
4	Routing Information		Critical	3 months before
5	International SCCP GW		Critical	3 months before
6	Domestic SCCP GW		Critical	3 months before
7	SCCP Protocol available at PMN ….		Normal	1 week
8	SUBSCRIBER IDENTITY AUTHENTICATION		Normal	1 week

9	Test Numbers Information		Medium. Maintenance usage	1 month before
10	MAP Interworking Specifically for Roaming		Normal. Critical for new version introduction	3 months before
11	MAP Optimal Routing of mobile-to-mobile calls		Normal	1 week
12	Inter-Operator SMS Enhancement		Normal	1 week
13	Network Elements Information		Medium	4 weeks before
14	USSD Information		Normal	1 week
15	CAMEL Information		Critical	3 months before
16	Packet Data Services Information		Critical	2 months before
17	IP-Roaming and IP-Interworking Information		Critical	2 months before
18	MMS Interworking Information		Critical	3 months before
19	WLAN Information		Critical	3 months before
20	Numbering Information		Normal	1 week
21	Contact Information		Critical for troubleshooting Normal for other contacts	3 months before 1 week
22	Roaming HUB Info		Critical	3 months before
23	Hosted Networks		Critical	45 days before

7 ANNEX C

7.1 RAEX IR.21 BUSINESS REQUIREMENTS

In addition to the Word, Excel or PDF IR.21, Operators may also choose to exchange IR.21 data electronically by using RAEX IR.21 until a defined date.
Even if the “electronic” way is considered initially optional, after the defined deadline, electronic format may become the only admitted and certified way to exchange PMN information.
RAEX IR.21 provides the means of exchanging the IR.21 using a pre-defined data format and according to a standardized business process represented here. The standard IR.21 will remain the legally binding document.

RAEX IR.21, when used, should conform to latest version of IR.21 in order to avoid any lose of changes on Roaming Partners data.

RAEX IR.21 requirements are **Binding** within the GSMA Community.

For RAEX purposes, Service Providers (SP) in this document will be considered: Operators and Roaming Hubbing Providers.

7.2 RAEX IR.21 EXCHANGE PROCESS AND NOTIFICATION FUNCTIONALITIES

This section highlights and describes the exchange process to be used by the parties using RAEX IR.21 format.

7.2.1 RAEX IR.21 exchange process

It is supposed to have the exchange process performed by GSMA Infocentre.
The implementation of the data input could be executed in two different ways:

A - Manual by operator
B - Using Infocenter GUI

(A) Manual by Operator

According to the diagram below, an Operator could populate its own RAEX IR.21 XML file and submit it to the GSMA Infocentre using the procedure described.
The Operator that submits the file to the Infocentre is in charge of conformity check and data validation.
Conformity checks and validation of the data and the file are operations in charge of the Operator sending the file. The Infocentre allows the Operator to bring an image file containing the network interconnection diagram.

(B) Using Infocenter GUI

The Infocentre GUI is an evolution of the user interface actually used for populating the Roaming Database. The GUI application is in charge to validate the integrity of the data and produce XML and PDF files. These will be then available for download.

Even if option A or B is used, once data upload or data entry is completed, notification/distribution process starts towards the operator lists accordingly.

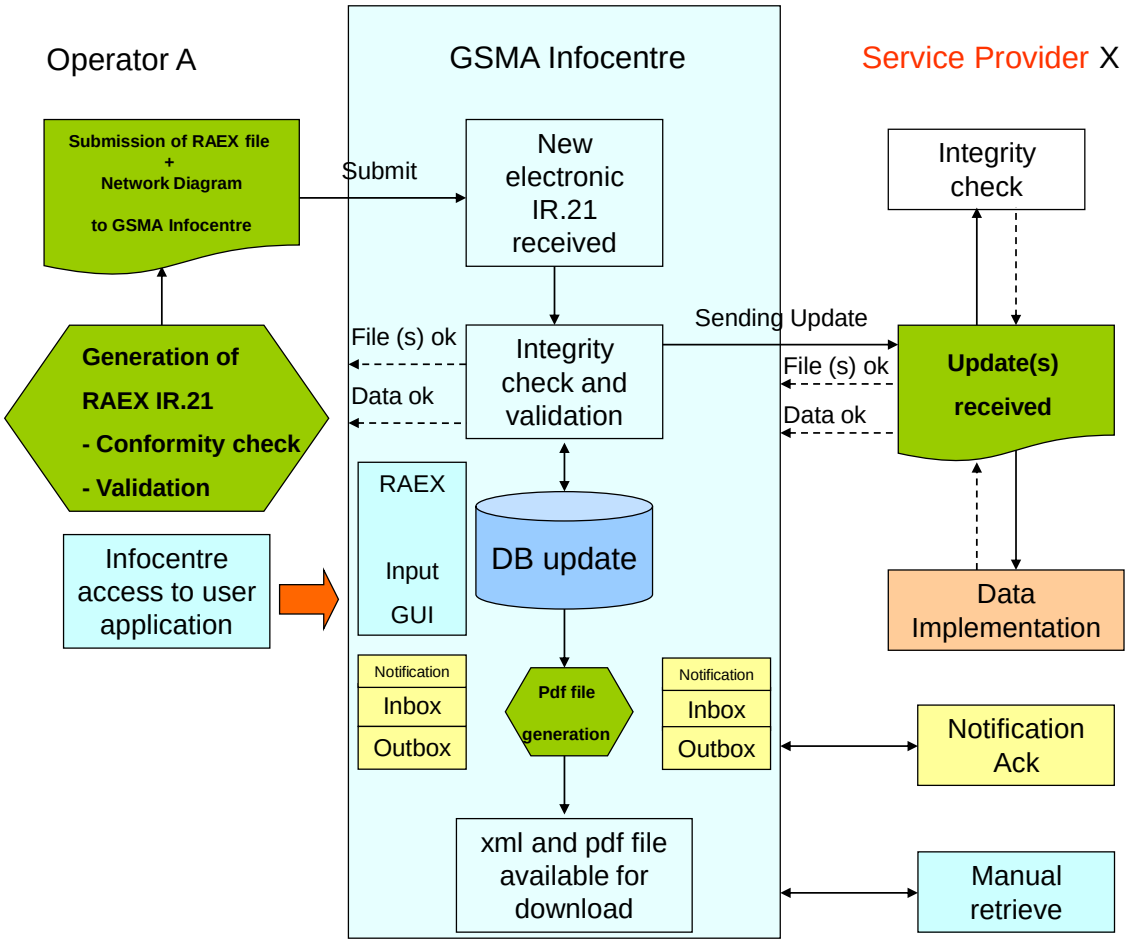


fig.1 - RAEX IR.21 Exchange Process

7.2.2 Details of Exchange process in manual or GUI scenarios

First four steps are applicable in the manual upload of the XML file and network image by a PMN

1. Operator A generates the RAEX IR.21 File containing all IR.21 data. Operator A should ensure that the File it produces is correctly formatted and populated. For this purpose an XML file template is used. Within the file the date of change is indicated.
2. Operator A Is also allowed to upload an image containing its network interconnection diagram
3. Submit the RAEX IR.21 File and image to the GSMA Infocentre. The Infocentre will use this data to update the Internal Roaming Database. There will be a special section folder to allow a RAEX format upload.
4. An acknowledgement from the Infocentre, communicating the file has been correctly accepted and uploaded. Note: The Infocentre should also verify the integrity of the file and the structure according to the RAEX principles. It is out of scope to verify the correctness of data inserted by operators.
5. Operator A may use the Infocentre GUI as an interface for submitting its network data. The Internal Roaming Database is updated as per point 3.

6. The Infocentre sends a notification to the receiving party (to receiving parties listed accordingly) that there is a new RAEX IR.21 available within the website. This is done according to the notification preferences set by the receiving party with the Infocentre. The notification sent to the receiving parties may contain a number of RAEX IR.21 available.
7. SPX, on the receiving party side, will receive the updated notification and/or the updated XML file(s) and network diagrams, as it optionally has chosen within the notification/distribution section on the Infocentre.
8. SPX checks RAEX file(s) received for opening and readability of data. Any error on the file or corruption should be troubleshooted directly with the other party
9. Once the file has been verified by the receiving party, it will be loaded into systems according to internal procedures defined (for example manually, electronically)
10. According to the notification functionality, the party will communicate the right implementation and definition of the data sending back notification acknowledgement via the Infocentre (see 3.3)

SPX is also able to manually retrieve XML/PDF IR.21 updated files and network diagrams. PDF versions are always generated by the Infocentre for backward compatibility.

7.3 NOTIFICATION FUNCTIONALITIES

The notification of IR.21 updates is implemented per week (that is on Fridays) and contains a list of updates generates by operators and the reply acknowledges, if any/still.
The format of the notification is by email and the content provided is represented as listed below:

- Organization and contact name providing the update
- Alert number and URL to get access to the content
- Accessing the Infocentre page, operator may acknowledge the receipt and provide implementation feedback (that is implemented or planned [date]). This is represented by operator “outbox” section. This information is either transmitted back to the operator who sent the update and stored into an “inbox” section for that operator on the Infocentre.

- Reply method on email received could be used. The reply must contain information on acknowledge and implementation as above. The automation on the Infocentre replies the mechanism above for storing and providing back acknowledges.
- The weekly notification contains also the status of acknowledges with Infocentre URL to point for verification and consequently the table with operator list – Alert number of acks replied.

7.4 COMPANY LOGO

Every operator is allowed to upload its company logo on the Infocentre at the same time the XML file is provided. The logo could be provided as a JPG file and will be automatically integrated into the PDF file while converted with the XML schema. The name of the file shall be “logo.jpg”.
If the update is done directly on the Infocentre via GUI, the company logo could be loaded as well in the input page.
The company logo position will be in the first page of IR.21

7.5 ACCESS TO ROAMING DATABASE

Infocentre designated IR.21 administrators can access to Roaming Database for information retrieval. The method consists in accessing the relative page on the Infocentre containing the front end mask selection.
The mask includes a wizard to allow a cascade selection of the content elements that are requested to be queried. Possible elements are those defined in IR.21 Data Definition. The format of the output is provided in clear/text content.
At the same URL containing the query wizard, there is also the reference for downloading the entire IR.21 in XML or PDF versions.

7.6 FILE NAMING CONVENTION

Naming convention is applied to RAEX IR.21 file according to GSMA IT specifications. It contains at least the following information:
- Organisation name/title
- TADIG Code
- Infocentre Id reference number

7.7 VERSION CONTROL AND CHANGELOG

Main reference for IR.21 data is Annex A. Every potential change/addition to data structure and definition, with principles of Change Request process, will mirror changes in RAEX structure. Revision control mechanism in use is still valid and also applied for RAEX sections.

A general ChangeLog is automatically populated with the information already present per section on the Infocentre.
It is defined by two fields:

- DATE
- DESCRIPTION

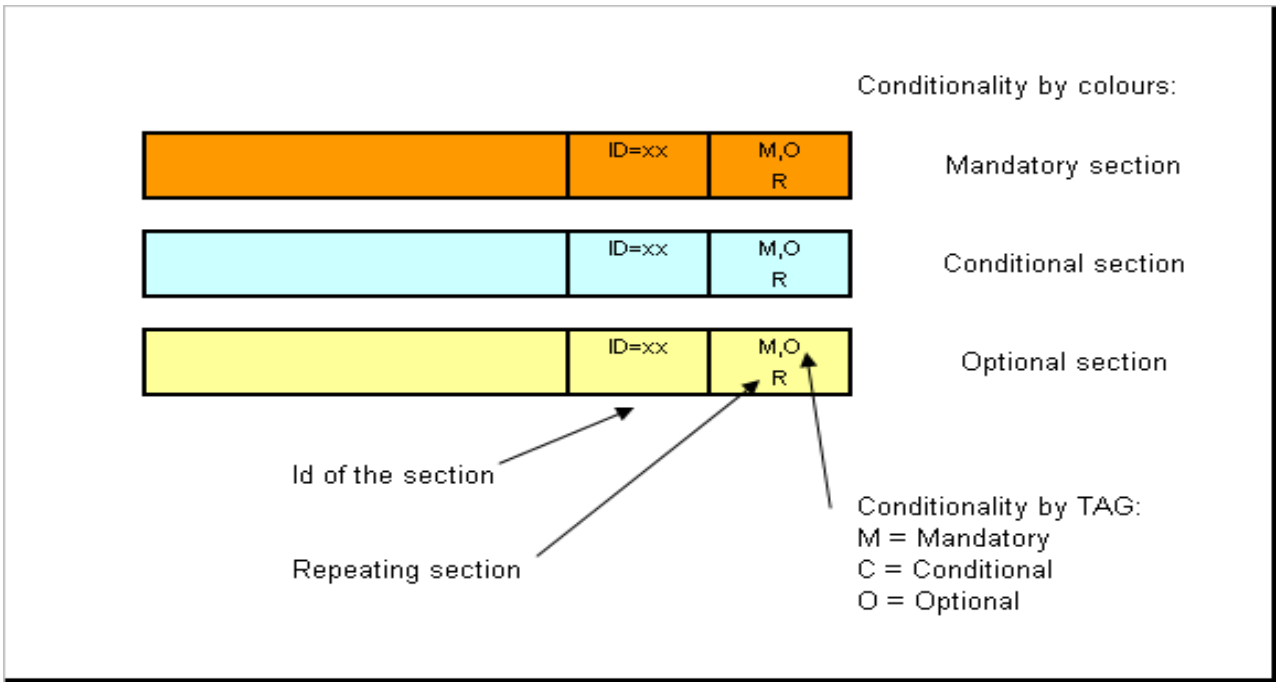
Operators must every time use latest versions definition and IR.21 RAEX documents, in order to avoid any lack of data or fields into their networks.
A version control mechanism is maintained by the Infocentre.

7.8 STRUCTURE OF DATA

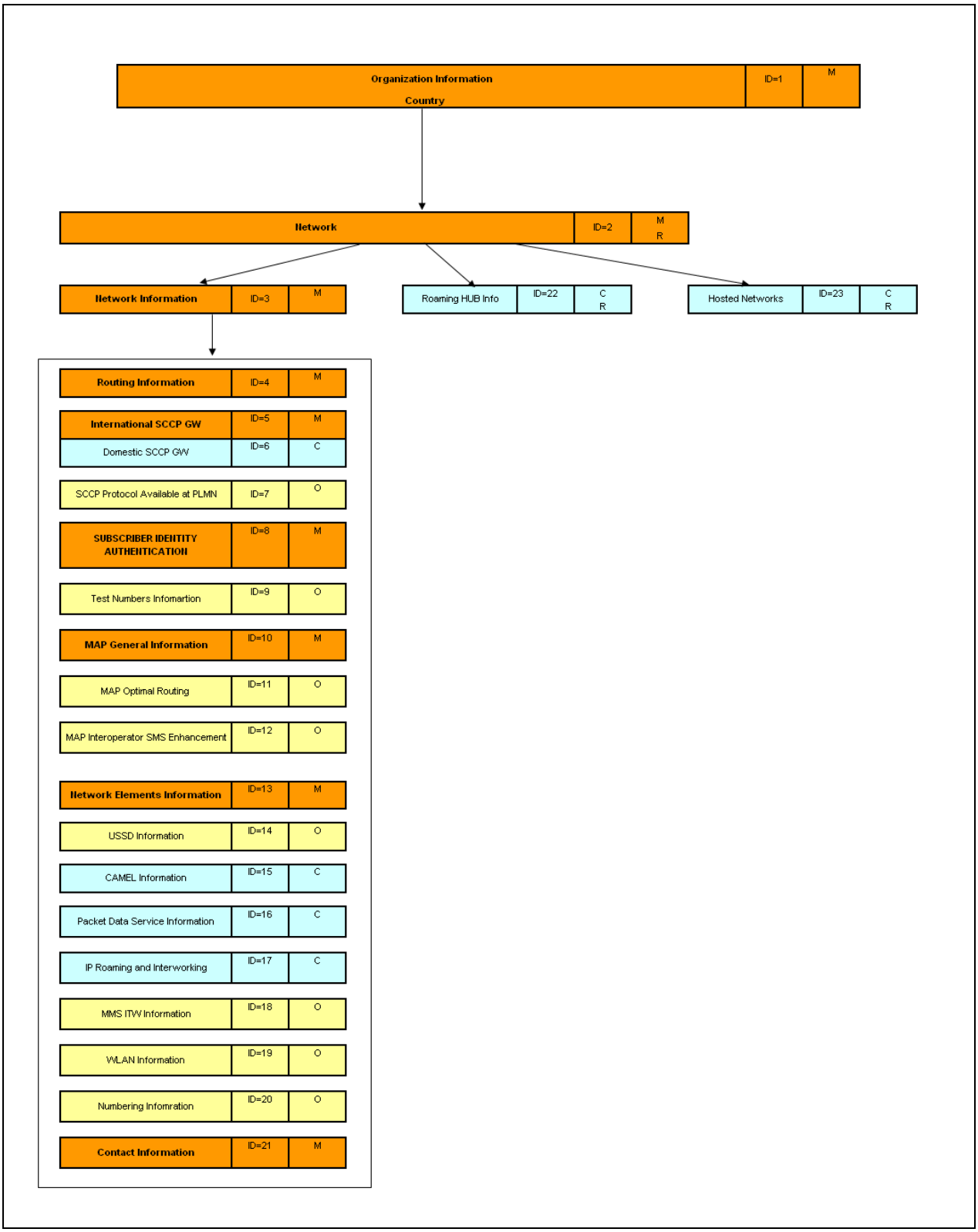
This paragraph shows the structure of the sections included within IR.21 Annex A with the purpose of:
A - Characterize sections with a tag (mandatory, optional, conditional)
B - Define dependencies between sections, if any
C - Identifying correctly the section name

In consideration of new services still in a design stage and scenarios already live (that is network extensions) it is proposed to structure the IR.21information considering these new services and to base the identification of a PMN with the IMSI associated, as described in the image attached.
Major level of the structure contains operator general information, the “organization name” that manages a single or a group of PMN(s), major identified with the element “network” (level 1).
Unique reference in this network level, according to IMSI and MGT information, is the TADIG code, managed and released by GSMA to every PMN.
Every PMN has a major definition with the fields IMSI and MGT and with the possibility of having multiple IMSI series translated in a single MGT. At the same level a differentiation by NDC is represented with the right parameters associated. This need is to accomplish those PMN who are indicating different SCCP GW destinations for their E.164 ranges.
Every operator will have as many different network data blocks as the pair of IMSI / MGT series they have.
Representation of extended and non terrestrial network will be given by a new section named “Hosted Networks”.
Roaming Hubbing will have its own section with relevant information on HUB provider.
The aim of structure is purely logical need, in order to let the data being reflected and verified within stable conditions.

In the below diagram, IR.21 sections are quoted with ID reference and color marked according to this legend:



Here is represented the Data Structure of IR.21 sections:


Organization Information
Country
ID=1
M
Network
ID=2
M
R
Network Information
ID=3
M
Roaming HUB Info
ID=22
C
R
Hosted Networks
ID=23
C
R
Routing Information
ID=4
M
International SCCP GW
ID=5
M
Domestic SCCP GW
ID=6
C
SCCP Protocol Available at PLMN
ID=7
O
SUBSCRIBER IDENTITY AUTHENTICATION
ID=8
M
Test Numbers Infomartion
ID=9
O
MAP General Information
ID=10
M
MAP Optimal Routing
ID=11
O
MAP Interoperator SMS Enhancement
ID=12
O
Network Elements Information
ID=13
M
USSD Information
ID=14
O
CAMEL Information
ID=15
C
Packet Data Service Information
ID=16
C
IP Roaming and Interworking
ID=17
C
MMS ITW Information
ID=18
O
WLAN Information
ID=19
O
Numbering Infomration
ID=20
O
Contact Information
ID=21
M

7.9 IR.21 DATA DICTIONARY

This chapter contains detailed information for every field populated within IR.21, indicating whether they are Mandatory, Optional etc, type of content e the description of the field. This data should be used to further define technical requirements for RAEX XML file.
Starting from § 6.3, top fields “Section name” and “Id” are used to uniquely identify the section, to be further addressed or referenced.
A legend is also created to define the structure of the content data.

7.9.1 Description

The table below describes each of the column headings used within the data dictionary. Every sub-chapter identifies IR.21 section name in

Column	Description	Example
Section Name	The name of the section	
ID	Section Id for reference	
Parent	Major referring element	
Element name	The name of the element described	
Format	Type format of the element	
Conditionality	Each element is defined as “Mandatory”, “Optional” or “Conditional”. - Conditional elements have a condition described in the particular “Description” field of the element. - Mandatory elements are a must. - Optional elements may not be present.	M= Mandatory C= Conditional O= Optional
Value Indicator	If available the value indicator contains a list of fix values allowed for the particular element or sub-element content	“Repeating” means the element can be used more times. “Y,N” means either value “Y” – yes or “N” – no, is allowed to be set.
Description	Textual description of the “IR.21 Element’s content”	Explicit description in case of “conditional” elements

Note: All free text fields must contain English text.

7.9.2 Terms legend

This legend is created with the intention to define the structure of common data repeated within the document. Elements defined in this legend are reported to the “format” field in next sections

Name	Format	Value(s) allowed	Example
Date	yyyymmdd		20070116
E.164GT Address	ITU E.164 number composed by CC+NDC+SN, max length xx digits		393359609600
E.164GT Address range	ITU E.164 number range, length is max xx digits		393351111111-393359999999
IMSI	ITU E.212 number composed by MCC+MNC+MSIN, length is max 15 digits		222011234567890
MGT	ITU E.214 number translated from E.212 and composed by CC+NC+MSIN, length is max xx digits		393391234567890
ITU DPC	Point code expressed in decimal format: a-b-c, length is max xx digits	a,c=1digit 0-9 b=3 digits 0 to 999	2-046-0
ANSI DPC	Point code expressed in decimal format: a-b-c, length is max xx digits	a=1digit 0-9 b=3 digits 0 to 999 c=2 digits 0 to 99	2-046-00
APN Op Id	mncxxx.mccxxx.gprs	X=0-9	mnc001.mcc222.gprs
IP Address	a.b.c.d (IPv4 format)	a=1-255 b=0-255 c=0-255 d=1-255	222.234.222.234
IP Address range	a.b.c.d/x	a=1-255 b=0-255 c=0-255 d=0-255 x= CIDR denotation of subnet mask. Values allowed are 1-32	222.234.222.0/16

ASN	xxxxx	Numeric Max 5 digit = 1- 65535	16232
Alpha	Alphanumeric		
Tel Number	(+) Number	(+) Number	+390612345678
WAP GW IP address	IP Address + (port number)		222.234.222.234:8080
Domain Name	Dot Alpha		Example: www.colorado.edu
URL (Uniform Resource Locator)	URL		http://wap.google.it; port may be included. Example: http://wap.google.it:3447

7.9.3 History of Changes

Section name: History of changes			**Conditionality: M,R**		
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
	Section ID	Numeric	M		ID of the section that has been modified.
	Date of change	Date	M		Represents the date when the change has been made to the section
	Description	Alphanumeric, max 512 chars	M		Brief description of changes made to the section

Table 1: History of Changes

7.9.4 Effective date of change

Section name: Effective date of changes			ID: 0	Conditionality: M,R	
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
	Effective date of change	Date	M		Represents the date when the updated information contained into IR.21 will become effective

7.9.5 Organization information

	Section name: Organization Information		ID: 1	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Organization Information	Organization Name	Alphanumeric Max 128 chars	M		Identifies the name of the operator
Organization Information	Country	Text Max 3 chars	M		Country Code abbreviated according to ISO 3166
Organization Information	Network	N/A	M,R		Element containing all the information related to a particular network

7.9.6 Network

Section name: Network			ID: 2	Conditionality: M,R	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Network	TADIG Code	Alpha, max 5 chars	M		TADIG code associated to MCC/MNC of the network, according TD.13
Network	Type		M	Terrestrial, NonTerrestrial	
Network	Network Information	N/A	M,R	N/A	
Network	Roaming HUB Info	N/A	O,R	N/A	
Network	Hosted Networks	N/A	O,R	N/A	

7.9.7 Network Information

Section name: Network Information			ID: 3	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
Network Information	Routing Information	N/A	M		
Network Information	International SCCP GW	N/A	M		

Section name: Network Information			ID: 3		Conditionality: M
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
Network Information	Domestic SCCP GW	N/A	C		
Network Information	SSCP Protocol available at PMN for International Roaming	N/A	O		
Network Information	Subscriber Identity Authentication	N/A	M		
Network Information	Auto Roam Testing	N/A	O		
Network Information	MAP General Information	N/A	M		
Network Information	MAP Optimal Routing	N/A	O		
Network Information	MAP Interoperator SMS Enhancement	N/A	O		

Section name: Network Information			ID: 3		Conditionality: M
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
Network Information	MSC/VLR	N/A	M		
Network Information	SMSC Address	N/A	M		
Network Information	USSD Information	N/A	M		
Network Information	CAMEL Information	N/A	C		Section is mandatory, where CAMEL service is supported by the PMN
Network Information	Vendor Information	N/A	O		
Network Information	Packet Data Services	N/A	C		
Network Information	IP Data Roaming Information	N/A	C		

Section name: Network Information			ID: 3	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Value Indicator**	**Description**
Network Information	MMS ITW Information	N/A	O		
Network Information	WLAN Information	N/A	O		
Network Information	Contact Information	N/A	M		
Network Information	Numbering Information	N/A	O		

7.9.8 Routing Information

Section name: Routing Information			ID: 4	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**

Section name: Routing Information			ID: 4	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Routing Information	CCITT E.164 Number Series	N/A	M		Contains definitions for the node ranges in use in the PMN.
Routing Information	E.212 Number Series	N/A	M		According ITU E.212, IMSI is composed by: 3 digits for MCC Max 3 digits for MNC
Routing Information	E.214 Mobile Global Title (MGT)	N/A	M		
Routing Information	Number Portability	Boolean	M	Yes No	
Routing Information	Numbering Information	N/A	M		
Numbering Information	E.164 Number Ranges due to Number Portability	E.164 GT Address	M,R		E.164 Number Ranges due to Number Portability may be included in this section.
Numbering Information	Additional Information	Alpha	M,R		Additional Information about Numbering and addressing may be included in this section.

Section name: Routing Information			ID: 4	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CCITT E.164 Number Series	MSISDN(s) number ranges	N/A	M,R		Number ranges in use in the PMN.
CCITT E.164 Number Series	Network nodes Global Title number range(s)	N/A	M,R		
CCITT E.164 Number Series	MSRN Number Range(s)	N/A	C,R		Field is mandatory for non terrestrial networks, otherwise it is optional. Definitions for Roaming Number ranges provided for MT calls in the PMN.
MSISDN(s) number ranges	Country Code (CC)		M		
MSISDN(s) number ranges	National Destination Code (NDC)		M		
MSISDN(s) number ranges	International DPC Primary		C		Primary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section “International SCCP GW”
MSISDN(s) number ranges	International DPC Secondary		C		Secondary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number

Section name: Routing Information			ID: 4	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
					series, by using one of the DPC values defined in section “International SCCP GW”
Network nodes Global Title number range(s)	Country Code (CC)		M		
Network nodes Global Title number range(s)	National Destination Code (NDC)		M		
Network nodes Global Title number range(s)	International DPC Primary		C		Primary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section “International SCCP GW”
Network nodes Global Title number range(s)	International DPC Secondary		C		Secondary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section “International SCCP GW”
MSRN Number Range(s)	Country Code (CC)		M		

Section name: Routing Information			ID: 4	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
MSRN Number Range(s)	National Destination Code (NDC)		M		
E.212 Number Series	Mobile Country Code (MCC)		M		
E.212 Number Series	Mobile Network Code (MNC)		M		
E.214 Mobile Global Title (MGT)	Country Code of MGT (CC)		M		
E.214 Mobile Global Title (MGT)	Network Code of MGT (NC)		M		

7.9.9 International SCCP GW

Section name: International SCCP GW			ID: 5		Conditionality: M
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
International SCCP GW	SCCP Carrier	N/A	M,R		
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	M		The name of the SCCP Carrier
SCCP Carrier	DPC Info	N/A	M,R		
DPC Info	Signature	Alpha max 64 letters	M		Name associated to the switching center
DPC Info	Type	Text max 64 chars	O		Type of switching center: ISC, MSC, Stand-alone SCCP
DPC Info	International DPC	Alpha	M		Destination Point Code parameters mandatory for Signalling routing configuration. This value can be used for defining Primary and Secondary DPC information in Routing Information Section. Both ANSI and ITU format shall be supported
DPC Info	Comments	Text max 64 chars	O		To provide more information about the specific DPC used (that is primary, secondary)

7.9.10 Domestic SCCP GW

Section name: Domestic SCCP GW			ID: 6	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Domestic SCCP GW	SCCP Carrier	N/A	M,R		
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	M		The name of the SCCP Carrier
SCCP Carrier	DPC Info	N/A	M,R		
DPC Info	Signature	Alpha max 64 letters	M		Name associated to the switching center
DPC Info	Type	Text max 64 chars	O		Type of switching center: ISC, MSC, Stand-alone SCCP
DPC Info	Domestic DPC	Alpha	M		Destination Point Code parameters mandatory for Signalling routing configuration Both ANSI and ITU format shall be supported
DPC Info	Comments	Text max 64 chars	O		To provide more information about the specific DPC used (that is primary, secondary)

7.9.11 SCCP Protocol available at PMN for connection for International SS7 Roaming Signalling

Section name: SCCP Protocol available at PMN			ID: 7	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
SCCP Protocol available at PMN	ETSI (ITU-T)	Boolean	M	Yes No	
SCCP Protocol available at PMN	ANSI	Boolean	M	Yes No	

7.9.12 SUBSCRIBER IDENTITY AUTHENTICATION

Section name: Subscriber Identity Authentication			ID: 7	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Subscriber Identity Authentication	Authentication performed for roaming subscribers at the commencement of GSM Service	Boolean	M	Yes No	Write YES if authentication is performed as described within the current version of SG.15
Subscriber Identity Authentication	Authentication performed for roaming subscribers in case of GPRS	Boolean	C	Yes No	Mandatory where GPRS is supported: write YES if authentication is performed as described within the current version of SG.15 under section Subscriber Identity Authentication/ Roamed Subscribe
Subscriber Identity Authentication	A5 Cipher Algorithm version in use	Alpha	M		Version of A5 algorithm in use

7.9.13 Test Numbers Information

Section name: Test Numbers Information			ID: 9	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Test Numbers Information	Test Number	N/A	M,R		
Test Number	Number Type	Listed values	M	AAC DAAC FAAC VTAAC RTAAC NNAAC NNDAAC NNFAAC NNVTAAC NNRTAAC CLIAAC CLIDAAC CLIFAAC CLIVTAAC CLIRTAAC SMSIW MMSIW	Possible Number Types for test numbers are: AAC – Voice Automatic Answering Circuit DAAC – Data Automatic Answering Circuit FAAC – Fax Automatic Answering Circuit VTAAC – Video Telephony Automatic Answering Circuit RNAAC – MSRN range Automatic Answering Circuit NN* – For any AAC type if an AAC is accessible from Network-Network Interconnection Interface only Number Type is prefixed with NN (for example NNAAC for voice AAC) CLI* – For any AAC type if an AAC in any way presents received CLI information Number Type is prefixed with CLI (for example CLIAAC for voice AAC) SMSIW – test number for SMS Interworking testing

					MMSIW – test number for MMS Interworking testing
Test Number	Number	E.164	M		
Test Number	Location	Text max 32 char	O		
Test Number	Comments	Text max 128 char	O		

7.9.14 MAP Interworking Specifically for Roaming

In this section, all the elements described contain maximum three sub elements. MSC/VLR and SGSN are relevant in case of Inbound Roaming context. Oubound Roaming doesn't require any differentiation. The values applicable to these sub elements are: MAPv1, MAPv2, MAPv3 or Not Applicable. All the elements defined in the following table are Mandatory.

Section name: MAP Interworking Specifically for Roaming		**ID: 10**	**Conditionality: M**
Parent	**Element Name**	**Applicable Sub Elements**	**Description**
MAP Interworking Specifically for Roaming	networkLocUp	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	roamingNumberEnquiry	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	InfoRetrieval	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	subscriberDataMngt	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	networkFunctionalSs	Inbound Roaming: MSC/VLR Outbound Roaming	

MAP Interworking Specifically for Roaming	MwdMngt	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	shortMsgMT-Relay (called shortMsgRelay in v1)	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	shortMsgMO-Relay (called shortMsgRelay in v1)	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	ss-InvocationNotification	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	subscriberInfoEnquiry	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	gprsLocationUpdate	Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	locationCancellation	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	MsPurging	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	

MAP Interworking Specifically for Roaming	reset	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	networkUnstructuredSs	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	Reporting	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	CallCompletion	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	IstAlerting	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	serviceTermination	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	locationSvcGateway	Outbound Roaming	
MAP Interworking Specifically for Roaming	mm-EventReporting	Inbound Roaming: MSC/VLR Outbound Roaming	

MAP Interworking Specifically for Roaming	AuthenticationFailureReport	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	ImsiRetrieval	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	GprsNotifyContext	Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	gprsLocationInfoRetrieval	Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	FailureReport	Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	secureTransportHandling	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	

7.9.15 MAP Optimal Routing of mobile-to-mobile calls

All the elements described in the following section contain maximum three sub elements. (V)MSC and GMSC are relevant in case of Inbound Roaming context. HLR is the element for Outbound Roaming. The values applicable to these sub elements are: MAPv1, MAPv2, MAPv3 or Not Applicable. All the elements defined in the following table are Optional.

Section name: MAP Optimal Routing of mobile-to-mobile calls		**ID: 10**	**Conditionality: O**
Parent	**Element Name**	**Applicable Sub Elements**	**Description**
MAP Optimal Routing of mobile-to-mobile calls	CallControlTransfer	Inbound Roaming: (V)MSC Inbound Roaming: GMSC	
MAP Optimal Routing of mobile-to-mobile calls	LocationInfoRetrieval	Inbound Roaming: GMSC Outbound Roaming: HLR	

7.9.16 Inter-Operator SMS Enhancement

All the elements described in the following section contain maximum three sub elements. SMS-GMSC and SMS-IWMSC are relevant in case of Inbound Roaming context. HLR is the element for Outbound Roaming. The values applicable to these sub elements are: MAPv1, MAPv2, MAPv3 or Not Applicable. All the elements defined in the following table are Optional.

Section name: MAP Optimal Routing of mobile-to-mobile calls		**ID: 12**	**Conditionality: O**
Parent	**Element Name**	**Applicable Sub Elements**	**Description**
Inter-Operator SMS Enhancement	shortMsgGateway	Inbound Roaming: SMS-GMSC Outbound Roaming: HLR	
Inter-Operator SMS Enhancement	shortMsgAlert	Inbound Roaming: SMS-IWMSC Outbound Roaming: HLR	

7.9.17 Network Elements Information

Section name: Network Elements Information			ID: 13		Conditionality: M
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Network Elements Information	Network Node	N/A	M,R		
Network Node	Node Type	Listed values	M		Type of the node (the complete list to be defined)
Network Node	Node Id	Alpha max 16 chars	O	BSS UTRAN CGSN EIR GGSN HLR MMSC MSC MSC-2G MSC-3G	The name associated to the node. Example:“SGSNRM4”

				MSC-2G+3G MSC/VLR MSC/VLR-2G MSC/VLR-3G MSC/VLR-2G+3G SCP SGSN SGSN-2G SGSN-3G SGSN-2G+3G SMSC IP-SMGW SSP HSS VLR	
				MME SGW PGW PCRF	
					[new node types available on LTE]
Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	M		GT address or range of GT addresses
Network Node	IP Address(es)	IP Address or IP Address range(s)	C		IP address or range of IP addresses are present in case of SGSN or GGSN node types
Network Node	Vendor Info	Alpha max 64 chars	O		

Network Node	SW/HW Version	Alpha max 64 chars	O		
Network Node	Dual Access	Boolean	O		
Network Node	Location	Alpha max 64 chars	O		
Network Node	UTC Time Offset	UTC	M		Time Zone of the area most served by MSC/VLR, in UTC + offset
Network Node	DST	N/A	O		Applicability of Daylight Savings Time (DST), if any.
DST	DST Start Date	Date	M		DST starting Date
DST	DST End Date	Date	M		DST ending Date

7.9.18 USSD Information

Section name: USSD Information			ID: 14	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
USSD Information	USSD capability available	Boolean	Mandatory	Yes No	Yes means USSD capability is supported including all of case a), section 5.1.2, 3GPP TS 22.090 / GSM 02.90.
USSD Information	Supported USSD Phase	Listed values	Conditional	Phase 1 Phase 2	The field is mandatory, where USSD capability is available. Phase 1 only support mobile initiated operation (pull operation) Phase 2 support for network initiated operation (pull and push operation).

7.9.19 CAMEL Information

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CAMEL Info	gsmSSF/MSC	N/A	M		
gsmSSF/MSC	CAP Version Supported Inbound	Listed values	M	CAPv1 CAPv2 CAPv3 CAPv4	
gsmSSF/MSC	CAP Version Supported Outbound	Listed values	M	CAPv1 CAPv2 CAPv3 CAPv4	
gsmSSF/MSC	CAP Version Planned	N/A	O		
CAP Version Planned	Planned Version	Listed values	M	CAPv2 CAPv3 CAPv4	
CAP Version Planned	Planned Date	Date	O		
CAMEL Info	CAMEL re-Routing Numbering Information	N/A	O		

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CAMEL re-Routing Numbering Information	List of numbers used for re-routing purposes	E.164GT Address	M,R		To provide information of Re Routing CAMEL number for troubleshooting
gsmSSF/MSC	CAPv4 Partial Implementations	N/A	C		Must be present if CAP version supported is CAPv4.
CAPv4 Partial Implementations	CAMEL Phase 4 CSIs	N/A	M		
CAPv4 Partial Implementations	Functionalities	N/A	M		
CAMEL Phase 4 CSIs	O-CSI	Boolean	M		
CAMEL Phase 4 CSIs	D-CSI	Boolean	M		
CAMEL Phase 4 CSIs	VT-CSI	Boolean	M		

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CAMEL Phase 4 CSIs	MT-SMS-CSI	Boolean	M		
Functionalities	Initiate Call Attempt	Boolean	M		
Functionalities	Split Leg	Boolean	M		
Functionalities	Move Leg	Boolean	M		
Functionalities	Disconnect Leg	Boolean	M		
Functionalities	Entity Released	Boolean	M		
Functionalities	DFC With Argument	Boolean	M		

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Functionalities	Play Tone	Boolean	M		
Functionalities	DTMF Mid Call	Boolean	M		
Functionalities	Charging Indicator	Boolean	M		
Functionalities	Alerting DP	Boolean	M		
Functionalities	Location At Alerting	Boolean	M		
Functionalities	Change Of Position DP	Boolean	M		
Functionalities	OR Interactions	Boolean	M		

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Functionalities	Warning Tone Enhancements	Boolean	M		
Functionalities	CF Enhancements	Boolean	M		
CAMEL Info	gprsSSF/SGSN	N/A	O		
gprsSSF/SGSN	CAP Version Supported	Listed values	M	CAPv3 CAPv4	
gprsSSF/SGSN	CAP Version Planned	N/A	O		
gprsSSF/SGSN	Partial implementations supported in CAP version 4	N/A	C		
Partial implementations supported in CAP version 4	CAMEL Phase 4 CSIs	N/A	M		

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CAMEL Phase 4 CSIs	MT-SMS-CSI	Boolean	M		
CAMEL Phase 4 CSIs	MG-CSI	Boolean	M		
CAMEL Phase 4 CSIs	PSI Enhancements	Boolean	M		
CAMEL Info	CAMEL Functionality Information	N/A	O,R		
CAMEL Functionality Information	Services name	Alpha max 64 chars	M		
CAMEL Functionality Information	SK	Numeric	M		
CAMEL Functionality Information	CAMEL Version	Listed values	M	CAPv1 CAPv2 CAPv3 CAPv4	

Section name: CAMEL Information			ID: 15	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
CAMEL Functionality Information	SCP GT Addresses	E.164 GT Address	M,R		One or more SCP GT Addresses referring to the service name

7.9.20 Packet Data Services Information

Section name: Packet Data Services Information			ID: 16	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Packet Data Services Information	APN Operator Identifier	APN OpID	M,R		
Packet Data Services Information	List of APN's available for testing and troubleshooting	N/A	O		

Section name: Packet Data Services Information			ID: 16	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
List of APN's available for testing and troubleshooting	WEB	N/A	O,R		
WEB	APN	Alpha	M		
WEB	Username	Alpha	O		
WEB	Password	Alpha	O		
WEB	ISP DNS IP address (primary)	IP Address	O		
WEB	ISP DNS IP address (secondary)	IP address	O		
WAP	APN	Alpha	M		

Section name: Packet Data Services Information			ID: 16	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
WAP	Username	Alpha	O		
WAP	Password	Alpha	O		
WAP	WAP Gateway IP address	WAP GW IP address	M		
WAP	WAP Server URL	URL	M		
WAP	WAP 1.0 Port(s)	Numeric	O,R		
WAP	WAP 2.0 Port(s)	Numeric	O,R		
MMS	APN	Alpha	M		

Section name: Packet Data Services Information			ID: 16	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
MMS	Username	Alpha	O		
MMS	Password	Alpha	O		
MMS	WAP Gateway IP address	WAP GW IP address	M		
MMS	WAP Server URL	URL	M		
Packet Data Services Information	GTP Version	N/A	M		
GTP Version	SGSN	Listed Values	M	GTPv0 GTPv1	
GTP Version	GGSN	Listed Values	M	GTPv0 GTPv1	

Section name: Packet Data Services Information			ID: 16	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Packet Data Services Information	BSS information	Alpha	O		BSS vendor(s), (software/hardware version) Ciphering active yes/no PBCCH
Packet Data Services Information	Data services supported	N/A	M,R		Repeating fields indicating one or more data services supported in a PMN
Data services supported	Data Service	Listed Values	M	GPRS EDGE 3G PS HSDPA HSUPA	
Data services supported	Multislot Class Capability	Alpha	O		Maximum Multislot class capability available
Packet Data Services Information	Multiple PDP Context support	N/A	M		Query on Multiple PDP context support
Multiple PDP Context Support	Supported or Not Supported	Boolean	M	Yes/No	
Multiple PDP Context Support	Number of simultaneous Primary PDP Context	Numeric	M,C		

7.9.21 IP-Roaming and IP-Interworking Information

Section name: IP-Roaming and IP-Interworking Information			ID: 17	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
IP-Roaming and IP-Interworking Information	All IP address ranges used by PMN for connection to Inter-PMN IP backbone	IP address ranges	M,R		IP addresses or IP address range(s) of all operator's nodes that connect to the inter-PLMN IP backbone network known as the "GRX" for example GGSNs, SGSNs, MMSCs, AAA Servers/Proxies, DNS Servers etc. This information is used for firewall and Border Gateway configuration (see PRD IR.34).
IP-Roaming and IP-Interworking Information	Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routeing Area Identity (RAI) in GTP messaging from SGSNs	N/A			Provide the details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any SGSN in the VPMN to the GGSN in the HPMN, in the Create PDP Context Request and Update PDP Context Request GTP messages. If only the MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank.
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that	MCC	MCC (3 digits)	O		Multiple values allowed

Section name: IP-Roaming and IP-Interworking Information			ID: 17		Conditionality: C
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
may be sent in the Routeing Area Identity (RAI) in GTP messaging from SGSNs					
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routeing Area Identity (RAI) in GTP messaging from SGSNs	MNC	MNC (2/3 digits)	O		Multiple values allowed
IP-Roaming and IP-Interworking Information	Autonomous System Number(s) (ASN)	AS number	M,R		The Autonomous System Number (ASN) is a 16 bit integer that every PLMN must assign to their IP network that is seen as one Autonomous System (AS). The ASN enables the exchange of exterior routing information between neighbouring Autonomous Systems. This can be either a private ASN (64512 through to 65535) or public ASN.
IP-Roaming and IP-Interworking Information	List of PLMN authoritative DNS server IP addresses & names	IP Address	O,R		IP address(es) and name(s) of DNS server(s) that are authoritative DNS server(s) that is DNS servers that answer DNS requests/queries from local caching DNS servers. Note that DNS hostname(s) given in this field should match the actual name(s) configured in the operator DNS server(s) (this is to avoid conflict with the NS records in the Root DNS and operator DNS

Section name: IP-Roaming and IP-Interworking Information			ID: 17		Conditionality: C
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
					servers).
IP-Roaming and IP-Interworking Information	List of PLMN local caching DNS server IP addresses & names	IP Address	O,R		
IP-Roaming and IP-Interworking Information	IP address that responds to ping/traceroute	IP Address	O		Pingable and traceroutable IP address of a node within the operator's AS. Maximum size for ping is 64 bytes. Minimum time interval for pinging is 1 hour.
IP-Roaming and IP-Interworking Information	GRX provider(s)	Alpha max 64 chars	M,R		Name of the GRX Provider

7.9.22 MMS Interworking Information

Section name: MMS Interworking Information			ID: 18	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
MMS Interworking Information	MMSE		M,R		
MMSE	Domain name of MMSC	Domain name	M		
MMSE	IP address range for MMSC	IP Address range	M		
MMSE	IP address(es) of incoming MTA	IP Address	M,R		
MMSE	IP address(es) of outgoing MTA	IP Address	M,R		
MMSE	Max. size of MMS allowed	Pattern “Kb”, numeric	O		

Section name: MMS Interworking Information			ID: 18	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
MMSE	Delivery Report allowed	Boolean	M	Yes No	
MMSE	Read Report allowed	Boolean	M	Yes No	
MMSE	MMS IW Hub Provider(s) GT addresses	E.164GT Address range	O,R		
MMSE	MMS IW Hub Provider(s) Name(s)	Alpha, max 64 chars	O		

7.9.23 WLAN Information

Section name: WLAN Information			ID: 19	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
WLAN Information	RADIUS server/ RADIUS proxy IP address(es) – Incoming Traffic	IP address	M,R		
WLAN Information	RADIUS server/ RADIUS proxy IP address(es) – Outgoing Traffic	IP address	M,R		
WLAN Information	IP address range(s) used for WLAN roaming signaling	IP address range	M,R		
WLAN Information	Realm(s)	Domain name	M,R		
WLAN Information	Brand name of the WLAN service	Alpha	M,R		Brand name of the Home WO WLAN service seen by the end user in the web based login page. The brand name can be used to mask the realm from the end user in web based login pages for example by utilizing a dropdown box into realm known by the network. This enables an operator to change its roaming realm with reduced impact to the user experience. If the

Section name: WLAN Information			ID: 19	Conditionality: O	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
					operator has multiple roaming realms they have to be mapped one-to-one to brand names

7.9.24 LTE ROAMING Information

Section name: LTE ROAMING Information			ID: 20	Conditionality: C	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
MAP Interworking	SCTP	N/A			
MAP Interworking	S6a	N/A			
MAP Interworking	S6d	N/A			
MAP Interworking	S8	N/A			

MAP Interworking	S9	N/A			
Diameter	IP addresses of the Diameter Edge Agent	IP address range			
S6a	Hostnames for HSS, MME in the form which they are used in the Diameter-Origin and Diameter-Destination, Host and Realm AVPs				
S6a	Is MAP interface available for connection to HSS (PMN supports MAP-IWF to HSS)?	Boolean	M	Y/N	
S6a	Is MAP interface available for connection to MME (PMN supports MAP-IWF to MME)?	Boolean	M	Y/N	
S6d	Is S6d used for legacy SGSN?	Boolean	M	Y/N	
S8	Is GTP Interface available?	Boolean	M	Y/N	

S8	Is PMIP Interface available?	Boolean	M	Y/N	
S9	Hostnames for PCRF in the form which they are used in the Diameter-Origin and Diameter-Destination, Host and Realm AVPs				
S9	Is S9 used for PCC?	Boolean	M	Y/N	
SMS ITW	SMS Delivery Mechanism	N/A			
SMS Delivery Mechanism	SMS over IP	Boolean	O	Y/N	
SMS Delivery Mechanism	SMS over SGs	Boolean	O	Y/N	
Voice ITW	IMS	Boolean	O	Y/N	
Voice ITW	CS Fallback	Boolean	O	Y/N	
Voice ITW	Other	Boolean	O	Y/N	

Roaming Retry	Is Roaming Retry Supported?	Boolean	M	Y/N	
Home PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	M	Y/N	
Visited PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	M	Y/N	
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 2 supported?	Boolean	M	Y/N	
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 3 supported?	Boolean	M	Y/N	
Visited PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 2 supported?	Boolean	M	Y/N	
Visited PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 3 supported?	Boolean	M	Y/N	
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 1 supported?	Boolean	M	Y/N	
Home PMN Information for 2G/3G and LTE Roaming	Is Scenario 2 supported?	Boolean	M	Y/N	

Agreement					
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 3 supported?	Boolean	M	Y/N	
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 4 supported?	Boolean	M	Y/N	
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 1 supported?	Boolean	M	Y/N	
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 2 supported?	Boolean	M	Y/N	
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 3 supported?	Boolean	M	Y/N	
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 4 supported?	Boolean	M	Y/N	

7.9.25 Contact Information

For this section a new Format type is defined named “Contact” as represented below. It occurs in in Contact Type elements. Conditionality is defined only if “Repeating” occurs.

Format Type: Contact					
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Contact	Person Name	Alpha, max 64 chars			
Contact	Tel	Tel number	R		
Contact	Fax	Tel number	R		
Contact	E-Mail	Email	R		

Section name: Contact Information				ID: 21	Conditionality: M
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Contact Information	Contact Type	Listed Values		Roaming Troubleshooting Contact Information SCCP inquiries and ordering of SS7 routes Roaming Coordinator IREG Tests TADIG Tests CAMEL Tests GPRS Contact Contact person(s) (in PMN) for GRX connectivity Contact person (in PLMN) to verify authority of a GRX provider to add/modify data in Root DNS Contact person(s) for IW MMS Contact person(s) for IW SMS Contact person(s) for WLAN Other contacts	
Contact Type	Roaming Troubleshooting Contact Information	N/A	M			
Roaming Troubleshooting Contact Information	Troubleshooting Office Information	N/A	M,R			
Troubleshooting Office Information	Location (City)	Alpha, max 64 chars	M			
Troubleshooting Office Information	Office Time Zone in UTC	UTC	M			

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Troubleshooting Office Information	Office Hours	Time range	M			
Roaming Troubleshooting Contact Information	Main Contact for Troubleshooting (Office Hours)	N/A	M			
Main Contact for Troubleshooting (Office Hours)	Team Name	Alpha, max 64 chars	M			
Main Contact for Troubleshooting (Office Hours)	Tel	Tel number	M,R			
Main Contact for Troubleshooting (Office Hours)	Fax	Tel number	M,R			
Main Contact for Troubleshooting (Office Hours)	E-Mail	Email	M,R			
Roaming Troubleshooting Contact Information	Escalation Contact for Troubleshooting	N/A	M			

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Escalation Contact for Troubleshooting	Person Name	Alpha, max 64 chars	M			
Escalation Contact for Troubleshooting	Tel	Tel number	M,R			
Escalation Contact for Troubleshooting	Fax	Tel number	M,R			
Escalation Contact for Troubleshooting	E-Mail	Email	M,R			
Roaming Troubleshooting Contact Information	24 x 7 Troubleshooting Contact (Out of Office Hours)	N/A	M			
24 x 7 Troubleshooting Contact (Out of Office Hours)	Team Name	Alpha, max 64 chars	M			
24 x 7 Troubleshooting Contact (Out of Office	Tel	Tel number	M,R			

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Hours)						
24 x 7 Troubleshooting Contact (Out of Office Hours)	Fax	Tel number	M,R			
24 x 7 Troubleshooting Contact (Out of Office Hours)	E-Mail	Email	M,R			
Contact Type	SCCP inquiries and ordering of SS7 routes	Contact	M,R			
Contact Type	Roaming Coordinator	Contact	M,R			
Contact Type	IREG Tests	Contact	Contact Type			
Contact Type	TADIG Tests	Contact	M,R			

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Contact Type	CAMEL Tests	Contact	M,R			
Contact Type	GPRS Contact	Contact	M,R			
Contact Type	Contact person(s) (in PMN) for GRX connectivity	Contact	M,R			
Contact Type	Contact person (in PLMN) to verify authority of a GRX provider to add/modify data in Root DNS	Contact	M,R			
Contact Type	Contact person(s) for IW MMS	Contact	M,R			
Contact Type	Contact person(s) for WLAN	Contact	M,R			

Section name: Contact Information				ID: 21	Conditionality: M	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**		**Description**
Other Contact	Job Ttitle	Contact	O,R			
Job Ttitle		Text	M			
Contact Information	Contact point (address) for distribution of updatings of the roaming database	Alpha, max 256 chars	M,R			

7.9.26 Hosted Networks

Section name: Hosted Networks			ID: 23	Conditionality: C,R	
Parent	**Element Name**	**Format**	**Conditionality**	**Values**	**Description**
Hosted Networks	Network	N/A	M		
Network	Name		M		Name of the Hosted network
Network	Type		M	Terrestrial, NonTerrestrial	
Network	TADIG Code		M		
Network	Network Node	N/A	M,R		
Network Node	Node Type	Listed values	M	(U)MSC/VLR (U)SGSN	Type of the node

Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	M		GT address or range of GT addresses
Network Node	MSRN Range		M,R		
Network Node	IP Address(es)	IP Address or IP Address range(s)	C		IP address or range of IP addresses are present in case of SGSN or GGSN node types

7.10 RELEASE MANAGEMENT

7.10.1 RAEX IR.21 Change Management

Changes in the RAEX IR.21 process have implications in other PRDs such as TD.81. Release Management Procedures must be aligned for all GSMA data interchange formats, in order to provide implementation time and rules for testing and migration. TADIG is the Working Group within the GSMA responsible for the specification and maintenance of data interchange formats.

Therefore, the RAEX IR.21 Release Management Process will be aligned to the document already defined and in place within the TADIG group.
The Release Management principles for RAEX IR.21 are defined in the Permanent Reference Document (PRD) TD.34

The table below summarizes the timescales for the "RAEX IR.21 Scheduled Releases" according to Section 2.1 of TD.34:

Format	Submission of Major Req's	Approval of Major Changes	Submission of Minor Req's	Approval of Minor Changes	Latest Implem. Date
RAEX IR.21	15 March 2010	15 May 2010	15 September 2010	15 November 2010	1 May 2011

7.10.2 RAEX IR.21 Version Control

When a new IR.21 is released a new version of RAEX Business Requirements and related TADIG documentation will also be created and SPs will need to support a new RAEX IR.21 version. It may also occur that development of TD documents may in turn create a change to RAEX IR.21. These changes are indicated using a latest version number.

Senders and receivers of IR.21 data in the new RAEX IR.21 version will need to make a change to their systems in order to create/accept any new information being exchanged in the newer RAEX IR.21 version.

Senders will need to indicate in their IR.21 ID.3 network information, which version of RAEX IR.21 they will 'send' to and can 'receive' from their roaming partners in order for them to understand what version of RAEX IR.21 is being supported by that Operator.

For Example:
RAEX IR.21 2010 All SPs must use the most recent version of RAEX IR.21.

8 DOCUMENT MANAGEMENT

Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
Draft	Dec. '92 - June '92	For EREG Discussions		
0.0.1	June 1992	For EREG Discussions		
1.0.1	June 1992	For EREG Discussions		
3.0.0	12th June 1992	Approved at MoU 20		
3.1.0		Approved at MoU 20 Note: No change to IR.21, only a new printout of the GSM Association Roaming database		
3.2.0	10th June 1993	Approved at MoU 24 - Includes CR no.2		
3.2.1		Approved at MoU 25 - Includes CR no.3		
3.2.2		Approved at MoU 26 - Includes CR no.4		
3.3.3	18th October 1995	Approved at MoU 32 - Includes CR no.5		
3.4.0	18th January 1996	Approved at MoU 33 - Includes CR no.6		
3.4.1	29th May 1996	Approved at MoU 34 - Includes CR no.7		
3.4.2	3rd October 1996	Conversion to PRD TD.15		
3.4.3	25th November 1996	Approved at IREG 31. Includes CR no.8, non-strategic: Removing the reference to PRD IR.22		
3.5.0	October 1999	CR# 9. PL Doc 181/99 Rev 1. Approved at Plenary 42		
3.6.0	27th April 2000	CR#10, PL Doc 030/00 approved at Plenary 43		
3.7.0	October 2000	Approved at Plenary 44 – CRs # 11 and 12		
3.8.0	May 2002	CR IREG 016/02 rev1 addition of new field containing network's SMSC GT addresses to allow operators with MSCs that require full SMSC addresses to enter them correctly CR IREG 019/02 rev1 introduction of GPRS and GSM vendor information		
3.8.1	August 2002	CR 013 IREG Doc 107/02 rev2 approved at IREG#43. Addition of "Pingable and traceroutable IP address" field in the "GPRS Information" section, in order to facilitate GPRS roaming testing and troubleshooting.		
3.8.2	February 2003	NCR 014 IREG Doc 019/03 rev1 approved at IREG#44. Addition of a GTP version field in the "GPRS Information" section, in order to clarify the GTP version supported by the operator.		
3.8.3	February 2003	NCR 015 IREG Doc 020/03 rev1 approved at IREG#44. Addition of MMS Information section.		
3.8.4	February 2003	NCR 016 IREG Doc 027/03 approved at IREG#44. Adding new fields to the CAP version information section, to show which CAMEL partial implementations are supported.		
3.9.0	February 2003	SCR 017 IREG Doc 029/03 Rev 1 approved at IREG#44. Adding a new section on WLAN information.		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
3.9.1	February 2003	NCR 018 IREG Doc 035/03 Rev 1 approved at IREG#44 Introduction of minimum time to inform roaming partners when updating IP based services Information.		
3.9.2	August 2003	NCR 019 on the IR.21 ver.3.9.1 for addition of the Application Context in MAP		
3.9.3	August 2003	NCR 20 to IR.21 Re AAC numbers		
3.9.4	August 2003	NCR 21 on the IR.21 Ver.3.9.1 for Clarification of supporting GTP version1		
3.9.5	November 2003	NCR 024 on the IR.21 for correction of AC name in MAP		
3.9.6	November 2003	NCR 025 on the IR.21 for clarification of supporting latest version of Release		
3.9.7	May 2004	NCR 027 to IR.21 v.3.9.6		
3.9.8	October 2004	NCR 029 to IR.21 v.3.9.7 implemenation of compliance to SG.15		
3.9.9	March 2005	Three NCR to IR.21 v.3.9.8 NCR 030 : Addition of new section regarding Authentication to record compliance with SG.15 NCR 031 : Structure reorganization of Miscellaneous section NCR 032 : Provided a mechanism to detect SIM Box usage		
3.9.10	June 2005	MCR 032: Addition of MMS Hub provider information and MMS Hub provider data		
3.9.11	August 2005	NCR033: Introduction of an update interval for SMS-SC addresses MCR034: Record of A5 cipher algorithm in use by each operator		
4.0	November 2005	MCR035: Identification of operator network technology standard MCR036: New section called “IP-Roaming and IP-Interworking information” containing proper information for GRX Interworking and for Master Root DNS Server MCR037: New section for SCCP Protocol availability at PLMN		
4.1	March 2007	MCR 038: GPRS Information section change and addition of fields for data service support		
4.2	April 2007	MCR 039: New section containing MSC and VLR Time Zone information		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
4.3	March 2008	MCR 046: collection of following CR MCR040: Enhancement of SMSC and CAMEL information sections MCR041: Removal of SS7 Access Solution section MCR042: Including Roaming Hubbing Information MCR043: Including USSD Information MCR044: Contact Point section review for Miscellaneous MCR045: Redesign of Auto Roam Section		
5.0	March 2008	MCR047: RAEX Business requirements and Infocentre improvements for notification procedures Editorial changes accordingly Revision of Annex A output		
5.2	July 2008	Editorial change on [Unrestricted]		
5.3	September 2008	MCR048: Revision of Annex A including new form template according xml schema Revision of IR.21 Data Dictionary Definition of Network Type Elements Removal of Technology and Frequency elements from IR21 Company logo in the output template Revision of Update Intervals Section Clarification of WLAN Roaming Signalling IP List		
5.4	March 2009	MCR049: Revision of Data Dictionary and Output Template. Changes needed after “proof of concept” analysis, to allow correct definition of operator’s data MCR050: - Revision of Annex A including “Comments” field on SCCP Carrier sections - Addition of CAMEL Re-Routing number information - Addition of Dual Access column in Network Elements information		
6.0	November 2009	MCR051: Removal of Roaming Hubbing section due to introduction of PRD IR.85	IREG eVote EMC#79	Fabrizio Fiorucci / Telecom Italia, Italy
6.0	December 2009	MCR052: - Addition of new section for RILTE information - Addition of RAI information - Editorial correction on section Id 3	IREG#57 EMC#79	Fabrizio Fiorucci / Telecom Italia, Italy
6.1	April 2010	mCR053: Support (or not support) of multiple PDP context	Signal#48	Fabrizio Fiorucci / Telecom Italia, Italy

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
6.2	October 2010	MCR054: -Definition of a Release Management proposal for RAEX IR.21 -Allow Roaming Hubs and other entities to receive IR.21 by replacing “Operator” with “Service Provider” in the text -State that RAEX IR.21 process is a “Binding” process.	IREG#58 EMC#80 DAG#73	Fabrizio Fiorucci / Telecom Italia, Italy
6.3	March 2011	MCR057: This CR is created in order to align the latest agreement made in Packet/RILTE on 2G/3G+LTE co-existence roaming scenarios. Also, current IR.21 on LTE roaming information (name of the information, Diameter sections) needs to be updated to align the latest IR.88.	Signal#53 Packet#49 IREG#59	Itsuma Tanaka / NTT DoCoMo, Japan

Other Information

Type	Description
Document Owner	IREG-SIGNAL
Editor / Company	Fabrizio Fiorucci / Telecom Italia, Italy