Latin America

Accidental and Border Roaming
Solutions and recommendations

Version 1.0

5/7/2010

This is a document of the GSM Association Latin America RIG.

Security Classification: This document contains GSMA Non-Confidential Information

Access to and distribution of this document is restricted to the persons listed under the heading Security Classification Category. This document is confidential to the Association and is subject to copyright protection. This document is to be used only for the purposes for which it has been supplied and information contained in it must not be disclosed or in any other way made available, in whole or in part, to persons other than those listed under Security Classification Category without the prior written approval of the Association. The GSM Association ("Association") makes no representation, warranty or undertaking (express or implied) with respect to and does not accept any responsibility for, and hereby disclaims liability for the accuracy or completeness or timeliness of the information contained in this document. The information contained in this document may be subject to change without prior notice.

Index:

ACCIDENTAL AND BORDER ROAMING

1-Summary:

Latin America is a region of low travel traffic between borders in comparison to Europe or North America. Nevertheless, an important population concentration exists in these zones of the region. 4 % of the population, according to the IIRSA, lives in these zones only a few kilometers away from an international border.

The electromagnetic spectrum is a limited resource and is assigned by the respective regulative authority in each country. As a consequence, there are many cases in which mobile networks of neighbor countries are assigned the same bands of frequencies.

When the signal of a network is more powerful than that of his neighbor, different implications to the provision of the service may occur. Particularly, interference problems can disable the possibility of placing calls and generate cases of **Accidental Roaming** inside the country of the customer.

As for the first problem, the regulators from border countries currently work jointly to make the use of the frequency colors compatible in such way that minimizes the possibility of interferences. Nevertheless, the second case is really a problem that, unavoidably, the operators of the region must approach.

It is necessary to emphasize that the accidental roaming is a topic which takes more relevance depending on the geography of the country, and the existence of Prepaid Roaming services with frontier countries.

The prepaid customers are the most affected by this problem since, unlike the pospaids, generally their communication will be cut or will not be able placed because of lack of credit in their accounts. On the other hand, any refund that could be realized will be performed after the intended communication.

Clearly it does not affect in equal way the different borders. In many cases, differences in the frequencies used or existence of important geographical barriers practically eliminates the occurrence of Accidental Roaming.

On the other hand, the proliferation of multi-band equipments between prepaid customers involves an increase in the problem cases.

In other cases, the border between countries is divided simply by a street (Uruguay – Brazil case) or coincides with a small river. In these cases, to avoid coverage overlapping is simply impossible if a good signal level is guaranteed in the own country.

The industry as a whole has implemented actions to eliminate or to minimize these problems. For their part, suppliers developed platforms that collaborate in the detection and elimination of these cases. As for the operators, they developed in diverse cases, in an individual or joint way, in house solutions of technical or commercial nature, or they implemented solutions developed by vendors.

These solutions have an impact in lowering the problem cases as was showed in the results in borders as that of Argentina - Paraguay or between diverse countries of Central America. In this paper, a brief description of these solutions and recommendations to operators and other players of this industry will be performed.

There exists a need for communicate in roaming for customers that move constantly between border zones with their places of residence at a limited price. Offers of this style can be defined in what can be called "**Border Roaming**".

The development of Border Roaming offers, where the price is defined near to a local plan, implies an important challenge for the operators because of the investments that are

required and that cannot be re-paid in the current context of interconnection costs and taxes imposed that do not make distinction of border zones.

It is important to take also into consideration that differences in the macroeconomic environments of neighboring countries can involve important distortions in border zones. The local prices, in term of a common reference currency, can be very unequal between neighbor operators due to the national exchange rate policies of each country.

On the other hand, the special charging of consumptions realized in border zones and destined to border zones represents a challenge by itself. In most cases, the charging systems currently used by the operators do not support this possibility, being necessary important developments for which the joint work with suppliers is indispensable.

Billing's solutions and techniques were already tested in the industry existing cases of success in diverse regions.

However, it is necessary for the commercial viability of these plans, to count on a reduced cost structure for these scenarios of Border roaming traffic.

Being the taxes the principal cost factor of the service, it is natural that the elimination or reduction of them is indispensable.

2-Solutions to Accidental Roaming

In the region several divergent solutions exist to the problem of the accidental roaming. None is for itself 100 % efficient. As GSMLA we recommend to the operators to perform a deep analysis to determine which is the best solution, or combination of them, for their case.

The solutions can be divided in:
- Commercial measures
- Adjustment of power and placement of the antennas in the Border zone.
- The elimination of the International Roaming service in narrow border zones.
- Solutions with platforms and signaling

2.1- Commercial Measures

In the first item, commercial solutions, the most important measure is the usage of the SMS welcome service as a way to notify the customer who is in a network different from the HPMN and therefore it is doing roaming. Also it is possible to call the customer to the action to realize a manual change of network towards the home one.

However, the usage of this tool for itself does not represent a complete solution and additionally it implies sending SMS's constantly to customer, even to those that realize roaming genuinely.

The reduction of prices of the roaming service in the above mentioned zones can also be a solution but the current costs of interconnection and taxes imposed make these planes unprofitable at a value similar to the one of a local plan.

2.2- Technical Measures

2.2.1- Adjustment of power and placement of the antennas in the Border zone.

The operators of both sides of the border can work jointly to measure and fit the antenna power and redirect them in order to minimize the coverage overlapping. This should be the first step of resolution since it does not imply investment and has a high impact on the reduction of Accidental Border cases. Nevertheless, it does not represent a complete solution by itself for the borders with high population density.

2.2.2- Solutions based on the blocking of problematic cells in the border operation network.

In some borders of the region, several operators implemented solutions with a selective blockade of cells for the neighboring roaming partners.

The operators implemented in a bilateral way a selective blockade of the cells that originate the accidental roaming generating a band of approximately 5KM where the visited operator does not offer service to the roamers from the neighboring operator. At the same time, home operator increased the power of his antennas next to the border zone invading the other country.

The blockade only applies to customers from the neighbor operator. It does not apply for other roaming partner´s customers.

Though this solution is effective, it requires the cooperation and joint work of every neighbor operator. The zones where the roaming is restricted must be equivalents between them. This solution implies a very important work of coordination between several operators.

As a previous measure it is necessary to detect the cells that originate the accidental roaming cases. The solution is not perfect since having cells from the neighbors eliminated can imply that customers are left without coverage performing genuine roaming in the neighbor country.

On the other hand, having the border antenna power increased and having eliminated those of the neighbor, own customers will perform consumptions in the visited country as if they were in their home network when actually they are abroad.

This solution does not involve investments in platforms for the operators but it demands an important quantity of working time from the technical teams to perform the measurements and configurations.

This solution is neither fast, nor easy to implement. Nevertheless, it is highly effective in eliminating cases of accidental roaming and allowing own customers to realize calls at local cost in a narrow, over the border zone (Border Roaming).

2.2.3- Solutions with platforms and signaling

In last GSM LA Plenary Meeting #33 (Miami, 21-23June'10) BARG WORKING discussion, Accidental roaming solutions provided by vendors were addressed. There are nowadays effective platforms and services that can reduce problems of accidental roaming.

Diverse suppliers offer solutions at signaling level that allow identifying if a customer is in a situation of accidental roaming and act in consequence.

These solutions identify the cell where the customer is and apply decision logics that affect the process of registration of the customer making him remain in his home network.

They realize follow-ups on the customer next registration to improve constantly and automatically the identification of cells that originates the accidental Roaming cases. In similar way, they identify also lacks in coverage from the home operator and allow the customer to register in the visited network in those cases.

Since these platforms make possible the Identification of zones in the own territory where coverage is not offered and where traffic exists, the Home operator gets useful information to deploy smartly the lacking coverage.

These solutions imply an investment. They do not affect the level of service to the customer since they don´t block cells from the visited network, in case of not possessing own coverage; the customer is always able to communicate doing roaming with the costs that it implies.

These solutions can reduce the cases of accidental roaming in an important way. In some borders of Central America, these tools have reduced the cases in 30 to 50 %.

Additionally, they possess another type of advantages. They don´t require coordinated work with the multiple operators of the neighboring country to achieve the expected results. On the other hand, these solutions can be associated to traffic steering tools.

3-Border Roaming

The differential charging of mobile service in border zones and towards border zones implies two challenges:

-Technical and Billing
-Commercial

3.1- Technical and Billing

From the Technical and Billing point of view it is necessary to perform the distinction between the Wholesale and Retail charging.

As for the retail charging, taking in account that most operators use the information from the TAPs, that do not include detail of the visited cell, there is impossible to discriminate these cases of border roaming. In the cases where the operator uses their own platforms for charging, then this discrimination is feasible.

However, there exists a solution that can be applied in this cases that solve this difficulty. TAP files include a non mandatory field called BID that can be to inform groups of cells where the customer performed a call.

Every operator can "buy" as many BIDs as groups of cells it wants to report in the TAPs. Hereby, grouping the border cells suitably in one or more BIDs can resolve the differential charging at Wholesale and retail level postpaid customers. This solution does not apply for prepaid customers' since the charging is naturally performed online and cannot be based on the TAP´s information.

This solution can be effective only if two issues are fulfilled:

1-That this solution needs to be implemented in a coordinated manner by many operators in the region. All the operators in every country have to use BIDs that include equivalent geographical zones.

2-That the Home operator fits its billing systems in order to be able to use the non mandatory BID field at both wholesale and retail level.

The second condition depends on the will of every operator to offer Border Roaming special plans to its customers. Nevertheless, the first condition does not depend on the operator who wants to offer these plans. Therefore, a regional commitment is necessary if this alternative of solution is to be used.

This solution is being used by some operators of the region and is highly used by operators inside USA.

An additional difficulty of the BID solution is that all the operators inside a country must agree that their BIDs should include cells that cover similar geographical regions. If that were not the case, a customer might receive normal Roaming charges if he registers in a network, whereas if he had registered in other network in the same geographical place would have been charged a Border Roaming price.

In case that the visited operator does not populate the field, Vendors could add this information in a way that the Home operator could perform the differential charging at retail level. Logically, the Visited operator must include some location information of the cell in the TAP files. For example, LAC or Cell ID.

The employment of solutions based on BID allows the identification of the place where the customer realized the consumption but in no way it identifies where the call was destined

3.2- Commercial

The structure of International Roaming service costs is formed by:

-Interconnection Cost (International Long distance).
-Roaming costs (Amount Charged by the Visited mobile operators for offering its network services).
-Taxes.

The first two costs usually do not discriminate between zones inside the visited country. Therefore, the cost turns out to be the same when performing consumption in a Border zone or in any other part of the visited country. On the other hand, at Wholesale level usually there is no more precise distinction than the country of destination of the call. In case of the SMSs there is no distinction for its destination at all.

The taxes are an important part in the service cost. Usually, due to the high tax burden and the double taxation (in the country of the HPMN and in the one of the VPMN).

In order to make feasible Border Roaming offers with prices near to a local plan, it is necessary improve the cost structure reducing or eliminating taxes for these cases of traffic.

4-Conclusion

There exist solutions that reduce the impact of Accidental Roaming already implemented by several operators of the region (América Móvil, Movistar, Telecom Personal, etc …). None for itself solves a 100 % of the cases without having an impact in the service level to the customers. On the other hand, investments in platforms and / or in internal resources are needed. Nevertheless, it is possible to implement an effective combination.

As GSMLA we recommend to each operator affected by cases of Border roaming to perform a deep analysis on the existing solutions and to apply the solution or combination of them that best fits their particularities.

The creation of Border zones with a differential charging requires the improvement in the cost structure to be feasible. The reduction of the tax burden for the scenarios of traffic involved in possible "Border" plans is indispensable for this type of offers to be feasible.

From the technical point of view, the joint collaboration between the operators of the visited country to identify border zones is necessary in order to allow the Home operator to realize the differentiated charging.