

# **Mobile Voice Service – Termination Rates and their Implications for End- User Charges**

**On- Net, Off- Net and Roaming  
Charges**

# AGENDA

- 1. Some history on mobile and mobile voice service in the Caribbean**
- 2. The current situational issues and their impact**
- 3. Regulatory intervention -compliance or Forbearance**
- 4. Presenters' recommendations**
- 5. Questions**

# **1. Some History on Mobile and Mobile Voice Service in the Caribbean**

# Brief looks ....at Mobile milestones in Trinidad and Tobago

- First mobile TDMA analogue network launched by Incumbent in 1992
- Receiving Party Pays (RPP) retail pricing method -selected to avoid fixed line network users charges that undermine fixed line subsidy (USO)
- Calling Party Pays (CPP) retail pricing introduced 2001 stimulating massive subscriber uptake and subsequently, wider coverage.
- First GSM digital network launched by Incumbent on the heels of a new telecom bill (WTO-based reform) being introduced by Government in 2001
- No interconnect charges or transfer pricing between mobile arm and fixed line arm of Incumbent
- New Act in 2004 and Second mobile operator introduced in 2005
- Early disputes 2006 -2007 and aggressive promotions, now reduced to “textbook” oligopolistic market competition

## ....at Liberalisation in Caribbean

- Jamaica leads the way as first English-speaking Caribbean Government to reform telecom market, beginning in 2001
- Prior to this were Puerto Rico in 1986 and Dominican Republic in 1992
- OECS in 2002, Barbados in 2003 and Trinidad and Tobago in 2005, Surinam in 2007, Guyana still undecided.
- Key markets for competition were Mobile, International -Direct-Dialling, Internet and Cable-TV

## .....at Mobile Voice Services

- **On- Net call** – this is a call placed between two subscribers of the same network.
  - Generally, lowest cost call of the network as it employs intra-network components and contributes to absorption of otherwise, idle capacity of the sunk network investment costs.
  - Retail price lowest and provides increasing externalities as subscription grows.
- **Off-Net** – this is a call placed by a subscriber of one network to a subscriber of another network.
  - A marginal cost call which is usually based on efficient long run network usage costs. It comprises of an on-net segment and off-net segments to interconnected networks(fixed line, mobile or, international networks);
  - -At retail level subscriber pays for call origination and call termination of off net segment ( usually called mobile network termination and domestic and international interconnection charges as case may be).

## ....at Roaming Voice Service

- Using your mobile phone outside of your operator's service area is called roaming – can be national and/or international.
- Quality of service has been main challenge to a proper roaming experience
  - 23% calls below minimum QoS standard in US and Western Europe
  - 59% below minimum QoS standard in Middle East, India, Africa and South America ( source: Ditech Networks, 2008)
- 2007 -2008 introduction and testing of Global Roaming Quality(GRQ) –end to end QoS measurement framework.
- Framework extended to Roaming Hubs in 2009 and provide SLA prescriptions for monitoring and maintaining QoS.
- Roaming rates not regulated and perception of extended call conveyance between home location register and visited network gives public expectation of higher rates.

# International settlement rates terminated in each world region

## International mobile settlement rates terminated in each region

- the average of proportion of weighted average: (All regions)
- MTR : FTR = 3.78 : 1
- TAS: 1.417:1
- TAF: 1.51:1
- TEUREM: 10.57:1
- TAL: 3.36:1
- Others: 2.157:1
- International settlement rates terminated within respondent country
- MTR : FTR =1.53:1
- B-National interconnection charges
- the average local interconnection charge for:
- fixed to fixed = around 0.016 SDR
- fixed to mobile = around 0.086 SDR



# Caribbean Roaming

- Roaming first introduced through needs of US business people and visitors to the Caribbean, using the availability of AT&T, later re-branded Cingular, mobile network already in the Caribbean
- C&W, having moved from TDMA to GSM 2G, offered roaming to dual-band hand sets, US visitors that could use their networks, and Europe's GSM users
- Digicel, with wholly -owned mobile networks in many countries, having acquired Cingular holdings in St Kitts, Bermuda, Antigua and Cayman Islands, then introduced a roaming service alternative to C&W.
- Websites of Caribbean mobile operators list the hosts of roaming partnerships available across the Globe.
- Retail rates are usually classified as follows:
  - Regional networks
  - USA and Canada
  - Rest of the World
- C&W complains about Digicel non-compliance with ITU–T Recommendation D.93 concerning use of HNI and brings roaming issue to forefront.

# Emergence of Mobile Termination

- Mobile networks preceded liberalisation in most countries, so mobile termination was not based on competitive liberalisation rates.
- Termination rate on mobile networks referred mainly to International calls paid for by international carriers.
- FCC benchmark rule decreed cuts in mobile termination as well: competitive domestic market nor cost-based termination rates were non-existent.
- A so called “Blended” termination rate is paid by international carriers to cover both fixed and mobile termination.

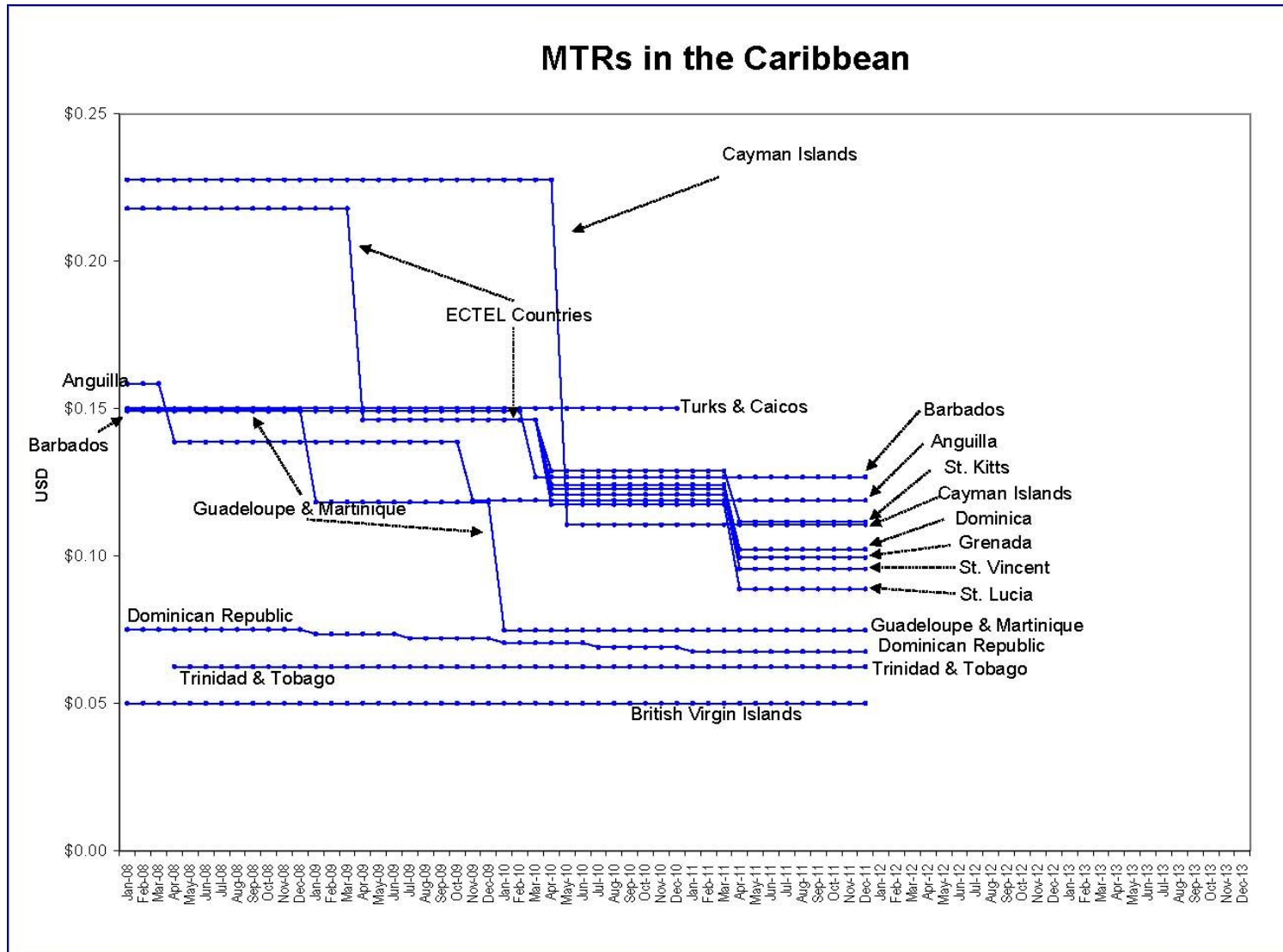
# Mobile Termination (continued)

- Asymmetrical termination rates introduced in Jamaica 2001. Higher rate to new-entrant.
- Dispute tribunal declares symmetrical mobile termination rate and a fixed line termination rate in T&T. New entrant status denied by Tribunal -2007.
- SMS Interconnection service to mobile and fixed line in T&T only agreed to by incumbent in 2007.
- T&T's Act does not allow regulator price-setting powers nor mandates formation of wholesale service providers – No MVNOs, bulk sale of mobile minutes, international calling cards etc. emerging in T&T.
- Barbados first to legitimise VoIP and have policy and termination rates for voice and SMS for fixed and mobile networks in 2010.

# Mobile Termination (Continued)

Country	Mobile Termination Rate Per Minute		
	2008	2009	2010
	<b>\$US</b>	<b>\$US</b>	<b>\$US</b>
British Virgin Islands	.05	.05	.05
Cayman Islands	.1845	.1845	.0864
Dominican Republic	.075	.0735 - 0720	.0705
<b>ECTEL Member States</b>			
	<b>EC \$</b>	<b>EC\$</b>	<b>EC\$</b>
Dominica	.55	.5500 - .3690	.3135
Grenada	.55	.5500 - .3690	.3100
St Kitts and Nevis	.55	.5500 - .3690	.3253
St Lucia	.55	.5500 - .3690	.2965
St Vincent and the Grenadines	.55	.5500 - .3690	.3051
<b>French West Indies</b>			
	<b>Euros</b>	<b>Euros</b>	<b>Euros</b>
Guadeloupe	.1100	.0870	.0550
Martinique	.1100	.0870	.0550
	<b>\$TT</b>	<b>\$TT</b>	<b>\$TT</b>
Trinidad and Tobago	.04	.04	.04

# Mobile Termination (Continued)



## **2.The current situational issues and their impact**

# 2.1. C&W, Digicel and using the Caribbean HNIs

- Mobile networks carry in sim – cards, an International Mobile Subscriber Identity (IMSI).
- IMIS broken into Mobile Country Code(MCC), Mobile Network Code(MNC) and Mobile Station Identification Number(MSIN ) –complies with ITU E.212 numbering standard.
- Combination of MCC and MNC is called Home Network Identifier(HNI) this is used to find the Home Location Register(HLR) for sending Roaming data.
- HNI indicates the home network in relation to each roaming call i.e. who is party to the settlement of call charges: ITU-T D93 outline possible call scenarios and resulting settlements.

## 2.1. C&W, Digicel and using the Caribbean HNIs (continued)

- Digicel employs HNI of Jamaica in all its Caribbean networks –non compliant with ITU-T D.93
- Reason given is for expedience and cost efficiency in launching roaming service partnerships.
- Home networks for all roaming Caribbean Digicel subscribers identified as a single country. This will only affect billing data but technically, will not deny revelation of the true home network.
- Financial impact as result of unadjusted out payments in roaming data – revenues of Digicel networks will be the subject of representational faithfulness, affecting audited financial statements and taxable income in their home network jurisdictions?



## 2.1. C&W, Digicel and using the Caribbean HNIs (continued)

- Adjusted out payments required to Caribbean networks roamed by visiting Digicel subscribers?
- C&W and Digicel now use same method for HNI in mediating roaming call data to billing data. System of adjustment for out-payments now incumbent on both operators to respective Caribbean home network jurisdictions.
- Use of service of Roaming HUBs could expedite Roaming Agreements and reconcile HNI discrepancies to the satisfaction of all Parties. ITU compliance still a question and requirement?

## 2.2 Effects of an MTR formed monopoly market

- There is no substitute for mobile termination service, networks enjoy a monopoly.( maybe SMS or VoIP?)
- Incentive is always there for terminating networks to set monopoly rates
- Termination rates are part of marginal costs of the originating network, the terminating network operator and customers are unaffected by these costs. Originating networks passes these on to their customers as costs imposed on them externally.
- Tacit collusion grows between the operators as to passing respective termination costs to their opposing call originating customers, thus indirectly exploiting each others customers.
- Under the rules of competition law, wholesale termination then classifies as a non- contestable monopolistic bottleneck where each network can impose market power. SMP or joint dominance regulation is justified and now inevitable, non availability of substitutes on demand-side fuels monopoly.

## 2.2.Effects of an MTR formed monopoly market(continued)

- High termination rates then allows operators to sit on their laurels not compelled to develop new services menus, or innovate products or quality
- Deters pace of national development to information society services and investment consistent with government expected outcomes, in their National ICT Plans.
- “Textbook” effects and symptoms of monopolistic behaviour become more rampant as no deterrent or intensity of competition present to prevent them from extracting all possible surpluses e.g. fixed line and external network customers.
- Distortion existing in one market may have an impact also in another market (call origination) rendering distortion full scale or more far reaching than expected.

## 2.3. Effects of an MTR formed monopoly market on International Roaming

- Signal strength key determinant of subscriber capture and traffic volumes for visited networks. Traffic volumes not guaranteed and therefore not individually negotiable under GSMA Standard Terms for International Roaming Agreement (STIRA).
- Incentive to offer lower prices and traffic discounts also not present under STIRA principle of non discrimination re general traffic pick up (preferred roaming status allowed) and same rates offered (FCC whipsaw rule against dominance in the US) to all.
- These two requirements retard the intensity of competition and correspondingly offer little or no impetus to the downward movement of termination rates. Changes in these principles will encourage traffic volume discounts.
- Regulators indifferent to follow through on regulation that provides benefits or protects the welfare of foreign subscribers. Lower domestic international roaming termination benefits foreigners. EU as federal commission still confined to “domestic” regions, so to speak.

## 2.4. Impact of change from CPP to RPP or SKA(B&K)

### Against RPP:

- Customer resistance to RPP where customer is charged for an incoming call. Impact more psychological than economically unfavourable
- Different call behaviour patterns may emerge that result in lower penetration rates.
- Mix of call volumes within networks can lead to higher costs from heavy users who attract greater interconnection cost to RPP networks and alter operators' cost/revenue profile.
- Lower than marginal cost of calling to RPP networks may encourage excessive spam and nuisance calls
- Subscribers will turn off their phones to avoid paying for unwanted calls
- "Waterbed effect" may be likely as removal of termination rates may lead to higher subscription costs. Since services are offered in bundles operators may seek to rebalance their prices to maintain their revenue base.

## 2.4. Impact of change from CCP to RPP or SKA(B&K)(continued)

- For Sender Keeps All
- Brings termination rate to zero and results in cost savings (billing and mediation and operator/carrier relations costs, cost modelling and regulatory compliance costs)
- Reduces regulatory intervention and related costs, as SMP effect of termination rates under CPP is removed.
- Advocated as most efficient interconnection regime for both fixed and mobile telecom services, but traffic symmetry must be existent for economic equations to hold.
- Regression analysis as a source of empirical evidence supports the notion that there is no negative impact on penetration rates by using the RPP or CPP MTR regime. There is evidence of some movement shortly after switching regimes, but for the countries that hold one regime over time, the outcome is that neither regime adversely affect penetration rates. *(Source: CPP or RPP? The Diffusion of Mobile Telephony with Endogenous Regulation, Ralf Dewenter, Jorn Kruse Drusseldorf Institute for Competition Economics, October 2010.)*

# 2.4. Impact of change from CPP to RPP or SKA(B&K)(continued)

## Regression Analysis - statistical inferences on RPP or CPP

	All obs	Switching countries	non-switching countries
CPP	-0.0148 (-0.54)	-0.0265 (-1.41)	-0.3511 (0.54)
COMP	-0.0691 (-1.29)	0.0280 (2.43)	0.0640 (1.90)
PREPAID	0.0227 (2.01)	0.0131 (1.62)	0.0103 (1.59)
POP	-4.96e-09 (-6.37)	-5.80e-09 (-3.29)	-3.71e-09 (-4.32)
POP AREA	0.0002 (1.44)	0.0007 (0.62)	-0.0001 (-1.13)
FIXED SUBS	0.0416 (1.55)	0.0690 (1.32)	-0.0099 -0.32
GDPC	5.47e -09 (0.62)	-6.64e-07 (-3.64)	-7.66e-06 (-6.95)
$\beta_i$	6.8760 (6.07)	7.87 (3.68)	1.1341 (1.86)
$F E, F E \cdot t$	YES	YES	YES
Adj. R2	0.96	0.96	0.96
No. observations	883	240	643
No. of groups	77	26	51
Durbin-Wu-Hausman $\chi^2$ (Prob.)	12.44 (0.00)	14.10 (0.01)	9.91 (0.01)
CPP	-0.0148 (-0.54)	-0.0265 (-1.41)	-0.3511 (-0.54)
COMP	-0.0691 (-1.29)	0.0280 (2.43)	0.0640 (1.90)
PREPAID	0.0227 (2.01)	0.0131 (1.62)	0.0103 (1.59)
POP	-4.96e-09 (-6.37)	-5.80e-09 (-3.29)	-3.71e-09 (-4.32)
POPAREA	0.0002 (1.44)	0.0007 (0.62)	-0.0001 (-1.13)
FIXEDSUBS	0.0416 (1.55)	0.0690 (1.32)	-0.0099 (-0.32)
GDPC	5.47e-09 (0.62)	-6.64e-07 (-3.64)	-7.66e-06 (-6.95)

Source: CPP or RPP? The Diffusion of Mobile Telephony with Endogenous Regulation, Ralf Dewenter, Jorn Kruse Drusseldorf Institute for Competition Economics, October 2010

# 2.4. Impact of change from CPP to RPP or SKA(B&K)(continued)

## Regression Analysis - statistical inferences on RPP or CPP (continued)

- Dewenter and Kruse have adopted the pragmatic outlook of scoring the conduct and impact of political and policy frameworks respectively, on the regulatory initiatives taken by regulators e.g. public and stakeholder participation, suppression of competitive, political participation, number of years since last regime change ,how open recruitment and appointment is for institutional executive levels, extent than non- elites can participate in political expression and political competition.
- Not accounting for the fact that market outcomes and institutional and public attitudes trigger regulatory intervention, the regression output inferred a positive impact of CPP on penetration rates. Not so when regulator behaviour included
- The key finding is “RPP or CPP would not reduce penetration rates, irrespective of whether a country’s penetration process has just begun or has nearly reached saturation levels”.



## 2.5. IP based mobile networks and Convergence possibilities

- VoIP on 3G and 4G networks will deliver a substitute service to voice regular service.
- MMS and audio visual services to drive demand for mobile broadband.
- M government and e commerce fertile ground for mobile IP based services incursion
- Elimination of termination rate regime key step to improving competition and stimulating forward investment into new services.
- 2G and 3G networks will run along side each other but difference in costs and usage measurement will force harmonised regulation for “voice” distinct from “data” services

# 2.6. Regulatory Framework for Convergence

- Service neutrality opens the door for IP based platforms delivering application and content services, services no longer confined to specific technologies and vice versa, technologies no longer confined to specific services -technology neutral networks.
- Data traffic by its nature and as already established in the ISP framework will do away with the minute as a unit of measure. Due to its “always on” quality, data conveyance networks are not time-based in their utilisation of network facilities nor is its routing specifically defined for the time and destination of its transmission.
- As technology specific identification of networks fade (e.g. fixed line vs. mobile) and networks integrate further their use of wire line and wireless conveyance into one single network, termination as belonging to mobile or fixed market distinctions will also disappear.
- Service costing and pricing will be more diverse as service cost become a function of the array of alternative and shared technologies that can be used to provision the same service to end-users.

# **3.Regulatory intervention - Compliance or Forbearance**

# 3.Regulatory intervention - Compliance or Forbearance

- More and more as technology innovation introduces complex and non traditional approaches to service delivery and pricing, regulators will be faced with the question of intervention or forbearance.
- There will be no tried and tested or relevant ex ante regulation to address some new problems and in order to allow innovation and creativity to develop, forbearance will become a useful option for regulators.
- Long term consumer benefits and national information society development policies should be the yardstick for regulatory intervention.
- In some cases established service providers may be inclined to stifle development of viable substitute services or deployment of new technologies that threaten their share in traditional markets. Here, regulators must choose if to intervene and remove barriers that can make traditional markets more competitive or eliminated altogether.
- Tracking regulatory compliance will become more difficult as competition issues begin to dominate as the object of regulation and natural monopoly market entry barriers become less significant, with the lower costs and diversity of market entry technologies
- The layered nature of the IP based NGN type network will facilitate market entry at each network layer bringing more competition and many more service markets, broadening the spectrum of service and content that will need to be addressed for social and economic equity and well-being, within the ICT sector.

## **4. Presenters' Recommendations**

# 4.1. Presenters' Recommendations

## Short term

- Mobile termination is a monopolistic market and the risks of consumer exploitation are too high, this warrants that regulation continues. Earnestly seek and obtain cost-based network and service information for cost modeling, this will assist in finding true costs for comparison of termination rates
- Regulate termination rates downward providing certainty for all and allow entry of voice service substitutes (VoIP) to the market, to bring more competitiveness in.
- Where network maturity seems evident, convert to an SKA interconnection pricing regime. Traffic symmetry should not be hard to identify and prove. This will eliminate a host of other tests and regulation that are now required to monitor and maintain equitable MTR. Most countries have two or three mobile operators.
- From an economic stand point, RPP provides a clearer platform for making decisions regarding efficient economic resource allocation and measuring consumer welfare. However, tradition and perception may have gone too far in turning the market's eye to a perpetuation of CPP. Focus on ascertaining traffic symmetry, a conversion to SKA may prove more practical and socially acceptable, than a hasty switch from CPP to RPP in the shorter term.

# 4.1. Presenters' Recommendations (continued)

## Long term

- Eliminate per minute charges for all digital data conveyance and introduce SKA interconnection charges to align mobile voice (switched-base) wholesale settlements regime with that for IP data, until the final conversion by all to full IP.
- At retail level where IP overlay provides voice service, use flat rate pricing. Where standard mobile technology still deployed, de-regulate per minute pricing and let operators compete openly with IP based voice service.
- In an all IP network environment consider forbearance to allow new service offering and markets to emerge and weigh benefits in relation to national information society objectives .
- Pursue convergence (communications and media) regulatory framework and governance, implement it along with subordinate legislation for purposes of direction and control.
- Develop appropriate investor and government partnership framework to address suitable timeline for achieving information society objectives of infrastructure development and human capital development and accumulation.

# 5. Questions



**Thank you for your time and  
concentration**

**John Thompson**

[John.thompson@igovtt.tt](mailto:John.thompson@igovtt.tt)

[druids59@hotmail.com](mailto:druids59@hotmail.com)

cell 1-868-325-8074

**The End**