

**Bmobile-Vodafone section 100 application**

**Adjudication of interconnection dispute**

**DRAFT**

*Explanatory Note*

***[The explanatory note is not part of the adjudication decision, but is intended to indicate its general effect.]***

*This is a statutory adjudication by the Solomon Islands' Telecommunications Commission. It addresses an interconnection dispute between the country's two mobile telecommunications service providers, Bmobile-Vodafone, and Our Telekom.*

*The main thing in contention is the charges for telephone call terminations between the mobile networks, and in respect of Our Telekom's landline network.*

*At present, the charges for calls between the mobile networks are at zero cents per minute, and each operator recovers its termination costs through the prices its customers pay for making calls. Neither operator currently charges its customers for receiving calls. Different rates apply as between Bmobile and the small landline network. The current termination arrangements have carried on under terms originally agreed in a 2010 contract.*

*Under the Telecommunications Act 2009, the services and prices available in the marketplace are determined by the outcome of competition between service providers. Regulatory intervention by the Commission can be called on when discretionary market power needs restraint. Interventions must nevertheless serve economic efficiency and consumer welfare.*

*In telecommunications, each network operator has absolute control over whether a call from a person on another network reaches a customer on its network. It therefore has a network "monopoly". Because of this market power, every network is obliged to maintain interconnection with all others. What charges, if any, apply to this interconnection service must first be negotiated by the companies, and failing agreement, resolved by the Commission.*

*Competition between mobile service providers in the Solomon Islands over the last six years has delivered sound results in terms of the sector's contribution to overall economic growth, the*

*expansion of mobile coverage, and the affordability, quality, choice, and range of telecommunications services. Competition has been facilitated by the removal of all licensing distinctions between different modes of telecommunications, and all direct supervision of tariffs and pricing. There are also no charges levied by the Commission on the allocation of radio-communications spectrum for use by wireless services such as mobile telephony.*

*The essence of the current dispute about termination rates is the fact that more calls are now being made from Bmobile-Vodafone's network, to customers on Our Telekom's mobile network, than in the other direction. Calls terminating in provincial areas where Our Telkom has more coverage, can use-up radio communication 'bandwidth' capacity. Since its mobile customers do not pay for receiving calls, even though they benefit from the call, the company itself is absorbing the cost of expanded bandwidth capacity to cover the total call volume.*

*Our Telekom seeks relief from this internal customer subsidy by a lift in call termination rates based on minutes of use. It currently proposes that the rate it gets should move from zero to 10 cents per minute, and the rate Bmobile-Vodafone gets go from zero to 5 cents. The latter proposes that the mobile rates should remain at zero for both networks.*

*Without the Commission's intervention, Our Telekom's has two commercial options for resolving the impasse on mobile termination rates. One is to create additional revenue from new call reception charges to its own customers. The other is to act on Bmobile-Vodafone's offer to negotiate an agreement between the two networks, whereby Bmobile would pay for using some of Our Telekom's network towers.*

*With the Commission's intervention in the matter, the options and considerations are different. The Commission's mandate to fix prices for call termination services, is referenced to economically efficient costs. And the main costs involved in traffic termination are units of transmission, not additional minutes of use. A regulated capacity based price would need to address the direct consequence of Our Telekom having to service the traffic imbalance from the Bmobile-Vodafone network, which is cost at peak load.*

*Neither company has adduced specific information about the costs of terminations on their respective networks. And Our Telekom has not engaged with the underlying network economics in making its case for a change. The Commission therefore does not have a sufficient basis for determining new mobile to mobile termination rates above zero,*

*It is also clear that since 2010 effective facilities based competition in the local market has flourished, even though rates have stayed at zero. Internationally, zero or unregulated termination rates are now the model for fully competitive mobile services markets and internet connectivity.*

*Introducing fully fledged regulation of call termination rates in Solomon Islands, also implies moving away from the zero administrative cost model of the zero call rate arrangement which has operated for the last six years. The Commission estimates that introducing a cost based interconnection regulatory regime, could cost up to \$2 million. This cost, and costs in subsequent price reviews, would of course be borne by the companies, and ultimately consumers.*

*As things stand, the Commission considers that there are commercial options open to the parties for moderating the impact of the traffic imbalance and it therefore declines to set new mobile termination rates. Instead, the Commission wants Our Telekom to act on the commercial option of Bmobile-Vodafone paying for using some network towers. Not only would such an arrangement help relieve the financial consequences arising from the “off-net” traffic on Our Telekom’s network, it would also progress the statutory objectives by bringing choice of mobile service to more parts of the country.*

*In contrast with mobile services, charges in respect of Our Telekom’s small landline network, have never been at zero rates. The Commission has not been given detailed cost information about the cost of terminations on the landline network. But it agrees with Our Telekom that there is no ongoing public interest rationale for a higher rate for calls to the Bmobile-Vodafone network, than from it.*

*Given that Our Telekom now accepts Bemobile-Vodafone’s proposed mobile to landline rate of 19 cents per minute, the Commission expects this rate to be included in the new interconnection agreement. It will be up to the parties to agree whether or not that or any other rate should also apply to terminations from the landline network to the Bmobile-Vodafone network.*

*Following the Commission’s acceptance of the adjudication role, a path forward for resolving the other issues in dispute, relating to congestion and noise on the physical interconnect, and outstanding invoices for termination charges, has now been identified by the parties themselves. The Commission’s further assistance is not required in these matters.*

## Adjudication Decision

1. At the outset, the Commission would like to express its appreciation to the management of both Bmobile-Vodafone<sup>1</sup> and Our Telekom<sup>2</sup> for their cooperation to date in the resolution of the dispute over their network interconnection arrangements. More generally, the Commission would like to compliment the companies for the manner in which they continue to conduct themselves in Solomon Island's very competitive telecommunications market. The store of practical goodwill between the rival companies built up since the legislative reforms<sup>3</sup> came into effect in 2010, is important to the maintenance of a 'light-handed' regulatory approach going forward, on interconnection and other intervention issues, and the implementation of this adjudication in the form of a fresh bilateral contract.
2. It is the preference of both companies that the Commission should adjudicate the dispute in accordance with the provisions of Part 17 of the Act. This may also involve the Commission exercising its powers under Part 10 of the Act to determine particular prices for interconnection services, and, or, applying licence conditions under Part 5, to mandate other interconnection provisions. The Commission can nevertheless, at any point, decline the application to assist in resolution of the dispute.<sup>4</sup>

### Scope of dispute

3. The original scope of the dispute, covered four distinct issues arising out of the terms and the operation of the 2010 Interconnection Agreement<sup>5</sup>. As identified in Bmobile-Vodafone's Section 100 Application<sup>6</sup>, **Issues 1 and 2**, concerned the rates, if any, to apply to telephone call terminations between the parties' respective mobile networks and between Our Telekom's fixed landline network and Bemobile-Vodafone. **Issue 3** concerned aspects of the physical interconnect between the networks, to do with traffic congestion, and voice call noise. The former results in calls not going through at peak hours, and arises out of the exponential growth in overall subscriber numbers since 2010.

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<sup>1</sup> In this document the telecommunications services class licensee, Bemobile (Solomon Islands) Limited, is referred to by its trading name, "Bemobile-Vodafone".

<sup>2</sup> The individual telecommunications licensee, Solomon Telekom Company Limited, is referred to by its trading name, "Our Telekom".

<sup>3</sup> The legislation governing this matter is the Telecommunications Act 2009, referred to in this document as "the Act".

<sup>4</sup> Section 100(9) of the Act provides that the application can be declined if, *inter alia*, the Commission determines that there are alternative means for resolving the dispute.

<sup>5</sup> The 2010 agreement was novated 2011 and 2012. Its term expired on 1 September 2013 but both parties continued to observe its provisions, including call terminations rates, up to September 2016. Since that date, interconnection, and the exchange of call traffic has nevertheless been maintained.

<sup>6</sup> The Application made under s.100 of the Act, and the Minute of Outcome from the convention of the parties which followed it, appear in Schedule A.

The latter involves a crackling noise on the voice circuits, and has been an on-again off-again problem since Bmobile-Vodafone commenced operations. The **fourth issue** concerned Our Telekom's non-payment, from April 2016, of landline to Bmobile termination charges as calculated under the rates in the 2010 Agreement. For reasons which will become apparent, the adjudication deals with the issues in reverse order.

#### Issue 4- outstanding payments resolved

4. The non-payment of termination charges arose out of the failure of the companies to agree on new call termination rate during intermittent negotiations after the expiry of the last formal contractual variation in September 2013. In its submission to the Commission on the adjudication, Our Telekom advised that the issue has been resolved between the parties, and the assistance of the Commission is not required. The Commission will be pleased if that is the case. Were the legal effect of the 2010 Agreement *inter partes* still in issue, the Commission would consider referring this part of the dispute to the High Court<sup>7</sup>.
5. The effect in contract law of an interconnection agreement is relevant for the future however. The Commission notes that because it is compulsory for the companies to exchange call traffic between their networks, it is in the interests of all concerned that in the fresh interconnection agreement to follow the adjudication, those elements which have a fixed term, are also given a specific default setting, for the possibility that at the end of the fixed term, the parties do not reach mutual agreement on its variation.

#### Issue 3-traffic congestion and noise interference resolved

6. The congestion and noise components of Issue 3 are of major quality of service concern for the Commission. These problems have been adversely impacting the overall perception of the local market's performance, as well as the operators' reputation for technical competence, and appropriate investment. After the exchange of submissions in the adjudication, it would appear that both companies are willing to address the traffic congestion problem by cooperating in the build of a digital trunking interface between the networks. This would replace the bank of E1 analog interconnectors which has been in place at Our Telekom's end for the last several years, and which is now clearly under-capacity.
7. The installation of an optic fibre interconnection, thus bypassing the Time-Division Multiplex, could also solve the problem of external noise on voice calls between the two networks. In the past, with prompting from the Commission, both companies have tried to find the source of the crackling noise, and have checked technical adjustments, but

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<sup>7</sup> Provision for reference of a non-telecommunication aspect of a dispute to the High court is made in section 100(10).

without lasting success. In its application to the Commission, Bmobile-Vodafone included a technical noise report. This says that the noise shifts across all circuits at random, but is not coming from any of the company's network elements. Bmobile-Vodafone also included a specific proposal for a digital link. In its response to the application, and the noise report, Our Telekom provided its own report which says that the noise does not emanate from Our Telekom's side. It nevertheless agrees that a new optic fibre interface is likely to solve both the noise and the congestion problem.

8. The Commission considers that an agreement on terms to install the new fibre resolution of the congestion is a public interest priority, and should be resolved by the companies as quickly as possible, regardless of the other topics. The Commission will be closely following progress. It is also independently assessing whether or not the noise problem is likely to be fully resolved by a new fibre link.

#### Main issue is mobile to mobile call termination rates- Issue 2

9. The major issue for the Commission's adjudication, is Issue 2 from Bmobile-Vodafone's Application. Whether or not there should be regulated charges for call terminations between the two mobile networks. Issue 1 concerns the landline terminations, which are less consequential in terms of total revenue and consumer use, and is dealt with last.
10. The parties' positions on MTRs<sup>8</sup> going forward are diametrically opposed. Bmobile-Vodafone advocates that MTR's for calls in both directions between the networks should remain at zero. Our Telekom submission is adamant that there should be a price for calls to its network. It concludes that its MTR should be 10 cents per minute, and that the MTR on Bmobile-Vodafone's network should be 5 cents. The MTRs have been at zero, since Bmobile-Vodafone commenced operations in 2010. This follows from an interconnection agreement, the form of which was negotiated in 2009 between Our Telekom and the Government, in conjunction with the overall Settlement Agreement.<sup>9</sup> There have been intermittent negotiations between Our Telekom and Bmobile-Vodafone on MTRs since 2012, but no meeting of minds on a change.

#### Considerations for intervention

11. The Solomon Islands statutory provisions for telecommunications networks are a model regime by international standards. The Act does not oblige the operators to deploy their networks to cover particular geographic areas, nor are they required to have totally

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<sup>8</sup> MTR means mobile termination rate. When MTR rates are at zero, the situation is often referred to as "SKA" which means sender keeps all, so that the network sending the call, keeps all the revenue from its customer making the call. In countries where telephone calls are paid for by the party receiving the call, known as "RPP", receiving party pays, the SKA payment arrangement is sometimes referred to as "BAK", meaning bill and keep

<sup>9</sup> The Settlement Agreement was principally concerned with a scheme of payments to Our Telekom in consideration for the surrender of its former exclusive telecommunications licence.

separately owned network assets.<sup>10</sup> There is also nothing in the Act or in Commission regulations which prevents the operators charging their customers for the calls those customers make, and or, charging them for the calls they receive, whether from a customer on the same network, or from someone on another network. There are no active regulations on how much customers can be charged. The operators do have a strict obligation to exchange call traffic between their networks however, but are otherwise free to contract for interconnection services as they see fit

12. When, as in this case, the Commission is called on to resolve an interconnection impasse, it is guided by the five criteria set out in s.3(2) of the Act for implementing the ultimate statutory objectives of consumer welfare and economic productivity. The Commission is also obliged by s.30 of the Act to refrain from regulating if it can be reasonably anticipated that effective competition can do the job. This constraint, together with the s.3(2) criteria mean that before regulating, the Commission needs to be confident that there is actually a 'market failure' from the interconnection impasse, and that any specific intervention proposal is actually going to be better than leaving things as they are.
13. Because the effect to date of zero MTRs must be relevant to whether there are regulated rates instead, the original goals for competition, and where competition has actually got to need to be identified along with the role zero MRTs may have played so far. That consideration is in turn helped by first briefly articulating what the key features of telecommunications markets are from a competition point of view.

#### How telecommunications competition works

14. The primary economic feature of telecommunications is that the most economically efficient number of networks is a single network. Therefore some allocative efficiency is always lost when other networks get deployed. From a policy point of view however, any dead weight loss from allocative inefficiency is worth the gain in productive and dynamic efficiencies, when competition in services arrives from a separate network operator. This is the case even when the networks are unevenly matched in terms of coverage and customer numbers. Accordingly, having two or more symmetrical, ubiquitous mobile networks is neither an aspiration of the statutory policy for facilities based competition, nor a likely marketplace outcome in Solomon Islands.<sup>11</sup>
15. The second important economic feature of telecommunications competition is that every network has a monopoly on calls terminating on it, no matter how big or small the network is relative to any others. This is because the operators have physical control over whether or not calls are terminated on their networks. They are also subject to networks effects, whereby services on a particular network become more economically more

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<sup>10</sup> Section 61 of the Act provides a 'safe-harbour' for co-location and similar cooperative network arrangements, so as to avoid excessive allocative inefficiency from the duplication of network costs.

<sup>11</sup> It follows from the nature of the trade-off amongst the different kinds of efficiencies, it is not the end objective of the statutory policy for network competition, to maximize allocative **inefficiency**.

valuable as more people join it. Telecommunications network operators also operate in a “two sided market”. That is, they provide two separate kinds of services to two distinct user categories.<sup>12</sup> Telephony call services to their customers, and interconnection services to each other. Networks are also subject to “call externalities”, the phenomenon that a particular call between different networks benefits both the caller and the called party, economically speaking.

16. As for what competition in telecommunications aims to do, its fundamental task is to determine; which telecommunications services are being produced; by whom; and at what price; through the exercise of consumer choice. Because its subject matter is services transactions, the concept of “competition” is a construct about process, and process only. It does not evoke a particular market structure, or specific consumer benefits, at any particular point in time. And because the competitive process is transaction focused, it is a feature of competitive markets that, day to day, there are winners and losers amongst the services on offer.
17. Competition analysis of any telecommunications market is only concerned with identifying the elements of the competitive process, and how well those elements are functioning over time. Similarly, regulatory interventions to protect or advance competition are only concerned with how the competitive process in the market concerned might be impacted. Interventions do not aim to protect the commercial position of particular competitors, to manipulate specific market structures, or to moderate financial consequences, however much the vested interests may want for that.<sup>13</sup>

#### Submissions on MTRs

18. In its Application, Bmobile-Vodafone has said that the MTRs should stay at zero, and that SKA “...*should remain as it works.*” Its brief explanation of why it works, refers to the propensity of MTRs to “*distort competition, become a barrier to new entrants and be harmful to end users.*” It suggests the elimination of MTRs is “...*lowering consumer prices, and spurring innovation in the entire telecommunications sector.*” Bmobile-Vodafone has not provided the Commission with data on the costs incurred in the Company’s terminating inbound traffic on its network, and it has offered Australian MTRs as a benchmark, for terminations from the landline network in particular.
19. Our Telekom also has not provided data on the costs it incurs in terminating inbound traffic on its mobile network, nor has it presented relevant benchmark data. In complete contrast with Bmobile-Vodafone’s point of view, Our Telekom seeks to end the era of zero

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<sup>12</sup> This can lead to the regulatory dilemma, where regulatory intervention on one side of the market, can lead to unintended price effects on the other.

<sup>13</sup> The Our Telekom submission argues for differential termination rates for MTRs and non-differential ones for FTRs, so as to “... *achieve a modicum... of commercial justice as between [the parties]*” That is not what regulation is for.



MTRs because, among other things, “...few of the intended effects of competition have been achieved...” and that “Mobile competition is restricted to high population density areas and a majority of the population and a substantial majority of the geographic area...remain without competitive mobile services save through interconnection with [Our Telekom’s] network.”<sup>14</sup> This lack of comparable network facilities on Bmobile-Vodafone’s part is said to have undermined the basis on which the company surrendered its monopoly.<sup>15</sup>

20. The submission also says that in the 2009 negotiations with the Solomon Islands Government “...It was always acknowledged that SKA was highly unusual and would be temporary.....No one suggested that SKA would be permanent...”<sup>16</sup> Further on the submission claims that “...it cannot be gainsaid now, that SKA is somewhat anomalous when compared to the overwhelming competitive jurisdictions or territories where interconnection rates apply...”<sup>17</sup> The submission goes on to link the deal the company made with the Government for SKA mobile interconnection, with the company’s expectations for a further capital expenditure subsidy by way of a Universal Access Scheme under Part 6 of the Act. Thus, the company claims, leading to the scenario of, “... [Our Telekom] alone, assuming, by default, the role of universal access provider without compensation...”

21. The submission also references the record of traffic asymmetry between the two mobile networks, which the company acknowledges is a feature of the market structure where its competitor remains the smaller network by coverage and customers. It notes that the cross network traffic ratio rose to 3:1 at the peak of competitive pricing by Bmobile-Vodafone in 2016. Our Telekom characterises this traffic imbalance as an “...effective and gigantic subsidy to Bemobile and its customers...” Therefore it says, SKA “...unfairly discriminates against [Our Telekom] to use the language of ss63 and 64 and is not competitively neutral and does not provide for fair and effective competition to use the language of s.3...” The Commission would therefore “...be in breach of its obligations under s.3 if it made a determination maintaining SKA...”

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<sup>14</sup> Our Telekom’s submission appears in Schedule B. In the Commission’s view the fact that Bmobile-Vodafone customers can only call people in some Solomon Islands districts by virtue of interconnection with Our Telekom’s network, is more likely an indication that, because it does not have the same geographical reach, competition from the Bmobile-Vodafone network is effective.

<sup>15</sup> There is nothing in the Settlement Agreement or the Act however, which says that in giving up its mobile network monopoly, Our Telekom was to be protected under a symmetrical duopoly.

<sup>16</sup> A thorough consideration in 2009 of the economic literature and market liberalization reforms elsewhere would have shown why zero MTRs were the correct setting for a newly emerging but small market, with a relatively uncomplicated regulatory history. (See for example, “The Economics of Interconnection” Brock (1995).)

<sup>17</sup> The Commission notes that the claim of ‘somewhat anomalousness’ for SKA is not supported by an actual comparative analysis. Versions of SKA/BAK operate in the USA, Canada, Singapore and Hong Kong among others. Other advanced economies have struggled to introduce optimal reforms for mobile services, and MTRs in particular, because of ubiquitous monopoly landline networks. MTRs have often been given regulated rates so as to influence mobile traffic relative to landline use. Solomon Islands does not have that problem. The country’s landline network is very small, and is not ubiquitous. Voice revenues from it are currently less than 7% of the total voice market.

22. Finally<sup>18</sup>, the submission notes that Bmobile-Vodafone now operates under a class licence, whereas Our Telekom remains an individual licensee. It is claimed that the unsighted class licence, is certainly is less onerous, otherwise there would be no reason to change. And because Bmobile no longer has to compete on equal terms under the class licence, this contravenes the spirit and intent of the company's agreement with the Government, and the statutory new entrant process.

#### Assessment of the MTR submissions

23. Having considered the two perspectives on MTRs presented by the companies, the Commission's assessment is that Bmobile-Vodafone is generally correct. On the other hand Our Telekom is mostly off track in terms of the underlying competition economics. Addressing the minor Our Telekom's submissions first, the Commission draws attention to the Solomon Islands *Gazette* of 12 September 2011. This established the form of class licence under which all telecommunications service providers, except Our Telekom, have been operating for the last six years. There is only one substantive difference. A class licence has no fixed term whereas Our Telekom's one has a fifteen year term. This 'discrimination' can be easily remedied however by the company voluntarily surrendering its current licence, and registering as a class licensee. This can be done in a matter of days.<sup>19</sup>
24. There is nevertheless a shadow submission to the class licence issue, which is that the company's advisers consider that the Company is entitled, by reason of its historical incumbency and contract with the Government, to be consulted, and thus have an opportunity to obstruct, the licensing of new competitors. The Commission's response to that message is to say that the company has no such right, in law or otherwise.
25. The company's historical monopoly and associated commercial power also underlies a related indirect submission that the Commission is to be influenced in the exercise of its statutory determination powers, by personal recollections of the company's contract negotiations in 2009 with the Government. This intimation also needs to be given short shrift. Nothing from the Settlement Agreement events, has any enduring relevance to the Commission's regulatory intervention discretions in the Act.

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<sup>18</sup> The submission also references Bmobile-Vodafone's ultimate ownership by the state of Papua New Guinea, and comments that it "*...ill behoves Bemobile to say...its...increase in market share is for the benefit of the people and Government of Solomon Islands...any such increase is for the ultimate benefit of its foreign owners.*" The Commission does not consider this point warrants further attention.

<sup>19</sup> Contrary to what is intimated in the submission, under s.38(4) of the Act, individual licences are the exception not the rule in Solomon Islands. One of the intended benefits of the class licence regime is to reduce the transaction costs, such as the legal fees for perusing a full form individual licence, which, as in Our Telekom's case, basically restate the provisions of the Act but with direct reference to the licence holder. Historically the form of individual licence also obliged networks to provide telephone access to emergency services, and public phones on the fixed network. Emergency services and connectivity with landline phones are a long established feature in the local market, and with competitive pressure in place, it is currently unnecessary to underwrite their existence with specific licence requirements.

26. This is notably the case with respect to the assertion that Our Telekom is by default the uncompensated universal access provider. Since the Act came into force, no operator has had an obligation or duty to the public, to deploy its network in any particular location, especially one that is uneconomic. The fundamental purpose of relying on market competition instead of regulatory *fiat* to shape network coverage is to ensure that investment in network assets in Solomon Islands is efficient.<sup>20</sup> Notwithstanding the absence of a universal access subsidy, as the submission itself claims, Our Telekom's "...extensive coverage across the nation..." includes "...some extremely remote areas." And as illustrated in Schedule C, since the introduction of competition in 2010, geographical coverage has gone from 20% to 93% of the national territory, giving telephony access to some 71% of the population.
27. Whether or not the 2010 negotiations with the Government left Our Telekom with edacious expectations of an additional balance sheet subsidy, any supply-side universal access plan under Part 6 of the Act, is a matter within the discretion of the Commission. And as the Commission has duly reported year on year, there is simply no case for subsidizing the networks, given the ongoing impetus competition has given to mobile voice coverage. This view has been developed in consultation with the likely donors to an access fund, including the World Bank, which has been able to share its experience of involvement in other Pacific telecommunications jurisdictions. The Commission is well aware that there are rural communities in Solomon Islands which would benefit from greater take up of internet services in particular. The issue in these low cash transaction communities is not about the cost of deploying mobile network towers however, it's about the affordability of telephone services and the cost of devices to access services.<sup>21</sup>

#### The problem with the Our Telekom perspective on competition

28. Our Telekom's submissions on competition include; that the intended effects for competition have not actually been achieved because of zero MTRs; that SKA is by its nature anti-competitive discrimination against the company; is not competitively neutral regulation; and degrades conditions providing for fair and effective competition. All these assertions are fundamentally benighted. As already observed, while Bmobile-Vodafone's mobile network may not replicate Our Telekom's in a number of respects <sup>22</sup> that is consistent with the 2009 policy objectives in both economic and legal terms. Competition between operators does not play out just in terms of the initial customer choice between service providers. Our Telekom's own submission illustrates just how significant the competitive effect has been on the company from calls *between* subscribers on the two

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<sup>20</sup> Efficient and sustainable investment in networks is one of the five criteria in s.3 of the Act which guide Commission regulatory determinations.

<sup>21</sup>The Commission therefore remains open to ideas for the development of demand-side subsidy measures to improve device and subscription affordability in the provinces. Where the international aid agencies are concerned, this requires a significant shift in current policy, and a viable scheme for Solomon Islands is still some way off.

<sup>22</sup> A map of the two networks appears in Schedule D.

mobile networks. Indeed the whole point of the company's case for a regulated MTR is to gain relief from the financial impact of the subscription pricing pressure which Bmobile-Vodafone's presence at the network level has brought to bear.<sup>23</sup> (The efficiency issues arising out of the traffic imbalance is discussed below.)

29. It also needs to be noted that the current incidence of zero MTRs is derived from a commercial agreement between the two operators as provided for under the interconnection provision of Part 9 of the Act. To date, MTRs at zero have not been mediated by regulation. There is nothing referenced in the submissions or in the facts on the ground which supports the idea that the market and regulatory conditions in the sector are not competitively neutral or are technologically biased, disproportionate or opaque at present. Indeed reciprocal MTRs at zero are by definition, neutral and proportionate as between the two mobile operators in terms of their battle for subscribers. Both use the same technology and even the same systems supplier.
30. And as far as the facts on the ground are concerned, by all the usual international measures of market performance, competition in mobile telecommunications services has flourished in Solomon Islands over the last six years.<sup>24</sup> The direct results of this competition are greater service coverage, lower prices, better services and a wider variety of services. Nothing in the market events or the trajectory of its growth in that period suggests that the zero MRTs have had a material negative influence on the development of competition and the consequential advancement of the broader statutory objectives.

#### What to do about the off-net call externality

31. As Our Telekom acknowledges the call traffic asymmetry between the two mobile networks is a feature of the market structure where its competitor remains (and is likely to remain) the smaller network by coverage and customers. The company will not find much support in the economic literature however, for its characterisation of the traffic situation as a subsidy from Our Telekom to Bmobile-Vodafone. That is because the standard economic analysis of the situation would be that the imbalance is a call externality which has yet to be internalized. In other words, if the traffic imbalance scenario does represents an "*effective gigantic subsidy*" as the submission suggests, then it is a subsidy by the company to its own customers, who receive the economic benefit of calls from Bmobile-Vodafone customers, but do not pay for any element of those calls at present.
32. The fact that there is such an externality, and that its size has been driven by the competitive subscription pricing of the smaller network, does not mean that zero MTR's are distorting the process by which the two networks compete for customers. On the

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<sup>23</sup>The Competition conduct rules are set out in Part 8 of the Act. They aim to prevent the exercise of discretionary market power, by market dominant service providers, and collusion between companies, which substantially lessens competition. Bmobile's recent pricing policies do not contravene these rules in any respect.

<sup>24</sup> See Schedule C.

contrary as already noted above, the scenario presented by Our Telekom is a demonstration of effective facilities based competition in action. In so far as the scenario does exhibit an inefficiency, then all the marketplace options available to Our Telekom to moderate it need to be exploited. Only after that can the question for the Commission about 'a market failure deserving an MTR regulatory solution' be properly addressed.

- 33.** There are two obvious options for Our Telekom to deal with its internal subsidy problem. One is to introduce call reception charges<sup>25</sup>, the other is to have a facilities sharing agreement with Bmobile-Vodafone. While the Act and the Commission are essentially agnostic about subscribers being charged for calls they receive, the Commission believes that the introduction of RPP charging would be difficult for Our Telekom to implement, now that the local market is used to CPP charging only. As well as the consumer resistance Our Telekom would probably face, the company would be at a competitive disadvantage if Bmobile-Vodafone did not follow suit. Which is the likely response from Bmobile-Vodafone because it would not have an incentive to do so. There are also indications from some other RPP jurisdictions, that this method suppresses the overall call volumes. Accordingly the Commission is not encouraging Our Telekom to look to offset its off-net call termination capacity costs through the introduction of call reception charges.
- 34.** On the other hand, it is much more likely that Our Telekom could establish a compensating revenue stream, through network facilities sharing, or other national roaming arrangements with Bmobile-Vodafone. An offer in that regard, in broad terms, has already been made by that company's management at the commencement of the adjudication process. Notwithstanding the market driven focus of the statutory criteria in s.3(2) of the Act, the Commission has remained conscious of the potential for investment in the industry to become inefficient as the strong rivalry between the mobile operators leads to greater degree of duplication of network assets.
- 35.** That potential is also recognized in the Act. To encourage the operators s.61 proves a specific statutory "safe harbour" for arrangements which provide for them *"... to use, own or hold an interest together in facilities, or lease or otherwise share facilities in order to reduce unnecessary duplication of costs..."* The effect of the safe harbour is to exempt facilities sharing agreements from contravention of the all-encompassing prohibition in s.60 against contracts arrangements and understandings which substantially lessen competition. In the absence of the safe harbour provisions, most arrangements for the common use of facilities would contravene s.60.
- 36.** Importantly from the Commission point of view, a facilities sharing arrangement which results in Bmobile-Vodafone services being available more widely than at present has significant public benefits. In particular it would conclusively address the criticism in the Our Telekom case that only its services are available in the more remote provincial districts, and that there is no competition for subscribers in those areas. In addition, new

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<sup>25</sup> Where there are customer call reception charges, the regime is referred to as RPP, "receiving party pays". Where there are customer call origination charges, as in Solomon Islands, the regime is referred to as CPP, "calling party pays".

network installations in areas currently not serviced at all, become more viable if both operators bear the cost, thus addressing the other Our Telekom concern about the lack of financial assistance for network deployment in more remote areas.

- 37.** The way forward from this point in the adjudication, is for the parties to meet to explore the scope for facilities sharing, and to arrange for the exchange of relevant technical information and specific proposals. The Commission would not participate in the commercial discussions but would expect to receive regular progress reports. The Commission would also wish to see the final terms of contract before they are executed. This is to ensure that the arrangements comply with the statutory safe harbour provisions. The Commission is prepared to make a sharing arrangement compulsory, by way of a direction under s.25 of the Act, or special licence conditions under s.41(2) of the Act, but does not expect that that step will be needed.

#### The basis for a regulatory solution to the call externality issue

- 38.** From a commercial point of view, it has been traditional for interconnection agreements to reference charges for voice call terminations on a minutes of use basis. The 2010 Agreement did this for both MTRs and FTRs.<sup>26</sup> Agreed per minute usage rates do not *per se*, directly reference any underlying costs associated with the terminations services in question, or the economic efficiencies associated with those costs or the actual charges. However, when MTRs are to have a regulated price, the Commission must use its powers under Part 10 of the Act. To set rates for the termination services of the dominant service provider<sup>27</sup> the Commission must have reference to relevant benchmarks. These are jurisdictions which are comparable, and where the prices are set on the basis of economically efficient costs. In addition there must be reference to detailed information about service providers' costs, including based on cost models in addition to or instead of the relevant benchmarks.<sup>28</sup>
- 39.** If it were to become necessary to apply regulated MTRs to deal with the Our Telekom pricing inefficiency, the Commission would not be satisfied with the minutes of use information which the company has adduced thus far. This is because the main costs incurred in the termination of the off-net traffic are units of transmission capacity, not minutes of use. And the key issue in the modelling for regulated MTRs would be cost at peak load. Clearly then the submissions to the Commission made thus far do not presently provide a sufficient basis for setting regulated rates.

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<sup>26</sup>FTR stands for "fixed- line termination rate" and refers to call termination on a landline network. In the case of the MTRs of course, the price per minute has been at zero since 2010.

<sup>27</sup> See para 15 above. Further to the definition of "dominant service provider" in s.2 of the Act, both mobile network operators are deemed to be dominant in respect of call termination services on their respective networks.

<sup>28</sup> See s.70 of the Act.

**40.** The establishment of a credible cost model for the ongoing regulation of the mobile termination services on the two networks would necessarily involve the engagement of expert economic professional services, probably by each of the two companies as well as the Commission. There would also be legal costs. All these costs would repeat at each renewal of the interconnection agreement's term. The move to regulated rates would therefore have transaction cost implications for the companies since the Act provides for them to pay for administrative costs of rate regulation. The Commission's preliminary guesswork on the likely costs of a contestable, cost based regulated MTR and FTR regime of the kind operating in other jurisdictions, could be as much as \$2 million. MTR intervention may therefore be difficult to justify. In contrast the current administrative model for interconnection, where MTRs are at zero, is virtually costless.

#### Commission main conclusions about MTRs

**41.** The Commission's main conclusions around the MTR issue are:

- a) Because an Our Telekom customer benefits economically from a call from a Bmobile-Vodafone customer, but does not contribute to the cost of the call, there is an economic inefficiency associated with Our Telekom pricing.
- b) The Commission declines to regulate MTRs to offset this internal customer subsidy at Our Telekom, because there are commercial options for dealing with it which are as yet, unexplored by the parties in their interconnection negotiations.
- c) Instead, the Commission is directing the parties to include in their ongoing negotiations, provisions for network facilities sharing so that new revenue from Bmobile-Vodafone might help offset the inefficiency in Our Telekom's pricing.
- d) Subsequently, if the parties are nevertheless still unable to reach agreement on interconnection terms, either can re-apply for adjudication of MTRs, in which case the Commission will require detailed data on the termination costs associated with each of the networks, including relevant transmission capacity costs, as well as relevant international cost benchmarks.

#### Landline call termination rates-Issue 1

**42.** In their submissions, both parties characterise Issue 1 as relating to the rates for two discrete services: landline-to-mobile termination and mobile-to-landline termination. Bmobile-Vodafone proposes new, lower charges for both mobile termination and landline termination, although it argues for the maintenance of a significant "differential" between the prices for each. Our Telekom argues for elimination of any differential, so that as a

matter of principle, termination on its landline network should be priced at the same level as termination on Bmobile-Vodafone's mobile network.<sup>29</sup>

43. In relation to landline termination charges Bmobile-Vodafone's application refers to a *"recent study of Australian mobile termination costs"* and a *"recent decision of the ACCC"* determining landline call termination charges. It also briefly discusses differentials between fixed and mobile termination charges, but provides no data on the costs of local landline line termination and does not propose or evaluate other relevant international benchmarks for rates. It goes on to propose that the rate for calls from its network terminating on Our Telekom's landline network should be reduced from 24 cents per minute to 19 cents.
44. Our Telekom takes issue with the appropriateness of Australian rates as a benchmark for Solomon Islands and with Bmobile-Vodafone's calculation of landline versus mobile differentials. Our Telekom's landline network is small in relation to the coverage of the two mobile networks, and the company submits that a *"...high differential operates as a major disincentive to any substantial investment by STCL"*. It proposes charges should be set at 19 cents per minute, for a term of five years, after which it should be reviewed with a view to reducing it further.
45. In the Commission's view, references to termination rates in a single country, Australia, in the case of Bmobile-Vodafone's submission, with no evaluation of factors affecting the relevance of those rates as a benchmark for Solomon Islands, does not provide the Commission with sufficient or satisfactory information on which to base a determination of a landline termination rate. However, the Commission does not need to determine a landline termination rate. This is because the parties' submissions show they agree that a termination rate of 19 cents per minute should be payable by Bmobile-Vodafone to Our Telekom in respect of calls that originate on Bmobile-Vodafone's network and terminate on Our Telekom's landline network. Accordingly, the Commission expects the parties to record their agreement on that rate in their new Interconnection agreement.
46. In relation to the rates for call terminations from the Our Telekom landline network on the Bmobile-Vodafone mobile network, Bmobile-Vodafone accepts that *"[c]osts are reducing for call transit across mobile networks..."* But beyond that, the company has not attempted to justify the position that there should be a new price of 64 cents for a termination from Our Telekom's landline, but no price at all for a termination from Our Telekom's mobile network.
47. Our Telekom previously proposed that the rate for landline-to-mobile calls should be 24 cents per minute and that the same rate should apply for mobile-to-landline calls. Our Telekom now proposes that, having accepted the rate of 19 cents per minute for mobile-to-landline termination, 19 cents should also be the rate for terminations in the other direction.

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<sup>29</sup> Our Telekom argues that the elimination of the differential will achieve commercial justice between the parties. It does not address the relevance of the prices or costs of the termination of calls from its landline network to its own mobile network.



48. Both parties appear to agree that the basis of the price agreed in 2009, of 74 Cents per minute is somewhat lost in the mists of time. For its part, the Commission has not been able to independently establish any economic rationale for that particular price level, as at 2009, or at any point since that date, or for a continuing differential price relative to the rate for mobile-to- landline terminations.
49. As in the case of mobile-mobile termination rates, regulatory determination of the level of the fixed-to-mobile termination rate would require the Commission to be in possession of detailed information, supported by evidence, regarding the costs incurred in terminating the relevant inbound traffic. The Commission has the power to direct either or both of the parties to furnish to the Commission the information it requires for that purpose. But as noted above, the processes of investigation by each party into its network costs and relevant international benchmarks; consideration of that evidence; and adjudication on termination rates is likely to be time-consuming and costly, for the parties and for the Commission alike. The Commission does not consider, however, that it is required at this time to fix a cost-based, or benchmarked, fixed-to-mobile termination rate.
50. The Commission expects that from here, the parties will make further reasonable efforts to negotiate agreement on the rate that should be payable for termination on Bmobile-Vodafone's mobile network of calls that originate on Our Telekom's landline network. Given that Our Telekom is prepared to pay a reciprocal rate at 19 cents per minute that would seem to be the obvious price point to agree on commercially. Accordingly for the time being the Commission is not setting a rate.

#### Formal conclusions in relation to statutory provisions

51. The adjudication of an interconnection dispute arising in a market driven regulatory regime such as the one in Solomon Islands necessarily requires discussion using language linking the economic, commercial, and legal considerations involved in a straight forward way. Its conclusions must nevertheless comply with the parameters and particulars of the language of the Act and Solomon Island's administrative law. Accordingly, the Commission notes its formal conclusions in response to the s.100 application as follows:

- a) The Commission has given due consideration to all the information placed before it by the parties to the dispute, and has had regard to the telecommunications market conditions in Solomon Islands, and the provisions of the Act, in forming the views set out in this adjudication decision.
- b) The Commission's determination is to deny the application for assistance to resolve the parties' dispute in relation to the charges payable for termination of mobile-originating calls on either of the parties' mobile networks. This is because, as more fully set out in the body of the decision, the Commission considers that there are alternative means available for resolving the dispute on this issue consistent with the Act that are likely to lead to a prompt and satisfactory resolution.

- c) The Commission therefore directs the parties to pursue resolution by means of network facilities sharing or similar commercial arrangements. If after reasonable efforts by both parties, this element of the dispute remains unresolved, either party may then apply for the Commission's assistance, providing detailed cost and benchmark data to support the MTR rate they propose.
- d) The Commission's determination is to deny the application for assistance to resolve the parties' dispute in relation to the charges payable for termination on Our Telekom's landline network of voice calls that originate on Bmobile-Vodafone's mobile network. This is because, as set out more fully of the body of the decision, the parties are in agreement that the rate in question should be 19 cents per minute for the term of the new interconnection agreement.
- e) The Commission's determination is to deny the application for assistance to resolve the parties' dispute in relation to the charges payable for termination on Bmobile-Vodafone's mobile network for voice calls that originate on Our Telekom's landline network. This is because, as set out more fully of the body of the decision, the Commission considers that there are alternative means available for resolving the dispute consistent with the Act that are likely to lead to a prompt and satisfactory resolution.
- f) The Commission therefore directs the parties to pursue resolution by means of an agreed rate, compatible with the agreed rate of 19 cents per minute for landline to mobile terminations. If after reasonable efforts by both parties, this element in dispute remains unresolved, either party may then apply for the Commission's assistance, providing detailed cost and benchmark data to support the rate they propose

**Telecommunications Commission**

17 July 2017

## **Schedule A**

[Section 100 Application-Minute of Convention of Parties]

10<sup>th</sup> August 2016

Telecommunications Commissioner  
Telecommunications Commission Solomon Islands  
Level 2, Alvaro Centre  
PO Box 2180  
Honiara  
Solomon Islands

Attention: BERNARD HILL

Dear Sir;

SUBJECT: OUTSTANDING INTERCONNECTION OWING BY SOLOMON TELEKOM  
COMPANY LTD TO BEMOBILE (SOLOMON ISLANDS) LTD

Reference is made to the subject matter.

The Interconnection Agreement dated 16<sup>th</sup> April 2010 ("the Agreement") between Solomon Telekom Company Ltd ("STCL") and Bemobile (Solomon Islands) Ltd ("Bemobile") was initially for a period of 12 months, which extended by subsequent interconnection Variation Agreements dated 28 October 2011 and 26<sup>th</sup> November 2012 for further 12 months each. It is very clear from the conduct and correspondences between the two (2) parties since the expiry of the 2012 Variation Agreement, parties have continue to impliedly apply the terms of the Agreement.

Therefore, under the Clause 6 of the Agreement STCL shall pay Bemobile a monthly fee, STCL had continued to pay the fees even after the expiry of the 2012 Variation Agreement, pursuant to the terms of the Agreement up until March 2016 when they stopped paying the interconnection fees, threatening Bemobile to negotiate the terms of a new interconnection agreement.

It must be noted that there had been various discussions held between Bemobile and STCL on the issue, in Bemobile's last efforts of negotiating reasonable rates that serves the interest of the customers of both parties, basing it on fair dealings and that the pricing is not unjustified as is expressed under the provisions of the Telecommunications Act 2009 ("the Act"), Bemobile gave its final offer to negotiate the pricing proposal by STCL, in a letter dated 13 April 2016 a copy of which was emailed to Telecommunications Commissioner Mr Bernard Hill as follows:

Abstract from Letter dated 13<sup>th</sup> April 2016

**a) Interconnect agreement (Landline to mobile)**

*The current interconnect agreement between the fixed-mobile (and visa-versa) stands at*

- *0.74 SBD/minute from landline to mobile and*
- *Mobile to landline is 0.24 SBD/minute.*

*We would propose the following:*

- *0.64 SBD/minute from landline to mobile and*
- *Mobile to landline at 0.19SBD/minute*

**b) Physical interconnection between carriers**

*The existing arrangement between mobile carriers was based on a traffic pattern that existed in the market in 2010. The market has clearly evolved since the introduction of competition and the increase in customers to both networks.*

*There is a need to increase the capacity of E1's from the existing 16 to 64.*

*The domestic market will unnecessarily suffer in terms of call quality between both networks which does not serve the country. To this extent, we have procured the equipment for the extra increase in E1's and would like to agree a timeframe for the physical upgrade to this link.*

**c) Withholding of payment**

*The legal validity of your threat to withhold payment unless and until we agree to your terms borders on extortion. This is neither palatable nor acceptable in the modern world of telecommunications. The issue of payment is a point not up for discussion as the current agreement continues.*

*To ensure that there is fairness in the process parties should both agree on the following:*

- *If parties fail to reach an agreement in the next 30 days then;*
- *Parties invite the regulator formally to arbitrate*

End of Letter dated 13<sup>th</sup> April 2016

For which STCL had refused to accept, and since then the matter has remained unresolved.

The total fees outstanding from March to July 2016 owing by STCL to Bemobile is US\$747,146.62. Despite numerous follow ups through emails and letters, the last being the letter from Whitlam K. Togamei Lawyers acting for Bemobile, STCL has continued to ignore the demands and has not made any attempts whatsoever to negotiate settlement with Bemobile.

Since the parties have not reached a compromise, Bemobile now invokes the provisions of the Act, pursuant to Section 100(1) of the Act Bemobile hereby formally seeks the intervention by the Telecommunications Commission ("the Regulator") to resolve the dispute between the parties. That the Regulator to convene a consultation meeting pursuant to section 100(4) of the Act. Thereafter, arrange to mediate and conduct adjudication of the dispute pursuant to Section 100(5)(a) and (b) as stipulated under the Act.

Should you have any further queries, please do not hesitate to contact the undersigned through email: [angin.wape@bmobile.com.pg](mailto:angin.wape@bmobile.com.pg) or on mobile number +675 7600 1303.

Yours faithfully,



Angin Wape (Ms)

Regulatory & Compliance Manager

|     |                          |   |                   |
|-----|--------------------------|---|-------------------|
| cc: | Chairman of Bemobile     | – | Mr Andrew Johnson |
|     | Group CEO of Bemobile    | - | Sundar Ramamurthy |
|     | CEO Bemobile Solomon Is. | - | Niall Downey      |

**Bmobile section 100 application**

**Convention of the Parties**

**MINUTE OF OUTCOME FROM MEETING**

**Date of meeting:** Wednesday 21 September 2016, at the Telecommunications Commission's offices.

**Attendees:** Loyley Ngira and Lionel Puhimana for Our Telekom; Sundar Ramamurthy and Angin Wape for Bmobile; Bernard Hill and Haggai Arumae for TCSI.

**1. Dispute to be adjudicated under s.100(5)(b) of the Telecommunications Act 2009**

The principal purpose of the convention of the parties held pursuant to s.100(4) of the Telecommunications Act 2009, was for the Commission to consult with Our Telekom and Bmobile on their respective preferences amongst the optional statutory methods for resolving their dispute.

Both parties expressed a preference for the matter to be adjudicated by the Commission, in terms of s.100(5)(b) of the Act. After thus consulting with the parties, the Commission formally advised the parties on 3 October 2016 that the Commission will conduct an adjudication.

**2. Matters to be adjudicated by the Commission**

The parties are in agreement that the principal matter for adjudication is the **call termination rates** which might apply going forward, between the parties' respective mobile networks and between mobile networks and Our Telekom's landline network.

Bmobile's position is for the rate to remain at zero for mobile to mobile traffic, but that the rates in the original interconnect agreement between its mobile network and Our Telekom's landline network, be adjusted downwards. Our Telekom's position is that an asymmetrical rate should apply as between the mobile networks, (with the higher rate applying to terminations on its network) and a lower but symmetrical rate between its landline network and Bmobile.<sup>1</sup> Our Telekom cites the trunk call-like costs associated with calls to its remote fixed exchanges, as a reason for Bmobile terminations at its fixed exchanges to bear a termination charge. Bmobile noted that it was open to the idea of a roaming agreement, whereby it would pay for using Our Telekom towers.

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<sup>1</sup> The specifics of the parties positions on call rates are detailed in the Position Paper tabled by Bmobile at the meeting and attached to this minute.

The Commission advised the parties that having regard to the prevailing state of competition, and technological advancement, any party proposing termination rates between any of the landline or mobile networks, at anything other than "zero", and by any methodology other than "Sender Keeps All", will bear the burden of establishing the public interest case for the Commission to determine particular rates. In the absence of compelling evidence that zero rates for the termination of all locally originated calls distorts the competitive process in the local market, or otherwise compromises the interest of consumers, the Commission is likely to determine rates between all the domestic networks, at zero.

**Insufficient physical interconnect capacity** on Our Telekom's side of the network interconnect is also a matter raised in Bmobile's application. Our Telekom acknowledges that it has not added E1 capacity as part of its negotiation stance on new call rates, but it does not disagree that some sixty four E1s is the appropriate capacity having regard to current levels of call traffic.

The Commission advised the parties that regardless of the Bmobile application, the limited E1 capacity is a significant public interest issue for the Commission, since it appears to be the cause of substantial uncompleted calls between the two operators, especially at peak hours, which is reflecting adversely on both companies. Accordingly, the Commission will also adjudicate on this matter.

### **3. Other Matters for resolution**

At the meeting, Bmobile reiterated two other complaints. The first concerns **Our Telekom's non-payment**, since April 2016, of landline to Bmobile call termination charges, at the rate in the original Interconnection Agreement. The total unpaid is \$891,000. Our Telekom does not contest the calculation of the outstanding charges, but explains its non-payment as part of its negotiation position concerning the adoption of a new mobile to mobile call termination rate.

The Commission advised the parties that, as the first step in the adjudication process, it would invite the parties to submit their respective legal views on whether or not the original provisions of clause 5.2(a) of the Interconnection Agreement have remained in effect between the parties as a matter of contract law. And secondly, whether or not the Commission's statutory jurisdiction extends to adjudicating on the merits of the contractual effect. The Commission will then decide how to include this matter in the adjudication.

Bmobile also raised the issue of the parties' practices concerning **transit traffic**, and in particular the need for both parties to accept transit calls on their networks, irrespective of where the call originates from, and for the transit termination rates to be "codified".

The Commission advised that it would not necessarily object to the parties having a pricing arrangement for the termination of transit traffic, but would need to be satisfied there was no adverse effect on domestic competition. It would be for the parties to submit a specific proposal for a transit tariff arrangement, and for the transit issues to then be included in the adjudication.



#### 4. Adjudication procedural matters

The parties acknowledged the Commission's proposal that the resolution of the Bmobile application should proceed "on the papers" whereby the parties would file evidence and submissions with the Commission, with each party given ample opportunity to respond to the filings of the other. The Commission would be responsible for the circulation of documents. The means of communication would be by documents sent by email attachment. The contact point for each of the parties was agreed to be Mr Ngira for Our Telekom, Ms Angin Wape for Bmobile, and Mr Hill for the Commission.

Depending on the type of evidence submitted it was not likely the matters to be adjudicated would involve oral presentation before the Commission. The Commission would not require evidence to be in be sworn. In due course the Commission would issue a draft adjudication determination, which the parties would have the opportunity to respond to.

#### 5. Adjudication programme

Following the transmission of this minute:

- a) each of the parties will have until **18 November 2016** to submit to the Commission, its legal opinion on the issues concerning Our Telekom's non-payment, outlined in paragraph 3 of the minute; and,
- b) each of the parties will have until **2 December 2016** to furnish evidence and submissions concerning the case for a particular call termination rate to apply to particular call terminations on any of the domestic networks; and,
- c) Our Telekom will have until **2 December 2016** to furnish to the Commission, its plan for rectifying the physical interconnect, by the deployment of additional E1s or any alternative link, in response to the Bmobile report on the interconnect, now being supplied to Our Telekom; and,
- d) Both parties will have until **30 November 2016** to submit a joint proposal for a transit tariff.



11 November 2016

Telecommunications Commission

## **Schedule B**

[Our Telekom submission]

***Telecommunications Act 2009 s.100(5)(b)***

**BETWEEN: BEMOBILE (SOLOMONS) LIMITED (“BEMOBILE”)**

**AND: SOLOMON TELEKOM COMPANY LIMITED (“STCL”)**

**ADJUDICATION BY  
TELECOMMUNICATIONS COMMISSION OF SOLOMON ISLANDS**

**SUBMISSION OF  
  
SOLOMON TELEKOM COMPANY LIMITED**

**Attention Mr B. Hill, Commissioner**

Date: 13 February 2017

Submission prepared by

J. Sullivan QC and R. Kingmele

Sol-Law

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Coronation Avenue

Honiara

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## **SUBMISSION OF SOLOMON TELEKOM COMPANY LIMITED ("STCL")**

### **Introduction**

Bemobile (Solomons) Limited ("Bemobile") has raised a number of issues for adjudication by the Commission pursuant to s.100(5)(b) of the *Telecommunications Act 2009* ("the Act").

Bemobile has filed an undated submission in which these issues are outlined. STCL now responds.

Issue 4 has been resolved between the parties and the assistance of the Commission is not required. This submission therefore concerns only Issues 1, 2 and 3 as set out in the Bemobile paper.

Issues 1 and 2 involve a determination of interconnection rates to be included in a fresh interconnection agreement between the parties. As they are interrelated, STCL has treated them as subsets of a broader rates issue.

Issue 3 concerns matters relating to traffic congestion and voice call degradation and is treated separately.

In each case, STCL summarises the Bemobile submission and then details its response and the conclusions drawn.

### **Issues 1 and 2**

#### Preliminary

The issue concerns proposals for interconnection terminations rates for both (1) fixed line/mobile and mobile/fixed line terminations – Issue 1 – and mobile to mobile terminations – Issue 2 - between Bemobile and Solomon Telekom Company Limited ("STCL") networks.

The original interconnection agreement between the parties was made in 2010 and was varied (effectively renewed) in 2011 and 2012, the latter renewal expiring on 1 September 2013. There has been no formal renewal since. Nevertheless, the rates pertaining at that date have been continued by the parties.

Subject to agreement as to interconnection rates, STCL is prepared to enter into a fresh agreement incorporating the agreed rates.

#### Bemobile Submission

Bemobile has separated the issues into two, the first covering terminations to or from the STCL fixed line network and the second dealing with mobile to mobile connections between the two networks.

1. Issue 1 – Fixed Line Terminations The current rates are SBD0.74 per minute for STCL fixed line to Bemobile mobile terminations and SBD0.24 per minute for reverse terminations, a differential of SBD0.50.

Bemobile recognises that there is an international trend, forced by regulators, to reduce this differential pricing and proposes that the new rates be set at SBD0.64 per minute for STCL fixed line to Bemobile mobile terminations and SBD0.19 per minute for Bemobile mobile to STCL fixed line terminations.

The rationale advanced by Bemobile, said to be the “only” reason, for maintaining the significant pricing differential is that “on average mobile networks are more expensive to operate than fixed line networks”. It emphasises the predominant use of copper loops in the fixed line systems, which with a capacity of 24 erlags per line, are said to be “effectively independent of the volume of traffic”, whereas it is said that “in the case of mobile networks, the reverse is true in that the access network elements are dimensioned to serve the traffic arising from incoming and outgoing calls”.

Bemobile also submits that, for historical reasons, STCL has a natural monopoly of strongly regulated fixed line services, whereas in contrast there are multiple mobile service providers encouraged to invest heavily in a highly competitive market.

Bemobile further submits that fixed line networks have a very long accounting life (20 years) and an even longer practical lifespan so that the need for change or upgrades is limited.

It is then said mobile networks have a shorter accounting life (10 years) and that infrastructure lifespan is much shorter because of the need to keep up with rapidly evolving technology, an “ever shortening technology platform lifecycle”. By contrast, it is said that “in most developed countries, fixed line connections are static or declining”.

It is also submitted that economies of scale are more limited in the case of mobile networks and points to duplication of mobile network infrastructure, absent in the case of fixed line networks.

The Bemobile submission considered Australian benchmarks including 9 international interconnections to countries with highly developed networks. The submission proffers an Australian benchmarked termination rate of 1.65¢ (Australian) for mobile terminations and 0.86¢ for fixed line terminations, a differential of 0.79¢ or 48%. It then says its proposal for Solomon Islands equates to 11¢ (Australian) and 3.2¢ respectively with a differential of 7.8¢ or 71%.

While no basis for using the Australian benchmark is offered, Bemobile states that because of different economies of scale (unspecified), the higher differential of 71% is justified for Solomon Islands.

2. Issue 2 – Mobile to Mobile Terminations The current arrangements are Sender Keeps All (“SKA”), that is, all domestic mobile to mobile terminations are free of charge by receiving network. Bemobile wishes to maintain the SKA arrangements. It is said, in justification of that position, that Bemobile has the PNG Government as its major shareholder (the relevance of this is not clear) and that Bemobile “has made large investments into the development of the mobile network in Solomon Islands”. It says that investment decisions will continue with “the aim of extending its services by increasing its market share which is beneficial for the people and government of Solomon Islands.”

It is then said that generally high termination rates ‘can distort competition, become a barrier to new entrants, and finally be harmful to end users. Eliminating termination rates among operators is lowering consumer prices, and spurring innovation in the entire telecommunications sector”. Bemobile says SKA should be maintained “as it works”.

No other submission, beyond these generalities, is made in support of SKA.

## STCL Response

### *General Comment*

The original 2010 interconnection agreement was derived from the 2009 settlement between STCL and the Government which led to STCL surrendering its telecommunications monopoly 10 years early, for which it is acknowledged STCL has been compensated.

However, at that stage, it was not known who the new entrant would be, nor what shape the new competitive environment would take. Government policy was to encourage a competitive telecommunications market throughout Solomon Islands and not just in the lucrative high density population areas such as Honiara, Gizo/Munda/Noro and Auki.

To that end, STCL was required to maintain its loss-making fixed line rural services for a 5 year period, for which it is acknowledged that STCL has also been compensated.

As a corollary to that obligation, it was agreed that the Commission would develop a Universal Access Plan and create a Universal Access Special Fund to take effect at the end of that five year period with universal access obligations to be imposed on service providers and a proportion of licence fees (described as levies) quarantined for that special fund, if necessary. Those matters are now enshrined in Part 6 of the Act. The policy underlying the agreement and Part 6, is that the plan and special fund would operate to encourage all players, especially STCL and the new entrant, to provide and expand services to rural and disadvantaged areas through the subsidies to be afforded by the special fund. At the time, it was envisaged that the special fund might be seeded by international donors, with the levy system available as a backup.

STCL agreed to the fixed line rural services and universal access arrangements on the basis that, at the end of the five year period, rural telecommunications access would be the common obligation of both STCL and the new entrant supported and subsidised by the Universal Access Plan and the special fund.

Further, the agreement between the Government and STCL was predicated on the knowledge that no new entrant would wish to invest in fixed line services and that the new entrant would provide mobile telecommunications services only. However, it was also envisaged that the new entrant would be issued a full individual service licence, so that STCL and the new entrant would be competing on a level playing field in respect of rights and obligations in the mobile sector, subject to STCL compensatory rights. Section 128 and Schedule 2 of the Act give effect to that agreement.

In addition, the fixed line/mobile termination rate differential of 74/24 was agreed by STCL on the basis of the Government's expert advisers representing that the prevailing average differential in developed telecommunications markets was in the order of USD9.2/3¢. While STCL preferred to compare Solomon Islands with other Pacific networks, sufficient relevant data was unavailable. While the cost of maintaining mobile networks *vis-à-vis* fixed line networks was advanced as one justification for the differential, that was not the only basis then advanced by the Government. It was argued that the substantial differential in favour of the new entrant's originating mobile network would be a factor encouraging the new entrant to fully develop its network across the nation.

It was always envisaged that the fixed line/mobile termination rate would be reviewed and that a convenient time for that review would be after about five years of competition.

Further, the SKA arrangements were agreed on two bases. The first was that it was said by the Government's experts that SKA would encourage rapid development of the new entrant's network across the nation. The second was that it would give



STCL some breathing space to develop its own competitive mobile network in circumstances where the Government experts were predicting that the new entrant would achieve a majority market share within a year or two of the commencement of competition, presumably through the rapid development envisaged above.

It was always acknowledged that SKA was highly unusual and would be temporary. During the negotiations it was envisaged that SKA would probably be kept in place for the initial five years and then be reviewed. No one suggested that SKA would be permanent.

What then has in fact occurred in the approximately 6½ years since Bemobile commenced operations?

First, STCL has kept its obligation to maintain rural fixed line services and has continued to do so after the expiry of the five year transitional period, notwithstanding that the number of rural fixed line customers has diminished as some have moved to a wholly mobile service. This constitutes an increase in STCL losses from those services.

Second, STCL has, in the spirit of the agreement, made substantial capital investment in its mobile network throughout Solomon Islands and now provides extensive coverage across the nation including some extremely remote areas.

Third, and in contrast, Bemobile started slowly but has, since its association with Vodafone, “cherry picked” its locations, concentrating on the lucrative Honiara market and the population centres of Gizo/Munda/Noro in Western Province and Auki in Malaita. Bemobile has shown no serious interest in providing mobile services to remote areas. This is completely contrary to the intent of the SKA arrangement.

Fourth, there is no Universal Access Plan in sight, even on the distant horizon and, because Bemobile has generally chosen not to go into rural and remote areas, the practical effect is that STCL remains the sole universal access provider at considerable commercial cost to itself. This, with respect, reflects a failure on the Commission’s part to pursue its statutory obligations under Part 6 of the Act and is contrary to one of the bases upon which STCL surrendered its monopoly.

Fifth, without consultation with STCL, Bemobile has been permitted by the Commission to surrender its individual licence and be issued a class licence instead. That matter was confirmed by the Commissioner in an earlier meeting. Although STCL has not seen the actual licence, it can be certain that its conditions are less onerous than the new entrant’s individual licence, otherwise there would be no reason to change. This is of course completely contrary not only to the spirit and intent of the agreement between the Government and STCL but also to the obvious intention of the whole new entrant process and licence introduced by the Act. As the

beneficiary of this change, Bemobile no longer has to compete on equal terms with STCL. Again, a major basis for the surrender of STCL's monopoly has failed to eventuate.

Sixth, Bemobile has taken commercial advantage of the SKA arrangements, not to develop its network but to market itself in the limited areas in which it carries on business by offering free calls to any other network (for that, read STCL as the only other network). In effect, it has invited its users in limited geographical areas to have free use of STCL's network in any area. That amounts to a substantial subsidy by STCL to Bemobile customers and has significantly contributed to the congestion of which Bemobile complains under Issue 3.

In short, few of the intended effects of competition have been achieved. Mobile competition is restricted to high population density areas and a majority of the population and a substantial majority of the geographic area of Solomon Islands remain without competitive mobile services save through interconnection with STCL's network. The basis upon which STCL surrendered its monopoly has been undermined and it is now time for a thorough review of interconnection rates which must reflect the present commercial reality rather than the failed policy intentions of 2009.

Annexure A shows *inter alia* details of the recorded traffic between STCL fixed line and Bemobile networks for the period May 2014 to December 2016 (Issue 1), together with a number of rating scenarios discussed below. It also extracts 2016 as a separate data set.

Annexure B is of similar ilk but relates to mobile to mobile traffic (Issue 2). Both Annexures demonstrate in stark terms the effect of Bemobile's much smaller network on interconnection traffic.

On a general note, STCL acknowledges that Bemobile is majority owned by the PNG Government. As far as STCL is aware, Bemobile has no Solomon Islands shareholders. By contrast, STCL is wholly owned for the benefit of Solomon Islands through Solomon Islands National Provident Fund Board and the Investment Corporation of Solomon Islands. It therefore ill behoves Bemobile to say that its investment decisions seeking an increase in market share is for the benefit of the people and Government of Solomon Islands. In truth, any such increase is for the ultimate benefit of its foreign owners. Not so STCL, whose profits are wholly retained locally.

#### 1. Issue 1 – Fixed Line Terminations

Bemobile wishes to reduce interconnect rates from SBD74/24¢ to 64/19¢ per minute, supposedly to acknowledge international trends, and it relies on

Australian data for international connections. No basis for using Australia is offered, nor is any basis given for the generalisation that, because of differences in economies of scale, a higher differential is justified for Solomon Islands.

The Bemobile proposal cannot be justified, even using the Australian comparator. The current differential is 50¢ or 67.5%. The Australian comparison offered is 48%. Nevertheless, Bemobile's proposal, while notionally reducing the differential to 45¢, actually increases the differential from 67.5% to 70.3%. No justification for that increase, set against an admitted trend of reduction, is proffered. The proposed differential is to Bemobile's obvious commercial advantage

In the Bemobile submission, the Australian fixed/mobile and mobile/fixed termination rates of AUD1.65¢ and 0.86¢ are said to equate to about SBD10¢ and 5¢ respectively, with the proposed rates of SBD64¢ and 19¢ equate to AUD11¢ and 3.2¢ respectively. STCL is prepared to accept those exchange rates as being about right for present purposes.

However, no justification (other than the generalisation about economies of scale) is advanced to support termination rates which have multipliers of 6.4 and 3.8 respectively when compared to Australia. Why, other than because it is to Bemobile's commercial advantage, should fixed/mobile terminations (which STCL pays) be 6.4 times Australian rates when mobile/fixed terminations (which Bemobile pays) are proposed to be only 3.8 times Australian rates.

Using the Australian comparator and the proposed 19¢ for mobile/fixed, a differential of 48% would result in a fixed/mobile rate of 36.5¢ per minute.

That is a result of correctly applying the comparison used by Bemobile. However, it does not take account of the facts on the ground as they are today.

Annexure A shows that in the 31 month period under review, there were over 7 million minutes of terminations between Bemobile and STCL's fixed lines. Of these approximately one third were mobile/fixed (i.e., paid by Bemobile) and two thirds fixed/mobile (i.e., paid by STCL). If one takes 2016 only, almost 3 million terminations, the mobile/fixed share is a little under 40% with fixed/mobile slightly over 60%. The disparity between mobile/fixed and fixed mobile inevitably reflects in part the limited spread of the Bemobile network.

Unless that changes (and there is presently no commercial incentive for Bemobile to change its business model so as to expand its network

nationwide), the ratios are unlikely to change much in the future and STCL will be left with a permanent loss making centre, namely, its fixed line services for Bemobile customers. Commercially, it could mitigate that loss by ending all rural fixed line services, which would not be desirable from the Commission's or Governments viewpoint but which would be commercially justifiable in the absence of a Universal Access Special Fund. That would still leave STCL with a permanent loss making centre with its fixed line services to Bemobile customers in Honiara, Gizo/Munda/Noro and Auki. The Bemobile proposal merely exacerbates that position and is unacceptable to STCL.

Further, the straight comparison with Australia not only fails to take account of the absence of the any universal access support, but the high differential also operates as a major disincentive to any substantial investment by STCL which would be required for a move from fixed line copper to fibre optic fixed line services. That disincentive cannot be in the national interest.

It also fails to take account of the favourable changes to Bemobile's licensing arrangements and the general shift away from the competitive environment envisaged when STCL agreed to surrender its monopoly.

STCL believes that for all these reasons, commercial justice between the parties will be achieved by eliminating the differential between fixed/mobile and mobile/fixed terminations. In the absence of any real evidence in justification, the maintenance of the differential is discriminatory against STCL.

This was the basis of STCL's earlier proposal for a shift to 24/24¢ rates.

STCL now accepts Bemobile's proposed rate of 19¢ per minute for mobile/fixed terminations, although this should be reviewed again after a maximum of five years with a view to further reducing the rate.

Assuming that rate is agreed, then the question for the Commission is what should the fixed/mobile rate now be?

Based on the submission that there should be no differential, the answer is 19¢ per minute.

In contending for no differential, STCL does not ignore the Bemobile submission that costs are higher on the mobile side than on the fixed line side. STCL accepts that to be true as a general rule. However, in the present circumstances, the case for eliminating the differential for fixed line connections, as set out above, outweighs the argument for a differential based on costs etc, because the objective of the present review should be the

furtherance of the policy objectives of the Act. By eliminating the differential, those objectives are better obtained than by maintaining it.

If the submission that there be no differential is not accepted, then plainly, if the Australian comparator used by Bemobile is valid, the fixed/mobile rate cannot be more than 36.5¢ per minute, but it should be reduced further to take account of the factors discussed above. This would result in a rate somewhere between 19¢ and 36.5¢.

Annexure A shows scenarios for the existing 74/24¢ arrangement, the 24/24¢ proposed earlier by STCL (Scenario 1), the 64/19¢ proposed by Bemobile (Scenario 2) and the 36.5/19¢ (Scenario 3) and 19/19¢ (Scenario 4) models referred to above. Scenario 5 is included to enable the Commission and parties to consider a variable range of rates by simply changing the rates in Columns Y and Z (highlighted in red).

This Annexure demonstrates that so long as Bemobile maintains its current commercial model, STCL will suffer a loss on fixed line inter-connections no matter what the rates. It also shows that the higher the fixed/mobile rate the greater the commercial disincentive for Bemobile to change or for STCL to further invest in a fibre optic network.

That cannot be justified and is inconsistent with the objectives and the Commission's obligations set out in s.3 of the Act.

It may also be added that Bemobile's submission that STCL's fixed line copper loop system is "effectively independent of the volume of traffic" is belied by its own submission in relation to congestion (Issue 3), which is not limited to mobile to mobile terminations although that is where the most obvious congestion is to be observed.

## 2. Issue 2 – Mobile to Mobile Terminations

Bemobile says that SKA should be maintained because "it works". It works only for Bemobile's commercial advantage as Annexure B amply demonstrates.

While the increase in Bemobile to STCKL Breeze terminations between mid-2014 and mid-2015 is a reflection of Bemobile expansion of its network into population centres, the subsequent data reflects seasonal traffic and Bemobile's marketing to take advantage of SKA (ceased or pulled back at least for now).

Annexure B reveals the great disparity between the two mobile networks. There were over 203 million minutes of Bemobile to STCL terminations compared to 88 million in the reverse direction, a ratio of 2.6:1. Extrapolating 2016, there were about 111 million and 40 million minutes respectively of such terminations. For 2016, when Bemobile marketing to take advantage of SKA was at its peak, the ratio rises to nearly 3:1, but that aside the overall ratio is remarkably stable.

The disparity is not surprising. In a two provider market, to achieve national coverage for its customers, the smaller network will naturally require more terminations into the larger network than the converse.

In short, in the past year, Bemobile's customers have been using STCL's much larger mobile network free of charge at more than 2.5 times the rate that STCL's customers are using Bemobile's network. That equates to an effective and gigantic subsidy to Bemobile and its customers. It is little wonder that Bemobile wants to maintain SKA. As Annexure B amply demonstrates, the size of that subsidy depends on what the true interconnection rates should be.

Bemobile cannot approbate and reprobate, that is, it cannot emphasise its greater investment, shorter timelines and rapid practical depreciation for the purposes justifying a large differential in respect of Issue 1, and then ignore it completely when it comes to Issue 2. It cannot be doubted that STCL has made a far greater overall investment (in current cost equivalents) into its mobile network than Bemobile has in its.

It was acknowledged during the 2009 negotiations, and it cannot be gainsaid now, that SKA is somewhat anomalous when compared to the overwhelming majority of competitive jurisdictions or territories where interconnection rates apply. It was also acknowledged that SKA would have to be reviewed. A five year period was commonly mentioned.

Further, under Issue 1, Bemobile wants to use Australia as a comparator. While no doubt domestic interconnection rates may vary widely in Australia among the large number of service providers, it is nowhere suggested that SKA applies in that jurisdiction.

It is equally plain from Annexure B that there is no incentive for Bemobile to extend its network beyond the high density population areas. To do so, would only reduce the ratio to closer to 1:1 and thus reduce the overall subsidy (in terms of net free terminations) it receives from STCL.

Further, none of the above takes into account the more favourable licensing conditions now applying to Bemobile when compared to STCL.

It is thus false to say that SKA “works”. It does not, save to Bemobile’s sole but narrow commercial advantage. That cannot be consistent with the objectives in s.3 of the Act.

SKA can no longer be justified. STCL will not agree to any interconnection agreement that maintains SKA because it naturally “unfairly discriminates” against STCL to use the language of ss.63 and 64 and is not “competitively neutral” and does not provide for “fair and effective competition” to use the language of s.3.

Going forward, the Commission would be in breach of its obligations under s.3 if it made a determination maintaining SKA and this would inevitably trigger an appeal under s.102. STCL hopes that this adjudication will not take that course.

If SKA is to be abandoned, then the question is what interconnections rates are to apply. That involves two matters for determination. First, whether the rates for Bemobile/STCL and STCL/Bemobile should be the same or differentiated, and, second, what the rates should be.

STCL submits that, as a matter of principle and policy, there is justification for a differential between the rate for Bemobile/STCL and STCL/Bemobile, with the former attracting a higher rate than the latter. There are a number of reasons for this.

First, as Annexure B shows, on Bemobile’s current business model there will always be a greater demand for Bemobile/STCL traffic than the reverse. That is inevitable because of Bemobile’s reduced customer base (both as to population and geographic coverage) compared to that of STCL. It is thus equally inevitable that Bemobile’s customers will use STCL’s network far more than the converse. That results in an inevitable subsidy by STCL to Bemobile, huge in the case of SKA. That subsidy should be kept within a commercially realistic range and this can be achieved by setting a higher rate for Bemobile/STCL traffic.

Second, the plain policy objective of the Act, highlighted by s.3 but permeating throughout, is to promote competitive telecommunications services throughout Solomon Islands and not just in high density population areas. At present, that is achieved by STCL expanding its investment into a nationwide mobile network and Bemobile piggybacking onto that network free of charge and without any commercial incentive to expand its own network further. That is a

distortion of the policy aims of the Act. An interconnection rating model which provides such incentive will be inconsistent with the Act's objectives.

Third, a differential rating model will provide that commercial incentive for Bemobile to expand its network. The incentive will arise, because it will be to Bemobile's advantage to expand its network into rural areas and thus not only reduce its customers' reliance on interconnection with STCL but also increase the need for STCL's customers to interconnect with Bemobile's network.

Fourth, a differential rating model will provide the commercial incentive for STCL to further expand its network into more remote areas, since it can do so in the knowledge that Bemobile will be contributing to that expansion via its interconnection payments.

Fifth, it is simply unjust that STCL should be cast in the role of universal access service provider with Bemobile having access to that service without having to pay its fair share for that service. A differential rate will right that obvious wrong.

Finally, Bemobile may well argue that there is no commercial incentive for it to develop a wider cover because of the failure of the Commission to implement a universal access plan and to establish the universal access special fund under Part 6. There is some force to that, but it equally applies to STCL, which has invested more widely than Bemobile on the promise that there would be a universal access plan and special fund. With respect to the Commission, its failure to implement Part 6 cannot be a justification for STCL, and STCL alone, assuming, by default, the role of universal access provider without compensation from the service provider benefiting most from STCL providing that service, namely, Bemobile.

For all of those reasons, a rating differential is consistent with the policy objectives of the Act and will achieve a modicum (not complete) of commercial justice as between STCL and Bemobile. The greater the differential the greater the commercial incentive to Bemobile to expand and the greater the commercial justice afforded to STCL.

STCL does not suggest that the differential be permanent. It should be reviewed regularly and at a minimum of 5 yearly intervals, but sooner if Bemobile expands its network in rural areas or if the Commission implements Part 6.

What then should the termination rates be? STCL initially suggested a rate of 24¢ per minute for Bemobile/STCL traffic and 10¢ for STCL/Bemobile connections. The 24¢ rate was equivalent to the current Bemobile/STCL fixed



line rate. At the time of that proposal, the 10¢ reverse rate was thought to set an appropriate differential based on the above principles but without reference to actual data.

Annexure B, Scenario 1, applies those rates to actual data. It shows that, at those rates, SKA has resulted in a subsidy by STCL to Bemobile of nearly SBD40 million for the period under review (May 2014-December 2016). Going forward, this would result in a net annual compensation by Bemobile of around SBD22 million based on 2016 data.

STCL acknowledges that when tested against actual data, its original proposal may appear too high. Nevertheless, it would provide a real incentive to Bemobile to rapidly change its business model for benefit of the competition objectives of the Act.

STCL is prepared to review its original proposal and now proposes 10¢ per minute for Bemobile/STCL traffic and 5¢ for STCL/Bemobile terminations.

Annexure B, Scenario 2, applies those rates to actual data. It shows that, at those rates, SKA has resulted in a subsidy by STCL to Bemobile of nearly SBD16 million for the period under review and that this would result in a net annual compensation by Bemobile of around SBD9 million based on 2016 data.

STCL considers that such an outcome would be consistent with objectives of the Act and provide a significant commercial incentive to Bemobile to change its business model as well as provide a reasonable degree of compensation to STCL for the use of its much more extensive network.

If the submission for a differential rate is rejected, then STCL, as an alternative, would propose a common rate of 10¢ per minute. This shows that, at those rates, SKA has resulted in a subsidy by STCL to Bemobile of over SBD11 million for the period under review and that this would result in a net annual compensation by Bemobile of around SBD7 million based on 2016 data.

If there is to be a common rate, contrary to STCL's contention for a differential, then this provides a reasonably fair outcome.

Annexure B Scenario 4 shows what the result would be based on a common termination rate of 5¢ per minute. STCL considers that, at this point in time, this would not provide sufficient commercial incentive for Bemobile to change its business model nor does it provide reasonable compensation to STCL for

the overwhelming use of its network by Bemobile. Such an outcome does not further the objectives of the Act.

STCL acknowledges that ultimately the goal should be to reduce, but not eliminate, interconnection rates. If, on review in say five years, Bemobile has substantially expanded its network or STCL is being sufficiently compensated for its universal access role, then a move to a common rate of 5¢ per minute should be considered.

Annexure B Scenario 5 is for the use of the Commission and parties. Various outcomes can be seen by changing the interconnection rates in Columns Y and Z (highlighted in red).

There is no inconsistency between the submission that there should be no differential under Issue 1 and the submission that there should be a differential under Issue 2. Both submissions are consistently underpinned by the need to further the policy objectives of the Act. In the present circumstances in Solomon Islands, it just so happens that those objectives are best obtained by eliminating the differential under Issue 1 and implementing a differential for Issue 2.

### 3. Conclusions - Issues 1 and 2

The Commission should consider the present state of competitive play between STCL and Bemobile in the light of the overriding objectives of the Act and its statutory obligations enshrined in s.3 and elsewhere.

In that light, SKA cannot be justified for mobile to mobile terminations and must be abandoned.

Consistent with the policy objectives of the Act and with commercial justice between the parties, STCL submits that the interconnection rates should be as follows –

- a. 19¢ per minute for all fixed line terminations;
- b. 10¢ per minute for Bemobile connections to STCL's mobile network;
- c. 5¢ per minute for STCL's connections to Bemobile's network.

There should be a review of these rates after 5 years or earlier in the event that a universal access plan and special fund is introduced or if Bemobile substantially expands its mobile network.

### Issue 3

#### Preliminary

This issue concerns alleged noise and traffic congestion in respect of terminations, primarily mobile to mobile, between Bemobile and STCL.

Bemobile has filed an undated submission in which this issue is outlined under Issue 3 and supported by a report entitled “Noise and Congestion Issue on Interconnect Voice Calls” with a review date of 29/30 September 2016. This submission is in response to that submission and report.

#### Bemobile Submission

There are two components to the submission, traffic congestion and noise –

1. Traffic Congestion Bemobile states that the “domestic market is adversely affected by the congestion on the current E1 capacity in terms of call quality between both networks, which does not adequately serve consumers in Solomon Islands”, which prevents local users making calls during busy periods. Bemobile recommends an increase in E1 capacity from 16 to 64 and seeks an agreed timeframe for the upgrade to be implemented.
2. Noise Bemobile states that “crackling noise” has been detected on the voice circuits causing poor quality and noise interference. Its report sets out Bemobile’s technical investigations and concludes that the Bemobile network is “noise free” and that the “noise appears to originate from” the STCL network. Its recommended solution is to “bypass the TDM link, increase interconnect capacity (presumably the increase from 16 to 64 in E1 capacity referred to above) and go optical” between the two networks. As a result it is said “all issues we face will be solved”.

#### STCL Response

1. Traffic Congestion

STCL concedes there is a degree of traffic congestion during busy periods. Much of that congestion has been generated by Bemobile’s aggressive marketing of free calls, which takes advantage of the current SKA regime and permits Bemobile customers to make exceptionally heavy use of STCL’s network free of charge. See the submission in relation to Issue 2 and Annexure B.

The congestion is again compounded by Bemobile's failure to expand into rural and remote areas, putting increased capacity stress on that part of STCL's network to which Bemobile's customers wish to terminate.

STCL has designed its network for its customers and has not invested so as to meet over 100 million free connections annually from Bemobile customers.

Therefore any solution to the congestion issue cannot be merely technical, but must also address the commercial and policy drivers of that congestion. SKA must be abandoned – see STCL submission re Issue 2.

On the technical side, STCL does not agree that the solution is to increase the number of E1 interconnectors from 16 to 64. E1s use outdated analog technology. STCL wishes to move away from that standard and instead proposes that the parties move to a wholly digital interconnect system. This will ensure capacity to meet all customer demands from both networks in the near to medium future.

STCL suggests that the parties move to a more modern, efficient and digital Session Initiation Protocol (SIP) trunking interface. Call quality will not be degraded and capacity either way will be improved without too much additional investment by the parties.

STCL notes that both it and Bemobile use Huawei equipment, so migration to SIP trunking should be easily achieved with co-operation between both parties.

STCL believes that it would require about 3 months from the date of agreement to implement this solution.

## 2. Noise

STCL acknowledges that there is some intermittent crackling noise experienced in Bemobile to STCL mobile terminations.

However, STCL has done its own technical investigations assisted by experts from Huawei – see Annexure C. As a result, STCL, does not agree that the noise originates from the STCL side. As Annexure C shows, the noise actually emanates from the Bemobile side. No noise originates from the STCL.

The solution, if any is available with the currently used equipment, lies with Bemobile and not STCL.

However, STCL agrees with Bemobile that, in any event, bypassing the TDM link and replacing it with optical fibre is the best solution. Thus, consistent with its proposal in respect of congestion, STCL recommends that the TDM link be replaced by an optical fibre SIP interface, which should go a long way towards solving both problems. If both operators use common Huawei equipment and the same SIP protocols for all call sessions, this should result in minimal voice call degradation.

3. Conclusion – Issue 3

STCL recommends that the parties agree to replace the current analog E1/TDM linking system with a modern optical fibre SIP solution, with common SIP protocols. This should increase voice call capacity both ways and significantly reduce voice call degradation.

STCL recommends that the parties make a common approach to Huawei for assistance and have a target of introducing the new system within 3 months of agreement.

STCL SUBMISSION - ANNEXURE A - FIXED LINE INTERCONNECTION - ACTUAL AND SCENARIOS

| Bemobile & STCL - Interconnect minutes (Fixed) |                                    |                                     |               |                |               |                     |                      |               |                     |                      |               |
|--|------------------------------------|-------------------------------------|---------------|----------------|---------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|
| Current Rate                                   |                                    |                                     |               |                |               | Scenario 1          |                      |               |                     |                      |               |
| 0.24   |                                    |                                     |               |                |               | 0.24                |                      |               |                     |                      |               |
| 0.74   |                                    |                                     |               |                |               | 0.24                |                      |               |                     |                      |               |
| Month  | (Inbound) Bemobile to Fixed - Mins | (Outbound) Fixed to Bemobile - Mins | Total Inbound | Total Outbound | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss |
|  |                                    |                                     |               |                |               |                     |                      |               |                     |                      |               |
| May-14   | 22,680                             | 165,698                             | 5,443         | 122,616        | -117,173      | 5,443               | 39,767               | -34,324       | 5,443               | 39,767               | -34,324       |
| Jun-14   | 18,887                             | 145,522                             | 4,533         | 107,666        | -103,133      | 4,533               | 34,925               | -30,392       | 4,533               | 34,925               | -30,392       |
| Jul-14   | 18,917                             | 146,833                             | 4,516         | 107,917        | -103,400      | 4,516               | 35,000               | -30,484       | 4,516               | 35,000               | -30,484       |
| Aug-14   | 17,785                             | 139,297                             | 4,288         | 103,080        | -98,811       | 4,288               | 33,440               | -29,153       | 4,288               | 33,440               | -29,153       |
| Sep-14   | 17,945                             | 130,998                             | 4,307         | 96,939         | -92,632       | 4,307               | 31,430               | -27,133       | 4,307               | 31,430               | -27,133       |
| Oct-14   | 17,669                             | 116,262                             | 4,240         | 86,034         | -81,793       | 4,240               | 27,203               | -23,662       | 4,240               | 27,203               | -23,662       |
| Nov-14   | 14,357                             | 80,141                              | 3,446         | 59,304         | -55,858       | 3,446               | 19,234               | -15,788       | 3,446               | 19,234               | -15,788       |
| Dec-14   | 19,275                             | 107,331                             | 4,626         | 79,425         | -74,798       | 4,626               | 25,760               | -21,134       | 4,626               | 25,760               | -21,134       |
| Jan-15   | 34,947                             | 111,584                             | 8,387         | 82,572         | -74,185       | 8,387               | 26,780               | -18,333       | 8,387               | 26,780               | -18,333       |
| Feb-15   | 46,597                             | 98,522                              | 10,958        | 72,907         | -61,948       | 10,958              | 23,645               | -12,687       | 10,958              | 23,645               | -12,687       |
| Mar-15   | 62,725                             | 123,132                             | 15,054        | 91,118         | -76,064       | 15,054              | 29,552               | -14,498       | 15,054              | 29,552               | -14,498       |
| Apr-15   | 66,740                             | 121,067                             | 16,018        | 89,590         | -73,572       | 16,018              | 29,056               | -13,038       | 16,018              | 29,056               | -13,038       |
| May-15   | 66,858                             | 120,870                             | 16,046        | 89,444         | -73,398       | 16,046              | 29,009               | -12,963       | 16,046              | 29,009               | -12,963       |
| Jun-15   | 59,784                             | 110,518                             | 15,044        | 81,783         | -66,740       | 15,044              | 26,524               | -11,481       | 15,044              | 26,524               | -11,481       |
| Jul-15   | 75,304                             | 108,817                             | 14,343        | 80,525         | -66,181       | 14,343              | 26,116               | -11,773       | 14,343              | 26,116               | -11,773       |
| Aug-15   | 78,304                             | 130,859                             | 18,073        | 96,936         | -78,763       | 18,073              | 31,405               | -13,333       | 18,073              | 31,405               | -13,333       |
| Sep-15   | 86,832                             | 135,580                             | 20,840        | 100,329        | -79,489       | 20,840              | 32,539               | -11,699       | 20,840              | 32,539               | -11,699       |
| Oct-15   | 102,509                            | 157,475                             | 24,566        | 116,531        | -91,965       | 24,566              | 37,794               | -13,228       | 24,566              | 37,794               | -13,228       |
| Nov-15   | 102,509                            | 156,292                             | 24,602        | 115,656        | -91,054       | 24,602              | 37,510               | -12,908       | 24,602              | 37,510               | -12,908       |
| Dec-15   | 112,554                            | 179,806                             | 27,037        | 133,057        | -106,020      | 27,037              | 42,193               | -16,117       | 27,037              | 42,193               | -16,117       |
| Jan-16   | 99,563                             | 177,996                             | 23,845        | 131,717        | -107,872      | 23,845              | 42,719               | -18,874       | 23,845              | 42,719               | -18,874       |
| Feb-16   | 117,013                            | 174,648                             | 28,063        | 129,240        | -101,157      | 28,063              | 44,786               | -15,156       | 28,063              | 44,786               | -15,156       |
| Mar-16   | 123,459                            | 186,821                             | 29,633        | 138,100        | -108,467      | 29,633              | 44,319               | -14,706       | 29,633              | 44,319               | -14,706       |
| Apr-16   | 117,591                            | 178,966                             | 28,246        | 132,435        | -104,189      | 28,246              | 42,552               | -14,706       | 28,246              | 42,552               | -14,706       |
| May-16   | 127,978                            | 189,795                             | 30,715        | 140,448        | -109,734      | 30,715              | 44,571               | -14,836       | 30,715              | 44,571               | -14,836       |
| Jun-16   | 119,568                            | 183,628                             | 28,696        | 135,985        | -107,189      | 28,696              | 44,071               | -16,606       | 28,696              | 44,071               | -16,606       |
| Jul-16   | 113,787                            | 182,978                             | 27,309        | 135,404        | -108,095      | 27,309              | 43,915               | -15,568       | 27,309              | 43,915               | -15,568       |
| Aug-16   | 115,995                            | 180,861                             | 27,839        | 133,837        | -105,998      | 27,839              | 43,407               | -15,568       | 27,839              | 43,407               | -15,568       |
| Sep-16   | 117,230                            | 180,959                             | 28,135        | 133,910        | -105,774      | 28,135              | 43,430               | -15,295       | 28,135              | 43,430               | -15,295       |
| Oct-16   | 120,460                            | 190,017                             | 28,910        | 140,612        | -111,702      | 28,910              | 45,604               | -16,994       | 28,910              | 45,604               | -16,994       |
| Nov-16   | 111,444                            | 171,452                             | 26,747        | 126,874        | -100,128      | 26,747              | 41,148               | -14,402       | 26,747              | 41,148               | -14,402       |
| Dec-16   | 122,989                            | 189,281                             | 29,517        | 125,253        | -95,736       | 29,517              | 40,623               | -11,105       | 29,517              | 40,623               | -11,105       |
| Grand Total                                    | 2,433,428                          | 4,732,786                           | 594,023       | 3,517,062      | -2,933,039    | 594,023             | 1,140,659            | -555,646      | 594,023             | 1,140,659            | -555,646      |

| Scenario 2  |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|-------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|
| 0.19        |                     |                      |               |                     |                      | 0.64          |                     |                      |               |                     |                      |               |
|             |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|             |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|             |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
| Month       | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss |
|             |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
| May-14      | 4,309               | 106,047              | -101,737      | 4,309               | 106,047              | -101,737      | 4,309               | 60,480               | -56,170       | 4,309               | 60,480               | -56,170       |
| Jun-14      | 3,589               | 93,134               | -89,545       | 3,589               | 93,134               | -89,545       | 3,589               | 53,115               | -49,527       | 3,589               | 53,115               | -49,527       |
| Jul-14      | 3,576               | 93,333               | -89,758       | 3,576               | 93,333               | -89,758       | 3,576               | 53,222               | -49,646       | 3,576               | 53,222               | -49,646       |
| Aug-14      | 3,379               | 89,150               | -85,771       | 3,379               | 89,150               | -85,771       | 3,379               | 50,843               | -47,464       | 3,379               | 50,843               | -47,464       |
| Sep-14      | 3,410               | 83,839               | -80,429       | 3,410               | 83,839               | -80,429       | 3,410               | 47,814               | -44,405       | 3,410               | 47,814               | -44,405       |
| Oct-14      | 3,357               | 74,408               | -71,051       | 3,357               | 74,408               | -71,051       | 3,357               | 42,436               | -39,079       | 3,357               | 42,436               | -39,079       |
| Nov-14      | 2,728               | 51,290               | -48,562       | 2,728               | 51,290               | -48,562       | 2,728               | 29,251               | -26,524       | 2,728               | 29,251               | -26,524       |
| Dec-14      | 3,662               | 68,682               | -65,020       | 3,662               | 68,682               | -65,020       | 3,662               | 39,176               | -35,514       | 3,662               | 39,176               | -35,514       |
| Jan-15      | 6,640               | 71,413               | -64,774       | 6,640               | 71,413               | -64,774       | 6,640               | 40,728               | -34,088       | 6,640               | 40,728               | -34,088       |
| Feb-15      | 8,675               | 63,034               | -54,359       | 8,675               | 63,034               | -54,359       | 8,675               | 39,767               | -27,288       | 8,675               | 39,767               | -27,288       |
| Mar-15      | 11,918              | 78,805               | -66,887       | 11,918              | 78,805               | -66,887       | 11,918              | 44,943               | -33,026       | 11,918              | 44,943               | -33,026       |
| Apr-15      | 12,681              | 77,483               | -64,802       | 12,681              | 77,483               | -64,802       | 12,681              | 44,190               | -31,509       | 12,681              | 44,190               | -31,509       |
| May-15      | 12,703              | 77,357               | -64,653       | 12,703              | 77,357               | -64,653       | 12,703              | 44,117               | -31,414       | 12,703              | 44,117               | -31,414       |
| Jun-15      | 11,909              | 70,731               | -58,822       | 11,909              | 70,731               | -58,822       | 11,909              | 40,339               | -28,430       | 11,909              | 40,339               | -28,430       |
| Jul-15      | 11,355              | 69,643               | -58,288       | 11,355              | 69,643               | -58,288       | 11,355              | 39,718               | -28,363       | 11,355              | 39,718               | -28,363       |
| Aug-15      | 14,308              | 83,750               | -69,442       | 14,308              | 83,750               | -69,442       | 14,308              | 47,764               | -33,456       | 14,308              | 47,764               | -33,456       |
| Sep-15      | 16,498              | 86,771               | -70,273       | 16,498              | 86,771               | -70,273       | 16,498              | 49,487               | -32,989       | 16,498              | 49,487               | -32,989       |
| Oct-15      | 19,448              | 100,784              | -81,336       | 19,448              | 100,784              | -81,336       | 19,448              | 57,478               | -38,030       | 19,448              | 57,478               | -38,030       |
| Nov-15      | 19,477              | 100,027              | -80,550       | 19,477              | 100,027              | -80,550       | 19,477              | 57,047               | -37,570       | 19,477              | 57,047               | -37,570       |
| Dec-15      | 21,404              | 115,076              | -93,672       | 21,404              | 115,076              | -93,672       | 21,404              | 64,969               | -43,565       | 21,404              | 64,969               | -43,565       |
| Jan-16      | 18,877              | 113,917              | -95,040       | 18,877              | 113,917              | -95,040       | 18,877              | 64,969               | -46,091       | 18,877              | 64,969               | -46,091       |
| Feb-16      | 22,232              | 111,775              | -89,542       | 22,232              | 111,775              | -89,542       | 22,232              | 68,117               | -45,885       | 22,232              | 68,117               | -45,885       |
| Mar-16      | 23,459              | 119,489              | -95,978       | 23,459              | 119,489              | -95,978       | 23,459              | 68,117               | -44,658       | 23,459              | 68,117               | -44,658       |
| Apr-16      | 22,361              | 114,558              | -92,177       | 22,361              | 114,558              | -92,177       | 22,361              | 65,322               | -42,961       | 22,361              | 65,322               | -42,961       |
| May-16      | 24,316              | 121,469              | -97,153       | 24,316              | 121,469              | -97,153       | 24,316              | 69,272               | -44,959       | 24,316              | 69,272               | -44,959       |
| Jun-16      | 22,718              | 117,522              | -94,804       | 22,718              | 117,522              | -94,804       | 22,718              | 67,024               | -44,306       | 22,718              | 67,024               | -44,306       |
| Jul-16      | 21,619              | 117,106              | -95,486       | 21,619              | 117,106              | -95,486       | 21,619              | 66,704               | -45,085       | 21,619              | 66,704               | -45,085       |
| Aug-16      | 22,039              | 115,751              | -93,712       | 22,039              | 115,751              | -93,712       | 22,039              | 66,014               | -43,975       | 22,039              | 66,014               | -43,975       |
| Sep-16      | 22,274              | 115,814              | -93,540       | 22,274              | 115,814              | -93,540       | 22,274              | 66,050               | -43,776       | 22,274              | 66,050               | -43,776       |
| Oct-16      | 22,887              | 121,611              | -98,723       | 22,887              | 121,611              | -98,723       | 22,887              | 69,356               | -46,469       | 22,887              | 69,356               | -46,469       |
| Nov-16      | 21,174              | 109,729              | -88,555       | 21,174              | 109,729              | -88,555       | 21,174              | 62,580               | -41,406       | 21,174              | 62,580               | -41,406       |
| Dec-16      | 23,368              | 108,327              | -84,959       | 23,368              | 108,327              | -84,959       | 23,368              | 61,780               | -39,412       | 23,368              | 61,780               | -39,412       |
| Grand Total | 462,351             | 3,041,783            | -2,579,432    | 462,351             | 3,041,783            | -2,579,432    | 462,351             | 1,734,767            | -1,272,416    | 462,351             | 1,734,767            | -1,272,416    |

| Scenario 3 |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|---------------------|----------------------|---------------|
| 0.19       |                     |                      |               |                     |                      | 0.365         |                     |                      |               |                     |                      |               |
|            |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|            |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
|            |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
| Month      | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss | Total Inbound (M2F) | Total Outbound (F2M) | Net Gain/Loss |
|            |                     |                      |               |                     |                      |               |                     |                      |               |                     |                      |               |
| May-14     | 4,309               | 60,480               | -56,170       | 4,309               | 60,480               | -56,170       | 4,309               | 53,115               | -49,527       | 4,309               | 53,115               | -49,527       |
| Jun-14     | 3,589               | 53,115               | -49,527       | 3,589               | 53,115               | -49,527       | 3,589               | 53,222               | -49,646       | 3,589               | 53,222               | -49,646       |
| Jul-14     | 3,576               | 53,222               | -49,646       | 3,576               | 53,222               | -49,646       | 3,576               | 50,843               | -47,464       | 3,576               | 50,843               | -47,464       |
| Aug-14     | 3,379               | 50,843               | -47,464       | 3,379               | 50,843               | -47,464       | 3,379               | 47,814               | -44,405       | 3,379               | 47,814               | -44,405       |
| Sep-14     | 3,410               | 47,814               | -44,405       | 3,410               | 47,814               | -44,405       | 3,410               | 42,436               | -39,079       | 3,410               | 42,436               | -39,079       |
| Oct-14     | 3,357               | 42,436               | -39,079       | 3,357               | 42,436               | -39,079       | 3,357               | 29,251               | -26,524       | 3,357               | 29,251               | -26,524       |
| Nov-14     | 2,728               | 29,251               | -26,524       | 2,728               | 29,251               | -26,524       | 2,728               | 29,251               | -26,524       | 2,728               | 29,251               | -26,524       |
| Dec-14     | 3,662               | 39,176               | -35,514       | 3,662               | 39,176               | -35,514       | 3,662               | 39,176               | -35,514       | 3,662               | 39,176               | -35,514       |
| Jan-15     | 6,640               | 40,728               | -34,088       | 6,640               | 40,728               | -34,088       | 6,640               | 40,728               | -34,088       | 6,640               | 40,728               | -34,088       |
| Feb-15     | 8,675               | 39,767               | -27,288       | 8,675               | 39,767               | -27,288       | 8,675               | 39,767               | -27,288       | 8,675               | 39,767               | -27,288       |
| Mar-15     | 11,918              | 44,943               | -33,026       | 11,918              | 44,943               | -33,026       | 11,918              | 44,943               | -33,026       | 11,918              | 44,943               | -33,026       |
| Apr-15     | 12,681              | 44,190               | -31,509       | 12,681              | 44,190               | -31,509       | 12,681              | 44,190               | -31,509       | 12,681              | 44,190               | -31,509       |
| May-15     | 12,703              | 44,117               | -31,414       | 12,703              | 44,117               | -31,414       | 12,703              | 44,117               | -31,414       | 12,703              | 44,117               | -31,414       |
| Jun-15     | 11,909              | 40,339               | -28,430       | 11,909              | 40,339               | -28,430       | 11,909              | 40,339               | -28,430       | 11,909              | 40,339               | -28,430       |
| Jul-15     | 11,355              | 39,718               | -28,363       | 11,355              | 39,718               | -28,363       | 11,355              | 39,718               | -28,363       | 11,355              | 39,718               | -28,363       |
| Aug-15     | 14,308              | 47,764               | -33,456       | 14,308              | 47,764               | -33,456       | 14,308              | 47,                  |               |                     |                      |               |

STCL SUBMISSION - ANNEXURE B

| Bemobile & STCL - interconnect minutes (M2M) |                                      |                                       |           |            |                                      |                                       |           |            |                                      |                                       |           |
|--|--------------------------------------|---------------------------------------|-----------|------------|--------------------------------------|---------------------------------------|-----------|------------|--------------------------------------|---------------------------------------|-----------|
| Current Rate                                 |                                      |                                       |           | Scenario 1 |                                      |                                       |           | Scenario 2 |                                      |                                       |           |
|  | Inbound (Bemobile to Bemobile - M2M) | Outbound (Bemobile to Bemobile - M2M) | Net       |            | Inbound (Bemobile to Bemobile - M2M) | Outbound (Bemobile to Bemobile - M2M) | Net       |            | Inbound (Bemobile to Bemobile - M2M) | Outbound (Bemobile to Bemobile - M2M) | Net       |
| Month  | Mins                                 | Total                                 | Gain/Loss | 0.24       | 0.1                                  | 0.05                                  | Gain/Loss | 0.1        | 0.05                                 | 0.05                                  | Gain/Loss |
| May-14                                       | 1,315,560                            | 1,977,351                             | -         | 313,734    | 197,735                              | 117,599                               | 32,698    | 313,556    | 98,866                               | 32,698                                | 56,779    |
| Jun-14                                       | 1,265,009                            | 1,917,034                             | -         | 304,562    | 185,463                              | 112,658                               | 33,220    | 312,507    | 98,562                               | 33,220                                | 66,501    |
| Jul-14                                       | 1,329,641                            | 1,954,654                             | -         | 318,416    | 197,039                              | 123,548                               | 32,874    | 312,954    | 97,400                               | 32,874                                | 65,672    |
| Aug-14                                       | 1,314,231                            | 1,970,991                             | -         | 322,976    | 183,813                              | 128,174                               | 37,173    | 314,423    | 97,354                               | 37,173                                | 65,028    |
| Sep-14                                       | 1,345,731                            | 1,948,071                             | -         | 346,582    | 194,708                              | 132,633                               | 17,881    | 344,563    | 97,354                               | 17,881                                | 50,145    |
| Oct-14                                       | 1,451,000                            | 2,285,026                             | -         | 318,318    | 229,503                              | 188,816                               | 12,604    | 314,563    | 114,751                              | 37,086                                | 66,507    |
| Nov-14                                       | 1,407,000                            | 2,027,027                             | -         | 337,680    | 207,207                              | 130,473                               | 34,617    | 340,700    | 103,604                              | 34,617                                | 66,507    |
| Dec-14                                       | 1,431,694                            | 1,951,046                             | -         | 1,731,129  | 173,113                              | 108,894                               | 434,189   | 1,456,624  | 113,113                              | 281,057                               | 86,566    |
| Jan-15                                       | 4,341,694                            | 1,731,129                             | -         | 1,042,007  | 191,698                              | 88,556                                | 413,922   | 486,624    | 165,405                              | 391,220                               | 165,610   |
| Feb-15                                       | 4,966,243                            | 1,654,046                             | -         | 1,191,898  | 180,837                              | 121,967                               | 489,122   | 583,541    | 186,937                              | 402,704                               | 181,988   |
| Mar-15                                       | 5,835,411                            | 1,808,372                             | -         | 1,893,155  | 166,791                              | 120,364                               | 590,481   | 1,861,971  | 153,718                              | 290,241                               | 196,844   |
| Apr-15                                       | 5,804,811                            | 1,867,911                             | -         | 1,933,155  | 178,797                              | 120,564                               | 590,481   | 1,861,971  | 153,718                              | 290,241                               | 196,844   |
| May-15                                       | 4,988,126                            | 2,714,357                             | -         | 1,197,150  | 271,436                              | 92,574                                | 363,055   | 1,197,150  | 271,436                              | 227,377                               | 135,718   |
| Jun-15                                       | 4,988,126                            | 2,714,357                             | -         | 1,197,150  | 271,436                              | 92,574                                | 363,055   | 1,197,150  | 271,436                              | 227,377                               | 135,718   |
| Jul-15                                       | 4,988,126                            | 2,714,357                             | -         | 1,197,150  | 271,436                              | 92,574                                | 363,055   | 1,197,150  | 271,436                              | 227,377                               | 135,718   |
| Aug-15                                       | 4,988,126                            | 2,714,357                             | -         | 1,197,150  | 271,436                              | 92,574                                | 363,055   | 1,197,150  | 271,436                              | 227,377                               | 135,718   |
| Sep-15                                       | 4,988,126                            | 2,714,357                             | -         | 1,197,150  | 271,436                              | 92,574                                | 363,055   | 1,197,150  | 271,436                              | 227,377                               | 135,718   |
| Oct-15                                       | 8,203,082                            | 2,483,363                             | -         | 1,215,956  | 429,553                              | 766,403                               | 505,648   | 1,215,956  | 429,553                              | 505,648                               | 1,215,956 |
| Nov-15                                       | 8,203,082                            | 2,483,363                             | -         | 1,215,956  | 429,553                              | 766,403                               | 505,648   | 1,215,956  | 429,553                              | 505,648                               | 1,215,956 |
| Dec-15                                       | 10,370,871                           | 2,898,807                             | -         | 1,750,527  | 249,336                              | 1,501,191                             | 427,324   | 1,750,527  | 249,336                              | 1,501,191                             | 427,324   |
| Jan-16                                       | 10,478,531                           | 2,841,004                             | -         | 1,956,747  | 248,156                              | 1,720,584                             | 604,718   | 1,956,747  | 248,156                              | 1,720,584                             | 604,718   |
| Feb-16                                       | 9,077,029                            | 2,602,770                             | -         | 1,323,326  | 268,072                              | 2,053,452                             | 868,116   | 1,323,326  | 268,072                              | 2,053,452                             | 868,116   |
| Mar-16                                       | 10,461,095                           | 2,956,287                             | -         | 2,489,009  | 268,057                              | 2,192,952                             | 958,109   | 2,489,009  | 268,057                              | 2,192,952                             | 958,109   |
| Apr-16                                       | 9,572,074                            | 3,159,129                             | -         | 2,971,003  | 268,057                              | 2,192,952                             | 958,109   | 2,971,003  | 268,057                              | 2,192,952                             | 958,109   |
| May-16                                       | 9,793,945                            | 3,169,783                             | -         | 2,510,683  | 268,057                              | 2,192,952                             | 958,109   | 2,510,683  | 268,057                              | 2,192,952                             | 958,109   |
| Jun-16                                       | 9,599,258                            | 3,841,772                             | -         | 2,510,683  | 268,057                              | 2,192,952                             | 958,109   | 2,510,683  | 268,057                              | 2,192,952                             | 958,109   |
| Jul-16                                       | 9,887,585                            | 3,875,086                             | -         | 2,287,298  | 315,913                              | 1,981,385                             | 796,251   | 2,287,298  | 315,913                              | 1,981,385                             | 796,251   |
| Aug-16                                       | 10,491,799                           | 3,674,822                             | -         | 2,361,563  | 316,068                              | 1,986,844                             | 821,942   | 2,361,563  | 316,068                              | 1,986,844                             | 821,942   |
| Sep-16                                       | 8,643,102                            | 3,913,583                             | -         | 2,303,822  | 316,068                              | 1,986,844                             | 821,942   | 2,303,822  | 316,068                              | 1,986,844                             | 821,942   |
| Oct-16                                       | 8,470,916                            | 4,059,583                             | -         | 3,841,772  | 384,177                              | 1,988,944                             | 192,089   | 3,841,772  | 384,177                              | 1,988,944                             | 192,089   |
| Nov-16                                       | 7,418,263                            | 4,059,583                             | -         | 2,518,032  | 387,509                              | 1,712,582                             | 855,426   | 2,518,032  | 387,509                              | 1,712,582                             | 855,426   |
| Dec-16                                       | 11,168,749                           | 3,674,822                             | -         | 2,074,345  | 361,762                              | 1,712,582                             | 855,426   | 2,074,345  | 361,762                              | 1,712,582                             | 855,426   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 2,033,020  | 376,459                              | 1,656,580                             | 88,872    | 2,033,020  | 376,459                              | 1,656,580                             | 88,872    |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   | 4,059,583  | 1,869,119                            | 1,477,761                             | 563,121   |
| Grand Total                                  | 7,418,263                            | 3,913,583                             | -         | 4,059,     |                                      |                                       |           |            |                                      |                                       |           |

*ANNEXURE C*

Interconnect Voice Calls – Noise Issue  
Between

SOLOMON TELEKOM COMPANY LIMITED

&

BEMOBILE VODAFONE (SOLOMON ISLANDS)  
LIMITED

**Report Compiled by: Solomon Telekom Company Limited Mobile Core Team.**

**Date: 26<sup>th</sup> December 2016**



## **Summary**

This report outlines the investigation done by Solomon Telekom Company Limited Mobile Core Team to find and verify the noise issue on voice calls between Solomon Telekom Company Limited and Bemobile Vodafone of Solomon Islands.

Noise issue is one of the critical issues experienced on the interconnection link. According to Bemobile Vodafone Report, it stated that the noise is from Solomon Telekom Mobile Network. Hence, to prove this, Solomon Telekom Company Limited gathered a team of Engineers from its own Mobile Core Platform to do necessary investigations and thorough testing on the interconnection link. The team gathered many relevant information with the help from Huawei Technical Support Team (TAC). The result of the investigation is outlined in this report.

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## Introduction

The setup of the interconnection link on Solomon Telekom Company Limited side is very simple. It is referred to as a signalling link. All configurations are done in UMG, the components are: link number, link name, board numbers, channel and interface type. Solomon Telekom configured five links for the interconnection between Solomon Telekom and Bemobile Vodafone. All of the 5 links are active and carrying heavy traffic (highlighted in yellow). The setup is outlined below:

| List MTP2 | signalling link  |                   |               |               |            |                      |                     |
|-----------|------------------|-------------------|---------------|---------------|------------|----------------------|---------------------|
| Link No.  | Link name        | Link type         | SPF board No. | Sub-board No. | Channel ID | Interface board type | Interface board No. |
| 0         | HON_BSC_01_0     | MTP2_64K_FOR_M2UA | 0             | 0             | 0          | E32                  | 1                   |
| 1         | HON_BSC_01_1     | MTP2_64K_FOR_M2UA | 0             | 0             | 1          | E32                  | 1                   |
| 2         | HON_BSC_01_2     | MTP2_64K_FOR_M2UA | 0             | 0             | 2          | E32                  | 1                   |
| 3         | HON_BSC_01_3     | MTP2_64K_FOR_M2UA | 0             | 0             | 3          | E32                  | 1                   |
| 4         | HON_BSC_01_4     | MTP2_64K_FOR_M2UA | 1             | 0             | 0          | E32                  | 5                   |
| 5         | HON_BSC_01_5     | MTP2_64K_FOR_M2UA | 1             | 0             | 1          | E32                  | 5                   |
| 6         | HON_BSC_01_6     | MTP2_64K_FOR_M2UA | 1             | 0             | 2          | E32                  | 5                   |
| 7         | HON_BSC_01_7     | MTP2_64K_FOR_M2UA | 1             | 0             | 3          | E32                  | 5                   |
| 8         | HON_BSC_01_8     | MTP2_64K_FOR_M2UA | 0             | 0             | 16         | E32                  | 3                   |
| 9         | HON_BSC_01_9     | MTP2_64K_FOR_M2UA | 0             | 0             | 17         | E32                  | 3                   |
| 11        | VMS_HON_1        | MTP2_64K_FOR_M2UA | 0             | 0             | 14         | E32                  | 1                   |
| 12        | VMS_HON_2        | MTP2_64K_FOR_M2UA | 1             | 0             | 12         | E32                  | 1                   |
| 13        | HONMSC_NGN_1     | MTP2_64K_FOR_M2UA | 0             | 0             | 6          | E32                  | 0                   |
| 14        | HONMSC_NGN_2     | MTP2_64K_FOR_M2UA | 1             | 0             | 4          | E32                  | 1                   |
| 16        | HON_BSC_01_16    | MTP2_64K_FOR_M2UA | 1             | 0             | 15         | E32                  | 3                   |
| 17        | HON_BSC_01_17    | MTP2_64K_FOR_M2UA | 1             | 0             | 16         | E32                  | 3                   |
| 18        | HON_BSC_01_18    | MTP2_64K_FOR_M2UA | 0             | 0             | 18         | E32                  | 4                   |
| 19        | HON_BSC_01_19    | MTP2_64K_FOR_M2UA | 0             | 0             | 19         | E32                  | 4                   |
| 21        | PSTN TEST_0      | MTP2_64K_FOR_M2UA | 0             | 0             | 5          | E32                  | 0                   |
| 22        | PSTN TEST_1      | MTP2_64K_FOR_M2UA | 0             | 0             | 13         | E32                  | 1                   |
| 24        | HON_BSC_01_24    | MTP2_64K_FOR_M2UA | 1             | 0             | 17         | E32                  | 4                   |
| 25        | HON_BSC_01_25    | MTP2_64K_FOR_M2UA | 1             | 0             | 18         | E32                  | 4                   |
| 31        | IGW TEST_0       | MTP2_64K_FOR_M2UA | 0             | 0             | 4          | E32                  | 0                   |
| 32        | IGW TEST_1       | MTP2_64K_FOR_M2UA | 1             | 0             | 11         | E32                  | 2                   |
| 33        | REACH SCCP       | MTP2_64K_FOR_M2UA | 1             | 0             | 10         | E32                  | 0                   |
| 34        | optus sccp       | MTP2_64K_FOR_M2UA | 1             | 0             | 14         | E32                  | 0                   |
| 41        | Bemobile_0       | MTP2_64K_FOR_M2UA | 0             | 0             | 8          | E32                  | 2                   |
| 43        | Bemobile_2       | MTP2_64K_FOR_M2UA | 0             | 0             | 9          | E32                  | 5                   |
| 44        | Bemobile_3       | MTP2_64K_FOR_M2UA | 1             | 0             | 7          | E32                  | 5                   |
| 45        | Bemobile_4       | MTP2_64K_FOR_M2UA | 0             | 0             | 10         | E32                  | 2                   |
| 46        | Bemobile_5       | MTP2_64K_FOR_M2UA | 1             | 0             | 8          | E32                  | 5                   |
| 50        | ALTO_BSC_01_0    | MTP2_64K_FOR_M2UA | 0             | 0             | 12         | E32                  | 4                   |
| 51        | ALTO_BSC_01_1    | MTP2_64K_FOR_M2UA | 0             | 0             | 15         | E32                  | 4                   |
| 52        | ALTO_BSC_01_2    | MTP2_64K_FOR_M2UA | 1             | 0             | 6          | E32                  | 3                   |
| 53        | ALTO_BSC_01_3    | MTP2_64K_FOR_M2UA | 1             | 0             | 13         | E32                  | 3                   |
| 140       | HON_BSC_01_140   | MTP2_64K_FOR_M2UA | 0             | 0             | 7          | E32                  | 3                   |
| 141       | HON_BSC_01_141   | MTP2_64K_FOR_M2UA | 1             | 0             | 5          | E32                  | 4                   |
| 160       | IP ACCESS BSC_00 | MTP2_64K_FOR_M2UA | 0             | 0             | 11         | E32                  | 3                   |
| 161       | IP ACCESS BSC_01 | MTP2_64K_FOR_M2UA | 1             | 0             | 9          | E32                  | 3                   |

To find out the cause of the noise, Solomon Telekom Mobile Team decides to test each signalling link to verify and pinpoint which link is making the cracking noise. To do this, a basic setup was done in MSOFTX3000 and UMG tool kits to route test numbers into the required Bemobile Channels for testing purposes. Solomon Telekom Team produce the trace results and then sent to Huawei Experts for verification of each link type.

## Noise Issue – Tests and Results

Tests are mostly done on the application side, thus, no configuration changes on hardware side is required. When making voice calls, noise can be heard on the Telekom Side but not on the Bemobile Side; hence, an audio trace was captured on UMG and MSOFTX3000 simultaneously to find the real cause of the noise. To investigate more of this noise issue, Solomon Telekom Team draw up some valid questions to help them gather the relevant information. In doing this, it will help most in finding the real cause of the issue. The questions are outlined below:

- Since when the noise is occurring, is it after some operation at or on the interconnection link?
- What kind of noise is it and how long does the noise last, is it occurring repetitively until now?
- Does the wireless side network element NE also belong to Huawei, specify the product that is affected (base system controller BSC or radio network controller RNC or both)?
- What type of calls are affected (2G or 3G)?
- When do the noise occur, is it during alerting or call in progress?
- Does the noise cause the call to drop or it does not affect the signalling?
- Does media gateway (MGW) belongs to Huawei?
- Network topology of the interconnection link?

To answer the questions above, Solomon Telekom Mobile Team focused mainly on the universal media gateway UMG and mobile soft switch MSOFTX3000 applications. Most tests are done in the mentioned platforms. Call trace was captured in the MSOFTX3000 and an audio trace was recorded in the UMG tool kit. Trace results then sent to Huawei and results listed below.

The Simple setup is:

|←-----Telekom end-----→|

Telekom customer<->Transmission(microwave/satellite)<->Node/BTS/RNC/BSC<->Telekom MSC<->Telekom UMG/MGW<->BemobileRNC<->Bemobile customer

```
|<-----Bemobile end----->|
```

### Basic Test Scenario:

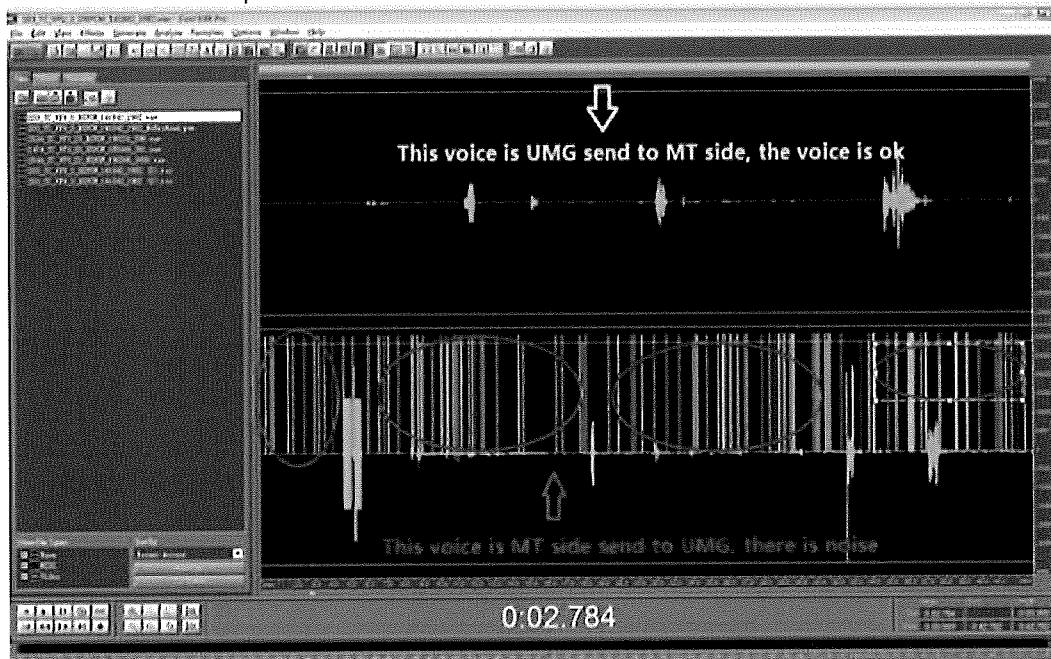
- If the mobile originating MO side and mobile terminating MT side are all in Telekom network, is there noise issue? No noise
- If the MO side and MT side are all in Bemobile network, is there noise issue? No.
- If the MO side is Telekom and MT side is Bemobile network, there is noise? YES

Noise exists when MO side is Solomon Telekom and MT side is Bemobile, hence, trace was required in:

- Master switch centre MSC user trace
- MGW full flow trace
- MGW record file trace

Solomon Telekom Team managed to capture the required trace and results outlined below:

- The call type is as below; from the UMG recording file, there is obvious noise in the voice which MT side (Bemobile) continuously sent to UMG side. Please refer to the below screenshot for the details of the source of the voice.
- MO side (Telekom)-----RNC----- (ATM) -----UMG----- (TDM) -----MT side(Bemobile)  
This issue needs the peer side to check it.



- From the noise type, it seems there are error bits in the TDM bearer. That is why the noise is continuous; to do this Solomon Telekom Team has to provide feedback Routine and Log files by UMG toolkits to Huawei Experts so that they could check whether there is error bit.
- Why noise is not heard on the MT side?  
In record file, from the voice UMG sent to MT side, the voice is clear, there is no noise in it, so MT side will hear the voice normally
- The noise can only be heard on the MO side. Is this because MT is creating/generating the noise?  
Yes, from the record file, MT side is sending the noise to UMG, and then UMG will send the noise to MO side, so MO side can hear the noise, this issue need to be checked by MT side (Bemobile Vodafone).

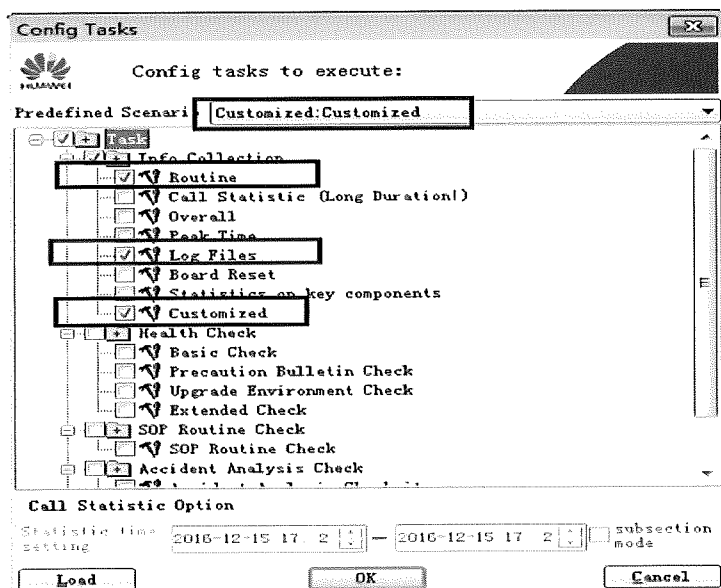
To go further on this investigation, Solomon Telekom Team gathered some valid log files and sent to Huawei to analyse, see result below:

- Logs received successfully and checked by Huawei Experts. From the alarm info, there are a lots of "Error bits" on these ports (**F2S0 port 20,21,22,23, F2S15 port 20, 21 , 22**). The error bits will trigger noise, hence, Huawei Expert Team concludes that the peer side (Bemobile) to check whether there is "Error bits" in these channels and solve it.

## Trace results

| A               | B          | C           | D            | E        | F                     | G           | H                             | I                   | J          | K             | L             | M                   | N             | O | P | Q | R |
|-----------------|------------|-------------|--------------|----------|-----------------------|-------------|-------------------------------|---------------------|------------|---------------|---------------|---------------------|---------------|---|---|---|---|
| Alarm Serial No | Alarm Type | Alarm Level | Alarm Origin | Alarm No | Network Manage serial | Sync serial | Alarm name                    | Alarm raised time   | Module No. | Location info | Cleared state | Cleared time        | Cleared state |   |   |   |   |
| 1610323         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320745      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610323       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610322         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320745      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610322       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610320         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320745      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610320       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610321         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320745      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610321       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610319         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320744      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610319       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610317         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320744      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610317       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610318         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320744      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610318       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610316         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320744      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610316       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610315         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320744      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610315       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610314         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610314       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610305         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610305       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610313         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610313       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610311         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610311       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610312         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610312       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610310         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320743      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610310       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610309         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320742      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610309       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610308         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320742      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610308       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610307         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320742      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610307       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610306         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 320742      | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610306       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610304         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 3207421     | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610304       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610298         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 3207419     | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610298       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610303         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 3207417     | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610303       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |
| 1610302         | Fault      | Warning     | UMG8900      | 2456     | Trunk                 | 3207415     | Signal deterioration of E1/T1 | 2016-12-15 17:21:51 | 1          | 1610302       | 1             | 2016-12-15 17:21:51 | 1             |   |   |   |   |

Procedure to collect Log files from the UMG tool kit.



Solomon Telekom Team with Huawei Experts therefore conclude the investigation because the above mentioned port is on UMG and UMG had received error bits coming from port. As such, the team does not know where the port is connected to and to which device on the peer side. It needs confirmation from the peer device and request the peer side to check why there are error bits which has led to this noise problem. This means bemobile must trace and locate the noise originating/initiating device because these devices from bemobile are sending noise back to the Solomon Telekom mobile caller.



## Conclusion

From the investigation, Telekom Mobile Network side is noise free, the noise is sent from the peer side (Bemobile). The noise is from Bemobile side. The error bits are received by these ports (**Frame2 Slot0 port 20,21,22,23, Frame2 Slot15 port 20, 21, 22**) at STL UMG. Therefore Bemobile needs to check and confirm which devices from their end are connected on these ports.

The aim of this report is to find out the source of the noise between the two competitors through the interconnect. Bemobile concluded that the noise comes from the STL as per their findings in the attached report "BM Noise Report.pdf". In the opinion of STL after an exhaustive test and trace tests from MO -> MT and MT-> MO, it was found that the noise did not originate from the the STL side of the towards the BM side either.

BM also concluded in the attached report that "BM Noise Report.pdf" that very high trunk utilization as a major issue leading to the saturation of the available capacity between the two networks. The main cause of the high trunk utilization in our opinion is due to the aggressive promotion of free mobile-to-mobile calls by the BMobile network which leads to high capacity demand on the STL network and free calls are being setup by the BMobile customers calling free into the STL mobile users.

## Recommendation:

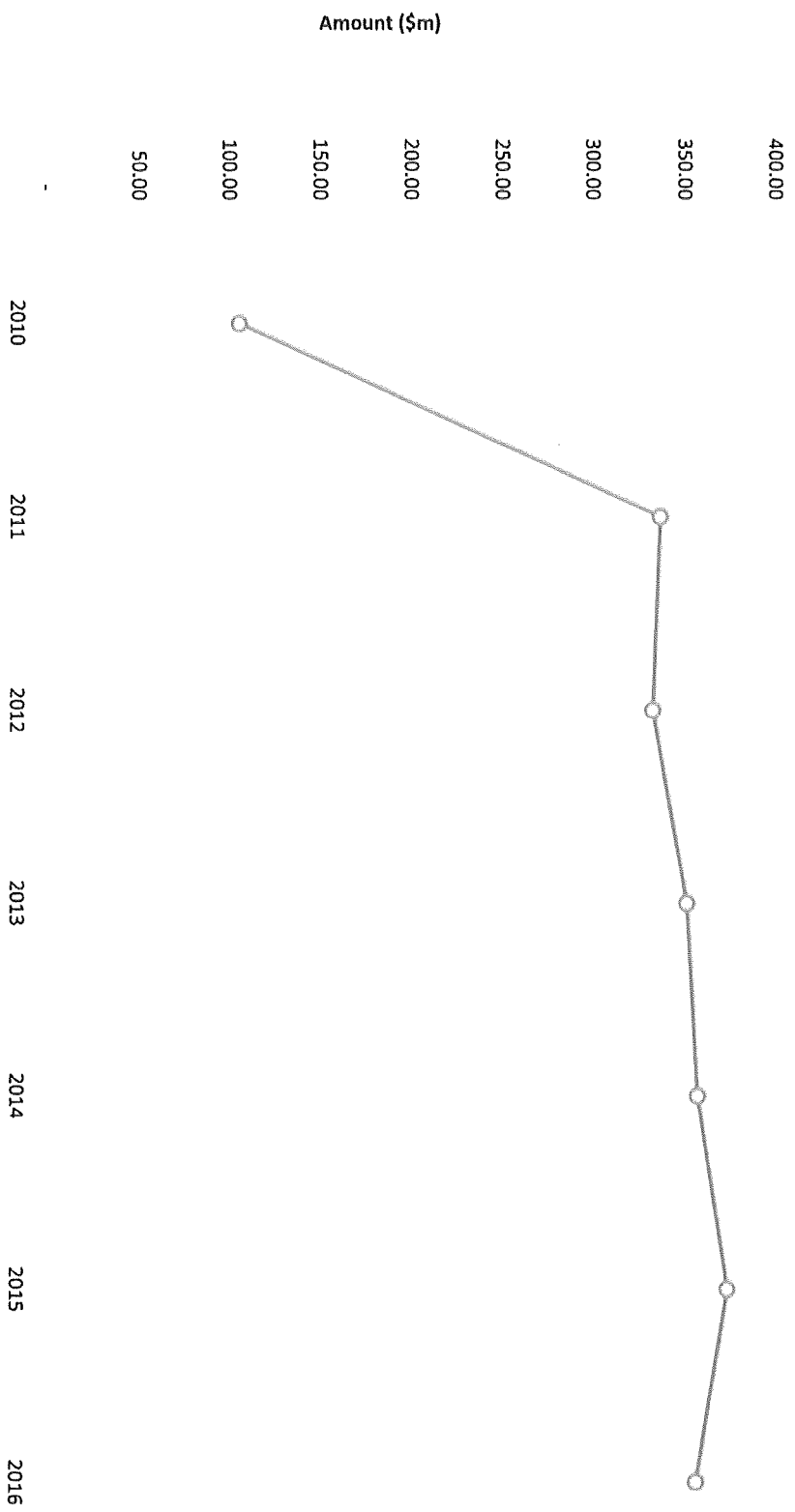
It is recommended that the BMobile and STL A-Interfaces be upgraded to IP interfaces (optical fiber) thereby bypassing the switch over from TDM -> IP and IP -> TDM in the cause of any calls originating and/or terminating in either network. This will also mitigate the capacity constraints that exist with TDM interfaces. The capacity can be increased with minimal voice call degradation as both operators will be using the same IP protocols for all call sessions.

**Referencing**  
HUAWEI-APTAC

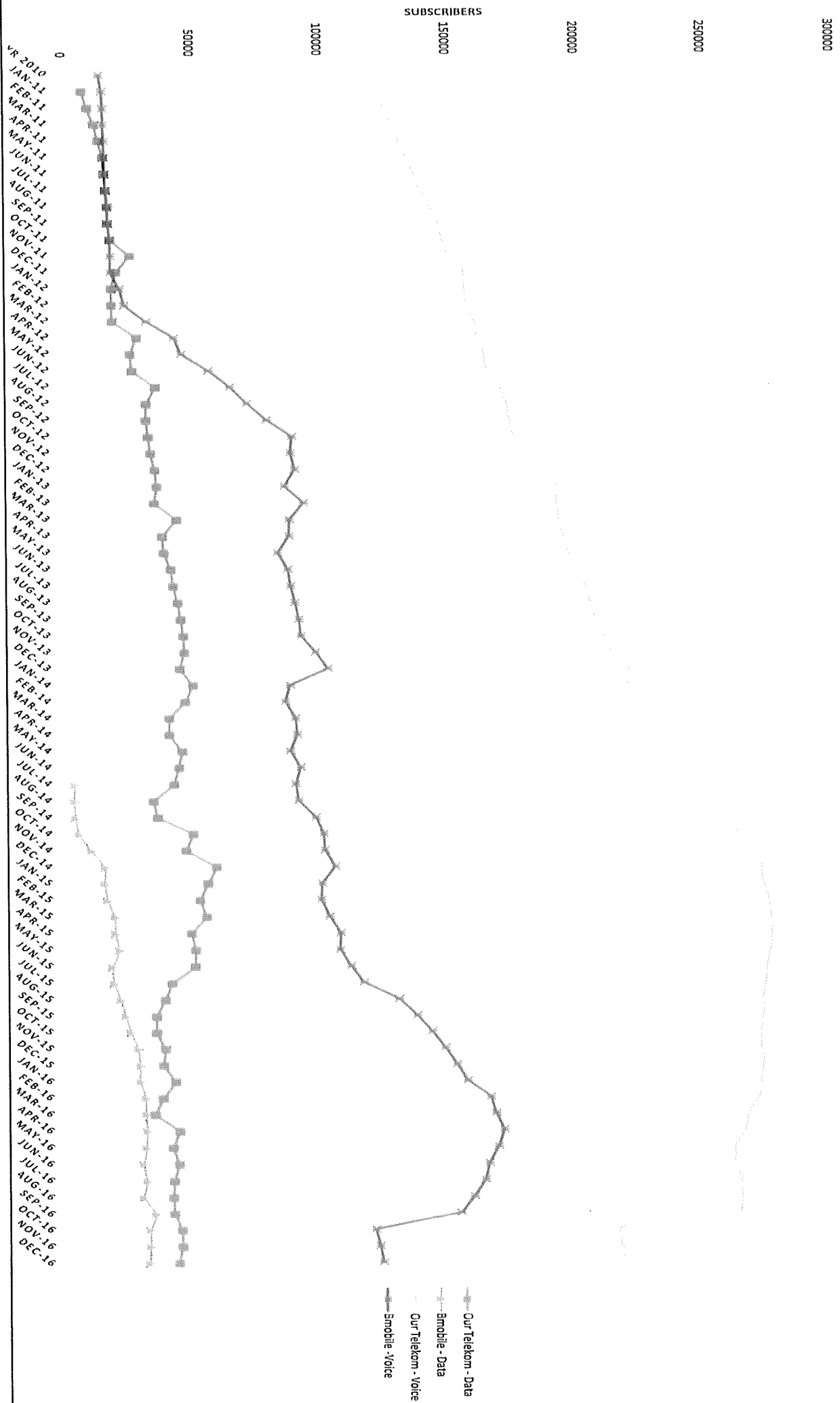
## **Schedule C**

[Market performance data]

### Total Revenue for Telecommunications sector



# TRENDS IN MOBILE VOICE & DATA SOLOMON ISLANDS 2010 - 2016



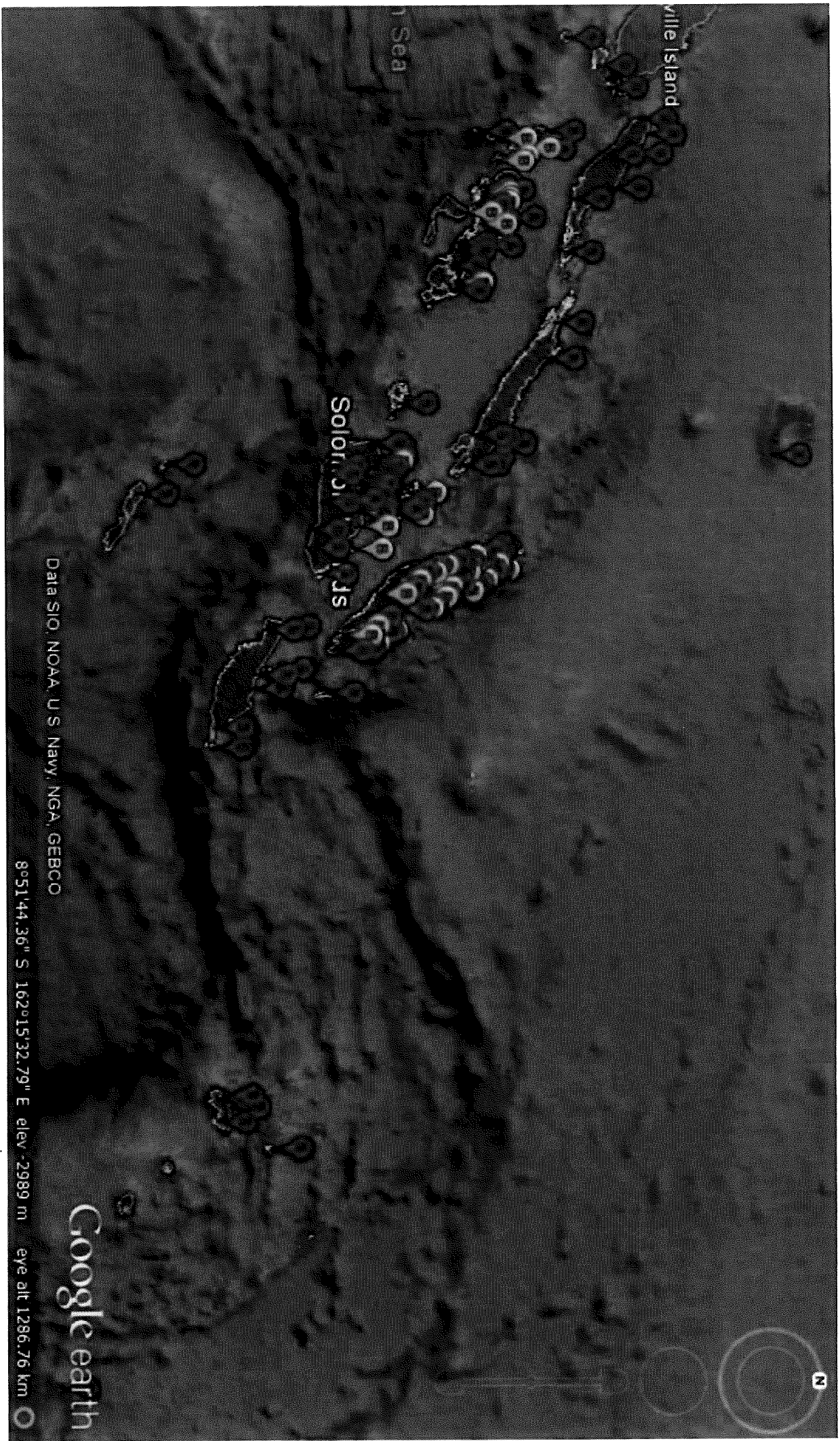
**Service Provider Tariffs**

| Mobile Network Services (National)          |                  |                |                     |                    |                     |                     |                    |      |             |      |
|---|------------------|----------------|---------------------|--------------------|---------------------|---------------------|--------------------|------|-------------|------|
|   | Mobile data /MB  | SMS on-net/min | SMS off-net per txt | M2M on-net per min | M2M off-net per min | M2F off-net per min | M2F on-net per min | MMS  | Video calls |      |
| 2017 Data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 | 1.00        | 0.50 |
|   | Bmobile Vodafone | 1.00           | 0.50                | 1.25               | 1.45                | 1.80                | 2.00               |      |             |      |
| 2016 Data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 | 1.00        | 0.50 |
|   | Bmobile Vodafone | 1.00           | 0.50                | 1.25               | 1.50                | 1.80                | 2.00               |      |             |      |
| 2015 Data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 | 1.00        | 0.50 |
|   | Bmobile Vodafone | 0.95           | 0.50                | 0.99               | 1.35                | 1.65                | 2.00               | -    | 1.49        | -    |
| 2014 data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 | 1.00        | 0.50 |
|   | Bmobile Vodafone | 0.95           | 0.50                | 0.99               | 1.30                | 1.65                | 2.00               | -    | 1.49        | -    |
| 2013 data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 | 1.50        | -    |
|   | Bernoble         | 1.10           | 0.50                | 0.99               | 1.30                | 1.62                | 1.80               |      | 1.49        |      |
| 2012 data                                   | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 |             |      |
|   | Bernoble         | 0.70           | 0.69                | 0.99               | 1.20                | 1.50                | 1.60               |      |             |      |
| 2011 data (New entrant)                     | Solomon Telekom  | 0.99           | 0.50                | 0.50               | 0.99                | 1.50                | 2.00               | 1.50 |             |      |
|   | Bernoble         | 0.70           | 0.69                | 0.99               | 1.20                | 1.50                | 1.60               |      |             |      |
| 2010 data                                   | Solomon Telekom  | 2.00           | 0.50                |                    | 1.50                | 1.50                | 2.00               | 2.00 |             |      |
|   | Bernoble         | 0.70           | 0.69                | 0.99               | 1.20                | 1.50                | 1.60               |      |             |      |
| Note: M2F-offnet refer interconnection rate |                  |                |                     |                    |                     |                     |                    |      |             |      |

Note: M2F-offnet refer interconnection rate

### Schedule D

[Mobile network deployment]



Solomon Islands

Solomon Sea

Solomon Islands

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

8°51'44.36" S 162°15'32.79" E elev -2989 m eye alt 1286.76 km

Google earth







