

5 July 2013

Australian Competition and Consumer Commission
mtasdeclarationinquiry@accc.gov.au

Review of the Declaration of the Domestic Mobile Terminating Access Service

Your Reference

Our Reference IP 071301

Macquarie Telecom Pty Limited ("**Macquarie**") welcomes the opportunity to make this submission to the Australian Competition and Consumer Commission ("**ACCC**") in response to the ACCC's discussion paper concerning the above.¹ Macquarie believes that the mobile terminating access service ("**MTAS**") should continue to be a service which is "declared" by the ACCC. This is because each mobile network operator ("**MNO**") has exclusive control of the access to end-users on its own network for the termination of voice calls and that if the MTAS was not declared there is a risk that an MNO could use its market power to set terms of access to its network which would be detrimental to competition.

Globally, communications markets have seen the rapid growth of wireless broadband networks including Internet Protocol ("**IP**") networks such as those utilising Long Term Evolution ("**LTE**") technology and the emergence of a range of so called over the top ("**OTT**") services. However, Macquarie submits that the time is not right to consider fundamental regulatory changes such as not re-declaring the MTAS. Such a decision would be high risk, jeopardising hard fought competitive gains in the both the fixed and mobile markets and would be adverse to the long term interests of end-users ("**LTIE**"). From Macquarie's research, globally no telecommunications regulator has formed a view that even with competition from OTT and other IP services, mobile terminating access is sufficiently competitive to warrant material changes to the regulatory regime for such access or indeed have set conditions for doing so in the future.

Macquarie would therefore contend that the declaration of MTAS for a further five years is in the LTIE because *inter alia*:

- in relation to fixed to mobile voice calls, circuit switching connectivity will continue for decades even assuming the deployment of the national broadband network ("**NBN**") by NBN Co in Australia;
- OTT and IP services are even more unlikely to be practical substitutes for fixed to mobile terminating access than for mobile to mobile terminating access;

¹ ACCC, Review of the declaration of the Domestic Mobile Terminating Access Service, Discussion Paper, May 2013 ("**Discussion Paper**")

- it is unlikely that 2G networks would be shut down before 2018, and may still be operating in 2020; and
- in Australia there is no explicit policy of 'net neutrality' or similar regulatory requirement imposed on MNOs to prevent discrimination either between traffic types or the origin of the IP traffic which is delivered to their network. This means even where there are possible IP technical solutions there is a possibility of discrimination or a differential grade/quality of service.

In relation to the specific scope of the MTAS service description, Macquarie considers that there are now compelling reasons for making two changes namely:

- (a) the inclusion of short message service ("**SMS**") and multimedia messaging service ("**MMS**"); and
- (b) the inclusion of international termination of roaming voice calls and SMS/MMS through a MNO's digital mobile network.

While the first issue is explored in the Discussion Paper, the second issue is somewhat new and necessitated by the MNOs pricing such services above their underlying cost and on unreasonable terms. Including the international termination of roaming voice calls and SMS/MMS within the scope of the declared MTAS service description would promote competition for those services and competition in downstream markets.

These reasons are elaborated upon together with Macquarie's detailed responses to the specific questions posed in the Discussion Paper in [Appendix A](#).

In conclusion, as each MNO continues to have a monopoly over the provision of services on its network and there are no practical substitutes for termination on a particular operator's network, creating an absolute barrier to entry, the continued declaration of the MTAS remains in the LTIE. The declaration of the MTAS continues to encourage the economically efficient use of, and investment in, infrastructure and does not permit MNOs to have the ability and incentive to set above cost MTAS prices.

Macquarie would be pleased to engage directly with the ACCC going forward to elaborate on its thinking on these important matters. Should you have any queries concerning this submission, please feel free to contact me.

Yours sincerely



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APPENDIX A

MACQUARIE RESPONSES TO SPECIFIC ACCC QUESTIONS IN THE DISCUSSION PAPER

In this Appendix, Macquarie has responded to each of the ACCC's questions as set out in the Discussion Paper. Macquarie is a mobile virtual network operator ("**MVNO**") providing mobile services to its customers on the networks operated by all three of Australia's MNOs, i.e., Telstra, SingTel Optus and Vodafone Hutchison Australia ("**VHA**"). As such, there is a practical limitation on the extent to which Macquarie is able to respond to some of these questions, as it is not a MNO.

Consultation Questions

1. Does each MNO continue to have a monopoly over the termination of voice calls on its network?

Yes absolutely. Each MNO has exclusive control of the access to end-users on its own network for the termination of voice calls (and SMS/MMS). While Macquarie notes that an end-user could be accessed via a VoIP service if the end-user's mobile device was connected to, for example, a Wi-Fi network it is not possible to do so where connectivity is provided over a mobile network unless a SIM is loaded in the end user's mobile device.²

2. Are there substitutes for the MTAS in the relevant markets?

Macquarie does not believe that there any effective substitutes for the MTAS. This follows from Macquarie's response to the previous question which notes that each MNO has exclusive control of the access to end-users on its own network for the termination of voice calls (and SMS/MMS). The alternatives for an A calling party who wishes to reach a B receiving party on a mobile network and avoid using the MTAS would appear to be:

- sending an email message;
- sending an SMS;
- calling via a VoIP service including utilising a so-called OTT³ service; and
- using a call-back arrangement.

If the B party's MNO were to increase significantly its charge for call termination, it would be likely that the A party would have an incentive to choose among these alternatives. Whether or not the A party would actually choose one or more of these alternatives would depend on whether it is practical and whether it would be cost effective. However, if the A party wishes to make a voice call to the B party's mobile service there is no other option to making use of the MTAS.

² The subscriber is identified by transmission of an International Mobile Subscriber Identity (IMSI) number, which is stored on the SIM card which corresponds to a domestic mobile number.

³ The classic definition of OTT is the distribution of products such as voice, messaging or video bypassing established mobile or fixed operator retail structuring of these products. An OTT application is any app or service that provides a product over a data channel and thereby disrupts traditional operator billing models.



3. How will LTE technology affect the termination of voice calls on a mobile network?

Macquarie understands that LTE technology⁴ will enable MNOs to provide a voice over LTE (“VoLTE”) service. LTE adopts an all-IP approach and as such only supports packet switched services, i.e., it does not support circuit switched voice services. This means that voice services are delivered as data flows. As VoLTE services are increasingly deployed, this should mean that the cost of terminating voice calls to mobile services will fall as the cost of termination as part of a broadband IP stream should be relatively low. That is, the mobile network costs attributable to the termination of circuit switched voice calls is falling as new investment in mobile networks is focused on the provision of data services. Macquarie notes recent media reports which indicate that, while Australia’s three MNOs have the required capability, none have deployed VoLTE services as yet.⁵

4. Are the markets defined in the 2009 Declaration Inquiry still appropriate for the MTAS? What other markets, if any, are appropriate?

Macquarie notes that the ACCC in its 2009 Declaration Inquiry identified three relevant markets:

- the wholesale market in which the MTAS is provided;
- the downstream retail mobile services market; and
- the downstream market for fixed to mobile services.

Macquarie considers that these markets remain appropriate for the MTAS. This is because the services provided in each market are sufficiently distinct, i.e., there are no effective substitutes for the services supplied in each of these markets. As noted elsewhere in this Appendix, Macquarie would contend that such markets include terminating access where the called Australian mobile customer is out of the country and roaming internationally.

5. How has the MTAS declaration impacted competition in each of the specific MTAS market as well as the two downstream markets identified in the 2009 Declaration Inquiry? Are there other developments or changes in these markets that make them more competitive than in 2009?

Macquarie believes that the MTAS declaration has had positive impacts on the markets identified in the 2009 Declaration Inquiry. In respect of the MTAS market, the declaration of the MTAS together with the MTAS FAD has reduced the MTAS charges from 9 cents per minute (“cpm”) to 3.6 cpm bringing them closer to underlying efficient cost. Moreover, the declaration of the MTAS has ensured that operators have access to the MTAS on regulated terms thereby removing the risk that an MNO could use its market power to set unreasonable terms of access for the MTAS.

⁴ This also includes its successor LTE-Advanced (“LTE-A”).

⁵ Communications Day, 11 June 2013, p. 4

Positive impacts have also occurred in respect of the downstream retail mobile services market and the downstream fixed to mobile services market. As noted in the Discussion Paper, the retail prices for mobile services have continued to fall.⁶ Macquarie submits that lower wholesale MTAS prices arising from the MTAS declaration has resulted in these lower retail prices as operators have passed-on cost savings. The Discussion Paper also notes that the volume of mobile voice call minutes has increased.⁷ Macquarie submits that the increase in call minutes indicates a stimulus to sector activity and thereby the achievement of economies of scale which can be attributed to the declaration of the MTAS.

6. How does the take-up of VoIP affect each of the markets identified in the 2009 Declaration Inquiry?

As noted in Macquarie's response to question 4 above, the ACCC in its 2009 Declaration Inquiry identified three relevant markets. Macquarie's view on the likely impact of the take-up of VoIP services on each of those markets is detailed in [Exhibit A.1](#) below.

Exhibit A.1: Likely impact on ACCC identified markets from increase in VoIP adoption

Market	Likely Impact
MTAS	<p>While the increased adoption of VoIP services will increase competition in the retail market for voice calls between mobiles, in the wholesale MTAS market there will be little change. Certainly the wholesale MTAS market will not be effectively competitive. This is because each MNO will continue to have exclusive control of the access to end-users on its own network for the termination of:</p> <ul style="list-style-type: none"> • Circuit switched voice calls; • SMS/MMS where both end users were not utilising the same VoIP or OTT app; and • IP switched voice calls (and SMS/MMS) where both the calling and called party were not utilising the same VoIP or OTT app (there is currently no cross-platform connectivity between different OTT apps making each OTT service an island). <p>While Macquarie notes that an end-user could be accessed via a VoIP service if the end-user's mobile device was connected to, for example, a Wi-Fi network it is not possible to do so where connectivity is provided over a digital mobile network unless a SIM is loaded in the end user's mobile device. However, being able to effectively make a call only when an end-user is connected to Wi-Fi network is not an effective substitute nor does it provide any-to-any connectivity.</p>
Downstream retail mobile services	<p>While the increased adoption of VoIP services will increase competition in the retail market for voice calls between mobile end-users, the lack of cross-platform connectivity means that two people must have the app installed on their mobile device in order to converse with one another. Some VoIP apps (e.g., iMessage/FaceTime) are limited to the operating system of the mobile device while others such as Viber, Skype etc work on multiple mobile device operating systems (e.g., iOS, Android, Windows Mobile etc).</p>
Downstream fixed to mobile services	<p>VoIP applications such as Skype, Viber etc do have desktop applications which would permit fixed to mobile calls. However, such calling forms are unlikely to form a significant proportion of fixed to mobile traffic volumes. It remains the case that a declared MTAS is needed to ensure that a provider of fixed to mobile services is able to access mobile termination on reasonable terms. A continued declaration is likely to promote competition in the fixed to mobile services market.</p>

Source: Windsor Place Consulting analysis

⁶ Discussion Paper, p. 15

⁷ *ibid*, p. 11

7. Is the continuing declaration of MTAS necessary to ensure any-to-any connectivity? How would any-to-any connectivity be achieved in the absence of declaration?

Any-to-any connectivity is a concept by which customers of any network can make (and receive) calls to (and from) any other network. Macquarie agrees with the ACCC's view arising from its 2009 Declaration Inquiry. That is, that the continued declaration of the MTAS together with MTAS FAD would promote any-to-any connectivity by preventing new entrants and small operators from being refused access to the MTAS of other operators. Macquarie is also of the view that the continued declaration of the MTAS would remove the risk that an MNO could use its market power to refuse access to, or set unreasonable terms of access for, the MTAS.

8. What has been the level and type of investment in mobile infrastructure since 2009?

Macquarie is not in a position to respond to this question.

9. How does declaration of the MTAS affect investment in 2G, 3G and LTE networks?

Macquarie is strongly of the view that the continued declaration of the MTAS will have no impact or a *de minimis* impact on investment in 2G, 3G and LTE networks. This is because no future investment is needed to provide additional coverage for voice calls or to cater for the expected growth in voice calls.

Outside of normal maintenance the announced investments of the major cellular operators are solely focussed on the provision for wireless data services including extensive deployments of 3G+ (HSPA) and LTE. Macquarie notes that such is the focus on the latter that for example, Telstra has recently stated in an industry forum that it will no longer make 3G investments and that all future growth will be LTE.⁸ Its other competitors, SingTel Optus and just recently VHA are also focused on wireless data centric deployments of 3G+ and LTE infrastructure.

10. What network sharing is currently taking place and/or planned? How does the declaration of MTAS promote the efficient use of and investment in infrastructure that is part of a shared network arrangement?

Macquarie is not in a position to comment on the extent to which network infrastructure sharing is taking place or is planned.

⁸ Comments from Mike Wright of Telstra at the Public Policy Forum of the GSMA Mobile Asia in Shanghai 27 June 2013. By June 2013, Telstra had deployed some 1,500 + LTE base stations providing 4G/LTE services to two-thirds of the Australian population.

Macquarie considers that the declaration of the MTAS together with the MTAS FAD promotes the efficient use of investment in infrastructure through driving MTAS prices closer to underlying efficient costs. The MTAS declaration through removing an opportunity for MNOs to generate excessive revenue, applies pressure to MNOs to seek operational cost savings in other areas such as that which can be achieved through network infrastructure sharing.

11. What would be the impact on competition in each of the markets identified in the 2009 Declaration Inquiry if the MTAS declaration were revoked or left to expire?

Macquarie is of the view that if the MTAS declaration were revoked or left to expire, the impact on competition in each of the markets identified in the 2009 Declaration Inquiry would essentially be a reversal of the positive effects on these markets as discussed in Macquarie's response to question 5. The following exhibit summarises the impact on competition in each of the markets if the MTAS declaration were revoked or left to expire.

Exhibit A.2: Market Impact if MTAS Declaration was Revoked or Left to Expire

Market	Likely Impact
MTAS	<ul style="list-style-type: none"> Removes mechanism to drive lower MTAS prices Opens up possibility for some MNOs to increase prices Opens up possibility for some MNOs to offer MTAS on unreasonable terms
Downstream retail mobile services	<ul style="list-style-type: none"> Removes mechanism to drive lower retail prices Removes stimulus to sector activity and economies of scale
Downstream fixed to mobile services	<ul style="list-style-type: none"> Removes mechanism to drive lower retail prices Removes stimulus to sector activity and economies of scale

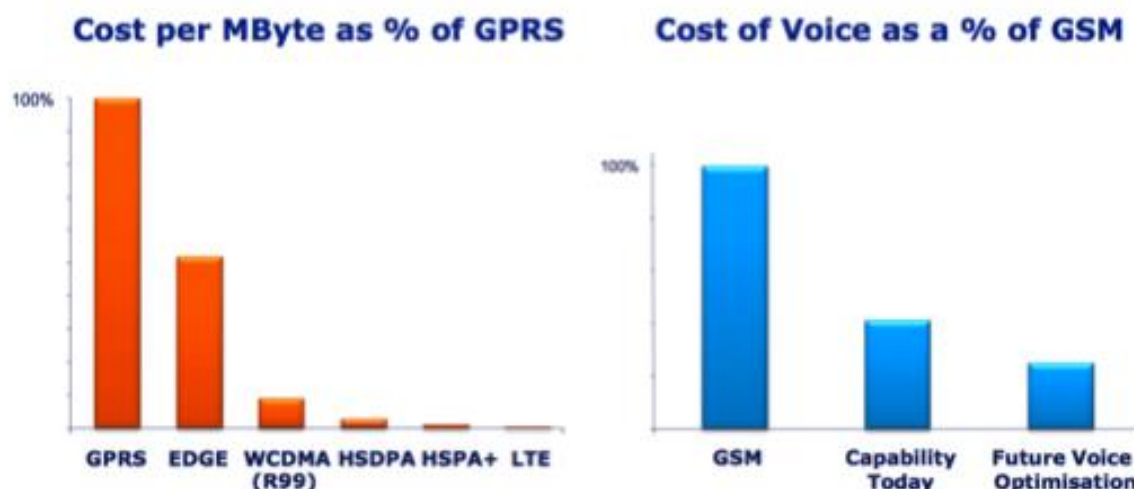
Source: Macquarie analysis

12. Would MTAS prices be above the cost of production or access to the MTAS not be provided on reasonable terms in the absence of declaration?

Macquarie believes that MTAS prices even at their lowest regulated rate under the MTAS FAD, i.e., 3.6 cpm with effect from 1 January 2014, are already above their efficient cost and will be in order of magnitudes above such costs in an IP/LTE environment as highlighted in Exhibit A.3 from Telstra below.

Significant reductions in the MTAS prices have been achieved through the process of regulation. As noted in its responses to other questions, Macquarie believes that in the absence of declaration together with the setting of regulated terms of access, there would no longer be a mechanism to drive MTAS prices closer to their underlying efficient cost. Moreover, Macquarie considers there to be a risk that in the absence of declaration, an MNO could use its market power to set unreasonable terms of access for the MTAS.

Exhibit A.3 Telstra comparison of voice and data as a percentage of GSM costs



Note: Telstra derived relative Wireless network unit costs

Source: *Spectrum and the Business Case for Mobile Broadband Mobile Asia Congress*, November 2009, Dr. Tony Warren, Telstra.

13. Should SMS or MMS services be covered by the MTAS service description?

Macquarie notes that SMS and MMS services are not currently covered by the MTAS service description and that the question of whether the MTAS service description should be expanded to cover such services has previously been raised by the ACCC. In the past, Macquarie has not held concerns with the MTAS service description and did not believe that it should be changed to cover SMS and / or MMS services.

However, it is now evident that while commercially agreed rates for the MTAS have fallen following the MTAS FAD, commercial wholesale rates for SMS and MMS have not fallen. Macquarie considers that the wholesale rates for these services are grossly excessive (see further discussion in Macquarie's responses to questions 15 and 18). Accordingly, Macquarie considers that there is merit in the ACCC having oversight of the SMS and MMS and supports these services being covered by the MTAS service description as this would be conducive to reducing the level of wholesale charges with a flow-on impact on retail charges.

Likewise Macquarie now considers that it is appropriate that the MTAS service description should also be amended so as to include international termination of roaming voice calls and SMS/MMS within its scope. Similar to the domestic termination of voice calls the MNO has exclusive control of the access to its end-users for the termination of roaming voice calls (which are all routed through its network to such end-users). The current wholesale pricing of such roaming services which forms an integral part of the service offered by Macquarie as an MVNO (and sought by business retail customers) are above their underlying cost and on unreasonable terms.⁹ Macquarie considers that the MNOs are using their market power to set terms of access to such services in a way which is detrimental to competition.

⁹ As well as being generally much higher than their underlying provisioning cost, wholesale inter-carrier roaming charges which are typically set in USD or SDRs have not fallen even with the overall rise in the exchange rate of the AUD.

14. Does the provision of SMS or MMS have similar bottleneck characteristics to the provision of mobile voice calls? If not, how are they different to the provision of voice calls?

Macquarie considers that the provision of SMS or MMS does have similar bottleneck characteristics to the provision of mobile voice calls. That is, each MNO has exclusive control of the access to end-users on its own network for the termination of SMS and MMS. This suggests that there is a strong case for arguing that such services should be declared as part of the MTAS or separately. As noted in its response to the previous question, Macquarie considers that the commercial rates for SMS and MMS are excessive and would welcome ACCC oversight of the SMS and MMS and supports these services being covered by the MTAS service description.

15. How are SMS and/or MMS interconnection arrangements, including any charges paid for terminating on a mobile network, currently structured and negotiated?

Macquarie's experience concerning this question is limited to the extent that it is simply a buyer of wholesale SMS and MMS services. Wholesale charges for these services are structured on the basis of a per unit charge.

[CIC]

16. Are data based messaging services, such as over the top messaging applications effective substitute services for SMS or MMS services?

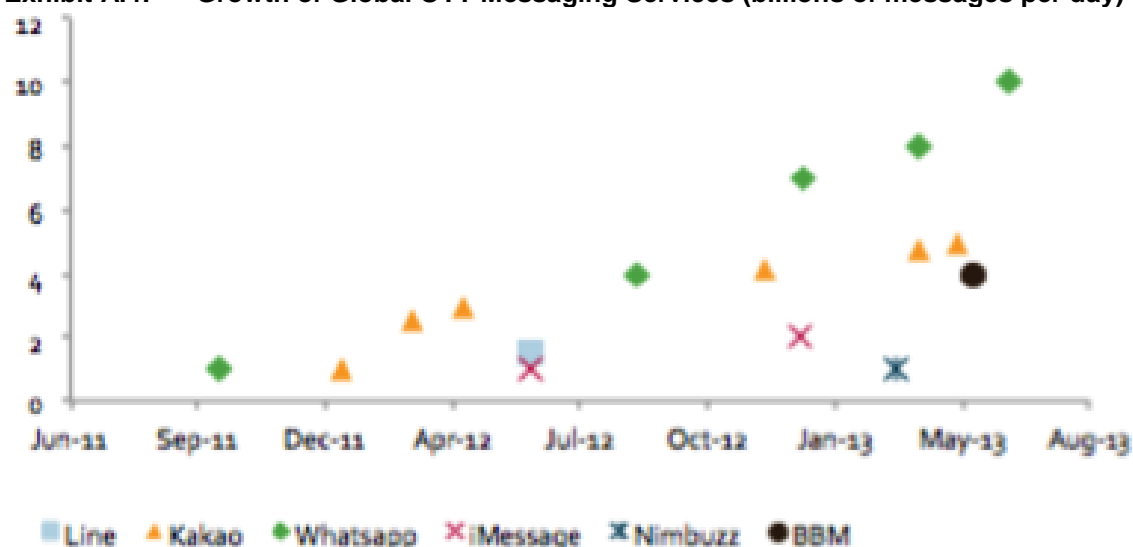
From Macquarie's perspective data based OTT messaging services are but a partial substitute for SMS/MMS services even though they are growing rapidly (as shown in Exhibit A.4 below) and they now form half of global messaging. Data based messaging services are only partial substitutes for SMS/MMS services for a number of reasons including *inter alia*:

- The SMS system is ubiquitous and is the fallback delivery technology if OTT style services do not work, e.g., in the case of iMessage on IOS devices. OTT services also require a smartphone and current estimates are that smartphone penetration will only be 80 *per cent* in Australia in 2017¹⁰ meaning that even by this date 20 *per cent* of Australian mobile users will be relying upon standard SMS;

¹⁰ See eMarketer, 29 May 2013. Available at www.emarketer.com/Article/Smartphone-Adoption-Tips-Past-50-Major-Markets-Worldwide/1009923

- The use of OTT messaging requires pre-enrolment in the service, which is not the case with SMS/MMS which forms part of the GSM/WCDMA standard. Importantly, there are a large number of OTT messaging service platforms of which the largest in Australia are likely to be Whatsapp, iMessage and Blackberry Messaging. However, there are no service gateways between such services, meaning that signing up to an OTT service offering only provides functionality for that OTT service and not all OTT messaging services; and
- OTT messaging does not and cannot take the place of emergency mobile SMS alerts. This system sends voice messages to landlines and text messages to mobile phones within a defined area, about likely or actual emergencies such as fire, flood, or extreme weather events. Refer to www.emergencyalert.gov.au.

Exhibit A.4: Growth of Global OTT Messaging Services (billions of messages per day)



Source: Enders Analysis, 2013

17. How is SMS originated, interconnected and terminated over 2G, 3G and 4G networks? How is MMS sent over these networks?

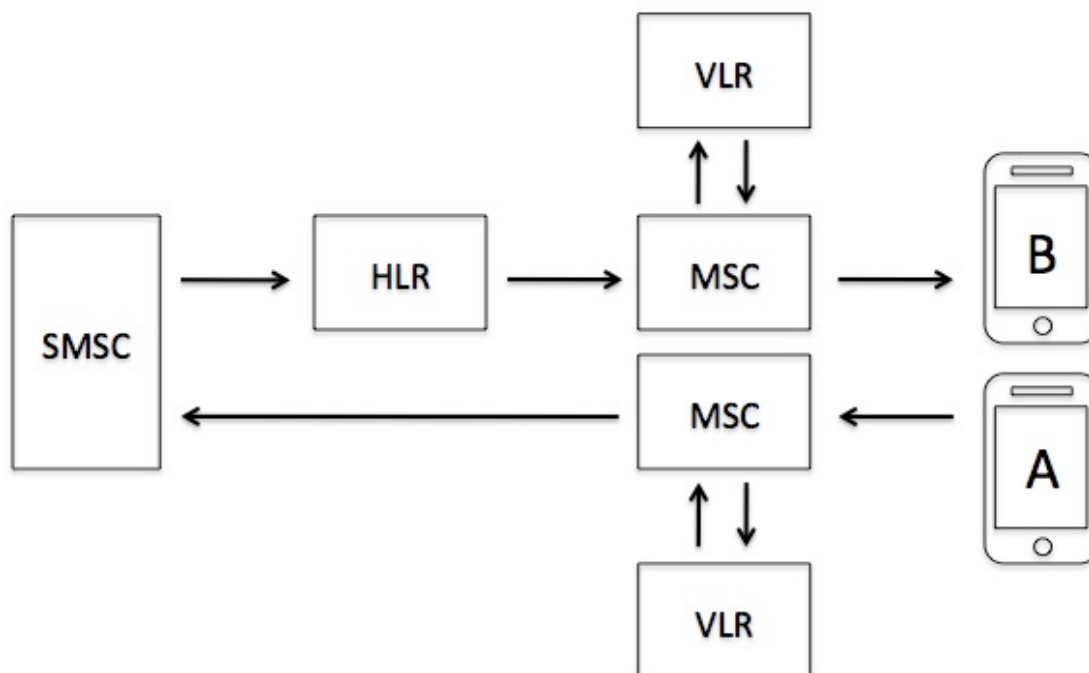
While the MNOs are better placed than Macquarie to describe how SMS and MMS are originated, interconnected and terminated over their 2G, 3G and 4G networks in Australia, Macquarie would note that the applicable standard is the 3GPP TS 23.040 version 11.5.0 Release 11.¹¹

SMS utilises a control channel on mobile networks that was used only for communicating reception strength and information about incoming calls as the pathway for short messages that are a maximum of 160 characters. A simplified version of how SMS are originated and terminated is depicted below (see [Exhibit A.5](#)).

¹¹ Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of the Short Message Service (SMS) (3GPP TS 23.040 version 11.5.0 Release 11). ETSI TS 123 040 V11.5.0 (2013-04)



Exhibit A.5: Simplified transmission of an SMS over a mobile network¹²



When party A sends an SMS to party B, the transmission occurs as shown in [Exhibit A.3](#) above. The Mobile Switching Center (“**MSC**”) is responsible for routing both voice telephone calls and SMS texts and the Visitor Location Register (“**VLR**”) is a database that temporarily stores information about subscribers that have roamed into its jurisdiction, including the subscriber's identity number (“**IMSI**”), phone number (“**MSISDN**”), mobile station roaming number (“**MSRN**”), authentication data, and Home Location Register (“**HLR**”) address. The HLR is a permanent database that is used for the storage and management of subscription and service profiles. The Short Message Service Center (“**SMSC**”) is an element in the mobile phone network that is a store and forward service, which allows the message to reach the recipient even if his or her device is unavailable, out of service, or switched off. In addition to forwarding the text message to party B, an acknowledgement that the SMS has been successfully sent is relayed to party A.

Macquarie understands that a MMS is sent in a similar manner.

18. What are the costs of terminating SMS and/or MMS on a mobile network? Are termination charges above the costs of providing termination?

Given Macquarie's response to question 17 above, the costs of terminating a SMS/MMS should indicate a low marginal cost. Recent costing studies in other foreign markets identified by Macquarie in [Exhibit A.6](#) over would suggest that the cost to the Australian MNOs is low and is orders of magnitude lower than the prices which are offered to Macquarie and other wholesale customers.

¹² Adapted from Claire Durkin, SMS Test Messaging, 10 June 2012.

Exhibit A.6: Recent examples of regulated SMS/MMS termination prices

Country	SMS Termination Regulated?	Year Introduced	SMS Termination Rate AUD cents per Message	MMS Termination Rate AUD cents per Message
France	Yes	2006	1.4	n.a
Malaysia	Not at this time	Indicative Pricing 2012 ¹³	0.0014	0.025
New Zealand	Yes	2011	0.051	n.a

Source: Windsor Place Consulting analysis, 2013

19. When do providers expect that they will begin offering voice services on LTE networks?

In its capacity as an MVNO Macquarie is unable to respond to this question. However, it would note that the world's first commercial VoLTE networks were launched beginning of August 2012 in South Korea (namely LGU+ and SK Telecom) and in the United States (namely MetroPCS).¹⁴ Major global VoLTE launches (e.g., by Verizon in the United States) are, however, only expected sometime in 2014.¹⁵

20. What are the arrangements between providers to originate, interconnect and terminate voice calls on an LTE mobile network?

In its capacity as an MVNO Macquarie is unable to fully respond to this question but it would note that the current approach is to use dual radio phones which utilise the 2G/3G networks in the mobile phone for all voice calls. Secondly, voice calls will be provided over LTE with circuit switch fall back (“CSFB”) to the 2G/3G networks where necessary (e.g., no coverage).

Lastly, the ultimate approach will be to adopt Single Radio Voice Call Continuity (“SRVCC”) for VoLTE, which uses an IP Multimedia Subsystem (“IMS”) system for call anchoring and handover and is based on a third party call control mechanism. This allows a mobile phone with an ongoing voice call to transition to the circuit-switched domain in the event of loss of LTE coverage. An IMS-based SRVCC provides QoS control, flexible charging, and better user experience.

¹³ Malaysian Communications and Multimedia Commission, *Public Inquiry Report: Review of Access Pricing*, 14 December 2012, page 111. TSLRIC+ model prepared by Ovum.

¹⁴ See www.prnewswire.com/news-releases/metropcs-launches-worlds-first-commercially-available-voice-over-lte-service-and-volte-capable-4g-lte-smartphone-165336456.html

¹⁵ Refer to www.theverge.com/2013/6/27/4467742/verizon-turns-lte-service-500th-market-volte-2014



21. How do these arrangements differ, if at all, when voice calls are carried over 2G and 3G networks as well as LTE networks?

In its capacity as an MVNO Macquarie is unable fully to respond to this question. However, Macquarie understands that there are significant differences between how voice calls are carried over 2G/3G in comparison with VoLTE. The key interface for VoLTE is the Interconnect Network Network Interface (“I-NNI”) between the networks of the two parties making a call. The I-NNI creates end-to-end call connectivity and it removes the need for expensive interworking functionality¹⁶ which is necessary with older generation technology.

22. What are the likely interconnection charging arrangements for terminating voice calls on a LTE network?

Macquarie would contend that the likely interconnection charging arrangements for terminating voice calls over a LTE network ought be significantly lower than circuit-switched calls. This is because VoLTE is more spectrally efficient than circuit-switched calls with the number of voice users which can LTE can accommodate in 5 MHz of spectrum being significantly higher than GSM or WCDMA as is shown in Exhibit A.7 below. By moving voice traffic to LTE (and indeed future LTE Advanced), MNOs generally need less spectrum to cater for their voice traffic.

Exhibit A.7: Maximum number of voice users per 5 MHz FDD carrier¹⁷

GSM	Circuit Switched		IP based	
	UMTS/WCDMA	HSPA+	VoHSPA	VoLTE
28	68	130	90	220

Further, studies in the United States suggest that by upgrading from 2G/3G services to LTE, MNOs can save an additional 63 *per cent* in network costs and need only 37 *per cent* less spectrum to transport their voice traffic.¹⁸ This is highlighted in Exhibit A.8 below which compares in percentage terms a range of circuit switched, Voice over mobile broadband (‘VoMBB’) and OTT options. Based on these costing studies it would seem that the cost of 3G circuit switched calls while significantly below the cost of 2G circuit switched calls, are higher than both HSPA circuit switched calls, VoLTE and Wi-Fi voice over Internet calls. Such studies could be verified by a detailed costing study of VoLTE in Australia in the future.

Macquarie considers that the cost advantages of such technological innovations should be passed on to consumers via the setting of a lower MTAS price.

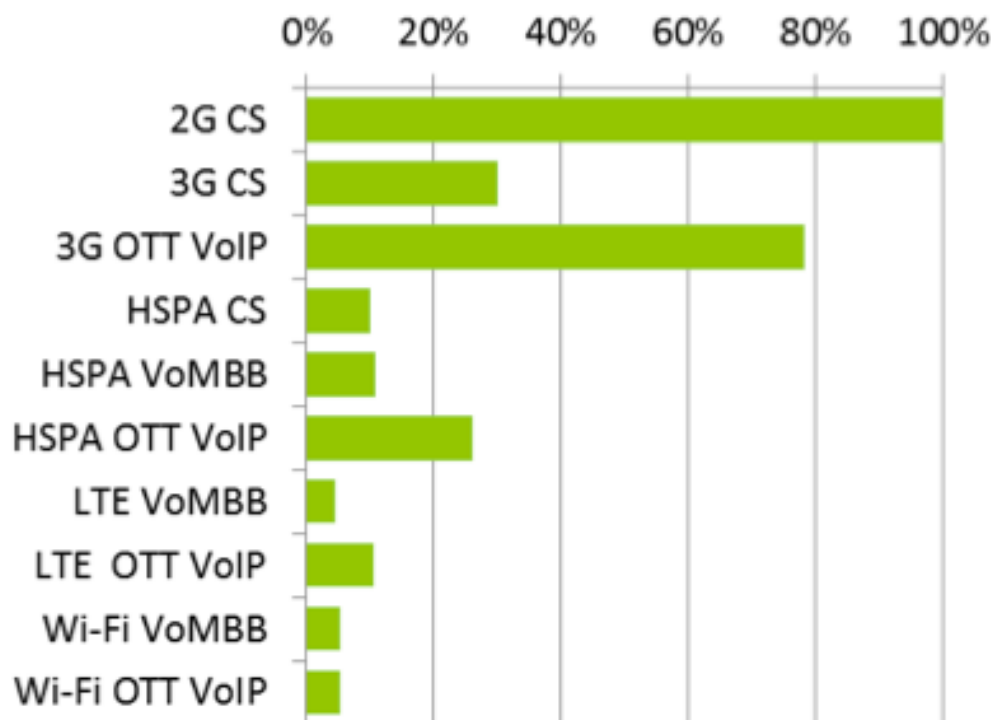
¹⁶ For more information, please refer to

www.nttdocomo.co.jp/english/binary/pdf/corporate/technology/rd/technical_journal/bn/vol13_4/vol13_4_045en.pdf

¹⁷ 3GPP and B Batard, *Migration to VoIP over Mobile Networks: technical Challenges and Economic Opportunity Analysis*, IEEE, 2010

¹⁸ Monica Paolini, Senza Fili Consulting, *White Paper: The costs and benefits of voice over mobile broadband (VoMBB): A more efficient use of network resources helps mobile operators reduce costs and unlock capacity for data traffic*, Seattle, 2012, page 13

Exhibit A.8: Cost per Minute of Use compared with 2G (in percentage terms)



Source: SenzaFili Consulting, Seattle, 2012. NB CS – Circuit Switched, VoIP –Voice over IP

23. What impact will LTE technology have on the market for the supply of MTAS?

As highlighted elsewhere in Macquarie's response to questions in the Discussion Paper, while the introduction of LTE technology will greatly facilitate OTT services such services are not practical substitutes for a declared MTAS. Macquarie notes that the Quality of Service ("QoS") on connecting network-based mobile VoIP calls will be much better than OTT services, thereby creating a *de facto* two-tier system. A VoLTE call would be explicitly identified in the operator domain as real time conversation and routed with low latency transit from network to network, whereas an OTT call would be treated as traditional data on the Internet.

24. Does the development of LTE networks impact the MTAS declaration in any other way?

Macquarie is not aware of any other way that the declaration of LTE networks would impact the MTAS declaration.

25. Should the MTAS declaration be varied to expressly apply to voice calls terminating on an LTE mobile network?

Macquarie prefers a technology neutral MTAS declaration which covers all types of digital mobile networks including those which are circuit or IP switched.

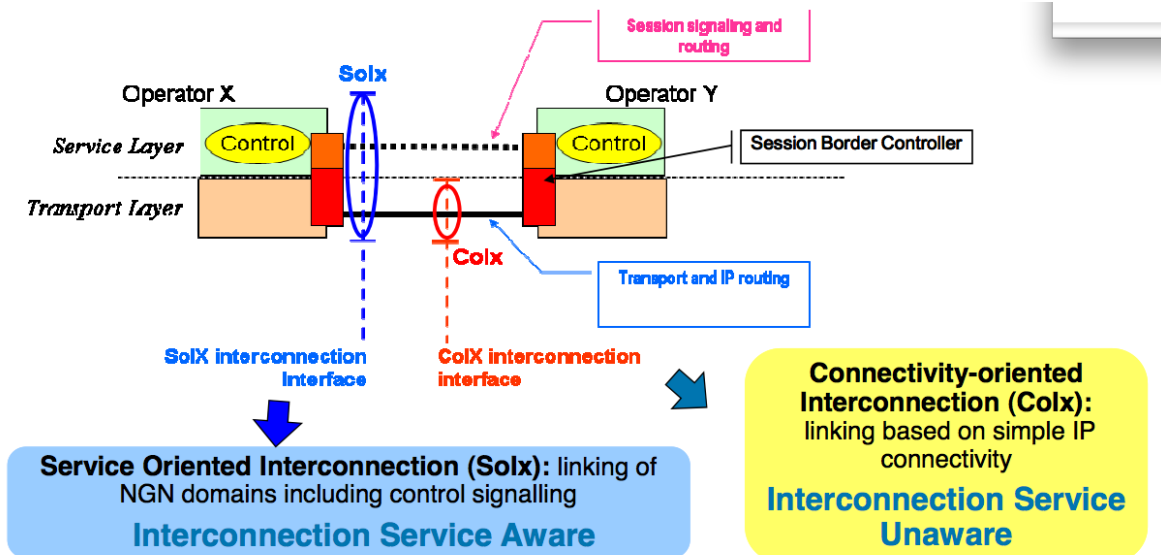
26. How do voice calls originating on an IP based network, such as the NBN, terminate on a mobile network? How does this differ with 2G, 3G and 4G mobile networks?

For a Next Generation Network (“NGN”) such as the NBN there are two types of interconnection:

- **Service oriented interconnection (“SOIX”)**: The physical and logical linking of NGN domains that allows carriers and service providers to offer services over NGN platforms with control, signalling (i.e., session based), which provides defined levels of interoperability. For instance, this is the case of "carrier grade" voice and/or multimedia services over IP interconnection. "Defined levels of interoperability" are dependent upon the service or the QoS or the security, etc; and
- **Connectivity oriented interconnection (“COIX”)**: The physical and logical linking of carriers and service providers based on simple IP connectivity irrespective of the levels of interoperability. For example, an IP interconnection of this type is not aware of the specific end-to-end service and, as a consequence, service specific network performance, QoS and security requirements are not necessarily assured. This definition does not exclude that some services may provide a defined level of interoperability.

However, only SOIX fully satisfies NGN interoperability requirements including the provision of high quality carrier grade voice interconnection (see [Exhibit A.9](#)). Depending on the form of interconnection offered to market participants such as Macquarie, the quality of the voice calls - which are time and more quality sensitive than data, the quality of the voice calls could differ markedly between that offered by MNOs and other competitors.

Exhibit A.9: Forms of NGN interconnection¹⁹



Source: Telecom Italia, 2010

¹⁹ Antonio Ascolese, *II-NNI in the 3GPP standard*, ETSI IMS Workshop, Sophia Antipolis 2010

27. What impact will voice calls originating on an IP based network, such as the NBN, and terminating on a mobile network, have on the wholesale MTAS market?

Unless there was a marked increase in the take-up of cross platform IP calling products (which is much more difficult to envisage during the lengthy transition period to the NBN) Macquarie does not consider that there would be a material impact on the wholesale MTAS market arising from voice calls originating on an IP based network.

28. What impact will voice calls originating on an IP based network, such as the NBN, and terminating on a mobile network, have on the retail mobile market?

If the type of interconnection provided for voice calls is 'carrier grade' to all market participants - not just vertically integrated operators - seeking such access as discussed in Macquarie's response to question 26, then there should be little impact on the retail mobile market. However, if the type of interconnection is inferior then the product offering is noticeably inferior then competition in this market could be significantly adversely affected by providing material advantages to vertically integrated operators.

29. What impact will voice calls originating on an IP based network, such as the NBN, have on the fixed to mobile voice market?

If the type of interconnection provided for voice calls is 'carrier grade' to all market participants seeking such access as discussed in Macquarie's response to question 26, then there should be little impact on the fixed to mobile voice market. However, if the type of interconnection is inferior then the product offering is noticeably inferior then competition in this market could be significantly adversely affected.

30. To what extent does the current MTAS service description cover voice calls originating on an IP based network, such as the NBN, and terminating on a mobile network?

Subject to the comments in relation to question 31, Macquarie considers that the current MTAS service description covers such voice calls even where they originate on an IP based network.

31. Should the current MTAS service description be varied to expressly apply to fixed to mobile calls originating on an IP network, such as the NBN, and terminating on a mobile network?

While Macquarie considers that the MTAS service description is technology neutral it would seem that amendments are needed to:

- define voice calls as carrier grade voice calls so that as discussed in Macquarie's response to question 26, the form of interconnection provided is SOIX; and
- address underlying definitions such as the Point of Interconnection. In an IP/NGN world there is no longer a "gateway exchange" for interconnection traffic.

32. What is an appropriate duration for a declared MTAS?

Macquarie is of the view that an appropriate duration for a declared MTAS would be five years. Macquarie bases its view on consideration of the following:

- the need to provide operators and investors with a more certain operating environment;
- the essential characteristic of the MTAS, i.e., that each MNO has exclusive control of the access to end-users on its own network and that this is unlikely to change; and
- the precedent that the ACCC has set in relation to the wholesale ADSL service where the duration of the declaration is five years.

Macquarie is also of the view that with a five year MTAS declaration, the duration of a MTAS FAD should be two years. This reflects the timeframes on which commercial agreements are made. This would also mean that the current undesirable situation in which a declaration inquiry and a final access determination inquiry are being conducted concurrently would be avoided. Such a situation is undesirable because a final access determination inquiry should only commence where a declaration is in place.

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