



Draft Decision on
**Bottleneck Fiber Optic
Communications
Facilities**

22 December 2021

Inviting public comment by

02/04/2022

BACKGROUND

- 1 This document sets out the TRA’s draft decision on whether to declare fiber optic facilities in FSM as bottleneck facilities and the reasoning for that decision. Appendix 5, titled “Draft Determination,” sets out the TRA’s draft determination based on the reasoning in this draft decision. The TRA invites public comment on the draft decision and the draft determination.
- 2 The objectives of the Telecommunications Act of 2014 (the Act) include “*providing conditions for effective competition among service providers in the Federated States of Micronesia and encouraging efficient and sustainable investment in and use of communications networks and services*”¹ and “*providing efficient use of communications facilities and providing for cost-based interconnection and access on an equitable and non-discriminatory basis for operators of communications networks...*”²
- 3 Among other measures to achieve these objectives, the Act requires licensees to provide access to their “*bottleneck facilities*” to other licensees for the purposes of providing communications services.³
- 4 The Act gives us the power to declare communications facilities to be “*bottleneck facilities*” for the purposes of the Act.
- 5 We are now determining whether this list should be amended by declaring certain submarine and terrestrial fiber optic communications facilities to be “*bottleneck facilities*” and by adding them to the list in Schedule 1 of the Interconnection and Access Rules, 2019 (the Access Rules).
- 6 This decision is separate from any subsequent decisions, if any, that TRA may need to make on the terms or interim prices of access to bottleneck facilities under sections 340 or 341 of the Act.

Consultation feedback information

- 7 The TRA invites written comments and feedback on the draft determination included in Appendix 5 to this draft decision and on the reasons for the draft determination included in this draft decision. We have provided a comments form for responses found in Attachment 1.
- 8 Responses may be submitted in person at TRA’s offices in Pohnpei or sent to consultations@tra.fm. Responses are due by February 4, 2022.
- 9 Submissions will be made public unless there is a specific request for confidentiality made under Section 322 of the Act.⁴

¹ Section 303(1)(c) of the Act.

² Section 303(1)(e) of the Act.

³ Section 339(1)(g) of the Act.

⁴ In accordance with Section 321 of the Act.

- 10 We intend to hold a public conference to allow interested parties, including those who did not submit written responses to this consultation, to provide additional feedback. We invite persons who submit written responses to this consultation to express a view in their submissions as to whether they wish to participate in this conference. Failure to advise will not preclude you from attending the conference if the TRA holds the conference, but if we do not receive any advice of interest in attending a conference, then that might be a factor in the TRA determining not to proceed with the intended conference.
- 11 After receiving feedback, we will publish the submissions and our response to submissions which will state our views and reasons for either making changes or maintaining our initial views.

Fiber Optic Communications Facilities

- 12 Submarine and terrestrial fiber optic networks have been built or are being planned in all States of the FSM.
- 13 Submarine fiber cables connect overseas locations with cable landing stations (CLS) in the FSM. Submarine cables currently land in Yap, Chuuk and Pohnpei,⁵ and one is planned for Kosrae in the near future.
- 14 Terrestrial fiber networks connect those cable landing stations to the central offices or exchanges of a telecommunications licensee and, from there, to Optical Network Terminals in individual homes and businesses via a core fiber distribution network along streets and roads⁶ and via drop cables connecting that core distribution network to individual premises.
- 15 Terrestrial fiber networks have been built on Weno and parts of Pohnpei, are being built in Yap, and are planned elsewhere in the FSM.

Bottleneck Facilities

- 16 The Act defines a “*bottleneck facility*” to be “*a communications facility declared by the Authority to be essential for the production of communications services which, for technical reasons or due to economies of scope and scale and the presence of sunk costs, cannot practicably be duplicated by a potential competitor in a communications market.*”⁷
- 17 The Act defines a “*communications facility*” to be “*any infrastructure, building, or switching equipment; any submarine cable landing in the Federated States of Micronesia, submarine cable landing station, or satellite transmitting facility; any location, mast site, tower, pole, trunk line, access line, duct or other underground facility; or other passive equipment that is used or is capable of being used for*

⁵ The Yap Spur on the SEA-US Cable, the Chuuk-Pohnpei Cable, and the Pohnpei Spur on the HANTRU-1 Cable System.

⁶ FSMTC described this “core” network in a February 2020 RFP as consisting of “primary” and “secondary” fiber. The FSM Telecommunications Cable Corporation (**the OAE**) described it in documentation available on its website (<https://fsmcable.com>) as the “communal network.”

⁷ Section 302(f) of the Act

communications or for any operation directly connected with communications, but excluding customer equipment.”⁸ (emphasis added)

- 18 In order for a communications facility to be considered a “*bottleneck facility*,” it must satisfy the definition in the Act, and we must make a declaration to that effect.

Consequences of a Declaration of Bottleneck Facility

- 19 Licensees who own or control bottleneck facilities are subject to various obligations in the Act and the Access Rules. These include, in particular, the obligations:
- in Section 339(g) of the Act, to provide “*access to communications facilities, networks, software and services, in a manner that is sufficiently unbundled, including co-location, to enable the second licensee to access the facilities and wholesale services that it reasonably requires in order to provide communications services to its customers;*”
 - in section 39(1) of the Access Rules, to “*agree to, and take all reasonable steps required to give effect to, reasonable requests for Access to and use of, Bottleneck Facilities it owns or Controls;*” and
 - in sections 39(2) and 42 of the Access Rules, to refuse to grant access to bottleneck facilities the licensee owns or controls only “*on grounds of technical, economic, or legal infeasibility.*”
- 20 Licensees who own or control bottleneck facilities are also subject to Section 343(2)(g) of the Act, which considers “*designing or installing a communications facility or a communications network with the purpose of preventing or hindering another licensee from acquiring interconnection or access*” to be anti-competitive conduct.
- 21 A declaration that a facility is a bottleneck facility does not change or affect the ownership or control of that facility. Such a declaration gives other licensees the right to request access to the facility and gives the licensee who owns or controls it the obligation to negotiate terms of access consistent with the Act and the Access Rules.
- 22 If submarine or terrestrial fiber networks do not satisfy the definition of “*bottleneck facilities*” under the Act, or if they do and we do not declare them to be “*bottleneck facilities*” under the Act, licensees who own or control them would not be required to provide access to them to other licensees. Further, we would not have the power under Section 340 of the Act to determine disputes between licensees on the terms of access to submarine or terrestrial fiber networks.
- 23 To the extent that they are essential for the production of communications services, a potential competitor could either be excluded from the market or could be forced to make an inefficient and unsustainable investment in duplicate facilities to produce those communications services, contrary to the objectives of the Act. This could prevent the development of effective competition in the FSM, contrary to the objectives of the Act, and could give licensees who own those facilities significant market power.

⁸ Section 302(h) of the Act

Consultation process

- 24 The TRA has provided ample opportunities for interested parties to provide their views throughout the draft determination process. The consultation process is summarised below. At various stages in the process, parties that made written or oral submissions to TRA included FSM Telecommunications Corporation (FSMTC), FSM Telecommunications Corporation (referred to as the Open Access Entity or OAE), Kacific, iBoom, the Department of Transportation, Communications, & Infrastructure (DTC&I), Chuuk State, and the Chuuk Public Utility Corporation (CPUC).
- 25 The TRA published a consultation paper on 1 June 2021 to gather and consider stakeholders' views before deciding whether to declare fiber optic communications facilities to be bottleneck facilities and, if so, the scope of that declaration.
- 26 Written responses to the consultation paper were received from the following parties, and are provided on the TRA's website:⁹
- Chuuk State
 - CPUC
 - DTC&I
 - FSMTC
 - iBoom
 - OAE.
- 27 The TRA held a subsequent stakeholder conference on 14 July 2021, listened to views expressed, and took these into account.
- 28 The TRA issued on 20 August 2021 a letter summarising the views expressed by stakeholders at the conference, along with TRA's request for additional information. A copy of a sample letter is attached as Appendix 1.
- 29 The TRA issued a further information request on 27 September 2021 (attached as Appendix 2).
- 30 Responses to the 20 August letter were received from the following parties:
- CPUC
 - FSMTC
 - Kacific
 - OAE.

⁹ TRA, "Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021", available at: <https://tra.fm/wp-content/uploads/2021/07/Comments-Received-Bottleneck-Facilities-.pdf>

- 31 Responses to the 27 September letter were received from the following parties:
- Kacific
 - FSMTC
 - iBoom.
- 32 All parties were given reminders and additional time to provide responses to TRA’s information requests and any additional relevant information.
- 33 While FSMTC and iBoom responded to the 27 September letter, the responses did not provide specific answers to TRA’s questions.
- 34 Written views provided by interested parties in response to the 20 August letter are summarized in Appendix 3.
- 35 This draft decision, including the draft determination in Appendix 5, is also part of the consultation process and is being issued for comment pursuant to section 321 (7) of the Act.

ANALYTICAL FRAMEWORK

- 36 In arriving at its analytical framework, the TRA follows the Act and has taken into account:
- written submissions and comments made by parties on the framework the TRA should adopt, and
 - where consistent with the application of the Act, academic literature on the “essential facilities doctrine” from the US, which has clear parallels to the regulatory framework in FSM.¹⁰
- 37 In summary, in historical antitrust cases, US courts have generally held a facility to be essential if it meets at least one of the following characteristics:
- The facility is essential to the public at large receiving a vital good or service.
 - The facility is essential to competition for the service. That is, controlling the facility allows the controlling party to improperly interfere with competition in the relevant markets downstream of the facility. This happens when the facility cannot be practicably duplicated by competitors.
- 38 Other US cases argued on the basis of a third characteristic—that the facility is essential because of consumer preferences to use the facility over potential substitutes—have at times been successful, but less consistently so.

¹⁰ Seelen, Christopher M. “The Essential Facilities Doctrine: What does it mean to be essential?” *Marquette Law Review*, Vol 80, Issue 4, 1997, available at: <https://core.ac.uk/download/pdf/148688457.pdf>

- 39 The FSM regulatory framework is broadly consistent with the two key characteristics from US antitrust case law:
- The Act essentially reflects the concept of communications services being essential to the public, by specifically targeting facilities that are “essential for the production of communications services” for potential access regulation as bottleneck facilities;
 - The Act also reflects the concept of “essentiality to competition” by targeting facilities that “cannot practicably be duplicated by a potential competitor in a communications market”.
- 40 TRA proposes that the question of whether a communications facility is a bottleneck facility should be addressed using the methodology described below and summarized in Appendix 4.
- 41 To determine whether a facility should be declared a bottleneck facility, the TRA has applied the following three steps. At each step, TRA considers a key question based on the available evidence:
1. **Define the reference facility by asking:** What is the reference facility and the characteristics of the services that can be produced using it, and the markets in which those services are provided?
 2. **Consider whether the facility is essential for the production of communications services by asking:** Are there, or likely to be, alternative facilities in a market in the FSM which can produce the same or similar services (providing customers with similar services at a similar cost)?
 3. If the answer to the previous question is “no,” consider **whether the reference facility can practicably be duplicated?**
- 42 The last two questions correspond to the two branches of the definition of bottleneck facilities in the Act, paraphrased below:
- “bottleneck facility” means a communications facility declared by the Authority*
1. *to be essential for the production of communications services*
 2. *which, for technical reasons or due to economies of scope and scale and the presence of sunk costs, cannot practicably be duplicated*
- by a potential competitor in a communications market.*
- Rationale for this methodology**
- 43 The first question focuses on functionality that licensees can use when accessing the reference facility. The TRA has statutory objectives of promoting the long-term interests of users and of providing conditions for effective competition. Users consume communications services (which are enabled by the functionality of the relevant facility), and competition between licensees is on the basis of services. In other words, facilities are not ends in themselves—they are used to produce communications services.
- 44 These services are then provided to consumers in specific markets in the FSM, in competition with services produced by other service providers using the same types or different types of facilities in the FSM. In other words, any assessment of possible

bottleneck facilities must start with describing the functionality provided by the facilities.

- 45 Once the services and their characteristics and markets are identified, one can proceed to address the two branches of the definition of bottleneck facility in the Act.
- 46 The second question focuses on alternatives to the reference facility. In assessing whether a facility is an alternative to another, it is necessary to consider it in the FSM context, in particular, the state of development of the market and the likelihood of the alternative facility being built if the reference facility exists. This is not a purely technological analysis focusing solely on the technical characteristics of the reference and alternative facilities. A facility that might be essential in one jurisdiction might not be elsewhere.
- 47 The analysis under the second question is not static. It is important to consider alternative facilities that are reasonably likely to exist within the near future, (but not speculative hypothetical facilities). It is also important to consider the likelihood of the alternative facility being deployed in the FSM if the reference facility were to be built.
- 48 If a potential competitor is not likely to deploy the alternative facility in the FSM to produce competitive services if the reference facility were already in place, then it likely should not be considered a true alternative. If such facilities do not exist already, they are only likely to be built if the owner of these alternative facilities can reasonably expect to earn sufficient returns to sustainably operate a business.
- 49 The third question focuses on duplication of the reference facility. Specifically on the technical or economic barriers that might exist that would act to prevent a potential competitor from deploying the same type of facility in order to produce competitive services.
- 50 As with alternative facilities, duplicate facilities are only likely to be built if the owner of these alternative facilities can reasonably expect to earn sufficient returns to sustainably operate a business.
- 51 As before, in assessing whether a facility can practicably be duplicated, it is necessary to consider it in the FSM context.

REFERENCE FACILITIES

What is the reference facility and the characteristics of the services that can be produced using it, and the markets in which those services are provided?

- 52 The first stage of the analysis focuses on the characteristics of what facilities are being considered as potential bottleneck facilities.
- 53 In this case, we are considering two types of facilities:
 - Submarine fiber optic communications facilities

- Terrestrial fiber optic communications facilities.

54 Both types can be used to produce a variety of communications services that are key to the development of the economy and society of the FSM.

Submarine Facilities

Description

55 A submarine fiber optic communications facility is a cable laid across the foreshore and under the sea containing one or more pairs of fiber strands connecting a location within the FSM to a location outside the FSM, or connecting islands within FSM to each other.

56 Submarine fiber optic cables are used for high-capacity access to the global internet.

Product market enabled by the facilities

57 The submarine facilities enable a telecommunications operator to provide its customers with internet services and international and inter-state calling services.

58 Any operator looking to provide internet services or national and international calling services in FSM would need to use the submarine facilities or other facilities that can provide an equivalent service.

Geographic market enabled by the facilities

59 In TRA's view, the relevant geographic markets enabled by submarine facilities are four separate markets—one for each State in the FSM. Each cable serves one State.

60 Services enabled by the cable in one State do not substitute for services provided in another State. Given the large distance between the main population centres of the FSM states, it is not practicable for a telecommunications operator to use the submarine facilities in one State to enable communications services in another state. The operator would still need a way to move data between the two relevant States.

61 Two cables connecting to one State, and providing connectivity for that State, do not create two markets, but rather two facilities that serve the same market.

Terrestrial Facilities

Description

62 A terrestrial fiber optic communications facility is a cable containing several pairs of fiber strands, starting from a central location (a CLS or telecommunications central office) and running to one or more customer premises.

63 It can be configured in different ways, depending upon the intended service. For example:

- In a point-to-point configuration to serve individual customers or to provide backhaul services for a communications network, or
- In a broader Fiber to the Premise (FTTP) network configuration that passes by a large number of premises (houses and businesses) in a neighborhood.

64 In an FTTP configuration, the premises can then be connected to the FTTP network by installing drop wires.

65 Through the strategic placement of splitters, an FTTP network might also be able to support solutions requiring the point-to-point configuration (refer OAE November 2020 document: "centralized" vs "cascaded" architecture).¹¹

Product market enabled by the facilities

66 Terrestrial fiber optic cables enable the operator to provide:

- End users with high-speed access to the Internet and local voice calls, provided that the terrestrial fiber facilities are connected to a submarine cable facility or some suitable alternative that provides inter-island and international connectivity
- Commercial customers (potentially including other telecommunications licensees) with high capacity backhaul data connectivity services to connect elements of those customers' own networks.

67 When providing a voice call service, modern phone networks use Voice over Internet Protocol (VoIP) at least for backhaul of voice calls and handle voice calls as a form of Internet protocol data traffic. In that sense, pure end-to-end voice calling facilities are no longer being created, though legacy systems remain in use in some countries.

68 Therefore, the TRA considers that the relevant product market can be defined as providing internet access and backhaul connectivity, but does not include pure end-to-end voice services.

Geographic market enabled by the facilities

69 The relevant geographic markets are areas covered by a contiguous FTTP network. This is typically a single island, or a group of islands lying in sufficiently close proximity to each other to enable connection to the same network.

70 Services provided using terrestrial fiber are inherently local in nature, as services provided on one island or group of islands do not substitute for services provided on another island or group of islands.

ALTERNATIVE FACILITIES

Are there, or likely to be, alternative facilities in a market in the FSM which can produce the same or similar (i.e. competitive) services?

71 The focus of this second stage in the analysis is on facilities other than the reference facility that can provide the same or similar functionality as the reference facility, which can be used to provide services that are competitive with the services produced using the functionality of the reference facility in the FSM.

¹¹ OAE, "FSM Wholesale Connectivity – Introduction for Potential Service Providers", at page 7. Available at <https://fsmcable.com/wp-content/uploads/2020/11/High-level-OAE-overview-for-RSP-2020.pdf>

Submarine Facilities

- 72 At the public conference, FSMTC argued that satellite facilities are a potential alternative to submarine (and terrestrial) fiber optic facilities to produce the services listed in the previous section.
- 73 As noted earlier in this paper, submarine fiber optic cables are used for high capacity access to the global internet. To put “high capacity” in perspective, the submarine cables that form the HANTRU-1 and SEA-US systems (which FSM is connected to) provide capacity of up to 160 Gbps.
- 74 By comparison, the Kacific satellite links over FSM currently provide capacity of between [REDACTED]¹² (over Pohnpei and Kosrae) and [REDACTED] gbps (over Chuuk). Kacific does not offer services to Yap, though it may do in the future. Starlink may also introduce a satellite service to end users in the FSM, but there is yet no indication of when or whether Starlink may seek to offer services in the FSM.
- 75 Other satellite providers do offer a backhaul satellite service to licensees in FSM. Between 2015 and 2018, total satellite facility capacity over the Pacific Ocean increased from 1.3 to 3.1 Gbps.¹³
- 76 Therefore, submarine facilities typically have a capacity that is at least 20 times the capacity currently available over satellite.
- 77 Satellite facilities also provide inferior service with more latency¹⁴ and jitter¹⁵ than submarine fiber facilities. As a result, the characteristics of the downstream services that can be provided over the two types of facilities are also markedly different. The table below compares the typical end user services (fiber and 4G) that can be provided with the support of international backhaul submarine services, to the satellite services currently being provided by Kacific that use satellite backhaul instead of using submarine fiber facilities.

Characteristics of downstream services

	Fiber (Typical)	4G (Typical)	5G (Typical)	Satellite (Kacific)
Speed down	~1000 Mbps	~20 Mbps	100-200 Mbps	3-30 Mbps
Speed up	~880 Mbps	~5 Mbps	12-20 Mbps	3-10 Mbps
Latency	10-20ms	36-55ms	29ms	550-600ms
Jitter	0.5-2ms	4.4-47ms	5-35ms	48.7ms

Sources:

Fibre (speed) - <https://www.business.org/services/internet/dsl-vs-cable-vs-fiber-vs-satellite/>

- ¹² Commercial in confidence, or c-i-c, refers to confidential business information disclosed to TRA for a specific purpose. In the public Draft Determination this information will be redacted and represented with blacked out blocks of text.
- ¹³ Inmarsat (2017), “Working Group on Technologies in Space and the Upper-Atmosphere – Identifying the potential of new communications technologies for sustainable development”, figure 3, p.20, available at: <https://www.intelsat.com/wp-content/uploads/2020/08/Intelsat-Technologies-in-Space-Report.pdf>
- ¹⁴ Latency is the time it takes for data to be transferred between its original source and its destination, i.e. the reaction speed of an internet connection
- ¹⁵ Jitter is the fluctuation or variation of latency over time

Fibre (latency) - https://www.ofcom.org.uk/data/assets/pdf_file/0027/113796/home-broadband-2017.pdf
 Fibre (jitter) - https://www.ofcom.org.uk/data/assets/pdf_file/0027/113796/home-broadband-2017.pdf
 4G (speed) - <https://www.4g.co.uk/how-fast-is-4g/>
 4G (latency) - <https://5g.co.uk/guides/4g-versus-5g-what-will-the-next-generation-bring/>
 4G (jitter) - <https://www.tutela.com/blog/colombia-tiqo-delivers-best-speeds-but-suffers-from-4g-jitter>,
<https://rootmetrics.com/en-US/content/us-LA-gaming-report-2020>
 5G (speed & latency) - <https://5g.co.uk/guides/how-fast-is-5g/>
 5G (upload speed) - <https://www.4g.co.uk/how-fast-is-4g/>
 5G (jitter) -
https://downloads.ctfassets.net/ob7bbcsqy5m2/4xleqsGvxfw4fejLt2ChdV/e07972594acb5f9f86b4cfac322d4cee/RootMetrics_Gaming_Report_Final.pdf
 Kacific (speed & latency) - <https://kacific.com>
 Satellite (jitter) - <https://broadbandnow.com/HughesNet-speed-test>

- 78 As the table above shows, the latency and jitter are orders of magnitude worse for satellite facilities.
- 79 Finally, satellite services are significantly more expensive per unit of capacity. This is why FSMTC only purchases a relatively small amount of satellite backhaul capacity as backup in the event that the fiber optic submarine cable fails. For example, when the HANTRU-1 cable required repairs in 2017, FSMTC had only 197 Mbps of satellite capacity in place as backup and was only able to secure an extra 130 Mbps once the repairs began.¹⁶ Thus, at its peak in 2017, FSMTC had only 0.3 Gbps of satellite back up capacity available.

- 80 **Draft Decision on submarine fiber optic cables providing internet services:**
 Where a submarine fiber optic facility exists, there are no alternative facilities that can produce the same or similar (i.e. competitive) services. TRA must therefore consider whether submarine fiber optic facilities can be practicably duplicated by a competitor.

Terrestrial facilities

- 81 Where terrestrial fiber facilities exist in a geographic market (an island, or group of islands), telecommunications services can also be achieved by sending data over copper wires (twisted pair and DSL), mobile networks (4g or 5g) or satellites. The key consideration is whether the resulting service is sufficiently similar to:

- Internet services provided to households and businesses over an FTTP network
- Point-to-point backhaul services over fiber to connect large commercial customers' own communications equipment.

FTTP facilities providing internet services

- 82 Internet access services produced using copper wires offer much lower speeds than what can be achieved with fiber, modern mobile networks, or even modern satellite communications. Copper facilities are therefore not sufficiently similar alternatives.
- 83 Internet access services provided using mobile communications and satellites are inferior (see earlier table) and more expensive.

¹⁶ Jaynes, B., "Fiber optic repair means slow internet in Pohnpei but almost no Internet services in RMI", *The Kaselehlie Press*, available at: http://www.kpress.info/index.php/index.php?option=com_content&view=article&id=504:fiber-optic-repair-means-slow-internet-in-pohnpei-but-almost-no-internet-services-in-rmi&catid=8:news&Itemid=103

- 84 Compare the expected retail costs of \$30-35 per month for fiber access with unlimited usage relying on OAE's wholesale services against:
- \$150+ per month for Kacific's unlimited satellite services offering inferior speeds, latency and jitter
 - FSMTC's best 4G offering of \$10 per 12GB of usage with inferior speeds, latency and jitter. Purchasing 300GB of usage (which is equivalent to the usage provided under the most basic fiber plan in Fiji)¹⁷ on FSMTC's 4G would cost \$250
 - The fact that any 5G services rolled out in FSM would likely be at prices similar to current 4G tariffs. While speeds would increase, they would still be inferior to fiber.
- 85 While mobile and satellite have broader reach than fiber—by their nature covering a broader area more effectively—the service quality is inferior and the cost to consumers is materially higher.
- 86 Satellite and mobile internet services can thus serve as a useful complement to FTTP internet services. For example, recent literature also confirms that substitution between mobile and fiber services is focused mainly on social media and music streaming use cases, with very limited substitution when it comes to other internet access use cases.¹⁸
- 87 **Draft Decision on FTTP facilities providing internet services:** Internet access services provided using copper, mobile or satellite communications facilities are not an effective substitute for similar services produced using FTTP facilities. Copper, mobile and satellite facilities are therefore not alternatives to FTTP facilities, and the TRA must consider whether terrestrial FTTP facilities can be practicably duplicated.
- Terrestrial fiber facilities providing point-to-point backhaul services*
- 88 For the same reasons as discussed for FTTP (significantly lower capacity and quality, and significantly higher costs), backhaul services produced using point-to-point satellite or mobile communications facilities are not effective product substitutes for backhaul services produced using fiber optic facilities.
- 89 This is because backhaul use cases generally require more capacity, higher speeds and lower latency and jitter than standard household internet usage.
- 90 In the specific use case where the backhaul service is to be provided between two points that have line of sight, point-to-point microwave facilities can provide comparable levels of service. The costs can also be similar or even lower, depending on distance, especially when connecting two sites separated by a body of water (like islands in close proximity). The TRA has already declared "towers and other supporting constructions for the provisions of radio communications services" to be bottleneck facilities, which

¹⁷ Telecom Fiji, "Fibre – The future of broadband", <https://www.telecom.com.fj/your-home/your-home-broadband/fibre-residential-packages/> (accessed December 21, 2021)

¹⁸ Quaglione, D. Matteucci, N. Furia, D. Marra, A & Pozzi, C. "Are mobile and fixed line broadband substitutes or complements? New empirical evidence from Italy and implications for the digital divide policies" *Socio-Economic Planning Sciences*, Vol 71, Sep 2020, available at: <https://www.sciencedirect.com/science/article/abs/pii/S0038012119301016>

will further facilitate the use of microwave facilities as an alternative, where suitable towers already exist.

- 91 **Draft Decision on terrestrial fiber facilities providing point-to-point backhaul services:** Point-to-point backhaul services provided using mobile or satellite communications facilities are not an effective substitute for similar services produced using fiber facilities. Mobile or satellite facilities are therefore not alternatives for point-to-point terrestrial fiber facilities.
- 92 In the specific case where direct line of sight exists between the two points to be connected, a microwave link might provide an effective alternative to a terrestrial fiber link. Such a case is likely to be fairly common in FSM, and so a blanket declaration of all point-to-point facilities as bottleneck facilities is unlikely to be warranted.
- 93 However, a microwave link might not be feasible in all cases, in particular where a direct line of sight does not exist. The TRA must therefore consider whether terrestrial fiber facilities providing point-to-point backhaul services can be duplicated where a microwave link is not feasible.

DUPLICATING THE REFERENCE FACILITIES

Submarine Facilities

Stakeholder views

- 94 The stakeholder consensus suggests it is not practicable to duplicate submarine fiber optic facilities with other submarine fiber optic facilities.
- 95 FSMTC believe that cost is the driving factor of whether duplication is practical rather than possible.¹⁹ During the TRA’s public hearing for bottleneck facilities, FSMTC stated “the investment cost of putting in submarine cable is quite high, it is very prohibitive for anyone especially in this small market”²⁰ and “FSMTC has no interest duplicating cables to Chuuk and Yap unless they get a grant to provide a backup service.”²¹
- 96 In feedback to the TRA on bottleneck facilities, OAE, CPUC and iBoom agree that it is not practical to duplicate submarine cables as they cannot be economically replicated while also keeping prices low for customers. OAE and CPUC make the point that duplicating networks results in twice the fixed costs needing to be shared over the same number of customers. iBoom also believe that it is a good long-term goal to have a secondary redundant backup, but there is no point achieving that “when the first submarine cable isn’t being used fairly.”²²

¹⁹ TRA Bottleneck Facilities Public Conference 14 July 2021 – 01:45:25 in accessed recording

²⁰ TRA Public Conference – 01:42:46 in accessed recording

²¹ TRA Public Conference – 01:44:20 in accessed recording

²² TRA, “Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021”, available at: <https://tra.fm/wp-content/uploads/2021/07/Comments-Received-Bottleneck-Facilities-.pdf>

Other evidence

- 97 In each of the markets (States) where subsea cables exist or are planned in the near future, the capital costs are high and donor funding or financing was required to make the projects viable:

Cost and donor support for FSM subsea cables

Cable	Cost (USD millions)	Donor support type	Donor
HANTRU-1 Pohnpei Spur	\$12	Concessional loan, 5% per annum	United States (US) Department of Agriculture Rural Utility Service ²³
Chuuk-Pohnpei	\$18.5	IDA Grant	World Bank ²⁴
SEA-US Yap Spur	\$22.5	IDA Grant	World Bank ²⁵
Kosrae to Pohnpei (planned)	\$14	Grant	US government ²⁶

- 98 The potential capacity on the HANTRU-1 Pohnpei spur is 160Gbps.²⁷ The International Telecommunication Union (ITU), last reported actual bandwidth usage in and out of FSM in 2017, providing a figure of 0.86Gbps,²⁸ while the Kaselehlie Press provided a figure of 1Gbps for 2016.²⁹

²³ Jaynes, B., "Congress again debating bill to transfer ownership of Pohnpei spur of HANTRU-1 fiber optic line", *The Kaselehlie Press*, available at: http://www.kpress.info/index.php?option=com_content&view=article&id=1679:congress-again-debating-bill-to-transfer-ownership-of-pohnpei-spur-of-hantru-1-fiber-optic-line&catid=8&Itemid=103

²⁴ The World Bank, "Pacific Regional Connectivity Program 2:FSM Connectivity Project (P130592) – Implementation Status and Results Report", available at: <https://documents1.worldbank.org/curated/en/729791626768477497/pdf/Disclosable-Version-of-the-ISR-Pacific-Regional-Connectivity-Program-2-FSM-Connectivity-Project-P130592-Sequence-No-12.pdf>

²⁵ "Pacific Regional Connectivity Program 2:FSM Connectivity Project (P130592) – Implementation Status and Results Report"

²⁶ Barrett, J., "U.S. funding tapped for Pacific undersea cable after China rebuffed", *Reuters*, accessed 10 December 2021 at: <https://www.reuters.com/world/asia-pacific/exclusive-us-funding-tapped-pacific-undersea-cable-after-china-rebuffed-2021-09-03/>

²⁷ Layer10 (2019), "Pacific-IX Desktop Feasibility Study", p. 20, available at: https://www.unescap.org/sites/default/files/Pacific_IXP_ISOC_FINAL_0.pdf

²⁸ ITU, "International Bandwidth In Mbits 2007-2019", available at: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2020/InternationalBandwidthInMbits_2007-2019.xlsx

²⁹ Jaynes, B., "Fiber optic repair means slow internet in Pohnpei but almost no Internet services in RMI", *The Kaselehlie Press*, available at: http://www.kpress.info/index.php?option=com_content&view=article&id=504:fiber-optic-repair-means-slow-internet-in-pohnpei-but-almost-no-internet-services-in-rmi&catid=8:news&Itemid=103

99 OAE has reported “current network capacity is sufficient for years to come and does not require extra capital expenditures to meet demand.”³⁰ This is supported by analysis from the World Bank which estimated FSM bandwidth requirements on HANTRU-1 in 2041. The estimates are provided in the table below and show a wide safety margin between estimated traffic and potential capacity.

Estimated Bandwidth Requirements on HANTRU-1, FSM in Year 2041 (Gbps)

	Low scenario	Baseline scenario	High scenario
FSM (Chuuk, Pohnpei)	3.0	5.9	14.7
FSM (Kosrae)	0.5	0.9	1.8

Source: <https://documents1.worldbank.org/curated/pt/687711494852044530/text/FSM-Pacific-Reg-Connectivity-PP-PAD2068-05112017.txt>

100 As at the end of 2017, according to the ITU, the international lit capacity of submarine cables connecting FSM was 4,000 Mbps, of which only 250 Mbps was committed.³¹

101 Donor funding and financing support for the current cables reduces the costs of the services provided using the cables. A competitor building a new submarine facility to a State or island where one already lands today is not likely to get a return on their investment because the current and reasonably anticipated demand is already satisfied by existing cable capacity.

102 **Draft Decision:** the TRA considers it is not practicable to duplicate any of the submarine fiber optic cable facilities in FSM for reasons of economies of scope or scale and sunk costs. Subject to the discussion below, all submarine facilities should therefore be declared to be bottleneck facilities.

Pohnpei Spur

103 FSMTC and OAE submitted that the Pohnpei Spur is effectively two facilities because half of the 16 available wavelengths on the facility are allocated to each of FSMTC and OAE, who can operate and upgrade them independently, and their two halves of the Pohnpei Spur are therefore “duplicated” and should not be considered a bottleneck facility.

104 However, the definition of bottleneck facility in the Act refers to physical assets, and does not mention rights such as wavelengths inside a fiber.

³⁰ OAE Annual report for 2018 and 2019, available at: [http://www.fsmopa.fm/files/FY%202020/FSMTCC_fs19%20\[FINAL%2003.16.21\].pdf](http://www.fsmopa.fm/files/FY%202020/FSMTCC_fs19%20[FINAL%2003.16.21].pdf)

³¹ ITU, “Maximising availability of international connectivity in the Pacific”, *ITUPublications*, available at: https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Infrastructure_portal/Maximising-availability-of-int-connectivity-in-the-pacific.pdf

- 105 The Pohnpei Spur is owned by FSMTC,³² not by FMSTC and OAE (OAE has rights of use established by contract). Thus, even if the Pohnpei Spur were considered to be two facilities, FSMTC would be considered to own both facilities.
- 106 New channels were not created to be given to OAE when the contract was signed—the system started with 16 channels, and still has 16. What FSMTC has done is share that submarine facility with OAE by giving OAE access to 8 specific wavelengths.
- 107 The TRA’s view is that there is a single facility which has been shared by two parties via an agreement, under which one party (FSMCT) allows access by another party (OAE).
- 108 The fact that OAE secured rights in the existing facility instead of building a separate facility between Pohnpei and Guam also suggests the Pohnpei Spur cannot practicably be duplicated. The fact that two parties each use half of the facility will, however, be an important consideration in the future when assessing whether terms and conditions offered to third parties satisfy the requirements of the Act (particularly Section 339(g)), as third parties will have access to two suppliers of similar services on the Pohnpei Spur.
- 109 **Draft Decision:** Given the above, and consistent with our conclusion on submarine facilities generally, the TRA considers that the Pohnpei Spur, like other submarine cables, is an essential facility (i.e. a facility that is essential for the production of communications services in the FSM) that cannot practicably be duplicated by a potential competitor. Therefore, the TRA intends to declare the Pohnpei Spur a bottleneck facility.

Submarine facilities that do not currently exist, but are expected to exist in the foreseeable future

- 110 In the market where submarine cables do not currently exist (i.e., Kosrae State), there is nothing to duplicate. At the present time, there is no reason to believe a submarine cable landing in Kosrae would be materially less expensive than the cables landing in the other States, or be able to accommodate a materially different amount of traffic (and therefore make a potential duplicate cable economically viable). However, it may be some time before such a cable is built, and conditions may change by then.
- 111 Therefore, the TRA does not intend to declare a future submarine cable landing in Kosrae to be a bottleneck facility at this time, although unless material changes take place in the market between now and the time that the Kosrae cable is commissioned, the TRA would likely declare the Kosrae cable to be a bottleneck facility following its commissioning. Prior to making any such decision, the TRA would repeat the assessment here at the relevant time.

Terrestrial Facilities

Stakeholder views

- 112 FSMTC submitted that:

³² TRA, “Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021”, p. 9, available at: <https://tra.fm/wp-content/uploads/2021/07/Comments-Received-Bottleneck-Facilities-.pdf>

- it is practicable for a potential competitor to build a terrestrial fiber optic facility
- the cost to build, maintain and operate (including cost of personnel) a terrestrial fiber optic network is the key determinant of whether that fiber optic network can practicably be duplicated
- The TRA need to consider separately (1) areas where fiber is duplicated, (2) areas where only one fiber network exists, and (3) areas where no fiber is constructed.
- FSMTC does not differentiate by product (i.e. point-to-point vs FTTH).

113 iBoom submitted that “Duplicating a fiber access network that connects everyone makes no financial sense... and only hurts the people and the end users.”³³

114 CPUC, OAE and DTC&I agreed that it does not make any economic sense to duplicate terrestrial infrastructure, with CPUC stating “we cannot make the economic business case to cover all of Weno. Duplicating the network is not financially possible.” And DTC&I added that the economies of scale in a small market like FSM needs to be taken into account, along with the expected return of investment and high cost of services for the business products.³⁴

115 During the public conference on bottleneck facilities, CPUC raised the point that “you can duplicate, but why would a public corporation duplicate cost to the people. It is not practical to have customers cover the costs (of duplication).”³⁵

Other evidence and analysis

Relevance of costs

116 The definition of “bottleneck facilities” in the Act specifies that the reasons why a facility cannot practicably be duplicated must be either “technical reasons” or “economies of scope and scale and the presence of sunk costs.” There is no evidence of technical³⁶ reasons why a potential competitor could not duplicate a terrestrial fiber optic network, therefore in these circumstances, the TRA agrees with FSMTC’s view on the key factor to assess whether duplication is practicable.

117 No parties submitted evidence of costs associated with building, maintaining or operating a terrestrial fiber network.

118 During the public conference, iBoom commented on the cost of establishing a point-to-point network, stating “It is very costly when you are starting from scratch... it is cost prohibitive, and unless you are very passionate for the people then nobody in their right

³³ TRA, “Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021”, available at: <https://tra.fm/wp-content/uploads/2021/07/Comments-Received-Bottleneck-Facilities-.pdf>

³⁴ “Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021”

³⁵ TRA Bottleneck Facilities Public Conference 14 July 2021 – 01:38:00 in accessed recording

³⁶ Possible “technical reasons” include, without limitation, inability to access land, poles or rights of way necessary to build a duplicate fiber facility.

mind as a competitor would have proceeded to duplicate the terrestrial fiber network on Yap."³⁷

- 119 Some information on the potential costs of building a FTTH network is available from public and confidential sources.
- OAE estimate of \$4-5 million to build an FTTH network across the FSM, with a further \$4-5 million to install drop wires to connect residences and businesses to that network.³⁸
 - FSMTC has estimated a total cost of approximately ██████████ to complete FTTH infrastructure. This includes ██████████ to reach up to 2,800 premises in Kosrae, ██████████ up to 2,000 premises in Yap and ██████████ up to 7,650 premises in Pohnpei.³⁹
 - The World Bank, through the Digital Federated States of Micronesia Project, estimate costs of up to \$12 million for "constructing and installing domestic fiber optic and wireless networks and related infrastructure to strengthen domestic internet and telecommunications connectivity."⁴⁰
- 120 Using a simple building blocks revenue recovery calculation, the TRA has modelled, at a high level, the required average revenue per user for a potential new entrant private operator to recover only the costs of building and operating its own FTTP network ("FTTP ARPU").
- 121 We used the following assumptions:
- A new entrant builds and operates their own FTTP network in Kosrae, Yap and Pohnpei (rather than getting access to an existing network)
 - The new entrant's capital costs will be similar to those expected by FSMTC, the World Bank and OAE, though the investor will have to use private capital, rather than grant funding
 - The new entrants' operating costs will be similar to those expected by OAE for operating its FTTP network
 - The new entrant will gain 50% market share once established.

³⁷ TRA Bottleneck Facilities Public Conference 14 July 2021 – 01:33:40 in accessed recording

³⁸ The OAE estimates that building the terrestrial fiber network along roads will cost an estimated \$4-5 million and that connecting individual homes and businesses to that network will cost an additional \$4-5 million. <https://fsmcable.com/2020/11/24/press-release/>

³⁹ Email correspondence between FSMTC and TRA, 20 April 2020

⁴⁰ World Bank, "Digital Federated States of Micronesia Project Appraisal Document", page 15 available at: <https://documents1.worldbank.org/curated/en/432601585596558171/pdf/Federated-States-of-Micronesia-Digital-Federated-States-of-Micronesia-Project.pdf>

122 We then also modelled the FTTP ARPU required by a new entrant that, instead of building its own FTTP network, gained access to an existing network. We modelled two scenarios:

- Firstly, assuming that the existing network is a grant-funded network of the kind OAE in planning to build, with tariffs at the level announced by OAE
- Secondly, assuming that the existing network is a privately-funded network, and the incumbent granting access would seek to recover its reasonable costs.

123 Our analysis showed that, on average over the first 10 years of operation, the FTTP ARPU required by the new entrant if building and operating its own network would need to be higher by:

- \$501 per year (\$42 per month) than when accessing an existing commercially-funded network
- \$870 per year (\$72 per month) than when accessing an existing grant-funded network

124 The increases in retail tariff would be much larger if the new entrant targeted just one geographic market. This is because operating costs and overheads would need to be spread over a smaller number of customers.

125 In FSM, \$42 is a very large monthly premium on tariffs. Such a premium would likely make it impossible for the new entrant to win any material market share against an incumbent with an existing FTTP network.

126 A key insight from our modelling is that two operators sharing one FTTP network (even if that network is privately funded) would reduce the total FTTP revenue requirement by \$2.9 million per year on average over the first 10 years of operation. If passed onto consumers through competition, this would be a significant saving. On the other hand, if the two operators compete using two separate networks, customers will be burdened with an additional \$2.9 million in charges annually.

Relevance of type of geographic area

127 FSMTC submits it has built terrestrial fiber networks in Yap, Weno, much of Pohnpei, and is starting to build in Kosrae. Based on the description, this appears to be FTTP. FSMTC reports that, as at the end of September 2021, it has [REDACTED], spread across Chuuk, Pohnpei and Yap.

128 It is likely that FSMTC has also built point-to-point fiber in these locations. It is unclear whether the FTTP network consists primarily of primary fiber on main roads or whether it also includes secondary fiber extending into neighborhoods, and whether the FTTP network is "centralized" or "cascaded" (if the latter, might not be easily used for point-to-point – this is relevant to practicable duplicability).

129 iBoom has built some fiber on Yap which appears at this time to be a point-to-point fiber connecting two or three locations.

- 130 There is no evidence any other person has built terrestrial fiber, whether point-to-point or FTTP, at this time.
- 131 Therefore, the evidence suggests there are currently no areas where FTTP is duplicated, and only one area where point-to-point is duplicated (part of Yap). There are several areas where one FTTP fiber optic facility and possibly point-to-point fiber optic facilities (based on presence of FTTP) are currently built (Yap, Weno, much of Pohnpei, and possibly part of Kosrae). There are many areas where no fiber exists (i.e. rest of country).

Duplication of FTTP network facilities

- 132 In regards to the likelihood of duplication being practicable in the near future, OAE has expressed interest in building FTTP in Yap, Chuuk lagoon (i.e. excluding Weno), Pohnpei and Kosrae. In other words, OAE has effectively decided not to duplicate the FSMTC FTTP fiber optic facility in Weno. OAE considers it a sub-optimal use for funds to duplicate FSMTC's fiber on Weno. OAE states it needs access to fiber to connect to FSMTC radio towers (which are considered bottleneck facilities) to provide connectivity to service providers to allow them to provide services on the islands of Tonowas, Udot and Eot.⁴¹
- 133 The TRA considers the total addressable market to be premises with electricity. Per OAE, the total number of such premises outside of Chuuk is 8,112.⁴² On Chuuk, FSMTC's current fiber network passes at least [REDACTED] homes. The cost estimates to construct an FTTP network to serve the potential customers outside Chuuk range up to \$12 million. It is challenging to cover the costs of building such a network, let alone the costs of maintaining and operating it, given the small customer base.
- 134 However, the question is not whether it would be practicable to build but whether it would be practicable to duplicate the FTTP network, i.e. taking into account the fact that a competitor would already have built a network and would be serving part of the market. In this scenario, the potential competitor would have to incur the full cost of building, maintaining and operating the FTTP network, but it is reasonable to assume it would be able to gain only part of the potential market given that part of the total addressable market would already be served. This is not likely economically practicable.
- 135 As noted above, our modelling suggests that, even with a generous assumption of winning 50% market share, a new entrant trying to recover such an investment would need to increase the FTTP component of their retail tariff by some \$42 to \$72 per month (compared to what they could charge if they were able to access an existing network).
- 136 **Draft Decision:** duplication of an FTTP fiber optic facility on islands where one exists is not practicable for economic reasons.

⁴¹ TRA, "Comments Received Bottleneck Facilities Consultation: 1 June – 25 June 2021", available at: <https://tra.fm/wp-content/uploads/2021/07/Comments-Received-Bottleneck-Facilities-.pdf>

⁴² FSMTC Cable (2020), "FSM Wholesale Connectivity – Introduction for potential service providers", available at" <https://fsmcable.com/wp-content/uploads/2020/11/High-level-OAE-overview-for-RSP-2020.pdf>

- 137 In the event that a FTTP fiber optic facility is duplicated by new FTTP fiber optic facilities, the TRA would repeat the assessment here at the relevant time in order to determine whether FTTP facilities in that area continue to be bottleneck facilities.
- 138 Islands where no FTTP facilities exist are even less densely populated. Therefore, the factors that make duplication of an FTTP facility not practicable where FTTP already exists (high costs, small customer base) are magnified. If duplication is not practicable on islands where FTTP facilities currently exist, it is likely less practicable on islands where FTTP facilities do not currently exist.
- 139 Therefore, unless material changes take place in the market between now and the time that FTTP facilities are commissioned on other islands, the TRA would likely declare such facilities to be bottleneck facilities following their commissioning. Prior to making any such decision, the TRA would repeat the assessment here at the relevant time.

Duplication of point-to-point fiber facilities

- 140 There is limited information on the record on the cost to build point-to-point fiber facilities. However, generally speaking, point-to-point facilities require lower capital cost to build because fewer physical assets are required. However, they are also smaller in scope, as they serve specific individual customers or provide backhaul for segments of a communications network.
- 141 If already built, the incumbent has some amount of influence over the likelihood of the facility being duplicated—the needs of the relevant customer have been met and the incumbent has incurred sunk costs. The incumbent knows that the customer may switch to another service provider if offered a better price or a better service, or both.
- 142 Acting rationally, the incumbent would seek to price competitively in a way that ensures any new entrant could not offer a better price. Nevertheless, operators and customers do not always act rationally. In practice, bypassing of incumbent networks by specialised competitors targeting large customers happens regularly in other markets. It is reasonable to expect this could also happen in FSM.
- 143 If not already built, whether the facility would ever be duplicated (as opposed to being built) would depend on the same considerations: once built, the facilities represent sunk costs and the owner, acting rationally, would seek to avoid bypass of its facilities.
- 144 However, in both instances, the relatively high revenues per individual customer (compared to the unit costs) for point-to-point connections mean that duplication of the facility (or replication with a microwave connection, as discussed earlier) is a distinct possibility.
- 145 Note the presence of pre-existing facilities does not necessarily mean any additional facilities are duplicates, for example, when the pre-existing facilities are fully utilized.
- 146 **Draft Decision:** In many cases, point-to-point terrestrial fiber optic facilities can be practicably duplicated. The TRA does not intend to declare all point-to-point fiber facilities to be bottleneck facilities. If any licensees consider that there is a case for specific point-to-point facilities to be declared bottlenecks, the TRA will assess those facilities individually on a case-by-case basis. Such an assessment will include an

assessment of whether, in that specific case, the potential access seeker can access poles, rights of way, or other inputs necessary to build its own duplicate facility.

- 147 Thus, while in general point-to-point fiber might be duplicable, it may be that in some parts of the geographic market it is not in practicably duplicable and a declaration of bottleneck facility might be necessary.

Annex – List of defined terms

The TRA	The Telecommunication Regulations Authority
The FSM	The Federated States of Micronesia
The Act	The FSM Telecommunications Act of 2014
FSMTC	Telecommunications Corporation of the Federated States of Micronesia
The OAE	FSM Telecommunications Cable Corporation
DTC&I	The Department of Transportation, Communications, & Infrastructure
CLS	Cable landing station
DSL	Digital subscriber line

Attachment 1 - Comments Form



Feedback on Draft Decision: Bottleneck Fiber Optic Communications Facilities

Information of commenting party

Full name		
Organization		
Phone number		
Email		
Is confidential information being submitted?	Y/N (Specify below)	

Comments

	Comment	Proposed changes	Confidentiality ⁴³
<i>Paragraph Number or Section of Draft Decision that Comment Pertains To</i>	<i>Please describe comments on specific section or question. Please be as detailed as possible and explain why you hold your views and what the potential impact of the Authority's draft decision would be</i>	<i>Please suggest an alternative to the draft decision (if applicable)</i>	<i>If confidential, please explain reasons for confidentiality request</i>
<i>(Insert rows as needed)</i>			

Please complete this form in full and submit to consultations@tra.fm or in person before **February 4, 2022** to:

Takuro Akinaga
 Chief Executive
 FSM Telecommunication Regulatory Authority
 Suite 1A, Varner-Boylan Building
 Pohnumpomp, Nett Municipality
 Pohnpei FM 96941, Federated States of Micronesia

⁴³ Confidentiality requests are managed under the rules set out in Section 322 of the Telecommunications Act. Respondents should clearly mark which information is claimed as being confidential and should provide reasons of what commercial harm will result should the information be published. Respondents who make a request for confidentiality should also provide a redacted copy of their submission, with all confidential information removed, that the TRA may publish.



Federated States of Micronesia
Telecommunication Regulation Authority
P.O. Box 1919 Pohnpei FM 96941
Tel: +691 320-2812 <http://www.tra.fm>

August 20, 2020

Mr. Fredy Perman
CEO, FSM Telecommunications Corporation
Mr. Pieter Bakker
CEO, FSM Telecommunications Cable Corporation
Mr. Lubuw Falanruw
Owner, Boom!, Inc.
Mr. Kembo Mida
CEO, Chuuk Public Utility Corporation

Gentlemen,

Thank you for participating in the TRA's July 14th, 2021, public conference on bottleneck facilities. A summary of the messages from attendees, and matters raised by the TRA, that emerged in the discussion that are relevant to progressing TRA's thinking on whether particular fiber optic communications facilities should be declared bottleneck facilities is attached to this letter and will be posted on our website, and we will take it into account in our decision-making.

Following the discussion at the public conference, we consider that additional information would be useful to our decision-making. Pursuant to our powers under section 379 of the Telecommunications Act 2014 (*Requirement to supply information or documents or give evidence*), we require that you answer the following questions. We will use your answers in deciding whether, and to what extent, fiber optic communications facilities are bottleneck facilities for the purposes of the Act.

1. Do you currently offer, or plan to offer within the next 12 to 24 months, broadband Internet access service?
2. If yes, do you currently offer it, or plan to offer it, to retail customers only, other licensees only, or both?

3. In which geographic areas, for example, in which islands, and if relevant in which municipalities, do you currently offer or plan to offer the service?
4. Which of the following communications facilities do you currently use, or plan to use, to provide the service? If more than one, also indicate the predominant facility that you currently use, or plan to use.
 - submarine fiber optic cables
 - terrestrial fiber optic cables
 - terrestrial copper cables
 - satellites
 - other
5. If you have already built the communications facilities, indicate separately for each of them and by geographic area where you currently offer or plan to offer service, the percentage of the customers' premises (homes or businesses) passed that already have the technical and commercial means to be connected to the network (i.e. no further construction or reconfiguration of the facilities is required, other than installation of a copper or fiber drop wire or a satellite terminal).
6. If you are currently offering or planning to offer the service using communications facilities:
 - a. you have built: what were your costs of construction and are your annual costs of operation and maintenance of the communications facilities; or
 - b. that you plan to build: what are your estimated costs of construction and annual costs of operation and maintenance of the communications facilities?

Provide this information by the smallest of the following geographic areas for which information is readily available:

- State
 - Island
 - Municipality
7. What are your existing or anticipated non-recurring (one-time) and monthly recurring prices for the service, and, as applicable, associated usage caps or limits, upload and download speeds, availability,

latency, jitter, and delay? If you have more than one plan, provide the information for the lowest- and highest-priced plans.

8. Describe any other factors which may affect the quality of service offered to customers.
9. Describe in detail any factors which have adversely affected or are anticipated to adversely affect your costs to construct, operate and maintain the communications facilities in question (e.g. access to land or rights of way, access to skilled personnel, etc.)

Please respond **by no later than 5pm September 10th, 2021.**

When responding to the above questions, please indicate whether and explain why you consider any of the information to be "sensitive information" as defined in section 322 of the Act. We may publish some or all of your answers to the questions, unless it is "sensitive information."

Sincerely,



Takuro Akinaga
Chief Executive



Federated States of Micronesia
Telecommunication Regulation Authority
P.O. Box 1919 Pohnpei FM 96941
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Key Messages Raised in the Public Conference on Bottleneck Fiber Optic Communications Facilities

20 August 2021

Introduction

The TRA hosted a public conference on Bottleneck Fiber Optic Communications Facilities by Zoom on 14 July 2021. The conference was attended by representatives of FSMTC, OAE, CPUC, Boom! Inc. and DTC&I.

The TRA is grateful for the extensive discussion and contributions by the stakeholders in attendance. The TRA notes that much of the discussion among attendees was general, and often related to stakeholders' views on a range of topics, including relationship matters and ongoing disputes between licensees, the appropriateness and validity of the regulatory regime, the role of the TRA, and the merits of telecommunications competition in FSM. To the extent such topics are not relevant to answering the question of whether certain fiber optic communications facilities are bottleneck facilities, they are not included in this summary and will not form part of the record of this consultation.

This summary is not a transcript of the proceedings, nor does it seek to summarize all of the discussion. The summary focuses on messages from attendees, and matters raised by TRA, that emerged in the discussion that are relevant to progressing TRA's thinking on whether particular fiber optic communications facilities should be declared bottleneck facilities pursuant to the Telecommunications Act 2014.

Key Messages Raised in the Public Conference

We summarize below the key messages presented by attendees during the conference. These represent the views of the attendees and not the TRA's own views or decisions on the matters.

1. Facilities should not be considered holistically. Subsea cables should be analyzed individually, and terrestrial facilities should be analyzed by geographic area.
2. A single physical facility access to which is controlled by a single party may need to be considered differently to a single physical facility where arrangements are already in place to allow access for more than one party.

An example of this is the Pohnpei spur of the HANTRU 1 cable. FSMTC owns the cable, but provides access to half of the spectrum on the cable to FSMTCC pursuant to the Indefeasible Right of Use Deed that is in place between the two entities.

3. While most facilities can technically be duplicated, the key issue is whether it is practicable to do so. The main determinant of whether it is practicable to duplicate the facility will be the cost of procuring, operating and maintaining the facility.
4. Where subsea cables are controlled by a sole party, while it is technically possible to duplicate the facility, it is not practicable to do so because of the high cost of procuring and installing a new cable.
5. The costs of duplicating terrestrial fiberoptic facilities in FSM may differ materially by region, including between different:
 - a. States
 - b. islands within a single State
 - c. distinct areas on a single island

For example, duplicating a fiberoptic network in a major population center where a submarine cable landing station already exists will likely be cheaper than in less densely populated and more remote parts of the same island.
6. Where some geographic areas have a fully developed terrestrial fiber network (for example Weno), and others do not, this may be a sign of differing market characteristics, and potentially different considerations when deciding whether a facility in each area should be declared a bottleneck.
7. Facilities that are planned, but not yet built (like the submarine cable to Kosrae) may need to be considered differently to existing facilities.
8. An important relevant consideration is whether satellite facilities are sufficiently strong substitutes to fiber facilities for the purposes of both:
 - a. international/inter-island connectivity, and
 - b. providing services to individual retail consumers
9. In considering the above, it is important to examine whether satellite services can provide access:
 - a. to the same set of retail consumers as terrestrial fiber
 - b. at a quality that is sufficiently comparable to fiber
 - c. at a price that is sufficiently comparable to fiber.

Appendix 2 – 27 September 2021 sample information request



Federated States of Micronesia
Telecommunication Regulation Authority
P.O. Box 1919 Pohnpei FM 96941
Tel: +691 320-2812 <http://www.tra.fm>

September 27, 2021

Mr. Fredy S. Perman
CEO/President
FSM Telecommunications Corporation
P.O. Box 1210
Kolonia, Pohnpei FM 96941

Dear Fredy,

The TRA greatly appreciates your answers to the questions set out in our letter of 20 August. Having reviewed the answers provided by all parties, we consider that additional information would be useful to our decision-making. In order to progress the TRA's work on whether particular fiber optic communications facilities should be declared bottleneck facilities, the TRA requires additional specific information on the minimum standards and unit costs of providing services that your organization has achieved, or is planning to achieve, using fiber optic or alternative facilities.

Pursuant to our powers under section 379 of the Telecommunications Act 2014 (*Requirement to supply information or documents or give evidence*), we require that you provide the following information. We will use the information in deciding whether, and to what extent, fiber optic communications facilities are bottleneck facilities for the purposes of the Act. For ease of collating the responses, Appendix 1 provides a response template that we would appreciate you filling out. We will also provide the template in the form of an excel file, and would appreciate you submitting your response electronically if possible.

Minimum standard of service

1. Please indicate the minimum standard of service that you are currently achieving or plan to sustainably achieve (whichever is superior) for approximately 99% (or other percentage as indicated by you) for the telecommunications services that you are providing or receiving. Please provide at least:
 - a. the upload speed on the connection
 - b. the download speed on the connection
 - c. the latency on the connection
 - d. the jitter on the connection
 - e. the availability of the connection in terms of percentage of time the connection is available and achieving the indicated speeds and latency in a typical year,

for each of the following services if they are relevant to you (you either supply these services or purchase them in order to enable you to supply telecommunications services to customers):

- a. Satellite backhaul services to enable internet traffic to flow to and from FSM and between islands in the FSM
- b. Submarine backhaul fiber services to enable internet traffic to flow to and from FSM and between islands in the FSM
- c. Fiber to the Premise (FTTP) broadband services for a typical household or small business
- d. Fixed Wireless broadband for a typical household or small business
- e. Satellite to customer services for a typical household or small business
- f. Digital Subscriber Line (DSL) broadband services using copper wires for a typical household or small business

We expect that, at a minimum, the above items a to f would be applicable for your organization.

To the extent that targeted or achievable service levels for each service materially differ by geographic area within FSM, please provide the above information broken down by relevant geographic area and an explanation of what causes the material difference in service levels. To do this, please insert additional rows where relevant in the response template and specify the relevant geographic location.

Unit costs and average revenues

2. For the services that you included in your answer to Question 1 please provide the approximate unit cost you are paying or plan to pay your suppliers (if you are purchasing the service), or the average revenues you are earning or plan to earn from your customers (if you are selling the service) as follows:
 - a. for satellite backhaul services, please provide the unit cost or average revenue per Gbps per month
 - b. for submarine backhaul fiber services, please provide the unit cost or average revenue per Gbps per month
 - c. for FTTP services, please provide the unit cost or average revenue per connection per month
 - d. for Fixed Wireless services (if relevant)
 - e. for satellite to customer services please provide the unit cost or average revenue per connection per month
 - f. for DSL services please provide the unit cost or average revenue per connection per month

Please identify whether your customers are or will be other licensees or retail end-users. If you supply or plan to supply services to both, report your prices or proposed prices to each separately.

To the extent that the unit costs or average revenues for each service materially differ by geographic area within FSM, please provide the above information broken down by relevant geographic area and an explanation of what causes the material difference in cost or revenue levels. To do this, please insert additional rows where relevant in the response template and specify the relevant geographic location.

Please respond **by no later than 5pm October 15th, 2021**.

When responding to the above questions, please indicate whether and explain in detail why you consider any of the information to be “sensitive information” as defined in section 322 of the Act. We may publish some or all of your answers to the questions, unless it is “sensitive information.”

Sincerely,



Takuto Akiyama
Chief Executive

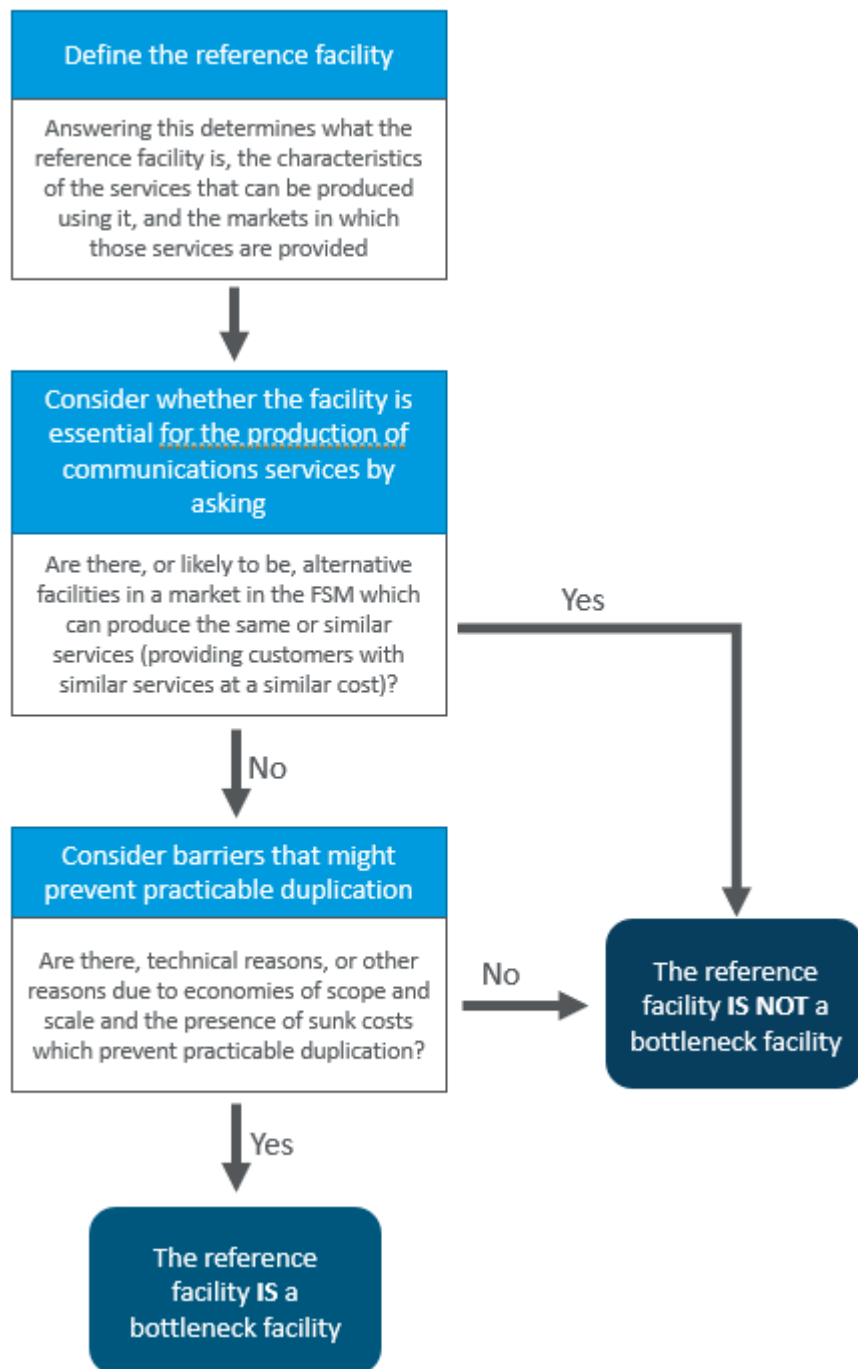
Appendix 3 – Summary of 20 August 2021 information request responses

August 20 letter responses		
Question	Response	
1) Do you currently offer, or plan to offer within the next 12 to 24 months, broadband Internet access service?	<p>Yes: CPUC, FSMTC, Kacific</p> <p>No: OAE (Not allowed to offer retail services by law)</p>	
2) If yes, do you currently offer it, or plan to offer it, to retail customers only, other licensees only, or both?	<p>Retail only: FSMTC (currently)</p> <p>Other licensees: FSMTC (no objection for a fair price)</p> <p>Both: CPUC, Kacific</p>	
3) In which geographic areas, for example, in which islands, and if relevant in which municipalities, do you currently offer or plan to offer the service?	<p>CPUC: Plans to offer in Chuck State, prioritising electrified or soon to be electrified islands.</p> <p>OAE: The 4 main island states and some islands in the Chuuk Lagoon.</p> <p>FSMTC: Kosrae, Pohnpei main island (including Ahnd and Pakin), Weno, Chuuk, the lagoon islands, outer islands (satellite only) and main island of Yap (satellite only)</p> <p>Kacific: Everywhere except Yap</p>	
4) Which of the following communications facilities do you currently use, or plan to use, to provide the service> If more than one, also indicate the predominant facility that you currently use, or plan to use.	Submarine fiber optic cables:	CPUC (predominant), OAE (Currently in use)
		FSMTC
	Terrestrial fiber optic cables:	OAE (Planned)
		CPUC
		FSMTC (predominant)
	Terrestrial copper cables:	FSMTC
Satellites:		CPUC
		FSMTC
		Kacific
Other:	CPUC: Wireless (WiFi, microwave, and millimeter-wave)	
	FSMTC: Hyrid satellite with fiber or copper	

<p>your annual costs of operation and maintenance of the communications facilities; or</p> <p>b. that you plan to build: what are your estimated costs of construction and annual costs of operation and maintenance of the communications facilities?</p> <p>Provide this information by the smallest of the following geographic areas for which information is readily available: • State • Island • Municipality</p>	<p>Kacific: [REDACTED]</p> <p>FSMTC: [REDACTED]</p>
<p>7) What are your existing or anticipated non-recurring (one-time) and monthly recurring prices for the service, and, as applicable, associated usage caps or limits, upload and download speeds, availability, latency, jitter, and delay? If you have more than one plan, provide the information for the lowest- and highest-priced plans.</p>	<p>b)</p> <p>CPUC: is still in the planning stages of the wireless networks it will provide. CPUC intends to use OAE provided backhaul to connect wireless equipment back to CPUCs main network location in Weno.</p> <p>OAE: Unclear at this moment. A fiber network design program is ongoing. The outcome will give input for grant-funded network build out and associated annual costs for O&M</p> <p>CPUC: CPUC has not finalized pricing, but expects to offer faster speeds at lower prices than FSMTC based on the input pricing that OAE has published, both for access connections and for international connectivity</p> <p>OAE: Not relevant for OAE.</p> <p>Kacific: unlimited satellite (Download/upload speed):</p> <p>Residential (20/5 Mbps) – \$128</p> <p>Enterprise (35-150/5-30) – \$174 - \$6,480</p> <p>VSAT equipment – \$940</p> <p>FSMTC: [REDACTED]</p>

<p>8) Describe any other factors which may affect the quality of service offered to customers.</p>	<p>CPUC: 1) Access to the Pohnpei spur, HANTRU-1 cable. 2) Access to terrestrial optical fiber installed on Weno</p> <p>OAE: Non-payment by OAE customers i.e., licensed operators may lead to an inability of OAE to pay its vendors and impact service level agreements</p> <p>FSMTC:</p> <p>a) Satellite services will be direct competitors, will add costs to fiber based retailers, and should be considered in any determination of a bottleneck facility as it provides the same service as fiber</p> <p>b) OAE is paying unrealistic wages (at inflated rates) paid for by grant funding</p> <p>c) OAE’s slow progress makes planning for future costs difficult</p> <p>d) Future bottleneck pricing needs to be fair and with TRA and all parties providing input to form agreed prices</p> <p>e) Prices/fees to OAE should also be discussed with all retailers before a determination of any bottleneck facilities</p> <p>f) FSMTC have concerns about how owners of bottleneck facilities will be compensated for allowing competitors to use such facilities</p> <p>Kacific: N/A</p>
<p>9) Describe in detail any factors which have adversely affected or are anticipated to adversely affect your costs to construct, operate and maintain the communications facilities in question (e.g. access to land or rights of way, access to skilled personnel, etc.)</p>	<p>CPUC: CPUC has requested access to FSMTC towers in order to provided CPUC network wireless backhaul to the lagoon islands. FSMTC has yet to provide a response, and CPUC may have to resort building its own towers, duplicating land procurement and infrastructure installation.</p> <p>OAE: Not relevant for submarine fiber but may become relevant for terrestrial fiber in the future.</p> <p>FSMTC: FSMTC is concerned about how the TRA is determining this issue of a bottleneck facility. This issue cannot be determined at the present time until the OAE is clear about its plans for building FTTH. If OAE is going to build a separate FTTH facility in any of the locations at issue, then it is premature to address the issue of bottleneck facility as there will not be a bottleneck. In order to address this fundamental issue OAE has to provide its plans, along with its business models and feasibility studies.</p> <p>Kacific: N/A</p>

Appendix 4 – Bottleneck facility determination methodology



The Authority has made, and hereby publishes, a [draft] determination that the following facilities are bottleneck facilities for the purposes of the FSM Telecommunications Act of 2014

- All submarine fiber optic cable facilities, including any ancillary equipment necessary for the operation of the cable (such as Power Feed Equipment) that have been built as of the date of this decision. For clarity, these are:
 - (a) The Yap Spur, consisting of the physical submarine cable from the Yap cable landing station to and including the branching unit on the SEA-US submarine cable system and access to capacity to international termination in Guam;
 - (b) The Chuuk- Pohnpei Cable, consisting of the physical submarine cable from the Chuuk cable landing station to the Pohnpei cable landing station; and
 - (c) The Pohnpei Spur, consisting of the physical submarine cable from the Pohnpei cable landing station to and including the branching unit on the HANTRU-1 submarine cable system and access to capacity to international termination in Guam.
- All fiber to the premise (FTTP) network facilities, consisting of optical fiber from and including the distribution frame in the exchange(s) to and including the termination point in the relevant customer premises, on islands where FTTP network facilities have been built as of the date of this decision. For clarity, these are Yap, Weno and Pohnpei.