Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2021

TATT: 2/17/8

March 16, 2021

Maintenance History		
Date	**Change Details**	**Version**
March 28th, 2017	Consultative study issued for first round of consultation (the "Initial Report")	0.1
June 4th, 2019	Revised Report issued for second round of consultation (the "Revised Report")	0.2
March 16th 2021	Final Report (Updated 2021 Report)	0.3

Note: Questions or concerns regarding the maintenance of this document may be directed to the Authority via e-mail to info@tatt.org.tt.

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List of Abbreviations

BBD	Barbadian Dollar
BEREC	Body of European Regulators of Electronic Communications
BU-LRIC	bottom-up long-run incremental cost
CPP	calling party pays
XCD	East Caribbean Dollar
EU	European Union
FWI	French West Indies
FDC/FAC	fully distributed/allocated costs
FICC	fixed international carriage charge
FTR	fixed termination rate
GDP	gross domestic product
ICC	international carriage charge
IFTR	international fixed termination rate
IMTR	international mobile termination rate
JMD	Jamaican Dollar
LCU	local currency unit
LRAIC	long-run average incremental cost
LRIC	long-run incremental cost
LRIC+	LRIC with a markup
MICC	mobile international carriage charge
MTR	mobile termination rate
NRA	national regulatory agency
RIAO	Reference Interconnection and Access Offer
RPP	receiving party pays
SCI	Sepulveda Consulting Inc.
SMS	short message service
TATT	Telecommunications Authority of Trinidad and Tobago
TR	transit rate
TTD	Trinidad and Tobago dollars
TCI	Turks and Caicos Islands
USD	US dollars

Executive Summary

To date, the Telecommunications Authority of Trinidad and Tobago (the Authority or TATT) has issued two interconnection benchmarking reports, both of which were based on a benchmarking study conducted on the Authority's behalf by Sepulveda Consulting Inc. (the 2016 SCI Study). The first report was issued in March 2017, *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago* (the Initial Report) and the second report was issued in May 2019, *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2019* (the Revised Report). The two Reports were issued in turn for consultation purposes and, as a result, the Authority received extensive comments on both. The Revised Report was produced in response to the stakeholders' comments on the Initial Report.

Based on the passage of time since the Initial Report was issued and stakeholders' comments on the Revised Report, the Authority determined that the 2016 SCI Study should be updated to incorporate recent benchmarking data. The Authority once again contracted SCI for this purpose. The 2016 SCI Study relied on historical interconnection rate benchmarking data to December 2016. The updated 2021 SCI Study (named the Results of an Interconnection Benchmarking Study for Trinidad and Tobago, 2021) adds an additional four years of data and is thus based on historical interconnection rate benchmarking data to December 2020. The results of the updated 2021 SCI Study are presented in this Updated 2021 Report.

The Initial Report, Revised Report and now this Updated 2021 Report have been undertaken by the Authority in compliance with regulation 15 of the *Telecommunications (Interconnection) Regulations (2006)* (the Interconnection Regulations), which allows for the establishment of "costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks". The Authority's objective in undertaking this process was to establish recommended costing benchmarks for the MTR and FTR and the mobile international carriage charge (MICC) and the fixed international carriage charge (FICC), based on which, combined with the MTR and FTR, the international mobile termination rate (IMTR) and the international termination rate (IFTR) may be determined. Having now established these recommended costing benchmarks via the current Updated 2021 Report, the Authority intends for these benchmarks to serve as rate "maxima", so that if implemented pursuant to regulation 15(2), operators would be free to set interconnection rates at or below the rate maxima.

In summary terms, the benchmarking methodology used to establish the Authority's recommended costing benchmarks for the MTR and FTR consists of the following steps:

i) **Establishment of Benchmarking Samples**: A set of seven benchmarking sample selection criteria are used to select benchmarking jurisdictions (i.e., countries and/or territories) that are closely comparable to Trinidad and Tobago for benchmarking purposes.

ii) **Determination of Benchmark Averages**: Two alternative historical interconnection rate benchmark averages are determined for benchmarking purposes – the "all sample" and the "cost-based sample" averages. The former includes all benchmarking sample jurisdictions regardless of the methodology used to set interconnection rates, whereas the latter includes only jurisdictions with cost-based interconnection rates.

iii) **Benchmark Average Rate Projections**: As part of the benchmarking analysis, both benchmark averages are projected to March 2024.

iv) **Determination of "End-Point" Benchmark Rates:** To determine "end point" March 2024 benchmark rates, projected rate levels for both the all and cost-based sample average rates are considered. The cost-based average is treated as a "lower bound" and the all sample average as an "upper bound" for the end-point interconnection rate benchmarks.

v) **Normalisation Adjustment and Sensitivity Analyses**: A detailed normalisation analysis was conducted to determine whether demographic, socio-economic and other environmental differences between the benchmarking sample jurisdictions and Trinidad and Tobago warrant any adjustments to the end-point benchmarks (either upwards or downwards). Additionally, an extensive set of sensitivity analyses were conducted to ensure the robustness of the results.

vi) **Glide-path to the End-Point Benchmark Rates**: A three-year glide-path is used to transition current interconnection rates in Trinidad and Tobago to the established end-point benchmark rates.

The Authority also updated the recommended costing benchmarks MICC and FICC by taking into account the analysis and observations relating to international call termination rates included in the December 2019 Arbitration Panel Report[1]. As a result, a uniform recommended costing benchmark for both the MICC and FICC is developed, based on which, (in combination with the MTR and FTR), the IMTR and IFTR may be determined. As with the domestic MTR and FTR, a three-year glide-path approach is adopted to transition to the MICC/FICC and IMTR/IFTR recommended costing benchmarks. Given the different starting points for the MICC and FICC, the uniform recommended costing benchmark is reached only at the end of the glide-path period.

[1] https://tatt.org.tt/AboutTATT/RegulatoryFramework/Disputes/Decisions.aspx

Table 1 summarises the Authority's updated recommended costing benchmarks for fiscal years 2021/22, 2022/23 and 2023/24, in US dollars (USD) and Trinidad and Tobago dollars (TTD).

Table 1. The Authority's Recommended Costing Benchmarks

Interconnection Rates	Currency*	Recommended Costing Benchmarks		
		April 2021 to March 2022	April 2022 to March 2023	April 2023 to March 2024
Domestic Mobile Termination Rate (MTR)	TTD	0.200	0.134	0.063
	USD	**0.0300**	**0.0200**	**0.0095**
Domestic Fixed Termination Rate (FTR)	TTD	0.0367	0.0267	0.0180
	USD	**0.0055**	**0.0040**	**0.0027**
Mobile International Carriage Charge (MICC)	TTD	0.321	0.180	0.043
	USD	**0.0480**	**0.0270**	**0.0065**
Fixed International Carriage Charge (FICC)	TTD	0.090	0.063	0.043
	USD	**0.0135**	**0.0095**	**0.0065**
International Mobile Termination Rate (IMTR)	TTD	0.521	0.314	0.106
	USD	**0.0780**	**0.0470**	**0.0160**
International Fixed Termination Rate (IFTR)	TTD	0.127	0.090	0.061
	USD	**0.0190**	**0.0135**	**0.0092**

*Note: * The recommended costing benchmarks were calculated and determined in USD. The TTD equivalent values in this table is provided for "illustrative purposes" only and is based on the weighted average historical USD/TTD exchange rate used for benchmarking analysis (0.1497), as described in Section 3.4. The USD/TTD exchange rate may be different at the date of publication of this report and over the course of the three-year glide-path period. If so, at the start of each of the three glide-path years, interconnection rates could be restated in TTD, based on the TTD/USD exchange rate at that time.*

The updated benchmarking results in the 2021 SCI Study continue to indicate that the MTR and FTR, the MICC and FICC, and therefore the IMTR and IFTR, in Trinidad and Tobago are well above the corresponding recommended costing benchmarks and, therefore, above cost. The Authority considers that the implementation of the recommended costing benchmarks would potentially offer significant consumer benefits. Reductions in domestic interconnection rates would allow for potential reductions in average retail call prices. To the extent that lower interconnection rates do, in fact, lead to lower average retail call prices, increased use of mobile and fixed services by end users should be expected. This could also promote greater inter-operator (intra-modal) competition as well as fixed-mobile (inter-modal) competition. Additionally, to the extent that reduced interconnection rates lead to lower average retail prices, increased demand of both fixed and mobile wireless services could be expected.

It is also important to recognise that lowering call termination rates over time, to ensure they reflect costs as closely as possible, is an interconnection policy objective pursued by virtually all national regulatory agencies (NRAs). Consequently, the Authority is in step with international regulatory practice with respect to its recommended costing benchmarks included in this Updated 2021 Report.

1. Introduction

In 2016, the Telecommunications Authority of Trinidad and Tobago (the Authority or TATT) contracted an independent consulting firm, Sepulveda Consulting Inc. (SCI), to undertake an interconnection benchmarking study (the 2016 SCI Study). The Authority reported the results of the 2016 SCI Study in its *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago* (the Initial Report), which was issued for public consultation in March 2017 in accordance with the *Procedures for Consultation in the Telecommunications Sector of Trinidad and Tobago* (ver. 2.0, 2010) (the Procedures for Consultation).

Several interested parties submitted comments on the Initial Report in 2017 (the Round 1 Comments). The Authority contracted SCI again to assist in the preparation of responses to the Round 1 Comments and, based on those comments, to revise the Initial Report as necessary. In May 2019, the Authority issued the *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2019* (the Revised Report), which also included the Authority's responses to, and decisions on, the Round 1 Comments – i.e., the Authority's Decisions on Recommendations (the Round 1 DoRs). A number of interested parties submitted comments on the Revised Report in September 2019 (the Round 2 Comments).

In December 2019, an Arbitration Panel (the Panel) established pursuant to Section 82 of the Telecommunications Act issued a Report and Decision[2] (the Panel Report) in the context of an inter-operator dispute on a number of issues, including whether new proposed international mobile termination rate (IMTR) and international fixed termination rate (IFTR) were reasonable and in accordance with the relevant legislative and regulatory framework. The Panel Report included an analysis of and observations on the mobile international carriage charge (MICC) and fixed international carriage charge (FICC) and the IMTR and IFTR. The Authority considered the findings of the Panel Report in determining the recommended costing benchmarks for the MICC and FICC and, by extension, the IMTR and IFTR.

The Authority once again requested SCI's assistance with the preparation of responses to the Round 2 Comments and, given the passage of time, to update the 2016 SCI Study to incorporate current interconnection rate data and information. The results of the updated benchmarking study (the 2021 SCI Study) are included in this Updated 2021 Report, which also includes the Authority's Round 2 DoRs in relation to the Round 2 Comments.

[2] https://tatt.org.tt/AboutTATT/RegulatoryFramework/Disputes/Decisions.aspx

The 2016 SCI Study, on which the Initial and Revised Reports are based, relied on historical interconnection rate benchmarking data to December 2016. The updated 2021 SCI Study relies on historical interconnection rate benchmarking data to December 2020.

The Initial Report, Revised Report and now this Updated 2021 Report have been undertaken by the Authority in compliance with regulation 15 of the *Telecommunications (Interconnection) Regulations (2006)* (the Interconnection Regulations) which allows for the establishment of "costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks". The Authority's objective in undertaking this process was to establish recommended interconnection costing benchmarks for the domestic mobile termination rate (MTR), the domestic fixed termination rate (FTR), the MICC and FICC, based on which, in combination with the MTR and FTR, the IMTR and IFTR may be determined. Having now established these recommended costing benchmarks via the current Updated 2021 Report, the Authority intends for these benchmarks to serve as rate "maxima", so that if implemented pursuant to regulation 15(2), operators would be free to set interconnection rates at or below the rate maxima.

The Authority notes that ensuring that prices for interconnection services are cost oriented is a standard policy objective of national regulatory authorities (NRAs) around the world and is a policy objective equally pursued by the Authority. It is commonly accepted that moving wholesale call termination rates closer to costs promotes both static and dynamic (that is, longer term) economic efficiency and, as a result, competition. In addition, moving termination rates closer to costs may have the effect of lowering consumer prices which may, in turn, stimulate consumer demand for operators' services.

The Updated 2021 Report is organised as follows: Section 2 presents the legislative basis for the interconnection benchmarking study and the resulting recommended costing benchmarks. Section 3 describes the interconnection rate benchmarking methodology, including the benchmarking sample selection criteria, the resulting benchmarking samples and the benchmarking database update process, and provides the related updated historical interconnection rate levels and trends. Section 4 describes the methodology used to benchmark the MTR and FTR and presents the Authority's corresponding recommended costing benchmarks. Section 5 describes the methodology used to benchmark the MICC and FICC and the IMTR and IFTR, and presents the Authority's corresponding recommended costing benchmarks for these rates. Section 6 provides an overview of the supplementary evidence and assessments relied on to support the Authority's recommendations. Section 7 provides concluding comments. Lastly, Appendix I provides the Authority's Round 2 DoRs and, for ease of cross-reference, Appendix II provides the Authority's Round 1 DoRs.

The Authority notes that this Updated 2021 Report makes reference to both the Initial Report and the Revised Report.

2. Legislative Basis

Section 25(2)(m) of the Telecommunications Act, Chap. 47:31 (the Act), which addresses network interconnection, requires that prices for interconnection services be "cost oriented", and states that:

> "… the Authority shall require a concessionaire to … disaggregate the network and, on a cost oriented basis such as the Authority may prescribe, establish prices for its individual elements and offer the elements at the established prices to other concessionaires of public telecommunications networks and public telecommunications services".

Furthermore, regulation 5(1) of the *Telecommunications (Interconnection) Regulations (2006)* (the Interconnection Regulations) requires that interconnection between parties should be provided under non-discriminatory terms, as specified hereunder:

> "5(1) A concessionaire shall provide interconnection under the same terms and conditions and of the same quality as it provides for its own networks and services, the networks and services of its subsidiaries and partners, or the networks and services of any other concessionaire to which it provides interconnection."

In addition, regulation 15(2) of the Interconnection Regulations provides guidelines for setting interconnection rates as follows:

> "15(2) Where the relevant data for the establishment of the costing methodologies, models or formulae are unavailable within a reasonable time, the concessionaire may set interconnection rates with reference to such costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks."

Moreover, in the interconnection dispute (2018-2019)[3], the Arbitration Panel established pursuant to Section 82 of the Telecommunications Act issued a Report and Decision[4] which recommended that the Authority intervene in the adoption of cost-based interconnection rates. In said decision, one recommendation is quoted as follows… *"the Panel further holds that these rates for fixed and mobile international termination access services shall remain in effect until….*

> *(2) The Authority determines the cost of fixed and mobile international termination access services by Benchmarks. as per the interim regime;"*

This Panel also considered the "Pricing Rules and Principles for the Termination of International Incoming Traffic on Domestic Networks in Trinidad and Tobago" issued by the Authority on

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[3] https://tatt.org.tt/DesktopModules/Bring2mind/DMX/API/Entries/Download?Command=Core_Download&EntryId=1325&PortalId=0&TabId=222

[4] https://tatt.org.tt/AboutTATT/RegulatoryFramework/Disputes/Decisions.aspx

February 18, 2013 (the Pricing Rules and Principles), which were issued pursuant to section 29(4) of the Act, establish the framework for the setting of the IMTR and IFTR, including that:

> "1. The rate charged by a concessionaire for the termination of incoming international telecommunications traffic on a domestic telecommunications network shall not be less than the sum of:
>
> a. the cost of termination of the international traffic on the relevant domestic network (herein referred to as the domestic termination rate); and
>
> b. any relevant cost incurred in terminating the international traffic."

The Authority notes that the Initial Report, Revised Report and now this Updated 2021 Report have been prepared in compliance with regulation 15(2), in that the recommended costing benchmarks developed in the Reports comport with internationally accepted standards for such benchmarks.

Finally, in addition to regulation 15(2), the recommended costing benchmarks developed in this Updated 2021 Report could also be implemented pursuant to section 29(2) of the Act that allows the Authority to establish "price regulation regimes, which may include setting, reviewing and approving prices" in any case where a "concessionaire has a dominant position in the relevant market".

3. Benchmarking Sample

This section discusses the benchmarking sample selection, the data compilation process and the related results, including the historical levels and trends of the MTRs and FTRs in the benchmarking sample.

3.1. Benchmarking Sample Selection Criteria

The selection of the jurisdictions to be included in the benchmarking sample is the first and one of the most critical steps in the process of a benchmarking analysis. With the objective that the selected jurisdictions be appropriately comparable to Trinidad and Tobago, the following benchmarking sample selection criteria were applied[5]:

i. **Regional Geography**: Only jurisdictions in the Caribbean region are included in the sample. This criterion ensures a reasonable degree of comparability because operators are providing service in relatively similar geographic and climatic conditions.

ii. **Physical Geography**: Only island nations and jurisdictions are included in the sample to ensure that operators face comparable cost conditions specifically related to island states, which may be different from those that apply in continental states.

iii. **Calling Party Pays (CPP) versus Receiving Party Pays (RPP) Regimes**: CPP and hybrid RPP/CPP regime jurisdictions are included in the benchmark sample, whereas "pure" RPP regimes are excluded. RPP and CPP regimes are conceptually different and, as a result, interconnection rates under these two regimes may not be comparable. Therefore, this criterion excludes jurisdictions in which pure RPP regimes are in effect but includes those jurisdictions that have hybrid RPP/CPP regimes, and where some or all interconnection rates in such cases are deemed to be reasonably comparable for benchmarking purposes.

[5] The sample selection criteria draw on selection criteria established in previous SCI studies in the Caribbean, including three consultations conducted by the Turks and Caicos Islands (TCI) Telecommunications Commission, which led to the following decisions: Telecommunications Decision 2011-2, *Decision on the Mobile Termination Rate Review*, issued January 24, 2011; Telecommunications Decision 2014-4, *Decision on the Review of Interconnection Rates*, issued June 20, 2014; and Telecommunications Decision 2020-2, Decision on the Third Review of Interconnection rates, issued October 13, 2020. The methodology is also consistent with the *Practical Guide on Benchmarking Telecommunication Prices*, issued by the International Telecommunication Union (ITU) in August 2014.

iv. **Number of Operators**: Only jurisdictions with two or more mobile operators are included in the benchmarking sample. Therefore, this criterion excludes jurisdictions that have a single mobile operator.

v. **Availability of Interconnection Rates**: Only jurisdictions where interconnection rates are publicly available and can be independently verified are included in the benchmarking sample. This criterion excludes jurisdictions where the interconnection rates are not publicly available or where they cannot be independently confirmed.

vi. **Confidentiality of Interconnection Rates**: This criterion excludes jurisdictions where interconnection rates are claimed to be commercially confidential by all operators. However, in jurisdictions where some but not all operators claimed confidentiality, the interconnection rates of those who did not claim confidentiality or who disclosed their rates are used.

vii. **Vintage of Regulatory Decision:** Only jurisdictions where NRAs have revised or approved interconnection rates in the last six years (i.e., since January 2014) are included in the benchmarking sample. This criterion ensures that the costing information underlying the rates used for benchmarking purposes are reasonably up to date[6].

It should be noted that, for jurisdictions meeting these sample selection criteria, no restrictions were applied with respect to the methodology used to set interconnection rates, i.e., whether or not they were set on a cost versus alternative basis or established by an NRA, court or through commercial negotiation. The objective was to include all interconnection rates in regulatory effect in each of the selected benchmark sample jurisdictions.

These selection criteria allowed for the establishment of a benchmarking sample of reasonable size, thereby limiting the influence of any one jurisdiction on the results, while at the same time maintaining an appropriate degree of comparability to Trinidad and Tobago.

[6] Note that the rationale and justification for this sample selection criterion was previously discussed in section 6.1.1 of the Initial and Revised Reports, and also addressed in the Round 1 DoRs (pages 71-73). For simplicity of presentation purposes, it is now grouped with the other benchmarking sample selection criteria. In the two earlier Reports, the vintage criterion cut-off was January 2012, which was based on consideration of the average vintage of the observed interconnection rates at the time the 2016 SCI Study was conducted. Based on the updated data included in the 2021 SCI Report, the vintage cut-off has been updated to January 2014.

3.2. Benchmarking Sample Jurisdictions

The application of the above-noted benchmarking selection criteria results in a benchmarking sample of 11 and 12 Caribbean jurisdictions for the MTR and FTR benchmarking samples, respectively. The benchmarking sample jurisdictions are listed in Table 1, which also indicates whether the interconnections rates in each case are set on a cost basis, i.e., using a pure long run incremental cost (Pure LRIC), LRIC with a markup for fixed and common costs (LRIC+), fully distributed cost (FDC) approach or another methodology, including benchmarking or commercial negotiation[7]. As can be seen from Table 1, the majority of jurisdictions in the sample are cost based.

For comparison purposes, Table 2 also includes the respective jurisdictions that were included in the Initial and Revised Reports. As discussed below, differences in the jurisdictions included in the benchmarking samples between Reports relate to the vintage sample selection criterion.

Table 2. MTR and FTR Benchmarking Sample Jurisdictions

		Initial and Revised Reports *(post-January 2012 sample)*		**Updated 2021 Report** *(post-January 2014 sample)*	
No.	**Jurisdictions**	**MTR**	**FTR**	**MTR**	**FTR**
1	Anguilla	Other	Other	- -	- -
2	Bahamas	Cost (FDC)	Cost (FDC)	Other	Other
3	Barbados	Cost (LRIC+)	Other	Cost (LRIC+)	Other
4	British Virgin Islands	--	Other	- -	- -
5	Cayman Islands	Cost (LRIC+)	Cost (LRIC+)	- -	- -
6	Dominica	- -	- -	Cost (LRIC+)	Cost (LRIC+)
7	Dominican Republic	Other	Other	Other	Other
8	Grenada	- -	- -	Cost (LRIC+)	Cost (LRIC+)
9	Guadeloupe & Martinique	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)
10	Jamaica	Cost (Pure LRIC)	- -	- -	Cost (Pure LRIC)
11	St. Barthelemy & St. Martin	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)
12	St. Kitts & Nevis	- -	- -	Cost (LRIC+)	Cost (LRIC+)
13	St. Lucia	- -	- -	Cost (LRIC+)	Cost (LRIC+)
14	St. Vincent & the Grenadines	- -	- -	Cost (LRIC+)	Cost (LRIC+)
15	Turks and Caicos Islands (TCI)	Other	Other	Other	Other
	Total All Sample	**9**	**8**	**11**	**12**
	Total Cost Based	**6**	**4**	**8**	**9**

Note: "- -" indicates jurisdictions that met criteria i) through vi) but were excluded from the sample because the vintage of the applicable regulatory decision pre-dated the vintage cut-off under criterion vii) in the Report(s) in question.

[7] Both TCI and The Bahamas use a benchmarking approach, whereas the NRA in the Dominican Republic has reviewed and approved commercially negotiated rates.

In the Initial and Revised Reports, there were 17 Caribbean jurisdictions included in what was referred to as the "full" benchmarking sample[8]. However, a number of these jurisdictions were subsequently excluded in the current Updated 2021 Report due to the fact that they failed to satisfy the vintage criterion[9]. As explained in Section 3.1, the vintage cut-off criterion was updated from January 2012 to January 2014 in the 2021 SCI Study. Nonetheless, the new "post-2014" MTR and FTR samples are now larger overall and include a greater number of cost-based jurisdictions in each case compared to the 2016 SCI Study. The increased sample size is due to the fact that a number of recent interconnection rate decisions have been issued by NRAs in the region since the 2016 SCI Study was completed,[10] while other jurisdictions are now excluded due to the updated post-2014 vintage criterion[11]. The increased benchmarking sample size provides for a comprehensive benchmarking analysis.

Lastly, following the two previous Reports, the four FWI jurisdictions are once again combined into two groups: (i) Guadeloupe & Martinique and (ii) St. Barthelemy & St. Martin. The rationale for doing this is provided in the Initial and Revised Reports and also addressed in detail in the Round 1 DoRs[12].

As in the previous Reports, two samples are considered for benchmarking purposes in what follows: (i) the full post-2014 benchmarking sample or "all sample" and (ii) the post-2014 cost-based benchmarking sample or "cost-based sample", with the latter being a subset of the former.

3.3. Benchmarking Database Update

The primary sources for interconnection rate data and information for the updated 2021 SCI Study are the same as in the 2016 SCI Study. They include NRA decisions and orders and/or operator-specific Reference Interconnection and Access Offers. In the first case, NRA decisions typically focus on MTRs and FTRs and, to a lesser extent, MICCs and FICCs, and IMTRs and IFTRs. For

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8 See section 3.2 of the Revised Report, where it is noted that there were 23 ungrouped Caribbean jurisdictions considered in total; however, it was determined that the four FWI jurisdictions should be grouped in two (i.e., Guadeloupe & Martinique and St. Barthelemy & St. Martin) and also that the former Netherlands Antilles (i.e., Bonaire, Curacao, Saba, St. Eustatius and St. Maarten) should be part of a single group. This reduced the "full" benchmarking sample to 17 jurisdictions.

9 See section 6.1.1 of the Revised Report.

10 This includes Jamaica (FTR) in 2017, the five ECTEL MS (FTR & MTR) in 2018, The Bahamas (FTR and MTR) in 2019 (moving from cost-based FDC approach to benchmarking) and TCI (FTR and MTR) in 2020.

11 This includes Anguilla and the British Virgin Islands and Jamaica (MTR) all in 2012. In this regard, it is important to note that the Jamaican NRA is currently in the process of reviewing the existing Pure LRIC-based MTR and, consequently, an updated and likely reduced MTR should come into effect in Jamaica in the near future.

12 For example, see Revised Report, sections 3.3 and 6.2 and Appendix II (Sensitivity #4) and the Round 1 DoRs, pages 63-66.

this update, the data compilation process involved the collection and assessment of publicly available data from NRA and operator websites[13].

The data compilation process for this updated benchmarking study was carried out in October to December 2020. While the collected interconnection rate information up to December 2020 is "actual" in nature, many NRA interconnection rate decisions include transitional or glide-path interconnection rate reductions into the future. Where specified, such mandated glide-path reductions are taken into account to project interconnection rates to March 2024 (as discussed further below).

3.4. Benchmarking Sample Data Adjustments

There are two technical matters that must be addressed to allow comparison of interconnection rates across benchmarking sample jurisdictions. These involve, where necessary, adjustments for differences in interconnection traffic rating units and differences in currencies across jurisdictions.

In the first case, and as discussed in the previous Reports, one form of adjustment that previously may have had an impact on ongoing benchmarking comparability related to expressing all interconnection rates on a uniform per-minute basis. All the benchmark sample jurisdictions state their domestic MTRs in this manner. However, as explained in the previous Reports, for domestic FTRs, a minority of jurisdictions historically included a combination of per-call set-up and differential time-of-day per-minute charges. In these instances, the 2016 SCI Study converted these into average per-minute rates, as is commonly done in benchmarking studies, to allow rate comparability across jurisdictions. While the 2021 SCI Study involves such conversions for historical benchmarking purposes, such adjustments are no longer relevant for current-day benchmarking purposes because all benchmarking jurisdictions no longer use non-uniform per-minute interconnection rates. Specifically, the last remaining benchmarking jurisdiction requiring a rate conversion exercise, Jamaica, adopted a uniform per-minute FTR in December 2017, so that all FTRs included in the benchmarking sample have been set on a uniform per-minute basis for three years now[14].

In the second case, interconnection rates are typically expressed in local currency units (LCUs). All such LCU rates must therefore be converted to a common currency, i.e., USD, for comparison purposes. Of the jurisdictions in the updated benchmarking sample, three are denominated in USD (i.e., The Bahamas, the Dominican Republic and TCI). The five ECTEL Member States (ECTEL MS) and Barbados had fixed official USD exchange rates during the period under investigation

[13] See the References section for full bibliographic details and related web links.

[14] See the First Round DoRs (pages 58-61).

(i.e., the East Caribbean Dollar (XCD) and the Barbadian Dollar (BBD)). In such cases, the official fixed USD exchange rates are used. FWI and Jamaica have floating exchange rates (i.e., the Euro (EUR) and Jamaican Dollar (JMD)) and Trinidad and Tobago has a managed floating exchange rate (TTD). With the objective of being able to separate changes in exchange rates from changes in LCU interconnection rates, a single, long-term (seven years, from January 2014 to December 2020) weighted average exchange rate (weighted more heavily for the last two years)[15] was used for each of these latter jurisdictions – i.e., FWI, Jamaica and Trinidad and Tobago[16]. As shown in the Revised Report (section 6.2 and Appendix II, Sensitivity #1), the benchmarking results are not sensitive to reasonable changes in these exchange rate assumptions.

3.5. Supplementary Benchmarking Data

As in the Initial and Revised Reports, in addition to Caribbean jurisdictions meeting the above-noted benchmarking selection criteria, interconnection rate levels and information on trends in EU Member States are also considered. In this respect, EU interconnection rate data is used solely for trend analysis and cross-check purposes, and not for benchmarking purposes.

Annex A of the Initial Report and Appendix I of the Revised Report included historical data on the average MTR and FTR levels and trends in Europe up to January 2016. This information has been updated to July 2020 for this Updated 2021 Report, using the same data source, i.e., the Body of European Regulators of Electronic Communications (BEREC)[17]. Updated EU MTR and FTR average trends to July 2020 are shown in the figures in the following sections.

In addition, in December 2020, the European Commission (EC) issued an EU-wide Delegated Regulation[18] setting maxima on the MTRs and FTRs charged by all operators providing call termination services in the EU. Under the EC Regulation, the established EU-wide maxima will

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15 As in the previous Reports, the weighting is 1 for each of the five years from 2014 – 2018 inclusive, and a weighting of 3 for each of the last two years, 2019 and 2020.

16 The LCU-USD weighted average exchange rates used are 1.1457 for EUR (historical data sourced from the European Central Bank), 0.0077 for JMD (historical data sourced from the Bank of Jamaica) and 0.1497 for TTD (historical data sourced from the Central Bank of Trinidad and Tobago).

17 BEREC publishes bi-annual survey reports on interconnection rates in Europe. Since 2016, there have been some minor changes in its interconnection rate survey methodology, affecting reported FTR averages across Europe; however, there minor methodological changes do not affect the use of the averages used for the purposes of this benchmarking exercise. The most recent BEREC termination rate report referenced for updated benchmarking exercise was BEREC's *Termination rates at the European level*, BoR (20) 209, dated December 10, 2020. Earlier BEREC termination rate reports were considered as well. See the References section for weblinks.

18 European Commission, Commission Delegated Regulation supplementing Directive (EU) 2018/1972 of the European Parliament/Council by setting a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination rate, Brussels, December 18, 2020, C(2020) 8703 final.

be phased in over a three-year transition period (i.e., 2021 to 2023). These mandated maxima will require reductions in the MTRs and FTR in effect in the FWI over the coming three-year period and, therefore, they are taken into account for forward-looking cost benchmarking purposes in Section 4 below.

3.6. Historical MTR and FTR Levels and Trends

Figures 1 and 2 illustrate monthly historical domestic MTR and FTR levels and trends for all the jurisdictions included in the MTR and FTR benchmarking samples for the period January 2014 to December 2020. In addition, they include the levels and trends of the all-sample and cost-based benchmarking sample averages[19], along with corresponding EU averages. The MTR and FTR for Trinidad and Tobago are also included[20].

Looking first at Figure 1, it shows MTRs in all 11 jurisdictions have fallen sharply over the seven-year period, especially in the case of the five ECTEL MS and Barbados. The all sample benchmark average (shown in red) has declined dramatically from USD$0.0760 in January 2014 to USD$0.0188 as of December 2020, a reduction of 75%. The cost-based MTR benchmark average (shown in blue), which is based on an average of up to eight benchmarking jurisdictions, is relatively flatter over time but also consistently well below the all sample MTR average. The cost-based MTR benchmark average was USD$0.0097 in December 2020. Additionally, as of July 2020 the EU average (shown in grey) is slightly lower still, at USD$0.0079. The benchmarking data suggests that the MTR in Trinidad and Tobago is currently well above cost, given the current levels of the all sample and cost-based sample MTR costing benchmark averages.

[19] The all sample average is calculated based on an unweighted average of the relevant interconnection rates in effect in the month in question. As such, there are 11 and 12 observations respectively in the MTR and FTR all sample averages for the entire January 2014 to December 2020 period. In contrast, the cost-based average only includes those observations which, during that month, had a cost-based rate. For example, none of the ECTEL MS had cost-based rates that met the vintage criterion until mid-2018, consequently the ECTEL MS data was only included in the cost-based sample average from that date forward. Furthermore, the ECTEL MS did not strictly have cost-based rates in mid-2018 because that was just the beginning of a three-year glide-path process that was completed in mid-2020, at which point they reached the intended cost-based rate level. For simplicity of exposition, that ultimate end-point rate is incorporated in the cost-based average in mid-2018 when the new rates were introduced. This expositional approach does not have an impact on the forward-looking benchmarking exercise. As in the previous Reports, the cost-based sample average trend line can vary upwards and downwards as benchmark jurisdictions either update or newly adopt cost-based interconnection rates over time.

[20] Given that the operators in Trinidad and Tobago have expressly deemed existing local interconnection rates to be confidential, Figures 1 and 2 exclude Trinidad and Tobago in the public version of this Report. A confidential version of the Report is available to local operators only, upon request.

Figure 1. Updated MTR Benchmarking Sample

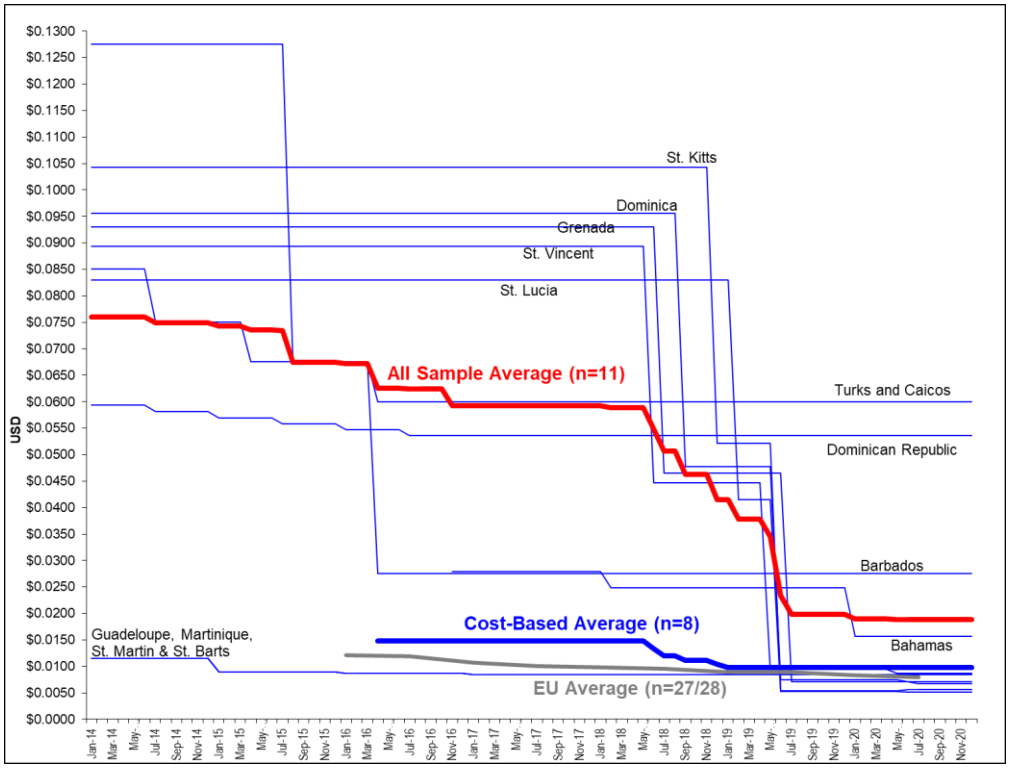
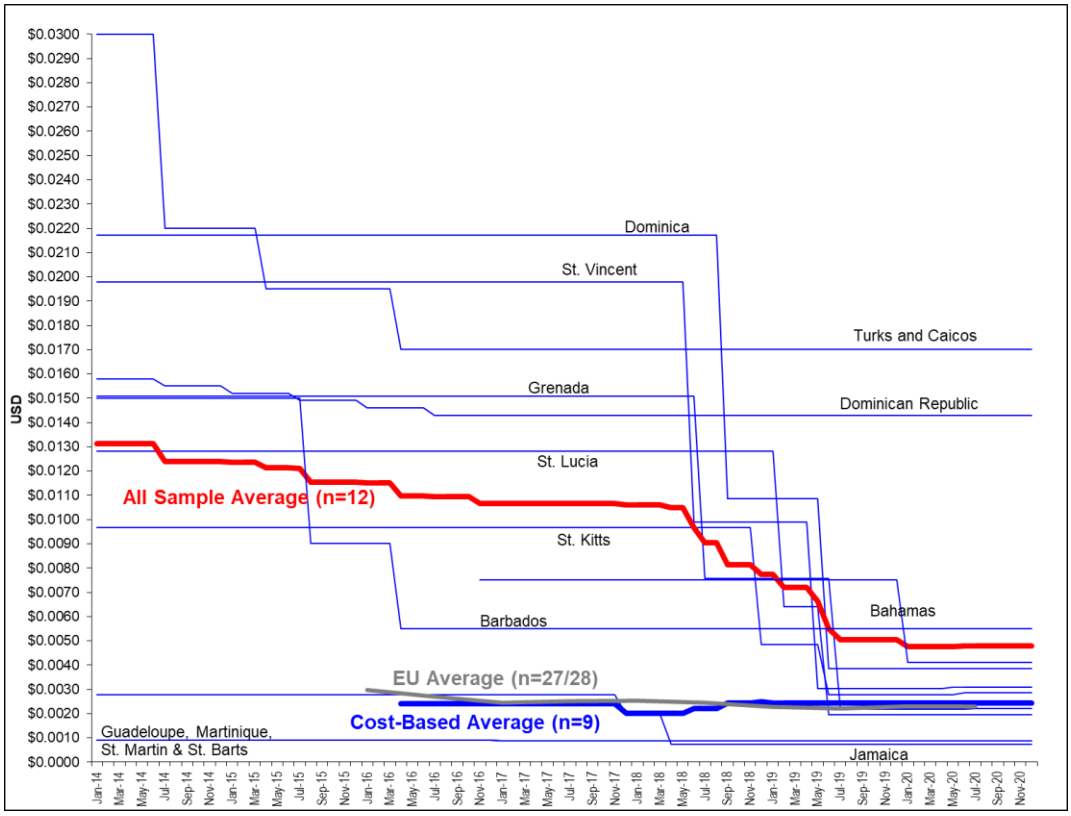


Figure 2 shows monthly FTRs for all 12 jurisdictions included in the FTR benchmarking sample over the same period. Here again, FTRs in all 12 jurisdictions have fallen sharply, with the most pronounced declines occurring in the five ECTEL MS and Barbados. The all sample benchmark average has declined dramatically from USD$0.0131 in January 2014 to USD$0.0048 as of December 2020, a reduction of 64%. The cost-based FTR benchmark average, which is based on an average of up to nine benchmarking jurisdictions, is relatively flat over time but once again also consistently well below the all sample FTR average. The cost-based FTR benchmark average was USD$0.0024 in December 2020. As of July 2020, the EU average is just slightly below the cost-based FTR benchmark average, at USD$0023. Here again, the benchmarking data suggest that the FTR in Trinidad and Tobago is currently well above cost, given the current levels of the all sample and cost-based sample FTR costing benchmark averages.

Figure 2: Updated FTR Benchmarking Sample



4. Domestic MTR and FTR Recommendations

This section discusses the methodology used to develop MTR and FTR costing benchmarks, and sets outs the Authority's related recommendations.

4.1. MTR and FTR Costing Benchmark Methodology

The previous Reports followed a multi-step benchmarking methodology to determine recommended MTR and FTR costing benchmarks. This same methodology is followed for this Updated 2021 Report, which consists of the following steps:

i) **Establishment of Benchmarking Sample**: This first step is described in Section 3.1.

ii) **Determination of Benchmark Averages**: This consists of determining the all sample and the cost-based sample averages described in Sections 3.2 and 3.6.

iii) **Benchmark Average Rate Projections**: It is clear from Figures 1 and 2 that MTR and FTR interconnection rates and, by implication, costs in the Caribbean benchmark sample as well as in the EU have been trending sharply downwards for many years[21]. In the previous Reports, these trends were projected out three years (to March 2020), to capture anticipated reductions in interconnections rates. In the case of the all sample averages, the projections were based on a "best-fit" statistical trend line analysis. In the absence of glide-path related mandated rate reductions, and with the objective of treating the cost-based averages in a conservative manner, these were not projected to further decline, but rather assumed to stay at the same level for the three-year period (i.e., "flat-lined"). For the current exercise involving, in this case, projections to March 2024, for the cost-based averages, the four FWI jurisdictions have glide-path related mandated rate reductions stretching out into the projection period while the same conservative flat-line projection approach is used for those jurisdictions that are not subject to glide-paths. For the all sample averages, this current Report adopts a conservative approach. In this case, two of the three non-cost-based countries (The Bahamas and TCI) have glide-path related mandated rate reductions. This makes statistically projecting these rates unnecessary. The third non-cost-based country, the Dominican Republic, is, on its own, projected based on a "best-fit" statistical trend line analysis.

iv) **Determination of "End-Point" Benchmark Rates**: To determine "end-point" FY 2023/24 benchmark rates, projected rate levels for both the all and cost-based sample

[21] Similar dramatic downward trends in the MTR and FTR up to 2016 are shown in the Initial and Revised Reports.

average rates are taken into account. The cost-based average is treated as a "lower bound" and the all sample average as an "upper bound" for the end-point MTR and FTR benchmarks. This ensures the resulting benchmarks are reasonably cost oriented, i.e., close to, but still above, average cost-based benchmark rate levels, while also closely tracking the all sample benchmark average rate levels. Importantly, as the results below show (see Figures 3 and 4 below), the all and cost-based sample averages are projected to converge over time in any event.

v) **Normalisation Adjustment Considerations**: The Initial and Revised Reports include a detailed normalisation analysis to determine whether demographic, socio-economic and other environmental differences between benchmarking sample jurisdictions and Trinidad and Tobago warrant any adjustments to the end-point benchmarks (either upwards or downwards). The results of that analysis show that, if anything, a small downward adjustment may be justified. However, to be conservative, the Authority decided not to apply such an adjustment. This approach is maintained for this Updated 2021 Report.

vi) **Glide-path to the End-Point Benchmark Rates**: The end-point benchmark rates are determined for FY 2023/24. Moving current rates in Trinidad and Tobago to the recommended end-point benchmark rate levels could be accomplished through a flash-cut or variety of multi-step processes. Consistent with the two previous Reports, the Authority considers that a three-year glide-path approach is appropriate for Trinidad and Tobago[22]. Such an approach is common in other jurisdictions in the region[23]. In addition, the Authority considers that the three steps should be roughly equal in magnitude.

The Authority considers that this dual benchmarking approach provides a robust, fair and reasonable basis for establishing MTR and FTR costing benchmarks, since both the all sample and cost-based samples lead to similar results (i.e., end points). It also effectively reduces the probability of error of either establishing a rate recommendation that is "too high" (substantially above actual costs) or "too low" (below costs).

4.2. Recommended MTR Costing Benchmarks

Figure 3 depicts the historical and projected all sample and cost-based MTR benchmark sample averages from January 2014 to March 2024. As the figure shows, the projections for both MTR benchmark averages tend to convergence by March 2024, with a lower bound of USD$0.0088 and an upper bound of USD$0.0102. For reference purposes, the EU average MTR by the same time

[22] See also Round 1 DoRs, pages 79-80.

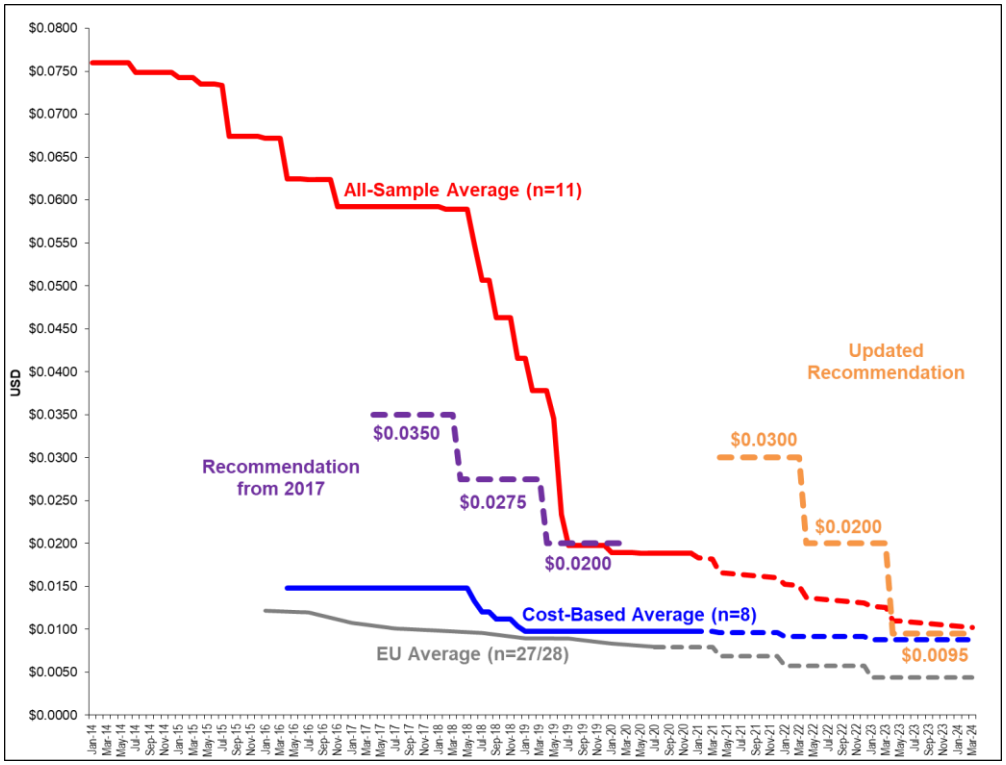
[23] For instance, The Bahamas, TCI and the ECTEL MS have all relied on a three-year glide-path process to implement newly established interconnection rates.

is expected to be significantly lower, having been mandated to be no higher than USD$0.0044 on average by January 2023.
Following the benchmarking methodology set out above results in an end-point recommended MTR costing benchmark of USD$0.0095. Applying a roughly equal three-step glide-path process to reach the end-point benchmark by fiscal year April 2023 to March 2024 results in recommended MTR costing benchmarks of USD$0.0300 as of April 2021, USD$0.0200 as of April 2022 and USD$0.0095 as of April 2023 (shown in Figure 3 as the three-step orange line).

Figure 3 also compares the Authority's current MTR recommendation with its previous MTR recommendation as described in the Initial and Revised Reports (i.e., shown in purple). The end-point MTR costing benchmark in these two earlier Reports is higher, at USD$0.0200, compared to the updated recommendation of USD$0.0095. This constitutes a 53% reduction in four years. As noted above, the all sample average decreased by 75% over seven years. As discussed earlier, this is due to the fact that the earlier Reports were based on the 2016 SCI Study and, since that study was completed, a number of NRAs have reviewed and reduced interconnection rates in their respective jurisdictions.

It is notable that the Authority's MTR recommendations included in the previous Reports track closely the updated MTR all sample average over the last four years. The Authority considers that this result supports the appropriateness of its benchmarking methodology. However, given recent developments, it is clear that MTRs in the region have continued to decline significantly and, as a result, a significantly lower recommended MTR costing benchmark is now appropriate.

Figure 3. Updated MTR Recommended Costing Benchmark



4.3. Recommended FTR Costing Benchmark

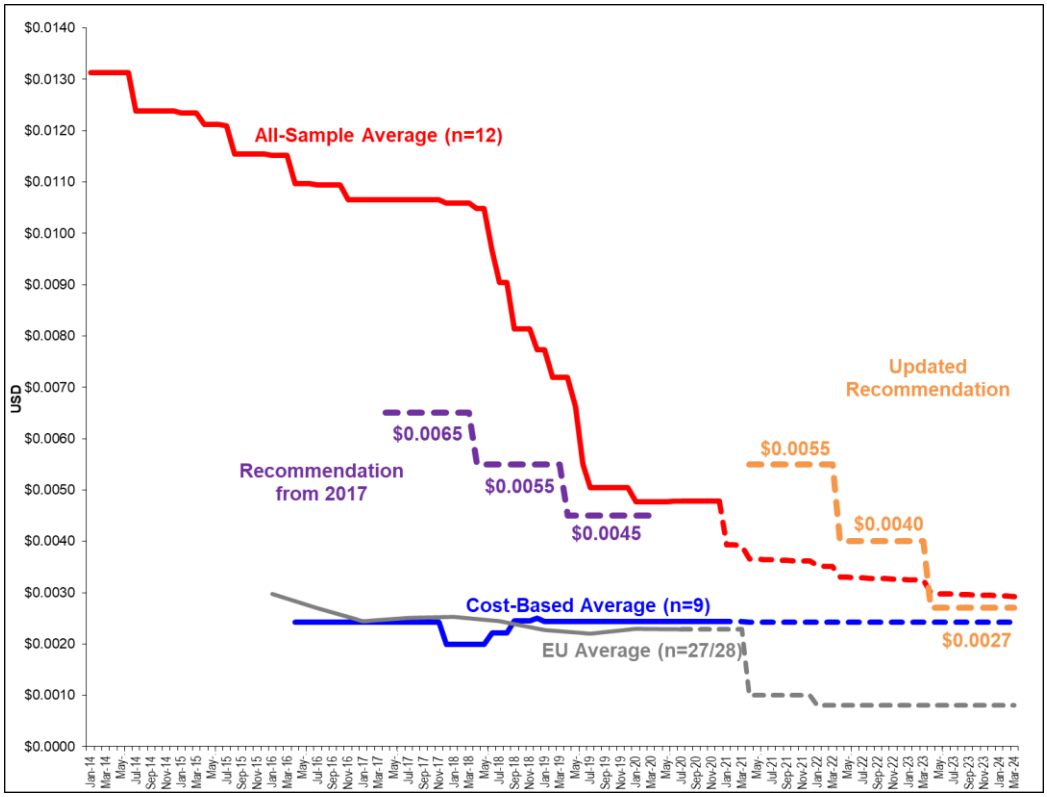
Figure 4 presents the historical and projected all sample and cost-based FTR benchmark sample averages from January 2014 to March 2024. As the figure shows, the projections for both benchmark averages tend to convergence by March 2024, with a lower bound of USD$0.0024 and an upper bound of USD$0.0029. The EU FTR average is expected to be significantly lower, having been mandated to be no higher than USD$0.0008 by January 2022.

Again, following the benchmarking methodology set out above results in an end-point recommended FTR costing benchmark of USD$0.0027. Applying a roughly equal three-step glide-path process to reach the end-point FTR by fiscal year April 2023 to March 2024 results in recommended FTR costing benchmarks of USD$0.0055 as of April 2021, USD$0.0040 as of April 2022 and USD$0.0027 as of April 2023.

Figure 4 also compares the Authority's current FTR recommendation with its previous FTR recommendation as described in the Initial and Revised Reports. The end-point FTR costing benchmark in these two earlier Reports is higher, at USD$0.0045, compared to the updated recommendation of USD$0.0027. This constitutes a 40% reduction in four years. As noted above, the all sample average had decreased by 64% over seven years. This is due to the fact that the

earlier Reports were based on the 2016 SCI Study and, since that study was completed, a number of NRAs have reviewed and reduced interconnection rates in their respective jurisdictions.

Figure 4. Updated FTR Recommended Costing Benchmark



It is notable again in this case that the FTR recommendations included in the Initial and Revised Reports track closely the updated all sample FTR benchmark average trend over the last four years, a result which also further supports the appropriateness of the benchmarking methodology adopted by the Authority. However, as in the case of the MTR, given recent developments, it is clear that FTRs in the region have continued to decline significantly and, as a result, a significantly lower recommended FTR costing benchmark is now appropriate.

4.4. Summary of MTR and FTR Costing Benchmarks

Table 3 provides a summary of the updated recommended MTR and FTR costing benchmarks.

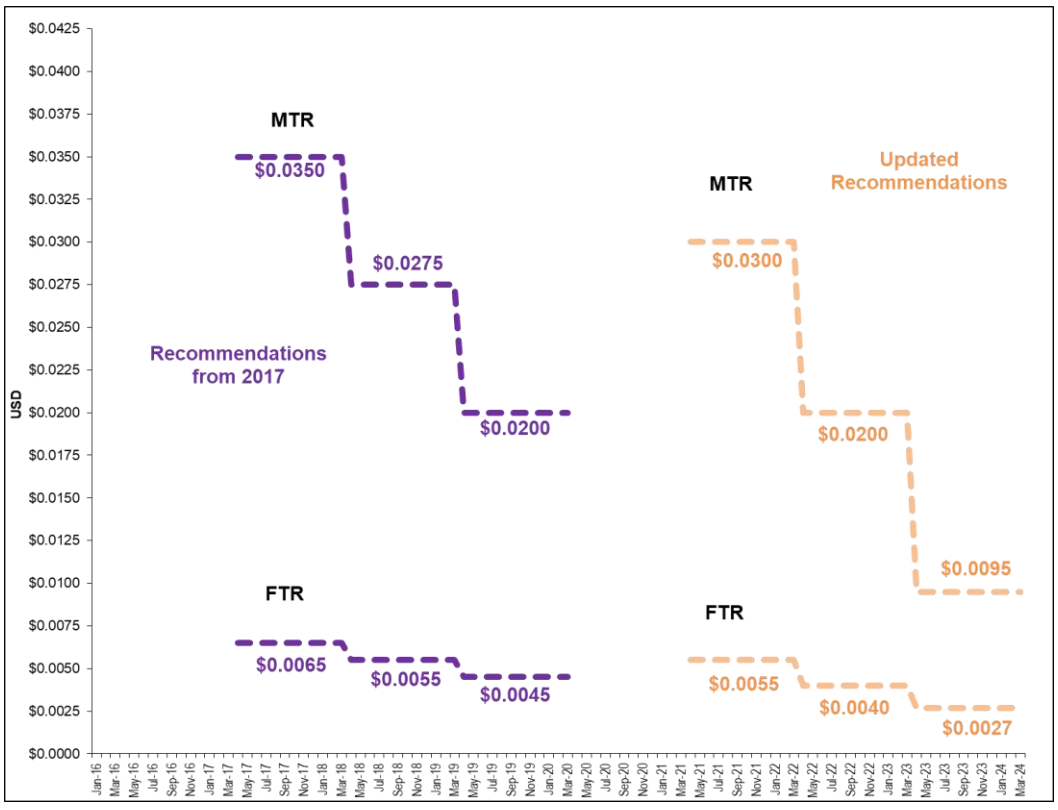
Table 3. Updated MTR and FTR Recommended Costing Benchmarks

Interconnection Rates	Currency*	Recommended Costing Benchmarks		
		April 2021 to March 2022	**April 2022 to March 2023**	**April 2023 to March 2024**
Domestic Mobile Termination Rate (MTR)	TTD	0.200	0.134	0.063
	USD	**0.0300**	**0.0200**	**0.0095**
Domestic Fixed Termination Rate (FTR)	TTD	0.0367	0.0267	0.0180
	USD	**0.0055**	**0.0040**	**0.0027**

*Note: * The recommended costing benchmarks were calculated and determined in USD. The TTD equivalent values in this table is provided for "illustrative purposes" only and is based on the weighted average historical USD/TTD exchange rate used for benchmarking analysis (0.1497), as described in Section 3.4. The USD/TTD exchange rate may be different at the date of publication of this report and over the course of the three-year glide-path period. If so, at the start of each of the three glide-path years, interconnection rates could be restated in TTD, based on the TTD/USD exchange rate at that time.*

Figure 5 provides a summary of the current MTR and FTR recommendations in comparison with the recommendations set out in the previous Reports.

Figure 5. Updated MTR and FTR Recommended Costing Benchmarks



5. International Carriage Charge Recommendations

This section sets out the Authority's updated recommended international carriage charge (ICC) cost benchmarking recommendations in response to the aforementioned Panel Report dealing with an IMTR/IFTR-related dispute. The Authority agrees with the Panel's conclusion that the MICC and FICC should be equal in that they are one and the same service. Any difference in this charge for incoming international mobile versus fixed calls would be arbitrary, and certainly not reflective of cost differences. Consequently, consistent with the Pricing Rules and Principles, the Authority considers that the MICC and FICC should be set on the basis of a uniform costing benchmark.

5.1. Regulatory Background

In Trinidad and Tobago, the IMTR and the IFTR are effectively each made up of two elements, an ICC and a domestic termination charge[24]. However, the ICC associated with the IMTR and IFTR have been set at different rate levels and hence they are referred to as the MICC and FICC. The Initial and Revised Reports, issued in March 2017 and May 2019, respectively developed and applied a benchmarking methodology to determine the Authority's recommended MICC and FICC costing benchmarks based on the 2016 SCI Study, both of which were subject to public consultation.

During this same period, the Panel was formed, and issued the Panel Report in December 2019. In considering matters relating to the setting of the IMTR and IFTR, the Panel concluded that the proposed new IMTR and IFTR did not comport with the Pricing Rules and Principles and, therefore, rejected the proposed rates[25]. In absence of a costing model, the Panel acknowledged that benchmarking could be used to set the IMTR and IFTR. In this respect, the Panel considered the recommended costing benchmark set out in the Revised Report; however, it disagreed with those results and did not adopt them, because they proposed different charges for the MICC and FICC.[26] In the interest of regulatory certainty, the Panel decided that an IMTR of USD$0.1100 and IFTR of USD$0.0250[27], as previously agreed to in a 2012 Interconnection Agreement, should remain in effect until, among other things, the Authority determines the cost of the IMTR and IFTR by benchmark.

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[24] In tariffing terms, the IMTR is typically referred to as "Incoming International Call Termination to PLMN Service" and the IFTR as "Incoming International Call Termination to PSTN Service".

[25] Panel Report, paragraph 13.19

[26] Panel Report, paragraphs 13.6 and 13.47.

[27] Panel Report, paragraph 14.

Bearing in mind the Pricing Rules and Principles and consistent with the conclusions of the Panel Report, the Authority considers that the MICC and FICC should move to uniform levels. The key considerations of the MICC and FICC are set out in the next section.

5.2. Determining the MICC and FICC

The updated MICC and FICC rates considered the following:

1) **Adoption of a uniform end-point ICC target rate (i.e., MICC = FICC)**
   As noted, in view of its Pricing Rules and Principles and consistent with the Panel Report, the Authority considered a uniform end-point target rate for both the MICC and FICC[28]. Under this approach, the existing difference between the current MICC and FICC would be eliminated over a three-year transition period. There would, of course, remain a difference between the IMTR and IFTR since those charges consist of two components: the MTR and FTR plus an ICC.

2) **Reliance on direct rather than both direct and indirect ICC benchmarks**
   The MICC and FICC benchmarking methodology used in the Initial and Revised Reports relied on "direct" and "indirect" measures of the MICC and FICC. The direct measures consisted of explicit and implicit MICCs and FICCs. The former consists of jurisdictions where an explicit ICC or an ICC-like tariff item exists; otherwise, implicit ICCs were calculated as the difference between the IMTR and MTR and IFTR and FTR, as applicable. The indirect approach involved consideration of IMTR/MTR and IFTR/FTR ratios. For the purpose and objective of considering a uniform ICC, the indirect approach is no longer relevant or appropriate. Therefore, the updated rates rely solely on direct benchmarks of the MICC and FICC, both explicit and implicit.

3) **Relation of MICC/FICC to IMTR/IFTR**
   The Initial and Revised Reports focussed on determining benchmark recommendations for the FICC and MICC and did not specifically calculate the IMTR and IFTR that would result from the combination of the domestic termination charges and the ICC. For greater clarity, this Updated 2021 Report separately benchmarks the two components of the IMTR and IFTR as set in Rule 1 of the Pricing Rules and Principles. The first is the "domestic termination rate",

[28] It is worth noting in this respect that in 2010, pursuant to the Pricing Rules and Principles, the Authority conducted an exercise to estimate the cost of the ICC component of international call termination rates. For that exercise it determined that the ICC should be the same for incoming international calls to both mobile and fixed customers – i.e., the MICC = FICC. In this respect, it determined that that ICC cost was USD$0.0142. The methodology used to determine this cost estimate is set out in the Authority's "Assessment of the Minimum Rates for Termination of Incoming International Traffic", made under Determination 2010/01, dated 3 February 2010. This ICC cost estimate is also referenced and discussed in the Panel Report (paragraph 13.12).

which includes the recommended MTR and FTR costing benchmarks set out in Section 4 of the current Report. The second is "any relevant cost incurred in terminating the international traffic", which includes the recommended MICC and FICC costing benchmarks developed below. As already mentioned, the end-point recommended costing benchmarks for the MICC and FICC are equal. The Authority notes that the Pricing Rules and Principles were designed to establish minima for the international settlement rates. The current Updated 2021 Report establishes benchmarking-based point estimates for the MTR and FTR, and the MICC and FICC, and by extension, the IMTR and IFTR. Further, as noted above, the Authority intends for these benchmarks to serve as maxima, so that when implemented, operators would be free to set interconnection rates at or below the recommended rate maxima.

5.3. Results of Updated IMTR and IFTR

Table 4 presents explicit and implicit ICCs associated with the IMTR and IFTR in the 11 jurisdictions that meet the selection criteria described in Section 3[29]. Other than Jamaica, each jurisdiction included in the Table has an IMTR and IFTR in place that meets the selection criteria. Therefore, there are effectively 21 benchmarking observations in total. Given that the consideration given to a uniform benchmark ICC, both benchmark MICCs and FICCs are treated equivalently for ICC benchmarking purposes.

As shown in Table 4, most benchmark sample jurisdictions have an effective implicit ICC of zero. This trend towards zero-rated implicit ICCs has been driven largely by a regulatory response to sector liberalization. In the initial phases of liberalization, former legal telecommunications monopolies in the region, for instance subsidiaries of Cable and Wireless, proposed or introduced an ICC-like tariff item in their respective RIOs called the "International Conveyance Assumption" (ICA)[30]. However, as sector liberalization became more widely established throughout the region, and the costs of international connectivity declined drastically as a result of the rollout of new digital technologies and the emergence of new international network operators, many NRAs eliminated the ICA from the respective RIOs. In effect, the costs of international connectivity have declined to "de minimis" levels and ICCs or zero is largely the norm today.[31]

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[29] Note that TCI's IMTR and IFTR are excluded since they do not meet the vintage sample selection criterion.

[30] The Authority has been able to confirm that the ICA was part of the respective RIOs in Barbados, Dominica, Grenada, Jamaica, St. Kitts, St. Lucia, St. Vincent within the benchmark sample, as well as in other jurisdictions, including Cayman Islands. The ICA was typically defined as a "notional figure negotiated by the Parties for use in the determination of the Incoming International to Mobile Termination Charge".

[31] For example, in its 2018 Interconnection Rate Recommendation, ECTEL determined that the LRIC+ based cost estimates for the MTR and IMTR as well as the FTR and IFTR for each of the five ECTEL MS. In the first case it found that there was no difference between the cost of the MTR and IMTR – i.e., the MICC = 0. In the second case, it found that a very small difference in cost between the FTR and IFTR existed. The average difference – or effective the FICC – amounted to USD$0.0005. Relative to the average FTR across the ECTEL MS this amount

Consequently, as shown in Table 4, it is not surprising to see that 17 of the 21 observations have "zero-rated" implicit ICCs in place (i.e., the IMTR = MTR and/or the IFTR = FTR). In the few remaining cases, the NRAs maintained or established non-zero implicit ICCs, as is the case of IMTR in The Bahamas and IMTR and IFTR in Barbados. The only explicit ICC-style observation in the benchmarking sample is that associated with the IFTR in Jamaica, at USD$0.0062.[32]

Based on the available benchmark sample observations two benchmark averages are calculated and presented in Table 3. First, Average "A" reflects the "all sample" average of the 21 explicit and implicit ICCs, which is USD$0.0062. Second, Average "B" reflects the average of all non-zero-rated ICCs, excluding the implicit ICC associated with the IMTR for Barbados, which is USD$0.0068. The Barbados implicit MICC observation is excluded because it is clearly an outlier relative to the other observations given it is more than twelve times greater than the ICC associated with the IFTR in Barbados and it also more than twenty times the size of the average of the other non-zero implicit ICCs. Taking these two benchmark averages into account, and also considering the only explicit ICC-style observation in the sample of USD$0.0062, the Authority considers that a recommended end-point target ICC of USD$0.0065 is appropriate for Trinidad and Tobago.[33]

Table 4. Updated MICC and FICC Benchmarking Sample (USD)

	Sample Jurisdictions	**MTR**	**IMTR**	**Explicit ICC**	**Implicit ICC**	**FTR**	**IFTR**	**Explicit ICC**	**Implicit ICC**
1	Bahamas	**$0.0066**	**$0.0123**		$0.0057	**$0.0007**	**$0.0007**		$0
2	Barbados	**$0.0275**	**$0.1375**		$0.1100	**$0.0055**	**$0.0141**		$0.0086
3	Dominica	**$0.0071**	**$0.0071**		$0	**$0.0039**	**$0.0039**		$0
4	Dominican Republic	**$0.0536**	**$0.0536**		$0	**$0.0143**	**$0.0143**		$0
5	Grenada	**$0.0068**	**$0.0068**		$0	**$0.0022**	**$0.0022**		$0
6	Guadeloupe & Martinique	**$0.0085**	**$0.0085**		$0	**$0.0009**	**$0.0009**		$0
7	Jamaica					**$0.0007**	**$0.0069**	$0.0062	$0.0001 *
8	St. Barts & St. Martin	**$0.0085**	**$0.0085**		$0	**$0.0009**	**$0.0009**		$0
9	St. Kitts & Nevis	**$0.0056**	**$0.0056**		$0	**$0.0029**	**$0.0029**		$0
10	St. Lucia	**$0.0052**	**$0.0052**		$0	**$0.0020**	**$0.0020**		$0
11	St. Vincent & the Grenadines	**$0.0087**	**$0.0087**		$0	**$0.0031**	**$0.0031**		$0
	Total			**0**	**10**			**1**	**10**
	Averages							**Obs.**	**Value**
A	All (Explicit and Implicit) ICCs							21	$0.0062

was negligible and, consequently, ECTEL set the same value of both the IFTR and FTR at the higher of the two cost amounts by country or effectively at the higher average rate of USD$0.0028.

[32] Note that there is an additional residual difference of USD$0.0001 between the IFTR and the FTR in Jamaica, excluding consideration of the explicit FICC of USD$0.0062, which is included for completeness in Table 4, but not used for benchmarking average calculation purposes.

[33] Further, the Authority notes that the recommended ICC end-point of $0.0065 is 54% lower than the USD$0.0142 ICC cost estimate calculated by the Authority in 2010 (see footnote 24). This difference is similar, though not as pronounced, as the decline in the all sample MTR and FTR benchmark averages over the last 10 years of 75% and 64%, respectively, as discussed in Section 3.6. Further, ECTEL's recent 2018 LRIC+ based ICC cost estimate of USD$0.0005 suggest that, if anything, the recommended ICC of USD$0.0065 is likely still well above cost. See also footnote 27.

B	Non Zero-Rated, Implicit and Explicit ICCs, excluding Outlier	3	$0.0068
	Recommended ICC Costing Benchmark		**$0.0065**

*Note: * The implicit ICC in this case a residual difference between the Jamaican IFTR and FTR, excluding consideration of the explicit ICC and it is not used for the calculation of benchmarking averages A or B.*

5.4. Summary of Recommended ICC Benchmarks

As with the recommended costing benchmarks for the domestic MTR and FTR, the Authority considers that the recommended ICC costing benchmarks should also be phased in over three years, in three roughly equal steps. Table 5 provides a summary of the Authority's updated recommended MICC and FICC and, by extension, IMTR and IFTR costing benchmarks. The Authority notes that in this transition period the MICC and FICC have different values, but that by the end-point MICC and FICC converge to the same value, as discussed above.

Table 5. Updated MICC/FICC and IMTR/IFTR Recommended Costing Benchmarks

Interconnection Rates	**Currency***	**Recommended Costing Benchmarks**		
		April 2021 to March 2022	**April 2022 to March 2023**	**April 2023 to March 2024**
MICC	TTD	0.321	0.180	0.043
	USD	**0.0480**	**0.0270**	**0.0065**
FICC	TTD	0.090	0.063	0.043
	USD	**0.0135**	**0.0095**	**0.0065**
IMTR = MTR + MICC	TTD	0.521	0.314	0.106
	USD	**0.0780**	**0.0470**	**0.0160**
IFTR = FTR + FICC	TTD	0.127	0.090	0.061
	USD	**0.0190**	**0.0135**	**0.0092**

*Note: * The recommended costing benchmarks were calculated and determined in USD. The TTD equivalent values in this table is provided for "illustrative purposes" only and is based on the weighted average historical USD/TTD exchange rate used for benchmarking analysis (0.1497), as described in Section 3.4. The USD/TTD exchange rate may be different at the date of publication of this report and over the course of the three-year glide-path period. If so, at the start of each of the three glide-path years, interconnection rates could be restated in TTD, based on the TTD/USD exchange rate at that time.*

Figure 6 gives a summary of the Authority's updated recommended MICC and FICC benchmarks in comparison with the recommendations set out in the Initial and Revised Reports. It is noteworthy that the current end-point for the unified MICC/FICC (USD$0.0065) is 28% below that of the simple average of the MICC and FICC from the Revised Report (USD$0.0090). This is comparable with the corresponding reductions in the recommended MTR and FTR of 53% and 40% from the previous Reports.

Figure 6. Updated MICC and FICC Recommended Costing Benchmarks

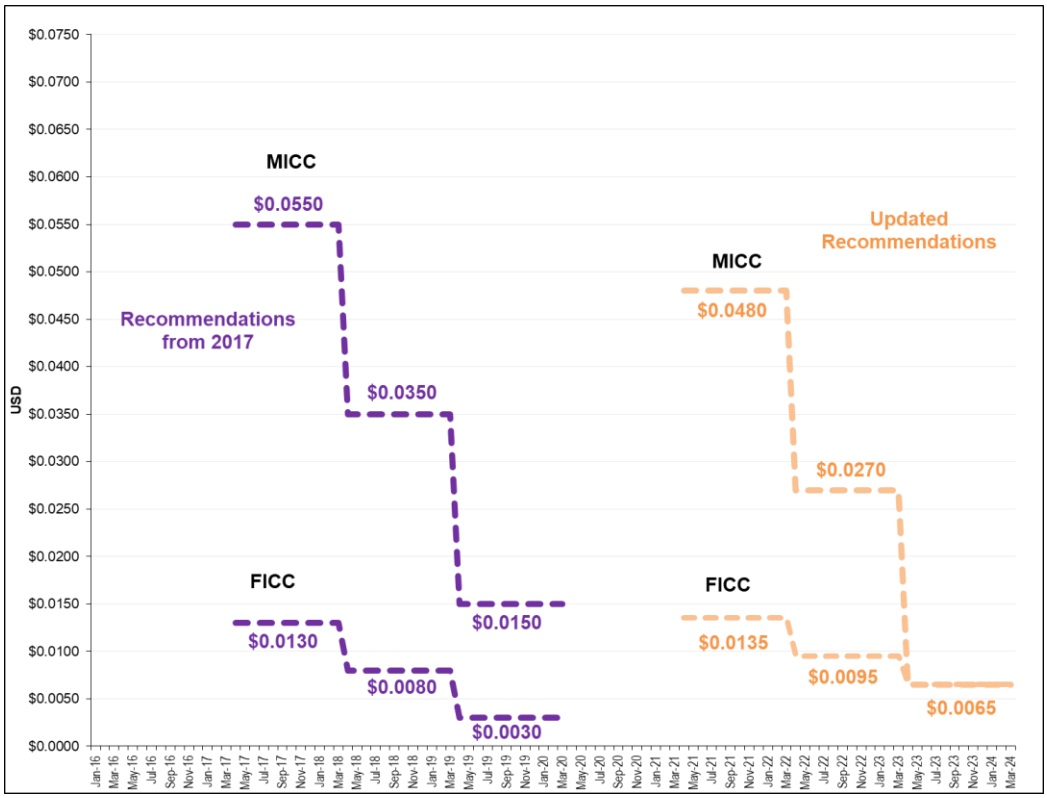
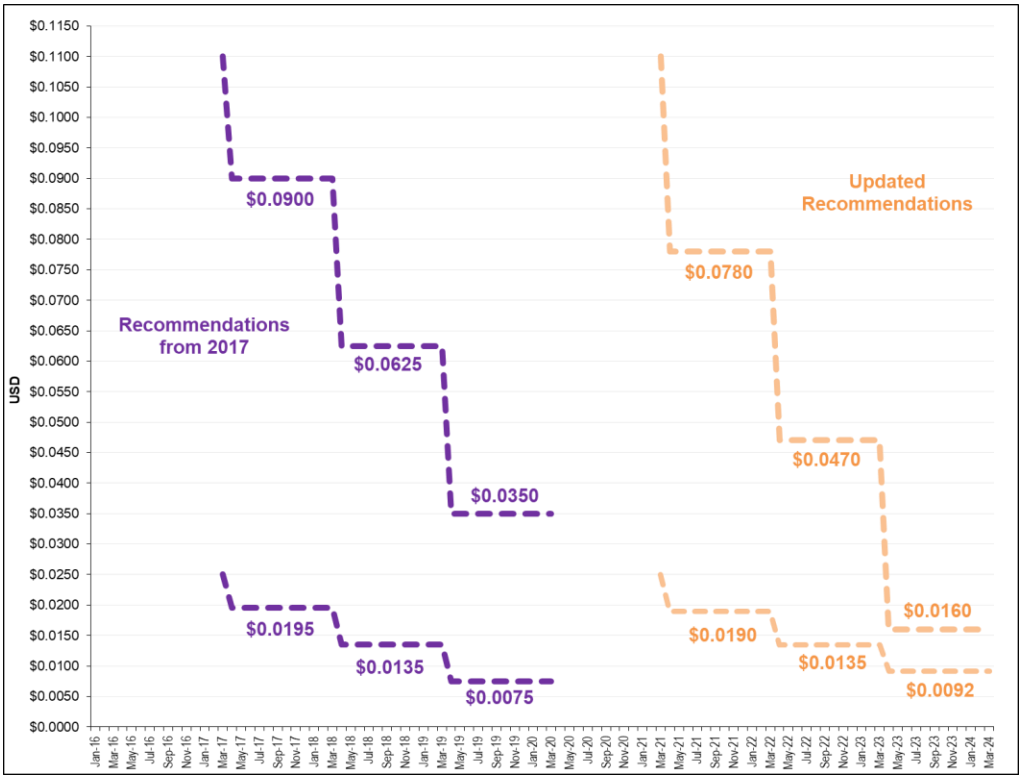


Figure 7 gives a summary of the Authority's updated recommended IMTR and IFTR benchmarks in comparison with the recommendations set out in the Initial and Revised Reports. Likewise, it is noteworthy that compared to the IMTR/IFTR in the Revised Report, the current end-points are 54% below and 22% above, respectively. The latter increase in the IFTR recommendation results from the unified end-value for the MICC and FICC.

Nevertheless, the previous IMTR and IFTR recommendations were not implemented and so a comparison with the currently-prevailing IMTR and IFTR of USD$0.1100 and USD$0.0250 is also appropriate and shows proposed reductions of 85% and 63%, respectively.

Figure 7. Updated IMTR and IFTR Recommended Costing Benchmarks



6. Supporting Analyses and Assessments

The Initial and Revised Reports include detailed normalisation and sensitivity analyses in support of the Authority's recommended MTR and FTR costing benchmarks included therein, as well as detailed assessments of the potential impacts on operators and consumers and the potential risks of reducing interconnection rates to more cost-based levels.

In the Authority's view, the results of the normalisation and sensitivity analyses and of the impact and risk assessments equally support the Authority's current recommended MTR and FTR costing benchmarks. To avoid unnecessary repetition, the applicable sections, and appendices of the two previous Reports are not repeated in this Updated 2021 Report[34]. Instead, a summary of the nature and scope of the analyses and assessments and their results is provided in this section.

6.1. Normalisation Analysis

The benchmarking sample selection criteria set out in section 3.1 are designed to select jurisdictions for benchmarking purposes that are suitably comparable to Trinidad and Tobago. Only other Caribbean island jurisdictions are included. A normalisation analysis was conducted in the previous Reports to assess whether any demographic, topographic, socio-economic and environmental factors between the selected benchmarking sample jurisdictions and Trinidad and Tobago may be significant enough to affect the MTR and FTR benchmarking results, i.e., potentially requiring a normalisation adjustment (either positive or negative) to the Authority's recommended MTR and FTR costing benchmarks.

For this analysis, the following 11 variables were considered:

a) population size
b) land area (square kilometres)
c) maximum elevation (metres)
d) population density (a/b)
e) income measured as GDP per capita (USD)
f) fixed subscribers
g) mobile subscribers
h) fixed density (f/a)
i) mobile density (g/a)
j) the number of mobile service providers
k) whether interconnection rates are set on a cost or some other basis

[34] Sections 6.2 and 6.3, and Appendix II of the Revised Report provide the most comprehensive set of normalisation and sensitivity analyses. See also sections 6.2 and 6.3, and Annex B of the Initial Report.

The results of the normalisation analysis included in the previous Reports showed that, for the most part, there is no strong basis for implementing a normalisation adjustment of any magnitude (whether positive or negative). Although in a couple of cases the analysis of the normalisation variables suggested that a downward adjustment to the MTR and FTR benchmark rates might be warranted, the Authority decided that no normalisation adjustment should be applied to the recommended MTR and FTR costing benchmarks included in the previous Reports. The Authority has decided to maintain this position for the current recommended MTR and FTR costing benchmarks set out in this Updated 2021 Report. Consequently, as in the case of the two earlier Reports, the Authority views the current recommended MTR and FTR costing benchmarks to be conservative in nature, since no downward adjustment was made despite such an adjustment being potentially warranted.

6.2. Sensitivity Analyses

Section 6.3 and Annex B of the Initial Report included a limited set of sensitivity analyses to assess the robustness of the MTR and FTR benchmarking results. In response to the Round 1 Comments, a number of additional sensitivity analyses were conducted and included in Section 6.2, Appendix II and Appendix IV of the Revised Report[35]. In total, the Revised Report includes six sets of sensitivity analyses for the domestic MTR and FTR benchmarking results, covering the following aspects of the benchmarking analysis:

1. Exchange rate assumptions used to translate interconnection rates into USD
2. The scope of the benchmarking sample (i.e., reliance on the full benchmarking sample rather than post-2012 and cost-based sub-samples, as described in the Initial Report)
3. Exclusion of outlier sample jurisdictions
4. The treatment of FWI as four rather than two sample jurisdictions
5. The exclusion of hybrid RPP/CPP jurisdictions (i.e., The Bahamas and Barbados)
6. The exclusion of projected first quarter 2017 MTRs and FTRs

As explained in the Revised Report and Round 1 DoRs, in relation to Sensitivity #2, the Authority found that reliance on the full benchmark sample did not provide a valid basis for developing the recommended costing benchmarks for either the MTR or FTR. Otherwise, in relation to the other five sensitivity analyses, it was found that they had no significant impact on the Authority's recommended costing benchmarks. As indicated in the Revised Report, the Authority concluded that the results of the sensitivity analyses supported the appropriateness and robustness of its

[35] The additional sensitivities are also discussed in detail in the Round 1 DoRs.

recommended costing benchmarks. The Authority maintains this view with respect to the current recommended MTR and FTR costing benchmarks set out in this Updated 2021 Report.

6.3. Impact on Operators and Consumers

Section 8 of the Initial and Revised Reports included detailed assessments of the potential impacts of reductions in the MTR and FTR to the recommended costing benchmarks on operators and consumers.

In the first instance, the Authority reviewed call traffic and interconnection revenue/payment data between operators and undertook an extensive impact analysis based on the assumed introduction of the recommended costing benchmarks. Due to the confidential nature of this data, this impact analysis was excluded from the Initial and Revised Reports. In general, reducing the relevant interconnection rates that held in March 2017 to the recommended costing benchmarks would have the effect of reducing all fixed and mobile domestic traffic interconnection payments and, correspondingly, revenues. In terms of net out- versus in-payments, some operators could be better off, while others may be worse off. More generally, the resultant benefit/loss of reducing the relevant interconnection rates to the recommended costing benchmarks for an individual operator would depend on relative call-traffic volume flows between operators for fixed and mobile call terminations, as applicable. On balance, the Authority is of the view that moving to cost-oriented rates would improve economic efficiency and better promote competition between operators.

In the second instance, the Authority considered that reducing interconnection rates to the recommended costing benchmarks should, in principle, bring about a number of positive benefits to consumers, including:

i) lower on- and off-net retail call prices
ii) increased usage of mobile and fixed services by end users
iii) increased take-up of both fixed and mobile wireless services

Additionally, the Authority is of the view that reductions in MICC and FICC, and the IMTR and IFTR to more cost-oriented levels should also, in principle, lead to reductions in international retail call prices. While the link between international interconnection rate reductions and retail international call prices is less direct compared to retail domestic call prices, reducing the MICC and FICC and IMTR and IFTR to the recommended costing benchmarks should lead to greater competition for international traffic carriage in and out of Trinidad and Tobago. This, in turn, could put downward pressure on inter-carrier settlement rates and, ultimately, retail international call prices, which would benefit consumers and, potentially, operators as a result of increased international call volumes.

Supporting empirical evidence for the Authority's views in all of the above-noted respects is provided in the Initial Report (Section 8 and Annex C) as well as in the Revised Report (Sections 8.1 and 8.2 and Appendices III and IV).

The Authority maintains the view that moving to the current recommended costing benchmarks would improve economic efficiency and better promote competition between operators and bring about a number of positive benefits to consumers.

6.4. Risk Assessment

The Authority also considered the risks related to not implementing the recommended costing benchmarks in terms of the costs and benefits.

Several potential negative impacts could be expected if the recommended costing benchmarks are not implemented. Leaving interconnection rates at current levels would allow operators to continue charging above-cost rates for interconnection services. This implies that operators with net in-payments would be allowed to continue profiting from excessive rates, while those with net out-payments would continue incurring excessive interconnection costs. The combined effect would allow interconnection pricing inefficiencies to remain in place, which would potentially inflate retail prices and/or bar market entry/expansion and, as a result, negatively impact consumer usage of retail call services.

With respect to the impact on consumers, above-cost call-termination service pricing very likely results in higher-than-otherwise retail call prices, since retail prices reflect operators' underlying costs, which include call termination costs. As a consequence, consumers are potentially harmed by excessive retail prices, which have the compounded effect of suppressing consumer demand in terms of usage as well as subscription levels. More specifically, allowing above-cost call-termination rates to remain in place also distorts competition in the retail market by serving to promote higher-than-otherwise retail calling prices.

There is a very high risk that not reducing the relevant interconnection rates to the recommended costing benchmarks would serve to sustain existing network interconnection pricing inefficiencies, harm consumers through higher-than-necessary retail prices, and distort market competition. The Authority, therefore, considers that these risks would be significantly mitigated by the implementation of the current recommended costing benchmarks set out in this Updated 2021 Report.

7. Conclusion

This 2021 Report updates the benchmarking analysis included in the Initial and Revised Reports and, accordingly, sets out the rationale and results for the Authority's current recommended costing benchmarks for the MTR and FTR, the MICC and FICC, and the IMTR and IFTR, in fulfilment of regulation 15(2) of the Interconnection Regulations.

The results of the updated benchmarking analysis summarised herein indicate that the current MTR and FTR, the MICC and FICC, and the IMTR and IFTR are high, and that the implementation of the Authority's recommended costing benchmarks would bring about a reduction in those charges to more reasonable and appropriate cost-based levels.

The Authority considers that implementing the recommended costing benchmarks will result in lower retail call prices and yield significant consumer benefits in Trinidad and Tobago.

It is also important to recognise that lowering interconnection rates over time to ensure they reflect costs as closely as possible is an interconnection policy objective pursued by virtually all NRAs, including the Authority. Evidence from the Caribbean region and elsewhere (e.g., Europe) testifies to this fact. Consequently, the Authority is in step with international regulatory practice with respect to its recommended costing benchmarks.

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Appendix I: Round 2 Decisions on Recommendations

Appendix II: Round 1 Decisions on Recommendations

The Authority notes that Round 1 DoRs are included in this Appendix for ease of cross-reference purposes when reading the Round 2 DoRs.